

YOLO COUNTY HOUSING

EL RIO VILLA HOUSING COMPLEX

SEWER SYSTEM MANAGEMENT PLAN (SSMP)

October 2020

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TECHNICAL REPORT CERTIFICATION

This technical report, which is required under Waste Discharge Requirements Order No. R5-2-2-0136 adopted by the California Regional Water Quality Control Board, Central Valley Region and Order No. 2006-0003-DWQ adopted by the State Water Resources Control Board, was prepared for Yolo County Housing by Nolte Associates, Inc. The report is based on information provided by the client that is believed to be reliable and was prepared in accordance with accepted engineering practices. No other warranty is implied or intended.

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**YOLO COUNTY HOUSING
EL RIO VILLA HOUSING COMPLEX
SEWER SYSTEM MANAGEMENT PLAN**

October 2020

1 INTRODUCTION

This document is the Sewer System Management Plan (SSMP), for the El Rio Villa Public Housing Complex (Housing Complex) located at 62 Shams Way in Winters, California. The Housing Complex is owned and operated by Yolo County Housing (YCH). This document describes the activities that YCH uses to manage its wastewater collection system effectively. The development of this SSMP was required when the State Water Resources Control Board (SWRCB) adopted the Statewide General Waste Discharge Requirement (GWDR) on May 2, 2006. The GWDR established requirements for operating, maintaining and managing wastewater collection systems. The GWDR applies to all public collection system agencies in California that own or operate collection systems comprised of more than one mile of pipe or sewer lines, which convey untreated wastewater to a publicly owned treatment facility, and requires each agency to prepare an SSMP.

Effective management of a wastewater collection system as defined in the GWDR includes:

1. Maintaining or improving the condition of the collection system infrastructure in order to provide reliable service into the future.
2. Cost-effectively minimizing infiltration/inflow (I/I) and providing adequate sewer capacity to accommodate design storm flows; and
3. Minimizing the number and impact of sanitary sewer overflows (SSOs) that occur.

In order to achieve the above goals each wastewater collection system agency is required to develop and implement an SSMP.

This document contains the required SSMP elements, as outlined in the Statewide GWDR. The required elements of an SSMP are as follow:

1. **GOALS:** Collection system management goals
2. **ORGANIZATION:** Organization of personnel, including the chain of command and communications
3. **LEGAL AUTHORITY:** Legal authority for permitting flows into the system, inflow/infiltration control as well as enforcement of proper design, installation, and testing standards, and inspection requirements for new and rehabilitated sewers

4. OPERATION AND MAINTENANCE PROGRAM: Operations and maintenance activities to maintain the wastewater collection system
5. DESIGN AND PERFORMANCE PROVISIONS
6. OVERFLOW EMERGENCY RESPONSE PLAN
7. FATS, OILS, AND GREASE (FOG) CONTROL PROGRAM
8. SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN
9. MONITORING, MEASUREMENT, AND PROGRAM MODIFICATIONS: Monitoring, measurement, and modifications plan for SSMP program effectiveness
10. SSMP PROGRAM AUDITS: Periodic internal SSMP audits
11. COMMUNICATION PROGRAM

This document follows the order required in GWDR. This introductory section has been added to introduce the need for the SSMP.

While not listed in the required SSMP elements, the first requirement of the GWDR is to develop a plan and schedule for completing the requirements of the GWDR. The schedule must take into account the size of the agency's sewage collection system since due dates are based on the population served. The plan and schedule should note those milestones and the persons responsible for completing them. The SSMP development plan and schedule is presented in Table 1.

Each section begins by listing the specific minimum SSMP requirements. Where there may be required sub-elements, the minimum SSMP requirements are included where the material covers that sub-element.

1.1 Service Area and Sewer System

YCH owns and operates a wastewater collection system at the El Rio Villa Housing Complex, located approximately 1 mile southeast of Winters, California. The housing complex's wastewater collection system contains approximately 4,640 feet (0.9 mile) of gravity collection system that drains into a pump station at the housing complex. A schematic of the onsite collection system is provided in Figure 1-1. Wastewater is then conveyed through a 9,100-foot (1.7 mile) force main, connecting to the City of Winters' (City) collection system near the intersection of East Grant Street (CA-128) and East Street. The force main route is provided in Figure 1-2. The wastewater is treated at the Winters wastewater treatment plant located approximately 2.5 miles northwest of the City.

The total length of the El Rio Villa Housing Complex collection system is approximately 13,740 feet (2.6 miles). The collection system therefore must comply with the WDRs and a SSMP must be prepared for the housing complex.

**TABLE 1-1
SSMP DEVELOPMENT PLAN AND SCHEDULE**

Main Task/Sub Task	Comments	Due Date	Status	Responsible Party
Application for coverage	Submit Notice of Intent (NOI) to the state identifying the agency's authorized representative including required permit fee.	11/1/2006	Complete	Mr. Ichtertz
SSO Electronic Reporting	Agency must report all SSOs to the statewide SSO database via the Internet.	11/1/2006	Complete	Mr. Ichtertz
SSMP Development Plan and Schedule	Initial plan on how the agency intends of developing and implementing their SSMP.	5/1/2008	Complete	Mr. Ichtertz
Element 1: Goals	Stated goals for the SSMP.	5/1/2008	Complete	Mr. Ichtertz
Element 2: Organization	Names and staff positions responsible for developing and implementing the SSMP including the chain of communications for reporting SSOs.	5/1/2008	Complete	Mr. Ichtertz
Element 3: Legal Authority	Agency's legal authority to operate and maintain its sewage collection system.	2/1/2010	Waived	Mr. Ichtertz
Element 4: Operation and Maintenance Program			Complete	
Mapping	Up to date mapping of the sewage collection system facilities including appropriate storm water systems.	2/1/2010		Mr. Ichtertz
Preventive Maintenance Program	Written description of the preventative maintenance activities the agency employs.	2/1/2010		Mr. Ichtertz
Rehabilitation and Replacement	Short and long term plan for the	2/1/2010		Mr. Ichtertz

**TABLE 1-1
SSMP DEVELOPMENT PLAN AND SCHEDULE**

Main Task/Sub Task	Comments	Due Date	Status	Responsible Party
Program	rehabilitation or replacement due to system deficiencies including funding (CIP).			
Inspection Program	Program for the regular visual and CCTV inspection of the system.	2/1/2010		Mr. Ichtertz
Staff training	Staff O&M training and assurance that contractors are adequately trained.	2/1/2010		Mr. Ichtertz
Equipment and Parts Inventory	Equipment and parts inventory including the identification of critical replacement parts.	2/1/2010		Mr. Ichtertz
Element 5: Design and Performance Provisions				
Design standards	Design standards for new and rehabilitated systems.	8/1/2010	Complete Design standards in place	Mr. Ichtertz
Inspection and testing standards	Inspection and testing standards for new and rehabilitated systems.	8/1/2010	Standards in place	Mr. Ichtertz
Element 6: Overflow Emergency Response Plan				
Element 7: FOG Control Program				
FOG Ordinance	Written procedures defining how the agency responds to SSOs.	2/1/2010	Complete	Mr. Ichtertz
FOG Program	Legal authority to prevent the discharge of FOG into the system. Program to reduce or eliminate FOG related SSOs.	2/1/2010	Complete	Mr. Ichtertz
Element 8: System Evaluation and Capacity Assurance Plan				
	Evaluate those portions of the system that are experiencing capacity related overflow. Establish steps to eliminate	8/1/2010	Waived	Mr. Ichtertz

**TABLE 1-1
SSMP DEVELOPMENT PLAN AND SCHEDULE**

Main Task/Sub Task	Comments	Due Date	Status	Responsible Party
	capacity related overflows including I&I capacity issues.			
Element 9: Monitoring, Measurements, and Program Modifications		8/1/2010	Waived	Mr. Ichtertz
Element 10: Program Audits		8/1/2010	Waived	Mr. Ichtertz
Element 11: Communication Program		8/1/2010	Waived	Mr. Ichtertz
Final SSMP	Final SSMP document after all elements have been developed and implemented.	8/1/2010	Complete	Mr. Ichtertz



LEGEND:

- SS — SANITARY SEWER MAIN
- SSFM — FORCE MAIN

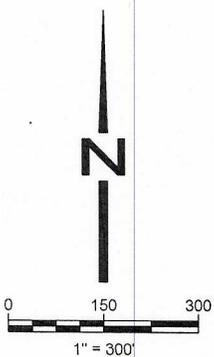
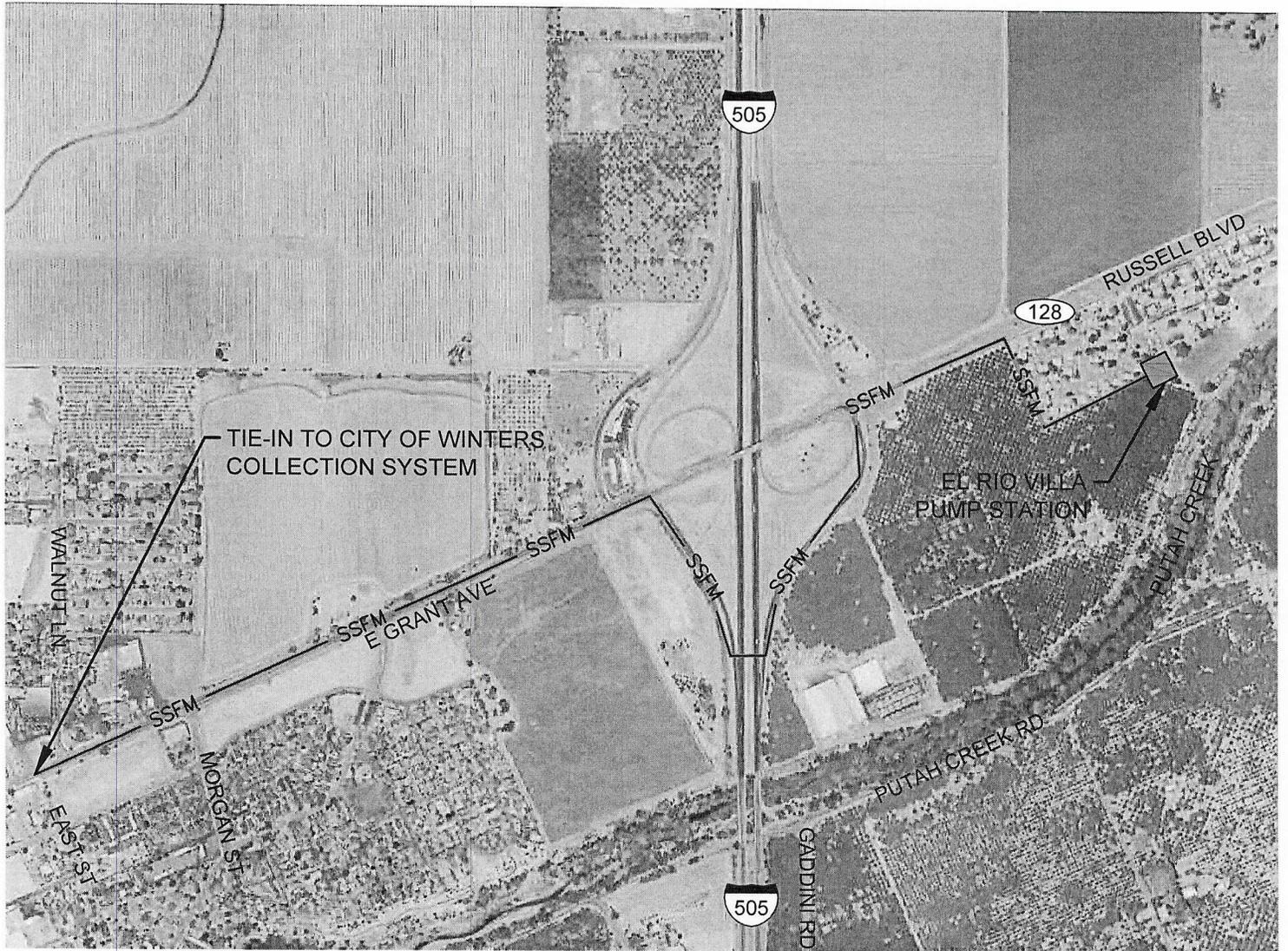


FIGURE 1-1
 EL RIO VILLA
 PUBLIC HOUSING COMPLEX
 SANITARY SEWER
 MANAGEMENT PLAN
 SEWER SYSTEM





LEGEND:

— SSFM — FORCE MAIN

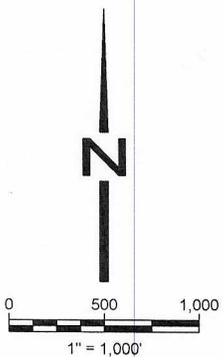
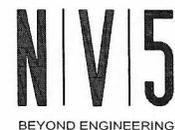


FIGURE 1-2
 EL RIO VILLA
 PUBLIC HOUSING COMPLEX
 SANITARY SEWER
 MANAGEMENT PLAN
SEWER FORCE MAIN



2 GOALS

This Sewer System Management Plan (SSMP) has been prepared to meet the requirements adopted by the State Water Resources Control Board (SWRCB) on May 2, 2006 and the amended Monitoring and Reporting Program adopted on February 20, 2013.

2.1 Regulatory Requirement

The goal of the SSMP is to provide a plan and schedule to properly manage, operate, and maintain all parts of the sanitary sewer system. This will help reduce and prevent SSOs, as well as mitigate any SSOs that occur.

2.2 SSMP Goals

YCH has developed the following goals to properly manage, operate and maintain its sewer system:

1. To properly manage, operate, and maintain all portions of the housing complex's sewer system
2. To minimize the frequency and magnitude of SSOs.
3. To prevent public health hazards.
4. To meet all applicable regulatory notification, monitoring and reporting requirements.
5. To protect the housing complex's investment in its collection systems by performing preventive maintenance and extending their useful life.
6. To prevent damage to public and private property that could result from SSOs.
7. To use funds available for sewer operations in the most efficient manner.
8. To convey wastewater to treatment facility with a minimum of infiltration, inflow, and exfiltration.
9. To provide adequate capacity to convey peak wastewater flows.
10. To perform all operations in a safe manner to avoid personal injury and property damage.

This SSMP will contribute to the proper management of the collection system and assist YCH in minimizing the frequency and impacts of SSOs by providing guidance for appropriate maintenance, capacity management, and emergency response.

3 ORGANIZATION

The intent of this section of the SSMP is to identify Agency Staff who are responsible for implementing this SSMP, responding to SSO events, and meeting the SSO reporting requirements. This section also includes the designation of the Authorized Representative to meet SWRCB requirements for completing and certifying spill reports.

3.1 Regulatory Requirement

The SSMP must identify:

1. The name of the agency's responsible or authorized representative responsible for implementing, managing, and updating the SSMP,
2. The names and telephone numbers for management, administrative, and maintenance positions for implementing specific measures in the SSMP program. The SSMP must identify lines of authority through an organization chart or similar document with a narrative explanation, and
3. The chain of communication for reporting SSOs, from receipt of a complaint or other information, including the person responsible for reporting SSOs to the State and Regional Water Board and other agencies if applicable (such as County Health Officer, County Environmental Health Agency, Regional Water Board, and/or State Office of Emergency Services (OES)).

3.2 Organization Charts

An organizational chart showing the management, administrative, and maintenance positions for implementing specific measures in the SSMP program and lines of authority is presented in Figure 2-1. A complete organizational chart for YCH is attached in Appendix A.

YCH Organizational Chart - May 1, 2019

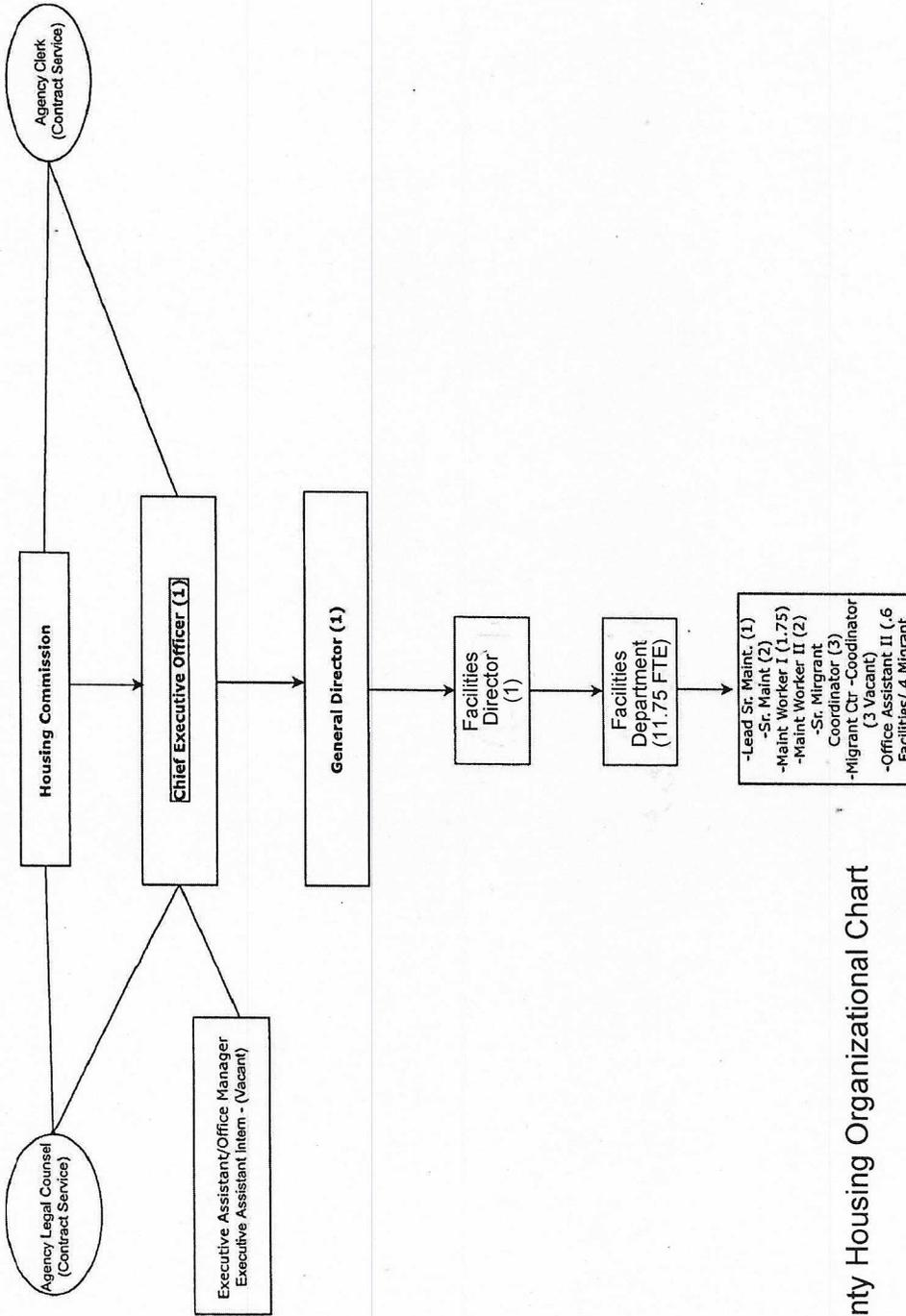


Figure 2-1 Yolo County Housing Organizational Chart

Departments - 2; Current paid Staff = 39.25 FTE (44 Staff)

Housing Services = 19.5FTE (24 staff)

Facilities = 11.75FTE (12 staff)

Finance = 5FTE (5 staff)

Department Directors = 2FTE

Executive = 1 Chief Executive Director, 1 Executive Assistant/Office Manager, Contract Legal Counsel & Agency Clerk

Total vacant unfunded existing positions = 6.25: .25 Maintenance Worker I, 3 Migrant Center Coordinators,

1 Executive Assistant/Office Manager; 1 Executive Assistant Intern, 1 IT/IS Administrator,

3.3 Authorized Representative

The Agency's Authorized Representative in all sewer system matters is:

Fred Ichtertz
Facilities Director
Yolo County Housing
147 W. Main Street
Woodland, CA 95695

Mr. Ichtertz is authorized to submit verbal, electronic, and written spill reports to the RWQCB, SWRCB, County Health Agency, and OES. Mr. Ichtertz is also authorized to certify electronic spill reports submitted to the SWRCB.

3.4 Names, Phone Numbers, and Lines of Authority

Name and telephone numbers for key management, administrative, and maintenance positions for implementing specific measures in the SSMP program are as follow:

<u>Position</u>	<u>Name</u>	<u>Telephone Number</u>
Chief Executive Officer	Sandra Sigrist	(530) 662-5428
Facilities Director	Fred Ichtertz	(530) 669-2240
Lead Maintenance Worker	Randy Perry	(530) 662-5428 (Office) (530) 530-207-7975 (Cell)

3.5 Description of General Responsibilities

Description of general responsibilities for staff responsible for management, administrative and maintenance positions responsible for implementing specific measures in the SSMP program are provided in this section.

Chief Executive Officer – This is a position appointed by the Board of Commissioners responsible for implementing policy and for planning, organizing, directing and controlling the activities and operations of YCH including public safety, community development, finance, public works and administration; to develop policy recommendations for Board of Commissioners action; and to provide highly responsible and complex administrative support to the Board of Commissioners.

Facilities Director – Plans, organizes, directs and reviews the activities and operations of the Housing Complex's sewer collection, water production and distribution systems, and conservation efforts. Provide highly responsible and complex administrative support to the Executive Director. Manages field operations and maintenance activities, provides relevant

information to agency management, prepares and implements contingency plans, leads emergency response, investigates and reports SSOs, and trains field crews.

Lead Maintenance Worker – Organizes, monitors and supervises assigned functions including the sewer system (the wastewater treatment facility is maintained and operated by the City of Winters). Performs a variety of technical tasks relative to the sewer operations. Provides technical assistance to the Facilities Administrator. Perform preventive maintenance activities, mobilize and respond to notification of stoppages and SSOs (mobilize sewer cleaning equipment, by-pass pumping equipment, and portable generators).

3.6 SSO Reporting Chain of Communication

The reporting chain of communication within YCH for reporting SSOs is combined with that of the City of Winters. Officials receiving immediate notification of the SSO vary depending on the size of the spill and whether or not the spill contains hazardous materials, affects surface waters, or has the potential to impact human health. Table 2-1 lists these officials, and the circumstances under which they are notified immediately.

**TABLE 2-1
OFFICIALS RECEIVING IMMEDIATE NOTIFICATION OF SSO**

Contact	Circumstance for Immediate Notification
Lead Maintenance Worker	All spills.
Facilities Director	All spills.
Chief Executive Officer	Major spills, or those affecting surface water or human health.
Winters Fire Department	Spills involving hazardous materials.
Yolo County Department of Environmental Health	Spills that may impact human health.
State Office of Emergency Services	Major spills (greater than 1,000 gallons), or those affecting surface water or human health.
Regional Water Quality Control Board	Major spills (greater than 1,000 gallons), or those affecting surface water or human health (within 24 hours).

SSO Management & Reporting – Wastewater Contractor (WWC)

The City of Winters’ WWC (currently Southwest Water Company) reports all sanitary sewer overflow (SSO) incidents to the City’s Public Works Environmental Services Manager (ESM), who then reports it to the YCH facilities administrator. The WWC shall be responsible for

managing the SSO response, investigating the cause, and reporting the SSO to the appropriate parties. As related to this SSMP, the WWC's role is as follows:

- Manage field operations and maintenance activities
- Provide relevant information to ESM
- Lead emergency response/respond to stoppages and SSOs
- Work with ESM to report SSOs to the State
- Train field crews
- Work with PWD to implement collections system capital improvement programs
- Perform preventative maintenance activities
- Report equipment needs to ESM

SSO Response

The On Call Staff sewer staff member (WWC staff member) shall be the highest level sewer staff member on duty at the time of spill discovery and reporting. The On Call Staff shall be responsible for immediately notifying the local WWC manager and the ESM of SSOs. On Call Staff shall take any means necessary to safely contain and redirect overflows to minimize negative impacts. All actions taken by On Call Staff shall be in accordance with prior spill response training, instruction, and individual assessment of the situation. The person acting as On Call Staff may transition to another sewer staff member during an emergency as directed by the WWC manager or ESM.

Chain of Communication for SSO Report

To facilitate consistent reporting procedures for the public, the City's Department of Public Works has implemented a one-stop call center. Emergency sewer calls, including SSOs are directly dispatched to the sewer maintenance crew during all business hours. As backup, the City's Police Department is available to locate WWC or City staff members to ensure prompt response.

The WWC has a process for receiving, responding to and reporting SSOs. The On Call Staff member is responsible for directing crew through the entire SSO event from response, to mitigation, cause removal and clean-up. The On Call Staff member is also responsible for ensuring photographs are taken and all necessary paperwork is completed in full. After the event, the On Call Staff member is responsible for communicating the details of the event to the WWC Manager or the ESM.

The WWC Manager is responsible for timely reporting of the incident to the appropriate agencies, as well developing a plan to increase or change preventative maintenance activities to prevent future spills.

- The WWC customer service phone line (530) 795-4660 is staffed 24 hours per day, seven days per week. As a backup, the Police Department will contact the appropriate WWC or City staff members. Police emergency dispatch is 911 and the main (non-emergency) line is (530) 795-4561.

- Once a report of an SSO is received (or internal staff witness an SSO), the On Call Staff member is contacted immediately via cell phone. If the spill is a Category (i) SSO (see terms and definitions), the On Call Staff contacts the WWC Manager and Public Works ESM immediately.
- On Call Staff will dispatch additional personnel and/or pump equipment contractor if necessary for assistance with mitigation, blockage clearing and clean-up. Yolo County Environmental Health Dept. is notified as necessary for water samples.
- On Call Staff takes photographs and completes SSO reporting forms.
- WWC Manager then contacts appropriate agencies, completes appropriate forms, and compiles all information and photos into SSO logs.
- ESM/YCH submits online reports.
- On Call Staff reviews information with the WWC Manager, ESM, and YCH and a plan is developed for preventative maintenance activities at the spill location as necessary.
- Copies of SSO logs are shared with office staff for input and training.

4 LEGAL AUTHORITY

The intent of this section of the SSMP is to summarize the legal authority of the agency to regulate the design, construction, and operation of the wastewater collection system. Legal authority refers to powers granted to the wastewater collection system agency to provide services to the public, typically through sewer use ordinances, service agreements, and other mechanisms. Using this legal authority, the wastewater collection system agency can require system users to meet performance standards, maintain user-owned elements of the system, and pay penalties for non-compliance.

Without adequate legal authority to own and operate a public sewer system, an agency will not be able to effectively operate that system, insure new sewers are constructed adequately, solve operation and maintenance problems, interact with the public and developers, and reduce sewer system overflows.

4.1 Regulatory Requirement

Each Enrollee must demonstrate, through sanitary sewer system use ordinances, service agreements, or other legally binding procedures, that it possesses the necessary legal authority to:

1. Prevent illicit discharges into its sanitary sewer system, including I/I from satellite wastewater collection systems and laterals, stormwater, unauthorized debris, etc.
2. Require proper design and construction of sewers and connections
3. Ensure access for maintenance, inspection and repairs to publicly owned portions of laterals
4. Limit the discharge of FOG and other debris that may cause blockages
5. Enforce violations of its sewer ordinances

4.2 YCH Legal Authority

This section is waived as the Housing Complex sewer system serves a population of less than 10,000.

5 OPERATIONS AND MAINTENANCE PROGRAM

This section of the SSMP discusses YCH's operations, maintenance and other related measures and activities. This section fulfills the Operation and Maintenance Program SSMP requirement for the SWRCB.

5.1 Regulatory Requirement

The SSMP must include those elements listed below that are appropriate and applicable to the Enrollee's system:

1. Maintain an up-to-date map of the sanitary sewer system, showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, and applicable stormwater conveyance facilities;
2. Describe routine preventive operation and maintenance activities by staff and contractors, including a system for scheduling regular maintenance and cleaning of the sanitary sewer system with more frequent cleaning and maintenance targeted at known problem areas. The Preventative Maintenance (PM) program should have a system to document scheduled and conducted activities, such as work orders;
3. Develop a rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan that addresses proper management and protection of the infrastructure assets. The plan shall include a time schedule for implementing the short- and long-term plans plus a schedule for developing the funds needed for the capital improvement plan;
4. Provide training on a regular basis for staff in sanitary sewer system operations and maintenance, and require contractors to be appropriately trained; and
5. Provide equipment and replacement part inventories, including identification of critical replacement parts.

5.2 Sewer System Map

A map showing the Housing Complex sewer system is presented in Figure 1-1 in the Introduction section of this SSMP.

5.3 El Rio Villa Housing Complex Preventive Operation and Maintenance Program

Operation and maintenance of the Housing Complex's lift station and force main is performed by the City of Winters (City) as part of the City's Operation and Maintenance Program described below. A copy of the Memorandum of Understanding between the City of Winters and the Housing Authority of the County of Yolo for Sewer Services is provided in Appendix B.

The Operation and Maintenance Plan includes the following elements:

- Sanitary sewer system description including sewer mains, manholes, and lift station;
- Inspection/testing procedures and schedules for each system element
- Sanitary sewer system repair plan
- Sanitary sewer capacity assessment and replacement/expansion plan

Sanitary Sewer System Description

The Housing Complex sewer system collects wastewater from 124 housing units. Figure 1-1 in the Introduction Section of the SSMP shows the sewer line alignments and the location of the El Rio Villa lift station.

Currently, wastewater flows from the Housing Complex are conveyed by the El Rio Villa lift station to the East Street (Main) Pump Station. The Main Pumping Station owned and operated by the City of Winters, in turn, pumps all flow to the Wastewater Treatment Facility through a 14-inch force main.

Sewer System Maintenance Procedures and Schedules

Sewer Lines and Manholes: Inspection and preventative maintenance activities for sewer lines and manholes and the frequencies at which the activities are scheduled to be conducted are summarized in Table 4-1.

**TABLE 4-1
SEWER LINES AND MANHOLES INSPECTION AND MAINTENANCE ACTIVITIES**

System Component	Inspection/Maintenance Activity	Frequency
Manholes	Inspect for function, debris, and structural damage	Once per year
Manholes	Inspect (drive-by) for stormwater inflow or SSO	During heavy rainfall events
Manholes and connection sewers	Inspect for debris accumulation and line blockage	Following complaints regarding odors or reports of vandalism
All sewer lines	Inspect for: <ul style="list-style-type: none"> - Condition of the line - Debris accumulation - Signs of illegal dumping - Signs of vandalism - Signs of illegal discharges Clean by flushing and vacuum	Once per 2 years
All affected sewer lines	Clean by flushing and vacuum	Following SSO, vandalism, or odors
All sewer lines	Inspect by video	Once per 5 years

Records regarding inspection and maintenance activities related to sewer lines and manholes are maintained by the sewer system maintenance contractor and are reported to the City monthly.

Records include the following information:

- Date of cleaning.
- Condition of the lines cleaned, including a description of any debris found in the line.
- Any comments or recommendations regarding extra-ordinary maintenance required on the line or manholes.

