SARI Line Emergency Response Plan (ERP)
Orange County Border to SAVI Ranch

February 2004

Revision Log SARI Line ERP		
Revision Date	**Description of Revision(s)**	**Division**

Contents

Appendices

Figures

Tables

Abbreviations

Cease and Desist Order ..... CDO
Cubic feet per second ..... cfs
Emergency Response Plan ..... ERP
Linear feet ..... ft
Gallons per minute ..... gpm
Million gallons per day ..... MGD
Manhole ..... MH
Office of Primary Responsibility ..... OPR
Orange County Public Facilities and Resources Department ..... PFRD
Orange County Sanitation District ..... OCSD
Regional Water Quality Control Board ..... RWQCB
Santa Ana River Interceptor ..... SARI
Santa Ana Watershed Project Authority ..... SAWPA
Sanitary sewer overflow ..... SSO
Pipeline Station ..... STA
Total dynamic head ..... TDH
United States Army Corps of Engineers ..... USACE

Section 1
Introduction

1.1 Introduction and Site Description

In a tentative Cease and Desist Order (CDO) dated April 22, 2003, the California Regional Water Quality Control Board, Santa Ana Region (RWQCB) identified a segment of the Santa Ana River Interceptor (SARI) sewer pipeline as a threatened release risk due to the conditions of its continued operation within the Santa Ana River floodplain, just downstream of Prado Dam. As shown in Figure 1-1, this segment ("subject reach") is approximately four miles in length and spans from SARI pipeline station 1230+04 at the Orange County/San Bernardino County border to station 1030+88 at the SARI Gate Structure at SAVI Ranch. Wastewater conveyed by the SARI pipeline includes desalter brines (as a majority of the total flow), industrial wastewater, treated groundwater from the Stringfellow site, and domestic sewage from residences.

The United States Army Corps of Engineers (USACE), as part of its Mainstem Project to be completed in approximately 2010, has plans to raise the level of Prado Dam by 30 feet. Following the completion of the project, controlled releases from Prado Dam may be as high as 30,000 cubic feet per second (cfs). Currently, and until the completion of the Mainstem Project, maximum controlled releases from Prado Dam are limited to 5,000 cfs. If not mitigated, the significantly increased future release rates from Prado Dam may increase the rate of scour in the floodplain of the Santa Ana River, possibly leading to failure of the SARI pipeline within the subject reach.

To address this future risk, the Orange County Public Facilities and Resources Department (PFRD) will be implementing a long-term corrective action, such as the installation of grade stabilizers, to control erosion and protect the pipeline within the floodplain after 2010. While the risk of additional scour in the floodplain of the Santa Ana River may exist after 2010, recent field survey data (RBF, 1998/2001/2003) has suggested that the existing low-flow riverbed channel has stabilized for releases of 3,000 to 5,000 cfs (AA Webb & Assoc., 2003).

The Orange County Sanitation District (OCSD) and the Santa Ana Watershed Project Authority (SAWPA), the owner/operators, have voluntarily agreed to implement the actions identified in the tentative CDO, one of which was the creation of a contingency plan to address emergencies that may arise from a break in the existing SARI line segment buried and operating in the Santa Ana River floodplain. OCSD, SAWPA, and CDM (a third-party consultant) have collaborated to produce this Emergency Response Plan (ERP). This site specific ERP builds upon existing agency emergency response programs to provide a document focused on the risks related to the SARI Line.

Figure 1-1
Map of Subject Reach
Orange County Border to SAVI Ranch

1.2 How to Use this Document for Planning and Emergency Response

1.2.1 Overview

The following sections will provide the emergency responder with specific information and tools that may be used to:

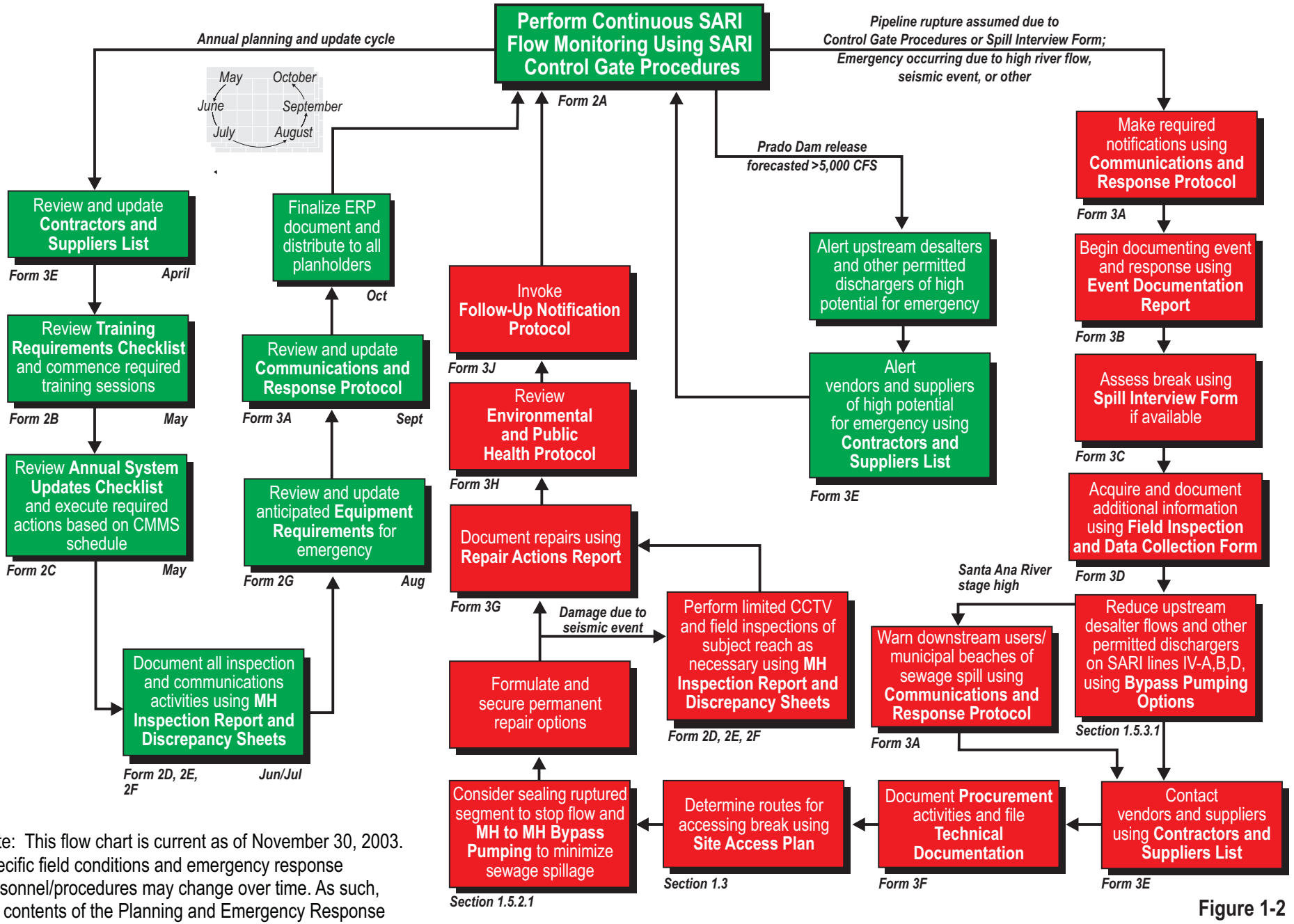
- Quickly identify existing access routes within the subject reach
- Understand key SARI pipeline failure mechanisms
- Understand the consequences associated with a SARI pipeline failure
- Identify, assess, and mitigate a SARI pipeline emergency
- Conduct annual emergency response training for agency staff
- Update and improve these ERP documents

The flow chart provided in Figure 1-2, and discussed in greater detail in Sections 2 and 3, may be used as a pre-event planning and emergency response reference guide for emergency responders and OCSD staff. The starting point of the flow chart revolves around continuous flow monitoring as described in the OCSD SARI Control Gate Procedures. Should flow readings vary significantly between the Green River Metering Station and the SARI Control Gate at SAVI Ranch, or should a sewage spill within the subject reach be reported, OCSD staff may conclude that a pipeline failure has occurred due to high river flow/washout, seismic event, or other. In this scenario, key steps to be considered have been summarized in the flow chart as the emergency responder proceeds through the flow chart in a clockwise direction.

If, while performing the continuous flow monitoring, no information suggests a possible SARI Line failure, OCSD staff may proceed through the flow chart in a counterclockwise manner from the starting point. This path denotes key training, planning, and ERP plan updating that should occur on an annual basis.

These clockwise and counterclockwise flow chart paths are described further in the following sections. A majority of the boxes within each of the flow chart paths reference specific forms (containing checklists and specific guidelines/instructions) that should be utilized during pre-event planning and emergency response.

Specific field conditions and emergency response personnel/procedures may change over time. As such, the contents of this Emergency Response Plan must be treated as living documents and be updated on (at least) an annual basis.



Note: This flow chart is current as of November 30, 2003. Specific field conditions and emergency response personnel/procedures may change over time. As such, the contents of the Planning and Emergency Response flow chart paths must be reviewed and updated on (at least) an annual basis.

Figure 1-2
Pre-Event Planning and Emergency Response Flow Chart

1.2.2 Safety and Training

All work performed relating to a SARI Line emergency shall conform to CAL-OSHA requirements. In addition to these requirements, response activities must also conform to the SARI Line-specific Health and Safety Plan that is currently under development by the OCSD Office of Health and Safety.

OCSD employees, vendors, and contractors should not attempt site access under conditions that they have not received previous training for. All potential responders to SARI Line emergencies should receive safety training as noted in the OCSD Integrated Emergency Response Plan (IERP) and Form 2B in this Emergency Response Plan, Training Requirements. However, due to the specific nature of potential SARI Line emergencies, the following conditions could cause safety concerns that may not be adequately addressed in the current training programs and should be considered before commencing any work:

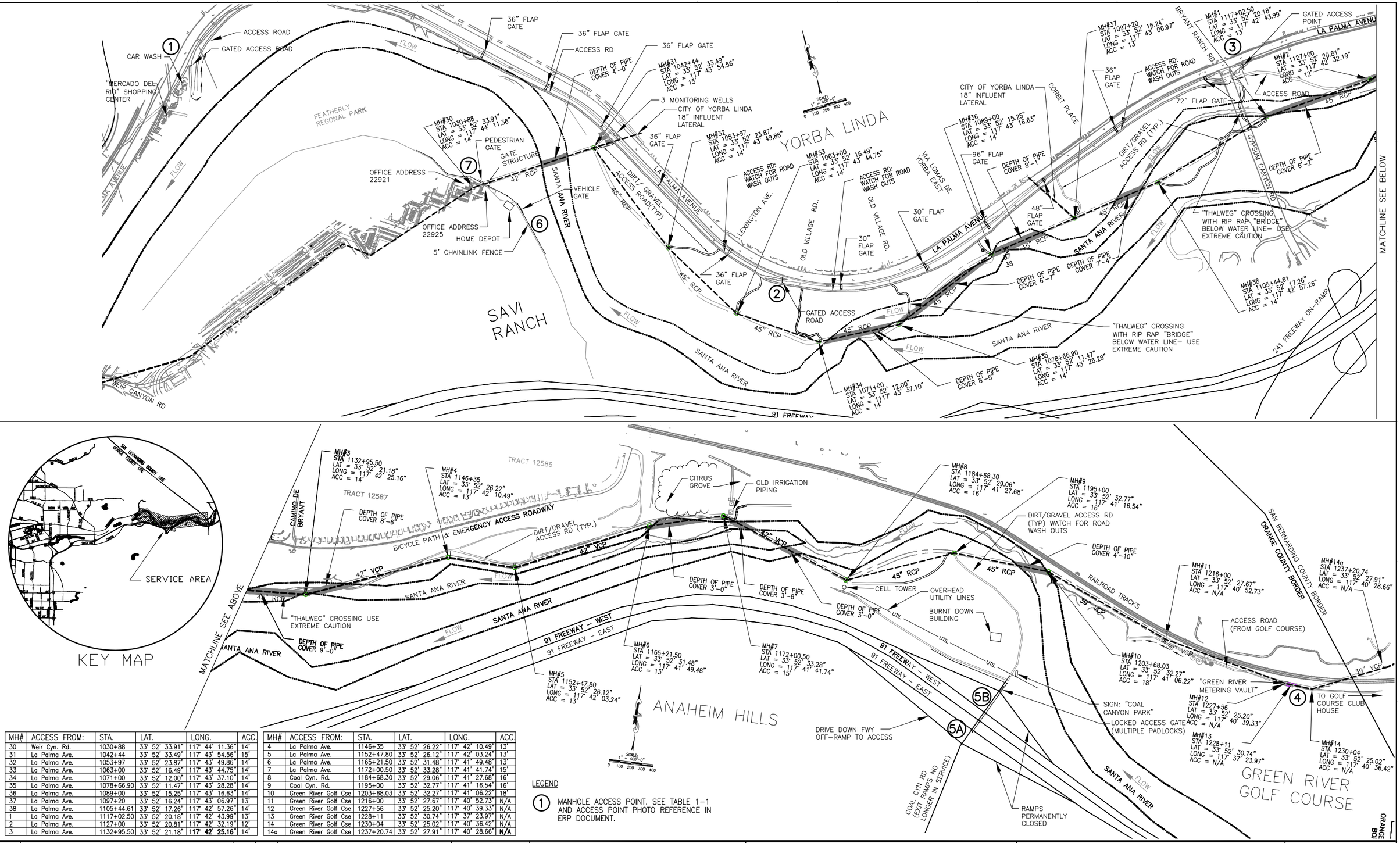
- Swiftly flowing waters
- High flood stages
- Poor visibility and communications
- Large amounts of debris
- Access road washouts
- Landslides/unstable soils
- Vehicle and personnel hazards (sinkholes, etc.)

1.3 Site Access Plan

1.3.1 Access Under Normal Conditions

Emergency responders and repair contractors will need access to the point(s) of pipeline failure during an emergency. Figure 1-3 provides a summary map of key Santa Ana River floodplain access points, road alignments, and visual landmarks for accessing each of the 24 manholes within the subject reach. Manhole numbering and stationing, longitude, latitude, and depth of cover data is based upon recent field survey data (RBF, 2003).

Table 1-1 and the photo reference below provide a summary of the six key access points for each of the 24 manholes within the subject reach. The numbered access points may be cross-referenced with those shown on Figure 1-3 for ease of identification.



MH#	ACCESS FROM:	STA.	LAT.	LONG.	ACC.
30	Weir Cyn. Rd.	1030+88	33° 52' 33.91"	117° 44' 11.36"	14'
31	La Palma Ave.	1042+44	33° 52' 33.49"	117° 43' 54.56"	15'
32	La Palma Ave.	1053+97	33° 52' 23.87"	117° 43' 49.86"	14'
33	La Palma Ave.	1063+00	33° 52' 16.49"	117° 43' 44.75"	14'
34	La Palma Ave.	1071+00	33° 52' 12.00"	117° 43' 37.10"	14'
35	La Palma Ave.	1078+66.90	33° 52' 11.47"	117° 43' 28.28"	14'
36	La Palma Ave.	1089+00	33° 52' 15.25"	117° 43' 16.63"	14'
37	La Palma Ave.	1097+20	33° 52' 16.24"	117° 43' 06.97"	13'
38	La Palma Ave.	1105+44.61	33° 52' 17.26"	117° 42' 57.26"	14'
1	La Palma Ave.	1117+02.50	33° 52' 20.18"	117° 42' 43.99"	13'
2	La Palma Ave.	1127+00	33° 52' 20.81"	117° 42' 32.19"	12'
3	La Palma Ave.	1132+95.50	33° 52' 21.18"	**117° 42' 25.16"**	14'

MH#	ACCESS FROM:	STA.	LAT.	LONG.	ACC.
4	La Palma Ave.	1146+35	33° 52' 26.22"	117° 42' 10.49"	13'
5	La Palma Ave.	1152+47.80	33° 52' 26.12"	117° 42' 03.24"	13'
6	La Palma Ave.	1165+21.50	33° 52' 31.48"	117° 41' 49.48"	13'
7	La Palma Ave.	1172+00.50	33° 52' 33.28"	117° 41' 41.74"	15'
8	Coal Cyn. Rd.	1184+68.30	33° 52' 29.06"	117° 41' 27.68"	16'
9	Coal Cyn. Rd.	1195+00	33° 52' 32.77"	117° 41' 16.54"	16'
10	Green River Golf Cse	1203+68.03	33° 52' 32.27"	117° 41' 06.22"	18'
11	Green River Golf Cse	1216+00	33° 52' 27.67"	117° 40' 52.73"	N/A
12	Green River Golf Cse	1227+56	33° 52' 25.20"	117° 40' 39.33"	N/A
13	Green River Golf Cse	1228+11	33° 52' 30.74"	117° 37' 23.97"	N/A
14	Green River Golf Cse	1230+04	33° 52' 25.02"	117° 40' 36.42"	N/A
14a	Green River Golf Cse	1237+20.74	33° 52' 27.91"	117° 40' 28.66"	**N/A**

LEGEND

(1) MANHOLE ACCESS POINT. SEE TABLE 1-1 AND ACCESS POINT PHOTO REFERENCE IN ERP DOCUMENT.

MARK	DESCRIPTION	DATE	APPR.
	MODIFIED BY CDM FOR SARI ERP	11/30/2003	

LINE IS 2 INCHES AT FULL SIZE
(IF NOT 2"-SCALE ACCORDINGLY)

ORANGE COUNTY SANITATION DISTRICT

SANTA ANA RIVER INTERCEPTOR

MANHOLE AND ACCESS ROADWAY MAP FROM SAVI RANCH TO COUNTY LINE

FIGURE 1-3

P:\SAWPA-2084\39691-SARI - ERP\7.0 Proj. Docs\7.1 Draft Docs\7.1.2 Task 3 Sub\Deliverables\OCAD\ mhaccess 11/21/03 11:00 perezsm XREFS: OCMAP1, mhaccess-topo, XREF-801, A-2-41-GDBD

Table 1-1
Summary of SARI Manhole Access Points

Manhole Number from Figure 1-3	SARI Pipeline Station	Access Point (see Figure 1-3)
1 – 7 and 31 – 38	1042+44 to 1172+00.50	Three access points along La Palma Avenue: **(1)** Gated gravel access road adjacent to the "Mercado del Rio" shopping center at the car wash (nearest manhole is No. 31 at Sta. 1042+44). **(2)** Gated paved access road at Old Village Road (nearest manhole is No. 33 at Sta. 1063+00). **(3)** Gated paved access road at Gypsum Canyon Road (nearest manhole is No. 1 at Sta. 1117+02.50).
10 – 14a	1203+68.03 to 1237+20.74	**(4)** Green River Golf Course service roads, parallel to the railroad tracks north of golf course.
8 – 9	1184+68.03 to 1195+00	**(5A)(5B)** Coal Canyon Road access gate, from SR-91 by way of eastbound freeway off-ramp at Coal Canyon.
30	1030+88	**(6)** Weir Canyon Road into SAVI Ranch near the SARI Gate Structure (Vehicle Gate).
30	1030+88	**(7)** Weir Canyon Road into SAVI Ranch near the SARI Gate Structure (Pedestrian Gate).

Access Point Photo Reference

(1) Looking southwest. Car wash building shown in background.

(2) Looking west. At Old Village Road.

(3) Looking west. At Gypsum Canyon Road.

(4) Looking southwest. View of golf course access road and Green River metering vault.

(5A) Looking southeast. View of SR-91 off-ramp at Coal Canyon Road. Access gate is to the left, on north side of SR-91.

(5B) Looking northeast. View of locked access gate on north side of SR-91 at Coal Canyon Road.

(6) Looking north. View of vehicle access gate near Home Depot. Note that in the future Home Depot may vacate this address to move to a different location.

(7) Looking northeast. View of pedestrian access gate leading to SARI Gate structure.

Green River Golf Course service roads on the northern boundary of the golf course provide access to manholes 10 through 14a, including the Green River Metering Vault. These service roads parallel the railroad tracks running east/west just north of the golf course. Access to the golf course is limited to a small bridge crossing over the Santa Ana River just off of Riverside Road (SR-91 frontage road). During larger flow events in the River (i.e., approximately 5,000 cfs or greater), this bridge crossing may become impassable.

Coal Canyon Road provides access to manholes 8 and 9. Coal Canyon Road may be accessed from SR-91 by way of the permanently closed westbound freeway on-ramp at Coal Canyon. By navigating the on-ramp in reverse from the westbound lanes of SR-91, emergency responders will arrive at a chain-link access gate. The access gate is typically locked with several padlocks from various public agencies including one Master A406 lock owned by OCSD. Any Master A406 key will open the lock.

Weir Canyon Road provides access to manhole 30 and the SARI Gate Structure at SAVI Ranch. A vehicle access gate and a pedestrian access gate on the south and north sides of the Home Depot store, respectively, lead to a dirt/gravel access road which parallels the south bank of the Santa Ana River. The SARI Gate Structure may be accessed from this road. The Gate Structure is locked with a Master A406 lock, which can be opened with any Master A406 key.

1.3.2 Access During Prado Dam Release

Some of the manhole access routes described above may be blocked or unavailable due to the high stage of the Santa Ana River during significant releases from Prado Dam. Based on water surface profiles developed for the subject reach by the USACE HEC-RAS model, Table 1-2 and Figure XX have been generated to approximate which areas of the Santa Ana River floodplain (and access routes) may become inundated during significant releases from Prado Dam.

FIGURE XX

USACE Inundation Map

[Not Shown; Data Unavailable as of Nov. 2003]

[Immediate Update shall be performed upon receipt of new USACE Inundation Map]

Table 1-2
SARI Manhole Access Points Likely Inundated During High Flows[1]

Prado Dam Release Rate (cfs)	Santa Ana River Floodplain Areas and SARI Manhole Access Routes Likely Inundated
5,000	1. Portions of dirt/gravel access roads aligned in parallel with, and accessed from, La Palma Avenue. Higher stages in the low flow channels of the Santa Ana River will likely prevent access to manholes 1, 3 through 7, 35, and 38 due to impassable thalweg crossings.
18,000	Those identified above, plus: 2. Small bridge crossing over the Santa Ana River just off of Riverside Road (SR-91 frontage road). This crossing provides the primary access route to the Green River Golf Course (and manholes 10 through 14a, including the Green River Metering Vault). Alternate access to these manholes may be available from the railroad tracks just north of the golf course. 3. Northwest portions of Green River Golf Course, including manholes 10 and 11. The inundation area under these conditions would likely extend to the toe of the railroad embankment on the northwest boundary of the golf course. 4. Entire length of dirt/gravel access roads aligned in parallel with, and accessed from, La Palma Avenue. Higher stages in the River would engulf these access roads as well as manholes 1 through 7 and 31 through 38. The inundation area under these conditions would likely extend to the toe of the bicycle path embankment on the southern edge of La Palma Avenue.
30,000	Those identified above, plus: 5. All manholes within the subject reach, with the exception of manhole 14a (northeast of both the railroad tracks and Green River Golf Course near station 1237+21) and manhole 30 (within SAVI Ranch commercial/industrial area near station 1030+88). Note that the SARI Gate Structure is not inundated at this dam release rate. 6. Portions of the dirt/gravel access road, which parallels the south bank of the Santa Ana River at the SARI Gate Structure at SAVI Ranch (near station 1030+88).

[1] Inundation areas identified in table based on best USACE data available as of Nov. 2003. USACE Inundation Map providing a superior delineation of inundation areas is currently being pursued.

1.4 Potential Pipeline Failure Mechanisms

In an effort to focus the scope of the ERP, only the assumed most likely failure scenarios have been investigated and addressed. However it should be noted that these scenarios are very thorough and do a good job of covering most all feasible scenarios and unexpected events which would likely result in similar effects. This ERP addresses pipeline failures caused by one or more of the following events:

- Increased discharge rate from Prado Dam (5,000 cfs, 18,000 cfs, or 30,000 cfs). Note that discharges greater than 30,000 cfs would involve uncontrolled releases over the Prado Dam spillway, which would cause extensive damage and unpredictable washouts of major downstream structures. Therefore, for the purposes of this ERP, only controlled discharge rates of up to 30,000 cfs have been examined.

- Earthquake
- Other event, including equipment damage to pipeline, surge, debris accumulation, vandalism, or pipeline deterioration

Based on these selected causes, the following likely effects have been assumed for the subject reach:

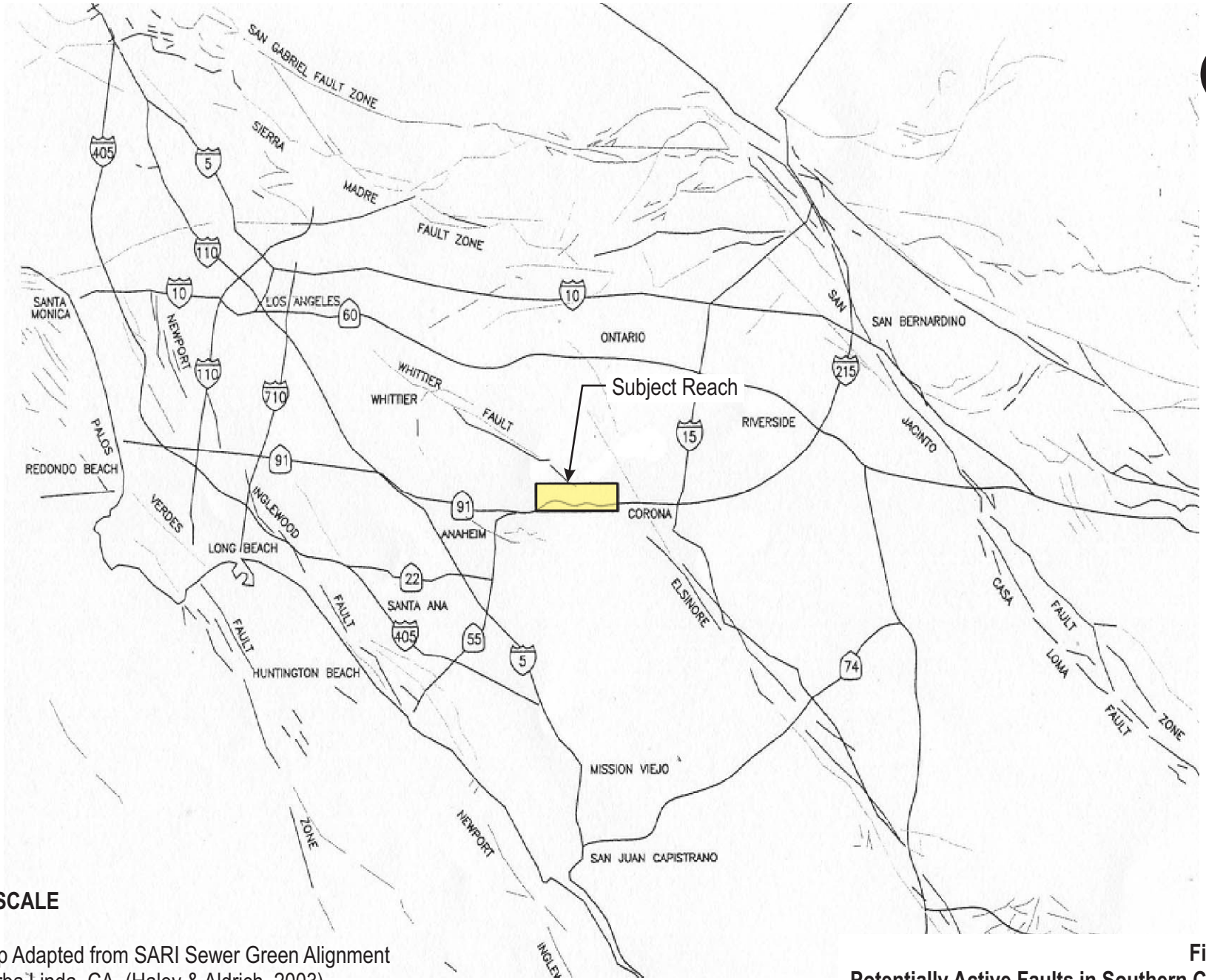
- Pipeline and/or manhole failure allowing SARI effluent to spill into the Santa Ana River
- Pipeline and/or manhole failure allowing Santa Ana River water and debris to flow into the SARI line
- Pipeline and/or manhole failure leading to effluent discharge from manholes downstream of the subject reach (discharges from upstream manholes on the upper portions of the SARI Line are addressed in a separate ERP developed for SAWPA alone).

1.4.1 Erosion

The Prado Dam reservoir, located just upstream of the subject reach, detains nearly all of the bed sediment picked up by the streams as they approach the reservoir. Waters released from the reservoir into the Santa Ana River channel, therefore, have additional sediment transport capacity. As these waters make their way through the subject reach and flow over the buried SARI pipeline, sediment can be transported from the riverbed resulting in scour. This scour, over time, may result in a reduction in earthen cover over the SARI pipeline. As cover soils are reduced, the SARI pipeline becomes more vulnerable to failure (washout) during a large flow rate release from Prado Dam. However, recent data indicates the riverbed has stabilized for flows of up to 5,000 cfs (AA Webb, 2003). Localized scour remains an issue.

1.4.2 Seismic

Many potentially known and unknown active faults are located within Southern California. These faults have the capability to produce significant ground accelerations, which may result in failure of the SARI pipeline within the subject reach. Note that the subject reach crosses the Whittier fault zone, which runs approximately in a northwest/southeast orientation through the eastern side of the City of Yorba Linda. Figure 1-4 provides a summary of potentially active Southern California faults near the subject reach.



NOT TO SCALE

Note: Map Adapted from SARI Sewer Green Alignment Study, Yorba Linda, CA. (Haley & Aldrich, 2003)

Figure 1-4
Potentially Active Faults in Southern California

1.4.3 Mechanical

Other causes of failure of the SARI pipeline include equipment damage from construction projects within the riverbed, excessive surge caused by upstream operations, debris accumulation due to illegal discharges, vandalism, or pipeline corrosion or deterioration. Each of these events may be considered a likely cause of failure and is addressed in this ERP.

1.5 Anticipated Consequences of Failure

1.5.1 Hydraulics

A failure within the subject reach of the SARI Line may lead to the *inflow* of water and debris into the SARI pipeline. Should the water surface elevation of the River be elevated, as in the case of a 30,000 cfs release from Prado Dam, flow within the SARI pipeline may become pressurized under the hydraulic head of the River. This pressurization could lead to additional downstream failures in the pipeline and associated manhole and siphon structures, especially in SARI Line segments not designed for this condition. Debris such as gravel, tree limbs, and other items carried by increased flows in the River and introduced to the pipeline under this hydraulic head could lead to blockages and further damage to downstream pipeline joints, siphons, and metering structures. Though unlikely due to the existing SARI Control Gate Operating and Notification Procedures, this effluent/debris combination could block bar screens causing sanitary sewer overflows (SSOs) in the collections systems and plants, and would rapidly fill grit chambers. In addition, clays and silts could adversely impact the primary clarifiers at OCSD Plant 2.

Under the pressurized conditions described above, the possibility exists for downstream SSOs along the length of the SARI pipeline. Due to the column of river water that would be resting on the cast-iron manhole covers and the mechanical reinforcements recently installed (i.e., concrete manhole rings and cast-iron covers bolted together), those manholes located within the subject reach may not be prone to SSO discharge, depending on pressures. However, under these same conditions, the increased energy grade line of the SARI pipeline flows within the subject reach would likely far exceed the rim elevations of the non-reinforced manholes downstream of SAVI Ranch causing SSO discharges. These discharges may occur in critical locations, such as busy city streets, and near buildings and public gathering places, but would not likely occur for more than one day due to the existing SARI Control Gate Operation and Notification Procedures. If implemented, these procedures would allow for the closure of the SARI gate at SAVI Ranch, effectively stopping the flow of the pipeline.

For the purposes of this ERP, two existing pipeline station segments have been selected as potential SARI failure points to assess the approximate locations and timing of SSO discharges upstream and downstream of the subject reach under conditions of SARI failure. One of these two points (MH #7 and short section of pipe downstream) is near the upstream end of the subject reach, and the other (MH #31 and short section of pipe downstream) is near the downstream end of the subject reach. Both pipeline stations were selected based on their minimal existing earthen cover (approximately three to four feet thick based on measurements by RBF, 2003) and are shown on Tables 1-3 and 1-4.

In the event of a 30,000 cfs release from Prado Dam resulting in a subsequent failure just downstream of either of these two points, downstream SSO locations and timeframes (due to pressurized flow conditions) have been calculated as summarized in Table 1-3. Note that these calculations have been based upon water surface profiles developed for the subject reach by the USACE HEC-RAS model, and take into account expected pipeline and minor headlosses. Detailed calculations are provided in Appendix A.

Table 1-3
Potential Sanitary Sewer Overflow Locations: Downstream[1]
(based on 30,000 cfs Prado Dam release event)

SARI Failure Location	Manholes Downstream of Failure Affected by SSO	Time until evidence of first SSO
Manhole 7 at Sta. 1172+00	All within 3.5 miles (Yorba Linda laterals unaffected)	Within 30 minutes of failure
Manhole 31 at Sta. 1042+44	All within 3.5 miles	Within 10 minutes of failure

[1] Data based on likely planning scenarios.

Following a failure such as this and the subsequent closure of the SARI Gate at SAVI Ranch to cease further downstream SSOs and prevent the downstream flow of debris, emergency responders may want to manually plug the damaged end of the SARI Line in order to prevent further sewage from spilling into the River. Plugging the damaged end would allow sewage to backup in the SARI and prepare the pipeline for manhole-to-manhole bypass pumping so that permanent repairs may be completed. Similar calculations to those shown above were made to assess upstream SSO locations and timeframes. These are summarized in Table 1-4. Note that these calculations have been based upon actual 2003 flow data for the SARI Line (discussed in greater detail in Section 1.5.2.1 below). Detailed calculations are provided in Appendix A.

Table 1-4
Potential Sanitary Sewer Overflow Locations: Upstream[1]
(based on 2003 SARI flow data)

SARI Failure Location	Manholes Upstream of Flow Stoppage Point Affected by SSO	Time until evidence of first SSO	Corresponding Volume of Sewage Backup Stored in Pipeline
Manhole 7 at Sta. 1172+00	Manhole 14a	Within 25 minutes of flow stoppage	1.26 MG
Manhole 31 at Sta. 1042+44	Yorba Linda Laterals; Manhole 14a	Within 10 minutes of flow stoppage (Yorba Linda Laterals); Within 45 minutes of flow stoppage (Manhole 14a)	2.22 MG (Manhole 14a)

[1] Data based on likely planning scenarios.

Should a failure in the SARI Line occur downstream of the SARI Control Gate (i.e., downstream of the subject reach), OCSD staff will rely upon existing SSO response procedures as well as applicable information from this ERP to appropriately address the situation. Should a failure occur upstream of the subject reach, SAWPA staff will rely upon procedures currently under development as part of the SAWPA Emergency Response Plan for SARI Lines IV-A, IV-B/V, and IV-D/IV-E.

1.5.2 Downstream Health and Recreation

The cause and effect failure scenarios described above could impact downstream public health, environmental habitats, recreational resources, and public agencies (e.g., OCSD). Due to the diurnal nature of the flows in the SARI pipeline, any failure within the subject reach will likely result in the spilling of effluent into the Santa Ana River. Depending on the flows in the River and pipeline at the time of the failure, this effluent may be significantly diluted. This would be the case in the event of a washout-type failure of the SARI Line caused by 30,000 cfs release event from Prado Dam, though the peak flows would likely subside after a number of days. Following this flow subsidence, effluent concentrations would increase in the Santa Ana River, probably impacting downstream public health and recreation (Brown and Caldwell, 2002). Under these conditions and depending on the magnitude, frequency, and duration of storms and the saturation levels of soils in the surrounding tributary basin, days or weeks may pass before any substantial SARI flow reduction (via bypass pumping measures or other) could be safely implemented.

