SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Volume II

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CITY OF PLACENTIA

Sewer System Management Plan (SSMP)
Volume II

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SEWER SYSTEM MANAGEMENT PLAN
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Appendix A

SSS WDR and MRP

STATE WATER RESOURCES CONTROL BOARD
ORDER NO. 2006-0003-DWQ

STATEWIDE GENERAL WASTE DISCHARGE REQUIREMENTS FOR SANITARY SEWER SYSTEMS

The State Water Resources Control Board, hereinafter referred to as "State Water Board", finds that:

1. All federal and state agencies, municipalities, counties, districts, and other public entities that own or operate sanitary sewer systems greater than one mile in length that collect and/or convey untreated or partially treated wastewater to a publicly owned treatment facility in the State of California are required to comply with the terms of this Order. Such entities are hereinafter referred to as "Enrollees".

2. Sanitary sewer overflows (SSOs) are overflows from sanitary sewer systems of domestic wastewater, as well as industrial and commercial wastewater, depending on the pattern of land uses in the area served by the sanitary sewer system. SSOs often contain high levels of suspended solids, pathogenic organisms, toxic pollutants, nutrients, oxygen-demanding organic compounds, oil and grease and other pollutants. SSOs may cause a public nuisance, particularly when raw untreated wastewater is discharged to areas with high public exposure, such as streets or surface waters used for drinking, fishing, or body contact recreation. SSOs may pollute surface or ground waters, threaten public health, adversely affect aquatic life, and impair the recreational use and aesthetic enjoyment of surface waters.

3. Sanitary sewer systems experience periodic failures resulting in discharges that may affect waters of the state. There are many factors (including factors related to geology, design, construction methods and materials, age of the system, population growth, and system operation and maintenance), which affect the likelihood of an SSO. A proactive approach that requires Enrollees to ensure a system-wide operation, maintenance, and management plan is in place will reduce the number and frequency of SSOs within the state. This approach will in turn decrease the risk to human health and the environment caused by SSOs.

4. Major causes of SSOs include: grease blockages, root blockages, sewer line flood damage, manhole structure failures, vandalism, pump station mechanical failures, power outages, excessive storm or ground water inflow/infiltration, debris blockages, sanitary sewer system age and construction material failures, lack of proper operation and maintenance, insufficient capacity and contractor-caused damages. Many SSOs are preventable with adequate and appropriate facilities, source control measures and operation and maintenance of the sanitary sewer system.

SEWER SYSTEM MANAGEMENT PLANS

5. To facilitate proper funding and management of sanitary sewer systems, each Enrollee must develop and implement a system-specific Sewer System Management Plan (SSMP). To be effective, SSMPs must include provisions to provide proper and efficient management, operation, and maintenance of sanitary sewer systems, while taking into consideration risk management and cost benefit analysis. Additionally, an SSMP must contain a spill response plan that establishes standard procedures for immediate response to an SSO in a manner designed to minimize water quality impacts and potential nuisance conditions.

6. Many local public agencies in California have already developed SSMPs and implemented measures to reduce SSOs. These entities can build upon their existing efforts to establish a comprehensive SSMP consistent with this Order. Others, however, still require technical assistance and, in some cases, funding to improve sanitary sewer system operation and maintenance in order to reduce SSOs.

7. SSMP certification by technically qualified and experienced persons can provide a useful and cost-effective means for ensuring that SSMPs are developed and implemented appropriately.

8. It is the State Water Board's intent to gather additional information on the causes and sources of SSOs to augment existing information and to determine the full extent of SSOs and consequent public health and/or environmental impacts occurring in the State.

9. Both uniform SSO reporting and a centralized statewide electronic database are needed to collect information to allow the State Water Board and Regional Water Quality Control Boards (Regional Water Boards) to effectively analyze the extent of SSOs statewide and their potential impacts on beneficial uses and public health. The monitoring and reporting program required by this Order and the attached Monitoring and Reporting Program No. 2006-0003-DWQ, are necessary to assure compliance with these waste discharge requirements (WDRs).

10. Information regarding SSOs must be provided to Regional Water Boards and other regulatory agencies in a timely manner and be made available to the public in a complete, concise, and timely fashion.

11. Some Regional Water Boards have issued WDRs or WDRs that serve as National Pollution Discharge Elimination System (NPDES) permits to sanitary sewer system owners/operators within their jurisdictions. This Order establishes minimum requirements to prevent SSOs. Although it is the State Water Board's intent that this Order be the primary regulatory mechanism for sanitary sewer systems statewide, Regional Water Boards may issue more stringent or more

prescriptive WDRs for sanitary sewer systems. Upon issuance or reissuance of a Regional Water Board's WDRs for a system subject to this Order, the Regional Water Board shall coordinate its requirements with stated requirements within this Order, to identify requirements that are more stringent, to remove requirements that are less stringent than this Order, and to provide consistency in reporting.

REGULATORY CONSIDERATIONS

12. California Water Code section 13263 provides that the State Water Board may prescribe general WDRs for a category of discharges if the State Water Board finds or determines that:

    - The discharges are produced by the same or similar operations;
    - The discharges involve the same or similar types of waste;
    - The discharges require the same or similar treatment standards; and
    - The discharges are more appropriately regulated under general discharge requirements than individual discharge requirements.

    This Order establishes requirements for a class of operations, facilities, and discharges that are similar throughout the state.

13. The issuance of general WDRs to the Enrollees will:
    a) Reduce the administrative burden of issuing individual WDRs to each Enrollee;
    b) Provide for a unified statewide approach for the reporting and database tracking of SSOs;
    c) Establish consistent and uniform requirements for SSMP development and implementation;
    d) Provide statewide consistency in reporting; and
    e) Facilitate consistent enforcement for violations.

14. The beneficial uses of surface waters that can be impaired by SSOs include, but are not limited to, aquatic life, drinking water supply, body contact and non-contact recreation, and aesthetics. The beneficial uses of ground water that can be impaired include, but are not limited to, drinking water and agricultural supply. Surface and ground waters throughout the state support these uses to varying degrees.

15. The implementation of requirements set forth in this Order will ensure the reasonable protection of past, present, and probable future beneficial uses of water and the prevention of nuisance. The requirements implement the water quality control plans (Basin Plans) for each region and take into account the environmental characteristics of hydrographic units within the state. Additionally, the State Water Board has considered water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect

water quality in the area, costs associated with compliance with these requirements, the need for developing housing within California, and the need to develop and use recycled water.

16. The Federal Clean Water Act largely prohibits any discharge of pollutants from a point source to waters of the United States except as authorized under an NPDES permit. In general, any point source discharge of sewage effluent to waters of the United States must comply with technology-based, secondary treatment standards, at a minimum, and any more stringent requirements necessary to meet applicable water quality standards and other requirements. Hence, the unpermitted discharge of wastewater from a sanitary sewer system to waters of the United States is illegal under the Clean Water Act. In addition, many Basin Plans adopted by the Regional Water Boards contain discharge prohibitions that apply to the discharge of untreated or partially treated wastewater. Finally, the California Water Code generally prohibits the discharge of waste to land prior to the filing of any required report of waste discharge and the subsequent issuance of either WDRs or a waiver of WDRs.

17. California Water Code section 13263 requires a water board to, after any necessary hearing, prescribe requirements as to the nature of any proposed discharge, existing discharge, or material change in an existing discharge. The requirements shall, among other things, take into consideration the need to prevent nuisance.

18. California Water Code section 13050, subdivision (m), defines nuisance as anything which meets all of the following requirements:
    a. Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
    b. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.
    c. Occurs during, or as a result of, the treatment or disposal of wastes.

19. This Order is consistent with State Water Board Resolution No. 68-16 (Statement of Policy with Respect to Maintaining High Quality of Waters in California) in that the Order imposes conditions to prevent impacts to water quality, does not allow the degradation of water quality, will not unreasonably affect beneficial uses of water, and will not result in water quality less than prescribed in State Water Board or Regional Water Board plans and policies.

20. The action to adopt this General Order is exempt from the California Environmental Quality Act (Public Resources Code §21000 et seq.) because it is an action taken by a regulatory agency to assure the protection of the environment and the regulatory process involves procedures for protection of the environment. (Cal. Code Regs., tit. 14, §15308). In addition, the action to adopt

this Order is exempt from CEQA pursuant to Cal.Code Regs., title 14, §15301 to the extent that it applies to existing sanitary sewer collection systems that constitute "existing facilities" as that term is used in Section 15301, and §15302, to the extent that it results in the repair or replacement of existing systems involving negligible or no expansion of capacity.

21. The Fact Sheet, which is incorporated by reference in the Order, contains supplemental information that was also considered in establishing these requirements.

22. The State Water Board has notified all affected public agencies and all known interested persons of the intent to prescribe general WDRs that require Enrollees to develop SSMPs and to report all SSOs.

23. The State Water Board conducted a public hearing on February 8, 2006, to receive oral and written comments on the draft order. The State Water Board received and considered, at its May 2, 2006, meeting, additional public comments on substantial changes made to the proposed general WDRs following the February 8, 2006, public hearing. The State Water Board has considered all comments pertaining to the proposed general WDRs.

IT IS HEREBY ORDERED, that pursuant to California Water Code section 13263, the Enrollees, their agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted hereunder, shall comply with the following:

A. DEFINITIONS

1. **Sanitary sewer overflow (SSO)** - Any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSOs include:
   (i) Overflows or releases of untreated or partially treated wastewater that reach waters of the United States;
   (ii) Overflows or releases of untreated or partially treated wastewater that do not reach waters of the United States; and
   (iii) Wastewater backups into buildings and on private property that are caused by blockages or flow conditions within the publicly owned portion of a sanitary sewer system.

2. **Sanitary sewer system** – Any system of pipes, pump stations, sewer lines, or other conveyances, upstream of a wastewater treatment plant headworks used to collect and convey wastewater to the publicly owned treatment facility. Temporary storage and conveyance facilities (such as vaults, temporary piping, construction trenches, wet wells, impoundments, tanks, etc.) are considered to be part of the sanitary sewer system, and discharges into these temporary storage facilities are not considered to be SSOs.

For purposes of this Order, sanitary sewer systems include only those systems owned by public agencies that are comprised of more than one mile of pipes or sewer lines.

3. **Enrollee** - A federal or state agency, municipality, county, district, and other public entity that owns or operates a sanitary sewer system, as defined in the general WDRs, and that has submitted a complete and approved application for coverage under this Order.

4. **SSO Reporting System** – Online spill reporting system that is hosted, controlled, and maintained by the State Water Board. The web address for this site is http://ciwqs.waterboards.ca.gov. This online database is maintained on a secure site and is controlled by unique usernames and passwords.

5. **Untreated or partially treated wastewater** – Any volume of waste discharged from the sanitary sewer system upstream of a wastewater treatment plant headworks.

6. **Satellite collection system** – The portion, if any, of a sanitary sewer system owned or operated by a different public agency than the agency that owns and operates the wastewater treatment facility to which the sanitary sewer system is tributary.

7. **Nuisance** - California Water Code section 13050, subdivision (m), defines nuisance as anything which meets all of the following requirements:
    a. Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
    b. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.
    c. Occurs during, or as a result of, the treatment or disposal of wastes.

B. APPLICATION REQUIREMENTS

1. Deadlines for Application – All public agencies that currently own or operate sanitary sewer systems within the State of California must apply for coverage under the general WDRs within six (6) months of the date of adoption of the general WDRs. Additionally, public agencies that acquire or assume responsibility for operating sanitary sewer systems after the date of adoption of this Order must apply for coverage under the general WDRs at least three (3) months prior to operation of those facilities.

2. Applications under the general WDRs – In order to apply for coverage pursuant to the general WDRs, a legally authorized representative for each agency must submit a complete application package. Within sixty (60) days of adoption of the general WDRs, State Water Board staff will send specific instructions on how to

apply for coverage under the general WDRs to all known public agencies that own sanitary sewer systems. Agencies that do not receive notice may obtain applications and instructions online on the Water Board's website.

3. Coverage under the general WDRs – Permit coverage will be in effect once a complete application package has been submitted and approved by the State Water Board's Division of Water Quality.

C. PROHIBITIONS

1. Any SSO that results in a discharge of untreated or partially treated wastewater to waters of the United States is prohibited.

2. Any SSO that results in a discharge of untreated or partially treated wastewater that creates a nuisance as defined in California Water Code Section 13050(m) is prohibited.

D. PROVISIONS

1. The Enrollee must comply with all conditions of this Order. Any noncompliance with this Order constitutes a violation of the California Water Code and is grounds for enforcement action.

2. It is the intent of the State Water Board that sanitary sewer systems be regulated in a manner consistent with the general WDRs. Nothing in the general WDRs shall be:

    (i) Interpreted or applied in a manner inconsistent with the Federal Clean Water Act, or supersede a more specific or more stringent state or federal requirement in an existing permit, regulation, or administrative/judicial order or Consent Decree;
    (ii) Interpreted or applied to authorize an SSO that is illegal under either the Clean Water Act, an applicable Basin Plan prohibition or water quality standard, or the California Water Code;
    (iii) Interpreted or applied to prohibit a Regional Water Board from issuing an individual NPDES permit or WDR, superseding this general WDR, for a sanitary sewer system, authorized under the Clean Water Act or California Water Code; or
    (iv) Interpreted or applied to supersede any more specific or more stringent WDRs or enforcement order issued by a Regional Water Board.

3. The Enrollee shall take all feasible steps to eliminate SSOs. In the event that an SSO does occur, the Enrollee shall take all feasible steps to contain and mitigate the impacts of an SSO.

4. In the event of an SSO, the Enrollee shall take all feasible steps to prevent untreated or partially treated wastewater from discharging from storm drains into

flood control channels or waters of the United States by blocking the storm drainage system and by removing the wastewater from the storm drains.

5. All SSOs must be reported in accordance with Section G of the general WDRs.

6. In any enforcement action, the State and/or Regional Water Boards will consider the appropriate factors under the duly adopted State Water Board Enforcement Policy. And, consistent with the Enforcement Policy, the State and/or Regional Water Boards must consider the Enrollee's efforts to contain, control, and mitigate SSOs when considering the California Water Code Section 13327 factors. In assessing these factors, the State and/or Regional Water Boards will also consider whether:

   (i) The Enrollee has complied with the requirements of this Order, including requirements for reporting and developing and implementing a SSMP;

   (ii) The Enrollee can identify the cause or likely cause of the discharge event;

   (iii) There were no feasible alternatives to the discharge, such as temporary storage or retention of untreated wastewater, reduction of inflow and infiltration, use of adequate backup equipment, collecting and hauling of untreated wastewater to a treatment facility, or an increase in the capacity of the system as necessary to contain the design storm event identified in the SSMP. It is inappropriate to consider the lack of feasible alternatives, if the Enrollee does not implement a periodic or continuing process to identify and correct problems.

   (iv) The discharge was exceptional, unintentional, temporary, and caused by factors beyond the reasonable control of the Enrollee;

   (v) The discharge could have been prevented by the exercise of reasonable control described in a certified SSMP for:
      - Proper management, operation and maintenance;
      - Adequate treatment facilities, sanitary sewer system facilities, and/or components with an appropriate design capacity, to reasonably prevent SSOs (e.g., adequately enlarging treatment or collection facilities to accommodate growth, infiltration and inflow (I/I), etc.);
      - Preventive maintenance (including cleaning and fats, oils, and grease (FOG) control);
      - Installation of adequate backup equipment; and
      - Inflow and infiltration prevention and control to the extent practicable.

   (vi) The sanitary sewer system design capacity is appropriate to reasonably prevent SSOs.

(vii) The Enrollee took all reasonable steps to stop and mitigate the impact of the discharge as soon as possible.

7. When a sanitary sewer overflow occurs, the Enrollee shall take all feasible steps and necessary remedial actions to 1) control or limit the volume of untreated or partially treated wastewater discharged, 2) terminate the discharge, and 3) recover as much of the wastewater discharged as possible for proper disposal, including any wash down water.

   The Enrollee shall implement all remedial actions to the extent they may be applicable to the discharge and not inconsistent with an emergency response plan, including the following:

   (i) Interception and rerouting of untreated or partially treated wastewater flows around the wastewater line failure;
   (ii) Vacuum truck recovery of sanitary sewer overflows and wash down water;
   (iii) Cleanup of debris at the overflow site;
   (iv) System modifications to prevent another SSO at the same location;
   (v) Adequate sampling to determine the nature and impact of the release; and
   (vi) Adequate public notification to protect the public from exposure to the SSO.

8. The Enrollee shall properly, manage, operate, and maintain all parts of the sanitary sewer system owned or operated by the Enrollee, and shall ensure that the system operators (including employees, contractors, or other agents) are adequately trained and possess adequate knowledge, skills, and abilities.

9. The Enrollee shall allocate adequate resources for the operation, maintenance, and repair of its sanitary sewer system, by establishing a proper rate structure, accounting mechanisms, and auditing procedures to ensure an adequate measure of revenues and expenditures. These procedures must be in compliance with applicable laws and regulations and comply with generally acceptable accounting practices.

10. The Enrollee shall provide adequate capacity to convey base flows and peak flows, including flows related to wet weather events. Capacity shall meet or exceed the design criteria as defined in the Enrollee's System Evaluation and Capacity Assurance Plan for all parts of the sanitary sewer system owned or operated by the Enrollee.

11. The Enrollee shall develop and implement a written Sewer System Management Plan (SSMP) and make it available to the State and/or Regional Water Board upon request. A copy of this document must be publicly available at the Enrollee's office and/or available on the Internet. This SSMP must be approved by the Enrollee's governing board at a public meeting.

12. In accordance with the California Business and Professions Code sections 6735, 7835, and 7835.1, all engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. Specific elements of the SSMP that require professional evaluation and judgments shall be prepared by or under the direction of appropriately qualified professionals, and shall bear the professional(s)' signature and stamp.

13. The mandatory elements of the SSMP are specified below. However, if the Enrollee believes that any element of this section is not appropriate or applicable to the Enrollee's sanitary sewer system, the SSMP program does not need to address that element. The Enrollee must justify why that element is not applicable. The SSMP must be approved by the deadlines listed in the SSMP Time Schedule below.

Sewer System Management Plan (SSMP)

(i) **Goal**: 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 do occur.

(ii) **Organization**: The SSMP must identify:

(a) The name of the responsible or authorized representative as described in Section J of this Order.

(b) The names and telephone numbers for management, administrative, and maintenance positions responsible 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

(c) 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)).

(iii) **Legal Authority:** 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:

(a) Prevent illicit discharges into its sanitary sewer system (examples may include I/I, stormwater, chemical dumping, unauthorized debris and cut roots, etc.);

(b) Require that sewers and connections be properly designed and constructed;

(c) Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the Public Agency;

(d) Limit the discharge of fats, oils, and grease and other debris that may cause blockages, and

(e) Enforce any violation of its sewer ordinances.

(iv) **Operation and Maintenance Program**. The SSMP must include those elements listed below that are appropriate and applicable to the Enrollee's system:

(a) 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;

(b) 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;

(c) 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;

(d) Provide training on a regular basis for staff in sanitary sewer system operations and maintenance, and require contractors to be appropriately trained; and

(e) Provide equipment and replacement part inventories, including identification of critical replacement parts.

(v) **Design and Performance Provisions**:

(a) 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

(b) Procedures and standards for inspecting and testing the installation of new sewers, pumps, and other appurtenances and for rehabilitation and repair projects.

(vi) **Overflow Emergency Response Plan -** 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 include the following:

(a) Proper notification procedures so that the primary responders and regulatory agencies are informed of all SSOs in a timely manner;

(b) A program to ensure an appropriate response to all overflows;

(c) 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 the waters of the State in accordance with the MRP. All SSOs shall be reported in accordance with this 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;

(d) Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Emergency Response Plan and are appropriately trained;

(e) Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and

(f) 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 from the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.

(vii) **FOG Control Program:** 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 for 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:

(a) An implementation plan and schedule for a public education outreach program that promotes proper disposal of FOG;

(b) 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;

(c) The legal authority to prohibit discharges to the system and identify measures to prevent SSOs and blockages caused by FOG;

(d) 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;

(e) Authority to inspect grease producing facilities, enforcement authorities, and whether the Enrollee has sufficient staff to inspect and enforce the FOG ordinance;

(f) An identification of sanitary sewer system sections subject to FOG blockages and establishment of a cleaning maintenance schedule for each section; and

(g) 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.

(viii) **System Evaluation and Capacity Assurance Plan**: The Enrollee shall prepare and implement a capital improvement plan (CIP) 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:

(a) **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 from 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;

(b) **Design Criteria:** Where design criteria do not exist or are deficient, undertake the evaluation identified in (a) above to establish appropriate design criteria; and

(c) **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 programs, increases and redundancy in pumping capacity, and storage facilities. The CIP shall include an implementation schedule and shall identify sources of funding.

(d) **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.

(ix) **Monitoring, Measurement, and Program Modifications:** The Enrollee shall:

(a) Maintain relevant information that can be used to establish and prioritize appropriate SSMP activities;

(b) Monitor the implementation and, where appropriate, measure the effectiveness of each element of the SSMP;

(c) Assess the success of the preventative maintenance program;

(d) Update program elements, as appropriate, based on monitoring or performance evaluations; and

(e) Identify and illustrate SSO trends, including: frequency, location, and volume.

(x) **SSMP Program Audits** - 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.

(xi) **Communication Program** – The Enrollee 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 Enrollee as the program is developed and implemented.

The Enrollee shall also create a plan of communication with systems that are tributary and/or satellite to the Enrollee's sanitary sewer system.

14. Both the SSMP and the Enrollee's program to implement the SSMP must be certified by the Enrollee to be in compliance with the requirements set forth above and must be presented to the Enrollee's governing board for approval at a public meeting. The Enrollee shall certify that the SSMP, and subparts thereof, are in compliance with the general WDRs within the time frames identified in the time schedule provided in subsection D.15, below.

    In order to complete this certification, the Enrollee's authorized representative must complete the certification portion in the Online SSO Database Questionnaire by checking the appropriate milestone box, printing and signing the automated form, and sending the form to:

    State Water Resources Control Board
    Division of Water Quality
    Attn: SSO Program Manager
    P.O. Box 100
    Sacramento, CA 95812

    The SSMP must be updated every five (5) years, and must include any significant program changes. Re-certification by the governing board of the Enrollee is required in accordance with D.14 when significant updates to the SSMP are made. To complete the re-certification process, the Enrollee shall enter the data in the Online SSO Database and mail the form to the State Water Board, as described above.

15. The Enrollee shall comply with these requirements according to the following schedule. This time schedule does not supersede existing requirements or time schedules associated with other permits or regulatory requirements.

Sewer System Management Plan Time Schedule

Task and Associated Section	**Completion Date**			
	Population > 100,000	Population between 100,000 and 10,000	Population between 10,000 and 2,500	Population < 2,500
Application for Permit Coverage ***Section C***	6 months after WDRs Adoption			
Reporting Program ***Section G***	6 months after WDRs Adoption[1]			
SSMP Development Plan and Schedule ***No specific Section***	9 months after WDRs Adoption[2]	12 months after WDRs Adoption[2]	15 months after WDRs Adoption[2]	18 months after WDRs Adoption[2]
Goals and Organization Structure ***Section D 13 (i) & (ii)***	12 months after WDRs Adoption[2]		18 months after WDRs Adoption[2]	
Overflow Emergency Response Program ***Section D 13 (vi)***	24 months after WDRs Adoption[2]	30 months after WDRs Adoption[2]	36 months after WDRs Adoption[2]	39 months after WDRs Adoption[2]
Legal Authority ***Section D 13 (iii)***				
Operation and Maintenance Program ***Section D 13 (iv)***				
Grease Control Program ***Section D 13 (vii)***				
Design and Performance ***Section D 13 (v)***	36 months after WDRs Adoption	39 months after WDRs Adoption	48 months after WDRs Adoption	51 months after WDRs Adoption
System Evaluation and Capacity Assurance Plan ***Section D 13 (viii)***				
Final SSMP, incorporating all of the SSMP requirements ***Section D 13***				

1. In the event that by July 1, 2006 the Executive Director is able to execute a memorandum of agreement (MOA) with the California Water Environment Association (CWEA) or discharger representatives outlining a strategy and time schedule for CWEA or another entity to provide statewide training on the adopted monitoring program, SSO database electronic reporting, and SSMP development, consistent with this Order, then the schedule of Reporting Program Section G shall be replaced with the following schedule:

Reporting Program ***Section G***	
Regional Boards 4, 8, and 9	8 months after WDRs Adoption
Regional Boards 1, 2, and 3	12 months after WDRs Adoption
Regional Boards 5, 6, and 7	16 months after WDRs Adoption

If this MOU is not executed by July 1, 2006, the reporting program time schedule will remain six (6) months for all regions and agency size categories.

2. In the event that the Executive Director executes the MOA identified in note 1 by July 1, 2006, then the deadline for this task shall be extended by six (6) months. The time schedule identified in the MOA must be consistent with the extended time schedule provided by this note. If the MOA is not executed by July 1, 2006, the six (6) month time extension will not be granted.

E. WDRs and SSMP AVAILABILITY

1. A copy of the general WDRs and the certified SSMP shall be maintained at appropriate locations (such as the Enrollee's offices, facilities, and/or Internet homepage) and shall be available to sanitary sewer system operating and maintenance personnel at all times.

F. ENTRY AND INSPECTION

1. The Enrollee shall allow the State or Regional Water Boards or their authorized representative, upon presentation of credentials and other documents as may be required by law, to:

    a. Enter upon the Enrollee's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order;

    b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

d. Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order or as otherwise authorized by the California Water Code, any substances or parameters at any location.

G. GENERAL MONITORING AND REPORTING REQUIREMENTS

1. The Enrollee shall furnish to the State or Regional Water Board, within a reasonable time, any information that the State or Regional Water Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The Enrollee shall also furnish to the Executive Director of the State Water Board or Executive Officer of the applicable Regional Water Board, upon request, copies of records required to be kept by this Order.

2. The Enrollee shall comply with the attached Monitoring and Reporting Program No. 2006-0003 and future revisions thereto, as specified by the Executive Director. Monitoring results shall be reported at the intervals specified in Monitoring and Reporting Program No. 2006-0003. Unless superseded by a specific enforcement Order for a specific Enrollee, these reporting requirements are intended to replace other mandatory routine written reports associated with SSOs.

3. All Enrollees must obtain SSO Database accounts and receive a “Username” and “Password” by registering through the California Integrated Water Quality System (CIWQS). These accounts will allow controlled and secure entry into the SSO Database. Additionally, within 30days of receiving an account and prior to recording spills into the SSO Database, all Enrollees must complete the “Collection System Questionnaire”, which collects pertinent information regarding a Enrollee’s collection system. The “Collection System Questionnaire” must be updated at least every 12 months.

4. Pursuant to Health and Safety Code section 5411.5, any person who, without regard to intent or negligence, causes or permits any untreated wastewater or other waste to be discharged in or on any waters of the State, or discharged in or deposited where it is, or probably will be, discharged in or on any surface waters of the State, as soon as that person has knowledge of the discharge, shall immediately notify the local health officer of the discharge. Discharges of untreated or partially treated wastewater to storm drains and drainage channels, whether man-made or natural or concrete-lined, shall be reported as required above.

   Any SSO greater than 1,000 gallons discharged in or on any waters of the State, or discharged in or deposited where it is, or probably will be, discharged in or on any surface waters of the State shall also be reported to the Office of Emergency Services pursuant to California Water Code section 13271.

H. CHANGE IN OWNERSHIP

1. This Order is not transferable to any person or party, except after notice to the Executive Director. The Enrollee shall submit this notice in writing at least 30 days in advance of any proposed transfer. The notice must include a written agreement between the existing and new Enrollee containing a specific date for the transfer of this Order's responsibility and coverage between the existing Enrollee and the new Enrollee. This agreement shall include an acknowledgement that the existing Enrollee is liable for violations up to the transfer date and that the new Enrollee is liable from the transfer date forward.

I. INCOMPLETE REPORTS

1. If an Enrollee becomes aware that it failed to submit any relevant facts in any report required under this Order, the Enrollee shall promptly submit such facts or information by formally amending the report in the Online SSO Database.

J. REPORT DECLARATION

1. All applications, reports, or information shall be signed and certified as follows:

    (i) All reports required by this Order and other information required by the State or Regional Water Board shall be signed and certified by a person designated, for a municipality, state, federal or other public agency, as either a principal executive officer or ranking elected official, or by a duly authorized representative of that person, as described in paragraph (ii) of this provision. (For purposes of electronic reporting, an electronic signature and accompanying certification, which is in compliance with the Online SSO database procedures, meet this certification requirement.)

    (ii) An individual is a duly authorized representative only if:

        (a) The authorization is made in writing by a person described in paragraph (i) of this provision; and

        (b) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity.

K. CIVIL MONETARY REMEDIES FOR DISCHARGE VIOLATIONS

1. The California Water Code provides various enforcement options, including civil monetary remedies, for violations of this Order.

2. The California Water Code also provides that any person failing or refusing to furnish technical or monitoring program reports, as required under this Order, or

falsifying any information provided in the technical or monitoring reports is subject to civil monetary penalties.

L. SEVERABILITY

1. The provisions of this Order are severable, and if any provision of this Order, or the application of any provision of this Order to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Order, shall not be affected thereby.

2. This order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the Enrollee from liability under federal, state or local laws, nor create a vested right for the Enrollee to continue the waste discharge.

CERTIFICATION

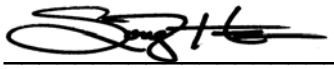
The undersigned Clerk to the State Water Board does hereby certify that the foregoing is a full, true, and correct copy of general WDRs duly and regularly adopted at a meeting of the State Water Resources Control Board held on May 2, 2006.

AYE: Tam M. Doduc
Gerald D. Secundy

NO: Arthur G. Baggett

ABSENT: None

ABSTAIN: None



Song Her
Clerk to the Board

STATE WATER RESOURCES CONTROL BOARD

MONITORING AND REPORTING PROGRAM NO. 2006-0003-DWQ
STATEWIDE GENERAL WASTE DISCHARGE REQUIREMENTS
FOR
SANITARY SEWER SYSTEMS

This Monitoring and Reporting Program (MRP) establishes monitoring, record keeping, reporting and public notification requirements for Order No. 2006-2003-DWQ, "Statewide General Waste Discharge Requirements for Sanitary Sewer Systems." Revisions to this MRP may be made at any time by the Executive Director, and may include a reduction or increase in the monitoring and reporting.

A. SANITARY SEWER OVERFLOW REPORTING

SSO Categories

1. Category 1 - All discharges of sewage resulting from a failure in the Enrollee's sanitary sewer system that:
   A. Equal or exceed 1000 gallons, or
   B. Result in a discharge to a drainage channel and/or surface water; or
   C. Discharge to a storm drainpipe that was not fully captured and returned to the sanitary sewer system.

2. Category 2 – All other discharges of sewage resulting from a failure in the Enrollee's sanitary sewer system.

3. Private Lateral Sewage Discharges – Sewage discharges that are caused by blockages or other problems within a privately owned lateral.

SSO Reporting Timeframes

4. Category 1 SSOs – All SSOs that meet the above criteria for Category 1 SSOs must be reported as soon as: (1) the Enrollee has knowledge of the discharge, (2) reporting is possible, and (3) reporting can be provided without substantially impeding cleanup or other emergency measures. Initial reporting of Category 1 SSOs must be reported to the Online SSO System as soon as possible but no later than 3 business days after the Enrollee is made aware of the SSO. Minimum information that must be contained in the 3-day report must include all information identified in section 9 below, except for item 9.K. A final certified report must be completed through the Online SSO System, within 15 calendar days of the conclusion of SSO response and remediation. Additional information may be added to the certified report, in the form of an attachment, at any time.

   The above reporting requirements do not preclude other emergency notification requirements and timeframes mandated by other regulatory agencies (local

County Health Officers, local Director of Environmental Health, Regional Water Boards, or Office of Emergency Services (OES)) or State law.

5. Category 2 SSOs – All SSOs that meet the above criteria for Category 2 SSOs must be reported to the Online SSO Database within 30 days after the end of the calendar month in which the SSO occurs (e.g. all SSOs occurring in the month of January must be entered into the database by March 1st).

6. Private Lateral Sewage Discharges – All sewage discharges that meet the above criteria for Private Lateral sewage discharges may be reported to the Online SSO Database based upon the Enrollee's discretion. If a Private Lateral sewage discharge is recorded in the SSO Database, the Enrollee must identify the sewage discharge as occurring and caused by a private lateral, and a responsible party (other than the Enrollee) should be identified, if known.

7. If there are no SSOs during the calendar month, the Enrollee will provide, within 30 days after the end of each calendar month, a statement through the Online SSO Database certifying that there were no SSOs for the designated month.

8. In the event that the SSO Online Database is not available, the enrollee must fax all required information to the appropriate Regional Water Board office in accordance with the time schedules identified above. In such event, the Enrollee must also enter all required information into the Online SSO Database as soon as practical.

Mandatory Information to be Included in SSO Online Reporting

All Enrollees must obtain SSO Database accounts and receive a "Username" and "Password" by registering through the California Integrated Water Quality System (CIWQS). These accounts will allow controlled and secure entry into the SSO Database. Additionally, within thirty (30) days of receiving an account and prior to recording SSOs into the SSO Database, all Enrollees must complete the "Collection System Questionnaire", which collects pertinent information regarding an Enrollee's collection system. The "Collection System Questionnaire" must be updated at least every 12 months.

At a minimum, the following mandatory information must be included prior to finalizing and certifying an SSO report for each category of SSO:

9. Category 2 SSOs:

   A. Location of SSO by entering GPS coordinates;
   B. Applicable Regional Water Board, i.e. identify the region in which the SSO occurred;
   C. County where SSO occurred;
   D. Whether or not the SSO entered a drainage channel and/or surface water;
   E. Whether or not the SSO was discharged to a storm drain pipe that was not fully captured and returned to the sanitary sewer system;

F. Estimated SSO volume in gallons;
G. SSO source (manhole, cleanout, etc.);
H. SSO cause (mainline blockage, roots, etc.);
I. Time of SSO notification or discovery;
J. Estimated operator arrival time;
K. SSO destination;
L. Estimated SSO end time; and
M. SSO Certification. Upon SSO Certification, the SSO Database will issue a Final SSO Identification (ID) Number.

10. Private Lateral Sewage Discharges:

A. All information listed above (if applicable and known), as well as;
B. Identification of sewage discharge as a private lateral sewage discharge; and
C. Responsible party contact information (if known).

11. Category 1 SSOs:

A. All information listed for Category 2 SSOs, as well as;
B. Estimated SSO volume that reached surface water, drainage channel, or not recovered from a storm drain;
C. Estimated SSO amount recovered;
D. Response and corrective action taken;
E. If samples were taken, identify which regulatory agencies received sample results (if applicable). If no samples were taken, NA must be selected.
F. Parameters that samples were analyzed for (if applicable);
G. Identification of whether or not health warnings were posted;
H. Beaches impacted (if applicable). If no beach was impacted, NA must be selected;
I. Whether or not there is an ongoing investigation;
J. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
K. OES control number (if applicable);
L. Date OES was called (if applicable);
M. Time OES was called (if applicable);
N. Identification of whether or not County Health Officers were called;
O. Date County Health Officer was called (if applicable); and
P. Time County Health Officer was called (if applicable).

Reporting to Other Regulatory Agencies

These reporting requirements do not preclude an Enrollee from reporting SSOs to other regulatory agencies pursuant to California state law. These reporting requirements do not replace other Regional Water Board telephone reporting requirements for SSOs.

1. The Enrollee shall report SSOs to OES, in accordance with California Water Code Section 13271.

Office of Emergency Services
Phone (800) 852-7550

2. The Enrollee shall report SSOs to County Health officials in accordance with California Health and Safety Code Section 5410 et seq.

3. The SSO database will automatically generate an e-mail notification with customized information about the SSO upon initial reporting of the SSO and final certification for all Category 1 SSOs. E-mails will be sent to the appropriate County Health Officer and/or Environmental Health Department if the county desires this information, and the appropriate Regional Water Board.

B. Record Keeping

1. Individual SSO records shall be maintained by the Enrollee for a minimum of five years from the date of the SSO. This period may be extended when requested by a Regional Water Board Executive Officer.

3. All records shall be made available for review upon State or Regional Water Board staff's request.

4. All monitoring instruments and devices that are used by the Enrollee to fulfill the prescribed monitoring and reporting program shall be properly maintained and calibrated as necessary to ensure their continued accuracy;

5. The Enrollee shall retain records of all SSOs, such as, but not limited to and when applicable:

   a. Record of Certified report, as submitted to the online SSO database;
   b. All original recordings for continuous monitoring instrumentation;
   c. Service call records and complaint logs of calls received by the Enrollee;
   d. SSO calls;
   e. SSO records;
   f. Steps that have been and will be taken to prevent the SSO from recurring and a schedule to implement those steps.
   g. Work orders, work completed, and any other maintenance records from the previous 5 years which are associated with responses and investigations of system problems related to SSOs;
   h. A list and description of complaints from customers or others from the previous 5 years; and
   i. Documentation of performance and implementation measures for the previous 5 years.

6. If water quality samples are required by an environmental or health regulatory agency or State law, or if voluntary monitoring is conducted by the Enrollee or its agent(s), as a result of any SSO, records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The individual(s) who performed the analyses;
e. The analytical technique or method used; and,
f. The results of such analyses.

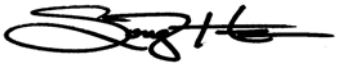
C. Certification

1. All final reports must be certified by an authorized person as required by Provision J of the Order.
2. Registration of authorized individuals, who may certify reports, will be in accordance with the CIWQS' protocols for reporting.

Monitoring and Reporting Program No. 2006-0003 will become effective on the date of adoption by the State Water Board.

CERTIFICATION

The undersigned Clerk to the Board does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Board held on May 2, 2006.



Song Her
Clerk to the Board

STATE OF CALIFORNIA
WATER RESOURCES CONTROL BOARD
ORDER NO. WQ 2013-0058-EXEC

AMENDING MONITORING AND REPORTING PROGRAM
FOR
STATEWIDE GENERAL WASTE DISCHARGE REQUIREMENTS FOR
SANITARY SEWER SYSTEMS

The State of California, Water Resources Control Board (hereafter State Water Board) finds:

1. The State Water Board is authorized to prescribe statewide general Waste Discharge Requirements (WDRs) for categories of discharges that involve the same or similar operations and the same or similar types of waste pursuant to Water Code section 13263(i).

2. Water Code section 13193 *et seq.* requires the Regional Water Quality Control Boards (Regional Water Boards) and the State Water Board (collectively, the Water Boards) to gather Sanitary Sewer Overflow (SSO) information and make this information available to the public, including but not limited to, SSO cause, estimated volume, location, date, time, duration, whether or not the SSO reached or may have reached waters of the state, response and corrective action taken, and an enrollee's contact information for each SSO event. An enrollee is defined as the public entity having legal authority over the operation and maintenance of, or capital improvements to, a sanitary sewer system greater than one mile in length.

3. Water Code section 13271, *et seq.* requires notification to the California Office of Emergency Services (Cal OES), formerly the California Emergency Management Agency, for certain unauthorized discharges, including SSOs.

4. On May 2, 2006, the State Water Board adopted Order 2006-0003-DWQ, "Statewide Waste Discharge Requirements for Sanitary Sewer Systems"[1] (hereafter SSS WDRs) to comply with Water Code section 13193 and to establish the framework for the statewide SSO Reduction Program.

5. Subsection G.2 of the SSS WDRs and the Monitoring and Reporting Program (MRP) provide that the Executive Director may modify the terms of the MRP at any time.

6. On February 20, 2008, the State Water Board Executive Director adopted a revised MRP for the SSS WDRs to rectify early notification deficiencies and ensure that first responders are notified in a timely manner of SSOs discharged into waters of the state.

7. When notified of an SSO that reaches a drainage channel or surface water of the state, Cal OES, pursuant to Water Code section 13271(a)(3), forwards the SSO notification information[2] to local government agencies and first responders including local public health officials and the applicable Regional Water Board. Receipt of notifications for a single SSO event from both the SSO reporter

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[1] Available for download at:
http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2006/wqo/wqo2006_0003.pdf

[2] Cal OES Hazardous Materials Spill Reports available Online at:
http://w3.calema.ca.gov/operational/malhaz.nsf/$defaultview and http://w3.calema.ca.gov/operational/malhaz.nsf

and Cal OES is duplicative. To address this, the SSO notification requirements added by the February 20, 2008 MRP revision are being removed in this MRP revision.

8. In the February 28, 2008 Memorandum of Agreement between the State Water Board and the California Water and Environment Association (CWEA), the State Water Board committed to re-designing the CIWQS[3] Online SSO Database to allow "event" based SSO reporting versus the original "location" based reporting. Revisions to this MRP and accompanying changes to the CIWQS Online SSO Database will implement this change by allowing for multiple SSO appearance points to be associated with each SSO event caused by a single asset failure.

9. Based on stakeholder input and Water Board staff experience implementing the SSO Reduction Program, SSO categories have been revised in this MRP. In the prior version of the MRP, SSOs have been categorized as Category 1 or Category 2. This MRP implements changes to SSO categories by adding a Category 3 SSO type. This change will improve data management to further assist Water Board staff with evaluation of high threat and low threat SSOs by placing them in unique categories (i.e., Category 1 and Category 3, respectively). This change will also assist enrollees in identifying SSOs that require Cal OES notification.

10. Based on over six years of implementation of the SSS WDRs, the State Water Board concludes that the February 20, 2008 MRP must be updated to better advance the SSO Reduction Program[4] objectives, assess compliance, and enforce the requirements of the SSS WDRs.

IT IS HEREBY ORDERED THAT:

Pursuant to the authority delegated by Water Code section 13267(f), Resolution 2002-0104, and Order 2006-0003-DWQ, the MRP for the SSS WDRs (Order 2006-0003-DWQ) is hereby amended as shown in Attachment A and shall be effective on September 9, 2013.

8/6/13
Date

Thomas Howard
Executive Director

[3] California Integrated Water Quality System (CIWQS) publicly available at http://www.waterboards.ca.gov/ciwqs/publicreports.shtml

[4] Statewide Sanitary Sewer Overflow Reduction Program information is available at: http://www.waterboards.ca.gov/water_issues/programs/sso/

ATTACHMENT A

STATE WATER RESOURCES CONTROL BOARD
ORDER NO. WQ 2013-0058-EXEC

AMENDING MONITORING AND REPORTING PROGRAM
FOR
STATEWIDE GENERAL WASTE DISCHARGE REQUIREMENTS FOR
SANITARY SEWER SYSTEMS

This Monitoring and Reporting Program (MRP) establishes monitoring, record keeping, reporting and public notification requirements for Order 2006-0003-DWQ, "Statewide General Waste Discharge Requirements for Sanitary Sewer Systems" (SSS WDRs). This MRP shall be effective from September 9, 2013 until it is rescinded. The Executive Director may make revisions to this MRP at any time. These revisions may include a reduction or increase in the monitoring and reporting requirements. All site specific records and data developed pursuant to the SSS WDRs and this MRP shall be complete, accurate, and justified by evidence maintained by the enrollee. Failure to comply with this MRP may subject an enrollee to civil liabilities of up to $5,000 a day per violation pursuant to Water Code section 13350; up to $1,000 a day per violation pursuant to Water Code section 13268; or referral to the Attorney General for judicial civil enforcement. The State Water Resources Control Board (State Water Board) reserves the right to take any further enforcement action authorized by law.

A. SUMMARY OF MRP REQUIREMENTS

Table 1 – Spill Categories and Definitions

CATEGORIES	DEFINITIONS [see Section A on page 5 of Order 2006-0003-DWQ, for Sanitary Sewer Overflow (SSO) definition]
CATEGORY 1	Discharges of untreated or partially treated wastewater of **any volume** resulting from an enrollee's sanitary sewer system failure or flow condition that: • Reach surface water and/or reach a drainage channel tributary to a surface water; or • Reach a Municipal Separate Storm Sewer System (MS4) and are not fully captured and returned to the sanitary sewer system or not otherwise 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 (e.g., infiltration pit, percolation pond).
CATEGORY 2	Discharges of untreated or partially treated wastewater of **1,000 gallons or greater** resulting from an enrollee's 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.
CATEGORY 3	All other discharges of untreated or partially treated wastewater resulting from an enrollee's sanitary sewer system failure or flow condition.
PRIVATE LATERAL SEWAGE DISCHARGE (PLSD)	Discharges of untreated or partially treated wastewater resulting from blockages or other problems **within a privately owned sewer lateral** connected to the enrollee's sanitary sewer system or from other private sewer assets. PLSDs that the enrollee becomes aware of may be voluntarily reported to the California Integrated Water Quality System (CIWQS) Online SSO Database.

Table 2 – Notification, Reporting, Monitoring, and Record Keeping Requirements

ELEMENT	REQUIREMENT	METHOD
NOTIFICATION **(see section B of MRP)**	• Within two hours of becoming aware of any Category 1 SSO **greater than or equal to 1,000 gallons discharged to surface water or spilled in a location where it probably will be discharged to surface water**, notify the California Office of Emergency Services (Cal OES) and obtain a notification control number.	Call Cal OES at: **(800) 852-7550**
REPORTING **(see section C of MRP)**	• Category 1 SSO: Submit draft report within three business days of becoming aware of the SSO and certify within 15 calendar days of SSO end date. • Category 2 SSO: Submit draft report within 3 business days of becoming aware of the SSO and certify within 15 calendar days of the SSO end date. • Category 3 SSO: Submit certified report within 30 calendar days of the end of month in which SSO the occurred. • SSO Technical Report: Submit within 45 calendar days after the end date of any Category 1 SSO in which 50,000 gallons or greater are spilled to surface waters. • "No Spill" Certification: Certify that no SSOs occurred within 30 calendar days of the end of the month or, if reporting quarterly, the quarter in which no SSOs occurred. • Collection System Questionnaire: Update and certify every 12 months.	Enter data into the CIWQS Online SSO Database (http://ciwqs.waterboards.ca.gov/), certified by enrollee's Legally Responsible Official(s).
WATER QUALITY MONITORING **(see section D of MRP)**	• Conduct water quality sampling **within 48 hours** after initial SSO notification for Category 1 SSOs in which 50,000 gallons or greater are spilled to surface waters.	Water quality results are required to be uploaded into CIWQS for Category 1 SSOs in which 50,000 gallons or greater are spilled to surface waters.
RECORD KEEPING **(see section E of MRP)**	• SSO event records. • Records documenting Sanitary Sewer Management Plan (SSMP) implementation and changes/updates to the SSMP. • Records to document Water Quality Monitoring for SSOs of 50,000 gallons or greater spilled to surface waters. • Collection system telemetry records if relied upon to document and/or estimate SSO Volume.	Self-maintained records shall be available during inspections or upon request.

B. NOTIFICATION REQUIREMENTS

Although Regional Water Quality Control Boards (Regional Water Boards) and the State Water Board (collectively, the Water Boards) staff do not have duties as first responders, this MRP is an appropriate mechanism to ensure that the agencies that have first responder duties are notified in a timely manner in order to protect public health and beneficial uses.

1. For any Category 1 SSO greater than or equal to 1,000 gallons that results in a discharge to a surface water or spilled in a location where it probably will be discharged to surface water, either directly or by way of a drainage channel or MS4, the enrollee shall, as soon as possible, but not later than two (2) hours after (A) the enrollee has knowledge of the discharge, (B) notification is possible, and (C) notification can be provided without substantially impeding cleanup or other emergency measures, notify the Cal OES and obtain a notification control number.

2. To satisfy notification requirements for each applicable SSO, the enrollee shall provide the information requested by Cal OES before receiving a control number. Spill information requested by Cal OES may include:

    i. Name of person notifying Cal OES and direct return phone number.
    ii. Estimated SSO volume discharged (gallons).
    iii. If ongoing, estimated SSO discharge rate (gallons per minute).
    iv. SSO Incident Description:
        a. Brief narrative.
        b. On-scene point of contact for additional information (name and cell phone number).
        c. Date and time enrollee became aware of the SSO.
        d. Name of sanitary sewer system agency causing the SSO.
        e. SSO cause (if known).
    v. Indication of whether the SSO has been contained.
    vi. Indication of whether surface water is impacted.
    vii. Name of surface water impacted by the SSO, if applicable.
    viii. Indication of whether a drinking water supply is or may be impacted by the SSO.
    ix. Any other known SSO impacts.
    x. SSO incident location (address, city, state, and zip code).

3. Following the initial notification to Cal OES and until such time that an enrollee certifies the SSO report in the CIWQS Online SSO Database, the enrollee shall provide updates to Cal OES regarding substantial changes to the estimated volume of untreated or partially treated sewage discharged and any substantial change(s) to known impact(s).

4. PLSDs: The enrollee is strongly encouraged to notify Cal OES of discharges greater than or equal to 1,000 gallons of untreated or partially treated wastewater that result or may result in a discharge to surface water resulting from failures or flow conditions within a privately owned sewer lateral or from other private sewer asset(s) if the enrollee becomes aware of the PLSD.

C. REPORTING REQUIREMENTS

1. **CIWQS Online SSO Database Account:** All enrollees shall obtain a CIWQS Online SSO Database account and receive a "Username" and "Password" by registering through CIWQS. These accounts allow controlled and secure entry into the CIWQS Online SSO Database.

2. **SSO Mandatory Reporting Information:** For reporting purposes, if one SSO event results in multiple appearance points in a sewer system asset, the enrollee shall complete one SSO report in the CIWQS Online SSO Database which includes the GPS coordinates for the location of the SSO appearance point closest to the failure point, blockage or location of the flow condition that caused the SSO, and provide descriptions of the locations of all other discharge points associated with the SSO event.

3. **SSO Categories**

   i. **Category 1** – Discharges of untreated or partially treated wastewater of any volume resulting from an enrollee's sanitary sewer system failure or flow condition that:

      a. Reach surface water and/or reach a drainage channel tributary to a surface water; or

      b. Reach a MS4 and are not fully captured and returned to the sanitary sewer system or not otherwise 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 (e.g., infiltration pit, percolation pond).

   ii. **Category 2** – Discharges of untreated or partially treated wastewater greater than or equal to 1,000 gallons resulting from an enrollee's sanitary sewer system failure or flow condition that does not reach a surface water, a drainage channel, or the MS4 unless the entire SSO volume discharged to the storm drain system is fully recovered and disposed of properly.

   iii. **Category 3** – All other discharges of untreated or partially treated wastewater resulting from an enrollee's sanitary sewer system failure or flow condition.

4. **Sanitary Sewer Overflow Reporting to CIWQS - Timeframes**

   i. **Category 1 and Category 2 SSOs** – All SSOs that meet the above criteria for Category 1 or Category 2 SSOs shall be reported to the CIWQS Online SSO Database:

      a. Draft reports for Category 1 and Category 2 SSOs shall be submitted to the CIWQS Online SSO Database within three (3) business days of the enrollee becoming aware of the SSO. Minimum information that shall be reported in a draft Category 1 SSO report shall include all information identified in section 8.i.a. below. Minimum information that shall be reported in a Category 2 SSO draft report shall include all information identified in section 8.i.c below.

      b. A final Category 1 or Category 2 SSO report shall be certified through the CIWQS Online SSO Database within 15 calendar days of the end date of the SSO. Minimum information that shall be certified in the final Category 1 SSO report shall include all information identified in section 8.i.b below. Minimum information that shall be certified in a final Category 2 SSO report shall include all information identified in section 8.i.d below.

ii. **Category 3 SSOs** – All SSOs that meet the above criteria for Category 3 SSOs shall be reported to the CIWQS Online SSO Database and certified within 30 calendar days after the end of the calendar month in which the SSO occurs (e.g., all Category 3 SSOs occurring in the month of February shall be entered into the database and certified by March 30). Minimum information that shall be certified in a final Category 3 SSO report shall include all information identified in section 8.i.e below.

iii. **"No Spill" Certification** – If there are no SSOs during the calendar month, the enrollee shall either 1) certify, within 30 calendar days after the end of each calendar month, a "No Spill" certification statement in the CIWQS Online SSO Database certifying that there were no SSOs for the designated month, or 2) certify, quarterly within 30 calendar days after the end of each quarter, "No Spill" certification statements in the CIWQS Online SSO Database certifying that there were no SSOs for each month in the quarter being reported on. For quarterly reporting, the quarters are Q1 - January/ February/ March, Q2 - April/May/June, Q3 - July/August/September, and Q4 - October/November/December.

If there are no SSOs during a calendar month but the enrollee reported a PLSD, the enrollee shall still certify a "No Spill" certification statement for that month.

iv. **Amended SSO Reports** – The enrollee may update or add additional information to a certified SSO report within 120 calendar days after the SSO end date by amending the report or by adding an attachment to the SSO report in the CIWQS Online SSO Database. SSO reports certified in the CIWQS Online SSO Database prior to the adoption date of this MRP may only be amended up to 120 days after the effective date of this MRP. After 120 days, the enrollee may contact the SSO Program Manager to request to amend an SSO report if the enrollee also submits justification for why the additional information was not available prior to the end of the 120 days.

5. **SSO Technical Report**

The enrollee shall submit an SSO Technical Report in the CIWQS Online SSO Database within 45 calendar days of the SSO end date for any SSO in which 50,000 gallons or greater are spilled to surface waters. This report, which does not preclude the Water Boards from requiring more detailed analyses if requested, shall include at a minimum, the following:

i. **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.

ii. **Enrollee's Response to SSO:**

a. Chronological narrative description of all actions taken by enrollee 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.

iii. **Water Quality Monitoring:**

a. Description of all water quality sampling activities conducted including analytical results and evaluation of the results.

b. Detailed location map illustrating all water quality sampling points.

6. **PLSDs**

Discharges of untreated or partially treated wastewater resulting from blockages or other problems within a privately owned sewer lateral connected to the enrollee's sanitary sewer system or from other private sanitary sewer system assets may be voluntarily reported to the CIWQS Online SSO Database.

i. The enrollee is also encouraged to provide notification to Cal OES per section B above when a PLSD greater than or equal to 1,000 gallons has or may result in a discharge to surface water. For any PLSD greater than or equal to 1,000 gallons regardless of the spill destination, the enrollee is also encouraged to file a spill report as required by Health and Safety Code section 5410 et. seq. and Water Code section 13271, or notify the responsible party that notification and reporting should be completed as specified above and required by State law.

ii. If a PLSD is recorded in the CIWQS Online SSO Database, the enrollee must identify the sewage discharge as occurring and caused by a private sanitary sewer system asset and should identify a responsible party (other than the enrollee), if known. Certification of PLSD reports by enrollees is not required.

7. **CIWQS Online SSO Database Unavailability**

In the event that the CIWQS Online SSO Database is not available, the enrollee must fax or e-mail all required information to the appropriate Regional Water Board office in accordance with the time schedules identified herein. In such event, the enrollee must also enter all required information into the CIWQS Online SSO Database when the database becomes available.

8. **Mandatory Information to be Included in CIWQS Online SSO Reporting**

All enrollees shall obtain a CIWQS Online SSO Database account and receive a "Username" and "Password" by registering through CIWQS which can be reached at CIWQS@waterboards.ca.gov or by calling (866) 792-4977, M-F, 8 A.M. to 5 P.M. These accounts will allow controlled and secure entry into the CIWQS Online SSO Database. Additionally, within thirty (30) days of initial enrollment and prior to recording SSOs into the CIWQS Online SSO Database, all enrollees must complete a Collection System Questionnaire (Questionnaire). The Questionnaire shall be updated at least once every 12 months.

i. **SSO Reports**

At a minimum, the following mandatory information shall be reported prior to finalizing and certifying an SSO report for each category of SSO:

a. **Draft Category 1 SSOs**: At a minimum, the following mandatory information shall be reported for a draft Category 1 SSO report:

1. SSO Contact Information: Name and telephone number of enrollee contact person who can answer specific questions about the SSO being reported.
2. SSO Location Name.
3. Location of the overflow event (SSO) by entering GPS coordinates. If a single overflow event results in multiple appearance points, provide GPS coordinates for the appearance point closest to the failure point and describe each additional appearance point in the SSO appearance point explanation field.
4. Whether or not the SSO reached surface water, a drainage channel, or entered and was discharged from a drainage structure.
5. Whether or not the SSO reached a municipal separate storm drain system.
6. Whether or not the total SSO volume that reached a municipal separate storm drain system was fully recovered.
7. Estimate of the SSO volume, inclusive of all discharge point(s).
8. Estimate of the SSO volume that reached surface water, a drainage channel, or was not recovered from a storm drain.
9. Estimate of the SSO volume recovered (if applicable).
10. Number of SSO appearance point(s).
11. Description and location of SSO appearance point(s). If a single sanitary sewer system failure results in multiple SSO appearance points, each appearance point must be described.
12. SSO start date and time.
13. Date and time the enrollee was notified of, or self-discovered, the SSO.
14. Estimated operator arrival time.
15. For spills greater than or equal to 1,000 gallons, the date and time Cal OES was called.
16. For spills greater than or equal to 1,000 gallons, the Cal OES control number.

b. **Certified Category 1 SSOs**: At a minimum, the following mandatory information shall be reported for a certified Category 1 SSO report, in addition to all fields in section 8.i.a :

1. Description of SSO destination(s).
2. SSO end date and time.
3. SSO causes (mainline blockage, roots, etc.).
4. SSO failure point (main, lateral, etc.).
5. Whether or not the spill was associated with a storm event.
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.
7. Description of spill response activities.
8. Spill response completion date.
9. Whether or not there is an ongoing investigation, the reasons for the investigation and the expected date of completion.

10. Whether or not a beach closure occurred or may have occurred as a result of the SSO.
11. Whether or not health warnings were posted as a result of the SSO.
12. Name of beach(es) closed and/or impacted. If no beach was impacted, NA shall be selected.
13. Name of surface water(s) impacted.
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.
15. If water quality samples were taken, identify which regulatory agencies received sample results (if applicable). If no samples were taken, NA shall be selected.
16. Description of methodology(ies) and type of data relied upon for estimations of the SSO volume discharged and recovered.
17. SSO Certification: Upon SSO Certification, the CIWQS Online SSO Database will issue a final SSO identification (ID) number.

c. **Draft Category 2 SSOs**: At a minimum, the following mandatory information shall be reported for a draft Category 2 SSO report:

1. Items 1-14 in section 8.i.a above for Draft Category 1 SSO.

d. **Certified Category 2 SSOs**: At a minimum, the following mandatory information shall be reported for a certified Category 2 SSO report:

1. Items 1-14 in section 8.i.a above for Draft Category 1 SSO and Items 1-9, and 17 in section 8.i.b above for Certified Category 1 SSO.

e. **Certified Category 3 SSOs**: At a minimum, the following mandatory information shall be reported for a certified Category 3 SSO report:

1. Items 1-14 in section 8.i.a above for Draft Category 1 SSO and Items 1-5, and 17 in section 8.i.b above for Certified Category 1 SSO.

ii. **Reporting SSOs to Other Regulatory Agencies**

These reporting requirements do not preclude an enrollee from reporting SSOs to other regulatory agencies pursuant to state law. In addition, these reporting requirements do not replace other Regional Water Board notification and reporting requirements for SSOs.

iii. **Collection System Questionnaire**

The required Questionnaire (see subsection G of the SSS WDRs) provides the Water Boards with site-specific information related to the enrollee's sanitary sewer system. The enrollee shall complete and certify the Questionnaire at least every 12 months to facilitate program implementation, compliance assessment, and enforcement response.

iv. **SSMP Availability**

The enrollee shall provide the publicly available internet web site address to the CIWQS Online SSO Database where a downloadable copy of the enrollee's approved SSMP, critical supporting documents referenced in the SSMP, and proof of local governing board approval of the SSMP is posted. If all of the SSMP documentation listed in this subsection is not publicly available on the Internet, the enrollee shall comply with the following procedure:

a. Submit an **electronic** copy of the enrollee's approved SSMP, critical supporting documents referenced in the SSMP, and proof of local governing board approval of the SSMP to the State Water Board, within 30 days of that approval and within 30 days of any subsequent SSMP re-certifications, to the following mailing address:

State Water Resources Control Board
Division of Water Quality
Attn: SSO Program Manager
1001 I Street, 15th Floor, Sacramento, CA 95814

D. WATER QUALITY MONITORING REQUIREMENTS:

To comply with subsection D.7(v) of the SSS WDRs, the enrollee shall develop and implement an SSO Water Quality Monitoring Program to assess impacts from SSOs to surface waters in which 50,000 gallons or greater are spilled to surface waters. The SSO Water Quality Monitoring Program, shall, at a minimum:

1. Contain protocols for water quality monitoring.

2. Account for spill travel time in the surface water and scenarios where monitoring may not be possible (e.g. safety, access restrictions, etc.).

3. Require water quality analyses for ammonia and bacterial indicators to be performed by an accredited or certified laboratory.

4. Require monitoring instruments and devices used to implement the SSO Water Quality Monitoring Program to be properly maintained and calibrated, including any records to document maintenance and calibration, as necessary, to ensure their continued accuracy.

5. Within 48 hours of the enrollee becoming aware of the SSO, require water quality sampling for, at a minimum, the following constituents:
   i. Ammonia
   ii. Appropriate Bacterial indicator(s) per the applicable Basin Plan water quality objective or Regional Board direction which may include total and fecal coliform, enterococcus, and e-coli.

E. RECORD KEEPING REQUIREMENTS:

The following records shall be maintained by the enrollee for a minimum of five (5) years and shall be made available for review by the Water Boards during an onsite inspection or through an information request:

1. General Records: The enrollee shall maintain records to document compliance with all provisions of the SSS WDRs and this MRP for each sanitary sewer system owned including any required records generated by an enrollee's sanitary sewer system contractor(s).

2. SSO Records: The enrollee shall maintain records for each SSO event, including but not limited to:
   i. Complaint records documenting how the enrollee responded to all notifications of possible or actual SSOs, both during and after business hours, including complaints that do not

result in SSOs. Each complaint record shall, at a minimum, include the following information:

a. Date, time, and method of notification.

b. Date and time the complainant or informant first noticed the SSO.

c. Narrative description of the complaint, including any information the caller can provide regarding whether or not the complainant or informant reporting the potential SSO knows if the SSO has reached surface waters, drainage channels or storm drains.

d. Follow-up return contact information for complainant or informant for each complaint received, if not reported anonymously.

e. Final resolution of the complaint.

ii. Records documenting steps and/or remedial actions undertaken by enrollee, using all available information, to comply with section D.7 of the SSS WDRs.

iii. Records documenting how all estimate(s) of volume(s) discharged and, if applicable, volume(s) recovered were calculated.

3. Records documenting all changes made to the SSMP since its last certification indicating when a subsection(s) of the SSMP was changed and/or updated and who authorized the change or update. These records shall be attached to the SSMP.

4. Electronic monitoring records relied upon for documenting SSO events and/or estimating the SSO volume discharged, including, but not limited to records from:

i. Supervisory Control and Data Acquisition (SCADA) systems

ii. Alarm system(s)

iii. Flow monitoring device(s) or other instrument(s) used to estimate wastewater levels, flow rates and/or volumes.

F. CERTIFICATION

1. All information required to be reported into the CIWQS Online SSO Database shall be certified by a person designated as described in subsection J of the SSS WDRs. This designated person is also known as a Legally Responsible Official (LRO). An enrollee may have more than one LRO.

2. Any designated person (i.e. an LRO) shall be registered with the State Water Board to certify reports in accordance with the CIWQS protocols for reporting.

3. Data Submitter (DS): Any enrollee employee or contractor may enter draft data into the CIWQS Online SSO Database on behalf of the enrollee if authorized by the LRO and registered with the State Water Board. However, only LROs may certify reports in CIWQS.

4. The enrollee shall maintain continuous coverage by an LRO. Any change of a registered LRO or DS (e.g., retired staff), including deactivation or a change to the LRO's or DS's contact information, shall be submitted by the enrollee to the State Water Board within 30 days of the change by calling (866) 792-4977 or e-mailing help@ciwqs.waterboards.ca.gov.

5. A registered designated person (i.e., an LRO) shall certify all required reports under penalty of perjury laws of the state as stated in the CIWQS Online SSO Database at the time of certification.

CERTIFICATION

The undersigned Clerk to the Board does hereby certify that the foregoing is a full, true, and correct copy of an order amended by the Executive Director of the State Water Resources Control Board.

7/30/13
Date

Jeanine Townsend
Clerk to the Board

SSO Discharger Work Book

Introduction:

Registering for CIWQS

Welcome to the Sanitary Sewer Overflow (SSO) Discharger Work Book. This guide is designed to help you through the SSO database. The SSO database is the newest module of the California Integrated Water Quality System (CIWQS). However, before you are allowed to use CIWQS, you must first register and receive a CIWQS username and password. At this time, registration for both data submitters and legally responsible officials (see discussion below for an explanation of these terms) is handled by paper. The data submitter and legally responsible official registration forms can be found on the CIWQS Help Center webpage at http://www.waterboards.ca.gov/ciwqs/chc.html. The instructions for submitting the completed forms can be found at the bottom of each form.

SSO Database Overview

This section describes the general workflow for the sanitary sewer overflow (SSO) database, which is utilized by an agency (enrollee) that has applied for coverage under Statewide General Waste Discharge Requirements for Sanitary Sewer Systems - Water Quality Order No. 2006-0003-DWQ (Sanitary Sewer Order) to comply with the SSO reporting requirements.

An enrollee must report two types of information into the SSO database: sanitary sewer system/agency characteristics – collection system questionnaire and spill details – SSO report. The collection system questionnaire must be initially completed before any SSO reports can be submitted. Additionally, the collection system questionnaire must be updated annually. All SSOs (aka spills) from an enrollee's sanitary sewer system must be reported to the SSO database. The reporting deadline for submittal of a SSO report depends on the classification of the spill, which is either Category 1 (greater threat) or Category 2 (lesser threat). For a Category 1 spill, the enrollee must submit an initial, uncertified report of the spill as soon as possible but no later than 3 business days after being made aware of the SSO. The final, certified report for a Category 1 spill must be submitted within 15 calendar days of the conclusion of SSO response activities. For a Category 2 spill, the enrollee must submit a final, certified report (no initial, uncertified report required) within 30 calendar days after the end of the calendar month in which the SSO occurred.

The process of entering information into the SSO database begins with the enrollee specifying the pertinent sanitary sewer system. If the enrollee is responsible for multiple sanitary sewer systems, then, after selecting the "SSO" link from the CIWQS main menu, the enrollee needs to identify the appropriate sanitary sewer system from the "Sanitary Sewer System" screen. If the enrollee is responsible for only one sanitary sewer system, then the SSO database

automatically correlates the information to it and the “Sanitary Sewer System” screen doesn’t appear.

The collection system questionnaire is an online form which contains questions regarding the relevant characteristics of an enrollee’s sanitary sewer system and agency. After initial login, the first major task an enrollee needs to perform is completing the collection system questionnaire. A new collection system questionnaire is accessed through the “Collection System Questionnaire” link on the SSO menu. The collection system questionnaire must be updated at least every 12 months, and this is done through the “Collection System Questionnaire” link on the SSO menu.

Along with completing the collection system questionnaire, an enrollee must also report all SSOs to the database. To begin a new spill report, the enrollee selects the “Reporting New SSO” link from the SSO menu. Then, the enrollee enters the information requested on the form. A spill report can exist at several different levels of completion: “work in progress”, “draft”, “ready to certify”, and “certified”. A “work in progress” SSO report is a preparatory draft of the report with limited required information and is intended only for the enrollee’s use. To save a spill report as a “work in progress”, the enrollee selects the “Save Work in Progress” button on the “SSO – General Information” screen. A SSO report in “draft” status is a working draft of the report with more required information than “work in progress” status. By submitting a report in “draft” status, the enrollee fulfills the initial, uncertified reporting requirement for a Category 1 spill. The enrollee selects the “Submit Draft” button on the “SSO – General Information” screen to submit a report as a “draft”. Once the spill report contains all the required information, it can be submitted for certification by selecting the “Ready to Certify” button on the “SSO – General Information” screen. A “ready to certify” SSO report that is complete and accurate is certified by the enrollee through first selecting the “Modify Existing SSO” link on the SSO menu. Then, the spill report to be certified must be located by using the “SSO – Search” screen. Next, the “Certify” button on the “SSO – General Information” screen for the specified report is selected. Finally, the report is certified by selecting the “Certify” button on the “SSO – Certifying an SSO Report” screen. The database will then display a confirmation of the report certification. An enrollee has fulfilled the final, certified reporting requirement for a Category 1 or Category 2 spill by submitting a certified report in the SSO database. A spill report can be submitted directly as “ready to certify” without being submitted as a “work in progress” or “draft”, assuming the enrollee has entered all the necessary information.

When submitting a spill report, the enrollee can add supporting documentation such as pictures and reports by using the “Attachments” tab on the “SSO – General Information” screen. Additionally, the enrollee can include details about related parties (e.g., fire or police department responders) by selecting the “Spill Related Parties” tab on the “SSO – General Information” screen.

A “certified” SSO report can be modified by an enrollee to correct or add information, if necessary. To do this, an enrollee begins by locating the “certified” spill report through the “SSO – Search” screen after selecting the “Modify Existing SSO” link on the SSO menu. The “Amend” button on the “SSO – General Information” screen for the designated “certified” SSO report is then selected. The spill report is returned to “Submit Draft” status and can be modified. Finally, the spill report needs to be re-certified after the necessary modifications have been completed.

If a sanitary sewer system doesn’t have any SSOs for an entire calendar month, a “no spill certification” must be submitted (“Generate No Spill Certification” link from the SSO menu) by the enrollee. A “no spill certification” must be submitted within 30 calendar days after the end of each calendar month in which no spills occur. The database will display a confirmation of the “no spill certification” when completed.

The SSO database automatically sends email notifications to interested parties when spill reports are generated. When a SSO report is submitted in “draft” form (“Submit Draft” button selected) for the first time, an email notification is sent to the enrollee, responsible Regional Water Quality Control Board, and County Health Official (if known – this is a courtesy and not required by the Sanitary Sewer Order). Every time a report is submitted as ready for certification (“Ready to Certify” button) or certified (“Certify” button) results in email notifications being sent to the enrollee, responsible Regional Water Quality Control Board, and County Health Official (if known – this is a courtesy and not required by the Sanitary Sewer Order). However if a SSO report is saved as a “work in progress” (“Save Work in Progress” button), no email notifications are generated because the report is preliminary and only intended to be viewed by the enrollee.

As for database use by an enrollee, there are two levels of access available to staff entering the information: legally responsible officials (LROs) and data submitters. LROs have full access to enter information and certify spill reports. Data submitters, on the other hand, only have authority to enter information - they can’t certify SSO reports, including a “No Spill Certification”. An enrollee can have multiple LROs and data submitters to enter the necessary information into the SSO database for their sanitary sewer system.

Part 1: Logging in and Changing Personal Information.

To get you started we are going to show you how to log into the system and how to make changes to your personal information. While these are very basic tasks it is one of the best beginner demonstrations to the module system in CIWQS and it will introduce you to the methods with which all information is changed in the system.

User roles that need to review this section: All

1. Start by going to the CIWQS login screen at: http://ciwqs.waterboards.ca.gov/.

2. Once the page loads enter your CIWQS username into the "User ID:" field and your password into the "Password:" field.

3. Press "Login".

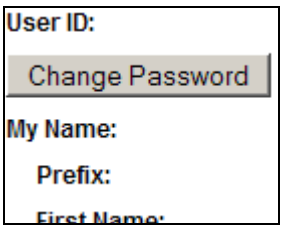
4. After you press "Login" the CIWQS main menu will appear. Depending on your access you will be provided with the links to various CIWQS modules. Including but not limited to:

   - Submit/Review a Self Monitoring Report (SMR)
   - Run Reports
   - View/Change My Personal Information
   - Create/Maintain Places
   - Create/Maintain Parties
   - Create/Maintain Regulatory Measures
   - Create/Maintain Violations
   - Create/Maintain Inspections
   - Create/Maintain Invoices
   - GeoWBS Online Editor
   - Map It!
   - Administer System
   - SSO

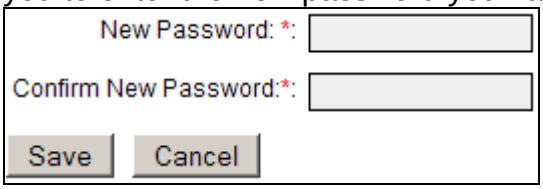
5. Select the "View/Change My Personal Information" module hyperlink.

6. You will be taken to the Personal Information page, here you can update your contact information, add a new facility, change your password, or request a more serious change.

7. Let's start with changing your password. To change your password; press the "Change Password" button.



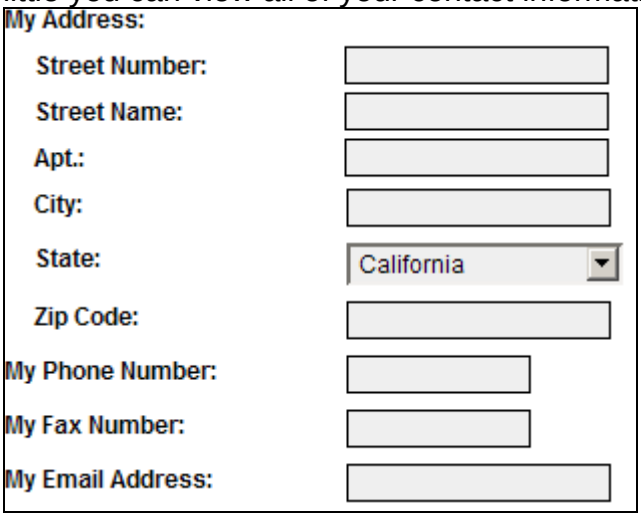
8. After pressing “Change Password” you will be taken to a new screen asking you to enter the new password you have chosen twice.



9. Once you have entered your new password press “Save”.

10. After pressing “Save” you will be asked to verify that you wish to save, press “Ok”.

11. You will be returned to the personal information screen. If you scroll down a little you can view all of your contact information.



12. If you make any changes to your contact information they have to be saved by pressing the “Save Changes” button at the bottom of the page.

13. After pressing “Save Changes” you will see a screen verifying that your changes were logged. You will also be provided with two hyperlinks. Press the first “here” hyperlink to return to the personal information screen.

14. To request another change to your account that you don't have access to make yourself press the "Request Another Change" button near the bottom of the view/change my personal information page.

15. After pressing the button your computer's email client will launch a new email window with the CIWQS Help Center email address in the "To:" field. Describe the change you wish to have made to your account and send the email. Be sure to include your name and username.

16. We are now done with this module; press the "Menu" hyperlink available at the top right corner of the page to return to the CIWQS main menu.

Part 2: Completing the SSO Collection System Questionnaire

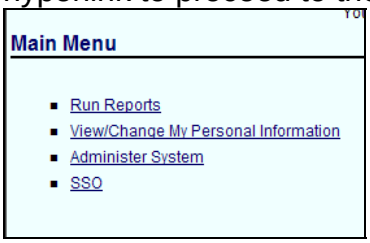
One of the first things that must be done by an enrollee is to complete the Collection System Questionnaire. For the new Sanitary Sewer Order the State has decided that instead of including a questionnaire with the Notice of Intent form they will require this online questionnaire to be filled out for each facility. This is a better system than the old one because employees at each facility can easily update the questionnaire at any time if something changes.

Note: All fields in this section, with the exception of one dropdown, are for numeric characters only. Also, the questionnaire must be updated every twelve months but can be modified more often if the enrollee desires.

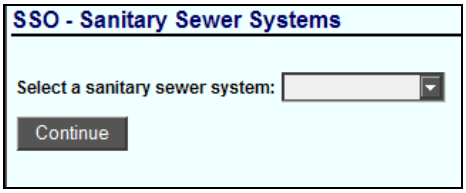
User roles that need to review this section: LRO

1. If you are not already logged into the CIWQS system proceed to this URL http://ciwqs.waterboards.ca.gov/ and login.

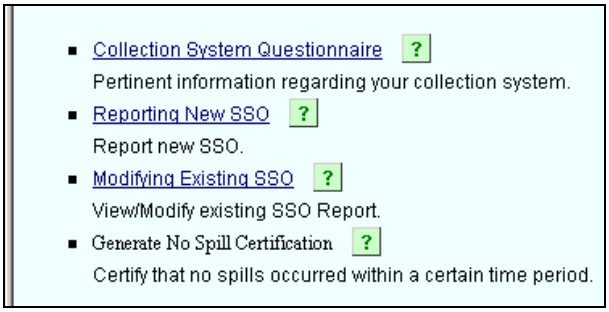
2. After logging in you will see the CIWQS main menu. Select the “SSO” hyperlink to proceed to the SSO module.



3. Upon entering the SSO module you will be required to select the collection system you wish to submit information for from the “Select a Sanitary Sewer System:” dropdown. After selecting the appropriate system press the “Continue” button.

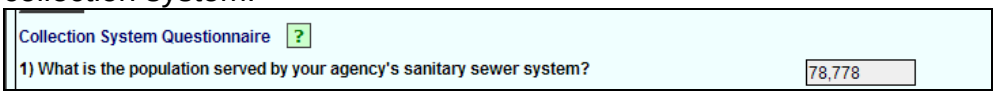


4. When a collection system has been selected you will be taken to the SSO main menu. At the top of this menu will be the “Collection System Questionnaire” hyperlink. Select that hyperlink.

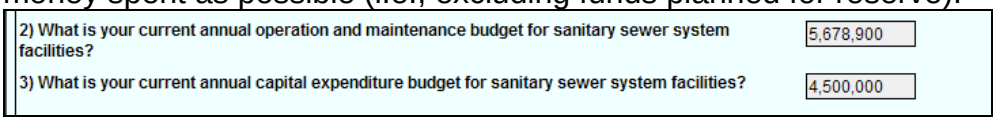


5. You will be taken to the collection system questionnaire page. It has a series of fields that need to be filled in with current information from your facility.

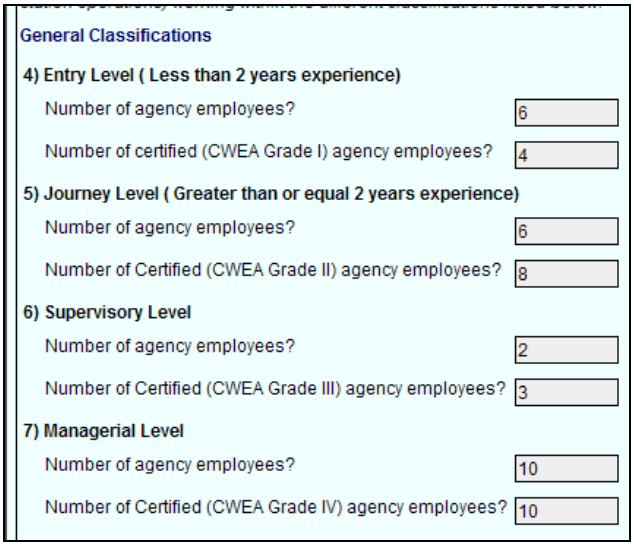
6. Question 1 requires you to enter the number of people served by your collection system.



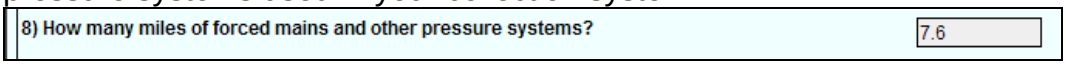
7. Questions 2 and 3 require annual budget information for the collection system. The values entered should be as close to the actual amount of money spent as possible (i.e., excluding funds planned for reserve).



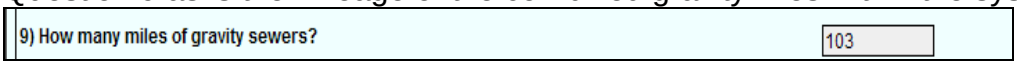
8. Sections 4 through 7 require you to enter number of employees you have in each of four experience levels and the number of employees in each of the four grades of California Water Environment Association (CWEA) collection system operator certification. There is no dependent relationship between these two numbers. For example, an enrollee can potentially have more Grade I certified employees than the total number of employees with less than 2 years experience. The number of employees can be entered as fractional values, if necessary (e.g., 1.5).



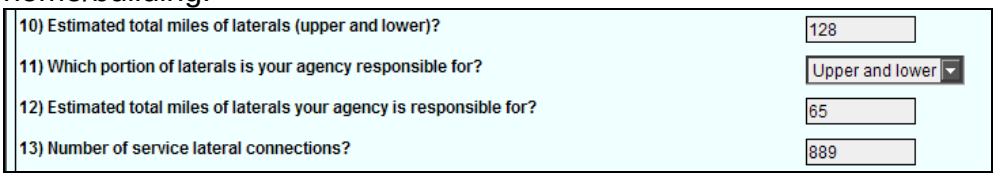
9. Question 8 requires you to enter the number of miles of forced mains and pressure systems used in your collection system.



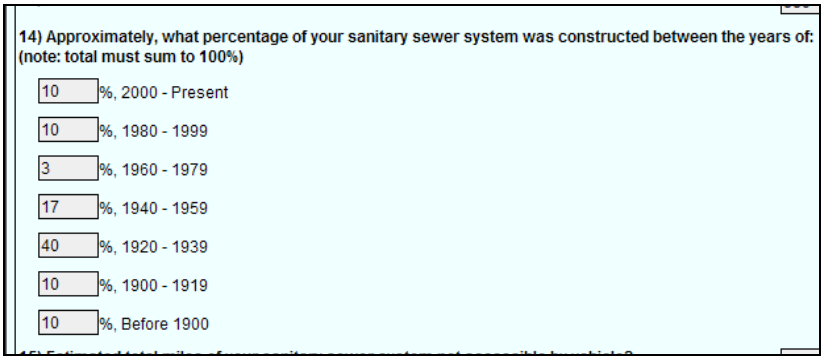
10. Question 9 asks the mileage of the combined gravity lines within the system.



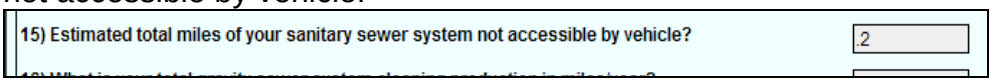
11. Questions 10 through 13 require information about the sewer laterals within the collection system. Including: their total mileage, the portion your agency is responsible for, the total mileage of that portion, and the number of service connections. The responsibility for maintaining a lateral can be split between the enrollee and private property owner. The terms “upper” and “lower” lateral indicates this. The enrollee would be responsible for the “lower” lateral section, which is connected to the main, and the private property owner would be responsible for the “upper” lateral section, which is connected to the home/building.



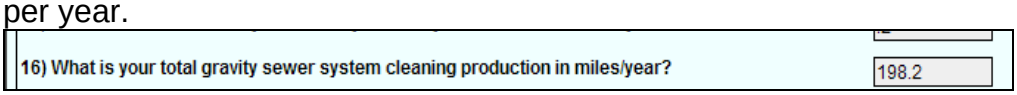
12. Section 14 is for you to enter what percentage of your collection system was constructed during various time periods. The total sum of the 7 fields in this section must equal 100.



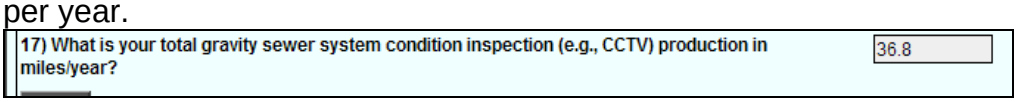
13. Question 15 is for you to enter the total miles of your collection system that is not accessible by vehicle.



14. Question 16 requires the total mileage of the collection system that is cleaned per year.



15. Question 17 is for the total mileage of the collection system that is inspected per year.



16. Once all the fields are complete look back over the questionnaire to make sure that all of the information is accurate.

17. Your questionnaire is now complete. Press one of the “Save” buttons that can be found either at the bottom left or top left of the page.

Part 3: Creating and Editing an SSO

This section describes the core purpose of the SSO module; which is the ability to report SSOs online. Before the enrollee is able to complete this task they must have a completed Collection System Questionnaire. There are two types of SSOs, Category 1 and Category 2, and both of them will be discussed and demonstrated here.

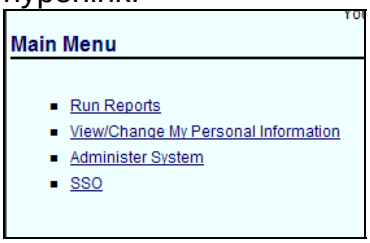
Note: In the SSO report screens only the fields with asterisks must be filled out before the report can be readied for certification or certified. This document goes over every field in the order they appear. Fewer fields must be completed to save a work in progress and to submit a draft. These mandatory fields are noted in the discussion below.

User roles that need to review this section: All

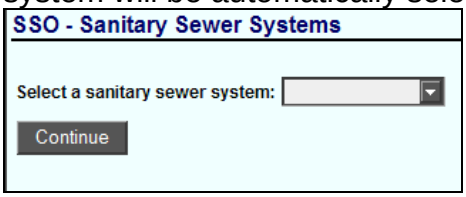
1. If you are not already in the system, proceed to the CIWQS Login page at: http://ciwqs.waterboards.ca.gov/.

2. Using your username and password log into the system.

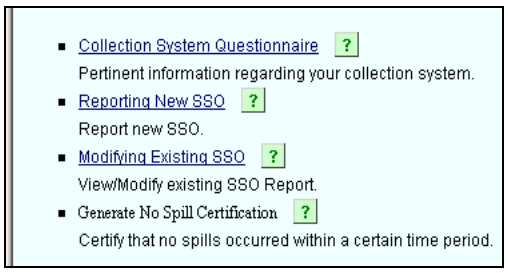
3. You will be taken to the CIWQS main menu. From that menu press the "SSO" hyperlink.



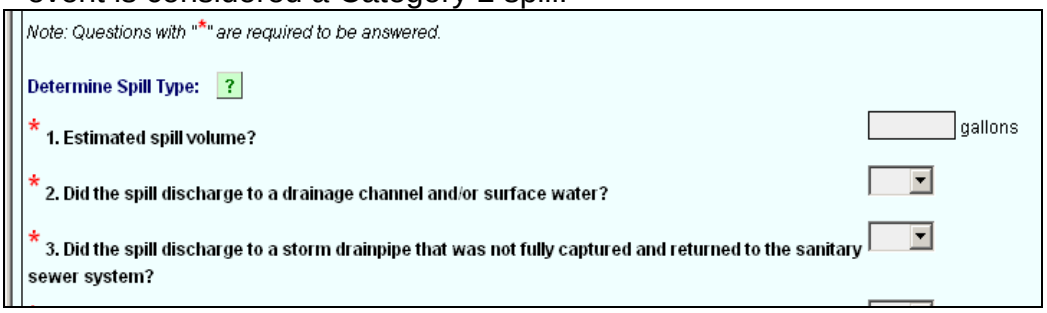
4. Upon entering the SSO module you will be required to select the sanitary sewer system (aka collection system) you wish to submit information for from the "Select a Sanitary Sewer System:" dropdown. After selecting the appropriate collection system press the "Continue" button. If your agency only has one collection system this screen will be bypassed and the collection system will be automatically selected.



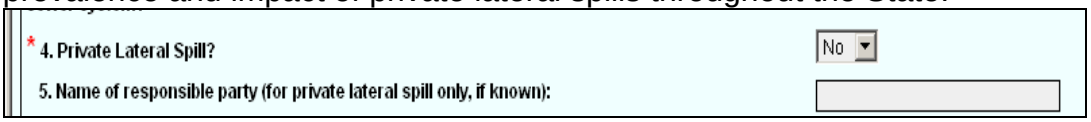
5. The SSO menu will appear. Press the "Reporting New SSO" hyperlink. It is the second one down on the page.



6. The first screen in reporting a new SSO helps you determine whether or not the SSO is a Category 1 or a Category 2 spill.
   a. If you answer yes to questions 2 or 3 and/or the spill amount is over 1000 the event is considered a Category 1 spill.
   b. If you answer no to both questions and the spill amount is under 1000 the event is considered a Category 2 spill.

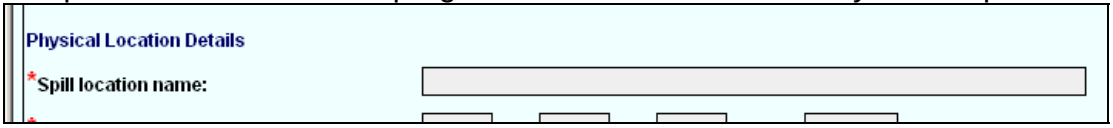


7. After entering your information in those three fields select whether or not the spill was a private lateral spill. If it was, list the responsible agency in the box provided. The reporting of private lateral SSOs is voluntary, based on the terms of the Sanitary Sewer Order, but enrollees are strongly encouraged to do so. This additional information will provide a better understanding of the prevalence and impact of private lateral spills throughout the State.

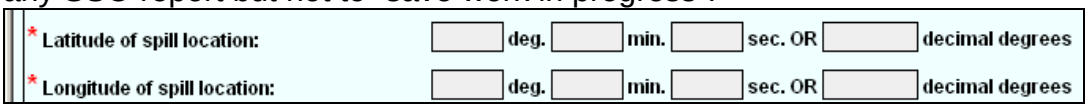


8. Check to make sure the information you entered is accurate then press the "Continue" button.

9. The SSO General Info tab will appear. Start by entering the name of the location where the spill occurred in the "Spill Location Name:" field. This entry should be a general descriptor of the spill location (e.g., street address, intersection, or manhole number). The "Spill Location Name:" field must be completed to "save work in progress" or "submit draft" for any SSO report.

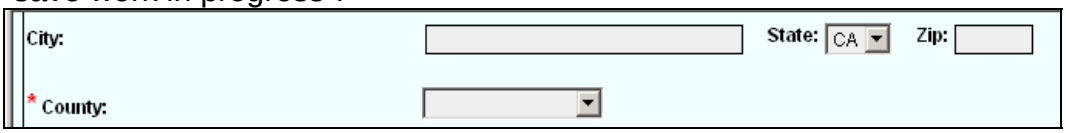


10. Enter the latitude and longitude of the spill location. Using a handheld GPS unit or referencing a web-based mapping site such as earth.google.com can determine this information. This field must be completed to "submit draft" for any SSO report but not to "save work in progress".

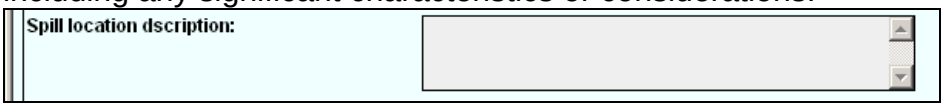


11. Enter the street address of the spill location and a cross street, if there was one.

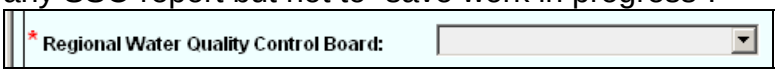
12. Enter the City, State, Zip, and county of the spill site in their corresponding fields. These fields can be found just above the "Location Description" field. This field must be completed to "submit draft" for any SSO report but not to "save work in progress".



13. Enter a description of the spill site in the "Spill Location Description:" field. This field is optional and allows for a detailed description of the spill site including any significant characteristics or considerations.

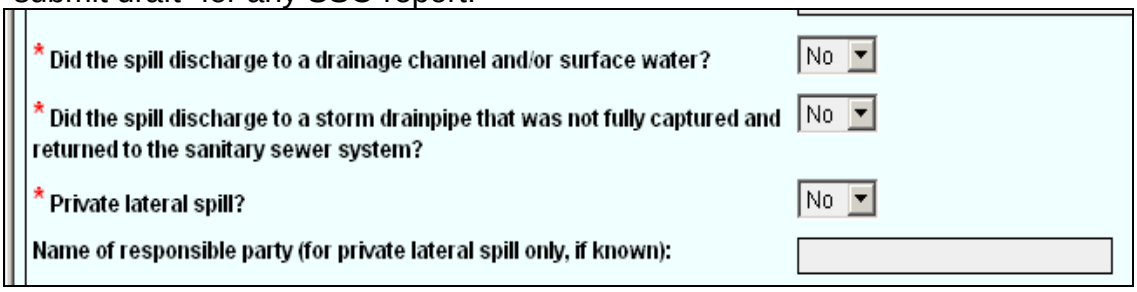


14. Select the region in which the spill occurred from the "Regional Water Quality Control Board:" dropdown. This field must be completed to "submit draft" for any SSO report but not to "save work in progress".

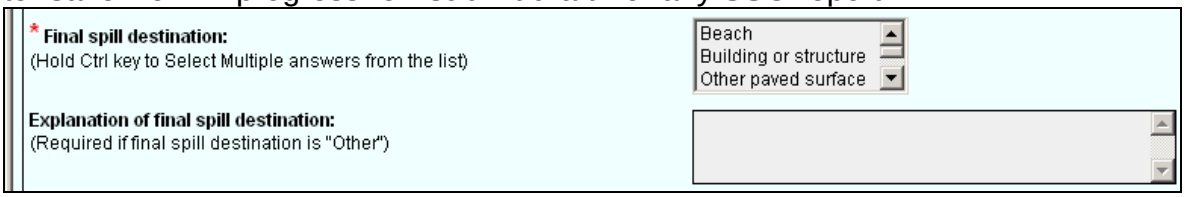


15. Select the spill appearance point from the "Spill Appearance Point:" dropdown. If you selected "other" you are required to enter a description in the text box available immediately below this field. The "Spill Appearance Point:" is where wastewater first surfaced on the spill site. This field must be completed to "submit draft" for any SSO report but not to "save work in progress".

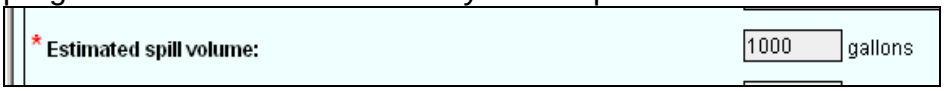
16. The next four questions were answered in step 6 when you were determining your spill type. If, at any time, you need to change the answers you can do so in this screen. These fields must be completed to “save work in progress” or “submit draft” for any SSO report.



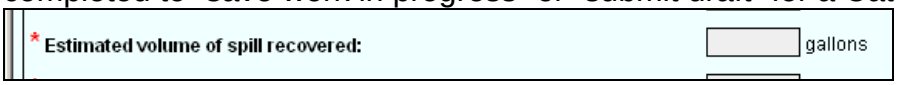
17. Select the final destinations of the spill in the “Final Spill Destination:” box. Hold CTRL on your keyboard if you wish to select multiple. If “other” was among your selections you are required to enter an explanation in the available text box. The “Final Spill Destination:” describes the areas that wastewater flowed through and ultimately reached, which means multiple entries can be selected if necessary. This field doesn’t need to be completed to “save work in progress” or “submit draft” for any SSO report.



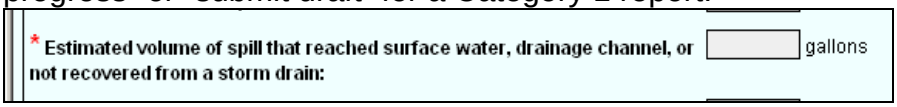
18. The field “Estimated Spill Volume:” was completed when determining your spill type. If, at any time, this number changes you can return to this screen and update the information. This field must be completed to “save work in progress” or “submit draft” for any SSO report.



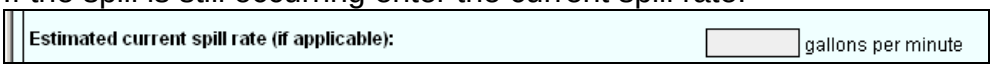
19. **This field will only appear if the spill is a Category 1.** It requires you to enter the volume of the spill that was recovered. This field doesn’t need to be completed to “save work in progress” or “submit draft” for a Category 1 report.



20. **This field will only appear if the spill is a Category 1.** Enter the volume of the spill that reached surface water, drainage channel, or was not recovered from a storm drain. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.

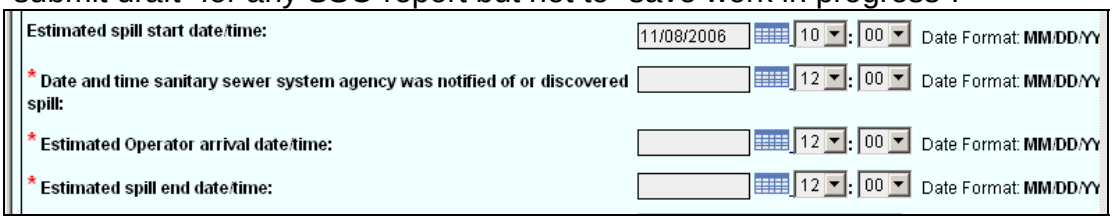


21. If the spill is still occurring enter the current spill rate.

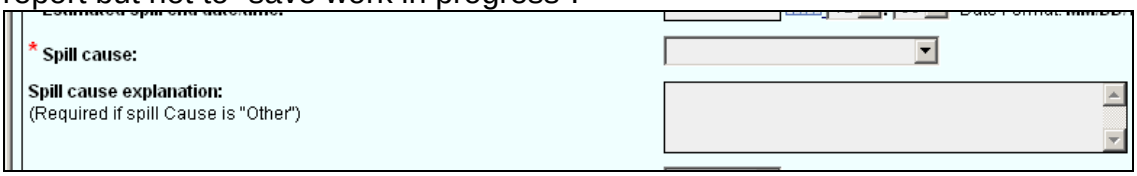


22. The next four fields require you to enter date and time information:
    a. Enter the "Estimated Spill Start Date/Time"
    b. Enter the Date/Time your agency discovered or was notified of the spill.
    c. Enter the "Estimated Operator Arrival Date/Time"
    d. Enter the "Estimated Spill End Date/Time"

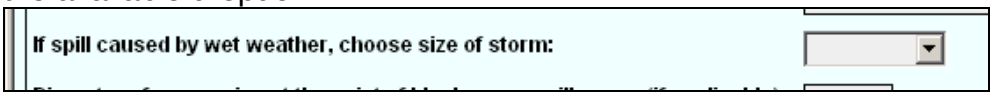
    Item (a) above must be completed to "save work in progress" or "submit draft" for any SSO report. Items (b), (c), and (d) above must be completed to "submit draft" for any SSO report but not to "save work in progress".



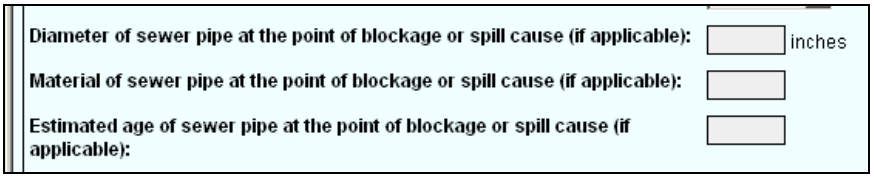
23. Please select a cause for the spill from the available dropdown. If the cause you selected was other you are required to enter an explanation in the available text box. This field must be completed to "submit draft" for any SSO report but not to "save work in progress".



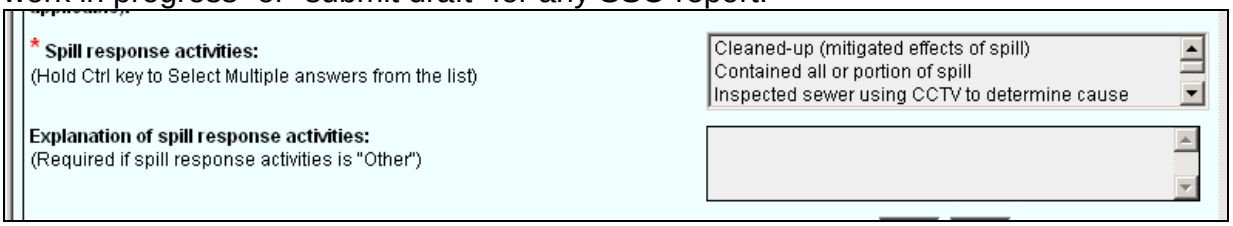
24. If the spill was cause by wet weather please select the size of the storm from the available dropdown.



25. If applicable to the spill cause you selected, the next three fields ask information about the point of blockage for the pipe or spill cause. The information asked is the diameter (in inches) of the pipe, the material of the pipe, and the age of the pipe. For material of pipe, abbreviations such as PVC and VCP are acceptable.



26. In this field, please enter the response activities that your agency initiated because of the spill. If your selection is other, you are required to enter an explanation of the activities. This field doesn't need to be completed to "save work in progress" or "submit draft" for any SSO report.



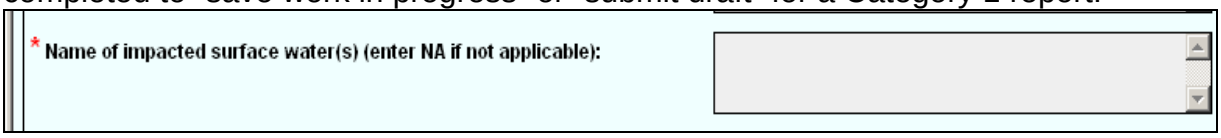
27. **This field will only appear if the spill is a Category 1.** This field requires the user to enter the date/time they completed their spill response activities. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.

28. The user can enter a description of the visual inspection results from the impacted receiving water.

29. **This field will only appear if the spill is a Category 1.** Select whether or not health warnings were posted because of the spill. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.

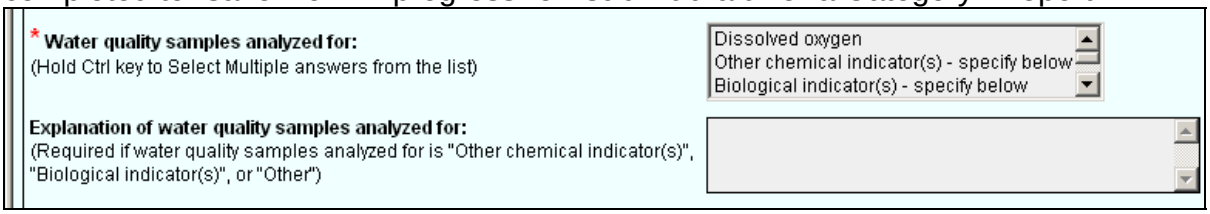
30. **This field will only appear if the spill is a Category 1.** Enter the names of any and all beaches that were impacted by the spill. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report

31. **This field will only appear if the spill is a Category 1.** Enter the names of any and all surface waters impacted by the spill. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.

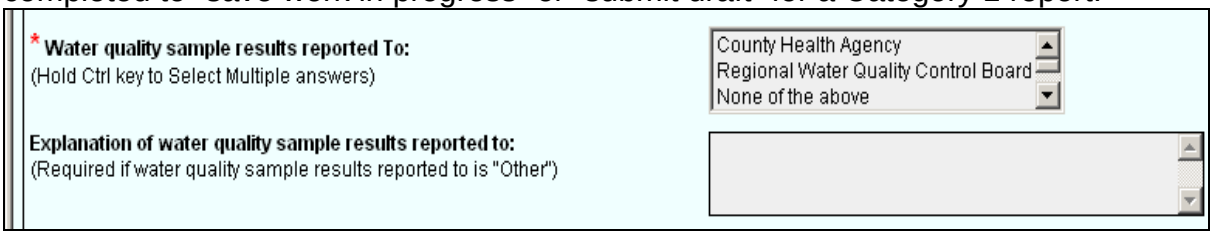


32. **This field will only appear if the spill is a Category 1.** Choose whether or not there is an ongoing investigation concerning the spill event. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.

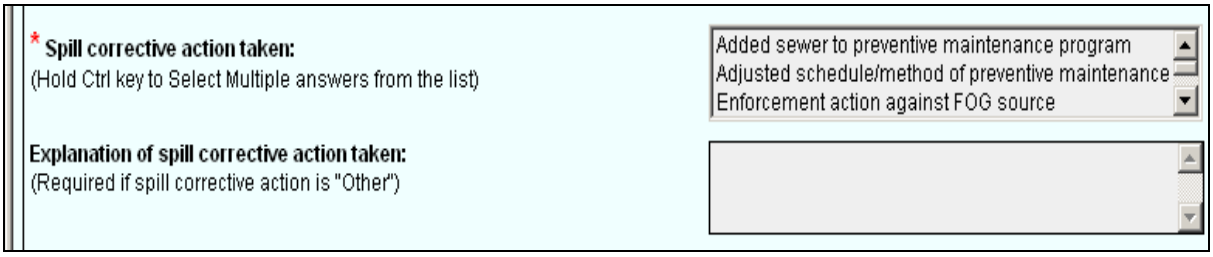
33. **This field will only appear if the spill is a Category 1.** Select what the water quality samples taken from the spill were analyzed for. Hold CTRL to select multiple. Please note that some selections require a description to be entered in the accompanying text field. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.



34. **This field will only appear if the spill is a Category 1.** Select which agencies the results of the water samples were reported to. Hold CTRL to select multiple. Please note that a selection of "other" requires a description to be entered in the accompanying text field. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.

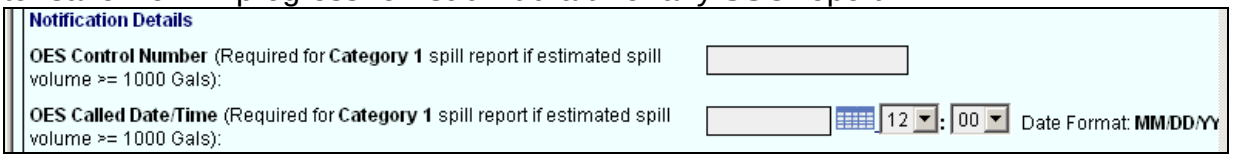


35. **This field will only appear if the spill is a Category 1.** Select which corrective actions were taken by your agency in response to the spill. Hold CTRL to select multiple. Please note that a selection of "other" requires a description to be entered in the accompanying text field. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.

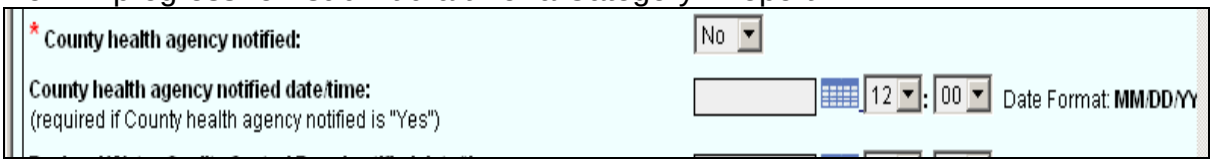


36. Enter an overall description of the spill.

37. Enter the OES Control Number for your agency and the date/time you notified OES of the spill. This field must be completed to “ready to certify” or “certify” a Category 1 report if the estimated spill volume is greater than or equal to 1,000 gal and wastewater reached a drainage channel/surface water or storm drainpipe that was not fully captured. This field doesn’t need to be completed to “save work in progress” or “submit draft” for any SSO report.

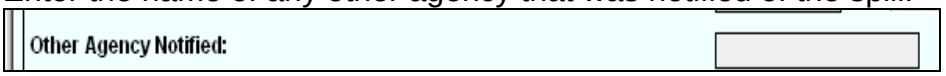


38. **These fields will only appear if the spill is a Category 1.** Select whether or not you notified your county health agency of the spill. If yes enter the date/time they were notified. This field doesn’t need to be completed to “save work in progress” or “submit draft” for a Category 1 report.

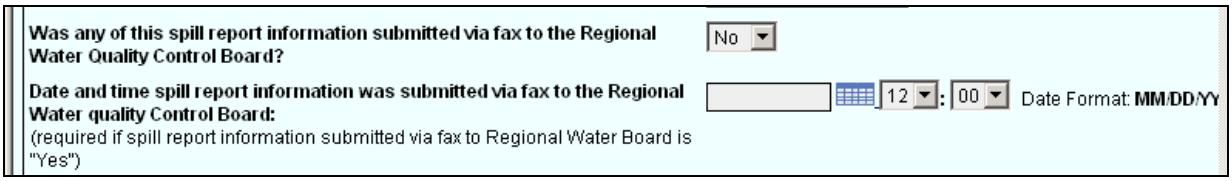


39. Enter the date and time that your Regional Water Quality Control Board was notified of the spill, if applicable. For example, some Regional Water Quality Control Boards require 24-hour notification of certain spills, which an enrollee can note was completed by entering the information in this field.

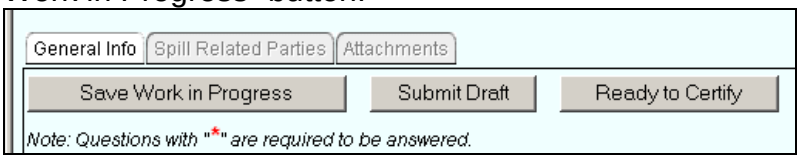
40. Enter the name of any other agency that was notified of the spill.



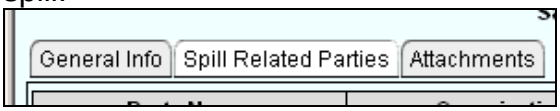
41. Select whether or not any of the information available in the report you just filled out was faxed to your Regional Water Quality Control Board. If some of the information was faxed, enter the date/time the fax was sent in the accompanying field. The Sanitary Sewer Order requires spill report information to be faxed to the responsible Regional Water Quality Control Board if the SSO database is not available for the enrollee to meet the applicable reporting deadline. When the SSO database becomes available, the enrollee must enter all faxed information into the SSO database.



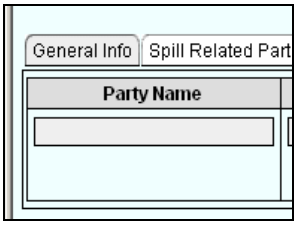
42. The “General Info” tab of your SSO report is now complete. Press the “Save Work in Progress” button.



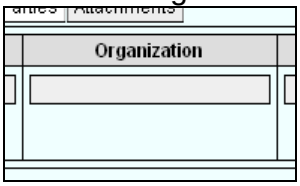
43. Select the “Spills Related Parties” tab. The purpose of this tab is to list any private parties who may have caused, contributed to, or were impacted by the spill.



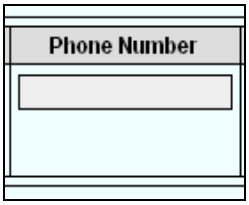
44. Enter the names of any individual or representatives in the “Party Name” field.



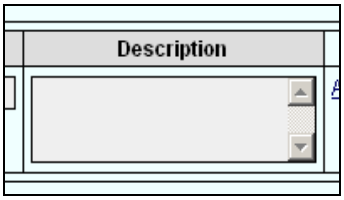
45. Enter the organization name in the “Organization” field.



46. Enter a number at which the part can be reached in the “Phone Number” field.

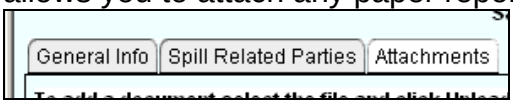


47. Enter a description of how the party is related to the spill in the “Description” field.

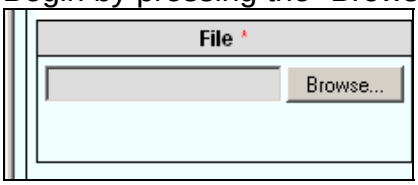


48. Once all of the information is complete for a party press the “Add” hyperlink to the right of the “Description” field. The information will be saved and you will then be allowed to enter another party. If, at any time, you wish to remove a party press the “Delete” hyperlink.

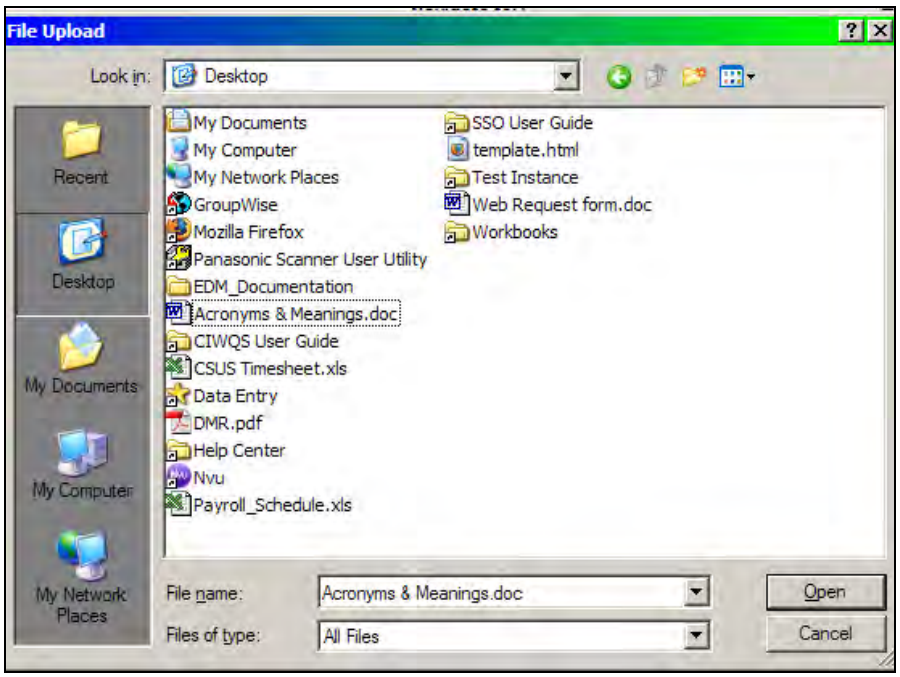
49. When you are finished adding parties select the “Attachments” tab. This tab allows you to attach any paper reports, pictures, diagrams, etc. of the spill.



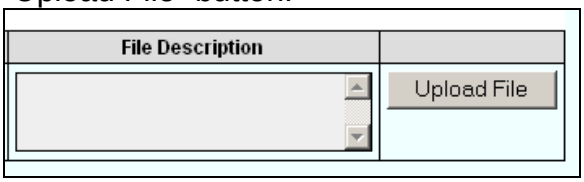
50. Begin by pressing the “Browse” button.



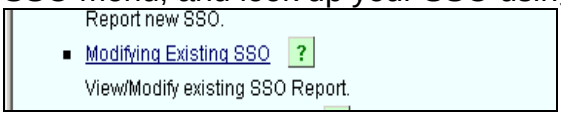
51. A file search window will appear. Locate the file you wish to attach, select it and press the “Open” button.



52. You will be returned to the attachments screen. Enter a brief description of the file you will be uploading into the “File Description” field and press the “Upload File” button.



53. Your SSO Spill report is now complete. If at any time you wish to edit the report before you certify it select the “Modify Existing SSO” hyperlink from the SSO menu, and look up your SSO using one of the available search fields.



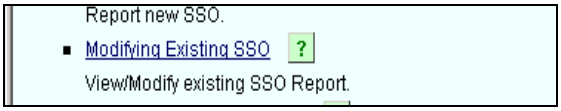
54. To learn how to save drafts and certify your report proceed to the next section of this document.

Part 4: Submitting Drafts and Certifying an SSO

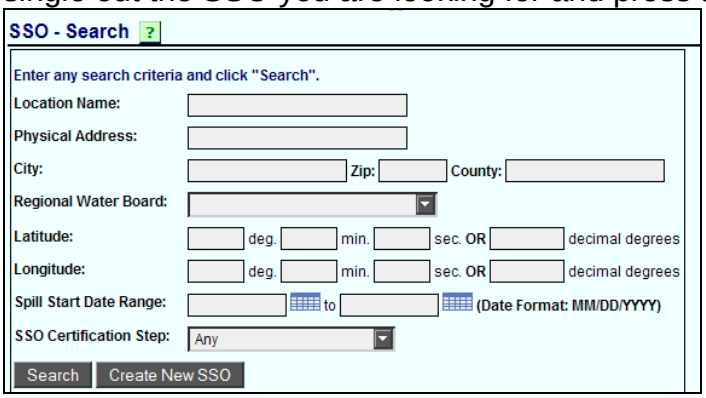
When the agency begins submitting drafts the system will start tracking all the changes made to certain fields. When the agency decides that it is ready to certify the SSO the Legally Responsible Official will have to finish the last few screens.

User roles that need to review this section: All, Certification LRO specific.

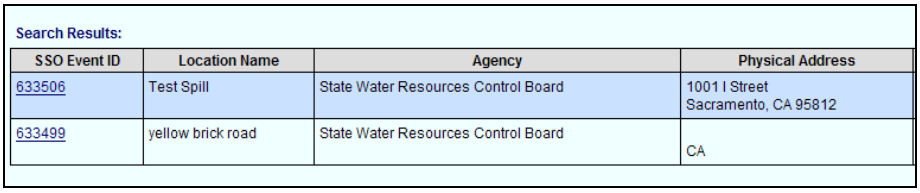
1. From the SSO main menu select the “Modify Existing SSO” hyperlink.



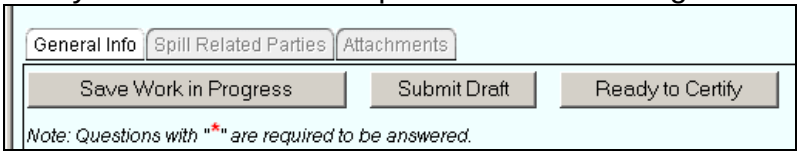
2. You will be taken to the SSO search screen. Enter any information that will single out the SSO you are looking for and press the “Search” button.



3. You SSO will appear. There will be a hyperlink in the “SSO Event ID” column, select it.



4. The SSO General Info tab will appear. If you press the “Submit Draft” button the system will save the report and start tracking version numbers.

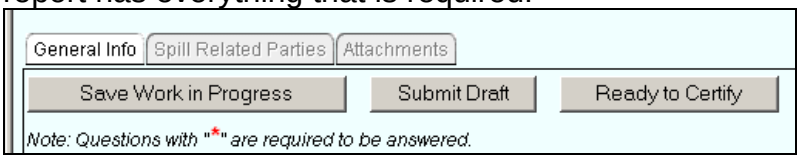


5. Every time you submit a new draft a new version number will be created and any changes to certain fields will be tracked. Click on any of the “View History” hyperlinks to see a history of the changes for these fields.

Close Window

SSO Event ID	Version	Current Spill Amount	Date Entered	User Info
601730	8	28	12/05/2005	Nick Arhontes (narhontes)
601730	7	34	12/05/2005	Nick Arhontes (narhontes)
601730	6	36	12/05/2005	Nick Arhontes (narhontes)
601730	5	36	12/05/2005	Nick Arhontes (narhontes)
601730	4	36	12/05/2005	Nick Arhontes (narhontes)
601730	3	36	11/28/2005	Nick Arhontes (narhontes)
601730	2	36	11/28/2005	Nick Arhontes (narhontes)
601730	1	36	11/28/2005	Nick Arhontes (narhontes)

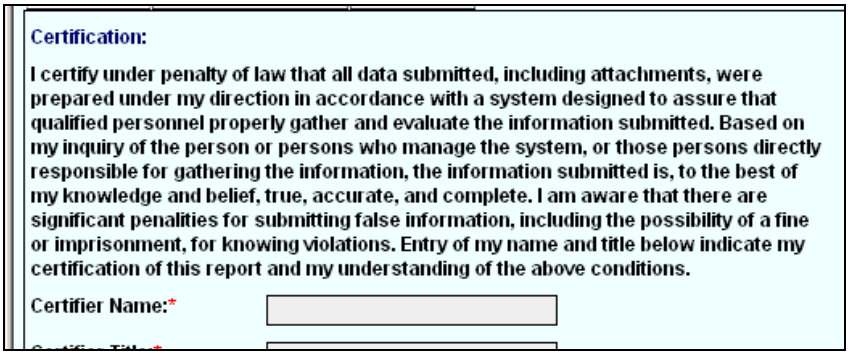
6. When you decide it is finally time to certify your SSO report press the “Ready to Certify” button. This will perform an error check and make sure that your report has everything that is required.



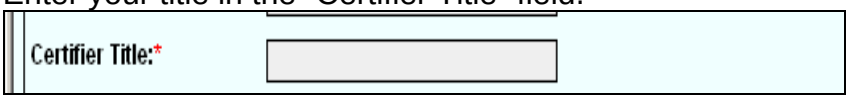
Note: Only the LRO can complete the rest of this section.

7. If the report passes the error check the “Certify” button will then become available. Press the “Certify” button.

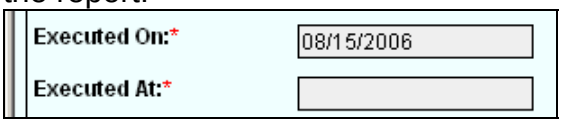
8. You will be taken to the Certification Screen. Start by entering your name in the “Certifier Name:” field.



9. Enter your title in the “Certifier Title” field.



10. The “Executed On:” field will be pre-populated with the date. Complete the “Executed At:” field, which indicates the location/office of the LRO certifying the report.



11. Once all four field are complete press the “Certify” button.

12. Your SSO report is now completed and submitted to the regional board. If at anytime you realize that some of the information has changed or is incorrect for some other reason you may look up the report and press the “Amend” button to reopen the report for editing. It will then have to be recertified.

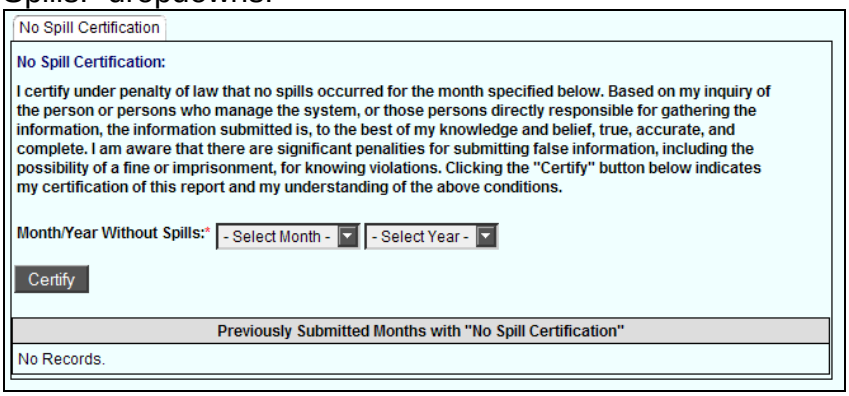
Part 5: No Spill Certification

Perhaps your agency doesn't have any spills to report for your period. That can be taken care of by completing no spill certification.

User roles that need to review this section: LRO

1. From the SSO main menu select the "Generate No Spill Certification" hyperlink.

2. The no spill certification section is only two dropdowns and a certification page. Select the period you didn't have a spill from the "Month/Year Without Spills:" dropdowns.



3. Press the "Certify" button.

4. No spill certification is now complete.

FACT SHEET

STATE WATER RESOURCES CONTROL BOARD

ORDER NO. 2006-0003

STATEWIDE GENERAL WASTE DISCHARGE REQUIREMENTS FOR SANITARY SEWER SYSTEMS

The State Water Resources Control Board (State Water Board) adopted Resolution 2004-80 in November 2004, requiring staff to work with a diverse group of stakeholders (known as the SSO Guidance Committee) to develop a regulatory mechanism to provide a consistent statewide approach for reducing Sanitary Sewer Overflows (SSOs). Over the past 14 months, State Water Board staff in collaboration with the SSO Guidance Committee, developed draft statewide general waste discharge requirements (WDRs) and a reporting program. The WDRs and reporting program reflect numerous ideas, opinions, and comments provided by the SSO Guidance Committee.

The SSO Guidance Committee consists of representatives from the State Water Board's Office of Chief Counsel, several Regional Water Quality Control Boards (Regional Water Boards), United States Environmental Protection Agency (USEPA), Region IX, non-governmental environmental organizations, as well as publicly-owned sanitary sewer collection system agencies. The draft WDRs, reporting program, and associated documents result from a collaborative attempt to create a robust and rigorous program, which will serve as the basis for consistent and appropriate management and operation of sanitary sewer systems.

During the collaborative process, several key issues regarding the draft WDRs were identified. These include:

- Is there a need for statewide collection system requirements?
- Should these systems be regulated under a National Pollutant Discharge Elimination System (NPDES) permit issued pursuant to the Federal Clean Water Act or under WDRs issued pursuant to the California Water Code (the Porter-Cologne Water Quality Control Act or Porter-Cologne)?
- Should the regulatory mechanism include a prohibition of discharge and, if so, should the prohibition encompass only SSOs that reach surface waters, ground water, or should all SSOs be prohibited?
- Should a regulatory mechanism include a permitted discharge, an affirmative defense, or explicit enforcement discretion?
- Should the regulated facilities include publicly-owned facilities, privately owned facilities, satellite systems (public and private), and/or private laterals?

- Should all SSOs be reported, and if not, what should the reporting thresholds be; and what should the reporting timeframes be?
- How will existing permits and reporting requirements incorporate these new WDRs?
- How much will compliance with these new WDRs cost?

The WDRs and Reporting Program considered the comments of all stakeholders and others who commented on the two drafts circulated to the public. These documents also incorporate legal requirements and other revisions to improve the effectiveness and management of the regulatory program. Following is a discussion of the above issues, comments received on the drafts and an explanation of how issues were resolved.

The Need

As California's wastewater collection system infrastructure begins to age, the need to proactively manage this valuable asset becomes increasingly important. The first step in this process is to have a reliable reporting system for SSOs. Although there are some data systems to record spills and various spill-reporting requirements have been developed, inconsistent requirements and enforcement have led to poor data quality. A few Regional Water Boards have comprehensively tracked SSOs over the last three to five years, and from this information we have been able to determine that the majority of collection systems surveyed have had SSOs within this time period.

Both the San Diego and Santa Ana Regional Water Boards have issued WDRs over the last several years to begin regulating wastewater collection systems in an attempt to quantify and reduce SSOs. In fact, 44 out of 46 collection system agencies regulated by the San Diego Regional Water Board have reported spills over the last four and a half years, resulting in 1467 reported SSOs. Twenty-five out of 27 collection system agencies subject to the Santa Ana Regional Water Board's general WDRs reported SSOs between the years of 1999-2004. During this time period, 1012 SSOs were reported.

The 2004 Annual Ocean and Bay Water Quality Report issued by the Orange County Environmental Health Care Agency shows the number of SSOs increasing from 245 in 1999 to 399 in 2003. While this number indicates a concerning trend, the total annual spill volume from these SSOs has actually decreased dramatically, as has the number of beach closures due to SSOs. It is likely, therefore, that the rise in number of SSOs reflects better reporting, and not an actual increase in the number of SSOs.

This information also suggests that the Santa Ana Regional Water Board's WDRs, which contain sanitary sewer management plan (SSMP) requirements similar to those in the proposed statewide general WDRs, have been effective in

not only increasing the number of spills that are reported but also in mitigating the impacts of SSOs that do occur.

Data supports the conclusion that virtually all collection systems have SSOs and that implementation of a regulatory measure requiring SSO reporting and collection system management, along with required measures to limit SSOs, will greatly benefit California water quality. Implementation of these requirements will also greatly benefit and prolong the useful life of the sanitary sewer system, one of California's most valuable infrastructure items.

NPDES vs. WDRs

Porter-Cologne subjects a broader range of waste discharges to regulation than the Federal Clean Water Act. In general, the Clean Water Act prohibits the discharge of pollutants from point sources to surface waters of the United States unless authorized under an NPDES permit. (33 U.S.C. §§1311, 1342). Since not all SSOs result in a discharge to surface water, however, not all SSOs violate the Clean Water Act's NPDES permitting requirements. Porter-Cologne, on the other hand, covers all existing and proposed waste discharges that could affect the quality of state waters, including both surface waters and groundwater. (Wat. Code §§13050(e), 13260). Hence, under Porter-Cologne, a greater SSO universe is potentially subject to regulation under WDRs. In addition, WDRs under Porter-Cologne can address both protection of water quality as well as the prevention of public nuisance associated with waste disposal. (***Id.*** §13263).

Some commenters contend that because all collection systems have the potential to overflow to surface waters the systems should be regulated under an NPDES permit. A recent decision by the United States Court of Appeals for the 2nd Circuit, however, has called into question the states' and USEPA's ability to regulate discharges that are only "potential" under an NPDES permit. In ***Waterkeeper Alliance v. United States Environmental Protection Agency*** (2005) 399 F.3d 486, 504-506, the appellate court held that USEPA can only require permits for animal feedlots with "an actual addition" of pollutants to surface waters. While this decision may not be widely followed, especially in the area of SSOs, these are clearly within the jurisdiction of the California Water Code.

USEPA defines a publicly owned treatment works (POTW) as both the wastewater treatment facility and its associated sanitary sewer system (40 C.F.R. §403.3(o)[1]). Historically, only the portion of the sanitary sewer system that is owned by the same agency that owns the permitted wastewater treatment facility has been subject to NPDES permit requirements. Satellite sewer collection systems (i.e. systems not owned or operated by the POTW) have not been

[1] The regulation provides that a POTW include sewers, pipes, and other conveyances only if they convey wastewater to a POTW.

typically regulated as part of the POTW and, therefore, have not generally been subject to NPDES permit requirements.

Comments were received that argued every collection system leading to a POTW that is subject to an NPDES permit should also be permitted based upon the USEPA definition of POTW. Under this theory, all current POTW NPDES permits could be expanded to include all satellite sewer collection systems, or alternatively, the satellite system owners or operators could be permitted separately. However, this interpretation is not widely accepted and USEPA has no official guidance to this fact.

There are also many wastewater treatment facilities within California that do not have discharges to surface water, but instead use percolation ponds, spray irrigation, wastewater reclamation, or other means to dispose of the treated effluent. These facilities, and their satellite systems, are not subject to the NPDES permitting process and could not be subject to a statewide general NPDES permit. POTWs that fall into this category, though, can be regulated under Porter-Cologne and do have WDRs.

In light of these factors, the State Water Board has determined that the best approach is to propose statewide general WDRs at this time.

Prohibition of Discharge

The Clean Water Act prohibits the discharge of wastewater to surface waters except as authorized under an NPDES permit. POTWs must achieve secondary treatment, at a minimum, and any more stringent limitations that are necessary to achieve water quality standards. (33 U.S.C. §1311(b)(1)(B) and (C)). Thus, an SSO that results in the discharge of raw sewage to surface waters is prohibited under the Clean Water Act.

Additionally, California Water Code section 13263 requires the State Water Board to, after any necessary hearing, prescribe requirements as to the nature of any proposed discharge, existing discharge, or material change in an existing discharge. The requirements shall, among other things, take into consideration the need to prevent nuisance.

California Water Code section 13050 (m), defines nuisance as anything which meets all of the following requirements:

a. Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
b. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.

c. Occurs during, or as a result of, the treatment or disposal of wastes.

Some SSOs do create a nuisance as defined in state law. Therefore, based upon these statutory requirements, the WDRs include prohibitions in Section C. of the WDRs. Section C. states:

C. PROHIBITIONS

1. Any SSO that results in a discharge of untreated or partially treated wastewater to waters of the United States is prohibited.

2. Any SSO that results in a discharge of untreated or partially treated wastewater, which creates a nuisance as defined in California Water Code section 13050(m) is prohibited.

Furthermore, the State Water Board acknowledges the potential for more stringent water quality standards that may exist pursuant to a Regional Water Board requirement. Language included in Section D.2 of the WDRs allows for these more stringent instances.

D. PROVISIONS

2. It is the intent of the State Water Board that sanitary sewer systems be regulated in a manner consistent with the general WDRs. Nothing in the general WDRs shall be:

(i) Interpreted or applied in a manner inconsistent with the Federal Clean Water Act, or supersede a more specific or more stringent state or federal requirement in an existing permit, regulation, or administrative/judicial order or Consent Decree;
(ii) Interpreted or applied to authorize an SSO that is illegal under either the Clean Water Act, an applicable Basin Plan prohibition or water quality standard, or the California Water Code;
(iii) Interpreted or applied to prohibit a Regional Water Board from issuing an individual NPDES permit or WDRs, superseding the general WDRs, for a sanitary sewer system, authorized under the Clean Water Act or California Water Code; or
(iv) Interpreted or applied to supersede any more specific or more stringent WDRs or enforcement order issued by a Regional Water Board.

Permitted Discharge, Affirmative Defense, and Enforcement Discretion

Commenters from the discharger community have requested inclusion of an affirmative defense to an SSO on the grounds that certain SSO events are unforeseen and unavoidable, such as SSOs due to extreme wet weather events. An affirmative defense is a mechanism whereby conduct that otherwise violates WDRs or a permit will be excused, and not subject to an enforcement action, under certain circumstances. Since many collection system industry experts believe that not all SSOs may be prevented, given certain circumstances (such as unforeseen vandalism, extreme wet weather, or other acts of God), many

collection system owner representatives believe this should formally be recognized by including an affirmative defense for these unavoidable SSOs.

Previous informal drafts of the general WDRs included affirmative defense language, which was contingent upon appropriate development and implementation of sanitary sewer management plan (SSMP) requirements, as well as a demonstration that the SSO was exceptional and unavoidable. Other stakeholders, including USEPA and the environmental groups opposed the concept of an affirmative defense for SSOs. They argued that its inclusion in the WDRs would undermine the Clean Water Act and inappropriately limit both Regional Water Board and third party enforcement.

After considering input from all stakeholders, and consulting with USEPA, staff is not recommending inclusion of an affirmative defense. Rather, the draft WDRs incorporate the concept of enforcement discretion, and explicitly identify what factors must be considered during any civil enforcement proceeding. The enforcement discretion portion of the WDRs is contained within Sections D. 6 and 7, and is consistent with enforcement discretion provisions within the California Water Code.

Facilities Subject to WDRs

Collection systems consist of pipelines and their appurtenances, which are intended to transport untreated wastewater to both publicly-owned and private wastewater treatment facilities. While wastewater treatment facilities are owned by a wide variety of public and private entities, public agencies (state and federal agencies, cities, counties, and special districts) own the vast majority of this infrastructure.

Collection systems that transport wastewater to POTWs could be grouped into four different categories:

1. Publicly-owned treatment works – pipelines and appurtenances that are owned by a public agency that also owns a wastewater treatment facility;
2. Publicly-owned satellites – pipelines and appurtenances that are owned by a public agency that does not own a wastewater treatment facility; and
3. Private laterals - pipelines and appurtenances that are not owned by a public agency, but rather discharge into one of the above types of facilities.
4. Privately owned treatment works – pipelines and appurtenances that are owned by a private entity, which also owns a wastewater treatment facility (often a septic tank and leach field).

The WDRs require all public agencies, which own wastewater collection systems (category 1 and 2 above) to enroll in the WDRs. Privately owned systems (categories 3 and 4) are not subject to the WDRs; however, a Regional Water

Board may at its discretion issue WDRs to these facilities on a case-by-case or region wide basis.

Collection systems discharging into POTWs (categories 1, 2, and 3) represent, by far, the greatest amount of collection system infrastructure within California. Since regulating private entities (categories 3 and4) on a statewide basis would be unmanageable and impractical (because of the extremely large number and lack of contact information and other associated records), staff believes focusing on the public sector is the best option for meaningful and consistent outcomes. The legal authority and reporting provisions contained in the WDR do require limited oversight of private laterals (category 3) by public entities. Given this limited responsibility of oversight, public entities are not responsible or liable for private laterals.

State Water Board staff will notify all known public agencies that own wastewater collection systems, regarding their obligation to enroll under these WDRs. However, because of data inaccuracies, State Water Board staff may inadvertently not contact an agency that should enroll in the WDRs or erroneously contact a public agency that does not own a collection system. Staff will make every effort to accurately identify public agencies. In the event that a public agency is overlooked or omitted, however, it is the agency's responsibility to contact the State Water Board for information on the application process. An agency can find the appropriate contact by visiting the State Water Board's SSO homepage at www.waterboards.ca.gov/sso.

SSO Reporting

SSOs can be distinguished between those that impact water quality and/or create a nuisance, and those that are indicators of collection system performance. Additionally, SSO liability is attributed to either private entities (homeowners, businesses, private communities, etc…) or public entities. Although all types of SSOs are important to track, the reporting time frames and the type of information that need to be conveyed differ.

The Reporting Program and Online SSO Database clearly distinguish the type of spill (major or minor) and the type of entity that owns the portion of the collection system that experienced the SSO (public or private entity). The reason to require SSO reporting for SSOs that do not necessarily impact public health or the environment is because these types of SSOs are indicators of collection system performance and management program effectiveness, and may serve as a sign of larger and more serious problems that should be addressed. Although these types of spills are important and must be regulated by collection system owners, the information that should be tracked and the time required to get them into the online reporting system are not as stringent.

Obviously, SSOs that are large in nature, affect public health, or affect the environment must be reported as soon as practicable and information associated with both the spill and efforts to mitigate the spill must be detailed. Since the Online SSO Database is a web based application requiring computer connection to the internet and is typically not as available as telephone communication would be, the Online Database will not replace emergency notification, which may be required by a Regional Water Board, Office of Emergency Services, or a County Health or Environmental Health Agency.

Incorporating Existing Permits

It is the State Water Board's intent to have one statewide regulatory mechanism that lays out the foundation for consistent collection system management requirements and SSO reporting. While there are a significant number of collection systems that are not actively regulated by the State or Regional Water Boards, some efforts have been made to regulate these agencies on a facility-by-facility or region-by-region basis. General WDRs, individual WDRs, NPDES permits, and enforcement orders that specifically include collections systems are mechanisms that have been used to regulate collection system overflows.

However, because of these varying levels of regulatory oversight, confusion exists among collection system owners as to regulatory expectations on a consistent and uniform basis (especially with reporting spills). Currently, there are a myriad of different SSO reporting thresholds and a number of different spill report repositories. Because of the varying levels of reporting thresholds and the lack of a common database to capture this information, an accurate picture of SSOs throughout California is unobtainable.

In order to provide a consistent and effective SSO prevention program, as well as to develop reasonable expectations for collection system management, these General WDRs should be the primary regulatory mechanism to regulate public collection systems. The draft WDRs detail requirements associated with SSMP development and implementation and SSO reporting.

All NPDES permits for POTWs currently include federally required standard conditions, three of which apply to collection systems. NPDES permits must clarify that the following three conditions apply to that part of the collection system that is owned or operated by the POTW owner or operator. These conditions are:

- Duty to mitigate discharges (40 CFR 122.41(d))
- Requirement to properly operate and maintain facilities (40 CFR 122.41(e))
- Requirement to report non-compliance (40 CFR 122.41(l)(6) and (7))

Understandably, revising existing regulatory measures will not occur immediately. However, as time allows and, at a minimum, upon readopting existing WDRs or WDRs that serve as NPDES permits, the Regional Water Boards should rescind redundant or inconsistent collection system requirements. In addition, the Regional Water Boards must ensure that existing NPDES permits clarify that the three standard permit provisions discussed above apply to the permittee's collection system.

Although it is the State Water Board's intent that this Order be the primary regulatory mechanism for sanitary sewer systems statewide, there will be some instances when Regional Water Boards will need to impose more stringent or prescriptive requirements. In those cases, more specific or more stringent WDRs or an NPDES permit issued by a Regional Water Board will supersede this Order. Finding number 11, in the WDRs states:

> 11. Some Regional Water Boards have issued WDRs or WDRs that serve as National Pollution Discharge Elimination System (NPDES) permits to sanitary sewer system owners/operators within their jurisdictions. This Order establishes minimum requirements to prevent SSOs. Although it is the State Water Board's intent that this Order be the primary regulatory mechanism for sanitary sewer systems statewide, Regional Water Boards may issue more stringent or more prescriptive WDRs for sanitary sewer systems. Upon issuance or reissuance of a Regional Water Board's WDRs for a system subject to this Order, the Regional Water Board shall coordinate its requirements with stated requirements within this Order, to identify requirements that are more stringent, to remove requirements that are less stringent than this Order, and to provide consistency in reporting.

Cost of Compliance

While the proposed WDRs contain requirements for systems and programs that should be in place to effectively manage collection systems, many communities have not implemented various elements of a good management plan. Some agencies are doing an excellent job managing their collection systems and will incur very little additional costs. Other agencies will need to develop and implement additional programs and will incur greater costs. However, any additional costs that a public agency may incur in order to comply with these General WDRs are costs that an agency would necessarily incur to effectively manage and preserve its infrastructure assets, protect public health and prevent nuisance conditions. These General WDRs prescribe minimum management requirements that should be present in all well managed collection system agencies.

In order to estimate the compliance costs associated with the proposed WDRs, staff analyzed costs associated with implementing the Santa Ana Regional Water Board's general WDRs. Twenty-one agencies, which discharge to Orange County Sanitation District, submitted financial summaries for the last five years, representing both pre- and post-WDRs adoption. Operation and maintenance costs, program development costs, as well as capital improvement costs were

considered and fairly accurately represent what can be expected statewide with the adoption of the General WDRs.

After extrapolating the sample to yield a statewide cost perspective, the projected annual cost of implementing the statewide WDRs is approximately $870 million. This total represents $345.6 million in O&M costs and $524.5 for capital improvement projects.

While this sum is substantial, presenting the costs on a per capita or per household basis puts the figure in perspective. Department of Finance estimated the total population for Californians that may be subject to the WDRs to be 30.3 million persons (1/1/05). Dividing the population by the approximate average household size of 2.5 yields 12 million households. The average household in California is assumed to be 2.5 persons. The increased average annual cost (in order to comply with these WDRs) per person is estimated to be $28.74 and $71.86 per household (or $5.99 per month per household)

Given these average costs there will be some communities that realize higher costs on a per household basis and some that realize less cost. Furthermore, larger communities will probably also realize an economy of scale, which is dependent upon a community's size. While larger communities may see lower costs associated with compliance, smaller communities will probably see a higher cost associated with compliance. Costs for compliance in small communities may be as high as $40 per month per household.

SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix B

SSMP Change Log

City of Placentia SSMP Change Log

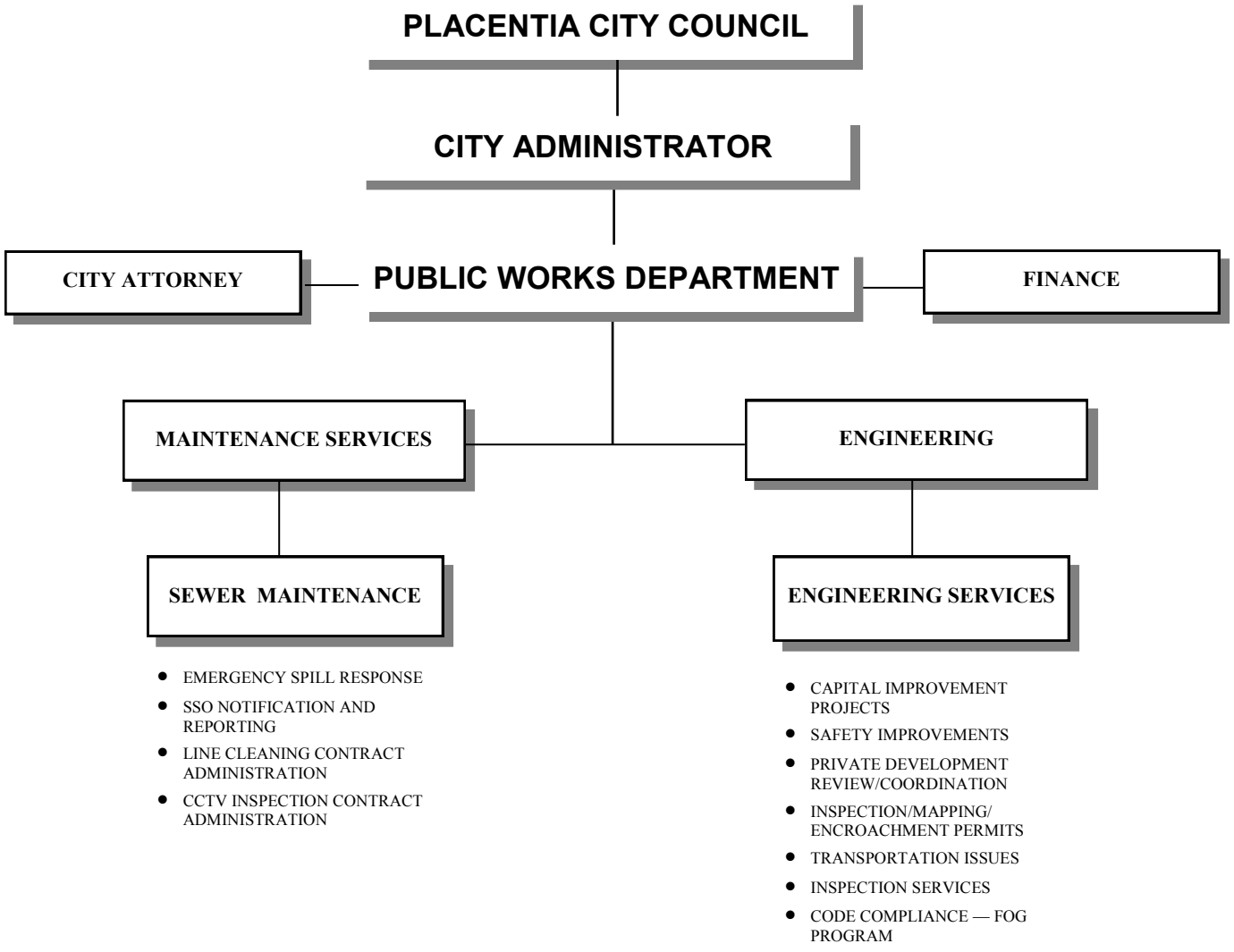
Revision Date	Significant Change (Y/N)	Approval Date	Section/ Reference	Description of Change/Revision Made

Revision Date	Significant Change (Y/N)	Approval Date	Section/ Reference	Description of Change/Revision Made

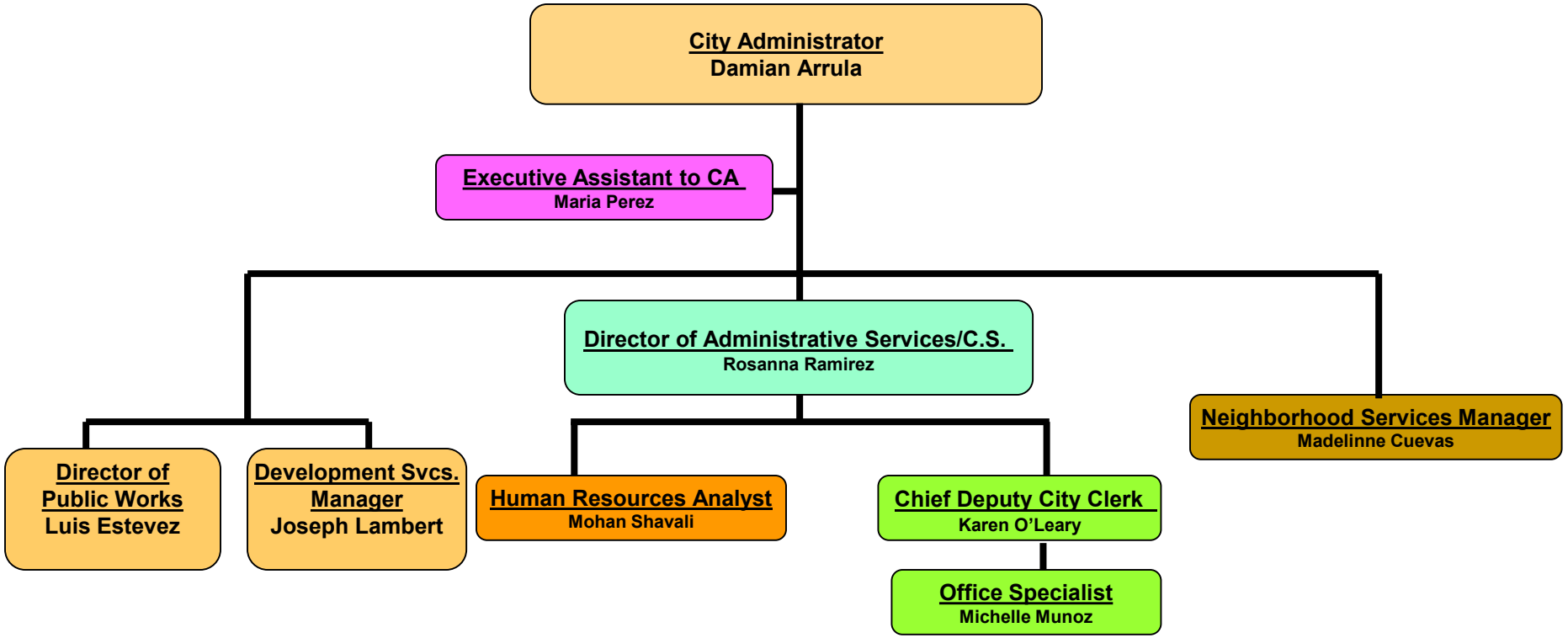
SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix C

Organizational Charts

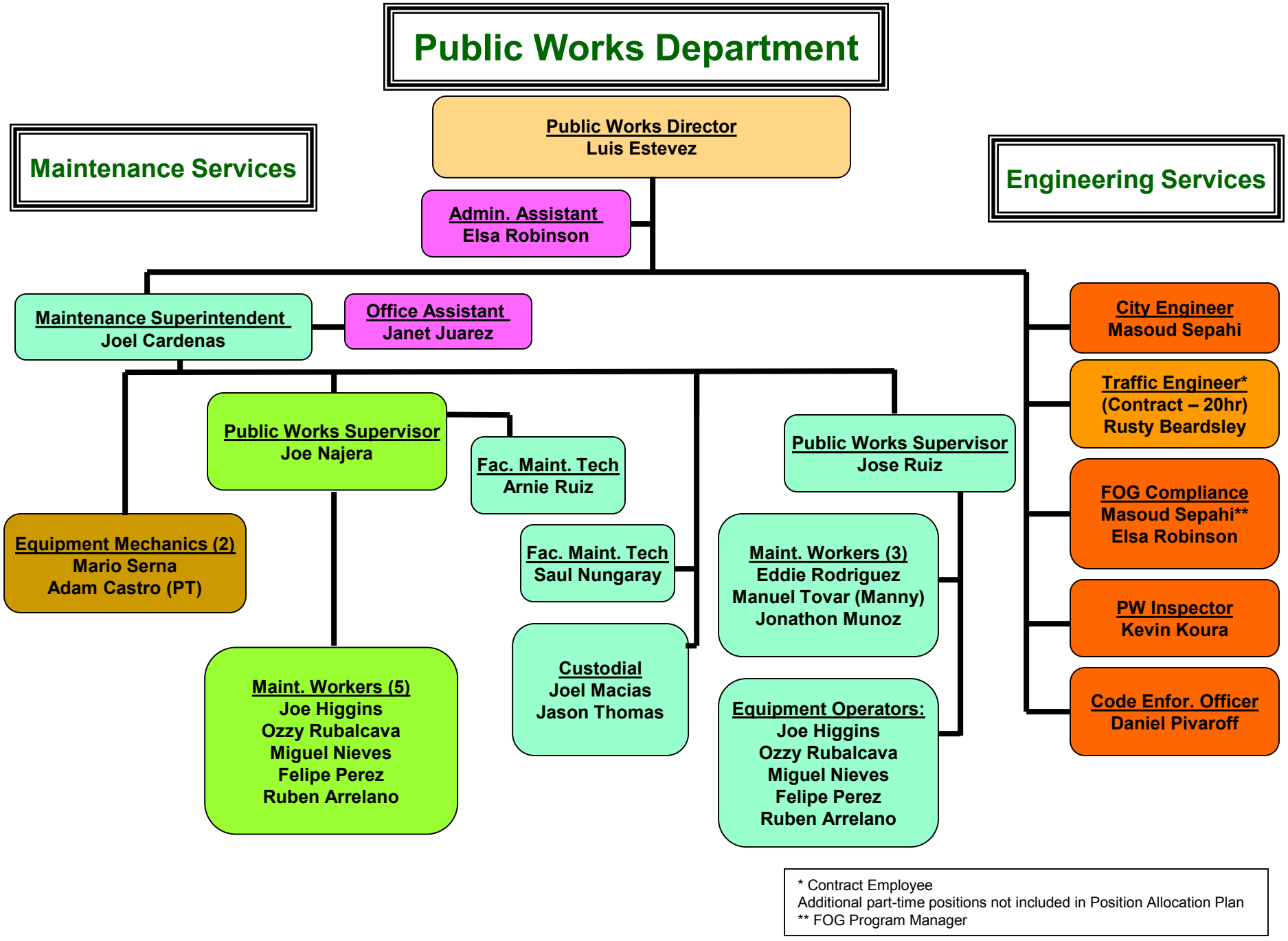

PLACENTIA CITY COUNCIL
CITY ADMINISTRATOR
CITY ATTORNEY
PUBLIC WORKS DEPARTMENT
FINANCE
MAINTENANCE SERVICES
ENGINEERING
SEWER MAINTENANCE
ENGINEERING SERVICES
• EMERGENCY SPILL RESPONSE
• SSO NOTIFICATION AND REPORTING
• LINE CLEANING CONTRACT ADMINISTRATION
• CCTV INSPECTION CONTRACT ADMINISTRATION
• CAPITAL IMPROVEMENT PROJECTS
• SAFETY IMPROVEMENTS
• PRIVATE DEVELOPMENT REVIEW/COORDINATION
• INSPECTION/MAPPING/ ENCROACHMENT PERMITS
• TRANSPORTATION ISSUES
• INSPECTION SERVICES
• CODE COMPLIANCE — FOG PROGRAM

Administration Department



* 960 Employee P-T

Additional part-time positions not included in Position Allocation Plan


Public Works Department
Public Works Director
Luis Estevez
Admin. Assistant
Elsa Robinson
Maintenance Services
Engineering Services
Maintenance Superintendent
Joel Cardenas
Office Assistant
Janet Juarez
City Engineer
Masoud Sepahi
Traffic Engineer*
(Contract – 20hr)
Rusty Beardsley
FOG Compliance
Masoud Sepahi**
Elsa Robinson
PW Inspector
Kevin Koura
Code Enfor. Officer
Daniel Pivaroff
Public Works Supervisor
Joe Najera
Fac. Maint. Tech
Arnie Ruiz
Public Works Supervisor
Jose Ruiz
Equipment Mechanics (2)
Mario Serna
Adam Castro (PT)
Fac. Maint. Tech
Saul Nungaray
Maint. Workers (3)
Eddie Rodriguez
Manuel Tovar (Manny)
Jonathon Munoz
Custodial
Joel Macias
Jason Thomas
Maint. Workers (5)
Joe Higgins
Ozzy Rubalcava
Miguel Nieves
Felipe Perez
Ruben Arrelano
Equipment Operators:
Joe Higgins
Ozzy Rubalcava
Miguel Nieves
Felipe Perez
Ruben Arrelano
* Contract Employee
Additional part-time positions not included in Position Allocation Plan
** FOG Program Manager

SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix D

Sanitary Sewer Overflow Emergency Response Plan

City of Placentia

Sanitary Sewer Overflow Response Plan

2019

City of Placentia

Sanitary Sewer Overflow
Emergency Response Plan

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City of Placentia
Sanitary Sewer Overflow
Emergency Response Plan

General

The City of Placentia owns and operates approximately 85% or 84 miles of sanitary collection system pipelines within the City. The sanitary collection system in the remaining 15% areas of the City is owned, operated and maintained by the Yorba Linda Water District (YLWD). The City currently utilizes, under contract, the services of, Houston & Harris PSC, Inc. to clean, maintain and provide emergency response for the City owned portion of the sanitary collection system. Should a Sanitary Sewer Overflow (SSO) occur within the City owned collection system, Houston & Harris PSC, Inc. is notified to provide emergency response and to clear any blockage. Houston & Harris PSC, Inc. and City crews work together to contain and cleanup the SSO. The City also maintains an agreement with YLWD to provide emergency assistance, on an as needed basis, to assist in removing blockages.

Authority

On May 2, 2006, the State Water Resources Control Board (SWRCB) issued Order No. 2006-003 DWQ (commonly referred to as the General Waste Discharge Requirements for sanitary sewer systems, also known as the GWDR) to all sewage collection system owner/operators in the state with one or more miles of collection pipelines. This permit is intended to ensure that all collection agencies within the state provide adequate and appropriate collection system capacity, maintenance and operation, emergency sewer spill response, and legal responsibility to reduce or eliminate sewage discharges from entering the waters of the state.

As the owner of a sanitary collection system within its City limits, the City of Placentia has the right and responsibility to ensure that the collection system is properly funded and maintained, including the appropriate response to sewer system overflows as prescribed in Order No. 2006-003 DWQ.

In September, 2013, the SWRCB made substantial changes to the Monitoring and Reporting requirements for sanitary sewer overflows. These new requirements are included herein.

Types of spills

Public Property SSO

A public property SSO is an overflow that occurs due to a malfunction in the publicly owned collection system. When an SSO occurs due to a malfunction in the publically owned collection system it is the responsibility of the City to determine the cause and initiate corrective action including the cleanup and recovery of all recoverable sewage. The city may request reimbursement for a SSO that originates on private property and migrates to public property. An example of a public property SSO is the overflow of a manhole on a city owned collection system line. All public property SSOs must be reported in accordance with the reporting procedures outlined in the Sanitary Sewer Overflow Emergency Response Plan (SSOERP).

Private Property SSO

A private property SSO is an overflow that occurs on private property as a result of a malfunction in the private system. Should a private property spill enter the public right-of-way it is still a private property spill provided its origin is due to a malfunction in the private system. An SSO that occurs on private property as a result of a malfunction in the public system is a public spill and not a private property spill. Private property SSOs are the responsibility of the property owner although the City or its collection system contractor may offer assistance. The City may request reimbursement from the property owner for such assistance. An example of a private property SSO is the backup of a private sewer lateral where the spill is either contained on the private property or migrates to public property. As the City becomes aware, the City may, at its option, report private property spills to the California Integrated Water Quality System (CIWQS) online database.

Regardless of the source of an SSO, every effort must be made to ensure that sewage does not reach the receiving waters of the U.S.; that is every effort must be made to prevent sewage from reaching storm drains, flood channels, drainage ditches or any other storm water conveyance. Should an SSO reach a storm water conveyance, every effort must be made to remove the sewage as rapidly and completely as possible. This includes all storm water conveyances whether the City owns them or not. Should an SSO reach a storm water conveyance owned and operated by the County of Orange, assistance may be required from the Orange County Flood Control District to recover the spill.

Procedures

The purpose of this response plan is: to protect the personnel and public health, environment and property from sewage spill events and restore area back to normal as soon as possible after a spill; to safely and competently respond with available resources and capabilities within the City of Placentia; to establish perimeters and control zones using appropriate measures and directing traffic as needed; to promptly notify the Orange County Health Care Agency (OCHCA), the Orange County Resources and Development Management Department (RDMD), California Regional Water Quality Control Board, and other agencies as required; and to contain the sewage discharge as much as possible—with every effort being made to prevent the discharge of sewage into surface waters.

The majority of SSOs that occur within the City are reported by a citizen who telephones the Placentia Police Department to report the overflow. Police personnel notify the Public Works Department who will dispatch field personnel to investigate the reported spill. Once on the scene of the spill, the crew leader will determine if the spill is within the jurisdiction of the City and initiate containment activities also beginning the notification process. If the spill is on private property the City will offer assistance but require the property owner to contact a plumber to clear the blockage. City personnel will take evasive action to ensure that the spill does not migrate to the storm drain system. If the spill is from the City's collection system, the crew leader will notify the City's line cleaning contractor to clear the blockage while taking action to contain the spill preventing it from entering the storm drain. If the spill has entered the storm drain, action will be taken to contain and remove the spill before entering the County's flood control system. The crew leader will notify RDMD for assistance if necessary. City crews will assist the line-cleaning contractor with spill clean up and traffic control as

needed. The crew leader or the Maintenance Supervisor will notify the appropriate regulatory agencies and initiate the report to the CIWQS on-line database. The City's Legally Responsible Official (LRO) is responsible to certify SSO spill reports to the CIWQS online database.

The following outlines the City of Placentia's response plan:

First Responder's Duties

1. Identify and assess the area and extent of the discharge. Determine if there is a need for additional support from City maintenance personnel.
2. Notify supervisor of the location and condition of the discharge. Off- duty hour phone numbers are identified on the standby list for additional personnel to be contacted.
3. Divert spill by building a berm to change direction of flow away from any storm drain system. If possible, retain spill by letting it collect in a natural low area to be recovered during the cleanup. Use all available means to prevent discharge from entering storm drain system or flowing into waterways.
4. Cordon off the area of the SSO to prevent contact by the general public.
5. Notify sewer line-cleaning contractors currently being used by the City. Phone numbers are listed below:
6. If necessary contact the Placentia Police Department Watch Commander for assistance with traffic or crowd control.
7. Area shall be flushed and disinfected as required with all wash water being captured and returned to the sewer system.

Houston and Harris PCS, Inc.	909-422-8990
Yorba Linda Water Dist.	714-701-3000
Orange County Septic	714-505-9662
Pro-Pipe	800-784-7473
Gentry Brothers	626-357-9631

8. Assist the supervisor with gathering field data for implementation in the CIWQS online database.

Duties of Supervisory Personnel

1. Assess discharge rate and duration of discharge to determine the size of the spill.
2. Contact OCHCA, RDMD, RWQCB and provide them with the required information regarding the spill and State OES.
3. Take photos of the discharge. Photos need to show the spill, the area affected and the area after the cleanup. Copies of these photos are to accompany the report to the CIWQS on-line database.

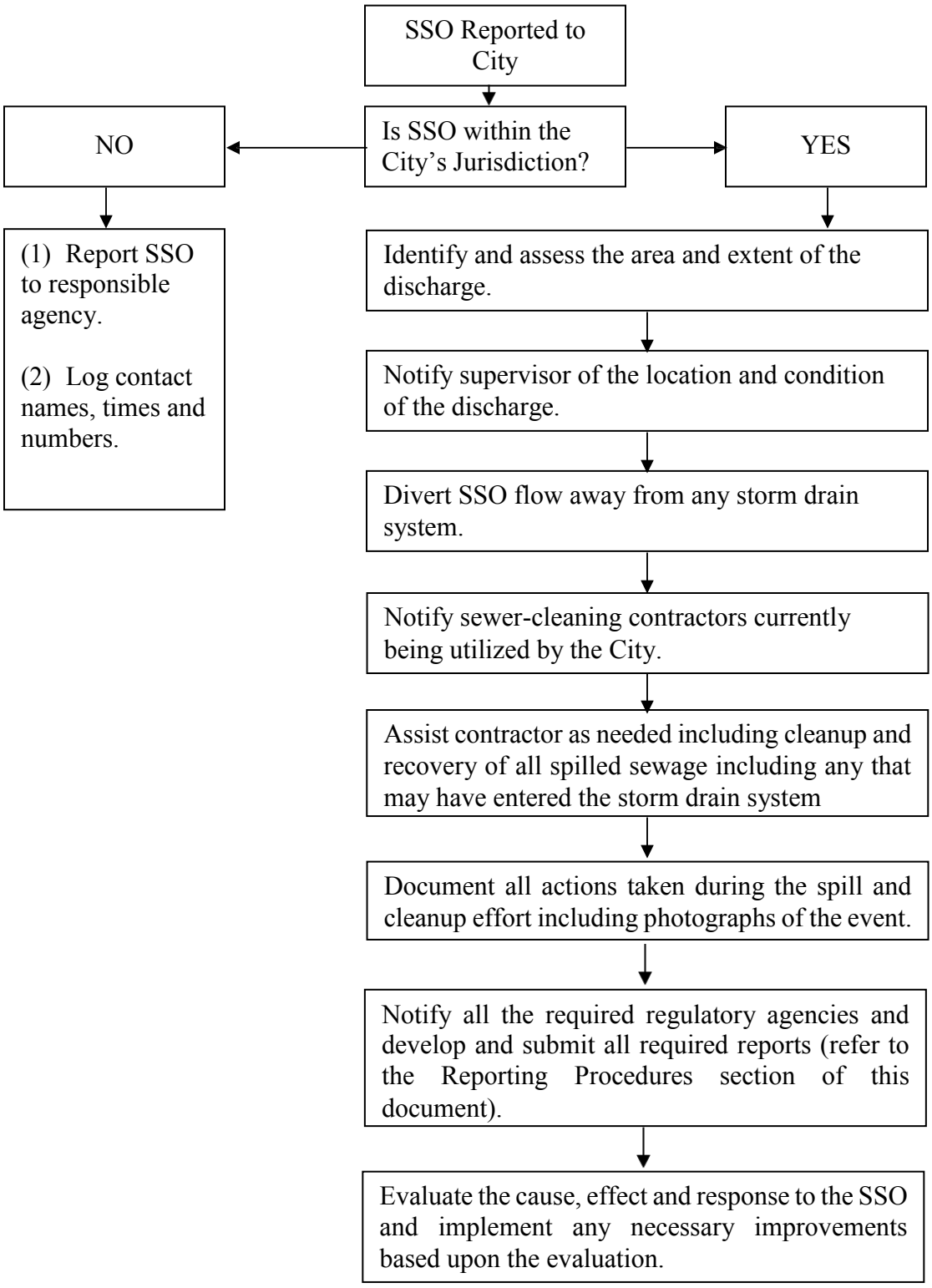
4. Ensure expedient arrival of sewer cleaning equipment. Supervise containment methods used by the first responder.
5. Document all actions taken during the spill: location of spill; flow rate; time of flow; when flow was stopped; type of containment; cause of discharge; time clean-up was completed; method used to clean area; and agencies contacted with names of personnel contacted.
6. If required by the OCHCA or RWQCB the supervisor will contract with laboratory services to provide sampling and laboratory analysis to determine the extent and impact of the SSO.
7. Submit or oversee the submission of the spill report to the CIWQS online database consistent with the provisions of the current Monitoring and Reporting Program (MRP) of the GWDR. Also provide any required notifications to OES, OCHCA and the RWQCB, Region 8.

Storm Drain System (MS4)

Every effort must be made to keep an SSO out of the storm drain system. The storm drain system includes catch basins, drainage ditches, flood control channels, waterways or any other conveyance utilized for storm water drainage. Earthen berms or sand bags can be constructed to divert and contain the sewage flow. Rubber sheeting, available on City response vehicles, can be used to prevent sewage from entering the storm drain system. Even if sewage has already entered the storm drain system the above methods should be utilized to prevent additional sewage from continuing to enter the storm drain system.

If the SSO has entered the storm drain system first take steps to prevent additional sewage from entering the storm drain. Consult the Storm Drain/Sewer Utility Map Book located in the response vehicle. Determine the direction of flow and the closest location where the storm drain system can be inspected to determine the extent of sewage contamination within the storm drain system. If the SSO has entered the county's flood control system, the RDMD will have to be notified for assistance or access to their facilities. Cleanup of the storm drain system is to begin as soon as equipment and personnel are available. Disinfectants should not be utilized unless under the direction of a supervisor or a regulatory agency representative. They will determine the type, amount and dilution of the disinfectant. City crews will work in conjunction with the contractor responding to the SSO to cleanup and remove the sewage from the storm drain system. To the extent that access permits, a vacuum truck should be utilized to remove the sewage from the storm drain and return the sewage to the sanitary collection system. If this is not possible whatever means are available should be used to clean up the storm drain thus preventing the SSO from reaching the waters of the United States.

City of Placentia
SSO Procedures Flow Chart



Reporting Procedures

Notification Requirements

The City is required to notify Cal OES (and obtain a notification control number), OCHCA and the Santa Ana RWQCB Region 8 for any SSO from the City's system that is greater than or equal to 1,000 gallons that discharges to, or probably will discharge to surface water directly or by way of a drainage channel or MS4. Notification is to be immediate but not later than two (2) hours after the City becomes, (A) aware of the SSO, (B) notification is possible, and (C) notification is possible without substantially impeding the cleanup or other emergency activities.

To satisfy the notification requirements for each applicable SSO the City must provide the information requested by Cal OES before receiving a control number. The requested spill information may include the following:

1. Name of person notifying Cal OES and direct return phone number.
2. Estimated SSO volume discharged (gallons).
3. If ongoing, estimated SSO discharge rate (gallons per minute).
4. SSO Incident Description:
    a. Brief narrative.
    b. On-scene point of contact for additional information (name and cell phone number).
    c. Date and time enrollee became aware of the SSO.
    d. Name of sanitary sewer system agency causing the SSO.
    e. SSO cause (if known).
5. Indication of whether the SSO has been contained.
6. Indication of whether surface water is impacted.
7. Name of surface water impacted by the SSO, if applicable.
8. Indication of whether a drinking water supply is or may be impacted by the SSO.
9. Any other known SSO impacts.
10. SSO incident location (address, city, state, and zip code).

After the initial notification to Cal OES and until the City has certified the SSO report in the CIWQS Online Database, the City is required to provide updates to Cal OES regarding substantial changes to the SSO's estimated volume or known impacts.

The City is strongly encouraged to notify Cal OES of discharges greater than or equal to 1,000 gallons of untreated or partially treated wastewater that result or may result in a discharge to surface water resulting from failures or flow conditions within a privately owned sewer later or from other private sewer asset(s) if the City becomes aware of the PLSD.

Additionally, as soon as possible, but no later than twenty-four (24) hours, after becoming aware of a discharge to a drainage channel or a surface water, the City shall submit to the Santa Ana Regional Water Quality Control Board, Region 8, a certification that the State Office of Emergency Services and the Orange County Health Care Agency have been notified of the discharge. Certification must be accomplished by an LRO. City to notify other regulatory agencies, as appropriate, pursuant to state law and requirements of the RWQCB.

Reporting Requirements

All SSOs occurring within the City's sanitary sewer collection system must be reported to the CIWQS Online SSO Database. SSOs from the City's collection system are classified as Category 1, Category 2 or Category 3 depending upon their size and whether they spilled to surface waters.

- A Category 1 SSO is any unauthorized volume discharge that reaches surface water or a drainage channel that is tributary to surface water or an MS4 and is not fully captured and disposed of properly. Any volume of wastewater not recovered from an MS4 is considered to have reached surface waters unless the storm drain system discharges to a dedicated storm water or ground water infiltration basin.

- A Category 2 SSO is any unauthorized wastewater discharge equal to or greater than 1,000 gallons and does not reach surface waters, a drainage channel, or MS4 unless the entire volume of the SSO is recovered and disposed of properly.

- A Category 3 SSO is any other unauthorized discharge of wastewater resulting from a failure or flow condition in the City's sanitary sewer collection system.

Category 1 and Category 2 SSOs must have a draft report submitted to the CIWQS Online Database within three (3) business days of the City becoming aware of the SSO. A final SSO report must be certified within 15 calendar days to the CIWQS Online Database. A Category 3 SSO must be reported to CIWQS and be certified within 30 calendar days after the month that the SSO occurred.

At a minimum, the following mandatory information shall be reported for a *draft* **Category 1 SSO Report**:

1. SSO Contact Information: Name and telephone number of enrollee contact person who can answer specific questions about the SSO being reported.
2. SSO Location Name.
3. Location of the overflow event (SSO) by entering GPS coordinates. If a single overflow event results in multiple appearance points, provide GPS coordinates for the appearance point closest to the failure point and describe each additional appearance point in the SSO appearance point explanation field.
4. Whether or not the SSO reached surface water, a drainage channel, or entered and was discharged from a drainage structure.

5. Whether or not the SSO reached a municipal separate storm drain system.
6. Whether or not the total SSO volume that reached a municipal separate storm drain system was fully recovered.
7. Estimate of the SSO volume, inclusive of all discharge point(s).
8. Estimate of the SSO volume that reached surface water, a drainage channel, or was not recovered from a storm drain.
9. Estimate of the SSO volume recovered (if applicable).
10. Number of SSO appearance point(s).
11. Description and location of SSO appearance point(s). If a single sanitary sewer system failure results in multiple SSO appearance points, each appearance point must be described.
12. SSO start date and time.
13. Date and time the enrollee was notified of, or self-discovered, the SSO.
14. Estimated operator arrival time.
15. For spills greater than or equal to 1,000 gallons, the date and time Cal OES was called.
16. For spills greater than or equal to 1,000 gallons, the Cal OES control number.

At a minimum, the following mandatory information shall be reported for a *certified* **Category 1 SSO Report**, in addition to all fields required in the *draft* Category 1 SSO Report:

1. Description of SSO destination(s).
2. SSO end date and time.
3. SSO causes (mainline blockage, roots, etc.).
4. SSO failure point (main, lateral, etc.).
5. Whether or not the spill was associated with a storm event.
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.
7. Description of spill response activities.
8. Spill response completion date.
9. Whether or not there is an ongoing investigation, the reasons for the investigation and the expected date of completion.

10. Whether or not a beach closure occurred or may have occurred as a result of the SSO.

11. Whether or not health warnings were posted as a result of the SSO.
12. Name of beach(es) closed and/or impacted. If no beach was impacted, NA shall be selected.

13. Name of surface water(s) impacted.
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.
15. If water quality samples were taken, identify which regulatory agencies received sample results (if applicable). If no samples were taken, NA shall be selected.
16. Description of methodology(ies) and type of data relied upon for estimations of the SSO volume discharged and recovered.
17. SSO Certification: Upon SSO Certification, the CIWQS Online SSO Database will issue a final SSO identification (ID) number.

At a minimum, the following mandatory information shall be reported for a *draft* **Category 2 SSO Report:**

1. SSO Contact Information: Name and telephone number of enrollee contact person who can answer specific questions about the SSO being reported.
2. SSO Location Name.
3. Location of the overflow event (SSO) by entering GPS coordinates. If a single overflow event results in multiple appearance points, provide GPS coordinates for the appearance point closest to the failure point and describe each additional appearance point in the SSO appearance point explanation field.
4. Whether or not the SSO reached surface water, a drainage channel, or entered and was discharged from a drainage structure.
5. Whether or not the SSO reached a municipal separate storm drain system.
6. Whether or not the total SSO volume that reached a municipal separate storm drain system was fully recovered.
7. Estimate of the SSO volume, inclusive of all discharge point(s).
8. Estimate of the SSO volume that reached surface water, a drainage channel, or was not recovered from a storm drain.
9. Estimate of the SSO volume recovered (if applicable).
10. Number of SSO appearance point(s).
11. Description and location of SSO appearance point(s). If a single sanitary sewer system failure results in multiple SSO appearance points, each appearance point must be described.
12. SSO start date and time.
13. Date and time the enrollee was notified of, or self-discovered, the SSO.
14. Estimated operator arrival time.

At a minimum, the following mandatory information shall be reported for a *certified* **Category 2 SSO Report**, in addition to all fields required in the *draft* Category 2 SSO Report:

1. SSO Contact Information: Name and telephone number of enrollee contact person who can answer specific questions about the SSO being reported.
2. SSO Location Name.
3. Location of the overflow event (SSO) by entering GPS coordinates. If a single overflow event results in multiple appearance points, provide GPS coordinates for the appearance point closest to the failure point and describe each additional appearance point in the SSO appearance point explanation field.
4. Whether or not the SSO reached surface water, a drainage channel, or entered and was discharged from a drainage structure.
5. Whether or not the SSO reached a municipal separate storm drain system.
6. Whether or not the total SSO volume that reached a municipal separate storm drain system was fully recovered.
7. Estimate of the SSO volume, inclusive of all discharge point(s).
8. Estimate of the SSO volume that reached surface water, a drainage channel, or was not recovered from a storm drain.
9. Estimate of the SSO volume recovered (if applicable).
10. Number of SSO appearance point(s).
11. Description and location of SSO appearance point(s). If a single sanitary sewer system failure results in multiple SSO appearance points, each appearance point must be described.
12. SSO start date and time.
13. Date and time the enrollee was notified of, or self-discovered, the SSO.
14. Estimated operator arrival time.
15. Description of SSO destination(s).
16. SSO end date and time.
17. SSO causes (mainline blockage, roots, etc.).
18. SSO failure point (main, lateral, etc.).
19. Whether or not the spill was associated with a storm event.
20. 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.
21. Description of spill response activities.
22. Spill response completion date.
23. Whether or not there is an ongoing investigation, the reasons for the investigation and the expected date of completion
24. SSO Certification: Upon SSO Certification, the CIWQS Online SSO Database will issue a final SSO identification (ID) number.

At a minimum, the following mandatory information shall be reported for a *certified* **Category 3 SSO Report**, in addition to all fields required in the *draft* Category 2 SSO Report:

1. SSO Contact Information: Name and telephone number of enrollee contact person who can answer specific questions about the SSO being reported.
2. SSO Location Name.
3. Location of the overflow event (SSO) by entering GPS coordinates. If a single overflow event results in multiple appearance points, provide GPS coordinates for the appearance point closest to the failure point and describe each additional appearance point in the SSO appearance point explanation field.
4. Whether or not the SSO reached surface water, a drainage channel, or entered and was discharged from a drainage structure.
5. Whether or not the SSO reached a municipal separate storm drain system.
6. Whether or not the total SSO volume that reached a municipal separate storm drain system was fully recovered.
7. Estimate of the SSO volume, inclusive of all discharge point(s).
8. Estimate of the SSO volume that reached surface water, a drainage channel, or was not recovered from a storm drain.
9. Estimate of the SSO volume recovered (if applicable).
10. Number of SSO appearance point(s).
11. Description and location of SSO appearance point(s). If a single sanitary sewer system failure results in multiple SSO appearance points, each appearance point must be described.
12. SSO start date and time.
13. Date and time the enrollee was notified of, or self-discovered, the SSO.
14. Estimated operator arrival time.
15. Description of SSO destination(s).
16. SSO end date and time.
17. SSO causes (mainline blockage, roots, etc.).
18. SSO failure point (main, lateral, etc.).
19. Whether or not the spill was associated with a storm event.
20. SSO Certification: Upon SSO Certification, the CIWQS Online SSO Database will issue a final SSO identification (ID) number.

SSO Technical Report.
The City must submit an SSO Technical Report to the CIWQS Online SSO Database within 45 calendar days of the end date for any SSO of 50,000 gallons or greater was spilled to surface waters. The Technical Report shall include:

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.

Enrollee's Response to SSO:

a. Chronological narrative description of all actions taken by enrollee 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 action not yet completed.

Water Quality Monitoring:

a. Description of all water quality sampling activities conducted including analytical results and evaluation of the results.
b. Detailed location map illustrating all water quality sampling points.

Water Quality Monitoring Requirements. To comply with subsection D.7(v) of the SSS WDRs, the City will develop and implement an SSO Water Quality Monitoring Program to assess impacts from SSOs to surface waters in which 50,000 gallons or greater are spilled to surface waters. The SSO Water Quality Monitoring Program, shall, at a minimum:

1. Contain protocols for water quality monitoring.
2. Account for spill travel time in the surface water and scenarios where monitoring may not be possible (e.g. safety, access restrictions, etc.).
3. Require water quality analyses for ammonia and bacterial indicators to be performed by an accredited or certified laboratory.
4. Require monitoring instruments and devices used to implement the SSO Water Quality Monitoring Program to be properly maintained and calibrated, including any records to document maintenance and calibration, as necessary, to ensure their continued accuracy.
5. Within 48 hours of the City becoming aware of the SSO, require water quality sampling for, at a minimum, the following constituents:
   i. Ammonia

ii. Appropriate Bacterial indicator(s) per the applicable Basin Plan water quality objective or Regional Board direction which may include total and fecal coliform, enterococcus, and e-coli.

Within 48 hours of an SSO that enters a surface water body the City shall have on site a firm experienced in taking and analyzing water samples. The City shall maintain the water sampling results as part of the records keeping for the SSO.

No spill certification

If no spills occurred during a calendar month the City must:

1) certify, within 30 calendar days after the end of the month that no spills occurred that there were no spills during that designated month or

2) certify quarterly, within 30 calendar days of the end of the quarter, that there were no spills during that quarter.

Quarters are Q1-January/February/March, Q2-April/May/June, Q3-July/August/ September, Q4-October/November/December. If the City reports a private property sewage discharge during a month (or quarter) that no spills occurred from the City's system, the City is still required to file a no spill certification.

Amended SSO Reports

The City may update or add additional information to a certified SSO report within 120 calendar days after the SSO end date by amending the report or adding an attachment to the SSO report in the CIWQS Online SSO Database.

Updated SSO Reporting Flow Charts, staff titles, and staff contact information are maintained at the WMWD Operations Department. Riverside County Department of Environmental Health has requested to be notified of any discharge from the City's collection system or from any private lateral or other private sewer asset that the City become aware of.

CIWQS Online Database Unavailability. Should the CIWQS Online Database be unavailable, the City is to fax or e-mail the required spill information to the appropriate Regional Water Quality Control Board (Region 8 or Region 9). The City must also enter all required spill information into the CIWQS Online Database once it becomes available.

Collection System Questionnaire. Every twelve months the City must complete and certify their Collection System Questionnaire.

The following table is a summary of how SSOs are to be reported.

SSO Reporting Summary

Type of Spill	Agency(s) to notify*	Notification Timeframe	Report Timeframe
Category 1 – any volume discharge of sewage resulting from a failure or flow condition in the City's sanitary sewer collection system that: A. Reach surface waters and/or reach a drainage channel tributary to a surface water; or B. 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 (e.g. infiltration pit, percolation pond).)	Cal OES RWQCB per staff request. OCHCA OC Public Works per staff request	Within 2 hours of City staff becoming aware of any Category 1 SSO greater than or equal to 1,000 gallons, notify the Cal OES and obtain a notification control number. Additionally, certify to RWQCB that OES was notified within 24 hours.	Submit draft report on CIWQS within **3** business days of becoming aware of the SSO. Certify within **15** calendar days of the SSO end date. SSO Technical Report: Submit within 45 calendar days after the end date of any Category 1 SSO in which 50,000 gallons or greater is spilled to surface waters.
Category 2 – Discharges of untreated or partially treated wastewater of **1,000 gallons or greater** that **do not** reach surface water, a drainage channel, or MS4 unless the entire SSO discharged to the storm drain system is fully recovered and disposed of properly.	RWQCB per staff request. OCHCA per staff request	Immediate	Submit draft report on CIWQS within **3** business days of becoming aware of the SSO. Certify within **15** calendar days of the SSO end date.
Category 3 – All other discharges of untreated or partially treated wastewater resulting from a flow condition or failure in the sanitary collection system.	RWQCB per staff request. OCHCA per staff request	Immediate	Must report and certify on CIWQS within 30 days after the end of the calendar month in which the SSO occurred.
Private lateral sewage discharges that are caused by blockages or other problems within a privately owned lateral or other private sewer assets.	Governing city/county. RWQCB per staff request. OCHCA per staff request.	Immediate as the City becomes aware.	Private lateral sewage discharges must be reported to the Online SSO Database based upon the SDRWQCB order. The Enrollee must identify the sewage discharge as occurring and caused by a private lateral, and a responsible party should be identified, if known.
No Spill Report	CIWQS		"No Spill" Certification: Certify that no SSOs occurred within 30 calendar days of the end of the month or, if reporting quarterly, the quarter in which no SSOs occurred.

SSO Notification Contacts	
Normal Hours	**After Hours**
OCHCA (Please call down the list until someone has been contacted) (1) (714) 433-6000 (Office Support Staff) (2) Lauren Robinson—Supervisor (714) 433-6280 (3) Hisham Elmishad—Senior Staff (714) 433-6284 (4) Pauline Liu—Staff (714) 433-6286 (5) Anthony Martinez—Manager (714) 433-6011	Control 1: (714) 628-7008 (will contact OCHCA on-call staff).
RWQCB - Santa Ana Region (951) 782-4130 Najah Amin (951) 320-6362	RWQCB: (951) 782-4130 (voice mail) OES: (800) 852-7550
OES (Office of Emergency Services) (916) 845-8911 or (800) 852-7550	(800) 852-7550
OC Public Works – O&M Division (714) 955-0200 (storm drain/flood channel facility owners)	Control 1: (714) 628-7008
Caltrans (657) 328-6000	24 hours
California Highway Patrol OC Communications Center (949) 784-6700 (traffic control/road way hazard on highways and unincorporated areas)	24 hours
Placentia Police Department - Watch Commander (714) 993-8151	24 hours

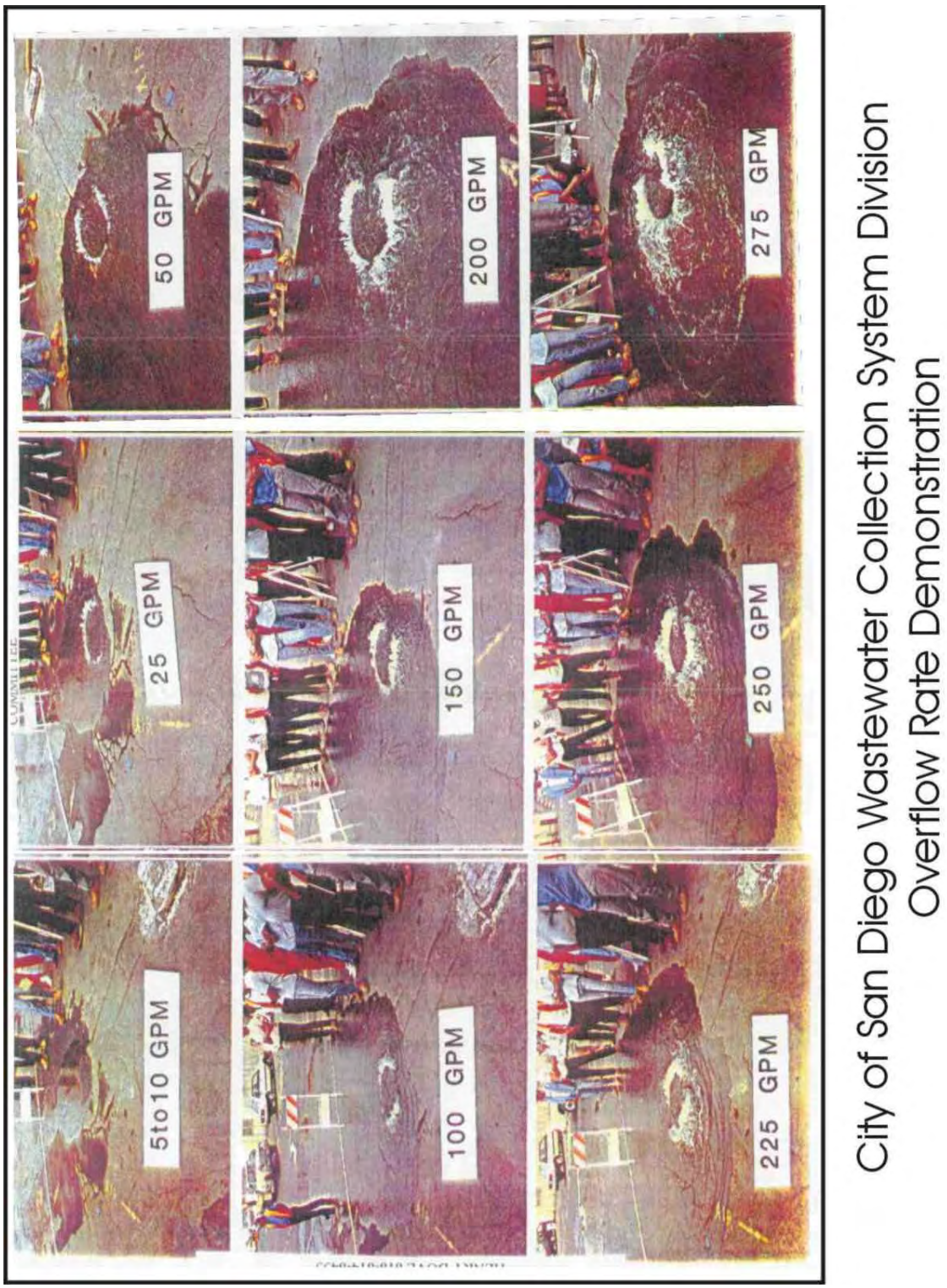
SSO Flow Estimation

Accurate flow estimation is essential to determine the impact of an SSO. Additionally, accurate flow estimation is important to determine the extent of the cleanup and its effectiveness. Flow estimation is basically the flow rate times the amount of time the flow has occurred. Exhibit I (low flow rates) and Exhibit II (higher flow rates) have been included to assist in the estimation of flow rates to determine the flow volume of an SSO. Exhibit I is a chart that assists in determining the estimated flow from the vent and pick holes in manhole covers. To use the chart determine the diameter of the vent or pick hole(s) and the height of the water column coming out of the hole(s). For any given size hole and water column the chart will provide the flow rates in cubic foot seconds (CFS), gallons per minute (GPM) or gallons per hour (GPH). The flow rate times the number of holes generating flow times the elapsed time of the SSO will determine the estimated volume of the SSO. Exhibit II is a series of illustrations depicting what an overflowing manhole looks like at various flow rates. Exhibit II can be used to give an approximate determination of the flow rate for manholes that are overflowing at a rate substantially higher than through only the vent and pick holes. To use exhibit II pick the illustration that most closely matches the actual overflow. Use that gpm rate times the elapsed time the manhole has been overflowing to determine the estimated SSO volume. Additionally, utilize the resources of the contractor who is assisting with the SSO to determine the estimated flow volume and amount of sewage recovered.

Exhibit I

Hole Dia. inches	Water Ht inches	Q cfs	Q gpm	Q gph
Vent Hole				
0.50	1/16 th	0.0005	0.23	14
0.50	1/8 th	0.0007	0.33	20
0.50	1/4 th	0.0010	0.47	28
0.50	one half	0.0015	0.66	40
0.50	3/4 ths	0.0018	0.81	49
0.50	1 inch	0.0021	0.94	56
Vent Hole				
0.75	1/16 th	0.0011	0.51	31
0.75	1/8 th	0.0016	0.72	43
0.75	1/4 th	0.0023	1.02	61
0.75	one half	0.0032	1.44	87
0.75	3/4 ths	0.0039	1.77	106
0.75	1 inch	0.0045	2.04	122
Vent Hole				
1.00	1/16 th	0.0020	0.88	53
1.00	1/8 th	0.0028	1.25	75
1.00	1/4 th	0.0039	1.77	106
1.00	one half	0.0056	2.50	150
1.00	3/4 ths	0.0068	3.06	184
1.00	1 inch	0.0079	3.54	212
Pick Hole semicircular area				
1.00	1/16 th	0.0010	0.44	27
1.00	1/8 th	0.0014	0.63	38
1.00	1/4 th	0.0020	0.89	53
1.00	one half	0.0028	1.25	75
1.00	3/4 ths	0.0034	1.53	92
1.00	1 inch	0.0039	1.77	106
1.00	1-1/2 inc	0.0048	2.17	130
1.00	2 inches	0.0056	2.51	150

Exhibit II


50 GPM
200 GPM
275 GPM
25 GPM
150 GPM
250 GPM
5to10 GPM
100 GPM
225 GPM
City of San Diego Wastewater Collection System Division
Overflow Rate Demonstration

DEPARTMENT OF PUBLIC WORKS

Emergency Stand by List

(06/16/2019 THROUGH 10/05/2019)

06/16/19 – 06/22/19	Ozzy Rubalcava	657-528-4331
06/23/19 – 06/29/19	Eddie Rodriguez	714-494-3002
INDEPENDENCE DAY 06/30/19 – 07/6/19	Jaime Nieves	714-357-1018
07/07/19 – 07/13/19	Felipe Perez	714-797-8742
07/14/19 – 07/20/19	Eddie Rodriguez	714-494-3002
07/21/19 – 07/27/19	Saul Nungaray	714-926-1834
07/28/19 – 08/03/19	Jaime Nieves	714-357-1018
08/04/19 – 08/10/19	Saul Nungaray	714-926-1834
08/11/19 – 08/17/19	Felipe Perez	714-797-8742
08/18/19 – 08/24/19	Ozzy Rubalcava	657-528-4331
08/25/19 – 08/31/19	Jaime Nieves	714-357-1018
LABOR DAY 09/1/19 – 09/07/19	Saul Nungaray	714-926-1834
09/08/19 – 09/14/19	Felipe Perez	714-797-8742
09/15/19 – 09/21/19	Jaime Nieves	714-357-1018
09/22/19 – 09/28/19	Ozzy Rubalcava	657-528-4331
09/29/19 – 10/05/19	Felipe Perez	714-797-8742

Emergency Sewer Callout:	Houston & Harris	909-721-1756 - cell
Emergency Signal Callout:	Bear Electrical Solutions	800-462-3271
Emergency Tree Service Callout:	West Coast Arborists	866-546-2369
Emergency Edison Callout:	So CA Edison- Tom Valenzuela	714-264-8041 cell

SUPERVISORY PERSONNEL

To be called out if there is no response from the standby personnel:

Joe Najera	714-920-8858 cell
Jose Ruiz	714-329-4912 cell
Joel Cardenas	714-920-8859 cell

VEHICLE MAINTENANCE CALLOUT

Mario Serna	Mechanic	714-296-0412 cell

DIVISION HEAD TO BE CONTACTED ONLY WHEN UNABLE TO REACH ANY OF THE ABOVE LISTED PERSONNEL:

Luis Estevez	Director of Public Works	714-504-8041 cell

Employee Call-Out List

Standby list is updated quarterly.

Current list is as follows:

Standby cell phone	714-920-8869
Public Works Supervisors	
Joe Najera	714-920-8858
Jose Ruiz	714-329-4912
Public Works Superintendent	
Joel Cardenas	714-920-8859
Director of Public Works	
Luis Estevez	714-504-8041

Resource List

Houston & Harris PCS, Inc. 21831 Barton Road Grand Terrace, CA 92313	909-422-8990 FAX 909-422-0841
Yorba Linda Water District 1717 E. Miraloma Ave Placentia, CA	714-701-3000 FAX 714-701-0413
Yorba Linda Water District Operations Yard 913 So. Richfield Placentia, CA 92870	714-701-1481
Orange County Sanitation District 10844 Ellis Avenue Fountain Valley, CA 92708	714-962-2411
Orange County Septic Pumping	714-540-5181
Valverde Construction	562-244-1213
American Intergrated Services	951-787-1949
Gentry Brothers	626-357-9631
Pro Pipe	800-784-7473

Sewage Spill Response

Call the Following Agencies- ASAP:

1. O. C. Environmental Health Division	714-433-6000
After Hours, Control One	714-628-7008
2. California Reg. Water Board	951-782-4130
3. State Emergency Service (Spills Over 1,000 Gal.)	800-852-7550

Contractors:

1. Houston & Harris PCS, Inc.	909-422-8990
2. Orange County Pumping	714-540-5181
3. Pro-Pipe	800-784-7473
4. Yorba Linda Water District Yard	714-701-1481
(After Hours)	714-777-9593

Oil Spill Coming to the Surface:

1. Chevron	800-762-3404

Hazardous Waste Company

Call Out in an Emergency:

Conoco Phillips (HAZMAT Cleanup)
2650 W. Lomita Blvd
Torrance, CA 90505
Phone 310-326-8777 Ext. 231; FAX 310-466-8187
Cell 310-466-8187; Pgr. 310-841-1703

General Environmental Management, Inc. (HAZMAT Cleanup)
9980 Cherry Avenue
Fontana, CA 92335
Phone (909) 822-7667; Toll Free 1-800-326-1011
FAX (909) 822-7552

Bridgemark Corporation (Oil Company)
1075 E. Yorba Linda Place, Suite 105
Placentia, CA 92870
Phone (714) 961-2767; FAX (714) 961-2766
Cell (714) 412-3916; Pgr. (714) 648-4533

Tosco (Oil Company)
2650 W. Lomita Blvd.
Torrance, CA 90505
Phone (310) 326-8777; FAX (310) 325-0454
Pgr. (213) 919-0518

Training and Review

This Sanitary Sewer Overflow Emergency Response Plan is reviewed consistent with the provisions of the Monitoring, Measurement and Program Modifications and the Program Audits sections of the SSMP for its effectiveness in responding to sewer overflows. Any supporting documentation is likewise to be reviewed to ensure all documentation is current, correct and applicable to this plan. More frequent reviews may be necessary if, after an overflow, it is determined that the procedures enclosed are inadequate. This plan is to be modified as needed to always allow for an appropriate response to any sanitary sewer overflow within the City's collection system. Modifications of this plan shall be distributed to all required City personnel within 30 days of the modifications being finalized. Modifications will documented in the program audits.

This plan shall be made available to any member of the public upon written request to the City of Placentia.

All City employees involved in the management, administration, supervision, maintenance, operation, or response to a sanitary sewer overflow shall be trained in, and become familiar with, the procedures contained in the Sanitary Sewer Overflow Emergency Response Plan and shall receive further training at least annually. More frequent training may be required. All training, including the names of those receiving training is to be documented.

Contractors employed by the City to provide line cleaning and emergency response assistance will be provided with the City's emergency response procedures.

CIWQS Discharger Work Book

SSO Discharger Work Book

Introduction:

Registering for CIWQS

Welcome to the Sanitary Sewer Overflow (SSO) Discharger Work Book. This guide is designed to help you through the SSO database. The SSO database is the newest module of the California Integrated Water Quality System (CIWQS). However, before you are allowed to use CIWQS, you must first register and receive a CIWQS username and password. At this time, registration for both data submitters and legally responsible officials (see discussion below for an explanation of these terms) is handled by paper. The data submitter and legally responsible official registration forms can be found on the CIWQS Help Center webpage at http://www.waterboards.ca.gov/ciwqs/chc.html. The instructions for submitting the completed forms can be found at the bottom of each form.

SSO Database Overview

This section describes the general workflow for the sanitary sewer overflow (SSO) database, which is utilized by an agency (enrollee) that has applied for coverage under Statewide General Waste Discharge Requirements for Sanitary Sewer Systems - Water Quality Order No. 2006-0003-DWQ (Sanitary Sewer Order) to comply with the SSO reporting requirements.

An enrollee must report two types of information into the SSO database: sanitary sewer system/agency characteristics – collection system questionnaire and spill details – SSO report. The collection system questionnaire must be initially completed before any SSO reports can be submitted. Additionally, the collection system questionnaire must be updated annually. All SSOs (aka spills) from an enrollee's sanitary sewer system must be reported to the SSO database. The reporting deadline for submittal of a SSO report depends on the classification of the spill, which is either Category 1 (greater threat) or Category 2 (lesser threat). For a Category 1 spill, the enrollee must submit an initial, uncertified report of the spill as soon as possible but no later than 3 business days after being made aware of the SSO. The final, certified report for a Category 1 spill must be submitted within 15 calendar days of the conclusion of SSO response activities. For a Category 2 spill, the enrollee must submit a final, certified report (no initial, uncertified report required) within 30 calendar days after the end of the calendar month in which the SSO occurred.

The process of entering information into the SSO database begins with the enrollee specifying the pertinent sanitary sewer system. If the enrollee is responsible for multiple sanitary sewer systems, then, after selecting the "SSO" link from the CIWQS main menu, the enrollee needs to identify the appropriate sanitary sewer system from the "Sanitary Sewer System" screen. If the enrollee is responsible for only one sanitary sewer system, then the SSO database

automatically correlates the information to it and the “Sanitary Sewer System” screen doesn’t appear.

The collection system questionnaire is an online form which contains questions regarding the relevant characteristics of an enrollee’s sanitary sewer system and agency. After initial login, the first major task an enrollee needs to perform is completing the collection system questionnaire. A new collection system questionnaire is accessed through the “Collection System Questionnaire” link on the SSO menu. The collection system questionnaire must be updated at least every 12 months, and this is done through the “Collection System Questionnaire” link on the SSO menu.

Along with completing the collection system questionnaire, an enrollee must also report all SSOs to the database. To begin a new spill report, the enrollee selects the “Reporting New SSO” link from the SSO menu. Then, the enrollee enters the information requested on the form. A spill report can exist at several different levels of completion: “work in progress”, “draft”, “ready to certify”, and “certified”. A “work in progress” SSO report is a preparatory draft of the report with limited required information and is intended only for the enrollee’s use. To save a spill report as a “work in progress”, the enrollee selects the “Save Work in Progress” button on the “SSO – General Information” screen. A SSO report in “draft” status is a working draft of the report with more required information than “work in progress” status. By submitting a report in “draft” status, the enrollee fulfills the initial, uncertified reporting requirement for a Category 1 spill. The enrollee selects the “Submit Draft” button on the “SSO – General Information” screen to submit a report as a “draft”. Once the spill report contains all the required information, it can be submitted for certification by selecting the “Ready to Certify” button on the “SSO – General Information” screen. A “ready to certify” SSO report that is complete and accurate is certified by the enrollee through first selecting the “Modify Existing SSO” link on the SSO menu. Then, the spill report to be certified must be located by using the “SSO – Search” screen. Next, the “Certify” button on the “SSO – General Information” screen for the specified report is selected. Finally, the report is certified by selecting the “Certify” button on the “SSO – Certifying an SSO Report” screen. The database will then display a confirmation of the report certification. An enrollee has fulfilled the final, certified reporting requirement for a Category 1 or Category 2 spill by submitting a certified report in the SSO database. A spill report can be submitted directly as “ready to certify” without being submitted as a “work in progress” or “draft”, assuming the enrollee has entered all the necessary information.

When submitting a spill report, the enrollee can add supporting documentation such as pictures and reports by using the “Attachments” tab on the “SSO – General Information” screen. Additionally, the enrollee can include details about related parties (e.g., fire or police department responders) by selecting the “Spill Related Parties” tab on the “SSO – General Information” screen.

A “certified” SSO report can be modified by an enrollee to correct or add information, if necessary. To do this, an enrollee begins by locating the “certified” spill report through the “SSO – Search” screen after selecting the “Modify Existing SSO” link on the SSO menu. The “Amend” button on the “SSO – General Information” screen for the designated “certified” SSO report is then selected. The spill report is returned to “Submit Draft” status and can be modified. Finally, the spill report needs to be re-certified after the necessary modifications have been completed.

If a sanitary sewer system doesn’t have any SSOs for an entire calendar month, a “no spill certification” must be submitted (“Generate No Spill Certification” link from the SSO menu) by the enrollee. A “no spill certification” must be submitted within 30 calendar days after the end of each calendar month in which no spills occur. The database will display a confirmation of the “no spill certification” when completed.

The SSO database automatically sends email notifications to interested parties when spill reports are generated. When a SSO report is submitted in “draft” form (“Submit Draft” button selected) for the first time, an email notification is sent to the enrollee, responsible Regional Water Quality Control Board, and County Health Official (if known – this is a courtesy and not required by the Sanitary Sewer Order). Every time a report is submitted as ready for certification (“Ready to Certify” button) or certified (“Certify” button) results in email notifications being sent to the enrollee, responsible Regional Water Quality Control Board, and County Health Official (if known – this is a courtesy and not required by the Sanitary Sewer Order). However if a SSO report is saved as a “work in progress” (“Save Work in Progress” button), no email notifications are generated because the report is preliminary and only intended to be viewed by the enrollee.

As for database use by an enrollee, there are two levels of access available to staff entering the information: legally responsible officials (LROs) and data submitters. LROs have full access to enter information and certify spill reports. Data submitters, on the other hand, only have authority to enter information - they can’t certify SSO reports, including a “No Spill Certification”. An enrollee can have multiple LROs and data submitters to enter the necessary information into the SSO database for their sanitary sewer system.

Part 1: Logging in and Changing Personal Information.

To get you started we are going to show you how to log into the system and how to make changes to your personal information. While these are very basic tasks it is one of the best beginner demonstrations to the module system in CIWQS and it will introduce you to the methods with which all information is changed in the system.

User roles that need to review this section: All

1. Start by going to the CIWQS login screen at: http://ciwqs.waterboards.ca.gov/.

2. Once the page loads enter your CIWQS username into the "User ID:" field and your password into the "Password:" field.

3. Press "Login".

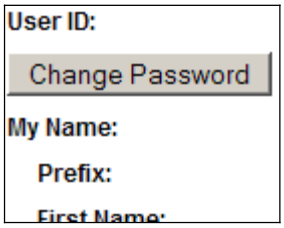
4. After you press "Login" the CIWQS main menu will appear. Depending on your access you will be provided with the links to various CIWQS modules. Including but not limited to:

    - Submit/Review a Self Monitoring Report (SMR)
    - Run Reports
    - View/Change My Personal Information
    - Create/Maintain Places
    - Create/Maintain Parties
    - Create/Maintain Regulatory Measures
    - Create/Maintain Violations
    - Create/Maintain Inspections
    - Create/Maintain Invoices
    - GeoWBS Online Editor
    - Map It!
    - Administer System
    - SSO

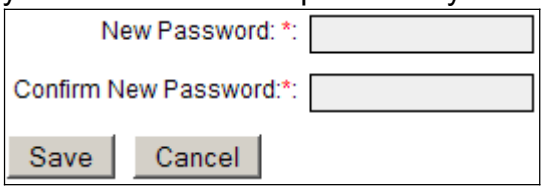
5. Select the "View/Change My Personal Information" module hyperlink.

6. You will be taken to the Personal Information page, here you can update your contact information, add a new facility, change your password, or request a more serious change.

7. Let's start with changing your password. To change your password; press the "Change Password" button.



8. After pressing “Change Password” you will be taken to a new screen asking you to enter the new password you have chosen twice.



9. Once you have entered your new password press “Save”.

10. After pressing “Save” you will be asked to verify that you wish to save, press “Ok”.

11. You will be returned to the personal information screen. If you scroll down a little you can view all of your contact information.

12. If you make any changes to your contact information they have to be saved by pressing the “Save Changes” button at the bottom of the page.

13. After pressing “Save Changes” you will see a screen verifying that your changes were logged. You will also be provided with two hyperlinks. Press the first “here” hyperlink to return to the personal information screen.

14. To request another change to your account that you don't have access to make yourself press the "Request Another Change" button near the bottom of the view/change my personal information page.

15. After pressing the button your computer's email client will launch a new email window with the CIWQS Help Center email address in the "To:" field. Describe the change you wish to have made to your account and send the email. Be sure to include your name and username.

16. We are now done with this module; press the "Menu" hyperlink available at the top right corner of the page to return to the CIWQS main menu.

Part 2: Completing the SSO Collection System Questionnaire

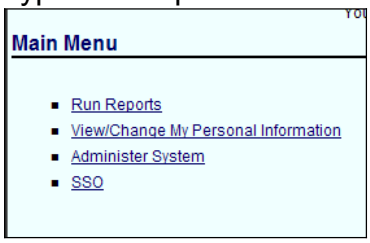
One of the first things that must be done by an enrollee is to complete the Collection System Questionnaire. For the new Sanitary Sewer Order the State has decided that instead of including a questionnaire with the Notice of Intent form they will require this online questionnaire to be filled out for each facility. This is a better system than the old one because employees at each facility can easily update the questionnaire at any time if something changes.

Note: All fields in this section, with the exception of one dropdown, are for numeric characters only. Also, the questionnaire must be updated every twelve months but can be modified more often if the enrollee desires.

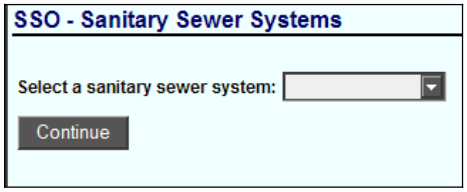
User roles that need to review this section: LRO

1. If you are not already logged into the CIWQS system proceed to this URL http://ciwqs.waterboards.ca.gov/ and login.

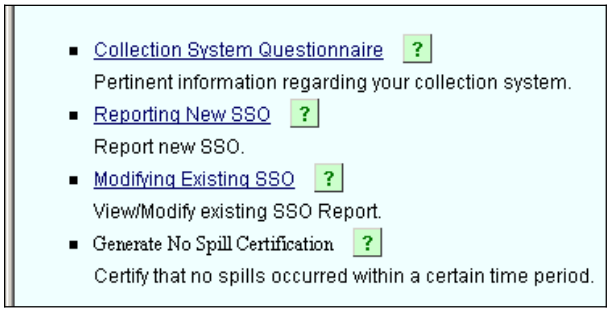
2. After logging in you will see the CIWQS main menu. Select the "SSO" hyperlink to proceed to the SSO module.



3. Upon entering the SSO module you will be required to select the collection system you wish to submit information for from the "Select a Sanitary Sewer System:" dropdown. After selecting the appropriate system press the "Continue" button.

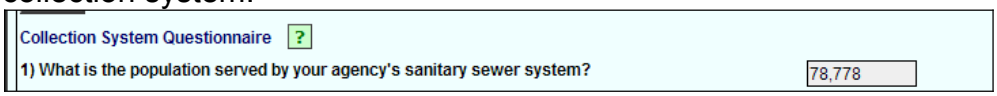


4. When a collection system has been selected you will be taken to the SSO main menu. At the top of this menu will be the "Collection System Questionnaire" hyperlink. Select that hyperlink.

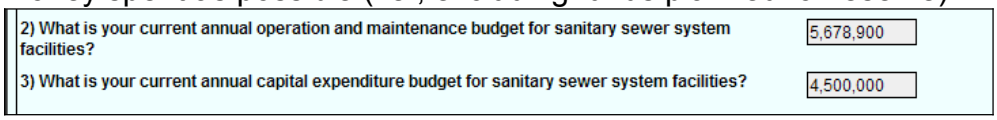


5. You will be taken to the collection system questionnaire page. It has a series of fields that need to be filled in with current information from your facility.

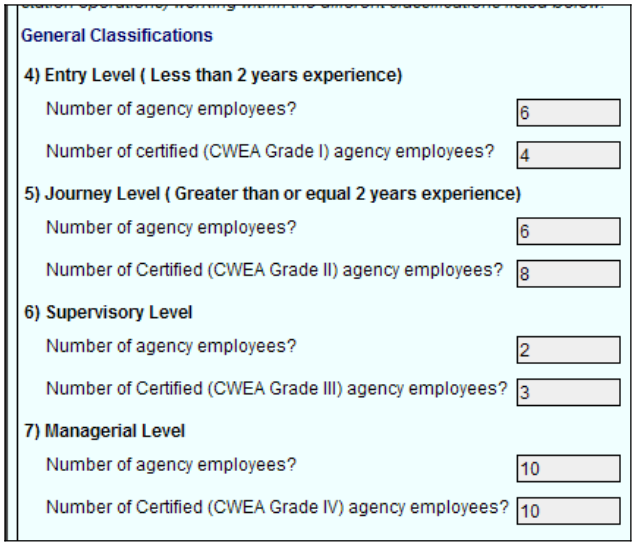
6. Question 1 requires you to enter the number of people served by your collection system.



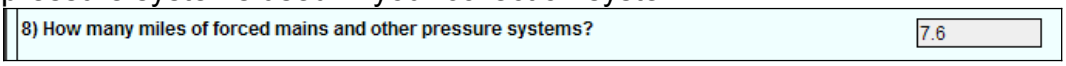
7. Questions 2 and 3 require annual budget information for the collection system. The values entered should be as close to the actual amount of money spent as possible (i.e., excluding funds planned for reserve).



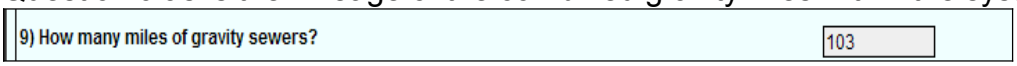
8. Sections 4 through 7 require you to enter number of employees you have in each of four experience levels and the number of employees in each of the four grades of California Water Environment Association (CWEA) collection system operator certification. There is no dependent relationship between these two numbers. For example, an enrollee can potentially have more Grade I certified employees than the total number of employees with less than 2 years experience. The number of employees can be entered as fractional values, if necessary (e.g., 1.5).



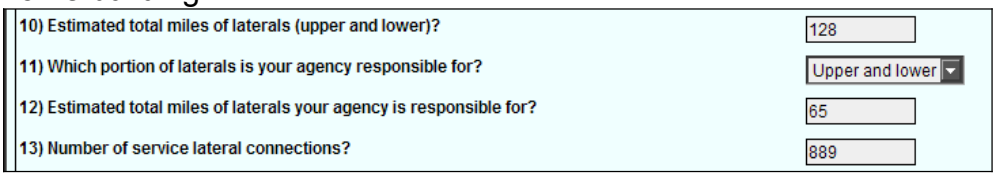
9. Question 8 requires you to enter the number of miles of forced mains and pressure systems used in your collection system.



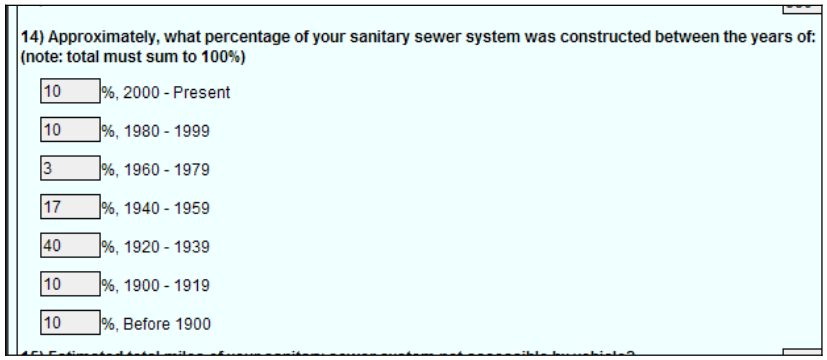
10. Question 9 asks the mileage of the combined gravity lines within the system.



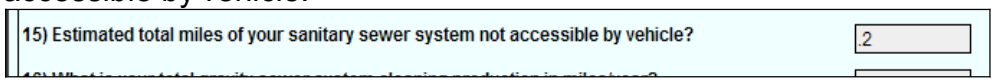
11. Questions 10 through 13 require information about the sewer laterals within the collection system. Including: their total mileage, the portion your agency is responsible for, the total mileage of that portion, and the number of service connections. The responsibility for maintaining a lateral can be split between the enrollee and private property owner. The terms “upper” and “lower” lateral indicates this. The enrollee would be responsible for the “lower” lateral section, which is connected to the main, and the private property owner would be responsible for the “upper” lateral section, which is connected to the home/building.



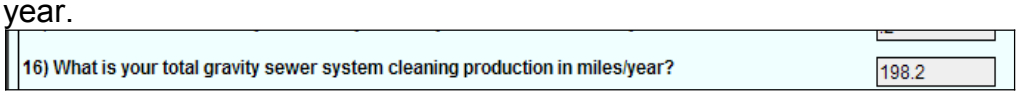
12. Section 14 is for you to enter what percentage of your collection system was constructed during various time periods. The total sum of the 7 fields in this section must equal 100.



13. Question 15 is for you to enter the total miles of your collection system that is not accessible by vehicle.



14. Question 16 requires the total mileage of the collection system that is cleaned per year.



15. Question 17 is for the total mileage of the collection system that is inspected per year.

16. Once all the fields are complete look back over the questionnaire to make sure that all of the information is accurate.

17. Your questionnaire is now complete. Press one of the “Save” buttons that can be found either at the bottom left or top left of the page.

Part 3: Creating and Editing an SSO

This section describes the core purpose of the SSO module; which is the ability to report SSOs online. Before the enrollee is able to complete this task they must have a completed Collection System Questionnaire. There are two types of SSOs, Category 1 and Category 2, and both of them will be discussed and demonstrated here.

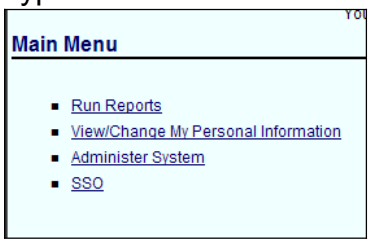
Note: In the SSO report screens only the fields with asterisks must be filled out before the report can be readied for certification or certified. This document goes over every field in the order they appear. Fewer fields must be completed to save a work in progress and to submit a draft. These mandatory fields are noted in the discussion below.

User roles that need to review this section: All

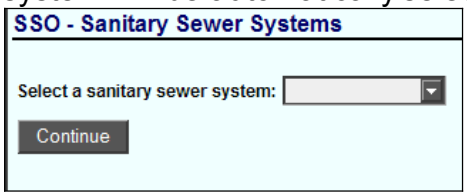
1. If you are not already in the system, proceed to the CIWQS Login page at: http://ciwqs.waterboards.ca.gov/.

2. Using your username and password log into the system.

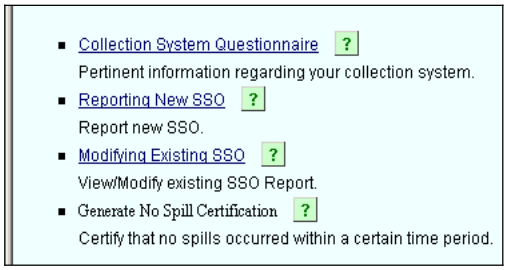
3. You will be taken to the CIWQS main menu. From that menu press the "SSO" hyperlink.



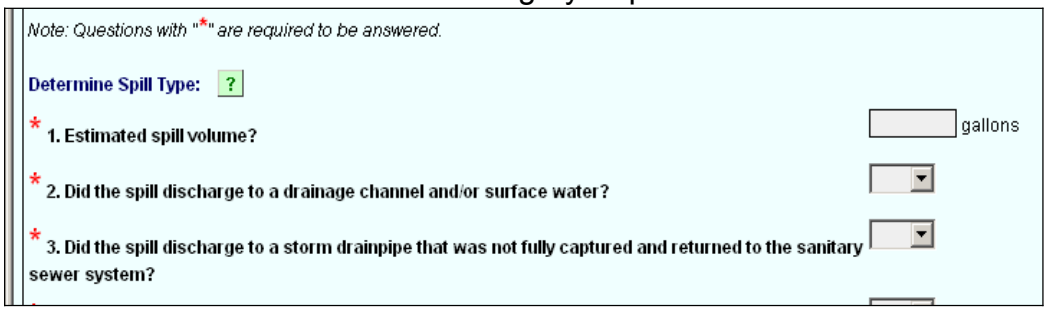
4. Upon entering the SSO module you will be required to select the sanitary sewer system (aka collection system) you wish to submit information for from the "Select a Sanitary Sewer System:" dropdown. After selecting the appropriate collection system press the "Continue" button. If your agency only has one collection system this screen will be bypassed and the collection system will be automatically selected.



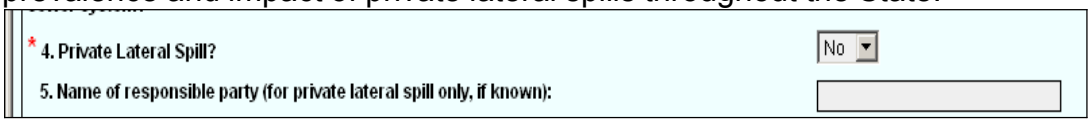
5. The SSO menu will appear. Press the "Reporting New SSO" hyperlink. It is the second one down on the page.



6. The first screen in reporting a new SSO helps you determine whether or not the SSO is a Category 1 or a Category 2 spill.
   a. If you answer yes to questions 2 or 3 and/or the spill amount is over 1000 the event is considered a Category 1 spill.
   b. If you answer no to both questions and the spill amount is under 1000 the event is considered a Category 2 spill.

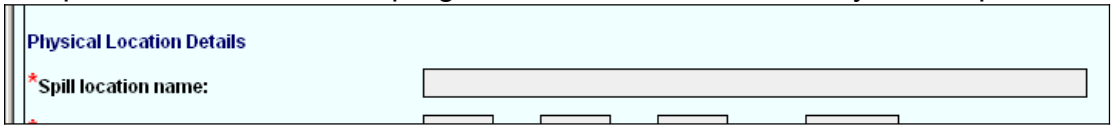


7. After entering your information in those three fields select whether or not the spill was a private lateral spill. If it was, list the responsible agency in the box provided. The reporting of private lateral SSOs is voluntary, based on the terms of the Sanitary Sewer Order, but enrollees are strongly encouraged to do so. This additional information will provide a better understanding of the prevalence and impact of private lateral spills throughout the State.

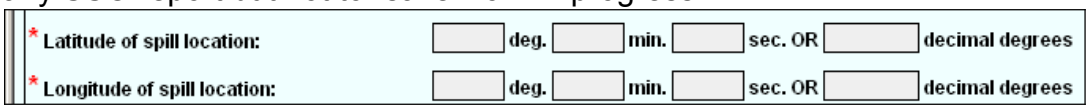


8. Check to make sure the information you entered is accurate then press the “Continue” button.

9. The SSO General Info tab will appear. Start by entering the name of the location where the spill occurred in the “Spill Location Name:” field. This entry should be a general descriptor of the spill location (e.g., street address, intersection, or manhole number). The “Spill Location Name:” field must be completed to “save work in progress” or “submit draft” for any SSO report.

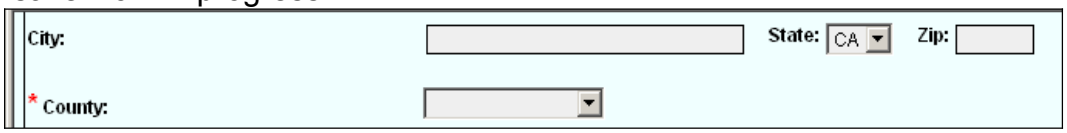


10. Enter the latitude and longitude of the spill location. Using a handheld GPS unit or referencing a web-based mapping site such as earth.google.com can determine this information. This field must be completed to “submit draft” for any SSO report but not to “save work in progress”.

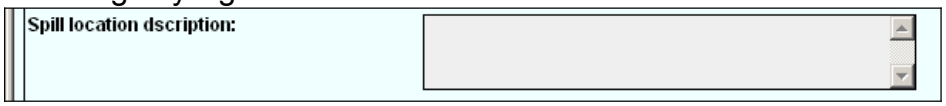


11. Enter the street address of the spill location and a cross street, if there was one.

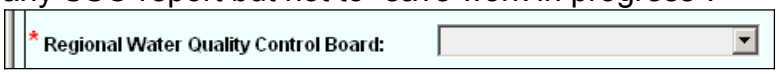
12. Enter the City, State, Zip, and county of the spill site in their corresponding fields. These fields can be found just above the “Location Description” field. This field must be completed to “submit draft” for any SSO report but not to “save work in progress”.



13. Enter a description of the spill site in the “Spill Location Description:” field. This field is optional and allows for a detailed description of the spill site including any significant characteristics or considerations.

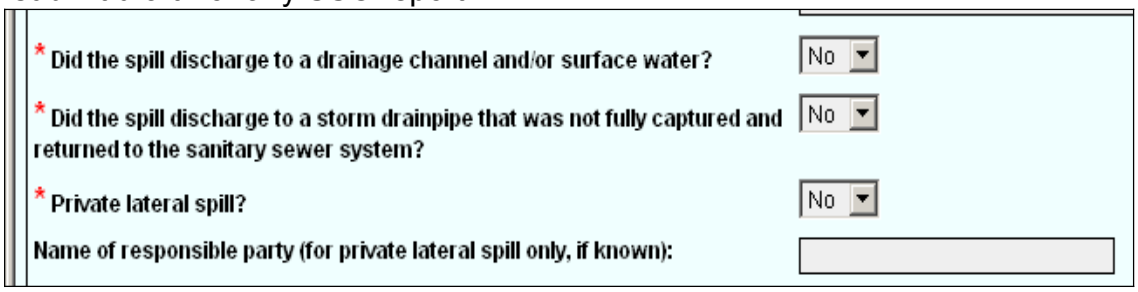


14. Select the region in which the spill occurred from the “Regional Water Quality Control Board:” dropdown. This field must be completed to “submit draft” for any SSO report but not to “save work in progress”.

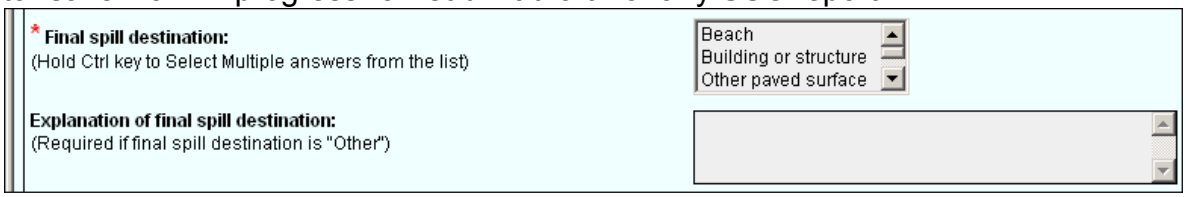


15. Select the spill appearance point from the “Spill Appearance Point:” dropdown. If you selected “other” you are required to enter a description in the text box available immediately below this field. The “Spill Appearance Point:” is where wastewater first surfaced on the spill site. This field must be completed to “submit draft” for any SSO report but not to “save work in progress”.

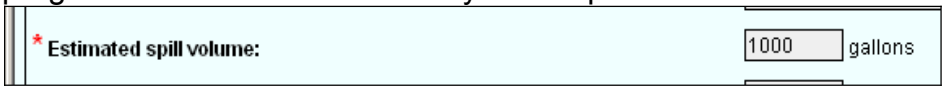
16. The next four questions were answered in step 6 when you were determining your spill type. If, at any time, you need to change the answers you can do so in this screen. These fields must be completed to “save work in progress” or “submit draft” for any SSO report.



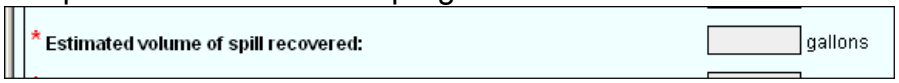
17. Select the final destinations of the spill in the “Final Spill Destination:” box. Hold CTRL on your keyboard if you wish to select multiple. If “other” was among your selections you are required to enter an explanation in the available text box. The “Final Spill Destination:” describes the areas that wastewater flowed through and ultimately reached, which means multiple entries can be selected if necessary. This field doesn’t need to be completed to “save work in progress” or “submit draft” for any SSO report.



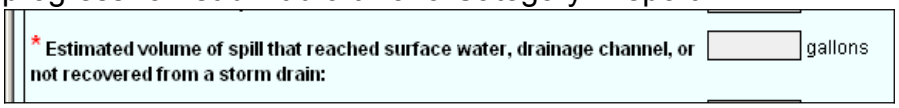
18. The field “Estimated Spill Volume:” was completed when determining your spill type. If, at any time, this number changes you can return to this screen and update the information. This field must be completed to “save work in progress” or “submit draft” for any SSO report.



19. **This field will only appear if the spill is a Category 1.** It requires you to enter the volume of the spill that was recovered. This field doesn’t need to be completed to “save work in progress” or “submit draft” for a Category 1 report.



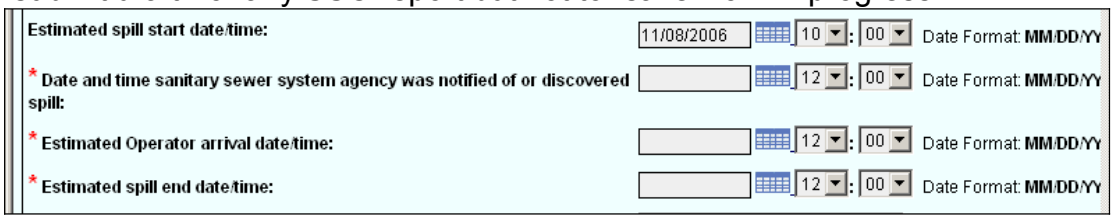
20. **This field will only appear if the spill is a Category 1.** Enter the volume of the spill that reached surface water, drainage channel, or was not recovered from a storm drain. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.



