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Appendices

Chapter 0.0 Introduction

On May 2, 2006 the State Water Resources Control Board (SWRCD) adopted Statewide General Waste Discharge Requirements (WDRs) and Monitoring and Reporting Program by issuing Order No. 2006-003 (Order) (Appendix A). The regulations in the Order were born out of a growing concern about the water quality impacts of Sanitary Sewer Overflows (SSOs), particularly those that threaten local water bodies, pose serious health and safety, or nuisance concerns. Two major components of the WDRs are the requirements that owners and operators of publically owned Sanitary Sewer Systems one (1) mile long or greater apply for coverage under the Order, and that they develop and implement a Sewer System Management Plan (SSMP).

The Town of Apple Valley (Town) filed its Notice of Intent (NOI) application with the SWRCB in August 2007 in compliance with the Order. The Town subsequently received its California Integrated Water Quality System (CIWQS) Username and Password for accessing the state's on-line reporting database. The Town then completed its "collection system questionnaire", has filed all subsequent updates, and all required SSO reporting.

The Town's SSMP is divided into 11 chapters, which closely align with the respective provisions contained in the Order. Each of the following chapters addresses one of the key elements of the SSMP program requirements. By implementing the policies and procedures contained in this SSMP, the occurrence of SSOs should decrease or possibly be avoided throughout the Town's sanitary sewer collection system.

Chapter 1.0 Town of Apple Valley SSMP Goal

The goal of the Town of Apple Valley's Sewer System Management Plan (SSMP) is to provide the framework to properly manage, operate, inspect, and maintain all components of the Town's sewer system to provide adequate sewer capacity for peak wastewater flows, protect the public health by minimizing the frequency and impact of unauthorized Sanitary Sewer Overflows (SSOs), implement standard procedures for responding to SSOs, preserve and improve the collection system to ensure dependable service now and into the future, and assure compliance with all regulatory notification and reporting requirements.

Chapter 2.0 Department Organization

2.1 Description of General Responsibilities

Town Council: Governing body; approves policy

Town Manager: Enforces policy

Assistant Town Manager – Municipal Operations and Contract Services: Legally Responsible Official (LRO), enforces policy, plans strategy, leads staff, allocates resources, prepares and controls department budget, delegates responsibility, authorizes outside contractors to perform services, reviews project plans and specifications, confers with consultant civil engineer, and coordinates the development and implementation of the SSMP. Advises Town Council and Town Manager on issues related to the Town's sewer collection system.

Pubic Services Assistant: Provides administrative support for the Assistant Town Manager, assists with coordinating the development and implementation of the SSMP, monitors and facilitates department compliance regarding regulatory requirements/deadlines. Provides backup for Permit Technicians. Official Data Submitter for the SSO online reporting system.

Permit Technicians: Issue sewer permits, research and address sewer questions/complaints received via phone or counter, receive and document sewer plan submittal and review, provide support for PW Supervisors and dispatch field personnel (Maintenance Workers). The Permit Technicians are the first contact for SSOs during regular business hours via phone.

Public Works Supervisor – Wastewater: Manages field operations and maintenance activities, provides relevant information to the Assistant Town Manager, provides plan review and approval for projects that require connection to the sewer, monitors budget expenditures, prepares and implements contingency plans, leads emergency response, investigates and reports SSOs, and trains field crews. Estimates needed equipment and equipment maintenance. Confers with contractors and engineers on construction/maintenance problems and procedures. Official Data Submitter for SSO online reporting system.

Senior Maintenance Worker: Inspects all sewer installations and connections, responds and mobilizes after receiving notifications of stoppages and SSOs, documents and reports SSOs, investigates sewer-related complaints from the general public. Confers with contractors and engineers on construction and maintenance problems and procedures. Official Data Submitter for the SSO online reporting system.

Maintenance Worker II: Monitors lift station function, conducts preventative and corrective maintenance activities, and mobilizes in response to notifications of stoppages and SSOs.

Maintenance Worker I: Conducts preventative and corrective maintenance activities, and mobilizes in response to notifications of stoppages and SSOs (e.g., mobilize sewer cleaning equipment, bypass pumping equipment, portable generators, etc.).

Consultant Civil Engineer: Prepares wastewater collection system planning documents, provides sewer plan review, prepares specifications and preliminary cost estimates, performs sewer feasibility studies, documents new and rehabilitated assets, and assists in the development of the SSMP.

2.2 Authorized Representative

The Town's authorized representative in all wastewater collection system matters is the Assistant Town Manager – Municipal Operations and Contract Services. The Assistant Town Manager is authorized to certify electronic spill reports submitted to the SWRCB via the California Integrated Water Quality System (CIWQS).

The Public Works Supervisor – Wastewater is authorized to act in the Assistant Town Manager's absence.

The Public Works Supervisor – Wastewater, Senior Maintenance Worker, and Public Services Assistant are also authorized to submit SSO reports and other required information to the appropriate government agencies.

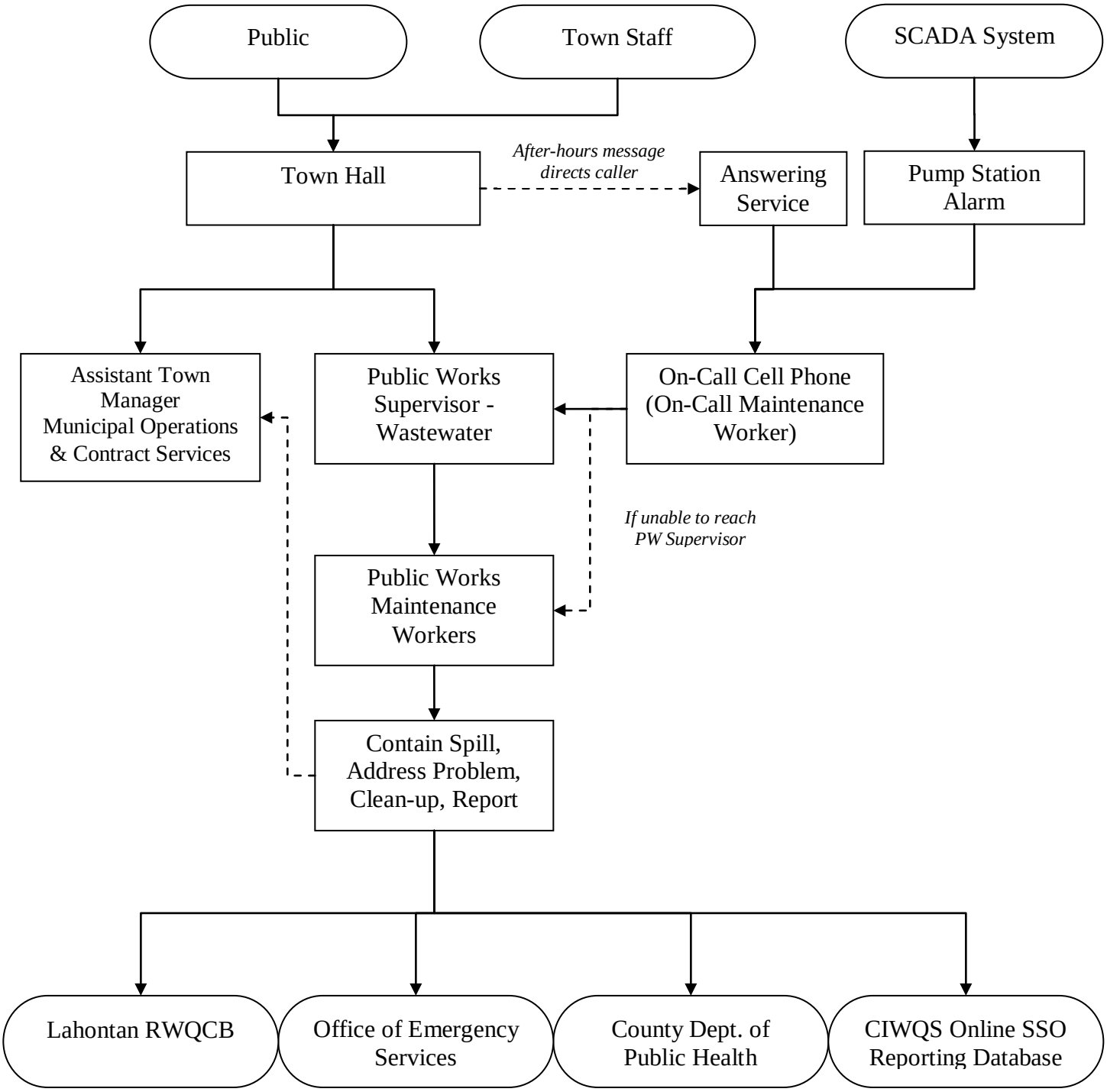
2.3 Responsibility for SSMP Implementation

The Assistant Town Manager is responsible for implementing and maintaining all elements of the SSMP.

2.4 SSO Response Chain of Communication – Contact List

Contact	*Telephone*
Town Hall	(760) 240-7000
Assistant Town Manager – Municipal Operations and Contract Services	(760) 240-7000 ext.7610
Public Services Assistant	(760) 240-7000 ext.7610
Public Works (Permit Technicians)	(760) 240-7000 ext.7500
Public Works Supervisor - Wastewater	(760) 240-7000 ext.7542
Public Works Maintenance Workers	(760) 240-7000 ext.7541
Public Works After Hours	(760) 961-6001
Wastewater On-Call Cell Phone	(760) 927-4953

2.5 SSO Response Chain of Communication



Chapter 3.0 Legal Authority

3.1 Legal Authority

The Town of Apple Valley's legal authority to own and operate a sanitary sewer system is derived from its establishment as the Apple Valley Water District (AVWD) in 1975. The purpose of the AVWD is to furnish residents and businesses with wastewater collection, treatment, and the disposal of sanitary waste. On December 13, 1977, the AVWD entered into a Joint Powers Authority agreement with the Victor Valley Water Authority. By that action, the Town has entrusted the collection and treatment of the Town's wastewater to the Victor Valley Wastewater Reclamation Authority. The Town, however, still maintains full ownership, operation and maintenance for the Town's sewer system.

In compliance with the WDR, this Chapter highlights the Town's legal authority to: 1) prevent illicit discharges into the sanitary sewer system; 2) require that sewers and connections be properly designed and constructed; 3) ensure access for maintenance, inspection, or repairs; 4) limit the discharges of FOG and other debris that may cause blockages; and 5) enforce any violation of sewer ordinances or Municipal Codes (MC). The legal authorities for the specific areas stipulated in the WDRs are covered in various sections of the Town of Apple Valley Sewer Ordinance discussed below:

3.2 Legal Authority to Prevent Illicit Discharges into the Sanitary Sewer System

In accordance with the Town's Sewer Ordinance No.2. Article III, Section 3.1, 3.2, and Article IV, Section 4.3, 4.4, and 4.6 the Town prohibits the unauthorized discharge of rain, surface or subsurface water (inflows) into the collection system. Article IV, Section 4.2, prohibits the illegal dumping of offensive or damaging substances such as chemicals, debris, etc. Other Sections of the ordinance that prohibit various forms of illicit discharges are 4.5, 4.6, 4.7 and 4.8. Ordinance No. 2. Title 6 (Health Sanitation), Section 6.30.040 requires that property owners be responsible for the clean-up and repair of over-flows from their house laterals, including the elimination of cracks, tree roots, and other debris which are in violation of the Town's nuisance ordinance, Title 6, Section 6.30,030. These laws combined constitute the Town's legal authority to prevent illicit discharges into the sewer system.

3.2.1 Legal Authority to Require that Sewers and Connections be properly Designed and Constructed

Town of Apple Valley Sewer Ordinance No. 6 Article VII, Section 7.1, 7.2, and 7.3, require that the design of new main-line sewers and pumping plants respectively in the Town, comply with the Standard Specifications and Master Plan of the District. Section 7.6 and 7.7 of the Ordinance requires that the design of new house laterals also conform to the requirements of Standard

Specifications and Master Plan of the District. Provisions and Standard Plans, all on file in the office of the City Director of Public Works.

3.2.2 Legal Authority to Ensure Access for Maintenance, Inspection, or Repairs

Article XIII, Section 13.1 grants the District Manager and other duly authorized employees of the Town the legal right to set requirements to allow unrestricted maintenance access to the public sewer infrastructure located on private property. In accordance with Sections 13.3 and 13.4 of the Town's Ordinance, the access is secured through the Town's enforcement of the requirement for legally recorded sewer easements around all public sewer appurtenances located in private properties.

3.2.3 Legal Authority Limiting the Discharge of FOG and other Debris that may cause Blockage

The Town of Apple Valley Sewer Ordinance No. 11, Section 3 gives the Town the legal authority to require the installation of grease interceptors at restaurants and other food establishments that generate grease in the Town. Article IV, Section 4.2 prohibits the discharge of FOG and other substances that may, among other things clog, obstruct, fill, or necessitate frequent repairs, cleaning out or flushing of sewer facilities, in the Town's Sewer System. Article IV, Section 4.6 gives the District Manager the authority to require the installation of treatment facilities, including grease interceptors, at any facility that generates FOG in the amount that will damage or increase the maintenance costs of the sewer collection system.

3.2.4 Legal Authority to Enforce any Violation of Sewer Ordinances

Under Article XV, Section 15.2, the Town of Apple Valley has the necessary legal authority to enforce the provisions of the Town's sewer ordinance, including the criminal prosecution, abatement of nuisances, civil remedies or other legal or equitable means.

Chapter 4.0 Operations and Maintenance Program

4.1 Description of the Sanitary Sewer System

The Town of Apple Valley's sanitary sewer system covers the areas served as indicated in the sewer maps and sewer database system. The Town's existing sewer consists of:

• 4-inch force mains	1,675 feet
• 6-inch collector sewer (in AD #2A only)	54,963 feet
• 8-inch collector sewer	528,836 feet
• 10-inch collector sewer	59,701 feet
• 12-inch collector sewer	20,321 feet
• 15-inch trunk sewer	31,693 feet
• 18-inch trunk sewer	27,863 feet
• 21-inch trunk sewer	5,546 feet
• 24-inch trunk sewer	5,447 feet
Total Length	736,045 feet (139.4 miles)

The total length of the sewer collection piping system will be increasing with growth and the Town of Apple Valley has been keeping a record of such increases. In addition, the Town of Apple Valley operates a total of eight wastewater lift stations. The Town of Apple Valley is a member of the Joint Power Agency, the Victor Valley Wastewater Reclamation Authority (VVWRA). VVWRA operates a regional interceptor sewer system and the wastewater reclamation plant.

The Town of Apple Valley's collection system is relatively new. The majority of the system was constructed within defined areas where an "assessment district" was formed to finance the work. An older computer model was used to evaluate the capacity of the entire system. The Town of Apple Valley is planning to update its sewer master plan and will be updating the computer model as well.

In order to ensure that the existing system has adequate capacity to serve a new development, each new project (not previously included in an assessment district) is required to have a sewer availability study review.

4.2 Collection System Operation and Maintenance

4.2.1 The collector system is regularly inspected by maintenance crew of the Town's Public Works Department. These inspections include:

a) Check for unauthorized tampering of the system for illegal dumping
b) Potential odor concerns
c) Potential overflow due to sewer back-ups from blockage due to Illegal Discharge and grease build-up (grease control will be further discussed in Section 7)
d) Potential pipeline trench settlement.

The collection system is regularly cleaned using a hydro-cleaner system (a proposed 3-year cycle). This work is performed by in-house staff and can be contracted with an outside firm.

4.2.2 A map showing the Town's collection sewer system is enclosed in this Section. The entire system is divided into three (3) tributary areas with the goal to totally hydro-clean the entire system within a 3-year cycle. The three sewer tributary areas generally consist of Desert Knolls (Assessment Districts 1-A, 1-B, 1-C and 2-B), Apple Valley Village (Assessment District 2-A) and Apple Valley Airport area, and Jess Ranch area and areas served by Assessment District 3-A. This map will be updated on a regular basis and/or upon the addition and final approval of sub-divisions of 200 or more homes. At this point in time, this map is not available to the public, and viewed only upon request.

4.2.3 Sewer inspections and cleaning are scheduled within each of the three tributary areas. Exhibit 4-1 shows the "master cleaning report" kept internally (SAMPLE only). The work order is administered by a Public Works Department technician and reviewed by the Supervisor.

4.3. Sewage Lift Station Operation and Maintenance

4.3.1 The operation and maintenance of each sewage lift station follows the design criteria at each site and the instructions provided by pump and electrical control equipment manufacturers as contained in the O & M manual(s). Each sewage lift station is regularly inspected and maintained by maintenance crews from the Public Works Department and covers the following:

a) Pump and drive equipment operate satisfactorily without excessive vibration, noise, and over-heating;
b) Pump operations are within the pre-set start and stop levels in the wet well;
c) Routine check and addition of lubricants to bearings etc;
d) For stations with sump pump in the dry-well, check to make sure that the sump pump works;
e) Check to make sure that the motor control equipment (such as variable frequency drives etc.) is working as designed;
f) Perform scheduled maintenance of equipment as recommended in the O&M manuals; including verification of parts inventory.

4.3.2 Each small wastewater lift station is equipped with a duplex pumping system to provide for 100% standby capacity. In the event of a power outage at a specific small station, rental generator equipment will be utilized. Additionally, the Town's diesel powered emergency pump could be used to cover such emergency situations.

4.3.3 Each of the larger wastewater lift stations is designed with multiple pumps to provide adequate standby capacity. In the event of power outage, each station is equipped with an

emergency generator. Additionally, the Town's diesel powered emergency pump could be used to cover such emergency situations. Each of the three larger lift stations operated by the Town has been fitted with emergency by-pass valves and a piping system. This ensures quick connection with the diesel powered emergency pump if such operation should be required. A brief description of each of the Town's sewage lift stations is included in this Section under Exhibit 4-2.

4.3.4 Exhibit 4-3 presents a "maintenance schedule" for the sewage lift stations. The Jess Ranch main lift station is being redesigned by the developer's engineer to include "flow equalization". Once the new station is constructed and operational, the basic maintenance will be included back into the schedule.
Major maintenance of equipment is contracted with qualified pump maintenance firms.

4.3.5 Each of the sewage lift stations is being monitored by a SCADA (system control and data acquisition) system. In the event of equipment malfunction, motor failure, intrusion, etc., the staff on duty will be notified via the telemetry.

4.4. Operation and Maintenance Budget

4.4.1 The Town of Apple Valley Public Works Department operates the sewer collection system. The Department includes its internal full-time staff members under the supervision of the Assistant Town Manager – Municipal Operations and Contract Services. The Town contracts for a department engineer to assist in plan check, planning, operational assistance, and provide advice on all sewer issues. Each year, based on the number of connections and wastewater flow, the Department establishes a budget sufficient to cover: salary and benefits, training, system maintenance, utility expenses, vehicles/equipment, fuel and other chemical needs, and outside services. A reserve is established in each annual budget cycle to cover for unforeseen emergencies.

4.4.2 Staff training records are maintained by the Town's Human Resources Department. Staff training includes daily meetings with the maintenance supervisor. Staff training covers work items to be performed, safety issues, and constant surveillance for sewer blockage and potential over-flows. Safety training occurs on a bi-weekly basis. Other trainings including encouraging staff to participate in operation and maintenance sessions provided by the California Association of Sanitation Agencies, California Water Environment Association (Desert Mountain Section), and the California Joint Power Insurance Authority (CJPIA; on various safety and related subjects).

4.4.3 Capital repair and Replacement Budget
The Town of Apple Valley establishes the following funds to expand and maintain the sewer system to ensure adequate capacity for current and future customers:

- Capital improvement fund (connection fees from new developments, also known as the AB 1600 fund). This fund is targeted for expanding trunk sewers and sewage lift stations.

- Built-in "repair and replacement" fund in the annual operating budget to accumulate capital

funds for replacement of equipment and perform necessary system upgrades.

- Sewer Fees - The Town of Apple Valley has established a monthly sewer fee of $19.96 per sewer unit (s.u.). The estimated total annual revenue generated to fund wastewater treatment operations, sewer facility maintenance, and sewer improvement projects is approximately $2,686,245.00. Properties within the District are assessed as follows:

    - Single family occupancy, each residential unit within a multiple family development, and each mobile home unit will be assessed at a rate of $19.96 per month.
    - Each commercial shop or office with individual restroom facilities will be assessed a rate of $19.96 per month plus $.998 per fixture unit in excess of twenty (20) fixture units.
    - Commercial and industrial shops or offices with public and/or centralized sewer use facilities, will be assessed a minimum of $19.96 per month plus $.998 per fixture unit in excess of twenty (20) fixture units.
    - Schools' monthly user fees will be calculated on the basis of total annual enrollment whereby twenty-three (23) students and/or faculty equals one (1) EDU, which is defined as twenty (20) fixture units which is assessed at the rate of $19.96 per EDU per month.

As commented at the beginning of this Section, the Town of Apple Valley's sewer system is relatively new. However, Town staff has monitored the repair and replacement needs closely based on the maintenance records. Component parts are purchased/replaced based on equipment manufacturer's recommendation.

5.0 Design and Performance Standards

5.1 Design & Construction Standards

The Town of Apple Valley Water District (District) requires that all sewers be designed in accordance with San Bernardino County Special Districts Department standards (see Appendix B). San Bernardino County has established standard plans and specifications for construction of sanitary sewers and appurtenances to ensure that sewer lines and connections are properly designed and constructed. In addition, the Town issues a standard detail sheet entitled General Sewer Notes and Standard Sewer Detail Sheet (Appendix C), which augment the County standards and ensures that all sewer systems are consistent with the District. The Town of Apple Valley requires that plans, profiles and specifications for the sanitary sewer system are prepared by a Civil Engineer licensed in the state of California and approved by the District. Review of plans is performed by the Town's Consultant Civil Engineer, prior to approval for construction. To ensure that all sanitary sewer systems are properly constructed, the Town Public Works staff conducts inspections of the actual construction work.

5.1.1 New Facility Standards

The Town Apple Valley Water District is responsible for establishing and enforcing rigorous construction standards through its Public Works Department. Public Works inspection staff conducts inspections of the installation of new sanitary sewer collection systems within the District, verifying that all new collection systems adhere to the San Bernardino County Special District Department Standards.

Town of Apple Valley Sewer Ordinance No. 6 Article VII, Section 7.1, 7.2, and 7.3 require that the design of new main-line sewers and pumping plants respectively, comply with the Standard Specifications and Master Plan of the District. Sections 7.6 and 7.7 of the Ordinance require that the design of new house laterals also conform to the requirements of Standard Specifications and Master Plan of the District.

5.1.2 Rehabilitation Standards

The Town of Apple Valley, through its Public Works Department, provides rehabilitation and inspection of deteriorated sanitary sewer collection systems. Public Works inspection staff conducts inspections of any sewer rehabilitation projects, documenting that the rehabilitated portions of the collection system meet and adhere to the San Bernardino County Special District Department Standards.

Town of Apple Valley Sewer Ordinance No. 6 Article VII, Section 7.1, 7.2, and 7.3 require that the design of replacement/rehabilitated main-line sewers and pumping plants respectively comply with the Standard Specifications and Master Plan of the District..

5.2 Inspection, Testing & Approval of New & Rehabilitated System Components

The Town requires that "As-Built" sewer plans of the completed projects be submitted prior to final approval for acceptance of sewer facilities for public use. The District reviews the plans to ensure that routine preventative maintenance can be adequately performed.

Chapter 6.0 Overflow Emergency Response Program

6.0 Introduction

This plan summarizes the actions that Town staff must take in responding, reporting, and resolving sanitary sewer overflows (SSOs). A SSO is any overflow, spill, discharge, or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSOs typically contain high levels of suspended solids, pathogenic organisms, toxic pollutants, nutrients, oil, and grease. These substances cause surface or ground water pollution, threaten public health, adversely affect aquatic life, and impair the recreational use and enjoyment of surface waters. SSOs often occur as a result of broken pipes, equipment failure, or system overload. Prevention measures include, but are not limited to, visual inspections, monitoring and maintenance programs, employee training, and public education.

The Town of Apple is responsible for operation and maintenance services of its sewer collection system, including cleaning, closed circuit television (CCTV) inspections, manhole inspections, and emergency repairs. The Town's Municipal Operations Division is responsible for implementing the sanitary sewer system program, which includes permitting, inspection and enforcement of illicit discharges to the public sewer system in concert with the Town's Code Enforcement Division.

6.1 Spill Response Team Responsibility

Every water and sewer system can face an emergency due to unforeseen conditions such as the "emergency sewer pipe break" suffered by the Town of Apple Valley in early 2005 due to extreme high storm flows in the Mojave River. From this incident and other prior emergency situations, the Town of Apple Valley has organized an "Emergency Response Team" (will be referred to as "response team" in subsequent references) for its collection system. The structure of the response team along with their contact numbers are as shown in the Table below:

Role	Work Number	Ext.	After-Hours Contact #
Public Works Supervisor-Wastewater	(760) 240-7000	7500	(760) 961-6001
Wastewater - Senior Maintenance Worker	(760) 240-7000	7500	(760) 961-6001
Wastewater -Maintenance Worker 2	(760) 240-7000	7500	(760) 961-6001
Wastewater -Maintenance Worker 1	(760) 240-7000	7500	(760) 961-6001
Public Works Supervisor-Streets	760) 240-7000	7500	(760) 961-6001
Streets – Senior Maintenance Worker	(760) 240-7000	7500	(760) 961-6001

Streets - Maintenance Worker 1	(760) 240-7000	7500	(760) 961-6001
Asst. Town Manager	(760) 240-7000	7500	(760) 403-5152
Public Works Engineer	(760) 242-2365	7500	(760) 954-6145 cell

In the event of a "sanitary sewer overflow" during normal working hours, the response team will be mobilized by the Public Works Supervisor via cellular telephone or two-way radio. After hours calls will be received through the Town's 24 hour answering service. The answering service will notify the "on-call" staff via home phone, cell phone or pager. On-call staff will contact the Supervisor who in turn mobilizes all needed team members and any required equipment. This same procedure applies to spills discovered by staff or by the public.

In addition to the response team listed above, telephone numbers of the Town's Director of Public Services and Public Works Engineer are also listed to be contacted to provide the necessary management support as required. The responsibilities of the individuals listed above are as follows:

- Assistant Town Manager – Municipal Operations/Contract Services has jurisdiction over the entire Public Works staff and is responsible to the Town Manager and Town Council to ensure that all emergency responses are properly conducted.
- Public Works Engineer – provides technical support and advice as the need arises. The engineering staff will provide emergency surveys and special designs when it is necessary.
- Public Works Supervisor - Wastewater and Public Works Supervisor – Streets are responsible for managing day to day staff activities.

The training of staff to handle emergency situations (including sanitary sewer overflows) is included under training as discussed in Section 4 - Operations and Maintenance Program. Additionally, Town staff joins with the staff of the Apple Valley Fire Protection District, the Apple Valley Unified School District, and other emergency response professionals to prepare for emergency situations, at least on a quarterly basis.

6.2 Emergency Response Equipment List and Location

The following is a listing of typical SSO Response equipment and materials that will be maintained by the District. It is not intended as an exclusive or complete listing. Equipment and materials may and will vary depending on the type of event, time of day, location, etc. Additionally, the District will maintain an inventory of forms and materials to ensure that adequate supplies are available. Training sessions and events will be held annually to train staff on SSO response procedures and on the safe use of the items listed below.

Documents, Forms, Etc.

- ✓ Procedures Manual for SSO response
- ✓ Event Report Forms
- ✓ List of Important Contacts

/ Inventory

- ☐ Barricades – Street & tape
- ☐ Sand Bags
- ☐ Disposal Bags and ties
- ☐ Nitrite Gloves
- ☐ Eye protection
- ☐ Eye wash kit
- ☐ Flashlights
- ☐ Portable work lights (area)
- ☐ Rain Gear (Incl. Boots)
- ☐ Water Key
- ☐ Bolt cutters
- ☐ Hydrant wrench
- ☐ Brooms, shovels, etc.
- ☐ Portable Pump with hoses
- ☐ Drain Plugs (Pipe Plugs)
- ☐ Bag(s) of Absorbent
- ☐ Clorox in hand sprayer or other disinfectant.

(*Note: use only approved and authorized chemicals)*

Because flows can occur at any time, day or night, these materials will be readily available to authorized staff.

Exhibit 6-1 is a detailed listing of emergency response equipment available with the Public Works Department and where this equipment is stored. Additionally, a listing of emergency equipment rental companies is also provided.

6.3 Overflow Corrections, Containment, Sampling and Final Clean-up

Unauthorized Sewage Discharges, sanitary sewer overflows (spills), and vandalism of various volumes may occur from time to time in spite of concerted prevention efforts. Sanitary sewer overflows may result from blocked sewers, pipe failures, or mechanical malfunctions among other natural or man-made causes. The Town of Apple Valley is on constant alert and is ready to respond upon notification and confirmation of an overflow.

This section describes specific actions to be performed by the response team in the event of a sanitary sewer overflow. The objectives of these actions are:

- To protect public health, the environment and property from sanitary sewer overflows and restore surrounding area back to normal as soon as possible;

- To establish perimeters and control zones with appropriate traffic cones and barricades, vehicles, or use of natural topography (e.g., hills, berms, etc.);
- To promptly notify the regulatory agency's (Regional Water Quality Control Board) communication center of preliminary overflow information and potential impacts; Town staff would seek input and further instructions/recommendations from RWQCB staff.
- To contain the sanitary sewer overflow to the maximum extent possible including preventing the discharge of raw-sewage into surface waters; and
- To cooperate and work with regulatory agencies to minimize The Town of Apple Valley's exposure to any regulatory agency penalties and fines.

Under most circumstances, The Town of Apple Valley will handle all response actions with its own "response team" (maintenance crews). They have the skills, training, and experience to take appropriate actions and respond in a timely manner.

Circumstances may arise when The Town of Apple Valley could benefit from the support of private-sector construction assistance should special equipment be required. The Town of Apple Valley has a list of qualified local contractors to contact for assistance such as open-trench excavation and emergency fill operations (refer to Exhibit 6-1).

6.3.1 Responsibilities of Response Team upon Arrival

It is the responsibility of the first responder at the site of a sanitary sewer overflow to protect the health and safety of the public by mitigating the impact of the spill. Should the spill not be the responsibility of the Town of Apple Valley, but there is imminent danger to public health, public or private property, or to the quality of surface waters, then prudent emergency action should be taken until the responsible party assumes responsibility and provides actions. Upon arrival at a spill, the response team shall perform the following:

- Determine the cause of the sanitary sewer overflow, e.g. sewer line blockage; pump station mechanical or electrical failure, sewer line break, etc;
- Identify and request, if necessary, assistance or additional resources to correct the overflow, or to assist in the determination of its cause;
- Determine if private property is impacted. If yes, the dispatcher should be informed so that the San Bernardino County Department of Public Health may be advised;
- Take immediate steps to stop the sanitary sewer overflow, (e.g. relieve pipeline blockage, manually operate pump station controls, repair pipe, etc.). Extraordinary steps may be considered where overflows from private property threaten public health and safety (e.g., an overflow running off from private property into the public right-of-way); and
- Request additional personnel, materials, supplies, or equipment that will expedite and minimize the impact of the sanitary sewer overflow.

6.3.2 Initial Measures for Containment

Town staff will initiate measures to contain the overflowing sewage and recover, where possible, sewage which has already been discharged, minimizing impact to public health or the environment. The following actions shall be taken:

- Determine the immediate destination of the overflow, e.g. storm drain, street curb gutter, body of receiving water, creek bed, etc;
- Identify and request the necessary materials and equipment to contain or isolate the overflow, if not readily available; and
- Take immediate steps to contain the overflow, e.g., block or sand-bag storm drains, recover through vacuum truck, divert into downstream manhole, etc.
- Control access to the affected area (including barricade or caution tape etc.) if this is determined to be necessary.

6.3.3 Additional Measures Under Potentially Prolonged Overflow Conditions

In the event of a prolonged sewer line blockage or a sewer line collapse, a determination should be made to set up a portable by-pass pumping operation around the obstruction. The following actions will be considered:

- Appropriate measures will be taken to determine the proper size and number of pumps required to effectively handle the sewage flow.
- Continuous or periodic monitoring of the by-pass pumping operation shall be implemented immediately as required.
- Regulatory agency issues will be addressed in conjunction with emergency repairs. Consult regulatory agency staff and jointly visit impacted site to seek input.

6.3.4 Sampling Procedures

Samples will be collected anytime when sewage reaches any surface water, stream or creek bed, or natural wash.

- Sampling sites and frequency will be as determined based on discussions with the Regional Water Quality Control Board (which may include total coliform and fecal coliform).
- Collected samples will be taken to the selected Testing Laboratory for analysis; a listing of the laboratories is enclosed at the end of this Section under Exhibit 6-1.
- Re-sampling will be as determined by the testing laboratory or the Regional Water Quality Control Board.

6.3.5 Notification Procedures

After all of the necessary actions to assess the cause of spill, extent of spill, containment procedures, and sampling have been completed, the response team will coordinate with management to provide the proper notifications. In order to address an unauthorized sewage discharge event in a timely and effective manner, the following notification protocol has been established:

6.3.5.1 Category 1: All discharges of sewage resulting from the failure of the sanitary sewer system that:

- Discharge in excess of the 1,000 gallons "reportable quantity", or
- Discharge into surface water and/or drainage channel, or
- Discharge of sewage into a storm drain pipe which was not fully captured and returned to the sanitary sewer system.

In the event of an unauthorized Category 1 sewage discharge, the Regional Water Quality Control Board – Lahontan Region shall be verbally notified as soon as: 1) the Town has knowledge of the discharge, 2) reporting is possible, and 3) reporting can be provided without substantially impeding clean-up or other emergency measures. Initial reporting of Category 1 SSO must be reported to the Online SSO System as soon as possible but no later than 3 business days after the Town is aware of the SSO. In addition, the Town must notify the Governor's Office of Emergency Services (OES) and the County Health Officer.

Agency Name	Phone
Regional Water Quality Control Board - Lahontan Region	(760) 241-6583
Governor's Office of Emergency Services	(916) 845-8911 or (800) 852-7550

6.3.5.2 Category 2: A sewage discharge less than 1,000 gallons.

In the event of an unauthorized Category 2 sewage discharge, the Town will submit a report to the Online SSO Database within 30 days after the end of the calendar month in which the SSO occurs.

6.3.5.3 Additionally, in the event of an unauthorized sewage discharge associated with any of the circumstances detailed above, the following public health agencies and local and regional water purveyors will also receive immediate verbal notification:

Agency Name	Phone
California - Department of Public Health Services	(916) 445-4171
San Bernardino County - Department of Public Health general line- Environmental Health Services direct line -	(800) 782-4264 (909) 884-4056
Water Purveyors (only those immediately affected by an SSO will be contacted)	
Apple Valley Foothill County Water District	(760) 247-1101
Apple Valley Heights County Water District	(760) 247-7330

Apple Valley Ranchos Water Company	(760) 247-6484
Apple Valley View Mutual Water Company	(760) 247-2894
Baldy Mesa County Water District	(760) 949-0332
City of Adelanto Water District	(760) 246-2300 ext.3045
County Service Areas - CSA 64, CSA 42, CSA 70C, CSA 70J	(760) 955-9885
Golden State Water Company	(800) 999-4033
Helendale Community Services District	(750) 962-1522
Hesperia Water District	(760) 947-1840
Juniper Riviera County Water District	(760) 247-9818
Mariana Ranchos County Water District	(760) 247-9405
Mojave Water Agency	(760) 946-7000
Navajo Mutual Water Company	(800) 507-1612
Rancheritos Mutual Water Company	(760) 247-3730
Thunderbird County Water District	(760) 247-2503
Victor Valley Water District	(760) 245-6424

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

Reporting of unauthorized Private Lateral sewage discharges will be made at the discretion of the Town. Should the Town elect to report a discharge resulting from a private lateral to the Online SSO Database, the Town must identify the sewage discharge as occurring and caused by a private lateral, and identify the responsible party (if known).

6.3.6 Final Cleanup

Sewer overflow sites are to be thoroughly cleaned after a spill or overflow. No readily identified residue (e.g., sewage solids, papers, rags, plastics, rubber products) is to remain. The following actions will be followed as appropriate:

- Where practical, the area is to be thoroughly flushed and cleaned of any sewage or wash-down water. Solids and debris are to be flushed, swept, raked, picked-up, and transported for proper disposal.
- If a ponded area contains fish or other aquatic life, chlorine or other disinfectants should not be applied and the California Department of Fish and Game will be contacted for specific instructions.

6.4 Records, Record Retention Policies & Procedures and Data Management

The Public Works Supervisor maintains all records of Class 1, Class 2 overflows and Private Laterals (as defined in section 6.3.5). The District will document the location, date and time of the all SSO events and includes the documentation in each annual report with any corresponding photos. Flow site is to be secured by the use of barricades and caution tape to prevent contact by the public until the site has been thoroughly cleaned. Posting, as required, will be undertaken.

- Where appropriate, the spill site is to be disinfected and deodorized.
- Where a sewage spill has resulted in ponding, the pond area will be pumped dry and the residue disposed of in accordance with applicable regulations and policies.
- If a ponded area contains sewage that cannot be pumped dry, it may be treated with chlorine (liquid bleach or powder chlorine). If sewage has discharged into a body of water that may contain fish or other aquatic life, chlorine or other disinfectants should not be applied and the California Department of Fish and Game will be contacted for specific instructions.

Chapter 7.0 Fats, Oils & Grease Control Program

7.1 Requirements

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

7.2 Sewer System Management Plan Fog Control Program

The Town of Apple Valley Public Works Wastewater Division has observed and enforced a Fats, Oils and Grease program since the Town incorporated in 1988. Revisions and standardization for the purposes of creating this SSMP document were finalized in April 2009.

The FOG Control Program consists of the following 6 elements:

A. Public education and outreach implementation plan and schedule,
B. Legal authority to prohibit illegal discharges, FOG blockages, and prevent sanitary sewer overflows (SSOs),
C. Require installation of grease removal devices and a means to standardize their installation,
D. Authority to inspect grease-producing facilities and enforce noncompliant facilities,
E. Identify system locations subject to FOG blockages and establish maintenance schedules,
F. Develop and implement source control measures for all FOG discharged to the sanitary sewer system.

Each element will describe the SSMP FOG Control Plan requirements, the Town's current practice, and the Town's plan and timeframe to implement the remaining requirements.

7.3 Public Education and Outreach

CURRENT PROGRAM

The Town of Apple Valley regularly distributes FOG program information to its residents. FOG prevention articles are published regularly in the quarterly "Our Town" Town-wide newsletter. The articles define FOG and explain why is not safe to pour down the drain. Also included is information regarding the disposing of FOG at the Town's Household Hazardous Waste Collection Center.

FOG flyers are available at Town Hall at the Public Services counter and are routinely distributed at Town-sponsored public events. FOG prevention information is also available on the Town website on the Public Works Wastewater Division page.

In partnership with Victor Valley Wastewater Reclamation Authority (VVWRA), the Town's Wastewater Division has identified FOG "hot spots" and commercial businesses for FOG outreach and education. The environmental compliance staff at VVWRA permits new businesses that may potentially discharge FOG to the sewer system and provides basic FOG prevention information to owners and/or pertinent staff. VVWRA performs regular drop-in inspections and businesses are required to submit proof of FOG maintenance (pumping manifests) at least every 6 months. Any problem locations are inspected more frequently and/or cited for non-compliance.

PROPOSED PROGRAM

The Town of Apple Valley plans to continuously educate the community on methods to handle FOG and to reduce the disposal of FOG into the collection system.

FOG information is planned to be distributed to citizens via trash/sewer utility bills by Fall 2009. Additionally, the Town is planning to purchase several hundred FOG magnets to pass out to residents at upcoming appropriate Town-sponsored events this summer. The magnets will have FOG prevention reminders printed on them and will also be available by request via the Town's website. All new sewer permits will be accompanied by FOG fliers as well.

A FOG best management practice (BMP) poster is currently being designed and will be provided to all new and existing restaurants and other potential commercial/industrial FOG producers. It too will be available by the end of 2009.

7.4 Legal Authority

The Town's sewer use ordinances in conjunction with VVWRA ordinances provide legal authority to prohibit illegal discharges, FOG blockages, and prevent sanitary sewer overflows (SSOs).

CURRENT PROGRAM

Per the 2007 California Plumbing Code section 1009.0 and 1009.1 for newly constructed and newly permitted facilities, the Town's Building and Safety department enforces the installation of grease removal devices (trap or interceptor) for food service establishments.

The Town of Apple Valley Sewer Ordinance No. 11, Section 3 gives the Town the legal authority to require the installation of grease interceptors at restaurants and other food establishments that generate grease in the Town. Article IV, Section 4.2 prohibits the discharge of FOG and other substances that may, among other things, clog, obstruct, fill, or necessitate frequent repairs, cleaning out or flushing of sewer facilities, in the Town's Sewer System. Article IV, Section 4.6 gives the District Manager the authority to require the installation of treatment facilities, including grease interceptors, at any facility that generates FOG in the amount that will damage or increase the maintenance costs of the sewer collection system

Per VVWRA Ordinance 001, 08-04.2 - General Discharge Prohibitions, "No person shall, except as hereinafter provided, discharge or cause to be discharged to the POTW (Publicly Owned Treatment Works) any of the following: any solid, semi-solid or viscous substances which may obstruct the flow of sewage, cause clogging of or adversely affect sewage pumping equipment, or sewage sludge pumping equipment, or the community sewer system, or interfere with the operation of the POTW, such as, but not limited to, grease..."

PROPOSED PROGRAM

The Town is currently updating the existing sewer ordinances in order to more explicitly identify prohibited discharge material (including FOG) and define penalties for violation. Additionally, the Town has recently reviewed all ordinances in order to meet the broader Legal Authority requirement (Section 3) of the SSMP.

7.5 FOG Removal Devices

The Town requires food service establishments to install grease removal devices and has developed a means to standardize their installation. One of the main components for controlling FOG from

nonresidential facilities is the requirement for installing FOG removal devices. The Town has a standard procedure of requiring grease removal devices based on the 2007 California Plumbing Code Section 1009.0 and 1009.1 for new food service establishments and for tenants who make major improvements to their kitchen area. A FOG removal device can either be a grease trap or interceptor, depending on location or the size of the tenant improvement. The size and type of grease removal device are also predicated on the
flow volume of the business. Additionally, restaurants are required by VVWRA to maintain a grease trap or interceptor cleaning log as part of its permitting program.

7.6 Inspection and Enforcement Authority

The Town and VVWRA currently have the legal authority to inspect and enforce FOG noncompliance. VVWRA's ordinances contain language that prohibits the discharge of grease into the sanitary sewer. The Town and VVWRA share the authority to inspect FOG producing facilities and enforce noncompliant facilities.

The inspection and public outreach of food service establishments in the identified "hot spot" areas will be a critical component of the Town's source control program for FOG. Food service establishments and other potential commercial/industrial FOG dischargers are required to maintain a regular cleaning schedule for their grease removing device (either a grease trap or interceptor) and must be able to furnish proof upon request. The Town's sewer ordinances also grant the Town the legal authority to prohibit illegal discharges, FOG blockages, and prevent sanitary sewer overflows (SSOs).

The Town's Wastewater Division field maintenance crew cleans and maintains all approx. 150 miles of sewer line. Staff is trained to identify problem areas and determine the sources of FOG blockages. Subsequently, the Town and VVWRA will inspect the targeted locations/facilities to determine if one or combinations of the following remedies are required: enforcement actions, increased maintenance by the business, or public outreach and education.

7.7 Identification of FOG Blockages and Establishment of Maintenance Schedules

The Town is required to identify locations of FOG blockages and establish a routine maintenance schedule to avoid SSOs. The Town has identified the locations that routinely contain heavy concentrations of FOG, which require enhanced cleaning of the sewer lines. These grease blockage areas or locations are commonly known as "hot spots." The Town has identified 11 hot spots that are cleaned on a regular schedule; 5 hot spots are cleaned bi-monthly; 3 hot spots are cleaned monthly and the remaining 3 are cleaned on a quarterly basis (see Appendix D).