Sewage Lift Station: Daily inspection and preventive maintenance activities for the El Rio Villa lift station and the frequencies at which the activities are scheduled to be conducted include the following:

1. Check run time on pumps for excessive operation
2. Visually inspect guide rails for pump
3. Clean 3B4 pump micro filters on booster pumps

4. Clean 3B4 pumps- 2 squirts daily
5. Clean up any debris on premises
6. Clean floats and inspect for cracks, holes, etc
7. Grease hoist for pulling pumps
8. Wash down well
9. Clean any debris from dry well and remove cobwebs
10. Exercise and grease all check valves in dry well.

Records regarding inspection and maintenance activities related to the sewage lift station are maintained by the City and its sewer system maintenance contractor. Sample inspection forms to document activities are included in Appendix C of this document.

Sewer System Repair Plan

The sewer system inspection program is intended to identify system components in need of repair. Based on inspection reports, the City Department of Public Works or YCH staff will assess the need for repairs and determine if the need is immediate or if the repairs can be scheduled as part of routine maintenance activities or capital improvement projects. Depending on the nature and extent of required repairs, immediate repairs will be performed by the City's sewer maintenance contractor or City forces. Extensive repairs that are not needed immediately will be placed on YCH's Capital Improvement Project (CIP) list. YCH will assign a priority to the repair project on the CIP list based on the relative urgency of the need to complete the repair.

Sewer System Capacity Assessment and Replacement/Expansion Plan

The City has performed a comprehensive assessment of the capacity of the system to convey base flow and peak flows under existing conditions and under proposed development plans to the year 2010. This assessment is documented in the *City of Winters Sewer Collection System Master Plan, September 2006* prepared by RMC Consulting Engineers. The Master Plan also recommends capital improvement projects to correct potential conveyance and pumping capacity deficiencies under existing and future conditions. The City is currently implementing the Sewer Master Plan recommendations.

6 DESIGN AND PERFORMANCE PROVISIONS

The intent of this section of the SSMP is to summarize YCH's sewer system design, inspection, and construction requirements for constructing new sewer components including the sewer pipelines, manholes, and pumping stations or for rehabilitating or replacing existing manholes or pipelines.

6.1 Regulatory Requirement

The SSMP must identify:

1. Design and construction standards and specifications for the installation of new sanitary sewer systems, pump stations and other appurtenances; and for the rehabilitation and repair of existing sanitary sewer systems; and
2. Procedures and standards for inspecting and testing the installation of new sewers, pumps, and other appurtenances and for rehabilitation and repair projects

6.2 El Rio Villa Housing Complex Design and Performance Provisions

YCH uses the Yolo County Design and Construction Standards, including sections for the sewer system, pump station and other appurtenances, and for the rehabilitation and repair of existing sanitary sewer systems. The Yolo County standards were updated in 2008. The County Standards include testing and inspection procedures for sewer projects.

A copy of the Table of Contents for the Improvement Standards is attached as Appendix D.

Also attached as Appendix E are copies of the following standard drawings:

- Drawing 7-1, Sheet 1: Standard 48" Sewer Manhole
- Drawing 7-1, Sheet 2: Manhole Base, Camera Channel Detail 1
- Drawing 7-1, Sheet 3: Manhole Base, Camera Channel Detail 2
- Drawing 7-2, Sheet 1: Standard 60" Sewer Manhole (Type A)
- Drawing 7-2, Sheet 2: Standard 60" Sewer Manhole (Type B)
- Drawing 7-3, Sheet 1: Grey Iron Standard 24" Manhole Frame and Cover
- Drawing 7-4, Sheet 1: Sewer Pipe Bedding and Initial Backfill
- Drawing 7-5, Sheet 1: Sewer Services
- Drawing 7-5, Sheet 2: Service Cleanout to Grade
- Drawing 7-5, Sheet 3: Service Cleanout to Grade Backfill Requirements
- Drawing 7-6, Sheet 1: Flushing Branch

- Drawing 7-6, Sheet 2: Flushing Branch Frame and Cover
- Drawing 7-7, Sheet 1: Utility Crossing
- Drawing 7-7, Sheet 2: Utility Crossing

6.3 El Rio Villa Housing Complex Inspection and Testing Provisions

Inspection and testing of the sewer system is done through the Operation and Maintenance Program as described in Element 4.

7 OVERFLOW EMERGENCY RESPONSE PLAN

The intent of this section of the SSMP is to summarize the key elements of YCH's overflow emergency response plan. The overflow emergency response plan should provide a standardized course of action for wastewater collection system personnel to follow in the event of an SSO. The overflow emergency response plan should also adequately prepare YCH's personnel to respond to SSO events.

7.1 Regulatory Requirement

Each Enrollee shall develop and implement an overflow emergency response plan that identifies measures to protect public health and the environment. At a minimum, this plan must including the following:

1. Proper notification procedures so that the primary responders and regulatory agencies are informed of all SSOs in a timely manner
2. A program to ensure an appropriate response to all overflows
3. Procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g., health agencies, Regional Water Boards, water suppliers, etc.) of all SSOs that potentially affect public health or reach water of the State in accordance with the MRP. All SSOs shall be reported in accordance with this Monitoring and Reporting Program (MRP), the California Water Code, other State Law, and other applicable Regional Water Board WDRs or NPDES permit requirements. The SSMP should identify the officials who will receive immediate notification
4. Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Emergency Response Plan and are appropriately trained
5. Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities
6. A program to ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting for the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge

On September 9, 2013, a revision to the monitoring and reporting program requirements (amended MRP) for the GWDR was adopted (Order No. WQ 2013-0058-EXEC). The amended MRP states that the Discharger is required to notify the State Office of Emergency Services

(OES) within two hours of becoming aware of any Category 1 SSO greater than or equal to 1,000 gallons that results in a discharge to surface water or spill in a location where it probably will be discharged to surface water. In addition, the amended MRP implemented changes to the SSO categories in order to distinguish between SSOs requiring notification to OES. Table 6-1 summarizes the SSO category definitions of the 2006 MRP and the amended MRP.

**TABLE 6-1
2013 AMENDED MRP SSO CATEGORY COMPARISON**

2006 MRP SSO Category	2013 Amended MRP SSO Category
<p><u>Category 1</u> are defined as all discharges of sewer resulting from a failure in the sanitary sewer system that:</p> <ul style="list-style-type: none"> - Equal or exceeds 1,000 gallons - Result in a discharge to a drainage channel and/or surface water - Result in a discharge to a storm drainpipe that was not fully captures and returned to the sanitary sewer system 	<p><u>Category 1</u> are defined as all discharges of untreated or partially treated wastewater of any volume resulting from a sanitary sewer system failure or flow condition that:</p> <ul style="list-style-type: none"> - Reach surface water and/or a drainage channel tributary to a surface water - Reach a Municipal Separate Storm Sewer System (MS4) and are not fully captured and disposed of properly. Any volume of wastewater not recovered from the MS4 is considered to have reached surface water unless the storm drain system discharges to a dedicated storm water or groundwater infiltration basin.
<p><u>Category 2</u> are defined as all discharges of sewage resulting from a failure in the sanitary sewer system that that are not Category 1 SSOs.</p>	<p><u>Category 2</u> are defined as discharges of untreated or partially treated wastewater of 1,000 gallons or greater resulting from a sanitary sewer system failure or flow condition that do not reach surface water, a drainage channel, or a MS4 unless the entire SSO discharged to the storm drain system is fully recovered and disposed of properly.</p>
<p><u>Private Lateral Sewage Discharge (PLSD)</u> are defined as sewer discharges that are caused by blockages or other problems within a privately owned lateral.</p>	<p><u>Private Lateral Sewage Discharge (PLSD)</u> are defined as all discharges of untreated or partially treated wastewater resulting from blockages or other problems within a privately owned sewer lateral connected to the sanitary sewer system or other private sewer assets.</p>

7.2 El Rio Villa Housing Complex Overflow Prevention and Emergency Response Plan

The Housing Complex's Overflow Prevention and Emergency Response Plan is implemented by YCH and the City.

The plan includes the following elements:

- Historical overflows – description and prevention
- Overflow response plan

Historical Overflows

Description: The Housing Complex has experienced two reportable SSO events in the past. The locations, volumes, and probable causes of these events are summarized in Table 6-1. Reports detailing the responses to each overflow and assessments of the causes are included in Appendix F of this document.

**TABLE 6-2
HISTORICAL SANITARY SEWER OVERFLOWS**

Date	Location	Volume (gallons)	Description/Cause
May 22, 2006	El Rio Villa Lift Station	150	Pump blockage caused sewage to overflow manhole for 60 – 75 minutes. Most sewage was contained and returned to the sanitary sewer. A small volume discharged to storm drain, but no wastewater discharged to creek.
December 1, 2006	El Rio Villa Lift Station	43,000	Operator failed to restart pumps after routine maintenance. Overflow occurred for 28 hours before overflow was reported. Sewage discharged to storm drain and subsequently to Putah Creek.

Prevention: Measures that will be taken to address the causes of these overflows and prevent future occurrence include the following:

1. Routinely check high water alarm function at the El Rio Villa lift station wet well;
2. Investigate the installation of isolation valves in the force main to prevent backflow in the event of a force main rupture. Install valves if feasible;
3. Perform a comprehensive inventory and inspection of all manholes to ensure proper identification and labeling of manhole covers.
4. Investigate the installation of valves in storm drain lines near surface water discharges or the use of temporary plugs to prevent discharge of sewage overflow from storm drain lines to surface waters. Implement the project if feasible.

5. Evaluate the lift station to identify and recommend actions to retrofit the system to improve alarm functions and reliability of lift station operation. Implement recommended actions.

Overflow Emergency Response Plan

The overflow emergency response plan includes the following principal elements, which are described below:

- SSO Notification Communication
- SSO Response Communication
- Containment and Control
- Clean-up
- Documentation
- Post SSO Notification and Reporting
- Public Notification / Posting
- Spill Sampling and Monitoring
- Record Keeping

SSO Notification Communication: Reports of SSOs are typically made by citizens or by City or YCH staff who first observed the condition. Contacts and phone numbers listed in the telephone directory that can be used to report an SSO include the following:

**TABLE 6-3
SANITARY SEWER OVERFLOW INITIAL REPORTING CONTACTS**

Contact	Phone Number
City Public Works – working hours	(530) 795-2820 or (530) 795-2811
City Public Works – after hours emergency	(530) 795-4561
YCH Facilities Director	(530) 669-2240
YCH Lead Maintenance Worker	(530) 207-7975
General Emergency	911

SSO Response Communication: The City’s Public Works department is designated as the first responder to SSOs. The City requires a maximum response time to SSOs of 60 minutes. Calls received by Public Works during working hours will be handled by staff within the maximum response time. Calls received at the after-hours number are routed to the County Sheriff’s

Dispatch office. The Dispatcher's protocol for contacting responders follows the order of contacts listed below:

**TABLE 6-4
EMERGENCY DISPATCH ORDER OF CONTACT**

Contact	Phone Number	
YCH Facilities Director	(530) 669-2240	
YCH Lead Maintenance Worker	(530) 207-7975	
City Public Works ON-CALL	(530) 681-9588	
City Public Works Staff ¹	Cell #	Home #
1. Terry Vendor	(530) 681-2873	
2. Tony Luna	(530) 681-9415	(707) 451-2236
3. Salomon Del Toro	(530) 681-9417	(530) 795-1970
4. Jim Keating	(805) 458-37-34	
5. Ricky Castro	(530) 312-6247	
6. Pedro Arredondo	(530) 601-1351	

If no response to on-call number after 10 minutes, call City staff in order at 10 min intervals

The City Manager, Public Works Department, and YCH, as appropriate, will be informed immediately of the SSO event by the first-responding personnel. All personnel who could potentially respond to an SSO event have been issued a Personnel Safety Bag that contains personnel safety equipment, all telephone numbers of Public Works personnel, City Manager, YCH Facility Administrator and ECO personnel, a disposable camera, and a Sewer Spill Report Form, which is included as Appendix G of this document.

Containment and Control: The primary objective of the first responder(s), aside from ensuring personal safety, is to contain the SSO and prevent discharge of sewage to surface waters. Following containment of the overflow, actions will be taken to control the overflow by alleviating or correcting the condition causing the overflow. The protocol to be followed by responder(s) to SSOs is as follows:

1. Proceed immediately to the site of the reported overflow with the following materials:
 - Radio and/or other communication equipment
 - Spill Containment Kits for storm drains and open water areas
 - Personnel Safety Bag

2. Crew leaders or supervisory personnel immediately assess the problem and begin implementation of corrective action, including, but not limited to:

- Call in all personnel
 - Call the City's sewer line maintenance contractor
 - Mobilize the Sewer Spill Response Trailer and cordoning off the spill area
 - Obtain equipment to facilitate containment of the spill
 - Contact outside agencies or contractors for assistance
3. Crew leaders or supervisory personnel determine the immediate destination of the overflow (e.g. storm drain, street curb gutter, body of water, culvert, landscaped area, etc), develop a containment strategy, and immediately obtain equipment and materials to facilitate such.
 4. Implement the containment strategy for the overflow using one of more of the following methods:
 - Contain the overflow with sand bags, soil berms, or containment pond to minimize spreading
 - Divert the flow (bypass) by pumping sewage into the sewer system, downstream the blockage. Continuously monitor the bypass pumping operation until terminated.
 - Vactor (vacuum) and transport the sewage to a downstream location or to a holding tank for subsequent discharge to the sewer system.
 5. Crew leaders or supervisory personnel initiate a process to alleviate or correct the condition causing the overflow using one or more of the following methods:

For obstructed or blocked sewers:

- Clean with high velocity water jet to clear blockage and restore service.
- Hand rod with auger from downstream manholes to “snag” object causing the Blockage
- Power rod when obstruction cannot be moved manually
- Bail when flow conditions will allow tool to move without causing its own stoppage
- Excavate above the blockage to remove the obstacle or repair the damaged pipe (method of last resort).

For failed lift station pumps:

- Determine cause of pump failure and correct or repair problem. Restart pumps.
6. If attempts to clear blockage of the sewer or correct pump failure are not immediately successful, implement emergency bypass procedures to convey or transport sewage from the affected segment of the sewer system to downstream segments of the sewer system that are unaffected. Continuously monitor the bypass pumping operation until terminated.

Clean-up: Following an overflow event, restore the affected areas to previous existing or better condition by one or more of the following methods:

1. Remove and replace contaminated soil. In some cases, soil will be decontaminated and tilled in when appropriate
2. Collect and dispose of any standing or pooled sewage
3. Clear surrounding area of spill residuals or any other signs of the spill
4. Where appropriate, the overflow site should be disinfected with HTH (hydrated calcium hypochlorite) and water or liquid bleach (aqueous sodium hypochlorite). Never flush any disinfectant into a storm drain or body of water.
5. Replace foliage, sod, grass, pavement, sidewalks, fencing, or structures damaged as a result of the overflow event or containment and control activities.

Documentation: Response crew leader or supervisory personnel at the overflow site will complete the Sewer Spill Report Form (see Appendix G), photograph the site, and submit all information to the City Manager or Public Works Department, as appropriate. The City Manager will prepare a Staff Memorandum describing the nature, extent, and cause of the overflow, the response activities performed and recommended follow-up measures to prevent reoccurrence of the overflow. Staff Memorandums for past SSOs are provided in Appendix F.

Post SSO Notification and Reporting:

Category 1 SSO: Category 1 SSOs are defined as all discharges of sewage resulting from a failure in the City or the Housing Complex's sanitary sewer system that:

- Result in a discharge to a drainage channel and/or surface water, or
- Result in a discharge to a storm drainpipe that was not fully captured and returned to the sanitary sewer system.

Initial Telephone Notification

All Category 1 SSOs with a volume of 1,000 gallons or more must be reported by telephone to the State Office of Emergency Services (OES) as soon as possible, but not later than two hours after:

- City has knowledge of the SSO
- Reporting is possible
- Reporting can be performed without substantially impeding cleanup or other emergency measures
-

SSO Information likely requested by OES during notification call includes the following (per the 2013 amended MRP):

1. Name and telephone number of person notifying Cal OES
2. Estimated SSO volume discharged (gallons)
3. Estimated SSO discharge rate (gpm) if spill ongoing.
4. SSO incident description including: brief narrative, on-scene contact person and phone number, date and time City became aware of SSO, name of sanitary sewer agency causing the SSO and SSO cause (if known).
5. Indicate whether SSO has been contained
6. Indicate whether surface water is impacted
7. Name of surface water impacted (if applicable)

8. Indicate whether drinking water supply is or may be impacted by SSO
9. Any other known SSO impacts
10. SSO incident location (street address)

After OES is notified by City, OES will notify the Central Valley Regional Water Quality Control Board and Yolo County Health Department of the SSO. Contact information for all three agencies is included in Table 6-5. Following notification to OES and until an SSO report is certified in the Board SSO database, the City must update OES on any substantial changes to the estimated SSO volume or known impacts.

**TABLE 6-5
POST SSO INITIAL REPORTING PHONE NUMBERS**

Agency Contact	Phone Number	Fax Number
Central Valley Regional Water Quality Control Board	(916) 464-3291	(916) 464-4645
State Office of Emergency Services (OES)	(800) 852-7550	(916) 845- 8910
Yolo County Health Department Environmental Health	(530) 666-8646	(530) 669-1948

Written or Online Notification

For Category 1 and Category 2 SSOs, the City must file a draft SSO report online with the Central Valley Water Quality Control Board (Board) within three days of having knowledge of the SSO if an online reporting system is available. If online reporting is not available, the City must fax the required information to the Board. A final certified report must be completed online or submitted in writing to the Board within 15 days of the conclusion of SSO response and remediation. The minimum information must be included in the draft and certified reports are summarized in Table 6-6 and Table 6-7, respectively.

**TABLE 6-6
MANDATORY INFORMATION IN DRAFT CATEGORY 1
AND CATEGORY 2 SSO REPORTS**

Item No.	Information Description
1.	SSO Contact Information: Name and telephone number of City contact
2.	SSO Location Name
3.	Location of SSO by GPS coordinates
4.	Did SSO reach surface water, a drainage channel or enter and discharge from a drainage structure?
5.	Did SSO reach a municipal separate storm drain system?
6.	Was total SSO volume that reached a municipal separate storm drain system fully recovered?
7.	Estimated SSO volume
8.	Estimate of SSO volume that reached surface water, a drainage channel, or was not recovered

- from a storm drain
- 9. Estimate of SSO volume recovered (if applicable)
- 10. Number of SSO appearance point(s)
- 11. Description and location of SSO appearance point(s)
- 12. SSO start date and time
- 13. Date and time City was notified of, or self-discovered, the SSO
- 14. Estimated operator arrival time
- 15.^a Date and time OES was notified if SSO was greater than or equal to 1,000 gallons
- 16.^a OES control number (if applicable)

^a Category 1 reports only.

**TABLE 6-7
MANDATORY INFORMATION IN CERTIFIED SSO REPORTS**

Item No.	Information Description	Applicable Category
1.	Description of SSO destination	1, 2 and 3
2.	SSO end date and time	1, 2 and 3
3.	SSO causes (i.e. mainline blockages, roots, etc.)	1, 2 and 3
4.	SSO failure point (main, lateral, etc.)	1, 2 and 3
5.	Whether or not spill was associated with a storm event	1, 2 and 3
6.	Description of spill corrective action, including steps planned or taken to reduce, eliminate, and prevent reoccurrence of the overflow; and a schedule of major milestones for those steps	1 and 2
7.	Description of spill response activities	1 and 2
8.	Spill response completion date	1 and 2
9.	Whether or not there is an ongoing investigation, the reasons for the investigation and the expected date of completion.	1 and 2
10.	Whether or not a beach closure occurred or may have occurred as a result of the SSO.	1 only
11.	Whether or not health warnings were posted as a result of the SSO.	1 only
12.	Name of beach(es) closed and/or impacted. If no beach was impacted, NA shall be selected.	1 only
13.	Name of surface water(s) impacted	1 only
14.	If water quality samples were collected, identify parameters the water quality samples were analyzed for. If no samples were taken, NA shall be selected.	1 only
15. ^a	If water quality samples were taken, identify which regulatory agencies received sample results (if applicable). If no samples were taken, NA shall be selected.	1 only
16.	Description of methodology and type of data relied upon for estimations of the SSO volume discharged and recovered.	1 only
17. ^a	SSO Certification: Upon SSO Certification, the CIWQS Online	1, 2 and 3

SSO Database will issue a final SSO identification number.

For Category 3 SSOs, the City must submit a certified report within thirty days after the end of the calendar month in which the SSO occurs, to the online reporting system, if available, or to the Board at the City's discretion. The minimum information required for a Category 3 SSO certified report includes: Items 1 through 14 listed in Table 6-6 and applicable items noted in Table 6-7.

PLSDs may be voluntarily reported to an online reporting system, if available, or to the Board at the City's discretion. If recorded, the report must identify the sewer discharge as occurring and caused by a private sanitary sewer system asset and should identify the responsible private party, if known. The Board encourages notification of OES in the event that the PLSD volume is 1,000 gallons or greater and has or may result in a discharge to surface water. Certification of the report is not required.

"No Spill" Certification: if there are no SSOs during the calendar month, the City shall either:

1. Certify, within 30 days after the end of each calendar month, a "No Spill" certification statement online certifying that there were no SSOs for that month
2. Certify, quarterly within 30 days after the end of each quarter, a "No Spill" certification statement online certifying that there were no SSOs for that quarter

Certification: All final reports must be certified by a person designated as either a principal executive officer or ranking elected official, or by duly authorized representative of that person having responsibility for the overall operation of the City or the Housing Complex's sewer system.

Public Notification / Posting: Working in conjunction with Yolo County health officials and with the RWQCB, all areas will be posted when necessary to alert the public of situations that may be hazardous to the health of persons or could contaminate property.

Each situation will be evaluated independently to determine what posting requirements, if any, apply. Criteria for posting are as follows:

1. Post locations of contamination when the spill reaches areas of pooled water
2. Place signs in locations with high visibility
3. Keep signs in place until cleanup has been completed

The City will use signs as approved by the Yolo County Department of Health Services.

Spill Sampling and Monitoring: **For all Category 1 spills in which 50,000 gallons or greater reach surface water, the amended MRP requires:**

1. water quality sampling within 48 hours after initial SSO notification
2. submission of water quality results to the Board's online reporting system
3. preparation of a technical report within 45 days of the SSO end date

At the direction of the City Manager, Public Works Department or YCH Facility Administrator, as appropriate, particularly whenever a spill reaches surface water, sampling of water impacted by the spill should be performed. Conducting sampling at the appropriate locations will allow staff to establish and monitor the levels of contamination as well as to establish or compare with the natural background levels of bacteria in the receiving waters.

If sampling is to be conducted, the City Manager, Public Works Department or YCH Facility Administrator, as appropriate, will develop and implement the sampling regimen and will notify Yolo County Department of Health Environmental Health Division and the California Department of Fish and Wildlife to advise them of the sampling to be conducted.

The sampling regimen is to be continued until a determination is made that contamination resulting from the spill event no longer exists and no longer poses a danger to the public. All final summary sampling and monitoring reports will be shared with Yolo County Department of Health and the California Department of Fish and Wildlife.

If sampling and monitoring are conducted, records of monitoring information shall include the following:

1. Date, exact place (shown on a map), and time of sampling or measurements
2. Individual(s) who performed the sampling or measurements
3. Date(s) of analyses by laboratory
4. Individual(s) who performed analyses
5. Analytical methods or techniques used
6. Results of analyses

The technical report required for Category 1 spills in which 50,000 gallons or greater reach surface water must include:

1. Causes and circumstances of the SSO
 - a. Complete and detailed explanation of how and when the SSO was discovered
 - b. Diagram showing the SSO failure point, appearance point(s), and final destination(s)
 - c. Detailed description of the methodology employed and available data used to calculate the volume of the SSO and, if applicable, the SSO volume recovered.
 - d. Detailed description of the cause(s) of the SSO
 - e. Copies of original field crew records used to document the SSO.
 - f. Historical maintenance records for the failure location.
2. Response to SSO
 - a. Chronological narrative description of all actions taken to terminate the spill
 - b. Explanation of how the SSMP Overflow Emergency Response plan was implemented to respond to and mitigate the SSO
 - c. Final corrective action(s) completed and/or planned to be completed, including a schedule for actions not yet completed.

Record Keeping: The City and YCH shall retain records of all SSOs for a minimum of five (5) years. Records shall include, but not limited to, the following when applicable:

1. Record of Certified SSO Report submitted to online SSO database or to Regional Board
2. Original recordings of continuous monitoring instrumentation
3. Service call records and complaint logs of call received by the City
4. SSO calls
5. SSO records
6. Actions that have been taken or will be taken to prevent the SSO from reoccurring and a schedule to complete actions
7. Work orders, work completed , and any other maintenance records from the previous five years that are associated with responses and investigations of system problems related to SSOs
8. A list and description of complaints from customers or others from the previous five years
9. Documentation of performance and implementation measures for the previous five years

8 FATS, OILS AND GREASE (FOG) CONTROL PROGRAM

The intent of this section of the SSMP is to summarize the key elements of YCH's fats, oils and grease program.

8.1 Regulatory Requirement

Each Enrollee shall evaluate its service area to determine whether a FOG control program is needed. If an Enrollee determines that a FOG program is not needed the Enrollee must provide justification as to why it is not needed. If FOG is found to be a problem, the Enrollee must prepare and implement a FOG source control program to reduce the amount of these substances discharged to the sanitary sewer system. This plan shall include the following as appropriate:

1. An implementation plan and schedule for a public education outreach program that promotes proper disposal of FOG
2. A plan and schedule for the disposal of FOG generated within the sanitary sewer system service area. This may include a list of acceptable disposal facilities and/or additional facilities needed to adequately dispose of FOG generated within a sanitary sewer system service area
3. The legal authority to prohibit discharges to the system and identify measures to prevent SSOs and blockages caused by FOG
4. Requirements to install grease removal devices (such as traps or interceptors), design standards for the removal devices, maintenance requirements, BMP requirements, record keeping and reporting requirements
5. Authority to inspect grease producing facilities, enforcement authorities, and whether the Enrollee has sufficient staff to inspect and enforce the FOG ordinance
6. An identification of sanitary sewer system sections subject to FOG blockages and establishment of a cleaning maintenance schedule for each section
7. Development and implementation of source control measures for all sources of FOG discharged to the sanitary sewer system for each section identified in (f) above

8.2 El Rio Villa Housing Complex Fats, Oils and Grease (FOG) Control Program

Under contract for the Housing Complex's sewer system operation and maintenance, the City is also responsible for any FOG issues.

The City has evaluated its collection service area and has determined that a separate FOG program is not needed at this time. None of the SOSs that have occurred to date have been caused by blockages due to FOG accumulation in the collection system. The City's Pretreatment Program and routine cleaning of sewer lines are considered to be adequate measures to prevent sewer line blockages due to FOGs.

Pretreatment Program

The City has adopted and implemented a Pretreatment Program that limits the concentration of FOGs that can be discharged to sanitary sewer system and establishes a discharge permit system. Commercial and industrial dischargers that could potentially discharge FOGs at elevated concentrations are required to obtain a discharge permit and to install grease removal devices (grease traps) to ensure compliance with FOG discharge limit. The City's Building Code requires that grease removal devices be sized in accordance with criteria set forth in the Uniform Plumbing Code. Legal authority for the City to require and inspect grease removal devices has been established by Chapter 13.08 of City Municipal Code. The ordinance also provides an enforcement procedure for discharge permits and a system of penalties for noncompliance.

Grease Removal Device Inspection Program

The City's contract collection system operator (currently ECO Resources) is required under the current contract to inspect and monitor grease removal devices twice per year, unless revised for cause by the City.

9 SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN

The intent of this section of the SSMP is to document YCH's planning efforts to assess the current capacity of the wastewater collection system, determine if there are current or expected planned needs, develop a capital improvement plan (CIP) for identified capacity needs, and fund the CIP program so that the wastewater conveyance needs are met before the capacity of the system is exceeded.

9.1 Regulatory Requirement

The Enrollee shall prepare and implement a capital improvement plan that will provide hydraulic capacity of key sanitary sewer system elements for dry weather peak flow conditions, as well as the appropriate design storm or wet weather event. At a minimum, the plan must include:

1. **Evaluation:** Actions needed to evaluate those portions of the sanitary sewer system that are experiencing or contributing to an SSO discharge caused by hydraulic deficiency. The evaluation must provide estimates of peak flows (including flows from SSOs that escape the system) associated with conditions similar to those causing overflow events, estimates of the capacity of key system components, hydraulic deficiencies (including components of the system with limiting capacity) and the major sources that contribute to the peak flows associated with overflow events.
2. **Design Criteria:** Where design criteria do not exist or are deficient, undertake the evaluation identified in (a) above to establish appropriate design criteria.
3. **Capacity Enhancement Measures:** The steps needed to establish a short- and long-term CIP to address identified hydraulic deficiencies, including prioritization, alternatives analysis, and schedules. The CIP may include increases in pipe size, I/I reduction, increases and redundancy in pumping capacity, and storage facilities. The CIP shall include an implementation schedule and shall identify sources of funding.
4. **Schedule:** The Enrollee shall develop a schedule of completion dates for all portions of the capital improvement program developed in (a) – (c) above. This schedule shall be reviewed and updated consistent with the SSMP review and update requirements as described in Section D. 14.

9.2 Capacity Assessment

This section is waived as the Housing Complex sewer system serves a population of less than 10,000.

9.3 System Evaluation and Capacity Assurance Plan

This section is waived as the Housing Complex sewer system serves a population of less than 10,000.

10 MONITORING, MEASUREMENT, AND PROGRAM MODIFICATIONS

The intent of this section of the SSMP is to summarize how YCH monitors the performance of the sewer system, determines the effectiveness of the O&M program, and measures the effectiveness of YCH's program to reduce SSOs. Examples of performance indicators include:

- Number of SSOs over the past 12 months, distinguishing between dry weather overflows and wet weather overflows
- Volume distribution of SSOs (e.g. number of SSOs < 100 gallons, 100 to 999 gallons, 1,000 to 9,999 gallons, > 10,000 gallons)
- Volume of SSOs that was contained in relation to total volume of SSOs
- SSOs by cause (e.g. roots, grease, debris, pipe failure, pump station failure, capacity, other).
- Number of stoppages over the past 12 months
- Stoppages by cause
- Average time to respond to an SSO
- Relationship of capacity-related SSOs to storm event return frequency
- Ratio of planned sewer cleaning to unplanned sewer cleaning
- Backlog of repair, rehabilitation, and replacement projects
- Plans developed for, or implementation of, activities to target specific problems identified, such as roots, structural deficiencies, or fats, oil, and grease (FOG)

This section of the SSMP should also contain a description of what the wastewater collection system agency plans to do to make sure the SSMP remains current and useful over time. Examples of changes that could occur include modified operations and maintenance procedures, new O&M programs like initiating a root or FOG control program, organizational changes, and new sewers or pump station improvements made to increase the capacity or improve the reliability of the wastewater collection system

10.1 Regulatory Requirement

The Enrollee shall:

1. Maintain relevant information that can be used to establish and prioritize appropriate SSMP activities
2. Monitor the implementation and, where appropriate, measure the effectiveness of each element of the SSMP
3. Assess the success of the preventive maintenance program

4. Update program elements, as appropriate, based on monitoring or performance evaluations
5. Identify and illustrate SSO trends, including: frequency, location, and volume.