1.5.2.1 Manhole-to-Manhole Bypass Pumping

If the manholes within the subject reach are accessible in the event of a failure in the SARI pipeline, temporary manhole-to-manhole bypass pumping systems may require installation. Within the subject reach, these systems would be capable of routing effluent through an alternate conduit from manhole(s) upstream of the failure to manhole(s) downstream of the failure, thereby isolating the problematic section of the SARI Line. Note that sustained high stages in the Santa Ana River would inundate these manholes and preclude the use of these temporary bypass systems.

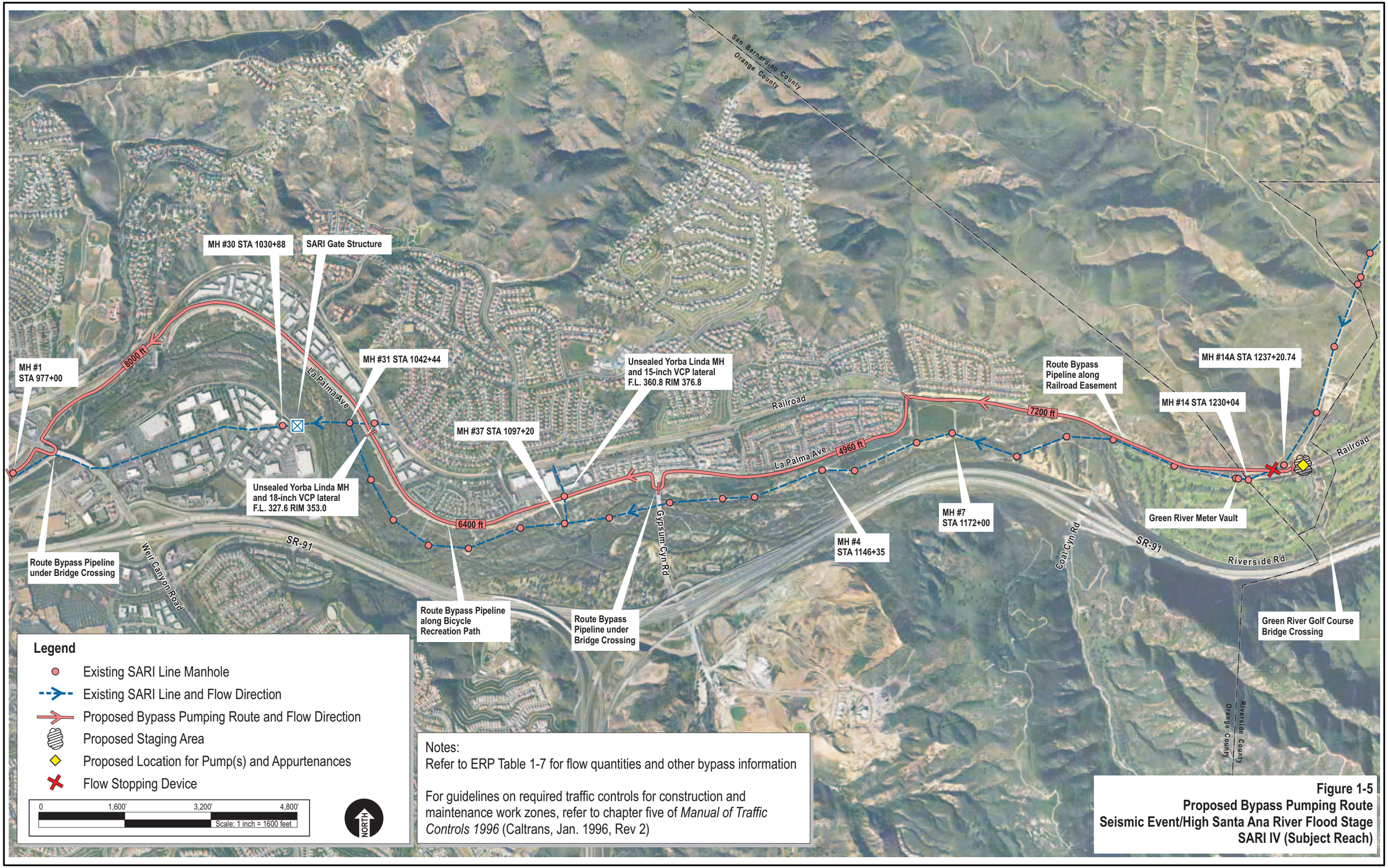
SARI flow rates have been estimated at three key pipeline stations as shown in Table 1-5 and Figures 1-5 through 1-7 to provide emergency responders and contractors with sufficient geometric and flow data to size pumps and piping for the temporary systems. The flow rate estimates summarized in Table 1-5 below are discussed in greater detail in Appendix B and are based on actual flow rate data collected from the flume and mag-meter at the Green River Metering Vault between January and June 2003, and Doppler flow data collected between February and March 2002 (MGD Technologies Co., 2002).

Table 1-5
SARI Pipeline Flow Rates for Reach IV (Subject Reach)

Pipeline Station Point (as shown on Figures 1-6 and 1-7)	Description	Average Dry Weather Estimated Flow Rate (MGD)	Peak Wet Weather Estimated Flow Rate (MGD)
1	Upstream end of the subject reach, at approximate station 1228+00 at the Green River Meter Vault. See Figure 1-6.	8.1 (diurnal variations between 5.5 and 10.5 MGD)	15.5
2	Just downstream of the City of Yorba Linda fifteen-inch influent lateral to the SARI (approximate station 1097+20). See Figure 1-7.	8.5	16.1
3	Just downstream of the City of Yorba Linda eighteen-inch influent lateral to the SARI (approximate station 1042+44). See Figure 1-7.	8.9	16.6

Data current as of Oct. 2003. SARI Pipeline Flow Rates discussed in greater detail in Appendix B.

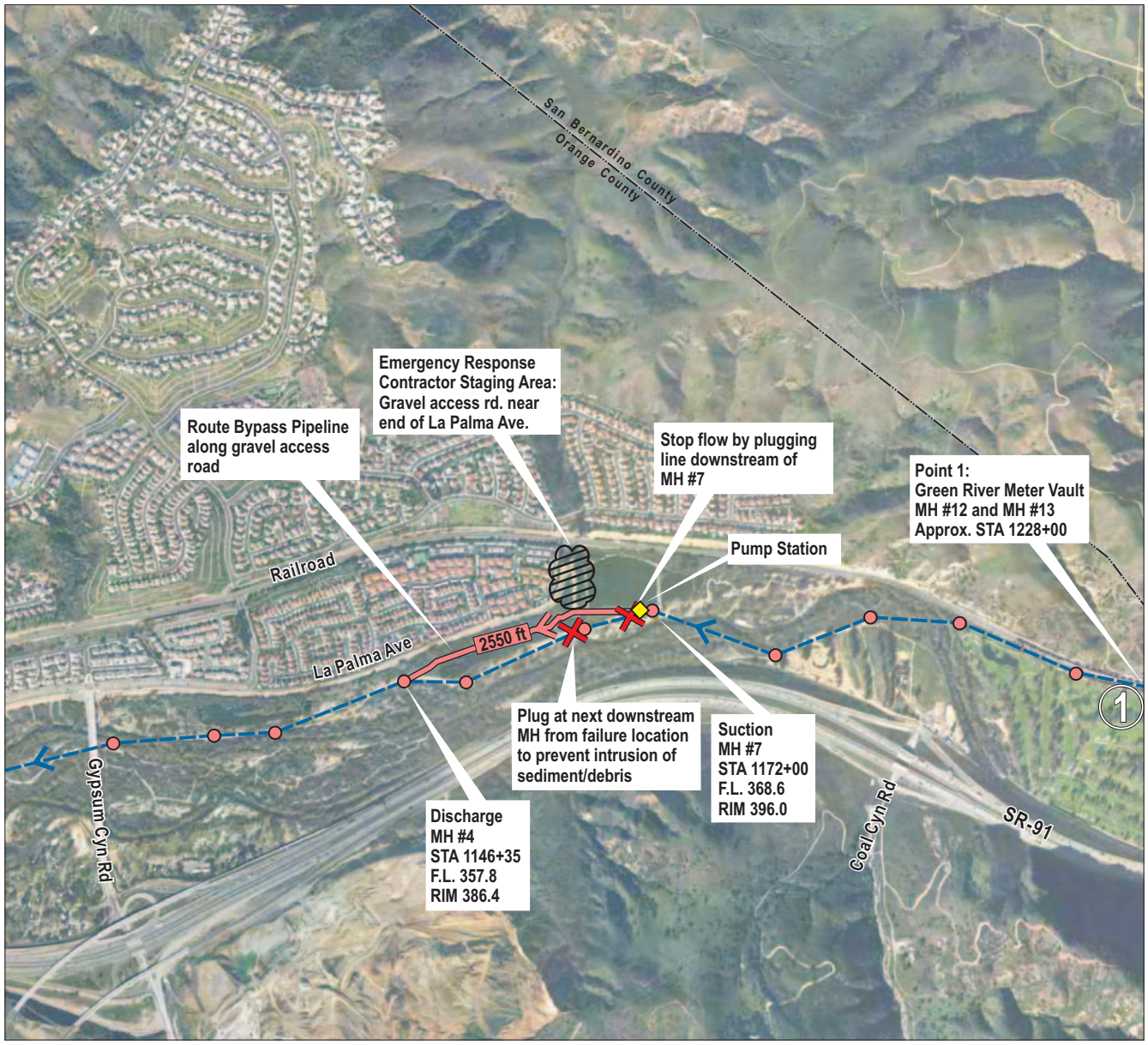
It is anticipated that bypass pumping contractors will be able to mobilize to the site with the necessary pumps and associated piping within one day following a SARI Line failure. In this scenario, these contractors would function as the general emergency response contractor with oversight from Orange County Sanitation District (OCSD). Depending on the magnitude of the specific emergency situation and in the event of reduced pump/pipe inventories at contractors' yards, multiple bypass pumping (and other) contractors may need to coordinate their efforts and their equipment supplies. In addition, OCSD may choose to function as the general emergency response contractor and provide significant on-site labor and equipment.



Notes:
Refer to ERP Table 1-7 for flow quantities and other bypass information

For guidelines on required traffic controls for construction and maintenance work zones, refer to chapter five of *Manual of Traffic Controls 1996* (Caltrans, Jan. 1996, Rev 2)

Figure 1-5
Proposed Bypass Pumping Route
Seismic Event/High Santa Ana River Flood Stage
SARI IV (Subject Reach)



Legend

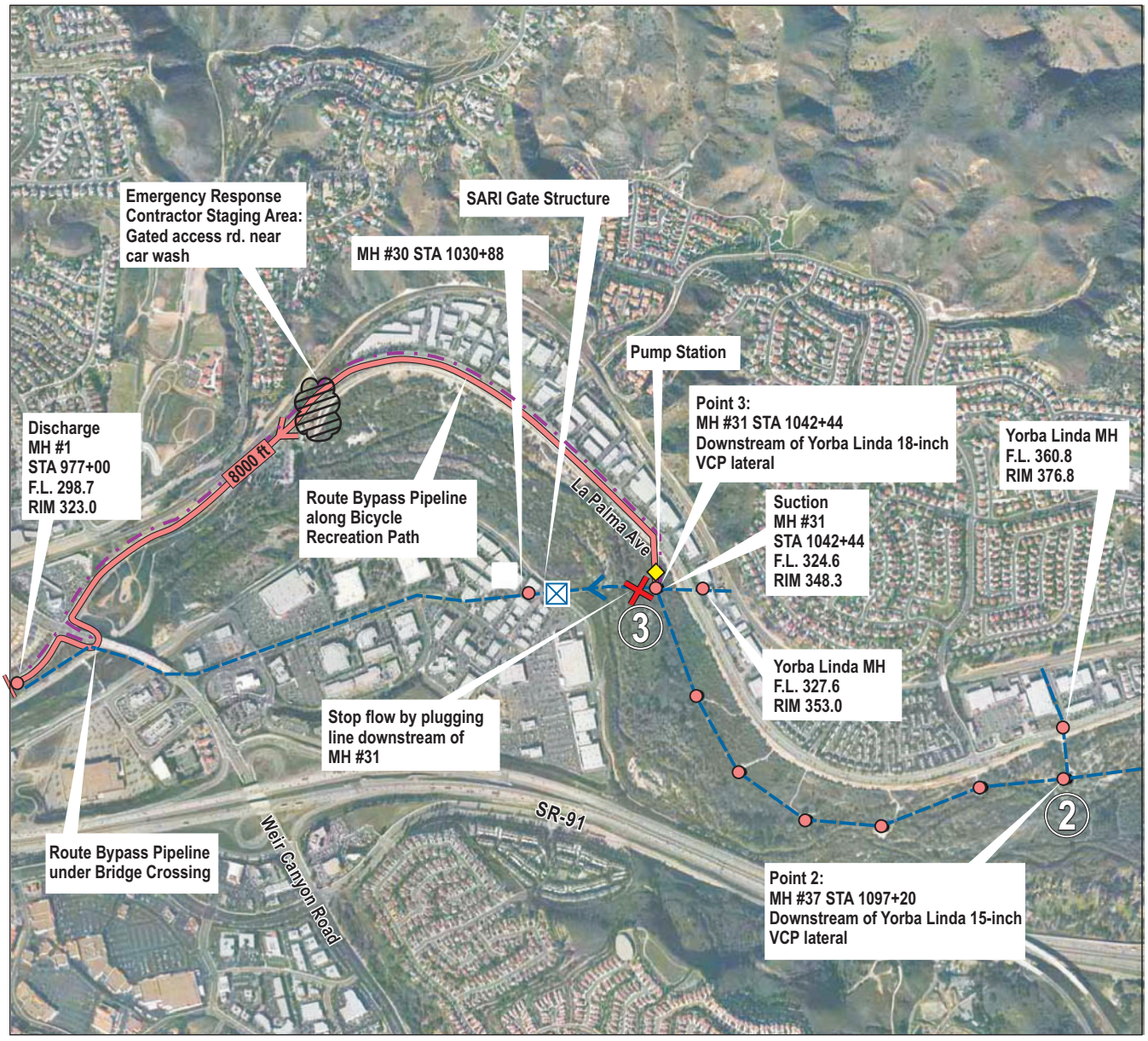
- Existing SARI Line Manhole
- Existing SARI Line and Flow Direction
- Proposed Bypass Pumping Route and Flow Direction
- Proposed Staging Area
- Proposed Location for Pump(s) and Appurtenances
- Flow Stopping Device

Notes:
Refer to ERP Table 1-7 for flow quantities and other bypass information

For guidelines on required traffic controls for construction and maintenance work zones, refer to chapter five of *Manual of Traffic Controls 1996* (Caltrans, Jan. 1996, Rev. 2)

Figure 1-6
Bypass Pumping Details for MH #7 Failure Scenario
SARI IV (Subject Reach)

CDM



NORTH

0 1,600' 3,200' 4,800'

Scale: 1 inch = 1600 feet

Notes:
Refer to ERP Table 1-7 for flow quantities and other information

For guidelines on required traffic controls for construction and maintenance work zones, refer to chapter five of *Manual of Traffic Controls 1996* (Caltrans, Jan. 1996, Rev. 2)

Legend

- Existing SARI Line Manhole
- Existing SARI Line and Flow Direction
- Proposed Bypass Pumping Route and Flow Direction
- Proposed Staging Area
- Proposed Location for Pump(s) and Appurtenances
- Flow Stopping Device
- Traffic/Pedestrian Barrier

CDM

Figure 1-7
Bypass Pumping Details for MH #31 Failure Scenario SARI IV (Subject Reach)

In this role, OCSD would contact pump and pipe supply vendors to procure the necessary bypass pumping equipment.

Based on availability at the time of failure and the general magnitude of the required bypass pumping system, contractors may be able to utilize small-diameter (6-inch) flexible PVC piping on the suction and discharge sides of the bypass pumping operation to save the setup time associated with laying rigid steel pipe. This flexible piping is typically rated up to 50 psi, and when assembled, is virtually watertight. Using a manifold, up to twelve 6-inch lines may be connected in parallel to a single 16-inch pump to achieve greater flow rates. A full bypass pumping system utilizing this type of piping may be assembled within one or two days (Charles King Co., 2003). Should flow rates or specific configurations require greater pipe diameters or piping distances, conventional steel piping may be supplied to the site and assembled. Depending on the complexity of the bypass pumping scenario, this process may take up to one or two weeks.

Under wet weather conditions and/or conditions removed from a source of electricity (e.g. generators), diesel pumps may be supplied over electric pumps. Certain diesel pumps, while providing an additional measure of safety over electric pumps in wet weather conditions, can also function as quietly when sound-attenuation devices are used. Under lower head conditions, one 16-inch, 500-hp diesel pump may provide up to 10,000 gpm of pumping capacity. Under greater required suction heads and/or pumping distances, multiple pumps may be used in series (i.e., booster pumps) to maintain the same flow rate. Standby/redundant pumps will be furnished to prevent system downtime.

Diesel pumps and diesel generators (to power electric pumps) will require refueling if operated for extended periods. Depending on the capabilities of the specific emergency response contractor(s), supplementary skid-mounted fuel tanks may be able to be delivered to the bypass pumping site (up to 750 gallons/tank) to allow continuous operation of the pumps for extended periods without refueling. Depending on applicable regulations, secondary containment structures (for example, polyurethane-coated fabric containment berms) may be required for these tanks. As an alternate source, tanker trucks may be able to be contracted to provide scheduled deliveries of fuel to the jobsite. Such deliveries may occur at any time of day, as the temporary pumping facilities shall be manned 24 hours per day, seven days per week.

Should the installation of temporary bypass pumping systems be required following a SARI pipeline failure at one of the two selected failure points described above in Section 1.5.1, Table 1-7 and Figures 1-5, 1-6 and 1-7 may be used in conjunction with each other to select specific pumps and temporary piping, and identify other equipment needs. Pipeline laying lengths from these possible points of failure to suggested downstream manholes are shown. Note that the bicycle recreation path (and possibly La Palma Avenue itself to the north) may be considered as convenient alignments for temporary pipelines.

1.5.2.2 Traffic Control

Traffic safety controls must be implemented during bypass pumping operations that occur on or near local roadways. Standard traffic control guidelines for construction and maintenance zones are provided in Chapter 5 of the Caltrans Traffic Manual (CTM), published by the State of California Department of Transportation (1996). The manual provides the standards for types of warning signs, lights, and other devices that may be placed on public highways and streets by persons performing work that may interfere with traffic movement (e.g. bypass pipelines crossing street intersections).

As stated in the CTM, the contractor or organization performing work on or next to a roadway must install the necessary devices to accommodate safe passage of the traveling public and to safeguard workers. Traffic control plans must be submitted before the onset of work and must be approved by the Engineer or public agency that has jurisdiction over the roadway.

The information provided in the CTM is not legal standard. It is provided for guidance and information. Engineering judgment must be used to apply the information to site specific conditions.

In addition to the guidelines found in the CTM, work performed within the subject reach as described in this ERP must also adhere to any additional local standards and specifications set forth by the City of Yorba Linda.

1.5.3 Upstream Permitted Dischargers

Upstream impacts could involve residential, commercial/industrial, and public agencies (e.g., SAWPA). Impact to residential users would likely be minimal, with impacts to industrial/commercial users and public agencies being the greatest, especially in the case of longer repair periods (Brown and Caldwell, 2002). These impacts would be primarily attributed to loss of service (i.e., loss of ability to discharge to the failed SARI Line).

1.5.3.1 Bypass Pumping Options

Under scenarios of multiple, complex, or difficult-to-access failures within the subject reach, permanent repairs could take up to a year (Brown and Caldwell, 2002). During this time, additional temporary bypass pumping systems would need to be implemented upstream by SAWPA, as would other contingency plans to minimize SARI pipeline flows and further damage and failures. These additional plans may include limitations on upstream desalter use, the identification and implementation of alternate treatment facilities, a limitation on new discharge permits or increased discharge flows for an existing permit, and/or a temporary halt to the construction of new connection laterals to the SARI pipeline, such as those for the Chino II Desalter and flow increases to existing laterals such as for the Perris Desalter.

A summary of SAWPA's specific emergency response protocols concerning the contingency plans described above is provided here in the following paragraphs to give emergency responders an overview of SAWPA's anticipated actions in the event of a SARI Line emergency. Note that the details of these contingency plans are provided in SAWPA's Emergency Response Plan for the SARI Line upstream of the Orange County border. Additional investigation is needed regarding SARI effluent/WWTP compatibility issues and other feasibility-of-implementation details for the bypass pumping alignments proposed below.

Upstream flows from SARI Reaches IV-A, IV-B/V, and IV-D/IV-E combine near Prado Dam to produce the flows measured at the Green River Metering Vault (west end of Reach IV). Flows entering these lines consist of six desalters, industrial dischargers, failsafe connections, domestic dischargers, and indirect dischargers. Of these, the six desalters constitute the majority of the effluent volume in the SARI Line. During a SARI emergency, SAWPA may temporarily suspend each desalter's discharge permit to reduce the total flow in the SARI Line. This practice will aid in minimizing the size and number of required bypass pumping operations both upstream of Prado Dam as well as in the subject reach. Note that periods of extended desalter shutoff in this case may only be able to be accomplished during the winter months, as in the summer months the desalters experience a high demand for potable water.

Based on data provided in the Upper SARI Planning Study (CDM, 2002) and subsequent updates provided by SAWPA, Table 1-6 provides estimated flow rates (including and excluding the six existing desalters) for the various SARI Reaches upstream of the subject reach.

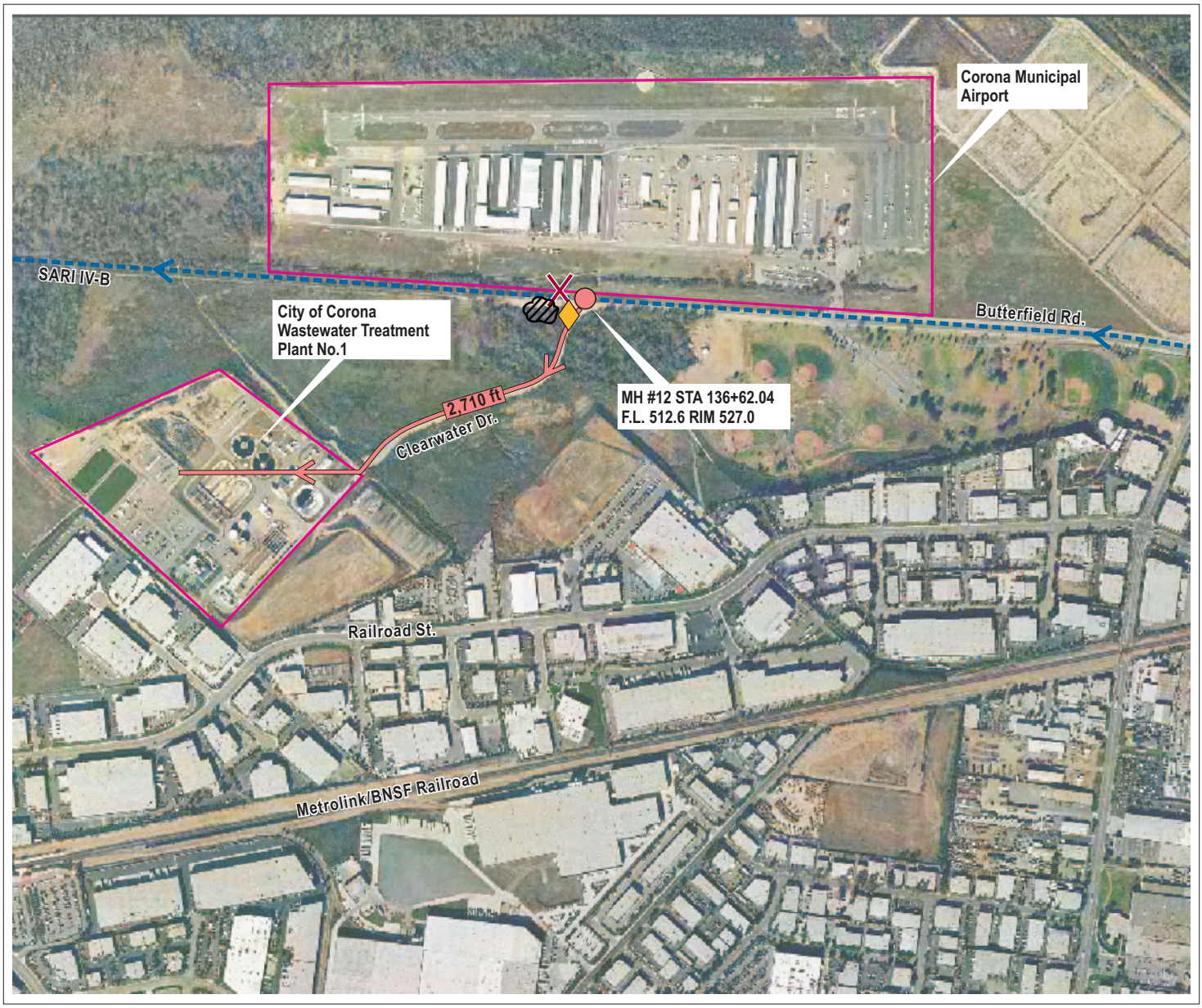
Table 1-6
SARI Flow Rates[1] (Reaches IV-A, IV-B/V, and IV-D/IV-E)

SARI Reach (SAWPA System)	Estimated Flow Rate (MGD)		Estimated Flow Rate Less Desalter Flows (MGD)	
	Average	High	Average	High
IV-A[2]	0.8	1.0	0.8	1.0
IV-B/V	2.1	3.2	0.1	0.2
IV-D/IV-E	5.9	9.8	4.1	6.4
TOTALS	***8.8***	***14.0***	***5.0***	***7.6***

[1] Flow data provided by SAWPA, October 2003

[2] Flows for Reach IV-A estimated from IEUA CBMWD Meter S-05 (Chino Basin)

Three key bypass pumping configurations to be implemented by SAWPA in an emergency have been identified through field investigations by SAWPA for SARI Reaches IV-A, IV-B/V, and IV-D/E. These configurations are shown in Figures 1-8 through 1-10. A summary of each of the proposed alignments is included in Table 1-7.



Legend

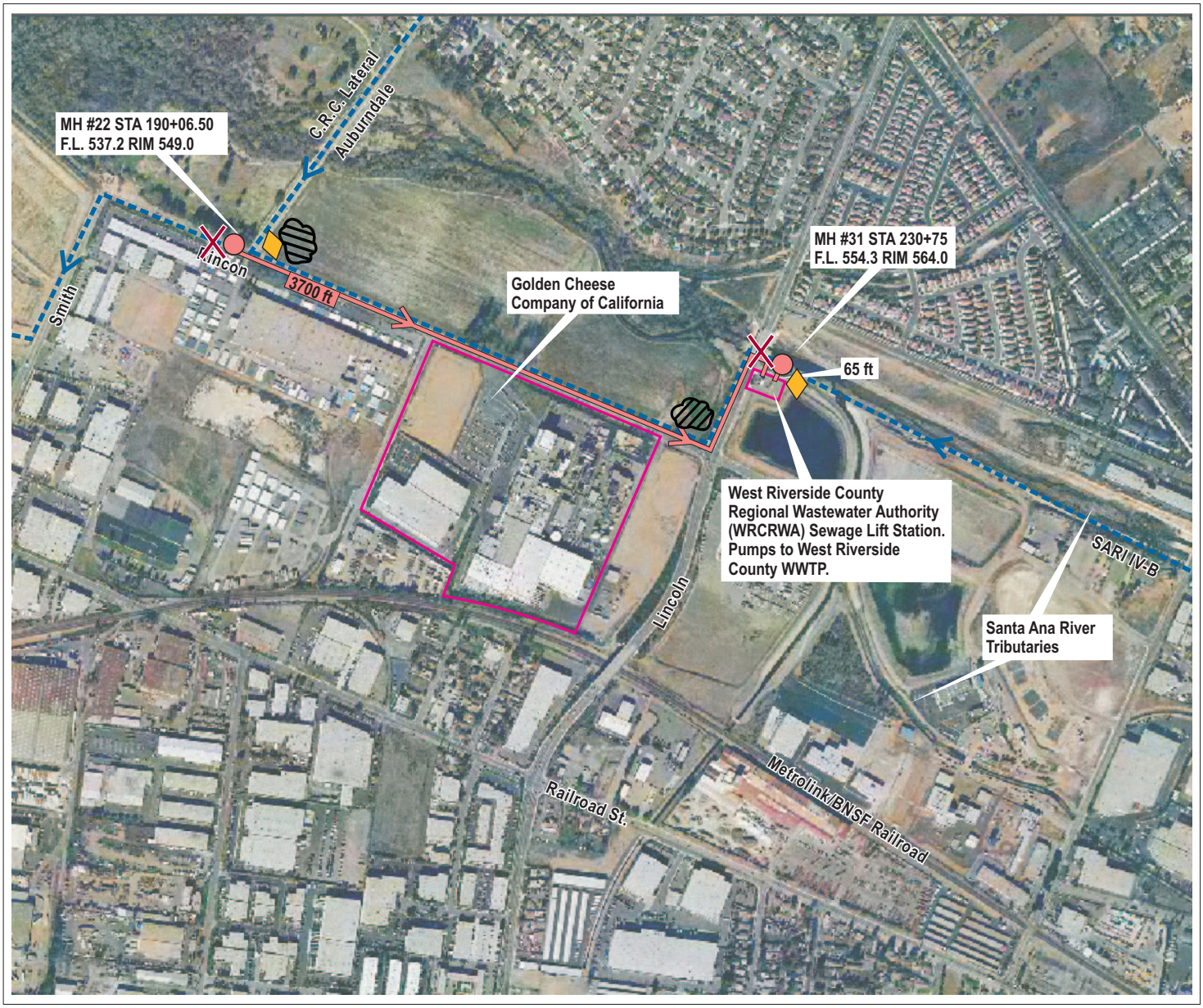
- Existing SARI Line Manhole
- Existing SARI Line and Flow Direction
- Proposed Bypass Pumping Route and Flow Direction
- Proposed Staging Area
- Proposed Location for Pump(s) and Appurtenances
- Flow Stopping Device

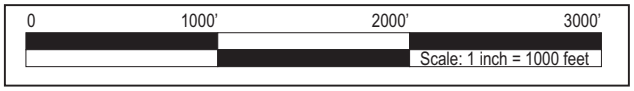
Notes:
Refer to ERP Table 1-7 for flow quantities and other information

For guidelines on required traffic controls for construction and maintenance work zones, refer to chapter five of *Manual of Traffic Controls 1996* (Caltrans, Jan. 1996, Rev. 2)

Figure 1-8
Proposed Bypass Pumping Route
Seismic Event/High Santa Ana River Flood Stage
SARI IV-B (Upstream of Prado Dam)

CDM





Legend

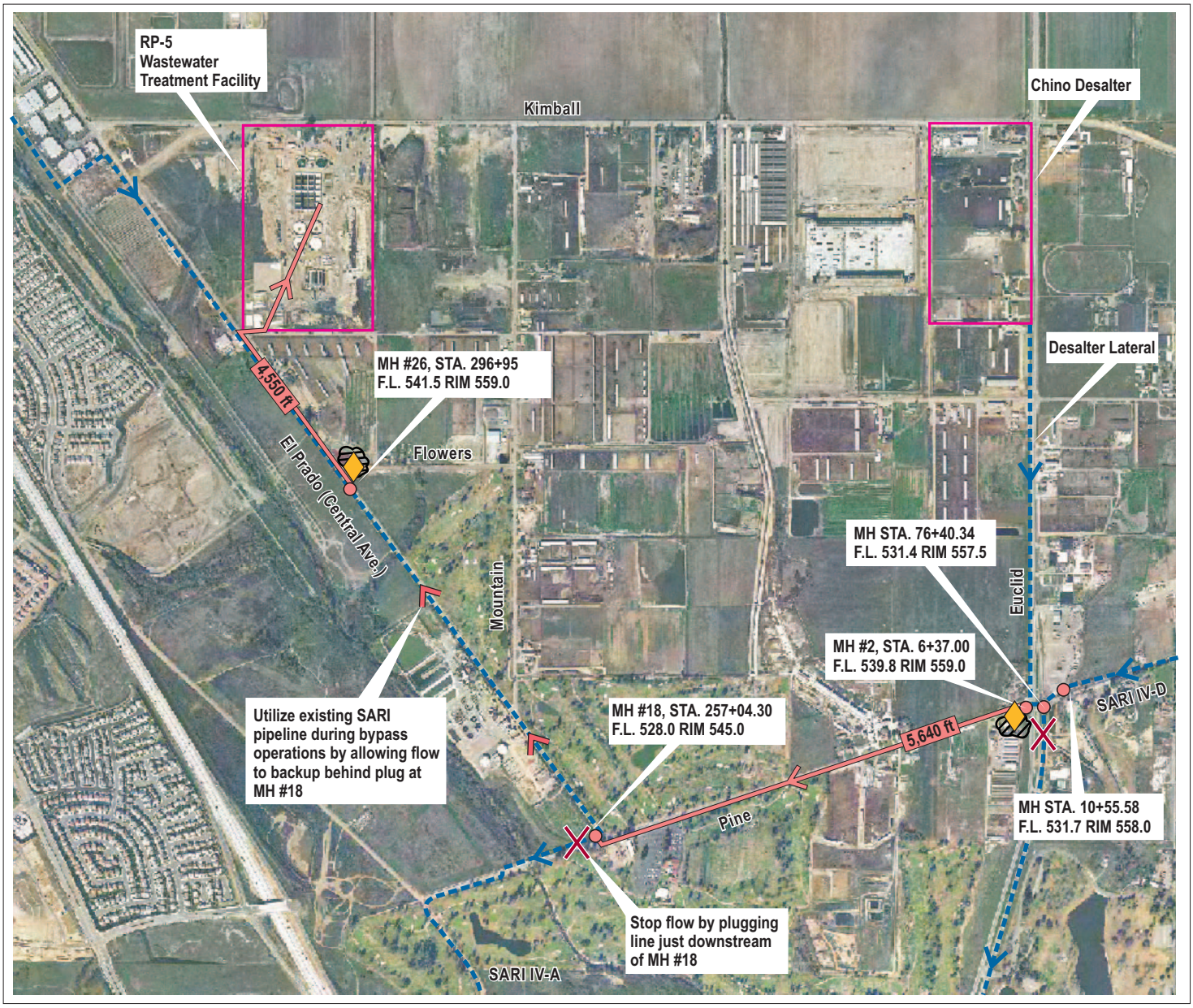
- Existing SARI Line Manhole
- Existing SARI Line and Flow Direction
- Proposed Bypass Pumping Route and Flow Direction
- Proposed Staging Area
- Proposed Location for Pump(s) and Appurtenances
- Flow Stopping Device

Notes:
Refer to ERP Table 1-7 for flow quantities and other information

For guidelines on required traffic controls for construction and maintenance work zones, refer to chapter five of *Manual of Traffic Controls 1996* (Caltrans, Jan. 1996, Rev. 2)

Figure 1-9
Proposed Bypass Pumping Route
Seismic Even/High Santa Ana River Flood Stage
SARI IV-B (Upstream of Prado Dam)

CDM



Legend

- Existing SARI Line Manhole
- Existing SARI Line and Flow Direction
- Proposed Bypass Pumping Route and Flow Direction
- Proposed Staging Area
- Proposed Location for Pump(s) and Appurtenances
- Flow Stopping Device

Notes:
Refer to ERP Table 1-7 for
flow quantities and other information

For guidelines on required traffic controls
for construction and maintenance
work zones, refer to chapter five of
Manual of Traffic Controls 1996
(Caltrans, Jan. 1996, Rev. 2)

Figure 1-10
Proposed Bypass Pumping Route
Seismic Even/High Santa Ana River Flood Stage
SARI IV-A and SARI IV-D (Upstream of Prado Dam)

CDM

Table 1-7
Summary of Potential Bypass Pumping Alignments (Subject Reach and Upstream)[1]

Applicable Events and Conditions[1]	Bypass Location (Suction)	Purpose and Description	Suction MH		Static Suction Head[2] (ft)	Discharge Elev.		Static Discharge Head[3] (ft)	Approx. Bypass Length (ft)	SARI Reach Capacity[4] (MGD, gpm)	Estimated Flows[5] (MGD, gpm)		Estimated Flows Less Upstream Desalters[6] (MGD, gpm)	
			Rim	Flow Line		Rim	Flow Line				Average	High[8]	Average	High[8]
All Conditions	Reach IV MH 14a Sta. 1237+20	Diverts Entire Subject Reach from MH 14a to MH 1	438.9	416.86	22.04	323.0 (MH 1, Sta. 977+00)	298.7 (MH 1, Sta. 977+00)	115.9	26560	29, 20137 (Reach IV)	8.1, 5639	15.5, 10757	4.3, 2986	9.0, 6250
Seismic or Low Flood Stage only	Reach IV MH 7 Sta. 1172+00	Diverts Reach IV flow around low cover area to downstream MH	396.0	368.6	27.4	386.4 (MH 4, Sta. 1146+35)	357.8 (MH 4, Sta. 1146+35)	-9.6	2550	29, 20137 (Reach IV)	8.1, 5639	15.5, 10757	4.3, 2986	9.0, 6250
Seismic or Low Flood Stage only	Reach IV MH 31 Sta. 1042+44	Diverts Reach IV flow around low cover area to downstream MH	346.8	324.4	22.4	323.0 (MH 1, Sta. 977+00)	298.7 (MH 1, Sta. 977+00)	-23.8	8000	29, 20137 (Reach IV)	8.9, 6181	16.6, 11528	5.1, 3542	10.1, 7014
All Conditions	Reach IV-A MH 26 Sta. 296+95	Diverts Reach IV-A flow to RP-5	559.0	541.5	17.5	566 (WWTP)		7.0	4550	18, 12499 (Reach IV-A)	0.8, 556	1.0, 694	0.8, 556	1.0, 694
All Conditions	Reach IV-D MH 2 Sta. 6+37	Diverts Reach IV-D/IV-E flows to IV-A and on to RP-5	559.0	539.8	19.2	545.0 (MH 18, Sta. 257+04)	528.0 (MH 18, Sta. 257+04)	-14.0	5640	20, 13888 (Reach IV-D)	5.9, 4097	9.8, 6806	4.1, 2847	6.4, 4444
Seismic or Low Flood Stage only	Reach IV-B MH 12 Sta. 136+62	Diverts Reach IV-B/V flow to Corona WWTP No. 1	527.0	512.6	14.4	536 (WWTP)		9.0	2710	26, 18054 (Reach IV-B)	3.9, 2708[7]	6.6, 4583[7]	1.9, 1319[7]	3.6, 2500[7]
All Conditions	Reach IV-B MH 22 Sta. 190+06	Diverts CRC Lateral flow to WRCRWA Lift Sta../WWTP	549.0	537.2	11.8	546 (Lift Sta.)		-3.0	3700	1.5, 1041 (CRC Lat.)	1.8, 1250 (CRC Lat. + Golden Cheese + Alcoa)	3.4, 2361 (CRC Lat. + Golden Cheese + Alcoa)	1.8, 1250 (CRC Lat. + Golden Cheese + Alcoa)	3.4, 2361 (CRC Lat. + Golden Cheese + Alcoa)
All Conditions	Reach IV-B MH 31 Sta. 230+75	Diverts Reach IV-B/V flow to WRCRWA Lift Sta../WWTP	564.0	554.3	9.7	546 (Lift Sta.)		-18.0	65	26, 18054 (Reach IV-B)	2.1, 1458[9]	3.2, 2222[9]	0.1, 69[9]	0.2, 139[9]

[1] See Figures 1-5 through 1-10 for proposed bypass piping alignments.