FOG "HOT SPOT" LOCATIONS

The following page contains a list of 11 locations that are recognized as high priority FOG sites. These sites were identified as such, based on location and the accumulation of FOG, in addition to frequency of back-ups, and routine maintenance cleanings:

Assessment District	Nearest Intersection	Frequency	Remarks
Interceptor	Hwy 18 & Apple Valley Rd.	Monthly	North side dirt road next to the county storm drainage channel.
Jess Ranch	Palo Verde & Ash St.	Bi-Monthly	In condo parking lot.
Jess Ranch	Town Center & Apple Valley Rd.	Bi-Monthly	Old wet well in grass south of block wall.
Jess Ranch	Town Center & Apple Valley Rd.	Bi-Monthly	Downstream MH northeast of above MH in bank parking lot.
1A	Wika & Muni	Monthly	In road.
1B	Corwin Rd. & Wintun	Quarterly	Intersection in road.
1C	Hwy 18 No. & Tao	Bi-Monthly	Intersection in road.
1C	Hwy 18 No. & Kasota Rd.	Bi-Monthly	Intersection in road.
7972	Siskiyou Rd. & Siskiyou Ct.	Quarterly	Northeast corner behind curb.
2A	Rancherias & Ottawa	Quarterly	check for surcharge m/h#3 manhole north of Ottawa
1B	Outer Hwy 18 Hospital	Monthly	Manhole west of storm drain

The Town intends to maintain its current maintenance/cleaning schedule since it has been successful at reducing sanitary sewer overflows (SSOs) due to FOG. The Town is planning to conduct more public outreach and education to the areas or locations that require high FOG maintenance. The Town plans to utilize the Wastewater Field Maintenance Crew to distribute or hand out FOG door hangers to the neighborhoods where they respond to FOG blockage problems. The Town is targeting the fall of 2009 to begin distributing FOG door hangers.

7.8 FOG Source Control Program

The Town is required to develop and implement source control measures for FOG control.

CURRENT PROGRAM

The Town's current FOG source control program consists of public outreach and education and the requirement to install grease removal devices for new businesses that produce grease and tenants who make major improvements to their site. The public outreach and education program includes distributing FOG prevention fliers at the Public Services counter, at various Town-sponsored events via the Town's website, and in articles in the Town's quarterly newsletter.

PROPOSED PROGRAM

The Town will continue to place strong emphasis on its public outreach and education program for FOG control. The Town's plan of action is as follows:

- Purchase and distribute FOG magnets via the Public Services counter and Community events;
- Add FOG information to trash/sewer billing statements and continue to educate the public about the importance of reducing FOG to the sanitary sewer system;
- Distribute FOG door hangers to "hot spot" areas; and
- Partner with VVWRA and produce and distribute FOG BMPs to all commercial/industrial potential FOG dischargers.

Chapter 8.0 System Evaluation and Capacity Assurance Plan

8.1 System Evaluation

The Apple Valley Water District was established to furnish residents and businesses within the Town of Apple Valley and within its sphere of influence with a reliable means of wastewater collection, treatment, and disposal. To ensure the system's future capacity and optimize service by sewage collector lines, pump stations and related facilities, the District commissioned feasibility studies and capacity analysis. In addition, the District is responsible for establishing and enforcing rigorous construction standards and evaluating appropriate financing methods for proposed projects.

The District has completed closed-circuit television (CCTV) inspection of 294,418 feet, totaling 40% of the Town's sanitary sewer system. The project identified those portions of the system that required additional inspection, cleaning or maintenance (see attached report in Appendix D).

8.2 Design Criteria and Required Capacity

Apple Valley Water District has the legal responsibility for ensuring sound, logical and functional design of the public sewer infrastructure. The existing and proposed sewage collection systems were analyzed using an in-house computer database model which is based on the premise that it is more prudent to somewhat oversize sewerage facilities than to undersize them.

The Town's Sewer Master Plan's wastewater flow projects are based on 100% saturation development of the land served by existing and proposed sewer systems. The following land use categories and their respective average daily wastewater flow coefficients are used to establish system capacities:

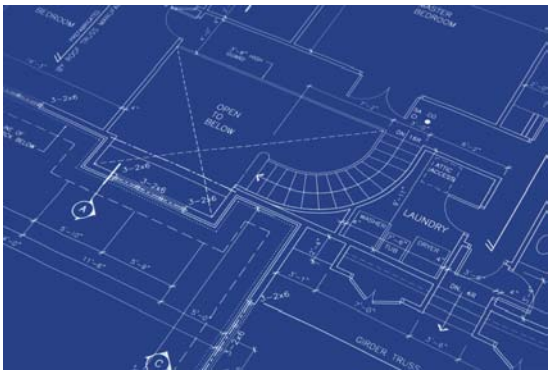
Land Use Category	Flow Coefficient
Single Family Residential*	2 EDU/Acre (490 GPD/Acre)
High Density Residential	10 EDU/Acre (2,450 GPD/Acre)
Commercial/Industrial	1500 GPD/Acre
Public Facility/Schools	1200 GPD/Acre

* Residential flow development is based on 245 gallons per day (GPD) per equivalent dwelling unit (EDU).

8.2.1 Required Capacity- Prerequisite to Building Permit

San Bernardino County Special District Department Design Criteria and Plan Preparation Manual (Manual) forms the basis upon which sewer construction plans are designed and plan checked with the Town of Apple Valley. This document provides specific information on the District's requirements for plan design, approval and permitting, but more importantly details requirements for sizing the sewer and designing it to established standard for proper operation. Supplementing the Manual are the Town of Apple Valley General Sewer Notes and Standard Sewer Detail Sheet. The Director of Public Works through his Contract Public Works Engineer provides a thorough review of all sewer plans for proposed development and redevelopment projects in the Town ensure that: 1) sewers are properly designed with sufficient capacity for current and future base, peak and wet weather flow demands; and 2) any impact of the proposed project on the existing sewer system is mitigated prior to being approved by the Town.

The Town's Contract Public Works Engineer determines what capacity is necessary in each public sewer to provide for the proper collection of sewage in the District. In the event that a development or redevelopment project exceeds the available sewer capacity, the District will withhold the issuance of a building permit until such time as adequate capacity is available or can be made available before the building is occupied.



8.2.2 Capacity

Pipe capacity is determined using Mannings Equation for Open Channel Flow (roughness coefficient equal to 0.013) is used to determine pipe capacities. "75% Full" indicates the peak pipeline capacity when the fluid depth is ¾ the diameter of the pipe.

8.2.3 Design Capacity

All gravity sewer pipes with in the District up to and including 8 inches in diameter are sized to carry peak flows when 50% full. All gravity sewer pipe larger than 8 inches, are sized to carry peak flow when 75% full. The District's standards are consistent with the San Bernardino County Standards for Sanitary Sewers.

8.3 Capacity Enhancement Measures

The submittal of a sewer area or capacity study is the official process for adequately sizing the sanitary sewer located within the District. The Apple Valley Water District requires the satisfactory completion of a capacity study by a state of California Registered Civil Engineer prior to giving approval for any project that can affect the

capacity of the public system. Completed studies are required to analyze the capacity in the existing system and must include mitigation requirements for the developer to ensure adequate capacity. In addition, capacity assessments must justify the sizing of proposed lines to accommodate the peak flows from all areas tributary to the mainline sewer under consideration or pumping station, now and in the future. The approved capacity study is referenced directly by the plan checker when design plans for the new infrastructure are submitted to assure adequate capacity. All proposals for new connection to the existing sewer must also comply with the District's policies for managing available sewer capacity.

Sewer plans for construction are designed by a state of California Registered Civil Engineer and submitted to the District for plan check. In addition, the San Bernardino County Special District Department Design Criteria and Plan Preparation manual and the District's Sewer Call-Out Sheet precepts are used in an iterative plan check process to ensure that the sewer will function properly now and for years to come. APWA Greenbook standards are referenced where more detailed design data is to be specified. Permits for construction of any public sewer infrastructure are not issued until the iterative plan check process has been satisfactorily completed, thus insuring the functional design and adequate capacity of the public sewer collection system.

The Town of Apple Valley program to optimize the use of available sewer capacity and prevent SSO's includes: a Closed Circuit Television (CCTV) program to identify pipe segments needing repairs or with infiltration/inflow (I/I) or tree root intrusion problems; 2) areas subject to FOG blockages; and a Capital Improvement program, to effect repairs or replacement of damaged pipes. Pipe segments identified to be deficient, through a Sewer Capacity Study, will be upgraded utilizing the Town's sewer funds. To date, no systems have been identified as being deficient by the Town of Apple Valley.

9.0 Monitoring, Measurement, and Program Modifications

9.1 Monitoring

The Town of Apple Valley's Director of Public Works and the Field Superintendents all annually review all SSO records, maintenance reports, and other relevant documents/data to evaluate the effectiveness of the key SSMP program elements.

9.2 Effectiveness Evaluation

The evaluation of the Town's SSMP Program Effectiveness is based on such key performance indicators as the total number of overflows, overflow response time, reduction in repeated incidents of SSO at some location, total overflow equal to or greater than 1,000 gallons or reaching the waters of the United States, and reduction in number of overflows that are caused by sewer capacity-related problems.

9.3 Program Modification

The Town will continually update or modify the key elements of its SSMP based on the results of the above mentioned monitoring and program effectiveness evaluations as necessary.

9.4 SSO Trending & Reductions

The annual SSO location maps prepared by the Town of Apple Valley are enclosed in Appendix E. The cause of each SSO incident is also recorded and shown on the map sheets. These maps are used for establishing SSO patterns, identifying hot spots, and for work assignment scheduling by Public Works field personnel.

10.0 SSMP Program Audits and Certification

10.1 SSMP Audits – Introduction

This section of the SSMP outlines the process that the Town will follow in order to evaluate the effectiveness of the SSMP to identify updates that may be needed for a more effective program.

10.2 Regulatory Requirements for SSMP Program Audits

RWQCB Requirement

Each wastewater collection system agency shall conduct an annual audit of their SSMP to identify any deficiencies and recommend steps to correct them (if applicable), appropriate to the size of the system and the number of overflows, and submit a report of such audit.

GWDR Requirement

As part of the SSMP, the Town 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 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 Town's compliance with the SSMP requirements identified in this subsection, including identification of any deficiencies in the SSMP and the recommended steps to correct them.

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10.3 Audits

The Town will audit its implementation and compliance with the provisions of this SSMP on an annual basis. Calendar Year 2011 will be the first year audited.

The audit will be conducted by a team consisting of Town staff selected from the Public Works department. The audit team may include members from other Town departments, outside agencies, and/or consultants.

The scope of the audit will cover each of the major sections of the SSMP. An Audit Checklist (see table 10.1), based on the requirements of the GWDR, will be utilized. The results of the audit, including the identification of any deficiencies and the steps taken or planned to correct them, will be included in an Audit Report.

10.4 SSMP Updates

The Town will determine the need to update its SSMP based on the results of the audit and the performance of its wastewater collection system based on information from the Monitoring and Measuring Program Modifications Section of the SSMP. In the event the Town decides that an update is warranted, the process to complete the update will be identified. The Town will complete the update within one year of the completion of the audit.

Table 10.1 SSMP Audit Checklist

Section	Title	Requirement	SSMP Current?	Implemented?
I	Goals	Reduce, prevent, and mitigate SSOs		
II	Organization	Designate LRO		
		Names and phone numbers for key management personnel		
		Names and phone numbers for key administrative personnel		
		Chain of communication for reporting SSOs		
III	Legal Authority	Prevent illicit discharges to sanitary sewer system		
		Require sewers and connection to be properly designed and constructed		
		Ensure access for inspection, maintenance, and repairs (includes public portion of lateral)		
		Limit discharge of FOG and debris that may cause blockages		
		Require the installation of grease removal devices		
		Ability to inspect FOG producing facilities		
		Enforce violations of the Town's sewer ordinances		
IV	O&M Program	Maintain up-to-date maps of the sanitary sewer system		
		Describe routine preventive maintenance program		

Section	Title	Requirement	SSMP Current?	Implemented?
		Document completed preventive maintenance		
		Rehabilitation and replacement plan that identifies and prioritizes sanitary sewer system defects		
		Provide regular technical training for Town Wastewater division staff		
		Require contractors to maintain appropriate CSLB license(s) in order to perform work on the Town's sanitary sewer system		
		Maintain equipment inventory		
		Maintain critical spare part inventory		
V	Design and Performance Provisions	Design and construction standards for new sanitary sewer system facilities		
		Design and construction standards for repair and rehabilitation of existing sanitary sewer system facilities		
		Procedures for the inspection and acceptance of new sanitary sewer system facilities		
		Procedures for the inspection and acceptance of repaired and rehabilitated sanitary sewer system facilities		
VI	Overflow Emergency Response Plan	Procedures for the notification of primary responders		
		Procedures for the notification of regulatory agencies		
		Program to ensure appropriate response to all SSOs		
		Proper reporting of all SSOs		

Section	Title	Requirement	SSMP Current?	Implemented?
		Procedure to ensure Town staff are aware of and follow SSO reporting procedures		
		Procedure to ensure contractor personnel are aware of and follow SSO reporting procedures		
		Procedures to address emergency operations such as traffic and crowd control		
		Program to prevent the discharge of sewage to surface waters		
		Program to minimize or correct the impacts of any SSOs that occur		
		Program of accelerated monitoring to determine the impacts of any SSOs that occur		
VII	Fog Control Program	Public outreach program that promotes the proper disposal of FOG		
		Plan for the disposal of FOG generated within the Town's service area		
		Demonstrate that the Town has allocated adequate resources for FOG control		
		Identification of sanitary sewer system facilities that have FOG-related problems		
		Program of preventive maintenance for sanitary sewer system facilities that have FOG-related problems		
		Identification of sanitary sewer system facilities that have FOG-related problems		
		Program of preventive maintenance for sanitary sewer system facilities that have FOG-related problems		

Section	Title	Requirement	SSMP Current?	Implemented?
VIII	System Evaluation and Capacity Assurance Plan	Identification of elements of the sanitary sewer system that experience or contribute to SSOs caused by hydraulic deficiencies		
		Established design criteria that provide adequate capacity		
		Short-term CIP that address known hydraulic deficiencies		
		Long-term CIP that address known hydraulic deficiencies		
		Procedures that provide for the analysis, evaluation, and prioritization of hydraulic deficiencies		
		The short- and long-term CIPs include schedules for the correction of each identified hydraulic deficiency		
IX	Monitoring, Measurement, and Program Modifications	Maintain relevant information to establish, evaluate, and prioritize SSMP activities		
		Monitor implementation of the SSMP		
		Measure, where appropriate, performance of the elements of the SSMP		
		Assess success of the Preventive maintenance program		
		Update SSMP program elements based on monitoring or performance		
		Identify and illustrate SSO trends		
X	SSMP Program Audits	Conduct periodic audits (every 2 years)		
		Record the results of the audit in a report		
		Record changes made and any corrective actions taken		

Section	Title	Requirement	SSMP Current?	Implemented?
		SSMP must be updated every five years and recertification is required by the governing board when major edits have been made.		
XI	Communications Program	Communicate with the public regarding the preparation of the SSMP		
		Communicate with the public regarding the performance of the SSMP		
		Communicate with satellite sewer systems (VVWRA)		

Chapter 11.0 Communication Program

11.1 Introduction

This section of the SSMP outlines the process involved in communicating with interested members of the public regarding the development, implementation, and performance of this plan. Communication with satellite agencies is addressed as well.

11.2 Communication Program

The Town 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 Town as the program is implemented.

11.3 SSMP Availability

The Town of Apple Valley SSMP has invited public review and comment throughout the SSMP development process via the Town's website .applevalley. . The final SSMP will be available via the Town's website and will be available for viewing in hard copy form at Town Hall during regular office hours. Additionally, SSMP performance-related inquiries will be directed to the CIWQS public access website found at:

.waterboards.ca.gov/water_issues/programs/ciwqs/publicreports.

Visitors to the site can view Town-specific SSO data and maps.

11.4 Communication with Satellite Agencies

The wastewater collected by the Town of Apple Valley sanitary sewer system is transported to the Victor Valley Wastewater Reclamation Authority (VVWRA) for treatment via an interceptor sewer which runs transversely through the Town. The Town is a member agency of VVWRA via a joint powers agreement and maintains communication with VVWRA on a regular basis by both administrative and Wastewater division staff.

Appendix A: Order No. 2006-003

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

tional compensation, if based on an act or failure to act by the Engineer, or in all other cases within fifteen (15) days after the happening of the event, thing or occurrence giving rise to the potential claim.

When the Contractor considers that any changes ordered involve extra work, he shall immediately notify the Engineer in writing and subsequently keep him informed as to when and where extra work is to be performed and shall make claim for compensation therefor each month not later than the first day of the month following that in which the work claimed to be extra work was performed, and he shall submit records as outlined in Section 10.11 of these General Conditions.

All such claims, in the absence of an approved Contract Change Order, shall state the date of the Engineer's written order and the date of approval by the Owner authorizing the work on which the claim is made.

11.0 CONFLICT.

11.1 CONTROLLING CONTRACTUAL DOCUMENTS.

If there be a conflict between Contractual Drawings and the Specifications, the provisions of the Specifications shall control.

An addendum can modify any of the Contractual Documents and shall control.

11.2 CONTROLLING PARTS OF THE SPECIFICATIONS.

In case of conflict between the Special Conditions and the General Conditions or between the Special Conditions and the Technical Specifications, the Special Conditions shall control in each case. If there is a conflict between the General Conditions and the Technical Specifications, the Technical Specifications shall control.

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT

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COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT

PREFACE TO THE TECHNICAL SPECIFICATIONS SEWERS

1. SUPPLEMENTAL DEFINITIONS TO THE TECHNICAL SPECIFICATIONS.

Whenever in these Technical Specifications the following terms, or pronouns in place of them, are used, the intent and meaning shall be interpreted as defined in the Ordinance and Rules and Regulations of the District which regulate the use and construction of sewerage facilities. These supplemental definitions shall apply only to the interpretation of these Technical Specifications.

CONTRACT — The written agreement covering the performance of the work and the furnishing of labor, materials, tools and equipment in the construction of the work. The Contract shall include the Notice to Contractors, Proposal, plans, specifications and contract bonds; also, any and all written supplemental agreements amending or extending the work in a substantial and acceptable manner. Supplemental agreements covering alterations, amendments or extensions to the Contract and include Contract change orders.

PLANS — The official project plans, profiles, typical cross sections, working drawings and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimensions and details of the work to be performed, and which are to be considered as part of the Contract.

CONTRACTOR — The individual, partnership, corporation, joint venture or other legal entity entering into a contract with the District to perform the work. In case of the work being done under permit issued by the District, the Permittee shall be construed to be the Contractor.

SPECIFICATIONS, TECHNICAL SPECIFICATIONS — The directions, provisions and requirements contained in the Technical Specifications for the District.

WORK — All the work specified, indicated, shown or contemplated in the Contract to construct the improvement, including all alterations, amendments or extensions thereto, made by supplemental agreements or written orders of the Engineer.

2. WORK SCHEDULE.

One (1) week prior to starting construction, the Contractor shall submit to the District, Engineer and Inspector a written work schedule which shall describe the sequence, time and method of operation that he plans to use on the job. The Contractor shall also provide a mobilization schedule, pipe installation schedule, pipe installation crews, and repair and cleaning crews. The Engineer reserves the right to require the Contractor to schedule the work forces necessary to repair damage due to the construction and restore the area of work to its original condition upon completion of any portion of the pipeline installation. The Engineer reserves the right to alter the schedule to permit the possible activation of certain sewers prior to the completion of the work.

The Contractor shall update this schedule once a month, showing work completed and work in progress. The Contractor shall provide the District, Engineer and Inspector copies of this updated schedule.

3. NOTIFICATION.

The Contractor shall notify the District, Engineer and Inspector one (1) week in advance of when he plans to start construction. The Contractor shall immediately notify all involved agencies when intermittent construction, end of construction, or stoppage in construction occurs.

4. SAFETY REQUIREMENTS.

All construction and design shall comply in full with all pertinent provisions of current safety laws and codes of OSHA and other Federal, State and Municipal regulatory agencies.

5. REFERENCED STANDARDS AND SPECIFICATIONS.

All references to other standards and specifications in these Technical Specifications shall imply the latest revision thereto.

6. CONNECTIONS TO EXISTING SYSTEMS.

Sewer construction shall start a minimum of five (5) feet from any existing sewer or manhole. The closing section shall not be installed until all mains and manholes have been cleaned, tested and tentatively accepted, in writing by the District.

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
TECHNICAL SPECIFICATIONS

SECTION 1
EARTHWORK

1.1 GENERAL.

Earthwork includes all plant labor, equipment, appliances and materials as required or necessary to clear, grub, excavate, trench, fill, backfill and grade for the construction of all structures, pipe lines, ditches, embankments and graded areas as shown and specified.

1.2 OBSTRUCTIONS.

All shrubs and brush, stumps and roots, fences, rock, stones, debris, and all obstructions of whatsoever kind or character whether natural or artificial, encountered in the construction of the work shall be removed unless otherwise specified on the construction plans.

In the installation of pipe lines outside of public rights of way or in easements, trees shall not be removed unless otherwise authorized in writing by the Engineer, and all fences, structures and landscaping which are removed or damaged by the Contractor shall be restored to their original condition and/or repaired to the satisfaction of the Engineer as soon as that portion of the work is installed, at the Contractor's expense without any compensation therefor. Any damage done to private property by reason of work on easements shall be the responsibility of the Contractor.

The Contractor shall restore all areas and objects that were damaged or disrupted due to construction activities, to the condition which existed prior to construction. Said restoration shall be completed by the Contractor as a continuing follow-up of any portion of pipe-line construction.

Material that is removed as specified herein is not to be incorporated in the improvement being constructed, shall be disposed of away from the construction site at the Contractor's expense.

The Contractor's attention is directed to the possible existence of pipe and other underground improvements which may or may not be shown on the plans. All reasonable precautions shall be taken to preserve and protect any such improvements whether shown on the plans or not. All improvements necessary to prosecute the work, shall be removed, maintained and permanently replaced at no expense to the District.

1.3 EARTHWORK IN CITY, COUNTY, STATE AND RAILROAD RIGHTS OF WAY.

Earthwork within the rights of way of the State of California, Department of Transportation, County Road Department, and City or other governmental agency having jurisdiction, shall be done in accordance with the requirements and provisions of the permits issued by those agencies for the construction within their respective rights of way. Such requirements and provisions, where applicable, shall take precedence and supersede the provisions of these specifications. The requirements of these technical specifications shall be the minimum requirement.

1.4 SAFETY PRECAUTIONS.

All excavations shall be performed, protected and supported as required for safety and in the manner set forth in the operating rules, orders and regulations prescribed by the Division of Industrial Safety of the Department of Industrial Relations of the State of California. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavation, from sunset each day to sunrise of the next day until such excavation is entirely refilled.

1.5 EXCAVATED MATERIAL.

Arrangements for disposing of excess excavated material shall be made by the Contractor. Excavated material suitable for backfill shall be stored temporarily in such a manner as will facilitate work under the Contract.

1.6 SHORING, SHEETING AND BRACING.

Sheet piling, shoring, sheeting, bracing, or other supports, where necessary, shall be furnished, placed, maintained and removed by the Contractor. Sheet piling and other supports shall be withdrawn in such a manner as to prevent additional backfill on

pipe lines which might cause overloading. At all times, rules of the Division of Industrial Safety of the Department of Industrial Relations of the State of California, with respect to excavation and construction, shall be strictly observed.

In advance of any excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall submit for acceptance of the Owner, or by a registered civil or structural engineer employed by the Owner, to whom the authority to accept has been delegated, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the shoring system standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer. Nothing herein contained shall be deemed to allow the use of shoring, sloping, or protective system less effective than that required by the Construction Safety Orders of the State Division of Industrial Safety. Shoring shall be in compliance with Section 6707 of Chapter 9, Part 1, Division 5 of the Labor Code of the State of California.

Nothing contained in this specification shall be construed to impose tort liability on the Owner, Engineer, or any of their employees.

Section 6500 of the Labor Code requires a permit for trenches five (5) feet or more in depth. The Owner will not issue a permit for trenching operations under this Contract. The Contractor, prior to beginning construction, shall obtain from the State Division of Industrial Safety, a permit authorizing said construction.

1.7 CLEARING AND GRUBBING.

Areas where construction is to be performed, shall be cleared of all trees, shrubs, brush, rubbish, and other objectionable material of any kind which, if left in place, would interfere with the proper performance or completion of the contemplated work, would impair its subsequent use, or form obstructions therein. Trees and other natural growths outside the actual lines of construction operations shall not be destroyed, and such measures as are necessary shall be taken by the Contractor for the protection thereof.

Organic material from clearing and grubbing operations will not be permitted for use as excavation backfill.

It shall be the Contractor's responsibility, at his own expense, to remove and dispose of all excess material resulting from clearing and grubbing operations. The Contractor shall make his own arrangements fo disposal sites, where said material may be wasted.

1.8 CONTROL OF WATER.

The Contractor shall provide and maintain at all times during construction, ample means and devices with which to promptly remove and dispose of all water entering the excavations or other parts of the work. No concrete footings or floors shall be laid in water nor shall water be allowed to rise over them until the concrete or mortar has set at least eight (8) hours. Water shall not be allowed to rise unequally against walls for a period of twenty-eight (28) days. Groundwater shall not be allowed to rise around pipe installations until jointing compound in the joints has set.

The Contractor shall dispose of water from the work in a suitable manner, without damage to adjacent property. No water shall be drained into work built or under construction. Water shall be disposed of in such a manner as not to be a menace to public health.

Dewatering for structures and pipe lines shall commence when groundwater is first encountered, and shall be continuous until such times as wate may be allowed to rise in accordance with the provisions of this section.

1.9 PIPELINE EXCAVATION.

1.9.01 Excavation — Excavation for pipelines, fittings, valves, and appurtenances shall be open trench to the depth and in the direction necessary for the proper installation of the same as shown on the plans or as otherwise directed by the Engineer, except where another method is specifically called for on the plans or in these specifications.

1.9.02 Limit of Excavation. — Except with specific approval of the Engineer, no more than four hundred (400) feet of open trench shall be excavated in advance of laying of pipe. All operations shall be carried out in an orderly fashion. Backfilling and clean-up work shall be accomplished as sections of the pipe installation are approved. Public travel through the work shall be impeded or obstructed as little as possible. At the end of each working day, there shall be a maximum of fifty (50) feet of open trench excluding manhole excavations for each oper-

ation. The remainder of the trench excavated that day shall be backfilled, compacted, and the roadway opened to the public.

At the end of each week, all trenches, including manhole excavations shall be backfilled, compacted, and the roadway opened to the public on Saturday, Sunday, and holidays.

The Contractor shall make the necessary arrangements for, and shall remove and dispose of all excess waste material from the site of the work as portions of the pipe line and appurtenances are installed.

1.9.03 Tunneling. — Tunneling will be permitted only where native earth is of such firmness that it will remain in its original position without sloughing off, throughout the work of excavation and backfilling. If sloughing occurs, the roof of the tunnel shall be broken down and the trench excavated as an open trench as herein specified.

1.9.04 Trench Width. — Banks of open cut trenches shall be kept as nearly vertical as possible. Where necessary in order to maintain the banks nearly vertical, the trench shall be properly sheeted and braced. The over-all trench width shall not be more than sixteen (16) inches or less than twelve (12) inches wider than the largest outside diameter of the pipe to be laid therein, measured at a point twelve (12) inches above the top of the pipe exclusive of the branches. Excavation and trenching shall be true to line so that a clear space of not more than eight (8) inches or less than six (6) inches in width is provided on each side of the largest outside diameter of the pipe in place. For the purpose of this section, the largest outside diameter shall be the outside diameter of the coupling.

1.9.05 Correction of Faulty Grades. — Should the excavation for the pipe line be carried below grade without instruction from the Engineer, it shall be refilled to proper grade with pipe-zone material compacted to ninety percent (90%) or crushed rock, at the expense of the Contractor. If compaction tests are required, they shall be at the expense of the Contractor.

1.10 PIPE FOUNDATION AND/OR SUBGRADE.

1.10.01 Foundations in Good Soil. — The trench shall have a flat or semi-circular bottom conforming to the grade to which the pipe is to be laid.

1.10.02 Foundations in Poor Soil. — All soft, spongy, or unstable material in the bottom of the trench shall be removed and replaced with approved material to a depth as determined in the field by the Engineer. The approved material shall be compacted to ninety percent (90%) to provide an unyielding foundation for the pipe. The removal and replacement of material from depths greater than two (2) feet below the grade shown on the plans, will be considered as Extra Work.

1.10.03 Foundation in Rock. — Where rock is encountered, it shall be removed below grade and the trench backfilled with suitable material to provide a compacted earth cushion with a thickness under the pipe of not less than one-half (½) inch per inch of nominal diameter of the pipe to be installed, with a minimum allowable thickness of six (6) inches.

1.11 TRENCH BACKFILL.

1.11.01 General. — All trenches shall be backfilled after pipe, fittings, valves and appurtenances have been installed. Whenever a relative compaction requirement value is specified hereunder, the optimum moisture content and density shall be determined in accordance with the State of California, Department of Transportation, Test Method No. California 216 or ASTM D1557.

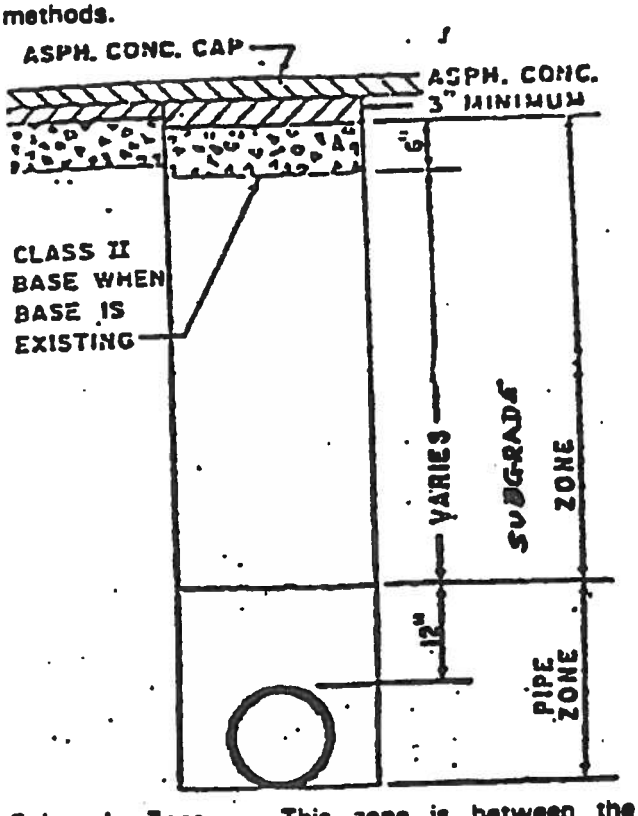
All wood and waste material shall be removed from excavation preparatory to backfilling. Backfill material shall be approved in all cases by the Engineer and shall be free of trash, wood, large rock, or other objectionable debris. Backfilling shall include the refilling and compacting of the fill in trenches or excavations up to the subgrade of the street or to the existing ground surface.

1.11.02 Procedure in Pipe Zone. — Selected backfill material consisting of granular material free from stone, clods, clay, or other deleterious material shall be placed in the trench simultaneously on each side of the pipe for the full width of the trench, in layers of about six (6) inches in depth. Granular backfill with a minimum sand equivalent of 30, when tested in accordance with the California Department of Transportation, Test Method No. California 217, will be required in the pipe zone, and the water densification method shall be used to densify the material in the pipe zone. When the excavated material is not granular as mentioned above, the Contractor shall import, at their own expense, and place a suitable granular backfill material. Particular attention is to be

given to the underside of the pipe and fittings to provide a firm bedding support along the full length of the pipe. Care shall be exercised in backfilling to avoid damage to the pipe. The pipe zone shall be considered to extend to twelve (12) inches above the top of pipe.

1.11.03 Procedure Above Pipe Zone. — From the top of the pipe-zone backfill to ground surface, the material for backfill may contain stones ranging in size up to six (6) inches in diameter, in quantity not exceeding forty percent (40%) of the volume when said coarse materials are well distributed throughout the finer materials and the specified compaction may be attained.

1.11.04 Compaction Above Pipe Zone. — Where it is important that the backfill be made safe for vehicular traffic or for the support of structures, the backfill shall be compacted to the densities indicated below in conformance with approved compaction methods.



Subgrade Zone. — This zone is between the subgrade of the aggregate base or the surfacing, and the pipe zone. Backfill in this zone shall be compacted to ninety percent (90%) relative compaction except the upper six (6) inches which shall be compacted to ninety-five percent (95%) relative compaction.

1.11.05 Compaction in Easements. — In easements and open terrain where the degree of compaction is less important, the backfill, if sufficiently granular in nature (sand equivalent of 20 or greater), shall be consolidated by a water densification method. If the backfill is not sufficiently granular in nature, the backfill shall be consolidated by a method approved by the Engineer. Backfill in easements and open terrain shall be compacted to eighty-five percent (85%) relative compaction.

1.11.06 Mechanically Compacted Backfill. — Mechanically compacted backfill shall be placed in horizontal layers of depths compatible to the material being placed and the type of equipment being used. All such equipment shall be of a size and type approved by the Engineer. Each layer shall be evenly spread, moistened (or dried, if necessary), and then tamped or rolled until the specified relative compaction has been attained. Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage to adjacent ground, existing improvements, or improvements installed under the contract. The Contractor shall make his own determination in this regard. Any damage which results shall be the responsibility of the Contractor and shall be repaired or replaced at the Contractor's expense.

1.11.07 Water Densified Backfill. — As used in these specifications, flooding shall mean the inundation of backfill with water, puddled with poles or bars to insure saturation of the backfill material for its full depth. Jetting shall be accomplished by the use of a jet pipe to which a hose is attached, carrying a continuous supply of water under pressure.

1.11.08 Requirements for Densification by Jetting. — Densification by jetting shall be subject to all of the following requirements:

(a) **Application of Water.** — The Contractor shall apply water in a quantity and at a rate sufficient to thoroughly saturate the entire thickness of the lift being densified. Water for jetting shall be from a continuous supply of water under pressure.

(b) **Use of Vibration.** — Where densities are required which cannot be attained by jetting alone, the Engineer may direct the Contractor to supplement the jetting process with the application of vibrating compacting equipment to the backfill.

(c) **Lift Thickness.** — The lift of the backfill shall not exceed that which can be readily densified by the

jetting procedure, but in no case shall the undensified lift exceed ten (10) feet for jetting.

(d) **Character of Material.** — The material being used with the water-settling methods to backfill the trenches in street rights of way shall have a sand equivalent of at least 20 when tested in accordance with the State of California, Department of Transportation Test Method No. California 217. Where the nature of the material excavated from the trench is generally unsuitable for densification with water, the Contractor may, at no cost to the District, import suitable material for jetting, or densify the excavated material by other methods. If water densification methods are employed, the Contractor shall, at his expense, provide a sump and pump to remove the accumulated water from the downstream end of the construction.

(e) **Damage to Adjacent Improvements.** — The Contractor shall make his own determination that the use of flooding or jetting methods will not result in damage to existing improvements. Permission to use such methods in densifying backfill shall not be construed as guaranteeing or implying that adjacent ground and improvements will be unaffected.

1.11.09 Compaction Test. — Compaction shall be tested in accordance with the methods specified by the State of California Department of Transportation Method No. California 216, or ASTM D1557.

Compaction test of the backfill will be required approximately every three hundred (300) feet, or more often if tests indicate the need, along the alignment on the main pipe line and, in addition, of approximately twenty percent (20%) of all laterals within the street rights of way. The tests shall be made at varying depths.

The Contractor, at his expense, shall excavate the holes for all of the tests, backfill the holes and compact this backfill, and pave the surface, if required, after the test.

1.11.10 Excess Excavated Material. — The Contractor shall make the necessary arrangements for and shall remove and dispose of all excess of waste material. All costs for the disposal of excess of waste material shall be borne by the Contractor.

It is the intent of these specifications that all surplus material not required for backfill shall be disposed of by the Contractor outside the limits of the public rights of way and in accordance with the requirement of the County Code, Title 6, Division 8, or ordinance of any other agencies having jurisdiction, at no cost to the District.

Excavated material shall not be deposited on private property unless written permission from the owner thereof is secured by the Contractor. Copies of said written permission, duly signed by the owner of the private property involved, shall be furnished to the Engineer by the Contractor before such material is placed on private property.

1.11.11 Imported Backfill Material. — Whenever the excavated material is unsuitable for backfill, the Contractor shall arrange for and furnish imported backfill material per Sections 1.11.02 and 1.11.08(d) of this specification, at his own expense. He shall dispose of the excess trench excavation as specified in the preceding paragraph. The backfilling with imported material shall be done in accordance with the methods described.

1.11.12 Completion of Cleanup. — The Contractor shall restore all areas and objects that were damaged or disrupted due to construction activities to a condition equal to that prior to construction. All fences, walls, shrubs, sprinkler systems, substructures or any other improvement removed or disturbed by the Contractor during construction, shall be replaced and/or repaired to the satisfaction of the Engineer immediately as that portion of the pipe line is installed, at the Contractor's expense. Said restoration shall be completed by the Contractor as an immediate follow-up to any portion of the pipe line installation.

1.12 STRUCTURAL EARTHWORK.

1.12.01 Structural Excavation. — The site shall be cleared of all natural obstructions, pavements, utilities and other items which will interfere with construction. Any method of excavation may be employed which, in the opinion of the Contractor, is considered best. Ground shall not be dug by machinery nearer than three (3) inches from any finished subgrade without the express approval of the Engineer. The last three (3) inches shall be removed without disturbing the subgrade. Should the excavation be carried below the lines and grades indicated on the plans, the Contractor shall, at his own expense, refill such excavated space to the proper elevation in accordance with the procedures specified for backfill, or, if under footings, the space shall be filled with concrete.

Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal

of forms, installation of services, and for inspection, except where concrete is authorized to be deposited directly against excavated surfaces.

1.12.02 **Structural Backfilling.** — After completion of foundation footings and walls, and of other construction below the elevation of the final grade, and prior to backfilling, all forms shall be removed and the excavation shall be cleaned of all debris. Unless otherwise shown, material for backfilling shall consist of excavated material, or imported sand, gravel, or other material approved by the Engineer, and shall be free of lumps, hard material exceeding six (6) inches in greatest dimension, trash, lumber, or other debris. Backfill shall be placed in horizontal layers not exceeding nine (9) inches in thickness, and shall have a moisture content such that the required degree of compaction may be obtained. Each layer shall be compacted by hand or machine tampers or by other suitable equipment or means, to a relative compaction of at least ninety percent (90%). Dewatering shall be maintained during the placement of compacted, clayey backfill.

1.12.03 **Stripping.** — All vegetation, such as roots, brush, heavy sods, heavy growths of grass and all decayed vegetable matter, rubbish, and other unsuitable material within the area of work, shall be stripped or otherwise removed before fill is started.

1.12.04 **Grading.** — After stripping has been done, excavation of every description and of whatever substance encountered within the grading limits of the work, shall be performed to the lines and grades indicated on the drawings. All suitable excavated material shall be transported to and placed in the fill area within the limits of the work. All excavated materials which are considered unsuitable by the Engineer and any surplus of excavated material which is not required for fill, shall be known as waste and shall be disposed of as directed in Section 1.11.10 of this specification. Construction, excavation and filling shall be performed in a manner and sequence that will provide drainage at all times.

Ditches shall be cut accurately to the cross sections and grades indicated. Any excessive ditch excavation shall be backfilled to grade either with suitable, thoroughly compacted material, or with suitable stone or cobble to form an adequate paving.

Surfaces under paved areas, dikes and elsewhere as directed by the Engineer, shall be wetted and compacted prior to placing fill.

1.12.05 **Fill.** — Fills or embankment shall be constructed at the locations and to the lines and grades indicated on the plans. Suitable material from excavations may be used for fill. Material shall be placed in horizontal layers of from eight (8) to twelve (12) inches in loose depth for the full width of the cross section and compacted as specified.

For general fill areas, the fill shall be compacted to ninety percent (90%) relative compaction.

For roadways and all areas to be paved, the fill shall be compacted, by means of a tamping roller or three-wheel power roller, to at least ninety percent (90%) relative compaction.

Dikes and embankments shall be compacted by the use of compaction rollers or three-wheel power rollers to ninety percent (90%) compaction.

Relative compaction shall be as determined in accordance with the State of California Department of Transportation, Test Method No. California 216, or ASTM D1557.

1.12.06 **Finish Grading.** — All areas covered by the work, including excavated and filled sections and transition areas, shall be graded uniformly to the elevations shown on the plans. The finished surface shall be reasonably smooth, compacted, and free from any irregular surface changes. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations. The finished surface shall not be more than two-tenths (0.2) foot above or below the established grade. Ditches shall be paved to drain readily. The surface of areas to be paved, on which a surface course is to be placed, shall not vary more than five-hundredths (0.05) foot from established grade and approved cross section.

1.12.07 **County and City Grading Ordinances.** — In addition to the requirements herein set forth for structural earthwork, all work shall be in accordance with the requirements of the County Code, Title 6, Division 8, or ordinance of any other agencies having jurisdiction.

1.13 DRILLING AND BLASTING.

1.13.01 **Use of Explosives.** — All operations, storage and handling of explosives shall be according to provisions of Division II, Part I, of the Health and Safety Code, State of California, and shall comply with all State, County and local laws.

Curing compound shall form a continuous, unbroken membrane which shall adhere to moist concrete and which will neither disintegrate, check, peel from the surface, nor show signs of such deterioration within thirty (30) days after application under actual working conditions. The compound shall be sufficiently transparent and free from color that there will be no permanent change in the color of the concrete. The compound shall contain, however, a temporary dye of sufficient color to make the membrane clearly visible for a period of at least four (4) hours after application. If the Contractor applies a deleterious compound to paint, plaster, gunite, or other surface treatment, the surface shall be thoroughly sandblasted to remove all vestiges of the compound at the Contractor's expense.

2.24 PROTECTION OF CONCRETE CONSTRUCTION.

All surfaces shall be protected against injury. Wheeling, working, or walking on the concrete shall not be permitted during the first seventy-two (72) hours after placing. All slabs subject to wear shall be covered with a layer of sand or other suitable material as soon as the concrete has set, and shall either be cured by the use of a curing compound or shall be kept wet for not less than fourteen (14) days, or shall be kept covered for the same period with Sisalcraft paper or other similar tough waterproof paper. All joints between adjacent strips of paper shall be sealed.

No concrete shall be placed during rain; and during such weather, all concrete placed within the preceding twelve (12) hours shall be protected with waterproof canvas or other suitable coverings. These coverings shall be provided and kept ready at hand.

All concrete construction shall be protected from excessive loadings.

2.25 REPAIR AND PATCHING.

After removing forms and before the concrete is thoroughly dry, any poor joints, voids, stone pockets or other defective areas and all tie holes shall be patched. Defective areas shall be chipped away to a depth of not less than one (1) inch with the edges perpendicular to the surface. The area to be patched with a space of at least six (6) inches wide entirely surrounding it shall be wetted to prevent absorption of water from the patching mortar. The patch shall be made of the same materials and proportions as used for the concrete, except that the coarse aggregate shall be omitted and white Portland cement substituted for a part of grey Portland cement. The amount of mixing water shall be as little as consistent with the requirements of handling and placing.

The mortar shall be thoroughly compacted into place slightly higher than the surrounding surface. After being undisturbed for one to two (1 to 2) hours to permit initial shrinkage, the patch shall be finished to match the adjoining surface.

Tie holes left by the withdrawal of form clamp rods or holes left by removal of snap ties shall be filled solid with mortar. For holes passing entirely through the wall, a plunger-type grease gun or other device shall be used to force mortar through the wall, starting at the back face. When the hole is completely filled, the excess mortar shall be struck off with a cloth, flush with the surface. Holes not passing entirely through the wall shall be filled with a small tool that will permit packing the hole solid with mortar, any excess mortar being struck off flush with the surface.

2.26 PLACING REINFORCING STEEL.

Reinforcing steel, before being positioned, shall be cleaned thoroughly of mill and rust scale or other coating that will destroy or reduce the bond. Reinforcement appreciably reduced in section shall be rejected. Where there is delay in depositing the concrete, reinforcement shall be reinspected and, when necessary, cleaned.

Reinforcement shall be carefully formed as indicated on the drawings. Stirrups and tie bars shall be bent around a pin having a diameter of not less than three (3) times the diameter of the bar. Except where specifically indicated otherwise on the drawings, bends for other bars shall be made around a pin having a diameter of not less than six (6) bar diameters. All bars shall be bent cold. Reinforcing steel shall not be bent or straightened in a manner that will injure the material. Bars with kinks or bends not shown on the drawings shall not be used. Heating of bars will be permitted only when the entire operation is approved by the Engineer.