10.2 El Rio Villa Housing Complex Monitoring, Measurement, and Program Modifications

This section is waived as the Housing Complex sewer system serves a population of less than 10,000.

11 SSMP PROGRAM AUDITS

The intent of this section of the SSMP is to document audits of the SSMP by YCH. Audit programs are intended to provide controls for ensuring that all programs associated with the SSMP are being implemented and managed appropriately. Audit outcomes should provide information about challenges and successes in implementing the SSMP and identify any program or policy changes that may be needed to ensure effective implementation. Information collected as part of an audit should be used in to plan program or procedure revisions necessary to improve program performance.

11.1 Regulatory Requirement

As part of the SSMP, the Enrollee shall conduct periodic internal audits, appropriate to the size of the system and the number of SSOs. At a minimum, these audits must occur every two years and a report must be prepared and kept on file. This audit shall focus on evaluating the effectiveness of the SSMP and the Enrollee's compliance with the SSMP requirements identified in this subsection (D. 13), including identification of any deficiencies in the SSMP and steps to correct them.

11.2 El Rio Villa Housing Complex SSMP Program Audit

This section is waived as the Housing Complex sewer system serves a population of less than 10,000.

12 COMMUNICATION PROGRAM

This section of the SSMP discusses YCH's communications with the public and satellite agencies. This section fulfills the Communication Program requirement for SWRCB.

12.1 Regulatory Requirements for Communication Program

The City shall communicate on a regular basis with the public on the development, implementation, and performance of its SSMP. The communication system shall provide the public the opportunity to provide input to the collection system agency as the program is developed and implemented. The City shall also create a plan of communication with systems that are tributary and/or satellite to the collection system agency's sanitary sewer system.

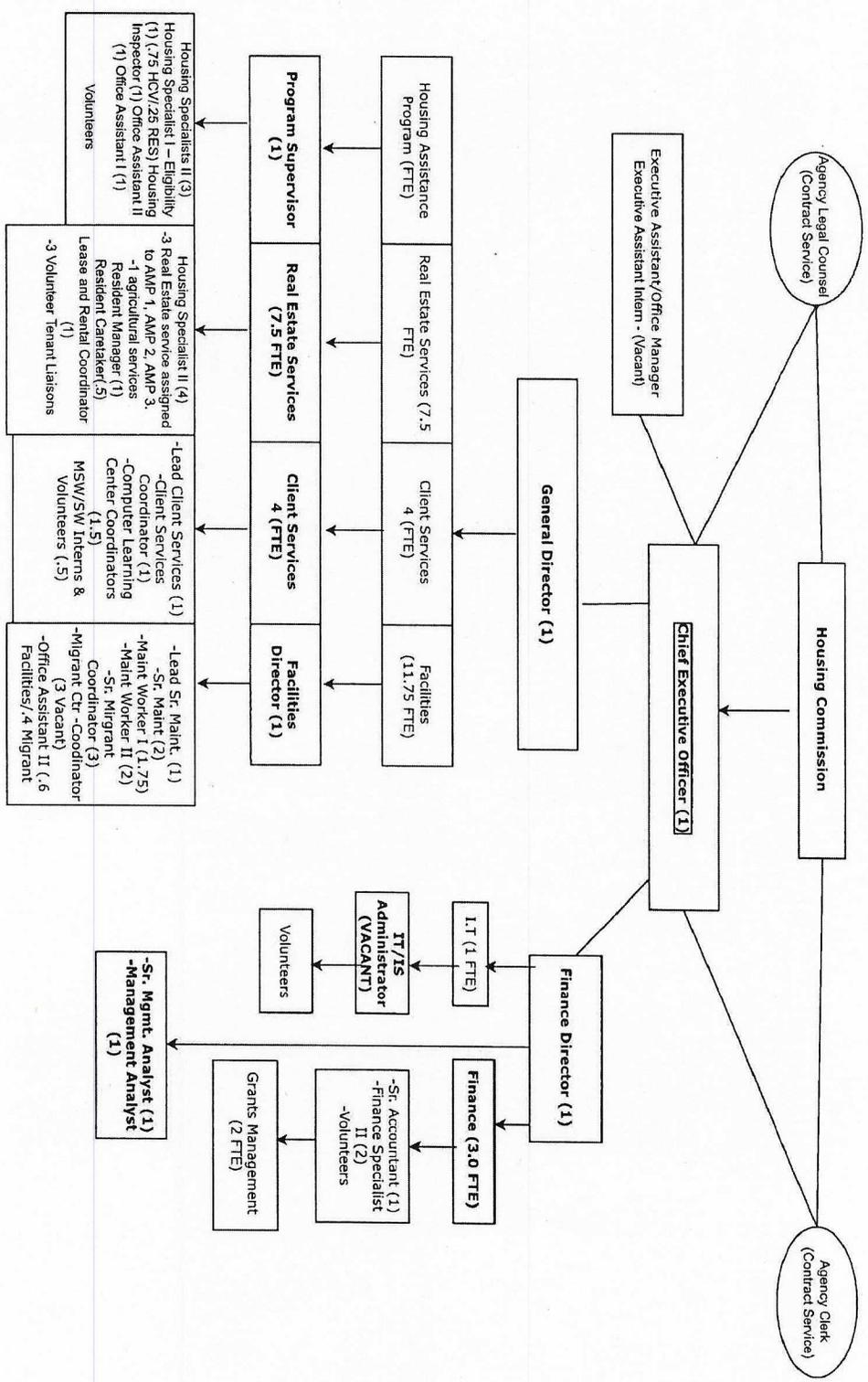
12.2 El Rio Villa Housing Complex Communication Program

This section is waived as the Housing Complex sewer system serves a population of less than 10,000.

APPENDIX A

Yolo County Housing Organizational Chart

YCH Organizational Chart - May 1, 2019



Departments - 2: Current paid Staff = 39.25 FTE (44 Staff)

Housing Services = 19.5FTE (24 staff)
 Facilities = 11.75FTE (12 staff)
 Finance = 5FTE (5 staff)
 Department Directors = 2FTE
 Executive = 1 Chief Executive Director, 1 Executive Assistant/Office Manager, Contract Legal Counsel & Agency Clerk
 Total vacant unfunded existing positions = 6.25: .25 Maintenance Worker, 1.3 Migrant Center Coordinators,
 1 Executive Assistant/Office Manager, 1 Executive Assistant Intern, 1 IT/IS Administrator.

Appendix A Yolo County Housing Organizational Chart

El Rio Villa Housing Complex SSMP
 October 2020

APPENDIX B

**Memorandum of Understanding between the City of Winters and the
Housing Authority of the County of Yolo for Sewer Services**

Agreement No. 19-04

**(Memorandum of Understanding Between the City of Winters and
the Housing Authority of the County of Yolo for Sewer Services)**

THIS MEMORANDUM OF UNDERSTANDING (MOU) is executed between the CITY OF WINTERS, a municipal corporation herein called "CITY", and the HOUSING AUTHORITY OF THE COUNTY OF YOLO, a public body corporate and politic organized and existing under the laws of the State of California, hereinafter called "YCH."

WITNESSETH:

WHEREAS, YCH is currently using sewer services provided by CITY for its EL RIO VILLA HOUSING DEVELOPMENT, located at 62 Shams Way, Winters, California, hereinafter called "EL RIO VILLA"; and

WHEREAS, the parties wish to enter into this MOU to replace the existing agreement dated October 1, 2009 that is set to expire on June 30, 2019 for purposes more specifically defining the obligations of CITY and YCH.

NOW, THEREFORE, in consideration of the mutual covenants herein contained, it is agreed by and between CITY and YCH as follows:

SECTION 1. SERVICE

1. CITY agrees to continue to provide YCH's EL RIO VILLA, with domestic sewer services subject to maximum daily flow restrictions as hereinafter set forth in Section 4 below. As part of said service:
 - a. YCH confirms its grant to CITY of full rights of ingress and egress to YCH's pump station and YCH's lines and connections, at any time. The sewer service provided by CITY shall be restricted solely to domestic waste and shall not be sewage from commercial, industrial or any other type of waste discharges.
 - b. YCH shall comply with all ordinances, rules and regulations of CITY related to control and discharge of sewage.
 - c. YCH specifically agrees that it will not allow any discharges prohibited by the State Water Resources Control Board, hereinafter called "SWRCB".
2. While CITY shall provide for the operation of sewer services at EL RIO VILLA, YCH agrees, at its sole cost and at all times, to be financially responsible for the

maintenance, repair and replacement of all sewer lines, sewer line force mains, lift station, and pumps necessary to transport wastewater from EL RIO VILLA to the MAIN PUMP STATION

SECTION 2. INDEMNIFICATION

1. YCH shall defend, indemnify and hold the CITY harmless from and against any and all liability, loss, expense, attorneys' fees, or claims for injury or damages arising from YCH's the performance of this MOU, with the exception of, and in proportion to, matters that are based upon the negligent or intentional acts or omissions of the CITY, its officers, agents, employees, subcontractors or volunteers.
2. CITY shall defend, indemnify and hold YCH harmless from and against any and all liability, loss, expense, attorneys' fees, or claims for injury or damages arising from CITY'S operations or the performance of this MOU, with the exception of, and in proportion to, matters that are based upon the negligent or intentional acts or omissions of YCH, its officers, agents, employees, subcontractors, or volunteers.

SECTION 3. SEWER LINES/LIFT PUMP STATION

1. YCH, as owner, shall be fully financially responsible for the security of the sewer lines, connections, clean-outs, and pump station, outside the city limits of the City of Winters, and for all electricity charges thereto.
2. At its own expense, YCH shall comply with any and all security requirements of the SWRCB, or the State, Federal, YSAQMD or Local government. CITY shall be responsible for maintenance, repair and replacement of sewer lines within the city limits of the City of Winters.
3. YCH shall establish a schedule for line inspection, and provide to CITY information on the replacement of its sewer lines and connections when necessary. YCH shall provide to CITY funds for such replacement in a timely manner, to avoid any violation of SWRCB rules and regulations.

SECTION 4. FLOW CAPACITY

Notwithstanding anything to the contrary contained herein regarding delivery of sewer services, it is mutually agreed that the maximum sewer services to be provided to EL RIO VILLA by CITY shall be limited to a dry weather flow of 36,000 gallons per day. No sewer service above said quantities shall be guaranteed, but CITY upon its sole determination and election may provide EL RIO VILLA with additional flow capacity upon request, dependent upon available sewer facility capacities and limitations of the system, future anticipated

requirements of CITY and any other factors that CITY may wish to consider. In such event, the sewer service charge shall be adjusted to reflect the increased cost of operation and maintenance.

SECTION 5. RATES & FEES

1. The current rate of \$67.02 per unit sewer service fee per month (\$8,310.48/month) will be adjusted annually, in the same manner as other residential units served by the CITY.
2. In addition, sewer charges may be adjusted by CITY from time to time on an annual basis, including retroactive adjustment to reflect annual costs, based upon the: (1) increase in level of service caused by new regulations of SWRCB, or the State, Federal or Local government; or (2) increased flows causing a change in CITY operation. Said charges shall not include a charge for capitalization or depreciation of existing or of CITY'S allocated portion of CITY sewer facilities, including collection and interceptor lines, and ponds, but shall include all other pro-rata costs of operation, maintenance and any subsequent capital improvements that may be added to the system which are used for YCH's sewage collection disposal and treatment.
3. YCH may request and CITY shall provide the cost figures used in computing YCH charges, but such request shall not be made more often than annually or upon a change of rate. Any cost incurred by CITY above normal costs incurred in establishing the annual rate shall be borne solely by YCH. All payments shall be made by YCH in accordance with YCH's standard payables policies and practices.
4. YCH shall pay annual operations/maintenance and capital projects costs of \$600 at the rate of \$50.00 per month. In addition, annual operating costs may be adjusted by CITY from time to time on an annual basis, including retroactive adjustment to reflect annual costs, based upon the: (1) increase in level of service caused by the new regulations of SWRCB, or the State, Federal or Local government; or (2) increased flows causing a change in CITY operation

SECTION 6. TERM AND TERMINATION

SECTION 6. TERM AND TERMINATION

1. YCH may terminate this MOU at any time on ten (10) days' written notice to CITY. Notwithstanding the termination notice, the CITY shall retain the right to continue the sewer service until relieved of its obligation as "operator" by SWRCB. Upon

receipt of YCH's termination notice, CITY shall undertake all reasonable efforts to be relieved by SWRCB in as expeditious a manner as possible. YCH shall be obligated to continue compensation to CITY until such relief is granted by SWRCB.

2. The term of this MOU is ten (10) years, beginning on July 1, 2019 and ending on June 30, 2029, subject to YCH's right of prior termination under Paragraph 1 of this section, and thereafter shall be automatically renewed from year to year without further notice. However, after the initial 10-year term, CITY and YCH shall have the right to terminate this MOU by giving written notice of termination at least one (1) year in advance.
3. In addition, this MOU shall terminate at any time that performance of terms, covenants and conditions would be contrary to applicable Federal, State or local statutes, ordinance, rules and regulations.

SECTION 7. INSURANCE

During the term of this MOU, each party, at its sole cost and expense, shall obtain and maintain throughout the entire term of this MOU the following insurance policies:

1. General public liability insurance in an amount of not less than Five Million Dollars (\$5,000,000) per occurrence for bodily injury, personal injury and property damage and Five Million Dollars (\$5,000,000) per aggregate, or equivalent self-insurance subject to approval by each party;"
2. Automobile insurance in an amount of not less than One Million Dollars (\$1,000,000) per accident for bodily injury and property damage, including coverage for hired and non-owned vehicles; and
3. Worker's compensation insurance to the established California limits.

CITY, its elected representatives, officers, agents, employees and volunteers shall be named as additional insured or as additional covered party for self-insurance, on all liability insurance or self-insurance maintained by YCH other than workers' compensation and automobile insurance. Any insurance maintained by CITY shall apply in excess of, and not contribute with, insurance provided by YCH's self-insurance or liability insurance policy. YCH, its elected representatives, officers, agents, employees and volunteers shall be named as additional insured or as additional covered party for self-insurance, on all liability insurance or self-insurance maintained by CITY other than workers' compensation insurance. Any insurance maintained by YCH shall apply in excess of, and not contribute with, insurance provided by CITY's self-insurance or liability insurance policy. Each insurance policy shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written

notice has been given to the other party. Upon request, each party shall provide the other party proof of such insurance coverage.

SECTION 8. INDEPENDENT CONTRACTOR

1. Neither YCH nor any of its officers or employees shall have any control over the conduct of CITY or any of CITY's employees. YCH shall have no voice in the selection, discharge, supervision or control of CITY's employees, representatives or agents, or in fixing their compensation or hours of service. CITY expressly warrants not to, at any time or in any manner, represent that it or any of its agents, representatives or employees, are in any manner agents, representatives or employees of YCH. CITY is, and shall at all times remain, a wholly independent contractor, and CITY's obligations to the YCH are solely such as are prescribed by this MOU.
2. Neither CITY nor any of its officers or employees shall have any control over the conduct of YCH or any of YCH's employees. CITY shall have no voice in the selection, discharge, supervision or control of YCH's employees, representatives or agents, or in fixing their compensation or hours of service. YCH expressly warrants not to, at any time or in any manner, represent that it or any of its agents, representatives or employees, are in any manner agents, representatives or employees of CITY. YCH is, and shall at all times remain, a wholly independent contractor, and YCH's obligations to the CITY are solely such as are prescribed by this MOU.

SECTION 9. NOTICES

Except as otherwise specified in this MOU, all notices to be sent pursuant to this MOU shall be made in writing, and sent to the parties at their respective addresses specified below or to such other address as a party may designate by written notice delivered in accordance with this Section. All such notices shall be sent by: (i) personal delivery; in which case notice shall be deemed delivered upon receipt; (ii) certified or registered mail, return receipt requested, in which case notice shall be deemed delivered two (2) business days after deposit, postage prepaid in the United States mail; (iii) nationally recognized overnight courier, in which case notice shall be deemed delivered one (1) day after deposit with such courier; or (iv) facsimile transmission, in which case notice shall be deemed delivered on transmittal, provided that a transmission report is generated reflecting the accurate transmission thereof. Any notice given by facsimile shall be considered to have been received as of the next business day if it is received after 5:00 p.m. recipient's time or on a non-business day. The addresses of the parties are as follows:

City: City of Winters

Attn: City Manager
318 First Street
Winters, CA 95694
Tel: (530) 795-4910
Fax: (530) 795-4935

YCH: Yolo County Housing
Attn: Chief Executive Officer
147 West Main Street
Woodland, CA 95695
Tel: (530) 662-5428
Fax: (530) 662-5429

SECTION 10. WAIVER

The failure of any party to insist on strict compliance with any of the terms, covenants, or conditions of this MOU by another party hereto shall not be deemed a waiver of that term, covenant, or condition, nor shall any waiver or relinquishment of any right or power at any one time or times be deemed a waiver or relinquishment of that right or power for all or any other times.

SECTION 11. AUTHORITY

Each person executing this agreement on behalf of a party represents that s/he has full power and authority to so execute this document and to bind the party to the terms, covenants and conditions of this MOU.

SECTION 12. ASSIGNMENT

This MOU may be assigned by YCH to any successor public agency but shall not otherwise be assigned in whole or in part without the prior written consent of CITY.

SECTION 13. SUCCESSORS AND ASSIGNS

Subject to any provision under this MOU restricting assignment, the provisions of this MOU shall be binding upon and inure to the benefit of the respective successors, assigns, heirs, *and* personal representatives of the parties to this MOU.

SECTION 14. LEGAL FEES

Each party will bear its own defense costs, including but not limited to. attorney's fees and costs, in the event a controversy or litigation occurs in connection with the performance by YCH or CITY of the terms, covenants and conditions of this MOU.

SECTION 15. GOVERNING LAW

This MOU shall be deemed to be executed within the State of California and construed in accordance with and governed by laws of the State of California. Any action or proceeding arising out of this Agreement shall be filed and resolved in a court of competent jurisdiction located in Yolo County, California.

SECTION 16. TIME IS OF THE ESSENCE

Time is of the essence in the performance of every term, covenant, condition, and provision of this MOU.

SECTION 17. SEVERABILITY

If any provision of this MOU is adjudicated by a court of competent jurisdiction to be invalid or unenforceable, the remainder of the MOU shall continue in full force and effect.

SECTION 18. AMENDMENT

This MOU may be amended only by a written instrument executed by all parties hereto, and any other purported amendment shall be of no force or effect.

SECTION 19. COUNTERPARTS

This MOU may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute the same one document.

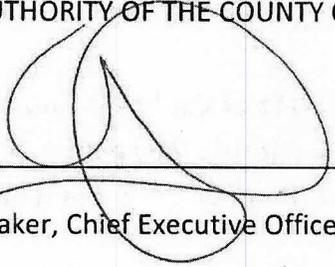
SECTION 20. ENTIRE AGREEMENT

This MOU constitutes the entire agreement between the parties and supersedes all prior agreements, representations, warranties, statements; promises and understandings, whether oral or written, with respect to the subject matter hereof and no party shall be bound by any representations, statements, promises or understandings not specifically set forth in this MOU. In the event of a dispute between the parties as to the language of this MOU or the construction or meaning of any term hereof, this MOU shall be deemed to have been drafted by the parties in equal parts so that no presumptions or inferences concerning its terms or interpretation may be construed against any party to this MOU.

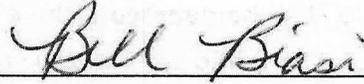
IN WITNESS WHEREOF, the parties hereto agree this 18th day of September, 2019

HOUSING AUTHORITY OF THE COUNTY OF YOLO

CITY OF WINTERS

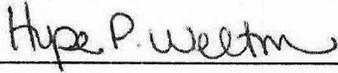


By: Lisa A. Baker, Chief Executive Officer



By: Bill Biasi, Mayor

APPROVED AS TO FORM



By: Hope Welton, Agency Counsel



By: Ethan Walsh, City Attorney

EXHIBIT A

Yolo Housing

El Rio Villa Lift Station Maintenance Cost Analysis

Cost Estimated as of 5/31/2019 (to be updated periodically)

Reserve Contributions

	27001	27002	Combined
Contributions to date	353,440.60	316,415.05	669,855.65

Actual System Expenditures

				<u>Expenditure Type/Notes</u>
7/2009-6/2010	5,985.41	-	5,985.41	SCADA
7/2010-6/2011	4,984.51	1,813.57	6,798.08	line cleaning, manual switch install
7/2011-6/2012	764.58	-	764.58	electrical rep
7/2012-6/2013	4,182.35	-	4,182.35	outage pumping, calibration, SCADA svc
7/2013-6/2014	3,000.00	600.00	3,600.00	line cleaning, booster pump disconnect
7/2014-6/2015	-	11,545.73	11,545.73	level transducer svc, calibration,
7/2015-6/2016	7,022.85	-	7,022.85	calibrations, transfer switch
7/2016-6/2017	2,498.84	83,337.75	85,836.59	Calibrations, 2 pumps replaced
7/2017-6/2018	20,303.74	18,291.00	38,594.74	MCC control panel update
7/2018-6/2019	6,458.32	-	6,458.32	
			170,788.65	
Remaining Cash Balance in Combined Reserve			\$ 499,067.00	

Anticipated System Expenditures (thru 6/30/2034)

update every 2 years to ensure still on track

Item	Typical / Expected Frequency	Cost/ Occurance	Total Estimated Cost	Notes/Comments
Generator and Light Installation	20-25 years	\$ 86,000	\$ 86,000	engineer estimate for late in 2019 project
Chemical Degreaser treatment	12 months	\$ 5,100	\$ 76,498.20	estimate based on history
Two New Pumps	8-10 years	\$ 100,000	\$ 100,000	estimated useful life
Calibrations/ line Cleaning	12 months	\$ 2,500	\$ 37,500	includes regular cleanout & video survey to main lines
Electricity	12 months	\$ 2,100	\$ 31,500	
Contingency/Reserve for unplanned work during period			\$ 100,000	
Estimated total operating cost for Lift Station system thru 12/2034			\$ 431,498	

Estimated Unit cost per month \$ 50 minimal contribution for add'l contingency

Projected Impact of Future Funding

Additional Sinking Fund Contributions over period	\$ 9,000	180 months pmts @ monthly rate
Remaining net balance in Sinking Fund @ 6/30/2034	<u>\$ 76,569</u>	add'l contingency over \$100k above

APPENDIX C

Sample Lift Station Inspection Form



**CITY OF WINTERS
DAILY INSPECTIONS**

EL RIO VILLA

DATE: _____

INITIAL

- _____ Check run time on pumps for proper operation
- _____ Visually inspect guide rails for pump looking for break, cracks, rust, etc
- _____ Clean 3B4 pump micro filters on booster pumps
- _____ Clean 3B4 pumps- 2 squirts daily
- _____ Clean up any debris on premises
- _____ Clean floats and inspect for cracks, holes, etc
- _____ Grease hoist for pulling pumps
- _____ Wash down well
- _____ Clean any debris from dry well and remove cobwebs
- _____ Exercise and grease all check valves in dry wall.

EL RIO VILLA	READING	DIFFERENCE	ISSUES
Flow			
Electrical			
Pump 1			
Pump 2			
Pump 3			
Pump 4			

EMPLOYEE SIGNATURE _____ DATE _____

SUPERVISOR SIGNATURE _____ DATE _____

APPENDIX D

**Yolo County Improvement Standards Specifications – Sanitation Sewers –
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SANITARY SEWERS

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**SECTION 7
SANITARY SEWERS**

7-1 DESIGN CRITERIA

These Improvement Standards shall only apply to sanitary sewer collection facilities to be maintained by a County Service Area or sewer maintenance district under control of the Board of Supervisors that provides extended sewer services. These Standards are minimum design criteria. The County Engineer may permit modifications or may require higher standards where unusual conditions are encountered. These Standards shall also apply to any privately owned and maintained sanitary sewer collection systems serving 4 or more residential units or any commercial or industrial uses. Where sanitary sewer facilities are to be maintained by a Community Service District or City, the standards of the District or City shall govern the design and construction of sanitary sewer facilities.

7-2 FLOW DETERMINATION

Flow determination shall be based upon the approved zoning, existing land uses or General Plan land use designations, whichever produces the greatest flow. The minimum population density used shall be based on the latest US Census Tract data for single-family residential housing. Design flows shall be calculated using Table 7-1.

TABLE 7-1 SANITARY SEWER DESIGN FLOWS			
Land Use	Unit	Minimum Average Daily Flow (Gallons per Unit)	Peaking Factors¹
Single Family Residential (3.5 persons per unit)	Residence	350	3
Multi-Family Residential (3.0 persons per unit)	Residence	300	3
Commercial, Office	Gross Acre ²	2,500 ²	2-4 ²
Central Business District	Gross Acre ²	3,500	2-4 ²
Light Industrial	Gross Acre ²	2,000 ²	2-4 ²
Heavy Industrial	Gross Acre ²	3,000 – 5,000 ²	2-4 ²
Recreation and Parks	Gross Acre	200	2
Elementary School	Student	50	3
Middle School	Student	50	3
High School	Student	60	3
1: Peaking Factors may be increased or decreased based on flow peaking studies for trunk mains and pumping stations. 2: Subject to review and confirmation of intended uses and waste generation rates. Industrial uses may require private pre-treatment and/or peak reduction facilities.			

The infiltration and inflow allowance shall be 600 gallons per gross acre per day.

7-3 DESIGN FLOW

Design flow shall be calculated using the average daily flow for the upstream service area, as described in Section 7-2, unless more current design criteria is available in a Sewer System Master Plan.

The following formula shall be used to calculate the design flow:

$$Q_d = (Q_a \times PF) + I$$

- Where:
- Q_d = Design Flow
 - Q_a = Minimum Average Daily Flow
 - PF = Peaking Factor
 - I = Infiltration/Inflow Allowance

7-4 PIPE CAPACITY, SLOPE, VELOCITY, SIZE, DEPTH AND MATERIAL

- A. **Size:** The minimum size sewer pipe shall be eight inches in diameter unless otherwise approved by the County Engineer. The minimum size sewer service lateral pipe shall be four inches.
- B. **Slope and Velocity:** Minimum slopes of sewer pipes shall be such that the velocity of flow in the pipe when full shall not be less than two feet per second. Manning's formula shall be used to determine the relation of slope, design flow, velocity, and diameter. The Manning's "n" value shall be 0.013.
 1. Table 7-2 shows the minimum slopes for various pipe diameters. Pipe slopes that are less than those listed in this table shall not be used without the approval of the County Engineer. Pipes shall not be artificially oversized to justify the use of a smaller slope. The slopes indicated are based on a velocity of two feet per second with the pipe flowing full, or half full.

TABLE 7-2 MINIMUM SLOPES	
Inside Diameter (Inches)	Minimum Slope
8"	0.0035
10"	0.0025
12"	0.0020
15"	0.0015

2. The maximum depth of flow at design conditions in any collector (12-inch inside diameter or less) shall be 0.7 of the pipe diameter. Mains larger than 12-inches in inside diameter may be designed to flow full unless direct sewer service connections are planned; in which case the 0.7 diameter maximum depth shall govern.
- C. **Capacity:** Pipe capacity and invert elevations, in all cases, shall be adequate to carry the design flow from the entire tributary area, even though said area may not be within the project boundaries.
 - D. **Depth:** In the design of a system, one of the controlling conditions shall be that the collector system shall be at sufficient depth to provide a minimum slope for the sewer services of 1/4 inch per foot (or 2%), at the same time maintaining a minimum cover of 12 inches at any buildable location within the properties to be served, and a minimum of four feet of cover at the back of sidewalk, except that the depth shall be increased to provide minimum 6 inch clearance from underground (dry) utilities installed at the back of the sidewalk.

Minimum depth of new sewer collectors or mains shall be 6 feet from finish grade to top of pipe. The maximum depth of sewer lines shall be 15 feet, unless approved by the County Engineer. A geotechnical study may be required to determine special backfill requirements for sewer pipelines exceeding 10 feet in depth.

E. Material:

1. Polyvinyl Chloride (PVC) C900 Class 200 DR 14 conforming to ASTM D1784 for pipes up to 12-inch, and AWWA C905 Class 200 DR14 for larger diameters.
2. Ceramic Epoxy lined Ductile Iron Pipe with a 40-mil-thick high build multi component lining materials consisting of Amine cured Novalac epoxy with at least 20% by volume ceramic quartz pigments. Protecto 401 Ceramic Lining, or equivalent. Encase ductile iron pipe in clear 4-mil HDPE wrapping tubes in accordance with ANSA/AWWA C105 standards. Secure wrap with three wraps of 10-mil HDPE tape, overlapping each wrap one-half tape width.
3. ABS pipe and fittings at service lateral cleanout assemblies shall be Schedule 40 conforming to ASTM F 628 and ASTM D 2661. All products shall bear the seal of a nationally recognized listing or certifying agency.

F. Testing: Sewer lines and laterals shall be air tested in accordance with ASTM F1417 “Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.” Acceptance testing shall occur following completion of all trench backfill, and placement and compaction of aggregate base in streets.

Sewer lines and laterals shall be balled and flushed, and a TV inspection shall be made, following placement of aggregate base for street, and prior to paving, to allow defective work to be repaired prior to paving. Complete color recordings and logs of TV inspections shall be submitted to the County. Defective work includes but is not limited to:

- Cracks or breaks in the pipe
- Joint separations > ½”
- Low spots (sags) > 1” depth
- Chipped pipe ends > ¼”
- Protruding, folded, or otherwise deformed gaskets or flexible connectors.

Sewer laterals shall be TV inspected prior to final building occupancy to ensure that the laterals are free of debris and damage.

7-5 GROUNDWATER REQUIREMENTS

Geotechnical Reports: A Geotechnical Investigation Report with groundwater handling or design recommendations shall be required for all plans where public or private sewer facilities are proposed for construction in high groundwater areas.

In areas where groundwater is expected to be encountered above the flow line of sanitary sewer pipe, cement slurry backfill, concrete dams, geotextile wrapping of bedding rock, or other approved methods shall be utilized in the trench to retard the movement of groundwater through trench bedding material and minimize the potential for subsurface erosion.

7-6 SEWER LOCATIONS AND ALIGNMENT REQUIREMENTS

A. General: All public sanitary sewers shall be placed within rights of way dedicated for public streets unless the County Engineer specifically approves the use of easements. In some streets, dual collectors may be required.