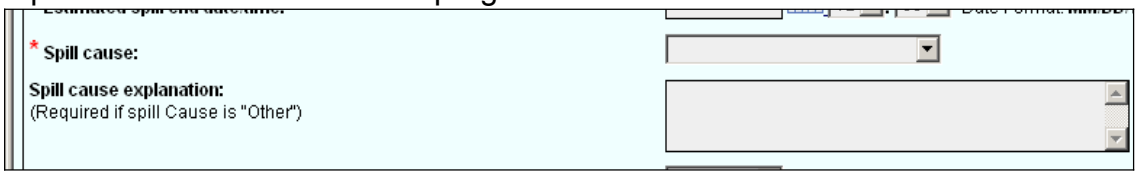
21. If the spill is still occurring enter the current spill rate.

22. The next four fields require you to enter date and time information:
    a. Enter the "Estimated Spill Start Date/Time"
    b. Enter the Date/Time your agency discovered or was notified of the spill.
    c. Enter the "Estimated Operator Arrival Date/Time"
    d. Enter the "Estimated Spill End Date/Time"

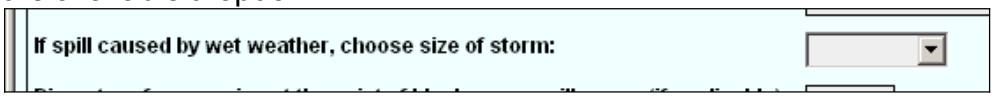
    Item (a) above must be completed to "save work in progress" or "submit draft" for any SSO report. Items (b), (c), and (d) above must be completed to "submit draft" for any SSO report but not to "save work in progress".



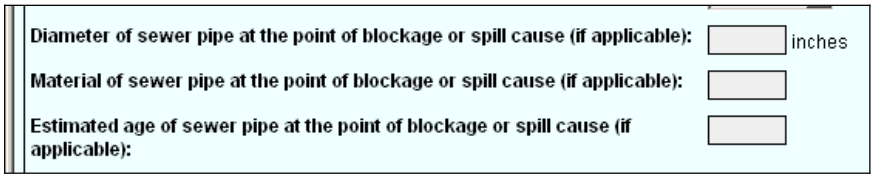
23. Please select a cause for the spill from the available dropdown. If the cause you selected was other you are required to enter an explanation in the available text box. This field must be completed to "submit draft" for any SSO report but not to "save work in progress".



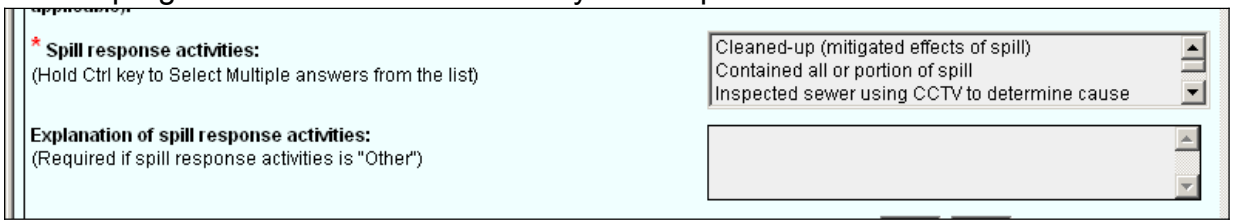
24. If the spill was cause by wet weather please select the size of the storm from the available dropdown.



25. If applicable to the spill cause you selected, the next three fields ask information about the point of blockage for the pipe or spill cause. The information asked is the diameter (in inches) of the pipe, the material of the pipe, and the age of the pipe. For material of pipe, abbreviations such as PVC and VCP are acceptable.



26. In this field, please enter the response activities that your agency initiated because of the spill. If your selection is other, you are required to enter an explanation of the activities. This field doesn't need to be completed to "save work in progress" or "submit draft" for any SSO report.



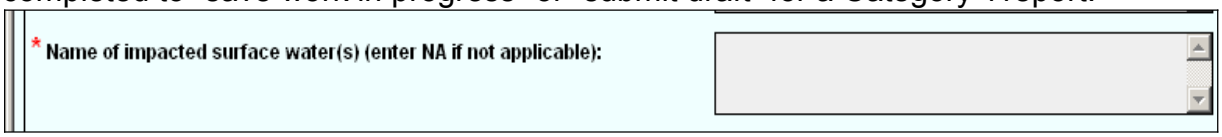
27. **This field will only appear if the spill is a Category 1.** This field requires the user to enter the date/time they completed their spill response activities. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.

28. The user can enter a description of the visual inspection results from the impacted receiving water.

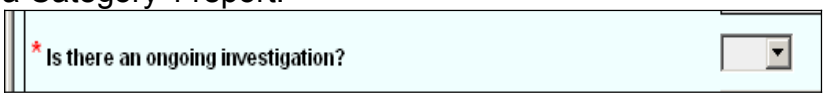
29. **This field will only appear if the spill is a Category 1.** Select whether or not health warnings were posted because of the spill. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.

30. **This field will only appear if the spill is a Category 1.** Enter the names of any and all beaches that were impacted by the spill. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report

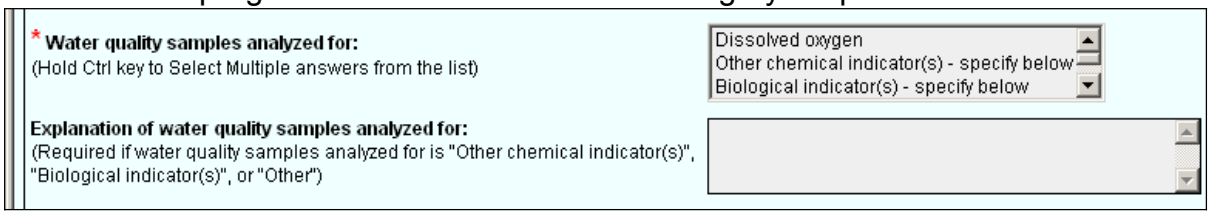
31. **This field will only appear if the spill is a Category 1.** Enter the names of any and all surface waters impacted by the spill. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.



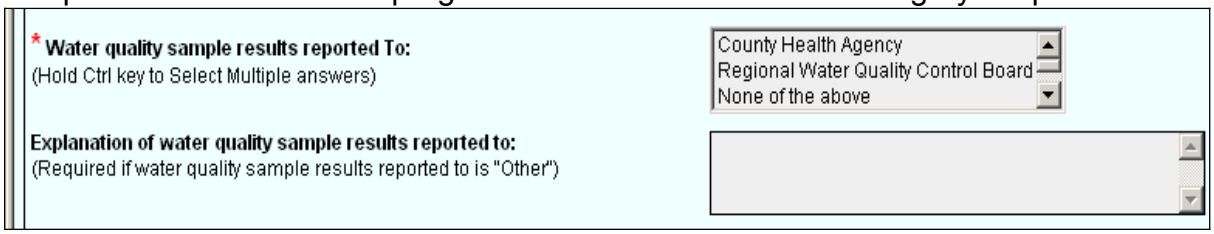
32. **This field will only appear if the spill is a Category 1.** Choose whether or not there is an ongoing investigation concerning the spill event. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.



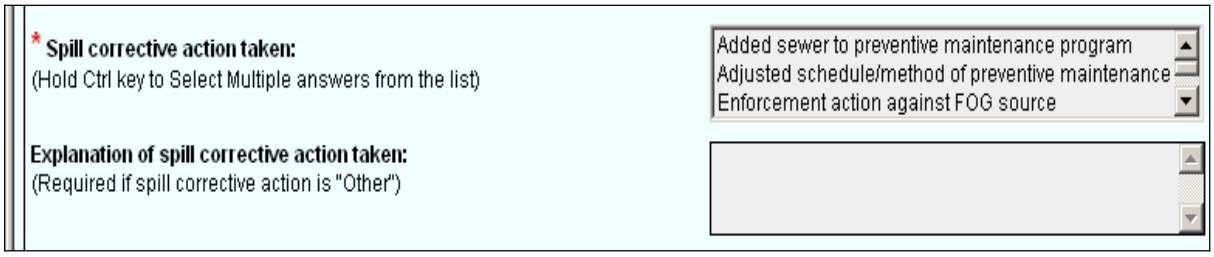
33. **This field will only appear if the spill is a Category 1.** Select what the water quality samples taken from the spill were analyzed for. Hold CTRL to select multiple. Please note that some selections require a description to be entered in the accompanying text field. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.



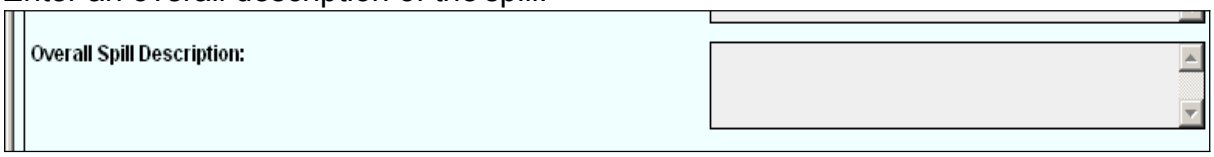
34. **This field will only appear if the spill is a Category 1.** Select which agencies the results of the water samples were reported to. Hold CTRL to select multiple. Please note that a selection of "other" requires a description to be entered in the accompanying text field. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.



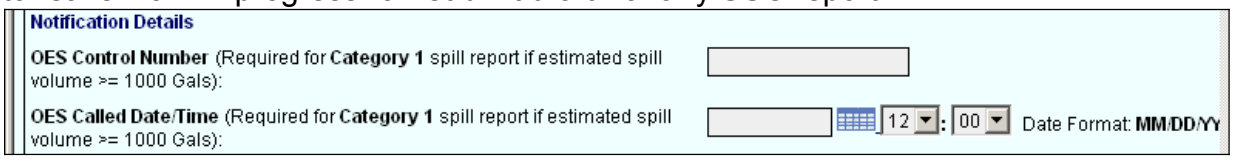
35. **This field will only appear if the spill is a Category 1.** Select which corrective actions were taken by your agency in response to the spill. Hold CTRL to select multiple. Please note that a selection of "other" requires a description to be entered in the accompanying text field. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.



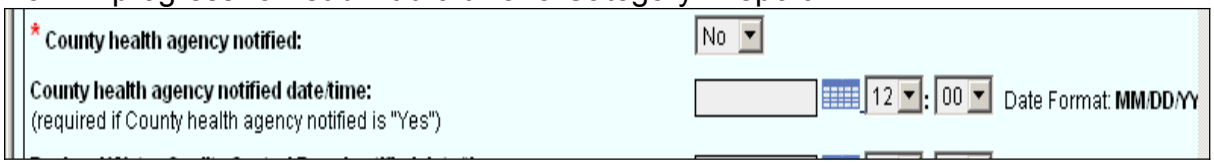
36. Enter an overall description of the spill.



37. Enter the OES Control Number for your agency and the date/time you notified OES of the spill. This field must be completed to "ready to certify" or "certify" a Category 1 report if the estimated spill volume is greater than or equal to 1,000 gal and wastewater reached a drainage channel/surface water or storm drainpipe that was not fully captured. This field doesn't need to be completed to "save work in progress" or "submit draft" for any SSO report.



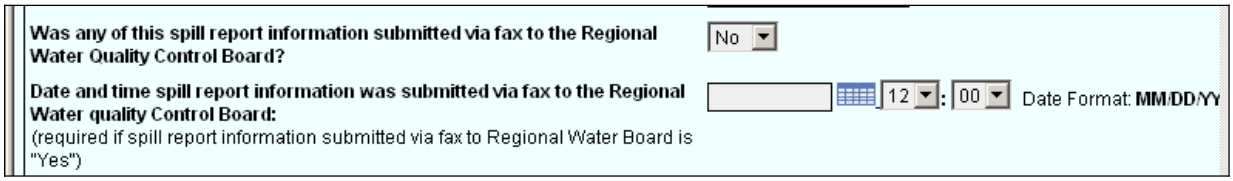
38. **These fields will only appear if the spill is a Category 1.** Select whether or not you notified your county health agency of the spill. If yes enter the date/time they were notified. This field doesn't need to be completed to "save work in progress" or "submit draft" for a Category 1 report.



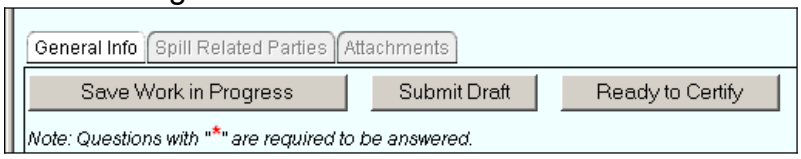
39. Enter the date and time that your Regional Water Quality Control Board was notified of the spill, if applicable. For example, some Regional Water Quality Control Boards require 24-hour notification of certain spills, which an enrollee can note was completed by entering the information in this field.

40. Enter the name of any other agency that was notified of the spill.

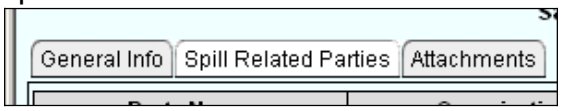
41. Select whether or not any of the information available in the report you just filled out was faxed to your Regional Water Quality Control Board. If some of the information was faxed, enter the date/time the fax was sent in the accompanying field. The Sanitary Sewer Order requires spill report information to be faxed to the responsible Regional Water Quality Control Board if the SSO database is not available for the enrollee to meet the applicable reporting deadline. When the SSO database becomes available, the enrollee must enter all faxed information into the SSO database.



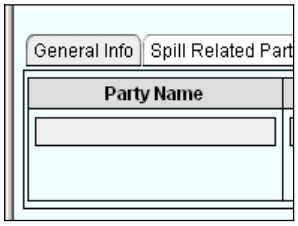
42. The “General Info” tab of your SSO report is now complete. Press the “Save Work in Progress” button.



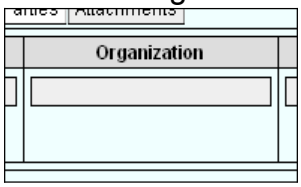
43. Select the “Spills Related Parties” tab. The purpose of this tab is to list any private parties who may have caused, contributed to, or were impacted by the spill.



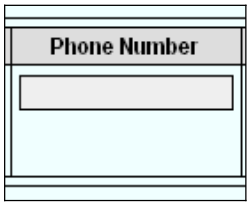
44. Enter the names of any individual or representatives in the “Party Name” field.



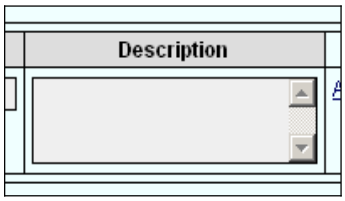
45. Enter the organization name in the “Organization” field.



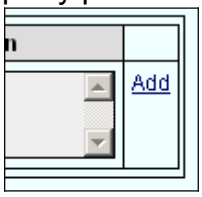
46. Enter a number at which the part can be reached in the “Phone Number” field.



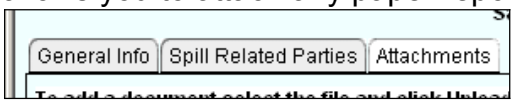
47. Enter a description of how the party is related to the spill in the “Description” field.



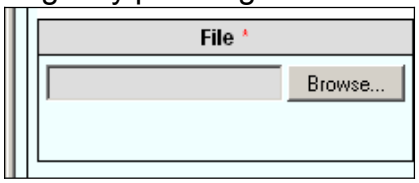
48. Once all of the information is complete for a party press the “Add” hyperlink to the right of the “Description” field. The information will be saved and you will then be allowed to enter another party. If, at any time, you wish to remove a party press the “Delete” hyperlink.



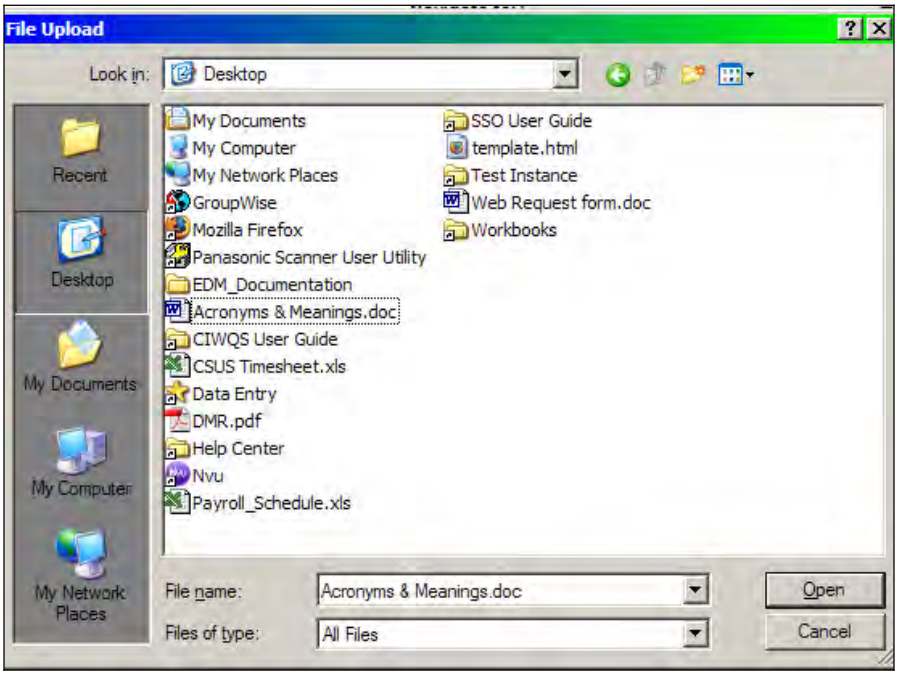
49. When you are finished adding parties select the “Attachments” tab. This tab allows you to attach any paper reports, pictures, diagrams, etc. of the spill.



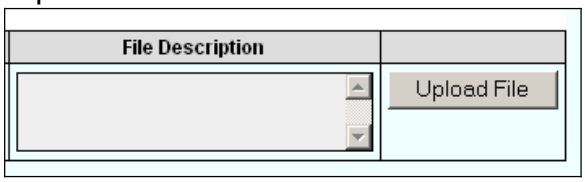
50. Begin by pressing the “Browse” button.



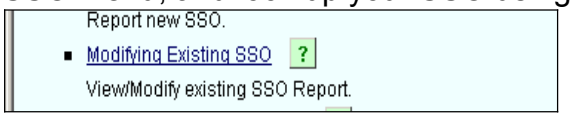
51. A file search window will appear. Locate the file you wish to attach, select it and press the “Open” button.



52. You will be returned to the attachments screen. Enter a brief description of the file you will be uploading into the “File Description” field and press the “Upload File” button.



53. Your SSO Spill report is now complete. If at any time you wish to edit the report before you certify it select the “Modify Existing SSO” hyperlink from the SSO menu, and look up your SSO using one of the available search fields.



54. To learn how to save drafts and certify your report proceed to the next section of this document.

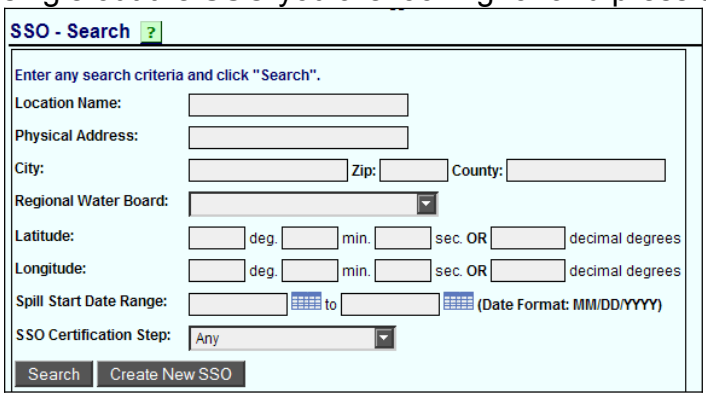
Part 4: Submitting Drafts and Certifying an SSO

When the agency begins submitting drafts the system will start tracking all the changes made to certain fields. When the agency decides that it is ready to certify the SSO the Legally Responsible Official will have to finish the last few screens.

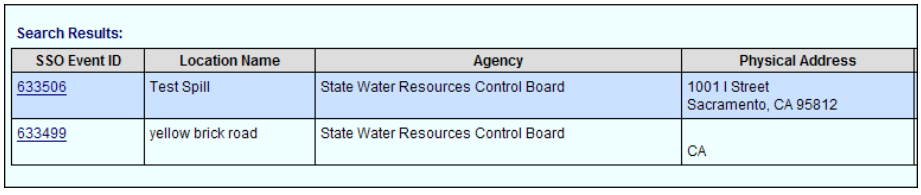
User roles that need to review this section: All, Certification LRO specific.

1. From the SSO main menu select the “Modify Existing SSO” hyperlink.

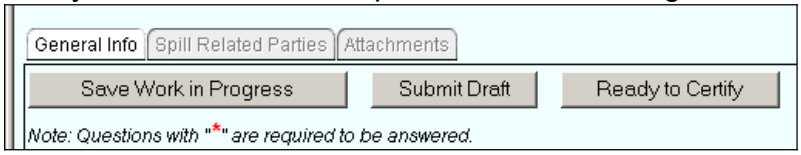
2. You will be taken to the SSO search screen. Enter any information that will single out the SSO you are looking for and press the “Search” button.



3. You SSO will appear. There will be a hyperlink in the “SSO Event ID” column, select it.



4. The SSO General Info tab will appear. If you press the “Submit Draft” button the system will save the report and start tracking version numbers.

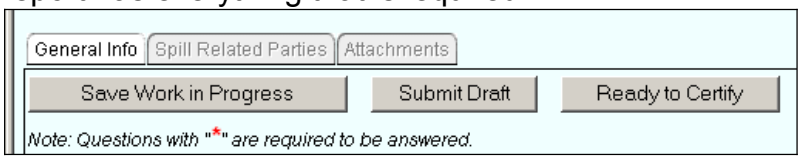


5. Every time you submit a new draft a new version number will be created and any changes to certain fields will be tracked. Click on any of the “View History” hyperlinks to see a history of the changes for these fields.

Close Window

SSO Event ID	Version	Current Spill Amount	Date Entered	User Info
601730	**8**	**28**	**12/05/2005**	**Nick Arhontes (narhontes)**
601730	7	34	12/05/2005	Nick Arhontes (narhontes)
601730	6	36	12/05/2005	Nick Arhontes (narhontes)
601730	5	36	12/05/2005	Nick Arhontes (narhontes)
601730	4	36	12/05/2005	Nick Arhontes (narhontes)
601730	3	36	11/28/2005	Nick Arhontes (narhontes)
601730	2	36	11/28/2005	Nick Arhontes (narhontes)
601730	1	36	11/28/2005	Nick Arhontes (narhontes)

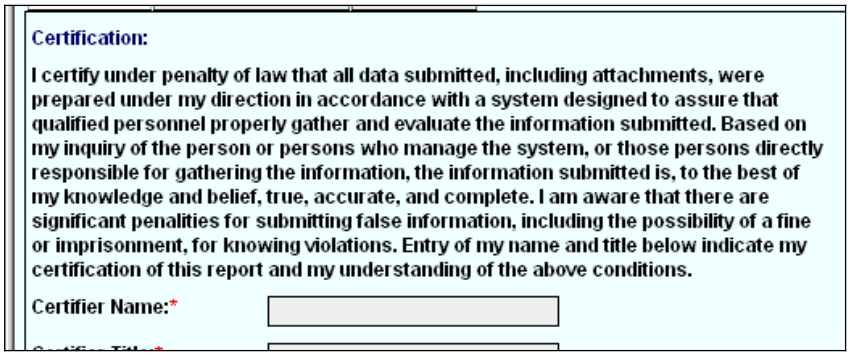
6. When you decide it is finally time to certify your SSO report press the “Ready to Certify” button. This will perform an error check and make sure that your report has everything that is required.



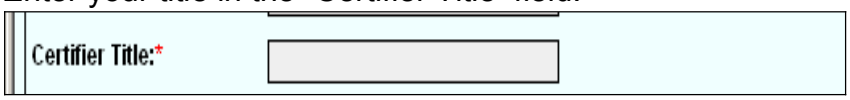
Note: Only the LRO can complete the rest of this section.

7. If the report passes the error check the “Certify” button will then become available. Press the “Certify” button.

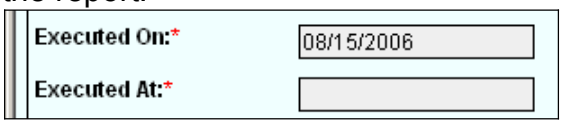
8. You will be taken to the Certification Screen. Start by entering your name in the “Certifier Name:” field.



9. Enter your title in the “Certifier Title” field.



10. The “Executed On:” field will be pre-populated with the date. Complete the “Executed At:” field, which indicates the location/office of the LRO certifying the report.



11. Once all four field are complete press the “Certify” button.

12. Your SSO report is now completed and submitted to the regional board. If at anytime you realize that some of the information has changed or is incorrect for some other reason you may look up the report and press the “Amend” button to reopen the report for editing. It will then have to be recertified.

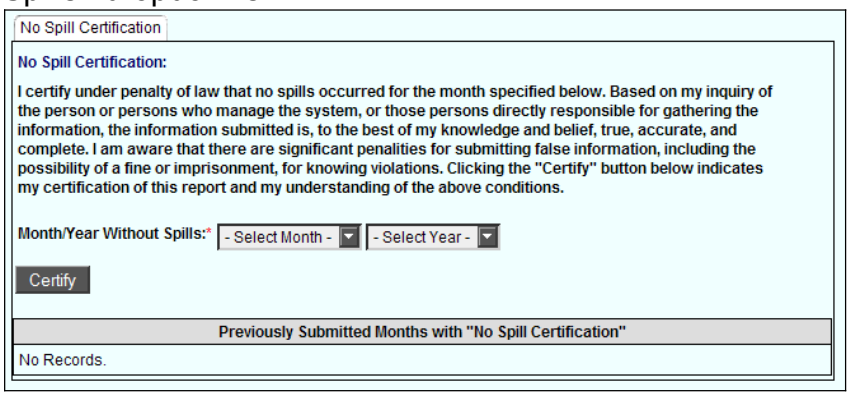
Part 5: No Spill Certification

Perhaps your agency doesn't have any spills to report for your period. That can be taken care of by completing no spill certification.

User roles that need to review this section: LRO

1. From the SSO main menu select the "Generate No Spill Certification" hyperlink.

2. The no spill certification section is only two dropdowns and a certification page. Select the period you didn't have a spill from the "Month/Year Without Spills:" dropdowns.



3. Press the "Certify" button.

4. No spill certification is now complete.

PORTABLE AERATION REPORT

Prepared for:

ORANGE COUNTY SANITATION DISTRICT

September 30, 2005

Prepared by:

BROWN AND CALDWELL
400 EXCHANGE, SUITE 100
IRVINE, CALIFORNIA 92602

Acknowledgements

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ABBREVIATIONS / ACRONYMS

CSIL	California Spatial Information Library
DO	Dissolved Oxygen
GIS	Geographical Information System
HDPE	High Density Polyethylene Pipe
OCSD	Orange County Sanitation District
PAP	Portable Aeration Plan
RWQCB	Regional Water Quality Control Board
SCFM	Standard Cubic Feet per Minute
SOTE	Standard Oxygen Transfer Efficiency
SSO	Sanitary Sewer Overflow
SWRCB	State Water Resources Control Board
TSMP	Trunk Sewer Mapping Project
WDR	Waste Discharge Requirements

INTRODUCTION AND REGULATORY FRAMEWORK

In April 2002, the Santa Ana Regional Water Quality Control Board (RWQCB) adopted General Waste Discharge Requirements (WDRs) for the sewage collection agencies in Orange County under RWQCB's jurisdiction (Order No. R8-2002-0014). The primary objective of this Order is to reduce the number of sanitary sewer overflows (SSOs) in the Santa Ana region and thereby reduce the number of impacted waterways.

An SSO is defined as sewage that is discharged from the sanitary sewer collection system prior to reaching the wastewater treatment plant. Because the raw sewage has not yet been treated, SSOs can contain disease-causing microorganisms, human waste, toxic pollutants, environmental nutrients such as nitrates and phosphates, oil and grease, and other contaminants. If left uncontained, SSOs can potentially cause significant environmental, water quality, and economic damage.

The specific language within the permit that addresses the requirement for the implementation of a Portable Aeration Plan (PAP) to address oxygen depletion in surface waters due to SSOs is as follows:

> Section C (Provisions), Part 12 (SSMP), subpart vii (Overflow Emergency Response Plan), paragraph G - *"Develop and implement a plan for the use of portable aerators where complete recovery of the sanitary sewer overflows is not practicable and where severe oxygen depletion in existing surface waters is expected"*

As stated in the permit, if severe oxygen depletion in a body of water is expected, portable aerators are to be used to help the impacted water body recover from depleted dissolved oxygen (DO) levels.

Figure 1. OCSD Service Area

OCSD and the named dischargers are regulated by the State Water Resources Control Board and its local authority, the Santa Ana Regional Water Quality Control Board (RWQCB), along with the federal and regional Environmental Protection Agency (EPA), for its discharges to surface waters. The regulations and resulting permits and orders require that all dischargers develop and implement management programs that, among other things, prevent the discharge of untreated sewage, report and respond to possible SSOs, and, should they occur, reasonably ensure capture of SSOs and attempt to restore the affected environment.

This report presents the findings from an initial study of tools and resources necessary for the development of a PAP.

ESTABLISHING GUIDELINES FOR PAP IMPLEMENTATION

The objective of portable aeration is to oxygenate or aerate the surface waters depleted by an SSO. The permit does not clearly state when a PAP is to be implemented; it only provides a guideline to use portable aerators when severe oxygen depletion is expected. This section establishes specific guidelines for implementation of a PAP.

Minimum DO Level

Per the WDR permit, a PAP will need to be implemented in case of severe oxygen depletion. In order to define "severe oxygen depletion" a minimum oxygen level needs to be defined. According to RWQCB's Region 8 Basin Plan, the minimum levels of DO needed to sustain healthy aquatic life are 5 mg/L for warm waters and 6 mg/L for cold waters. The RWQCB defines warm waters and cold waters as those that are in inlet areas and mountainous areas, respectively; no other specific information is provided. Within OCSD's service area, all surface waters fall into the warm waters category, and therefore only the DO level of 5 mg/L applies.

DO levels that are below 1-2 mg/L for even a few hours can result in large fish kills. A polluted water source will need to be aerated until the measured DO level returns to a healthy level in order to prevent environmental damage.

Defining Surface Water

The WDR requires permittees to use portable aerators where severe oxygen depletion occurs in existing surface waters due to an SSO. Although surface waters can be interpreted in numerous ways, it is defined here to mean waters of the state. The State Water Resources Control Board (SWRCB) defines waters of the state as any surface water or groundwater supply, including saline waters, within the boundaries of the State. Although SWRCB extends waters of the state as far as water collected on the side of a street, for a PAP, it is understood that a PAP will be only implemented for bodies of water with aquatic life. A list of all the waters of the state in Orange County was obtained from the RWQCB and can be found in Appendix A.

Map Development

The list of waters of the state in Appendix A includes sources both inside and outside of the OCSD service area. Using a filtering process, the information was limited only to those waters of the state located within OCSD's service boundary. First, using data obtained from the OCSD Geographical Information System (GIS) and the California Spatial Information Library (CSIL), a GIS county map showing all waters of the state was developed ("Layer 1"). Specifics of the data set obtained from OCSD and CSIL are summarized in Table 1.

Table 1. Orange County GIS Water Data

Source	File Name		Brief Description
OCSD			
	Hydro_L	-	Contains washes, creeks, canyons, and rivers within OCSD service area.
	Hydro_P	-	Contains reservoirs, dams, ponds, lakes, basins, and bays within OCSD service area.
CSIL			
	hyda_059	-	Contains bays, lakes, basins, channels, creeks, ponds, reservoirs, and rivers in Orange County.
	hydl_059	-	Contains creeks, channels, bays, washes, canyons, and rivers in Orange County.

The OCSD data set was limited to waters within the OCSD service area, and the CSIL data set contained all waters in Orange County. Both data sets were mapped using Arc Info® 8.0 to check for consistency between the two data sets. If one data set missed a data point, then the other data set was used to fill that data set.

To isolate waters within OCSD's service area, a second layer ("Layer 2") showing OCSD's service area boundary was overlaid onto the GIS county map (Figure 2). This process was verified through the use of an additional layer ("Layer 3"), an aerial image, which ensured that the data sets were complete and that no water supplies had been improperly excluded.

Figure 2

Identification of Impoundments

After identifying and mapping the waters within the OCSD service area, the next step was to locate and identify impoundments. A PAP will only be implemented for identified impoundments. In case of flowing waters, the contaminated water will naturally be flushed, so aeration will not be required. To identify impoundments, all flowing waters (e.g., rivers, channels, creeks, etc.) were identified and separated from the map, and a map of impoundments within OCSD's service area was created. Figure 3 shows a part of the created map for the Anaheim area. In the figure, dark blue represents running water, and light blue identifies impoundments. Streets are overlaid to provide directions to those impoundments. A list of these impoundments within OCSD's service area is presented in Table 2. These impoundments contain a sufficient volume of water and have the potential to receive SSOs either from a direct SSO or from an overflow that enters the storm drainage system and discharges to the body of water.

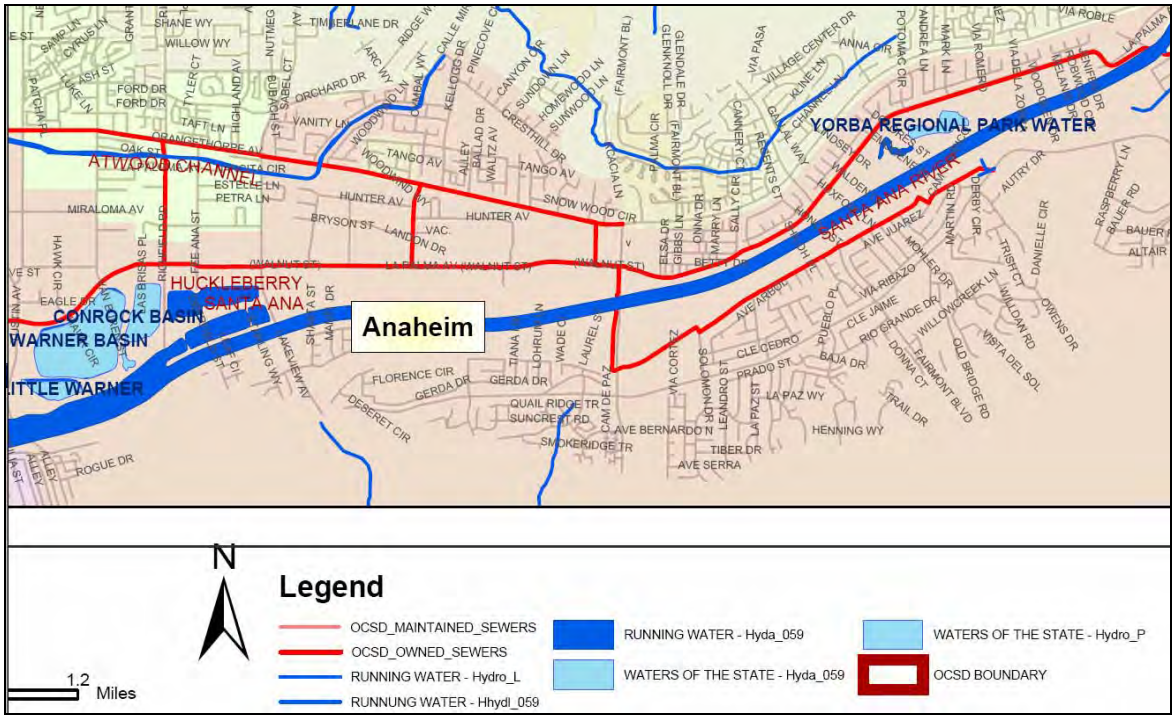


Figure 3

Table 2. Impoundments within OCSD's Service Area

o ANAHEIM BAY	o LITTLE WARNER
o ANAHEIM LAKE	o LOWER PETERS CANYON RESERVOIR
o ANAHEIM UNION RESERVOIR	o MILLER BASIN
o BARBARAS LAKE	o NEWPORT BAY
o BAY ISLAND	o NORTH LAKE
o BIG CANYON RESERVOIR	o OLIVE HILLS RESERVOIR
o BIRD ROCK	o ORANGE COUNTY
o BONITA RESERVOIR	o ORANGE COUNTY RESERVOIR
o BREA RESERVOIR	o PETERS CANYON RESERVOIR
o CARBON CANYON DAM	o PORTOLA RESERVOIR
o CITY OF BREA RESERVOIR	o RATTLESNAKE RESERVOIR
o CONROCK BASIN	o RAYMOND RETARDING BASIN
o CRESCENT BASIN	o SAN JOAQUIN RESERVOIR
o DRY RESERVOIR	o SAND CANYON RESERVOIR
o DUCK PONDS	o SANTIAGO CREEK RECHARGE BASIN
o EL TORO RESERVOIR	o SEAL ROCK
o HASTER RETARDING BASIN	o SIPHON RESERVOIR
o HUCKLEBERRY POND	o SOUTH LAKE
o HUNTINGTON HARBOUR	o SULLY MILLER LAKE
o IRVINE LAKE	o SULPHUR CREEK RESERVOIR
o KRAEMER BASIN	o UPPER NEWPORT BAY
o LAGUNA LAKE	o UPPER OSO RESERVOIR
o LAGUNO RESERVOIR	o VEEH RESERVOIR
o LAKE HUNTINGTON	o VILLA PARK DAM
o LAKE MISSION VIEJO	o VILLAGE POND
o LAKE SANTA MARGARITA	o WALNUT CANYON RESERVOIR
o LAKE TALBERT	o WARNER BASIN
o LAMBERT RESERVOIR	o WEST STREET BASIN
o LINDA ISLE	o YORBA LINDA RESERVOIR

Development of the Final Map

In order to be useful as a tool, the map needed additional details. For example, to properly locate the contaminated water and execute a PAP, the SSO response crew would need detailed information such as major cross streets, access points, surrounding information, and sewer lines. Therefore, the following layers were added to the map: city information ("Layer 4"), street centerline data ("Layer 5"), running waters ("Layer 6"), and OCSD sanitary sewer lines ("Layer 7"). Further details of each layer are shown in Table 3.

Table 3. Added Layers for the Final Map

Layer	Data	Source of Data	Description	Purpose
4	City Information	TSMP	Shows city names and boundaries	Show visual location of impoundments
5	Center Line Data	TSMP	Shows city street center lines and names	Label major cross streets near the impoundments
6	Running Waters	OCSD CSIL	Shows all running waters	Identify running waters leading to impoundments
7	OCSD Sewer Line	TSMP	Show OCSD owned and maintained sewer lines	Identify sewer lines near impoundments

With all of these layers added to the map, the map was unreadable and lacked to clarity to quickly identify and read the data points in the map. To rectify the clutter, and for a zoomed look at the impoundments, the map was divided into twelve quadrants, and each quadrant was mapped separately. The main key plan and detailed maps for each quadrant are provided in Appendix C. As an example of the information that can be seen in a quadrant map, Figure 4 is provided below. In this figure, as detailed in the legend, red lines indicate OCSD-owned sewer lines, blue lines are flowing waters, and black lines represent streets.

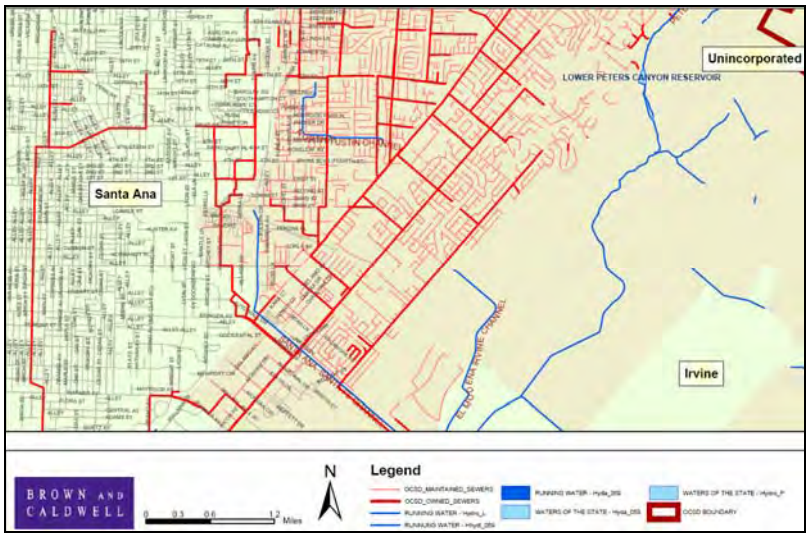


Figure 4

PORTABLE AERATION EQUIPMENT – SELECTION

Once the impoundments within OCSD's service area were located, identified, and mapped, the next step was to evaluate and select the aeration equipment. The following categories were considered in the aeration equipment selection process: portability, adaptability, safety, and effectiveness. Table 4 summarizes the selection criterion and describes each category in greater detail. After applying the predetermined evaluation criterion to various aeration procedures, three aeration processes were selected. After the final evaluation, one aeration process will be recommended for the PAP.

Table 4. Selection Criteria for Portable Aeration Equipment

Evaluation Categories	Remarks
Portability	Since the aeration equipment will not become a permanent fixture in the water, it must be portable. The response crew will need to easily transport the aerating equipment from site to site and to put it in storage when not in use.
Adaptability	The equipment must be easily adaptable for varying sizes and depths of water. Depending on the need, the aeration equipment might be able to cover larger surface areas and volumes.
Safety	When the aeration equipment is in place, it should not pose any safety hazard to the environment or people nearby. Safety will be a great concern when working in impoundments with swimming, fishing, or boating access. Specifics include no exposed wires, no exposed propellers, solid anchoring of equipment.
Aesthetic	The aeration equipment should be visually pleasing to on-lookers. The impoundments often will be located in parks or residential areas where there is a very low tolerance for noise and unsightly equipment.

Floating Aerators

Floating aerators are one of the most commonly used types of aerators. A typical photo of floating aerator is shown in Figure 5.

Figure 5. Typical floating aerator

An illustrative sketch of a floating aerator is shown in Figure 6. The aerator uses an electric motor to drive the propeller. The motor sits on top of a floating device, which is anchored to prevent the aerator from floating away. Although floating aerators can be transported, they are too bulky and heavy for quick transport, and emergency setup might cause a safety hazard for the crew. In addition, the use of the electric motor requires running an electric wire in the water, increasing safety concerns, and there is an increased possibility of environmental and personal injury due to the unprotected propeller rotating underwater. With regards to adaptability, the fixed shaft and propeller make it difficult to adjust to varying water depths. For example, in shallow waters, the propeller digs through the ground, damaging both the environment and the equipment, and in deeper waters, the shaft does not extend far enough for proper aeration of the water. However, there is little concern aesthetically, since the working portion of the device is hidden underwater

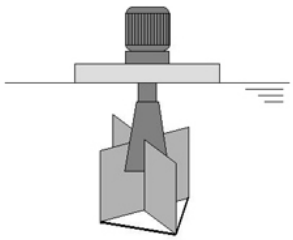


Figure 6. Floating Aerators

Table 5. Pros and Cons for Floating Aerators

Evaluation Categories	Pros	Cons
Portability	Popular and easily obtainable	Bulky and heavy
Adaptability		Fixed propeller shaft makes it difficult to adapt to varying water depth Will require multiple units for larger aeration needs
Safety		Electrical wires through the water Propellers exposed If anchor fails, the aerator will float around uncontrolled
Aesthetic	Propellers are out of site only exposing the motor	With electrical motor, noise could be an issue

Self-Aspirating Floating Aerators

Self-aspirating floating aerators (Figure 7) are also commonly used. An illustration of self-aspirating floating aerator is shown in Figure 8. The fundamental concept is similar to floating aerators but is differentiated by the tilting shaft that allows for greater flexibility to varying water depth. To minimize movement of the unit, it is anchored to the shores at different locations. The bulkiness and the total weight of the system creates difficulty in transport during emergency situations, and the use of an electric motor, the exposed propeller, and the weight of the system could all create a safety hazard for workers, the public, and the environment.

Figure 7. Self-Aspirating Floating Aerator

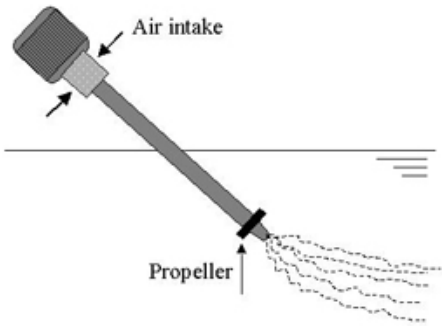


Figure 8. Self-Aspirating Floating Aerators

Table 6. Pros and Cons for Self-Aspirating Floating Aerators

Evaluation Categories	Pros	Cons
Portability	Popular and easily obtainable	Bulky and heavy
Adaptability	Tilting propeller shaft allows quick adaptability to varying water depth	Will require multiple units for larger aeration needs
Safety		Electrical wires through the water Propellers exposed If anchor fails, the aerator will float around uncontrolled
Aesthetic	Propellers are out of site only exposing the motor	With electrical motor, noise could be an issue

BioFlex Piping System (Recommended)

The recommended equipment to be used in the aeration process is the BioFlex Piping System from the Parkson Corporation. The BioFlex System is commonly used at wastewater treatment plants but can be easily modified for portable aeration applications. It contains multiple fine-bubble diffusers that are assembled in parallel to form a unit called a BioFuser (Figure 9).

The diffusers are mounted on a high-strength polymer-resin frame for low buoyancy, higher strength, and easier handling. The BioFuser is suspended from a high density polyethylene pipe (HDPE), with chains running from the main pipe to the ends of the BioFuser (Figure 10). When this system is placed in the water, the suspended BioFuser slowly moves back and forth in the water, releasing bubbles into the water (Figure 11). Series of these assemblies can be attached to each other through the main pipe, forming the BioFlex Piping System (Figure 12), which provides an effective aeration process. This system has no powered moving parts, does not require electric wire transferred through the water, can be easily transported, and can adapt to any width or depth of water. The quick assembly and low weight maximizes the safety of workers, and with most of the working parts hidden underwater, it is more aesthetically pleasing to the public. This system best fits the predetermined evaluation criteria and is therefore recommended for portable aeration use.

Figure 9. BioFuser

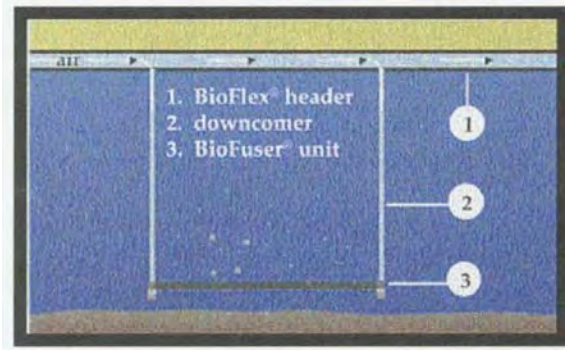


Figure 10. BioFuser Unit

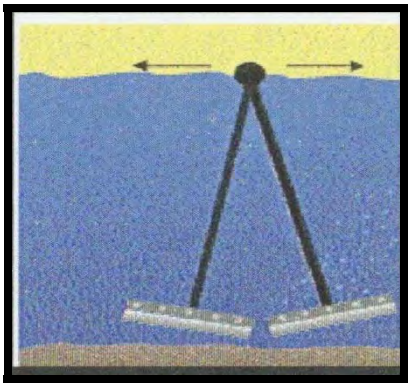


Figure 11. BioFuser Movement

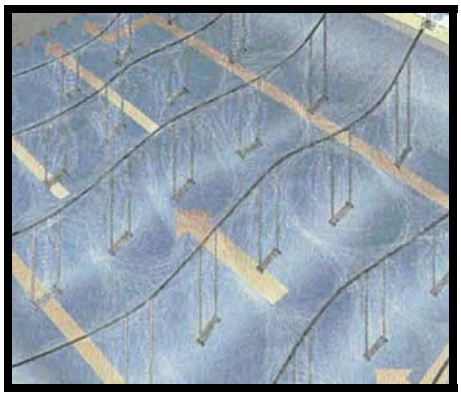


Figure 12. BioFlex Piping System

Table 7. Pros and Cons for BioFlex Piping System

Evaluation Categories	Pros	Cons
Portability	Can easily be assembled at site Not bulky and/or heavy	Assembling multiple pieces can be cumbersome Require a separate blower unit for diffusers
Adaptability	Can easily be lengthened for greater aeration needs Depth of diffuser can be easily adapt to water depth	
Safety	No electrical wires through the water No moving parts that can cause harm	
Aesthetic	Very little exposed	With use of a blower, noise could be an issue Blower, power supply, and trailer can obstruct scenic views

PORTABLE AERATION EQUIPMENT – GENERAL SPECIFICATION

A preliminary general specification for temporary portable aeration of shallow lagoons was be obtained from the Parkson Corporation. Each assembly is based on using a 20-foot section of 4-inch diameter HDPE piping. This 20-foot section is tapped for installation of three BioFuser assemblies delivering 54 SCFM at a depth of 4 feet (Figure 13). Each BioFuser assembly consists of three diffuser tubes. At a depth of 4 feet and airflow of 18 SCFM per BioFuser, each BioFuser imparts 1.29 lbs O_2 per hour into the water, based on clean water efficiencies. The overall efficiency is 6.8% SOTE, or just over 3.0 lbs O_2 per horsepower per hour of operation. Since it is recommended that the BioFlex assembly be located 20 feet from the shore, the use of an additional 20 feet of HDPE pipe is required, which aids in the placement of the assembly and also acts as a floatation device. The air is connected to the assembly via a flexible hose connected to a portable air source, which is composed of a blower and power source on a trailer.

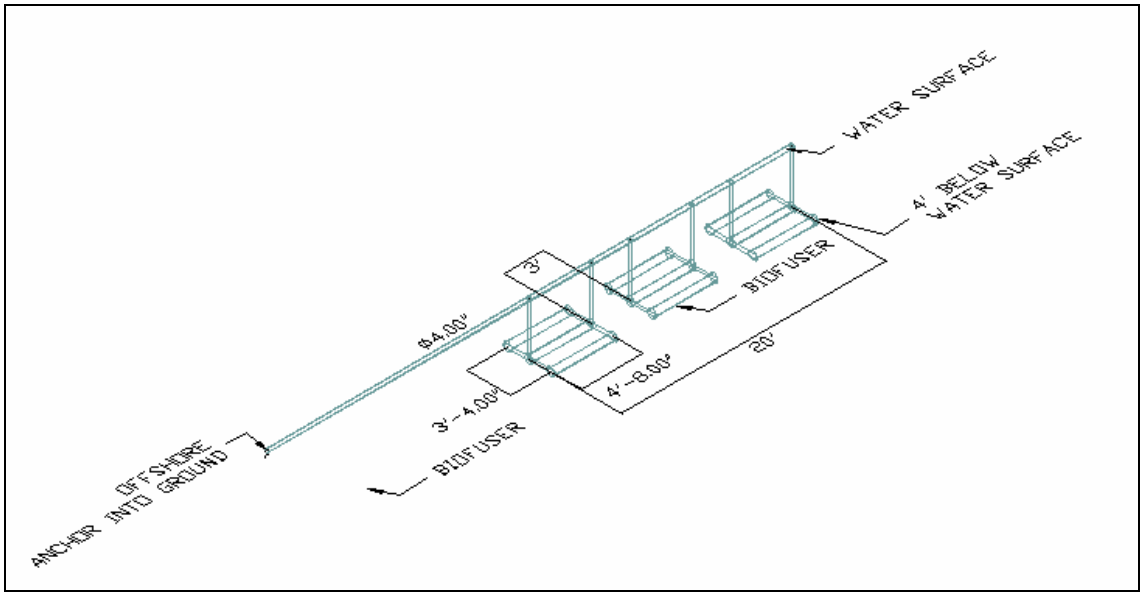


Figure 13. BioFlex Piping System Layout

The BioFlex Piping System will be anchored to the ground from the ends of the main pipe. The BioFuser will hang down about 4 feet into the contaminated water. The blower will provide air into the system and down to the BioFuser, releasing fine air bubbles to aerate the water. The aeration process will take place until DO levels in the water are restored, targeting pre-SSO DO levels.

Based on these parameters, the breakdown of estimated material price and quantity is shown in Table 8.

Table 8. Estimated Cost of Recommended Portable Aeration Equipment

Item	Quantity / Length	Estimated Unit Price	Estimated Price
BioFuser Assembly	6	$2,000	$12,000
HDPE Pipe (4" diameter)	40 ft.	$20/LF	$800
Flexible Air Hose	50 ft.	$10/LF	$500
Portable Air Supply Unit (blower, power supply, trailer)	1	$20,000	$20,000
		Total:	$45,000

Contractors

It is recommended that a contractor be used when implementing a PAP. The limited manpower and resources will make it difficult and it will be more economical and efficient for OCSD to rely on outside help for portable aeration. A list of local contractors that may be able to perform aeration work and SSO spill capture work was developed and is included as Table 9. The list is not inclusive, and OCSD and Brown and Caldwell make no warranties or guarantees as to the contractors listed. The list is merely intended to indicate that there are a variety of contractors willing to perform the work.

Table 9. List of Contractors for Portable Aeration Plan

Company	Address	Phone
Advanced Cleaning Technologies, Inc.	San Diego, CA 92110	800-334-2284
Advanced Sewer Technologies	4617 Brazil St., Los Angeles, CA	800-800-0510
Ancon Marine	2250 E. Dominguez St, Carson, CA	800-556-9090
Budget Environmental	1963 Mount Vernon Ave., Pomona, CA	800-669-2783
Ecology Control Industries	19500 Normandie Ave., Torrance, CA	310-354-6676
Haz Pak Inc.	Fontana, CA	800-326-1011
HMHTTC Response Inc	Pomona, CA	800-927-9303
Hoffman Southwest Corp.	Mission Viejo CA 92691	800-386-1497
National Plant Services, Inc.	1461 Harbor Ave., Long Beach, CA	800-445-3614
NRC Environmental Services	Pier D, Berth D-47, Long Beach, CA	562-590-6706
Ocean Blue Environmental Services	925 West Esther St., Long Beach, CA	562-624-4120
Patriot Environmental	1900 W. Anaheim St., Long Beach, CA	562-436-2614
United Storm Water	14000 E. Valley Blvd., City of Industry, CA	877-717-8676

FUTURE ACTIVITIES

This study helped identify and develop resources needed to create and implement PAP. Among other things, some recommended future activities include development of scope of work for contractors, safety guidelines, work flow diagram, and training for responding contractors.

APPENDIX A

Waters of the State in Orange County

Waters of the State in Orange County

List of "Waters of the state" in Region 8:

INLAND SURFACE STREAMS

Lower Santa Ana River Basin

1. Santa Ana River
   - Reach 1 – Tidal Prism to 17th St. in Santa Ana
   - Reach 2 – 17th St. in Santa Ana to Prado Dam
   - Aliso Creek
   - Carbon Canyon Creek
2. Santiago Creek Drainage
   - Santiago Creek
     - Reach 1 – Below Irvine Lake
     - Reach 2 – Irvine Lake
     - Reach 3 – Irvine Lake to Modjeska Canyon
     - Reach 4 – In Modjeska Canyon
   - Silverado Creek
   - Black Star Creek
   - Ladd Creek
3. San Diego Creek Drainage
   - San Diego Creek
     - Reach 1 – Below Jeffery Rd.
     - Reach 2 – Above Jeffery Rd. to Headwaters
   - Other tributaries:
     - Bonita Creek
     - Serrano Creek
     - Peters Canyon Wash Creek
     - Hicks Canyon Wash Creek
     - Borrego Canyon Wash Creek
     - Agua Chinon Wash Creek
     - Laguna Canyon Wash Creek
     - Rattlesnake Canyon Wash Creek
     - San Canyon Wash Creek
4. San Gabriel River Drainage
   - Coyote Creek (within Santa Ana Regional Boundary)

Upper Santa Ana River Basin

1. Santa Ana River
   - Reach 3 – Prado Dam to Mission Blvd. in Riverside
   - Reach 4 – Mission Blvd. in Riverside to San Jacinto Fault in San Bernardino
   - Reach 5 – San Jacinto Fault in San Bernardino to Seven Oaks Dam
   - Reach 6 – Seven Oaks Dam to Headwaters
2. San Bernardino Mountain Streams
   - Mill Creek Drainage:
   - Mill Creek
   - Reach 1 – Confluence with Santa Ana River to Bridge Crossing Rt. 38 at Upper Powerhouse
   - Reach 2 – Bridge Crossing Rt. 38 at Upper Powerhouse to Headwaters
   - Mountain Home Creek
   - Mountain Home Creek, East Fork
   - Monkey Face Creek
   - Alger Creek
   - Falls Creek
   - Green Creek
   - Skinner Creek
   - Momyer Creek
   - Glen Martin Creek
   - Camp Creek
   - Hatchery Creek

- Vivian Creek
- High Creek
- Lost Creek
- Oak Cove Creek
- Rattlesnake Creek
- Slide, Snow Creek
- Bridal Veil Creek
- Oak Creeks

- Bear Creek Drainage:
  - Bear Creek
  - Siberia Creek
  - Slide Creek
  - All other tributaries to these creeks
  - Big Bear Lake

- Big Bear Lake Tributaries:
  - North Creek
  - Metcalf Creek
  - Grout Creek
  - Rathbone (Rathbun) Creek
  - Meadow Creek
  - Summit Creek
  - Knickerbocker Creek
  - Johnson Creek
  - Minnelusa Creek
  - Polique Creek
  - Red Ant Creeks

- Baldwin Lake
- Baldwin Lake Drainage:
  - Shay Creek
  - Sawmill
  - Green
  - Caribou Canyons

- Streams Draining to Santa Ana River:
  - Cajon Creek
  - City Creek
  - Devil Canyon Creek
  - East Twin and Strawberry Creeks
  - Waterman Canyon Creek
  - Fish Creek
  - Forsee Creek
  - Plunge Creek
  - Barton Creek
  - Bailey Canyon Creek
  - Kimbark Canyon Creek
  - East Fork Kimbark Canyon
  - Ames Canyon Creek
  - West Fork Cable Canyon Creeks
  - Alder Creek
  - Wild Horse Creek
  - Badger Canyon
  - Bledsoe Gulch
  - Borea Canyon
  - Breakneck
  - Cable Canyon
  - Cienega Seca
  - Cold
  - Converse
  - Coon
  - Crystal
  - Deer
  - Elder
  - Fredalba
  - Frog
  - Government
  - Hamilton
  - Heart Bar
  - Hemlock
  - Keller
  - Kilpecker
  - Little Mill
  - Little San Canyon
  - Lost
  - Meyer Canyon
  - Monroe Canyon
  - Oak
  - Rattlesnake
  - Round Cienega
  - Schneider
  - Warm Springs Canyon

3. San Gabriel Mountain Streams:
    - San Antonio Creek
    - Lytle Creek and Coldwater Canyon Creek
    - Day Creek
    - East Etiwanda Creek
    - Cucamonga Creek
        - Reach 1 – Confluence with Mill Creek to 23rd St. in Upland
        - Reach 2 – 23rd St. in Upland to headwaters
    - Mill Creek
    - Cajon Canyon
    - San Sevaine
    - Duncan Canyon
    - Henderson Canyon
    - Telegraph Canyon
    - Stoddard Canyon
    - Icehouse Canyon
    - Cascade Canyon
    - Cedar
    - Falling Rock
    - Kerkhoff
    - Cherry Creek

4. San Timoteo Area Streams
    - San Timoteo Creek
        - Reach 1 – Santa Ana River Confluence to Gage at San Timoteo Canyon Rd.
        - Reach 2- Gage at San Timoteo Canyon Road to Confluence with Yucaipa Creek
        - Reach 3 – Confluence with Yucaipa Creek to Bunker Hill II Groundwater sub-basin boundary
        - Reach 4 – Bunker Hill II Groundwater Sub-basin Boundary to confluence with little San Gorgonio and Noble Creeks

    - Oak Glen, Potato Canyon, and Birch Creeks
    - Little San Gorgonio Creek
    - Yucaipa Creek

5. Anza Park Drain
6. Sunnyslope Channel
7. Tequesquite Arroyo (Sycamore Creek)
8. Prado Area Streams
    - Chino Creek
        - Reach 1 – Santa Ana River Confluence to beginning of concrete-lined channel south of Los Serranos Rd.
        - Reach 2 – Beginning of concrete lined south of Los Serranos Rd. to confluence with San Antonio Creek
    - Temescal Creek
        - Reach 1A – Santa Ana River confluence to Lincoln Ave.
        - Reach 1B – Lincoln Ave. to Riverside Canal
        - Reach 2 – Riverside Canal to Lee Lake
        - Reach 3 – Lee Lake
        - Reach 4 – Lee Lake to Mid-section line of Section 17

- Reach 5 – Mid-section line of section 17 to Elsinore Groundwater subbasin boundary
- Reach 6 – Elsinore Groundwater subbasin boundary to Lake Elsinore Outlet.

- Coldwater Canyon Creek
- Bedford Canyon Creek
- Dawson Canyon Creek

9. San Jacinto River Basin
   - San Jacinto River
     - Reach 1 – Lake Elsinore to Canyon Lake
     - Reach 2 – Canyon Lake
     - Reach 3 – Canyon Lake to Nuevo
     - Reach 4 – Nuevo Rd. to North-South Mid-Section Line
     - Reach 5 – North-South Mid-Section Line to confluence with Poppet Creek
     - Reach 6 – Poppet Creek to Cranston Bridge
     - Reach 7 – Cranston Bridge to Lake Hemet

   - Bautista Creek –Headwaters to Debris Dam
   - Strawberry Creek and San Jacinto River, North Fork
   - Fuller Mill Creek
   - Stone Creek
   - Salt Creek
   - Logan Creek
   - Black Mountain Creek
   - Juaro Canyon Creek
   - Indian Creek
   - Hurkey Creek
   - Poppet Creek
   - Protrero Creek

LAKES AND RESERVOIRS

Upper Santa Ana River Basin

1. Baldwin Lake
2. Big Bear Lake
3. Erwin Lake
4. Evans Lake
5. Jenks Lake
6. Lee Lake
7. Mathews Lake
8. Mockingbird Reservoir
9. Lake Norconian

Lower Santa Ana River Basin

1. Anaheim Lake
2. Irvine Lake (Santiago Reservoir)
3. Laguna Reservoir
4. Lambert Reservoir
5. Peters Canyon Reservoir
6. Rattlesnake Reservoir
7. Sand Canyon Reservoir
8. Siphon Reservoir

San Jacinto River Basin

1. Canyon Lake (Railroad Canyon Reservoir)
2. Lake Elsinoir
3. Lake Fulmor
4. Lake Hemet
5. Lake Perris

WETLANDS (INLAND)

1. San Joaquin Freshwater Marsh
2. Shay Meadows
3. Stanfield Marsh
4. Prado Flood Control Basin
5. San Jacinto Wildlife Perserve
6. Glen Helen

BAYS, ESTUARIES, AND TIDAL PRISMS

1. Anaheim Bay – Outer Bay
2. Anaheim Bay – Seal Beach National Wildlife Refuge
3. Sunset Bay – Huntington Harbor
4. Bolsa Bay
5. Bolsa Chica Ecological Reserve
6. Lower Newport Bay
7. Upper Newport Bay
8. Santa Ana River Salt Marsh
9. Tidal Prism of Santa Ana River (to within 1000 ft. of Victoria St.) and Newport Slough
10. Tidal Prism of San Gabriel River – River Mouth to Marina Dr.
11. Tidal Prisms of Flood Control Channels Discharging to Coastal or Bay Waters

APPENDIX B

Waters of the State (Impoundments) in OCSD's Service Area

Waters of the state (Impoundments) in OCSD's Service Area

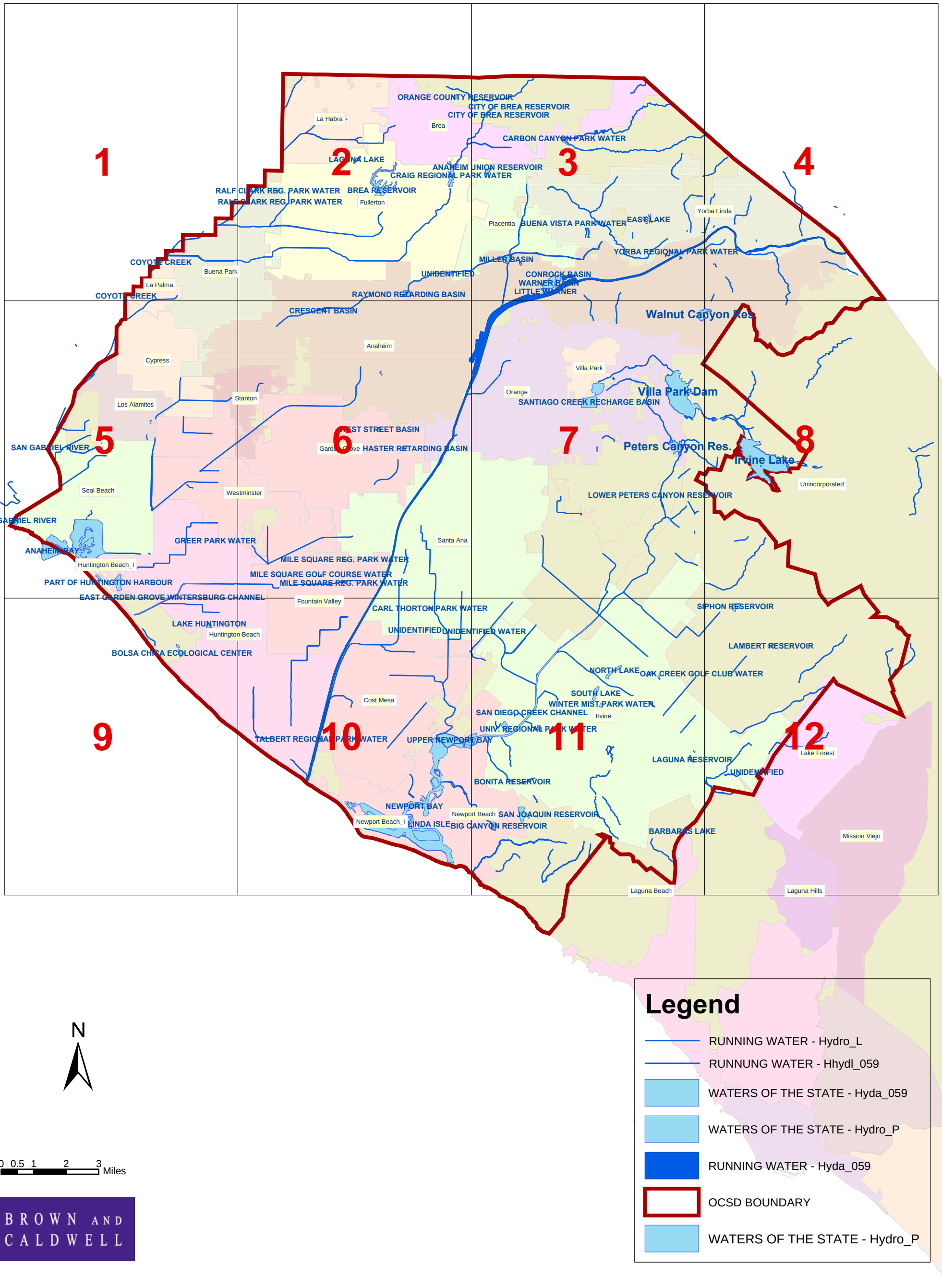
WATERS OF THE STATE	LOCATION	Thomas Guide		
		PAGE	GRID	
ANAHEIM BAY	ORANGE COUNTY	826	5	F
ANAHEIM LAKE	ANAHEIM	739	7	G
ANAHEIM UNION RESERVOIR	PLACENTIA	739	2	E
BARBARAS LAKE	LAGUNA BEACH	891	7	A
BAY ISLAND	BALBOA	919	1	B
BIG CANYON RESERVOIR	NEWPORT BEACH	889	7	G
BIRD ROCK	LAGUNA BEACH	950	3	F
BONITA RESERVOIR	NEWPORT BEACH	889	5	H
BREA RESERVOIR	FULLERTON	738	2	G
CARBON CANYON DAM	YORBA LINDA	709	6	H
CITY OF BREA RESERVOIR	ORANGE COUNTY	709	6	F
CONROCK BASIN	ANAHEIM	770	1	A
CRESCENT BASIN	ANAHEIM	768	4	D
DRY RESERVOIR	FULLERTON	738	3	G
DUCK PONDS	IRVINE	859	7	H
EL TORO RESERVOIR	MISSION VIEJO	892	5	B
HASTER RETARDING BASIN	GARDEN GROVE	799	5	A
HUCKLEBERRY POND	ANAHEIM	770	1	A
HUNTINGTON HARBOUR	HUNTINGTON BEACH	826	6	J
IRVINE LAKE	ORANGE COUNTY	801	4	C
KRAEMER BASIN	ANAHEIM	769	1	F
LAGUNA LAKE	FULLERTON	738	2	F
LAGUNO RESERVOIR	IRVINE	890	3	J
LAKE	IRVINE	860	5	G
LAKE HUNTINGTON	HUNTINGTON BEACH	857	3	G
LAKE MISSION VIEJO	MISSION VIEJO	892	4	D
LAKE SANTA MARGARITA	RANCHO SANTA MARGARITA	893	1	B
LAKE TALBERT	HUNTINGTON BEACH	857	2	H
LAMBERT RESERVOIR	IRVINE	861	3	F
LINDA ISLE	NEWPORT BEACH	889	7	B
LITTLE WARNER	ANAHEIM	769	2	J
LOWER PETERS CANYON RESERVOIR	TUSTIN	830	1	H
MILLER BASIN	ANAHEIM	739	7	F
NEWPORT BAY	NEWPORT BEACH	888	6	G
NORTH LAKE	IRVINE	860	4	E
OLIVE HILLS RESERVOIR	ORANGE	770	4	A
ORANGE COUNTY	ORANGE COUNTY	709	5	C
ORANGE COUNTY RESERVOIR	ORANGE COUNTY	709	5	C
PETERS CANYON RES.	COWAN HEIGHTS	800	4	H
PORTOLA RESERVOIR	CUT DE CAZA	893	4	C
RATTLESNAKE RES.	IRVINE	831	5	B
RAYMOND RETARDING BASIN	ANAHEIM	768	3	J
SAN JOAQUIN RESERVOIR	NEWPORT BEACH	889	6	J

WATERS OF THE STATE	LOCATION	Thomas Guide		
		PAGE	GRID	
SAND CANYON RES.	IRVINE	890	2	E
SANTIAGO CREEK RECHARGE BASIN	ORANGE	800	1	C
SEAL ROCK	LAGUNA BEACH	950	2	D
SIPHON RESERVOIR	IRVINE	831	7	C
SOUTH LAKE	IRVINE	860	6	D
SULLY MILLER LAKE	HUNTINGTON BEACH	857	3	H
SULPHUR CREEK RES.	LAGUNA NIGEL	951	2	G
UPPER NEWPORT BAY	NEWPORT BEACH	889	2	D
UPPER OSO RESERVOIR	MISSION VIEJO	862	7	F
VEEH RESERVOIR	LAGUNA HILLS	891	5	C
VILLA PARK DAM	ORANGE COUNTY	770	7	H
VILLAGE POND	LAKE FOREST	891	5	F
WALNUT CANYON RES.	ANAHEIM	771	3	A
WARNER BASIN	ANAHEIM	769	2	J
WEST STREET BASIN	GARDEN GROVE	798	4	H
YORBA LINDA RESERVOIR	YORBA LINDA	740	5	B

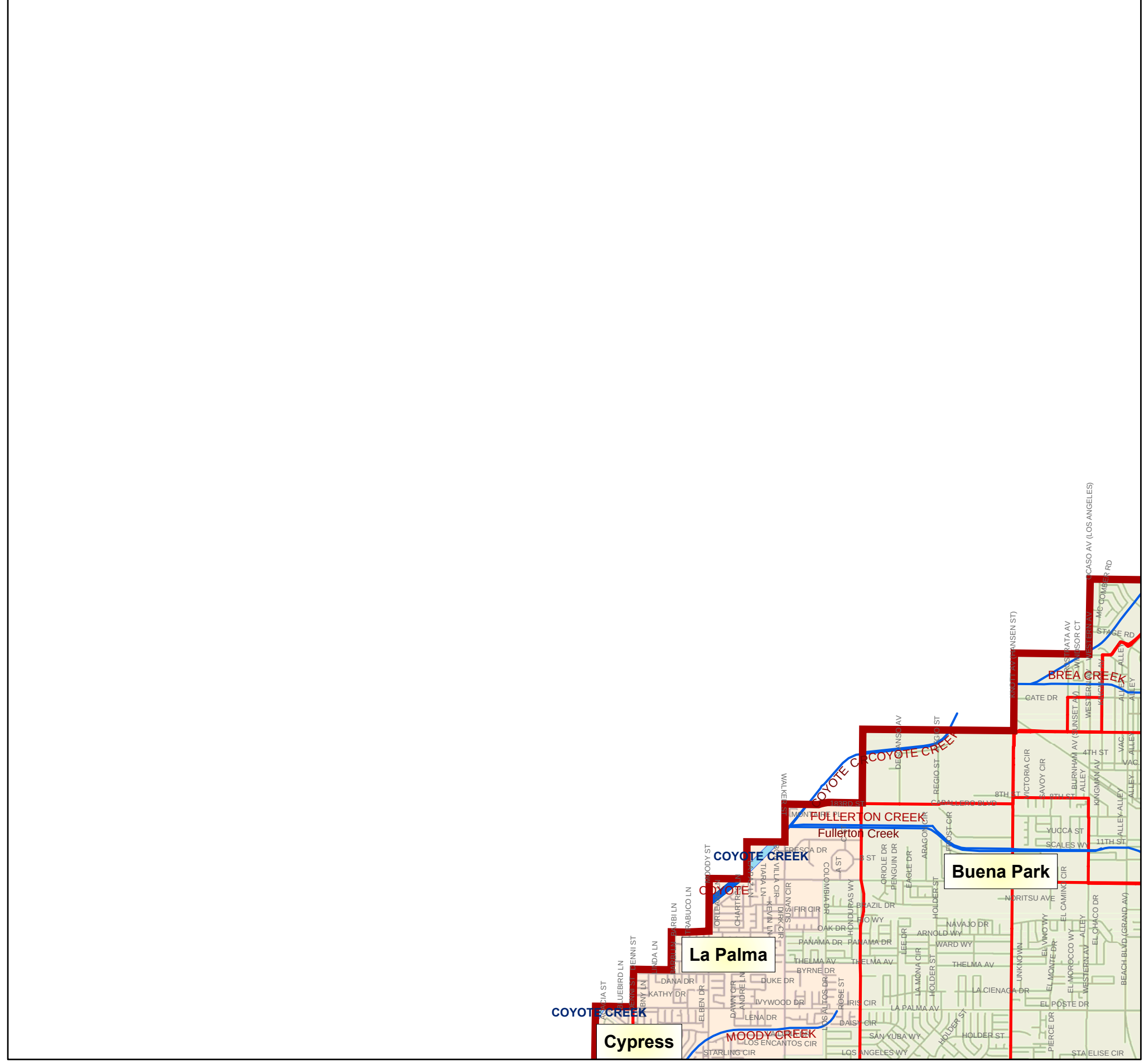
APPENDIX C

State Waters Within OCSD
(Key plan + Detailed View of Quadrants)

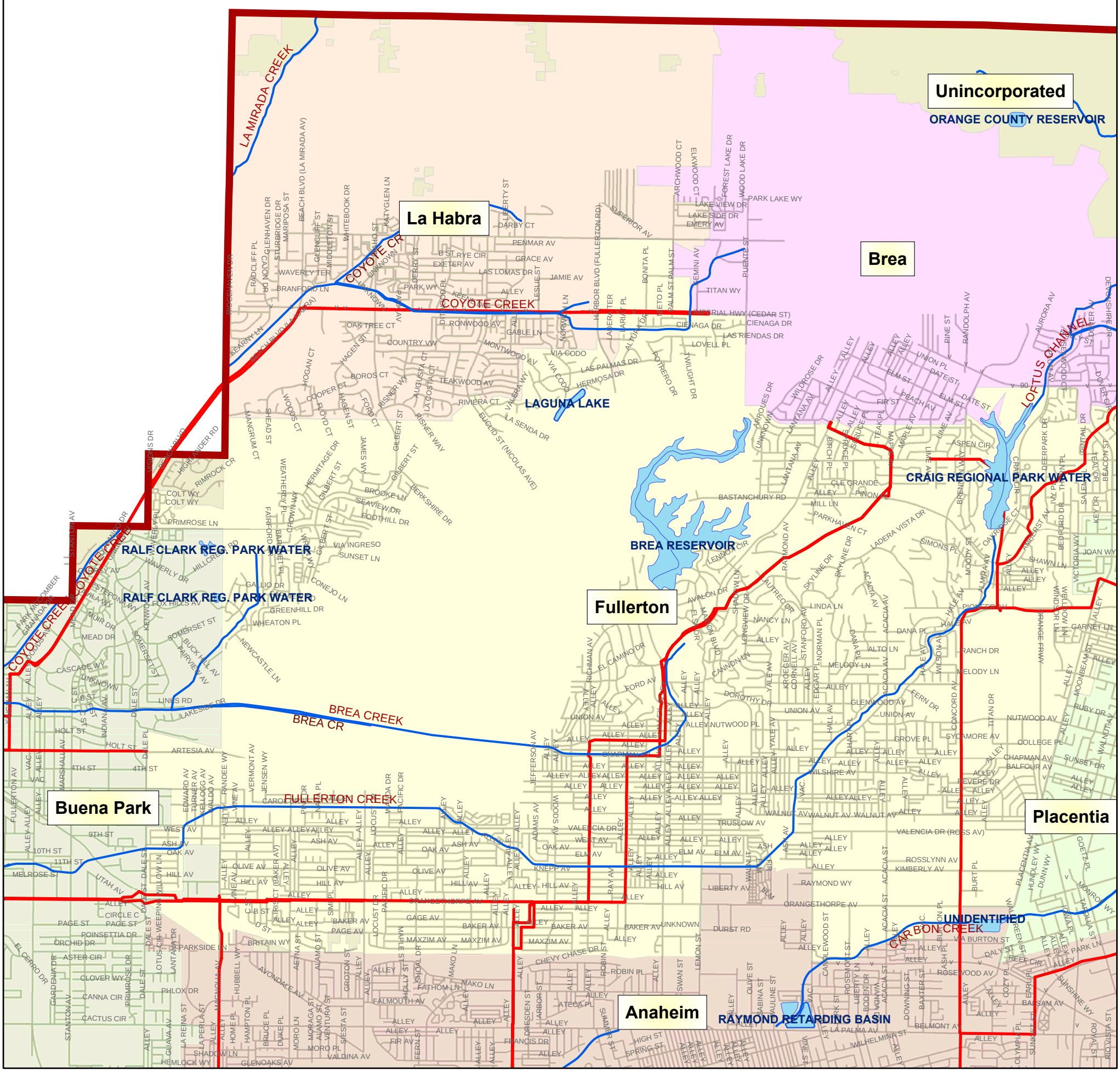
Keyplan for Detailed View of State Waters within OCSD



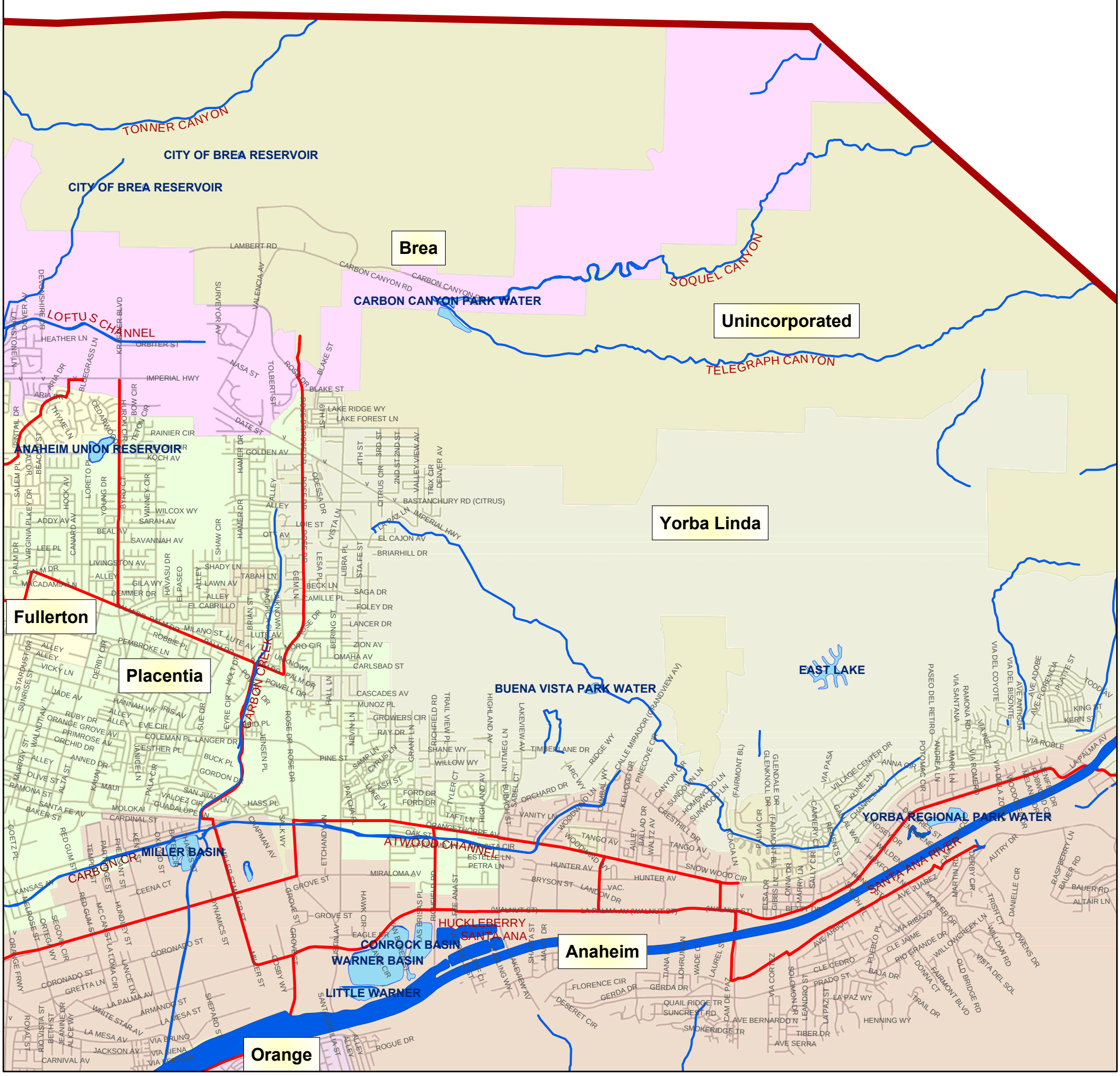
State Waters Within OCSD with Details - Quadrant 1



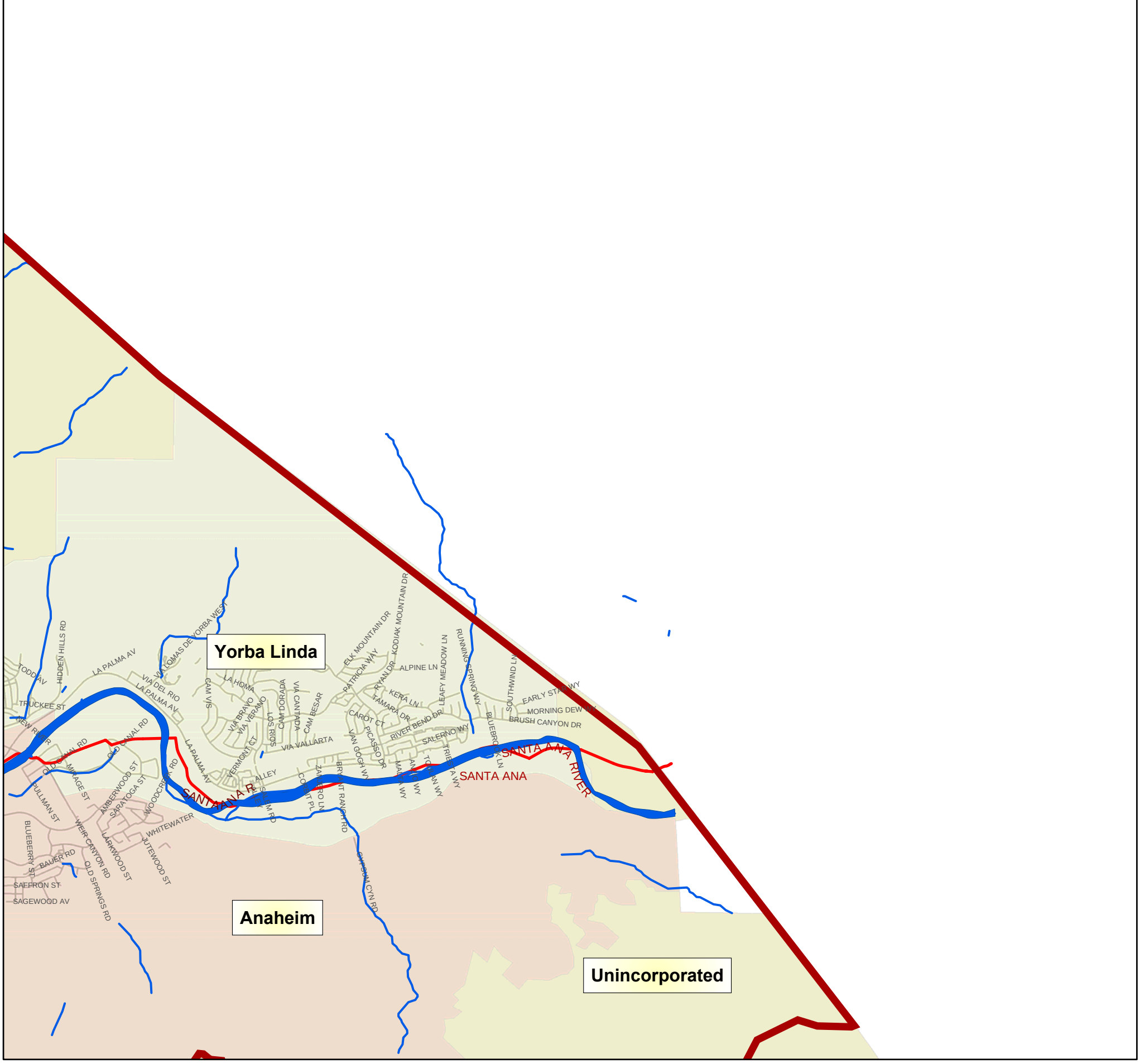
State Waters Within OCSD with Details - Quadrant 2



State Waters Within OCSD with Details - Quadrant 3



State Waters Within OCSD with Details - Quadrant 4



BROWN AND CALDWELL

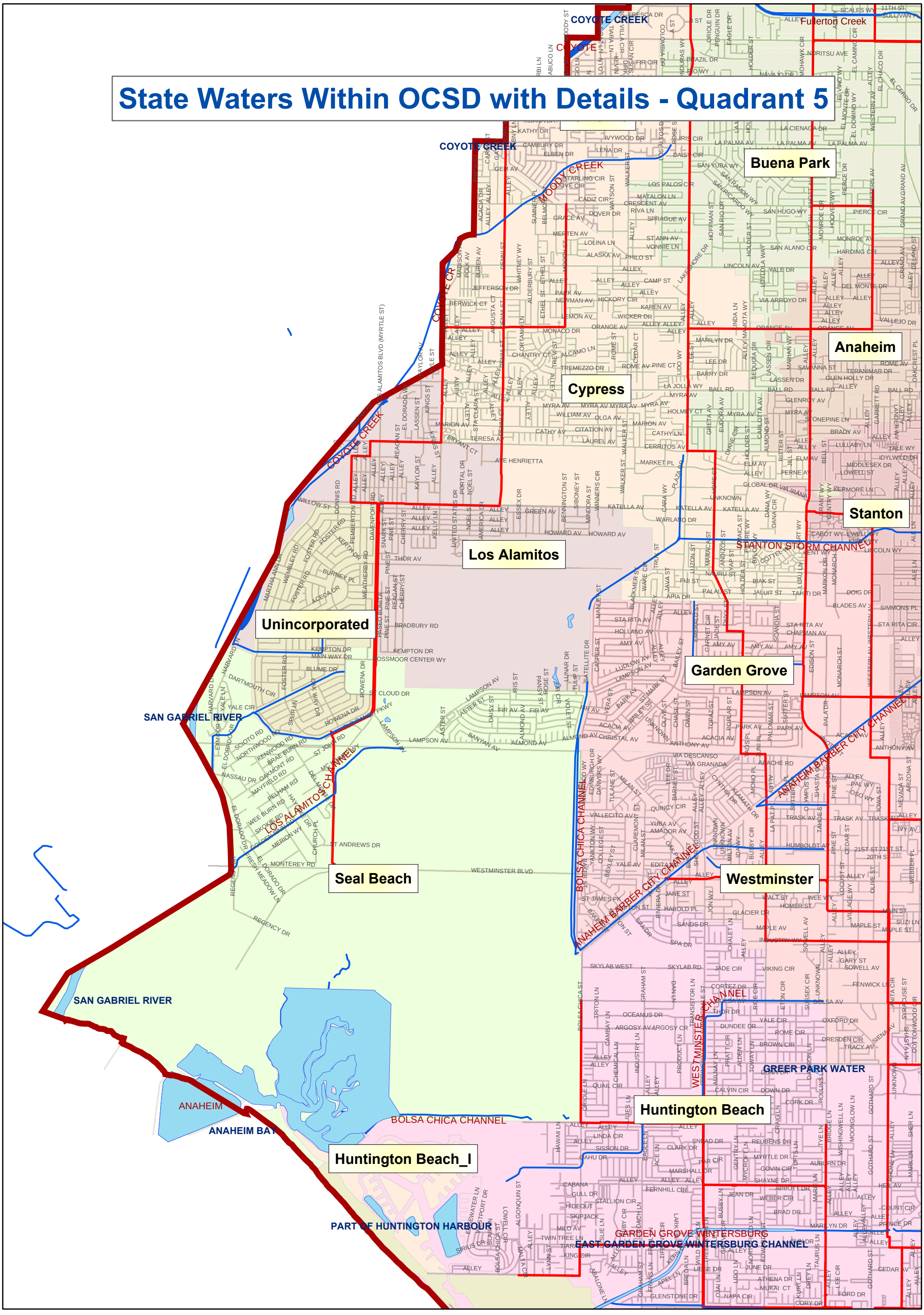
0 0.3 0.6 1.2 Miles

N

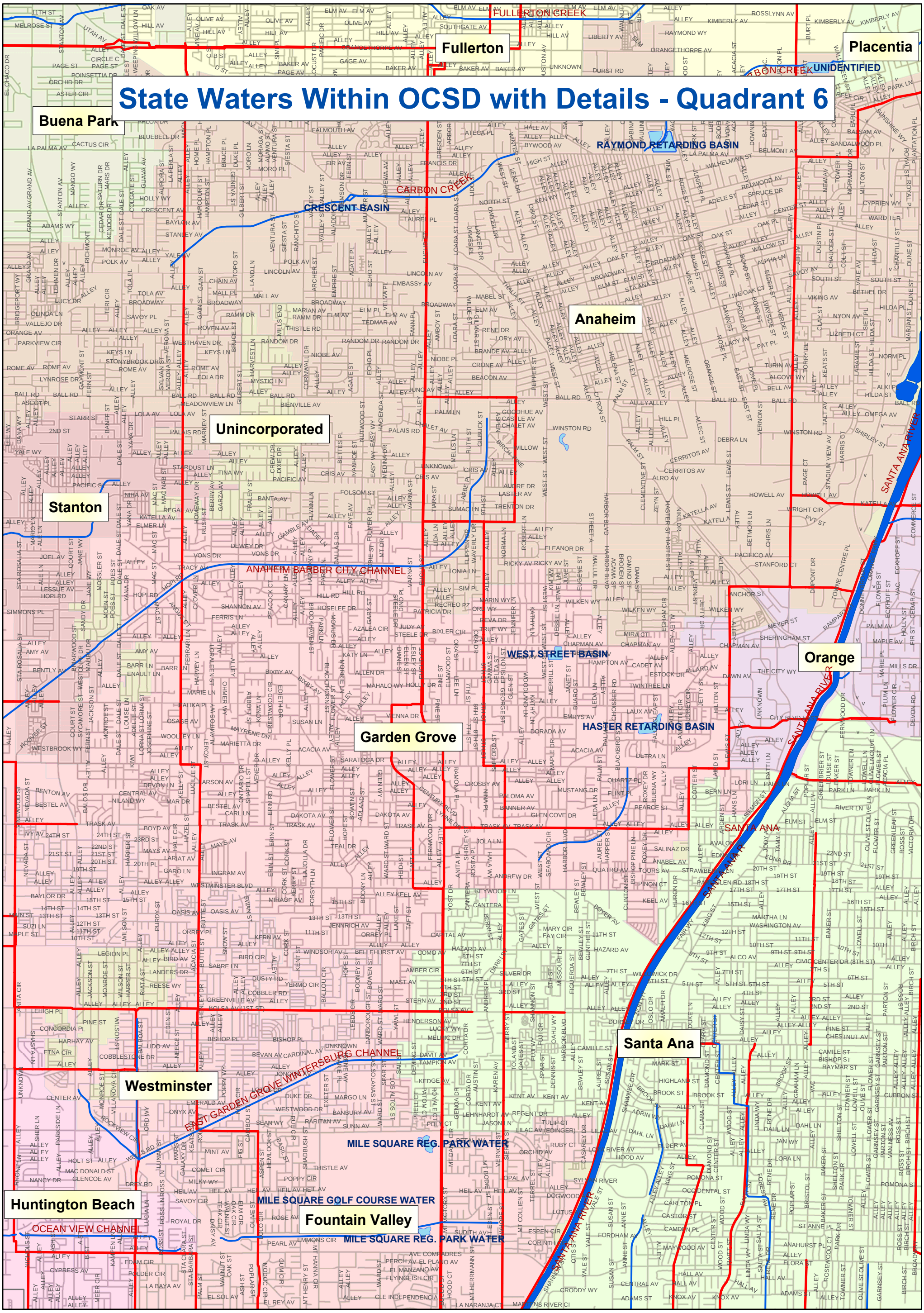
Legend

- OCSD_MAINTAINED_SEWERS
- OCSD_OWNED_SEWERS
- RUNNING WATER - Hydro_L
- RUNNUNG WATER - Hhydl_059
- RUNNING WATER - Hyda_059
- WATERS OF THE STATE - Hyda_059
- WATERS OF THE STATE - Hydro_P
- OCSD BOUNDARY

State Waters Within OCSD with Details - Quadrant 5



State Waters Within OCSD with Details - Quadrant 6



BROWN AND CALDWELL

0 0.3 0.6 1.2 Miles

N

Legend

- OCSD_MAINTAINED_SEWERS
- OCSD_OWNED_SEWERS
- RUNNING WATER - Hydro_L
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- WATERS OF THE STATE - Hydro_P
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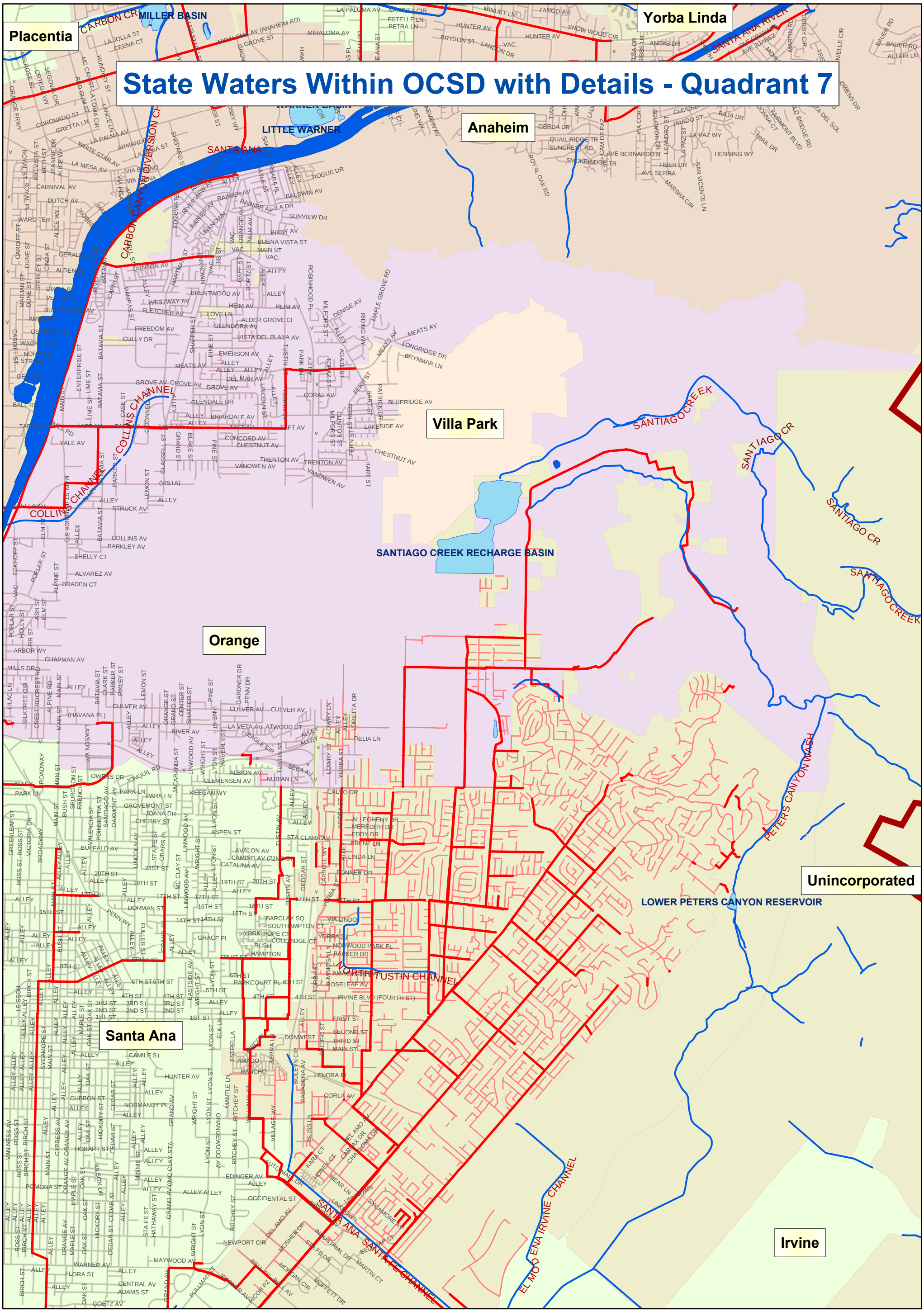
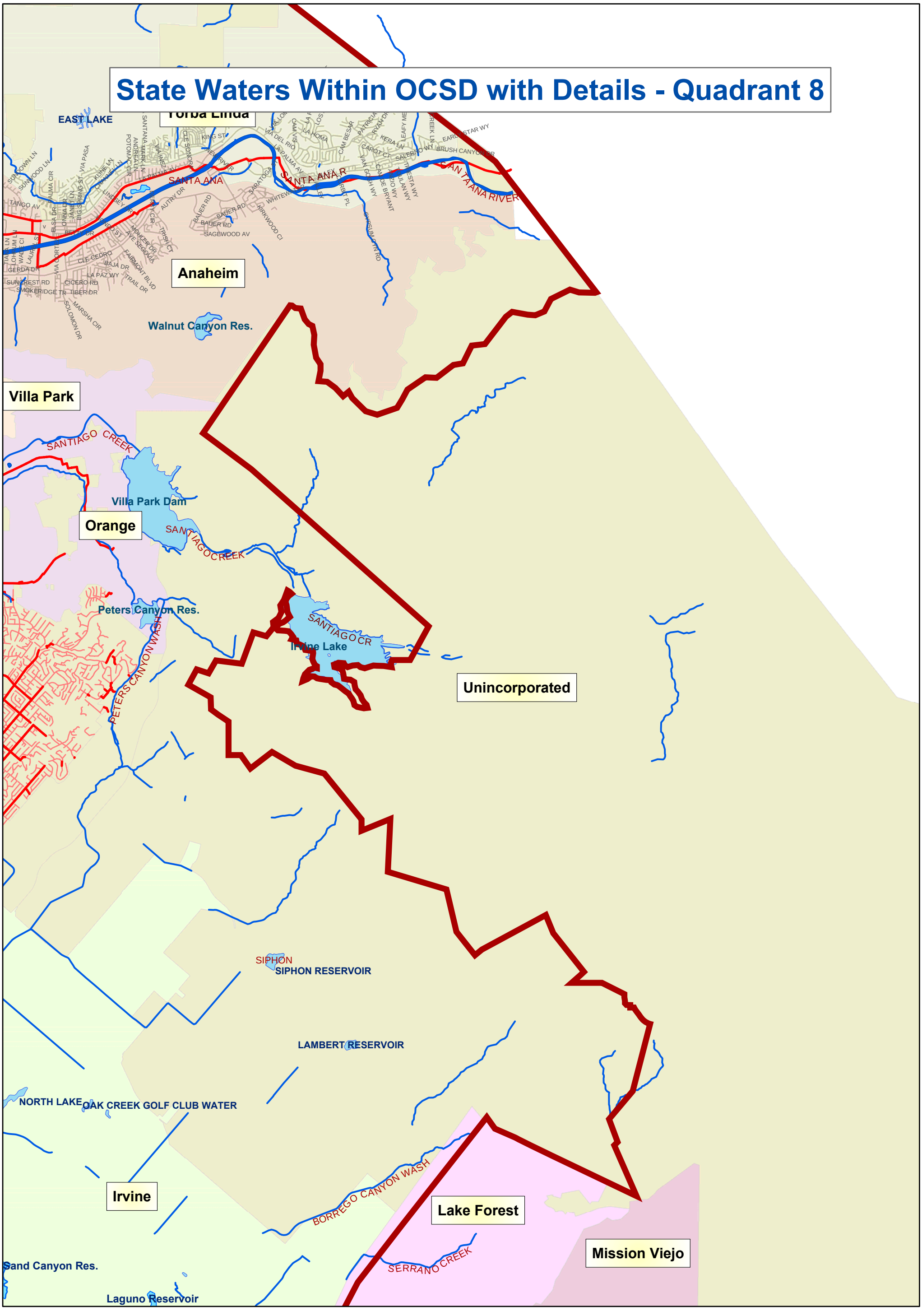
State Waters Within OCSD with Details - Quadrant 7


Placentia
Yorba Linda
Anaheim
Villa Park
Orange
Santa Ana
Unincorporated
Irvine
CARBON CR
MILLER BASIN
LITTLE WARNER
SANTA ANA RIVER
CARBON CANYON DIVERSION CH
SANTIAGO CREEK
SANTIAGO CR
SANTIAGO CREEK RECHARGE BASIN
COLLINS CHANNEL
PETERS CANYON WASH
LOWER PETERS CANYON RESERVOIR
NORTH TUSTIN CHANNEL
SANTA ANA - SANTA FE CHANNEL
EL MODENA IRVINE CHANNEL
55
MIRALOMA AV (ANAHEIM RD)
GROVE ST
LA PALOMA AV
NARCITA CIR
ESTELLE LN
PETRA LN
MINUET LN
TANGO AV
HUNTER AV
BRYSON ST
LANDON DR
SNOW WOOD CIR
ANEAS DR
GERDA DR
QUAIL RIDGE TR
SUNCREST RD
AVE BERNARDO N
SMOKERIDGE TR
TIBER DR
AVE SERRA
PRADO ST
BAJA DR
LA PAZ WY
HENNING WY
TRAIL DR
ROYAL OAK RD
MARSHA CIR
SAN VICENTE LN
LA PAZ ST
LEANDRO ST
SOLOMON DR
VIA CORTA
CAM DE PAZ
FAIRMONT BLVD
OLD BRIDGE RD
DONNA CT
AVE JUAREZ
MARTIN RD
DERBY CIR
BAUER RD
ALTAIR LN
OWENS DR
CORONADO ST
GRETTA LN
LA PALMA AV
WHITE STAR AV
LA MESA AV
CARNIVAL AV
DUTCH AV
WARD TER
ROGUE DR
BALDWIN AV
SUNVIEW DR
BIXBY AV
BUENA VISTA ST
MAIN ST
DUNTON AV
BRENTWOOD AV
WESTWAY AV
FLETCHER AV
HEIM AV
LOVE LN
ALDER GROVE CI
GLENDORA AV
FREEDOM AV
CULLY DR
VISTA DEL PLAYA AV
EMERSON AV
DEL MAR AV
GROVE AV
GLENDALE DR
BRIARDALE AV
CONCORD AV
CHESTNUT AV
TRENTON AV
VANOWEN AV
TAFT AV
YALE AV
BALL RD
MEATS AV
LONGRIDGE DR
BRYNMAR LN
MAPLE GROVE RD
RIDING WY
DENISE AV
MILFORD ST
ROBINHOOD PL
AGATE ST
TOPAZ ST
CORAL AV
BLUERIDGE AV
LAKESIDE AV
PATRICK DR
HART ST
FERN ST
CLINTON ST
CHESTNUT AV
SANTIAGO CREEK RECHARGE BASIN
ORANGE AV
CULVER AV
ATWOOD CT
LA VETA AV
RIVER AV
DELIA LN
EAGLE CIR
ALBION AV
NUBIAN LN
SEBA AV
CLEMENSEN AV
CALVO DR
KEEGAN WY
PARK LN
GROVEMONT ST
JOANA DR
CHERRY ST
ASPEN ST
STA CLARA AV
ALLEGHENY DR
MEREDITH DR
EDDY DR
BRENT LN
LINDA LN
BONNER DR
AVALON AV
CAMINO AV (22ND ST)
CATALINA AV
20TH ST
19TH ST
18TH ST
17TH ST
16TH ST
15TH ST
14TH ST
21ST ST
BUFFALO AV
ARBOR WY
CHAPMAN AV
MILLS DR
COLLINS AV
BARKLEY AV
SHELLY CT
ALVAREZ AV
BRADEN CT
VIA LINDO
BARCLAY SQ
SOUTHAMPTON CT
YORK POPE CT
COLERIDGE CT
YORBA ST
NORWOOD PARK PL
PARKER DR
RUSH
HAMPTON
GRACE PL
FRUIT ST
PARKCOURT PL
6TH ST
5TH ST
4TH ST
3RD ST
2ND ST
1ST ST
IRVINE BLVD (FOURTH ST)
FIRST ST
SECOND ST
THIRD ST
MAIN ST
DONWEST
LENORA PL
CORLA AV
HUNTER AV
CAMILE ST
CUBBON ST
NORMANDY PL
HOBART ST
POMONA ST
EDINGER AV
OCCIDENTAL ST
NEWPORT CIR
MAYWOOD AV
WARNER AV
FLORA ST
CENTRAL AV
ADAMS ST
GOETZ AV
PENN WY
DORMAN ST
FULLER ST
ALLEY
(HAVANA PL)
(VISTA)
STRUCK AV
ELM ST
ASH ST
FIR ST
HOLLY ST
POPLAR ST
EUCALYPTUS AV
ARMANDO
SHEPARD ST
EDGEWATER ST
RIVERVIEW AV
RAINIER AV
LA VISTA ST
VIA BUENO
VIA ANA
VIA PAZ
ROYAL ST
RIO VISTA ST
BETH ST
JEANINE DR
ALICE WY
ROBBIE CT
MARIAN ST
CARDIFF ST
DUNE ST
STEHLEY ST
CINDA ST
GERALD CI
ALDEN PL
DIANA AV
VERDE AV
BURNTWOOD AV
AMES AV
OSHKOSH AV
WAGNER AV
NORA PL
STRONG PL
GEOID CT
CAPRI ST
PAMPAS ST
BATAVIA ST
ENTERPRISE ST
LIME ST
MAIN ST
CASE ST
O'CONNELL
GLASSELL ST
GRAND ST
BLAKE ST
PINE ST
PARKER ST
LEMON ST
ALLEY
SHAFFER ST
GAFF ST
BORTZ ST
JIB ST
HARTMAN ST
UNKNOWN
VAC.
ORANGE AV
PALM AV
LINCOLN ST
TUSTIN ST
PARK AV
TUSTIN AV
ROSS ST
BROADWAY
SPURGEON ST
FRENCH ST
OWENS DR
JONQUIL RD
PARK LN
JACARANDA ST
LINWOOD AV
WRIGHT ST
LYON ST
KEEGAN WY
MAIN ST
BUSH ST
SANTIAGO AV
OAKMONT AV
POINSETTIA ST
VALENCIA ST
VICTORIA DR
GREENLEAF ST
ROSS ST
OBARR PL
STA FE ST
HATHAWAY ST
MC CLAY ST
LINWOOD AV
WRIGHT ST
LYON ST
ALLEY
ALLEY ALLEY
20TH ST
18TH ST
17TH ST
16TH ST
15TH ST
14TH ST
ALLEY
DORMAN ST
PENN WY
FULLER ST
GRAND AV
GRACE PL
FRUIT ST
8TH ST
6TH ST
5TH ST
4TH ST
3RD ST
2ND ST
1ST ST
EASTSIDE AV
PARKCOURT PL
ROSELEAF AV
IRVINE BLVD (FOURTH ST)
FIRST ST
SECOND ST
THIRD ST
MAIN ST
DONWEST
PACIFIC ST
ESTRELLA
SERRA LN
AMADO
RANCHO
LENORA PL
CORLA AV
BOLEYN CIR
PASADENA AV
MANTLE LN
RITCHEY ST
WILLOWS CT
VILLAGE WY
BLISS LN
KARA CT
HONEY CT
CARRAX DR
CHAKOMA DR
BEL AMO AV
AUTOMALL DR
MEAR LN
UNKNOWN
SYCAMORE AV
DEL AMO AV
MOSHER DR
STA FE DR
INDUSTRIAL DR
MARTIN CT
BELL AV
MORGAN CIR
MOFFETT DR
RICOH PZ
WARNER AV
PULLMAN ST
CAMILE ST
HUNTER AV
CUBBON ST
NORMANDY PL
HOBART ST
POMONA ST
EDINGER AV
OCCIDENTAL ST
NEWPORT CIR
MAYWOOD AV
WARNER AV
FLORA ST
CENTRAL AV
ADAMS ST
GOETZ AV
SYCAMORE ST
MAIN ST
BUSH ST
BIRCH ST
ROSS ST
VAN NESS AV
CYPRESS AV
ORANGE AV
MAPLE ST
OAK ST
CEDAR ST
HICKORY ST
MINNIE ST
NELSON DR
GRAND AV ((MC CLAY ST))
ORANGEWOOD AV
LYON ST
RITCHEY ST
WRIGHT ST
LINWOOD AV
JACARANDA ST
CENTER ST
ORANGE ST
PINE ST
GARDNER DR
PENN DR
LOWRY LN
LORETTA DR
YORBA ST
MIMOSA LN
AMAZONIA AV

State Waters Within OCSD with Details - Quadrant 8



BROWN AND CALDWELL

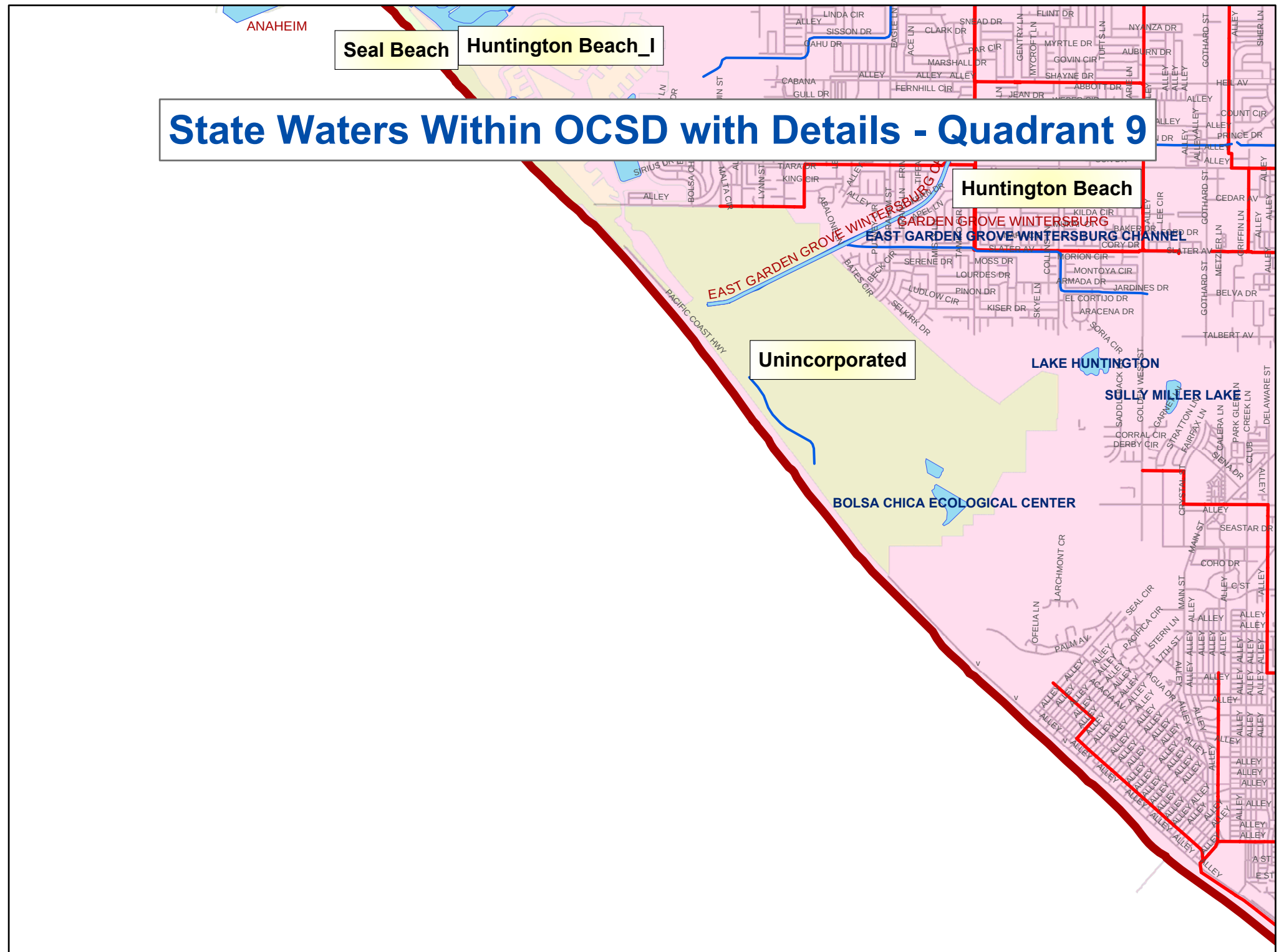
0 0.5 1 2 Miles

N

Legend

- OCSD_MAINTAINED_SEWERS
- OCSD_OWNED_SEWERS
- RUNNING WATER - Hydro_L
- RUNNUNG WATER - Hhydl_059
- WATERS OF THE STATE - Hydro_P
- RUNNING WATER - Hyda_059
- WATERS OF THE STATE - Hyda_059
- OCSD BOUNDARY

State Waters Within OCSD with Details - Quadrant 9



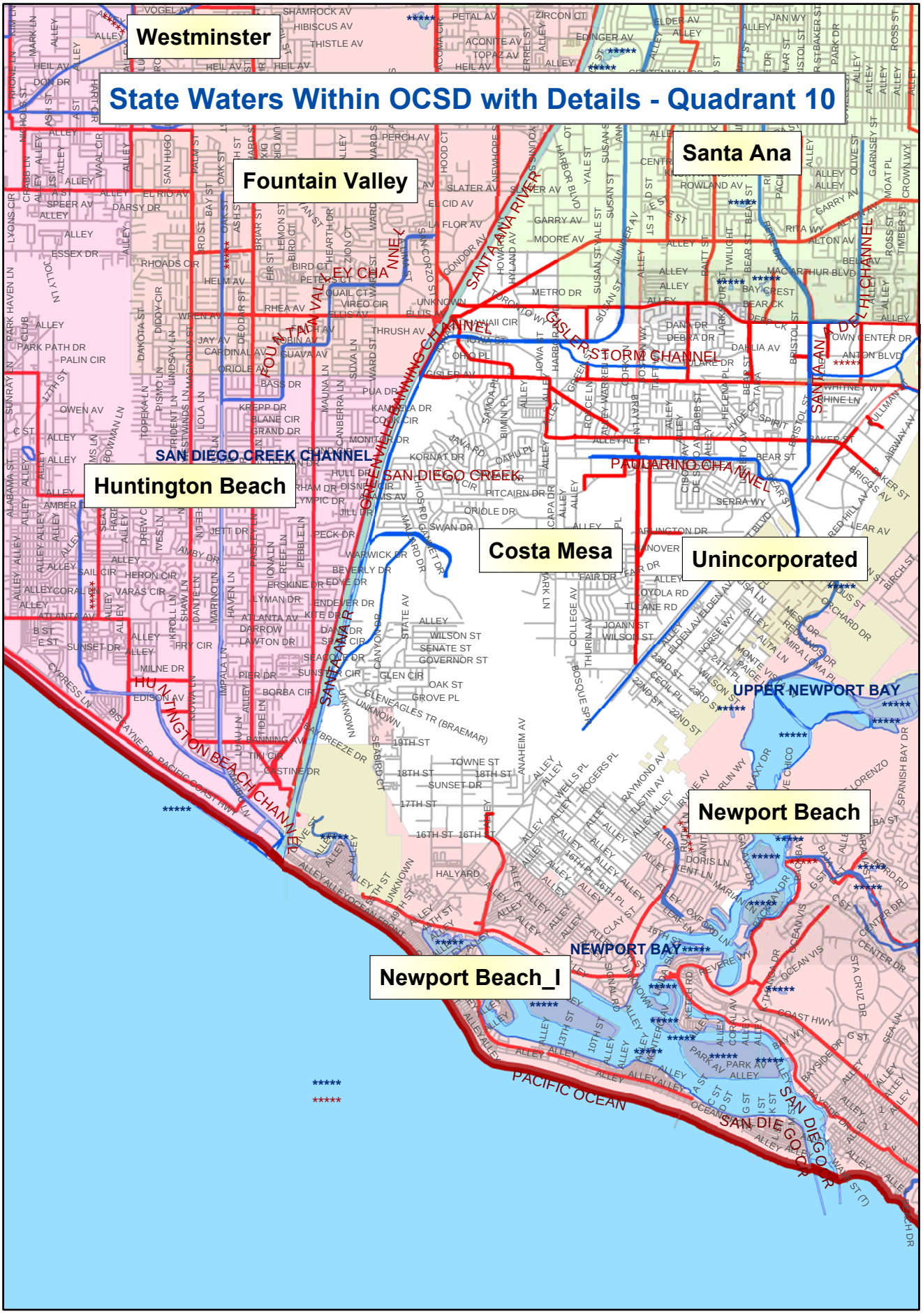
BROWN AND CALDWELL

0 0.3 0.6 1.2 Miles

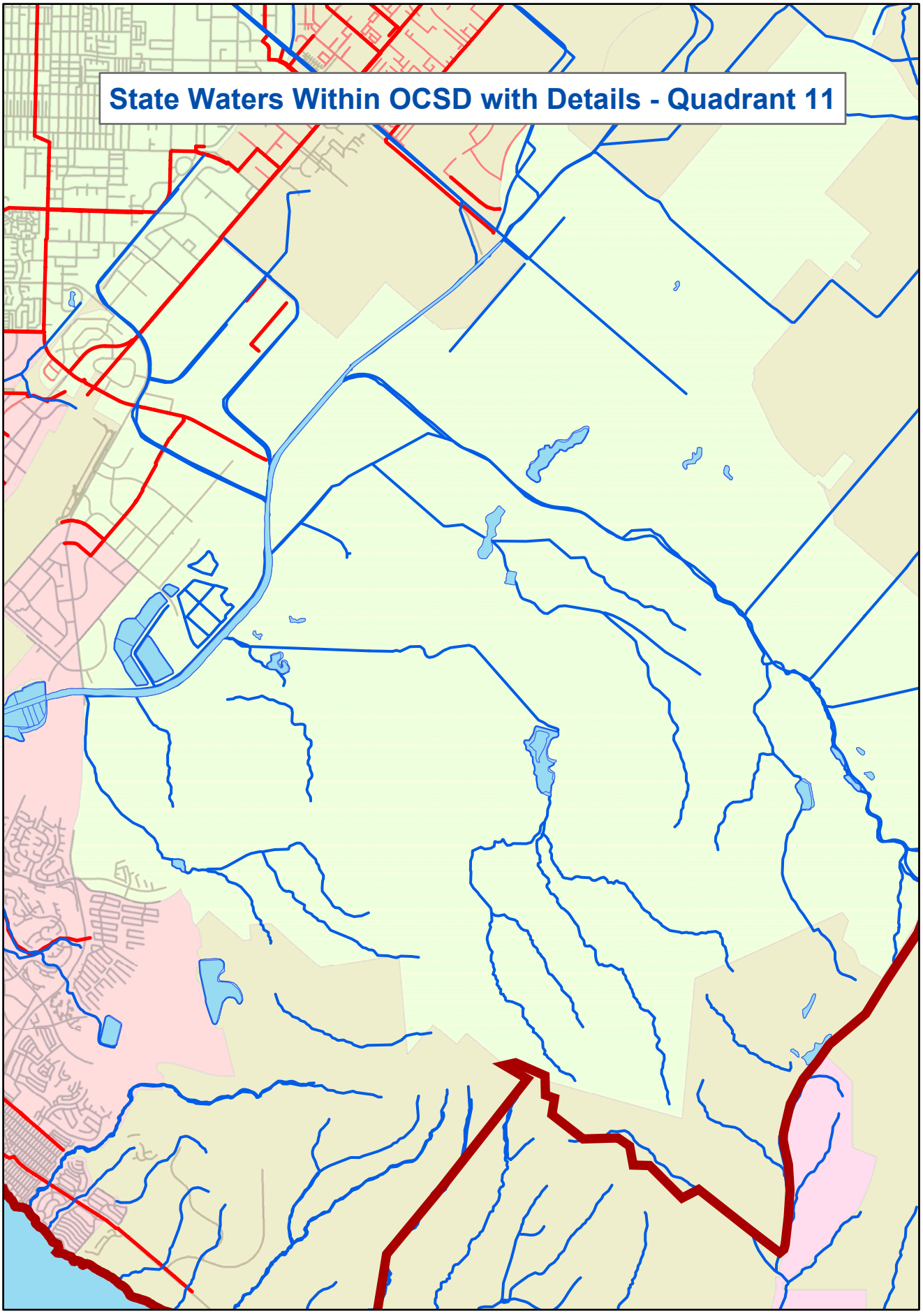
N

Legend

- OCSD_MAINTAINED_SEWERS
- OCSD_OWNED_SEWERS
- RUNNING WATER - Hydro_L
- RUNNUNG WATER - Hhydl_059
- RUNNING WATER - Hyda_059
- WATERS OF THE STATE - Hyda_059
- WATERS OF THE STATE - Hydro_P
- OCSD BOUNDARY


State Waters Within OCSD with Details - Quadrant 10
Westminster
Fountain Valley
Santa Ana
Huntington Beach
Costa Mesa
Unincorporated
Newport Beach
Newport Beach_I
SAN DIEGO CREEK CHANNEL
SAN DIEGO CREEK
GREENVILLE-BANNING CHANNEL
SANTA ANA RIVER
GISLER-STORM CHANNEL
SANTA ANA-DELHI CHANNEL
PACIFIC OCEAN
UPPER NEWPORT BAY
NEWPORT BAY
HUNTINGTON BEACH CHANNEL
Legend
OCSD_MAINTAINED_SEWERS
OCSD_OWNED_SEWERS
RUNNING WATER - Hydro_L
RUNNUNG WATER - Hhydl_059
RUNNING WATER - Hyda_059
WATERS OF THE STATE - Hyda_059
WATERS OF THE STATE - Hydro_P
OCSD BOUNDARY
BROWN AND CALDWELL
0 0.3 0.6 1.2 Miles
N

State Waters Within OCSD with Details - Quadrant 11



BROWN AND CALDWELL

0 0.3 0.6 1.2 Miles

N

Legend

- OCSD_MAINTAINED_SEWERS
- OCSD_OWNED_SEWERS
- RUNNING WATER - Hydro_L
- RUNNUNG WATER - Hhydl_059
- RUNNING WATER - Hyda_059
- WATERS OF THE STATE - Hyda_059
- WATERS OF THE STATE - Hydro_P
- OCSD BOUNDARY

State Waters Within OCSD with Details - Quadrant 12

SIPHON RESERVOIR
SIPHON
LAMBERT RESERVOIR
Bee Canyon Wash
BORREGO CANYON WASH
SERRANO CREEK
SAN DIEGO CREEK
San Diego Creek
UNIDENTIFIED

Unincorporated
Irvine
Lake Forest
Mission Viejo
Laguna Hills

BROWN AND CALDWELL

0 0.3 0.6 1.2 Miles

N

Legend

- OCSD_MAINTAINED_SEWERS
- OCSD_OWNED_SEWERS
- RUNNING WATER - Hydro_L
- RUNNUNG WATER - Hhydl_059
- RUNNING WATER - Hyda_059
- WATERS OF THE STATE - Hyda_059
- WATERS OF THE STATE - Hydro_P
- OCSD BOUNDARY

SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix E

Legal Authority

Placentia Municipal Code

Title 16 SEWERS AND STORM DRAINS

Chapter 16.04 INDUSTRIAL WASTE

16.04.010 Definitions.
16.04.020 Purpose—Permission to discharge industrial waste.
16.04.030 Permit—Required.
16.04.040 Permit—Application—Contents.
16.04.050 Investigation and granting permit.
16.04.060 Conditional permit.
16.04.070 Several applicants—Prorate.
16.04.080 Revocation of permit—Overloading.
16.04.090 Permit to deposit industrial waste in ditch or pond.
16.04.100 Application for permit.
16.04.110 Granting of permit.
16.04.120 Fee for discharging industrial waste.
16.04.130 Deposit may be required.
16.04.140 Appeal to council.

Chapter 16.08 WATER POLLUTION

16.08.010 Enforcement—Administration.
16.08.020 Definitions.
16.08.030 Notice.
16.08.040 Pollution of water prohibited.
16.08.050 Permits for disposal of industrial wastes.
16.08.060 Permits—Application—Filing.
16.08.070 Permits—Application—Time for action.
16.08.080 Permits—Issuance when.
16.08.090 Permits—Not authorization of certain acts.
16.08.100 Permits—Term.
16.08.110 Permits—Transfer.
16.08.120 Enforcement.
16.08.130 Tests—Inspections.
16.08.140 Cooperation by other departments.
16.08.150 Notice of violation.
16.08.160 Cessation of activities.
16.08.170 Suspension of permit.
16.08.180 Revocation of permits—Grounds.
16.08.190 Revocation of permits—Proceedings.
16.08.200 Hearing—Request—Generally.
16.08.210 Hearing—Request—Grounds.
16.08.220 Hearing—Notice.
16.08.230 Hearing—Appearance.
16.08.240 Hearing—Decision.

Chapter 16.12 SEWER CONNECTIONS

16.12.010 Definitions.
16.12.020 Mandatory.
16.12.030 Connection charge.
16.12.040 Payment of charge condition for filing tract map.
16.12.050 Payment prerequisite to sewer services.
16.12.060 Right of city to disconnect for no payment.
16.12.070 Cesspools—Restrictions.
16.12.080 Cesspools—Use—Discontinuance.
16.12.090 Permit—Required—Fee.

16.12.100 Permit—Application—Issuance.
16.12.110 Permit—Appeal—Work standards.
16.12.120 Separate connection for each building—Exceptions.
16.12.130 Connections to old sewers.
16.12.140 Maintenance of sewer laterals.

Chapter 16.16 SEWER CONNECTIONS OUTSIDE CITY

16.16.010 Applicability.
16.16.020 Sewer maintenance fee—Established.
16.16.030 Sewer maintenance fee—Amount.
16.16.040 Collection of fees.

Chapter 16.20 STORMWATER RUNOFF AND URBAN POLLUTANT CONTROL

Note
16.20.010 Purpose.
16.20.020 Definitions.
16.20.030 Prohibition on illicit connections and prohibited discharges.
16.20.040 Control of urban runoff.
16.20.050 Inspections.
16.20.060 Permits.
16.20.070 Enforcement.
16.20.080 Interagency cooperation.
16.20.090 Compliance disclaimer.

Chapter 16.24 APPLICABLE TO FOOD SERVICE ESTABLISHMENTS FOR CONTROLLING FATS, OILS AND GREASE

16.24.010 General provisions.
16.24.020 General limitations, prohibitions, and requirements on fats, oils, and grease ("FOG") discharges.
16.24.030 FOG wastewater discharge permits for food service establishments.
16.24.040 Facilities requirements.
16.24.050 Monitoring, reporting, notification and inspection requirements.
16.24.060 Enforcement.
16.24.070 Severability.
16.24.080 California Building Standards Law findings.

View the mobile version.

Chapter 16.04 INDUSTRIAL WASTE

16.04.010 Definitions.

For the purpose of this title certain words and terms are defined as follows:

(1) “Domestic sewage” means water which has been used for washing and flushing waste products from the home;

(2) “Equivalent of domestic sewage” means wastes not constituting a greater load of oxidizable organic material and settleable solids or otherwise constituting a greater loading or burden upon treatment plants, or otherwise requiring greater, more or different treatment, care and attention than domestic sewage;

(3) “Industrial wastes” means fluid wastes incident to the operation of oil wells and refineries and other oil field operations, canneries, creameries, wineries, laundries, distilleries, all other similar and dissimilar fluid wastes and sewage of every kind other than domestic sewage. (Prior code § 26-1)

16.04.020 Purpose—Permission to discharge industrial waste.

The sewage disposal system of the city and the county sanitation district No. 2 were constructed and are operated and maintained primarily for the disposal of domestic sewage.

The disposition of industrial wastes shall be permitted through the sewage systems only to the extent that the same may be done without interfering with the ability of said systems to dispose of domestic sewage. Industrial wastes shall not be permitted in said systems to an extent or of such a character as to cause overloading of the. carrying capacity or of the treatment capacity of said systems, or of such character or quantities as to cause damage to the facilities thereof. Said sewage disposal systems must be operated in such a manner as not to constitute a nuisance or to cause odorous or other objectionable conditions along transmission lines or in the vicinity of treatment plants and other facilities of said systems. (Prior code § 26-2)

16.04.030 Permit—Required.

Before any person discharges industrial wastes into the municipal sewers of the city, it shall be the duty of such person to first apply to, and obtain from, the city engineer a permit therefor. (Prior code § 26-3)

16.04.040 Permit—Application—Contents.

Application for permit to discharge industrial wastes in the municipal sewer shall be made in writing to the city engineer and shall contain the following information:

(1) Name and address of applicant;

(2) Location of connection or proposed connection with municipal sewers;

(3) Estimated gallonage of wastes proposed to be discharged and statement as to approximate time of discharging same, together with information as to peak loads, and such other similar data as the city engineer may by rule prescribe;

(4) Statement of the character of waste proposed to be discharged, including such detail in connection therewith as the city engineer may by rule prescribe. (Prior code § 26-4)

16.04.050 Investigation and granting permit.

Upon receipt of an application, as provided for in Section 16.04.040, the city engineer shall promptly give the same his consideration and make such investigation relating thereto as he deems necessary. In the event that the city engineer finds and determines:

(1) That there is unused carrying and treatment capacity not necessary for the disposition of domestic sewage of the city;

(2) That the amount and character of the wastes proposed to be discharged by applicant is such that the same can be transported and treated in such a manner that an effluent will result which complies with all applicable state laws and regulations, and which, in the opinion of the city engineer, will not result in a nuisance nor any objectionable or unpleasant odors along the pipe fines or in the vicinity of treatment plants and other facilities;

(3) That such wastes will not result in damage to pipe lines and other disposal facilities, he shall issue to applicant a permit, as requested. (Prior code § 26-5)

16.04.060 Conditional permit.

The city engineer, in his discretion, and toward the end of fulfilling the intent and purpose of this chapter may grant an application in part only, and may prescribe conditions with respect to discharge of such wastes into such sewers, and may require treatment thereof by applicants before granting a permit. (Prior code § 26-6)

16.04.070 Several applicants—Prorate.

In the event of demands upon the sewer systems by several applicants which in the aggregate exceed the surplus capacity of such systems, the city engineer shall prorate among the several applicants the available carrying and treatment capacity upon an equitable basis, taking into consideration the total amount of industrial wastes of each applicant and the character and quantity of such wastes. (Prior code § 26-7)

16.04.080 Revocation of permit—Overloading.

In the event that after the granting of a permit, as provided for in this title, it shall develop by reason of increased flow of domestic sewage, or for any cause whatever, that the discharging of such wastes in pursuance of such permit, causes the carrying or treatment capacity of said systems to be exceeded, or causes a nuisance or objectionable or unpleasant odors or conditions along the lines or in the vicinity of treatment plants or other facilities, or resulting in damage to pipelines or other facilities then, in his discretion, the city engineer may revoke the permit, or may impose further conditions with respect thereto, toward the end of remedying such conditions. (Prior code § 26-8)

16.04.090 Permit to deposit industrial waste in ditch or pond.

No person shall dispose of industrial wastes, or solids therefrom, by depositing the same in ditches or natural water channels or in ponds for evaporation and percolation into the ground, or in beds for drying or by processing through chemical or biological or other type treatment works, without first obtaining a permit in accordance with the provisions of Section 16.08.050. (Prior code § 26-9)

16.04.100 Application for permit.

Application for such permit mentioned in Section 16.04.090, shall be in writing and filed in accordance with the provisions of Section 16.08.060. (Prior code § 26-10)

16.04.110 Granting of permit.

Such permit mentioned in Section 16.04.090, shall be granted in accordance with the provisions of Section

16.08.080. (Prior code § 26-11)

16.04.120 Fee for discharging industrial waste.

All persons to whom a permit shall have been granted for the disposition of industrial wastes into the sewer system of the city, shall pay to the city as rental for the use of such facilities as follows:

(1) For the first seventy-two thousand gallons in any day, no charge;

(2) For all quantities in excess of seventy-two thousand gallons per day, there shall be paid a base charge of ten dollars per million gallons. The base charge shall be deemed to cover the cost of gravity transmission of the equivalent of domestic sewage only, and shall not include the cost of extra pumping, treatment, chlorination or other service or attention that may be required to dispose of such wastes. The city engineer shall in each case, determine the cost to the city for pumping, treatment, chlorination and any other attention or service required in order to properly dispose of such industrial wastes, which amount shall be added to the base charge. The charges provided for in this paragraph shall be billed on the first day of each month covering the preceding calendar month, and shall then be immediately due and payable. (Prior code § 26-12)

16.04.130 Deposit may be required.

The city engineer shall have full authority to require of any person disposing of industrial wastes, to make a deposit in such reasonable amount as he may consider necessary in order to secure to the city the payment of the charges herein provided for. The city engineer may require meters to be installed to determine the quantity of industrial wastes, and may require the installation and maintenance of such devices and apparatus as he may, in his discretion, deem necessary to determine or record the character and quantity of such industrial wastes. (Prior code § 26-13)

16.04.140 Appeal to council.

Any person dissatisfied with the action of the city engineer. in denying or granting a permit, as provided for in this title, or with any condition imposed by such permit, may within ten days appeal to the council, by giving notice thereof to the city engineer and to the city clerk. In the event of such an appeal, the city engineer shall transmit to the city clerk all papers on file in his office relating to the matter and copies of all reports and other data relating thereto, and at the next ensuing meeting of the council the matter shall either be determined or a time set therefor. The council shall have full power to review any action of the city engineer. (Prior code § 26-14)

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Chapter 16.08 WATER POLLUTION

16.08.010 Enforcement—Administration.

The county and all of its offices, employees and agents are authorized and empowered to enforce and administer the provisions of this chapter within the city. (Prior code § 26-15)

16.08.020 Definitions.

As used in this chapter unless the context otherwise requires:

(1) "Department" means any department of the city or the county;

(2) "Director" means the duly appointed administrator of Ordinance No. 703 appointed by the board of supervisors of the county;

(3) "Industrial waste" means any and all liquid or solid waste substance, not sewage from any producing, manufacturing or processing operation of whatever nature. It includes sewage mixed with "industrial waste"; however, it shall not include domestic sewage from residences, business buildings and institutions, containing only waste from waterclosets, wash water, baths and kitchens;

(4) "Pollution of underground or surface waters" means any condition resulting from the depositing or discharging of industrial waste which impairs or contributes to the impairment of the usefulness of waters for human or animal consumption or domestic, agricultural, industrial, or recreational purposes, or any other useful purposes;

(5) "Public agency" means and includes the United States or any department or agency thereof, the state or any department or agency thereof, county, city, public corporation, municipal corporation or public district;

(6) "Public sewer" means the main line sewer, publicly owned or maintained, constructed in a street, highway, alley, place or right-of-way dedicated to public use;

(7) "Sewage" means any waste, liquid or otherwise associated with human occupancy of buildings including sewage effluent and water contaminated with offal, filth and feculent matter.

(8) "Underground" or "surface water" means any surface or subterranean stream, watercourse, lake or other body or water, and includes water wells and any underground or surface storage reservoir, whether natural or artificial. (Prior code § 26-16)

16.08.030 Notice.

Unless otherwise expressly provided, any notice under this chapter required to be given by the board of supervisors or the director shall be in writing and may be served either in the manner provided in the Code of Civil Procedure for the service of process or by registered mail. When service is by registered mail, the notice shall be sent to the last address given to the director.

The failure to comply with a notice of violation issued and served pursuant to this chapter constitutes a wilful violation of this chapter and each day of wilful violation constitutes a separate offense punishable as provided for in this code. (Prior code § 26-17)

16.08.040 Pollution of water prohibited.

No person shall discharge or deposit or cause or suffer to be discharged or deposited from any source any industrial waste in a manner which will or may cause or result in the pollution of any underground or surface waters. (Prior code

§ 26-18)

16.08.050 Permits for disposal of industrial wastes.

No person shall discharge or deposit or cause or suffer to be deposited or discharged any industrial waste into or upon any area in the city, or into any underground or surface waters in the city where such industrial waste is or may be deposited upon or may be carried through or over any area of the city or county, except in conformity with the provisions of this chapter, and unless he shall have first secured, in the manner hereinafter provided, a permit so to do from the director. (Prior code § 26-19)

16.08.060 Permits—Application—Filing.

Applications for permits required hereunder shall be filed with the director upon printed forms to be prescribed and supplied by him. The director may require any additional information, including plans and specifications, which he may deem necessary for the proper disposition of the application. (Prior code § 26-20)

16.08.070 Permits—Application—Time for action.

Within thirty days after the receipt of all of the information requested of an applicant, the director shall either grant or deny the permit and shall immediately notify the applicant by first class mail of the action taken. (Prior code § 26-21)

16.08.080 Permits—Issuance when.

The director shall issue a permit:

(1) For industrial waste disposal if he determines that:

(A) The material to be discharged or deposited in the manner proposed will not cause or result in the pollution of any underground or surface waters, as herein prohibited, and that

(B) Under existing circumstances and conditions it is reasonable and necessary to dispose of the waste in the manner proposed;

(2) The director may incorporate in any permit issued pursuant to this chapter, such limitations or conditions as may be reasonably necessary to effectuate the purpose of this chapter and may from time to time, review the limitations or conditions which have been incorporated in any permit theretofore issued, giving consideration to changed conditions, and may, whenever in his judgment, it is advisable or required in order to maintain the waters of the city and county free from pollution, alter, revise, modify, delete, or add further limitations or conditions applicable to any permit theretofore issued. No such alterations, revision, modification, deletion or addition of limitations or conditions shall be effective, however, until notice in writing thereof shall have been served upon the permittee in the manner provided by Section 16.08.030. (Prior code § 26-22)

16.08.090 Permits—Not authorization of certain acts.

A permit issued under this chapter does not authorize any act or acts forbidden by any law, rule, regulation or order of any public agency or department and such fact shall be so stated on the face of all permits issued. (Prior code § 26-23)

16.08.100 Permits—Term.

A permit for the disposal of industrial waste shall be valid until suspended or revoked in the manner hereinafter provided. (Prior code § 26-24)

16.08.110 Permits—Transfer.

The director may transfer a permit to the successor in interest of a permittee upon the filing by the successor in interest of a written application therefor, together with such evidence of transfer of title or interest as the director may require: provided, however, a permit shall not be transferable from one location to another. The director shall immediately notify, by first class mail, the person requesting a transfer of a permit of the action taken. (Prior code § 26-25)

16.08.120 Enforcement.

The director shall enforce this chapter and shall, upon his own initiative, or may upon the complaint of a third person, investigate any violation of this chapter, or of any permit issued hereunder. For such purpose, he shall have the powers of a peace officer. (Prior code § 26-27)

16.08.130 Tests—Inspections.

For the purpose of securing compliance with this chapter, the director shall make periodic tests of samples of industrial waste obtained from the place or places of discharge or deposit, and such other tests deemed necessary for proper administration hereof. For the purpose of making such tests or inspections, the director or his duly authorized deputies or agents shall be permitted at all reasonable hours to enter any premises or place where industrial waste is being or is proposed to be discharged or deposited, or where there may be a violation of this chapter. (Prior code § 26-28)

16.08.140 Cooperation by other departments.

In carrying out the duties imposed upon him, the director may request and receive the aid of any other city or county department. (Prior code § 26-29)

16.08.150 Notice of violation.

Whenever the director finds that any person is acting in violation of any provision of this chapter or of any permit issued hereunder, he shall serve upon the person causing or suffering such violation to be committed, including the permittee, if a permit has been issued, a notice of violation. The notice shall state the act or acts constituting the violation and shall direct that the violation be corrected within such time to be specified in the notice as the director may deem reasonable. (Prior code § 26-30)

16.08.160 Cessation of activities.

Whenever the director finds that the continued violation of any provision of this chapter or of the conditions of any permit issued hereunder is so aggravated that the prevention of pollution of underground or surface waters requires the immediate cessation of the activities causing the violation, he may so direct in the notice of violation. A person who has been so notified shall immediately cease all such activities and shall not resume them until the director determines that all of the violations charged in the notice have been corrected. (Prior code § 26-31)

16.08.170 Suspension of permit.

The director may suspend a permit by giving notice thereof to the permittee:

(1) When a permittee fails to rectify a violation within the time specified in a notice thereof; or

(2) When a violation is so aggravated as to require cessation of activities as provided in Section 16.08.160.

A permit suspended by the director shall be reinstated by him when all of the violations charged in a notice thereof have been corrected. (Prior code § 26-32)

16.08.180 Revocation of permits—Grounds.

The board of supervisors may, after notice and hearing as hereinafter provided, revoke a permit on any one or more of the following grounds:

(1) Fraud or deceit in obtaining a permit;

(2) Failure of a permittee to correct a violation within the time prescribed in a notice of violation;

(3) Wilful violation of any provisions of this chapter, of a condition or limitation of a permit, or of any lawful order of the director. (Prior code § 26-33)

16.08.190 Revocation of permits—Proceedings.

Proceedings for the revocation of a permit may be initiated:

(1) By the director by serving upon the permittee a copy of and filing with the county clerk, a written recommendation of revocation setting forth the grounds therefor and requesting a hearing thereon before the board of supervisors; or

(2) By the board of supervisors, on its own motion or upon the complaint of a third person, by serving or causing to be served upon the permittee and the director a notice of intention to revoke, setting forth the grounds therefor and designating a time and place for hearing thereon. (Prior code § 26-34)

16.08.200 Hearing—Request—Generally.

A person who is dissatisfied with an action of the director may request a hearing before the board of supervisors. (Prior code §§ 26-26 and 26-35)

16.08.210 Hearing—Request—Grounds.

Any person who feels himself aggrieved by an action of the director:

(1) Denying an application for a permit or incorporating limitations or conditions in a permit;

(2) Denying an application for the transfer of a permit;

(3) Ordering the correction of a violation of any provision of this chapter, or of a condition or limitation of a permit issued hereunder;

(4) Directing the cessation of operations pending the correction of a violation; or

(5) Suspending or refusing to reinstate a permit suspended by him; may, within thirty days after receipt of a notice of the action complained of, serve upon the director a copy of and file with the county clerk a written request for a hearing before the board of supervisors. The request shall set forth in concise language the particular action or actions complained of and the reasons why the person or permittee feels himself aggrieved thereby.

Failure to file a request for hearing within the time prescribed herein shall constitute a waiver of any objection to the action of the director and his action shall be final. (Prior code § 26-36)

16.08.220 Hearing—Notice.

When a request for heating is filed with the county clerk, the board of supervisors shall set the matter for heating and give notice of the time and place thereof to the person requesting the hearing, the director, and any other person or public agency requesting notice thereof. The hearing shall be held not more than thirty days after a written request

therefor has been filed with the county clerk and not less than ten days after the issuance of the notice thereof. (Prior code § 26-37)

16.08.230 Hearing—Appearance.

At the time and place set for heating, the person requesting the hearing, the director, and any interested person or public agency may appear and be heard either in person or by counsel. (Prior code § 26-38)

16.08.240 Hearing—Decision.

The board of supervisors shall, within thirty days after conclusion of the hearing, render its decision. The board of supervisors may:

(1) Confirm the action of the director;

(2) Direct the director to issue a permit with or without such conditions or limitations as the board may deem appropriate;

(3) Vacate or modify the suspension of permit;

(4) Cancel a notice of violation or modify such notice in such particulars as the board may deem appropriate;

(5) Direct the director to transfer a permit;

(6) Revoke a permit on any of the grounds specified in Section 16.08.180;

(7) Make such other disposition of the matter heard as may be appropriate and in conformity with this chapter. (Prior code § 26-39)

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Chapter 16.12 SEWER CONNECTIONS

16.12.010 Definitions.

For the purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them in this section:

(1) "Building" means a structure entirely separate from any other structure by a space or by walls in which there are no communicating doors or windows or similar openings;

(2) "Chief building official" means the chief building official of the city or his duly authorized representative;

(3) "Lot" means any piece or parcel of land as bounded, defined or shown upon the latest map, plan or deed recorded in the office of the county recorder or upon the assessor's map as prepared by the county assessor;

(4) "Main sewer" means a main pipe line sewer of the city laid in the streets, alleys and along the rights-of-way for the collection of sewage from connecting sewers and conveying the same to the outfall sewer;

(5) "Sewer lateral" means that portion of the sewer system which extends from the main sewer to the building or structure served. (Prior code § 26-40)

16.12.020 Mandatory.

All buildings or other structures which contain any plumbing fixtures and which are located within the city limits must be connected to a public sewer except as otherwise provided in Section 16.12.080. (Prior code § 26-41)

16.12.030 Connection charge.

All property of every kind within the city limits, excepting:

(1) Property within the Placentia sanitary district which was improved and taxes paid upon such improved property to said district prior to June 30, 1954; and, excepting further;

(2) All property served by the Yorba Linda County water district pursuant to the terms of an agreement between said district and the city dated June 10, 1964, shall upon being furnished sewer services or subdivided be charged, in addition to other charges as established, pay a connection charge in the amount established by city council resolution. This payment shall be made as a connection charge and shall be paid prior to the connecting up or furnishing of sewer facilities to the property and the owner of the property. (Ord. O-2007-07 § 20, 2007; Ord. 71-O-127 § 1, 1971; prior code § 26-42)

16.12.040 Payment of charge condition for filing tract map.

In connection with property subject to such charge which is hereafter subdivided and tract map placed of record, that the payment of such connection charge shall be a condition of the filing and approval of a tract map and shall be a part of the improvements to be made by the subdivider in accordance with the subdivision contract and a part for which the subdivision bondsman shall be liable. (Prior code § 26-43)

16.12.050 Payment prerequisite to sewer services.

No sewer facilities shall be furnished or connection made for the furnishing of sewer facilities to the property or any person for which the charge in Section 16.12.030 is applicable unless such charge is paid. (Prior code § 26-44)

16.12.060 Right of city to disconnect for no payment.

The connection of any sewer facilities without the payment of the charges provided for in this chapter gives the city the right to go upon private or public property and disconnect the sewer facilities. (Prior code § 26-45)

16.12.070 Cesspools—Restrictions.

No person shall make any connection with any cesspool or other facility for depositing sewage, except with and into the city sewage disposal lines when the property
or place so to be connected, fronts upon or is located within two hundred feet of a constructed, completed and accepted city main line sewer; provided, however, that the provisions of this section shall be construed and applied in conformity with Section 16.12.080. (Prior code § 26-46)

16.12.080 Cesspools—Use—Discontinuance.

On any lot where there is an existing cesspool or other place where sewage is being deposited, such building may continue to be served from such cesspool or other facility; provided, however, no person shall continue to use any cesspool or place where sewage has been or is being deposited, which the county health officer finds unsuitable, after the expiration of thirty days from service of notice upon the property owner and/or occupant to this effect. Before the expiration of such thirty day period, such building or structure containing any plumbing fixtures shall be connected to the city sewage disposal system. (Prior code § 26-47)

16.12.090 Permit—Required—Fee.

No person shall make or attempt to make any connection with the main sewer lines of the city without first having secured a permit therefor and having paid the established connection fee. (Ord. 71-O-127 § 2, 1971; prior code § 26-48)

16.12.100 Permit—Application—Issuance.

A permit to make a sewer connection shall be granted upon application made upon blank forms furnished by the city, and in the manner as in such form prescribed, which application will be filed with the chief building official who is authorized to issue such a permit. (Prior code § 26-49)

16.12.110 Permit—Appeal—Work standards.

An appeal from the decision of the chief building official, as to the granting or denial of any sewer connection permit may be made to the city council. All sewer connections and pipe lines laid in connection with such permit shall be under the supervision of the chief building official and in conformity with city standards. (Prior code § 26-50)

16.12.120 Separate connection for each building—Exceptions.

Every building or other structure situated within the city shall be separately and independently connected with a connecting sewer, except where more than one building or other structure is situated upon the same lot, in which case all such buildings and structures may, by special permit authorized by the chief building official, be joined in the use of one house and connecting sewer; provided, however, that all such buildings and structures are owned by the same person. The same connecting sewer may, in special cases by special permission of the city council, be used to serve two or more lots. (Prior code § 26-51)

16.12.130 Connections to old sewers.

No building or other structure shall be connected to an old sewer, nor shall any old sewer line be used until a permit has been granted for so connecting and a certificate of inspection obtained from the chief building official. (Prior code § 26-52)

16.12.140 Maintenance of sewer laterals.

It shall be the responsibility of each property owner to maintain the sewer lateral serving his property in proper working order. (Prior code § 26-53)

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Chapter 16.16 SEWER CONNECTIONS OUTSIDE CITY

16.16.010 Applicability.

It is the intention of the city council that this chapter apply to all areas outside of the city that are served by sewers provided by the city. Sewer maintenance services are provided to properties located within the city as a city service included within the city tax rate. (Ord. 68-O-136 § 4, 1968)

16.16.020 Sewer maintenance fee—Established.

A sewer maintenance fee is established to cover the cost of serving, maintaining, and administering sewer services provided to property owners on property that is located outside of the city boundaries. (Ord. 68-O-136 § 1, 1968)

16.16.030 Sewer maintenance fee—Amount.

The sewer maintenance fee is set forth in Chapter 5.24 of this code. (Ord. 79-O-117 § 2, 1979; Ord. 68-O-136 § 2, 1968)

16.16.040 Collection of fees.

(1) Sewer maintenance fees shall be paid in a lump sum payment for the fifty-year life period.

(2) The city engineer shall compute and collect sewer maintenance fees at the time of issuance of sewer connection permits.

(3) The city engineer shall collect sewer acreage fees set forth in Chapter 5.24 of this code for all land uses. (Ord. 79-O-117 § 3, 1979; Ord. 68-O-136 § 3, 1968)

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Chapter 16.20 STORMWATER RUNOFF AND URBAN POLLUTANT CONTROL

Note

Sections:

16.20.010 Purpose.

16.20.020 Definitions.

16.20.030 Prohibition on illicit connections and prohibited discharges.

16.20.040 Control of urban runoff.

16.20.050 Inspections.

16.20.060 Permits.

16.20.070 Enforcement.

16.20.080 Interagency cooperation.

16.20.090 Compliance disclaimer.

16.20.010 Purpose.

(a) The Clean Water Act, 33 U.S.C. Section 1251, et seq., as amended, mandates, in part, that municipal separate storm sewer systems, such as in Placentia, obtain permits to "effectively prohibit nonstormwater discharges into the storm sewers" and "require controls to reduce the discharge of pollutants to the maximum extent practicable..." Permitting authority has been delegated by the United States Environmental Protection Agency to the state of California, which has authorized the State Water Resources Control Board and its local regulatory agencies, the Regional Water Quality Control Boards, to control nonpoint source discharges to California's waterways.

(b) The Santa Ana and San Diego Regional Water Quality Control Boards have addressed the obligation to implement the Clean Water Act by issuing waste discharge requirements governing stormwater runoff for the county of Orange, Orange County Flood Control District and the incorporated cities of Orange County. These permits shall be referred to collectively herein as the National Pollution Discharge Elimination System Permit ("NPDES permits").

(c) The city of Placentia is participating as a "co-permittee" under the NPDES permits in the development and adoption of an ordinance to accomplish the requirements of the Clean Water Act. The purpose of this chapter is to participate in the improvement of water quality and comply with federal requirements for the control of urban pollutants to stormwater runoff, which enters the network of storm drains throughout Placentia and Orange County. (Ord. O-2010-04 § 3, 2010)

16.20.020 Definitions.

"Authorized inspector" means the director of public works and persons designated by and under his or her instruction and supervision, who are assigned to investigate compliance with, detect violations of and/or take actions pursuant to this chapter.

"City" means the city of Placentia, California.

"Co-permittee" means the county of Orange, the Orange County Flood Control District, and/or any one of the thirty-one (31) municipalities, including the city, which are responsible for compliance with the terms of the NPDES permit.

"DAMP" means the Orange County Drainage Area Management Plan, as the same may be amended from time to time. A full, true and correct copy of said DAMP is maintained on file in the office of the director of public works of the city.

"Development project guidance" means DAMP Chapter VII and the Appendix thereto, entitled Best Management Practices for New Development Including Non-Residential Construction Projects, as the same may be amended from time to time.

"Discharge" means any release, spill, leak, pump, flow, escape, leaching (including subsurface migration or deposition to groundwater), dumping or disposal of any liquid, semi-solid or solid substance.

"Discharge exception" means the group of activities not restricted or prohibited by this chapter, including only:

Discharges composed entirely of stormwater; discharges subject to regulation under current EPA or Regional Water Quality Control Board issued NPDES permits, State General Permits, or other waivers, permits or approvals granted by an appropriate government agency; discharges from property for which best management practices set forth in the development project guidance are being implemented and followed; discharges to the stormwater drainage system from potable water line flushing, fire fighting activities, landscape irrigation systems, diverted stream flows, rising groundwater, and de minimis groundwater infiltration to the stormwater drainage system (from leaks in joints or connections or cracks in water drainage pipes or conveyance systems); discharges from potable water sources, passive foundation drains, air conditioning condensation and other building roof runoff; agricultural irrigation water runoff; water from crawl space pumps, passive footing drains, lawn watering, noncommercial vehicle washing; flows from riparian habitats and wetlands; dechlorinated swimming pool discharges; discharges of reclaimed water generated by a lawfully permitted water treatment facility; public street wash waters when related to cleaning and maintenance by, or on behalf of, the city; discharges authorized pursuant to a permit issued under Section 16.20.060 hereof; discharges allowable under the domestic sewage exception; discharges for which the discharger has reduced to the extent feasible the amount of pollutants in such discharge; and discharges authorized pursuant to federal or state laws or regulations.

In any action taken to enforce this chapter, the burden shall be on the person who is the subject of such action to establish that a discharge was within the scope of this discharge exception.

"Domestic sewage exception" means discharges which are exceptions to this chapter and excluded from the definition of prohibited discharge, as defined herein, including only discharges composed entirely of accidental spills of untreated sanitary wastes (commonly called domestic sewage) and other wastes, but limited solely to wastes that are controlled by and are within publicly owned wastewater treatment system collection facilities immediately prior to the accidental spill.

"Enforcing attorney" means the city attorney of the city of Placentia or his or her deputy or the district attorney acting as counsel to the city and designee, which counsel is authorized to take enforcement action pursuant to this chapter.

"EPA" means the United States Environmental Protection Agency.

"Hearing officer" means that person appointed pursuant to the provisions of Section 1.10.080 of the Placentia Municipal Code, as the same may be amended from time to time, who shall preside at the administrative hearings authorized by this chapter and issue final decisions on the matters raised in such administrative hearings.

"Illicit connection" means any man-made conveyance or drainage system, pipeline, conduit, inlet or outlet through which the discharge of any pollutant to the stormwater drainage system occurs or may occur. The term "illicit connection" shall not include legal nonconforming connections or connections to the stormwater drainage system that are hereinafter authorized by the agency with jurisdiction over the system at the location at which the connection is made.

"Invoice for costs" means the actual costs and expenses of the city including, but not limited to, administrative overhead, salaries and other expenses recoverable under state law, incurred during any inspection conducted pursuant to Section 16.20.050 or where a notice of noncompliance, administrative compliance order or other enforcement option under Section 16.20.070 is utilized to obtain compliance.

"Legal nonconforming connection" means connections to the stormwater drainage system existing as of the adoption of this chapter that were in compliance with all federal, state and local rules, regulations, statutes and

administrative requirements in effect at the time the connection was established, including but not limited to any discharge permitted pursuant to the terms and conditions of an individual discharge permit issued pursuant to Chapter 16.04 of the Placentia Municipal Code, as the same may be amended from time to time.

"New development" means all public and private residential (whether single-family, multi-unit or planned unit development), industrial, commercial, retail, and other nonresidential construction projects, or grading for future construction, for which either a discretionary land use approval, grading permit, building permit or nonresidential plumbing permit is required.

"Nonresidential plumbing permit" means a plumbing permit authorizing the construction and/or installation of facilities for the conveyance of liquids other than stormwater, potable water, reclaimed water or domestic sewage.

"NPDES permit" means the currently applicable municipal discharge permit(s) issued by the Regional Water Quality Control Board, Santa Ana Region, which permit(s) establishes waste discharge requirements applicable to stormwater runoff in the city.

"Person" means any natural person as well as any corporation, partnership, government entity or subdivision, trust, estate, cooperative association, joint venture, business entity, or other similar entity, or the agent, employee or representative of any of the foregoing.

"Pollutant" means any liquid, solid or semi-solid substances, or combination thereof, including, and not limited to:

(1) Artificial materials (such as floatable plastics, wood products or metal shavings);

(2) Household waste such as trash, paper, and plastics; cleaning chemicals; yard wastes; animal fecal materials; used oil and fluids from vehicles, lawn mowers and other common household equipment;

(3) Metals and nonmetals, including compounds of metals and nonmetals, (such as cadmium, lead, zinc, copper, silver, nickel, chromium, cyanide, phosphorus and arsenic), with characteristics which cause an adverse effect on living organisms;

(4) Petroleum and related hydrocarbons (such as fuels, lubricants, surfactants, waste oils, solvents, coolants and grease);

(5) Animal wastes (such as discharge from confinement facilities, kennels, pens and recreational facilities, including, stables, show facilities, or polo fields);

(6) Substances having a pH less than 6.5 or greater than 8.6, or unusual coloration, turbidity or odor;

(7) Waste materials and wastewater generated on construction sites and by construction activities (such as painting and staining; use of sealants and glues; use of lime; use of wood preservatives and solvents; disturbance of asbestos fibers, paint flakes or stucco fragments; application of oils, lubricants, hydraulic, radiator or battery fluids; construction equipment washing; concrete pouring and cleanup; use of concrete detergents; steam cleaning or sand blasting; use of chemical degreasing or diluting agents; and use of super chlorinated water for potable water line flushing);

(8) Materials causing an increase in biochemical oxygen demand, chemical oxygen demand or total organic carbon;

(9) Materials which contain base/neutral or acid extractible organic compounds;

(10) Those pollutants defined in 33 U.S.C. Section 1362(6), as the same may be amended from time to time; and

(11) Any other constituent or material, including but not limited to pesticides, herbicides, fertilizers, fecal coliform, fecal streptococcus or enterococcus, or eroded soils, sediment and particulate materials, in quantities that will interfere with or adversely affect the beneficial uses of the receiving waters, flora or fauna of the state.

"Prohibited discharge" means any discharge which contains any pollutant, from public or private property to: (1) the stormwater drainage system; (2) any upstream flow, which is tributary to the stormwater drainage system; (3) any groundwater, river, stream, creek, wash or dry weather arroyo, wetlands area, marsh, coastal slough, or (4) any coastal harbor, bay, or the Pacific Ocean. The term prohibited discharge shall not include discharges allowable under the discharge exception.

"Significant redevelopment" means the rehabilitation or reconstruction of public or private residential (whether single-family, multi-unit or planned unit development), industrial, commercial, retail, or other nonresidential structures, for which either a discretionary land use approval, grading permit, building permit or nonresidential plumbing permit is required.

"State general permit" means either the state general industrial stormwater permit or the state general construction permit and the terms and requirements of either or both. In the event the EPA revokes the in-lieu permitting authority of the State Water Resources Control Board, then the term state general permit shall also refer to any EPA administered stormwater control program for industrial and construction activities.

"Stormwater drainage system" means street gutter, channel, storm drain, constructed drain, lined diversion structure, wash area, inlet, outlet or other facility, which is a part of or tributary to the county-wide stormwater runoff system and owned, operated, maintained or controlled by the county of Orange, the Orange County Flood Control District or any co-permittee city, and used for the purpose of collecting, storing, transporting, or disposing of stormwater. (Ord. O-2010-04 § 3, 2010)

16.20.030 Prohibition on illicit connections and prohibited discharges.

(a) No person shall:

(1) Construct, maintain, operate and/or utilize any illicit connection;

(2) Cause, allow or facilitate any prohibited discharge;

(3) Act, cause, permit or suffer any agent, employee, or independent contractor, to construct, maintain, operate or utilize any illicit connection, or cause, allow or facilitate any prohibited discharge.

(b) The prohibition against illicit connections shall apply irrespective of whether the illicit connection was established prior to the date of enactment of the ordinance codified in this chapter; however, legal nonconforming connections shall not become illicit connections until the earlier of the following:

(1) For all structural improvements to property installed for the purpose of discharge to the stormwater conveyance system, the expiration of five (5) years from the adoption of this chapter.

(2) For all nonstructural improvements to property existing for the purpose of discharge to the stormwater conveyance system, the expiration of six (6) months following delivery of a notice to the owner or occupant of the property, which states a legal nonconforming connection has been identified. The notice of a legal nonconforming connection shall state the date of expiration of use under this chapter.

(c) A violation of subsection (a) shall occur irrespective of the negligence or intent of the violator to construct, maintain, operate or utilize an illicit connection or to cause, allow or facilitate any prohibited discharge.

(d) If the authorized inspector reasonably determines that a discharge, which is otherwise within the discharge exception, may adversely affect the beneficial uses of receiving waters, then the authorized inspector may give written notice to the owner of the property or facility that the discharge exception shall not apply to the subject discharge following expiration of the thirty (30) day period commencing upon delivery of the no-

tice. Upon expiration of the thirty (30) day period any such discharge shall constitute a violation of subsection (a).

(e) The owner or occupant of property on which a legal nonconforming connection exists may request an administrative hearing, pursuant to the procedures set forth in Section 16.20.070(a)(6) through (10) for an extension of the period allowed for continued use of the connection. A reasonable extension of use may be authorized by the director of public works upon consideration of the following factors:

(1) The potential adverse effects of the continued use of the connection upon the beneficial uses of receiving waters;

(2) The economic investment of the discharger in the legal nonconforming connection; and

(3) The financial effect upon the discharger of a termination of the legal nonconforming connection. (Ord. O-2010-04 § 3, 2010)

16.20.040 Control of urban runoff.

(a) New Development and Significant Redevelopment.

(1) All new development and significant redevelopment within the city shall be undertaken in accordance with:

(a) The DAMP, including, but not limited to, the development project guidance; and

(b) Any conditions and requirements established by the development services and/or public works departments, which are reasonably related to the reduction or elimination of pollutants in stormwater runoff from the project site.

(2) Prior to the issuance by the city of a grading permit, building permit or nonresidential plumbing permit for any new development or significant redevelopment, the development services and/or public works departments shall review the project plans and impose terms, conditions and requirements on the project in accordance with this section. If the new development or significant redevelopment will be approved without application for a grading permit, building permit or nonresidential plumbing permit, the development services and/or public works departments shall review the project plans and impose terms, conditions and requirements on the project in accordance with this section prior to the issuance of a discretionary land use approval or, at the city's discretion, prior to recordation of a subdivision or parcel map.

(3) Notwithstanding the provisions of subsections (a)(1) and (2), compliance with the development project guidance shall not be required for construction of one (1) single-family detached residence unless the development services and/or public works departments determine that the construction may result in the discharge of significant levels of a pollutant into a tributary to the stormwater drainage system.

(4) Compliance with the conditions and requirements of the DAMP shall not exempt any person from the requirement to independently comply with each provision of this chapter.

(5) If the development services and/or public works departments determine that the project will have a de minimis impact on the quality of stormwater runoff, then they may issue a written waiver of the requirement for compliance with the provisions of the development project guidance.

(6) The owner of a new development or significant redevelopment project, or upon transfer of the property, its successors and assigns, shall implement and adhere to the terms, conditions and requirements imposed pursuant to subsection (a)(1) on a new development or significant redevelopment project. Each failure by the owner of the property or any successors or assigns, to implement and adhere to the terms, conditions and requirements imposed pursuant to subsection (a)(1) on a new development or significant redevelopment project shall constitute a violation of this chapter.

(7) The development services and/or public works departments may require that the terms, conditions and requirements imposed pursuant to subsection (a)(1) be recorded with the county recorder's office by the property owner. The signature of the owner of the property or any successive owner shall be sufficient for the recording of these terms, conditions and requirements and a signature on behalf of the city shall not be required for recordation.

(b) Cost Recovery. The city shall be reimbursed by the project applicant for all costs and expenses incurred by the development services and/or public works departments in the review of new development or significant development projects for compliance with the DAMP. The city council may, by resolution, elect to require a deposit of estimated costs and expenses, and the actual costs and expenses shall be deducted from the deposit, and the balance, if any, refunded to the project applicant.

(c) Litter Control. No person shall discard any waste material, including, but not limited to, common household rubbish or garbage of any kind (whether generated or accumulated at a residence, business or other location), upon any public property, whether occupied, open or vacant, including, but not limited to, any street, sidewalk, alley, right-of-way, open area or point of entry to the stormwater drainage system. (Ord. O-2010-04 § 3, 2010)

16.20.050 Inspections.

(a) Right to Inspect. Prior to commencing any inspection as herein authorized, the authorized inspector shall

obtain either the consent of the owner or occupant of the property or shall obtain an administrative inspection warrant or criminal search warrant.

(b) Entry to Inspect. The authorized inspector may enter property to investigate the source of any discharge to any public street, inlet, gutter, storm drain or the stormwater drainage system located within the jurisdiction of the city.

(c) Compliance Assessments. The authorized inspector may inspect property for the purpose of verifying compliance with this chapter, including, but not limited to: (1) identifying products produced, processes conducted, chemicals used and materials stored on or contained within the property; (2) identifying point(s) of discharge of all wastewater, process water systems and pollutants; (3) investigating the natural slope at the location, including drainage patterns and man-made conveyance systems; (4) establishing the location of all points of discharge from the property, whether by surface runoff or through a storm drain system; (5) locating any illicit connection or the source of prohibited discharge; (6) evaluating compliance with any permit issued pursuant to Section 16.20.060 hereof; and (7) investigating the condition of any legal nonconforming connection.

(d) Portable Equipment. For purposes of verifying compliance with this chapter, the authorized inspector may inspect any vehicle, truck, trailer, tank truck or other mobile equipment.

(e) Records Review. The authorized inspector may inspect all records of the owner or occupant of property relating to chemicals or processes presently or previously occurring on-site, including material and/or chemical inventories, facilities maps or schematics and diagrams, Material Safety Data Sheets, hazardous waste manifests, business plans, pollution prevention plans, state general permits, stormwater pollution prevention plans, monitoring program plans and any other record(s) relating to illicit connections, prohibited discharges, a legal nonconforming connection or any other source of contribution or potential contribution of pollutants to the stormwater drainage system.

(f) Sample and Test. The authorized inspector may inspect, sample and test any area runoff, soils area (including groundwater testing), process discharge, materials within any waste storage area (including any container contents), and/or treatment system discharge for the purpose of determining the potential for contribution of pollutants to the stormwater drainage system. The authorized inspector may investigate the integrity of all storm drain and sanitary sewer systems, any legal nonconforming connection or other pipelines on the property using appropriate tests, including, but not limited to, smoke and dye tests or video surveys. The authorized inspector may take photographs or video tape, make measurements or drawings, and create any other record reasonably necessary to document conditions on the property.

(g) Monitoring. The authorized inspector may erect and maintain monitoring devices for the purpose of measuring any discharge or potential source of discharge to the stormwater drainage system.

(h) Test Results. The owner or occupant of property subject to inspection shall, on submission of a written request, receive copies of all monitoring and test results conducted by the authorized inspector. (Ord. O-2010-04 § 3, 2010)

16.20.060 Permits.

(a) Discharge Permit Procedure.

(1) Permit. On application of the owner of property or the operator of any facility, which property or facility is not otherwise subject to the requirements of a state general permit or an NPDES permit regulating stormwater discharges, the director of public works may issue a permit authorizing the release of nonstormwater discharges to the stormwater drainage system if:

(A) The discharge of material or constituents is reasonably necessary for the conduct of otherwise legal activities on the property; and

(B) The discharge will not cause a nuisance, impair the beneficial uses of receiving waters, or cause any reduction in established water quality standards.

(2) Application. The applicant shall provide all information requested by the director of public works for review and consideration of the application, including, but not limited to, specific detail as to the activities to be conducted on

the property, plans and specifications for facilities located on the property, identification of equipment or processes to be used on-site and other information as may be requested in order to determine the constituents, and quantities thereof, which may be discharged if permission is granted.

(3) Permit Issuance. The permit shall be granted or denied by the director of public works or his or her designated representative, no later than sixty (60) business days following the completion and acceptance of the application as determined by the director of public works and the applicant shall be notified in person or by first-class mail, postage prepaid, of the action taken.

(4) Permit Conditions. The permit may include terms, conditions and requirements to ensure compliance with the objectives of this chapter and as necessary to protect the receiving waters, including, but not limited to:

(A) Identification of the discharge location on the property and the location at which the discharge will enter the stormwater drainage system;

(B) Identification of the constituents and quantities thereof to be discharged into the stormwater drainage system;

(C) Specification of pollution prevention techniques and structural or nonstructural control requirements as reasonably necessary to prevent the occurrence of potential discharges in violation of this chapter;

(D) Requirements for self-monitoring of any discharge;

(E) Requirements for submission of documents or data, such as technical reports, production data, discharge reports, self-monitoring reports and waste manifests; and

(F) Other terms and conditions appropriate to ensure compliance with the provisions of this chapter and the protection of receiving waters, including requirements for compliance with best management practices guidance documents approved by any federal, state or regional agency.

(5) General Permit. In the discretion of the director of public works the permit may, in accordance with the conditions identified in subsection (a)(4), be prepared as a general permit applicable to a specific category of activities. If a general permit is issued, any person intending to discharge within the scope of the authorization provided by the general permit may do so by filing an application to discharge with the director of public works. No discharge within the scope of the general permit shall occur until such application is so filed.

Notwithstanding the foregoing provisions of this subsection (5), the director of public works, in his or her discretion, may eliminate the requirement that an application for a general permit be filed for any specific activity for which a general permit has been issued.

(6) Permit Fees. Permission to discharge shall be conditioned upon the applicant’s payment of the city’s costs, in accordance with a fee schedule adopted by separate resolution, as follows:

(A) For individually issued permits, the costs of reviewing the permit application, preparing and issuing the permit, and the costs reasonably related to administrating this permit program.

(B) For general permits, the costs of reviewing the permit application, that portion of the costs of preparing the general permit which is reasonably attributable to the permittee’s application for the general permit, and the costs reasonably related to administering the general permit program.

(b) Permit Suspension, Revocation or Modification.

(1) The director of public works may suspend or revoke any permit when it is determined that:

(A) The permittee has violated any term, condition or requirement of the permit or any applicable provision of this chapter; or

(B) The permittee’s discharge or the circumstances under which the discharge occurs have changed so that it is no longer appropriate to except the discharge from the prohibitions on prohibited discharge contained within this chapter; or

(C) The permittee fails to comply with any schedule for compliance issued pursuant to this chapter; or

(D) Any regulatory agency, including EPA or a Regional Water Quality Control Board having jurisdiction over the discharge, notifies the city that the discharge should be terminated.

(2) The director of public works may modify any permit when it is determined that:

(A) Federal or state law requirements have changed in a manner that necessitates a change in the permit; or

(B) The permittee's discharge or the circumstances under which the discharge occurs have changed so that it is appropriate to modify the permit's terms, conditions or requirements; or

(C) A change to the permit is necessary to ensure compliance with the objectives of this chapter or to protect the quality of receiving waters.

The permittee, or in the case of a general permit, each person who has filed an application pursuant to subsection (a)(5), shall be informed of any change in the permit terms and conditions at least forty-five (45) business days prior to the effective date of the modified permit.

(3) The determination that a permit shall be denied, suspended, revoked or modified may be appealed by a permittee pursuant to the same procedures applicable to appeal of an administrative compliance order hereunder. In the absence of a judicial order to the contrary, the permittee may continue to discharge pending the final administrative decision of the hearing officer.

(c) Permit Enforcement Penalties. Any violation of the terms, conditions and requirements of any permit issued by the director of public works shall constitute a violation of this chapter and subject the violator to the administrative, civil and criminal remedies available under this chapter.

(d) Compliance with the terms, conditions and requirements of a permit issued pursuant to this chapter shall not relieve the permittee from compliance with all federal, state and local laws, regulations and permit requirements, applicable to the activity for which the permit is issued.

(1) Limited Permittee Rights. Permits issued under this chapter are for the person or entity identified therein as the "permittee" only, and authorize the specific operation at the specific location identified in the permit. The issuance of a permit does not vest the permittee with a continuing right to discharge.

(2) Transfer of Permits. No permit issued to any person may be transferred to allow:

(A) A discharge to the stormwater drainage system at a location other than the location stated in the original permit; or

(B) A discharge by a person other than the person named in the permit, provided however, that the city may approve a transfer if such written approval is obtained, in advance, from the director of public works. (Ord. O-2010-04 § 3, 2010)

16.20.070 Enforcement.

(a) Administrative Remedies.

(1) Notice of Noncompliance. The authorized inspector may deliver to the owner or occupant of any property, or to any person responsible for an illicit connection or prohibited discharge a notice of noncompliance. The notice of noncompliance shall be delivered in accordance with subsection (a)(6).

(A) The notice of noncompliance shall identify the provision(s) of this chapter or the applicable permit which has been violated. The notice of noncompliance shall state that continued noncompliance may result in additional enforcement actions against the owner, occupant and/or person.

(B) The notice of noncompliance shall state a compliance date that must be met by the owner, occupant and/or person; provided, however, that the compliance date may not exceed ninety (90) days unless the authorized inspector extends the compliance deadline an additional ninety (90) days where good cause exists for the extension.

(2) Administrative Compliance Orders. The authorized inspector may issue an administrative compliance order. The administrative compliance order shall be delivered in accordance with subsection (a)(6). The administrative compliance order may be issued to:

(A) The owner or occupant of any property requiring abatement of conditions on the property that cause or may cause a prohibited discharge or an illicit connection in violation of this chapter;

(B) The owner of property subject to terms, conditions or requirements imposed on a project under Section 16.20.040(a)(1) to ensure adherence to those terms, conditions and requirements.

(C) A permittee subject to the requirements of any permit issued pursuant to this section to ensure compliance with the terms, conditions and requirements of the permit.

(D) Any person responsible for an illicit connection or prohibited discharge.

(3) The administrative compliance order may include the following terms and requirements:

(A) Specific steps and time schedules for compliance as reasonably necessary to prevent the imminent threat of a prohibited discharge, including but not limited to a prohibited discharge from any pond, pit, well, surface impoundment, holding or storage area;

(B) Specific steps and time schedules for compliance as reasonably necessary to discontinue any illicit connection;

(C) Specific requirements for containment, cleanup, removal, storage, installation of overhead covering, or proper disposal of any pollutant having the potential to contact stormwater runoff;

(D) Any other terms or requirements reasonably calculated to prevent the imminent threat of or continuing violations of this chapter, including, but not limited to requirements for compliance with best management practices guidance documents promulgated by any federal, state of California or regional agency;

(E) Any other terms or requirements reasonably calculated to achieve full compliance with the terms, conditions and requirements of any permit issued pursuant hereto.

(4) Cease and Desist Orders. The authorized inspector may issue a cease and desist order. A cease and desist order shall be delivered in accordance with subsection (a)(6). A cease and desist order may direct the owner or occupant of any property and/or other person responsible for a violation of this chapter to:

(A) Immediately discontinue any illicit connection or prohibited discharge to the stormwater drainage system;

(B) Immediately contain or divert any flow of water off the property, where the flow is occurring in violation of any provision of this chapter;

(C) Immediately discontinue any other violation of this chapter;

(D) Clean up the area affected by the violation.

(E) The authorized inspector may direct by cease and desist order that the owner of any property or any permittee under any permit issued pursuant to this section immediately cease any activity not in compliance with the terms, conditions and requirements of the applicable permit.

(5) Recovery of Costs.

(A) The authorized inspector may deliver to the owner or occupant of any property, any permittee or any other person who becomes subject to a notice of noncompliance or administrative order, an invoice for costs. An invoice for costs shall be delivered in accordance with subsection (a)(6). An invoice for costs shall be immediately due and payable to the city for the actual costs incurred by the city in issuing and enforcing any notice or order.

(B) If any owner or occupant, permittee or any other person subject to an invoice for costs fails to either pay the invoice for costs or appeal successfully the invoice for costs in accordance with subsection (a)(7), the enforcing attorney may then institute collection proceedings.

(6) Delivery of Notice. Any notice of noncompliance, administrative compliance order, cease and desist order or invoice of costs to be delivered pursuant to the requirements of this chapter shall be subject to the following:

(A) The notice shall state that the recipient has a right to appeal the matter as set forth in subsections (a)(7) through (11).

(B) Delivery shall be deemed complete upon: (i) personal service to the recipient; (ii) deposit in the U.S. mail, postage pre-paid for first class delivery; or (iii) facsimile service with confirmation of receipt.

(C) Where the recipient of notice is the owner of the property, the address for notice shall be the address from the most recently issued equalized assessment roll for the property or as otherwise appears in the current records of the

city.

(D) Where the owner or occupant of any property cannot be located after the reasonable efforts of the authorized inspector, a notice of noncompliance or cease and desist order shall be deemed delivered after posting on the property for a period of ten (10) business days.

(7) Administrative Hearing for Notices of Noncompliance, Administrative Compliance Orders, Invoices for Costs and Adverse Determinations. Except as set forth in subsection (a)(9), any person receiving a notice of noncompliance, administrative compliance order, a notice of legal nonconforming connection, an invoice for costs, or any person who is subject to any adverse determination made pursuant to this chapter, may appeal the matter by requesting an administrative hearing. Notwithstanding the foregoing, these administrative appeal procedures shall not apply to criminal proceedings initiated to enforce this chapter.

(8) Request for Administrative Hearing. Any person appealing a notice of noncompliance, an administrative compliance order, a notice of legal nonconforming connection, an invoice for costs or an adverse determination shall, within ten (10) days of receipt thereof, file a written request for an administrative hearing, accompanied by an administrative hearing fee as established by separate resolution, with the office of the city clerk with a copy of the request for administrative hearing mailed on the date of filing to the director of public works and the city attorney. Said request for administrative hearing shall be filed in accordance with the procedures set forth in Section 1.10.070 of Title 1 of the Placentia Municipal Code and the hearing officer shall be appointed as provided in Section 1.10.080 of Title 1 of the Placentia Municipal Code.

(9) Administrative Hearing for Cease and Desist Orders and Emergency Abatement Actions. An administrative hearing on the issuance of a cease and desist order or following an emergency abatement action shall be held within five (5) business days following the issuance of the order or the action of abatement, unless the hearing (or the time requirement for the hearing) is waived in writing by the party subject to the cease and desist order or the emergency abatement. A request for an administrative hearing shall not be required from the person subject to the cease and desist order or the emergency abatement action.

(10) Hearing Proceedings. Administrative hearings shall be conducted in accordance with the provisions of Section 1.10.090 of Title 1 of the Placentia Municipal Code.

(11) Final Decision and Appeal.

(A) The final decision of the hearing officer shall issue within ten (10) business days of the conclusion of the hearing in accordance with the provisions of Section 1.10.100 of the Placentia Municipal Code. The final decision shall include notice that any legal challenge to the final decision shall be made pursuant to the provisions of California Code of Civil Procedure Sections 1094.5 and 1094.6 and shall be commenced within ninety (90) days following issuance of the final decision.

(B) Notwithstanding the provisions of subsection (a)(11)(A), the final decision of the hearing officer in any proceeding determining the validity of a cease and desist order or following an emergency abatement action shall be mailed within five (5) business days following the conclusion of the hearing.

(12) City Abatement. In the event the owner of property, the operator of a facility, a permittee or any other person fails to comply with any provision of a compliance schedule issued to such owner, operator, permittee or person pursuant to this chapter, the authorized inspector may request the enforcing attorney to obtain an abatement warrant or other appropriate judicial authorization to enter the property, abate the condition and restore the area. Any costs incurred by the city in obtaining and carrying out an abatement warrant or other judicial authorization may be recovered pursuant to subsection (b)(4).

(b) Nuisance. Any condition in violation of the provisions of this chapter, including, but not limited to, the maintenance or use of any illicit connection or the occurrence of any prohibited discharge, shall constitute a threat to the public health, safety and welfare, and is declared and deemed a nuisance pursuant to California Government Code Section 38771, as the same may be amended from time to time.

(1) Court Order to Enjoin or Abatement. At the request of the director of public works, the enforcing attorney may seek a court order to enjoin and/or abate the nuisance.

(2) Notice to Owner and Occupant. Prior to seeking any court order to enjoin or abate a nuisance or threatened

nuisance, the director of public works shall provide notice of the proposed injunction or abatement to the owner and occupant, if any, of the property where the nuisance or threatened nuisance is occurring.

(3) Emergency Abatement. In the event the nuisance constitutes an imminent danger to public safety or the environment, the director of public works may enter the property from which the nuisance emanates, abate the nuisance and restore any property affected by the nuisance. To the extent reasonably practicable, informal notice shall be provided to the owner or occupant prior to abatement. If necessary to protect the public safety or the environment, abatement may proceed without prior notice to or consent from the owner or occupant thereof and without judicial warrant.

(A) An imminent danger shall include, but is not limited to, exigent circumstances created by the dispersal of pollutants, where the same presents a significant and immediate threat to the public safety or the environment.

(B) Notwithstanding the authority of the city to conduct an emergency abatement action, an administrative hearing pursuant to subsection (a)(9) shall follow the abatement action.

(4) Reimbursement of Costs. All costs incurred by the city in responding to any nuisance, all administrative expenses and all other expenses recoverable under state law, shall be recoverable from the person(s) creating, causing, committing, permitting or maintaining the nuisance.

(5) Nuisance Lien.

(A) All costs shall become a lien against the property from which the nuisance emanated and a personal obligation against the owner thereof in accordance with California Government Code Sections 38773.1 and 38773.5, as the same may be amended from time to time. The owner of record of the property subject to any lien shall be given notice of the lien prior to recording as required by California Government Code Section 38773.1, as the same may be amended from time to time.

(B) At the direction of the director of public works, the enforcing attorney is authorized to collect nuisance abatement costs or enforce a nuisance lien in an action brought for a money judgment or by delivery to the county assessor of a special assessment against the property in accord with the conditions and requirements of California Government Code Section 38773.5, as the same may be amended from time to time.

(c) Criminal Sanctions.

(1) Prosecutor. The enforcing attorney may act on the request of the director of public works to pursue enforcement actions in accordance with the provisions of this chapter.

(2) Infractions. Any person who may otherwise be charged with a misdemeanor under this chapter may be charged, at the discretion of the enforcing attorney, with an infraction punishable by a fine of not more than one hundred dollars ($100.00) for a first violation, two hundred dollars ($200.00) for a second violation, and a fine not exceeding five hundred dollars ($500.00) for each additional violation occurring within one (1) year.

(3) Misdemeanors. Any person who negligently or knowingly violates any provision of this chapter, undertakes to conceal any violation of this chapter, continues any violation of this chapter after notice thereof, or violates the terms, conditions and requirements of any permit issued pursuant to this chapter, shall be guilty of a misdemeanor punishable by a fine of not more than one thousand dollars ($1,000.00) or by imprisonment for a period of not more than six (6) months, or both.

(d) Consecutive Violations. Each day in which a violation occurs and each separate failure to comply with either a separate provision of this chapter, an administrative compliance order, a cease and desist order or a permit issued pursuant to this chapter, shall constitute a separate violation of this chapter punishable by fines or sentences issued in accordance herewith.

(e) Nonexclusive Remedies. Each and every remedy available for the enforcement of this chapter shall be nonexclusive and it is within the discretion of the authorized inspector or enforcing attorney to seek cumulative remedies, except that multiple monetary fines or penalties shall not be available for any single violation of this chapter.

(f) Citations. Pursuant to California Penal Code Section 836.5, as the same may be amended from time to time, the authorized inspector shall have the authority to cause the arrest of any person committing a violation of this chapter. The person shall be released and issued a citation to appear before a magistrate in accordance with California

Penal Code Sections 853.5, 853.6 and 853.9, as the same may be amended from time to time, unless the person demands to be taken before a magistrate. Following issuance of any citation the authorized inspector shall refer the matter to the enforcing attorney.

Each citation to appear shall state the name and address of the violator, the provisions of this chapter violated, and the time and place of appearance before the court, which shall be at least ten (10) business days after the date of violation. The person cited shall sign the citation giving his or her written promise to appear as stated therein. If the person cited fails to appear, the enforcing attorney may request issuance of a warrant for the arrest of the person cited.

(g) Violations of Other Laws. Any person acting in violation of this chapter also may be acting in violation of the Federal Clean Water Act or the State Porter-Cologne Act and other laws and also may be subject to sanctions including civil liability. Accordingly, the enforcing attorney is authorized to file a citizen suit pursuant to 33 U.S.C. Section 1365, as the same may be amended from time to time, seeking penalties, damages, and orders compelling compliance, and other appropriate relief. The enforcing attorney may notify EPA Region IX, the Santa Ana Regional Water Quality Control Board, or any other appropriate state or local agency, of any alleged violation of this chapter.

(h) Injunctions. At the request of the director of public works, the enforcing attorney may cause the filing, in a court of competent jurisdiction, of a civil action seeking an injunction against any threatened or continuing noncompliance with the provisions of this chapter.

(1) Order for Reimbursement. Any temporary, preliminary or permanent injunction issued pursuant hereto may include an order for reimbursement to the city of all costs incurred in enforcing this chapter, including costs of inspection, investigation and monitoring, the costs of abatement undertaken at the expense of the city, costs relating to restoration of the environment and all other expenses authorized by law.

(i) Other Civil Remedies.

(1) The director of public works may request the enforcing attorney to file an action for civil damages in a court of competent jurisdiction seeking recovery of: (A) all costs incurred in enforcement of the chapter, including but not limited to costs relating to investigation, sampling, monitoring, inspection, administrative expenses, all other expenses as authorized by law, and consequential damages; (B) all costs incurred in mitigating harm to the environment or reducing the threat to human health; and (C) damages for irreparable harm to the environment.

(2) The enforcing attorney is authorized to file actions for civil damages resulting from any trespass or nuisance occurring on public land or to the stormwater drainage system from any violation of this chapter where the same has caused damage, contamination or harm to the environment, public property or the stormwater drainage system.

(3) The remedies available to the city pursuant to the provisions of this chapter shall not limit the right of the city to seek any other remedy that may be available by law. (Ord. O-2010-04 § 3, 2010)

16.20.080 Interagency cooperation.

(a) The city intends to cooperate with other agencies with jurisdiction over stormwater discharges to ensure that the regulatory purposes underlying stormwater regulations promulgated pursuant to 33 U.S.C. Section 1251, et seq., as the same may be amended from time to time, are met.

(b) The city may, to the extent authorized by law, elect to contract for the services of any public agency or private enterprise to carry out the planning approvals, inspections, permits and enforcement authorized by this chapter. (Ord. O-2010-04 § 3, 2010)

16.20.090 Compliance disclaimer.

Full compliance by any person or entity with the provisions of this chapter shall not preclude the need to comply with other local, state or federal statutory or regulatory requirements, which may be required for the control of the discharge of pollutants into stormwater and/or the protection of stormwater quality. (Ord. O-2010-04 § 3, 2010)

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Chapter 16.24 APPLICABLE TO FOOD SERVICE ESTABLISHMENTS FOR CONTROLLING FATS, OILS AND GREASE

16.24.010 General provisions.

(a) Purpose and Policy.

(1) The purpose of this chapter is to facilitate the maximum beneficial public use of the city's sewer services and facilities while preventing blockages of the sewer facilities resulting from discharges of fats, oils and grease ("FOG") to sewer facilities, and to specify appropriate FOG discharge requirements for Food Service Establishments.

(2) This chapter shall be interpreted in accordance with the definitions set forth in subsection (b) of this section. The provisions of this chapter shall apply to the discharge of all wastewater or waste containing FOG which is or may be carried to the sewer facilities of the city.

(3) To comply with federal, state, and local policies and to allow the city to meet applicable standards, provisions are made in this chapter for the regulation of discharges of wastewater or waste containing FOG to sewer facilities.

(4) This chapter establishes standards on all wastewater and/or waste discharges from food service establishments containing FOG, which may alone or collectively cause or contribute to FOG accumulation in the sewer facilities causing or potentially causing or contributing to the occurrence of sewer system overflows ("SSOs").

(b) Definitions.

(1) Unless otherwise defined in this chapter, terms related to water quality shall be as adopted in the latest edition of Standard Methods for Examination of Water and Wastewater, published by the American Public Health Association, the American Water Works Association and the Water Environment Federation. The testing procedures for waste constituents and characteristics shall be as provided in 40 CFR 136 (Code of Federal Regulations).

(2) Other terms not specifically defined in this chapter shall have the same definition as set forth in the latest adopted editions of the California Codes of Regulations applicable to building construction adopted pursuant to the California Building Standards Law.

(3) Subject to the foregoing provisions, the following definitions shall apply in these regulations:

"Best management practices" means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the introduction of FOG to the sewer facilities as more specifically provided for in Section 16.24.040(e) of these regulations.

"Change in operations" means any change in the ownership, food types, operational procedures or business practices that have the potential to increase the amount of FOG generated and/or discharged by food service establishments in an amount that alone or in conjunction with other FOG discharges causes or creates a potential for SSOs to occur.

"City" means the city of Placentia.

"City administrator" means the city administrator of the city of Placentia or designee.

"City council" means the city council of the city of Placentia.

"Composite sample" means a collection of individual samples obtained at selected intervals based on an increment of either flow or time. The resulting mixture (composite sample) forms a representative sample of the waste stream discharged during the sample period.

"Discharger" means any person who discharges or causes a discharge of wastewater or waste directly or indirectly to the sewer facilities. Discharger means the same as user.

"Effluent" means any liquid outflow from a food service establishment that is discharged to the sewer facilities.

"Fats, oils, and grease ("FOG")" means any substance such as a vegetable or animal product that is used in, or is a by-product of, the cooking or food preparation process, and that turns or may turn viscous or solidifies or may solidify with a change in temperature or due to other conditions. Discharges of FOG to the sewer system from a food service establishment constitute the discharge of industrial waste.

"FOG control program" means the FOG control program required by and developed pursuant to RWQCB Order No. R8-2002-0014, Section (c)(12)(viii).

"FOG control program manager" means the individual designated by the city to administer the FOG control program. Except as otherwise set forth in this chapter, the FOG control program manager is responsible for all determinations of compliance with the FOG control program.

"FOG wastewater discharge permit" means a permit issued by the city subject to the requirements and conditions established by the city authorizing the permittee to discharge wastewater into the city's sewer facilities or into sewer facilities which ultimately discharge into a city sewer facility.

"Food grinder" means any device installed for the purpose of grinding food waste or food preparation by-products for disposal to the sewer system.

"Food service establishment" means facilities defined in California Uniform Retail Food Service Establishments Law (CURFFL), California Health and Safety Code Section 113785, and any commercial entity discharging directly or indirectly to the city's sewer system, operating in a permanently constructed structure such as a room, building, or place, or portion thereof, maintained, used, or operated for the purpose of storing, preparing, serving, manufacturing, packaging, or otherwise handling food for sale to other entities, or for consumption by the public, its members or employees, and which has any process or device that uses or produces FOG, or grease vapors, steam, fumes, smoke or odors that are required to be removed by a Type I or Type II hood.

"Grab sample" means a sample taken from a waste stream on a one-time basis without regard to the flow in the waste stream and without consideration of time.

"Grease control device" means any grease interceptor, grease trap or other mechanism, device, or process, which attaches to, or is applied to, wastewater plumbing fixtures and lines, the purpose of which is to trap, collect or treat FOG prior to discharge into the sewer system. "Grease control device" may also include any other proven method to reduce FOG subject to the approval of the city.

"Grease disposal mitigation fee" means a fee charged to an owner and/or operator of a food service establishment when there are physical limitations to the property that make the installation of a grease interceptor or grease control device for the food service establishment, impossible or impracticable. The grease disposal mitigation fee is intended to cover the costs of increased maintenance of the sewer system for inspection and removal of FOG and other viscous or solidifying agents that a properly employed grease control device would otherwise prevent from entering the sewer system.

"Grease interceptor" means a multi-compartment device that is constructed in different sizes and is generally required to be located, according to the California Plumbing Code, underground between a food service establishment and the connection to the sewer system. These devices primarily use gravity to separate FOG from the wastewater as it moves from one (1) compartment to the next. These devices must be cleaned, maintained, and have the FOG removed and disposed of in a proper manner on regular intervals to be effective.

"Grease trap" means a grease control device that is used to serve individual fixtures and have limited effect and should only be used in those cases where the use of a grease interceptor or other grease control device is determined to be impossible or impracticable.

"Hot spots" means areas in sewer lines that have experienced sanitary sewer overflows or that must be cleaned or maintained frequently to avoid blockages of sewer system.

"Infiltration" means water entering the sewer system from the ground through such means as defective pipes, pipe joints, connections or manhole walls.

"Inflow" means stormwater or urban runoff which enters the sewer system. Inflow may, in certain circumstances, cause a rapid increase in wastewater flows.

"Inspector" means a person authorized by the city to inspect any existing or proposed wastewater or waste generation, conveyance, processing and/or disposal facilities.

"Interceptor" means a grease interceptor.

"Interference" means any discharge which, alone or in conjunction with discharges from other sources, inhibits or disrupts the city's sewer system, collection processes or operations; or is a cause of violation of Chapter 16.04 of this code.

"Limited food preparation establishment" means an establishment engaged only in reheating, hot holding or assembling of ready-to-eat (precooked and prepackaged) food products, from which establishment there is only a de minimus discharge of FOG to the sewer system. A limited food service preparation establishment is not considered a food service establishment under this chapter. A limited food preparation establishment does not include any preparation that changes the form, flavor or consistency of food. Any person who contends that he/she/it meets the definition of a limited food preparation establishment shall have the burden to establish that he/she/it meets the criteria set forth in this definition.

"Manifest" means that receipt to be retained by the generator of wastes for disposing of recyclable wastes or other liquid or solid wastes as required by the city or a regulatory agency.

"New construction" means any structure planned or under construction for which a sewer connection permit has not been issued.

"Permittee" means a person who has received from the city a permit to discharge wastewater into the city's sewer facilities subject to the requirements and conditions established by the city.

"Person" means any individual, partnership, firm, association, corporation or public agency, including the state of California and the United States of America.

"Public agency" means the state of California and/or any city, county, special city, other local governmental authority or public body of or within this state.

"Public sewer" means a sewer owned and operated by the city or by another local public agency, which sewer is tributary to the city's sewer facilities.

"Regulatory agencies" means those agencies having regulatory jurisdiction over environmental quality matters, including, but not limited to:

(1) United States Environmental Protection Agency, Region IX, San Francisco and Washington, DC (EPA);

(2) California State Water Resources Control Board (SWRCB);

(3) California Regional Water Quality Control Board, Santa Ana Region (RWQCB);

(4) South Coast Air Quality Management City (SCAQMD);

(5) California Department of Health Services (DOHS).

"Remodeling" means a physical or operational change (a) causing an increase in the amount of FOG discharged to the sewer system by a food service establishment which amount, alone or in conjunction with other FOG discharges, causes or creates a potential for an SSO to occur; or (b) exceeding a cost of fifty thousand dollars ($50,000.00) to a food service establishment, requiring a building permit, and involving any one (1) or combination of the following: (1) under slab plumbing in the food processing area, (2) a thirty (30) percent increase in the net public seating area, (3) a thirty (30) percent increase in the size of the kitchen area, or (4) any change in the size or type of food preparation equipment.

"Sample point" means a location approved by the city, from which industrial wastewater can be collected that is representative in content and consistency of the entire flow of industrial wastewater being discharged to the sewer system.

"Sampling facilities" means structure(s) provided at the user's expense for the city or user to measure and record wastewater constituent mass concentrations, collect a representative sample, or provide access to plug or terminate the

discharge to the sewer system.

"Sewage" means wastewater.

"Sewer facilities or system" means any and all facilities used for collection, conveyance, pumping, treatment, reclamation, reuse and/or disposal of wastewater and/or sludge.

"Sewer lateral" means a building sewer as defined in the latest edition of the California Plumbing Code. It is the wastewater connection between a building's wastewater facilities and a public sewer system.

"Sludge" means any solid, semi-solid or liquid decant, subnate or supernate from a manufacturing process, utility service or pretreatment facility.

"Twenty-five (25) percent rule" means requirement for grease interceptors to be maintained such that the combined FOG and solids accumulation does not exceed twenty-five (25) percent of the design hydraulic depth of the grease interceptor. This is to ensure that the minimum hydraulic retention time and required available hydraulic volume is maintained to effectively intercept and retain FOG prior to entry into the public sewer system.

"User" means any person who discharges or causes a discharge of wastewater or waste directly or indirectly to sewer facilities. User means the same as discharger.

"Waste" means sewage and any and all other waste substances, liquid, solid, gaseous or radioactive, associated with human habitation or of human or animal nature, including such wastes placed within containers of whatever nature prior to and for the purpose of disposal.

"Waste minimization practices" means plans or programs intended to reduce or eliminate discharges to the sewer system or to conserve water, including, but not limited to, product substitutions, housekeeping practices, inventory control, employee education, and other steps as necessary to minimize waste or wastewater produced.

"Wastehauler" means any person carrying on or engaging in vehicular transport of waste as part of, or incidental to, any business for that purpose.

"Wastewater" means the liquid and water-carried wastes of the community and all constituents thereof, whether treated or untreated, discharged, directly or indirectly, into the sewer system.

"Wastewater constituents and characteristics" means the individual chemical, physical and bacteriological parameters, including volume and flow rate, and such other parameters that serve to define, classify or measure the quality and quantity of wastewater.

(4) Words used in these regulations in the singular may include the plural and the plural the singular. Use of masculine means feminine and use of feminine means masculine. Shall is mandatory; may is permissive or discretionary. (Ord. O-2004-07 § 1, 2004)

16.24.020 General limitations, prohibitions, and requirements on fats, oils, and grease ("FOG") discharges.

(a) FOG Discharge Limitation. No food service establishment shall discharge or cause to be discharged into the sewer system FOG that may accumulate and/or cause or contribute to blockages in the sewer system, including the sewer lateral which connects the food service establishment to the public sewer system.

(b) Prohibitions. The following prohibitions shall apply to all food service establishments:

(1) Installation of food grinders in new constructions of food service establishments shall be prohibited. Furthermore, all food grinders shall be removed from all existing food service establishments within one hundred eighty (180) days of the effective date of these regulations, except when expressly allowed by the FOG control program manager pursuant to the applicable provisions of the latest edition of the California Plumbing Code.

(2) Introduction of any additives into a food service establishment's wastewater system for the purpose of emulsifying FOG is prohibited, unless a specific written authorization from the FOG control program manager is obtained based upon evidence showing that such additives will not cause or contribute to interference and/or a sewer system overflow.

(3) Discharge of waste cooking oil, directly or indirectly, into the drainage pipes and/or the sewer system is prohibited. All waste cooking oils shall be collected and stored properly in receptacles such as barrels or drums for recycling or other acceptable methods of disposal.

(4) Discharge of wastewater from dishwashers to any grease trap or grease interceptor is prohibited.

(5) Discharge of wastewater with temperatures in excess of one hundred forty degrees Fahrenheit (140°F) to any grease control device, including grease traps and grease interceptors, is prohibited.

(6) The use of biological additives to treat or reduce FOG or as a supplement to interceptor maintenance, without prior authorization from the FOG control program manager, is prohibited. Such authorization shall be based upon evidence showing that such biological additives will not cause or contribute to interference and/or a sewer system overflow.

(7) Discharge of wastes from toilets, urinals, washbasins, and any other fixtures containing fecal or other bodily waste materials to piping which flows to a grease control device is prohibited. Except as otherwise authorized pursuant to this chapter, the discharge of FOG wastes shall only occur to piping which flows to a grease interceptor prior to discharge to the sewer system.

(8) No waste removed from a grease control device may be discharged to the sewer system. FOG and solid materials removed from grease control devices shall be wastehauled periodically as part of the operation and maintenance requirements for grease interceptors or other grease control devices.

(9) No person shall allow the accumulation of FOG and/or solids in a grease interceptor which accumulation exceeds twenty-five (25) percent of the total operating hydraulic depth of the grease interceptor.

(c) FOG Wastewater Discharge Permit Required. No person shall discharge, or cause to be discharged, any wastewater from a food service establishment directly or indirectly into the sewer system without first obtaining a FOG wastewater discharge permit pursuant to this chapter. Within sixty (60) days of the effective date of this chapter, all food service establishments in the city shall file an application for a FOG wastewater discharge permit with the city on a form approved by the city administrator for such purpose. Except for limited food preparation establishments, which are not subject to the permit requirements of this chapter, any person who wishes to open or operate a new food service establishment following the effective date of this chapter shall apply for and obtain a FOG wastewater discharge permit prior to commencement of operations.

(d) FOG Pretreatment Required. Except as otherwise set forth in this chapter, each food service establishment shall install, operate and maintain an adequately sized grease interceptor necessary to maintain compliance with this chapter. The grease interceptor shall be adequate to separate and remove FOG contained in wastewater discharges from the food service establishment prior to discharge to the sewer system. Fixtures, equipment, and drain lines located in the food preparation and cleanup areas of food service establishments that are sources of FOG discharges shall be connected to the grease interceptor.

(1) New Construction of Food Service Establishments. All food service establishments which are newly constructed shall install, operate and maintain grease interceptors prior to and following commencement of wastewater discharges to the sewer system.

(2) Existing Food Service Establishments.

(A) For existing food service establishments, the requirement to install, properly operate and maintain a grease interceptor may be conditionally stayed, that is, delayed in its implementation, by the FOG control program manager for a maximum period of five (5) years from the effective date of this chapter (five- (5) year amortization period). Terms and conditions for application of a stay for a food service establishment shall be set forth in the permit. The city council finds that five (5) years is a reasonable amortization period for existing food service establishments that are operating without a grease interceptor.

(B) Existing food service establishments, which have caused or contributed to a grease-related blockage in the sewer system, or which have sewer laterals connected to hot spots, or which have been determined to contribute significant FOG to the sewer system by the FOG control program manager based on inspection or sampling, shall be deemed to have reasonable potential to adversely impact the sewer system, and shall install and commence proper operation of grease interceptors within one hundred eighty (180) days upon notification by the city.

(C) Existing food service establishments undergoing remodeling or a change in operations as defined in Section 16.24.010(b) shall be required to install a grease interceptor, except as otherwise authorized by this chapter.

(e) Variance and Waiver of Grease Interceptor Requirement.

(1) Variance from Grease Interceptor Requirements. A variance from the grease interceptor requirements to allow alternative pretreatment technology that is, at least, equally effective in controlling the FOG discharge in lieu of a grease interceptor may be granted. Additionally, a variance from the grease interceptor requirement may be granted to food service establishments demonstrating that it is impossible or impracticable to install, operate or maintain a grease interceptor, and/or where the implementation of best management practices is as effective as a grease interceptor in controlling FOG discharges into the sewer system. The FOG control program manager's determination to grant a variance shall be based upon an evaluation of the following factors:

(A) The availability of adequate space for installation and/or maintenance of a grease interceptor;

(B) The availability of an adequate slope for gravity flow between kitchen plumbing fixtures and the grease interceptor and/or between the grease interceptor and the private or public sewer collection lines;

(C) Whether the food service establishment can establish that the alternative pretreatment technology and/or implementation of best management practices is equivalent to or better than a grease interceptor in controlling its FOG discharge. In addition, the food service establishment must be able to demonstrate, after installation of the proposed alternative pretreatment, its effectiveness to control FOG discharges through downstream visual monitoring of the sewer system by the city or by a city-approved contractor, for at least three (3) months, at the food service establishment's own expense. A variance may be granted if the monitoring demonstrates no visible accumulation of FOG from discharges in the food service establishment's lateral and in downstream sewer lines;

(D) Other factors reasonably related to physical constraints in the construction and operation of a grease interceptor or to the minimization of FOG discharges to the sewer system.

(2) Conditional Waiver from Installation of Grease Interceptor. A conditional waiver from installation of a grease interceptor may be granted for food service establishments that have been determined to have a de minimus FOG discharge to and insignificant impact on the sewer system. The FOG control program manager's determination to grant a conditional waiver shall be based upon, but not limited to, evaluation of the following conditions:

(A) Quantity and quality of FOG discharge as measured or as indicated by the size of food service establishment based on seating capacity, number of meals served, menu, water usage, amount of on-site consumption of prepared food and other conditions that may reasonably be shown to contribute to FOG discharges;

(B) Adequacy of implementation of best management practices and compliance history:

(C) Sewer size, grade, condition based on visual inspection, FOG deposition in the sewer system by the food service establishment, and history of maintenance and sewage spills in the receiving sewer system;

(D) Changes in operations that significantly affect FOG discharge;

(E) Any other condition determined by the FOG control program manager to be reasonably related to the generation of FOG or control of FOG discharges.

(3) Waiver from Grease Interceptor Installation with a Grease Disposal Mitigation Fee. For food service establishments where the installation of a grease interceptor is impossible or impracticable and no equivalent alternative pretreatment is feasible, a waiver from the grease interceptor requirement may be granted by the FOG control program manager upon the imposition of a grease disposal mitigation fee as described in subsection (g) of this section. Additional requirements may be imposed to mitigate the discharge of FOG into the sewer system. The FOG control program manager's determination to grant a waiver upon imposition of a grease disposal mitigation fee shall be based upon the following factors:

(A) The availability of adequate space for installation and/or maintenance of a grease interceptor;

(B) The availability of an adequate slope for gravity flow between kitchen plumbing fixtures and the grease interceptor and/or between the grease interceptor and the private or public collection lines;

(C) Whether a variance from grease interceptor installation requirements to allow alternative pretreatment

technology can be granted;

(D) Other factors reasonably related to physical constraints in the construction and operation of a grease interceptor or to the minimization of FOG discharges to the sewer system.

(4) Application for Variance or Waiver of Requirement for Grease Interceptor. A food service establishment may submit an application for variance or waiver from the grease interceptor requirement to the FOG control program manager. The food service establishment shall bear the burden of demonstrating, to the FOG control program manager's reasonable satisfaction, that the variance or waiver is justified by factors listed in subsection (e) of this section. Upon determination by the FOG control program manager that the food service establishment has met its burden, a FOG wastewater discharge permit may be issued or revised to include the variance or waiver.

(5) Terms and Conditions. The issuance of a variance or waiver may be subject to such terms and conditions that the FOG control program manager determines are reasonably appropriate to minimize or eliminate the discharge of FOG to the sewer system. A variance or waiver may be revoked at any time when any of the terms and conditions for its issuance are not satisfied or if the conditions upon which the variance or waiver was based change so that the justification for the variance or waiver no longer exists. Except as otherwise set forth in this chapter, a variance or waiver shall be valid so long as the food service establishment remains in compliance with the terms and conditions of the variance or waiver, or until the expiration date specified in the FOG wastewater discharge permit.

(f) Commercial Properties. Property owners of commercial properties shall be responsible for the installation and maintenance of the grease interceptor serving multiple food service establishments.

(g) Grease Disposal Mitigation Fee. A food service establishment that does not qualify for a variance or waiver, and for which establishment the installation of a grease control device or interceptor is impossible or impracticable may be required to pay an annual grease disposal mitigation fee to cover the costs of increased maintenance of the sewer system as a result of the food service establishment's inability to adequately remove FOG from its wastewater discharge. This section shall not be interpreted to allow the new construction of a food service establishment or the remodeling or change in operation of an existing food service establishment without installation of a grease control device or grease interceptor unless the city has determined that it is impossible or impracticable to install or operate a grease control device or grease control interceptor for the subject facility under the provisions of subsection (e) of this section.

(1) The grease disposal mitigation fee shall be established by ordinance or resolution of the city council, and shall be based on the estimated annual cost of maintaining the sewer system for inspection and removal of FOG and other viscous or solidifying agents attributable to the food service establishment resulting from the lack of a grease interceptor or grease control device.

(2) The grease disposal mitigation fee may be waived or reduced if the food service establishment demonstrates to the reasonable satisfaction of the FOG control program manager that, through implementation of best management practices and waste minimization practices, it has reduced to a de minimus level the discharge of FOG into the sewer system.

(3) The grease disposal mitigation fee shall not be waived or reduced when the food service establishment has not complied with the minimum requirements of this chapter and/or its discharge into the sewer system in the preceding twelve (12) months has caused or contributed to a sewer blockage or SSO in the sewer system.

(h) Sewer System Overflows, Public Nuisance, Abatement Orders and Cleanup Costs. Notwithstanding the five-(5) year amortization period established in subsection (d) of this section, food service establishments which have contributed to a sewer blockage, SSO or any sewer system interference resulting from the discharge of wastewater or waste containing FOG, shall install, operate and maintain a grease interceptor, and may be required to abate such nuisance and prevent any future health hazards created by such sewer line blockage, SSO or any other sewer system interference. SSOs may threaten or cause injury to public health, safety, and welfare and are declared to be a public nuisance. Furthermore, sewer lateral failures and SSOs caused by food service establishments, alone or collectively, are the responsibility of the private property owner and food service establishment, and their respective responsible officers and/or owners. If, either at the request of a food service establishment or to abate an immediate threat of injury to the public health, safety, welfare, or property, the city acts to contain and/or clean up an SSO or the blockage of a

sewer lateral or the sewer system caused by a food service establishment, the city's costs for such abatement shall be entirely borne by the property owner, operator of the food service establishment, and their respective responsible officers and/or owners, and each of them, and shall constitute a debt to the city and become due and payable upon the city's request for reimbursement of such costs. (Ord. O-2004-07 § 1, 2004)

16.24.030 FOG wastewater discharge permits for food service establishments.

(a) FOG Wastewater Discharge Permit Required.

(1) Food service establishments proposing to discharge or which, upon the effective date of this chapter, are discharging wastewater-containing FOG into the city's sewer system shall obtain a FOG wastewater discharge permit from the city.

(2) FOG wastewater discharge permits shall be expressly subject to all provisions of this chapter and all other regulations, charges for use, and fees established by the city. Each permittee shall at all times comply with the terms and condition in its FOG wastewater discharge permit.

(3) FOG wastewater discharge permits granted to food service establishments by the city may be in the following forms:

(A) Interim Permit. Upon the effective date of this chapter, all food service establishments in the city shall be subject to the conditions in a FOG wastewater discharge permit as described in this section. For a period of eighteen (18) months following adoption, all food service establishments will be granted a blanket interim permit until such time as the city's FOG control program staff inspects them. Notwithstanding the foregoing, each food service establishment shall at all times comply with the provisions of Sections 16.24.020(a) and (b), and prior to the expiration of the eighteen- (18) month interim permit period, each food service establishment shall obtain a permit pursuant to subsection (c)(2), (c)(3) or (c)(4) of this section in order to continue discharging wastewater to the sewer system upon expiration of the interim permit;

(B) Regular Permit. A FOG wastewater discharge permit issued upon the installation of a grease interceptor as described in Section 16.24.020(d);

(C) Variance Permit. A FOG wastewater discharge permit issued subject to implementation of best management practices, alternative pretreatment technology and/or payment of a grease disposal mitigation fee as described in Section 16.24.020 (e)(3);

(D) Waiver Permit. A FOG wastewater discharge permit issued pursuant to Section 16.24.020(e) to a food service establishment with a de minimus FOG discharge to the sewer system.

(4) Proper installation and maintenance of a grease interceptor and application for a regular permit shall be the standard method of compliance with this chapter.

(b) FOG Wastewater Discharge Permit Application.

(1) Any person required to obtain a FOG wastewater discharge permit shall complete and file with the city prior to commencing or continuing discharges to the sewer system, an application in a form prescribed by the city. The applicable fees shall accompany the application. The applicant shall, at a minimum, submit the following information:

(A) Name, address, telephone number, assessor's parcel number(s) and description of the food service establishment's operation, cuisine, service activities, and, as applicable, clients using the applicant's services;

(B) (Whichever is applicable) Name, address of any and all principals/owners/major shareholders of the food service establishment; articles of incorporation; most recent annual statement filed with the Secretary of State; and business license;

(C) Name and address of property owner or lessor and the property manager for the property where the food service establishment is located;

(D) Any other information reasonably related to the food service establishment's potential FOG generating or disposal operations as requested by the FOG control program manager.

(2) Applicants may be required to submit site and facility plans pursuant to Section 16.24.040(a) of this code.

(3) Other information related to the applicant's business operations and potential FOG discharge may be requested to properly evaluate the permit application.

(4) After evaluation of the data furnished, the city may issue a FOG wastewater discharge permit, subject to terms and conditions designed to meet the purposes of this chapter and as otherwise determined by the FOG control program manager to be appropriate to protect the city's sewer system and/or the public health and safety.

(c) FOG Wastewater Discharge Permit Conditions. The issuance of a FOG wastewater discharge permit may contain any of the following conditions or limits:

(1) Limits on discharge of FOG and other priority pollutants which may cause or contribute to SSOs and/or sewer blockages;

(2) Requirements for proper operation and maintenance of grease interceptors and other grease control devices;

(3) Grease interceptor maintenance schedule;

(4) Requirements for implementation of best management practices and installation of adequate grease interceptor and/or grease control devices;

(5) Requirements for maintaining and reporting the status of best management practices;

(6) Requirements for maintaining and submitting logs and records, including wastehauling records and waste manifests;

(7) Requirements to self-monitor the discharge to the sewer system and periodically assess and report on the condition of the sewer lateral;

(8) Requirements for the food service establishment to construct, operate and maintain, at its own expense, FOG sampling facilities;

(9) Additional requirements determined to be reasonably appropriate by the FOG control program manager to protect the city's sewer system or as otherwise specified by other regulatory agencies;

(10) Other terms and conditions reasonably related to the minimization or elimination of FOG discharges to the sewer system.

(d) FOG Wastewater Discharge Permit Application Fee. The FOG wastewater discharge application permit fee shall be paid by the applicant in an amount adopted by ordinance or resolution of the city council. Payment of the application permit fee must be received by the city at the time of filing the application for the permit. A permittee shall also pay any delinquent invoices in full prior to permit renewal.

(e) Modification of FOG Wastewater Discharge Permit Terms and Conditions.

(1) The terms and conditions of an issued permit may be subject to modification in the determination of the FOG control program manager during the life of the permit based on:

(A) The discharger's current or anticipated operating data;

(B) The city's current or anticipated operating data;

(C) Changes in the requirements of regulatory agencies which affect the city or sewer system; or

(D) A determination by the FOG control program manager that such modification is appropriate to further the objectives of this chapter.

(2) A permittee may request a modification of the terms and conditions of an issued permit. The request shall be in writing stating the requested change, and the reasons for the change. The FOG control program manager shall review the request, make a determination on the request, and respond in writing.

(3) The permittee shall be informed of any change in the permit limits, conditions, or requirements at least forty-five (45) days prior to the effective date of the change. Any changes or new conditions in the permit shall include a reasonable time schedule for compliance.

(4) Any existing food service establishment shall, prior to commencement of either a change in operations which may affect the discharge of FOG to the sewer system or a remodeling project, apply for and obtain a new or modified FOG wastewater discharge permit pursuant to this section.

(f) FOG Wastewater Discharge Permit Duration and Renewal. FOG wastewater discharge permits shall be issued annually. At least thirty (30) days prior to the expiration of the permit, the user shall apply for renewal of the permit in accordance with the provisions of this section.

(g) Exemption from FOG Wastewater Discharge Permit. A limited food preparation establishment is exempt from the requirement to obtain a FOG wastewater discharge permit.

(h) Nontransferability of Permits. FOG wastewater discharge permits issued pursuant to this chapter are for a specific food service establishment, for a specific operation, at a specific location and create no vested rights.

(1) No permit holder shall assign, transfer or sell any FOG wastewater discharge permit issued pursuant to this chapter, nor use any such permit for or on any premises or for facilities, operations or discharges not expressly encompassed within the underlying permit.

(2) Any permit which is transferred to a new owner, operator or facility is void.

(i) FOG Wastewater Discharge Permit Charge for Use. A charge to cover all costs of the city for administering the FOG program shall be established by ordinance or resolution of the city council. (Ord. O-2004-07 § 1, 2004)

16.24.040 Facilities requirements.

(a) Drawing Submittal Requirements. Upon request by the city:

(1) Food service establishments may be required to submit two (2) copies of facility site plans, mechanical and plumbing plans, and details to show all sewer locations and connections. The submittal shall be in a form and content acceptable to the city for review of existing or proposed grease control device(s), the grease interceptor, monitoring facilities, metering facilities, and operating procedures. The review of the plans and procedures shall in no way relieve the food service establishments of the responsibility of modifying the facilities or procedures in the future, as necessary to produce an acceptable discharge, and to meet the requirements of this chapter or any requirements of other regulatory agencies;

(2) Applicants may be required to submit site plans, floor plans, mechanical and plumbing plans, and details to show all sewers, grease control device(s), the grease interceptor or other pretreatment equipment and appurtenances by size, location and elevation for evaluation;

(3) Food service establishments may be required to submit a schematic drawing of grease control device(s), the grease interceptor or other pretreatment equipment, piping and instrumentation, as well as a wastewater characterization report;

(4) The city may require the drawings be prepared by a California Registered Civil, Chemical, Mechanical or Electrical Engineer, as appropriate.

(b) Grease Interceptor Requirements.

(1) All food service establishments shall provide wastewater acceptable to the city, under the requirements and standards established in this chapter before discharging, directly or indirectly, to any public sewer. Except as otherwise authorized in this chapter, any food service establishment required to provide FOG pretreatment shall install, operate, and maintain an adequately sized grease interceptor in accordance with the requirements of this chapter.

(2) Grease interceptor sizing and installation shall conform to the current edition of the Uniform Plumbing Code. Grease interceptors shall have a minimum of two (2) compartments with fittings designed for grease retention. Additional compartments may be required depending on the scope of business operations.

(3) The grease interceptor shall be installed at a location where it shall be at all times easily accessible for inspection, cleaning and removal of accumulated grease.

(4) Access manholes, with a minimum diameter of twenty-four (24) inches, shall be provided over each grease interceptor chamber and sanitary tee. The access manholes shall extend at least to finished grade and be designed and maintained to prevent water inflow or infiltration. The manholes shall also have readily removable covers to facilitate inspection, grease removal and wastewater sampling activities.

(c) Grease Trap Requirements.

(1) Food service establishments may be required to install grease traps in waste lines leading from drains, sinks, and other fixtures or equipment where grease may be introduced into the sewer system in quantities that can cause blockage.

(2) Sizing and installation of grease traps shall conform to the current edition of the California Plumbing Code.

(3) Grease traps shall be maintained in efficient operating conditions by removing accumulated grease on a daily basis.

(4) Grease traps shall be maintained free of all food residues and any FOG waste removed during the cleaning and scraping process.

(5) Grease traps shall be inspected periodically to check for leaking seams and pipes, and for effective operation of the baffles and flow-regulating device. Grease traps and their baffles shall be maintained free of all caked-on FOG and waste. Removable baffles shall be removed and cleaned during the maintenance process.

(6) Dishwashers and food waste disposal units shall not be connected to or discharged into any grease trap.

(d) Monitoring Facilities Requirements.

(1) The city may require a food service establishment to construct and maintain in proper operating condition at the food service establishment's sole expense, flow monitoring, constituent monitoring and/or sampling facilities.

(2) The location of the monitoring or metering facilities shall be subject to approval by the FOG control program manager.

(3) Each food service establishment shall provide immediate, clear, safe and uninterrupted access to the FOG control program manager or inspectors to monitoring and metering facilities.

(4) Food service establishments may also be required by the FOG control program manager to submit waste analysis plans and contingency plans to ensure proper operation and maintenance of the grease control device(s) or grease interceptor(s).

(5) No food service establishment shall increase the use of water or in any other manner attempt to dilute a discharge as a partial or complete substitute for treatment to achieve compliance with the requirements of this chapter and the terms of an applicable FOG wastewater discharge permit.

(e) Requirements for Best Management Practices.

(1) All food service establishments shall implement best management practices in accordance with the requirements and guidelines established by the city under its FOG control program in an effort to minimize the discharge of FOG to the sewer system.

(2) All food service establishments shall be required, at a minimum, to comply with the following best management practices:

(A) Installation of Drain Screens. Drain screens shall be installed on all drainage pipes in food preparation areas;

(B) Segregation and Collection of Waste Cooking Oil. All waste cooking oil shall be collected and stored properly in recycling receptacles such as barrels or drums. Such recycling receptacles shall be maintained properly to ensure that they do not leak. Food service establishments shall use licensed wastehaulers and licensed recycling facilities to dispose of waste cooking oil;

(C) Disposal of Food Waste. All food waste shall be disposed of directly into the trash or garbage, and not in sinks;

(D) Employee Training. Employees of food service establishments shall be trained by ownership/management, upon commencement of employment at least annually thereafter, on the following subjects:

(i) How to "dry wipe" pots, pans, dishware and work areas before washing to remove grease,

(ii) How to properly dispose of food waste and solids in enclosed plastic bags prior to disposal in trash bins or containers to prevent leaking and odors,

(iii) The location and use of absorption products to clean under fryer baskets and other locations where grease may be spilled or dripped,

(iv) How to properly dispose of grease or oils from cooking equipment into a grease receptacle such as a barrel or drum without spilling,

Training shall be documented and employee signatures retained indicating each employee's attendance and understanding of the practices reviewed. Training records shall be available for review at any reasonable time by the FOG control program manager or an inspector;

(E) Kitchen Signage. Best management and waste minimization practices shall be posted conspicuously in the food preparation and dishwashing areas at all times.

(f) Grease Interceptor Maintenance Requirements.

(1) All food service establishments with grease interceptors shall comply with the following maintenance requirements:

(A) Grease interceptors shall be maintained in efficient operating condition by periodic removal of the full content of the interceptor which includes wastewater, accumulated FOG, floating materials, sludge and solids;

(B) All existing and newly installed grease interceptors shall be maintained in a manner consistent with a maintenance frequency approved by the FOG control program manager pursuant to this section;

(C) No FOG that has accumulated in a grease interceptor shall be allowed to pass into any sewer lateral, sewer system, storm drain, or public right-of-way during maintenance activities;

(D) Food service establishments with grease interceptors may be required to submit data and information necessary to establish the maintenance frequency of grease interceptors;

(E) The maintenance frequency for all food service establishments with a grease interceptor shall be determined in one (1) of the following methods:

(i) 25% Rule. Grease interceptors shall be fully pumped out and cleaned at a frequency such that the combined FOG and solids accumulation does not exceed twenty-five (25) percent of the total designed hydraulic depth of the grease interceptor. This is to ensure that the minimum hydraulic retention time and required available hydraulic volume is maintained to effectively intercept and retain FOG discharged to the sewer system,

(ii) Each food service establishment with a grease interceptor shall fully pump out and clean its grease interceptor not less than every six (6) months, unless sooner required by the twenty-five (25) percent rule in subsection (f)(1)(E)(i) of this section, or a later interval determined under subsection (f)(1)(E)(iii) of this section,

(iii) Grease interceptors shall be fully pumped out and cleaned every six (6) months when the frequency described in subsection (f)(1)(E)(i) of this section has not been established. The maintenance frequency may be adjusted by the FOG control program manager when sufficient data have been obtained to establish an average frequency based on the requirements described in subsection (f)(1)(E)(i) of this section. The FOG control program manager may change the maintenance frequency at any time to reflect changes in actual operating conditions. Based on the actual generation of FOG from the food service establishment, the maintenance frequency may increase or decrease,

(iv) The owner/operator of a food service establishment may submit a request to the FOG control program manager requesting a change in the maintenance frequency at any time. The food service establishment shall have the burden to demonstrate that the requested change in frequency reflects actual operating conditions based on the average FOG accumulation over time, meets the requirements described in subsection (f)(1)(E)(i) of this section, and that it is in full compliance with the conditions of its permit and the requirements of this chapter. Upon determination by the FOG control program manager that requested revision is justified, the permit may be revised accordingly to reflect the change in maintenance frequency,

(v) If the grease interceptor, at any time, contains FOG and/or solids accumulation that does not meet the requirements described in subsection (f)(1)(E)(i) of this section, the food service establishment shall have the grease interceptor serviced immediately such that all FOG, sludge, and other materials are completely removed from the grease interceptor. If deemed necessary, the FOG control program manager may also increase the maintenance frequency of the grease interceptor;

(F) Wastewater, accumulated FOG, floating materials, sludge/solids, and other materials removed from the

grease interceptor shall be properly disposed of off-site by wastehaulers in accordance with all applicable federal, state and/or local laws. (Ord. O-2004-07 § 1, 2004)

16.24.050 Monitoring, reporting, notification and inspection requirements.

(a) Monitoring and Reporting Conditions.