Reinforcing steel shall be positioned accurately and secured against displacement by using annealed iron wire or suitable clips at intersections and shall be supported by concrete chairs or spacers, or metal hangers.

opportunity to check the forms for accuracy, cleanliness and position of reinforcing before the placing is started. Concrete shall not be placed in the forms unless the Engineer has been notified twenty-four (24) hours in advance of concrete placement.

2.19 SUBGRADE PREPARATION.

Subgrade for slabs over native earth or fill shall be finished to exact location and section of bottom of slab and shall be maintained in a smooth, compacted condition, until concrete is placed. Subgrade shall be thoroughly moistened but not muddy, at time concrete is placed.

2.20 COMPACTING.

Concrete, during and immediately after depositing shall be thoroughly worked around the reinforcement and embedded fixtures and into corners of the forms. Internal vibrators shall be used for all walls, and self-supporting beams or slabs. Vibrators shall be handled by experienced workmen and care shall be taken to avoid separation of aggregate due to over vibration. At least one (1) vibrator shall be used for each fifteen (15) cubic yards per hour of concrete placed. Standby vibrators shall be kept on hand.

2.21 CONSTRUCTION JOINTS.

Concrete in each unit of construction shall be placed continuously, and the Contractor shall not be permitted to begin work on any part unless his facilities and forces are sufficient to complete the unit without interruption. All joints in concrete shall be located as indicated on the drawings and as approved by the Engineer. The Contractor shall submit to the Engineer for approval, drawings marked to show the location and sequence of pours.

All construction joints shall be made as watertight as possible. A waterstop shall be provided where called for on the drawings or where deemed necessary by the Engineer. Where these methods fail, the joint shall be grouted under pressure after the concrete has set and forms have been removed.

The surfaces of construction joints in any location shall be thoroughly cleaned and roughened by dry method sandblasting to remove all laitance and expose aggregate solidly embedded in the mortar matrix.

2.22 BONDING.

Before new concrete is deposited on or against concrete which has set, the forms shall be retightened, the surface of the set concrete shall be roughened, thoroughly cleaned of foreign matter and laitance as specified under Section 2.21 "Construction Joints," and sprayed with water so that the concrete is saturated but no free water is left on the surface. The new concrete placed in contact with hardened or partially hardened concrete, shall contain an excess of mortar to insure bond. To insure this excess mortar at the juncture of the hardened and newly deposited concrete on vertical and inclined surfaces, the cleaned and saturated surfaces of the hardened concrete shall first be slushed with a coating of neat cement grout against which the new concrete shall be placed before the grout has attained its initial set. For horizontal surfaces, a layer at least one (1) inch thick of cement mortar composed of one (1) part cement and two (2) parts sand shall be placed before depositing the concrete.

2.23 CURING.

(a) **Water Curing.** — Uniformed concrete surfaces shall be covered with wet burlap mats as soon as the concrete has sufficiently set, and shall thereafter be kept wet under wet burlap until backfilled or for fourteen (14) days after the concrete is placed. Where drying conditions are severe, as determined by the Engineer, fog sprays shall be employed to prevent checking of the fresh concrete surface. Immediately following the first leveling, the fog spray will absorb moisture and shall be discontinued when the applied moisture is rejected. Fog spraying shall be continued as specified until the finished surface has attained sufficient strength to permit flooding or covering with burlap mats.

Formed surfaces, both interior and exterior, shall be water cured under burlap mats or by water sprays beginning as soon as the forms are stripped. Prior to stripping of forms, the concrete shall be kept moist by the water sprays.

(b) **Curing Compounds.** — With the approval of the Engineer, concrete surfaces may be cured by curing compound as defined below. Any concrete curing compound shall be of a nature and composition not deleterious to concrete, and thinned to a working consistency either with a volatile solvent or by emulsification with water. The curing compound shall be of a standard and uniform quality ready for use as shipped by the manufacturer.

and tested, as specified for the job concrete. Certified copies of all laboratory reports shall be sent promptly to the Engineer directly from the testing laboratory, stating whether the items reported meet the specifications. A final report shall be submitted at the completion of all concreting, summarizing all findings concerned with concrete used in the project.

If more than one (1) supplier of concrete is used by the Contractor, each shall submit his mix design as described above. When concrete is used for architectural work, only one (1) supplier will be allowed.

2.13 JOINT FILLER.

Preformed fillers shall be of the type indicated on the drawings and shall be as indicated on the drawings.

2.14 WATERSTOPS.

Waterstops shall be installed where so indicated on the drawings. Waterstops shall be of polyvinyl chloride plastic, "Burke Vinylok" type RB 316-4, medium duty or approved equal. Proper care in placing of waterstops in forms shall be exercised so that the center bulb coincides with the construction joint. When concrete is being placed, it shall be properly vibrated to insure density at waterstops location. Waterstops shall be made continuous at splices and intersections (horizontal and/or vertical) by "welding" with a polyvinyl chloride splicing iron.

2.15 MIXING.

(a) Job mixing of structural concrete will not be permitted unless otherwise specified. When allowed, concrete shall be mixed in a batch mixer of approved type which will insure a uniform distribution of the materials throughout the mass, so that the mixture is uniform in color and homogeneous. All concrete shall be placed within one (1) hour after water is first added to the batch. The mixer shall be equipped with a suitable charging hopper, a water storage, and water-measuring device controlled from a case which may be kept locked and so constructed that the water may be discharged only while the mixer is being charged. The entire contents of the mixing drum shall be discharged before recharging. The mixer shall be cleaned at frequent intervals while in use. The volume of mixed materials per batch shall not exceed the rated capacity of the mixer.

(b) Transit-mixed concrete shall be batched, mixed and delivered in accordance with ASTM C 94, except that truck agitators may not be used. All concrete shall be deposited in place not more than forty-five (45) minutes after water is added when the temperature of the concrete exceeds 85 °F. Certified, public weighmaster tickets shall be delivered to the Engineer or his representative in the field prior to placing the concrete to which the ticket applies.

2.16 CONSISTENCY.

The quantity of water required for proper consistency of the concrete shall be determined by the slump test, in accordance with ASTM C 143. Unless otherwise stated, slump allowances shall be as follows:

Vertical Wall Sections, Columns. — Maximum four (4) inches ± one (1) inch.

Floor Slabs, Beams, Footings. — Maximum three (3) inches ± one-half (½) inch.

2.17 RETEMPERING.

Retempering of concrete which has hardened; that is, mixing with or without cement, aggregate, or water, will not be pi

2.18 DEPOSITING.

Concrete shall not be placed until the forms forcement have been approved by the E Concrete shall be conveyed from the mixe place of final deposit as rapidly as posi methods which will prevent the separation o ingredients. It shall be deposited in the f nearly as practicable in its final position with over one and one half (1 ½) feet high, so as t tain a plastic surface approximately hor Concrete shall not be dropped more than e feet unless a suitable chute or tube is used. for walls, or other sections of considerable shall be provided with openings, or other shall be used which will avoid accumulati hardened concrete on the forms or metal rei ment. Under no circumstances shall concre has partially hardened be deposited in the Temporary joints shall not remain exposed fo than forty-five (45) minutes before ad concrete is placed. Concrete shall be contin inspected by the inspector, who shall be affor

weight of shale or cherty material; and shall show a loss of not more than ten percent (10%) when tested for soundness in sodium sulfate solution in accordance with ASTM C 88. Coarse aggregate shall be graded uniformly from one-quarter (¼) inch size to maximum size. The combined grading of coarse and fine aggregate shall fall within the following percentages by weight:

	Percentage Passing Sieves		
Sieve Size	1-1/2 in. Max.	1 in. Max.	3/4 in. Max.
2 in.	100		
1-1/2 in.	90-100	100	
1 in.	50-86	90-100	100
3/4 in.	45-75	80-90	90-100
3/8 in	38-55	65-85	60-80
No. 4	30-45	35-50	40-60
No. 8	23-35	25-40	30-45
No. 16	12-27	19-30	20-35
No. 30	10-17	12-20	13-23
No. 50	4-9	5-10	5-15
No. 100	1-3	1-4	1-5
No. 200	0-2	0-2	0-2

2.7 MIXING WATER.

Mixing water shall be clean and free from deleterious amounts of acids, alkalies, salts or organic materials.

2.8 ADMIXTURES.

Unless otherwise specified or directed by the Engineer, water-reducing admixtures shall be used to reduce the required mixing water, for equivalent slump in plain concrete, at least ten percent (10%). If the admixture used entrains more than two percent (2%) air, the water reduction shall be an additional two percent (2%) for each percent of air entrained over two percent (2%), but in no case shall air entrained exceed five percent (5%).

Air-entraining admixtures shall be included in the mix design. The combined admixtures shall entrain five percent (5%) plus or minus one percent (1%). Acceptable admixtures are those manufactured by Master Builders, Superior Concrete Emulsions and Sika Chemical Corporation. Admixtures containing calcium chloride will not be approved.

2.9 OTHER ADMIXTURES.

No other admixtures shall be used without the Engineer's approval.

2.10 REINFORCING STEEL.

Reinforcing steel shall consist of deformed bars of the size called for on the drawings. Reinforcing steel shall conform to ASTM A 615, and shall be either Grade 40 or Grade 60. Deformations shall conform to ASTM A 615. If specified, mill certificates shall be furnished to the Engineer for each melt if so requested. Wire reinforcement shall conform to ASTM A 82. Placing sheets and bending schedules shall be submitted to the Engineer before placing.

2.11 TEST ON CONCRETE.

Test cylinders of all concrete shall be made in accordance with ASTM C 31 and C 39. A minimum of three (3) cylinders per each one hundred (100) cubic yards of concrete or portion thereof shall be made. One (1) cylinder shall be tested at seven (7) days and one (1) cylinder at twenty eight (28) days. If test cylinders fail to indicate required strength as specified, cores shall be taken as required by the Engineer and tested in accordance with ASTM C 42, all at Contractor's expense.

If more than one in ten (1 in 10) laboratory control strength test cylinders for any structure fall below the specified compressive strength, the Engineer shall have the right to order a change in proportions or the water content of the concrete for the remaining structures. If the strength of any cured cylinders falls below the specified compressive strength, assuming they have received protection and curing equivalent to concrete in the structure, the Engineer shall have the right to require new mix design with trial batch necessary to secure the required strength and may require tests in accordanca with ASTM C 42, or order load tests to be made on the structures so affected.

2.12 MIX DESIGN.

Before beginning concrete work, the proper proportions of materials for each class of concrete shall be determined by the Contractor and/or his supplier. The mix design shall be prepared at the Contractor's expense, by a recognized inspection and testing laboratory approved by the Engineer, and shall show the expected strengths and corresponding slumps, and all ingredient weights and other physical properties necessary to check the design mix. A trial batch shall be made for Class I, II and III concrete to be used on the job, and from each batch, four (4) standard test cylinders shall be cast, cured

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
TECHNICAL SPECIFICATIONS

SECTION 2
CONCRETE CONSTRUCTION

2.1 SCOPE.

The Contractor shall furnish all labor, equipment, materials and appliances necessary to complete construction of Portland cement concrete as shown on the drawings and as specified herein.

2.2 COMPOSITION.

Concrete shall be composed of Portland cement, sand, coarse aggregate, waste, and admixtures as specified or approved, all well mixed and brought to the proper consistency suitable for the specific conditions of placement and in accordance with the requirements of this specification.

2.3 CLASSES OF CON

All Portland cement use
the classes described
stated, each class shall
listed:

(a) Class I. — Compr
min.

Mix — 6-sack minim
cement)

7-sack, test not require

Use — Walls, beams, sl

Equivalent California Sta
tation, Class D (for 7-sa

(b) Class II. — Compres
min.

Mix — 6-sack minimu
cement)

Use — Walls, beams,
specified.)

Equivalent California Stat
tation, Class D.

(c) Class III. — Compr
psi min.

Mix — 6-sack, test not required.

Use — Slabs, footings, walls (where specified).

Equivalent California State Department of Transportation, Class A.

(d) Class IV. — Compressive Strength — 2,500 psi min.

Mix — 5-sack, test not required.

Use — Paving, cradles, curbs, gutters, sidewalks, thrust blocks, manhole bases, pipe easements, or where specified.

Equivalent California State Department of Transportation, Class B.

2.4 PORTLAND CEMENT.

se specified, Portland Cement shall
II, or Type V, complying with ASTM
all have a total alkali content not
-tenths percent (0.6%) when
sodium oxide as determined by
in ASTM C 114. There shall not be a
d of cement during course of work
ritten approval of the Engineer.

washed natural sand having hard,
able particles, and which does not
an two percent (2%) by weight or
substances as clay lumps, shale,
ca, coated grains, or soft and flaky
hall be graded uniformly from fine to
at the combined grading of coarse
and set forth in Paragraph 2.6. will
than three percent (3%) shall pass
en as determined by ASTM C 117.

GREGATE.

e shall be a clean, hard, fine-
d, sound crushed rock, or washed
ation of both. It shall be free from
oil, organic matter or other deleterious substances
and shall not contain more than two percent (2%) by

1.13.02 **Skilled Workmen.** — Drilling and blasting are to be done only by personnel skilled in rock techniques.

1.13.03 **Safety.** — All necessary precautions shall be taken for protection of life and property. Warnings shall be given to nearby property owners that blasting is in progress. Safety mats shall be used to restrict flying particles. The Contractor shall size each "shot" to minimize nuisance and reduce the possibility of damage to local structures.

1.14 FINAL CLEANUP.

After all earthwork operations have been completed, the right of way and all other areas shall be dressed smooth and left in a neat and presentable condition to the satisfaction of the Engineer and Owner.

opportunity to check the forms for accuracy, cleanness and position of reinforcing before the placing is started. Concrete shall not be placed in the forms unless the Engineer has been notified twenty-four (24) hours in advance of concrete placement.

2.19 SUBGRADE PREPARATION.

Subgrade for slabs over native earth or fill shall be finished to exact location and section of bottom of slab and shall be maintained in a smooth, compacted condition, until concrete is placed. Subgrade shall be thoroughly moistened but not muddy, at time concrete is placed.

2.20 COMPACTING.

Concrete, during and immediately after depositing shall be thoroughly worked around the reinforcement and embedded fixtures and into corners of the forms. Internal vibrators shall be used for all walls, and self-supporting beams or slabs. Vibrators shall be handled by experienced workmen and care shall be taken to avoid separation of aggregate due to over vibration. At least one (1) vibrator shall be used for each fifteen (15) cubic yards per hour of concrete placed. Standby vibrators shall be kept on hand.

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Concrete in each unit of construction shall be placed continuously, and the Contractor shall not be permitted to begin work on any part unless his facilities and forces are sufficient to complete the unit without interruption. All joints in concrete shall be located as indicated on the drawings and as approved by the Engineer. The Contractor shall submit to the Engineer for approval, drawings marked to show the location and sequence of pours.

All construction joints shall be made as watertight as possible. A waterstop shall be provided where called for on the drawings or where deemed necessary by the Engineer. Where these methods fail, the joint shall be grouted under pressure after the concrete has set and forms have been removed.

The surfaces of construction joints in any location shall be thoroughly cleaned and roughened by dry method sandblasting to remove all laitance and expose aggregate solidly embedded in the mortar matrix.

2.22 BONDING.

Before new concrete is deposited on or against concrete which has set, the forms shall be retightened, the surface of the set concrete shall be roughened, thoroughly cleaned of foreign matter and laitance as specified under Section 2.21 "Construction Joints," and sprayed with water so that the concrete is saturated but no free water is left on the surface. The new concrete placed in contact with hardened or partially hardened concrete, shall contain an excess of mortar to insure bond. To insure this excess mortar at the juncture of the hardened and newly deposited concrete on vertical and inclined surfaces, the cleaned and saturated surfaces of the hardened concrete shall first be slushed with a coating of neat cement grout against which the new concrete shall be placed before the grout has attained its initial set. For horizontal surfaces, a layer at least one (1) inch thick of cement mortar composed of one (1) part cement and two (2) parts sand shall be placed before depositing the concrete.

2.23 CURING.

(a) **Water Curing.** — Uniformed concrete surfaces, shall be covered with wet burlap mats as soon as the concrete has sufficiently set, and shall thereafter be kept wet under wet burlap until backfilled or for fourteen (14) days after the concrete is placed. Where drying conditions are severe, as determined by the Engineer, fog sprays shall be employed to prevent checking of the fresh concrete surface. Immediately following the first leveling, the fog spray will absorb moisture and shall be discontinued when the applied moisture is rejected. Fog spraying shall be continued as specified until the finished surface has attained sufficient strength to permit flooding or covering with burlap mats.

Formed surfaces, both interior and exterior, shall be water cured under burlap mats or by water sprays beginning as soon as the forms are stripped. Prior to stripping of forms, the concrete shall be kept moist by the water sprays.

(b) **Curing Compounds.** — With the approval of the Engineer, concrete surfaces may be cured by curing compound as defined below. Any concrete curing compound shall be of a nature and composition not deleterious to concrete, and thinned to a working consistency either with a volatile solvent or by emulsification with water. The curing compound shall be of a standard and uniform quality ready for use as shipped by the manufacturer.

Curing compound shall form a continuous, unbroken membrane which shall adhere to moist concrete and which will neither disintegrate, check, peel from the surface, nor show signs of such deterioration within thirty (30) days after application under actual working conditions. The compound shall be sufficiently transparent and free from color that there will be no permanent change in the color of the concrete. The compound shall contain, however, a temporary dye of sufficient color to make the membrane clearly visible for a period of at least four (4) hours after application. If the Contractor applies a deleterious compound to paint, plaster, gunite, or other surface treatment, the surface shall be thoroughly sandblasted to remove all vestiges of the compound at the Contractor's expense.

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No concrete shall be placed during rain; and during such weather, all concrete placed within the preceding twelve (12) hours shall be protected with waterproof canvas or other suitable coverings. These coverings shall be provided and kept ready at hand.

All concrete construction shall be protected from excessive loadings.

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The mortar shall be thoroughly compacted into place slightly higher than the surrounding surface. After being undisturbed for one to two (1 to 2) hours to permit initial shrinkage, the patch shall be finished to match the adjoining surface.

Tie holes left by the withdrawal of form clamp rods or holes left by removal of snap ties shall be filled solid with mortar. For holes passing entirely through the wall, a plunger-type grease gun or other device shall be used to force mortar through the wall, starting at the back face. When the hole is completely filled, the excess mortar shall be struck off with a cloth, flush with the surface. Holes not passing entirely through the wall shall be filled with a small tool that will permit packing the hole solid with mortar, any excess mortar being struck off flush with the surface.

2.26 PLACING REINFORCING STEEL.

Reinforcing steel, before being positioned, shall be cleaned thoroughly of mill and rust scale or other coating that will destroy or reduce the bond. Reinforcement appreciably reduced in section shall be rejected. Where there is delay in depositing the concrete, reinforcement shall be reinspected and when necessary, cleaned.

Reinforcement shall be carefully formed as indicated on the drawings. Stirrups and tie bars shall be bent around a pin having a diameter of not less than three (3) times the diameter of the bar. Except where specifically indicated otherwise on the drawings, bends for other bars shall be made around a pin having a diameter of not less than six (6) bar diameters. All bars shall be bent cold. Reinforcing steel shall not be bent or straightened in a manner that will injure the material. Bars with kinks or bends not shown on the drawings shall not be used. Heating of bars will be permitted only when the entire operation is approved by the Engineer.

Reinforcing steel shall be positioned accurately and secured against displacement by using annealed iron wire or suitable clips at intersections and shall be supported by concrete chairs or spacers, or metal hangers.

In slabs, beams, and girders, and walls subject to lateral pressure, splices of reinforcement shall not be made at points of maximum stress without the express approval of the Engineer. Splices, where permitted, shall provide sufficient lap to transfer the stress between bars bond and shear. Adjacent bars shall not be spliced at the same point. The minimum allowable lap at points of maximum stress shall be thirty (30) times the diameter of the larger bar of the splice, but in no case shall the lap be less than eighteen (18) inches.

2.27 FORM MATERIAL.

The following classification shall be used for all concrete form work:

Class I. — For permanent exposed concrete surfaces where architectural appearance is important. Class I forms shall be constructed with particular care to assure a high type of architectural finish of uniform texture free from visible irregular ties, patch marks and discolorations. Forms shall be of synthetic resin bonded plywood specially made for concrete work or nonwarping hardboard. The entire surface shall be lightly sanded if necessary.

Class II. — For unplastered interior of all rooms and for all surfaces in contact with water, such as interior walls of channels and tanks. These forms shall be of hardboard, steel or waterproof synthetic resin bonded plywood specially made for concrete work.

The Contractor will be permitted to use the most advantageous panel sizes and panel joint location. Class II forms for painted concrete surfaces shall be free of all surface imperfections. Neat patches and minor surface imperfections will be permitted in forms for unpainted concrete provided the finished surface conforms to the requirements specified hereunder.

Class III. — For formed surfaces not exposed to view such as footings, backfilled walls and pipe trenches. These forms shall be of metal or of smooth planed boards in good condition, free from large or loose knots.

2.28 FORM CONSTRUCTION.

Exposed edges of concrete on the outside of structures and all those in the inside of structures shall be chamfered or beveled at an angle of 45°, bevel being one (1) inch on a side. If so directed by the Engineer, however, the Contractor shall provide square edges for any portion of the work.

All dirt, chips, sawdust and other foreign matter shall be removed from within the forms before any concrete is deposited therein. Forms previously used shall be thoroughly cleaned of all dirt, mortar and foreign matter before being used. Before concrete is deposited within the forms, all inside surfaces of the forms shall be thoroughly coated with an approved oil.

Bolts, rods or single wires shall preferably be used for internal ties, and if so used, shall be so arranged that when the forms are removed, no metal shall be within one (1) inch of any surface. Twisted wire ties will not be permitted in the forms for any wall later to be subjected to water pressure. The Contractor shall take due precaution to prevent future leakage or seepage along ties in all walls which will be subjected to water pressure. Ties used in all such walls must be cut back into the face of the wall at least one (1) inch and the resulting holes pointed up with one to three (1:3) mortar.

Temporary openings shall be provided at the base of the column and wall forms and at other points where necessary to facilitate cleaning and inspection before depositing concrete.

Forms, bracing and shores shall be kept in place until removal is approved by the Engineer and in no case shall removal commence earlier than the following schedule:

Sides of footings and rafters	1 day
Walls above ground	3 days
Walls below ground	7 days
Columns	10 days
Slabs	14 days
Beams	21 days

Members subject to additional loads during construction shall be adequately reshored to support both member and construction loads in a manner that will protect member from damage.

2.29 FINISH OF FORMED SURFACES.

All finished or formed surfaces shall conform accurately to the shape, alignment, grades and sections as shown on the drawings or prescribed by the Engineer. Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing or roughness of any kind, and shall present a finished, smooth, continuous, hard surface. All sharp angles, where required, shall be rounded or beveled.

In case of floor and flat roof surfaces where drains are provided, all exterior concrete floor, sidewalk and flat surfaces, the Contractor shall be particularly careful to provide an adequate slope to the drains or to suitable points of disposal. The direction of slope and the amount of crowning generally are shown on the drawings, otherwise they shall be subject to the approval of the Engineer.

Where Class I forms are required, the surface of the concrete shall be given the following finish: After wetting the surface, a grout shall be rubbed in using a rubber float or burlap. The grout shall be made by mixing one (1) part of cement and one and one-half (1 ½) parts of fine sand with sufficient water to give it the consistency of thick paint. After the grout hardens sufficiently, it shall be scraped from the surface with the edge of a steel trowel without disturbing the grout in the air holes. After further drying, the surface shall be rubbed with burlap to remove all surface grout. The entire surface shall be finished to secure a uniform texture.

2.30 FINISH OF SLABS.

(a) **Wood Float Finish.** — The forms shall be completely filled with concrete with as little working as possible. All high or low spots exceeding one-fourth (¼) inch in ten (10) feet shall be elliminated. The surface shall then be wood-floated until it is smooth and free from blemishes.

(b) **Broomed Finish.** — Surfaces to receive a broomed finish shall be wood-floated as specified above, followed by steel troweling. After steel troweling and before initial set, the surface shall then be slightly roughened by means of a broom or a burlap mat to produce an even textured surface finish.

2.31 INSERTS.

Where pipes, castings or conduits are to pass through the walls, the Contractor shall place such pipes or castings in the forms before pouring the concrete, or in special cases, with the express consent and approval of the Engineer or as specified herein, shall build approved boxes in the forms to make openings for subsequent insertion of such pipes, castings, or conduits. To withstand water pressure and to insure watertightness around the openings so formed, the boxes or cores shall be provided with continuous keyways all the way around, and shall have a slight flare to facilitate grouting and the escape of entrapped air during grouting. The grout shall contain Embeco or similar material and shall be mixed and placed in accordance with man facturer's instruction.

Additional reinforcement shall be provided around such openings, if large, to meet the approval of the Engineer. The pipes, castings, or conduits, as specified, shall be grouted in place by pouring in grout under a head of at least four (4) inches. The grout shall be poured, rammed or joggled into place to fill completely the space between the pipes, castings, or conduits, and the sides of the openings, so as to obtain the same watertightness as through the wall itself. The grouted castings shall then be water cured. The grouting material so placed shall be surfaced when the forms are removed to give a uniform appearance to the wall if such wall will be exposed to view.

The Contractor shall set accurately and hold in exact position in the forms until the concrete is poured and set, all gate frames, gate thimbles, special castings, channels, or other metal parts that are to be embedded in concrete, and shall furnish and set accurately all inserts and anchor or other bolts necessary for the attaching of piping, valves, metal sash, and equipment. All nailing blocks, plugs, strips and the like, necessary for the attachment of trim, finish, and similar work, and all wires for suspending ceilings will be furnished and placed by the Contractor.

2.32 GUNITE.

When the Contractor elects or the Engineer specifies the use of gunite, the Contractor shall furnish and install such gunite according to the special technical provisions of the specifications.

2.33 PRESTRESSED CONCRETE.

When prestressed construction is specified by the Engineer, or is submitted as an acceptable alternate by the Contractor, it shall be according to the special technical provisions of these specifications.

2.34 MISCELLANEOUS CONCRETE MIXES.

Miscellaneous concrete mixes shall be as listed as follows:

Use	28-day Strength	Mix
Grout	2,000	Seven (7) sacks Portland cement with pea gravel.
Mortar	1,800	One (1) part Portland cement, one-fourth (¼) to one-half (½) part hydrated lime or lime putty, aggregate not less than two and one-fourth (2¼) and not more than three (3) times the sum of the volumes of the cement and lime used.
Coarse grout for filling masonry blocks and for bond beams	2,000	One (1) part Portland cement to which may be added not more than one-tenth (1/10) part hydrated lime or lime putty, and two (2) to three (3) parts sand, and not more than two (2) parts pea gravel.

2.35 COLD WEATHER REQUIREMENTS.

Adequate equipment shall be provided for heating the concrete during freezing or near freezing weather. No frozen materials or materials containing ice shall be used.

All concrete materials and all reinforcement, forms, fillers and ground which the concrete is to come in contact with shall be free from ice and frost. Whenever the temperature of the surrounding air is below 40 °F, all concrete placed in the forms shall have a temperature between 70 °F and 80 °F and an adequate means shall be provided for maintaining a temperature between 50 °F and 80 °F during the curing period.

The housing, covering or other protection used in connection with curing, shall remain in place and intact at least twenty-four (24) hours after the artificial heating is discontinued. The use of salt or chemicals for the prevention of freezing is prohibited.

When heating of concrete materials is required, the mixing of water and aggregate shall be heated to not more than 90 °F prior to being placed in the mixer, so that the temperature of the mixed concrete shall not be less than 70 °F nor more than 80 °F. Aggregates shall be heated either by steam or by dry heat, and the heating apparatus shall be of a type which whill heat the mass uniformly and in such a manner as to preclude areas, or hot spots, which will burn the material. Flame throwers, or other, similar direct-heating devices will not be allowed.

COUNTY OF SAN BERNARDINO
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SECTION 3
PIPELINE MATERIALS AND INSTALLATION

3.1 GENERAL.

This portion of the work shall include the furnishing and installation in conformance with the plans and specifications, true to line and grade, and free from leaks, cracks, and obstructions. Where choices are allowed, the Contractor shall select such materials and construction methods as will result in a satisfactory completed project. Materials and equipment used in the work shall be new and unused unless otherwise specified. In case a reference is not clear as to which of several grades is desired, the highest quality material shall be used. Materials and strength of pipe shall be as shown on the plans. Unless two (2) or more materials are approved as equals, the Contractor shall not substitute another material for the one specified.

3.2 VITRIFIED CLAY PIPE (VCP) AND CLAY FITTINGS

3.2.01 Materials. — Vitrified Clay Pipe (VCP) and Clay Fittings shall be extra strength, durable, first quality, well-burned clay pipe in accordance with the Western Regional Standards of the National Clay Pipe Institute. Crushing strength shall be determined by the three (3) edge bearing method of ASTM C 301, and hydrostatic testing shall be at ten (10) psi as described in the Clay Pipe Engneering Handbook.

Each pipe and fitting shall be marked with the name of the manufacturer or his trademark.

The Engineer or Inspector may reject any pipe or fitting which contain excessive dimensional distortion as defined by the West Coast Standards of the National Clay Pipe Institute, foreign matter fused into the pipe, breaks which would affect the watertightness of the pipe and cracks which extend through the entire thickness of the pipe barrel.

3.2.02 COMPRESSION JOINT FOR VCP.

(a) **Molded Compression Joint.** — When molded compression-type joints are used to join VCP, the joint shall be manufactured in accordance with ASTM C 425. The joints shall be "Wedge-Lock," "Speed Seal," or approved equal.

(b) **Mechanical Compression Joint.** — When mechanical compression-type joints are used to join VCP, the joint shall be manufactured in accordance with ASTM C 594, "Test Condition II." The joint shall be as manufactured by Mission Clay Products Corp., "Band-Seal Type II Mainline Joint," with a stainless steel shear ring, or approved equal.

3.2.03 Hot-pour Joints. — Hot-pour joints will not be permitted.

3.3 ASBESTOS-CEMENT SEWER PIPE (ACP).

3.3.01 Material. — Pipe shall be epoxy-lined, unlined asbestos-cement pipe as indicated on the plans. Pipe shall be of the class called for on the plans. It shall be manufactured and tested within the continental limits of the United States in accordance with ASTM C 428, C 644, C 500, and Federal Specification SS-P-331.

To assure chemical stability, the pipe shall not have an uncombined calcium hydroxide content in excess of one percent (1%) where tested in accordance with the method outlined in Federal Specification SS-P-331 or ASTM C 500.

3.3.02 Double Compression Ring and Collar. — Double compression ring and collar for asbestos-cement pipe shall be a self-centering joint comprising a collar of the same material and strength as the pipe, containing two (2) continuous rubber rings of uniform cross section, each contained in its own groove under continuous lateral compression. The pipe ends shall be step machined to close tolerance and shall have shoulders of pipe ends within the collar. The collars and spigots shall be designed so that two (2) different pipe classes may be jointed by a standard collar not requiring use of an adapter.

3.3.03. **Sewer Pipe Lining.** — Asbestos-cement pipe shall be lined as required by the District. The lining shall be an epoxy-resin base of one hundred percent (100%) solids content (solvent free). This epoxy lining shall be completely resistant to the dilute sulfuric acid generated in the hydrogen-sulfide cycle and shall also be resistant to those materials common to sewage. The lining material shall be able to withstand a ten percent (10%) sulfuric-acid solution by weight without loss of its protective capabilities.

The lining shall have a strong permanent bond to the pipe wall. This bond shall be such that a lined stave of pipe shall be able to withstand a test of immersion in boiling water for four (4) hours and/or immersion in water at 150° for ninety-six (96) hours without showing signs of blisters, bubbles, peeling or any other form of separation of the lining from the pipe wall.

Epoxy lining shall be centrifugally cast into the pipe wall in at least two (2) passes to produce a continuous film of uniform thickness, containing no uncoated areas, thin spots, runs, sags or pinhole-type defects. The thickness of the pipe lining shall be a minimum of twelve (12) mils (0.012 inches).

3.3.04 **Assembling Lined and Unlined Pipe.** — Lined and unlined pipe shall be assembled by stabbing, bar and block, or suitable puller as recommended by pipe manufacturer. After the assembly has been made, the position of the rubber ring shall be checking with a gauge supplied by the manufacturer. If the ring is not properly seated, the joint shall be pulled apart and satisfactorily remade.

3.3.05 **Damaged Lined Pipe.** — No damaged lined pipe shall be used. Field repairs of the epoxy lining shall not be permitted.

3.4 REINFORCED PLASTIC MORTAR PIPE (RPM).

(Not permitted.)

3.5 CAST-IRON PIPE (CIP)

All cast-iron pipe shall be Class 22, Class 23, or Class 24, manufactured in accordance with American National Standards Institute, Inc. Standards ANSI Specification A 21.6 and Federal Specifications WW-P-421. Cast-iron pipe may, at the Contractor's option have mechanical joints or be jointed by the use of one hundred twenty-five (125) pound ANSI flanges or Victaulic-type couplings. Where flexibility of joints is a factor, such as at connection between inside and outside piping, a flexible-type joint such as Victaulic-type couplings shall be used.

3.5.01 **Flanged Joints.** — Bolts, nuts and washers for flanged joints shall conform to the recommendations of the pipe manufacturer and shall be uniformly tightened. Ring gaskets shall be one-sixteenth (1/16) inch rubber or neoprene lubricated and installed in accordance with the manufacturer's recommendations.

3.5.02 **Mechanical Joints.** — Mechanical joints shall consist of a stuffing box into which an endless rubber ring is compressed by a follower gland. The gasket must be fully confined and under constant compression. Mechanical-joint pipe shall be installed in accordance with manufacturer's recommendations. Gasket shall conform to American National Standards Institute Specification A 21.11.

3.5.03 **Victaulic-type Couplings.** — Cast-iron pipe for Victaulic-type couplings shall have either grooved or shouldered ends. An endless rubber gasket of C-shaped cross section shall be used in each coupling. Couplings shall be installed in accordance with manufacturer's recommendations.

3.6 POLYVINYL CHLORIDE (PVC) SEWER MAIN AND LATERAL.

3.6.01 **Scope.** — Polyvinyl chloride (PVC) sewer-pipe material for sizes up to and including twelve (12) inch diameter pipe.

3.6.02 **Material.** — Pipe and fittings shall be made from PVC compound as defined in ASTM D 1784. Pipe and fittings shall meet the requirements of ASTM D 3034 with the following exception:

All pipe and fittings shall have rubber joints capable of withstanding an internal pressure conforming to pipe manufacturer's recommendations. The rubber ring shall be made of a natural or synthetic rubber-base compound, conforming to the requirement of ASTM D 1869. The compound shall be resistant to acids, alkalies, solvents and greases encountered in sanitary sewers. Solvent weld connections will be allowed only for end caps, repairs, saddles, and factory-fabricated fittings.

The pipe shall have a minimum "pipe stiffness" of F/Y = 46 measured at five percent (5%) deflection.

This pipe stiffness shall be measured in accordance with ASTM Designation D 2412, Test for External Loading Properties of Plastic Pipe by Parallel-Plate loading. The pipe shall have a maximum Standard Dimension Ratio (SDR) of thirty-five (35).

3.6.03 Fittings. — All fittings and accessories shall be as manufactured and furnished by the pipe suppliers or approved equal.

3.6.04 Installation. — Pipe and fittings shall be delivered and installed in accordance with the pipe manufacturer's recommendation and ASTM D 2321, except only Class I, II, and III embedment materials will be considered suitable for PVC installations. PVC sewer pipe shall not be installed where soil conditions preclude a firm stable trench wall.

3.6.05 Connections to Concrete Structures. — Connections to concrete structures, such as manhole bases, shall be watertight. An asbestos-cement connection coupling, as approved by the Engineer, shall be precast directly into the manhole base so that the PVC sewer pipe is not in contact with the concrete, thus providing a flexible joint.

3.6.06 Allowable Verticle Deflection. — The allowable initial (after backfilling and compaction) vertical deflection shall not exceed five percent (5%) of the average inside diameter of the pipe in an unloaded condition.

Due to the flexible characteristics of PVC pipe, the Contractor may have to exceed the specification requirements for backfill material and minimum depths on rigid pipes. Any additional costs incurred for the installation of flexible pipe shall be borne by the Contractor.

3.6.07 Testing. — Testing shall be done in accordance with Sections 3.8 and 6.0 of these specifications.

3.6.08 Marking. — Each length of pipe shall be marked at least once by the manufacturer, with trade name, lot identification, nominal size, the ASTM number, and the type and grade.

3.7 ACRYLONITRILE BUTADIENE STYRENE (ABS) SEWER MAIN AND LATERAL.

3.7.01 Scope. — Acrylonitrile butadiene styrene (ABS) truss sewer pipe as herein specified is defined as an internally braced, double-wall pipe for use in gravity sanitary sewers. Six (6) inch diameter and smaller shall be solid-wall pipe.

3.7.02 Material. — Truss sewer pipe shall be manufactured by extruding ABS thermoplastic into a truss with inner and outer walls connected by webs.

The pipe and joints shall conform to the requirements of ASTM D 2680.

3.7.03 Joints. — Chemically welded joints shall be made in conformance with the pipe manufacturer's recommendations. Both a primer and a cement shall be of the composition recommended by the manufacturer. The primer and cement shall be of the composition recommended by the pipe manufacturer.

3.7.04 Physical Requirements. — The tests contained herein are quality-control tests. Pipe meeting these quality-control requirements will be acceptable for use in sanitary sewers.

(a) **Truss Pipe.** — A six (6) inch long piece, when tested by ASTM D 2412, shall equal or exceed the following values even after twenty-four (24) hour immersion in five percent (5%) solutions by weight of H_2SO_4 when deflection reaches five percent (5%):

Nominal Diameter (Inches)	Minimum Diameter (Inches)	Minimum EL-Lb./In.	F/Y Lbs./In.^{2}
8	7.75	2,400	200
10	9.75	4,800	200
12	11.75	8,100	200
15	14.75	15,900	200

The F/Y shall be computed by dividing the load in (lbs./in.) at five percent (5%) by the deflection in inches. Pipe shall not fail when deflected ten percent (10%).

(b) **Solid Wall Pipe.** — Pipe and joints shall conform to ASTM 2751-75. The pipe shall have a maximum Standard Dimension Ratio of thirty-five (35).

3.7.05 Couplings and Fittings. — Couplings and fittings shall be manufactured or materials having equal or superior chemical and physical characteristics as the pipe itself. Each solvent weld-type coupling shall be accurately formed so as to have the proper dimension necessary to assure a leak-proof joint. One (1) coupling shall be furnished with each standard length of pipe.

3.7.06 Installation. — Pipe and fittings shall be delivered and installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field manager shall be present during the first day of pipe-laying operations to instruct personnel in the installation of the pipe.

3.7.07 Manholes and Special Structures. — An O-ring coupling and water stop shall be installed at the point of entry and exit of the sewer, through manholes and special structures. The coupling shall be placed so that the flared end will be flush with the outside wall of the structure. No concrete shall be placed past the flared end of the coupling.

3.7.08 Allowable Vertical Deflection. — The allowable initial (after backfilling and compaction) vertical deflection shall not exceed five percent (5%) of the average inside diameter of the pipe in an unloaded condition.

3.7.09 Marking. — Each length of pipe shall be marked at least once by the manufacturer, with trade name, lot identification, nominal size, the ASTM number, and the type and grade.

3.8 ASBESTOS-CEMENT PIPE FORCE MAIN.

3.8.01 Material. — Pipe shall be asbestos-cement pipe of the class indicated on the plans. It shall be manufactured and tested within the continental limits of the United States in accordance with AWWA Specification C 400, ASTM C 296 and C 688. The tests shall include subjecting the pipe to a sustained hydrostatic pressure for five (5) seconds to assure adequate structural soundness and density. Each piece of six (6) inch and eight (8) inch pipe shall also be subjected to a flexural test.

To assure chemical stability, the pipe shall not have an uncombined calcium hydroxide content in excess of one percent (1%) where tested in accordance with the method outlined in Federal Specification SS-P-331 or ASTM C 500.

3.8.02 Double Compression Ring and Collar. — Double compression ring and collar for asbestos-cement pipe shall be a self-centering joint comprising a collar of the same material and strength as the pipe, containing two (2) continuous rubber rings of uniform cross section, each contained in its own groove under continuous lateral compression. The pipe ends shall be step machined for automatic separation of pipe ends within the collar. The collars and spigots shall be designed so that two (2) different pipe classes may be jointed by a standard collar, not requiring use of an adaptor.

3.8.03 Assembling Pipe. — Pipe shall be assembled by stabbing, bar and block, or suitable puller. After the assembly has been made, the position of the rubber ring shall be checked with a gauge supplied by the manufacturer. If the ring is not properly seated, the joint shall be pulled apart and satisfactorily remade.

3.9 PVC PIPE FORCE MAIN.

3.9.01 SDR-PR PVC Pipe. — Standard Dimension Ratio (SDR) — Pressure Rated (PR) PVC pipe shall meet the requirements of ASTM D 2241 and shall be made of the following material:

ASTM D 1784, Type 1, Grade 1, with a hydrostatic design stress of 2,000 psi for water at 73.4 °F, designated as PVC 1120.

Samples of pipe and physical and chemical data sheets shall be submitted to the Engineer for approval, and his approval shall be obtained before the pipe is purchased.

PVC pipe shall have an SDR rating as shown on the drawings.

The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects. The pipe shall be as uniform as commercially practical in color.

The pipe shall be shipped with one coupling, factory applied. Pipe shall have a ring painted around the uncoupled end in such a manner as to allow field checking of setting depth of pipe in the socket.

Pipe shall be delivered to the job site by means which will adequately support it, and not subject it to undue stresses. In particular, the load shall be so supported that the bottom rows of pipe are not damaged by crushing. Pipe shall be unloaded carefully and strung as close to the final point of placement as is practical.

Pipe shall be jointed with solvent welds and the pipe manufacturer shall have an experienced representative on the job for a maximum of one (1) day at the commencement of joining and laying operations.

Workmanship, pipe dimensions and tolerances, outside diameters, wall thickness, eccentricity, sustained pressures, burst pressures, flattening extrusion quality, marking and all other requirements of ASTM D 2241 shall be conformed with in all respects.

The PVC pipe shall bear the National Sanitation Foundation (NSF) seal of approval.

3.9.02 PVC Fittings.

(a) General. — Fittings shall be of the same material as the pipe, and in no case shall have thinner walls than that of the pipe furnished. Where molded fittings are used, they shall be made of NSF-approved material.

Samples of each type of fitting shall be submitted for the Engineer's approval.

The dry fit of fittings and coupling sockets shall be snug. Building up the joint to overcome a loose fit with multiple layers of filler solvent shall not be permitted.

(b) PVC Couplings. — Couplings shall be of the extruded type, designed to be interference fit for at least one-half (½) of the socket depth. They shall have a beveled entrance to permit the wiping off of the solvents on male end while being installed. The following will be considered the minimum socket depth for PVC couplings:

Size (Inches)	Socket Depth (Inches)
6	5.000
8	6.000

The wall thickness of the PVC couplings shall be equal to SDR 17 pipe or shall be one-tenth (1/10) of an inch thick, whichever is greater.

(c) Elbows. — Elbows shall be long radius bends with minimum walls equal to that of the pipe joining or shall be one-tenth (1/10) of an inch thick, whichever is greater. Tapered-welding sockets shall be equal to those required for couplings. Standard elbows, as manufactured by NSF Standards, shall be acceptable but are subject to special blocking and bedding at no extra cost, unless deep-socket adapters have been properly installed.

(d) Tees. — Tees shall be a molded fitting with NSF approval. A deep-socket adapter shall be installed in each outlet by the pipe manufacturer or by the Contractor at least twenty-four (24) hours before field installation. The deep-socket adapter shall have a socket depth and wall equal to the coupling.

3.9.03 PVC Welding Solvents. — PVC welding solvent shall be purchased from the manufacturer of the pipe.

The PVC welding solvent shall be compounded to conform with the socket fit and the weather conditions at the time of installation.

3.9.04 PVC Pipe Laying. — The pipe, fittings, and valves shall be placed in the trench with care. Under no circumstances shall pipe or other material be dropped or dumped into the trench. The pipe shall not be dragged in a manner that would cause scratching of the pipe surface. An excessive amount of scratching on the surface of the pipe will be considered cause for rejection.