There shall be a minimum horizontal clearance of ten feet between parallel water and sanitary sewer mains and the water main shall be higher than the sewer. At crossings, the water main shall be at least 12 inches above the sewer main. If a sanitary sewer force main must cross a water main, the requirements of Section 8-15.B shall apply.

- B. Location in New Subdivision:** In new subdivisions, sewers shall be located six feet southerly or easterly of street centerlines.
- C. Location in Existing Streets:** The County Engineer shall determine where sanitary sewers shall be installed in an existing street, considering factors such as curbs, gutters, sidewalks, traffic conditions, traffic lane conditions, pavement conditions, future street improvements plans, and existing utilities.
- D. Easements:** Permanent easements shall be a minimum of 15 feet wide for sewers up to 18 inches in inside diameter and a minimum of 20 feet wide for larger diameter sewers. Widths shall be increased as required to provide for trench wall slopes of 1.5:1 (Horizontal:Vertical) unless flatter slopes are required by existing soil conditions.
- Temporary working easements of adequate dimensions shall be provided to allow the construction within the permanent easement to be completed in a safe and reasonable manner.
- E. Water Well Clearance:** No sanitary sewer interceptor, trunk main, collector, or service shall be placed closer than 100 feet to any water well, public or private, unless the well has been abandoned in full accordance with Yolo County Environmental Health Department permit requirements, or the location otherwise approved, in writing, by the appropriate regulatory (State and/or County) agencies. If a clearance of less than 100 feet is approved, all pipe within that distance from the well shall be of material approved by the County Engineer. In no case shall a clearance of less than 50 feet be allowed.
- F. Alignment:** Alignment of all sewer pipe and structures shall be designed to provide a minimum 10 feet of clear separation from parallel existing or proposed water mains as a means of protecting the water main from contamination. Sanitary sewer lines shall pass beneath water mains at all transverse crossings and shall be placed to provide a vertical clearance of at least one foot between the respective pipes. A minimum of one-foot clearance from all other utilities and/or improvements shall be provided, in accordance with Department of Health Services requirements and California Waterworks Standards, unless otherwise approved by the County Engineer.
1. Horizontal alignment shall be parallel to the street centerline and straight between structures wherever possible. Minimum radius for sanitary sewers 8 inches through 12 inches in diameter shall be at least 140% of the pipe manufacturer's recommendation for minimum radius of curvature. A larger radius shall be used wherever practicable or where necessary to avoid joint deflection in excess of 80% of the pipe manufacturers' recommended maximum. Only factory joints will be allowed. Curve information shown on the plans shall include pipe radius (if not concentric with street centerline), sub-tended angle, length, and if needed, maximum pipe lengths.
 2. Vertical alignment shall provide a constant slope between manholes. If a change in grade is necessary, construction of a manhole shall be required unless the County Engineer approves the use of a vertical curve. In such case, elevations shall be shown at ten-foot intervals throughout the length of the vertical curve. Joint deflections in excess of 80% of the pipe manufacturers' recommended maximum will not be allowed. Only factory joints will be allowed.
- G. Upstream Uses:** Each property owner is responsible for the installation of a collector sewer across their property and/or frontage that will serve all upstream uses within an upstream service area.

7-7 TRENCH LOADING CONDITIONS AND PIPE DESIGN

- A. **Conduit Loading:** For rigid conduit, Marston's formula shall be used to determine the load placed on the pipe by backfill. The procedure for rigid pipe is described in the ASCE Manual and Report of Engineering Practice 60 and in similar handbooks. In the absence of specific soils data, as determined by a Geotechnical Engineer, a soil weight of 120 p.c.f. and a k_u factor of 0.110 shall be used.

For flexible conduits, Marston's formula for flexible conduits as shown in the ASCE Manual and Report of Engineering Practice No. 60 and in similar handbooks shall be used to determine the load placed on the pipe by the backfill. The maximum load allowable shall be determined by pipe deflections computed by the Iowa Deflection Formula (or Spangler's Formula.) The soils reaction modulus (E') shall be estimated using a method acceptable to the County Engineer, and shall consider the modulus values of both the native and the bedding materials (ATV method). The bedding soils reaction modulus (E') used in the deflection calculation shall be 1,000 psi for Type II bedding, utilizing imported material to twelve inches above the top of the pipe. Deflection lag factor shall be 1.5. In the absence of specific soils data, as determined by a soils engineer, a soil weight of 120 pcf, a k_u factor of 0.110, and a bedding constant of 0.110 shall be used. Placement of flexible conduits within soils equivalent to Class V and types MH and CH of Class IV ASTM D2321 material will not be permitted unless approved by the County Engineer.

- B. **Safety Factor:** A safety factor of 1.25 shall be used for reinforced concrete pipe, and 1.5 for all other rigid pipe. Only the three edge bearing strength of the pipe shall be used in the computations for rigid pipe.

- C. **Bedding and Initial Backfill:** Bedding types and factors shall conform to Standard Drawing 7-4. Bedding and initial backfill type shall be as necessitated by height of cover over the pipe, trench width, pipe strength, and other factors used to determine safe pipe loading.

Special attention shall be given to backfill requirements for deep trenches, pipes located in State rights-of-way and for pipes placed in areas where trench width is excessive, such as in the vicinity of bore pits. See Section 7-13 regarding this condition. Any special backfill requirements shall be noted on the plans.

Unless otherwise noted on the plans, bedding and initial backfill for all pipe sizes shall be Type II, with trench widths subject to limitations set forth in Standard Drawing 7-4. The minimum trench width for all rigid pipe shall be pipe O.D. plus 12 inches.

Type III bedding and initial backfill are intended primarily for emergency field conditions. Their use shall normally not be specified on the plans and shall require specific written approval of the County Engineer before use.

- D. **Special Pipe Strength Requirements:** Ductile iron, or other high-strength pipe approved by the County Engineer, shall be used whenever cover is greater than 25 feet, or extra support strength is required (such as to resist traffic loading). Ductile iron pipe or other high-strength pipe approved by the County Engineer, shall be used whenever cover is less than four feet, or insufficient clearance exists between the sewer pipe and rigid or load transmitting structures.

7-8 MANHOLE CRITERIA

- A. **General:** Manholes shall be placed at all intersections of sanitary sewer mains, at any change in pipe slope, at any angular or abrupt change in horizontal alignment, at the end of any main terminating in a cul-de-sac, at the end of all permanent mains 120 feet or more in length, and at the end of any temporary main more than 200 feet in length. All manholes from which sewer main extensions are anticipated shall have a pipe stub installed at the grade and in the direction of

the anticipated extension. Summit manholes connecting two sewer collectors are not acceptable. Manholes may be required on lateral lines serving industrial sites in accordance with Yolo County Code section 6-5.307.

- B. Spacing:** Maximum spacing of manholes shall be 400 feet for all straight sewer mains of ten-inch diameter or less. Where sewers are installed with curvilinear alignments, manholes shall be placed at the beginning or end of such curves, and the distance between manholes shall not exceed 300 feet. Where the length of the curve is in excess of 300 feet, manholes shall be placed at intermediate points along the curve. Reverse curves require a manhole at the point of tangency between the curves.
- C. Elevation Criteria:** When two mains of the same size enter a manhole such that the flow of one must change direction more than 20 degrees, or if flow in a single main must change direction more than that amount, the invert grade at the exit must be at least 0.10' below that of the entrance pipe, but in no case shall the crown of the exit pipe be lower than the invert of the entrance pipe. If the pipes entering and exiting any manhole are not of the same size, the crown of the exit pipe shall never be higher than the crowns of pipes entering the manhole. Manholes not meeting these conditions shall be governed by inside drop connection requirements.
- D. Construction Requirements:** Manhole construction shall conform to the provisions of Standard Drawings 7-1 to 7-3. Lock-type or pressure-type manhole covers shall be used on manholes located in easements, and in areas subject to flooding.
- If the distance from the crown of the pipe to the top of the rim is less than 6 feet 11 inches, 18-inch high cone shall be used. Manholes shall use flat slab tops that have through mains and less than 5 feet 8 inches from the crown of the pipe to the rim. The plans shall note that the frame on manholes located in unimproved areas shall be set 1.0' above existing ground level, provided with a concrete collar and an object marker.
- Manholes located outside of paved areas shall be provided with all-weather access, and shall be located in the center of a 10 foot diameter level all-weather pad, so that they are accessible to maintenance personnel and equipment.
- E. Vacuum Testing:** All manholes shall be vacuum tested in accordance ASTM C 1244. Acceptance testing shall occur following placement of aggregate base and prior to paving.

7-9 DROP CONNECTION

Drop connections are not allowed, but may be approved by the County Engineer. If approved, manholes containing drop connections shall be coated with a protective coating of either a) 40-mil T-lok PVC liner, Ameron Protective Coatings, b) CCS Coating, high build chemical resistance 40-mil epoxy coating by ChemCo Systems, c) Raven 405 epoxy, 60 mils, d) or equivalent. There shall be no more than one inside drop connection into a four-foot diameter manhole.

7-10 FLUSHING BRANCH

A flushing branch may only be used at the end of a collector less than 200 feet in length if the collector extends to a subdivision boundary and if there are definite plans for its extension. If a collector extends to a subdivision boundary, is planned for definite extension, and has no sewer service connections, it may be capped. Flushing branches shall conform to Standard Drawing 7-6.

7-11 SEWER SERVICES

- A. General:** Sewer service laterals shall conform to Standard Drawing 7-5 and shall be aligned at right angles to the main unless otherwise approved by the County Engineer. The sewer service shall extend from the collector sewer to the lot being served. Sewer services shall extend at least one foot beyond the edge of the pavement of any private road. Easements of adequate width to

accommodate the services shall be obtained. A plan and profile of any sewer service shall be supplied to the County Engineer upon request. Construction of the cleanout to grade for all sewer services is required. The cleanout location shall be accurately staked with a 4"x 4" post until final landscaping is completed and service connections are completed.

The location of all sanitary sewer services shall be permanently marked with a 2-inch tall "S" set in the top of concrete curb. Where curbs do not exist, a 2'x2' concrete pad shall be placed around the sewer cleanout box, and a permanent post (2" diameter, galvanized steel, painted white) shall also be installed to mark the location of the sewer cleanout box.

- B. Sizing:** Normal sewer service size is four inches for residential and six inches for multi-family or commercial. Six-inch or larger sewer services shall serve schools and other developments expected to contribute high sewage flows. In addition, sewer services shall be sized according to requirements of the Uniform Plumbing Code, and as determined by the Engineer. If the sewer service and collector are of the same size, a manhole must be constructed.
- C. Connection Limitations:** Sewer services shall not directly connect to sewer mains designed to flow full or to mains more than 16 feet in depth without the approval of the County Engineer.
- D. Material:** The "T" or wye and the sewer service shall be of the same material as the collector to which it connects.
- E. Location:** When sanitary sewers are constructed as part of new subdivision improvements, a separate sewer service shall be constructed between the main and each lot. In new subdivisions or developed areas, unless specifically requested otherwise in writing by the property owner or Design Engineer, sewer services shall be placed on the low side of any subdivision lot or similar parcel with two percent or greater slope across the front. Otherwise, the sewer service shall be placed in the center of said lot or parcel. Consideration shall be given to trees, improvements, proposed driveways etc., so as to minimize interference when the sewer service is extended to service the house. If the property is located such that sewer service is available both to a main located in an easement and also in right of way, sewer service shall be connected to the right of way location unless otherwise approved by the County Engineer. No sewer service shall be located such that future on site construction will result in the main being in such proximity to a water well or water main or water service that applicable health standards will be violated.
- F. Depth:** The Design Engineer shall verify the adequacy of the normal sewer service depth at the edge of easement or right of way to serve the intended parcel. A depth of four feet to crown of pipe, measured from the ground surface at the back of sidewalk shall be considered normal sewer service depth, except as allowed in the event of conflict with dry utilities, as provided for on Standard Drawing 7-5. Whenever greater depth is required, the Design Engineer shall designate the invert elevation of the sewer service at the edge of the right of way or easement on the construction plans. If a joint trench is being utilized for other utilities, the Design Engineer shall indicate on the plans that a Joint trench will exist and shall adjust service elevations as necessary. It shall be the responsibility of the Design Engineer to arrange for coordination of the grade of utilities located in the joint trench and the sewer services.
- G. Service Requirements in Developed Areas:** In developed areas, a sewer service shall be provided to each legal parcel containing a source of sewage and having a property line less than 200 feet from a collector. A property owner's request for sewer service location shall be honored whenever practicable. Parcels having two or more sources of sewage must have an independent sewer service provided to each sewage source. A sewer service shall be provided to each subdivision lot or lot similar as to size and possible development. At an early stage of design, the Design Engineer shall send every property owner affected by the proposed work a questionnaire requesting, in writing, the owner's preferred sewer service location. In absence of a response to this questionnaire, the Design Engineer shall provide a sewer service as required by this Section.

In addition, when sewer services are staked immediately prior to construction, each property owner shall be given notice that he should give consideration to the staked location of his sewer service and, if not satisfactory, immediately notify the Design Engineer. The date of notification, nature of change, and other pertinent information shall be recorded. Compilation of this information shall be the responsibility of the Design Engineer and the information shall be furnished to the County Engineer upon request.

7-12 CREEK OR CANAL CROSSING DESIGN

Advance approval of the County Engineer and of other appropriate agencies is necessary prior to initiating design. Copies of required permits shall be provided to the Department prior to approval of the plans.

- A. **General:** In all cases, the proposed future creek or canal bed elevation shall be used for design purposes. Crossing details of pipe, piers, anchorage, transition couplings, etc., shall be shown on a detail sheet of the plans.
- B. **Design:** Calculations shall be submitted which clearly indicate the design of the pipe and supports regarding impact, horizontal and vertical forces, overturning, pier and anchorage reactions, etc.
- C. **Construction and Material:** For collector sizes ten inches and smaller, ductile iron pipe or other pipe material as approved by the County Engineer shall be used under the full channel width, plus ten feet each side, unless the pipe is four feet or more below the channel bed elevation. For main sizes twelve inches and larger, pipe used shall be as directed by the County Engineer. Special care shall be taken to provide a firm base for the pipe bedding. The plans shall specify that all soft or organic material within the channel banks shall be replaced with select imported backfill. In addition, the pipe shall be encased in concrete or soil cement shall be used to protect the pipe for the full width of the channel. Unless otherwise directed a clay soil plug shall be required at the top of the pipe at the downstream side of the crossing. The plug shall be a minimum of four feet in length, shall extend the full width of the trench, and shall extend twelve inches above and below the pipe or as approved by the County Engineer.

If the pipe must cross above the channel, ductile iron or welded steel pipe shall be used. Steel pipe may be cement lined and coated, fusion epoxy lined and coated, or glass lined; the County Engineer shall specify or approve the type of coating and lining specified, and the gauge, class, or thickness of the pipe.

Reinforced concrete piers of adequate depth shall be located as necessary for adequate support of the pipe. The pipe shall be held in cylindrical cradles, formed in the pier tops, by galvanized steel straps, with galvanized anchor bolts of adequate size. Cushion material shall be placed between the pipe, clamps, and support. The invert elevation at the point of maximum deflection of the suspended pipe shall be invert of the pipe at its downstream support.

7-13 JACK AND BORE REQUIREMENTS

Where use of conductor casing is specified, the casing shall be reinforced concrete pipe. The casing shall be of sufficient diameter to allow dry sand to be blown into the void between the carrier and the conductor and to allow adjustment of the carrier pipe to grade. Normally, an inside diameter six inches greater than the outside diameter of the couplings of the carrier pipe is sufficient. Reinforced concrete pipe conductors must be designed for the loading condition and, if jacked, the additional loading imposed by the jacking operation.

Direct dry boring of reinforced concrete pipe and of the portion of sewers and sewer services, which pass beneath curbs and gutter, sidewalks, and other obstructions, up to a maximum length of 15 feet, is

permissible. Six-inch and smaller pipelines may be installed by wet boring where approved by the County Engineer. Pipe material used in the small size dry and wet bores shall be ductile iron pipe, or Class 200 (DR-14) PVC pipe conforming to the requirements of AWWA C900.

Backfill in bore pits shall be given special attention with respect to preventing structural failure of the pipe entering or exiting the conductor, and adequate bedding and initial backfill shall be specified.

7-14 PUMP STATION AND FORCE MAIN REQUIREMENTS

Every phase of pump station design, including force mains, shall be closely coordinated with and shall be under the direction of the County Engineer. Pump station features shall include, but not be limited to, buried non-corrosive wet well, duplex (redundant) submersible pumps & motors, above ground weather proof enclosure for automated controls, telemetry, SCADA, remote dialing alarms, phone service, power supply, backup power generator powered by natural gas or propane (LPG), lighting, all weather access, sulfide related corrosion control or reduction, life cycle cost analysis of proposed features, etc. Force Main features shall include, but not be limited to, non-corrosive pipe materials, pipe routing, exit manhole sulfide related corrosion control or reduction, life cycle cost analysis of proposed features, etc.

A. Plans for Wastewater Pump Stations

1. General Layout:
 - a. Plot plan showing layout of site and building(s), including driveway and number of parking stalls, exterior piping and appurtenances, fencing, and utilities. Property ties shall also be shown.
 - b. Plans and details of grading, drainage, erosion control, landscaping, and sprinkler system.
 - c. Show FEMA flood elevations if area is in a 100-year flood plain.
2. Detail Plans:
 - a. Architectural plans, elevations, and details.
 - b. Structural plans, elevations, sections, and details.
 - c. Utility plans (electrical, mechanical, etc.) showing exact location and elevation to prevent damage from future excavations.
 - d. Mechanical plans including pump, isometrics, plumbing, ventilation, air condition and other equipment installations, piping layout, and details.
 - e. Electrical and telemetering plans and details including conduit schedule and lighting fixture layouts, control equipment arrangement, and wiring diagrams (one line and elementary control diagrams) for power distribution and controls.
 - f. Wastewater level control arrangement for operating pumps and alarms.
 - g. Other plans, sections, elevations, schematics, details and notes, as required, to adequately show the proposed construction.

B. Specifications: All work shall be in accordance with these Improvement Standards. Special provisions shall supplement the Improvement Standards and shall specify in detail the construction of the wastewater pump station, and all appurtenances.

C. Other Requirements:

1. Design Calculations: Calculations pertinent to the design shall be submitted to the Planning and Public Works Department. Such calculations shall be used by the County for determining the adequacy and feasibility of the proposed facilities under review. Any failure on the part of the Developer or authorized representatives to submit such calculations will delay the review and approval of the desired project.
2. Revisions to Approved Plans and Specifications: Any deviations from these specifications shall be approved by the County Engineer in writing before such changes are made. Any deviations shall be submitted well in advance of any construction work which will be affected by such changes to permit sufficient time for review and approval.

3. **Operation During Construction:** Existing facilities and pump station units shall be kept in operation during construction.
4. **Equipment Manuals:** Equipment manuals shall be provided for each pump station. The manuals shall contain sufficient information on the installation, operation, maintenance, and repair of the pump station equipment. Manuals shall be bound in looseleaf “D” binders. Folders shall contain only the information in relation to the equipment furnished. Each binder shall be labeled on its front cover and spine with the name of the facility and subject matter. Two sets of manuals shall be provided to the County.
5. **Facilities Operations and Maintenance Manual:** A detailed operations and maintenance manual for the facilities to be constructed shall be required for all pump station projects. The manual shall give the operations and maintenance personnel the proper understanding, techniques, and any other information necessary to efficiently operate and maintain their facilities. Operations and maintenance manuals shall comply with all applicable State and Federal statutes, ordinances, and regulations. Two sets of manuals shall be provided to the County.
6. **Initial Start-Up Procedure Training:** Services of field engineers or qualified personnel for all equipment provided shall be required to assist and instruct the County's operating and maintenance personnel. Such services shall commence before final acceptance testing.
7. **Spill Prevention Plan and Emergency Response Plan:** The facility's O&M manual shall include sufficient operating instructions in the form of a spill prevention plan to prevent spills. The emergency response plan shall also provide instructions to the operator on how emergencies are to be handled. Two sets of manuals shall be provided to the County.
8. **One Year Certification:** A certification shall be prepared after one year of facility operation documenting the performance of the facility. This certification is intended to confirm that the facility is operating as planned and there are no problems with the equipment. The certification should be prepared by the facility designer, construction manager, or other registered engineer approved by the County.

D. Design Factors to be Considered:

1. **Type of Station (Built-In-Place Wastewater Pump Station):** All pump stations shall be built-in-place and may be either dry or wet well type. Premanufactured pump station systems may be considered upon review by the County Engineer.
2. **Wastewater Flows and Design Capacity:**
 - a. *Wastewater Flows.* Wastewater flows shall be determined in accordance with County Improvement Standards.
 - b. *Design Capacity.* Wastewater pump stations shall be designed to discharge design flows.
 - c. *Location:* Wastewater pump stations shall be located where tributary areas will be most effectively serviced and where development, construction, and operational costs would be at a minimum. Pump stations should not be subject to flooding and shall be readily accessible. Wastewater pump station sites shall be adequate to allow on-site parking of service trucks and equipment and to buffer adjoining properties from noise. Future modification and expansion requirements shall be given consideration.

E. Site Improvements:

1. **Grading:** Wastewater pump stations shall be located two feet (2') above 100-Year Flood Level and provided with adequate drainage facilities to carry away storm waters. Adjacent properties shall not be jeopardized by such provisions.
2. **Driveways and Parking Areas:** Paved driveways and parking areas shall be provided for service trucks. Width of driveways shall be 12 feet minimum. Pavement shall be asphalt or Portland cement concrete. Concrete curbs shall be required for all pump stations. Entrance gates shall be set inward, toward the station, at least 18-feet to allow trucks entering or leaving the station to pull off the adjacent street.

3. Fencing: Pump station sites shall be fenced in with a six-foot (6') high fence or wall. Masonry walls or other approved types of enclosures are required if pump station is located adjacent to a residential project. Where chain link fences are used, wire fabric shall be nine gauge minimum, galvanized, and plastic coated with color determined by the County. In isolated areas, three strands of barbed wire should be installed along the top of the fence on an arm projecting outward at an angle of 45 degrees. A one foot (1') wide gravel strip shall be provided under fencing. Gravel strip shall be contained with redwood or other approved durable material headers.
4. Gates: Gates shall be provided with heavy duty padlock hasp fixtures and shall be designed for safe opening and closing during strong winds. At facilities where PG&E transformers and/or meters are installed within the station's perimeter, hasps shall be designed to accommodate two padlocks. Design shall allow access with either padlock removed.
5. Landscaping: Sites shall be landscaped to blend with the surrounding environment to render a pleasing overall appearance. Consideration shall be made to minimize groundskeeping maintenance. Chain link fencing shall be screened with landscaping.
6. Sprinkler System: Automatic sprinkler systems shall be installed for lawn/foilage irrigation.

F. Structures and Appurtenances:

1. Architectural Design: Wastewater pump stations shall be architecturally designed to be in harmony with surrounding development. Materials shall be selected to keep construction and maintenance cost at a practical level. As much as possible, non-corrosive materials shall be used. All architectural design shall be prepared by a Registered Architect.
2. Substructure: Built-in-place pump station substructures shall be reinforced concrete construction. All substructures shall be waterproof and watertight. Test borings shall be made to determine the soil characteristics and ground water conditions at all pump station sites and foundations shall be suitably designed. Consideration shall be given to flotation during construction and/or flooding condition. Ensure that NPSH requirements of pump are met. Structural backfill for the lift station shall be placed as engineered fill, in lifts not exceeding 12 inches in compacted thickness. Each layer shall be uniformly moisture conditioned to at least the optimum moisture condition and compacted to at least 95% of the maximum dry density per ASTM D1557-91 specifications.
3. Backfill: Backfill around the lift station well shall consist of clean crushed rock with 100% passing through a one inch (1") sieve and no appreciable amount passing through a #4 sieve. A minimum of 12 inches (12") of crushed rock shall be placed at the base of the sewer lift station footing for stabilization and extending a minimum of 12 inches (12") outside the edge of cast-in-place or pre-cast base. In all areas the crushed rock shall be separated from the native material with an approved non-woven geotextile fabric. With approval of the County Engineer, excavated soils may be used for backfill, after required drying has occurred to allow the specified degree of compaction to be achieved. Imported soils must be free of organic concentrations, rubble or debris and must have approval of the County Engineer. The contractor may find it necessary to use deep wells to lower the water table in lieu of using sump construction and pumping. If sheet piling is used the contractor shall extend the tips to a sufficient depth to prevent "quick" conditions or sand "boils" from occurring. The excavation for the sewer lift station may require the contractor to use special construction techniques, which may include but not limited to, sloped excavation, shoring and/or sheet piling, or a combination of methods. The contractor shall submit to the County Engineer for review and approval all shop drawings and proposed methods of construction.
4. Dry Wells: Dry wells shall be sized to meet space requirements for equipment, piping and ease of maintenance. Adequate working space, at least two feet (2') clear, shall be provided between and around pumps and other equipment. Provide three feet (3') clearance for electrical equipment to comply with the National Electrical Code. Space and provisions for planned future pumps and equipment shall also be provided.

5. Wet Wells: Wet wells shall be designed on the basis of minimizing deposits of solids, preventing wastewater from becoming septic, and avoiding frequent starting of pumps. Minimum pump cycle (period from start to start) for any one pump shall be 5 minutes, but not less than the pump manufacturer's minimum pump cycle time rating. Maximum retention time of wastewater in wet wells shall be 30 minutes at average flow (total wet well wastewater volume shall be used in computing retention time). Wet wells shall have a minimum inside width of five feet (5') and shall be sized to keep wastewater levels within the following limits:
 - a. High water level. Desired: at invert of incoming sewer. Maximum: at crown of incoming sewer.
 - b. Low water level. Not lower than top of pump casing.
 - c. Vertical distance between pump start and stop levels. Six inches (6") minimum.
 - d. Floors shall have a slope of 1:1 minimum, sloping towards a hopper bottom. The hopper bottom shall be designed for proper installation and function of pump suction inlets. Influent lines shall be designed without vertical drops into the wet well to minimize release of entrained air/gases. The wet well shall be divided into two or more sections, properly interconnected, to facilitate repairs and cleaning. Wet wells shall have a minimum 40-mil PVC 'T-lock' lining to protect against hydrogen sulfide corrosion.
6. Access. Reinforced concrete or structural steel stairways shall be provided for access to dry wells. Stairways shall have a clear passage of at least 30 inches. Stairs shall be provided with permanent non-slip treading. Access shall be provided to all wet well compartments. Access manholes shall be located to best facilitate maintenance operations.
7. Ventilation. Dry well shall be ventilated by a mechanical air exhaust system providing at least one air change every three (3) minutes. Outlets of exhaust system should not be located less than 12 feet from any opening except when exhausting through the roof. Ventilation exhaust shall be located downwind of any inlet openings. Velocity in air ducts shall not exceed 1500 fpm. When required fan capacity is large, the use of two fans shall be considered. Switches for the operation of the ventilation equipment shall be interlocked with the dry well light switch. Ventilation shafts shall be provided for wet well compartments with only one access opening.
8. Drainage. Dry well floors shall be constructed to drain by gravity into trench drains channeled to a sump. The sump pump shall be submersible. Minimum sump pump capacity shall be 25 gpm with exception of stations equipped with water seal systems, hydraulic operated cone-check valves, or similar type equipment. These stations shall be provided with duplex submersible pumps, each capable of pumping at least 50 gpm. A switch for lead/lag operations shall be provided at the Motor Control Center (MCC). Sump pump discharge shall enter the wet well adjacent to and as high as possible to the ground floor level. Trench drains shall be covered with corrosion resistant gratings. Floor framing and anchoring devices for gratings shall be 316L stainless steel.
9. Superstructure: All pump stations shall have a superstructure.
 - a. *Floor Elevation and Area.* The latest flood zone map shall be consulted. Floor areas shall be adequate for mechanical equipment, electrical equipment and controls, sanitary facilities, storage, and future expansion. Adequate working space, at least two feet (2') clear, shall be provided between and around all equipment. Provide three feet (3') clearance for electrical equipment to comply with the National Electrical Code.
 - b. *Height.* Height of superstructure shall provide adequate working height. Whenever possible, height of superstructures shall be adequate to permit the removal of motor rotor from its stator or the removal of other equipment of larger size with the installed hoisting equipment.
 - c. *Materials of Construction.* The following materials are acceptable for construction of superstructures:

- i. Beams and Columns: reinforced concrete or structural steel.
 - ii. Roof: reinforced concrete.
 - iii. Wall: masonry or reinforced concrete.
 - d. *Insect Screens*. All structure openings for ventilation or light, except doorways, shall be equipped with removable stainless steel insect screens.
 - e. *Doors*. Doors shall be of adequate size to permit removal of pumps, motors, and other equipment. Locks shall be keyable to the Department of Planning and Public Works master key.
 - f. *Roofing*. Unless otherwise submitted and approved, roofing shall be pitched, standing seam metal.
 - g. *Railings and Stairways*. Railings and stairways shall conform to OSHA regulations and County-adopted Building Codes.
 - h. *Outdoor Enclosures*. Gages, meters, and control devices installed outdoors shall be mounted within weather protected enclosures. Gages integral of other devices such as bearing thermometer on motors are excepted. PG&E meter location shall permit easy PG&E viewing.
 - i. *Provision for Equipment Removal*: Provisions shall be made to facilitate removing pumps and other equipment for repair and maintenance.
 - j. *Openings*. Openings shall be provided in ground and intermediate level floors of pump stations. Ground level floor openings shall be covered with removable grates and have removable pipe posts and guard chains around its periphery. Stationary posts with removable pipe railing sections shall be provided around intermediate floor openings. All openings shall be provided with portable peripheral curbing and shall be large enough to provide ample room to install or remove pumps and other equipment.
 - k. *Hoists*. Built-in-place pump stations shall be equipped with trolley type hoists traveling on steel beams or traveling bridge cranes. Traveling bridge cranes shall be provided for installations equipped with 6 mgd pumps and larger. Bridge cranes shall be electrically controlled. Hoists for station with a vertical lift of 25 feet or more (pump room floor to top floor) shall be electrically powered. Plug-in type hoists operating on single phase 120 volts may be allowed for small stations.
 - l. *Eye Bolts*. Eye bolts for block and tackle type hoist shall be provided over pumps, valves, header piping, and other locations to facilitate maintenance operations and equipment removal. The load rating of each eyebolt shall be shown on the plans.
 - m. *Headroom*. Sufficient headroom, including room for lifting device, shall be provided to allow pump rotating element to be removed without disturbing the pump volute.
10. Station Facilities: Depending on proximity of station to other available facilities, and on a case-by-case basis, pump stations may be required by the County Engineer to incorporate any or all of the following:
 - a. *Sanitary Fixtures and Accessories*.
 - i. Service sink shall be acid resistant, white enameled, cast iron body, stainless steel rim.
 - ii. Water closet shall be vitreous china, wall hung, close-coupled closet combination with open front, black closet seat without cover.
 - iii. Paper towel dispenser shall be chromium plated.
 - iv. Toilet paper holder shall be chromium plated.
 - v. Paper toilet seat cover dispenser shall be chromium plated.
 - vi. Soap dish shall be chromium plated.
 - vii. Waste paper basket shall be plastic or noncorrosive material.
 - viii. Wall mirror shall be a minimum 12 in. x 24 in.
 - ix. Small storage cabinet for janitorial supplies shall be a minimum 12 in. wide, 18 in. high, and 8 in. deep.