(1) Monitoring for Compliance with Permit Conditions and Reporting Requirements.

(A) The FOG control program manager may require periodic reporting of the status of implementation of best management practices, in accordance with the FOG control program.

(B) The FOG control program manager may require visual monitoring and reporting by the city or an approved contractor, at the sole expense of the permittee, to observe the actual conditions of any food service establishment's sewer lateral and sewer lines downstream.

(C) The FOG control program manager may require reports from any food service establishment for self-monitoring of wastewater constituents and potential FOG accumulation in the private sewer line and for FOG characteristics of any permittee's operations to determine compliance with any conditions or requirements specified in the applicable FOG wastewater discharge permit or this chapter. Monitoring reports of the analyses of wastewater constituents and FOG characteristics shall be in a manner and form approved by the FOG control program manager and shall be submitted upon request of the FOG control program manager. Failure by the permittee to perform any required monitoring, or to submit monitoring reports required by the FOG control program manager shall constitute a violation of this chapter and may be cause for the city to initiate tasks and analyses to determine the wastewater constituents and FOG characteristics for compliance with any conditions and requirements specified in the FOG wastewater discharge permit or in this chapter. The permittee shall be responsible for any and all expenses of the city in undertaking such monitoring analyses and preparation of reports.

(D) Other reports may be required of any food service establishment such as compliance schedule progress reports, FOG control monitoring reports, and any other reports deemed reasonably appropriate by the FOG control program manager to ensure compliance with this chapter.

(2) Record Keeping Requirements. Each food service establishment shall be required to keep all manifests, records, receipts and invoices relating to all cleaning, maintenance and grease removal of/from the grease control device, and the disposal carrier and disposal site location for no less than two (2) years. Each food service establishment shall, upon request, make the manifests, records, receipts and invoices available to any city representative or inspector. These records shall include:

(A) A logbook of grease interceptor, grease trap or grease control device cleaning and maintenance practices;

(B) A record of best management practices being implemented including employee training;

(C) Copies of records and manifests of wastehauling of interceptor contents;

(D) Records of sampling data and sludge height monitoring for FOG and solids accumulation in the grease interceptors;

(E) Records of any FOG and/or wastewater spills and records of the cleaning of sewer laterals;

(F) Any other information deemed appropriate by the FOG control program manager to ensure compliance with this chapter.

(3) Falsifying Information or Tampering with Process. It is unlawful to make any false statement or representation on any record, report, plan or other document that is filed with the city pursuant to this chapter, or to tamper with or knowingly render inoperable any grease control device, monitoring device or method or access point required under this chapter.

(b) Inspection and Sampling Conditions.

(1) The FOG control program manager may inspect or order the inspection and sample the wastewater discharges of any food service establishment to ascertain whether the intent of this chapter is being met and the permittee is complying with all requirements. The permittee shall allow the city access to the food service

establishment premises, during normal business hours, for purposes of inspecting the food service establishment's grease control devices or interceptor, and reviewing the manifests, records, receipts and invoices relating to the cleaning, maintenance and inspection of the grease control devices or interceptor.

(2) The FOG control program manager shall have the right to place or order the placement on the food service establishment's property or other locations as determined by the FOG control program manager, such devices as are necessary to conduct sampling or metering operations. Where a food service establishment has security measures in force, the permittee shall make necessary arrangements so that representatives of the city shall be permitted to enter without delay for the purpose of performing their specific responsibilities.

(3) In order for the FOG control program manager to determine the wastewater characteristics of the discharger for purposes of determining the annual use charge and for compliance with permit requirements, the permittee shall make available for inspection and copying by the city all notices, monitoring reports, waste manifests, and records including, but not limited to, those related to wastewater generation, and wastewater disposal without restriction. All such records shall be kept by the permittee a minimum of two (2) years.

(c) Right of Entry. Representatives of a food service establishment where wastewater is created or discharged shall allow the FOG control program manager, or city representatives, reasonable access to all parts of the wastewater generating and disposal facilities for the purposes of inspection and sampling during all times the discharger's facility is open, operating, or any other reasonable times. No person shall interfere with, delay, resist or refuse entrance to city representatives attempting to inspect any food service establishment involved directly or indirectly with a discharge of wastewater to the city's sewer system. In the event of an emergency involving actual or imminent sanitary sewer overflow, city's representatives may access adjoining businesses or properties that share a sewer system with a food service establishment in order to prevent or remediate an actual or imminent sewer overflow.

(d) Notification of Spill.

(1) In the event a permittee is unable to comply with any permit condition due to a breakdown of equipment, accident, or human error or the permittee has reasonable opportunity to know that his/her/its discharge will exceed the discharge provisions of the applicable FOG wastewater discharge permit or this chapter, the discharger shall immediately notify the city by telephone at the number specified in the permit. If the material discharged to the sewer has the potential to cause or result in sewer blockages or SSOs, the discharger shall immediately notify the local health department, and the city.

(2) Confirmation of this notification shall be made in writing to the FOG control program manager at the address specified in the permit no later than five (5) working days from the date of the incident. The written notification shall state the date of the incident, the reasons for the discharge or spill, what steps were taken to immediately correct the problem, and what steps are being taken to prevent the problem from recurring.

(3) Such notification shall not relieve the permittee of any expense, loss, damage or other liability which may be incurred as a result of damage or loss to the city or any other damage or loss to person or property; nor shall such notification relieve the permittee of any fees or other liability which may be imposed pursuant to this chapter or other applicable law.

(e) Notification of Planned Changes. Permittees shall notify the city at least sixty (60) days in advance prior to any facility expansion/remodeling, or process modifications that may result in new or substantially increased FOG discharges or a change in the nature of the discharge. Permittees shall notify the city in writing of the proposed expansion or remodeling and shall submit any information requested by the city for evaluation of the effect of such expansion on the permittee's FOG discharge to the sewer system. (Ord. O-2004-07 § 1, 2004)

16.24.060 Enforcement.

(a) General Procedure.

(1) To ensure that all interested parties are afforded due process of law and that violations are resolved as soon as possible, the general policy of the city is that any determination relating to a notice of violation and compliance schedule order (CSO) will be made by the city administrator upon information provided by the FOG control program

manager or inspector, with a right of appeal by the permittee to the city council pursuant to the procedures set forth in subsection (l) of this section.

(2) The city, at its discretion, may utilize any one (1), combination, or all enforcement remedies provided in this section in response to any permit violation or other violation of this chapter.

(b) Determination of Noncompliance with FOG Wastewater Discharge Permit Conditions.

(1) Sampling and Inspection Procedures.

(A) Sampling and inspection of food service establishments shall be conducted in the time, place, manner, and frequency determined at the sole discretion of the FOG control program manager.

(B) Noncompliance with permit discharge conditions, or any discharge provision of this chapter may be determined by an inspection of a grease control device, grease interceptor and associated manifest(s) and documentation; analysis of a grab or composite sample of the effluent of a food service establishment; or by other information relating to the operations of or discharge from a food service establishment.

(C) Any sample taken from a designated sample point shall be considered to be representative of the discharge to the public sewer.

(2) Noncompliance Fee. Any permittee determined to be in noncompliance with the terms and conditions specified in its permit or with any provision of this chapter shall pay a noncompliance fee. The purpose of the noncompliance fee is to compensate the city for costs of additional inspection and follow-up, sampling, monitoring, laboratory analysis, treatment, disposal, and administrative processing incurred as a result of the noncompliance, and shall be in addition to and not in lieu of any penalties as may be assessed pursuant to subsections (j) and (k) of this section. Noncompliance fees shall be in the amount adopted by ordinance or resolution of the city council.

(c) Compliance Schedule Order (CSO).

(1) Upon determination that a permittee is in noncompliance with the terms and conditions specified in its permit or any provision of this chapter, or needs to construct and/or acquire and install a grease control device or grease interceptor, the FOG control program manager may issue to the permittee a CSO.

(2) The CSO may contain terms and conditions including but not limited to requirements for installation of a grease control device, grease interceptor and facilities, submittal of drawings or reports, audit of waste hauling records, best management and waste minimization practices, payment of fees, or other provisions to ensure compliance with this chapter.

(3) If compliance is not achieved in accordance with the terms and conditions of a CSO during its term, the FOG control program manager may issue an order suspending or revoking the applicable FOG wastewater discharge permit pursuant to subsection (d) or (e) of these regulations.

(d) Permit Suspension.

(1) The city administrator may suspend any permit when it is determined that a permittee:

(A) Fails to comply with the terms and conditions of a CSO;

(B) Knowingly provides a false statement, representation, record, report, or other document to the city;

(C) Refuses to provide records, reports, plans, or other documents required by the city to determine permit terms or conditions, discharge compliance, or compliance with this chapter;

(D) Falsifies, tampers with, or knowingly renders inaccurate any monitoring device or sample collection method;

(E) Refuses reasonable access to the permittee’s premises for the purpose of inspection and monitoring;

(F) Does not make timely payment of all amounts owed to the city for user charges, permit fees, or any other fees imposed pursuant to this chapter;

(G) Causes interference, a sewer blockage, or an SSO in the sewer system;

(H) Violates grease interceptor maintenance requirements, any condition or limit of its FOG wastewater discharge permit or any provision of this chapter.

(2) When the FOG control program manager has reason to believe that grounds exist for permit suspension,

he/she shall give written notice thereof by certified mail to the permittee setting forth a statement of the facts and grounds deemed to exist, together with the time and place where the charges shall be heard by the city administrator. The hearing date shall be not less than fifteen (15) calendar days nor more than forty-five (45) calendar days after the mailing of such notice.

(A) At the suspension hearing, the permittee shall have an opportunity to respond to the allegations set forth in the notice by presenting written or oral evidence. The hearing shall be conducted in accordance with procedures established by the city administrator.

(B) If the city administrator designates a hearing officer, after the conclusion of the hearing, the hearing officer shall submit a written report to the city administrator setting forth a brief statement of facts found to be true, a determination of the issues presented, conclusions and a recommendation.

(C) Upon receipt of the written report of the hearing officer or conclusion of the hearing, if the city administrator conducts the hearing, the city administrator shall make his/her determination and should he/she find that grounds exist for suspension of the permit, he/she shall issue his/her decision and order in writing within thirty (30) calendar days after the conclusion of the hearing. The written decision and order of the city administrator shall be sent by certified mail to the permittee or its legal counsel/representative at the permittee's business address.

(3) Effect.

(A) Upon an order of suspension by the city administrator becoming final, the permittee shall immediately cease and desist its discharge and shall have no right to discharge any wastewater containing FOG directly or indirectly to the city's sewer system for the duration of the suspension. All costs for physically terminating and reinstating sewer service shall be paid by the permittee.

(B) Any owner or responsible management employee of the permittee shall be bound by the order of suspension.

(C) An order of permit suspension issued by the city administrator shall be final in all respects on the sixteenth (16th) day after it is mailed to the permittee unless a request for hearing with the city council is filed with the city clerk pursuant to subsection (l) of this section no later than 4:30 p.m. on the fifteenth (15th) day following such mailing.

(e) Permit Revocation.

(1) The city administrator may revoke any permit when it is determined that a permittee:

(A) Knowingly provides a false statement, representation, record, report or other document to the city;

(B) Refuses to provide records, reports, plans, or other documents required by the city to determine permit terms, conditions, discharge compliance or compliance with this chapter;

(C) Falsifies, tampers with, or knowingly renders inaccurate any monitoring device or sample collection method;

(D) Fails to comply with the terms and conditions of a permit suspension or CSO;

(E) Discharges effluent to the sewer system while its permit is suspended;

(F) Refuses reasonable access to the permittee's premises for the purpose of inspection and monitoring;

(G) Does not make timely payment of all amounts owed to the city for user charges, permit fees, or any other fees imposed pursuant to this chapter;

(H) Causes interference, a sewer blockage, or an SSO in the sewer system;

(I) Violates grease interceptor maintenance requirements, any condition or limit of its FOG wastewater discharge permit or any provision of this chapter.

(2) When the FOG control program manager has reason to believe that grounds exist for the revocation of a permit, he/she shall give written notice by certified mail thereof to the permittee setting forth a statement of the facts and grounds deemed to exist together with the time and place where the charges shall be heard by the city administrator. The hearing date shall be not less than fifteen (15) calendar days nor more than forty-five (45) calendar days after the mailing of such notice.

(A) At the revocation hearing, the permittee shall have an opportunity to respond to the allegations set forth in the

notice by presenting written or oral evidence. The hearing shall be conducted in accordance with the procedures established by the city administrator.

(B) If the city administrator designates a hearing officer, after the conclusion of the hearing, the hearing officer shall submit a written report to the city administrator setting forth a brief statement of facts found to be true, a determination of the issues presented, conclusions and a recommendation.

(C) Upon receipt of the written report of the hearing officer, or conclusion of the hearing, if the city administrator conducts the hearing, the city administrator shall make his/her determination and should he/she find that grounds exist for permanent revocation of the permit, he/she shall issue his/her decision and order in writing within thirty (30) calendar days after the conclusion of the hearing. The written decision and order of the city administrator shall be sent by certified mail to the permittee or its legal counsel/representative at the permittee's business address.

In the event the city administrator determines to not revoke the permit, he/she may order other enforcement actions, including, but not limited to, a temporary suspension of the permit, under terms and conditions that he/she deems appropriate.

(3) Effect.

(A) Upon an order of revocation by the city administrator becoming final, the permittee shall permanently lose all rights to discharge any wastewater containing FOG directly or indirectly to the city's sewer system. All costs for physical termination of sewer service shall be paid by the permittee.

(B) Any owner or responsible management employee of the permittee shall be bound by the order of revocation.

(C) Any future application for a permit at any location within the city by any person associated with an order of revocation will be considered by the city after fully reviewing the records of the revoked permit, which records may be the basis for denial of a new permit.

(D) An order of permit revocation issued by the city administrator shall be final in all respects on the sixteenth (16th) day after it is mailed to the permittee unless a request for hearing with the city council is filed with the city clerk pursuant to subsection (l) of this section no later than 4:30 p.m. on the fifteenth (15th) day following such mailing.

(f) Damage to Facilities or Interruption of Normal Operations.

(1) Any person who discharges any waste and/or wastewater which causes or contributes to any sewer blockage, SSO, obstruction, interference, damage, or any other impairment to the city's sewer facilities or to the operation of those facilities shall be liable for all costs incurred to clean or repair the facilities together with expenses incurred by the city to resume normal operations, including all city overhead expenses related to the event. The total amount shall be payable within forty-five (45) days of invoicing by the city.

(2) Any person who discharges waste and/or wastewater to the sewer system which causes or contributes to the city violating discharge requirements established by any regulatory agency shall be liable for any costs or expenses incurred by the city as a result, including but not limited to regulatory fines, penalties, and assessments made by other agencies or a court.

(g) Public Nuisance. The discharge of waste and/or wastewater in any manner in violation of this chapter or of any order issued by the FOG control program manager or city administrator, as authorized by this chapter, is declared a public nuisance and may be corrected or abated as directed by the FOG control program manager or city administrator. Any person creating a public nuisance is guilty of a misdemeanor.

(h) Termination of Service.

(1) The city, by order of the city administrator, may physically terminate sewer service to any property as follows:

(A) On a term of any order of suspension or revocation of a permit; or

(B) Upon the failure of a person not holding a valid FOG wastewater discharge permit to immediately cease the discharge, whether direct or indirect, to the city's sewer facilities after the notice and process in accordance with subsection (e)(2) of this section.

(2) All costs for physical termination shall be paid by the owner or operator of the food service establishment or permittee as well as all costs for reinstating service.

(i) Emergency Suspension Order.

(1) The city may, by order of the city administrator, suspend sewer service when the city administrator determines that such suspension is necessary in order to stop an actual or impending discharge which presents or may present an imminent or substantial endangerment to the health and welfare of persons, or to the environment, or may cause an SSO, sewer blockage, interference to the city's sewer facilities, or may cause the city to violate any state or federal law or regulation. Any discharger notified of and subject to an emergency suspension order shall immediately cease and desist the discharge of all waste and/or wastewater containing FOG to the sewer system.

(2) As soon as reasonably practicable following the issuance of an emergency suspension order, but in no event more than five (5) business days following the issuance of such order, the city administrator shall hold a hearing to provide the food service establishment or permittee the opportunity to present information in opposition to the issuance of the emergency suspension order. Such a hearing shall not stay the effect of the emergency suspension order. The hearing shall be conducted in accordance with procedures established by the city administrator. The city administrator shall issue a written decision and order within two (2) business days following the hearing, which decision shall be sent by certified mail to the food service establishment or its legal counsel/representative at that food service establishment's business address. The decision of the city administrator following the hearing shall be final and not appealable to the city council, but may be subject to judicial review pursuant to subsection (n) of this section.

(j) Civil Penalties.

(1) All users of the city's sewer system and facilities are subject to enforcement actions administratively or judicially by the city, U.S. EPA, state of California Regional Water Quality Control Board or the county of Orange. Such actions may be taken pursuant to the authority and provisions of several laws, including but not limited to: (1) Federal Water Pollution Control Act, commonly known as the Clean Water Act (33 U.S.C.A. Section 1251 et seq.); (2) California Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.); (3) California Hazardous Waste Control Law (California Health & Safety Code Sections 25100 to 25250); (4) Resource Conservation and Recovery Act of 1976 (42 U.S.C.A. Section 6901 et seq.); and (5) California Government Code, Sections 54739-54740.6.

(2) In the event the city is subject to the payment of fines or penalties pursuant to the legal authority and actions of other regulatory or enforcement agencies based on a violation of law or regulation or its permits, and such violation can be established by the city as caused by the discharge of any user of the city's sewer system which is in violation of any provision of this chapter or the user's permit, the city shall be entitled to recover from the user all costs and expenses, including, but not limited to, the full amount of such fines or penalties to which it has been subjected.

(3) Pursuant to the authority of California Government Code Sections 54739 through 54740, any person who violates any provision of this chapter; any permit condition, prohibition or effluent limit; or any suspension or revocation order shall be liable civilly for a sum not to exceed twenty-five thousand dollars ($25,000.00) per violation for each day in which such violation occurs. Pursuant to the authority of the Clean Water Act, 33 U.S.C. Section 1251 et seq., any person who violates any provision of this chapter, or any permit condition, prohibition, or effluent limit shall be liable civilly for a sum not to exceed twenty-five thousand dollars ($25,000.00) per violation for each day in which such violation occurs. The city attorney, upon request of the city administrator, shall petition the Superior Court to impose, assess, and recover such penalties, or such other penalties as the city may impose, assess, and recover pursuant to federal and/or state legislative authorization.

(4) Administrative Civil Penalties.

(A) Pursuant to the authority of California Government Code Sections 54740.5 and 54740.6, the city may issue an administrative complaint to any person who violates:

(i) Any provision of these regulations;

(ii) Any permit condition, prohibition or effluent limit; or

(iii) Any suspension or revocation order.

(B) The administrative complaint shall be served by personal delivery or certified mail on the person and shall inform the person that a hearing will be conducted, and shall specify a hearing date within sixty (60) days following service. The administrative complaint will allege the act or failure to act that constitutes the violation of the city's regulations, the provisions of law authorizing civil liability to be imposed, and the proposed civil penalty. The matter shall be heard by the city administrator. The person to whom an administrative complaint has been issued may waive the right to a hearing, in which case a hearing will not be conducted.

(C) At the hearing, the person shall have an opportunity to respond to the allegations set forth in the administrative complaint by presenting written or oral evidence. The hearing shall be conducted in accordance with the procedures established by the city administrator.

(D) If the city administrator designates a hearing officer, after the conclusion of the hearing, the hearing officer shall submit a written report to the city administrator setting forth a brief statement of the facts found to be true, a determination of the issues presented, conclusions and a recommendation.

(E) Upon receipt of the written report of the hearing officer, or conclusion of the hearing if the city administrator conducts the hearing, the city administrator shall make his/her determination and should he/she find that grounds exist for assessment of a civil penalty against the person, he/she shall issue his/her decision and order in writing within thirty (30) calendar days after the conclusion of the hearing.

(F) If, after the hearing or appeal, if any, it is found that the person has violated reporting or discharge requirements, the city administrator or city council may assess a civil penalty against that person. In determining the amount of the civil penalty, the city administrator or city council may take into consideration all relevant circumstances, including but not limited to the extent of harm caused by the violation, the economic benefit derived through any noncompliance, the nature and persistence of the violation, the length of time over which the violation occurs, and corrective action, if any, attempted or taken by the person involved.

(G) Civil penalties may be assessed as follows:

(i) In an amount which shall not exceed two thousand dollars ($2,000.00) for each day for failing or refusing to furnish required reports;

(ii) In an amount which shall not exceed three thousand dollars ($3,000.00) for each day for failing or refusing to timely comply with any compliance schedules established by the city;

(iii) In an amount which shall not exceed five thousand dollars ($5,000.00) per violation for each day of discharge in violation of any waste discharge limit, permit condition, or requirement issued, reissued or adopted by the city;

(iv) In an amount which does not exceed ten dollars ($10.00) per gallon for discharges in violation of any suspension, revocation, cease and desist order or other order or prohibition issued, reissued or adopted by the city;

(H) An order assessing administrative civil penalties issued by the city administrator shall be final in all respects on the thirty-first (31st) day after it is served on the person unless an appeal and request for hearing with the city council is filed with the city clerk pursuant to subsection (l) of this section no later than the thirtieth (30th) day following such mailing. An order assessing administrative civil penalties issued by the city council shall be final upon issuance.

(I) Copies of the administrative order shall be served on the party served with the administrative complaint, either by personal service or by registered mail to the person at his/her/its business or residence address, and upon other persons who appeared at the hearing and requested a copy of the order.

(J) Any person aggrieved by a final order issued by the city council, after granting review of the order of the city administrator, may obtain review of the order of the city council in the superior court, pursuant to Government Code Section 54740.6, by filing in the court a petition for writ of mandate within thirty (30) days following the service of a copy of the decision or order issued by the city council.

(K) Payment of any order setting administrative civil penalties shall be made within thirty (30) days of the date the order becomes final. The amount of any administrative civil penalties imposed shall constitute a debt to the city.

(L) No administrative civil penalties shall be recoverable for any violation for which the city has recovered civil

penalties through a judicial proceeding filed pursuant to Government Code Section 54740.

(k) Criminal Penalties. Any person who violates any provision of these regulations is guilty of a misdemeanor, which upon conviction is punishable by a fine not to exceed one thousand dollars ($1,000.00), or imprisonment for not more than one (1) year, or both. Each violation and each day in which a violation occurs shall constitute a new and separate violation of this chapter and shall be subject to the penalties contained in this chapter.

(l) Appeals to the City Council.

(1) Any food service establishment, permit applicant, or permittee adversely affected by a decision, action, or determination made by the FOG control program manager or city administrator may, prior to the date that the city administrator's order becomes final, file with the city clerk a written request for hearing before the city council accompanied by an appeal fee in the amount established by a separate ordinance or resolution of the city council. The request for hearing shall set forth in detail all the issues in dispute for which the appellant seeks a determination and all facts supporting appellant's request.

No later than twenty-five (25) days after receipt of the request for hearing, the city council shall either set the matter for a hearing, or deny the request for a hearing.

A hearing shall be held by the city council within thirty (30) days from the date of determination granting a hearing, unless a later date is agreed to by the appellant and the city council. If the matter is not heard within the required time, due to actions or inactions of the appellant, the city administrator's order shall be deemed final.

(2) The city council shall grant all requests for a hearing on appeals concerning permit suspension, revocation, or denial. Whether to grant or deny the request for a hearing on appeals of other decisions of the city administrator shall be within the sole discretion of the city council.

(3) The appeal fee shall be refunded if the city council denies a hearing or reverses or modifies, in favor of the appellant, the order of the city administrator. The fee shall not be refunded if the city council denies the appeal.

(4) After the hearing, the city council shall make a determination whether to uphold, modify, or reverse the decision, action, or determination made by the city administrator.

The decision of the city council shall be set forth in writing within thirty (30) days after the close of the hearing and shall contain findings of the facts found to be true, the determination of issues presented, and the conclusions. The written decision and order of the city council shall be sent by certified mail to the appellant or its legal counsel/representative at the appellant's business address.

The order of the city council shall be final upon its adoption. In the event the city council fails to reverse or modify the city administrator's order, it shall be deemed affirmed.

(m) Payment of Charges.

(1) Except as otherwise provided, all fees, charges and penalties established by these regulations are due and payable upon receipt of notice thereof. Accounts shall become delinquent if not paid within thirty (30) days of the date of mailing, or if personally delivered, the date of delivery. Any action for collection may include an application for an injunction to prevent repeated and recurring violations of this chapter.

(2) Any invoice outstanding and unpaid after ninety (90) days shall be cause for immediate initiation of permit revocation proceedings or immediate suspension of the permit.

(3) Penalties charged under this section shall not accrue to those invoices successfully appealed, provided the city receives written notification of the successful appeal prior to the payment due date. However, payment of disputed charges is still required by the due date during city review of any appeal submitted by permittees.

(n) Judicial Review.

(1) Pursuant to Section 1094.6 of the California Code of Civil Procedure, the city enacts this part to limit to ninety (90) days following final decisions in adjudicatory administrative hearings the time within which an action can be brought to review such decisions by means of administrative mandamus.

(2) Definitions. As used in this section, the following terms and words shall have the following meanings:

(A) "Decision" means and includes adjudicatory administrative decisions that are made after hearing, or after

revoking, suspending, or denying an application for a permit.

(B) "Complete record" means and includes the transcript, if any exists, of the proceedings, all pleadings, all notices and orders, any proposed decision by the city's officers, agents, or employees, the final decision, all admitted exhibits, all rejected exhibits in the possession of the city or its officers, agents or employees, all written evidence, and any other papers in the case.

(3) Time Limit for Judicial Review. Judicial review of any decision of the city or its officer or agent may be made pursuant to Section 1094.5 of the Code of Civil Procedure only if the petition for writ of mandate is filed not later than the ninetieth (90th) day following the date on which the decision becomes final. If there is no provision for reconsideration in the procedures governing the proceedings or if the date is not otherwise specified, the decision is final on the date it is made. If there is provision for reconsideration, the decision is final upon the expiration of the period during which such reconsideration can be sought; provided that if reconsideration is sought pursuant to such provision the decision is final for the purposes of this section on the date that reconsideration is rejected.

(4) The complete record of the proceedings shall be prepared by the city officer or agent who made the decision and shall be delivered to the petitioner within ninety (90) days after he/she has filed written request therefor. The city may recover from the petitioner its actual costs for transcribing and otherwise preparing the record.

(5) If the petitioner files a request for the record within ten (10) days after the date the decision becomes final, the time within which a petition, pursuant to Section 1094.5 of the Code of Civil Procedure, may be filed shall be extended to not later than the thirtieth (30th) day following the date on which the record is either personally delivered or mailed to the petitioner or the petitioner's attorney of record, if appropriate.

(6) In issuing a final decision, the city shall provide notice to the party that Section 1094.6 of the Code of Civil Procedure governs the time within which judicial review must be sought.

(7) Notwithstanding the foregoing, and pursuant to Government Code Section 54740.6, judicial review of an order of the city council imposing administrative civil penalties pursuant to subsection (j)(4) of this section may be made only if the petition for writ of mandate is filed not later than the thirtieth (30th) day following the day on which the order of the city council becomes final. (Ord. O-2004-07 § 1, 2004)

16.24.070 Severability.

If any section, subsection, subdivision, sentence, clause, phrase or word of this chapter is for any reason held to be unconstitutional or otherwise invalid, such invalidity shall not affect the validity of this entire chapter or any of the remaining portions of this chapter. The city council declares that it would have adopted this chapter, and each section, subsection, subdivision, sentence, clause or phrase hereof, irrespective of the fact that any one (1) or more sections, subsections, subdivisions, sentences, clauses, phrases or words be declared unconstitutional or otherwise invalid. (Ord. O-2004-07 § 1, 2004)

16.24.080 California Building Standards Law findings.

Pursuant to the provisions of the California Building Standards Law, California Health and Safety Code Sections 18941.5, 17958, 17958.5 and 17958.7, the city council finds that the amendments to the State Building Standards and Housing Laws, more particularly the California Plumbing Code, adopted in this chapter are necessary because of climatic, geological or topographical conditions of property in the city's jurisdiction, and as more specifically described below.

(a) Articles 2 and 4 modify the authority and discretion of the "Administrative Authority" of Section 1014.1 of the 2001 California Plumbing Code by requiring all food service establishments to install and operate a grease control device, which may be a grease interceptor or grease trap, if no other device, mechanism, or process is found to successfully trap or collect or treat FOG prior to it being discharged into the sewer system.

(b) Section 16.24.040 of this code modifies the general maintenance requirements for grease interceptors of Section 1014.6 of the 2001 California Plumbing Code and establishes more specific maintenance requirements.

Findings for “a” and “b”: The city’s topography and geography that has created the Santa Ana Watershed and the city’s proximity to the Pacific Ocean coupled with the general waste discharge requirements imposed by the RWQCB require the strict compliance with grease control device regulations to prevent sewer system overflows that threaten the health and safety of the public within the immediate vicinity of the overflow and downstream to the local beaches.

(c) Administrative/Procedural Amendments. Additional amendments and deletions to the California Plumbing Code are found to be administrative or procedural and are found to be reasonable and necessary to safeguard life and property within the city. (Ord. O-2004-07 § 1, 2004)

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Chapter 20.12 CALIFORNIA PLUMBING CODE, 2016 EDITION

20.12.010 Title.

This chapter shall be known as the "Placentia Plumbing Code." (Ord. O-2016-07 § 7, 2016)

20.12.020 Purpose.

The purpose of this chapter is to prescribe regulations for construction, enlargement, alteration, repair, improving, removal, conversion, demolition, equipment use, plumbing systems, materials and appurtenances and conditions hazardous to life or property in the occupancy of buildings and premises as herein provided. (Ord. O-2016-07 § 7, 2016)

20.12.030 Adoption of Plumbing Code.

There hereby is adopted as the "Placentia Plumbing Code," except as otherwise provided in this chapter, that certain Code known and designated as the California Plumbing Code, 2016 Edition, as set forth in Title 24, Part 5 of the California Code of Regulations, based on the 2016 Uniform Plumbing Code, including all appendices thereto and including all amendments made herein, and such Code shall be and become the plumbing code of the city of Placentia, governing the construction, enlargement, alteration, repair, improving, removal, conversion, demolition, equipment use, plumbing systems, materials and appurtenances and conditions hazardous to life or property in the occupancy of buildings and premises as herein provided.

Whenever the California Code of Regulations and State Building Standards Code of Regulations differ from any provision of the Placentia Plumbing Code, said state regulations shall prevail over the provisions of the Placentia Plumbing Code except as specifically modified herein. (Ord. O-2016-07 § 7, 2016)

20.12.040 Definition of terms.

Whenever any of the following names or terms are used in the California Plumbing Code, each such name or term shall be deemed and construed to have the meaning ascribed to it in this section as follows:

(a) "Authority having jurisdiction" means the city of Placentia.

(b) "Building department" means the building and safety division of the city.

(c) "Building official" means the chief building official of the city as appointed by the city administrator of the city, or designee.

(d) "City" means the city of Placentia.

(e) "Fire Code" means the Placentia Fire Code.

(f) "Fire code official" means the director of fire services of the Orange County fire authority, or designee.

(g) "Jurisdiction" means the city.

(h) "Local enforcing agency" means the city. (Ord. O-2016-07 § 7, 2016)

20.12.050 Amendments to Plumbing Code.

The following provisions of the California Plumbing Code hereby are amended to read, in words and figures, as follows:

Section 110.A. Right of Entry.

1. The building official shall have the authority to enter any building or premises for the purpose making an inspection to enforce the provisions of this code, or to investigate the existence in any building or upon any premises any conditions or violation(s) of this code, which make the building or premises unsafe, dangerous or hazardous in order to protect the public health, safety and welfare of the City. In addition, the building official is authorized to enter any building or premises in order to inspect the same for purposes of issuing any permit issued or required hereunder.

2. Except in emergency situations, the building official shall not enter any building or premises without the consent of the owner or occupant thereof, unless he or she possesses a search warrant authorizing entry and search of said building or premises. No person shall hinder or prevent the building official while in the performance of the duties herein described as emergency situations or while in possession of a search warrant, from entering upon and into any and all premises under his or her jurisdiction, at all reasonable hours, for the purpose of inspecting the same to determine whether or not the provisions of this code and all other applicable laws or ordinances pertaining to the protection of persons or property are observed therein.

(Ord. O-2016-07 § 7, 2016)

20.12.060 Enforcement and inspections.

The Placentia Plumbing Code, as set forth in this chapter shall be enforced by the building official or designee.

20.12.070 Fees.

Notwithstanding any provision of the Placentia Residential Code as hereby adopted, all fees for services provided pursuant to the Placentia Residential Code shall approved by resolution therefor as adopted by the city council of the city of Placentia pursuant to the provisions of California Government Code Section 66016, et seq. In addition to any other fee(s) to be charged hereunder, any person, firm, partnership or corporation initiating or engaging in any work without the permit therefor as required hereunder shall pay, a penalty equal to one hundred (100) percent of the fee for the requisite permit if issued after such work commences, is initiated or engaged in by such person, firm, partnership or corporation. (Ord. O-2016-07 § 7, 2016)

20.12.080 Copy filed.

One (1) copy of the California Plumbing Code, 2016 Edition, based on the 2016 Uniform Plumbing Code, including all appendices thereto and including all amendments made herein is on file in the office of the Building Official pursuant to the requirements of California Health and Safety Code Section 18942(e)(1) and is available for public inspection. (Ord. O-2016-07 § 7, 2016)

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Chapter 20.36 UNIFORM SWIMMING POOL, SPA AND HOT TUB CODE

Note

* Prior history: Ords. 74-O-102, 72-O-102, 71-O-111, 68-O-122, 68-O-112 and prior code §§ 6-40—6-47, 6-47.1, 6-48 and 6-49.

20.36.010 Adoption.

A certain document, one (1) copy of which is on file in the office of the city clerk, being marked and designated as the Uniform Swimming Pool, Spa and Hot Tub Code, 1997 Edition, adopted with appendices as the swimming pool, spa and hot tub code of the city, and each and all of the regulations, provisions penalties and conditions and terms of such Uniform Swimming Pool, Spa and Hot Tub Code, 1997 Edition, Appendices, on file in the office of the city clerk are referred to, adopted and made a part hereof as if fully set out in this chapter, except as hereinafter changed or amended. (Ord. 99-O-106, 1999; Ord. 95-O-115, 1995; Ord. 92-O-109, 1992; Ord. 89-O-127, 1989; Ord. 87-O-115, 1987; Ord. 85-O-117, 1985)

20.36.020 Section 1.7—First paragraph amended—Violation and penalties.

Section 1.2, first paragraph, is amended to read as follows:

Any person, firm, or corporation violating any provision of this Code shall be subject to penalties as specified in Chapter 1.08 of the Placentia Municipal Code.

(Ord. 85-O-117, 1985)

20.36.030 Section 1.11 amended—Schedule of fees.

That portion of Section 1.11 titled Schedule of Fees shall be amended as follows:

Fees shall be in accordance with the fee schedule established by city council resolution.

(Ord. O-2007-07 § 26, 2007; Ord. 85-O-117, 1985)

20.36.040 Section 102 amended—Definitions.

Section 102, “Administrative Authority” and “Swimming Pool,” are amended to read as follows:

Whenever the term “Administrative Authority” is used in this code, it shall be construed to mean the Chief Building Official of the City of Placentia or his authorized representative.

A swimming pool is any constructed or prefabricated pool used for swimming, bathing or wading, eighteen (18) inches or more in depth.

(Ord. 85-O-117, 1985)

20.36.050 Section 301 added—General requirements.

Section 301 is amended by adding the following:

(c) Any and all premises upon which a Swimming Pool, Spa, Wading Pool or Hot Tub is located shall have a substantial wall or fence, not less than five feet (5′) above the adjacent surface on the exterior side of said wall or fence, that completely surrounds the Swimming Pool, Spa, Wading Pool or Hot Tub. Holes, openings or gaps in said fence, wall, or gate shall be so positioned as not to afford a means of climbing over, under or through such fence, wall or gate. Provided that a permanent building on the same premises may be used for part of said enclosure.

(d) Maintain in working order at all times all gates and doors which afford access to such body of water with self-closing and self-latching devices, designed for and capable of keeping such gates or doors securely closed at all times. Such latching devices shall be located not less than four and one-half feet (4′6″) above the exterior surface of the floor or ground area for a minimum of five feet (5′) in any direction from such closing and latching device. Walk through doors from garage areas to pool areas shall be included.

(e) Decking, of a permanent, non-absorbent, non-skid material, of a minimum width of four (4) feet from waters edge, shall be installed a minimum of two-thirds the perimeter of the pool.

(f) There shall be a minimum horizontal clearance of five (5′) feet between the water's edge of any pool and a fence, equipment, or property line, and a vertical clearance to the sky, except as to electric wires which shall comply with California Public Utilities Commission Resolution No. E 1109, Appendix B and C, as revised. Setbacks from streets shall conform to requirements for main buildings on subject property as zoned at time of construction. Diving boards, slides, ladders or similar pieces of equipment used for entering or exiting pool may be omitted from the above requirements. Planters not to exceed twelve inches (12") in height, or roof overhang with a minimum clearance of seven feet (7') from the decking may be no closer than 2' of the waterline.

(Ord. 85-O-117 (part) 1985)

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22.48.030 Sanitary sewers.

Sanitary sewers, appurtenances and service connections shall be constructed to the lines and grades approved by the city engineer and shall be of such size and design as the city engineer designates. Where there is no sewer within reasonable proximity, when gravity flow is impossible, when pumping costs would be excessive, and when, in the opinion of the city council no public nuisance would result, sanitary sewers, on specific permit of the city council, may be constructed for future connection to permanent sewer facilities and remain dry until an outfall is provided. (Ord. 88-O-117 § 1, 1988)

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714.0 Damage to Public Sewer or Private Sewage Disposal System

714.1 Unlawful

Practices

It shall be unlawful for a person to deposit, by means whatsoever, into a plumbing fixture, floor drain, interceptor, sump, receptor, or device which is connected to a drainage system, public sewer, private sewer, septic tank, or cesspool, ashes; cinders; solids; rags; flammable, poisonous, or explosive liquids or gases; oils; grease; and whatsoever that is capable of causing damage to the public sewer, private sewer, or private sewage disposal system.

714.2 Prohibited Water Discharge

No rain, surface, or subsurface water shall be connected to or discharged into a drainage system, unless first approved by the Authority Having Jurisdiction.

714.3 Prohibited Sewer

Connection

No cesspool, septic tank, seepage pit, or drain field shall be connected to a public sewer or to a building sewer leading to such public sewer.

714.4 Commercial Food Waste Disposer

The Authority Having Jurisdiction shall review before approval, the installation of a commercial food waste disposer connecting to a private sewage disposal system.

714.5

Tanks

An approved-type, watertight sewage or wastewater holding tank, the contents of which, due to their character, shall be periodically removed and disposed of at some approved off-site location, shall be installed where required by the Authority Having Jurisdiction or the Health Officer to prevent anticipated surface or subsurface contamination or pollution, damage to the public sewer, or other hazardous or nuisance conditions.

Exported from UpCodes

SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix F

Preventative Maintenance Program

Sanitary Sewer
Preventive Maintenance Program

2019

City of Placentia
Sanitary Sewer Preventive Maintenance Program

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CITY OF PLACENTIA
Preventive Maintenance Program

General

The preventive maintenance program is a key element of the City of Placentia's Sanitary Sewer Management Plan (SSMP). The preventive maintenance program's goal is to establish the proper type and amount of sanitary sewer collection system routine preventive and predictive maintenance to reduce and eventually eliminate preventable sanitary sewer overflows (SSOs) from occurring within the City's sanitary collection system. As part of the SSMP, the preventive maintenance program provides part of the asset management framework required to operate and maintain the City's sanitary collection system at its optimal level of performance today and into the future.

System Overview

The Placentia sanitary sewer collection system consists of approximately 84 miles of pipelines and manholes. Piping sizes range from 6" to 21" in diameter. Pipe construction is mostly VCP with sizes above 15" being both VCP and RCP. There are no lift stations or force mains as the entire system is a gravity flow system. Private laterals connect private properties to the City's collection system but are not part of the City's collection system. Maintenance and repair of all private laterals is the responsibility of the private property owner up to the point of connection with the City's collection system. This is provided for in the City's Municipal Code Section 16.12.140.

Orange County Sanitation District (OCSD) operates and maintains an interceptor system that collects wastewater throughout the Santa Ana Basin. A portion of OCSD's system is within the City of Placentia. OCSD has lines that extend from the City of Brea down Kraemer Boulevard to Palm Drive; up to two lines in Palm Drive that extend the entire length of Palm Drive; on Rose Drive from Palm Drive into the City of Yorba Linda; through the Alta Vista Country Club from Palm Drive to the City of Anaheim roughly along Carbon Creek; and along Orangethorpe Avenue from the City of Yorba Linda to Rose Drive. The City's collection system connects to the OCSD system at approximately thirty-three separate locations, including three locations within the City of Fullerton and two within the City of Anaheim. This arrangement essentially divides the City's collection system into six specific drainage areas whose only interconnection is the OCSD interceptor system.

Line cleaning, enhanced maintenance area cleaning and response to plug-ups, of the City's collection system, are provided for the City via contract. City personnel provide first response, cleanup and assistance should a sanitary sewer overflow occur.

Unique to the City is that the Yorba Linda Water District (YLWD) has the sewering jurisdiction within approximately 12% to 15% of the area within city limits. This

sanitary collection system, although within city limits, is wholly owned and operated by the YLWD and is not part of the City's SSMP or preventive maintenance program.

Preventive Maintenance

The City's sanitary collection system is a network of various sized gravity pipelines and manholes that collect domestic sewerage from throughout the City's jurisdiction. The City does not have the necessary equipment or trained personnel to maintain this system on its own. Maintenance for this system is provided via contract where the City has the administrative oversight.

In fiscal year 2005/2006, the City initiated a new enhanced preventive maintenance program. The goal of this 2-phase program is to reduce and potentially eliminate all preventable SSOs while gaining in-depth knowledge of the condition and needs of the collection system asset. Phase I consisted of an aggressive line cleaning and CCTV inspection during the first three years of the program. All of the City's sewer lines were cleaned every 12 months, with a minimum 25% of the system undergoing CCTV inspection each year for the first three years. Combined with previously acquired CCTV inspection data, the City's current inspection data is 100% of the City's collection system. Stored on CD-ROM, the CCTV inspection data establishes a baseline condition assessment of the City's collection system. Each year thereafter City performed approximately 5% or approximately 4 miles of new CCTV inspection to update the baseline information. Additionally, during the first cleaning phase, a City representative accompanied the contactor's cleaning crews to perform manhole inspections and to verify the accuracy of the City's sewer atlas maps. Data acquired, manhole location, depth, pipe size and type, direction of flow, etc. will be utilized to populate the City's asset management database. During this first phase, data was analyzed to determine the actual condition of the collection system. Based upon the system's condition, the true maintenance needs of the system are determined. I&I, capacity, replacement and rehabilitation issues are addressed, with these programs being updated. The Capital Improvement Projects (CIP) list is regularly updated and prioritized to ensure the most critical needs are addressed first. The actual cost of maintenance and the CIP list is evaluated on an ongoing basis to ensure the current sewer service fee will provide sufficient funding with adjustments being made as necessary.

To assist in this endeavor, the City has entered into a shared resource project with OCSD. This project allows the City access to maintenance and other resources of OCSD on an actual cost basis. OCSD may provide training for City employees to assist them in performing field inspections and evaluations of the line cleaning contractor's performance. They may also assist the City in evaluating the collection system's condition based upon the CCTV data. The City also is afforded the right to utilize OCSD's RFPs and other administrative documentation to assist in negotiating with line cleaning and other contractors. The City feels this offers the City quality expertise in developing and maintaining an effective and efficient preventive maintenance program to meet the specific needs of the City's collection system.

The City is currently in Phase II of the preventive maintenance program. Phase II is the City's final or permanent phase of its line cleaning program and is based upon the data evaluation from Phase I. Line cleaning frequency is based upon actual needs of specific drainage areas. Drainage areas are those reaches that collect sewage from specific areas and discharge into OCSD's interceptor system. Based upon condition and use, some drainage areas may require more frequent cleaning than others. Line segments prone to grease or root buildup would require more frequent cleaning. Currently, the City is cleaning all of its collection system annually with enhanced maintenance areas being cleaned quarterly. CCTV inspections will be performed at approximately 14 -20%,or approximately 12 to 17 miles, of the system per year giving the City a complete updated condition assessment every 5 to 7 years.

Cleaning Requirements

Since the City is currently, and for the foreseeable future, going to utilize contract services for the cleaning, maintenance and repair of its sanitary collection system, the City has developed a standard by which cleaning shall be accomplished. This standard is included as Attachment A of the preventive maintenance program. Any contractor providing line cleaning for the City must, at a minimum, provide services compatible with the City's line cleaning standard. As for the frequency of cleaning the City's collection system lines, all lines will be cleaned at least every 2 years. Some areas may require more frequent cleaning while others may need cleaning at a lower frequency.

Should it be necessary, the City may also develop of a cooperative program with private plumbing contractors to notify the City anytime a private lateral is cleaned so any resulting debris can be removed from the collection main prior to it resulting in an SSO.

Enhanced Maintenance Areas

Enhanced maintenance areas are areas within the City's collection system that are designated as needing addition attention beyond the normal routine maintenance program. Enhanced maintenance areas are areas of known problems or of prior SSOs. Enhanced maintenance areas are currently cleaned quarterly, or more frequently if needed. All enhanced maintenance areas were CCTV inspected and evaluated during the initial implementation of Phase I of the preventive maintenance program. Those requiring an engineering solution are prioritized and added to the CIP list. Enhanced maintenance areas attributed to grease buildup will continue to require additional cleaning until the City's fats, oils, and grease source control program has abated the problem. Enhanced maintenance areas attributed to root growth would be handled by the City's root control program. Attachment C is a current list of the City's Enhanced maintenance areas.

Fats, Oils and Grease (FOG) Control

On January 1, 2005, the City implemented its FOG source control program to limit FOG discharges from food service establishments (FSEs) into the City's collection system. This is a permit-based program compliant with the City's FOG Control Ordinance. Enforcement is through site visits and regularly scheduled kitchen BMP and grease

interceptor inspections. Fines are possible for noncompliance. The City has conducted public meetings and other educational public outreach to inform FSEs of their responsibilities under the FOG control program. The City's FOG Control Manager oversees this program.

As part of the FOG control program, a FOG characterization study was conducted to identify sources of FOG within the City's collection system. Enhanced maintenance areas, especially those subject to FOG buildup, were reviewed, as were FSEs upstream of those enhanced maintenance areas. All FSEs discharging into the City's collection system were inventoried using the Orange County Health Care Agency's records and the City's business license records. Site inspections were conducted to determine the capability and capacity a FSE had to discharge FOG. A questionnaire was sent out to all potentially affected FSEs and the gathered data was tracked in a database. CCTV inspections during the initial implementation of Phase I assisted in targeting FSEs who are not compliant with the FOG program. Currently, the City is committed to performing FSE inspections at least once annually.

Root Control Program

The City currently does not have a significant problem with roots causing SSOs. This does not mean the potential for blockages due to roots is not there. Should CCTV inspection reveal areas where root intrusion is problematic, appropriate means to remediate the problem will be incorporated. This would include the Best Management Practices (BMPs) for root control including enhanced cleaning methods or chemical additives.

Infiltration/Inflow (I/I) Reduction Plan

The City has developed an I/I program to be implemented in conjunction with the SSMP. The I/I program is designed to identify and eliminate sources of I/I within the City's sanitary collection system. The City's I/I Reduction Plan is included as Attachment D. During Phase I of the preventative maintenance program particular attention is to be paid for potential I/I sources during the CCTV inspections. Those areas suspected of providing potential I&I will be subject to additional evaluation, such as smoke testing, to determine the extent of their I/I potential. Areas of the City's collection system requiring an engineering solution to I/I will be added to the City's CIP list.

During year 2008/2009 the City engaged in its first major I/I reduction project referred to as the Walnut Avenue. Drainage Project. This project involved the replacement of a inefficient storm drain on Walnut Avenue and the rehabilitation of several sewer mains in the vicinity. During heavy rains the defective storm drain system caused extensive flooding that impacted the sewer collection system.

Enforcement

The City has appointed a Code Enforcement Officer the responsibility of enforcement for violations of the City's Municipal Code related to activities that may cause or contribute to a SSO. This includes violations to the City's FOG Control Program and I/I Reduction Plan. This individual also provides inspections and enforces violations of the City's MS4 NPDES program.

Predictive Maintenance

The predictive maintenance program is a subset of the preventive maintenance program and is essentially scheduled inspection tasks designed to determine the effectiveness of the preventive maintenance program as well as the overall condition of the sanitary collection system. Inspections are both manual, for manholes and short sections of pipe, and CCTV for a more detailed examination of the interior of the collection system pipelines. Additionally, CCTV provides data for future reference and comparison. Aside from determining the effectiveness of the preventive program, the predictive maintenance program will assist in asset management related to future system rehabilitation or replacement. The City has developed a standard for pipeline inspection including CCTV and is included as Attachment B of this document.

Corrective Maintenance

As part of the preventive maintenance program, corrective maintenance is designed to respond to a failure in the system, such as a blockage. Additionally, corrective maintenance would provide for system rehabilitation, repair or replacement based upon the regular condition assessment of the collection system. Enhanced maintenance areas or other problem areas for which an engineering solution is possible are also considered corrective maintenance. To assist with corrective maintenance, the City has established, and regularly updates a CIP list. This list is prioritized to ensure those areas of greatest need are the areas receiving the necessary resource. As part of the shared resource project, OCSD may also assist with corrective maintenance. On an as needed basis, OCSD's expertise is utilized to assist the City in prioritizing its corrective maintenance, selection of appropriate contractors, and ensuring the job is completed with the anticipated results.

System Mapping

The City maintains a system of paper atlas maps as well as Geographic Information System (GIS) mapping of its sanitary collection system as well as the storm drain system. Both the paper and GIS maps are housed in the Engineering Division of the Public Works Department of the City. The maps include the locations of manholes and their ID tags, siphons, easements, property parcels, pipelines, their depth and direction of flow. Map books, which contain paper copies of both the sanitary collection system and the storm drain system, are available to maintenance personnel and are in those vehicles utilized for first response in the event of an SSO. As part of Phase I of the preventive maintenance program, a City representative accompanied the line cleaning contractor to inspect and plot the position of all manholes, determine pipe size, material and direction of flow, and verified current information on the atlas maps made updates as necessary.

Record Keeping

As part of this program, the City has upgraded its record keeping to more accurately track line cleaning segments, manual and CCTV inspections, manhole and pipeline rehabilitation, repair and replacement, enhanced maintenance areas, problem areas, and SSOs and their causes. Cleaning records are provided by the cleaning contractor as line segments are cleaned. CCTV inspections are provided by the inspection contractor electronically with written notes and are consistent with NASSCO standards. Records are maintained in a computerized database.

Funding

In early 2005, the City adopted a sewer service fee for all parcels connected to the City's collection system. This was a needs based fee that is calculated on the amount of potable water a parcel uses. The fee was structured to provide adequate funding for the day-to-day operation, maintenance and administration of the collection system, including a dedicated reserve fund for the future rehabilitation or replacement of the collection system. Likewise, sewer capital improvement projects are funded through the sewer service fee. Part of the Phase I analysis was the determination of the actual cost to operate and maintain the City's collection system. This information is used to determine what changes need to be made in the sewer service fee to ensure sufficient revenue is being created to properly fund the needs of the collection system. The sewer service fee is currently being reviewed and the City anticipates a rate adjustment in 2020.

Sewer Line Cleaning Guide

Purpose

To meet the requirements of the Waste Discharge Requirements established by the State Water Resources Control Board and to operate its sanitary collection system at its maximum efficiency, the City contracts all sewer line cleaning of its sanitary collection system to a qualified service provider. Outside contracts are utilized for sewer line cleaning, as the City does not maintain the required equipment or personnel needed to properly clean the pipelines and manholes of the sanitary collection system. The purpose of this Sewer Line Cleaning Guide is to establish the minimum standards for the sewer line cleaning of the City's sanitary collection system. Any service provider utilized for the sanitary collection system sewer line cleaning is expected, at a minimum, to provide a level of cleaning compliant with this Sewer Line Cleaning Guide.

General

The Placentia sanitary collection system consists of approximately 76 miles of pipelines and manholes. Piping sizes range from 6" to 21" in diameter. Pipe construction is mostly VCP with sizes above 15" being both VCP and RCP. There are no lift stations or force mains as the entire system is a gravity flow system. Private laterals connect private properties to the City's collection system but are not part of the City's collection system.

Orange County Sanitary District (OCSD) operates and maintains an interceptor system that collects wastewater throughout the Santa Ana Basin. A portion of OCSD's system is within the City of Placentia. OCSD has lines that extend from the City of Brea down Kraemer Boulevard to Palm Drive; up to two lines in Palm Drive that extend the entire length of Palm Drive; on Rose Drive from Palm Drive into the City of Yorba Linda; through the Alta Vista Country Club from Palm Drive to the City of Anaheim roughly along Carbon Creek; and along Orangethorpe Avenue from the City of Yorba Linda to Rose Drive. The City's collection system connects to the OCSD system at approximately thirty-three separate locations including three locations within the City of Fullerton and two within the City of Anaheim. This arrangement essentially divides the City's collection system into specific drainage areas whose only interconnection is the OCSD interceptor system.

The service provider is required to furnish all labor, equipment, materials and incidentals necessary for the proper cleaning of the City's sanitary collection system sewer pipelines and manholes. It is the responsibility of the service provider to remove any and all debris from the pipelines. All debris must be removed and not passed from manhole to manhole or flushed into the OCSD system or the collection systems of the neighboring cities. Debris consists of, but is not limited to, sludge, dirt, sand, rocks, gravel, grease, roots, solid or semi-solid materials. All debris collected must be properly disposed of. Liquid may be drained back into the collection system; all solid or semi-solid material must be transported to the OCSD treatment facilities. Additionally, the service provider must ensure that no spills occur during the cleaning process and that any line cleaning residue

is cleaned up leaving the area in a clean and sanitary condition prior to moving to the next pipe segment. At no time is the service provider to engage in any activity that is unsafe, or that may result in damage to either private or public property.

Cleaning Equipment

A high velocity hydro-cleaning and vacuum removal unit (combo unit) shall be utilized for both cleaning and clearing of blockages within the City's collection system.

Combo units must meet the following specifications to meet the intent of the sewer line-cleaning guide:

- Hydro unit must be capable of providing an adequate supply of water and have a pump capable of producing adequate pressure and flow to sufficiently scour the pipe sizes being cleaned. All operating controls must be located topside and within easy access to the operator.
- Sufficient length of one-inch high-pressure hydro flushing hose to clean the longest reaches of the collection system (minimum 900 feet recommended) and be equipped with a hydraulically operated hose reel.
- Two or more high velocity cleaning nozzles capable of producing a scouring action from 15 to 45 degrees in all size lines within the City's collection system. Nozzle skids are to be used for the appropriate size line being cleaned. Nozzle jet orifices must be maintained within manufacturer's recommendations. Nozzles with worn out orifices may not be used.
- At least one root cutter appropriate to the size pipes being cleaned must be available.
- The combo unit must be equipped with a high-pressure handgun for cleaning manhole walls, channel, benches and cover frames.
- Combo units must have a centrifugal or positive displacement blower vacuum equipment capable of removing all debris at the down stream manhole while hydro flushing operations are in progress.

The type of cleaning equipment used must be specifically designed and constructed for sewer line cleaning. Line cleaning equipment must be properly maintained and operated as per manufacturer's recommendations. The use of equipment that is defective, inoperative, deficient or unsafe to use does not meet the requirements of this Sewer Line Cleaning Guide. The service provider must satisfactorily demonstrate to the City that their personnel are proficient in both the methods utilized for sewer line cleaning and in the operation the equipment being used. California Water Environment Association (CWEA) certification may be used to demonstrate operator efficiency.

Cleaning Precautions

While cleaning the City's sanitary collection system, the service provider shall take satisfactory precautions while using the cleaning equipment to ensure that no damage occurs to the sewer lines, and public or private property. When using hydro-cleaning

units, nozzle skids are required to prevent accidental entry into the service laterals. Care must be taken to prevent water pressure or head from flooding any properties served by the sewer. Should flooding or other damage occur, the service provider shall be responsible for the costs of all repairs and / or clean up to the satisfaction of the City. All debris is to be removed from the sewer and not passed down through the system. It is the responsibility of the service provider to remove any sewer cleaning equipment that becomes dislodged within the sewer pipe during cleaning operations.

Should the service provider encounter misaligned joints, broken pipes, intruding lateral connections that prevent the proper cleaning of a line segment, the service provider is to cease the cleaning of that segment and immediately notify the City's Maintenance Superintendent (714) 920-8859, or the Public Works Supervisors (714) 920-8858 or (714)329-4912. Likewise, if the service provider encounters large quantities of fresh soil or pieces of sewer pipe, or if the cleaning equipment encounters a blockage that cannot be cleared, cleaning in that segment of pipe should be terminated and the City notified.

Safety Precautions

The service provider is required to be compliant with all applicable safety regulations while performing the sewer line cleaning function for the City. This is particularly important as it relates to manhole entry and traffic control. Prior to initiating service, the service provider is to submit a copy of their written confined space entry program and demonstrate to the City's satisfaction that the program, safety equipment, and trained personnel being used are compliant with the current Title 8 or the California Code of Regulations, Sections 5156, 5157,and 5158. Additionally, the service provider is to practice proper traffic control consistent with city, county or Cal-Trans regulations as appropriate. Adequate traffic control must be utilized to prevent injury or property damage to the service provider, the City or the general public. All sewer line cleaning operations, emergency or routine, must be performed in the safest possible manner.

Line Cleaning Procedures

Sewer line cleaning is divided into two basic categories, routine scheduled line cleaning and emergency blockage cleaning. For routine scheduled line cleaning, the service provider will coordinate with City for the line segments to be cleaned the following week. The service provider shall acquire any required permits or access permission prior to the cleaning of an affected segment. This would include any required access to private properties or easements. Upon request, the City will provide the service provider with a printed sewer atlas, list of enhanced maintenance areas and siphons. Routine scheduled cleaning shall be conducted during the normal workweek, Monday through Friday, during the City's normal business hours. Circumstances could arise, such as the disruption of normal traffic flow, where line cleaning during normal business hours is impractical. In this case, with City approval, line cleaning may need to be scheduled after normal business hours or on weekends. For emergency blockage cleaning, the service provider will make every effort to respond to the City's request for assistance as rapidly as possible, regardless of time of day. Emergency blockage cleaning will be consistent with the City's Sanitary Sewer Overflow Response Plan (SSORP).

For routine scheduled cleaning, the cleaning equipment is normally located at the downstream manhole to jet towards the upstream manhole, thereby pulling any debris to the downstream manhole where it can be removed with the vacuum unit. At a minimum, two passes are required for each line segment being cleaned. The pullback rate on jetting shall not exceed forty feet per minute. If no debris is present the line segment shall be considered sufficiently cleaned. If debris is present, additional passes shall be made for the entire line segment until no debris exists. Should excessive amounts of dirt, gravel, or broken pipe pieces be present in the debris, or if a significant amount of dirt appears on the jet nozzle, the service provider is to cease operation and immediately notify the City of a possible pipeline failure. Likewise, if the entire length of pipe cannot be traversed from the downstream manhole, the service provider should attempt cleaning from the upstream manhole to the downstream manhole. If this is still unsuccessful, the service provider should cease operations and notify the City of a possible blockage, misalignment or pipeline failure. Before moving to the next pipe segment, manholes are to be thoroughly washed with the high-pressure water gun and inspected and the area cleaned up of any debris left from the cleaning operation. Manhole covers are to be securely replaced and resealed if they were previously sealed. Manholes not cleaned or inadequately cleaned shall be re-cleaned, along with their adjoining pipe segments, by the service provider at no additional cost to the City. Any deficiencies to the manhole structure, channel, bench or ring and cover assembly are to be noted and reported to the City. While washing the manhole, care must be taken to avoid spraying nearby vehicles or pedestrians.

Normally, 1 to 3 passes is considered light cleaning, 4 to 6 passes is medium cleaning, with 7 or more passes considered heavy cleaning. Most routine cleaning is considered light cleaning. If a pipeline segment is being prepared for close circuit television (CCTV) inspection or relining, a more thorough scouring of the pipeline is required and may require medium to heavy cleaning. The service provider shall make necessary arrangements with either the Southern California Water Company (SCWC) or the Yorba Linda Water District (YLWD) for the water needed for the cleaning operation. The service provider shall not take water from hydrants they are not authorized to use or that are within the jurisdiction of adjoining cities.

The service provider shall provide a cleaning crew consisting of at least two qualified individuals, one located at the upstream manhole to indicate when the cleaning nozzle is to be retracted. When traffic control or manhole entry is required, the service provider shall supply sufficient qualified staff to complete the task. The service provider must also provide an on-site supervisor or foreman to provide oversight for at least eight hours per workweek. The supervisor or foreman must also be available to the City via telephone and, upon request, be available to the City within a reasonable time period.

Grease Removal: Should grease buildup be encountered during the cleaning process, the service provider shall utilize the proper equipment to scour the grease from the pipeline and to remove it from the collection system. It is not permissible to breakup the grease and flush it down the system, it must be removed. All areas where grease buildup is encountered are to be noted and reported to the City.

Root Removal: Should a root buildup be encountered during the cleaning process, the service provider shall utilize the proper equipment to cut the roots from the pipeline and to remove them from the collection system. It is not permissible to cut up the roots and flush them down the system. Root stubs no longer than one half inch are permissible. Pipe segments with root stubs longer than allowable will require re-cleaning by the service provider at no additional cost to the City. All areas where root buildups are encountered are to be noted and reported to the City.

Enhanced Cleaning Areas: Enhanced cleaning areas are areas within the collection system where blockages or other problems have historically occurred. Enhanced cleaning areas are cleaned and inspected more frequently (currently quarterly) than other areas of the system. Procedures for cleaning enhanced cleaning areas is to be consistent with normal line cleaning practices but on a more frequent basis.

Siphon Cleaning: There are several siphons located within the City, some of which are associated with enhanced cleaning areas. Particular attention is to be paid to the cleaning of siphons to ensure they are clean and free flowing.

Material Removal and Disposal

All debris encountered during the cleaning process must be removed from the system. It is not permissible to flush debris down from manhole segment to manhole segment. (Note: In certain areas of the collection system, it may not be possible to remove debris at each manhole. In this case it is permissible to flush debris down to the first accessible manhole providing the debris is removed from the system.) Liquids shall be decanted and carefully drained back into the collection system. Solid or semi-solid materials must be removed and properly disposed of. If debris removal is by methods other than a vacuum unit, the process must be submitted to the City for review. If debris removal or any other operation requires entry into the manhole, the process must be consistent with the current Cal-OSHA Confined Space Entry regulations and submitted to the City for review. All debris removed must be properly disposed of. Disposal is not to be made into another part of the City's collection system, OCSD's interceptor system, or the collection system of an adjoining city, but transported to the OCSD treatment facility. No debris may remain on-site for later cleanup and transport.

Spill Reporting and Handling

The service provider is not to engage in any activity that could possibly result in a sewage spill. This includes, but is not limited to, blocking the normal sewage flow, diverting the normal sewage flow, using improper cleaning equipment, using the cleaning equipment in a manner for which it was not designed, improperly using the cleaning equipment, or any other process or procedure that would result in sewage being backed up or spilled on private or public property. Should a spill occur, the procedures outlined in the City's Sanitary Sewer Overflow Emergency Response Plan (SSOERP) shall be adhered to, paying particular attention to containment and recovery of the spill. All reporting specified in the SSOERP shall be adhered to. Additionally, any costs to the City resulting from a sewer spill initiated by the service provider, including damage, cleanup,

disruption of service, fines, penalties, assessments, etc. shall be the responsibility of the service provider. This is in addition to any costs incurred by private property owners.

Line Cleaning Reports

At the end of each week of line cleaning, the service provider shall provide to the City a report of the line segments cleaned the previous week. The report shall include, but not be limited to: the manholes, by ID number, that were cleaned and their condition; the pipeline segments that were cleaned, their location and the type of debris removed by pipeline segment (roots, grease, grit, etc.); the type of cleaning required (light, medium, heavy) and the number of passes required by segment; the reason for cleaning (routine, for inspection, blockage removal, etc.); problems encountered (such as limited or unavailable access, poor pipeline conditions that prevented cleaning, complaints from residents, etc.); and other comments and recommendations that are appropriate for the line segments cleaned during that time period. Hard copy and electronic reports are to be provided to the City in Microsoft Excel format or other format suitable to the City.

Cleaning Verification

To verify that the service provider has properly and completely cleaned the City's collection system, after each months cleaning, the City, at its option, may require up to 10% of the cleaned lines be randomly selected for CCTV inspection. This CCTV inspection will occur within one week of the submittal of the cleaning report. This is in addition to manual visual inspections of manholes and pipelines by mirroring or other devices. If the CCTV inspection reveals inadequate cleaning, additional segments may be inspected beyond the initial 10%. If the inspection reveals that more than 10% of the line segments listed in the report require re-cleaning, the service provider shall be required, at no additional expense to the City, to re-clean all the pipe segments listed in the report. All (100%) of the re-cleaned pipe segments shall be CCTV inspected after the re-cleaning has been completed. Additionally, the service provider shall not proceed with any additional line cleaning until all previously cleaned pipe segments are cleaned to the City's satisfaction. Failure of the service provider to provide satisfactory line cleaning may result in the City withholding payment until satisfactory service is provided. The City's CCTV contractor and not the line cleaning service provider will provide the CCTV inspection.

Sewer Line Inspection Guide

Purpose

To meet the requirements of the Waste Discharge Requirements established by the State Water Resources Control Board and to operate its sanitary collection system at its maximum efficiency, the City contracts its closed circuit television (CCTV) inspections of its sanitary collection system to a qualified service provider. Outside contracts are utilized for CCTV inspections as the City does not maintain the required equipment or personnel needed to properly inspect the interior of the pipelines of the sanitary collection system. The purpose of this Sewer Line Inspection Guide is to establish the minimum standards for the sewer line CCTV inspection of the City's sanitary collection system. Any service provider utilized for the sanitary collection system sewer line inspection is expected, at a minimum, to provide a level of CCTV inspection compliant with this Sewer Line Inspection Guide.

General

The Placentia sanitary collection system consists of approximately 76 miles of pipelines and manholes. Piping sizes range from 6" to 21" in diameter. Pipe construction is mostly VCP with sizes above 15" being both VCP and RCP. There are no lift stations or force mains as the entire system is a gravity flow system. Private laterals connect private properties to the City's collection system but are not part of the City's collection system.

The service provider is required to furnish all labor, equipment, materials and incidentals necessary for the proper CCTV inspection of the City's sanitary collection system sewer pipelines and manholes. As enhanced line cleaning is normally required to ensure the proper CCTV inspection of the pipeline interiors, the service provider may provide this service to the City or the City may have this action provided by its normal collection system pipeline cleaning service provider. The City and the service provider, prior to the start of the CCTV inspection will agree upon the method utilized. Any cleaning of the pipelines prior to the CCTV inspection, must be in compliance with the City's Sewer Line Cleaning Guide. Additionally, the service provider must ensure that no spills occur during the cleaning or CCTV inspection process. At no time is the service provider to engage in any activity that is unsafe, or that may result in damage to either private or public property while providing sewer line cleaning or CCTV inspection of the City's sanitary collection system.

Inspection Methods

There are several inspection methods that may be utilized by the City on a case-by-case basis for collection system pipelines and manholes. Manual inspections are used to inspect manholes or short lengths of pipe and may be performed by City personnel or the pipeline cleaning service provider. CCTV inspections without use of video recording equipment are sometimes utilized to get a quick look at a potential trouble spot. This guide does not pertain to these types of inspections but is specifically for CCTV

inspections that include a video archive to document and allow an internal assessment of the condition of the City's sanitary collection system pipelines.

Service Provider Qualifications

The service providers CCTV operators must be certified by the National Association of Sewer Service Companies (NASSCO) and have passed the Pipeline Assessment and Certification Program (PACP). Supervisors, in addition to having the same qualifications as the operators, must have at least 5 years experience in videotaping sewer pipeline inspections. Supervisors must also be able to communicate with the City's staff, as well as his/her own crew, and be able to demonstrate the ability to understand all Cal-OSHA requirements, plans, drawings, and specifications as necessary. NASSCO certification shall be the standard for evaluation, data collection and reporting for CCTV inspections. All work, procedures, personnel training and equipment must be compliant with current Cal-OSHA specifications.

Service Provider CCTV Equipment

All of the equipment used by the service provider for CCTV inspections is to be designed and constructed specifically for operation within a sanitary sewer system and compliant with current Cal-OSHA regulations. The camera shall be capable of operating in an atmosphere with 100% humidity and be capable of performing Pan-and-Tilt (with a minimum 360X270 degree rotation) operations. The camera must have illumination sensitivity of 3 lux or less and be capable of focusing from a minimum of 1 inch to infinity. Lighting intensity shall be adjustable to minimize reflective glare and picture quality shall be adjustable to provide a clear, sharp picture of the entire periphery of the pipeline. Equipment necessary for the movement of the camera through the pipeline shall not interfere with the documentation or inspection process of the sewer pipeline. Camera cables, power cords and ancillary equipment shall be long enough to complete the longest pipe segments in one direction. The camera and monitor must be capable of producing a color picture with a minimum 460-line resolution. A color video recording of the inspection shall be created in high quality digital video suitable for presentation to the City.

Types of CCTV Inspections

The City utilizes two basic types of CCTV inspections, preliminary and standard. The preliminary inspection is normally conducted prior to any cleaning of the pipeline and is used to accurately assess the pipeline in its natural working environment. A preliminary inspection may also be used to determine the extent of root intrusion, grease buildup or blockages. A preliminary inspection may or may not include a recording requirement. The standard inspection is conducted after the pipeline has been sufficiently cleaned to enable a comprehensive evaluation of its interior condition.

Inspection Process

Prior to performing a standard CCTV inspection, the sewer lines to be inspected must be adequately cleaned to allow the CCTV camera to pass through the pipe. Should a pipe segment be found to have excessive debris prohibiting a successful inspection, the service

provider is to notify the City's representative of the condition before continuing with the inspection. The service provider is to provide a minimum of a two-man crew at all times.

Once the camera is inserted into the pipe in the manhole, the camera cable shall have the slack removed and the cable footage counter is to be reset to the distance between the centerline of the manhole and the front of the camera lens. The camera is to move in a downstream direction whenever possible, at a uniform rate of approximately 30 feet per minute. The cable footage counter shall measure each pipeline segment from manhole centerline to manhole centerline with accuracy of less than 1% error over the measured distance. The service provider shall adjust the camera height so that the camera lens is always centered at least one-half the inside diameter of the pipeline being inspected. Should the water level be greater than 20% of the inside pipeline diameter, the service provider should resume inspection at the low flow period or engage in a flow reduction activity that is acceptable to the City without creating a sewage spill. Video recordings made while floating the camera are not acceptable unless approved by the City. Pausing the video recording during periods of inactivity is permitted to eliminate unnecessary recording. Any time a significant defect or a service lateral is noticed, the camera shall stop to provide a clear, focused view of the pipeline condition. An audio narration shall accompany each defect. Significant defects include but are not limited to: laterals (open, sealed, protruding or defective), cracks, offset joints, open joints, sags, line deviations, siphons, missing sections, debris, grease, roots, vermin, and infiltration. If the defect is due to active infiltration, the service provider shall estimate the gallons per minute flow rate at the point of the infiltration. The service provider shall provide a 360-degree pan of all manholes. All manhole numbers used for identification shall be those assigned by the City correlating to the City's sewer atlas maps. The camera lens must be kept clear of condensation and debris.

Should, during the inspection process, the CCTV camera encounter broken or severely misaligned pipe, etc. that could cause the camera to become stuck or further damage the pipe, the service provider shall discontinue the inspection and notify the City's representative of the condition encountered. Likewise, should it be impossible for the camera to pass through the entire pipe segment to be inspected (due to obstruction, etc.) it may be necessary for the service provider to continue the inspection from the opposite manhole. If this occurs, the service provider is to immediately notify the City's representative for further instructions.

Video Recording and CCTV Inspection Report

Video Recording: The purpose of the video recording is to create a visual and an audio record of the problem areas within the collection system pipelines that may be replayed. The electronic files shall be high quality formatted in a format acceptable to the City and provided on a flash drive. Playback shall be at the same speed at which it was recorded. The recording shall be in color and shall be clear and in focus. Recordings are to be continuous between manholes. Do not leave gaps between segments and do not show a single segment on more than one file without the City's approval. Recordings showing steam, inadequate lighting, excessive distortion, discoloration or general poor picture quality shall be cause for rejection.

Each pipe segment (manhole to manhole) shall be identified by text on the initial screen at the beginning of the segment, on the running screen during the inspection and on the ending screen. The initial screen text and voice recording shall identify the current time and date, weather conditions, service provider, operator's name, street name, upstream and downstream manhole ID numbers, direction of camera movement, pipeline materials, length of segment, pipe size and filenamer. Located at the bottom of the screen, the running screen text shall include the running footage, upstream and downstream manhole ID numbers, pipe size, pipe length, date and time. At the end of the segment, the ending screen shall state the end of the segment or reason for an incomplete inspection if applicable. The City shall approve these screens prior to the CCTV inspection. Text may be temporarily turned off during the inspection to facilitate a clearer view of a defect.

Each file shall include a complete audio narration. The audio narration shall be clear, concise and complete made in real time as the video is being recorded and not an overdub after the video recording has been completed. The audio narration shall be in English unless another language is specifically requested by the City. The service provider shall take steps necessary to reduce or eliminate all background chatter that could detract from the audio quality. The audio track shall describe the parameters of the pipeline being inspected and shall include, but not limited to, pipeline location, depth, diameter and pipeline material as well as a description of all connections, defects and unusual conditions observed during the inspection.

Each flashdrive shall be permanently labeled. The label shall include the name of the service provider, type of inspection (preliminary or standard), flash drive number, date recorded, and date submitted. The label shall include the starting and ending manhole numbers (all manhole numbers used for identification shall be those assigned by the City correlating to the City's sewer atlas maps), pipe diameter, pipe or segment length and street name. Video recording shall be submitted and become the property of the City.

CCTV Inspection Report: The CCTV inspection report or log shall be a written report and shall include segment location (manhole numbers for upstream and downstream manholes), street name, date, time, service provider and operator's name, pipeline information (size, shape, material, depth, age, slope, joint lengths), flash drive or file number and include points of significance including lateral locations, unusual conditions, roots, grease, sludge, broken or missing pipe, defect descriptions, etc. and shall accompany the flash drive(s) to be supplied to the City. The City may also request digital still photographs (JPEG format) of defects or other areas of significance. As with the electronic video files, the inspection report and any still photographs shall become the property of the City.

Frequency of Inspection

After an initial video inspection of the entire City owned and operated collection system, consistent with the SSMP's condition assessment requirement, the City endeavors to conduct CCTV inspections of pipelines and manholes at a minimum rate of 15-20% of

the system per year. Trouble or enhanced cleaning areas may require more frequent inspections.

Sanitary Sewer Enhanced Maintenance Areas

Map No.	Street or Easement	From Manhole #	To Manhole #	Footage	Comments
19	Kraemer Blvd.	4187	4188	225	
19	Kraemer Blvd.	4186	4187	225	
19	Kraemer Blvd.	4179	4186	75	
19	Kraemer Blvd.	4178	4179	150	
19	Sheffield St.	4176	4178	150	
18	Sheffield St.	3940	4176	250	
18	Sheffield St.	3939	3940	165	
18	Sheffield St.	3932	3939	150	
18	Sheffield St.	3931	3932	45	
18	Sheffield St.	3229	3931	175	
18	Essex Cir.	3229	3930	200	
18	Sheffield St.	3928	3229	350	
18	Newcastle Ave.	3925	3928	260	
19	Easement	4102	4103	165	
18	Carlson Ln.	3914	3915	350	
31	Alley	6411	6410	500	
31	Center St.	6462	6411	165	
31	Center St.	6424	6462	165	
31	Alley	6260	6424	450	
31	Alley	6260	6422	125	
30	Alley	6258	6260	340	
30	Alley	6258	6259	110	
30	Alley	6257	6258	235	
30	Alley	6254	6257	255	
39	Vincente	4112	4300	130	
39	Vincente	4111	4112	175	
39	Vincente	4110	4111	218	
39	Vincente	4109	4110	273	
39	Vincente	4108	4109	305	
39	Vincente	4107	4108	314	
40	Vincente	4106	4107	296	
40	Van Buren	4105	4106	65	
40	Van Buren	4104	4105	124	
30	Monterey Cir.	6210	6211	150	
30	Alley	6203	6210	175	
30	Alley	6202	6203	120	
30	Easement	6201	6202	310	
30	Easement	6200	6201	100	
30	Easement	6201	6200	310	
37	Highland	7812	4203	350	
38	Lakeview Siphon	4303	4304	100	
43	Orangethorpe	2114	2110	150	
43	Orangethorpe	8734	8735	100	

Map No.	Street or Easement	From Manhole #	To Manhole #	Footage	Comments
28	Walnut Easement	5966	5965	200	
30	Chapman	5912	6280	500	
18	Newcastle Ave.	4103	3925	260	
18	Bradford Ave.	3913	3914	330	
18	Bradford Ave.	3911	3913	330	
31	Alley	6425	6426	270	
31	Alley	6424	6425	300	
30	Santa Fe Ave.	6268	6460	355	
30	Main St.	6267	6268	125	
30	Alley	6266-A	6267	215	
30	Easement	6266-B	6266-A	140	
30	Santa Fe Ave.	6266-C	6266-B	240	
30	Santa Fe Ave.	6266-D	6266-C	200	
38	Highland	7811	7812	80	
38	Highland	7810	7811	240	
30	Placentia Ave.	6288	5912	50	
30	Placentia Ave.	6275	6288	450	
43	Orangethorpe	8736	8735	275	
43	Orangethorpe	8733	8734	220	
18	Bradford Ave.	3914	3914-A	310	
3	Valencia	1300	1301	65	
43	Monroe Way	8707	8708	350	
43	Monroe Way	8706	8707	148	
43	Monroe Way	8704	8706	226	
43	Community Dr	8524	8525	270	
43	Community Dr	8523	8524	285	
43	Community Dr	8503	8523	503	
40	Jefferson St.	8204	8203	085	
43	Crowther Ave.	8728	8729	120	
27	Ruby Easement	5710	5717	325	
27	Melrose Ave	5707	5710	330	
43	Crowther Ave.	8730	8731	360	
28	Ruby Elementary	5745	3800	330	
28	Ruby Elementary	5944	5945	413	
28	Ruby Elementary	5943	5945	418	
46	Melrose Ave	9341	9392	150	
30	Placentia Ave.	6375	6288	440	
30	Placentia Ave.	6274	6275	445	
30	Placentia Ave.	6273	6274	320	
30	Alley	6256	6255	320	
31	Alley	6411	6410	460	
30	Chapman	6283	6284	300	
30	Chapman	6292	6283	300	
30	Chapman	6281	6292	50	
30	Chapman	6280	6281	350	

Map No.	Street or Easement	From Manhole #	To Manhole #	Footage	Comments
30	Chapman	6288	5912	250	
35	Jefferson St.	7219	7202 sandist	300	
30	Murray	6232	6233	300	

Infiltration/Inflow Reduction Plan

Introduction

Infiltration and inflow (I/I) is common in sanitary collection systems and can be a major factor in collection system failures during times of inclement weather. Infiltration is normally groundwater that enters the collection system at a more or less steady rate through cracked or broken pipes, misaligned joints, root intrusion, defective manholes, etc. The amount of infiltration normally increases as the ground surrounding the collection system becomes saturated. Inflow, on the other hand, is the rapid increase in flow as storm water enters the collection system.

Nationally, it is estimated that up to 50% of the inflow into a collection system can be associated with manhole covers. Water can enter through the vent or pick holes and/or around the frame and cover. Manholes located in areas that traditionally flood during heavy rains can create inflow. Other sources of inflow include storm drains connected to either a private or the public sanitary collection system.

Figure 1 graphically illustrates the type of conditions that can contribute to I/I. Left unchecked, I/I presents increased and unnecessary treatment and collection costs and can surcharge the system beyond its designed capacity resulting in sewage spilling into the environment. Whatever the source, I/I must be identified and eliminated, or to the greatest extent possible, severely reduced.

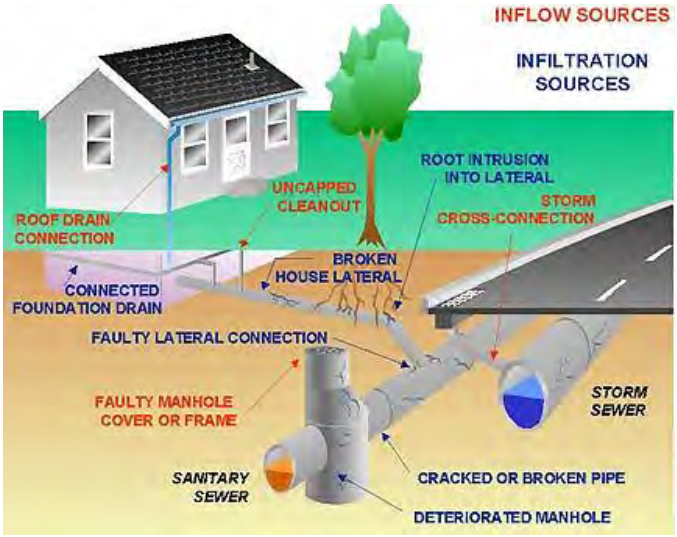

Figure 1

To this end, the City of Placentia has developed this Infiltration/Inflow Reduction Plan (IIRP) as part of its Sewer Master Plan with the goal to significantly reduce or eliminate, where possible, all I/I in the sanitary collection system. As part of the Master Plan, the IIRP becomes part of the operational guidelines for the ongoing operation and maintenance of the City of Placentia's sanitary collection system.

Plan Overview

The IIRP is a phased approach for the reduction or elimination of sources of I/I within the City's sanitary collection system. The first phase is an assessment of the collection system to determine where, and to what extent, I/I is occurring. This phase will include a review of maintenance records, sewer overflow reports, review of areas that traditionally flood during rain storms, rainfall monitoring and analysis, long term flow monitoring,

comprehensive cleaning and videoing (CCTV) of the sanitary collection system. Phase 2 provides for the determination of where within the sanitary collection system I/I is occurring. After careful analysis of the data accumulated during Phase 1, a prioritized list is developed based upon areas where the heaviest amounts of I/I are occurring. During Phase 2, individual reaches within the service area will be analyzed to determine the exact source of the I/I and methods of remediation will be determined. Phase 3 is the actual remediation. This phase may include pressure grouting, sliplining, line replacement, manhole plugging or raising, etc. Phase 4 is to evaluate the success of the IIRP and its remediation methods. Comparisons will be made to baseline flows to determine the effectiveness of the program. Since this is an ongoing program, different portions of the City's collection system may be in different phases at different times.

Phase 1:

Phase 1 is an assessment to determine to what extent I/I has affected the City's sanitary collection system. This phase primarily relies on flow monitoring to determine I/I flow increases. Rainfall monitoring is an important element combined with the flow monitoring. Existing maintenance records and sewer overflow reports will be used to target trouble spots. The storm drain system will be evaluated to establish its ability to remove storm runoff without impacting the sanitary collection system. Comprehensive line cleaning and CCTV of the collection system will be used to assess the overall condition of the sanitary collection system.

- Flow Monitoring – Initially, temporary flow meters will be installed at key locations within the collection system. These temporary meters may be replaced with permanent meters depending upon the severity and effectiveness of I/I control measures. Flow monitoring will occur during dry and wet weather with the dry weather flows used to establish a baseline. The flow meters utilized shall be capable of monitoring both flow depth and velocity. Based upon data received, more monitoring points may be required or the monitoring points may need to be relocated to more accurately reflect I/I into the system. As data is gathered throughout the year, an accurate assessment can be made of the amount of I/I entering the system and from what areas in the City it is being introduced.
- Rainfall Monitoring – To assist in accurately determining inflow, rainfall-monitoring stations will be placed, approximately one per every two to four flow monitoring sites, to measure rainfall in the areas being monitored. Soil saturation is another component of rainfall monitoring. Soil saturation and a rising groundwater table will effect infiltration into the system.
- System Cleaning and CCTV – A comprehensive cleaning program of the sanitary collection system is essential to allow the system to flow at its designed capacity, reduce system overflows due to debris buildup, and allow for more accurate flow monitoring. As per Orange County Sanitation District's recommendations, collection lines 12 inches in diameter and smaller shall be cleaned at leased once each 18 months. Lines 15 inches in diameter and greater shall be cleaned at least once every 5 years. Trouble spots shall be cleaned more frequently as conditions dictate to keep the system free flowing without overflows. CCTV shall be done

in conjunction with line cleaning offering an accurate assessment of pipeline condition and possible sources of I/I.

- Review of Records – Review of maintenance and overflow records will assist in determining trouble spots that may have a negative effect on gathering accurate data related to I/I. These areas may require additional cleaning or monitoring.

After sufficient data has been gathered to indicate the presence and levels of I/I and from which portions of the City it is originating, a report will be created prioritizing affected areas and in what order they are to proceed to Phase 2. Those areas with the highest levels of I/I are to be addressed first.

Phase 2:

After it has been determined that I/I is entering the sanitary collection system and at what levels, Phase 2 is to establish the sources of I/I and determine the most cost effective form of remediation that will eliminate or substantially reduce the amount of I/I. Remediation can range from plugging manhole vents to pipeline rehabilitation or replacement. Investigating the sources of I/I requires the careful analysis of data gathered in Phase 1, review of maintenance records, review of CCTV videos, and review of manhole locations and their susceptibility to ponding or flooding, as well as their overall condition. Private sewer service laterals are another source of I/I. This could include private drainage systems that are tied to the collection system, deteriorated service laterals or faulty lateral connections. Any direct connections to the storm drain system must also be corrected.

- Review Maintenance Reports and Sewer Overflow Reports – Carefully review maintenance reports and sewer overflow reports of areas shown to have sources of I/I. Particular attention should be paid to those incidents that occurred during the rainy season.
- Review CCTV Videos – Careful review of the CCTV videos of areas of known I/I may reveal the source of the I/I. Review should be in conjunction with the review of the maintenance and overflow reports.
- Smoke Testing – Smoke testing can be used in areas of suspected I/I to further assist in determining the source. This can be especially useful in detecting sources in service laterals.
- Flooding – Review areas that have a tendency to flood during rainstorms. Review drainage in these areas to insure that drainage is not into the sanitary collection system.
- Manholes – Inspect manholes for their integrity. Interior walls should be inspected for signs of I/I. The ring and lid should be inspected for fit. The level of the manhole should be inspected to insure it has not settled to create a low spot subject to ponding. Manholes in low-lying areas or in intersections prone to flooding should be plugged or sealed to prevent I/I.

Once the sources of I/I have been discovered, create a report outlining recommended methods of remediation, anticipated effect, and cost. Pipeline remediation may consist of

various types of relining, pressure grouting, pipe bursting and replacement. Manhole remediation may consist of various types of relining, pressure grouting, frame realignment or replacement, vent plugging or sealing, manhole raising, diversion of runoff, or manhole replacement. The property owner should be notified and directed to make necessary repairs for I/I entering the sanitary collection system from private property.

A project list should be created to establish the order that remediation projects are to be completed. A cost benefit ratio should be established. Those projects that offer the greatest cost benefit should receive the highest ranking for assignment. Cooperative funding should be investigated. Funding opportunities, grants, low or no interest loans from local, state or federal agencies should be pursued.

Phase 3:

Phase 3 is the actual assignment of projects based upon the order of priority established in Phase 2. City forces may complete some projects while others will require the services of outside contractors. Normal City protocol will determine how projects and contracts are assigned.

Phase 4:

Phase 4 evaluates the effectiveness of the overall IIRP and the effectiveness of individual remediation projects. Individual projects are best evaluated through long term flow and rainfall monitoring compared to baseline data. The overall program effectiveness is evaluated in the amount of citywide I/I reduction based upon long-term flow and rainfall monitoring compared to baseline data. Adjustments to the program will be necessary to achieve the goal of the most cost effective I/I reduction possible.

SANITARY SEWER HOT SPOT LIST

Map No.	Street or Easement	From Manhole #	To Manhole #	Footage	Comments
19	Kraemer Blvd.	4187	4188	225	
19	Kraemer Blvd.	4186	4187	225	
19	Kraemer Blvd.	4179	4186	75	
19	Kraemer Blvd.	4178	4179	150	
19	Sheffield St.	4176	4178	150	
18	Sheffield St.	3940	4176	250	
18	Sheffield St.	3939	3940	165	
18	Sheffield St.	3932	3939	150	
18	Sheffield St.	3931	3932	45	
18	Sheffield St.	3229	3931	175	
18	Essex Cir.	3229	3930	200	
18	Sheffield St.	3928	3229	350	
18	Newcastle Ave.	3925	3928	260	
19	Easement	4102	4103	165	
18	Carlson Ln.	3914	3915	350	
31	Alley	6411	6410	500	
31	Center St.	6462	6411	165	
31	Center St.	6424	6462	165	
31	Alley	6260	6424	450	
31	Alley	6260	6422	125	
30	Alley	6258	6260	340	
30	Alley	6258	6259	110	
30	Alley	6257	6258	235	
30	Alley	6254	6257	255	
39	Vincente	4112	4300	130	
39	Vincente	4111	4112	175	
39	Vincente	4110	4111	218	
39	Vincente	4109	4110	273	
39	Vincente	4108	4109	305	
39	Vincente	4107	4108	314	
40	Vincente	4106	4107	296	
40	Van Buren	4105	4106	65	
40	Van Buren	4104	4105	124	
30	Monterey Cir.	6210	6211	150	
30	Alley	6203	6210	175	
30	Alley	6202	6203	120	
30	Easement	6201	6202	310	
30	Easement	6200	6201	100	
30	Easement	6201	6200	310	
37	Highland	7812	4203	350	
38	Lakeview Siphon	4303	4304	100	
43	Orangethorpe	2114	2110	150	
43	Orangethorpe	8734	8735	100	
28	Walnut Easement	5966	5965	200	
30	Chapman	5912	6280	500	
18	Newcastle Ave.	4103	3925	260	
18	Bradford Ave.	3913	3914	330	
18	Bradford Ave.	3911	3913	330	
31	Alley	6425	6426	270	

SANITARY SEWER HOT SPOT LIST

Map No.	Street or Easement	From Manhole #	To Manhole #	Footage	Comments
31	Alley	6424	6425	300	
30	Santa Fe Ave.	6268	6460	355	
30	Main St.	6267	6268	125	
30	Alley	6266-A	6267	215	
30	Easement	6266-B	6266-A	140	
30	Santa Fe Ave.	6266-C	6266-B	240	
30	Santa Fe Ave.	6266-D	6266-C	200	
38	Highland	7811	7812	80	
38	Highland	7810	7811	240	
30	Placentia Ave.	6288	5912	50	
30	Placentia Ave.	6275	6288	450	
43	Orangethorpe	8736	8735	275	
43	Orangethorpe	8733	8734	220	
18	Bradford Ave.	3914	3914-A	310	
3	Valencia	1300	1301	65	
43	Monroe Way	8707	8708	350	
43	Monroe Way	8706	8707	148	
43	Monroe Way	8704	8706	226	
43	Community Dr	8524	8525	270	
43	Community Dr	8523	8524	285	
43	Community Dr	8503	8523	503	
40	Jefferson St.	8204	8203	085	
43	Crowther Ave.	8728	8729	120	
27	Ruby Easement	5710	5717	325	
27	Melrose Ave	5707	5710	330	
43	Crowther Ave.	8730	8731	360	
28	Ruby Elementary	5745	3800	330	
28	Ruby Elementary	5944	5945	413	
28	Ruby Elementary	5943	5945	418	
46	Melrose Ave	9341	9392	150	
30	Placentia Ave.	6375	6288	440	
30	Placentia Ave.	6274	6275	445	
30	Placentia Ave.	6273	6274	320	
30	Alley	6256	6255	320	
31	Alley	6411	6410	460	
30	Chapman	6283	6284	300	
30	Chapman	6292	6283	300	
30	Chapman	6281	6292	50	
30	Chapman	6280	6281	350	
30	Chapman	6288	5912	250	
35	Jefferson St.	7219	7202 sandist	300	
30	Murray	6232	6233	300	

SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix G

Capacity Assurance Plan

Sanitary Sewer Master Plan and Condition Assessment

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FEBRUARY 2018

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APPENDICES

Appendix A. Hydraulic Model Results Table
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ACRONYMS AND ABBREVIATIONS

af/yr	acre-feet per year
ac	acre
ADWF	average dry weather flow
CCTV	closed-circuit television
CIP	Capital Improvement Program
CIPP	cured-in-place pipe
City	City of Placentia
d/D	Depth to Diameter ratio
du/DU	dwelling unit
FOG	fats, oils and grease
FSE	food service establishment
GIS	Geographic Information System
gpd	gallons per day
gpd/acre	gallons per day per acre
gpd/DU	gallons per day per dwelling unit
gpm	gallons per minute
i.e.	in example
I/I	inflow and infiltration
LF	Lineal feet
MACP	Manhole Assessment and Certification Program
mgd	million gallons per day
NASSCO	National Association of Sewer Service Companies
OCSD	Orange County Sanitation District
PDWF	peak dry weather flow
PWWF	peak wet weather flow
RDI	rain derived inflow
SCAG	Southern California Association of Governments
SSMP	Sewer System Management Plan
SSO	sanitary sewer overflow
TOD	Transit-Oriented Development
UNK	unknown
VCP	vitrified clay pipe
WDR	Waste Discharge Requirements
YLWD	Yorba Linda Water District

ACKNOWLEDGEMENTS

We appreciate the combined efforts of the entire project team in the development and preparation of the sewer master plan. Our project team includes staff from the City and Dudek. The efforts of the following individuals are respectfully and gratefully acknowledged for their contributions to the completion of the evaluations presented in this report:

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ES EXECUTIVE SUMMARY

The Sewer Master Plan for the City of Placentia (City) evaluates the operation, condition, and capacity of the existing wastewater collection system within the City of Placentia, and makes recommendations for future system improvements.

ES.1 Existing System

The City of Placentia provides wastewater collection service to the majority of parcels within the 6.6 square mile City limits through approximately 84 miles of gravity sanitary sewer pipelines. The City's wastewater collection system conveys untreated wastewater to Orange County Sanitation District's (OCSD) trunk sewer system via 35 separate connections. The City consists of primarily residential land use types, with some commercial and industrial areas that are mainly in the southern portion of the City.

ES.2 Existing System Capacity Evaluation

In order to evaluate the capacity of the City's existing collection system, design and evaluation criteria were developed and a hydraulic model was built based on the City's GIS data. A three-week flow monitoring program was utilized to calibrate the existing dry weather hydraulic model scenario. No usable wet weather response was captured for the flow monitoring period and so wet weather flow monitoring data from OCSD Meter OC_M053 was utilized to determine peak wet weather flow scenarios. Results of the existing system capacity evaluation are shown in Table ES-1.

Table ES-1: Existing System Capacity Evaluation

Existing System Capacity Evaluation	Existing System PDWF Scenario	Existing System PWWF Scenario
Total Flow to OCSD (mgd)	5.81	18.60
Total Number of Segments Exhibiting Capacity Deficiency	35	279
Total Length (LF) of Segments Exhibiting Capacity Deficiency	8,658	66,580

ES.3 Ultimate System Capacity Evaluation

In order to evaluate the City's existing collection system at ultimate or build-out conditions, the calibrated hydraulic model was updated to include flows from known potential redevelopment areas. The largest of these redevelopments are the TOD Zone and the Old Town redevelopments. Both of these developments affect the City's collection system in the

southwestern portion of the City. Results of the ultimate system capacity evaluation are shown in Table ES-2.

Table ES-2: Ultimate System Capacity Evaluation

Ultimate System Capacity Evaluation	Ultimate System PDWF Scenario	Ultimate System PWWF Scenario
Total Flow to OCSD (mgd)	6.08	19.44
Total Number of Segments Exhibiting Capacity Deficiency	35	286
Total Length (LF) of Segments Exhibiting Capacity Deficiency	8,658	69,130

ES.4 Condition Assessment

This master plan continued the work of previous condition assessment efforts in the southwestern portion of the City and included the review of CCTV videos of 341 sewer segments (15 miles). The review identified defects and provided recommendations for repair, rehabilitation, or replacement of a portion of or the entire pipe segment. Results of the pipeline condition assessment effort are shown in Table ES-3.

Table ES-3: Pipeline Condition Assessment Results

Pipeline Rehabilitation Method	Number of Segments	Lineal Footage/# of Repairs
CIPP	79	22,182 LF
In-Situ Point Repairs	25	28 EA
Excavation Point Repair	8	10 (EA)
Full Pipe Replacement	4	1,177 LF
Trim Intruding	7	17 (EA)
CCTV/Clean	47	10,142 LF

The condition assessment also included video inspections of 94 manholes in the southeast portion of the City. Results of the manhole condition assessment effort are shown in Table ES-4.

Table ES-4: Manhole Condition Assessment Results

Manhole Rehabilitation Method	Number of Manholes	Lineal Footage/# of Repairs
Wall/Bench Rehab (lining and/or partial cementitious reconstruction)	65	457 LF
Wall/Bench/Channel Rehab (lining and/or partial cementitious reconstruction)	23	174 LF / 23 EA
Maintenance Action (remove debris in channels or on benches)	30	30 EA

ES.5 Recommended CIP Projects

The master planning capacity evaluation and condition assessment effort resulted in seven (7) capacity related CIP projects, three (3) pipeline condition related rehabilitation projects, and one (1) manhole rehabilitation project (See Table ES-5). The total project costs for the full CIP program is $15,972,000.

Table ES-5: CIP Project Summary

CIP Project Type	Number of Projects	Probable Project Costs
Capacity Projects	7	$13,755,000
Pipeline Rehabilitation Projects	3	$1,963,000
Manhole Rehabilitation Projects	1	$254,000
TOTAL CIP PROJECTS	11	$15,972,000

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1 INTRODUCTION

The Sewer Master Plan for the City of Placentia (City) evaluates the operation and capacity of the existing wastewater collection system within the City of Placentia, and makes recommendations for future system improvements. Collection system capacity has been evaluated based on flow meter data during preparation of this master plan report and future wastewater projections based on planned redevelopments. A computerized sewer collection system hydraulic model is used for capacity analysis. A focused conditions assessment has been conducted on a 15-mile portion of the collection system and 100 manholes. A list of recommended capital improvement program projects has been developed as part of this sewer system condition and capacity assessment to provide for continued reliable wastewater service. The prioritized list of projects has been identified to improve system reliability and/or capacity, and extend the useful life of the collection system.

1.1 Background

The City of Placentia was incorporated in 1926 after becoming the center of Valencia Orange Growing and Packing. The Southern California Association of Governments (SCAG) estimates the 2014 population of the City at approximately 52,094. The City is served by two water purveyors: Yorba Linda Water District (YLWD) and Golden State Water Company. Sewer service is provided by the City, YLWD, or the Orange County Sanitation District (OCSD).

The City of Placentia provides wastewater collection service to the majority of parcels within the City limits through approximately 84 miles of gravity sanitary sewer pipelines. The City's wastewater collection system conveys untreated wastewater to OCSD's trunk sewer system via multiple separate connections. OCSD conveys, treats, and disposes of the City's wastewater flows via OCSD Plants No. 1 and/or 2.

YLWD provides wastewater collection system within approximately 15% of the City of Placentia. These wastewater flows are also ultimately conveyed to the OCSD system, however, at multiple locations, the YLWD does connect to the City's wastewater collection system prior to outfalls with the OCSD system. OCSD owns and operates approximately 2.9 miles of gravity sewers within a 0.11 square mile unincorporated area completely within the City of Placentia's border, known as the "County Island". The wastewater flows from this area have no known connections to the City's system.

1.2 Service Area Overview

The City of Placentia is approximately 6.6 square miles and is located in north central Orange County in Southern California as shown in Figure 1-1 and Figure 1-2. The 57 Freeway (Orange Freeway) runs north/south through the southwest section and along the western border of the City. The 91 Freeway (Riverside Freeway) runs east/west and passes directly south of the City. Average annual precipitation is 14 inches and most of the rainfall occurs between November and March. Elevations range from 200 feet along the southern portion of the City to 410 feet at the

northeastern portion of the City. Drainage in the eastern half of the City is generally to the south to the Santa Ana River. Drainage in the western portion of the City is generally to the south west to the San Gabriel-Coyote Creek as shown in Figure 1-3.

Figure 1-1: City of Placentia Vicinity Map

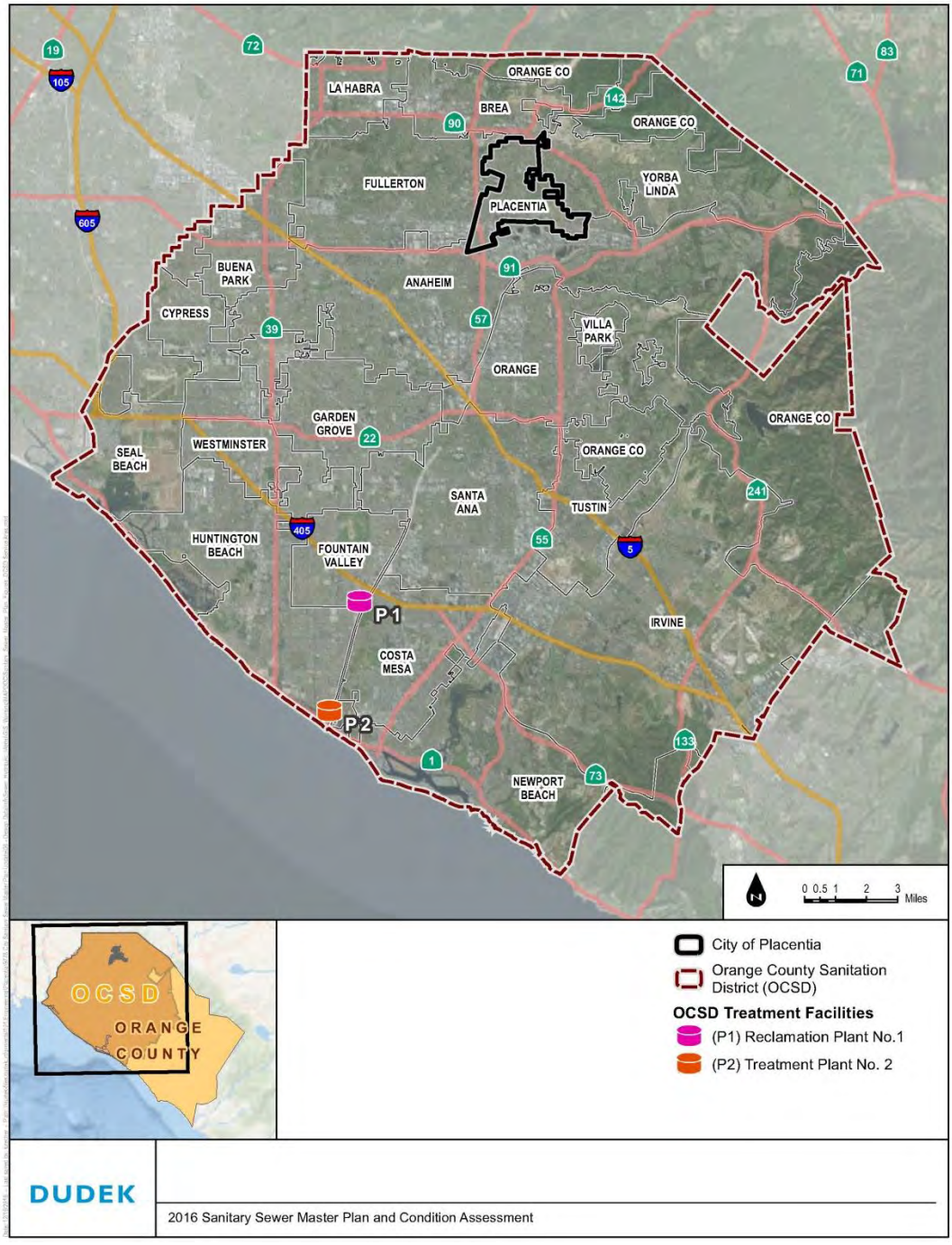


Figure 1-2: Placentia Service Area

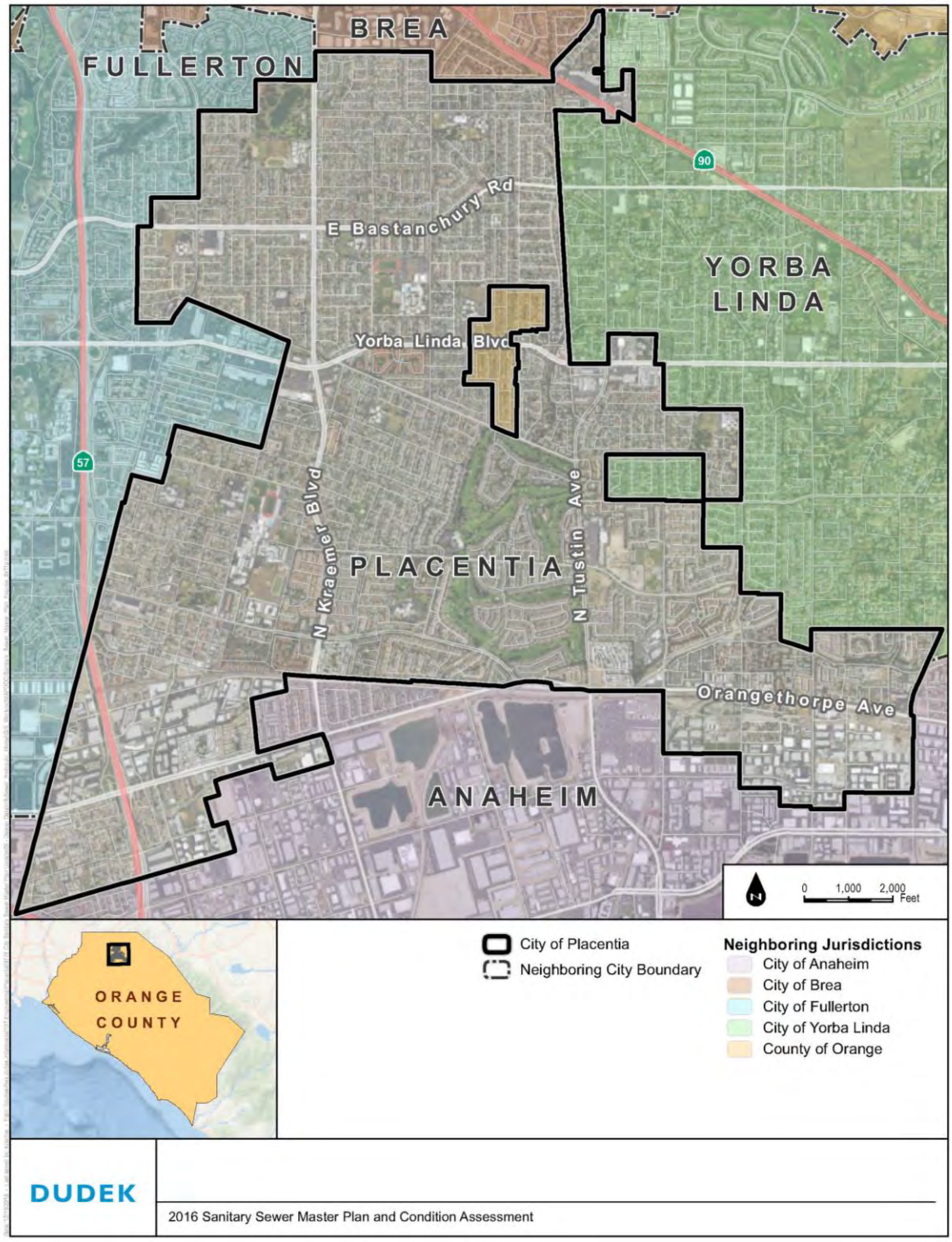
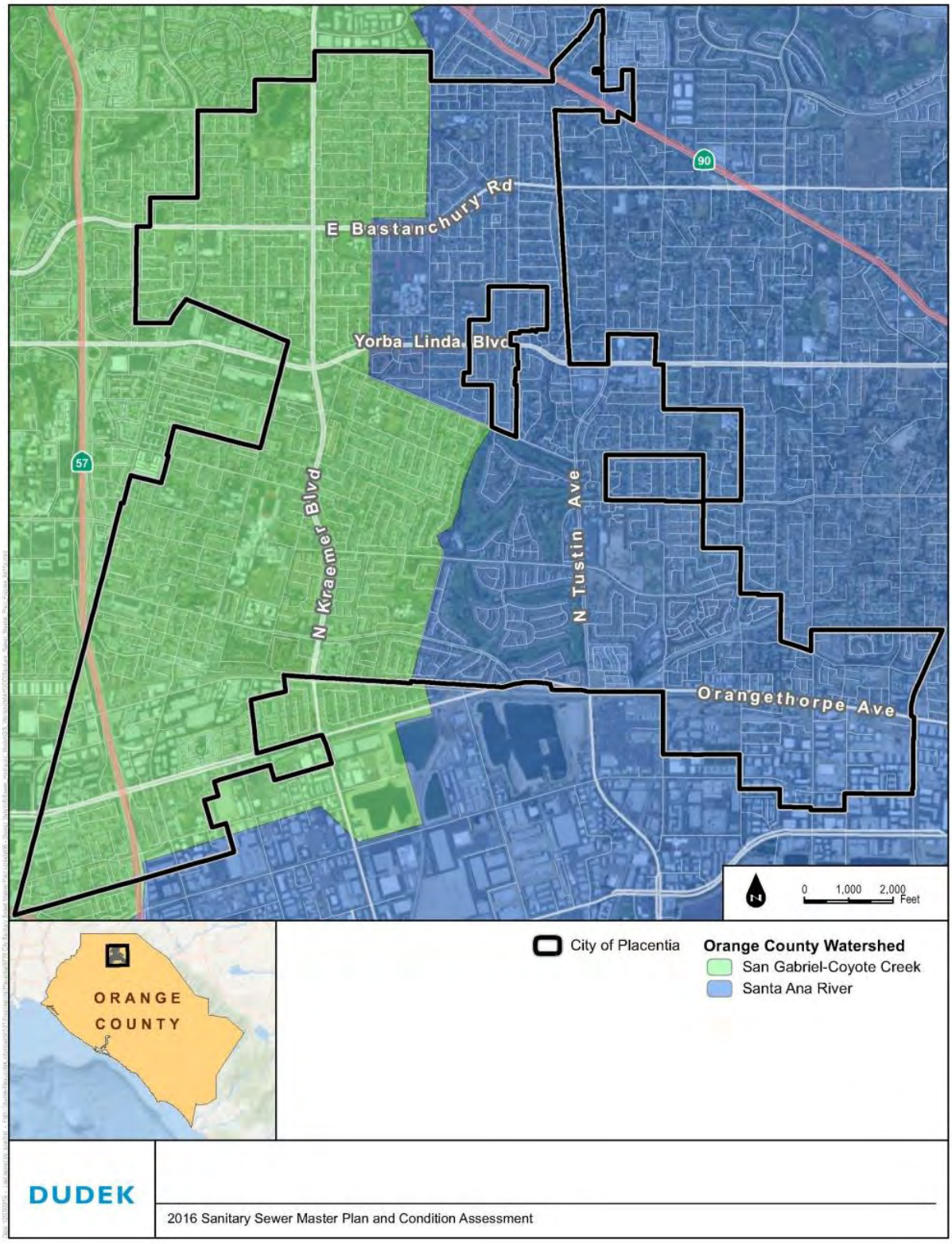


Figure 1-3: Placentia Area Watersheds



1.3 Land Use

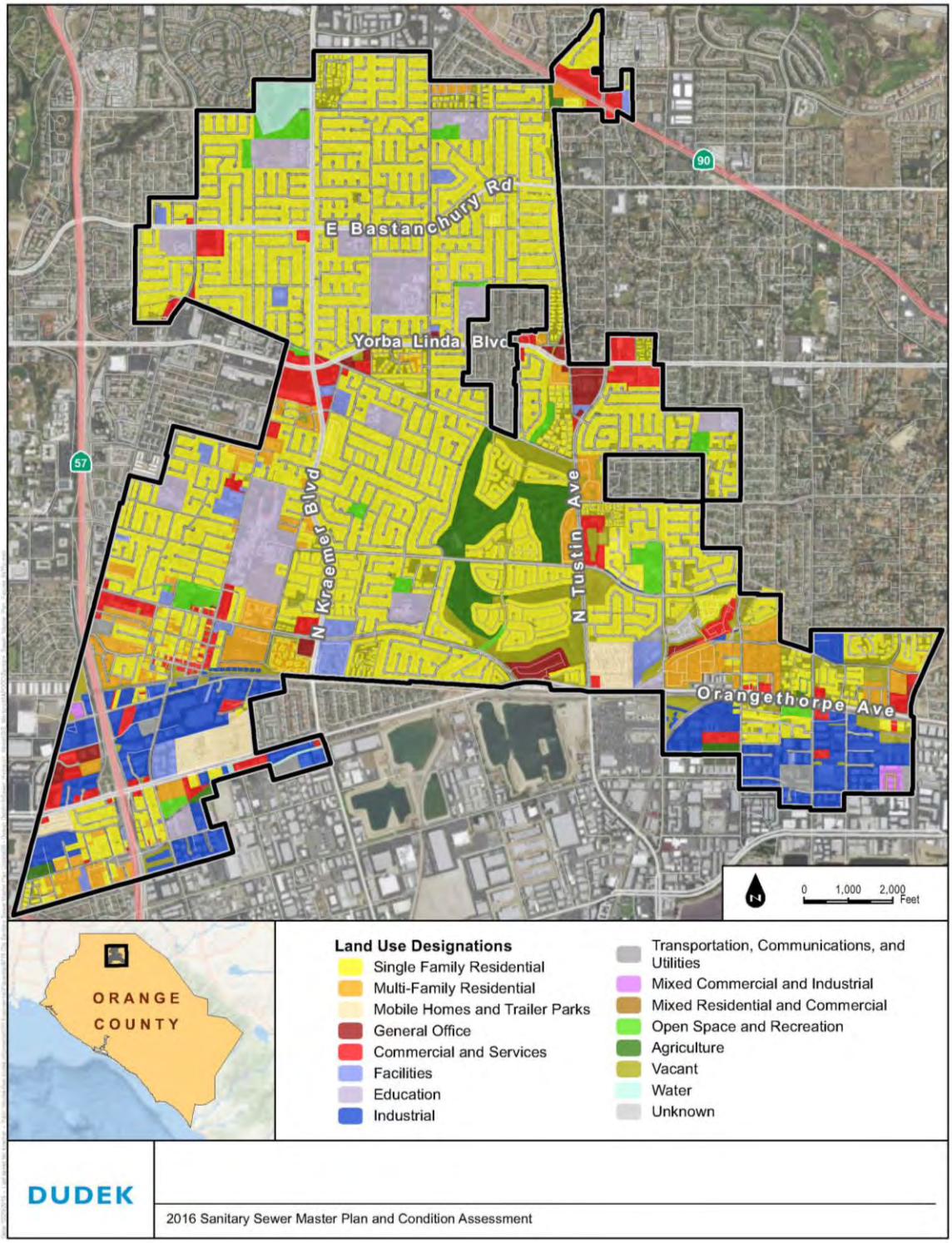
The City of Placentia General Plan serves as a blueprint for the long-range, orderly, physical development and redevelopment of the City. The current General Plan was adopted in 2013. The general plan land use based on the City's geographical information system (GIS) general plan land use layer is shown on Figure 1-4. The City of Placentia consists primarily of residential areas and neighborhoods. There are also open space and recreational areas, generally located adjacent to residential areas and schools. Commercial centers are located primarily along main arterials in the eastern and western portions of the City. The City also has industrial areas, mainly in the southern portion of the City, adjacent to existing rail lines. A breakdown of City land use type by parcel and area is shown in Table 1-1.

Table 1-1: Land Use Type Areas

Land Use Type	Number of Parcels	Area (acres)	Percentage of Total City Area
Agriculture	20	104.5	3.2%
Commercial and Service	197	247.7	7.6%
Education	25	224.1	6.9%
Facilities	42	83.0	2.5%
General Office	28	59.9	1.8%
Industrial	221	296.4	9.1%
Mixed Commercial/Industrial	25	8.7	0.3%
Mixed Residential/Commercial	4	0.5	0.0%
Mobile Home/Trailer Park	5	62.3	1.9%
Multi-Family Residential	303	225.6	6.9%
Open Space/Recreation	34	68.2	2.1%
Single Family Residential	10,908	1,799.0	55.1%
Unknown[1]	43	87.3	2.7%

[1] Unknown land use types include bus yards, switch yards, propane and petroleum suppliers, public works buildings and reservoirs

Figure 1-4: Land Use Types



1.4 Sewer System Management Plan

A Sewer System Management Plan (SSMP) was prepared by Dudek for the City in 2009, and updated in 2013. The purpose of the SSMP is to prevent sanitary sewer overflows (SSOs). The primary City programs that prevent SSOs are the fats, oils and grease (FOG) reduction program and closed-circuit television (CCTV) inspection program.

1.5 Waste Discharge Requirements

The City of Placentia has been covered under the Region 8 Waste Discharge Requirement (WDR) since 2002. The Region 8 WDR and State WDR are similar. The City is an active member in the Orange County WDR Steering Committee.

1.6 Purpose of the Study

The purpose of this Sewer Master Plan is to evaluate the City's existing and future wastewater collection system needs, make recommendations and prepare a preliminary opinion of probable cost for each of the proposed improvements. The Sewer Master Plan includes an assessment of the existing system and future needs determined by review of known potential redevelopment projections. Information derived from this evaluation has been used to prepare a list of improvement projects recommended to address future capacity needs as well as extending the useful life of the system.

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2 EXISTING SYSTEM DESCRIPTION

This chapter summarizes facilities of the City of Placentia wastewater collection system. These facilities include trunk sewers and collector sewers. Information regarding the existing wastewater collection system facilities was obtained from the City's sewer system Geographic Information System (GIS), previous reports and City staff input.

2.1 Collection System

The City's existing wastewater collection system is shown in Figure 2-1, and is comprised of 84 miles of gravity sewer pipelines with pipe diameters ranging from 6-inch to 21-inch (See Table 2-1). All flows generated within the City are conveyed to the OCSD system for additional conveyance and treatment. There are 35 outfall connections to the OCSD trunk sewer.

Table 2-1: City of Placentia's Pipeline Length

Diameter (inches)	Length (feet)	Length (miles)
6	15,500	2.94
8	368,369	69.77
10	29,926	5.67
12	20,786	3.94
15	6,835	1.29
18	1,209	0.23
21	346	0.07
Total	442,971	83.91

Approximately 20 percent of the City's collection system was constructed prior to 1970. Generally, the older portions of the collection system are found in the southwestern sections of the City. Half of the City's collection system was constructed during the 1980's and 1990's with the remaining post year 2000 construction. The majority of the City's collection system is constructed of vitrified clay pipe (VCP) material.

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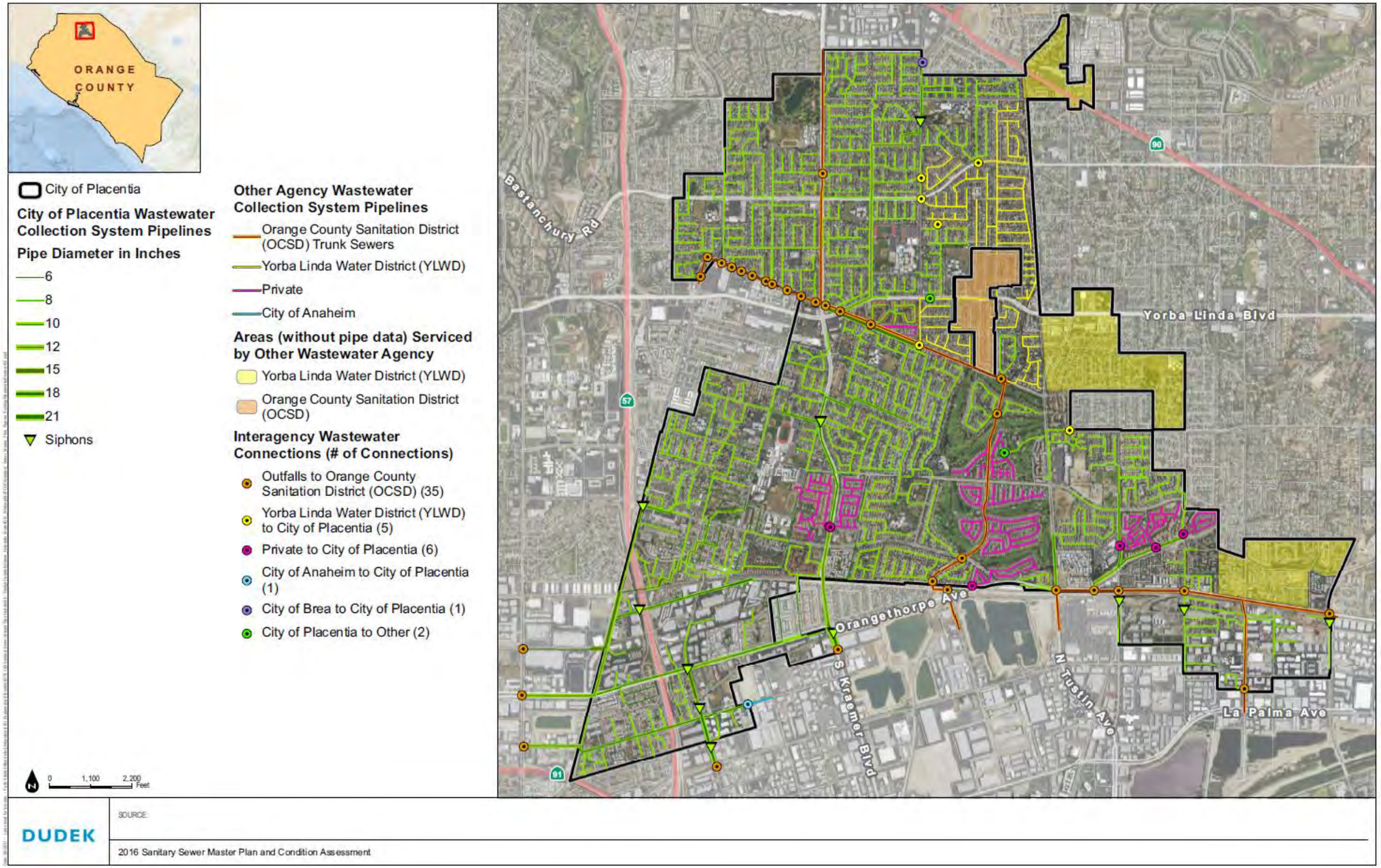
Figure 2-1: City of Placentia Existing Wastewater Collection System



DUDEK

SOURCE:

2016 Sanitary Sewer Master Plan and Condition Assessment

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The City's wastewater collection system is comprised entirely of gravity sewer pipelines. There are no lift stations or force mains. The City's collection system contains eleven inverted siphons as shown in Table 2-1.

Table 2-1: City of Placentia Inverted Siphons

Siphon No.	Location	Type	Pipe Sizes (inch)	Confirmed[1]
1	Kraemer Blvd south of Orangethorpe Ave	Double Barrel	15/10	Y
2	Jefferson St south of Orangethorpe Ave	Single Barrel	8	Y
3	Van Buren St south of Oak St	Single Barrel	10	Y
4	Lakeview Ave south of Orangethorpe Ave	Double Barrel	8/8	Y
5	Blue Gum St south of La Jolla St	Double Barrel	12/12	N
6	Melrose St north of La Jolla St	Double Barrel	12/12	Y
7	Melrose St and Orangethorpe Ave	Double Barrel	12/12	Y
8	Valencia Ave and Purdy Ave	Double Barrel	8/8	Y
9	Crowther west of I-57	Single Barrel	10	Y
10	Placentia Ave and Chapman Ave	Single Barrel	10	N
11	Madison Ave and Kraemer Blvd	Single Barrel	8	N

[1] Unconfirmed inverted siphons were indicated in City GIS data, but could not be verified by atlas maps or CCTV

The Yorba Linda Water District (YLWD) owns and operates approximately 10 miles of gravity sewers within the City of Placentia. Wastewater flows are conveyed to the OCSD system. At five known locations, the YLWD collection system outfalls to the City's wastewater collection system. Four of the connections into the City's system have been verified by discussions with YLWD and/or CCTV data. The fifth connection shown in City sewer atlas map has not been verified. These YLWD connections to the Placentia collection system are described in Table 2-2.

Table 2-2: YLWD Connections to City Collection System

Connection No.	Location	City Manhole Number	Verified
1	Buena Vista Ave and Windemere Dr	5135	Yes
2	Swanson Ave and Valencia Ave	2302	Yes
3	Bastanchury Rd and Valencia Ave	2300	Yes
4	Anderson St (between Alcott Ave and Holmes Ave)	3026	Yes
5	Bastanchury Rd and Cartlen Dr	2328	No

The City of Brea has one known connection to the City's wastewater collection system on Valencia Avenue near Elm Street. Flows from a commercial development within the City of Brea

are conveyed to the City's collection system through the existing 8-inch diameter pipeline via City manhole no. 1338.

2.2 Collection System Operation and Management

The City currently cleans its entire wastewater collection system at least once annually. The City has enhanced maintenance areas located in areas with known FOG issues. As a preventative measure for SSOs, these enhanced maintenance areas are on an enhanced cleaning schedule and are cleaned at least four times per year. Collected FOG from cleaned lines is taken to OCSD Plant #1 in Fountain Valley. After sewer pipelines are cleaned, they are inspected with CCTV to ensure line cleaning quality and inspect for deficiencies.

3 EXISTING SYSTEM FLOW AND CAPACITY EVALUATION

To assess the capacity of the City's existing collection system, determination of existing flows and model calibration are required. This chapter discusses the development of existing flows under both dry and wet weather conditions as well as the methodology used to construct and calibrate the hydraulic model, evaluate these flows and determine capacity deficiencies.

3.1 Design Criteria

Design criteria provide the standards against which the existing system can be evaluated and the basis for planning of new facilities. The City does not currently maintain wastewater design criteria. Several similar and/or neighboring wastewater service providers were queried for comparison and to assist in the establishment of new design criteria for the City of Placentia. Current design criteria used by selected services providers and the recommended design criteria for the City of Placentia is shown in Table 3-1 The recommended design criteria will be used for evaluating performance of the existing collection system and for the planning of new facilities to address current performance issues or address future increases in sewer flows.

Table 3-1: Sewer Design Criteria Comparison

Design Criteria	City of Anaheim	Yorba Linda Water District	City of Brea	City of Placentia
Minimum Size	8-inches	8-inches	8-inches	8-inches
Minimum Slope (8")	0.36%	0.40%	N/A[3]	0.40%
Minimum Slope (12" and larger)	0.20%	0.22%	N/A[3]	0.24%
Mannings "n"	0.013; 0.010[2]	0.013	0.013	0.013
Minimum Velocity (ft/s)	2	2	2	2
Maximum d/D[1] (<12") at PWWF	0.67	0.5	0.5	0.5
Maximum d/D (12" and larger) at PWWF	0.75	0.75	0.64 [4]	0.75
Maximum Distance between Manholes (ft)	300	300	400	300

Notes:

[1] d/D = ratio of depth of water to the diameter of the pipe

[2] 0.013 for RCP, ACP, VCP, ABS &DIP; 0.010 for PVC

[3] All sewers shall be designed and constructed to provide mean velocity of not less than 2 ft/s when flowing at estimated ADWF. Slope shall be maximum possible and shall not generate a max flow velocity greater than 5 ft/s at PDWF.

[4] d/D less than 0.82 at PWWF conditions.

Sewer pipe capacity is determined by pipe diameter, pipe roughness, allowable depth of flow, and the limiting velocity and slope. The most important evaluation criteria for gravity sewers are the depth of flow and velocity, which are calculated based on Manning's Equation.

Manning's Equation: $Q = 1.49 \cdot A \cdot R^{2/3} \cdot S^{1/2} \cdot n^{-1}$

Where: Q = volumetric flow rate (cubic feet per second)

A = cross-sectional area of flow (squared feet)

R = hydraulic radius (feet)

S = the pipe slope (feet per feet)

n = Manning's coefficient of friction.

Where: R = A/P

P = wetted perimeter (feet)

Gravity sewers are not typically designed to flow full, as unoccupied space at the top of the pipe is required for conveyance of sewage and gasses to provide contingent capacity for wet weather inflow and infiltration.

Manning's coefficient of friction factors for pipelines vary with the material and the age of the pipe. A roughness factor as indicated by a Manning's coefficient ("n") of 0.013 is commonly used to evaluate existing gravity sewers and for projection of future sizing needs. Previous studies have indicated that this value provides a conservative estimate of the average friction factor of pipelines over their useful life.

Most of the City's wastewater collection system is comprised of gravity sewers and is analyzed with Manning's Equation. However, the City does own and operate eleven inverted siphons. An inverted siphon is a dip or sag in a sewer used to cross under a structure, channel or stream. The sewer pipe in the inverted siphon is below the hydraulic grade line and thus is always full of wastewater under pressure. The design criteria for inverted siphons is different than for typical gravity sewers and should consider PWWF, while still maintaining a daily minimum flushing velocity to reduce the risk of blockage.

3.2 Evaluation Criteria

Evaluation criteria (Table 3-2) are the standards against which the existing system can be evaluated for potential capacity deficiencies within the hydraulic model. If the model indicates that specific segments do not meet these criteria under PDWF and/or PWWF flow scenarios, then those segments are flagged and evaluated to determine if future replacement or rehabilitation is warranted. Pipeline segments that do not meet the evaluation criteria that are connected to other segments that do not meet the evaluation criteria indicate that future upsizing may be required. Flagged segments are also reviewed for indication of surcharge. Surcharge means that flow has completely filled a pipeline and may fill up within a manhole. The presence of surcharge is also an indicator that upsizing may be required.

Table 3-2: Evaluation Criteria

Evaluation Criteria	
Maximum d/D (<12")	0.5
Maximum d/D (12" and larger)	0.75
Presence of Surcharge	Y/N

3.3 Hydraulic Model Development

The principal tool utilized in the capacity analysis is a hydraulic model that simulates flow conditions, such as wastewater depth, flow rate, and velocity within the City's wastewater collection system. The development of a new computer model for the City included use of InfoSewer® software, which is an ArcGIS-based computer program developed by Innovyze. InfoSewer ® software allows for direct importation of the existing sewer GIS data maintained by the City.

A new hydraulic model was developed from the City's existing wastewater collection system GIS data. City sewer and manhole GIS layers were imported into the InfoSewer® model to form the basis of the model's links (pipelines) and nodes (manholes), along with other City provided background data files. The physical parameters of the model, including pipe diameter, slope, rim elevation, invert elevation, and roughness coefficients were based on the City's GIS data. Background GIS layers also included land use, potential redevelopment areas, City parcels, City boundary, and YLWD Service Area.

In order to run the hydraulic model must have specific data entered for the following fields: pipeline diameter, pipeline length, pipeline upstream invert elevation, pipeline downstream invert elevation, pipeline roughness coefficient and manhole rim elevation. In many instances, the GIS data was missing or contained incorrect data for these required fields. A substantial gap analysis, including review and quality control checks of the GIS, was conducted to identify missing data, erroneous input values, and values, which appeared to be estimated. The review process required multiple data exchange iterations with City staff to fill in missing data. Where available, missing inverts and pipeline diameters were input from sewer atlas maps, calculated from upstream/downstream inputs, estimated from Google Earth, or obtained from City staff after meetings and verbal discussions.

The existing system model includes all City-owned and operated gravity sewer, manholes and siphons. Additionally, the model includes point-loaded flow inputs from YLWD sewers and the City of Brea sewers that convey flows through the City's system before connecting to the OCSD system. These input flows are point-loaded at the connection points to the City's system. Upstream agency collection systems (pipes and manholes) are not included as part of the model. The model also includes the OCSD trunk sewers through the City, providing the outflow locations for the City's collection system. OCSD facilities (i.e. invert elevation, slope, diameter,

etc.) were estimated to allow for complete drainage of all flows from the City's existing and future wastewater collection system.

3.4 Existing Flow Evaluation

Following completion of the preliminary pipeline network, wastewater flow loading is applied to model nodes (manholes). The calculation of flow loading can be estimated using numerous sources of historic flow data. Historic data was not available for model development. Therefore, the process of estimating and applying existing system flows into the model progressed in the following approach:

1. Using City GIS parcel information, assign a land use type to each model node, based on the predominate land usage near the node. (Figure 1-4)
2. Estimate the number of equivalent dwelling units (EDU's) or acreage of non-residential land assigned to each model node.
3. Research typical unit flow factors for neighboring sewer service providers.
4. Estimate City of Placentia unit flow factors and use factors and EDU/acreage for preliminary flow input projection.
5. Use flow metering average daily flow rates to refine estimated unit factors. (See Section 3.4.1)
6. Use flow metering 24-hour average flow rates to refine the 24-hour diurnal curve used by each unit flow factor at each model node.

A typical collection system drains to one outfall location, making it relatively simple to measure and sum the flows through the overall system. Flows are then used to refine the unit flow factors by land use type. The City's collection system drains to 35 separate outfall locations from over 40 separate sewersheds or drainage basins, which adds to the complexity of the flow evaluation methodology described above.

3.4.1 **Flow Monitoring Program**

A flow monitoring program was initiated to begin the existing flow evaluation. Temporary installation of eight flowmeters was used to measure existing wastewater flows and to calibrate the existing dry weather hydraulic model scenario. Flow measurement data was obtained for three weeks from November 18, 2016 through December 9, 2016. Flowmeter locations (See Figure 3-1 and Table 3-3) were chosen based on consideration of several factors including:

- Large upstream sewershed, with singular predominant land use type
- Downstream of another agency's wastewater outfall into the City's collection system
- Downstream of a proposed redevelopment area
- Diverse geographical region of the City
- Older area of the City

Figure 3-1: Flow Monitoring Locations

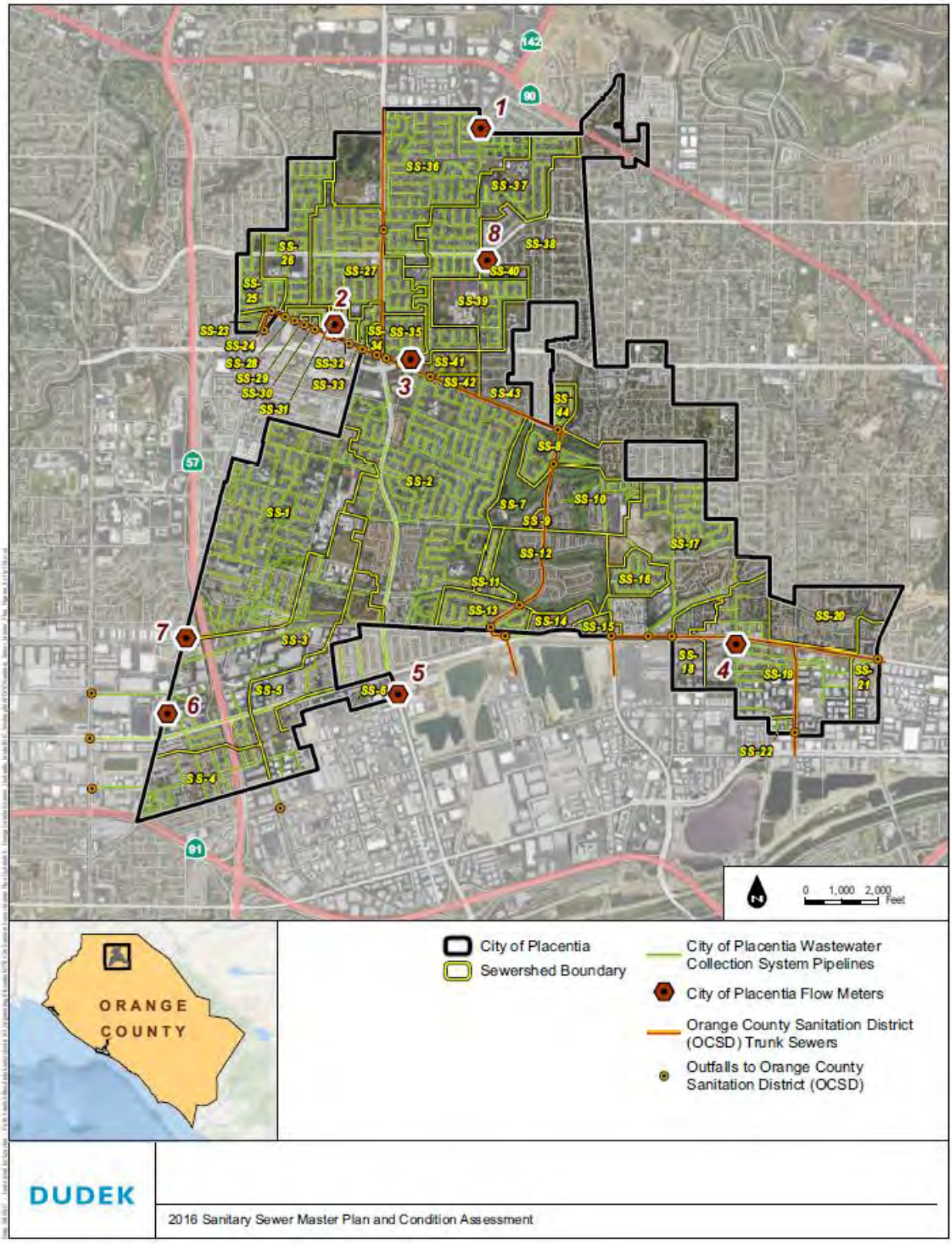


Table 3-3: Flow Monitoring Locations

Flow Meter No.	Location	MH ID	Upstream Pipeline DIA (inches)	Upstream Sewershed(s)	No. of Parcels	Land Use Type
1	E. Elm St and Valencia Ave	1338	8	City of Brea	UNK	UNK
2	North of E. Palm Dr and Tuffree Blvd	3422	8	SS-27	618	Single Family Residential
3	234 Yorba Linda Blvd	3258	12	YLWD / SS-37	YLWD, 630	Single Family Residential
4	South of Orangethorpe Ave and Van Buren St	7204	10	SS-19	183	Mixed (Single Family Residential & Industrial)
5	South of Orangethorpe Ave on Kraemer Blvd	8405	21	City of Anaheim / SS-6	City of Anaheim, 2	UNK
6	North of Orangethorpe Ave and S. Placentia Ave	8900A	12	SS-3	168	Mixed (Single Family Residential & Industrial)
7	North of Fender Ave on S. Placentia Ave	6104	8	SS-1	550	Single Family Residential
8	E. Bastanchury Rd and Valencia Ave	2300	8	YLWD / SS-37	YLWD, 253	Single Family Residential

3.4.2 Existing Average and Peak Dry Weather Flow

Statistical analysis of the flow monitoring data was performed to de fine the existing average and peak dry weather flow (ADWF and PDWF) for each of the flow meters. ADWF was determined by analyzing the data for the dry days only. A dry day is defined as a day when no rainfall occurred 72 hours prior to that day and when there were no noticeable lingering effects from a previous rainfall. ADWF defines the baseline for comparison with AWWF (average wet weather flow) when considering the presence of defect flow.

Flows for many of the sites differ on Friday evenings compared to Mondays through Thursdays. Similarly, flow patterns for Saturday and Sunday also have unique evening flow patterns. ADWF diurnal patterns are taken from dry days, when rainfall derived inflow (RDI) had the least impact on the baseline flow. The overall ADWF is calculated per the following equation:

$$ADWF = \left(\text{ADWFmon} - \text{thurs} \times \frac{4}{7}\right) + \left(ADWFfri \times \frac{1}{7}\right) + \left(ADWFsat \times \frac{1}{7}\right) + (ADWFsun \times \frac{1}{7})$$

The ADWF calculated for each of the flow meter sewersheds is shown in Table 3-4.

Table 3-4: Flow Metering ADWF and PDWF

Flow Meter No.[1]	Overall Calculated ADWF (mgd)	Overall Calculated ADWF (gpm)	Overall Calculated PDWF (mgd)	Overall Calculated PDWF (gpm)
1	0.001	0.69	0.060	41.60
2	0.081	56.25	0.210	145.80
3	0.266	184.72	0.570	395.80
4	0.062	43.06	0.160	111.10
6	0.188	130.56	0.340	236.10
7	0.150	104.17	0.320	222.20
8	0.008	5.56	0.050	34.70

Note:
[1] Flow Meter No. 5 was installed on parallel sewer and is removed from analysis.

The dominant land use type for each sewershed is reflected in the flow meter data as shown in Figure 3-2 and Figure 3-3. For example, Meter 2 (Figure 3-2) is dominated by residential flow and shows distinct morning and evening peaks, while Meter 4 (Figure 3-3) is dominated by industrial and commercial flows, with peak flows occurring during weekday business hours.

Figure 3-2: Meter 2 Flow Monitoring Data (Residential Dominant)

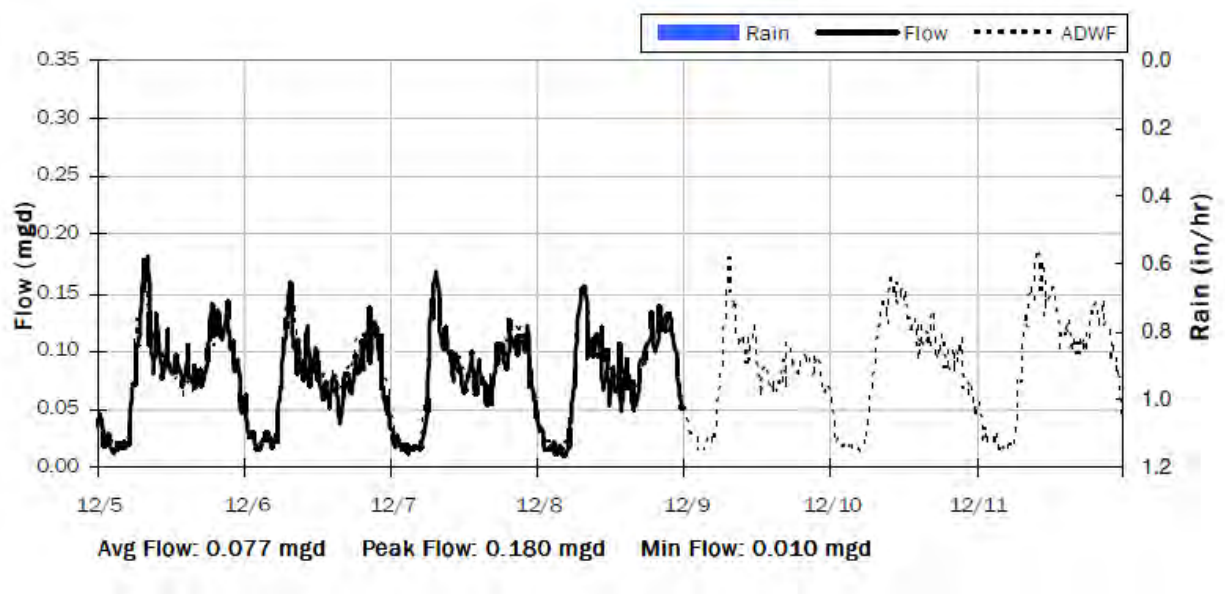
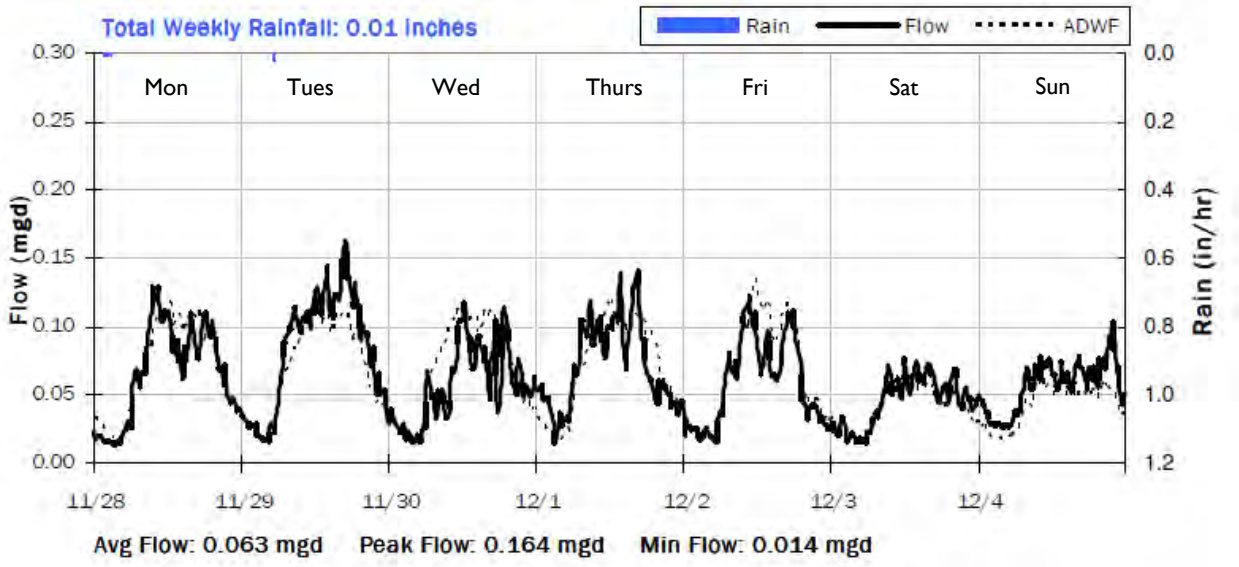


Figure 3-3: Meter 4 Flow Monitoring Data (Commercial/Industrial Dominant)



The peak measured dry weather flow rates for each of the flow meters is also shown in Table 3-4. The peak measured flows are used to determine an initial peaking factor, which is defined as the peak measured flow divided by the ADWF.

3.5 Flow Generation Factors

Within the hydraulic model, each parcel within the City's boundary was initially assigned a flow generation factor based on its land use type (See Table 3-5). These loads were then assigned to the closest corresponding model node.

Table 3-5: Initial Unit Flow Factors

Model Land Use Type	City of Placentia Initial Unit Flow Factor (gpd/acre)
Agriculture	646
Commercial and Service	2,670
Education	200
Institutional	356
General Office	3,210
Industrial	3,180
Industrial	3,200
Commercial and Service	3,200
Mobile Home/Trailer Park	2,520
Multi-Family Residential	2,520
Open Space/Recreation	220
Single Family Residential	220

A "diurnal flow pattern" represents the hour-by-hour estimate of sewer flow over at 24-hour period. The term "diurnal" represents the common two peak hours of sewer flows that occur at a typical residence in the morning before work and late afternoon before dinner. A diurnal flow pattern is applied to the estimated residential and commercial/industrial flows to develop model flow inputs into the collection system. Initial residential and commercial/industrial diurnal patterns were developed based on neighboring agency patterns entered into the model. The diurnal flow patterns are used as dry weather peaking factors to determine the PDWF for each load into the collection system, based on land use. This scenario represents the base, uncalibrated dry weather flow scenario for the City's wastewater collection system. Initial diurnal curves used in the hydraulic model for residential land use types are shown in Figure 3-4 and for non-residential land use types, Figure 3-7.

Figure 3-4: Initial Residential Diurnal Profiles

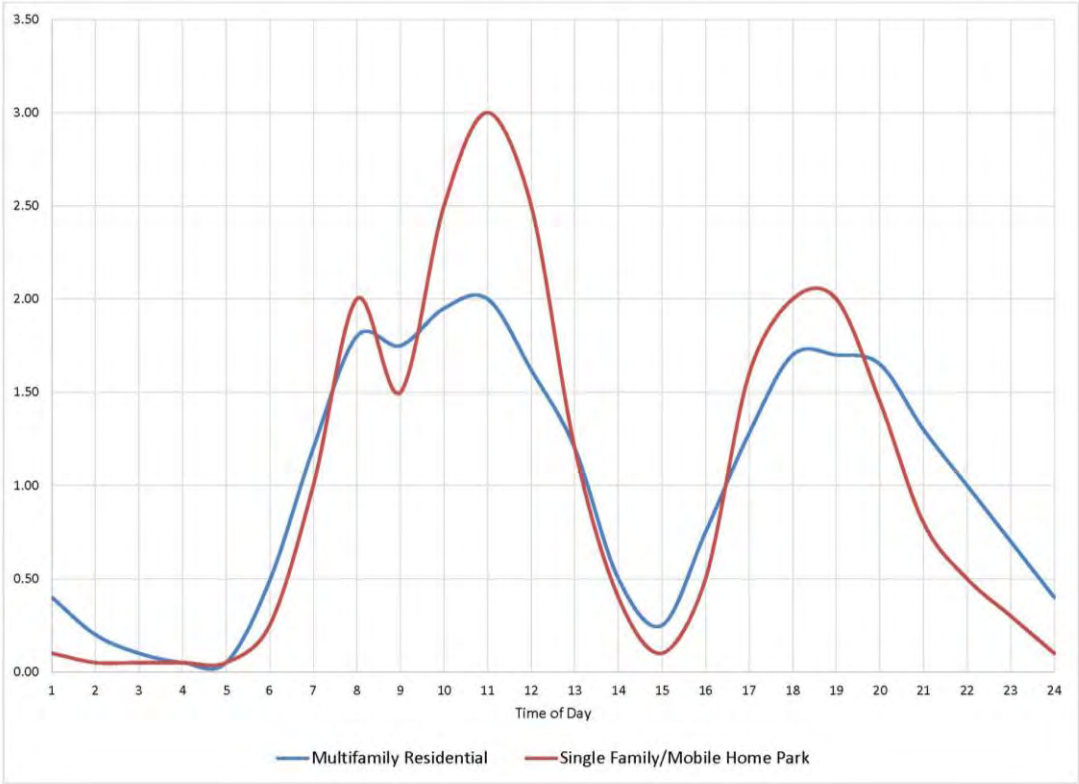
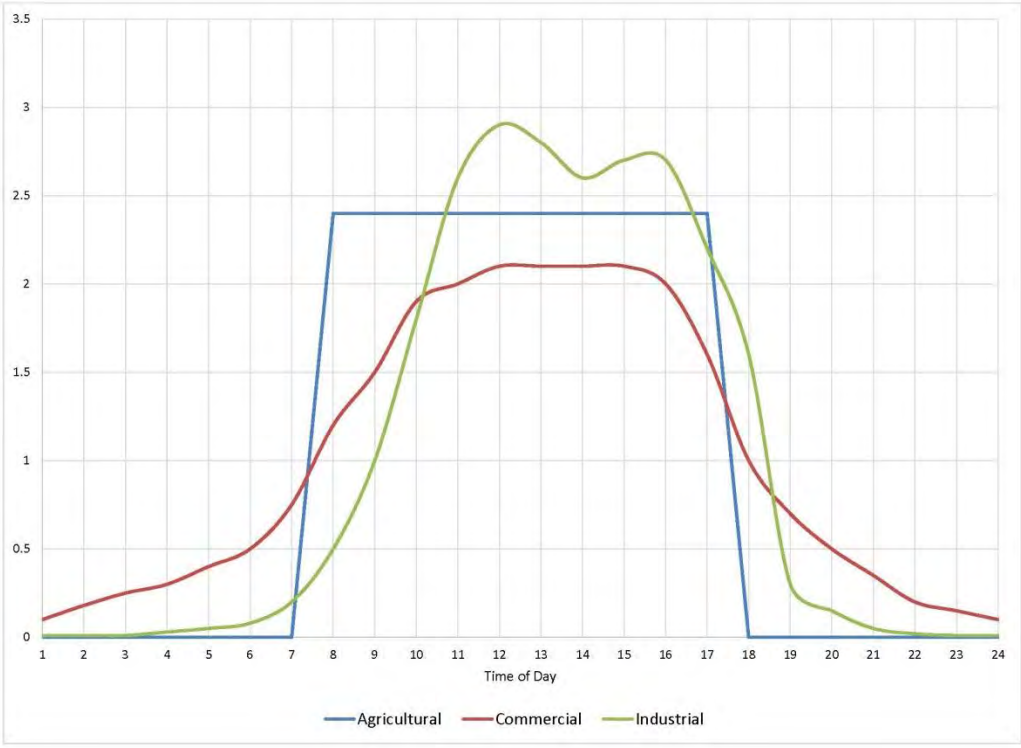


Figure 3-5: Initial Non-Residential Diurnal Profiles



3.6 Model Calibration

Once the hydraulic model is loaded with the initial unit flow factors and diurnal flow patterns, the model is run and the results are compared with flow monitoring data. The unit flow factors and diurnal flow patterns are then adjusted to calibrate the modeled system to match the actual system.

3.6.1 Average Flow Calibration

Upon completion of the flow monitoring study, a 24-hour simulation was run within the hydraulic model. Modeled average flow values at key locations were compared to average flow monitoring results at the same locations. An iterative process followed where sewershed delineations were further investigated and corrected (most typically at four-way manholes) and the initial estimates of unit flow factors were modified until modeled flows were within 20 percent of measured flows.

The resulting unit flow factors from the calibration process are presented in Table 3-6. ADWF calibration results are presented in Section 3.6.3.

Table 3-6: Calibrated Unit Flow Factors for Various Land Use Types

Land Use Type	Model Land Use Type	City of Placentia Unit Flow Factor (gpd/acre)[1]
Agriculture	Agriculture	646
Commercial and Service	Commercial and Service	1,250
Education	Education	200
Facilities	Institutional	356
General Office	General Office	1,300
Industrial	Industrial	800
Mixed Commercial/Industrial	Industrial	800
Mixed Residential/Commercial	Commercial and Service	1,250
Mobile Home/Trailer Park	Mobile Home/Trailer Park	3,400
Multi-Family Residential	Multi-Family Residential	4,200
Open Space/Recreation	Open Space/Recreation	218
Single Family Residential	Single Family Residential	155

Note:
[1] Unit flow factor for Single Family Residential in units of gpd/DU.

3.6.2 Peak Flow Calibration

The initially-developed diurnal curves for residential (single-family residential/mobile home and multi-family residential) and non-residential (commercial, agricultural and industrial) land use types were modified during the calibration process to calibrate modeled peak dry weather flows with measured peak dry weather flows. The diurnal profile which resulted in the best calibration for a given calibration basin was used within the hydraulic model.

For the non-residential land use types such as general office, commercial and services, education, facilities and open space/recreation, the commercial diurnal pattern was used. The industrial diurnal pattern was used for the industrial and mixed commercial/industrial land use types. The agricultural diurnal pattern was used for the agricultural land use type.

Figure 3-6 and Figure 3-7 illustrate the calibrated set of diurnal profiles used for modeling dry weather flows for residential and non-residential land use types, respectively.

Figure 3-6: Residential Diurnal Profiles

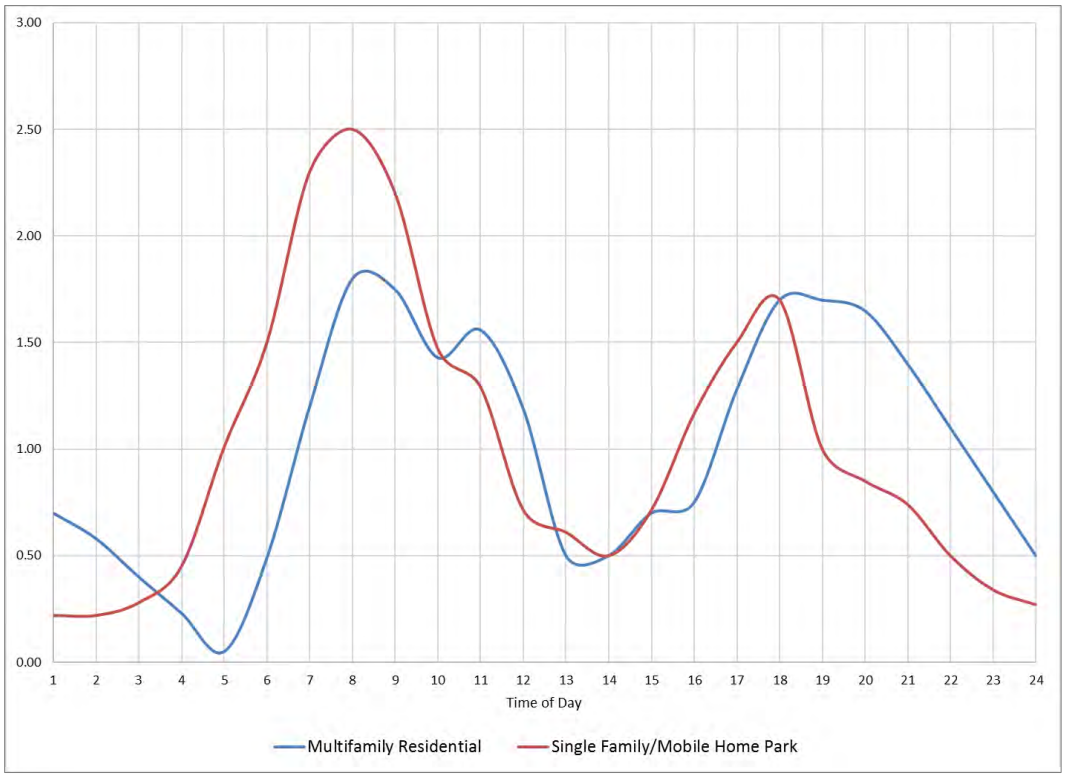
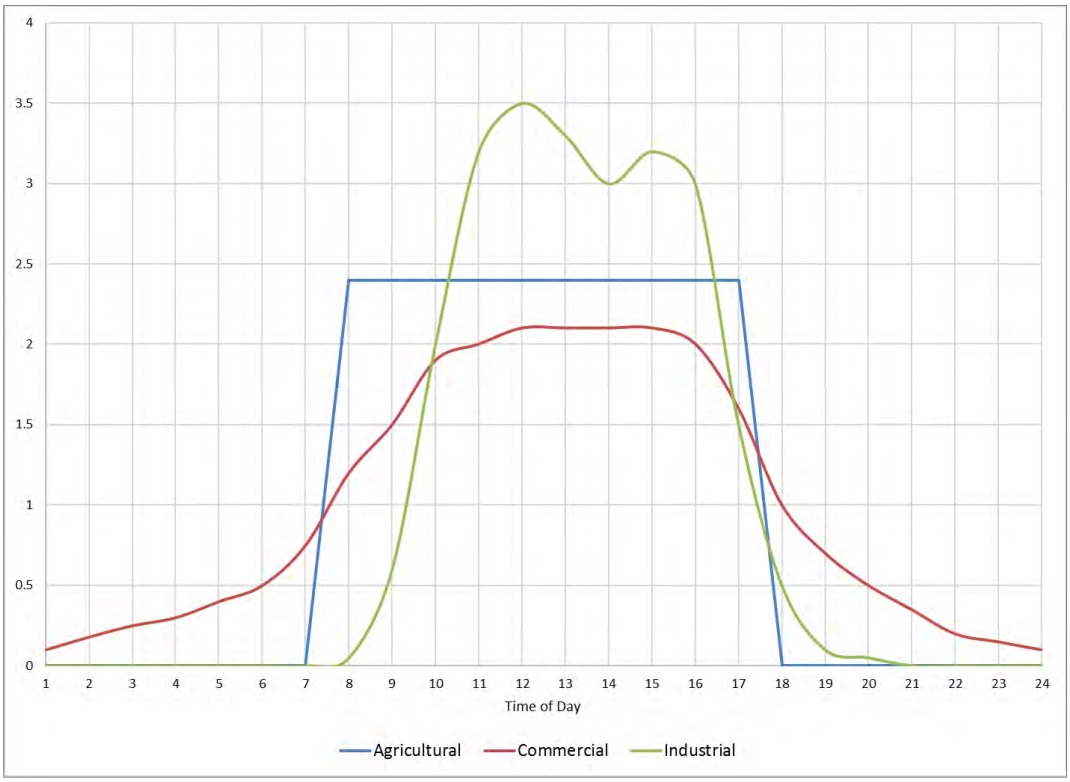


Figure 3-7: Non-Residential Diurnal Profiles



3.6.3 Calibration Results

Table 3-7 presents the results of the calibration of the hydraulic model.

Table 3-7: Summary of Calibration Results

Flow Meter	Sewershed	Average Dry Weather Flows (mgd)			Peak Dry Weather Flows (mgd)		
		Measured	Modeled	% Error	Measured	Modeled	% Error
2	SS-27	0.810	0.810	0.6	0.210	0.195	7
3	SS-37	0.266	0.214	19.6	0.570	0.477	16
4	SS-19	0.062	0.064	2	0.164	0.176	7
6B	SS-3	0.188	0.201	7	0.339	0.385	14
7	SS-1	0.150	0.142	6	0.321	0.287	11
			Average % Error	7%			11%

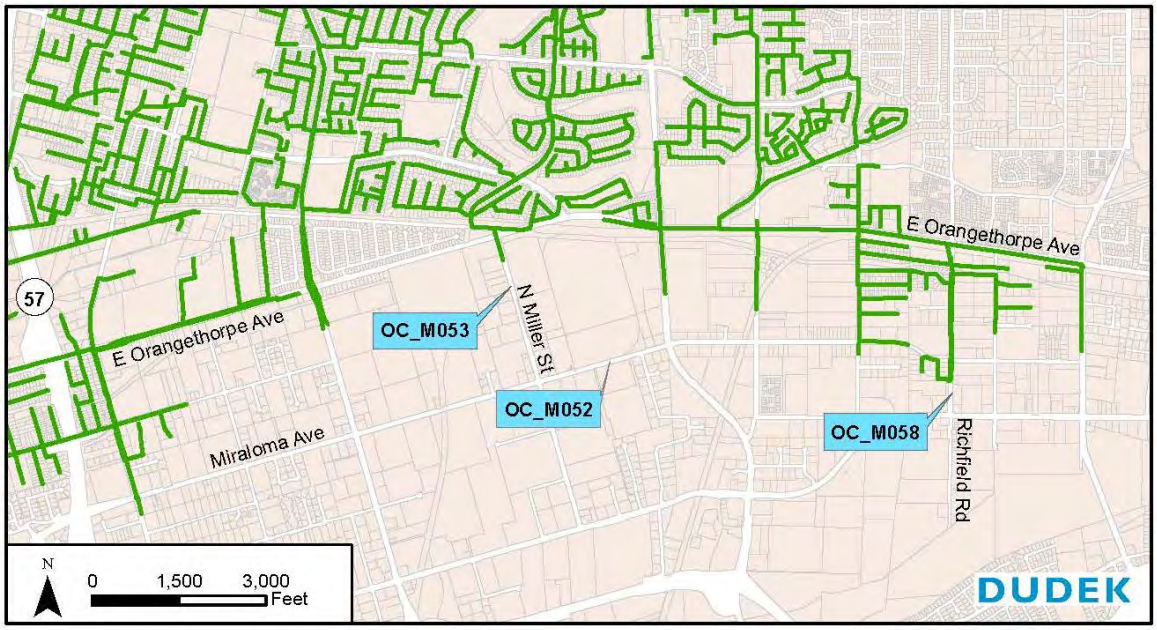
Data from Flow Meters 1 and 8 was not utilized for calibration because of the flow inputs from other agencies

3.7 Peak Wet Weather Flow

While flow meters were installed during the rainy season, no usable wet weather response was captured for the flow monitoring period. Peak wet weather peaking factors estimated for the model were derived from OCSD flow monitoring data from January 19 through January 25, 2017 from three flow monitors located in the vicinity of the City's system, shown in Figure 3-8. Of the three monitors near the City's system, OCSD flow monitor OC_M053 on North Miller Street was chosen for the calculation of peak wet weather peaking. The location of this flow meter in the OCSD system collected the largest portion of the City's flow as compared to the other two meters and was therefore considered the most representative of the City's wet weather impacts.

Of the seven days of data obtained, four days of dry weather flow and one significant rainstorm event were reported. Comparing average dry weather peaks against the single wet weather peak found in the data resulted in an estimated wet weather peaking factor of 3.2. A global multiplier of 3.2 was applied to the loading in the model to simulate the peak wet weather flow scenarios for the City of Placentia.

Figure 3-8: OCSD Flow Meter Locations



3.8 Existing System Evaluation

Once the model is calibrated, a capacity analysis is performed to identify deficiencies in the existing collection system.

3.8.1 Capacity Analysis Results

A capacity analysis of the existing collection system was performed under existing dry and wet weather flow conditions. Model simulations were performed in order to identify potential improvement projects. Maximum depth over diameter (d/D) ratios for all pipes for both the dry and wet weather flow scenarios were compared against the evaluation criteria from Section 3.2. Pipes that exceeded these criteria were flagged for potential upsizing as a CIP project.

Figure 3-9 illustrates segments (35 with total length of 8,658 linear feet {LF}) that exhibit a capacity deficiency at existing PDWF conditions. Figure 3-10 illustrates segments (279 with a total length of 66,580 LF) that exhibit a capacity deficiency at existing PWWF conditions. Of these, 236 pipeline segments (total length of 55,470 LF) are pipelines with a diameter smaller than 12-inches.

Table 3-8 includes the total flows modeled at the 35 City outfalls to OCSD at ultimate PDWF and ultimate PWWF conditions. Appendix A includes the full model output data for both existing PDWF and PWWF conditions for all pipe segments and includes each pipeline segment, existing PDWF d/D, existing PDWF flow rates, existing PWWF d/D and existing PWWF flow rates.

Figure 3-9: Existing PDWF Capacity Analysis

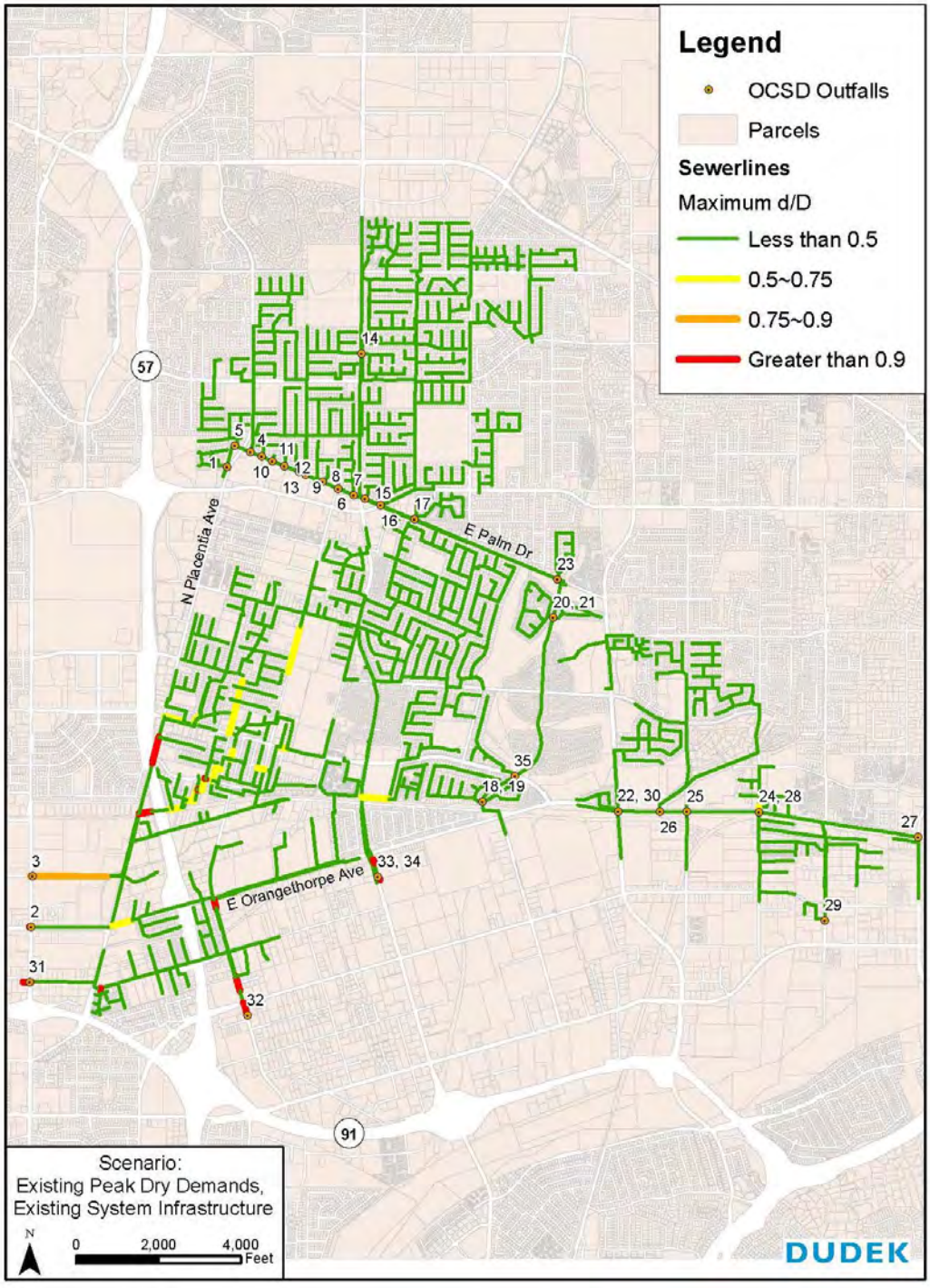


Figure 3-10: Existing PWWF Capacity Analysis

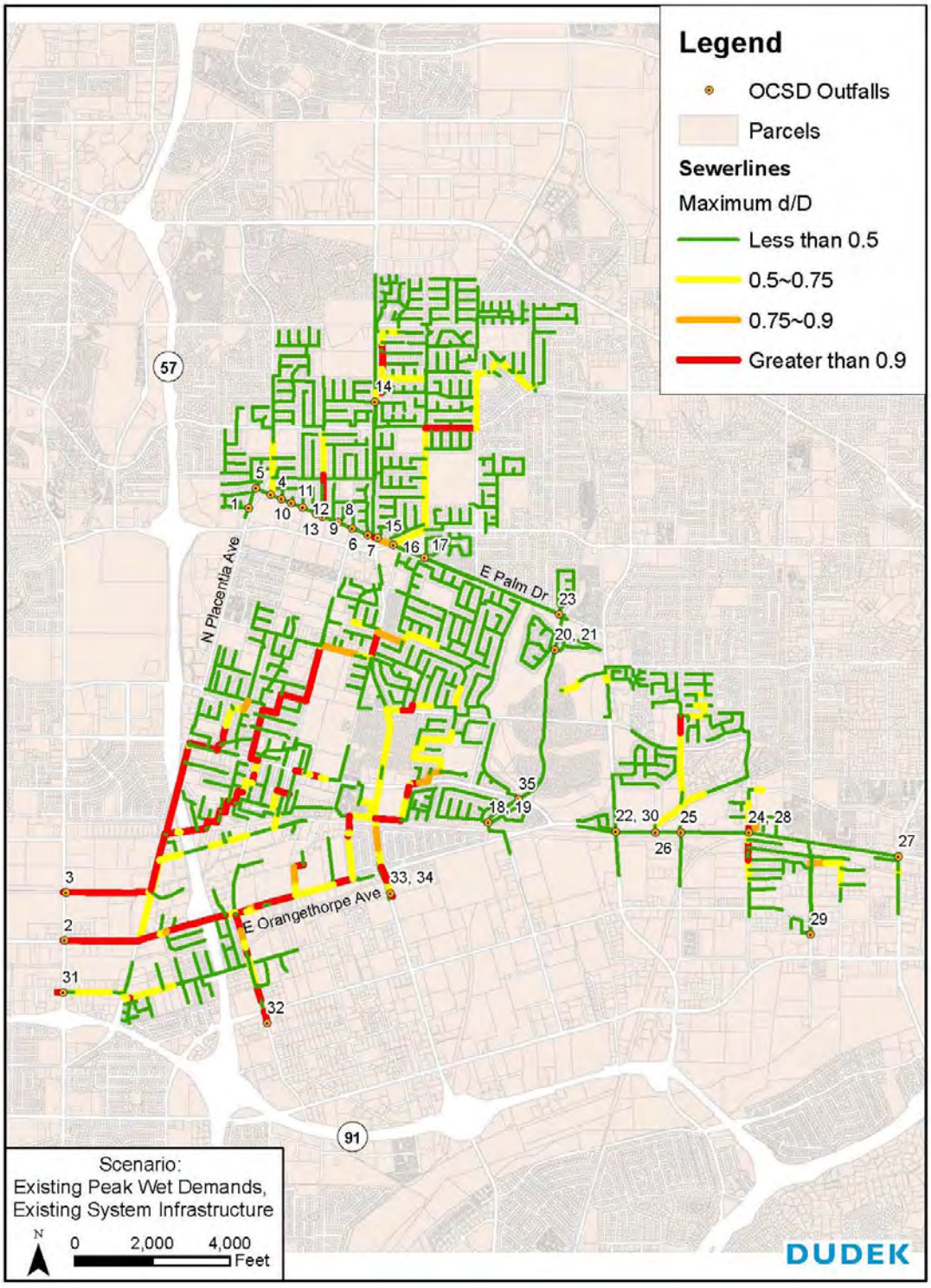


Table 3-8: Existing PDWF/PWWF Capacity Analysis

Outfall Number	Existing Maximum PDWF (mgd)	Existing Maximum PWWF (mgd)
1	0.03	0.08
2	0.56	2.03
3	1.10	3.14
4	0.15	0.48
5	0.07	0.21
6	0.01	0.04
7	0.01	0.03
8	0.02	0.05
9	0.20	0.64
10	0.02	0.05
11	0.00	0.01
12	0.00	0.01
13	0.01	0.02
14	0.24	0.85
15	0.05	0.16
16	0.49	1.48
17	0.08	0.27
18	0.06	0.18
19	0.02	0.05
20	0.06	0.21
21	0.05	0.15
22	0.02	0.05
23	0.02	0.07
24	0.18	0.56
25	0.04	0.13
26	0.36	1.16
27	0.04	0.12
28	0.21	0.68
29	0.02	0.05
30	0.26	0.82
31	0.27	0.87
32	0.56	1.78
33	0.01	0.02
34	0.59	2.03
35	0.04	0.12
TOTAL	5.81	18.60

4 ULTIMATE FLOW PROJECTIONS AND ANALYSIS

Future flow projections are used to analyze the capacity of City wastewater collection facilities under ultimate conditions. The existing wastewater collection system was analyzed with projected peak wet weather flows from the known potential redevelopment areas to identify capacity deficiencies in the future.

4.1 Anticipated Redevelopment and Ultimate Flows

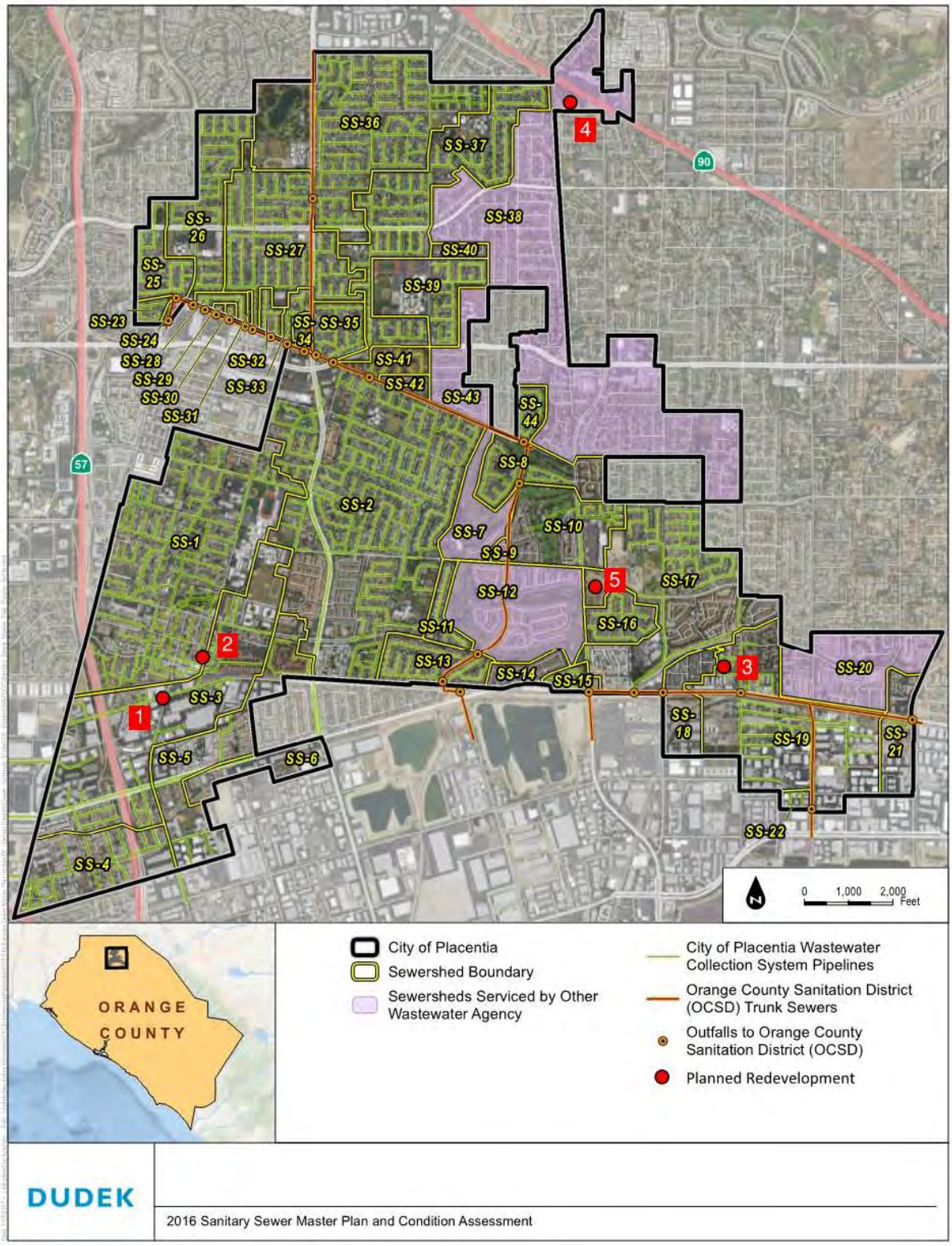
Per the 2013 General Plan, the City is 98% built-out with only 84 acres of vacant or underdeveloped land located in the southern portion of the City. However, there are five (5) planned redevelopment areas within the City, specifically in the older sections in the southwest portion of the City. Potential redevelopment areas are shown in Figure 4-1 and further defined in Table 4-1.

Table 4-1: Planned Redevelopment Areas

Map Number	Development Name	Description	Area	Density
1	Transit-Oriented Development (TOD Zone)	Development to encourage an appropriate mixture and density of activity around the Metrolink station to increase ridership and promote alternative modes of transportation to the automobile.	20.9 ac	65-95 du/ac
2	Old Town Santa Fe District	A zone change plan to improve and position the City's historic center to better connect with other areas of the City. The plan is to enhance the historic importance of the area and create public spaces and pathways making a cohesive small scale walkable urban village feel with retail, restaurants, offices, & community facilities.	32.0 ac	Varies depending on land use changes; increased commercial land use
3	Spruce Street Condominiums	Condo development	0.52 ac	up to 25 du/ac
4	Olson Urban 1049 Golden Avenue	Single family housing development	2.68 ac	12.3 du/ac
5	Shapell Homes – Alta Vista east of Rose	Medium density single family housing development	11.3 ac	up to 15 du/ac

The two largest redevelopment projects are the TOD Zone and Old Town redevelopment projects.

Figure 4-1: Planned Redevelopment Areas



4.1.1 TOD Zone Development

The TOD Zone development (Figure 4-2) includes the redevelopment of approximately 22.1 acres of land. The existing land use type of the parcels ranges from single family residential to industrial, but will be re-zoned to multi-family residential. The analysis included a parcel-by-parcel update of flows in the TOD zone and resulted in increases in loading as shown in Table 4-2.

Table 4-2: TOD Zone Development Flow Projections

TOD Zone Development	Existing Conditions	Future Conditions (with redevelopment)	Change in Conditions
Redevelopment Area (No. Parcels/Acres)	32 parcels/22.1 acres		Multi-Family Residential
Total ADWF Loading (gpm)	22.4	142	120
Total PDWF Loading (gpm)	51.5	327.5	276.0
Total PWWF Loading (gpm)	164.9	1048.1	883.2

Source: Transit Oriented Development Packing House District Development Standards (October 4, 2016) - projects conversion to multi-family residential at an est avg density of 65 to 95 DU/Ac. For purposes of this analysis, the average density of 80 DU/ac was assumed along with a unit flow factor of 110 gpd/DU.

Figure 4-2: TOD Zone Development

4.1.2 Old Town Development

The Old Town development (Figure 4-3) includes the redevelopment of approximately 32.0 acres, of which 7.95 acres (38 parcels) are directly upstream of the TOD zone development. The existing upstream parcels are different land use types, including single family residential and commercial, but will be re-zoned to commercial. This development results in loading increases as shown in Table 4-3.

Table 4-3: Old Town Development Flow Projections

Old Town Development	Existing Conditions	Future Conditions (with redevelopment)	Change in Conditions
Redevelopment Area (No. Parcels/Acres)	146 parcels/32.0 acres		Re-zone to Multi-Family Residential & Commercial
Redevelopment Area Upstream of TOD Zone (no. Parcels/Acres)	39 parcles/7.95 acres		Re-zone to Multi-Family Residential & Commercial
Total ADWF Loading (gpm)	25.1	36.5	11.4
Total PDWF Loading (gpm)	57.8	84.0	26.2
Total PWWF Loading (gpm)	185.0	268.9	83.9
Total ADWF Loading Upstream of TOD Zone (gpm)	7.1	10.4	3.3
Total PDWF Loading Upstream of TOD Zone (gpm)	16.2	23.9	7.7
Total PWWF Loading Upstream of TOD Zone (gpm)	52.0	76.5	24.6

Source: Old Town Placentia Revitalization Plan (December 6, 2016)

Figure 4-3: Old Town Development

4.2 Ultimate Capacity Analysis Results

A capacity analysis of the existing collection system was performed under future dry and wet weather flow conditions. Model simulations were performed in order to identify potential improvement projects required as a result of redevelopment within the City. Maximum depth over diameter (d/D) ratios for all pipes for both the dry and wet weather flow scenarios were compared against the evaluation criteria from Section 3.2. Pipes that exceeded these criteria were flagged for potential upsizing as a CIP project.

Figure 4-4 illustrates segments (35 with total length of 8,658 LF) that exhibit a capacity deficiency at future PDWF conditions. Figure 4-5 illustrates segments (286 with a total length of 69,130 LF) that exhibit a capacity deficiency at future PWWF conditions. Of these, 237 pipeline segments (total length of 55,506 LF) are pipelines with a diameter smaller than 12-inches.

Table 4-4 includes the total flows modeled at the 35 City outfalls to OCSD at ultimate PDWF and ultimate PWWF conditions. Appendix A includes the full model output data for both future PDWF and PWWF conditions for all pipe segments and includes each pipeline segment, future PDWF d/D, future PDWF flow rates, future PWWF d/D and future PWWF flow rates.

Figure 4-4: Ultimate PDWF Capacity Analysis

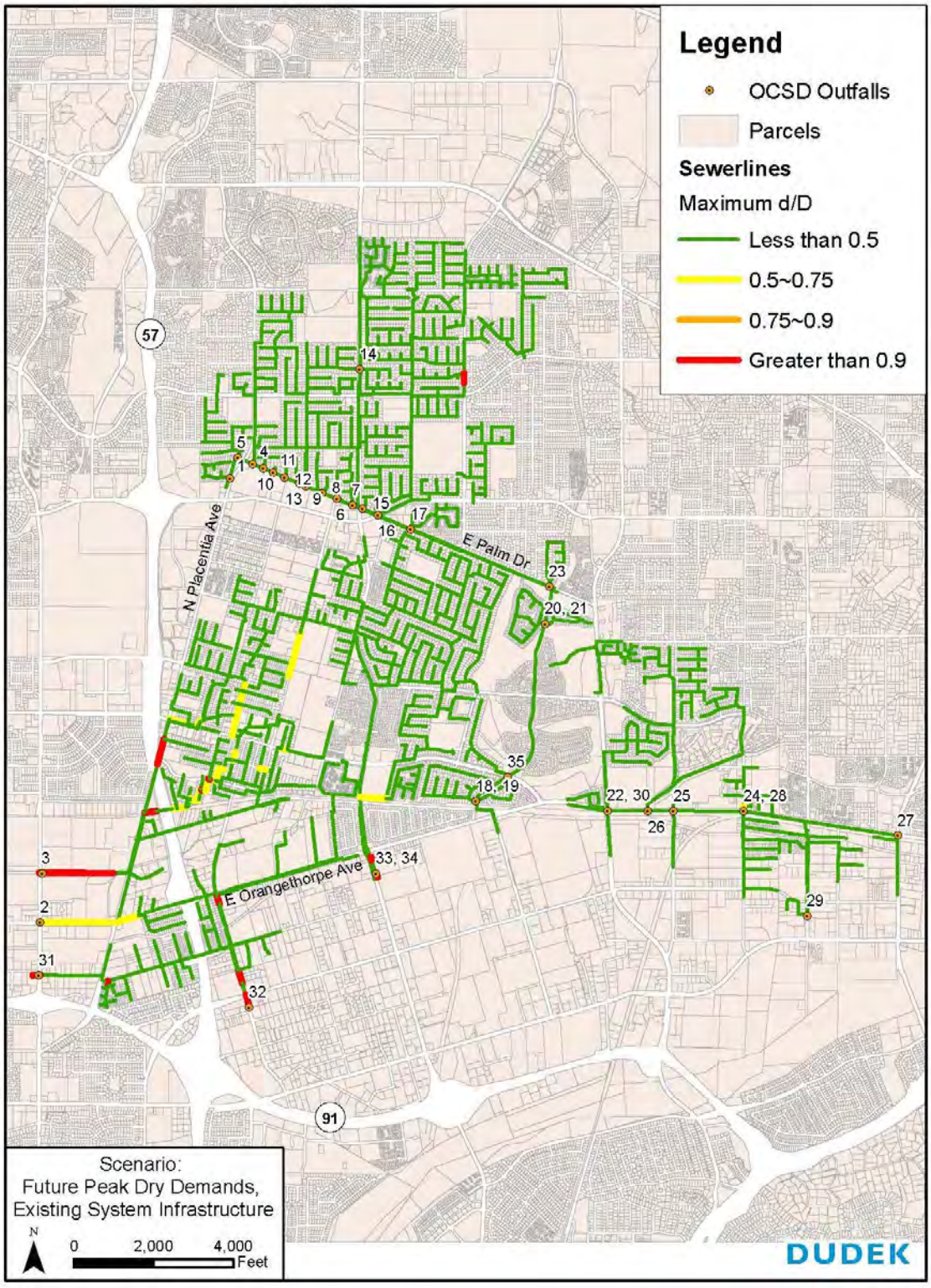


Figure 4-5: Ultimate PWWF Capacity Analysis

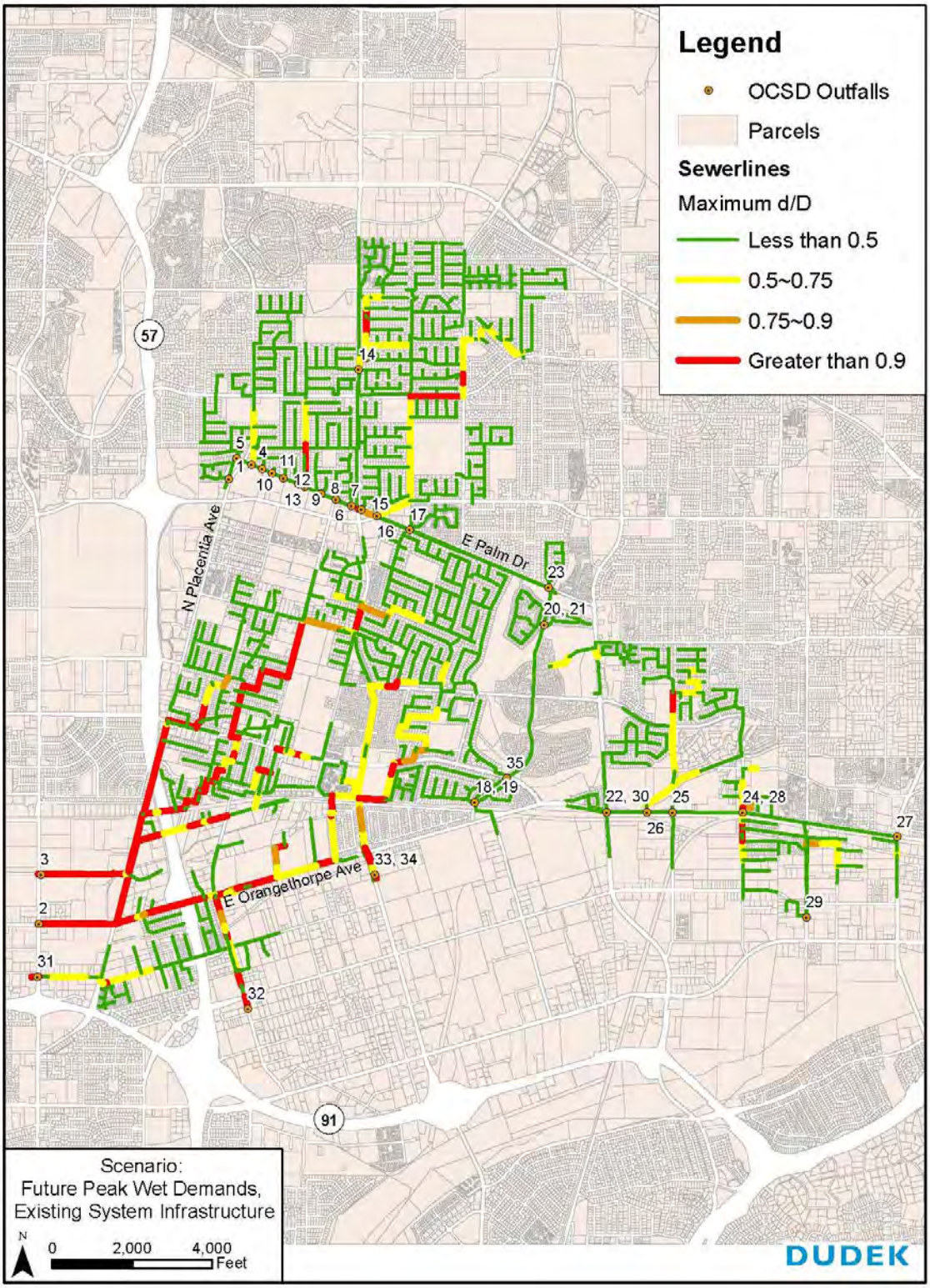


Table 4-4: Ultimate PDWF/PWWF Capacity Analysis

Outfall Number	Future Maximum PDWF (mgd)	Future Maximum PWWF (mgd)
1	0.03	0.08
2	0.80	2.82
3	1.12	3.19
4	0.15	0.48
5	0.07	0.21
6	0.01	0.04
7	0.01	0.03
8	0.02	0.05
9	0.20	0.64
10	0.02	0.05
11	0.00	0.01
12	0.00	0.01
13	0.01	0.02
14	0.24	0.85
15	0.05	0.16
16	0.49	1.48
17	0.08	0.27
18	0.06	0.18
19	0.02	0.05
20	0.06	0.21
21	0.05	0.15
22	0.02	0.05
23	0.02	0.07
24	0.18	0.56
25	0.04	0.13
26	0.36	1.16
27	0.04	0.12
28	0.21	0.68
29	0.02	0.05
30	0.26	0.82
31	0.27	0.87
32	0.56	1.78
33	0.01	0.02
34	0.59	2.03
35	0.04	0.12
TOTAL	6.08	19.44

5 CONDITION ASSESSMENT

This master plan includes a condition assessment to address condition-related deficiencies in portions of the City's aging sewer collection system.

5.1 Background and Methodology

The City previously undertook a condition assessment program in 2015, which reviewed Closed-Circuit-Television (CCTV) videos of 135 sewer segments (4.9 miles) and provided rehabilitation recommendations and construction costs for inclusion into the City's capital improvement repair program. The previous program focused on older portions of the City's sewer collection system in the southwestern portion of the City. This master planning condition assessment effort continues the previous efforts in the southwestern portion of the City and includes review of 341 sewer segments (15 miles). The City verified the additional pipes to be included in the master planning condition assessment effort shown in Figure 5-1.

City-provided CCTV inspection videos for the pipes were reviewed to identify defects and provide recommendations for repair, rehabilitation, or replacement of a portion of or the entire pipe segment, as appropriate. Observations and recommendations for all reviewed segments were noted and are included in a sewer data table spreadsheet (See Appendix B). Pipes requiring additional cleaning and investigation were also identified.

5.1.1 Pipeline Rehabilitation and Replacement Alternatives

Rehabilitation and replacement alternatives considered include:

- Investigate/CCTV/Clean: CCTV videos of poor quality or showing heavy grease/debris do not allow for accurate determination of pipe condition. It is recommended that pipes with poor quality videos be videoed again. In those cases where grease/debris obscured the pipe condition, cleaning should take place just prior to re-inspection. The new videos should be reviewed to assess the condition of the pipes and determine rehabilitation or repair strategies consistent with this master plan condition assessment.

- Trim Intruding: Laterals or joint sealing rings that are intruding into a pipe can catch debris and impede the flow of sewage. These intruding elements should be trimmed by a robotic trimming device to prevent blockages.

- CIPP Lining: Cured-In-Place Pipe (CIPP) lining of entire segment from manhole to manhole. CIPP lining constructs a new pipe within an existing pipe using the existing pipe as a mold. The liner is made from a resin-saturated felt tube that is inverted into the pipe between manholes and cured using steam or hot water. The resulting pipe is as strong as the original "host" pipe and has an expected useful life in excess of 50 years.

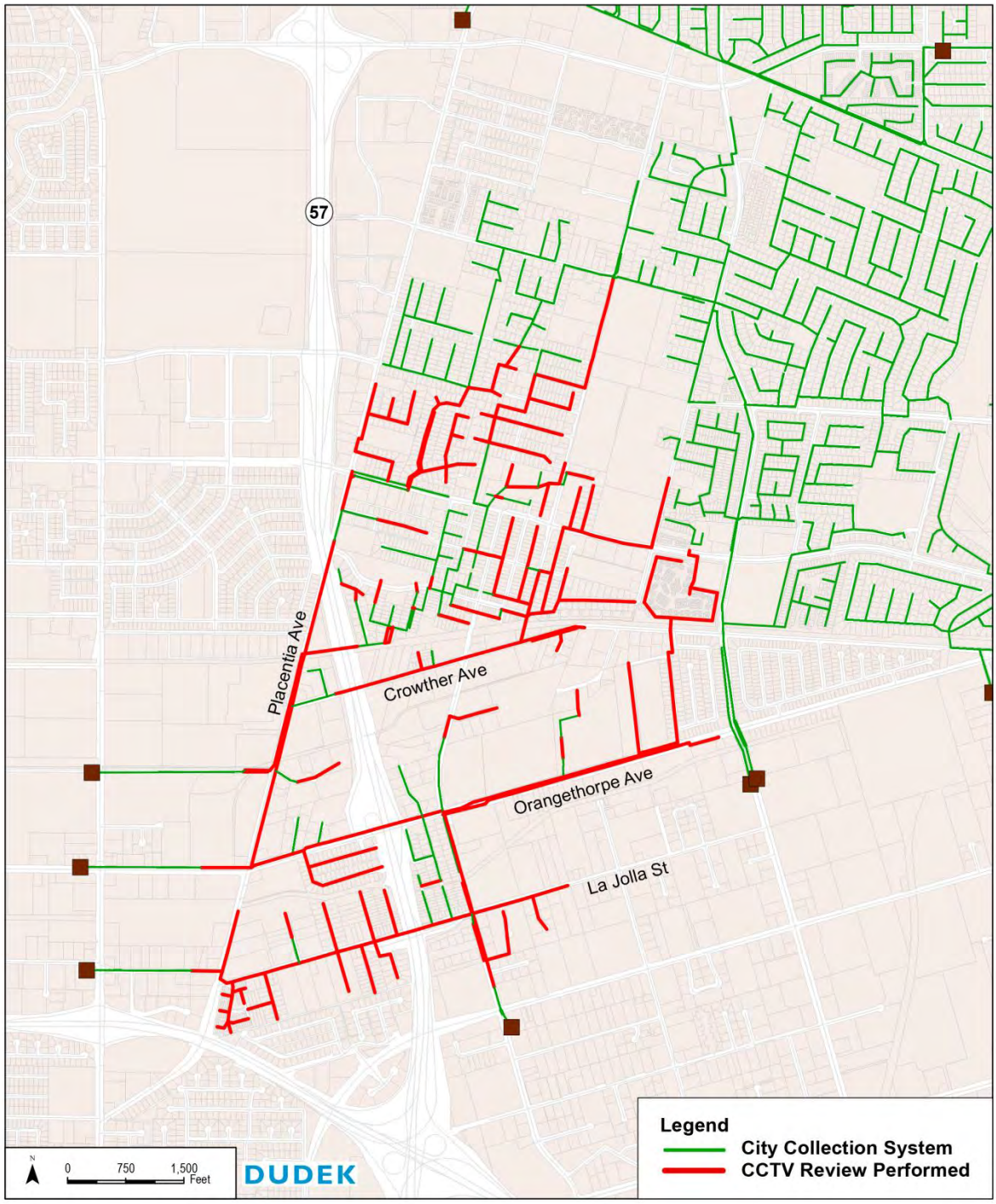
- Replace: Excavation and replacement of the entire segment from manhole to manhole.

- In-situ Point Repair: Trenchless/in-situ repair of a single defect, typically 4-feet in length or less, using a CIPP short liner.

- Excavation Point Repair: Replacement of a short segment of pipe by open trench construction to address a severe defect. Dresser style coupling for connections to the existing pipe are recommended to reduce the potential for differential settlement. May also include replacement of a lateral connection with the sewer main.

In-situ (i.e. trenchless) rehabilitation methods are recommended to repair whenever practical to reduce project costs and impact to the public and environment.

Figure 5-1: Condition Assessment Analysis



5.1.2 Pipeline Condition Assessment Findings and Recommendations

A summary of the results of the pipeline condition assessment are included in Table 5-1. The full condition assessment data table with rehabilitation and replacement recommendations developed for this master planning effort is included as Appendix B.

Table 5-1: Pipeline Condition Assessment Results

Pipeline Rehabilitation Method	Number of Segments	Lineal Footage/# of Repairs
CIPP	79	22,182 LF
In-Situ Point Repairs	25	28 EA
Excavation Point Repair	8	10 (EA)
Full Pipe Replacement	4	1,177 LF
Trim Intruding	7	17 (EA)
CCTV/Clean	47	10,142 LF

5.2 Manhole Assessments and Recommendations

This master planning condition assessment effort also included video inspections of 94 manholes. The City requested that the manhole inspection focus on older manholes in the southeast portion of the City (See Figure 5-2). The inspection consisted of suspending a panoramic camera into the manhole to obtain a 360 degree scan with a NASSCO Manhole Assessment and Certification Program (MACP) Level-2 condition assessment report. A screenshot of one of the views for manhole number 7235 is shown as an example in Figure 5-3.

Figure 5-2: Manhole Condition Assessment

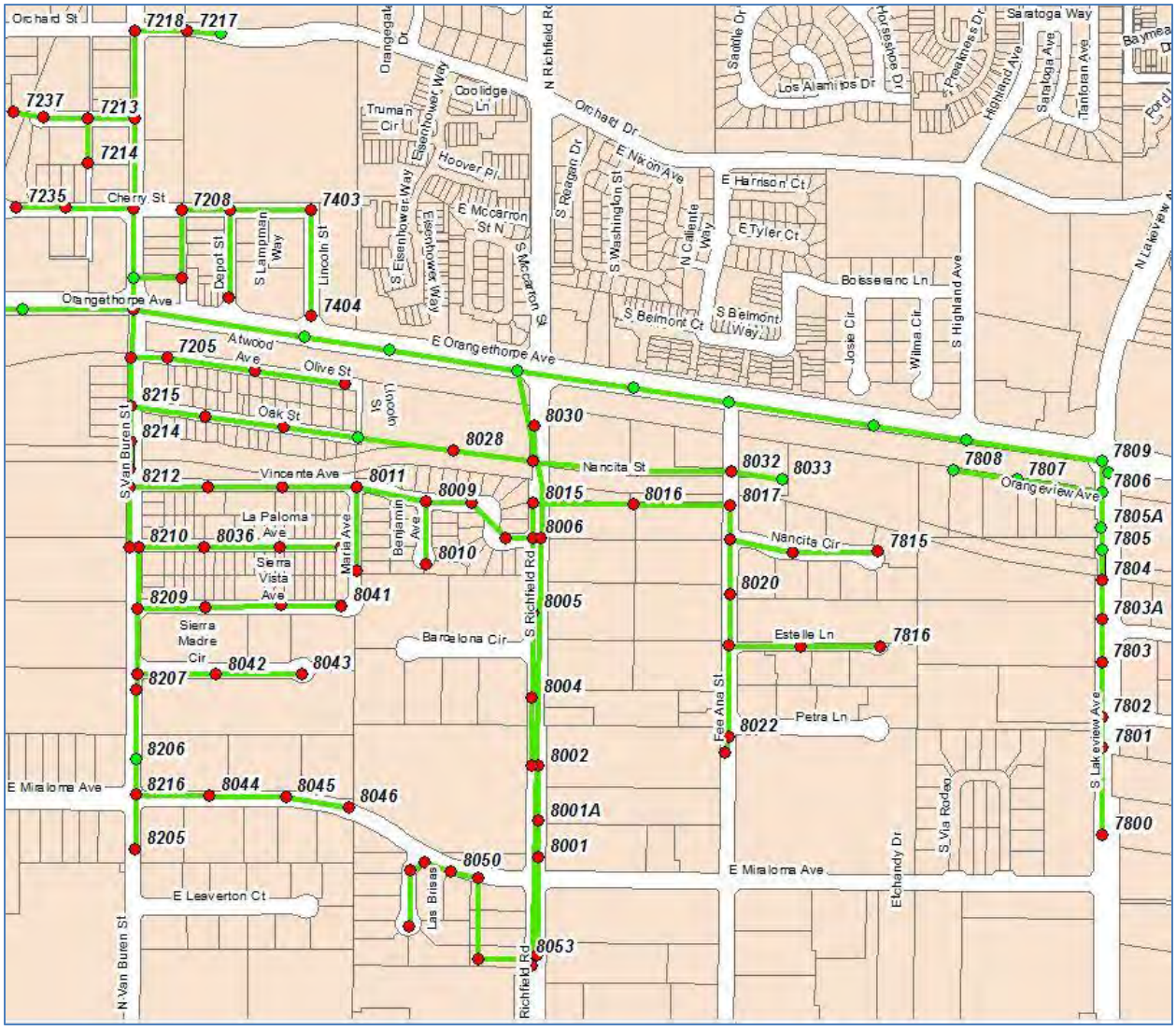
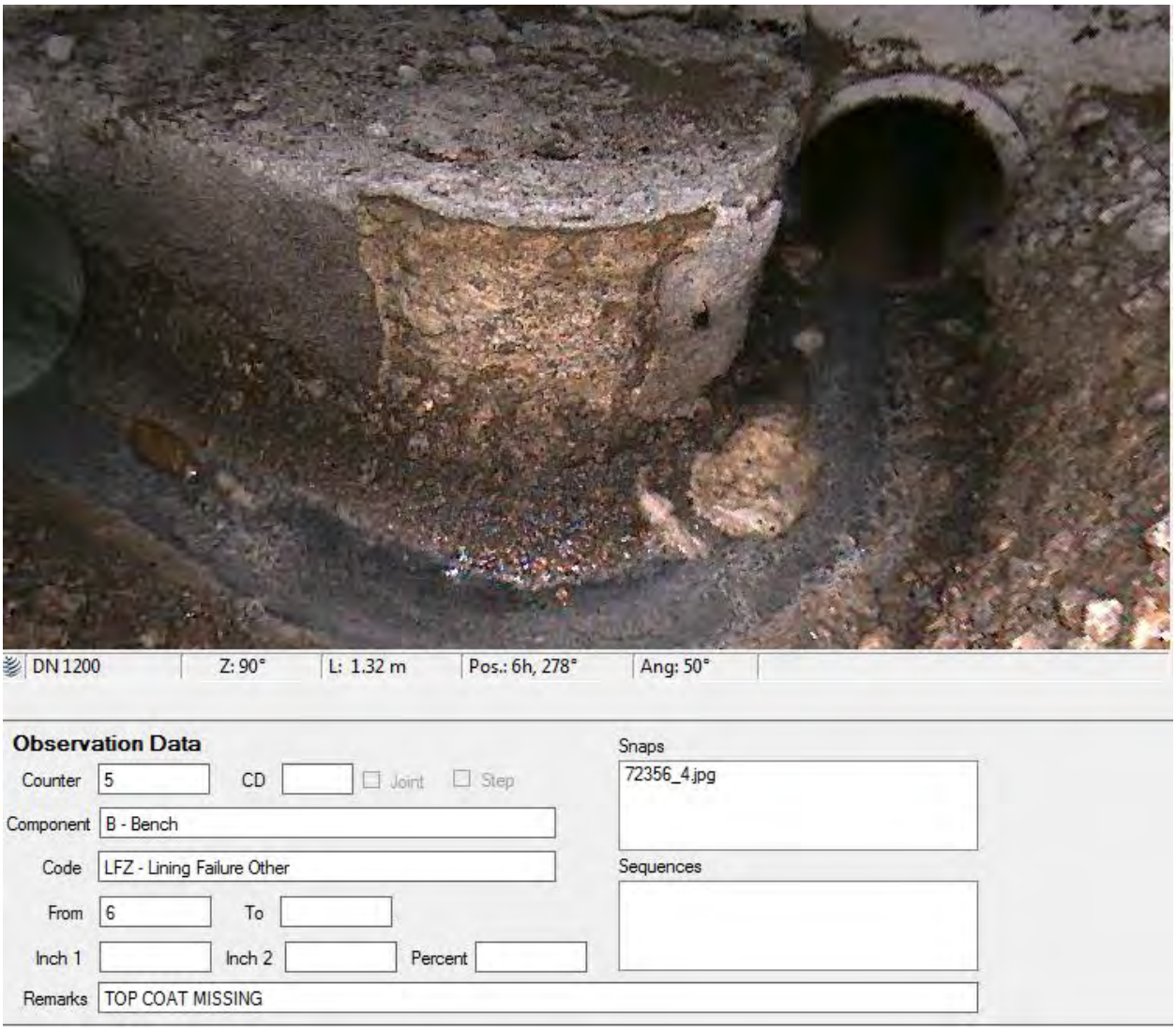


Figure 5-3: Manhole Condition Assessment Screenshot Example



5.2.1 Manhole Rehabilitation Alternatives

The following rehabilitation/repair strategies were identified to address defects observed in the 94 manholes inspected:

- Wall/ Bench Cementitious Rehabilitation: Prepare the surface and apply a corrosion resistant cementitious project, such as calcium aluminate cement, to the manhole walls and bench to address concrete corrosion and restore the structural integrity.
- Wall/ Bench/ Channel Cementitious Rehabilitation: Same as above with additional rehabilitation of the channel to address corrosion or damage. Requires flow bypassing.
- Maintenance Action: Additional inspection and removal of debris in channels or on benches.

5.2.2 Manhole Findings and Recommendations

A summary of the results of the manhole condition assessment is included in Table 5-1.

Complete results of the manhole inspection are included in Appendix C.

Table 5-2: Manhole Condition Assessment Results

Manhole Rehabilitation Method	Number of Manholes	Lineal Footage/# of Repairs
Wall/Bench Rehab (lining and/or partial cementitious reconstruction)	65	457 LF
Wall/Bench/Channel Rehab (lining and/or partial cementitious reconstruction)	23	174 LF / 23 EA
Maintenance Action (remove debris in channels or on benches)	30	30 EA

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6 RECOMMENDED CIP PROJECTS

This chapter describes the recommended capacity-related and rehabilitation CIP projects and their overall project cost estimates.

6.1 Capacity-Related CIP Project Development

Capacity-related CIP projects were developed by the following steps:

(1) Pipeline segments with an identified capacity deficiency (Sections 3.8.1 and 4.2) were grouped with other pipeline segments immediately upstream or downstream that are also capacity deficient under existing and/or ultimate scenarios to form a capacity-related CIP Project.
(2) Outlying pipeline segments (i.e. small pipeline segments that were geographically isolated from other capacity deficient segments) were identified and analyzed to determine whether the deficiency warranted complete replacement of the identified segment. For example, if the segment met d/D criteria under future PDWF conditions and had a capacity issues (d/D < 1.0) that did not result in surcharging at future PWWF conditions, it was eliminated from consideration for a CIP project.
(3) Capacity-related CIP projects that included smaller diameter pipeline segments (8-inch or 10-inch), and that had no capacity issues under future PDWF conditions, and only required one pipeline diameter upsizing to meet evaluation criteria under future PWWF conditions were eliminated from consideration for a CIP project.
(4) Seven (7) capacity-related CIP projects were identified. Project descriptions are included in (See Table 6-1)
(5) Diameters for the pipeline segments in the proposed CIP projects were calculated to meet the d/D design criteria at future PWWF flow scenarios. Additional considerations included the following:
    a. Pipeline segments downstream of upsized pipeline segments should have diameters greater than or equal to the upstream pipeline diameters.
    b. Pipeline segments that were not identified as capacity deficient, but had a smaller diameter than proposed upsized segments upstream were upsized to match upstream diameter.

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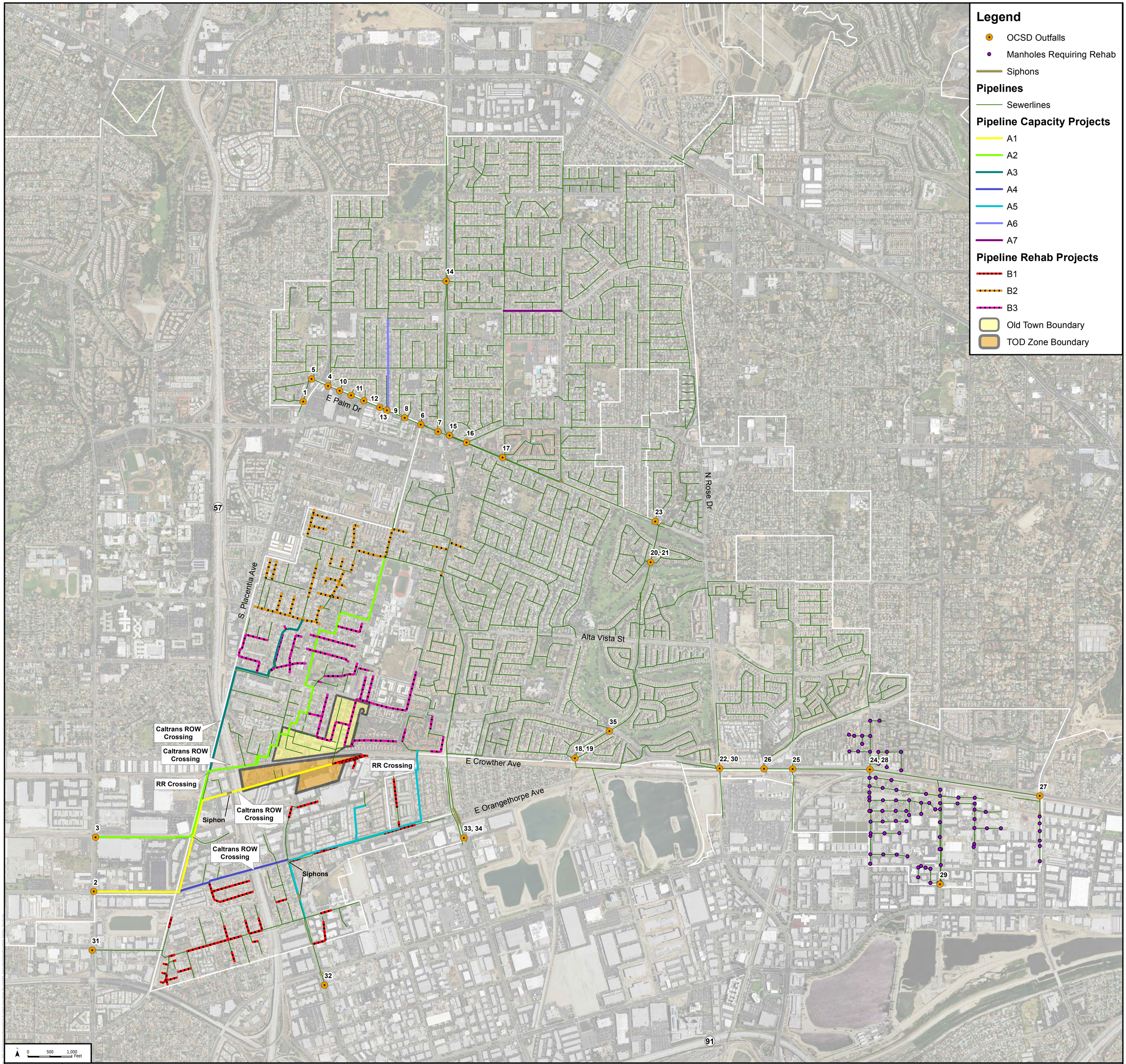

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SOURCE:

Figure 6-1. Recommended CIP Projects

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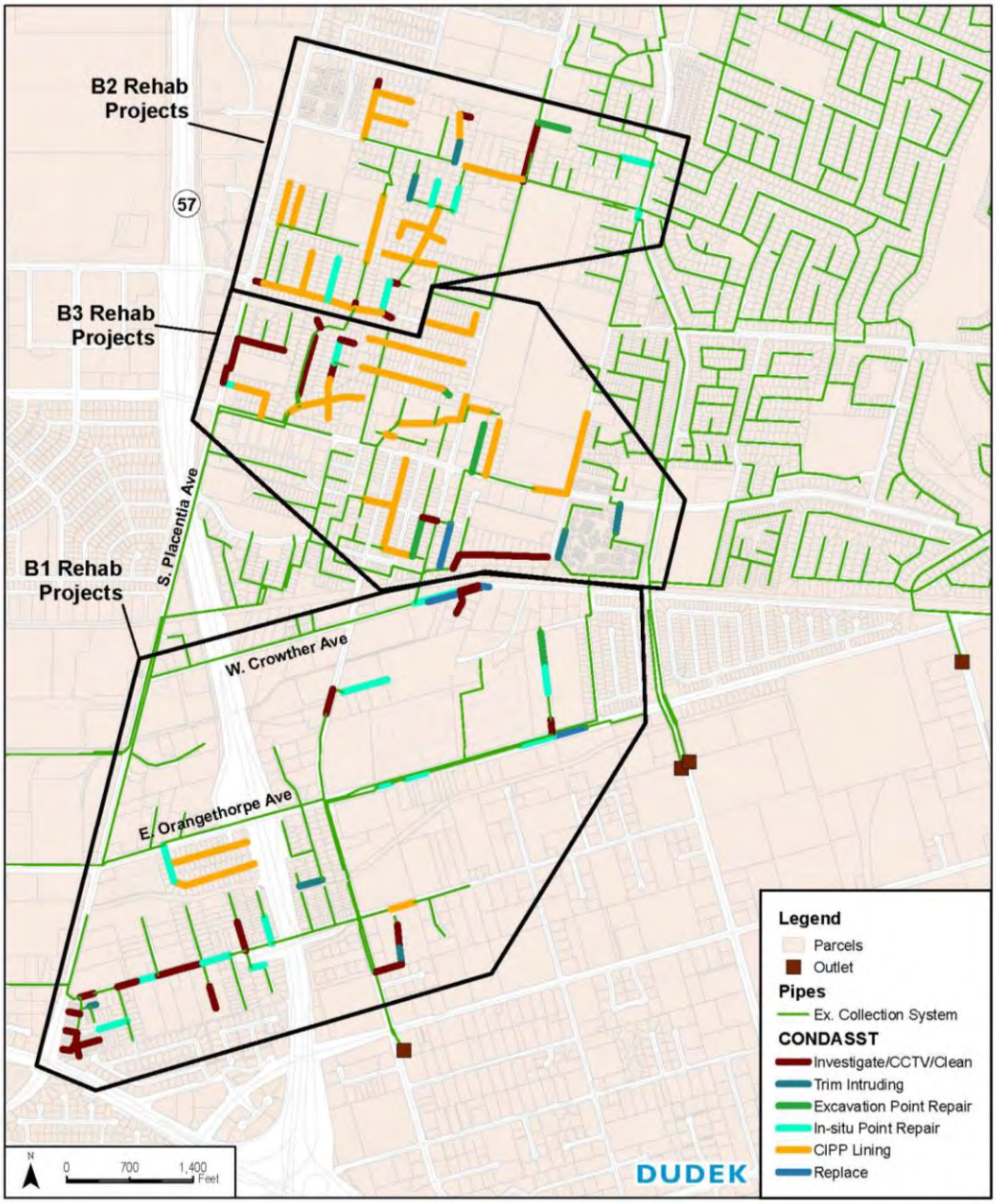
6.2 Condition-Related CIP Project Development

Proposed condition-related improvements for pipe segments were grouped into three overall condition-related CIP projects based on general location. (See Figure 6-1). The condition-related CIP projects are shown by recommended rehabilitation method in Figure 6-2. Proposed condition-related improvements for manholes are all grouped into one CIP project as shown in Figure 6-1.

Figure 6-2: Condition-Related CIP Project by Proposed Rehabilitation Method



6.3 CIP Project Costs

To determine probable construction costs for each of the CIP projects, the unit costs shown in Table 6-1 were utilized. The unit costs are based on quotations from general contractors and site conditions. Probable construction cost estimates are based on planning level quantity takeoffs, vendor/supplier/manufacturer quotations, and recent contract bid award data. Probable project costs include an additional 40% allowance for design, environmental work, permitting, overhead and administration, construction management, and inspection.

A summary of the recommended CIP projects and their associated probable costs is shown in Table 6-1.

Table 6-1: Recommended CIP Projects and Probable Costs

Project ID	Location	Size/Quantity	Unit Cost	Probable Construction Cost	Probable Project Cost*
Capacity Projects			**Total**	**$ 9,825,000**	**$ 13,755,000**
A1	Crowther Ave, S. Placentia Ave, Orangethorpe Ave	15"/1534 LF 18"/5776 LF *Includes Caltrans ROW crossing, RR crossing and one siphon	15" @ $255/ft 18" @ $306/ft	$ 2,286,000	$ 3,200,000
A2	Bradford Ave, Orange Grove Ave, Walnut Ave, Santa Barbara St, Placentia Ave	12"/5675 LF 15"/1759 LF 18"/2440 LF 24"/1881 LF *Includes two RR crossings	12" @ $204/ft 15" @ $255/ft 18" @ $306/ft 24" @ $408/ft	$ 3,304,000	$ 4,626,000
A3	Twilight St, Sunrise Way, Sunrise St, Melody Ln, Chapman Ave, Placentia Ave	12"/2448 LF 15"/2477 LF *Includes Caltrans ROW crossing and one siphon	12" @ $204/ft 15" @ $255/ft	$ 1,198,000	$ 1,677,000
A4	Orangethorpe Ave	12"/2021 LF 15"/591 LF *Includes Caltrans ROW crossing	12" @ $204/ft 15" @ $255/ft	$ 596,000	$ 834,000
A5	Orangethorpe Ave, Melrose St, Silverlake Dr, Glenlake Dr	12"/4027 LF 15"/1563 LF 18"/1283 LF *Includes RR crossing and two siphons	12" @ $204/ft 15" @ $255/ft 18" @ $306/ft	$ 1,708,000	$ 2,391,000
A6	Tuffree Blvd	12"/2096 LF	12" @ $255/ft	$ 453,000	$ 634,000
A7	Bastanchury Rd	12"/1300 LF	12" @ $255/ft	$ 281,000	$ 393,000
Pipeline Rehabilitation Projects			**Total**	**$ 1,402,000**	**$ 1,963,000**
B1	Various in southwestern portion of City (Orangethorpe Ave, Ohio Ave, Missouri Ave, Kansas Ave, Arnold Dr, Cypress Ave, La Jolla St, Vista Ave, Ortega Way, Melrose St, Boysenberry Ln, Crowther Ave, Temple St)	Replace 735 LF 6" & 8" Two (2) Excavation Point Repair 10" Three (3) Excavation Point Repairs 6" & 8" Sixteen (16) In-Situ Point Repairs 6" & 8" Three (3) Trim Intruding Lateral (or Sealing Ring) 8" CIPP Liner/ 170 LF 6" CIPP Liner/ 2,035 LF Clean & Re-Inspect 4,564 LF	Replace 6" & 8" $150/LF Exc Pt Rp 10" $9,000/EA Exc Pt Rp 6" & 8" $8,000/EA In-Situ Pt Rp 6" & 8" $3,000/EA Trim Lateral $275/EA 8" CIPP Liner $40/LF 6" CIPP Liner $35/LF Clean & Re-inspect $2/LF	$ 326,000	$ 456,000
B2	Various in southwestern portion of City (Primrose Ave, Diamond Rd, Orange Grove Ave, Kraemer Blvd, Sunrise St, Stardust Dr, Moonbeam St, Twilight St, Ruby Drive Elementary, Diane Ave, Vicky Ln, Sheree Ln, Lawanda Pl, Aquamarine St, Jade Circle, Emerald Way, Madison Ave, Bradford Ave, Carlson Ln, Paeantry Dr, Fairway Ln)	One (1) Excavation Point Repair 8" Five (5) In-Situ Point Repairs 8" & 10" Five (5) Trim Intruding Lateral (or Sealing Ring) CIPP Liner 10"/ 350 LF CIPP Liner 8"/ 7,781 LF Clean & Re-Inspect 1,862 LF	Exc Pt Rp 10" $9,000/EA In-Situ Pt Rp 8" & 10" $3,000/EA Trim Lateral $275/EA 10" CIPP Liner $45/LF 8" CIPP Liner $40/LF Clean & Re-inspect $2/LF	$ 401,000	$ 561,000
B3	Various in southwestern portion of City (Center St, alleys, Angelina Dr, Chapman Ave, Kraemer Memorial Park, Anned Dr, Bradford Ave, Wilson Ave, Orchid Dr, Primrose Ave, Sunset Dr, Placentia Ave, Harmony Ln, Twilight St, Alta St, Backs Ln, Molokai Ln, Lanai Ln, Kauai Ln)	Replace 442 LF 6" Four (4) Excavation Point Repairs 6" & 8" Seven (7) In-Situ Point Repairs 8" Nine (9) Trim Intruding Lateral (or Sealing Ring) 10" CIPP Liner/ 675 LF 8" CIPP Liner/ 6,370 LF 6" CIPP Liner/ 4,801 LF Clean & Re-Inspect 3,716 LF	Replace 6" $150/LF Exc Pt Rp 6" & 8" $8,000/EA In-Situ Pt Rp 8" $3,000/EA Trim Lateral $275/EA 10" CIPP Liner $45/LF 8" CIPP Liner $40/LF 6" CIPP Liner $35/LF Clean & Re-inspect $2/LF	$ 675,000	$ 945,000
Manhole Rehabilitation Projects			**Total**	**$ 181,000**	**$ 254,000**
Wall	Various in southeastern portion of City (Van Buren St, Lakeview Ave, Vicente Ave, Richfield Rd)	631 LF (vertical)	$250/VLF	$ 173,800	$ 243,000
Bench/Channel	Various in southeastern portion of City (Van Buren St, Lakeview Ave, Vicente Ave, Richfield Rd)	23 MHs	$1000/EA	$ 25,300	$ 35,000
			TOTAL COST	**$ 11,408,000**	**$ 15,972,000**

* Includes 40% markup for soft costs: Design, Environmental, Permitting, Overhead, Construction Management and Inspection, etc.

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6.4 Other Recommendations

In addition to the recommended capacity-related and condition-related CIP projects, it is recommended that the City consider the following:

- Additional/Extended Flow Monitoring – PWWF conditions were estimated by using OCSD data. Additional flow monitoring during the rainy season may give a better representation of PWWF conditions within the City's collection system. Changes to PWWF conditions within the hydraulic model may yield different results (i.e. more or less capacity deficiencies).
- Expand Gap Analysis – The hydraulic model was based on the City's GIS data and sewer atlas maps. An expanded gap analysis, including review of existing as-built drawings, may correct remaining data errors, and increase accuracy of the hydraulic model.