[2] 'Worst-case" static suction head measured from manhole flow line to rim. Actual suction head will likely be much less as flow backs up in SARI following plugging of line.

[3] Static discharge head calculated as Rim Elev. of Discharge minus Rim Elev. of Suction. Does not include dynamic losses. Total Dynamic Head (TDH) requirement must be calculated on a case-by-case basis by Emergency Response Contractor.

[4] Pipeline capacities as estimated by SAWPA personnel.

[5] Flow data current as of Oct. 2003. Flow data for Reach IV provided by OCSD (see Appendix B). Flow data for Reaches IV-A, IV-B/V, IV-D/E, and CRC Lateral provided by SAWPA.

[6] Flow data current as of Oct. 2003. Desalter flow data provided by SAWPA. Values in table assume 100% shutoff of desalter flows.

[7] Flows assume no upstream bypass operations (e.g. from MH #22 or MH #31) are in place. Flow, therefore, is calculated as IV-B/V + Golden Cheese + Alcoa + CRC Lateral flow.

[8] "High" flows calculated from recent flow data only. Actual peak flows may be greater than shown in table.

[9] Flow does not include Golden Cheese, Alcoa, or CRC Lateral contributions as these dischargers are downstream of this bypass pumping point.

Section 2
Pre-Event Planning and Update Cycle

The forms and checklists that comprise the pre-event planning and update cycle are intended to keep OCSD system operators and responders informed on the key aspects of planning for, identifying, and responding to an emergency situation on the SARI pipeline. These forms and checklists also assist system operators and management with conducting annual preventative maintenance and inspections. Activities such as these are vital to the longevity of the SARI pipeline, as they:

- Maintain access to the pipeline and associated structures
- Confirm the condition of the pipeline and associated structures
- Document changes in site conditions

Figure 2-1, Pre-Event Planning Flow Chart, highlights the pre-event planning cycle and suggests the general order of actions to be followed on an annual basis. Note that the activities in each of the individual boxes within this flow chart may be executed at any given time during the pre-event planning cycle. That is, the box order shown in the flow chart is a suggestion, and multiple activity boxes may be processed at once (in a 'parallel'-type architecture). As noted, the pre-event planning cycle should begin in May and continue through October, finishing before the onset of the rainy season.

The following information can be found in this section:

- Figure 2-1, Pre-Event Planning, which highlights the appropriate order of actions that should occur annually and indicates who is responsible for completing the action.
- Section 2.1 provides a description of each form and instructions for its use.
- Section 2.2 provides instructions for updating each form, including who is responsible for updating the form and when it should be updated.
- Section 2.3 provides copy of each form in the Pre-Event Planning and Update Cycle.

2.1 Form Descriptions and Instructions

Description of each form in the pre-event planning and update cycle and instructions for using them are provided below. Each form has been assigned a Responsible Division/Supervisor and a deadline for completion. Of the forms requiring action, the Responsible Division/Supervisor is responsible for ensuring that the activities on each form are completed in a timely manner. On all other forms, the Responsible Division/Supervisor is responsible for keeping track of the information listed on the form.

2.1.1 Form 2A – SARI Control Gate Procedures

The SARI control gate procedures provide operators with key instructions on how to anticipate/identify a flow emergency on the SARI pipeline, and how to operate the SARI Control Gate accordingly. These procedures should be followed on a continual basis (i.e. daily) to ensure that potential breaks in the SARI line will be immediately identified and appropriately responded to as indicated in the Pre-Event Planning and Emergency Response Flow Chart. If the control gate procedures do not indicate an emergency situation, then operators and responders should continue to follow the annual planning and update cycle sequence.

	Form	Responsible Division/ Employee	Completion Schedule	Final to CMMS	Comments
Perform Continuous SARI Flow Monitoring Using SARI Control Gate Procedures	*2A*	*520*			
May					
Review and update **Contractors and Suppliers List**	*3E*	*420*			
April					
Review **Training Requirements Checklist** and commence required training sessions	*2B*	*420*			
May					
Review **Annual System Updates Checklist** and execute required actions based on CMMS schedule	*2C*	*420 and 750*			
May					
Document all inspection and communications activities using **MH Inspection Report and Discrepancy Sheets**	*2D, 2E, 2F*	*420*			
Jun/Jul					
Review and update anticipated **Equipment Requirements** for emergency	*2G*	*420 and 230*			
Aug					
Review and update **Communications and Response Protocol**	*3A*	*620 and 130*			
Sept					
Finalize ERP document and distribute to all planholders		*410*			
Oct					

CDM

Figure 2-1
Pre-Event Planning Flow Chart

2.1.2 Form 2B – Training Requirements

This form provides a checklist of training items that should be completed each year by system operators and responders prior to the start of the rainy season. The list has been separated into two categories to indicate which training courses will occur in a classroom setting and which courses will take place in the field.

2.1.3 Form 2C – Annual SARI Related Systems Update Checklist

This document provides a running checklist containing maintenance activities, information, and key documents and systems requiring updating on an annual basis. This checklist provides a way for system operators and responders to track their progress concerning the review and update of key OCSD documents and systems related to a SARI pipeline emergency.

2.1.4 Form 2D – Manhole Inspection Report

This form is to be used for both annual inspections and emergency event inspections. It provides system operators and responders with a means to rate the condition of a manhole by evaluating the structural integrity, the coating, and the cover. Form to be filled out by Div. 420 personnel.

2.1.5 Form 2E – Field Discrepancy Sheet for Manholes - Line Segments - Laterals

This form is to be used for both annual inspections and emergency event inspections. It allows system operators and responders to evaluate and document discrepancies regarding additions or deletions from SARI line facilities. This form should be used in conjunction with Form 2D, Manhole Inspection Report. Form to be filled out by Emergency Response Contractor.

2.1.6 Form 2F – CCTV Contractor Discrepancy Sheet for Manholes - Line Segments - Laterals

This form is to be used for both annual inspections and emergency event inspections. It allows CCTV contractors to evaluate and document discrepancies regarding additions or deletions from SARI line facilities. This form should be used in conjunction with Form 2D, Manhole Inspection Report. Form to be filled out by Emergency Response Contractor.

2.1.7 Form 2G– Equipment/Material Requirements

This document provides system operators and responders with a list of possible equipment requirements that may be realized during a SARI pipeline emergency. Form to be maintained by Div. 750 personnel.

2.2 Form Updates

As outlined in Figure 2-1, annual updates of each form are an integral part of maintaining an effective emergency response plan. As such, a Responsible Division/Supervisor has been assigned to update each form. Instructions for updating each form are summarized below in Table 2-1, which also provides the original source of the form, the Responsible Division/Supervisor, and the date when the form should be updated. This information is provided as quick reference to aid the Responsible Division/Supervisor responsible for updating forms, and is not intended to replace Form 2C, Annual SARI Related Systems Update Checklist.

When updating each form, the Responsible Division/Supervisor responsible for the update should contact the Responsible Division/Supervisor responsible for using the form to determine if the usability/format of each form could be improved upon. Any changes deemed necessary by the user of the form should be incorporated into the updated version. Should any changes be proposed concerning asset number or revision schedule, the Responsible Division/Supervisor shall coordinate with the CMMS.

The Computer Maintenance Management System (CMMS) is a stand alone asset management software system used for cataloging physical assets, scheduling equipment for maintenance, and work history retention owned or managed by OCSD. Maintenance personnel are able to maintain predictive, preventative and corrective work-order history for all assets with this application. Work-order history includes action taken, labor, equipment, and material used with related cost associated to the action taken also condition assessment logs for the asset. This system can also be linked to other software products for reporting purposes; stored data can be retrieved, analyzed, and reformatted to produce reports related to both facility and civil assets.

Table 2-1
Form Update Instructions

Form	Reference	Responsible Division	Instructions for Updating Form	Date to be Updated[1]
2A SARI Control gate Procedures	OCSD SARI Control Gate Procedures; Revised by OCSD 7/2003	830 and 420	Refer, as appropriate, to most recent version of OCSD SARI Control Gate Procedures	TBD
2B Training Requirements	Created by CDM 9/2003	520	Review Form 2B from previous year; add relevant training courses as deemed necessary	TBD
2C Annual SARI Related Systems Update Checklist	Created by CDM 9/2003	420 and CMMS Support Group	Review Form 2C, add relevant information/activities/reports/documents/forms to be updated as deemed necessary	TBD
2D Manhole Inspection Report	OCSD, Revised 04/03/03	420 and 750	Refer, as appropriate, to most recent version of OCSD Manhole Inspection Report	TBD
2E Field Discrepancy Sheet for Manholes - Line Segments - Laterals	OCSD, Revised 05/27/03	420	Refer, as appropriate, to most recent version of OCSD Discrepancy Sheet for Manholes, Line Segments, and Laterals	TBD
2F CCTV Contractor Discrepancy Sheet for Manholes - Line Segments - Laterals	OCSD, Revised 05/27/03	420	Refer, as appropriate, to most recent version of OCSD CCTV Contractor Discrepancy Sheet for Manholes, Line Segments, and Laterals	TBD
2G Equipment/Material Requirements	Created by CDM 9/2003.	420 and 750	Review Form 2G from previous year; add relevant equipment requirements as deemed necessary	TBD

[1] Must be coordinated with Maintenance Plan as entered into CMMS.

2.3 Pre-Event Planning and Update Cycle Forms

Contents
Section 2
Forms

Form 2A
SARI CONTROL GATE PROCEDURES

Form 2A SARI Control Gate Procedures **Prado Dam Flows & District Response Thresholds**			
Responsible Division: 520		**Responsible Supervisor (Name & Position):**	
SAR d/c Rate Cubic Feet Per Second (cfs)	**Control Center Div. 830 Actions**	**Collections O&M Div. 420 Actions**	**Engineering Div. 750/760 Actions**
Seismic Event	▪ **Normal operating procedures.** ▪ **Monitor SARI Gate and Green River metering station levels.** ▪ **Watch for and respond to alarms.**	▪ **During next business day, Collections O&M staff to inspect the SARI gate and accessible manholes.** ▪ **Verify integrity of visible manholes.^** ▪ **Notify Control Center of findings and if any problems are found. Including turbid or muddy water in the well. Use float measure to record the flow height.**	▪ **Normal operating procedures.**
200-499 **(130 – 320 MGD)** **"BLUE"** *Normal Alarm*	▪ **Normal operating procedures.** ▪ **Monitor SARI Gate and Green River metering station levels.** ▪ **Watch for and respond to alarms.**	▪ **Normal operating procedures including regular preventative maintenance schedule.**	▪ **Normal operating procedures.**
500-999 **(320-650 MGD)** **"YELLOW"** *Normal Alarm*	▪ **Army Corps notifies Control Center (CC).** ▪ **CC fills out notification form (Control Center Reports/SARI Procedures & Forms directory) and emails out to Spill Notification w/o PNA Outlook distribution list.** ▪ **CC monitors SARI Gate and Green River metering station levels via CRISP system.**	▪ **Normal operating procedures including regular preventative maintenance schedule.**	▪ **Normal operating procedures.**

Modified by CDM for SARI ERP on November 30, 2003
(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Form 2A SARI Control Gate Procedures Prado Dam Flows & District Response Thresholds			
1,000-4,999 **(up to 3,230 MGD)** **"ORANGE"** *Normal to High Alarm*	▪ **Army Corps notifies Control Center.** ▪ **Dispatch Collections to inspect SARI Gate the next business day.** ▪ **Control Center fills out notification form (Control Center Reports/SARI Procedures & Forms directory) and emails out to Spill Notification w/o PNA Outlook and SAWPA Staff distribution lists.** ▪ **CC (at least once per hour) monitors SARI Gate and Green River metering station levels via CRISP system** ▪ **Send notification to Spill Notification if Collections finds any problems.** ▪ **Continue to track SAR flow levels on the Army Corps website. http://www.spl.usace.army.mil/resreq/htdocs/telemetry.html**	▪ **During next business day, Collections O&M staff to inspect the SARI gate and accessible manholes.** ▪ **Verify integrity of visible manholes.^** ▪ **Notify Control Center of findings and if any problems are found. Including turbid or muddy water in the well. Use float measure to record the flow height.**	▪ **Normal operating procedures.**
5,000-9,999 **(up to 6,500 MGD)** **"PINK"** *High to High High Alarm*	▪ **Army Corps notifies Control Center of the intent to increase release to 5,000 cfs. Ask the Corps if they can hold back flow until Collections staff can respond to the scene and change the switch from local to remote.** ▪ **Dispatch Collections to inspect SARI Gate.** ▪ **Control Center fills out notification form (Control Center Reports/SARI Procedures & Forms directory) and emails out to Spill Notification w PNA Outlook and SAWPA Staff distribution list.** ▪ **CC closely (at least three times per hour) monitors SARI Gate and Green River metering station levels via CRISP system.** ▪ **Send notifications and updates to Spill Notification and SAWPA staff if Collections finds any problems.** ▪ **Do not close the gate until a break in the line is confirmed by Collections staff.** ▪ **Continue to track SAR flow levels on the Army Corps website http://www.spl.usace.army.mil/resreq/htdocs/telemetry.html**	▪ **Immediately dispatched Collections O&M staff to inspect the SARI gate and accessible manholes.** ▪ **Fill out inspection form.** ▪ **Verify integrity of visible manholes.^** ▪ **Notify Control Center if any problems are found. Including turbid and muddy water in the well. Use float measure to record the flow height. Call Control Center to verify all flow levels.** ▪ **Be prepared to flip the switch from local to remote. (Must have Operations Director or Designee approval first).** ▪ **If possible go up to Green River and verify the amount of flow passing through the flume. Call Control Center to verify the flow amount.**	▪ **Engineering project manager will have surveyor inspect critical points for significant issues or changes since last inspection, once the flow has subsided. Issues will be reported back to Control Center by Engineering along with a plan and schedule for further work.**

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Form 2A SARI Control Gate Procedures **Prado Dam Flows & District Response Thresholds**			
>10,000 (>6,500 MGD) **"RED"** *High High Alarm*	▪ **Army Corps notifies Control Center.** ▪ **Control Center fills out notification form (Control Center Reports/SARI Procedures & Forms directory) and emails out to Spill Notification w PNA Outlook and SAWPA Staff distribution list.** ▪ **CC extremely closely (at least four times per hour) monitors SARI Gate and Green River metering station levels via CRISP system.** ▪ **Activate Incident Command System (ICS)** ▪ **Continue to track SAR flow levels on the Army Corps website http://www.spl.usacc.army.mil/resreq/htdocs/telemetry.htmg**	▪ **Collections O&M staff are immediately dispatched to the SARI gate and critical scour points to verify integrity.** ▪ **Fill out inspection form.** ▪ **Verify integrity of visible manholes.^** ▪ **Notify Control Center if any problems are found (turbidity, mud in well). Use the float measure to record the flow height. Call Control Center to verify all flow levels.** ▪ **Be prepared to flip the switch from local to remote. (Must have Operations Director or Designee approval first).** ▪ **If possible go up to Green River and verify the amount of flow passing through the flume. Call Control Center to verify the flow amount.**	▪ **Engineering project manager will have surveyor inspect critical points for significant issues or changes since last inspection, once the flow has subsided. Issues will be reported back to Control Center by Engineering along with a plan and schedule for further work.**

There are THREE specific questions that the CC must have answered by the field staff:

1. Is the water in the SARI Gate well turbid (white caps, muddy)?
2. Has the flow in the SARI Gate well reached the shelf? Has it covered the shelf?
3. Are the manhole covers immediately upstream of the SARI Gate still in tact? Have they popped off? (MH #31, MH#32, MH#36)

* As measured by gage data on website. Army Corps reports that this value is higher that what they discharge, however, it does not include additional downstream inflows. Therefore, the District will conservatively use this figure in basing its responses.

^ Verifying integrity includes but is not limited to: broken straps on the manhole, missing covers, overflows, broken concrete casing, manhole station totally washed out, and anything else out of the ordinary.

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Alarms & Evaluating Potential Breaks in SARI Line

A. Operational Strategy

1. The SARI control gate shall remain in the Local position unless directed by the Operations Director or his designee to have the setting changed. Generally, this decision is made as part of the District's High Flow Emergency Response Plan.

2. The SARI control gate shall be closed only under a failure of the SARI line large enough to result in a large inflow of sand and debris from the Santa Ana River into the sewer that would damage the Plants. Such a failure is possible when flows exceeding 5000 cfs are discharged from Prado Dam due to a major storm event(s).

3. Do not close the gate under any other circumstances without direct authorization from the Operations Director or ICS commander except for routine maintenance for a short time (about 5 to 10 minutes).

B. Division 830 Operating Procedure: Normal Conditions/Seismic Events

1. Control Center staff shall remotely monitor the flow and water depth of the SARI control gate structure on a continuous basis (normal flow is 10 to 15 inches).

2. Control Center staff shall:

   a) Monitor its flow and water depth.

   b) Compare the Green River metering station and the SARI control gate flow values to ensure the values are not significantly different.

Note: An obvious indication of a problem would be if Green River were flowing at the expected average daily flow and the SARI control gate was suddenly flowing full (i.e. sudden increasing trend without a matching trend at Green River). This worst-case scenario could mean that the SARI line is broken between the two monitoring points.

   c) If there is a *significant* discrepancy between the two values (Green River and SARI), Control Center staff shall immediately notify:

      i. Operations Supervisor on duty

      ii. Collection Facilities Manager and Supervisor, who will dispatch Collections personnel to perform visual inspections of the SARI control gate and the Green River metering structures per the Division 420 Operating Procedure section of this procedure.

      iii. During off-hours, Control Center staff shall dispatch the Collection O&M standby personnel.

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C. Division 830 Operating Procedure: HIGH Alarm

1. If the Control Center panel reads a HIGH alarm (25 inches), Control Center staff shall immediately notify the following:

   a) Operations Supervisor on duty

   b) Collection Facilities Manager and Supervisor, who will dispatch Collections personnel to perform visual inspections of the SARI control gate and the Green River metering structures per the Division 420 Operating Procedure section of this procedure.

   c) During off-hours, Control Center staff shall dispatch the Collection O&M standby personnel.

2. Control Center staff shall begin the event investigation and log investigation actions on the SARI Control Gate Problem Report (Attachment A), making as many detailed notes of the investigation steps as possible.

3. Control Center staff shall call the Army Corps of Engineers at (213) 452-3532 to ask the following. Record responses on the SARI Control Gate Problem Report.

   a) What is the flood stage of Prado Dam?

   b) Is there any discharge from Prado Dam to the Santa Ana River? If so, how much (in cfs)?

   c) Is the Army Corps aware of pipeline breaks or sewage spills in the Santa Ana River?

   If a live person cannot be reached at this number leave a voicemail stating the current situation. Hang up and call **(213) 452-3623** and leave a similar voice message w/the information you are trying to acquire. This number automatically pages designated Corps staff 24-hours a day and they will return your call.

4. Control Center staff shall log onto the Army Corps of Engineers' website to monitor and report the river stage and flow data by performing Steps A and C OR Steps B and C below. See Attachment B for examples of the pages. If unable to log onto the Internet, go to Step 6.

   a) Go directly to http://www.spl.usace.army.mil/resreg/htdocs/telemetry.html and click on Latest Data in the second paragraph, OR

   b) Log on as follows:

      i. Open Internet Explorer and go to http://www.spl.usace.army.mil/.

ii. Click on Los Angeles District Reservoir Regulation Page (the fourth box).

iii. Click on **COE & Other Agency Telemetry Data** (the third bullet).

iv. Click on Latest Data in the second paragraph.

c) Run the gage data report as follows:

i. Select SAR7, Santa Ana River at Highway 71 for Gage to View.

ii. Select 24 or a more appropriate number as the Number of Hours to View.

iii. Select Line Graph, which is the easiest Output to read.

5. If unable to log onto the Internet, Control Center staff shall call the Army Corps of Engineers directly at (213) 452-3532 or via their paging system at (213) 452-3623 and request flow data for Santa Ana River at Highway 71 for the last 24 hours.

6. Control Center staff shall print and attach any information obtained from the website or record any information obtained directly from the Army Corps of Engineers to the SARI Control Gate Problem Report.

7. If the HIGH HIGH alarm (40 inches) comes on after the HIGH alarm, Control Center staff shall immediately notify the Operations Supervisor on duty and go to the HIGH HIGH Alarm section of this procedure.

D. Division 830 Operating Procedure: HIGH HIGH Alarm

1. If the Control Center panel reads a HIGH HIGH alarm (40 inches), Control Center staff shall immediately notify the following

a) The Operations Supervisor on duty

b) Collection Facilities Manager and Supervisor, who will dispatch Collections personnel to the SARI control gate and the Green River metering sites to perform visual inspections per the Division 420 Operating Procedure section of this procedure.

c) During off-hours, Control Center staff shall dispatch the Collection O&M standby personnel.

2. If a HIGH alarm investigation was performed by Control Center staff (detailed in the High Alarm section), the Operations Supervisor shall review that information.

3. IF the following conditions exist:

Note: At a minimum, Conditions D and E below are required before ordering the gate closed.

a) The Army Corps is discharging large flows (over 5,000 cfs) from Prado Dam; AND

b) SARI control gate water depth and/or flow have suddenly and dramatically increased.

c) The flow at the Green River metering station and two City of Yorba Linda connections has remained considerably constant compared to SARI.

d) If possible, Collections has determined through visual inspection that the SARI line is broken (refer to Division 420 Emergency Operating Procedure section).

THEN, the Operations Supervisor shall close the SARI control gate (either remotely or by instructing Collections personnel to close the gate locally) ***as soon as possible to protect the downstream SARI line and the treatment plants.*** The Operations Supervisor should request that the Incident Command Center be activated to help with the decision of closing the gate and/or assist with necessary follow up. (Refer to Section 2, Page 2-1 for Notifications section.)

4. After the gate has been closed, the Operations Supervisor or designee shall make the necessary notifications outlined in the Notifications section **as *quickly as possible*** so that the agencies may implement their respective emergency procedures.

5. After the gate has been closed and IF Collections could not confirm the break or Operations relied *only* on telemetry, the Operations Supervisor shall:

a) Ask Collections for such information as:

- Status of flow at the SARI control gate, and the Green River metering structures (to verify telemetry).
- Color and turbidity of water. Clear water with low turbidity means no break, but highly turbid, colored water may indicate a break
- Evidence of sinkholes and whirlpools at the riverbed
- Status of flow in the upstream manhole and/or the Green River metering structures if manhole is under water

b) Pass on this information to District staff and others on the internal notification list shown in Form 3A of this ERP. It is recommended to have the Incident Command Center activated.

6. **IF** Collections reports:

a) Green River metering structure water level has remained constant after the gate is closed, then the pipe probably is broken (closing the gate is the right decision).

b) Green River metering structure water level starts to consistently increase after the gate is closed, then the pipe is probably not broken and may need to be reopened.

Note that the Green River meter structure may not be accessible when dam releases are above 5,000 cfs.

E. Division 420 Operating Procedure: HIGH and HIGH HIGH Alarm

Note: Due to the severity of the decision to close the SARI control gate, the Control Center will need the following information in determining whether to close the gate. To confirm a line break, the following conditions must exist:

- High flow at the SARI control gate
- Water in pipe at SARI control gate is colored and turbid instead of clear with the normal low turbidity
- Low flow in the upstream manhole and/or Green River metering structure

1. Maintain communications with Control Center while performing the following.
2. At the SARI control gate structure, open the access hatch and visually inspect the flow level. The control panel contains a spotlight powered by batteries or electricity, if necessary. The panel is also equipped with a ½" drive ratchet, a ¾" socket for the inspection door, and a wheel to operate the gate manually if necessary. These tools are here for your use.
3. Contact Control Center and compare gauge reading to HIGH and/or HIGH HIGH alarm readings (normal flow is 17 to 20 inches, HIGH alarm is 25 inches, and HIGH HIGH alarm is 40 inches).
4. If there is high flow at the SARI control gate, perform the following for indications of a break in the pipe:

a) Inspect the pipe where it crosses the riverbed to observe abnormalities such as sinkholes and whirlpools, which may indicate a break in the pipe. Sinkholes and whirlpools may also be caused by large debris such as trees in the river and does NOT necessarily confirm a line break.

b) Using the SARI Site Location Map, go upstream to manhole 1089 + 00.00 (if it is not covered by water) or to the Green River metering structure and compare the flow level relative to the level at the SARI control gate.

Note: There should be a relative balance between the flow level and velocity at the SARI control gate and flow level and velocity at the manhole. The flow and velocity may vary slightly between SARI control gate and the Green River metering structure due to the addition of downstream flows (two City of Yorba Linda connections).

c) If flow in the manhole is low and/or flow is backing up the pipe, contact Control Center.

5. If flow in the manhole is high (relative to the SARI control gate flow), have Control Center check flow at Green River Metering station (if online).

6. If Control Center confirms a significantly lower flow at the Green River metering structure, go there to confirm the telemetry reading.

7. Continue to monitor the Green River metering structure water level. If the SARI control gate is closed, report to Control Center staff whether the level is remaining constant or consistently increasing. The gate may need to be re-opened if the Green River metering structure water levels begin to significantly increase.

8. Remain onsite and wait for further instructions from the Operations Supervisor or Incident Commander.

References

Operation and Maintenance Manual for Santa Ana River Interceptor Control Gate Structure, Orange County Sanitation District, July 1999.

SARI Site Location Map.

Attachments

Attachment A: SARI Control Gate Problem Report – Sample Form

Attachment B: Army Corps of Engineers Website Navigation for Prado Dam Information

Attachment C: Float Measurement Directions for Flow Levels in the SARI Line near the SARI Gate

Attachment A SARI Control Gate Problem Report – Sample Form

Page 1 of 2

Orange County Sanitation District
SARI GATE PROBLEM & NOTIFICATION REPORT

Original: Control Center c: Nick Arhontes, Tom Blanda

References:

1. Emergency 24-Hour Contact Number for Army Corps of Engineers – 213-452-3532 (e.g. if OCSD has a problem with the SARI line and we need them to reduce flow to the Santa Ana River).
2. Army Corp Website with Gaging Information (check Latest Data at SAR7 and PRDO): http://www.spl.usace.army.mil/resreg/htdocs/telemetry.html
3. SARI Procedures (January 2001): Control Center Reports\SARI Gate Procedures and Forms\01-01 SARI Gate Procedures.doc
4. Checking Levels in Prado Dam (current release status and to help predict future releases): Control Center Reports\SARI Gate Procedures and Forms\Checking Levels At Prado Dam.doc

NOTIFICATION

Contact Date / Time: _

Contact Name: _ Agency: _ Phone: _

Dam Release Information:

Rate of Discharge: (>500 cfs requires visual inspection of the line) _ cfs

Est. Start Date / Time: _ Est. Completion Date / Time: _

Misc. Info: _

OCSD Staff Notified: _

Action Taken: (e.g. Collection staff will be responding for visual inspection – give date) _

ALARM(S)

Alarm Date/Time: _ SERVICE REQUEST # _

Problem: HIGH ALARM ☐ Time: _ HIGH HIGH ALARM ☐ Time: _

Time	***SARI Gate Water Level***		***Green River Metering Station Level:***		**Prado Dam Discharge (cfs)**
	Level (inches)	**MGD**	**Level (inches)**	**MGD**	

Detailed Description: _

Action Taken (include times, responding personnel, and equipment):_

Report Received By: _ Date/Time: _

Ops. Supervisor: _ Date/Time: _

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Updated: 12/30/2002 9:34 AM

Page 1 of 2

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11/30/03
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Orange County Sanitation District
SARI GATE PROBLEM & NOTIFICATION REPORT

NOTIFICATIONS – if the SARI Gate will be closed because the SARI trunkline is believed to be broken, the following notifications need to be made ***as quickly as possible.***

External

Date/ Time of Notification	*Order of Priority & Responsibility*	*Notification Contact*	*Business Hours*	*After-Hours*
	1 – Divert flows away from recharge basins	**OCWD** (Orange County Water District)	**(714) 378-3200** – the answering service will notify appropriate parties after-hours	
	2 – Close beaches as necessary	**OCHCA** (Orange County Health Care Agency)	**(714) 667-3600**	**See Control 1**
	3 – Local required notification	**Control 1**	**(714) 628-7008**	
	4 – State required notification	**OES**	**(800) 852-7550**	
	5 - Reduce flows to SARI line	**SAWPA** (Santa Ana Watershed Project Authority)	**(909) 785-5411 or Pgr: (909) 320-9791** 1. Operations Superintendent ext. 44 2. Eldon Horst ext. 42	
	6 – In charge of regional surface waters	**RWQCB** (Regional Water Quality Control Board)	**(909) 782-4130**	**See OES**
	7 - In charge of local flood control system	**PFRD** (County of Orange Public Facilities and Resources Department)	**(714) 567-6363**	**See Control 1**
	8 - In charge of state flood control system	**Army Corps of Engineers** (Emergency Management Branch Operations)	**(213) 452-3532**	
	9 - In charge of wetlands	**California Department of Fish and Game**	**(916) 445-0411 or (888) 334-2258**	
	10 - 3rd Party Administrator for any damages to public/private property	**Carl Warren & Company**	**(800) 572-6900** Ed Garbo (714) 740-7999, x123	(714) 283-8769 Ed Garbo (Home) (714) 549-0703 Joan Week (Home)

Internal

Time of Notification	**Name (listed in order of priority)**	**Division / Agency**	**Pager / Cell Number**
	Spill Notification	Outlook Distribution List	-
	Bob Ooten	810	264-6375
	Public Information Officer	130	
	Jim Matte	530	219-9511 / 305-5933
	Doug Cook	840	237-8042 / 342-9384
	Nick Arhontes	420	749-8953
	John Finias	830	216-4243 / 342-7082
	Tom Blanda	420	806-2902 / 269-6309
	Chandra Johannesson	620	201-2297 / 343-0333

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Updated: 12/30/2002 9:34 AM

Page 2 of 2

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11/30/03
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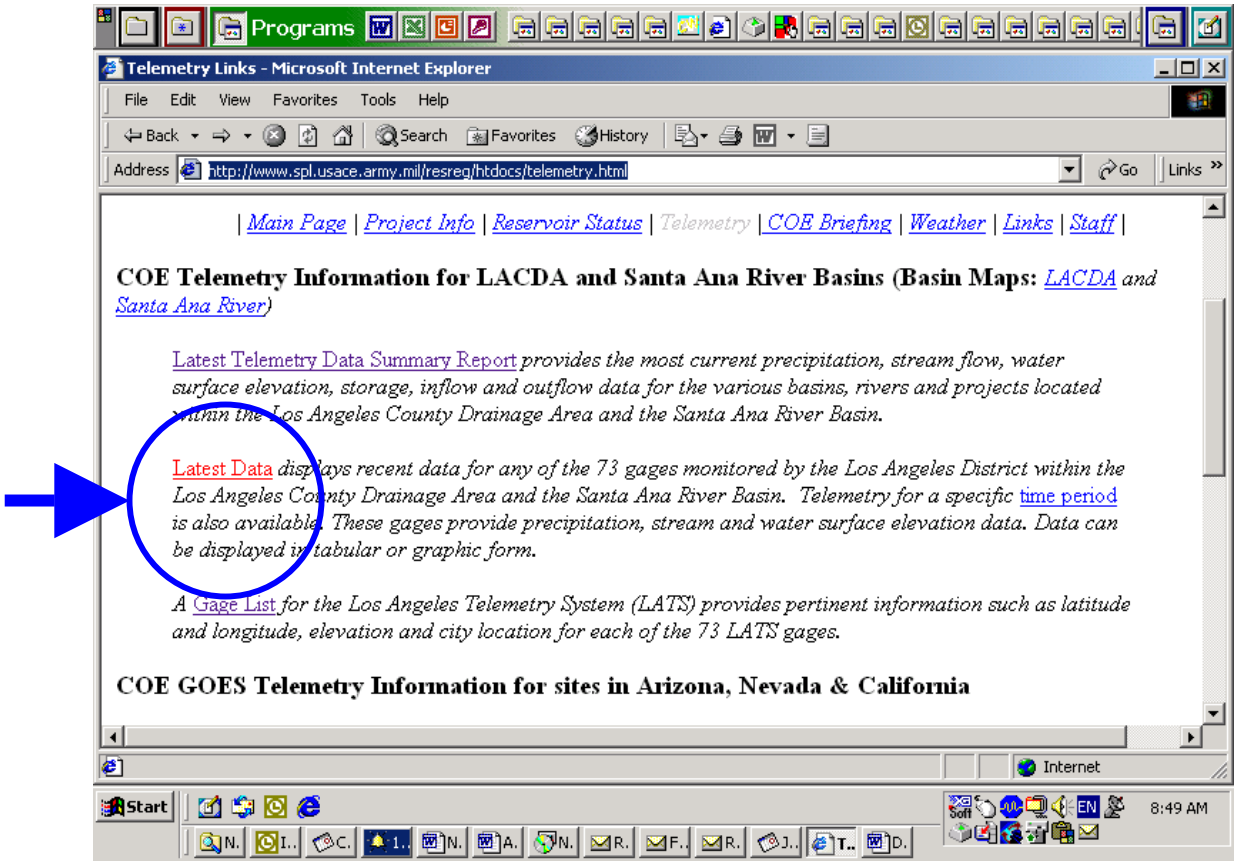
Attachment B
Army Corps of Engineers Website Navigation for
Prado Dam Discharge Information

1. For checking levels being released from the Dam to the Santa Ana River, open Internet Explorer and go to: http://www.spl.usace.army.mil/resreg/htdocs/telemetry.html.