The pipe shall be snaked into the trench, either employing the natural snaking tendency or the pipe shall be laid from one side to the other on alternate lengths.

3.10 PIPE JOINTS.

Upon the District's request, the Contractor shall furnish for approval, the pipe manufacturr drawings showing dimensions and manufactur... tolerances of pipe and joint to be used on the work.

3.11 TESTING FREQUENCY AND FINAL ACCEPTABILITY OF PIPE.

The District may call for crushing and hydrostatic testing of up to one-half percent (0.5%) of the total pieces of nonmetallic pipe of each size to be used in the work. If any of these tests fail to meet the tabulated design strength and/or the listed hydrostatic test, the testing frequency shall be increased so that two percent (2%) of the total pieces of each size are being tested for bearing and bursting strength. If consistent failures occur, the entire lot of pipe which the samples represent shall be rejected.

Notwithstanding prior factory or yard inspection, the District shall have the right to reject any damaged or defective pipe found on the job, which in its opinion will affect the durability of the installation, and the District may order its removal from the work.

3.12 INSTALLATION OF PIPELINES.

Pipe laying shall proceed upgrade with the spigot ends of bell-and-spigot pipe pointing in the dire

tion of the flow. Each pipe shall be laid true to line and grade and in such manner as to form a close concentric joint with the adjoining pipe, following manufacturer's instructions for the specific jointing method being used. All pipe and fittings shall be placed in the trench with care.

3.13 Cleanouts.

The pipe for the cleanouts shall be of the same size and material as the sewer main. The cleanouts shall be constructed as shown on the District's Standard Drawing No. E-8 and installed at the locations indicated on the plans.

3.14 Tees.

Tees shall be of the same materials as the sewer main, and the longitudinal barrel of the tee shall be of the same size as the sewer main. Tees of the size called for on the plans shall be installed at approximately the locations shown on the plans. The exact location will be determined in the field by the Engineer, to best service the property in question. A suitable plug shall be provided and installed prior to backfilling operations to provide a watertight joint.

The Contractor shall reference each tee connection in the field with a surface marker. The surface marker shall be as specified on the District's Standard Drawing No. E-9 or No. E-10.

3.15 Sewer Laterals.

The sewer laterals shall be constructed as shown on the District's Standard Drawings No. E-9, No. E-10, and No. E-11. Sewer laterals of the size called for on the plans shall be installed at approximately the locations shown on the plans. The exact location will be determined in the field by the Engineer, to best service the property in question. A suitable plug shall be provided and installed prior to backfilling operations to provide a watertight joint. Sewer lateral and building lateral pipe material shall be as specified in Section 3, "Pipe Line Materials and Installation," of these specifications.

The Contractor shall reference each building lateral connection in the field with a surface marker. The surface marker shall be as specified on the District's Standard Drawing No. E-9 and E-10.

Sewer laterals in waterways, easement, and deep cuts should have the house lateral service brought to a minimum depth of five (5) feet.

3.16 Bedding.

Unless otherwise called for in the plans and specifications, "normal bedding" of pipe in the trench will be satisfactory. Granular bedding material to provide special or normal bedding shall mean coarse granular material acceptable to the Engineer with a maximum particle size of ½-inch. Reference is made to Standard Drawing No. E-2.

Plastic pipe shall be bedded as shown in the following table:

Type of Pipe	Depth of Cover in Feet	Bedding Required
Solid Wall (ABS and PVC) 4-inch to 15-inch size	Less than 4	Concrete blanket per Standard Drawing E-3 for traffic or Special Design
	4 to 17	Crushed rock bedding to spring line of pipe
	17 to 30	Concrete cradle per Standard Drawing E-2
	greater than 30	Special Design
ABS composite 8-inch larger or ABS solid wall 4-inch to 6-inch diameter	Less than 4	Concrete blanket per Standard Drawing E-3 for traffic or Special Design
	4 or 9	Normal bedding per Standard Drawing E-2
	9 to 20	Crushed rock bedding to spring line
	20 to 30	Encasement per Standard Drawing E-2 or
	greater than 30	Special Design

3.17 Excavation and Backfill.

The Contractor is directed to Section 1, "Earthwork," of these specifications for all items pertaining to excavation and backfill.

3.18 Pavement Removal and Replacement.

The Contractor is referred to Section 8, "Removal and Replacement of Paved Surfaces," of these specifications.

3.19 Leakage Tests.

Leakage tests shall be in accordance with Section 6, "Cleaning and Testing," of these specifications.

3.20 Pipeline in Casing.

The Contractor is referred to Section 5, "Concre Blankets and Conductor Pipe," of these specifications.

3.21 Pipe Joint Deflections.

Short lengths of pipe shall be required to make curved alignments of the sewer without exceeding the manufacturer's recommendations for joint deflections.

COUNTY OF SAN BERNARDINO
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SECTION 4
MANHOLES AND CLEANOUTS

4.1 GENERAL.

All manholes shall be constructed in conformance with the District's Standard Drawing No. E-4, No. E-6 or E-17. All such structures shall be built into the sewer lines at the locations shown on the plans. Pipe for future lateral sewer lines shall be built into the structures as shown on the plans, and the outer ends closed with a cap securely fixed in place. The caps shall be so fixed as to be easily removed in the future and shall be watertight.

4.2 PRECAST MANHOLES.

Precast manhole sections will be manufactured in a plant designed for this type of work. All units will conform to the details on the above-referenced drawings with eccentric cone top sections. Concrete use in the precast section shall be manufactured of approved and selected materials in such proportions as per Section 2, "Concrete Construction," of these specifications, with a minimum compressive strength of 3,000 psi. Sections will be compacted by vibration or centrifugal force and cured according to approved practice, either by steam, sprinkling, membrane solution or a combination of these methods. Manholes shall conform with ASTM C 478.

4.3 MANHOLE BASE.

Manhole bases shall be monolothic construction of Class IV concrete and shall be poured to the size, line and grade as shown on the standard drawings and plans. Drop-manhole bases shall be constructed as detailed on the District's Standard Drawing E-6. The Contractor is referred to Section 2, "Concrete Construction," of these specifications.

In laying the pipe up to structures, no pipe shall be allowed to project beyond the inside of the wall of the structure. Flexible joints shall be provided in all sewer pipes outside of manholes, but within twelve (12) inches of concrete base.

A notch or groove conforming to the precast manhole section shall be formed on top of the base section.

4.4 PRECAST MANHOLE JOINTS.

Precast manhole sections shall be tongue and groove alternately on both ends of the sections, and shall be laid with the grooved portion facing up. Each section shall be set to enable the manhole to rise vertically above the base.

A concrete waterproof mortar shall be placed on the top of each ring, completely covering the grooved portion prior to the installation of the next precast section. Excess mortar shall flow out equally on both sides of the joint for the complete circumference of the ring. Finish mortar joint should have a minimum thickness of one-fourth (¼) inch.

Mortar shall consist of one (1) part by volume of cement and three (3) parts by volume of sand. Mortar shall be mixed in a suitable mixer in a watertight mixing box. The materials must be thoroughly mixed dry until the mass assumes a uniform color and then sufficient water should be added to bring the mixture to a workable consistency. No mortar which has begun to set shall be used and no retempering thereof will be permitted. Mortar shall conform to Section 2.34 of these specifications.

4.5 GRADE RINGS.

Precast grade rings shall be used to reach desired height of the manhole cover. Minor adjustment shall be made by the use of "Shims" under the frame. Grade rings are not required for manholes constructed in easements unless needed for adjustment to finish grade.

4.6 MANHOLES STEPS.

Manhole steps will not be allowed except for manholes constructed within the City of Big Bear Lake and Lake Arrowhead Sanitation District where steps are required.

4.7 BRICK MANHOLES.

Brick manholes are not acceptable for new construction.

4.8 CLEANOUTS.

Cleanouts shall be constructed as shown on the District's Standard Drawing No. E-8, and in conformance with the notes contained therein.

4.9 CASTINGS.

All castings shall be of tough gray iron, free from cracks and swells. The iron shall conform to the requirements of ASTM A 48, Class 30.

4.9.01 Manhole Frames and Covers. — Manhole frames and covers to be constructed in easements shall be Long Beach Iron Works No. X 103 D, or approved equal. All other frame and covers shall be Long Beach Iron Works No. X-106E, or approved equal.

Covers shall be diamond tread finish and shall be provided with a "lifting receptacle" per District's Standard Drawing No. E-7. All frames and covers are to be machined to fit (nonrocking).

4.9.02 Cleanout Frames and Covers. — Cleanout frames and covers shall be Long Beach Iron Works No. X-508B, or approved equal. Covers shall be diamond tread with the letter "S" stamped on the nameplate.

4.9.03 Nameplate. — The nameplate on each and every sanitary sewer manhole cover shall read as follows: "Sanitary Sewer."

4.9.04. Bolt-Down Frames and Covers. — Manhole frames and covers shall be drilled to match. Covers shall be counter bored to accept standard socket wrench and permit bolt heads to be flush with cover.

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SECTION 5
CONCRETE BLANKETS AND CONDUCTOR PIPE

5.1 CONCRETE BLANKET.

5.1.01 General. — Concrete blankets shall be constructed at the locations shown on the plans and in accordance with the District's Standard Drawing No. E-3. Concrete shall be of Class IV Portland cement concrete.

5.2 EXCAVATION AND BACKFILL.

The Contractor is referred to Section 1, "Earthwork," of these specifications.

5.3 STEEL CONDUCTOR TUBE.

5.3.01 Materials. — Steel conductor tube shall be butt welded of sheets conforming to ASTM A 283. Conductor tube used shall not have a thickness of less than one-fourth (¼) inch. All field joints shall be butt welded in full circumference.

5.3.02 Installation. — Steel conductor tube of the size and thickness specified on the plans shall be installed in place by jacking methods without the use of water or air, at the locations shown on the plans, and to grades required to install the sewer pipes and/or force mains. Should voids or loss of ground occur during jacking operations, said voids shall be filled with grout consisting of a lean mixture of cement and sand.

Pipe lines shall be installed within the conductor tube to the lines and grades shown on the plans. The sewer pipe shall be supported on wood skids in such a manner as to relieve the pipe joints from all load and bearing. The annular space between the conductor tube and pipe shall be filled with sand. The pipe lines shall pass a successful test for leakage as provided in Section 6, "Cleaning and Testing," of these specifications.

5.4 CONCRETE CONSTRUCTION.

The Contractor is referred to Section 2, "Concrete Construction," of these specifications.

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
TECHNICAL SPECIFICATIONS

SECTION 6
CLEANING AND TESTING

6.1 GENERAL.

It is the intent of the plans and specifications that the completed sewer pipes of all types, along with manholes and other appurtenances, shall be watertight and clean.

6.2 INFILTRATION AND EXFILTRATION TEST.

Each section of sewer between two (2) successive manholes shall be tested for leakage or, at the option of the Engineer, for infiltration. In general, the leakage test shall be made on all sections of sewer except those where, in the opinion of the Engineer, excessive ground water is encountered, the infiltration test shall be made.

Even though a section may have previously passed the leakage or infiltration test, each section of sewer shall be tested subsequent to the last backfill compacting operation in connection therewith, and upon approval and acceptance of necessary soils tests; wherein, in the opinion of the Engineer, heavy compaction of the Contractor or others may have damaged or affected the required watertight integrity of the pipe, structure, and appurtenances. The Contractor shall furnish all materials required for the tests and bear all costs in connection therewith. Tests shall be made in the presence of the Engineer.

If the exfiltration or infiltration rate as shown by the tests specified herein is greater than the amount specified, the pipe joints shall be repaired or, if necessary, the pipe shall be removed and relaid by the Contractor at his expense. The sewer will not be considered acceptable until the leakage or infiltration rate, as determined by the test, is less than the allowable.

Air testing described in Section 6.3 may be used in lieu of water testing when approved by the District.

Unless excessive ground water is encountered, each section of sanitary sewer, between two (2) successive structures, shall be tested by closing the lower end of the sewer to be tested and the inlet sewer of the upper structure with plugs or stoppers, and filling the pipe and structure with water to a point four (4) feet above the invert of the open sewer in the upper structure.

Where the difference in elevation between the inver of the upper structure and the invert of the lowe structure is more than fifteen feet, an air test pe Section 6.3 hereof shall be used in lieu of the wate test.

The total leakage shall be the decrease in volume o water in the upper structure. The leakage shall no exceed four-tenths (0.40) gallons per two (2) hou test period per inch of nominal diameter of pipe pe one hundred (100) feet of sewer pipe being tested

If the leakage, as shown by the test, is greater thai allowed, the pipe shall be overhauled and, if neces sary, replaced and relaid until the joints and pip shall hold satisfactorily under this test. All tests mus be completed before street or trench is resurfaced unless otherwise directed by the Engineer. The Con tractor shall furnish all labor and materials for makin the tests required, at his own expense.

If, in the construction of a section of the sewe between structures, excessive ground water encountered, the test for leakage described abo.. shall not be used, but instead, the end of the sewe at the upper structure shall be closed sufficiently t prevent the entrance of water. Pumping of groun water shall be discontinued for at least three (3) day after which the section shall be tested for infiltration The infiltration shall not exceed four-tenths (0.40 gallons per two (2) hour test periods per inch of dia meter, per one hundred (100) feet of main line sewe being tested, and does not include the length o house laterals entering that section. Where any infi tration in excess of this amount is discovered befor completion and acceptance of the sewer, the sewe shall be immediately uncovered and the amount o infiltration reduced to a quantity within the specifie amount of infiltration before the sewer is accepted at the expense of the Contractor. Should, howeve the infiltration be less than the specified amount, th Contractor shall stop any individual leaks that ma be observed when ordered to do so by the Engineer The Contractor shall furnish all labor, materials equipment and water for making the test required, a his own expense. All tests must be completed befor street or trench is resurfaced, unless otherwis directed by the Engineer.

6.3 AIR TESTING.

The Contractor shall test all sewers that cannot be tested hydrostatically by means of the air test specified herein, unless otherwise directed by the Engineer. The length of the line tested at one time shall be limited to the length between adjacent manholes. Air test procedure shall be as follows:

Pressurize the test section to four (4.0) psi and hold at four (4.0) psi for not less than two (2) minutes. Add air if necessary to keep the pressure at four (4.0) psi. Disconnect air supply. When pressure decreases to three and one-half (3.5) psi, start stopwatch. Determine the time in seconds that is required for the internal pressure to reach two and one-half (2.5) psi. This time interval shall be greater than time given in the following table. The section of pipe shall not have passed if the time is less than shown. Release air from the opposite end of the section.

Sewer Size (in inches)	Minimum Time (in seconds)
4	113
6	170
8	226
10	283
12	340
15	425
18	510
21	595
24	680

When the prevailing ground water is above the sewer being tested, air pressure shall be increased forty-three hundredths (0.43) psi for each foot the water table is above the flow line of the sewer.

If the test is not passed, the leak shall be found and repaired to the satisfaction of the Engineer.

Building laterals shall be considered part of the lateral to which they are connected and no adjustment of test time shall be allowed to compensate for the smaller diameter of the house sewers.

The pressure gauge used shall be supplied by the Contractor, shall have minimum divisions of one-tenth (0.10) psi, and shall have an accuracy of four hundredths (0.04) psi. Accuracy and calibration of the gauge shall be certified by a reliable testing firm at six (6) month intervals or when requested by the Engineer.

When the air-pressure test is used for testing of the pipe, the manholes shall be water tested. Each manhole shall be filled with water four (4) feet above flow line of the manhole with the inlet and outlet of each manhole plugged. The maximum leakage rate shall be ten (10) gallons per hour per manhole test to be run for a minimum of thirty (30) minutes.

6.4 TESTING — FORCE MAIN.

After trenches are backfilled and compacted, the force main shall be subjected to a hydrostatic pressure test of the specified operating pressure for the class of pipe to be tested for a period of four (4) hours.

Care shall be taken to expel all air from the pipe line as the line is filled with water for the test. The water necessary to maintain this pressure shall be measured by means satisfactory to the Engineer. The leakage shall be considered as the amount of water entering the pipe during the test, less the measured leakage through the valves and bulkheads. Leakage shall not exceed the rate of twelve (12) gallons per inch of diameter per twenty-four (24 hours per mile of pipe. Any noticeable leaks shall be stopped and any defective pipe shall be repaired or replaced with new sections and retested as specified above before final approval and acceptance of the work by the Engineer. All labor, materials, equipment and water for tests, shall be furnished by the Contractor.

6.5 CLEANING.

Prior to putting any sewer into service, or before final acceptance, all sewer facilities shall be visually checked and all foreign objects, materials or obstructions removed from the facilities. If dirt, silt or other materials are found, the Engineer may require that the facilities be cleaned by flushing, balling, rodding or other means so that the materials may be removed from the system.

6.6 PIPE TESTING.

Tests of pipe for strength, straightness and durability shall be as required in Section 3, "Pipe Line Materials and Installation," of these specifications.

6.7 TESTING OF FLEXIBLE SEWER PIPE.

All sections of pipe shall be tested for watertightness in accordance with Sections 6.2 and 6.3

of these specifications, after installation has been completed.

Prior to the above test, all sections shall be subject to a deflection performance test as follows:

All flexible sanitary sewer pipe (PVC and ABS, etc.) shall be tested for excessive deflections after backfill has been placed and compacted but before leak testing and final paving operations.

A rigid mandrel, with a circular cross section having a diameter of at least ninety-five percent (95%) of the specified average inside diameter, shall be pulled through the pipe by hand. The minimum length of the circular portion of the mandrel shall be equal to the nominal diameter of the pipe. Obstructions encountered by the mandrel shall be corrected by the Contractor. All material, equipment and labor to perform the test shall be provided by the Contractor at no cost to the Owner.

The testing device shall be pulled through the completed pipe lines. If the device sticks in the pipe at any point, the pipe shall be repaired and retested. For acceptance, the device must pass through the entire section of line between structures in one pass without the use of excessive force.

6.8 TELEVISION INSPECTION.

For projects that exceed 5,000 lineal feet of main line pipe, television inspection shall be performed as described herein:

The Contractor shall secure the services of a firm or agency for viewing and recording on video tape, newly installed sewer pipelines. The pipe sections to be viewed shall be determined by the Engineer. The total length of pipeline to be inspected by television shall be approximately twenty percent (20%) of the total lineal feet of main line sewer.

Any defective pipe detected by the television inspection shall be removed and replaced by the Contractor, and an additional section of the sewer main between manholes shall be added to the total length of pipeline to be tested. Television testing shall include (1) a verbal tape describing the condition of the pipe inspected at various locations along the pipeline and (2) a digital readout of the locations of all laterals or tees.

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
TECHNICAL SPECIFICATIONS

SECTION 7
EROSION CONTROL SEEDING

7.1 GENERAL.

The Contractor shall provide erosion-control measures as defined herewith on all areas where the natural vegetation has been disturbed by the installation of sanitary facilities. If a ground cover other than natural vegetation has been disturbed, this section does not apply and the Contractor shall replace said ground cover in kind.

7.2 PREPARATION.

After the backfill has been compacted and the pipeline tested, the Contractor shall remove and dispose of rocks and debris from the area to be reseeded. No seeding shall be performed during windy weather or when the ground is too wet or in an untillable condition. The fertilizer and seed shall be spread before the straw cover material is applied. Commercial fertilizer shall not be applied until after the seed has been sown.

7.3 MATERIAL.

Materials shall consist of the following:

7.3.01 Seed. — The seed shall consist of the following mixture: Crested Wheatgrass, forty-seven percent (47%); Intermediate Wheatgrass, twenty-seven percent (27%); Wimmera Ryegrass, thirteen percent (13%); Blando Ryegrass, thirteen percent (13%). The seed shall be spread at the rate of one hundred (100) pounds per acre and shall be applied by the use of a "Cyclone Seed Sower" or equal.

7.3.02 Fertilizer. — The fertilizer shall be Ammonium Phosphate (16-20-0) spread at the rate of three hundred (300) pounds per acre and shall be applied by the use of a "Cyclone Seed Sower" or equal.

7.3.03 Mulch. — After the application of the seed and fertilizer, new straw (stable bedding straw shall not be used) shall be uniformly spread at the approximate rate of four (4) tons per acre. The straw shall then be "mulched" into the ground by the use of a "wire" roller or other approved equipment.

7.4 PROTECTION FOR STEEP SLOPES.

In cases where the grade over the pipeline exceeds twenty-five percent (25%) slope, the Contractor shall provide additional erosion-control measures to stabilize the backfill material. The Contractor shall submit to the District for its approval, special engineering details of the method to be used.

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT
TECHNICAL SPECIFICATIONS

SECTION 8
REMOVAL AND REPLACEMENT OF PAVED SURFACES

8.1 GENERAL.

Street pavement and surfaces shall be removed and replaced in all areas of construction excavation in conformance with details shown on the plans and as specified herein. Resurfacing of existing pavement and surfaces damaged or removed in connection with construction of improvements, including all appurtenances, shall conform to the provisions of permits issued by the State of California Department of Transportation, the County Transportation Department under whose jurisdiction the road falls, and/or the city for the work within the rights of way of these respective agencies.

8.2 EXCAVATION AND BACKFILL.

The Contractor is directed to Section 1, "Earthwork," of these specifications, for all items pertaining to excavation and backfilling.

8.3 PAVEMENT REMOVAL.

8.3.01 General. — Street pavement, existing road surfacing or other surfaced areas shall be removed within the limits of all construction excavations prior to proceeding with excavation operations of any nature. Surplus material shall be removed as provided in Section 1, "Earthwork," in these specifications. Prior to removal of existing surfacing, pavement cuts shall be made as shown on the plans and as specified herein. All pavement cuts shall be neat and straight along both sides of the trench, and approximately parallel to the alignment of the pipe, to provide an unfractured and level pavement joint for bonding existing surfacing with pavement replacement. Where large irregular surfaces are removed, such trimming or cutting as hereinafter provided shall be parallel with roadway centerline or at right angles to the same. All cut edges shall provide clean, solid, vertical faces, free from all loose material.

8.3.02 Plant-Mix Surfacing (Asphalt-Concrete Pavement). — Streets and alleys surfaced with asphalt-concrete pavement shall be cut at the limits of the trench and/or excavation prior to removal of existing surfacing. Cuts shall be made with pneumatic tools or other approved equipment.

8.3.03 Road-Mixed Surfacing. — Streets and alleys surfaced with road-mixed surfacing shall be cut at the limits of the trench and/or excavation prior to removal of existing surfacing. Cuts shall be made with pneumatic tools or other approved equipment.

8.4 REPLACEMENT.

8.4.01 General. — In all streets or areas in which the surface is removed, broken or damaged by equipment, or in which the ground has caved in or settled due to the installation of the improvements, the surface shall be restored to the original grade and crown section by the Contractor. In absence of specific designation on the plans, and where the street has been improved with roadway surface, base course, curb, sidewalk or gutter, trenches or damaged sections shall be restored with the type of improvement conforming to that which existed at the time the Contractor entered upon the work.

Prior to resurfacing, the existing surfacing shall be removed as provided above. All work shall match the appearance of the existing improvements and finished pavement shall not deviate from existing grade by more than one-eighth (1/8) inch in ten (10) feet and shall be free from ruts, depressions and irregularities.

8.4.02 State Highway Right of Way. — Construction of sewer lines within State Highway rights of way shall be subject to Department of Transportation utility encroachment permit, which will be provided by the District. All work done within highway rights of way shall conform to the "Terms

and Conditions Relating to Utility Encroachments," as issued by the State Department of Transportation, and as to details as indicated on the plans.

8.4.03 County Roads. — The Contractor's attention is directed to the requirements of the County Transportation Department regarding resurfacing of excavations in County roads. The specification, policies and procedures of said County Transportation Department shall supersede all other provisions of this Section within the jurisdiction of the County Transportation Department, but only if such specifications exceed the requirements of these specifications.

8.4.04 Base Material. — Base material shall be furnished, placed and compacted in the trench excavation when required by the agency having jurisdiction.

8.4.05 Plant-Mix Surfacing (Asphalt-Concrete Pavement). — All asphalt-concrete surfaces, including but not limited to pavements, curbs, driveways, and sidewalks, which are removed, damaged or broken by the Contractor's installation of improvement under this contract, shall be replaced and/or reconstructed. All asphalt-concrete shall be placed on compacted fills or base material as hereinbefore specified, and replacement and/or reconstruction shall be to the same dimensions as existing surfaces unless otherwise stated herein or required by the agency having jurisdiction over the road.

Materials and workmanship for asphalt-concrete replacement and/or reconstruction shall conform to the requirements of Section 39 of the State of California Department of Transportation Standard Specifications.

Plant-mix surfacing shall be Type B asphalt-concrete and shall conform to the grading specified for one-half (½) inch maximum, medium size, as specified in Section 39 of the above-mentioned specifications.

Paving asphalt to be mixed with the mineral aggregate shall be steam-refined asphalt and shall conform to the provisions in Section 92 in the above-named specifications, with the viscosity range of AR 1,000, 2,000 or 4,000 as specified by the Engineer.

Paint binder shall be grade RS-1 emulsified asphalt unless otherwise designated by the Engineer.

8.4.06 Road-Mix Surfacing. — All road-mix surfaces including but not limited to pavements, curbs, driveways, and sidewalks, which are removed, damaged or broken by the Contractor's installation of improvements under this contract, shall be replaced and/or reconstructed. All road-mix surfacing shall be placed on compacted fills or base material as hereinbefore specified and replacement and/or reconstruction shall be to the same dimensions as existing surfaces unless otherwise stated herein or required by the agency having jurisdiction over the road.

Materials and workmanship for road-mix resurfacing and/or reconstruction shall conform to the requirements of Section 38 of the State Department of Transportation Standard Specifications.

Mineral aggregate may be either selected material from the roadway excavation or selected material obtained from other sources. All material shall first meet the approval of the agency involved and the Engineer.

Bituminous binder to be mixed with the mineral aggregate shall be a liquid asphalt, grade SC-800, and shall conform to the provisions in Section 93 in the above-named specifications. In no case shall the quantity of bituminous binder be less than five percent (5%) by weight of the dry mineral aggregate.

8.4.07 Temporary Resurfacing. — The Contractor shall furnish, place, and maintain temporary resurfacing as herein specified, over backfill in paved dedicated streets wherever so ordered in writing by the Engineer, or as specified by State, County or city permits.

Temporary resurfacing shall be placed at the locations and of the thickness required by the permit and/or by the Engineer and shall consist of a cold-mix asphalt concrete. Binder shall be liquid, grade SC-800 or approved equal.

Temporary resurfacing shall be placed to the grade of existing surfaces and rolled and compacted as soon as the condition of the backfill is considered, by the Engineer, to be suitable to receive such surfacing. The Contractor shall maintain all temporary resurfacing in proper, usable condition until the permanent resurfacing operations are to be commenced. Temporary resurfacing shall be removed and disposed of by the Contractor before permanent resurfacing is placed in conformance with the plans and specifications.

COUNTY OF SAN BERNARDINO
SPECIAL DISTRICTS DEPARTMENT

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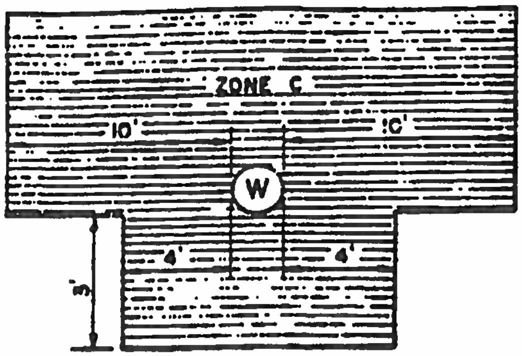
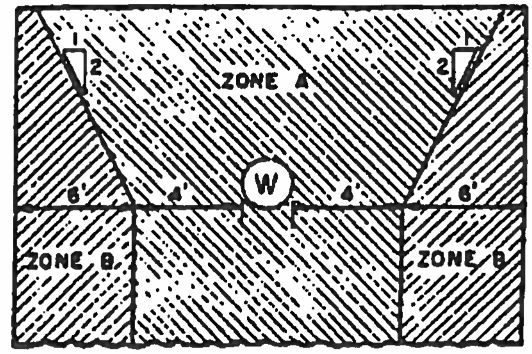
DIVISION "E"
STANDARD DRAWINGS
SEWERS



CROSSING
SANITARY SEWERS AND UTILITY WATER LINES



PARALLEL
SANITARY SEWERS AND UTILITY WATER LINES

A	SEWER LINES WILL NOT BE PERMITTED IN THIS ZONE WITHOUT SPECIAL PERMISSION FROM THE DEPARTMENT OF HEALTH, STATE OF CALIFORNIA.
B	EXTRA STRENGTH VITRIFIED CLAY PIPE WITH COMPRESSION JOINTS; OR CONCRETE PIPE WITH REINFORCED CONCRETE COLLARS AROUND THE JOINTS, WHICH JOINTS SHALL HAVE A MINIMUM THICKNESS OF SIX INCHES AND A MINIMUM DISTANCE ALONG THE PIPE OF SIX INCHES ON EITHER SIDE OF THE JOINT; OR RUBBER GASKET REINFORCED CONCRETE PIPE; OR RUBBER-GASKETED ASBESTOS-CEMENT PIPE; OR PLASTIC PIPE WITH RUBBER GASKET OR SOLVENT WELD COUPLINGS ; OR CAST IRON PIPE WITH COMPRESSION JOINTS.
C	CLASS 22,23,24 OR HEAVIER CAST IRON PIPE WITH APPROVED CORROSION PROTECTION AND APPROVED MECHANICAL JOINTS; OR ANY APPROVED SEWER PIPE WITHIN A CONTINUOUS STEEL CASING, WHICH CASING SHALL HAVE A THICKNESS OF NOT LESS THAN ONE-FOURTH INCH AND WITH ALL VOIDS BETWEEN SEWER PIPE AND CASING FILLED WITH SAND.

NOTES:

1. (W) INDICATES PRESSURE UTILITY WATER MAIN FOR POTABLE WATER. DIMENSIONS ARE FROM OUTSIDE OF WATER PIPE TO OUTSIDE OF SEWER PIPE.
2. SEWER LINES SHALL BE INSTALLED AS FAR FROM UTILITY WATER LINES AS POSSIBLE. IF THE HORIZONTAL SEPARATION BETWEEN SEWER AND WATER LINES MUST BE LESS THAN 10 FEET AND THE SEWER IS NOT MORE THAN 1 FOOT BELOW THE WATER LINE, SPECIAL CONSTRUCTION AS SHOWN ABOVE IS REQUIRED.
3. IN CASES WHERE THE SEWER LINE CROSSES A WATER LINE, THE LENGTH OF SEWER PIPE SHALL BE CENTERED ON THE WATER LINE.
4. BUILDING LATERALS SHALL BE INSTALLED BELOW UTILITY WATER LINES. IF THIS CONDITION CANNOT BE MET, SPECIAL CONSTRUCTION WILL BE REQUIRED AS SHOWN ABOVE.
5. SEWER LINES SHALL NOT BE INSTALLED WITHIN 25 FEET OF A LOW HEAD WATER MAIN WITHOUT PRIOR APPROVAL OF THE DEPARTMENT OF HEALTH, STATE OF CALIFORNIA.

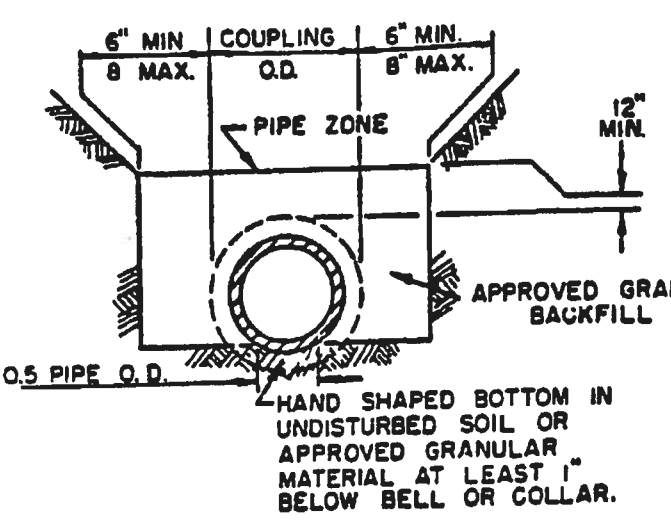
ENVIRONMENTAL IMPROVEMENT AGENCY
DEPARTMENT OF SPECIAL DISTRICTS — OPERATIONS
COUNTY OF SAN BERNARDINO

PROTECTION OF UTILITY WATER LINES FROM GRAVITY SEWERS

APPROVAL [signature] 1/16/76
DATE

DRAWING NUMBER
E-1

5/82
10/79
REVISED



NORMAL BEDDING

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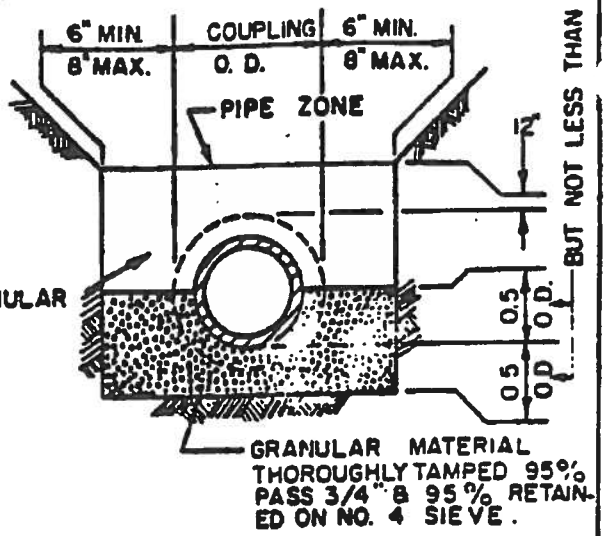

SPECIAL BEDDING

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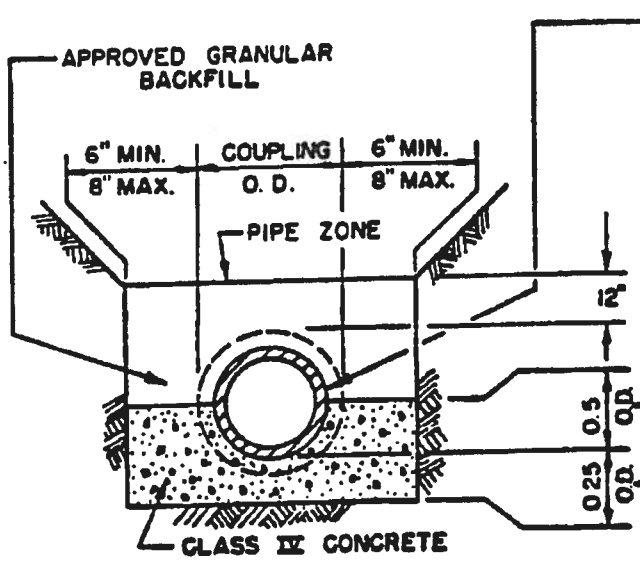

CONCRETE CRADLE

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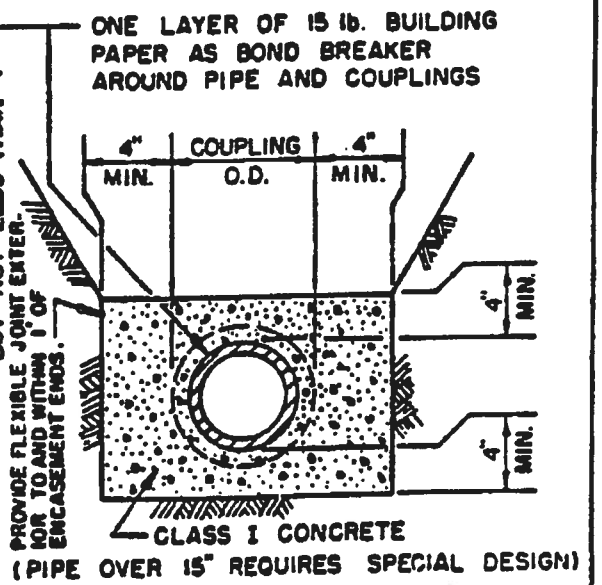

(PIPE OVER 15" REQUIRES SPECIAL DESIGN)

CONCRETE ENCASEMENT

(LOAD FACTOR = 4.5)

NOTE:
DO NOT USE ENCASEMENT FOR P.V.C. OR A.B.S. PIPE.

ALL BACKFILL SHALL BE PLACED IN ACCORDANCE WITH THE SPECIFICATIONS.

TECH. SPEC. REFERENCE:
CONCRETE — SECTION 2.0
BEDDING — SECTION 3.16

5/82
9-75
REVISED

ENVIRONMENTAL IMPROVEMENT AGENCY
DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS
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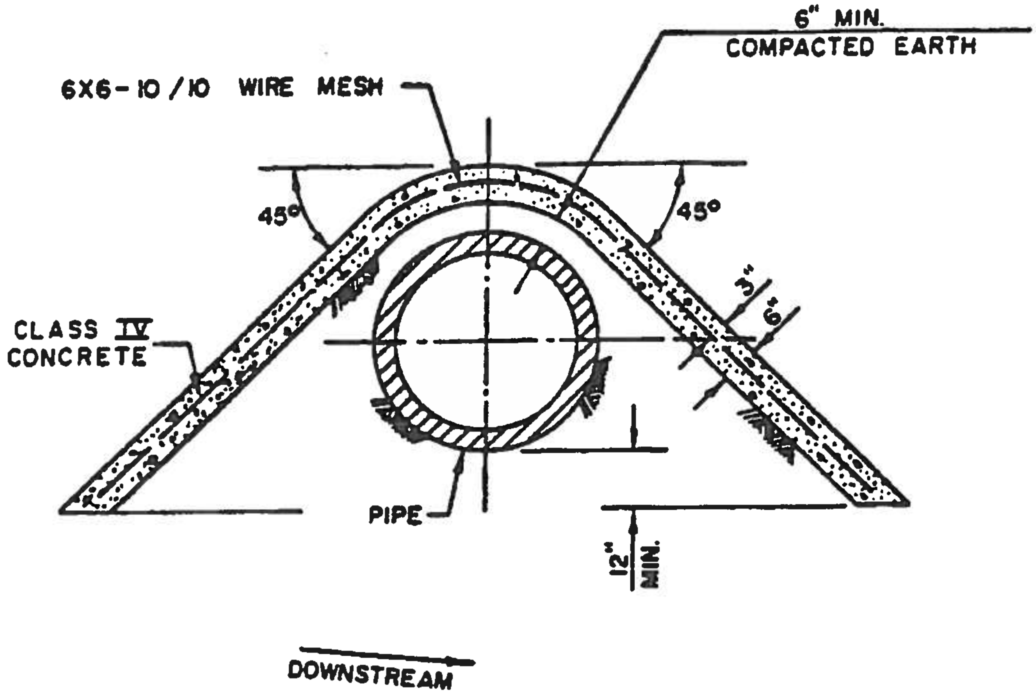
PIPE BEDDING

APPROVAL _____ DATE _____

DRAWING NUMBER
E-2



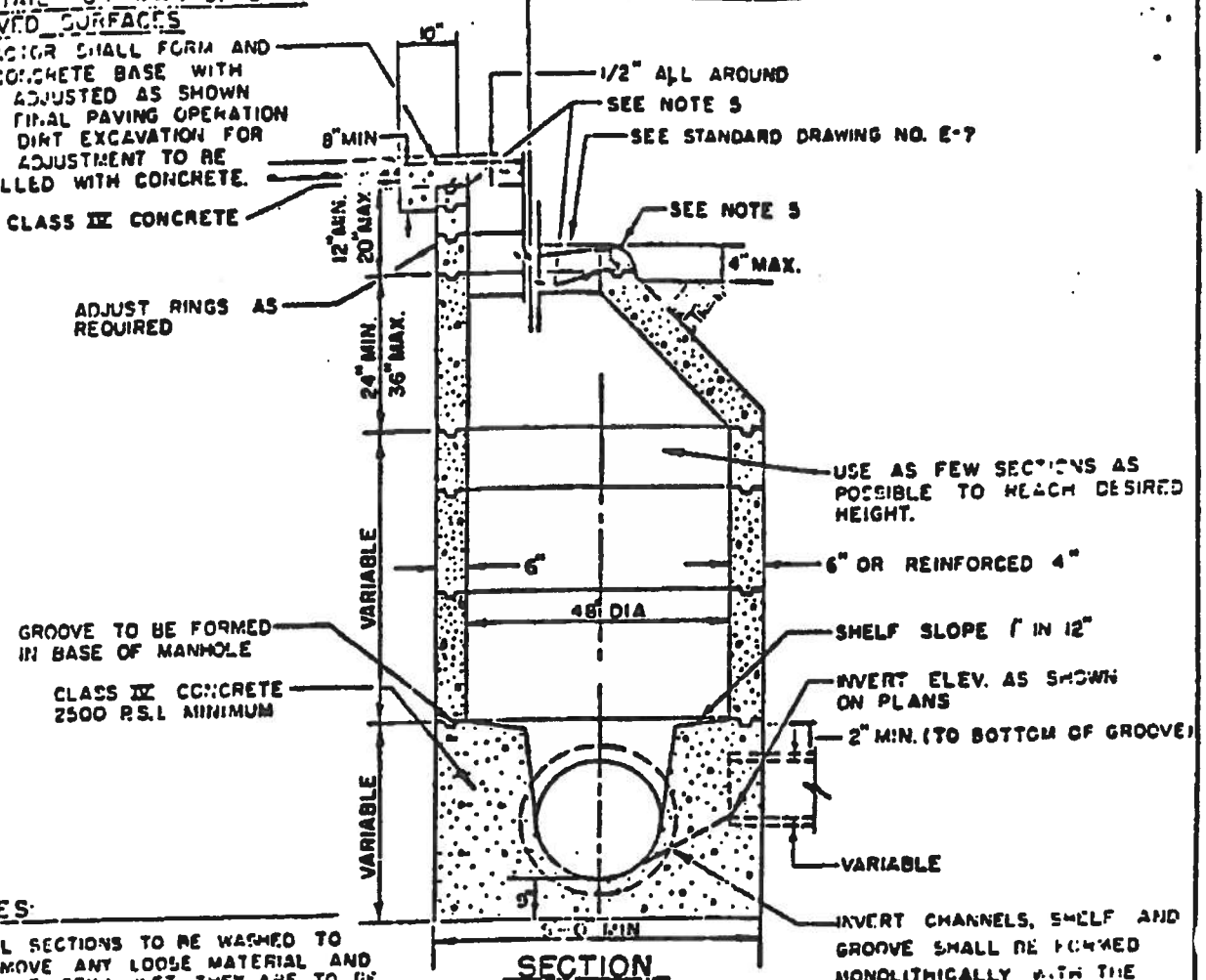
TECH. SPEC. REFERENCE:
CONCRETE —— SECTION 2.0
CONC. BLANKET - SECTION 5.0

	ENVIRONMENTAL IMPROVEMENT AGENCY DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS COUNTY OF SAN BERNARDINO
	CONCRETE BLANKET
5/82 6/81 REVISED	APPROVAL: Norman A. Nut[illegible] 9/30/81 DATE — DRAWING NUMBER E-3

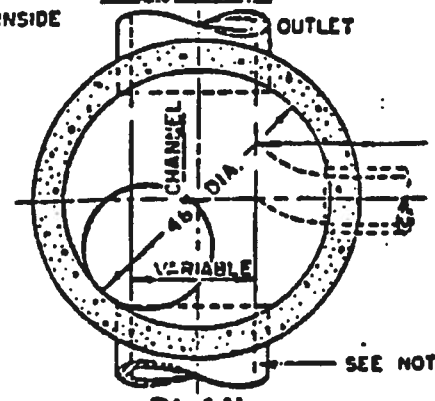
DETAIL FOR MANHOLES IN PAVED SURFACES

CONTRACTOR SHALL FORM AND POUR CONCRETE BASE WITH COVER ADJUSTED AS SHOWN AFTER FINAL PAVING OPERATION. ENTIRE DIRT EXCAVATION FOR FRAME ADJUSTMENT TO BE BACKFILLED WITH CONCRETE.