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APPENDIX A

Hydraulic Model Results Table

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Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
55	198.84	197.66	6	6	420	0.0028	0.002	0.483	0.07	0.006	0.687	0.121	0.002	0.483	0.07	0.006	0.687	0.121	0.002	0.483	0.07	0.006	0.687	0.121
63	196.94	195.6	6	6	479.11	0.0028	0.002	0.515	0.077	0.007	0.731	0.134	0.002	0.515	0.077	0.007	0.731	0.134	0.002	0.515	0.077	0.007	0.731	0.134
64	195.6	194.22	6	6	491.37	0.0028	0.007	0.706	0.126	0.021	0.996	0.223	0.007	0.706	0.126	0.021	0.996	0.223	0.007	0.706	0.126	0.021	0.996	0.223
66	194.22	193.88	6	6	121.31	0.0028	0.01	0.8	0.155	0.032	1.124	0.276	0.01	0.8	0.155	0.032	1.124	0.276	0.01	0.8	0.155	0.032	1.124	0.276
69	195.98	193.31	6	6	533	0.0050	0.006	0.848	0.107	0.02	1.199	0.187	0.006	0.848	0.107	0.02	1.199	0.187	0.006	0.848	0.107	0.02	1.199	0.187
70	197.69	195.98	6	6	533.1	0.0032	0.002	0.539	0.074	0.007	0.765	0.129	0.002	0.539	0.074	0.007	0.765	0.129	0.002	0.539	0.074	0.007	0.765	0.129
233	204.71	194.71	6	6	200	0.0500	0.005	1.754	0.055	0.015	2.495	0.095	0.028	2.987	0.127	0.09	4.214	0.224	0.028	1.998	0.168	0.09	2.802	0.3
234	205.12	201.98	6	6	200	0.0157	0.007	1.325	0.088	0.023	1.879	0.153	0.041	2.23	0.203	0.132	3.108	0.369	0.041	2.255	0.202	0.132	3.144	0.365
240	233.25	232.71	6	6	152.51	0.0035	0.005	0.704	0.105	0.016	0.996	0.184	0.005	0.704	0.105	0.016	0.996	0.184	0.005	0.704	0.105	0.016	0.996	0.184
241	232.51	231.31	6	6	128.51	0.0093	0.007	1.094	0.098	0.022	1.55	0.171	0.007	1.094	0.098	0.022	1.55	0.171	0.007	1.094	0.098	0.022	1.55	0.171
282	221.9	214.5	6	6	370	0.0200	0.009	1.555	0.093	0.03	2.204	0.163	0.009	1.555	0.093	0.03	2.204	0.163	0.009	1.555	0.093	0.03	2.204	0.163
295	217.19	213.35	6	6	160	0.0240	0.006	1.429	0.071	0.018	2.03	0.123	0.006	1.429	0.071	0.018	2.03	0.123	0.006	1.429	0.071	0.018	2.03	0.123
296	213.35	209.99	6	6	140	0.0240	0.008	1.602	0.085	0.027	2.272	0.148	0.008	1.602	0.085	0.027	2.272	0.148	0.008	1.602	0.085	0.027	2.272	0.148
297	220.38	217.19	6	6	133	0.0240	0.001	0.884	0.034	0.004	1.26	0.058	0.001	0.884	0.034	0.004	1.26	0.058	0.001	0.884	0.034	0.004	1.26	0.058
298	222.59	217.19	6	6	193	0.0280	0.003	1.199	0.048	0.009	1.707	0.083	0.003	1.199	0.048	0.009	1.707	0.083	0.003	1.199	0.048	0.009	1.707	0.083
300	219.77	219.29	6	6	140	0.0034	0.002	0.536	0.07	0.007	0.762	0.122	0.002	0.536	0.07	0.007	0.762	0.122	0.002	0.536	0.07	0.007	0.762	0.122
310	220.15	203.46	6	6	214	0.0780	0.002	1.55	0.032	0.006	2.211	0.056	0.002	1.55	0.032	0.006	2.211	0.056	0.002	1.55	0.032	0.006	2.211	0.056
312	229.67	216.99	6	6	317	0.0400	0.005	1.61	0.057	0.015	2.29	0.099	0.005	1.61	0.057	0.015	2.29	0.099	0.005	1.61	0.057	0.015	2.29	0.099
313	216.99	214.99	6	6	200	0.0100	0.009	1.191	0.106	0.027	1.686	0.186	0.009	1.191	0.106	0.027	1.686	0.186	0.009	1.191	0.106	0.027	1.686	0.186
318	239.38	227.38	6	6	300	0.0400	0.003	1.368	0.045	0.009	1.948	0.077	0.004	1.542	0.054	0.013	2.194	0.093	0.004	1.542	0.054	0.013	2.194	0.093
326	226.12	224.93	6	6	477	0.0025	0.005	0.621	0.113	0.016	0.878	0.199	0.005	0.621	0.113	0.016	0.878	0.199	0.005	0.621	0.113	0.016	0.878	0.199
328	268.28	254.78	6	6	450	0.0300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
330	254.78	245.38	6	6	470.15	0.0200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
335	236.72	222.68	6	6	390	0.0360	0.003	1.295	0.045	0.008	1.844	0.077	0.003	1.295	0.045	0.008	1.844	0.077	0.003	1.295	0.045	0.008	1.844	0.077
337	232.21	215.74	6	6	305	0.0540	0.001	1.113	0.026	0.003	1.588	0.045	0.001	1.113	0.026	0.003	1.588	0.045	0.001	1.113	0.026	0.003	1.588	0.045
340	238.88	215.68	6	6	357	0.0650	0.001	1.339	0.03	0.005	1.91	0.051	0.001	1.339	0.03	0.005	1.91	0.051	0.001	1.339	0.03	0.005	1.91	0.051
341	216.21	214.18	6	6	145	0.0140	0	0.45	0.018	0.001	0.642	0.031	0	0.45	0.018	0.001	0.642	0.031	0	0.45	0.018	0.001	0.642	0.031
342	240.24	238.88	6	6	68	0.0200	0	0	0	0	0.502	0.016	0	0	0	0	0.502	0.016	0	0	0	0	0.502	0.016
345	245.84	241.95	6	6	216	0.0180	0.004	1.137	0.062	0.012	1.617	0.108	0.004	1.137	0.062	0.012	1.617	0.108	0.004	1.137	0.062	0.012	1.617	0.108
346	241.95	232.35	6	6	533.5	0.0180	0.013	1.67	0.113	0.042	2.36	0.199	0.013	1.67	0.113	0.042	2.36	0.199	0.013	1.67	0.113	0.042	2.36	0.199
349	211.24	210.88	6	6	178	0.0020	0.003	0.506	0.097	0.01	0.717	0.169	0.003	0.506	0.097	0.01	0.717	0.169	0.003	0.506	0.097	0.01	0.717	0.169
352	225.51	223.2	6	6	221	0.0105	0.003	0.855	0.061	0.009	1.215	0.105	0.003	0.855	0.061	0.009	1.215	0.105	0.003	0.855	0.061	0.009	1.215	0.105
353	220.52	218.7	6	6	228	0.0080	0.003	0.778	0.065	0.009	1.106	0.112	0.003	0.778	0.065	0.009	1.106	0.112	0.003	0.778	0.065	0.009	1.106	0.112
355	227.45	218.45	6	6	225	0.0400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
357	215.68	214.18	6	6	75	0.0200	0.002	0.944	0.043	0.006	1.345	0.074	0.002	0.944	0.043	0.006	1.345	0.074	0.002	0.944	0.043	0.006	1.345	0.074
371	223.31	221.9	6	6	351	0.0040	0.004	0.682	0.09	0.012	0.967	0.158	0.004	0.682	0.09	0.012	0.967	0.158	0.004	0.682	0.09	0.012	0.967	0.158
411	229.11	226.58	6	6	158	0.0160	0.002	0.836	0.042	0.005	1.191	0.073	0.002	0.836	0.042	0.005	1.191	0.073	0.002	0.836	0.042	0.005	1.191	0.073
412	235.1	231.94	6	6	158	0.0200	0.002	0.903	0.04	0.005	1.287	0.069	0.002	0.903	0.04	0.005	1.287	0.069	0.002	0.903	0.04	0.005	1.287	0.069
413	224.23	223.35	6	6	92	0.0096	0.001	0.64	0.042	0.004	0.912	0.072	0.001	0.64	0.042	0.004	0.912	0.072	0.001	0.64	0.042	0.004	0.912	0.072
460	253.1	245.2	6	6	151.5	0.0521	0.004	1.666	0.049	0.012	2.372	0.085	0.004	1.666	0.049	0.012	2.372	0.085	0.004	1.666	0.049	0.012	2.372	0.085
473	245.93	244.8	6	6	113	0.0100	0.001	0.65	0.041	0.004	0.926	0.071	0.001	0.65	0.041	0.004	0.926	0.071	0.001	0.65	0.041	0.004	0.926	0.071
474	244.6	236.6	6	6	400	0.0200	0.004	1.229	0.065	0.014	1.747	0.112	0.004	1.229	0.065	0.014	1.747	0.112	0.004	1.229	0.065	0.014	1.747	0.112
475	236.4	230.05	6	6	320	0.0198	0.007	1.446	0.084	0.024	2.05	0.146	0.007	1.446	0.084	0.024	2.05	0.146	0.007	1.446	0.084	0.024	2.05	0.146
476	231.19	230.1	6	6	217.92	0.0050	0.002	0.558	0.056	0.005	0.794	0.096	0.002	0.558	0.056	0.005	0.794	0.096	0.002	0.558	0.056	0.005	0.794	0.096
477	244.32	239.45	6	6	243.5	0.0200	0.001	0.827	0.035	0.004	1.179	0.061	0.001	0.827	0.035	0.004	1.179	0.061	0.001	0.827	0.035	0.004	1.179	0.061
478	239.45	237.8	6	6	165.39	0.0100	0.003	0.852	0.063	0.009	1.212	0.109	0.003	0.852	0.063	0.009	1.212	0.109	0.003	0.852	0.063	0.009	1.212	0.109
479	237.8	237.35	6	6	45.5	0.0099	0.003	0.85	0.063	0.009	1.208	0.109	0.003	0.85	0.063	0.009	1.208	0.109	0.003	0.85	0.063	0.009	1.208	0.109
480	250.24	247	6	6	108	0.0300	0.001	0.841	0.026	0.002	1.2	0.046	0.001	0.841	0.026	0.002	1.2	0.046	0.001	0.841	0.026	0.002	1.2	0.046
481	255.4	253.8	6	6	320	0.0050	0.001	0.511	0.049	0.004	0.727	0.084	0.001	0.511	0.049	0.004	0.727	0.084	0.001	0.511	0.049	0.004	0.727	0.084
482	253.8	251.3	6	6	300	0.0083	0.004	0.905	0.079	0.014	1.285	0.138	0.004	0.905	0.079	0.014	1.285	0.138	0.004	0.905	0.079	0.014	1.285	0.138
483	253.4	250.75	6	6	530	0.0050	0.007	0.888	0.115	0.023	1.255	0.202	0.007	0.888	0.115	0.023	1.255	0.202	0.007	0.888	0.115	0.023	1.255	0.202
541	273.48	272.3	6	6	117.85	0.0100	0.001	0.65	0.041	0.004	0.927	0.071	0.001	0.65	0.041	0.004	0.927	0.071	0.001	0.65	0.041	0.004	0.927	0.071
542	272.6	271.3	6	6	130.15	0.0100	0.001	0.65	0.041	0.004	0.926	0.071	0.001	0.65	0.041	0.004	0.926	0.071	0.001	0.65	0.041	0.004	0.926	0.071
1133	331.76	329.99	6	6	85	0.0208	0.002	0.98	0.044	0.006	1.396	0.076	0.002	0.98	0.044	0.006	1.396	0.076	0.002	0.98	0.044	0.006	1.396	0.076
1135	336.02	335.2	6	6	78.91	0.0104	0.001	0.659	0.041	0.004	0.939	0.071	0.001	0.659	0.041	0.004	0.939	0.071	0.001	0.659	0.041	0.004	0.939	0.071
2113	321.15	318.66	6	6	85	0.0293	0.001	0.834	0.027	0.002	1.19	0.046	0.001	0.834	0.027	0.002	1.19	0.046	0.001	0.834	0.027	0.002	1.19	0.046
2120	310.13	308.85	6	6	110	0.0116	0.002	0.748	0.046	0.005	1.065	0.079	0.002	0.748	0.046	0.005	1.065	0.079	0.002	0.748	0.046	0.005	1.065	0.079
2381	236.5	236.08	6	6	12	0.0350	0.063	3.345	0.205	0.189	4.59	0.361	0.063	3.345	0.205	0.189	4.59	0.361	0.063	3.345	0.205	0.189	4.59	0.361
2699	237.96	237.04	6	6	181	0.0051	0.004	0.759	0.089	0.013	1.075	0.155	0.004	0.759	0.089	0.013	1.075	0.155	0.004	0.759	0.089	0.013	1.075	0.155
2732	197	195.51	6	6	372	0.0040	0.005	0.753	0.106	0.017	1.066	0.185	0.005	0.753	0.106	0.017	1.066	0.185	0.005	0.753	0.106	0.017	1.066	0.185
2792	260.46	259.2	6	6	315	0.0040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2793	259	257.78	6	6	305	0.0040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2796	228.4	227.92	6	6	270	0.0018	0.001	0.357	0.062	0.004	0.507	0.107	0.001	0.357	0.062	0.004	0.507	0.107	0.001	0.357	0.062	0.004	0.507	0.107
3	187.97	187.68	8	8	46.34	0.0063	0.008	0.957	0.08	0.026	1.358	0.14	0.008	0.957	0.08	0.026	1.358	0.14	0.008	0.957	0.08	0.026	1.358	0.14
4	190.57	187.78	8	8	139.64	0.0200	0.001	0.792	0.025	0.004	1.13	0.042	0.001	0.792	0.025	0.004	1.13	0.042	0.001	0.792	0.025	0.004	1.13	0.042
5	189.1	188.38	8	8	115.86	0.0062	0.002	0.617	0.041	0.006	0.88	0.071	0.002	0.617	0.041	0.006	0.88	0.071	0.002	0.617	0.041	0.006	0.88	0.071
6	188.28	187.68	8	8	96.53	0.0062	0.003	0.738	0.054	0.011	1.051	0.093	0.003	0.738	0.054	0.011	1.051	0.093	0.003	0.738	0.054	0.011	1.051	0.093
7	187.58	187.06	8	8	130.26	0.0040	0.013	0.938	0.111	0.041	1.326	0.194	0.013	0.938	0.111	0.041	1.326	0.194	0.013	0.938	0.111	0.041	1.326	0.194
8	187.06	186.7	8	8	212	0.0017	0.016	0.742	0.151	0.051	1.043	0.268	0.016	0.742	0.151	0.051	1.043	0.268	0.016	0.742	0.151	0.051	1.043	0.268
9	186.7	185.98	8	8	58.07	0.0124	0.019	1.569	0.102	0.061	2.221	0.178	0.019	1.569	0.102	0.061	2.221	0.178	0.019	1.569	0.102	0.061	2.221	0.178
10	189.57	186.4	8	8	128	0.0248	0.002	0.998	0.03	0.006	1.423	0.051	0.002	0.998	0.03	0.006	1.423	0.051	0.002	0.998	0.03	0.006	1.423	0.051
11	189.34	187.97	8	8	221.59	0.0062	0.005	0.824	0.064	0.016	1.172	0.111	0.005	0.824	0.064	0.016	1.172	0.111	0.005	0.824	0.064	0.016	1.172	0.111
14	189.26	187.73	8	8	388	0.0039	0.036	1.271	0.183	0.115	1.778	0.329	0.036	1.271	0.183	0.115	1.778	0.329	0.036	1.271	0.183	0.115	1.778	0.329
15	189.46	189.26	8	8	325	0.0006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	190.24	189.26	8	8	245	0.0040	0.002	0.559	0.049	0.007	0.796	0.085	0.002	0.559	0.049	0.007	0.796	0.085	0.002	0.559	0.049	0.007	0.796	0.085
18	192.63	191.42	8	8	331	0.0037	0.008	0.799	0.092	0.027	1.133	0.161	0.008	0.799	0.092	0.027	1.133	0.161	0.008	0.799	0.092	0.027	1.133	0.161
20	192.42	191.42	8	8	255	0.0039	0.037	1.282	0.187	0.119	1.793	0.336	0.037	1.282	0.187	0.119	1.793	0.336	0.037	1.282	0.187	0.119	1.793	0.336
21	193.84	192.63	8	8	336	0.0036	0.003	0.566	0.054	0.009	0.805	0.094	0.003	0.566	0.054	0.009	0.805	0.094	0.003	0.566	0.054	0.009	0.805	0.094
28	190.85	189.64	8	8	331	0.0037	0.023	1.089	0.151	0.075	1.531	0.268	0.023	1.089	0.151	0.075	1.531	0.268	0.023	1.089	0.151	0.075	1.531	0.268
29	192.06	190.85	8	8	336	0.0036	0.018	0.996	0.132	0.056	1.404	0.234	0.018	0.996	0.132	0.056	1.404	0.234	0.018	0.996	0.132	0.056	1.404	0.234
30	193.37	192.42	8	8	238	0.0040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	185.98	185.72	8	8	63.83	0.0041	0.025	1.157	0.153	0.081	1.627	0.271	0.025	1.157	0.153	0.081	1.627	0.271	0.025	1.157	0.153	0.081	1.627	0.271

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
32	185.72	185.84	8	8	55.42	-0.0022	0.026	0.113	1	0.082	0.363	1	0.026	0.113	1	0.082	0.363	1	0.026	0.113	1	0.082	0.363	1
33	186.84	185.98	8	8	95.02	0.0091	0.005	0.967	0.061	0.018	1.375	0.106	0.005	0.967	0.061	0.018	1.375	0.106	0.005	0.967	0.061	0.018	1.375	0.106
34	189.83	187.04	8	8	77.5	0.0360	0.001	0.858	0.018	0.002	1.225	0.031	0.001	0.858	0.018	0.002	1.225	0.031	0.001	0.858	0.018	0.002	1.225	0.031
35	189.89	187.04	8	8	178	0.0160	0.004	1.033	0.044	0.011	1.471	0.075	0.004	1.033	0.044	0.011	1.471	0.075	0.004	1.033	0.044	0.011	1.471	0.075
39	188.39	185.96	8	8	290	0.0084	0.005	0.902	0.058	0.015	1.282	0.101	0.005	0.902	0.058	0.015	1.282	0.101	0.005	0.902	0.058	0.015	1.282	0.101
40	190.83	188.39	8	8	290	0.0084	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	185.96	182.86	8	8	290	0.0107	0.012	1.285	0.084	0.037	1.822	0.146	0.012	1.285	0.084	0.037	1.822	0.146	0.012	1.285	0.084	0.037	1.822	0.146
42	193.61	192.61	8	8	319	0.0031	0.009	0.783	0.101	0.03	1.109	0.176	0.009	0.783	0.101	0.03	1.109	0.176	0.009	0.783	0.101	0.03	1.109	0.176
43	194.62	193.61	8	8	314	0.0032	0.004	0.591	0.064	0.011	0.841	0.11	0.004	0.591	0.064	0.011	0.841	0.11	0.004	0.591	0.064	0.011	0.841	0.11
45	195.31	194.29	8	8	336	0.0030	0.009	0.761	0.099	0.028	1.078	0.173	0.009	0.761	0.099	0.028	1.078	0.173	0.009	0.761	0.099	0.028	1.078	0.173
46	194.65	193.87	8	8	324.86	0.0024	0.011	0.755	0.117	0.036	1.067	0.207	0.011	0.755	0.117	0.036	1.067	0.207	0.011	0.755	0.117	0.036	1.067	0.207
47	193.67	193.33	8	8	143.49	0.0024	0.017	0.856	0.145	0.055	1.204	0.258	0.017	0.856	0.145	0.055	1.204	0.258	0.017	0.856	0.145	0.055	1.204	0.258
48	193.13	192.66	8	8	196.37	0.0024	0.022	0.924	0.163	0.071	1.296	0.291	0.022	0.924	0.163	0.071	1.296	0.291	0.022	0.924	0.163	0.071	1.296	0.291
49	194.29	193.26	8	8	336	0.0031	0.013	0.868	0.121	0.043	1.225	0.212	0.013	0.868	0.121	0.043	1.225	0.212	0.013	0.868	0.121	0.043	1.225	0.212
50	194.95	194.34	8	8	305	0.0020	0.006	0.601	0.094	0.021	0.851	0.165	0.006	0.601	0.094	0.021	0.851	0.165	0.006	0.601	0.094	0.021	0.851	0.165
51	195.56	194.95	8	8	305	0.0020	0.002	0.389	0.048	0.005	0.554	0.083	0.002	0.389	0.048	0.005	0.554	0.083	0.002	0.389	0.048	0.005	0.554	0.083
54	197.98	196.97	8	8	420	0.0024	0.003	0.531	0.067	0.011	0.754	0.117	0.003	0.531	0.067	0.011	0.754	0.117	0.003	0.531	0.067	0.011	0.754	0.117
56	197.66	196.18	8	8	260	0.0057	0.003	0.71	0.054	0.011	1.01	0.094	0.003	0.71	0.054	0.011	1.01	0.094	0.003	0.71	0.054	0.011	1.01	0.094
57	195.65	194.97	8	8	285	0.0024	0.018	0.87	0.148	0.058	1.223	0.263	0.018	0.87	0.148	0.058	1.223	0.263	0.018	0.87	0.148	0.058	1.223	0.263
58	196.34	196.18	8	8	70	0.0023	0.01	0.72	0.113	0.032	1.018	0.199	0.01	0.72	0.113	0.032	1.018	0.199	0.01	0.72	0.113	0.032	1.018	0.199
59	198.3	197.93	8	8	153	0.0024	0.002	0.445	0.051	0.006	0.633	0.088	0.002	0.445	0.051	0.006	0.633	0.088	0.002	0.445	0.051	0.006	0.633	0.088
60	197.83	197.21	8	8	260	0.0024	0.004	0.562	0.074	0.014	0.798	0.129	0.004	0.562	0.074	0.014	0.798	0.129	0.004	0.562	0.074	0.014	0.798	0.129
61	197.05	196.34	8	8	287	0.0025	0.008	0.685	0.098	0.025	0.97	0.172	0.008	0.685	0.098	0.025	0.97	0.172	0.008	0.685	0.098	0.025	0.97	0.172
67	193.15	192.6	8	8	195	0.0028	0.021	0.966	0.153	0.068	1.358	0.273	0.021	0.966	0.153	0.068	1.358	0.273	0.021	0.966	0.153	0.068	1.358	0.273
71	193.72	193.31	8	8	202.12	0.0020	0.012	0.725	0.126	0.038	1.023	0.222	0.012	0.725	0.126	0.038	1.023	0.222	0.012	0.725	0.126	0.038	1.023	0.222
72	197.27	196.65	8	8	220	0.0028	0.002	0.469	0.049	0.006	0.668	0.085	0.002	0.469	0.049	0.006	0.668	0.085	0.002	0.469	0.049	0.006	0.668	0.085
73	196.65	196.04	8	8	220	0.0028	0.007	0.692	0.091	0.023	0.981	0.159	0.007	0.692	0.091	0.023	0.981	0.159	0.007	0.692	0.091	0.023	0.981	0.159
81	190.43	187.26	8	8	128	0.0248	0.002	1.055	0.032	0.007	1.504	0.056	0.002	1.055	0.032	0.007	1.504	0.056	0.002	1.055	0.032	0.007	1.504	0.056
86	202.4	201.75	8	8	81	0.0080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
87	201.75	200.63	8	8	228.59	0.0049	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	200.63	199.48	8	8	176	0.0065	0.018	1.229	0.115	0.057	1.737	0.202	0.018	1.229	0.115	0.057	1.737	0.202	0.018	1.229	0.115	0.057	1.737	0.202
89	199.48	197.71	8	8	346.56	0.0051	0.018	1.127	0.122	0.057	1.592	0.215	0.018	1.127	0.122	0.057	1.592	0.215	0.018	1.127	0.122	0.057	1.592	0.215
90	201.5	200.92	8	8	166.43	0.0035	0.009	0.81	0.098	0.029	1.147	0.171	0.009	0.81	0.098	0.029	1.147	0.171	0.009	0.81	0.098	0.029	1.147	0.171
91	200.82	199.7	8	8	311.57	0.0036	0.013	0.902	0.113	0.041	1.274	0.199	0.013	0.902	0.113	0.041	1.274	0.199	0.013	0.902	0.113	0.041	1.274	0.199
94	217.5	215.19	8	8	350	0.0066	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	206.14	204.87	8	8	363.6	0.0035	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99	215.05	206.14	8	8	330	0.0270	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	222.28	221.19	8	8	273	0.0040	0.121	1.813	0.337	0.388	2.428	0.667	0.121	1.813	0.337	0.388	2.428	0.667	0.121	1.813	0.337	0.388	2.428	0.667
107	223.34	222.38	8	8	241	0.0040	0.112	1.773	0.324	0.359	2.389	0.632	0.112	1.773	0.324	0.359	2.389	0.632	0.112	1.773	0.324	0.359	2.389	0.632
108	227.11	221.19	8	8	197.4	0.0300	0.043	2.732	0.122	0.137	3.858	0.215	0.043	2.732	0.122	0.137	3.858	0.215	0.043	2.732	0.122	0.137	3.858	0.215
109	230.88	227.31	8	8	238.05	0.0150	0.037	2.045	0.134	0.117	2.882	0.236	0.037	2.045	0.134	0.117	2.882	0.236	0.037	2.045	0.134	0.117	2.882	0.236
110	234.87	231.08	8	8	296	0.0128	0.029	1.803	0.124	0.093	2.545	0.218	0.029	1.803	0.124	0.093	2.545	0.218	0.029	1.803	0.124	0.093	2.545	0.218
111	236.17	234.97	8	8	298.95	0.0040	0.014	0.956	0.114	0.043	1.351	0.2	0.014	0.956	0.114	0.043	1.351	0.2	0.014	0.956	0.114	0.043	1.351	0.2
112	237.79	236.37	8	8	355	0.0040	0.009	0.853	0.095	0.03	1.208	0.166	0.009	0.853	0.095	0.03	1.208	0.166	0.009	0.853	0.095	0.03	1.208	0.166
113	224.95	223.54	8	8	353.01	0.0040	0.11	1.762	0.32	0.35	2.379	0.621	0.11	1.762	0.32	0.35	2.379	0.621	0.11	1.762	0.32	0.35	2.379	0.621
115	226.71	225.15	8	8	341	0.0046	0.106	1.834	0.304	0.34	2.492	0.582	0.106	1.834	0.304	0.34	2.492	0.582	0.106	1.834	0.304	0.34	2.492	0.582
116	239.6	227.6	8	8	306	0.0392	0.016	2.248	0.073	0.053	3.193	0.126	0.016	2.248	0.073	0.053	3.193	0.126	0.016	2.248	0.073	0.053	3.193	0.126
117	227.5	226.71	8	8	98.65	0.0080	0.027	1.497	0.134	0.086	2.11	0.237	0.027	1.497	0.134	0.086	2.11	0.237	0.027	1.497	0.134	0.086	2.11	0.237
118	210.3	210	8	8	354	0.0008	0.002	0.32	0.069	0.007	0.455	0.12	0.002	0.32	0.069	0.007	0.455	0.12	0.002	0.32	0.069	0.007	0.455	0.12
119	201.37	200.22	8	8	336	0.0034	0.047	1.31	0.217	0.151	1.821	0.395	0.047	1.31	0.217	0.151	1.821	0.395	0.047	1.31	0.217	0.151	1.821	0.395
120	208.16	206.82	8	8	335	0.0040	0.023	1.116	0.146	0.073	1.57	0.259	0.023	1.116	0.146	0.073	1.57	0.259	0.023	1.116	0.146	0.073	1.57	0.259
122	209.6	208.26	8	8	335	0.0040	0.014	0.966	0.116	0.045	1.364	0.204	0.014	0.966	0.116	0.045	1.364	0.204	0.014	0.966	0.116	0.045	1.364	0.204
123	204.98	203.82	8	8	338.37	0.0034	0.035	1.205	0.188	0.114	1.685	0.339	0.035	1.205	0.188	0.114	1.685	0.339	0.035	1.205	0.188	0.114	1.685	0.339
124	198.35	197.81	8	8	160	0.0034	0.067	1.441	0.259	0.213	1.984	0.482	0.067	1.441	0.259	0.213	1.984	0.482	0.067	1.441	0.259	0.213	1.984	0.482
125	200.12	198.98	8	8	336	0.0034	0.054	1.36	0.233	0.174	1.885	0.428	0.054	1.36	0.233	0.174	1.885	0.428	0.054	1.36	0.233	0.174	1.885	0.428
126	203.82	202.64	8	8	346	0.0034	0.042	1.265	0.205	0.135	1.763	0.372	0.042	1.265	0.205	0.135	1.763	0.372	0.042	1.265	0.205	0.135	1.763	0.372
127	202.64	201.47	8	8	347	0.0034	0.044	1.278	0.21	0.141	1.779	0.383	0.044	1.278	0.21	0.141	1.779	0.383	0.044	1.278	0.21	0.141	1.779	0.383
128	197.71	197.3	8	8	23.9	0.0172	0.067	2.561	0.173	0.213	3.589	0.31	0.067	2.561	0.173	0.213	3.589	0.31	0.067	2.561	0.173	0.213	3.589	0.31
131	196.73	195.82	8	8	285	0.0032	0.104	1.602	0.33	0.332	2.153	0.647	0.104	1.602	0.33	0.332	2.153	0.647	0.104	1.602	0.33	0.332	2.153	0.647
132	216	214	8	8	250	0.0080	0.014	1.232	0.098	0.045	1.745	0.172	0.014	1.232	0.098	0.045	1.745	0.172	0.014	1.232	0.098	0.045	1.745	0.172
133	197.65	197.11	8	8	156	0.0035	0.076	1.511	0.275	0.244	2.072	0.518	0.076	1.511	0.275	0.244	2.072	0.518	0.076	1.511	0.275	0.244	2.072	0.518
146	209.2	208.15	8	12	260.63	0.0040	0.178	2.021	0.414	0.57	2.528	1	0.178	2.021	0.414	0.57	2.528	1	0.178	1.954	0.235	0.57	2.706	0.433
147	208.15	203.73	8	12	15.001	0.2946	0.192	9.519	0.145	0.613	13.397	0.257	0.192	9.519	0.145	0.613	13.397	0.257	0.192	7.055	0.102	0.613	9.985	0.178
148	208.15	207.1	8	12	261	0.0040	0.178	2.02	0.414	0.57	2.528	1	0.178	2.02	0.414	0.57	2.528	1	0.178	1.953	0.236	0.57	2.705	0.433
149	217	215.001	8	12	300.001	0.0067	0.178	2.427	0.361	0.57	3.203	0.736	0.178	2.427	0.361	0.57	3.203	0.736	0.178	2.336	0.208	0.57	3.253	0.377
150	210.5	209.5	8	12	100.001	0.0100	0.178	2.811	0.324	0.57	3.787	0.633	0.178	2.811	0.324	0.57	3.787	0.633	0.178	2.696	0.188	0.57	3.768	0.339
151	213	211	8	12	260.001	0.0077	0.178	2.557	0.348	0.57	3.404	0.696	0.178	2.557	0.348	0.57	3.404	0.696	0.178	2.457	0.201	0.57	3.427	0.363
152	215	213	8	12	260.01	0.0077	0.178	2.557	0.348	0.57	3.404	0.696	0.178	2.557	0.348	0.57	3.404	0.696	0.178	2.457	0.201	0.57	3.427	0.363
153	217.72	217.51	8	12	50.38	0.0042	0.178	2.046	0.41	0.57	2.528	1	0.178	2.046	0.41	0.57	2.528	1	0.178	1.978	0.234	0.57	2.741	0.429
154	209.5	208.5	8	8	100.001	0.0100	0.014	1.332	0.093	0.045	1.887	0.163	0.014	1.332	0.093	0.045	1.887	0.163	0.014	1.332	0.093	0.045	1.887	0.163
155	212	209.5	8	8	260.001	0.0096	0.014	1.314	0.094	0.045	1.861	0.165	0.014	1.314	0.094	0.045	1.861	0.165	0.014	1.314	0.094	0.045	1.861	0.165
156	214	212	8	8	260.1	0.0077	0.014	1.215	0.099	0.045	1.721	0.174	0.014	1.215	0.099	0.045	1.721	0.174	0.014	1.215	0.099	0.045	1.721	0.174
157	217	216	8	8	125	0.0080	0.014	1.232	0.098	0.045	1.745	0.172	0.014	1.232	0.098	0.045	1.745	0.172	0.014	1.232	0.098	0.045	1.745	0.172
158	217.5	217	8	8	30.001	0.0167	0.014	1.58	0.082	0.044	2.242	0.142	0.014	1.58	0.082	0.044	2.242	0.142	0.014	1.58	0.082	0.044	2.242	0.142
159	234.43	212.09	8	8	129.31	0.1728	0.011	3.375	0.043	0.037	4.808	0.075	0.011	3.375	0.043	0.037	4.808	0.075	0.011	3.375	0.043	0.037	4.808	0.075
160	207.47	206.49	8	12	244.88	0.0040	0.161	1.96	0.392	0.514	2.278	1	0.161	1.96	0.392	0.514	2.278	1	0.161	1.892	0.224	0.514	2.626	0.41
161	205.01	203.86	8	12	240.01	0.0048	0.16	2.093	0.373	0.514	2.733	0.776	0.16	2.093	0.373	0.514	2.733	0.776	0.16	2.016	0.214	0.514	2.804	0.39
162	235.03	234.53	8	8	124.12	0.0040	0.007	0.779	0.082	0.022	1.106	0.143	0.007	0.779	0.082	0.022	1.106	0.143	0.007	0.779	0.082	0.022	1.106	0.143
163	207.99	207.67	8	8	79.31	0.0040	0.011	0.912	0.105	0.037	1.29	0.184	0.011	0.912	0.105	0.037	1.29	0.184	0.011	0.912	0.105	0.037	1.29	0.184
164	206.29	205.11	8	12	246.35	0.0048	0.16	2.093	0.373	0.514	2.733	0.776	0.16	2.093	0.373	0.514	2.733	0.776	0.161	2.016	0.214	0.514	2.804	0.39
165	203.76	201.32	8	12	276.99	0.0088	0.16	2.607	0.317	0.513	3.523	0.616	0.16	2.607	0.317	0.513	3.523	0.616	0.16	2.421	0.188	0.513	3.384	0.339
166	195	194.08	8	8	233.41	0.0039	0.01	0.857	0.097	0.031	1.214	0.17	0.01	0.857	0.097	0.031	1.214	0.17	0.01	0.857	0.097	0.031	1.214	0.17

							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
167	196.03	195.1	8	8	237	0.0039	0.005	0.684	0.068	0.015	0.971	0.119	0.005	0.684	0.068	0.015	0.971	0.119	0.005	0.684	0.068	0.015	0.971	0.119
169	193.54	192.22	8	8	304.18	0.0043	0.011	0.913	0.099	0.034	1.293	0.174	0.011	0.913	0.099	0.034	1.293	0.174	0.011	0.913	0.099	0.034	1.293	0.174
176	195.9	195.07	8	8	219	0.0038	0.037	1.269	0.189	0.12	1.774	0.34	0.037	1.269	0.189	0.12	1.774	0.34	0.037	1.269	0.189	0.12	1.774	0.34
177	198.1	196.73	8	8	343.82	0.0040	0.026	1.163	0.157	0.084	1.634	0.279	0.026	1.163	0.157	0.084	1.634	0.279	0.026	1.163	0.157	0.084	1.634	0.279
178	196.63	196.05	8	8	144.5	0.0040	0.032	1.237	0.172	0.103	1.734	0.309	0.032	1.237	0.172	0.103	1.734	0.309	0.032	1.237	0.172	0.103	1.734	0.309
179	217.88	214.88	8	8	280	0.0107	0.034	1.775	0.139	0.108	2.5	0.247	0.034	1.775	0.139	0.108	2.5	0.247	0.034	1.775	0.139	0.108	2.5	0.247
180	214.7	211.71	8	8	249	0.0120	0.05	2.076	0.164	0.16	2.913	0.293	0.05	2.076	0.164	0.16	2.913	0.293	0.05	2.076	0.164	0.16	2.913	0.293
181	211.61	203.66	8	8	92.12	0.0863	0.052	4.184	0.104	0.166	5.921	0.182	0.052	4.184	0.104	0.166	5.921	0.182	0.052	4.184	0.104	0.166	5.921	0.182
182	203.69	202.48	8	8	241	0.0050	0.052	1.541	0.206	0.166	2.147	0.375	0.052	1.541	0.206	0.166	2.147	0.375	0.052	1.541	0.206	0.166	2.147	0.375
183	202.48	201.33	8	8	250	0.0046	0.058	1.543	0.223	0.185	2.143	0.407	0.058	1.543	0.223	0.185	2.143	0.407	0.058	1.543	0.223	0.185	2.143	0.407
184	201.33	198.37	8	8	370	0.0080	0.06	1.898	0.198	0.192	2.649	0.358	0.06	1.898	0.198	0.192	2.649	0.358	0.06	1.898	0.198	0.192	2.649	0.358
185	198.37	195.57	8	8	350	0.0080	0.069	1.978	0.212	0.221	2.752	0.386	0.069	1.978	0.212	0.221	2.752	0.386	0.069	1.978	0.212	0.221	2.752	0.386
186	195.82	195.55	8	8	50	0.0054	0.108	1.954	0.293	0.345	2.665	0.558	0.108	1.954	0.293	0.345	2.665	0.558	0.108	1.954	0.293	0.345	2.665	0.558
187	196.92	196.2	8	8	300	0.0024	0.002	0.477	0.057	0.008	0.678	0.099	0.002	0.477	0.057	0.008	0.678	0.099	0.002	0.477	0.057	0.008	0.678	0.099
188	196.2	195.7	8	8	209.17	0.0024	0.004	0.535	0.069	0.012	0.761	0.119	0.004	0.535	0.069	0.012	0.761	0.119	0.004	0.535	0.069	0.012	0.761	0.119
189	197.52	196.92	8	8	250	0.0024	0.001	0.393	0.042	0.004	0.559	0.073	0.001	0.393	0.042	0.004	0.559	0.073	0.001	0.393	0.042	0.004	0.559	0.073
196	198.79	197.95	8	8	400	0.0021	0.002	0.423	0.053	0.006	0.603	0.091	0.002	0.423	0.053	0.006	0.603	0.091	0.002	0.423	0.053	0.006	0.603	0.091
197	198.11	197.43	8	8	285	0.0024	0.004	0.554	0.073	0.013	0.787	0.126	0.004	0.554	0.073	0.013	0.787	0.126	0.004	0.554	0.073	0.013	0.787	0.126
198	197.43	197.12	8	8	129.49	0.0024	0.007	0.666	0.097	0.024	0.943	0.169	0.007	0.666	0.097	0.024	0.943	0.169	0.007	0.666	0.097	0.024	0.943	0.169
199	198.59	198.11	8	8	199	0.0024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
216	195.31	194.31	8	8	251	0.0040	0.032	1.229	0.171	0.101	1.722	0.307	0.032	1.229	0.171	0.101	1.722	0.307	0.032	1.229	0.171	0.101	1.722	0.307
217	194.11	193.77	8	8	86	0.0040	0.038	1.29	0.187	0.121	1.804	0.337	0.038	1.29	0.187	0.121	1.804	0.337	0.038	1.29	0.187	0.121	1.804	0.337
218	193.57	193.09	8	8	119	0.0040	0.043	1.352	0.199	0.138	1.886	0.36	0.043	1.352	0.199	0.138	1.886	0.36	0.043	1.352	0.199	0.138	1.886	0.36
219	192.89	192.46	8	8	106.27	0.0040	0.045	1.367	0.202	0.143	1.907	0.367	0.045	1.367	0.202	0.143	1.907	0.367	0.045	1.367	0.202	0.143	1.907	0.367
225	199.64	199.07	8	8	143	0.0040	0.004	0.655	0.063	0.012	0.931	0.109	0.004	0.655	0.063	0.012	0.931	0.109	0.004	0.655	0.063	0.012	0.931	0.109
226	198.97	197.55	8	8	356	0.0040	0.006	0.73	0.075	0.018	1.036	0.13	0.006	0.73	0.075	0.018	1.036	0.13	0.006	0.73	0.075	0.018	1.036	0.13
242	238.83	228.89	8	8	70	0.1420	0.011	3.128	0.045	0.036	4.455	0.077	0.011	3.128	0.045	0.036	4.455	0.077	0.011	3.128	0.045	0.036	4.455	0.077
249	201.06	197.28	8	15	500	0.0076	0.295	2.91	0.46	0.945	4.187	1	0.295	2.91	0.46	0.945	4.187	1	0.296	2.761	0.193	0.946	3.856	0.348
250	204.86	201.06	8	15	500	0.0076	0.295	2.916	0.46	0.945	4.187	1	0.295	2.916	0.46	0.945	4.187	1	0.296	2.766	0.192	0.946	3.863	0.347
251	206.81	204.86	8	15	257	0.0076	0.295	2.914	0.46	0.945	4.187	1	0.295	2.914	0.46	0.945	4.187	1	0.296	2.764	0.193	0.946	3.861	0.348
252	207	206.81	8	15	170.001	0.0011	0.295	1.308	1	0.945	4.187	1	0.295	1.308	1	0.945	4.187	1	0.296	1.399	0.312	0.946	1.895	0.602
253	207.48	207	8	15	500	0.0010	0.295	1.309	1	0.945	4.187	1	0.295	1.309	1	0.945	4.187	1	0.296	1.325	0.325	0.946	1.785	0.634
257	217.28	216.12	8	12	484.69	0.0024	0.212	1.741	0.531	0.678	3.006	1	0.212	1.741	0.531	0.678	3.006	1	0.212	1.707	0.294	0.679	2.327	0.559
258	210.28	208.91	8	8	168.84	0.0081	0.007	0.992	0.069	0.022	1.409	0.12	0.007	0.992	0.069	0.022	1.409	0.12	0.007	0.992	0.069	0.022	1.409	0.12
259	208.71	207.1	8	8	196.65	0.0082	0.009	1.086	0.079	0.029	1.542	0.138	0.009	1.086	0.079	0.029	1.542	0.138	0.009	1.086	0.079	0.029	1.542	0.138
260	208.18	206.3	8	8	106	0.0177	0.005	1.218	0.052	0.017	1.733	0.09	0.005	1.218	0.052	0.017	1.733	0.09	0.005	1.218	0.052	0.017	1.733	0.09
261	206.5	202.84	8	8	140.87	0.0260	0.018	2.002	0.084	0.058	2.84	0.146	0.018	2.002	0.084	0.058	2.84	0.146	0.018	2.002	0.084	0.058	2.84	0.146
262	202.84	199.84	8	8	296	0.0101	0.022	1.538	0.116	0.072	2.173	0.204	0.022	1.538	0.116	0.072	2.173	0.204	0.022	1.538	0.116	0.072	2.173	0.204
263	199.84	198.67	8	8	290.32	0.0040	0.033	1.247	0.174	0.105	1.748	0.312	0.033	1.247	0.174	0.105	1.748	0.312	0.033	1.247	0.174	0.105	1.748	0.312
265	195.85	194.74	8	8	256	0.0043	0.047	1.42	0.203	0.15	1.98	0.369	0.047	1.42	0.203	0.15	1.98	0.369	0.047	1.42	0.203	0.15	1.98	0.369
266	194.74	193.56	8	8	249	0.0047	0.051	1.499	0.207	0.162	2.089	0.376	0.051	1.499	0.207	0.162	2.089	0.376	0.051	1.499	0.207	0.162	2.089	0.376
267	196.99	193.46	8	8	262.29	0.0135	0.003	0.895	0.04	0.009	1.275	0.069	0.003	0.895	0.04	0.009	1.275	0.069	0.003	0.895	0.04	0.009	1.275	0.069
268	199.94	198.33	8	8	97.69	0.0165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	205.11	205	8	8	55	0.0020	0.044	1.059	0.239	0.14	1.465	0.439	0.044	1.059	0.239	0.14	1.465	0.439	0.044	1.059	0.239	0.14	1.465	0.439
271	204.9	195.95	8	8	252.5	0.0354	0.044	2.916	0.118	0.14	4.118	0.208	0.044	2.916	0.118	0.14	4.118	0.208	0.044	2.916	0.118	0.14	4.118	0.208
273	193.66	193.25	8	8	56.93	0.0072	0.052	1.753	0.189	0.166	2.45	0.341	0.052	1.753	0.189	0.166	2.45	0.341	0.052	1.753	0.189	0.166	2.45	0.341
275	198.13	194.48	8	8	221.24	0.0165	0.002	0.809	0.029	0.005	1.154	0.051	0.002	0.809	0.029	0.005	1.154	0.051	0.002	0.809	0.029	0.005	1.154	0.051
276	203.95	201.72	8	8	280	0.0080	0.002	0.628	0.035	0.005	0.896	0.06	0.002	0.628	0.035	0.005	0.896	0.06	0.002	0.628	0.035	0.005	0.896	0.06
280	199.7	195.22	8	15	150.001	0.0299	0.653	5.945	0.49	1.715	7.6	1	0.677	6	0.5	1.76	7.803	1	0.512	5.269	0.18	1.517	7.218	0.311
281	218.7	210.88	8	8	298	0.0262	0.016	1.936	0.079	0.051	2.748	0.137	0.016	1.936	0.079	0.051	2.748	0.137	0.016	1.936	0.079	0.051	2.748	0.137
283	213.56	211.53	8	8	405	0.0050	0.001	0.49	0.034	0.004	0.699	0.058	0.011	0.961	0.096	0.034	1.362	0.168	0.011	0.961	0.096	0.034	1.362	0.168
284	211.53	199.7	8	8	305	0.0388	0.014	2.123	0.067	0.044	3.017	0.116	0.035	2.81	0.104	0.112	3.976	0.182	0.035	2.81	0.104	0.112	3.976	0.182
286	209.99	199.7	8	8	147	0.0700	0.015	2.693	0.061	0.049	3.83	0.106	0.014	2.591	0.058	0.043	3.686	0.1	0.014	2.591	0.058	0.08	4.436	0.135
287	195.22	195.2	8	15	15.001	0.0013	0.686	3.04	1	1.818	8.059	1	0.711	3.15	1	1.866	8.27	1	0.545	1.765	0.413	1.625	2.049	1
288	219.29	217.21	8	8	239	0.0087	0.182	2.691	0.341	0.343	3.187	0.482	0.191	2.725	0.349	0.347	3.197	0.485	0.021	1.437	0.117	0.068	2.031	0.207
289	226	216.11	8	8	366	0.0270	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.045	1.521	0.189
290	216.11	215.8	8	8	124	0.0025	0.001	0.375	0.038	0.003	0.535	0.066	0.001	0.375	0.038	0.003	0.535	0.066	0.001	0.375	0.038	0.048	1.174	0.235
291	215.03	214.19	8	8	337	0.0025	0.003	0.53	0.066	0.011	0.754	0.114	0.004	0.573	0.074	0.014	0.813	0.128	0.004	0.573	0.074	0.056	1.229	0.255
292	214.19	209.99	8	8	140	0.0300	0.007	1.585	0.052	0.023	2.255	0.09	0.005	1.46	0.046	0.017	2.08	0.079	0.005	1.46	0.046	0.059	3.001	0.142
293	215.8	215.03	8	8	309	0.0025	0.002	0.464	0.053	0.007	0.66	0.092	0.002	0.464	0.053	0.007	0.66	0.092	0.002	0.464	0.053	0.05	1.191	0.242
294	221.99	219.29	8	8	338	0.0080	0.178	2.592	0.344	0.328	3.051	0.481	0.187	2.626	0.353	0.332	3.061	0.485	0.017	1.293	0.106	0.053	1.829	0.186
299	222.96	221.99	8	8	121	0.0080	0.001	0.531	0.027	0.003	0.757	0.046	0.001	0.531	0.027	0.003	0.757	0.046	0.001	0.531	0.027	0.003	0.757	0.046
301	224.12	222.27	8	8	257	0.0072	0.07	1.909	0.219	0.471	3.195	0.622	0.07	1.909	0.219	0.494	3.226	0.642	0.241	2.711	0.417	0.727	3.223	1
302	227.31	225.44	8	8	286.7	0.0065	0.065	1.808	0.217	0.209	2.514	0.395	0.065	1.808	0.217	0.209	2.514	0.395	0.065	1.808	0.217	0.209	2.514	0.395
303	225.44	224.95	8	8	49.37	0.0099	0.067	2.113	0.198	0.214	2.949	0.358	0.067	2.113	0.198	0.214	2.949	0.358	0.067	2.113	0.198	0.214	2.949	0.358
305	224.62	224.12	8	8	67.5	0.0074	0.068	1.912	0.214	0.465	3.222	0.61	0.068	1.912	0.214	0.487	3.254	0.63	0.239	2.733	0.412	0.721	3.195	1
306	230.94	228.13	8	8	294.3	0.0095	0	0	0	0.254	3.046	0.396	0	0	0	0.277	3.12	0.416	0.174	2.745	0.324	0.556	3.698	0.632
307	228.11	224.67	8	8	296.5	0.0116	0.001	0.702	0.031	0.257	3.281	0.379	0.001	0.702	0.031	0.281	3.362	0.397	0.175	2.949	0.309	0.559	3.998	0.595
308	230.93	227.51	8	8	172.87	0.0198	0.053	2.518	0.149	0.17	3.541	0.266	0.053	2.518	0.149	0.17	3.541	0.266	0.053	2.518	0.149	0.17	3.541	0.266
314	217.21	214.99	8	8	251	0.0088	0.187	2.724	0.343	0.359	3.243	0.492	0.196	2.76	0.352	0.363	3.253	0.496	0.026	1.54	0.129	0.084	2.172	0.229
315	224.93	224.12	8	8	323	0.0025	0.165	1.663	0.452	0.527	2.337	1	0.172	1.682	0.464	0.551	2.443	1	0.172	1.682	0.464	0.551	2.443	1
317	224.12	221.99	8	8	444	0.0048	0.174	2.14	0.389	0.311	2.486	0.543	0.182	2.167	0.399	0.315	2.494	0.547	0.011	0.967	0.1	0.037	1.369	0.176
319	227.38	224.12	8	8	263	0.0124	0.006	1.134	0.061	0.021	1.612	0.106	0.008	1.2	0.067	0.025	1.704	0.116	0.008	1.2	0.067	0.025	1.704	0.116
327	241.6	224.93	8	8	622	0.0268	0.156	3.847	0.236	0.499	5.328	0.433	0.156	3.847	0.236	0.499	5.328	0.433	0.156	3.847	0.236	0.499	5.328	0.433
329	243.81	242.88	8	8	290	0.0032	0.14	1.741	0.385	0.447	1.98	1	0.14	1.741	0.385	0.447	1.98	1	0.14	1.741	0.385	0.447	1.98	1
331	245.38	244.16	8	8	379.85	0.0032	0.012	0.853	0.113	0.038	1.205	0.199	0.012	0.853	0.113	0.038	1.205	0.199	0.012	0.853	0.113	0.038	1.205	0.199
332	242.11	241.9	8	8	160	0.0013	0.149	1.272	0.514	0.476	2.109	1	0.149	1.272	0.514	0.476	2.109	1	0.149	1.272	0.514	0.476	2.109	1
333	242.88	242.11	8	8	146.51	0.0053	0.147	2.111	0.347	0.469	2.811	0.693	0.147	2.111	0.347	0.469	2.811	0.693	0.147	2.111	0.347	0.469	2.811	0.693
334	222.68	218.45	8	8	140.92	0.0300	0.007	1.545	0.05	0.021	2.2	0.087	0.007	1.545	0.05	0.021	2.2	0.087	0.007	1.545	0.05	0.021	2.2	0.087
336	218.45	215.74	8	8	337.17	0.0080	0.01	1.124	0.085	0.033	1.594	0.148	0.01	1.124	0.085	0.033	1.594	0.148	0.01	1.124	0.085	0.033	1.594	0.148
338	215.74	214.18	8	8	196.3	0.0079	0.011	1.151	0.089	0.036	1.631	0.155	0.011	1.151	0.089	0.036	1.631	0.155	0.011	1.151	0.089	0.036	1.631	0.155
339	214.18	212.76	8	8	177.83	0.0080	0.013	1.211	0.096	0.043	1.715	0.168	0.013	1.211	0.096	0.043	1.715	0.168	0.013	1.211	0.096	0.043	1.715	0.168

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
343	245.8	241.06	8	12	339	0.0140	0.344	3.8	0.422	0.95	4.21	1	0.344	3.8	0.422	0.95	4.21	1	0.343	3.675	0.239	0.948	4.892	0.407
344	236.31	232.35	8	12	330	0.0120	0.359	3.633	0.451	0.999	4.429	1	0.359	3.633	0.451	0.999	4.429	1	0.358	3.526	0.254	0.998	4.688	0.437
347	232.35	230.37	8	12	165	0.0120	0.374	3.672	0.462	1.048	4.643	1	0.374	3.672	0.462	1.048	4.643	1	0.374	3.568	0.26	1.047	4.748	0.448
348	241.06	236.31	8	12	339	0.0140	0.349	3.818	0.425	0.968	4.289	1	0.349	3.818	0.425	0.968	4.289	1	0.348	3.695	0.241	0.966	4.92	0.411
350	206.78	196.72	8	8	207	0.0486	0.032	2.968	0.095	0.103	4.204	0.166	0.032	2.968	0.095	0.103	4.204	0.166	0.032	2.968	0.095	0.103	4.204	0.166
351	210.88	206.78	8	8	84.1	0.0488	0.021	2.618	0.078	0.068	3.716	0.135	0.021	2.618	0.078	0.068	3.716	0.135	0.021	2.618	0.078	0.068	3.716	0.135
354	223.2	218.7	8	8	300	0.0150	0.008	1.287	0.064	0.025	1.829	0.112	0.008	1.287	0.064	0.025	1.829	0.112	0.008	1.287	0.064	0.025	1.829	0.112
356	227.92	222.68	8	8	174.65	0.0300	0.004	1.331	0.04	0.013	1.896	0.069	0.004	1.331	0.04	0.013	1.896	0.069	0.004	1.331	0.04	0.013	1.896	0.069
358	230.35	226.46	8	12	324.05	0.0120	0.377	3.681	0.464	1.058	4.69	1	0.377	3.681	0.464	1.058	4.69	1	0.377	3.578	0.261	1.058	4.761	0.451
359	225.5	222.14	8	12	340	0.0099	0.391	3.455	0.502	1.103	4.891	1	0.391	3.455	0.502	1.103	4.891	1	0.391	3.374	0.279	1.104	4.478	0.489
360	215.98	212.76	8	12	173	0.0186	0.406	4.413	0.428	1.151	5.102	1	0.406	4.413	0.428	1.151	5.102	1	0.407	4.274	0.243	1.153	5.724	0.419
361	221.18	215.98	8	12	647	0.0080	0.406	3.224	0.545	1.149	5.093	1	0.406	3.224	0.545	1.149	5.093	1	0.406	3.166	0.3	1.151	4.185	0.533
362	222.14	221.18	8	12	120	0.0080	0.402	3.21	0.543	1.136	5.035	1	0.402	3.21	0.543	1.136	5.035	1	0.402	3.151	0.299	1.137	4.166	0.53
363	226.46	225.5	8	12	215.001	0.0045	0.38	2.529	0.632	1.067	4.731	1	0.38	2.529	0.632	1.067	4.731	1	0.38	2.516	0.338	1.067	3.28	0.612
364	257.58	256.46	8	8	330	0.0034	0.063	1.42	0.251	0.202	1.96	0.465	0.063	1.42	0.251	0.202	1.96	0.465	0.063	1.506	0.241	0.202	2.082	0.444
365	247.06	245.8	8	12	315	0.0040	0.342	2.369	0.611	0.946	4.193	1	0.342	2.369	0.611	0.946	4.193	1	0.342	2.348	0.329	0.944	3.059	0.585
366	249.1	247.44	8	12	415	0.0040	0.336	2.36	0.604	0.927	4.108	1	0.336	2.36	0.604	0.927	4.108	1	0.336	2.336	0.326	0.925	3.045	0.578
367	250.42	249.1	8	12	330	0.0040	0.334	2.356	0.602	0.92	4.076	1	0.334	2.356	0.602	0.92	4.076	1	0.333	2.332	0.325	0.917	3.039	0.575
369	254.74	250.42	8	12	330	0.0131	0.328	3.662	0.418	0.899	3.985	1	0.328	3.662	0.418	0.899	3.985	1	0.327	3.541	0.238	0.897	4.704	0.402
370	256.26	254.94	8	8	330	0.0040	0.069	1.544	0.252	0.22	2.13	0.467	0.069	1.544	0.252	0.22	2.13	0.467	0.069	0.305	1	0.22	0.975	1
372	217.26	214.86	8	8	300	0.0080	0.009	1.063	0.078	0.028	1.509	0.136	0.009	1.063	0.078	0.028	1.509	0.136	0.009	1.063	0.078	0.028	1.509	0.136
373	214.86	213.46	8	8	350	0.0040	0.023	1.117	0.146	0.073	1.571	0.26	0.023	1.117	0.146	0.073	1.571	0.26	0.023	1.117	0.146	0.073	1.571	0.26
374	212.46	207.63	8	8	220.42	0.0219	0.039	2.378	0.126	0.125	3.355	0.221	0.039	2.378	0.126	0.125	3.355	0.221	0.039	2.378	0.126	0.125	3.355	0.221
375	213.46	212.46	8	8	250	0.0040	0.033	1.244	0.174	0.105	1.742	0.313	0.033	1.244	0.174	0.105	1.742	0.313	0.033	1.244	0.174	0.105	1.742	0.313
376	217.99	217.38	8	12	240	0.0025	0.164	1.67	0.45	0.526	2.33	1	0.164	1.67	0.45	0.526	2.33	1	0.164	1.621	0.254	0.526	2.235	0.471
377	232.82	230.07	8	8	233	0.0118	0.001	0.645	0.027	0.003	0.921	0.046	0.001	0.645	0.027	0.003	0.921	0.046	0.001	0.645	0.027	0.003	0.921	0.046
378	229.97	218.13	8	8	300	0.0395	0.005	1.607	0.043	0.017	2.289	0.074	0.005	1.607	0.043	0.017	2.289	0.074	0.005	1.607	0.043	0.017	2.289	0.074
379	222.26	218.11	8	8	414.97	0.0100	0.044	1.873	0.161	0.141	2.63	0.287	0.044	1.873	0.161	0.141	2.63	0.287	0.044	1.873	0.161	0.141	2.63	0.287
380	218.01	217.43	8	8	248	0.0023	0.048	1.149	0.24	0.153	1.59	0.443	0.048	1.149	0.24	0.153	1.59	0.443	0.048	1.149	0.24	0.153	1.59	0.443
381	215.22	215.02	8	8	96.45	0.0021	0.04	1.048	0.227	0.129	1.454	0.416	0.04	1.048	0.227	0.129	1.454	0.416	0.04	1.048	0.227	0.129	1.454	0.416
382	223.46	220.47	8	8	380.37	0.0079	0.002	0.68	0.04	0.007	0.969	0.068	0.002	0.68	0.04	0.007	0.969	0.068	0.002	0.68	0.04	0.007	0.969	0.068
383	217.19	216.93	8	8	31	0.0084	0.04	1.716	0.161	0.129	2.409	0.287	0.04	1.716	0.161	0.129	2.409	0.287	0.04	1.716	0.161	0.129	2.409	0.287
384	216.93	215.42	8	8	180	0.0084	0.04	1.716	0.161	0.129	2.409	0.287	0.04	1.716	0.161	0.129	2.409	0.287	0.04	1.716	0.161	0.129	2.409	0.287
385	220.27	217.39	8	8	342	0.0084	0.04	1.719	0.161	0.129	2.413	0.287	0.04	1.719	0.161	0.129	2.413	0.287	0.04	1.719	0.161	0.129	2.413	0.287
386	221.89	220.29	8	8	405.6	0.0039	0.002	0.557	0.05	0.007	0.793	0.086	0.002	0.557	0.05	0.007	0.793	0.086	0.002	0.557	0.05	0.007	0.793	0.086
387	220.21	219.53	8	8	225.54	0.0030	0.004	0.592	0.067	0.012	0.842	0.116	0.004	0.592	0.067	0.012	0.842	0.116	0.004	0.592	0.067	0.012	0.842	0.116
388	219.47	219.29	8	8	61.1	0.0029	0.004	0.605	0.071	0.014	0.859	0.123	0.004	0.605	0.071	0.014	0.859	0.123	0.004	0.605	0.071	0.014	0.859	0.123
389	219.23	218.94	8	8	96.03	0.0030	0.005	0.641	0.076	0.016	0.911	0.132	0.005	0.641	0.076	0.016	0.911	0.132	0.005	0.641	0.076	0.016	0.911	0.132
390	211.6	211.43	8	12	50.49	0.0034	0.163	1.847	0.414	0.521	2.309	1	0.163	1.847	0.414	0.521	2.309	1	0.163	1.709	0.243	0.521	2.362	0.448
391	211.36	211.29	8	12	76.6	0.0009	0.163	1.131	0.61	0.522	2.314	1	0.163	1.131	0.61	0.522	2.314	1	0.163	1.177	0.318	0.522	1.59	0.616
392	211.19	211.08	8	12	99.41	0.0011	0.164	1.22	0.575	0.525	2.325	1	0.164	1.22	0.575	0.525	2.325	1	0.164	1.163	0.322	0.525	1.568	0.626
394	223.21	220.09	8	8	199.99	0.0156	0.005	1.168	0.054	0.018	1.661	0.093	0.005	1.168	0.054	0.018	1.661	0.093	0.005	1.168	0.054	0.018	1.661	0.093
395	220.19	219.82	8	8	158.88	0.0023	0.008	0.677	0.101	0.026	0.958	0.177	0.008	0.677	0.101	0.026	0.958	0.177	0.008	0.677	0.101	0.026	0.958	0.177
396	219.72	218.94	8	8	339	0.0023	0.022	0.904	0.163	0.069	1.269	0.29	0.022	0.904	0.163	0.069	1.269	0.29	0.022	0.904	0.163	0.069	1.269	0.29
397	218.82	218.54	8	8	120.4	0.0023	0.028	0.977	0.183	0.089	1.367	0.33	0.028	0.977	0.183	0.089	1.367	0.33	0.028	0.977	0.183	0.089	1.367	0.33
398	218.44	218.14	8	8	130.35	0.0023	0.028	0.982	0.186	0.091	1.373	0.335	0.028	0.982	0.186	0.091	1.373	0.335	0.028	0.982	0.186	0.091	1.373	0.335
399	219.23	211.66	8	12	89.32	0.0848	0.163	5.853	0.181	0.521	8.191	0.325	0.163	5.853	0.181	0.521	8.191	0.325	0.163	1.572	0.258	0.521	2.166	0.48
401	218.94	218.92	8	8	7	0.0029	0.027	1.047	0.173	0.087	1.467	0.31	0.027	1.047	0.173	0.087	1.467	0.31	0.027	1.047	0.173	0.087	1.467	0.31
402	219.97	219.52	8	12	190.8	0.0024	0.161	1.615	0.454	0.515	2.283	1	0.161	1.615	0.454	0.515	2.283	1	0.161	1.569	0.256	0.515	2.162	0.476
403	224.64	223.65	8	12	177.35	0.0056	0.154	2.188	0.35	0.494	2.908	0.704	0.154	2.188	0.35	0.494	2.908	0.704	0.154	2.103	0.202	0.494	2.932	0.366
404	223.65	223.11	8	12	96.71	0.0056	0.156	2.194	0.352	0.498	2.912	0.709	0.156	2.194	0.352	0.498	2.912	0.709	0.156	2.109	0.203	0.498	2.94	0.368
405	223.11	222.5	8	12	108.86	0.0056	0.157	2.201	0.353	0.502	2.92	0.712	0.157	2.201	0.353	0.502	2.92	0.712	0.157	2.116	0.204	0.502	2.95	0.369
406	222.5	220.07	8	12	433.31	0.0056	0.158	2.206	0.355	0.506	2.924	0.716	0.158	2.206	0.355	0.506	2.924	0.716	0.158	2.121	0.204	0.506	2.957	0.37
407	220.22	219.82	8	8	170.79	0.0023	0.003	0.487	0.06	0.009	0.693	0.104	0.003	0.487	0.06	0.009	0.693	0.104	0.003	0.487	0.06	0.009	0.693	0.104
408	226.48	223	8	8	174	0.0200	0.007	1.369	0.057	0.022	1.947	0.098	0.007	1.369	0.057	0.022	1.947	0.098	0.007	1.369	0.057	0.022	1.947	0.098
409	220.44	219.82	8	8	132.84	0.0047	0.01	0.922	0.095	0.032	1.305	0.166	0.01	0.922	0.095	0.032	1.305	0.166	0.01	0.922	0.095	0.032	1.305	0.166
410	231.84	226.58	8	8	268	0.0196	0.003	1.062	0.039	0.01	1.514	0.067	0.003	1.062	0.039	0.01	1.514	0.067	0.003	1.062	0.039	0.01	1.514	0.067
418	222.54	221.97	8	8	225	0.0025	0.005	0.59	0.076	0.015	0.837	0.133	0.005	0.59	0.076	0.015	0.837	0.133	0.005	0.59	0.076	0.015	0.837	0.133
419	221.14	220.47	8	8	277.28	0.0024	0.037	1.08	0.21	0.119	1.504	0.382	0.037	1.08	0.21	0.119	1.504	0.382	0.037	1.08	0.21	0.119	1.504	0.382
420	222.95	222.54	8	8	181.6	0.0023	0.002	0.459	0.057	0.007	0.653	0.098	0.002	0.459	0.057	0.007	0.653	0.098	0.002	0.459	0.057	0.007	0.653	0.098
421	221.92	221.34	8	8	240.47	0.0024	0.003	0.492	0.06	0.009	0.7	0.104	0.003	0.492	0.06	0.009	0.7	0.104	0.003	0.492	0.06	0.009	0.7	0.104
422	221.77	221.34	8	8	261.2	0.0016	0.007	0.573	0.102	0.022	0.811	0.179	0.007	0.573	0.102	0.022	0.811	0.179	0.007	0.573	0.102	0.022	0.811	0.179
423	232.3	231.34	8	8	299.99	0.0032	0.041	1.228	0.206	0.131	1.711	0.373	0.041	1.228	0.206	0.131	1.711	0.373	0.041	1.228	0.206	0.131	1.711	0.373
424	231.34	225.71	8	8	327	0.0172	0.049	2.337	0.148	0.156	3.287	0.263	0.049	2.337	0.148	0.156	3.287	0.263	0.049	2.337	0.148	0.156	3.287	0.263
425	235.76	234.43	8	8	517.35	0.0026	0.024	0.969	0.166	0.077	1.36	0.298	0.024	0.969	0.166	0.077	1.36	0.298	0.024	0.969	0.166	0.077	1.36	0.298
426	236.65	233.23	8	8	517.33	0.0066	0.002	0.667	0.044	0.007	0.95	0.076	0.002	0.667	0.044	0.007	0.95	0.076	0.002	0.667	0.044	0.007	0.95	0.076
427	238.84	232.43	8	8	471.3	0.0136	0.004	1.001	0.047	0.012	1.426	0.082	0.004	1.001	0.047	0.012	1.426	0.082	0.004	1.001	0.047	0.012	1.426	0.082
428	241.84	231.47	8	8	471.27	0.0220	0.003	1.146	0.04	0.011	1.633	0.069	0.003	1.146	0.04	0.011	1.633	0.069	0.003	1.146	0.04	0.011	1.633	0.069
429	241.3	239.07	8	8	245.7	0.0091	0.002	0.704	0.038	0.006	1.004	0.065	0.002	0.704	0.038	0.006	1.004	0.065	0.002	0.704	0.038	0.006	1.004	0.065
430	236.74	235.76	8	8	153.65	0.0064	0.02	1.266	0.123	0.064	1.787	0.216	0.02	1.266	0.123	0.064	1.787	0.216	0.02	1.266	0.123	0.064	1.787	0.216
431	233.91	233.69	8	8	67.19	0.0033	0.002	0.494	0.048	0.006	0.704	0.082	0.002	0.494	0.048	0.006	0.704	0.082	0.002	0.494	0.048	0.006	0.704	0.082
432	233.69	233.22	8	8	146	0.0032	0.028	1.101	0.171	0.09	1.543	0.305	0.028	1.101	0.171	0.09	1.543	0.305	0.028	1.101	0.171	0.09	1.543	0.305
433	233.22	232.3	8	8	287	0.0032	0.033	1.157	0.186	0.107	1.618	0.335	0.033	1.157	0.186	0.107	1.618	0.335	0.033	1.157	0.186	0.107	1.618	0.335
434	239.07	236.74	8	8	260	0.0090	0.005	0.938	0.059	0.016	1.334	0.102	0.005	0.938	0.059	0.016	1.334	0.102	0.005	0.938	0.059	0.016	1.334	0.102
435	241.11	226.11	8	8	250	0.0600	0.042	3.454	0.102	0.134	4.888	0.179	0.042	3.454	0.102	0.134	4.888	0.179	0.042	3.454	0.102	0.134	4.888	0.179
436	226.11	225.71	8	8	55.4	0.0072	0.043	1.662	0.173	0.138	2.328	0.31	0.043	1.662	0.173	0.138	2.328	0.31	0.043	1.662	0.173	0.138	2.328	0.31
437	248.36	245.45	8	8	404	0.0072	0.033	1.537	0.152	0.107	2.16	0.271	0.033	1.537	0.152	0.107	2.16	0.271	0.033	1.537	0.152	0.107	2.16	0.271
438	249.06	248.36	8	8	130.001	0.0054	0.032	1.371	0.16	0.102	1.925	0.286	0.032	1.371	0.16	0.102	1.925	0.286	0.032	1.371	0.16	0.102	1.925	0.286
439	245.45	242.55	8	8	396	0.0073	0.036	1.583	0.158	0.116	2.224	0.281	0.036	1.583	0.158	0.116	2.224	0.281	0.036	1.583	0.158	0.116	2.224	0.281
440	242.55	241.11	8	8	229.34	0.0063	0.038	1.527	0.169	0.123	2.141	0.302	0.038	1.527	0.169	0.123	2.141	0.302	0.038	1.527	0.169	0.123	2.141	0.302
441	250	249.48	8	8	131.29	0.0040	0.031	1.217	0.17	0.099	1.706	0.304	0.031	1.217	0.17	0.099	1.706	0.304	0.031	1.217	0.17	0.099	1.706	0.304
442	249.38	249.16	8	8	60.44	0.0036	0.031	1.186	0.174	0.1	1.661	0.312	0.031	1.186	0.174	0.1	1.661	0.312	0.031	1.186	0.174	0.1	1.661	0.312

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
443	242.13	239.82	8	8	301.55	0.0077	0.002	0.702	0.042	0.007	1	0.073	0.002	0.702	0.042	0.007	1	0.073	0.002	0.702	0.042	0.007	1	0.073
444	242.96	240.67	8	8	257	0.0089	0.002	0.653	0.034	0.005	0.932	0.058	0.002	0.653	0.034	0.005	0.932	0.058	0.002	0.653	0.034	0.005	0.932	0.058
445	241.9	239.82	8	8	260	0.0080	0.005	0.88	0.058	0.015	1.251	0.101	0.005	0.88	0.058	0.015	1.251	0.101	0.005	0.88	0.058	0.015	1.251	0.101
446	243.58	241.9	8	8	210.2	0.0080	0.002	0.712	0.042	0.007	1.015	0.073	0.002	0.712	0.042	0.007	1.015	0.073	0.002	0.712	0.042	0.007	1.015	0.073
447	240.67	237.52	8	8	254.85	0.0124	0.003	0.868	0.041	0.009	1.237	0.07	0.003	0.868	0.041	0.009	1.237	0.07	0.003	0.868	0.041	0.009	1.237	0.07
449	237.42	236.84	8	8	146.24	0.0040	0.014	0.952	0.114	0.043	1.345	0.2	0.014	0.952	0.114	0.043	1.345	0.2	0.014	0.952	0.114	0.043	1.345	0.2
450	239.72	237.52	8	8	287.24	0.0077	0.01	1.095	0.085	0.032	1.553	0.147	0.01	1.095	0.085	0.032	1.553	0.147	0.01	1.095	0.085	0.032	1.553	0.147
451	243.57	242.13	8	8	180	0.0080	0.001	0.509	0.025	0.002	0.727	0.043	0.001	0.509	0.025	0.002	0.727	0.043	0.001	0.509	0.025	0.002	0.727	0.043
452	239.61	238.39	8	8	154.13	0.0079	0.034	1.594	0.15	0.108	2.242	0.266	0.034	1.594	0.15	0.108	2.242	0.266	0.034	1.594	0.15	0.108	2.242	0.266
453	238.04	235.4	8	8	330.49	0.0080	0.044	1.731	0.17	0.141	2.427	0.304	0.044	1.731	0.17	0.141	2.427	0.304	0.044	1.731	0.17	0.141	2.427	0.304
454	238.39	238.04	8	8	44.1	0.0079	0.038	1.658	0.159	0.123	2.328	0.284	0.038	1.658	0.159	0.123	2.328	0.284	0.038	1.658	0.159	0.123	2.328	0.284
455	239.65	238.6	8	8	130.41	0.0081	0.032	1.582	0.146	0.103	2.226	0.259	0.032	1.582	0.146	0.103	2.226	0.259	0.032	1.582	0.146	0.103	2.226	0.259
456	248.05	246.73	8	8	165	0.0080	0.002	0.674	0.039	0.006	0.96	0.067	0.002	0.674	0.039	0.006	0.96	0.067	0.002	0.674	0.039	0.006	0.96	0.067
457	246.73	238.39	8	8	297.91	0.0280	0.004	1.286	0.04	0.012	1.833	0.069	0.004	1.286	0.04	0.012	1.833	0.069	0.004	1.286	0.04	0.012	1.833	0.069
458	243	238.04	8	8	177	0.0280	0.005	1.35	0.043	0.015	1.924	0.074	0.005	1.35	0.043	0.015	1.924	0.074	0.005	1.35	0.043	0.015	1.924	0.074
459	242.89	235.4	8	8	340.63	0.0220	0.002	1.012	0.033	0.007	1.443	0.057	0.002	1.012	0.033	0.007	1.443	0.057	0.002	1.012	0.033	0.007	1.443	0.057
461	253.1	236.31	8	8	320	0.0525	0.007	1.946	0.046	0.024	2.772	0.08	0.007	1.946	0.046	0.024	2.772	0.08	0.007	1.946	0.046	0.024	2.772	0.08
462	242.05	235.4	8	8	237.65	0.0280	0.002	0.972	0.026	0.005	1.387	0.045	0.002	0.972	0.026	0.005	1.387	0.045	0.002	0.972	0.026	0.005	1.387	0.045
463	235.4	227.78	8	8	328.78	0.0232	0.051	2.622	0.14	0.162	3.693	0.249	0.051	2.622	0.14	0.162	3.693	0.249	0.051	2.622	0.14	0.162	3.693	0.249
464	232	227.78	8	8	154	0.0274	0.002	1.033	0.029	0.006	1.474	0.05	0.002	1.033	0.029	0.006	1.474	0.05	0.002	1.033	0.029	0.006	1.474	0.05
465	227.74	227.57	8	8	65	0.0026	0.053	1.233	0.246	0.17	1.703	0.455	0.053	1.233	0.246	0.17	1.703	0.455	0.053	1.233	0.246	0.17	1.703	0.455
466	227.53	226.73	8	8	335.12	0.0024	0.056	1.208	0.257	0.178	1.665	0.479	0.056	1.208	0.257	0.178	1.665	0.479	0.056	1.208	0.257	0.178	1.665	0.479
467	235.5	226.83	8	8	113.38	0.0765	0.002	1.378	0.021	0.005	1.967	0.035	0.002	1.378	0.021	0.005	1.967	0.035	0.002	1.378	0.021	0.005	1.967	0.035
468	226.53	225.71	8	8	288.92	0.0028	0.059	1.31	0.255	0.19	1.806	0.473	0.059	1.31	0.255	0.19	1.806	0.473	0.059	1.31	0.255	0.19	1.806	0.473
469	225.71	224.64	8	12	269.46	0.0040	0.153	1.93	0.382	0.49	2.494	0.813	0.153	1.93	0.382	0.49	2.494	0.813	0.153	1.86	0.219	0.49	2.585	0.4
470	238.75	232.6	8	8	215	0.0286	0.002	1.049	0.029	0.006	1.496	0.049	0.002	1.049	0.029	0.006	1.496	0.049	0.002	1.049	0.029	0.006	1.496	0.049
471	242.85	232.6	8	8	430	0.0238	0.008	1.529	0.059	0.026	2.174	0.102	0.008	1.529	0.059	0.026	2.174	0.102	0.008	1.529	0.059	0.026	2.174	0.102
472	247.9	242.95	8	8	430	0.0115	0.004	0.95	0.049	0.013	1.353	0.086	0.004	0.95	0.049	0.013	1.353	0.086	0.004	0.95	0.049	0.013	1.353	0.086
484	241.9	241.6	8	8	93.49	0.0032	0.154	1.788	0.406	0.493	2.183	1	0.154	1.788	0.406	0.493	2.183	1	0.154	1.788	0.406	0.493	2.183	1
485	234.56	231.13	8	8	346.93	0.0099	0.003	0.811	0.044	0.009	1.155	0.075	0.003	0.811	0.044	0.009	1.155	0.075	0.003	0.811	0.044	0.009	1.155	0.075
486	242.33	234.55	8	8	270	0.0288	0.009	1.652	0.057	0.027	2.35	0.099	0.009	1.652	0.057	0.027	2.35	0.099	0.009	1.652	0.057	0.027	2.35	0.099
487	234.55	232.8	8	8	349.66	0.0050	0.026	1.259	0.148	0.084	1.771	0.263	0.026	1.259	0.148	0.084	1.771	0.263	0.026	1.259	0.148	0.084	1.771	0.263
488	232.8	231.13	8	8	335.53	0.0050	0.045	1.477	0.194	0.145	2.063	0.35	0.045	1.477	0.194	0.145	2.063	0.35	0.045	1.477	0.194	0.145	2.063	0.35
489	220.99	220.45	8	12	135.2	0.0040	0.174	2.001	0.409	0.556	2.463	1	0.174	2.001	0.409	0.556	2.463	1	0.174	1.934	0.233	0.556	2.679	0.428
490	220.35	219.17	8	12	296	0.0040	0.175	2.003	0.411	0.56	2.481	1	0.175	2.003	0.411	0.56	2.481	1	0.175	1.936	0.234	0.56	2.683	0.43
491	218.97	217.92	8	12	52.67	0.0199	0.175	3.579	0.269	0.56	4.916	0.504	0.175	3.579	0.269	0.56	4.916	0.504	0.175	3.418	0.157	0.56	4.802	0.28
492	256.12	255.27	8	8	262	0.0032	0.005	0.658	0.075	0.016	0.935	0.13	0.005	0.658	0.075	0.016	0.935	0.13	0.005	0.658	0.075	0.016	0.935	0.13
493	255.07	254.05	8	8	255.61	0.0040	0.01	0.862	0.097	0.031	1.221	0.169	0.01	0.862	0.097	0.031	1.221	0.169	0.01	0.862	0.097	0.031	1.221	0.169
494	256.61	256.32	8	8	124	0.0023	0.001	0.332	0.034	0.002	0.474	0.058	0.001	0.332	0.034	0.002	0.474	0.058	0.001	0.332	0.034	0.002	0.474	0.058
495	258.27	256.32	8	8	390	0.0050	0.003	0.685	0.057	0.011	0.974	0.098	0.003	0.685	0.057	0.011	0.974	0.098	0.003	0.685	0.057	0.011	0.974	0.098
496	257.22	255.27	8	8	390	0.0050	0.003	0.661	0.054	0.01	0.94	0.093	0.003	0.661	0.054	0.01	0.94	0.093	0.003	0.661	0.054	0.01	0.94	0.093
497	258.15	252.35	8	8	483	0.0120	0.011	1.312	0.079	0.035	1.862	0.137	0.011	1.312	0.079	0.035	1.862	0.137	0.011	1.312	0.079	0.035	1.862	0.137
498	250.87	250	8	8	348.66	0.0025	0.003	0.519	0.063	0.01	0.737	0.11	0.003	0.519	0.063	0.01	0.737	0.11	0.003	0.519	0.063	0.01	0.737	0.11
499	252.19	249.9	8	8	318.43	0.0072	0.026	1.424	0.135	0.083	2.007	0.238	0.026	1.424	0.135	0.083	2.007	0.238	0.026	1.424	0.135	0.083	2.007	0.238
500	254.05	252.35	8	8	375.18	0.0045	0.012	0.961	0.104	0.038	1.36	0.182	0.012	0.961	0.104	0.038	1.36	0.182	0.012	0.961	0.104	0.038	1.36	0.182
501	257.84	257.52	8	8	176.72	0.0018	0.006	0.561	0.092	0.019	0.795	0.16	0.006	0.561	0.092	0.019	0.795	0.16	0.006	0.561	0.092	0.019	0.795	0.16
502	249.92	245.74	8	8	259.3	0.0161	0.017	1.67	0.091	0.055	2.366	0.16	0.017	1.67	0.091	0.055	2.366	0.16	0.017	1.67	0.091	0.055	2.366	0.16
503	245.74	241.51	8	8	258.4	0.0164	0.02	1.754	0.098	0.064	2.484	0.171	0.02	1.754	0.098	0.064	2.484	0.171	0.02	1.754	0.098	0.064	2.484	0.171
504	241.51	239.65	8	8	146.42	0.0127	0.022	1.651	0.108	0.07	2.334	0.19	0.022	1.651	0.108	0.07	2.334	0.19	0.022	1.651	0.108	0.07	2.334	0.19
505	248.4	241.15	8	8	259	0.0280	0.007	1.512	0.051	0.021	2.152	0.088	0.007	1.512	0.051	0.021	2.152	0.088	0.007	1.512	0.051	0.021	2.152	0.088
507	241.15	239.65	8	8	108.58	0.0138	0.01	1.346	0.074	0.032	1.911	0.128	0.01	1.346	0.074	0.032	1.911	0.128	0.01	1.346	0.074	0.032	1.911	0.128
508	252.94	241.15	8	8	268	0.0440	0.003	1.35	0.03	0.009	1.925	0.052	0.003	1.35	0.03	0.009	1.925	0.052	0.003	1.35	0.03	0.009	1.925	0.052
509	250.53	248.4	8	8	212.86	0.0100	0.004	0.9	0.051	0.012	1.281	0.088	0.004	0.9	0.051	0.012	1.281	0.088	0.004	0.9	0.051	0.012	1.281	0.088
510	253.17	250.53	8	8	219.84	0.0120	0.001	0.664	0.028	0.004	0.947	0.048	0.001	0.664	0.028	0.004	0.947	0.048	0.001	0.664	0.028	0.004	0.947	0.048
511	252.8	250.02	8	8	350	0.0079	0.016	1.268	0.103	0.05	1.794	0.181	0.016	1.268	0.103	0.05	1.794	0.181	0.016	1.268	0.103	0.05	1.794	0.181
513	253.72	252.8	8	8	115	0.0080	0.003	0.772	0.048	0.01	1.1	0.082	0.003	0.772	0.048	0.01	1.1	0.082	0.003	0.772	0.048	0.01	1.1	0.082
514	267.46	266.45	8	8	360.61	0.0028	0.008	0.726	0.098	0.026	1.029	0.171	0.008	0.726	0.098	0.026	1.029	0.171	0.008	0.726	0.098	0.026	1.029	0.171
515	273.26	272.4	8	8	358	0.0024	0.011	0.755	0.117	0.036	1.066	0.207	0.011	0.755	0.117	0.036	1.066	0.207	0.011	0.755	0.117	0.036	1.066	0.207
516	274.47	273.92	8	8	147.16	0.0037	0.002	0.517	0.046	0.006	0.737	0.08	0.002	0.517	0.046	0.006	0.737	0.08	0.002	0.517	0.046	0.006	0.737	0.08
517	273.96	273.46	8	8	210	0.0024	0.002	0.468	0.056	0.007	0.665	0.097	0.002	0.468	0.056	0.007	0.665	0.097	0.002	0.468	0.056	0.007	0.665	0.097
518	274.34	273.92	8	8	175.5	0.0024	0.002	0.443	0.051	0.006	0.631	0.089	0.002	0.443	0.051	0.006	0.631	0.089	0.002	0.443	0.051	0.006	0.631	0.089
519	273.92	273.26	8	8	276.62	0.0024	0.006	0.63	0.089	0.02	0.893	0.155	0.006	0.63	0.089	0.02	0.893	0.155	0.006	0.63	0.089	0.02	0.893	0.155
520	266.17	266.02	8	8	61.02	0.0025	0.072	1.317	0.292	0.231	1.796	0.556	0.072	1.317	0.292	0.231	1.796	0.556	0.072	1.317	0.292	0.231	1.796	0.556
530	269.12	263.94	8	8	258.57	0.0200	0.004	1.172	0.045	0.013	1.669	0.077	0.004	1.172	0.045	0.013	1.669	0.077	0.004	1.172	0.045	0.013	1.669	0.077
531	267.8	265.55	8	8	225	0.0100	0.001	0.623	0.029	0.004	0.889	0.05	0.001	0.623	0.029	0.004	0.889	0.05	0.001	0.623	0.029	0.004	0.889	0.05
532	266.18	264.89	8	8	341.67	0.0038	0.003	0.575	0.054	0.009	0.819	0.093	0.003	0.575	0.054	0.009	0.819	0.093	0.003	0.575	0.054	0.009	0.819	0.093
533	266.5	265.62	8	8	341.65	0.0026	0.005	0.609	0.079	0.016	0.864	0.138	0.005	0.609	0.079	0.016	0.864	0.138	0.005	0.609	0.079	0.016	0.864	0.138
534	264.89	264.39	8	8	182	0.0027	0.037	1.132	0.204	0.12	1.578	0.37	0.037	1.132	0.204	0.12	1.578	0.37	0.037	1.132	0.204	0.12	1.578	0.37
535	265.62	264.89	8	8	260	0.0028	0.034	1.105	0.192	0.107	1.543	0.347	0.034	1.105	0.192	0.107	1.543	0.347	0.034	1.105	0.192	0.107	1.543	0.347
536	267.44	267.02	8	8	212.5	0.0020	0.007	0.616	0.099	0.023	0.872	0.174	0.007	0.616	0.099	0.023	0.872	0.174	0.007	0.616	0.099	0.023	0.872	0.174
537	267.02	266.65	8	8	186	0.0020	0.016	0.782	0.145	0.05	1.101	0.257	0.016	0.782	0.145	0.05	1.101	0.257	0.016	0.782	0.145	0.05	1.101	0.257
538	266.45	265.62	8	8	295	0.0028	0.027	1.041	0.174	0.087	1.459	0.311	0.027	1.041	0.174	0.087	1.459	0.311	0.027	1.041	0.174	0.087	1.459	0.311
539	292.08	267.46	8	8	140	0.1759	0.005	2.646	0.029	0.016	3.775	0.051	0.005	2.646	0.029	0.016	3.775	0.051	0.005	2.646	0.029	0.016	3.775	0.051
543	271.1	262.99	8	8	48	0.1690	0.003	2.242	0.024	0.01	3.2	0.041	0.003	2.242	0.024	0.01	3.2	0.041	0.003	2.242	0.024	0.01	3.2	0.041
545	278.71	277.95	8	8	185.27	0.0041	0.002	0.512	0.042	0.005	0.729	0.073	0.002	0.512	0.042	0.005	0.729	0.073	0.002	0.512	0.042	0.005	0.729	0.073
546	277.95	275.53	8	8	199.91	0.0121	0.002	0.755	0.033	0.006	1.077	0.058	0.002	0.755	0.033	0.006	1.077	0.058	0.002	0.755	0.033	0.006	1.077	0.058
547	275.53	275.11	8	8	121.5	0.0035	0.002	0.517	0.049	0.007	0.736	0.085	0.002	0.517	0.049	0.007	0.736	0.085	0.002	0.517	0.049	0.007	0.736	0.085
548	274.91	273.88	8	8	256.58	0.0040	0.009	0.856	0.095	0.03	1.212	0.167	0.009	0.856	0.095	0.03	1.212	0.167	0.009	0.856	0.095	0.03	1.212	0.167
549	273.78	272.65	8	8	256	0.0044	0.011	0.921	0.099	0.034	1.304	0.174	0.011	0.921	0.099	0.034	1.304	0.174	0.011	0.921	0.099	0.034	1.304	0.174
550	277.67	277.06	8	8	152.08	0.0040	0.02	1.069	0.136	0.063	1.507	0.241	0.02	1.069	0.136	0.063	1.507	0.241	0.02	1.069	0.136	0.063	1.507	0.241
551	276.87	275.67	8	8	298.32	0.0040	0.02	1.076	0.137	0.064	1.516	0.243	0.02	1.076	0.137	0.064	1.516	0.243	0.02	1.076	0.137	0.064	1.516	0.243
552	275.57	275	8	8	142.88	0.0040	0.021	1.083	0.139	0.066	1.526	0.247	0.021	1.083	0.139	0.066	1.526	0.247	0.021	1.083	0.139	0.066	1.526	0.247

							Demand Scenario:	Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
553	276.69	272.75	8	8	246.06	0.0160	0.001	0.668	0.022	0.003	0.953	0.039	0.001	0.668	0.022	0.003	0.953	0.039	0.001	0.668	0.022	0.003	0.953	0.039
554	279.44	276.79	8	8	221	0.0120	0	0.502	0.018	0.002	0.717	0.031	0	0.502	0.018	0.002	0.717	0.031	0	0.502	0.018	0.002	0.717	0.031
555	280.59	279.64	8	8	237.57	0.0040	0	0.21	0.011	0	0.3	0.019	0	0.21	0.011	0	0.3	0.019	0	0.21	0.011	0	0.3	0.019
556	281.11	280.69	8	8	103.94	0.0040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
557	283.15	279.78	8	8	163.5	0.0206	0.019	1.868	0.09	0.06	2.648	0.157	0.019	1.868	0.09	0.06	2.648	0.157	0.019	1.868	0.09	0.06	2.648	0.157
558	279.68	249.9	8	8	239.18	0.1245	0.019	3.499	0.059	0.06	4.976	0.102	0.019	3.499	0.059	0.06	4.976	0.102	0.019	3.499	0.059	0.06	4.976	0.102
559	374.8	273.21	8	8	158.86	0.6395	0.04	7.75	0.057	0.127	11.025	0.098	0.04	7.75	0.057	0.127	11.025	0.098	0.04	7.75	0.057	0.127	11.025	0.098
560	273.11	272.65	8	8	115.87	0.0040	0.04	1.31	0.191	0.127	1.831	0.345	0.04	1.31	0.191	0.127	1.831	0.345	0.04	1.31	0.191	0.127	1.831	0.345
561	280.4	279.88	8	8	129	0.0040	0	0.21	0.011	0	0.301	0.019	0	0.21	0.011	0	0.301	0.019	0	0.21	0.011	0	0.301	0.019
562	272.55	272.4	8	8	37.5	0.0040	0.051	1.415	0.217	0.163	1.968	0.395	0.051	1.415	0.217	0.163	1.968	0.395	0.051	1.415	0.217	0.163	1.968	0.395
563	270.51	268.83	8	8	352.88	0.0048	0.055	1.542	0.216	0.177	2.144	0.394	0.055	1.542	0.216	0.177	2.144	0.394	0.055	1.542	0.216	0.177	2.144	0.394
564	268.73	268.22	8	8	258	0.0020	0.058	1.143	0.276	0.185	1.568	0.519	0.058	1.143	0.276	0.185	1.568	0.519	0.058	1.143	0.276	0.185	1.568	0.519
565	277.62	275.52	8	8	350	0.0060	0.003	0.676	0.048	0.009	0.962	0.084	0.003	0.676	0.048	0.009	0.962	0.084	0.003	0.676	0.048	0.009	0.962	0.084
566	275.42	268.22	8	8	60	0.1200	0.005	2.309	0.032	0.016	3.293	0.055	0.005	2.309	0.032	0.016	3.293	0.055	0.005	2.309	0.032	0.016	3.293	0.055
567	268.42	267.71	8	8	256.07	0.0028	0.064	1.327	0.266	0.205	1.824	0.498	0.064	1.327	0.266	0.205	1.824	0.498	0.064	1.327	0.266	0.205	1.824	0.498
568	272.39	270.51	8	8	178.12	0.0106	0.052	2.001	0.172	0.165	2.805	0.307	0.052	2.001	0.172	0.165	2.805	0.307	0.052	2.001	0.172	0.165	2.805	0.307
569	271.24	270.51	8	8	183	0.0040	0.002	0.494	0.041	0.005	0.704	0.071	0.002	0.494	0.041	0.005	0.704	0.071	0.002	0.494	0.041	0.005	0.704	0.071
570	281.11	277.61	8	8	350	0.0100	0.003	0.807	0.043	0.009	1.15	0.074	0.003	0.807	0.043	0.009	1.15	0.074	0.003	0.807	0.043	0.009	1.15	0.074
571	277.51	267.91	8	8	59.02	0.1627	0.004	2.439	0.028	0.014	3.479	0.048	0.004	2.439	0.028	0.014	3.479	0.048	0.004	2.439	0.028	0.014	3.479	0.048
572	267.61	266.27	8	8	172.15	0.0078	0.069	1.959	0.214	0.222	2.726	0.389	0.069	1.959	0.214	0.222	2.726	0.389	0.069	1.959	0.214	0.222	2.726	0.389
573	285.36	284.53	8	8	228	0.0036	0.016	0.976	0.127	0.052	1.377	0.224	0.016	0.976	0.127	0.052	1.377	0.224	0.016	0.976	0.127	0.052	1.377	0.224
574	284.33	284.07	8	8	65	0.0040	0.017	1.029	0.128	0.055	1.451	0.226	0.017	1.029	0.128	0.055	1.451	0.226	0.017	1.029	0.128	0.055	1.451	0.226
575	283.93	283.35	8	8	143.5	0.0040	0.017	1.032	0.128	0.055	1.456	0.225	0.017	1.032	0.128	0.055	1.456	0.225	0.017	1.032	0.128	0.055	1.456	0.225
576	286.39	285.36	8	8	236	0.0044	0.012	0.954	0.106	0.039	1.349	0.186	0.012	0.954	0.106	0.039	1.349	0.186	0.012	0.954	0.106	0.039	1.349	0.186
577	343.11	336.19	8	8	252	0.0275	0.013	1.838	0.07	0.041	2.611	0.122	0.013	1.838	0.07	0.041	2.611	0.122	0.013	1.838	0.07	0.041	2.611	0.122
578	325.92	324.96	8	8	240	0.0040	0.007	0.768	0.081	0.021	1.09	0.141	0.007	0.768	0.081	0.021	1.09	0.141	0.007	0.768	0.081	0.021	1.09	0.141
579	361.2	358.21	8	8	189	0.0158	0.004	1.086	0.048	0.014	1.547	0.082	0.004	1.086	0.048	0.014	1.547	0.082	0.004	1.086	0.048	0.014	1.547	0.082
580	352.64	343.31	8	8	189	0.0494	0.004	1.613	0.036	0.014	2.299	0.063	0.004	1.613	0.036	0.014	2.299	0.063	0.004	1.613	0.036	0.014	2.299	0.063
581	343.43	336.09	8	8	192	0.0382	0.004	1.476	0.039	0.014	2.103	0.067	0.004	1.476	0.039	0.014	2.103	0.067	0.004	1.476	0.039	0.014	2.103	0.067
582	337.09	325.06	8	8	234	0.0514	0.004	1.589	0.035	0.012	2.265	0.06	0.004	1.589	0.035	0.012	2.265	0.06	0.004	1.589	0.035	0.012	2.265	0.06
583	328.96	326.12	8	8	187	0.0152	0.004	1.071	0.048	0.014	1.525	0.083	0.004	1.071	0.048	0.014	1.525	0.083	0.004	1.071	0.048	0.014	1.525	0.083
587	334.02	329.06	8	8	192.29	0.0258	0.002	1.012	0.029	0.006	1.443	0.051	0.002	1.012	0.029	0.006	1.443	0.051	0.002	1.012	0.029	0.006	1.443	0.051
588	346.14	337.19	8	8	233	0.0384	0.002	1.085	0.024	0.005	1.549	0.042	0.002	1.085	0.024	0.005	1.549	0.042	0.002	1.085	0.024	0.005	1.549	0.042
589	350.55	343.58	8	8	187.29	0.0372	0.002	1.149	0.027	0.006	1.639	0.046	0.002	1.149	0.027	0.006	1.639	0.046	0.002	1.149	0.027	0.006	1.639	0.046
590	362.03	352.74	8	8	190.29	0.0488	0.002	1.263	0.025	0.006	1.802	0.044	0.002	1.263	0.025	0.006	1.802	0.044	0.002	1.263	0.025	0.006	1.802	0.044
591	368.78	361.3	8	8	190.29	0.0393	0.003	1.298	0.031	0.009	1.851	0.054	0.003	1.298	0.031	0.009	1.851	0.054	0.003	1.298	0.031	0.009	1.851	0.054
592	362.52	358.11	8	8	75.35	0.0585	0.001	1.015	0.016	0.002	1.45	0.027	0.001	1.015	0.016	0.002	1.45	0.027	0.001	1.015	0.016	0.002	1.45	0.027
593	358.01	343.21	8	8	252	0.0587	0.007	1.956	0.043	0.021	2.787	0.074	0.007	1.956	0.043	0.021	2.787	0.074	0.007	1.956	0.043	0.021	2.787	0.074
594	336.09	324.44	8	8	193.65	0.0602	0.019	2.739	0.071	0.062	3.891	0.123	0.019	2.739	0.071	0.062	3.891	0.123	0.019	2.739	0.071	0.062	3.891	0.123
595	324.86	324.64	8	8	56.35	0.0039	0.012	0.913	0.108	0.038	1.291	0.189	0.012	0.913	0.108	0.038	1.291	0.189	0.012	0.913	0.108	0.038	1.291	0.189
596	363.39	343.06	8	8	233.42	0.0871	0.002	1.441	0.02	0.005	2.058	0.034	0.002	1.441	0.02	0.005	2.058	0.034	0.002	1.441	0.02	0.005	2.058	0.034
597	332.63	323.41	8	8	180	0.0512	0.001	1.098	0.02	0.004	1.567	0.034	0.001	1.098	0.02	0.004	1.567	0.034	0.001	1.098	0.02	0.004	1.567	0.034
599	324.44	323.21	8	8	258.4	0.0048	0.032	1.313	0.165	0.103	1.843	0.295	0.032	1.313	0.165	0.103	1.843	0.295	0.032	1.313	0.165	0.103	1.843	0.295
600	323.11	322.95	8	8	40	0.0040	0.034	1.261	0.178	0.11	1.766	0.32	0.034	1.261	0.178	0.11	1.766	0.32	0.034	1.261	0.178	0.11	1.766	0.32
601	319.95	318.43	8	8	254.09	0.0060	0.042	1.536	0.177	0.133	2.152	0.318	0.042	1.536	0.177	0.133	2.152	0.318	0.042	1.536	0.177	0.133	2.152	0.318
602	322.75	320.15	8	8	260	0.0100	0.036	1.763	0.146	0.115	2.481	0.259	0.036	1.763	0.146	0.115	2.481	0.259	0.036	1.763	0.146	0.115	2.481	0.259
603	321.23	320.15	8	8	215	0.0050	0.002	0.573	0.043	0.006	0.817	0.074	0.002	0.573	0.043	0.006	0.817	0.074	0.002	0.573	0.043	0.006	0.817	0.074
604	318.23	314.66	8	8	274.46	0.0130	0.043	2.046	0.15	0.139	2.878	0.267	0.043	2.046	0.15	0.139	2.878	0.267	0.043	2.046	0.15	0.139	2.878	0.267
605	314.46	312.17	8	8	168.46	0.0136	0.045	2.105	0.152	0.145	2.959	0.27	0.045	2.105	0.152	0.145	2.959	0.27	0.045	2.105	0.152	0.145	2.959	0.27
606	328.15	326.68	8	8	266.3	0.0055	0.01	0.988	0.093	0.033	1.4	0.163	0.01	0.988	0.093	0.033	1.4	0.163	0.01	0.988	0.093	0.033	1.4	0.163
607	331.66	328.15	8	8	260.67	0.0135	0.006	1.151	0.059	0.02	1.637	0.102	0.006	1.151	0.059	0.02	1.637	0.102	0.006	1.151	0.059	0.02	1.637	0.102
608	326.68	326.03	8	8	162.04	0.0040	0.012	0.921	0.107	0.038	1.303	0.188	0.012	0.921	0.107	0.038	1.303	0.188	0.012	0.921	0.107	0.038	1.303	0.188
609	329.37	328.15	8	8	305.66	0.0040	0.002	0.56	0.049	0.007	0.797	0.086	0.002	0.56	0.049	0.007	0.797	0.086	0.002	0.56	0.049	0.007	0.797	0.086
610	334.06	331.66	8	8	240	0.0100	0.004	0.9	0.051	0.012	1.281	0.088	0.004	0.9	0.051	0.012	1.281	0.088	0.004	0.9	0.051	0.012	1.281	0.088
611	314.57	312.27	8	8	240	0.0096	0.002	0.759	0.04	0.007	1.081	0.07	0.002	0.759	0.04	0.007	1.081	0.07	0.002	0.759	0.04	0.007	1.081	0.07
612	314.3	312.17	8	8	380	0.0056	0.002	0.63	0.046	0.007	0.897	0.079	0.002	0.63	0.046	0.007	0.897	0.079	0.002	0.63	0.046	0.007	0.897	0.079
613	316.96	315.94	8	8	247	0.0041	0.001	0.458	0.036	0.004	0.653	0.061	0.001	0.458	0.036	0.004	0.653	0.061	0.001	0.458	0.036	0.004	0.653	0.061
615	311.89	308.03	8	8	385.74	0.0100	0.007	1.057	0.065	0.021	1.502	0.113	0.007	1.057	0.065	0.021	1.502	0.113	0.007	1.057	0.065	0.021	1.502	0.113
616	308.03	300.32	8	8	385.74	0.0200	0.01	1.53	0.067	0.032	2.173	0.117	0.01	1.53	0.067	0.032	2.173	0.117	0.01	1.53	0.067	0.032	2.173	0.117
617	315.74	311.89	8	8	385.74	0.0100	0.003	0.87	0.048	0.011	1.239	0.083	0.003	0.87	0.048	0.011	1.239	0.083	0.003	0.87	0.048	0.011	1.239	0.083
618	312.41	311.33	8	8	88	0.0123	0.002	0.782	0.035	0.006	1.115	0.06	0.002	0.782	0.035	0.006	1.115	0.06	0.002	0.782	0.035	0.006	1.115	0.06
619	309.16	307	8	8	300	0.0072	0.007	0.959	0.072	0.022	1.362	0.125	0.007	0.959	0.072	0.022	1.362	0.125	0.007	0.959	0.072	0.022	1.362	0.125
620	311.33	309.16	8	8	301.28	0.0072	0.003	0.777	0.052	0.011	1.106	0.09	0.003	0.777	0.052	0.011	1.106	0.09	0.003	0.777	0.052	0.011	1.106	0.09
621	307	301.36	8	8	300	0.0188	0.01	1.515	0.07	0.033	2.152	0.121	0.01	1.515	0.07	0.033	2.152	0.121	0.01	1.515	0.07	0.033	2.152	0.121
622	300.12	297.47	8	8	264.97	0.0100	0.024	1.561	0.12	0.077	2.205	0.211	0.024	1.561	0.12	0.077	2.205	0.211	0.024	1.561	0.12	0.077	2.205	0.211
623	301.16	300.12	8	8	259.01	0.0040	0.012	0.921	0.107	0.038	1.304	0.188	0.012	0.921	0.107	0.038	1.304	0.188	0.012	0.921	0.107	0.038	1.304	0.188
624	312.07	310.92	8	8	136.84	0.0084	0.051	1.845	0.181	0.165	2.582	0.326	0.051	1.845	0.181	0.165	2.582	0.326	0.051	1.845	0.181	0.165	2.582	0.326
625	309.5	308.47	8	8	258	0.0040	0.058	1.468	0.231	0.185	2.035	0.424	0.058	1.468	0.231	0.185	2.035	0.424	0.058	1.468	0.231	0.185	2.035	0.424
626	310.73	309.7	8	8	122	0.0084	0.053	1.868	0.184	0.171	2.612	0.332	0.053	1.868	0.184	0.171	2.612	0.332	0.053	1.868	0.184	0.171	2.612	0.332
627	311.2	309.7	8	8	375	0.0040	0.003	0.587	0.053	0.009	0.835	0.092	0.003	0.587	0.053	0.009	0.835	0.092	0.003	0.587	0.053	0.009	0.835	0.092
628	299.66	296.01	8	8	320	0.0114	0.108	2.556	0.243	0.347	3.533	0.449	0.108	2.556	0.243	0.347	3.533	0.449	0.108	2.556	0.243	0.347	3.533	0.449
629	325.8	307.56	8	8	377	0.0484	0.013	2.237	0.061	0.041	3.18	0.106	0.013	2.237	0.061	0.041	3.18	0.106	0.013	2.237	0.061	0.041	3.18	0.106
630	307.56	305.91	8	8	250.05	0.0066	0.014	1.137	0.101	0.043	1.609	0.177	0.014	1.137	0.101	0.043	1.609	0.177	0.014	1.137	0.101	0.043	1.609	0.177
631	308.27	306.89	8	8	345.26	0.0040	0.061	1.488	0.236	0.194	2.061	0.435	0.061	1.488	0.236	0.194	2.061	0.435	0.061	1.488	0.236	0.194	2.061	0.435
632	306.89	306.13	8	8	189	0.0040	0.063	1.51	0.241	0.202	2.088	0.444	0.063	1.51	0.241	0.202	2.088	0.444	0.063	1.51	0.241	0.202	2.088	0.444
633	306.81	303.46	8	8	238.73	0.0140	0.002	0.797	0.032	0.006	1.136	0.056	0.002	0.797	0.032	0.006	1.136	0.056	0.002	0.797	0.032	0.006	1.136	0.056
634	303.26	302.24	8	8	256	0.0040	0.004	0.644	0.062	0.012	0.916	0.107	0.004	0.644	0.062	0.012	0.916	0.107	0.004	0.644	0.062	0.012	0.916	0.107
635	303.72	303.46	8	8	54.95	0.0047	0.001	0.424	0.028	0.002	0.605	0.049	0.001	0.424	0.028	0.002	0.605	0.049	0.001	0.424	0.028	0.002	0.605	0.049
636	306.81	305.79	8	8	256	0.0040	0.001	0.425	0.032	0.003	0.605	0.056	0.001	0.425	0.032	0.003	0.605	0.056	0.001	0.425	0.032	0.003	0.605	0.056
637	305.69	303.53	8	8	269.44	0.0080	0.004	0.844	0.054	0.013	1.201	0.094	0.004	0.844	0.054	0.013	1.201	0.094	0.004	0.844	0.054	0.013	1.201	0.094
638	302.14	301.17	8	8	269.55	0.0036	0.007	0.747	0.084	0.022	1.06	0.146	0.007	0.747	0.084	0.022	1.06	0.146	0.007	0.747	0.084	0.022	1.06	0.146
639	300.97	299.41	8	8	164.52	0.0095	0.091	2.274	0.233	0.291	3.151	0.428	0.091	2.274	0.233	0.291	3.151	0.428	0.091	2.274	0.233	0.291	3.151	0.428

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
640	305.66	303.53	8	8	230.77	0.0092	0.077	2.15	0.217	0.248	2.989	0.395	0.077	2.15	0.217	0.248	2.989	0.395	0.077	2.15	0.217	0.248	2.989	0.395
641	303.33	302.42	8	8	90.23	0.0101	0.082	2.254	0.218	0.261	3.133	0.397	0.082	2.254	0.218	0.261	3.133	0.397	0.082	2.254	0.218	0.261	3.133	0.397
642	302.42	301.17	8	8	152.48	0.0082	0.082	2.097	0.23	0.263	2.908	0.421	0.082	2.097	0.23	0.263	2.908	0.421	0.082	2.097	0.23	0.263	2.908	0.421
643	303	302.66	8	8	200	0.0017	0.004	0.486	0.077	0.012	0.689	0.134	0.004	0.486	0.077	0.012	0.689	0.134	0.004	0.486	0.077	0.012	0.689	0.134
644	302.61	301.5	8	8	348	0.0032	0.007	0.722	0.087	0.022	1.024	0.153	0.007	0.722	0.087	0.022	1.024	0.153	0.007	0.722	0.087	0.022	1.024	0.153
645	301.5	300.84	8	8	252	0.0026	0.009	0.735	0.105	0.03	1.04	0.184	0.009	0.735	0.105	0.03	1.04	0.184	0.009	0.735	0.105	0.03	1.04	0.184
646	301.31	300.84	8	8	117.52	0.0040	0.002	0.495	0.041	0.005	0.705	0.071	0.002	0.495	0.041	0.005	0.705	0.071	0.002	0.495	0.041	0.005	0.705	0.071
647	300.79	300.39	8	8	167	0.0024	0.013	0.783	0.125	0.041	1.106	0.22	0.013	0.783	0.125	0.041	1.106	0.22	0.013	0.783	0.125	0.041	1.106	0.22
648	300.39	299.68	8	8	275	0.0026	0.016	0.866	0.138	0.052	1.22	0.244	0.016	0.866	0.138	0.052	1.22	0.244	0.016	0.866	0.138	0.052	1.22	0.244
649	302.15	295.06	8	8	265.89	0.0267	0.007	1.489	0.052	0.021	2.119	0.09	0.007	1.489	0.052	0.021	2.119	0.09	0.007	1.489	0.052	0.021	2.119	0.09
650	311.1	307.84	8	8	118.44	0.0275	0.002	0.967	0.026	0.005	1.379	0.045	0.002	0.967	0.026	0.005	1.379	0.045	0.002	0.967	0.026	0.005	1.379	0.045
651	307.84	302.05	8	8	226.93	0.0255	0.003	1.206	0.039	0.011	1.719	0.067	0.003	1.206	0.039	0.011	1.719	0.067	0.003	1.206	0.039	0.011	1.719	0.067
652	294.96	291.54	8	8	103.2	0.0331	0.007	1.634	0.05	0.022	2.326	0.087	0.007	1.634	0.05	0.022	2.326	0.087	0.007	1.634	0.05	0.022	2.326	0.087
653	291.25	290.02	8	8	310	0.0040	0.009	0.851	0.095	0.03	1.205	0.167	0.009	0.851	0.095	0.03	1.205	0.167	0.009	0.851	0.095	0.03	1.205	0.167
654	286.16	282.27	8	8	258.01	0.0151	0.036	2.029	0.131	0.114	2.862	0.232	0.036	2.029	0.131	0.114	2.862	0.232	0.036	2.029	0.131	0.114	2.862	0.232
655	291.03	289.3	8	8	240	0.0072	0.002	0.65	0.04	0.006	0.926	0.068	0.002	0.65	0.04	0.006	0.926	0.068	0.002	0.65	0.04	0.006	0.926	0.068
656	289.92	288.82	8	8	279.09	0.0039	0.016	0.99	0.122	0.05	1.398	0.215	0.016	0.99	0.122	0.05	1.398	0.215	0.016	0.99	0.122	0.05	1.398	0.215
657	295.58	288.92	8	8	329.97	0.0202	0.002	0.982	0.034	0.007	1.401	0.058	0.002	0.982	0.034	0.007	1.401	0.058	0.002	0.982	0.034	0.007	1.401	0.058
658	288.72	287.59	8	8	256.01	0.0044	0.021	1.12	0.136	0.066	1.578	0.24	0.021	1.12	0.136	0.066	1.578	0.24	0.021	1.12	0.136	0.066	1.578	0.24
659	289.3	287.59	8	8	240	0.0071	0.005	0.866	0.062	0.016	1.231	0.108	0.005	0.866	0.062	0.016	1.231	0.108	0.005	0.866	0.062	0.016	1.231	0.108
660	289.13	287.7	8	8	240	0.0060	0.003	0.674	0.048	0.009	0.96	0.084	0.003	0.674	0.048	0.009	0.96	0.084	0.003	0.674	0.048	0.009	0.96	0.084
661	287.7	286.26	8	8	240	0.0060	0.006	0.852	0.069	0.019	1.21	0.12	0.006	0.852	0.069	0.019	1.21	0.12	0.006	0.852	0.069	0.019	1.21	0.12
662	287.49	286.26	8	8	256.01	0.0048	0.028	1.263	0.154	0.089	1.776	0.274	0.028	1.263	0.154	0.089	1.776	0.274	0.028	1.263	0.154	0.089	1.776	0.274
663	282.17	280.73	8	8	360	0.0040	0.039	1.305	0.189	0.124	1.823	0.34	0.039	1.305	0.189	0.124	1.823	0.34	0.039	1.305	0.189	0.124	1.823	0.34
664	280.73	279.49	8	8	310.73	0.0040	0.042	1.34	0.198	0.136	1.87	0.358	0.042	1.34	0.198	0.136	1.87	0.358	0.042	1.34	0.198	0.136	1.87	0.358
665	282.53	282.17	8	8	65.37	0.0055	0.001	0.506	0.033	0.004	0.722	0.057	0.001	0.506	0.033	0.004	0.722	0.057	0.001	0.506	0.033	0.004	0.722	0.057
666	288.63	287.39	8	8	256	0.0048	0.001	0.503	0.036	0.004	0.717	0.062	0.001	0.503	0.036	0.004	0.717	0.062	0.001	0.503	0.036	0.004	0.717	0.062
667	287.29	279.39	8	8	394.77	0.0200	0.004	1.123	0.042	0.012	1.6	0.072	0.004	1.123	0.042	0.012	1.6	0.072	0.004	1.123	0.042	0.012	1.6	0.072
668	279.39	278.55	8	8	210.23	0.0040	0.048	1.392	0.211	0.154	1.938	0.384	0.048	1.392	0.211	0.154	1.938	0.384	0.048	1.392	0.211	0.154	1.938	0.384
669	284.94	280.57	8	8	333	0.0131	0.006	1.132	0.059	0.019	1.61	0.101	0.006	1.132	0.059	0.019	1.61	0.101	0.006	1.132	0.059	0.019	1.61	0.101
670	288.73	285.07	8	8	183	0.0200	0.001	0.792	0.025	0.004	1.131	0.042	0.001	0.792	0.025	0.004	1.131	0.042	0.001	0.792	0.025	0.004	1.131	0.042
671	288.63	285.04	8	8	272	0.0132	0.002	0.83	0.036	0.007	1.183	0.062	0.002	0.83	0.036	0.007	1.183	0.062	0.002	0.83	0.036	0.007	1.183	0.062
672	289.53	288.63	8	8	187.38	0.0048	0.002	0.527	0.039	0.005	0.751	0.068	0.002	0.527	0.039	0.005	0.751	0.068	0.002	0.527	0.039	0.005	0.751	0.068
673	278.55	277.6	8	8	186.76	0.0051	0.057	1.589	0.215	0.181	2.21	0.392	0.057	1.589	0.215	0.181	2.21	0.392	0.057	1.589	0.215	0.181	2.21	0.392
674	280.47	277.7	8	8	69.24	0.0400	0.007	1.759	0.049	0.023	2.505	0.085	0.007	1.759	0.049	0.023	2.505	0.085	0.007	1.759	0.049	0.023	2.505	0.085
675	281.43	279.91	8	8	374.66	0.0041	0.002	0.563	0.049	0.007	0.801	0.085	0.002	0.563	0.049	0.007	0.801	0.085	0.002	0.563	0.049	0.007	0.801	0.085
676	279.94	278.55	8	8	371.44	0.0037	0.006	0.737	0.08	0.02	1.045	0.139	0.006	0.737	0.08	0.02	1.045	0.139	0.006	0.737	0.08	0.02	1.045	0.139
677	286.03	282.41	8	8	359.98	0.0101	0.148	2.674	0.294	0.475	3.645	0.561	0.148	2.674	0.294	0.475	3.645	0.561	0.148	2.674	0.294	0.475	3.645	0.561
678	292.67	291.75	8	8	112.92	0.0081	0.13	2.387	0.29	0.415	3.259	0.551	0.13	2.387	0.29	0.415	3.259	0.551	0.13	2.387	0.29	0.415	3.259	0.551
679	291.55	289.31	8	8	227.08	0.0099	0.135	2.585	0.282	0.432	3.537	0.532	0.135	2.585	0.282	0.432	3.537	0.532	0.135	2.585	0.282	0.432	3.537	0.532
682	289.31	286.44	8	8	302.77	0.0095	0.136	2.553	0.286	0.434	3.489	0.541	0.136	2.553	0.286	0.434	3.489	0.541	0.136	2.553	0.286	0.434	3.489	0.541
683	286.24	286.03	8	8	21.23	0.0099	0.147	2.651	0.294	0.47	3.613	0.56	0.147	2.651	0.294	0.47	3.613	0.56	0.147	2.651	0.294	0.47	3.613	0.56
684	280.33	278.48	8	8	209.76	0.0088	0.004	0.886	0.055	0.014	1.261	0.094	0.004	0.886	0.055	0.014	1.261	0.094	0.004	0.886	0.055	0.014	1.261	0.094
685	276.5	275.6	8	8	225.15	0.0040	0.013	0.938	0.111	0.041	1.326	0.194	0.013	0.938	0.111	0.041	1.326	0.194	0.013	0.938	0.111	0.041	1.326	0.194
686	278.38	276.7	8	8	196	0.0086	0.008	1.052	0.073	0.025	1.494	0.126	0.008	1.052	0.073	0.025	1.494	0.126	0.008	1.052	0.073	0.025	1.494	0.126
690	282.41	277.38	8	8	48.22	0.1043	0.15	6.147	0.165	0.48	8.625	0.295	0.15	6.147	0.165	0.48	8.625	0.295	0.15	6.147	0.165	0.48	8.625	0.295
691	277.6	275.9	8	8	170	0.0100	0.064	2.097	0.194	0.206	2.928	0.35	0.064	2.097	0.194	0.206	2.928	0.35	0.064	2.097	0.194	0.206	2.928	0.35
692	275.8	275.46	8	8	42.45	0.0080	0.066	1.948	0.207	0.21	2.714	0.375	0.066	1.948	0.207	0.21	2.714	0.375	0.066	1.948	0.207	0.21	2.714	0.375
695	275.4	274.38	8	8	255.09	0.0040	0.017	1.029	0.128	0.056	1.452	0.226	0.017	1.029	0.128	0.056	1.452	0.226	0.017	1.029	0.128	0.056	1.452	0.226
696	274.55	274.38	8	8	43.18	0.0039	0.002	0.527	0.046	0.006	0.75	0.079	0.002	0.527	0.046	0.006	0.75	0.079	0.002	0.527	0.046	0.006	0.75	0.079
697	274.76	274.65	8	8	26	0.0042	0.002	0.505	0.04	0.005	0.719	0.07	0.002	0.505	0.04	0.005	0.719	0.07	0.002	0.505	0.04	0.005	0.719	0.07
698	273.72	273.01	8	8	178.33	0.0040	0.022	1.108	0.145	0.072	1.559	0.257	0.022	1.108	0.145	0.072	1.559	0.257	0.022	1.108	0.145	0.072	1.559	0.257
699	272.37	271.61	8	8	189.93	0.0040	0.025	1.153	0.154	0.081	1.621	0.274	0.025	1.153	0.154	0.081	1.621	0.274	0.025	1.153	0.154	0.081	1.621	0.274
700	272.37	271.61	8	8	189.93	0.0040	0.023	1.121	0.147	0.074	1.577	0.261	0.023	1.121	0.147	0.074	1.577	0.261	0.023	1.121	0.147	0.074	1.577	0.261
701	274.28	273.82	8	8	116	0.0040	0.02	1.071	0.138	0.064	1.509	0.244	0.02	1.071	0.138	0.064	1.509	0.244	0.02	1.071	0.138	0.064	1.509	0.244
702	274.69	272.57	8	8	139.39	0.0152	0.002	0.842	0.033	0.006	1.201	0.057	0.002	0.842	0.033	0.006	1.201	0.057	0.002	0.842	0.033	0.006	1.201	0.057
703	271.51	271.26	8	8	62.32	0.0040	0.026	1.167	0.157	0.084	1.639	0.279	0.026	1.167	0.157	0.084	1.639	0.279	0.026	1.167	0.157	0.084	1.639	0.279
705	277.13	276.6	8	8	104.49	0.0051	0.003	0.637	0.05	0.009	0.907	0.087	0.003	0.637	0.05	0.009	0.907	0.087	0.003	0.637	0.05	0.009	0.907	0.087
706	275.99	275.8	8	8	46	0.0041	0.001	0.458	0.036	0.004	0.653	0.061	0.001	0.458	0.036	0.004	0.653	0.061	0.001	0.458	0.036	0.004	0.653	0.061
707	275.7	275.6	8	8	26.13	0.0038	0.002	0.551	0.05	0.007	0.785	0.086	0.002	0.551	0.05	0.007	0.785	0.086	0.002	0.551	0.05	0.007	0.785	0.086
708	305.78	303	8	8	200	0.0139	0.002	0.763	0.031	0.005	1.088	0.053	0.002	0.763	0.031	0.005	1.088	0.053	0.002	0.763	0.031	0.005	1.088	0.053
709	296.01	292.61	8	8	340	0.0100	0.129	2.564	0.275	0.413	3.517	0.516	0.129	2.564	0.275	0.413	3.517	0.516	0.129	2.564	0.275	0.413	3.517	0.516
717	295.1	293.5	8	8	171	0.0094	0.001	0.538	0.024	0.002	0.767	0.042	0.001	0.538	0.024	0.002	0.767	0.042	0.001	0.538	0.024	0.002	0.767	0.042
718	286.96	286.43	8	8	7	0.0757	0.014	2.682	0.057	0.044	3.815	0.099	0.014	2.682	0.057	0.044	3.815	0.099	0.014	2.682	0.057	0.044	3.815	0.099
719	293.02	286.96	8	8	67.91	0.0892	0.013	2.791	0.054	0.042	3.971	0.093	0.013	2.791	0.054	0.042	3.971	0.093	0.013	2.791	0.054	0.042	3.971	0.093
720	294.82	293.02	8	8	300	0.0060	0.012	1.06	0.097	0.038	1.501	0.17	0.012	1.06	0.097	0.038	1.501	0.17	0.012	1.06	0.097	0.038	1.501	0.17
721	296.63	294.82	8	8	301.14	0.0060	0.01	0.994	0.088	0.031	1.409	0.153	0.01	0.994	0.088	0.031	1.409	0.153	0.01	0.994	0.088	0.031	1.409	0.153
722	298.03	296.98	8	8	14.23	0.0738	0.008	2.256	0.045	0.026	3.214	0.077	0.008	2.256	0.045	0.026	3.214	0.077	0.008	2.256	0.045	0.026	3.214	0.077
723	297.1	295.98	8	8	250.36	0.0045	0.005	0.719	0.067	0.015	1.021	0.116	0.005	0.719	0.067	0.015	1.021	0.116	0.005	0.719	0.067	0.015	1.021	0.116
724	295.98	294.6	8	8	342.01	0.0040	0.009	0.855	0.095	0.03	1.211	0.166	0.009	0.855	0.095	0.03	1.211	0.166	0.009	0.855	0.095	0.03	1.211	0.166
725	301.7	297.02	8	8	194.43	0.0241	0.001	0.845	0.024	0.004	1.206	0.041	0.001	0.845	0.024	0.004	1.206	0.041	0.001	0.845	0.024	0.004	1.206	0.041
726	296.85	296.08	8	8	187.26	0.0041	0.002	0.535	0.045	0.006	0.762	0.078	0.002	0.535	0.045	0.006	0.762	0.078	0.002	0.535	0.045	0.006	0.762	0.078
727	297.9	297.02	8	8	173.65	0.0051	0.002	0.575	0.043	0.006	0.819	0.074	0.002	0.575	0.043	0.006	0.819	0.074	0.002	0.575	0.043	0.006	0.819	0.074
728	301.12	298.23	8	8	317.06	0.0091	0.007	1.041	0.068	0.022	1.479	0.118	0.007	1.041	0.068	0.022	1.479	0.118	0.007	1.041	0.068	0.022	1.479	0.118
729	302.23	301.25	8	8	304.6	0.0032	0.005	0.656	0.075	0.016	0.932	0.13	0.005	0.656	0.075	0.016	0.932	0.13	0.005	0.656	0.075	0.016	0.932	0.13
730	303.01	302.45	8	8	202.06	0.0028	0.002	0.493	0.054	0.007	0.701	0.093	0.002	0.493	0.054	0.007	0.701	0.093	0.002	0.493	0.054	0.007	0.701	0.093
731	303.5	302.43	8	8	120.52	0.0089	0.001	0.598	0.03	0.004	0.853	0.051	0.001	0.598	0.03	0.004	0.853	0.051	0.001	0.598	0.03	0.004	0.853	0.051
732	291.14	289.61	8	8	152.49	0.0100	0.004	0.9	0.051	0.012	1.282	0.088	0.004	0.9	0.051	0.012	1.282	0.088	0.004	0.9	0.051	0.012	1.282	0.088
733	289.61	286.3	8	8	286.5	0.0116	0.004	0.973	0.051	0.014	1.386	0.089	0.004	0.973	0.051	0.014	1.386	0.089	0.004	0.973	0.051	0.014	1.386	0.089
734	284.98	284.4	8	8	21	0.0276	0.016	1.966	0.077	0.051	2.79	0.135	0.016	1.966	0.077	0.051	2.79	0.135	0.016	1.966	0.077	0.051	2.79	0.135
735	292.04	291.14	8	8	226.1	0.0040	0.002	0.529	0.045	0.006	0.753	0.079	0.002	0.529	0.045	0.006	0.753	0.079	0.002	0.529	0.045	0.006	0.753	0.079
736	287.93	286.6	8	8	132.21	0.0101	0.011	1.245	0.083	0.036	1.766	0.145	0.011	1.245	0.083	0.036	1.766	0.145	0.011	1.245	0.083	0.036	1.766	0.145

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
737	296.03	293.6	8	8	221.96	0.0109	0.002	0.702	0.032	0.005	1.001	0.056	0.002	0.702	0.032	0.005	1.001	0.056	0.002	0.702	0.032	0.005	1.001	0.056
738	289.7	288.03	8	8	219.84	0.0076	0.01	1.092	0.085	0.032	1.549	0.148	0.01	1.092	0.085	0.032	1.549	0.148	0.01	1.092	0.085	0.032	1.549	0.148
739	291.13	289.7	8	8	224.12	0.0064	0.008	0.949	0.078	0.025	1.348	0.136	0.008	0.949	0.078	0.025	1.348	0.136	0.008	0.949	0.078	0.025	1.348	0.136
740	293.6	291.13	8	8	221	0.0112	0.004	0.935	0.049	0.012	1.331	0.085	0.004	0.935	0.049	0.012	1.331	0.085	0.004	0.935	0.049	0.012	1.331	0.085
741	295.62	291.23	8	8	366	0.0120	0.002	0.725	0.032	0.005	1.033	0.055	0.002	0.725	0.032	0.005	1.033	0.055	0.002	0.725	0.032	0.005	1.033	0.055
742	295.7	290.42	8	8	278.33	0.0190	0.048	2.408	0.144	0.154	3.39	0.255	0.048	2.408	0.144	0.154	3.39	0.255	0.048	2.408	0.144	0.154	3.39	0.255
743	289.65	289.12	8	8	264	0.0020	0.016	0.792	0.146	0.052	1.114	0.26	0.016	0.792	0.146	0.052	1.114	0.26	0.016	0.792	0.146	0.052	1.114	0.26
744	286.91	285.43	8	12	350	0.0042	0.198	2.115	0.433	0.633	2.805	1	0.198	2.115	0.433	0.633	2.805	1	0.198	2.049	0.245	0.633	2.832	0.453
745	283.75	283.53	8	12	40.59	0.0054	0.2	2.325	0.407	0.641	2.842	1	0.2	2.325	0.407	0.641	2.842	1	0.201	2.247	0.232	0.642	3.114	0.426
746	285.23	283.75	8	12	304.69	0.0049	0.2	2.231	0.418	0.639	2.831	1	0.2	2.231	0.418	0.639	2.831	1	0.2	2.159	0.238	0.639	2.988	0.438
747	288.2	287.11	8	12	268.89	0.0041	0.196	2.077	0.435	0.627	2.778	1	0.196	2.077	0.435	0.627	2.778	1	0.196	2.013	0.247	0.627	2.781	0.456
749	285.85	284.83	8	8	256	0.0040	0.004	0.653	0.063	0.012	0.928	0.109	0.004	0.653	0.063	0.012	0.928	0.109	0.004	0.653	0.063	0.012	0.928	0.109
750	283	281.46	8	8	384	0.0040	0.011	0.893	0.102	0.035	1.264	0.179	0.011	0.893	0.102	0.035	1.264	0.179	0.011	0.893	0.102	0.035	1.264	0.179
751	282.06	281.46	8	8	150.55	0.0040	0.001	0.453	0.036	0.004	0.645	0.062	0.001	0.453	0.036	0.004	0.645	0.062	0.001	0.453	0.036	0.004	0.645	0.062
752	281.26	280.65	8	8	152	0.0040	0.014	0.963	0.115	0.044	1.361	0.202	0.014	0.963	0.115	0.044	1.361	0.202	0.014	0.963	0.115	0.044	1.361	0.202
753	280.5	277.92	8	8	108.16	0.0239	0.015	1.852	0.079	0.049	2.629	0.138	0.015	1.852	0.079	0.049	2.629	0.138	0.015	1.852	0.079	0.049	2.629	0.138
754	285.75	279.1	8	8	131.85	0.0504	0.002	1.35	0.027	0.007	1.926	0.047	0.002	1.35	0.027	0.007	1.926	0.047	0.002	1.35	0.027	0.007	1.926	0.047
755	286.73	286.08	8	8	161.79	0.0040	0.002	0.561	0.049	0.007	0.798	0.085	0.002	0.561	0.049	0.007	0.798	0.085	0.002	0.561	0.049	0.007	0.798	0.085
756	285.98	280.23	8	8	76.13	0.0755	0.003	1.758	0.03	0.011	2.507	0.052	0.003	1.758	0.03	0.011	2.507	0.052	0.003	1.758	0.03	0.011	2.507	0.052
757	284.63	283.1	8	8	383.82	0.0040	0.007	0.793	0.085	0.023	1.125	0.148	0.007	0.793	0.085	0.023	1.125	0.148	0.007	0.793	0.085	0.023	1.125	0.148
758	286.97	285.95	8	8	255	0.0040	0.002	0.495	0.041	0.005	0.705	0.071	0.002	0.495	0.041	0.005	0.705	0.071	0.002	0.495	0.041	0.005	0.705	0.071
759	289.92	287.09	8	8	354	0.0080	0.003	0.806	0.051	0.011	1.147	0.088	0.003	0.806	0.051	0.011	1.147	0.088	0.003	0.806	0.051	0.011	1.147	0.088
760	286.45	285.41	8	8	130	0.0080	0.005	0.879	0.058	0.015	1.251	0.101	0.005	0.879	0.058	0.015	1.251	0.101	0.005	0.879	0.058	0.015	1.251	0.101
761	282.73	282.63	8	8	4	0.0250	0.005	1.339	0.046	0.016	1.907	0.08	0.005	1.339	0.046	0.016	1.907	0.08	0.005	1.339	0.046	0.016	1.907	0.08
762	292.97	290.12	8	8	356	0.0080	0.002	0.63	0.035	0.005	0.898	0.06	0.002	0.63	0.035	0.005	0.898	0.06	0.002	0.63	0.035	0.005	0.898	0.06
763	306	304.22	8	8	178	0.0100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
764	304.22	301.3	8	8	292	0.0100	0.007	1.075	0.067	0.022	1.528	0.116	0.007	1.075	0.067	0.022	1.528	0.116	0.007	1.075	0.067	0.022	1.528	0.116
765	301.3	298.5	8	8	280	0.0100	0.014	1.337	0.094	0.046	1.894	0.164	0.014	1.337	0.094	0.046	1.894	0.164	0.014	1.337	0.094	0.046	1.894	0.164
766	298.5	295.7	8	8	280	0.0100	0.025	1.59	0.123	0.081	2.244	0.218	0.025	1.59	0.123	0.081	2.244	0.218	0.025	1.59	0.123	0.081	2.244	0.218
767	306.91	306.4	8	8	163.13	0.0031	0.046	1.261	0.219	0.148	1.752	0.401	0.046	1.261	0.219	0.148	1.752	0.401	0.046	1.261	0.219	0.148	1.752	0.401
768	306.2	305.85	8	8	37	0.0095	0.047	1.873	0.168	0.15	2.626	0.301	0.047	1.873	0.168	0.15	2.626	0.301	0.047	1.873	0.168	0.15	2.626	0.301
776	302.74	301.31	8	8	358	0.0040	0.002	0.495	0.041	0.005	0.705	0.071	0.002	0.495	0.041	0.005	0.705	0.071	0.002	0.495	0.041	0.005	0.705	0.071
777	301.11	298.31	8	8	279.82	0.0100	0.004	0.899	0.051	0.012	1.28	0.088	0.004	0.899	0.051	0.012	1.28	0.088	0.004	0.899	0.051	0.012	1.28	0.088
778	292.61	289.65	8	8	285	0.0104	0.014	1.332	0.091	0.043	1.888	0.158	0.014	1.332	0.091	0.043	1.888	0.158	0.014	1.332	0.091	0.043	1.888	0.158
779	295.46	292.61	8	8	285	0.0100	0.011	1.229	0.082	0.035	1.744	0.143	0.011	1.229	0.082	0.035	1.744	0.143	0.011	1.229	0.082	0.035	1.744	0.143
780	298.31	295.46	8	8	285	0.0100	0.008	1.11	0.07	0.025	1.577	0.122	0.008	1.11	0.07	0.025	1.577	0.122	0.008	1.11	0.07	0.025	1.577	0.122
781	297.97	295.9	8	8	322.7	0.0064	0.003	0.692	0.048	0.009	0.985	0.082	0.003	0.692	0.048	0.009	0.985	0.082	0.003	0.692	0.048	0.009	0.985	0.082
782	289.12	288.2	8	8	259.05	0.0036	0.029	1.154	0.17	0.094	1.618	0.304	0.029	1.154	0.17	0.094	1.618	0.304	0.029	1.154	0.17	0.094	1.618	0.304
783	289.71	289.65	8	8	132.13	0.0005	0.002	0.232	0.068	0.005	0.33	0.118	0.002	0.232	0.068	0.005	0.33	0.118	0.002	0.232	0.068	0.005	0.33	0.118
784	293.85	289.12	8	8	320	0.0148	0.01	1.377	0.072	0.032	1.956	0.126	0.01	1.377	0.072	0.032	1.956	0.126	0.01	1.377	0.072	0.032	1.956	0.126
785	295.9	293.85	8	8	320	0.0064	0.007	0.921	0.074	0.022	1.308	0.129	0.007	0.921	0.074	0.022	1.308	0.129	0.007	0.921	0.074	0.022	1.308	0.129
786	296.13	295.34	8	8	79.52	0.0099	0.1	2.376	0.241	0.319	3.285	0.445	0.1	2.376	0.241	0.319	3.285	0.445	0.1	2.376	0.241	0.319	3.285	0.445
787	293.42	292.02	8	12	400	0.0035	0.113	1.694	0.336	0.361	2.27	0.664	0.113	1.694	0.336	0.361	2.27	0.664	0.113	1.627	0.194	0.361	2.271	0.351
788	296.13	295.34	8	8	79.01	0.0100	0.101	2.389	0.242	0.323	3.303	0.447	0.101	2.389	0.242	0.323	3.303	0.447	0.101	2.389	0.242	0.323	3.303	0.447
789	294.77	293.62	8	12	332.12	0.0035	0.11	1.678	0.333	0.354	2.252	0.656	0.11	1.678	0.333	0.354	2.252	0.656	0.11	1.611	0.193	0.354	2.25	0.348
790	291.82	290.59	8	12	308	0.0040	0.117	1.793	0.33	0.373	2.41	0.648	0.117	1.793	0.33	0.373	2.41	0.648	0.117	1.721	0.191	0.373	2.404	0.345
792	290.88	289.34	8	8	384.87	0.0040	0.003	0.611	0.057	0.01	0.87	0.098	0.003	0.611	0.057	0.01	0.87	0.098	0.003	0.611	0.057	0.01	0.87	0.098
793	289.14	288.03	8	8	276.4	0.0040	0.005	0.709	0.071	0.016	1.007	0.123	0.005	0.709	0.071	0.016	1.007	0.123	0.005	0.709	0.071	0.016	1.007	0.123
794	287.83	286.44	8	8	98.08	0.0142	0.011	1.403	0.077	0.036	1.991	0.134	0.011	1.403	0.077	0.036	1.991	0.134	0.011	1.403	0.077	0.036	1.991	0.134
795	288.83	288.03	8	8	250.03	0.0032	0.005	0.655	0.075	0.016	0.93	0.13	0.005	0.655	0.075	0.016	0.93	0.13	0.005	0.655	0.075	0.016	0.93	0.13
796	293.88	292.81	8	8	268.09	0.0040	0.003	0.586	0.053	0.009	0.835	0.092	0.003	0.586	0.053	0.009	0.835	0.092	0.003	0.586	0.053	0.009	0.835	0.092
797	292.81	291.75	8	8	265	0.0040	0.005	0.708	0.071	0.016	1.006	0.124	0.005	0.708	0.071	0.016	1.006	0.124	0.005	0.708	0.071	0.016	1.006	0.124
798	289.79	288.83	8	8	240	0.0040	0.002	0.495	0.041	0.005	0.705	0.071	0.002	0.495	0.041	0.005	0.705	0.071	0.002	0.495	0.041	0.005	0.705	0.071
799	315.73	308	8	8	360	0.0215	0.003	1.096	0.038	0.01	1.562	0.066	0.003	1.096	0.038	0.01	1.562	0.066	0.003	1.096	0.038	0.01	1.562	0.066
800	304.1	301.5	8	8	316.08	0.0082	0.005	0.888	0.058	0.015	1.264	0.1	0.005	0.888	0.058	0.015	1.264	0.1	0.005	0.888	0.058	0.015	1.264	0.1
801	305	304.1	8	8	300	0.0030	0.002	0.479	0.049	0.006	0.682	0.084	0.002	0.479	0.049	0.006	0.682	0.084	0.002	0.479	0.049	0.006	0.682	0.084
802	308	304.42	8	8	360	0.0099	0.006	1.015	0.061	0.019	1.444	0.106	0.006	1.015	0.061	0.019	1.444	0.106	0.006	1.015	0.061	0.019	1.444	0.106
803	301.7	300.98	8	8	300	0.0024	0.004	0.564	0.074	0.014	0.8	0.129	0.004	0.564	0.074	0.014	0.8	0.129	0.004	0.564	0.074	0.014	0.8	0.129
804	302.49	301.8	8	8	150	0.0046	0.002	0.519	0.04	0.005	0.74	0.068	0.002	0.519	0.04	0.005	0.74	0.068	0.002	0.519	0.04	0.005	0.74	0.068
805	300.98	298.7	8	8	316.06	0.0072	0.007	0.975	0.074	0.023	1.385	0.129	0.007	0.975	0.074	0.023	1.385	0.129	0.007	0.975	0.074	0.023	1.385	0.129
806	309.54	306.22	8	8	264	0.0126	0.005	1.054	0.054	0.016	1.5	0.094	0.005	1.054	0.054	0.016	1.5	0.094	0.005	1.054	0.054	0.016	1.5	0.094
807	306.22	303.29	8	8	248.41	0.0118	0.007	1.157	0.066	0.023	1.644	0.114	0.007	1.157	0.066	0.023	1.644	0.114	0.007	1.157	0.066	0.023	1.644	0.114
808	303.29	300.28	8	8	316.59	0.0095	0.01	1.194	0.082	0.033	1.694	0.142	0.01	1.194	0.082	0.033	1.694	0.142	0.01	1.194	0.082	0.033	1.694	0.142
809	300.71	300.08	8	8	180	0.0035	0.001	0.433	0.037	0.004	0.617	0.064	0.001	0.433	0.037	0.004	0.617	0.064	0.001	0.433	0.037	0.004	0.617	0.064
810	299.63	298.8	8	8	345	0.0024	0.017	0.849	0.142	0.053	1.196	0.251	0.017	0.849	0.142	0.053	1.196	0.251	0.017	0.849	0.142	0.053	1.196	0.251
811	298.8	295.9	8	8	350	0.0083	0.02	1.394	0.116	0.065	1.969	0.204	0.02	1.394	0.116	0.065	1.969	0.204	0.02	1.394	0.116	0.065	1.969	0.204
812	300.88	299.63	8	8	184.04	0.0068	0.014	1.168	0.103	0.046	1.652	0.18	0.014	1.168	0.103	0.046	1.652	0.18	0.014	1.168	0.103	0.046	1.652	0.18
813	306.95	306.42	8	8	100	0.0053	0.001	0.5	0.034	0.004	0.713	0.058	0.001	0.5	0.034	0.004	0.713	0.058	0.001	0.5	0.034	0.004	0.713	0.058
814	301.36	299.36	8	8	300	0.0067	0.005	0.846	0.063	0.016	1.203	0.109	0.005	0.846	0.063	0.016	1.203	0.109	0.005	0.846	0.063	0.016	1.203	0.109
815	307.3	301.36	8	8	238.44	0.0249	0.002	1.057	0.032	0.007	1.507	0.056	0.002	1.057	0.032	0.007	1.507	0.056	0.002	1.057	0.032	0.007	1.507	0.056
816	299.36	298.65	8	8	300	0.0024	0.008	0.681	0.101	0.026	0.965	0.177	0.008	0.681	0.101	0.026	0.965	0.177	0.008	0.681	0.101	0.026	0.965	0.177
817	321.2	320.12	8	8	71	0.0152	0.001	0.636	0.022	0.002	0.908	0.037	0.001	0.636	0.022	0.002	0.908	0.037	0.001	0.636	0.022	0.002	0.908	0.037
818	319.92	312.85	8	8	310.18	0.0228	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
819	312.65	311.72	8	8	231.83	0.0040	0.003	0.588	0.053	0.009	0.836	0.092	0.003	0.588	0.053	0.009	0.836	0.092	0.003	0.588	0.053	0.009	0.836	0.092
820	319.82	316.49	8	8	231.83	0.0144	0.003	0.915	0.039	0.009	1.304	0.068	0.003	0.915	0.039	0.009	1.304	0.068	0.003	0.915	0.039	0.009	1.304	0.068
821	316.19	311.82	8	8	310.12	0.0141	0.005	1.071	0.051	0.015	1.525	0.088	0.005	1.071	0.051	0.015	1.525	0.088	0.005	1.071	0.051	0.015	1.525	0.088
822	311.62	311.35	8	8	121.29	0.0022	0.008	0.667	0.103	0.026	0.944	0.18	0.008	0.667	0.103	0.026	0.944	0.18	0.008	0.667	0.103	0.026	0.944	0.18
823	311.15	310.88	8	8	119.27	0.0023	0.009	0.69	0.107	0.028	0.976	0.187	0.009	0.69	0.107	0.028	0.976	0.187	0.009	0.69	0.107	0.028	0.976	0.187
825	310.24	309.54	8	8	130	0.0054	0.01	0.957	0.09	0.031	1.356	0.158	0.01	0.957	0.09	0.031	1.356	0.158	0.01	0.957	0.09	0.031	1.356	0.158
826	309.54	302.39	8	8	350.42	0.0204	0.012	1.609	0.072	0.037	2.285	0.125	0.012	1.609	0.072	0.037	2.285	0.125	0.012	1.609	0.072	0.037	2.285	0.125
827	308.97	305.97	8	8	315.44	0.0095	0.003	0.826	0.046	0.01	1.176	0.08	0.003	0.826	0.046	0.01	1.176	0.08	0.003	0.826	0.046	0.01	1.176	0.08
828	304.74	300.99	8	8	260	0.0144	0.057	2.3	0.167	0.182	3.226	0.298	0.057	2.3	0.167	0.182	3.226	0.298	0.057	2.3	0.167	0.182	3.226	0.298

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
829	312.8	309.99	8	8	305	0.0092	0.002	0.661	0.034	0.005	0.943	0.058	0.002	0.661	0.034	0.005	0.943	0.058	0.002	0.661	0.034	0.005	0.943	0.058
830	300.79	296.33	8	8	180	0.0248	0.075	3.014	0.167	0.239	4.228	0.298	0.075	3.014	0.167	0.239	4.228	0.298	0.075	3.014	0.167	0.239	4.228	0.298
832	314.15	313.88	8	8	111.14	0.0024	0.005	0.581	0.077	0.015	0.825	0.134	0.005	0.581	0.077	0.015	0.825	0.134	0.005	0.581	0.077	0.015	0.825	0.134
833	313.46	312.64	8	8	260	0.0032	0.034	1.151	0.187	0.107	1.609	0.336	0.034	1.151	0.187	0.107	1.609	0.336	0.034	1.151	0.187	0.107	1.609	0.336
834	317.69	316.39	8	8	250	0.0052	0.002	0.613	0.047	0.007	0.874	0.08	0.002	0.613	0.047	0.007	0.874	0.08	0.002	0.613	0.047	0.007	0.874	0.08
835	318.79	313.46	8	8	310	0.0172	0.013	1.558	0.078	0.041	2.211	0.136	0.013	1.558	0.078	0.041	2.211	0.136	0.013	1.558	0.078	0.041	2.211	0.136
836	319.51	318.79	8	8	180	0.0040	0.01	0.884	0.101	0.034	1.252	0.176	0.01	0.884	0.101	0.034	1.252	0.176	0.01	0.884	0.101	0.034	1.252	0.176
837	316.39	312.84	8	8	240	0.0148	0.005	1.142	0.054	0.017	1.625	0.094	0.005	1.142	0.054	0.017	1.625	0.094	0.005	1.142	0.054	0.017	1.625	0.094
838	314.08	313.36	8	8	260	0.0028	0.018	0.911	0.142	0.057	1.283	0.251	0.018	0.911	0.142	0.057	1.283	0.251	0.018	0.911	0.142	0.057	1.283	0.251
839	312.84	307.33	8	8	255.07	0.0216	0.041	2.406	0.129	0.132	3.394	0.229	0.041	2.406	0.129	0.132	3.394	0.229	0.041	2.406	0.129	0.132	3.394	0.229
840	305.94	304.94	8	8	250	0.0040	0.006	0.754	0.078	0.02	1.07	0.136	0.006	0.754	0.078	0.02	1.07	0.136	0.006	0.754	0.078	0.02	1.07	0.136
841	302.39	300.99	8	8	350	0.0040	0.015	0.993	0.121	0.049	1.402	0.213	0.015	0.993	0.121	0.049	1.402	0.213	0.015	0.993	0.121	0.049	1.402	0.213
842	323.07	321.51	8	8	300	0.0052	0.003	0.67	0.053	0.01	0.953	0.092	0.003	0.67	0.053	0.01	0.953	0.092	0.003	0.67	0.053	0.01	0.953	0.092
843	321.51	318.6	8	8	260	0.0112	0.006	1.058	0.06	0.019	1.505	0.103	0.006	1.058	0.06	0.019	1.505	0.103	0.006	1.058	0.06	0.019	1.505	0.103
845	320.04	318.6	8	8	360.4	0.0040	0.003	0.611	0.057	0.01	0.869	0.098	0.003	0.611	0.057	0.01	0.869	0.098	0.003	0.611	0.057	0.01	0.869	0.098
846	318.4	314.08	8	8	230	0.0188	0.012	1.579	0.074	0.038	2.242	0.129	0.012	1.579	0.074	0.038	2.242	0.129	0.012	1.579	0.074	0.038	2.242	0.129
847	327	323.01	8	8	123	0.0324	0.002	1.023	0.025	0.005	1.46	0.043	0.002	1.023	0.025	0.005	1.46	0.043	0.002	1.023	0.025	0.005	1.46	0.043
860	351.93	347.72	8	8	126.35	0.0333	0.002	1.169	0.03	0.007	1.668	0.052	0.002	1.169	0.03	0.007	1.668	0.052	0.002	1.169	0.03	0.007	1.668	0.052
861	347.62	343.96	8	8	112.03	0.0327	0.005	1.435	0.042	0.015	2.045	0.072	0.005	1.435	0.042	0.015	2.045	0.072	0.005	1.435	0.042	0.015	2.045	0.072
862	346.44	338.9	8	8	112.47	0.0670	0.003	1.687	0.031	0.011	2.406	0.053	0.003	1.687	0.031	0.011	2.406	0.053	0.003	1.687	0.031	0.011	2.406	0.053
863	343.86	340.94	8	8	95.5	0.0306	0.005	1.47	0.046	0.017	2.093	0.079	0.005	1.47	0.046	0.017	2.093	0.079	0.005	1.47	0.046	0.017	2.093	0.079
864	340.88	340.4	8	8	144.25	0.0033	0.005	0.664	0.074	0.016	0.943	0.129	0.005	0.664	0.074	0.016	0.943	0.129	0.005	0.664	0.074	0.016	0.943	0.129
865	341.04	340.84	8	8	757.21	0.0003	0.01	0.34	0.194	0.033	0.475	0.35	0.01	0.34	0.194	0.033	0.475	0.35	0.01	0.34	0.194	0.033	0.475	0.35
866	347.11	341.04	8	8	168.5	0.0360	0.003	1.259	0.032	0.009	1.796	0.055	0.003	1.259	0.032	0.009	1.796	0.055	0.003	1.259	0.032	0.009	1.796	0.055
867	341.51	340.98	8	8	166.89	0.0032	0.003	0.585	0.063	0.011	0.831	0.11	0.003	0.585	0.063	0.011	0.831	0.11	0.003	0.585	0.063	0.011	0.831	0.11
868	340.3	339.36	8	8	294.25	0.0032	0.018	0.969	0.139	0.059	1.365	0.247	0.018	0.969	0.139	0.059	1.365	0.247	0.018	0.969	0.139	0.059	1.365	0.247
869	339.26	338.8	8	8	143.17	0.0032	0.024	1.053	0.159	0.078	1.478	0.283	0.024	1.053	0.159	0.078	1.478	0.283	0.024	1.053	0.159	0.078	1.478	0.283
870	339.92	339.51	8	8	103.57	0.0040	0.001	0.452	0.036	0.004	0.644	0.062	0.001	0.452	0.036	0.004	0.644	0.062	0.001	0.452	0.036	0.004	0.644	0.062
871	338.36	337.79	8	8	144.36	0.0039	0.002	0.557	0.05	0.007	0.794	0.086	0.002	0.557	0.05	0.007	0.794	0.086	0.002	0.557	0.05	0.007	0.794	0.086
873	337.44	336.22	8	8	224.08	0.0054	0.017	1.131	0.117	0.053	1.599	0.205	0.017	1.131	0.117	0.053	1.599	0.205	0.017	1.131	0.117	0.053	1.599	0.205
874	339.51	338.65	8	8	205	0.0042	0.003	0.621	0.056	0.01	0.884	0.097	0.003	0.621	0.056	0.01	0.884	0.097	0.003	0.621	0.056	0.01	0.884	0.097
875	338.65	337.79	8	8	205.69	0.0042	0.01	0.887	0.098	0.032	1.256	0.171	0.01	0.887	0.098	0.032	1.256	0.171	0.01	0.887	0.098	0.032	1.256	0.171
876	337.79	337.54	8	8	37.44	0.0067	0.015	1.171	0.105	0.047	1.657	0.183	0.015	1.171	0.105	0.047	1.657	0.183	0.015	1.171	0.105	0.047	1.657	0.183
877	338.7	338.06	8	8	238.29	0.0027	0.029	1.041	0.181	0.092	1.456	0.324	0.029	1.041	0.181	0.092	1.456	0.324	0.029	1.041	0.181	0.092	1.456	0.324
878	337.45	337.07	8	8	118.19	0.0032	0.038	1.199	0.197	0.121	1.674	0.356	0.038	1.199	0.197	0.121	1.674	0.356	0.038	1.199	0.197	0.121	1.674	0.356
879	338.65	338.16	8	8	152.97	0.0032	0.003	0.586	0.063	0.011	0.834	0.109	0.003	0.586	0.063	0.011	0.834	0.109	0.003	0.586	0.063	0.011	0.834	0.109
880	339.99	337.96	8	8	117.04	0.0173	0.003	1.018	0.04	0.01	1.45	0.069	0.003	1.018	0.04	0.01	1.45	0.069	0.003	1.018	0.04	0.01	1.45	0.069
881	336.97	336.6	8	8	114.98	0.0032	0.038	1.207	0.199	0.123	1.684	0.36	0.038	1.207	0.199	0.123	1.684	0.36	0.038	1.207	0.199	0.123	1.684	0.36
882	336.51	335.51	8	8	312.91	0.0032	0.042	1.235	0.208	0.134	1.72	0.377	0.042	1.235	0.208	0.134	1.72	0.377	0.042	1.235	0.208	0.134	1.72	0.377
883	338.35	337.34	8	8	252.08	0.0040	0.009	0.853	0.095	0.03	1.208	0.166	0.009	0.853	0.095	0.03	1.208	0.166	0.009	0.853	0.095	0.03	1.208	0.166
884	345.89	338.55	8	8	292.45	0.0251	0.005	1.341	0.046	0.016	1.91	0.08	0.005	1.341	0.046	0.016	1.91	0.08	0.005	1.341	0.046	0.016	1.91	0.08
885	339.52	338.55	8	8	243.36	0.0040	0.002	0.529	0.045	0.006	0.754	0.079	0.002	0.529	0.045	0.006	0.754	0.079	0.002	0.529	0.045	0.006	0.754	0.079
886	346.85	345.89	8	8	240.57	0.0040	0.003	0.586	0.053	0.009	0.835	0.092	0.003	0.586	0.053	0.009	0.835	0.092	0.003	0.586	0.053	0.009	0.835	0.092
887	346.04	337.34	8	8	306.43	0.0284	0.003	1.159	0.034	0.009	1.653	0.058	0.003	1.159	0.034	0.009	1.653	0.058	0.003	1.159	0.034	0.009	1.653	0.058
888	337.14	336.22	8	8	230.3	0.0040	0.015	0.978	0.118	0.047	1.381	0.208	0.015	0.978	0.118	0.047	1.381	0.208	0.015	0.978	0.118	0.047	1.381	0.208
889	343.09	339.41	8	8	255.35	0.0144	0.003	0.954	0.042	0.01	1.36	0.072	0.003	0.954	0.042	0.01	1.36	0.072	0.003	0.954	0.042	0.01	1.36	0.072
890	339.31	336.22	8	8	122.75	0.0252	0.005	1.311	0.044	0.015	1.867	0.077	0.005	1.311	0.044	0.015	1.867	0.077	0.005	1.311	0.044	0.015	1.867	0.077
891	336.02	335	8	8	254.51	0.0040	0.037	1.294	0.186	0.12	1.81	0.335	0.037	1.294	0.186	0.12	1.81	0.335	0.037	1.294	0.186	0.12	1.81	0.335
892	334.9	334.43	8	8	114.67	0.0041	0.038	1.308	0.186	0.121	1.83	0.335	0.038	1.308	0.186	0.121	1.83	0.335	0.038	1.308	0.186	0.121	1.83	0.335
893	338.24	337.55	8	8	172.27	0.0040	0.003	0.634	0.06	0.011	0.901	0.104	0.003	0.634	0.06	0.011	0.901	0.104	0.003	0.634	0.06	0.011	0.901	0.104
894	337.35	334.53	8	8	161.87	0.0174	0.007	1.326	0.06	0.024	1.886	0.104	0.007	1.326	0.06	0.024	1.886	0.104	0.007	1.326	0.06	0.024	1.886	0.104
895	334.33	333.05	8	8	321.61	0.0040	0.052	1.419	0.218	0.165	1.972	0.399	0.052	1.419	0.218	0.165	1.972	0.399	0.052	1.419	0.218	0.165	1.972	0.399
896	338.28	335.41	8	8	252	0.0114	0.005	1.019	0.056	0.016	1.45	0.096	0.005	1.019	0.056	0.016	1.45	0.096	0.005	1.019	0.056	0.016	1.45	0.096
897	341.13	338.38	8	8	242.01	0.0114	0.002	0.805	0.039	0.007	1.147	0.067	0.002	0.805	0.039	0.007	1.147	0.067	0.002	0.805	0.039	0.007	1.147	0.067
898	335.31	334.43	8	8	71.68	0.0123	0.006	1.114	0.06	0.02	1.585	0.104	0.006	1.114	0.06	0.02	1.585	0.104	0.006	1.114	0.06	0.02	1.585	0.104
899	355.23	354.43	8	8	200	0.0040	0.005	0.691	0.068	0.015	0.982	0.119	0.005	0.691	0.068	0.015	0.982	0.119	0.005	0.691	0.068	0.015	0.982	0.119
900	368.2	360.86	8	8	244.74	0.0300	0.004	1.356	0.041	0.014	1.933	0.071	0.004	1.356	0.041	0.014	1.933	0.071	0.004	1.356	0.041	0.014	1.933	0.071
902	346.37	345.54	8	8	258	0.0032	0.027	1.082	0.166	0.085	1.518	0.297	0.027	1.082	0.166	0.085	1.518	0.297	0.027	1.082	0.166	0.085	1.518	0.297
903	350.76	349.64	8	8	253	0.0044	0.014	0.989	0.111	0.043	1.399	0.195	0.014	0.989	0.111	0.043	1.399	0.195	0.014	0.989	0.111	0.043	1.399	0.195
904	353.01	350.76	8	8	205	0.0110	0.005	0.982	0.054	0.015	1.398	0.093	0.005	0.982	0.054	0.015	1.398	0.093	0.005	0.982	0.054	0.015	1.398	0.093
905	355.16	353.01	8	8	215	0.0100	0.002	0.77	0.04	0.007	1.097	0.069	0.002	0.77	0.04	0.007	1.097	0.069	0.002	0.77	0.04	0.007	1.097	0.069
906	354.23	350.96	8	8	254.79	0.0128	0.007	1.173	0.063	0.022	1.668	0.109	0.007	1.173	0.063	0.022	1.668	0.109	0.007	1.173	0.063	0.022	1.668	0.109
907	356.08	255.23	8	8	215.8	0.4673	0.002	2.922	0.016	0.007	4.173	0.028	0.002	2.922	0.016	0.007	4.173	0.028	0.002	2.922	0.016	0.007	4.173	0.028
908	356.19	354.23	8	8	65	0.0302	0.001	0.913	0.022	0.004	1.304	0.038	0.001	0.913	0.022	0.004	1.304	0.038	0.001	0.913	0.022	0.004	1.304	0.038
909	353	351.28	8	8	215	0.0080	0.002	0.712	0.042	0.007	1.015	0.073	0.002	0.712	0.042	0.007	1.015	0.073	0.002	0.712	0.042	0.007	1.015	0.073
910	351.28	349.44	8	8	205	0.0090	0.005	0.916	0.057	0.015	1.303	0.098	0.005	0.916	0.057	0.015	1.303	0.098	0.005	0.916	0.057	0.015	1.303	0.098
911	347.89	346.69	8	8	215	0.0056	0.002	0.629	0.046	0.007	0.895	0.079	0.002	0.629	0.046	0.007	0.895	0.079	0.002	0.629	0.046	0.007	0.895	0.079
912	346.69	345.54	8	8	205	0.0056	0.005	0.778	0.063	0.015	1.105	0.11	0.005	0.778	0.063	0.015	1.105	0.11	0.005	0.778	0.063	0.015	1.105	0.11
913	349.44	348.41	8	8	258	0.0040	0.02	1.08	0.139	0.066	1.522	0.246	0.02	1.08	0.139	0.066	1.522	0.246	0.02	1.08	0.139	0.066	1.522	0.246
914	348.21	347.39	8	8	205.04	0.0040	0.022	1.11	0.145	0.072	1.562	0.257	0.022	1.11	0.145	0.072	1.562	0.257	0.022	1.11	0.145	0.072	1.562	0.257
915	347.39	346.57	8	8	205	0.0040	0.025	1.143	0.152	0.079	1.607	0.27	0.025	1.143	0.152	0.079	1.607	0.27	0.025	1.143	0.152	0.079	1.607	0.27
916	345.34	344.77	8	8	143.4	0.0040	0.033	1.239	0.174	0.105	1.736	0.312	0.033	1.239	0.174	0.105	1.736	0.312	0.033	1.239	0.174	0.105	1.736	0.312
917	360.86	354.46	8	8	260	0.0246	0.007	1.471	0.054	0.022	2.094	0.094	0.007	1.471	0.054	0.022	2.094	0.094	0.007	1.471	0.054	0.022	2.094	0.094
918	359.94	354.55	8	8	241	0.0224	0.004	1.19	0.042	0.012	1.695	0.072	0.004	1.19	0.042	0.012	1.695	0.072	0.004	1.19	0.042	0.012	1.695	0.072
919	352.79	351.91	8	8	216	0.0041	0.004	0.658	0.063	0.012	0.936	0.109	0.004	0.658	0.063	0.012	0.936	0.109	0.004	0.658	0.063	0.012	0.936	0.109
920	351.68	350.78	8	8	221	0.0041	0.004	0.658	0.063	0.012	0.936	0.109	0.004	0.658	0.063	0.012	0.936	0.109	0.004	0.658	0.063	0.012	0.936	0.109
921	349.36	348.75	8	8	301	0.0020	0.028	0.932	0.19	0.089	1.302	0.342	0.028	0.932	0.19	0.089	1.302	0.342	0.028	0.932	0.19	0.089	1.302	0.342
922	348.75	348.13	8	8	254.68	0.0024	0.03	1.017	0.189	0.096	1.422	0.34	0.03	1.017	0.189	0.096	1.422	0.34	0.03	1.017	0.189	0.096	1.422	0.34
923	349.84	349.56	8	8	65	0.0043	0.001	0.465	0.035	0.004	0.663	0.061	0.001	0.465	0.035	0.004	0.663	0.061	0.001	0.465	0.035	0.004	0.663	0.061
924	350.55	349.56	8	8	242	0.0041	0.025	1.152	0.151	0.079	1.621	0.269	0.025	1.152	0.151	0.079	1.621	0.269	0.025	1.152	0.151	0.079	1.621	0.269
925	351.52	350.55	8	8	242	0.0040	0.019	1.057	0.134	0.061	1.49	0.236	0.019	1.057	0.134	0.061	1.49	0.236	0.019	1.057	0.134	0.061	1.49	0.236
926	354.36	351.62	8	8	261	0.0105	0.013	1.314	0.088	0.041	1.863	0.153	0.013	1.314	0.088	0.041	1.863	0.153	0.013	1.314	0.088	0.041	1.863	0.153

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
927	352.59	351.78	8	8	198	0.0041	0.002	0.499	0.041	0.005	0.711	0.07	0.002	0.499	0.041	0.005	0.711	0.07	0.002	0.499	0.041	0.005	0.711	0.07
928	353.72	352.89	8	8	203	0.0041	0.002	0.499	0.041	0.005	0.711	0.07	0.002	0.499	0.041	0.005	0.711	0.07	0.002	0.499	0.041	0.005	0.711	0.07
929	360.98	360.04	8	8	231	0.0041	0.001	0.456	0.036	0.004	0.65	0.061	0.001	0.456	0.036	0.004	0.65	0.061	0.001	0.456	0.036	0.004	0.65	0.061
930	361.36	361.06	8	8	71.26	0.0042	0.001	0.461	0.035	0.004	0.658	0.061	0.001	0.461	0.035	0.004	0.658	0.061	0.001	0.461	0.035	0.004	0.658	0.061
931	369.94	368.3	8	8	200.99	0.0082	0.002	0.634	0.035	0.005	0.904	0.06	0.002	0.634	0.035	0.005	0.904	0.06	0.002	0.634	0.035	0.005	0.904	0.06
932	335.41	334.67	8	8	164.9	0.0045	0.042	1.392	0.191	0.134	1.945	0.345	0.042	1.392	0.191	0.134	1.945	0.345	0.042	1.392	0.191	0.134	1.945	0.345
933	334.47	332	8	8	179.08	0.0138	0.043	2.083	0.147	0.138	2.931	0.262	0.043	2.083	0.147	0.138	2.931	0.262	0.043	2.083	0.147	0.138	2.931	0.262
934	332.85	332.31	8	8	295.05	0.0018	0.059	1.121	0.285	0.19	1.532	0.54	0.059	1.121	0.285	0.19	1.532	0.54	0.059	1.121	0.285	0.19	1.532	0.54
935	332.27	331.92	8	8	131.68	0.0027	0.061	1.292	0.263	0.196	1.777	0.492	0.061	1.292	0.263	0.196	1.777	0.492	0.061	1.292	0.263	0.196	1.777	0.492
936	339.48	337.98	8	8	324.99	0.0046	0.001	0.494	0.037	0.004	0.704	0.063	0.001	0.494	0.037	0.004	0.704	0.063	0.001	0.494	0.037	0.004	0.704	0.063
937	337.87	332.95	8	8	272.92	0.0180	0.004	1.148	0.047	0.014	1.635	0.081	0.004	1.148	0.047	0.014	1.635	0.081	0.004	1.148	0.047	0.014	1.635	0.081
938	331	330.52	8	8	350	0.0014	0.112	1.204	0.432	0.36	1.594	1	0.112	1.204	0.432	0.36	1.594	1	0.112	1.204	0.432	0.36	1.594	1
939	327.66	324.92	8	8	252.85	0.0108	0.192	2.955	0.33	0.69	4.053	0.706	0.192	2.955	0.33	0.69	4.053	0.706	0.192	2.955	0.33	0.69	4.053	0.706
940	331.8	331.13	8	8	243.03	0.0028	0.106	1.526	0.346	0.338	2.034	0.69	0.106	1.526	0.346	0.338	2.034	0.69	0.106	1.526	0.346	0.338	2.034	0.69
941	333.84	329.46	8	8	234	0.0187	0.013	1.635	0.079	0.043	2.32	0.137	0.013	1.635	0.079	0.043	2.32	0.137	0.013	1.635	0.079	0.043	2.32	0.137
942	336.33	331.42	8	8	295.77	0.0166	0.005	1.134	0.049	0.015	1.614	0.085	0.005	1.134	0.049	0.015	1.614	0.085	0.005	1.134	0.049	0.015	1.614	0.085
943	337.54	336.43	8	8	250.14	0.0044	0.002	0.513	0.04	0.005	0.731	0.069	0.002	0.513	0.04	0.005	0.731	0.069	0.002	0.513	0.04	0.005	0.731	0.069
944	338.16	337.99	8	8	89.89	0.0019	0.037	0.987	0.222	0.118	1.371	0.406	0.037	0.987	0.222	0.118	1.371	0.406	0.037	0.987	0.222	0.118	1.371	0.406
946	338.79	337.42	8	8	336.44	0.0041	0.004	0.677	0.065	0.014	0.963	0.114	0.004	0.677	0.065	0.014	0.963	0.114	0.004	0.677	0.065	0.014	0.963	0.114
947	339.55	338.82	8	8	147.11	0.0050	0.002	0.533	0.039	0.005	0.76	0.067	0.002	0.533	0.039	0.005	0.76	0.067	0.002	0.533	0.039	0.005	0.76	0.067
948	337.97	337.42	8	8	168.76	0.0033	0.038	1.204	0.196	0.12	1.681	0.354	0.038	1.204	0.196	0.12	1.681	0.354	0.038	1.204	0.196	0.12	1.681	0.354
949	337.06	336.46	8	8	150	0.0040	0.063	1.507	0.241	0.202	2.085	0.445	0.063	1.507	0.241	0.202	2.085	0.445	0.063	1.507	0.241	0.202	2.085	0.445
950	339.45	338.63	8	8	340	0.0024	0.002	0.47	0.056	0.007	0.668	0.096	0.002	0.47	0.056	0.007	0.668	0.096	0.002	0.47	0.056	0.007	0.668	0.096
951	336.99	333.84	8	8	163	0.0193	0.012	1.609	0.075	0.039	2.285	0.13	0.012	1.609	0.075	0.039	2.285	0.13	0.012	1.609	0.075	0.039	2.285	0.13
952	337.81	336.99	8	8	340	0.0024	0.01	0.731	0.111	0.032	1.034	0.195	0.01	0.731	0.111	0.032	1.034	0.195	0.01	0.731	0.111	0.032	1.034	0.195
953	338.63	337.81	8	8	340	0.0024	0.006	0.62	0.086	0.019	0.879	0.149	0.006	0.62	0.086	0.019	0.879	0.149	0.006	0.62	0.086	0.019	0.879	0.149
954	329.71	329.46	8	8	10	0.0250	0.114	3.424	0.205	0.364	4.771	0.372	0.114	3.424	0.205	0.364	4.771	0.372	0.114	3.424	0.205	0.364	4.771	0.372
955	338.44	336.99	8	8	82	0.0177	0.002	0.829	0.029	0.005	1.183	0.05	0.002	0.829	0.029	0.005	1.183	0.05	0.002	0.829	0.029	0.005	1.183	0.05
956	330.42	329.81	8	8	318.33	0.0019	0.113	1.363	0.395	0.362	1.604	1	0.113	1.363	0.395	0.362	1.604	1	0.113	1.363	0.395	0.362	1.604	1
957	331.14	330.17	8	8	405	0.0024	0.002	0.443	0.051	0.006	0.631	0.089	0.002	0.443	0.051	0.006	0.631	0.089	0.002	0.443	0.051	0.006	0.631	0.089
958	329.99	329.42	8	8	238.56	0.0024	0.009	0.712	0.107	0.03	1.007	0.188	0.009	0.712	0.107	0.03	1.007	0.188	0.009	0.712	0.107	0.03	1.007	0.188
959	329.22	328.74	8	8	282.5	0.0017	0.058	1.082	0.286	0.26	1.591	0.68	0.058	1.082	0.286	0.26	1.591	0.68	0.058	1.082	0.286	0.26	1.591	0.68
960	330.07	329.99	8	8	129	0.0006	0.006	0.393	0.122	0.02	0.555	0.215	0.006	0.393	0.122	0.02	0.555	0.215	0.006	0.393	0.122	0.02	0.555	0.215
961	331.91	330.07	8	8	340	0.0054	0.002	0.622	0.046	0.007	0.886	0.08	0.002	0.622	0.046	0.007	0.886	0.08	0.002	0.622	0.046	0.007	0.886	0.08
962	332.09	330.77	8	8	165	0.0080	0.041	1.699	0.165	0.207	2.704	0.373	0.041	1.699	0.165	0.207	2.704	0.373	0.041	1.699	0.165	0.207	2.704	0.373
963	330.82	330.09	8	8	183.5	0.0040	0.002	0.559	0.05	0.007	0.796	0.086	0.002	0.559	0.05	0.007	0.796	0.086	0.002	0.559	0.05	0.007	0.796	0.086
964	329.47	328.74	8	8	183.5	0.0040	0.002	0.559	0.05	0.007	0.796	0.086	0.002	0.559	0.05	0.007	0.796	0.086	0.002	0.559	0.05	0.007	0.796	0.086
965	330.57	330.09	8	8	282.5	0.0017	0.042	0.988	0.244	0.21	1.523	0.587	0.042	0.988	0.244	0.21	1.523	0.587	0.042	0.988	0.244	0.21	1.523	0.587
966	329.89	329.42	8	8	282.5	0.0017	0.046	1.01	0.258	0.224	1.533	0.617	0.046	1.01	0.258	0.224	1.533	0.617	0.046	1.01	0.258	0.224	1.533	0.617
967	328.54	327.86	8	8	282.54	0.0024	0.063	1.254	0.273	0.275	1.851	0.626	0.063	1.254	0.273	0.275	1.851	0.626	0.063	1.254	0.273	0.275	1.851	0.626
968	329.77	327.86	8	8	238.55	0.0080	0.128	2.364	0.29	0.41	3.227	0.55	0.128	2.364	0.29	0.41	3.227	0.55	0.128	2.364	0.29	0.41	3.227	0.55
970	324.92	323.46	8	8	120	0.0122	0.194	3.089	0.322	0.696	4.259	0.68	0.194	3.089	0.322	0.696	4.259	0.68	0.194	3.089	0.322	0.696	4.259	0.68
971	329.46	328.33	8	8	188.48	0.0060	0.002	0.57	0.037	0.005	0.812	0.064	0.002	0.57	0.037	0.005	0.812	0.064	0.002	0.57	0.037	0.005	0.812	0.064
972	326.81	325.64	8	8	283.3	0.0041	0.007	0.776	0.08	0.021	1.102	0.139	0.007	0.776	0.08	0.021	1.102	0.139	0.007	0.776	0.08	0.021	1.102	0.139
973	329.52	327.01	8	8	334.27	0.0075	0.002	0.616	0.035	0.005	0.878	0.061	0.002	0.616	0.035	0.005	0.878	0.061	0.002	0.616	0.035	0.005	0.878	0.061
974	328.15	325.64	8	8	125.64	0.0200	0.002	0.865	0.028	0.005	1.234	0.048	0.002	0.865	0.028	0.005	1.234	0.048	0.002	0.865	0.028	0.005	1.234	0.048
975	326.78	324.59	8	8	125.64	0.0174	0.002	0.825	0.029	0.005	1.177	0.05	0.002	0.825	0.029	0.005	1.177	0.05	0.002	0.825	0.029	0.005	1.177	0.05
976	323.42	322.72	8	8	174	0.0040	0.209	2.107	0.453	0.744	3.297	1	0.209	2.107	0.453	0.744	3.297	1	0.209	2.107	0.453	0.744	3.297	1
977	324.39	323.62	8	8	278.37	0.0028	0.014	0.853	0.127	0.046	1.203	0.225	0.014	0.853	0.127	0.046	1.203	0.225	0.014	0.853	0.127	0.046	1.203	0.225
978	325.44	324.59	8	8	283.3	0.0030	0.01	0.798	0.107	0.033	1.129	0.189	0.01	0.798	0.107	0.033	1.129	0.189	0.01	0.798	0.107	0.033	1.129	0.189
979	328.33	327.01	8	8	278.35	0.0047	0.003	0.622	0.051	0.009	0.886	0.088	0.003	0.622	0.051	0.009	0.886	0.088	0.003	0.622	0.051	0.009	0.886	0.088
980	324.34	323.18	8	8	291	0.0040	0.009	0.829	0.091	0.027	1.175	0.159	0.009	0.829	0.091	0.027	1.175	0.159	0.009	0.829	0.091	0.027	1.175	0.159
981	318.16	314.15	8	8	313.36	0.0128	0.002	0.839	0.038	0.007	1.195	0.065	0.002	0.839	0.038	0.007	1.195	0.065	0.002	0.839	0.038	0.007	1.195	0.065
982	322.72	319.51	8	8	240	0.0134	0.209	3.265	0.327	0.745	4.482	0.691	0.209	3.265	0.327	0.745	4.482	0.691	0.209	3.265	0.327	0.745	4.482	0.691
983	323.05	322.21	8	8	350	0.0024	0.005	0.589	0.079	0.016	0.836	0.138	0.005	0.589	0.079	0.016	0.836	0.138	0.005	0.589	0.079	0.016	0.836	0.138
984	321.19	320.45	8	8	309	0.0024	0.02	0.896	0.155	0.064	1.26	0.276	0.02	0.896	0.155	0.064	1.26	0.276	0.02	0.896	0.155	0.064	1.26	0.276
985	318.58	318.26	8	8	100	0.0032	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
986	319.31	319.15	8	8	10	0.0160	0.242	3.626	0.337	0.849	4.935	0.713	0.242	3.626	0.337	0.849	4.935	0.713	0.242	3.626	0.337	0.849	4.935	0.713
987	320.45	319.57	8	8	325	0.0027	0.021	0.946	0.153	0.066	1.33	0.273	0.021	0.946	0.153	0.066	1.33	0.273	0.021	0.946	0.153	0.066	1.33	0.273
988	325.32	324.34	8	8	196	0.0050	0.002	0.572	0.043	0.006	0.815	0.074	0.002	0.572	0.043	0.006	0.815	0.074	0.002	0.572	0.043	0.006	0.815	0.074
989	324.06	323.28	8	8	196	0.0040	0.002	0.494	0.041	0.005	0.704	0.071	0.002	0.494	0.041	0.005	0.704	0.071	0.002	0.494	0.041	0.005	0.704	0.071
990	326.54	325.76	8	8	196	0.0040	0.002	0.529	0.045	0.006	0.753	0.079	0.002	0.529	0.045	0.006	0.753	0.079	0.002	0.529	0.045	0.006	0.753	0.079
991	329	328.22	8	8	196	0.0040	0.001	0.4	0.03	0.002	0.57	0.051	0.001	0.4	0.03	0.002	0.57	0.051	0.001	0.4	0.03	0.002	0.57	0.051
992	328.22	323.01	8	8	278.57	0.0187	0.002	0.957	0.034	0.007	1.364	0.059	0.002	0.957	0.034	0.007	1.364	0.059	0.002	0.957	0.034	0.007	1.364	0.059
993	323.79	323.19	8	8	290	0.0021	0.005	0.575	0.086	0.017	0.816	0.15	0.005	0.575	0.086	0.017	0.816	0.15	0.005	0.575	0.086	0.017	0.816	0.15
994	322.73	322.37	8	8	148	0.0024	0.011	0.75	0.115	0.035	1.06	0.202	0.011	0.75	0.115	0.035	1.06	0.202	0.011	0.75	0.115	0.035	1.06	0.202
995	325.89	323.35	8	8	223	0.0114	0.001	0.576	0.023	0.002	0.821	0.04	0.001	0.576	0.023	0.002	0.821	0.04	0.001	0.576	0.023	0.002	0.821	0.04
996	323.25	322.73	8	8	173.97	0.0030	0.003	0.53	0.057	0.009	0.754	0.099	0.003	0.53	0.057	0.009	0.754	0.099	0.003	0.53	0.057	0.009	0.754	0.099
997	324.44	323.99	8	8	111.5	0.0040	0.001	0.455	0.036	0.004	0.648	0.062	0.001	0.455	0.036	0.004	0.648	0.062	0.001	0.455	0.036	0.004	0.648	0.062
998	323.74	323.29	8	8	111.5	0.0040	0.001	0.455	0.036	0.004	0.648	0.062	0.001	0.455	0.036	0.004	0.648	0.062	0.001	0.455	0.036	0.004	0.648	0.062
999	325.13	324.68	8	8	111.5	0.0040	0.002	0.531	0.045	0.006	0.757	0.078	0.002	0.531	0.045	0.006	0.757	0.078	0.002	0.531	0.045	0.006	0.757	0.078
1000	324.48	323.89	8	8	290	0.0020	0.003	0.464	0.062	0.009	0.659	0.108	0.003	0.464	0.062	0.009	0.659	0.108	0.003	0.464	0.062	0.009	0.659	0.108
1001	323.9	322.83	8	8	108.73	0.0098	0.008	1.104	0.07	0.025	1.568	0.122	0.008	1.104	0.07	0.025	1.568	0.122	0.008	1.104	0.07	0.025	1.568	0.122
1002	324.37	323.89	8	8	200	0.0024	0.001	0.335	0.033	0.002	0.478	0.057	0.001	0.335	0.033	0.002	0.478	0.057	0.001	0.335	0.033	0.002	0.478	0.057
1003	323.89	323.05	8	8	350	0.0024	0.004	0.559	0.073	0.013	0.794	0.127	0.004	0.559	0.073	0.013	0.794	0.127	0.004	0.559	0.073	0.013	0.794	0.127
1004	322.21	321.39	8	8	341	0.0024	0.017	0.848	0.141	0.053	1.194	0.25	0.017	0.848	0.141	0.053	1.194	0.25	0.017	0.848	0.141	0.053	1.194	0.25
1005	340.05	339.27	8	8	145	0.0054	0.001	0.444	0.028	0.002	0.633	0.048	0.001	0.444	0.028	0.002	0.633	0.048	0.001	0.444	0.028	0.002	0.633	0.048
1006	338.51	338.34	8	8	154.15	0.0011	0.035	0.803	0.248	0.112	1.109	0.458	0.035	0.803	0.248	0.112	1.109	0.458	0.035	0.803	0.248	0.112	1.109	0.458
1007	339.27	338.35	8	8	278.7	0.0033	0.034	1.176	0.186	0.109	1.645	0.336	0.034	1.176	0.186	0.109	1.645	0.336	0.034	1.176	0.186	0.109	1.645	0.336
1008	344.57	343.88	8	8	105	0.0066	0.033	1.484	0.155	0.106	2.085	0.276	0.033	1.484	0.155	0.106	2.085	0.276	0.033	1.484	0.155	0.106	2.085	0.276
1009	339.66	339.56	8	8	65.23	0.0015	0.001	0.325	0.045	0.004	0.463	0.077	0.001	0.325	0.045	0.004	0.463	0.077	0.001	0.325	0.045	0.004	0.463	0.077
1010	337.22	336.88	8	8	85.13	0.0040	0.043	1.341	0.198	0.136	1.872	0.358	0.043	1.341	0.198	0.136	1.872	0.358	0.043	1.341	0.198	0.136	1.872	0.358

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
1011	332.6	332.09	8	8	63	0.0081	0.001	0.511	0.025	0.002	0.73	0.043	0.001	0.511	0.025	0.002	0.73	0.043	0.001	0.511	0.025	0.002	0.73	0.043
1012	309.94	306.77	8	8	317	0.0100	0.012	1.267	0.086	0.038	1.797	0.15	0.012	1.267	0.086	0.038	1.797	0.15	0.012	1.267	0.086	0.038	1.797	0.15
1013	320.07	318.06	8	8	335	0.0060	0.003	0.676	0.048	0.009	0.962	0.084	0.003	0.676	0.048	0.009	0.962	0.084	0.003	0.676	0.048	0.009	0.962	0.084
1014	317.86	315.43	8	8	262.8	0.0092	0.006	0.99	0.062	0.019	1.407	0.108	0.006	0.99	0.062	0.019	1.407	0.108	0.006	0.99	0.062	0.019	1.407	0.108
1015	316.75	315.41	8	8	335	0.0040	0.003	0.587	0.053	0.009	0.835	0.092	0.003	0.587	0.053	0.009	0.835	0.092	0.003	0.587	0.053	0.009	0.835	0.092
1016	313.09	309.94	8	8	315.06	0.0100	0.011	1.242	0.084	0.036	1.762	0.146	0.011	1.242	0.084	0.036	1.762	0.146	0.011	1.242	0.084	0.036	1.762	0.146
1017	315.43	313.29	8	8	315.23	0.0068	0.01	1.062	0.089	0.033	1.506	0.155	0.01	1.062	0.089	0.033	1.506	0.155	0.01	1.062	0.089	0.033	1.506	0.155
1018	336.21	333.82	8	8	363.28	0.0066	0.065	1.814	0.216	0.209	2.522	0.394	0.065	1.814	0.216	0.209	2.522	0.394	0.065	1.814	0.216	0.209	2.522	0.394
1019	333.82	332.73	8	8	151.95	0.0072	0.067	1.889	0.215	0.216	2.627	0.392	0.067	1.889	0.215	0.216	2.627	0.392	0.067	1.889	0.215	0.216	2.627	0.392
1029	312.23	311.21	8	8	256	0.0040	0.008	0.806	0.087	0.025	1.142	0.152	0.008	0.806	0.087	0.025	1.142	0.152	0.008	0.806	0.087	0.025	1.142	0.152
1030	308.6	307.37	8	8	370.19	0.0033	0.016	0.938	0.128	0.051	1.323	0.226	0.016	0.938	0.128	0.051	1.323	0.226	0.016	0.938	0.128	0.051	1.323	0.226
1031	311.84	310	8	8	255	0.0072	0.002	0.65	0.04	0.006	0.927	0.068	0.002	0.65	0.04	0.006	0.927	0.068	0.002	0.65	0.04	0.006	0.927	0.068
1032	309.8	307.37	8	8	125	0.0194	0.016	1.752	0.085	0.052	2.484	0.148	0.016	1.752	0.085	0.052	2.484	0.148	0.016	1.752	0.085	0.052	2.484	0.148
1033	316.27	311.21	8	8	255	0.0198	0.003	1.024	0.037	0.009	1.46	0.063	0.003	1.024	0.037	0.009	1.46	0.063	0.003	1.024	0.037	0.009	1.46	0.063
1034	316.58	312.23	8	8	255	0.0171	0.003	0.971	0.038	0.009	1.385	0.065	0.003	0.971	0.038	0.009	1.385	0.065	0.003	0.971	0.038	0.009	1.385	0.065
1035	313.44	312.23	8	8	297.42	0.0041	0.003	0.59	0.053	0.009	0.84	0.092	0.003	0.59	0.053	0.009	0.84	0.092	0.003	0.59	0.053	0.009	0.84	0.092
1036	311.01	310	8	8	254	0.0040	0.013	0.936	0.111	0.041	1.323	0.194	0.013	0.936	0.111	0.041	1.323	0.194	0.013	0.936	0.111	0.041	1.323	0.194
1037	313.59	313.44	8	8	87.58	0.0017	0.002	0.394	0.055	0.006	0.561	0.096	0.002	0.394	0.055	0.006	0.561	0.096	0.002	0.394	0.055	0.006	0.561	0.096
1038	313.6	312.24	8	8	179	0.0076	0.006	0.954	0.069	0.021	1.355	0.119	0.006	0.954	0.069	0.021	1.355	0.119	0.006	0.954	0.069	0.021	1.355	0.119
1039	315.38	315.18	8	8	71	0.0028	0.001	0.401	0.039	0.004	0.572	0.067	0.001	0.401	0.039	0.004	0.572	0.067	0.001	0.401	0.039	0.004	0.572	0.067
1040	314.98	313.6	8	8	193	0.0072	0.004	0.837	0.059	0.014	1.191	0.102	0.004	0.837	0.059	0.014	1.191	0.102	0.004	0.837	0.059	0.014	1.191	0.102
1041	307.27	306.91	8	8	150.03	0.0024	0.034	1.045	0.2	0.107	1.458	0.362	0.034	1.045	0.2	0.107	1.458	0.362	0.034	1.045	0.2	0.107	1.458	0.362
1042	310.13	309.46	8	8	256	0.0026	0.008	0.706	0.099	0.026	1	0.173	0.008	0.706	0.099	0.026	1	0.173	0.008	0.706	0.099	0.026	1	0.173
1043	312.78	310.23	8	8	323.55	0.0079	0.003	0.743	0.045	0.009	1.058	0.078	0.003	0.743	0.045	0.009	1.058	0.078	0.003	0.743	0.045	0.009	1.058	0.078
1044	312.01	309.46	8	8	322.54	0.0079	0.003	0.744	0.045	0.009	1.059	0.078	0.003	0.744	0.045	0.009	1.059	0.078	0.003	0.744	0.045	0.009	1.059	0.078
1045	311.04	310.23	8	8	302.4	0.0027	0.003	0.532	0.062	0.01	0.756	0.108	0.003	0.532	0.062	0.01	0.756	0.108	0.003	0.532	0.062	0.01	0.756	0.108
1046	309.36	308.6	8	8	253.97	0.0030	0.013	0.855	0.12	0.042	1.207	0.212	0.013	0.855	0.12	0.042	1.207	0.212	0.013	0.855	0.12	0.042	1.207	0.212
1047	311.3	311.04	8	8	87.58	0.0030	0.002	0.478	0.049	0.006	0.68	0.084	0.002	0.478	0.049	0.006	0.68	0.084	0.002	0.478	0.049	0.006	0.68	0.084
1050	312.2	310.19	8	8	197.81	0.0102	0.003	0.811	0.043	0.009	1.156	0.074	0.003	0.811	0.043	0.009	1.156	0.074	0.003	0.811	0.043	0.009	1.156	0.074
1051	310.19	308.38	8	8	179.21	0.0101	0.004	0.929	0.053	0.014	1.322	0.091	0.004	0.929	0.053	0.014	1.322	0.091	0.004	0.929	0.053	0.014	1.322	0.091
1052	312.9	312.2	8	8	71	0.0099	0.001	0.62	0.029	0.004	0.884	0.05	0.001	0.62	0.029	0.004	0.884	0.05	0.001	0.62	0.029	0.004	0.884	0.05
1056	311.2	306.61	8	8	261	0.0176	0.006	1.238	0.054	0.019	1.762	0.093	0.006	1.238	0.054	0.019	1.762	0.093	0.006	1.238	0.054	0.019	1.762	0.093
1057	303.22	302.6	8	8	256	0.0024	0.018	0.869	0.146	0.057	1.223	0.26	0.018	0.869	0.146	0.057	1.223	0.26	0.018	0.869	0.146	0.057	1.223	0.26
1058	307.06	306.61	8	8	185	0.0024	0.004	0.55	0.071	0.012	0.781	0.123	0.004	0.55	0.071	0.012	0.781	0.123	0.004	0.55	0.071	0.012	0.781	0.123
1059	307.51	307.06	8	8	87	0.0052	0.002	0.541	0.039	0.005	0.771	0.066	0.002	0.541	0.039	0.005	0.771	0.066	0.002	0.541	0.039	0.005	0.771	0.066
1060	313.21	312.4	8	8	253.51	0.0032	0.001	0.419	0.038	0.004	0.598	0.065	0.001	0.419	0.038	0.004	0.598	0.065	0.001	0.419	0.038	0.004	0.598	0.065
1061	312.4	311.2	8	8	200	0.0060	0.004	0.753	0.057	0.012	1.071	0.099	0.004	0.753	0.057	0.012	1.071	0.099	0.004	0.753	0.057	0.012	1.071	0.099
1063	303.07	302.6	8	8	195	0.0024	0.004	0.548	0.071	0.012	0.779	0.123	0.004	0.548	0.071	0.012	0.779	0.123	0.004	0.548	0.071	0.012	0.779	0.123
1064	305.94	304.57	8	8	185	0.0074	0.002	0.694	0.043	0.007	0.988	0.074	0.002	0.694	0.043	0.007	0.988	0.074	0.002	0.694	0.043	0.007	0.988	0.074
1065	304.57	302.22	8	8	185	0.0127	0.004	0.977	0.048	0.012	1.392	0.083	0.004	0.977	0.048	0.012	1.392	0.083	0.004	0.977	0.048	0.012	1.392	0.083
1066	303.49	303.07	8	8	177.1	0.0024	0.002	0.442	0.051	0.006	0.629	0.089	0.002	0.442	0.051	0.006	0.629	0.089	0.002	0.442	0.051	0.006	0.629	0.089
1067	302.4	301.92	8	8	200	0.0024	0.024	0.942	0.168	0.075	1.321	0.301	0.024	0.942	0.168	0.075	1.321	0.301	0.024	0.942	0.168	0.075	1.321	0.301
1068	306.41	303.22	8	8	256	0.0125	0.012	1.355	0.081	0.037	1.923	0.141	0.012	1.355	0.081	0.037	1.923	0.141	0.012	1.355	0.081	0.037	1.923	0.141
1069	301.92	298.57	8	8	132.94	0.0252	0.025	2.198	0.099	0.082	3.112	0.174	0.025	2.198	0.099	0.082	3.112	0.174	0.025	2.198	0.099	0.082	3.112	0.174
1070	302.53	298.8	8	8	252.01	0.0148	0.017	1.615	0.093	0.054	2.289	0.162	0.017	1.615	0.093	0.054	2.289	0.162	0.017	1.615	0.093	0.054	2.289	0.162
1071	307.59	303.75	8	8	300	0.0128	0.002	0.839	0.038	0.007	1.196	0.065	0.002	0.839	0.038	0.007	1.196	0.065	0.002	0.839	0.038	0.007	1.196	0.065
1072	303.11	302.73	8	8	167.73	0.0023	0.007	0.651	0.097	0.023	0.922	0.17	0.007	0.651	0.097	0.023	0.922	0.17	0.007	0.651	0.097	0.023	0.922	0.17
1073	303.75	303.11	8	8	267.7	0.0024	0.005	0.592	0.08	0.016	0.84	0.14	0.005	0.592	0.08	0.016	0.84	0.14	0.005	0.592	0.08	0.016	0.84	0.14
1074	308.5	303.95	8	8	254.38	0.0179	0.003	0.988	0.037	0.009	1.408	0.065	0.003	0.988	0.037	0.009	1.408	0.065	0.003	0.988	0.037	0.009	1.408	0.065
1075	304.85	303.28	8	8	220.06	0.0071	0.001	0.489	0.026	0.002	0.698	0.045	0.001	0.489	0.026	0.002	0.698	0.045	0.001	0.489	0.026	0.002	0.698	0.045
1076	303.18	302.73	8	8	231.87	0.0019	0.008	0.636	0.106	0.026	0.9	0.186	0.008	0.636	0.106	0.026	0.9	0.186	0.008	0.636	0.106	0.026	0.9	0.186
1077	299.5	298.8	8	8	206.57	0.0034	0.002	0.529	0.051	0.007	0.752	0.089	0.002	0.529	0.051	0.007	0.752	0.089	0.002	0.529	0.051	0.007	0.752	0.089
1078	298.8	298.57	8	8	180.34	0.0013	0.021	0.727	0.185	0.067	1.017	0.332	0.021	0.727	0.185	0.067	1.017	0.332	0.021	0.727	0.185	0.067	1.017	0.332
1079	297.55	296.9	8	8	185.51	0.0035	0.05	1.344	0.222	0.16	1.867	0.406	0.05	1.344	0.222	0.16	1.867	0.406	0.05	1.344	0.222	0.16	1.867	0.406
1080	300.55	297.55	8	8	60	0.0500	0.001	0.961	0.016	0.002	1.373	0.028	0.001	0.961	0.016	0.002	1.373	0.028	0.001	0.961	0.016	0.002	1.373	0.028
1081	298.03	297.55	8	8	198.9	0.0024	0.048	1.164	0.239	0.154	1.611	0.441	0.048	1.164	0.239	0.154	1.611	0.441	0.048	1.164	0.239	0.154	1.611	0.441
1082	298.37	298.03	8	8	142.55	0.0024	0.047	1.149	0.236	0.149	1.591	0.434	0.047	1.149	0.236	0.149	1.591	0.434	0.047	1.149	0.236	0.149	1.591	0.434
1083	296.9	296.52	8	8	157.11	0.0024	0.051	1.184	0.246	0.163	1.636	0.454	0.051	1.184	0.246	0.163	1.636	0.454	0.051	8.365	0.064	0.163	11.892	0.111
1087	303.95	303.28	8	8	278.89	0.0024	0.005	0.593	0.08	0.016	0.841	0.14	0.005	0.593	0.08	0.016	0.841	0.14	0.005	0.593	0.08	0.016	0.841	0.14
1091	339.88	338.5	8	8	344.73	0.0040	0.011	0.893	0.102	0.035	1.263	0.179	0.011	0.893	0.102	0.035	1.263	0.179	0.011	0.893	0.102	0.035	1.263	0.179
1092	342.66	341.81	8	8	212.04	0.0040	0.004	0.674	0.066	0.014	0.957	0.114	0.004	0.674	0.066	0.014	0.957	0.114	0.004	0.674	0.066	0.014	0.957	0.114
1093	342.85	341.87	8	8	244.11	0.0040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1094	341.67	340.45	8	8	306.07	0.0040	0.003	0.61	0.057	0.01	0.868	0.098	0.003	0.61	0.057	0.01	0.868	0.098	0.003	0.61	0.057	0.01	0.868	0.098
1095	340.25	339.34	8	8	226.31	0.0040	0.005	0.709	0.071	0.016	1.007	0.123	0.005	0.709	0.071	0.016	1.007	0.123	0.005	0.709	0.071	0.016	1.007	0.123
1096	339.14	338.5	8	8	160.98	0.0040	0.008	0.805	0.087	0.025	1.141	0.152	0.008	0.805	0.087	0.025	1.141	0.152	0.008	0.805	0.087	0.025	1.141	0.152
1097	340.42	340.08	8	8	85	0.0040	0.003	0.587	0.053	0.009	0.835	0.092	0.003	0.587	0.053	0.009	0.835	0.092	0.003	0.587	0.053	0.009	0.835	0.092
1098	340.83	339.01	8	8	251.92	0.0072	0.002	0.688	0.043	0.007	0.98	0.074	0.002	0.688	0.043	0.007	0.98	0.074	0.002	0.688	0.043	0.007	0.98	0.074
1099	343.94	342.85	8	8	223.73	0.0049	0.002	0.6	0.047	0.007	0.854	0.082	0.002	0.6	0.047	0.007	0.854	0.082	0.002	0.6	0.047	0.007	0.854	0.082
1100	347.88	343.94	8	8	89.64	0.0440	0.002	1.137	0.023	0.005	1.623	0.04	0.002	1.137	0.023	0.005	1.623	0.04	0.002	1.137	0.023	0.005	1.623	0.04
1104	343.21	341.54	8	8	106.94	0.0156	0.002	0.794	0.03	0.005	1.133	0.051	0.002	0.794	0.03	0.005	1.133	0.051	0.002	0.794	0.03	0.005	1.133	0.051
1107	338.48	337.16	8	8	236.56	0.0056	0.003	0.659	0.049	0.009	0.938	0.085	0.003	0.659	0.049	0.009	0.938	0.085	0.003	0.659	0.049	0.009	0.938	0.085
1108	338.1	336.21	8	8	236.46	0.0080	0.003	0.747	0.045	0.009	1.063	0.078	0.003	0.747	0.045	0.009	1.063	0.078	0.003	0.747	0.045	0.009	1.063	0.078
1109	336.21	334.34	8	8	233.46	0.0080	0.005	0.902	0.06	0.016	1.282	0.105	0.005	0.902	0.06	0.016	1.282	0.105	0.005	0.902	0.06	0.016	1.282	0.105
1110	337.16	335.85	8	8	223.46	0.0059	0.005	0.827	0.067	0.017	1.176	0.117	0.005	0.827	0.067	0.017	1.176	0.117	0.005	0.827	0.067	0.017	1.176	0.117
1111	344.39	341.61	8	8	215.23	0.0129	0.001	0.681	0.027	0.004	0.971	0.047	0.001	0.681	0.027	0.004	0.971	0.047	0.001	0.681	0.027	0.004	0.971	0.047
1112	341.61	340.08	8	8	383	0.0040	0.007	0.794	0.085	0.023	1.126	0.148	0.007	0.794	0.085	0.023	1.126	0.148	0.007	0.794	0.085	0.023	1.126	0.148
1113	338.3	337.26	8	8	260.01	0.0040	0.02	1.074	0.137	0.064	1.514	0.243	0.02	1.074	0.137	0.064	1.514	0.243	0.02	1.074	0.137	0.064	1.514	0.243
1116	332.95	331.74	8	8	270.6	0.0045	0.018	1.084	0.127	0.058	1.53	0.225	0.018	1.084	0.127	0.058	1.53	0.225	0.018	1.084	0.127	0.058	1.53	0.225
1117	333.53	331.74	8	8	318.79	0.0056	0.004	0.757	0.061	0.014	1.077	0.105	0.004	0.757	0.061	0.014	1.077	0.105	0.004	0.757	0.061	0.014	1.077	0.105
1119	334.12	333.83	8	8	122.04	0.0024	0.002	0.467	0.056	0.007	0.665	0.097	0.002	0.467	0.056	0.007	0.665	0.097	0.002	0.467	0.056	0.007	0.665	0.097
1120	331.06	326.8	8	8	280	0.0152	0.025	1.834	0.111	0.08	2.593	0.195	0.025	1.834	0.111	0.08	2.593	0.195	0.025	1.834	0.111	0.08	2.593	0.195
1121	331.54	331.06	8	8	92.76	0.0052	0.024	1.233	0.139	0.075	1.737	0.247	0.024	1.233	0.139	0.075	1.737	0.247	0.024	1.233	0.139	0.075	1.737	0.247

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
1122	335.47	334.31	8	8	207.46	0.0056	0.002	0.629	0.046	0.007	0.896	0.079	0.002	0.629	0.046	0.007	0.896	0.079	0.002	0.629	0.046	0.007	0.896	0.079
1123	334.31	333.15	8	8	207.47	0.0056	0.005	0.777	0.063	0.015	1.104	0.11	0.005	0.777	0.063	0.015	1.104	0.11	0.005	0.777	0.063	0.015	1.104	0.11
1124	336.83	335.67	8	8	207.46	0.0056	0.002	0.629	0.046	0.007	0.896	0.079	0.002	0.629	0.046	0.007	0.896	0.079	0.002	0.629	0.046	0.007	0.896	0.079
1125	335.67	334.51	8	8	207.47	0.0056	0.005	0.777	0.063	0.015	1.104	0.11	0.005	0.777	0.063	0.015	1.104	0.11	0.005	0.777	0.063	0.015	1.104	0.11
1126	339.09	338.43	8	8	207.46	0.0032	0.002	0.489	0.048	0.006	0.697	0.083	0.002	0.489	0.048	0.006	0.697	0.083	0.002	0.489	0.048	0.006	0.697	0.083
1127	338.43	335.86	8	8	207.47	0.0124	0.004	0.969	0.048	0.012	1.379	0.083	0.004	0.969	0.048	0.012	1.379	0.083	0.004	0.969	0.048	0.012	1.379	0.083
1128	336.17	335.86	8	8	60.29	0.0051	0	0.353	0.02	0.001	0.504	0.035	0	0.353	0.02	0.001	0.504	0.035	0	0.353	0.02	0.001	0.504	0.035
1129	335.66	334.51	8	8	261	0.0044	0.005	0.749	0.072	0.017	1.064	0.125	0.005	0.749	0.072	0.017	1.064	0.125	0.005	0.749	0.072	0.017	1.064	0.125
1130	334.31	333.15	8	8	261	0.0044	0.011	0.936	0.101	0.036	1.325	0.178	0.011	0.936	0.101	0.036	1.325	0.178	0.011	0.936	0.101	0.036	1.325	0.178
1131	330.19	329.2	8	8	310	0.0032	0.01	0.797	0.102	0.031	1.129	0.179	0.01	0.797	0.102	0.031	1.129	0.179	0.01	0.797	0.102	0.031	1.129	0.179
1132	333.37	332.72	8	8	203	0.0032	0.002	0.458	0.043	0.005	0.652	0.074	0.002	0.458	0.043	0.005	0.652	0.074	0.002	0.458	0.043	0.005	0.652	0.074
1134	329.85	329	8	8	203	0.0042	0.002	0.538	0.045	0.006	0.767	0.078	0.002	0.538	0.045	0.006	0.767	0.078	0.002	0.538	0.045	0.006	0.767	0.078
1136	335.2	332.92	8	8	270.82	0.0084	0.002	0.725	0.042	0.007	1.033	0.072	0.002	0.725	0.042	0.007	1.033	0.072	0.002	0.725	0.042	0.007	1.033	0.072
1137	332.92	330.19	8	8	310	0.0088	0.006	0.993	0.065	0.02	1.411	0.113	0.006	0.993	0.065	0.02	1.411	0.113	0.006	0.993	0.065	0.02	1.411	0.113
1138	329.2	328.07	8	8	290.06	0.0039	0.014	0.961	0.117	0.046	1.358	0.207	0.014	0.961	0.117	0.046	1.358	0.207	0.014	0.961	0.117	0.046	1.358	0.207
1140	329.18	327.82	8	8	394.93	0.0034	0.003	0.601	0.062	0.011	0.855	0.107	0.003	0.601	0.062	0.011	0.855	0.107	0.003	0.601	0.062	0.011	0.855	0.107
1141	325.88	324.62	8	12	338.5	0.0037	0.172	1.943	0.414	0.549	2.433	1	0.172	1.943	0.414	0.549	2.433	1	0.172	1.879	0.236	0.549	2.603	0.434
1142	327.82	327.02	8	8	201	0.0040	0.01	0.872	0.099	0.032	1.234	0.173	0.01	0.872	0.099	0.032	1.234	0.173	0.01	0.872	0.099	0.032	1.234	0.173
1143	328.16	327.5	8	12	259	0.0025	0.159	1.657	0.442	0.509	2.258	1	0.159	1.657	0.442	0.509	2.258	1	0.159	1.608	0.25	0.51	2.219	0.463
1144	327.5	326.61	8	12	353.7	0.0025	0.16	1.653	0.445	0.513	2.274	1	0.16	1.653	0.445	0.513	2.274	1	0.16	1.604	0.251	0.513	2.213	0.466
1145	326.61	326.52	8	12	42.3	0.0021	0.161	1.555	0.468	0.515	2.284	1	0.161	1.555	0.468	0.515	2.284	1	0.161	1.513	0.263	0.516	2.081	0.491
1146	326.52	325.88	8	12	305	0.0021	0.171	1.57	0.486	0.547	2.423	1	0.171	1.57	0.486	0.547	2.423	1	0.171	1.531	0.272	0.547	2.101	0.51
1147	331.52	329.72	8	8	250	0.0072	0.002	0.65	0.04	0.006	0.926	0.068	0.002	0.65	0.04	0.006	0.926	0.068	0.002	0.65	0.04	0.006	0.926	0.068
1148	329.72	327.92	8	8	250.07	0.0072	0.004	0.826	0.057	0.014	1.175	0.099	0.004	0.826	0.057	0.014	1.175	0.099	0.004	0.826	0.057	0.014	1.175	0.099
1149	321.4	320.42	8	8	240	0.0041	0.025	1.151	0.151	0.079	1.619	0.269	0.025	1.151	0.151	0.079	1.619	0.269	0.025	1.151	0.151	0.079	1.619	0.269
1150	328.89	328.11	8	8	196	0.0040	0.002	0.494	0.041	0.005	0.704	0.071	0.002	0.494	0.041	0.005	0.704	0.071	0.002	0.494	0.041	0.005	0.704	0.071
1151	324.96	324.1	8	8	211	0.0041	0.004	0.658	0.063	0.012	0.936	0.108	0.004	0.658	0.063	0.012	0.936	0.108	0.004	0.658	0.063	0.012	0.936	0.108
1152	327.08	326.55	8	8	132.37	0.0040	0.006	0.74	0.076	0.019	1.05	0.132	0.006	0.74	0.076	0.019	1.05	0.132	0.006	0.74	0.076	0.019	1.05	0.132
1153	325.05	323.1	8	8	211	0.0092	0.004	0.875	0.052	0.012	1.246	0.089	0.004	0.875	0.052	0.012	1.246	0.089	0.004	0.875	0.052	0.012	1.246	0.089
1154	322.47	321.6	8	8	214.58	0.0041	0.004	0.657	0.063	0.012	0.934	0.109	0.004	0.657	0.063	0.012	0.934	0.109	0.004	0.657	0.063	0.012	0.934	0.109
1155	322.32	321.49	8	8	204.59	0.0041	0.002	0.497	0.041	0.005	0.709	0.07	0.002	0.497	0.041	0.005	0.709	0.07	0.002	0.497	0.041	0.005	0.709	0.07
1156	321.49	320.62	8	8	214.58	0.0041	0.004	0.657	0.063	0.012	0.934	0.109	0.004	0.657	0.063	0.012	0.934	0.109	0.004	0.657	0.063	0.012	0.934	0.109
1157	325	322.47	8	8	204.58	0.0124	0.002	0.732	0.031	0.005	1.044	0.054	0.002	0.732	0.031	0.005	1.044	0.054	0.002	0.732	0.031	0.005	1.044	0.054
1158	326.44	325.5	8	8	200.09	0.0047	0.002	0.523	0.039	0.005	0.746	0.068	0.002	0.523	0.039	0.005	0.746	0.068	0.002	0.523	0.039	0.005	0.746	0.068
1159	325.81	324.96	8	8	208.14	0.0041	0.002	0.498	0.041	0.005	0.71	0.07	0.002	0.498	0.041	0.005	0.71	0.07	0.002	0.498	0.041	0.005	0.71	0.07
1160	328.01	327.28	8	8	182.06	0.0040	0.004	0.674	0.066	0.014	0.958	0.114	0.004	0.674	0.066	0.014	0.958	0.114	0.004	0.674	0.066	0.014	0.958	0.114
1161	324.39	323.9	8	8	118	0.0042	0.007	0.805	0.084	0.024	1.141	0.147	0.007	0.805	0.084	0.024	1.141	0.147	0.007	0.805	0.084	0.024	1.141	0.147
1162	323.9	322.9	8	8	245.5	0.0041	0.012	0.935	0.108	0.04	1.323	0.19	0.012	0.935	0.108	0.04	1.323	0.19	0.012	0.935	0.108	0.04	1.323	0.19
1163	322.9	321.4	8	8	245.5	0.0061	0.019	1.217	0.119	0.059	1.719	0.21	0.019	1.217	0.119	0.059	1.719	0.21	0.019	1.217	0.119	0.059	1.719	0.21
1164	320.42	319.81	8	8	151	0.0040	0.03	1.212	0.166	0.095	1.7	0.296	0.03	1.212	0.166	0.095	1.7	0.296	0.03	1.212	0.166	0.095	1.7	0.296
1165	313.7	313.3	8	8	119	0.0034	0	0.305	0.022	0.001	0.435	0.038	0	0.305	0.022	0.001	0.435	0.038	0	0.305	0.022	0.001	0.435	0.038
1166	313.2	312.91	8	8	85	0.0034	0.001	0.429	0.037	0.004	0.611	0.064	0.001	0.429	0.037	0.004	0.611	0.064	0.001	0.429	0.037	0.004	0.611	0.064
1167	313.89	313.8	8	8	23	0.0039	0	0.321	0.022	0.001	0.459	0.037	0	0.321	0.022	0.001	0.459	0.037	0	0.321	0.022	0.001	0.459	0.037
1168	306.62	306	8	8	256	0.0024	0.011	0.757	0.117	0.036	1.069	0.206	0.011	0.757	0.117	0.036	1.069	0.206	0.011	0.757	0.117	0.036	1.069	0.206
1169	300.08	298.09	8	8	463.13	0.0043	0.025	1.183	0.151	0.081	1.663	0.269	0.025	1.183	0.151	0.081	1.663	0.269	0.025	1.183	0.151	0.081	1.663	0.269
1170	305.04	300.28	8	8	165	0.0288	0.025	2.304	0.096	0.082	3.264	0.168	0.025	2.304	0.096	0.082	3.264	0.168	0.025	2.304	0.096	0.082	3.264	0.168
1171	306	305.04	8	8	210	0.0046	0.007	0.818	0.08	0.022	1.161	0.14	0.007	0.818	0.08	0.022	1.161	0.14	0.007	0.818	0.08	0.022	1.161	0.14
1172	307.44	306.82	8	8	256	0.0024	0.005	0.594	0.08	0.016	0.843	0.139	0.005	0.594	0.08	0.016	0.843	0.139	0.005	0.594	0.08	0.016	0.843	0.139
1173	308.71	306.6	8	8	352.31	0.0060	0.005	0.796	0.062	0.015	1.131	0.108	0.005	0.796	0.062	0.015	1.131	0.108	0.005	0.796	0.062	0.015	1.131	0.108
1174	309.02	306.01	8	8	367.31	0.0082	0.003	0.784	0.048	0.01	1.117	0.083	0.003	0.784	0.048	0.01	1.117	0.083	0.003	0.784	0.048	0.01	1.117	0.083
1175	308	306.82	8	8	367.31	0.0032	0.003	0.566	0.06	0.01	0.805	0.103	0.003	0.566	0.06	0.01	0.805	0.103	0.003	0.566	0.06	0.01	0.805	0.103
1176	308.81	307.64	8	8	367.31	0.0032	0.003	0.542	0.056	0.009	0.771	0.097	0.003	0.542	0.056	0.009	0.771	0.097	0.003	0.542	0.056	0.009	0.771	0.097
1177	305.8	305.24	8	8	175	0.0032	0.017	0.945	0.134	0.054	1.332	0.237	0.017	0.945	0.134	0.054	1.332	0.237	0.017	0.945	0.134	0.054	1.332	0.237
1178	309.73	308.91	8	8	135.2	0.0061	0.002	0.647	0.045	0.007	0.922	0.077	0.002	0.647	0.045	0.007	0.922	0.077	0.002	0.647	0.045	0.007	0.922	0.077
1179	301.82	300.94	8	8	220	0.0040	0.004	0.654	0.063	0.012	0.93	0.109	0.004	0.654	0.063	0.012	0.93	0.109	0.004	0.654	0.063	0.012	0.93	0.109
1180	300.94	300.11	8	8	157.31	0.0053	0.009	0.927	0.087	0.028	1.314	0.152	0.009	0.927	0.087	0.028	1.314	0.152	0.009	0.927	0.087	0.028	1.314	0.152
1181	300.11	298.91	8	8	300	0.0040	0.014	0.96	0.115	0.044	1.356	0.202	0.014	0.96	0.115	0.044	1.356	0.202	0.014	0.96	0.115	0.044	1.356	0.202
1182	295.76	294.56	8	8	249.02	0.0048	0.06	1.584	0.224	0.191	2.199	0.409	0.06	1.584	0.224	0.191	2.199	0.409	0.06	1.584	0.224	0.191	2.199	0.409
1183	294.56	293.79	8	8	192.35	0.0040	0.063	1.504	0.24	0.201	2.081	0.443	0.063	1.504	0.24	0.201	2.081	0.443	0.063	1.504	0.24	0.201	2.081	0.443
1184	293.79	293.19	8	8	45	0.0133	0.084	2.505	0.206	0.268	3.491	0.373	0.084	2.505	0.206	0.268	3.491	0.373	0.084	2.505	0.206	0.268	3.491	0.373
1185	298.77	298.1	8	8	117.5	0.0057	0.002	0.633	0.046	0.007	0.902	0.079	0.002	0.633	0.046	0.007	0.902	0.079	0.002	0.633	0.046	0.007	0.902	0.079
1186	298.1	297.15	8	8	186.31	0.0051	0.02	1.17	0.13	0.064	1.65	0.229	0.02	1.17	0.13	0.064	1.65	0.229	0.02	1.17	0.13	0.064	1.65	0.229
1187	297.57	297.15	8	8	54.24	0.0077	0.032	1.552	0.146	0.101	2.183	0.259	0.032	1.552	0.146	0.101	2.183	0.259	0.032	1.552	0.146	0.101	2.183	0.259
1188	297.15	296.39	8	8	141.46	0.0054	0.052	1.584	0.204	0.168	2.208	0.37	0.052	1.584	0.204	0.168	2.208	0.37	0.052	1.584	0.204	0.168	2.208	0.37
1189	301.85	300.66	8	8	248	0.0048	0.003	0.651	0.054	0.01	0.927	0.094	0.003	0.651	0.054	0.01	0.927	0.094	0.003	0.651	0.054	0.01	0.927	0.094
1190	300.6	299.54	8	8	214.38	0.0049	0.005	0.763	0.068	0.016	1.084	0.117	0.005	0.763	0.068	0.016	1.084	0.117	0.005	0.763	0.068	0.016	1.084	0.117
1191	299.54	298.4	8	8	236.42	0.0048	0.009	0.91	0.091	0.03	1.29	0.159	0.009	0.91	0.091	0.03	1.29	0.159	0.009	0.91	0.091	0.03	1.29	0.159
1192	298.4	297.57	8	8	207.25	0.0040	0.025	1.143	0.152	0.079	1.607	0.27	0.025	1.143	0.152	0.079	1.607	0.27	0.025	1.143	0.152	0.079	1.607	0.27
1193	300.86	297.57	8	8	236.99	0.0139	0.005	1.117	0.055	0.017	1.59	0.095	0.005	1.117	0.055	0.017	1.59	0.095	0.005	1.117	0.055	0.017	1.59	0.095
1194	300.66	299.81	8	8	211.53	0.0040	0.007	0.796	0.085	0.024	1.128	0.148	0.007	0.796	0.085	0.024	1.128	0.148	0.007	0.796	0.085	0.024	1.128	0.148
1195	299.81	299.33	8	8	70.87	0.0068	0.011	1.073	0.09	0.035	1.521	0.157	0.011	1.073	0.09	0.035	1.521	0.157	0.011	1.073	0.09	0.035	1.521	0.157
1196	299.33	298.1	8	8	258.52	0.0048	0.015	1.056	0.116	0.049	1.492	0.204	0.015	1.056	0.116	0.049	1.492	0.204	0.015	1.056	0.116	0.049	1.492	0.204
1197	299.99	299.33	8	8	116.99	0.0056	0.002	0.558	0.038	0.005	0.795	0.065	0.002	0.558	0.038	0.005	0.795	0.065	0.002	0.558	0.038	0.005	0.795	0.065
1198	298.91	293.79	8	8	136.3	0.0376	0.021	2.369	0.081	0.066	3.361	0.142	0.021	2.369	0.081	0.066	3.361	0.142	0.021	2.369	0.081	0.066	3.361	0.142
1199	296.39	295.76	8	8	158.18	0.0040	0.053	1.431	0.222	0.17	1.988	0.405	0.053	1.431	0.222	0.17	1.988	0.405	0.053	1.431	0.222	0.17	1.988	0.405
1200	301.85	300.6	8	8	115	0.0109	0.002	0.75	0.036	0.006	1.069	0.062	0.002	0.75	0.036	0.006	1.069	0.062	0.002	0.75	0.036	0.006	1.069	0.062
1202	293.19	292.43	8	8	84.25	0.0090	0.084	2.182	0.226	0.268	3.027	0.415	0.084	2.182	0.226	0.268	3.027	0.415	0.084	2.182	0.226	0.268	3.027	0.415
1240	294.53	294.1	8	8	178.86	0.0024	0.002	0.427	0.048	0.005	0.608	0.083	0.002	0.427	0.048	0.005	0.608	0.083	0.002	0.427	0.048	0.005	0.608	0.083
1241	294.1	293.31	8	8	245.99	0.0032	0.015	0.912	0.126	0.048	1.287	0.222	0.015	0.912	0.126	0.048	1.287	0.222	0.015	0.912	0.126	0.048	1.287	0.222
1242	294.32	294	8	8	90.5	0.0035	0.001	0.384	0.03	0.002	0.547	0.052	0.001	0.384	0.03	0.002	0.547	0.052	0.001	0.384	0.03	0.002	0.547	0.052
1243	292.9	292.12	8	8	244.36	0.0032	0.019	0.973	0.14	0.06	1.37	0.249	0.019	0.973	0.14	0.06	1.37	0.249	0.019	0.973	0.14	0.06	1.37	0.249
1244	294.02	293.31	8	8	162.44	0.0044	0.001	0.467	0.035	0.004	0.666	0.06	0.001	0.467	0.035	0.004	0.666	0.06	0.001	0.467	0.035	0.004	0.666	0.06

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
1245	293.41	293.1	8	8	65.38	0.0047	0.017	1.092	0.123	0.056	1.542	0.217	0.017	1.092	0.123	0.056	1.542	0.217	0.017	1.092	0.123	0.056	1.542	0.217
1246	290.75	285.82	8	8	289.27	0.0170	0.03	2.004	0.117	0.094	2.831	0.205	0.03	2.004	0.117	0.094	2.831	0.205	0.03	2.004	0.117	0.094	2.831	0.205
1247	295.56	291.92	8	8	220.69	0.0165	0.002	0.916	0.036	0.007	1.306	0.061	0.002	0.916	0.036	0.007	1.306	0.061	0.002	0.916	0.036	0.007	1.306	0.061
1248	292.79	291.67	8	8	187.15	0.0060	0.002	0.609	0.041	0.006	0.868	0.071	0.002	0.609	0.041	0.006	0.868	0.071	0.002	0.609	0.041	0.006	0.868	0.071
1249	291.55	290.95	8	8	187.15	0.0032	0.002	0.49	0.048	0.006	0.698	0.083	0.002	0.49	0.048	0.006	0.698	0.083	0.002	0.49	0.048	0.006	0.698	0.083
1250	296.42	295.56	8	8	398.42	0.0022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1251	294.37	291.68	8	8	210.14	0.0128	0.002	0.839	0.038	0.007	1.196	0.065	0.002	0.839	0.038	0.007	1.196	0.065	0.002	0.839	0.038	0.007	1.196	0.065
1252	290.12	288.98	8	8	278.6	0.0041	0.009	0.859	0.094	0.03	1.217	0.165	0.009	0.859	0.094	0.03	1.217	0.165	0.009	0.859	0.094	0.03	1.217	0.165
1253	296.4	295.36	8	8	66.63	0.0156	0.001	0.642	0.022	0.002	0.917	0.037	0.001	0.642	0.022	0.002	0.917	0.037	0.001	0.642	0.022	0.002	0.917	0.037
1254	292.12	291.67	8	8	78.01	0.0058	0.022	1.253	0.131	0.07	1.767	0.231	0.022	1.253	0.131	0.07	1.767	0.231	0.022	1.253	0.131	0.07	1.767	0.231
1255	291.87	290.75	8	8	288.74	0.0039	0.025	1.139	0.155	0.081	1.601	0.276	0.025	1.139	0.155	0.081	1.601	0.276	0.025	1.139	0.155	0.081	1.601	0.276
1256	293	290.32	8	8	305	0.0088	0.002	0.696	0.038	0.006	0.992	0.065	0.002	0.696	0.038	0.006	0.992	0.065	0.002	0.696	0.038	0.006	0.992	0.065
1257	290.89	288.98	8	8	216.8	0.0088	0.002	0.697	0.038	0.006	0.993	0.065	0.002	0.697	0.038	0.006	0.993	0.065	0.002	0.697	0.038	0.006	0.993	0.065
1258	288.78	287.41	8	8	288	0.0048	0.014	1.023	0.11	0.044	1.446	0.194	0.014	1.023	0.11	0.044	1.446	0.194	0.014	1.023	0.11	0.044	1.446	0.194
1259	291.48	290.32	8	8	281.5	0.0041	0.005	0.716	0.071	0.016	1.017	0.123	0.005	0.716	0.071	0.016	1.017	0.123	0.005	0.716	0.071	0.016	1.017	0.123
1260	291.24	287.41	8	8	221.68	0.0173	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1261	287.21	282.62	8	8	395.27	0.0116	0.017	1.473	0.097	0.053	2.087	0.17	0.017	1.473	0.097	0.053	2.087	0.17	0.017	1.473	0.097	0.053	2.087	0.17
1262	281.62	280.83	8	8	280.22	0.0028	0.028	1.055	0.177	0.091	1.477	0.318	0.028	1.055	0.177	0.091	1.477	0.318	0.028	1.055	0.177	0.091	1.477	0.318
1263	286.13	281.81	8	8	360	0.0120	0.006	1.084	0.059	0.019	1.542	0.102	0.006	1.084	0.059	0.019	1.542	0.102	0.006	1.084	0.059	0.019	1.542	0.102
1264	289.21	286.13	8	8	257	0.0120	0.002	0.819	0.038	0.007	1.168	0.066	0.002	0.819	0.038	0.007	1.168	0.066	0.002	0.819	0.038	0.007	1.168	0.066
1265	290.77	289.49	8	8	266.76	0.0048	0.001	0.483	0.034	0.004	0.688	0.059	0.001	0.483	0.034	0.004	0.688	0.059	0.001	0.483	0.034	0.004	0.688	0.059
1266	289.49	288.27	8	8	254.74	0.0048	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1267	283.89	280.83	8	8	274.81	0.0111	0.015	1.399	0.093	0.047	1.983	0.162	0.015	1.399	0.093	0.047	1.983	0.162	0.015	1.399	0.093	0.047	1.983	0.162
1268	280.63	279.79	8	8	262.51	0.0032	0.046	1.268	0.217	0.147	1.763	0.396	0.046	1.268	0.217	0.147	1.763	0.396	0.046	1.268	0.217	0.147	1.763	0.396
1269	288.07	284.36	8	8	309.91	0.0120	0.003	0.859	0.041	0.009	1.224	0.071	0.003	0.859	0.041	0.009	1.224	0.071	0.003	0.859	0.041	0.009	1.224	0.071
1270	284.36	283.89	8	8	35.68	0.0132	0.003	0.959	0.045	0.011	1.365	0.078	0.003	0.959	0.045	0.011	1.365	0.078	0.003	0.959	0.045	0.011	1.365	0.078
1271	285.79	285.08	8	8	255.45	0.0028	0.004	0.576	0.068	0.012	0.818	0.119	0.004	0.576	0.068	0.012	0.818	0.119	0.004	0.576	0.068	0.012	0.818	0.119
1272	285.08	284.67	8	8	129.69	0.0032	0.008	0.743	0.092	0.025	1.053	0.161	0.008	0.743	0.092	0.025	1.053	0.161	0.008	0.743	0.092	0.025	1.053	0.161
1273	284.41	283.89	8	8	136.48	0.0038	0.01	0.868	0.102	0.033	1.228	0.178	0.01	0.868	0.102	0.033	1.228	0.178	0.01	0.868	0.102	0.033	1.228	0.178
1274	284.67	284.41	8	8	67.19	0.0039	0.009	0.842	0.096	0.03	1.193	0.167	0.009	0.842	0.096	0.03	1.193	0.167	0.009	0.842	0.096	0.03	1.193	0.167
1275	286.99	285.08	8	8	228.78	0.0083	0.002	0.723	0.042	0.007	1.03	0.072	0.002	0.723	0.042	0.007	1.03	0.072	0.002	0.723	0.042	0.007	1.03	0.072
1276	285.25	280.75	8	8	295.74	0.0152	0.002	0.891	0.036	0.007	1.27	0.062	0.002	0.891	0.036	0.007	1.27	0.062	0.002	0.891	0.036	0.007	1.27	0.062
1277	287.05	285.79	8	8	292.83	0.0043	0.002	0.543	0.045	0.006	0.774	0.077	0.002	0.543	0.045	0.006	0.774	0.077	0.002	0.543	0.045	0.006	0.774	0.077
1278	286.11	285.79	8	8	131.28	0.0024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1279	279.38	278.72	8	8	275.36	0.0024	0.014	0.805	0.13	0.044	1.135	0.23	0.014	0.805	0.13	0.044	1.135	0.23	0.014	0.805	0.13	0.044	1.135	0.23
1280	287.13	286.17	8	8	240.57	0.0040	0.003	0.586	0.053	0.009	0.835	0.092	0.003	0.586	0.053	0.009	0.835	0.092	0.003	0.586	0.053	0.009	0.835	0.092
1281	285.97	280.65	8	8	265.94	0.0200	0.005	1.24	0.049	0.016	1.765	0.084	0.005	1.24	0.049	0.016	1.765	0.084	0.005	1.24	0.049	0.016	1.765	0.084
1282	280.55	280.19	8	8	89.82	0.0040	0.009	0.842	0.093	0.028	1.193	0.163	0.009	0.842	0.093	0.028	1.193	0.163	0.009	0.842	0.093	0.028	1.193	0.163
1283	277.92	277.2	8	8	300	0.0024	0.023	0.937	0.167	0.074	1.314	0.298	0.023	0.937	0.167	0.074	1.314	0.298	0.023	0.937	0.167	0.074	1.314	0.298
1284	279.98	279.38	8	8	251.12	0.0024	0.011	0.754	0.118	0.036	1.064	0.207	0.011	0.754	0.118	0.036	1.064	0.207	0.011	0.754	0.118	0.036	1.064	0.207
1286	281.2	278.12	8	8	385.54	0.0080	0.004	0.856	0.056	0.014	1.219	0.097	0.004	0.856	0.056	0.014	1.219	0.097	0.004	0.856	0.056	0.014	1.219	0.097
1287	282.25	281.4	8	8	106.9	0.0080	0.002	0.711	0.042	0.007	1.013	0.073	0.002	0.711	0.042	0.007	1.013	0.073	0.002	0.711	0.042	0.007	1.013	0.073
1288	278.52	277.92	8	8	246.81	0.0024	0.016	0.84	0.138	0.051	1.184	0.245	0.016	0.84	0.138	0.051	1.184	0.245	0.016	0.84	0.138	0.051	1.184	0.245
1290	283.06	277.4	8	8	404.07	0.0140	0.003	0.98	0.045	0.011	1.395	0.077	0.003	0.98	0.045	0.011	1.395	0.077	0.003	0.98	0.045	0.011	1.395	0.077
1291	285.38	284.76	8	8	310	0.0020	0.003	0.497	0.07	0.011	0.707	0.122	0.003	0.497	0.07	0.011	0.707	0.122	0.003	0.497	0.07	0.011	0.707	0.122
1292	284.82	284.76	8	8	300	0.0002	0.004	0.224	0.123	0.011	0.316	0.216	0.004	0.224	0.123	0.011	0.316	0.216	0.004	0.224	0.123	0.011	0.316	0.216
1293	286	285.38	8	8	310	0.0020	0.001	0.356	0.042	0.004	0.508	0.073	0.001	0.356	0.042	0.004	0.508	0.073	0.001	0.356	0.042	0.004	0.508	0.073
1294	282.86	280.06	8	8	385.49	0.0073	0.005	0.889	0.064	0.017	1.264	0.11	0.005	0.889	0.064	0.017	1.264	0.11	0.005	0.889	0.064	0.017	1.264	0.11
1295	282.32	281.36	8	8	318.82	0.0030	0.05	1.272	0.23	0.16	1.764	0.422	0.05	1.272	0.23	0.16	1.764	0.422	0.05	1.272	0.23	0.16	1.764	0.422
1297	277.36	277	8	8	180	0.0020	0.004	0.514	0.074	0.012	0.73	0.129	0.004	0.514	0.074	0.012	0.73	0.129	0.004	0.514	0.074	0.012	0.73	0.129
1298	286.41	282.61	8	8	190	0.0200	0.002	0.865	0.028	0.005	1.234	0.048	0.002	0.865	0.028	0.005	1.234	0.048	0.002	0.865	0.028	0.005	1.234	0.048
1300	281.32	276.07	8	8	262.5	0.0200	0.055	2.551	0.151	0.175	3.586	0.269	0.055	2.551	0.151	0.175	3.586	0.269	0.055	2.551	0.151	0.175	3.586	0.269
1304	283.99	283.38	8	8	304	0.0020	0.005	0.557	0.084	0.016	0.79	0.146	0.005	0.557	0.084	0.016	0.79	0.146	0.005	0.557	0.084	0.016	0.79	0.146
1305	284.6	283.99	8	8	304	0.0020	0.002	0.417	0.053	0.006	0.593	0.092	0.002	0.417	0.053	0.006	0.593	0.092	0.002	0.417	0.053	0.006	0.593	0.092
1306	284.66	283.38	8	8	288.28	0.0044	0.04	1.364	0.186	0.127	1.907	0.336	0.04	1.364	0.186	0.127	1.907	0.336	0.04	1.364	0.186	0.127	1.907	0.336
1307	283.28	282.32	8	8	318.83	0.0030	0.048	1.261	0.227	0.155	1.75	0.415	0.048	1.261	0.227	0.155	1.75	0.415	0.048	1.261	0.227	0.155	1.75	0.415
1308	277.95	275.56	8	8	318.87	0.0075	0.012	1.144	0.092	0.038	1.621	0.161	0.012	1.144	0.092	0.038	1.621	0.161	0.012	1.144	0.092	0.038	1.621	0.161
1309	275.56	273.17	8	8	318.86	0.0075	0.015	1.236	0.104	0.049	1.748	0.182	0.015	1.236	0.104	0.049	1.748	0.182	0.015	1.236	0.104	0.049	1.748	0.182
1310	280.75	277.95	8	8	385.77	0.0073	0.003	0.722	0.046	0.009	1.028	0.08	0.003	0.722	0.046	0.009	1.028	0.08	0.003	0.722	0.046	0.009	1.028	0.08
1311	280.06	278.05	8	8	280.67	0.0072	0.006	0.921	0.068	0.02	1.309	0.118	0.006	0.921	0.068	0.02	1.309	0.118	0.006	0.921	0.068	0.02	1.309	0.118
1312	280.95	280.15	8	8	200	0.0040	0.001	0.453	0.036	0.004	0.646	0.062	0.001	0.453	0.036	0.004	0.646	0.062	0.001	0.453	0.036	0.004	0.646	0.062
1313	280.05	277.9	8	8	179.04	0.0120	0.003	0.895	0.044	0.01	1.276	0.076	0.003	0.895	0.044	0.01	1.276	0.076	0.003	0.895	0.044	0.01	1.276	0.076
1314	277.9	275.74	8	8	180	0.0120	0.005	1.013	0.053	0.015	1.442	0.091	0.005	1.013	0.053	0.015	1.442	0.091	0.005	1.013	0.053	0.015	1.442	0.091
1315	280.29	280.15	8	8	70	0.0020	0.001	0.315	0.035	0.002	0.449	0.06	0.001	0.315	0.035	0.002	0.449	0.06	0.001	0.315	0.035	0.002	0.449	0.06
1316	278.09	273.78	8	8	359.06	0.0120	0.003	0.928	0.046	0.011	1.322	0.08	0.003	0.928	0.046	0.011	1.322	0.08	0.003	0.928	0.046	0.011	1.322	0.08
1317	279.19	278.09	8	8	100.36	0.0110	0.001	0.568	0.023	0.002	0.811	0.04	0.001	0.568	0.023	0.002	0.811	0.04	0.001	0.568	0.023	0.002	0.811	0.04
1320	278.74	277.9	8	8	260.48	0.0032	0.048	1.29	0.222	0.154	1.791	0.406	0.048	1.29	0.222	0.154	1.791	0.406	0.048	1.29	0.222	0.154	1.791	0.406
1321	279.59	278.74	8	8	266.85	0.0032	0.047	1.272	0.219	0.149	1.768	0.4	0.047	1.272	0.219	0.149	1.768	0.4	0.047	1.272	0.219	0.149	1.768	0.4
1322	280	277.9	8	8	119.27	0.0176	0.002	0.828	0.029	0.005	1.181	0.05	0.002	0.828	0.029	0.005	1.181	0.05	0.002	0.828	0.029	0.005	1.181	0.05
1324	278.16	276.08	8	8	321.4	0.0065	0.052	1.687	0.194	0.166	2.355	0.35	0.052	1.687	0.194	0.166	2.355	0.35	0.052	1.687	0.194	0.166	2.355	0.35
1325	274.82	274.31	8	8	191.78	0.0027	0.002	0.429	0.045	0.005	0.612	0.078	0.002	0.429	0.045	0.005	0.612	0.078	0.002	0.429	0.045	0.005	0.612	0.078
1326	273.54	269.96	8	8	280	0.0128	0.067	2.308	0.186	0.213	3.228	0.334	0.067	2.308	0.186	0.213	3.228	0.334	0.067	2.308	0.186	0.213	3.228	0.334
1327	275.44	274.31	8	8	282.38	0.0040	0.005	0.708	0.071	0.016	1.006	0.124	0.005	0.708	0.071	0.016	1.006	0.124	0.005	0.708	0.071	0.016	1.006	0.124
1328	274.21	273.64	8	8	178.22	0.0032	0.009	0.778	0.098	0.028	1.102	0.172	0.009	0.778	0.098	0.028	1.102	0.172	0.009	0.778	0.098	0.028	1.102	0.172
1329	274	273.54	8	8	82.26	0.0056	0.056	1.641	0.21	0.18	2.286	0.381	0.056	1.641	0.21	0.18	2.286	0.381	0.056	1.641	0.21	0.18	2.286	0.381
1330	276.57	275.44	8	8	282.37	0.0040	0.002	0.53	0.045	0.006	0.755	0.078	0.002	0.53	0.045	0.006	0.755	0.078	0.002	0.53	0.045	0.006	0.755	0.078
1331	276.08	274	8	8	321.41	0.0065	0.055	1.715	0.2	0.176	2.392	0.361	0.055	1.715	0.2	0.176	2.392	0.361	0.055	1.715	0.2	0.176	2.392	0.361
1332	275.07	272.76	8	8	320.38	0.0072	0.005	0.849	0.06	0.015	1.207	0.103	0.005	0.849	0.06	0.015	1.207	0.103	0.005	0.849	0.06	0.015	1.207	0.103
1333	272.76	270.45	8	8	275.06	0.0084	0.006	0.976	0.066	0.02	1.388	0.114	0.006	0.976	0.066	0.02	1.388	0.114	0.006	0.976	0.066	0.02	1.388	0.114
1334	278.78	275.07	8	8	320.38	0.0116	0.002	0.716	0.032	0.005	1.021	0.055	0.002	0.716	0.032	0.005	1.021	0.055	0.002	0.716	0.032	0.005	1.021	0.055
1335	277	273.69	8	8	330.65	0.0100	0.03	1.678	0.135	0.097	2.365	0.238	0.03	1.678	0.135	0.097	2.365	0.238	0.03	1.678	0.135	0.097	2.365	0.238
1336	271.5	270.57	8	8	262.52	0.0035	0.038	1.241	0.192	0.121	1.733	0.347	0.038	1.241	0.192	0.121	1.733	0.347	0.038	1.241	0.192	0.121	1.733	0.347