2. Run the gage data report as follows:
   - ☐ Select **SAR7, Santa Ana River at Highway 71** for Gage to View.
   - ☐ Select **24** or a more appropriate number as the Number of Hours to View.
   - ☐ Select **Line Graph**, which is the easiest Output to read

3. For checking levels within **Prado Dam** including what they're inflows are and what they are releasing, open Internet Explorer and go to http://www.spl.usace.army.mil/resreg/htdocs/telemetry.html.

4. Run the gage data report as follows:
   - ☐ Select **PRADO** for Gage to View.
   - ☐ Select **24** or a more appropriate number as the Number of Hours to View.
   - ☐ Select **Line Graph**, which is the easiest Output to read.



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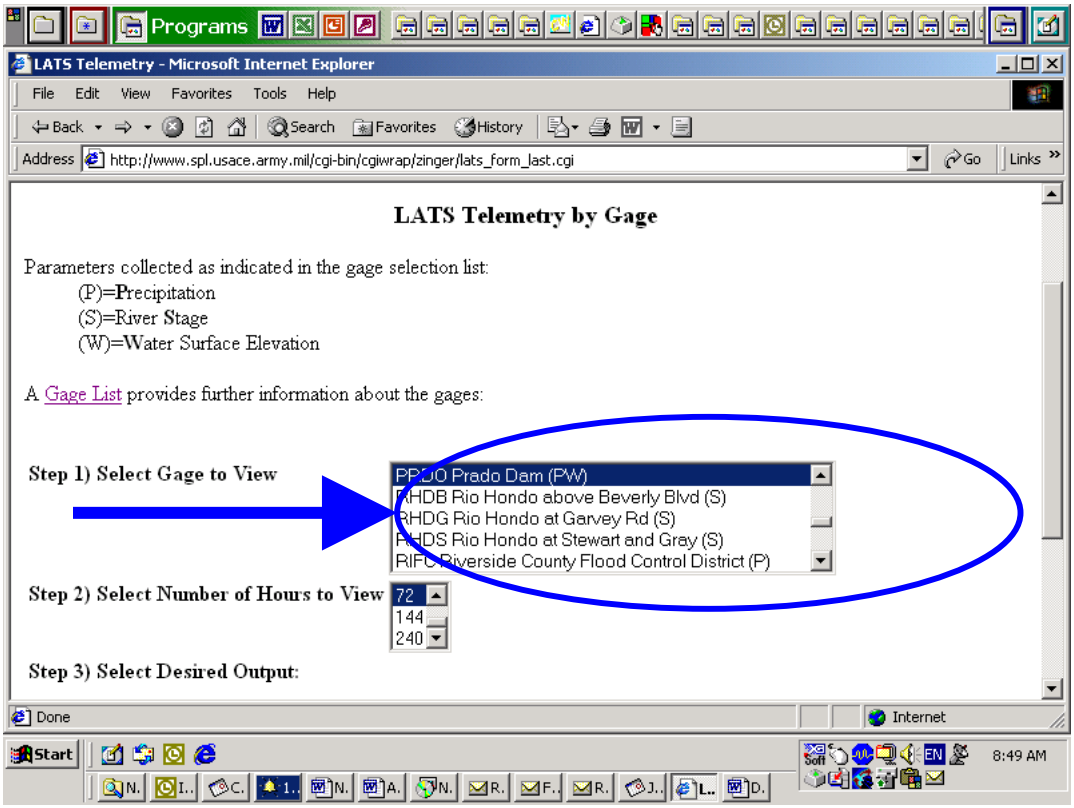

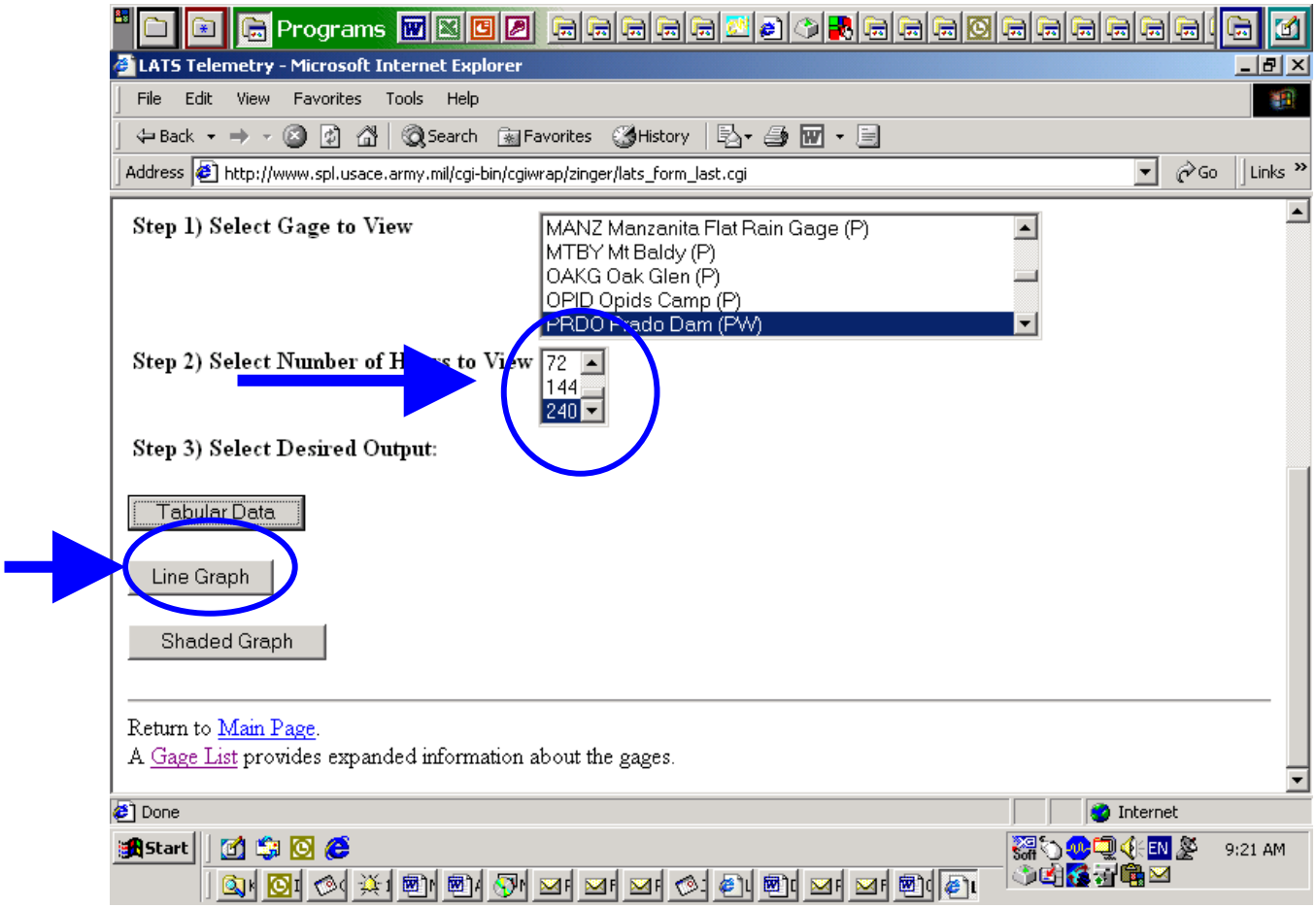

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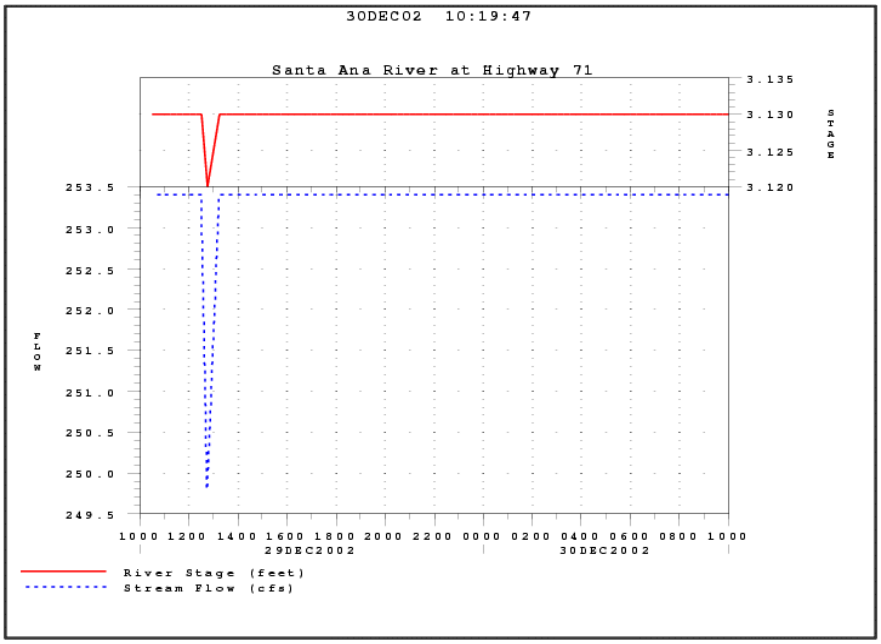
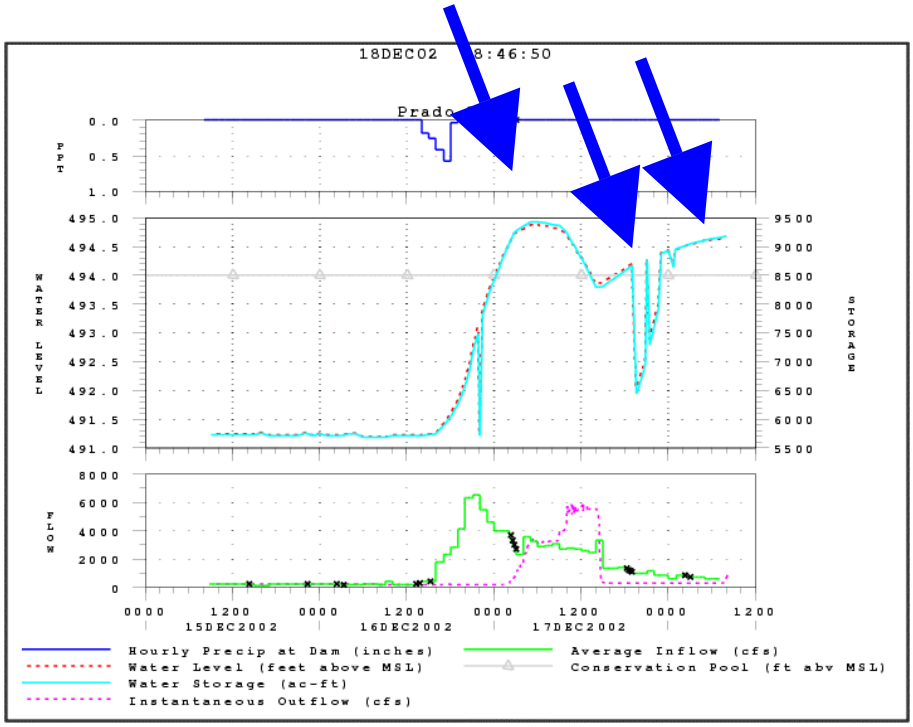
Final Graphs. Note in the Prado Dam graphic, they are bumping up against the capacity of the dam and used the large discharge to get the level down. The "inflows" unexpectedly rose and they needed to re-release from the dam today. This is a good site to watch to try to anticipate future releases.

SANTA ANA RIVER 7

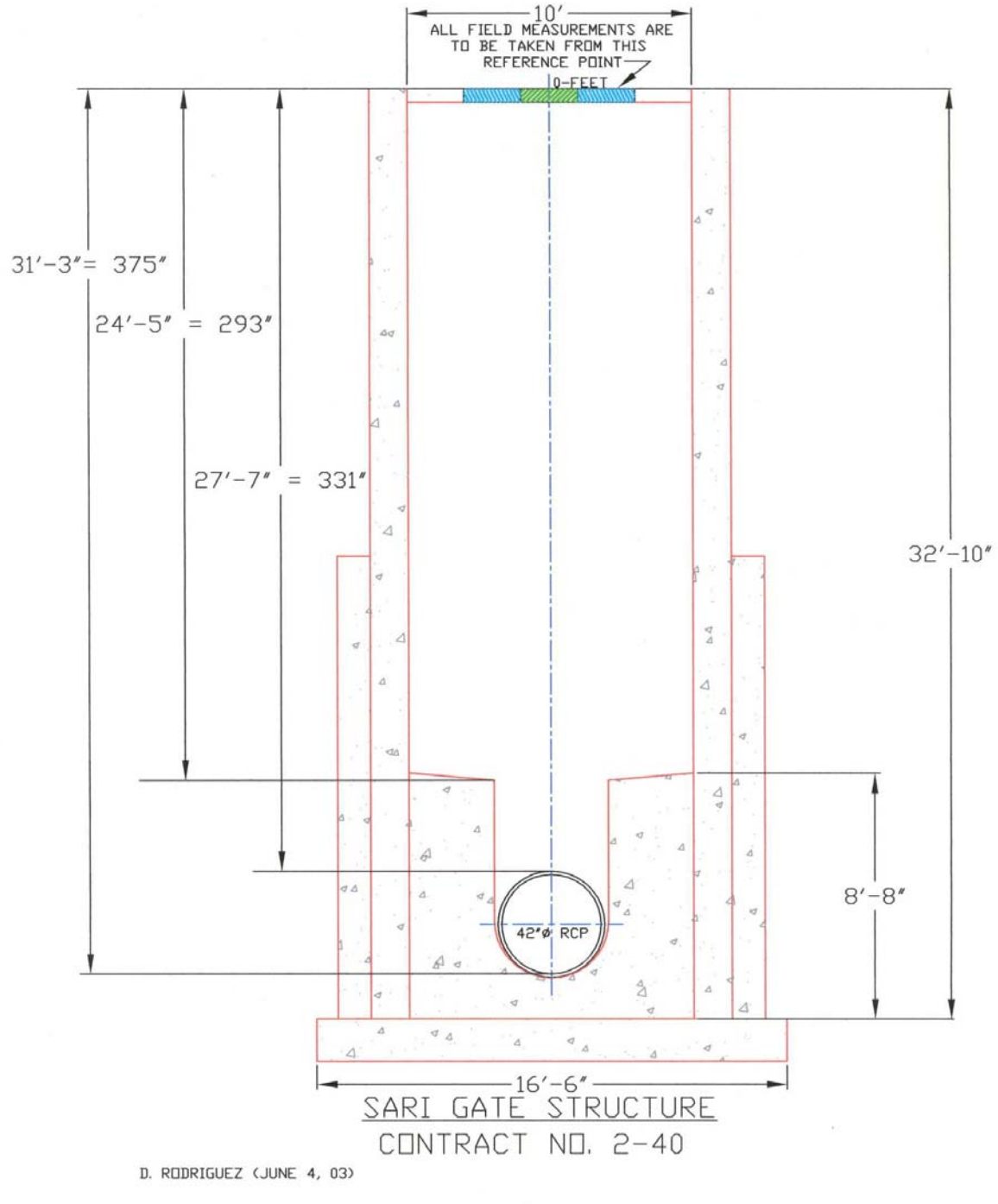


PRADO



Attachment C
Float Measurement Directions for
Flow Levels in the SARI Line near the SARI Gate

1. Take the measure and float from the panel, set up over the concrete deck of the structure. Drop measure into the gate structure**.**



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1. Use the conversion chart provided to determine the flow depth based on the measurements taken. Report recorded depth to the Control Center.

SARI Gate Structure Water Level Conversion Chart		
Total Depth of SARI Gate Structure 31'-3" = 375"		
All Field Measurements are to be taken from the Concrete Deck of the Structure – See Drawing		**Conversion of Tape Measurement Equals the Depth of the Water Level (float ball has been included in the tabulated water level column)**
31'	=	15"
30'-9"	=	18"
30'-6"	=	21"
30'-3"	=	24"
30'	=	27"
29'-9"	=	30"
29'-6"	=	33"
29'-3"	=	36"
29'	=	39"
28'-9"	=	42"
28'-6"	=	45"
28'-3"	=	48"
28'	=	51"
27'-9"	=	54"
27'-6"	=	57"
27'-3"	=	60"
27'	=	63"
26'-9"	=	66"
26'-6"	=	69"
26'-3"	=	72"
26'	=	75"
25'-9"	=	78"
25'-6"	=	81"
25'-3"	=	84"
25'	=	87"
24'-9"	=	90"
24'-6"	=	93"
24'-3"	=	96"
24'	=	99"
23'-9"	=	102"
23'-6"	=	105"
23'-3"	=	108"
23'	=	111"
22'-9"	=	114"
22'-6"	=	117"
22'-3"	=	120"
22'	=	123"
21'-9"	=	126"
21'-6"	=	129"
21'-3"	=	132"
Rev. 2-(June-03)		

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Form 2B
TRAINING REQUIREMENTS

Form 2B Training Requirements

This page is to document that training has been provided for all employees on required subjects. Training must be provided to the level needed for the employee's level of responsibility within the agency. This list of training requirements is **in addition to** the Training Requirements found in the IERP document.

Documentation of Training Annual Employee Training Provided on:					
Responsible Division: 420		**Responsible Supervisor (Name & Position):**			
Training Item	**Deadline[1]**	**Training Division[1]**	**Initials**	**Date**	**Time**
Classroom Training					
Procedures to review and update the SARI Line ERP.	TBD	TBD			
Pipeline cover survey procedure.	TBD	TBD			
Pre-Event Planning	TBD	TBD			
Pre and post wet season manhole access road inspection procedures.	TBD	TBD			
Review of all new structures, connections or work performed on or near this reach of the SARI Line in the past year (Field and Classroom Training).	TBD	TBD			
SARI Line, gate, and meter structures inspection procedures.	TBD	TBD			
Event occurrence protocol (Field and Classroom Training).	TBD	TBD			
[1] Must be coordinated with Maintenance Plan as entered into CMMS.					

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Form 2C
ANNUAL SARI RELATED SYSTEMS UPDATE CHECKLIST

Form 2C
Annual SARI Related Systems Update Checklist
YEAR:

Responsible Division: 420 and 750				**Responsible Supervisor (Name & Position):**			
System Update Item	**Asset Number[2]**	**Deadline[2]**	**Responsible Division**	**Data**	**Initials**	**Date**	**Time**
SARI Average Dry Weather Peak Flow (mgd)	TBD	TBD	750				
SARI Peak Wet Weather Flow (mgd)	TBD	TBD	750				
High Desalter Flows (mgd)	TBD	TBD	SAWPA				
Average Desalter Flows (mgd)	TBD	TBD	SAWPA				
Low Desalter Flows (mgd)	TBD	TBD	SAWPA				
Periodic MH Inspection	TBD	Quarterly	420				
Periodic Access Road Inspection	TBD	TBD	420				
Pipeline Cover Survey [1]	TBD	TBD	750				
Visual Inspection of Green River Meter Station	TBD	Weekly	420				
Visual Inspection and exercise of SARI Isolation Gate	TBD	Every 6 Weeks	420				
Lube of SARI Isolation Gate	TBD	Quarterly	420				
Pre Wet Season Access Road Inspection [1]	TBD	TBD	420				
Post Wet Season Access Road Inspection [1]	TBD	TBD	420				

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11/30/03
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Form 2C
Annual SARI Related Systems Update Checklist
YEAR:

Responsible Division: 420 and 750				**Responsible Supervisor (Name & Position):**			
System Update Item	**Asset Number[2]**	**Deadline[2]**	**Responsible Division**	**Data**	**Initials**	**Date**	**Time**
Visual Inspection of Finish Grades Above Pipe	TBD	TBD	750				
Perform Topographic Survey	TBD	TBD	750				
Confirm New Structures, Connections or Work Performed on SARI Line and add info to ERP [1]	TBD	TBD	750				
SARI Gate Maintenance Check	TBD	TBD	420				
Perform CCTV Inspection	TBD	Every Five Years	420				
Add any Modifications to Operational Protocol to ERP	TBD	TBD	830 and 420				
Periodic Maintenance and Repair	TBD	TBD	420				
Annual Notification by OCSD to the City of Yorba Linda	TBD	TBD	750				

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Form 2C
Annual SARI Related Systems Update Checklist
YEAR:

Responsible Division: 420 and 750				**Responsible Supervisor (Name & Position):**			
System Update Item	**Asset Number[2]**	**Deadline[2]**	**Responsible Division**	**Data**	**Initials**	**Date**	**Time**
Train OCSD/SAWPA field staff	TBD	TBD	520				
Train Operations staff	TBD	TBD	520				
Update Form 2A “SARI Control Gate Procedures”	TBD	TBD	830 and 420				
Update Form 2B ”Training Requirements”	TBD	TBD	520				
Update Form 2C “Annual SARI Related Systems Update Checklist””	TBD	TBD	420 with CMMS Support Group				
Update Form 2D “Manhole Inspection Report”	TBD	TBD	420				
Update Form 2E “”Field Discrepancy Sheet for Manholes - Line Segments - Laterals“	TBD	TBD	420				
Update Form 2F “”CCTV Contractor Field Discrepancy Sheet for Manholes - Line Segments - Laterals“	TBD	TBD	420				
Update Form 2G “Equipment/Material Requirements”	TBD	TBD	420 and 230				
Update Figure “Manhole and Access Roadway Map from SAVI Ranch to County Line”	TBD	TBD	750				
“Update Form 3A “Communication and Response Protocol”	TBD	TBD	620 and 130				

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Form 2C
Annual SARI Related Systems Update Checklist
YEAR:

Responsible Division: 420 and 750				**Responsible Supervisor (Name & Position):**			
System Update Item	**Asset Number[2]**	**Deadline[2]**	**Responsible Division**	**Data**	**Initials**	**Date**	**Time**
Update Form 3B "OCSD Event Documentation Report"	TBD	TBD	830				
Update Form 3C "OCSD Control Center Spill Interview Form""	TBD	TBD	830				
Update Form 3D "OCSD Collection System Problem Report (Field SSO Report)"	TBD	TBD	830				
Update Form 3E "Contractors and Suppliers"	TBD	TBD	420 and 230				
Update Form 3F "OCSD Procurement and Technical Documents"	TBD	TBD	830				
Update Form 3G"OCSD Incident Repair Actions Report"	TBD	TBD	830				
Update Form 3H "Environmental and Public Health Protocols"	TBD	TBD	620				
Update Form 3J "Follow-Up Notification Protocol"	TBD	TBD	620				
Update "Site Access Plan"	TBD	TBD	750				

[1]. Include field data in update of Figure "Manhole and Access Roadway Map from SAVI Ranch to County Line".
Color code the tasks for OCSD responsible and SAWPA responsible.
Include an electronic file path on this sheet so it can be accessed.
Make sure to add any other reoccurring issues in need of updates that you might identify in later sections.
[2] Must be coordinated with Maintenance Plan as entered into CMMS.

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Form 2D
MANHOLE INSPECTION REPORT

Orange County Sanitation District
Collection Facilities O&M – Division 420
Manhole Inspection Report

District No. _____ Date: _____ Time: _____ ☐ a.m. ☐ p.m. By: _____

Contract No. _____ Trunk Name: _____ ☐ IBC ☐ Tustin ☐ Uninc – D7

Manhole Station: _____ Manhole Type: ☐ A ☐ B ☐ C GW Seepage: ☐ Yes ☐ No

Cross Street On: _____ ☐ At/Near ☐ _____

CONDITION/ ITEM	GOOD 0-10%			FAIR 11-25%			POOR 25-50%			VERY POOR >51%		
	TOP	MID	BASE	TOP	MID	BASE	TOP	MID	BASE	TOP	MID	BASE
EXPOSED AGG												
SOFTENING CONC.												
EXPOSED STEEL												
BRICKS MORTAR												

COVER SIZE: _____ MODEL #: _____ BOLT DOWN: ☐ Yes ☐ No SEALED: ☐ Yes ☐ No	GOOD	FAIR	POOR	VERY POOR
GRADE RINGS				
FRAME & COVER				

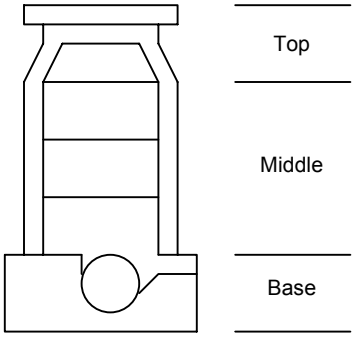
COATINGS: PVC ☐/ ZEBRON ☐/NONE ☐ FIBERGLASS ☐ OTHER:	GOOD			FAIR			POOR			VERY POOR		
	TOP	MID	BASE	TOP	MID	BASE	TOP	MID	BASE	TOP	MID	BASE
BUBBLES												
PEELING												
MISSING AREAS												

MANHOLE DESCRIPTION *(Check One):* ☐DIVERSION MANHOLE ☐DROP MANHOLE ☐METER VAULT ☐ SIPHON MANHOLE ☐ STANDARD MANHOLE ☐ VENT VAULT

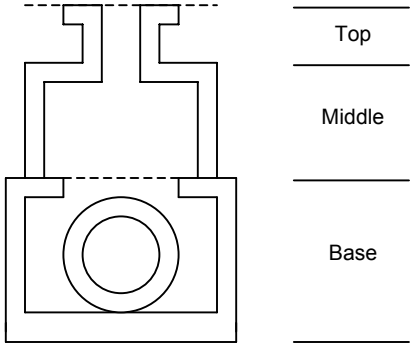
PIPE SIZE: _____ FLOW DEPTH: ☐-1/4+ ☐-1/3+ ☐-1/2+ ☐-2/3+ ☐-3/4+ ☐ FULL H_2S: _____ PPM (If Entry Is Made)

COMMENT _____

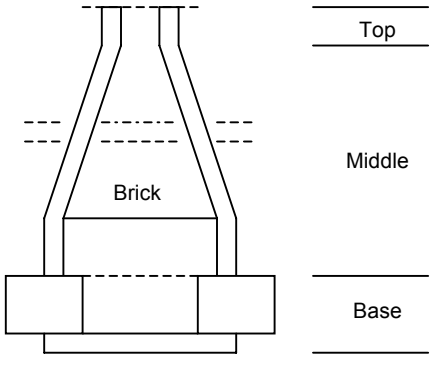
Type A



Type B



Type C



- Denotes Bad Area(s)

Form 2E
FIELD DISCREPANCY SHEET FOR MANHOLES – LINE SEGMENTS – LATERALS

ORANGE COUNTY SANITATION DISTRICT

COLLECTION FACILITIES O&M – DIVISION 420
FIELD DISCRIPANCY SHEET FOR
MANHOLES - LINE SEGMENTS - LATERALS
(ADDITIONS OR DELETIONS FROM THE COLLECTIONS SYSTEM)

---

1. Date _____ Time _____ (*Check One)* ☐ am ☐ pm
2. CMMS W.O. No. _____ Discrepancy Form Sequence No. _____
3. Name _____ Emp. No. _____ Division No. _____
4. Sewer Map Book Service Area No. _____ Page No. _____ Grid No. _____

DISCREPANCY ASSET INFORMATION: (*Check One*) ☐ Manhole ☐ Line Segment ☐ Lateral

- Existing Upstream Struct I.D. No. (MH) _____
- Existing Downstream Struct I.D. No. (MH) _____
- Existing Upstream Line Segment No. _____
- Existing Downstream Line Segment No. _____

DISCREPANCY ASSET LOCATION

- Approximate Address _____
- Nearest Cross Street _____ City _____

DISCRIBE ACTION NEEDED:

_____

_____

_____

_____

_____

_____

******Attached Manhole Inspection Sheet Required******

DR:co
G:\WP.DTA\OM\430\RODRIGUE\COLL_DISCREPENCY_MH\COLL_DISCREPANCY SHEET_05-27-03_REVISED.DOC

Form 2F
CCTV CONTRACTOR DISCREPANCY SHEET FOR MANHOLES – LINE SEGMENTS – LATERALS

ORANGE COUNTY SANITATION DISTRICT

CCTV CONTRACTOR DISCREPANCY SHEET FOR MANHOLES - LINE SEGMENTS - LATERALS

1. Date _____ Time _____ (*Check One)* ☐ am ☐ pm
2. CMMS W.O. No. _____ Discrepancy Form Sequence No. _____
3. Company Name _____
4. Operator's Name _____ Telephone No. _____
5. Sewer Map Book Service Area No. _____ Page No. _____ Grid No. _____

DISCREPANCY ASSET INFORMATION: (*Check One*) ☐ Manhole ☐ Line Segment ☐ Lateral

- Existing Upstream Struct I.D. No. (MH) _____
- Existing Downstream Struct I.D. No. (MH) _____
- Existing Upstream Line Segment No. _____
- Existing Downstream Line Segment No. _____
- Video Tape / CD No. _____
- Footage (ft.) from Existing Struct I.D. No. (MH) - to the (MH) Discrepancy _____
- Direction of CCTV of Line was Conducted *(Check One)* ☐ **Upstream** or ☐ **Downstream**

DISCREPANCY ASSET LOCATION

- Approximate Address _____
- Nearest Cross Street _____ City _____

DISCRIBE ACTION NEEDED:

_____

_____

_____

_____

_____

_____

******Attached Manhole Inspection Sheet Required******

DR:co

G:\WP.DTA\OM\430\RODRIGUE\COLL_DISCREPENCY_MH\COLL_DISCREPANCY SHEET_05-27-03_REVISED.DOC

Form 2G
EQUIPMENT/MATERIAL REQUIREMENTS

Form 2G Equipment/Material Requirements

Responsible Division: 420 and 230	**Responsible Supervisor (Name and Position):**

- Restoration and repair supplies and equipment (size, quantity, and capacity will be determined by the conditions at the break)
  - Pipe supplies and hardware (see Table 1-7 in Section 1)
  - General hardware and supplies
  - Pumps and motors (see Table 1-7 in Section 1)
  - Manhole frames, covers, stops, and locks
  - Emergency Generators
  - Concrete, Redi-Mix, gravel, and sand, AC, and sand bags
  - Shoring, shields, and jacks
  - Mechanical valves (plug or ball)
  - Heavy equipment rentals (cranes, forklifts, paldet jacks, fuel trucks, water trucks, concrete trucks, concrete cutting signs, flashing signs, cones, temperature stripping)
  - Lighting equipment
  - Traffic control equipment
  - Temporary fencing and barricades
  - Excavation equipment (backhoes, front end loaders, scrapers, dump trucks)
  - Imported backfill material
  - Replacement Reinforced Concrete Pipe (RCP)
  - Paving equipment (paving cutting, vibratory equipment, rollers)

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Section 3
Emergency Response Protocol

Concern: Failure of the SARI pipeline within the subject reach caused by one or more of the following events:

- Increased discharge rate from Prado Dam (5,000 cfs, 18,000 cfs, or 30,000 cfs)
- Earthquake
- Other event, including equipment damage to pipeline, surge, debris accumulation, vandalism, or pipeline deterioration

Result: Based on these selected causes, the following likely effects have been assumed for the subject reach:

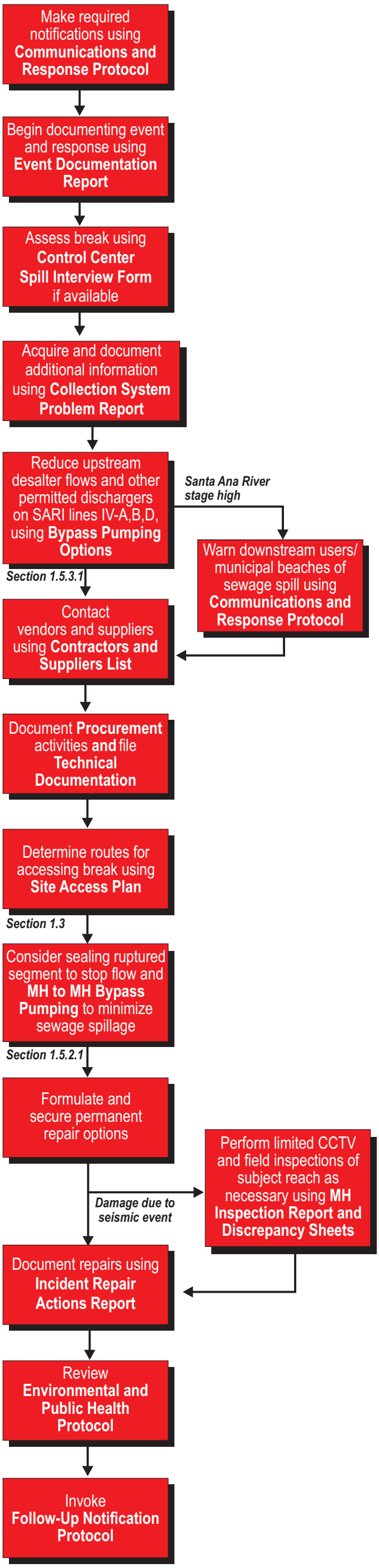
- Pipeline and/or manhole failure allowing SARI effluent to spill into the Santa Ana River
- Pipeline and/or manhole failure allowing Santa Ana River water and debris to flow into the SARI line
- Pipeline and/or manhole failure leading to effluent discharge from manholes downstream of the subject reach (discharges from upstream manholes on the upper portions of the SARI Line are addressed in a separate ERP developed for SAWPA alone).

Overview: In the event that a failure has occurred in the SARI Line, this ERP should be implemented. Figure 3-1, Emergency Response Flow Chart, highlights the emergency response protocol and indicates the suggested order of actions that should be followed during an emergency event in the SARI line. Note that the activities in each of the individual boxes within this flow chart may be executed at any given time during the emergency response. That is, the box order shown in the flow chart is a suggestion, and multiple activity boxes may be processed at once (in a 'parallel'-type architecture).

The forms and checklists that comprise the emergency response protocol are meant to guide the emergency responders on the initial, intermediate, and follow-up actions that need to be executed during an emergency situation in the SARI line.

The following information can be found in this section:

- Figure 3-1, Emergency Response Flow Chart, highlights the appropriate order of actions that should occur during an emergency and who is responsible for implementing them. It is also intended to be used as a checklist to ensure that all actions are accomplished.