DETAIL FOR MANHOLES IN EASEMENTS



SECTION



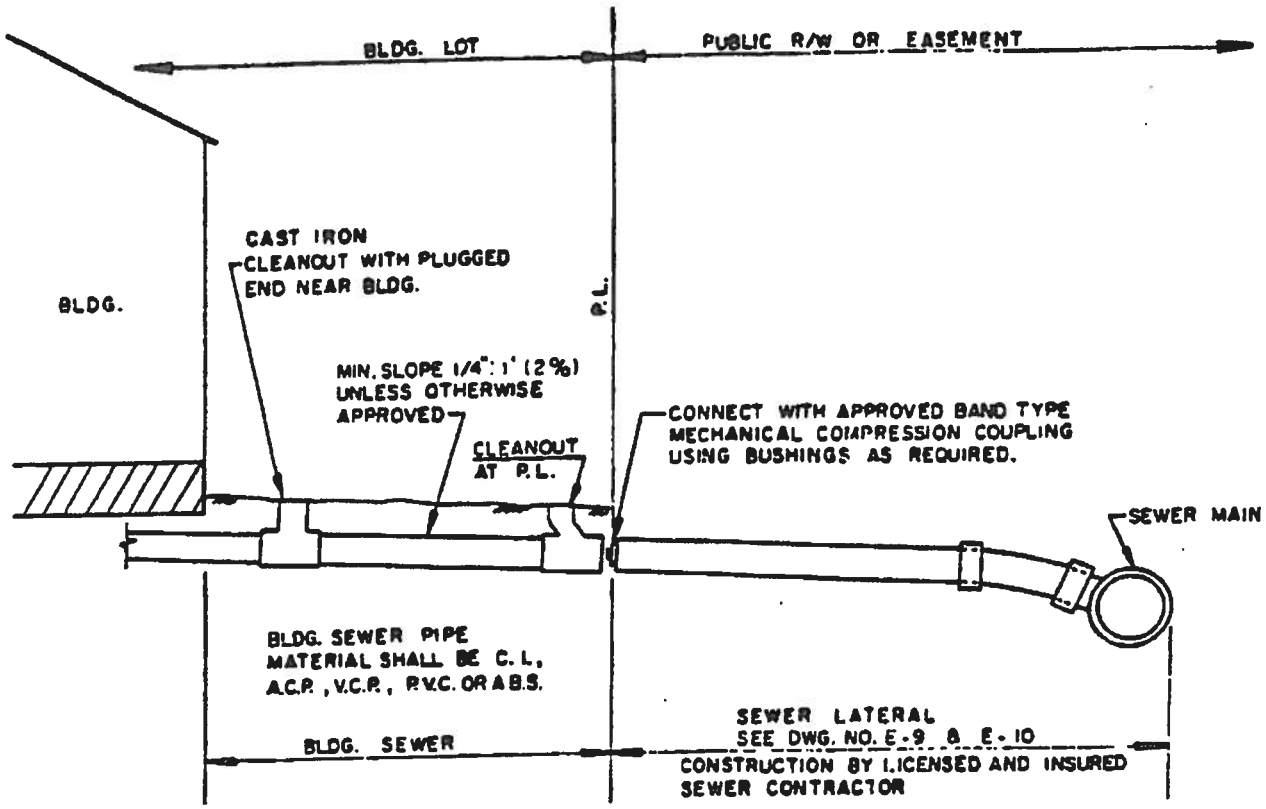
PLAN

NOTES:

1. ALL SECTIONS TO BE WASHED TO REMOVE ANY LOOSE MATERIAL AND WHILE STILL WET THEY ARE TO BE SET IN 1:3 MORTAR TRIMMED SMOOTH INSIDE AND OUTSIDE AT TIME OF SETTING INCLUDING FRAME, EXCEPT IN NOTE 4.
2. CONCRETE FOR MANHOLE SECTIONS 3000 P.S.I. MIN.
3. PROVIDE FLEXIBLE JOINT IN ALL SEWER PIPES OUTSIDE OF MANHOLE BUT WITHIN 12" OF CONCRETE BASE.
4. ON ALL EASEMENT MANHOLES, THE CONTRACTOR SHALL ANCHOR FRAME TO CONCRETE SECTIONS BY THE USE OF EPOXY OR OTHER METHOD AS APPROVED BY THE ENGINEER.
5. MORTAR AROUND AND UNDER FRAME SHALL HAVE A MIX IN ACCORDANCE WITH THE SPECIFICATIONS AND SHALL BE CURED BY "HUNTS" COMPOUND OR APPROVED EQUAL.

TECH. SPEC. REFERENCE:
CONCRETE — SECTION 2.0
MANHOLE — SECTION 4.0

	ENVIRONMENTAL IMPROVEMENT AGENCY DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS COUNTY OF SAN BERNARDINO
	PRECAST MANHOLE
5/82. 7-81 9-19/5 REVISED	APPROVAL _____ DATE 9/30/82
	DRAWING NUMBER E-4



NOTES:

1. CONNECTION OF BUILDING SEWER TO DISTRICT'S SEWER SYSTEM REQUIRES A DISTRICT PERMIT WITH PAYMENT OF REQUIRED FEES, INSPECTION AND AFFIXING OF AN APPROVAL TAG BY THE DISTRICT.
2. CONSTRUCTION OF BUILDING SEWER REQUIRES A DEPARTMENT OF BUILDING AND SAFETY PERMIT AND INSPECTION.

ENVIRONMENTAL IMPROVEMENT AGENCY
DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS
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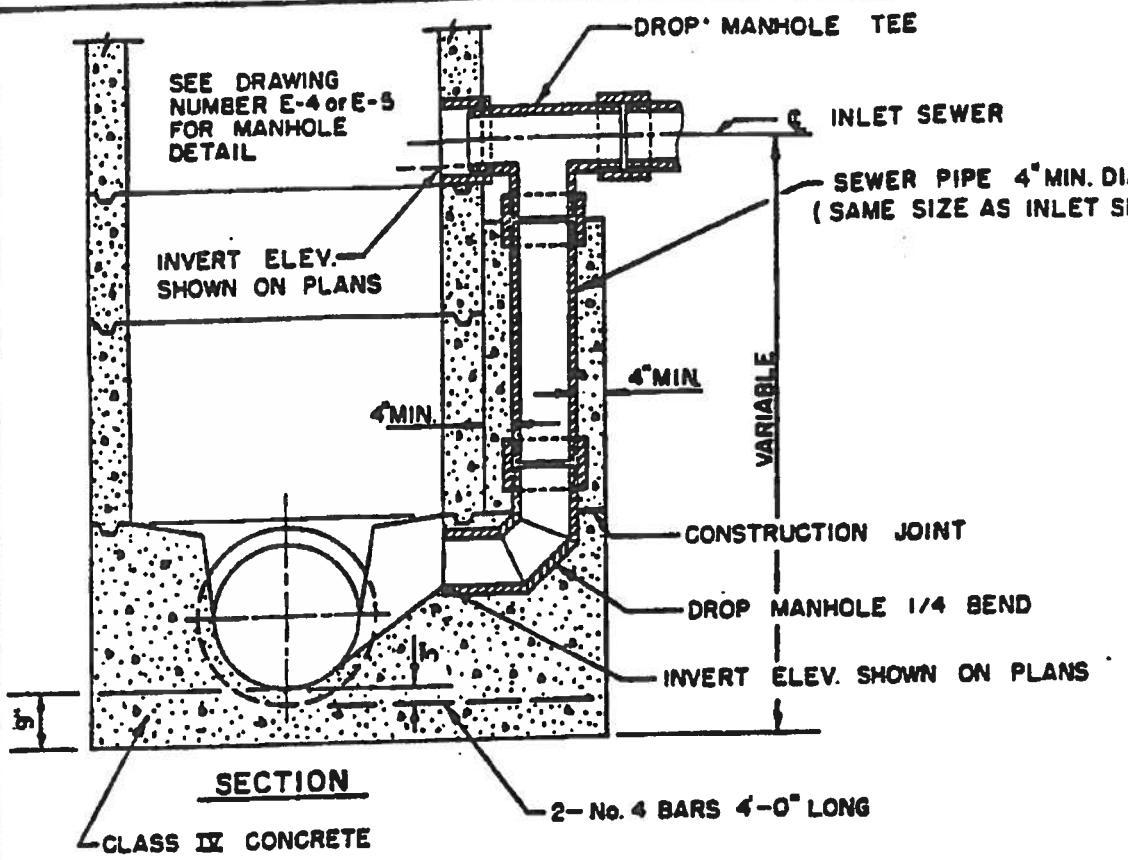
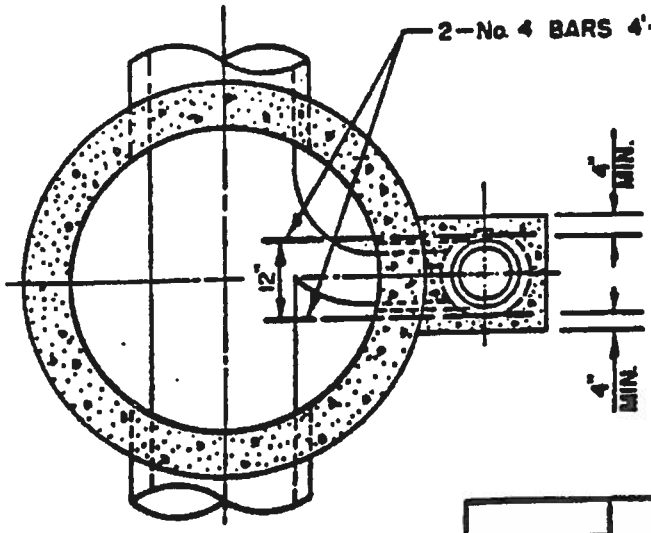
BUILDING LATERAL

APPROVAL _____ DATE 1/16/86

DRAWING NUMBER E-5

5/82
REVISED





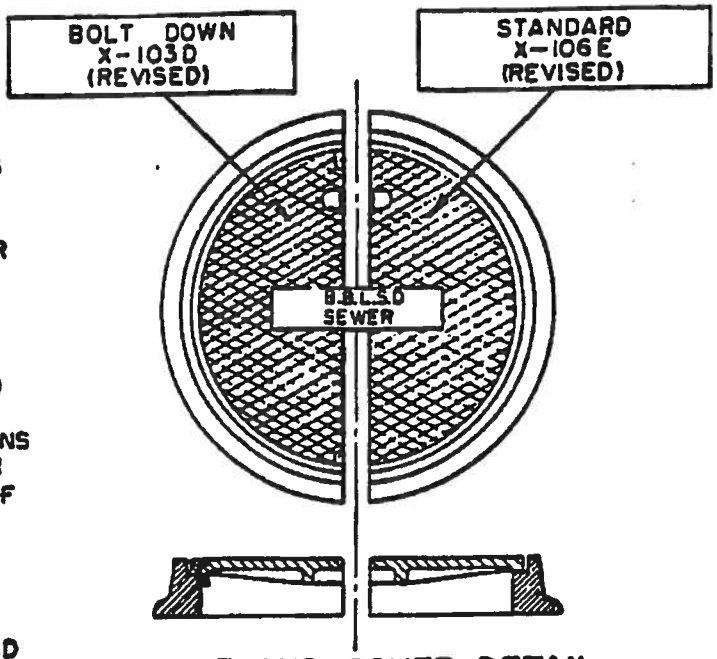
NOTE:
FOUNDATION FOR DROP SECTION SHALL BE POURED MONOLITHICALLY WITH MANHOLE BASE.

TECH. SPEC. REFERENCE
CONCRETE SECTION 2.0
MANHOLE SECTION 4.0

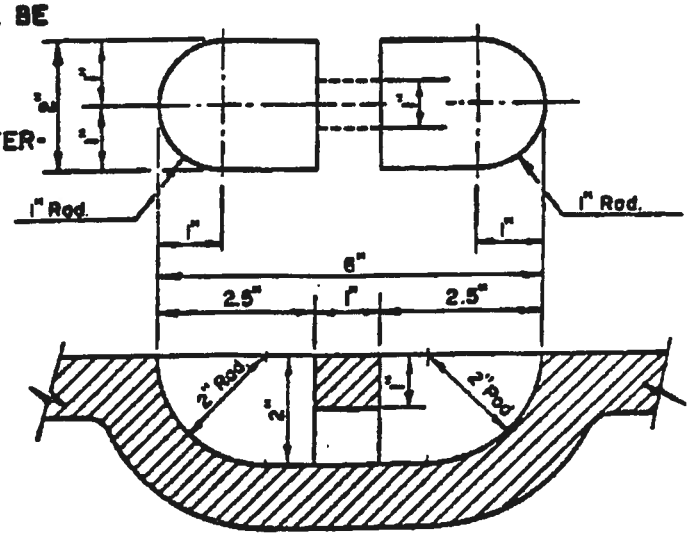
	ENVIRONMENTAL IMPROVEMENT AGENCY DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS COUNTY OF SAN BERNARDINO	
	DROP MANHOLE	
5/82 6/81 REVISED	APPROVAL [signature] 9/30/81 DATE	DRAWING NUMBER E-6

NOTES:

1. FRAME AND COVER SHALL BE LONG BEACH IRON WORKS INC. X-106E AND X-103D OR APPROVED EQUAL WITH LIFTING DEVICE CAST COVER AS PER DETAIL SHOWN BELOW. COVER SHALL BE DIAMOND TREAD WITH NAME LETTERED AS SHOWN.
2. BOLT-DOWN COVERS ARE REQUIRED IN SOME LOCATIONS AND ARE DENOTED THUSLY —⊙— ON THE PLANS OR AS DIRECTED BY THE ENGINEER
3. THE CONTRACTOR, AT THE TIME OF COMPLETION, SHALL FURNISH THE DISTRICT WITH A "HOOK" LIFTING TOOL AS APPROVED BY DISTRICT.
4. TWO ONE-HALF INCH STAINLESS STEEL OR MONEL STEEL HEX. HEAD BOLTS REQUIRED FOR EACH BOLT-DOWN COVER. BOLT HOLES SHALL BE DRILLED COMPLETELY THROUGH THE FRAME AND SHALL BE AMERICAN NATIONAL COURSE THREAD. COVER SHALL BE COUNTER-BORED TO ALLOW BOLTS TO FINISH FLUSH WITH TOP OF COVER.



FRAME AND COVER DETAIL



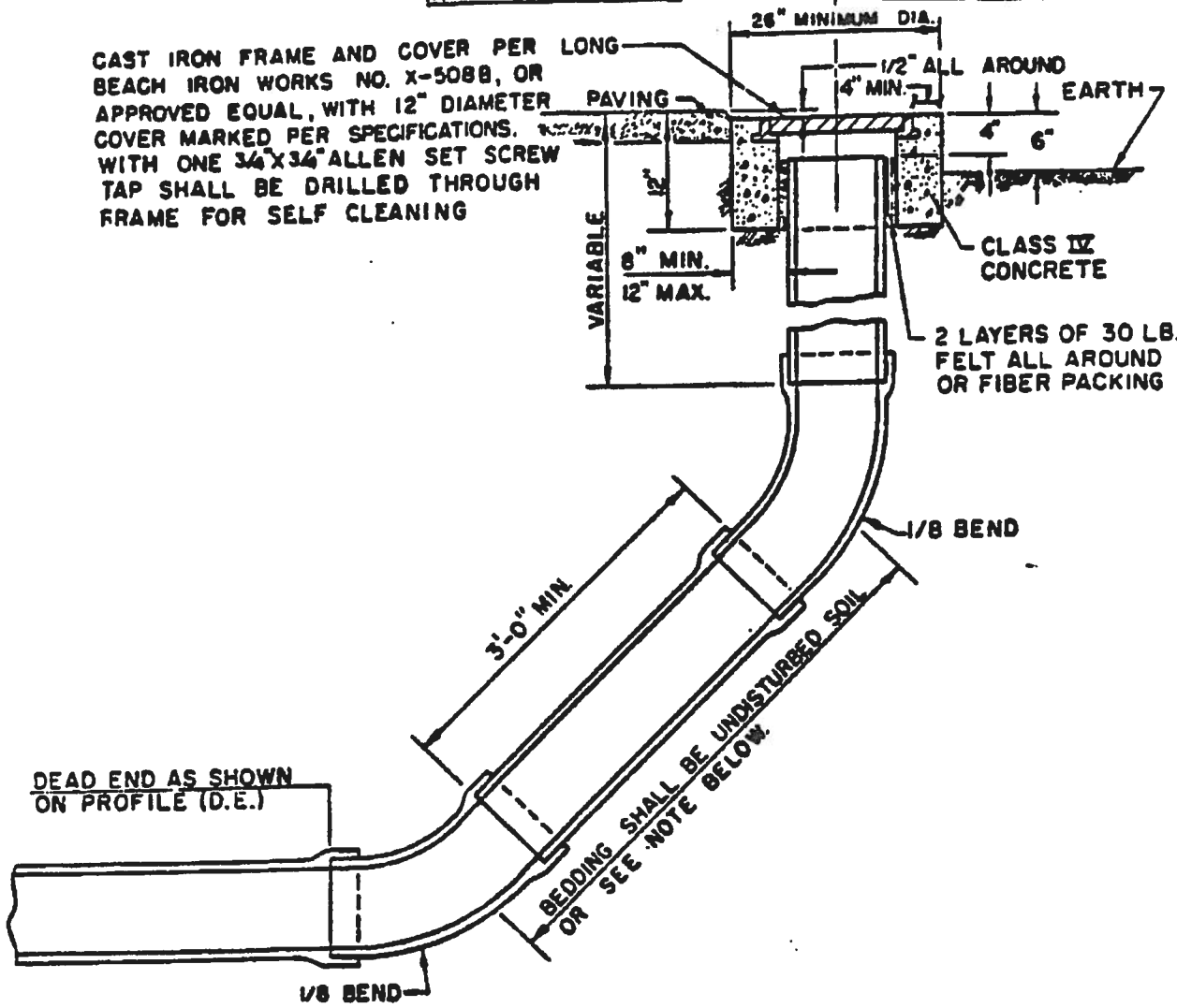
LIFTING RECEPTACLE DETAIL

TECH. SPEC. REFERENCE:
SECTION 4.9

	ENVIRONMENTAL IMPROVEMENT AGENCY DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS COUNTY OF SAN BERNARDINO
	MANHOLE FRAME AND COVER
5/82 9-80 9-78 REVISED	APPROVAL _____ DATE 9/30/11
	DRAWING NUMBER E-7

DETAIL FOR CLEANOUTS IN PAVED SURFACES

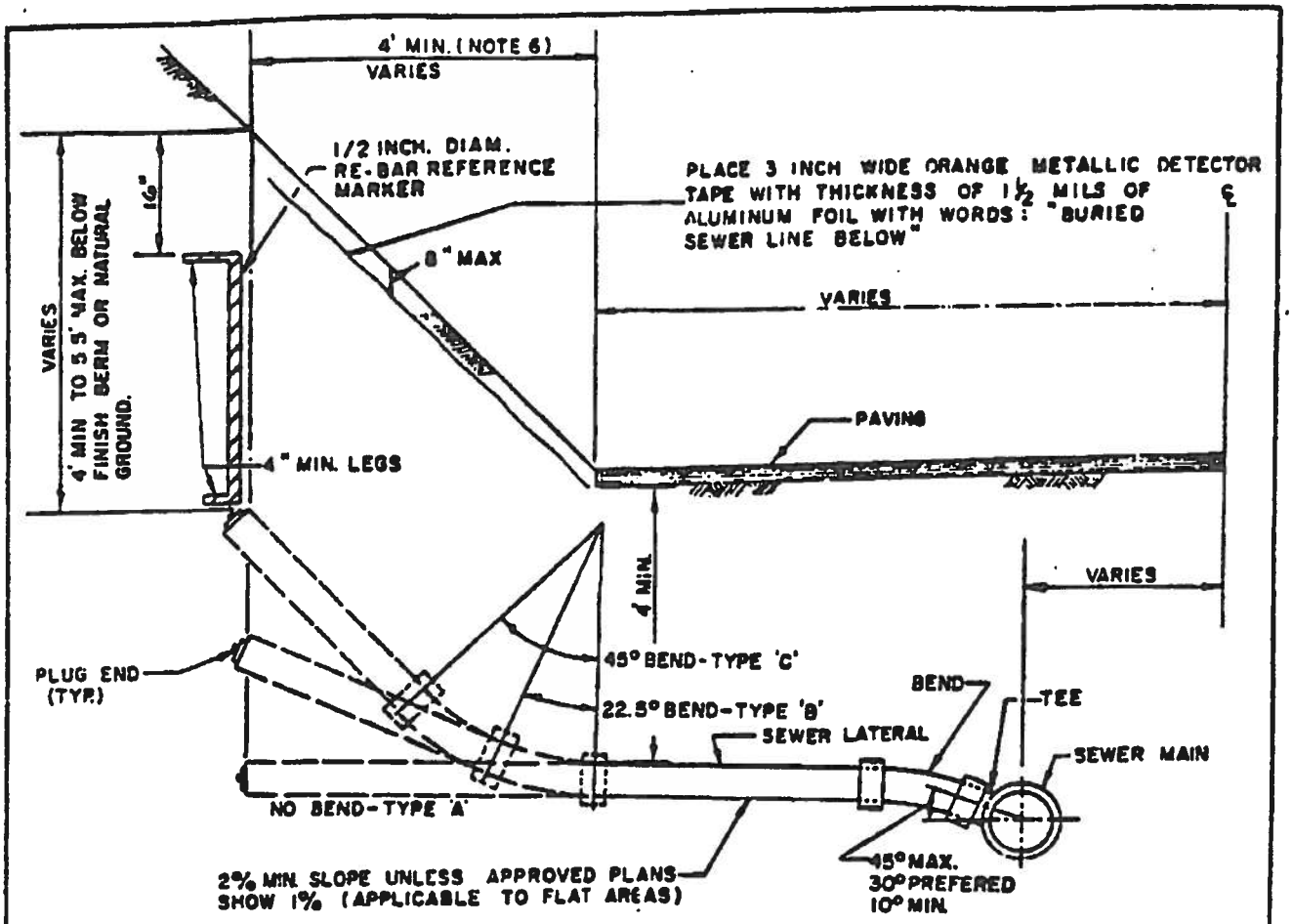
DETAIL FOR CLEANOUTS IN EASEMENTS



NOTE:
CLEAN-OUT LINE TO BE OF THE SAME MATERIAL & SIZE AS SEWER MAIN. THE SEWER MAIN SHALL BE LAID FOR THE FULL LENGTH & DEPTH SHOWN ON THE PLAN & PROFILE TO THE STATION MARKED DEAD END (D.E.). THE TRENCH FOR A DEAD END SHALL BE EXCAVATED ONLY TO SUBGRADE WHICH IS THE BOTTOM OF THE SLOPING PIPE AND FITTINGS. SHOULD THE EXCAVATION FOR ANY REASON BE CARRIED BELOW SUBGRADE, IT SHALL BE REFILLED TO SUBGRADE WITH ROCK OR GRAVEL WHICH SHALL BE TAMPED UNTIL FIRM AND UNYIELDING. SHOULD A FIRM AND UNYIELDING FOUNDATION BE UNOBTAINABLE BY THIS METHOD A CONCRETE PIPE CRADLE SHALL BE USED.

TECH. SPEC. REFERENCE
CONCRETE SECTION 2.0
CLEANOUT SECTIONS 3.15, 4.6

	ENVIRONMENTAL IMPROVEMENT AGENCY DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS COUNTY OF SAN BERNARDINO
	CLEANOUT
5/82	APPROVAL _____ 7/29/11 DATE
9-80	DRAWING NUMBER E-8
9-75	
REVISED	

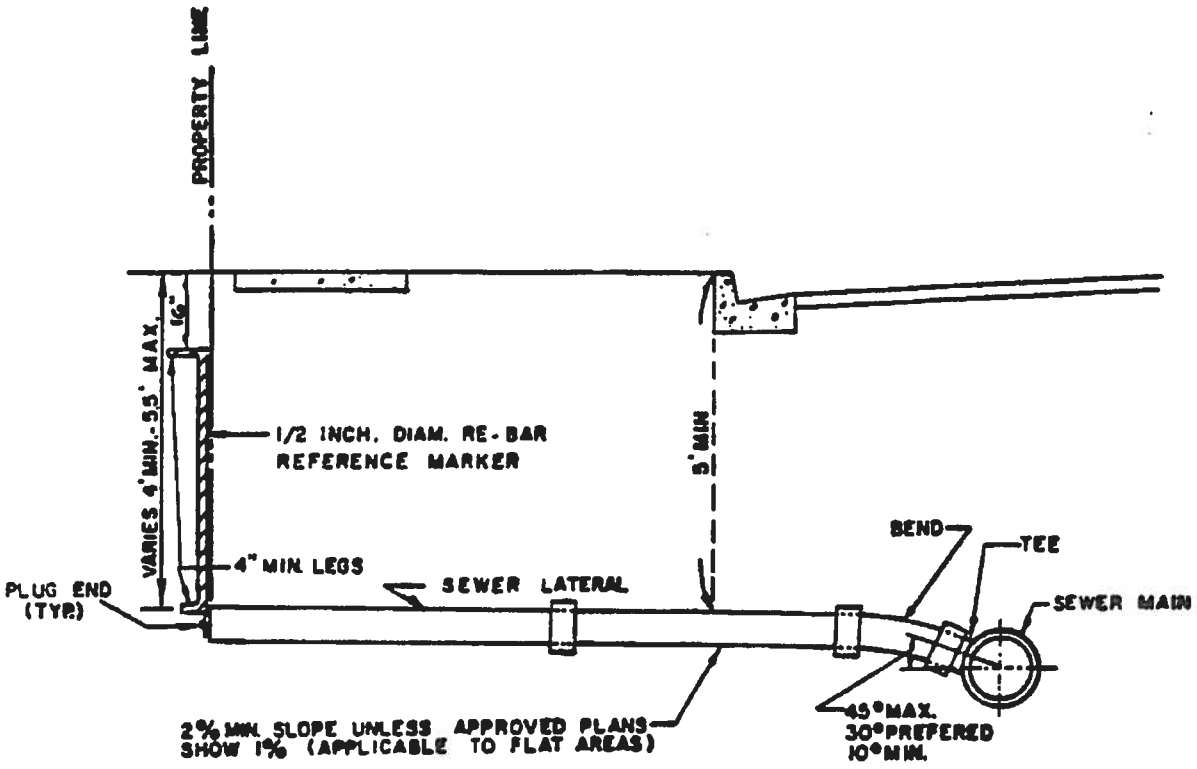


NOTES:

1. 4" PIPE FOR SINGLE DWELLINGS. 6" MIN. FOR ALL OTHER LATERALS.
2. LATERAL LOCATIONS SHALL BE MEASURED AT RIGHT ANGLES TO STREET CENTERLINE FROM THE CENTERLINE OF THE NEAREST DOWNSTREAM MANHOLE COVER.
3. WHENEVER DEPTH OF COVER OVER LATERAL IS LESS THAN 4'-0", SPECIAL BEDDING OR CONCRETE CRADLE PER STANDARD DRAWING NO. E-2 SHALL BE USED.
4. CONTRACTOR SHALL REFERENCE EACH LATERAL IN THE FIELD WITH A REFERENCE MARKER WHICH SHALL BE PLACED AT TIME OF BACKFILLING. MARKER SHALL BE VERTICAL.
5. MAXIMUM LENGTH OF PIPE SECTIONS SHALL NOT EXCEED 6'-6".
6. END OF LATERAL SHALL BE AT PROPERTY LINE, BUT IN NO CASE SHALL IT BE LESS THAN 4' OUTSIDE EDGE OF PAVEMENT.

TECH. SPEC. REFERENCE SECTIONS 3.15, 3.16

	ENVIRONMENTAL IMPROVEMENT AGENCY DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS COUNTY OF SAN BERNARDINO
	SEWER LATERAL NON-CURBED STREETS TYPES A, B AND C
5/82	APPROVAL [signature] 7/30/82 DATE
6-81	DRAWING NUMBER
9-80	E-9
9-75	
REVISED	

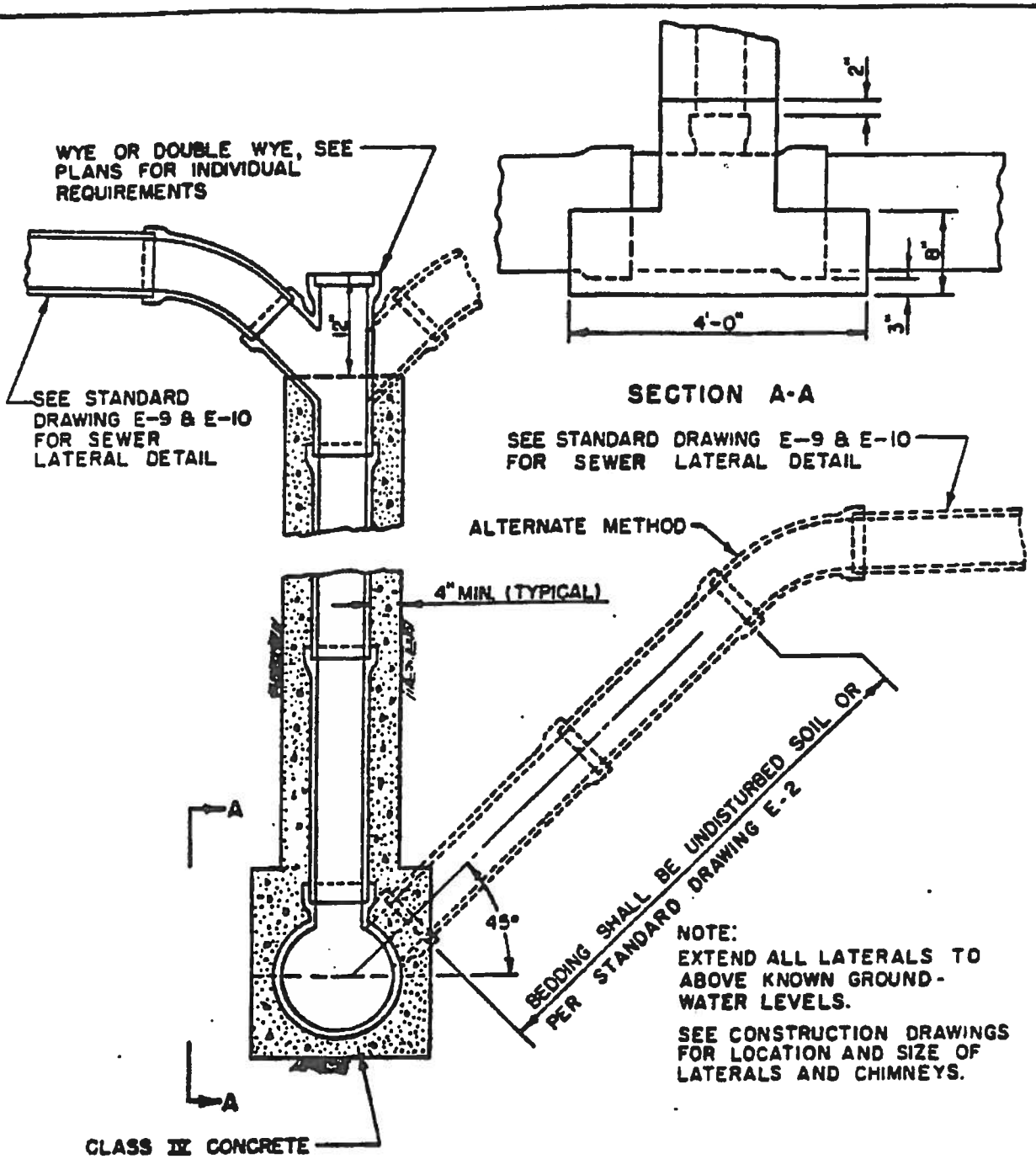


NOTES:

1. 4" PIPE FOR SINGLE DWELLINGS. 6" MIN. FOR ALL OTHER LATERALS.
2. LATERAL LOCATIONS SHALL BE MEASURED AT RIGHT ANGLES TO STREET CENTERLINE FROM THE CENTERLINE OF THE NEAREST DOWNSTREAM MANHOLE COVER.
3. WHENEVER DEPTH OF COVER OVER LATERAL IS LESS THAN 4'-0", SPECIAL BEDDING OR CONCRETE CRADLE PER STANDARD DRAWING NO. E-2 SHALL BE USED.
4. CONTRACTOR SHALL REFERENCE EACH LATERAL IN THE FIELD WITH A REFERENCE MARKER WHICH SHALL BE PLACED AT TIME OF BACKFILLING. MARKER SHALL BE VERTICAL.
5. MAXIMUM LENGTH OF PIPE SECTIONS SHALL NOT EXCEED 6'-6".

TECH. SPEC. REFERENCE
SECTIONS 3.15, 3.16

	ENVIRONMENTAL IMPROVEMENT AGENCY DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS COUNTY OF SAN BERNARDINO
	SEWER LATERAL CURBED STREETS
5182 6-81 9-75 REVISED	APPROVAL _____ DATE 9/24/25
	DRAWING NUMBER E-10

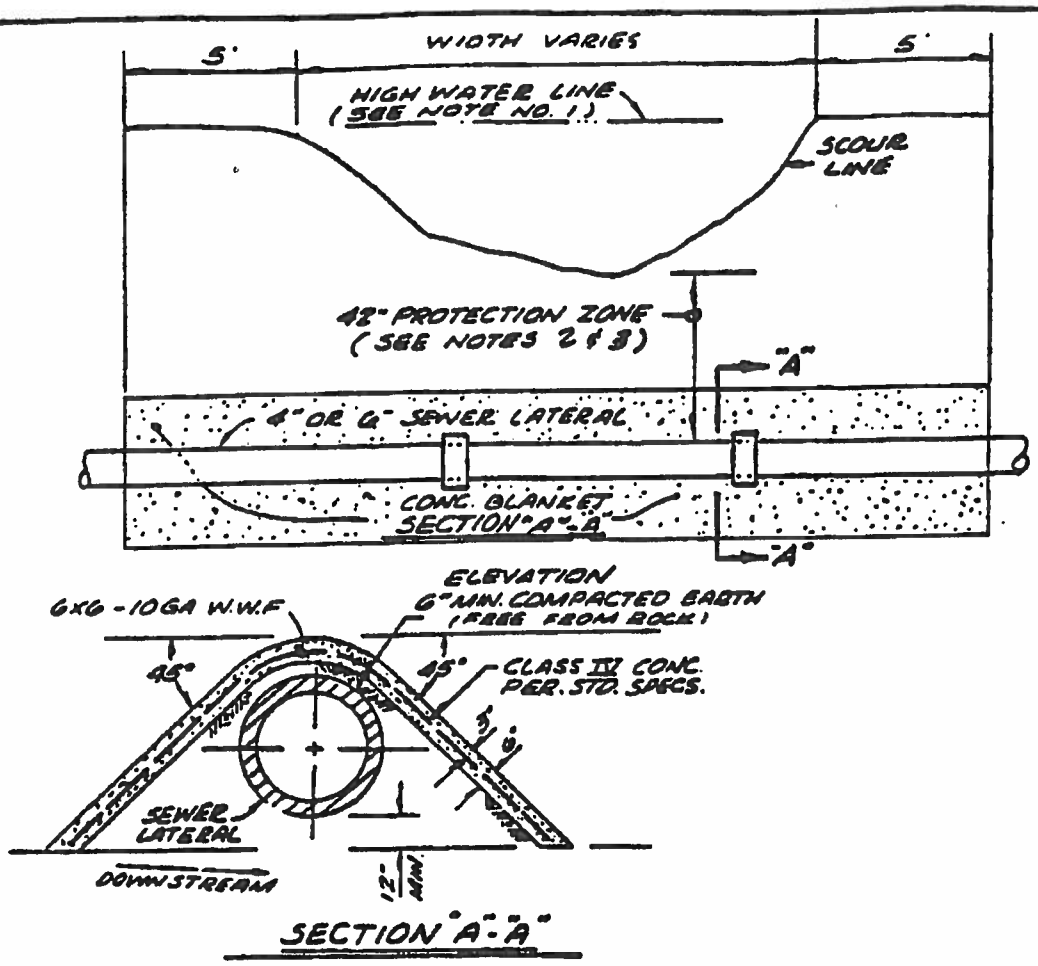


NOTE:
EXTEND ALL LATERALS TO ABOVE KNOWN GROUND-WATER LEVELS.

SEE CONSTRUCTION DRAWINGS FOR LOCATION AND SIZE OF LATERALS AND CHIMNEYS.

TECH. SPEC. REFERENCE
CONCRETE — SECTION 2.0
LATERALS — SECTIONS 3.15, 3.16

5/82	ENVIRONMENTAL IMPROVEMENT AGENCY DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS COUNTY OF SAN BERNARDINO
9-75	**CHIMNEY AND DEEP LATERAL**
REVISED	APPROVAL [signature] 9/30/75 DATE — DRAWING NUMBER E-11

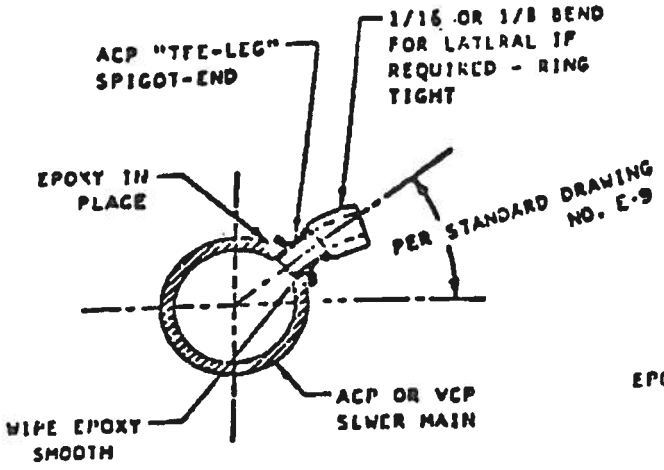


SECTION "A"-"A"

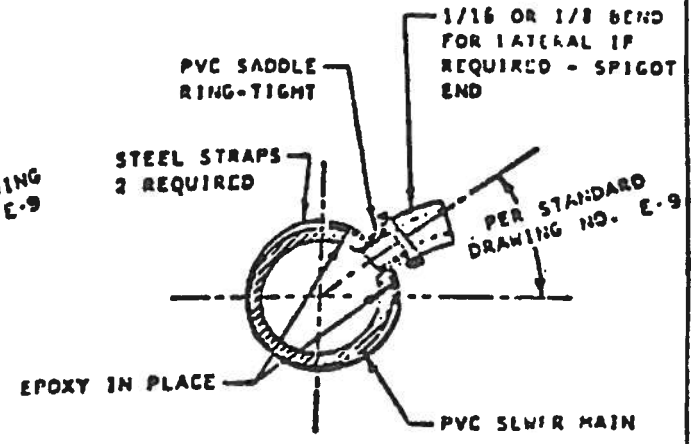
NOTES:

1. HIGH WATER LINE TO BE DETERMINED IN THE FIELD BY THE DISTRICT.
2. SEWER LATERAL DEEPER THAN 42" BELOW SCOUR LINE DOES NOT REQUIRE CONCRETE BLANKET
3. SPECIAL DESIGN REQUIRED IF LATERAL IS ABOVE SCOUR LINE.

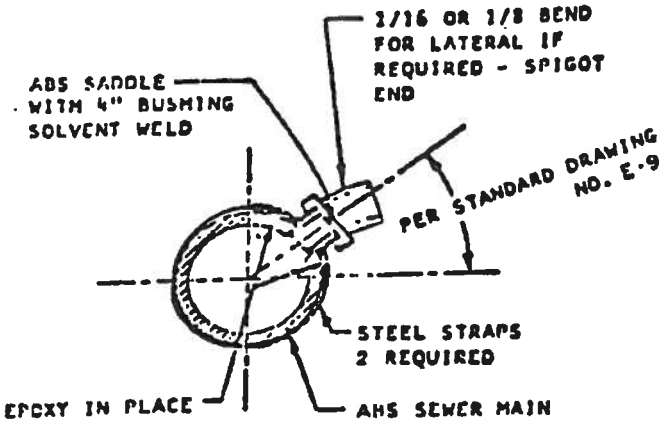
	ENVIRONMENTAL IMPROVEMENT AGENCY DEPARTMENT OF SPECIAL DISTRICTS-OPERATIONS COUNTY OF SAN BERNARDINO	
	CONCRETE BLANKET FOR SEWER LATERAL CROSSING UNDER WATER COURSE OR CROSSING	
5/82 6-81 REVISED	APPROVAL R.A. Bushman 5/14/82 DATE	DRAWING NUMBER E-12



A. C. P. OR V. C. P. PIPE
TYPE "A"



P. V. C. PIPE
TYPE "B"



A. B. S. PIPE
TYPE "C"

NOTES:

1. ALL HOLES SHALL BE MACHINE DRILLED
2. THE EPOXY IN THE TYPE "A" INSTALLATION SHALL BE GIVEN A 2 HOUR SET-UP TIME WITH ADAPTOR NOT TOUCHED WITH FITTINGS OR BACKFILL, AFTER WHICH SAND SHALL BE PLACED ALL AROUND CONNECTION FITTING.

ENVIRONMENTAL IMPROVEMENT AGENCY
DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS
COUNTY OF SAN BERNARDINO

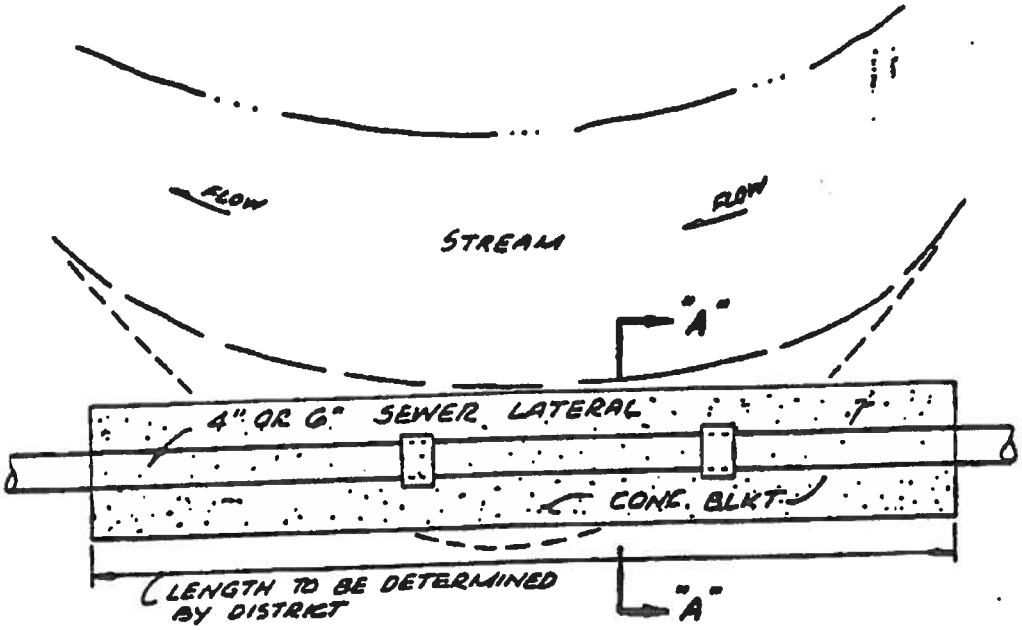
MACHINE TAPPING CONNECTION DETAILS

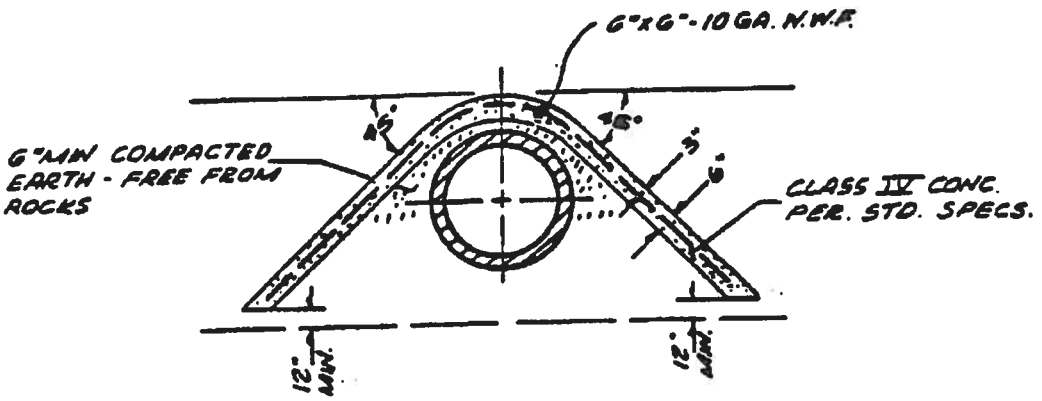
APPROVALS

DATE

DRAWING NUMBER
E-13

5/82
9-80
REVISED





SEWER LATERAL
SECTION "A"-"A"

NOTES:
OTHER PROTECTION MAY BE REQUIRED BY DISTRICT IN LIEU OF CONC. BLKT.