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
1337	270.37	267.76	8	8	260.5	0.0100	0.045	1.89	0.163	0.145	2.653	0.291	0.045	1.89	0.163	0.145	2.653	0.291	0.045	1.89	0.163	0.145	2.653	0.291
1338	270.53	270.17	8	8	123.05	0.0029	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1339	266.46	263.89	8	8	220.02	0.0117	0.053	2.084	0.169	0.168	2.923	0.302	0.053	2.084	0.169	0.168	2.923	0.302	0.053	2.084	0.169	0.168	2.923	0.302
1340	266.91	266.46	8	8	128	0.0035	0.051	1.35	0.223	0.162	1.874	0.408	0.051	1.35	0.223	0.162	1.874	0.408	0.051	1.35	0.223	0.162	1.874	0.408
1341	267.56	266.91	8	8	269.65	0.0024	0.049	1.17	0.241	0.157	1.618	0.445	0.049	1.17	0.241	0.157	1.618	0.445	0.049	1.17	0.241	0.157	1.618	0.445
1342	267.86	267.56	8	8	126.42	0.0024	0.002	0.442	0.051	0.006	0.629	0.089	0.002	0.442	0.051	0.006	0.629	0.089	0.002	0.442	0.051	0.006	0.629	0.089
1343	275.18	272.77	8	8	241.22	0.0100	0.002	0.728	0.037	0.006	1.038	0.063	0.002	0.728	0.037	0.006	1.038	0.063	0.002	0.728	0.037	0.006	1.038	0.063
1345	273.69	271.7	8	8	332.45	0.0060	0.035	1.456	0.162	0.111	2.044	0.29	0.035	1.456	0.162	0.111	2.044	0.29	0.035	1.456	0.162	0.111	2.044	0.29
1346	276.59	269.38	8	8	356	0.0203	0.002	0.984	0.034	0.007	1.403	0.058	0.002	0.984	0.034	0.007	1.403	0.058	0.002	0.984	0.034	0.007	1.403	0.058
1347	269.23	267.45	8	8	356	0.0050	0.006	0.815	0.074	0.02	1.158	0.129	0.006	0.815	0.074	0.02	1.158	0.129	0.006	0.815	0.074	0.02	1.158	0.129
1348	367.35	265.59	8	8	356	0.2858	0.009	3.764	0.035	0.03	5.366	0.06	0.009	3.764	0.035	0.03	5.366	0.06	0.009	3.764	0.035	0.03	5.366	0.06
1349	266.2	263.02	8	8	159.05	0.0200	0.004	1.144	0.043	0.012	1.63	0.074	0.004	1.144	0.043	0.012	1.63	0.074	0.004	1.144	0.043	0.012	1.63	0.074
1350	268.2	266.3	8	8	164.56	0.0115	0.002	0.809	0.039	0.007	1.153	0.067	0.002	0.809	0.039	0.007	1.153	0.067	0.002	0.809	0.039	0.007	1.153	0.067
1351	268.25	266.59	8	8	332.97	0.0050	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1352	266.49	265.59	8	8	180.25	0.0050	0.003	0.634	0.05	0.009	0.902	0.087	0.003	0.634	0.05	0.009	0.902	0.087	0.003	0.634	0.05	0.009	0.902	0.087
1353	261.22	260.66	8	8	140	0.0040	0.019	1.062	0.135	0.062	1.497	0.238	0.019	1.062	0.135	0.062	1.497	0.238	0.019	1.062	0.135	0.062	1.497	0.238
1354	257.89	257.63	8	8	65.27	0.0040	0.027	1.171	0.159	0.086	1.645	0.283	0.027	1.171	0.159	0.086	1.645	0.283	0.027	1.171	0.159	0.086	1.645	0.283
1355	258.5	257.99	8	8	127.21	0.0040	0.026	1.159	0.155	0.083	1.629	0.276	0.026	1.159	0.155	0.083	1.629	0.276	0.026	1.159	0.155	0.083	1.629	0.276
1356	259.61	258.6	8	8	252.24	0.0040	0.024	1.132	0.149	0.076	1.592	0.266	0.024	1.132	0.149	0.076	1.592	0.266	0.024	1.132	0.149	0.076	1.592	0.266
1358	260.56	259.71	8	8	213.04	0.0040	0.022	1.097	0.142	0.069	1.545	0.253	0.022	1.097	0.142	0.069	1.545	0.253	0.022	1.097	0.142	0.069	1.545	0.253
1359	261.79	261.32	8	8	117.72	0.0040	0.018	1.035	0.13	0.057	1.46	0.229	0.018	1.035	0.13	0.057	1.46	0.229	0.018	1.035	0.13	0.057	1.46	0.229
1360	265.39	262.86	8	8	188.59	0.0134	0.015	1.493	0.089	0.047	2.117	0.155	0.015	1.493	0.089	0.047	2.117	0.155	0.015	1.493	0.089	0.047	2.117	0.155
1361	262.76	261.99	8	8	192.92	0.0040	0.016	1.007	0.124	0.052	1.422	0.219	0.016	1.007	0.124	0.052	1.422	0.219	0.016	1.007	0.124	0.052	1.422	0.219
1362	279.76	275.64	8	8	205.91	0.0200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1363	262.82	257.63	8	8	242.17	0.0214	0.007	1.378	0.054	0.021	1.961	0.094	0.007	1.378	0.054	0.021	1.961	0.094	0.007	1.378	0.054	0.021	1.961	0.094
1364	269.27	262.92	8	8	136.31	0.0466	0.001	1.062	0.02	0.004	1.516	0.035	0.001	1.062	0.02	0.004	1.516	0.035	0.001	1.062	0.02	0.004	1.516	0.035
1365	275.54	269.37	8	8	151.38	0.0408	0	0.724	0.013	0.001	1.034	0.021	0	0.724	0.013	0.001	1.034	0.021	0	0.724	0.013	0.001	1.034	0.021
1366	257.43	256.71	8	8	178.86	0.0040	0.035	1.27	0.18	0.112	1.778	0.323	0.035	1.27	0.18	0.112	1.778	0.323	0.035	1.27	0.18	0.112	1.778	0.323
1367	256.51	255.22	8	8	321.55	0.0040	0.036	1.277	0.182	0.114	1.787	0.327	0.036	1.277	0.182	0.114	1.787	0.327	0.036	1.277	0.182	0.114	1.787	0.327
1371	277.85	277.28	8	8	237	0.0024	0.003	0.492	0.06	0.009	0.699	0.104	0.003	0.492	0.06	0.009	0.699	0.104	0.003	0.492	0.06	0.009	0.699	0.104
1372	276.53	275.92	8	8	256	0.0024	0.008	0.673	0.098	0.025	0.953	0.172	0.008	0.673	0.098	0.025	0.953	0.172	0.008	0.673	0.098	0.025	0.953	0.172
1373	277.28	276.73	8	8	230	0.0024	0.005	0.605	0.083	0.017	0.859	0.145	0.005	0.605	0.083	0.017	0.859	0.145	0.005	0.605	0.083	0.017	0.859	0.145
1374	270.4	267.3	8	8	201	0.0154	0.007	1.25	0.06	0.022	1.778	0.104	0.007	1.25	0.06	0.022	1.778	0.104	0.007	1.25	0.06	0.022	1.778	0.104
1375	275.2	273.94	8	8	350	0.0036	0.002	0.511	0.047	0.006	0.727	0.08	0.002	0.511	0.047	0.006	0.727	0.08	0.002	0.511	0.047	0.006	0.727	0.08
1376	273.94	271.51	8	8	151.14	0.0161	0.004	1.092	0.047	0.014	1.555	0.082	0.004	1.092	0.047	0.014	1.555	0.082	0.004	1.092	0.047	0.014	1.555	0.082
1377	270.8	268.85	8	8	323.7	0.0060	0.003	0.73	0.054	0.011	1.039	0.094	0.003	0.73	0.054	0.011	1.039	0.094	0.003	0.73	0.054	0.011	1.039	0.094
1378	268.85	267.5	8	8	208.83	0.0065	0.006	0.874	0.068	0.019	1.242	0.118	0.006	0.874	0.068	0.019	1.242	0.118	0.006	0.874	0.068	0.019	1.242	0.118
1379	270.86	267.88	8	8	341	0.0087	0.002	0.685	0.037	0.006	0.976	0.064	0.002	0.685	0.037	0.006	0.976	0.064	0.002	0.685	0.037	0.006	0.976	0.064
1380	267.88	266.49	8	8	166.29	0.0084	0.005	0.91	0.059	0.016	1.295	0.103	0.005	0.91	0.059	0.016	1.295	0.103	0.005	0.91	0.059	0.016	1.295	0.103
1381	267.3	266.49	8	8	249	0.0033	0.015	0.91	0.124	0.047	1.285	0.219	0.015	0.91	0.124	0.047	1.285	0.219	0.015	0.91	0.124	0.047	1.285	0.219
1392	262.25	261.13	8	8	258	0.0043	0.01	0.898	0.097	0.032	1.272	0.169	0.01	0.898	0.097	0.032	1.272	0.169	0.01	0.898	0.097	0.032	1.272	0.169
1393	271.04	268.97	8	8	260.86	0.0079	0.002	0.628	0.035	0.005	0.895	0.06	0.002	0.628	0.035	0.005	0.895	0.06	0.002	0.628	0.035	0.005	0.895	0.06
1394	263.85	263.47	8	8	95.66	0.0040	0.005	0.706	0.071	0.016	1.003	0.124	0.005	0.706	0.071	0.016	1.003	0.124	0.005	0.706	0.071	0.016	1.003	0.124
1395	268.87	263.95	8	8	225.05	0.0219	0.003	1.143	0.04	0.011	1.629	0.069	0.003	1.143	0.04	0.011	1.629	0.069	0.003	1.143	0.04	0.011	1.629	0.069
1396	263.37	262.35	8	8	259.52	0.0039	0.007	0.789	0.085	0.024	1.12	0.149	0.007	0.789	0.085	0.024	1.12	0.149	0.007	0.789	0.085	0.024	1.12	0.149
1397	263.67	262.41	8	8	293.14	0.0043	0.005	0.745	0.073	0.018	1.059	0.127	0.005	0.745	0.073	0.018	1.059	0.127	0.005	0.745	0.073	0.018	1.059	0.127
1398	264.65	263.87	8	8	88	0.0089	0.002	0.66	0.035	0.005	0.941	0.06	0.002	0.66	0.035	0.005	0.941	0.06	0.002	0.66	0.035	0.005	0.941	0.06
1399	273.36	265.38	8	8	175.58	0.0454	0.001	1.053	0.02	0.004	1.504	0.035	0.001	1.053	0.02	0.004	1.504	0.035	0.001	1.053	0.02	0.004	1.504	0.035
1400	265.28	263.77	8	8	145	0.0104	0.002	0.781	0.04	0.007	1.113	0.068	0.002	0.781	0.04	0.007	1.113	0.068	0.002	0.781	0.04	0.007	1.113	0.068
1401	262.21	261.23	8	8	250.12	0.0039	0.007	0.765	0.081	0.021	1.085	0.142	0.007	0.765	0.081	0.021	1.085	0.142	0.007	0.765	0.081	0.021	1.085	0.142
1402	261.54	261.23	8	8	80	0.0039	0.001	0.448	0.036	0.004	0.639	0.062	0.001	0.448	0.036	0.004	0.639	0.062	0.001	0.448	0.036	0.004	0.639	0.062
1403	258.67	257.45	8	8	304.15	0.0040	0.002	0.561	0.049	0.007	0.798	0.085	0.002	0.561	0.049	0.007	0.798	0.085	0.002	0.561	0.049	0.007	0.798	0.085
1404	257.25	256.59	8	8	239.09	0.0028	0.005	0.622	0.078	0.016	0.883	0.135	0.005	0.622	0.078	0.016	0.883	0.135	0.005	0.622	0.078	0.016	0.883	0.135
1405	256.09	255.37	8	8	181	0.0040	0.008	0.817	0.089	0.026	1.158	0.156	0.008	0.817	0.089	0.026	1.158	0.156	0.008	0.817	0.089	0.026	1.158	0.156
1406	257.14	256.29	8	8	213.18	0.0040	0.002	0.494	0.041	0.005	0.704	0.071	0.002	0.494	0.041	0.005	0.704	0.071	0.002	0.494	0.041	0.005	0.704	0.071
1407	267.89	265.09	8	8	347.79	0.0081	0.008	1.048	0.076	0.026	1.488	0.132	0.008	1.048	0.076	0.026	1.488	0.132	0.008	1.048	0.076	0.026	1.488	0.132
1408	270.86	269.49	8	8	339	0.0040	0.001	0.466	0.037	0.004	0.664	0.064	0.001	0.466	0.037	0.004	0.664	0.064	0.001	0.466	0.037	0.004	0.664	0.064
1409	269.39	267.99	8	8	346	0.0040	0.004	0.68	0.066	0.014	0.967	0.115	0.004	0.68	0.066	0.014	0.967	0.115	0.004	0.68	0.066	0.014	0.967	0.115
1410	263.79	262.75	8	8	173.55	0.0060	0.064	1.749	0.22	0.206	2.43	0.402	0.064	1.749	0.22	0.206	2.43	0.402	0.064	1.749	0.22	0.206	2.43	0.402
1411	265.09	263.79	8	8	162.62	0.0080	0.011	1.127	0.086	0.034	1.598	0.149	0.011	1.127	0.086	0.034	1.598	0.149	0.011	1.127	0.086	0.034	1.598	0.149
1412	262.75	260.44	8	8	339.87	0.0068	0.067	1.854	0.218	0.216	2.576	0.398	0.067	1.854	0.218	0.216	2.576	0.398	0.067	1.854	0.218	0.216	2.576	0.398
1413	255.19	254.4	8	8	196.67	0.0040	0.075	1.584	0.262	0.239	2.18	0.489	0.075	1.584	0.262	0.239	2.18	0.489	0.075	1.584	0.262	0.239	2.18	0.489
1414	258.92	255.29	8	8	94	0.0386	0.039	2.892	0.109	0.124	4.09	0.192	0.039	2.892	0.109	0.124	4.09	0.192	0.039	2.892	0.109	0.124	4.09	0.192
1415	259.77	259.22	8	8	228.48	0.0024	0.082	1.355	0.314	0.263	1.834	0.608	0.082	1.355	0.314	0.263	1.834	0.608	0.082	1.355	0.314	0.263	1.834	0.608
1416	262.91	260.54	8	8	258	0.0092	0.008	1.094	0.073	0.026	1.553	0.127	0.008	1.094	0.073	0.026	1.553	0.127	0.008	1.094	0.073	0.026	1.553	0.127
1417	260.44	259.77	8	8	280.85	0.0024	0.079	1.333	0.307	0.251	1.809	0.591	0.079	1.333	0.307	0.251	1.809	0.591	0.079	1.333	0.307	0.251	1.809	0.591
1418	263.99	263.01	8	8	307.16	0.0032	0.003	0.565	0.06	0.01	0.803	0.103	0.003	0.565	0.06	0.01	0.803	0.103	0.003	0.565	0.06	0.01	0.803	0.103
1419	263.7	262.91	8	8	132	0.0060	0.003	0.675	0.048	0.009	0.961	0.084	0.003	0.675	0.048	0.009	0.961	0.084	0.003	0.675	0.048	0.009	0.961	0.084
1420	267.25	266.21	8	8	277	0.0038	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1422	258.15	257.23	8	8	265.01	0.0035	0.011	0.859	0.107	0.036	1.214	0.189	0.011	0.859	0.107	0.036	1.214	0.189	0.011	0.859	0.107	0.036	1.214	0.189
1423	266.11	263.14	8	8	303	0.0098	0.003	0.801	0.043	0.009	1.142	0.074	0.003	0.801	0.043	0.009	1.142	0.074	0.003	0.801	0.043	0.009	1.142	0.074
1424	260.84	258.15	8	8	265.02	0.0102	0.009	1.164	0.075	0.028	1.653	0.13	0.009	1.164	0.075	0.028	1.653	0.13	0.009	1.164	0.075	0.028	1.653	0.13
1425	263.63	263.14	8	8	123	0.0040	0.002	0.529	0.045	0.006	0.753	0.079	0.002	0.529	0.045	0.006	0.753	0.079	0.002	0.529	0.045	0.006	0.753	0.079
1426	263.04	260.84	8	8	216.08	0.0102	0.006	1.024	0.061	0.019	1.456	0.106	0.006	1.024	0.061	0.019	1.456	0.106	0.006	1.024	0.061	0.019	1.456	0.106
1427	262.91	260.12	8	8	291.59	0.0096	0.005	0.981	0.06	0.017	1.395	0.104	0.005	0.981	0.06	0.017	1.395	0.104	0.005	0.981	0.06	0.017	1.395	0.104
1428	267.15	263.24	8	8	391	0.0100	0.003	0.807	0.043	0.009	1.15	0.074	0.003	0.807	0.043	0.009	1.15	0.074	0.003	0.807	0.043	0.009	1.15	0.074
1429	260.12	257.92	8	8	288.43	0.0076	0.009	1.054	0.08	0.028	1.495	0.139	0.009	1.054	0.08	0.028	1.495	0.139	0.009	1.054	0.08	0.028	1.495	0.139
1430	257.13	256.53	8	8	250.8	0.0024	0.077	1.329	0.305	0.248	1.805	0.585	0.077	1.329	0.305	0.248	1.805	0.585	0.077	1.329	0.305	0.248	1.805	0.585
1431	259.12	258.41	8	8	293.88	0.0024	0.046	1.151	0.234	0.148	1.595	0.43	0.046	1.151	0.234	0.148	1.595	0.43	0.046	1.151	0.234	0.148	1.595	0.43
1432	261.04	258.51	8	8	421.51	0.0060	0.002	0.645	0.045	0.007	0.918	0.078	0.002	0.645	0.045	0.007	0.918	0.078	0.002	0.645	0.045	0.007	0.918	0.078
1433	258.41	257.82	8	8	241.6	0.0024	0.052	1.195	0.247	0.166	1.65	0.458	0.052	1.195	0.247	0.166	1.65	0.458	0.052	1.195	0.247	0.166	1.65	0.458
1434	357.82	257.49	8	8	133.21	0.7532	0.063	9.447	0.068	0.201	13.424	0.118	0.063	9.447	0.068	0.201	13.424	0.118	0.063	9.447	0.068	0.201	13.424	0.118

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
1435	257.49	257.13	8	8	149.19	0.0024	0.064	1.266	0.277	0.206	1.734	0.521	0.064	1.266	0.277	0.206	1.734	0.521	0.064	1.266	0.277	0.206	1.734	0.521
1436	259.12	259.001	8	8	75	0.0016	0.038	0.933	0.234	0.12	1.292	0.43	0.038	0.933	0.234	0.12	1.292	0.43	0.038	0.933	0.234	0.12	1.292	0.43
1437	261.03	260.02	8	8	258	0.0039	0.019	1.049	0.134	0.061	1.478	0.238	0.019	1.049	0.134	0.061	1.478	0.238	0.019	1.049	0.134	0.061	1.478	0.238
1438	261.82	259.82	8	8	228.26	0.0088	0.026	1.535	0.13	0.084	2.165	0.229	0.026	1.535	0.13	0.084	2.165	0.229	0.026	1.535	0.13	0.084	2.165	0.229
1439	259.82	259.62	8	8	23.43	0.0085	0.047	1.805	0.173	0.15	2.53	0.309	0.047	1.805	0.173	0.15	2.53	0.309	0.047	1.805	0.173	0.15	2.53	0.309
1440	259.62	256.53	8	8	348.53	0.0089	0.049	1.855	0.175	0.157	2.599	0.314	0.049	1.855	0.175	0.157	2.599	0.314	0.049	1.855	0.175	0.157	2.599	0.314
1441	256.43	256.07	8	8	150.99	0.0024	0.128	1.528	0.399	0.411	1.822	1	0.128	1.528	0.399	0.411	1.822	1	0.128	1.528	0.399	0.411	1.822	1
1443	271.51	270.4	8	8	95	0.0117	0.005	1.028	0.055	0.016	1.463	0.096	0.005	1.028	0.055	0.016	1.463	0.096	0.005	1.028	0.055	0.016	1.463	0.096
1444	266.29	264.01	8	8	255.93	0.0089	0.021	1.434	0.115	0.066	2.027	0.202	0.021	1.434	0.115	0.066	2.027	0.202	0.021	1.434	0.115	0.066	2.027	0.202
1445	267.99	265.99	8	8	196	0.0102	0.002	0.733	0.036	0.006	1.045	0.063	0.002	0.733	0.036	0.006	1.045	0.063	0.002	0.733	0.036	0.006	1.045	0.063
1446	265.99	264.01	8	8	196	0.0101	0.004	0.929	0.053	0.014	1.323	0.091	0.004	0.929	0.053	0.014	1.323	0.091	0.004	0.929	0.053	0.014	1.323	0.091
1447	264.01	261.82	8	8	227.49	0.0096	0.025	1.559	0.123	0.08	2.2	0.217	0.025	1.559	0.123	0.08	2.2	0.217	0.025	1.559	0.123	0.08	2.2	0.217
1448	292.8	292.08	8	8	300	0.0024	0.005	0.595	0.081	0.016	0.844	0.14	0.005	0.595	0.081	0.016	0.844	0.14	0.005	0.595	0.081	0.016	0.844	0.14
1478	237.35	237.19	8	8	15	0.0107	0.081	2.296	0.214	0.26	3.194	0.39	0.081	2.296	0.214	0.26	3.194	0.39	0.081	2.296	0.214	0.26	3.194	0.39
1479	236.99	235.49	8	8	374.5	0.0040	0.081	1.621	0.274	0.26	2.224	0.515	0.081	1.621	0.274	0.26	2.224	0.515	0.081	1.621	0.274	0.26	2.224	0.515
1480	235.29	235.19	8	8	2.5	0.0400	0.083	3.682	0.156	0.266	5.173	0.279	0.083	3.682	0.156	0.266	5.173	0.279	0.083	3.682	0.156	0.266	5.173	0.279
1487	244.58	239.8	8	8	143.66	0.0333	0.016	2.124	0.076	0.053	3.015	0.131	0.016	2.124	0.076	0.053	3.015	0.131	0.016	2.124	0.076	0.053	3.015	0.131
1488	245.14	244.88	8	8	64.21	0.0040	0.017	1.018	0.125	0.053	1.437	0.22	0.017	1.018	0.125	0.053	1.437	0.22	0.017	1.018	0.125	0.053	1.437	0.22
1498	254.31	253.28	8	8	261	0.0039	0.138	1.873	0.363	0.443	2.467	0.742	0.138	1.873	0.363	0.443	2.467	0.742	0.138	1.873	0.363	0.443	2.467	0.742
1499	255.97	255.6	8	8	154.86	0.0024	0.129	1.53	0.4	0.412	1.828	1	0.129	1.53	0.4	0.412	1.828	1	0.129	1.53	0.4	0.412	1.828	1
1500	255.17	254.31	8	8	158.49	0.0054	0.138	2.098	0.332	0.44	2.816	0.654	0.138	2.098	0.332	0.44	2.816	0.654	0.138	2.098	0.332	0.44	2.816	0.654
1501	255.31	255.17	8	8	91.51	0.0015	0.13	1.301	0.454	0.415	1.838	1	0.13	1.301	0.454	0.415	1.838	1	0.13	1.301	0.454	0.415	1.838	1
1534	235	231	8	8	350.001	0.0114	0.165	2.883	0.301	0.527	3.921	0.575	0.165	2.883	0.301	0.527	3.921	0.575	0.165	2.883	0.301	0.527	3.921	0.575
1535	237.44	236.45	8	8	247.32	0.0040	0.161	1.962	0.392	0.515	2.284	1	0.161	1.962	0.392	0.515	2.284	1	0.161	1.962	0.392	0.515	2.284	1
1537	236	235	8	8	250.001	0.0040	0.163	1.967	0.395	0.521	2.309	1	0.163	1.967	0.395	0.521	2.309	1	0.163	1.967	0.395	0.521	2.309	1
1538	231	229	8	8	250.001	0.0080	0.176	2.585	0.342	0.564	3.453	0.68	0.176	2.585	0.342	0.564	3.453	0.68	0.176	2.585	0.342	0.564	3.453	0.68
1539	229	228.5	8	8	250.001	0.0020	0.22	1.64	0.575	0.705	3.126	1	0.22	1.64	0.575	0.705	3.126	1	0.22	1.64	0.575	0.705	3.126	1
1540	228.5	228	8	8	250.001	0.0020	0.22	1.64	0.575	0.705	3.126	1	0.22	1.64	0.575	0.705	3.126	1	0.22	1.64	0.575	0.705	3.126	1
1541	230.25	229.75	8	8	128.05	0.0039	0.047	1.368	0.209	0.149	1.905	0.379	0.047	1.368	0.209	0.149	1.905	0.379	0.047	1.368	0.209	0.149	1.905	0.379
1542	245.23	243.87	8	8	341	0.0040	0.131	1.851	0.351	0.419	2.459	0.706	0.131	1.851	0.351	0.419	2.459	0.706	0.131	1.851	0.351	0.419	2.459	0.706
1543	250.69	249.64	8	8	261.82	0.0040	0.008	0.807	0.087	0.025	1.145	0.152	0.008	0.807	0.087	0.025	1.145	0.152	0.008	0.807	0.087	0.025	1.145	0.152
1544	255.82	253.45	8	8	212	0.0112	0.002	0.8	0.039	0.007	1.141	0.067	0.002	0.8	0.039	0.007	1.141	0.067	0.002	0.8	0.039	0.007	1.141	0.067
1545	253.35	250.89	8	8	212.21	0.0116	0.005	1.049	0.057	0.017	1.492	0.099	0.005	1.049	0.057	0.017	1.492	0.099	0.005	1.049	0.057	0.017	1.492	0.099
1546	250.41	249.54	8	8	217.65	0.0040	0.004	0.654	0.063	0.012	0.929	0.109	0.004	0.654	0.063	0.012	0.929	0.109	0.004	0.654	0.063	0.012	0.929	0.109
1547	249.44	248.86	8	8	144.14	0.0040	0.014	0.965	0.115	0.045	1.364	0.202	0.014	0.965	0.115	0.045	1.364	0.202	0.014	0.965	0.115	0.045	1.364	0.202
1548	248.66	247.65	8	8	252.37	0.0040	0.014	0.971	0.117	0.046	1.372	0.205	0.014	0.971	0.117	0.046	1.372	0.205	0.014	0.971	0.117	0.046	1.372	0.205
1549	246.45	245.43	8	8	255.74	0.0040	0.129	1.842	0.348	0.412	2.452	0.697	0.129	1.842	0.348	0.412	2.452	0.697	0.129	1.842	0.348	0.412	2.452	0.697
1550	247.55	246.55	8	8	251	0.0040	0.016	0.999	0.123	0.051	1.411	0.216	0.016	0.999	0.123	0.051	1.411	0.216	0.016	0.999	0.123	0.051	1.411	0.216
1551	249.77	248.68	8	8	272	0.0040	0.103	1.734	0.309	0.33	2.351	0.596	0.103	1.734	0.309	0.33	2.351	0.596	0.103	1.734	0.309	0.33	2.351	0.596
1552	248.25	247.43	8	8	235	0.0035	0.005	0.659	0.071	0.015	0.936	0.123	0.005	0.659	0.071	0.015	0.936	0.123	0.005	0.659	0.071	0.015	0.936	0.123
1553	247.23	246.65	8	8	144.14	0.0040	0.112	1.776	0.322	0.357	2.396	0.628	0.112	1.776	0.322	0.357	2.396	0.628	0.112	1.776	0.322	0.357	2.396	0.628
1554	249.27	248.35	8	8	231	0.0040	0.002	0.559	0.05	0.007	0.796	0.086	0.002	0.559	0.05	0.007	0.796	0.086	0.002	0.559	0.05	0.007	0.796	0.086
1555	242.19	240.98	8	8	303.57	0.0040	0.136	1.872	0.359	0.436	2.473	0.73	0.136	1.872	0.359	0.436	2.473	0.73	0.136	1.872	0.359	0.436	2.473	0.73
1556	243.77	242.39	8	8	345.67	0.0040	0.134	1.864	0.356	0.429	2.469	0.72	0.134	1.864	0.356	0.429	2.469	0.72	0.134	1.864	0.356	0.429	2.469	0.72
1557	241.18	240.25	8	8	233.12	0.0040	0.004	0.673	0.066	0.014	0.956	0.114	0.004	0.673	0.066	0.014	0.956	0.114	0.004	0.673	0.066	0.014	0.956	0.114
1558	241.8	241.38	8	8	104	0.0040	0.002	0.496	0.041	0.005	0.707	0.07	0.002	0.496	0.041	0.005	0.707	0.07	0.002	0.496	0.041	0.005	0.707	0.07
1559	240.15	239.72	8	8	107.32	0.0040	0.007	0.782	0.083	0.022	1.109	0.144	0.007	0.782	0.083	0.022	1.109	0.144	0.007	0.782	0.083	0.022	1.109	0.144
1560	238.5	237.54	8	8	241.18	0.0040	0.152	1.928	0.381	0.487	2.496	0.806	0.152	1.928	0.381	0.487	2.496	0.806	0.152	1.928	0.381	0.487	2.496	0.806
1561	239.44	238.7	8	8	185.06	0.0040	0.151	1.928	0.379	0.484	2.502	0.8	0.151	1.928	0.379	0.484	2.502	0.8	0.151	1.928	0.379	0.484	2.502	0.8
1562	240.78	239.64	8	8	284.52	0.0040	0.148	1.917	0.374	0.473	2.501	0.781	0.148	1.917	0.374	0.473	2.501	0.781	0.148	1.917	0.374	0.473	2.501	0.781
1563	240.04	239.64	8	8	124.28	0.0032	0.002	0.491	0.048	0.006	0.699	0.083	0.002	0.491	0.048	0.006	0.699	0.083	0.002	0.491	0.048	0.006	0.699	0.083
1564	245.84	242	8	8	252.79	0.0152	0.008	1.303	0.065	0.026	1.852	0.113	0.008	1.303	0.065	0.026	1.852	0.113	0.008	1.303	0.065	0.026	1.852	0.113
1565	241.9	240.8	8	8	253	0.0043	0.01	0.888	0.095	0.031	1.258	0.166	0.01	0.888	0.095	0.031	1.258	0.166	0.01	0.888	0.095	0.031	1.258	0.166
1566	251.23	245.91	8	8	112	0.0475	0.002	1.168	0.023	0.005	1.667	0.04	0.002	1.168	0.023	0.005	1.667	0.04	0.002	1.168	0.023	0.005	1.667	0.04
1567	251.68	251.43	8	8	63.06	0.0040	0.002	0.493	0.041	0.005	0.703	0.071	0.002	0.493	0.041	0.005	0.703	0.071	0.002	0.493	0.041	0.005	0.703	0.071
1568	280.73	265.13	8	8	243.93	0.0640	0.002	1.466	0.026	0.007	2.092	0.045	0.002	1.466	0.026	0.007	2.092	0.045	0.002	1.466	0.026	0.007	2.092	0.045
1569	274.02	256.15	8	8	274.99	0.0650	0.002	1.474	0.026	0.007	2.104	0.044	0.002	1.474	0.026	0.007	2.104	0.044	0.002	1.474	0.026	0.007	2.104	0.044
1570	256.05	255.17	8	8	191.05	0.0046	0.006	0.777	0.074	0.019	1.103	0.128	0.006	0.777	0.074	0.019	1.103	0.128	0.006	0.777	0.074	0.019	1.103	0.128
1571	254.97	253.91	8	8	221.23	0.0048	0.007	0.832	0.079	0.022	1.181	0.138	0.007	0.832	0.079	0.022	1.181	0.138	0.007	0.832	0.079	0.022	1.181	0.138
1572	255.11	254.11	8	8	204.94	0.0049	0.007	0.851	0.081	0.024	1.208	0.141	0.007	0.851	0.081	0.024	1.208	0.141	0.007	0.851	0.081	0.024	1.208	0.141
1573	257.3	255.21	8	8	96.4	0.0217	0.006	1.358	0.053	0.02	1.933	0.091	0.006	1.358	0.053	0.02	1.933	0.091	0.006	1.358	0.053	0.02	1.933	0.091
1574	265.03	257.5	8	8	215.12	0.0350	0.005	1.506	0.043	0.016	2.146	0.074	0.005	1.506	0.043	0.016	2.146	0.074	0.005	1.506	0.043	0.016	2.146	0.074
1575	253.91	252.67	8	8	314.6	0.0039	0.017	1.011	0.126	0.053	1.426	0.222	0.017	1.011	0.126	0.053	1.426	0.222	0.017	1.011	0.126	0.053	1.426	0.222
1576	254.2	252.57	8	8	361.69	0.0045	0.078	1.671	0.26	0.25	2.301	0.485	0.078	1.671	0.26	0.25	2.301	0.485	0.078	1.671	0.26	0.25	2.301	0.485
1577	252.47	251.7	8	8	196.79	0.0039	0.097	1.691	0.302	0.311	2.299	0.578	0.097	1.691	0.302	0.311	2.299	0.578	0.097	1.691	0.302	0.311	2.299	0.578
1578	251.5	251.06	8	8	114.65	0.0038	0.099	1.686	0.306	0.315	2.289	0.587	0.099	1.686	0.306	0.315	2.289	0.587	0.099	1.686	0.306	0.315	2.289	0.587
1579	251.38	250.51	8	8	217.18	0.0040	0.002	0.495	0.041	0.005	0.705	0.071	0.002	0.495	0.041	0.005	0.705	0.071	0.002	0.495	0.041	0.005	0.705	0.071
1580	250.96	249.87	8	8	272.52	0.0040	0.1	1.719	0.305	0.32	2.334	0.585	0.1	1.719	0.305	0.32	2.334	0.585	0.1	1.719	0.305	0.32	2.334	0.585
1581	233.63	232.09	8	8	385.45	0.0040	0.01	0.883	0.1	0.033	1.249	0.176	0.01	0.883	0.1	0.033	1.249	0.176	0.01	0.883	0.1	0.033	1.249	0.176
1582	235.01	233.83	8	8	296	0.0040	0.007	0.793	0.085	0.024	1.125	0.148	0.007	0.793	0.085	0.024	1.125	0.148	0.007	0.793	0.085	0.024	1.125	0.148
1583	236.42	235.11	8	8	326.18	0.0040	0.003	0.588	0.053	0.009	0.836	0.092	0.003	0.588	0.053	0.009	0.836	0.092	0.003	0.588	0.053	0.009	0.836	0.092
1584	235.48	234.62	8	8	214	0.0040	0.003	0.612	0.057	0.01	0.871	0.098	0.003	0.612	0.057	0.01	0.871	0.098	0.003	0.612	0.057	0.01	0.871	0.098
1585	237.06	236.35	8	8	177	0.0040	0.002	0.561	0.049	0.007	0.798	0.085	0.002	0.561	0.049	0.007	0.798	0.085	0.002	0.561	0.049	0.007	0.798	0.085
1586	236.1	235.23	8	8	217	0.0040	0.003	0.587	0.053	0.009	0.836	0.092	0.003	0.587	0.053	0.009	0.836	0.092	0.003	0.587	0.053	0.009	0.836	0.092
1587	237.09	236.25	8	8	211	0.0040	0.001	0.452	0.036	0.004	0.645	0.062	0.001	0.452	0.036	0.004	0.645	0.062	0.001	0.452	0.036	0.004	0.645	0.062
1588	236.15	235.13	8	8	254	0.0040	0.007	0.769	0.081	0.021	1.091	0.14	0.007	0.769	0.081	0.021	1.091	0.14	0.007	0.769	0.081	0.021	1.091	0.14
1589	233.31	232.71	8	8	142	0.0042	0.025	1.176	0.152	0.082	1.654	0.271	0.025	1.176	0.152	0.082	1.654	0.271	0.025	1.176	0.152	0.082	1.654	0.271
1590	233.66	232.64	8	8	204	0.0050	0.003	0.634	0.05	0.009	0.903	0.087	0.003	0.634	0.05	0.009	0.903	0.087	0.003	0.634	0.05	0.009	0.903	0.087
1591	234.53	233.51	8	8	254	0.0040	0.003	0.612	0.057	0.01	0.871	0.098	0.003	0.612	0.057	0.01	0.871	0.098	0.003	0.612	0.057	0.01	0.871	0.098
1592	234.42	233.41	8	8	252	0.0040	0.019	1.057	0.134	0.061	1.49	0.236	0.019	1.057	0.134	0.061	1.49	0.236	0.019	1.057	0.134	0.061	1.49	0.236
1593	232.64	232.19	8	8	112	0.0040	0.031	1.223	0.169	0.099	1.715	0.302	0.031	1.223	0.169	0.099	1.715	0.302	0.031	1.223	0.169	0.099	1.715	0.302
1594	235.03	234.62	8	8	103	0.0040	0.014	0.953	0.114	0.043	1.347	0.2	0.014	0.953	0.114	0.043	1.347	0.2	0.014	0.953	0.114	0.043	1.347	0.2

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
1595	231.99	230.58	8	8	353.19	0.0040	0.044	1.355	0.201	0.141	1.889	0.365	0.044	1.355	0.201	0.141	1.889	0.365	0.044	1.355	0.201	0.141	1.889	0.365
1596	247.53	241.49	8	8	240	0.0252	0.003	1.112	0.035	0.009	1.62	0.062	0.003	1.112	0.035	0.009	1.62	0.062	0.003	1.112	0.035	0.009	1.62	0.062
1597	251.01	247.73	8	8	260	0.0126	0	0	0	0.001	0.563	0.021	0	0	0	0.001	0.563	0.021	0	0	0	0.001	0.563	0.021
1598	250.98	245.3	8	8	300	0.0189	0.003	1.049	0.039	0.009	1.465	0.066	0.003	1.049	0.039	0.009	1.465	0.066	0.003	1.049	0.039	0.009	1.465	0.066
1599	245.1	238	8	8	301.12	0.0236	0.007	1.425	0.053	0.02	2.009	0.091	0.007	1.425	0.053	0.02	2.009	0.091	0.007	1.425	0.053	0.02	2.009	0.091
1600	233.5	232.41	8	8	274.67	0.0040	0.002	0.528	0.046	0.006	0.752	0.079	0.002	0.528	0.046	0.006	0.752	0.079	0.002	0.528	0.046	0.006	0.752	0.079
1601	229.5	227.2	8	8	285.11	0.0081	0.013	1.199	0.094	0.04	1.69	0.162	0.013	1.199	0.094	0.04	1.69	0.162	0.013	1.199	0.094	0.04	1.69	0.162
1602	232.21	229.7	8	8	129.51	0.0194	0.01	1.531	0.069	0.033	2.163	0.119	0.01	1.531	0.069	0.033	2.163	0.119	0.01	1.531	0.069	0.033	2.163	0.119
1603	227	225.36	8	8	204.11	0.0080	0.017	1.305	0.107	0.054	1.84	0.187	0.017	1.305	0.107	0.054	1.84	0.187	0.017	1.305	0.107	0.054	1.84	0.187
1604	232.3	227.2	8	8	172.02	0.0296	0.002	1.123	0.031	0.007	1.601	0.053	0.002	1.123	0.031	0.007	1.601	0.053	0.002	1.123	0.031	0.007	1.601	0.053
1605	235.11	230.97	8	8	364	0.0114	0.012	1.338	0.085	0.04	1.907	0.149	0.012	1.338	0.085	0.04	1.907	0.149	0.012	1.338	0.085	0.04	1.907	0.149
1606	238.91	236.31	8	8	364.08	0.0071	0.008	1.002	0.078	0.027	1.433	0.137	0.008	1.002	0.078	0.027	1.433	0.137	0.008	1.002	0.078	0.027	1.433	0.137
1607	229.54	228.52	8	8	259.49	0.0039	0.022	1.103	0.145	0.072	1.556	0.259	0.022	1.103	0.145	0.072	1.556	0.259	0.022	1.103	0.145	0.072	1.556	0.259
1608	234.47	232.23	8	8	449.38	0.0050	0.003	0.66	0.054	0.01	0.939	0.093	0.003	0.66	0.054	0.01	0.939	0.093	0.003	0.66	0.054	0.01	0.939	0.093
1609	235	232.1	8	8	405.29	0.0072	0.003	0.776	0.052	0.011	1.104	0.09	0.003	0.776	0.052	0.011	1.104	0.09	0.003	0.776	0.052	0.011	1.104	0.09
1610	238	231.52	8	8	364.1	0.0178	0.003	1.065	0.042	0.011	1.517	0.073	0.003	1.065	0.042	0.011	1.517	0.073	0.003	1.065	0.042	0.011	1.517	0.073
1611	227.1	225.36	8	8	364.28	0.0048	0.036	1.358	0.174	0.115	1.906	0.313	0.036	1.358	0.174	0.115	1.906	0.313	0.036	1.358	0.174	0.115	1.906	0.313
1612	228.32	227.3	8	8	259.49	0.0039	0.029	1.19	0.165	0.093	1.673	0.295	0.029	1.19	0.165	0.093	1.673	0.295	0.029	1.19	0.165	0.093	1.673	0.295
1613	230.77	229.74	8	8	261.51	0.0039	0.015	0.988	0.121	0.05	1.4	0.215	0.015	0.988	0.121	0.05	1.4	0.215	0.015	0.988	0.121	0.05	1.4	0.215
1614	241.29	239.11	8	8	260.64	0.0084	0.006	0.956	0.064	0.019	1.373	0.113	0.006	0.956	0.064	0.019	1.373	0.113	0.006	0.956	0.064	0.019	1.373	0.113
1615	225.16	224.7	8	8	118.88	0.0039	0.055	1.428	0.226	0.175	1.981	0.414	0.055	1.428	0.226	0.175	1.981	0.414	0.055	1.428	0.226	0.175	1.981	0.414
1616	228.83	227.8	8	8	210.77	0.0049	0.016	1.074	0.117	0.051	1.517	0.206	0.016	1.074	0.117	0.051	1.517	0.206	0.016	1.074	0.117	0.051	1.517	0.206
1617	218.72	218.28	8	8	93.01	0.0047	0.056	1.542	0.217	0.178	2.144	0.396	0.056	1.542	0.217	0.178	2.144	0.396	0.056	1.542	0.217	0.178	2.144	0.396
1618	227.44	218.28	8	8	57.98	0.1580	0.017	3.659	0.053	0.053	5.207	0.091	0.017	3.659	0.053	0.053	5.207	0.091	0.017	3.659	0.053	0.053	5.207	0.091
1628	231.8	230.07	8	8	350	0.0049	0.004	0.725	0.063	0.014	1.03	0.108	0.004	0.725	0.063	0.014	1.03	0.108	0.004	0.725	0.063	0.014	1.03	0.108
1629	233.99	232	8	8	201.21	0.0099	0.002	0.678	0.033	0.005	0.966	0.057	0.002	0.678	0.033	0.005	0.966	0.057	0.002	0.678	0.033	0.005	0.966	0.057
1630	231.92	230.94	8	8	200	0.0049	0.007	0.852	0.081	0.023	1.209	0.141	0.007	0.852	0.081	0.023	1.209	0.141	0.007	0.852	0.081	0.023	1.209	0.141
1631	235.46	234.42	8	8	210	0.0050	0.001	0.431	0.028	0.002	0.615	0.048	0.001	0.431	0.028	0.002	0.615	0.048	0.001	0.431	0.028	0.002	0.615	0.048
1632	234.22	233.33	8	8	181.05	0.0049	0.003	0.63	0.051	0.009	0.897	0.088	0.003	0.63	0.051	0.009	0.897	0.088	0.003	0.63	0.051	0.009	0.897	0.088
1633	233.13	232.12	8	8	205.79	0.0049	0.005	0.742	0.065	0.015	1.055	0.113	0.005	0.742	0.065	0.015	1.055	0.113	0.005	0.742	0.065	0.015	1.055	0.113
1634	230.74	230.07	8	8	137.95	0.0049	0.009	0.912	0.091	0.03	1.292	0.158	0.009	0.912	0.091	0.03	1.292	0.158	0.009	0.912	0.091	0.03	1.292	0.158
1642	283.55	277.06	8	8	205.04	0.0317	0.007	1.606	0.051	0.022	2.286	0.088	0.007	1.606	0.051	0.022	2.286	0.088	0.007	1.606	0.051	0.022	2.286	0.088
1643	277.79	276.9	8	8	222.7	0.0040	0.004	0.673	0.066	0.014	0.957	0.114	0.004	0.673	0.066	0.014	0.957	0.114	0.004	0.673	0.066	0.014	0.957	0.114
1644	283.29	279.4	8	8	176.67	0.0220	0.002	0.958	0.031	0.006	1.366	0.053	0.002	0.958	0.031	0.006	1.366	0.053	0.002	0.958	0.031	0.006	1.366	0.053
1645	274.78	274.44	8	8	86	0.0040	0.001	0.451	0.036	0.004	0.643	0.062	0.001	0.451	0.036	0.004	0.643	0.062	0.001	0.451	0.036	0.004	0.643	0.062
1646	276.7	274.44	8	8	252.75	0.0089	0.01	1.169	0.083	0.033	1.659	0.145	0.01	1.169	0.083	0.033	1.659	0.145	0.01	1.169	0.083	0.033	1.659	0.145
1647	279.3	276.8	8	8	96.09	0.0260	0.004	1.254	0.041	0.012	1.787	0.07	0.004	1.254	0.041	0.012	1.787	0.07	0.004	1.254	0.041	0.012	1.787	0.07
1648	291.8	283.39	8	8	150.27	0.0560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1649	286.1	285.4	8	8	117	0.0060	0.002	0.644	0.045	0.007	0.917	0.078	0.002	0.644	0.045	0.007	0.917	0.078	0.002	0.644	0.045	0.007	0.917	0.078
1650	291.32	285.3	8	8	167.25	0.0360	0.001	0.971	0.021	0.004	1.387	0.037	0.001	0.971	0.021	0.004	1.387	0.037	0.001	0.971	0.021	0.004	1.387	0.037
1651	285.2	283.65	8	8	48.47	0.0320	0.005	1.46	0.044	0.016	2.079	0.075	0.005	1.46	0.044	0.016	2.079	0.075	0.005	1.46	0.044	0.016	2.079	0.075
1652	276.96	274.93	8	8	253.81	0.0080	0.011	1.137	0.087	0.035	1.613	0.151	0.011	1.137	0.087	0.035	1.613	0.151	0.011	1.137	0.087	0.035	1.613	0.151
1653	269.87	264.43	8	8	159.86	0.0340	0.022	2.35	0.087	0.072	3.332	0.152	0.022	2.35	0.087	0.072	3.332	0.152	0.022	2.35	0.087	0.072	3.332	0.152
1654	271.55	270.07	8	8	99.87	0.0148	0.02	1.701	0.101	0.064	2.408	0.176	0.02	1.701	0.101	0.064	2.408	0.176	0.02	1.701	0.101	0.064	2.408	0.176
1655	272.77	271.75	8	8	127.39	0.0080	0.02	1.372	0.117	0.064	1.938	0.205	0.02	1.372	0.117	0.064	1.938	0.205	0.02	1.372	0.117	0.064	1.938	0.205
1656	274.73	272.87	8	8	232.5	0.0080	0.016	1.287	0.105	0.052	1.82	0.185	0.016	1.287	0.105	0.052	1.82	0.185	0.016	1.287	0.105	0.052	1.82	0.185
1657	265.45	264.33	8	8	270.79	0.0041	0.021	1.099	0.139	0.067	1.548	0.246	0.021	1.099	0.139	0.067	1.548	0.246	0.021	1.099	0.139	0.067	1.548	0.246
1658	264.23	263.87	8	8	90.03	0.0040	0.045	1.366	0.204	0.145	1.904	0.37	0.045	1.366	0.204	0.145	1.904	0.37	0.045	1.366	0.204	0.145	1.904	0.37
1659	272.78	263.49	8	8	193.51	0.0480	0.017	2.451	0.071	0.056	3.482	0.123	0.017	2.451	0.071	0.056	3.482	0.123	0.017	2.451	0.071	0.056	3.482	0.123
1660	274.24	272.88	8	8	193	0.0070	0.014	1.174	0.101	0.045	1.662	0.176	0.014	1.174	0.101	0.045	1.662	0.176	0.014	1.174	0.101	0.045	1.662	0.176
1661	263.67	263.49	8	8	44.56	0.0040	0.045	1.371	0.204	0.145	1.911	0.369	0.045	1.371	0.204	0.145	1.911	0.369	0.045	1.371	0.204	0.145	1.911	0.369
1662	263.29	256.57	8	8	139	0.0483	0.064	3.642	0.132	0.205	5.135	0.233	0.064	3.642	0.132	0.205	5.135	0.233	0.064	3.642	0.132	0.205	5.135	0.233
1664	276.89	275.43	8	8	364.59	0.0040	0.001	0.49	0.04	0.005	0.698	0.069	0.001	0.49	0.04	0.005	0.698	0.069	0.001	0.49	0.04	0.005	0.698	0.069
1665	275.23	271	8	8	196	0.0216	0.007	1.378	0.054	0.021	1.961	0.094	0.007	1.378	0.054	0.021	1.961	0.094	0.007	1.378	0.054	0.021	1.961	0.094
1666	266.52	265.55	8	8	242.95	0.0040	0.013	0.945	0.112	0.042	1.336	0.197	0.013	0.945	0.112	0.042	1.336	0.197	0.013	0.945	0.112	0.042	1.336	0.197
1668	274.29	265.65	8	8	230	0.0376	0.003	1.38	0.035	0.011	1.967	0.061	0.003	1.38	0.035	0.011	1.967	0.061	0.003	1.38	0.035	0.011	1.967	0.061
1669	270.9	266.72	8	8	193.39	0.0216	0.01	1.551	0.065	0.031	2.205	0.113	0.01	1.551	0.065	0.031	2.205	0.113	0.01	1.551	0.065	0.031	2.205	0.113
1670	285.19	281.63	8	8	133	0.0268	0.025	2.225	0.096	0.079	3.152	0.169	0.025	2.225	0.096	0.079	3.152	0.169	0.025	2.225	0.096	0.079	3.152	0.169
1671	269.91	269.42	8	8	102.31	0.0048	0	0.345	0.021	0.001	0.492	0.035	0	0.345	0.021	0.001	0.492	0.035	0	0.345	0.021	0.001	0.492	0.035
1672	272.56	269.42	8	8	258	0.0122	0.005	1.043	0.055	0.016	1.484	0.095	0.005	1.043	0.055	0.016	1.484	0.095	0.005	1.043	0.055	0.016	1.484	0.095
1673	274.2	272.66	8	8	248.73	0.0062	0.002	0.652	0.045	0.007	0.929	0.077	0.002	0.652	0.045	0.007	0.929	0.077	0.002	0.652	0.045	0.007	0.929	0.077
1674	279.5	274.3	8	8	176.21	0.0295	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1676	281.52	279.6	8	8	130	0.0148	0.025	1.822	0.112	0.081	2.575	0.198	0.025	1.822	0.112	0.081	2.575	0.198	0.025	1.822	0.112	0.081	2.575	0.198
1677	265.9	264.29	8	8	161	0.0100	0.045	1.891	0.163	0.145	2.654	0.292	0.045	1.891	0.163	0.145	2.654	0.292	0.045	1.891	0.163	0.145	2.654	0.292
1678	269.22	268.09	8	8	113.33	0.0100	0.007	1.074	0.067	0.022	1.527	0.116	0.007	1.074	0.067	0.022	1.527	0.116	0.007	1.074	0.067	0.022	1.527	0.116
1679	267.89	267.44	8	8	45.25	0.0099	0.009	1.156	0.075	0.028	1.641	0.131	0.009	1.156	0.075	0.028	1.641	0.131	0.009	1.156	0.075	0.028	1.641	0.131
1680	267.24	266.1	8	8	113.73	0.0100	0.01	1.189	0.078	0.031	1.687	0.136	0.01	1.189	0.078	0.031	1.687	0.136	0.01	1.189	0.078	0.031	1.687	0.136
1681	264.09	256.57	8	8	124.97	0.0602	0.046	3.564	0.107	0.148	5.042	0.188	0.046	3.564	0.107	0.148	5.042	0.188	0.046	3.564	0.107	0.148	5.042	0.188
1682	275.1	272.77	8	8	132.17	0.0176	0.027	1.981	0.112	0.087	2.801	0.196	0.027	1.981	0.112	0.087	2.801	0.196	0.027	1.981	0.112	0.087	2.801	0.196
1683	270.28	266.1	8	8	90.32	0.0463	0.035	2.992	0.1	0.112	4.235	0.175	0.035	2.992	0.1	0.112	4.235	0.175	0.035	2.992	0.1	0.112	4.235	0.175
1684	271.49	270.38	8	8	162.83	0.0068	0.033	1.509	0.155	0.107	2.121	0.275	0.033	1.509	0.155	0.107	2.121	0.275	0.033	1.509	0.155	0.107	2.121	0.275
1685	272.67	271.59	8	8	216	0.0050	0.03	1.31	0.158	0.096	1.84	0.282	0.03	1.31	0.158	0.096	1.84	0.282	0.03	1.31	0.158	0.096	1.84	0.282
1686	279.4	275.2	8	8	94.5	0.0444	0.026	2.706	0.088	0.084	3.836	0.154	0.026	2.706	0.088	0.084	3.836	0.154	0.026	2.706	0.088	0.084	3.836	0.154
1696	245.97	239.74	8	8	235.77	0.0264	0.035	2.462	0.114	0.112	3.479	0.201	0.035	2.462	0.114	0.112	3.479	0.201	0.035	2.462	0.114	0.112	3.479	0.201
1697	278.29	276.52	8	8	276	0.0064	0.002	0.624	0.041	0.006	0.889	0.07	0.002	0.624	0.041	0.006	0.889	0.07	0.002	0.624	0.041	0.006	0.889	0.07
1698	276.32	274.35	8	8	246	0.0080	0.005	0.906	0.061	0.016	1.288	0.105	0.005	0.906	0.061	0.016	1.288	0.105	0.005	0.906	0.061	0.016	1.288	0.105
1699	274.15	269.83	8	8	248	0.0174	0.019	1.766	0.094	0.061	2.502	0.164	0.019	1.766	0.094	0.061	2.502	0.164	0.019	1.766	0.094	0.061	2.502	0.164
1700	269.93	264.54	8	8	269	0.0200	0.022	1.941	0.098	0.07	2.749	0.171	0.022	1.941	0.098	0.07	2.749	0.171	0.022	1.941	0.098	0.07	2.749	0.171
1701	264.34	260.58	8	8	172.36	0.0218	0.024	2.051	0.1	0.077	2.904	0.174	0.024	2.051	0.1	0.077	2.904	0.174	0.024	2.051	0.1	0.077	2.904	0.174
1702	260.38	257.95	8	8	98.98	0.0246	0.028	2.245	0.105	0.09	3.177	0.183	0.028	2.245	0.105	0.09	3.177	0.183	0.028	2.245	0.105	0.09	3.177	0.183
1703	257.75	253.16	8	8	166.44	0.0276	0.03	2.376	0.104	0.095	3.363	0.183	0.03	2.376	0.104	0.095	3.363	0.183	0.03	2.376	0.104	0.095	3.363	0.183
1704	252.96	246.17	8	8	246	0.0276	0.033	2.449	0.109	0.105	3.463	0.192	0.033	2.449	0.109	0.105	3.463	0.192	0.033	2.449	0.109	0.105	3.463	0.192

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
1705	239.54	237.93	8	8	115.07	0.0140	0.037	2.002	0.137	0.119	2.821	0.242	0.037	2.002	0.137	0.119	2.821	0.242	0.037	2.002	0.137	0.119	2.821	0.242
1706	254.78	253.16	8	8	121	0.0134	0.002	0.806	0.034	0.006	1.149	0.059	0.002	0.806	0.034	0.006	1.149	0.059	0.002	0.806	0.034	0.006	1.149	0.059
1707	262.93	261.95	8	8	214	0.0046	0.002	0.519	0.04	0.005	0.739	0.068	0.002	0.519	0.04	0.005	0.739	0.068	0.002	0.519	0.04	0.005	0.739	0.068
1807	227.96	226.59	8	8	273.76	0.0050	0.012	1.005	0.103	0.04	1.422	0.181	0.012	1.005	0.103	0.04	1.422	0.181	0.012	1.005	0.103	0.04	1.422	0.181
1808	233.27	232.21	8	8	265	0.0040	0.003	0.587	0.053	0.009	0.835	0.092	0.003	0.587	0.053	0.009	0.835	0.092	0.003	0.587	0.053	0.009	0.835	0.092
1809	231.82	227.89	8	8	196.38	0.0200	0.007	1.345	0.055	0.021	1.914	0.096	0.007	1.345	0.055	0.021	1.914	0.096	0.007	1.345	0.055	0.021	1.914	0.096
1810	230.21	229.65	8	8	139.67	0.0040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1811	229.45	227.89	8	8	389.12	0.0040	0.002	0.53	0.045	0.006	0.755	0.078	0.002	0.53	0.045	0.006	0.755	0.078	0.002	0.53	0.045	0.006	0.755	0.078
1813	232.01	231.92	8	8	23.73	0.0038	0.005	0.695	0.072	0.016	0.987	0.125	0.005	0.695	0.072	0.016	0.987	0.125	0.005	0.695	0.072	0.016	0.987	0.125
1814	226.39	224.69	8	8	339.94	0.0050	0.013	1.023	0.106	0.042	1.448	0.186	0.013	1.023	0.106	0.042	1.448	0.186	0.013	1.023	0.106	0.042	1.448	0.186
1815	220.23	219.88	8	8	86.7	0.0040	0.015	0.987	0.119	0.048	1.394	0.21	0.015	0.987	0.119	0.048	1.394	0.21	0.015	0.987	0.119	0.048	1.394	0.21
1816	224.49	220.43	8	8	75	0.0541	0.013	2.348	0.061	0.042	3.339	0.105	0.013	2.348	0.061	0.042	3.339	0.105	0.013	2.348	0.061	0.042	3.339	0.105
1817	221.81	220.43	8	8	346	0.0040	0.002	0.527	0.045	0.006	0.75	0.078	0.002	0.527	0.045	0.006	0.75	0.078	0.002	0.527	0.045	0.006	0.75	0.078
1818	223.95	223.59	8	8	89.83	0.0040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1819	223.39	222.01	8	8	346	0.0040	0.002	0.527	0.045	0.006	0.75	0.078	0.002	0.527	0.045	0.006	0.75	0.078	0.002	0.527	0.045	0.006	0.75	0.078
1855	255.99	253.08	8	8	364.22	0.0080	0.137	2.407	0.3	0.438	3.274	0.573	0.137	2.407	0.3	0.438	3.274	0.573	0.137	2.407	0.3	0.438	3.274	0.573
1887	370.98	369.79	8	8	220	0.0054	0.004	0.726	0.059	0.012	1.033	0.101	0.004	0.726	0.059	0.012	1.033	0.101	0.004	0.726	0.059	0.012	1.033	0.101
1888	368.9	366.09	8	8	108	0.0260	0.006	1.447	0.05	0.02	2.059	0.087	0.006	1.447	0.05	0.02	2.059	0.087	0.006	1.447	0.05	0.02	2.059	0.087
1889	369.59	369.1	8	8	100.89	0.0049	0.005	0.757	0.068	0.016	1.076	0.118	0.005	0.757	0.068	0.016	1.076	0.118	0.005	0.757	0.068	0.016	1.076	0.118
1890	372.31	370.98	8	8	246.86	0.0054	0.002	0.549	0.038	0.005	0.782	0.066	0.002	0.549	0.038	0.005	0.782	0.066	0.002	0.549	0.038	0.005	0.782	0.066
1891	372.1	369.3	8	8	260	0.0108	0.004	0.92	0.05	0.012	1.311	0.086	0.004	0.92	0.05	0.012	1.311	0.086	0.004	0.92	0.05	0.012	1.311	0.086
1892	362.48	361.59	8	8	250	0.0036	0.018	0.995	0.133	0.057	1.403	0.236	0.018	0.995	0.133	0.057	1.403	0.236	0.018	0.995	0.133	0.057	1.403	0.236
1893	370.49	369.5	8	8	105.67	0.0094	0.001	0.538	0.024	0.002	0.768	0.042	0.001	0.538	0.024	0.002	0.768	0.042	0.001	0.538	0.024	0.002	0.768	0.042
1894	369.67	367.12	8	8	97.95	0.0260	0.002	1.015	0.029	0.006	1.448	0.05	0.002	1.015	0.029	0.006	1.448	0.05	0.002	1.015	0.029	0.006	1.448	0.05
1895	369.3	367.12	8	8	237.99	0.0092	0.008	1.095	0.074	0.026	1.555	0.128	0.008	1.095	0.074	0.026	1.555	0.128	0.008	1.095	0.074	0.026	1.555	0.128
1896	366.92	363.59	8	8	333.12	0.0100	0.012	1.257	0.085	0.037	1.782	0.148	0.012	1.257	0.085	0.037	1.782	0.148	0.012	1.257	0.085	0.037	1.782	0.148
1897	363.47	362.48	8	8	273.25	0.0036	0.015	0.946	0.121	0.047	1.336	0.214	0.015	0.946	0.121	0.047	1.336	0.214	0.015	0.946	0.121	0.047	1.336	0.214
1898	364.7	362.94	8	8	260.25	0.0068	0.012	1.106	0.095	0.038	1.566	0.165	0.012	1.106	0.095	0.038	1.566	0.165	0.012	1.106	0.095	0.038	1.566	0.165
1899	366.88	364.9	8	8	100.75	0.0197	0.002	0.974	0.034	0.007	1.388	0.059	0.002	0.974	0.034	0.007	1.388	0.059	0.002	0.974	0.034	0.007	1.388	0.059
1900	366.48	364.9	8	8	263	0.0060	0.008	0.943	0.081	0.026	1.338	0.141	0.008	0.943	0.081	0.026	1.338	0.141	0.008	0.943	0.081	0.026	1.338	0.141
1901	362.74	361.59	8	8	260	0.0044	0.015	1.013	0.115	0.047	1.432	0.203	0.015	1.013	0.115	0.047	1.432	0.203	0.015	1.013	0.115	0.047	1.432	0.203
1902	364.76	362.94	8	8	100.78	0.0181	0.002	0.894	0.032	0.006	1.275	0.055	0.002	0.894	0.032	0.006	1.275	0.055	0.002	0.894	0.032	0.006	1.275	0.055
1903	361.39	358.76	8	8	147.69	0.0178	0.033	2.109	0.122	0.106	2.977	0.215	0.033	2.109	0.122	0.106	2.977	0.215	0.033	2.109	0.122	0.106	2.977	0.215
1904	358.27	354.36	8	8	227	0.0172	0	0.537	0.015	0.001	0.767	0.026	0	0.537	0.015	0.001	0.767	0.026	0	0.537	0.015	0.001	0.767	0.026
1905	354.99	351.5	8	8	280	0.0125	0	0.48	0.016	0.001	0.686	0.028	0	0.48	0.016	0.001	0.686	0.028	0	0.48	0.016	0.001	0.686	0.028
1912	353.1	352.56	8	8	126	0.0043	0.026	1.186	0.153	0.083	1.668	0.271	0.026	1.186	0.153	0.083	1.668	0.271	0.026	1.186	0.153	0.083	1.668	0.271
1913	359.02	356.71	8	8	240.95	0.0096	0.005	0.983	0.06	0.017	1.398	0.104	0.005	0.983	0.06	0.017	1.398	0.104	0.005	0.983	0.06	0.017	1.398	0.104
1914	356.46	355.28	8	8	211.42	0.0056	0.006	0.838	0.071	0.019	1.19	0.124	0.006	0.838	0.071	0.019	1.19	0.124	0.006	0.838	0.071	0.019	1.19	0.124
1915	355.04	353.77	8	8	212.01	0.0060	0.006	0.868	0.071	0.02	1.233	0.124	0.006	0.868	0.071	0.02	1.233	0.124	0.006	0.868	0.071	0.02	1.233	0.124
1916	354.01	352.66	8	8	224.81	0.0060	0.005	0.807	0.063	0.016	1.147	0.11	0.005	0.807	0.063	0.016	1.147	0.11	0.005	0.807	0.063	0.016	1.147	0.11
1917	356.51	355.18	8	8	221.15	0.0060	0.007	0.91	0.076	0.023	1.291	0.133	0.007	0.91	0.076	0.023	1.291	0.133	0.007	0.91	0.076	0.023	1.291	0.133
1918	355.08	353.67	8	8	221	0.0064	0.016	1.186	0.111	0.052	1.677	0.195	0.016	1.186	0.111	0.052	1.677	0.195	0.016	1.186	0.111	0.052	1.677	0.195
1919	353.57	353.2	8	8	91.95	0.0040	0.024	1.134	0.149	0.076	1.594	0.265	0.024	1.134	0.149	0.076	1.594	0.265	0.024	1.134	0.149	0.076	1.594	0.265
1920	352.46	350.13	8	8	118.73	0.0196	0.032	2.161	0.118	0.103	3.053	0.207	0.032	2.161	0.118	0.103	3.053	0.207	0.032	2.161	0.118	0.103	3.053	0.207
1922	364.1	362.42	8	8	223.44	0.0075	0.004	0.839	0.057	0.014	1.193	0.098	0.004	0.839	0.057	0.014	1.193	0.098	0.004	0.839	0.057	0.014	1.193	0.098
1923	361.86	360.78	8	8	135	0.0080	0.003	0.806	0.051	0.011	1.148	0.088	0.003	0.806	0.051	0.011	1.148	0.088	0.003	0.806	0.051	0.011	1.148	0.088
1924	363.5	362.42	8	8	135	0.0080	0.004	0.833	0.053	0.012	1.185	0.092	0.004	0.833	0.053	0.012	1.185	0.092	0.004	0.833	0.053	0.012	1.185	0.092
1925	360.47	358.28	8	8	273.59	0.0080	0.022	1.409	0.122	0.071	1.99	0.214	0.022	1.409	0.122	0.071	1.99	0.214	0.022	1.409	0.122	0.071	1.99	0.214
1926	359.02	358.18	8	8	185.82	0.0045	0.003	0.634	0.055	0.01	0.902	0.094	0.003	0.634	0.055	0.01	0.902	0.094	0.003	0.634	0.055	0.01	0.902	0.094
1927	361.06	360.68	8	8	96	0.0040	0.002	0.558	0.05	0.007	0.794	0.086	0.002	0.558	0.05	0.007	0.794	0.086	0.002	0.558	0.05	0.007	0.794	0.086
1928	360.78	360.57	8	8	27.15	0.0077	0.007	0.967	0.069	0.021	1.373	0.12	0.007	0.967	0.069	0.021	1.373	0.12	0.007	0.967	0.069	0.021	1.373	0.12
1929	358.74	358.28	8	8	115.93	0.0040	0.003	0.585	0.053	0.009	0.833	0.092	0.003	0.585	0.053	0.009	0.833	0.092	0.003	0.585	0.053	0.009	0.833	0.092
1930	362.32	360.47	8	8	218.41	0.0085	0.012	1.208	0.091	0.04	1.712	0.159	0.012	1.208	0.091	0.04	1.712	0.159	0.012	1.208	0.091	0.04	1.712	0.159
1931	358.18	356.61	8	8	126.87	0.0124	0.03	1.795	0.126	0.095	2.533	0.223	0.03	1.795	0.126	0.095	2.533	0.223	0.03	1.795	0.126	0.095	2.533	0.223
1932	355.79	354.33	8	8	156	0.0094	0.04	1.775	0.156	0.127	2.494	0.277	0.04	1.775	0.156	0.127	2.494	0.277	0.04	1.775	0.156	0.127	2.494	0.277
1933	356.84	356.25	8	8	147	0.0040	0.003	0.612	0.057	0.01	0.871	0.098	0.003	0.612	0.057	0.01	0.871	0.098	0.003	0.612	0.057	0.01	0.871	0.098
1934	354.92	354.33	8	8	147	0.0040	0.005	0.695	0.069	0.015	0.988	0.12	0.005	0.695	0.069	0.015	0.988	0.12	0.005	0.695	0.069	0.015	0.988	0.12
1935	353.94	353.35	8	8	147	0.0040	0.003	0.612	0.057	0.01	0.871	0.098	0.003	0.612	0.057	0.01	0.871	0.098	0.003	0.612	0.057	0.01	0.871	0.098
1936	353.25	349.1	8	8	138.35	0.0300	0.055	2.944	0.137	0.176	4.148	0.243	0.055	2.944	0.137	0.176	4.148	0.243	0.055	2.944	0.137	0.176	4.148	0.243
1937	354.23	353.35	8	8	245	0.0036	0.048	1.337	0.215	0.153	1.859	0.393	0.048	1.337	0.215	0.153	1.859	0.393	0.048	1.337	0.215	0.153	1.859	0.393
1938	356.89	355.89	8	8	100	0.0100	0.002	0.728	0.037	0.006	1.038	0.063	0.002	0.728	0.037	0.006	1.038	0.063	0.002	0.728	0.037	0.006	1.038	0.063
1939	356.61	356.25	8	8	115	0.0031	0.032	1.132	0.183	0.102	1.584	0.329	0.032	1.132	0.183	0.102	1.584	0.329	0.032	1.132	0.183	0.102	1.584	0.329
1940	356.15	355.89	8	8	89	0.0029	0.037	1.15	0.199	0.117	1.604	0.36	0.037	1.15	0.199	0.117	1.604	0.36	0.037	1.15	0.199	0.117	1.604	0.36
1941	345.24	344.84	8	8	59	0.0068	0.06	1.786	0.205	0.191	2.489	0.373	0.06	1.786	0.205	0.191	2.489	0.373	0.06	1.786	0.205	0.191	2.489	0.373
1942	345.24	344.84	8	8	59	0.0068	0.06	1.786	0.205	0.191	2.489	0.373	0.06	1.786	0.205	0.191	2.489	0.373	0.06	1.786	0.205	0.191	2.489	0.373
1944	344.42	340.18	8	8	258.17	0.0164	0.099	2.831	0.212	0.316	3.94	0.385	0.099	2.831	0.212	0.316	3.94	0.385	0.099	2.831	0.212	0.316	3.94	0.385
1945	342.05	341.21	8	8	210.71	0.0040	0.002	0.529	0.045	0.006	0.754	0.079	0.002	0.529	0.045	0.006	0.754	0.079	0.002	0.529	0.045	0.006	0.754	0.079
1946	341.21	340.38	8	8	210	0.0040	0.004	0.651	0.063	0.012	0.926	0.109	0.004	0.651	0.063	0.012	0.926	0.109	0.004	0.651	0.063	0.012	0.926	0.109
1947	340.38	339.45	8	8	184	0.0051	0.107	1.905	0.297	0.343	2.594	0.567	0.107	1.905	0.297	0.343	2.594	0.567	0.107	1.905	0.297	0.343	2.594	0.567
1948	348.02	345.8	8	8	168.24	0.0132	0.095	2.59	0.219	0.304	3.6	0.401	0.095	2.59	0.219	0.304	3.6	0.401	0.095	2.59	0.219	0.304	3.6	0.401
1949	345.8	344.42	8	8	223.61	0.0062	0.096	1.984	0.267	0.308	2.727	0.5	0.096	1.984	0.267	0.308	2.727	0.5	0.096	1.984	0.267	0.308	2.727	0.5
1950	349.6	348.4	8	8	300	0.0040	0.088	1.657	0.285	0.281	2.265	0.54	0.088	1.657	0.285	0.281	2.265	0.54	0.088	1.657	0.285	0.281	2.265	0.54
1951	350.5	347.82	8	8	250	0.0107	0.003	0.855	0.044	0.01	1.217	0.077	0.003	0.855	0.044	0.01	1.217	0.077	0.003	0.855	0.044	0.01	1.217	0.077
1952	351	348.6	8	8	135	0.0178	0.002	0.889	0.032	0.006	1.268	0.055	0.002	0.889	0.032	0.006	1.268	0.055	0.002	0.889	0.032	0.006	1.268	0.055
1953	348.6	348.02	8	8	95.35	0.0061	0.091	1.942	0.261	0.291	2.674	0.486	0.091	1.942	0.261	0.291	2.674	0.486	0.091	1.942	0.261	0.291	2.674	0.486
1954	350.83	350.17	8	8	133.93	0.0049	0.077	1.72	0.253	0.247	2.372	0.47	0.077	1.72	0.253	0.247	2.372	0.47	0.077	1.72	0.253	0.247	2.372	0.47
1955	353.32	352.35	8	8	241.35	0.0040	0.006	0.752	0.078	0.02	1.068	0.135	0.006	0.752	0.078	0.02	1.068	0.135	0.006	0.752	0.078	0.02	1.068	0.135
1956	351.53	350.37	8	8	242	0.0048	0.005	0.736	0.066	0.015	1.046	0.114	0.005	0.736	0.066	0.015	1.046	0.114	0.005	0.736	0.066	0.015	1.046	0.114
1957	352.69	351.53	8	8	241.35	0.0048	0.002	0.565	0.044	0.006	0.804	0.075	0.002	0.565	0.044	0.006	0.804	0.075	0.002	0.565	0.044	0.006	0.804	0.075
1958	352.35	351.39	8	8	242	0.0040	0.008	0.813	0.089	0.026	1.153	0.155	0.008	0.813	0.089	0.026	1.153	0.155	0.008	0.813	0.089	0.026	1.153	0.155
1959	350.37	349.6	8	8	142.41	0.0054	0.086	1.836	0.262	0.276	2.526	0.488	0.086	1.836	0.262	0.276	2.526	0.488	0.086	1.836	0.262	0.276	2.526	0.488
1960	351.35	351.09	8	8	127.52	0.0020	0.07	1.221	0.302	0.224	1.66	0.578	0.07	1.221	0.302	0.224	1.66	0.578	0.07	1.221	0.302	0.224	1.66	0.578

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
1961	351.19	350.73	8	8	122.07	0.0038	0.007	0.752	0.082	0.021	1.067	0.143	0.007	0.752	0.082	0.021	1.067	0.143	0.007	0.752	0.082	0.021	1.067	0.143
1962	346.8	344.22	8	8	195.16	0.0132	0.001	0.686	0.027	0.004	0.979	0.047	0.001	0.686	0.027	0.004	0.979	0.047	0.001	0.686	0.027	0.004	0.979	0.047
1974	339.45	336.64	8	8	363	0.0077	0.108	2.223	0.267	0.345	3.055	0.5	0.108	2.223	0.267	0.345	3.055	0.5	0.108	2.223	0.267	0.345	3.055	0.5
1975	334.02	331.41	8	8	363	0.0072	0.109	2.174	0.274	0.35	2.981	0.516	0.109	2.174	0.274	0.35	2.981	0.516	0.109	2.155	0.276	0.35	2.953	0.519
1976	336.64	334.02	8	8	363	0.0072	0.109	2.173	0.273	0.347	2.981	0.513	0.109	2.173	0.273	0.347	2.981	0.513	0.109	2.173	0.273	0.347	2.981	0.513
1977	331.41	328.94	8	8	362.66	0.0068	0.138	2.279	0.314	0.442	3.084	0.607	0.138	2.279	0.314	0.442	3.084	0.607	0.138	2.279	0.314	0.442	3.084	0.607
1979	357.94	354.8	8	8	316	0.0099	0.041	1.823	0.155	0.13	2.562	0.276	0.041	1.823	0.155	0.13	2.562	0.276	0.041	1.823	0.155	0.13	2.562	0.276
1980	358.62	358.32	8	8	163.68	0.0018	0.034	0.954	0.215	0.109	1.327	0.392	0.034	0.954	0.215	0.109	1.327	0.392	0.034	0.954	0.215	0.109	1.327	0.392
1981	363.12	360.81	8	8	240.51	0.0096	0.001	0.614	0.029	0.004	0.876	0.05	0.001	0.614	0.029	0.004	0.876	0.05	0.001	0.614	0.029	0.004	0.876	0.05
1982	360.81	358.32	8	8	276.7	0.0090	0.003	0.84	0.049	0.011	1.196	0.085	0.003	0.84	0.049	0.011	1.196	0.085	0.003	0.84	0.049	0.011	1.196	0.085
1983	358.12	357.74	8	8	20.5	0.0185	0.039	2.243	0.131	0.125	3.163	0.231	0.039	2.243	0.131	0.125	3.163	0.231	0.039	2.243	0.131	0.125	3.163	0.231
1984	353.26	352.62	8	8	302.97	0.0021	0.051	1.127	0.254	0.162	1.554	0.471	0.051	1.127	0.254	0.162	1.554	0.471	0.051	1.127	0.254	0.162	1.554	0.471
1985	354.8	354.03	8	8	316	0.0024	0.044	1.137	0.228	0.141	1.578	0.417	0.044	1.137	0.228	0.141	1.578	0.417	0.044	1.137	0.228	0.141	1.578	0.417
1986	354.03	353.26	8	8	316	0.0024	0.048	1.165	0.237	0.153	1.613	0.437	0.048	1.165	0.237	0.153	1.613	0.437	0.048	1.165	0.237	0.153	1.613	0.437
1988	352.02	351.35	8	8	339.67	0.0020	0.069	1.199	0.301	0.22	1.63	0.577	0.069	1.199	0.301	0.22	1.63	0.577	0.069	1.199	0.301	0.22	1.63	0.577
1989	352.87	352.47	8	8	248.97	0.0016	0.014	0.693	0.141	0.043	0.976	0.251	0.014	0.693	0.141	0.043	0.976	0.251	0.014	0.693	0.141	0.043	0.976	0.251
1990	352.37	352.02	8	8	171.75	0.0020	0.067	1.204	0.294	0.214	1.64	0.561	0.067	1.204	0.294	0.214	1.64	0.561	0.067	1.204	0.294	0.214	1.64	0.561
1991	352.62	352.47	8	8	68.67	0.0022	0.053	1.153	0.256	0.168	1.588	0.476	0.053	1.153	0.256	0.168	1.588	0.476	0.053	1.153	0.256	0.168	1.588	0.476
1992	359.13	355.77	8	8	296	0.0114	0.003	0.843	0.042	0.009	1.201	0.072	0.003	0.843	0.042	0.009	1.201	0.072	0.003	0.843	0.042	0.009	1.201	0.072
1993	353.43	352.97	8	8	196.82	0.0023	0.012	0.763	0.122	0.038	1.077	0.215	0.012	0.763	0.122	0.038	1.077	0.215	0.012	0.763	0.122	0.038	1.077	0.215
1994	354.15	353.43	8	8	296	0.0024	0.01	0.725	0.109	0.031	1.025	0.191	0.01	0.725	0.109	0.031	1.025	0.191	0.01	0.725	0.109	0.031	1.025	0.191
1995	355.77	354.15	8	8	296	0.0055	0.006	0.825	0.071	0.019	1.172	0.123	0.006	0.825	0.071	0.019	1.172	0.123	0.006	0.825	0.071	0.019	1.172	0.123
2088	321.4	319.78	8	8	213	0.0076	0.026	1.447	0.132	0.082	2.04	0.234	0.026	1.447	0.132	0.082	2.04	0.234	0.026	1.447	0.132	0.082	2.04	0.234
2089	324.12	322.78	8	8	260	0.0052	0.004	0.735	0.062	0.014	1.046	0.107	0.004	0.735	0.062	0.014	1.046	0.107	0.004	0.735	0.062	0.014	1.046	0.107
2090	325.41	323.92	8	8	155	0.0096	0.002	0.718	0.037	0.006	1.024	0.064	0.002	0.718	0.037	0.006	1.024	0.064	0.002	0.718	0.037	0.006	1.024	0.064
2091	324.4	324.02	8	8	95	0.0040	0.001	0.453	0.036	0.004	0.646	0.062	0.001	0.453	0.036	0.004	0.646	0.062	0.001	0.453	0.036	0.004	0.646	0.062
2093	323.99	322.98	8	8	138	0.0073	0.017	1.273	0.111	0.056	1.799	0.195	0.017	1.273	0.111	0.056	1.799	0.195	0.017	1.273	0.111	0.056	1.799	0.195
2094	322.88	321.5	8	8	181	0.0076	0.023	1.407	0.126	0.074	1.986	0.223	0.023	1.407	0.126	0.074	1.986	0.223	0.023	1.407	0.126	0.074	1.986	0.223
2095	320.1	319.69	8	8	254	0.0016	0.007	0.56	0.1	0.021	0.792	0.175	0.007	0.56	0.1	0.021	0.792	0.175	0.007	0.56	0.1	0.021	0.792	0.175
2096	322.46	319.58	8	8	240	0.0120	0.002	0.776	0.035	0.006	1.106	0.061	0.002	0.776	0.035	0.006	1.106	0.061	0.002	0.776	0.035	0.006	1.106	0.061
2097	319.49	319.18	8	8	154.7	0.0020	0.018	0.813	0.153	0.057	1.143	0.272	0.018	0.813	0.153	0.057	1.143	0.272	0.018	0.813	0.153	0.057	1.143	0.272
2098	319.68	319.18	8	8	100.38	0.0050	0.029	1.29	0.155	0.092	1.813	0.275	0.029	1.29	0.155	0.092	1.813	0.275	0.029	1.29	0.155	0.092	1.813	0.275
2099	322.94	321.92	8	8	255	0.0040	0.005	0.724	0.074	0.017	1.028	0.128	0.005	0.724	0.074	0.017	1.028	0.128	0.005	0.724	0.074	0.017	1.028	0.128
2100	323.91	323.04	8	8	253	0.0034	0.002	0.531	0.051	0.007	0.756	0.089	0.002	0.531	0.051	0.007	0.756	0.089	0.002	0.531	0.051	0.007	0.756	0.089
2101	320.84	319.69	8	8	210	0.0055	0.011	0.996	0.095	0.035	1.411	0.166	0.011	0.996	0.095	0.035	1.411	0.166	0.011	0.996	0.095	0.035	1.411	0.166
2102	321.72	320.94	8	8	194	0.0040	0.008	0.82	0.089	0.026	1.162	0.155	0.008	0.82	0.089	0.026	1.162	0.155	0.008	0.82	0.089	0.026	1.162	0.155
2103	323.52	320.3	8	8	150	0.0215	0.002	0.949	0.031	0.006	1.354	0.053	0.002	0.949	0.031	0.006	1.354	0.053	0.002	0.949	0.031	0.006	1.354	0.053
2104	324.02	322.38	8	8	207.07	0.0079	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2105	322.28	320.81	8	8	186	0.0079	0.003	0.744	0.045	0.009	1.059	0.078	0.003	0.744	0.045	0.009	1.059	0.078	0.003	0.744	0.045	0.009	1.059	0.078
2106	320.71	320.3	8	8	255	0.0016	0.003	0.445	0.07	0.01	0.632	0.122	0.003	0.445	0.07	0.01	0.632	0.122	0.003	0.445	0.07	0.01	0.632	0.122
2111	314.52	311.28	8	8	286.39	0.0113	0.063	2.178	0.187	0.203	3.045	0.336	0.063	2.178	0.187	0.203	3.045	0.336	0.063	2.178	0.187	0.203	3.045	0.336
2112	318.49	317.16	8	8	335	0.0040	0.003	0.61	0.057	0.01	0.867	0.098	0.003	0.61	0.057	0.01	0.867	0.098	0.003	0.61	0.057	0.01	0.867	0.098
2114	318.98	318.45	8	8	133.03	0.0040	0.047	1.382	0.209	0.151	1.924	0.379	0.047	1.382	0.209	0.151	1.924	0.379	0.047	1.382	0.209	0.151	1.924	0.379
2115	318.45	317.16	8	8	135.4	0.0095	0.049	1.897	0.171	0.156	2.659	0.306	0.049	1.897	0.171	0.156	2.659	0.306	0.049	1.897	0.171	0.156	2.659	0.306
2116	316	314.52	8	8	220.5	0.0067	0.002	0.634	0.04	0.006	0.903	0.069	0.002	0.634	0.04	0.006	0.903	0.069	0.002	0.634	0.04	0.006	0.903	0.069
2118	317.65	313.01	8	8	345	0.0134	0.002	0.853	0.037	0.007	1.216	0.064	0.002	0.853	0.037	0.007	1.216	0.064	0.002	0.853	0.037	0.007	1.216	0.064
2119	310.48	306.04	8	8	265	0.0168	0.001	0.763	0.027	0.004	1.088	0.046	0.001	0.763	0.027	0.004	1.088	0.046	0.001	0.763	0.027	0.004	1.088	0.046
2121	308.85	307.47	8	8	174.5	0.0079	0.074	2.006	0.22	0.236	2.788	0.401	0.074	2.006	0.22	0.236	2.788	0.401	0.074	2.006	0.22	0.236	2.788	0.401
2122	308	306.04	8	8	311	0.0063	0.076	1.867	0.236	0.243	2.586	0.434	0.076	1.867	0.236	0.243	2.586	0.434	0.076	1.867	0.236	0.243	2.586	0.434
2123	308.2	308	8	8	35	0.0057	0.001	0.453	0.027	0.002	0.646	0.047	0.001	0.453	0.027	0.002	0.646	0.047	0.001	0.453	0.027	0.002	0.646	0.047
2124	306.04	300.69	8	8	165	0.0324	0.081	3.388	0.162	0.258	4.757	0.289	0.081	3.388	0.162	0.258	4.757	0.289	0.081	3.388	0.162	0.258	4.757	0.289
2125	318.75	317.82	8	8	60	0.0155	0.001	0.641	0.022	0.002	0.914	0.037	0.001	0.641	0.022	0.002	0.914	0.037	0.001	0.641	0.022	0.002	0.914	0.037
2126	312.81	311.28	8	8	386	0.0040	0.005	0.689	0.069	0.015	0.979	0.119	0.005	0.689	0.069	0.015	0.979	0.119	0.005	0.689	0.069	0.015	0.979	0.119
2127	311.08	309.04	8	8	278.5	0.0073	0.071	1.932	0.22	0.227	2.684	0.401	0.071	1.932	0.22	0.227	2.684	0.401	0.071	1.932	0.22	0.227	2.684	0.401
2204	298.76	296.38	8	8	400	0.0059	0.001	0.473	0.028	0.003	0.675	0.049	0.001	0.473	0.028	0.003	0.675	0.049	0.001	0.473	0.028	0.003	0.675	0.049
2205	293.26	289.06	8	8	300	0.0140	0.005	1.074	0.051	0.015	1.529	0.089	0.005	1.074	0.051	0.015	1.529	0.089	0.005	1.074	0.051	0.015	1.529	0.089
2206	282.55	278.36	8	8	133.83	0.0313	0.007	1.604	0.051	0.022	2.283	0.089	0.007	1.604	0.051	0.022	2.283	0.089	0.007	1.604	0.051	0.022	2.283	0.089
2207	296.26	283.26	8	8	300	0.0433	0.003	1.409	0.033	0.01	2.009	0.056	0.003	1.409	0.033	0.01	2.009	0.056	0.003	1.409	0.033	0.01	2.009	0.056
2208	289.06	282.65	8	8	266.94	0.0240	0.006	1.385	0.05	0.019	1.972	0.087	0.006	1.385	0.05	0.019	1.972	0.087	0.006	1.385	0.05	0.019	1.972	0.087
2209	282.01	278.26	8	8	375.4	0.0100	0.013	1.307	0.091	0.042	1.852	0.158	0.013	1.307	0.091	0.042	1.852	0.158	0.013	1.307	0.091	0.042	1.852	0.158
2210	272.86	267.63	8	8	36	0.1453	0.023	3.908	0.062	0.073	5.557	0.108	0.023	3.908	0.062	0.073	5.557	0.108	0.023	3.908	0.062	0.073	5.557	0.108
2211	293.61	291.49	8	8	176.28	0.0120	0.002	0.776	0.035	0.006	1.107	0.061	0.002	0.776	0.035	0.006	1.107	0.061	0.002	0.776	0.035	0.006	1.107	0.061
2212	289.59	285.87	8	8	185.83	0.0200	0.002	0.865	0.028	0.005	1.235	0.048	0.002	0.865	0.028	0.005	1.235	0.048	0.002	0.865	0.028	0.005	1.235	0.048
2213	298.76	291.49	8	8	256.11	0.0284	0.002	1.033	0.028	0.006	1.474	0.049	0.002	1.033	0.028	0.006	1.474	0.049	0.002	1.033	0.028	0.006	1.474	0.049
2214	291.39	285.87	8	8	276.11	0.0200	0.006	1.316	0.053	0.02	1.872	0.092	0.006	1.316	0.053	0.02	1.872	0.092	0.006	1.316	0.053	0.02	1.872	0.092
2215	285.77	282.01	8	8	187.85	0.0200	0.009	1.491	0.065	0.029	2.119	0.112	0.009	1.491	0.065	0.029	2.119	0.112	0.009	1.491	0.065	0.029	2.119	0.112
2216	278.16	272.96	8	8	120.44	0.0432	0.022	2.532	0.081	0.07	3.592	0.141	0.022	2.532	0.081	0.07	3.592	0.141	0.022	2.532	0.081	0.07	3.592	0.141
2243	295.61	288.41	8	8	346	0.0208	0.024	2.026	0.101	0.078	2.868	0.178	0.024	2.026	0.101	0.078	2.868	0.178	0.024	2.026	0.101	0.078	2.868	0.178
2244	288.31	285.99	8	8	252	0.0092	0.024	1.523	0.123	0.078	2.15	0.217	0.024	1.523	0.123	0.078	2.15	0.217	0.024	1.523	0.123	0.078	2.15	0.217
2246	283.33	283.09	8	8	24	0.0100	0.024	1.568	0.121	0.078	2.214	0.213	0.024	1.568	0.121	0.078	2.214	0.213	0.024	1.568	0.121	0.078	2.214	0.213
2247	277.5	276.71	8	8	157.64	0.0050	0.115	1.94	0.31	0.369	2.63	0.597	0.115	1.94	0.31	0.369	2.63	0.597	0.115	1.94	0.31	0.369	2.63	0.597
2248	273.2	266.3	8	8	379.22	0.0182	0.137	3.228	0.243	0.438	4.463	0.449	0.137	3.228	0.243	0.438	4.463	0.449	0.137	3.228	0.243	0.438	4.463	0.449
2249	258.06	256.19	8	8	187.23	0.0100	0.137	2.607	0.283	0.438	3.566	0.535	0.137	2.607	0.283	0.438	3.566	0.535	0.137	2.607	0.283	0.438	3.566	0.535
2250	266.1	258.26	8	8	245	0.0320	0.137	3.943	0.211	0.438	5.489	0.384	0.137	3.943	0.211	0.438	5.489	0.384	0.137	3.943	0.211	0.438	5.489	0.384
2251	276.51	273.4	8	8	54.85	0.0567	0.137	4.826	0.183	0.438	6.752	0.33	0.137	4.826	0.183	0.438	6.752	0.33	0.137	4.826	0.183	0.438	6.752	0.33
2252	279.67	278.4	8	8	317.19	0.0040	0.024	1.141	0.151	0.078	1.604	0.269	0.024	1.141	0.151	0.078	1.604	0.269	0.024	1.141	0.151	0.078	1.604	0.269
2253	291.4	289.18	8	8	198.44	0.0112	0.002	0.8	0.039	0.007	1.141	0.067	0.002	0.8	0.039	0.007	1.141	0.067	0.002	0.8	0.039	0.007	1.141	0.067
2254	288.98	278.4	8	8	194.85	0.0543	0.005	1.754	0.039	0.016	2.5	0.067	0.005	1.754	0.039	0.016	2.5	0.067	0.005	1.754	0.039	0.016	2.5	0.067
2255	278.2	277.55	8	8	162.83	0.0040	0.032	1.237	0.173	0.103	1.733	0.31	0.032	1.237	0.173	0.103	1.733	0.31	0.032	1.237	0.173	0.103	1.733	0.31
2256	296.46	295	8	8	146.43	0.0100	0.002	0.679	0.033	0.005	0.969	0.057	0.002	0.679	0.033	0.005	0.969	0.057	0.002	0.679	0.033	0.005	0.969	0.057
2257	281.35	280.99	8	8	90.42	0.0040	0.016	1	0.123	0.051	1.411	0.216	0.016	1	0.123	0.051	1.411	0.216	0.016	1	0.123	0.051	1.411	0.216
2258	280.33	279.87	8	8	114.75	0.0040	0.016	1.002	0.123	0.051	1.415	0.216	0.016	1.002	0.123	0.051	1.415	0.216	0.016	1.002	0.123	0.051	1.415	0.216

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
2259	394.8	294.09	8	8	70.7	1.4245	0.003	4.507	0.014	0.009	6.439	0.023	0.003	4.507	0.014	0.009	6.439	0.023	0.003	4.507	0.014	0.009	6.439	0.023
2260	297.7	296.18	8	8	152.08	0.0100	0.002	0.68	0.033	0.005	0.97	0.057	0.002	0.68	0.033	0.005	0.97	0.057	0.002	0.68	0.033	0.005	0.97	0.057
2261	298.24	296.98	8	8	48.99	0.0257	0.004	1.249	0.041	0.012	1.78	0.07	0.004	1.249	0.041	0.012	1.78	0.07	0.004	1.249	0.041	0.012	1.78	0.07
2262	296.76	295.48	8	8	83	0.0154	0.005	1.105	0.05	0.015	1.574	0.086	0.005	1.105	0.05	0.015	1.574	0.086	0.005	1.105	0.05	0.015	1.574	0.086
2263	299.1	298.34	8	8	29.5	0.0258	0.002	1.011	0.029	0.006	1.443	0.051	0.002	1.011	0.029	0.006	1.443	0.051	0.002	1.011	0.029	0.006	1.443	0.051
2264	295.98	295.48	8	8	88.92	0.0056	0.002	0.63	0.046	0.007	0.898	0.079	0.002	0.63	0.046	0.007	0.898	0.079	0.002	0.63	0.046	0.007	0.898	0.079
2265	299.89	298.49	8	8	139.59	0.0100	0.002	0.681	0.033	0.005	0.971	0.057	0.002	0.681	0.033	0.005	0.971	0.057	0.002	0.681	0.033	0.005	0.971	0.057
2266	295.48	294.54	8	8	73.92	0.0127	0.007	1.189	0.065	0.024	1.69	0.112	0.007	1.189	0.065	0.024	1.69	0.112	0.007	1.189	0.065	0.024	1.69	0.112
2267	296.98	294.54	8	8	171.67	0.0142	0.001	0.704	0.027	0.004	1.004	0.046	0.001	0.704	0.027	0.004	1.004	0.046	0.001	0.704	0.027	0.004	1.004	0.046
2268	294.34	282.03	8	8	69.08	0.1782	0.009	3.155	0.038	0.028	4.496	0.066	0.009	3.155	0.038	0.028	4.496	0.066	0.009	3.155	0.038	0.028	4.496	0.066
2269	282.36	282.13	8	8	81.55	0.0028	0.005	0.612	0.074	0.015	0.869	0.129	0.005	0.612	0.074	0.015	0.869	0.129	0.005	0.612	0.074	0.015	0.869	0.129
2270	283.5	282.97	8	8	131.16	0.0040	0.003	0.589	0.053	0.009	0.838	0.092	0.003	0.589	0.053	0.009	0.838	0.092	0.003	0.589	0.053	0.009	0.838	0.092
2271	282.77	282.56	8	8	52.96	0.0040	0.003	0.632	0.06	0.011	0.898	0.104	0.003	0.632	0.06	0.011	0.898	0.104	0.003	0.632	0.06	0.011	0.898	0.104
2272	281.83	281.55	8	8	69.07	0.0041	0.014	0.976	0.116	0.046	1.379	0.205	0.014	0.976	0.116	0.046	1.379	0.205	0.014	0.976	0.116	0.046	1.379	0.205
2273	280.99	280.53	8	8	64.33	0.0072	0.016	1.227	0.107	0.051	1.736	0.187	0.016	1.227	0.107	0.051	1.736	0.187	0.016	1.227	0.107	0.051	1.736	0.187
2274	294.69	281.55	8	8	191.62	0.0686	0.001	1.215	0.018	0.004	1.734	0.032	0.001	1.215	0.018	0.004	1.734	0.032	0.001	1.215	0.018	0.004	1.734	0.032
2275	282.93	276.71	8	8	140	0.0444	0.024	2.64	0.085	0.078	3.744	0.148	0.024	2.64	0.085	0.078	3.744	0.148	0.024	2.64	0.085	0.078	3.744	0.148
2276	284.41	281.45	8	8	296	0.0100	0.014	1.327	0.093	0.045	1.88	0.162	0.014	1.327	0.093	0.045	1.88	0.162	0.014	1.327	0.093	0.045	1.88	0.162
2277	281.35	277.89	8	8	341	0.0101	0.088	2.306	0.225	0.281	3.201	0.412	0.088	2.306	0.225	0.281	3.201	0.412	0.088	2.306	0.225	0.281	3.201	0.412
2278	282.58	281.51	8	8	266	0.0040	0.002	0.571	0.051	0.008	0.812	0.088	0.002	0.571	0.051	0.008	0.812	0.088	0.002	0.571	0.051	0.008	0.812	0.088
2279	277.79	277.55	8	8	60.81	0.0039	0.088	1.648	0.286	0.281	2.253	0.541	0.088	1.648	0.286	0.281	2.253	0.541	0.088	1.648	0.286	0.281	2.253	0.541
2280	269.56	267.98	8	8	396	0.0040	0.002	0.501	0.042	0.005	0.714	0.072	0.002	0.501	0.042	0.005	0.714	0.072	0.002	0.501	0.042	0.005	0.714	0.072
2281	267.88	266.3	8	8	395.5	0.0040	0.002	0.557	0.049	0.007	0.794	0.085	0.002	0.557	0.049	0.007	0.794	0.085	0.002	0.557	0.049	0.007	0.794	0.085
2282	273.2	272.73	8	8	118	0.0040	0.001	0.366	0.026	0.002	0.523	0.045	0.001	0.366	0.026	0.002	0.523	0.045	0.001	0.366	0.026	0.002	0.523	0.045
2283	295.67	294.52	8	8	230.49	0.0050	0.005	0.782	0.07	0.017	1.111	0.121	0.005	0.782	0.07	0.017	1.111	0.121	0.005	0.782	0.07	0.017	1.111	0.121
2284	294.22	291.06	8	8	242.77	0.0130	0.009	1.252	0.069	0.027	1.779	0.12	0.009	1.252	0.069	0.027	1.779	0.12	0.009	1.252	0.069	0.027	1.779	0.12
2285	295.13	293.88	8	8	250.57	0.0050	0.003	0.634	0.05	0.009	0.902	0.087	0.003	0.634	0.05	0.009	0.902	0.087	0.003	0.634	0.05	0.009	0.902	0.087
2286	293.58	292.93	8	8	108.28	0.0060	0.004	0.775	0.06	0.014	1.102	0.103	0.004	0.775	0.06	0.014	1.102	0.103	0.004	0.775	0.06	0.014	1.102	0.103
2287	292.73	291.16	8	8	241	0.0065	0.006	0.894	0.07	0.02	1.269	0.121	0.006	0.894	0.07	0.02	1.269	0.121	0.006	0.894	0.07	0.02	1.269	0.121
2288	290.86	289.02	8	8	184	0.0100	0.018	1.437	0.105	0.058	2.033	0.184	0.018	1.437	0.105	0.058	2.033	0.184	0.018	1.437	0.105	0.058	2.033	0.184
2289	296.64	295.87	8	8	153.48	0.0050	0.002	0.606	0.047	0.007	0.863	0.081	0.002	0.606	0.047	0.007	0.863	0.081	0.002	0.606	0.047	0.007	0.863	0.081
2290	290.43	284.43	8	8	333.18	0.0180	0.017	1.743	0.09	0.056	2.47	0.156	0.017	1.743	0.09	0.056	2.47	0.156	0.017	1.743	0.09	0.056	2.47	0.156
2291	288.72	284.53	8	8	262	0.0160	0.02	1.755	0.1	0.066	2.485	0.174	0.02	1.755	0.1	0.066	2.485	0.174	0.02	1.755	0.1	0.066	2.485	0.174
2292	293	290.63	8	8	131.93	0.0180	0.015	1.668	0.084	0.048	2.366	0.146	0.015	1.668	0.084	0.048	2.366	0.146	0.015	1.668	0.084	0.048	2.366	0.146
2293	284.23	280.78	8	8	265.37	0.0130	0.041	2.016	0.147	0.132	2.837	0.26	0.041	2.016	0.147	0.132	2.837	0.26	0.041	2.016	0.147	0.132	2.837	0.26
2294	293.02	292.42	8	8	119.01	0.0050	0.002	0.594	0.045	0.007	0.847	0.078	0.002	0.594	0.045	0.007	0.847	0.078	0.002	0.594	0.045	0.007	0.847	0.078
2295	292.13	288.06	8	8	290.78	0.0140	0.004	1.029	0.048	0.013	1.466	0.083	0.004	1.029	0.048	0.013	1.466	0.083	0.004	1.029	0.048	0.013	1.466	0.083
2296	287.86	285.35	8	8	179.38	0.0140	0.007	1.201	0.061	0.022	1.707	0.106	0.007	1.201	0.061	0.022	1.707	0.106	0.007	1.201	0.061	0.022	1.707	0.106
2297	285.15	280.68	8	8	149.1	0.0300	0.008	1.673	0.057	0.027	2.38	0.098	0.008	1.673	0.057	0.027	2.38	0.098	0.008	1.673	0.057	0.027	2.38	0.098
2298	280.48	277.04	8	8	119.06	0.0289	0.051	2.839	0.134	0.163	4.003	0.236	0.051	2.839	0.134	0.163	4.003	0.236	0.051	2.839	0.134	0.163	4.003	0.236
2300	289.14	284.5	8	8	290	0.0160	0.016	1.626	0.088	0.051	2.305	0.154	0.016	1.626	0.088	0.051	2.305	0.154	0.016	1.626	0.088	0.051	2.305	0.154
2301	286.84	283.24	8	8	290	0.0124	0.007	1.14	0.062	0.021	1.62	0.107	0.007	1.14	0.062	0.021	1.62	0.107	0.007	1.14	0.062	0.021	1.62	0.107
2302	281.58	280.69	8	8	223	0.0040	0.078	1.603	0.269	0.251	2.201	0.504	0.078	1.603	0.269	0.251	2.201	0.504	0.078	1.603	0.269	0.251	2.201	0.504
2303	277.55	276.22	8	8	256	0.0052	0.002	0.613	0.047	0.007	0.873	0.08	0.002	0.613	0.047	0.007	0.873	0.08	0.002	0.613	0.047	0.007	0.873	0.08
2304	282.94	281.88	8	8	266	0.0040	0.075	1.581	0.263	0.24	2.175	0.492	0.075	1.581	0.263	0.24	2.175	0.492	0.075	1.581	0.263	0.24	2.175	0.492
2305	280.39	276.32	8	8	264	0.0154	0.085	2.645	0.199	0.271	3.691	0.361	0.085	2.645	0.199	0.271	3.691	0.361	0.085	2.645	0.199	0.271	3.691	0.361
2306	272.4	271.46	8	8	260	0.0036	0.107	1.69	0.325	0.343	2.277	0.634	0.107	1.69	0.325	0.343	2.277	0.634	0.107	1.69	0.325	0.343	2.277	0.634
2307	274.65	273.57	8	8	270	0.0040	0.092	1.677	0.292	0.294	2.288	0.554	0.092	1.677	0.292	0.294	2.288	0.554	0.092	1.677	0.292	0.294	2.288	0.554
2308	288.43	284.5	8	8	172.5	0.0228	0.042	2.469	0.129	0.135	3.483	0.228	0.042	2.469	0.129	0.135	3.483	0.228	0.042	2.469	0.129	0.135	3.483	0.228
2309	293.32	289.34	8	8	226	0.0176	0.005	1.214	0.052	0.017	1.727	0.09	0.005	1.214	0.052	0.017	1.727	0.09	0.005	1.214	0.052	0.017	1.727	0.09
2310	289.17	287.04	8	8	226	0.0094	0.003	0.854	0.049	0.011	1.215	0.085	0.003	0.854	0.049	0.011	1.215	0.085	0.003	0.854	0.049	0.011	1.215	0.085
2311	291.66	283.24	8	8	172.5	0.0488	0.002	1.179	0.023	0.005	1.683	0.039	0.002	1.179	0.023	0.005	1.683	0.039	0.002	1.179	0.023	0.005	1.683	0.039
2312	286.08	280.69	8	8	293	0.0184	0.003	1.039	0.04	0.01	1.48	0.068	0.003	1.039	0.04	0.01	1.48	0.068	0.003	1.039	0.04	0.01	1.48	0.068
2313	289.78	281.78	8	8	172.5	0.0464	0.002	1.158	0.023	0.005	1.653	0.04	0.002	1.158	0.023	0.005	1.653	0.04	0.002	1.158	0.023	0.005	1.653	0.04
2314	285.96	274.95	8	8	171.99	0.0640	0.002	1.295	0.021	0.005	1.849	0.037	0.002	1.295	0.021	0.005	1.849	0.037	0.002	1.295	0.021	0.005	1.849	0.037
2315	276.02	274.95	8	8	223.6	0.0048	0.089	1.771	0.274	0.284	2.429	0.514	0.089	1.771	0.274	0.284	2.429	0.514	0.089	1.771	0.274	0.284	2.429	0.514
2316	272.15	271.46	8	8	101	0.0068	0.001	0.546	0.032	0.004	0.778	0.054	0.001	0.546	0.032	0.004	0.778	0.054	0.001	0.546	0.032	0.004	0.778	0.054
2317	275.65	272.7	8	8	269.5	0.0109	0.009	1.179	0.072	0.027	1.675	0.125	0.009	1.179	0.072	0.027	1.675	0.125	0.009	1.179	0.072	0.027	1.675	0.125
2318	277.35	275.95	8	8	206	0.0068	0.005	0.831	0.06	0.015	1.182	0.105	0.005	0.831	0.06	0.015	1.182	0.105	0.005	0.831	0.06	0.015	1.182	0.105
2319	284.08	278.44	8	8	343.91	0.0164	0.002	0.865	0.033	0.006	1.233	0.056	0.002	0.865	0.033	0.006	1.233	0.056	0.002	0.865	0.033	0.006	1.233	0.056
2320	278.24	277.65	8	8	58.25	0.0101	0.004	0.903	0.051	0.012	1.286	0.087	0.004	0.903	0.051	0.012	1.286	0.087	0.004	0.903	0.051	0.012	1.286	0.087
2321	288.2	285.94	8	8	226	0.0100	0.002	0.68	0.033	0.005	0.97	0.057	0.002	0.68	0.033	0.005	0.97	0.057	0.002	0.68	0.033	0.005	0.97	0.057
2322	285.74	275.85	8	8	151	0.0655	0.003	1.549	0.028	0.009	2.21	0.048	0.003	1.549	0.028	0.009	2.21	0.048	0.003	1.549	0.028	0.009	2.21	0.048
2323	273.27	272.6	8	8	168.6	0.0040	0.097	1.698	0.3	0.309	2.31	0.574	0.097	1.698	0.3	0.309	2.31	0.574	0.097	1.698	0.3	0.309	2.31	0.574
2324	271.16	269.06	8	8	179	0.0117	0.11	2.592	0.243	0.352	3.584	0.449	0.11	2.592	0.243	0.352	3.584	0.449	0.11	2.592	0.243	0.352	3.584	0.449
2325	278.55	273.47	8	8	135	0.0376	0.003	1.381	0.035	0.011	1.968	0.061	0.003	1.381	0.035	0.011	1.968	0.061	0.003	1.381	0.035	0.011	1.968	0.061
2326	285.15	278.85	8	8	211.71	0.0298	0.001	0.909	0.022	0.004	1.298	0.039	0.001	0.909	0.022	0.004	1.298	0.039	0.001	0.909	0.022	0.004	1.298	0.039
2327	277.2	274.6	8	8	165.65	0.0157	0.051	2.297	0.155	0.164	3.228	0.277	0.051	2.297	0.155	0.164	3.228	0.277	0.051	2.297	0.155	0.164	3.228	0.277
2328	284.2	283.14	8	8	266	0.0040	0.065	1.515	0.244	0.207	2.093	0.451	0.065	1.515	0.244	0.207	2.093	0.451	0.065	1.515	0.244	0.207	2.093	0.451
2329	268.84	267.98	8	8	270.01	0.0032	0.161	1.806	0.418	0.517	2.29	1	0.161	1.806	0.418	0.517	2.29	1	0.161	1.806	0.418	0.517	2.29	1
2330	268.08	267.37	8	8	158.36	0.0045	0.166	2.061	0.386	0.531	2.351	1	0.166	2.061	0.386	0.531	2.351	1	0.166	2.061	0.386	0.531	2.351	1
2331	288.62	287.28	8	8	309.11	0.0043	0.002	0.509	0.04	0.005	0.725	0.069	0.002	0.509	0.04	0.005	0.725	0.069	0.002	0.509	0.04	0.005	0.725	0.069
2332	285.37	277.72	8	8	239.68	0.0319	0.003	1.206	0.033	0.009	1.719	0.056	0.003	1.206	0.033	0.009	1.719	0.056	0.003	1.206	0.033	0.009	1.719	0.056
2333	277.52	272.97	8	8	106.32	0.0428	0.005	1.651	0.042	0.017	2.352	0.073	0.005	1.651	0.042	0.017	2.352	0.073	0.005	1.651	0.042	0.017	2.352	0.073
2334	272.67	272.15	8	8	130.07	0.0040	0.026	1.158	0.155	0.083	1.628	0.277	0.026	1.158	0.155	0.083	1.628	0.277	0.026	1.158	0.155	0.083	1.628	0.277
2335	271.95	271.45	8	8	115.11	0.0043	0.027	1.208	0.155	0.086	1.698	0.277	0.027	1.208	0.155	0.086	1.698	0.277	0.027	1.208	0.155	0.086	1.698	0.277
2336	287.08	285.67	8	8	309.11	0.0046	0.002	0.518	0.04	0.005	0.738	0.068	0.002	0.518	0.04	0.005	0.738	0.068	0.002	0.518	0.04	0.005	0.738	0.068
2337	286.65	284.95	8	8	275	0.0062	0.002	0.616	0.041	0.006	0.878	0.071	0.002	0.616	0.041	0.006	0.878	0.071	0.002	0.616	0.041	0.006	0.878	0.071
2338	286.9	286.42	8	8	120.76	0.0040	0.001	0.452	0.036	0.004	0.645	0.062	0.001	0.452	0.036	0.004	0.645	0.062	0.001	0.452	0.036	0.004	0.645	0.062
2339	286.12	284.95	8	8	291.8	0.0040	0.003	0.634	0.06	0.011	0.902	0.104	0.003	0.634	0.06	0.011	0.902	0.104	0.003	0.634	0.06	0.011	0.902	0.104
2340	289.66	287.36	8	8	226.04	0.0102	0.002	0.733	0.037	0.006	1.044	0.063	0.002	0.733	0.037	0.006	1.044	0.063	0.002	0.733	0.037	0.006	1.044	0.063
2341	287.16	283.49	8	8	296	0.0124	0.005	1.074	0.056	0.017	1.528	0.098	0.005	1.074	0.056	0.017	1.528	0.098	0.005	1.074	0.056	0.017	1.528	0.098

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
2342	283.29	276.78	8	8	203.86	0.0319	0.016	2.068	0.075	0.051	2.936	0.13	0.016	2.068	0.075	0.051	2.936	0.13	0.016	2.068	0.075	0.051	2.936	0.13
2343	276.58	273.44	8	8	196	0.0160	0.019	1.715	0.096	0.061	2.43	0.168	0.019	1.715	0.096	0.061	2.43	0.168	0.019	1.715	0.096	0.061	2.43	0.168
2344	273.24	272.97	8	8	67.63	0.0040	0.02	1.074	0.137	0.064	1.513	0.243	0.02	1.074	0.137	0.064	1.513	0.243	0.02	1.074	0.137	0.064	1.513	0.243
2345	284.65	283.59	8	8	266	0.0040	0.009	0.829	0.091	0.027	1.175	0.159	0.009	0.829	0.091	0.027	1.175	0.159	0.009	0.829	0.091	0.027	1.175	0.159
2346	271.45	261.44	8	8	224.86	0.0445	0.027	2.729	0.089	0.086	3.868	0.155	0.027	2.729	0.089	0.086	3.868	0.155	0.027	2.729	0.089	0.086	3.868	0.155
2347	238.6	238.08	8	8	267	0.0019	0.041	1.026	0.231	0.13	1.422	0.424	0.041	1.026	0.231	0.13	1.422	0.424	0.041	1.026	0.231	0.13	1.422	0.424
2348	239.99	239.73	8	8	220	0.0012	0.002	0.373	0.068	0.008	0.53	0.117	0.002	0.373	0.068	0.008	0.53	0.117	0.002	0.373	0.068	0.008	0.53	0.117
2349	239.63	239.28	8	8	135	0.0026	0.024	0.977	0.168	0.078	1.37	0.3	0.024	0.977	0.168	0.078	1.37	0.3	0.024	0.977	0.168	0.078	1.37	0.3
2350	239.27	238.68	8	8	296	0.0020	0.024	0.891	0.179	0.078	1.247	0.321	0.024	0.891	0.179	0.078	1.247	0.321	0.024	0.891	0.179	0.078	1.247	0.321
2351	238.07	237.62	8	8	228	0.0020	0.064	1.174	0.29	0.204	1.603	0.55	0.064	1.174	0.29	0.204	1.603	0.55	0.064	1.174	0.29	0.204	1.603	0.55
2352	237.62	237.36	8	8	23	0.0113	0.075	2.288	0.203	0.24	3.189	0.367	0.075	2.288	0.203	0.24	3.189	0.367	0.075	2.288	0.203	0.24	3.189	0.367
2353	235.65	235.26	8	8	187.11	0.0021	0.177	1.58	0.497	0.554	2.455	1	0.177	1.58	0.497	0.554	2.455	1	0.177	1.58	0.497	0.554	2.455	1
2354	237.16	236.67	8	8	242	0.0020	0.088	1.297	0.34	0.281	1.734	0.675	0.088	1.297	0.34	0.281	1.734	0.675	0.088	1.297	0.34	0.281	1.734	0.675
2355	236.04	235.65	8	8	145.47	0.0027	0.152	1.668	0.424	0.475	2.104	1	0.152	1.668	0.424	0.475	2.104	1	0.152	1.668	0.424	0.475	2.104	1
2356	236.93	236.38	8	8	306	0.0018	0.019	0.802	0.164	0.062	1.126	0.292	0.019	0.802	0.164	0.062	1.126	0.292	0.019	0.802	0.164	0.062	1.126	0.292
2357	236.37	235.82	8	8	306	0.0018	0.023	0.844	0.178	0.073	1.182	0.32	0.023	0.844	0.178	0.073	1.182	0.32	0.023	0.844	0.178	0.073	1.182	0.32
2358	237.49	236.94	8	8	306	0.0018	0.018	0.782	0.157	0.057	1.099	0.28	0.018	0.782	0.157	0.057	1.099	0.28	0.018	0.782	0.157	0.057	1.099	0.28
2359	237.64	236.23	8	8	353	0.0040	0.001	0.453	0.036	0.004	0.646	0.062	0.001	0.453	0.036	0.004	0.646	0.062	0.001	0.453	0.036	0.004	0.646	0.062
2360	235.26	234.49	8	8	114.42	0.0067	0.178	2.437	0.36	0.559	3.208	0.722	0.178	2.437	0.36	0.559	3.208	0.722	0.178	2.437	0.36	0.559	3.208	0.722
2361	239.07	237.66	8	8	352	0.0040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2362	236.03	235.46	8	8	143	0.0040	0.002	0.494	0.041	0.005	0.704	0.071	0.002	0.494	0.041	0.005	0.704	0.071	0.002	0.494	0.041	0.005	0.704	0.071
2363	237.35	236.76	8	8	300	0.0020	0.043	1.049	0.238	0.126	1.417	0.417	0.043	1.049	0.238	0.126	1.417	0.417	0.043	1.049	0.238	0.126	1.417	0.417
2364	239.09	237.85	8	8	302.5	0.0041	0.041	1.335	0.192	0.118	1.816	0.33	0.041	1.335	0.192	0.118	1.816	0.33	0.041	1.335	0.192	0.118	1.816	0.33
2365	237.85	237.35	8	8	300	0.0017	0.042	0.98	0.244	0.122	1.322	0.429	0.042	0.98	0.244	0.122	1.322	0.429	0.042	0.98	0.244	0.122	1.322	0.429
2366	238.72	238.17	8	8	276	0.0020	0.008	0.636	0.104	0.025	0.899	0.182	0.008	0.636	0.104	0.025	0.899	0.182	0.008	0.636	0.104	0.025	0.899	0.182
2367	239.21	238.73	8	8	241	0.0020	0.003	0.48	0.067	0.01	0.681	0.116	0.003	0.48	0.067	0.01	0.681	0.116	0.003	0.48	0.067	0.01	0.681	0.116
2368	238.16	237.62	8	8	266	0.0020	0.011	0.707	0.121	0.035	0.998	0.213	0.011	0.707	0.121	0.035	0.998	0.213	0.011	0.707	0.121	0.035	0.998	0.213
2369	239.37	238.82	8	8	276	0.0020	0.007	0.623	0.1	0.024	0.882	0.176	0.007	0.623	0.1	0.024	0.882	0.176	0.007	0.623	0.1	0.024	0.882	0.176
2370	239.86	239.38	8	8	241	0.0020	0.003	0.482	0.067	0.01	0.685	0.117	0.003	0.482	0.067	0.01	0.685	0.117	0.003	0.482	0.067	0.01	0.685	0.117
2371	238.81	238.27	8	8	266	0.0020	0.015	0.77	0.139	0.047	1.085	0.246	0.015	0.77	0.139	0.047	1.085	0.246	0.015	0.77	0.139	0.047	1.085	0.246
2372	240.57	239.19	8	8	350	0.0039	0.001	0.398	0.03	0.002	0.568	0.051	0.001	0.398	0.03	0.002	0.568	0.051	0.001	0.398	0.03	0.002	0.568	0.051
2373	241.53	240.22	8	8	328	0.0040	0.004	0.648	0.062	0.012	0.922	0.108	0.004	0.648	0.062	0.012	0.922	0.108	0.004	0.648	0.062	0.012	0.922	0.108
2374	240.12	238.8	8	8	328	0.0040	0.016	1.011	0.124	0.052	1.426	0.218	0.016	1.011	0.124	0.052	1.426	0.218	0.016	1.011	0.124	0.052	1.426	0.218
2376	242.14	240.99	8	8	286.99	0.0040	0.013	0.953	0.113	0.043	1.348	0.199	0.013	0.953	0.113	0.043	1.348	0.199	0.013	0.953	0.113	0.043	1.348	0.199
2377	243.3	242.15	8	8	286.41	0.0040	0.005	0.713	0.072	0.016	1.012	0.124	0.005	0.713	0.072	0.016	1.012	0.124	0.005	0.713	0.072	0.016	1.012	0.124
2378	240.97	239.83	8	8	286	0.0040	0.022	1.101	0.143	0.07	1.55	0.254	0.022	1.101	0.143	0.07	1.55	0.254	0.022	1.101	0.143	0.07	1.55	0.254
2379	238.67	238.6	8	8	33	0.0021	0.024	0.91	0.176	0.078	1.275	0.316	0.024	0.91	0.176	0.078	1.275	0.316	0.024	0.91	0.176	0.078	1.275	0.316
2380	236.66	236.5	8	8	78	0.0021	0.148	1.501	0.451	0.462	2.049	1	0.148	1.501	0.451	0.462	2.049	1	0.148	1.501	0.451	0.462	2.049	1
2382	239.83	238.7	8	8	220.5	0.0051	0.048	1.516	0.197	0.153	2.115	0.357	0.048	1.516	0.197	0.153	2.115	0.357	0.048	1.516	0.197	0.153	2.115	0.357
2383	235.33	234.88	8	8	268	0.0017	0.09	1.221	0.363	0.288	1.609	0.741	0.09	1.221	0.363	0.288	1.609	0.741	0.09	1.221	0.363	0.288	1.609	0.741
2384	240.43	238.24	8	8	120	0.0183	0.005	1.196	0.049	0.016	1.703	0.085	0.005	1.196	0.049	0.016	1.703	0.085	0.005	1.196	0.049	0.016	1.703	0.085
2385	237.04	236.39	8	8	185.5	0.0035	0.018	0.987	0.133	0.056	1.391	0.236	0.018	0.987	0.133	0.056	1.391	0.236	0.018	0.987	0.133	0.056	1.391	0.236
2386	237.21	236.84	8	8	151.5	0.0024	0.011	0.754	0.116	0.035	1.065	0.203	0.011	0.754	0.116	0.035	1.065	0.203	0.011	0.754	0.116	0.035	1.065	0.203
2387	237.4	236.19	8	8	348.76	0.0035	0.056	1.38	0.234	0.178	1.912	0.431	0.056	1.38	0.234	0.178	1.912	0.431	0.056	1.38	0.234	0.178	1.912	0.431
2389	236.66	235.53	8	8	270	0.0042	0.006	0.742	0.074	0.018	1.054	0.128	0.006	0.742	0.074	0.018	1.054	0.128	0.006	0.742	0.074	0.018	1.054	0.128
2390	237.4	236.66	8	8	185	0.0040	0.003	0.604	0.056	0.01	0.86	0.096	0.003	0.604	0.056	0.01	0.86	0.096	0.003	0.604	0.056	0.01	0.86	0.096
2391	236.19	235.53	8	8	356	0.0019	0.084	1.243	0.341	0.27	1.661	0.677	0.084	1.243	0.341	0.27	1.661	0.677	0.084	1.243	0.341	0.27	1.661	0.677
2398	226.09	225.53	8	8	136	0.0041	0.001	0.426	0.032	0.003	0.607	0.055	0.001	0.426	0.032	0.003	0.607	0.055	0.001	0.426	0.032	0.003	0.607	0.055
2399	226.9	226.36	8	8	106	0.0051	0.041	1.45	0.184	0.132	2.028	0.331	0.041	1.45	0.184	0.132	2.028	0.331	0.041	1.45	0.184	0.132	2.028	0.331
2400	235.25	233.64	8	8	321	0.0050	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2401	233.62	232.02	8	8	321	0.0050	0.036	1.385	0.174	0.116	1.941	0.311	0.036	1.385	0.174	0.116	1.941	0.311	0.036	1.385	0.174	0.116	1.941	0.311
2402	232	230.39	8	8	321	0.0050	0.039	1.413	0.179	0.123	1.978	0.321	0.039	1.413	0.179	0.123	1.978	0.321	0.039	1.413	0.179	0.123	1.978	0.321
2403	230.39	227.77	8	8	80	0.0327	0.041	2.786	0.117	0.132	3.936	0.206	0.041	2.786	0.117	0.132	3.936	0.206	0.041	2.786	0.117	0.132	3.936	0.206
2404	227.75	227.03	8	8	153	0.0047	0.041	1.41	0.188	0.132	1.971	0.338	0.041	1.41	0.188	0.132	1.971	0.338	0.041	1.41	0.188	0.132	1.971	0.338
2405	227.01	226.92	8	8	18	0.0050	0.041	1.44	0.185	0.132	2.014	0.333	0.041	1.44	0.185	0.132	2.014	0.333	0.041	1.44	0.185	0.132	2.014	0.333
2426	256.73	247.7	8	8	396	0.0228	0.027	2.16	0.104	0.086	3.057	0.183	0.027	2.16	0.104	0.086	3.057	0.183	0.027	2.16	0.104	0.086	3.057	0.183
2427	247.6	243.7	8	8	160	0.0244	0.028	2.242	0.105	0.09	3.172	0.184	0.028	2.242	0.105	0.09	3.172	0.184	0.028	2.242	0.105	0.09	3.172	0.184
2428	243.7	237.94	8	8	236	0.0244	0.047	2.607	0.133	0.149	3.675	0.236	0.047	2.607	0.133	0.149	3.675	0.236	0.047	2.607	0.133	0.149	3.675	0.236
2512	271.79	269.46	8	8	229.9	0.0101	0.011	1.248	0.083	0.036	1.77	0.145	0.011	1.248	0.083	0.036	1.77	0.145	0.011	1.248	0.083	0.036	1.77	0.145
2513	269.26	265.91	8	8	255.12	0.0131	0.017	1.549	0.095	0.054	2.195	0.167	0.017	1.549	0.095	0.054	2.195	0.167	0.017	1.549	0.095	0.054	2.195	0.167
2514	275.29	273.18	8	8	213.82	0.0099	0.002	0.766	0.04	0.007	1.092	0.069	0.002	0.766	0.04	0.007	1.092	0.069	0.002	0.766	0.04	0.007	1.092	0.069
2516	272.89	267.73	8	8	375.09	0.0138	0.006	1.137	0.057	0.019	1.618	0.099	0.006	1.137	0.057	0.019	1.618	0.099	0.006	1.137	0.057	0.019	1.618	0.099
2517	272.62	272	8	8	124.1	0.0050	0.001	0.49	0.034	0.004	0.698	0.059	0.001	0.49	0.034	0.004	0.698	0.059	0.001	0.49	0.034	0.004	0.698	0.059
2518	279	272.17	8	8	314	0.0218	0.007	1.41	0.056	0.022	2.006	0.096	0.007	1.41	0.056	0.022	2.006	0.096	0.007	1.41	0.056	0.022	2.006	0.096
2519	271.97	265.91	8	8	257.5	0.0235	0.01	1.62	0.065	0.032	2.303	0.113	0.01	1.62	0.065	0.032	2.303	0.113	0.01	1.62	0.065	0.032	2.303	0.113
2520	284.12	283.35	8	8	94	0.0082	0.001	0.513	0.025	0.002	0.733	0.043	0.001	0.513	0.025	0.002	0.733	0.043	0.001	0.513	0.025	0.002	0.733	0.043
2521	280.14	274.58	8	8	299	0.0186	0.006	1.288	0.055	0.02	1.832	0.095	0.006	1.288	0.055	0.02	1.832	0.095	0.006	1.288	0.055	0.02	1.832	0.095
2522	269.08	260.74	8	8	253.09	0.0330	0.012	1.939	0.066	0.04	2.756	0.115	0.012	1.939	0.066	0.04	2.756	0.115	0.012	1.939	0.066	0.04	2.756	0.115
2523	283.15	280.34	8	8	246.47	0.0114	0.003	0.912	0.047	0.011	1.298	0.081	0.003	0.912	0.047	0.011	1.298	0.081	0.003	0.912	0.047	0.011	1.298	0.081
2524	274.38	269.28	8	8	303	0.0168	0.01	1.441	0.07	0.032	2.047	0.122	0.01	1.441	0.07	0.032	2.047	0.122	0.01	1.441	0.07	0.032	2.047	0.122
2525	276.19	273.55	8	8	159.86	0.0165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2526	273.35	264.43	8	8	332.52	0.0268	0.003	1.184	0.036	0.01	1.688	0.063	0.003	1.184	0.036	0.01	1.688	0.063	0.003	1.184	0.036	0.01	1.688	0.063
2527	262.9	262.65	8	8	49.49	0.0051	0.049	1.52	0.201	0.157	2.12	0.363	0.049	1.52	0.201	0.157	2.12	0.363	0.049	1.52	0.201	0.157	2.12	0.363
2528	262.45	260.74	8	8	342.68	0.0050	0.051	1.534	0.206	0.164	2.137	0.373	0.051	1.534	0.206	0.164	2.137	0.373	0.051	1.534	0.206	0.164	2.137	0.373
2529	260.54	259.4	8	8	226.48	0.0050	0.067	1.66	0.234	0.213	2.3	0.43	0.067	1.66	0.234	0.213	2.3	0.43	0.067	1.66	0.234	0.213	2.3	0.43
2530	272.11	264.43	8	8	408.91	0.0188	0.004	1.12	0.044	0.012	1.595	0.076	0.004	1.12	0.044	0.012	1.595	0.076	0.004	1.12	0.044	0.012	1.595	0.076
2531	264.23	263.1	8	8	226.53	0.0050	0.047	1.495	0.197	0.151	2.087	0.357	0.047	1.495	0.197	0.151	2.087	0.357	0.047	1.495	0.197	0.151	2.087	0.357
2536	196.72	195.22	8	8	150	0.0100	0.033	1.719	0.14	0.106	2.421	0.248	0.033	1.719	0.14	0.106	2.421	0.248	0.033	1.719	0.14	0.106	2.421	0.248
2557	196.18	195.65	8	8	225	0.0024	0.015	0.813	0.134	0.047	1.146	0.237	0.015	0.813	0.134	0.047	1.146	0.237	0.015	0.813	0.134	0.047	1.146	0.237
2568	227.03	226.51	8	8	80	0.0065	0.072	1.858	0.228	0.23	2.578	0.418	0.072	1.858	0.228	0.23	2.578	0.418	0.072	1.858	0.228	0.23	2.578	0.418
2570	265.7	264.03	8	8	94.73	0.0176	0.002	0.887	0.032	0.006	1.264	0.055	0.002	0.887	0.032	0.006	1.264	0.055	0.002	0.887	0.032	0.006	1.264	0.055
2571	263.93	262.23	8	8	291.62	0.0058	0.003	0.669	0.049	0.009	0.952	0.084	0.003	0.669	0.049	0.009	0.952	0.084	0.003	0.669	0.049	0.009	0.952	0.084

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
2572	262.21	258.04	8	8	215.99	0.0193	0.005	1.224	0.049	0.016	1.743	0.085	0.005	1.224	0.049	0.016	1.743	0.085	0.005	1.224	0.049	0.016	1.743	0.085
2573	269.3	258.25	8	8	443	0.0249	0.004	1.24	0.041	0.013	1.767	0.071	0.004	1.24	0.041	0.013	1.767	0.071	0.004	1.24	0.041	0.013	1.767	0.071
2575	271.56	261.76	8	8	350	0.0280	0.035	2.507	0.112	0.112	3.545	0.197	0.035	2.507	0.112	0.112	3.545	0.197	0.035	2.507	0.112	0.112	3.545	0.197
2576	222.82	220.54	8	8	118	0.0193	0.009	1.457	0.064	0.028	2.071	0.111	0.009	1.457	0.064	0.028	2.071	0.111	0.009	1.457	0.064	0.028	2.071	0.111
2580	309.99	307.33	8	8	311.11	0.0086	0.005	0.944	0.062	0.017	1.342	0.107	0.005	0.944	0.062	0.017	1.342	0.107	0.005	0.944	0.062	0.017	1.342	0.107
2581	307.13	304.94	8	8	260	0.0084	0.049	1.823	0.177	0.158	2.553	0.318	0.049	1.823	0.177	0.158	2.553	0.318	0.049	1.823	0.177	0.158	2.553	0.318
2582	314.55	309.34	8	8	137	0.0380	0.005	1.514	0.04	0.015	2.158	0.07	0.005	1.514	0.04	0.015	2.158	0.07	0.005	1.514	0.04	0.015	2.158	0.07
2585	286.99	286.55	8	8	54	0.0081	0.005	0.885	0.058	0.015	1.259	0.1	0.005	0.885	0.058	0.015	1.259	0.1	0.005	0.885	0.058	0.015	1.259	0.1
2587	337.96	337.55	8	8	124.4	0.0033	0.037	1.206	0.195	0.119	1.684	0.352	0.037	1.206	0.195	0.119	1.684	0.352	0.037	1.206	0.195	0.119	1.684	0.352
2593	351.5	350.43	8	8	104	0.0103	0.002	0.709	0.034	0.005	1.011	0.059	0.002	0.709	0.034	0.005	1.011	0.059	0.002	0.709	0.034	0.005	1.011	0.059
2595	350.43	349.8	8	8	50	0.0126	0.003	0.925	0.044	0.01	1.318	0.077	0.003	0.925	0.044	0.01	1.318	0.077	0.003	0.925	0.044	0.01	1.318	0.077
2600	325.56	324.54	8	8	281	0.0036	0.004	0.651	0.067	0.014	0.925	0.117	0.004	0.651	0.067	0.014	0.925	0.117	0.004	0.651	0.067	0.014	0.925	0.117
2601	323.28	322.39	8	8	172	0.0052	0.012	1.007	0.101	0.038	1.425	0.177	0.012	1.007	0.101	0.038	1.425	0.177	0.012	1.007	0.101	0.038	1.425	0.177
2610	282.42	281.62	8	8	287	0.0028	0.02	0.946	0.15	0.064	1.331	0.266	0.02	0.946	0.15	0.064	1.331	0.266	0.02	0.946	0.15	0.064	1.331	0.266
2613	270.8	270.29	8	8	171.48	0.0030	0.002	0.478	0.049	0.006	0.68	0.084	0.002	0.478	0.049	0.006	0.68	0.084	0.002	0.478	0.049	0.006	0.68	0.084
2615	280.94	277.36	8	8	178.85	0.0200	0.002	0.98	0.034	0.007	1.397	0.058	0.002	0.98	0.034	0.007	1.397	0.058	0.002	0.98	0.034	0.007	1.397	0.058
2616	272.77	270.37	8	8	240	0.0100	0.005	0.974	0.057	0.016	1.386	0.099	0.005	0.974	0.057	0.016	1.386	0.099	0.005	0.974	0.057	0.016	1.386	0.099
2619	248.48	247.43	8	8	261.82	0.0040	0.105	1.745	0.313	0.337	2.363	0.604	0.105	1.745	0.313	0.337	2.363	0.604	0.105	1.745	0.313	0.337	2.363	0.604
2620	261.75	261.43	8	8	81.86	0.0039	0.003	0.606	0.057	0.01	0.862	0.099	0.003	0.606	0.057	0.01	0.862	0.099	0.003	0.606	0.057	0.01	0.862	0.099
2621	261.23	260.58	8	8	71	0.0092	0.004	0.872	0.052	0.012	1.241	0.089	0.004	0.872	0.052	0.012	1.241	0.089	0.004	0.872	0.052	0.012	1.241	0.089
2623	229.87	229.03	8	8	173	0.0049	0.014	1.039	0.111	0.046	1.469	0.196	0.014	1.039	0.111	0.046	1.469	0.196	0.014	1.039	0.111	0.046	1.469	0.196
2624	283.97	283.7	8	8	67.81	0.0040	0.001	0.452	0.036	0.004	0.645	0.062	0.001	0.452	0.036	0.004	0.645	0.062	0.001	0.452	0.036	0.004	0.645	0.062
2627	261.34	256.88	8	8	162.57	0.0274	0.027	2.304	0.1	0.086	3.262	0.175	0.027	2.304	0.1	0.086	3.262	0.175	0.027	2.304	0.1	0.086	3.262	0.175
2631	236.13	235.52	8	8	254	0.0024	0.115	1.485	0.375	0.367	1.937	0.783	0.115	1.485	0.375	0.367	1.937	0.783	0.115	1.485	0.375	0.367	1.937	0.783
2632	238.54	236.99	8	8	337.4	0.0046	0.004	0.666	0.058	0.011	0.948	0.101	0.004	0.666	0.058	0.011	0.948	0.101	0.004	0.666	0.058	0.011	0.948	0.101
2633	235.32	234.88	8	8	185.4	0.0024	0.118	1.489	0.381	0.376	1.928	0.807	0.118	1.489	0.381	0.376	1.928	0.807	0.118	1.489	0.381	0.376	1.928	0.807
2634	240.69	238.35	8	8	389.8	0.0060	0.013	1.078	0.1	0.04	1.526	0.175	0.013	1.078	0.1	0.04	1.526	0.175	0.013	1.078	0.1	0.04	1.526	0.175
2635	238.15	236.99	8	8	321.17	0.0036	0.038	1.253	0.192	0.122	1.75	0.347	0.038	1.253	0.192	0.122	1.75	0.347	0.038	1.253	0.192	0.122	1.75	0.347
2636	236.99	236.33	8	8	181	0.0036	0.107	1.695	0.324	0.343	2.284	0.631	0.107	1.695	0.324	0.343	2.284	0.631	0.107	1.695	0.324	0.343	2.284	0.631
2637	238.15	237.5	8	8	361	0.0018	0.017	0.774	0.154	0.055	1.089	0.275	0.017	0.774	0.154	0.055	1.089	0.275	0.017	0.774	0.154	0.055	1.089	0.275
2638	243.03	242.2	8	8	206	0.0040	0.003	0.596	0.054	0.009	0.848	0.094	0.003	0.596	0.054	0.009	0.848	0.094	0.003	0.596	0.054	0.009	0.848	0.094
2639	242.2	240.65	8	8	390.2	0.0040	0.005	0.692	0.069	0.015	0.983	0.12	0.005	0.692	0.069	0.015	0.983	0.12	0.005	0.692	0.069	0.015	0.983	0.12
2640	240.63	239.31	8	8	375.8	0.0035	0.015	0.944	0.124	0.048	1.332	0.218	0.015	0.944	0.124	0.048	1.332	0.218	0.015	0.944	0.124	0.048	1.332	0.218
2641	239.3	238.16	8	8	356	0.0032	0.015	0.914	0.127	0.048	1.289	0.223	0.015	0.914	0.127	0.048	1.289	0.223	0.015	0.914	0.127	0.048	1.289	0.223
2642	240.81	239.5	8	8	131	0.0100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2643	247.19	246.21	8	8	326	0.0030	0.004	0.583	0.066	0.012	0.829	0.114	0.004	0.583	0.066	0.012	0.829	0.114	0.004	0.583	0.066	0.012	0.829	0.114
2644	248.01	247.2	8	8	250.9	0.0032	0.001	0.387	0.033	0.003	0.552	0.057	0.001	0.387	0.033	0.003	0.552	0.057	0.001	0.387	0.033	0.003	0.552	0.057
2645	249.86	249.16	8	8	346	0.0020	0.012	0.718	0.124	0.037	1.013	0.219	0.012	0.718	0.124	0.037	1.013	0.219	0.012	0.718	0.124	0.037	1.013	0.219
2646	246.01	245.78	8	8	85.53	0.0027	0.037	1.116	0.203	0.117	1.556	0.368	0.037	1.116	0.203	0.117	1.556	0.368	0.037	1.116	0.203	0.117	1.556	0.368
2648	239.64	239.43	8	8	51.48	0.0041	0.016	1.003	0.121	0.05	1.416	0.213	0.016	1.003	0.121	0.05	1.416	0.213	0.016	1.003	0.121	0.05	1.416	0.213
2649	244.87	244.17	8	8	346	0.0020	0.017	0.803	0.149	0.054	1.129	0.264	0.017	0.803	0.149	0.054	1.129	0.264	0.017	0.803	0.149	0.054	1.129	0.264
2650	243.27	243.24	8	8	15	0.0020	0.028	0.931	0.192	0.09	1.3	0.346	0.028	0.931	0.192	0.09	1.3	0.346	0.028	0.931	0.192	0.09	1.3	0.346
2651	242.44	241.83	8	8	304	0.0020	0.043	1.053	0.236	0.137	1.458	0.433	0.043	1.053	0.236	0.137	1.458	0.433	0.043	1.053	0.236	0.137	1.458	0.433
2652	241.59	241.22	8	8	180	0.0021	0.107	1.376	0.376	0.342	1.792	0.787	0.107	1.376	0.376	0.342	1.792	0.787	0.107	1.376	0.376	0.342	1.792	0.787
2653	241.2	240.77	8	8	126	0.0034	0.025	1.082	0.158	0.067	1.45	0.259	0.025	1.082	0.158	0.067	1.45	0.259	0.025	1.082	0.158	0.067	1.45	0.259
2654	240.67	240.34	8	8	166.71	0.0020	0.026	0.909	0.186	0.072	1.218	0.309	0.026	0.909	0.186	0.072	1.218	0.309	0.026	0.909	0.186	0.072	1.218	0.309
2655	240.24	239.82	8	8	211.13	0.0020	0.028	0.926	0.191	0.077	1.243	0.319	0.028	0.926	0.191	0.077	1.243	0.319	0.028	0.926	0.191	0.077	1.243	0.319
2656	239.72	239.19	8	8	267.08	0.0020	0.038	1.017	0.224	0.111	1.374	0.388	0.038	1.017	0.224	0.111	1.374	0.388	0.038	1.017	0.224	0.111	1.374	0.388
2657	240.76	239.82	8	8	236	0.0040	0.008	0.825	0.09	0.027	1.169	0.158	0.008	0.825	0.09	0.027	1.169	0.158	0.008	0.825	0.09	0.027	1.169	0.158
2658	244.83	244.01	8	8	206	0.0040	0.006	0.754	0.079	0.02	1.07	0.137	0.006	0.754	0.079	0.02	1.07	0.137	0.006	0.754	0.079	0.02	1.07	0.137
2659	243.81	243.61	8	8	49.63	0.0040	0.01	0.869	0.097	0.031	1.231	0.17	0.01	0.869	0.097	0.031	1.231	0.17	0.01	0.869	0.097	0.031	1.231	0.17
2660	243.41	243.08	8	8	82.68	0.0040	0.01	0.866	0.098	0.031	1.227	0.171	0.01	0.866	0.098	0.031	1.227	0.171	0.01	0.866	0.098	0.031	1.227	0.171
2661	242.88	242.19	8	8	171.86	0.0040	0.011	0.899	0.103	0.035	1.272	0.18	0.011	0.899	0.103	0.035	1.272	0.18	0.011	0.899	0.103	0.035	1.272	0.18
2662	241.99	240.87	8	8	279.43	0.0040	0.012	0.931	0.109	0.04	1.317	0.192	0.012	0.931	0.109	0.04	1.317	0.192	0.012	0.931	0.109	0.04	1.317	0.192
2663	240.67	239.84	8	8	208.04	0.0040	0.016	0.995	0.122	0.05	1.405	0.215	0.016	0.995	0.122	0.05	1.405	0.215	0.016	0.995	0.122	0.05	1.405	0.215
2664	242.57	241.79	8	8	392	0.0020	0.106	1.357	0.378	0.339	1.764	0.793	0.106	1.357	0.378	0.339	1.764	0.793	0.106	1.357	0.378	0.339	1.764	0.793
2665	245.42	245.31	8	8	55.51	0.0020	0.04	1.028	0.228	0.128	1.425	0.419	0.04	1.028	0.228	0.128	1.425	0.419	0.04	1.028	0.228	0.128	1.425	0.419
2666	245.31	244.75	8	8	280.44	0.0020	0.042	1.047	0.234	0.135	1.45	0.431	0.042	1.047	0.234	0.135	1.45	0.431	0.042	1.047	0.234	0.135	1.45	0.431
2667	246.45	245.08	8	8	343.47	0.0040	0.006	0.737	0.076	0.018	1.046	0.132	0.006	0.737	0.076	0.018	1.046	0.132	0.006	0.737	0.076	0.018	1.046	0.132
2668	247.03	245.61	8	8	285	0.0050	0.014	1.043	0.11	0.045	1.475	0.193	0.014	1.043	0.11	0.045	1.475	0.193	0.014	1.043	0.11	0.045	1.475	0.193
2669	243.9	243.47	8	8	216	0.0020	0.028	0.929	0.192	0.09	1.298	0.346	0.028	0.929	0.192	0.09	1.298	0.346	0.028	0.929	0.192	0.09	1.298	0.346
2670	243.04	242.45	8	8	294	0.0020	0.028	0.932	0.192	0.09	1.302	0.346	0.028	0.932	0.192	0.09	1.302	0.346	0.028	0.932	0.192	0.09	1.302	0.346
2671	241.82	241.22	8	8	300	0.0020	0.053	1.119	0.263	0.17	1.54	0.491	0.053	1.119	0.263	0.17	1.54	0.491	0.053	1.119	0.263	0.17	1.54	0.491
2673	244.22	243.86	8	8	180	0.0020	0.083	1.269	0.33	0.264	1.706	0.649	0.083	1.269	0.33	0.264	1.706	0.649	0.083	1.269	0.33	0.264	1.706	0.649
2674	244.74	244.23	8	8	256	0.0020	0.076	1.237	0.316	0.242	1.673	0.612	0.076	1.237	0.316	0.242	1.673	0.612	0.076	1.237	0.316	0.242	1.673	0.612
2676	248.6	247.13	8	8	297	0.0049	0.028	1.276	0.153	0.089	1.794	0.272	0.028	1.276	0.153	0.089	1.794	0.272	0.028	1.276	0.153	0.089	1.794	0.272
2677	243.86	243.55	8	8	153	0.0020	0.096	1.331	0.357	0.308	1.761	0.724	0.096	1.331	0.357	0.308	1.761	0.724	0.096	1.331	0.357	0.308	1.761	0.724
2678	245.98	244.06	8	8	230.64	0.0083	0.01	1.122	0.082	0.032	1.592	0.143	0.01	1.122	0.082	0.032	1.592	0.143	0.01	1.122	0.082	0.032	1.592	0.143
2679	243.35	242.58	8	8	383.41	0.0020	0.098	1.334	0.362	0.314	1.759	0.739	0.098	1.334	0.362	0.314	1.759	0.739	0.098	1.334	0.362	0.314	1.759	0.739
2680	246.37	246.02	8	8	179.47	0.0020	0.033	0.964	0.208	0.105	1.343	0.377	0.033	0.964	0.208	0.105	1.343	0.377	0.033	0.964	0.208	0.105	1.343	0.377
2681	246.55	246.53	8	8	93.3	0.0002	0.033	0.438	0.365	0.105	0.576	0.75	0.033	0.438	0.365	0.105	0.576	0.75	0.033	0.438	0.365	0.105	0.576	0.75
2682	247.31	246.96	8	8	180	0.0019	0.033	0.963	0.208	0.105	1.341	0.378	0.033	0.963	0.208	0.105	1.341	0.378	0.033	0.963	0.208	0.105	1.341	0.378
2683	248.1	247.66	8	8	227.001	0.0019	0.021	0.846	0.168	0.068	1.186	0.3	0.021	0.846	0.168	0.068	1.186	0.3	0.021	0.846	0.168	0.068	1.186	0.3
2684	249.15	248.9	8	8	124	0.0020	0.016	0.783	0.143	0.05	1.102	0.254	0.016	0.783	0.143	0.05	1.102	0.254	0.016	0.783	0.143	0.05	1.102	0.254
2686	267.53	265.91	8	8	34	0.0476	0.008	1.94	0.05	0.026	2.762	0.086	0.008	1.94	0.05	0.026	2.762	0.086	0.008	1.94	0.05	0.026	2.762	0.086
2687	273.83	272.17	8	8	69	0.0241	0.002	0.922	0.027	0.005	1.316	0.046	0.002	0.922	0.027	0.005	1.316	0.046	0.002	0.922	0.027	0.005	1.316	0.046
2688	286.54	283.52	8	8	302.68	0.0100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2689	283.32	279.2	8	8	221.62	0.0186	0.003	1.043	0.04	0.01	1.486	0.068	0.003	1.043	0.04	0.01	1.486	0.068	0.003	1.043	0.04	0.01	1.486	0.068
2690	286.5	279.44	8	8	363.17	0.0194	0.003	1.017	0.037	0.009	1.448	0.063	0.003	1.017	0.037	0.009	1.448	0.063	0.003	1.017	0.037	0.009	1.448	0.063
2691	276.13	273.85	8	8	251	0.0091	0.007	1.04	0.068	0.022	1.478	0.119	0.007	1.04	0.068	0.022	1.478	0.119	0.007	1.04	0.068	0.022	1.478	0.119
2692	273.65	272.03	8	8	96	0.0169	0.009	1.39	0.066	0.028	1.975	0.115	0.009	1.39	0.066	0.028	1.975	0.115	0.009	1.39	0.066	0.028	1.975	0.115
2694	279.24	276.33	8	8	141.02	0.0206	0.004	1.191	0.045	0.014	1.696	0.077	0.004	1.191	0.045	0.014	1.696	0.077	0.004	1.191	0.045	0.014	1.696	0.077

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
2695	281.08	269.54	8	8	311.88	0.0370	0.003	1.271	0.032	0.009	1.813	0.054	0.003	1.271	0.032	0.009	1.813	0.054	0.003	1.271	0.032	0.009	1.813	0.054
2696	265.71	264.43	8	8	252	0.0051	0.036	1.394	0.173	0.116	1.954	0.31	0.036	1.394	0.173	0.116	1.954	0.31	0.036	1.394	0.173	0.116	1.954	0.31
2698	234.68	234.36	8	8	130.14	0.0025	0.212	1.76	0.528	0.68	3.014	1	0.212	1.76	0.528	0.68	3.014	1	0.212	1.76	0.528	0.68	3.014	1
2701	239.13	239.03	8	8	4	0.0250	0.016	1.89	0.079	0.05	2.682	0.137	0.016	1.89	0.079	0.05	2.682	0.137	0.016	1.89	0.079	0.05	2.682	0.137
2703	274.5	268.96	8	8	159.13	0.0348	0.052	3.052	0.129	0.167	4.304	0.228	0.052	3.052	0.129	0.167	4.304	0.228	0.052	3.052	0.129	0.167	4.304	0.228
2726	237.73	236.68	8	8	262.53	0.0040	0.037	1.293	0.186	0.12	1.808	0.335	0.037	1.293	0.186	0.12	1.808	0.335	0.037	1.293	0.186	0.12	1.808	0.335
2727	226.66	226.27	8	8	96.74	0.0040	0.037	1.297	0.186	0.12	1.813	0.334	0.037	1.297	0.186	0.12	1.813	0.334	0.037	1.297	0.186	0.12	1.813	0.334
2728	283.61	282.78	8	8	84	0.0099	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2733	231.23	231.01	8	8	13	0.0169	0.009	1.39	0.066	0.028	1.975	0.115	0.018	1.736	0.093	0.059	2.459	0.163	0.018	1.736	0.093	0.059	2.459	0.163
2736	272.63	269.66	8	8	396	0.0075	0.001	0.456	0.022	0.002	0.651	0.039	0.001	0.456	0.022	0.002	0.651	0.039	0.001	0.456	0.022	0.002	0.651	0.039
2737	332.7	332.6	8	8	15	0.0067	0	0.387	0.019	0.001	0.552	0.033	0	0.387	0.019	0.001	0.552	0.033	0	0.387	0.019	0.001	0.552	0.033
2739	209.9	209.7	8	8	30	0.0067	0.014	1.154	0.102	0.045	1.634	0.18	0.014	1.154	0.102	0.045	1.634	0.18	0.014	1.154	0.102	0.045	1.634	0.18
2747	211.08	210.9	8	12	50.56	0.0036	0.164	1.89	0.409	0.526	2.33	1	0.164	1.89	0.409	0.526	2.33	1	0.164	1.896	0.227	0.526	2.631	0.416
2751	276.89	274.93	8	8	110	0.0178	0.003	1.033	0.04	0.01	1.472	0.069	0.003	1.033	0.04	0.01	1.472	0.069	0.003	1.033	0.04	0.01	1.472	0.069
2753	271.71	270.83	8	8	162	0.0054	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2754	270.83	269.51	8	8	278	0.0047	0	0.344	0.021	0.001	0.491	0.035	0	0.344	0.021	0.001	0.491	0.035	0	0.344	0.021	0.001	0.491	0.035
2755	269.51	268.4	8	8	273	0.0041	0.002	0.533	0.045	0.006	0.759	0.078	0.002	0.533	0.045	0.006	0.759	0.078	0.002	0.533	0.045	0.006	0.759	0.078
2756	267.33	263.3	8	8	29.001	0.1390	0.002	1.814	0.02	0.006	2.59	0.034	0.002	1.814	0.02	0.006	2.59	0.034	0.002	1.814	0.02	0.006	2.59	0.034
2777	290.59	290.42	8	12	92	0.0018	0.119	1.363	0.41	0.38	1.685	1	0.119	1.363	0.41	0.38	1.685	1	0.119	1.317	0.234	0.38	1.825	0.429
2779	256.9	256.79	8	8	80	0.0014	0.013	0.652	0.145	0.042	0.918	0.258	0.013	0.652	0.145	0.042	0.918	0.258	0.013	0.652	0.145	0.042	0.918	0.258
2783	244.16	243.9	8	8	130	0.0020	0.022	0.862	0.169	0.07	1.209	0.302	0.022	0.862	0.169	0.07	1.209	0.302	0.022	0.862	0.169	0.07	1.209	0.302
2785	241.22	240	8	8	5	0.2440	0.135	8.03	0.128	0.445	11.418	0.229	0.135	8.03	0.128	0.445	11.418	0.229	0.135	8.03	0.128	0.445	11.418	0.229
2786	239.93	239.83	8	8	135	0.0007	0.044	0.742	0.307	0.14	1.007	0.59	0.044	0.742	0.307	0.14	1.007	0.59	0.044	0.742	0.307	0.14	1.007	0.59
2787	363.22	363.12	8	8	12	0.0083	0.001	0.516	0.025	0.002	0.737	0.043	0.001	0.516	0.025	0.002	0.737	0.043	0.001	0.516	0.025	0.002	0.737	0.043
2788	244.16	243.81	8	8	110	0.0032	0.102	1.592	0.327	0.327	2.143	0.64	0.102	1.592	0.327	0.327	2.143	0.64	0.102	1.592	0.327	0.327	2.143	0.64
2789	255	254.3	8	8	285	0.0025	0.001	0.376	0.039	0.004	0.536	0.067	0.001	0.376	0.039	0.004	0.536	0.067	0.001	0.376	0.039	0.004	0.536	0.067
2790	254.3	253.8	8	8	48	0.0104	0.002	0.731	0.036	0.006	1.041	0.062	0.002	0.731	0.036	0.006	1.041	0.062	0.002	0.731	0.036	0.006	1.041	0.062
2791	253.8	252.8	8	8	170	0.0059	0.002	0.635	0.045	0.007	0.904	0.077	0.002	0.635	0.045	0.007	0.904	0.077	0.002	0.635	0.045	0.007	0.904	0.077
2794	247.44	247.06	8	12	95	0.0040	0.339	2.363	0.607	0.934	4.141	1	0.339	2.363	0.607	0.934	4.141	1	0.338	2.34	0.327	0.932	3.05	0.581
2795	219.52	219.33	8	12	80	0.0024	0.162	1.623	0.456	0.52	2.304	1	0.162	1.623	0.456	0.52	2.304	1	0.162	1.577	0.257	0.52	2.173	0.477
2800	198.88	198.35	8	8	154	0.0034	0.06	1.41	0.245	0.193	1.949	0.453	0.06	1.41	0.245	0.193	1.949	0.453	0.06	1.41	0.245	0.193	1.949	0.453
2801	197.11	196.73	8	8	132	0.0029	0.104	1.543	0.339	0.332	2.065	0.671	0.104	1.543	0.339	0.332	2.065	0.671	0.104	1.543	0.339	0.332	2.065	0.671
2802	210.4	210.3	8	8	25	0.0040	0.002	0.549	0.048	0.007	0.782	0.083	0.002	0.549	0.048	0.007	0.782	0.083	0.002	0.549	0.048	0.007	0.782	0.083
2803	247.65	247.31	8	8	166	0.0020	0.021	0.862	0.166	0.068	1.21	0.296	0.021	0.862	0.166	0.068	1.21	0.296	0.021	0.862	0.166	0.068	1.21	0.296
2804	246.52	246.37	8	8	75	0.0020	0.033	0.973	0.206	0.105	1.355	0.375	0.033	0.973	0.206	0.105	1.355	0.375	0.033	0.973	0.206	0.105	1.355	0.375
3024	331.41	331.41	8	8	1.001	0.0000	0.137	0.607	1	0.438	1.943	1	0.137	0.607	1	0.438	1.943	1	0.137	2.194	0.321	0.439	2.961	0.624
3028	224.5	224.12	8	8	300	0.0013	0.166	1.29	0.556	0.279	1.235	1	0.174	1.303	0.572	0.279	1.235	1	0	0	0	0	0	0
3016	317	315	8.001	8.001	286.001	0.0070	0.053	1.747	0.193	0.171	2.44	0.348	0.053	1.747	0.193	0.171	2.44	0.348	0.053	1.747	0.193	0.171	2.44	0.348
13	189.44	188.49	10	10	231.9	0.0041	0.177	1.996	0.299	0.565	2.717	0.571	0.177	1.996	0.299	0.565	2.717	0.571	0.177	1.996	0.299	0.565	2.717	0.571
17	194.14	193.06	10	10	300	0.0036	0.036	1.195	0.14	0.114	1.684	0.248	0.036	1.195	0.14	0.114	1.684	0.248	0.036	1.195	0.14	0.114	1.684	0.248
22	191.22	190.33	10	10	248.17	0.0036	0.124	1.722	0.258	0.398	2.372	0.481	0.124	1.722	0.258	0.398	2.372	0.481	0.124	1.722	0.258	0.398	2.372	0.481
23	190.33	189.44	10	10	254.1	0.0035	0.137	1.757	0.273	0.44	2.411	0.514	0.137	1.757	0.273	0.44	2.411	0.514	0.137	1.757	0.273	0.44	2.411	0.514
24	186.47	185.82	10	10	161	0.0040	0.235	2.151	0.348	0.75	2.863	0.697	0.235	2.151	0.348	0.75	2.863	0.697	0.235	2.151	0.348	0.75	2.863	0.697
25	187.73	186.47	10	10	264	0.0048	0.223	2.254	0.325	0.715	3.036	0.634	0.223	2.254	0.325	0.715	3.036	0.634	0.223	2.254	0.325	0.715	3.036	0.634
26	185.8	185.42	10	10	100	0.0038	0.26	2.164	0.373	0.831	2.825	0.778	0.26	2.164	0.373	0.831	2.825	0.778	0.26	2.164	0.373	0.831	2.825	0.778
27	188.49	187.53	10	10	239	0.0040	0.187	2.015	0.309	0.598	2.731	0.596	0.187	2.015	0.309	0.598	2.731	0.596	0.187	2.015	0.309	0.598	2.731	0.596
36	185.22	184.35	10	10	91.17	0.0095	0.26	3.015	0.293	0.831	4.111	0.558	0.26	3.015	0.293	0.831	4.111	0.558	0.26	3.015	0.293	0.831	4.111	0.558
37	184.15	183.39	10	10	69.21	0.0110	0.26	3.17	0.283	0.831	4.337	0.534	0.26	3.17	0.283	0.831	4.337	0.534	0.26	3.17	0.283	0.831	4.337	0.534
44	192.41	191.22	10	10	329.53	0.0036	0.082	1.529	0.209	0.262	2.13	0.38	0.082	1.529	0.209	0.262	2.13	0.38	0.082	1.529	0.209	0.262	2.13	0.38
52	194.96	194.14	10	10	230	0.0036	0.028	1.105	0.124	0.089	1.56	0.219	0.028	1.105	0.124	0.089	1.56	0.219	0.028	1.105	0.124	0.089	1.56	0.219
53	199.78	199.71	10	10	395	0.0002	0.007	0.252	0.129	0.021	0.355	0.227	0.007	0.252	0.129	0.021	0.355	0.227	0.007	0.252	0.129	0.021	0.355	0.227
62	195.4	194.87	10	12	270	0.0020	0.175	1.527	0.36	0.559	2.016	0.734	0.175	1.527	0.36	0.559	2.016	0.734	0.175	1.504	0.28	0.559	2.06	0.527
68	190.24	189.94	10	15	421	0.0007	0.276	1.173	0.633	0.883	2.504	1	0.276	1.173	0.633	0.883	2.504	1	0.276	1.167	0.339	0.883	1.562	0.67
74	196.78	195.85	10	10	260	0.0036	0.016	0.937	0.095	0.051	1.328	0.167	0.016	0.937	0.095	0.051	1.328	0.167	0.016	0.937	0.095	0.051	1.328	0.167
75	198.93	197.75	10	10	327.63	0.0036	0.041	1.244	0.149	0.131	1.75	0.265	0.041	1.244	0.149	0.131	1.75	0.265	0.041	1.244	0.149	0.131	1.75	0.265
76	197.75	196.78	10	10	270	0.0036	0.01	0.819	0.077	0.033	1.162	0.134	0.01	0.819	0.077	0.033	1.162	0.134	0.01	0.819	0.077	0.033	1.162	0.134
82	195.85	194.96	10	10	245	0.0036	0.028	1.112	0.124	0.089	1.57	0.218	0.028	1.112	0.124	0.089	1.57	0.218	0.028	1.112	0.124	0.089	1.57	0.218
83	199.4	198.93	10	10	265	0.0018	0.038	0.948	0.17	0.121	1.328	0.305	0.038	0.948	0.17	0.121	1.328	0.305	0.038	0.948	0.17	0.121	1.328	0.305
84	199.7	199.4	10	10	165	0.0018	0.036	0.943	0.166	0.115	1.323	0.296	0.036	0.943	0.166	0.115	1.323	0.296	0.036	0.943	0.166	0.115	1.323	0.296
85	199.71	199.7	10	10	70	0.0001	0.01	0.264	0.166	0.032	0.371	0.296	0.01	0.264	0.166	0.032	0.371	0.296	0.01	0.264	0.166	0.032	0.371	0.296
135	203.73	202.69	10	12	346	0.0030	0.192	1.827	0.338	0.613	2.446	0.669	0.192	1.827	0.338	0.613	2.446	0.669	0.192	1.798	0.263	0.613	2.474	0.491
141	201.53	199.85	10	15	346	0.0049	0.346	2.558	0.408	1.108	3.144	1	0.346	2.558	0.408	1.108	3.144	1	0.346	2.472	0.233	1.108	3.426	0.427
168	191.57	190.24	10	12	167	0.0080	0.266	2.846	0.311	0.852	3.856	0.6	0.266	2.846	0.311	0.852	3.856	0.6	0.266	2.796	0.243	0.852	3.866	0.448
170	192.01	191.73	10	12	145.98	0.0019	0.246	1.66	0.437	0.786	2.229	1	0.246	1.66	0.437	0.786	2.229	1	0.246	1.642	0.336	0.786	2.201	0.662
171	192.99	192.34	10	12	325	0.0020	0.233	1.662	0.419	0.744	2.112	1	0.233	1.662	0.419	0.744	2.112	1	0.233	1.642	0.323	0.744	2.215	0.629
172	193.36	192.99	10	12	185	0.0020	0.229	1.655	0.415	0.733	2.079	1	0.229	1.655	0.415	0.733	2.079	1	0.229	1.635	0.32	0.733	2.207	0.622
173	193.64	193.36	10	12	140	0.0020	0.229	1.655	0.415	0.733	2.079	1	0.229	1.655	0.415	0.733	2.079	1	0.229	1.635	0.32	0.733	2.208	0.622
174	194.29	193.64	10	12	325	0.0020	0.229	1.655	0.415	0.733	2.079	1	0.229	1.655	0.415	0.733	2.079	1	0.229	1.635	0.32	0.733	2.208	0.622
175	194.87	194.29	10	12	287	0.0020	0.228	1.66	0.413	0.731	2.074	1	0.228	1.66	0.413	0.731	2.074	1	0.228	1.64	0.319	0.731	2.215	0.619
201	192.34	192.01	10	12	156.61	0.0021	0.234	1.697	0.415	0.75	2.128	1	0.234	1.697	0.415	0.75	2.128	1	0.234	1.677	0.32	0.75	2.264	0.621
202	191.63	191.57	10	12	19	0.0032	0.247	1.996	0.382	0.791	2.58	0.812	0.247	1.996	0.382	0.791	2.58	0.812	0.247	1.968	0.296	0.791	2.681	0.564
203	189.85	189.7	10	18	40	0.0038	0.319	2.277	0.419	1.022	2.898	1	0.319	2.277	0.419	1.022	2.898	1	0.319	2.158	0.187	1.022	3.017	0.337
227	214.68	203.08	10	15	725	0.0160	0.087	2.627	0.149	0.509	4.386	0.364	0.135	2.996	0.185	0.706	4.788	0.435	0.308	3.638	0.164	0.942	5.042	0.286
228	196.78	194.6	10	18	360.31	0.0061	0.186	2.328	0.277	0.828	3.437	0.646	0.427	2.931	0.431	1.638	4.646	1	0.599	3.072	0.227	1.871	4.236	0.411
229	198.84	198.17	10	18	40	0.0168	0.166	3.237	0.203	0.765	4.974	0.45	0.424	4.237	0.327	1.624	5.885	0.731	0.595	4.394	0.176	1.86	6.115	0.312
230	198.17	197.55	10	18	125.76	0.0049	0.169	2.105	0.278	0.773	3.124	0.662	0.424	2.714	0.456	1.626	4.612	1	0.595	2.852	0.238	1.861	3.924	0.433
236	203.08	201.88	10	15	457.5	0.0026	0.107	1.476	0.259	0.576	2.287	0.672	0.265	1.9	0.417	1.114	3.161	1	0.435	2.12	0.306	1.35	2.857	0.576
237	225.09	214.68	10	10	520	0.0200	0.021	1.861	0.072	0.068	2.643	0.126	0.034	2.155	0.091	0.11	3.054	0.159	0.034	2.155	0.091	0.11	3.054	0.159
238	230.9	228.14	10	10	143	0.0193	0.001	0.617	0.014	0.002	0.881	0.024	0.013	1.57	0.057	0.04	2.233	0.099	0.013	1.57	0.057	0.04	2.233	0.099
239	235.27	231.12	10	10	222.11	0.0187	0.001	0.771	0.02	0.004	1.101	0.034	0.001	0.771	0.02	0.004	1.101	0.034	0.001	0.771	0.02	0.004	1.101	0.034
248	208.96	207.63	10	15	480.001	0.0028	0.261	1.931	0.408	0.836	2.371	1	0.261	1.931	0.408	0.836	2.371	1	0.262	1.867	0.233	0.837	2.588	0.427
255	209.02	208.96	10	15	20.001	0.0030	0.212	1.878	0.357	0.678	2.486	0.723	0.212	1.878	0.357	0.678	2.486	0.723	0.212	1.807	0.206	0.679	2.518	0.373

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
309	212.68	204.12	10	12	348	0.0246	0.421	4.856	0.295	1.199	6.434	0.523	0.421	4.856	0.295	1.199	6.434	0.523	0.422	4.769	0.23	1.201	6.408	0.397
311	204.12	203.46	10	12	239	0.0028	0.43	2.191	0.544	1.226	3.477	1	0.43	2.191	0.544	1.226	3.477	1	0.43	2.186	0.411	1.229	2.421	1
320	211.04	203.46	10	10	151	0.0502	0.196	5.006	0.168	0.397	6.156	0.239	0.207	5.086	0.173	0.402	6.175	0.24	0.038	3.067	0.077	0.123	4.354	0.134
324	214.99	212.24	10	10	135	0.0204	0.195	3.637	0.21	0.394	4.452	0.299	0.206	3.694	0.215	0.398	4.465	0.3	0.037	2.219	0.094	0.119	3.143	0.165
325	212.24	211.04	10	10	61	0.0197	0.196	3.597	0.212	0.397	4.407	0.303	0.207	3.654	0.218	0.402	4.42	0.305	0.038	2.212	0.096	0.123	3.133	0.168
414	211.02	210.9	10	10	77	0.0016	0.034	0.877	0.167	0.108	1.23	0.298	0.034	0.877	0.167	0.108	1.23	0.298	0.034	0.877	0.167	0.108	1.23	0.298
415	210.82	210.06	10	10	346	0.0022	0.04	1.037	0.166	0.127	1.454	0.296	0.04	1.037	0.166	0.127	1.454	0.296	0.04	1.037	0.166	0.127	1.454	0.296
416	209.11	209.04	10	10	33.61	0.0021	0.047	1.07	0.182	0.151	1.497	0.328	0.047	1.07	0.182	0.151	1.497	0.328	0.047	1.07	0.182	0.151	1.497	0.328
417	209.98	209.19	10	10	356	0.0022	0.045	1.083	0.176	0.145	1.516	0.317	0.045	1.083	0.176	0.145	1.516	0.317	0.045	1.083	0.176	0.145	1.516	0.317
521	265.33	265	10	10	183.24	0.0018	0.26	1.646	0.459	0.832	2.361	1	0.26	1.646	0.459	0.832	2.361	1	0.26	1.647	0.459	0.832	2.361	1
522	262.99	262.06	10	10	335	0.0028	0.264	1.939	0.411	0.693	2.409	0.76	0.264	1.939	0.411	0.693	2.409	0.76	0.264	1.939	0.411	0.693	2.41	0.76
523	264.4	264	10	10	260	0.0015	0.278	1.579	0.499	0.888	2.519	1	0.278	1.579	0.499	0.888	2.519	1	0.278	1.579	0.499	0.888	2.52	1
524	260	259.63	10	10	61.85	0.0060	0.272	2.582	0.339	0.716	3.319	0.589	0.272	2.582	0.339	0.716	3.319	0.589	0.272	2.582	0.339	0.716	3.319	0.589
525	260.93	260.2	10	10	261.36	0.0028	0.271	1.957	0.416	0.715	2.423	0.78	0.271	1.957	0.416	0.715	2.423	0.78	0.271	1.957	0.416	0.715	2.423	0.78
526	262.06	261.41	10	10	231.5	0.0028	0.266	1.949	0.41	0.696	2.423	0.76	0.266	1.949	0.41	0.696	2.423	0.76	0.266	1.95	0.41	0.696	2.423	0.76
529	263.78	262.9	10	10	279.85	0.0031	0.261	2.022	0.394	0.681	2.538	0.712	0.261	2.022	0.394	0.681	2.538	0.712	0.261	2.022	0.394	0.681	2.538	0.712
540	264	263.87	10	10	98.15	0.0013	0.019	0.693	0.13	0.213	1.395	0.448	0.019	0.693	0.13	0.213	1.395	0.448	0.019	0.693	0.13	0.213	1.395	0.448
544	265	264.5	10	10	260	0.0019	0.272	1.707	0.462	0.871	2.47	1	0.272	1.707	0.462	0.871	2.47	1	0.272	1.707	0.462	0.871	2.47	1
1102	341.36	338.88	10	10	309.6	0.0080	0.124	2.287	0.211	0.396	3.184	0.383	0.124	2.287	0.211	0.396	3.184	0.383	0.124	2.287	0.211	0.396	3.184	0.383
1103	342.88	341.54	10	10	190	0.0071	0.121	2.171	0.215	0.386	3.019	0.392	0.121	2.171	0.215	0.386	3.019	0.392	0.121	2.171	0.215	0.386	3.019	0.392
1296	269.63	269.17	10	10	305.18	0.0015	0.081	1.12	0.26	0.261	1.542	0.484	0.081	1.12	0.26	0.261	1.542	0.484	0.081	1.12	0.26	0.261	1.542	0.484
1299	267.79	266.98	10	10	258.63	0.0031	0.173	1.802	0.317	0.552	2.435	0.614	0.173	1.802	0.317	0.552	2.435	0.614	0.173	1.801	0.317	0.553	2.435	0.614
1301	268.78	268.58	10	10	130.06	0.0015	0.112	1.235	0.304	0.358	1.677	0.583	0.112	1.235	0.304	0.358	1.677	0.583	0.112	1.235	0.304	0.358	1.677	0.583
1303	269.96	269.73	10	10	150.52	0.0015	0.012	0.638	0.102	0.038	0.903	0.178	0.012	0.638	0.102	0.038	0.903	0.178	0.012	0.638	0.102	0.038	0.903	0.178
1318	268.88	268.38	10	10	261.07	0.0019	0.106	1.315	0.279	0.339	1.8	0.526	0.106	1.315	0.279	0.339	1.8	0.526	0.106	1.315	0.279	0.339	1.8	0.526
1319	269.17	268.98	10	10	261.49	0.0007	0.099	0.912	0.348	0.318	1.214	0.696	0.099	0.912	0.348	0.318	1.214	0.696	0.099	0.912	0.348	0.318	1.214	0.696
1369	266.16	265.53	10	10	350	0.0018	0.187	1.508	0.382	0.598	1.948	0.813	0.187	1.508	0.382	0.598	1.948	0.813	0.187	1.508	0.382	0.598	1.948	0.813
1370	266.78	266.16	10	10	343.03	0.0018	0.183	1.501	0.378	0.585	1.951	0.793	0.183	1.501	0.378	0.585	1.951	0.793	0.183	1.501	0.378	0.585	1.951	0.793
1387	260.87	260.45	10	10	29	0.0145	0.056	2.225	0.124	0.331	3.751	0.298	0.056	2.225	0.124	0.331	3.751	0.298	0.056	2.225	0.124	0.331	3.751	0.298
1388	260.25	259.36	10	10	221	0.0040	0.056	1.42	0.169	0.331	2.36	0.419	0.056	1.42	0.169	0.331	2.36	0.419	0.056	1.42	0.169	0.331	2.36	0.42
1389	256.78	253.5	10	10	391	0.0084	0.077	2.023	0.165	0.399	3.244	0.38	0.077	2.023	0.165	0.399	3.244	0.38	0.077	2.023	0.165	0.399	3.244	0.38
1390	258.36	256.8	10	10	391	0.0040	0.065	1.477	0.182	0.359	2.402	0.44	0.065	1.477	0.182	0.359	2.402	0.44	0.065	1.477	0.182	0.359	2.403	0.44
1391	259.34	258.38	10	10	241	0.0040	0.056	1.417	0.17	0.332	2.353	0.422	0.056	1.417	0.17	0.332	2.353	0.422	0.056	1.417	0.17	0.332	2.353	0.422
1442	253.48	253.31	10	10	16	0.0106	0.078	2.201	0.156	0.4	3.537	0.357	0.078	2.201	0.156	0.4	3.537	0.357	0.078	2.202	0.156	0.4	3.537	0.357
1489	252.78	249.17	10	10	376.05	0.0096	0.216	2.868	0.267	0.844	4.135	0.562	0.216	2.868	0.267	0.844	4.135	0.562	0.216	2.868	0.267	0.844	4.135	0.562
1490	242.08	238.33	10	10	375	0.0100	0.218	2.917	0.265	0.849	4.207	0.557	0.218	2.917	0.265	0.849	4.207	0.557	0.218	2.917	0.265	0.85	4.207	0.557
1492	249.17	245.74	10	10	374.8	0.0092	0.216	2.819	0.27	0.844	4.06	0.57	0.216	2.819	0.27	0.844	4.06	0.57	0.216	2.819	0.27	0.844	4.06	0.571
1496	245.74	242.08	10	10	375	0.0098	0.217	2.889	0.266	0.847	4.165	0.561	0.217	2.889	0.266	0.847	4.165	0.561	0.217	2.889	0.266	0.847	4.165	0.561
1536	236.25	236	10	10	62.91	0.0040	0.163	1.93	0.289	0.521	2.635	0.548	0.163	1.93	0.289	0.521	2.635	0.548	0.163	1.93	0.289	0.521	2.635	0.548
1906	347.3	346.04	10	10	316.02	0.0040	0.119	1.764	0.246	0.38	2.437	0.454	0.119	1.764	0.246	0.38	2.437	0.454	0.119	1.764	0.246	0.38	2.437	0.454
1908	347.94	347.37	10	10	112	0.0051	0.119	1.924	0.231	0.38	2.667	0.424	0.119	1.924	0.231	0.38	2.667	0.424	0.119	1.924	0.231	0.38	2.667	0.424
1910	349.8	349.1	10	10	150	0.0047	0.035	1.306	0.131	0.114	1.842	0.231	0.035	1.306	0.131	0.114	1.842	0.231	0.035	1.306	0.131	0.114	1.842	0.231
1911	348.57	348.08	10	10	52	0.0094	0.088	2.19	0.171	0.281	3.07	0.307	0.088	2.19	0.171	0.281	3.07	0.307	0.088	2.19	0.171	0.281	3.07	0.307
1943	345.4	343	10	10	300	0.0080	0.12	2.264	0.207	0.383	3.153	0.376	0.12	2.264	0.207	0.383	3.153	0.376	0.12	2.264	0.207	0.383	3.153	0.376
2299	267.27	266	10	10	395	0.0032	0.167	1.8	0.309	0.533	2.441	0.594	0.167	1.8	0.309	0.533	2.441	0.594	0.167	1.8	0.309	0.533	2.441	0.594
2429	234.13	232.65	10	10	400	0.0037	0.056	1.377	0.172	0.178	1.929	0.308	0.056	1.377	0.172	0.178	1.929	0.308	0.056	1.377	0.172	0.178	1.929	0.308
2430	230.86	229.73	10	10	280.75	0.0040	0.191	2.027	0.312	0.61	2.745	0.603	0.191	2.027	0.312	0.61	2.745	0.603	0.191	2.027	0.312	0.61	2.745	0.603
2433	238.34	234.23	10	10	400	0.0103	0.053	1.944	0.131	0.17	2.741	0.232	0.053	1.944	0.131	0.17	2.741	0.232	0.053	1.944	0.131	0.17	2.741	0.232
2434	240.04	238.44	10	10	399.31	0.0040	0.047	1.346	0.155	0.15	1.891	0.276	0.047	1.346	0.155	0.15	1.891	0.276	0.047	1.346	0.155	0.15	1.891	0.276
2435	232.55	230.96	10	10	398	0.0040	0.188	2.015	0.311	0.603	2.73	0.6	0.188	2.015	0.311	0.603	2.73	0.6	0.188	2.015	0.311	0.603	2.73	0.6
2438	265.9	264.63	10	10	395	0.0032	0.169	1.807	0.311	0.54	2.449	0.599	0.169	1.807	0.311	0.54	2.449	0.599	0.169	1.807	0.311	0.54	2.449	0.599
2439	264.53	263.46	10	10	333.91	0.0032	0.17	1.809	0.312	0.545	2.45	0.604	0.17	1.809	0.312	0.545	2.45	0.604	0.17	1.809	0.312	0.545	2.45	0.604
2440	263.36	262.95	10	10	160	0.0026	0.17	1.67	0.331	0.545	2.242	0.651	0.17	1.67	0.331	0.545	2.242	0.651	0.17	1.67	0.331	0.545	2.242	0.651
2441	262.85	262.35	10	10	155.5	0.0032	0.17	1.812	0.312	0.545	2.453	0.603	0.17	1.812	0.312	0.545	2.453	0.603	0.17	1.812	0.312	0.545	2.453	0.603
2442	262.25	245.73	10	10	236	0.0700	0.17	5.394	0.145	0.545	7.591	0.257	0.17	5.394	0.145	0.545	7.591	0.257	0.17	5.394	0.145	0.545	7.591	0.257
2443	245.63	229.84	10	10	239.06	0.0661	0.174	5.323	0.149	0.558	7.486	0.264	0.174	5.323	0.149	0.558	7.486	0.264	0.174	5.323	0.149	0.558	7.486	0.264
2547	208.33	204.55	10	10	303	0.0125	0.588	4.164	0.422	1.701	4.826	1	0.588	4.164	0.422	1.701	4.826	1	0.588	4.164	0.422	1.7	4.821	1
2548	204.55	207.15	10	10	97	-0.0268	0.588	1.668	1	1.699	4.82	1	0.588	1.668	1	1.699	4.82	1	0.588	1.668	1	1.697	4.815	1
2555	202.69	201.53	10	12	346	0.0034	0.192	1.901	0.328	0.613	2.556	0.643	0.192	1.901	0.328	0.613	2.556	0.643	0.192	1.869	0.256	0.613	2.576	0.475
2556	204.81	203.73	10	12	336	0.0032	0.192	1.872	0.332	0.613	2.514	0.653	0.192	1.872	0.332	0.613	2.514	0.653	0.192	1.842	0.258	0.613	2.536	0.481
2558	193.06	192.41	10	10	179.64	0.0036	0.07	1.46	0.193	0.223	2.039	0.349	0.07	1.46	0.193	0.223	2.039	0.349	0.07	1.46	0.193	0.223	2.039	0.349
2599	348.08	347.94	10	10	23	0.0061	0.088	1.878	0.191	0.281	2.624	0.344	0.088	1.878	0.191	0.281	2.624	0.344	0.088	1.878	0.191	0.281	2.624	0.344
2602	346.04	345.05	10	10	247	0.0040	0.119	1.77	0.246	0.382	2.446	0.455	0.119	1.77	0.246	0.382	2.446	0.455	0.119	1.77	0.246	0.382	2.446	0.455
2607	261.15	260.93	10	10	76.84	0.0029	0.267	1.967	0.41	0.702	2.446	0.759	0.267	1.967	0.41	0.702	2.446	0.759	0.267	1.967	0.41	0.702	2.446	0.759
2608	261.41	261.15	10	10	93.5	0.0028	0.267	1.945	0.413	0.701	2.414	0.767	0.267	1.945	0.413	0.701	2.414	0.767	0.267	1.946	0.413	0.701	2.414	0.767
2611	270.45	269.96	10	10	220.53	0.0022	0.009	0.673	0.082	0.03	0.955	0.143	0.009	0.673	0.082	0.03	0.955	0.143	0.009	0.673	0.082	0.03	0.955	0.143
2612	269.73	269.63	10	10	70	0.0014	0.013	0.64	0.108	0.042	0.906	0.189	0.013	0.64	0.108	0.042	0.906	0.189	0.013	0.64	0.108	0.042	0.906	0.189
2614	268.58	268.38	10	10	131.07	0.0015	0.113	1.235	0.306	0.361	1.676	0.588	0.113	1.235	0.306	0.361	1.676	0.588	0.113	1.568	0.258	0.361	2.159	0.48
2647	236.5	236.08	10	10	12	0.0350	0.086	3.443	0.123	0.273	4.856	0.216	0.086	3.443	0.123	0.273	4.856	0.216	0.086	3.443	0.123	0.273	4.856	0.216
2704	240.3	226.91	10	10	284	0.0471	0.255	5.292	0.195	0.817	7.389	0.352	0.255	5.292	0.195	0.817	7.389	0.352	0.255	5.292	0.195	0.817	7.389	0.352
2705	259.2	257.4	10	10	296	0.0061	0.067	1.732	0.167	0.214	2.43	0.298	0.067	1.732	0.167	0.214	2.43	0.298	0.067	1.732	0.167	0.214	2.43	0.298
2706	257.2	255.4	10	10	296	0.0061	0.067	1.735	0.167	0.216	2.434	0.299	0.067	1.735	0.167	0.216	2.434	0.299	0.067	1.735	0.167	0.216	2.434	0.299
2707	255.2	253.4	10	10	296	0.0061	0.067	1.735	0.167	0.216	2.434	0.299	0.067	1.735	0.167	0.216	2.434	0.299	0.067	1.735	0.167	0.216	2.434	0.299
2708	253.2	240.5	10	10	296	0.0429	0.252	5.099	0.198	0.806	7.115	0.358	0.252	5.099	0.198	0.806	7.115	0.358	0.252	5.099	0.198	0.806	7.115	0.358
2734	228.89	225.09	10	10	220.001	0.0173	0.011	1.456	0.056	0.036	2.071	0.096	0.011	1.456	0.056	0.036	2.071	0.096	0.011	1.456	0.056	0.036	2.071	0.096
2735	216.02	209.02	10	15	50	0.1400	0.212	7.342	0.136	0.678	10.346	0.241	0.212	7.342	0.136	0.678	10.346	0.241	0.212	6.953	0.081	0.679	9.864	0.142
2799	197.55	196.78	10	18	125	0.0062	0.186	2.343	0.276	0.828	3.463	0.642	0.427	2.951	0.429	1.638	4.646	1	0.599	3.092	0.226	1.871	4.264	0.409
2805	189.94	189.85	10	18	130.41	0.0007	0.319	1.189	0.712	1.022	2.898	1	0.319	1.189	0.712	1.022	2.898	1	0.319	1.184	0.286	1.022	1.618	0.542
38	183.19	182.95	12	12	75.8	0.0032	0.27	2.021	0.31	0.865	2.739	0.597	0.27	2.021	0.31	0.865	2.739	0.597	0.27	2.021	0.31	0.865	2.739	0.597
92	227.8	221.91	12	12	446	0.0132	0.588	4.201	0.32	2.032	5.759	0.656	0.588	4.201	0.32	2.032	5.759	0.656	0.588	4.201	0.32	2.032	5.76	0.656
93	204.43	204.09	12	12	273.41	0.0012	0.005	0.431	0.054	0.015	0.614	0.093	0.005	0.431	0.054	0.015	0.614	0.093	0.005	0.431	0.054	0.015	0.614	0.093
96	204.5	200.75	12	12	304.45	0.0123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
104	217.84	209.8	12	12	496	0.0162	0.588	4.521	0.303	2.032	6.248	0.611	0.588	4.521	0.303	2.032	6.248	0.611	0.588	4.522	0.303	2.032	6.249	0.611
105	221.81	217.94	12	12	496	0.0078	0.588	3.474	0.368	2.032	4.58	0.816	0.588	3.474	0.368	2.032	4.58	0.816	0.588	3.474	0.368	2.032	4.58	0.816
136	196.63	196.11	12	15	260.42	0.0020	0.489	2.005	0.485	1.565	3.083	1	0.489	2.005	0.485	1.565	3.083	1	0.49	1.986	0.349	1.567	2.641	0.7
137	197.23	196.63	12	15	137	0.0044	0.489	2.678	0.389	1.565	3.083	1	0.489	2.678	0.389	1.565	3.083	1	0.49	2.633	0.285	1.567	3.6	0.538
138	198.05	197.23	12	15	167	0.0049	0.489	2.792	0.377	1.565	3.631	0.792	0.489	2.792	0.377	1.565	3.631	0.792	0.49	2.743	0.276	1.567	3.759	0.52
139	198.62	198.05	12	15	307	0.0019	0.489	1.951	0.495	1.564	3.082	1	0.489	1.951	0.495	1.564	3.082	1	0.489	1.934	0.356	1.566	2.561	0.72
140	199.85	198.62	12	15	346	0.0036	0.489	2.481	0.412	1.565	3.082	1	0.489	2.481	0.412	1.565	3.082	1	0.489	2.443	0.3	1.566	3.323	0.574
192	196.11	195.75	12	12	36	0.0100	0.245	2.958	0.22	0.782	4.11	0.401	0.245	2.958	0.22	0.782	4.11	0.401	0.245	2.958	0.22	0.783	4.111	0.401
204	178.58	176.67	12	18	450.001	0.0042	0.562	2.747	0.423	2.03	3.999	1	0.802	3.011	0.519	2.817	5.55	1	0.967	3.107	0.317	3.073	4.192	0.612
205	183.52	182.42	12	18	439	0.0025	0.241	1.799	0.31	1.004	2.564	0.721	0.482	2.174	0.45	1.803	3.553	1	0.65	2.299	0.296	2.052	3.121	0.56
206	200.001	189.36	12	12	100	0.1064	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
207	189.36	187.82	12	12	607	0.0025	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
208	187.82	186.06	12	18	699	0.0025	0.186	1.673	0.271	0.828	2.48	0.625	0.427	2.109	0.42	1.638	3.226	1	0.599	2.249	0.283	1.871	3.059	0.528
209	186.06	185.68	12	18	150	0.0025	0.186	1.676	0.27	0.827	2.486	0.624	0.427	2.113	0.419	1.638	3.226	1	0.599	2.254	0.283	1.871	3.066	0.527
210	185.68	184.24	12	18	575	0.0025	0.228	1.77	0.301	0.963	2.547	0.697	0.469	2.158	0.444	1.77	3.486	1	0.64	2.288	0.294	2.011	3.106	0.553
243	190	189.91	12	18	200.001	0.0004	0.784	1.544	1	2.136	4.209	1	0.809	1.593	1	2.186	4.307	1	0.646	1.229	0.469	1.953	1.71	1
244	192.2	191.7	12	15	228	0.0022	0.751	2.301	0.613	2.028	3.995	1	0.776	2.316	0.627	2.077	4.092	1	0.611	2.184	0.384	1.842	2.81	0.77
245	191.7	191.35	12	15	130	0.0027	0.783	2.515	0.589	2.133	4.201	1	0.808	2.533	0.601	2.183	4.3	1	0.645	2.387	0.373	1.95	3.098	0.74
246	191	190	12	18	200.001	0.0050	0.784	3.184	0.488	2.136	4.209	1	0.809	3.209	0.497	2.186	4.307	1	0.646	2.936	0.247	1.953	3.995	0.443
247	190.3	190	12	18	20.001	0.0150	0.784	4.765	0.36	2.136	6.122	0.649	0.809	4.806	0.366	2.186	6.15	0.66	0.646	4.331	0.188	1.953	5.959	0.329
269	193.48	192.82	12	15	313.78	0.0021	0.701	2.23	0.594	1.867	3.677	1	0.726	2.247	0.608	1.915	3.772	1	0.56	2.483	0.327	1.675	3.295	0.612
272	192.75	192.25	12	15	138.39	0.0036	0.704	2.743	0.504	1.874	3.693	1	0.728	2.767	0.515	1.923	3.788	1	0.563	2.378	0.339	1.683	3.14	0.64
274	192.85	192.75	12	15	35.73	0.0028	0.701	2.489	0.543	1.868	3.679	1	0.726	2.51	0.555	1.916	3.774	1	0.561	2.329	0.343	1.676	3.07	0.65
277	194.53	194.52	12	15	130.001	0.0001	0.697	1.373	1	1.853	3.65	1	0.721	1.421	1	1.901	3.745	1	0.556	0.701	1	1.661	2.094	1
278	195.22	194.53	12	15	288	0.0024	0.686	2.334	0.563	1.819	3.584	1	0.711	2.353	0.575	1.867	3.678	1	0.545	2.185	0.352	1.626	2.866	0.673
279	194.52	193.48	12	15	20.001	0.0520	0.698	7.199	0.246	1.857	9.473	0.41	0.723	7.272	0.25	1.905	9.537	0.416	0.557	2.384	0.336	1.666	3.152	0.632
285	200.32	199.7	12	15	308	0.0020	0.627	2.137	0.561	1.633	3.217	1	0.638	2.146	0.567	1.638	3.226	1	0.473	1.972	0.342	1.365	2.582	0.632
321	203.46	202.42	12	12	173	0.0060	0.625	3.211	0.408	1.628	3.996	0.748	0.636	3.227	0.412	1.632	3.997	0.75	0.471	2.973	0.35	1.359	3.879	0.652
322	202.42	200.57	12	12	308	0.0060	0.625	3.211	0.408	1.628	3.994	0.749	0.636	3.226	0.412	1.632	3.995	0.75	0.471	2.972	0.35	1.359	3.879	0.652
323	200.57	200.32	12	12	128	0.0020	0.625	2.111	0.566	1.629	3.209	1	0.636	2.12	0.572	1.633	3.218	1	0.471	1.97	0.477	1.361	2.68	1
945	326.6	322.68	12	12	365.31	0.0107	0.202	2.867	0.196	0.571	3.867	0.333	0.202	2.867	0.196	0.571	3.867	0.333	0.202	2.867	0.196	0.571	3.867	0.333
1020	332.4	332.32	12	12	11.75	0.0068	0.04	1.51	0.101	0.204	2.448	0.221	0.04	1.51	0.101	0.204	2.448	0.221	0.04	1.51	0.101	0.204	2.448	0.221
1021	332.32	329.6	12	12	238.4	0.0114	0.175	2.81	0.181	0.486	3.777	0.301	0.175	2.81	0.181	0.486	3.777	0.301	0.175	2.81	0.181	0.486	3.777	0.301
1022	329.6	326.6	12	12	300	0.0100	0.176	2.686	0.187	0.488	3.607	0.312	0.176	2.686	0.187	0.488	3.607	0.312	0.176	2.686	0.187	0.488	3.607	0.312
1023	322.05	321.07	12	12	121.98	0.0080	0.221	2.658	0.221	0.633	3.582	0.379	0.221	2.658	0.221	0.633	3.582	0.379	0.221	2.658	0.221	0.633	3.582	0.379
1024	311.91	309.03	12	12	360	0.0080	0.433	3.219	0.311	1.31	4.307	0.578	0.433	3.219	0.311	1.31	4.307	0.578	0.433	3.219	0.311	1.31	4.307	0.578
1025	321.01	318.23	12	12	337	0.0082	0.224	2.692	0.221	0.641	3.63	0.379	0.224	2.692	0.221	0.641	3.63	0.379	0.224	2.692	0.221	0.641	3.63	0.379
1026	318.23	315	12	12	466	0.0069	0.396	2.981	0.308	1.191	3.988	0.57	0.396	2.981	0.308	1.191	3.988	0.57	0.396	2.981	0.308	1.191	3.988	0.57
1027	314.66	314.19	12	12	84	0.0056	0.396	2.761	0.326	1.192	3.67	0.611	0.396	2.761	0.326	1.192	3.67	0.611	0.396	2.761	0.326	1.193	3.67	0.611
1028	314.99	312.24	12	12	261.84	0.0105	0.425	3.531	0.287	1.286	4.758	0.526	0.425	3.531	0.287	1.286	4.758	0.526	0.426	3.531	0.287	1.287	4.759	0.526
1048	307.95	305.62	12	12	363.16	0.0064	0.454	3.013	0.337	1.377	3.993	0.643	0.454	3.013	0.337	1.377	3.993	0.643	0.454	3.013	0.337	1.378	3.993	0.643
1049	309.03	307.95	12	12	135	0.0080	0.434	3.221	0.311	1.314	4.31	0.579	0.434	3.221	0.311	1.314	4.31	0.579	0.434	3.221	0.311	1.314	4.31	0.579
1053	303.06	300.19	12	12	350	0.0082	0.457	3.298	0.318	1.388	4.405	0.595	0.457	3.298	0.318	1.388	4.405	0.595	0.457	3.298	0.318	1.388	4.405	0.595
1054	300.19	297.76	12	12	297.01	0.0082	0.459	3.299	0.319	1.395	4.406	0.598	0.459	3.299	0.319	1.395	4.406	0.598	0.459	3.299	0.319	1.395	4.406	0.598
1055	305.78	303.06	12	12	332	0.0082	0.455	3.292	0.317	1.381	4.399	0.594	0.455	3.292	0.317	1.381	4.399	0.594	0.455	3.292	0.317	1.381	4.399	0.594
1084	292.03	289.48	12	12	319.17	0.0080	0.486	3.324	0.33	1.481	4.422	0.627	0.486	3.324	0.33	1.481	4.422	0.627	0.486	3.324	0.33	1.481	4.422	0.627
1085	297.56	294.99	12	12	306.79	0.0084	0.484	3.378	0.326	1.475	4.502	0.615	0.484	3.378	0.326	1.475	4.502	0.615	0.485	3.378	0.326	1.476	4.502	0.615
1086	294.99	292.03	12	12	307	0.0096	0.485	3.553	0.314	1.476	4.756	0.588	0.485	3.553	0.314	1.476	4.756	0.588	0.485	3.554	0.314	1.477	4.757	0.588
1101	338.68	337.1	12	12	263	0.0060	0.129	2.046	0.181	0.412	2.863	0.326	0.129	2.046	0.181	0.412	2.863	0.326	0.129	2.046	0.181	0.412	2.863	0.326
1105	334.01	332.73	12	12	284.62	0.0045	0.148	1.923	0.209	0.472	2.679	0.379	0.148	1.923	0.209	0.472	2.679	0.379	0.148	1.923	0.209	0.472	2.679	0.379
1106	339.13	337.43	12	12	326.95	0.0052	0.002	0.578	0.028	0.007	0.824	0.048	0.002	0.578	0.028	0.007	0.824	0.048	0.002	0.578	0.028	0.007	0.824	0.048
1114	337.1	335.85	12	12	264.5	0.0047	0.133	1.9	0.196	0.427	2.653	0.354	0.133	1.9	0.196	0.427	2.653	0.354	0.133	1.9	0.196	0.427	2.653	0.354
1115	335.52	334.34	12	12	269	0.0044	0.141	1.879	0.205	0.45	2.619	0.372	0.141	1.879	0.205	0.45	2.619	0.372	0.141	1.879	0.205	0.45	2.619	0.372
1139	322.62	322.05	12	12	89.59	0.0064	0.206	2.399	0.226	0.585	3.222	0.388	0.206	2.399	0.226	0.585	3.222	0.388	0.206	2.399	0.226	0.585	3.222	0.388
1491	238.33	234.95	12	12	375	0.0090	0.279	2.962	0.241	1.044	4.265	0.486	0.279	2.962	0.241	1.044	4.265	0.486	0.279	2.962	0.241	1.044	4.265	0.486
1493	231.41	227.9	12	12	379	0.0093	0.367	3.236	0.275	1.322	4.566	0.555	0.367	3.236	0.275	1.322	4.566	0.555	0.367	3.236	0.275	1.323	4.566	0.556
1495	234.95	231.41	12	12	375	0.0094	0.36	3.24	0.271	1.301	4.582	0.547	0.36	3.24	0.271	1.301	4.582	0.547	0.36	3.24	0.271	1.301	4.582	0.547
1497	231.41	227.9	12	12	379	0.0093	0.368	3.239	0.275	1.327	4.57	0.557	0.368	3.239	0.275	1.327	4.57	0.557	0.368	0.725	1	1.327	2.615	1
2431	228.79	227.96	12	12	206.39	0.0040	0.361	2.388	0.338	1.155	3.196	0.67	0.361	2.388	0.338	1.155	3.196	0.67	0.361	2.388	0.338	1.155	3.196	0.67
2432	226.92	226.28	12	12	174.46	0.0037	0.364	2.316	0.348	1.165	3.082	0.697	0.364	2.316	0.348	1.165	3.082	0.697	0.364	2.316	0.348	1.165	3.082	0.697
2437	226.08	222.34	12	12	182.37	0.0205	0.364	4.283	0.224	1.164	5.947	0.41	0.364	4.283	0.224	1.164	5.947	0.41	0.364	4.283	0.224	1.164	5.947	0.41
2444	229.63	228.89	12	12	184.07	0.0040	0.361	2.388	0.338	1.155	3.196	0.67	0.361	2.388	0.338	1.155	3.196	0.67	0.361	2.388	0.338	1.155	3.196	0.67
2539	192.23	192.21	12	15	2	0.0100	0.747	4.059	0.391	2.015	5.126	0.723	0.772	4.094	0.398	2.064	5.143	0.738	0.607	3.037	0.3	1.828	4.074	0.552
2545	200.75	204.43	12	12	11	-0.3345	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2553	196.11	195.75	12	12	36	0.0100	0.245	2.958	0.22	0.782	4.11	0.401	0.245	2.958	0.22	0.782	4.11	0.401	0.245	2.958	0.22	0.783	4.111	0.401
2629	227.86	227.02	12	12	210.54	0.0040	0.364	2.387	0.34	1.165	3.191	0.676	0.364	2.387	0.34	1.165	3.191	0.676	0.364	2.387	0.34	1.165	3.191	0.676
2709	182.42	180.5	12	18	450.001	0.0043	0.562	2.753	0.423	2.03	3.999	1	0.802	3.016	0.519	2.817	5.55	1	0.967	3.113	0.317	3.073	4.201	0.611
2710	180.5	178.58	12	18	450.001	0.0043	0.562	2.753	0.423	2.03	3.999	1	0.802	3.016	0.519	2.817	5.55	1	0.967	3.113	0.317	3.073	4.201	0.611
2712	179.93	178.95	12	12	305	0.0032	0.27	2.032	0.308	0.865	2.755	0.594	0.27	2.032	0.308	0.865	2.755	0.594	0.27	2.032	0.308	0.865	2.755	0.594
2713	192.86	181.9	12	12	300.43	0.0365	0.27	4.81	0.168	0.865	6.746	0.3	0.27	4.81	0.168	0.865	6.746	0.3	0.27	2.028	0.309	0.865	2.749	0.595
2714	181.9	180.92	12	12	305	0.0032	0.27	2.032	0.308	0.865	2.755	0.594	0.27	2.032	0.308	0.865	2.755	0.594	0.27	2.032	0.308	0.865	2.755	0.594
2715	180.92	179.93	12	12	310	0.0032	0.27	2.027	0.309	0.865	2.749	0.595	0.27	2.027	0.309	0.865	2.749	0.595	0.27	2.027	0.309	0.865	2.749	0.595
2716	178.95	175.97	12	12	100.001	0.0298	0.27	4.48	0.176	0.865	6.274	0.316	0.27	4.48	0.176	0.865	6.274	0.316	0.27	4.48	0.176	0.865	6.274	0.316
2806	184.24	183.52	12	18	286	0.0025	0.234	1.787	0.305	0.982	2.561	0.707	0.475	2.169	0.446	1.785	3.516	1	0.644	2.296	0.294	2.03	3.119	0.555
3002	176	176	12	18	29.765	0.0000	0.562	1.106	1	2.03	3.999	1	0.802	1.579	1	2.817	5.55	1	0.967	0.847	1	3.073	2.691	1
3004	175	175	12	12	1	0.0000	0.27	0.533	1	0.865	1.705	1	0.27	0.533	1	0.865	1.705	1	0.27	0.533	1	0.865	1.705	1
3008	204	204	12	12	1	0.0000	0.007	0.09	0.208	0.022	0.126	0.377	0.007	0.09	0.208	0.022	0.126	0.377	0.007	0.09	0.208	0.022	0.126	0.377
231	201.08	198.84	14	18	662.5	0.0034	0.166	1.769	0.194	0.765	2.726	0.426	0.424	2.318	0.311	1.624	3.258	0.678	0.595	2.494	0.262	1.86	3.412	0.482
232	201.53	201.08	14	18	363.5	0.0012	0.135	1.168	0.224	0.666	1.811	0.526	0.345	1.523	0.363	1.37	1.983	1	0.515	1.671	0.315	1.606	2.248	0.599
235	201.88	201.53	14	15	135.5	0.0026	0.123	1.473	0.179	0.628	2.343	0.411	0.31	1.926	0.283	1.258	2.781	0.623	0.48	2.167	0.323	1.494	2.904	0.618
77	194.52	193.89	15	18	198.5	0.0032	0.497	2.355	0.311	1.589	3.191	0.601	0.497	2.355	0.311	1.589	3.191	0.601	0.497	2.315	0.243	1.591	3.201	0.449
101	209.12	204.55	15	15	303	0.0151	0	0	0	0.446	3.975	0.199	0	0	0	0.446	3.975	0.199	0	0	0	0.446	3.976	0.199

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
190	195.75	196.04	15	18	211	-0.0014	0.489	0.617	1	1.565	1.973	1	0.489	0.617	1	1.565	1.973	1	0.49	0.429	1	1.567	1.372	1
191	196.04	195.84	15	18	221	0.0009	0.491	1.49	0.434	1.572	1.982	1	0.491	1.49	0.434	1.572	1.982	1	0.492	1.474	0.334	1.574	1.977	0.657
193	195.84	195.25	15	18	347	0.0017	0.494	1.878	0.366	1.58	2.468	0.753	0.494	1.878	0.366	1.58	2.468	0.753	0.494	1.851	0.284	1.582	2.531	0.537
195	194.81	194.52	15	18	205	0.0014	0.494	1.756	0.385	1.58	1.992	1	0.494	1.756	0.385	1.58	1.992	1	0.494	1.733	0.298	1.582	2.359	0.569
211	188	186	15	15	250.001	0.0080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
212	182	180.52	15	18	336	0.0044	1.095	3.295	0.436	3.136	3.954	1	1.12	3.314	0.442	3.186	4.017	1	0.959	3.141	0.313	2.955	4.217	0.59
213	180.44	179.9	15	18	10.14	0.0533	1.095	8.078	0.227	3.136	10.878	0.392	1.12	8.131	0.23	3.186	10.924	0.395	0.959	7.605	0.168	2.955	10.553	0.294
214	179.7	178.39	15	24	1852.717	0.0007	1.095	1.6	0.805	3.136	3.954	1	1.12	1.412	1	3.186	4.017	1	0.959	1.58	0.339	2.955	2.098	0.654
215	182.55	182.13	15	18	53.17	0.0079	1.095	4.079	0.372	3.136	5.259	0.704	1.12	4.104	0.376	3.187	5.272	0.712	0.959	3.87	0.269	2.955	5.266	0.493
220	183.71	182.54	15	18	346	0.0034	1.095	2.988	0.47	3.136	3.954	1	1.12	3.005	0.476	3.187	4.018	1	0.959	2.856	0.335	2.955	3.8	0.644
221	189.21	188.73	15	18	96.08	0.0050	1.078	3.437	0.417	3.08	3.884	1	1.103	3.457	0.423	3.131	3.947	1	0.942	3.269	0.3	2.899	4.408	0.56
222	188.63	186.88	15	18	346	0.0051	1.078	3.452	0.416	3.08	3.884	1	1.103	3.473	0.421	3.131	3.947	1	0.942	3.283	0.299	2.899	4.429	0.558
223	186.8	185.35	15	18	346	0.0042	1.079	3.222	0.439	3.085	3.889	1	1.104	3.242	0.444	3.135	3.953	1	0.943	3.07	0.314	2.904	4.12	0.593
224	185.35	183.74	15	18	346	0.0047	1.079	3.349	0.426	3.085	3.889	1	1.104	3.369	0.432	3.135	3.953	1	0.943	3.188	0.306	2.904	4.29	0.573
774	289.19	288.69	15	15	250	0.0020	0.573	2.075	0.38	1.76	2.684	0.771	0.573	2.075	0.38	1.76	2.684	0.771	0.574	2.075	0.38	1.761	2.684	0.771
1089	288.36	288.2	15	15	80	0.0020	0.626	2.125	0.398	1.928	2.43	1	0.626	2.125	0.398	1.928	2.43	1	0.626	2.125	0.398	1.928	2.431	1
1090	288.69	288.36	15	15	166.23	0.0020	0.577	2.072	0.382	1.771	2.676	0.777	0.577	2.072	0.382	1.771	2.676	0.777	0.577	2.073	0.382	1.771	2.676	0.778
1226	293.18	292.48	15	15	350	0.0020	0.002	0.354	0.022	0.005	0.505	0.038	0.002	0.354	0.022	0.005	0.505	0.038	0.002	0.354	0.022	0.005	0.505	0.038
1227	290.38	289.68	15	15	350	0.0020	0.088	1.206	0.147	0.28	1.696	0.261	0.088	1.206	0.147	0.28	1.696	0.261	0.088	1.206	0.147	0.28	1.696	0.261
1230	291.02	290.38	15	15	320	0.0020	0.087	1.204	0.147	0.279	1.694	0.261	0.087	1.204	0.147	0.279	1.694	0.261	0.087	1.204	0.147	0.279	1.694	0.261
1231	289.68	289.19	15	15	245	0.0020	0.09	1.214	0.149	0.287	1.708	0.265	0.09	1.214	0.149	0.287	1.708	0.265	0.09	1.214	0.149	0.287	1.708	0.265
1232	291.08	291.02	15	15	30	0.0020	0.003	0.453	0.032	0.011	0.646	0.055	0.003	0.453	0.032	0.011	0.646	0.055	0.003	0.453	0.032	0.011	0.646	0.055
1233	291.78	291.08	15	15	350	0.0020	0.003	0.42	0.028	0.009	0.599	0.049	0.003	0.42	0.028	0.009	0.599	0.049	0.003	0.42	0.028	0.009	0.599	0.049
1234	292.48	291.78	15	15	350	0.0020	0.002	0.379	0.024	0.006	0.541	0.042	0.002	0.379	0.024	0.006	0.541	0.042	0.002	0.379	0.024	0.006	0.541	0.042
1235	293.88	293.18	15	15	351.3	0.0020	0.001	0.286	0.016	0.002	0.409	0.027	0.001	0.286	0.016	0.002	0.409	0.027	0.001	0.286	0.016	0.002	0.409	0.027
2538	192.11	191.73	15	15	215	0.0018	0.75	2.13	0.456	2.023	2.551	1	0.774	2.148	0.464	2.073	2.613	1	0.61	2.424	0.354	1.837	3.182	0.683
2541	192.21	192.11	15	15	54	0.0019	0.748	2.166	0.449	2.019	2.546	1	0.773	2.184	0.458	2.069	2.608	1	0.609	2.432	0.353	1.833	3.195	0.679
2543	189.91	189.3	15	18	10.82	0.0564	1.078	8.205	0.222	3.08	11.051	0.382	1.103	8.259	0.225	3.131	11.101	0.386	0.942	7.718	0.164	2.899	10.713	0.287
2546	204.55	208.66	15	15	97	-0.0424	0	0	0	0.446	0.562	1	0	0	0	0.446	0.562	1	0	0	0	0.446	0.562	1
3014	195.25	194.81	15	18	100	0.0044	0.494	2.644	0.285	1.58	3.614	0.54	0.494	2.644	0.285	1.58	3.614	0.54	0.494	2.596	0.223	1.582	3.604	0.409
78	193.57	192.95	18	18	336	0.0018	0.538	1.952	0.29	1.721	2.664	0.552	0.538	1.952	0.29	1.721	2.664	0.552	0.538	1.952	0.291	1.722	2.664	0.552
79	192.95	193.11	18	24	339	-0.0005	0.557	0.487	1	1.781	1.559	1	0.557	0.487	1	1.781	1.559	1	0.557	1.828	0.207	1.782	2.546	0.377
80	193.89	193.57	18	18	263.5	0.0012	0.535	1.678	0.323	1.713	2.262	0.63	0.535	1.678	0.323	1.713	2.262	0.63	0.536	1.678	0.323	1.714	2.262	0.63
2549	193.11	192.27	18	24	270.5	0.0031	0.557	2.374	0.259	1.781	3.269	0.482	0.557	2.374	0.259	1.781	3.269	0.482	0.557	0.997	0.319	1.782	1.346	0.62
3006	192	192	18	24	1	0.0000	0.557	0.487	1	1.781	1.559	1	0.557	0.487	1	1.781	1.559	1	0.557	3.416	0.134	1.782	4.814	0.238
3012	192	192	18	24	62.5	0.0000	0.557	0.487	1	1.781	1.559	1	0.557	0.487	1	1.781	1.559	1	0.557	0.274	1	1.782	0.877	1
100	207.05	206.7	21	21	346	0.0010	0.588	1.592	0.287	2.032	2.214	0.571	0.588	1.592	0.287	2.032	2.214	0.571	0.588	1.592	0.287	2.032	2.214	0.571
3010	206	206	21	21	1	0.0000	0.588	0.378	1	2.032	1.307	1	0.588	0.378	1	2.032	1.307	1	0.588	0.378	1	2.032	1.307	1
687	0	0	100	100	1	0.0000	0.661	0.269	0.122	2.039	0.376	0.211	0.661	0.269	0.122	2.039	0.376	0.211	0.661	0.269	0.122	2.04	0.376	0.211
688	0	0	100	100	1	0.0000	0.885	0.293	0.141	2.758	0.41	0.246	0.885	0.293	0.141	2.758	0.41	0.246	0.884	0.293	0.14	2.756	0.41	0.246
689	0	0	100	100	1	0.0000	0.879	0.293	0.14	2.74	0.409	0.245	0.879	0.293	0.14	2.74	0.409	0.245	0.879	0.293	0.14	2.738	0.409	0.245
693	0	0	100	100	1	0.0000	1.114	0.314	0.157	3.491	0.439	0.277	1.114	0.314	0.157	3.491	0.439	0.277	1.114	0.314	0.157	3.49	0.439	0.277
694	0	0	100	100	1	0.0000	1.114	0.314	0.157	3.491	0.439	0.277	1.114	0.314	0.157	3.491	0.439	0.277	1.114	0.314	0.157	3.49	0.439	0.277
704	0	0	100	100	1	0.0000	1.14	0.316	0.159	3.573	0.442	0.28	1.14	0.316	0.159	3.573	0.442	0.28	1.139	0.316	0.159	3.572	0.442	0.28
710	0	0	100	100	1	0.0000	1.049	0.309	0.153	3.284	0.431	0.268	1.049	0.309	0.153	3.284	0.431	0.268	1.049	0.309	0.153	3.283	0.431	0.268
711	0	0	100	100	1	0.0000	0.9	0.295	0.142	2.805	0.412	0.248	0.9	0.295	0.142	2.805	0.412	0.248	0.899	0.295	0.142	2.804	0.412	0.248
712	0	0	100	100	1	0.0000	0.883	0.293	0.14	2.751	0.41	0.245	0.883	0.293	0.14	2.751	0.41	0.245	0.882	0.293	0.14	2.749	0.41	0.245
713	0	0	100	100	1	0.0000	0.883	0.293	0.14	2.75	0.41	0.245	0.883	0.293	0.14	2.75	0.41	0.245	0.882	0.293	0.14	2.748	0.41	0.245
714	0	0	100	100	1	0.0000	0.874	0.292	0.14	2.724	0.409	0.244	0.874	0.292	0.14	2.724	0.409	0.244	0.874	0.292	0.14	2.722	0.409	0.244
715	0	0	100	100	1	0.0000	0.675	0.271	0.123	2.087	0.378	0.214	0.675	0.271	0.123	2.087	0.378	0.214	0.676	0.271	0.123	2.088	0.378	0.214
716	0	0	100	100	1	0.0000	0.647	0.267	0.121	1.997	0.373	0.209	0.647	0.267	0.121	1.997	0.373	0.209	0.648	0.267	0.121	1.998	0.373	0.209
748	0	0	100	100	1	0.0000	0.298	0.212	0.084	1.029	0.307	0.151	0.298	0.212	0.084	1.029	0.307	0.151	0.298	0.212	0.084	1.029	0.307	0.151
769	0	0	100	100	1	0.0000	0.297	0.211	0.083	1.026	0.307	0.151	0.297	0.211	0.083	1.026	0.307	0.151	0.297	0.211	0.083	1.026	0.307	0.151
770	0	0	100	100	1	0.0000	0.298	0.211	0.084	1.027	0.307	0.151	0.298	0.211	0.084	1.027	0.307	0.151	0.298	0.211	0.084	1.027	0.307	0.151
771	0	0	100	100	1	0.0000	0.3	0.212	0.084	1.033	0.307	0.151	0.3	0.212	0.084	1.033	0.307	0.151	0.3	0.212	0.084	1.033	0.307	0.151
772	0	0	100	100	1	0.0000	0.3	0.212	0.084	1.034	0.307	0.151	0.3	0.212	0.084	1.034	0.307	0.151	0.3	0.212	0.084	1.034	0.307	0.151
773	0	0	100	100	1	0.0000	0.3	0.212	0.084	1.034	0.307	0.151	0.3	0.212	0.084	1.034	0.307	0.151	0.3	0.212	0.084	1.034	0.307	0.151
775	0	0	100	100	1	0.0000	0.643	0.267	0.121	1.984	0.373	0.208	0.643	0.267	0.121	1.984	0.373	0.208	0.644	0.267	0.121	1.985	0.373	0.208
848	0	0	100	100	1	0.0000	0.005	0.06	0.012	0.016	0.086	0.021	0.005	0.06	0.012	0.016	0.086	0.021	0.005	0.06	0.012	0.016	0.086	0.021
849	0	0	100	100	1	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
850	0	0	100	100	1	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
851	0	0	100	100	1	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
852	0	0	100	100	1	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
853	0	0	100	100	1	0.0000	0.005	0.06	0.012	0.016	0.086	0.021	0.005	0.06	0.012	0.016	0.086	0.021	0.005	0.06	0.012	0.016	0.086	0.021
854	0	0	100	100	1	0.0000	0.006	0.063	0.013	0.018	0.09	0.022	0.006	0.063	0.013	0.018	0.09	0.022	0.006	0.063	0.013	0.018	0.09	0.022
855	0	0	100	100	1	0.0000	0.247	0.2	0.077	0.867	0.292	0.139	0.247	0.2	0.077	0.867	0.292	0.139	0.247	0.2	0.077	0.867	0.292	0.139
856	0	0	100	100	1	0.0000	0.247	0.2	0.077	0.867	0.292	0.139	0.247	0.2	0.077	0.867	0.292	0.139	0.247	0.2	0.077	0.867	0.292	0.139
857	0	0	100	100	1	0.0000	0.249	0.2	0.077	0.872	0.292	0.14	0.249	0.2	0.077	0.872	0.292	0.14	0.249	0.2	0.077	0.872	0.292	0.14
858	0	0	100	100	1	0.0000	0.248	0.2	0.077	0.869	0.292	0.139	0.248	0.2	0.077	0.869	0.292	0.139	0.248	0.2	0.077	0.869	0.292	0.139
859	0	0	100	100	1	0.0000	0.25	0.201	0.077	0.876	0.293	0.14	0.25	0.201	0.077	0.876	0.293	0.14	0.25	0.201	0.077	0.876	0.293	0.14
1088	0	0	100	100	1	0.0000	0.628	0.265	0.119	1.936	0.37	0.206	0.628	0.265	0.119	1.936	0.37	0.206	0.628	0.265	0.119	1.937	0.37	0.206
1211	0	0	100	100	1	0.0000	0.304	0.213	0.084	1.047	0.309	0.152	0.304	0.213	0.084	1.047	0.309	0.152	0.304	0.213	0.084	1.047	0.309	0.152
1212	0	0	100	100	1	0.0000	0.303	0.213	0.084	1.045	0.308	0.152	0.303	0.213	0.084	1.045	0.308	0.152	0.303	0.213	0.084	1.045	0.308	0.152
1213	0	0	100	100	1	0.0000	0.303	0.213	0.084	1.045	0.308	0.152	0.303	0.213	0.084	1.045	0.308	0.152	0.303	0.213	0.084	1.045	0.308	0.152
1219	0	0	100	100	1	0.0000	0.305	0.213	0.084	1.051	0.309	0.153	0.305	0.213	0.084	1.051	0.309	0.153	0.305	0.213	0.084	1.051	0.309	0.153
1220	0	0	100	100	1	0.0000	0.304	0.213	0.084	1.048	0.309	0.153	0.304	0.213	0.084	1.048	0.309	0.153	0.304	0.213	0.084	1.048	0.309	0.153
1221	0	0	100	100	1	0.0000	0.305	0.213	0.084	1.051	0.309	0.153	0.305	0.213	0.084	1.051	0.309	0.153	0.305	0.213	0.084	1.051	0.309	0.153
1225	0	0	100	100	1	0.0000	0.303	0.213	0.084	1.045	0.308	0.152	0.303	0.213	0.084	1.045	0.308	0.152	0.303	0.213	0.084	1.045	0.308	0.152
1619	0	0	100	100	1	0.0000	0.787	0.283	0.133	2.59	0.403	0.238	0.787	0.283	0.133	2.59	0.403	0.238	0.787	0.283	0.133	2.59	0.403	0.238
1622	0	0	100	100	1	0.0000	0.787	0.283	0.133	2.59	0.403	0.238	0.787	0.283	0.133	2.59	0.403	0.238	0.787	0.283	0.133	2.59	0.403	0.238
1623	0	0	100	100	1	0.0000	0.673	0.27	0.123	2.227	0.385	0.221	0.673	0.27	0.123	2.227	0.385	0.221	0.673	0.27	0.123	2.227	0.385	0.221
1624	0	0	100	100	1	0.0000	0.714	0.275	0.127	2.359	0.392	0.227	0.714	0.275	0.127	2.359	0.392	0.227	0.714	0.275	0.127	2.359	0.392	0.227