Form	Responsible Division/ Employee	Completion Schedule	Final to CMMS	Comments
3A	*620 and 130*			
3B	*830*			
3C	*830*			
3D	*830*			
3A	*620 and 130*			
3E	*420 and 230*			
3F	*830*			
2D, 2E, 2F	*420 (all)*			
3G	*830*			
3H	*620*			
3J	*620*			

Figure 3-1
Emergency Response Flow Chart

- Section 3.1 provides a description of each form and instructions for its use, including who is responsible for using the form and when it should be used during an emergency.

- Section 3.2 provides instructions for updating each form, including who is responsible for updating the form and when it should be updated

- Section 3.3 provides a copy of each form in the Emergency Response Protocol

3.1 Form Descriptions and Instructions

Descriptions of each form in the emergency response protocol and instructions for using them are provided below. Each form has been assigned a Responsible Division/Supervisor. Although this information is provided on each form, it is also summarized in Table 3-1.

3.1.1 Form 3A – Communication and Response Protocol

This document provides the notification protocol that should be used during and following a SARI Pipeline emergency. This form outlines the order in which contacts should be notified through the use of a color-coded tier system that identify the relative importance level (Tiers 1-3) of each contact. As noted on the form, Tier 1 contacts are to be notified immediately in the event of an emergency, Tier 2 contacts are to be notified within 24 hours, and Tier 3 contacts should be notified within 3 days. In some cases, an alternate contact has been provided in the list for the Tier 1 contacts. These persons should only be notified if the primary contact cannot be reached.

3.1.2 Form 3B – OCSD Event Documentation Report

This document should be used to collect a description of the incident and response. Additionally, it provides space for an evaluation of the response and future recommendations. Once commenced, the event documentation will continue until the repair is complete and physically inspected by OCSD/SAWPA.

3.1.3 Form 3C – OCSD Control Center Spill Interview Form

This document provides an interview form to be used if a resident or agency calls to report a spill along the SARI Line. The intent of the form is to collect additional information about the reported spill that can be used to estimate the magnitude of the situation.

3.1.4 Form 3D – OCSD Collection System Problem Report (Field SSO Report)

This form is intended to collect information regarding reported problems with the collections system. The location, type, and magnitude of the problem should be collected. Additionally, the actions of the field personnel responding to any particular emergency should be logged throughout the duration of the initial emergency response. Data from this sheet can be used in conjunction with form 3B, OCSD Event Documentation Protocol, to evaluate the appropriate repairs needed to the SARI Line.

3.1.5 Form 3E – Contractors and Suppliers

This document provides a list of known emergency response contractors and suppliers that may be called upon during an emergency on the SARI pipeline, including general comments on inventories and required lead times for mobilization.

3.1.6 Form 3F – OCSD Procurement and Technical Documents

This document is intended to serve as a list of all technical documents generated during and following a SARI Pipeline emergency. The form serves as a catalog for attaching emergency action/repair documents relating to grading, surveys, photographs, as-built drawings, materials testing, geotechnical testing, structures and materials data, laboratory data, and other materials. All of the documents listed on this form should be filed with the OCSD Administrative assistant for Division 420.

3.1.7 Form 3G – OCSD Incident Repair Actions Report

This document is intended to provide a summary description of the damage to the SARI pipeline and to document the repair actions completed, including modifications to manholes or other structures. Outstanding repair issues and recommendations for follow-up repair actions are also included in this form. This form should be completed by describing the final repair status and including all team members involved in the repair process.

3.1.8 Form 3H – Environmental and Public Health Protocol

This document is a list that summarizes which environmental and CEQA requirements need to be met during emergency response actions and following the completion of repairs. This list serves as a general summary and is not intended to replace Form 3A, Communications and Response Protocol.

3.1.9 Form 3J – Follow-Up Notification Protocol

This document provides the follow-up notification and data-flow protocol that should be implemented following a SARI Pipeline emergency and completion of all repairs. This form outlines which contacts should be notified, and the follow-up data/documents they should receive.

3.2 Form Updates

As outlined in Figure 3.1, maintaining an updated version of each form is an integral part of an effective emergency response plan. As such, a Responsible Division/Supervisor has been assigned to update each form. Instructions for updating each form are summarized below in Table 3-1, which also provides the original source of the form, and the date when the form should be updated. This information is provided as quick reference to aid the Responsible Division/Supervisor responsible for updating forms, and is not intended to replace Form 2C, Annual SARI Related Systems Update Checklist.

Table 3-1
Form Update Instructions

Form	Reference	Responsible Division	Instructions for Updating Form	Date to be Updated[1]
3A Communication and Response Protocol	OCSD Spill Notification Procedures and OCSD ICS Position Callouts for SARI Gate Emergency; Revised by OCSD 5/2003	620 and 130	Refer, as appropriate, to most recent version of OCSD Spill Notification Procedures and OCSD ICS Position Callouts for SARI Gate Emergency	TBD
3B OCSD Event Documentation Report	IERP Vol. II Appx. A – ICS Forms; Revised by OCSD and CDM 9/2003	830	Review Form 3B from previous year; make relevant changes when deemed necessary.	TBD
3C OCSD Control Center Spill Interview Form	Spill Notification Procedures; Revised by OCSD 5/2003	830	Refer, as appropriate, to OCSD Spill Notification Procedures and make relevant changes as deemed necessary	TBD
3D OCSD Collection System Problem Report (Field SSO Report)	IERP Vol. II Appx. A – ICS Forms; Revised by OCSD and CDM 9/2003	830	Review Form 3D from previous year; make relevant changes when deemed necessary.	TBD
3E Contractors and Suppliers	IERP Vol. II Appx. C - Contractors and Suppliers; Revised by OCSD and CDM 9/2003.	420 and 230	Review Form 3E from previous year; check to make sure phone numbers and addresses are up to date. Review OCSD Contractors and Suppliers List in IERP Vol. II and include any relevant updates.	TBD
3F OCSD Procurement and Technical Documents	Created by CDM 10/2003	830	Review Form 3F from previous year; add relevant documentation needed as deemed necessary	TBD
3G OCSD Incident Repair Actions Report	Created by CDM 10/2003 and loosely based on form pulled from IERP Vol. II Appx. A – ICS Forms	830	Review Form 3G from previous year; make relevant changes as deemed necessary	TBD
3H Environmental and Public Health Protocol	Created by CDM 10/2003	620	Review Form 3H from previous year, review current compliance rules and regulations, and make relevant changes as deemed necessary	TBD
3J Follow-Up Notification Protocol	Created by CDM 10/2003	620	Review Form 3I from previous year; make relevant changes as deemed necessary	TBD

[1] Must be coordinated with Maintenance Plan as entered into CMMS.

When updating each form, the Responsible Division/Supervisor responsible for the update should contact the Responsible Division/Supervisor responsible for using the form to determine if the usability/format of each form could be improved upon. Any changes deemed necessary by the user of the form should be incorporated into the updated version.

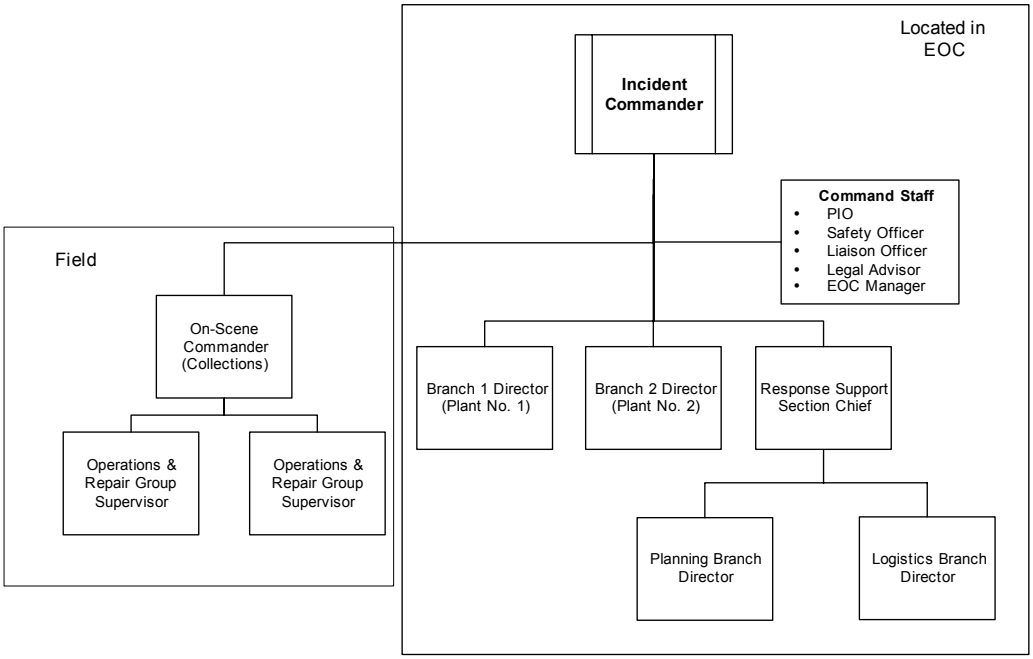
3.3 Emergency Response Protocol Forms

Contents
Section 3
Forms

Form 3A
Communication and Response Protocol

Form 3A Communication and Response Protocol

Responsible Division: 620 and 130



ICS Activation Schematic for SARI Gate Emergency

1. As the Operations Supervisor becomes aware of a SARI pipeline emergency:

   a) The Operations Supervisor shall instruct ECM staff (shown below in Table 1) to make the notifications shown in the Notification/Communication List shown on the following pages. Contacts shall be notified in the order specified by the three-tiered color system shown in Table 2.

Table 1
ECM Contact Information

Name	Back-Up Order	Internal	Pager/Cell	Home
Chandra Johannesson*	**1-ECM 620**	**x 7471**	**(714) 201-2297**	**(949) 709-0183**
Michele Farmer*	**2-ECM 620**	**x 7477**	**(714) 219-0315**	**(714) 356-4632**
Jim Colston	*3-ECM 620*	*x 7458*	*(714) 803-1397*	*(949) 766-0045*
Deirdre Hunter	*4-ECM 620*	*x 7459*	*(714) 219-9071*	*(714) 734-5878*
Layne Baroldi	*5-ECM 620*	*x 7456*	*(714) 299-2943*	*(562) 697-2263*
Kevin Hadden	*6-ECM 620*	*x 7462*	*(714) 219-1590*	*(714) 963-2352*
Mike Moore	*7-ECM-620*	*x 7450*	*(714) 749-6314*	*(714) 964-5099*
***ECM Primary Spill Responders will carry ECM Spill cell phone (714) 343-0333.**				

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Table 2 **Notification Tier System**		
Tier Number	Color Code	Notify
Tier 1 (Bolded)	**Red**	**Immediately/Within 1 Hour**
Tier 2 (Italicized)	*Green*	*See Note Below*
Tier 3 (Normal)	Blue	As determined by Incident Commander

Note: In the event that a Tier 1 contact cannot be reached, Tier 2 contacts are provided as alternates. Although in some cases there is more than one alternate provided, only one of them needs to be contacted.

b) If ECM staff is not immediately available or this event occurs after-hours, the Operations Supervisor shall make these notifications.

Note: If possible, speak to a person. Avoid leaving voice mail messages due to the severity of the situation.

2. When making these notifications, ECM staff or Operations Supervisor shall explain the following:

a) The downstream portion of the SARI trunkline has been isolated with a gate due to a (confirmed or assumed) break in the upstream portion of that trunkline, and;

b) Therefore, raw sewage is (confirmed or assumed to be) flowing into the Santa Ana River from the SARI trunkline. Based on the Green River metering station data (if available) the estimated flow going to the Santa Ana River is _____.

Note: **Follow-up/interim conversations may be required on an as-needed basis** to clarify emergency situations and developments.

Notification/Communication List **Red/Tier 1 (Bolded) = T1** *Green/Tier 2 (Italicized) = T2* Blue/Tier 3 (Normal) = T3								
Position	**Color Code**	**Primary/ Alternate**	**Division/Office Ext.**	**Home**	**Other (Alpha, Pager, Cellular)**	**Contacted**	**Date/Time**	**By Whom**
Command								
SAWPA Contacts	**T1**	**Primary Tony Gutierrez**	**OPS**	**(909) 354-4220**	**(909) 538-9343 (C)**			
	T2	*Alternate Eldon Horst Rich Haller*	*ENGR and OPS*	*(909) 354-4220 (909) 354-4220*	*(909) 453-8551 (C) (909) 354-4240 (C)*			
Incident Commanders								
Process-related and General Emergencies	**T1**	**Primary Bob Ooten**	**810/7020**	**(714) 545-9613**	**(714) 219-9512 (A) (714) 264-6375 (C)**			
	T2	*Alternate Doug Cook*	*840/7600*	*(562) 692-3504*	*(714) 219-9157 (P) (714) 342-9384 (C)*			
On-Scene Commander (Collections) **Note:** Arhontes or Blanda may serve as Deputy IC in the EOC.	**T1**	**Primary Nick Arhontes**	**430/7210**	**(714) 997-9219**	**(714) 749-8953 (C)**			
	T2	*Alternate Tom Blanda*	*420/7641*	*(714) 520-0573*	*(714) 269-6309 (C)*			
Safety Officer	**T1**	**Primary Jim Matte**	**530/7155**	**(714) 970-7923**	**(714) 305-5933 (C)**			
	T2	*Alternate Pat Carnahan Pete Morrison*	*530/7152 530/7612*	*(949) 586-3990 (949) 586-8792*	*(714) 216-2257 (A) (714) 219-9510 (A) (714) 305-5936 (C)*			
Liaison Officer	**T1**	**Primary Chandra Johannesson**	**620/7471**	**(949) 709-0183**	**(714) 201-2297 (A)**			

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11/30/03
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Notification/Communication List **Red/Tier 1 (Bolded) = T1** *Green/Tier 2 (Italicized) = T2* Blue/Tier 3 (Normal) = T3								
Position	**Color Code**	**Primary/ Alternate**	**Division/Office Ext.**	**Home**	**Other (Alpha, Pager, Cellular)**	**Contacted**	**Date/Time**	**By Whom**
Note: Colston may also serve as Legal Advisor	*T2*	*Alternate* *Michele Farmer*	*620/7477*	*(714) 356-4632*	*(714) 343-0333 (C)*			
	T3	Alternate Jim Colston Deirdre Hunter	620/7458 620/7459	(949) 766-0045 (714) 734-5878	(714) 219-9071 (A) (714) 803-1397 (C) (714) 219-0315 (A) (714) 655-1547 (C)			
Legal Advisor	T3	Primary Terry Andrus	(714) 558-7000	(714) 673-4861	(714) 299-0609 (C)			
	T3	Alternate Tom Woodruff	(714) 558-7000	(949) 888-0844	(714) 624-2299 (C)			
Public Information Officer	**T1**	**Primary** **Carol Beekman**	**130/7120**	**(949) 661-2216**	**(949) 633-8231 (C)**			
	T2	*Alternate* *Sonja Wassgren*	*130/7122*	*(949) 305-9619* *Alt* *(213) 925-0275*	*(714) 269-7548 (C)* *(714) 358-002 (P)*			
EOC Manager	**T1**	**Primary** **Bob Taylor**	**530/7204**	**(714) 267-3556 C**				

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(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Notification/Communication List **Red/Tier 1 (Bolded) = T1** *Green/Tier 2 (Italicized) = T2* Blue/Tier 3 (Normal) = T3								
Position	**Color Code**	**Primary/ Alternate**	**Division/Office Ext.**	**Home**	**Other (Alpha, Pager, Cellular)**	**Contacted**	**Date/Time**	**By Whom**
Response Operations Section								
Branch 1 Director (Plant No. 1)	**T1**	**Primary John Finias**	**830/7040**	**(949) 362-1693**	**(714) 216-4243 (A) (714) 342-7082 (C)**			
	T2	*Alternate Ron Wade*	*830/7044*	*(714) 962-2292*	*(714) 216-8382 (A) (714) 473-9359 (C)*			
	T2	*Alternate Operations Supervisor on Duty*	*7025*	*N/A*	*N/A*			
Branch 2 Director (Plant No. 2)	**T1**	**Primary Doug Cook**	**840/7600**	**(714) 441-2134**	**(714) 237-8042 (A) (714) 342-9384 (C)**			
	T2	*Alternate Dave Heinz*	*840/7610*	*(714) 964-2940*	*(714) 473-9357 (C)*			
	T2	*Alternate Operations Supervisor on Duty*	*7625*	*N/A*	*N/A*			
Operations and Repair Group Supervisors (Collection System)	**T1**	**Primary John Gonzalez**	**420/7644**	**(714) 530-8443**	**(714) 354-2954 (A) (714) 305-5940 (C)**			
	T2	*Alternate Jeff Peterson*	*420/7642*	*(714) 997-8766*	*(714) 806-3315 (A) (714) 269-6309 (C)*			
Construction Management	**T1**	**Primary Jim Lawhon**	**760/7366**	**N/A**	**(714) 713-6216 (C)**			
Response Support Section								
Response Support Section Chief	**T1**	**Primary Simon Watson**	**850/7213**	**(909) 609-1729**	**(714) 342-3747 (C)**			
	T2	*Alternate Mark Esquer*	*820/7030*	*(714) 965-0585*	*(714) 216-2001 (A) (714) 473-9354 (C)*			

Modified by CDM for SARI ERP on November 30, 2003
(G):\ntglobal\SARI\ERP Forms
11/30/03
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Position	**Color Code**	**Primary/ Alternate**	**Division/Office Ext.**	**Home**	**Other (Alpha, Pager, Cellular)**	**Contacted**	**Date/Time**	**By Whom**
Planning Branch								
Planning Branch Director	**T1**	**Primary Simon Watson**	**850/7213**	**(909) 609-1729**	**(714) 342-3747 (C)**			
	T2	*Alternate Mark Esquer*	*820/7030*	*(714) 965-0585*	*(714) 216-2001 (A) (714) 473-9354 (C)*			
Logistics Branch								
Logistics Branch Director	**T1**	**Primary Anne Marie Feery**	**230/7584**	**(949) 548-8744**	**(714) 219-7161 (A)**			
	T2	*Alternate Chris Maher Marc Dubois*	*230/7582 230/7580*	*(949) 559-1394 (562) 809-8397*	*(714) 655-4879 (C) (714) 810-4383 (A) (714) 473-9353 (C)*			

Modified by CDM for SARI ERP on November 30, 2003
(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Notification Contacts **Red/Tier 1 (Bolded) = T1** *Green/Tier 2 (Italicized) = T2* Blue/Tier 3 (Normal) = T3						
Normal Hours		**Color Code**	**After-hours**	**Contacted**	**Date/Time**	**By Whom**
(1) OCHCA **(Please call down the list, in order, until someone has been contacted)** **2009 East Edinger Avenue** **Santa Ana, California 92705** **Environmental Health Division** **Phone:** **(2) Monica Mazur** **Pager:** *Larry Brennler* *Mike Fennessy* *Larry Honeybourne*	 **(714) 667-3600** **(714) 667-3751** **(714) 834-Page #5210** *(714) 667-3756* *(714) 667-3755* *(714) 667-3750*	 **T1** *T2*	**OES: (800) 852-7550**			
RWQCB - Santa Ana Region **3737 Main St., Suite 500** **Riverside, California 92501** **Phone:** **Julio Lara** *Gary Stewart* *Najah Amin*	 **(909) 782-4130** **(909) 782-4901** *(909) 782-4379* *(909) 320-6362*	 **T1** *T2*	**OES: (800) 852-7550** **(909) 203-9303 (C)** *(909) 781-8019 (C)*			
OES	**(800) 852-7550**	**T1**	**24 hours**			
SAWPA **Pager:**	**(909) 354-4220 or** **(909) 320-9791**	**T1**	**Operations Superintendent ext. 44** **Eldon Horst ext. 42**			
Control 1	**(714) 628-7008**	**T1**	**24 hours**			

Modified by CDM for SARI ERP on November 30, 2003
(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

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Normal Hours	**Color Code**	**After-hours**	**Contacted**	**Date/Time**	**By Whom**
California Fish and Game **South Coast Regional Office** **4949 Viewridge Avenue** **San Diego, California 92123** **Phone: (858) 467-4201**	**T1**				
U.S. Fish and Wildlife **2730 Loker Avenue West** **Carlsbad, California 92008** **Phone:** **Jonathan Snyder/** **David Zoutendyk (760) 431-9440**	**T1**				
Environmental Protection Agency Region 9 (AZ, CA, HI, NV) 75 Hawthorne Street San Francisco, California 94105 Phone: (916) 445-0931 Katherine Moore (415) 972-3505	T3	Message: (760) 805-5610			
OCWD (714) 378-3240	T3	Answering service will notify appropriate party After-hours			
Army Corps of Engineers **Los Angeles District** **911 Wilshire Boulevard** **Los Angeles, California 90053-2325** **Phone: (213) 452-3532**	**T1**	**Pager Voicemail System** **(213) 452-3623**			
PFRD (714) 567-6300 **(storm channel facility owners)**	**T1**	**Control 1:** **(714) 628-7008**			
Caltrans (949) 724-2607	T3	24 hours			
California Highway Patrol (714) 567-6000	T3	911			

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(G):\ntglobal\SARI\ERP Forms
11/30/03
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Normal Hours	**Color Code**	**After-hours**	**Contacted**	**Date/Time**	**By Whom**
Carl Warren & Company District's Third Party Administrator (public / private property damage) Phone: (800) 572-6900 Ed Garbo (714) 740-7999 x123	T3	Ed Garbo (Home): (714) 283-8769 Joan Week (Home): (714) 549-0703			

City, Sewer, and Water Agency Contacts **Red/Tier 1 (Bolded) = T1** *Green/Tier 2 (Italicized) = T2* Blue/Tier 3 (Normal) = T3								
City	**Color Code**	**Business Hours**	**After-hours**	**Notification E-Mail**	**Comments**	**Contacted**	**Date/ Time**	**By Whom**
Public Works/Cities								
Anaheim	**T1**	**(714) 765-6860**	**(714) 765-3300[2] (water)** **(714) 765-6840**	**ivechione@anaheim.net**	**24-hr Emergency Dispatch After-hours.**			
Brea	T3	(714) 990-7691	(714) 990-7911	jerrym@ci.brea.ca.us	After-hours: Police Dept.			
Buena Park	T3	(714) 562-3655	(714) 562-3902	frank_heldman@ci.buena-park.ca.us, rhunt@buenapark.com	After-hours: Police Dept.			
Cypress	T3	(714) 229-6760	(714) 686-1454	gvazquez@ci.cypress.ca.us, pdickson@ci.cypress.ca.us	After-hours: Police Dept.			
Fountain Valley	T3	(714) 593-4493	(714) 593-4483	steve.hauerwaas@fountainvalley.org	After-hours: Police Dept.			
Fullerton	T3	(714) 738-6897	(714) 738-6710	dand@ci.fullerton.ca.us, jorgeg@ci.fullerton.ca.us	After-hours: Police Dept.			
Huntington Beach	T3	(714) 960-8861	(714) 960-8825	nobled@surfcity-hb.org, jjones@surfcity-hb.org	After-hours: Police Dept.			

Modified by CDM for SARI ERP on November 30, 2003
(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

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Blue/Tier 3 (Normal) = T3

City	Color Code	Business Hours	After-hours	Notification E-Mail	Comments	Contacted	Date/ Time	By Whom
Irvine	T3	(949) 724-7365	(949) 724-7000	kilani@irwd.com	After-hours: Call IRWD			
John Wayne Airport	T3	(949) 852-4000			Use Phone's - Key for Commands			
La Habra	T3	(562) 905-9792	(562) 905-9750	tina-truebe@lahabracity.com, carlo_nafarrete@lahabracity.com	After-hours: Police Dept.			
La Palma	T3	(714) 690-3325	(714) 690-3370	ibash@pacbell.net, chafikm@cityoflapalma.org, ismilen@cityoflapalma.org	After-hours: Police Dept.			
Laguna Beach	T3	(949) 497-0765	(949) 497-0717		After-hours: Police Dept. Hours: 7:00-3:30			
Newport Beach	T3	(949) 644-3011	(714) 644-3717	jdelicce@city.newport-beach.ca.us, eburt@city.newport-beach.ca.us	After-hours: Police Dept.			
Orange	T3	(714) 532-6480	(714) 538-1961	jloertscher@cityoforange.org				
Placentia	T3	(714) 993-8245	(714) 993-8152	N/A	After-hours: Police Dept.			
San Clemente	T3	(949) 366-1553	(949) 770-6011		After-hours: Police Dept.			
San Juan Capistrano	T3	(949) 443-6363	(949) 493-1171		After-hours: Answering Service			
Santa Ana	T3	(714) 647-3380 (714) 647-3344	(714) 647-3380	rstrenberg@ci.santa-ana.ca.us	After-hours: Answering Service Rick Strenberg Cell: (714) 402-7042			

Modified by CDM for SARI ERP on November 30, 2003
(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

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City	Color Code	Business Hours	After-hours	Notification E-Mail	Comments	Contacted	Date/ Time	By Whom
Seal Beach	T3	(562) 431-2527	(562) 799-4100	N/A	After-hours: Police Dept.			
Stanton	T3	(714) 379-9222, x202	(714) 304-4324 Standby (714) 288-6742 Sheriff's	t_soza@ci.stanton.ca.us, c_stubbe@ci.stanton.ca.us	After-hours: Standby Pager			
Tustin	T3	(714) 573-3150	(714) 573-3200 Field Service, (714) 573-3225 Police	ryee@tustinca.org	After-hours: Police Dept.			
Villa Park	T3	(714) 998-1500	(714) 528-3117	cityhall@villapark.org	After-hours: Street Superintendent			
Westminster	T3	(714) 895-2876 (Dial O for Operator)	(714) 898-3315 x326 or 911		After-hours: Watch Commander Jeff Howell			
Yorba Linda	**T1**	**(714) 961-7170**	**(714) 990-7911**		**After-hours: Police Dept.**			
Sanitation Districts								
Capistrano Beach	T3	(949) 248-3940 Out of Service			After-hours: Answering Service			
Costa Mesa	T3	(714) 754-5252	(714) 393-4433	dawn_schmeisser@ci.costa-mesa.ca.us, tomfauth@ci.costa-mesa.ca.us	After-hours: Tom Fauth's Cell Phone			
Dana Point	T3	(949) 499-4555			After-hours: Answering Service			
Garden Grove	T3	(714) 741-5395	(714) 806-1250 (714) 741-5704 p.d.	konyav@ci.garden-grove.ca.us, brenth@ci.garden-grove.ca.us	After-hours: Police Dept.			

Modified by CDM for SARI ERP on November 30, 2003
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11/30/03
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Blue/Tier 3 (Normal) = T3

City	Color Code	Business Hours	After-hours	Notification E-Mail	Comments	Contacted	Date/ Time	By Whom
O.C.S.D.	T3	(714) 962-2411	(714) 593-7025		After-hours: Control Center			
Midway City and Westminster	T3	(714) 893-3553	(714) 310-9004		After-hours: Standby Cell Phone			
Rossmoor Los Alamitos Sewering District	T3	(562) 431-2223	(562) 678-3217 pgr.		After-hours: Standby Pager OR General Manager Ann Crafton HM: (562) 598-8404			
Sunset Beach	T3	(562) 493-9932	(562) 493-9932		After-hours: Answering Service			
Water Districts								
El Toro	T3	(949) 837-0660	(949) 837-7050[2]		Administration Center with Answering Service			
Irvine Ranch	T3	(949) 453-5300	(949) 453-5300	roberts@irwd.com	After-hours: Answering Service			
Los Alisos	T3	(949) 830-0580			After-hours Answering Service			
Moulton Niguel[3]	T3	(949) 831-2500						
Orange	T3	(714) 532-6480	(714) 538-1961		After-hours: Answering Service			
Santa Margarita	T3	(949) 459-6400	(949) 459-6581[2]					

Modified by CDM for SARI ERP on November 30, 2003
(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

City, Sewer, and Water Agency Contacts
Red/Tier 1 (Bolded) = T1
Green/Tier 2 (Italicized) = T2
Blue/Tier 3 (Normal) = T3

City	Color Code	Business Hours	After-hours	Notification E-Mail	Comments	Contacted	Date/ Time	By Whom
Santiago Canyon	T3	(714) 649-2630			After-hours: Answering Service			
South Coast[4]	T3	(949) 499-4555			After-hours: Answering Service			
Trabuco Canyon	T3	(949) 551-8580			Trash Only			
Yorba Linda	T3	(714) 777-3018	(714) 777-9593		After-hours: Answering Service			

[1] This is a living document. E-mails will be added as they are obtained. Check G:\\\ntglobal\Control Center Reports\ Spill Procedures & Forms\Updated Email and Phone List.doc for the most current information.
[2] Daytime Secondary Number
[3] Cities served – Laguna Niguel, Aliso Viejo, Laguna Hills, Sections of Mission Viejo and North Dana Point
[4] Cities served – Dana Point, Capistrano Beach and South Laguna
Phone numbers last updated: 5/22/00

Modified by CDM for SARI ERP on November 30, 2003
(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Form 3B
OCSD Event Documentation Report

Form 3B OCSD Event Documentation Report	
Incident Type	Incident Start Date/Time
Responsible Division 830	Responsible Supervisor (Name and Position)
Date/Time ERP Activated	Activation Termination Date/Time
Location of Incident	
Type of Incident (sewage spill, high flow, etc.)	
Weather Conditions	
Note: Please follow OCSD safety guidelines specified in XXXX when responding to a SARI Line emergency.	
Description of Incident and Preliminary Risk Assessment (Attach photos to form)	
Cause of Incident	
Description of Response (Include summary of use of internal resources and any outside responders)	
Government and Other Agencies Contacted	
Losses (injuries, fatalities, property damage; attach data or reports)	

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(G):\ntglobal\SARI\ERP Forms
11/30/03
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Form 3B OCSD Event Documentation Report		
Incident Type	Incident Start Date/Time	
Responsible Division 830	Responsible Supervisor (Name and Position)	
Costs (direct and indirect; attach reports)		
Evaluation of Response		
Incident Investigation Team Members		
This report was written by:	Position:	Date
This report was reviewed by:	Position:	Date
Distribution: This report shall be distributed to Red contacts as deemed appropriate		

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(G):\ntglobal\SARI\ERP Forms
11/30/03
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Form 3C
OCSD Control Center Spill Interview Form

Orange County Sanitation District
CONTROL CENTER SPILL INTERVIEW FORM

Call Initiated: Date: _____ Time: _____ CMMS Work Order #: _____

PERSON REPORTING PROBLEM:

Name: _____ Agency: _____

Spill Location: _____

City: _____ Phone # _____
(Use Unincorporated County if applicable)

Nearest Cross Street: _____ Thomas Guide® Page & Coordinates: _____

IF A RESIDENT IS REPORTING PROBLEM:		**Notes:**
Example Opening Statement: We'll be dispatching our field crew momentarily. To help us most effectively respond to your call, we need some additional information. These questions should only take a minute, but will help us tremendously in better responding to your call. For the field responders, is there a good reference landmark? (shops, houses, etc.)		
Did you see water flowing from a manhole?	Yes ☐ No ☐ Don't Know ☐	
If not, where is it coming from?		
Why do you think it's sewage? (Is there an odor? / Does the manhole say "OCSD" or "sewer?")		
How fast is the water flowing? (Is it a small trickle out the side or is it gushing through all outlets with force?)		
Is the water flowing in or to the street gutter?	Yes ☐ No ☐ Don't Know ☐	
Do you know if a storm drain catch basin is nearby?	Yes ☐ No ☐ Don't Know ☐	
Is the water flowing to or about to get to that catch basin?	Yes ☐ No ☐ Don't Know ☐	
Approximately how wide and deep is the (flowing or wet) water path?	Deep: _____ Wide: _____	
Have you called any other agencies or did another agency refer you to us?		

IF ANOTHER AGENCY IS REPORTING PROBLEM: **Notes:**

1. **If the Agency took the call from a Resident:** Get the resident's name and phone number. Call the resident and ask the above questions.
2. **Which "Agencies" do these questions apply to?** These questions are geared to *RESPONDING AGENCIES* (Cities and OCSD member agencies), not referring agencies. See No. 1 above for questions for referring agencies such as Control One.
3. **Example Opening Statement:** We'll be dispatching our field crew momentarily. To help us most effectively respond to your call, we need some additional information. These questions should only take a minute, but will help us tremendously in better responding to your call.

1. Do you have a crew currently onsite?	Yes ☐ No ☐ Don't Know ☐	
a. If so, have they contained the spill and protected storm drains?	Yes ☐ No ☐ Don't Know ☐	
b. If not, will your agency be responding?	Yes ☐ No ☐ Don't Know ☐	
2. Is the water flowing in or to the street gutter?	Yes ☐ No ☐ Don't Know ☐	
3. Is the water flowing to a storm drain/catch basin?	Yes ☐ No ☐ Don't Know ☐	
a. Approximately how wide and deep is the (flowing or wet) water path?	Deep: _____ Wide: _____	
If the answers to **1a and 1b. are NO**, and **2 or 3 is YES,** then you should state the following:	Although we will be responding as quickly as possible, we request that your staff start protecting the storm drains, setting up containment, and any necessary traffic control until we arrive onsite. These measures are important to protect the environment and possibly prevent a beach closure.	
How fast is the water flowing? (Is it a small trickle out the side or is it gushing through all outlets with force?)		

Orange County Sanitation District
CONTROL CENTER SPILL INTERVIEW FORM

QUESTIONS FOR THE COLLECTIONS CREW: **Notes:**

Fill in the Blanks: If there are any blanks left on page one, ask Collections these questions when they arrive onsite.

General information:

Is this a District problem (i.e., in, from, or caused by District's facilities)? Yes ☐ No ☐

Type of spill: Sewage ☐ Chemical (I.W.) ☐ Other ☐ _____

Size of line (not cleanout): _____ inches **Did any sewage reach storm drain?** Yes ☐ No ☐

List **receiving water** (*if known)*: Newport Bay ☐ Santa Ana River ☐ San Gabriel River ☐ Other _____

Cause of spill: Grease ☐ Roots ☐ Other Debris ☐ Rain-related Inflow ☐ Line Break ☐
Vandalism ☐ Other ☐ _____

Initial Estimated **volume**: _____ gallons Estimated amount **recovered** to sewer or vactored: _____ gallons

Response:

Responding Personnel: _____

Responding Vehicles: _____

1.) Time Collections was first contacted: _____ 2.) Time arrived onsite: _____

3.) Time containment set: _____ 4.) Time blockage cleared: _____

5.) Time clean up complete/left site: _____

Form 3D
OCSD Collection System Problem Report (Field SSO Report)

Orange County Sanitation District
Collection Facilities O&M - Division 420
Collection System Problem Report

Service Request No.: _____ CMMS Work Order No.: _____

Customer Evaluation Form Given: ☐ Yes ☐ No If, Yes, give No.: _____

Fill Form Out Completely:

Date of Occurrence: _____ Time of Occurrence: _____ ☐ a.m. ☐ p.m.

Date of Notification: _____ Time of Notification: _____ ☐ a.m. ☐ p.m.

Date Problem Solved: _____ Time Problem Solved: _____ ☐ a.m. ☐ p.m.

Date Control Center notified problem was solved: _____ Time: _____ ☐ a.m. ☐ p.m.

Customer Reporting Problem:

Name: _____ Phone: ( ) _____

Agency Name (if any): _____

Address: _____

Location of Problem in Thomas Guide: Page No.: _____ Grid: _____

Address: _____

City: _____ Nearest Cross Street _____

District No.: _____ Trunk Name: _____ M.H. Station No. or I.D.: _____

Is this a District problem? ☐ Yes ☐ No

If No, who is the responsible party: _____

Problem: ☐ Odor ☐ Stoppage ☐ Pump Station ☐ Other

Probable cause of stoppage: ☐ Roots ☐ Grease ☐ Debris ☐ Collapse ☐ Other

Sewage Spill: ☐ Yes ☐ No **If Yes, Fill Out Reverse Side: Spill Report Section**

Note: If spill is **"District Problem"**, tell reporting individual OCSD staff will clean up and report it.