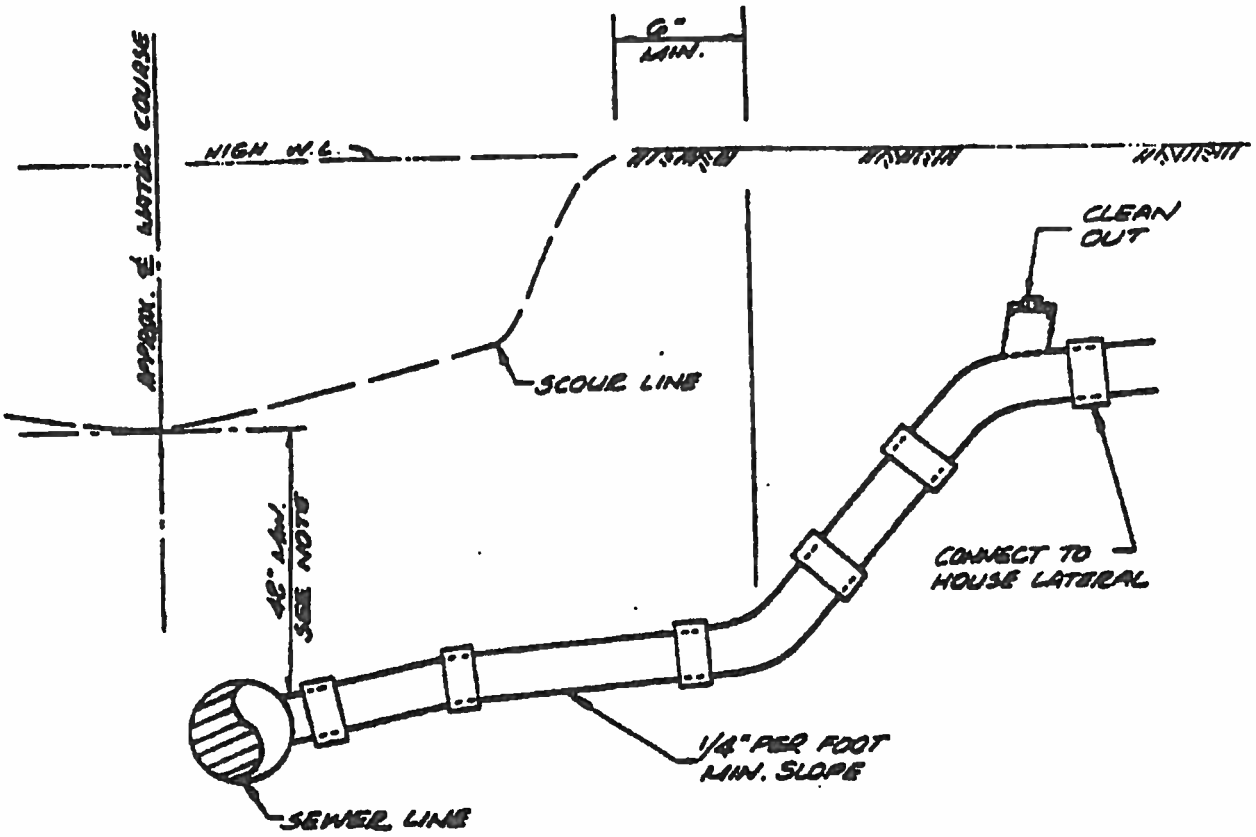
ENVIRONMENTAL IMPROVEMENT AGENCY
DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS
COUNTY OF SAN BERNARDINO

SEWER LATERAL
PARALLEL WITH WATER COURSE

APPROVAL [signature] 5-6-82 DATE

DRAWING NUMBER E-14

5/82 REVISED



NOTE: IF LESS THAN 42" DEEP LATERAL MUST BE BLANKETED OR MADE OF CAST IRON

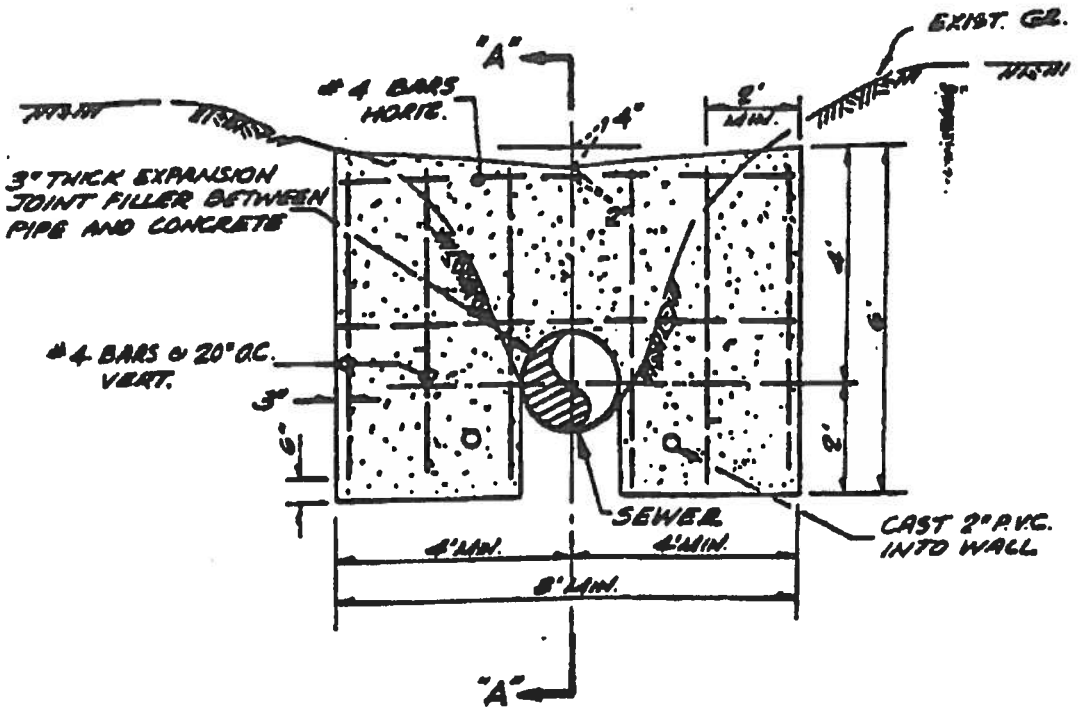
ENVIRONMENTAL IMPROVEMENT AGENCY
DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS
COUNTY OF SAN BERNARDINO

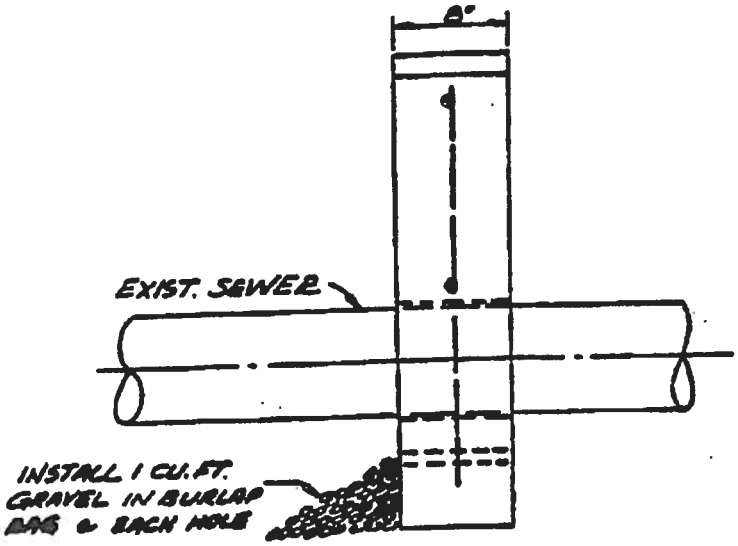
LATERAL CONNECTION
ADJACENT TO WATERWAYS

APPROVAL _____ DATE 5-6-82

CRAWING NUMBER E-15

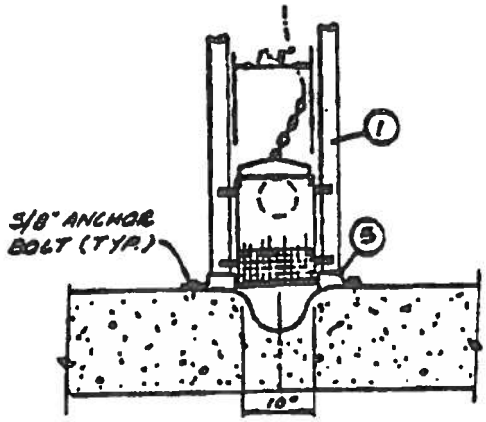
5/82
REVISED



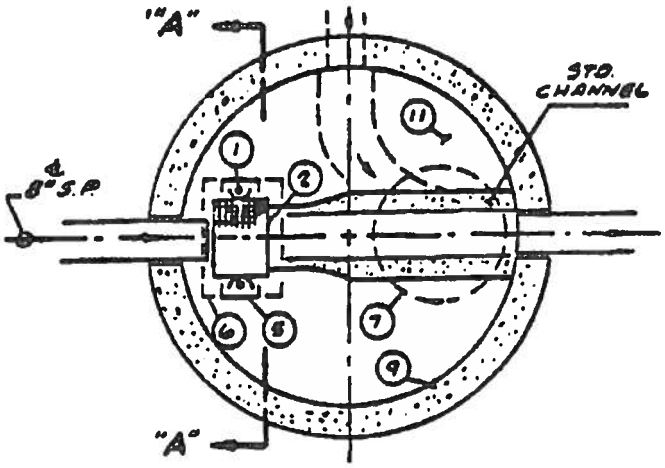


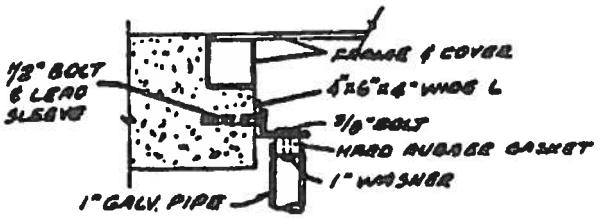
SECTION "A"-"A"

	ENVIRONMENTAL IMPROVEMENT AGENCY DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS COUNTY OF SAN BERNARDINO
	CUT-OFF WALL
5/82 REVISED	APPROVAL R.A. Burmester S.C.E. DATE
	DRAWING NUMBER E-16

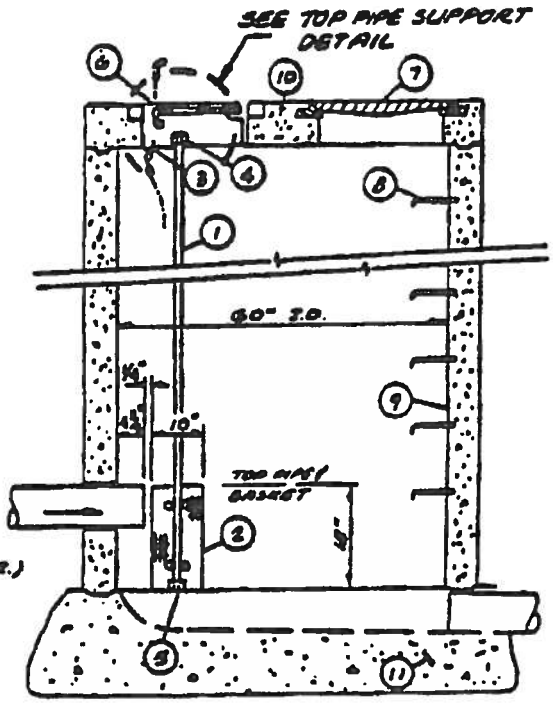


SECTION A-A
N.T.S.





TOP PIPE SUPPORT DETAIL
N.T.S.



MATERIAL LIST

1. 1" STD GALV. PIPE
2. STAINLESS STEEL BASKET PER HYDRO-O-MATIC OR FLYGT CORP.
3. CHAIN HOOK - ANCHOR TO WALL WITH 2-1/4" LAG BOLTS
4. TOP PIPE SUPPORT WITH RUBBER COMPRESSION INSERT (PER. BSKT. MFGR.)
5. BOTTOM PIPE SUP. AND FOOT ANCHOR (PER. BSKT. MFGR.)
6. 2'-0" x 2'-0" ST. DOOR FOR H-20 LOADING PER BALCO - J OR BABCOCK - DAVIS.
7. MANHOLE FRAME & COVER PER STD DWG. E-9
8. MANHOLE STEPS (OPTIONAL IF REQ'D. BY DIST.)
9. 60" I.D. PRECAST CONC. MAN. SECTIONS PER. STD. DWG. E-6 (MODIFIED)
10. PRECAST CONC. FLAT-TOP THICKNESS PER MFGR.
11. CONC. M.H. BASE PER STD. DWG. E-4 (MODIFIED)

NOTES:

1. IF INLET PIPE IS LARGER THAN 8" BOTTOM OF BASKET SHALL BE SUPPORTED BY BRACKETS MOUNTED ON SIDEWALL
2. ALL METAL WORK INCLUDING STAINLESS STEEL SHALL BE COATED WITH COAL-TAR EPOXY

ENVIRONMENTAL IMPROVEMENT AGENCY
DEPARTMENT OF SPECIAL DISTRICTS - OPERATIONS
COUNTY OF SAN BERNARDINO

TRASH BASKET MANHOLE

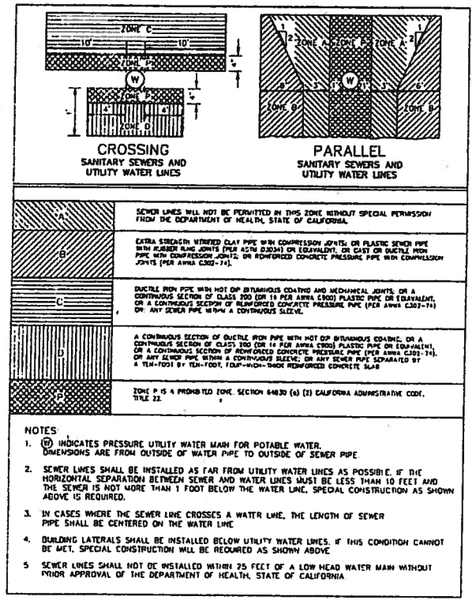
APPROVAL [signature] 5-6-82
DATE

DRAWING NUMBER
E-17

5/82
REVISED

Appendix D: Town of Apple Valley General Sewer Notes and Standard Sewer Detail Sheet

11394077



NOTES

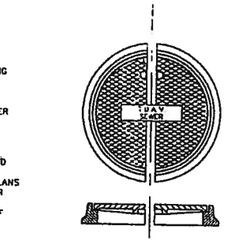
1. (W) INDICATES PRESSURE UTILITY WATER MAIN FOR POTABLE WATER. DIMENSIONS ARE FROM OUTSIDE OF WATER PIPE TO OUTSIDE OF SEWER PIPE.
2. SEWER LINES SHALL BE INSTALLED AS FAR FROM UTILITY WATER LINES AS POSSIBLE. IF THE HORIZONTAL SEPARATION BETWEEN SEWER AND WATER LINES MUST BE LESS THAN 10 FEET AND THE SEWER IS NOT MORE THAN 1 FOOT BELOW THE WATER LINE, SPECIAL CONSTRUCTION AS SHOWN ABOVE IS REQUIRED.
3. IN CASES WHERE THE SEWER LINE CROSSES A WATER LINE, THE LENGTH OF SEWER PIPE SHALL BE CENTERED ON THE WATER LINE.
4. BUILDING LATERALS SHALL BE INSTALLED BELOW UTILITY WATER LINES. IF THIS CONDITION CANNOT BE MET, SPECIAL CONSTRUCTION WILL BE REQUIRED AS SHOWN ABOVE.
5. SEWER LINES SHALL NOT BE INSTALLED WITHIN 25 FEET OF A LOW HEAD WATER MAIN WITHOUT PRIOR APPROVAL OF THE DEPARTMENT OF HEALTH, STATE OF CALIFORNIA.

PROTECTION OF UTILITY WATER LINES FROM GRAVITY SEWERS

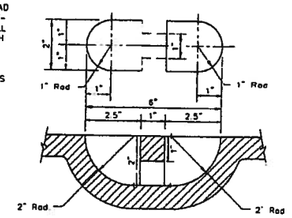
NOT TO SCALE

NOTES:

1. FRAME AND COVER SHALL BE LONG BEACH IRON WORKS INC. X-1066, ALHAMBRA FOUNDRY INC., LTD. A-1254 OR APPROVED EQUAL WITH LIFTING POCKET. CAST COVER AS PER DETAIL SHOWN BELOW. COVER SHALL BE DIAMOND TREAD WITH NAME LETTERED AS SHOWN.
2. BOLT-DOWN COVERS ARE REQUIRED IN SOME LOCATIONS AND ARE SENDTED THUSLY —⊙— ON THE PLANS OR AS DIRECTED BY THE ENGINEER
3. THE CONTRACTOR, AT THE TIME OF COMPLETION, SHALL FURNISH THE DISTRICT WITH A "HOOK" LIFTING TOOL AS APPROVED BY DISTRICT
4. TWO ONE-HALF INCH STAINLESS STEEL OR MONEL STEEL HEX. HEAD BOLTS REQUIRED FOR EACH BOLT-DOWN COVER. BOLT HOLES SHALL BE DRILLED COMPLETELY THROUGH THE FRAME AND SHALL BE AMERICAN NATIONAL COARSE THREAD. COVER SHALL BE COUNTER-BORED TO ALLOW BOLTS TO FINISH FLUSH WITH TOP OF COVER



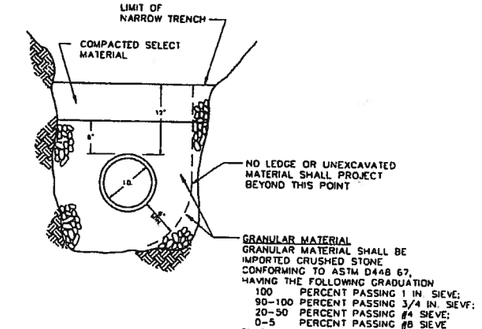
FRAME AND COVER DETAIL



LIFTING RECEPTACLE DETAIL

MANHOLE FRAME & COVER

NOT TO SCALE

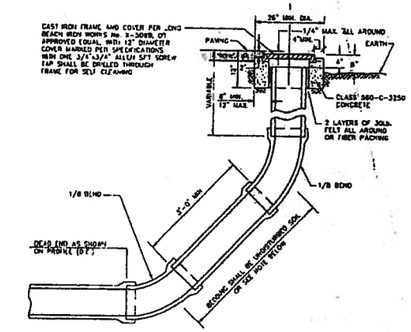


P.V.C. PIPE BEDDING DETAIL

NOT TO SCALE

DETAIL FOR CLEANOUTS IN PAVED SURFACES

DETAIL FOR CLEAN-OUTS IN EASEMENTS

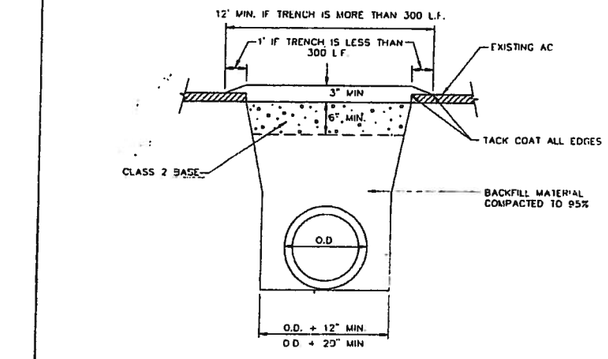


NOTES

CLEAN-OUT LINE TO BE OF THE SAME MATERIAL & SIZE AS SEWER MAIN. THE SEWER MAIN SHALL BE LAID FOR THE FULL LENGTH & DEPTH SHOWN ON THE PLAN & PROFILE TO THE STATION MARKED DEAD END (D.E.). THE TRENCH FOR A DEAD END SHALL BE EXCAVATED ONLY TO SUBGRADE WHICH IS THE BOTTOM OF THE SLOPING PIPE AND FITTINGS. SHOULD THE EXCAVATION FOR ANY REASON BE CARRIED BELOW SUBGRADE, IT SHALL BE REFILLED TO SUBGRADE WITH ROCK OR GRAVEL WHICH SHALL BE TAMPED UNTIL FIRM AND UNYIELDING. SHOULD A FIRM AND UNYIELDING FOUNDATION BE UNOBTAINABLE BY THIS METHOD A CONCRETE PIPE CRADLE SHALL BE USED

CLEANOUT

NOT TO SCALE

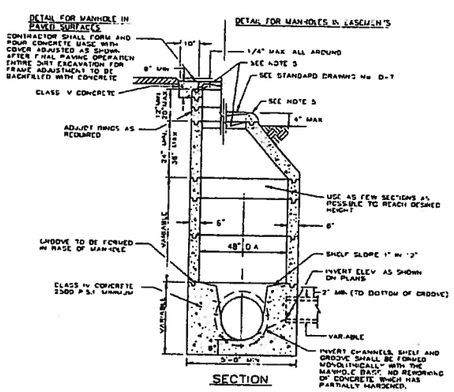


NOTE:

TRENCH REPAIR TO MEET ALL REQUIREMENTS OF TOWN OF APPLE VALLEY ENGINEERING DEPARTMENT

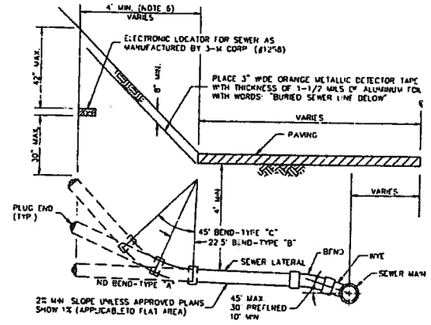
TRENCH AND PAVEMENT REPAIR DETAIL

NOT TO SCALE



PRECAST MANHOLE

NOT TO SCALE

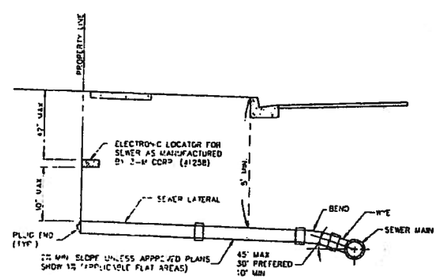


NOTE

1. 4" PIPE FOR SINGLE DWELLINGS 6" MIN FOR ALL OTHER LATERALS
2. LATERAL LOCATIONS SHALL BE MEASURED AT RIGHT ANGLES TO STREET CENTERLINE FROM THE CENTERLINE OF THE NEAREST DOWNSTREAM MANHOLE COVER
3. WHENEVER DEPTH OF COVER OVER LATERAL IS LESS THAN 4'-0", SPECIAL BEDDING OR CONCRETE CRADLE PER STANDARD DRAWING NO. D-2 SHALL BE USED.
4. CONTRACTOR SHALL REFERENCE EACH LATERAL IN THE FIELD WITH AN ELECTRONIC LOCATOR WHICH SHALL BE PLACED AT TIME OF BACKFILLING. LOCATOR SHALL BE HORIZONTAL
5. MAXIMUM LENGTH OF PIPE SECTIONS SHALL NOT EXCEED 6'-6"
6. END OF LATERAL SHALL BE AT PROPERTY LINE, BUT IN NO CASE SHALL IT BE LESS THAN 4' OUTSIDE EDGE OF PAVEMENT

SEWER LATERAL — NON-CURBED STREETS TYPES A, B, AND C

NOT TO SCALE



NOTE

1. 4" PIPE FOR SINGLE DWELLINGS 6" MIN FOR ALL OTHER LATERALS
2. LATERAL LOCATIONS SHALL BE MEASURED AT RIGHT ANGLES TO STREET CENTERLINE FROM THE CENTERLINE OF THE NEAREST DOWNSTREAM MANHOLE COVER
3. WHENEVER DEPTH OF COVER OVER LATERAL IS LESS THAN 4'-0", SPECIAL BEDDING OR CONCRETE CRADLE PER STANDARD DRAWING NO. D-2 SHALL BE USED
4. CONTRACTOR SHALL REFERENCE EACH LATERAL IN THE FIELD WITH AN ELECTRONIC LOCATOR WHICH SHALL BE PLACED AT TIME OF BACKFILLING. LOCATOR SHALL BE HORIZONTAL
5. MAXIMUM LENGTH OF PIPE SECTIONS SHALL NOT EXCEED 6'-6"

SEWER LATERAL — CURBED STREETS

NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER No. C Civil Exp. STATE OF CALIFORNIA

REV.	REVISION DESCRIPTION	BY	DATE

DESIGNED BY: _____
DRAWN BY: _____
CHECKED BY: _____

PROJECT ENGINEER _____ R.C.E. No. _____ DATE _____
SUBMITTED BY _____ R.C.E. No. _____ DATE _____

SCALE: AS SHOWN
PROJECT NO

PREPARED BY:

APPROVED BY
CLIFFORD B. WILLIAMS, COMMUNITY SERVICES DIRECTOR DATE
APPROVED BY
WILSON F. SO, WATER DEPARTMENT ENGINEER C 21651 DATE

TOWN OF APPLE VALLEY PROJECT No. _____

TOWN OF APPLE VALLEY

STANDARD SEWER DETAIL SHEET

DRAWING NO _____
SHEET _____ OF _____

General Sewer Notes

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE TOWN OF APPLE VALLEY PUBLIC WORKS DEPARTMENT REQUIREMENTS AND SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION.

2. THE LOCATION OF ANY AND ALL UNDERGROUND UTILITIES MAY OR MAY NOT BE SHOWN ON THESE PLANS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FAMILIARIZE HIMSELF WITH THE JOBSITE AND UNDERGROUND UTILITIES. THE CONTRACTOR SHALL AT HIS OWN EXPENSE AND COST CONSTRUCT ALL IMPROVEMENTS IN SUCH A MANNER AS WILL PROTECT ALL UNDERGROUND UTILITIES. THE ENGINEER WILL NOT BE RESPONSIBLE FOR DAMAGE TO ANY UNDERGROUND UTILITY.

3. MAINTAIN 10' MINIMUM HORIZONTAL SEPARATION BETWEEN EDGE TO EDGE OF WATER AND SEWER MAIN.

4. MAINTAIN 1' MINIMUM VERTICAL SEPARATION WHERE SEWER AND WATER CROSS. WHERE THIS SEPARATION CANNOT BE MAINTAINED A CORRECTIVE ACTION WILL BE REVIEWED AND RECOMMENDED BY THE TOWN OF APPLE VALLEY PUBLIC WORKS STAFF.

5. CONTRACTOR SHALL ADJUST EXISTING W.A.V.T.S. FLOW LINE ELEVATION AND MATCH PIPELINE CROWNS ACCORDINGLY. CORE ELEVATION SHALL BE APPROVED BY T.O.A.V. IN ADVANCE.

6. CONTRACTOR SHALL NOTIFY OWNER 48 HOURS PRIOR TO CONNECTING ANY EXISTING FACILITIES TO THIS PROJECT.

7. PIPE BEDDING SHALL BE NORMAL BEDDING PER DETAILS ON SHEET 6.

8. NO LOTS SHALL BE CONNECTED TO THE SEWER MAIN UNTIL THAT PORTION OF THE SEWER MAIN TERMINATES IN A CLEANOUT OR MANHOLE CONSTRUCTED PER STANDARDS.

9. SEWER CONSTRUCTION SHALL START A MINIMUM OF 5.0 FEET FROM ANY EXISTING SEWER OR MANHOLE. THE CLOSING SECTION SHALL NOT BE INSTALLED UNTIL ALL MAINS HAVE BEEN CLEANED, TESTED, AND TENTATIVELY ACCEPTED BY THE OWNER/DISTRICT IN WRITING.

10. MANHOLE STRUCTURES SHALL BE CONSTRUCTED PER DETAILS ON SHEET 6.

11. CONTRACTOR/DEVELOPER SHALL PROVIDE THE SERVICES OF A CIVIL ENGINEER OR SURVEYOR TO FURNISH CONSTRUCTION STAKING. ENGINEER OR SURVEYOR SHALL BE CURRENTLY LICENSED IN THE STATE OF CALIFORNIA. CONSTRUCTION STAKES SHALL BE ESTABLISHED FROM HORIZONTAL AND VERTICAL CONTROLS ON SITE.

12. ALL POLYVINYL CHLORIDE (PVC) PIPE SHALL BE CLASS SDR 35, PER ASTM D-3034 SPECIFICATIONS.

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL DAMAGE TO PIPE INCURRED WHILE BACKFILLING AND COMPACTING.

14. COMPACTION SHALL BE AS OUTLINED IN THE "STANDARDS FOR SANITARY SEWERS", COUNTY OF SAN BERNARDINO, SPECIAL DISTRICTS DEPARTMENT JANUARY 1977 - SECTION 1.11 DIVSION "D".

15. GRADING OVER SEWER MAINS SHALL BE DONE IN SUCH A MANNER AS TO PREVENT THE PONDING OF WATER.

16. THE TOP OF ALL MANHOLES & CLEANOUTS LOCATED IN PAVEMENT SHALL BE BROUGHT TO PAVEMENT GRADE AFTER STREETS ARE PAVED.

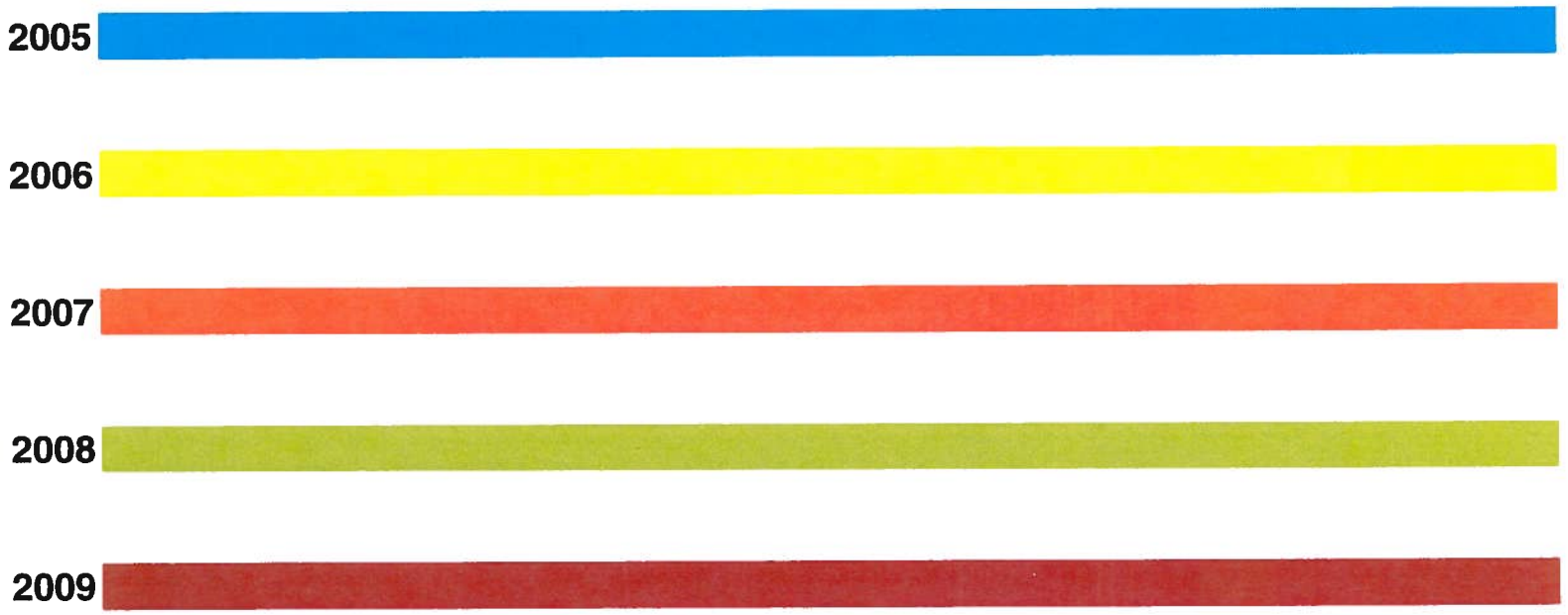
17. ALL PIPELINE SHALL BE CLEANED, MANDRELED, AIR TESTED AND VIDEO INSPECTED TO TOWN OF APPLE VALLEY STANDARD. REPORTS AND VIDEO TAPE TO BE PROVIDED TO PUBLIC WORKS DEPARTMENT.

Appendix E: Hot Spot Identification

Date Inspection Due	Date Inspected	Assessment District	Manhole Number	Nearest Intersection	Condition	Remarks	Initial
Monthly	6/17/09	Interceptor		Hwy 18 &		North side dirt road next to the	Ma/Pr
				Aple Valley Rd.		county storm drainage channel.	
BiMonthly	5/21/09	Jess Ranch		Palo Verde &		In condo parking lot.	Ma/Pr
				Ash St.			
BiMonthly	5/21/09	Jess Ranch	CL	Town Center &		Old wet well in grass south of	Ma/Pr
				Apple Valley Rd.		block wall.	
BiMonthly	6/25/09	Jess Ranch	CL	Town Center &		Down stream Manhole north east	Ma/Pr
				Apple Valley Rd.		of above manhole in the dirt lot.	
BiMonthly	6/17/09	1C	Vis.	Hwy 18 No. &		In road.	Ma/Pr
				Tao			
Monthly	6/17/09	1A	CL	Wika &		In road.	Ma/Pr
				Muni			
3 Months	6/17/09	7972	CL	Siskiyou Rd. &		North East corner behind curb.	Ma/Pr
				Siskiyou Ct.			
3 Months	6/17/09	1B	CL	Corwin Rd. &		Manhole in corwin@ intersection,&	Ma/Pr
				Wintun		1st MH, NE Corwin Need TC to do	
Monthly	6/17/09	1B	CL	Outer Hwy 18		Manhole west of stormdrain colvert	Ma/Pr
				Hospital			
BiMonthly	6/17/09		CL	Outer Hwy 18		Manhole in intersection	Ma/Pr
				Kasota		Need Traffic Control to do.	
3 Months	6/25/09	2A	CL	Rancheries		3 Manholes north of Ottawa	Ma/Pr
				Ottawa			

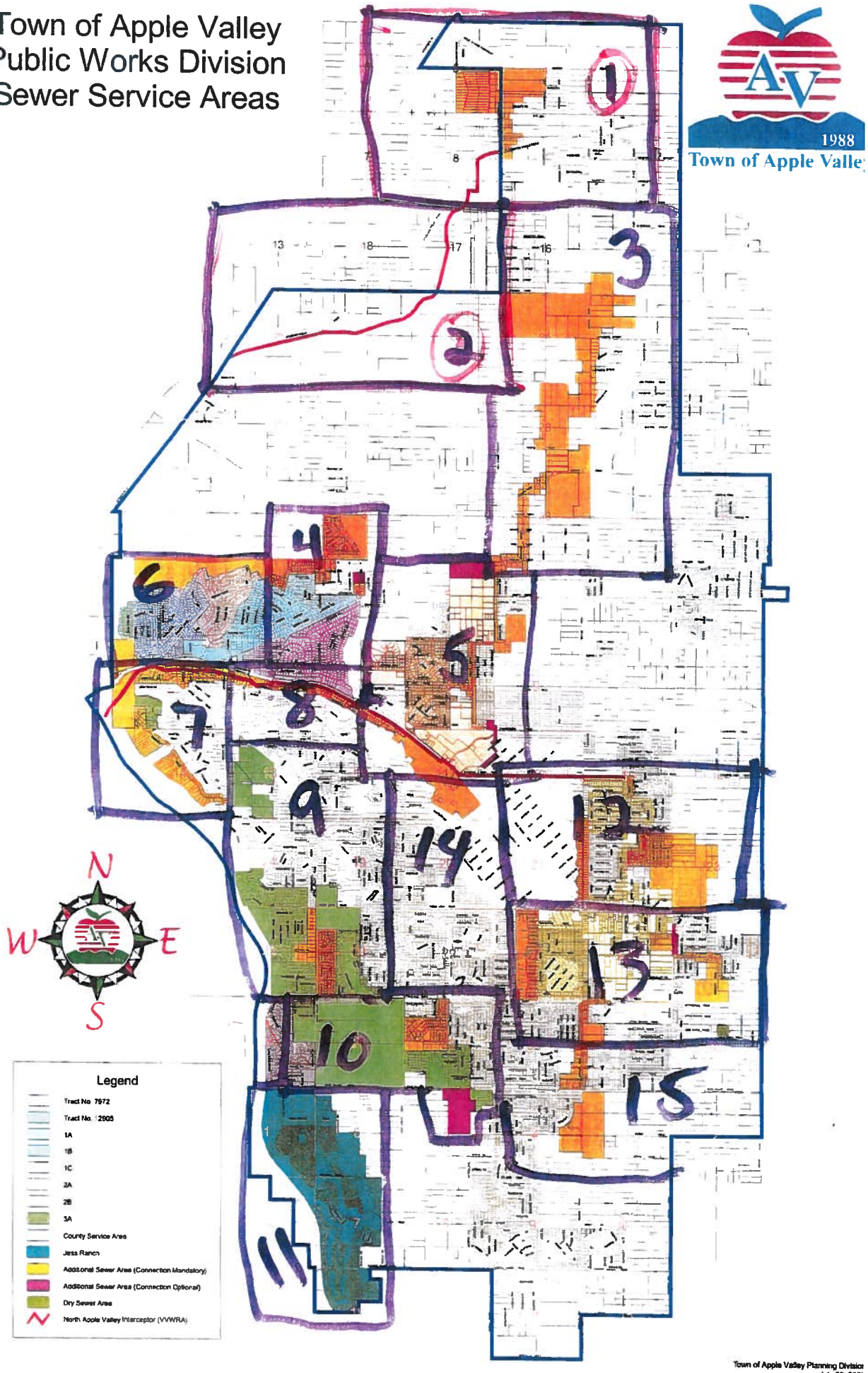
Appendix F: CCTV Report

Town of Apple Valley Sewer Video Inspections

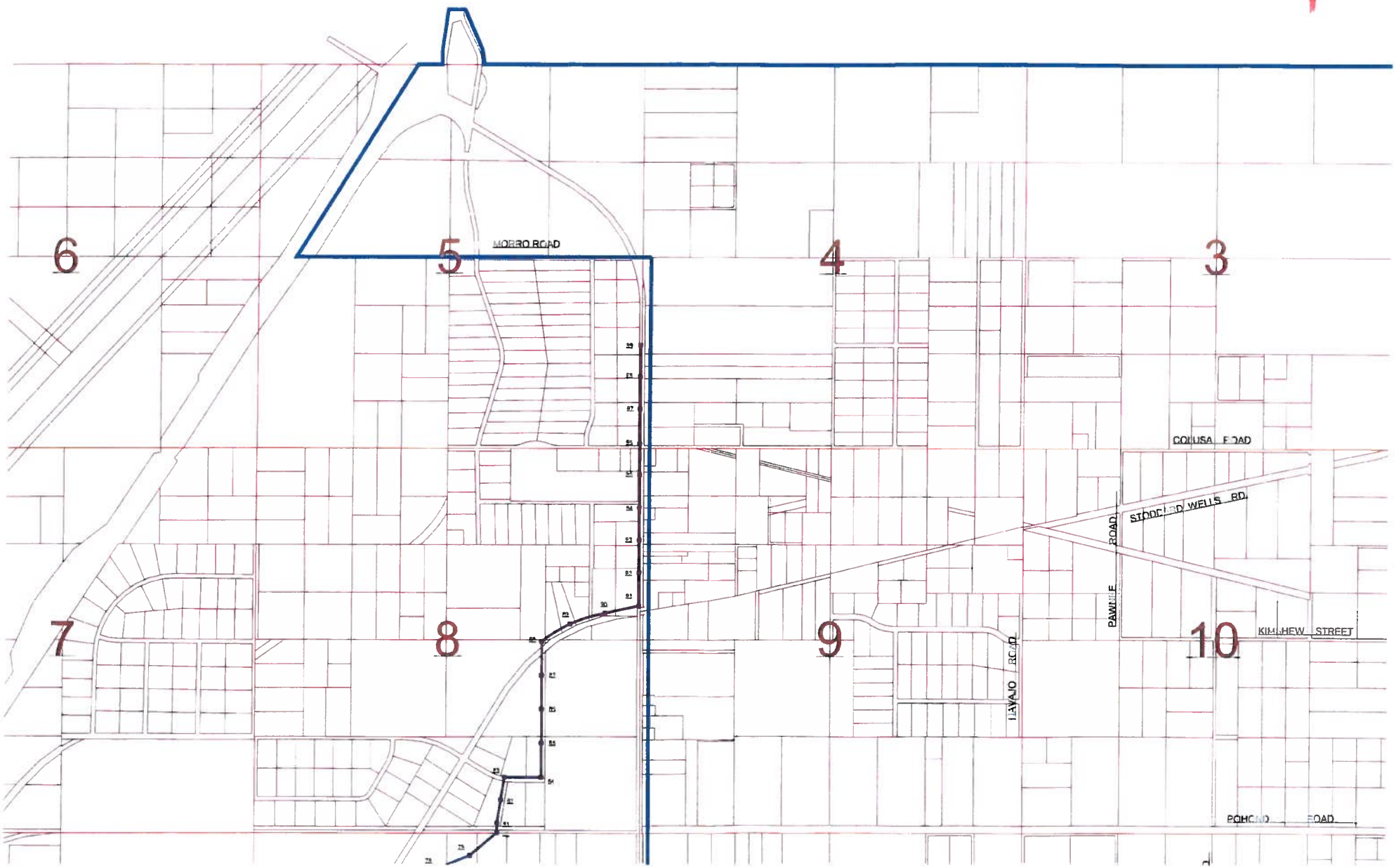


Appendix G: Annual SSO Location Maps

Town of Apple Valley
Public Works Division
Sewer Service Areas



Town of Apple Valley Planning Division
July 25, 2008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COLUSA ROAD
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PAWNEE ROAD
KIMLAHEW STREET
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HAVASU ROAD
POHONO ROAD