Demand Scenario:							Existing PDWF			Existing PWWF			Future PDWF			Future PWWF			Future PDWF with CIP			Future PWWF with CIP		
Pipe ID	Up Stream (US) Invert (ft)	Down Stream (DS) Invert (ft)	Existing Diameter (in)	Proposed Diameter for CIP (in)	Length (ft)	Slope (ft/ft)	EXST PDWF Max Flow (mgd)	EXST PDWF Max Velocity (ft/s)	EXST PDWF Max d/D	EXST PWWF Max Flow (mgd)	EXST PWWF Max Velocity (ft/s)	EXST PWWF Max d/D	FUT PDWF Max Flow (mgd)	FUT PDWF Max Velocity (ft/s)	FUT PDWF Max d/D	FUT PWWF Max Flow (mgd)	FUT PWWF Max Velocity (ft/s)	FUT PWWF Max d/D	FUT PDWF with CIP Max Flow (mgd)	FUT PDWF with CIP Max Velocity (ft/s)	FUT PDWF with CIP Max d/D	FUT PWWF with CIP Max Flow (mgd)	FUT PWWF with CIP Max Velocity (ft/s)	FUT PWWF with CIP Max d/D
1625	0	0	100	100	1	0.0000	0.713	0.275	0.127	2.354	0.392	0.227	0.713	0.275	0.127	2.354	0.392	0.227	0.713	0.275	0.127	2.354	0.392	0.227
1626	0	0	100	100	1	0.0000	0.674	0.271	0.123	2.231	0.386	0.221	0.674	0.271	0.123	2.231	0.386	0.221	0.674	0.271	0.123	2.231	0.386	0.221
1627	0	0	100	100	1	0.0000	0.674	0.27	0.123	2.229	0.386	0.221	0.674	0.27	0.123	2.229	0.386	0.221	0.674	0.27	0.123	2.229	0.386	0.221
1663	0	0	100	100	1	0.0000	0.563	0.256	0.113	1.873	0.366	0.203	0.563	0.256	0.113	1.873	0.366	0.203	0.563	0.256	0.113	1.873	0.366	0.203
1687	0	0	100	100	1	0.0000	0.674	0.27	0.123	2.228	0.386	0.221	0.674	0.27	0.123	2.228	0.386	0.221	0.674	0.27	0.123	2.228	0.386	0.221
1688	0	0	100	100	1	0.0000	0.674	0.27	0.123	2.229	0.385	0.221	0.674	0.27	0.123	2.229	0.385	0.221	0.674	0.27	0.123	2.229	0.385	0.221
1690	0	0	100	100	1	0.0000	0.674	0.27	0.123	2.229	0.385	0.221	0.674	0.27	0.123	2.229	0.385	0.221	0.674	0.27	0.123	2.229	0.385	0.221
1691	0	0	100	100	1	0.0000	0.673	0.27	0.123	2.227	0.385	0.221	0.673	0.27	0.123	2.227	0.385	0.221	0.673	0.27	0.123	2.227	0.385	0.221
1692	0	0	100	100	1	0.0000	0.327	0.218	0.087	1.121	0.315	0.158	0.327	0.218	0.087	1.121	0.315	0.158	0.327	0.218	0.087	1.121	0.315	0.158
1693	0	0	100	100	1	0.0000	0.563	0.256	0.113	1.873	0.366	0.203	0.563	0.256	0.113	1.873	0.366	0.203	0.563	0.256	0.113	1.873	0.366	0.203
1694	0	0	100	100	1	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1837	0	0	100	100	1	0.0000	0.673	0.27	0.123	2.227	0.385	0.221	0.673	0.27	0.123	2.227	0.385	0.221	0.673	0.27	0.123	2.227	0.385	0.221
2392	0	0	100	100	1	0.0000	0.839	0.289	0.137	2.687	0.407	0.242	0.839	0.289	0.137	2.687	0.407	0.242	0.839	0.289	0.137	2.687	0.407	0.242
2393	0	0	100	100	1	0.0000	1.247	0.325	0.166	3.991	0.456	0.297	1.247	0.325	0.166	3.991	0.456	0.297	1.247	0.325	0.166	3.991	0.456	0.297
2394	0	0	100	100	1	0.0000	1.247	0.325	0.166	3.991	0.456	0.297	1.247	0.325	0.166	3.991	0.456	0.297	1.247	0.325	0.166	3.991	0.456	0.297
2395	0	0	100	100	1	0.0000	0.883	0.293	0.14	2.827	0.413	0.249	0.883	0.293	0.14	2.827	0.413	0.249	0.883	0.293	0.14	2.827	0.413	0.249
2396	0	0	100	100	1	0.0000	0.844	0.289	0.137	2.702	0.408	0.243	0.844	0.289	0.137	2.702	0.408	0.243	0.844	0.289	0.137	2.702	0.408	0.243
2397	0	0	100	100	1	0.0000	0.825	0.287	0.136	2.642	0.405	0.24	0.825	0.287	0.136	2.642	0.405	0.24	0.825	0.287	0.136	2.642	0.405	0.24
2436	0	0	100	100	1	0.0000	0.883	0.293	0.14	2.828	0.413	0.249	0.883	0.293	0.14	2.828	0.413	0.249	0.883	0.293	0.14	2.828	0.413	0.249
2450	0	0	100	100	1	0.0000	0.455	0.24	0.102	1.467	0.341	0.18	0.455	0.24	0.102	1.467	0.341	0.18	0.455	0.24	0.102	1.467	0.341	0.18
2452	0	0	100	100	1	0.0000	0.446	0.239	0.101	1.438	0.339	0.178	0.446	0.239	0.101	1.438	0.339	0.178	0.446	0.239	0.101	1.438	0.339	0.178
2717	0	0	100	100	1	0.0000	0.787	0.283	0.133	2.592	0.403	0.238	0.787	0.283	0.133	2.592	0.403	0.238	0.787	0.283	0.133	2.592	0.403	0.238
2718	0	0	100	100	1	0.0000	0.286	0.209	0.082	0.916	0.297	0.143	0.286	0.209	0.082	0.916	0.297	0.143	0.286	0.209	0.082	0.916	0.297	0.143
2719	0	0	100	100	1	0.0000	0.233	0.196	0.074	0.746	0.279	0.129	0.233	0.196	0.074	0.746	0.279	0.129	0.233	0.196	0.074	0.746	0.279	0.129
2720	0	0	100	100	1	0.0000	0.191	0.185	0.068	0.61	0.262	0.117	0.191	0.185	0.068	0.61	0.262	0.117	0.191	0.185	0.068	0.61	0.262	0.117
2721	0	0	100	100	1	0.0000	0.145	0.17	0.06	0.465	0.242	0.103	0.145	0.17	0.06	0.465	0.242	0.103	0.145	0.17	0.06	0.465	0.242	0.103
2722	0	0	100	100	1	0.0000	0.074	0.139	0.043	0.237	0.197	0.075	0.074	0.139	0.043	0.237	0.197	0.075	0.074	0.139	0.043	0.237	0.197	0.075
2723	0	0	100	100	1	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2725	0	0	100	100	1	0.0000	1.513	0.344	0.182	4.842	0.481	0.328	1.513	0.344	0.182	4.842	0.481	0.328	1.513	0.344	0.182	4.842	0.481	0.328
2743	0	0	100	100	1	0.0000	0.155	0.173	0.061	0.507	0.248	0.108	0.155	0.173	0.061	0.507	0.248	0.108	0.155	0.173	0.061	0.507	0.248	0.108
2784	0	0	100	100	1	0.0000	0.016	0.086	0.021	0.05	0.123	0.036	0.016	0.086	0.021	0.05	0.123	0.036	0.016	0.086	0.021	0.05	0.123	0.036
3020	0	0	100	100	1	0.0000	0.081	0.142	0.045	0.259	0.203	0.078	0.081	0.142	0.045	0.259	0.203	0.078	0.081	0.142	0.045	0.259	0.203	0.078
3022	0	0	100	100	1	0.0000	0.139	0.168	0.058	0.445	0.239	0.101	0.139	0.168	0.058	0.445	0.239	0.101	0.139	0.168	0.058	0.445	0.239	0.101
3026	0	0	100	100	1	0.0000	0.455	0.24	0.102	1.467	0.341	0.18	0.455	0.24	0.102	1.467	0.341	0.18	0.455	0.24	0.102	1.467	0.341	0.18

APPENDIX B

Condition Assessment Results Table

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PLACENTIA SEWER CCTV
CONDITION ASSESSMENT REVIEW DATA

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
1	10/13/2006	**8503-8501**	8503	8501	355	Orangethorpe Ave	Downstream	10	VCP	UPSIZE TO 12" (CAPACITY ISSUE)	8'-Grease 48'-Grease 132.5'-Grease 140.8'-Alignment Right 190.9'-Sag 233.9'-Grease 249.2'-Grease 292.4'-Grease 297.9'-Sag	None		UPSIZE TO 12" (CAPACITY ISSUE)
2	10/9/2006	**8505-8503**	8505	8503	355	Orangethorpe Ave	Downstream	10	VCP	UPSIZE TO 12" (CAPACITY ISSUE)	Varying WL - likely sags present.	None		UPSIZE TO 12" (CAPACITY ISSUE)
3	10/9/2006	**8507-8505**	8507	8505	355	Orangethorpe Ave	Downstream	10	VCP	UPSIZE TO 12" (CAPACITY ISSUE)	Varying WL - likely sags present. Camera underwater at 262.9' after small hydraulic jump			UPSIZE TO 12" (CAPACITY ISSUE)
4	8/15/2006	**8509-8507**	8509	8507	335	Orangethorpe Ave	Downstream	10	VCP	UPSIZE TO 12" (CAPACITY ISSUE)	Varying WL - likely sags present.			UPSIZE TO 12" (CAPACITY ISSUE)
5	8/14/2006	**8506-8504**	8506	8504	350	Orangethorpe Ave	Downstream	8	VCP		252'-Grease or some other deposit 261'-Roots fine	267'-TFA 11:00 326'-TFA 11:00		NO REPAIR
6	8/14/2006	**8508-8506**	8508	8506	335	Orangethorpe Ave	Downstream	8	VCP		129'-Roots fine, circumferential fracture	59'-TFA 9:00	129' - line over crack	IN-SITU POINT REPAIR
7	8/14/2006	**8520-8508**	8520	8508	335	Orangethorpe Ave	Downstream	8	VCP		Varying WL - likely sags present 277'-Deposits attached encrustation 315'-Material Change	331'-TFA 9:00 335'-TFA 9:00		TRENCH
8	8/14/2006	**8521-8520**	8521	8520	340	Orangethorpe Ave	Downstream	8	VCP		308'-Intruding sealing ring (roots fine?)			NO REPAIR
9	8/18/2006	**8500-8725**	8500	8725	345	Orangethorpe Ave	Downstream	8	VCP		207'-Circumferential crack	136'-TFA 10:00 164'-TFA 11:00 264'-TFA 11:00 292'-TFA 10:00	207' - line over crack	IN-SITU POINT REPAIR
10	8/18/2006	**8725A-8724**	8725A	8724	175	Orangethorpe Ave	Downstream	8	VCP		142'-Circumferential Fracture	35'-TFA 10:00	142' - line over crack	IN-SITU POINT REPAIR
11	10/16/2006	**8739-8738**	8739	8738	320	Orangethorpe Ave	Downstream	12	VCP	UPSIZE TO 15" (CAPACITY ISSUE)	17'-Grease 42'-Grease 63'-Sag begins 75'-Deposits Ingressed Fine (?) Camera underwater approx 100'-270' 277'-Deposits Ingressed Fine 302'-Sag ends 302'-Deposits Ingressed Fine 310'-Sag 317'-Alignment Left			UPSIZE TO 15" (CAPACITY ISSUE)
12	10/16/2006	**8738-8737**	8738	8737	168	Orangethorpe Ave	Downstream	12	VCP	UPSIZE TO 15" (CAPACITY ISSUE)	5'-Sag begins 5'-Deposits Ingressed Fine 46'-Sag ends 51'-Deposits Ingressed Fine 60'-Sag begins 81'-Sag ends 144'-Sag begins Camera underwater 155'-165' OBSTACLE-External pipe or Cable @MH 8737			UPSIZE TO 15" (CAPACITY ISSUE)
13	8/18/2006	**8725-8725A**	8725	8725A	170	Orangethorpe Ave	Downstream	8	VCP		5'-Sag begins 20'-Circuferential Fracture 25'-Circumferential Crack 77'-Sag ends	61'-TFA 10:00 130'-TFA 11:00		LINE
14	8/2/2006	**9119-9118**	9119	9118	115	Seaview Circle	Downstream	8	VCP		20'-Grease	2'-TFA 10:00 19'-TFA 3:00 32'-TFA 3:00 40'-TFA 9:00 48'-TFA 10:00 66'-TFA 2:00 84'-TFA 10:00		CLEAN & RE-INSPECT
15	8/2/2006	**9118-9117**	9118	9117	100	Seaview Circle	Downstream	8	VCP		3'-Grease			CLEAN & RE-INSPECT
16	8/2/2006	**9120-9117**	9120	9117	145	Driftwood Circle	Downstream	8	VCP		57'-Grease	5'-TFA 10:00 9'-TFA 2:00 37'-TFA 10:00 39'-TFA 2:00 47'-TFA 2:00 50'-TFA 10:00 88'-TFA 2:00		CLEAN & RE-INSPECT
17	8/2/2006	**9116-9115**	9116	9115	135	Reef Circle	Downstream	8	VCP		94'-Grease	5'-TFA 10:00 9'-TFA 2:00 37'-TFA 10:00 40'-TFA 2:00 47'-TFA 10:00 50'-TFA 2:00 89'-TFA 11:00 91'-TFA 3:00		CLEAN & RE-INSPECT
18	8/4/2006	**9114-9113**	9114	9113	135	Westwind Circle	Downstream	8	VCP		50'-Grease	9'-TFA 3:00 12'-TFA 9:00 38'-TFA 10:00 41'-TFA 2:00 49'-TFA 10:00 51'-TFA 3:00 90'-TFA 10:00 93'-TFA 2:00		CLEAN & RE-INSPECT
19	8/1/2006	**9122-9121**	9122	9121	220	Eastwind Dr	Downstream	8	VCP		75' - Grease	7' - TFA 9:00 29' - TFA 2:00 37' -TFA 10:00 61' - TFA 10:00 68' - TFA 9:00 71' - TFA 2:00 79' - TFA 2:00 107' - TFA 10:00 115' - TFA 9:00 117' - TFA 3:00 125' - TFA 2:00 153' - TFA 9:00 161' - TFA 2:00 174' - TFA 2:00 218' - TFA 3:00		CLEAN & RE-INSPECT
20	8/1/2006	**9121-9117**	9121	9117	50	Eastwind Dr	Downstream	8	VCP		19' - Grease			CLEAN & RE-INSPECT
21	8/2/2006	**9117-9115**	9117	9115	140	Moisi Ln	Downstream	8	VCP		16' - Grease			CLEAN & RE-INSPECT
22	8/2/2006	**9115-9113**	9115	9113	215	Moisi Ln	Downstream	8	VCP		5' - Grease			NO REPAIR
23	8/4/2006	**9113-9109**	9113	9109	65	Moisi Ln	Downstream	8	VCP	Hanna thinks that this video is actually MH 9109 to MH 9108	8' - Grease			NO REPAIR
24	8/4/2006	**9111-9110**	9111	9110	190	Buccaneer Dr	Downstream	8	VCP			3' - TFA 9:00 9' - TFA 9:00 43' - TFA 9:00 50' - TFA 9:00 94' - TFA 9:00 102' - TFA 9:00 141' - TFA 10:00		NO REPAIR
25	8/4/2006	**9112-9110**	9112	9110	80	Anchorage Circle	Downstream	8	VCP		7' - Joint Offset Medium 72' - Joint Offset/ Intruding Sealing Ring	9' - TFA 3:00 42' - TFA 3:00 50' - TFA 3:00		TRIM INTRUDING
26	8/4/2006	**9110-9109**	9110	9109	160	Anchorage Circle	Downstream	8	VCP		4' - Grease	8' - TFA 2:00 21' - TFA 2:00		NO REPAIR
27	8/4/2006	**9109-9108**	9109	9108	65	Moisi Ln	Downstream	8	VCP	Hanna thinks that this video is actually MH 9109 to MH 9108				NO REPAIR
28	8/4/2006	**9108-9107**	9108	9107	65	Moisi Ln	Downstream	8	VCP	Pipe ~50% full near the end of video				NO REPAIR
29	8/1/2006	**9126-9125**	9126	9125	335	Easton Street	Downstream	8	VCP		57' - Crack Multiple 137' - Grease 314' - Alignement Down	49' - TFA 3:00 52' - TFA 9:00 134' - TFA 3:00 136' - TFA 9:00	57' - line over crack	IN-SITU POINT REPAIR
30	8/2/2006	**9127-9125**	9127	9125	250	Wallgreen St	Downstream	8	VCP		81' - Grease	20' - TFA 10:00 23' - TFA 2:00 77' - TFA 2:00 80' - TFA 10:00 134' - TFA 10:00 135' - TFA 2:00 171' - TFA 10:00 208' - TFA 2:00		NO REPAIR
31	8/2/2006	**9125-9124**	9125	9124	400	Wallgreen St	Downstream	8	VCP		6' - Grease 233' - Roots Fine Joint 287' - Roots Fine Joint	34' - TFA 2:00 57' - TFA 10:00 87' - TFA 2:00 131' - TFA 10:00 134' - TFA 2:00 178' - TFA 10:00 181' - TFA 2:00 228' - TFA 2:00 286' - TFA 2:00		NO REPAIR
32	8/4/2006	**9132-9129**	9132	9129	235	La Jolla St	Downstream	10	VCP		8' - Grease 200' - Root Ball Lateral 10:00 212' - Roots Fine Joint 233' - Roots Fine Joint	11' - TFA 10:00 59' - TFA 10:00 59' - TBA 2:00 72' - TFA 2:00 72' - TBA 10:00 136' - TFA 2:00 149' - TFA 10:00 157' - TFA 2:00 200' - TFA 10:00 212' - TBA 10:00		CLEAN
33	8/4/2006	**9300-9132**	9300	9132	250	La Jolla St	Downstream	10	VCP		7' - Grease 217' - Root Ball Lateral	80' - TFA 2:00 104' - TFC 10:00 115' - TBA 2:00 121' - TFA 2:00 217' - TFA 10:00 233' - TFA 2:00 240' - TBA 10:00		CLEAN
34	8/4/2006	**9129-9128**	9129	9128	255	La Jolla St	Downstream	10	VCP		23' - Grease 93' - Crack Circumferencal 101' - Root Fine Joint 142' - Root Ball Lateral	43' - TFC 10:00 123' - TFA 10:00 142' - TFA 10:00 175' - TFA 2:00 214' - TFA 9:00	Line over crack - 93'	IN-SITU POINT REPAIR
35	8/4/2006	**9128-9124**	9128	9124	240	La Jolla St	Downstream	10	VCP	Water level >50 % at end of pipe;	6' to 8' - Large Grease Deposit 8' - Roots Fine Joint	6' - TFA 10:00 30' - TFA 2:00 151' - TFA 10:00 205' - TFA 10:00 218' - TFA 2:00		CLEAN
36	8/4/2006	**9124-9123**	9124	9123	270	La Jolla St	Downstream	10	VCP		27' - Grease 162' - Roots Medium Lateral 204' - Roots Fine Joint	48' - TFA 10:00 103' - TFA 10:00 162' - TFA 10:00 243' - TFA 10:00		NO REPAIR
37	8/4/2006	**9123-9107**	9123	9107	160	La Jolla St	Downstream	10	VCP		7' - Grease 28' - Roots Fine Joint 35' - Roots Ball Lateral 36' - Roots Fine Joint 77' - Roots Fine Joint 104' - Root Ball Lateral 106' - Roots Fine Joint 121' - Roots Fine Joint 138' - Root Ball Lateral 144' - Roots Fine Joint	35' - TFA 9:00 104' - TFA 10:00 138' - TFA 2:00 151' - TFC 10:00		CLEAN
38	8/4/2006	**9107-9100**	9107	9100	80	La Jolla St	Downstream	10	VCP		6' - Grease 96' - Roots Fine Joint	50' - TFA 2:00 58' - TFA 10:00		NO REPAIR

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
39	8/8/2006	**9100-9101**	9100	9101	100	Placentia Ave	Downstream	10	VCP	Camera underwater;				NO REPAIR
40	8/8/2006	**9101-9102**	9101	9102	80	Placentia Ave	Downstream	10	VCP					NO REPAIR
41	8/10/2006	**9102-9103**	9102	9103	87	E Via Burton	Downstream	10	VCP	Camera underwater;				NO REPAIR
42	7/27/2006	**9133-9301**	9133	9301	285	Arnold Dr	Downstream	8	VCP			7' - TFA 10:00 8' - TBA 2:00 19' - TFA 2:00 29' - TFA 2:00 62' - TFA 10:00 75' - TFA 2:00 129' - TFA 10:00 189' - TFA 2:00 206' - TFA 2:00 243' - TFA 10:00 276' - TFA 2:00 302' - TFA 10:00 328' - TFA 2:00		NO REPAIR
43	7/27/2006	**9301-9300**	9301	9300	330	Arnold Dr	Downstream	8	VCP	ABANDONED SURVEY; NEED VIDEO OF LAST 150' OF PIPE	76' to 83' - Slight sag in pipe 179' - Grease deposits 179' - ABANDONED SURVEY	5' - TFA 10:00 60' - TFA 10:00 109' - TFA 2:00 135' - TFA 10:00 179' - TFA 2:00		CLEAN & RE-INSPECT
44	8/8/2006	**9106-9105**	9106	9105	315	Placentia Ave	Downstream	8	VCP	No flow in video and only one active lateral	30' to 28' - Grease Deposits on bottom of pipe 68' - Roots Medium Joint 289' - Fracture	15' - TFC 3:00 135' - TFC 2:00 273' - TFA 2:00	289' - Fracture	IN-SITU POINT REPAIR
45	8/8/2006	**9105-9104**	9105	9104	300	Placentia Ave	Downstream	8	VCP		23' - Grease Deposits on bottom of pipe	148' - TFA 3:00 166' - TFA 9:00		NO REPAIR
46	8/8/2006	**9104-9102**	9104	9102	300	Placentia Ave	Downstream	8	VCP		18' - Grease Deposits on bottom of pipe	42' - TFC 9:00 149' - TFC 9:00 255' - TFC 9:00		NO REPAIR
47	10/19/2006	**9138-9137**	9138	9137	45	Orangethorpe Ave	Downstream	10	VCP	Camera underwater; ABANDONED SURVEY; NEED VIDEO OF LAST DS PORTION OF PIPE; **UPSIZE PIPE TO 15" (CAPACITY ISSUE)**	3' - Offset Joint Medium 4' - ABANDONED SURVEY (deposits)			**UPSIZE PIPE TO 15" (CAPACITY ISSUE)**
48	10/19/2006	**8919-9138**	8919	9138	551	Orangethorpe Ave	Downstream	10	VCP	THIS IS FOR TWO (2) VIDEOS - from 8919 to 9138A and 9138A to 9138; Camera underwater; **UPSIZE PIPE TO 15" (CAPACITY ISSUE)**	84' - Water level sag 84' - Grease deposits 116' - Water level sag 134' - Water Level sag 165' - Grease deposits 171' - Water level sag 187' - Grease deposits 189' - Water level sag 221' - Water level sag 243' - Crack 314' - Water level sag 325' - Water level sag 343' - Fracture 343' - Water level sag 380' - Water level sag	187' - TBA 3:00		**UPSIZE PIPE TO 15" (CAPACITY ISSUE)**
49	10/19/2006	**8913-8919**	8913	8919	169	Orangethorpe Ave	Downstream	10	VCP	**UPSIZE PIPE TO 15" (CAPACITY ISSUE)**	4' - Fracture Multiple 4' - Joint Offset Medium 10' - Grease deposits 14' - Crack 25' - Water level sag 159' - Joint Seperated Medium 162' - Joint Offset Medium			**UPSIZE PIPE TO 15" (CAPACITY ISSUE)**
50	10/19/2006	**8914-8913**	8914	8913	31	Orangethorpe Ave	Downstream	10	VCP	**UPSIZE PIPE TO 12" (CAPACITY ISSUE)**	10'-Grease			**UPSIZE PIPE TO 12" (CAPACITY ISSUE)**
51	10/19/2006	**8915-8914**	8915	8914	148	Orangethorpe Ave	Downstream	10	VCP	**UPSIZE PIPE TO 12" (CAPACITY ISSUE)**	10'-Sag begins 20'-Deposits Attached (Other) 97'-Sag ends 119'-Deposits Attached (Other)	19'-TFC 2:00 124'-TFC 2:00		**UPSIZE PIPE TO 12" (CAPACITY ISSUE)**
52	8/10/2006	**9136-8913**	9136	8913	225	Ohio Ave	Downstream	8	VCP		60'-Circumferential Crack 170'-Grease	58'-TFA 10:00 117'-TFA 1:00 roots medium	60' - Line over crack	IN-SITU POINT REPAIR
53	8/8/2006	**9135-9136**	9135	9136	205	Ohio Ave	Downstream	8	VCP		25'-Grease 62'-Cicumferential Crack	20'-TFA 9:00 76'-TFA 9:00 137'-TFA 9:00 198'-TFA 9:00	62' - line over crack	IN-SITU POINT REPAIR
54	8/9/2006	**8726-9136**	8726	9136	533	Missouri Ave	Downstream	6	VCP		6'-Circumferential Fracture 36'-Longitudinal crack 43'-Circumferential crack 66'-Roots fine, longitudinal crack 69'-Roots medium 71'-Roots medium, circumferential crack 89'-Fractured/broken pipe 107'-roots medium 110'-Circumferential crack 113'-Circumferential crack 128'-Circumferential crack, roots fine .....more cracks/fractures/roots throughout	7'-TFA 9:00 57'-TFA 2:00 70'-TFA 10:00 roots light 114'-TFA 3:00 120'-TFA 9:00 174'-TFA 3:00 187'-TFA 9:00 238'-TFA 3:00 roots medium 240'-TFA 9:00 roots medium 294'-TFA 9:00 roots medium 296'-TFA 3:00 353'-TFA 9:00 359'-TFA 3:00 420'-TFA 3:00 424'-TFA 9:00 479'-TFA 9:00 484'-TFA 3:00		LINE
55	8/9/2006	**8727-8726**	8727	8726	300	Missouri Ave	Upstream	6	VCP		8'-Grease 25'-Roots ..... roots throughout ABANDONED SURVEY @ 58' b/c of heavy roots lateral	3'-TFA 9:00 58'-TFA 3:00 roots heavy		LINE
Duplicate Pipe	8/9/2006	**8727-8726**	8727	8726	300	Missouri Ave	Downstream	6	VCP		18'-Circumferential crack 20'-Longitudinal crack .....repeated cracks/fractures ABANDONED SURVEY @ 265' b/c of heavy roots lateral	19'-TFA 3:00 31'-TFA 9:00 72'-TFA 3:00 88'-TFA 9:00 139'-TFA 3:00 144'-TFA 9:00 197'-TFA 3:00 206'-TFA 9:00 260'-TFA 3:00 265'-TFA 9:00 roots heavy		LINE
56	8/8/2006	**9134-9135**	9134	9135	122	Ohio Ave (survey says Kansas Ave)	Downstream	6	VCP		6'-Longitudinal crack varying WL - pipe likely sagged... true in multiple locations. 37'-Grease 83'-Circumferential crack 118'-Circumferential fracture	10'-TFA 9:00 62'-TFA 9:00 68'-TFA 3:00 106'-TFA 9:00		LINE
57	8/8/2006	**9326-9134**	9326	9134	495	Kansas Ave	Downstream	6	VCP		12'-Circumferential fracture 25'-Grease 38'-Roots fine, longitudinal crack 45'-Roots fine 55'-Roots fine.... & beyond 128'-Circumferential crack 155'-Circumferential crack.... & beyond 225'-Circumferential frature 261'-Circumferential fracture	20'-TFA 3:00 33'-TFA 9:00 78'-TFA 3:00 roots medium 98'-TFA 9:00 136'-TFA 3:00 158'-TFA 9:00 roots light 207'-TFA 3:00 225'-TFA 9:00 272'-TFA 3:00 281'-TFA 9:00 322'-TFA 3:00 346'-TFA 9:00 391'-TFA 3:00 404'-TFA 9:00 460'-TFA 3:00 462'-TFA 9:00		LINE
58	8/8/2006	**9327-9326**	9327	9326	285	Kansas Ave	Downstream	6	VCP		12' - Crack 31' - Crack 49' - Crack 62' - Crack 73' - Crack 79' - Crack 98' - Grease 104' - Crack 107' - Crack 140' - Cracks 143' - Crack 179' - Crack 208' - Crack 237' - Fracture 244' - Crack 273' - Fracture Multiple 277' - Crack Multiple	13' - TFA 9:00 61' - TFA 3:00 74' - TFA 9:00 115' - TFA 3:00 135' - TFA 9:00 183' - TFA 3:00 196' - TFA 9:00 245' - TFA 3:00 261' - TFA 9:00		LINE
59	7/31/2006	**9303-9302**	9303	9302	245	Arnold Dr	Upstream	8	VCP	ABANDONED SURVEY	40' - Grease 105' - Grease Deposits 214' - Grease Deposits 236' - GREASE DEPOSITS 236' - ABANDONED SURVEY	21' - TFA 3:00 31' - TFC 10:00 84' - TBA 12:00 102' - TFA 2:00 112' - TFA 10:00 135' - TBA 12:00 180' - TBA 12:00 193' - TFA 10:00 195' - TFA 2:00 226' - TFC 2:00 229' - TFC 10:00 234' - TBA 12:00		CLEAN & RE-INSPECT
60	7/31/2006	**9302-9300**	9302	9300	260	Arnold Dr	Downstream	8	VCP		7' - Grease	52' - TFC 2:00 62' - TFA 10:00 107' - TFC 10:00 109' - TFC 2:00 136' - TBA 9:00 141' - TBA 2:00 160' - TFC 10:00 163' - TFC 2:00 238' - TFC 2:00 241' - TFC 10:00		NO REPAIR

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
61	7/26/2006	**9306-9305**	9306	9305	315	Ave De Pio Pico	Downstream	8	VCP		318' - Crack Multiple in MH 9305	20' - TFA 10:00 29' - TFA 2:00 77' - TFA 10:00 86' - TFA 2:00 93' - TFA 2:00 130' - TFA 11:00 142' - TFA 2:00 159' - TFA 10:00 196' - TFA 10:00 244' - TFA 2:00 285' - TFA 2:00 287' - TFA 10:00 300' - TFA 2:00 306' - TFA 10:00	318' - Line cracks in MH 9305	NO REPAIR
62	7/26/2006	**9305-9304**	9305	9304	375	Ave De Pio Pico	Downstream	8	VCP			25' - TBA 2:00 31' - TFA 2:00 33' - TFA 10:00 81' - TFA 10:00 118' - TFA 2:00 155' - TFA 2:00 175' - TFA 10:00 243' - TFA 2:00 248' - TFA 10:00		NO REPAIR
63	7/26/2006	**9312-9311**	9312	9311	330	Cypress St	Downstream	8	VCP	Bubbles over camera at 203'; Multiple laterals with bubble coming out of them	14' - Grease	13' - TFA 9:00 30' - TFA 3:00 33' - TFA 3:00 36' - TFC 10:00 39' - TFA 10:00 46' - TFC 2:00 48' - TFA 3:00 82' - TFA 3:00 126' - TFA 10:00 195' - TFA 10:00 209' - TFA 2:00 221' - TFA 2:00 276' - TFA 10:00 329' - TFA 2:00		NO REPAIR
64	7/31/2006	**9311-9310**	9311	9310	145	Cypress St	Downstream	8	VCP		89' - Fracture 94' - Crack		Line Pipe from 89' to 94'	IN-SITU POINT REPAIR
65	7/31/20006	**9310-9307**	9310	9307	225	Cypress Ave	Downstream	8	VCP	Water level changes in pipe				NO REPAIR
66	8/14/2006	**9308-9307**	9308	9307	340	Cypress Ave	Downstream	8	VCP	ABANDONED SURVEY	262' - ABANDONED SURVEY due to large debris in sewer	7' - TFA 2:00 41' - TFA 10:00 85' - TFA 10:00 92' - TFA 2:00 135' - TFA 10:00 140' - TFA 2:00 170' - TFA 10:00 231' - TFA 10:00		CLEAN & RE-INSPECT
67	8/4/2006	**9313-9307**	9313	9307	305	La Jolla St	Downstream	10	VCP	ABANDONED SURVEY	2' - Crack 204' - Broken Soil Visible 204' - ABANDONED SURVEY	54' - TFA 2:00 98' - TFA 2:00 111' - TFC 10:00 145' - TFA 2:00 177' - TFA 2:00	204' - trench broken pipe and replace between 199' and 204' from MH 9313	EXCAVATION POINT REPAIR
Duplicate Pipe	8/4/2006	**9313-9307**	9313	9307	305	La Jolla St	Upstream	10	VCP	ABANDONED SURVEY	2' - Grease 100' - Broken Soil Visible 100' - ABANDONED SURVEY	52' - TFA 10:00 91' - TFA 10:00 94' - TFC 2:00		
68	8/4/2006	**9307-9304**	9307	9304	130	La Jolla St	Upstream	10	VCP		8' - Grease Deposits	53' - TFA 10:00 87' - TFA 2:00		NO REPAIR
69	8/4/2006	**9304-9300**	9304	9300	335	La Jolla St	Downstream	10	VCP		8' - Grease 253' - Fracture	8' - TFA 2:00 62' - TFA 2:00 105' - TFA 10:00 108' - TFA 2:00 238' - TFA 2:00 241' - TFC 10:00 252' - TBA 2:00	253' - Line over fracture	IN-SITU POINT REPAIR
70	7/27/2006	**9314-9313**	9314	9313	300	Vista Ave	Downstream	8	VCP		51' - Obstacle in Joint 170' - Water Level Sag 179' - Joint Seperated medium 180' - Crack	43' - TFA 10:00 49' - TFA 10:00 59' - TFA 2:00 85' - TFA 2:00 98' - TFA 10:00 111' - TFA 2:00 158' - TFA 10:00 178' - TFA 2:00 181' - TFA 10:00	179' - Line over joint seperation	IN-SITU POINT REPAIR
71	7/27/2006	**9315-9314**	9315	9314	330	Vista Ave	Downstream	8	VCP	Large flow and bubbles coming out of lateral at 254'	154' - Crack	64' - TFA 10:00 74' - TFA 2:00 79' - TFA 2:00 110' - TBA 2:00 127' - TFA 2:00 133' - TFA 10:00 162' - TFA 10:00 172' - TFA 2:00 178' - TFA 10:00 179' - TBA 2:00 221' - TFA 10:00 234' - TFA 2:00 254' - TFA 2:00 270' - TFA 10:00 287' - TBA 2:00 290' - TFA 2:00		NO REPAIR
72	7/27/2006	**9309-9308**	9309	9308	330	Cypress Ave	Downstream	8	VCP		34' - Water level sag 46' - Water level sag	4' - TFA 2:00 22' - TFA 10:00 52' - TFA 10:00 102' - TFA 10:00 108' - TFA 2:00 121' - TFA 2:00 123' - TFA 10:00 178' - TFA 10:00 183' - TFA 2:00 189' - TFA 10:00 238' - TFA 2:00 264' - TFA 10:00 277' - TFA 2:00 303' - TFA 10:00 316' - TFA 10:00		NO REPAIR
73	8/2/2006	**9316-9313**	9316	9313	350	La Jolla St	Downstream	10	VCP		124' - Fracture 126' to 130' - Patch at abandoned manhole 299' - Roots Fine Joint 317' - Roots Fine Joint	48' - TFC 10:00 195' - TFC 2:00 234' - TFC 2:00 298' - TFA 2:00 332' - TFC 11:00		NO REPAIR
74	8/2/2006	**9317-9316**	9317	9316	130	La Jolla St	Downstream	10	VCP			67' - TFC 10:00		NO REPAIR
75	8/7/2006	**9329-9330**	9329	9330	300	Alley between Gonzales St and Tafolla St	Downstream	8	VCP		15' - Crack 135' - Roots Fine Joint 179' - Crack 207' - Roots Fine Joint 233' - Roots Fine Joint	13' - TFA 3:00 15' - TBA 3:00 38' - TFA 3:00 52' - TFC 3:00 56' - TFA 9:00 112' - TFC 3:00 177' - TFC 3:00 178' - TBA 1:00 195' - TFC 9:00 227' - TBI 1:00		TRIM INTRUDING
76	8/2/2006	**9320-9317**	9320	9317	255	La Jolla St	Upstream	10	VCP			107' - TFC 2:00 146' - TFA 10:00 169' - TFC 3:00 197' - TFA 10:00 205' - TFA 10:00		NO REPAIR
77	8/2/2006	**9322-9320**	9322	9320	275	La Jolla St	Upstream	10	VCP	Pipe upstream of MH 9322 BLOCKED		76' - TFA 11:00 79' - TFC 1:00 133' - TFA 11:00 177' - TFC 2:00 199' - TFA 10:00		NO REPAIR
78	10/24/2006	**9338-9337**	9338	9337	320	La Jolla St	Downstream	10	VCP		163' - Roots Fine Joint 318' - Drop inlet 6:00	41' - TBA 3:00 132' - TFA 3:00 170' - TFA 9:00 286' - TFA 9:00		NO REPAIR
79	10/23/2006	**9500-9338**	9500	9338	332	La Jolla St	Downstream	10	VCP		124' - Roots Fine Joint 191' - ROOTS Fine Barrel 191' - Hole Soil Visible 191' - Fracture Multiple	16' - TFA 3:00		LINE
80	10/23/2006	**9501-9500**	9501	9500	165	La Jolla St	Downstream	10	VCP			9' - TBC 9:00 91' - TBA 3:00		NO REPAIR
81	10/23/2006	**9502-9501**	9502	9501	315	Segovia Circle	Downstream	8	VCP			48' - TFA 3:00 56' - TFA 9:00 185' - TFA 9:00 205' - TFA 3:00		NO REPAIR
82	10/23/2006	**9503-9502**	9503	9502	165	Segovia Circle	Downstream	8	VCP			9' - TFA 9:00 84' - TFA 3:00 158' - TFA 9:00		NO REPAIR
83	10/26/2006	**9337-9336**	9337	9336	272	Melrose St	Downstream	18	VCP	Camera underwater (75% full)	66' - Joint Offset Medium 123' - Water level sag 180' - Water level sag	123' - TBA 125' 10:00		NO REPAIR
84	10/26/2006	**9340-9337**	9340	9337	202	Melrose St	Downstream	15	VCP	**UPSIZE TO 18" (CAPACITY ISSUE)**	15' - Intruding Seal Ring Hanging			**UPSIZE TO 18" (CAPACITY ISSUE)**
85	10/26/2006	**9336-9335**	9336	9335	355	Melrose St	Downstream	18	VCP	Camera underwater (50% full)	75' - Water level sag 344' - Water level sag	93' - TBA 9:00 233' - TBA 9:00		NO REPAIR
86	10/26/2006	**9335-9334**	9335	9334	345	Melrose St	Downstream	18	VCP	Camera underwater	51' - Joint Offset Medium 143' - Joint Offset Medium 206' - Water level sag			NO REPAIR
87	10/25/2006	**9347-9335**	9347	9335	350	Alley parallel to Via Martens	Downstream	8	VCP		8' - Grease Deposits 180' - Deposits			CLEAN
88	10/24/2006	**9345-9346**	9345	9346	235	Ortega Way	Downstream	8	VCP		102' - Deposits 169' - Deposits 194' - Deposits 229' - Deposits	76' - TFA 3:00 101' - TFA 9:00 192' - TFA 3:00		CLEAN
89	10/24/2006	**9344-9345**	9344	9345	86	Ortega Way	Downstream	8	VCP		13' - Deposits	6' - TFA 3:00 10' - TFA 9:00 57' - TFA 3:00		NO REPAIR
90	10/25/2006	**9346-9347**	9346	9347	183	Alley parallel to Ortega Way	Upstream	8	VCP		8' - Deposits 63' - Intruding Sealing Ring	56' - TFA 9:00 125' - TFA 9:00 128' - TFA 3:00 175' - TFA 9:00		TRIM INTRUDING
91	11/6/2006	**9334-9333**	9334	9333	275	Melrose St	Downstream	18	VCP	**UPSIZE TO 21" (CAPACITY ISSUE)**	217' - Water level sag 250' -Water level sag			NO REPAIR
92	10/26/2006	**9341-9340**	9341	9340	213	Melrose St	Downstream	15	VCP	**UPSIZE TO 18" (CAPACITY ISSUE)**		6' - TBA 9:00 11' - TBA 9:00		**UPSIZE TO 18" (CAPACITY ISSUE)**
93	10/25/2006	**9342-9341**	9342	9341	98	Melrose St	Downstream	15??	VCP	**SIPHON 15"/15";** CANNOT GET CAMERA THROUGH SIPHON. RECOMMEND FOCUSED SIPHON INSPECTION; **UPSIZE TO 18" (CAPACITY ISSUE)???**				**UPSIZE TO 18" (CAPACITY ISSUE)**

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
94	10/25/2006	**8732-9342**	8732	9342	351	Melrose St	Downstream	15	VCP	**UPSIZE TO 18" (CAPACITY ISSUE)**	119' - Deposits Ingressed Fine 149' - Water level sag 214' - Water level sag 220' - Intruding Sealing Ring 229' - Water level sag 250' - Water level sag 250' - Deposits Ingressed Fine 305' - Fracture Multiple	24' - TBA 9:00 158' - TBA 9:00	305' - Line over Fracture 220' Trim intruding seal ring	**UPSIZE TO 18" (CAPACITY ISSUE**
95	10/24/2006	**8733-8732**	8733	8732	226	Melrose St	Downstream	15	VCP	**UPSIZE TO 18" (CAPACITY ISSUE)**	50' - Deposits Ingressed Fine			**UPSIZE TO 18" (CAPACITY ISSUE**
96	10/24/2006	**8734-8733**	8734	8733	216	Melrose St	Downstream	15	VCP	CAMERA UNDERWATER; **UPSIZE TO 18" (CAPACITY ISSUE)**	13' - Deposits Ingressed Fine 122' - Water level sag 152' - Deposits Ingressed Fine 214' - Crack Multiple		214' - line over cracks	**UPSIZE TO 18" (CAPACITY ISSUE)**
97	10/16/2006	**8735-8734**	8735	8734	44	Melrose St	Downstream	12	VCP	**SIPHON 12"/12"** RECOMMEND FOCUSED SIPHON INSPECTION; **UPSIZE TO 15" (CAPACITY ISSUE)???**	2' - Grease Deposits			**UPSIZE TO 15" (CAPACITY ISSUE)???**
98	7/31/2006	**8718-8717**	8718	8717	255	Melrose St	Downstream	8	VCP		7' - GREASE DEPOSITS	113' - TBA 2:00 135' - TFA 2:00 173' - TBA 12:00		CLEAN & RE-INSPECT
99	7/31/2006	**8743-8718**	8743	8718	100	Boysenberry Ln	Downstream	8	VCP			11' - TFA 3:00 13' - TFA 9:00		NO REPAIR
100	7/31/2006	**8742-8743**	8742	8743	250	Boysenberry Ln	Downstream	8	VCP		74' - Fracture	7' - TFA 3:00 10' - TFA 9:00 168' - TFA 10:00	74' - line over fracture	IN-SITU POINT REPAIR
101	7/31/2006	**8741-8742**	8741	8742	290	Boysenberry Ln	Downstream	8	VCP		17' - GREASE DEPOSITS 208' - Fracture 282' - Fracture	182' - TFA 9:00	208' - line over fracture 282' - line over fracture	IN-SITU POINT REPAIR & CLEAN
102	10/18/2006	**8714-8705**	8714	8705	275	Orangethorpe Ave	Upstream	10	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	148' - Grease	113' - TFA 9:00 187' - TFC 9:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
103	10/18/2006	**8705-8704**	8705	8704	290	Orangethorpe Ave	Downstream	10	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	67' - Water level sag 89' - Water level sag 89' - Grease 100' - Water level sag 143' - Water level sag 163' - Water level sag 194' - Water level sag 211' - Grease Deposits 285' - Grease Deposits	115' - TFC 3:00 189' - TFC 3:00 268' - TFC 3:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
104	10/18/2006	**8704-8703**	8704	8703	328	Orangethorpe Ave	Downstream	10	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	8' - Deposits 59' - Water level sag 61' - Grease 84' - Water level sag 149' - Water level sag	26' - TFC 3:00 155' - TFC 3:00 256' - TFC 3:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
105	10/18/2006	**8703-8702**	8703	8702	8	Orangethorpe Ave	Downstream	10	VCP	SIPHON RECOMMEND FOCUSED SIPHON INSPECTION	3' - Joint Offset Medium 8' - Alignment Down 8' - ABANDONED SURVEY			**UPSIZE TO 12" (CAPACITY ISSUE)**
Duplicate Pipe	10/18/2006	**8703-8702**	8703	8702	132	Orangethorpe Ave	Upstream	10	VCP	SIPHON RECOMMEND FOCUSED SIPHON INSPECTION	4' - Joint Offset Medium			**UPSIZE TO 12" (CAPACITY ISSUE)**
106	10/18/2006	**8702-8701**	8702	8701	190	Orangethorpe Ave	Downstream	10	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	17' - Grease 42' - Water level sag 48' - Water level sag 97' - Grease 101' - Water level sag	90' - TFC 3:00 180' - TFC 3:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
107	10/18/2006	**8701-8700**	8701	8700	330	Orangethorpe Ave	Downstream	10	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	6' - Grease 17' - Water level sag 53' - Water level sag 64' - Water level sag 79' - Water level sag 112' - Water level sag 138' - Water level sag 286' - Water level sag 295' - Grease	64' - TBA 12:00 100' - TFC 3:00 196' - TFC 3:00 281' - TFC 3:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
108	10/19/2006	**8700-8915**	8700	8915	160	Orangethorpe Ave	Downstream	10	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	8' - Grease 17' - Water level sag 64' - Deposits 79' - Water level sag 107' - Water level sag 147' - Water level sag	63' - TFC 3:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
109	10/24/2006	**8900-8900A**	8900	8900A	286	Placencia Ave	Downstream	12	VCP	**UPSIZE TO 18" (CAPACITY ISSUE)**	61' - Crack Multiple 157' - Water level sag 215' - Crack 228' - Crack Multiple 231' - Water level sag 283' - Fracture	105' - TFA 9:00 252' - TBA 10:00		**UPSIZE TO 18" (CAPACITY ISSUE)**
110	10/24/2006	**8900A-9137**	8900A	9137	439	Placentia Ave	Downstream	12	VCP	**UPSIZE TO 18" (CAPACITY ISSUE)**; Buried DS MH 9137	6' - Crack 8' - Water level sag 22' - Water level sag 62' - Fracture 115' - Crack Multiple 138' - Fracture 168' - Fracture 186' - Crack Multiple 207' - Fracture 219' - Fracture 303' - Fracture 306' - Water level sag 306' - Crack Multiple 326' - Crack Multiple 335' - Crack 340' - Water level sag 383' - Crack	107' - TBA 9:00 223' - TBA 9:00		**UPSIZE TO 18" (CAPACITY ISSUE)**
111	10/24/2006	**8924-8900**	8924	8900	578	Placentia Ave	Downstream	12	VCP	**UPSIZE TO 18" (CAPACITY ISSUE)**; Royal Blue water	33' to 36' - Hole Void Visible 148' - Grease deposits 300' - Grease	173' - TBA 9:00 486' - TBA 9:00	33' to 36' - Trench and replace broken pipe	**UPSIZE TO 18" (CAPACITY ISSUE)**
112	10/23/2006	**8901-8924**	8901	8924	155	Placentia Ave	Downstream	12	VCP	**UPSIZE TO 18" (CAPACITY ISSUE)**				**UPSIZE TO 18" (CAPACITY ISSUE)**
113	10/23/2006	**8902-8901**	8902	8901	730	Placentia Ave	Downstream	12	VCP	**UPSIZE TO 18" (CAPACITY ISSUE)** Red Water; Steaming water (419' lateral); Two "Joint Seperated" after 610'	140' - Grease deposits 506' - Crack 519' - Grease 562' - Crack Multiple 610' - Joint Seperated Medium 619' - Grease 626' - Joint Seperated	419' - TBA 9:00 477' - TBA 9:00 563' - TBA 9:00	610' - line over seperated joint 626' - line over seperated joint	**UPSIZE TO 18" (CAPACITY ISSUE)**
114	10/19/2006	**6103-8902**	6103	8902	588	Placentia Ave	Downstream	12	VCP		141' - Deposits Ingressed Fine 208' - Deposits Ingressed Fine 258' - Deposits Ingressed Fine 476' - Roots Fine Joint 489' - Roots Fine Joint 492' - Roots Fine Joint 583' - Fracture	488' - TBC 12:00		NO REPAIR
115	10/19/2006	**6102-6101**	6102	6101	12	Placentia Ave	Downstream	15	VCP	Fast velocity sewage flow; **UPSIZE TO 21" (CAPACITY ISSUE)**				**UPSIZE TO 21" (CAPACITY ISSUE)**
116		**6102-6103**	6102	6103		Placentia Ave				NO VIDEO				NO RECOMMENDATION
117		**9323-9322**	9323	9322		Melrose St				NO VIDEO				NO RECOMMENDATION
116	7/11/2006	**6105-6104**	6105	6104	383	Placentia Ave	Downstream	8	VCP	Fast velocity sewage flow; **UPSIZE TO 15" (CAPACITY ISSUE)**	13' - Crack Multiple 215' - Crack 218' - Crack 271' - Crack 341' - Crack 350' - Crack 363' - Crack 372' - Grease	133' - TFC 10:00 339' - TFA 10:00	13" - line over cracks	**UPSIZE TO 15" (CAPACITY ISSUE)**
117	7/12/2006	**6104-6102**	6104	6102	500	Placentia Ave	Downstream	8	VCP	Fast velocity sewage flow; Camera underwater after 475'; **UPSIZE TO 15" (CAPACITY ISSUE)**	8' - Grease 103' - Roots Fine Joint 128' - Crack Multiple 245' - Roots Fine Joint 251' - Roots Fine Joint 254' - Roots Fine Joint (more roots downstream in joints) 300' - Roots Fine Joint 346' - Roots Fine Joint 349' - Roots Medium Joint 475' - Water level 50%	108' - TBA 10:00 179' - TBA 10:00 486' - TFA 1:00		**UPSIZE TO 15" (CAPACITY ISSUE)**
118		**6273-6105**	6273	6105	257	Placentia Ave		8		**UPSIZE TO 15" (CAPACITY ISSUE)**				**UPSIZE TO 15" (CAPACITY ISSUE)**
118	10/19/2006	**6101-6100**	6101	6100	104	Placentia Ave	Downstream	15	VCP	Fast velocity sewage flow; **UPSIZE TO 21" (CAPACITY ISSUE)**	8' - Grease deposits 49' - Water level sag 73' - Water level sag			**UPSIZE TO 21" (CAPACITY ISSUE)**
119	10/19/2006	**6100-8912**	6100	8912	350	Placentia Ave	Downstream	15	VCP	**UPSIZE TO 21" (CAPACITY ISSUE)**	8' - Deposits Attached Grease 5% 80.5' - Deposits Attached Grease 10% 122.5' - Water Level Sag 30% 135.1 - Water Level Sag 15% 153 - General Observation 163.4' - Deposits Attached Grease 230.7' - Water Level Sag (30%) 250.8' - Water Level Sag 20% 253.6' - Water Level Sag 35% 269.5' - Camera Submerged 293.6' -Camera Submerged 293.6' - Water Level Sag 20% 353.6' - Manhole	None observed		**UPSIZE TO 21" (CAPACITY ISSUE)**
120	10/19/2006	**8912-8911**	8912	8911	353	Placentia Ave	Downstream	15	VCP	**UPSIZE TO 21" (CAPACITY ISSUE)**	8' - Water Level Sag 20% 8' - DAG 10% 45' - DAG 15% 63' - GO 111.8' - DAG 10% 122.3' -Water Level Sag 35% 155.7' - WLS 20% 198.1 - DAG 10% 203.5 - WLS 15% 228.2 - WLS 15% 264.5 - DAG 5% 347.2' - WLS 40%	None observed		**UPSIZE TO 21" (CAPACITY ISSUE)**
121	10/24/2006	**8911-8910**	8911	8910	355	Placentia Ave	Downstream	15	VCP	**UPSIZE TO 21" (CAPACITY ISSUE)**	8' - WLS 45% 22.6' - WLS 15% 22.6' - DAGS 10% 117.9' - DAG 10% 122.7' - WLS 30% 143.6' - WLS 15% 160.4' - WLS 60% 193.8 - WLS 25% 222.2 - WLS 15% 258.6' - WLS 15%	None observed		**UPSIZE TO 21" (CAPACITY ISSUE)**

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
122	10/24/2006	**8910-8909**	8910	8909	355	Placentia Ave	Downstream	15	VCP	**UPSIZE TO 21" (CAPACITY ISSUE)**	8' - WLS 15% 8' - DAGS 10% 92.1' - WLS 30% 121.3' - WLS 15% 148.1' - WLS 30% 160.0' - CAMERA SUBMERGED 212.3' - WLS 15% 235.4' - WLS 45% 297.0' - WLS 20% 303.5' - DAGS 10% 307.5' - WLS 30% 314.1' - CAMERA SUBMERGED 351.6' - JOINT OFFSET MEDIUM	None observed		**UPSIZE TO 21" (CAPACITY ISSUE)**
123	10/24/2006	**8909-8908**	8909	8908	58	Placentia Ave	Downstream	15	VCP	**UPSIZE TO 21" (CAPACITY ISSUE)**	8.0' - WLS 15% 23.6' - DAGS 10% 26.7' - WLS 45% 39.1' - WLS 15%	None observed		**UPSIZE TO 21" (CAPACITY ISSUE)**
124	10/24/2006	**8908-8907**	8908	8907	345	Kimberly Ave	Downstream	15	VCP	**UPSIZE TO 21" (CAPACITY ISSUE)**	2' - WLS 15% 9' - DAGS 10% 42.9' - WLS 30% 81.2' - WLS 15% 81.2' - DAGS 10% 93.6' - WLS 30% 111.5' - WLS 15% 156.6' - WLS 30% 173.0 - WLS 15% 212.6' - WLS 30% 240.4' - WLS 15% 312.0' - WLS 30% 325.0' - CAMERA SUBMERGED	None observed		**UPSIZE TO 21" (CAPACITY ISSUE)**
125	10/24/2006	**8907-8906**	8907	8906	16	Kimberly Ave	Downstream	15	VCP	**UPSIZE TO 21" (CAPACITY ISSUE)**	8.0' - WLS 25% 8.0' - DAO 10%	None observed		**UPSIZE TO 21" (CAPACITY ISSUE)**
126	8/2/2006	**8729-8728**	8729	8728	120	Crowther Ave		10		SIPHON; **UPSIZE TO 18" (CAPACITY ISSUE)**				**UPSIZE TO 18" (CAPACITY ISSUE)**
127	9/18/2013	**8728-8903**	8728	8903	129.5	Crowther Ave		10		**UPSIZE TO 18" (CAPACITY ISSUE)**				**UPSIZE TO 18" (CAPACITY ISSUE)**
128		**8730-8729**	8730	8729	663	Crowther Ave		14		**UPSIZE TO 18" (CAPACITY ISSUE)**				**UPSIZE TO 18" (CAPACITY ISSUE)**
129		**8731-8730**	8731	8730	364	Crowther Ave		14		**UPSIZE TO 18" (CAPACITY ISSUE)**				**UPSIZE TO 18" (CAPACITY ISSUE)**
130	2/15/2011	**6270-8731**	6270	8731	170	Crowther Ave		10		**UPSIZE TO 15" (CAPACITY ISSUE)**				**UPSIZE TO 15" (CAPACITY ISSUE)**
131		**6269-8731**	6269	8731		Goetz Pl				NO VIDEO				NO RECOMMENDATION
131		**6400-6400A**	6400	6400A	465	Crowther Ave		10		DO NOT VIEW; **UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
132		**6400A-6400B**	6400A	6400B	50	Crowther Ave		10		DO NOT VIEW; **UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
133		**6400B-6400C**	6400B	6400C	137	Crowther Ave		10		DO NOT VIEW; **UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
134		**6400C-6400D**	6400C	6400D	29	Crowther Ave		10		DO NOT VIEW; **UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
135		**6400D-6272**	6400D	6272	260	Crowther Ave		10		DO NOT VIEW; **UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
136	10/5/2011	**6468-6400**	6468	6400	140	Crowther Ave	Downstream	8	VCP		130.3' - CRACKS ABANDONED AT 160' DUE TO DEBRIS	7.0' - TFA 10:00		IN-SITU POINT REPAIR & CLEAN
137	10/5/2011	**6469-6468**	6469	6468	100	Crowther Ave	Downstream	8	VCP		9.5' - BROKEN SOIL VISIBILE, PIPE COLLAPSED AND FILLED WITH GRAVEL	None observed	Excavate and replace broken section of pipe	TRENCH
Duplicate Pipe	10/5/2011	**6469-6468**	6469	6468	100	Crowther Ave	Upstream	8	VCP		ROCKS AND BROKEN PIPE THROUGHOUT PIPE BEGINNING AT APPROXIMATELY 20', SURVEY ABANDONED DUE TO ROCKS AT 41.2', COLLAPSED PIPE VISIBLE AT END OF PIPE.	None observed		TRENCH
138		**6471-6468A**	6471	6468A		Crowther Ave				UNSURE OF VIDEO LOCATION				
139	7/20/2006	**P6471A-6471**	P6471A	6471	300	Crowther Ave	Upstream	6	CI	Excavate and replace pipe with 8" PVC to meet current design standards.	MODERATE TO SEVERE TUBERCULATION THROUGHOUT, SURVEY ABANDONED DO TO CORROSION OF PIPE PREVENTING CAMERA FROM CONTINUING. DYE TEST VISIBLE, FLOW IS NOT BLOCKED.	None observed		TRENCH
140	7/20/2006	**6470-6471**	6470	6471	60	Crowther Ave	Upstream	8	VCP		No observations	None observed		NO REPAIR
141		**6472-6471**	6472	6471		Cameron St								NO RECOMMENDATION
142		**6472A-6472**	6472A	6472		Cameron St								NO RECOMMENDATION
143		**6200-6102**	6200	6102	200	Parallel to railroad near I57		12		**UPSIZE TO 21" (CAPACITY ISSUE)**				**UPSIZE TO 21" (CAPACITY ISSUE)**
144		**6201-6200**	6201	6200	20	Parallel to railroad near I57		12		**UPSIZE TO 15" (CAPACITY ISSUE)**				**UPSIZE TO 15" (CAPACITY ISSUE)**
145		**6202-6201**	6202	6201	200	Parallel to railroad near I57		12		**UPSIZE TO 15" (CAPACITY ISSUE)**				**UPSIZE TO 15" (CAPACITY ISSUE)**
146		**6210A-6203**	6210A	6203	228	Parallel to railroad near I57		12		**UPSIZE TO 15" (CAPACITY ISSUE)**				**UPSIZE TO 15" (CAPACITY ISSUE)**
147		**6211-6211A**	6211	6211A	2	Parallel to Monterey Way		12		**UPSIZE TO 15" (CAPACITY ISSUE)**				**UPSIZE TO 15" (CAPACITY ISSUE)**
148		**6217-6216**	6217	6216		Santa Fe Ave								NO RECOMMENDATION
149		**6459-6400**	6459	6400	257	Bradford Ave		8		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
141	6/20/2006	**6252-6244**	6252	6244	150	Center St	Downstream	10	VCP		6.0' - WATER LEVEL 5% 11.5' - CIRCUMFERENTIAL CRACK 8:00-1:00 14.2' - CRACK LONGITUDINAL 17.3' - CRACK LONGITUDINAL 24.5 - RFJ 4:00 61.5' - RFJ 10:00 69.6' - RFJ 4:00 87.6' - RFJ 8:00 92.8' - RMJ 5:00-10:00 100.0 - DAO 108.6' - RFJ 4:00-9:00 134.8' - RFJ 5:00 CONTINUOUS CRACKS AT JOINTS	88.9' - TFC 2:00		LINE
142		**6244-6243**	6244	6243		Center St								NO RECOMMENDATION
142	6/20/2007	**6253-6252**	6253	6252	60	Center St	Downstream	10	VCP		4.1' - WL 5% 5.9' - CC 9:00-1:00 12.6' - CC 8:00 58.0' - CC 3:00-6:00	None observed		LINE
143	6/20/2007	**6254-6253**	6254	6253	140	Center St	Downstream	10	VCP		7.0' - WL 5% 9.2' - RFJ 14.6' - CC 9:00-2:00 14.6' - RFJ 7:00-11:00 17.4' - CC 8:00-12:00 22.7' - CL 8:00 28.0' - CL 12:00 30.4' - CL 12:00 33.1 - CC 7:00-5:00 40.0' - CL 12:00 CRACKS LONGITUDINAL CONTINUE THROUGHOUT REMAINING PIPE 68.4' - RFB 75.1' - RFJ 76.3' - TFA 2:00 79.9' - RMJ 2:00-4:00 81.3 - TBA 2:00 CRACK CONTINUOUS AT JOINTS 85.4' - RFJ 4:00-5:00	None observed		LINE
144	6/20/2007	**6257-6254**	6257	6254	250	Alley between Melrose St and Main St	Downstream	8	VCP		4.8' - WL 5% 8.0' - TFA 11:00 17.2' - WL 10% 19.9' - CC 2:00-9:00 24.9' - CC 7:00-9:00 CRACKS CONTINUOUS AT THE JOINTS 25.9' - TFA 2:00 41.5' - TFA 11:00 66.9' - FC 3:00-6:00	None observed		LINE
145	6/20/2007	**6258-6257**	6258	6257	240	Alley between Melrose St and Main St	Downstream	8	VCP		2' - DAGS 5% 7.0' - WL 10% 13.7' - CL 7:00 16.4' - CL 4:00 18.8' - CC 7:00-5:00 CRACKS CONTINUOUS AT JOINTS 28.5' - WL 5% CRACKS CONTINUOUS AT JOINTS 69.7' - HOLE VOID VISIBLE 8:00-1:00 91.4' - DAGS 4:00-8:00 5% CRACKS CONTUOUS AT JOINTS 119.0' - TFA 2:00 124.3' - TFA 11:00 124.3' - RFL 11:00 154.1' - RFJ 4:00-8:00 154.1' - DAGS 4:00-8:00 5% 156.5' - RFJ 1:00-3:00 169.0' - TBI 12:00	40.7' - TFC 11:00 41.9' - TBA 12:00 67.1' - TFC 11:00 69.7' - TBA 9:00 79.3' - TFC 2:00 78.3' - TFA 12:00 155.2' - TFA 2:00 156.5' - TBA 11:00 170.7' - TFC 10:00		LINE
146	6/20/2007	**6260-6258**	6260	6258	370	Aguirre Ln	Downstream	8	VCP		8.0' - WL 5% 8.0' - CL 3:00 17.8' - DAGS 4:00-8:00 5% 25.8' - CL 10:00 31.6' - CL 1:00 64.2' - CL 10:00 81.9' - CL 8:00 87.3' - CC 7:00-11:00 97.5' - CC 4:00-9:00 99.7' - CL 9:00 102.3' - CL 3:00 104.8' - CC 7:00-5:00 CRACKS CONTINUOUS AT JOINTS CRACKS CONTINUE AT JOINTS 133.2' -BROKEN VOID VISIBLE 10:00-2:00 147.2' - CC 4:00-8:00 152.2' - CC 9:00-3:00 CRACKS CONTINUOUS AT JOINTS 193.0' - RFJ 8:00 213.1' - RFJ 3:00-9:00 218.8' - DAGS 4:00-8:00 5% CRACKS CONTINUOUS AT JOINTS 225.9' - RFJ 4:00-8:00 229.7' - HOLE SOIL VISIBLE CRACKS CONTINUOUS AT JOINTS 286.4' - RFJ 4:00 288.6' - RFJ 3:00-11:00	16.9' - TFC 10:00 25.4' - TBA 10:00 37.6' - TFA 10:00 50.2' - TFA 10:00 52.8' - TFA 1:00 75.7' - TFC 10:00 110.8' - TBA 10:00 115.8 - TFC 10:00 209.3' - TFC 10:00 229.7' - TBA 10:00 263.4' - TFA 10:00 300.6' - TFA 10:00 318.7' - TFC 10:00 331.5' - TBA 12:00		LINE
147	12/20/2011	**6245-6424**	6245	6424	150	Alley between Main St and Bradford Ave	Downstream	8	VCP	VIDEO IS LABELED AS 6424-6260	148.8' - WL 20%	67.8' - TFA 9:00 75.4' - TFA 3:00		NO REPAIR

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
148	6/20/2007	**6424-6260**	6424	6260	250	Alley between Main St and Bradford Ave	Downstream	8	VCP	VIDEO IS LABELED AS 6425-6424	10' - Fracture 75' - Crack 90' - Crack 107' - Fracture Multiple 107' - Hole Soil Visible 124' - Crack 198' - Crack 200' - Crack Longitudinal 231' - Crack 136' - Crack 139' - Fracture 162' - Crack 167' - Crack 178' - Crack 191' - Crack 265' - Crack	24' - TBA 2:00 32' - TFA 10:00 50' - TFC 2:00 76' - TFC 3:00 83' - TFC 10:00 87' - TBI 2:00 107' - TBA 10:00 123' - TBA 3:00 130' - TFC 10:00 138' TFC 2:00 138' - TBI 2:00 171' - TFA 10:00 176' - TFA 2:00	107' - trench and replace broken pipe	EXCAVATION POINT REPAIR AND LINE
149		**6426-6425**	6426	6425		Alley between Main St and Bradford Ave								NO RECOMMENDATION
150		**6422-6460**	6422	6460		Aguirre Ln								NO RECOMMENDATION
151		**6461-6460**	6461	6460	297	Bradford Ave		8		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
152		**6460-6459**	6460	6459	68	Bradford Ave		8		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
153		**6462-6461**	6462	6461	294	Bradford Ave		8		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
149	7/26/2006	**6411-6462**	6411	6462	165	Center St	Downstream	8	VCP		6' - Grease deposits 11' - Crack 77' - Crack 78' - Root medium lateral 129' - Roots fine joint 137' - Roots fine joint	78' - TFA 10:00		CLEAN & RE-INSPECT
150	12/20/2011	**6462-6424**	6462	6424	162	Center St	Upstream	8	VCP	Stagnant flow at 09:38; Overflow pipe of MH 6462	40' - Crack			CLEAN & RE-INSPECT
151	7/26/2006	**6410-6411**	6410	6411	442	Alley between Bradford Ave and Alta St	Downstream	6	VCP		8' -Obstable External Pipe or Cable OBP 8' - Abandoned Survey MSA			TRENCH
Duplicate Pipe	7/26/2006	**6410-6411**	6410	6411	442	Alley between Bradford Ave and Alta St	Upstream	6	VCP		0' - VC Vermin Cockroach 0.7' - BSV Broken Visible Soil 1002 9' - MWL Water Level at 15% (KB observation - pooled) 28.3' - MGO General Observation 71' - DAGS Deposits Attached Grease 0903 5% 76.6' - DAGS Deposits Attached Grease 0408 5% 86.4' - RFJ Roots Fine Joint 0102 112.4' - MWL Water Level 10% 127.7' - B Broken 1201 193.1' - HVV Hole Void Visible 1002 193.2' - FM Fracture Multiple 0710 242.3' - HSV Hole Soil Visible 1002 332.6' - JOM Joint Offset Medium 332.6' - MSA Aboned Survey due to JOM	0.7' - BSV Broken Visible Soil 1002 50.7' - TBA Tap Break-in Active 1100 62.6' - TBI Tap Break-in Intruding 0100 64.6' - TFC Tap Factory Capped 0100 95.6' - TFC Tap Factory Capped 1100 98' - TBA Tap Break-in Active 1211 120.6' - TFC Tap Factory Capped 0200 127.7' - B Broken 1201 136.9' - TFC Tap Factory Capped 1100 138' - TBA Tap Break-in Active 1211 165.8' - TBA Tap Break-in Active 1200 182.5' - TFC Tap Factory Capped 0200 191.6' - TBA Tap Break-in Active 1200 192.7' - TFC Tap Factory Capped 1100		TRENCH
152	7/26/2006	**6412-6411**	6412	6411	630	Alley between Bradford Ave and Alta St	Downstream	8	VCP		7' - DAGS 0507 5% 7' - MWL 10% (KB observation - flowing) 29' - CL 0500 (KB obs - "8" long) 54.9' - RFJ 0910 54.9' - CL 1200 ("4") 60.2' - RFJ 0708 62.8' - RFJ 0809 65.5' - RFJ 1100 (roots are continuous at the joints) 65.5' - CL 1100 (KB obs "6") 68.2' - RFJ 0700 73.3' - RFJ 0705 130' - 155' - heavey root intrusion at joints 271.2' - CL 0900 ("6" long) 278.9' - CL 0200 ("4" long) 289.4' - CL 0900 ("10" long) 291.9' - CL 0200 ("1.5' long) 305.1' - CL 0900 ("10" long) 318.1' - CL 1200 ("6"long) 328.6' - CL 1000 ("8" long) 333.8' - CL 0300 ("2" long) 341.5' - CC 1002 370.2' - CL 0500 ("6") 396.2' - CL 0900 ("6") 398.7' - RFJ 0309 399.5' - BVV 1201 416.9' - CL 1100 ("1") 432.4' - CL 0800 ("8")	7' - TBA 0300 54.2' - TBA 1200 56.4' - TFC 1000 58.9' - TFC 0200 74.8' - TBA 0200 95.3' - TFC 1100 97.7' - TFC 0100 123.5' - TBA 0200 150.3' - TFC 0100 197.1' - TFC 1000 199.8' - TFC 0100 231.1' - TBA 0300 249' - TFC 1100 251.6' - TFC 0100 261.9' - TBA 1200 298.5' - TFA 1100 300.9' - TFC 0100 314' - TBA 0300 350.7' - TFC 1100 351.1' - TBA 1211 353.1' - TFC 0200 399' - TBA 0100 402.6' - TFC 0100 441.6' - TBC 1200 443.6' - TBI 1100 451.6' - TFC 1100 454.2' - TFC 0100		LINE
153	7/20/2006	**6413-6412**	6413	6412	100	Chapman Ave	Downstream	8	VCP		6.1' - DAGS 0408 (continuous) 7.6' - CL 0400 ("2") 10.1' - CL 0300 ("5") 97' - AMH	86.2' - TFA 0200		LINE
154	7/26/2006	**6414-6413**	6414	6413	520	Alley between Bradford and Anned Dr	Upstream	6	VCP		8' - MWL 5% (flowing) 29.2' - Hole soil visible 50.7' - RFJ 0204 53.6' - RFJ 0204 71.8' - RMJ 0705 15% 76' - RFJ 0708 80.4' - RRB 0606 95% 80.4' - MSA	58.8' - TBA 0100	Excavate and replace between 28' and 32' from MH 6413	EXCAVATION POINT REPAIR AND LINE
155	7/18/2006	**6417-6416**	6417	6416	250	Anned Dr	Upstream	6	VCP		1' - DAGS 0507 5% (grease is continuous) 44.7' - CM 169.3' - RFL 0200 208.3' - RFJ 0305 322.6' - DAGS 0507 5% 322.6' - AMH (buried manhole)	44.5' - TBI 1200 91.4' - TBA 0200 114.4' - TBA 0200 169.3' - TBA 0200		LINE
156	7/18/2006	**6416-6415**	6416	6415	300	Anned Dr	Downstream	6	VCP		0' - DAGS 0507 4' - RFJ 0309 8' - MWL 5% 23.4' - pipe joint lengths are 3' 115.9' - RFJ 0710 122' - RFJ 0205 190' - MWL 15% (appears to be a sag) 199' - RFL 0903 202.1' - RMJ 0705 10% 205.5' - RFJ 0309 208.4' - RFJ 0705 211.6' - RFJ 0705 214.8' - RFJ 0705 220.9' - RFJ 1200 227' - RFJ 0705 236.1' - RFJ 0210 245.3' - RFJ 0309 302.1' - DAGS 0705 5% 302.1' - AMH	27.7' - TBA 1200 72.6' - CM 0903 109.6' - CM 1002 113.4' - TBA 1200 115.9' - CM 0705 166.6' - TBA 1200 202.1' - FM 0705 203.5' - TBA 1100 208.6' - CC 0705 227' - CC 0204 285.3' - FM 0705		LINE
157	7/18/2006	**6422-6421**	6422	6421	470	Angelina Dr	Downstream	6	VCP		1' - MSA (lateral at 0600 obstruction)	1' - TFA 0600		LINE
Duplicate Pipe	7/18/2006	**6422-6421**	6422	6421	470	Angelina Dr	Upstream	6	VCP		13.1' - MGO (pipe joint length = 2') 101.5' - RFJ 1007 105.8' - RFJ 0409 114' - RFJ 0409 115.9' - RFJ 0809 120' - RFJ 0309 (continuous) 261' - RFJ 0709 263' - RFJ 0709 267.1' - RFJ 0709 269.4 ' RFJ 0709 (continuous at joints) 451.1' - MGO (bottom of pipe, looks active) 451.1' - MSA	10.9' - CM 1005 19.6' - CL 0400 19.6' - CL 0900 22.9' - TBA 0200 105.8' - CL 0900 114' - CL 0300 115.9' - CL 0900 144' - CL 0300 154.3' - CL 0400 160.5' - CL 0300 184.5' - TBA 0900 195.5' - CL 0200 248.4' - FM 0209 252.1' TBA 0200 267.1' - CL 0900 285.7' - CL 0400 391.8' - CL 0300 443.3' - JSL 444.9' - TFA 0300 445.3' - JSL 449.6' - JSM 449.6' - FM 0105 451.1' - TBI 0600		LINE
158	7/21/2006	**6421-6420**	6421	6420	130	Angelina Dr	Downstream	6	VCP		9.9' - RFJ - 0305 11.8' - MGO pipe joint length = 2' 11.8' - RFP 0305 16.1' - RFJ 0410 18.4' - RFJ 0309 (continuous at joints) 128.7 - MSA abandonded due to offset joint	11.8' - CL 0400 67.3' - CL 0400 79.4' - CL 0900 89.6' - CL 0300 89.6' - CL 0800 91.7' - CL 0400 91.7' - CL 0800 93.7' - CL 0800 127.9' - JOM		LINE
159	7/21/2006	**6421-6420**	6421	6420	350	Angelina Dr	Upstream	6	VCP		223.3' - RFJ 0705 (continuous) 237.4' - RMJ 1101 350.3' - MSA (abandoned due to offset joint)	67.3' - CL 0400 339.4' - CL 0300 339.4' - CC 0306 339.8' - CL 0900 346' - JSM 349.7' - JOM		LINE

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
160	7/20/2006	**6420-6419**	6420	6419	375	Chapman Ave	Downstream	8	VCP		15.3' - MGO pipe length = 2' 63.4' - RFJ 1200 125' - FL 0800 165.2' - RFJ 0705 186.2' - RFJ 0810 (continuous) 188.2' - RFB 0400 214.4' - RFL 0900 continuous at joints 216.1' - RFJ 0405 continuous at joints 219.1' - RFB 0801 234' - RFJ continuous at joints 374.2 AMH	30.8' - CL 0800 79.4' - CL 0900 125' - CL 0100 127.3' - CC 0610 129.6' - CC 0610 157.4' - CL 0400 125' - CL 0100 127.3' - CC 0610 129.6' - CC 0610 157.4' - CL 0400 165.2' - CL 0400 165.2' - CL 0400 165.2' - FL 0400 170.4' - CL 0800 (at 0 continuous at joints) 201 - CL continuous at joints 201 - CL continuous at joints 221' - CL continous at joints 239' - CL continuous at joints 257' - CL and RFJ continuous at joints 299' - CL continuous at joints 323' - CL continuous at			LINE
161	7/20/2006	**6419-6419A**	6419	6419A	110	Chapman Ave	Downstream	8	VCP	**UPSIZE TO 10" (CAPACITY ISSUE)**	5.5' - FL 0400 5.5' - FL 0800 16' - MWL 10% 8.0' - CL 0400 10.7' - CL 0400 18.3' - CL 0400 (continuous) 23.5' - CL continuous at joints 23.5' - MGO pipe joint length ` 2' 77.7' - MWL 25% 89.6' - CL 0300 96' - MGO Debris was holding back the water flow 99.9' - CL continuous at joints 107.6' - AMH			LINE
162	7/20/2006	**6419A-6418**	6419A	6418	295	Chapman Ave	Downstream	8	VCP		8.9' - DAGS 0408 continuous 9' - CL 0900 11.6' - FL 0900 11.7' - MGO pipe joint = 2' 14.4' - CL 0900 14.4' - CL 0300 14.8' - CC 0306 14.8' - CC 0609 16.7' - CL 0900 16.7' - CL 0300 (continuous at joints) 89.6' - CL 0800 90' - KB comment MGO - dips in the line are present from this point to 290' 90' - CL continuous at joints. 222.6' - RFJ 0810 228' - MGO CL continuous DAGS continuous 265.5' - RFJ 0710 290.6' - DAGS 0408 (continuous) 290.6' - CL 0800 (continuous) 293.7' - AMH			LINE
163	7/20/2006	**6418-6415**	6418	6415	150	Chapman Ave	Downstream	8	VCP		4.6' - DAGS - 0507 (continuous) 9.7' - MGO pipe joint length is 2" 26' - MGO (KB) - Series of dips in pipe 47.2' - RFJ 0812 49.8' - RFJ 0903 52.2' - RFJ 0804 62.4' - RFJ 0804 75' - CL 0300 75' - RFJ 0804 (continuous at joints) 82.4' - JOM 91.7' - CL 0400 95.5' - CL 0300 147' - RFJ continuous at joints 147' - DAGS 0507 continuous 147' - AMH			LINE
164	7/20/2006	**6415-6413**	6415	6413	160	Chapman Ave	Downstream	8	VCP		3.4' - DAGS 0307 (continuous) 6.3' - CL 0300 8.8' - CL 0800 8.8' - MGO pipe joint length is 2' 24' - CL 0400 44.3' - FL 0900 60' - MGO (KB) - series of dips in pipe 74.9' - CL 0400 74.9' - CL 0800 91.7' - CL 0800 155.9' - DAGS 0509 (continuous) 155.9' - AMH			LINE
165	6/20/2007	**6255-6254**	6255	6254	205	Alley between Melrose St and Main St	Downstream	6	VCP		13' - Roots fine lateral 22' - Grease deposits 38' - Crack 44' - Crack 118' - Roots fine joint 120' - ROOTS 120' - DEPOSITS 133' - Crack 149' - Roots fine joint 155' - Crack 194' - Fracture	93.7' - CL 0800		LINE
166	6/20/2007	**6256-6255**	6256	6255	90	Alley between Melrose St and Main St	Upstream	6	VCP	ABANDONED SURVEY	6' - Grease deposits 17' - Grease deposits 74' - Fracture 90' - ABANDONED SURVEY (TBI)	127.9' - JOM	74' - line over fracture	LINE
167	6/20/2007	**6256-6255**	6256	6255	230	Alley between Melrose St and Main St	Downstream	6	VCP	ABANDONED SURVEY	7' - Crack 36' - Crack 69' - Crack 73' - Crack 75' - Roots fine joint 83' - Roots fine joint 87' - Roots fine joint 93' - Roots fine joint 100' - Crack 117' - Roots fine joint 163' - Crack 212' - Crack 226' - ABANDONED SURVEY (TBI)	4' - TBA 12:00 6' - TBA 12:00 6' - TFA 3:00 8' - TFC 11:00 33' - TFA 11:00 33' - TBA 12:00 43' - TFC 1:00 70' - TBA 12:00 76' - TFC 10:00 102' - TBA 3:00 125' - TFA 11:00 133' - TBA 1:00 156' - TFC 2:00 162' - TBA 12:00 170' - TFC 10:00 201' - TFC 2:00 204' - TBA 3:00 210' - TBA 3:00 226' - TBI 3:00		LINE & TRIM INTRUDING
168	7/31/2006	**6251-6248**	6251	6248	60	Kraemer Memorial Park	Downstream	6	VCP		0 - AMH buried with roots coming through 3.6' - MWL 5% 4' - RFJ 0705 (continuous at joints) 12' - MGO pipe length is 2' 19' - RIF continuous at joints 60.5' - MGO VCP clay pipe length in line 68' - RFJ continuous at joints 80.5' - RFJ 0705 80.5' - AMH	28.2' - TFC 0900 58.1' - CC 1002 64.4' - FC 0408		LINE
169	7/18/2006	**6430-6431**	6430	6431	145	Kraemer Memorial Park	Downstream	8	VCP		0' - VC 1.2' - MWL 5% 19' - MGO pipe length is 2.5' 21.3' - RFJ 0309 23.9' - RFJ 0711 (continuous at joints) 34' - RFJ continuous at joints 68' - RFJ continuous at joints 96' - RFJ continuous at joints 144.3' - VC 144.3' - RFJ 0707 144.3' - AMH (buried)	11.2' - CC 0309 94.2' - CC 0711		LINE
170	7/18/2006	**6431-6250**	6431	6250	325	Kraemer Memorial Park	Downstream	10	VCP		4' - RFJ 0609 9.4' - RFJ 0705 (continuous at joints) 18' - RFJ continuous at joints 29' - MGO (KB)- major dip in line 39.2' - RFJ continuous at joints 40.7' - MWL 10% 53.7' - RFJ 0709 56.4' - RFJ 0709 continuous 60.1' - MWL 5% 71.8' - RFJ 0708 82.4' - RFJ 0709 84.8' - RFJ 0408 continuous at joints 90.1' - RFJ 0708 97.9' - RFJ 0708 continuous at joints 131' - RFJ continuous at joints 175' - RFJ continuous at joints 205' - RFJ continuous at joints 251' - RFJ continuous at joints 267.5' - RMJ 0705 15% 288' - RFJ continuous at joints 331' - MWL 15% 343' - RFJ 0710 (end of continuous roots) 345' - AMH (trouble entering manhole - session ended ~2' before manhole)	4' - CM 0903 53.7' - FC 0408 87.5' - CL 0200 90.1' - CM 0705 94.2' - CC 0711 97.9' - CL 0800 129' - CL 0800 199.5' - CM 1209 265' - CL 0300 322.4 - CL 0700 324.9' - CL 0200 337.9' - CM 1002		LINE
171		**6429-6430**	6429	6430		Alley into Kraemer Memorial Park								NO RECOMMENDATION
171	7/18/2006	**6432-6430**	6432	6430	200	Kraemer Memorial Park	Downstream	8	VCP		7' - Crack 13' - Crack 16' - Crack 31' - Crack multiple 75' - Root fine joint 78' - Root fine joint 80' - Root fine joint 90' - Root fine joint 93' - Root fine joint 96' - Root fine joint 106' - Crack Multiple 169' - Material change to VCP 175' - Material change to CIP	102' - TFC 3:00 108' - TBA 12:00 110' - TFC 10:00 173' - TFA 12:00		LINE

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
172	7/12/2006	**6434-5701**	6434	5701	185	Anned Dr	Downstream	6	VCP		4' - Grease 15' - Crack Multiple 27' - Root fine joint 30' - Root fine joint 95' - Crack 95' - Roots fine joint 147' - Fracture	120' - TFA 3:00		LINE
173	7/12/2006	**6435-6434**	6435	6434	75	Anned Dr	Upstream	6	VCP	Buried US MH 6435				NO REPAIR
174	7/18/2006	**6432A-6432**	6432A	6432	270	Bradford Ave	Downstream	6	VCP	Use epoxy grout to seal infiltration at 152' prior to lining	35' - Crack 45' - Crack Multiple 62' - Crack 64' - Crack 66' - Crack 77' - Crack 87' - Crack Multiple 89' - Crack Multiple 125' - Crack 152' - Infiltration GUSHER 203' - Joint offset medium 264' - Fracture 268' - Joint offset medium	3' - TBA 2:00 132' - TBA 1:00		LINE
175		**5972-6250**	5972	6250		Kraemer Memorial Park								NO RECOMMENDATION
175	7/6/2006	**5967-5966**	5967	5966	220	Wilson Ave	Downstream	6	VCP		31' - Roots fine joint 65' - Roots fine joint 83' - Fracture 83' -Roots fine joint 136' - Roots Fine Barrel 138' - Hole Soil Visible 138' - ROOTS 138' - Crack Multiple 153' - Roots fine joint 159' - ROOTS	11' - TFA 9:00 13' - TFA 3:00 41' - TFA 9:00 43' - TFA 3:00 93' - TFA 9:00 94' - TFA 3:00 148' - TBA 9:00 149' - TFA 3:00 192' - TBA 9:00 198' - TBA 3:00		LINE
176	7/6/2006	**5968-5966**	5968	5966	325	Wilson Ave	Downstream	6	VCP	Roots throughout pipe	1' - Grease 29' - Roots fine joint 35' - Roots fine joint 48' - Roots fine joint 54' - Roots fine joint 64' - Roots fine joint 69' - Roots fine joint 75' -Roots fine joint 84' - Roots fine joint 294' - Roots fine joint	64' - TFA 2:00 65' - TFA 9:00 125' - TFA 2:00 127'' - TFA 10:00 165' - TFA 2:00 166' - TFA 10:00 238' - TFA 2:00 239' - TFA 10:00 293' - TFA 2:00 294' - TFA 10:00		LINE
177	6/27/2006	**5703-5968**	5703	5968	401	Wilson Ave	Downstream	6	VCP	Roots throughout pipe	3' - Roots fine jont 8' - ROOTS 42' - Roots fine lateral 241' - Roots fine joint 243' - Roots fine lateral 273' - Roots fine joint 286' - Grease deposits 289' - Roots fine lateral 291' - Roots fine lateral 330' - DEPOSITS 343' - Roots fine lateral 345' - Roots fine lateral 397' - Grease deposits	9' - TFA 3:00 40' - TFA 3:00 42' - TFA 9:00 88' - TFA 3:00 90' - TFA 9:00 140' - TFA 3:00 141' - TFA 9:00 191' - TFA 3:00 241' - TFA 3:00 243' - TFA 9:00 289' - TFA 3:00 291' - TFA 9:00 344' - TFA 3:00 345' - TFA 9:00		LINE
178	6/27/2006	**5702-5703**	5702	5703	115	Wilson Ave	Upstream	6	VCP	Roots throughout pipe	7' - Roots fine joint 63' - Roots fine lateral 111' - ROOTS BLOCKING Cleanout 111' - ABANDONED SURVEY	63' - TFA 3:00 64' - TFA 9:00 108' - TFA 3:00	115' - trench and replace cleanout with MH or new cleanout	EXCAVATION POINT REPAIR AND LINE
179	6/29/2006	**5705-5969**	5705	5969	434	Orchid Dr	Downstream	8	VCP		4' - Roots fine joint 4' - Fracture 39' - Fracture Multiple 44' - Roots fine joint 44' - Crack 45' - Roots fine lateral 142' - Crack Multiple 173' - Fracture 197' - Fracture Multiple 231' - Fracture Multiple 255' - Fracture Multiple 273' - Fracture 295' - Fracture 297' - Fracture Multiple 297' - Roots fine joint 307' Roots fine joint 377' - Fracture Multiple 410' - Crack Multiple 419' - Fracture Multiple 422' - Fracture Multiple	39' - TFA 9:00 45' - TFA 3:00 174' - TFA 9:00 180' - TFA 3:00 232' - TFA 9:00 238' - TFA 3:00 290' - TFA 9:00 296' - TFA 3:00 345' - TFA 9:00 351' - TFA 3:00 402' - TFA 9:00 408' - TFA 3:00		LINE
180	6/29/2006	**5970-5969**	5970	5969	215	Orchid Dr	Downstream	8	VCP		10' - ROOTS Medium Joint 11' - Root medium lateral 12' - Roots fine joint 16' - Fracture 17' - Roots fine lateral 21' - Fracture Multiple 62' - Roots fine joint 152' - Fracture 152' - Roots fine joint 164' - Fracture 176' - Fracture 179' - Fracture 212' - FRACTURE	11' - TFA 3:00 17' - TBA 9:00 19' - TFA 3:00 62' - TFA 9:00 68' - TFA 3:00 120' - TFA 9:00 126' - TFA 3:00 180' - TFA 9:00 186' - TFA 3:00		LINE
181	7/3/20006	**5969-5966**	5969	5966	340	Alley Parallel to Walnut Ave	Downstream	8	VCP	Roots and grease throughout pipe; **UPSIZE TO 12" (CAPACITY ISSUE)**	1' - Grease deposits 9' - Crack Multiple 19' - Crack Multiple 19' - Roots fine joint 22' - Roots fine joint 54' - Roots fine joint 74' - Roots fine joint 100' - Roots fine joint 102' - Grease deposits 152' - ROOTS Medium Joint 157' - DEPOSITS 188' - DEPOSITS			**UPSIZE TO 12" (CAPACITY ISSUE)**
182	7/3/2006	**5966-5965**	5966	5965	164	Alley Parallel to Walnut Ave	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
183	7/10/2006	**5965-6286**	5965	6286	650	Walnut Ave	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
184	7/10/2006	**6286-6247**	6286	6247	173	Chapman Ave		8		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
185		**5971-5969**	5971	5969	215	Alley Parallel to Walnut Ave				**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
182	6/28/2006	**5706-5971**	5706	5971	326	Alley Parallel to Orchid Dr	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	3' - Fracture Multiple 131' - Water level sag 138' - Water level sag 166' - Roots fine joint 213' - DEPOSITS 231' - Roots fine joint 255' - DEPOSITS 276' - DEPOSITS 316' -ROOTS fine barrel 324' - Roots fine joint	183' - TBA 2:00 285' - TBA 12:00		**UPSIZE TO 10" (CAPACITY ISSUE)**
183	6/28/2006	**5707-5706**	5707	5706	166	Melrose St	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	3' - Fracture Multiple 14' - Grease 157' - Water level sag 157' - Deposits	45' - TBA 1:00 117' - TBA 2:00 119' - TFC 9:00	3' - line over fracture	**UPSIZE TO 12" (CAPACITY ISSUE)**
184	6/29/2006	**5704-5705**	5704	5705	431	Orchid Dr	Downstream	8	VCP		9' - Joint separated medium 9' - Crack 11' - Fracture Multiple 53' - Roots Fine joint 54' - Grease deposits 65' - Roots fine joint 65' - Crack Multiple 108' - Fracture Multiple 108' - Roots fine joint 122' - Deposits 141' - Fracture Multiple 162' - Roots fine joint 174' - Roots fine joint 224' - Crack 241' - Fracture Multiple 290' - Fracture Multiple 323' - Fracture Multiple 366' - Roots fine joint 366' - Fracture	10' - TFA 9:00 12' - TFA 3:00 15' - TFA 9:00 18' - TFA 3:00 48' - TFA 9:00 54' - TFA 3:00 109' - TBA 9:00 115' - TFA 3:00 172' - TFA 9:00 179' - TFA 3:00 224' - TBA 2:00 237' - TFA 9:00 243' - TFA 3:00 301' - TFA 9:00 306' - TFA 3:00 361' - TFA 9:00 367' - TFA 3:00 422' - TFA 9:00 428' - TFA 3:00		LINE
185	6/28/2006	**5708-5707**	5708	5707	535	Primrose Ave	Downstream	6	VCP		3' - Roots fine lateral 9' - Crack Multiple 18' - Roots fine joint 117' - Roots fine joint 136' - Roots fine joint 136' - Fracture Multiple 146' - Fracture Multiple 148' - Roots fine lateral 151' - Grease deposits 194' - Joint separated medium 218' - DEPOSITS 247' - Roots fine lateral 306' - FRACTURE 372' - Fracture 377' - Fracture 501' - FRACTURE	3' - TFA 9:00 46' - TFA 9:00 56' - TFA 3:00 96' - TFA 9:00 98' - TFA 3:00 145' - TFA 9:00 148' - TFA 3:00 195' - TFA 9:00 197' - TFA 3:00 247' - TFA 9:00 249' - TFA 3:00 299' - TFA 9:00 301' - TFA 3:00 351' - TFA 9:00 353' - TFA 3:00 401' - TFA 9:00 402' - TFA 2:00 452' - TFA 9:00 454' - TFA 3:00		LINE
186	6/26/2006	**5710-5707**	5710	5707	331	Melrose St	Downstream	8	VCP	Roots throughout pipe; **UPSIZE TO 12" (CAPACITY ISSUE)**	7' - Fracture Multiple 9' - Fracture 9' - Roots fine joint 12' - Grease 198' - Roots fine joint 247' - Surface corrosion in lateral 326' - Fracture	12' - TBA 12:00 79' - TBI 12:00 97' - TFC 9:00 129' - TBA 12:00 168' - TBA 12:00 248' - TBA 12:00 264' - TFC 9:00		**UPSIZE TO 12" (CAPACITY ISSUE)**

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
187	6/27/2006	**5709-5708**	5709	5708	250	Alley Parallel to Bradford Ave	Upstream	6	VCP	Roots throughout pipe; CAST IRON BELL at US end of pipe; NO ACCESS TO US MH 5709	12' - Joint offset medium 20' - Roots fine joint 80' - Roots medium lateral 25% 99' - Grease 105' - Crack 110' - Joint offset medium 115' - FRACTURE Multiple 115' -Roots medium barrel 124' - Fracture 125' - Joint offset medium 135' - Roots fine joint 148' - Joint offset medium 176' - Joint offset medium 187' - Crack 205' - Crack 211' - Fracture Multiple 215' - Material change to Cast Iron bell	80' - TBA 2.00 86' - TFC 2.00 115' - TFA 2.00 173' - TFC 2.00 188' - TBI 10:00 209' - TBA 12:00 211' - TBA 10:00 213' - TBA 10:00	215' - Excavate dead end and replace with MH or cleanout after lining	LINE & TRIM INTRUDING
188	6/26/2006	**5712-5711**	5712	5711	375	Orange Grove Ave	Downstream	8	VCP	Roots throughout pipe; **UPSIZE TO 12" (CAPACITY ISSUE)**	14' - Crack Multiple 14' - Grease 54' - Fracture 71' - Roots fine joint 87' - Roots fine joint 115' - ROOTS 126' - Fracture 154' - Fracture 154' - ROOTS 186' - ROOTS medium lateral 15% 189' - Roots fine lateral 216' - Roots fine joint 239' - Roots fine joint 369' - Fracture Multiple	101' - TFA 3:00 134' - TFA 9:00 186' - TFA 9:00 189' - TFA 3:00 209' - TFA 9:00 240' - TFA 3:00 286' - TFA 9:00 288' - TFA 3:00 337' - TFA 9:00 342' - TFA 3:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
189	6/26/2006	**5711-5710**	5711	5710	305	Orange Grove Ave	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	8' - Grease 12' - Crack 14' - Fracture Multiple 68' - Roots fine joint 73' - Roots fine joint 107' - Grease 112' - Roots fine lateral 115' - Roots fine lateral 163' - Roots fine joint 163' - Crack 243' - Roots fine joint 263' - Roots fine joint 297' - Crack	13' - TFA 9:00 15' - TFA 3:00 69' - TFA 3:00 74' - TFA 9:00 112' - TFA 9:00 115' - TFA 3:00 142' - TBA 9:00 162' - TFA 9:00 164' - TFA 3:00 177' - TFA 9:00 216' - TFA 3:00 264' - TFA 3:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
190	6/21/2006	**5714-5713**	5714	5713	320	Bradford Ave	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	4' - Fracture Multiple 24' - Grease 93' - Grease 128' - Crack 190' - Fracture 297' - Fracture 319' - Roots fine joint 319' - Fracture Multiple	12' - TBA 3:00 259' - TBA 2:00 289' - TBA 3:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
191	6/21/2006	**5713-5712A**	5713	5712A	95	Bradford Ave	Downstream	8	VCP	Roots throughout pipe; **UPSIZE TO 12" (CAPACITY ISSUE)**	2' - Fracture 3' - Roots fine lateral 5' - Roots fine joint 13' - Roots fine joint 17' - Roots fine lateral 26' - Water level sag 34' - Water level sag 34' - Grease 46' - Water level sag 70' - Water level sag 75' - Fracture Multiple 93' - Crack 93' - Roots Fine Joint	3' - TBA 12:00 17' - TFC 3:00 25' - TBA 3:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
192		**5712A-5712**	5712A	5712	315	Bradford Ave				**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
192	6/21/2006	**5715-5714**	5715	5714	330	Bradford Ave	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	8' - Water level sag 42' - Fracture Multiple 74' - Water level sag 81' - Fracture Multiple 145' - Grease 206' - Fracture 232' - Grease 277 - Fracture Multiple 295' - Grease 303' - Fracture 310' - Fracture Multiple 328' - Fracture Multiple	40' - TFA 3:00 124' - TBA 3:00 319' - TBA 2:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
193	6/20/2006	**3911-5715**	3911	5715	332	Bradford Ave	Downstream	8	VCP	Roots throughout pipe; **UPSIZE TO 12" (CAPACITY ISSUE)**	2' - Fracture Multiple 38' - Roots fine joint 38' - Joint offset medium 70' - Grease 99' - Roots fine joint 125' - Fracture Multiple 189' - Water level sag 172' - Water level sag 176' - Fracture Multiple 202' - Water level sag 214' - Water level sag 262' - Water level sag 280' - Water level sag 290' - Crack multiple 325' - Joint offset medium	155' - TBA 12:00 136' - TBA 12:00 255' - TBA 2:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
194		**6274-6273**	6274	6273	170	Placentia Ave		8		**UPSIZE TO 15" (CAPACITY ISSUE)**				**UPSIZE TO 15" (CAPACITY ISSUE)**
195		**6279-6278**	6279	6278		Center St								NO RECOMMENDATION
196		**6278-6277**	6278	6277		Center St								NO RECOMMENDATION
197		**6288-6275**	6288	6275	480	Placentia Ave		10		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
198		**6289-6288**	6289	6288	20	Placentia Ave								NO RECOMMENDATION
194	7/5/2006	**6282-6294**	6282	6294	100	Melody Ln	Downstream	8	VCP	Fast velocity flow; Camera underwater; **UPSIZE TO 12" (CAPACITY ISSUE)**	3' - Grease deposits 76' - GREASE DEPOSITS	26' - TFA 3:00 46' - TBA 3:00 88' - TFA 2:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
195	7/5/2006	**6294-6281**	6294	6281	50	Melody Ln	Downstream	8	VCP	Fast velocity flow; Camera underwater; ABANDONED SURVEY due to offset joint; **UPSIZE TO 12" (CAPACITY ISSUE)**	10' - Camera underwater 47' - Joint offset large 48' - ABANDONED SURVEY		47' - trench and replace offset joint	**UPSIZE TO 12" (CAPACITY ISSUE)**
196	7/5/2006	**6281-6280**	6281	6280	247	Chapman Ave	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
197	7/5/2006	**6280-5912**	6280	5912	490	Chapman Ave	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
198		**5912-5912A**	5912	5912A	20	Placentia Ave		10		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
199		**5912A-6288**	5912A	6288	50	Placentia Ave		10		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
196	7/3/2006	**5901-5900**	5901	5900	420	Sunset Dr	Downstream	8	VCP		69' - Fracture Multiple 71' - Joint offset large 112' - Crack 131' - Root ball lateral 85% 133' - Crack 143' - Root medium lateral 30% 145' - Crack 201' - Fracture 222' - Crack Multiple 241' - Fracture 377' - Crack 395' - Crack Multiple	7' - TFA 9:00 25' - TFA 3:00 65' - TFC 3:00 71' - TFA 10:00 72' - TFA 3:00 131' - TFA 10:00 143' - TFA 10:00 145' - TFA 2:00 160' - TFA 2:00 200' - TFA 10:00 221' - TFA 3:00 263' - TFA 10:00 278' - TFA 2:00 351' - TFA 3:00 378' - TFA 10:00 393' - TFA 9:00		LINE
197	7/3/2006	**5900-6280**	5900	6280	252	Sunset Dr	Downstream	8	VCP		11' - Grease 87' - Crack 108' - Crack Multiple 112' - Crack 117' - Fracture 123' - Crack Multiple 126' - Crack 169' - Crack	5' - TFA 10:00 58' - TFA 9:00 113' - TFA 9:00 170' - TFA 10:00 191' - TFA 10:00		LINE
198	7/3/2006	**5902-5901**	5902	5901	97	Sunset Dr	Upstream	8	VCP		1' - Fracture Multiple 4' - Grease deposits 75' - Grease deposits		1' - line over fracture	IN-SITU POINT REPAIR & CLEAN
199	7/3/2006	**5903-5902**	5903	5902	182	Placentia Ave	Downstream	8	VCP		3' - Grease deposits 96' - Joint offset medium 157' - Crack	142' - TFA 3:00		CLEAN & RE-INSPECT
200	7/3/2006	**5904-5903**	5904	5903	30	Placentia Ave	Upstream	8	VCP		4' - Grease deposits			CLEAN & RE-INSPECT
201	7/3/2006	**5905-5904**	5905	5904	346	Placentia Ave	Downstream	8	VCP		2' - Grease deposits 236' - Roots medium joint	335' - TFA 9:00		CLEAN & RE-INSPECT
202	6/29/2006	**5906-5905**	5906	5905	380	Placentia Ave	Downstream	8	VCP		8' - Grease deposits 313' - Roots Fine Lateral 372' - Joint offset medium	36' - TFA 9:00 103' - TFA 9:00 176' - TFA 9:00 247' - TFA 9:00 313' - TFA 9:00		NO REPAIR
203	6/29/2006	**5907-5905**	5907	5905	277	Harmony Ln	Downstream	8	VCP		15' - Deposits 75' - Deposits 141' - Deposits 171' - Deposits 229' - Deposits 273' - Deposits	14' - TFA 9:00 63' - TFA 9:00 144' - TFA 9:00 228' - TFA 9:00		CLEAN & RE-INSPECT
204	6/29/2006	**5909-5907**	5909	5907	260	Harmony Ln	Downstream	8	VCP		11' - Grease 89' - Obstacle Construction Debris 159' - Grease deposits 257' - Water level sag	14' - TFA 9:00 60' - TFA 9:00 131' - TFA 9:00 204' - TFA 9:00		CLEAN & RE-INSPECT
205	6/29/2006	**5908-5907**	5908	5907	241	Moonbeam Dr	Downstream	8	VCP		36' - Grease deposits	7' - TFA 9:00 9' - TFA 3:00 19' - TFA 9:00 27' - TFA 3:00 105' - TFA 3:00 108' - TFA 9:00 175' - TFA 9:00 177' - TFA 3:00		NO REPAIR
206	6/29/2006	**5911-5910**	5911	5910	182	Stardust Dr	Downstream	8	VCP		8' - Grease 131' - Grease 149' - Fracture	8' - TFA 9:00 11' - TFA 3:00 51' - TFA 3:00 77' - TFA 9:00 128' - TFA 3:00 154' - TFA 9:00		NO REPAIR

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
207	6/29/2006	**5910-5909**	5910	5909	227	Stardust Dr	Downstream	8	VCP		20' - Grease	21' - TFA 3:00 40' - TFA 9:00 94' - TFA 3:00 108' - TFA 9:00 164' - TFA 3:00 197' - TFA 9:00		NO REPAIR
208	7/5/2006	**5979-6293**	5979	6293	120	Melody Ln	Downstream	8	VCP		4' - Fracture 4' - Joint offset medium 8' - Grease 12' - Fracture Multiple 40' - Crack 43' - Crack 52' - Crack Multiple 67' - Crack Multiple 110' - Crack	5' - TFA 9:00		LINE
209		**5978-5979**	5978	5979		Melody Ln								NO RECOMMENDATION
209	6/29/2006	**5957-5956**	5957	5956	133	Twilight St	Downstream	8	VCP		4' - Roots fine joint 6' - Roots 11' - Grease 37' - Fracture 37' - Roots fine joint 38' - Roots fine lateral 49' - Crack 91' - Fracture 119' - Grease	5' - TFC 3:00 38' - TBA 3:00 50' - TFA 3:00		LINE
210	7/3/2006	**5963-5956**	5963	5956	161	Melody Ln	Downstream	8	VCP		2' - Crack Multiple 43' - Fracture 134' - Crack Multiple 157' - Grease deposits	18' - TFA 2:00 27' - TFA 2:00 84' - TFA 2:00 111' - TFC 2:00		LINE
211	7/3/2006	**5956-5978**	5956	5978	330	Melody Ln	Downstream	8	VCP		3' - Grease 4' - Crack Multiple 11' - Crack 17' - Crack 35' - Crack Multiple 59' - Crack Multiple 87' - Crack 139' - Crack Multiple 229' - Crack Multiple 289 - Crack 304' - Crack Multiple 310' - Crack 314' - Crack 329' - Crack	113' - TFA 9:00 146' - TFA 10:00 160' - TFA 2:00 233' - TFA 2:00 260' - TFA 10:00 274' - TFA 10:00		LINE
212	7/5/2006	**6285-5956**	6285	5956	173	Twilight St	Downstream	8	VCP		16' - Grease 21' - Crack Multiple 42' - Crack 106' - Crack Multiple 121' - Crack	8' - TFA 3:00 22' - TFA 9:00 43' - TFA 3:00 61' - TFA 3:00 67' - TFC 10:00 113' - TBA 3:00 152' - TFC 3:00		LINE
213	6/29/2006	**5964-5963**	5964	5963	204	Melody Ln	Downstream	8	VCP		14' - Crack Multiple 27' - Fracture 74' - Grease 157' - Fracture Multiple 164' - Fracture Multiple 178' - Fracture 201' - Fracture	10' - TFA 9:00 12' - TFA 3:00 53' - TFA 3:00 55' - TFA 9:00 129' - TFA 9:00 132' - TFA 3:00		LINE
214	6/27/2006	**5959-5959A**	5959	5959A	180	Twilight St	Downstream	8	VCP			74' - TFA 3:00 82' - TFA 3:00		CLEAN & RE-INSPECT
215	6/29/2006	**5959A-5957**	5959A	5957	117	Twilight St	Downstream	8	VCP		3' - Fracture 3' - Roots Fine Barrel 5' - Roots Fine Joint 5' - Fracture Multiple 6' - Root Ball Lateral (55%) 7' - Roots Medium Joint (25%) 12' - Grease 28' - Roots Fine Joint 32' - ROOTS Medium Joint (25%) 33' - Root ball lateral 35' - Roots Fine Barrel 49' - Roots Medium Joint (25%) 57' - Roots Medium lateral 80' - Roots Medium Joint (30%) 107' - Fracture Multiple	6' - TFA 9:00 8' - TFA 3:00 33' - TFA 9:00 57' - TFA 3:00 108' - TFA 3:00		LINE
216	6/27/2006	**5961-5959**	5961	5959	270	Twilight St	Downstream	8	VCP		99' - Crack Multiple	40' - TFA 3:00 49' - TFA 3:00 162' - TFA 3:00 222' - TFA 3:00 231' - TFA 3:00	99' - line over crack	IN-SITU POINT REPAIR
217	6/27/2006	**5960-5959**	5960	5959	159	Wilson Circle	Upstream	6	VCP			79' - TFA 9:00 81' - TFA 3:00 94' - TFA 9:00 135' - TFA 3:00 154' - TFA 3:00		NO REPAIR
218	6/27/2006	**5962-5961**	5962	5961	159	Orchid Cricle	Upstream	6	VCP		55' - Roots Fine Joint 85' - Roots Fine Joint 88' - Roots Fine Joint	75' - TFC 9:00 85' - TFA 3:00 94' - TFA 9:00 135' - TFA 3:00 155' - TFA 3:00 157' - TFA 9:00 159' - Cleanout Main		CLEAN & RE-INSPECT
219	6/27/2006	**5976-5977**	5976	5977	66	Sunrise St	Downstream	8	VCP			35' - TFA 9:00		NO REPAIR
220	6/27/2006	**5977-5978**	5977	5978	101	Sunrise St	Downstream	8	VCP			35' - TFA 9:00		NO REPAIR
221	6/27/2006	**5974-5975**	5974	5975	411	Sunrise St	Downstream	8	VCP			54' - TFA 9:00 66' - TFA 9:00 177' - TFA 9:00 235' - TFA 9:00 246' - TFA 9:00 361' - TFA 9:00		CLEAN & RE-INSPECT
222	6/27/2006	**5975-5976**	5975	5976	230	Sunrise St	Downstream	8	VCP			13' - TFA 9:00 23' - TFA 9:00 76' - TFA 9:00 134' - TFA 9:00		CLEAN & RE-INSPECT
223	7/5/2006	**5913-5973**	5913	5973	50	Sunrise St	Downstream	8	VCP	Fast velocity sewage; **UPSIZE TO 12" (CAPACITY ISSUE)**	3' - Grease			**UPSIZE TO 12" (CAPACITY ISSUE)**
224	7/5/2006	**5973-6282**	5973	6282	80	Melody Ln	Downstream	8	VCP	Fast velocity sewage; Camera underwater; **UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE)**
225	7/3/2006	**5914-5913**	5914	5913	90	Sunrise St	Downstream	8	VCP	Fast velocity sewage; Camera underwater; Water level 50%; **UPSIZE TO 12" (CAPACITY ISSUE)**	3' - Grease 50' - Roots Fine Joint 57' - Crack 12:00 66' - Crack Multiple	28' - TFA 3:00 67' - TFA 3:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
226	7/3/2006	**5915A-5914**	5915A	5914	81	Sunrise St	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	5' - Grease deposits 11' - Crack Multiple	55' - TFA 3:00 73' - TFA 10:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
227	7/3/2006	**5915-5915A**	5915	5915A	193	Sunrise St	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	4' - Grease 5' - Crack 10' - Debris in lateral 184' - Grease Deposits	9' - TFA 2:00 15' - TFA 10:00 24' - TFA 9:00 75' - TFA 3:00 78' - TFA 9:00 83' - TFA 3:00 135' - TFA 9:00		**UPSIZE TO 12" (CAPACITY ISSUE)**
228	6/29/2006	**5916-5915**	5916	5915	438	Sunrise St	Downstream	8	VCP	**UPSIZE TO 10" (CAPACITY ISSUE)**	8' - Depositis grease 22' - Roots medium lateral 26' - Crack Multiple 26' - Roots Fine Joint 56' - GREASE DEPOSITS 60' - Roots Fine Joint 63' - Roots Fine Joint 75' - Roots Fine Joint 78' - Water level sag 80' - Fracture Multiple 80' - Roots Fine Joint 82' - Root ball lateral 55% 89' - Water level sag 93' - Roots medium lateral 15% 109' - Roots Fine Joint 126' - Water level sag 131' - Fracture 141' - Grease deposits 153' - Water level sag 180' - Water level sag 196' - Water level sag 200' - Fracture Multiple 206' - Fracture 265' - Grease Deposits 271' - Fracture Multiple 292' - Crack Multiple 307' - Crack	22' - TFA 9:00 76' - TFA 3:00 82' - TFA 9:00 87' - TFA 3:00 93' - TFA 9:00 198' - TFA 3:00 204' - TFA 9:00 207' - TFA 3:00 261' - TFA 9:00 263' - TFA 3:00 272' - TFA 9:00 385' - TFA 3:00 387' - TFA 9:00		**UPSIZE TO 10" (CAPACITY ISSUE)**
229	6/28/2006	**5917-5916**	5917	5916	108	Sunrise St	Downstream	8	VCP	**UPSIZE TO 10" (CAPACITY ISSUE)**	5' - Fracture 6' - Fracture 8' - Grease Deposits 41' - Grease Deposits 81' - Fracture 81' - Water level sag 99' - Water level sag	82' - TFA 3:00		**UPSIZE TO 10" (CAPACITY ISSUE)**
230	6/28/2006	**5918-5917**	5918	5917	86	Cudesac on Sunrise St and Sunrise Way	Upstream	6	VCP	Camera underwater	9' - Grease 26' - Water level sag 79' - Camera Underwater 86' - Grease Deposits 88' - Cleanout	47' - TFA 9:00 59' - TFA 3:00 65' - TFA 3:00		CLEAN & RE-INSPECT
231	6/28/2006	**5919-5917**	5919	5917	98	Sunrise Way	Downstream	8	VCP	**UPSIZE TO 10" (CAPACITY ISSUE)**	2' - Grease deposits 40' - Fracture 59' - Water level sag	5' - TFA 3:00 17' - TFA 9:00		**UPSIZE TO 10" (CAPACITY ISSUE)**
232	6/28/2006	**5920-5919**	5920	5919	177	Sunrise Way	Downstream	8	VCP	**UPSIZE TO 10" (CAPACITY ISSUE)**	5' - Fracture Multiple 5' - Grease 51' - Crack 78' - Grease deposits 103' - Water level sag 108' - Water level sag 123' - Fracture Multiple 144' - Grease deposits 150' - Crack	70' - TFA 3:00 100' - TFA 9:00 136' - TFA 3:00		**UPSIZE TO 10" (CAPACITY ISSUE)**

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
233	6/28/2006	**5921-5920**	5921	5920	269	Twilight St	Downstream	8	VCP	**UPSIZE TO 10" (CAPACITY ISSUE)**	4' - Fracture 9' - Fracture Multiple 27' - Water level sag 53' - Water level sag 53' - Grease 68' - Water level sag 107' - Fracture Multiple 115' - Grease deposits 127' - Crack 130' - Crack 144' - Fracture Multiple 163' - Water level sag 163' - Grease deposits 233' - Grease 244' - Crack	179' - TFA 9:00 190' - TFA 9:00		**UPSIZE TO 10" (CAPACITY ISSUE)**
234	6/26/2006	**5946-5921**	5946	5921	290	Primrose Ave	Downstream	8	VCP		6' - Grease 35' - Fracture Multiple 46' - Grease 77' - Fracture Multiple 87' - Fracture Multiple 91' - Fracture 102' - Grease Deposits 140' - Fracture 150' - Fracture Multiple 153' - Water level sag 155' - Hole Soil Visible 161' - Water level sag 219 - Fracture 222' - Fracture Multiple 245' - Fracture Multiple 248' - Crack Multiple 285' - Hole Soil Visible 285' - Water level sag	16' - TFC 9:00 76' - TFC 9:00 82' - TFA 9:00 94' - TFA 9:00 122' - TFC 3:00 134' - TFC 9:00 181' - TFA 9:00 204' - TFC 3:00 240' - TFA 9:00		LINE
235	6/26/2006	**5947-5946**	5947	5946	114	Primrose Ave	Downstream	8	VCP			11' - TFA 9:00 23' - TFA 3:00 36' - TFA 3:00 73' - TFA 9:00		CLEAN & RE-INSPECT
236	6/26/2006	**5948-5946**	5948	5946	335	Diamond Rd	Downstream	8	VCP		52' - Water level sag 117' - Grease 124' - Water level sag 151' - Water level sag 161' - Grease 175' - Water level sag 198' - Water level sag 200' - Grease 269' - Grease 323' - Grease 331' - Water level sag 332' - Fracture	16' - TFA 3:00 24' - TFA 3:00 52' - TFA 9:00 89' - TFA 3:00 157' - TFA 9:00 166' - TFA 9:00 187' - TFA 3:00 204' - TFA 3:00 252' - TFA 3:00 314' - TFA 3:00	332' - line over fracture	IN-SITU POINT REPAIR & CLEAN
237	6/26/2006	**5949-5948**	5949	5948	65	Orange Grove Ave	Downstream	8	VCP		3' - Water level sag 13' - Grease 54' - Grease 57' - Water level sag	21' - TFA 3:00		CLEAN & RE-INSPECT
238	6/26/2006	**5950-5949**	5950	5949	153	Orange Grove Ave	Downstream	8	VCP			8' - TFA 3:00 11' - TFA 9:00 24' - TFA 9:00 31' - TFA 3:00 74' - TFA 3:00		NO REPAIR
239		**5951-5949**	5951	5949		Diamond Rd								NO RECOMMENDATION
239	7/21/2006	**6405-6404**	6405	6404	250	Alta Street	Upstream	8	VCP	GREASE ON LENSE				NO RECOMMENDATION
Duplicate Pipe	7/21/2006	**6405-6404**	6405	6404	250	Alta Street	Downstream	8	VCP	ABANDONED SURVEY at 104' inside structure with two parallel sewers. Recommend investigation into sewer configuration to facilitate future cleaning and maintenance	76' - Joint Seperated Large 104' - DOUBLE PIPE (main one pipe capped) 104' - ABANDONED SURVEY			INVESTIGATE DOUBLE PIPE AT 104' FROM MH 6405
240		**6404-6403**	6404	6403		Parallel to railroad								NO RECOMMENDATION
240	7/21/2006	**6406-6405**	6406	6405	345	Alta Street	Downstream	8	VCP	Seperators between pipe joints	176' - Grease 236' - Joint separated large 253' - Joint separated medium 303' - Joint seperated medium 309' - Joint separated large 337' - Joint offset medium	26' - TFA 10:00 99' - TFA 10:00 112' - TFA 10:00 212' - TFA 10:00 224' - TFA 10:00		NO REPAIR
241	7/21/2006	**6407-6405**	6407	6405	329	Backs Ln	Downstream	8	VCP	Seperators between pipe joints; ABANDONED SURVEY due to debris	75' - Joint seperated large 130' - Water level sag 138' - Water level sag 138' - Joint seperated large 293' - Joint offset medium 297' - Water level sag 329' - ABANDONED SURVEY	35' - TFA 10:00 104' - TFA 2:00 145' - TFA 2:00 151' - TFA 10:00 191' - TFA 10:00 287' - TFA 10:00		CLEAN & RE-INSPECT
Duplicate Pipe	7/21/2006	**6407-6405**	6407	6405	11	Backs Ln	Downstream	8	VCP		7' - Water level sag 12' - ABANDONED SURVEY			CLEAN & RE-INSPECT
242	7/21/2006	**6408-6407**	6408	6407	355	Backs Ln	Downstream	8	VCP	Seperators between pipe joints	45' - Joint seperated medium 103' - Joint seperated medium 113' - Crack 113' - Roots Fine Barrel	16' - TFA 10:00 52' - TFA 10:00 103' - TFA 2:00 149' - TFA 2:00 173' - TFA 10:00 213' - TFA 10:00 282' - TFA 2:00 327' - TFA 2:00 340' - TFA 10:00		CLEAN & RE-INSPECT
243	7/21/2006	**6408A-6408**	6408A	6408	275	Backs Ln	Downstream	8	VCP		17' - Crack 62' - Crack	10' - TFA 2:00 11' - TFA 10:00 74' - TFA 2:00 125' - TFA 10:00 160' - TFA 10:00 201' - TFA 2:00 252' - TFA 2:00		CLEAN & RE-INSPECT
244		**6409-9408A**	6409	9408A		Backs Ln								NO RECOMMENDATION
244	10/16/2006	**8722-8719**	8722	8719	275	Orangethorpe Ave	Downstream	8	VCP	ABANDONED SURVEY;	18' - Grease 82' - Grease 111' - Water level sag 128' - Water level sag 158' - Water level sag 186' - Grease 253' - Water level sag 276' - Hole Soil Visible 276' - Joint Large Offset 276' - ABANDONED SURVEY	70' - TFC 9:00 73' - TBA 9:00 197' - TFC 9:00	276' - trench and replace large offset	EXCAVATION POINT REPAIR
245	8/18/2006	**8740-8722**	8740	8722	135	Orangethorpe Ave	Downstream	8	VCP		92' - Roots fine joint			NO REPAIR
246	8/18/2006	**8724-8723**	8724	8723	25	Orangethorpe Ave	Upstream	8	VCP					NO REPAIR
247	8/18/2006	**8723-8740**	8723	8740	155	Orangethorpe Ave	Downstream	8	VCP			52' - TBA 10:00 56' - TFC 10:00		NO REPAIR
248		**8504-8502**	8504	8502		Orangethorpe Ave								NO RECOMMENDATION
249		**8502-8500**	8502	8500		Orangethorpe Ave								NO RECOMMENDATION
248	8/14/2006	**8522-8521**	8522	8521	20	Orangethorpe Ave	Upstream	8	VCP		8' - WL 5%			NO REPAIR
249	8/14/2006	**8409A-8522**	8409A	8522	355	Orangethorpe Ave	Downstream	8	VCP		221.2' - WL 15% 280' - WL 5%	5.6' - TFA 9:00 148.5' - TFA 9:00 256.2' - TFA 9:00 258.6' - TFA 9:00		NO REPAIR
250	8/14/2006	**8409-8409A**	8409	8409A	30	Orangethorpe Ave	Downstream	8	VCP		8' - WL 5%			NO REPAIR
251	10/16/2006	**8736-8735**	8736	8735	267	Orangethorpe Ave	Downstream	12	VCP	**UPSIZE TO 15" (CAPACITY ISSUE)**	2.0' - CC 7:00-2:00 2.0' - LR 30% 8.0' - WL 40% 15.3' - MCU 19.5' - JOM 164.1' - JOM 164.2' - MCU 183.5' - WL 15% 207.1' - WL 35% 219.5' - WL 15% 258.1' - WL 25%			**UPSIZE TO 15" (CAPACITY ISSUE**
252	10/16/2006	**8737-8736**	8737	8736	146	Orangethorpe Ave	Downstream	12	VCP	**UPSIZE TO 15" (CAPACITY ISSUE)**	8.0' - WL 15% 13.6' - WL 35% 41.8' - MCU 80.4' - WL 30% 80.4' - DNF 5% 110.4' - RFI 111.1 - WL 15% 120.6' - WL 35% 135.6' - MCU			**UPSIZE TO 15" (CAPACITY ISSUE**
253	10/16/2006	**8501-8739**	8501	8739	350	Orangethorpe Ave	Downstream	12	VCP	**UPSIZE TO 15" (CAPACITY ISSUE)**	4.0 - WL 50% 4.0 - MCU 62.9' - MCU 66.5' - ML 30% 66.8' - DNF 5% 92.1' - WL 20% 104.8' - WL 10% 121.8' - WL 20% 144.8' - DNF 5% 183.3' - WL 30% 199.0' - WL 40% 206.3' - MCU 244.4' - MCU 314.2' - WL 15% 320.0 - DAGS 3:00-9:00 10% 347.3' - DAGS 3:00-9:00 10%			**UPSIZE TO 15" (CAPACITY ISSUE**
254		**8527-8526**	8527	8526		Alley between Ridgelake Dr and Porter Way								NO RECOMMENDATION
255		**8528-8527**	8528	8527		Alley between Ridgelake Dr and Porter Way								NO RECOMMENDATION
256		**8529-8528**	8529	8528		Alley between Ridgelake Dr and Porter Way								NO RECOMMENDATION
254	8/10/2006	**8510-8509**	8510	8509	35	Temple St	Downstream	8	Cast Iron	**UPSIZE TO 12" (CAPACITY ISSUE)**	Material Change from Cast Iron to VCP @ 15' Grade Break @ 30' causing water level to drop from ~50% upstream to ~10% downstream	25'-TFC 12:00		**UPSIZE TO 12" (CAPACITY ISSUE**
255	8/10/2006	**8511-8510**	8511	8510	199	Temple St	Downstream	8	VCP		8'-Grease 188'-Grease			CLEAN & RE-INSPECT
256	10/9/2006	**8515-8510**	8515	8510	270	Orangethorpe Ave	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	4-36'-Minor Sag 45'-Sag bagins 60'-Sag ends Sags throughout line			**UPSIZE TO 12" (CAPACITY ISSUE**
257	8/10/2006	**8512-8511**	8512	8511	310	Temple St	Downstream	8	VCP		None	None		NO REPAIR
258	8/10/2006	**8513-8512**	8513	8512	285	Temple St	Downstream	8	VCP		Small Sag at 68' 90'-Multiple Fractures (Severe)	None	90' - line over fracture	IN-SITU POINT REPAIR
259	8/10/2006	**8514-8513**	8514	8513	265	Temple St	Upstream	8	VCP		Large offset joint @ 227' ABANDONED SURVEY @ 227'	228'-TFA 9:00	227' - trench and replace large offset and reconnect lateral	EXCAVATION POINT REPAIR
Duplicate Pipe	8/10/2006	**8514-8513**	8514	8513	265	Temple St	Downstream	8	VCP		Large offset joint @ 38' ABANDONED SURVEY @ 42'			EXCAVATION POINT REPAIR AND LINE

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
260	8/10/2006	**6445-8514**	6445	8514	167	Temple St	Upstream	8	VCP		Large offset joint @ 135' 163'-Grease		135' - trench and replace large offset and reconnect lateral	EXCAVATION POINT REPAIR
261	10/9/2006	**8516-8515**	8516	8515	265	Orangethorpe Ave	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	Minor sags throughout line			**UPSIZE TO 12" (CAPACITY ISSUE**
262	10/9/2006	**8517-8516**	8517	8516	167	Partridge St	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	Sag 45'- 131'	11'-TFA 3:00 35'-TFA 9:00 42'-TFA 3:00 119'-TFA 3:00		**UPSIZE TO 12" (CAPACITY ISSUE**
263	10/9/2006	**8518-8517**	8518	8517	300	Partridge St	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	Terrible focus on video. Hard to see anything.	40'-TFA 9:00 77'-TFA 3:00 103'-TFA 3:00 122'-TFA 9:00 148'-TFA 9:00 201'-TFA 3:00 226'-TFA 9:00 233'-TFA 3:00		**UPSIZE TO 12" (CAPACITY ISSUE**
264	8/18/2006	**8519-8518**	8519	8518	300	Partridge St	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	None	5'-TFA 3:00 46'-TFA 9:00 64'-TFA 3:00 106'-TFA 9:00 125'-TFA 3:00 167'-TFA 9:00 186'-TFA 3:00 227'-TFA 9:00 262'-TFA 3:00 292'-TFA 3:00 300'-TFA 9:00		**UPSIZE TO 12" (CAPACITY ISSUE**
265	8/18/2006	**6446-8519**	6446	8519	345	Partridge St	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	Sags throughout line. Poor construction overall. 254'-Joint Offset Medium	15'-TFA 9:00 50'-TFA 3:00 86'-TFA 9:00 128'-TFA 3:00 164'-TFA 3:00 177'-TFA 9:00 201'-TFA 9:00 237'-TFA 3:00 273'-TFA 3:00 280'-TFA 9:00 338'-TFA 9:00		**UPSIZE TO 12" (CAPACITY ISSUE**
266	8/18/2006	**6448-6446**	6448	6446	70	Partridge St	Upstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	52'-Joint Offset Medium	3'-TFA 3:00		**UPSIZE TO 12" (CAPACITY ISSUE**
267	8/18/2006	**6449-6448**	6449	6448	60	Cardinal St	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	21'- Grease deposits 29' - GREASE DEPOSITS48' - Grease			**UPSIZE TO 12" (CAPACITY ISSUE**
268	8/18/2006	**6450-6449**	6450	6449	307	Cardinal St	Downstream	8	VCP	**UPSIZE TO 12" (CAPACITY ISSUE)**	Varying WL from the beginning. Sags throughout. Poor construction. 180'-Joint Offset Medium 305'-Circumferental Fracture, roots	181'-TBA 12:00	305' - line over fracture	**UPSIZE TO 12" (CAPACITY ISSUE**
269	7/21/2006	**6451-6450**	6451	6450	150	Crowther Ave	Downstream	8	VCP	UNDER RAILROAD; **UPSIZE TO 12" (CAPACITY ISSUE)**	Sags throughout line. Poor construction. Alignment down @ 30', causes big hydraulic jump. Camera underwater @ 46', back up at 70' Another sag at 120'			**UPSIZE TO 12" (CAPACITY ISSUE**
270	7/21/2006	**6452-6451**	6452	6451	285	Molokai Dr	Downstream	8	VCP		4'-Offset Joint Multiple Sags Present. Lots of small hydraulic jumps due to poor sewer construction as well.	112'-TFA 3:00 175'-TFA 3:00 222'-TFA 3:00		NO REPAIR
271	7/16/2006	**6467-6451**	6467	6451	210	Molokai Dr	Downstream	8	VCP			53' - TFA 9:00 106' - TFA 10:00 153'-TFA 10:00		NO REPAIR
272	7/21/2006	**6453-6452**	6453	6452	250	Molokai Dr	Downstream	8	VCP		37'-Sag (~10" long) Other minor sags throughout due to poor construction 240'-Longitudinal fracture	51'-TFA 3:00 99'-TFA 3:00 147'-TFA 3:00 205'-TFA 3:00	240' - line over fracture	IN-SITU POINT REPAIR
273	7/21/2006	**6662-6453**	6662	6453	350	Lanai Ln	Downstream	8	VCP		Minor Hydraulic flow level modulations due either to minor sags or poor sewer construction throughout. 354'-Circumferential crack	54'-TFA 3:00 111'-TFA 3:00 164'-TFA 3:00 222'-TFA 3:00	354' - line over crack	IN-SITU POINT REPAIR
274	7/19/2006	**6454A-6454**	6454A	6454	80	Oahu Way	Downstream	8	VCP		None	7'-TFA 9:00 49'-TFA 9:00		NO REPAIR
275	7/19/2006	**6455-6454**	6455	6454	105	Oahu Way	Downstream	8	VCP		None	21'-TFA 3:00 91'-TFA 3:00 95'-TFA 3:00		NO REPAIR
276	7/19/2006	**6454-6662**	6454	6662	355	Hawaii Way	Downstream	8	VCP		98'-Sag 300'-338'-Poor Construction	49'-TFA 3:00 106'-TFA 3:00 154'-TFA 3:00 218'-TFA 3:00 327'-TFA 9:00		NO REPAIR
277	7/20/2006	**6456-6455**	6456	6455	350	Oahu Way	Downstream	8	VCP		33'-Alignment Left 285'-Intruding Sealing Ring Hanging	163'-TFA 3:00 181'-TFA 9:00 224'-TFA 3:00 266'-TFA 3:00	285-Trim joint seal	TRIM INTRUDING
278	7/20/2006	**6457-6456**	6457	6456	140	Chapman Ave	Downstream	8	VCP		140'-Alignment down			NO REPAIR
279	7/20/2006	**6458-6457**	6458	6457	50	Chapman Ave	Downstream	8	VCP		2'-Alignment right			NO REPAIR
280	7/19/2006	**6466-6467**	6466	6467	255	Molokai Dr	Downstream	8	VCP		122'-Alignment right 129'-Alignment left	14'-TFA 9:00 71'-TFA 9:00 123'-TFA 9:00		NO REPAIR
281	7/19/2006	**6465-6466**	6465	6466	315	Kauai Ln	Downstream	8	VCP		81'-"Intruding Sealing Ring Hanging" (or root?) 160'-Intruding Sealing Ring Hanging 202'-More of the weird rubbery looking solid infiltrating into the sewer from the joint, called out as "Intruding Sealing Ring Hanging"	24'-TFA 9:00 87'-TFA 9:00 135'-TFA 9:00 192'-TFA 9:00		TRIM INTRUDING
282	7/19/2006	**6464-6465**	6464	6465	310	Kauai Ln	Downstream	8	VCP		46'-Alignment left 40'-Alignment right 207'-Roots fine joint 230'-Roots fine barrel	113'-TFA 9:00 180'-TFA 9:00 228'-TFA 9:00 286'-TFA 9:00		NO REPAIR
283	7/19/2006	**6463-6464**	6463	6464	310	Maui Dr	Downstream	8	VCP		None	7'-TFA 9:00 54'-TFA 10:00 102'-TFA 10:00 215'-TFA 9:00 226'-TFA 10:00 279'-TFA 10:00 327'-TFA 9:00		NO REPAIR
284		**5746-5747**	5746	5747	279.85	Madison Ave		10		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE**
284	7/10/2006	**5606-5746**	5606	5746	255	Kraemer Blvd	Downstream	10	VCP	**MONITOR A2**	5' - Grease Deposits 5' - Crack 40' - Water level sag			NO REPAIR
285	7/10/2006	**5746-5745**	5746	5745	120	Kraemer Blvd	Downstream	10	VCP	Fast velocity sewage flow	5' - Grease 30' - Fracture 91' - Grease Deposits 106' - GREASE DEPOSITS	80' - TFA 12:00	30' - line over fracture	IN-SITU POINT REPAIR & CLEAN
286		**5749-5748**	5749	5748		Madison Ave								NO RECOMMENDATION
287		**5750-5748**	5750	5748		Madison Ave								NO RECOMMENDATION
288		**5748-5747**	5748	5747		Madison Ave								NO RECOMMENDATION
289		**5747-5751**	5747	5751	335	Madison Ave		10		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE**
290		**5751-5752**	5751	5752	115.75	Madison Ave		10		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE**
291		**5752-5753**	5752	5753	115.75	Madison Ave		10		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE**
292		**5753-5754**	5753	5754	170.34	Madison Ave		10		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE**
293		**5754-3912**	5754	3912	261.36	Madison Ave		10		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE**
294		**3912-3911**	3912	3911	61.85	Madison Ave		10		**UPSIZE TO 12" (CAPACITY ISSUE)**				**UPSIZE TO 12" (CAPACITY ISSUE**
295		**3944-5754**	3944	5754		London Circle								NO RECOMMENDATION
296		**3945-5753**	3945	5753		Derby Circle								NO RECOMMENDATION
286	6/28/2006	**5922-5921**	5922	5921	325	Primrose Ave	Downstream	8	VCP		8' - Fracture Multiple 72' - Fracture 82' - Fracture Multiple 134' - Crack 171' - Fracture Multiple 185' - Fracture 195' - Fracture 204' - Fracture Multiple 217' - ROOTS medium joint 221' - Roots fine joint 251' - Fracture 281' Fracture 300' - Grease 308' - Fracture Multiple	7' - TFA 3:00 70' - TFA 3:00 100' - TFC 9:00 133' - TFA 3:00 196' - TFA 3:00 212' - TFC 9:00 256' - TFA 3:00		LINE
287	6/27/2006	**5923-5922**	5923	5922	474	Sunrise St	Downstream	8	VCP		16' - Fracture 227' - Fracture 293' - Roots medium lateral 352' - Crack 405' - Crack 440' - Grease	17' - TFA 3:00 20' - TFA 9:00 49' - TFA 3:00 52' - TFA 9:00 111' - TFA 3:00 113' - TFA 9:00 173' - TFA 3:00 175' - TFA 9:00 231' - TFA 3:00 234' - TFA 9:00 293' - TFA 3:00 296' - TFA 9:00 351' - TFA 3:00 354' - TFA 9:00 406' - TFA 9:00 409' - TFA 3:00	227' -line over fracture	IN-SITU POINT REPAIR
288	6/28/2006	**5924-5922**	5924	5922	301	Primrose Ave	Downstream	8	VCP		0' - Grease Deposits 45' - Fracture Multiple 45' - Roots fine joint 62' - Water level sag 72' - Water level sag 72' - Roots fine joint 96' - Crack 166' - Crack Multiple 179' - Fracture 220' - Fracture 240' - Fracture 287' - Fracture Multiple	44' - TFA 3:00 118' - TFA 3:00 178' - TFA 3:00 245' - TFA 3:00		LINE
289	6/27/2006	**5925-5924**	5925	5924	472	Stardust Dr	Downstream	8	VCP		3' - Fracture 7' - Crack 8' - Deposits 20' - Fracture 23' - Roots fine joint 57' - Fracture 61' - Fracture 83' - Fracture 120' - Fracture 132' - Roots fine joint 142' - Crack Multiple 155' - Crack 159' - Fracture 161' - Fracture Multiple 171' - Fracture Multiple 222' - Roots fine lateral 386' - FRACTURE 399' - Roots fine joint 426' - Roots fine joint	21' - TFA 3:00 24' - TFA 9:00 50' - TFA 9:00 52' - TFA 3:00 111' - TFA 3:00 121' - TFA 9:00 160' - TFA 9:00 176' - TFA 3:00 222' - TFA 9:00 224' - TFA 3:00 280' - TFA 3:00 303' - TFA 9:00 348' - TFA 3:00 351' - TFA 9:00 427' - TFA 9:00 429' - TFA 3:00		LINE

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
290	6/28/2006	**5926-5924**	5926	5924	286	Primrose Ave	Downstream	8	VCP		10' - Fracture 17' - Fracture Multiple 26' - Fracture Multiple 50' - Fracture Multiple 66' - Roots fine joint 71' - Roots medium lateral 25% 133' - Crack Multiple 133' - Roots fine joint 137' - Roots fine joint 137' - Fracture 143' - Roots fine joint 147' - Roots medium joint 148' - Roots ball lateral 159' - Roots fine joint 159' - Fracture Multiple 183' - Crack 206' - Fracture Circumferential 214' - Roots fine lateral 222' - Fracture 256' - Roots fine joint 279' - Fracture	17' - TFA 3:00 71' - TFA 3:00 148' - TFA 3:00 201' - TFC 9:00 214' - TFA 3:00 274' - TFA 3:00		LINE
291	6/28/2006	**5928-5926**	5928	5926	146	Primrose Ave	Downstream	8	VCP		57' - Roots fine joint 61' - Fracture Multiple 74' - Fracture Multiple 82' - Roots fine barrel 98' - Fracture Multiple 124' - Fracture Multiple 145' - Hole Void Visible	46' - TFA 3:00 102' - TFA 3:00		LINE
292		**5927-5926**	5927	5926		Moonbeam St								NO RECOMMENDATION
292	6/28/2006	**5929-5928**	5929	5928	68	Primrose Ave	Upstream	8	VCP		8' - Grease	23' - TFA 9:00 66' - TFA 9:00 68' - CLEANOUT 12:00		CLEAN & RE-INSPECT
293		**5930-5928**	5930	5928		Alley between Placentia Ave and Moonbeam St								NO RECOMMENDATION
293	6/26/2006	**5932-5931**	5932	5931	261	Alley between Placentia Ave and Moonbeam St	Downstream	8	VCP		8' - Fracture 41' - Roots fine joint 55' - Roots fine barrel 58' - Roots fine joint 79' - Roots fine lateral 147' - Fracture 191' - Fracture	19' - TFA 3:00 79' - TFA 3:00 145' - TFA 3:00 198' - TFA 3:00		LINE
294		**5931-5930**	5931	5930		Alley between Placentia Ave and Moonbeam St								NO RECOMMENDATION
294	6/26/2006	**3812-5932**	3812	5932	246	Alley between Placentia Ave and Moonbeam St	Upstream	8	VCP		3' - Grease deposits 10' - Fracture 43' - Roots fine joint 99' - DEPOSITS 123' - Fracture Multiple 136' - Fracture 162' - Roots fine lateral 179' - Roots fine barrel 243' - Hole Void Visible 243' - Fracture Multiple 243' - Joint offset medium	39' - TFA 9:00 99' - TFA 9:00 162' - TFA 9:00 212' - TFA 9:00		LINE
295	6/26/2006	**5935-5934**	5935	5934	258	Moonbeam St	Downstream	8	VCP		3' - BROKEN PIPE 3' - Fracture Multiple 29' - Fracture Multiple 32' - Crack Multiple 49' - Fracture Multiple 92' - Crack Multiple 96' - Grease 105' - Fracture 109' - Fracture Multiple 109' - Roots fine joint 112' - Roots fine joint 172' - Fracture Multiple 175' - Fracture Multiple 178' - Crack 195' - Roots fine joint	27' - TFA 3:00 30' - TFA 9:00 86' - TFA 3:00 90' - TFA 9:00 146' - TFA 3:00 149' - TFA 9:00 209' - TFA 3:00 212' - TFA 9:00		LINE
296	6/26/2006	**5934-5933**	5934	5933	257	Moonbeam St	Downstream	8	VCP		3' - Fracture 7' - Roots fine joint 11' - Roots medium lateral 25% 37' - FRACTURE multiple 74' - Roots fine lateral 79' - Fracture 103' - Fracture 106' - Fracture 133' - Root medium lateral 248' - FRACTURE	11' - TFA 3:00 14' - TFA 9:00 74' - TFA 3:00 77' - TFA 9:00 130' - TFA 3:00 133' - TFA 9:00 186' - TFA 3:00 190' - TFA 9:00		LINE
297		**5936-5933**	5936	5933		Ruby Dr								NO RECOMMENDATION
298		**5937-5936**	5937	5936		Stardust Dr								NO RECOMMENDATION
299		**5939-5936**	5939	5936		Ruby Dr								NO RECOMMENDATION
300		**5938-5937**	5938	5937		Stardust Dr								NO RECOMMENDATION
301		**5940-5939**	5940	5939		Ruby Dr								NO RECOMMENDATION
297	6/26/2006	**5941-5921**	5941	5921	56	Twilight St	Downstream	8	VCP		24' - Roots fine joint 38' - Crack Multiple			CLEAN & RE-INSPECT
298		**5943-5942**	5943	5942		Twilight St								NO RECOMMENDATION
299		**5942-5941**	5942	5941		Twilight St								NO RECOMMENDATION
298	6/22/2006	**5944-5943**	5944	5943	385	Ruby Drive Elementary	Downstream	8	VCP		3' - Crack 14' - Crack Multiple 40' - Water level sag 48' - Water level sag 51' - Fracture 66' - Fracture 82' - Fracture Multiple 202' - Fracture Multiple 283' - Fracture 290' - Fracture 316' - Fracture 383' - Joint offset medium	10' - TFC 9:00 12' - TFC 3:00 65' - TFC 9:00 71' - TFC 3:00 87' - TBA 12:00 125' - TFC 9:00 130' - TFC 3:00 174' - TBA 12:00 179' - TFC 9:00 184' - TFC 3:00 264' - TBA 9:00 324' - TBA 9:00 327' - TFC 9:00 332' - TFC 3:00		LINE
299	6/22/206	**5945-5944**	5945	5944	405	Ruby Drive Elementary	Downstream	8	VCP		3' - Fracture 20' - Fracture Multiple 24' - Fracture Multiple 44' - Fracture 54' - Grease 57' - Crack 74' - Crack 77' - Fracture 80' - Fracture Multiple 87' - Fracture 138' - Fracture 145' - Water level sag 148' - Fracture 286' - Fracture 298' - Grease deposits 10% 298' - Fracture 301' - ROOTS 344' - Crack	173' - TFC 9:00 178' - TFC 3:00 232' - TFC 9:00 237' - TFC 3:00 294' - TFC 9:00 299' - TFA 3:00 352' - TFC 9:00 358' - TFC 3:00 362' - TBA 2:00		LINE
300	6/22/2006	**3800-5945**	3800	5945	100	Ruby Drive Elementary	Upstream	8	VCP		4' - Grease			NO REPAIR
301		**3801-3800**	3801	3800		Ruby Drive Elementary								NO RECOMMENDATION
302		**3802-3801**	3802	3801		Twilight Ln and Kevin Way								NO RECOMMENDATION
303		**3803-3802**	3803	3802		Kevin Way								NO RECOMMENDATION
304		**3804-3802**	3804	3802		Twilight Ln								NO RECOMMENDATION
301	6/14/2006	**3806-3805**	3806	3805	260	Diane Ave	Downstream	8	VCP		3' - Grease 17' - Fracture 156' - Fracture Multiple 200' - Crack Multiple 252' - Fracture Multiple	38' - TFA 3:00 81' - TFA 9:00 121' - TFA 3:00 187' - TFA 9:00 190' - TFA 3:00		LINE
302		**3805-3804**	3805	3804		Madison Ave								NO RECOMMENDATION
302	6/14/2006	**3808-3806**	3808	3806	265	Diane Ave	Downstream	8	VCP		9' - Crack 12' - Fracture Multiple 235' - Fracture 249' - Fracture 260' - Fracture Multiple	80' - TFA 3:00 86' - TFA 9:00 145' - TFA 3:00 188' - TFA 9:00 224' - TFA 3:00		LINE
303	6/14/2006	**3807-3806**	3807	3806	395	Vicky Ln	Downstream	8	VCP		10' - Fracture 20' - Grease 34' - Crack 47' - Crack Multiple 54' - Rots fine joint 74' - Roots fine joint 74' - Fracture Multiple 84' - Roots fine joint 85' - Roots fine lateral 86' - Roots medium joint 143' - Crack 150' - Roots fine joint 150' - Fracture 153' - Fracture 218' - Roots fine joint 247' - Roots fine joint 280' - Roots fine joint 307' - Roots fine joint 330' - Roots fine joint 384' - Crack	6' - TFA 9:00 9' - TFA 3:00 85' - TFA 3:00 88' - TFA 9:00 161' - TFA 3:00 163' - TFA 9:00 243' - TFA 3:00 246' - TFA 9:00		LINE
304	6/14/2006	**3810-3808**	3810	3808	123	Diane Ave	Upstream	8	VCP		2' - Grease 96' - Joint offset medium 120' - Joint offset medium	20' - TFA 9:00 76' - TFA 3:00 92' - TFA 9:00		CLEAN & RE-INSPECT
305	6/14/2006	**3809-3808**	3809	3808	395	Sheree Ln	Downstream	8	VCP		6' - Roots fine joint 23' - Crack 30' - Grease 60' - Fracture 96' - Fracture Multiple 109' - Grease Deposits 149' - Fracture Multiple 260' - Fracture Multiple 297' - Fracture 310' - Fracture Multiple 314' - Fracture 320' - Fracture Multiple	7' - TFA 9:00 10' - TFA 3:00 16' - TFA 9:00 19' - TFA 3:00 85' - TFA 3:00 88' - TFA 9:00 167' - TFA 9:00 170' - TFA 3:00 239' - TFA 9:00 242' - TFA 3:00		LINE
306	6/15/2006	**3902-3901**	3902	3901	217	Lawanda Pl	Downstream	8	VCP		2' - intruding sealing ring 152' - Roots fine lateral 175' - Roots fine joint 179' - Roots fine joint 199' - Roots fine joint	18' - TFA 9:00 103' - TFA 9:00 152' - TFA 3:00		CLEAN & TRIM SEAL RING

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
307	6/15/2006	**3903-3902**	3903	3902	292	Lawanda Pl	Downstream	8	VCP		12' - Roots fine joint 13' - Roots fine lateral 14' - Roots fine joint 30' - Roots fine joint 42' - Roots medium lateral 25% 43' - Deposits 176' - Roots fine lateral 289' - Fracture	13' - TFA 3:00 42' - TFA 3:00 101' - TFA 3:00 176' - TFA 3:00 189' - TFA 9:00 238' - TFA 9:00 256' - TFA 3:00		LINE
308	6/14/2006	**3904-3903**	3904	3903	94	Lawanda Pl	Downstream	8	VCP		5' - Roots fine joint 7' - Grease 11' - Roots fine joint	10' - TFA 9:00 18' - TFA 3:00 35' - TFA 3:00 79' - TFA 3:00		CLEAN & RE-INSPECT
309		**3901-3900**	3901	3900		Madison Ave								NO RECOMMENDATION
310		**3900-3804**	3900	3804		Madison Ave								NO RECOMMENDATION
309	6/20/2006	**3811-5955**	3811	5955	217	Aquamarine St	Downstream	8	VCP		56' - Intruding Sealing Ring 59' - Grease	36' - TFA 3:00 54' - TFA 9:00 107' - TFA 3:00 135' - TFA 9:00 188' - TFA 3:00		TRIM INTRUDING
310		**3918-3811**	3918	3811		Aquamarine St								NO RECOMMENDATION
310	6/21/2006	**5955-5724**	5955	5724	260	Jade Ave	Downstream	8	VCP		20' - Roots fine lateral 224' - Intruding Seal Ring	12' - TFA 3:00 20' - TFA 3:00 47' - TFA 3:00 125' - TFA 3:00 218' - TFA 3:00		NO REPAIR
311	6/21/2006	**5724-5723**	5724	5723	112	Jade Ave	Downstream	8	VCP			11' - TFA 3:00		NO REPAIR
312	6/21/2006	**3919-5724**	3919	5724	275	Jade Cir	Downstream	8	VCP		3' - Fracture Multiple	12' - TFA 9:00 15' - TFA 3:00 43' - TFA 3:00 46' - TFA 9:00 138' - TFA 3:00 141' - TFA 9:00 189' - TFA 9:00 211' - TFA 3:00	3' - Line over Fracture	IN-SITU POINT REPAIR
313	6/21/2006	**5723-5721**	5723	5721	287	Diamond Rd	Downstream	8	VCP	MH 5722 does not exist	3' - Fracture 118' - Water level sag 133' - Fracture 138' - Water level sag 161' - Fracture 174' - Fracture 204' - Fracture 266' - Fracture 273' - Fracture	169' - TFA 9:00 212' - TFA 3:00 251' - TFA 9:00		LINE
314	6/21/2006	**5725-5723**	5725	5723	150	Jade Ave	Downstream	8	VCP		28' - Roots fine lateral	28' - TFA 9:00 111' - TFA 9:00		NO REPAIR
315	6/20/2006	**5726-5725**	5726	5725	262	Diamond Rd	Downstream	8	VCP		31' - Roots fine lateral 33' - Roots fine lateral 258' - Fracture	31' - TFA 9:00 33' - TFA 3:00 76' - TFA 9:00 98' - TFA 3:00 146' - TFA 9:00 199' - TFA 3:00 227' - TFA 9:00	258' - Line over fracture	IN-SITU POINT REPAIR
316	6/20/2006	**3905-5726**	3905	5726	262	Diamond Rd	Downstream	8	VCP		250' - Crack	76' - TFA 3:00 84' - TFA 9:00 157' - TFA 9:00 180' - TFA 3:00 223' - TFA 9:00 247' - TBA 9:00 256' - TFA 3:00		NO REPAIR
317	6/21/2006	**5721-5719**	5721	5719	45	Diamond Rd	Downstream	8	VCP		2' - Fracture 9' - Fracture 41' - Fracture			LINE
318	6/21/2006	**5954-5721**	5954	5721	300	Emerald Way	Downstream	8	VCP		5' - Fracture Multiple 25' - Crack 49' - Crack 75' - Crack 144' - Crack 194' - Fracture 228' - Fracture 257' - Fracture Multiple 267' - Fracture 277' - Crack 291' - Crack 294' - Fracture Multiple	17' - TFA 9:00 93' - TFC 3:00 96' - TFA 9:00 169' - TFA 9:00		LINE
319	6/20/2006	**5953-5954**	5953	5954	168	Emerald Way	Downstream	8	VCP		3' - FRACTURE 9' - Fracture 19' - Fracture 77' - Fracture 154' - Fracture	8' - TFA 3:00 11' - TFA 9:00 36' - TFA 3:00 56' - TFA 9:00 118' - TBA 3:00 132' - TFA 9:00		LINE
320	6/21/2006	**5720-5719**	5720	5719	178	Emerald Way	Downstream	8	VCP		21' - Crack 54' - Crack Multiple 89' - Fracture Multiple 173' - Hole Soil Visible 173' - Joint Offset Medium	7' - TFA 9:00 10' - TFA 3:00 56' - TFA 9:00 58' - TFA 3:00		LINE
321		**5722-5721**	5722	5721		Diamond Rd								NO RECOMMENDATION
321	6/21/2006	**5719-5951**	5719	5951	331	Diamond Rd	Downstream	8	VCP		2' - Fracture 8' - Crack 14' - Fracture 159' - Fracture 289' - Fracture 295' - Fracture 326' - Fracture	35' - TFA 3:00 88' - TFA 9:00 91' - TFA 3:00 164' - TFA 3:00 214' - TFA 9:00 260' - TFA 3:00		LINE
322	6/21/2006	**5718-5951**	5718	5951	239	Ruby Dr	Downstream	8	VCP		27' - Crack 27' - Grease Deposits 60' - Fracture 65' - Fracture 192' - Fracture 198' - Fracture 235' - Fracture Multiple	9' - TFA 3:00 12' - TFA 9:00 61' - TFA 9:00 64' - TFA 3:00 130' - TFA 9:00		LINE
323	6/22/2006	**5952-5951**	5952	5951	343	Ruby Dr	Downstream	8	VCP		14' - Crack Multiple 40' - Fracture Multiple 50' - Fracture 80' - Hole Soil Visible 80' - Roots fine joint 86' - Fracture 99' - Roots fine joint 132' - Fracture 139' - Roots fine joint 152' - FRACTURE 152' - Hole Soil Visible 184' - Crack Multiple 204' - Roots fine joint 324' - Fracture Multiple 334' - Crack 337' - Hole Soil Visible 337' - BROKEN PIPE	29' - TFA 9:00 32' - TFA 3:00 97' - TFA 9:00 100' - TFA 3:00 163' - TFA 9:00 169' - TFA 3:00 232' - TFA 9:00		LINE
324	6/27/2006	**5716-5717**	5716	5717	517	Ruby Dr	Upstream	6	VCP	CAST IRON BELL AT US MH 5716	212' - Roots fine joint 243' - Joint offset medium 403' - ROOTS 404' - Roots fine lateral 404' - Joint Offset Medium 404' - Roots fine joint 515' - Surface corrosion in bell	31' - TFA 9:00 32' - TFA 3:00 82' - TFA 9:00 84' - TFA 3:00 134' - TFA 9:00 135' - TFA 3:00 189' - TFA 9:00 191' - TFA 3:00 244' - TFA 9:00 245' - TFA 3:00 295' - TFA 9:00 287' - TFA 3:00 347' - TFA 9:00 348' - TFA 3:00 401' - TFA 9:00 404' - TFA 3:00 464' - TFA 3:00 474' - TBA 10:00 486' - TFC 9:00 508' - TFA 9:00 512' - TFA 3:00		NO REPAIR
325	6/26/2006	**5717-5710**	5717	5710	325	Melrose St	Upstream	8	VCP	HANNA IS UNSURE IF THIS PIPE IS IN THE LOCATION LISTED	88' - Roots fine joint 100' - Roots fine joint 105' - Roots fine joint			NO REPAIR
326		**5717-5718**	5717	5718		Ruby Dr								NO RECOMMENDATION
326	6/20/2006	**3906-3905**	3906	3905	362	Madison Ave	Downstream	8	VCP	Roots in joints throughout	2' - Roots fine joint 23' - ROOTS 133' - Fracture 164' - Fracture 253' - Roots fine joint	106' - TBA 3:00 109' - TFC 3:00 112' - TFC 9:00 135' - TBA 3:00 173' - TBA 9:00 226' - TFC 3:00 254' - TBA 3:00 320' - TFC 3:00		LINE
327	6/20/2006	**3907-3906**	3907	3906	111	Madison Ave	Downstream	8	VCP	MH 3907 is buried. Will need to be exposed for lining.	0' - Cleanout Mainline 1' - Roots fine joint 21' - Roots fine joint 34' - Roots fine joint 46' - Roots fine lateral 67' - Roots fine joint 67' - Fracture 69' - Roots fine lateral 72' - Roots fine joint 77' - Roots fine joint 102' - Roots fine joint	0' - TFC 12:00 32' - TBI 3:00 46' - TFA 9:00 69' - TBA 3:00 83' - TFC 3:00 86' - TFA 9:00	32' - TRIM INTRUDING LATERAL	LINE
328	6/20/2006	**3908-3907**	3908	3907	172	Madison Ave	Downstream	8	VCP	MH 3907 is buried. Will need to be exposed for lining.		41' - TBA 3:00		LINE
329	6/20/2006	**3909-3908**	3909	3908	50	Madison Ave	Upstream	8	VCP					NO REPAIR
330	6/20/2006	**3910-3909**	3910	3909	300	Bradford Ave	Upstream	8	VCP		105' - Joint offset medium 114' - Water level sag 145' - Water level sag 180' - Water level sag 236' - Water level sag 251' - Water level sag 278' - Joint Offset Medium	105' - TFA 3:00 264' - TFA 9:00 280' - TFA 9:00		NO REPAIR

#	CCTV Date	Pipe Segment	U/S MH	D/S MH	Length (ft)	Street	Direction	Diam (in)	Material	General Notes	CCTV Condition Notes	Lateral Notes	Point Repair Notes	Final Recommendation
331	6/20/2006	**3913-3911**	3913	3911	335	Bradford Ave	Upstream	8	VCP	Water level 50%; CAMERA UNDERWATER; ABANDONED SURVEY	17' - Joint offset medium 38' - Fracture 58' - Surface corrosion in lateral 68' - Fracture 73' - Joint offset medium 74' - Joint offset medium 154' - Roots fine lateral 154' - Roots fine joint 157' - Roots fine joint 179' - Grease deposits 186' - Grease deposits 194' - Roots medium lateral 25% 277' - Joint Offset Medium 291' - CAMERA UNDERWATER 304' - Joint offset medium 307' - HOLE VOID VISIBLE 307' - ABANDONED SURVEY	58' - TBA 12:00 154' - TBA 9:00 194' - TBA 3:00 295' - TBA 9:00	307' - TRENCH??	CLEAN & RE-INSPECT
332	6/20/2006	**3914-3913**	3914	3913	335	Bradford Ave	Downstream	8	VCP	114' - STRANGE REPAIR PATCH?? BLOCKED SURVEY	9' - Crack 16' - Crack Multiple 24' - Grease 33' - Grease Deposits 37' - Corrosion in lateral 57' - Water level sag 73' - DEPOSITS 15% 93' - DEPOSITS 100' - Water level sag 114' - CEMENT SLURRY 20% 116' - Hole Void Visible 117' - ABANDONED SURVEY	37' - TBA 10:00 46' - TBA 3:00		CLEAN & RE-INSPECT
333	12/20/2011	**3915-3914**	3915	3914	57	Carlson Ln	Upstream	8	VCP	ABANDONED SURVEY	10' - CAMERA UNDERWATER 57' - ABANDONED SURVEY			NO RECOMMENDATION
Duplicate Pipe	12/20/2011	**3915-3914**	3915	3914	250	Carlson Ln	Downstream	8	VCP	Sag between 287' and 330'	213' - Roots medium lateral 245' - Joint offset LARGE 247' - Joint offset Large, roots and broken pipe 282' - Grease 290' - Attached grease 10% 287' - Water level Sag	25.5' - TFA 3:00 68' - TFA 2:00 126' - TFA 2:00 233' - TFA 3:00 246' - TFA 3:00	245' to 247' - TRENCH and replace offset pipe segment and reconnect lateral	EXCAVATION POINT REPAIR
334		**3914B-3914A**	3914B	3914A		Bradford Ave				NOT SURE OF LOCATION; MAY NOT BE IN PLACENTIA BOUNDARY				
335		**3914A-3914**	3914A	3914		Bradford Ave				NOT SURE OF LOCATION; MAY NOT BE IN PLACENTIA BOUNDARY				
336		**3924-3922**	3924	3922		Paeantry Dr								NO RECOMMENDATION
337		**3923-3922**	3923	3922		Coventry Cir								NO RECOMMENDATION
338		**3922-3920**	3922	3920		Paeantry Dr								NO RECOMMENDATION
339		**3921-3920**	3921	3920		Oxford Dr								NO RECOMMENDATION
336	7/10/2006	**3920-4100**	3920	4100	360	Paeantry Dr	Downstream	8	VCP		134' - Roots fine joint 144' - Roots fine joint 145' - Root ball lateral 148' - Root ball lateral 353' - Joint Seperated Large	74' - TFA 3:00 77' - TFA 9:00 145' - TFA 3:00 148' - TFA 9:00 212' - TFA 2:00 219' - TFA 10:00 292' - TFA 2:00 295' - TFA 10:00	353' - line over seperated joint	IN-SITU POINT REPAIR
337	12/13/2012	**4101-4100**	4101	4100	187	Kraemer Blvd	Downstream	10	VCP	HIGH WATER LEVEL 50%; CAMERA UNDERWATER;	8' - Grease Deposits 11' - Water level sag			NO REPAIR
338	7/11/2006	**4100-5606**	4100	5606	254	Kraemer Blvd	Downstream	10	VCP	HIGH WATER LEVEL 50%; CAMERA UNDERWATER;	45' - Water level sag 176' - Water level sag 214' - Water level sag	247' - TFA 2:00		NO REPAIR
339		**4102-4101**	4102	4101		Kraemer Blvd								
340		**4103-4102**	4103	4102		Alley off Kraemer Blvd								
341	7/10/2006	**4106-4101**	4106	4101	350	Fairway Ln	Downstream	10	VCP	HIGH WATER LEVEL 50%; CAMERA UNDERWATER;	0' - Roots fine joint 2' - Grease Deposits 8' - Roots medium barrel 8' - Roots medium joint 13' - Roots medium joint 5% 30' - Roots medium lateral 35' - Roots fine joint 79' - Root ball lateral 86' - Grease deposits 111' - Roots medium joint 142' - Grease deposits 160' - CAMERA UNDERWATER (45% Water level) 260' - Root ball lateral 60% 280' - Roots fine joint 302' - Grease deposits 305' - Roots fine joint	30' - TFA 2:00 79' - TFA 10:00 111' - TFA 2:00 181' - TFA 2:00 260' - TFA 2:00		LINE

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APPENDIX C

Manhole Inspection Results Table

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Manhole Number	Street	MH Component ID	MH Component Description	MACP Code	MACP Code Description	Rehab Work	Maintenance Work
7204	VAN BUREN ST	B	Bench	SAV	Surface Aggregate Visible	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		C	Channel	OBZ	Obstacle Other		
		WI	Wall Interior	OBZ	Obstacle Other		
		WI	Wall Interior	LFD	Lining Failure Detached		
		WI	Wall Interior	LFD	Lining Failure Detached		
7205	OLIVE ST	B	Bench	CL	Crack Longitudinal	WALL&BENCH	NONE
		B	Bench	SAV	Surface Aggregate Visible		
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CM	Crack Multiple		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	H	Hole		
		WI	Wall Interior	IS	Infil Stain		
7207	ORANGETHORPE	CMI	Chimney Interior	CL	Crack Longitudinal	WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	LFD	Lining Failure Detached		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	LFD	Lining Failure Detached		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	SRI	Surface Roughness Increased		
7208	CHERRY ST	WI	Wall Interior	SRV	Surface Reinforcement Visible	WALL&BENCH	NONE
		WI	Wall Interior	CM	Crack Multiple		
		WI	Wall Interior	CM	Crack Multiple		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
7209	VAN BUREN ST & CHERRY ST	C	Channel	SAV	Surface Aggregate Visible	WALL&BENCH	NONE
		COI	Cone Interior	LFD	Lining Failure Detached		
		WI	Wall Interior	CM	Crack Multiple		
		WI	Wall Interior	SRP	Surface Reinforcement Projecting		
		WI	Wall Interior	SRI	Surface Roughness Increased		
		WI	Wall Interior	LFD	Lining Failure Detached		
		WI	Wall Interior	MMS	Mortar Missing Small		
		WI	Wall Interior	SRI	Surface Roughness Increased		
7211	VAN BUREN ST & SPRUCE ST	B	Bench	SAV	Surface Aggregate Visible	WALL&BENCH	NONE
		B	Bench	SAV	Surface Aggregate Visible		
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
		COI	Cone Interior	LFD	Lining Failure Detached		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
7213	SPRUCE ST	B	Bench	DSF	Deposits Settled Fine	WALL&BENCH	NONE
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	CL	Crack Longitudinal		
7214	SPRUCE & ALLEY	B	Bench	DSF	Deposits Settled Fine	WALL&BENCH	NONE
		B	Bench	OBN	Obstacle Construction Debris		
		CMI	Chimney Interior	LFD	Lining Failure Detached		
7216	1549 CHERRY ST	CMI	Chimney Interior	FC	Fracture Circumferential	WALL&BENCH	NONE
		CMI	Chimney Interior	FC	Fracture Circumferential		
		CMI	Chimney Interior	SAM	Surface Aggregate Missing		
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	CL	Crack Longitudinal		
7217	ORCHARD ST	B	Bench	DAR	Deposits Attached Ragging	WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	RFB	Roots Fine Barrel		
		COI	Cone Interior	CL	Crack Longitudinal		
7218	ORCHARD ST & VAN BUREN ST	B	Bench	DSF	Deposits Settled Fine	WALL&BENCH	NONE
7235	CHERRY ST	B	Bench	LFZ	Lining Failure Other	WALL&BENCH	NONE
		B	Bench	SAP	Surface Aggregate Projecting		
		COI	Cone Interior	LFD	Lining Failure Detached		
		COI	Cone Interior	LFD	Lining Failure Detached		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
7236	SPRUCE ST	CMI	Chimney Interior	CL	Crack Longitudinal	WALL&BENCH	NONE
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	RFJ	Roots Fine Joint		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	RFJ	Roots Fine Joint		
		WI	Wall Interior	CM	Crack Multiple		
		WI	Wall Interior	CL	Crack Longitudinal		
7237	SPRUCE ST	CMI	Chimney Interior	LFD	Lining Failure Detached	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	FL	Fracture Longitudinal		
		WI	Wall Interior	FS	Fracture Spiral		
		WI	Wall Interior	MMS	Mortar Missing Small		
		WI	Wall Interior	CM	Crack Multiple		
		WI	Wall Interior	LFD	Lining Failure Detached		
7401	DEPOT ST	B	Bench	DSF	Deposits Settled Fine	WALL&BENCH	NONE
		B	Bench	DSF	Deposits Settled Fine		
		COI	Cone Interior	RFB	Roots Fine Barrel		
		WI	Wall Interior	MGO	General Observation		
7402	CHERRY ST & DEPOT ST	B	Bench	SAV	Surface Aggregate Visible	WALL&BENCH	NONE
		CMI	Chimney Interior	CM	Crack Multiple		
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		COI	Cone Interior	CC	Crack Circumferential		
		COI	Cone Interior	SRI	Surface Roughness Increased		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	CS	Crack Spiral		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
7403	CHERRY ST & LINCOLN ST	CMI	Chimney Interior	CL	Crack Longitudinal	NO REHAB	DEBRIS_ON_BENCH
		COI	Cone Interior	CC	Crack Circumferential		
		COI	Cone Interior	CL	Crack Longitudinal		
		WI	Wall Interior	CM	Crack Multiple		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	CL	Crack Longitudinal		

7404	LINCOLN ST	B	Bench	DSF	Deposits Settled Fine	WALL&BENCH	NONE
		C	Channel	DSC	Deposits Settled Compacted		
		COI	Cone Interior	RFB	Roots Fine Barrel		
		WI	Wall Interior	RFB	Roots Fine Barrel		
7800	LAKEVIEW AVE	C	Channel	DSC	Deposits Settled Compacted	WALL&BENCH	DEBRIS_IN_CHANNELS
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	MMS	Mortar Missing Small		
		COI	Cone Interior	CC	Crack Circumferential		
		COI	Cone Interior	VC	Vermin Cockroach		
7801	LAKEVIEW AVE	B	Bench	SRI	Surface Roughness Increased	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		B	Bench	SAV	Surface Aggregate Visible		
		B	Bench	SAV	Surface Aggregate Visible		
		CMI	Chimney Interior	CL	Crack Longitudinal		
7802	LAKEVIEW AVE	CMI	Chimney Interior	MMS	Mortar Missing Small	WALL&BENCH	NONE
		CMI	Chimney Interior	MMS	Mortar Missing Small		
		CMI	Chimney Interior	MMS	Mortar Missing Small		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	MMS	Mortar Missing Small		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	SZ	Surface Other		
		CMI	Chimney Interior	SZ	Surface Other		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	IS	Infil Stain		
7803	LAKEVIEW AVE	CMI	Chimney Interior	CL	Crack Longitudinal	WALL&BENCH	NONE
		CMI	Chimney Interior	FL	Fracture Longitudinal		
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		WI	Wall Interior	VC	Vermin Cockroach		
7803A	S LAKEVIEW AVE	CMI	Chimney Interior	CL	Crack Longitudinal	WALL&BENCH	NONE
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
7804	S LAKEVIEW AVE	CMI	Chimney Interior	CL	Crack Longitudinal	WALL&BENCH	NONE
		CMI	Chimney Interior	CL	Crack Longitudinal		
7815	NANCITA CIR	CMI	Chimney Interior	SRI	Surface Roughness Increased	NO REHAB	NONE
7816	ESTELLE LN	CMI	Chimney Interior	CC	Crack Circumferential	WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
8000	RICHFIELD RD	C	Channel	DSC	Deposits Settled Compacted	CHANNEL&WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	CL	Crack Longitudinal		
8001	RICHFIELD RD & E MIRALOMA AVE	B	Bench	SRI	Surface Roughness Increased	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		B	Bench	SAV	Surface Aggregate Visible		
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
8001A	RICHFIELD RD	CMI	Chimney Interior	SZ	Surface Other	NO REHAB	NONE
		CMI	Chimney Interior	SZ	Surface Other		
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		WI	Wall Interior	LFPH	Lining Failure Pinhole		
8002	RICHFIELD RD	CMI	Chimney Interior	MMS	Mortar Missing Small	WALL&BENCH	NONE
		WI	Wall Interior	DAR	Deposits Attached Ragging		
		WI	Wall Interior	CM	Crack Multiple		
8003	RICHFIELD RD	B	Bench	DSC	Deposits Settled Compacted	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		B	Bench	DSC	Deposits Settled Compacted		
		B	Bench	DSC	Deposits Settled Compacted		
		C	Channel	DAR	Deposits Attached Ragging		
		C	Channel	DSC	Deposits Settled Compacted		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	SRI	Surface Roughness Increased		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	DAR	Deposits Attached Ragging		
8004	RICHFIELD RD	B	Bench	DSC	Deposits Settled Compacted	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		B	Bench	DSC	Deposits Settled Compacted		
		B	Bench	DSC	Deposits Settled Compacted		
		C	Channel	DAR	Deposits Attached Ragging		
		C	Channel	DSC	Deposits Settled Compacted		
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		CMI	Chimney Interior	CC	Crack Circumferential		
8005	RICHFIELD RD	B	Bench	SAV	Surface Aggregate Visible	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		C	Channel	DSC	Deposits Settled Compacted		
		C	Channel	DSC	Deposits Settled Compacted		
		C	Channel	DAR	Deposits Attached Ragging		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	VC	Vermin Cockroach		
		WI	Wall Interior	VC	Vermin Cockroach		
8006	RICHFIELD RD & VICENTE AVE	B	Bench	SAV	Surface Aggregate Visible	CHANNEL&WALL&BENCH	NONE
		B	Bench	SAP	Surface Aggregate Projecting		
		C	Channel	SAV	Surface Aggregate Visible		
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	SRI	Surface Roughness Increased		
8006A	RICHFIELD RD & VICENTE AVE	B	Bench	DSF	Deposits Settled Fine	NO REHAB	NONE
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CM	Crack Multiple		
8007	1788 VICENTE AVE	C	Channel	SAV	Surface Aggregate Visible	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		WI	Wall Interior	FL	Fracture Longitudinal		
8008	1749 VICENTE AVE	C	Channel	SAV	Surface Aggregate Visible	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
		CMI	Chimney Interior	CC	Crack Circumferential		
		WI	Wall Interior	CC	Crack Circumferential		
8009	VICENTE AVE & BENJAMIN AVE	C	Channel	SAV	Surface Aggregate Visible	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	FL	Fracture Longitudinal		
		COI	Cone Interior	CL	Crack Longitudinal		
		COI	Cone Interior	CC	Crack Circumferential		
		COI	Cone Interior	VC	Vermin Cockroach		
8010	BENJAMIN AVE	CMI	Chimney Interior	CC	Crack Circumferential	WALL&BENCH	NONE
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		B	Bench	SAV	Surface Aggregate Visible		

8011	VICENTE AVE & MARIA AVE	CMI	Chimney Interior	LFD	Lining Failure Detached	CHANNEL&WALL&BENCH	NONE
		COI	Cone Interior	CL	Crack Longitudinal		
		COI	Cone Interior	VC	Vermin Cockroach		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
8012	641 MARIA AVE	CMI	Chimney Interior	CM	Crack Multiple	WALL&BENCH	NONE
		COI	Cone Interior	CC	Crack Circumferential		
		COI	Cone Interior	SSS	Surface Spalling		
8013	VICENTE AVE	CMI	Chimney Interior	LFD	Lining Failure Detached	WALL&BENCH	NONE
		COI	Cone Interior	FC	Fracture Circumferential		
		COI	Cone Interior	FL	Fracture Longitudinal		
8014	VICENTE AVE	CMI	Chimney Interior	CL	Crack Longitudinal	WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CC	Crack Circumferential		
8015	RICHFIELD RD & NANCITA ST	C	Channel	SAP	Surface Aggregate Projecting	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	B	Broken		
		WI	Wall Interior	CC	Crack Circumferential		
		WI	Wall Interior	CL	Crack Longitudinal		
8016	NANCITA ST	B	Bench	CC	Crack Circumferential	WALL&BENCH	NONE
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	LFD	Lining Failure Detached		
8017	NANCITA ST & FEE ANA ST	C	Channel	SAV	Surface Aggregate Visible	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
8018	FEE ANA ST	B	Bench	DSF	Deposits Settled Fine	WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
8019	NANCITA CIR	CMI	Chimney Interior	CM	Crack Multiple	WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
8020	FEE ANA ST	C	Channel	SAV	Surface Aggregate Visible	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		C	Channel	SAV	Surface Aggregate Visible		
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CM	Crack Multiple		
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
8021	FEE ANA ST & ESTELLE LN	C	Channel	SAV	Surface Aggregate Visible	CHANNEL&WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		COI	Cone Interior	CL	Crack Longitudinal		
8022	PETRA LN & FEE ANA ST	C	Channel	SAV	Surface Aggregate Visible	CHANNEL&WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
8023	FEE ANA ST	C	Channel	SAM	Surface Aggregate Missing	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		COI	Cone Interior	CM	Crack Multiple		
		WI	Wall Interior	FC	Fracture Circumferential		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	CC	Crack Circumferential		
8025	OAK ST	B	Bench	DSZ	Deposits Settled Other	WALL&BENCH	BROKEN_BENCH_IN_ABANDONED_CHANNEL
		B	Bench	SAV	Surface Aggregate Visible		
		B	Bench	B	Broken		
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	CC	Crack Circumferential		
		WI	Wall Interior	MMS	Mortar Missing Small		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
8026	OAK ST	B	Bench	LFDL	Lining Failure Delaminating	WALL&BENCH	NONE
		COI	Cone Interior	SRI	Surface Roughness Increased		
		WI	Wall Interior	SRI	Surface Roughness Increased		
8028	OAK ST	B	Bench	SAV	Surface Aggregate Visible	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		B	Bench	SAV	Surface Aggregate Visible		
		B	Bench	SAV	Surface Aggregate Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	CL	Crack Longitudinal		
8029	OAK ST & RICHFIELD RD	B	Bench	DSC	Deposits Settled Compacted	WALL&BENCH	NONE
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CS	Crack Spiral		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	FM	Fracture Multiple		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
8030	RICHFIELD RD	B	Bench	DSGV	Deposits Settled Gravel	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		C	Channel	DSC	Deposits Settled Compacted		
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
		COI	Cone Interior	SZ	Surface Other		
		COI	Cone Interior	CL	Crack Longitudinal		
		COI	Cone Interior	SZ	Surface Other		
		COI	Cone Interior	CC	Crack Circumferential		
		COI	Cone Interior	CC	Crack Circumferential		
8031	NANCITA ST	B	Bench	DSC	Deposits Settled Compacted	CHANNEL&WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		B	Bench	DSC	Deposits Settled Compacted		
		B	Bench	DSC	Deposits Settled Compacted		
		C	Channel	DSC	Deposits Settled Compacted		
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	FL	Fracture Longitudinal		
		CMI	Chimney Interior	FL	Fracture Longitudinal		
		CMI	Chimney Interior	MML	Mortar Missing Large		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	B	Broken		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	VC	Vermin Cockroach		
		CMI	Chimney Interior	CL	Crack Longitudinal		

8032	NANCITA ST & FEE ANA ST	CMI	Chimney Interior	CL	Crack Longitudinal	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
8034	OLIVE ST	CMI	Chimney Interior	CC	Crack Circumferential	WALL&BENCH	NONE
		COI	Cone Interior	CC	Crack Circumferential		
		WI	Wall Interior	CC	Crack Circumferential		
		WI	Wall Interior	CC	Crack Circumferential		
8035	OLIVE ST	CMI	Chimney Interior	CL	Crack Longitudinal	NO REHAB	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	CL	Crack Longitudinal		
		COI	Cone Interior	CC	Crack Circumferential		
		WI	Wall Interior	CC	Crack Circumferential		
8036	1620 LA PALOMA	B	Bench	SAV	Surface Aggregate Visible	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	CM	Crack Multiple		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	CC	Crack Circumferential		
		WI	Wall Interior	CC	Crack Circumferential		
8037	1644 LA PALOMA	CMI	Chimney Interior	SRI	Surface Roughness Increased	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		CMI	Chimney Interior	CC	Crack Circumferential		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
8038	1672 LA PALOMA	CMI	Chimney Interior	LFD	Lining Failure Detached	WALL&BENCH	NONE
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
		COI	Cone Interior	CC	Crack Circumferential		
		WI	Wall Interior	CL	Crack Longitudinal		
8039	1617 SIERRA VISTA AVE	B	Bench	SAV	Surface Aggregate Visible	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		CMI	Chimney Interior	CL	Crack Longitudinal		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	CC	Crack Circumferential		
8040	1649 SIERRA VISTA AVE	C	Channel	CM	Crack Multiple	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	FL	Fracture Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
8041	1675 SIERRA VISTA AVE	C	Channel	OBC	Obstacle Thru Connection	WALL&BENCH	DEBRIS_IN_CHANNELS
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		WI	Wall Interior	OBZ	Obstacle Other		
8042	1616 SIERRA MADRE CIR	B	Bench	VC	Vermin Cockroach	WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		WI	Wall Interior	DAGS	Deposits Attached Grease		
		WI	Wall Interior	IS	Infil Stain		
8043	1688 SIERRA MADRE CIR	CMI	Chimney Interior	CM	Crack Multiple	WALL&BENCH	NONE
8044	E MIRALOMA AVE	CMI	Chimney Interior	CC	Crack Circumferential	WALL&BENCH	NONE
		WI	Wall Interior	CC	Crack Circumferential		
8045	E MIRALOMA AVE	CMI	Chimney Interior	CC	Crack Circumferential	WALL&BENCH	NONE
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	CC	Crack Circumferential		
8046	E MIRALOMA AVE	CMI	Chimney Interior	CM	Crack Multiple	WALL&BENCH	NONE
		WI	Wall Interior	CC	Crack Circumferential		
8047	LAS BRISAS PL	CMI	Chimney Interior	SRV	Surface Reinforcement Visible	WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	VC	Vermin Cockroach		
8048	MIRALOMA AVE	COI	Cone Interior	VC	Vermin Cockroach	CHANNEL&WALL&BENCH	NONE
		COI	Cone Interior	CC	Crack Circumferential		
		WI	Wall Interior	CC	Crack Circumferential		
8049	LAS BRISAS PL & MIRALOMA AVE	CMI	Chimney Interior	CS	Crack Spiral	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	CC	Crack Circumferential		
		COI	Cone Interior	CC	Crack Circumferential		
8051	E MIRALOMA AVE	CMI	Chimney Interior	CL	Crack Longitudinal	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	CS	Crack Spiral		
		COI	Cone Interior	CM	Crack Multiple		
8052	E MIRALOMA AVE EASEMENT	CMI	Chimney Interior	CC	Crack Circumferential	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
8053	RICHFIELD RD	C	Channel	SAV	Surface Aggregate Visible	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	SRI	Surface Roughness Increased		
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	CC	Crack Circumferential		
		WI	Wall Interior	VC	Vermin Cockroach		
		WI	Wall Interior	CL	Crack Longitudinal		
		WI	Wall Interior	VC	Vermin Cockroach		
8053A	RICHFIELD RD	B	Bench	DSGV	Deposits Settled Gravel	CHANNEL&WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	CC	Crack Circumferential		
		CMI	Chimney Interior	CM	Crack Multiple		
		WI	Wall Interior	VC	Vermin Cockroach		
		WI	Wall Interior	CC	Crack Circumferential		

8053B	RICHFIELD RD	B	Bench	SAV	Surface Aggregate Visible	NO REHAB	NONE
		CMI	Chimney Interior	RFB	Roots Fine Barrel		
		CMI	Chimney Interior	CL	Crack Longitudinal		
8054	1930 ESTELLE LN	CMI	Chimney Interior	CC	Crack Circumferential	WALL&BENCH	NONE
		CMI	Chimney Interior	CC	Crack Circumferential		
		COI	Cone Interior	CC	Crack Circumferential		
8205	VAN BUREN ST	C	Channel	DSF	Deposits Settled Fine	WALL&BENCH	DEBRIS_IN_CHANNELS
		CMI	Chimney Interior	SRV	Surface Reinforcement Visible		
		CMI	Chimney Interior	CC	Crack Circumferential		
8207	VAN BUREN ST	C	Channel	DSC	Deposits Settled Compacted	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		C	Channel	DSC	Deposits Settled Compacted		
		WI	Wall Interior	VC	Vermin Cockroach		
8208	VAN BUREN ST & SIERRA MADRE CIR	CMI	Chimney Interior	SRI	Surface Roughness Increased	WALL&BENCH	NONE
		WI	Wall Interior	VC	Vermin Cockroach		
8209	VAN BUREN ST & SIERRA VISTA AVE	C	Channel	DAR	Deposits Attached Ragging	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		CMI	Chimney Interior	CC	Crack Circumferential		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
8210	VAN BURENST & LA PALOMA	B	Bench	SAV	Surface Aggregate Visible	WALL&BENCH	NONE
		B	Bench	SAV	Surface Aggregate Visible		
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
8211	VAN BUREN ST & LA PALOMA	B	Bench	DSC	Deposits Settled Compacted	WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		B	Bench	OBN	Obstacle Construction Debris		
		CMI	Chimney Interior	MGO	General Observation		
		CMI	Chimney Interior	SZ	Surface Other		
		COI	Cone Interior	SRI	Surface Roughness Increased		
		COI	Cone Interior	SRI	Surface Roughness Increased		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
8212	VAN BUREN ST & VICENTE AVE	C	Channel	DAR	Deposits Attached Ragging	WALL&BENCH	HIGH_WATER_LEVEL
		C	Channel	DAGS	Deposits Attached Grease		
		CMI	Chimney Interior	MMM	Mortar Missing Medium		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	LFD	Lining Failure Detached		
8213	VAN BUREN ST & BEJAC BLVD	C	Channel	MWL	Water Level	CHANNEL&WALL&BENCH	OBSTACLE_BLOCKING_SIPHON_BARREL
		CMI	Chimney Interior	SRV	Surface Reinforcement Visible		
		CMI	Chimney Interior	SRV	Surface Reinforcement Visible		
		COI	Cone Interior	SAV	Surface Aggregate Visible		
		COI	Cone Interior	CC	Crack Circumferential		
8214	VAN BUREN ST	B	Bench	SAV	Surface Aggregate Visible	CHANNEL&WALL&BENCH	OBSTACLE_BLOCKING_SIPHON_BARREL
		B	Bench	DAR	Deposits Attached Ragging		
		CMI	Chimney Interior	LFD	Lining Failure Detached		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	SRI	Surface Roughness Increased		
		COI	Cone Interior	SRI	Surface Roughness Increased		
		COI	Cone Interior	LFD	Lining Failure Detached		
		COI	Cone Interior	SAV	Surface Aggregate Visible		
		WI	Wall Interior	SAV	Surface Aggregate Visible		
8215	VAN BUREN ST & OAK ST	B	Bench	SAM	Surface Aggregate Missing	CHANNEL&WALL&BENCH	DEBRIS_IN_POTENTIALLY_ABANDONED_CHANNELS
		B	Bench	SAV	Surface Aggregate Visible		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		CMI	Chimney Interior	CL	Crack Longitudinal		
		COI	Cone Interior	CC	Crack Circumferential		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
8216	VAN BUREN ST & E MIRALOMA AVE	CMI	Chimney Interior	VC	Vermin Cockroach	WALL&BENCH	NONE
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
UKN#1	E MIRALOMA AVE	C	Channel	SAV	Surface Aggregate Visible	CHANNEL&WALL&BENCH	NONE
UNK # 2	VAN BUREN ST & ORANGETHORPE	COI	Cone Interior	SRV	Surface Reinforcement Visible	WALL&BENCH	NONE
		COI	Cone Interior	SRV	Surface Reinforcement Visible		
		COI	Cone Interior	LFD	Lining Failure Detached		
		COI	Cone Interior	CC	Crack Circumferential		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRI	Surface Roughness Increased		
		WI	Wall Interior	LFD	Lining Failure Detached		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		
		WI	Wall Interior	SRV	Surface Reinforcement Visible		

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APPENDIX D

Flow Monitoring Study

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CITY OF PLACENTIA
SANITARY SEWER
FLOW MONITORING CAPACITY STUDY

Prepared for:

Dudek & Associates
750 Second Street
Encinitas, CA 92024

Date: December 2016

Prepared by:

V&A

V&A Project No. 16-0291

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1.0 INTRODUCTION

V&A Consulting Engineers (V&A) was retained by Dudek & Associates (Dudek) to perform sanitary sewer flow monitoring and a sewer capacity study within the City of Placentia, California (City). The purpose of this study was to measure the average and peak dry weather flows and determine the available capacity of the subject pipelines. Flow monitoring was performed at eight sites for three weeks from November 18 to December 9, 2016. The flow monitoring locations are described in Table 1-1 and shown in Figure 1-1.

Table 1-1. Flow Monitoring Locations

Site ID	Location	Pipe Dia. (in)
Site 1	Valencia Avenue at East Elm Street	8
Site 2	1547 Tuffree Boulevard	8
Site 3	Yorba Linda Boulevard north of East Palm Drive	12
Site 4	South Van Buren Street at Olive Street	10
Site 5	847 South Kraemer Boulevard	12
Site 6b	1121 South Placentia Avenue	12
Site 7	South Placentia Avenue north of Fender Avenue	10
Site 8	East Bastanchury Road and Valencia Avenue	8

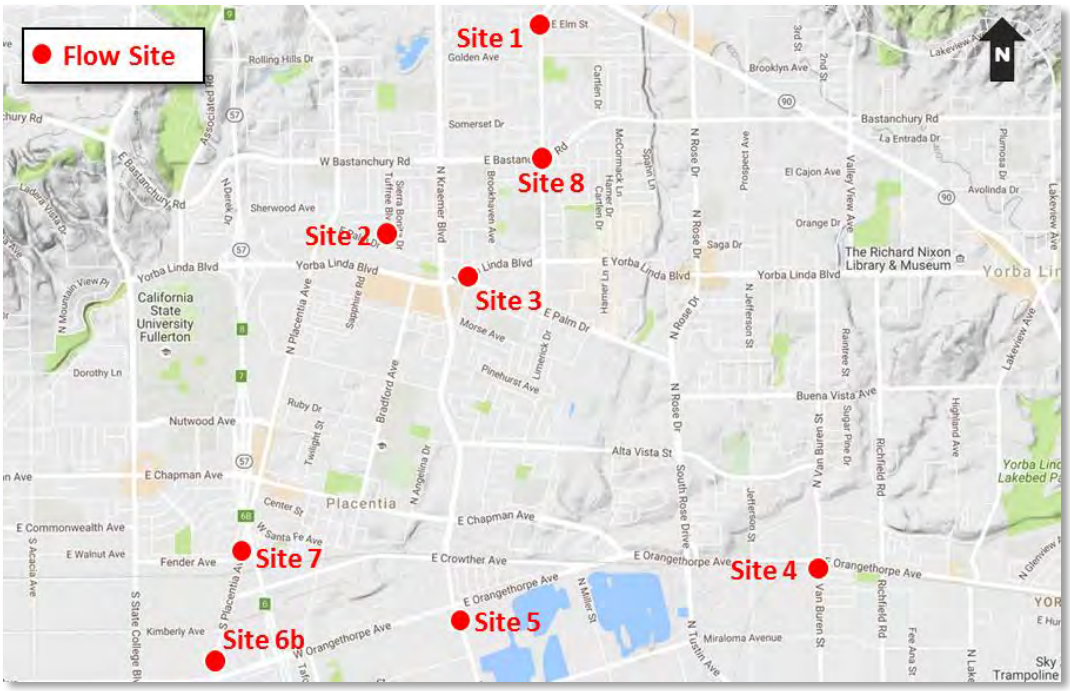


Figure 1-1. Flow Monitoring Locations Overview

2.0 METHODS AND PROCEDURES

2.1 Confined Space Entry

A confined space (Photo 2-1) is defined as any space that is large enough and so configured that a person can bodily enter and perform assigned work, has limited or restricted means for entry or exit, and is not designed for continuous employee occupancy. In general, the atmosphere must be constantly monitored for sufficient levels of oxygen (19.5% to 23.5%), and the absence of hydrogen sulfide (H_2S) gas, carbon monoxide (CO) gas, and lower explosive limit (LEL) levels. A typical confined space entry crew has members with OSHA-defined responsibilities of Entrant, Attendant and Supervisor. The Entrant is the individual performing the work. He or she is equipped with the necessary personal protective equipment needed to perform the job safely, including a personal four-gas monitor (Photo 2-2). If it is not possible to maintain line-of-sight with the Entrant, then more Entrants are required until line-of-sight can be maintained. The Attendant is responsible for maintaining contact with the Entrants to monitor the atmosphere using another four-gas monitor and maintaining records of all Entrants, if there is more than one. The Supervisor is responsible for developing the safe work plan for the job at hand prior to entering.

Photo 2-1. Confined Space Entry

Photo 2-2. Typical Personal Four-Gas Monitor

2.2 Flow Meter Installation

Eight Teledyne Isco 2150 meters were installed by V&A in the sewer lines. Isco 2150 meters use submerged sensors with a pressure transducer to collect depth readings and an ultrasonic Doppler sensor to determine the average fluid velocity. The ultrasonic sensor emits high-frequency sound waves, which are reflected by air bubbles and suspended particles in the flow. The sensor receives the reflected signal and determines the Doppler frequency shift, which indicates the estimated average flow velocity. The sensor is typically mounted at a manhole inlet to take advantage of smoother upstream flow conditions. The sensor may be offset to one side to lessen the chances of fouling and sedimentation where these problems are expected to occur. Manual level and velocity measurements were taken during installation of the flow meters and again when they were removed and were compared to simultaneous level and velocity readings from the flow meters to ensure proper calibration and accuracy. The pipe diameter was also verified in order to accurately calculate the flow cross-section. The continuous depth and velocity readings were recorded by the flow meters on 5-minute intervals. Figure 2-1 shows a typical installation for a flow meter with a submerged sensor.

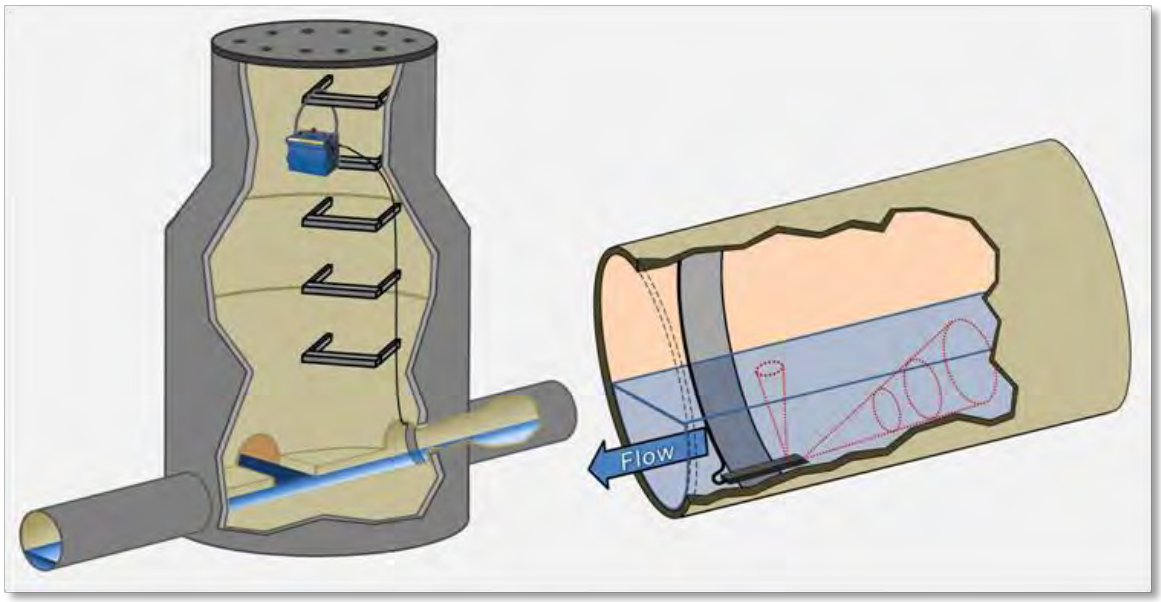


Figure 2-1. Typical Installation for Flow Meter with Submerged Sensor

2.3 Flow Calculation

Data retrieved from the flow meter was placed into a spreadsheet program for analysis. Data analysis includes data comparison to field calibration measurements, as well as necessary geometric adjustments as required for sediment (sediment reduces the pipe's wetted cross-sectional area available to carry flow). Area-velocity flow metering uses the continuity equation,

$$Q = v \cdot A = v \cdot (A_T - A_S)$$

where Q: volume flow rate
v: average velocity as determined by the ultrasonic sensor
A: cross-sectional area available to carry flow
A_T: total cross-sectional area with both wastewater and sediment
A_S: cross-sectional area of sediment.

For circular pipe,

$$A_T = \left[\frac{D^2}{4} \cos^{-1}\left(1 - \frac{2d_W}{D}\right) \right] - \left[\left(\frac{D}{2} - d_W\right)\left(\frac{D}{2}\right) \sin\left(\cos^{-1}\left(1 - \frac{2d_W}{D}\right)\right) \right]$$

$$A_S = \left[\frac{D^2}{4} \cos^{-1}\left(1 - \frac{2d_S}{D}\right) \right] - \left[\left(\frac{D}{2} - d_S\right)\left(\frac{D}{2}\right) \sin\left(\cos^{-1}\left(1 - \frac{2d_S}{D}\right)\right) \right]$$

where d_W: distance between wastewater level and pipe invert
d_S: depth of sediment
D: pipe diameter

2.4 Average Dry Weather Flow Determination

For this study, four distinct average dry weather flow (ADWF) curves were established for each site location:

- Mondays – Thursdays
- Fridays
- Saturdays
- Sundays

Flows for many sites differ on Friday evenings compared to Mondays through Thursdays. Starting around 7 pm, the flows are often decreased (compared to Monday through Thursday). Similarly, flow patterns for Saturday and Sunday were also separated due to their unique evening flow pattern. This type of differentiation can be important when determining I/I response, especially if a rain event occurs on a Friday, Saturday, or Sunday evening.

Figure 2-2 illustrates a sample of varying flow patterns within a typical dry week.

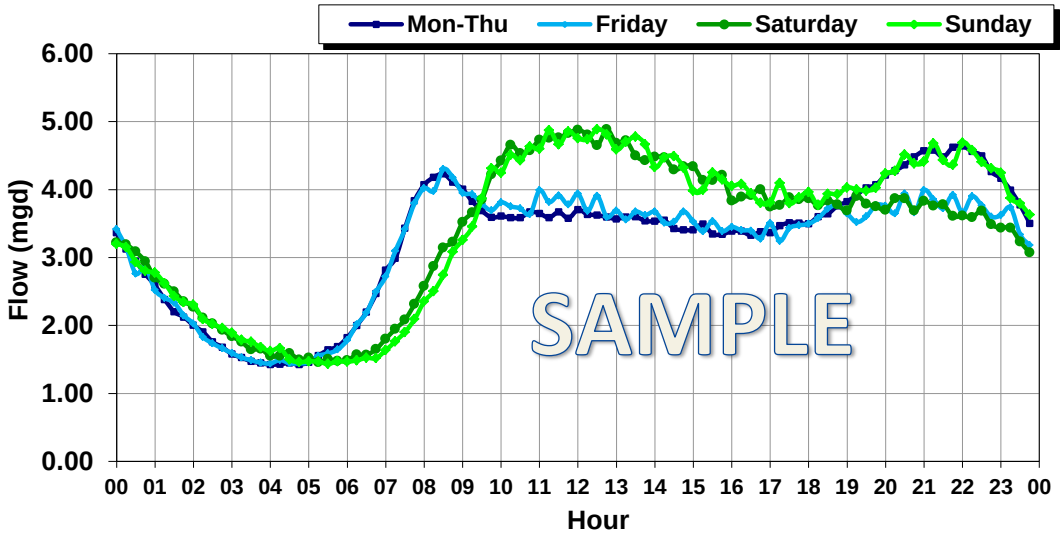


Figure 2-2. Sample Average Dry Weather Flow Diurnal Flow Patterns

ADWF curves are taken from dry days, when RDI had the least impact on the baseline flow. The overall ADWF was calculated per the following equation:

$$ADWF = \left(ADWF_{Mon–Thu} \times \frac{4}{7} \right) + \left(ADWF_{Fri} \times \frac{1}{7} \right) + \left(ADWF_{Sat} \times \frac{1}{7} \right) + \left(ADWF_{Sun} \times \frac{1}{7} \right),$$

3.0 RESULTS AND ANALYSIS

3.1 Flow Monitoring Results

Table 3-1 lists the ADWF, peak measured flow, and other calculated factors used to determine the pipeline capacity. Detailed graphs of the flow monitoring data are included in *Appendix A*.

Table 3-1. Dry Weather Flow Summary

Monitoring Site	Mon–Thu ADWF (mgd)	Friday ADWF (mgd)	Saturday ADWF (mgd)	Sunday ADWF (mgd)	Overall ADWF (mgd)
Site 1	0.001	0.001	0.001	0.003	0.001
Site 2	0.079	0.077	0.085	0.093	0.081
Site 3	0.266	0.250	0.264	0.280	0.266
Site 4	0.070	0.067	0.043	0.043	0.062
Site 5	0.083	0.084	0.094	0.087	0.085
Site 6	0.187	0.177	0.189	0.207	0.188
Site 7	0.151	0.140	0.147	0.157	0.150
Site 8	0.008	0.008	0.009	0.009	0.008

The following additional information is noted.

- There was approximately 1.21 inches of rainfall during the flow monitoring period. Some of the flow monitoring sites showed a slight inflow response. The impact of inflow and infiltration (I/I) was not evaluated as part of this study. Under wet weather flow conditions the available capacity may be less due to I/I.

3.2 Capacity Analysis: Peaking Factor and d/D Ratio

Peak measured flows and the corresponding flow levels (depths) are important to understand the capacity limitations of a collection system. The peak flows and flow levels reported are from the peak measurements as taken across the entirety of the flow monitoring period. The following capacity analysis terms are defined as follows.

- **Peaking Factor:** Peaking factor is defined as the peak measured flow divided by the overall ADWF. Peaking factors are influenced by many factors including size and topography of tributary area, proximity to pump stations, and I/I entering the collection system. Flow attenuation will also affect the peaking factor. A peaking factor threshold value of 3.0 is commonly used for sanitary sewer design of new pipe; however, it is noted that this value is variable and subject to attenuation and the size of the upstream collector area. The City should follow its own standards and criteria when examining peaking factors.

- **d/D Ratio:** The d/D ratio is the peak measured depth of flow (d) divided by the pipe diameter (D). Standards for d/D ratio vary from agency to agency, but typically range between $0.5 \leq d/D \leq 0.75$. The d/D ratio for each site was computed based on the maximum depth of flow for the flow monitoring study.

Table 3-2 summarizes the peak recorded flows, levels, *d/D* ratios, and peaking factors per site during the flow monitoring period. Results of note have been shaded in RED. Capacity analysis data is presented on a site-by-site basis and represents the hydraulic conditions only at the site locations; hydraulic conditions in other areas of the collection system will differ.

Table 3-2. Capacity Analysis Summary

Site	ADWF (mgd)	Peak Measured Flow (mgd)	Peaking Factor	Pipe Diameter, *D* (in)	Max Depth, *d* (in)	Max *d/D* Ratio
Site 1	0.001	0.06	57.0	8	2.79	0.35
Site 2	0.081	0.21	2.6	8	3.28	0.41
Site 3	0.266	0.57	2.1	12	5.35	0.45
Site 4	0.062	0.16	2.6	10	4.15	0.42
Site 5	0.085	0.18	2.1	12	3.78	0.32
Site 6	0.188	0.34	1.8	12	4.68	0.39
Site 7	0.150	0.32	2.1	10	2.52	0.25
Site 8	0.008	0.05	6.0	8	3.15	0.39

The following capacity analysis results are noted.

- **Peaking Factor:** Site 1 and Site 8 had peaking factors greater than 5.0. It is possible that these peaking factors were skewed high because of their respective low ADWFs.

- **d/D Ratio:** All sites had a max *d/D* ratio below the typically accepted values. None of the monitored sites reached a surcharged condition during this study.

3.3 Inflow and Infiltration

Two storm events occurred during the flow monitoring period. The greater of the storms had approximately 1.21 inches of rain fall during the overnight hours of November 20, 2016. Three sites indicated a minor response to rainfall. Site 3 had the largest response; however, the I/I response was still relatively small and had minimal impact on available capacity of the local collection system (Figure 3-1). Site 5 (Figure 3-2) and Site 7 (Figure 3-3) had very small, but perceivable I/I responses. The other flow monitoring sites had negligible I/I response to the rainfall event.