Detailed Description of Customer Problem: _____

_____

_____

_____

_____

Action Taken: (Detail description including responding personnel and equipment)

Report Written By: _____ Date: _____ Time: _____ ☐ a.m. ☐ p.m.

Followed Up By: _____

cc: N. Arhontes T. Blanda J. Peterson D. Hunter Original Copy to Library

Orange County Sanitation District
COLLECTION SYSTEM PROBLEM REPORT – FIELD SSO REPORT

c: Nick Arhontes, Tom Blanda, Michele Farmer

Collections Notified By: _____ Date: _____ Time: _____

CMMS Work Order #: _____ -or- Service Request #: _____

INCIDENT LOCATION:

Contact Name: _____

Address: _____

City: _____ Phone # _____
(Use Unincorporated County if applicable)

Nearest Cross Street: _____ Thomas Guide® Page & Coordinates: _____

**GPS: Latitude (e.g. 33.70218)* _____

**GPS: Longitude (e.g. 117.85461)* _____

SSO CAUSE:

Is this a **District problem** (i.e., in, from, or caused by District's facilities)? Yes ☐ No ☐

Size of line (w/blockage): _____ **Did any sewage reach storm drains?** Yes ☐ No ☐

Cause of spill: Grease ☐ Other Debris ☐ Rain-Related Inflow ☐ Line Break ☐

Pushed-in Roots ☐ Vandalism ☐ Pump Station ☐ Roots in Lateral ☐

Roots in Main Line (not pushed in from lateral) ☐ Other ☐ _____

SSO DETAILS:

*Did any eyewitnesses indicate when the SSO could have started? (*No need to go searching for them, just report info provided onsite or via Control.) No ☐ Yes ☐ If yes, what date / time did they first notice the SSO? _____

When you arrived onsite was there a Wet Spot ☐ or Flowing Sewage ☐

Describe the flow from the **manhole**:

Number of holes: _____ Size of holes: _____ Height of flow: _____

Estimate the sewage **path**: Depth *(if flowing)*: _____ Width: _____ Length: _____
Velocity (ft/sec): _____ Other Info: _____

Estimated spill **volume**: _____ gallons Estimated amount **recovered**/vactored: _____ gallons

Was the field volume estimate based on: Flow Rate ☐ Vent-hole Calculation ☐ Observation ☐
Other _____

Estimated volume of wash down water used? _____ gallons

Was 100% of this wash water and all sewage-contaminated water recovered? Yes ☐ No ☐

If applicable, estimated volume to **storm drain**: _____ Distance to impacted storm drain: _____

Contract #: _____ Manhole/Station # I.D.: _____

**Disregard Until Program Is Developed & Supported*

Orange County Sanitation District

COLLECTION SYSTEM PROBLEM REPORT – FIELD SPILL REPORT

SSO RESPONSE:

Responding Personnel: _____

Responding Vehicles: _____

1.) Time arrived onsite: _____ 2.) Time containment set: _____

3.) Time blockage cleared: _____ 4.) Time clean up complete/left site: _____

Did you attempt containment to protect storm drainage system? Yes ☐ No ☐

Containment material(s) used: _____

Photos taken? Yes ☐ No ☐ If no, please state reason: _____
(Required for each SSO) *(Please email photos to Report Distribution List)*

Action Taken: _____

Did any other **Agencies** respond to or assist with the spill? Yes ☐ No ☐

If so, list the name of the Agencies and describe their action. _____

FOLLOW-UP:

Is this an existing **Trouble Spot**? Yes ☐ No ☐ Should it be added to the list? Yes ☐ No ☐

Has there been another SSO within **1,000 feet** of this location in the last 12-months (by pipe segments or by radius)? Yes ☐ No ☐ If so, please list dates: _____

Describe recommended follow-up work. _____

Collection Staff Signature: _____ Date: _____

Form 3E
Contractors and Suppliers

Form 3E Contractors and Suppliers Contents

Form 3E Contractors and Suppliers		
Responsible Division: 420 and 230	**Responsible Supervisor (Name & Position):**	
Emergency Supplies and Equipment		
Company	**Contact/Telephone**	**Address**
Disposal/Hauling		
Art's Disposal Service	(323) 724-3918	
Asbury Environmental Services	(310) 886-3400	
Safety Kleen (Hazardous/toxic waste removal and disposal)	(714) 557-0840	
Rainbow Disposal	(714) 847-3581	
National Plant Services (Vacuum truck service)	(562) 436-7600	
Generators		
Foothill Engineering and Dewatering	Wyndell Bradford (909) 737-5391 (909) 737-0792 Fax	905 East Third Street Corona, CA 91719
Safety Supplies		
Airgas Safety Tucker	(714) 994-7600 Lisa Hodder	
Tools/Maintenance Items		
IDG (Industrial Dist. Group)	(714) 994-6960	
Breezer Equipment & Supply	(714) 238-6101	
Home Depot (Building supplies)	(714) 966-8551 (714) 435-8321	3500 W. MacArthur Blvd. Santa Ana, CA 92704
Shamrock Supply	(714) 547- 4422 Lisa Hodder	301 E. Alton Ave. Santa Ana, CA 92707
Restoration and Repair Supplies and Equipment		
Company	**Contact/Telephone**	**Address**
General Hardware and Supplies		
C.E.D. (Electrical supplies)	(714)-557-6801	766 St. Clair Costa Mesa, CA 92626
FST Sand & Gravel (Sand, gravel, road base)	(909) 277-8440	
Home Depot (Building supplies)	(714) 966-8551 (714) 435-8321	3500 W. MacArthur Blvd. Santa Ana, CA 92704
Smith Pipe & Supply (Plumbing supplies)	(714) 957-1708	

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11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Pipe Supplies & Hardware/ Mechanical Valves			
Company	**Contact**	**Telephone**	**Products and Lead Time**
Consumers Pipe & Supply		(323) 685-6870	Pipe Diameters: 1/8th in. to 12 in. Volume: 500 feet of each diameter Lead Time: 1 to 2 hours Material: Any
Inland Concrete	Office	(909) 788-9720	N/A
Hydro Conduit	Office	(909) 277-2420	Pipe Diameters: Volume: Lead Time:
Marden Susco	Office	(949) 888-3305	Pipe Diameters: Volume: Lead Time:
G. McBean	Office	(213) 564-4654	Pipe Diameters: Volume: Lead Time:
Neal Supply		(562) 949-6541	Pipe Diameters: Through 10 in. Volume: Any length Lead Time: 2 to 3 hours Material: Any
Smardan Supply		(714) 545-6912	Pipe Diameters: Through 4 in Volume: 1,000 ft Lead Time: Within 24 hours Material: Steel, Copper, PVC, Cast Iron
S & J Supply	Office	(562) 944-7433	Pipe Diameters: Through 24 in. Volume: 1,000 ft Lead Time: Within 3 hours
Standard Concrete Products	Office	(714) 549-2233	N/A
Trench Shoring	Tom	(714) 879-1005	N/A
United Concrete	Office	(818) 788-4228	N/A
Wells Supply	Office	(714) 542-0711	N/A

Manholes, Cast Iron		
Company	**Contact**	**Telephone**
Craneveyor	Office	(626) 442-1524
Long Beach Iron works		(562) 432-5451
Pre Con Products	Office	(805) 527-0841
Southwest Concrete		(909) 983-9789
South Bay Foundry		(619) 474-8481
Alhambra Foundry		(626) 289-4294
Concrete - Redi Mix, Gravel Sand		
FST Sand & Gravel	Office	(909) 277-8440
Associated Ready-mix concrete		(949) 253-2800
Standard Concrete	Office	(714) 549-2233
Saddleback Materials	E-sandbags	(949) 277-8440
Shoring, Shields, and Jack Suppliers		
Harbor Machine Shop	Bob Ayou	(714) 642-1981
Trench Shoring	Tom Malloy	(714) 879-1005

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(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Heavy Equipment and Other Rentals			
Company	**Contact**	**Telephone**	**Pumps and Lead Time**
Action Rentals	Irvine	(949) 552-0151	Pump Size: 6"Trash pump at 1,600 gpm # in Stock: 1 Lead Time: 2-3 hours
Adco Equipment Inc.	Office	(714) 671-1077	N/A
Southwest Mobile Storage		(800) 686-9114 (619) 922-0081 Cell	N/A
Sunbelt Rentals		(714) 994-6360 (714) 231-2005 Cell	Pump Size: 3"Trash pump at 300 gpm # in Stock: Several Lead Time: 2-3 hours
Coast Crane Co.	Office	(818) 810-1870	N/A
Coastline Equipment Co.	Office	(714) 265-5500	N/A
California Barricade Rentals		(714) 558-8474	N/A
Contractors Equipment Rentals	Office	(714) 835-8050	N/A
United Rental		(949) 862-1100 (714) 842-7765	Pump Size: 2"Trash pump at 360 gpm # in Stock: 3 –4 Pump Size: 6"Trash pump at 1,000 gpm # in Stock: 1 Lead Time: 2-3 hours
Baker Tanks Rental		(562) 904-3680	N/A
D & D Equipment Rental	Office	(213) 595-4555	N/A
Foothill Engineering and Dewatering	Wyndell Bradford	(909) 737-5391	Pump Size: 10"Trash pump at 3,000 gpm # in Stock: 2 -3 Lead Time: 2-3 hours
Great Pacific Equipment, Inc.	Office	(714) 526-0686	N/A
Shepherd Machinery Co.	Office	(562) 692-2415	N/A
Trench Plate Rental Co.	Office	(800) 772-8004	N/A
Trench Shoring Co. Corona Los Angeles	Office	(714) 879-1005	N/A

Contractors			
Company	**Contact**	**Office Phone**	**Home Phone**
General Contractors			
Anaheim Sewer	Ed Silbermann	(714) 544-9190 (714) 746-4300 Cell	(714) 633-7893
C.K. Construction	Office	(310) 426-1558	
Coast Pipeline	Herb Gallegly	(714) 998-0550	
Colich & Sons 547 W. 140th St. Gardena, CA 90749	Don Colich Tom Bensfield	(213) 770-2920 (213) 329-1532 (Fax)	(213) 716-0715 Cell
Hunt's Final Phase Const. 2070 Republic Ave. Costa Mesa, CA 92627	Office	(949) 642-6709 (949) 642-1968	

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(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Contractors			
Company	**Contact**	**Office Phone**	**Home Phone**
Jamison Engineering, Inc. 17197 Newhope St., Suite J Fountain Valley, CA 92708	Don Jamison	(714) 434-9196	(714) 296-2090 Cell (714) 963-8809 Home
Olsson Construction		(714) 516-9596	
Manhole Adjusting Contr.	Art Balline	(213) 725-1387	(323) 558-8000
Paulus Engineering	Ron Paulus	(714) 632-3975	
Penhall Co.		(714) 772-6450	
Prlich; Mike, & Sons	Mike Prlich Pete Serdar	(213) 283-7852	
Sancon Engineering		(714) 891-2323	
Thoryson			
Valverde Construction	Office	(562) 906-1826	
Paving Contractors			
All American Asphalt		(909) 736-7600	
Best Western Paving Walnut		(949) 598-2723	
SS Mechanical		(714) 847-1317	
Foss Environmental		(562) 590-6706	
J.R. Filanc Construction		(909) 898-6513	
MMC, INC		(714) 521-2022	
Roads & Traffic Control			
California Barricade Rentals		(714) 558-8474	
Traffic Control Services Anaheim		(714) 937-0422 (714) 359-0996	
Sandblasting and Water Blasting			
Sancon Engineering		(714) 891-2323	
Concrete Cutting/Coring			
Flat & Vertical Concrete Cutting		(714) 774-2031	
Concrete Coring Co.		(714) 635-5944	
Dewatering Contractors			
National Plant Services	Dennis Keene	(562) 436-7600	
Nottingham Co.		(714) 953-6700	
Rain for Rent	Pat Galbraith	(619) 235-8265	
Godwin	Stewart Warren	(562) 884-8394	
Sewer Line TV Investigation Contractors			
American Leak Detection	Office	(714) 836-8477	
National Plant Services	Dennis Keene	(562) 436-7600	
Propipe Services		(800) 386-1497	(800) 209-0000
Innerline Engineering		(909) 658-8541	
PVC/Poly Contractors & Suppliers			
Pacific Mechanical Supply		(714) 522-5374	
Harrington Industrial		(714) 879-9030	
PSI Plastic Sales		(949) 492-5301	
Sancon Engineering		(714) 891-2323	
Concrete Coring & Saw Cutting Contractors			
Penhall International		(714) 772-6450	
Street Sweeping			
Armor Vac Truck	(714) 839-4386		Parking lots only
Coffelt Sweeping	(714) 992-4070		
Van Power Sweep	(714) 349-8048		
Steam Cleaner/Power Washing			
Hitech Pressure Steam Cleaning	(949) 472-1111		(714) -316-1474 Pgr

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(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Contractors			
Company	**Contact**	**Office Phone**	**Home Phone**
Tree Service/Landscaping/Weed Abatement			
David's Tree Service	(714) 842-6345		
Great Scott Tree Service	(714) 826-1750		
Tropical Plaza	(714) 998-4100		
Pest Control			
Lloyd Pest control	(714) 825-3558		
Terminix Int'l	(714) 634-1145		
Access Exterminator Service	(714) 630-6310		
Steel/Metal Sheets			
Summit Steel	(714) 898-3433		
Industrial Metal Supply	(949) 250-3343		
Fence Companies			
Alcorn Fence	(714) 744-9447		
Golden-west Fence	(714) 893-0034		
Pyramid	(949) 548-9662		
State Wide Rent-A-Fence	(800) 342-3620		
Mechanical Parts (belts, gears, bearings, hose)			
Thompson Int'l	David Phipps		(714) 632-8895 (714) 563-5011 Pgr
Sunset Int'l	(562) 809-8300		(562) 221-7309 Cell
Motion Industries	(949) 752-0023		(949) 735-4914

Spill Response Contractors		
Company	**Contact**	**Equipment**
Nottingham Co. Santa Ana	Frank Howenstein (714) 953-6700	▪ 2000-gal mild steel tank vacuum truck for sewage • 4000-gal mild steel vacuum truck for sewage
National Plant Service Long Beach	Brian Keene (562) 436-7600 (800) 445-3614 24 Hour Hotline	▪ Combination sewer cleaning truck with two-person crew ▪ Industrial vacuum truck with two-person crew for grit and debris
United Pumping Service City of Industry	Mark Acosta (626) 961-9326	▪ 2000-gal mild steel tank vacuum truck for sewage ▪ 4000-gal mild steel vacuum truck for sewage ▪ 2000-gal Kestie-lined tank vacuum truck for pH 1 through 4 chemicals ▪ Combination sewer cleaning truck with two-person crew ▪ Industrial vacuum truck with two-person crew for grit and debris removal ▪ Various traffic control equipment for Caltrans and right-of-way

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11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Bypass Pumping Contractors		
Company	**Contact**	**Equipment**
Foothill Engineering & Dewatering Corona	Wyndell Bradford (909) 737-5391	▪ Steel and PVC bypass piping ▪ Variety of diesel and electric pumps ▪ Most pipe in stock is 12" dia. ▪ Largest pipe dia. Is 16"
Godwin Pumps of America, Inc. Corona	Stewart Warren (562) 884-8394 Cell	▪ Various bypass equipment and materials ▪ Bower-type couplings (large joint deflection capabilities) ▪ Fused HDPE bypass piping
Rain for Rent Riverside	Chris Musser (Inland Empire) (909) 653-2171 Pat Galbraith (Orange Co.) (619) 235-8265	▪ Various bypass equipment and materials ▪ Aluminum piping w/Victaulic couplings ▪ Numerous equipment yards nationwide to draw from
Charles King Co. Signal Hill	Butch King (562) 426-2974	▪ 10,000-ft flexible 6" PVC pipe ▪ 8" and 10" electric and diesel pumps ▪ Two 16" sound-attenuated diesel pumps (10,000 gpm)

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(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Form 3F
OCSD Procurement and Technical Documents

Form 3F OCSD Procurement and Technical Documents	
Incident Name:	Incident Start Date/Time:
Responsible Division: 830	Responsible Supervisor (Name and Position):
Instructions: Insert name, date, and filing location of document in the appropriate box below. Original documentation should be submitted to Admin. Asst. Div. 420 at (714) 593-7256 for filing.	
Grading Plan ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____	**Survey Data** ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____
Photographs ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____	**As Built Sketches/Drawings** ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____
Materials Testing ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____	**Geotechnical Data** ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____
Product and Materials Data (i.e. precast manhole, precast vault, etc.) ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____	**Lab Data** ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____

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11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Form 3F OCSD Procurement and Technical Documents	
Incident Name:	Incident Start Date/Time:
Responsible Division: 830	Responsible Supervisor (Name and Position):
Traffic Control Plan ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____	**Staging Area Plan** ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____
Repair Equipment (i.e. proposed machinery) ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____	**Construction Contracts** ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____
Submittals ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____	**RFIs** ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____
Other ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____	**Other** ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____
Distribution: This report shall be distributed to the appropriate Tier I (Red) contacts found in Communication and Response Protocol when completed and reviewed. Original documentation should be submitted to Administrative Assistant for Division 420 for filing.	

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11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Form 3G
OCSD Incident Repair Actions Report

Form 3G OCSD Incident Repair Actions Report	
OCSD Incident Type:	OCSD Incident Start Date/Time:
Responsible Division: 830	Responsible Supervisor (Name and Position):
Location of OCSD Incident:	
Type of OCSD Incident (SSO, high flow, seismic event, etc.):	
Note: Please follow OCSD safety guidelines specified in XXXX when responding to a SARI Line emergency.	
Description of Damage to SARI Pipeline	
Description of Repairs to SARI Line Check all that apply: Notes: ☐ Grading (soil)* ☐ Photographs documenting repairs* ☐ Surveys performed* ☐ As-built sketches of Repairs* ☐ Other: _____ * Refer to Form "Procurement and Technical Documents" to find report titles.	
Description of any Manhole Modifications:	
Description of Other Structures or Repairs:	
Attach detailed shop drawings, product specifications, etc. under "Procurement Technical Documents"	
Approximate Repair Costs (direct and indirect; attach reports under "Procurement and Technical Documents):	

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(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Form 3G OCSD Incident Repair Actions Report		
OCSD Incident Type:	OCSD Incident Start Date/Time:	
Responsible Division: 830	Responsible Supervisor (Name and Position):	
Outstanding Repair Issues:		
Recommendations for Follow-Up Repair Actions		
Ultimate Resolution		
Repair Team Members		
This report written by:	**Position**	**Date**
This report reviewed by:	**Position**	**Date**
Distribution: This report shall be distributed to the appropriate contacts as deemed necessary.		

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(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Form 3H
Environmental and Public Health Protocol

Form 3H Environmental and Public Health Protocol

Responsible Division: 620

CEQA Review

Emergency repairs are exempt from environmental review under the California Environmental Quality Act (CEQA). Pursuant to Section 15269 of the CEQA Guidelines, emergency repairs to publicly or privately owned service facilities necessary to maintain service essential to the public health, safety or welfare are exempt from CEQA.

Local and Regional Agencies

Orange County Health Care Agency

Health and Safety Code Section 5410-5415

The Orange County Health Care Agency must be notified if there is an overflow or a break in the line. During business hours, call the Environmental Health Division. Outside of business hours, a phone call should be made to the Orange County emergency communication center and then the dispatcher will notify the appropriate agencies. This phone number is used for any type of emergency situations within the county. Failing to notify the Health Care Agency is a misdemeanor punishable by fine or imprisonment. The Health Care Agency will determine if public notification is required to safeguard public health. Refer to *Communication and Response Protocol* for contact information.

Regional Water Quality Control Board

Water Code Section 13271

If sewage is discharged into state waters, notification of the Governor's Office of Emergency Services (OES) is required (see below under *State Agencies*). OES will then notify the Regional Water Quality Control Board, and the Regional Board will notify the State Water Quality Control Board if required. During normal business hours the RWQCB should be contacted directly by OCSD staff, in addition to notifying OES. Refer to *Communication and Response Protocol* for contact information.

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11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

State Agencies

Governor's Office of Emergency Services

Water Code Section 13271

For any discharge to the waters of the state, the Governor's Office of Emergency Services (OES) should be notified immediately, as soon as the notification can be provided without substantially impeding emergency response measures. OES will immediately notify other the Regional Water Quality Control Board, and the local health officer. Failing to notify OES is a misdemeanor punishable by fine or imprisonment. Refer to *Communication and Response Protocol* for contact information.

California Fish and Game

Fish and Game Code 1601(f)(1)(A)

Immediate work necessary to protect life and property may be conducted without obtaining a permit for construction that may adversely impact wildlife. However, the Department must be notified of the emergency work being conducted within 14 days. Refer to *Communication and Response Protocol* for contact information.

Federal Agencies

Environmental Protection Agency
40 CFR Chapter 1 233.22

In the event of an emergency involving discharge of dredged or fill material, a temporary emergency permit is required. Contact Region 9 staff member Katherine Moore of the Environmental Protection Agency regarding issuance of the permit. An emergency permit is issued if there is not adequate time for a standard permit to be obtained before severe loss of physical property is likely to occur. The emergency permit will be limited in duration of completion of the emergency action, typically 90 days or less. Refer to *Communication and Response Protocol* for contact information.

U.S. Army Corps of Engineers
33 CFR 325.2(e)(4)

In emergency situations, a permit is required from the U.S. Army Corps of Engineers (Corps) for anything that falls within their regulatory jurisdiction. The Corps does not have an emergency permit but it has a modified permitting procedure in an emergency situation. The process usually takes days or hours depending on the urgency of the situation. The Corps has several categories of permits depending on the situation. An emergency is a situation that would result hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if action requiring a permit is not undertaken within a time period less than the normal time to process the application under standard procedures. Refer to *Communication and Response Protocol* for contact information.

(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

U.S. Fish and Wildlife Service

Due to the location of the subject reach within an environmentally sensitive area, notification of the U.S. Fish and Wildlife Service is required in an emergency. In addition, the U.S. Fish and Wildlife Service will be contacted by the Regional Director of the Environmental Protect Agency regarding the issuance of an EPA emergency permit. Refer to *Communication and Response Protocol* for contact information.

(G):\ntglobal\SARI\ERP Forms
11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Form 3J
Follow-Up Notification Protocol

Form 3J Follow-Up Notification Protocol

Responsible Division: 620

1. Upon resolution of the SARI Pipeline emergency:

   a) The Operations Supervisor shall work with ECM staff to send the appropriate follow-up information to the contacts shown in Communication and Response Protocol.

   b) Copies of the following information will be sent to each Contact Tier level:

   - **Tier 1 (Red, Bolded):**
     - Event Documentation Report
     - Repair Actions Report
     - Procurement and Technical Documents (Include copies of all attached reports)
     - Others as deemed appropriate
   - *Tier 2 (Green, Italicized)*
     - Documentation sent determined on a case by case basis
   - Tier 3 (Blue, Normal)
     - Documentation sent determined on a case by case basis

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11/30/03
Dist: Arhontes, Johannesson, Khublall, Admin. Asst. Div. 420, Documentation Unit Leader

Appendix A
Hydraulics Calculations

CDM	Client: **SAWPA/OCSD**	Job No. **2084-39691**	Computed By: **MAC**
	Project: **SARI Line ERP**	Dated Checked: **10/21/2003**	Date: **10/15/2003**
	Detail: **SSO Evaluation**	Checked By: **CLK**	Page No.: **1**

Friction Losses through Pipe Runs

For 30" and > diameter pipe:

Note: A K of 0.003 is used assuming reinforced concrete pipe.

$h_f = (Q^2*L)/(N^2*A^2*R^{7/6})$

$N = 74.8/K^{1/6}$

197

K = 0.003 ft

Minor Losses through Fittings

Type	k	Description	
pipe entrance	0.5	From CDM Guidelines.	$h_f = kV^2/2g$
pipe exit	1.0	From CDM Guidelines.	

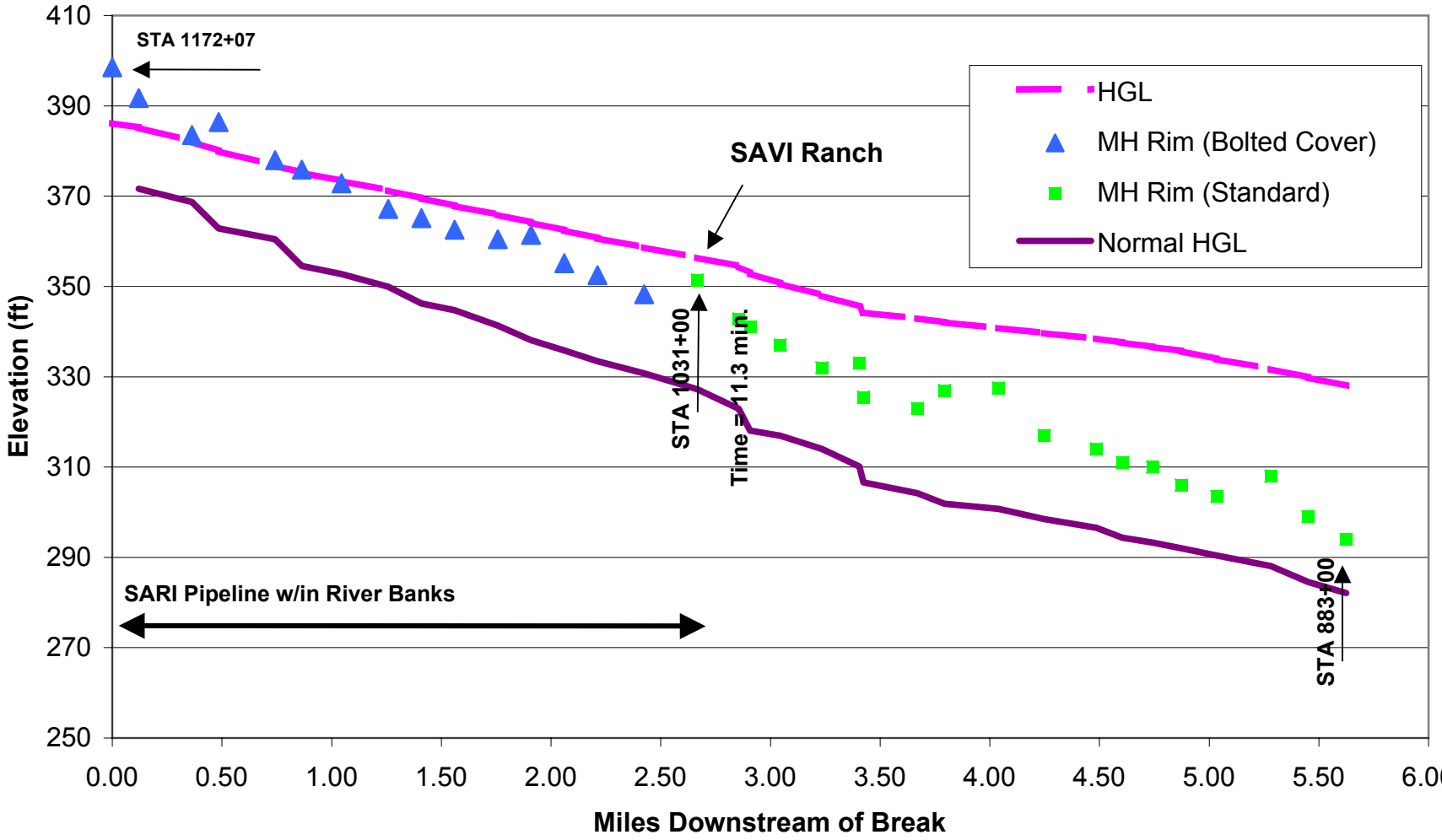
Project Specific Notes: k value of 1.5 for manholes was calculated by adding the k value for pipe entrance to pipe exit.
Mannings equation used to calculate flows for steady state, full flowing pipe flow
Flow is calculated using smallest diameter size (3.5 ft)

Assumptions

Break at: **Green River**
SAR Flow: **5,000 cfs**
SAR WSL: 387.3 ft

Fitting Type	Station	Length	Pipe Invert	Cumulative Length (mi)	k	Q (cfs)	D (ft)	H (ft)	HGL	Unsealed MH Rim Elev (end of pipe)	Sealed Manholes (end of pipe)
									387.30		398.5
Manhole			369	0.00	1.5	67.9	3.50	1.160	386.14		
Pipe spool			369	0.12		67.9	3.50	0.960	385.18		391.7
Manhole			366.1	0.12	1.5	67.9	3.50	1.160	384.02		
Pipe spool			366.1	0.36		67.9	3.50	1.921	382.10		383.55
Manhole			360.2	0.36	1.5	67.9	3.50	1.160	380.94		
Pipe spool			360.2	0.48		67.9	3.50	0.960	379.98		386.37
Manhole			357.8	0.48	1.5	67.9	3.50	1.160	378.82		
Pipe spool			357.8	0.74		67.9	3.50	2.041	376.78		377.99
Manhole			351.7	0.74	1.5	67.9	3.75	0.881	375.90		
Pipe spool			351.7	0.86		67.9	3.75	0.672	375.22		375.87
Manhole			349.9	0.86	1.50	67.9	3.75	0.881	374.34		
Pipe spool			349.9	1.05		67.9	3.75	1.009	373.33		372.85
Manhole			347.1	1.05	1.5	67.9	3.75	0.881	372.45		
Pipe spool			347.1	1.26		67.9	3.75	1.177	371.28		367.17
Manhole			343.42	1.26	1.5	67.9	3.75	0.881	370.40		
Pipe spool			343.42	1.41		67.9	3.75	0.841	369.56		365.13
Manhole			341.95	1.41	1.5	67.9	3.75	0.881	368.68		
Pipe spool			341.95	1.56		67.9	3.75	0.841	367.83		362.56
Manhole			338.5	1.56	1.5	67.9	3.75	0.881	366.95		
Pipe spool			338.5	1.76		67.9	3.75	1.093	365.86		360.43
Manhole			335.3	1.76	1.5	67.9	3.75	0.881	364.98		
Pipe spool			335.3	1.91		67.9	3.75	0.841	364.14		361.43
Manhole			333.02	1.91	1.5	67.9	3.75	0.881	363.26		
Pipe spool			333.02	2.06		67.9	3.75	0.841	362.42		355.13
Manhole			330.6	2.06	1.5	67.9	3.75	0.881	361.54		
Pipe spool			330.6	2.21		67.9	3.75	0.841	360.70		352.48
Manhole			327.91	2.21	1.5	67.9	3.75	0.881	359.82		
Pipe spool			327.91	2.42		67.9	3.75	1.177	358.64		348.27
Manhole			324.4	2.42	1.5	67.9	3.75	0.881	357.76		
Pipe spool (ends at SAVI Ranch)			324.4	2.67		67.9	3.75	1.345	356.42	351.41	
Manhole (SAVI Ranch)	103000		320.1	2.67	1.5	67.9	3.75	0.881	355.54		
Pipe spool		997.16	320.1	2.86		67.9	3.75	1.048	354.49	342.8	
Manhole	102003		315.45	2.86	1.5	67.9	3.50	1.160	353.33		
Pipe spool		271.35	315.45	2.91		67.9	3.50	0.407	352.92	341	
Manhole	101731		314.3	2.91	1.5	67.9	3.50	1.160	351.76		
Pipe spool		731.49	314.3	3.05		67.9	3.50	1.098	350.66	337	
Manhole	101000		311.39	3.05	1.5	67.9	3.50	1.160	349.50		
Pipe spool		1000	311.39	3.23		67.9	3.50	1.501	348.00	332	
Manhole	100000		307.5	3.23	1.5	67.9	3.50	1.160	346.84		
Pipe spool		900	307.5	3.41		67.9	3.50	1.351	345.49	333	
Manhole	99100		304	3.41	1.5	67.9	3.50	1.160	344.33		
Pipe spool		100	304	3.42		67.9	3.50	0.150	344.18	325.5	
Manhole	99000		301	3.42	1.5	67.9	4.25	0.534	343.65		
Pipe spool		1300	301	3.67		67.9	4.25	0.715	342.93	323	
Manhole	97700		298.72	3.67	1.5	67.9	4.25	0.534	342.40		
Pipe spool		650	298.72	3.79		67.9	4.25	0.358	342.04	327	
Manhole	97050		297.58	3.79	1.5	67.9	4.25	0.534	341.51		
Pipe spool		1300	297.58	4.04		67.9	4.25	0.715	340.79	327.5	
Manhole	95750		295.31	4.04	1.5	67.9	4.25	0.534	340.26		
Pipe spool		1100	295.31	4.25		67.9	4.25	0.605	339.65	317	
Manhole	94650		293.38	4.25	1.5	67.9	4.25	0.534	339.12		
Pipe spool		1250	293.38	4.48		67.9	4.25	0.688	338.43	314	
Manhole	93400		291.19	4.48	1.5	67.9	4.25	0.534	337.90		
Pipe spool		630	291.19	4.60		67.9	4.25	0.347	337.55	311	
Manhole	92770		290.1	4.60	1.5	67.9	4.25	0.534	337.02		
Pipe spool		727	290.1	4.74		67.9	4.25	0.400	336.62	310	
Manhole	92043		288.83	4.74	1.5	67.9	4.25	0.534	336.08		
Pipe spool		693	288.83	4.87		67.9	4.25	0.381	335.70	306	
Manhole	91350		287.61	4.87	1.5	67.9	3.75	0.881	334.82		
Pipe spool		856.22	287.61	5.04		67.9	3.75	0.900	333.92	303.5	
Manhole	90494		285.28	5.04	1.5	67.9	3.75	0.881	333.04		
Pipe spool		1295.78	285.28	5.28		67.9	3.75	1.361	331.68	308	
Manhole	89198		281.75	5.28	1.5	67.9	3.75	0.881	330.80		
Pipe spool		898	281.75	5.45		67.9	3.75	0.944	329.85	299	
Manhole	88300		279.31	5.45	1.5	67.9	3.75	0.881	328.97		
Pipe spool		916.31	279.31	5.62		67.9	3.75	0.963	328.01	294	
	87384		276.81								

Comparison of Hydraulic Grade Line and Manhole Rim Elevations
Santa Ana River Flow - 5,000 cfs



CDM	Client: **SAWPA/OCSD**	Job No. **2084-39691**	Computed By: **MAC**
	Project: **SARI Line ERP**	Dated Checked: **10/21/2003**	Date: **10/15/2003**
	Detail: **SSO Evaluation**	Checked By: **CLK**	Page No.: **2**

Friction Losses through Pipe Runs

For 30" and > diameter pipe:

Note: A K of 0.003 is used assuming reinforced concrete pipe.

$h_f = (Q^2*L)/(N^2*A^2*R^{7/6})$

$N = 74.8/K^{1/6}$

197

K = 0.003 ft

Minor Losses through Fittings

Type	k	Description	
pipe entrance	0.5	From CDM Guidelines.	$h_f = kV^2/2g$
pipe exit	1.0	From CDM Guidelines.	