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CARDOVA
LABRADOR
DOBERMAN
JOHNSON
DALE EVANS PARKWAY
ROAD


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DOBERMAN STREET
SHEPHERD STREET
JOHNSON ROAD
DACHSHUND AVE
DALE EVANS PARKWAY
21
22
LAFAYETTE STREET
LIVERMORE STREET
LOS PADRES ROAD
DUNSMUIR AVENUE
ALTADENA STREET
GUSTINE STREET
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ERESNO ROAD
CORWIN ROAD
FERNANDEZ AVENUE
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COMANCHE ROAD
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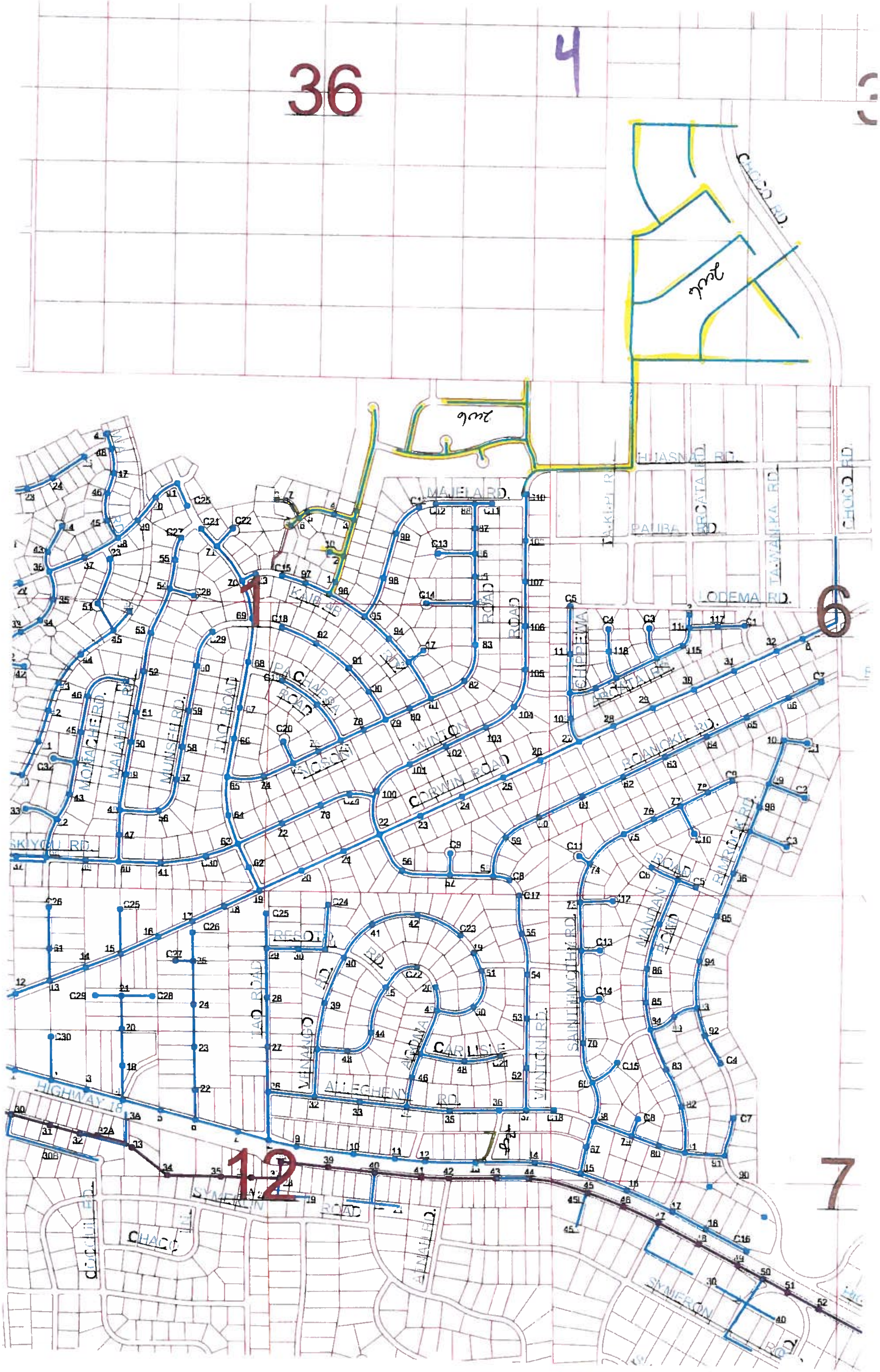
RAMONA ROAD
NAVAJO ROAD
AZTEC ROAD
HUASNA RD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LODEMA RD.
MAJELA RD.
WINTON ROAD
CORWIN ROAD
ROANOKE RD.
SKIYOU RD.
HIGHWAY 18
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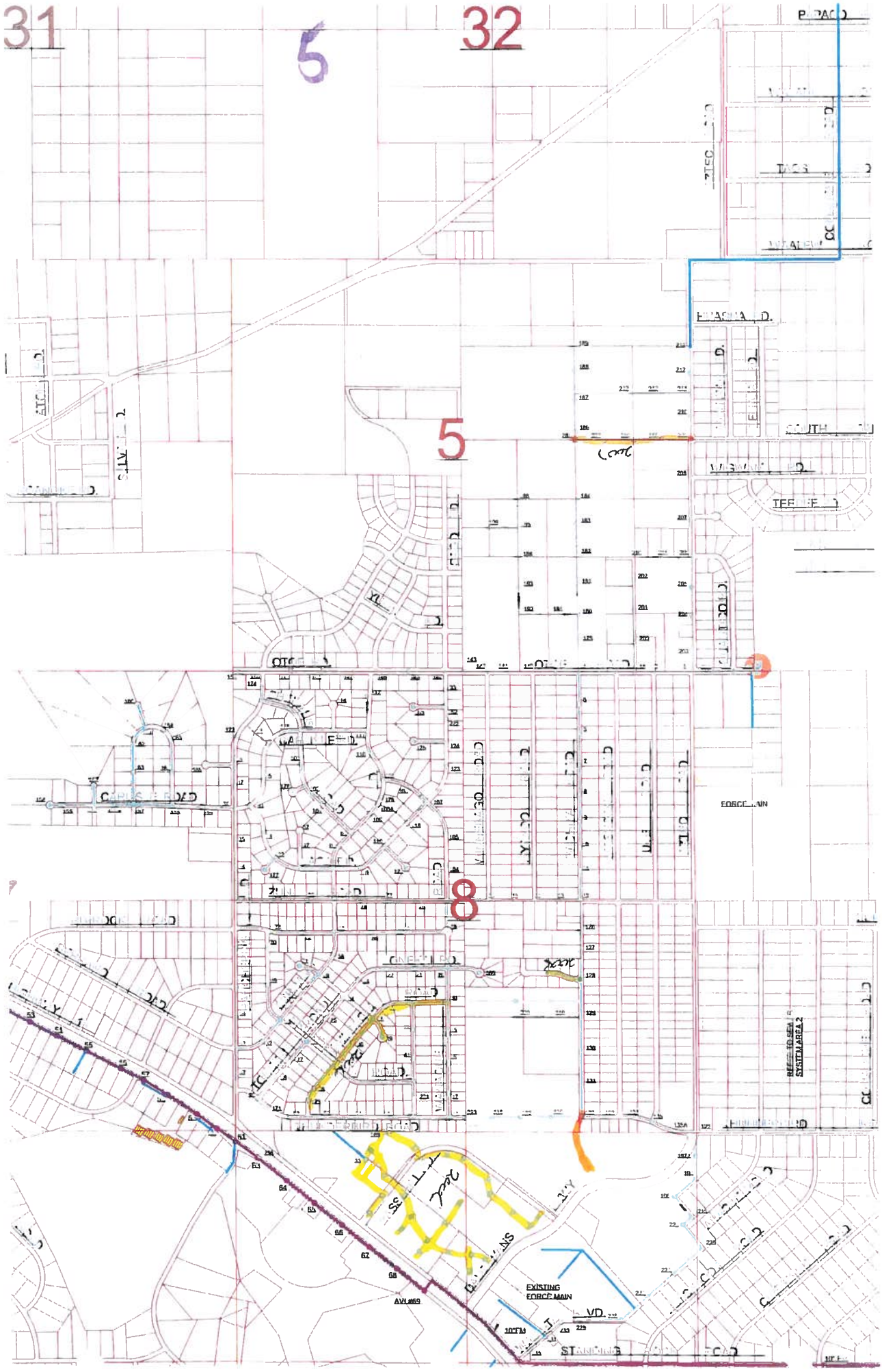
CARLISLE
TAO ROAD
MANDAN ROAD
RIMROCK RD.
CHACO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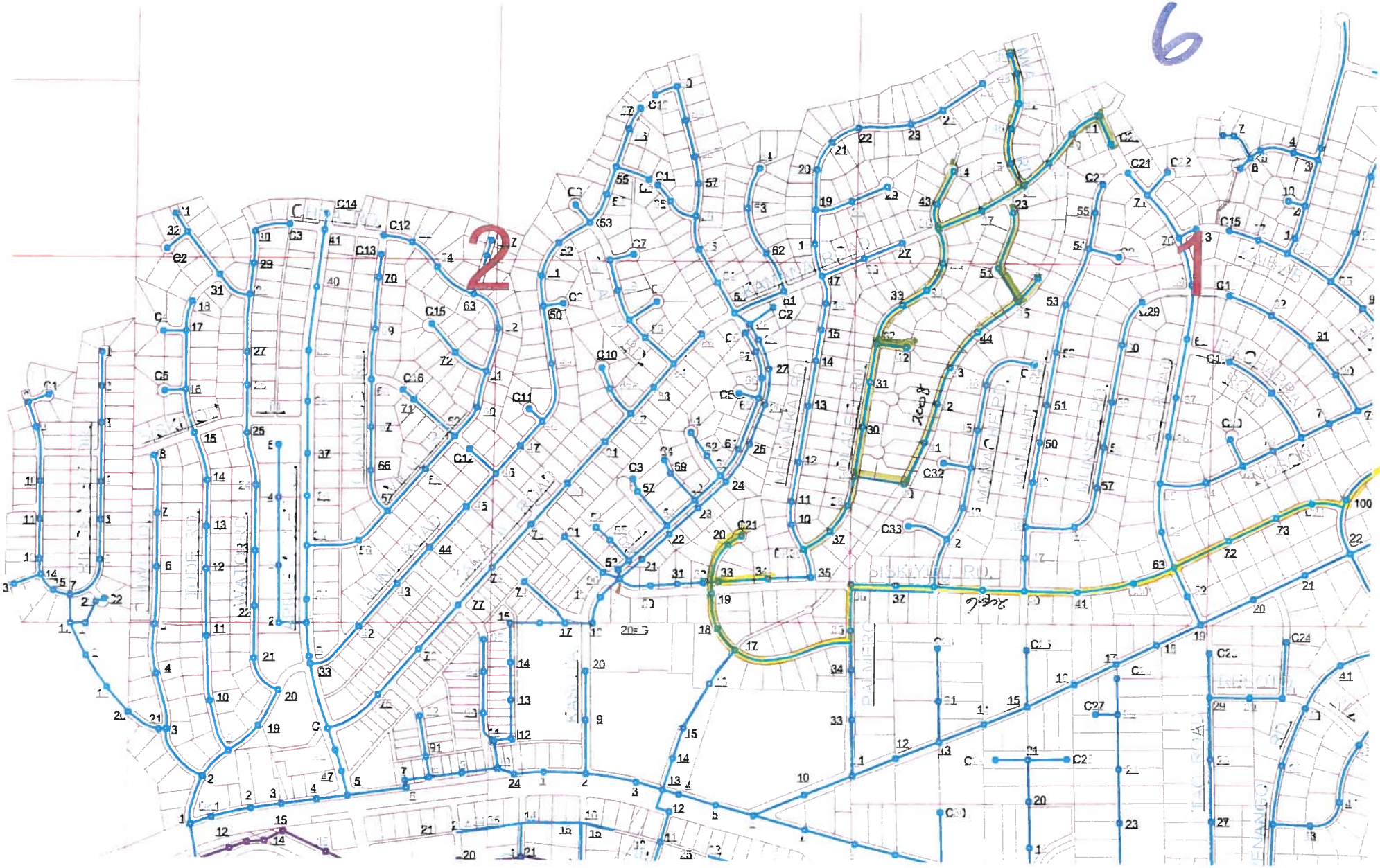
AVL#69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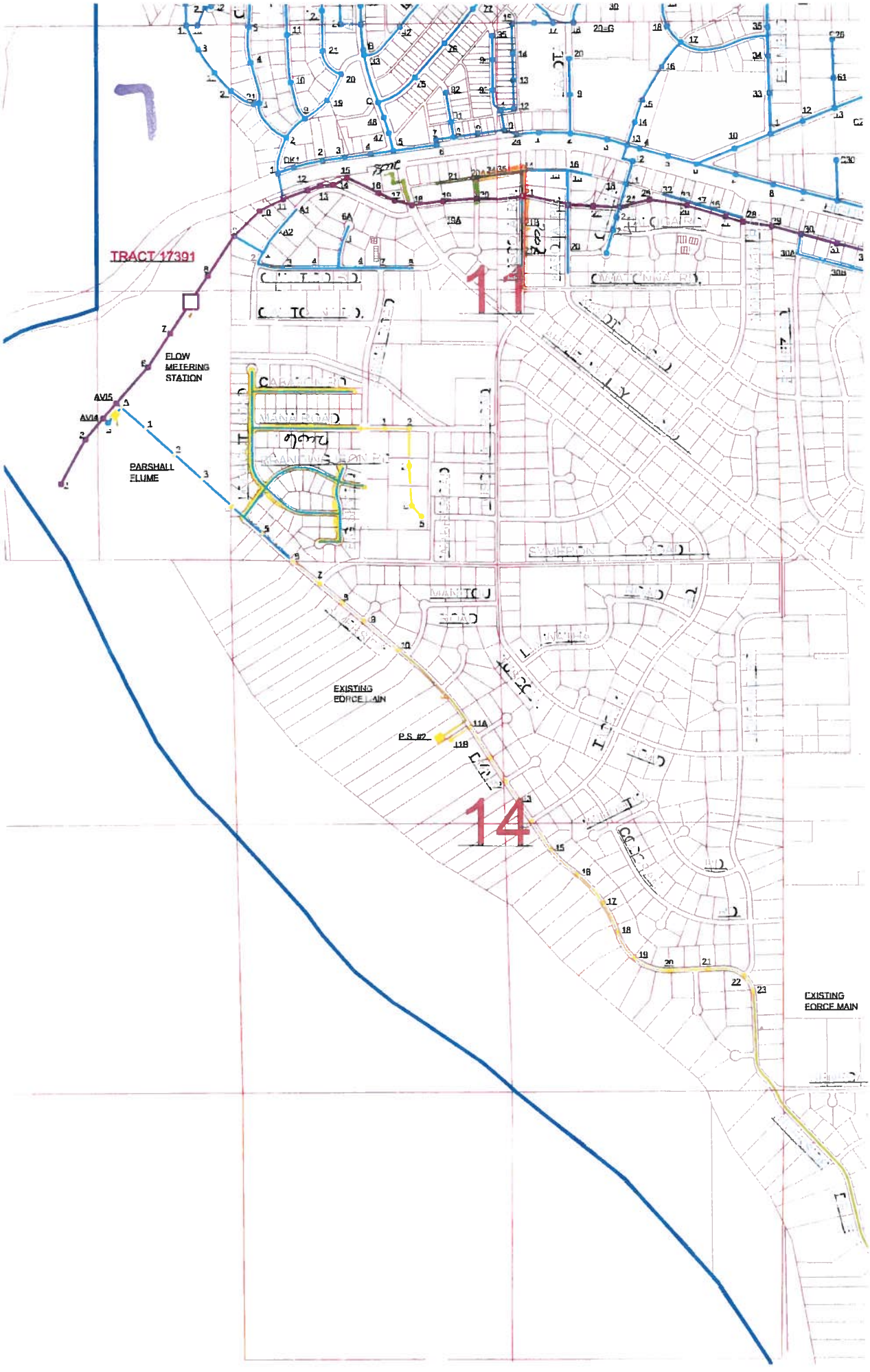
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FLOW METERING STATION
AV15
AV14
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P.S. #2
EXISTING FORCE MAIN
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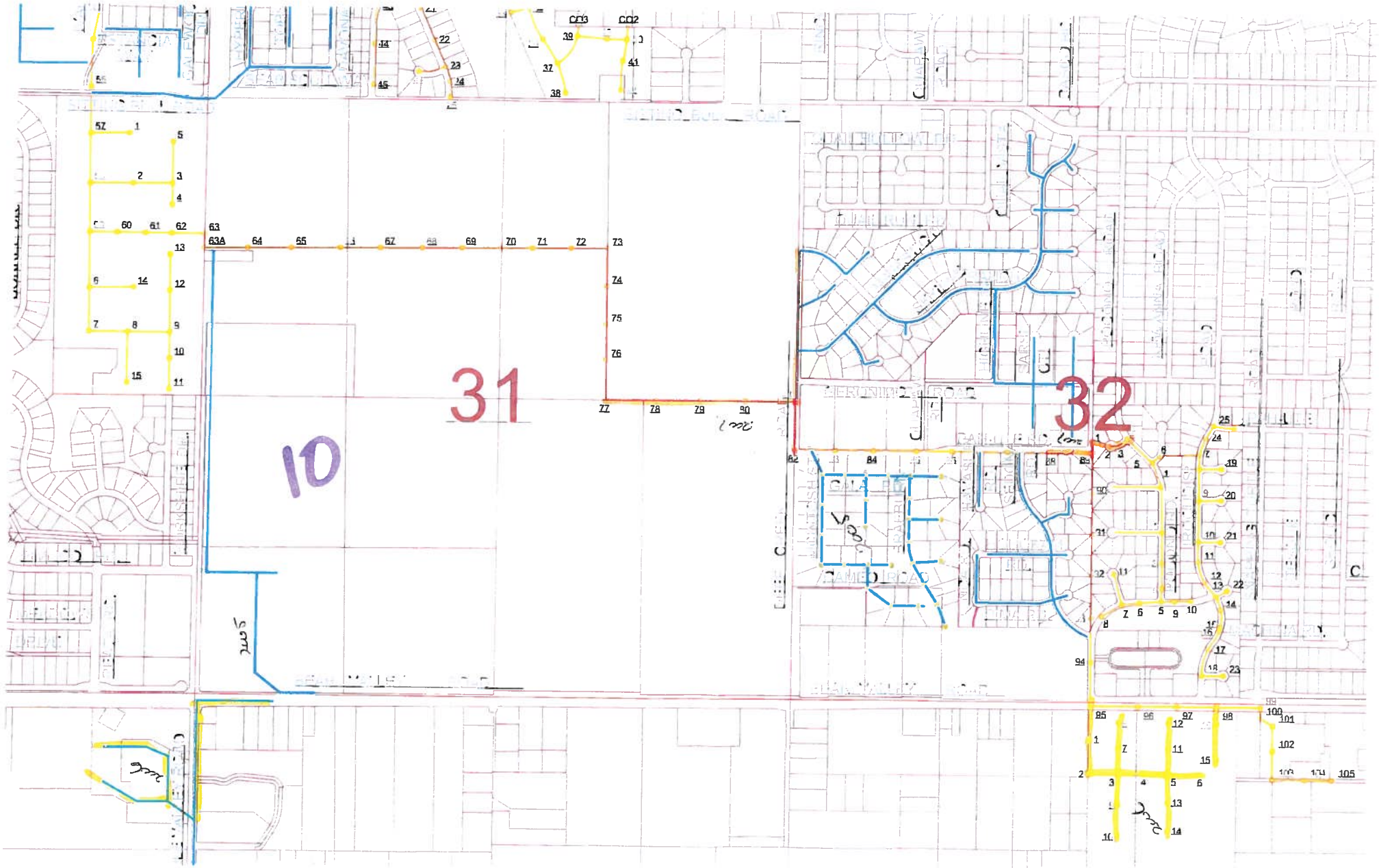
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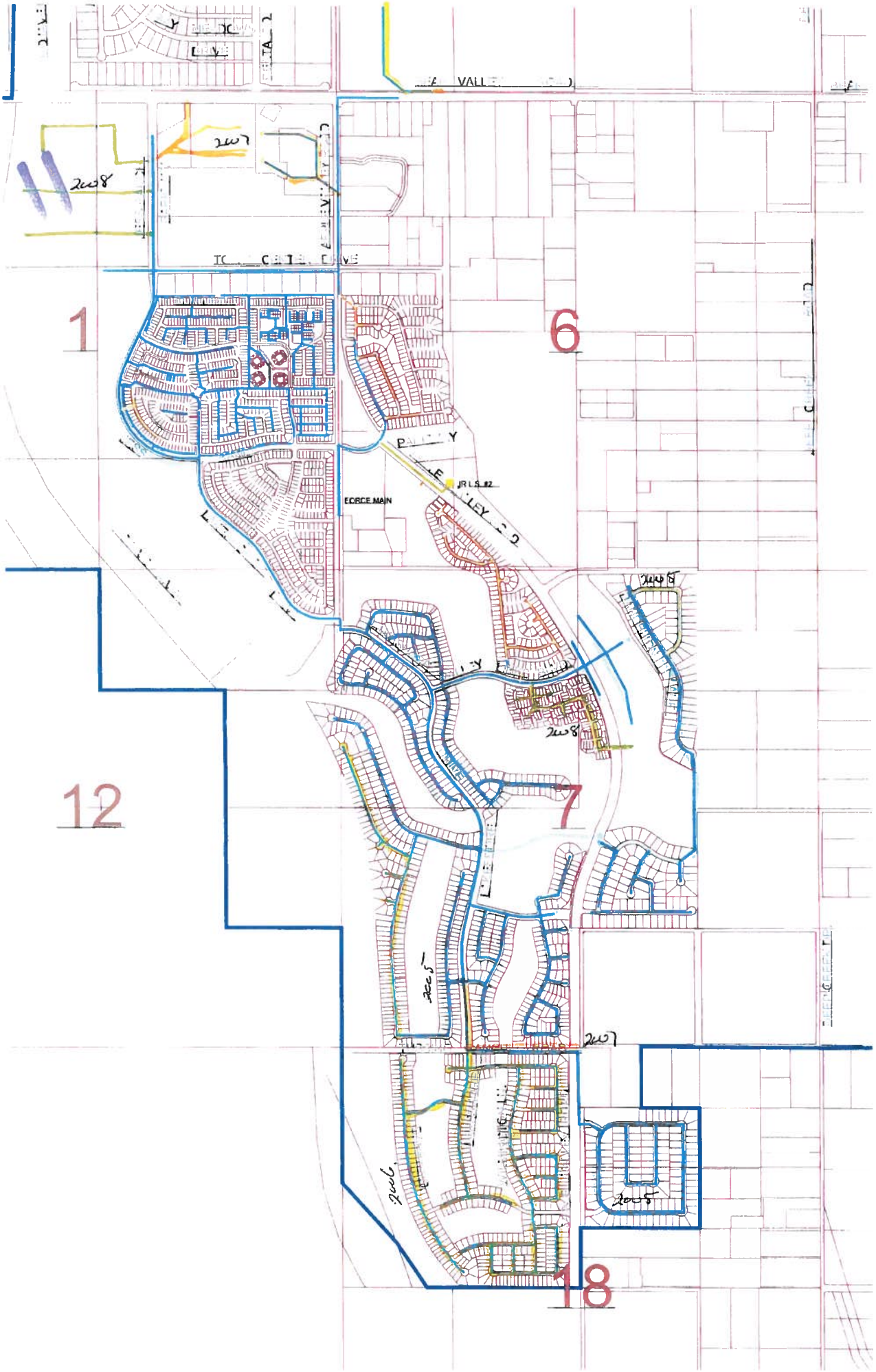
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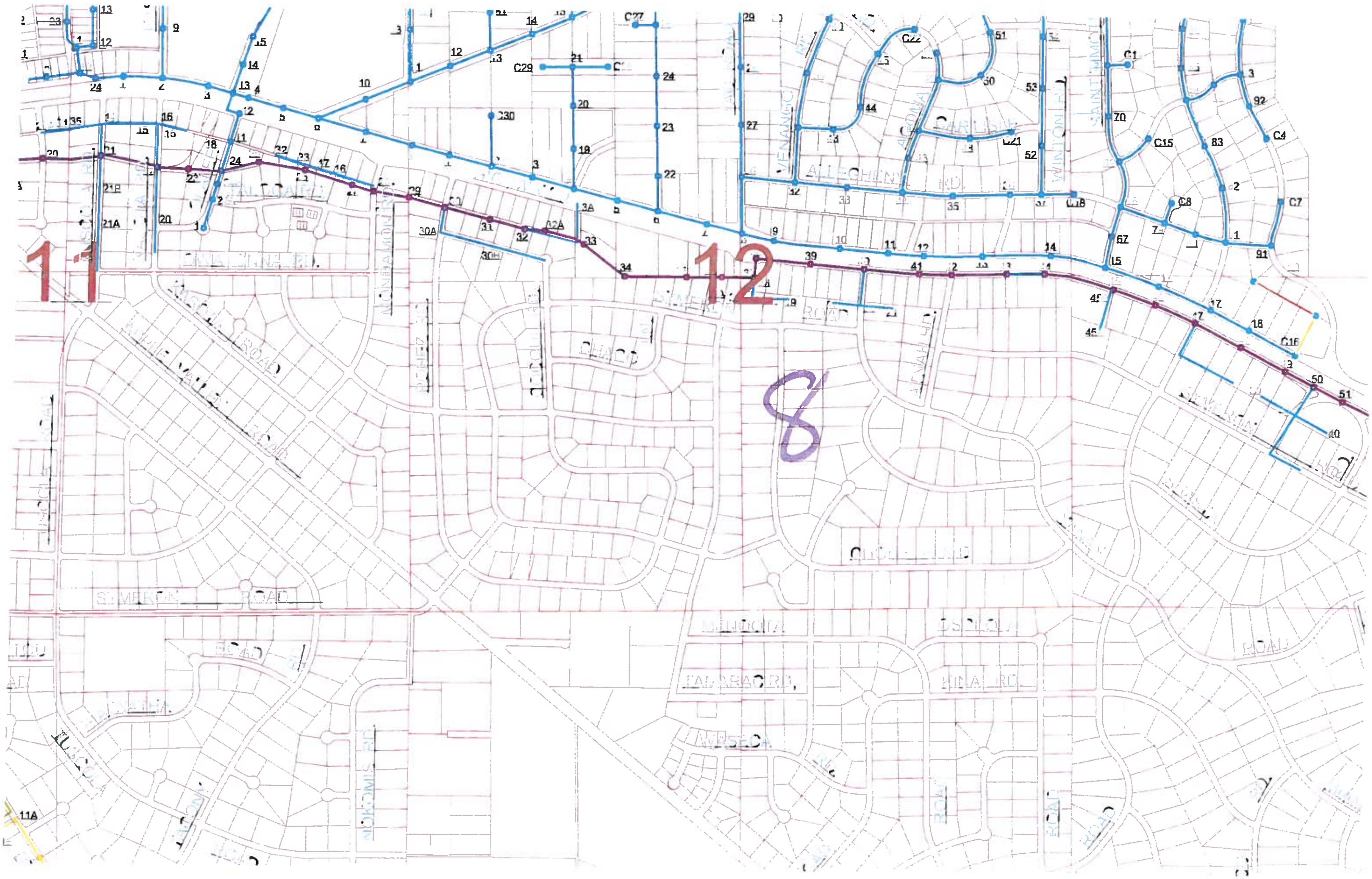
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SIMERON
ROAD
MENDOTA
OSCEOLA
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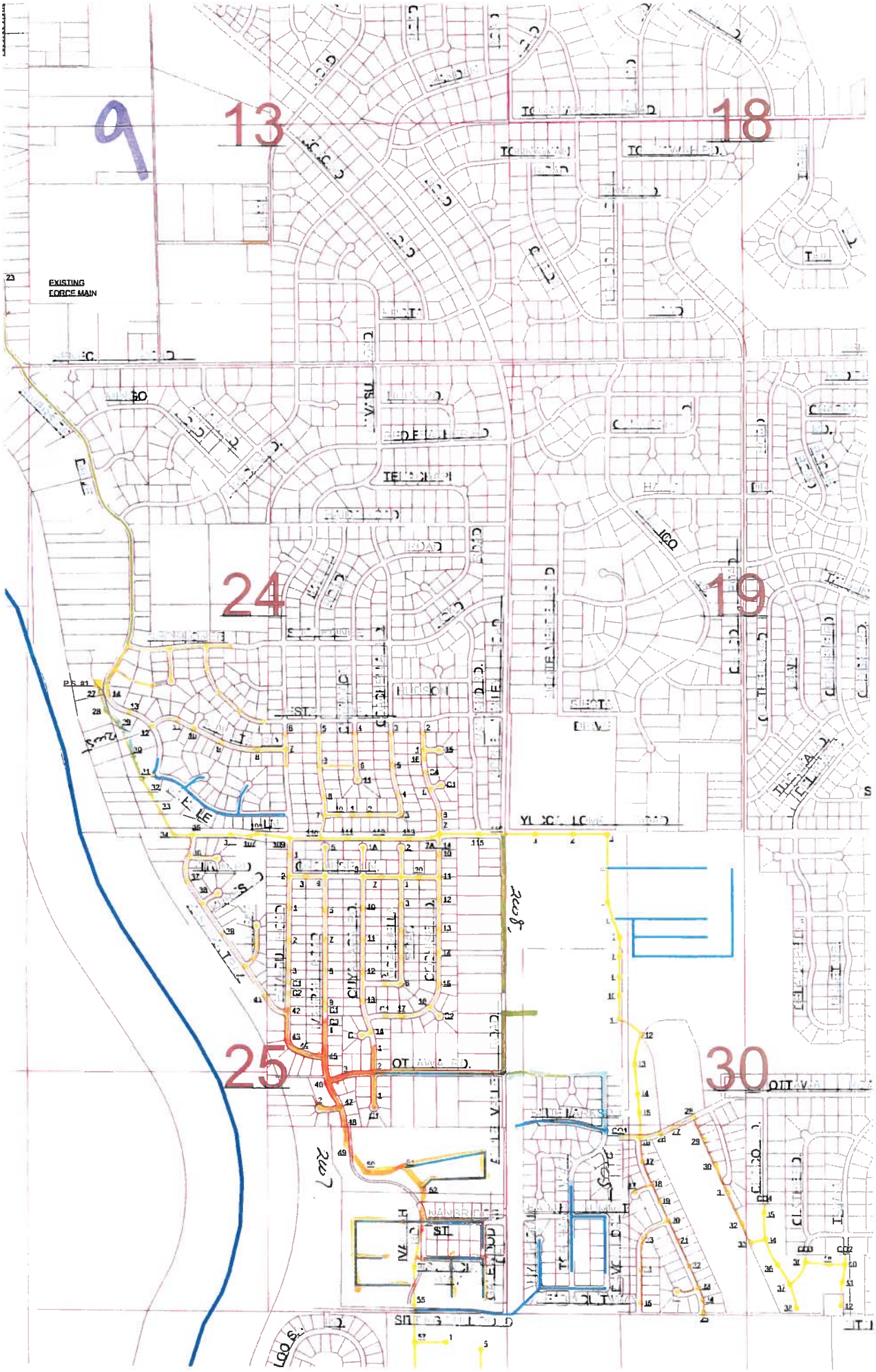
PINAL RD
WASECA
NOKOMIS RD.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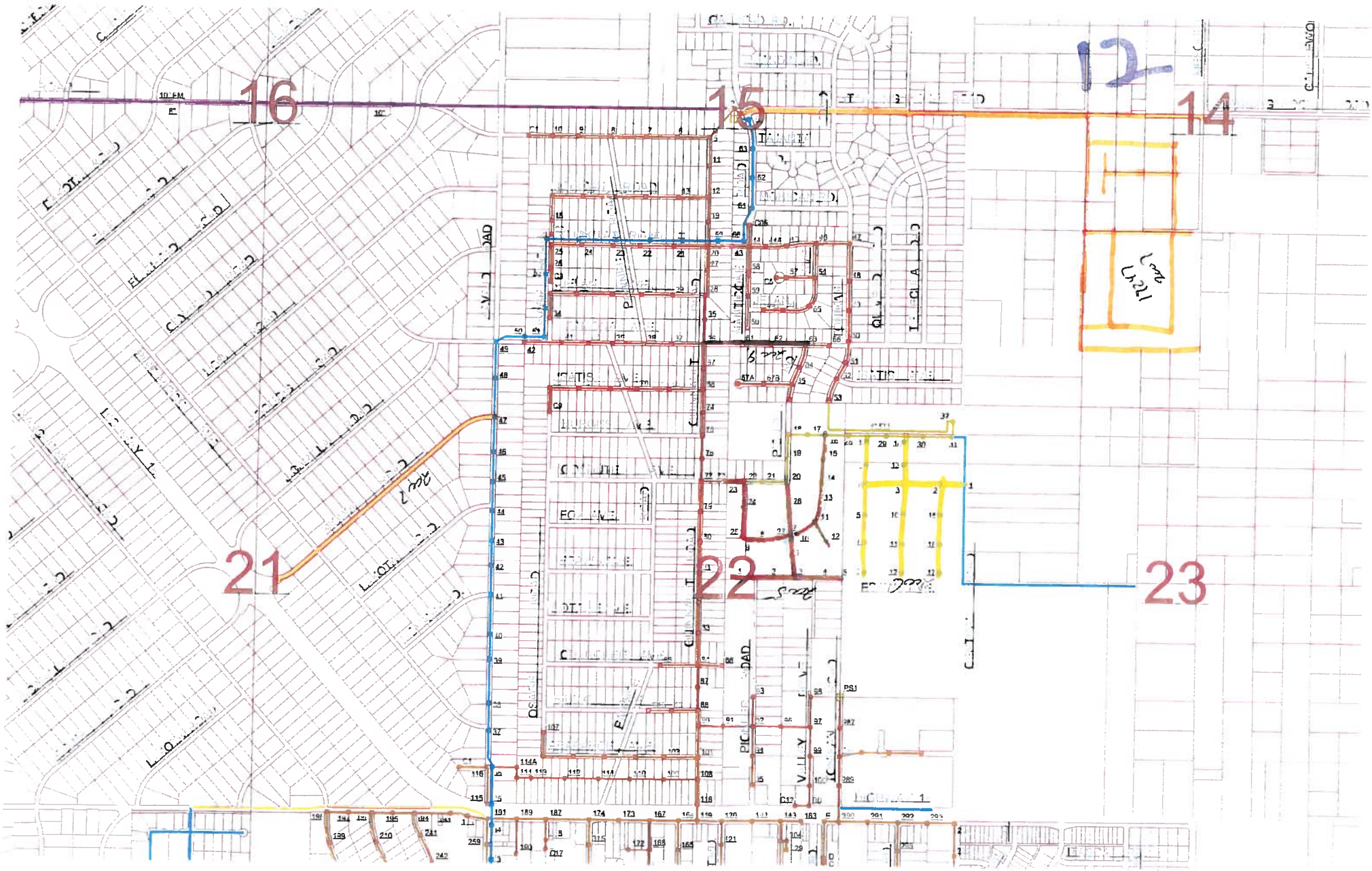
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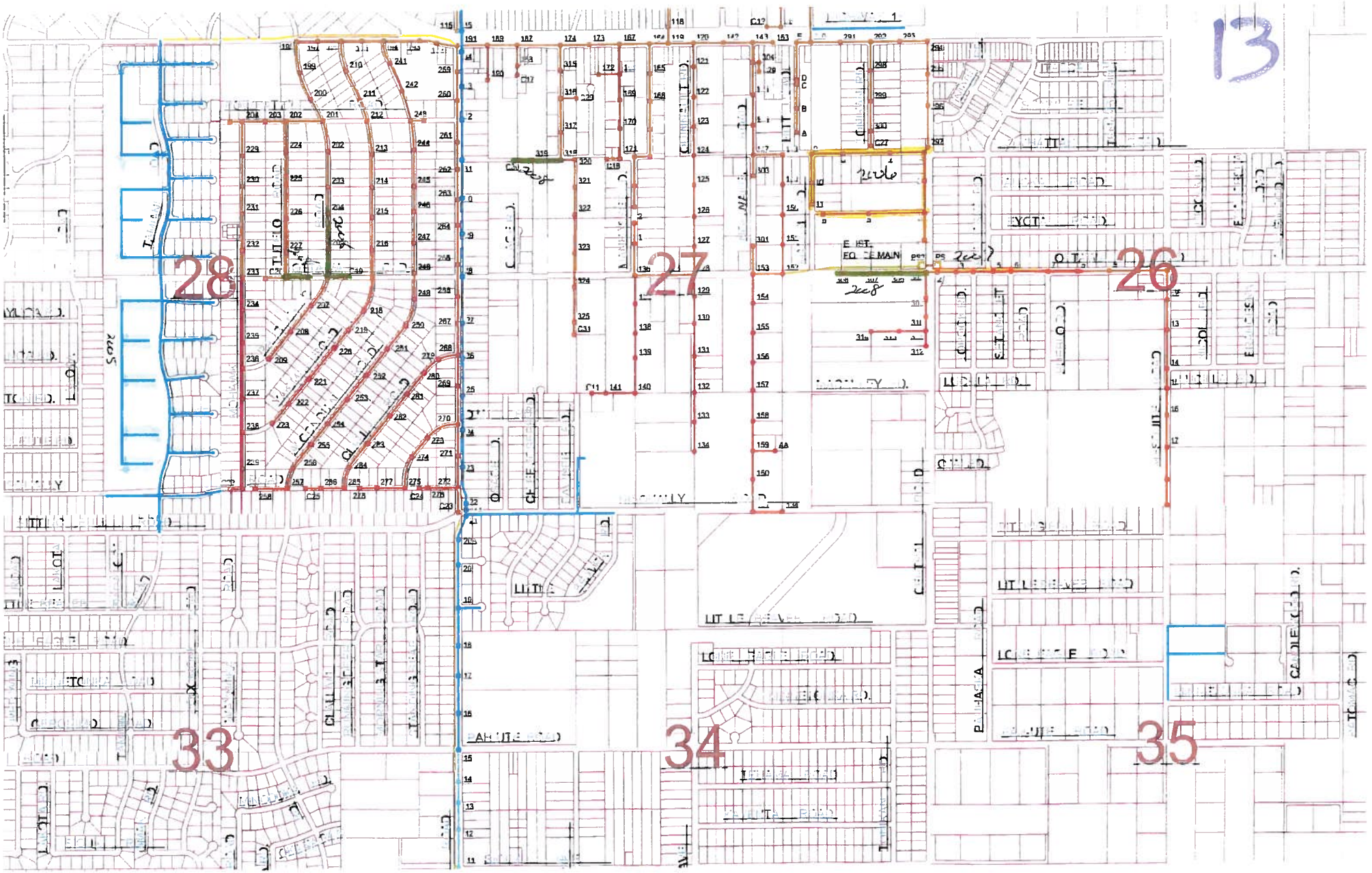
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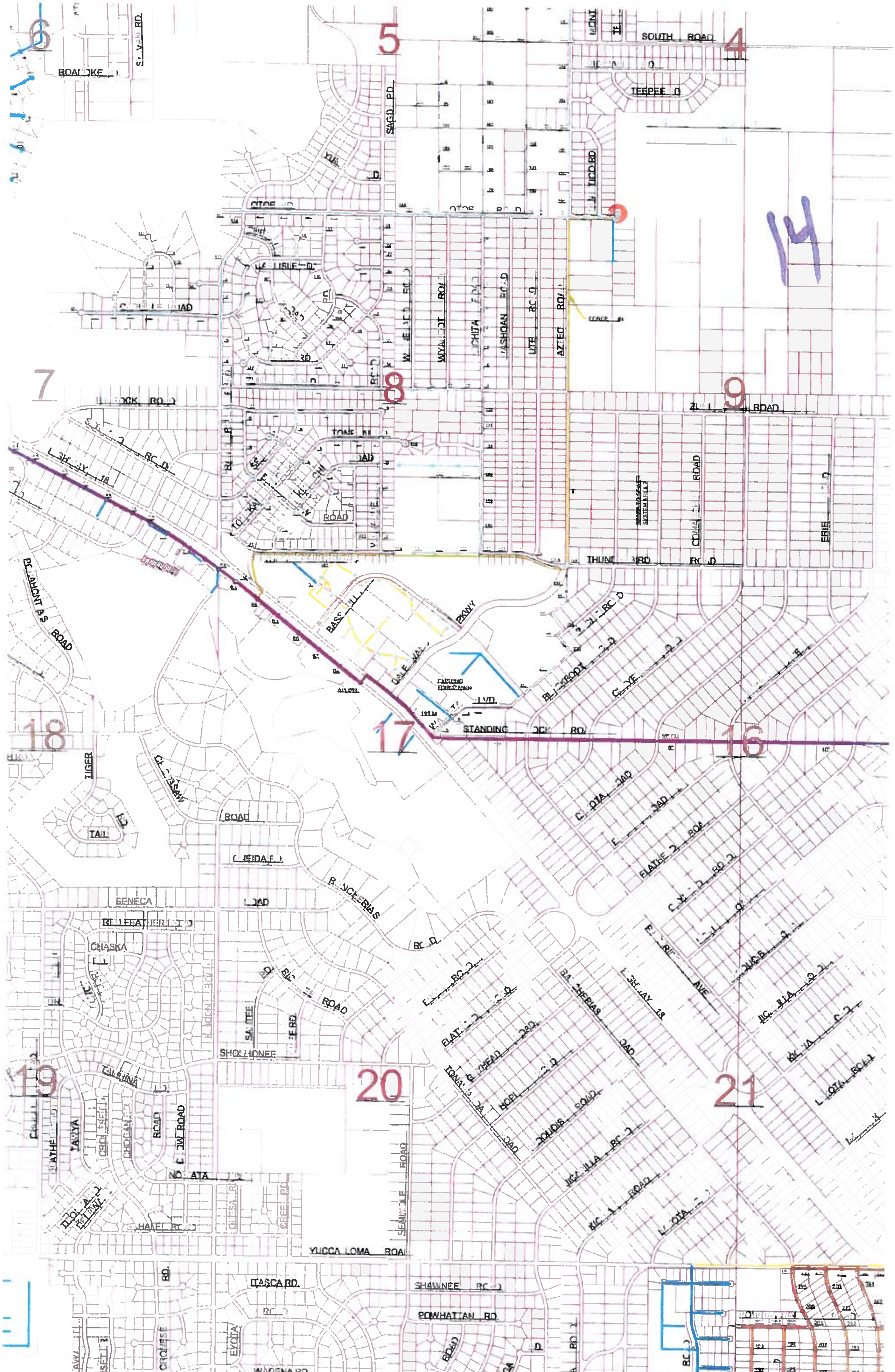
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THUNDERBIRD ROAD
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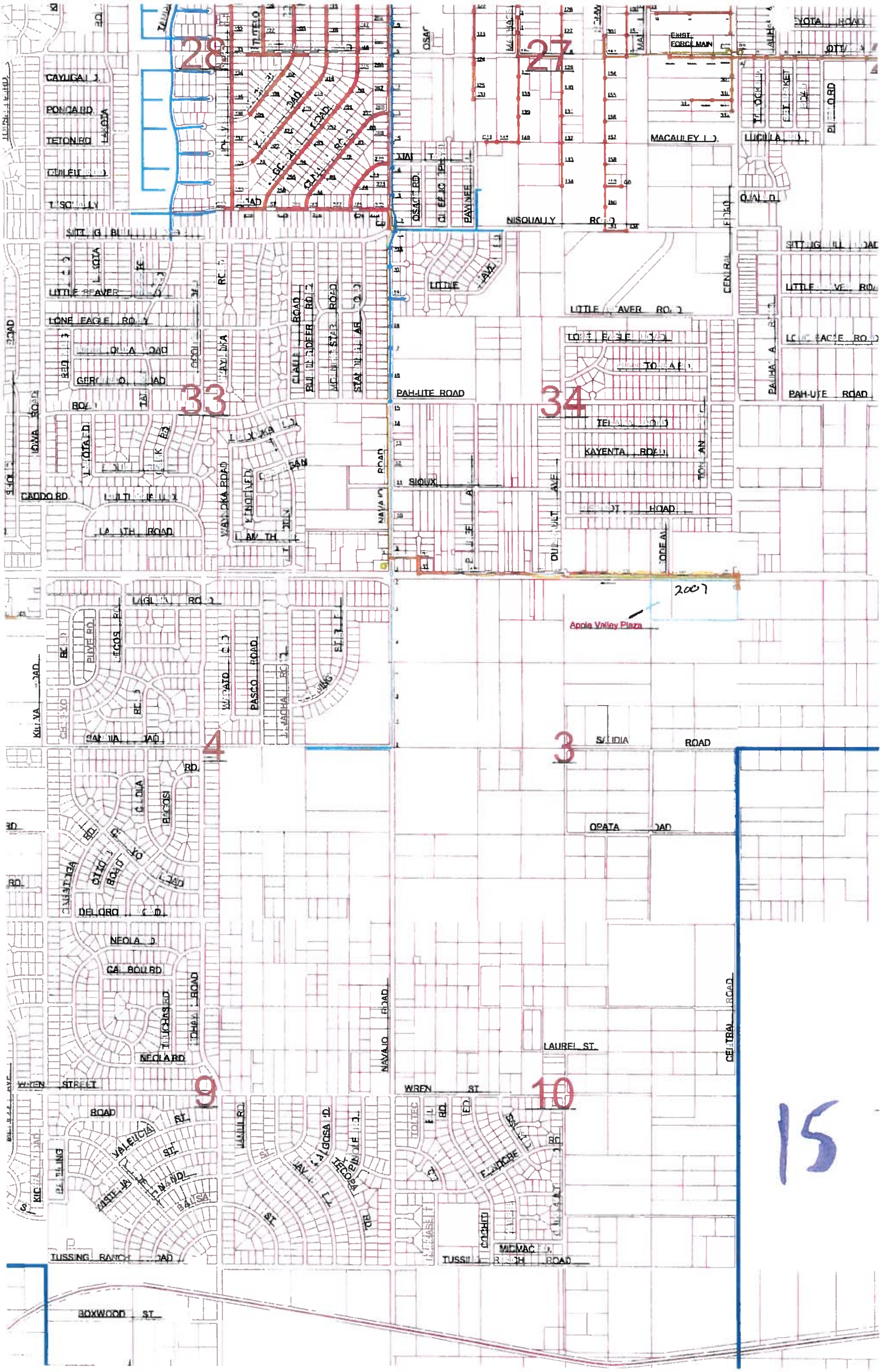
WADENA RD.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MACAULEY
OSAGE RD.
PAWNEE
LITTLE BEAVER ROAD
LONE EAGLE ROAD
PAH-UTE ROAD
SIOUX
KAYENTA ROAD
NAVAJO ROAD
CADDO RD
WAYNOKA ROAD
CENTRAL
Apple Valley Plaza
SANDIA ROAD
OPATA ROAD
DEL ORO
NEOLA
NEOLA RD
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WREN STREET
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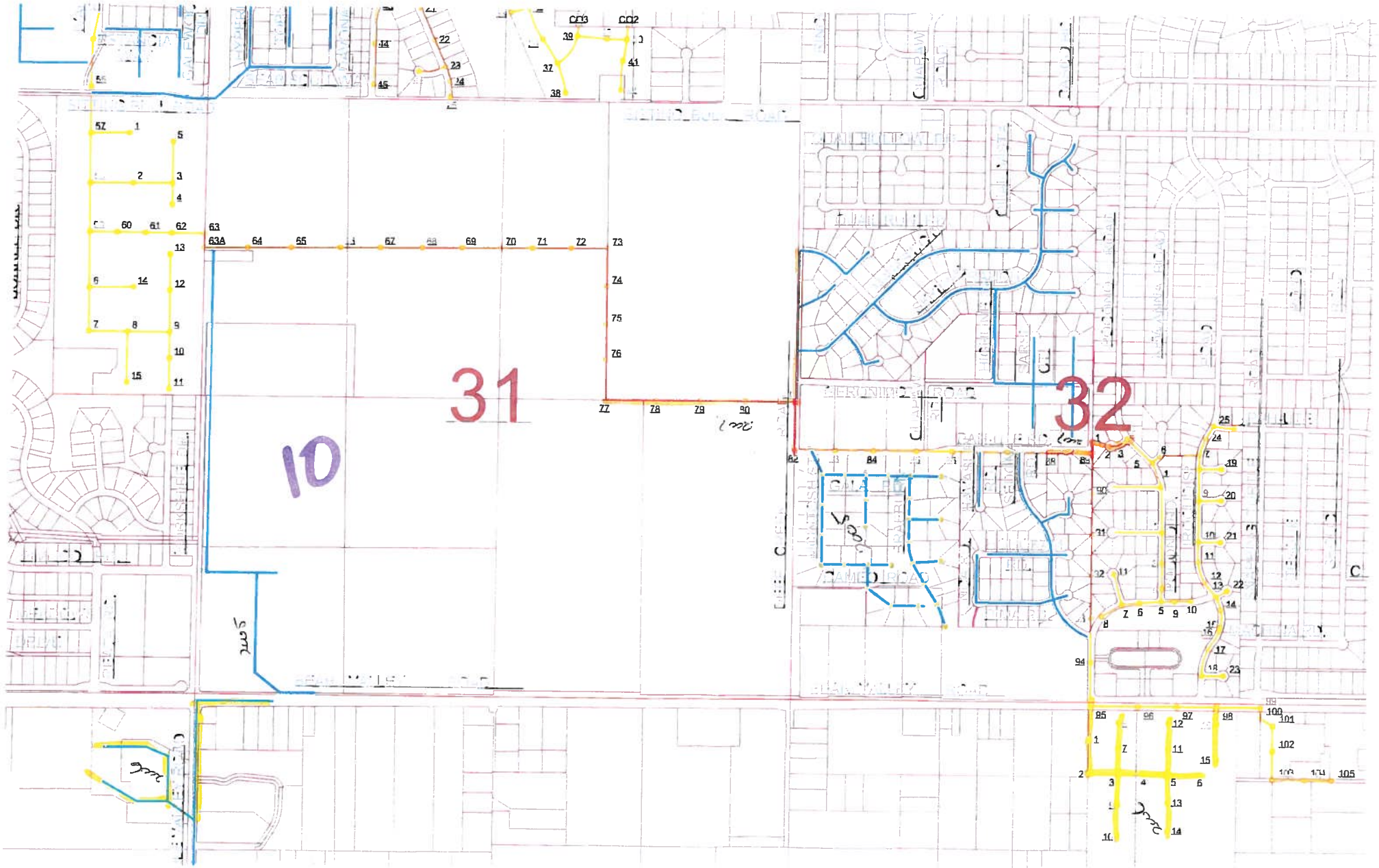
BOXWOOD ST.
PASCO ROAD
COCHITI
MIDMAC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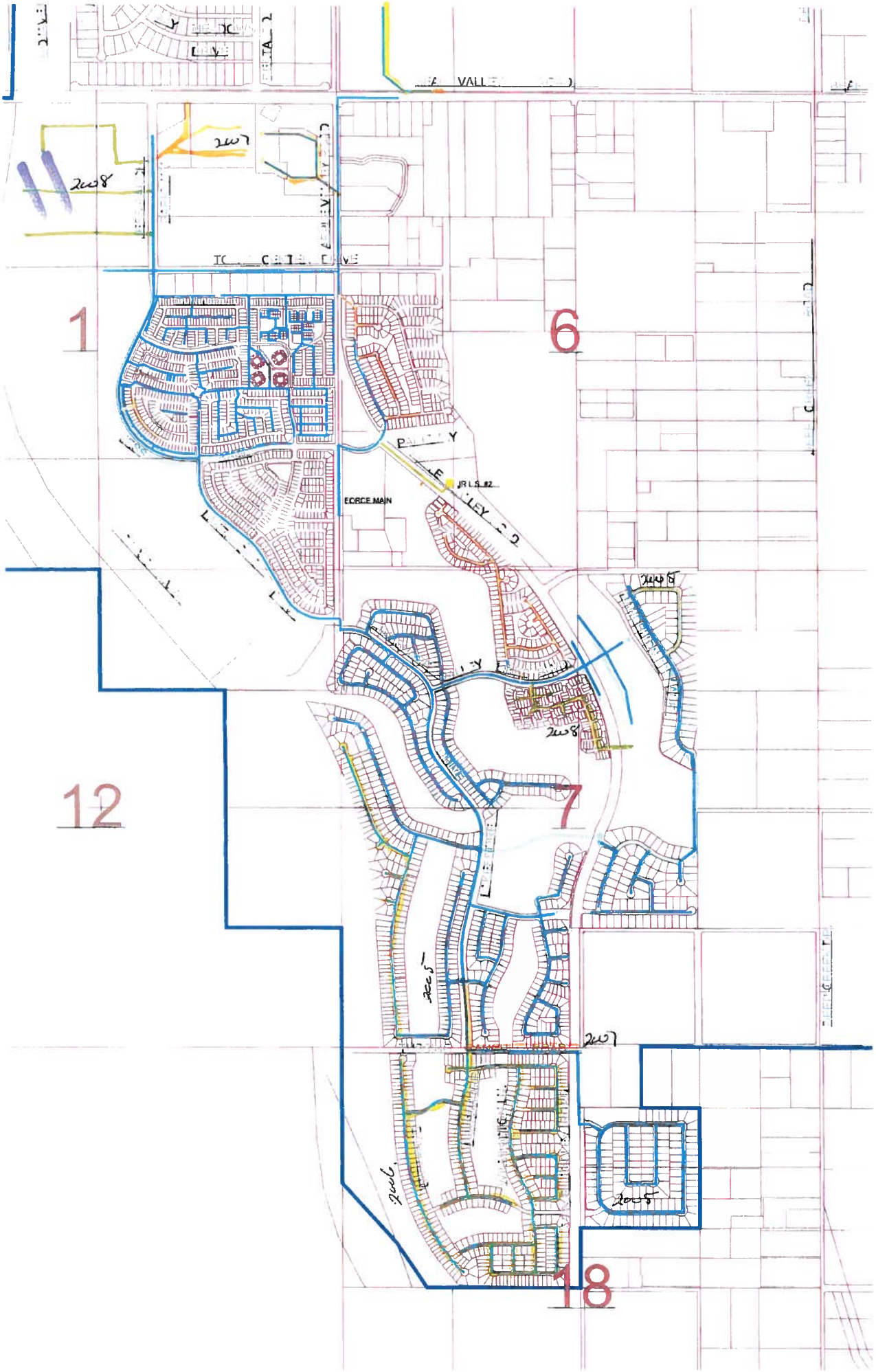
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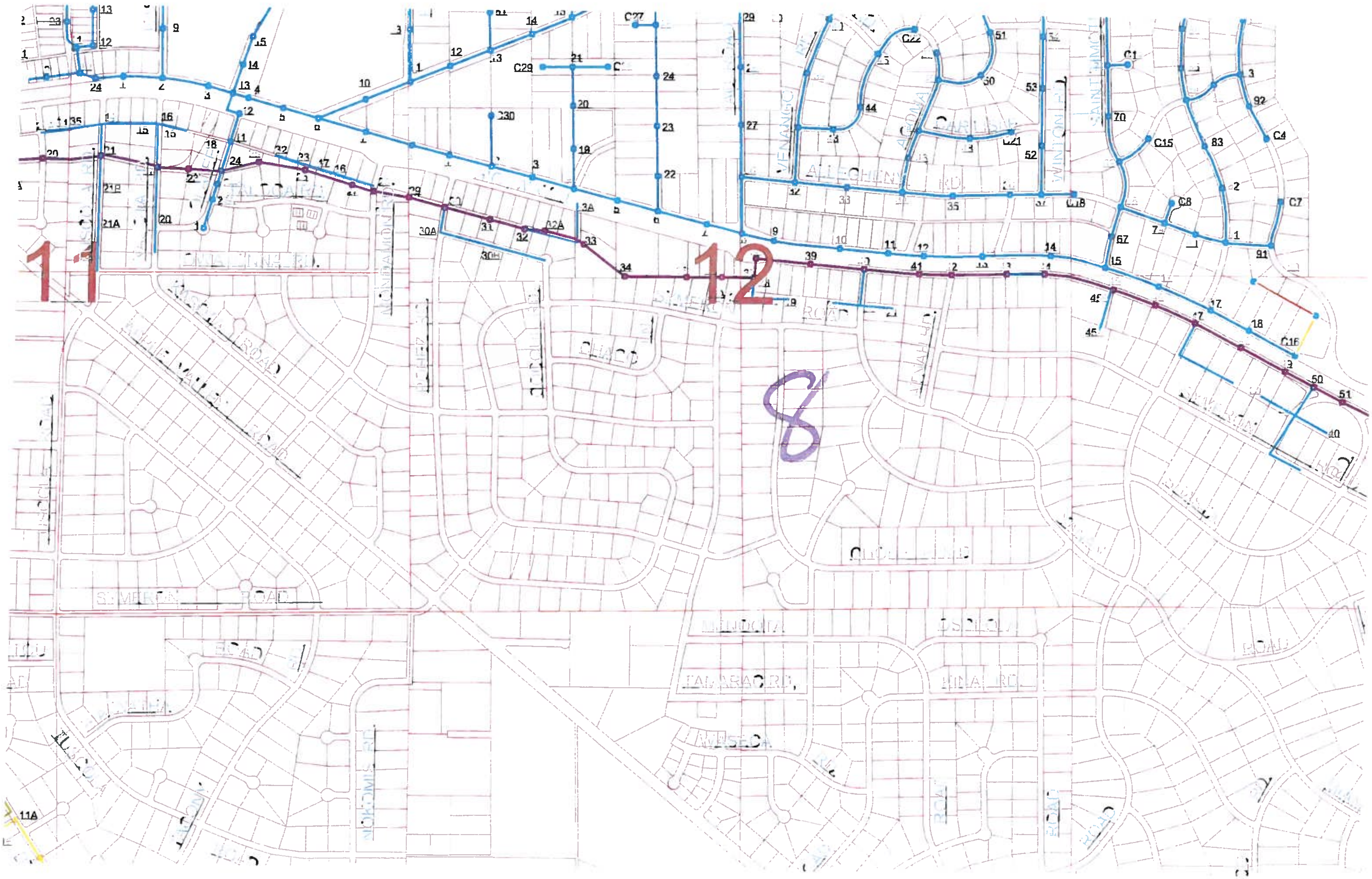