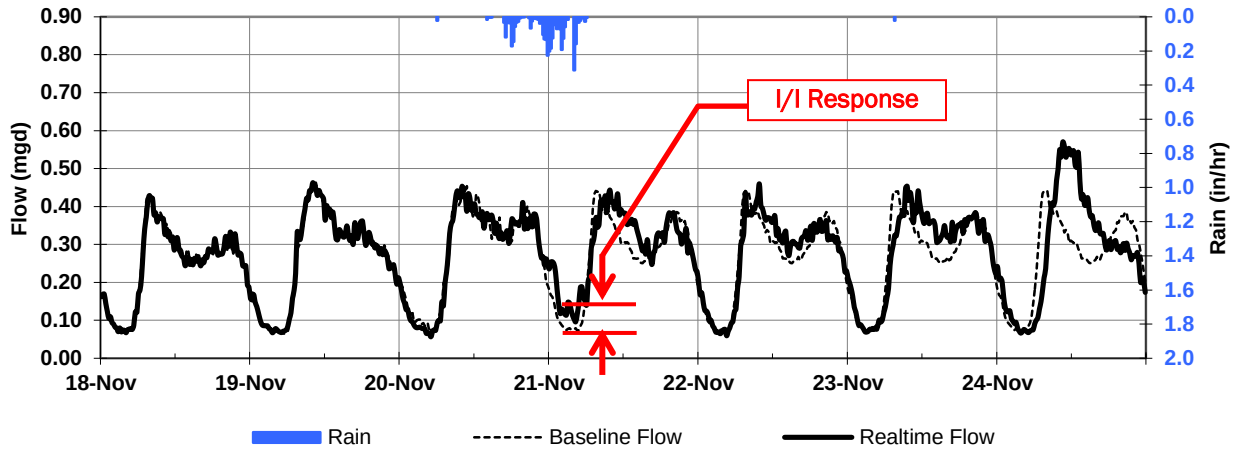


Figure 3-1. Site 3 Inflow / Infiltration Response

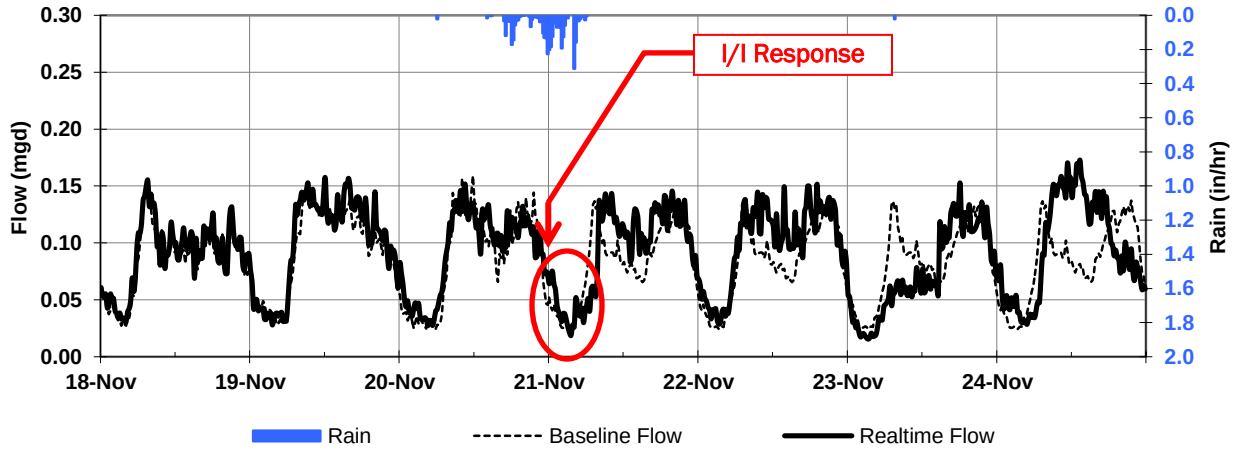


Figure 3-2. Site 5 Inflow / Infiltration Response

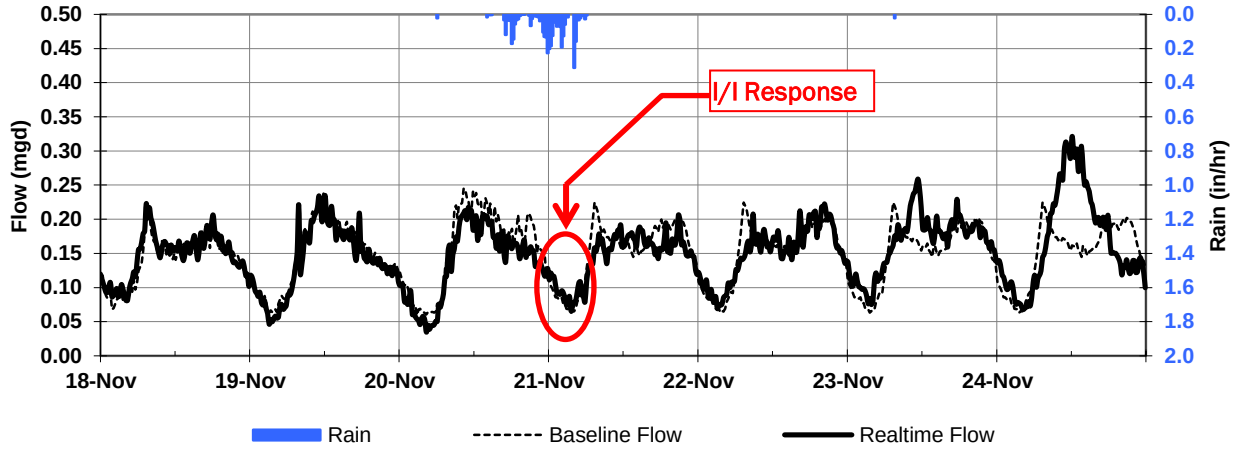


Figure 3-3. Site 7 Inflow / Infiltration Response

APPENDIX A. FLOW MONITORING SITES: DATA, GRAPHS, INFORMATION

City of Placentia

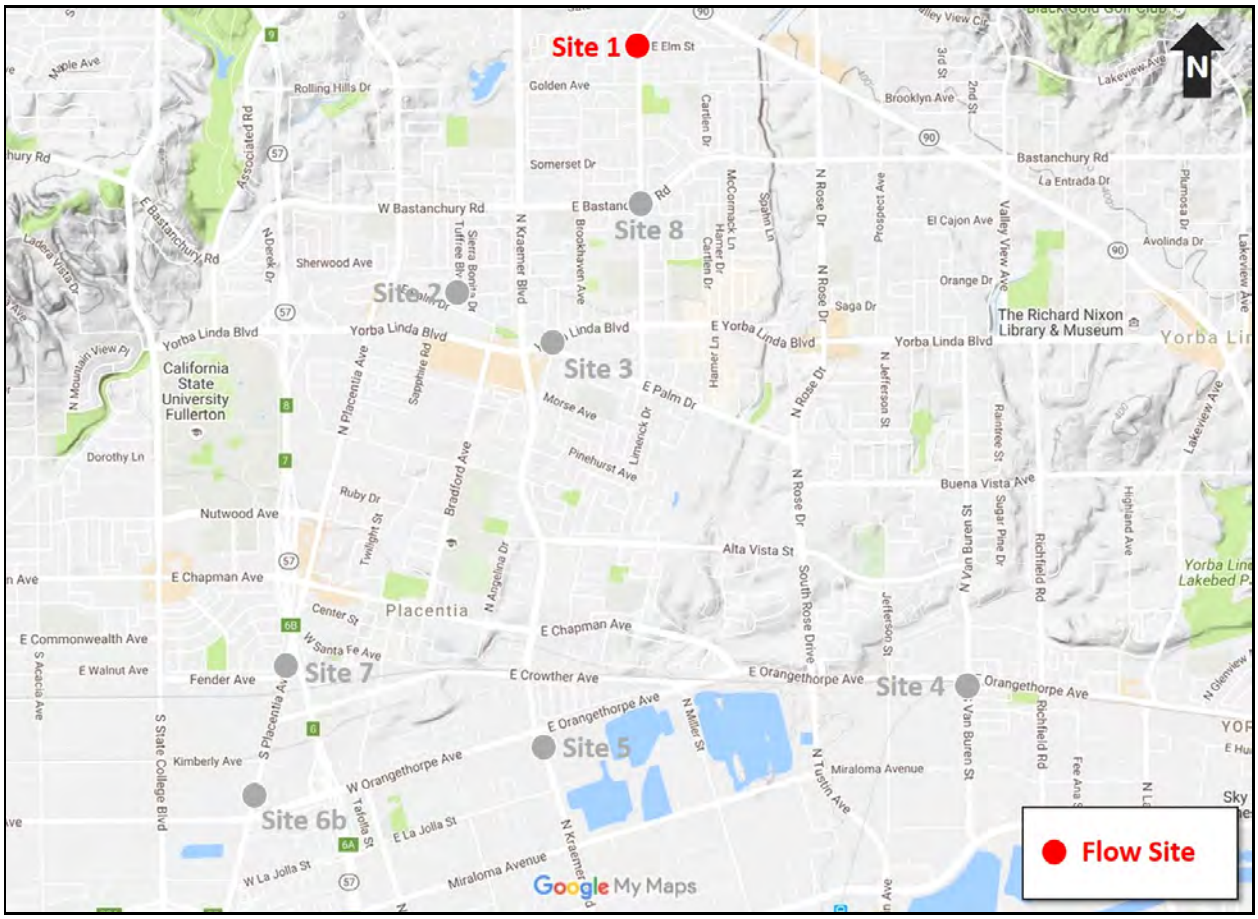
Sanitary Sewer Flow Monitoring

Temporary Monitoring: November 18 - December 8, 2016

Monitoring Site: Site 1

Location: Valencia Avenue at East Elm Street

Data Summary Report



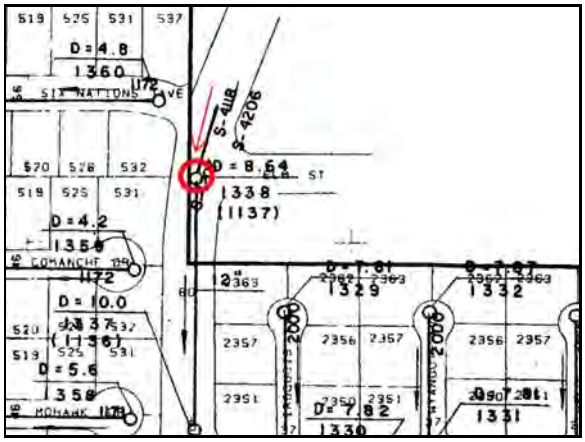
Vicinity Map: Site 1

SITE 1

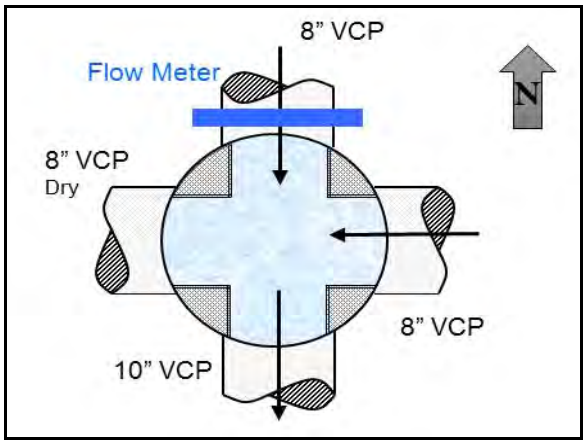
Site Information

Location:	Valencia Avenue at East Elm Street
Coordinates:	117.8550° W, 33.9060° N
Rim Elevation (Earth):	363 feet
Pipe Diameter:	8 inches
ADWF:	0.001 mgd
Peak Measured Flow:	0.057 mgd

Satellite Map



Sewer Map



Flow Sketch

Street View

Plan View

SITE 1

Additional Site Photos

North Inlet

South Outlet

SITE 1

Additional Site Photos

East Inlet

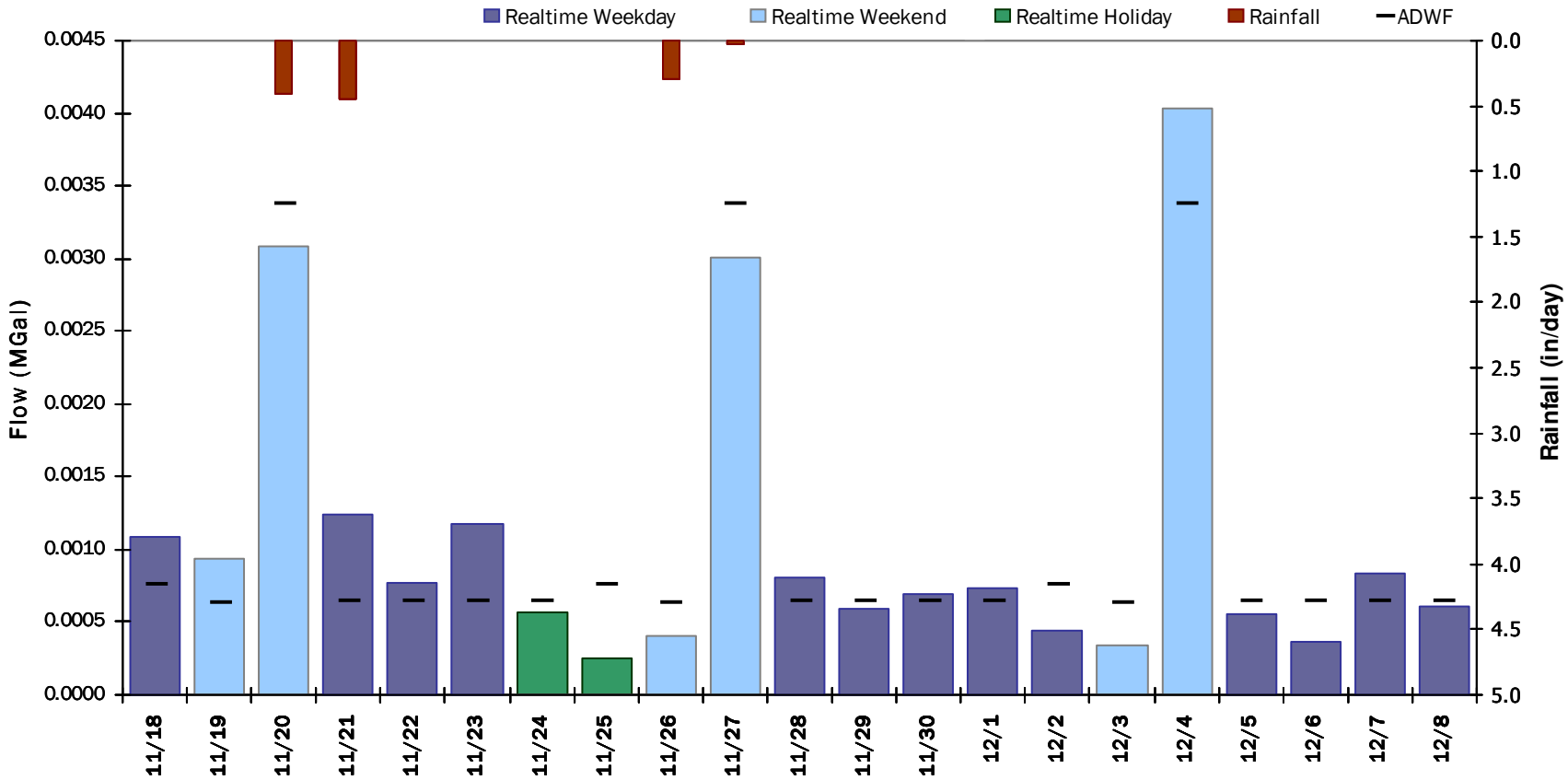
West Inlet

SITE 1

Period Flow Summary: Daily Flow Totals

Avg Period Flow: 0.001 MGal **Peak Daily Flow: 0.004 MGal** **Min Daily Flow: 0.000 MGal**

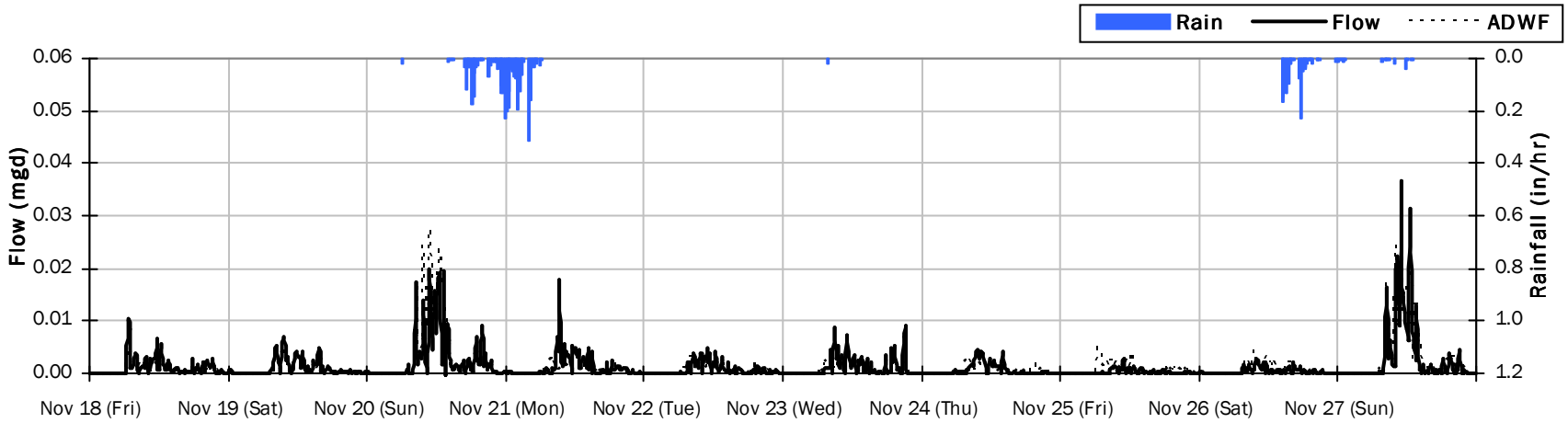
Total Period Rainfall: 1.21 inches

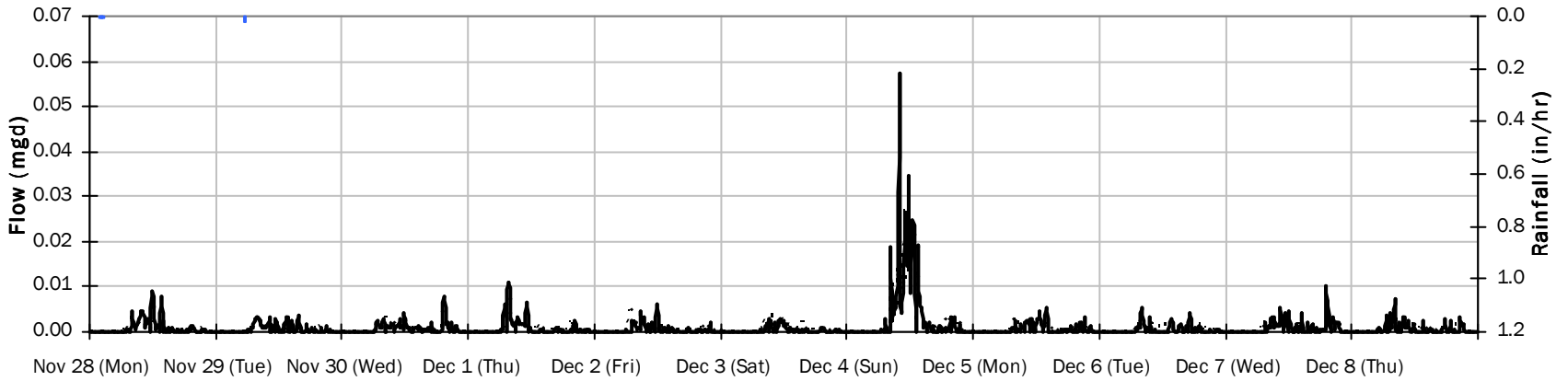


SITE 1

Flow Summary: 11/18/2016 to 12/8/2016

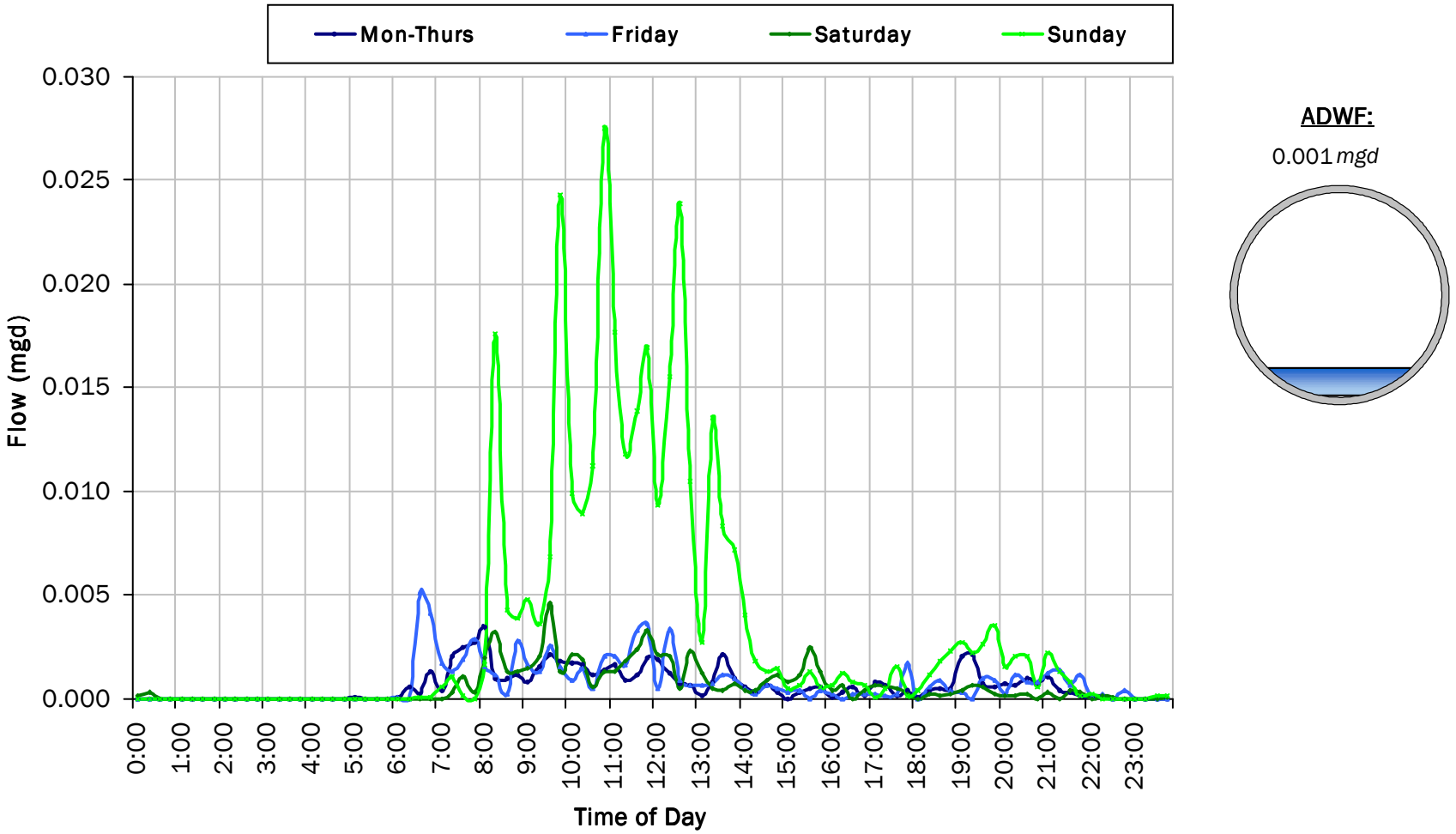
Total Period Rainfall: 1.21 inches **Avg Flow: 0.001 mgd** **Peak Flow: 0.057 mgd** **Min Flow: 0.000 mgd**





SITE 1

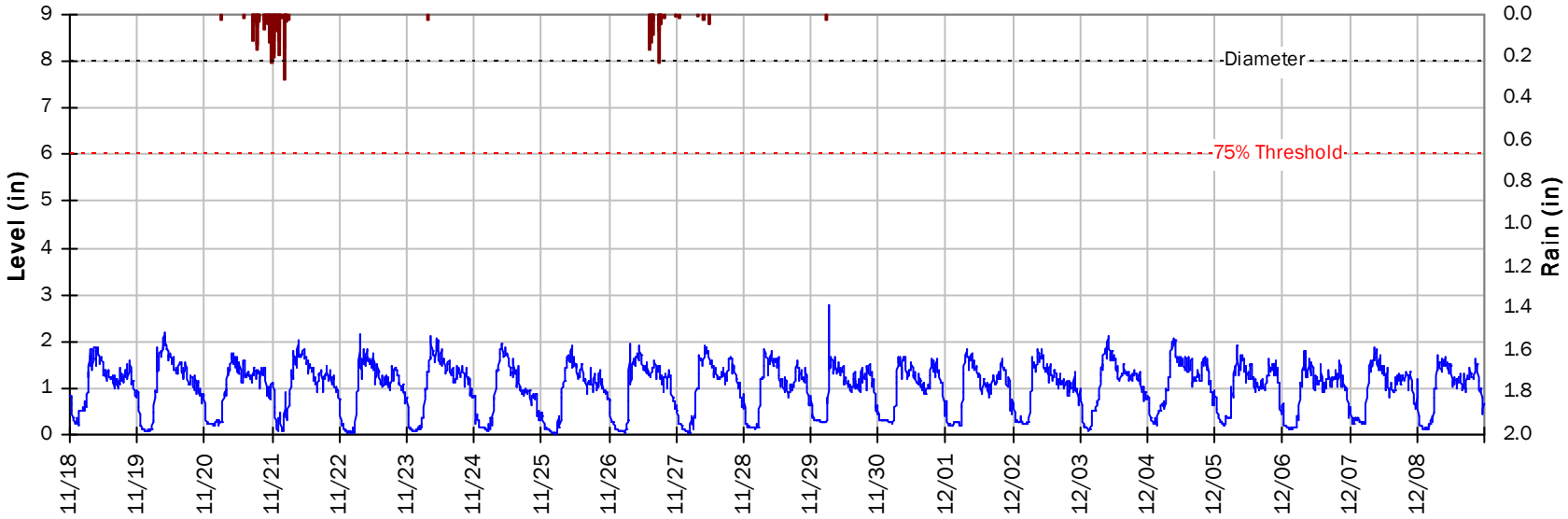
Average Dry Weather Flow Hydrographs

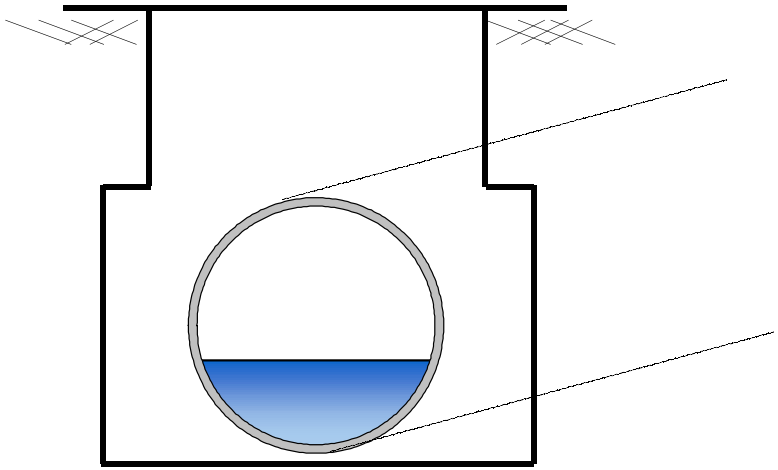


SITE 1

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Rainfall Event



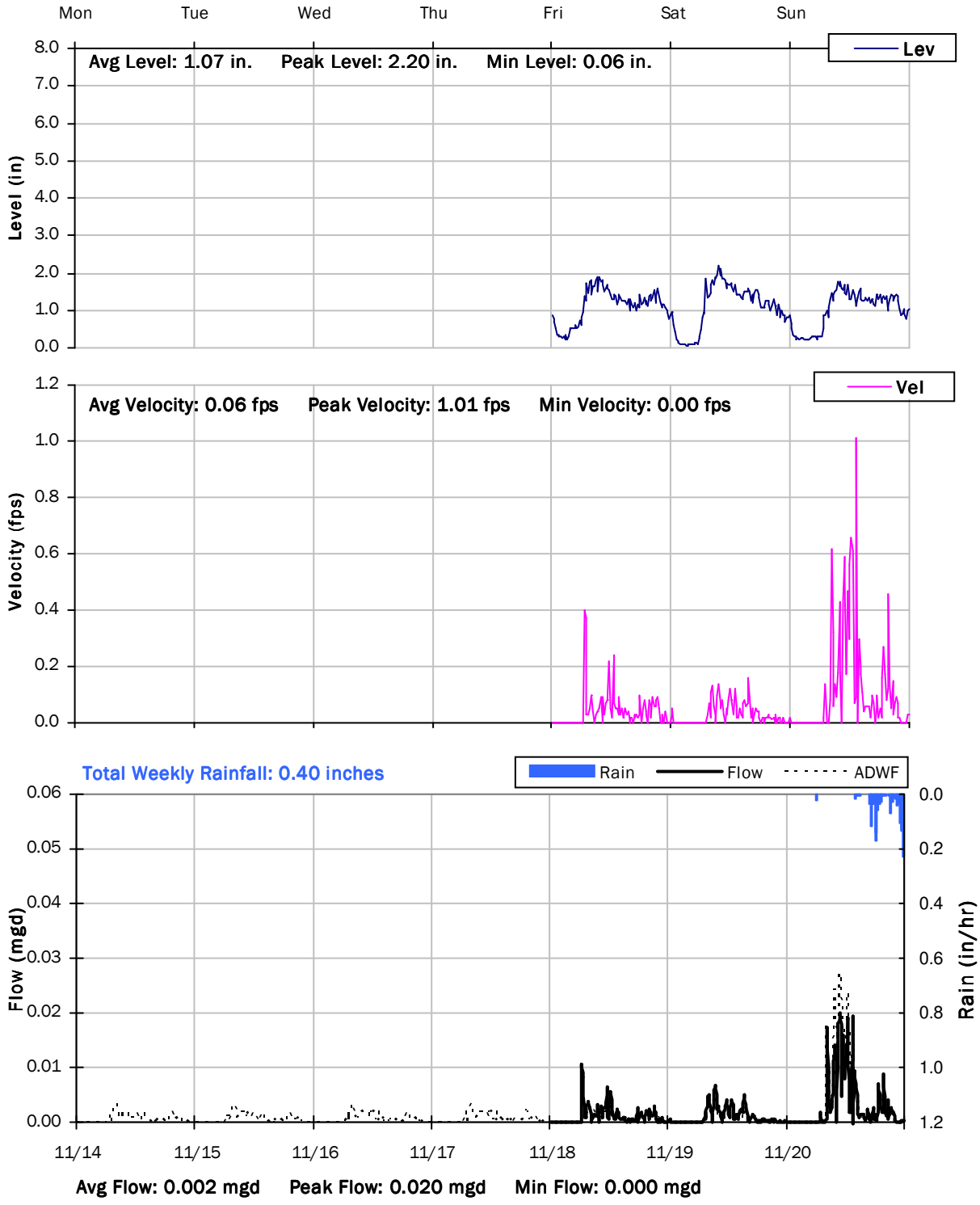


Pipe Diameter:	8	*inches*
Peak Measured Level:	2.79	*inches*
Peak d/D Ratio:	0.35	
Dry Weather Design Threshold Level:	4.00	*inches*

SITE 1

Weekly Level, Velocity and Flow Hydrographs

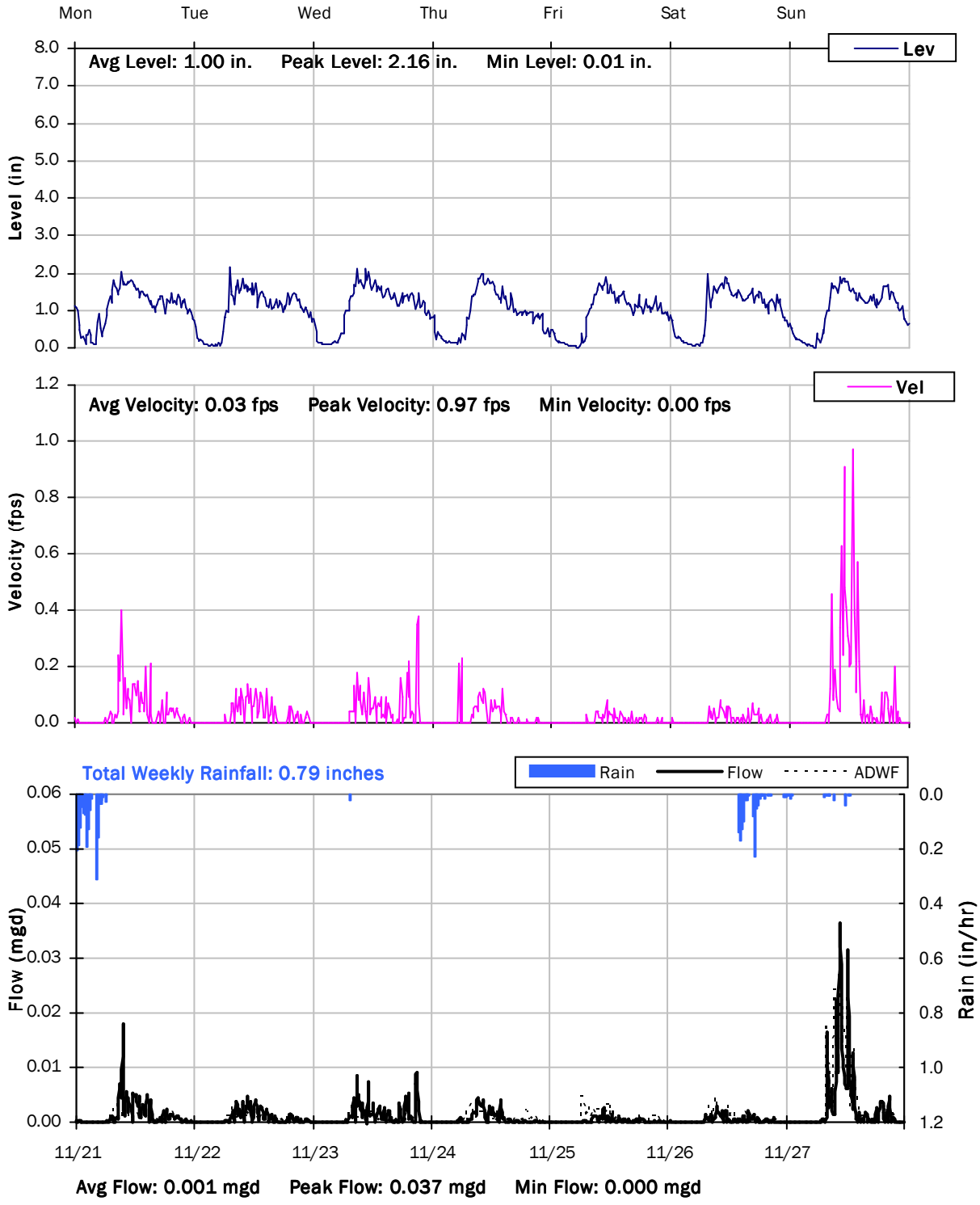
11/14/2016 to 11/21/2016



SITE 1

Weekly Level, Velocity and Flow Hydrographs

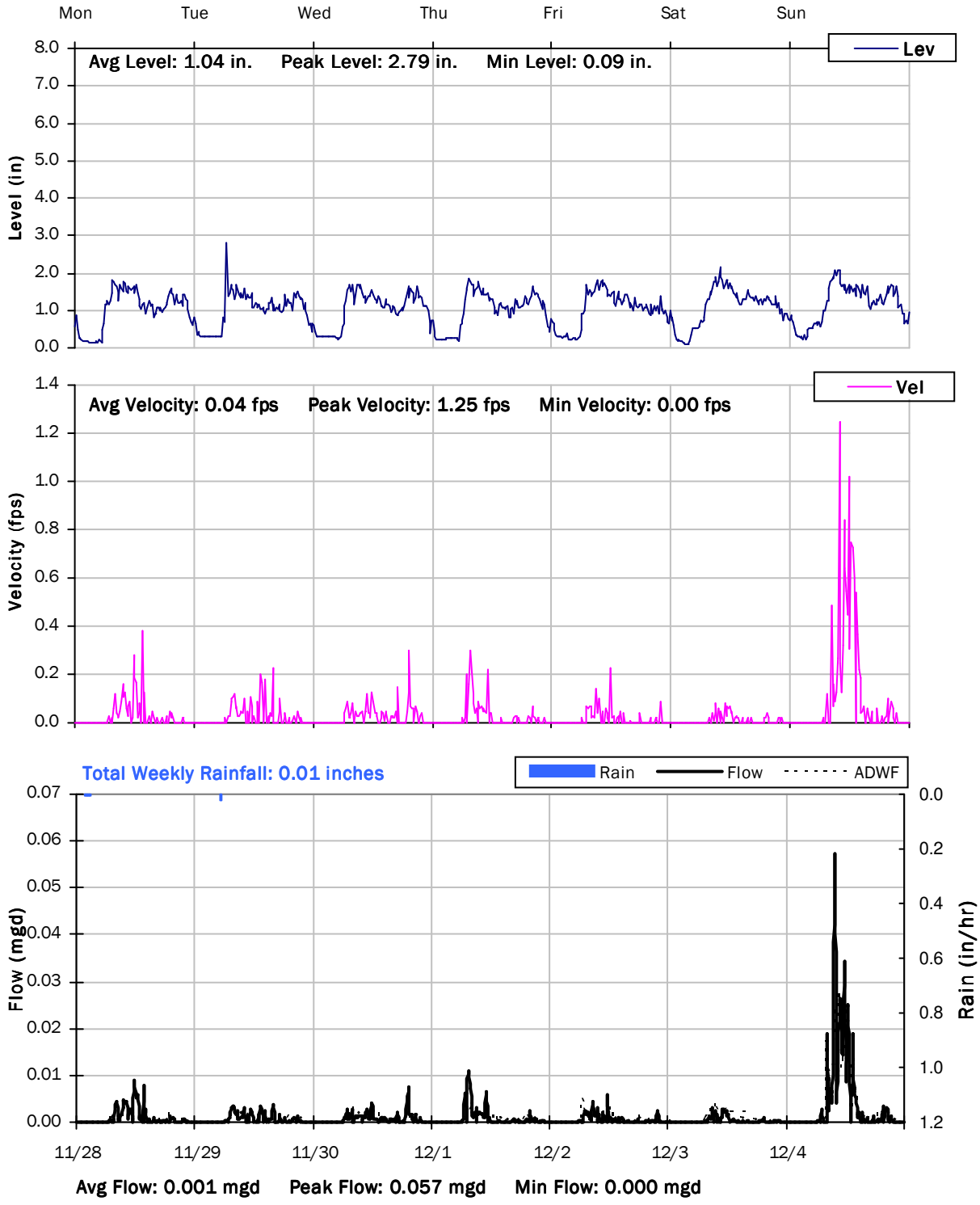
11/21/2016 to 11/28/2016



SITE 1

Weekly Level, Velocity and Flow Hydrographs

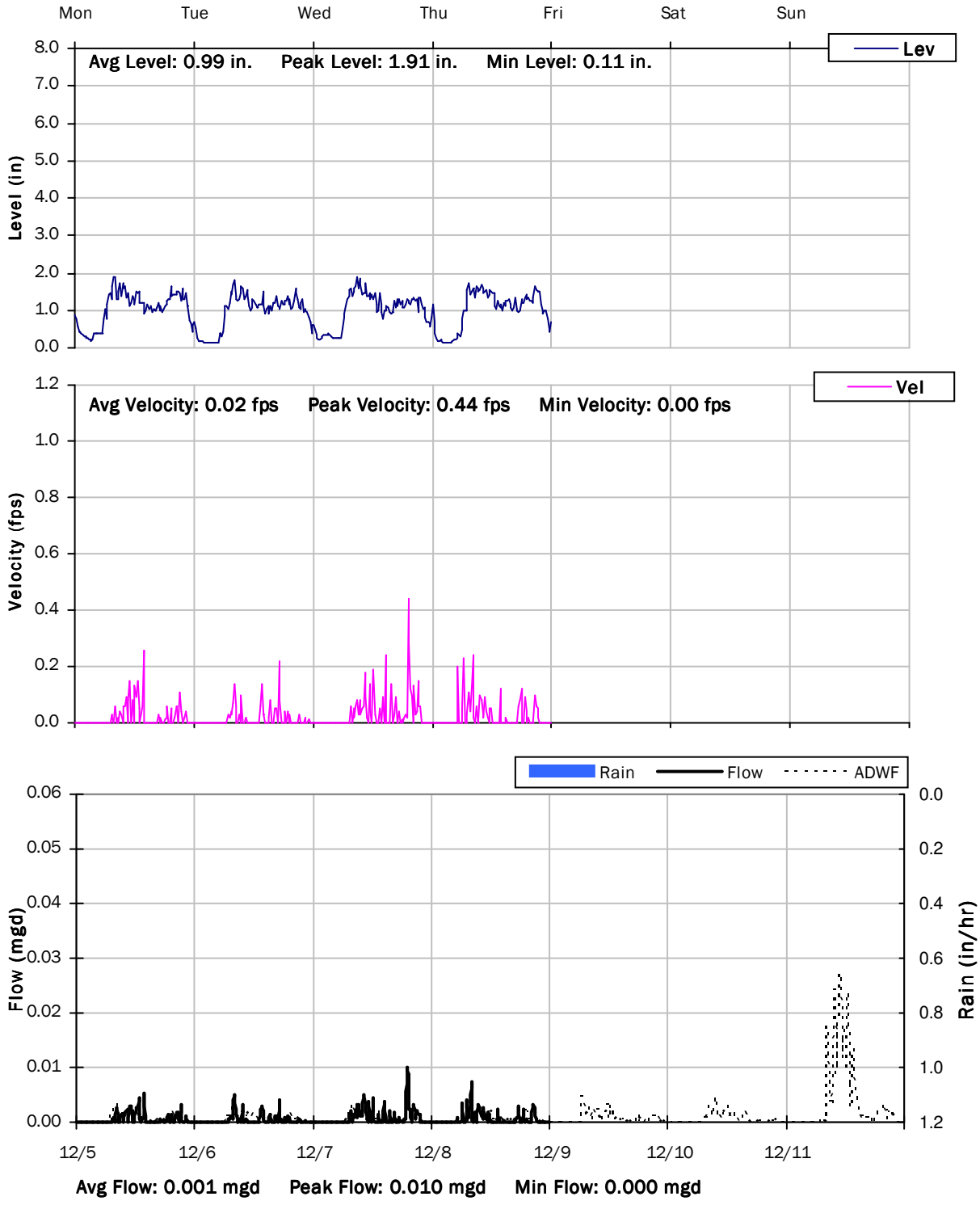
11/28/2016 to 12/5/2016



SITE 1

Weekly Level, Velocity and Flow Hydrographs

12/5/2016 to 12/12/2016



City of Placentia

Sanitary Sewer Flow Monitoring

Temporary Monitoring: November 18 - December 8, 2016

Monitoring Site: Site 2

Location: 1547 Tuffree Boulevard

Data Summary Report

Vicinity Map: Site 2

SITE 2

Site Information

Location: 1547 Tuffree Boulevard

Coordinates: 117.8680° W, 33.8911° N

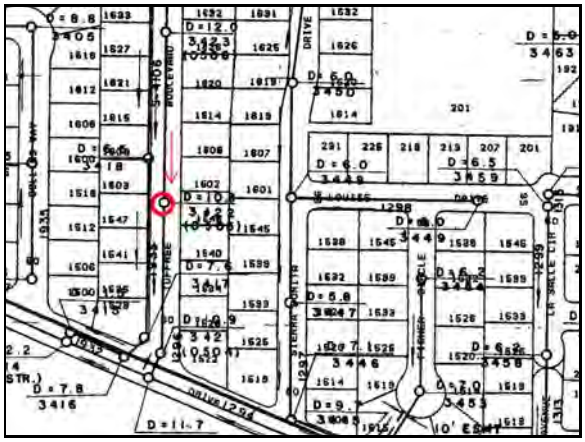
Rim Elevation (Earth): 295 feet

Pipe Diameter: 8 inches

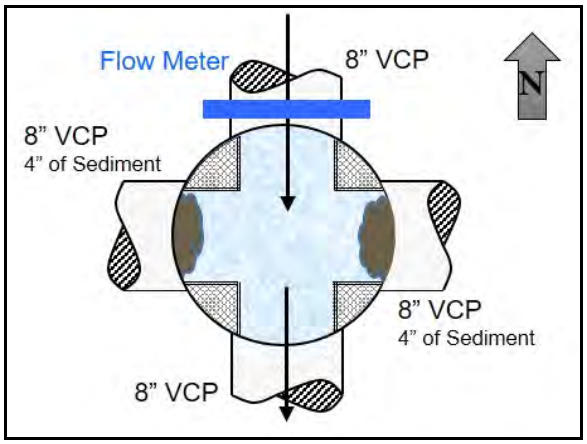
ADWF: 0.081 mgd

Peak Measured Flow: 0.210 mgd

Satellite Map



Sewer Map



Flow Sketch

Street View

Plan View

SITE 2

Additional Site Photos

North Inlet

South Outlet

SITE 2

Additional Site Photos

East Inlet

West Inlet

SITE 2

Period Flow Summary: Daily Flow Totals

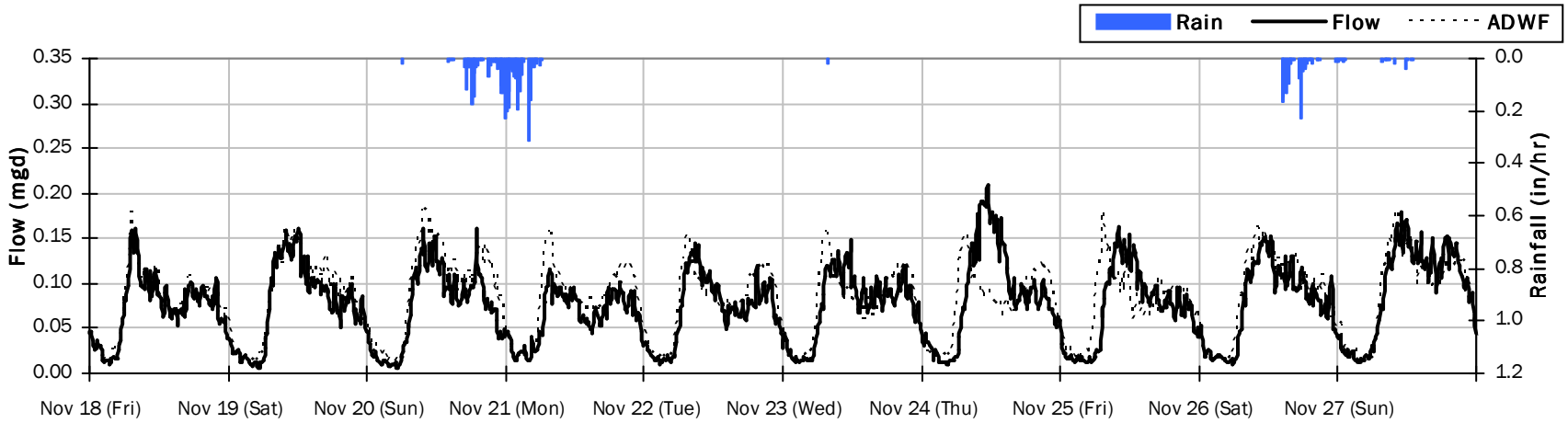
Avg Period Flow: 0.079 MGal **Peak Daily Flow: 0.093 MGal** **Min Daily Flow: 0.064 MGal**

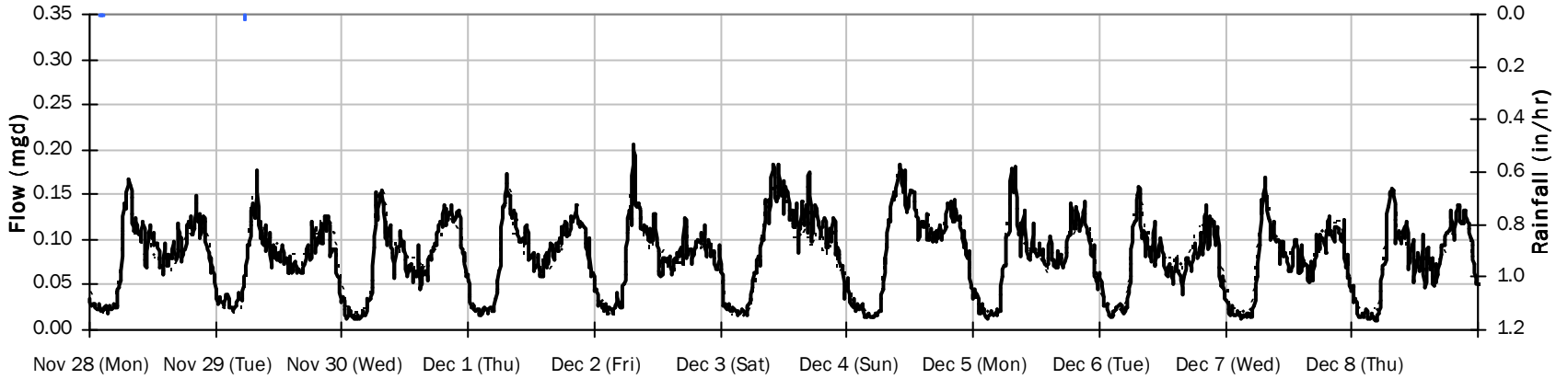
Total Period Rainfall: 1.21 inches

SITE 2

Flow Summary: 11/18/2016 to 12/8/2016

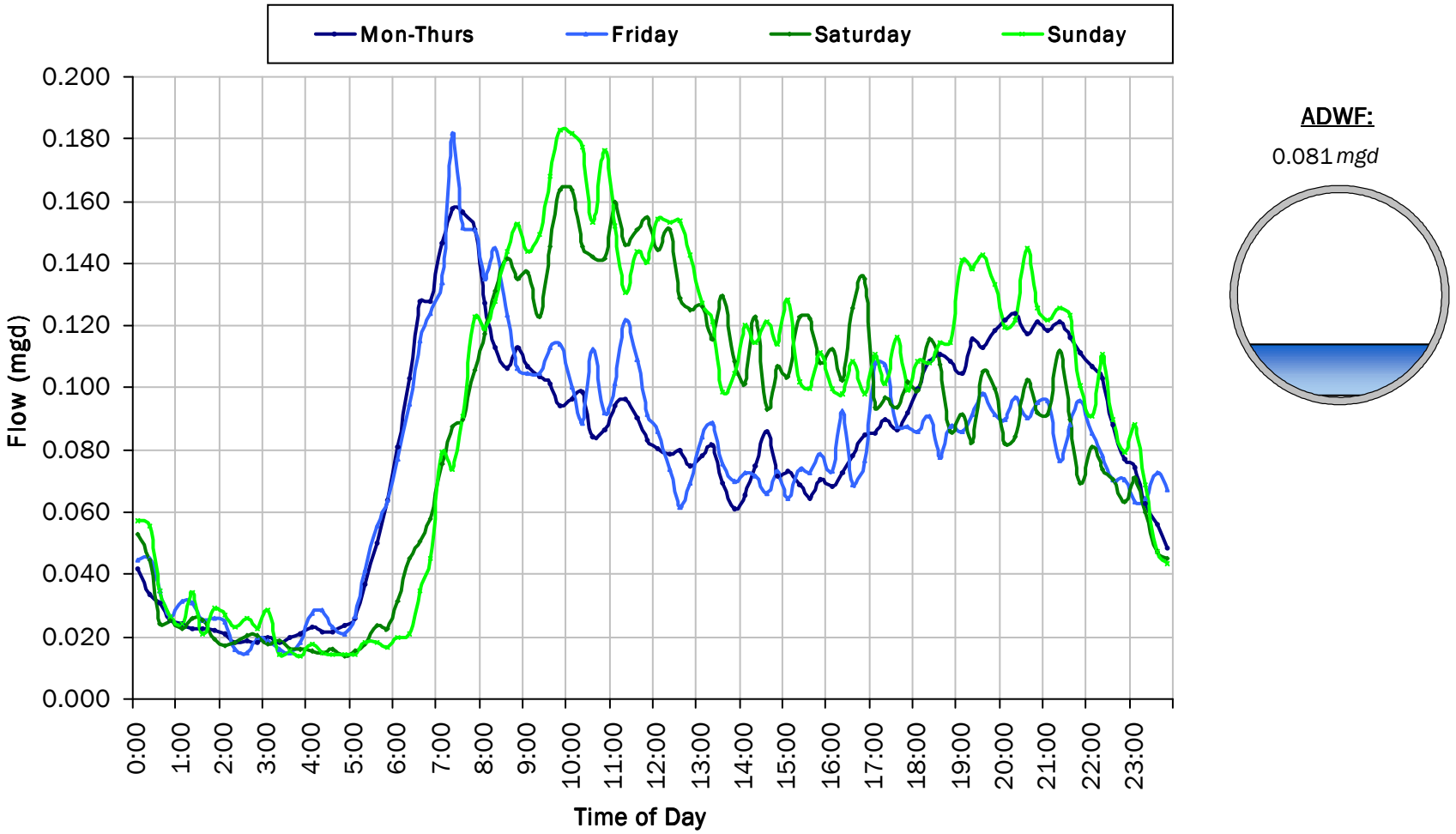
Total Period Rainfall: 1.21 inches **Avg Flow: 0.079 mgd Peak Flow: 0.210 mgd Min Flow: 0.006 mgd**





SITE 2

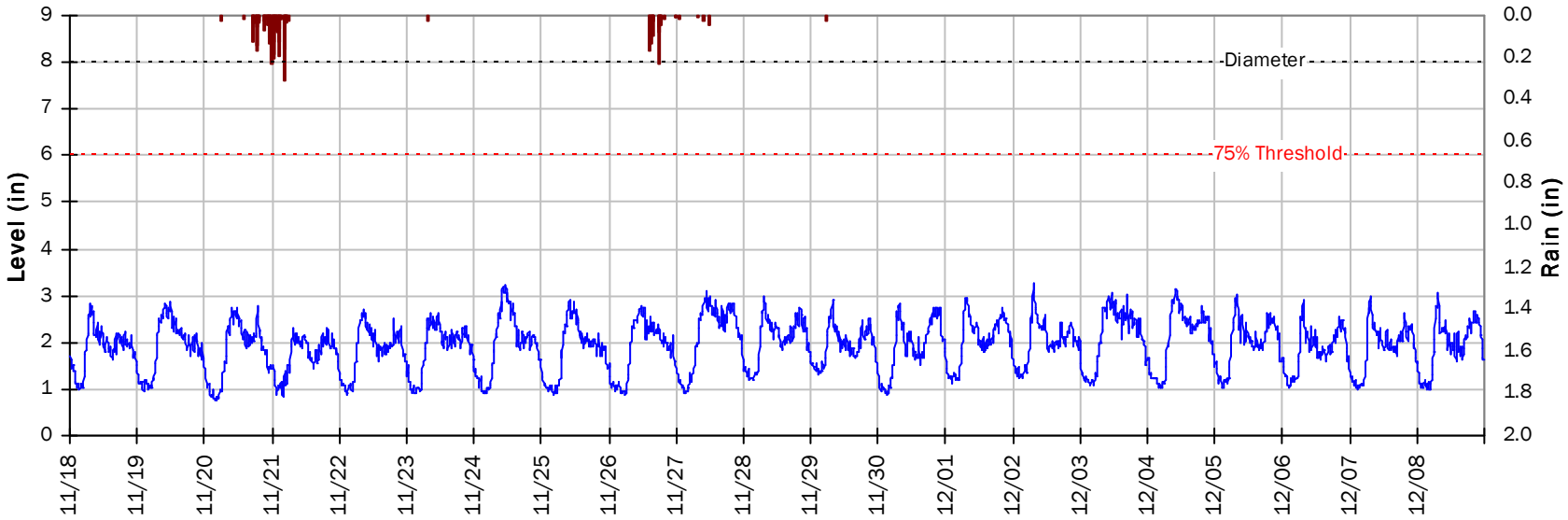
Average Dry Weather Flow Hydrographs

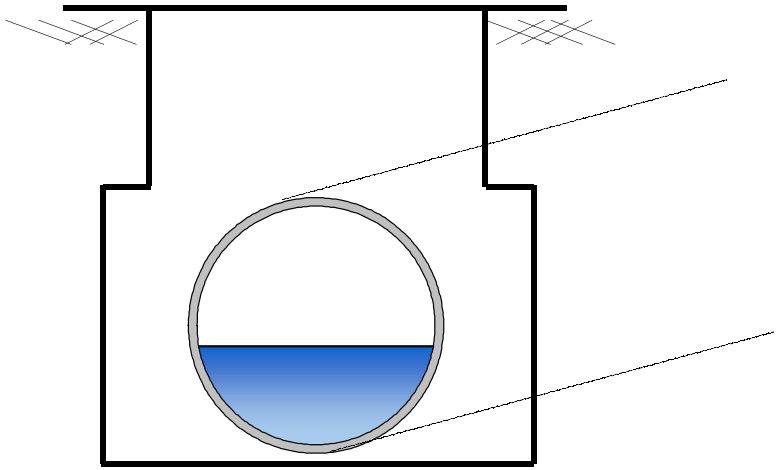


SITE 2

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Rainfall Event



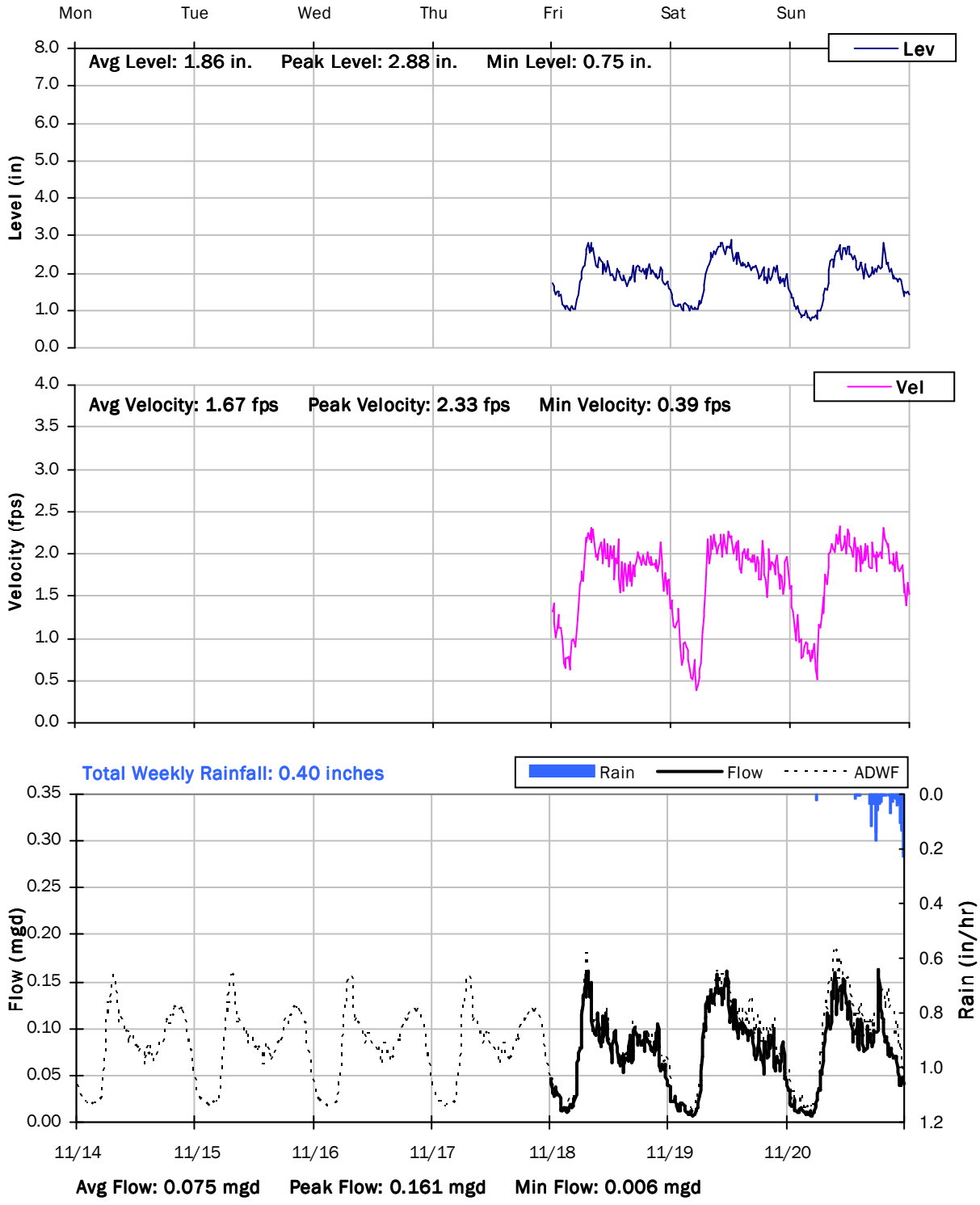


Pipe Diameter:	8	*inches*
Peak Measured Level:	3.28	*inches*
Peak d/D Ratio:	0.41	
Dry Weather Design Threshold Level:	4.00	*inches*

SITE 2

Weekly Level, Velocity and Flow Hydrographs

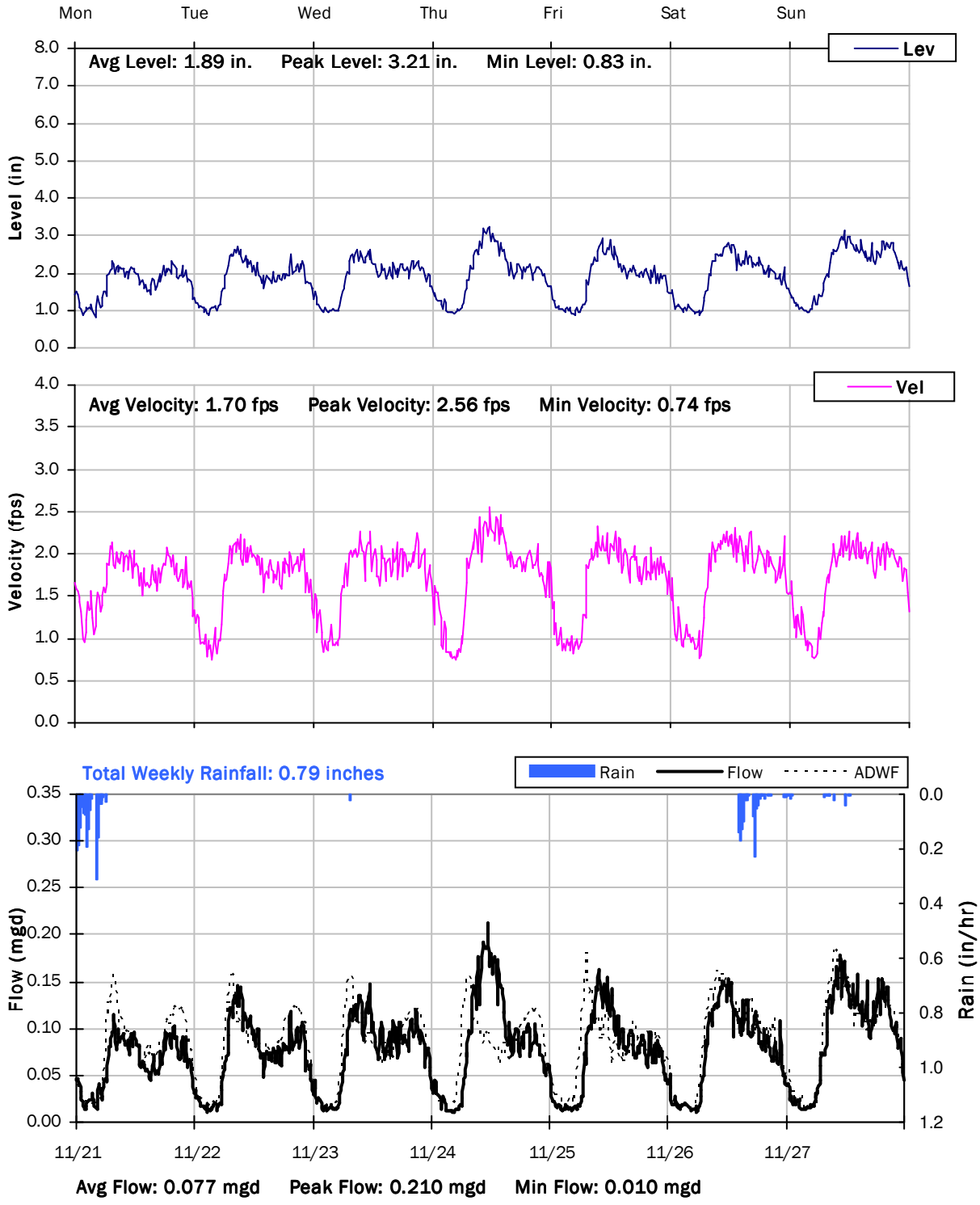
11/14/2016 to 11/21/2016



SITE 2

Weekly Level, Velocity and Flow Hydrographs

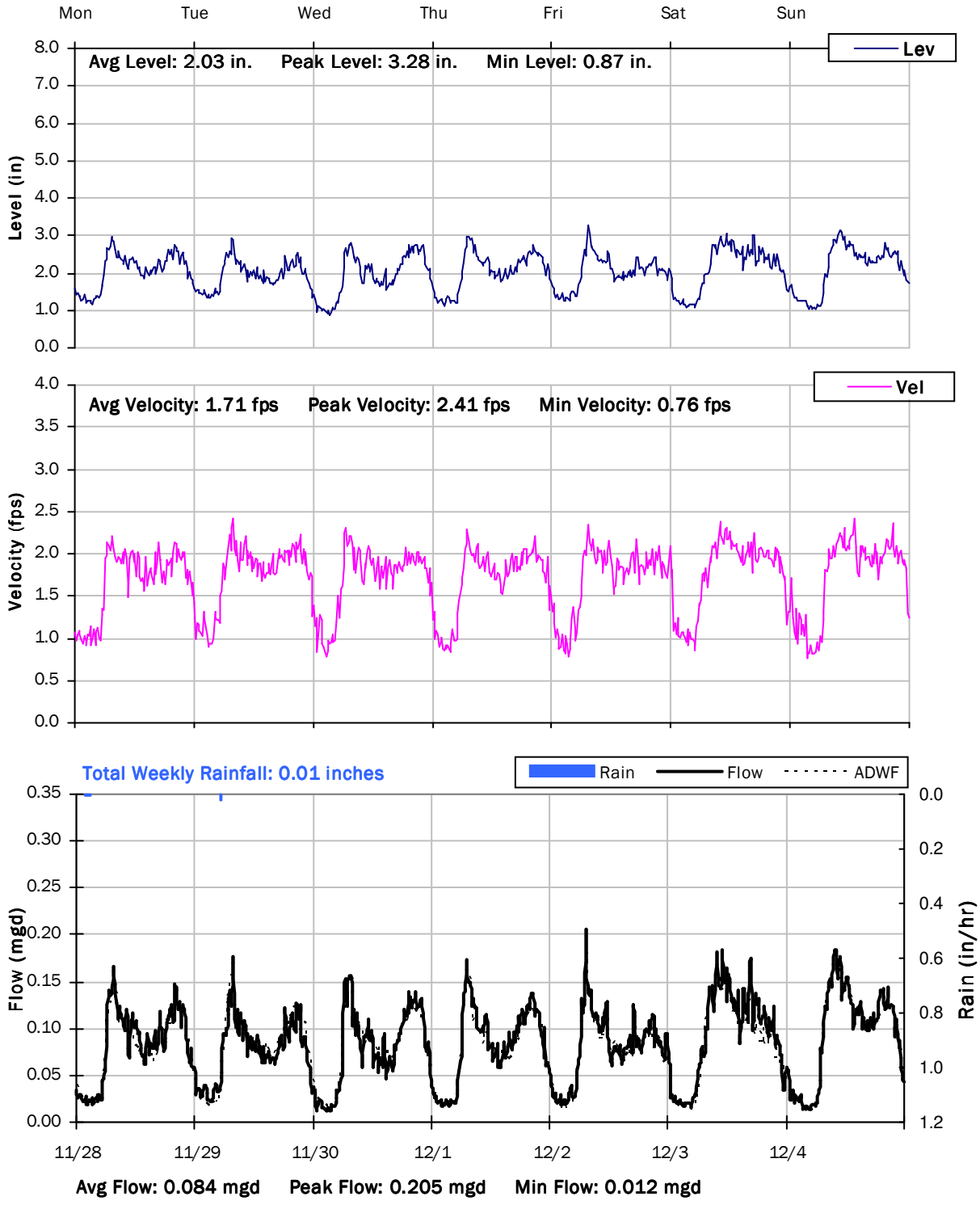
11/21/2016 to 11/28/2016



SITE 2

Weekly Level, Velocity and Flow Hydrographs

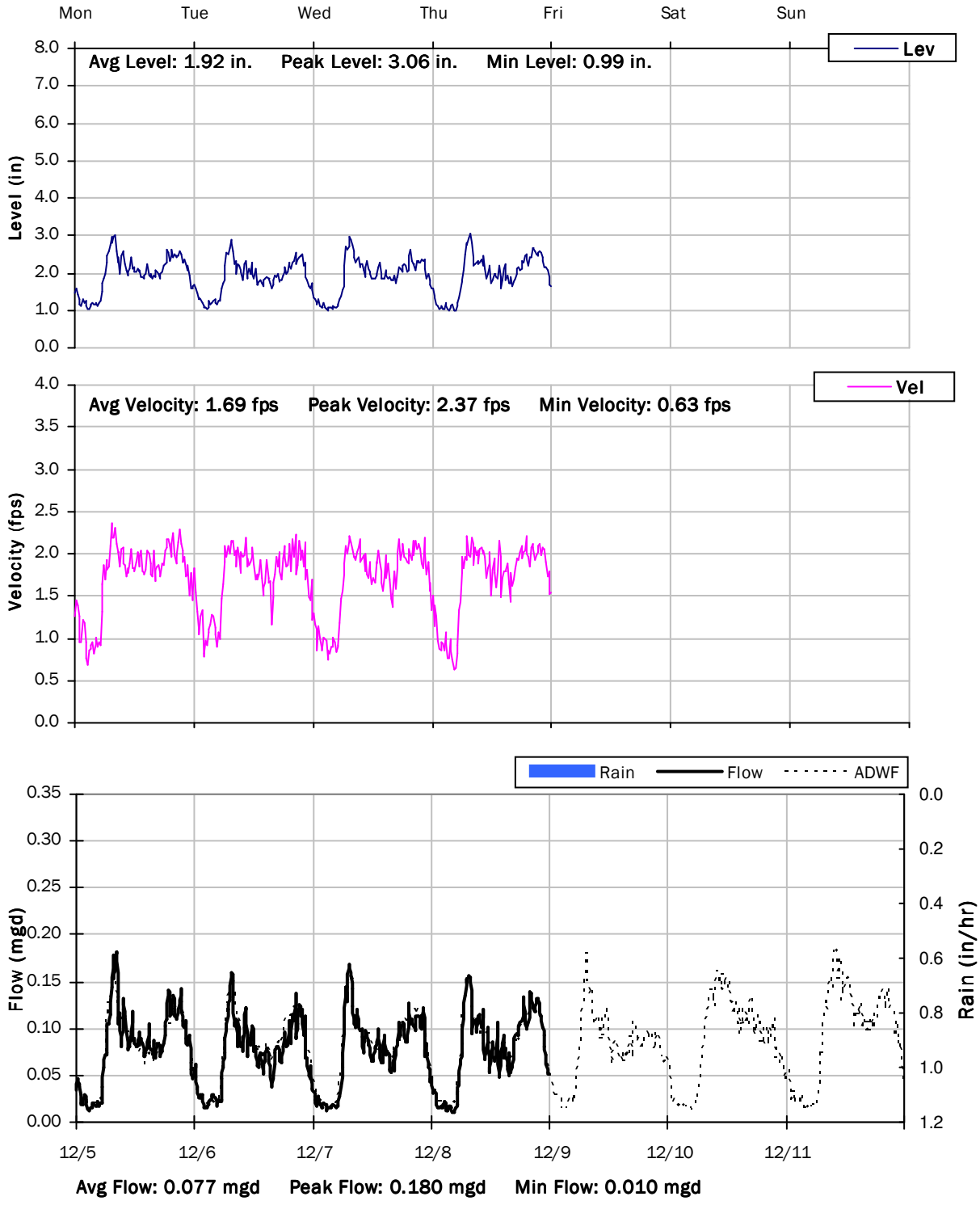
11/28/2016 to 12/5/2016



SITE 2

Weekly Level, Velocity and Flow Hydrographs

12/5/2016 to 12/12/2016



City of Placentia

Sanitary Sewer Flow Monitoring

Temporary Monitoring: November 18 - December 8, 2016

Monitoring Site: Site 3

Location: Yorba Linda Boulevard north of East Palm Drive

Data Summary Report

Vicinity Map: Site 3

SITE 3

Site Information

Location: Yorba Linda Boulevard north of East Palm Drive

Coordinates: 117.8611° W, 33.8886° N

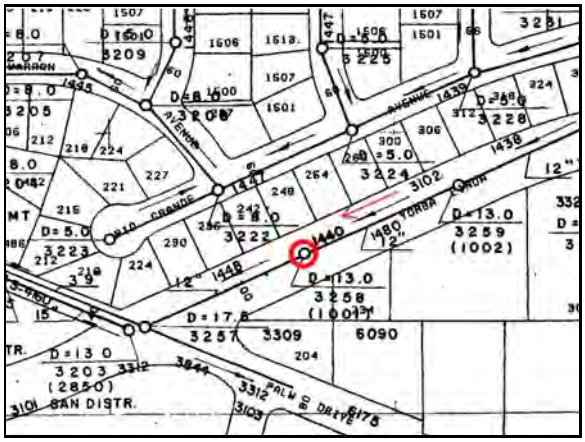
Rim Elevation (Earth): 306 feet

Pipe Diameter: 12 inches

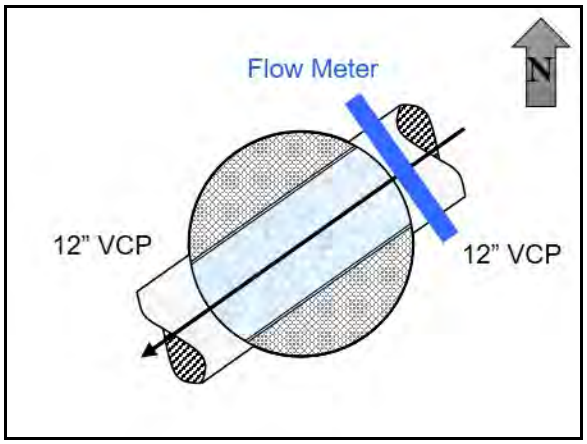
ADWF: 0.266 mgd

Peak Measured Flow: 0.570 mgd

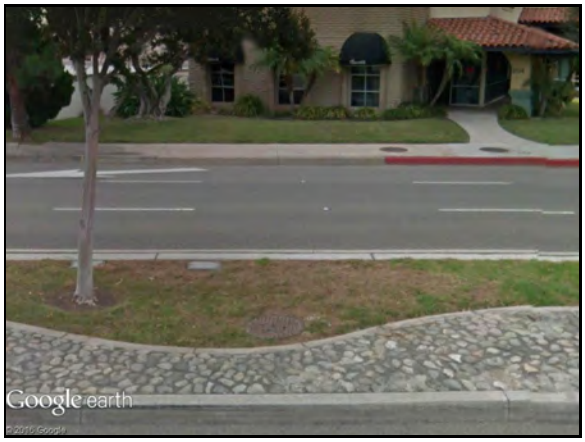
Satellite Map



Sewer Map



Flow Sketch



Street View

Plan View

SITE 3

Additional Site Photos

East Inlet

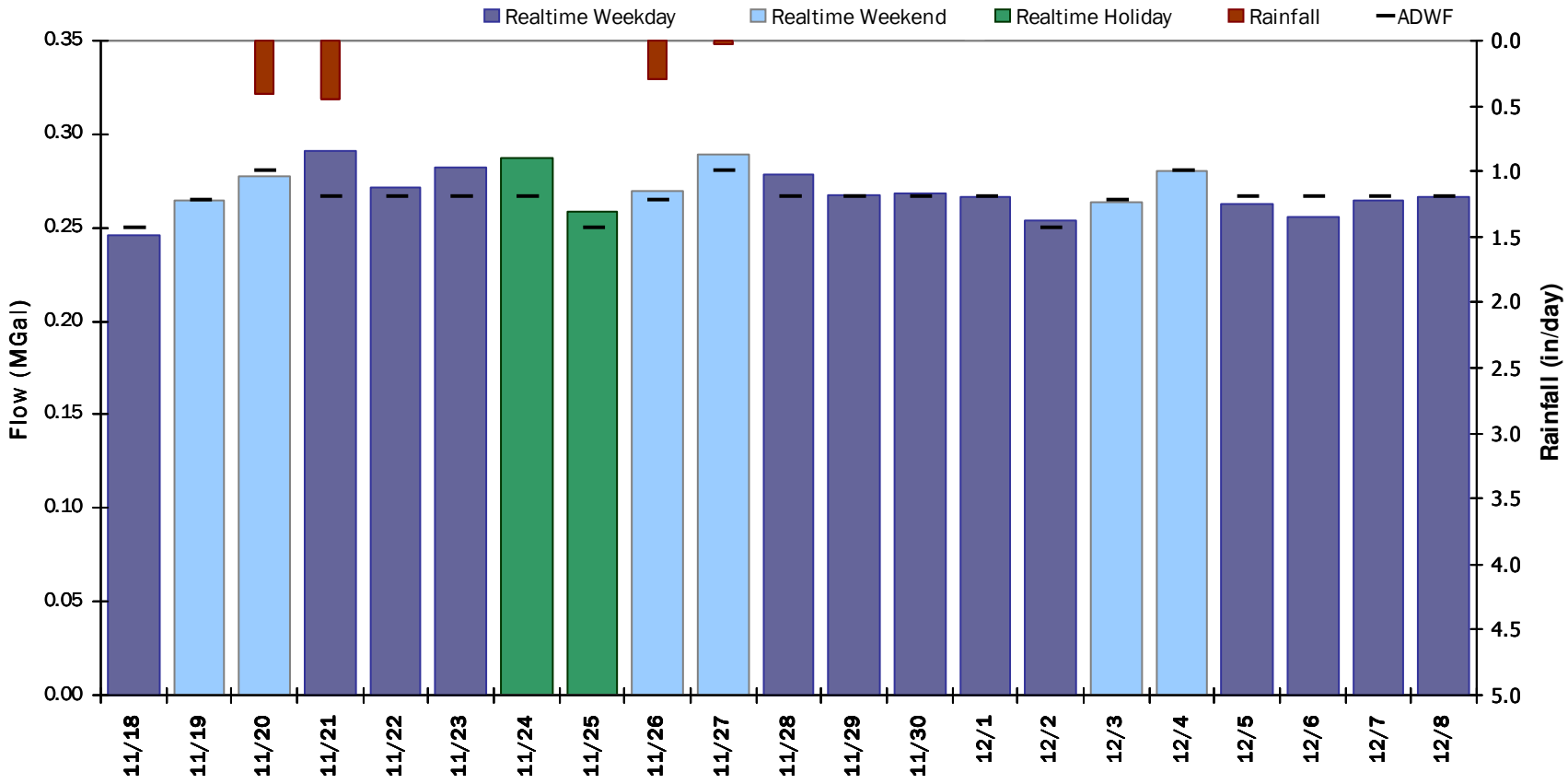
West Outlet

SITE 3

Period Flow Summary: Daily Flow Totals

Avg Period Flow: 0.270 MGal **Peak Daily Flow: 0.291 MGal** **Min Daily Flow: 0.246 MGal**

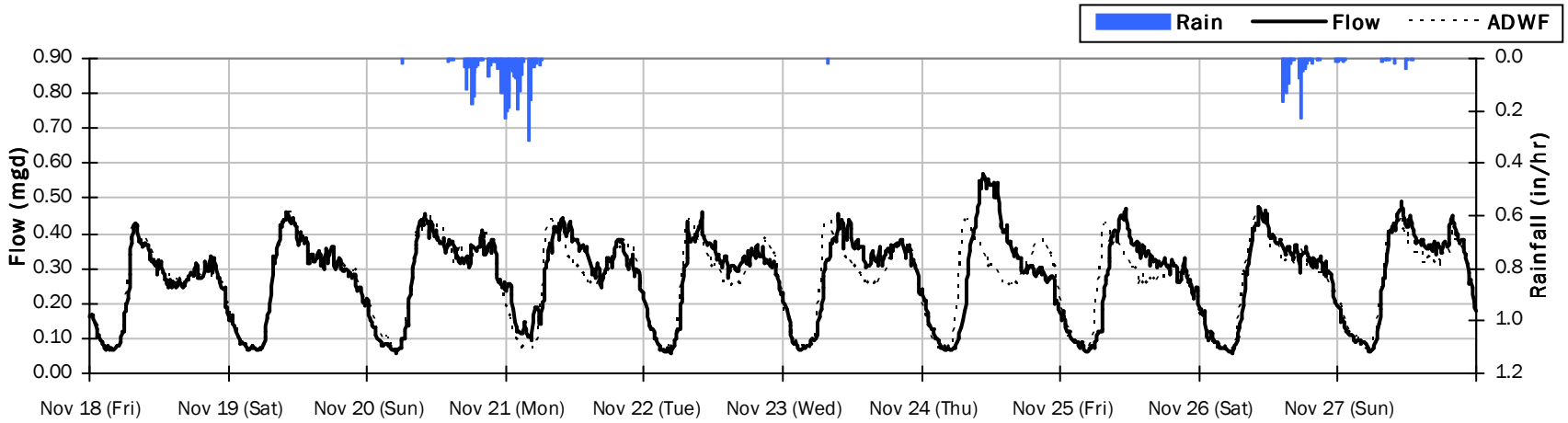
Total Period Rainfall: 1.21 inches

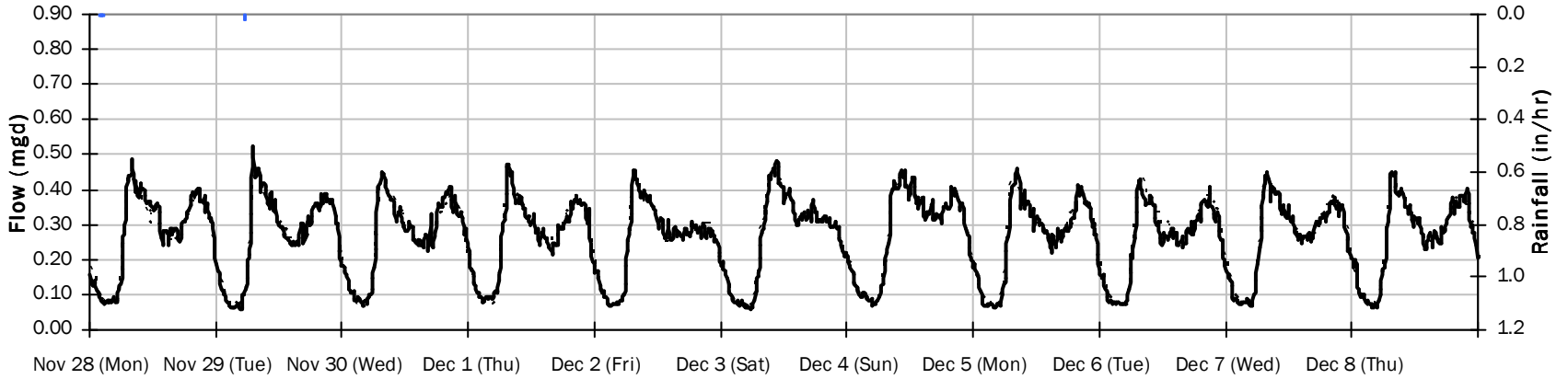


SITE 3

Flow Summary: 11/18/2016 to 12/8/2016

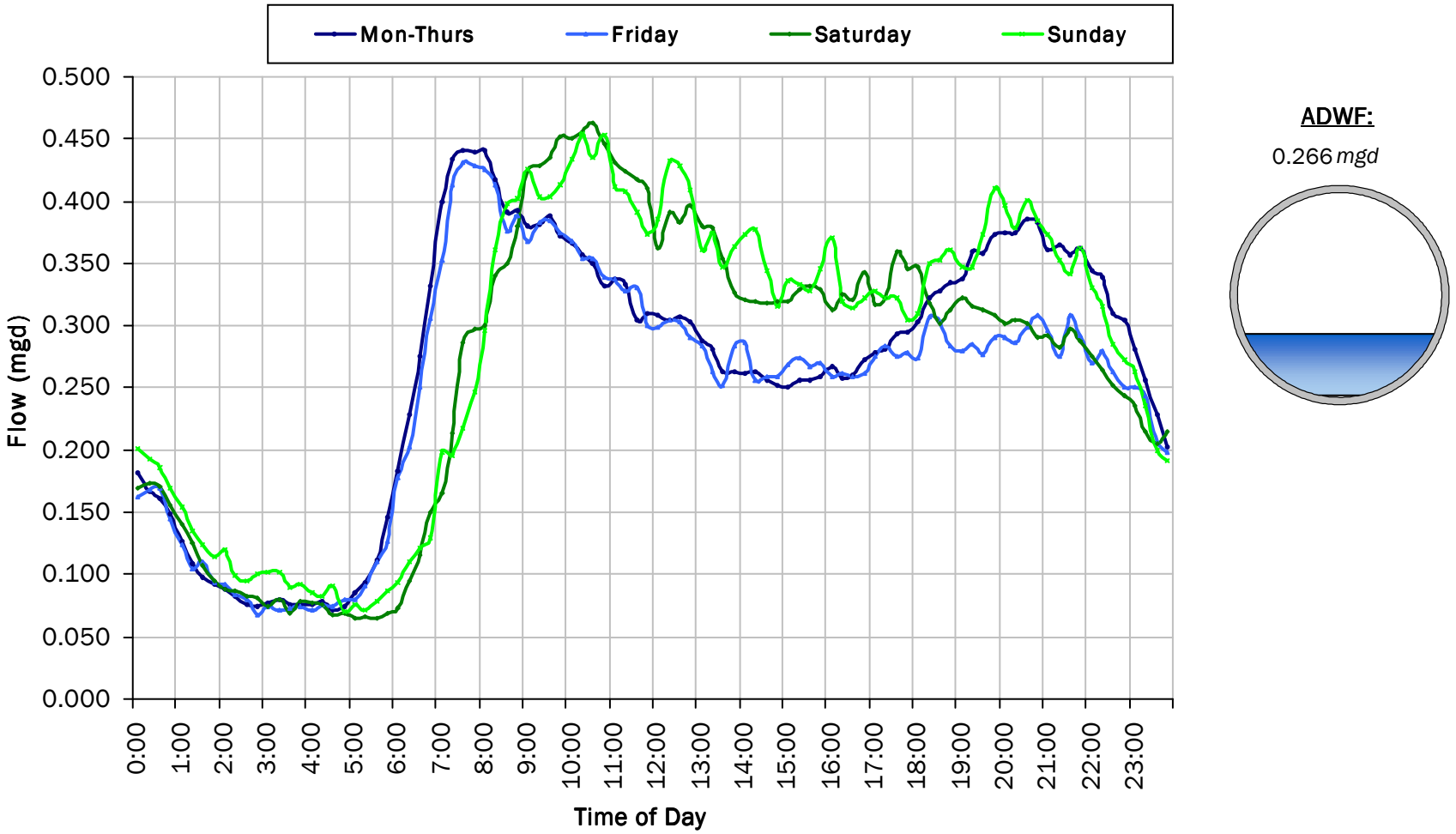
Total Period Rainfall: 1.21 inches **Avg Flow: 0.270 mgd Peak Flow: 0.570 mgd Min Flow: 0.056 mgd**





SITE 3

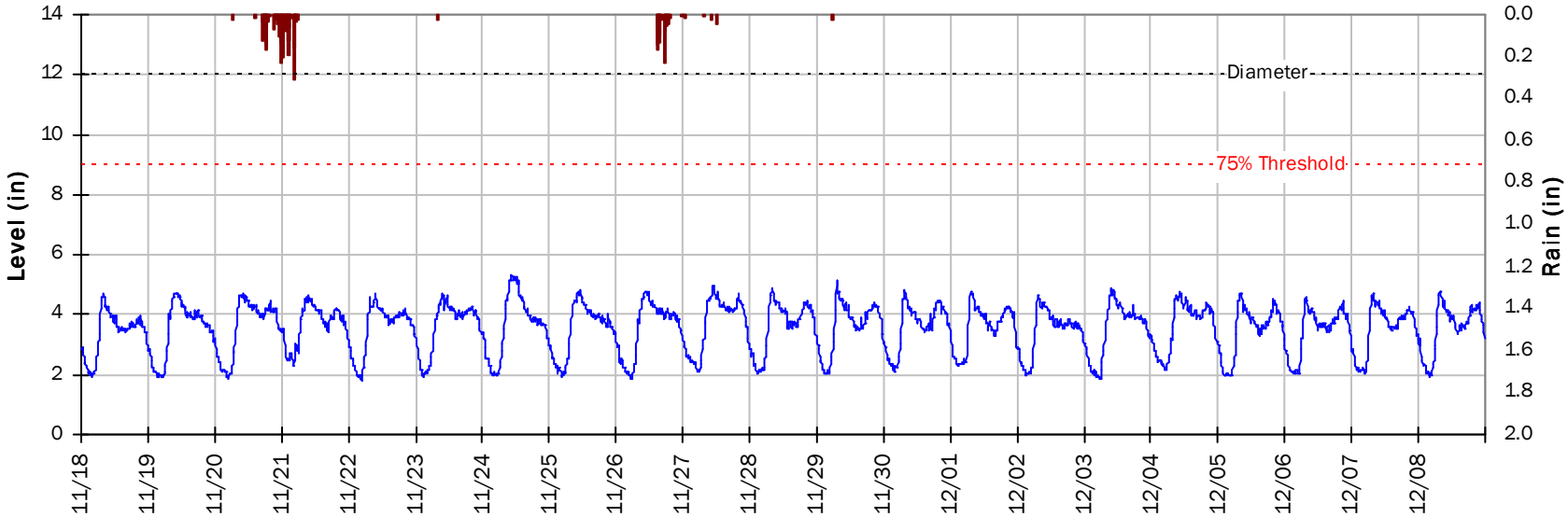
Average Dry Weather Flow Hydrographs

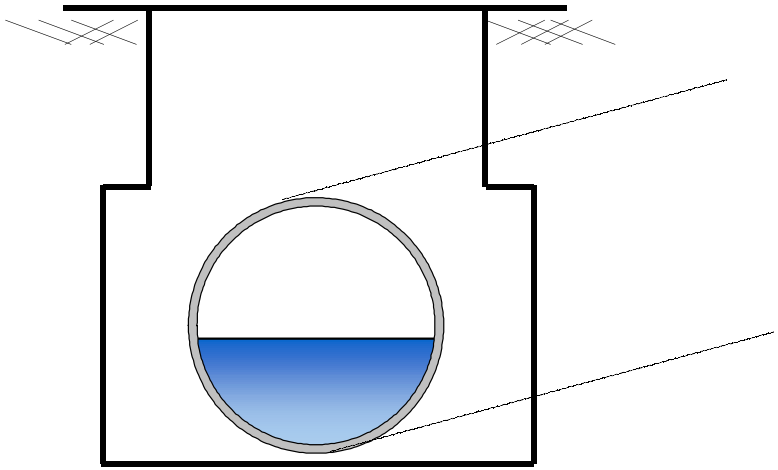


SITE 3

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Rainfall Event



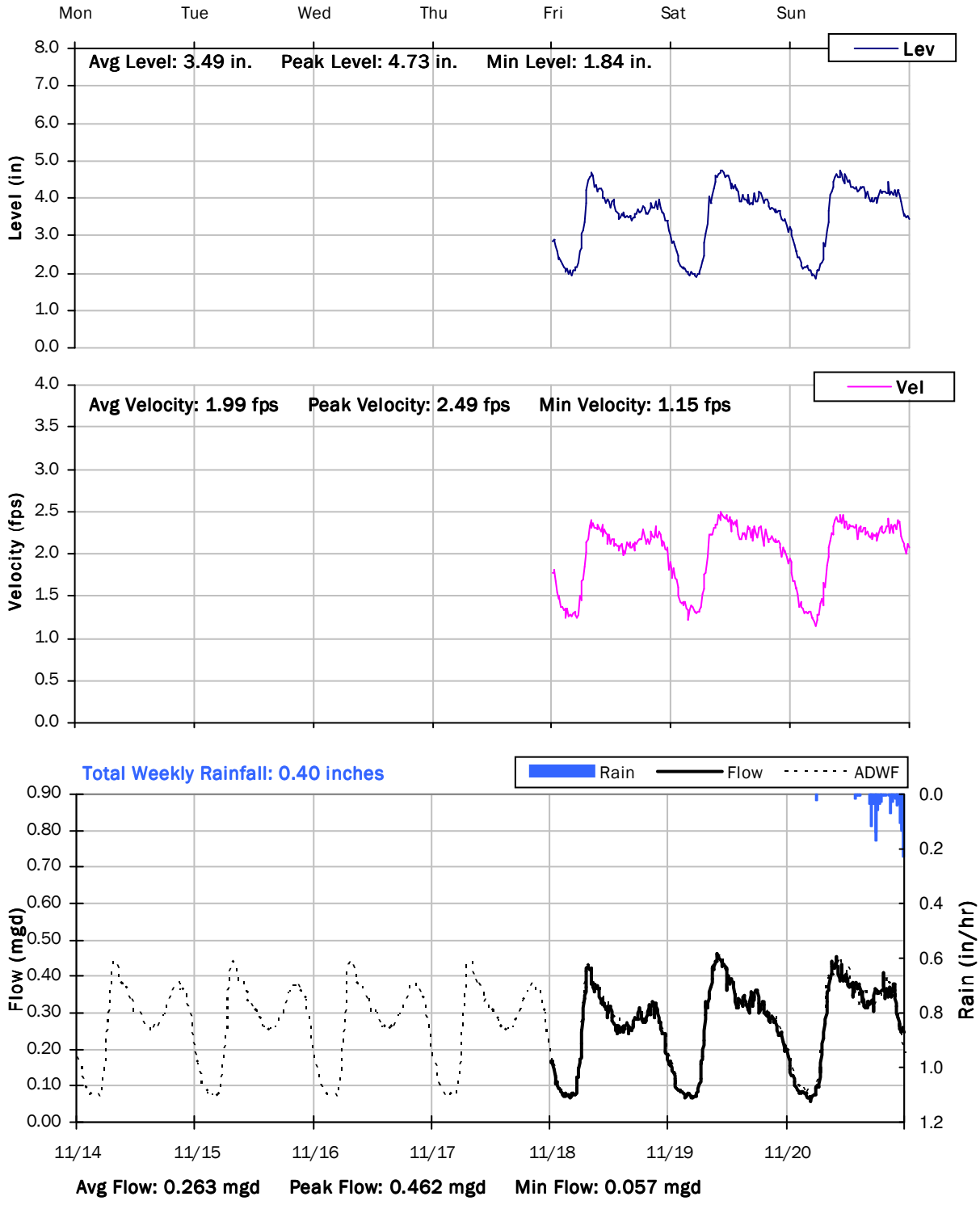


Pipe Diameter:	12	*inches*
Peak Measured Level:	5.35	*inches*
Peak d/D Ratio:	0.45	
Dry Weather Design Threshold Level:	6.00	*inches*

SITE 3

Weekly Level, Velocity and Flow Hydrographs

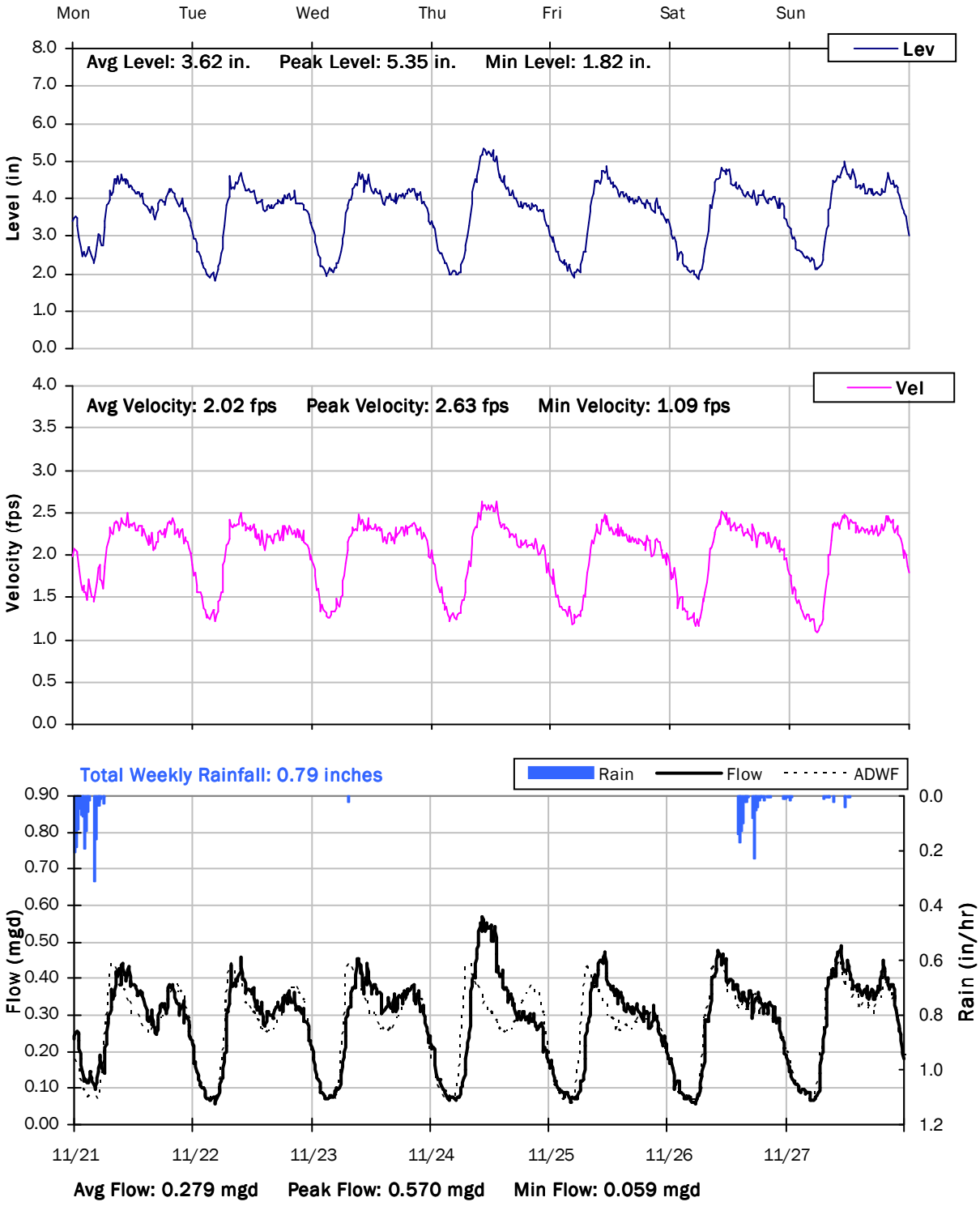
11/14/2016 to 11/21/2016



SITE 3

Weekly Level, Velocity and Flow Hydrographs

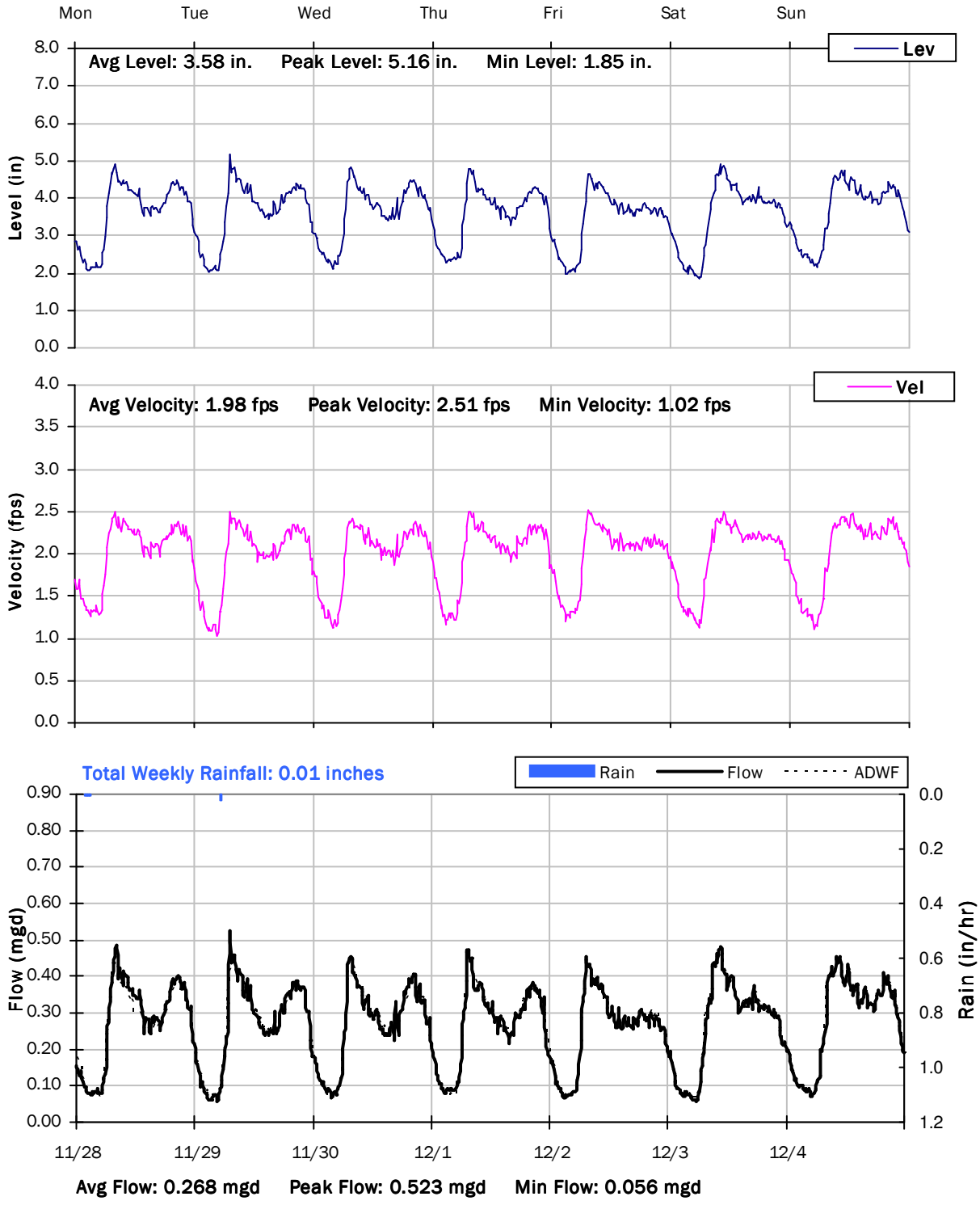
11/21/2016 to 11/28/2016



SITE 3

Weekly Level, Velocity and Flow Hydrographs

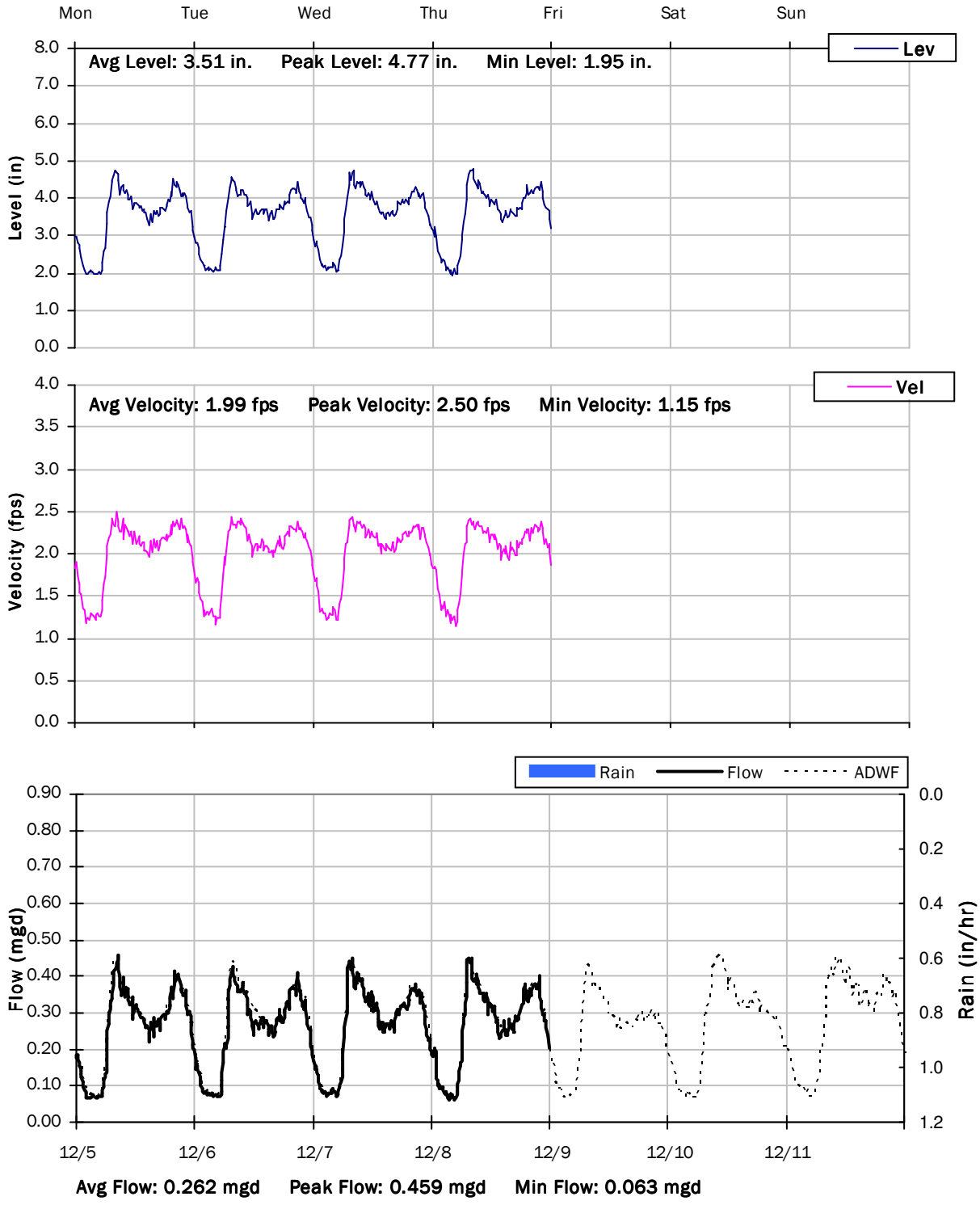
11/28/2016 to 12/5/2016



SITE 3

Weekly Level, Velocity and Flow Hydrographs

12/5/2016 to 12/12/2016



City of Placentia

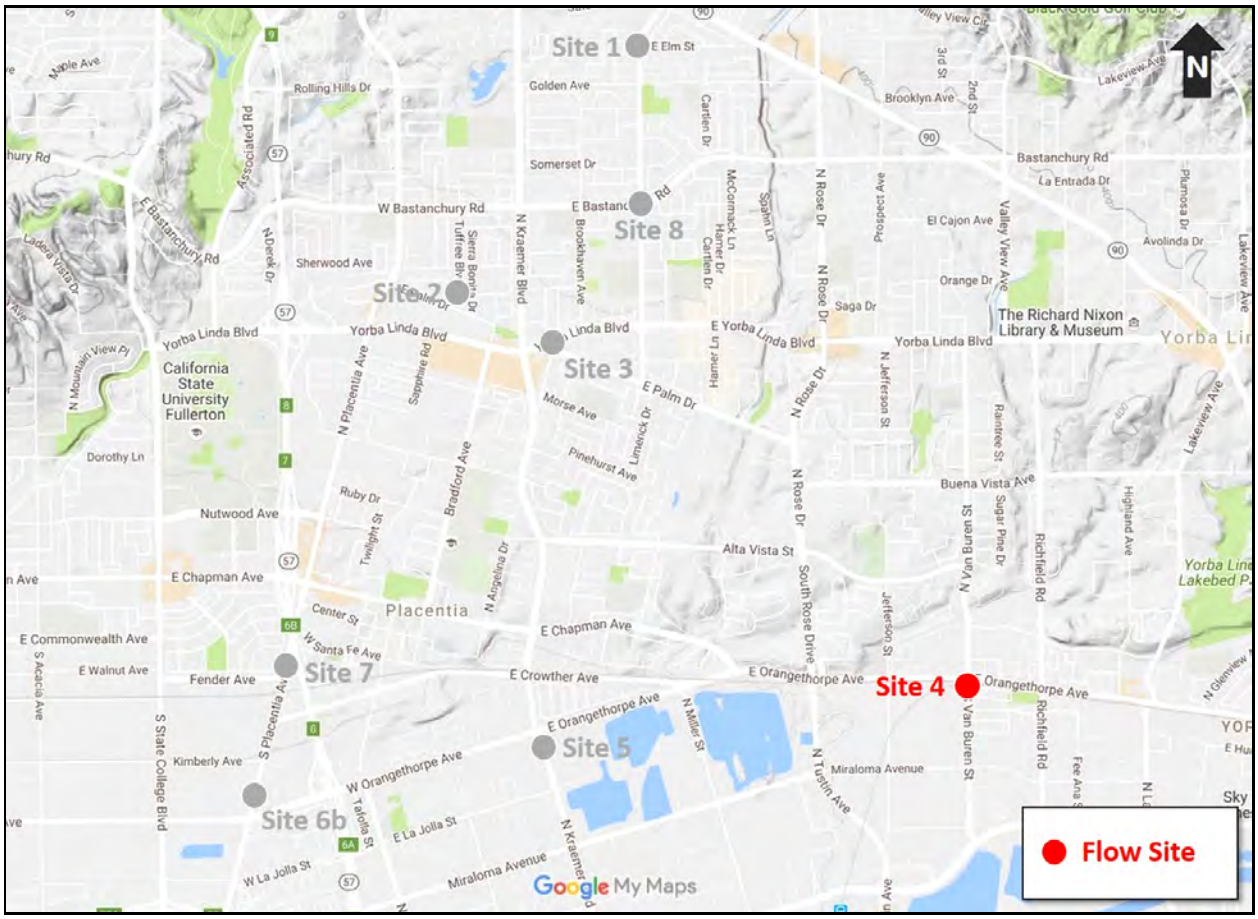
Sanitary Sewer Flow Monitoring

Temporary Monitoring: November 18 - December 8, 2016

Monitoring Site: Site 4

Location: South Van Buren Street at Olive Street

Data Summary Report



Vicinity Map: Site 4

SITE 4

Site Information

Location: South Van Buren Street at Olive Street

Coordinates: 117.8314° W, 33.8676° N

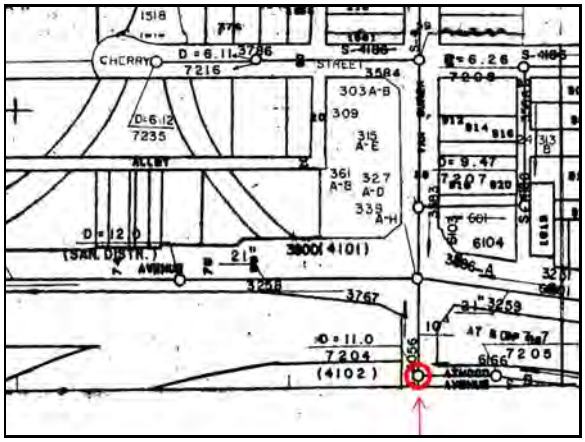
Rim Elevation (Earth): 245 feet

Pipe Diameter: 10 inches

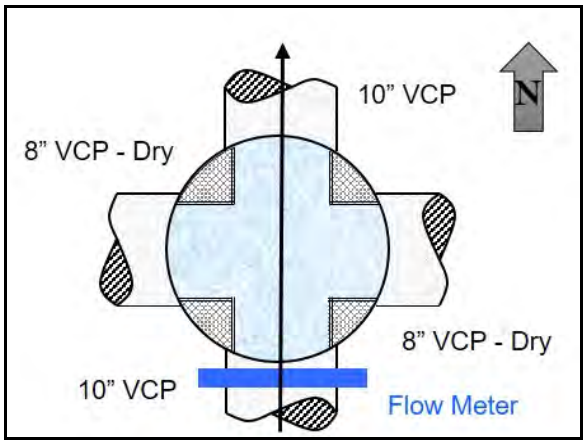
ADWF: 0.062 mgd

Peak Measured Flow: 0.164 mgd

Satellite Map



Sewer Map



Flow Sketch

Street View

Plan View

SITE 4

Additional Site Photos

South Inlet

North Outlet

SITE 4

Additional Site Photos

East Inlet

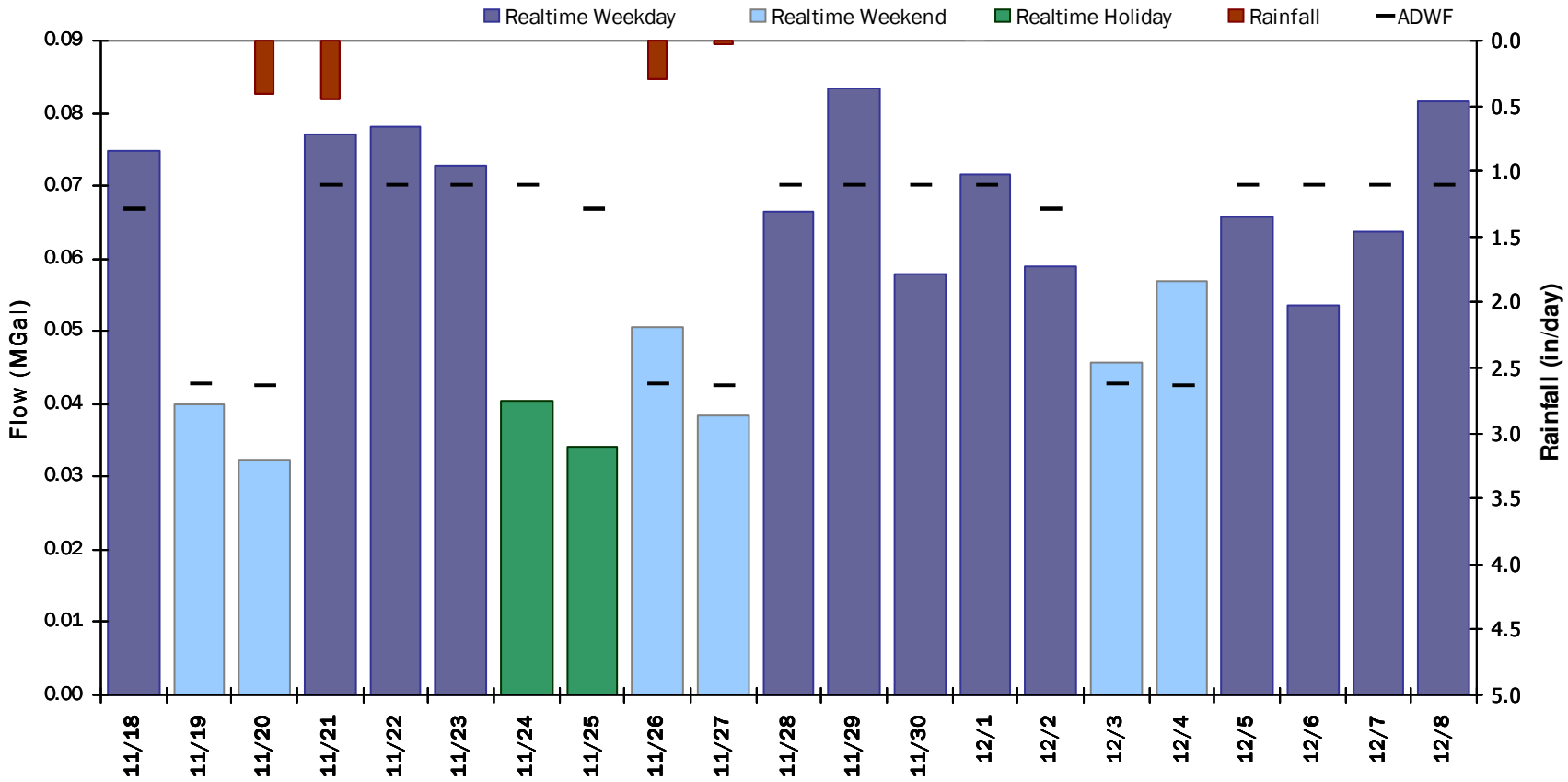
West Inlet

SITE 4

Period Flow Summary: Daily Flow Totals

Avg Period Flow: 0.059 MGal **Peak Daily Flow: 0.083 MGal** **Min Daily Flow: 0.032 MGal**

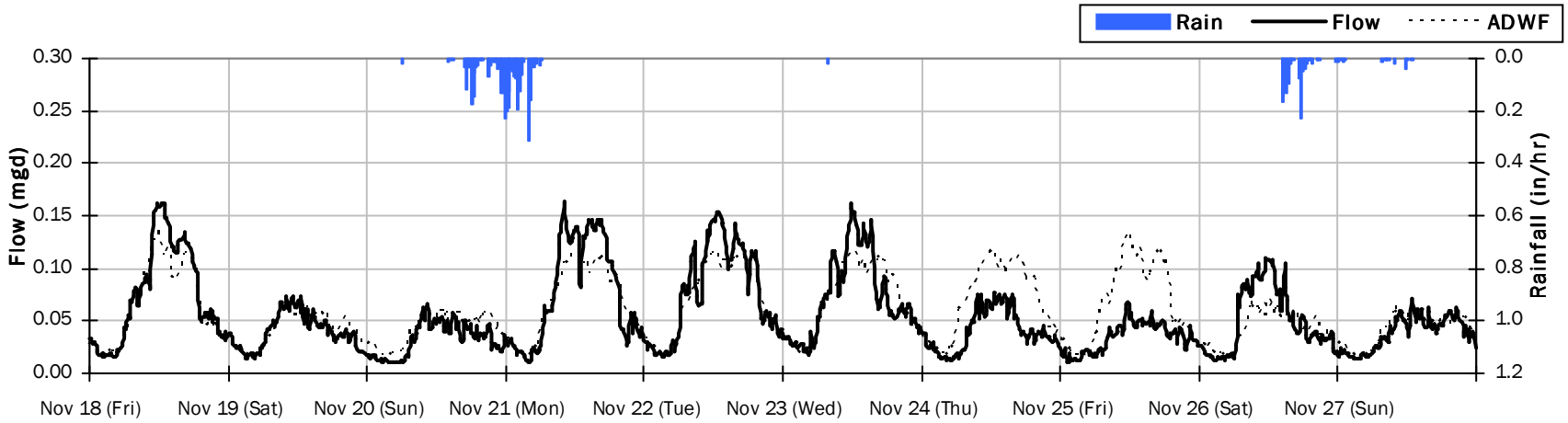
Total Period Rainfall: 1.21 inches

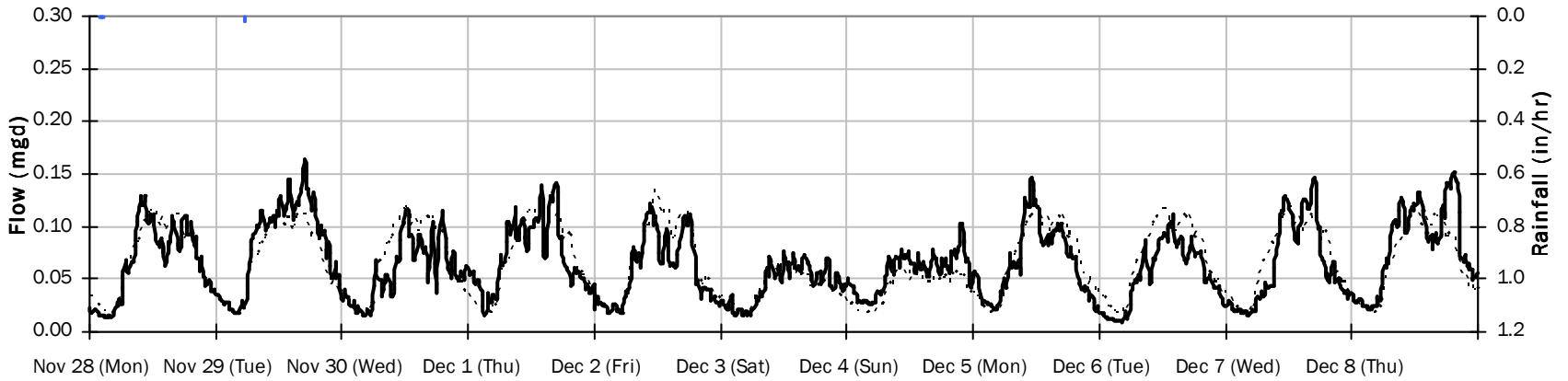


SITE 4

Flow Summary: 11/18/2016 to 12/8/2016

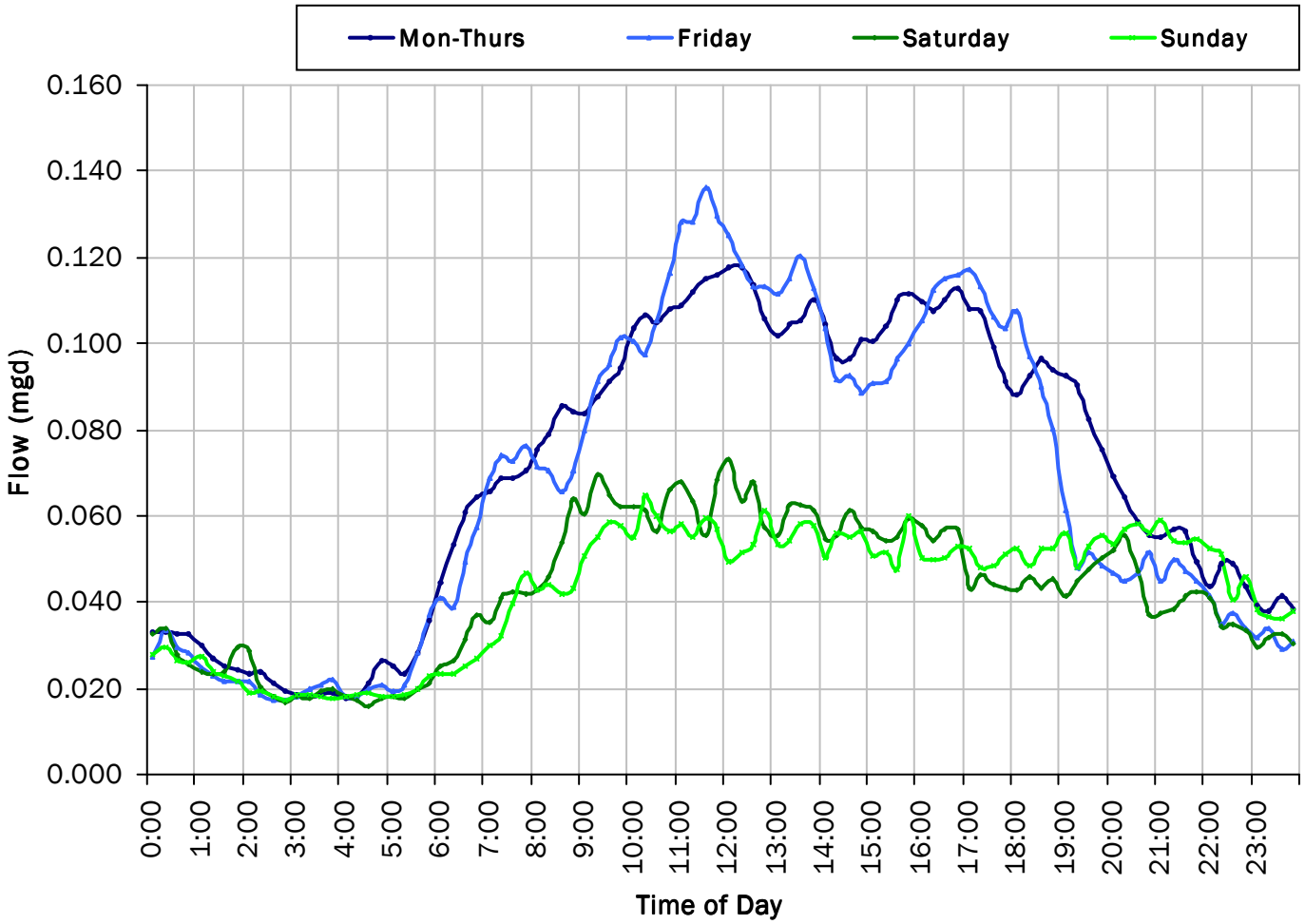
Total Period Rainfall: 1.21 inches **Avg Flow: 0.059 mgd Peak Flow: 0.164 mgd Min Flow: 0.009 mgd**





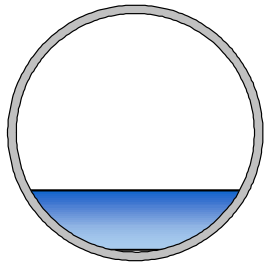
SITE 4

Average Dry Weather Flow Hydrographs



ADWF:

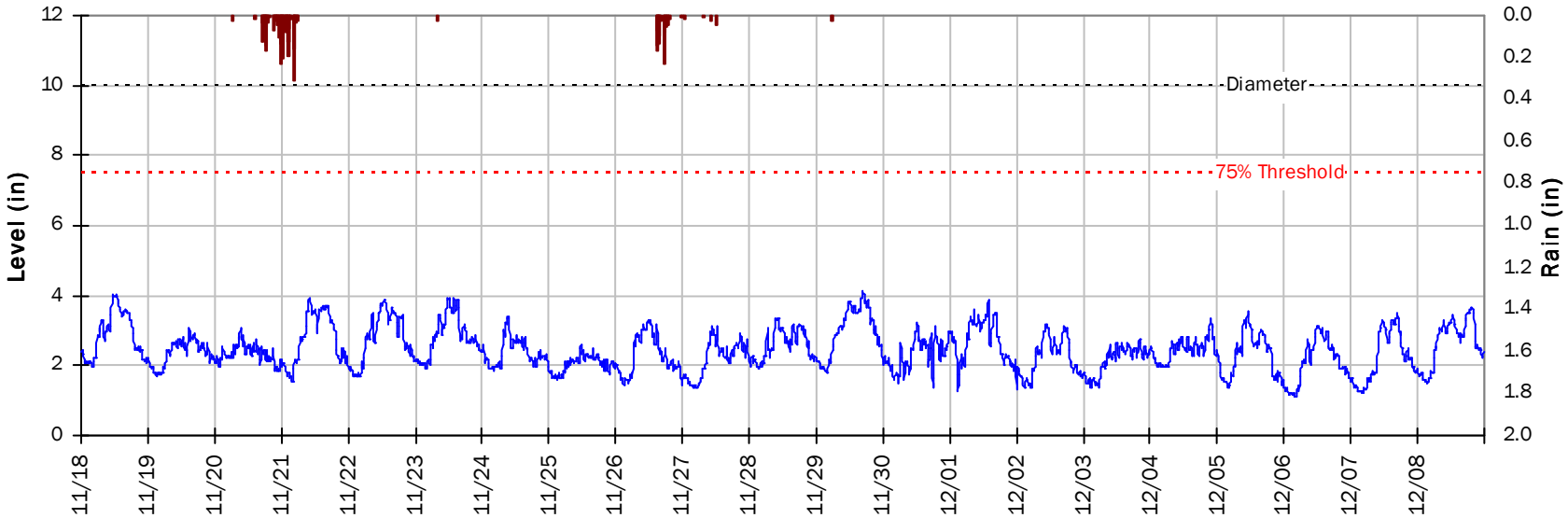
0.062 *mgd*

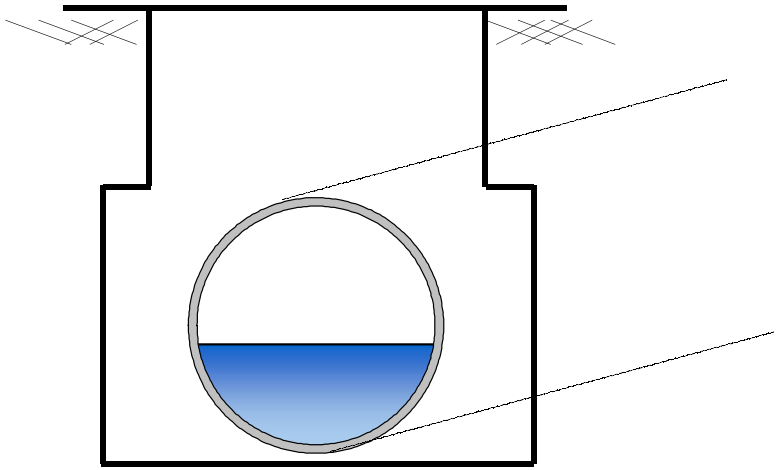


SITE 4

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Rainfall Event



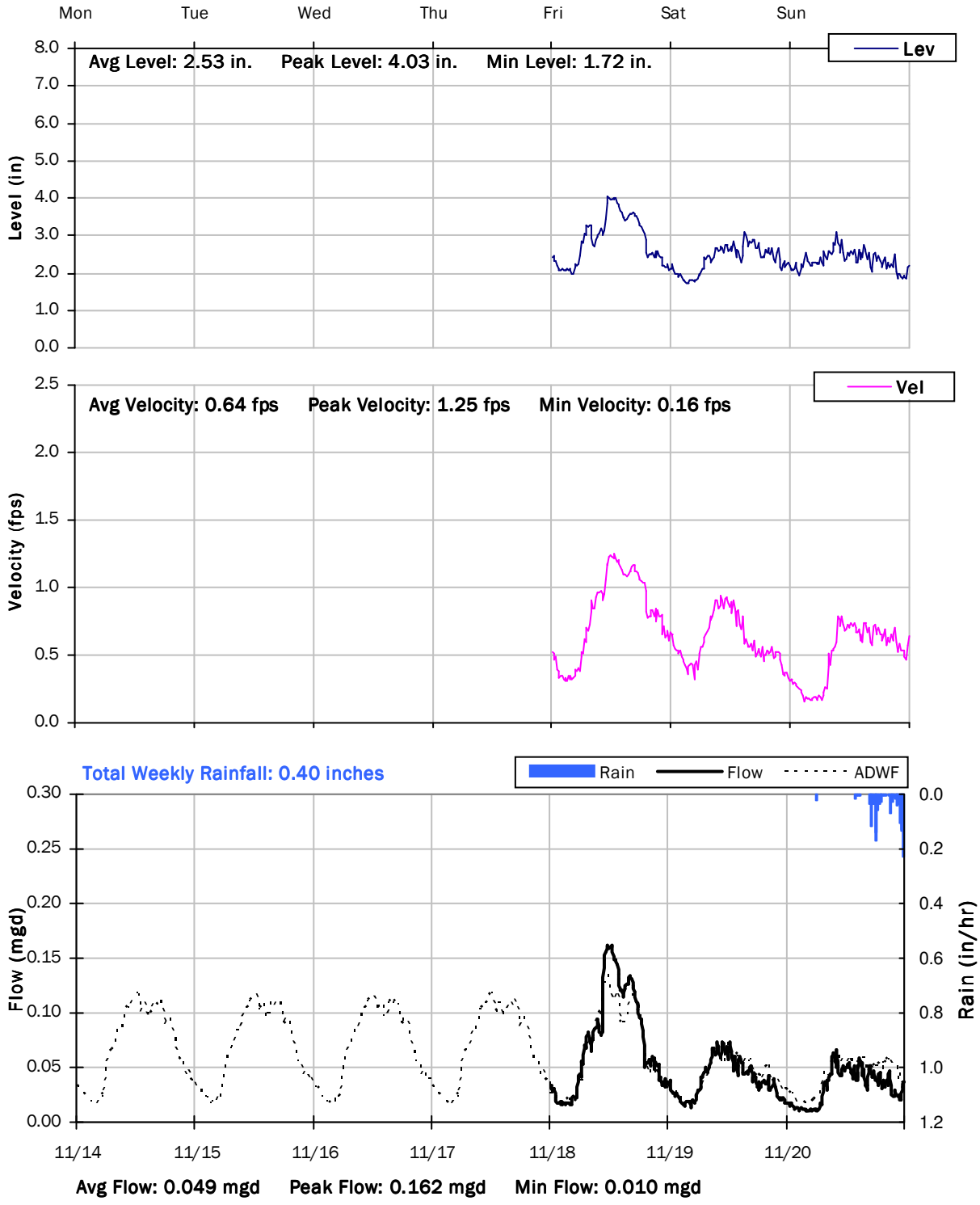


Pipe Diameter:	10	*inches*
Peak Measured Level:	4.15	*inches*
Peak d/D Ratio:	0.42	
Dry Weather Design Threshold Level:	5.00	*inches*

SITE 4

Weekly Level, Velocity and Flow Hydrographs

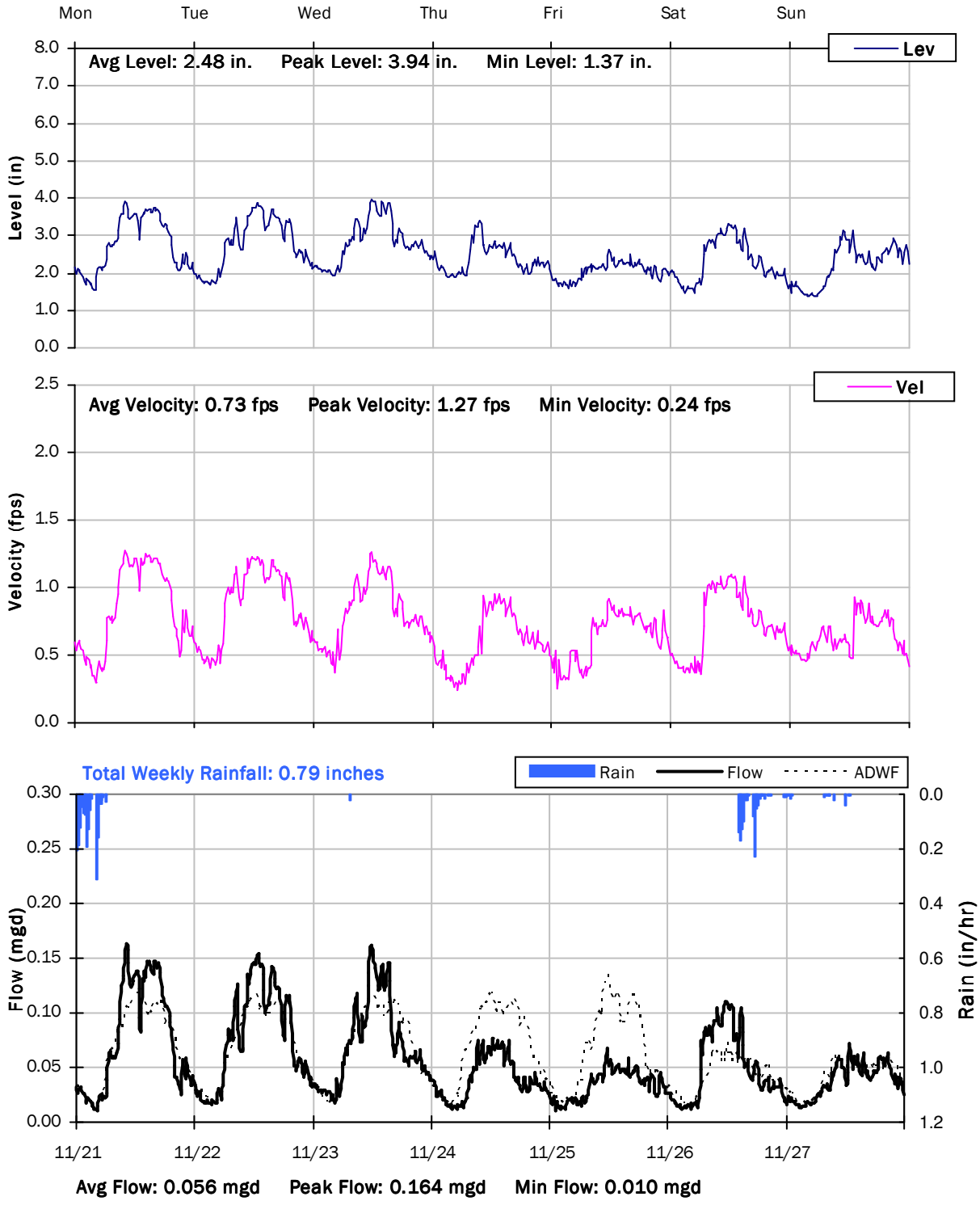
11/14/2016 to 11/21/2016



SITE 4

Weekly Level, Velocity and Flow Hydrographs

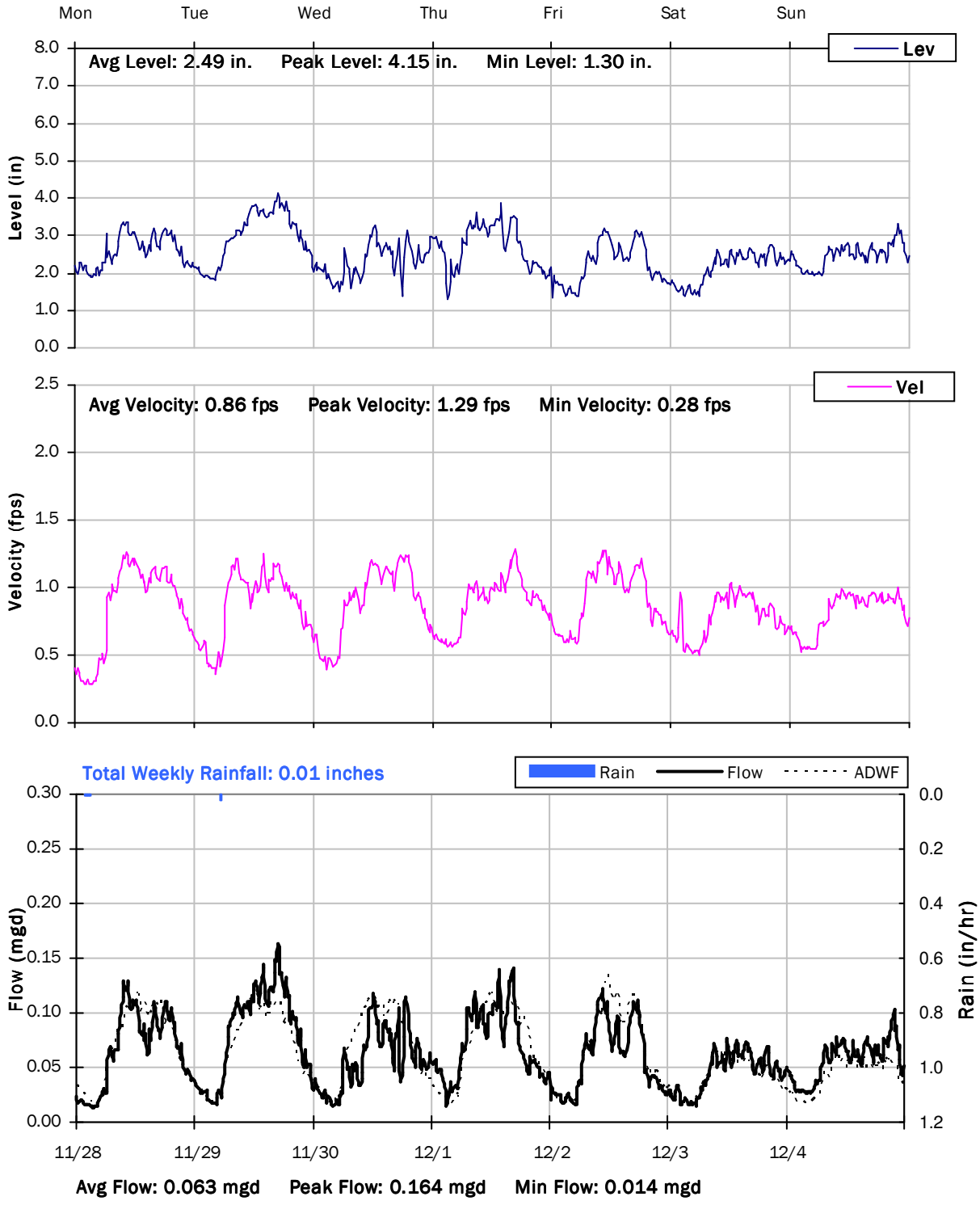
11/21/2016 to 11/28/2016



SITE 4

Weekly Level, Velocity and Flow Hydrographs

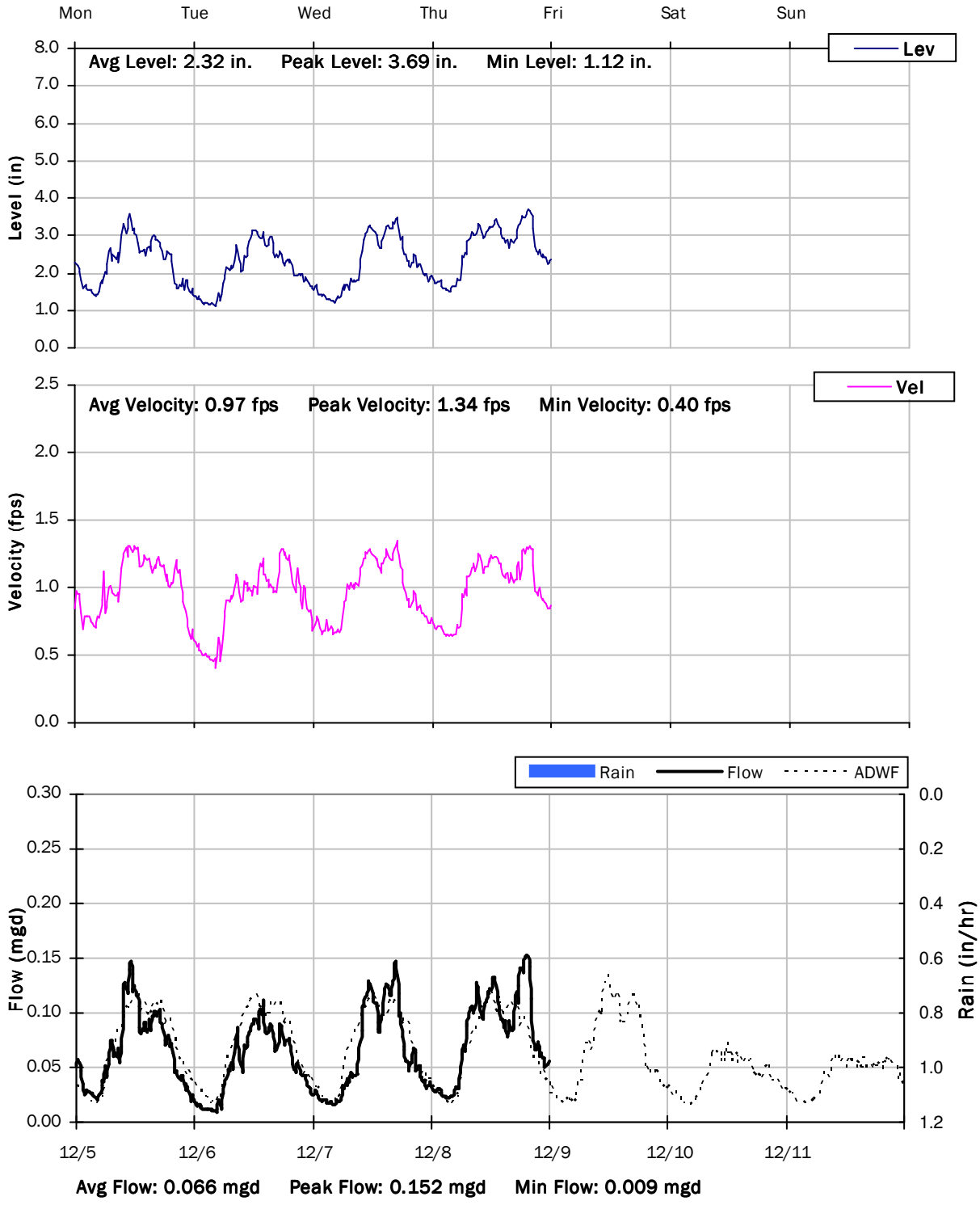
11/28/2016 to 12/5/2016



SITE 4

Weekly Level, Velocity and Flow Hydrographs

12/5/2016 to 12/12/2016



City of Placentia

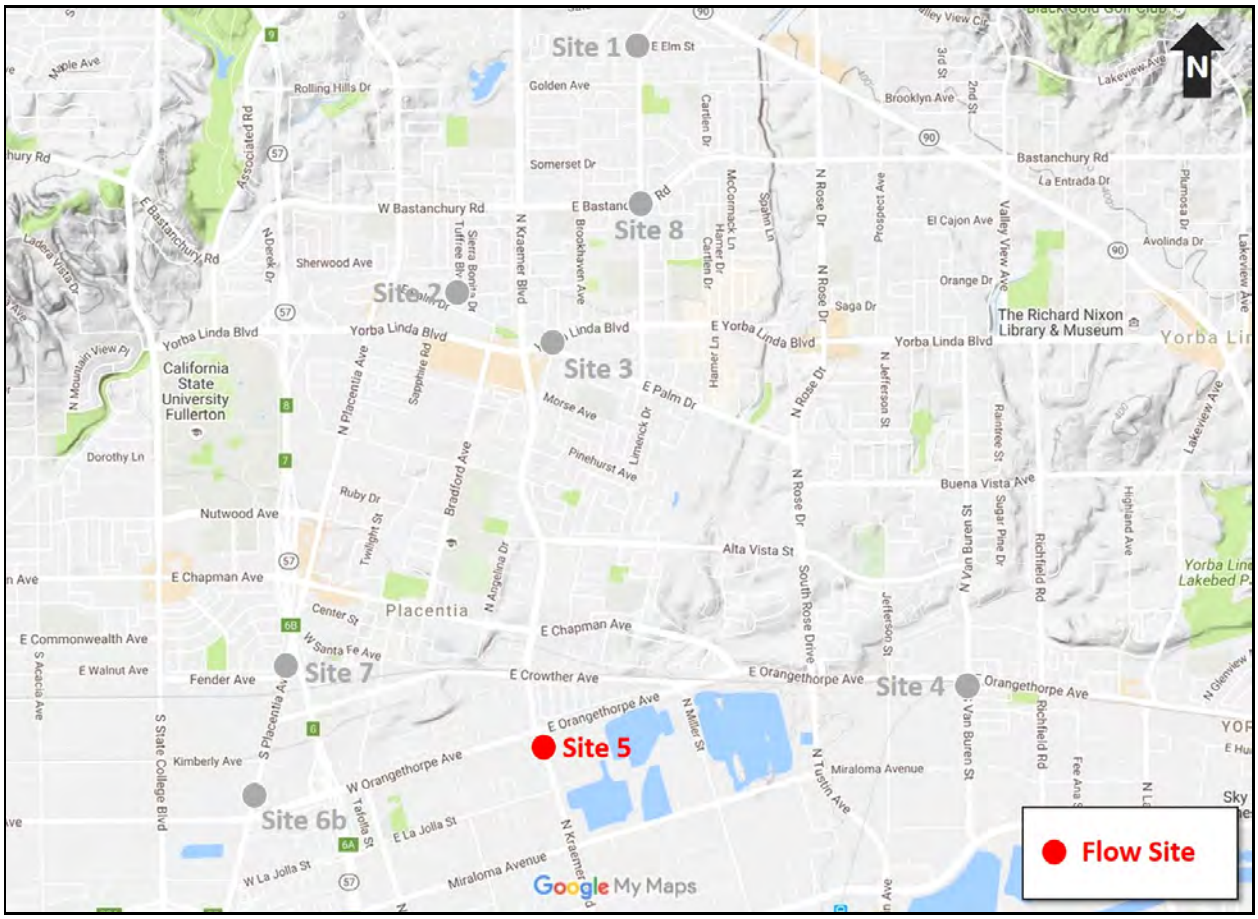
Sanitary Sewer Flow Monitoring

Temporary Monitoring: November 18 - December 8, 2016

Monitoring Site: Site 5

Location: 847 South Kraemer Boulevard

Data Summary Report



Vicinity Map: Site 5

SITE 5

Site Information

Location: 847 South Kraemer Boulevard

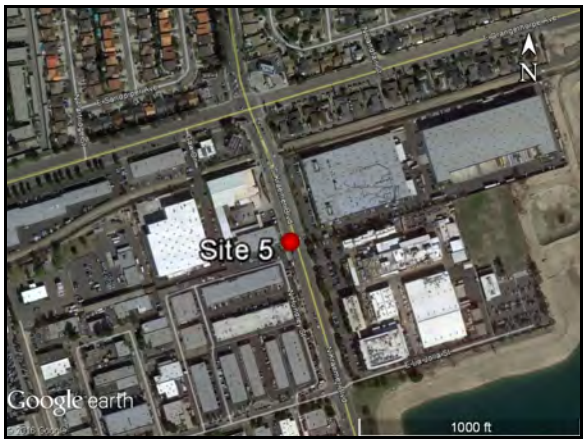
Coordinates: 117.8618° W, 33.8634° N

Rim Elevation (Earth): 217 feet

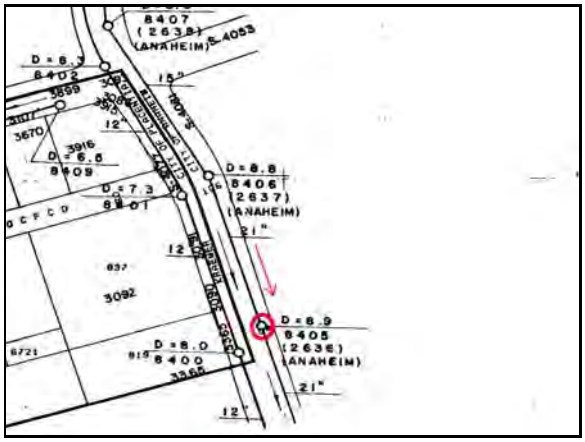
Pipe Diameter: 12 inches

ADWF: 0.085 mgd

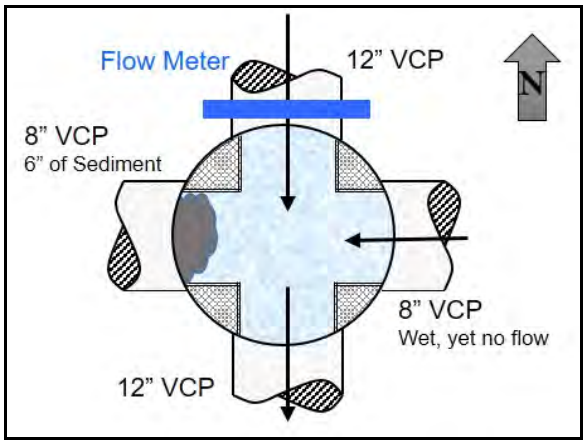
Peak Measured Flow: 0.182 mgd



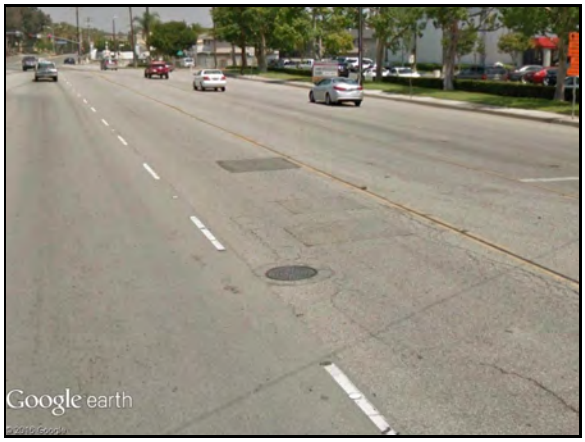
Satellite Map



Sewer Map



Flow Sketch



Street View

Plan View

SITE 5

Additional Site Photos

North Inlet

South Outlet

SITE 5

Additional Site Photos

East Inlet

West Inlet

SITE 5

Period Flow Summary: Daily Flow Totals

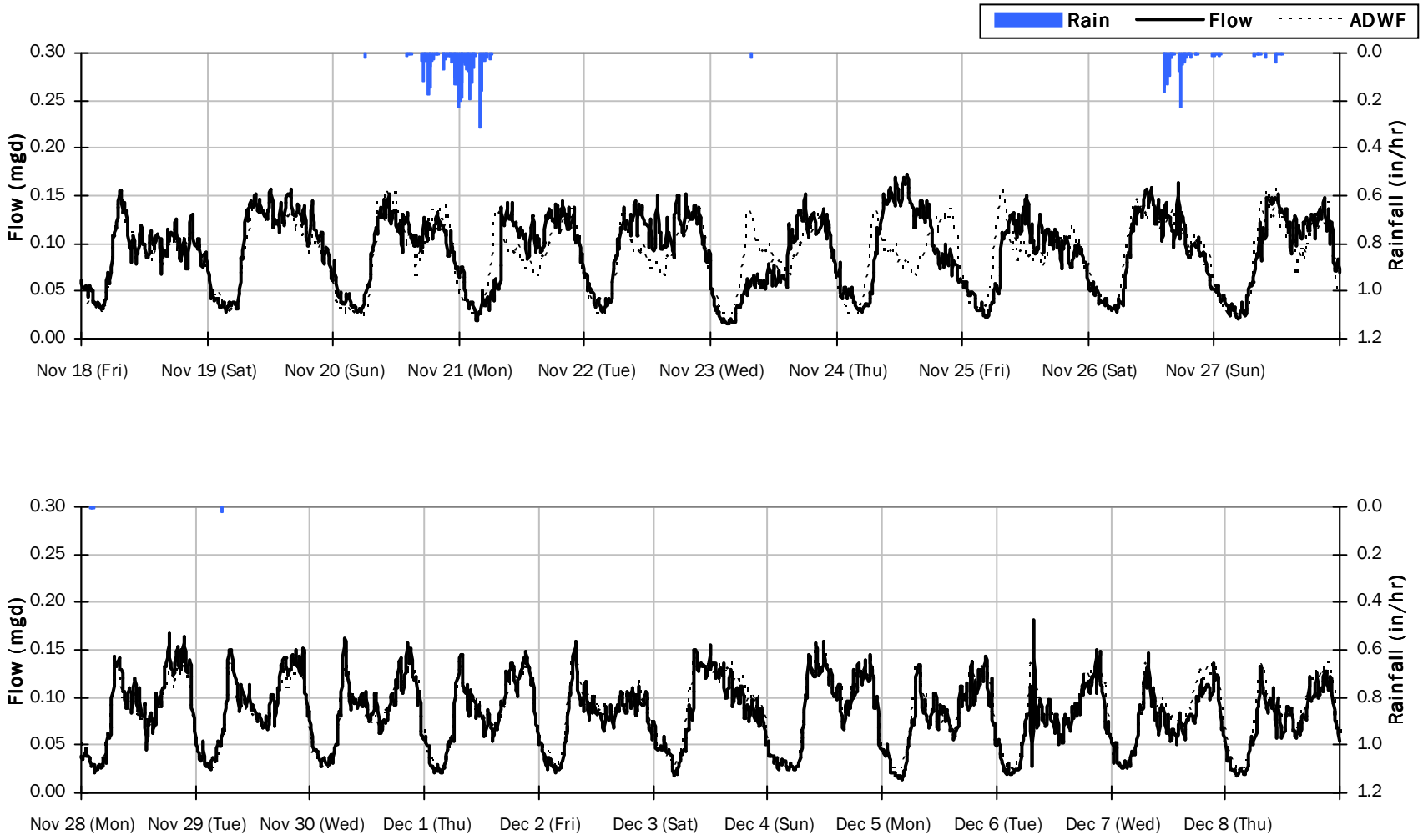
Avg Period Flow: 0.087 MGal **Peak Daily Flow: 0.100 MGal** **Min Daily Flow: 0.073 MGal**

Total Period Rainfall: 1.21 inches

SITE 5

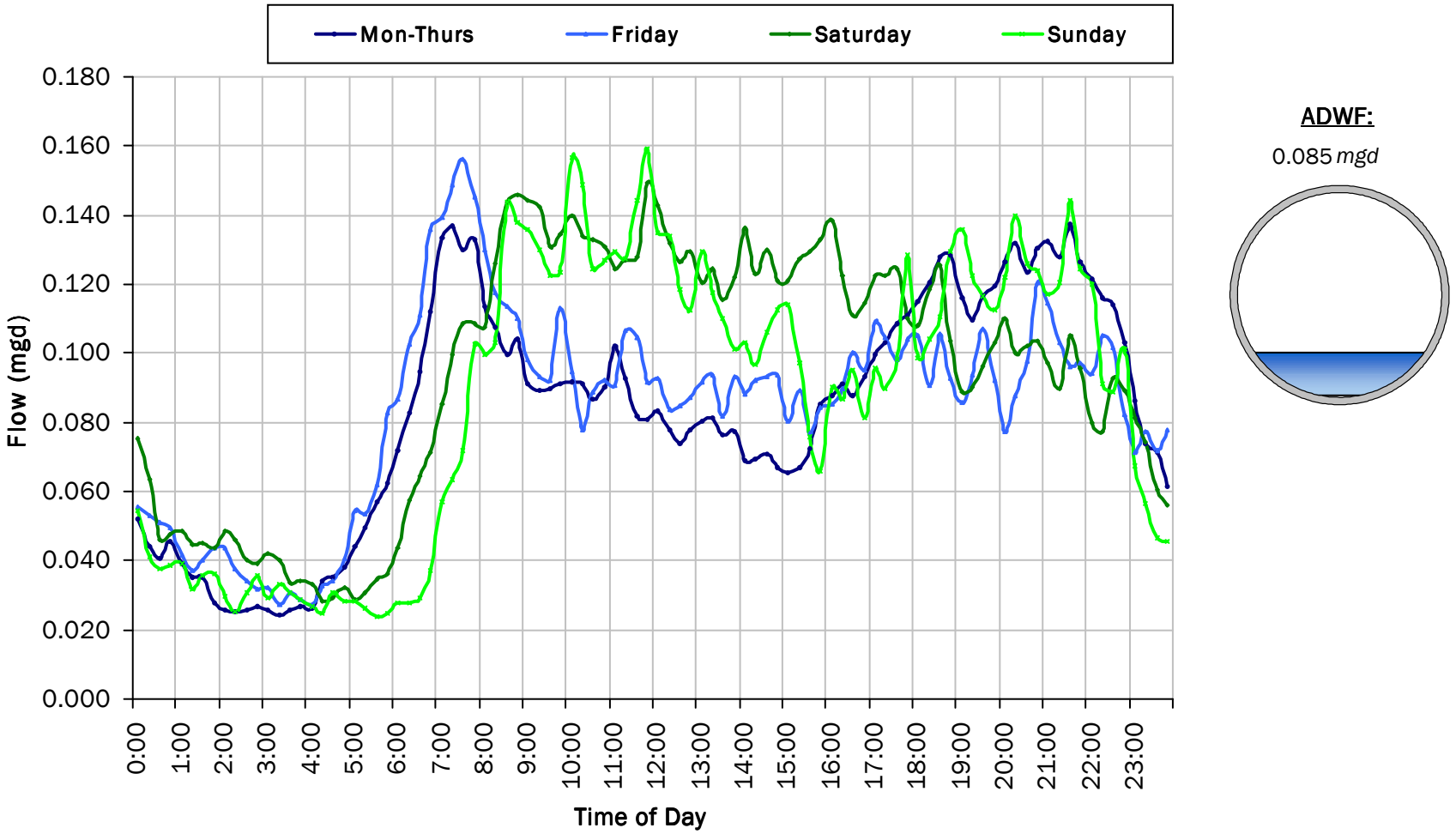
Flow Summary: 11/18/2016 to 12/8/2016

Total Period Rainfall: 1.21 inches **Avg Flow: 0.087 mgd** **Peak Flow: 0.182 mgd** **Min Flow: 0.015 mgd**



SITE 5

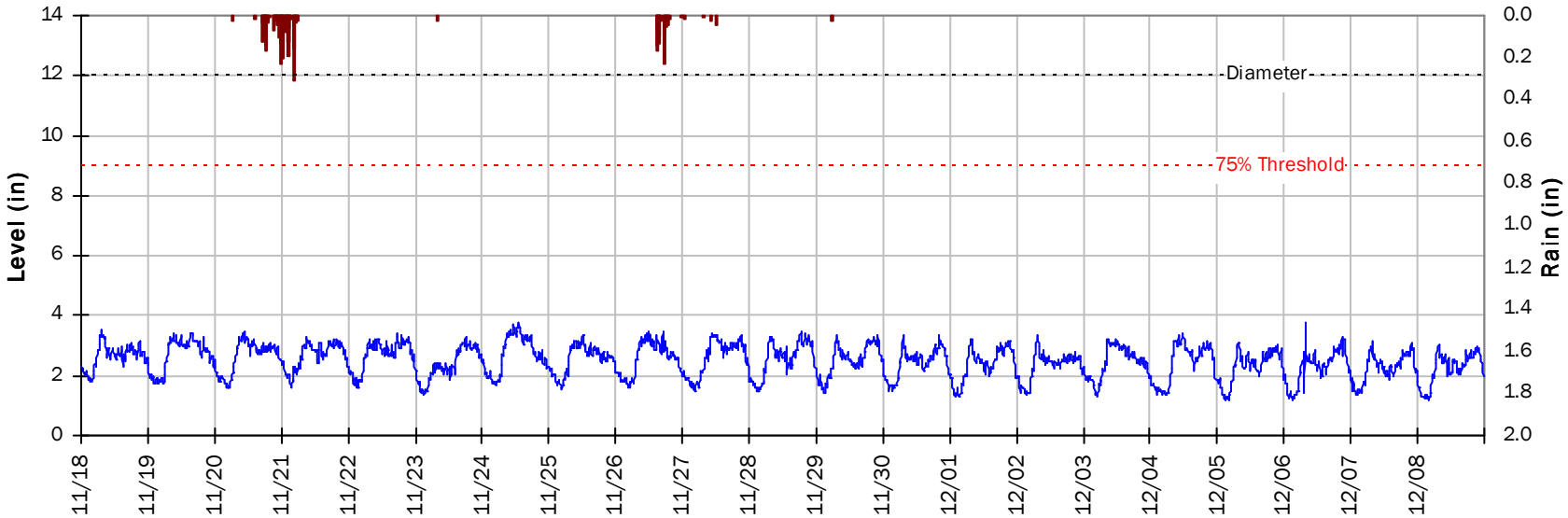
Average Dry Weather Flow Hydrographs

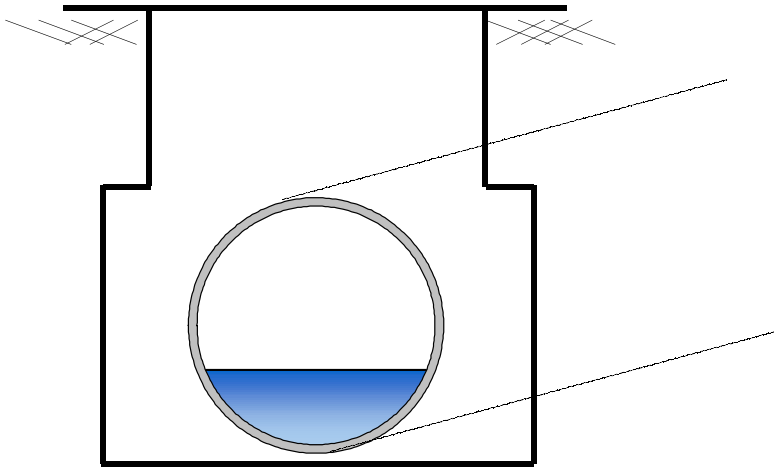


SITE 5

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Rainfall Event



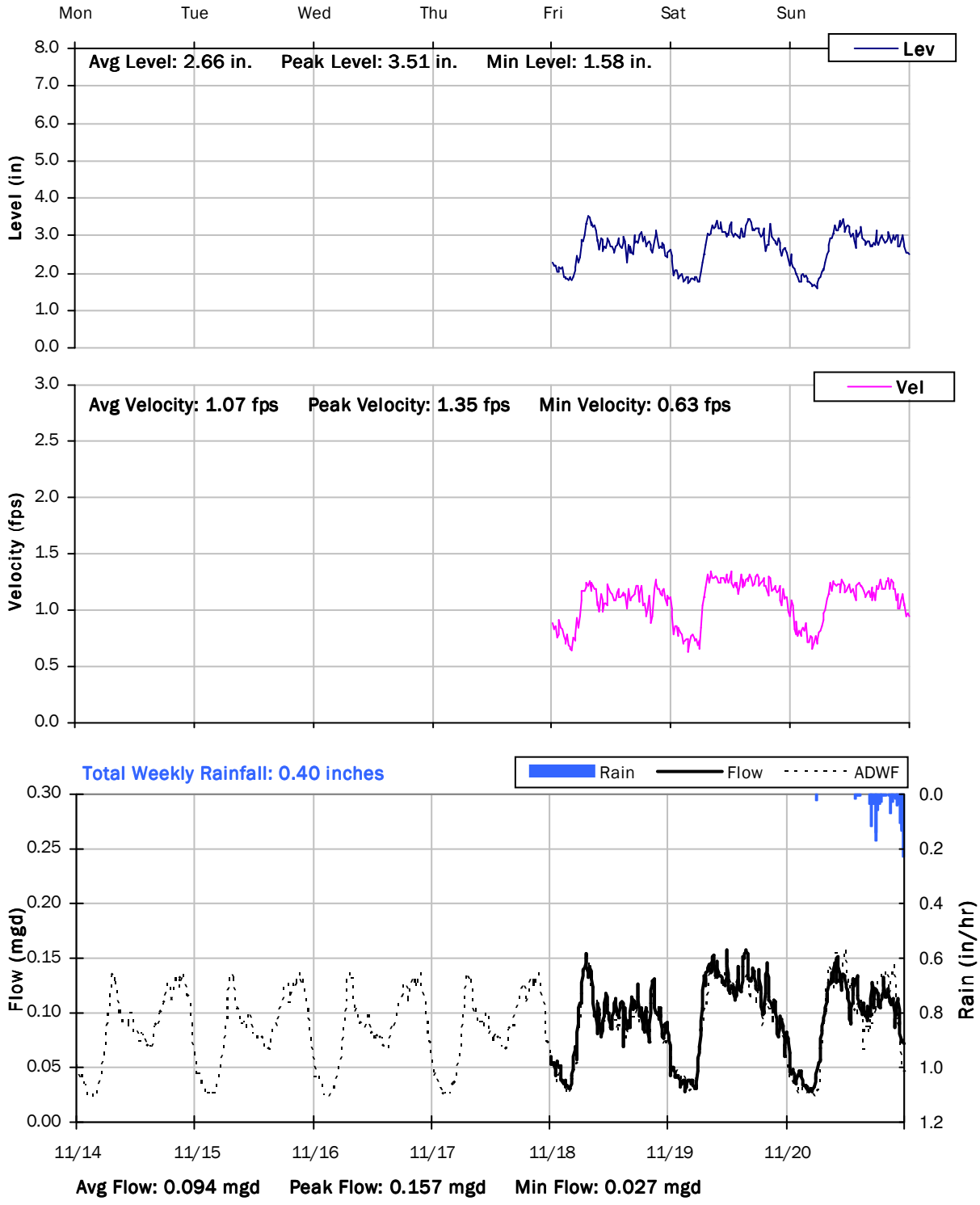


Pipe Diameter:	12	*inches*
Peak Measured Level:	3.78	*inches*
Peak d/D Ratio:	0.32	
Dry Weather Design Threshold Level:	6.00	*inches*

SITE 5

Weekly Level, Velocity and Flow Hydrographs

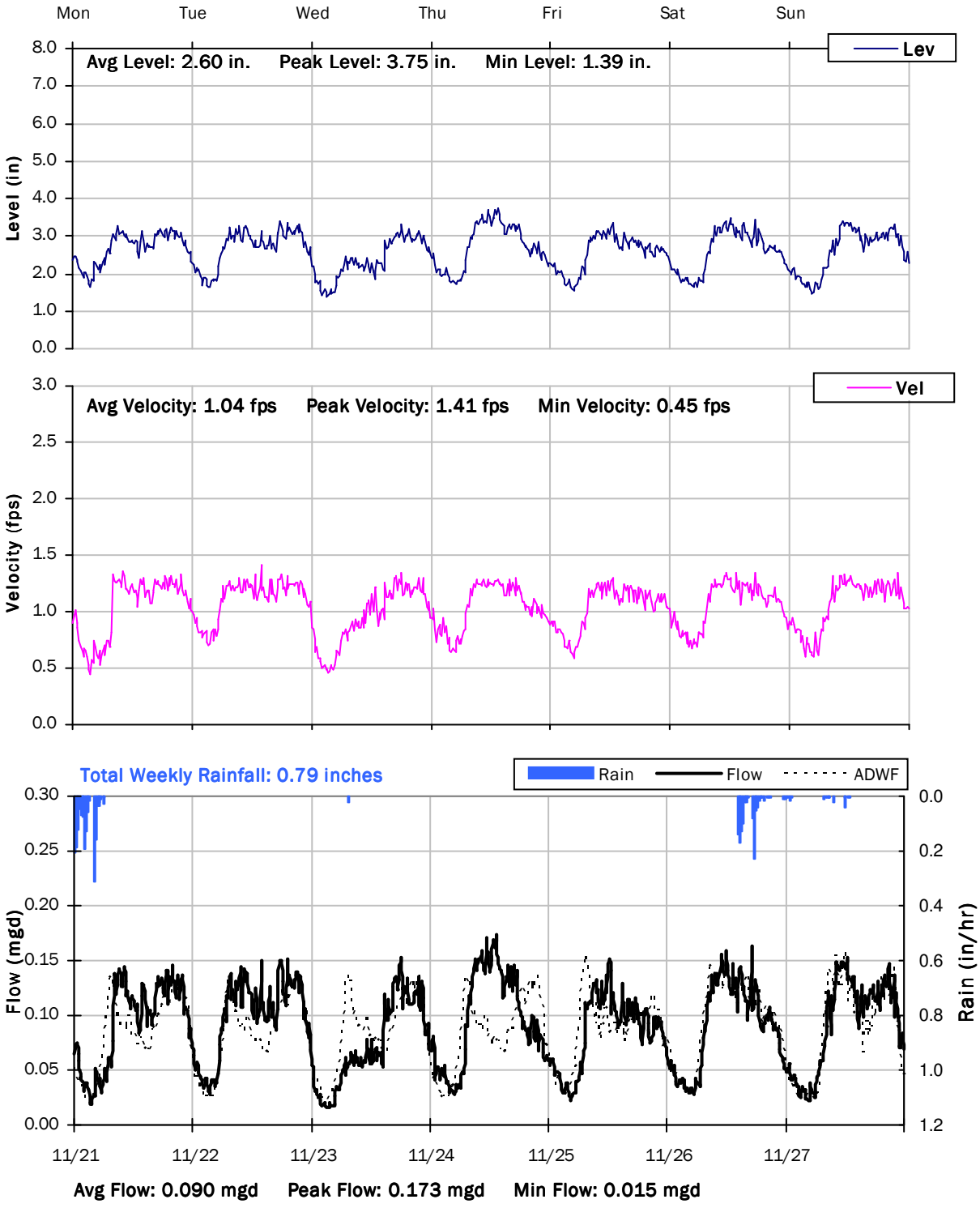
11/14/2016 to 11/21/2016



SITE 5

Weekly Level, Velocity and Flow Hydrographs

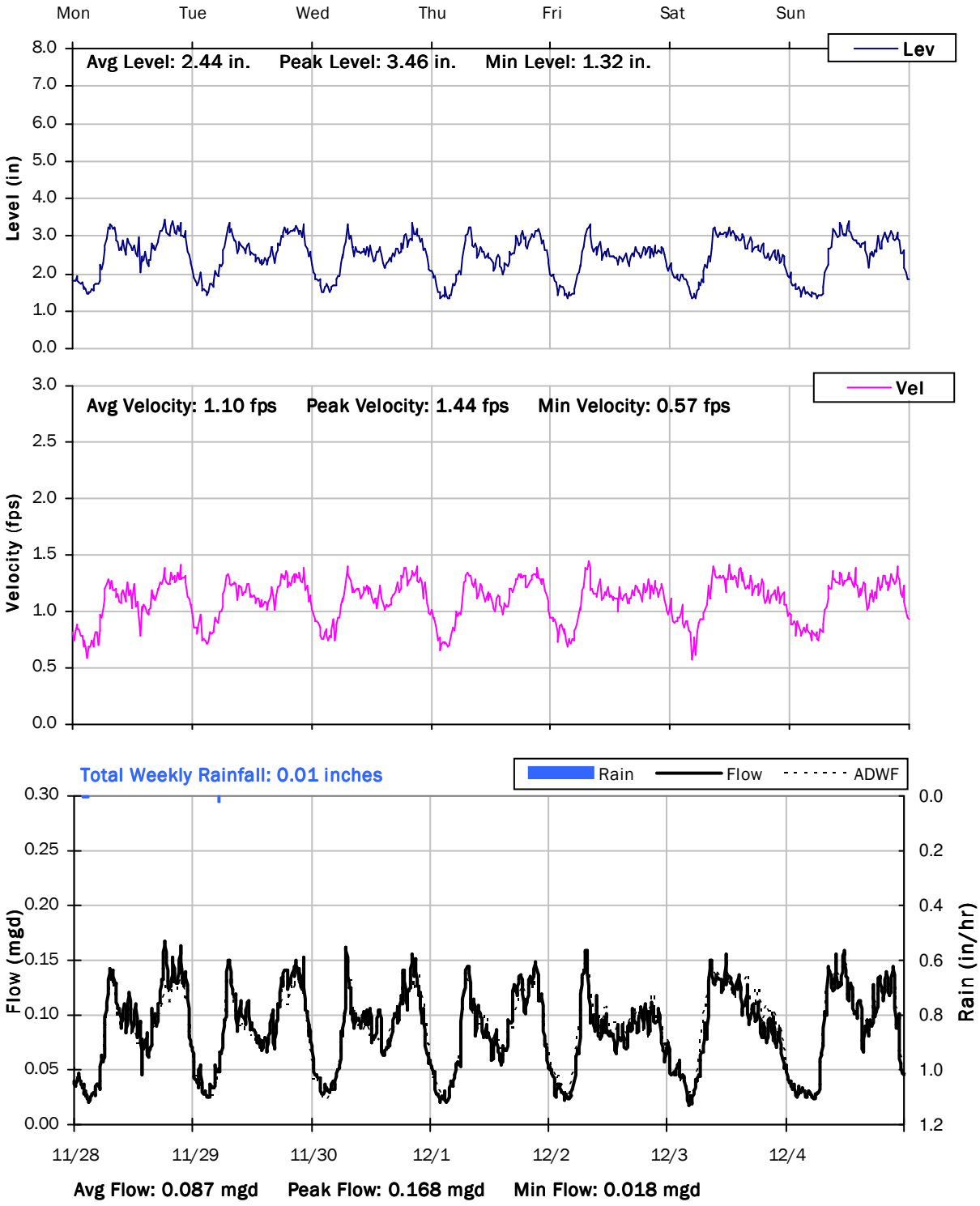
11/21/2016 to 11/28/2016



SITE 5

Weekly Level, Velocity and Flow Hydrographs

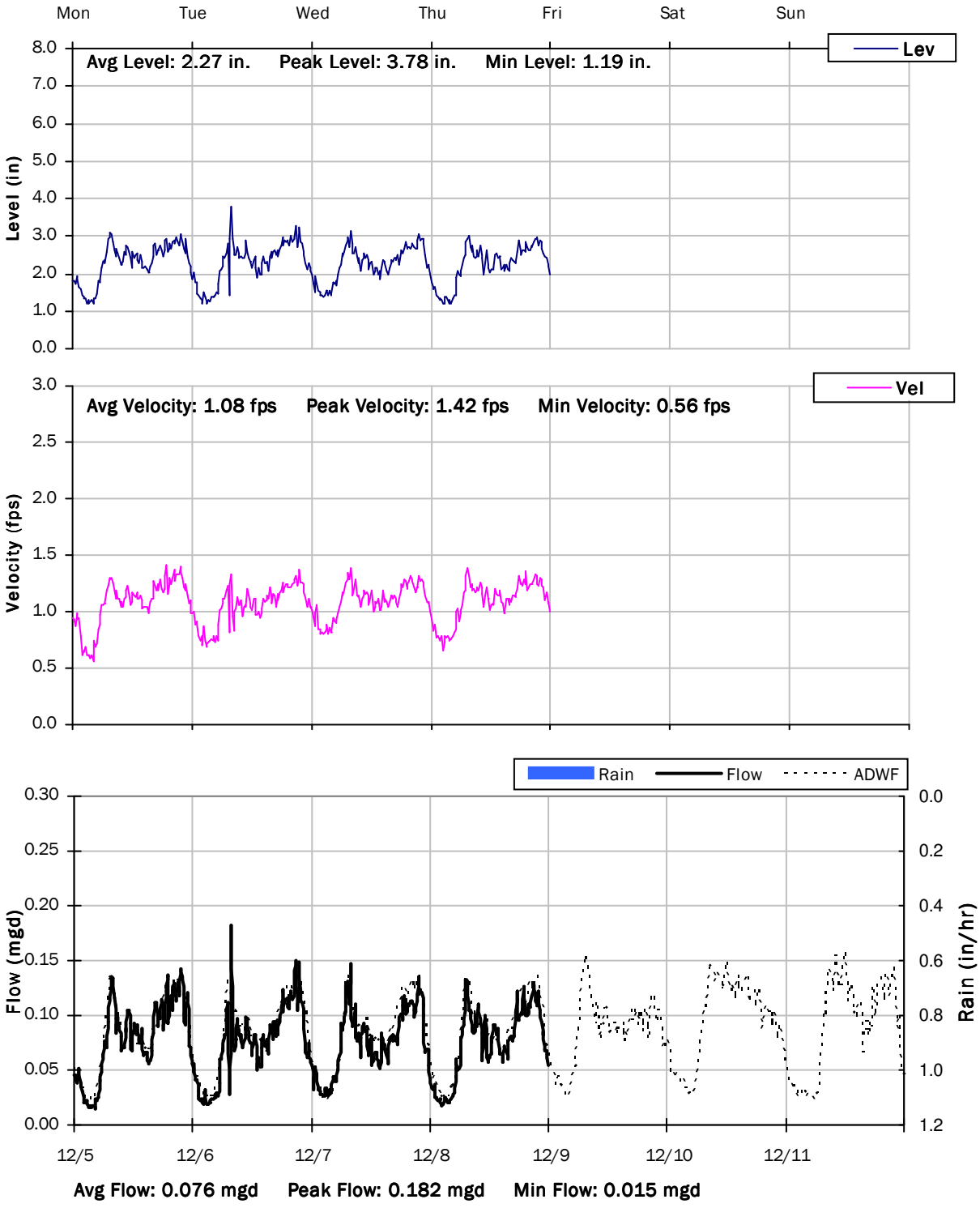
11/28/2016 to 12/5/2016



SITE 5

Weekly Level, Velocity and Flow Hydrographs

12/5/2016 to 12/12/2016



City of Placentia

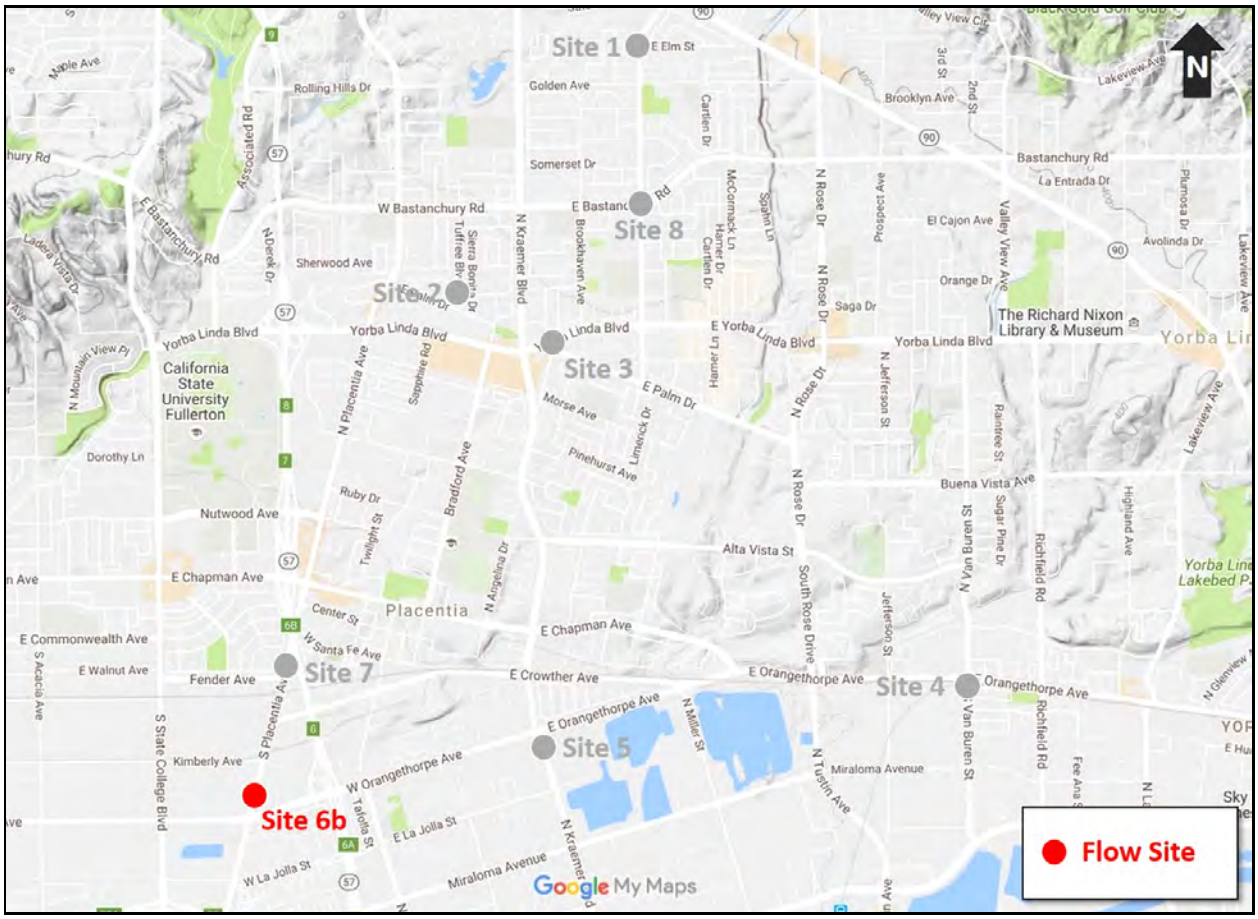
Sanitary Sewer Flow Monitoring

Temporary Monitoring: November 18 - December 8, 2016

Monitoring Site: Site 6b

Location: 1121 South Placentia Avenue

Data Summary Report



Vicinity Map: Site 6b

SITE 6B

Site Information

Location: 1121 South Placentia Avenue

Coordinates: 117.8828° W, 33.8610° N

Rim Elevation (Earth): 199 feet

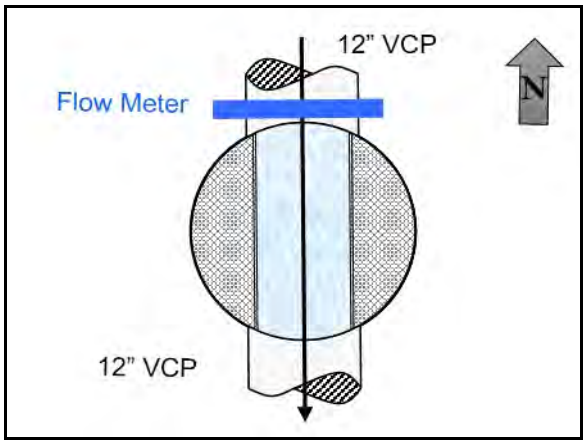
Pipe Diameter: 12 inches

ADWF: 0.188 mgd

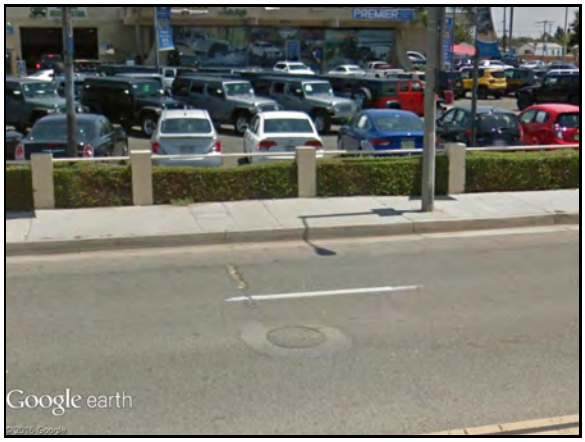
Peak Measured Flow: 0.339 mgd

Satellite Map

Sewer Map



Flow Sketch



Street View

Plan View

SITE 6B

Additional Site Photos

North Inlet

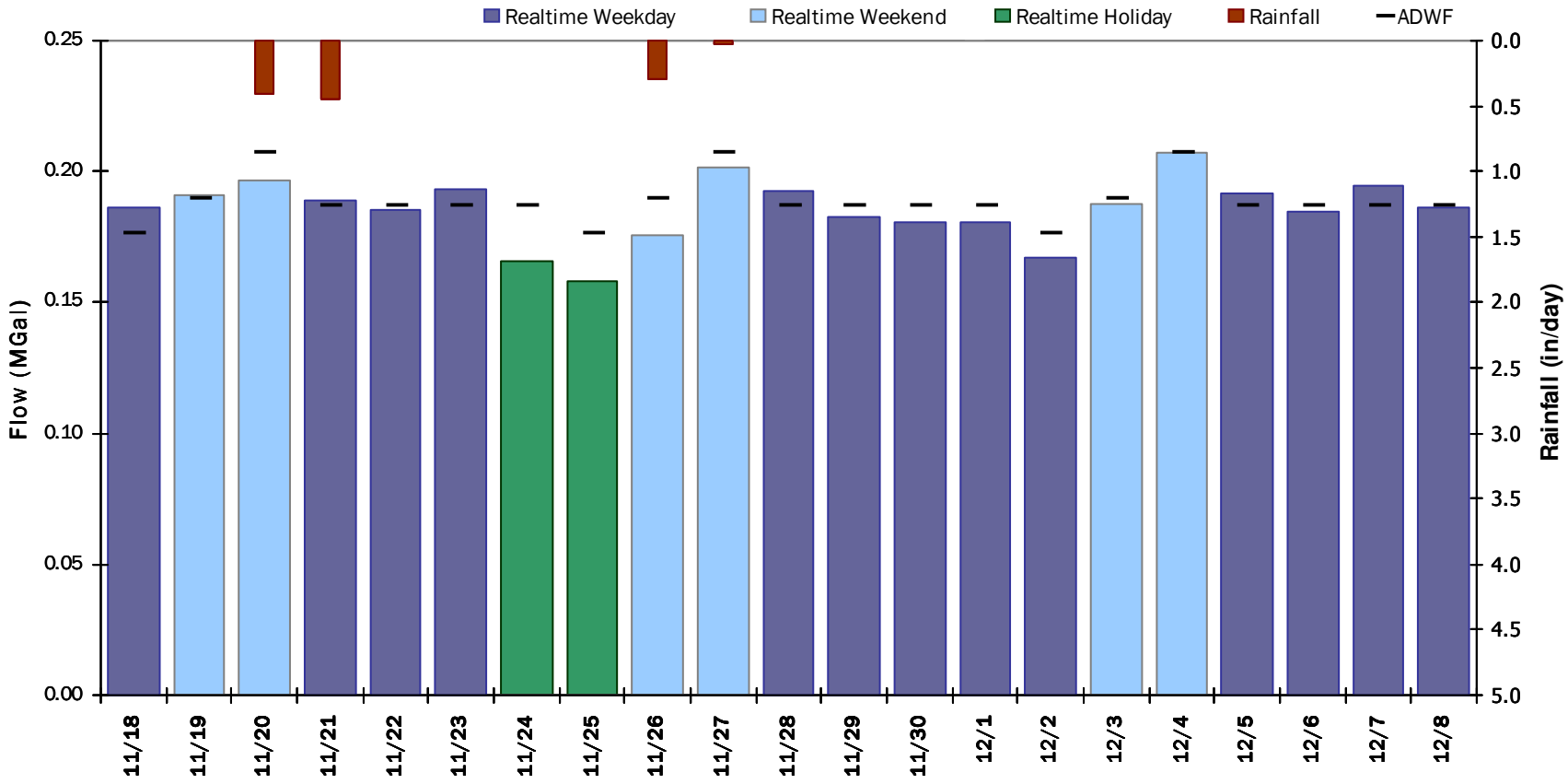
South Outlet

SITE 6B

Period Flow Summary: Daily Flow Totals

Avg Period Flow: 0.186 MGal **Peak Daily Flow: 0.207 MGal** **Min Daily Flow: 0.158 MGal**

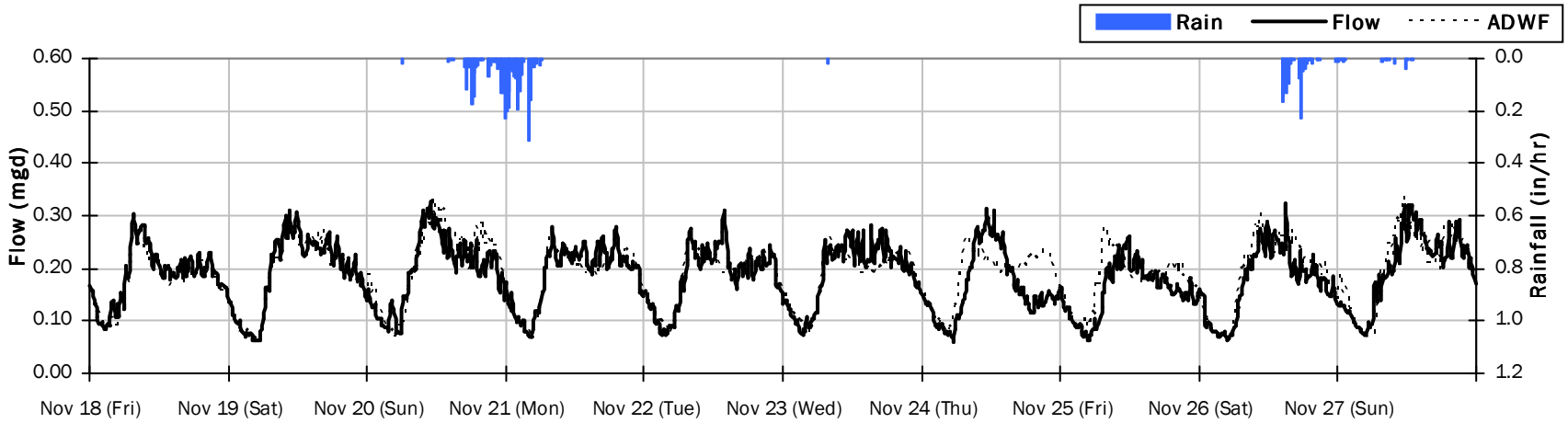
Total Period Rainfall: 1.21 inches

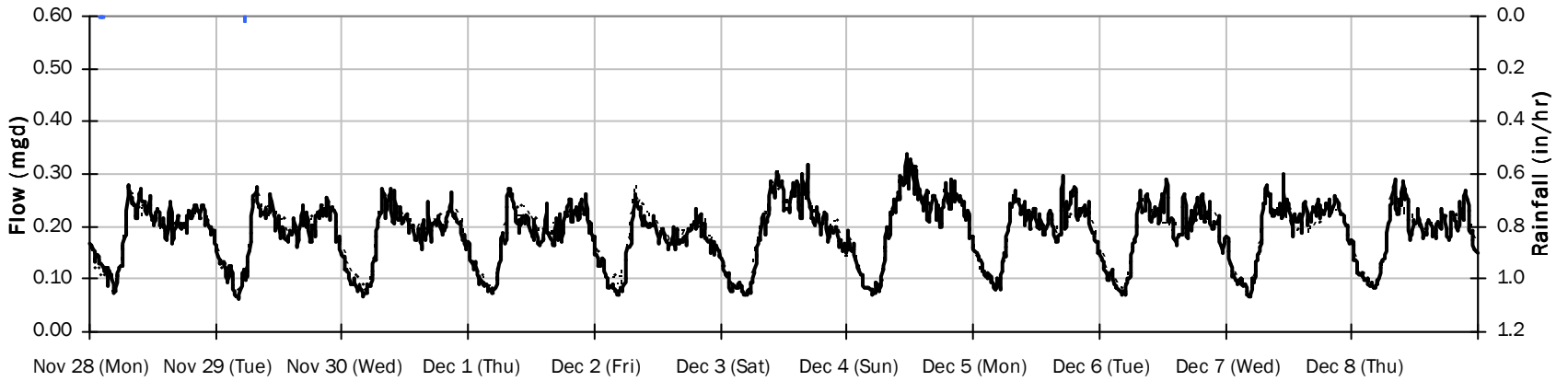


SITE 6B

Flow Summary: 11/18/2016 to 12/8/2016

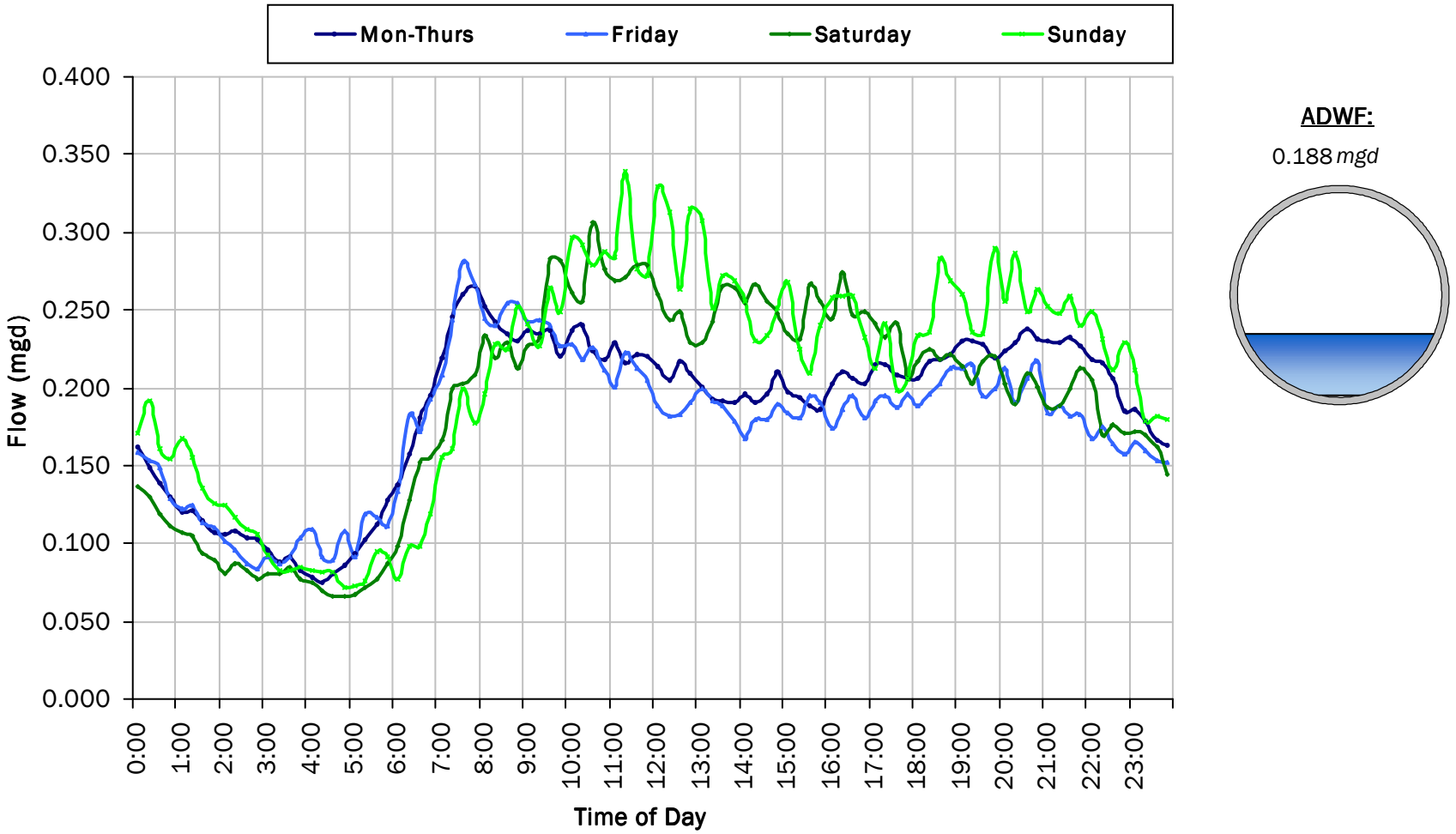
Total Period Rainfall: 1.21 inches **Avg Flow: 0.186 mgd** **Peak Flow: 0.339 mgd** **Min Flow: 0.060 mgd**





SITE 6B

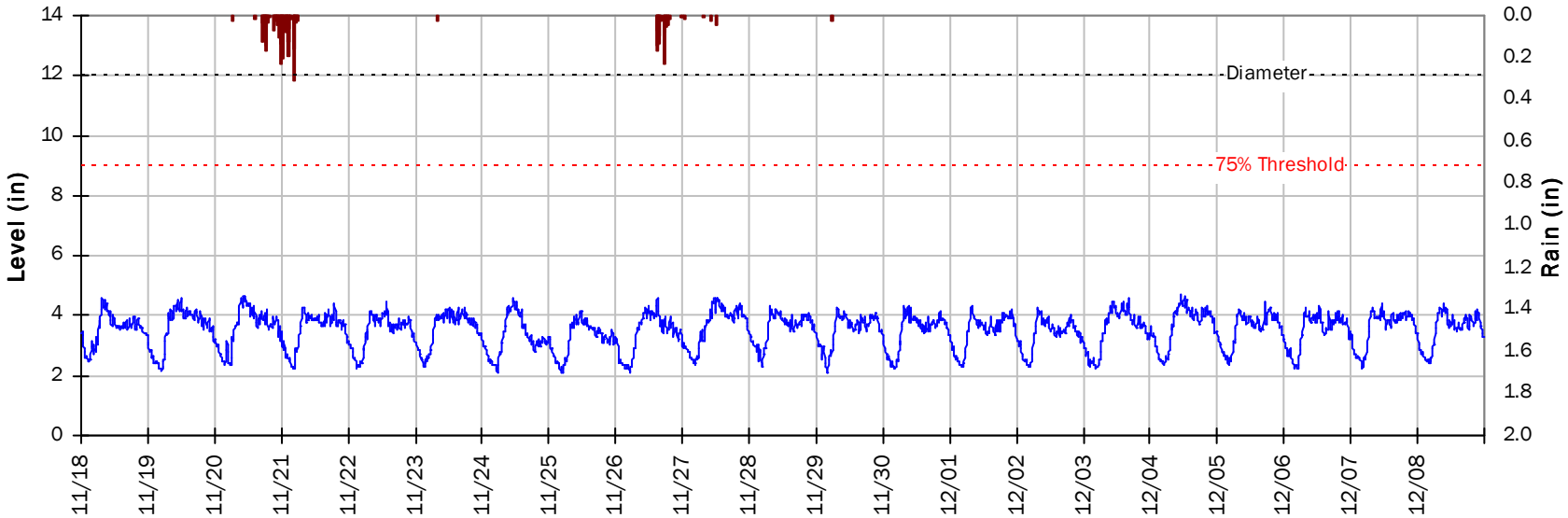
Average Dry Weather Flow Hydrographs

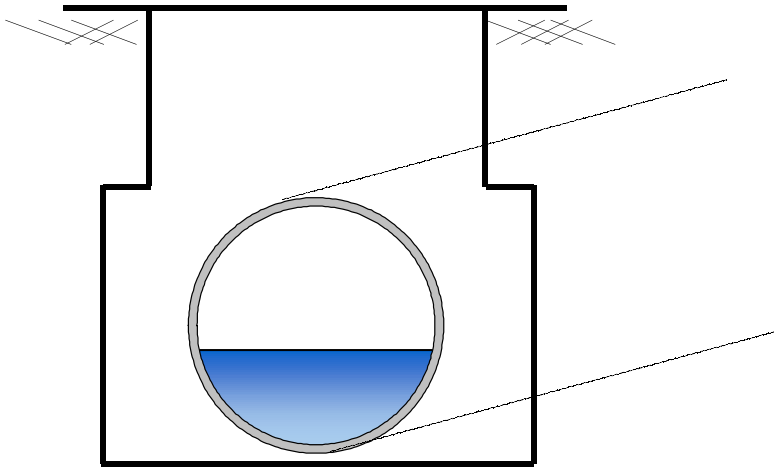


SITE 6B

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Rainfall Event



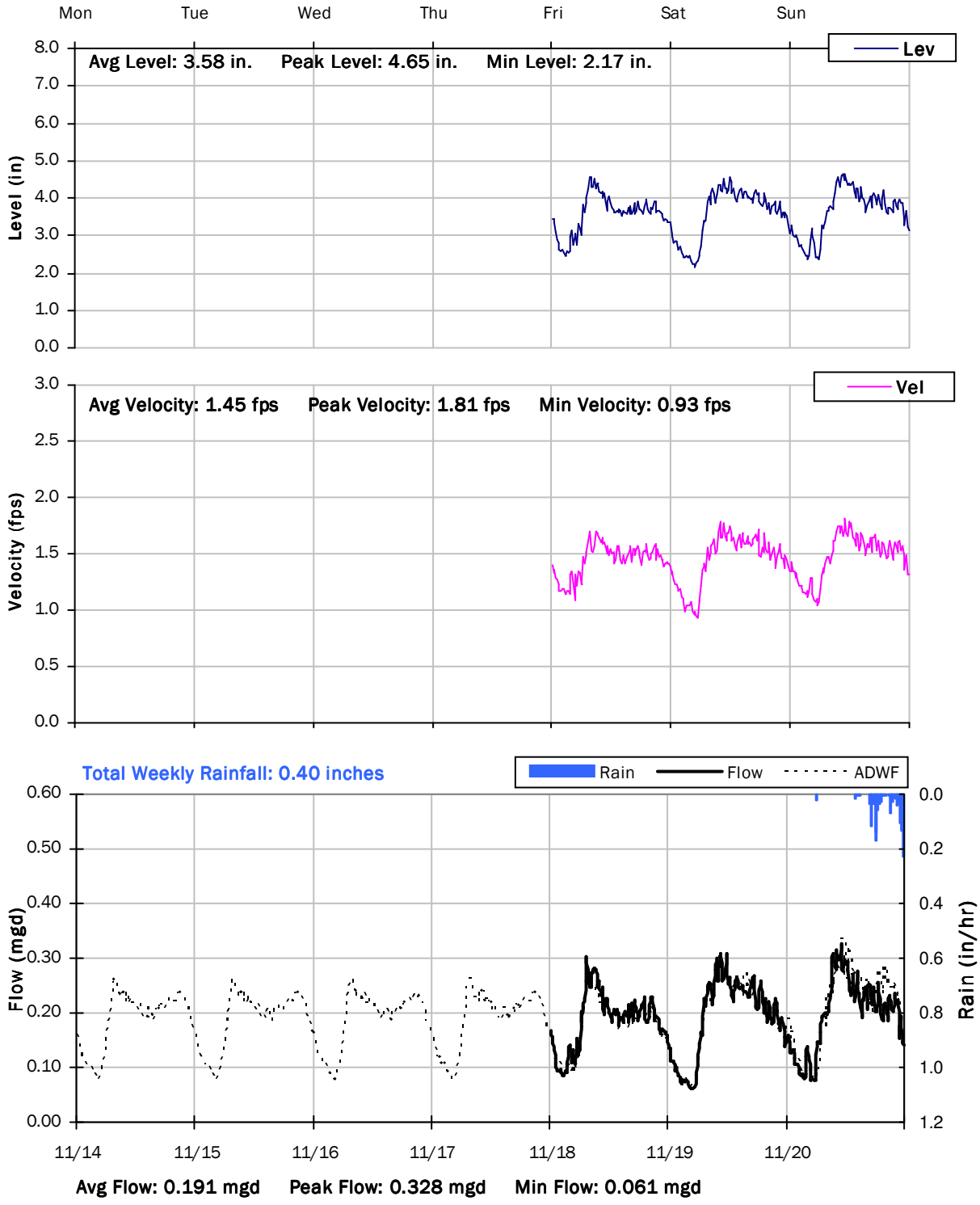


Pipe Diameter:	12	*inches*
Peak Measured Level:	4.68	*inches*
Peak d/D Ratio:	0.39	
Dry Weather Design Threshold Level:	6.00	*inches*

SITE 6B

Weekly Level, Velocity and Flow Hydrographs

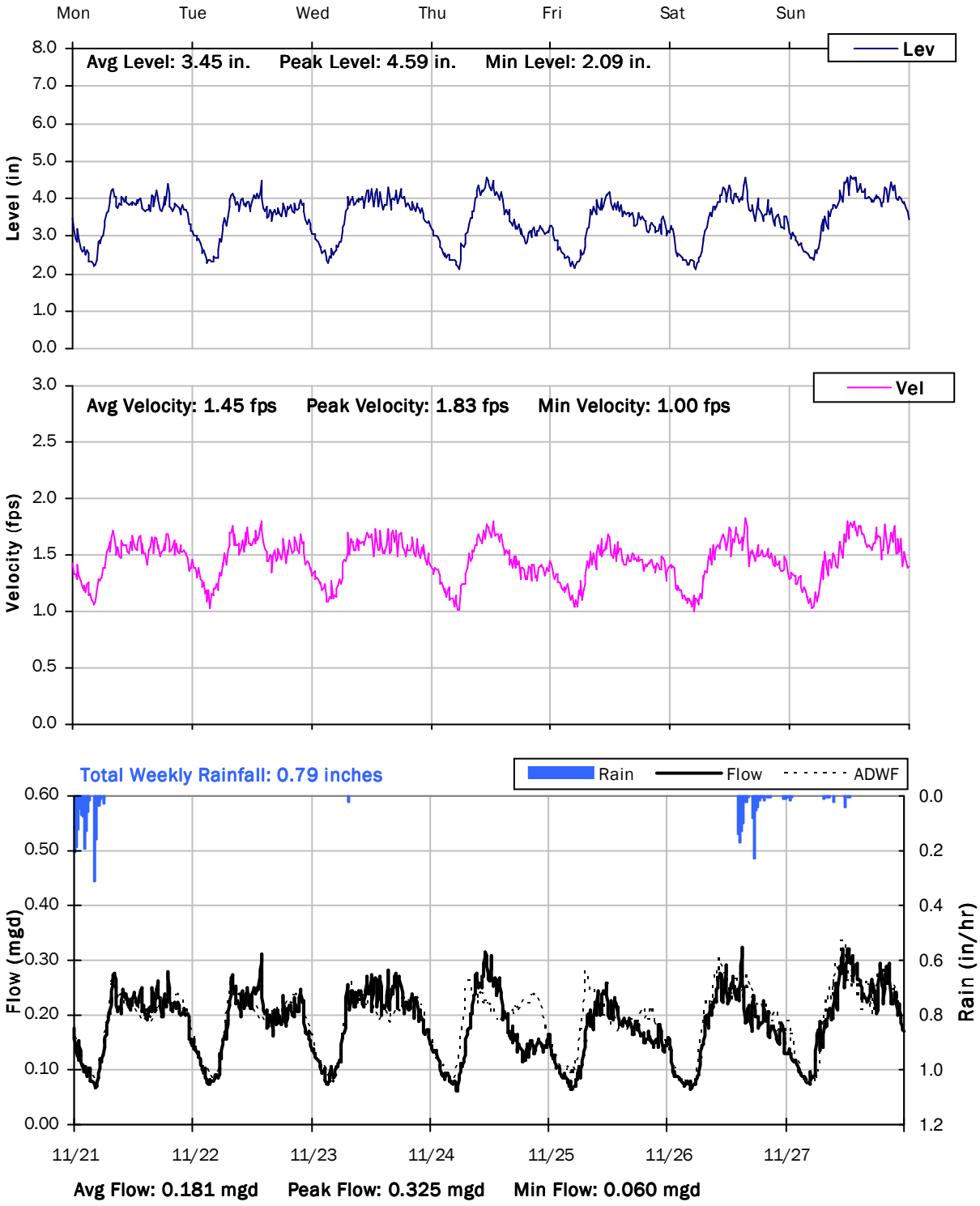
11/14/2016 to 11/21/2016



SITE 6B

Weekly Level, Velocity and Flow Hydrographs

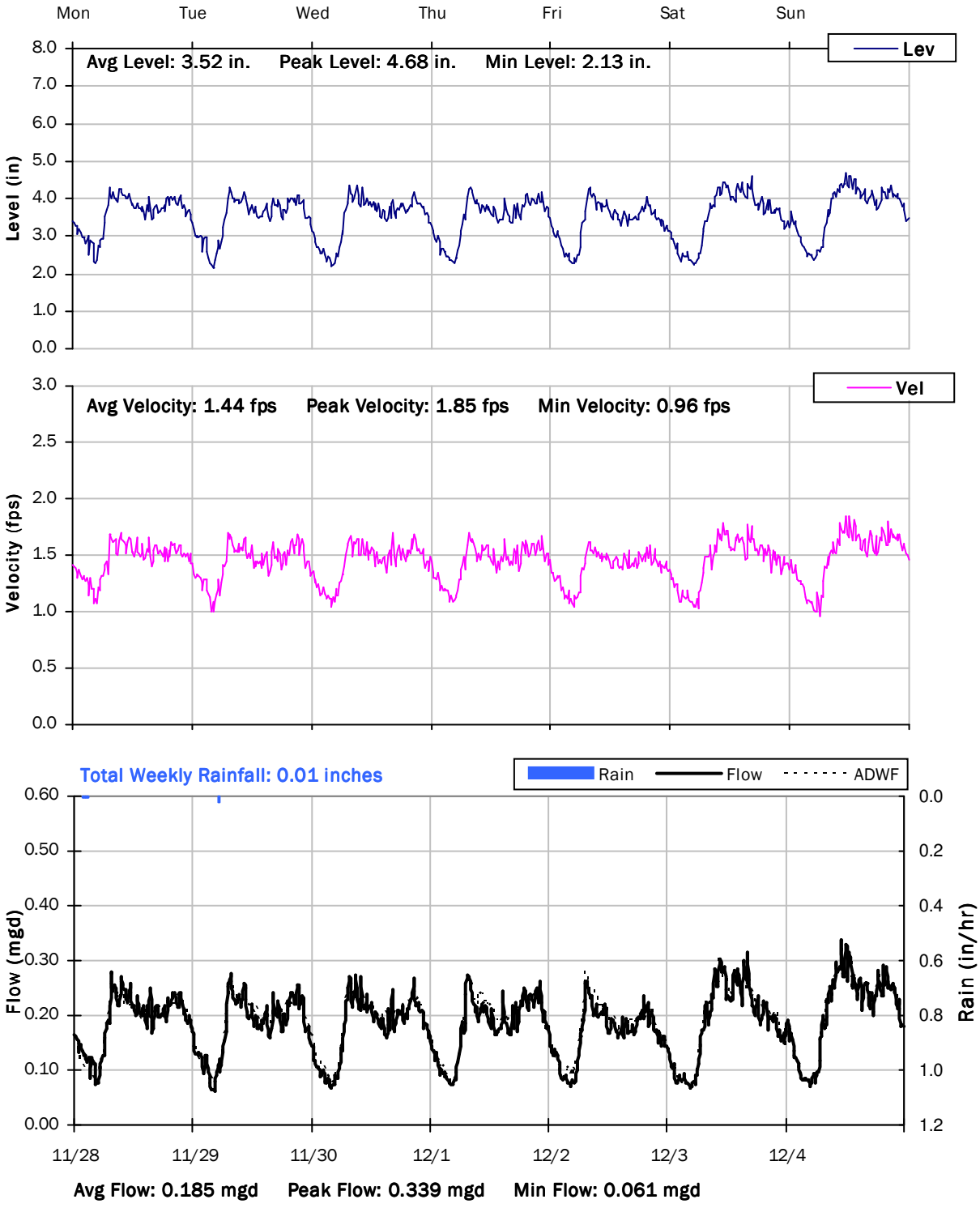
11/21/2016 to 11/28/2016



SITE 6B

Weekly Level, Velocity and Flow Hydrographs

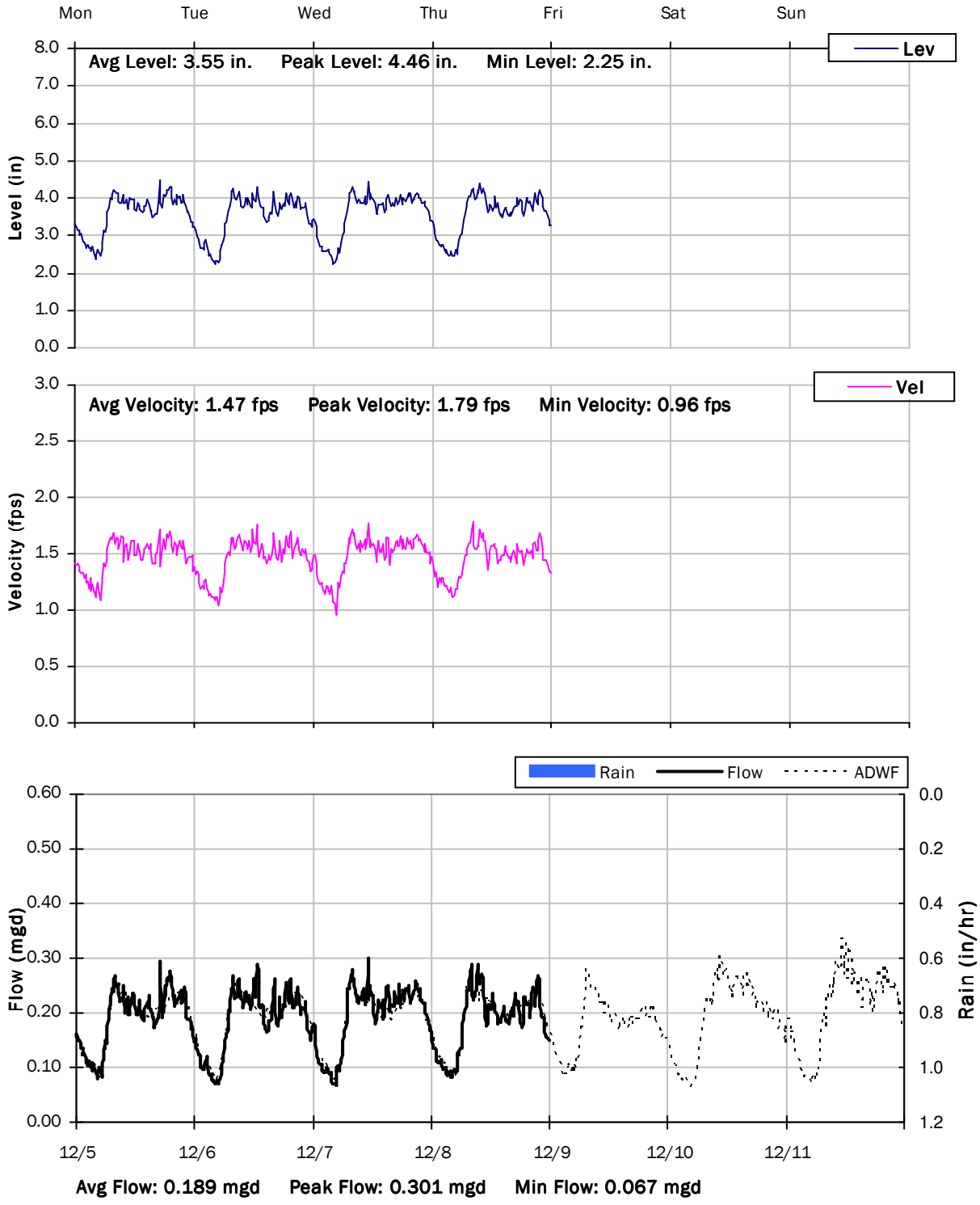
11/28/2016 to 12/5/2016



SITE 6B

Weekly Level, Velocity and Flow Hydrographs

12/5/2016 to 12/12/2016



City of Placentia

Sanitary Sewer Flow Monitoring

Temporary Monitoring: November 18 - December 8, 2016

Monitoring Site: Site 7

Location: South Placentia Avenue north of Fender Avenue

Data Summary Report

Vicinity Map: Site 7

SITE 7

Site Information

Location: South Placentia Avenue north of Fender Avenue

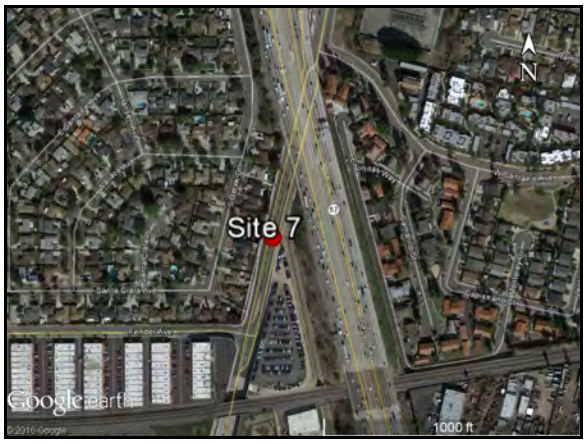
Coordinates: 117.8803° W, 33.8692° N

Rim Elevation (Earth): 211 feet

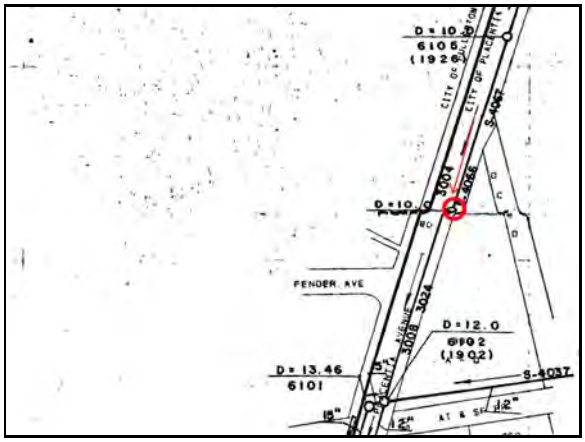
Pipe Diameter: 10 inches

ADWF: 0.150 mgd

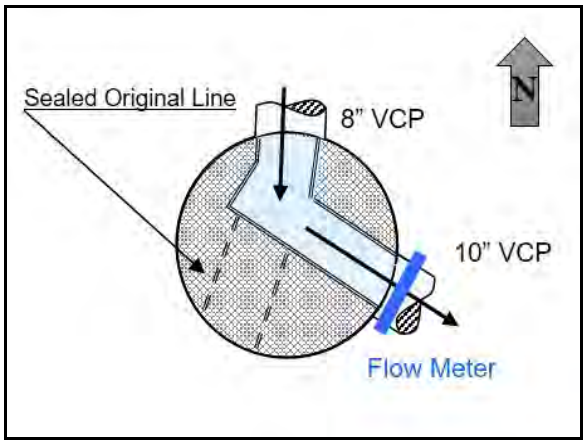
Peak Measured Flow: 0.321 mgd



Satellite Map



Sewer Map



Flow Sketch

Street View

Plan View

SITE 7

Additional Site Photos

North Inlet

South Outlet

SITE 7

Period Flow Summary: Daily Flow Totals

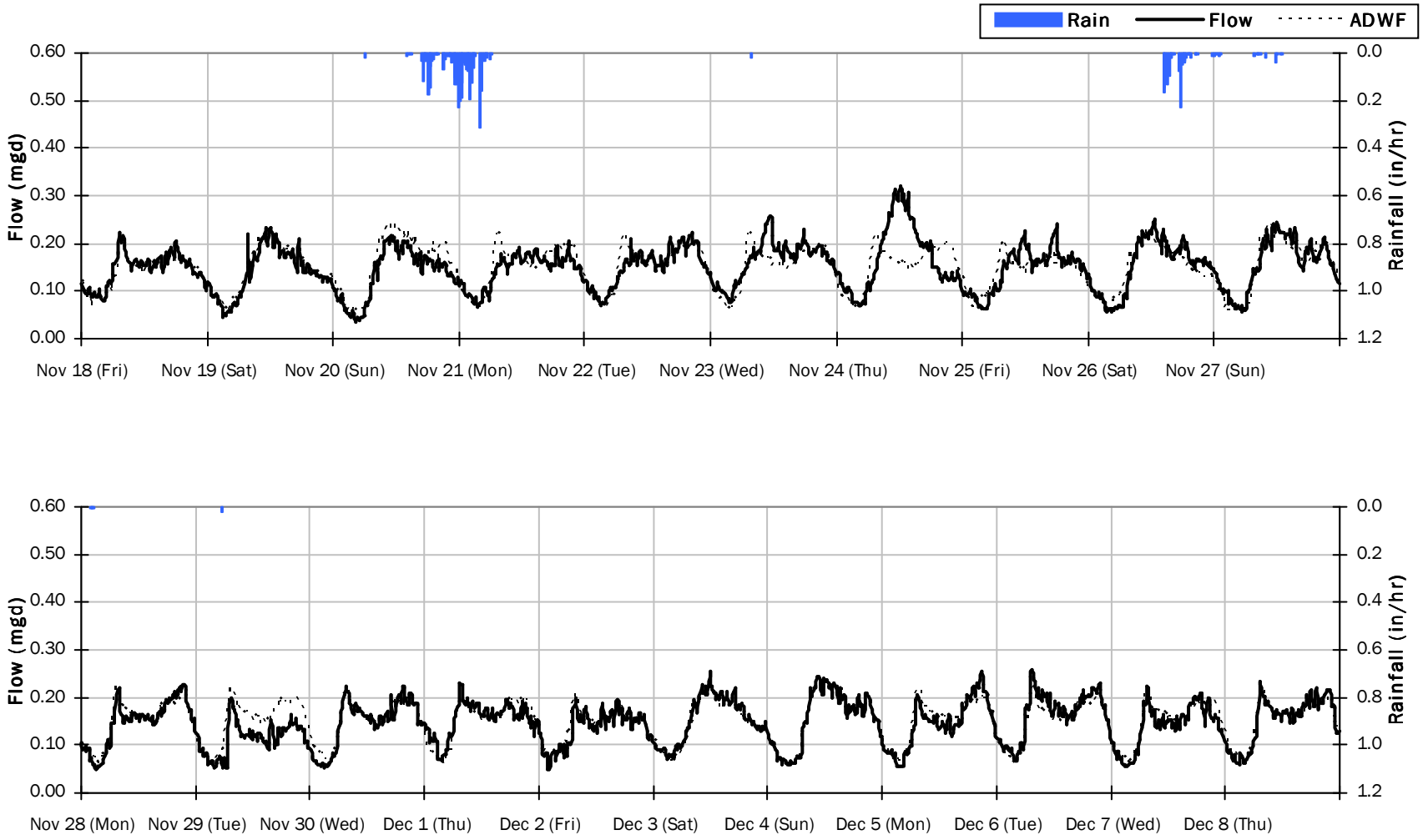
Avg Period Flow: 0.149 MGal **Peak Daily Flow: 0.170 MGal** **Min Daily Flow: 0.113 MGal**

Total Period Rainfall: 1.21 inches

SITE 7

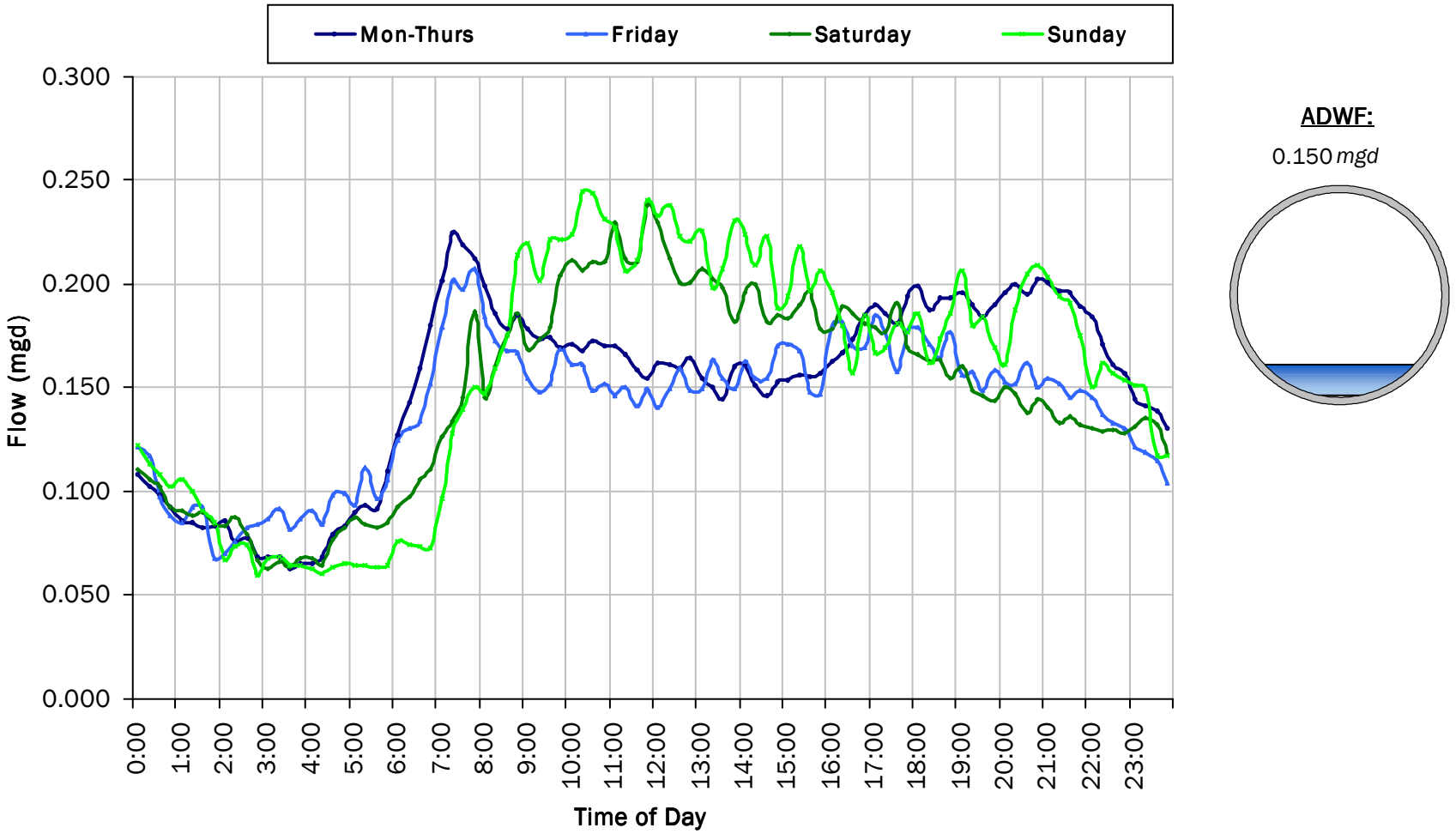
Flow Summary: 11/18/2016 to 12/8/2016

Total Period Rainfall: 1.21 inches **Avg Flow: 0.149 mgd** **Peak Flow: 0.321 mgd** **Min Flow: 0.035 mgd**



SITE 7

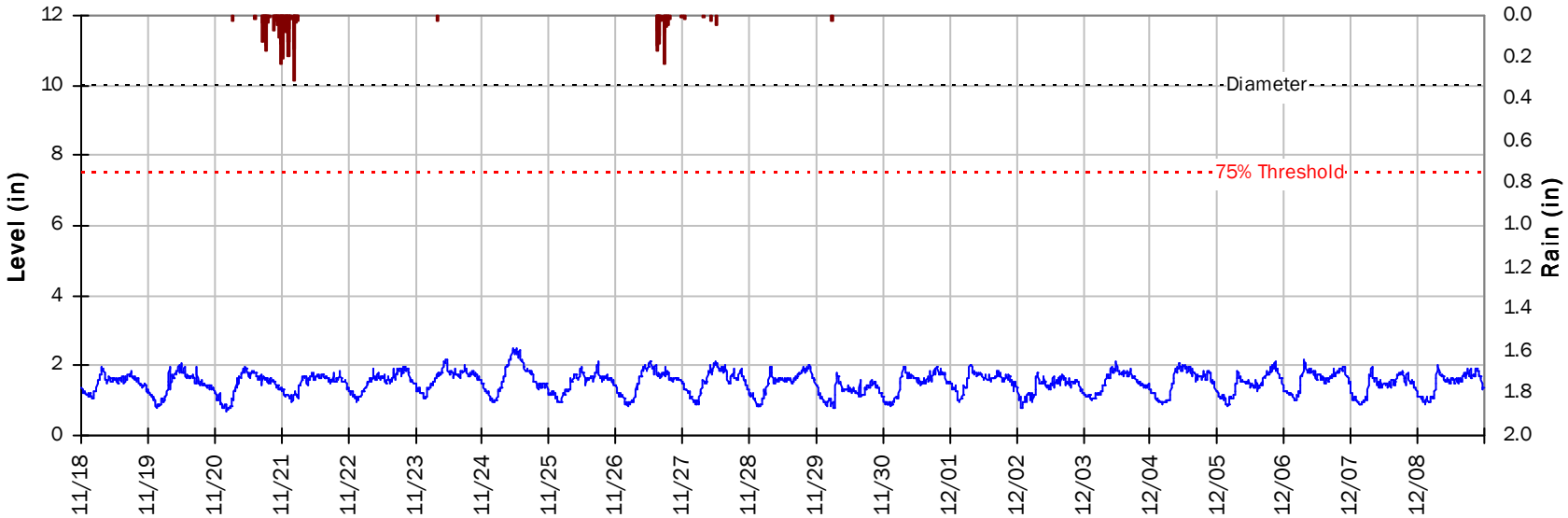
Average Dry Weather Flow Hydrographs

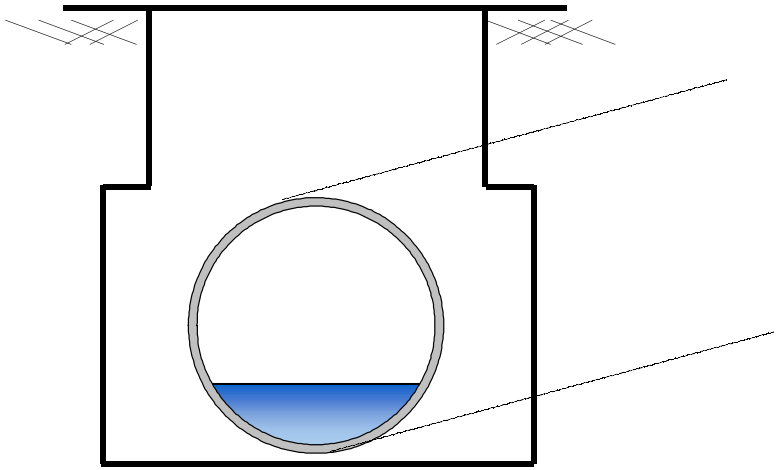


SITE 7

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Rainfall Event



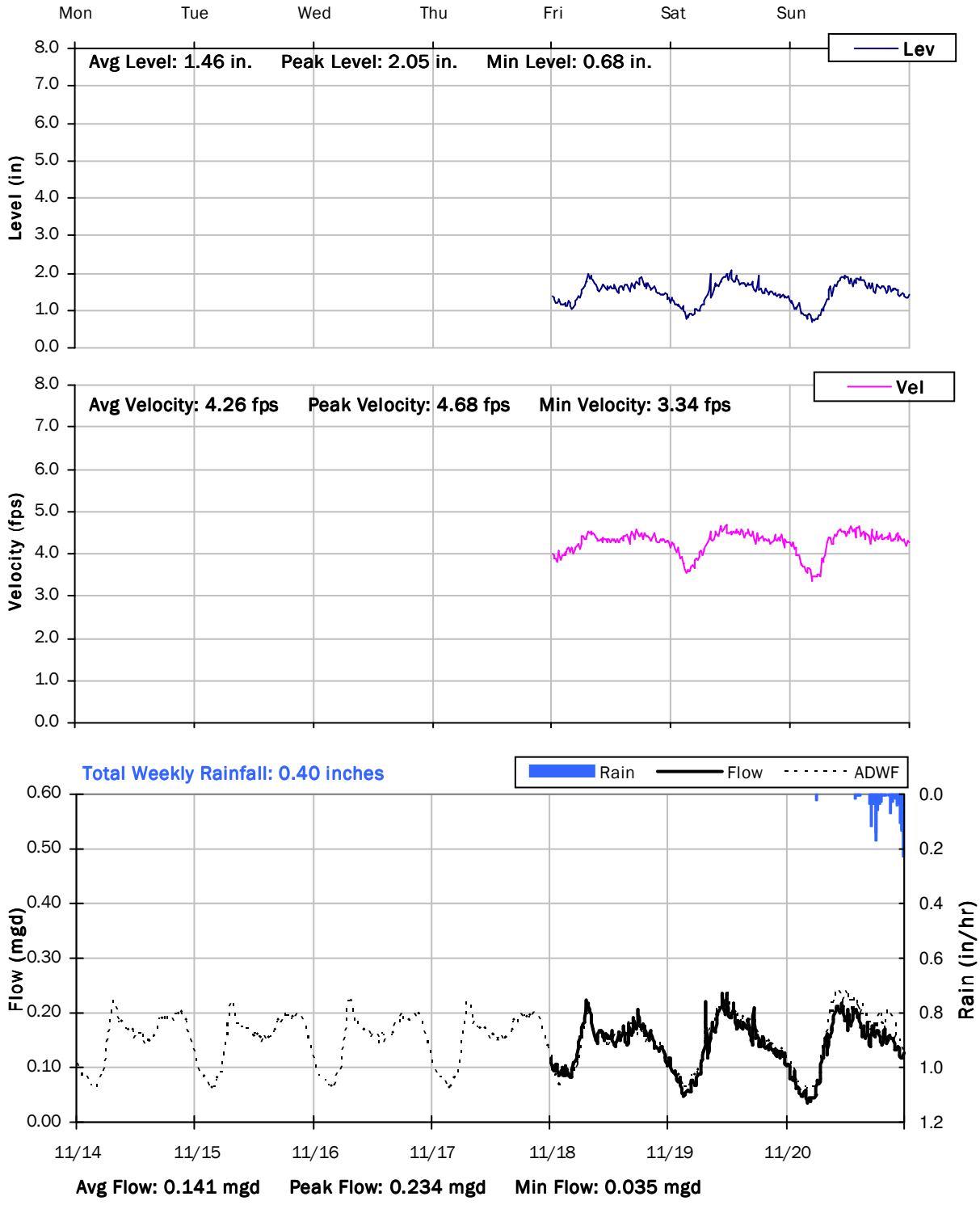


Pipe Diameter:	10	*inches*
Peak Measured Level:	2.52	*inches*
Peak d/D Ratio:	0.25	
Dry Weather Design Threshold Level:	5.00	*inches*

SITE 7

Weekly Level, Velocity and Flow Hydrographs

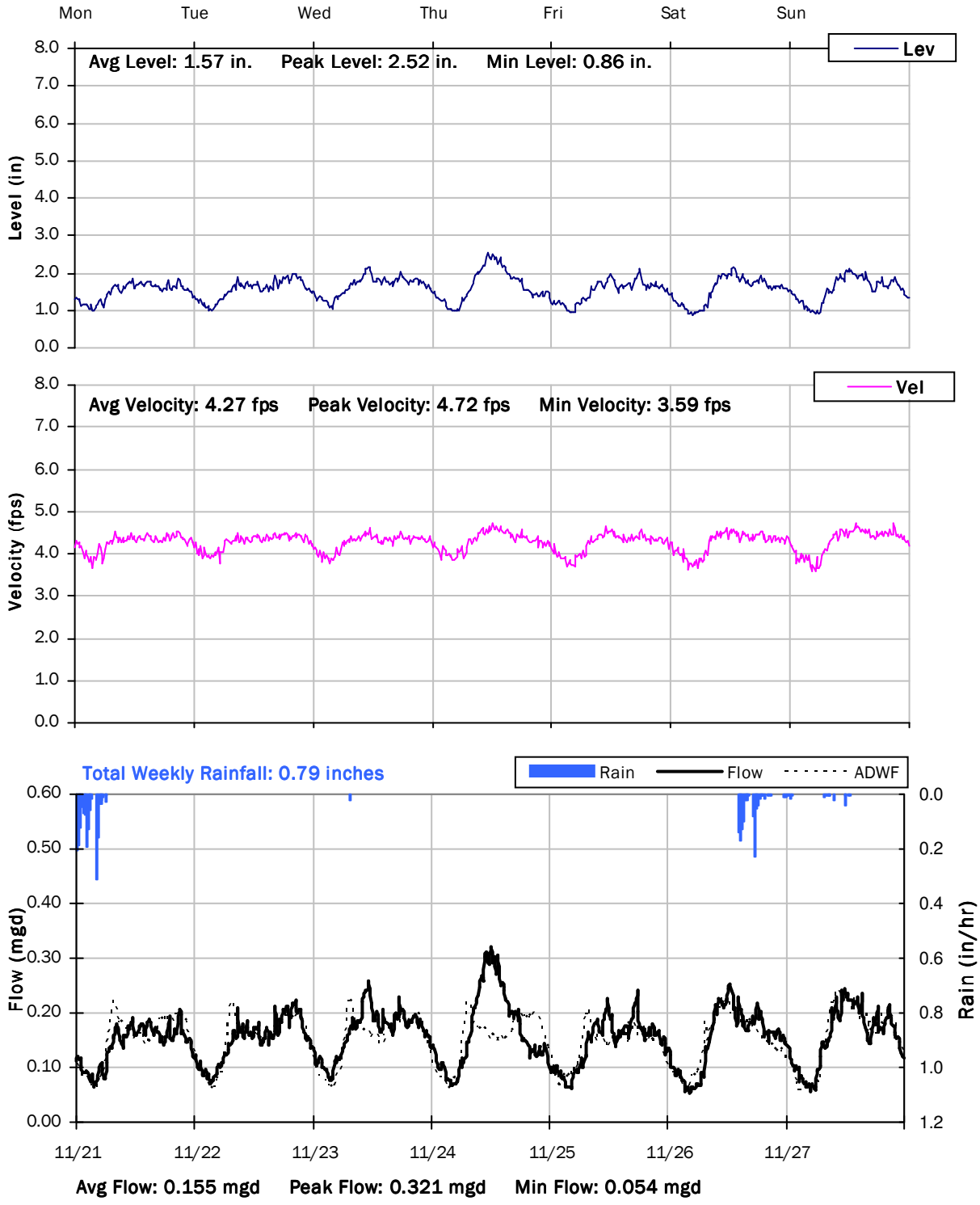
11/14/2016 to 11/21/2016



SITE 7

Weekly Level, Velocity and Flow Hydrographs

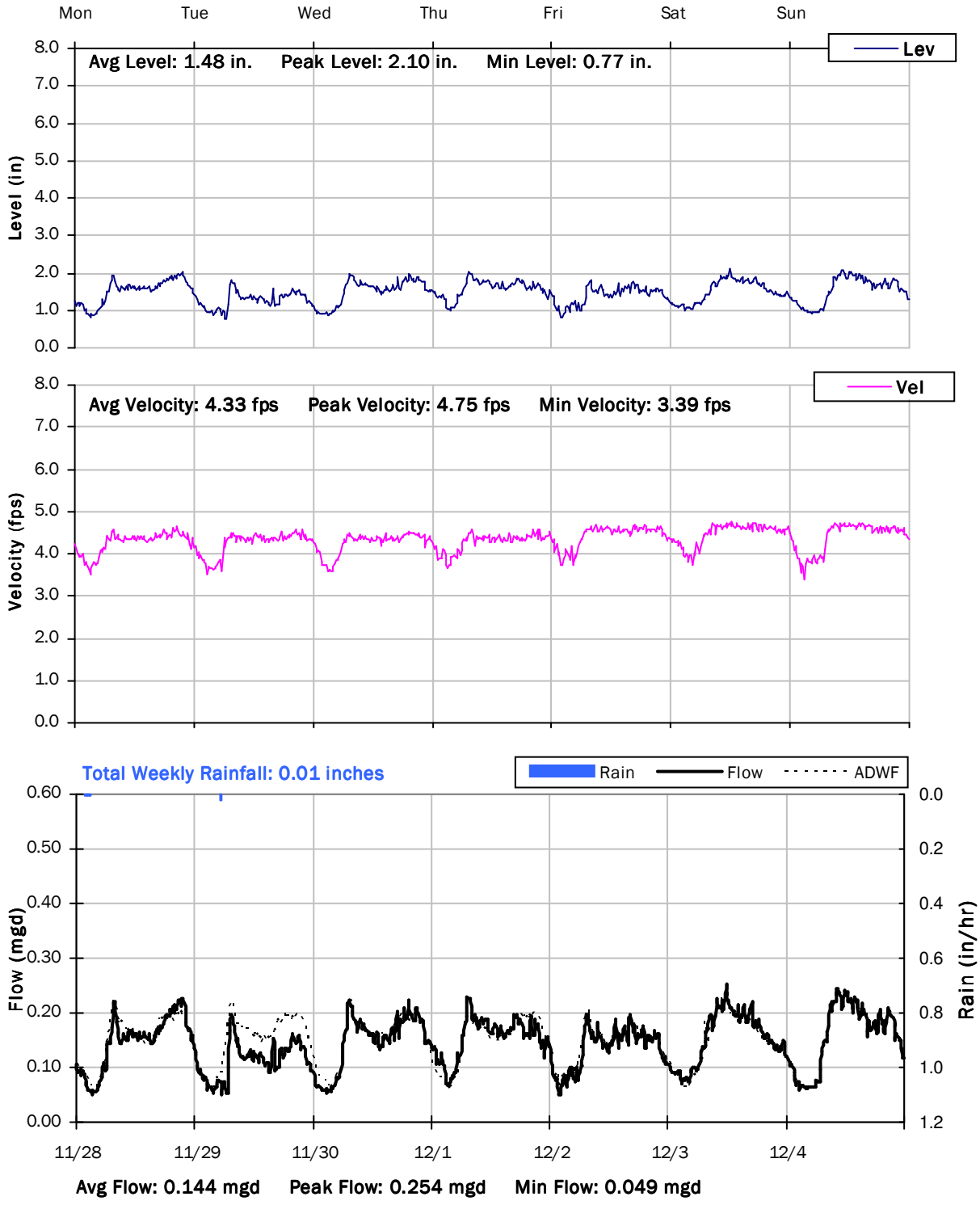
11/21/2016 to 11/28/2016



SITE 7

Weekly Level, Velocity and Flow Hydrographs

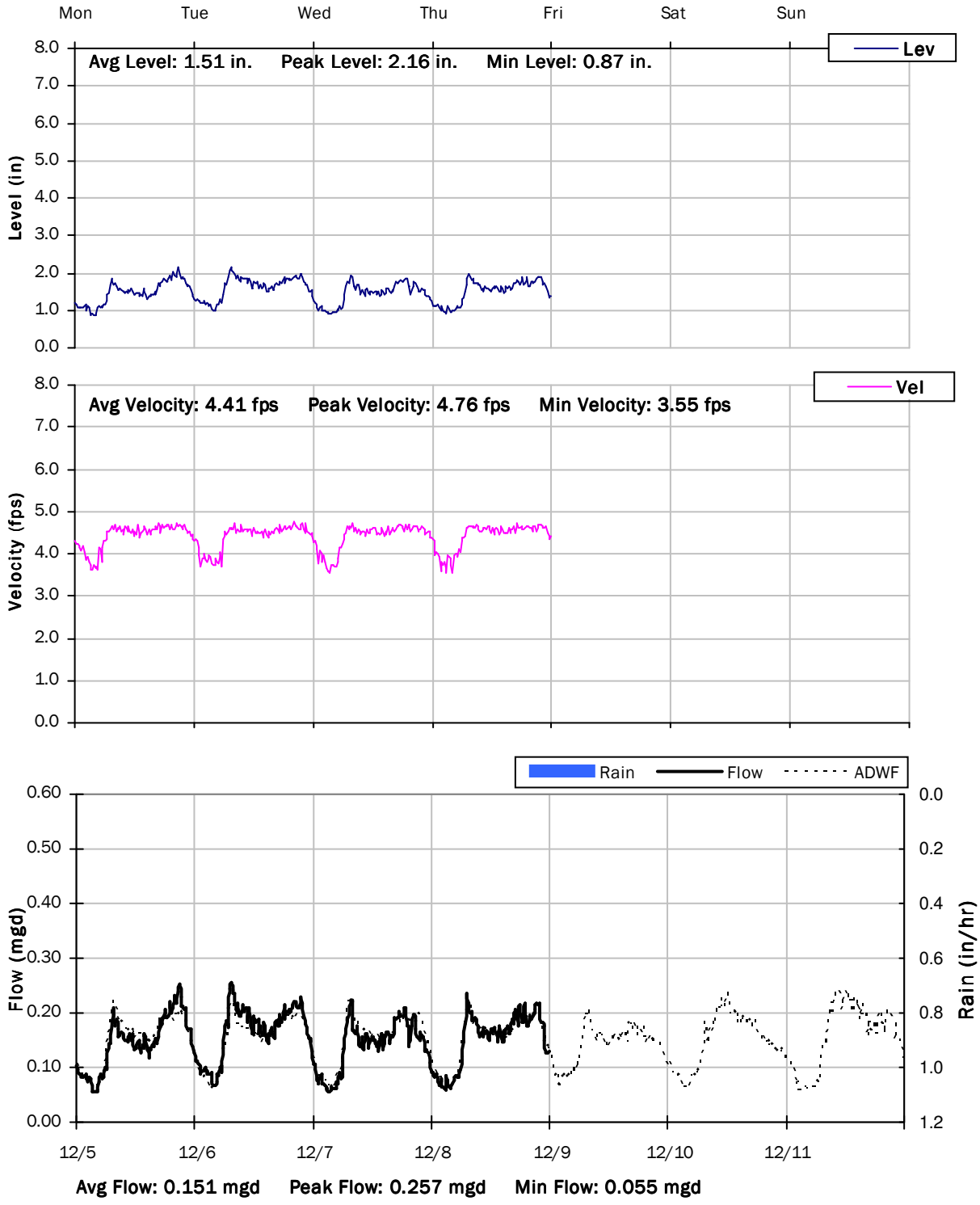
11/28/2016 to 12/5/2016



SITE 7

Weekly Level, Velocity and Flow Hydrographs

12/5/2016 to 12/12/2016



City of Placentia

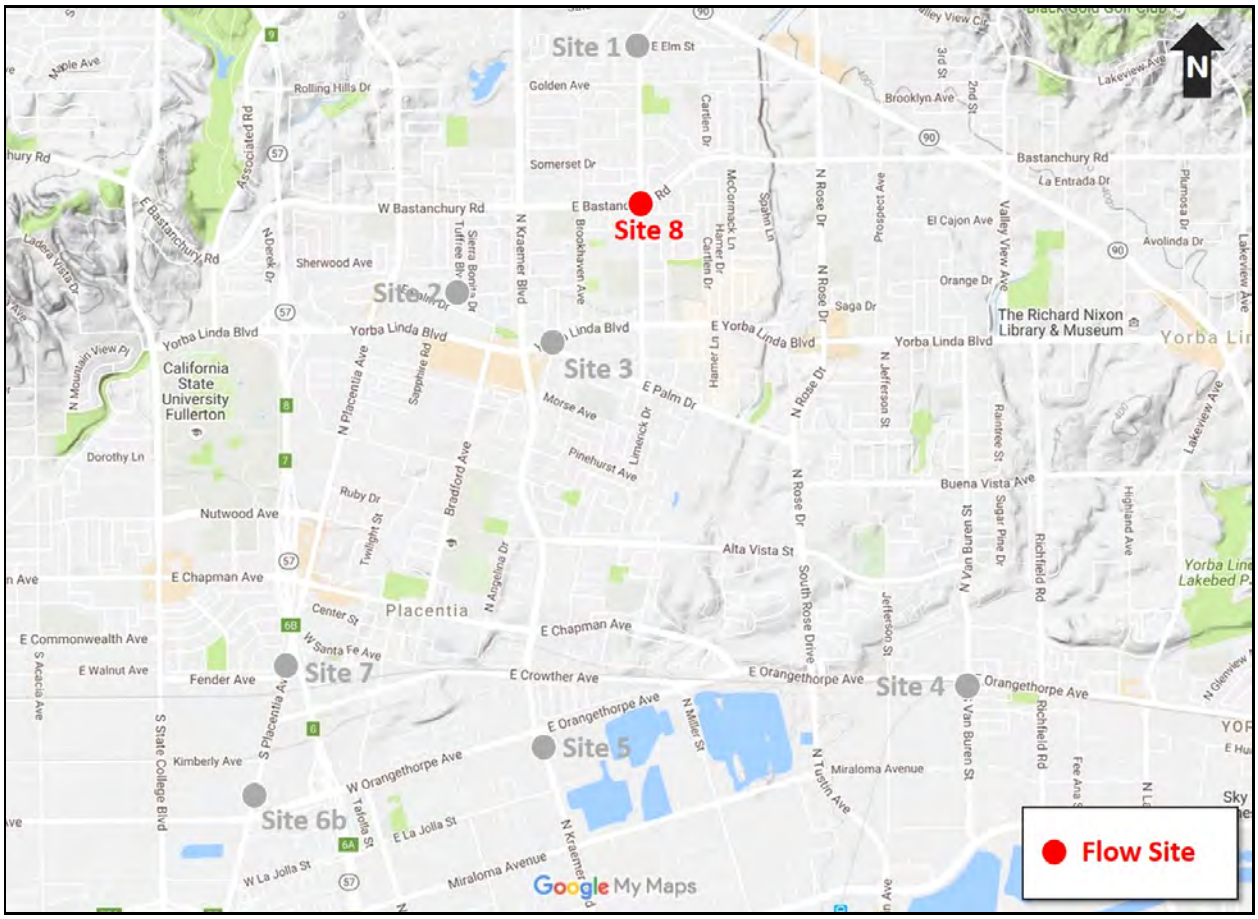
Sanitary Sewer Flow Monitoring

Temporary Monitoring: November 18 - December 8, 2016

Monitoring Site: Site 8

Location: East Bastanchury Road and Valencia Avenue

Data Summary Report



Vicinity Map: Site 8

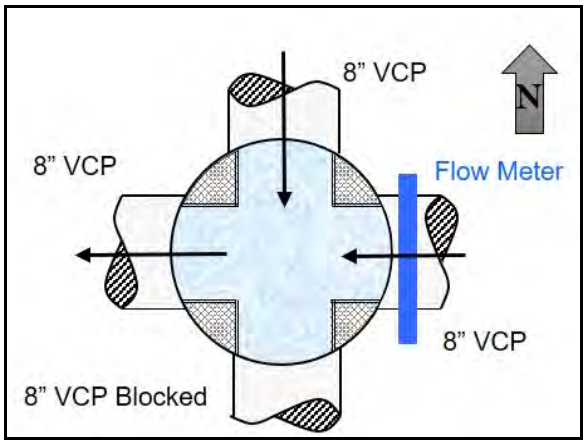
SITE 8

Site Information

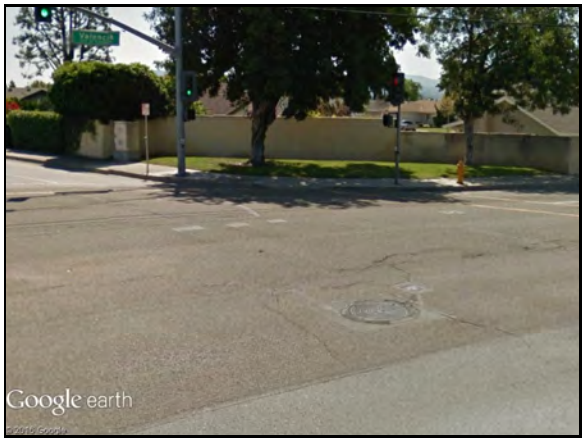
Location:	East Bastanchury Road and Valencia Avenue
Coordinates:	117.8550° W, 33.8966° N
Rim Elevation (Earth):	339 feet
Pipe Diameter:	8 inches
ADWF:	0.008 mgd
Peak Measured Flow:	0.047 mgd

Satellite Map

Sewer Map



Flow Sketch



Street View

Plan View

SITE 8

Additional Site Photos

Southeast Inlet

West Outlet

SITE 8

Additional Site Photos

North Inlet

South Inlet

SITE 8

Period Flow Summary: Daily Flow Totals

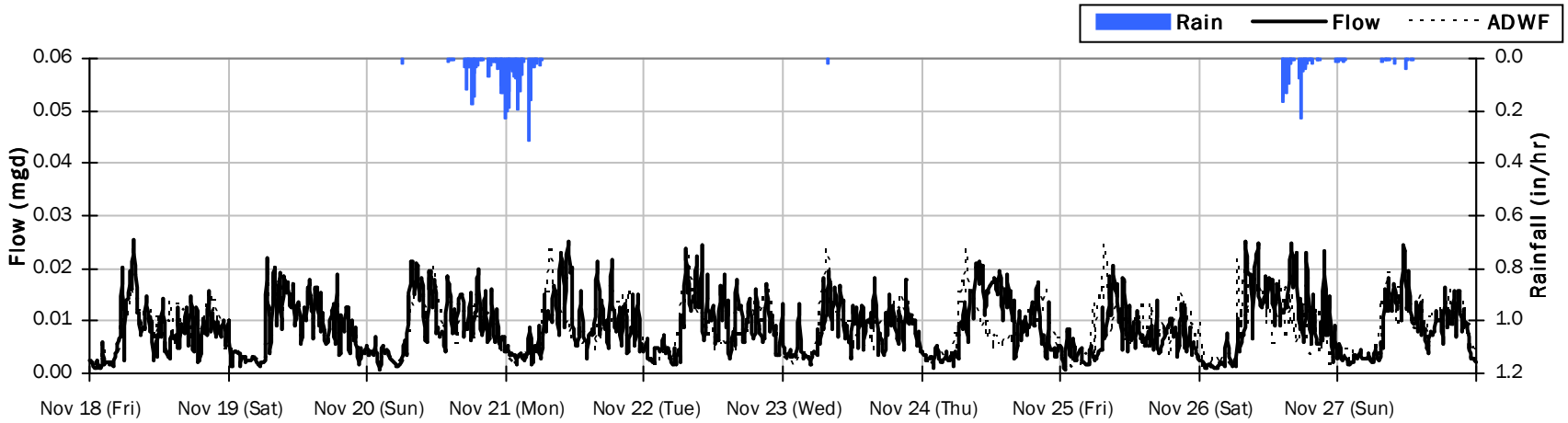
Avg Period Flow: 0.009 MGal **Peak Daily Flow: 0.011 MGal** **Min Daily Flow: 0.007 MGal**

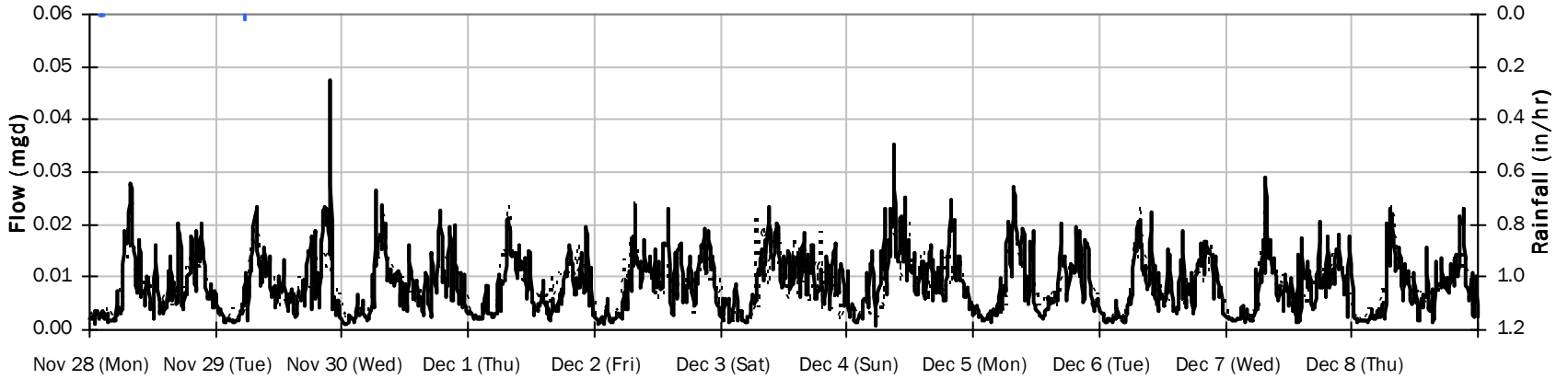
Total Period Rainfall: 1.21 inches

SITE 8

Flow Summary: 11/18/2016 to 12/8/2016

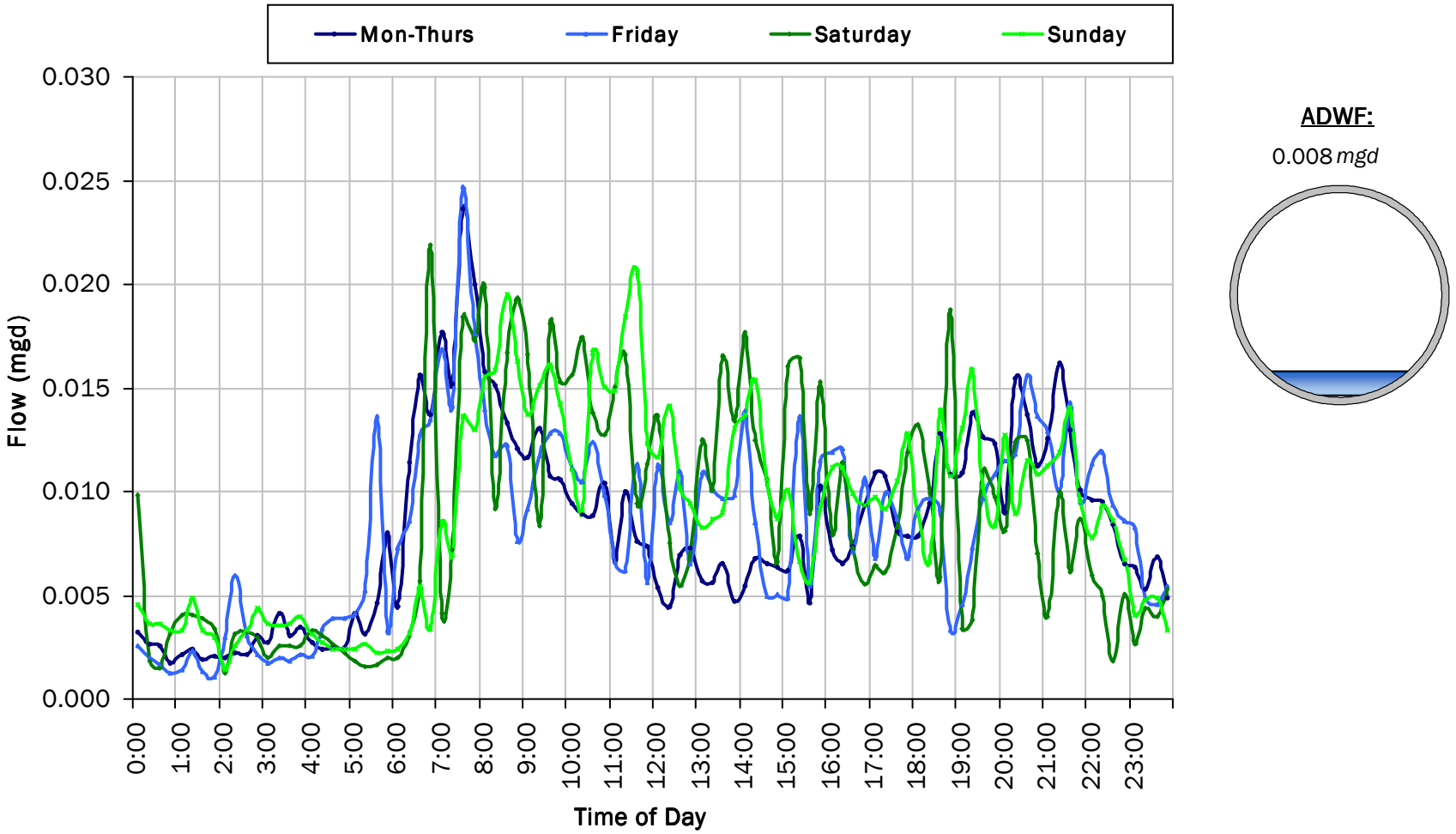
Total Period Rainfall: 1.21 inches **Avg Flow: 0.009 mgd Peak Flow: 0.047 mgd Min Flow: 0.001 mgd**





SITE 8

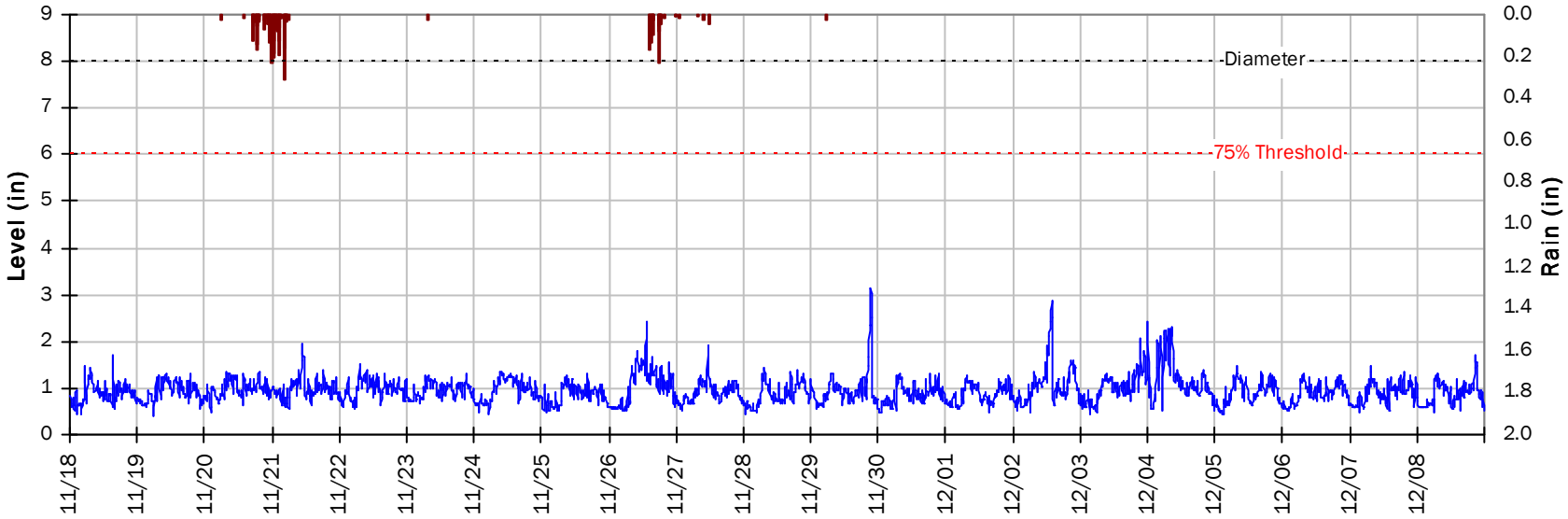
Average Dry Weather Flow Hydrographs

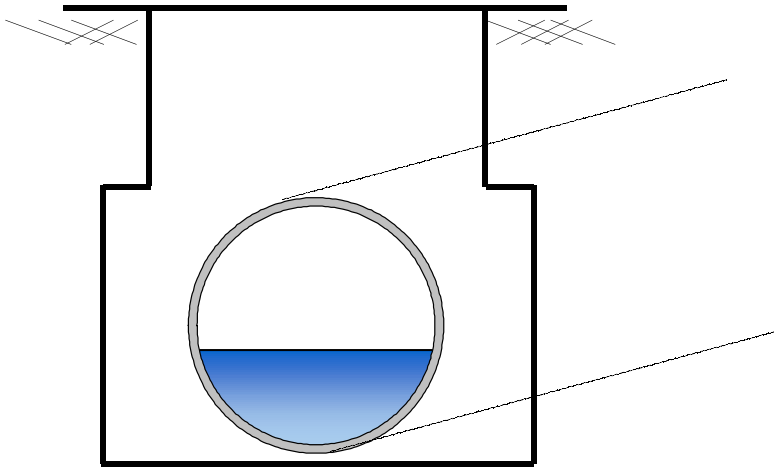


SITE 8

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Rainfall Event



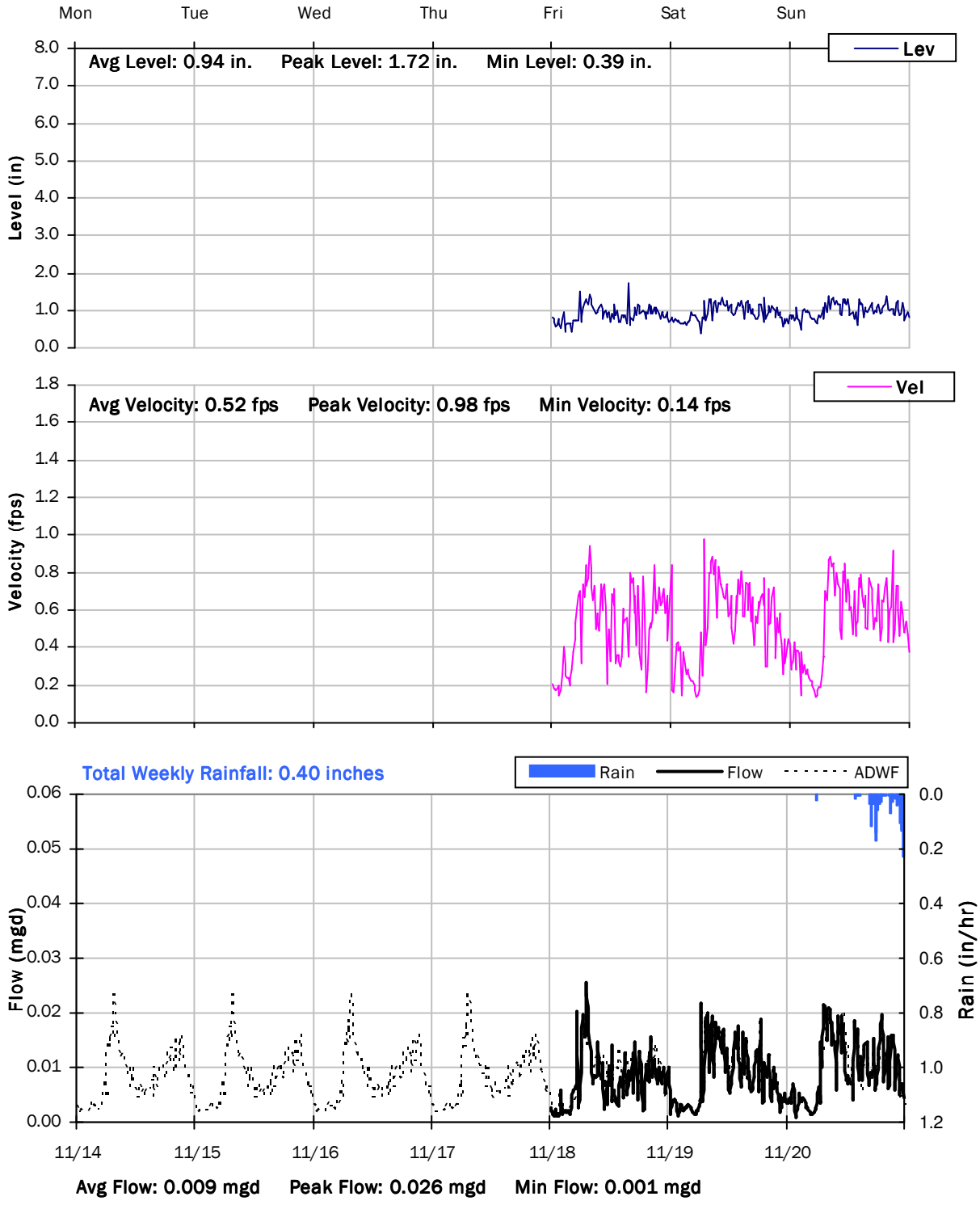


Pipe Diameter:	8	*inches*
Peak Measured Level:	3.15	*inches*
Peak d/D Ratio:	0.39	
Dry Weather Design Threshold Level:	4.00	*inches*

SITE 8

Weekly Level, Velocity and Flow Hydrographs

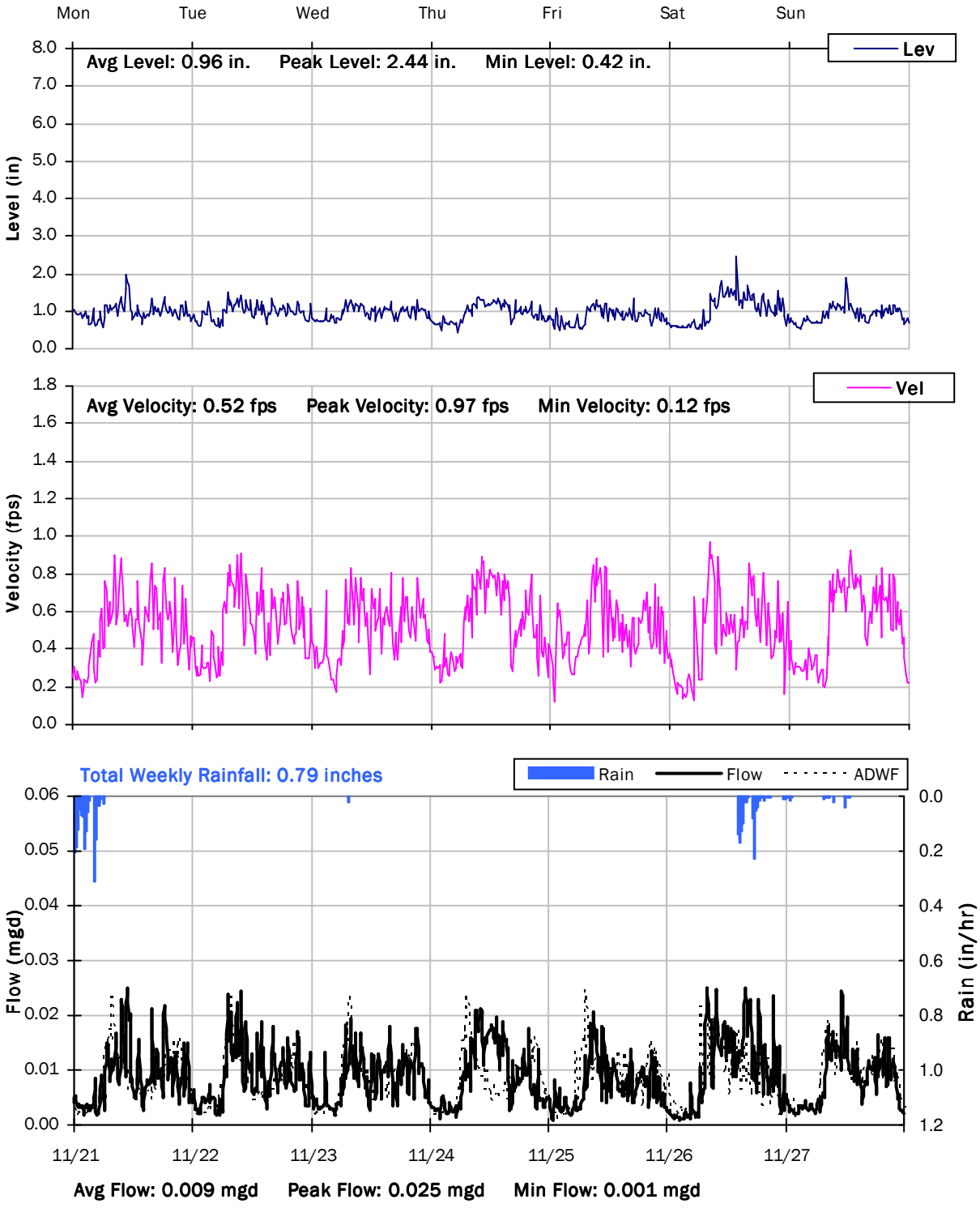
11/14/2016 to 11/21/2016



SITE 8

Weekly Level, Velocity and Flow Hydrographs

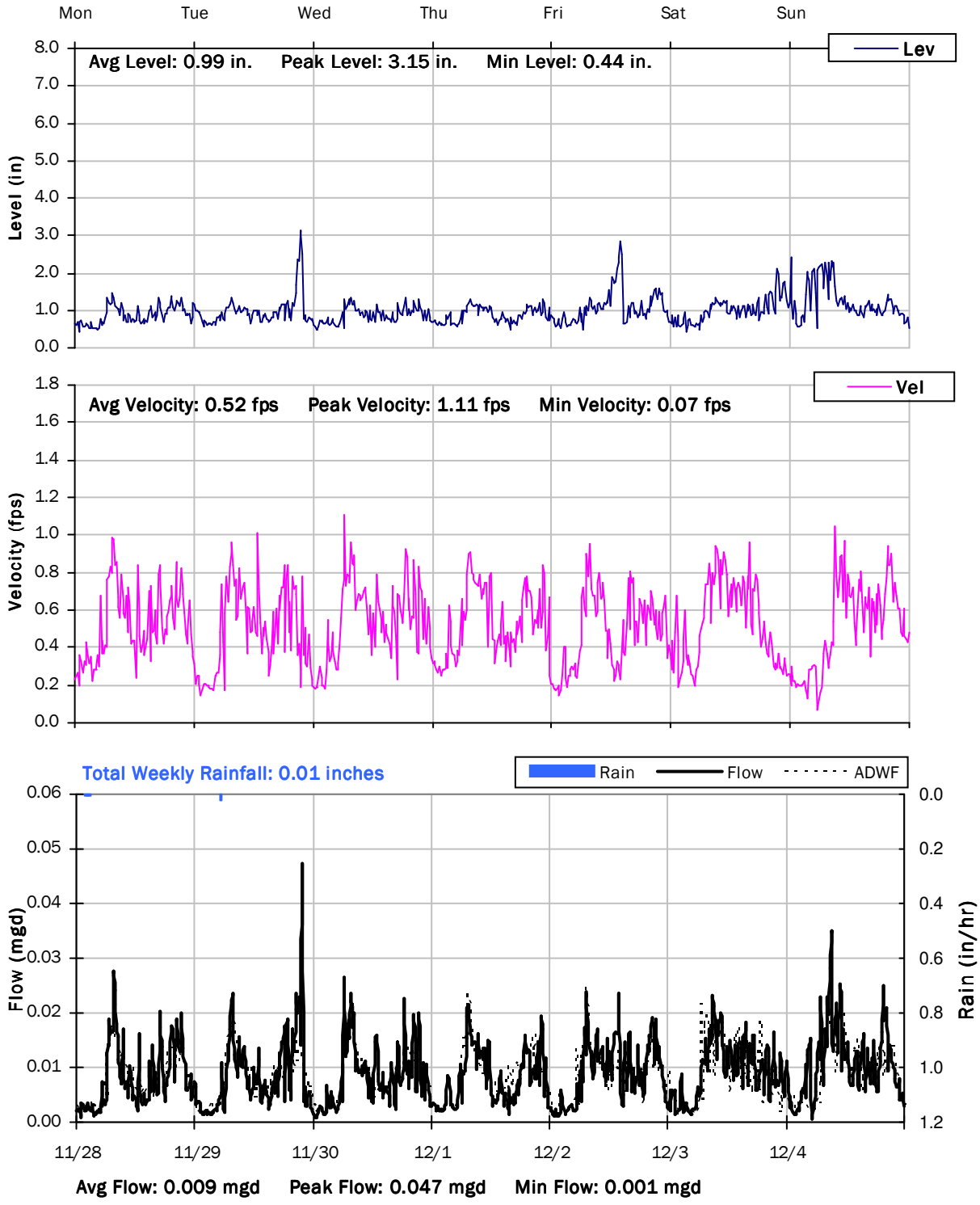
11/21/2016 to 11/28/2016



SITE 8

Weekly Level, Velocity and Flow Hydrographs

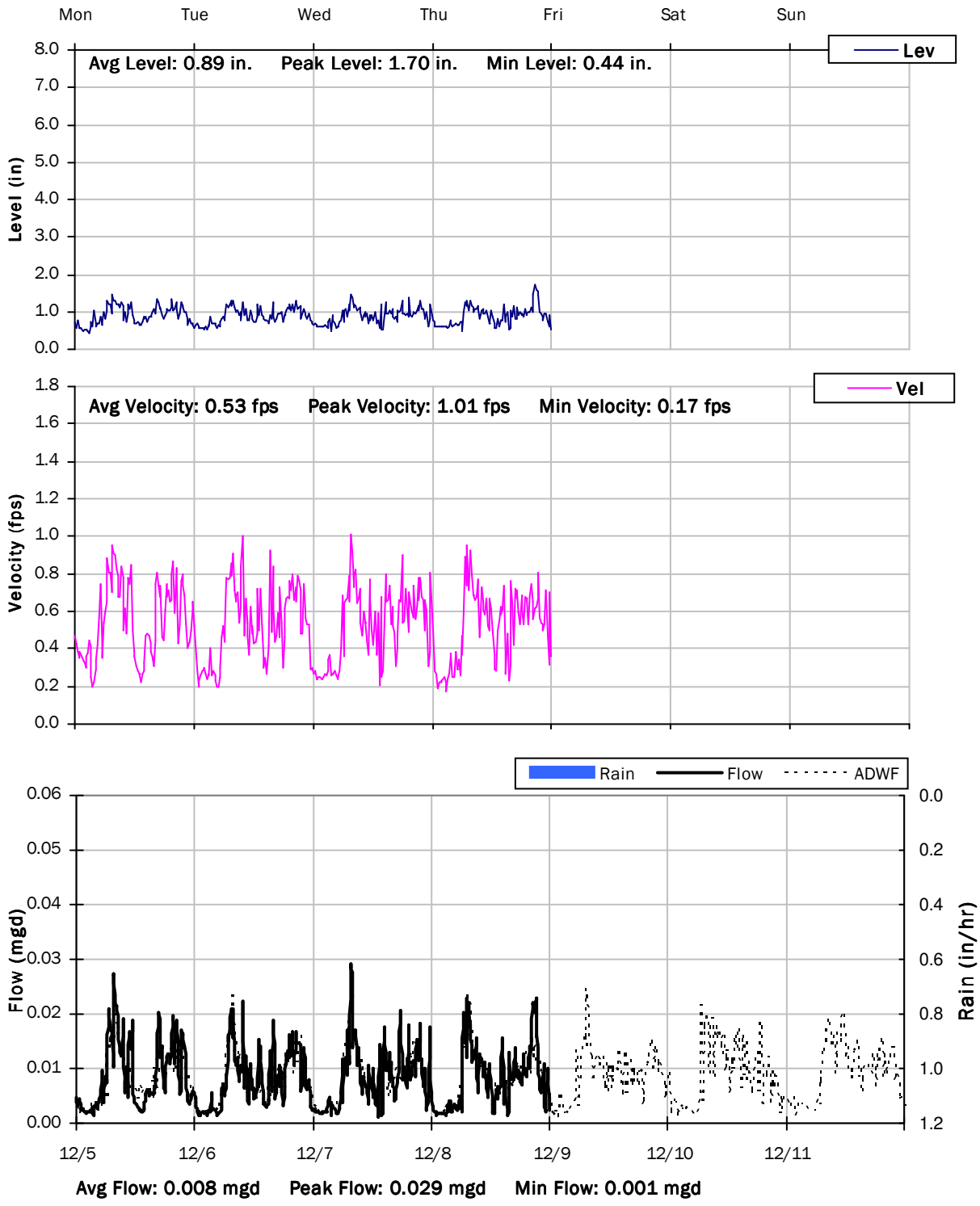
11/28/2016 to 12/5/2016



SITE 8

Weekly Level, Velocity and Flow Hydrographs

12/5/2016 to 12/12/2016



SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix H

Replacement and Rehabilitation Plan

City of Placentia
Sanitary Collection System
Replacement/Rehabilitation Plan

The City of Placentia is primarily a residential community with a small commercial/industrial element. To serve its citizens, the City operates and maintains a sanitary collection system comprised of approximately 84 miles of gravity sewer pipelines currently serving a population of approximately 44,400. This is not the entire population of Placentia as approximately 12 to 15 percent of the City is sewered by the Yorba Linda Water District (YLWD). Approximately 95 percent of the connections to the City's sanitary collection system are residential with single-family residential being the largest user category. The vast majority of the sanitary collection system is constructed of vitrified clay pipe (VCP) that is 12 inches or less in diameter.