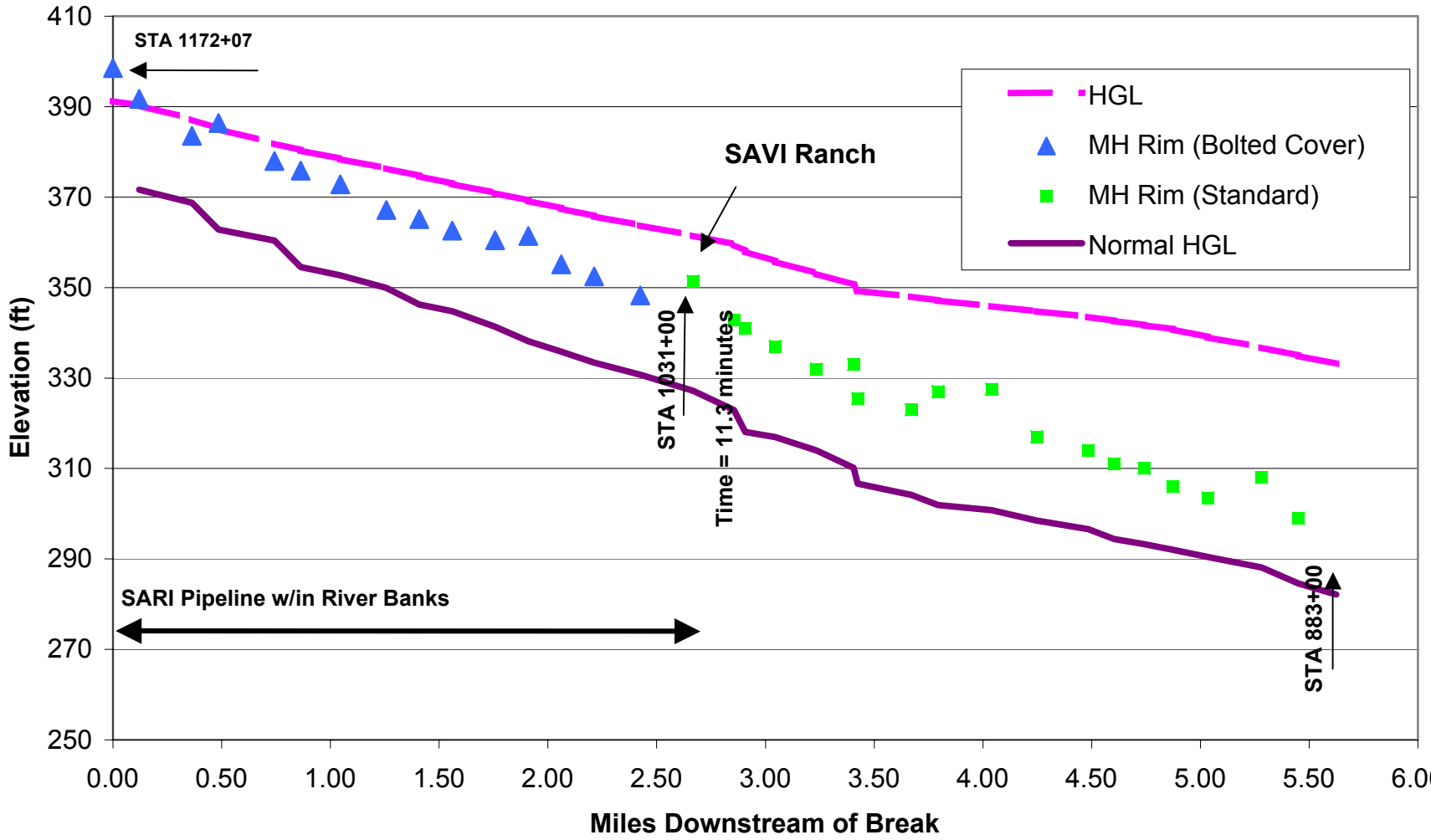
Project Specific Notes: k value of 1.5 for manholes was calculated by adding the k value for pipe entrance to pipe exit.
Mannings equation used to calculate flows for steady state, full flowing pipe flow

Assumptions

Break at: **Green River**
SAR Flow: **18,000 cfs**
SAR WSL: 392.4 ft

Fitting Type	Station	Length	Pipe Invert	Cumulative Length (mi)	k	Q (cfs)	D (ft)	H (ft)	HGL	Unsealed MH Rim Elev (end of pipe)	Sealed Manholes (end of pipe)
									392.40		398.5
Manhole			369	0.00	1.5	67.9	3.50	1.160	391.24		
Pipe spool			369	0.12		67.9	3.50	0.960	390.28		391.7
Manhole			366.1	0.12	1.5	67.9	3.50	1.160	389.12		
Pipe spool			366.1	0.36		67.9	3.50	1.921	387.20		383.55
Manhole			360.2	0.36	1.5	67.9	3.50	1.160	386.04		
Pipe spool			360.2	0.48		67.9	3.50	0.960	385.08		386.37
Manhole			357.8	0.48	1.5	67.9	3.50	1.160	383.92		
Pipe spool			357.8	0.74		67.9	3.50	2.041	381.88		377.99
Manhole			351.7	0.74	1.5	67.9	3.75	0.881	381.00		
Pipe spool			351.7	0.86		67.9	3.75	0.672	380.32		375.87
Manhole			349.9	0.86	1.50	67.9	3.75	0.881	379.44		
Pipe spool			349.9	1.05		67.9	3.75	1.009	378.43		372.85
Manhole			347.1	1.05	1.5	67.9	3.75	0.881	377.55		
Pipe spool			347.1	1.26		67.9	3.75	1.177	376.38		367.17
Manhole			343.42	1.26	1.5	67.9	3.75	0.881	375.50		
Pipe spool			343.42	1.41		67.9	3.75	0.841	374.66		365.13
Manhole			341.95	1.41	1.5	67.9	3.75	0.881	373.78		
Pipe spool			341.95	1.56		67.9	3.75	0.841	372.93		362.56
Manhole			338.5	1.56	1.5	67.9	3.75	0.881	372.05		
Pipe spool			338.5	1.76		67.9	3.75	1.093	370.96		360.43
Manhole			335.3	1.76	1.5	67.9	3.75	0.881	370.08		
Pipe spool			335.3	1.91		67.9	3.75	0.841	369.24		361.43
Manhole			333.02	1.91	1.5	67.9	3.75	0.881	368.36		
Pipe spool			333.02	2.06		67.9	3.75	0.841	367.52		355.13
Manhole			330.6	2.06	1.5	67.9	3.75	0.881	366.64		
Pipe spool			330.6	2.21		67.9	3.75	0.841	365.80		352.48
Manhole			327.91	2.21	1.5	67.9	3.75	0.881	364.92		
Pipe spool			327.91	2.42		67.9	3.75	1.177	363.74		348.27
Manhole			324.4	2.42	1.5	67.9	3.75	0.881	362.86		
Pipe spool (ends at SAVI Ranch)			324.4	2.67		67.9	3.75	1.345	361.52	351.41	
Manhole (SAVI Ranch)	103000		320.1	2.67	1.5	67.9	3.75	0.881	360.64		
Pipe spool		997.16	320.1	2.86		67.9	3.75	1.048	359.59	342.8	
Manhole	102003		315.45	2.86	1.5	67.9	3.50	1.160	358.43		
Pipe spool		271.35	315.45	2.91		67.9	3.50	0.407	358.02	341	
Manhole	101731		314.3	2.91	1.5	67.9	3.50	1.160	356.86		
Pipe spool		731.49	314.3	3.05		67.9	3.50	1.098	355.76	337	
Manhole	101000		311.39	3.05	1.5	67.9	3.50	1.160	354.60		
Pipe spool		1000	311.39	3.23		67.9	3.50	1.501	353.10	332	
Manhole	100000		307.5	3.23	1.5	67.9	3.50	1.160	351.94		
Pipe spool		900	307.5	3.41		67.9	3.50	1.351	350.59	333	
Manhole	99100		304	3.41	1.5	67.9	3.50	1.160	349.43		
Pipe spool		100	304	3.42		67.9	3.50	0.150	349.28	325.5	
Manhole	99000		301	3.42	1.5	67.9	4.25	0.534	348.75		
Pipe spool		1300	301	3.67		67.9	4.25	0.715	348.03	323	
Manhole	97700		298.72	3.67	1.5	67.9	4.25	0.534	347.50		
Pipe spool		650	298.72	3.79		67.9	4.25	0.358	347.14	327	
Manhole	97050		297.58	3.79	1.5	67.9	4.25	0.534	346.61		
Pipe spool		1300	297.58	4.04		67.9	4.25	0.715	345.89	327.5	
Manhole	95750		295.31	4.04	1.5	67.9	4.25	0.534	345.36		
Pipe spool		1100	295.31	4.25		67.9	4.25	0.605	344.75	317	
Manhole	94650		293.38	4.25	1.5	67.9	4.25	0.534	344.22		
Pipe spool		1250	293.38	4.48		67.9	4.25	0.688	343.53	314	
Manhole	93400		291.19	4.48	1.5	67.9	4.25	0.534	343.00		
Pipe spool		630	291.19	4.60		67.9	4.25	0.347	342.65	311	
Manhole	92770		290.1	4.60	1.5	67.9	4.25	0.534	342.12		
Pipe spool		727	290.1	4.74		67.9	4.25	0.400	341.72	310	
Manhole	92043		288.83	4.74	1.5	67.9	4.25	0.534	341.18		
Pipe spool		693	288.83	4.87		67.9	4.25	0.381	340.80	306	
Manhole	91350		287.61	4.87	1.5	67.9	3.75	0.881	339.92		
Pipe spool		856.22	287.61	5.04		67.9	3.75	0.900	339.02	303.5	
Manhole	90494		285.28	5.04	1.5	67.9	3.75	0.881	338.14		
Pipe spool		1295.78	285.28	5.28		67.9	3.75	1.361	336.78	308	
Manhole	89198		281.75	5.28	1.5	67.9	3.75	0.881	335.90		
Pipe spool		898	281.75	5.45		67.9	3.75	0.944	334.95	299	
Manhole	88300		279.31	5.45	1.5	67.9	3.75	0.881	334.07		
Pipe spool		916.31	279.31	5.62		67.9	3.75	0.963	333.11	294	
	87384		276.81								

Comparison of Hydraulic Grade Line and Manhole Rim Elevations
Santa Ana River Flow - 18,000 cfs



CDM	Client: **SAWPA/OCSD**	Job No. **2084-39691**	Computed By: **MAC**
	Project: **SARI Line ERP**	Dated Checked: **10/21/2003**	Date: **10/15/2003**
	Detail: **SSO Evaluation**	Checked By: **CLK**	Page No.: **3**

Friction Losses through Pipe Runs

For 30" and > diameter pipe:

Note: A K of 0.003 is used assuming reinforced concrete pipe.

$h_f = (Q^2*L)/(N^2*A^2*R^{7/6})$

$N = 74.8/K^{1/6}$

197

K = 0.003 ft

Minor Losses through Fittings

Type	k	Description	
pipe entrance	0.5	From CDM Guidelines.	$h_f = kV^2/2g$
pipe exit	1.0	From CDM Guidelines.	

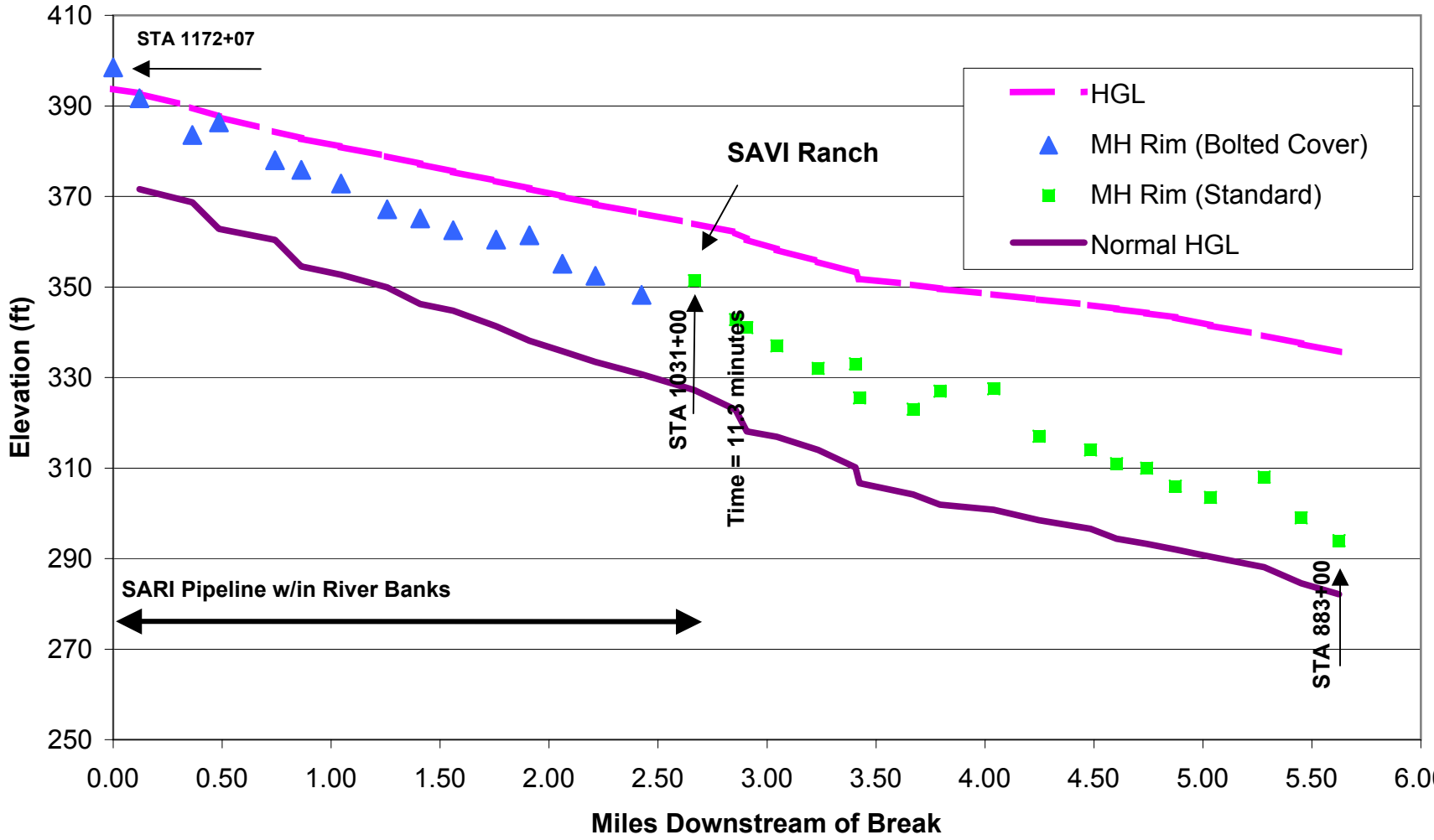
Project Specific Notes: k value of 1.5 for manholes was calculated by adding the k value for pipe entrance to pipe exit.
Mannings equation used to calculate flows for steady state, full flowing pipe flow

Assumptions

Break at: **Green River**
SAR Flow: **30,000 cfs**
SAR WSL: 394.9 ft

Fitting Type	Station	Length	Pipe Invert	Cumulative Length (mi)	k	Q (cfs)	D (ft)	H (ft)	HGL	Unsealed MH Rim Elev (end of pipe)	Sealed Manholes (end of pipe)
									394.90		398.5
Manhole			369	0.00	1.5	67.9	3.50	1.160	393.74		
Pipe spool			369	0.12		67.9	3.50	0.960	392.78		391.7
Manhole			366.1	0.12	1.5	67.9	3.50	1.160	391.62		
Pipe spool			366.1	0.36		67.9	3.50	1.921	389.70		383.55
Manhole			360.2	0.36	1.5	67.9	3.50	1.160	388.54		
Pipe spool			360.2	0.48		67.9	3.50	0.960	387.58		386.37
Manhole			357.8	0.48	1.5	67.9	3.50	1.160	386.42		
Pipe spool			357.8	0.74		67.9	3.50	2.041	384.38		377.99
Manhole			351.7	0.74	1.5	67.9	3.75	0.881	383.50		
Pipe spool			351.7	0.86		67.9	3.75	0.672	382.82		375.87
Manhole			349.9	0.86	1.50	67.9	3.75	0.881	381.94		
Pipe spool			349.9	1.05		67.9	3.75	1.009	380.93		372.85
Manhole			347.1	1.05	1.5	67.9	3.75	0.881	380.05		
Pipe spool			347.1	1.26		67.9	3.75	1.177	378.88		367.17
Manhole			343.42	1.26	1.5	67.9	3.75	0.881	378.00		
Pipe spool			343.42	1.41		67.9	3.75	0.841	377.16		365.13
Manhole			341.95	1.41	1.5	67.9	3.75	0.881	376.28		
Pipe spool			341.95	1.56		67.9	3.75	0.841	375.43		362.56
Manhole			338.5	1.56	1.5	67.9	3.75	0.881	374.55		
Pipe spool			338.5	1.76		67.9	3.75	1.093	373.46		360.43
Manhole			335.3	1.76	1.5	67.9	3.75	0.881	372.58		
Pipe spool			335.3	1.91		67.9	3.75	0.841	371.74		361.43
Manhole			333.02	1.91	1.5	67.9	3.75	0.881	370.86		
Pipe spool			333.02	2.06		67.9	3.75	0.841	370.02		355.13
Manhole			330.6	2.06	1.5	67.9	3.75	0.881	369.14		
Pipe spool			330.6	2.21		67.9	3.75	0.841	368.30		352.48
Manhole			327.91	2.21	1.5	67.9	3.75	0.881	367.42		
Pipe spool			327.91	2.42		67.9	3.75	1.177	366.24		348.27
Manhole			324.4	2.42	1.5	67.9	3.75	0.881	365.36		
Pipe spool (ends at SAVI Ranch)			324.4	2.67		67.9	3.75	1.345	364.02	351.41	
Manhole (SAVI Ranch)	103000		320.1	2.67	1.5	67.9	3.75	0.881	363.14		
Pipe spool		997.16	320.1	2.86		67.9	3.75	1.048	362.09	342.8	
Manhole	102003		315.45	2.86	1.5	67.9	3.50	1.160	360.93		
Pipe spool		271.35	315.45	2.91		67.9	3.50	0.407	360.52	341	
Manhole	101731		314.3	2.91	1.5	67.9	3.50	1.160	359.36		
Pipe spool		731.49	314.3	3.05		67.9	3.50	1.098	358.26	337	
Manhole	101000		311.39	3.05	1.5	67.9	3.50	1.160	357.10		
Pipe spool		1000	311.39	3.23		67.9	3.50	1.501	355.60	332	
Manhole	100000		307.5	3.23	1.5	67.9	3.50	1.160	354.44		
Pipe spool		900	307.5	3.41		67.9	3.50	1.351	353.09	333	
Manhole	99100		304	3.41	1.5	67.9	3.50	1.160	351.93		
Pipe spool		100	304	3.42		67.9	3.50	0.150	351.78	325.5	
Manhole	99000		301	3.42	1.5	67.9	4.25	0.534	351.25		
Pipe spool		1300	301	3.67		67.9	4.25	0.715	350.53	323	
Manhole	97700		298.72	3.67	1.5	67.9	4.25	0.534	350.00		
Pipe spool		650	298.72	3.79		67.9	4.25	0.358	349.64	327	
Manhole	97050		297.58	3.79	1.5	67.9	4.25	0.534	349.11		
Pipe spool		1300	297.58	4.04		67.9	4.25	0.715	348.39	327.5	
Manhole	95750		295.31	4.04	1.5	67.9	4.25	0.534	347.86		
Pipe spool		1100	295.31	4.25		67.9	4.25	0.605	347.25	317	
Manhole	94650		293.38	4.25	1.5	67.9	4.25	0.534	346.72		
Pipe spool		1250	293.38	4.48		67.9	4.25	0.688	346.03	314	
Manhole	93400		291.19	4.48	1.5	67.9	4.25	0.534	345.50		
Pipe spool		630	291.19	4.60		67.9	4.25	0.347	345.15	311	
Manhole	92770		290.1	4.60	1.5	67.9	4.25	0.534	344.62		
Pipe spool		727	290.1	4.74		67.9	4.25	0.400	344.22	310	
Manhole	92043		288.83	4.74	1.5	67.9	4.25	0.534	343.68		
Pipe spool		693	288.83	4.87		67.9	4.25	0.381	343.30	306	
Manhole	91350		287.61	4.87	1.5	67.9	3.75	0.881	342.42		
Pipe spool		856.22	287.61	5.04		67.9	3.75	0.900	341.52	303.5	
Manhole	90494		285.28	5.04	1.5	67.9	3.75	0.881	340.64		
Pipe spool		1295.78	285.28	5.28		67.9	3.75	1.361	339.28	308	
Manhole	89198		281.75	5.28	1.5	67.9	3.75	0.881	338.40		
Pipe spool		898	281.75	5.45		67.9	3.75	0.944	337.45	299	
Manhole	88300		279.31	5.45	1.5	67.9	3.75	0.881	336.57		
Pipe spool		916.31	279.31	5.62		67.9	3.75	0.963	335.61	294	
	87384		276.81								

Comparison of Hydraulic Grade Line and Manhole Rim Elevations
Santa Ana River Flow - 30,000 cfs



CDM					
	Client: **SAWPA/OCSD**	Job No. **2084-39691**	Computed By: **MAC**
	Project: **SARI Line ERP**	Dated Checked: **10/21/2003**	Date: **10/15/2003**
	Detail: **SSO Evaluation**	Checked By: **CLK**	Page No.: **4**

Friction Losses through Pipe Runs

For 30" and > diameter pipe:

Note: A K of 0.003 is used assuming reinforced concrete pipe.

$h_f = (Q^2*L)/(N^2*A^2*R^{7/6})$

N = $74.8/K^{1/6}$

197

K = 0.003 ft

Minor Losses through Fittings

Type	k	Description	
pipe entrance	0.5	From CDM Guidelines.	$h_f = kV^2/2g$
pipe exit	1.0	From CDM Guidelines.	

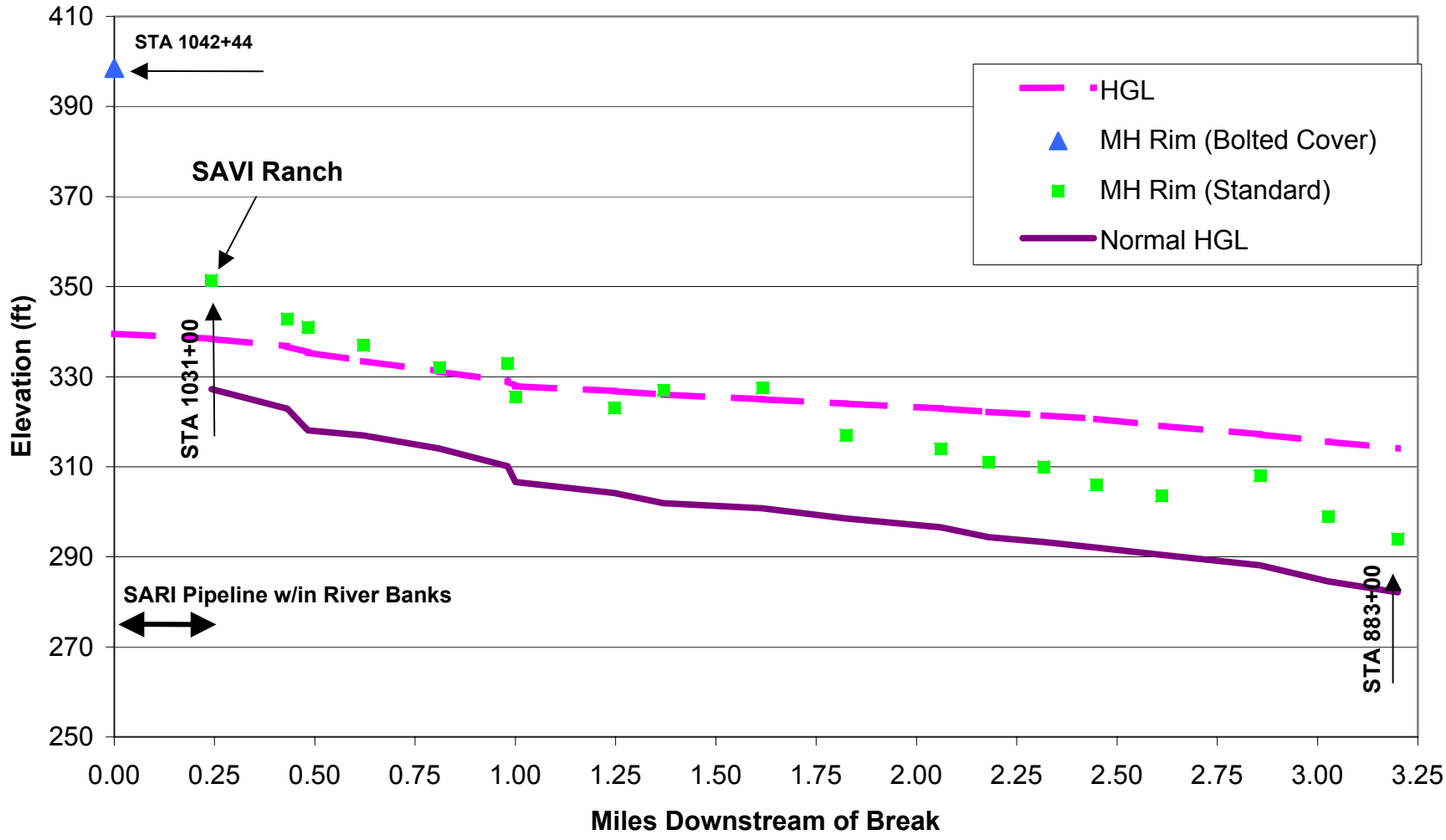
Project Specific Notes: k value of 1.5 for manholes was calculated by adding the k value for pipe entrance to pipe exit.
Mannings equation used to calculate flows for steady state, full flowing pipe flow

Assumptions

Break at: **Savi Ranch**
SAR Flow: **5,000 cfs**
SAR WSL: 340.3 ft

Fitting Type	Station	Length	Pipe Invert	Cumulative Length (mi)	k	Q (cfs)	D (ft)	H (ft)	HGL	Unsealed MH Rim Elev (end of pipe)	Sealed Manholes (end of pipe)
									340.30		398.5
Manhole			324.4	0.00	1.5	62.9	3.75	0.756	339.54		
Pipe spool (ends at SAVI Ranch)			324.4	0.24		62.9	3.75	1.154	338.39	351.41	
Manhole (SAVI Ranch)	103000		320.1	0.24	1.5	62.9	3.75	0.756	337.63		
Pipe spool		997.16	320.1	0.43		62.9	3.75	0.899	336.74	342.8	
Manhole	102003		315.45	0.43	1.5	62.9	3.50	0.996	335.74		
Pipe spool		271.35	315.45	0.48		62.9	3.50	0.349	335.39	341	
Manhole	101731		314.3	0.48	1.5	62.9	3.50	0.996	334.39		
Pipe spool		731.49	314.3	0.62		62.9	3.50	0.942	333.45	337	
Manhole	101000		311.39	0.62	1.5	62.9	3.50	0.996	332.46		
Pipe spool		1000	311.39	0.81		62.9	3.50	1.288	331.17	332	
Manhole	100000		307.5	0.81	1.5	62.9	3.50	0.996	330.17		
Pipe spool		900	307.5	0.98		62.9	3.50	1.159	329.01	333	
Manhole	99100		304	0.98	1.5	62.9	3.50	0.996	328.02		
Pipe spool		100	304	1.00		62.9	3.50	0.129	327.89	325.5	
Manhole	99000		301	1.00	1.5	62.9	4.25	0.458	327.43		
Pipe spool		1300	301	1.25		62.9	4.25	0.614	326.82	323	
Manhole	97700		298.72	1.25	1.5	62.9	4.25	0.458	326.36		
Pipe spool		650	298.72	1.37		62.9	4.25	0.307	326.05	327	
Manhole	97050		297.58	1.37	1.5	62.9	4.25	0.458	325.59		
Pipe spool		1300	297.58	1.62		62.9	4.25	0.614	324.98	327.5	
Manhole	95750		295.31	1.62	1.5	62.9	4.25	0.458	324.52		
Pipe spool		1100	295.31	1.82		62.9	4.25	0.520	324.00	317	
Manhole	94650		293.38	1.82	1.5	62.9	4.25	0.458	323.54		
Pipe spool		1250	293.38	2.06		62.9	4.25	0.590	322.95	314	
Manhole	93400		291.19	2.06	1.5	62.9	4.25	0.458	322.50		
Pipe spool		630	291.19	2.18		62.9	4.25	0.298	322.20	311	
Manhole	92770		290.1	2.18	1.5	62.9	4.25	0.458	321.74		
Pipe spool		727	290.1	2.32		62.9	4.25	0.343	321.40	310	
Manhole	92043		288.83	2.32	1.5	62.9	4.25	0.458	320.94		
Pipe spool		693	288.83	2.45		62.9	4.25	0.327	320.61	306	
Manhole	91350		287.61	2.45	1.5	62.9	3.75	0.756	319.86		
Pipe spool		856.22	287.61	2.61		62.9	3.75	0.772	319.08	303.5	
Manhole	90494		285.28	2.61	1.5	62.9	3.75	0.756	318.33		
Pipe spool		1295.78	285.28	2.86		62.9	3.75	1.168	317.16	308	
Manhole	89198		281.75	2.86	1.5	62.9	3.75	0.756	316.40		
Pipe spool		898	281.75	3.03		62.9	3.75	0.810	315.59	299	
Manhole	88300		279.31	3.03	1.5	62.9	3.75	0.756	314.84		
Pipe spool		916.31	279.31	3.20		62.9	3.75	0.826	314.01	294	
	87384		276.81								

Comparison of Hydraulic Grade Line and Manhole Rim Elevations
Santa Ana River Flow - 5,000 cfs



CDM					
	Client: **SAWPA/OCSD**	Job No. **2084-39691**	Computed By: **MAC**
	Project: **SARI Line ERP**	Dated Checked: **10/21/2003**	Date: **10/15/2003**
	Detail: **SSO Evaluation**	Checked By: **CLK**	Page No.: **5**

Friction Losses through Pipe Runs

For 30" and > diameter pipe:

Note: A K of 0.003 is used assuming reinforced concrete pipe.

$h_f = (Q^2*L)/(N^2*A^2*R^{7/6})$

N = $74.8/K^{1/6}$

197

K = 0.003 ft

Minor Losses through Fittings

Type	k	Description	
pipe entrance	0.5	From CDM Guidelines.	$h_f = kV^2/2g$
pipe exit	1.0	From CDM Guidelines.	

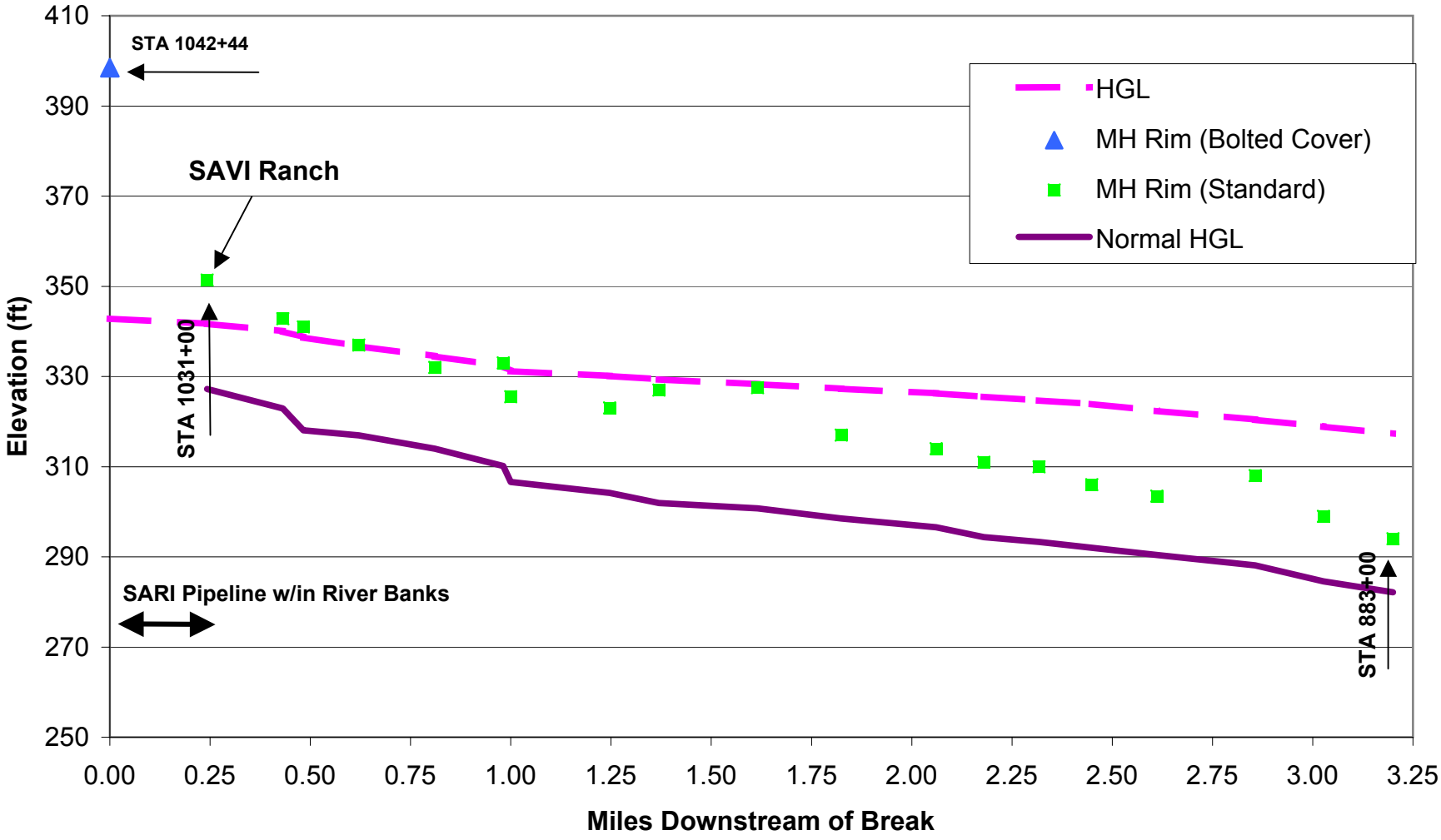
Project Specific Notes: k value of 1.5 for manholes was calculated by adding the k value for pipe entrance to pipe exit.
Mannings equation used to calculate flows for steady state, full flowing pipe flow

Assumptions

Break at: **Savi Ranch**
SAR Flow: **18,000 cfs**
SAR WSL: 343.6 ft

Fitting Type	Station	Length	Pipe Invert	Cumulative Length (mi)	k	Q (cfs)	D (ft)	H (ft)	HGL	Unsealed MH Rim Elev (end of pipe)	Sealed Manholes (end of pipe)
									343.60		398.5
Manhole			324.4	0.00	1.5	62.9	3.75	0.756	342.84		
Pipe spool (ends at SAVI Ranch)			324.4	0.24		62.9	3.75	1.155	341.69	351.41	351.41
Manhole (SAVI Ranch)	103000		320.1	0.24	1.5	62.9	3.75	0.756	340.93		
Pipe spool		997.16	320.1	0.43		62.9	3.75	0.899	340.03	342.8	
Manhole	102003		315.45	0.43	1.5	62.9	3.50	0.996	339.04		
Pipe spool		271.35	315.45	0.48		62.9	3.50	0.350	338.69	341	
Manhole	101731		314.3	0.48	1.5	62.9	3.50	0.996	337.69		
Pipe spool		731.49	314.3	0.62		62.9	3.50	0.942	336.75	337	
Manhole	101000		311.39	0.62	1.5	62.9	3.50	0.996	335.75		
Pipe spool		1000	311.39	0.81		62.9	3.50	1.288	334.47	332	
Manhole	100000		307.5	0.81	1.5	62.9	3.50	0.996	333.47		
Pipe spool		900	307.5	0.98		62.9	3.50	1.159	332.31	333	
Manhole	99100		304	0.98	1.5	62.9	3.50	0.996	331.31		
Pipe spool		100	304	1.00		62.9	3.50	0.129	331.19	325.5	
Manhole	99000		301	1.00	1.5	62.9	4.25	0.458	330.73		
Pipe spool		1300	301	1.25		62.9	4.25	0.614	330.11	323	
Manhole	97700		298.72	1.25	1.5	62.9	4.25	0.458	329.65		
Pipe spool		650	298.72	1.37		62.9	4.25	0.307	329.35	327	
Manhole	97050		297.58	1.37	1.5	62.9	4.25	0.458	328.89		
Pipe spool		1300	297.58	1.62		62.9	4.25	0.614	328.28	327.5	
Manhole	95750		295.31	1.62	1.5	62.9	4.25	0.458	327.82		
Pipe spool		1100	295.31	1.82		62.9	4.25	0.520	327.30	317	
Manhole	94650		293.38	1.82	1.5	62.9	4.25	0.458	326.84		
Pipe spool		1250	293.38	2.06		62.9	4.25	0.591	326.25	314	
Manhole	93400		291.19	2.06	1.5	62.9	4.25	0.458	325.79		
Pipe spool		630	291.19	2.18		62.9	4.25	0.298	325.49	311	
Manhole	92770		290.1	2.18	1.5	62.9	4.25	0.458	325.03		
Pipe spool		727	290.1	2.32		62.9	4.25	0.343	324.69	310	
Manhole	92043		288.83	2.32	1.5	62.9	4.25	0.458	324.23		
Pipe spool		693	288.83	2.45		62.9	4.25	0.327	323.91	306	
Manhole	91350		287.61	2.45	1.5	62.9	3.75	0.756	323.15		
Pipe spool		856.22	287.61	2.61		62.9	3.75	0.772	322.38	303.5	
Manhole	90494		285.28	2.61	1.5	62.9	3.75	0.756	321.62		
Pipe spool		1295.78	285.28	2.86		62.9	3.75	1.169	320.45	308	
Manhole	89198		281.75	2.86	1.5	62.9	3.75	0.756	319.70		
Pipe spool		898	281.75	3.03		62.9	3.75	0.810	318.89	299	
Manhole	88300		279.31	3.03	1.5	62.9	3.75	0.756	318.13		
Pipe spool		916.31	279.31	3.20		62.9	3.75	0.826	317.30	294	
	87384		276.81								

Comparison of Hydraulic Grade Line and Manhole Rim Elevations
Santa Ana River Flow - 18,000 cfs



CDM					
	Client: **SAWPA/OCSD**	Job No. **2084-39691**	Computed By: **MAC**
	Project: **SARI Line ERP**	Dated Checked: **10/21/2003**	Date: **10/15/2003**
	Detail: **SSO Evaluation**	Checked By: **CLK**	Page No.: **6**

Friction Losses through Pipe Runs

For 30" and > diameter pipe:

Note: A K of 0.003 is used assuming reinforced concrete pipe.