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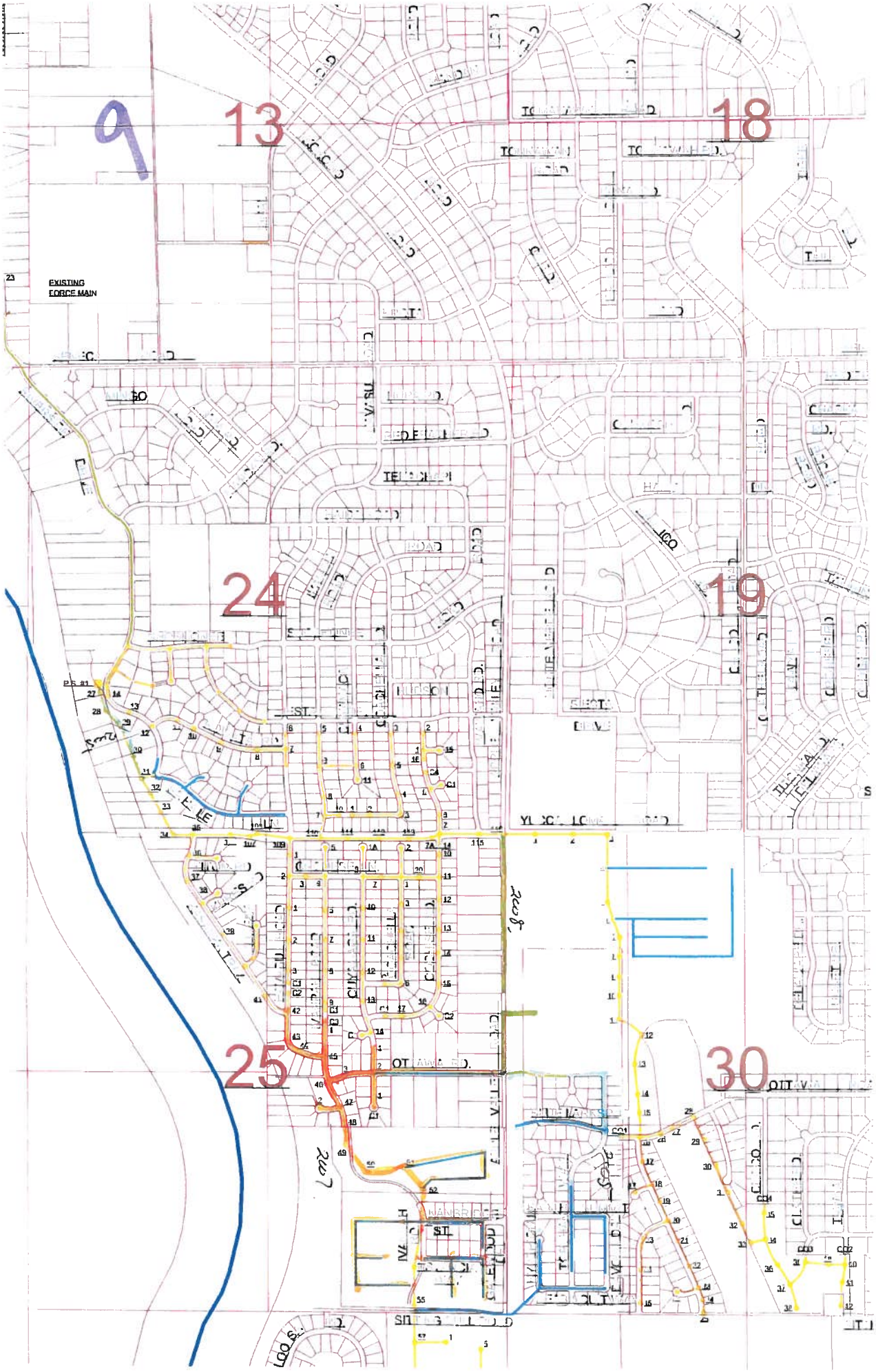
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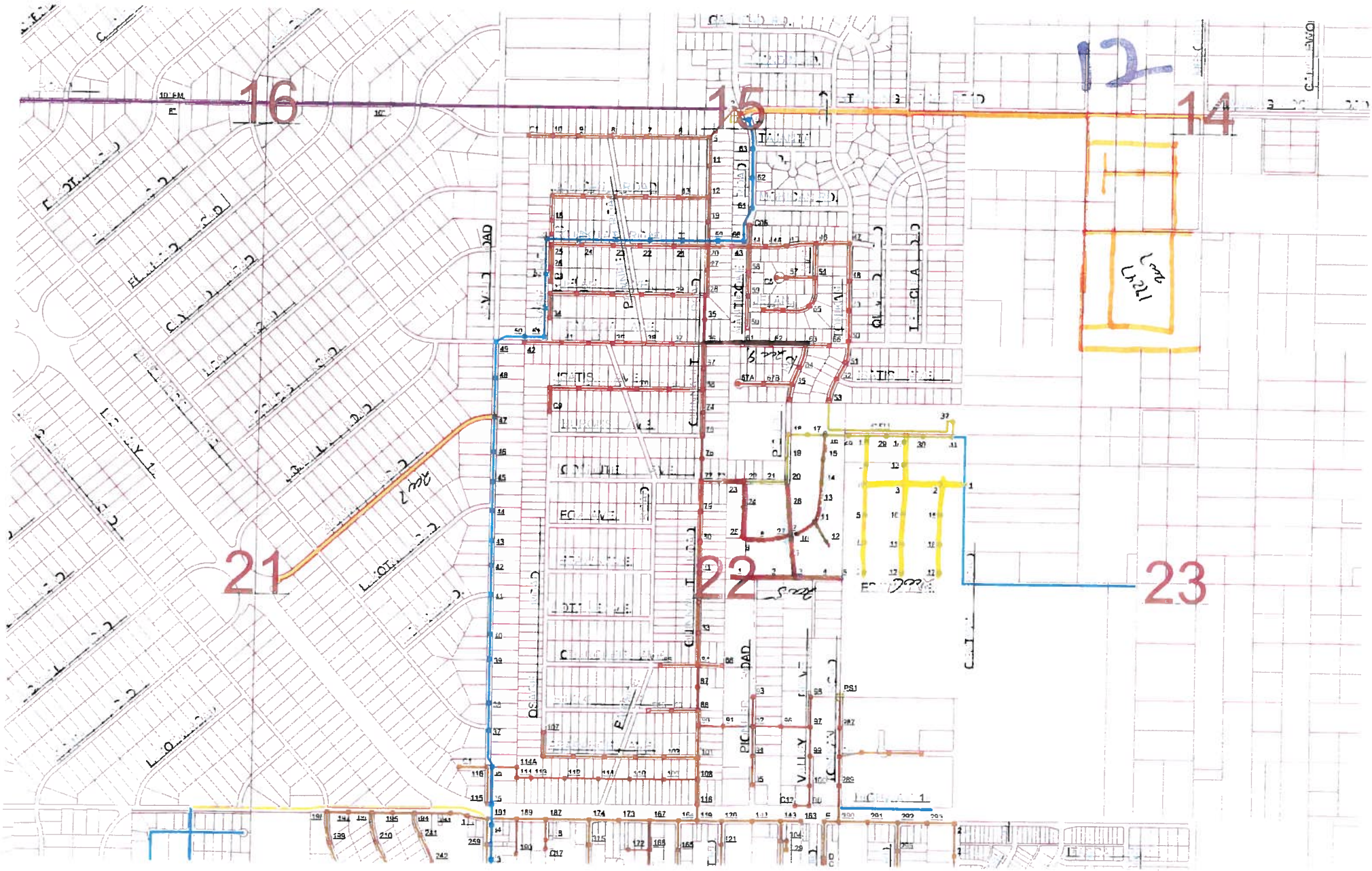
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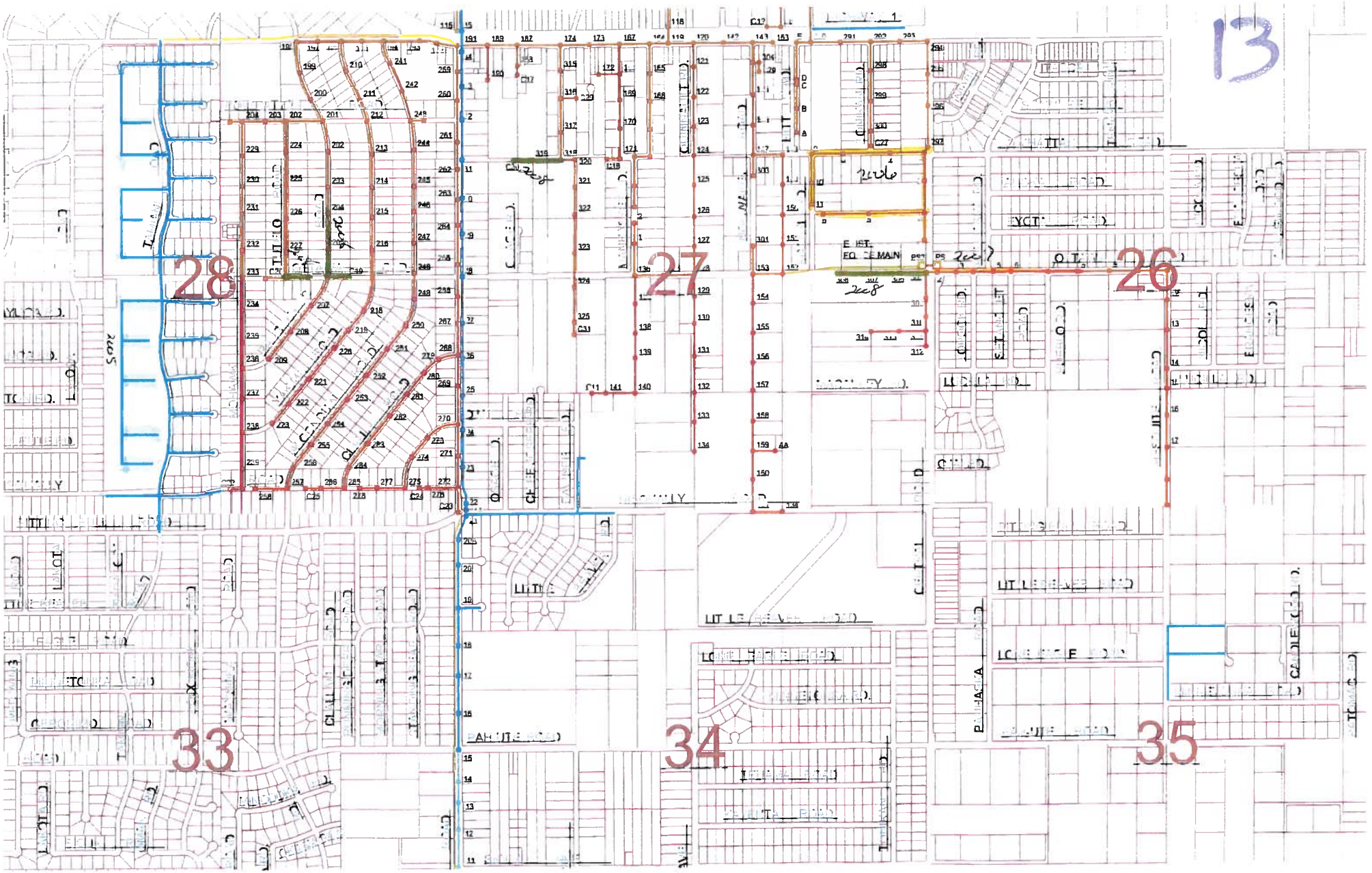
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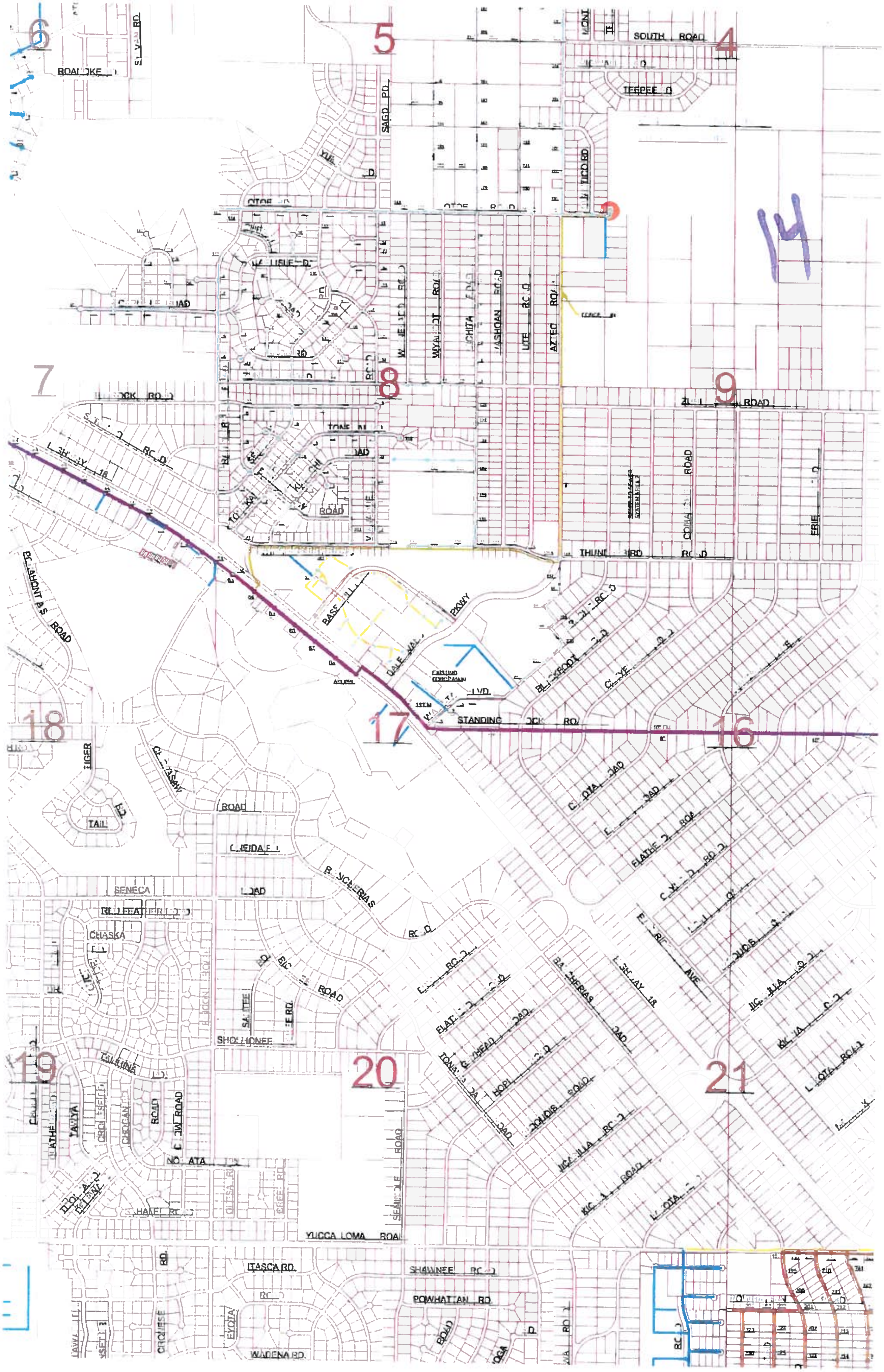

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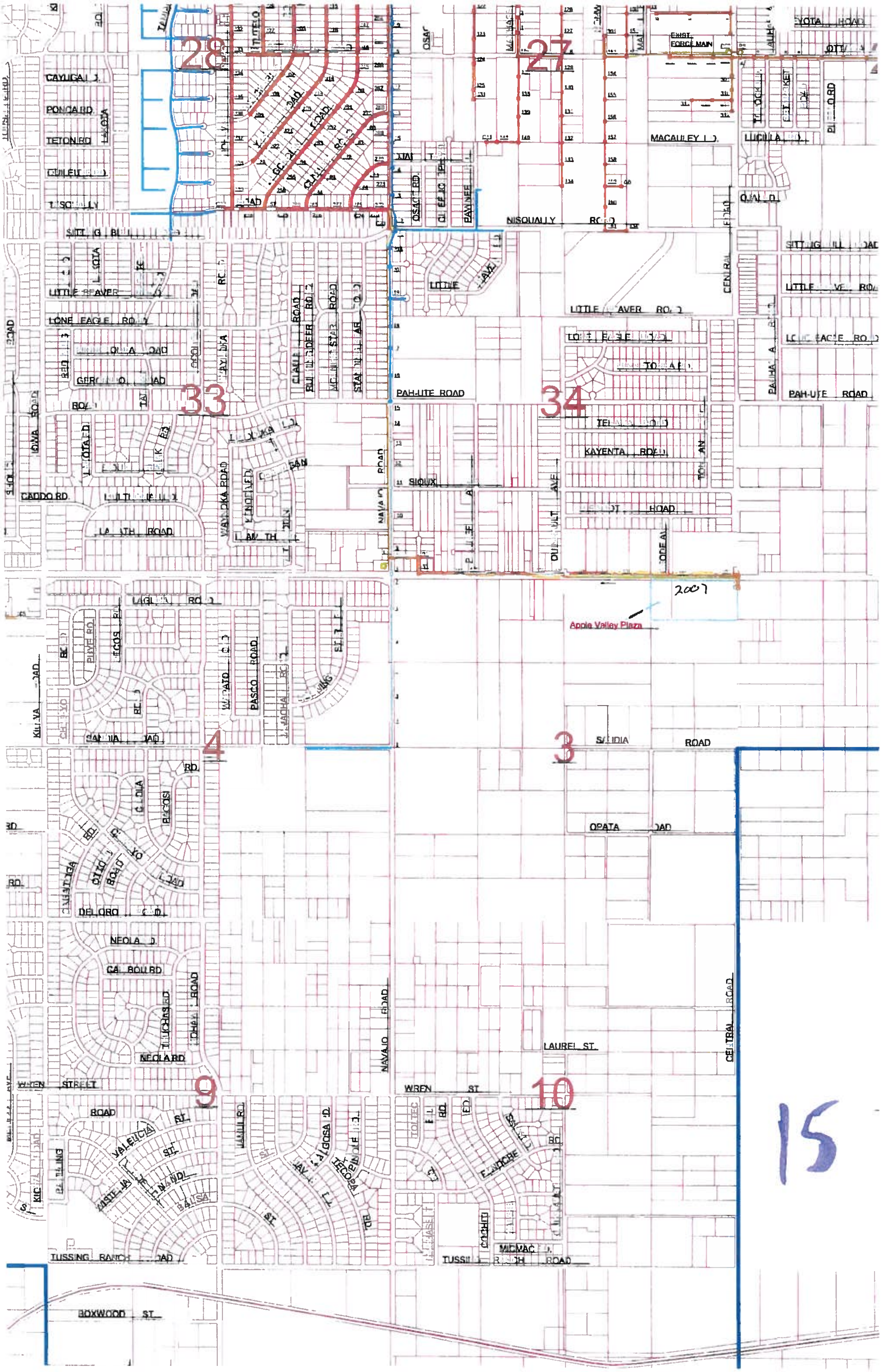

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EXIST. FORCE MAIN
OSAGE RD.
PAWNEE
LITTLE BEAVER ROAD
LONE EAGLE ROAD
PAH-UTE ROAD
TELAYA
KAYENTA ROAD
SIOUX
CADDO RD
NAVAJO ROAD
WAYWOKA ROAD
CENTRAL
SITTING BULL ROAD
Apple Valley Plaza
2007
SANDIA ROAD
OPATA ROAD
PASCO ROAD
DEL ORO
NEOLA RD
NEOLA RD
CAL BOU RD
LAUREL ST.
CENTRAL ROAD
WREN STREET
WREN ST
VALENCIA
BALSA
TUSSING RANCH ROAD
MIDMAC
BOXWOOD ST.

Town of Apple Valley
Sewer Overflows 2006 - 2009

1. 5/31/06 - Kasota Road and Highway 18 North

1. 10/12/07 - 19201 Palo Verde Drive

2. 10/28/07 - Siphon

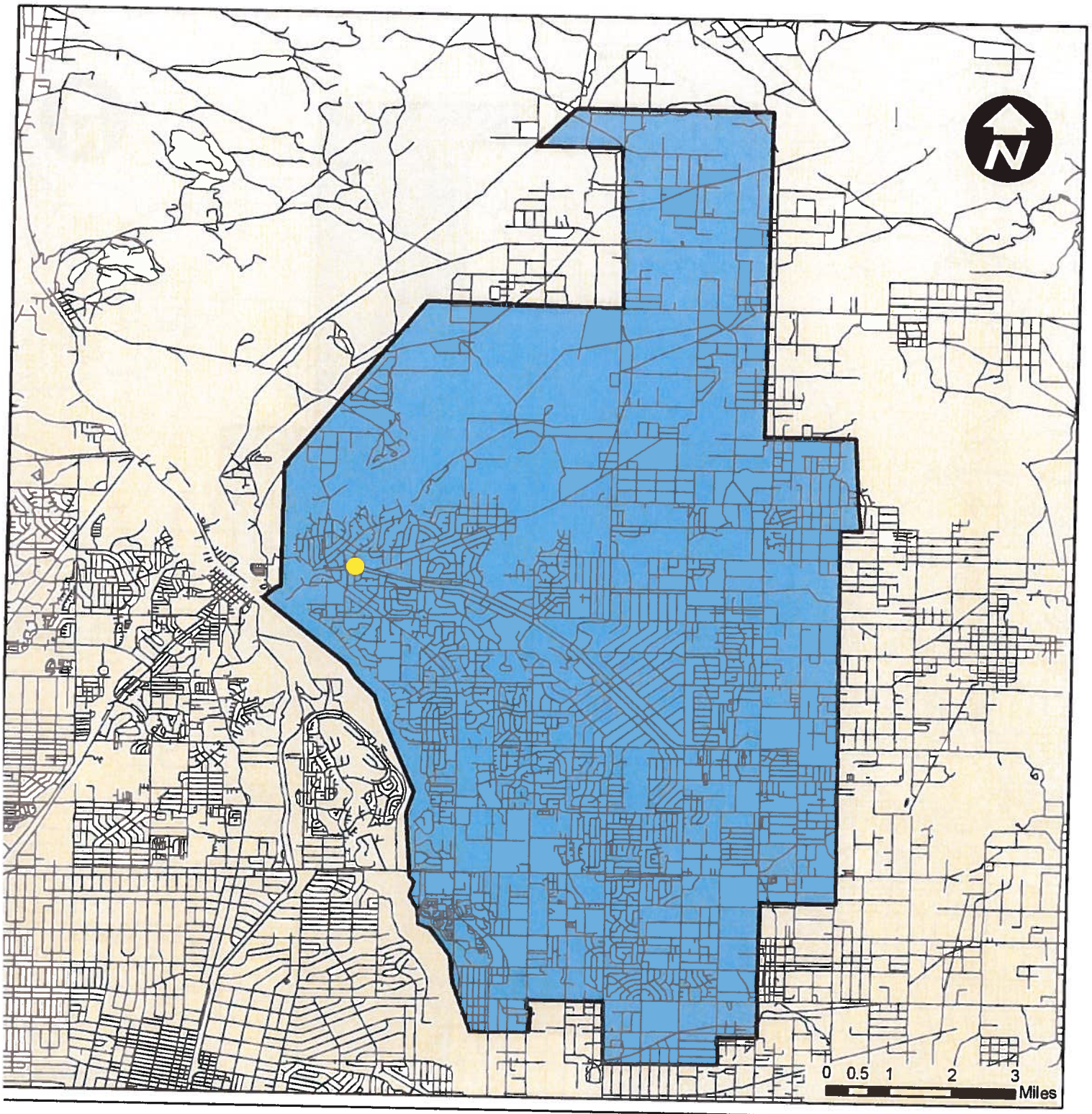
3. 12/10/07 - Ivanpah Road and Monterey Road

4. 12/14/07 - 19018 Outer Highway 18 North

5. 1/30/08 - 15036 Riverside Drive

6. 5/19/08 - Bear Valley Road and Jess Ranch Parkway

7. 12/29/08 - Corwin Road and Highway 18 North

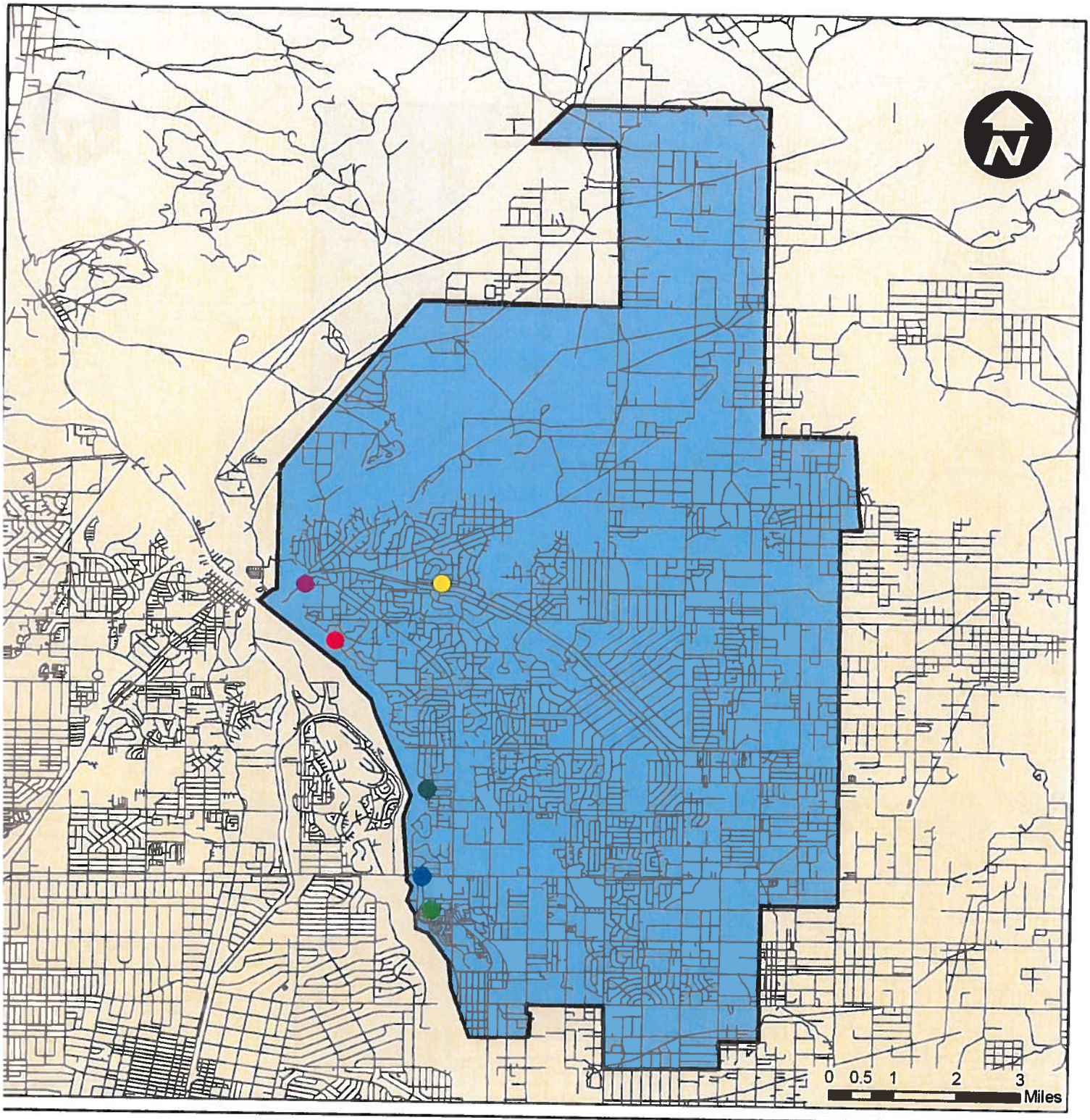


Apple Valley SSOs:

July 1, 2006 - June 30, 2007

Legend

- Kasota Road and Highway 18 North - 20 Gallons
- Apple Valley



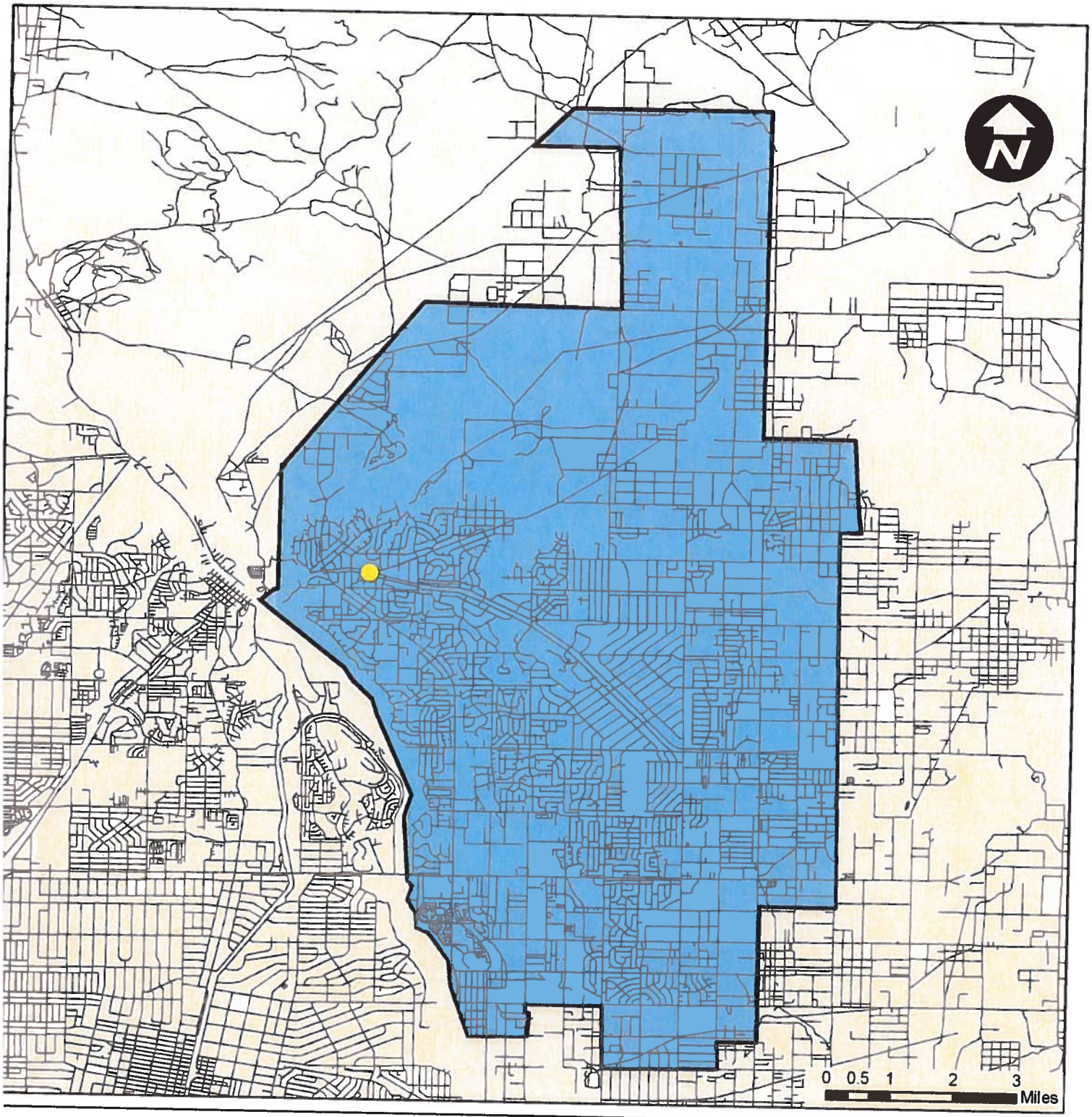
Apple Valley SSOs:

July 1, 2007 - June 30, 2008

Legend

Sanitary Sewer Overflows

- 15036 Riverside Drive - 100 Gallons
- 19201 Palo Verde Drive - 20 Gallons
- 19018 Outer Highway 18 North - 884 Gallons
- Ivanpah Road and Monterey Road - 50 Gallons
- Potomac Road and Quantico Road - 880 Gallons
- Bear Valley Raod and Jess Ranch Parkway - 11,364 Gallons
- Apple Valley



Apple Valley SSOs:

July 1, 2008 - June 30, 2009

Legend

- Corwin Road and Highway 18 North - 100 Gallons
- Apple Valley