The Orange County Sanitation District (OCSD) provides for the City's sewage treatment. OCSD operates and maintains a network of sewer interceptor pipelines throughout the Santa Ana Basin to collect and transport raw sewage to its treatment facilities. The City's collection system connects to the OCSD interceptor system at several locations. OCSD has interceptor lines in Palm Avenue and Kraemer Boulevard that collect the flow from the northern portion of the City. The southern portion of the City connects to the OCSD interceptor system at three locations in the City of Fullerton and two locations in the City of Anaheim. The City also connects to OCSD along a portion of Orangethorpe in the southeast corner of the City. Because of the way that OCSD's interceptor systems intersect the City's collection system, the City has been divided into six drainage areas. These drainage areas are essentially independent of each other and connect to the OCSD interceptor system at one or more points. Additionally, the City receives flow from the City of Brea and a small area of the YLWD.

Although the City's history dates back to 1837 with the City incorporating in 1926, the majority of development within the City occurred during the 1960s and 1970s. The City's population in 1960 was approximately 5,000 and had risen to approximately 25,000 by 1970. Much of the early development within the City utilized private septic systems for the disposal of wastewater. In 1954, OCSD was formed to provide treatment and develop a means of gathering wastewater within the Santa Ana basin. Prior to that, septic systems or, as in some areas, a connection was made to a sewer outfall system that collected wastewater and deposited it in the Pacific Ocean. In 1960, OCSD installed the interceptor system along Palm Drive and Placentia Avenue. The interceptor on Kraemer Boulevard was added in 1974 with Rose Drive's interceptor being installed in 1980. As OCSD's ability to transport and treat wastewater increased and the City developed by adding new housing tracts, new and existing development was required to connect to the City's developing collection system. Today there are no known private septic systems

functioning within the City of Placentia. All wastewater is collected through the City's collection system that ultimately connects to the OCSD interceptor system.

Drainage Areas:

The City's collection system is divided into six drainage areas. Each of these drainage areas are essentially independent of each other with each one being connected to the OCSD interceptor system at one or more locations. Additionally, there are 44 reaches within the City's collection system. A reach is a pipeline that collects wastewater from smaller systems serving individual streets or properties and tie into other reaches that eventually connect to the OCSD system. Each drainage area is comprised of several reaches; each reach does not comprise its own drainage area. Each drainage area is a geographical area comprised of tracts that tended to develop within the same one to two decade period. The tracts located in a given drainage area drain to the reaches in that drainage area.

The following lists and describes the six drainage areas within the City. Each is a geographical area with boundaries based upon how that area intersects with the OCSD interceptor system.

Drainage Area #1. This drainage area is bound on the north by the City of Brea, on the east by Kraemer Boulevard, on the south by Palm Drive, and on the west by the City of Fullerton. The area is predominately single-family residential and basically flows south connecting to the OCSD system through Reaches 1 and 2. There are no known enhanced maintenance areas or capacity issues in this drainage area. Refer to Attachment 1 to review the tract listings for this drainage area.

Drainage Area #2. This drainage area is bound on the north by the City of Brea, on the east by the YLWD service area within Placentia's city limits, on the south by Palm Drive and on the west by Kraemer Boulevard. This area is predominately single-family residential with some commercial development. Flows from this area basically flow south and intersect the OCSD system through Reaches 6 (Kraemer Blvd.), 7 and 10 (both on Palm Drive). There are no known enhanced maintenance areas or capacity issues in this drainage area. Although capacity issues could arise depending upon substantial flow increases from the City of Brea. This drainage area also receives some flows from the YLWD owned system within the City of Placentia. Refer to Attachment 2 to review the tract listings for this drainage area.

Drainage Area #3. This drainage area is bound on the north by the City of Fullerton, on the east roughly along the boundary of Valencia High School, on the south by the railroad tracks, and on the west by the City of Fullerton. This drainage area contains the oldest portions of the City's collection system. The area is a mix of single-family residential, multi-family residential, and commercial establishments. The Old Town area, south of Chapman Avenue was CCTV surveyed and recommendations for rehabilitation made in the (Old Town) Sewer Rehabilitation Evaluation, 2003, by Carollo Engineers. Condition

assessment of portions of Drainage Area #3, including the Old Town area, was also performed by Dudek as part of the 2018 Sanitary Sewer Master Plan and rehabilitation and replacement recommendations made. This area has five known enhanced maintenance areas and has some potential capacity issues in some pipe segments in Reaches 25 and 27. Refer to Attachment 3 to review the tract listings for this drainage area.

Drainage Area #4. This drainage area is bound on the north by Palm Drive, on the east by Rose Drive, on the south by the City of Anaheim, and on the west by the tracts west of Kraemer Boulevard (Valencia High School). This drainage area is composed primarily of single-family residences with some multi-family and commercial development. Flows are basically south into OCSD interceptors within the City of Anaheim. The eastern most area of this drainage area contains some of the newest development within the City. There are several tracts that border the OCSD interceptor that parallels Carbon Creek and that discharge directly into that interceptor. There is one known enhanced maintenance areas and no known capacity issues in this drainage area. Reaches 35 and 40 connect this drainage area to the OCSD interceptor system. Refer to Attachment 4 to review the tract listings for this drainage area.

Drainage Area #5. Located in the southeast corner of the City, this drainage is a mix of residential, commercial and light industrial. Flows are both north and south with all reaches connecting to the OCSD interceptor located on Orangethorpe Avenue. This interceptor enters the City from the City of Yorba Linda along Orangethorpe Avenue and continues to the City of Anaheim along Rose Drive. Reaches 41, 43, 45, 47, 49, and 50 connect this drainage area to the OCSD interceptor. There are three known enhanced maintenance areas in this drainage area. Reach 48 has the potential for capacity issues. Refer to Attachment 5 to review the tract listings for this drainage area.

Drainage Area #6. This drainage area is a combination of single and multi-family residential, commercial, and light industrial. The northern most portions of this drainage area contain some of the oldest facilities in the City. Additionally, the northern most portion of this drainage area was included in the Old Town CCTV inspection and rehabilitation study conducted by Carrollo Engineers. Flows in this drainage area are basically south to OCSD's interceptor in the City of Anaheim (R-22) and southwest (R-20, R-25, and R-27) to OCSD's interceptor in the City of Fullerton. Refer to Attachment 6 to review the tract listings for this drainage area.

By dividing the City's collection system into drainage areas, pipeline replacement or rehabilitation can be initially indicated based upon the age of the pipe relative to when the tracts in a given drainage area were developed. Initially, since the majority of the City's collection system is comprised of VCP and based upon information provided by the Nation Clay Pipe Institute (NCPI), a one hundred year service life expectancy was utilized to determine an anticipated date for the replacement or rehabilitation of a given pipeline. Understanding that other factors such as improper installation, land movement,

tree roots, improper maintenance, etc. can shorten the useful life expectancy of any pipe. The City reevaluated their replacement/rehabilitation schedule based upon data being gathered during its Phase I maintenance program. In addition to comprehensive pipeline cleaning, the Phase I maintenance program included visual and CCTV inspection of 25% of the City's collection system per year for the first 3 years. Additionally, as part of the 2018 Sanitary Sewer Master Plan, condition assessment of approximately 15 miles (18%) of the City's sewer system, including the Old Town area, was performed that resulted in about 4 miles of rehabilitation and replacement projects recommended for the City's most recent capital improvement program (CIP). This data combined with existing inspection data from the Old Town area will provide the City with an accurate, up-to-date assessment of approximately 90% of its collection system. The remaining areas will be provided visual and CCTV inspection during the regular maintenance operations.

Replacement or rehabilitation is based upon an assessment of the pipeline utilizing the NASSCO pipeline rating system. Upon CCTV inspection, the best available engineering technology will be utilized to determine whether a given pipeline defect requires replacement or rehabilitation. Noted defects will be prioritized and placed on the collection system CIP list. In this way, the initial replacement/rehabilitation schedule, based upon the age of the pipe, will be updated based upon the actual condition of the pipe. This strategy has been used in the Old Town area of drainage area 3.

Under the current schedule, replacement or rehabilitation of the various drainage areas is anticipated to take place as follows:

Drainage Area #1.	Year 2060 - 2070
Drainage Area #2.	Year 2060 - 2070
Drainage Area #3.	Year 2050 – 2070
Old Town	Year 2010 - 2020
Drainage Area #4.	Year 2060 - 2070
Drainage Area #5.	Year 2080 - 2090
Drainage Area #6.	Year 2020 - 2030

Funding

The sewer service fee provides funding for the replacement/rehabilitation of the City's collection system.

Attachment 1

Drainage Area #1

Tract #	Accepted and File Date	Anticipated Replacement Date
4289	26-Feb-1962	26-Feb-2062
4510	2-Apr-1962	2-Apr-2062
4671	18-Jun-1962	18-Jun-2062
4070	6-Jul-1962	6-Jul-2062
4300	14-Jul-1963	14-Jul-2063
4610	28-Aug-1963	28-Aug-2063
4959	22-Mar-1965	22-Mar-2065
4010	22-Dec-1965	22-Dec-2065
6662	25-Sep-1968	25-Sep-2068
6780	23-Dec-1968	23-Dec-2068
6890	17-Jul-1969	17-Jul-2069
6900	26-Aug-1969	26-Aug-2069
6844	28-Oct-1969	28-Oct-2069
5181	12-May-1972	12-May-2072
8164	25-May-1973	25-May-2073
7725	31-May-1974	31-May-2074
8757	31-Mar-1975	31-Mar-2075
8730	31-Mar-1975	31-Mar-2075
8686	8-May-1975	8-May-2075
8765	26-Apr-1976	26-Apr-2076
9940	28-Apr-1978	28-Apr-2078
4264		

Drainage Area #1 Comments
Boundaries: North - City of Brea
East - Kraemer Blvd.
South - Palm Drive
West - City of Fullerton
Pipe Material: Predominately VCP
Life expectancy: 100 years
Reaches: 1 & 2
Drains to: OCSD interceptor system on Palm Drive
Number of known hot spots; None
Capacity issues: None
I&I issues: Unknown
Overall condition: Unknown
Anticipated date of replacement: 2060-2070
Description: Drainage area is predominately single family residential. Flows are basically south connecting to the OCSD interceptor system on Palm Drive. Initial system was installed in the 1960's and 1970's.

Attachment 2

Drainage Area #2

Tract #	Accepted and File Date	Anticipated Replacement Date
4718	27-Aug-1962	27-Aug-2062
4814	25-Oct-1962	25-Oct-2062
4681	29-Oct-1962	29-Oct-2062
4836	26-Dec-1962	26-Dec-2062
4794	1-Feb-1963	1-Feb-2063
4807	11-Jun-1963	11-Jun-2063
5377	9-Mar-1964	9-Mar-2064
5632	19-Jan-1965	19-Jan-2065
5815	2-Mar-1965	2-Mar-2065
5842	3-Aug-1965	3-Aug-2065
6154	17-Mar-1966	17-Mar-2066
6043	7-Jun-1966	7-Jun-2066
6065	21-Jul-1966	21-Jul-2066
6155	9-Dec-1966	9-Dec-2066
5458	13-Apr-1967	13-Apr-2067
6126	17-May-1967	17-May-2067
6389	12-Sep-1967	12-Sep-2067
6430	15-Nov-1967	15-Nov-2067
6525	19-Dec-1967	19-Dec-2067
5818	3-Jul-1968	3-Jul-2068
5648	19-Jun-1969	19-Jun-2069
6980	26-May-1970	26-May-2070
6981	6-Nov-1970	6-Nov-2070
7169	10-Dec-1970	10-Dec-2070
7262	25-Feb-1971	25-Feb-2071

Drainage Area #2 Comments
Boundaries: North - City of Brea
East - YLWD
South - Palm Drive
West - Kreamer Blvd.
Pipe Material: Predominately VCP
Life expectancy: 100 years
Reaches: 6, 7 & 10
Drains to: OCSD interceptor system on Kreamer Blvd. (R-6) and Palm Drive (R-7 & R-10)
Number of known hot spots: None
Capacity issues: Currently no critical issues
I&I issues: Unknown
Overall condition: Unknown
Anticipated date of replacement: 2060-2070
Description: Drainage area is predominately single family residential. There are currently no known hot spots or critical capacity issues. This area does receive flow from the City of Brea to the north under an agreement with that City. Capacity issues could arise depending upon substantial flow increases from the City of Brea. This drainage area also receives some flows from the YLWD owned system within the City of Placentia.

Attachment 2 Continued

6982	18-Mar-1971	18-Mar-2071							
6979	19-May-1971	19-May-2071							
6394	30-Dec-1971	30-Dec-2071							
7469	7-Feb-1972	7-Feb-2072							
4525	7-Apr-1972	7-Apr-2072							
7042	18-May-1972	18-May-2072							
7866	29-Dec-1972	29-Dec-2072							
8207	29-Mar-1974	29-Mar-2074							
8276	29-Jul-1974	29-Jul-2074							
9007	20-Jan-1976	20-Jan-2076							
6894	14-Apr-1976	14-Apr-2076							
10751	14-Dec-1979	14-Dec-2079							
10752	14-Dec-1979	14-Dec-2079							
10565	25-Nov-1980	25-Nov-2080							
13906	30-Oct-1989	30-Oct-2089							
15839	14-Feb-2000	14-Feb-2100							

Attachment 3

Drainage Area #3

Tract #	Accepted and File Date	Anticipated Replacement Date
35	28-Feb-1916	28-Feb-2016
548	1-Jan-1924	1-Jan-2024
675	1-Feb-1924	1-Feb-2024
708	1-Jun-1924	1-Jun-2024
915	1-Feb-1933	1-Feb-2033
1118	1-Sep-1945	1-Sep-2045
1214	1-Jun-1948	1-Jun-2048
1482	1-Jul-1950	1-Jul-2050
1405	1-Aug-1950	1-Aug-2050
1514	17-Feb-1953	17-Feb-2053
1674	16-Oct-1953	16-Oct-2053
1883	3-Sep-1954	3-Sep-2054
1935	22-Jun-1955	22-Jun-2055
2848	20-Jan-1956	20-Jan-2056
2037	21-Oct-1956	21-Oct-2056
2837	25-Oct-1956	25-Oct-2056
2064	24-Oct-1958	24-Oct-2058
3081	18-Nov-1958	18-Nov-2058
3587	4-Mar-1960	4-Mar-2060
4124	16-Jun-1961	16-Jun-2061
4175	28-Dec-1961	28-Dec-2061
4263	23-Feb-1962	23-Feb-2062
4641	22-May-1962	22-May-2062
1709	16-Sep-1964	16-Sep-2064
5836	14-Jun-1965	14-Jun-2065
5955	27-Sep-1965	27-Sep-2065
7322	1-Oct-1971	1-Oct-2071
7400	24-Feb-1972	24-Feb-2072
2859	5-Dec-1973	5-Dec-2073
8271	28-Apr-1977	28-Apr-2077
9747	7-Feb-1978	7-Feb-2078
146		
22		

Drainage Area #3 Comments
Boundaries: North - City of Fullerton
East - Roughly along Valencia High School property
South - Railroad tracks
West - City of Fullerton
Pipe Material: Predominately VCP
Life expectancy: 100 years
Reaches: 25 & 27
Drains to: OCSD interceptor system on State College Blvd in Fullerton (R-25 & R-27)
Number of known hot spots: Five
Capacity issues: Potential capacity issues exist in some pipe segments of both R-25 and R-27.
I&I issues: Unknown
Overall condition: Condition of Old Town section, south of Chapman Avenue has been determined, the remainder of the area is unknown.
Anticipated date of replacement: Old Town 2006-2008 remainder 2050-2070
Description: This drainage area contains the oldest portions of the City's collection system. The area is a mix of single family residential, multi-family residential, and commercial establishments. The Old Town area, south of Chapman Avenue has been CCTV surveyed and recommendations for rehabilitation have been made in the (Old Town) Sewer Rehabilitation Evaluation, 2003, by Carollo Engineers. The remaining areas will be CCTV surveyed during Phase I of the City's maintenance program. This area has five known hot spots and has some potential capacity issues in some pipe segments in Reach 25 and 27.

Attachment 4

Drainage Area #4

Tract #	Accepted and File Date	Anticipated Replacement Date
4207	15-Aug-1961	15-Aug-2061
4343	11-Dec-1961	11-Dec-2061
4526	27-Aug-1962	27-Aug-2062
4657	27-Sep-1962	27-Sep-2062
4319	24-Oct-1962	24-Oct-2062
4583	17-May-1963	17-May-2063
4585	6-Nov-1963	6-Nov-2063
4584	21-Nov-1963	21-Nov-2063
5375	22-Jan-1964	22-Jan-2064
5401	3-Nov-1964	3-Nov-2064
5402	17-Mar-1965	17-Mar-2065
6017	7-Jul-1965	7-Jul-2065
5948	14-Sep-1965	14-Sep-2065
6382	6-Jul-1967	6-Jul-2067
6700	16-Oct-1968	16-Oct-2068
6713	31-Oct-1968	31-Oct-2068
4790	11-Aug-1969	11-Aug-2069
6999	17-Oct-1969	17-Oct-2069
7328	13-Aug-1971	13-Aug-2071
5851	11-Oct-1971	11-Oct-2071
7575	28-Oct-1971	28-Oct-2071
7280	9-Nov-1971	9-Nov-2071
7669	22-Feb-1972	22-Feb-2072
6344	18-Apr-1972	18-Apr-2072
7670	29-Jun-1972	29-Jun-2072
8037	7-Jun-1973	7-Jun-2073
8435	29-Apr-1975	29-Apr-2075
8434	10-Dec-1975	10-Dec-2075
9113	27-Apr-1976	27-Apr-2076
8921	28-Jun-1976	28-Jun-2076
8459	12-Aug-1976	12-Aug-2076
8446	3-May-1977	3-May-2077

Drainage Area # 4 Comments
Boundaries: North - Palm Drive
East - Rose Drive
South - City of Anaheim
West - Just west of Kraemer Blvd (Valencia High School)
Pipe Material: Predominately VCP
Life expectancy: 100 years
Reaches: 35 & 40
Drains to: OCSD interceptor system
Number of known hot spots: 1
Capacity issues: None
I&I issues: Unknown
Overall condition: Unknown
Anticipated date of replacement: 2060-2070
Description: This drainage area is composed primarily of single-family residences with some multi-family and commercial development. Flows are basically south with into OCSD interceptors within the City of Anaheim. The eastern most area of this drainage area contains some of the newest development within the City. There are several tracts that border the OCSD interceptor that parallels Carbon Creek that discharge directly into that interceptor.

Note: Tract numbers that are in BOLD face are those tracts that drain directly into the OCSD interceptor that parallels Carbon Creek. Some of these tracts around the Alto Vista Country Club may have private systems and would not be included in the City's Replacement/Rehabilitation Program.

Attachment 4 Continued

9693	3-May-1977	3-May-2077							
9694	3-May-1977	3-May-2077							
9856	13-Oct-1977	13-Oct-2077							
10173	20-Sep-1978	20-Sep-2078							
9961	10-Oct-1978	10-Oct-2078							
9644	16-Feb-1979	16-Feb-2079							
10316	12-Apr-1979	12-Apr-2079							
10298	23-Apr-1979	23-Apr-2079							
11132	14-May-1982	14-May-2082							
11677	17-Sep-1982	17-Sep-2082							
11926	21-Jun-1983	21-Jun-2083							
10937	10-May-1984	10-May-2084							
12021	31-Dec-1984	31-Dec-2084							
12477	23-Sep-1985	23-Sep-2085							
11651	6-Dec-1985	6-Dec-2085							
12478	16-May-1986	16-May-2086							
12579	23-May-1986	23-May-2086							
12275	31-Oct-1986	31-Oct-2086							
12580	31-Oct-1986	31-Oct-2086							
13868	27-Feb-1990	27-Feb-2090							
14026	3-Aug-1992	3-Aug-2092							
12862	22-Aug-1992	22-Aug-2092							
13550	15-Jan-1993	15-Jan-2093							
13551	13-Apr-1994	13-Apr-2094							
13552	14-Oct-1994	14-Oct-2094							
14569	30-Dec-1994	30-Dec-2094							
15221	15-Feb-1996	15-Feb-2096							
14027	22-May-1996	22-May-2096							
15229	11-Apr-1997	11-Apr-2097							
15385	11-Apr-1997	11-Apr-2097							
15508	23-Apr-1998	23-Apr-2098							
15139	21-Jul-1998	21-Jul-2098							
15313	9-Jun-2000	10-Jun-2100							
15357	9-Jun-2000	10-Jun-2100							

Attachment 5

Drainage Area #5

Tract #	Accepted and File Date	Anticipated Replacement Date
7257	6-Apr-1971	6-Apr-2071
8844	25-Nov-1975	25-Nov-2075
9938	13-Apr-1978	13-Apr-2078
13178	5-Dec-1988	5-Dec-2088
14161	26-Feb-1991	26-Feb-2091
14189	24-May-1991	24-May-2091
14279	3-Jul-1992	3-Jul-2092
14094	4-Sep-1992	4-Sep-2092
15137	29-Feb-1996	29-Feb-2096
15138	23-Jul-1996	23-Jul-2096
15176	21-Aug-1996	21-Aug-2096
15015	26-Mar-1997	26-Mar-2097
15295	31-Oct-1997	31-Oct-2097

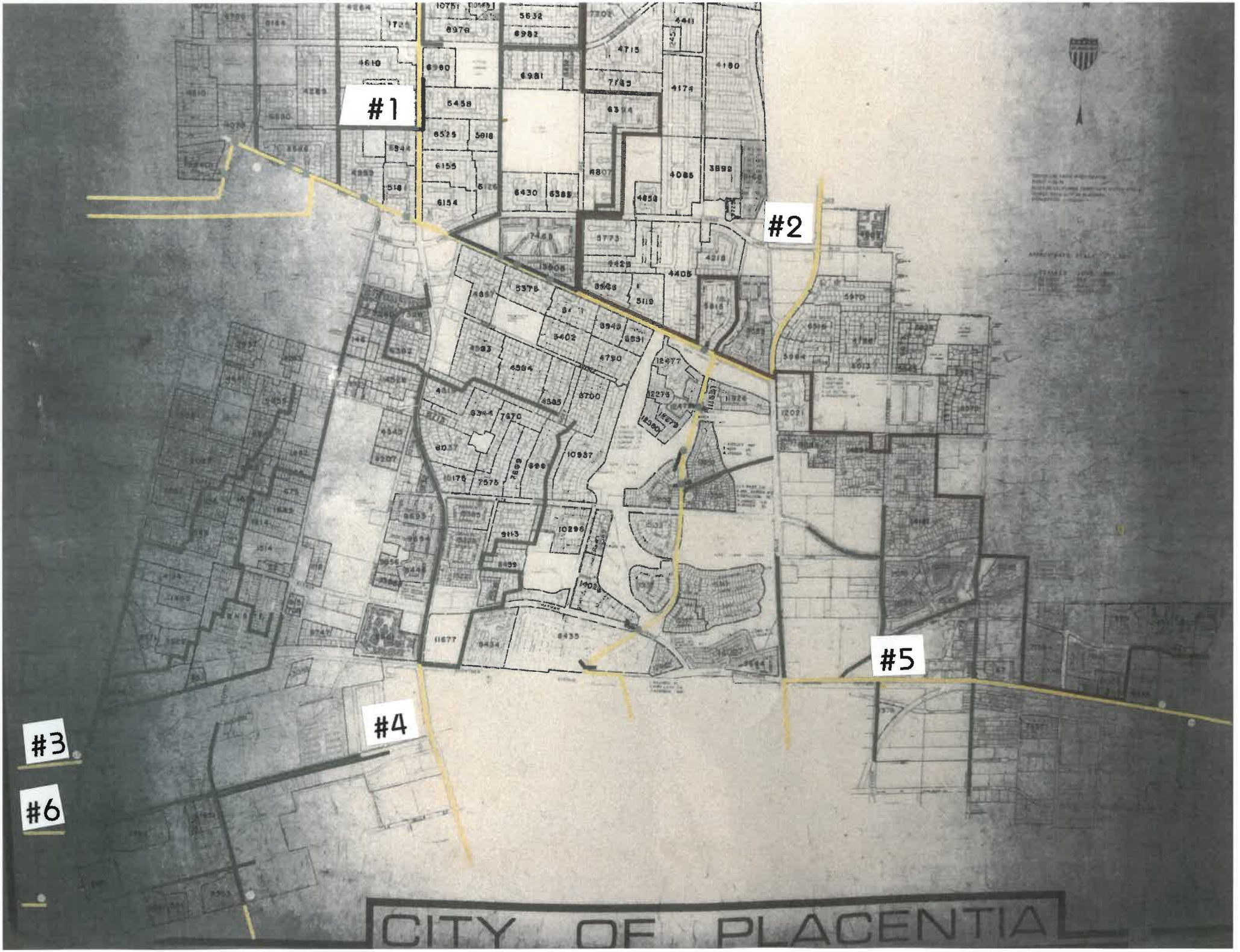
Drainage Area # 5 Comments
Boundaries: North -YLWD
East -City of Yorba Linda
South - City of Anaheim
West - Rose Drive
Pipe Material: Predominately VCP
Life expectancy: 100 years
Reaches: 41, 43, 45, 46, 47, 49, & 50
Drains to: OCSD interceptor system
Number of known hot spots: 3
Capacity issues: Potential capacity issues in segments of R-47 and R-48.
I&I issues: Unknown
Overall condition: Unknown
Anticipated date of replacement: 2080 - 2090
Description: Located in the south east corner of the City this drainage is a mix of residential, commercial and light industrial. Flows are both north and south with all reaches connecting to the OCSD interceptor located on Orangethorpe Avenue.

Attachment 6

Drainage Area #6

Tract #	Accepted and File Date	Anticipated Replacement Date
558	26-Dec-1923	26-Dec-2023
1067	1-Feb-1941	1-Feb-2041
1651	21-Apr-1953	21-Apr-2053
2230	30-Jun-1954	30-Jun-2054
2359	20-Dec-1954	20-Dec-2054
8553	31-Jul-1974	31-Jul-2074
524		
1283		

Drainage Area # 6 Comments
Boundaries: North - Railroad tracks
East - Kraemer Boulevard
South - City of Anaheim
West - City of Fullerton
Pipe Material: Predominately VCP
Life expectancy: 100 years
Reaches: 20, 22, 25, & 27
Drains to: OCSD interceptor system
Number of known hot spots: 2
Capacity issues: Potential capacity issues in Reaches 25, 27, & 28
I&I issues: Unknown
Overall condition: Unknown
Anticipated date of replacement: 2008 - 2010
Description: This drainage area is a combination of single and multi-family residential, commercial, and light industrial. The northern most portions of this drainage area contain some of the oldest facilities in the City. Additionally, the northern most portion of this drainage area was included in the Old Town CCTV inspection and rehabilitation study conducted by Carrollo Engineers. Flows in this drainage area are basically south to OCSD's interceptor in the City of Anaheim (R-22) and southwest (R-20, R-25, & R-27) to OCSD's interceptor in the City of Fullerton.


#1
#2
#3
#4
#5
#6
CITY OF PLACENTIA

SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix I

FOG Ordinance

Chapter 16.24 APPLICABLE TO FOOD SERVICE ESTABLISHMENTS FOR CONTROLLING FATS, OILS AND GREASE

16.24.010 General provisions.

(a) Purpose and Policy.

(1) The purpose of this chapter is to facilitate the maximum beneficial public use of the city's sewer services and facilities while preventing blockages of the sewer facilities resulting from discharges of fats, oils and grease ("FOG") to sewer facilities, and to specify appropriate FOG discharge requirements for Food Service Establishments.

(2) This chapter shall be interpreted in accordance with the definitions set forth in subsection (b) of this section. The provisions of this chapter shall apply to the discharge of all wastewater or waste containing FOG which is or may be carried to the sewer facilities of the city.

(3) To comply with federal, state, and local policies and to allow the city to meet applicable standards, provisions are made in this chapter for the regulation of discharges of wastewater or waste containing FOG to sewer facilities.

(4) This chapter establishes standards on all wastewater and/or waste discharges from food service establishments containing FOG, which may alone or collectively cause or contribute to FOG accumulation in the sewer facilities causing or potentially causing or contributing to the occurrence of sewer system overflows ("SSOs").

(b) Definitions.

(1) Unless otherwise defined in this chapter, terms related to water quality shall be as adopted in the latest edition of Standard Methods for Examination of Water and Wastewater, published by the American Public Health Association, the American Water Works Association and the Water Environment Federation. The testing procedures for waste constituents and characteristics shall be as provided in 40 CFR 136 (Code of Federal Regulations).

(2) Other terms not specifically defined in this chapter shall have the same definition as set forth in the latest adopted editions of the California Codes of Regulations applicable to building construction adopted pursuant to the California Building Standards Law.

(3) Subject to the foregoing provisions, the following definitions shall apply in these regulations:

"Best management practices" means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the introduction of FOG to the sewer facilities as more specifically provided for in Section 16.24.040(e) of these regulations.

"Change in operations" means any change in the ownership, food types, operational procedures or business practices that have the potential to increase the amount of FOG generated and/or discharged by food service establishments in an amount that alone or in conjunction with other FOG discharges causes or creates a potential for SSOs to occur.

"City" means the city of Placentia.

"City administrator" means the city administrator of the city of Placentia or designee.

"City council" means the city council of the city of Placentia.

"Composite sample" means a collection of individual samples obtained at selected intervals based on an increment of either flow or time. The resulting mixture (composite sample) forms a representative sample of the waste stream discharged during the sample period.

"Discharger" means any person who discharges or causes a discharge of wastewater or waste directly or indirectly to the sewer facilities. Discharger means the same as user.

"Effluent" means any liquid outflow from a food service establishment that is discharged to the sewer facilities.

"Fats, oils, and grease ("FOG")" means any substance such as a vegetable or animal product that is used in, or is a by-product of, the cooking or food preparation process, and that turns or may turn viscous or solidifies or may solidify with a change in temperature or due to other conditions. Discharges of FOG to the sewer system from a food service establishment constitute the discharge of industrial waste.

"FOG control program" means the FOG control program required by and developed pursuant to RWQCB Order No. R8-2002-0014, Section (c)(12)(viii).

"FOG control program manager" means the individual designated by the city to administer the FOG control program. Except as otherwise set forth in this chapter, the FOG control program manager is responsible for all determinations of compliance with the FOG control program.

"FOG wastewater discharge permit" means a permit issued by the city subject to the requirements and conditions established by the city authorizing the permittee to discharge wastewater into the city's sewer facilities or into sewer facilities which ultimately discharge into a city sewer facility.

"Food grinder" means any device installed for the purpose of grinding food waste or food preparation by-products for disposal to the sewer system.

"Food service establishment" means facilities defined in California Uniform Retail Food Service Establishments Law (CURFFL), California Health and Safety Code Section 113785, and any commercial entity discharging directly or indirectly to the city's sewer system, operating in a permanently constructed structure such as a room, building, or place, or portion thereof, maintained, used, or operated for the purpose of storing, preparing, serving, manufacturing, packaging, or otherwise handling food for sale to other entities, or for consumption by the public, its members or employees, and which has any process or device that uses or produces FOG, or grease vapors, steam, fumes, smoke or odors that are required to be removed by a Type I or Type II hood.

"Grab sample" means a sample taken from a waste stream on a one-time basis without regard to the flow in the waste stream and without consideration of time.

"Grease control device" means any grease interceptor, grease trap or other mechanism, device, or process, which attaches to, or is applied to, wastewater plumbing fixtures and lines, the purpose of which is to trap, collect or treat FOG prior to discharge into the sewer system. "Grease control device" may also include any other proven method to reduce FOG subject to the approval of the city.

"Grease disposal mitigation fee" means a fee charged to an owner and/or operator of a food service establishment when there are physical limitations to the property that make the installation of a grease interceptor or grease control device for the food service establishment, impossible or impracticable. The grease disposal mitigation fee is intended to cover the costs of increased maintenance of the sewer system for inspection and removal of FOG and other viscous or solidifying agents that a properly employed grease control device would otherwise prevent from entering the sewer system.

"Grease interceptor" means a multi-compartment device that is constructed in different sizes and is generally required to be located, according to the California Plumbing Code, underground between a food service establishment and the connection to the sewer system. These devices primarily use gravity to separate FOG from the wastewater as it moves from one (1) compartment to the next. These devices must be cleaned, maintained, and have the FOG removed and disposed of in a proper manner on regular intervals to be effective.

"Grease trap" means a grease control device that is used to serve individual fixtures and have limited effect and should only be used in those cases where the use of a grease interceptor or other grease control device is determined to be impossible or impracticable.

"Hot spots" means areas in sewer lines that have experienced sanitary sewer overflows or that must be cleaned or maintained frequently to avoid blockages of sewer system.

"Infiltration" means water entering the sewer system from the ground through such means as defective pipes, pipe joints, connections or manhole walls.

"Inflow" means stormwater or urban runoff which enters the sewer system. Inflow may, in certain circumstances, cause a rapid increase in wastewater flows.

"Inspector" means a person authorized by the city to inspect any existing or proposed wastewater or waste generation, conveyance, processing and/or disposal facilities.

"Interceptor" means a grease interceptor.

"Interference" means any discharge which, alone or in conjunction with discharges from other sources, inhibits or disrupts the city's sewer system, collection processes or operations; or is a cause of violation of Chapter 16.04 of this code.

"Limited food preparation establishment" means an establishment engaged only in reheating, hot holding or assembling of ready-to-eat (precooked and prepackaged) food products, from which establishment there is only a de minimus discharge of FOG to the sewer system. A limited food service preparation establishment is not considered a food service establishment under this chapter. A limited food preparation establishment does not include any preparation that changes the form, flavor or consistency of food. Any person who contends that he/she/it meets the definition of a limited food preparation establishment shall have the burden to establish that he/she/it meets the criteria set forth in this definition.

"Manifest" means that receipt to be retained by the generator of wastes for disposing of recyclable wastes or other liquid or solid wastes as required by the city or a regulatory agency.

"New construction" means any structure planned or under construction for which a sewer connection permit has not been issued.

"Permittee" means a person who has received from the city a permit to discharge wastewater into the city's sewer facilities subject to the requirements and conditions established by the city.

"Person" means any individual, partnership, firm, association, corporation or public agency, including the state of California and the United States of America.

"Public agency" means the state of California and/or any city, county, special city, other local governmental authority or public body of or within this state.

"Public sewer" means a sewer owned and operated by the city or by another local public agency, which sewer is tributary to the city's sewer facilities.

"Regulatory agencies" means those agencies having regulatory jurisdiction over environmental quality matters, including, but not limited to:

(1) United States Environmental Protection Agency, Region IX, San Francisco and Washington, DC (EPA);

(2) California State Water Resources Control Board (SWRCB);

(3) California Regional Water Quality Control Board, Santa Ana Region (RWQCB);

(4) South Coast Air Quality Management City (SCAQMD);

(5) California Department of Health Services (DOHS).

"Remodeling" means a physical or operational change (a) causing an increase in the amount of FOG discharged to the sewer system by a food service establishment which amount, alone or in conjunction with other FOG discharges, causes or creates a potential for an SSO to occur; or (b) exceeding a cost of fifty thousand dollars ($50,000.00) to a food service establishment, requiring a building permit, and involving any one (1) or combination of the following: (1) under slab plumbing in the food processing area, (2) a thirty (30) percent increase in the net public seating area, (3) a thirty (30) percent increase in the size of the kitchen area, or (4) any change in the size or type of food preparation equipment.

"Sample point" means a location approved by the city, from which industrial wastewater can be collected that is representative in content and consistency of the entire flow of industrial wastewater being discharged to the sewer system.

"Sampling facilities" means structure(s) provided at the user's expense for the city or user to measure and record wastewater constituent mass concentrations, collect a representative sample, or provide access to plug or terminate the

discharge to the sewer system.

"Sewage" means wastewater.

"Sewer facilities or system" means any and all facilities used for collection, conveyance, pumping, treatment, reclamation, reuse and/or disposal of wastewater and/or sludge.

"Sewer lateral" means a building sewer as defined in the latest edition of the California Plumbing Code. It is the wastewater connection between a building's wastewater facilities and a public sewer system.

"Sludge" means any solid, semi-solid or liquid decant, subnate or supernate from a manufacturing process, utility service or pretreatment facility.

"Twenty-five (25) percent rule" means requirement for grease interceptors to be maintained such that the combined FOG and solids accumulation does not exceed twenty-five (25) percent of the design hydraulic depth of the grease interceptor. This is to ensure that the minimum hydraulic retention time and required available hydraulic volume is maintained to effectively intercept and retain FOG prior to entry into the public sewer system.

"User" means any person who discharges or causes a discharge of wastewater or waste directly or indirectly to sewer facilities. User means the same as discharger.

"Waste" means sewage and any and all other waste substances, liquid, solid, gaseous or radioactive, associated with human habitation or of human or animal nature, including such wastes placed within containers of whatever nature prior to and for the purpose of disposal.

"Waste minimization practices" means plans or programs intended to reduce or eliminate discharges to the sewer system or to conserve water, including, but not limited to, product substitutions, housekeeping practices, inventory control, employee education, and other steps as necessary to minimize waste or wastewater produced.

"Wastehauler" means any person carrying on or engaging in vehicular transport of waste as part of, or incidental to, any business for that purpose.

"Wastewater" means the liquid and water-carried wastes of the community and all constituents thereof, whether treated or untreated, discharged, directly or indirectly, into the sewer system.

"Wastewater constituents and characteristics" means the individual chemical, physical and bacteriological parameters, including volume and flow rate, and such other parameters that serve to define, classify or measure the quality and quantity of wastewater.

(4) Words used in these regulations in the singular may include the plural and the plural the singular. Use of masculine means feminine and use of feminine means masculine. Shall is mandatory; may is permissive or discretionary. (Ord. O-2004-07 § 1, 2004)

16.24.020 General limitations, prohibitions, and requirements on fats, oils, and grease ("FOG") discharges.

(a) FOG Discharge Limitation. No food service establishment shall discharge or cause to be discharged into the sewer system FOG that may accumulate and/or cause or contribute to blockages in the sewer system, including the sewer lateral which connects the food service establishment to the public sewer system.

(b) Prohibitions. The following prohibitions shall apply to all food service establishments:

(1) Installation of food grinders in new constructions of food service establishments shall be prohibited. Furthermore, all food grinders shall be removed from all existing food service establishments within one hundred eighty (180) days of the effective date of these regulations, except when expressly allowed by the FOG control program manager pursuant to the applicable provisions of the latest edition of the California Plumbing Code.

(2) Introduction of any additives into a food service establishment's wastewater system for the purpose of emulsifying FOG is prohibited, unless a specific written authorization from the FOG control program manager is obtained based upon evidence showing that such additives will not cause or contribute to interference and/or a sewer system overflow.

(3) Discharge of waste cooking oil, directly or indirectly, into the drainage pipes and/or the sewer system is prohibited. All waste cooking oils shall be collected and stored properly in receptacles such as barrels or drums for recycling or other acceptable methods of disposal.

(4) Discharge of wastewater from dishwashers to any grease trap or grease interceptor is prohibited.

(5) Discharge of wastewater with temperatures in excess of one hundred forty degrees Fahrenheit (140°F) to any grease control device, including grease traps and grease interceptors, is prohibited.

(6) The use of biological additives to treat or reduce FOG or as a supplement to interceptor maintenance, without prior authorization from the FOG control program manager, is prohibited. Such authorization shall be based upon evidence showing that such biological additives will not cause or contribute to interference and/or a sewer system overflow.

(7) Discharge of wastes from toilets, urinals, washbasins, and any other fixtures containing fecal or other bodily waste materials to piping which flows to a grease control device is prohibited. Except as otherwise authorized pursuant to this chapter, the discharge of FOG wastes shall only occur to piping which flows to a grease interceptor prior to discharge to the sewer system.

(8) No waste removed from a grease control device may be discharged to the sewer system. FOG and solid materials removed from grease control devices shall be wastehauled periodically as part of the operation and maintenance requirements for grease interceptors or other grease control devices.

(9) No person shall allow the accumulation of FOG and/or solids in a grease interceptor which accumulation exceeds twenty-five (25) percent of the total operating hydraulic depth of the grease interceptor.

(c) FOG Wastewater Discharge Permit Required. No person shall discharge, or cause to be discharged, any wastewater from a food service establishment directly or indirectly into the sewer system without first obtaining a FOG wastewater discharge permit pursuant to this chapter. Within sixty (60) days of the effective date of this chapter, all food service establishments in the city shall file an application for a FOG wastewater discharge permit with the city on a form approved by the city administrator for such purpose. Except for limited food preparation establishments, which are not subject to the permit requirements of this chapter, any person who wishes to open or operate a new food service establishment following the effective date of this chapter shall apply for and obtain a FOG wastewater discharge permit prior to commencement of operations.

(d) FOG Pretreatment Required. Except as otherwise set forth in this chapter, each food service establishment shall install, operate and maintain an adequately sized grease interceptor necessary to maintain compliance with this chapter. The grease interceptor shall be adequate to separate and remove FOG contained in wastewater discharges from the food service establishment prior to discharge to the sewer system. Fixtures, equipment, and drain lines located in the food preparation and cleanup areas of food service establishments that are sources of FOG discharges shall be connected to the grease interceptor.

(1) New Construction of Food Service Establishments. All food service establishments which are newly constructed shall install, operate and maintain grease interceptors prior to and following commencement of wastewater discharges to the sewer system.

(2) Existing Food Service Establishments.

(A) For existing food service establishments, the requirement to install, properly operate and maintain a grease interceptor may be conditionally stayed, that is, delayed in its implementation, by the FOG control program manager for a maximum period of five (5) years from the effective date of this chapter (five- (5) year amortization period). Terms and conditions for application of a stay for a food service establishment shall be set forth in the permit. The city council finds that five (5) years is a reasonable amortization period for existing food service establishments that are operating without a grease interceptor.

(B) Existing food service establishments, which have caused or contributed to a grease-related blockage in the sewer system, or which have sewer laterals connected to hot spots, or which have been determined to contribute significant FOG to the sewer system by the FOG control program manager based on inspection or sampling, shall be deemed to have reasonable potential to adversely impact the sewer system, and shall install and commence proper operation of grease interceptors within one hundred eighty (180) days upon notification by the city.

(C) Existing food service establishments undergoing remodeling or a change in operations as defined in Section 16.24.010(b) shall be required to install a grease interceptor, except as otherwise authorized by this chapter.

(e) Variance and Waiver of Grease Interceptor Requirement.

(1) Variance from Grease Interceptor Requirements. A variance from the grease interceptor requirements to allow alternative pretreatment technology that is, at least, equally effective in controlling the FOG discharge in lieu of a grease interceptor may be granted. Additionally, a variance from the grease interceptor requirement may be granted to food service establishments demonstrating that it is impossible or impracticable to install, operate or maintain a grease interceptor, and/or where the implementation of best management practices is as effective as a grease interceptor in controlling FOG discharges into the sewer system. The FOG control program manager's determination to grant a variance shall be based upon an evaluation of the following factors:

(A) The availability of adequate space for installation and/or maintenance of a grease interceptor;

(B) The availability of an adequate slope for gravity flow between kitchen plumbing fixtures and the grease interceptor and/or between the grease interceptor and the private or public sewer collection lines;

(C) Whether the food service establishment can establish that the alternative pretreatment technology and/or implementation of best management practices is equivalent to or better than a grease interceptor in controlling its FOG discharge. In addition, the food service establishment must be able to demonstrate, after installation of the proposed alternative pretreatment, its effectiveness to control FOG discharges through downstream visual monitoring of the sewer system by the city or by a city-approved contractor, for at least three (3) months, at the food service establishment's own expense. A variance may be granted if the monitoring demonstrates no visible accumulation of FOG from discharges in the food service establishment's lateral and in downstream sewer lines;

(D) Other factors reasonably related to physical constraints in the construction and operation of a grease interceptor or to the minimization of FOG discharges to the sewer system.

(2) Conditional Waiver from Installation of Grease Interceptor. A conditional waiver from installation of a grease interceptor may be granted for food service establishments that have been determined to have a de minimus FOG discharge to and insignificant impact on the sewer system. The FOG control program manager's determination to grant a conditional waiver shall be based upon, but not limited to, evaluation of the following conditions:

(A) Quantity and quality of FOG discharge as measured or as indicated by the size of food service establishment based on seating capacity, number of meals served, menu, water usage, amount of on-site consumption of prepared food and other conditions that may reasonably be shown to contribute to FOG discharges;

(B) Adequacy of implementation of best management practices and compliance history:

(C) Sewer size, grade, condition based on visual inspection, FOG deposition in the sewer system by the food service establishment, and history of maintenance and sewage spills in the receiving sewer system;

(D) Changes in operations that significantly affect FOG discharge;

(E) Any other condition determined by the FOG control program manager to be reasonably related to the generation of FOG or control of FOG discharges.

(3) Waiver from Grease Interceptor Installation with a Grease Disposal Mitigation Fee. For food service establishments where the installation of a grease interceptor is impossible or impracticable and no equivalent alternative pretreatment is feasible, a waiver from the grease interceptor requirement may be granted by the FOG control program manager upon the imposition of a grease disposal mitigation fee as described in subsection (g) of this section. Additional requirements may be imposed to mitigate the discharge of FOG into the sewer system. The FOG control program manager's determination to grant a waiver upon imposition of a grease disposal mitigation fee shall be based upon the following factors:

(A) The availability of adequate space for installation and/or maintenance of a grease interceptor;

(B) The availability of an adequate slope for gravity flow between kitchen plumbing fixtures and the grease interceptor and/or between the grease interceptor and the private or public collection lines;

(C) Whether a variance from grease interceptor installation requirements to allow alternative pretreatment

technology can be granted;

(D) Other factors reasonably related to physical constraints in the construction and operation of a grease interceptor or to the minimization of FOG discharges to the sewer system.

(4) Application for Variance or Waiver of Requirement for Grease Interceptor. A food service establishment may submit an application for variance or waiver from the grease interceptor requirement to the FOG control program manager. The food service establishment shall bear the burden of demonstrating, to the FOG control program manager's reasonable satisfaction, that the variance or waiver is justified by factors listed in subsection (e) of this section. Upon determination by the FOG control program manager that the food service establishment has met its burden, a FOG wastewater discharge permit may be issued or revised to include the variance or waiver.

(5) Terms and Conditions. The issuance of a variance or waiver may be subject to such terms and conditions that the FOG control program manager determines are reasonably appropriate to minimize or eliminate the discharge of FOG to the sewer system. A variance or waiver may be revoked at any time when any of the terms and conditions for its issuance are not satisfied or if the conditions upon which the variance or waiver was based change so that the justification for the variance or waiver no longer exists. Except as otherwise set forth in this chapter, a variance or waiver shall be valid so long as the food service establishment remains in compliance with the terms and conditions of the variance or waiver, or until the expiration date specified in the FOG wastewater discharge permit.

(f) Commercial Properties. Property owners of commercial properties shall be responsible for the installation and maintenance of the grease interceptor serving multiple food service establishments.

(g) Grease Disposal Mitigation Fee. A food service establishment that does not qualify for a variance or waiver, and for which establishment the installation of a grease control device or interceptor is impossible or impracticable may be required to pay an annual grease disposal mitigation fee to cover the costs of increased maintenance of the sewer system as a result of the food service establishment's inability to adequately remove FOG from its wastewater discharge. This section shall not be interpreted to allow the new construction of a food service establishment or the remodeling or change in operation of an existing food service establishment without installation of a grease control device or grease interceptor unless the city has determined that it is impossible or impracticable to install or operate a grease control device or grease control interceptor for the subject facility under the provisions of subsection (e) of this section.

(1) The grease disposal mitigation fee shall be established by ordinance or resolution of the city council, and shall be based on the estimated annual cost of maintaining the sewer system for inspection and removal of FOG and other viscous or solidifying agents attributable to the food service establishment resulting from the lack of a grease interceptor or grease control device.

(2) The grease disposal mitigation fee may be waived or reduced if the food service establishment demonstrates to the reasonable satisfaction of the FOG control program manager that, through implementation of best management practices and waste minimization practices, it has reduced to a de minimus level the discharge of FOG into the sewer system.

(3) The grease disposal mitigation fee shall not be waived or reduced when the food service establishment has not complied with the minimum requirements of this chapter and/or its discharge into the sewer system in the preceding twelve (12) months has caused or contributed to a sewer blockage or SSO in the sewer system.

(h) Sewer System Overflows, Public Nuisance, Abatement Orders and Cleanup Costs. Notwithstanding the five-(5) year amortization period established in subsection (d) of this section, food service establishments which have contributed to a sewer blockage, SSO or any sewer system interference resulting from the discharge of wastewater or waste containing FOG, shall install, operate and maintain a grease interceptor, and may be required to abate such nuisance and prevent any future health hazards created by such sewer line blockage, SSO or any other sewer system interference. SSOs may threaten or cause injury to public health, safety, and welfare and are declared to be a public nuisance. Furthermore, sewer lateral failures and SSOs caused by food service establishments, alone or collectively, are the responsibility of the private property owner and food service establishment, and their respective responsible officers and/or owners. If, either at the request of a food service establishment or to abate an immediate threat of injury to the public health, safety, welfare, or property, the city acts to contain and/or clean up an SSO or the blockage of a

sewer lateral or the sewer system caused by a food service establishment, the city's costs for such abatement shall be entirely borne by the property owner, operator of the food service establishment, and their respective responsible officers and/or owners, and each of them, and shall constitute a debt to the city and become due and payable upon the city's request for reimbursement of such costs. (Ord. O-2004-07 § 1, 2004)

16.24.030 FOG wastewater discharge permits for food service establishments.

(a) FOG Wastewater Discharge Permit Required.

(1) Food service establishments proposing to discharge or which, upon the effective date of this chapter, are discharging wastewater-containing FOG into the city's sewer system shall obtain a FOG wastewater discharge permit from the city.

(2) FOG wastewater discharge permits shall be expressly subject to all provisions of this chapter and all other regulations, charges for use, and fees established by the city. Each permittee shall at all times comply with the terms and condition in its FOG wastewater discharge permit.

(3) FOG wastewater discharge permits granted to food service establishments by the city may be in the following forms:

(A) Interim Permit. Upon the effective date of this chapter, all food service establishments in the city shall be subject to the conditions in a FOG wastewater discharge permit as described in this section. For a period of eighteen (18) months following adoption, all food service establishments will be granted a blanket interim permit until such time as the city's FOG control program staff inspects them. Notwithstanding the foregoing, each food service establishment shall at all times comply with the provisions of Sections 16.24.020(a) and (b), and prior to the expiration of the eighteen- (18) month interim permit period, each food service establishment shall obtain a permit pursuant to subsection (c)(2), (c)(3) or (c)(4) of this section in order to continue discharging wastewater to the sewer system upon expiration of the interim permit;

(B) Regular Permit. A FOG wastewater discharge permit issued upon the installation of a grease interceptor as described in Section 16.24.020(d);

(C) Variance Permit. A FOG wastewater discharge permit issued subject to implementation of best management practices, alternative pretreatment technology and/or payment of a grease disposal mitigation fee as described in Section 16.24.020 (e)(3);

(D) Waiver Permit. A FOG wastewater discharge permit issued pursuant to Section 16.24.020(e) to a food service establishment with a de minimus FOG discharge to the sewer system.

(4) Proper installation and maintenance of a grease interceptor and application for a regular permit shall be the standard method of compliance with this chapter.

(b) FOG Wastewater Discharge Permit Application.

(1) Any person required to obtain a FOG wastewater discharge permit shall complete and file with the city prior to commencing or continuing discharges to the sewer system, an application in a form prescribed by the city. The applicable fees shall accompany the application. The applicant shall, at a minimum, submit the following information:

(A) Name, address, telephone number, assessor's parcel number(s) and description of the food service establishment's operation, cuisine, service activities, and, as applicable, clients using the applicant's services;

(B) (Whichever is applicable) Name, address of any and all principals/owners/major shareholders of the food service establishment; articles of incorporation; most recent annual statement filed with the Secretary of State; and business license;

(C) Name and address of property owner or lessor and the property manager for the property where the food service establishment is located;

(D) Any other information reasonably related to the food service establishment's potential FOG generating or disposal operations as requested by the FOG control program manager.

(2) Applicants may be required to submit site and facility plans pursuant to Section 16.24.040(a) of this code.

(3) Other information related to the applicant's business operations and potential FOG discharge may be requested to properly evaluate the permit application.

(4) After evaluation of the data furnished, the city may issue a FOG wastewater discharge permit, subject to terms and conditions designed to meet the purposes of this chapter and as otherwise determined by the FOG control program manager to be appropriate to protect the city's sewer system and/or the public health and safety.

(c) FOG Wastewater Discharge Permit Conditions. The issuance of a FOG wastewater discharge permit may contain any of the following conditions or limits:

(1) Limits on discharge of FOG and other priority pollutants which may cause or contribute to SSOs and/or sewer blockages;

(2) Requirements for proper operation and maintenance of grease interceptors and other grease control devices;

(3) Grease interceptor maintenance schedule;

(4) Requirements for implementation of best management practices and installation of adequate grease interceptor and/or grease control devices;

(5) Requirements for maintaining and reporting the status of best management practices;

(6) Requirements for maintaining and submitting logs and records, including wastehauling records and waste manifests;

(7) Requirements to self-monitor the discharge to the sewer system and periodically assess and report on the condition of the sewer lateral;

(8) Requirements for the food service establishment to construct, operate and maintain, at its own expense, FOG sampling facilities;

(9) Additional requirements determined to be reasonably appropriate by the FOG control program manager to protect the city's sewer system or as otherwise specified by other regulatory agencies;

(10) Other terms and conditions reasonably related to the minimization or elimination of FOG discharges to the sewer system.

(d) FOG Wastewater Discharge Permit Application Fee. The FOG wastewater discharge application permit fee shall be paid by the applicant in an amount adopted by ordinance or resolution of the city council. Payment of the application permit fee must be received by the city at the time of filing the application for the permit. A permittee shall also pay any delinquent invoices in full prior to permit renewal.

(e) Modification of FOG Wastewater Discharge Permit Terms and Conditions.

(1) The terms and conditions of an issued permit may be subject to modification in the determination of the FOG control program manager during the life of the permit based on:

(A) The discharger's current or anticipated operating data;

(B) The city's current or anticipated operating data;

(C) Changes in the requirements of regulatory agencies which affect the city or sewer system; or

(D) A determination by the FOG control program manager that such modification is appropriate to further the objectives of this chapter.

(2) A permittee may request a modification of the terms and conditions of an issued permit. The request shall be in writing stating the requested change, and the reasons for the change. The FOG control program manager shall review the request, make a determination on the request, and respond in writing.

(3) The permittee shall be informed of any change in the permit limits, conditions, or requirements at least forty-five (45) days prior to the effective date of the change. Any changes or new conditions in the permit shall include a reasonable time schedule for compliance.

(4) Any existing food service establishment shall, prior to commencement of either a change in operations which may affect the discharge of FOG to the sewer system or a remodeling project, apply for and obtain a new or modified FOG wastewater discharge permit pursuant to this section.

(f) FOG Wastewater Discharge Permit Duration and Renewal. FOG wastewater discharge permits shall be issued annually. At least thirty (30) days prior to the expiration of the permit, the user shall apply for renewal of the permit in accordance with the provisions of this section.

(g) Exemption from FOG Wastewater Discharge Permit. A limited food preparation establishment is exempt from the requirement to obtain a FOG wastewater discharge permit.

(h) Nontransferability of Permits. FOG wastewater discharge permits issued pursuant to this chapter are for a specific food service establishment, for a specific operation, at a specific location and create no vested rights.

(1) No permit holder shall assign, transfer or sell any FOG wastewater discharge permit issued pursuant to this chapter, nor use any such permit for or on any premises or for facilities, operations or discharges not expressly encompassed within the underlying permit.

(2) Any permit which is transferred to a new owner, operator or facility is void.

(i) FOG Wastewater Discharge Permit Charge for Use. A charge to cover all costs of the city for administering the FOG program shall be established by ordinance or resolution of the city council. (Ord. O-2004-07 § 1, 2004)

16.24.040 Facilities requirements.

(a) Drawing Submittal Requirements. Upon request by the city:

(1) Food service establishments may be required to submit two (2) copies of facility site plans, mechanical and plumbing plans, and details to show all sewer locations and connections. The submittal shall be in a form and content acceptable to the city for review of existing or proposed grease control device(s), the grease interceptor, monitoring facilities, metering facilities, and operating procedures. The review of the plans and procedures shall in no way relieve the food service establishments of the responsibility of modifying the facilities or procedures in the future, as necessary to produce an acceptable discharge, and to meet the requirements of this chapter or any requirements of other regulatory agencies;

(2) Applicants may be required to submit site plans, floor plans, mechanical and plumbing plans, and details to show all sewers, grease control device(s), the grease interceptor or other pretreatment equipment and appurtenances by size, location and elevation for evaluation;

(3) Food service establishments may be required to submit a schematic drawing of grease control device(s), the grease interceptor or other pretreatment equipment, piping and instrumentation, as well as a wastewater characterization report;

(4) The city may require the drawings be prepared by a California Registered Civil, Chemical, Mechanical or Electrical Engineer, as appropriate.

(b) Grease Interceptor Requirements.

(1) All food service establishments shall provide wastewater acceptable to the city, under the requirements and standards established in this chapter before discharging, directly or indirectly, to any public sewer. Except as otherwise authorized in this chapter, any food service establishment required to provide FOG pretreatment shall install, operate, and maintain an adequately sized grease interceptor in accordance with the requirements of this chapter.

(2) Grease interceptor sizing and installation shall conform to the current edition of the Uniform Plumbing Code. Grease interceptors shall have a minimum of two (2) compartments with fittings designed for grease retention. Additional compartments may be required depending on the scope of business operations.

(3) The grease interceptor shall be installed at a location where it shall be at all times easily accessible for inspection, cleaning and removal of accumulated grease.

(4) Access manholes, with a minimum diameter of twenty-four (24) inches, shall be provided over each grease interceptor chamber and sanitary tee. The access manholes shall extend at least to finished grade and be designed and maintained to prevent water inflow or infiltration. The manholes shall also have readily removable covers to facilitate inspection, grease removal and wastewater sampling activities.

(c) Grease Trap Requirements.

(1) Food service establishments may be required to install grease traps in waste lines leading from drains, sinks, and other fixtures or equipment where grease may be introduced into the sewer system in quantities that can cause blockage.

(2) Sizing and installation of grease traps shall conform to the current edition of the California Plumbing Code.

(3) Grease traps shall be maintained in efficient operating conditions by removing accumulated grease on a daily basis.

(4) Grease traps shall be maintained free of all food residues and any FOG waste removed during the cleaning and scraping process.

(5) Grease traps shall be inspected periodically to check for leaking seams and pipes, and for effective operation of the baffles and flow-regulating device. Grease traps and their baffles shall be maintained free of all caked-on FOG and waste. Removable baffles shall be removed and cleaned during the maintenance process.

(6) Dishwashers and food waste disposal units shall not be connected to or discharged into any grease trap.

(d) Monitoring Facilities Requirements.

(1) The city may require a food service establishment to construct and maintain in proper operating condition at the food service establishment's sole expense, flow monitoring, constituent monitoring and/or sampling facilities.

(2) The location of the monitoring or metering facilities shall be subject to approval by the FOG control program manager.

(3) Each food service establishment shall provide immediate, clear, safe and uninterrupted access to the FOG control program manager or inspectors to monitoring and metering facilities.

(4) Food service establishments may also be required by the FOG control program manager to submit waste analysis plans and contingency plans to ensure proper operation and maintenance of the grease control device(s) or grease interceptor(s).

(5) No food service establishment shall increase the use of water or in any other manner attempt to dilute a discharge as a partial or complete substitute for treatment to achieve compliance with the requirements of this chapter and the terms of an applicable FOG wastewater discharge permit.

(e) Requirements for Best Management Practices.

(1) All food service establishments shall implement best management practices in accordance with the requirements and guidelines established by the city under its FOG control program in an effort to minimize the discharge of FOG to the sewer system.

(2) All food service establishments shall be required, at a minimum, to comply with the following best management practices:

(A) Installation of Drain Screens. Drain screens shall be installed on all drainage pipes in food preparation areas;

(B) Segregation and Collection of Waste Cooking Oil. All waste cooking oil shall be collected and stored properly in recycling receptacles such as barrels or drums. Such recycling receptacles shall be maintained properly to ensure that they do not leak. Food service establishments shall use licensed wastehaulers and licensed recycling facilities to dispose of waste cooking oil;

(C) Disposal of Food Waste. All food waste shall be disposed of directly into the trash or garbage, and not in sinks;

(D) Employee Training. Employees of food service establishments shall be trained by ownership/management, upon commencement of employment at least annually thereafter, on the following subjects:

(i) How to "dry wipe" pots, pans, dishware and work areas before washing to remove grease,

(ii) How to properly dispose of food waste and solids in enclosed plastic bags prior to disposal in trash bins or containers to prevent leaking and odors,

(iii) The location and use of absorption products to clean under fryer baskets and other locations where grease may be spilled or dripped,

(iv) How to properly dispose of grease or oils from cooking equipment into a grease receptacle such as a barrel or drum without spilling,

Training shall be documented and employee signatures retained indicating each employee's attendance and understanding of the practices reviewed. Training records shall be available for review at any reasonable time by the FOG control program manager or an inspector;

(E) Kitchen Signage. Best management and waste minimization practices shall be posted conspicuously in the food preparation and dishwashing areas at all times.

(f) Grease Interceptor Maintenance Requirements.

(1) All food service establishments with grease interceptors shall comply with the following maintenance requirements:

(A) Grease interceptors shall be maintained in efficient operating condition by periodic removal of the full content of the interceptor which includes wastewater, accumulated FOG, floating materials, sludge and solids;

(B) All existing and newly installed grease interceptors shall be maintained in a manner consistent with a maintenance frequency approved by the FOG control program manager pursuant to this section;

(C) No FOG that has accumulated in a grease interceptor shall be allowed to pass into any sewer lateral, sewer system, storm drain, or public right-of-way during maintenance activities;

(D) Food service establishments with grease interceptors may be required to submit data and information necessary to establish the maintenance frequency of grease interceptors;

(E) The maintenance frequency for all food service establishments with a grease interceptor shall be determined in one (1) of the following methods:

(i) 25% Rule. Grease interceptors shall be fully pumped out and cleaned at a frequency such that the combined FOG and solids accumulation does not exceed twenty-five (25) percent of the total designed hydraulic depth of the grease interceptor. This is to ensure that the minimum hydraulic retention time and required available hydraulic volume is maintained to effectively intercept and retain FOG discharged to the sewer system,

(ii) Each food service establishment with a grease interceptor shall fully pump out and clean its grease interceptor not less than every six (6) months, unless sooner required by the twenty-five (25) percent rule in subsection (f)(1)(E)(i) of this section, or a later interval determined under subsection (f)(1)(E)(iii) of this section,

(iii) Grease interceptors shall be fully pumped out and cleaned every six (6) months when the frequency described in subsection (f)(1)(E)(i) of this section has not been established. The maintenance frequency may be adjusted by the FOG control program manager when sufficient data have been obtained to establish an average frequency based on the requirements described in subsection (f)(1)(E)(i) of this section. The FOG control program manager may change the maintenance frequency at any time to reflect changes in actual operating conditions. Based on the actual generation of FOG from the food service establishment, the maintenance frequency may increase or decrease,

(iv) The owner/operator of a food service establishment may submit a request to the FOG control program manager requesting a change in the maintenance frequency at any time. The food service establishment shall have the burden to demonstrate that the requested change in frequency reflects actual operating conditions based on the average FOG accumulation over time, meets the requirements described in subsection (f)(1)(E)(i) of this section, and that it is in full compliance with the conditions of its permit and the requirements of this chapter. Upon determination by the FOG control program manager that requested revision is justified, the permit may be revised accordingly to reflect the change in maintenance frequency,

(v) If the grease interceptor, at any time, contains FOG and/or solids accumulation that does not meet the requirements described in subsection (f)(1)(E)(i) of this section, the food service establishment shall have the grease interceptor serviced immediately such that all FOG, sludge, and other materials are completely removed from the grease interceptor. If deemed necessary, the FOG control program manager may also increase the maintenance frequency of the grease interceptor;

(F) Wastewater, accumulated FOG, floating materials, sludge/solids, and other materials removed from the

grease interceptor shall be properly disposed of off-site by wastehaulers in accordance with all applicable federal, state and/or local laws. (Ord. O-2004-07 § 1, 2004)

16.24.050 Monitoring, reporting, notification and inspection requirements.

(a) Monitoring and Reporting Conditions.

(1) Monitoring for Compliance with Permit Conditions and Reporting Requirements.

(A) The FOG control program manager may require periodic reporting of the status of implementation of best management practices, in accordance with the FOG control program.

(B) The FOG control program manager may require visual monitoring and reporting by the city or an approved contractor, at the sole expense of the permittee, to observe the actual conditions of any food service establishment's sewer lateral and sewer lines downstream.

(C) The FOG control program manager may require reports from any food service establishment for self-monitoring of wastewater constituents and potential FOG accumulation in the private sewer line and for FOG characteristics of any permittee's operations to determine compliance with any conditions or requirements specified in the applicable FOG wastewater discharge permit or this chapter. Monitoring reports of the analyses of wastewater constituents and FOG characteristics shall be in a manner and form approved by the FOG control program manager and shall be submitted upon request of the FOG control program manager. Failure by the permittee to perform any required monitoring, or to submit monitoring reports required by the FOG control program manager shall constitute a violation of this chapter and may be cause for the city to initiate tasks and analyses to determine the wastewater constituents and FOG characteristics for compliance with any conditions and requirements specified in the FOG wastewater discharge permit or in this chapter. The permittee shall be responsible for any and all expenses of the city in undertaking such monitoring analyses and preparation of reports.

(D) Other reports may be required of any food service establishment such as compliance schedule progress reports, FOG control monitoring reports, and any other reports deemed reasonably appropriate by the FOG control program manager to ensure compliance with this chapter.

(2) Record Keeping Requirements. Each food service establishment shall be required to keep all manifests, records, receipts and invoices relating to all cleaning, maintenance and grease removal of/from the grease control device, and the disposal carrier and disposal site location for no less than two (2) years. Each food service establishment shall, upon request, make the manifests, records, receipts and invoices available to any city representative or inspector. These records shall include:

(A) A logbook of grease interceptor, grease trap or grease control device cleaning and maintenance practices;

(B) A record of best management practices being implemented including employee training;

(C) Copies of records and manifests of wastehauling of interceptor contents;

(D) Records of sampling data and sludge height monitoring for FOG and solids accumulation in the grease interceptors;

(E) Records of any FOG and/or wastewater spills and records of the cleaning of sewer laterals;

(F) Any other information deemed appropriate by the FOG control program manager to ensure compliance with this chapter.

(3) Falsifying Information or Tampering with Process. It is unlawful to make any false statement or representation on any record, report, plan or other document that is filed with the city pursuant to this chapter, or to tamper with or knowingly render inoperable any grease control device, monitoring device or method or access point required under this chapter.

(b) Inspection and Sampling Conditions.

(1) The FOG control program manager may inspect or order the inspection and sample the wastewater discharges of any food service establishment to ascertain whether the intent of this chapter is being met and the permittee is complying with all requirements. The permittee shall allow the city access to the food service

establishment premises, during normal business hours, for purposes of inspecting the food service establishment's grease control devices or interceptor, and reviewing the manifests, records, receipts and invoices relating to the cleaning, maintenance and inspection of the grease control devices or interceptor.

(2) The FOG control program manager shall have the right to place or order the placement on the food service establishment's property or other locations as determined by the FOG control program manager, such devices as are necessary to conduct sampling or metering operations. Where a food service establishment has security measures in force, the permittee shall make necessary arrangements so that representatives of the city shall be permitted to enter without delay for the purpose of performing their specific responsibilities.

(3) In order for the FOG control program manager to determine the wastewater characteristics of the discharger for purposes of determining the annual use charge and for compliance with permit requirements, the permittee shall make available for inspection and copying by the city all notices, monitoring reports, waste manifests, and records including, but not limited to, those related to wastewater generation, and wastewater disposal without restriction. All such records shall be kept by the permittee a minimum of two (2) years.

(c) Right of Entry. Representatives of a food service establishment where wastewater is created or discharged shall allow the FOG control program manager, or city representatives, reasonable access to all parts of the wastewater generating and disposal facilities for the purposes of inspection and sampling during all times the discharger's facility is open, operating, or any other reasonable times. No person shall interfere with, delay, resist or refuse entrance to city representatives attempting to inspect any food service establishment involved directly or indirectly with a discharge of wastewater to the city's sewer system. In the event of an emergency involving actual or imminent sanitary sewer overflow, city's representatives may access adjoining businesses or properties that share a sewer system with a food service establishment in order to prevent or remediate an actual or imminent sewer overflow.

(d) Notification of Spill.

(1) In the event a permittee is unable to comply with any permit condition due to a breakdown of equipment, accident, or human error or the permittee has reasonable opportunity to know that his/her/its discharge will exceed the discharge provisions of the applicable FOG wastewater discharge permit or this chapter, the discharger shall immediately notify the city by telephone at the number specified in the permit. If the material discharged to the sewer has the potential to cause or result in sewer blockages or SSOs, the discharger shall immediately notify the local health department, and the city.

(2) Confirmation of this notification shall be made in writing to the FOG control program manager at the address specified in the permit no later than five (5) working days from the date of the incident. The written notification shall state the date of the incident, the reasons for the discharge or spill, what steps were taken to immediately correct the problem, and what steps are being taken to prevent the problem from recurring.

(3) Such notification shall not relieve the permittee of any expense, loss, damage or other liability which may be incurred as a result of damage or loss to the city or any other damage or loss to person or property; nor shall such notification relieve the permittee of any fees or other liability which may be imposed pursuant to this chapter or other applicable law.

(e) Notification of Planned Changes. Permittees shall notify the city at least sixty (60) days in advance prior to any facility expansion/remodeling, or process modifications that may result in new or substantially increased FOG discharges or a change in the nature of the discharge. Permittees shall notify the city in writing of the proposed expansion or remodeling and shall submit any information requested by the city for evaluation of the effect of such expansion on the permittee's FOG discharge to the sewer system. (Ord. O-2004-07 § 1, 2004)

16.24.060 Enforcement.

(a) General Procedure.

(1) To ensure that all interested parties are afforded due process of law and that violations are resolved as soon as possible, the general policy of the city is that any determination relating to a notice of violation and compliance schedule order (CSO) will be made by the city administrator upon information provided by the FOG control program

manager or inspector, with a right of appeal by the permittee to the city council pursuant to the procedures set forth in subsection (l) of this section.

(2) The city, at its discretion, may utilize any one (1), combination, or all enforcement remedies provided in this section in response to any permit violation or other violation of this chapter.

(b) Determination of Noncompliance with FOG Wastewater Discharge Permit Conditions.

(1) Sampling and Inspection Procedures.

(A) Sampling and inspection of food service establishments shall be conducted in the time, place, manner, and frequency determined at the sole discretion of the FOG control program manager.

(B) Noncompliance with permit discharge conditions, or any discharge provision of this chapter may be determined by an inspection of a grease control device, grease interceptor and associated manifest(s) and documentation; analysis of a grab or composite sample of the effluent of a food service establishment; or by other information relating to the operations of or discharge from a food service establishment.

(C) Any sample taken from a designated sample point shall be considered to be representative of the discharge to the public sewer.

(2) Noncompliance Fee. Any permittee determined to be in noncompliance with the terms and conditions specified in its permit or with any provision of this chapter shall pay a noncompliance fee. The purpose of the noncompliance fee is to compensate the city for costs of additional inspection and follow-up, sampling, monitoring, laboratory analysis, treatment, disposal, and administrative processing incurred as a result of the noncompliance, and shall be in addition to and not in lieu of any penalties as may be assessed pursuant to subsections (j) and (k) of this section. Noncompliance fees shall be in the amount adopted by ordinance or resolution of the city council.

(c) Compliance Schedule Order (CSO).

(1) Upon determination that a permittee is in noncompliance with the terms and conditions specified in its permit or any provision of this chapter, or needs to construct and/or acquire and install a grease control device or grease interceptor, the FOG control program manager may issue to the permittee a CSO.

(2) The CSO may contain terms and conditions including but not limited to requirements for installation of a grease control device, grease interceptor and facilities, submittal of drawings or reports, audit of waste hauling records, best management and waste minimization practices, payment of fees, or other provisions to ensure compliance with this chapter.

(3) If compliance is not achieved in accordance with the terms and conditions of a CSO during its term, the FOG control program manager may issue an order suspending or revoking the applicable FOG wastewater discharge permit pursuant to subsection (d) or (e) of these regulations.

(d) Permit Suspension.

(1) The city administrator may suspend any permit when it is determined that a permittee:

(A) Fails to comply with the terms and conditions of a CSO;

(B) Knowingly provides a false statement, representation, record, report, or other document to the city;

(C) Refuses to provide records, reports, plans, or other documents required by the city to determine permit terms or conditions, discharge compliance, or compliance with this chapter;

(D) Falsifies, tampers with, or knowingly renders inaccurate any monitoring device or sample collection method;

(E) Refuses reasonable access to the permittee’s premises for the purpose of inspection and monitoring;

(F) Does not make timely payment of all amounts owed to the city for user charges, permit fees, or any other fees imposed pursuant to this chapter;

(G) Causes interference, a sewer blockage, or an SSO in the sewer system;

(H) Violates grease interceptor maintenance requirements, any condition or limit of its FOG wastewater discharge permit or any provision of this chapter.

(2) When the FOG control program manager has reason to believe that grounds exist for permit suspension,

he/she shall give written notice thereof by certified mail to the permittee setting forth a statement of the facts and grounds deemed to exist, together with the time and place where the charges shall be heard by the city administrator. The hearing date shall be not less than fifteen (15) calendar days nor more than forty-five (45) calendar days after the mailing of such notice.

(A) At the suspension hearing, the permittee shall have an opportunity to respond to the allegations set forth in the notice by presenting written or oral evidence. The hearing shall be conducted in accordance with procedures established by the city administrator.

(B) If the city administrator designates a hearing officer, after the conclusion of the hearing, the hearing officer shall submit a written report to the city administrator setting forth a brief statement of facts found to be true, a determination of the issues presented, conclusions and a recommendation.

(C) Upon receipt of the written report of the hearing officer or conclusion of the hearing, if the city administrator conducts the hearing, the city administrator shall make his/her determination and should he/she find that grounds exist for suspension of the permit, he/she shall issue his/her decision and order in writing within thirty (30) calendar days after the conclusion of the hearing. The written decision and order of the city administrator shall be sent by certified mail to the permittee or its legal counsel/representative at the permittee's business address.

(3) Effect.

(A) Upon an order of suspension by the city administrator becoming final, the permittee shall immediately cease and desist its discharge and shall have no right to discharge any wastewater containing FOG directly or indirectly to the city's sewer system for the duration of the suspension. All costs for physically terminating and reinstating sewer service shall be paid by the permittee.

(B) Any owner or responsible management employee of the permittee shall be bound by the order of suspension.

(C) An order of permit suspension issued by the city administrator shall be final in all respects on the sixteenth (16th) day after it is mailed to the permittee unless a request for hearing with the city council is filed with the city clerk pursuant to subsection (l) of this section no later than 4:30 p.m. on the fifteenth (15th) day following such mailing.

(e) Permit Revocation.

(1) The city administrator may revoke any permit when it is determined that a permittee:

(A) Knowingly provides a false statement, representation, record, report or other document to the city;

(B) Refuses to provide records, reports, plans, or other documents required by the city to determine permit terms, conditions, discharge compliance or compliance with this chapter;

(C) Falsifies, tampers with, or knowingly renders inaccurate any monitoring device or sample collection method;

(D) Fails to comply with the terms and conditions of a permit suspension or CSO;

(E) Discharges effluent to the sewer system while its permit is suspended;

(F) Refuses reasonable access to the permittee's premises for the purpose of inspection and monitoring;

(G) Does not make timely payment of all amounts owed to the city for user charges, permit fees, or any other fees imposed pursuant to this chapter;

(H) Causes interference, a sewer blockage, or an SSO in the sewer system;

(I) Violates grease interceptor maintenance requirements, any condition or limit of its FOG wastewater discharge permit or any provision of this chapter.

(2) When the FOG control program manager has reason to believe that grounds exist for the revocation of a permit, he/she shall give written notice by certified mail thereof to the permittee setting forth a statement of the facts and grounds deemed to exist together with the time and place where the charges shall be heard by the city administrator. The hearing date shall be not less than fifteen (15) calendar days nor more than forty-five (45) calendar days after the mailing of such notice.

(A) At the revocation hearing, the permittee shall have an opportunity to respond to the allegations set forth in the

notice by presenting written or oral evidence. The hearing shall be conducted in accordance with the procedures established by the city administrator.

(B) If the city administrator designates a hearing officer, after the conclusion of the hearing, the hearing officer shall submit a written report to the city administrator setting forth a brief statement of facts found to be true, a determination of the issues presented, conclusions and a recommendation.

(C) Upon receipt of the written report of the hearing officer, or conclusion of the hearing, if the city administrator conducts the hearing, the city administrator shall make his/her determination and should he/she find that grounds exist for permanent revocation of the permit, he/she shall issue his/her decision and order in writing within thirty (30) calendar days after the conclusion of the hearing. The written decision and order of the city administrator shall be sent by certified mail to the permittee or its legal counsel/representative at the permittee's business address.

In the event the city administrator determines to not revoke the permit, he/she may order other enforcement actions, including, but not limited to, a temporary suspension of the permit, under terms and conditions that he/she deems appropriate.

(3) Effect.

(A) Upon an order of revocation by the city administrator becoming final, the permittee shall permanently lose all rights to discharge any wastewater containing FOG directly or indirectly to the city's sewer system. All costs for physical termination of sewer service shall be paid by the permittee.

(B) Any owner or responsible management employee of the permittee shall be bound by the order of revocation.

(C) Any future application for a permit at any location within the city by any person associated with an order of revocation will be considered by the city after fully reviewing the records of the revoked permit, which records may be the basis for denial of a new permit.

(D) An order of permit revocation issued by the city administrator shall be final in all respects on the sixteenth (16th) day after it is mailed to the permittee unless a request for hearing with the city council is filed with the city clerk pursuant to subsection (l) of this section no later than 4:30 p.m. on the fifteenth (15th) day following such mailing.

(f) Damage to Facilities or Interruption of Normal Operations.

(1) Any person who discharges any waste and/or wastewater which causes or contributes to any sewer blockage, SSO, obstruction, interference, damage, or any other impairment to the city's sewer facilities or to the operation of those facilities shall be liable for all costs incurred to clean or repair the facilities together with expenses incurred by the city to resume normal operations, including all city overhead expenses related to the event. The total amount shall be payable within forty-five (45) days of invoicing by the city.

(2) Any person who discharges waste and/or wastewater to the sewer system which causes or contributes to the city violating discharge requirements established by any regulatory agency shall be liable for any costs or expenses incurred by the city as a result, including but not limited to regulatory fines, penalties, and assessments made by other agencies or a court.

(g) Public Nuisance. The discharge of waste and/or wastewater in any manner in violation of this chapter or of any order issued by the FOG control program manager or city administrator, as authorized by this chapter, is declared a public nuisance and may be corrected or abated as directed by the FOG control program manager or city administrator. Any person creating a public nuisance is guilty of a misdemeanor.

(h) Termination of Service.

(1) The city, by order of the city administrator, may physically terminate sewer service to any property as follows:

(A) On a term of any order of suspension or revocation of a permit; or

(B) Upon the failure of a person not holding a valid FOG wastewater discharge permit to immediately cease the discharge, whether direct or indirect, to the city's sewer facilities after the notice and process in accordance with subsection (e)(2) of this section.

(2) All costs for physical termination shall be paid by the owner or operator of the food service establishment or permittee as well as all costs for reinstating service.

(i) Emergency Suspension Order.

(1) The city may, by order of the city administrator, suspend sewer service when the city administrator determines that such suspension is necessary in order to stop an actual or impending discharge which presents or may present an imminent or substantial endangerment to the health and welfare of persons, or to the environment, or may cause an SSO, sewer blockage, interference to the city's sewer facilities, or may cause the city to violate any state or federal law or regulation. Any discharger notified of and subject to an emergency suspension order shall immediately cease and desist the discharge of all waste and/or wastewater containing FOG to the sewer system.

(2) As soon as reasonably practicable following the issuance of an emergency suspension order, but in no event more than five (5) business days following the issuance of such order, the city administrator shall hold a hearing to provide the food service establishment or permittee the opportunity to present information in opposition to the issuance of the emergency suspension order. Such a hearing shall not stay the effect of the emergency suspension order. The hearing shall be conducted in accordance with procedures established by the city administrator. The city administrator shall issue a written decision and order within two (2) business days following the hearing, which decision shall be sent by certified mail to the food service establishment or its legal counsel/representative at that food service establishment's business address. The decision of the city administrator following the hearing shall be final and not appealable to the city council, but may be subject to judicial review pursuant to subsection (n) of this section.

(j) Civil Penalties.

(1) All users of the city's sewer system and facilities are subject to enforcement actions administratively or judicially by the city, U.S. EPA, state of California Regional Water Quality Control Board or the county of Orange. Such actions may be taken pursuant to the authority and provisions of several laws, including but not limited to: (1) Federal Water Pollution Control Act, commonly known as the Clean Water Act (33 U.S.C.A. Section 1251 et seq.); (2) California Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.); (3) California Hazardous Waste Control Law (California Health & Safety Code Sections 25100 to 25250); (4) Resource Conservation and Recovery Act of 1976 (42 U.S.C.A. Section 6901 et seq.); and (5) California Government Code, Sections 54739-54740.6.

(2) In the event the city is subject to the payment of fines or penalties pursuant to the legal authority and actions of other regulatory or enforcement agencies based on a violation of law or regulation or its permits, and such violation can be established by the city as caused by the discharge of any user of the city's sewer system which is in violation of any provision of this chapter or the user's permit, the city shall be entitled to recover from the user all costs and expenses, including, but not limited to, the full amount of such fines or penalties to which it has been subjected.

(3) Pursuant to the authority of California Government Code Sections 54739 through 54740, any person who violates any provision of this chapter; any permit condition, prohibition or effluent limit; or any suspension or revocation order shall be liable civilly for a sum not to exceed twenty-five thousand dollars ($25,000.00) per violation for each day in which such violation occurs. Pursuant to the authority of the Clean Water Act, 33 U.S.C. Section 1251 et seq., any person who violates any provision of this chapter, or any permit condition, prohibition, or effluent limit shall be liable civilly for a sum not to exceed twenty-five thousand dollars ($25,000.00) per violation for each day in which such violation occurs. The city attorney, upon request of the city administrator, shall petition the Superior Court to impose, assess, and recover such penalties, or such other penalties as the city may impose, assess, and recover pursuant to federal and/or state legislative authorization.

(4) Administrative Civil Penalties.

(A) Pursuant to the authority of California Government Code Sections 54740.5 and 54740.6, the city may issue an administrative complaint to any person who violates:

(i) Any provision of these regulations;

(ii) Any permit condition, prohibition or effluent limit; or

(iii) Any suspension or revocation order.

(B) The administrative complaint shall be served by personal delivery or certified mail on the person and shall inform the person that a hearing will be conducted, and shall specify a hearing date within sixty (60) days following service. The administrative complaint will allege the act or failure to act that constitutes the violation of the city's regulations, the provisions of law authorizing civil liability to be imposed, and the proposed civil penalty. The matter shall be heard by the city administrator. The person to whom an administrative complaint has been issued may waive the right to a hearing, in which case a hearing will not be conducted.

(C) At the hearing, the person shall have an opportunity to respond to the allegations set forth in the administrative complaint by presenting written or oral evidence. The hearing shall be conducted in accordance with the procedures established by the city administrator.

(D) If the city administrator designates a hearing officer, after the conclusion of the hearing, the hearing officer shall submit a written report to the city administrator setting forth a brief statement of the facts found to be true, a determination of the issues presented, conclusions and a recommendation.

(E) Upon receipt of the written report of the hearing officer, or conclusion of the hearing if the city administrator conducts the hearing, the city administrator shall make his/her determination and should he/she find that grounds exist for assessment of a civil penalty against the person, he/she shall issue his/her decision and order in writing within thirty (30) calendar days after the conclusion of the hearing.

(F) If, after the hearing or appeal, if any, it is found that the person has violated reporting or discharge requirements, the city administrator or city council may assess a civil penalty against that person. In determining the amount of the civil penalty, the city administrator or city council may take into consideration all relevant circumstances, including but not limited to the extent of harm caused by the violation, the economic benefit derived through any noncompliance, the nature and persistence of the violation, the length of time over which the violation occurs, and corrective action, if any, attempted or taken by the person involved.

(G) Civil penalties may be assessed as follows:

(i) In an amount which shall not exceed two thousand dollars ($2,000.00) for each day for failing or refusing to furnish required reports;

(ii) In an amount which shall not exceed three thousand dollars ($3,000.00) for each day for failing or refusing to timely comply with any compliance schedules established by the city;

(iii) In an amount which shall not exceed five thousand dollars ($5,000.00) per violation for each day of discharge in violation of any waste discharge limit, permit condition, or requirement issued, reissued or adopted by the city;

(iv) In an amount which does not exceed ten dollars ($10.00) per gallon for discharges in violation of any suspension, revocation, cease and desist order or other order or prohibition issued, reissued or adopted by the city;

(H) An order assessing administrative civil penalties issued by the city administrator shall be final in all respects on the thirty-first (31st) day after it is served on the person unless an appeal and request for hearing with the city council is filed with the city clerk pursuant to subsection (l) of this section no later than the thirtieth (30th) day following such mailing. An order assessing administrative civil penalties issued by the city council shall be final upon issuance.

(I) Copies of the administrative order shall be served on the party served with the administrative complaint, either by personal service or by registered mail to the person at his/her/its business or residence address, and upon other persons who appeared at the hearing and requested a copy of the order.

(J) Any person aggrieved by a final order issued by the city council, after granting review of the order of the city administrator, may obtain review of the order of the city council in the superior court, pursuant to Government Code Section 54740.6, by filing in the court a petition for writ of mandate within thirty (30) days following the service of a copy of the decision or order issued by the city council.

(K) Payment of any order setting administrative civil penalties shall be made within thirty (30) days of the date the order becomes final. The amount of any administrative civil penalties imposed shall constitute a debt to the city.

(L) No administrative civil penalties shall be recoverable for any violation for which the city has recovered civil

penalties through a judicial proceeding filed pursuant to Government Code Section 54740.

(k) Criminal Penalties. Any person who violates any provision of these regulations is guilty of a misdemeanor, which upon conviction is punishable by a fine not to exceed one thousand dollars ($1,000.00), or imprisonment for not more than one (1) year, or both. Each violation and each day in which a violation occurs shall constitute a new and separate violation of this chapter and shall be subject to the penalties contained in this chapter.

(l) Appeals to the City Council.

(1) Any food service establishment, permit applicant, or permittee adversely affected by a decision, action, or determination made by the FOG control program manager or city administrator may, prior to the date that the city administrator's order becomes final, file with the city clerk a written request for hearing before the city council accompanied by an appeal fee in the amount established by a separate ordinance or resolution of the city council. The request for hearing shall set forth in detail all the issues in dispute for which the appellant seeks a determination and all facts supporting appellant's request.

No later than twenty-five (25) days after receipt of the request for hearing, the city council shall either set the matter for a hearing, or deny the request for a hearing.

A hearing shall be held by the city council within thirty (30) days from the date of determination granting a hearing, unless a later date is agreed to by the appellant and the city council. If the matter is not heard within the required time, due to actions or inactions of the appellant, the city administrator's order shall be deemed final.

(2) The city council shall grant all requests for a hearing on appeals concerning permit suspension, revocation, or denial. Whether to grant or deny the request for a hearing on appeals of other decisions of the city administrator shall be within the sole discretion of the city council.

(3) The appeal fee shall be refunded if the city council denies a hearing or reverses or modifies, in favor of the appellant, the order of the city administrator. The fee shall not be refunded if the city council denies the appeal.

(4) After the hearing, the city council shall make a determination whether to uphold, modify, or reverse the decision, action, or determination made by the city administrator.

The decision of the city council shall be set forth in writing within thirty (30) days after the close of the hearing and shall contain findings of the facts found to be true, the determination of issues presented, and the conclusions. The written decision and order of the city council shall be sent by certified mail to the appellant or its legal counsel/representative at the appellant's business address.

The order of the city council shall be final upon its adoption. In the event the city council fails to reverse or modify the city administrator's order, it shall be deemed affirmed.

(m) Payment of Charges.

(1) Except as otherwise provided, all fees, charges and penalties established by these regulations are due and payable upon receipt of notice thereof. Accounts shall become delinquent if not paid within thirty (30) days of the date of mailing, or if personally delivered, the date of delivery. Any action for collection may include an application for an injunction to prevent repeated and recurring violations of this chapter.

(2) Any invoice outstanding and unpaid after ninety (90) days shall be cause for immediate initiation of permit revocation proceedings or immediate suspension of the permit.

(3) Penalties charged under this section shall not accrue to those invoices successfully appealed, provided the city receives written notification of the successful appeal prior to the payment due date. However, payment of disputed charges is still required by the due date during city review of any appeal submitted by permittees.

(n) Judicial Review.

(1) Pursuant to Section 1094.6 of the California Code of Civil Procedure, the city enacts this part to limit to ninety (90) days following final decisions in adjudicatory administrative hearings the time within which an action can be brought to review such decisions by means of administrative mandamus.

(2) Definitions. As used in this section, the following terms and words shall have the following meanings:

(A) "Decision" means and includes adjudicatory administrative decisions that are made after hearing, or after

revoking, suspending, or denying an application for a permit.

(B) "Complete record" means and includes the transcript, if any exists, of the proceedings, all pleadings, all notices and orders, any proposed decision by the city's officers, agents, or employees, the final decision, all admitted exhibits, all rejected exhibits in the possession of the city or its officers, agents or employees, all written evidence, and any other papers in the case.

(3) Time Limit for Judicial Review. Judicial review of any decision of the city or its officer or agent may be made pursuant to Section 1094.5 of the Code of Civil Procedure only if the petition for writ of mandate is filed not later than the ninetieth (90th) day following the date on which the decision becomes final. If there is no provision for reconsideration in the procedures governing the proceedings or if the date is not otherwise specified, the decision is final on the date it is made. If there is provision for reconsideration, the decision is final upon the expiration of the period during which such reconsideration can be sought; provided that if reconsideration is sought pursuant to such provision the decision is final for the purposes of this section on the date that reconsideration is rejected.

(4) The complete record of the proceedings shall be prepared by the city officer or agent who made the decision and shall be delivered to the petitioner within ninety (90) days after he/she has filed written request therefor. The city may recover from the petitioner its actual costs for transcribing and otherwise preparing the record.

(5) If the petitioner files a request for the record within ten (10) days after the date the decision becomes final, the time within which a petition, pursuant to Section 1094.5 of the Code of Civil Procedure, may be filed shall be extended to not later than the thirtieth (30th) day following the date on which the record is either personally delivered or mailed to the petitioner or the petitioner's attorney of record, if appropriate.

(6) In issuing a final decision, the city shall provide notice to the party that Section 1094.6 of the Code of Civil Procedure governs the time within which judicial review must be sought.

(7) Notwithstanding the foregoing, and pursuant to Government Code Section 54740.6, judicial review of an order of the city council imposing administrative civil penalties pursuant to subsection (j)(4) of this section may be made only if the petition for writ of mandate is filed not later than the thirtieth (30th) day following the day on which the order of the city council becomes final. (Ord. O-2004-07 § 1, 2004)

16.24.070 Severability.

If any section, subsection, subdivision, sentence, clause, phrase or word of this chapter is for any reason held to be unconstitutional or otherwise invalid, such invalidity shall not affect the validity of this entire chapter or any of the remaining portions of this chapter. The city council declares that it would have adopted this chapter, and each section, subsection, subdivision, sentence, clause or phrase hereof, irrespective of the fact that any one (1) or more sections, subsections, subdivisions, sentences, clauses, phrases or words be declared unconstitutional or otherwise invalid. (Ord. O-2004-07 § 1, 2004)

16.24.080 California Building Standards Law findings.

Pursuant to the provisions of the California Building Standards Law, California Health and Safety Code Sections 18941.5, 17958, 17958.5 and 17958.7, the city council finds that the amendments to the State Building Standards and Housing Laws, more particularly the California Plumbing Code, adopted in this chapter are necessary because of climatic, geological or topographical conditions of property in the city's jurisdiction, and as more specifically described below.

(a) Articles 2 and 4 modify the authority and discretion of the "Administrative Authority" of Section 1014.1 of the 2001 California Plumbing Code by requiring all food service establishments to install and operate a grease control device, which may be a grease interceptor or grease trap, if no other device, mechanism, or process is found to successfully trap or collect or treat FOG prior to it being discharged into the sewer system.

(b) Section 16.24.040 of this code modifies the general maintenance requirements for grease interceptors of Section 1014.6 of the 2001 California Plumbing Code and establishes more specific maintenance requirements.

Findings for “a” and “b”: The city’s topography and geography that has created the Santa Ana Watershed and the city’s proximity to the Pacific Ocean coupled with the general waste discharge requirements imposed by the RWQCB require the strict compliance with grease control device regulations to prevent sewer system overflows that threaten the health and safety of the public within the immediate vicinity of the overflow and downstream to the local beaches.

(c) Administrative/Procedural Amendments. Additional amendments and deletions to the California Plumbing Code are found to be administrative or procedural and are found to be reasonable and necessary to safeguard life and property within the city. (Ord. O-2004-07 § 1, 2004)

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SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix J

FOG Control Program

Fats, Oils, and Grease Control Program

Basis for Program Development, Program Components, and Policies

Program Overview

In an effort to eliminate sanitary sewer overflows caused by the accumulation of Fats, Oils and Grease (FOG) within the City's sanitary collection system and to remain compliant with the California Regional Water Quality Control Board, Santa Ana Region's Order Number R8-2004-0014, the City of Placentia has established a FOG Control Program. The FOG Control Program is designed to reduce or eliminate the discharge of FOG from Food Service Establishments (FSEs) into the City's sanitary collection system. The FOG Control Program has been established under the authority of, and is subservient to, the City's FOG Control Ordinance Number 0-2004-07. The FOG Control Program took effect on December 30, 2004 after which all FSEs that discharge wastewater into the City's sanitary collection system had 60 days to apply to the City for a FOG Wastewater Discharge Permit. To initiate the FOG Control Program, the City issued a blanket interim permit to all FSEs giving the City sufficient time to review and categorize each applicant ensuring fair and equitable treatment. Under the FOG Control Program, all new or remodeled FSEs are required to install and maintain a grease interceptor. FSEs are also required to implement kitchen Best Management Practices (BMPs) and to educate their employees in the use of FOG reduction practices. The FOG Control Program is enforced through a series of routine inspections with penalties for noncompliance being established by the City's FOG Control Ordinance. Funding for this program is provided from the application and permit fees collected from each participating FSE. A limited food preparation establishment is not considered an FSE and is exempt from obtaining a FOG Wastewater Discharge Permit. A limited food preparation establishment is one that only engages in the reheating, hot holding or assembly of ready to eat food products and does not change the form, flavor, or consistency of food.

Rev. 10/17/19

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PURPOSE

The purpose of the Fats, Oils, and Grease (FOG) Control Program is to prevent blockages of the sanitary sewer lines that can cause sanitary sewer overflows (SSOs) by establishing control mechanisms that establish regulations and policies for the disposal of FOG from Food Service Establishments (FSEs). The control mechanisms are comprised of the FOG Control Ordinance (Ordinance) and FOG Wastewater Discharge Permit (permit), which define the general prohibitions and restrictions on discharges, facilities requirements, administrative requirements, procedures for recovering costs associated with FOG discharges and blockages, and enforcement tools for implementing the program.

In addition to establishing control mechanisms, the FOG Control Program also includes an enforcement management system to address the fundamental requirements necessary to regulate FSEs; obtain and evaluate information on FSE compliance; identify violations; select appropriate enforcement action; establish time frames for implementation; and resolve noncompliance in a timely, fair and consistent manner.

The discharge of FOG to the City's sanitary collection system from FSEs are effectively controlled through the FOG Control Program by:

- Administering an extensive permitting program to regulate wastewater discharges from FSEs;
- Tracking compliance through inspection of FSEs, reviewing Kitchen Best Management Practices (BMPs) and Grease Interceptor Maintenance Practices, and monitoring wastewater discharges;
- Evaluating and screening the results of inspections and reports to identify violations;
- Consistently responding to all types of violations to ensure long-term compliance; and
- Requiring FSEs, when applicable, to pretreat wastewater to reduce FOG prior to discharge to the sewer system.

BASIS FOR DEVELOPING FOG CONTROL PROGRAM

Pursuing an Equitable FOG Control Program

A good FOG Control Program should consistently succeed in keeping FOG discharges below acceptable levels to protect the City's sanitary collection system from clogging and causing sanitary sewer overflows (SSOs). Since the problem is caused significantly by FSEs discharging FOG, FSEs share a major responsibility for the consequences of their FOG discharges.

It is the City of Placentia's objective to develop and implement a FOG Control Program that is equitable by:

- Requiring all FSEs to reduce the level of their FOG discharge through implementation of Best Management Practices (BMPs) and the installation of appropriate/adequate grease interceptor/FOG control device, among other requirements necessary for an effective FOG control.
- Establishing specific permit requirements for reducing FOG discharges by considering the quantity of FOG generated by the FSE and its potential impact to the collection system; establishing requirements that are effective to achieve the desired environmental results while considering costs incurred by FSEs, considering requirements with sound technical basis; establishing practical requirements tailored individually to each FSE based on established criteria versus a "one size fits all" set of requirements.
- Establishing basic user fees and any additional user fees that may be imposed for discharges above acceptable levels to recover costs of additional maintenance required beyond normal; imposing mitigation fees for FSEs where installation of adequate grease interceptor/FOG control device is not feasible.
- Recovering the cost of the FOG Control Program, which includes inspections, sampling, program administration and maintenance, educational outreach, etc.
- Implementing a FOG Control Program that addresses all FSEs that are sources of FOG and is consistent among all FSEs.

Sewer blockages are largely dependent on the quantity of FOG being discharged from FSEs, but are also dependent on other factors such as the size of the sewer line, pipe material, number of dischargers to the line, type of dischargers, topography (slope), age and condition of the sewer lines, etc. The City will correct sewer conditions within its system that are contributing to blockages; however, any capital improvement will take a longer time to implement. Although more frequent sewer cleaning and maintenance is one of the solutions, a balance between the frequency of cleaning and the public cost involved must also be maintained. In the interest of protecting public health, the immediate burden is placed on significant FOG dischargers (FSEs) to control and reduce their FOG discharges in conjunction with a practical sewer cleaning and maintenance schedule by the City.

FOG Control Essentials

There are two essential elements for effectively controlling the discharge of FOG:

- Pretreatment through installation, operation, and maintenance of a properly designed and adequately sized grease interceptor. The use of a properly maintained grease interceptor has been shown to be the most effective conventional FOG control technology. However, because of space restrictions and/or cost-prohibitive retrofits for existing FSEs, its implementation becomes a complicated issue. While other FOG control devices may be used when the installation of a grease interceptor is not feasible, an evaluation must be conducted to ensure that its efficacy is, at least, equivalent to that of a grease interceptor.

- Implementation of Best Management Practices. BMPs are practical measures that when implemented will significantly reduce the quantities of FOG released from FSEs. When practiced consistently, BMPs help reduce FOG loading on the grease interceptor/FOG control device. As a result, the performance of the grease interceptor/FOG control device is optimized and improved, with its maintenance frequency reduced, as well. BMPs include proper grease disposal and handling and proper kitchen practices for minimizing the discharge of FOG at the source.

The City will implement the above as basic general requirements, among other requirements that will facilitate enforcement of these essentials. When appropriate, deviation from the pretreatment requirement will be considered, to apply practicality while maintaining consistency.

A limited food preparation establishment is not considered an FSE and is exempt from the FOG Control Program. Exempted establishments shall be engaged only in reheating, hot holding or assembly of ready to eat food products and, as a result, discharges wastewater containing only a de minimus amount of FOG. A limited food preparation establishment does not include any operation that changes the form, flavor, or consistency of food.

Requirements for Installation of Grease Interceptors

All FSEs are required to have grease interceptors or equivalent FOG control devices. Conditional waivers to install grease interceptors may be granted to FSEs that are able to demonstrate that their FOG discharge is insignificant and has no impact to the City's sanitary collection system. A conditional variance to allow alternative pretreatment technology in lieu of a grease interceptor, but equivalent in performance and effectiveness, may also be granted to FSEs demonstrating that the installation of a grease interceptor is not feasible. When a conditional variance

cannot be granted, a Waiver with a Grease Disposal Mitigation Fee may be allowed. The fee is used to recover the City's additional cost of maintenance and line cleaning associated with the elevated FOG discharge due to the FSE's inability to install the required grease interceptor or equivalent FOG control device. The Grease Disposal Mitigation Fee is established such that FSEs do not get an economic advantage for opting to pay the mitigation fee rather than installing the grease interceptor. Therefore, it is, at a minimum, equivalent to the cost of installing a new grease interceptor and associated costs for its cleaning and maintenance.

Remodeled or New FSEs

Existing FSEs undergoing remodeling or businesses undergoing a change in operations as defined in Section 16.24.010(b) of the City's FOG Control Ordinance shall be required to install a grease interceptor.

Requirements for Implementation of BMPs

In addition to pretreatment, another basic component of the FOG control program is the application of BMPs to control generation of FOG from the source. At a minimum, **all FSEs** are required to implement enforceable BMPs. Acceptable BMPs are defined in the City's FOG Control Ordinance. Information on BMPs is available on the City's website (http://placentia.org/259/Sanitary-Sewer-Maintenance).

Regulatory Considerations

Use of Numerical Limits for Controlling FOG Discharge

Numerical effluent limits have been used traditionally as a tool for monitoring discharges for most of the pollutants. When federal limits have not been defined, local limits that are technically based are developed. In the case of FOG where no federal limit has been defined, a local limit is necessary. However, because of difficulties associated in establishing a technically based limit for FOG at this time, alternative methods for controlling FOG discharges that are also effective will be adopted until such time that a technically based FOG limit can be established. As discussed in the following sections, the City will implement alternative methods for monitoring FOG discharges from FSEs that will primarily focus on establishing performance standards, action levels as indicated by the depth of solids/FOG build-up in the existing interceptor, and procedures for visual inspection of FOG build-up through CCTV.

Use of Performance Standards for Regulating FSEs

1. BMP Performance Standards - The ability of FSEs to consistently implement BMPs is an important aspect of the FOG control program. The effectiveness of the efforts of FSEs to reduce their FOG discharges could have been easily determined if the actual discharge level can be compared to an established numerical limit (pretreatment standard). In the absence of a FOG numerical limit, however, establishing performance standards based on consistent implementation of enforceable BMPs is utilized. This means that compliance evaluations are based on the FSEs' ability to meet established performance standards for consistently implementing BMPs. As an example, specific minimum BMPs are required for each FSE, as specified in its permit, which will be enforced. The City may monitor FSEs' compliance by requiring periodic submittal of BMP implementation status reports (signed by the responsible officer under penalty of perjury) and verifying submitted information through inspections. Depending on available resources, the City has the flexibility to conduct thorough verification or spot-checking of BMPs. Appropriate enforcement procedures will be implemented when FSEs fail to comply with the requirement.

2. Maintenance Performance Standards – Like the BMP Performance Standards, establishing Performance Standards for ensuring proper maintenance of the grease interceptor/FOG control device is also important. This ensures that FSEs adhere to the established maintenance schedule. The City may require notification whenever maintenance is performed in accordance with a predetermined schedule (performance standard). This information may also be verified through waste haulers. Notice of Violations may be issued when an FSE fails to comply with the required maintenance schedule and/or notification requirement.

Use of Grease Interceptor Liquid Depth as an Action Level for Controlling FOG Pass-through

For FSEs with grease interceptors, an alternative indicator that can be used to evaluate compliance with the required pretreatment equipment maintenance is by measuring the level of solids and FOG accumulation in the grease interceptors. Excessive levels of FOG and solids accumulation in grease interceptors diminishes removal efficiency, eventually resulting in FOG passing through the equipment and discharged to the City's sanitary collection system. Therefore, establishing an interceptor liquid depth action level will provide another method for controlling FOG discharges. Based on a minimum allowable liquid level established as a performance standard, compliance monitoring and evaluation may be conducted by measuring the sludge height using a sludge judge or an electronic height measuring

device to obtain the solid-free liquid level. The City's FOG Control Ordinance establishes a sludge height performance standard based on the 25% rule, which requires that grease interceptors be pumped-in-full when the total accumulation of surface FOG (including floating solids) and settled solids reaches 25% of the grease interceptor's overall liquid depth. This provides an alternative method for controlling the amount of FOG discharge other than actual measurements of effluent concentration. With the use of an interceptor liquid depth action level, compliance can be monitored and enforcement actions, which may include escalation of interceptor maintenance frequency, may be imposed.

Use of Visual Observations of FSEs' Lateral for Requiring Grease Interceptors

Visual observation of the FSE's lateral is the most accurate indicator of a facility's impact as a result of discharging FOG at significant levels that cause sewer blockage. This can also be used to establish action levels that would trigger the requirement for installation of a grease interceptor. While this is accurate, it entails the use of CCTV at the public's expense to actually get a photograph or video of the FOG accumulation in the laterals and downstream of the FSE's connection to the City's sanitary collection system. Depending on the availability of resources, this monitoring method is useful in controlling FOG discharge. There are occasions, however, when a clean lateral may not necessarily represent the absence of FOG discharge. The use of additives or discharge of solvents that emulsify grease can camouflage a significantly high FOG discharge. The City's FOG Control Ordinance prohibits the use of emulsifying additives or solvents without the prior consent of the City's FOG Control Program Manager.

Technical Considerations

Interceptor Sizing Consideration

Currently, there are different methods available for sizing grease interceptors. The sizes will vary considerably depending on the method used. Currently, or until a more acceptable sizing method is adopted, the Uniform Plumbing Code (UPC) formula is used for grease interceptor sizing. Although this may result in a larger interceptor, it is conservative and is universally accepted. Deriving a new formula that is technically justified will require a considerable amount of research and study, which should include obtaining data for the local condition. **(***A minimum size interceptor is established; 750 gallons minimum volume is recommended. Interceptor sizes from 375 to 750 gallons should require the minimum volume of 750 gallons. 375 gallons is recommended as a de minimis value for requiring interceptors; i.e., installation requiring less than 375 gal may be exempt. When the UPC sizing calculation exceeds 1000 gallons, the calculation should be compared with other formulas to ensure that the interceptor is not oversized.***)** Engineering judgment should be used when there are large discrepancies by also considering other factors such as menu, frequency of use of drainage fixture units, etc., to determine the final size of the interceptor.

Determining Interceptor Cleaning Frequency

The cleaning frequency should depend upon the FSEs' type of operation and is, therefore, expected to vary. The frequency for cleaning interceptors is affected by a lot of factors and varies from FSE to FSE. Although frequent grease interceptor cleaning is desirable, a balance between cost and benefit should be maintained. Because this is an important issue for FSEs due to the cost involved, as well as for the City as it affects the success of the FOG control program, it is very important to establish a cleaning frequency requirement that is practical and effective. Therefore, this issue must be addressed appropriately. The use of a "one size fits all" cleaning frequency may seem very easy to manage from the regulatory standpoint, but can be either impractical and/or cost prohibitive for some FSEs or too lax for other FSEs. Specifying a cleaning frequency for each FSE that reflects a representative time when cleaning is actually needed is ideal but the determination for establishing frequency may be more involved. The following procedure will be used for establishing required cleaning frequency:

1. Grease interceptors shall be pumped out (pumped-in-full) and cleaned at a frequency such that the combined FOG and solids accumulation does not exceed 25% of the total liquid depth of the grease interceptor. This is to ensure that the minimum hydraulic retention time and required available volume is maintained to effectively intercept and retain FOG discharged to the sewer system.

2. Grease interceptors shall be pumped out and cleaned not less than every 6

months when the frequency described in (1) has not been established. This standard default cleaning frequency was established based on the most common or typical frequency found to be effective for most FSEs. This frequency is used only for the purpose of establishing a default cleaning frequency initially, but will be changed accordingly to reflect a more representative frequency based on actual data. The maintenance frequency shall be adjusted when sufficient data have been obtained to establish an average frequency based on the requirements described in (1) and guidelines in the FOG Control Ordinance. The City may change the maintenance frequency at any time to reflect changes in actual operating conditions in accordance with the FOG Control Policies. Based on the actual generation of FOG from the FSE, the maintenance frequency may increase or decrease.

3. FSEs may submit a request to change the maintenance frequency at any time. The FSE shall have the burden of responsibility to demonstrate that the requested change in frequency reflects actual operating conditions based on the average FOG accumulation over time meets the requirements described in (1), and that it is in full compliance with the conditions of its permit and the City's FOG Control Ordinance. Upon determination by the FOG Control Program Manager that requested revision is justified, the permit may be revised accordingly to reflect the change in maintenance frequency.

4. All FSEs with a grease interceptor will be required to maintain their grease interceptor at least every 6 months.

Routine inspection to monitor liquid depth to verify the FSE's ability to maintain liquid depth above the action level will serve as a check whether cleaning frequencies previously established are still applicable or need to be re-adjusted.

BASIC REQUIREMENTS OF THE FOG CONTROL PROGRAM

Permit Requirements

1. FOG Wastewater Discharge Permit Required. All FSEs that discharge wastewater into the City's sanitary collection system shall be required to obtain a permit and pay the associated permit processing fee. FSEs shall have 60 days from the date of the FOG Control Program Implementation, December 30, 2004, to apply to the City of Placentia for a FOG Wastewater Discharge Permit. Permit duration is one year. FSEs shall apply for renewal prior to permit expiration as specified in the Permit. Permits are non-transferable.

2. BMPs Required. Permittees shall implement enforceable kitchen BMPs as a standard basic requirement. The City may require periodic BMP Implementation Status Reports be submitted to the City as specified in the permit in order to monitor the continuous and routine implementation of BMPs.

3. FOG Pretreatment Required. FSEs that discharge wastewater into the City's sanitary collection system are required to install, operate and maintain an approved type and adequately sized grease interceptor. Fixtures, equipment, and drain lines located in the food preparation and clean up areas that are sources of FOG discharges shall be connected to the grease interceptor. At least annually, the City or its representative shall inspect and monitor the effectiveness of all grease interceptors.

   A. New FSEs

      New FSEs shall install grease interceptors prior to commencing discharge of wastewater to the City's sanitary collection system.

   B. Existing FSEs

      - Existing FSEs that have caused or contributed to a grease-related blockage in the City's sanitary collection system, or which have sewer laterals connected to enhanced maintenance areas, or which have been determined to contribute significant FOG to the sewer system by the FOG Control Program Manager, shall be deemed to have reasonable potential to adversely impact the City's sanitary collection system, and shall install grease interceptors within 180 days upon notification by the City.

      - For existing FSEs who continue to contribute FOG to the City's collection system and where the City makes the determination that it is impractical or impossible to install a grease interceptor, a Grease Disposal Mitigation Fee may be imposed.

      - Existing FSEs involved in a remodel or a change in operation as defined in the FOG Control Ordinance, or FSEs which change ownership, shall be required to install a grease interceptor.

Fee Requirements

1. FOG Wastewater Discharge Permit Application Fee. All FSEs who discharge wastewater to the City's sanitary collection system shall pay a FOG Wastewater Discharge Permit Application Fee when filing for a FOG Wastewater Discharge Permit. This fee shall allow the City to recoup its costs for processing the permit application.

2. FOG Wastewater Discharge Permit Fee. All FSEs who discharge wastewater to the City's sanitary collection system shall pay a FOG Wastewater Discharge Permit Fee. This fee shall allow the City to recoup its cost to administer and manage the FOG Control Program.

3. Grease Disposal Mitigation Fee. The Grease Disposal Mitigation Fee shall be imposed upon a FOG contributing FSE where the City determines that it is impractical or impossible to install a grease interceptor. This fee shall allow the City to recoup its increased maintenance costs required to remove the contributed FOG from the City's sanitary collection system.

4. Noncompliance Fee. The Noncompliance Fee shall be assessed to any FSE who discharges wastewater to the City's sanitary collection system and is found by the City to be out of compliance with the City's FOG Control Program. This fee shall allow the City to recoup any costs required to return the FSE to compliance.

Issuance of Variance and Waivers

1. Variance from Grease Interceptor Requirements

   A variance to allow alternative pretreatment technology that is, at least, equally effective in controlling the FOG discharge in lieu of a grease interceptor may be granted to FSEs demonstrating that it is impossible or impracticable to install, operate or maintain a grease interceptor. The FOG Control Program Manager's determination to grant a variance will be based upon, but not limited to, evaluation of the following conditions:

   - The availability of adequate space for installation and/or maintenance of a grease interceptor.

   - The availability of an adequate slope for gravity flow between kitchen plumbing fixtures and the grease interceptor and/or between the grease interceptor and the private collection lines or the City's sanitary collection system.

2. Conditional Waiver from Installation of Grease Interceptor

   A conditional waiver from the installation of a grease interceptor may be granted for FSEs that have been determined to have negligible FOG discharge to and insignificant impact on the City's sanitary collection system. The FOG Control Program Manager's determination to grant or revoke a conditional waiver shall be based upon, but not limited to, evaluation of the following conditions:

   - Quantity of FOG discharge as measured or as indicated by the size of the FSE based on seating capacity, number of meals served, menu, water usage, etc.
   - Adequacy of implementation of BMPs and compliance history.
   - Sewer size, grade, condition based on visual information (CCTV), FOG deposition in the sewer system by the FSE, and history of maintenance and blockages/sewage spills in the receiving sewer system.
   - Changes in operation that significantly affects FOG discharge.
   - Any other condition deemed appropriate by the FOG Control Program Manager.

3. Waiver from Grease Interceptor Installation with a Grease Disposal Mitigation Fee.

   For FSEs where the installation of grease interceptor is not feasible and no equivalent alternative pretreatment can be installed, a waiver from the grease interceptor requirement may be granted by the FOG Control Program Manager upon the imposition of a Grease Disposal Mitigation Fee as described in the FOG Control Ordinance. The FOG Control Program Manager's determination to grant a waiver upon imposition of a Grease Disposal Mitigation Fee shall be based upon the following factors:

   - The availability of adequate space for installation and/or maintenance of a grease interceptor.
   - The availability of an adequate slope for gravity flow between kitchen plumbing fixtures and the grease interceptor and/or between the grease interceptor and the private collection lines or the City's sanitary collection system.

4. Request for Waiver or Variance of Requirement for Grease Interceptor

   An FSE may request a waiver or variance from the grease interceptor requirement from the City's FOG Control Program Manager. The FSE shall bear the burden of demonstrating, to the FOG Control Program Manager's reasonable satisfaction, that the installation of a grease interceptor is not feasible or applicable. Upon determination by the FOG Control Program Manager that reasons are sufficient to justify a variance or waiver, the permit may be issued or revised to include the variance or waiver. Terms and conditions for issuance of a variance to an FSE shall be set forth in the permit. A waiver or variance may be revoked at any time when any of the terms and conditions for its issuance are no longer satisfied.

Prohibitions

No FSE shall discharge or cause to be discharged into the sewer system FOG that may accumulate and/or cause or contribute to blockages in the sewer system, including the sewer lateral which connects the FSE to the City's sanitary collection system. The following prohibitions shall apply to all FSEs:

1. Installation of food grinders in the plumbing system of new FSEs is prohibited. Furthermore, all food grinders shall be removed from all existing FSEs within 180 days of the effective date of the Fog Control Ordinance, except when expressly allowed by the FOG Control Program Manager.

2. Introduction of any additives into an FSE's wastewater system for the purpose of emulsifying FOG is prohibited, unless a specific written authorization from the FOG Control Program Manager is obtained.

3. Disposal of waste cooking oil into drainage pipes is prohibited. All waste cooking oils shall be collected and stored properly in receptacles such as barrels or drums for recycling by the FSE.

4. Discharge of wastewater from dishwashers to any grease trap or grease interceptor is prohibited.

5. Discharge of wastewater with temperatures in excess of 140˚F to any FOG control device, including grease traps and grease interceptors, is prohibited.

6. The use of biological additives for grease remediation or as a supplement to interceptor maintenance, without prior authorization from the FOG Control Program Manager, is prohibited.

7. Discharge of wastes from toilets, urinals, washbasins, and other fixtures

containing fecal materials to piping which flows to a grease interceptor is prohibited.

8. Discharge of any waste including FOG and solid materials removed from the FOG control device to the sewer system is prohibited. Materials removed from grease interceptors shall be wastehauled periodically as part of the operation and maintenance requirements.

Facilities Requirements

1. Grease Interceptor Requirements

   - Any FSE required to provide FOG pretreatment shall install, operate, and maintain an adequately sized grease interceptor necessary to maintain compliance with the objectives of the FOG Control Ordinance.

   - Grease interceptor sizing and installation shall conform to the current edition of the Uniform Plumbing Code. Grease interceptors shall have a minimum of two compartments with fittings designed for grease retention.

   - The grease interceptor shall be installed at a location where it shall be at all times easily accessible for inspection, cleaning, and removal of accumulated materials.

   - Access manholes, with a minimum diameter of 24 inches, shall be provided over each grease interceptor chamber and sanitary tee. The access manholes shall extend at least to finished grade and be designed and maintained to prevent water inflow or infiltration. The manholes shall also have readily removable covers to facilitate inspection, grease removal, and wastewater sampling activities.

2. Grease Trap Requirements

   - FSEs may be required to install grease traps in the waste lines leading from drains, sinks, and other fixtures or equipment where grease may be introduced into the sewer system in quantities that can cause blockage.

   - Sizing and installation of grease traps shall conform to the current edition of the Uniform Plumbing Code.

   - Grease traps shall be maintained in efficient operating conditions by removing accumulated grease on a daily basis.

- Grease traps shall be maintained free of all food residues and any FOG waste removed during the cleaning and scraping process.

- Grease traps shall be inspected periodically to check for leaking seams and pipes, and for effective operation of the baffles and flow regulating device. Grease traps and their baffles shall be maintained free of all caked-on FOG and waste. Removable baffles shall be removed and cleaned during the maintenance process.

- Dishwashers and food waste disposal unit shall not be connected to or discharge into any grease trap.

3. Monitoring Facilities Requirements

   - The City may require a FSE to construct and maintain in proper operating condition at the FSE's sole expense, flow monitoring, constituent monitoring and/or sampling facilities.

4. Requirements for Best Management Practices

   All FSEs shall implement kitchen best management practices in accordance with the requirements and guidelines established by the City under its FOG Control Program in an effort to minimize the discharge of FOG to the City's sanitary collection system. All FSEs shall be required, at a minimum, to comply with the following BMPs, when applicable:

   - Installation of drain screens. Drain screens shall be installed on all drainage pipes in food preparation areas.

   - Segregation and collection of waste cooking oil. All waste cooking oil shall be collected and stored properly in recycling receptacles such as barrels or drums. Such recycling receptacles shall be maintained properly to ensure they do not leak. Licensed haulers and licensed recycling facilities must be used to dispose of waste cooking oil.

   - Disposal of food waste. All food waste shall be disposed of directly into the trash or garbage, and not in sinks.

   - Employee training. Employees of FSEs shall be trained by ownership/management, upon commencement of employment and at least annually thereafter, on the following subjects:

     - How to "dry wipe" pots, pans, dishware and work areas before washing to remove grease.

- How to properly dispose of food waste and solids in enclosed plastic bags prior to disposal in trash bins or containers to prevent leaking and odors.

- The location and use of absorption products to clean under fryer baskets and other locations where grease may be spilled or dripped.

- How to properly dispose of grease or oils from cooking equipment into a grease receptacle such as a barrel or drum without spilling.

Training shall be documented and employee signatures retained indicating each employee's attendance and understanding of the practices reviewed. Training records shall be made available to the City's FOG Control Program Manager or other authorized inspectors at any reasonable time.

- Maintenance of kitchen exhaust filters. Filters shall be cleaned as frequently as necessary to be maintained in good operating condition. The wastewater generated from cleaning the exhaust filter shall be disposed of properly.

- Kitchen Signage. Best management and waste minimization practices shall be posted conspicuously in the food preparation and dishwashing areas at all times.

5. Grease Interceptor Maintenance Requirements. All Food Service Establishments with grease interceptors shall comply with the following maintenance requirements:

    - Grease Interceptors shall be maintained in efficient operating condition by periodic removal of the full content of the interceptor which includes wastewater, accumulated FOG, floating materials, sludge and solids.

    - All existing and newly installed grease interceptors shall be maintained in a manner consistent with a maintenance frequency specified in the City's FOG Control Ordinance.

    - No FOG that has accumulated in a grease interceptor shall be allowed to pass into any sewer lateral, sewer system, storm drain, or public right of way during maintenance activities.

    - FSEs with grease interceptors may be required to submit data and information necessary to establish the maintenance frequency grease interceptors.

Public Outreach

The City provides public outreach to the general public as well as FSEs through kitchen BMPs and frequently asked questions (FAQ) content on their website (http://placentia.org/259/Sanitary-Sewer-Maintenance), the City newsletter, public events, as well as through distribution of kitchen BMP posters in English and Spanish to FSEs during annual inspections.

Inspections

To ensure compliance with the FOG Control Program, the City or its representative shall periodically inspect every FSE covered under the program. At least annually, the City or its representative shall inspect each FSE to ensure compliance with the required employee training, implementation of kitchen BMPs, segregation, collection and disposal of waste cooking oil, and the proper maintenance of any onsite grease interceptor including inspection of grease waste hauling manifests. The City or its representative shall at least annually inspect all grease interceptors that discharge into the City's wastewater collection system to ensure each interceptor is functional and is being properly maintained. The City will provide follow-up inspections as needed whenever discrepancies are reported.

Notification of Spills

In the event a permittee is unable to comply with any permit condition due to a breakdown of equipment, accident, or human error or the permittee has reasonable opportunity to know that his/her/its discharge will exceed the discharge provisions of the applicable FOG Wastewater Discharge Permit or the FOG Control Ordinance, the discharger shall immediately notify the City by telephone at the number specified in the permit. If the material discharged to the sewer has the potential to cause or result in sewer blockages or SSOs, the discharger shall immediately notify the local Health Department, and the City.

Confirmation of this notification shall be made in writing to the FOG Control Program Manager at the address specified in the permit no later than five (5) working days from the date of the incident. The written notification shall state the date of the incident, the reasons for the discharge or spill, what steps were taken to immediately correct the problem, and what steps are being taken to prevent the problem from recurring.

Such notification shall not relieve the permittee of any expense, loss, damage or other liability which may be incurred as a result of damage or loss to the City or any other damage or loss to person or property; nor shall such notification relieve the permittee of any fees or other liability which may be imposed by the FOG Control Ordinance or other applicable law.

Enforcement

To ensure that all interested parties are afforded due process of law and that violations are resolved as soon as possible, the general policy of the City is that any determination relating to a notice of violation and compliance schedule order (CSO) will be made by the City Administrator upon information provided by the FOG Control Program Manager or inspector, with a right of appeal by the permittee to the City Council pursuant to the procedures set forth in 16.24.060(I) of the City's FOG Control Ordinance number 0-2004-07. The City, at its discretion, may utilize any one, combination, or all enforcement remedies provided in Section 16.24.060 in response to any permit or FOG Control Ordinance violations.

Any permittee determined to be in noncompliance with the terms and conditions specified in its permit or with any provision of the City's FOG Control Ordinance shall pay a noncompliance fee.

Record-keeping and Reporting Requirements

To assist with record-keeping and reporting requirements, the City shall provide each FSE with a FOG Control Program binder containing the copies of the City's FOG Control Program, FOG Control Ordinance, kitchen BMPs, signage and training materials, and various reporting forms. FSEs shall be required to keep records and submit or make available for review, the following documents to the City, upon request:

1. A logbook of grease interceptor, grease trap or grease control device cleaning and maintenance practices.

2. A record of Best Management Practices being implemented including employee training.

3. Copies of records and manifests of wastehauling of interceptor contents.

4. Records of sampling data and sludge height monitoring for FOG and solids accumulation in the grease interceptors.

5. Records of any FOG and/or wastewater spills and records of the cleaning of sewer laterals.

6. Any other information deemed appropriate by the FOG Control Program Manager.

SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix K

FOG Characterization Study

FOG Characterization Study

City of Placentia

FOG Characterization Study

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City of Placentia

FOG CHARACTERIZATION

History

On April 26, 2002, the California Regional Water Quality Control Board (RWQCB), Santa Ana Region, adopted Order Number R8-2002-0014, General Waste Discharge Requirements (WDR) for sewage collection systems in Orange County within the Santa Ana region. As part of this order, any collection system that has had sanitary sewer overflows (SSO) caused by or contributed to by accumulations of fats, oils and grease (FOG) is to create and implement an effective FOG reduction program by December 30, 2004. Historically, within the City of Placentia, FOG has caused or directly attributed to over 90% of the City's SSOs. As per the WDR, the City's FOG reduction program is comprised of a FOG source reduction ordinance and a written FOG Control Program requiring the reduction of FOG generation through the use of FOG source control devices, kitchen best management practices (BMPs), enhanced line cleaning, monitoring and inspections.

To establish a level of consistency throughout the region, the Orange County Sanitation District (OCSD), on behalf of its member cities/agencies, commissioned a FOG Control Study to be conducted by Environmental Engineering and Contracting (EEC). This two phase study characterized the FOG problem in the Santa Ana region and provided instructional building blocks for the development of an effective FOG reduction program in phase one with phase two to evaluate the effectiveness of various FOG reduction technologies.

Purpose

A key element to establishing an effective FOG reduction program is a local FOG characterization study. The purpose of a local FOG characterization study is to determine the sources of FOG contribution and the most efficient and cost effective means of reducing it. Studies done nationally and elsewhere have determined that the number one source of FOG in a sanitary collection system, such as that owned and operated by the City of Placentia, is restaurants or food service establishments (FSE). The City's FOG control ordinance defines an FSE as: "*Facilities defined in California Uniform Retail Food Service Establishments Law (CURFFL), California Health and Safety Code Section 113785, and any commercial entity discharging directly or indirectly to the City's sewer system, operating in a permanently constructed structure such as a room, building, or place, or portion thereof, maintained, used, or operated for the purpose of storing, preparing, serving, manufacturing, packaging, or otherwise handling food for sale to other entities, or for consumption by the public, its members or employees, and which has any process or device that uses or produces FOG, or grease vapors, steam, fumes, smoke or odors that are required to be removed by a Type I or Type II hood."* Under this

definition, not all establishments that provide food service qualify as an FSE. Likewise, not all restaurants are high producers of FOG. The FOG characterization study identifies those facilities that are producing FOG and those that are not. It also identifies what types of FOG reduction practices are currently in place and what types of FOG reduction practices need to be instituted.

Overview

The City of Placentia is primarily a residential community with a population of approximately 49,000 residents. The City operates and maintains a sanitary sewer collection system that serves approximately 85% of the City's population. The Yorba Linda Water District (YLWD) provides the remaining City residents sanitary sewer service (Appendix A illustrates the boundaries of the City and the YLWD). Most of the connections (approximately 10,067) to the City's sanitary collection system are from single-family residences. Additionally, there are approximately 306 multi-family (two or more residences per connection), approximately 535 commercial and industrial connections, and approximately 52 other miscellaneous sanitary connections (Appendix B illustrates the current land use within the City showing areas of residential, commercial and industrial development).

Almost every residence produces some level of FOG. Single-family residences tend to produce the lowest amount of FOG per sewer connection. The higher population densities of multi-family residential, particularly larger apartment or condominium complexes, produce higher levels of FOG per sewer connection than single-family residences. The higher volume of meal preparation and cleanup during the normal course of business of a typical FSE generates a greater amount of FOG per sewer connection. FSEs also are more likely to have a greater impact upon the collection system as they tend to be clustered in geographical areas allowing for higher concentrations of FOG to be released into concentrated sections of the sanitary collection system (Appendix C illustrates the locations of restaurants and FSEs within the City of Placentia). Not all restaurants or FSEs release FOG into the collection system. FSEs that have installed and properly maintained grease interceptors do not contribute FOG. Restaurants that char broil as opposed to frying foods and who utilize paper serving products that are disposed of instead of being washed tend to produce a minimal amount of FOG. The same is true for sandwich shops that only assemble sandwiches and heat but do not cook any of the products used in the sandwich preparation.

FOG is released into the sanitary collection system when fats, oils or grease are disposed of into sink or floor drains. Cooking oils or grease that is used in meal preparation or that is a byproduct of the cooking process should be rendered or properly disposed of. Food scraps that are disposed of into a garbage grinder instead of the trash and flushed down the drain contribute to the problem. Hot wash or rinse water that is used for the cleanup of pots, pans, utensils and dishes will carry FOG down the drain, as will using the sink to clean stove vent hood screens or filters and floor mats. FOG will remain fluid at temperatures above 140 degrees Fahrenheit and will flow on top of the water that is

flowing from the food preparation area through the site's lateral connection to the City's sanitary collection system. As it cools, FOG adheres to the insides of the pipes, both in the private lateral and the City's sanitary collection system, and hardens to form a sticky goo that over time will completely block the normal flow of sewage resulting in an SSO. As this FOG builds up in sewer pipes, the accumulated food particles attract insects and vermin and also cause odor problems and public health hazards. Adding hot water or detergents gives the illusion of "dissolving" grease. In fact, all it does is move the problem a little further downstream, since the grease is not dissolved but just temporarily suspended. FOG may also form grease balls. Grease balls can vary in size depending upon the amount of available FOG, velocity of flow and other conditions within the collection system. Grease balls will travel with the flow through the system until they adhere to the pipe wall or other obstructions within the pipeline causing or contributing to an SSO.

Sanitary Collection System Overview

The City's sanitary collection system is comprised of approximately 76 miles of gravity sewer lines. These lines range in size from 6 and 8-inches in diameter to 21-inch diameter lines. Most of the sanitary collection is constructed of vitrified clay pipe. This is a commonly used material for gravity sewers and when properly installed and maintained can provide useful service in excess of 100 years. OCSD has interceptor lines that collect sewage throughout the region for transport and eventual treatment at their Fountain Valley facilities. One of these lines enters the City from the City of Yorba Linda flowing from east to west along Orangethorpe Avenue to Rose Drive where it turns south into the City of Anaheim. Flow from the southeastern area of the City flows into this interceptor. OCSD operates two interceptors on Palm Drive. One extends from Valencia Avenue and extends west along Palm Drive to roughly Placentia Avenue where it turns south into the City of Fullerton. An OCSD interceptor from the City of Brea extends south along Kraemer Boulevard and connects to the OCSD line at the intersection of Palm Avenue and Kraemer Boulevard. A second OCSD interceptor flows west to east along Palm Drive from the City of Fullerton east to Carbon Creek where it turns south along the creek past Chapman Avenue into the City of Anaheim. City flows north of Palm Drive flow into these interceptors, as do the flows generated around Carbon Creek including the area south of Chapman Avenue and west to San Clemente Lane. At the point where this interceptor turns south down Carbon Creek, a second OCSD interceptor flowing east to west on Palm Drive connects to it. This connecting interceptor flows south on Rose Drive before turning west on Palm Drive and collects flows from a portion of the City that is serviced by the Yorba Linda Water District. Flows generated south of Palm Drive and west of the Alta Vista Country Club area connect to the OCSD system in the City of Anaheim at Kraemer Boulevard and on Melrose Street. Other flows from the southwestern area of the City connect to the OCSD interceptor that follows State College Boulevard in the City of Fullerton. The City also collects flows from the City of Brea on both Valencia Avenue (1 MGD by agreement) and Cebu Court (36,000 gallons per day by agreement) and from the City of Fullerton on Bradford Avenue near Quartz Lane. Flows from the Yorba Linda Water District enter

the City's sanitary collection system on Yorba Linda Boulevard near Valencia Avenue. These flows pass through Placentia's sanitary collection system before flowing into the OCSD system. The OCSD interceptors and connection points with the City's sanitary collection system are illustrated in Appendix D.

Hot Spots

As in other collection systems within the Santa Ana basin, FOG is the primary source of line blockages within the Placentia sanitary collection system. Within the City, FOG is either the cause or the major contributing factor to over 90% of all line blockages and SSOs. These blockages tend to occur at specific locations referred to as hot spots. Several factors can contribute to the creation of a hot spot. Poor pipeline design, improper installation, insufficient pipe capacity, changes in pipe elevation, inadequate pipe cleaning or maintenance, pipe defects (i.e. sags, offsets, cracks, breaks, etc.), user contributions (i.e. FOG, debris, etc.), tree roots, and other factors can all contribute to the creation of a hot spot. Historically, the City has established a hot spot list of areas where blockages have occurred or tend to occur. Appendix E lists the City's current hot spots and their location.

To properly characterize FOG and its source within the City's collection system, these hot spot areas have been carefully analyzed. To complete this analysis, several factors must be considered.

- The condition of the City's collections system and any structural deficiencies that are causing or contributing to hot spots. This would include ensuring that the City's collection system has adequate capacity for its current and projected land use.
- The types of discharges that are being made into the hot spots. Although there is not a recognized standard for allowable FOG discharge, many studies indicate that FOG levels above 100 mg/l are unacceptable.
- The business practices of the FSEs that discharge to hot spots.
- Are FSEs that discharge to a hot spot utilizing grease interceptors, grease traps or other FOG abatement technologies?
- Mapping the location of the FSEs in relation to hot spots. Determining what FSEs are directly contributing to a hot spot or are connected within 1,000 feet (approximately two manholes) upstream of a known hot spot.
- For hot spots where roots are also a contributing factor, determine what impact trees are having on the main lines and the connecting service laterals.
- Historical cleaning records along with information provided by City crews on the type and amount of debris removed from each hot spot is reviewed.

Based upon these and other considerations, each hot spot is characterized as to its severity of FOG accumulation and cleaning requirements. Currently, the City cleans all of its hot spots quarterly. In an effort to improve its maintenance program, the City has

changed its sewer line cleaning requirements. Line cleaning contractors must use, in addition to line flushing equipment, vacuum or other suitable equipment to remove all FOG and other debris from the sewer line during the line cleaning operation. This, along with a change in line cleaning contractors, has had a positive effect on keeping the City's hot spots clean. The program was first initiated in the summer of 2004. At that time, the contractor reported encountering and removing heavy amounts of FOG from the various hot spots. At the next scheduled cleaning performed in the late fall of 2004, the contractor reported only light grease encountered but did utilize a root saw at several of the hot spots. Copies of recent hot spot cleaning reports can be found in Appendix F. The City's maintenance program also requires periodic CCTV inspection to ensure the collection system lines are being properly cleaned.

Characterization Development

To identify potential sources of FOG contribution to the City's sanitary collection system, an inventory of suspected FOG generators was created. Two sources of data were used to create this inventory. A listing of food manufacturers and providers was obtained from the Orange County Health Care Agency (OCHCA). This list contained the names and addresses of all food related establishments that required multiple OCHCA inspections annually. A second list was derived from the City's business license files. These two lists were compared with duplicate entries and establishments that only sold prepackaged food products being deleted. The inventory is being temporarily maintained in an Excel spreadsheet (Appendix G). Addresses were checked and physical inspections were conducted to eliminate any FSEs that did not discharge into the City's sanitary collection system.

Inspections were initiated in the fall of 2004 in conjunction with the requirement for the City to inspect all restaurants as part of its NPDES stormwater program. These inspections were broadened to gather data relative to FOG pretreatment and FOG reduction practices employed by each establishment. Data gathered from these inspections is being temporarily maintained in an Excel spreadsheet (Appendix H).

Hot spots were characterized and overlaid upon the City's existing sewer atlas maps. Manhole numbers were used to define the area of the hot spot. Information relative to each hot spot, including street location, manhole numbers, length of pipe, pipe materials, direction of flow, cleaning dates and comments, are being temporarily maintained in an Excel spreadsheet (Appendix H). Additionally, FSEs that could potentially contribute FOG to a hot spot area are listed along with inspection dates and any FOG reduction practices that the FSE employs.

The City's FOG Control Program went into effect on December 30, 2004. Prior to this, the FOG Characterization Study was initiated, hot spots were analyzed, and potential sources of FOG contribution were identified. During the first quarter of 2005, each potential FSE that contributes to the City's sanitary collection system must apply for a FOG Wastewater Discharge Permit. The current inventory of potential FSEs (Appendix

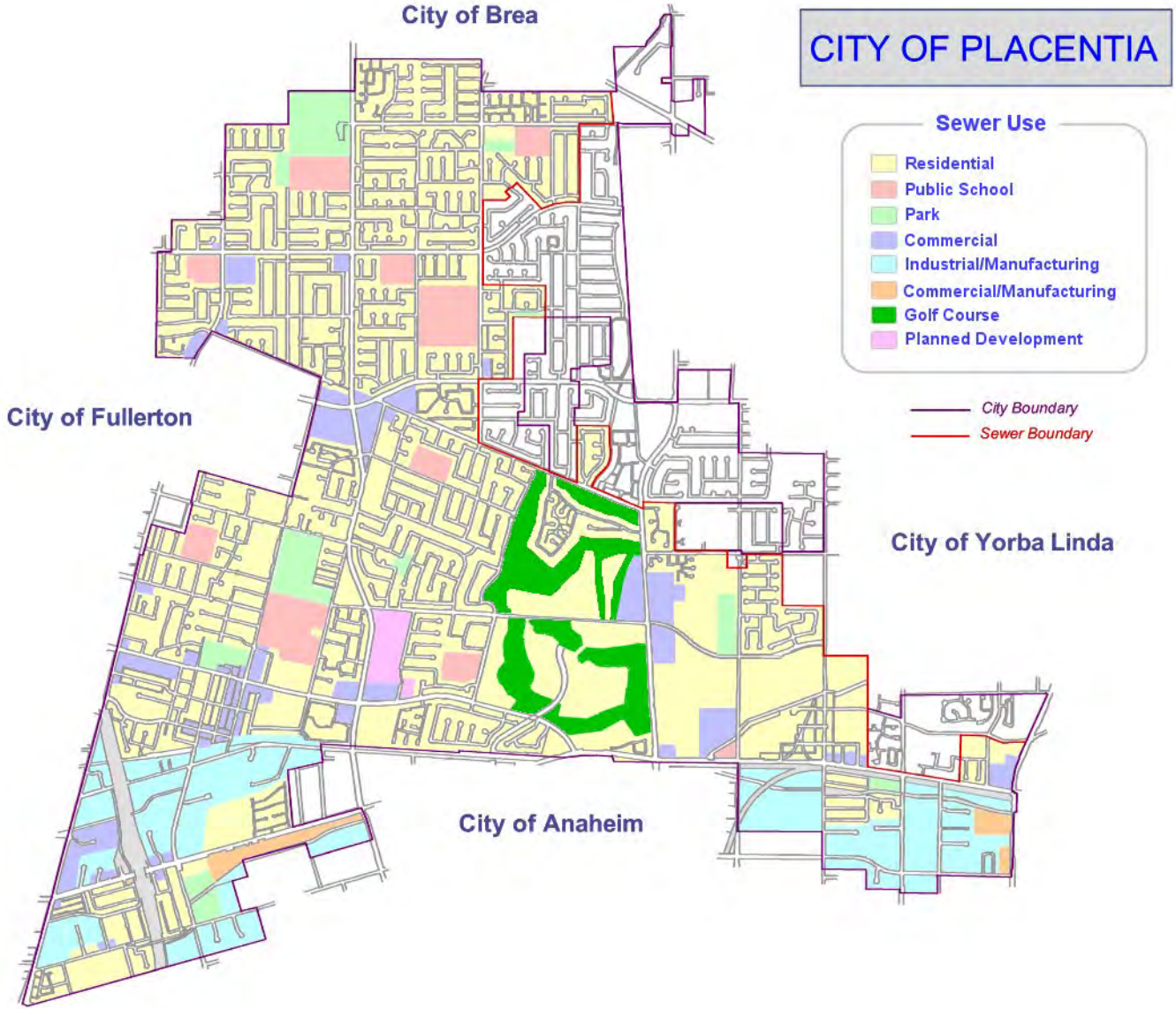
G) will be updated based upon the responses received and physical on site inspections. The FOG Control Program allows for an 18-month period for the City to further refine who its FSEs are and what types of FOG reduction equipment and practices will be required by each FSE. To assist in this determination, each site will be physically inspected with the results becoming part of the ongoing FOG Characterization Study. CCTV will also be utilized, paying particular attention to the lateral connections of FSEs, as part of the City's routine sanitary collection system maintenance. The FOG Characterization Study will continue to be updated and maintained and will be used as an assessment tool to determine the effectiveness of the City's FOG Control Program.

Appendix A

City and YLWD collection system boundaries

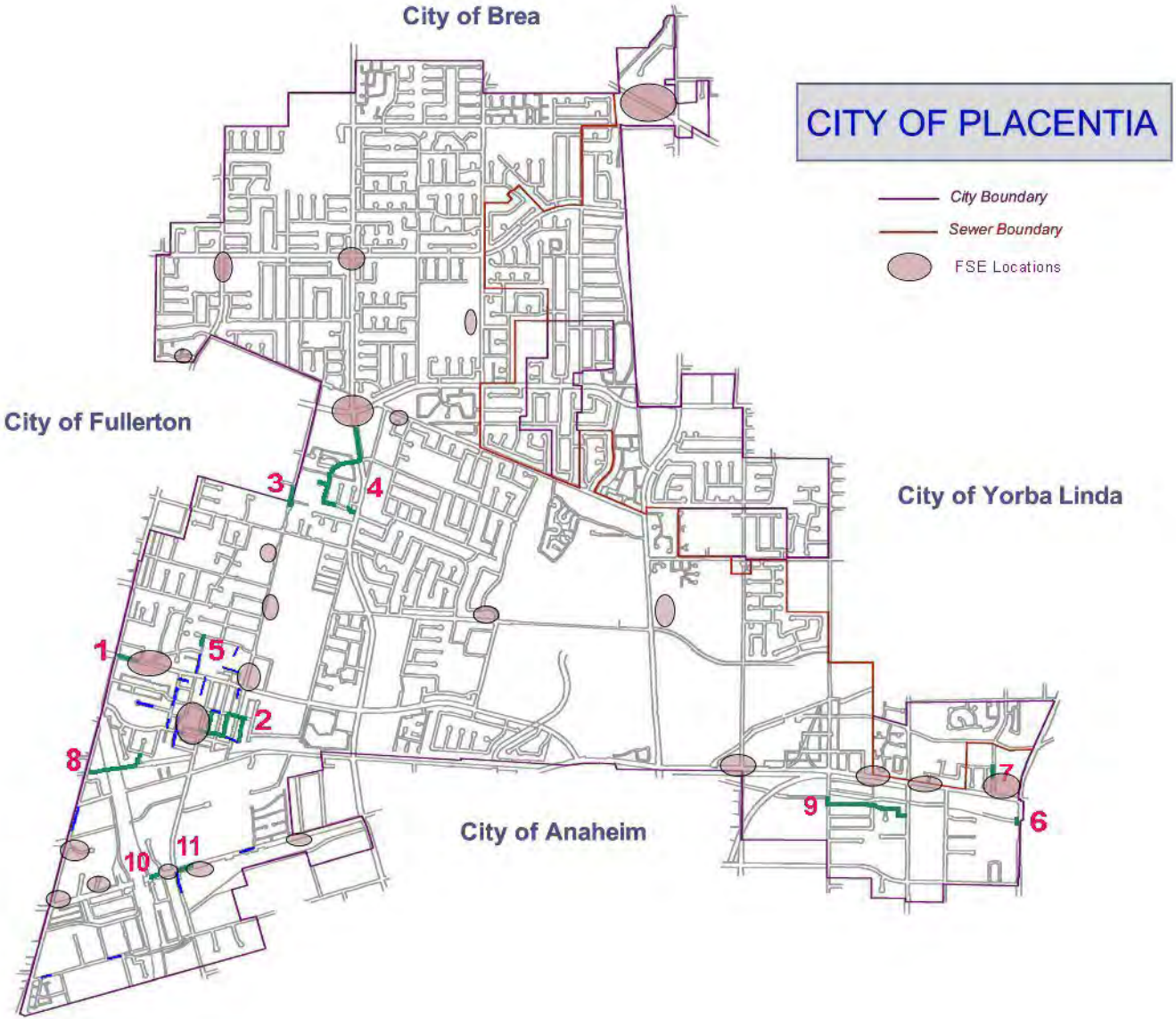
Appendix B

Current land use map


City of Brea
CITY OF PLACENTIA
Sewer Use
Residential
Public School
Park
Commercial
Industrial/Manufacturing
Commercial/Manufacturing
Golf Course
Planned Development
City Boundary
Sewer Boundary
City of Fullerton
City of Yorba Linda
City of Anaheim

Appendix C

Location of restaurants and FSEs


City of Brea
CITY OF PLACENTIA
City Boundary
Sewer Boundary
FSE Locations
City of Fullerton
City of Yorba Linda
City of Anaheim
1
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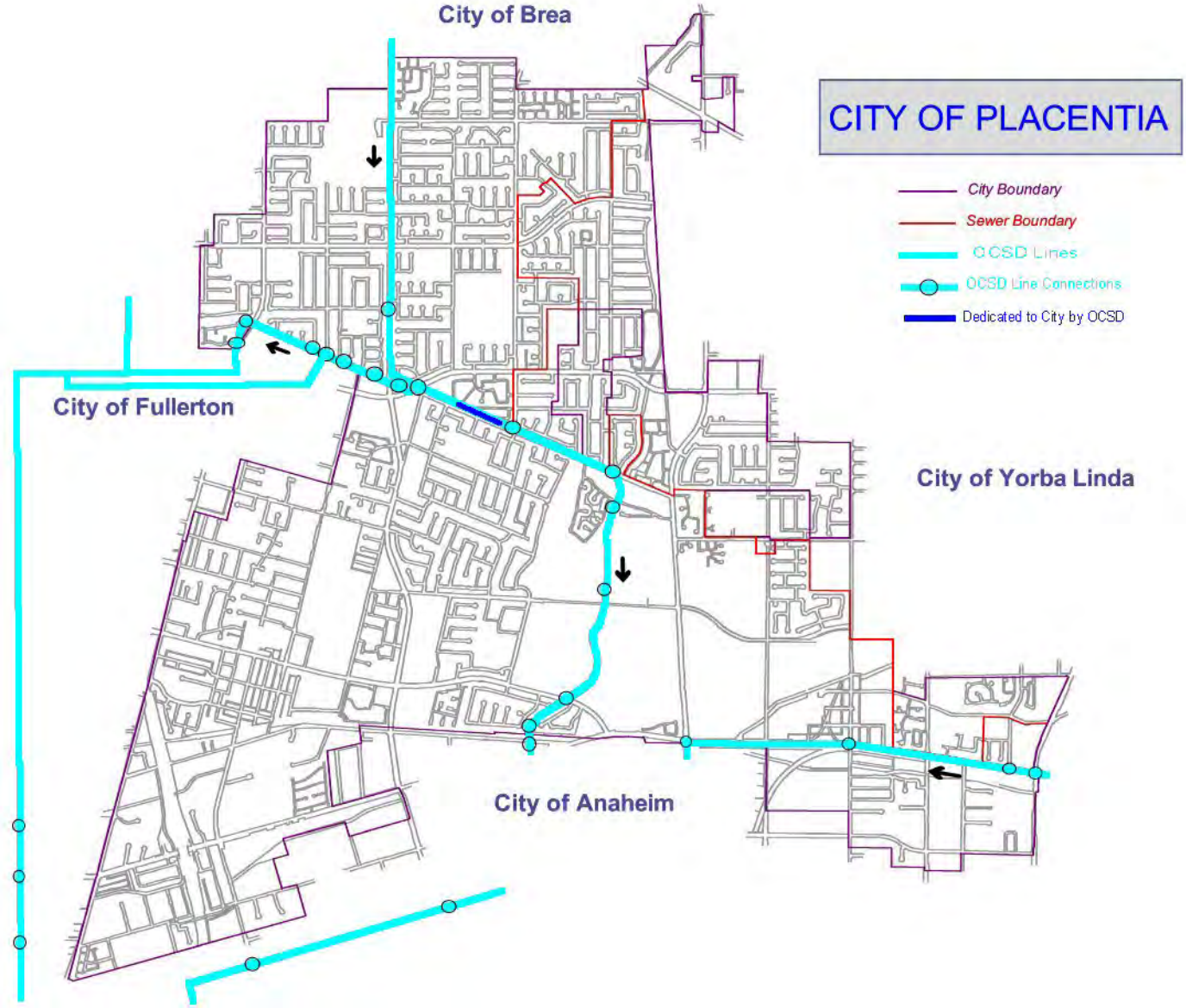
Appendix D

OCSD connections with Placentia's collection system


City of Brea
CITY OF PLACENTIA
City Boundary
Sewer Boundary
OCSD Lines
OCSD Line Connections
Dedicated to City by OCSD
City of Fullerton
City of Yorba Linda
City of Anaheim

Appendix E

Hot spot list and locations

Sanitary Sewer Hot Spot List

Map No.	Street or Easement	From Manhole #	To Manhole #	Footage	Comments
19	Kraemer Blvd.	4187	4188	225	
19	Kraemer Blvd	4186	4187	225	
19	Kraemer Blvd	4179	4186	75	
19	Kraemer Blvd	4178	4179	150	
19	Sheffield	4176	4178	150	
18	Sheffield	3940	4176	250	
18	Sheffield	3939	3940	165	
18	Sheffield	3932	3939	150	
18	Sheffield	3931	3932	45	
18	Sheffield	3229	3931	175	
18	Essex	3229	3930	200	
18	Sheffield	3928	3229	350	
18	Newcastle	3925	3928	260	
18	Newcastle	4103	3925	255	
19	Easement	4102	4103	165	
18	N Bradford	3914	0002	300	Heavy Grease
18	N Bradford	0002	0001	310	
31	Alley	6411	6410	500	
31	Center	6462	6411	165	Medium Grease
31	Center	6424	6462	165	Medium Grease
31	Alley	6425	6426	300	
31	Alley	6424	6425	263	
31	Alley	6423	6424	450	Medium Grease
31	Alley	6423	6260	125	Medium Grease
30	Alley	6258	6260	340	Medium Grease
30	Alley	6258	6259	210	Medium Grease
30	Alley	6257	6258	235	Medium Grease
30	Alley	6254	6257	255	Medium Grease
39	Vincente	4112	4300	130	Lite Grease
39	Vincente	4111	4112	175	Lite Grease
39	Vincente	4110	4111	218	Lite Grease
39	Vincente	4109	4110	273	Lite Grease
39	Vincente	4108	4109	305	Lite Grease
39	Vincente	4107	4108	314	Lite Grease
40	Vincente	4106	4107	296	Lite Grease
40	Van Buren	4105	4106	65	Lite Grease
40	Van Buren	4104	4105	124	Heavy Sludge
30	Monterey Cir.	6210	6211	150	Heavy Grease
30	Alley	6203	6210	175	Heavy Grease

Map No.	Street or Easement	From Manhole #	To Manhole #	Footage	Comments
30	Alley	6202	6203	120	Heavy Grease
30	Easement	6201	6202	310	Heavy Grease
30	Easement	6200	6201	100	Heavy Grease
29	Easement	6201	6200	310	Heavy Grease
37	Highland	No#	4203	540	Medium Grease
38	Lakeview Siphon	4303	4304	100	Heavy Sludge
43	Orangethorpe	2114	2110	150	Medium Grease
43	Orangethorpe	8736	8735		Heavy Grease
28	Walnut Easement	5966	5965	300	Roots & Medium Grease
30	Chapman	5912	6280	500	Grease
30	Placentia	6275	6288	450	Grease

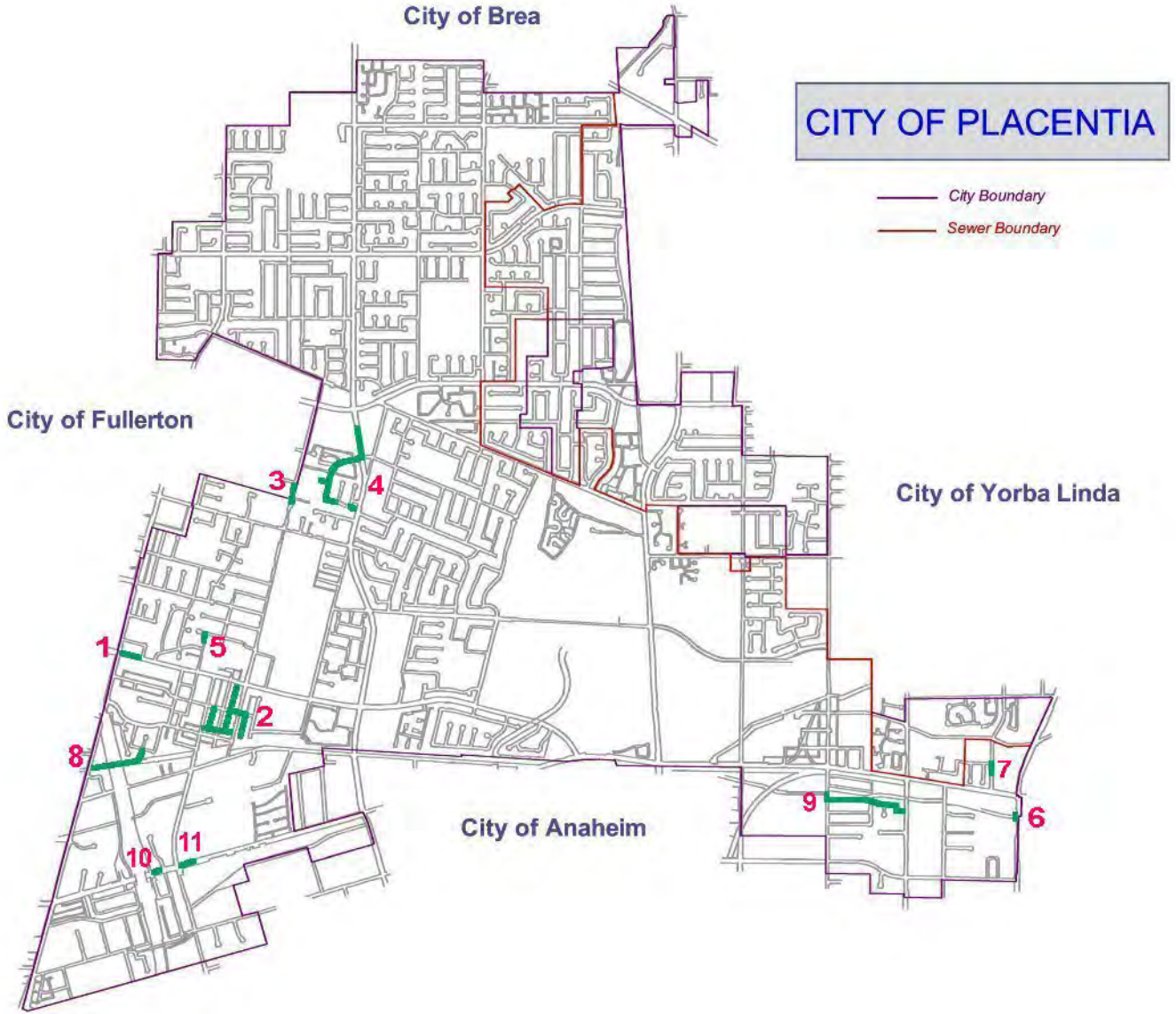
Master Hot Spot Notes

(Priority based upon severity)

Hot Spot #1	Page 30. Manholes 5912–6280. This is a new hot spot on Chapman. This segment is primarily residential with some restaurants in the general vicinity. Line is checked weekly as it tends to backup. Line shows evidence of heavy grease, although Walker Sewer Service stated that they hit something the last time they jetted the line. What they hit is unknown.
Hot Spot #2	Pages 30 & 31. Manholes 6254, 6257, 6259, 6258, 6260, 6424, 6462, 6410. This is the Old Town section of Placentia with the oldest lines and several (approximately 10) FSEs. Lines are cleaned (jetted) quarterly.
Hot Spot #3	Page 18. Manholes 3914 upstream to Quartz Lane. This line is actually within the city of Fullerton but is somehow the responsibility of Placentia. There are restaurants in the area and the problem is grease.
Hot Spot #4	Pages 18 & 19. Manholes 4188, 4187, 4186, 4179,4178, 4176, 3940, 3939, 3932, 3931, 3930, 3229, 3928, 3925, 4103, 4102. Several FSEs are located upstream of manhole 4188 with grease being the primary problem. This line is located on Kraemer Blvd. but leaves Kraemer to collect sewage in an adjacent tract before it re-enters Kraemer. Backups are occurring within that tract. One possibility is to extent the Kraemer line making it contiguous on Kraemer. The City has an enzyme injection program on this segment in lieu of increased cleaning and it has shown some success. Injection is at manholes 4188 & 3940. Segment 4103-4102 , where the line re-enters Kraemer is undersized.
Hot Spot #5	Page 28. Manholes 5966-5965. This segment is located within a residential area with grease and roots the primary problem. This is another area where the collection system leaves a major artery, Bradford Avenue, to collect wastewater from a residential area. Problems here tend to be related to problems at Hot Spot #3 upstream on Bradford. Additionally several of the line segments in this area are in easements that go down the centerline of several residential lots. Very few problems have resulted here since quarterly cleaning was initiated here and at Hot Spot #3.
Hot Spot #6	Page 38. Manholes 7805-7804. This is a siphon under the flood control channel. Primary problem is industrial debris. Very few problems since quarterly cleaning was initiated.

The remaining Hot Spots, although numbered, are not listed in any priority as very few problems have occurred since being placed on the Hot Spot list for additional cleaning or land use in the area has changed.

Hot Spot #7	Page 37. Manholes 4203 downstream. This area is primarily residential with single family homes and condominiums. There have been some private property spill in the strip mall containing the Jack-In-The-Box and the Lakeview Café.
Hot Spot #8	Page 30 & 29. Manholes 6211, 6210, 6203, 6201, 6200, 6102. This 12 inch line drains all of Old Town including areas north of Chapman and east of Walnut. Manhole 6201 was inaccessible due to activities of the railroad. Once uncovered, a round plywood disc and some 2X4s were found partially blocking the channel. There is also a siphon (6201-6200) under the flood control channel with an additional siphon between 6210 & 6211.
Hot Spot #9	Pages 40 & 39. Manholes 8214 (4104), 8213 (4105), 8212 (4106), 8014 (4107), 8013 (4108), 8011 (4109), 8009 (4110), 8008 (4111), 8007 (4112), 8006 (4300). This segment has a siphon between 8214 (4104) & 8213 (4105) with the rest of the line being relatively flat. The primary problem was with motor oil, eggshells, grease and sand. Very few problems since quarterly cleaning was initiated.
Hot Spot #10	Page 43. Manholes 8702-8703. This is a siphon under the flood control channel. Area has not had a problem since a large piece of asphalt was removed after a paving operation.
Hot Spot #11	Page 43. Manholes 8735-8736. Primary problem has been grease. There are several upstream restaurants and a large apartment complex that has been converted into senior living quarters. There have been no problems since the conversion.


City of Brea
CITY OF PLACENTIA
City Boundary
Sewer Boundary
City of Fullerton
City of Yorba Linda
City of Anaheim
1
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3
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17
19
CITY OF FULLERTON
CITY OF PLACENTIA
QUARTZ LN
TOPAZ LN
PENBROKE
YORK DRIVE
ESSEX
NEWCASTLE AVENUE
PAGEANTRY
COVENTRY CIRCLE
NORTHGATE WAY
1680 LANE
3101
3147
3380
3103
3494
3148
3150
3943
3942
3941
3940
3939
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3932
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3922
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3915
3914
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3911
3910
3907
3906
3903
3902
3901
3900
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1403
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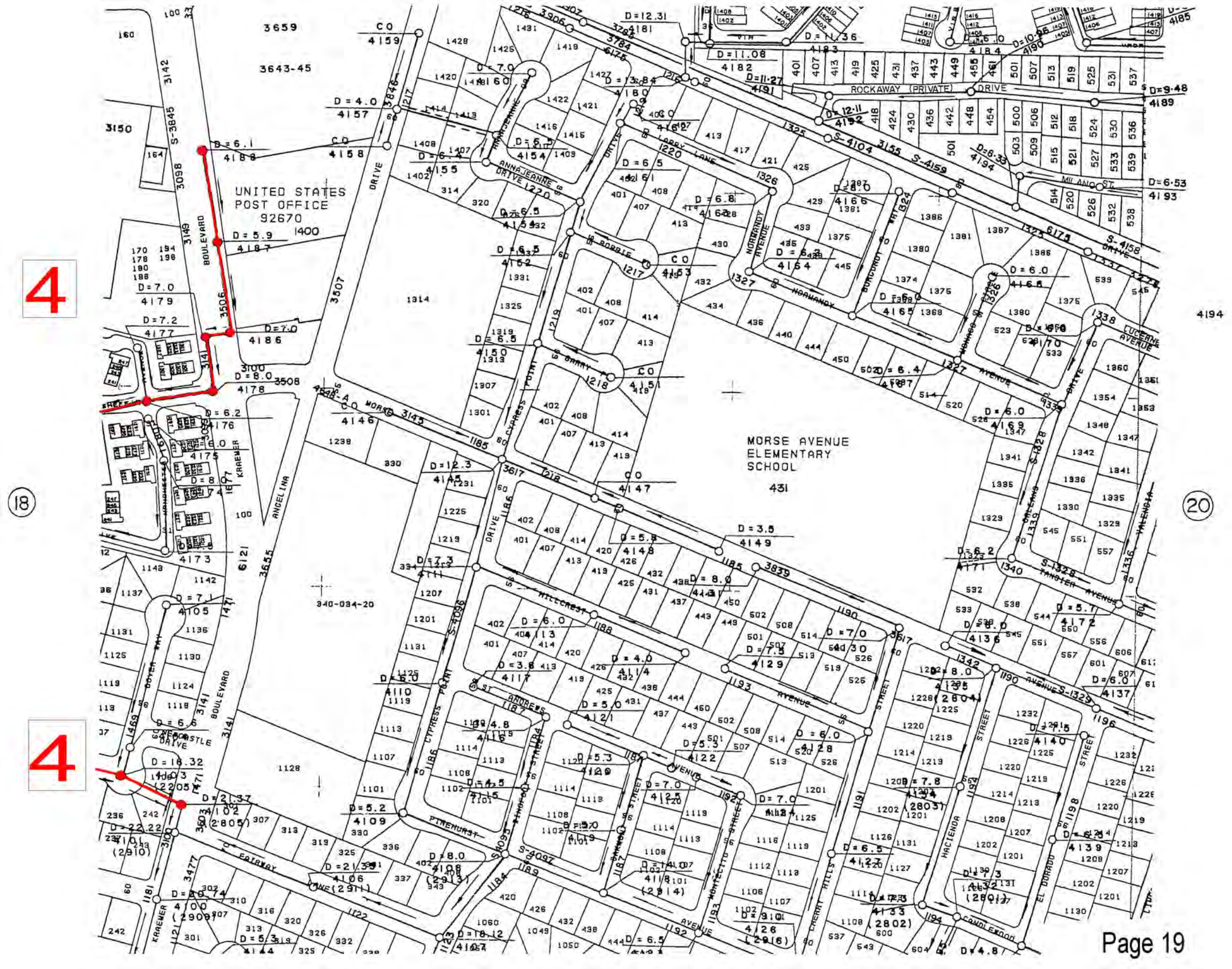
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4
(18)
(20)
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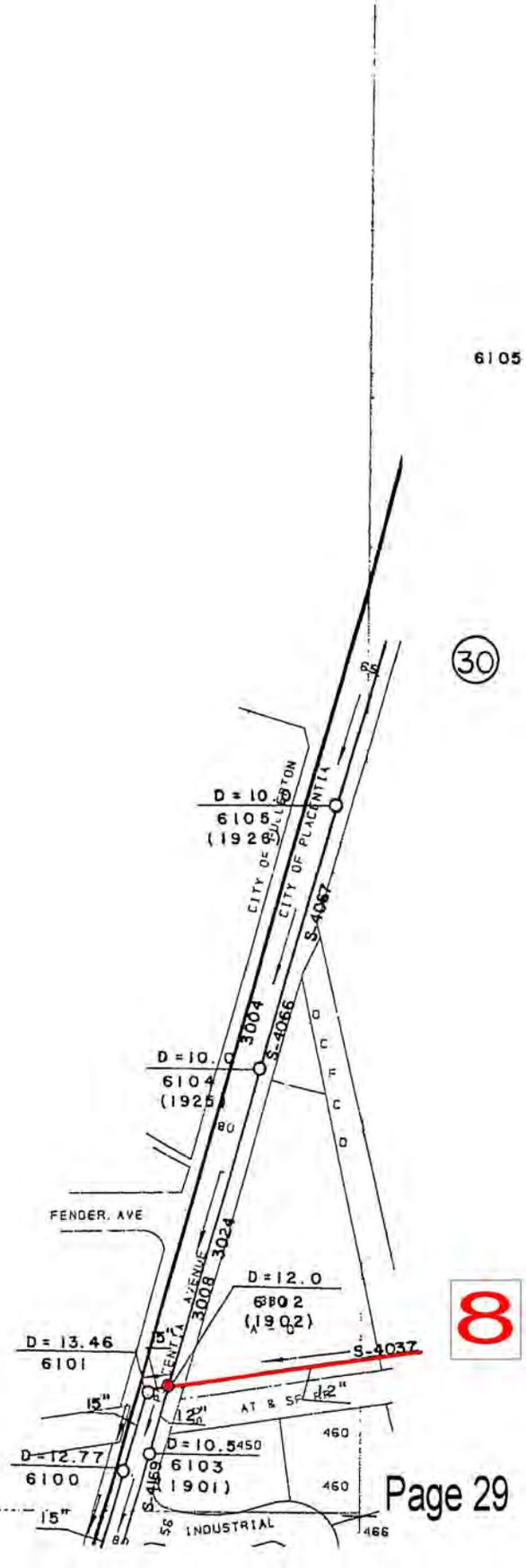
ROCKAWAY (PRIVATE) DRIVE
MILLANO ST.
BOULEVARD
DRIVE
AVENUE
STREET
LANE
340-034-20

RUBY DRIVE ELEMENTARY SCHOOL
RUBY DR
NUTWOOD AVE
PRIMROSE AVE
SUNSET
HARMONY LANE
ORCHID CIRCLE
WILSON CIRCLE
ORCHID DRIVE
7.5' ESMT
CITY OF FULLERTON
CITY OF PLACENTIA
5979
27
5
Page 28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D = 10
6105
(1928)
CITY OF PLACENTIA
CITY OF FULLERTON
S-4067
3004
S-4066
D = 10.0
6104
(1925)
80
3008
3024
FENDER AVE
D = 12.0
6102
(1902)
D = 13.46
6101
15"
S-4037
12"
AT & SF
12"
460
D = 10.5450
6103
(1901)
D = 12.77
6100
S-4169
460
15"
56
INDUSTRIAL
466
8

1

2

8

29

31

5912

CHAPMAN

CENTER

OLIVE STREET

EDISON 60 STREET

RAMONA STREET

BAKER STREET

PATRIOT STREET

AVENUE

ALLEY

CITY OF FULLERTON

CITY OF PLACENTIA

SANTA FE

A T & S F R R

BRAEMER MEMORIAL PARK

SANTA FE PARK

MEL ROSE

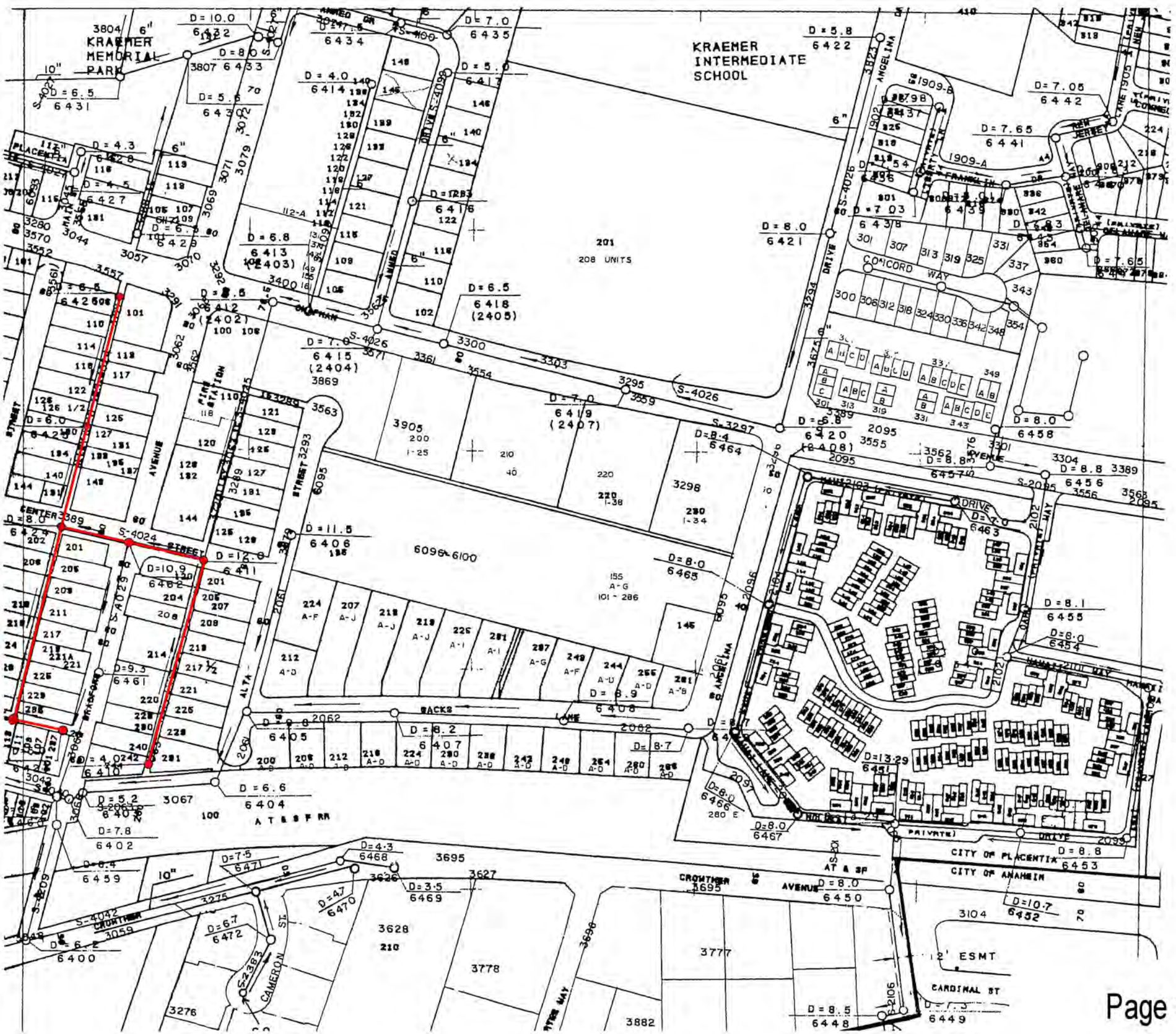
MAIN

12" ESMT

3682 THRU 3684

75-291-35

Page 30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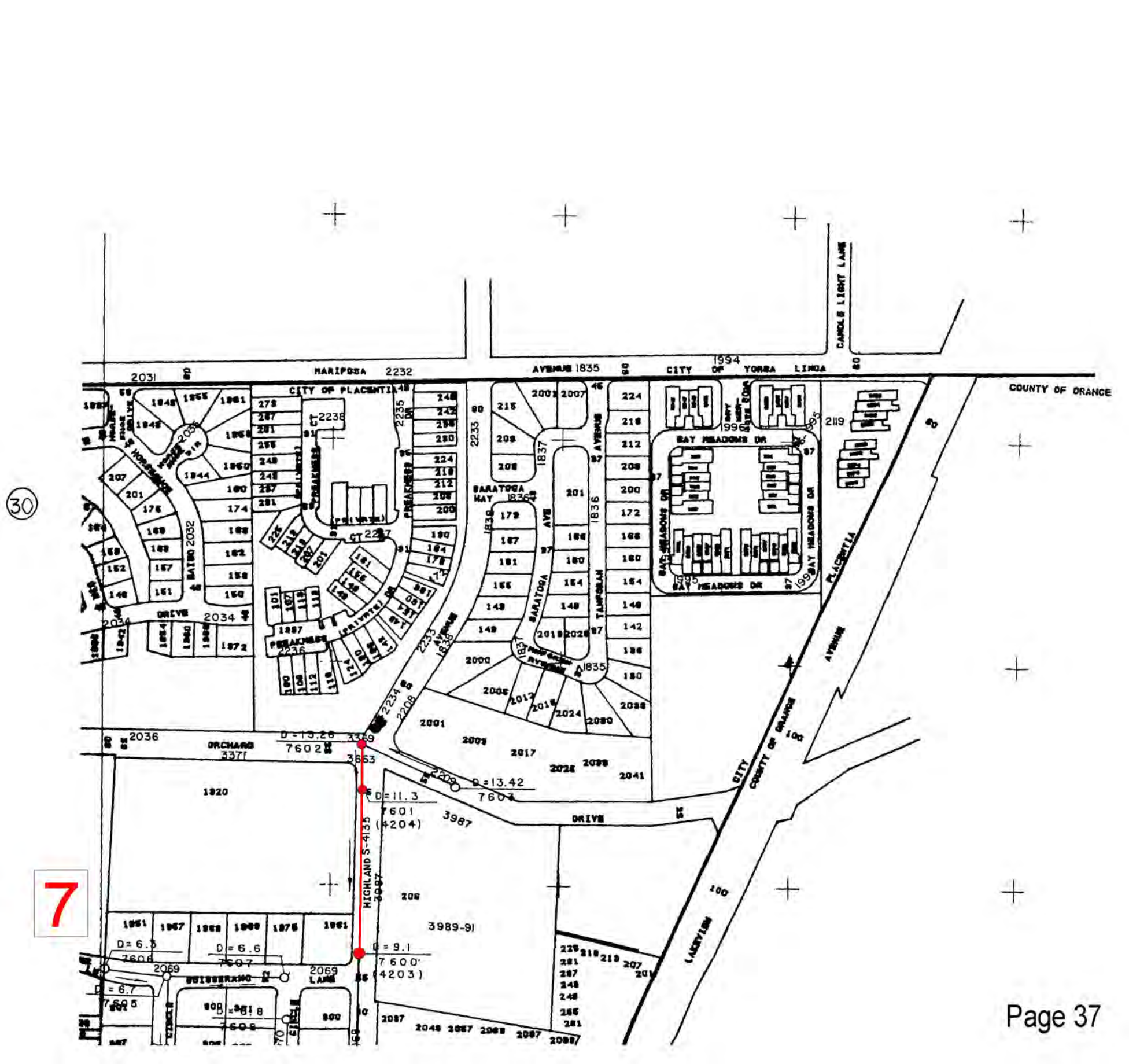
KRAEMER INTERMEDIATE SCHOOL
201
208 UNITS
CONCORD WAY
DRIVE
AVENUE
STREET
LANE
BACKS
CROWTHER AVENUE
CAMERON ST.
CARDINAL ST
CITY OF PLACENTIA
CITY OF ANAHEIM
2' ESMT
30
32
2
6473
Page 31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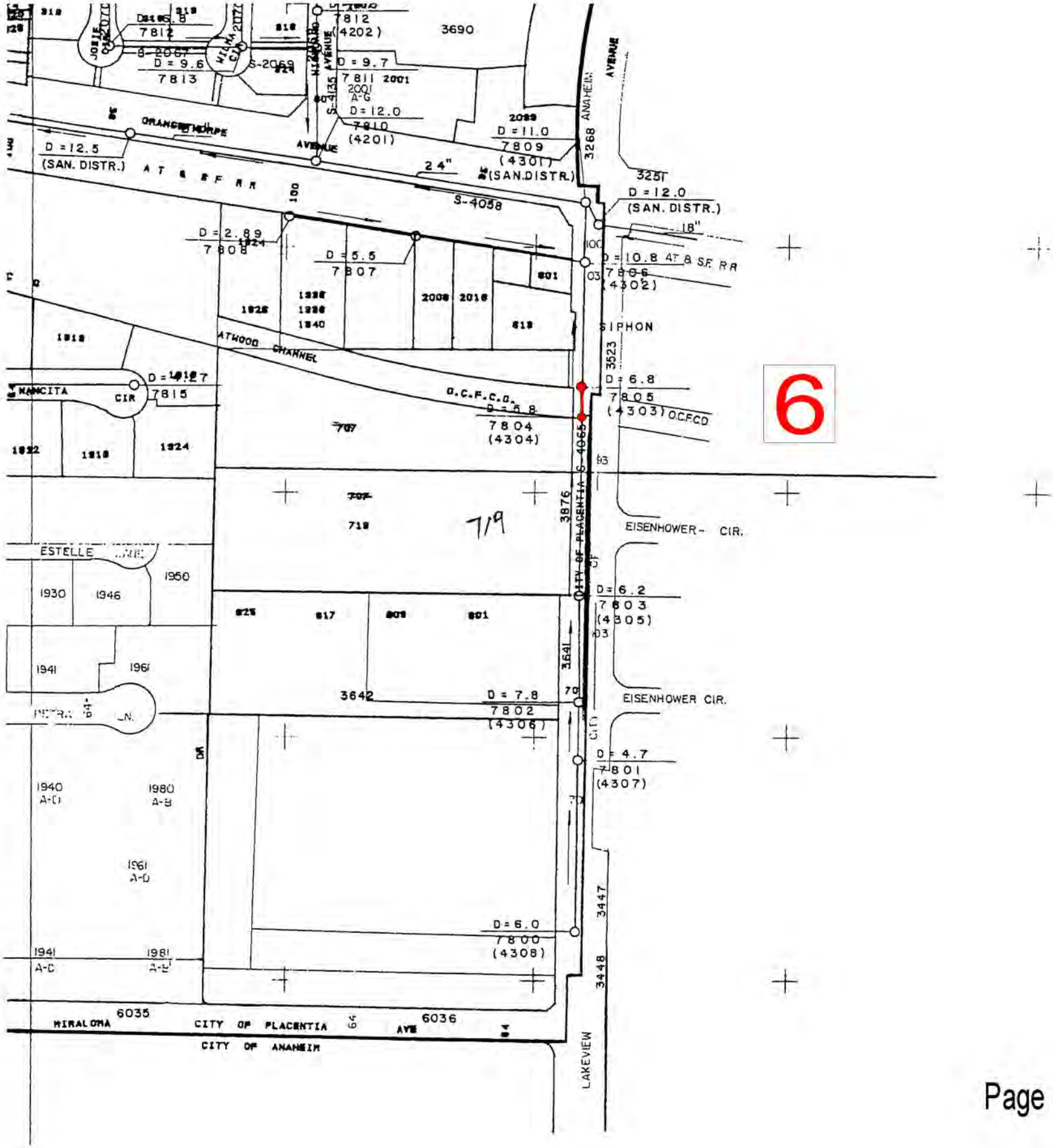
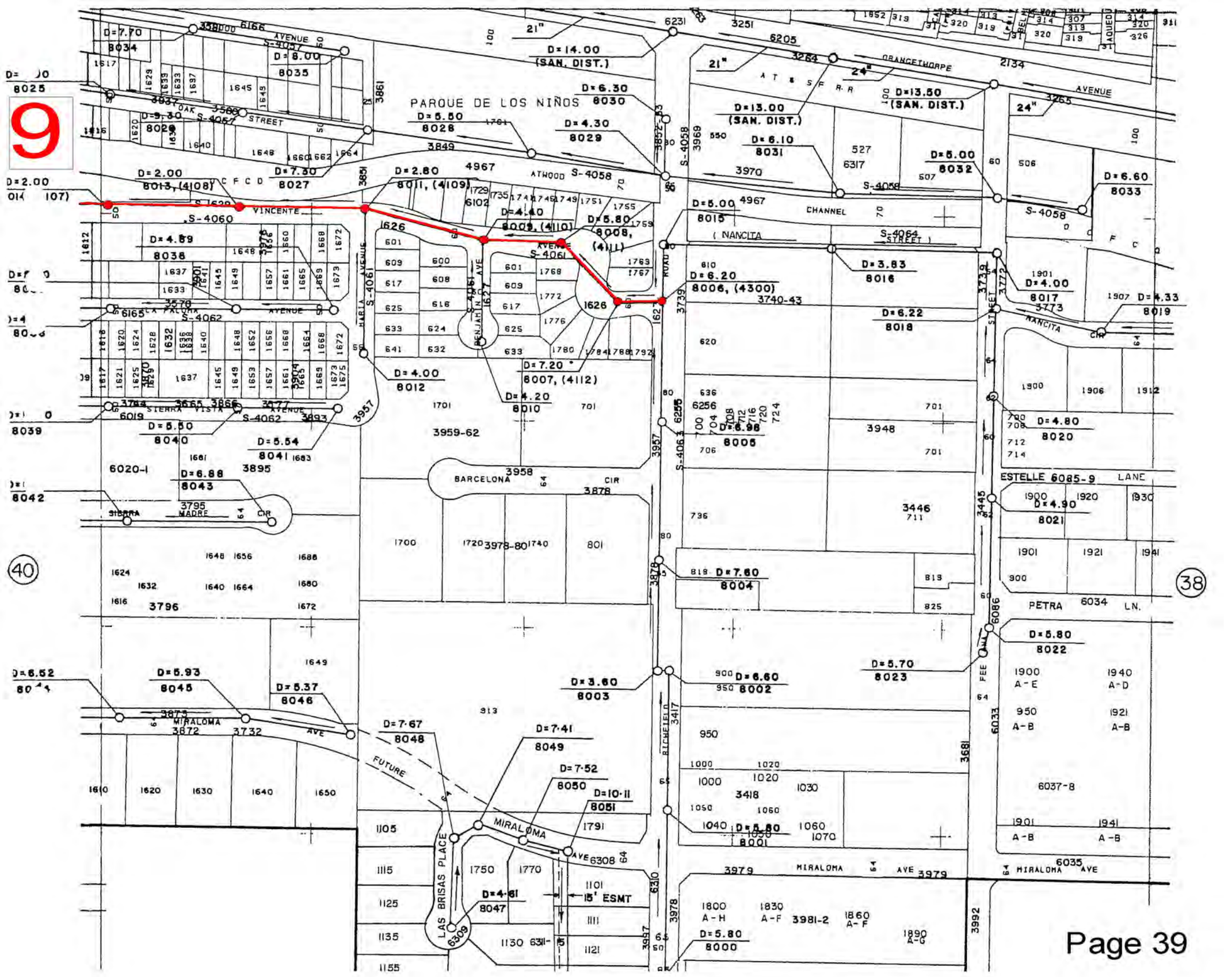
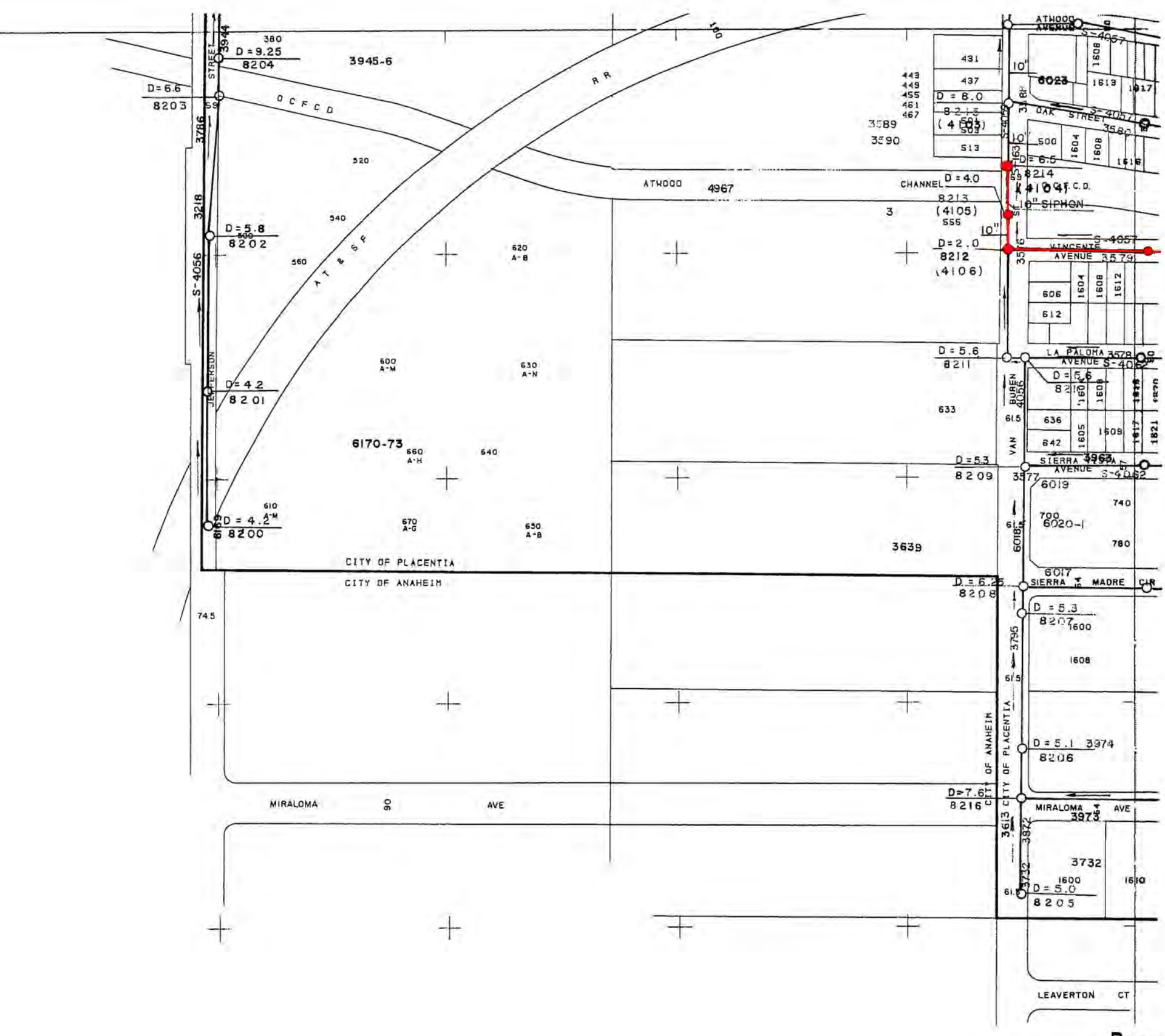
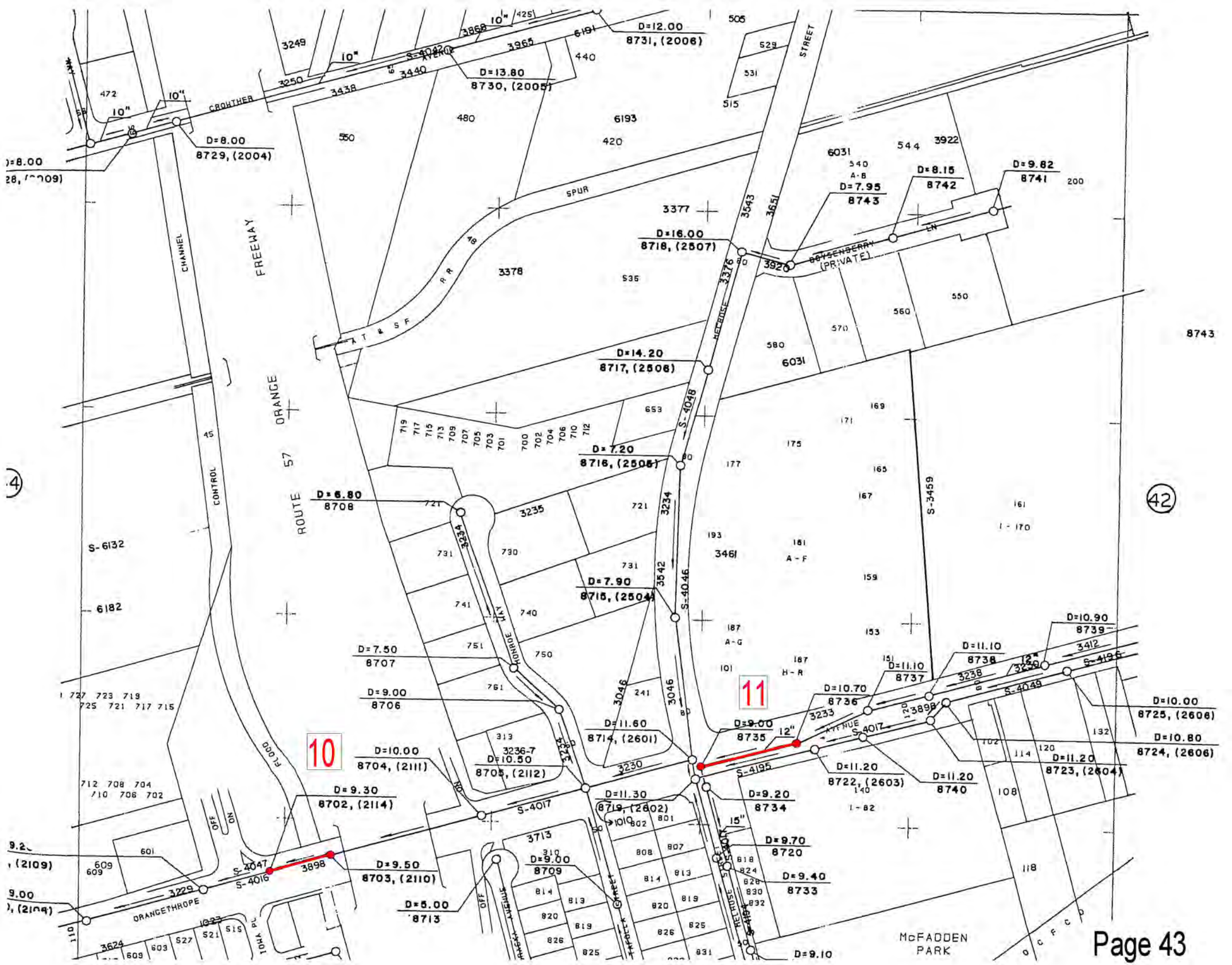
CITY OF PLACENTIA
CITY OF YORBA LINDA
COUNTY OF ORANGE
CAROLS LIGHT LANE
BAY MEADOWS DR
SARATOGA AVE
ORCHARD DRIVE
HIGHLAND S-4135
PLACENTIA AVENUE
CITY COUNTY OF ORANGE
LAURELWOOD
30
7


6
39
719
ESTELLE
EISENHOWER CIR.
EISENHOWER- CIR.
ATWOOD CHANNEL
SIPHON
O.C.F.C.D.
CITY OF PLACENTIA
CITY OF ANAHEIM
MIRALOMA
LAKEVIEW
ANAHEIM AVENUE
ORANGETHORPE AVENUE
A T & S F R R
3690
3268
3251
3523
3876
3641
3642
3447
3448
6035
6036
7812 (4202)
D = 9.6 7813
D = 9.7 7811 2001
D = 12.0 7810 (4201)
D = 12.5 (SAN. DISTR.)
D = 11.0 7809 (4301) (SAN.DISTR.)
D = 12.0 (SAN. DISTR.)
D = 10.8 AT & S.F. R.R. 7806 (4302)
D = 2.89 7808
D = 5.5 7807
D = 6.8 7805 (4303) O.C.F.C.D.
D = 6.8 7804 (4304)
D = 6.2 7803 (4305)
D = 7.8 7802 (4306)
D = 4.7 7801 (4307)
D = 6.0 7800 (4308)
S-4058
S-4065
S-4135
S-2067
S-2069
24"
18"
1940 A-C
1980 A-B
1941 A-C
1981 A-B
1961 A-D


9
PARQUE DE LOS NIÑOS
VINCENTE
ATWOOD
CHANNEL
NANCITA
BARCELONA
CIR
ESTELLE 6085-9 LANE
PETRA 6034 LN.
MIRALOMA AVE
FUTURE
LAS BRISAS PLACE
15' ESMT
ORANGETHORPE AVENUE
SIERRA MADRE CIR
SIERRA VISTA AVENUE
LA PALOMA AVENUE
OAK STREET
BENJAMIN CT
HARIA AVENUE
RICHFIELD
FEE
A T & S F R.R
A C F C D
(SAN. DIST.)
(NANCITA STREET)
40
38
Page 39


9
8216
39
Page 40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8729, (2004)
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D=7.20
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8735
D=11.20
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8739
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FREEWAY
ORANGE
ROUTE 57
CHANNEL
CONTROL
FLOOD
CROWTHER
AVENUE
SPUR
A T & S F R R
HERITAGE
HONROE
STREET
LANE
AVENUE
ORANGETHROPE
BONSENBERRY
(PRIVATE)
McFADDEN
PARK
10
11
42
S-4048
S-4017
S-4195
S-4049
S-4047
S-4016
S-3459
S-6132
6182
6193
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3440
3868
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3651
3376
3820
3542
3234
3235
3046
3236-7
3238
3233
3230
3229
3412
3922
Page 43

Appendix F

Past hot spot cleaning reports from 2004

Appendix G

Restaurant and FSE inventory

Appendix H

Hot spot, inspection and FSE data

SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix L

Records Retention

RE: Sanitary Collection System Records Retention Guidelines

As a requirement of the State Water Resources Control Boards Order Number 2006-0003-DWQ and the 2013 Revised Monitoring and Reporting (MRP) Order No. WQ 2013-0058-EXEC, records pertaining to SSOs and the operation and maintenance of the City's sanitary collection system must be retained. The following table illustrates the minimum time periods that specific records must be retained to be compliant with the Order. Additional records relative to the City's operation and maintenance activities for the sanitary collection system must also be retained consistent with the City's current record retention policy.

Report Activity	Retention Time
Monitoring results from collected samples	5 years
SSO reports	5 years
SSO complaints	5 years
Work orders related to an SSO	5 years
Documentation of SSMP performance and implementation measures	5 years
SSMP Audits	5 years

SEWER SYSTEM MANAGEMENT PLAN
FOR
CITY OF PLACENTIA

Appendix M

SSMP Tracker

City of Placentia CIWQS

Year	Spill Category			Totals	Volume by Spill Category			Volume Totals	Spills by Cause and Category			Spills by Category and EMA Location*			EMA SSO Totals	Additional Notes:
	1	2	3		1	2	3		1	2	3	1	2	3		
2010	0	0	1	**1**	-	-	650	**650**	0	0	Debris-General	0	0	1	1	One Debris-caused Category 3 spill in a EMA at Monroe Way near MH 8708
2011	3	0	0	**3**	1,375	-	-	**1,375**	Grease deposition (FOG); Pipe Damage from Contractor; Root Intrusion	0	0	0	0	1	1	800 gal FOG-caused. 500 gal pipe contractor-caused in EMA on rowther near MH 8731. 75 gal Root intrusion-caused.
2012	1	0	0	**1**	9,500	-	-	**9,500**	Grease deposition (FOG)	0	0	1	0	0	1	One FOG-caused Category 1 spill in a EMA at Placentia Ave between MH 6275 and MH 6274
2013	1	0	0	**1**	300	-	-	**300**	Root Intrusion	0	0	1	0	0	1	One Root Intrusion-caused Category 1 spill in a EMA at 148 Ruby Dr near MH 5717
2014	0	0	0	**0**	-	-	-	**-**	0	0	0	0	0	0	0	
2015	0	0	0	**0**	-	-	-	**-**	0	0	0	0	0	0	0	
2016	0	0	0	**0**	-	-	-	**-**	0	0	0	0	0	0	0	
2017	1	0	0	**1**	320	-	-	**320**	Debris - General	0	0	1	0	0	1	One Debris-caused Category 1 spill in a EMA at Chapman Ave Between MH 6281 and MH 6280
2018	0	0	0	**0**	-	-	-	**-**	0	0	0	0	0	0	0	
2019	0	0	0	**0**	-	-	-	**-**	0	0	0	0	0	0	0	
2020				**0**				**-**							0	
2021				**0**				**-**							0	
2022				**0**				**-**							0	
2023				**0**				**-**							0	
2024				**0**				**-**							0	
2025															0	
Totals	**6**	**0**	**1**	**7**	**11,495**	**-**	**650**	**12,145**	**--**	**-**	**--**				**5**	

Average SSO Rate: **0.83** *(Average # of SSOs/100 miles of system/year--want to keep under 2)*

* EMA = Enhanced Maintenance Area