- b. *Light Fixtures and Receptacles.* Electrical systems shall conform to the National Electric Code.
 - i. *Light Fixtures.* Light fixtures shall be provided to supply adequate illumination within pump stations and shall be mounted where relamping can be accomplished with reasonable ease. Light fixtures shall also be installed next to exterior doors on the outside and around the perimeter of the building with at least one light over the wet well cover manholes. Wet wells shall not require light fixtures. Light fixtures below ground level shall be vapor-tight. Fluorescent fixtures using 48 inch T-8 type tubes are preferred. High pressure sodium fixtures shall be used where appropriate.
 - ii. *Night Lights.* Night lights shall be provided above all building entrances and equipped with lamp shades to prevent glare beyond the perimeter fence line. Consideration shall be made for a night light at the perimeter entrance gate. Night lights shall be automatically controlled by photocells.
 - iii. *Emergency Lights.* Battery-powered emergency lights shall be provided at all floor levels of the pump station and emergency generator location or building. Emergency lights shall be connected to the normal service via a receptacle, mounted adjacent to the emergency light.
 - iv. *Receptacles.* Weather-proof receptacles shall be installed at all floor levels of pump station and outside the building, adjacent to the wetwell.
- c. *Telephone.* Terminal cabinet and touch tone instrument shall be provided.
- d. *Miscellaneous Equipment.*
 - i. *Fire Extinguishers.* Fifteen lbs. CO2 for MCC room and generator area. Ten lbs. dry chemical for lower floors. All fire extinguishers shall be wall mounted.
 - ii. *First aid kit.*
 - iii. *Eight inch electric clock.*
 - iv. *Plastic trash receptacle, thirty gallons capacity with cover.*
 - v. *Desk and chair.*
 - vi. *Storage cabinet for flammable materials.*
 - vii. *Legal size drawer file cabinet with lock.*

G. Pumps, Motors, and Controls:

1. *General.* Major pump stations shall be equipped with a minimum of three pumps. Smaller pump stations may be equipped with two pumps. Pumps shall be capable of operating over the range of flows without excessive cycling and without long retention time. Variable speed drives shall be utilized for wastewater pump stations and whenever conditions such as long retention periods or short pumping cycles cannot be avoided. Dual speed motors may be considered where appropriate. All pump stations shall be equipped with a standby pump equal in capacity to the largest of the main pumping units. The main pumping units shall be capable of handling the station's design flow without the use of the standby unit. Pumps shall be capable of passing spheres of at least two inches (2") and shall have a minimum discharge opening of four inches (4") in diameter. Speed of pumps shall not exceed 1200 rpm. Pumps shall be capable of safely rotating in reverse direction at full runaway speed without damage to appurtenances under the shutoff head of the units. The brake horsepower required at full motor speed at any head along the curve shall not exceed the rated horsepower of the motors.
2. *System Head-Capacity Curves.* Pumps shall be selected so that the head-capacity characteristics correspond as nearly as possible to the overall station requirements. This shall be accomplished by the preparation of the system head-capacity curves showing all conditions of head and capacity under which the pumps will be required to operate. The system head-capacity curves shall be developed using standard hydraulic methods for determining friction losses to show the minimum and maximum head losses that can be expected. The equivalent length method using the Hazen-Williams formula is preferred.

Minimum and maximum head losses shall be determined using “C” values. The system head-capacity curves shall consist of the following:

- a. System Curves. Curves showing total dynamic losses in the force main at varying pumping rates for minimum and maximum static heads.
 - b. Individual Pump Characteristic Curves. Curves furnished by pump manufacturer showing pump's head-capacity characteristics. Curves at minimum and maximum anticipated speeds shall be furnished for variable speed pumps.
 - c. Modified Pump Curves. Curves showing pump's head capacity characteristics at the station header, obtained by deducting friction losses in the suction and discharge piping of each individual pump from their characteristic curves at corresponding pumping rates.
 - d. Combined Modified Curves. Curves showing multiple pump operation, obtained by adding capacities at points of equal heads on the modified pump curves.
 - e. NPSH Curves. Curves showing the available system net positive suction head (NPSHA) and the pump's required net positive suction head (NPSHR) shall also be evaluated to minimize the occurrence of cavitation. The NPSHA and NPSHR curves shall include the operating conditions of minimum static suction head and maximum frictional loss ($C=100$) over the entire operating range of each pump. For variable speed pumps where operation of a single pump at the maximum speed will result in cavitation, NPSHA and NPSHR curves shall also be evaluated at the highest variable speed that the pump will experience when it is operated alone or when operated simultaneously with other pumps.
3. Types of Pumps. All pumps shall be vertical units. Motors for stations with pump capacities greater than 2 mgd shall be installed on the ground level floor and connected to pumps with removable driveshafts, intermediate driveshafts, and equipped with removable and adjustable flexible couplings. For pumps of less than 2 mgd capacity, submersible pumps may be used for wet pit installation. Consideration for pump on/off cycling shall be made to avoid high motor temperature. Motors for stations with pump capacities less than 2 mgd may be pedestal mounted.
4. Dry Pit Pump Construction.
- a. Handholes shall be provided on the periphery of pump casings and suction elbows for purposes of inspection and removal of obstructions. Handhole covers shall be flanged and secured to bossed sections and shall have interior surfaces formed to match interior surfaces of casting to which attached. Pump casing handhole shall be located so that visual inspection can be made of the discharge end as well as the volute. Handholes shall be a minimum of four inches (4") or about half of the pump size.
 - b. Pumps shall have flanged suction and discharge nozzles, faced and drilled to conform to ANSI Class 125 lb. standard. Pumps of sizes greater than five inches (5") shall be furnished with suction elbows that are separate and not integrally cast with any other part of the pump. Suction elbows shall be designed to prevent cavitation. Guide vanes shall not be used in suction nozzles.
 - c. Pumps of sizes greater than five inches (5") shall be provided with either fabricated structural steel supports or cast iron ribbed supports. Cast iron supports shall be cast integral with the pump casing or suction nozzle.
 - d. Base or sole plates shall be provided. Plates shall be anchored by stainless steel bolts with stainless steel lock washers and grouted to reinforced concrete pedestals. Hardened steel jacking screws for leveling and for aligning of pumps shall be provided. Mating surfaces shall be machined and all holes drilled and not be burned.
 - e. Intermediate drive shaft sections should be not more than 12 feet in length. Where more than one drive shaft is required, self-aligning steady bearings shall be provided at each intermediate location. Bearings shall be equipped with mechanism to allow alignment adjustments. Bearing and shaft guards shall be provided. Safe access to bearing and

- guards shall be provided. Grease fittings shall be equipped with extension tubing to facilitate lubrication.
- f. Drain and air release lines shall be provided for all pumps. Drain lines shall be installed at the packing drip reservoir and at the centerline of the suction pipe. Air release line shall be installed at high point of pump casings. Connecting points shall be bossed, drilled, and tapped. Air release lines from pump to the first valve shall be brass. Provisions shall be made for a sampling tap for wastewater unless waived by City.
 - g. Other features of pumps shall be as follows:
 - i. Bearing Housing: Of single cast piece or fabricated structural steel.
 - ii. Bearings: Not less than two.
 - iii. Shaft Sleeve: Replaceable stainless steel sleeve, from the outside end of the seal gland to the impeller, and set screwed to the drive shaft.
 - iv. Sealing Gland: Double mechanical seal with suitable fluid sealing/lubrication system.
 - v. Casing and Impeller Wearing Rings: Stainless steel and "Z" or "L" shaped.
 - vi. Suction Plate: Separate from suction elbow (pumps five inches (5") and smaller may be excepted).
 - vii. Taper Pins and Jacking Screws: On all machined joints and handholes.
 - viii. Eyebolts or Other Provisions For Lifting: On volute and bearing housing.
 - ix. Impeller Locknut: With smooth surface, no sharp corners and edges, and easily replaceable.
 - x. Seals: On both the upper and lower sections of the bearing housing.
 - xi. Tapered Shaft: Tapered for the full length of fit and keyed to the impeller. Exception may be made for four inch pumps.
 - h. Stock bronze fitted pumps with cast iron casings and bronze impellers are permitted for temporary installations. Impeller rings and shaft sleeve shall be bronze.
5. Wet Well Submersible Pump.
- a. Handholes shall be provided on the periphery of pump casings and suction elbows for purposes of inspection and removal of obstructions. Handhole covers shall be flanged and secured to bossed sections and shall have interior surfaces formed to match interior surfaces of casting to which attached. Pump casing handhole shall be located so that visual inspection can be made of the discharge end as well as the volute. Handholes shall be a minimum of four inches (4") or about half of the pump size.
 - b. Pumps shall have flanged suction and discharge nozzles, faced and drilled to conform to ANSI Class 125 lb. standard. Pumps of sizes greater than five inches (5") shall be furnished with suction elbows that are separate and not integrally cast with any other part of the pump. Suction elbows shall be designed to prevent cavitation. Guide vanes shall not be used in suction nozzles.
 - c. Base sole plates shall be provided. Plates shall be anchored by stainless steel bolts with stainless steel lock washers and grouted to reinforced concrete pedestals. Hardened steel jacking screws for leveling and for aligning of pumps shall be provided. Mating surfaces shall be machined and all holes shall be drilled and shall not be burned.
 - d. Drain and air release lines shall be provided for all pumps. Drain lines shall be installed at the centerline of the suction pipe. Air release line shall be installed at high point of pump casings. Connecting points shall be bossed, drilled, and tapped. Minimum size shall be d inch. Air release lines from pump to the first valve shall be brass. Provisions shall be made for a sampling tap for wastewater unless waived by the County.
 - e. Other features of pumps shall be as follows:
 - i. Pump shaft shall be stainless steel.
 - ii. Bearings: Not less than two, sealed, and grease lubricated.
 - iii. Seal: Tandem, double mechanical seal running in an oil reservoir. It shall be composed of two separate lapped-face seals, each consisting of one stationary and

- one rotating tungsten carbide ring; with each pair held in contact by a separate springs. The compression spring shall be protected against exposure to the pump liquid.
- iv. Casing and Impeller Wearing Rings: Stainless steel and "Z" or "L" shaped.
 - v. Suction plate: Separate from suction elbow (pumps five inches (5") and smaller may be excepted).
 - vi. Taper Pins and Jacking Screws: On all machined joints and handholes.
 - vii. Eyebolts or Other Provisions for Lifting: On volute and bearing housing.
 - viii. Impeller Locknut: With smooth surface, no sharp corners and edges, and easily removable and replaceable.
 - ix. Tapered Shaft: Tapered for the full length of fit and keyed to the impeller. Exception may be made for four inch (4") pumps.
 - x. Provide sensors and alarms for:
 - High temperature
 - Vibration
 - Seal leakage
6. Motor Construction.
- a. Dry Pit Motor.
 - i. Motors shall conform to the latest standards of the NEMA and the IEEE. Motors shall have ample capacity to operate the pumps under all head and discharge conditions without overloading. Starting current taken by the motors shall not exceed the values as regulated by PG&E or as permitted by the emergency generator. Motors shall be capable of safely rotating in the reverse direction at runaway speed without damage to appurtenances under shutoff head. Motors shall operate pumps through flexible shafts and couplings. Vertical shaft motors mounted on floors shall be furnished with rugged cast iron or steel foundation rings. Motors shall be induction type, drip proof, and suitable for operation from 230/460 volts, 3 phase, 60 cycle A.C. power systems. Motors shall have a service factor of 1.15. All pump motors shall have running time meters installed at the starter. All pump motors above 20 HP shall have an ammeter installed at the starter. Dry pit sump pump motor shall have running time meters installed at the starter.
 - ii. Motors shall be grease lubricated. Motors 7 HP or larger shall be provided with space heaters. Variable speed motors shall be provided with a RPM measuring device with a 4 to 20 milliamp output and a panel mounted digital RPM indicator.
 - b. Submersible Motor.
 - i. Motors shall conform to the latest standards of the NEMA and the IEEE. Motors shall have ample capacity to operate the pumps under all head and discharge conditions without overloading. Starting current taken by the motors shall not exceed the values as regulated by the PG&E or as permitted by the emergency generator. Motors shall be capable of safely rotating in the reverse direction at runaway speed without damage to appurtenances under shutoff head. Motors shall be suitable for operation from 230/460 volts, 3 phase, 60 cycle A.C. power systems. Motors shall have a service factor of 1.15. All pump motors shall have running time meters installed at the starter. All pump motors above 20 HP shall have an ammeter installed at the starter. The motor power wiring shall be brought up directly to the level of the MCC.
 - ii. Pump motors shall be housed in a watertight casing and shall have moisture resistant insulated windings. Pump motors shall have cooling characteristics suitable to permit continuous operation in a non-submerged condition.

7. Indicating Pressure Gauges. Indicating pressure gauges shall be provided at discharge nozzle and suction plate of pumps. Indication shall be in feet. Isolation valves and stainless steel diaphragm seals shall be provided at gauges.
8. Testing. All wastewater pumps shall be factory tested in accordance with the ASME Power Test Codes or the Standards of the Hydraulic Institute. Five (5) certified copies of the pump curves and data shall be furnished with each pump requiring drive motors 40 HP or smaller. For pumps requiring drive motors greater than 40 HP, a witness shop test shall be required and five (5) certified copies of the pump curves, data and report shall be furnished with each pump. Each pump casing shall be tested under a hydrostatic pressure of not less than 60 psi. All impellers, including spares, shall be statically and dynamically balanced. All electric motors shall be tested by the motor manufacturer. Routine tests are required for motors rated at 40 HP or less and Witnessed Complete Tests shall be required for motors larger than 40 HP. Five (5) copies of the certified or witnessed test data shall be furnished for each motor. All pumps shall be field tested to demonstrate satisfactory operations.
9. Spare Parts. All installations shall be furnished with the following minimum spare parts:
 - a. For each pump:
 - i. One set renewable sleeve for the pump shaft.
 - ii. One set of gaskets for all pump casing joints.
 - iii. One set of wearing rings, complete, for both pump casing and impeller.
 - iv. All parts recommended in the manufacturer's O&M manual.
 - b. In addition to the above, provide for each different size pump:
 - i. One complete pump, including suction plate.
 - ii. One set of each type of bearing used in the pump and shafting.
 - iii. One packing gland complete with rings, nuts, bolts, and one box of coil packing (if applicable)
 - iv. One mechanical seal assembly (if applicable).
 - c. For submersible pump:
 - i. One complete pump unit with stand.
 - d. For motor:
 - i. One set of bearings, complete for each size of motor 30 HP or larger.
 - ii. One set of space heaters for each size of motor.
 - iii. One set of brushes for each wound rotor motor.
 - iv. One brush holder assembly (for each size of wound rotor motor).
 - e. For generator:
 - i. All parts recommended in the manufacturer's O&M manual.
 - ii. One circuit board for the voltage regulator.
 - f. For ventilation fan:
 - i. One set of fan drive belts.
10. Starters and Controls:
 - a. Liquid Level Controls. The operation of wastewater pump motors shall be automatically controlled by liquid level sensing devices, actuated by wastewater level fluctuations in the wet well. Ultra Sonic/Transducer type with a 4-20 MA output should be provided. Automatic control settings shall be manually adjustable. Duplicate control units shall be provided for all pump stations equipped with split wetwell chambers. Controlling devices should also be capable of alternating the lead pump and setting off high and low level alarm. The operating range of controlling devices shall conform with the requirements of minimum pump cycle and maximum detention time.
 - b. Selector Switches. HAND-OFF-AUTO selector switches shall be provided to operate pumps. Selector switches shall be located at the motor control center and watertight switches next to pumps. Both selector switch settings must be the same in order for the pump to operate (Example: HAND-HAND or AUTO-AUTO). Automatic and manual

- control for variable speed pumps shall be capable of being adjusted over the effective speed range.
- c. Starters. Unless otherwise restricted by PG&E, starters shall be of the combination, magnetic, across-the-line type. Starters shall be solid-state.
 - d. Control Centers. Starters shall be mounted and wired as an integral part of free standing, unitized, enclosed control centers. Control centers shall be designed and constructed in accordance with the latest standards of the NEMA and the IEEE. Starters for temporary installations may be surface mounted. Control center cabinets shall be installed to permit full opening of doors without interference from adjoining cabinets, walls or other equipment. Split hinge doors may be used to prevent opening interference. All major components of control centers shall be by one manufacturer. If more than one control center is to be installed it shall be of the same type and manufacturer who has a qualified electrical service engineer permanently assigned and residing in Northern California. All panel units, devices, indicating lights, and instrumentation shall be identified by engraved nameplates or metal collars. All starters shall be of the draw out type whereby all control wiring and power conductors are automatically disconnected upon removal of the starter.
 - e. Indicating Lights and Elapsed Time Meters. Appropriate indicating lights and elapsed time meters should be installed for each starter. The running time meters shall be non-resetting, digital display, including a one-tenth hour feature. Indicating lights should be of the push-to-test type or light emitting diode (LED).
11. Instrumentation and SCADA System: SCADA software and PLC's shall conform to equipment as currently used by the County, or as approved by the County.
- a. Instrumentation. Pump stations shall be provided with instrumentation and SCADA systems which include the following:
 - i. Telemeter.
 - ii. Discharge flow.
 - iii. Discharge pressure.
 - iv. Wet well level.
 - v. Run-time pump hours.
 - b. Report-back of operational status:
 - i. Sewage pumps.
 - ii. Sump pumps.
 - iii. Emergency generator.
 - iv. Other items of importance to operations.
 - c. Alarms:
 - i. Normal power source failure (i.e. low voltage, high and low frequency, or phase reversal).
 - ii. Alternate power source failure.
 - iii. Generator operating.
 - iv. Main buss power failure.
 - v. Low level in wet well.
 - vi. High level in wet well.
 - vii. High level in pump room sump.
 - viii. Other equipment failures which could endanger pump station operations.
 - ix. Backup Generator Engine Supervision (i.e., starter failure, low speed, low oil pressure, high water temperature, etc.)
 - x. Building intrusion.
12. Remote Controls. When conditions dictate that installations be remotely controlled from supervisory stations, the following additional functions shall be provided:
- a. Report-back:
 - i. Operational status of each pump (running or not running).

- ii. Operational status of any other item of importance to remote control operations.
 - b. Supervisory remote controls:
 - i. Start and stop pumps.
 - ii. Other functions of importance to remote control operations.
 - c. Alarms:
 - i. Warning of transfer to supervisory remote control operations.
 - ii. Other alarms of importance to remote control operations.
- 13. Relay to Department of Public Works. All readings, alarms, and indications, shall be relayed to supervisory stations designated by the County Engineer.
- 14. Suppliers. Instrumentation systems should be provided by one integrator with field and shop maintenance facilities and full time service engineers located in Northern California.
- 15. Flow Meters.
 - a. Flow meter receiving instruments at the pump station shall be capable of totalizing, indicating, and recording of flows.
 - b. Recorder shall be electronic type with a month duration, four inch (4") wide circular paper chart and a visible face of approximately four inches (4").
 - c. Indicator shall be four inches (4") long or shall be digital with approximately one inch high numerals.
 - d. Flow meter pressure differential producers shall be of the standard venturi type. Insert type differential producers or Dall tubes shall not be permitted.
 - e. All sensors for temperature, pressure, flow, and all other measurement outputs must have 4-20 mA outputs if possible.
- 16. Level Meters.
 - a. Wet well level meter receiving instruments at the pump station shall be capable of indicating and recording wet well levels.
 - b. Recorder shall be electronic type with a month duration, four inch (4") wide circular paper chart and a visible face of approximately four inches (4").
 - c. Indicator shall be four inches (4") long or shall be digital with approximately one inch high numerals.
 - d. Fuel level (inventory) meter shall be installed in the generator room for fuel tank systems.
- 17. Pressure Meters.
 - a. Force main pressure meter receiving instruments at the pump station shall be capable of indicating and recording pressure.
 - b. Recorder shall be electronic type with a month duration, and a visible face of approximately four inches (4").
 - c. Indicator shall be four inches (4") long or shall be digital with approximately one inch high numerals.
 - d. Single recorder with three (3) inputs may be used.
- 18. Instrumentation Panels. All pertinent receiving instruments, devices, alarms, indicating lights, and remote controls shall be mounted on centralized instrument panels. All items shall be identified with engraved nameplates. Electrical power to the panel and all instruments shall be through an uninterruptible power supply unit.
- 19. Indicating Lights. Appropriate indicating lights shall be provided to show the status of equipment operation, alarms, controls, etc. Indicating lights shall be of the push-to-test type or light emitting diodes (LED).
- 20. Amperage Meter. Provide an amperage meter for each sewage pump motor. Amperage metering to monitor all legs.

H. Piping and Valves:

- 1. Wastewater Pump Piping:
 - a. Discharge and header (manifold) piping for wastewater pumps shall be not less than four inches (4") in diameter. Suction piping shall be not less than six inches (6") in diameter.

- b. Velocities in wastewater pump piping shall be as follows:
 - i. Suction from wet well 5 fps (desirable max.) 6 fps (absolute max.)
 - ii. Discharge to header 7 fps (desirable max.) 8 fps (absolute max.)
 - iii. Header (Manifold) 6 fps (desirable max.) 7 fps (absolute max.) 2 fps (desirable min.) 1.5 fps (absolute min.)
 - iv. Discharge risers 3 fps (absolute min.)
 - c. Pipe and fittings shall be cast iron or ductile iron, cement lined and coated on the inside. Cast iron pipes shall be Class 150 and fittings ANSI Class 250. Ductile iron pipe shall be Class 52-minimum. Buried pipe and fittings shall be protected on the outside with an approved corrosion protection coating and cathodic protection. Zinc chromate primer shall be used on the outside for exposed piping to be painted with enamel. Joints shall be flanged with flanges faced and drilled to conform to ANSI Class 125 lb. standard with full face gaskets. Adequate braces and supports shall be provided for piping to ensure no undue strains are induced.
 - d. Piping shall be arranged so that all pumps discharge into a common header. In permanent pump stations, discharge lines shall not enter headers perpendicularly. Base bends, properly supported on concrete pedestals, shall be provided at the bottom of vertical risers. Headers shall be properly blocked to resist water hammer.
 - e. Suction lines shall have turned-down bellmouth inlets. Bottom of the bellmouth shall not be more than $D/2$ nor less than $D/3$ (in which D is the diameter of the suction bell) above the floor of the wet well. Reducers used on the suction side of pumps shall be of the eccentric type to prevent air pockets.
 - f. Gate valves in suction lines, except for temporary pump stations and pump stations with capacity 1 mgd or smaller, shall be provided with extension stems to floor stand operators on the ground level floor. Gate valves shall be solid wedge, rising stem type with iron body, bronze trimmed, outside screw and yoke, and flanged ends. Flanges shall conform to ANSI Class 125 lb. standard except where high pressures are encountered. Valve operators for valves 16 inches or larger shall be electrically motorized. All motorized actuators shall have manual operation back-up provisions.
 - g. Swing check valves shall be provided on the discharge side of pumps and shall be placed horizontally between the gate valves and the pumps. Where damaging effects of water hammer are anticipated, valves with controlled rate of closure shall be installed. Swing check valves shall be iron bodied, bronze trimmed with outside lever and weight, and flanged ends. Flanges shall conform to ANSI Class 125 lb. standard except where high pressures are encountered.
2. Sump Pump Piping: All sump pump fixed piping in wetwells shall be schedule 80 PVC and in dry wells shall be brass. A gate valve and check valve shall be installed on the discharge line. Flanged joints or unions shall be provided on the discharge line to facilitate dismantling of the piping. Minimum diameter of the discharge line shall be two inches (2"). Velocity in discharge risers shall not be less than 3 fps. The discharge point shall be installed at the highest elevation possible to prevent reverse flow when the wet well is filled to capacity. Typical discharge elevation shall be under and close to the ground floor. The sump pump shall be fitted with a flexible PVC hose, minimum two inches (2") diameter. Camlock fittings shall be provided for the PVC hose connectors to the pump and fixed piping.
 3. Waste, Drain, and Vent Lines: Pipe and fittings shall be extra heavy cast iron soil type, except piping installed above ground or inside pump stations and piping two and one-half inches (2 1/2") in diameter or smaller, may be standard weight galvanized steel pipe with standard cast iron screwed, recessed drainage fittings. Clean-outs shall be provided as necessary and shall be solid cast brass, rough finish with square heads. Bronze access frames and covers shall be provided for finish floors and walls. Frames and covers for wall

installation shall be square with polished finish. Those for floor installations shall be round with scoriated finish. Clean-outs shall be readily accessible.

4. Potable Water Piping: Water piping and fittings shall be copper except that water piping one inch (1") in diameter and smaller within structures shall be Type K copper pipe with standard brass fittings.
5. Sprinkler System Piping: Sprinkler system piping shall be solvent welded schedule 40 PVC. Lawn risers shall be PVC or polypropylene and shrubbery risers shall be galvanized steel.
6. Piping Between Flow Tube and Instruments: Piping between flow tube to flow transmitter shall be one inch (1") minimum diameter 316 stainless steel. Horizontal runs shall have a minimum declining slope of one-quarter inch (1/4") per foot from the flow tube to the in-station equipment and shall be permanently supported and braced to prevent sediment traps and/or air pockets. Piping shall be connected to the flow tube on a horizontal axis. 316 stainless steel valves, unions and necessary fittings shall be installed close to the flow tube to facilitate maintenance. 316 stainless steel ball valves, gate valves, unions, tees and elbows shall be used on the entire system. Flow transmitters and diaphragm seals shall be installed inside the pump station and mounted for easy maintenance access.
7. Pipe Sleeves: Pipe sleeves shall be provided whenever small piping passes through concrete walls. Wall pipe shall be used for larger piping.

I. Emergency Provisions:

Emergency facilities shall be provided to protect pump stations and the community from possible damages that may result from power failure, emergency maintenance shutdown, pumping capacity being exceeded, or other unforeseen circumstances.

1. Standby Electric Power Equipment: Stations shall be equipped with a natural gas or propane(LPG) powered generator(s) to provide electric power to pump the design flow. The generator's synchronous speed shall be 1800 RPM. The engine generator set shall be a new, standard, current model and in accordance with ANSI and NEMA standards. Provide vehicular access including a pad for a portable generator.
 - a. Operation of the emergency facilities shall be automatic upon power failure. Power failure monitors shall monitor all three phases. Monitoring of one phase of a three-phase system is not adequate.
 - b. Automatic load transfer switches shall conform to PG&E requirements. When possible, bypass of the automatic transfer switch and manual override of automatic functions shall be provided.
 - c. A plug for connection of a portable load bank shall be provided to fully load the generator periodically. The connection shall be made to the generator side of the transfer switch via a circuit breaker. This connection can also be used to connect a portable generator when the installed generator is not available for service.
 - d. Telemetry and SCADA systems shall be powered through an uninterruptable power supply unit. The uninterruptable power supply shall be sized to furnish emergency power for 8-hours minimum.
2. Fuel Storage System: The system shall comply with Federal, State and County regulations. The fuel tank capacity shall be based on two (2) days at design sewage flow and five (5) days at the daily average flow. Underground fuel tank installation shall be designed to prevent surface water infiltration into the fuel tank system. A leak alert monitor shall be provided with capabilities to display fuel inventory, and with audio and visual leak alarms.
3. Portable Pump Facilities: Pump stations shall be equipped to pump wastewater from the wet well into the force main with a portable pump. This shall be accomplished by providing fixed discharge and suction piping for the portable pump with connections to the force main and the wet well. The portable pump discharge piping shall be connected to the downstream side of the flow meter tube and shall include a gate valve, 90° elbow, flanged reducer, and a blind flange. The suction piping shall be connected to the wet well and shall include piping

with a 90° elbow and a blind flange. All piping for the portable pumps shall be sized with consideration to the capacity of the installed pumps and the operating characteristics of the available standby pumps. Portable pumps shall be located near the wet well to minimize the possible occurrence of cavitation. Provide vehicular access including a pad for a portable engine-driven Pump.

J. Miscellaneous:

1. Potable Water Supply: All pump stations shall be provided with a potable water supply system for sanitary fixtures, lawn sprinkling, washdown, and other maintenance purposes, as required. Adequate and conveniently located water outlets shall be provided for flushing and washing purposes. Hose bibs shall be 3/4-inch with vacuum breakers at all floor levels and outside of pump station. Stop cock valves shall be provided immediately before each hose bibb located within the building. Two conveniently located 1-1/2 inch diameter standpipes shall be provided adjacent to the wetwell. The standpipes shall have 1-1/2 inch angle globe valves for National Standard fire hose thread and end cap with chain. A 3/4-inch hose bib with vacuum breakers shall be installed on the standpipe directly below the globe valve. The main water supply line shall be two inches (2") in diameter, metered and equipped with a master valve located within the station's perimeter fence. A two inch (2") reduced pressure backflow preventer shall also be provided and located within the station's perimeter fence. Under no circumstances shall potable water supply be directly connected to sewage pumps or piping. Seal water, positive air gap and/or pneumatic water tanks shall be provided as necessary. The potable water supply system shall conform to County, State, and Federal codes and regulations.
2. Painting: Pump stations shall have maintenance-free colored exterior finish, subject to County Engineer approval. County may, at its own discretion, approve a painted exterior finish. Painting shall be in accordance with the best practice and in strict compliance with the paint manufacturer's instructions and recommendations. No lead-base primer or paint shall be used. A minimum of two (2) finish coats over one prime coat shall be required.
3. Corrosion Protection: All materials and equipment exposed to corrosive conditions shall be either corrosion resistant or protected with appropriate protective coatings or linings.
4. Odor Control: All stations shall be provided with a 6-inch wetwell vent pipe to be used for treatment of foul odors. The vent pipe shall be schedule 40, 316 stainless steel, permanently installed through the wetwell slab and covered with a blind flange. A receptacle, at appropriate voltage, shall be installed near the vent pipe.