$h_f = (Q^2*L)/(N^2*A^2*R^{7/6})$

N = $74.8/K^{1/6}$

197

K = 0.003 ft

Minor Losses through Fittings

Type	k	Description	
pipe entrance	0.5	From CDM Guidelines.	$h_f = kV^2/2g$
pipe exit	1.0	From CDM Guidelines.	

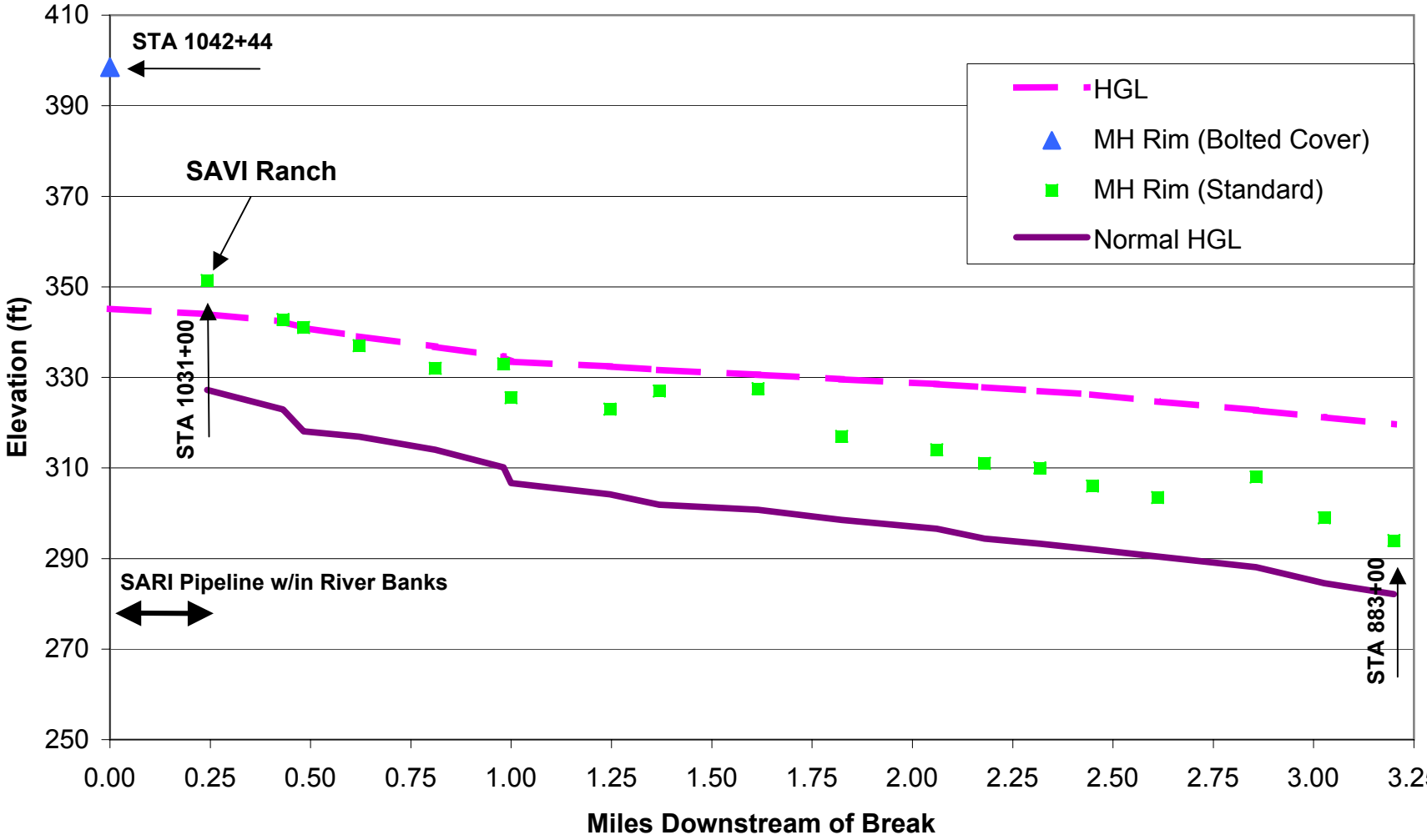
Project Specific Notes: k value of 1.5 for manholes was calculated by adding the k value for pipe entrance to pipe exit.
Mannings equation used to calculate flows for steady state, full flowing pipe flow

Assumptions

Break at: **Savi Ranch**
SAR Flow: **30,000 cfs**
SAR WSL: 345.9 ft

Fitting Type	Station	Length	Pipe Invert	Cumulative Length (mi)	k	Q (cfs)	D (ft)	H (ft)	HGL	Unsealed MH Rim Elev (end of pipe)	Sealed Manholes (end of pipe)
									345.90		398.5
Manhole			324.4	0.00	1.5	62.9	3.75	0.756	345.14		
Pipe spool (ends at SAVI Ranch)			324.4	0.24		62.9	3.75	1.155	343.99	351.41	
Manhole (SAVI Ranch)	103000		320.1	0.24	1.5	62.9	3.75	0.756	343.23		
Pipe spool		997.16	320.1	0.43		62.9	3.75	0.899	342.33	342.8	
Manhole	102003		315.45	0.43	1.5	62.9	3.50	0.996	341.34		
Pipe spool		271.35	315.45	0.48		62.9	3.50	0.350	340.99	341	
Manhole	101731		314.3	0.48	1.5	62.9	3.50	0.996	339.99		
Pipe spool		731.49	314.3	0.62		62.9	3.50	0.942	339.05	337	
Manhole	101000		311.39	0.62	1.5	62.9	3.50	0.996	338.05		
Pipe spool		1000	311.39	0.81		62.9	3.50	1.288	336.77	332	
Manhole	100000		307.5	0.81	1.5	62.9	3.50	0.996	335.77		
Pipe spool		900	307.5	0.98		62.9	3.50	1.159	334.61	333	
Manhole	99100		304	0.98	1.5	62.9	3.50	0.996	333.61		
Pipe spool		100	304	1.00		62.9	3.50	0.129	333.49	325.5	
Manhole	99000		301	1.00	1.5	62.9	4.25	0.458	333.03		
Pipe spool		1300	301	1.25		62.9	4.25	0.614	332.41	323	
Manhole	97700		298.72	1.25	1.5	62.9	4.25	0.458	331.95		
Pipe spool		650	298.72	1.37		62.9	4.25	0.307	331.65	327	
Manhole	97050		297.58	1.37	1.5	62.9	4.25	0.458	331.19		
Pipe spool		1300	297.58	1.62		62.9	4.25	0.614	330.58	327.5	
Manhole	95750		295.31	1.62	1.5	62.9	4.25	0.458	330.12		
Pipe spool		1100	295.31	1.82		62.9	4.25	0.520	329.60	317	
Manhole	94650		293.38	1.82	1.5	62.9	4.25	0.458	329.14		
Pipe spool		1250	293.38	2.06		62.9	4.25	0.591	328.55	314	
Manhole	93400		291.19	2.06	1.5	62.9	4.25	0.458	328.09		
Pipe spool		630	291.19	2.18		62.9	4.25	0.298	327.79	311	
Manhole	92770		290.1	2.18	1.5	62.9	4.25	0.458	327.33		
Pipe spool		727	290.1	2.32		62.9	4.25	0.343	326.99	310	
Manhole	92043		288.83	2.32	1.5	62.9	4.25	0.458	326.53		
Pipe spool		693	288.83	2.45		62.9	4.25	0.327	326.21	306	
Manhole	91350		287.61	2.45	1.5	62.9	3.75	0.756	325.45		
Pipe spool		856.22	287.61	2.61		62.9	3.75	0.772	324.68	303.5	
Manhole	90494		285.28	2.61	1.5	62.9	3.75	0.756	323.92		
Pipe spool		1295.78	285.28	2.86		62.9	3.75	1.169	322.75	308	
Manhole	89198		281.75	2.86	1.5	62.9	3.75	0.756	322.00		
Pipe spool		898	281.75	3.03		62.9	3.75	0.810	321.19	299	
Manhole	88300		279.31	3.03	1.5	62.9	3.75	0.756	320.43		
Pipe spool		916.31	279.31	3.20		62.9	3.75	0.826	319.60	294	
	87384		276.81								

Comparison of Hydraulic Grade Line and Manhole Rim Elevations
Santa Ana River Flow - 30,000 cfs



CDM	Client: **SAWPA/OCSD**	Job No. **2084-39691**	Computed By: **MAC**
	Project: **SARI Line ERP**	Dated Checked: **10/21/2003**	Date: **10/21/2003**
	Detail: **SSO Evaluation #2**	Checked By: **CLK**	Page No.: **1**

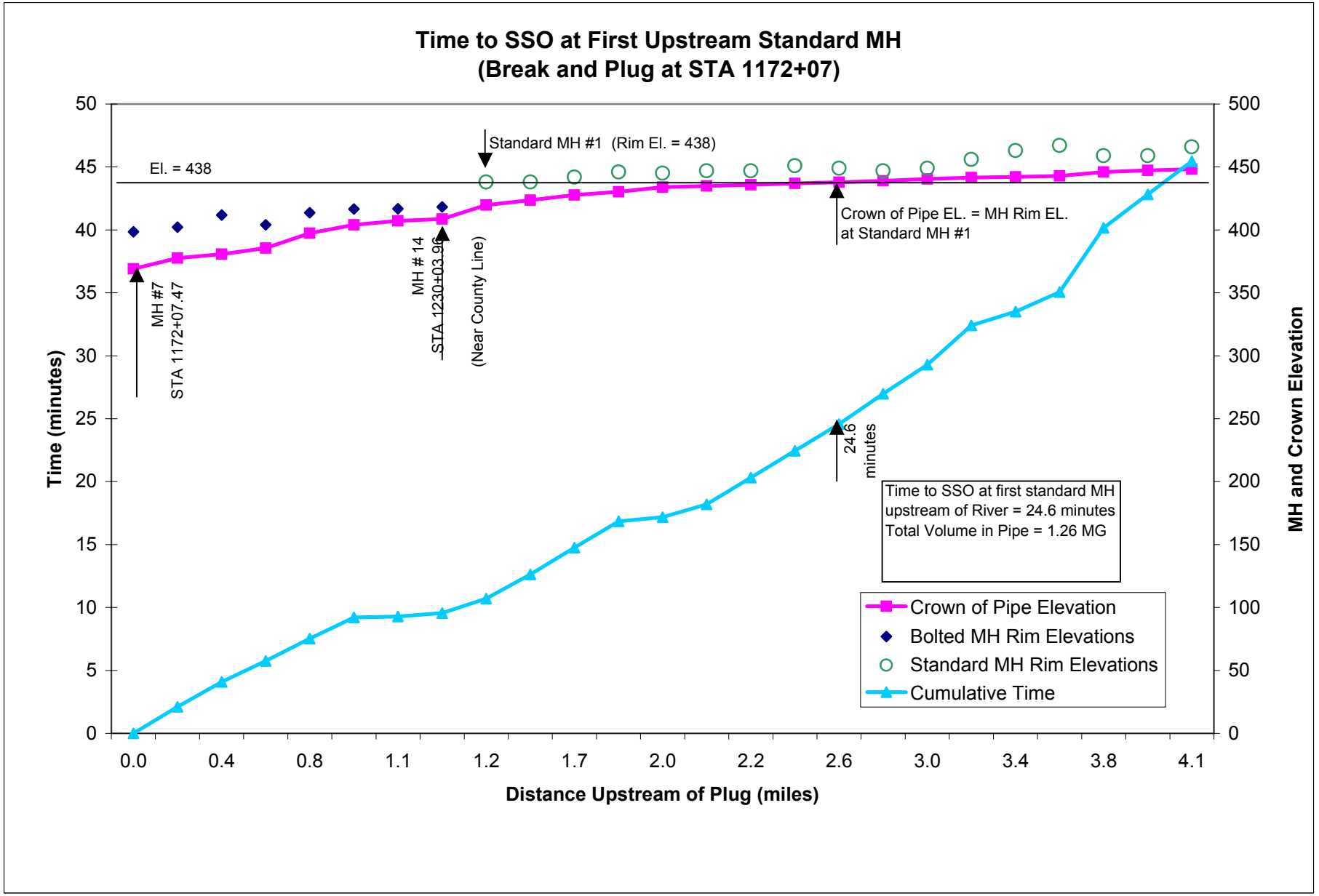
Assumptions:

1. Peak Flow throughout pipeline
2. Pipeline Rupture at MH 7 is completed plugged.

Green River
Peak wet weather flow = 15.49 MGD
23.96657721 ft3/s

Assuming SSO at first standard MH, total volume in Pipe (MG)= 1.25

MH Label	Pipe Invert (ft)	Diameter to Downstream MH (ft)	El. Of Top of Pipe (ft)	Area (ft2)	Standard MH Rim Elevation (ft)	Bolted MH Rim Elevation Unsealed (ft)	Length To Downstream MH (ft)	Cumulative Distance (ft)	Cumulative Distance (miles)	Total Volume (ft3)	Available Volume (ft3)	Cumulative Total Volume	Cumulative Available Volume (ft3)	Time (minutes)	Cumulative Time (minutes)
1	443.2	5	448.2	19.63		466.00	770.00	21646.72	4.10	15118.91	3779.73	261474.91	65368.73	2.63	45.46
2	442.22	5	447.22	19.63		459.00	780.00	20876.72	3.95	15315.26	3828.82	246355.99	61589.00	2.66	42.83
3	441.02	5	446.02	19.63		459.00	1497.03	20096.72	3.81	29394.12	7348.53	231040.73	57760.18	5.11	40.17
4	438.92	4	442.92	12.57		467.00	712.97	18599.69	3.52	8959.45	2239.86	201646.61	50411.65	1.56	35.06
5	438.17	4	442.17	12.57		463.00	499.45	17886.72	3.39	6276.27	1569.07	192687.17	48171.79	1.09	33.50
6	437.65	4	441.65	12.57		456.00	1423.08	17387.27	3.29	17882.95	4470.74	186410.89	46602.72	3.11	32.41
7	436.37	4	440.37	12.57		449.00	1060.06	15964.19	3.02	13321.11	3330.28	168527.94	42131.99	2.32	29.30
8	435.05	4	439.05	12.57		447.00	1100.75	14904.13	2.82	13832.43	3458.11	155206.84	38801.71	2.40	26.98
9	433.9	4	437.9	12.57		449.00	973.66	13803.38	2.61	12235.37	3058.84	141374.40	35343.60	2.13	24.58
10	432.88	4	436.88	12.57		451.00	975.00	12829.72	2.43	12252.21	3063.05	129139.03	32284.76	2.13	22.45
11	431.86	4	435.86	12.57		447.00	975.34	11854.72	2.25	12256.48	3064.12	116886.82	29221.70	2.13	20.32
12	430.84	4	434.84	12.57		447.00	464.66	10879.38	2.06	5839.09	1459.77	104630.34	26157.58	1.02	18.19
13	430	4	434	12.57		445.00	148.96	10414.72	1.97	1871.89	467.97	98791.25	24697.81	0.33	17.18
14	426.78	3.5	430.28	9.62		446.00	1246.76	10265.76	1.94	11995.24	2998.81	96919.36	24229.84	2.09	16.85
15	424.29	3.5	427.79	9.62		442.00	1272.35	9019.00	1.71	12241.44	3060.36	84924.12	21231.03	2.13	14.76
16	420.22	3.5	423.72	9.62		438.00	1149.93	7746.65	1.47	11063.62	2765.91	72682.68	18170.67	1.92	12.64
17	416.54	3.25	419.79	8.30		438.00	800.00	6596.72	1.25	6636.61	1659.15	61619.06	15404.76	1.15	10.71
MH 14	405.4	3.25	408.65	8.30	418.36		192.96	5796.72	1.10	1600.75	400.19	54982.44	13745.61	0.28	9.56
MH 13	403.96	3.25	407.21	8.30	416.77		55.00	5603.76	1.06	456.27	114.07	53381.69	13345.42	0.08	9.28
MH 12	400.8	3.25	404.05	8.30	416.53		1156.00	5548.76	1.05	9589.91	2397.48	52925.42	13231.36	1.67	9.20
MH 11	394.2	3.25	397.45	8.30	413.69		1231.70	4392.76	0.83	10217.90	2554.47	43335.52	10833.88	1.78	7.53
MH 10	381.7	3.75	385.45	11.04	403.96		868.30	3161.06	0.60	9590.08	2397.52	33117.62	8279.40	1.67	5.76
MH 9	377	3.75	380.75	11.04	411.85		1031.66	2292.76	0.43	11394.34	2848.58	23527.54	5881.88	1.98	4.09
MH 8	374	3.5	377.5	9.62	402.23		1261.10	1261.10	0.24	12133.20	3033.30	12133.20	3033.30	2.11	2.11
MH 7	369	0	369	0.00	398.50		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00


Time to SSO at First Upstream Standard MH
(Break and Plug at STA 1172+07)
Time (minutes)
MH and Crown Elevation
Distance Upstream of Plug (miles)
El. = 438
Standard MH #1 (Rim El. = 438)
MH #7
STA 1172+07.47
MH # 14
STA 1230+03.96
(Near County Line)
Crown of Pipe EL. = MH Rim EL.
at Standard MH #1
24.6
minutes
Time to SSO at first standard MH
upstream of River = 24.6 minutes
Total Volume in Pipe = 1.26 MG
Crown of Pipe Elevation
Bolted MH Rim Elevations
Standard MH Rim Elevations
Cumulative Time
0
5
10
15
20
25
30
35
40
45
50
0
50
100
150
200
250
300
350
400
450
500
0.0
0.4
0.8
1.1
1.2
1.7
2.0
2.2
2.6
3.0
3.4
3.8
4.1

CDM	Client: **SAWPA/OCSD**	Job No. **2084-39691**	Computed By: **MAC**
	Project: **SARI Line ERP**	Dated Checked: **10/21/2003**	Date: **10/21/2003**
	Detail: **SSO Evaluation #2**	Checked By: **CLK**	Page No.: **1**

Assumptions:

1. Peak Flow throughout pipeline
2. Pipeline Rupture at MH 31 is completed plugged.

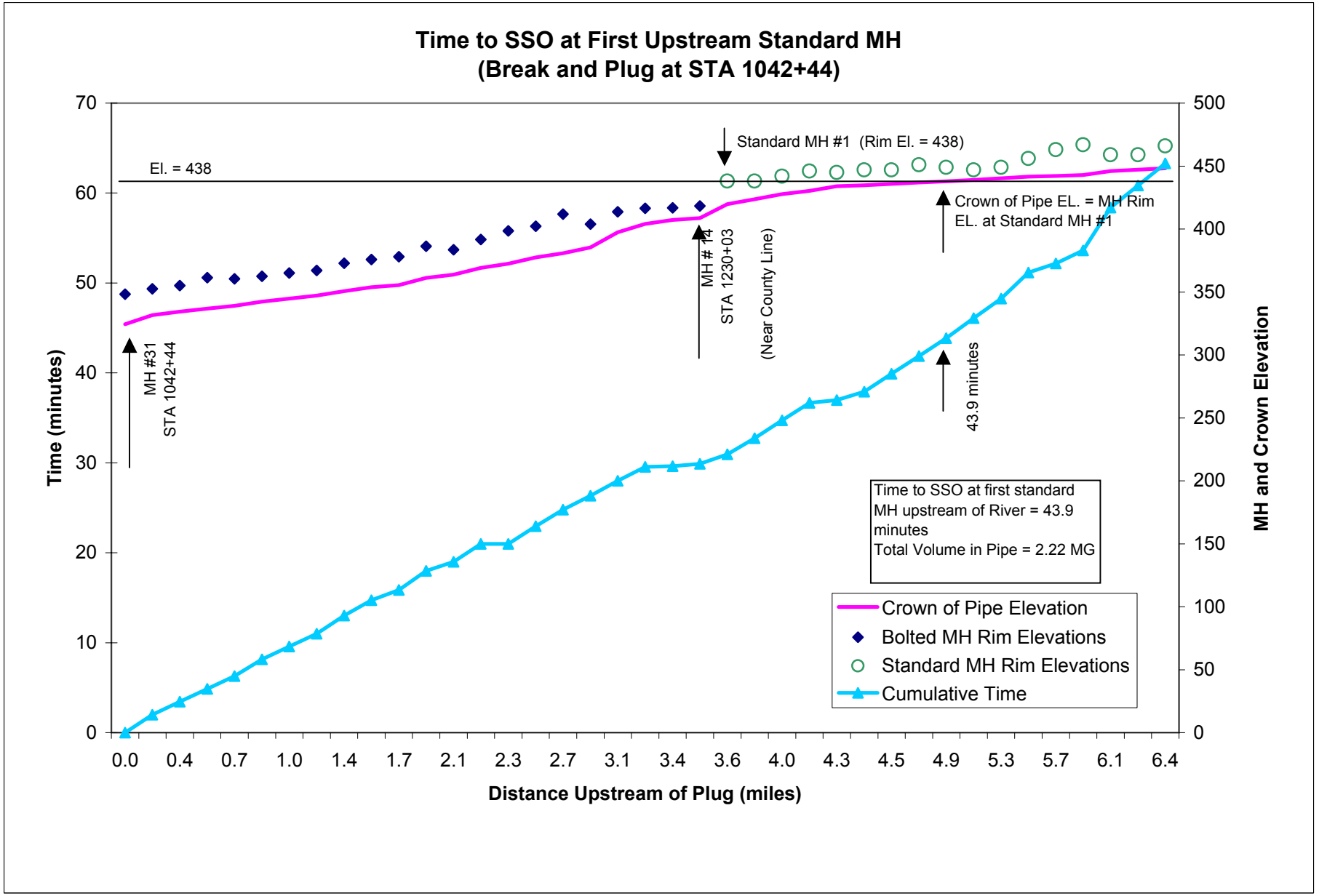
SAVI Ranch

Peak wet weather flow = 16.64 MGD

25.74589056 ft3/s

Assuming SSO at first standard MH, total volume in Pipe (MG)= 2.22

MH Label	Pipe Invert (ft)	Diameter to Downstream MH (ft)	El. Of Top of Pipe (ft)	Area (ft2)	Standard MH Rim Elevation (ft)	Bolted MH Rim Elevation Unsealed (ft)	Length To Downstream MH (ft)	Cumulative Distance (ft)	Cumulative Distance (miles)	Total Volume (ft3)	Available Volume (ft3)	Cumulative Total Volume	Cumulative Available Volume (ft3)	Time (minutes)	Cumulative Time (minutes)
1	443.2	5	448.2	19.63		466.00	770.00	33806.72	6.40	15118.91	3779.73	391108.80	97777.20	2.45	63.296
2	442.22	5	447.22	19.63		459.00	780.00	33036.72	6.26	15315.26	3828.82	375989.89	93997.47	2.48	60.849
3	441.02	5	446.02	19.63		459.00	1497.03	32256.72	6.11	29394.12	7348.53	360674.62	90168.66	4.76	58.371
4	438.92	4	442.92	12.57		467.00	712.97	30759.69	5.83	8959.45	2239.86	331280.51	82820.13	1.45	53.614
5	438.17	4	442.17	12.57		463.00	499.45	30046.72	5.69	6276.27	1569.07	322321.06	80580.27	1.02	52.164
6	437.65	4	441.65	12.57		456.00	1423.08	29547.27	5.60	17882.95	4470.74	316044.79	79011.20	2.89	51.148
7	436.37	4	440.37	12.57		449.00	1060.06	28124.19	5.33	13321.11	3330.28	298161.84	74540.46	2.16	48.254
8	435.05	4	439.05	12.57		447.00	1100.75	27064.13	5.13	13832.43	3458.11	284840.73	71210.18	2.24	46.098
9	433.9	4	437.9	12.57		449.00	973.66	25963.38	4.92	12235.37	3058.84	271008.30	67752.07	1.98	43.859
10	432.88	4	436.88	12.57		451.00	975.00	24989.72	4.73	12252.21	3063.05	258772.93	64693.23	1.98	41.879
11	431.86	4	435.86	12.57		447.00	975.34	24014.72	4.55	12256.48	3064.12	246520.71	61630.18	1.98	39.896
12	430.84	4	434.84	12.57		447.00	464.66	23039.38	4.36	5839.09	1459.77	234264.23	58566.06	0.94	37.913
13	430	4	434	12.57		445.00	148.96	22574.72	4.28	1871.89	467.97	228425.14	57106.28	0.30	36.968
14	426.78	3.5	430.28	9.62		446.00	1246.76	22425.76	4.25	11995.24	2998.81	226553.25	56638.31	1.94	36.665
15	424.29	3.5	427.79	9.62		442.00	1272.35	21179.00	4.01	12241.44	3060.36	214558.02	53639.50	1.98	34.724
16	420.22	3.5	423.72	9.62		438.00	1149.93	19906.65	3.77	11063.62	2765.91	202316.57	50579.14	1.79	32.743
17	416.54	3.25	419.79	8.30		438.00	800.00	18756.72	3.55	6636.61	1659.15	191252.95	47813.24	1.07	30.952
MH 14	405.4	3.25	408.65	8.30	418.36		192.96	17956.72	3.40	1600.75	400.19	184616.34	46154.08	0.26	29.878
MH 13	403.96	3.25	407.21	8.30	416.77		55.00	17763.76	3.36	456.27	114.07	183015.59	45753.90	0.07	29.619
MH 12	400.8	3.25	404.05	8.30	416.53		1156.00	17708.76	3.35	9589.91	2397.48	182559.32	45639.83	1.55	29.545
MH 11	394.2	3.25	397.45	8.30	413.69		1231.70	16552.76	3.13	10217.90	2554.47	172969.41	43242.35	1.65	27.993
MH 10	381.7	3.75	385.45	11.04	403.96		868.30	15321.06	2.90	9590.08	2397.52	162751.51	40687.88	1.55	26.339
MH 9	377	3.75	380.75	11.04	411.85		1031.66	14452.76	2.74	11394.34	2848.58	153161.43	38290.36	1.84	24.787
MH 8	374	3.5	377.5	9.62	402.23		1261.10	13421.10	2.54	12133.20	3033.30	141767.10	35441.77	1.96	22.943
MH 7	369	3.5	372.5	9.62	398.50		0.00	12160.00	2.30	0.00	0.00	129633.89	32408.47	0.00	20.980
MH 6	365.7	3.50	369.2	9.62	391.70		1280.00	12160.00	2.30	12315.04	3078.76	129633.89	32408.47	1.99	20.980
MH 5	360.25	3.50	363.75	9.62	383.55		640.00	10880.00	2.06	6157.52	1539.38	117318.85	29329.71	1.00	18.987
MH 4	357.64	3.50	361.14	9.62	386.37		1360.00	10240.00	1.94	13084.73	3271.18	111161.33	27790.33	2.12	17.990
MH 3	351.7	3.75	355.45	11.04	377.99		640.00	8880.00	1.68	7068.58	1767.15	98076.60	24519.15	1.14	15.873
MH 2	350.05	3.75	353.8	11.04	375.87		960.00	8240.00	1.56	10602.88	2650.72	91008.01	22752.00	1.72	14.729
MH 1	346.9	3.75	350.65	11.04	372.85		1120.00	7280.00	1.38	12370.02	3092.51	80405.14	20101.28	2.00	13.013
MH 38	343.42	3.75	347.17	11.04	367.17		800.00	6160.00	1.17	8835.73	2208.93	68035.12	17008.78	1.43	11.011
MH 37	340.9	3.75	344.65	11.04	365.13		800.00	5360.00	1.02	8835.73	2208.93	59199.39	14799.85	1.43	9.581
MH 36	338.5	3.75	342.25	11.04	362.56		1040.00	4560.00	0.86	11486.45	2871.61	50363.66	12590.91	1.86	8.151
MH 35	335.3	3.75	339.05	11.04	360.43		800.00	3520.00	0.67	8835.73	2208.93	38877.21	9719.30	1.43	6.292
MH 34	333.02	3.75	336.77	11.04	361.43		800.00	2720.00	0.52	8835.73	2208.93	30041.48	7510.37	1.43	4.862
MH 33	330.6	3.75	334.35	11.04	355.13		800.00	1920.00	0.36	8835.73	2208.93	21205.75	5301.44	1.43	3.432
MH 32	327.91	3.75	331.66	11.04	352.48		1120.00	1120.00	0.21	12370.02	3092.51	12370.02	3092.51	2.00	2.002
MH 31	324.4	0.00	324.4	0.00	348.21		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000


Time to SSO at First Upstream Standard MH
(Break and Plug at STA 1042+44)
Time (minutes)
MH and Crown Elevation
Distance Upstream of Plug (miles)
El. = 438
Standard MH #1 (Rim El. = 438)
Crown of Pipe EL. = MH Rim EL. at Standard MH #1
MH #31 STA 1042+44
MH # 14 STA 1230+03 (Near County Line)
43.9 minutes
Time to SSO at first standard MH upstream of River = 43.9 minutes
Total Volume in Pipe = 2.22 MG
Crown of Pipe Elevation
Bolted MH Rim Elevations
Standard MH Rim Elevations
Cumulative Time
0 10 20 30 40 50 60 70
0 50 100 150 200 250 300 350 400 450 500
0.0 0.4 0.7 1.0 1.4 1.7 2.1 2.3 2.7 3.1 3.4 3.6 4.0 4.3 4.5 4.9 5.3 5.7 6.1 6.4

Appendix B
SARI Flow Data: Green River Metering Station, SARI Gate, and Doppler Records

Appendix B
SARI Flow Data: Green River Metering Station, SARI Gate, and Doppler Records

CDM has reviewed the following

1. Green River Sta. flow data (flume + mag meter) as emailed by W. Cassidy. Data is in electronic format. This data is in 15-minute intervals starting 01-Jan-2003 and ending 30-Jun-2003.

2. Temporary Flow Monitoring data (by MGD Technologies Co.; using Doppler) as mailed by D. Ton. Data is in hardcopy format (report). This data is in hourly intervals starting 15-Feb-2002 and ending 02-Mar-2002.

3. SARI Gate "24-Hour Chart" data (derived from elevations; not actual flow readings) as faxed by C. Johannesson. Data is in hand-written hardcopy format. This data is in daily intervals starting 16-Jul-2002 and ending 16-Sep-2003.

Findings and Conclusions

CDM started with the electronic data (Item #1 above) because it was already in Excel format AND it provided the best mix of date range, collection interval (every 15 minutes), and accuracy. There are a few individual data points we threw out as we felt that they were not representative of typical conditions (flume and mag mtr flows have been added here):

- 89.54 MGD for 15 minutes at noon on 28-Jan

- 53.33 MGD for 15 minutes at 2:45 a.m. on 30-Jan

- 21.32 MGD for 15 minutes at 1:45 p.m. on 29-Jan (also shows mag mtr flow as negative)

- 18.79 MGD for 15 minutes at 11:15 p.m. on 29-Jan

After doing this the peak wet weather flow comes out at **15.49 MGD** (15-Mar). This appears to be part of a wet weather event generating elevated flows from approx. 12-Mar to 16-Mar.

To obtain an average dry weather flow, CDM attempted to filter out the wet weather events. Therefore, we focused on the date range of 01-Apr to 01-May (flow relatively steady for the month and it looks even a little conservative based on the other steady periods in the dataset). The average dry weather flow comes out at **8.12 MGD**, with a min. diurnal low of 4.58 MGD and a max. diurnal high of 12.44 MGD. (The majority of the diurnal variations are between 5.5 MGD and 10.5 MGD.)

Looking at Item #2 above (the 2002 Temporary Flow Monitoring data), we noticed that the numbers collected near the Green River vault were very comparable even though they were collected a year earlier: Peak = 14.52 MGD, Average = 8.76 MGD. Note that this average is a bit higher due to the influence of some moderate wet weather during the period of measurement as suggested by the Green River flume + mag meter data charts from Item #1.

Another interesting note about the Item #2 data is that they also collected flow readings at each of the Yorba Linda laterals and at SAVI Ranch downstream. For the 15" YL lateral (the upstream one), Peak = **1.25 MGD**, Average = **0.38 MGD**. For the 18" YL lateral (the downstream one), Peak = **1.04 MGD**, Average = **0.40 MGD**. Finally, for the SARI line reading at SAVI Ranch (near pipe Sta. 1031+00), Peak = 16.02 MGD, Average = 9.00 MGD.

Looking at Item #3 above (the hand-written SARI Gate flow estimates based on elevation), we noticed that the flow numbers were much less comparable to the other two data sources. For example, for the period of 01-Apr to 01-May (the relatively steady period of dry weather flow as described above), average daily flows were as high as 15.57 MGD with daily peaks of up to 19.02 MGD. Clearly this is suspicious. As such, CDM discarded this dataset completely.

So, based on the two 'good' datasets (Items #1, #2), CDM plans to use the following approximate values as appropriate Reach IV SARI line flows for the ERP (to replace the EXTRAN Model values previously used):

At Green River
Peak wet weather flow = **15.49 MGD**

Average dry weather flow = **8.12 MGD** (with diurnal variations between 5.5 and 10.5 MGD)

(Peaking factor works out to 1.9)

At SAVI Ranch
Peak wet weather flow = **16.64 MGD** (this is the 15.49 number above plus half of the combined Yorba Linda peak flows of 1.25 MGD and 1.04 MGD)

Average dry weather flow = **8.90 MGD** (this is the 8.12 number above plus all of the combined Yorba Linda average flows of 0.38 MGD and 0.40 MGD)

(Peaking factor works out to 1.9)

JPC 10/17/2003