K Force Mains:

1. Locations: Force mains shall be located in streets or along road rights-of-way. In locating force mains, ease of installation and maintenance and elimination of high points shall be considered. Air release valves shall be installed at high points.
2. Sizing:
 - a. Force mains shall be sized not less than six inches (6") in diameter (four inches (4") upon approval of County Engineer).
 - b. Velocities in force mains shall be as follows:
 - i. Minimum: 3.0 fps
 - ii. Maximum: 10.0 fps
 - iii. Force mains shall be designed to carry the maximum rate of pumping without excessive frictional head loss. Total dynamic head should not exceed 100 feet.
3. Materials: The material selected shall be adapted to local conditions with special consideration given to the quality of wastewater, possible septic conditions, soil characteristics, internal pressure, abrasion, external loadings, foundations, necessity of reducing the number of joints and other similar problems. Corrosion resistant lining, coating, wrapping, and cathodic protection shall be used. Insulating flanges or fittings may be

required at entrance or exits from buildings. The following material is acceptable for force mains subject to the conditions indicated:

- a. Ductile Iron Pipe (Cement or other approved lining and Coated). Ductile iron pipe shall be wrapped with HDPE plastic wrap and have cathodic protection.
4. Minimum and maximum Cover and Clearances: Shall conform to the requirements as set forth in other sections of these standards.
5. Alignment and Grade: Pipe shall be laid in a straight alignment and with constant grades. Force mains may be curved by deflecting the joints to eliminate the necessity for fittings. In no case shall the deflection exceed the maximum as set forth by the manufacturer for the type of pipe used.

7-15 SEWER IMPROVEMENT PLAN REQUIREMENTS

Plans for the construction of sanitary sewers whether in conjunction with other improvements or for a sewer project only, shall conform to the following standards, as well as other standards contained in the General Requirements and Improvement Plan Requirements of these Improvement Standards.

- A. General Requirements:** All information, which, in the opinion of the County Engineer, is necessary for the satisfactory design, review, construction, and maintenance of a project shall be provided and, where applicable, shall be shown on the plans.

A parcel or area which benefits from and financially participates in a sewer construction project, but is not included within the project boundaries, shall have a note to this effect placed on the layout map and on the plan and profile sheet if the parcel appears thereon. Parcels, which make use of those facilities, may be subject to additional fees at the time of connection, if the participation has not been so noted.

- B. Plan and Profile Sheets:** Sewers shall be shown on the Project Street Improvements Plan and Profile sheets. The following standards, with respect to drafting and the information to be included on the plan and profile sheets, generally apply to projects in developed areas. In new subdivisions, only the requirements that are applicable shall apply.

1. Sewer mains to be constructed shall be indicated on the profile by parallel lines spaced by one pipe diameter. Manholes shall also be indicated by parallel lines spaced according to scale. Pipe slope shall be printed immediately above, and preferably parallel to, the pipeline, or between the parallel lines. The length, size, and type of pipe material between each manhole shall be printed parallel to the horizontal grid lines between manholes. All pipe-inverts at manholes and other structures shall be indicated on the profile. All manholes, flushing branches, or other appurtenances shall be noted on the plan and profile with stationing. Cone heights other than standard, shall be clearly labeled for those manholes requiring the shorter cones due to lack of available depth. Existing facilities shall be shown in profile using dashed lines or shaded lines.
2. In improved areas, the location of each proposed sewer service shall be indicated on the plans by stationing, or by reference to a permanent, well-defined structure, if available. In new subdivisions, the sewer services shall be located by stationing unless the situation exists, such as at the end of a cul-de-sac, where stationing is not an adequate description of location. In such cases a dimension to a lot line may be used. The invert elevation of the sewer service at its upstream end shall be shown on the plans whenever the service is not at standard depth. Standard depth shall conform to the conditions set forth on Standard Drawing 7-5.

Improvements or lots shown on a plan sheet but served to a main shown on another plan sheet shall have the direction of service shown by a small triangle and letter "S".

3. Permanent and working (temporary construction) easements shall be shown to scale on the plans. Easement dimensions shall be shown and each easement shall be dimensioned to the property line and the sewer main. Each permanent easement shown on the plans shall be identified by a box or table, on the same plan sheet, which gives the property owner's name and the Recorder's book and page number in which the easement is recorded. The Design Engineer shall provide the book and page number.
 4. Proposed sewer mains shall be adequately dimensioned from street centerline. If the sewer is to be located outside of the right of way, sufficient dimensions and bearings from an approved horizontal control shall be shown on the plans to locate the main in the field.
 5. Any other existing or proposed gas, electric, water, storm drain, etc., shall be determined and accurately shown on the plans. The location of any utility line which is parallel to and within five feet of the sewer main or which crosses the sewer main at an angle of 30 degrees or less shall be determined with an accuracy of $1.0 \pm$ foot and the clearance shown on the plans.
 6. Trees, and other objects within 10 feet of construction centerline, shall have their correct location shown on the plans and the clearance from construction centerline shown. The diameter of tree trunks and interfering heavy tree branches shall be noted. Removal of a tree or object, or other special handling shall be noted on the plans. The Design Engineer shall assume full responsibility for such notes as it is the Design Engineer responsibility to make all necessary arrangements with the owner of the object to be handled. Written documentation of any special arrangements regarding preservation of property made between property owners and the Design Engineer shall be supplied to the County Engineer if no easement document is involved. If an easement is negotiated, all special arrangements are to be included in the easement document. The County Engineer must approve tree removal within public rights-of-way or easements.
 7. Culverts shall be shown on both plan and profile when crossed by the construction or when parallel and within 20 feet of the construction line. The size and type of all such culverts shall be indicated and when the culvert crosses or is perpendicular or nearly so and within 20 feet of the construction line, the invert of the culvert end nearest the construction line shall be shown.
 8. Addresses of buildings shall be shown on the plan view, within the outline of the building. Only the front line and indication of sidelines of buildings need be shown.
- C. Detail Drawings:** Items of a special nature should be shown with detail drawings, either on the plan sheets, or on a separate detail sheet.
- D. Connection to existing facilities where bypassing or stoppage of existing flow will be required:** When improvement plans require connection to an existing facility which will require bypassing or stopping existing flows, a note shall be placed on the plans which provides an estimate of the existing flow to be bypassed (in gpm), or the times between which the flow may be stopped. Where the operation will be accomplished on a major trunk or interceptor, submittal of a work plan for review may be required prior to initiation of the operation.

7-16 DESIGN OF ON-SITE SEWER SYSTEMS FOR PRIVATE MULTIPLE OWNERSHIP RESIDENTIAL DEVELOPMENTS

The following design requirements shall apply to that portion of the sanitary sewer within a privately owned multiple ownership development that is "on-site" and is not an outfall sewer for an upstream area, thereby being considered a private system and not subject to maintenance by a County Service Area. Discharge from such developments shall require an agreement between an owner's association and the sewage treatment provider regarding the operation and maintenance of the private sanitary sewer.

- A. Planned Unit Developments and Townhouses:** Residential developments where separate lots and structures are sold. These differ from usual subdivisions in that adjacent land is owned in common and a homeowner's association performs maintenance.
1. General - Sanitary sewers shall meet all requirements for public sewers contained in these Improvement Standards, except as specified below.
 2. Manhole spacing - Maximum spacing of manholes on collectors shall be 300 feet for all straight runs of pipe.
 3. Wyes - Wyes shall be used for all sewer services connecting to the "on-site" collectors.
 4. Minimum Depth - All collectors located within vehicular traffic areas shall have a minimum cover of five feet to finish grade. Additionally, if the cover over the pipe at any location may be less than two feet at any time after the pipe is installed, ductile iron pipe or Class 200 (DR-14) PVC pipe conforming to the requirements of AWWA C900 shall be installed.
 5. Plan and Profile Sheets - "On-site" improvement plans may be prepared without the sanitary sewer profile that is required by these Improvement Standards, unless otherwise instructed by the County Engineer. However, the final "on-site" grades and drainage facilities must be shown on the plans on the same sheet as the plan view of the sanitary sewers. Pipe dimensions shall be shown adjacent to the corresponding pipe section.
 6. Location - Wherever possible, collectors shall be located in areas to be paved.
 7. Review and Approval - Plans must be reviewed and approved by the County Engineer.

7-17 MULTI-STRUCTURAL COMMERCIAL AND INDUSTRIAL DEVELOPMENTS

The "on-site" sanitary sewers for all new commercial and industrial developments containing more than one structure shall be designed in accordance with the requirements contained in Section 7-16A of these standards unless otherwise specified by the County Engineer. Any separate building within a multi-building commercial or industrial development shall have its own separate connection to a sewer system designed to public standards.

Flow recording devices for the continuous measurement of discharge volumes may be required by the County Engineer. Grease, oil, and sand separators shall be provided as determined by the County Engineer.

7-18 SEWER SYSTEM MASTER PLAN (SSMP) FOR A SPECIFIC AREA

Submission of a Sewer System Master Plan (SSMP) for a specific area is required prior to review of the sewer design for new developments for which public sewer services are proposed, or if there is a possibility that upstream or adjacent areas might require service through the subject property. The plan will fully describe the area to be served by the local collection facilities and the facilities necessary to provide that service.

- A. General Requirements:** In order to develop a SSMP the following information must be accumulated:
1. Regional Setting
 2. Topographic map of the area to be served
 3. Any specific projects that precipitated the study
 4. Relevant assumptions or special conditions
 5. Existing and proposed development

6. Ultimate development within the SSMP area
7. Hydraulic grade line at point of discharge into major facilities

The flows generated within each sub-service area of the sub-area plan will be calculated in accordance with the procedures contained in these Standards unless otherwise specified by the County Engineer.

- B. Study Map:** The method of providing sewer service to the entire service area, including pipe sizes and slopes, shall be shown to the extent necessary to determine the requirements within the subject property.
- C. Report Preparation:** In order to insure that all SSMPs are compatible and understandable; they will all be published in the following format.
1. Section Headings - Each SSMP shall be written with the following sections entitled as follows:
 - a. Executive Summary - A concise description of the recommended sewer system, the impacts upon adjacent or Regional systems, and any special design criteria necessary due to unusual local conditions, sealed by the responsible civil engineer.
 - b. Introduction - A thorough background description of the sewer shed, any specific project(s) that precipitated the study, any special conditions, a vicinity map and a topographic map of the study area
 - c. Criteria and Data - All of the information upon which the plan was based shall be delineated in this section in an easily readable manner.
 - d. Plan description - A map showing the service area, the needed sewer facilities (pipes, slopes, flowlines, depths, and service areas), a spread sheet summary, and verbiage describing the collection system shall be included in this section
 - e. Appendices - All of the backup information shall be included in an appropriate number of appendices
 2. Report Format - The SSMP shall be bound as a single document with appropriate dividers between each section and pockets for all the required maps. The approval block shall be in a highly visible location at the end of the Executive Summary.

7-19 WASTEWATER TREATMENT SYSTEMS

Sanitary sewer collection systems shall be connected to existing wastewater treatment systems operated by a Community Service District, City, or other agency where feasible, as determined by the County Engineer. The connection shall be either by gravity flow, or by the installation of pump lift stations. The Developer shall be responsible for applying to the Yolo County Local Agency Formation Commission (LAFCO) for annexations or “out-of-service area” agreements required to accommodate such connections, and shall be responsible for complying with all standards and requirements of the entity that will provide services.

Where a County Service Area (CSA) is proposed to provide wastewater treatment services, the Developer shall be responsible for all costs to create the CSA, prepare an Engineer’s Report to estimate assessments, and provide engineered plans for the wastewater treatment facilities. Such plans shall be prepared by an engineering firm retained by the Developer that 1.) has demonstrated expertise and experience designing municipal wastewater treatment systems, and 2.) is approved by the County Engineer prior to the commencement of design work.

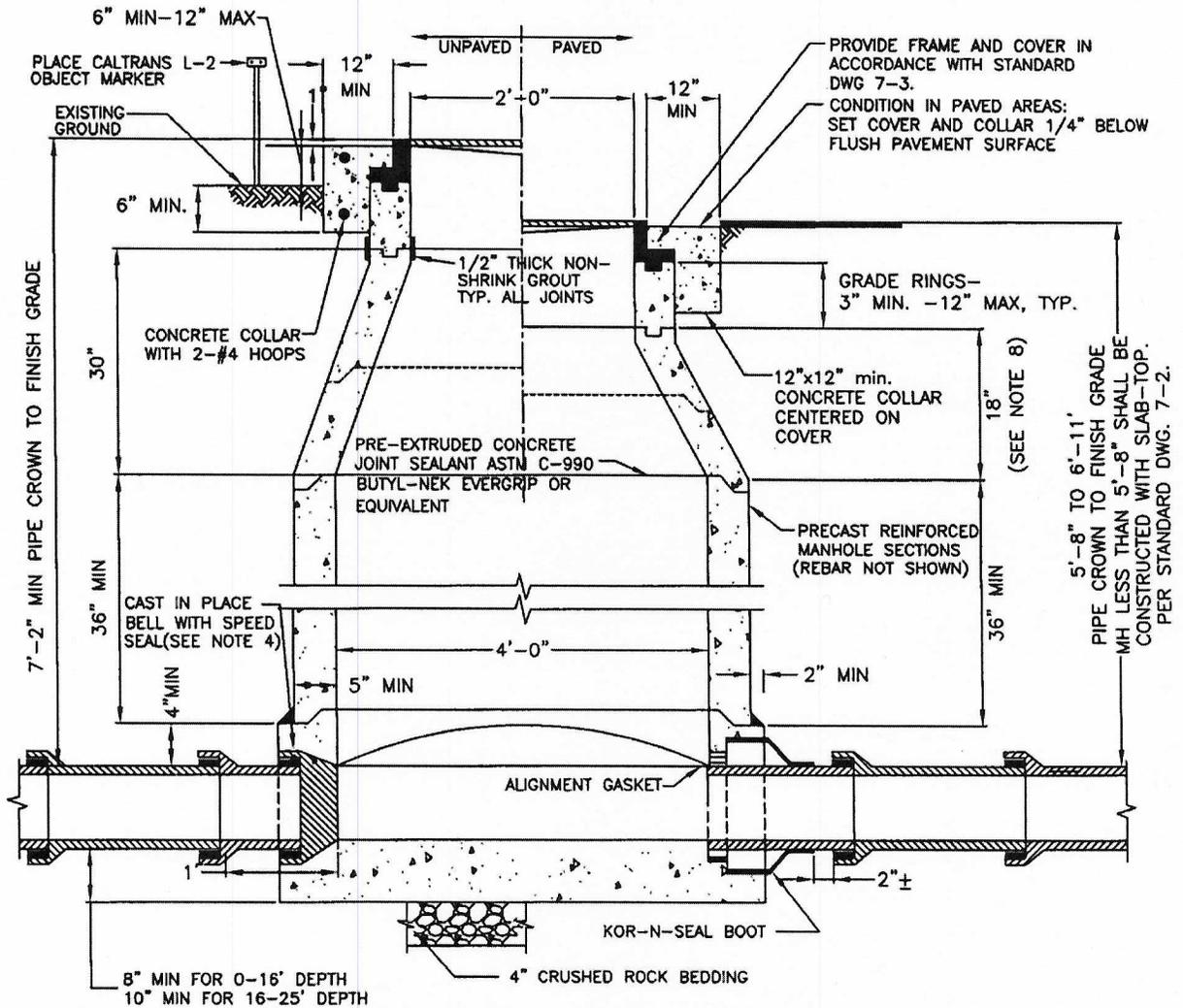
The Developer shall be responsible for obtaining all State and local permits necessary to operate a new wastewater treatment system. The Developer shall be responsible for funding all ancillary equipment required to start-up and operate the treatment system, as determined by the County Engineer. The Developer shall deposit with the County a cash deposit (“Establishment Costs”) to cover the costs to establish the CSA, and costs that may arise from unforeseen circumstances during operation of the facility for the first two years following County acceptance of the facilities, or full project build out, whichever comes later. Such costs may exceed assessments received, the assessment being based on the estimated costs for normal operations and maintenance services, as estimated in the approved Engineer’s Report. Establishment Costs include, but are not limited to the following costs, and are subject to the approval of the County Engineer:

1. Legal and administrative costs incurred by County to establish the CSA, the CSA fund, the CSA budget, and the CSA advisory committee;
2. Administrative costs related to transferring permits into the County’s name, soliciting proposals for third party operations and maintenance services, negotiating and awarding contracts and purchase orders necessary to assume operations and maintenance responsibilities;
3. Administrative and inspection costs related to warranty work that may occur following acceptance of the CSA Facilities, not covered under operation and maintenance contracts or warranty;
4. Materials, parts, and labor costs to refine operations of the CSA Facilities to operate at maximum efficiency, including, but not limited to, modifications to piping, valves, software, telemetry, and controls;
5. Added administrative, operational, or maintenance costs that may be incurred due to low or variable flows during build out of the project, or plant upsets due to construction activities;
6. Periodic maintenance costs (for example, sludge wasting), incurred by the County within one month of acceptance that result from the Developer’s operation and maintenance of the CSA Facilities; and
7. Other unforeseen costs incurred by the CSA following acceptance of the CSA Facilities due to conditions beyond the Developer’s or County’s control, to the extent that the unforeseen costs cause a CSA expense.

APPENDIX E

Yolo County Improvement Standards – Sanitary Sewer Design Drawings

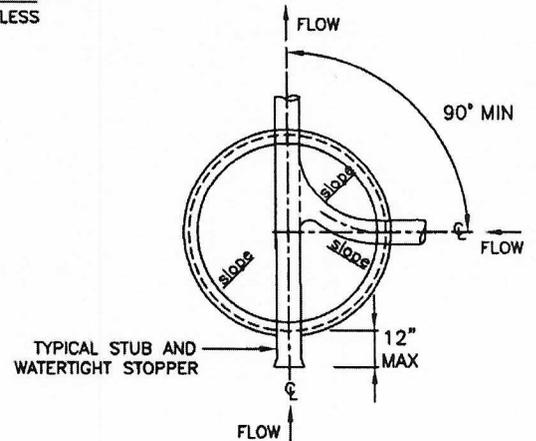
Standard Drawings		
Section 7 – Sanitary Sewer Design		
Drawing	Sheets	Description
7-1	1 of 3	Standard 48" Sewer Manhole
7-1	2 of 3	Manhole Base, Camera Channel Detail
7-1	3 of 3	Manhole Base, Camera Channel Detail
7-2	1 of 2	Standard 60" Sewer Manhole (Type A)
7-2	2 of 2	Standard 60" Sewer Manhole (Type B)
7-3	1	Grey Iron Standard 24" Manhole Frame and Cover
7-4	1	Sewer Pipe Bedding and Initial Backfill
7-5	1 of 3	Sewer Services
7-5	2 of 3	Service Cleanout to Grade
7-5	3 of 3	Service Cleanout to Grade Backfill Requirements
7-6	1 of 2	Flushing Branch
7-6	2 of 2	Flushing Branch Frame and Cover
7-7	1 of 2	Utility Crossing
7-7	2 of 2	Utility Crossing



STANDARD 48" MANHOLE
 FOR SANITARY SEWER 12" DIAMETER OR LESS
 SEE SHEET 2 FOR REBAR

NOTES:

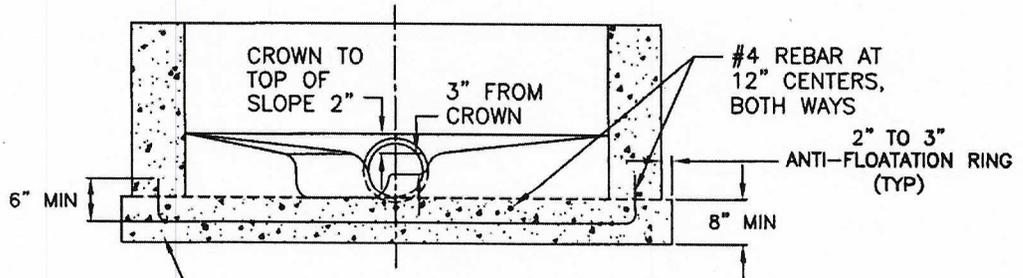
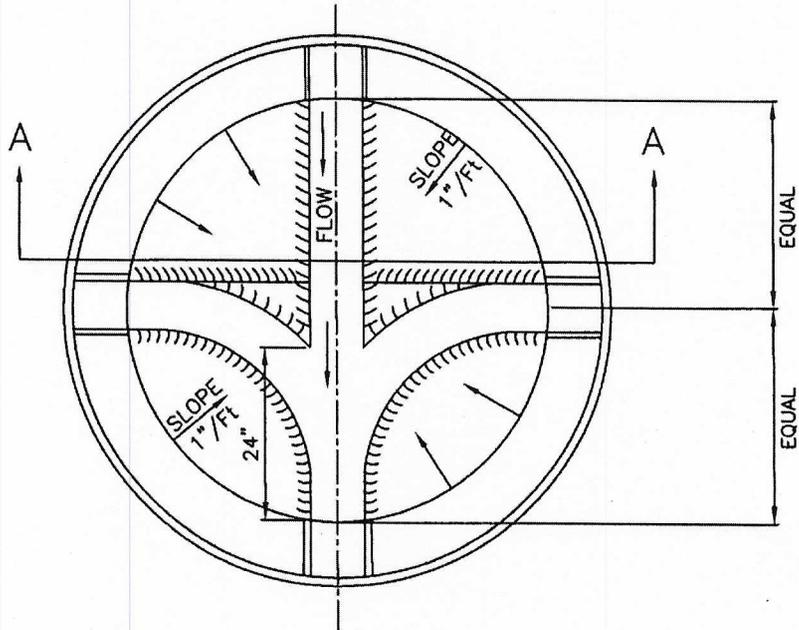
1. CLASS A CONCRETE, 6-SACK MIX SHALL BE USED FOR MANHOLE BASES.
2. PIPE SHALL STOP AT INSIDE FACE OF MANHOLE.
3. JOINTS FOR THE BARREL SECTION SHALL BE TONGUE AND GROOVE, ALL LIFTING HOLES SHALL BE SEALED WITH NON METALLIC NON SHRINK GROUT.
4. ALL MANHOLE BASES SHALL BE PRECAST BASES AND SHALL BE PLACED ON 4" MIN OF CRUSHED ROCK PLACED OVER UNDISTURBED MATERIAL. CONNECTION OF THE PIPE TO THE MANHOLE SHALL USE A RESILIENT CONNECTOR CONFORMING TO ASTM STANDARD C923 SUCH AS KOR-N-SEAL, A-LOK, OR APPROVED EQUIVALENT. ALL MANHOLE BASES TO INCLUDE AN ANTI-FLOATATION RING PER DRAWING 7-1 SHEET 2.
5. ANY SERVICE SEWER ENTERING A MANHOLE SHALL BE INSTALLED WITH THE INVERT ELEVATION OF THE SERVICE PIPE MATCHING THE CROWN ELEVATION OF THE EXIT SEWER EXCEPT WHEN AN INTERNAL DROP CONNECTION IS USED. IF THE MANHOLE AT THE END OF A CUL-DE-SAC IS CONSTRUCTED WITH A PRE CAST BASE. THE INVERT OF ANY SERVICE STUBS SHALL BE A MINIMUM OF ONE INCH ABOVE THE INVERT OF THE EXIT PIPE.
6. BEDDING FOR PRE CAST MANHOLE SHALL BE SELECT IMPORTED MATERIAL 1/2" OR 3/4" CRUSHED ROCK (4" MIN).
7. THE STANDARD CONE MAY BE PROVIDED AS TWO PRE CAST SECTIONS.
8. CUL-DE-SAC MANHOLES OR END OF LINE MANHOLES WITH A DEPTH OF 6'-11" OR LESS SHALL USE 18" CONES.



PLAN VIEW OF 48" MANHOLE
 SHOWING INTERSECTING SEWERS

COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT		DATE: 08/05/08
STANDARD 48" SEWER MANHOLE		SHEET # 1 OF 3
<i>Panos Kakkas</i> COUNTY ENGINEER No. C42401	28 AUG - 08 APPROVAL DATE	DRAWING #: 7-1 NOT TO SCALE

**CAMERA CHANNEL
REQUIRED FOR ALL LINES**

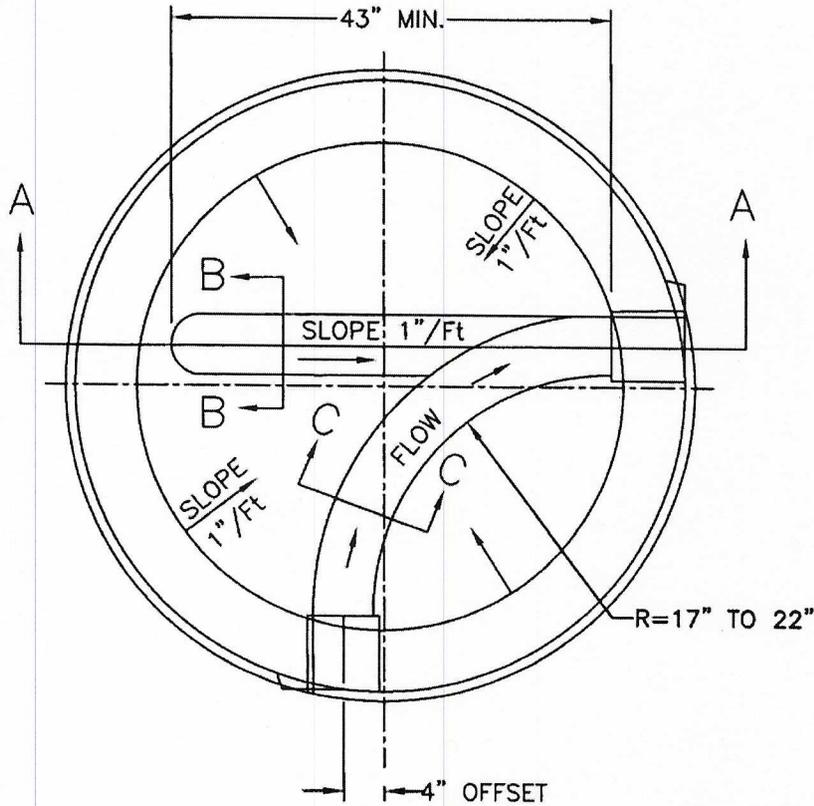


PRECAST BASE
PLACED ON 4" MIN OF
CRUSHED ROCK PLACED
OVER UNDISTURBED MATERIAL

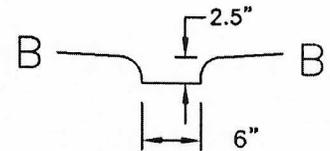
SECTION A-A

COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT	DATE: 08/05/08
MANHOLE BASE CAMERA CHANNEL DETAIL	SHEET # 2 OF 3
<i>Pamela Kulkas</i> COUNTY ENGINEER No. C42401	<i>28 AUG 08</i> APPROVAL DATE
	DRAWING #: 7-1 NOT TO SCALE

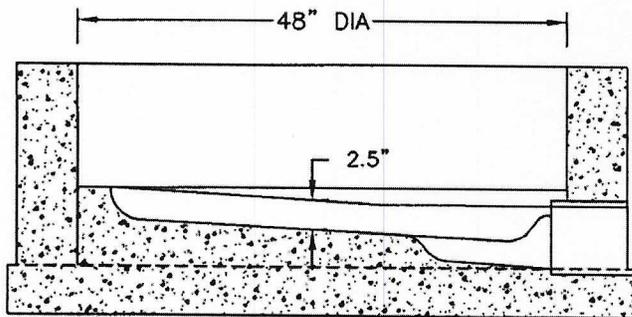
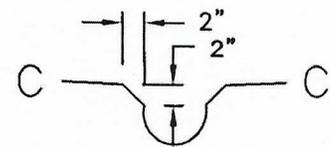
**CAMERA CHANNEL REQUIRED FOR
ALL 8" AND 10" LINES**



FOR 8" LINE ONLY

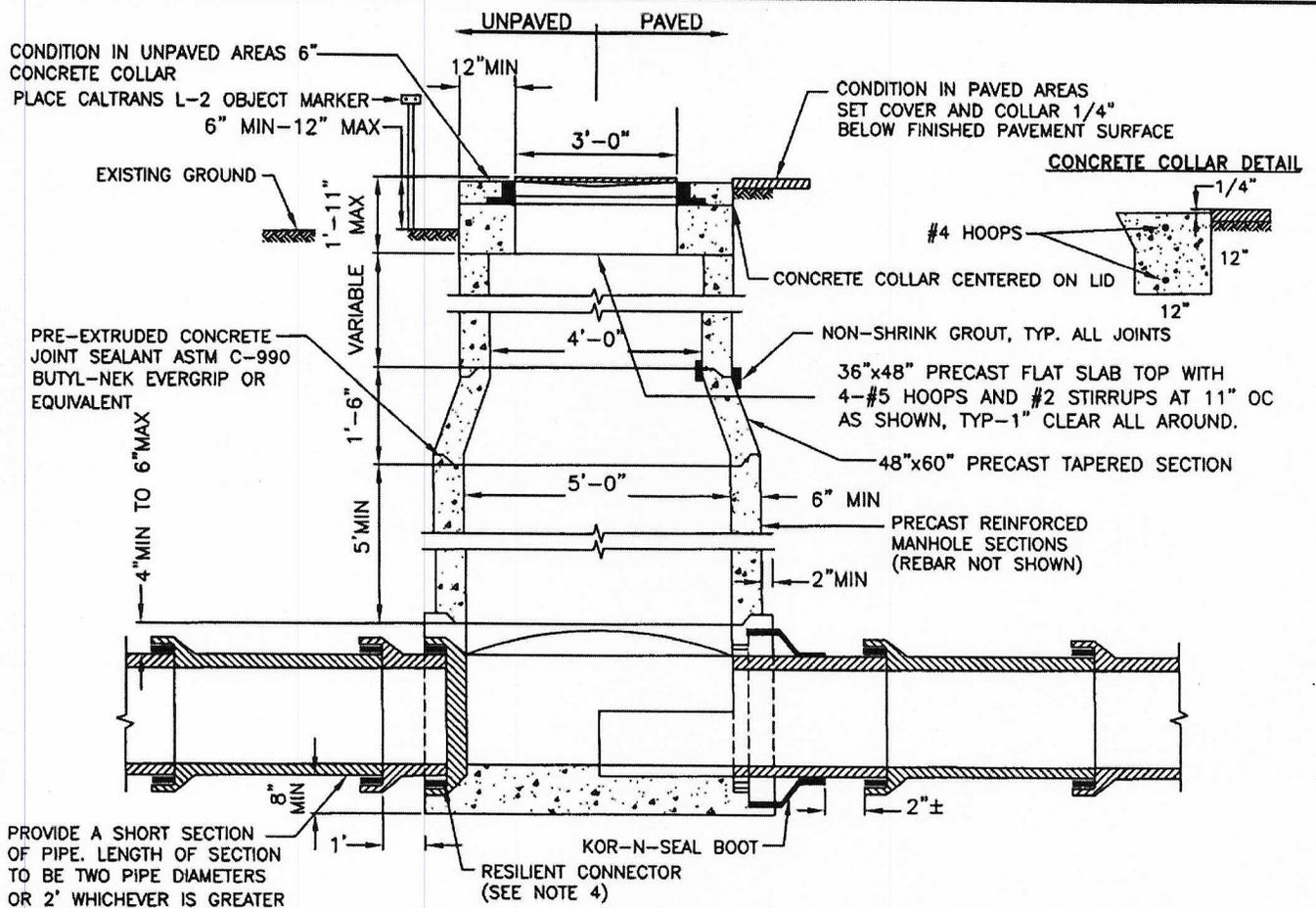


OR



SECTION A-A

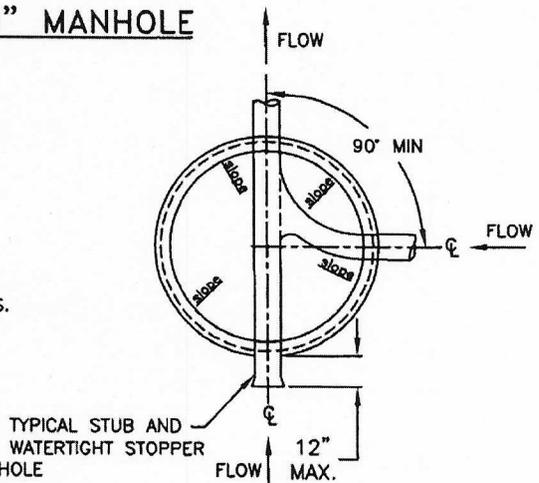
COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT		DATE: 08/05/08
MANHOLE BASE CAMERA CHANNEL DETAIL		SHEET # 3 OF 3
<i>Panos Kakkas</i> COUNTY ENGINEER No. C42401	28 AUG. 08 APPROVAL DATE	DRAWING #: 7-1 NOT TO SCALE



STANDARD TYPE A 60" MANHOLE

NOTES:

1. CLASS A CONCRETE, 6-SACK MIX SHALL BE USED FOR MANHOLE BASES.
2. PIPE SHALL STOP AT INSIDE FACE OF MANHOLE OR SHALL BE CONTINUOUS THROUGH MANHOLE. IF PIPE LAID CONTINUOUS, TOP HALF SHALL BE REMOVED AFTER BASE IS POURED.
3. JOINTS FOR THE BARREL SECTION SHALL BE TONGUE AND GROOVE, ALL JOINTS MUST BE SEALED WITH GULF STATES PRE-EXTRUDED CONCRETE JOINT SEALANT.
4. FOR PRECAST MANHOLE BASES, CONNECTION OF THE PIPE TO THE MANHOLE SHALL USE A RESILIENT CONNECTOR CONFORMING TO ASTM STANDARD C923 SUCH AS KOR-N-SEAL, A-LOK, OR EQUIVALENT.
5. ANY SERVICE SEWER ENTERING A MANHOLE SHALL BE INSTALLED WITH THE INVERT ELEVATION OF THE SERVICE PIPE MATCHING THE CROWN ELEVATION OF THE EXIT SEWER EXCEPT WHEN AN INTERNAL DROP CONNECTION IS USED.
6. BEDDING FOR PRE-CAST MANHOLE SHALL BE SELECT IMPORTED MATERIAL 1/2" OR 3/4" CRUSHED ROCK.
7. ALL MANHOLE SECTIONS TO BE FITTED WITH EXTERNAL LIFTING PINS, NO THROUGH PENETRATION HOLES ALLOWED.

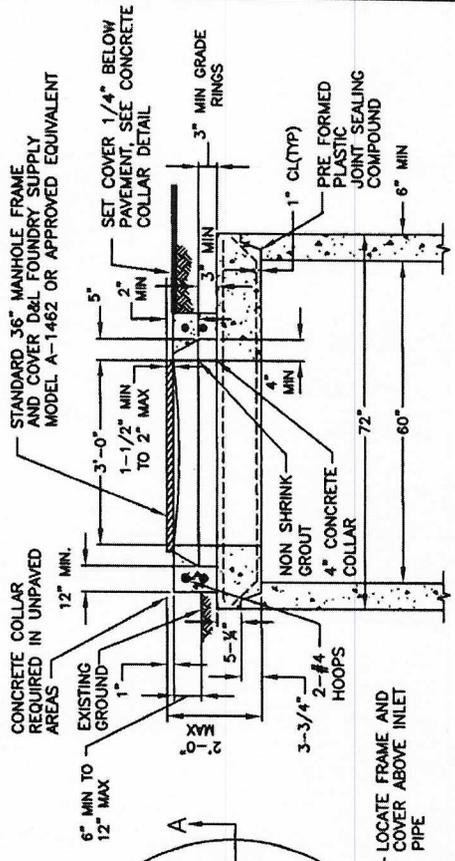


PLAN VIEW OF 60" MANHOLE SHOWING INTERSECTING SEWERS

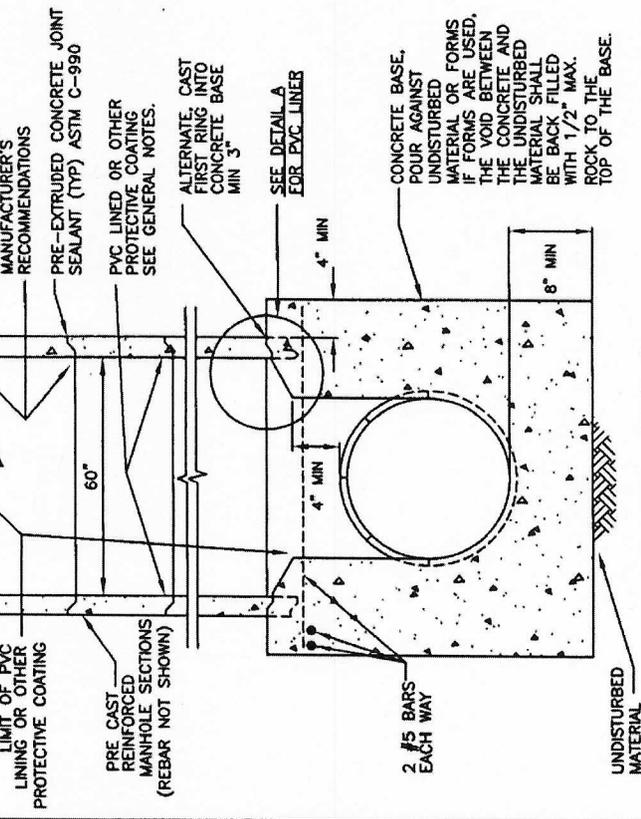
COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT STANDARD 60" SEWER MANHOLE (TYPE A)		DATE: 08/05/08
<i>Parrus Kakkas</i> COUNTY ENGINEER No. C42401		SHEET # 1 OF 2
23 AUG. 08 APPROVAL DATE		DRAWING #: 7-2 NOT TO SCALE

NOTES:

1. PROTECTIVE COATING SHALL BE (a) T-LOCK PVC LINER, AMERON PROTECTIVE COATING, 40 MIL. (b) CCS COATING, HIGH CHEMICAL RESISTANCE EPOXY COATING BY CHEMO SYSTEMS OF REDWOOD CITY, CA. MULTIPLE LAYER SPRAY APPLIED TO A MINIMUM FINISHED THICKNESS OF NOT LESS THAN 40 MILS. (c) RAVEN 405 EPOXY MORTAR MULTY LAYERED SPRAY APPLIED TO A MINIMUM THICKNESS OF NOT LESS THAN 60 MILS. (d) OR APPROVED EQUIVALENT.
2. BOTH PVC LINING AND PROTECTIVE COATINGS SHALL BE SPARK TESTED FOR INTEGRITY AFTER INSTALLATION.
3. PROTECTIVE COATING SHALL BE APPLIED TO MANHOLE SHELVES, UNDERSIDE OF COVER SLAB, INSIDE OF GRADE RINGS AND ALL OTHER PLACES WHERE PVC IS SHOWN ON DETAIL BELOW.
4. PVC LINER SHALL BE WHITE IN COLOR.
5. SLAB TOP TO MEET H-20 LOAD SPECIFICATIONS. WEIGHT AND LOAD SPECIFICATIONS TO BE SUBMITTED BY MANUFACTURER.

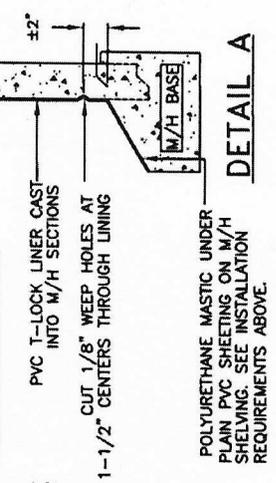


PLAN



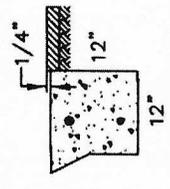
MANHOLE DETAIL

SECTION A-A



DETAIL A

CONCRETE COLLAR DETAIL

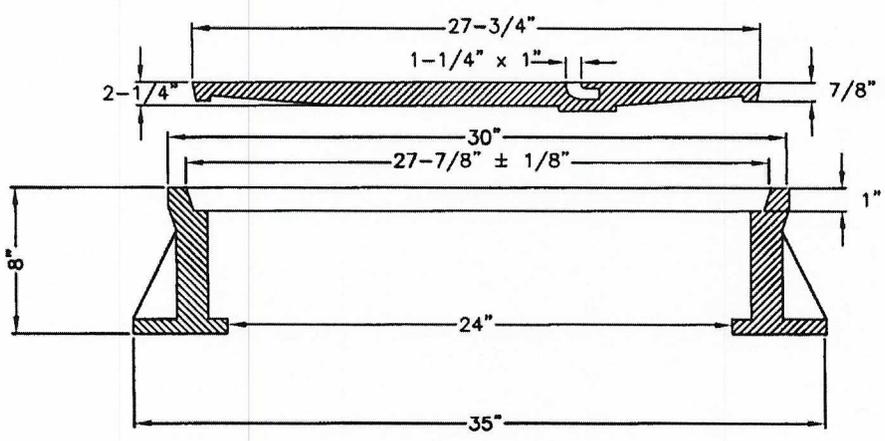
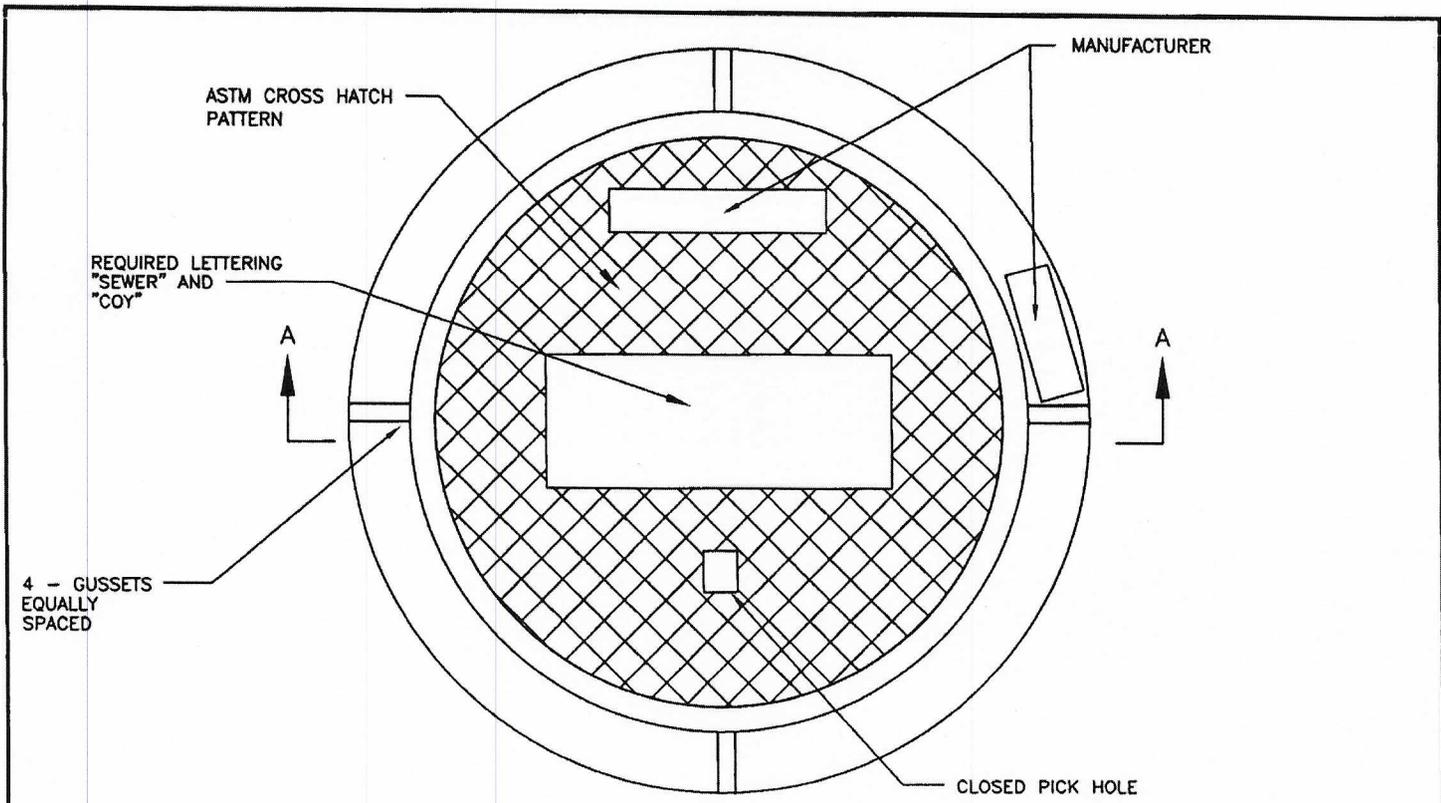


STANDARD SLAB TOP DETAILS

INSTALLATION REQUIREMENTS FOR PVC SHELF LINER

1. 30 MIL PVC SHELF LINER SHALL BE PRECUT AND PREPARED ABOVE GROUND PRIOR TO INSTALLATION WITH SAND EMBEDDED NONSKID SURFACE 1" PLUS IN FROM EDGE ACCORDING TO PVC SHEETING MANUFACTURER'S RECOMMENDATION.
2. COAT CLEAN AND DRY CONCRETE SURFACE OF M/H SHELVES W/LINABOND PRIMER EP30 AND LINABOND POLYURETHANE MASTIC TO A MIN. THICKNESS OF 125 MIL. ALSO COAT CONTACT SIDE OF THE PRECUT PVC SHEETING WITH LINABOND CLA-1 ACTIVATOR ALL AS MANUFACTURED BY ALLIED COATINGS CO. OF HOLLYWOOD, CA OR EQUIVALENT (SUBMITTAL WILL BE REQUIRED).
3. ALL MATERIALS SHALL BE APPLIED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT	DATE: 08/05/08
STANDARD 60" MANHOLE (TYPE B)	SHEET # 2 OF 2
<i>James Kallas</i> COUNTY ENGINEER No. C42401	DRAWING #: 7-2 NOT TO SCALE
<i>28 AUG 08</i> APPROVAL DATE	

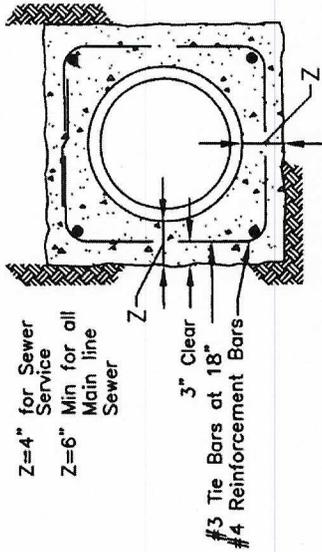


SECTION A-A

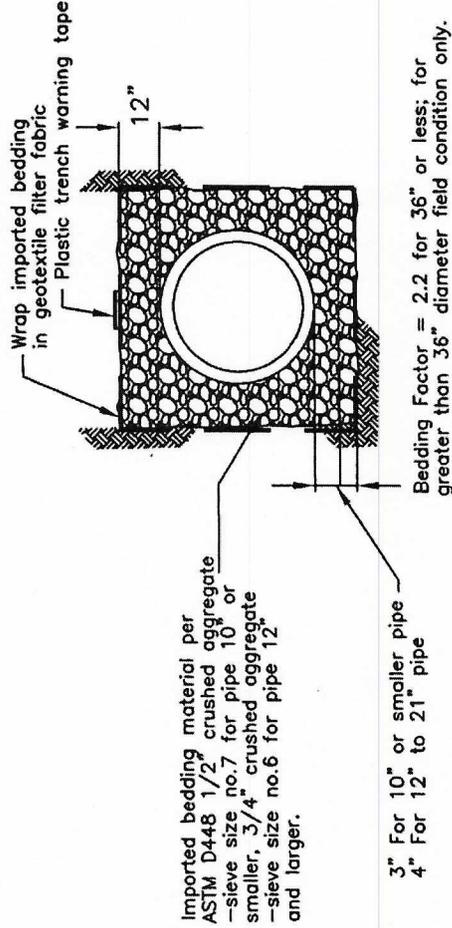
NOTES:

1. ALL CASTINGS TO CONFORM TO ASTM A48, CLASS 35B. D&L FOUNDRY A-1018, OR EQUIVALENT
2. FRAME AND COVER TO MEET H-20 LOAD SPECIFICATIONS.
3. MACHINED HORIZONTAL AND VERTICAL BEARING SURFACES NOT TO EXCEED 1/64" TOLERANCE.
4. FRAME AND COVER SHALL HAVE A COATING OF BITUMINOUS MATERIAL.
5. LOCKING COVER TYPE FRAME AND COVERS SHALL BE USED IN EASEMENT AREAS UNLESS OTHERWISE APPROVED.
6. COVER SHALL BE LABELED AS REQUIRED BY SERVICE DISTRICT. COUNTY COVERS SHALL BE DENOTED "COY".

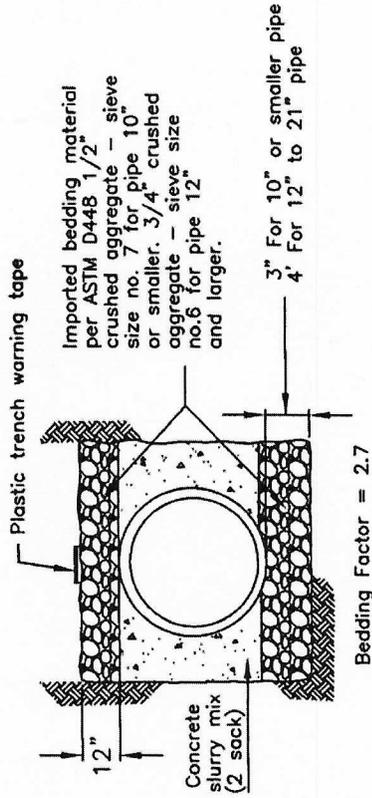
COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT		DATE: 08/05/08
GRAY IRON STANDARD 24" MANHOLE FRAME AND COVER		SHEET # 1 OF 1
<i>Paros Kakkal</i> COUNTY ENGINEER No. C42401	28 AUG 08 APPROVAL DATE	DRAWING #: 7-3 NOT TO SCALE



CONCRETE ENCASEMENT



TYPE II



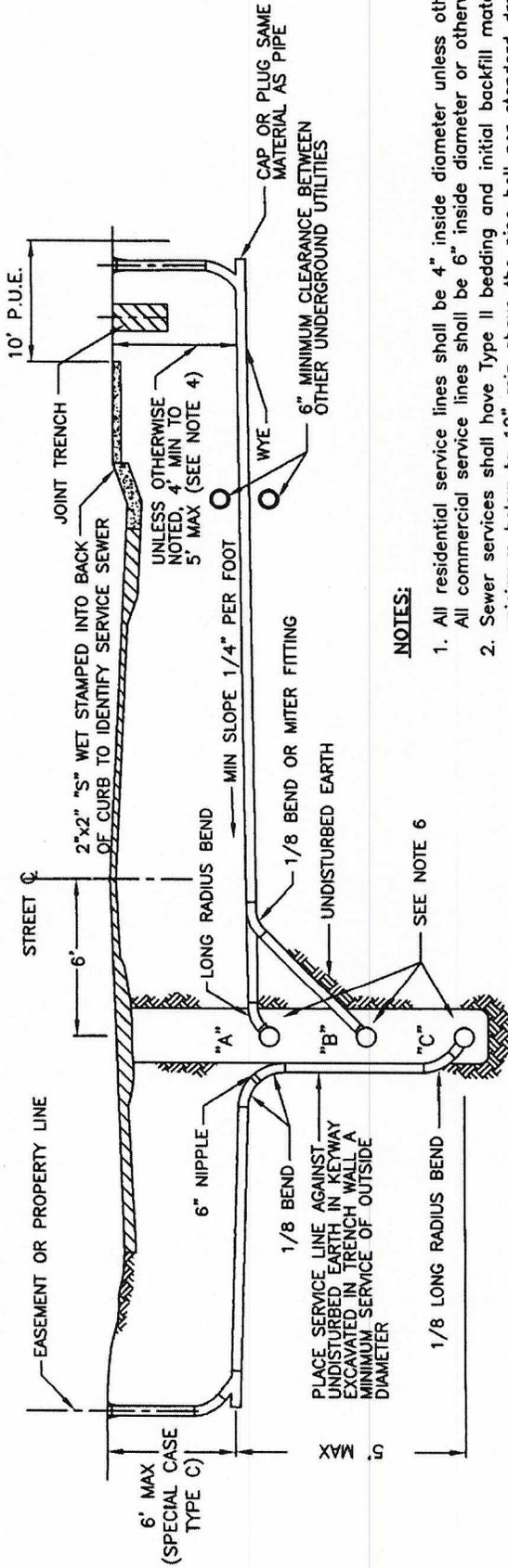
TYPE III
(See Note 3)

(Concrete must extend from pipe to the trench walls. TYPE III not allowed where soils are expansive)

NOTES:

1. Unless otherwise noted on plans bedding and initial backfill for all pipes shall be Type II.
2. Minimum depth of bedding and material under pipe bells shall be 1 1/2 inches.
3. Type III may be used only when construction conditions encountered in the field have resulted in the allowable trench width for Type II being exceeded. Written approval of the Director is necessary.
4. For all flexible (non-rigid) pipe, imported material must be used for bedding and initial backfill to 12 inches over pipe bell.
5. See Drawing 7-4 Sheet 2 for concrete dam to be installed where required due to groundwater conditions.
6. Trench backfill above initial bedding zone shall be compacted to 95% relative compaction, unless higher density is required due to site specific conditions.

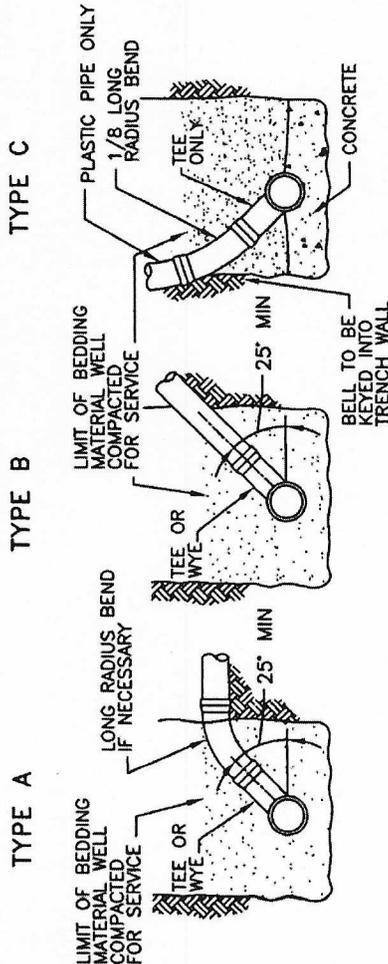
COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT	DATE: 08/05/08
SEWER PIPE BEDDING AND INITIAL BACKFILL	SHEET # 1 OF 1
<i>James Kollmes</i> COUNTY ENGINEER NO. C42401	DRAWING #: 7-4 NOT TO SCALE
<i>ZBMc-08</i> APPROVAL DATE	



NOTES:

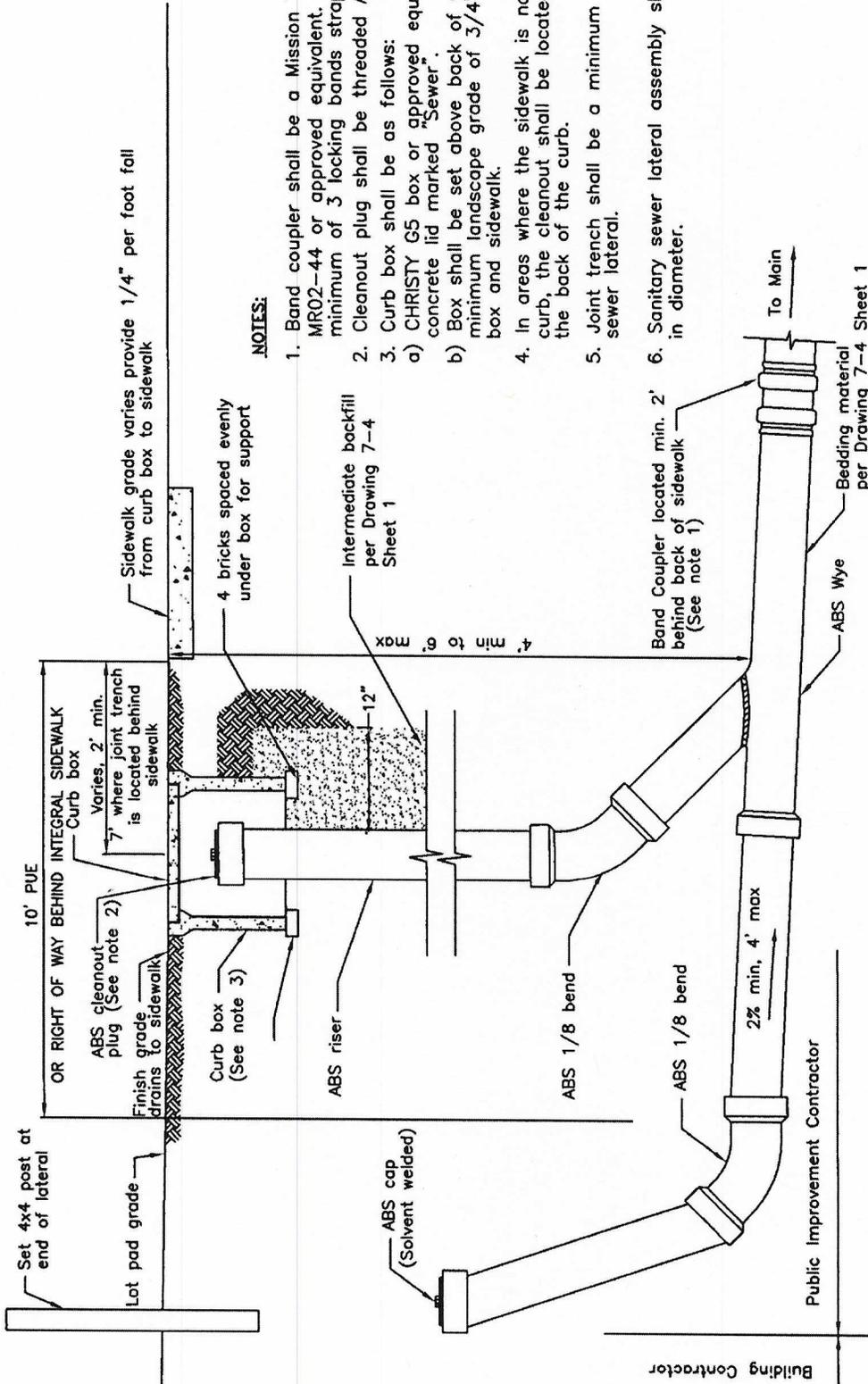
- All residential service lines shall be 4" inside diameter unless otherwise noted. All commercial service lines shall be 6" inside diameter or otherwise noted.
- Sewer services shall have Type II bedding and initial backfill material from 3" minimum below to 12" min above the pipe bell per standard drawing 7-4, Sheet 1. Contractor shall use the most appropriate type connection (A, B or C)
- The standard sewer service has 4' to 5' of cover at back of sidewalk or 6' maximum for Type C. The standard cover may need to be deeper should other utilities be located in adjacent areas.
- Minimum depth of cover to be 5' and maximum 6' where joint trench (PG&E, phone, CATV) is to be installed at back of sidewalk as part of sub-division improvements.
- Place concrete 12" wide or well compacted bedding material 18" wide under the tee or wye, the fitting, and unsupported pipe. When bedding material is used, place additional bedding material to top of bend, the full width of the trench.
- Minimum specified cover at the property line shall be measured from existing ground surface or edge of adjacent roadway, whichever is lower.
- A specific elevation at the property line, when shown on the plans or designated by the engineer, shall govern.
- Miter fittings shall be maximum 45'.
- Only long radius bends shall be used.

ELEVATIONS



CONNECTION DETAILS

COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT	DATE: 08/05/08
SEWER SERVICES	SHEET # 1 OF 3
<i>Pamela Kallas</i> COUNTY ENGINEER No. C42401	DRAWING #: 7-5 NOT TO SCALE
28 AUG. 08 APPROVAL DATE	



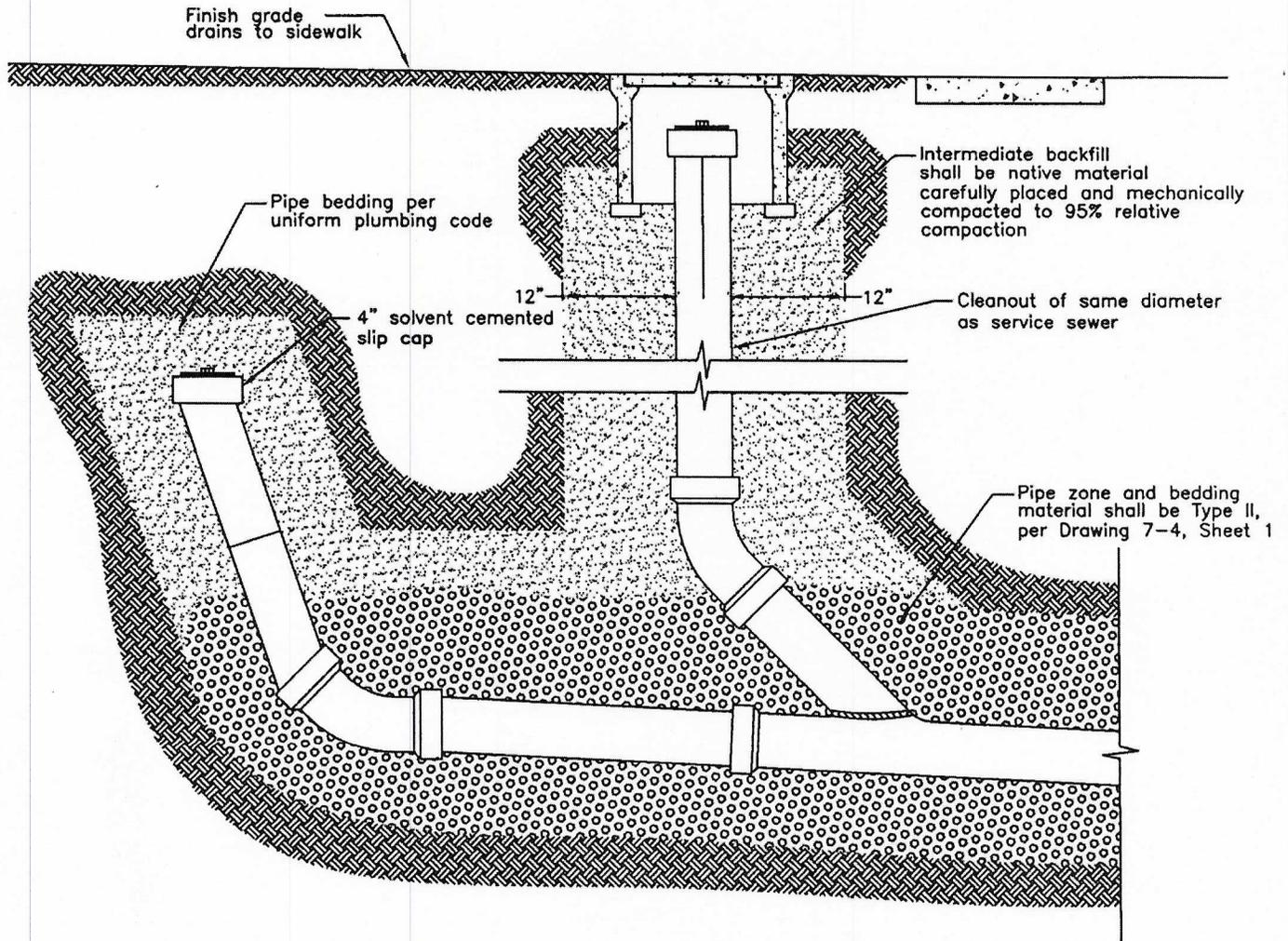
NOTES:

1. Band coupler shall be a Mission Transition Coupler, Model MR02-44 or approved equivalent. Band shall have a minimum of 3 locking bands straps.
2. Cleanout plug shall be threaded ABS.
3. Curb box shall be as follows:
 - a) CHRISTY G5 box or approved equivalent, with a custom concrete lid marked "Sewer".
 - b) Box shall be set above back of walk to provide minimum landscape grade of 3/4" per foot between box and sidewalk.
4. In areas where the sidewalk is not monolithic with the curb, the cleanout shall be located within 18" to 24" from the back of the curb.
5. Joint trench shall be a minimum of 6" above the sanitary sewer lateral.
6. Sanitary sewer lateral assembly shall not be less than 4" in diameter.

COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT	DATE: 08/05/08
SERVICE CLEANOUT TO GRADE	SHEET # 2 OF 3
<i>Thomas Kellias</i> COUNTY ENGINEER No. C42401	DRAWING #: 7-5 APPROVAL DATE: 28 AUG. 08

Building Contractor

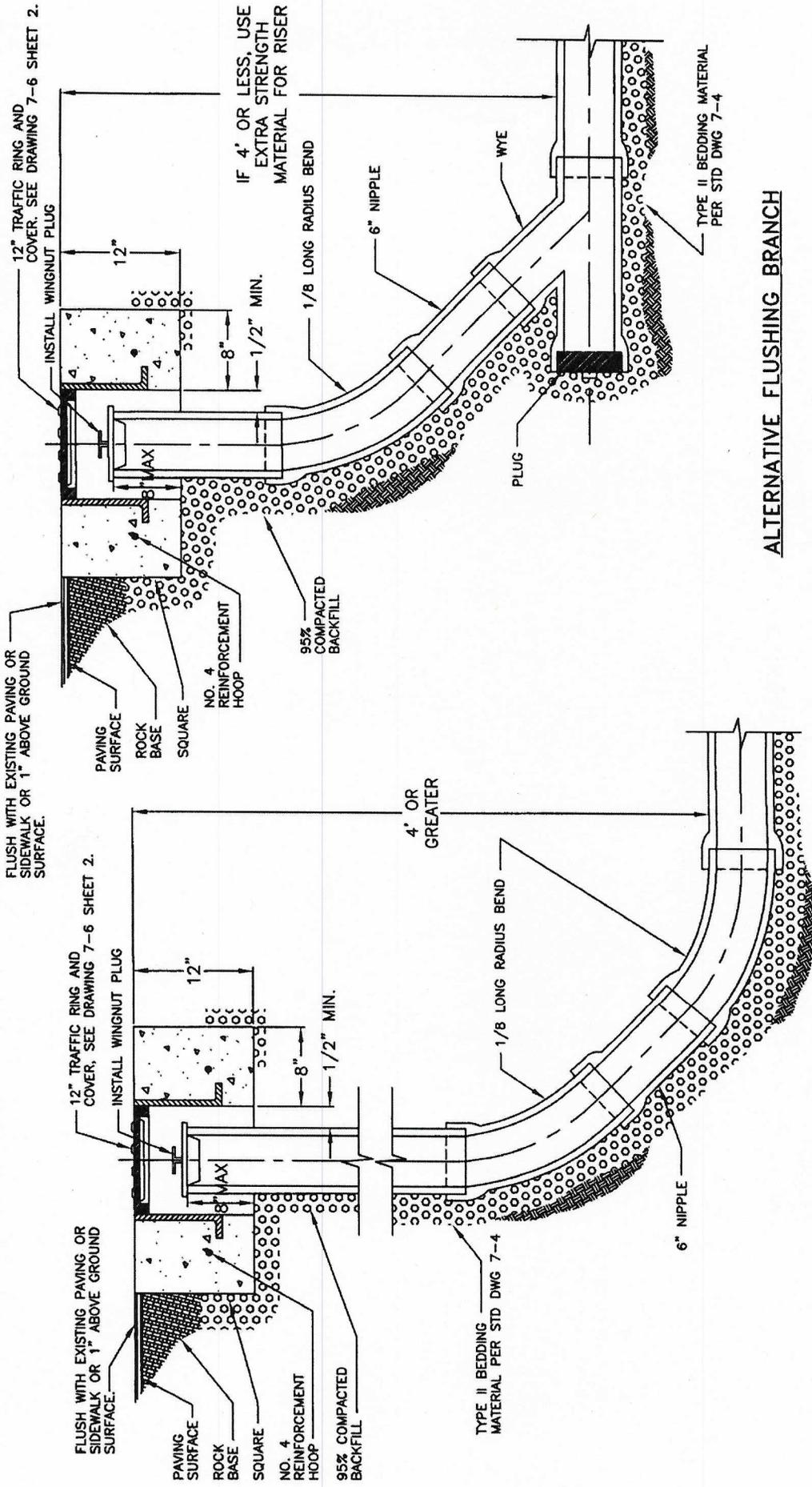
Public Improvement Contractor



COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT		DATE: 08/05/08
SERVICE CLEANOUT TO GRADE BACKFILL REQUIREMENTS		SHEET # 3 OF 3
<i>Panos Kalkas</i> COUNTY ENGINEER No. C42401		DRAWING #: 7-5 NOT TO SCALE
		28 AUG. 08 APPROVAL DATE

FLUSH WITH EXISTING PAVING OR SIDEWALK OR 1" ABOVE GROUND SURFACE.

FLUSH WITH EXISTING PAVING OR SIDEWALK OR 1" ABOVE GROUND SURFACE.



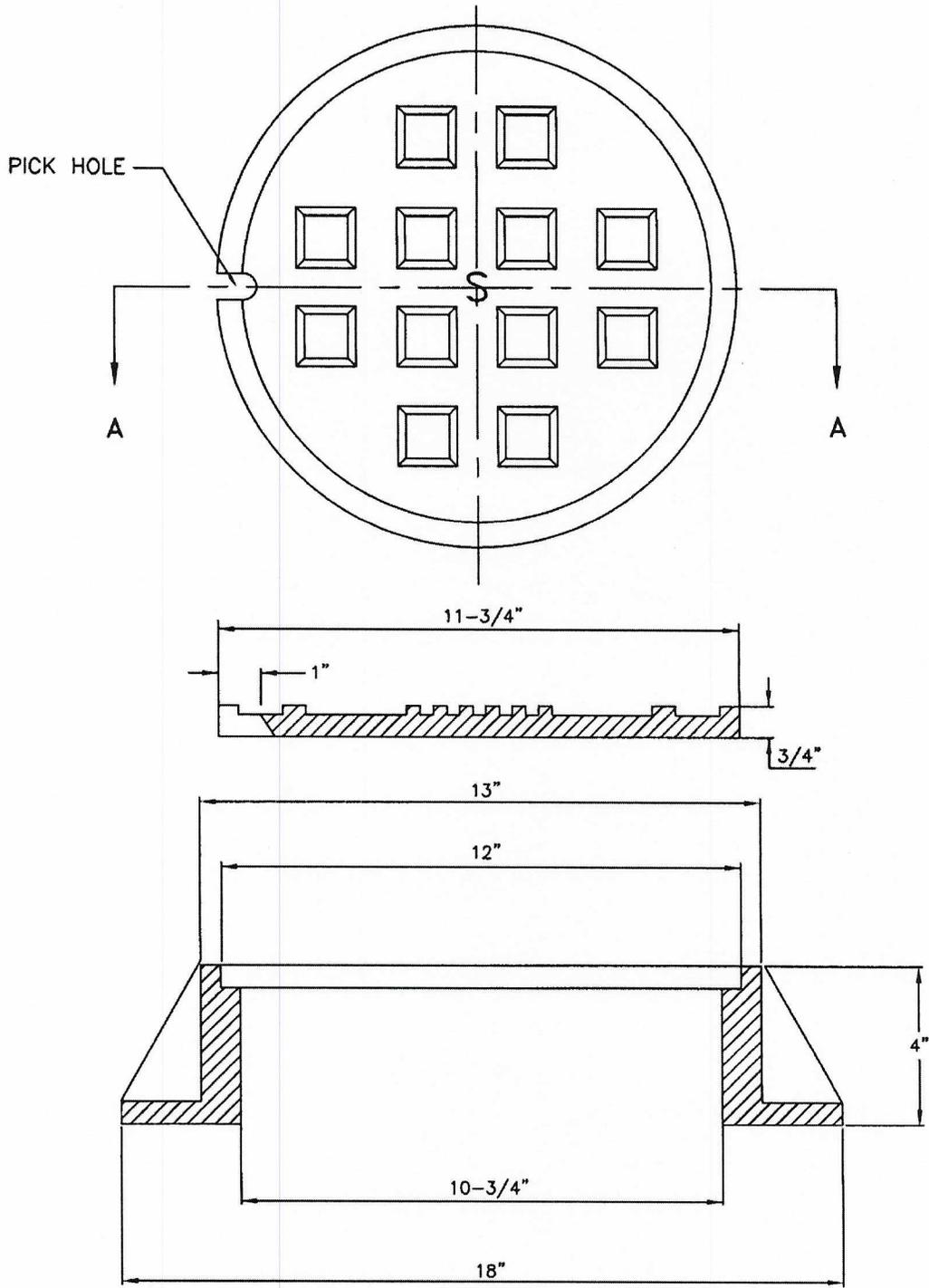
ALTERNATIVE FLUSHING BRANCH

TYPICAL FLUSHING BRANCH

NOTES:

1. ALL PIPE FITTINGS SHALL BE THE SAME SIZE AND MATERIAL AS THE HORIZONTAL PIPE TO WHICH THEY CONNECT.
2. JOINT SHALL BE AS SPECIFIED FOR THE TYPE OF PIPE USED.

PLANNING AND PUBLIC WORKS DEPARTMENT	COUNTY OF YOLO	DATE: 08/05/08
FLUSHING BRANCH		SHEET # 1 OF 2
<i>Pamela Kollas</i> COUNTY ENGINEER No. C42401	28 AUG. 08 APPROVAL DATE	DRAWING #: 7-6 NOT TO SCALE

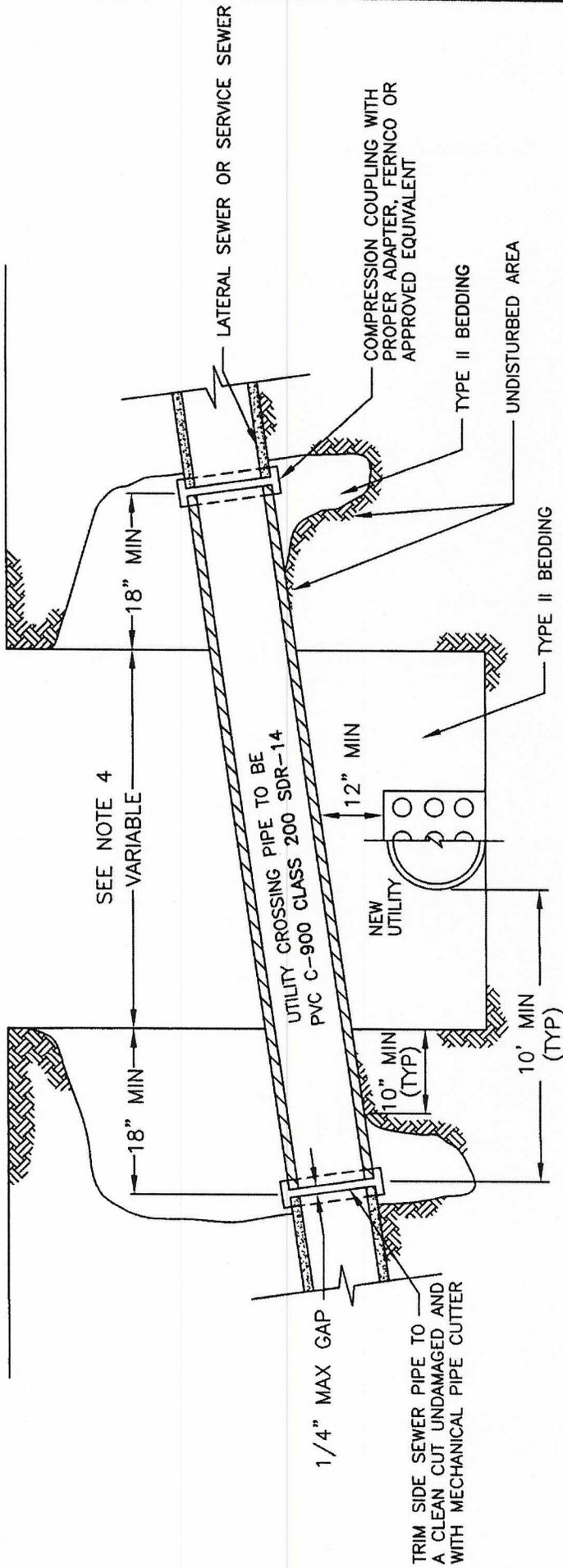


SECTION A-A

NOTES:

1. All materials used in manufacturing shall conform to ASTM 48, Class 35B. D&L Supply Model H-8024 or equivalent.
2. Frame and cover meets H-20 wheel loading.

COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT		DATE: 08/05/08
FLUSHING BRANCH FRAME AND COVER		SHEET # 2 OF 2
<i>Parros Kalkas</i> COUNTY ENGINEER No. C42401	28 AUG 08 APPROVAL DATE	DRAWING #: 7-6 NOT TO SCALE

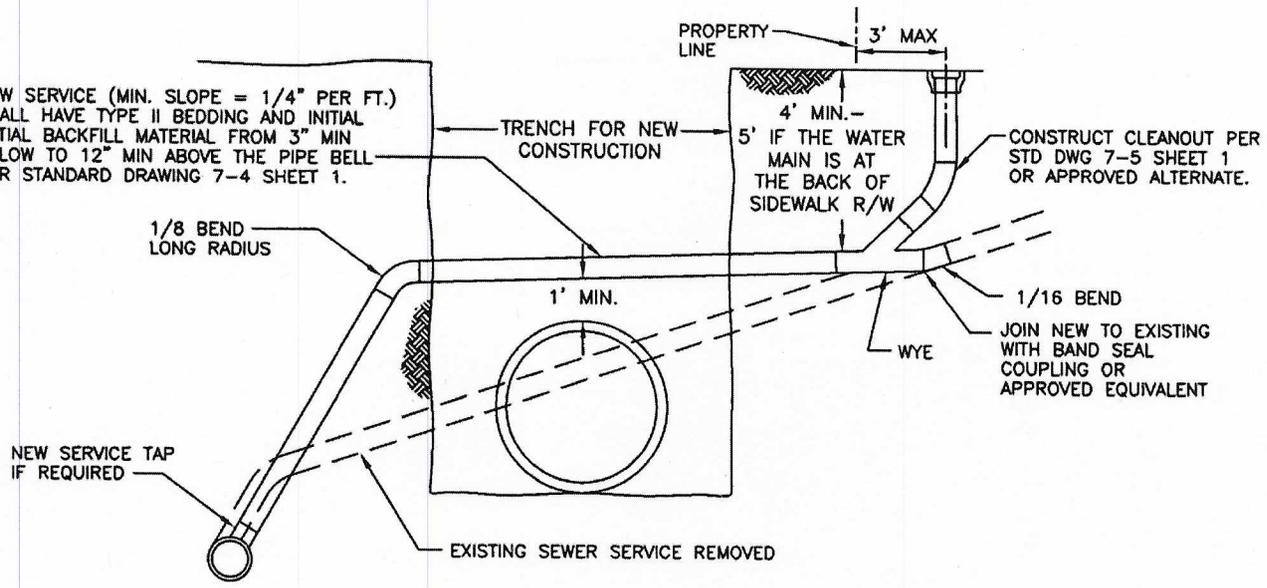


NOTES:

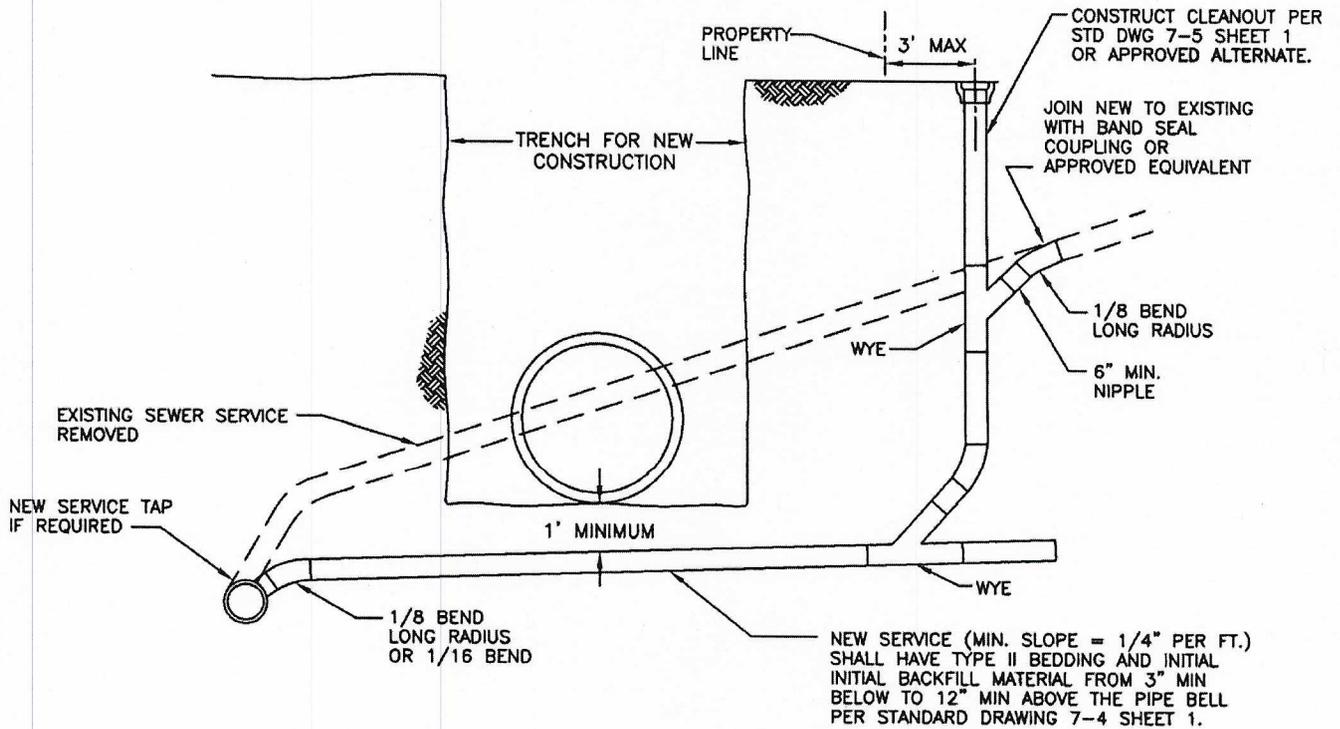
1. All lines are to be protected in place. This detail shall apply whenever the main collector or lateral sewer service is cut or damaged when new construction passes beneath these lines, and may only be used when directed to do so by the County Engineer. Detail does not apply to new water lines.
2. Inside diameter of utility crossing pipe to be the same as the pipe to which it connects.
3. Alteration of sewer grades will be permitted only after written permission has been received from the County engineer.
4. 10 feet minimum from the new utility to the newly created joint of the utility crossing pipe. Place Type II bedding to 12" above the new utility and 18" minimum each side of its center line.
5. Any new utility with 12" clearance may be required to place a compressible material (styrofoam or equivalent) between the lines.

COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT	DATE: 08/05/08
UTILITY CROSSING	SHEET # 1 OF 2
<i>James Cobles</i> COUNTY ENGINEER No. C42401	DRAWING #: 7-7 NOT TO SCALE
28th June 08 APPROVAL DATE	

NEW SERVICE (MIN. SLOPE = 1/4" PER FT.) SHALL HAVE TYPE II BEDDING AND INITIAL INITIAL BACKFILL MATERIAL FROM 3" MIN BELOW TO 12" MIN ABOVE THE PIPE BELL PER STANDARD DRAWING 7-4 SHEET 1.



A. SEWER SERVICE RELOCATION OPTION OVER NEW CONSTRUCTION
(WATER MAIN UNDER NOT ALLOWED)



B. SEWER SERVICE RELOCATION OPTION UNDER NEW CONSTRUCTION
(WATER MAIN OVER SEWER SERVICE)

NOTE:

IF NEITHER OF THESE OPTIONS IS AVAILABLE, THE ELEVATION OF THE NEW FACILITY WILL NEED TO BE ADJUSTED TO ACCOMMODATE ONE OF THESE OPTIONS.

COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT		DATE: 08/05/08
UTILITY CROSSING		SHEET # 2 OF 2
<i>Panos Kakkas</i> COUNTY ENGINEER No. C42401	28 AUG 08 APPROVAL DATE	DRAWING #: 7-7 NOT TO SCALE

APPENDIX F

Reports and Memorandum on City of Winters Sanitary Sewer Overflows

January 14 2007

Ms. Anne Olson
CRWQCB
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114

RE: Updated Report on El Rio Villa Sewer Spill- December 1-3, 2006

Dear Ms. Olson:

The following is an updated report on the December 1-3, 2006 sewer spill at the El Rio Villa Lift Station at the Yolo County Housing Authority. This is an update from the previously submitted documents and reports on December 4 and a preliminary report sent on December 13, 2006.

Following the spill, the City of Winters has conducted an investigation into the spill and is presenting determinations on both cause and amounts as part of this report.

Summary:

At approximately 4:00 p.m. on Sunday, December 3, 2006, the City's contract sewer operator, Eco Resources was called to respond to a report of a sewage discharge at the Yolo County Housing Authority's El Rio Villa Complex located on Russell Blvd in the unincorporated area of Winters. The call was initiated by the YCHA personnel who had been called to unclog what was reported to be a clogged line. The spill was discharging from a manhole located near a lift station located at the facility.

The cause of the overflow was determined to be the inoperability of the lift station pumps which had been turned off. Upon arrival, personnel initiated the booster pumps for the lift station which immediately stopped the discharge. Clean-up of the site around the leakage was begun and completed within approximately 40 minutes of personnel being onsite.

It quickly became apparent that effluent had been discharged into the local storm drain system which flows in Putah Creek, an adjacent waterway. Notifications were immediately made to appropriate agencies and sampling to test for coliforms was initiated.

Location:

Attached as Exhibit A is a map of the location showing both the location of the spill and the area of discharge into Putah Creek.

Response:

Exhibit B of this report is the preliminary report submitted to the RWQCB by Eco Resources which details the response, clean-up, resolution of issues and notification of the appropriate agencies.

Volume of the Spill:

The initial reports submitted to the RWQCB by Eco Resources was 500-1,000 gallons. Through a City initiated investigation, it has been determined that the spill duration and volume was significantly larger than initially reported. Both City Staff, our Contract City Engineer and consultants have reviewed and calculated data to determine our most accurate estimates of the spill.

It has been determined that the duration of the spill was approximately 28 hours and the volume estimate is approximately 43,000 gallons. Calculations for this amount are included in Exhibit C of this report.

Notifications:

The following agencies were notified and reported to regarding the spill within hours of the spill:

1. Anne Olson, RWQCB- December 3, 2006
2. State OES- December 3 and 4, 2006
3. Yolo County Environmental Health- December 3 and 4, 2006
4. State Hazmat- December 3, 2006
5. Yolo County Department of Emergency Services- December 3-4, 2006
6. State Fish and Game- December 4, 2006

Environmental Issues:

The City initiated environmental protection measures immediately following the spill. These included:

- Clean-up and sanitation of the area with granulated chlorine and collection of standing effluent back into the collection system.
- Contacting Wayne Tamaguchi from Yolo County Environmental Health who directed posting of locations along Putah Creek and testing. (See Attachment E for which all items were implemented as directed)

- From December 4-14, 2006 testing was initiated along Putah Creek.

It has been determined that the spill did not cause any major environmental disturbances (fish kills or sickness) but did increase total coliform levels for a period of approximately 7 days.

Test results for the period are attached as Exhibit D of this report.

Cause of the Spill:

The cause and gravity of the spill has been determined to be the negligence of the City's contract operator, Eco Resources and personnel from the Yolo County Housing Authority. This includes the following:

1. Eco Resources in performing a maintenance check on Friday, December 1, 2006, pulled one of the lift station pumps for maintenance. Prior to leaving the facility, the operator turned the power off to both pumps at the Station, causing the inoperability of the lift station and causing the discharge.
2. Eco Resource personnel negligently checked the pumps on both Saturday, December 2 and Sunday, December 3, 2006 when they failed to notice the pumps not operating during the daily check of the lift station. Both in the check of the well water levels and not noticing the adjacent discharge Eco Resources personnel failed to .
3. YCHA personnel delayed response to the spill by their failure to notify Eco Resources of the spill in a timely manner.

While it has been determined by the City investigation that the spill was not intentionally caused by any one party, it is our determination that the spill cause and duration were both preventable and the result of the negligence of Eco Resources.

Conclusion:

The City of Winters recognizes the serious nature of this spill and is diligently working to correct the performance of our operations and alleviate the potential for negligence by our contract operator. We will be requesting a meeting with the Board Staff to discuss our progress in improving our overall operations.

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my knowledge and on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

El Rio Villa Spill- December 3, 2006
Updated Report to RWQCB
January 15, 2007
Page 4

John W. Donlevy, Jr.
City Manager

MAYOR:
Dan Martinez
MAYOR PRO TEM:
Woody Fridae
COUNCIL:
Tom Stone
Bob Chapman
Harold Anderson



MAYOR EMERITUS:
Bob Chapman
TREASURER:
Margaret Dozier
CITY CLERK:
Nanci G. Mills
CITY MANAGER:
John W. Donlevy, Jr.

May 31, 2006

Ms. Anne Olson, P.E.
Water Resources Control Engineer
California Regional Water Quality Control Board
11020 Sun River Drive, suite 200
Rancho Cordova, CA 95670-6114

Dear Ms. Olson:

This is the formal written notification of the sewer overflow that occurred at El Rio Villa, Yolo County Housing Authority Property, Yolo County. City of Winters through ECO Resources operates the lift station at this location. The overflow occurred on Monday, May 22, 2006.

At approximately 9:30 am it was reported to ECO Resources that a manhole overflowed in the EL Rio Villa neighborhood. Wes Mercado was on call when he received notification, he was some distance away and called Terry Vendor, City Employee, for assistance. He advised that Terry reset the pump motors so that the pumps would restart. Terry was able to do so after several tries. During that time, wastewater "burped" from the manhole at approximately 2 gallons per minute for about 60-75 minutes. This estimates to approximately 120-150 gallons total. Most was contained; however a small portion did make it to the storm drain. The area was washed down and a light sprinkle of chlorine was added to kill any bacteria. The storm drain is at least two to three hundred yards from the creek so it is believed that no wastewater made it to the creek.

Karen Honer, facility manager was at an out of town meeting and was informed. Kathy Stone, District Manager was also informed. Anne Olson of the RWQCB was advised both in the morning and in the afternoon.

Per the California Code of Regulations, Title 23, and the City of Winters Sanitary Sewer Overflow Prevention and Response Plan, the Office of Emergency Services (OES) was also notified with number 06-3082 assigned to the incident.

After the pump came on line and the spill was cleaned up, Wes Mercado monitored the pump every few hours to make sure there would not be repeat failure.

The next day, Wes Mercado and Karen Honer pulled the El Rio Villa pump that had failed the day before. Trash and debris were stuck in the impeller. More importantly a broken broom handle was jammed in the impeller. The broom handle was approximately

a foot long and about 3/4" in diameter. The broom handle provided a barrier for the rags and debris to wrap around. Fortunately, there was enough area around the broom handle and debris for water to be pumped. It was not pumped enough, but it was pumping. Karen and Wes cleaned and removed the debris and reset the pump. It is now operating correcting at this time.

Should you have any questions, Please feel free to call me at 530-795-4910, ext113.

Thank you

Charles Simpson

Cc: John W. Donlevy, Jr. – City Manager
Mark List, P.E., Chief – Regional Water Quality Control Board
Fred Ichtertz, Facilities/Maintenance Manager, Yolo County Housing Authority
Karen Honer, Facilities Manager, ECO Resources Inc.

APPENDIX G

Sewer Spill Report Form



SEWER SPILL REPORT FORM

Photos to be taken of spill site, surrounding areas including storm inlets

Agency phone #s: RWQCB (916) 464-3291; OES (800) 852-7550; Yolo Co. Health(530) 666-8646

Employee Name: _____ Date of incident: _____

Location of SSO (with GPS coordinates): _____

Time you received incident call: _____ From whom? _____

Time of arrival at SSO site: _____ Estimated SSO end time: _____

SSO source, cause and destination (if known): _____

Estimated SSO total volume (gallons) _____ Estimated SSO recovered volume (gallons) _____

Estimated SSO volume that entered drainage channel or surface water (gallons) _____

Estimated SSO volume that entered storm drain system not recovered (gallons) _____

Damaged caused by SSO: _____

Response and corrective actions: _____

Health Warnings Posted: (YES / NO) Date and time Yolo County Health Department notified: _____

Samples taken: (YES / NO) Constituents analyzed: _____

_____ Results sent to: _____

Date and time OES notified: _____ OES Control Number _____

Recommended follow-up: _____

This form must be completed as part of the investigation and response for this SSO. The Public Works Department must be informed immediately concerning this SSO. The Department will notify OES, RWQCB, and Yolo County Health Department, as appropriate.

Employee Signature: _____ Date: _____