

Executive Summary



EXECUTIVE SUMMARY

RBF Consulting, under the leadership of HDR, was retained by VVWRA in November 2007 to update their Sewer Master Plan (SMP). The SMP has been developed to accomplish the following primary objectives:

1. To satisfy the System Evaluation and Capacity Assurance Program (SECAP) requirements in the Sewer System Management Plan (SSMP) mandated by the California State Water Resources Control Board (SWRCB).
2. To provide data and assessments that will supplement the Operation and Maintenance Plan and Monitoring, Measurement and Modification Plan requirements in the SSMP mandated by the SWRCB.
3. To analyze and estimate Interceptor capacity in relationship to the VVWRA Strategic Plan.
4. To provide the estimates of probable capital cost and construction schedules for Interceptor improvements recommended in this SMP for integration into the current VVWRA Capital Improvements Plan.

The major tasks completed to accomplish these goals were:

1. Conduct flow monitoring during dry and wet weather conditions.
2. Review, compile and integrate previous flow monitoring conducted by VVWRA in the Service Area.
3. Review, compile and integrate member agency sewer master plans.
4. Compile and integrate the April 2009 VVWRA Service Area Flow Projection Update.
5. Conduct field survey of all accessible manholes.
6. Conduct visual condition assessment of all accessible manholes.



7. Construct and calibrate the VVWRA Interceptor Model.
8. Analyze impacts on Interceptor capacity as growth occurs in the Service Area and capital improvements, such as regional reclamation plants, are brought on line.
9. Recommend Interceptor improvements, including capital cost and construction schedule estimates, to be integrated into the VVWRA Capital Improvements Plan.
10. Conduct workshops and meetings with the member agencies to present the results of the work and gather comments.

EXISTING CONDITIONS ASSESSMENT

The following major tasks were undertaken for assessment of existing conditions:

- Interceptor design drawings and available as-built drawings were reviewed to verify pipe sizes, pipe materials, invert elevations, manholes configurations and major lateral connections. Current sewer master plans from the City of Victorville, City of Hesperia and Town of Apple Valley were reviewed to determine if independent flow monitoring has been conducted, what that monitoring reveals in terms of the flow split between major connections to the VVWRA Interceptor, inflow and infiltration to their collection systems and projections for growth and the impact of that growth on their collection systems.
- VVWRA's Regional Wastewater Reclamation Facility was reviewed. Influent Flow Meter records were acquired and reviewed. The configuration of the existing raw sewage emergency storage system was assessed to facilitate the estimate of inflow and infiltration to the Interceptor.
- A field survey was conducted at all accessible manholes in the Interceptor. GPS coordinates were obtained for input to the VVWRA GIS. Electronic leveling off



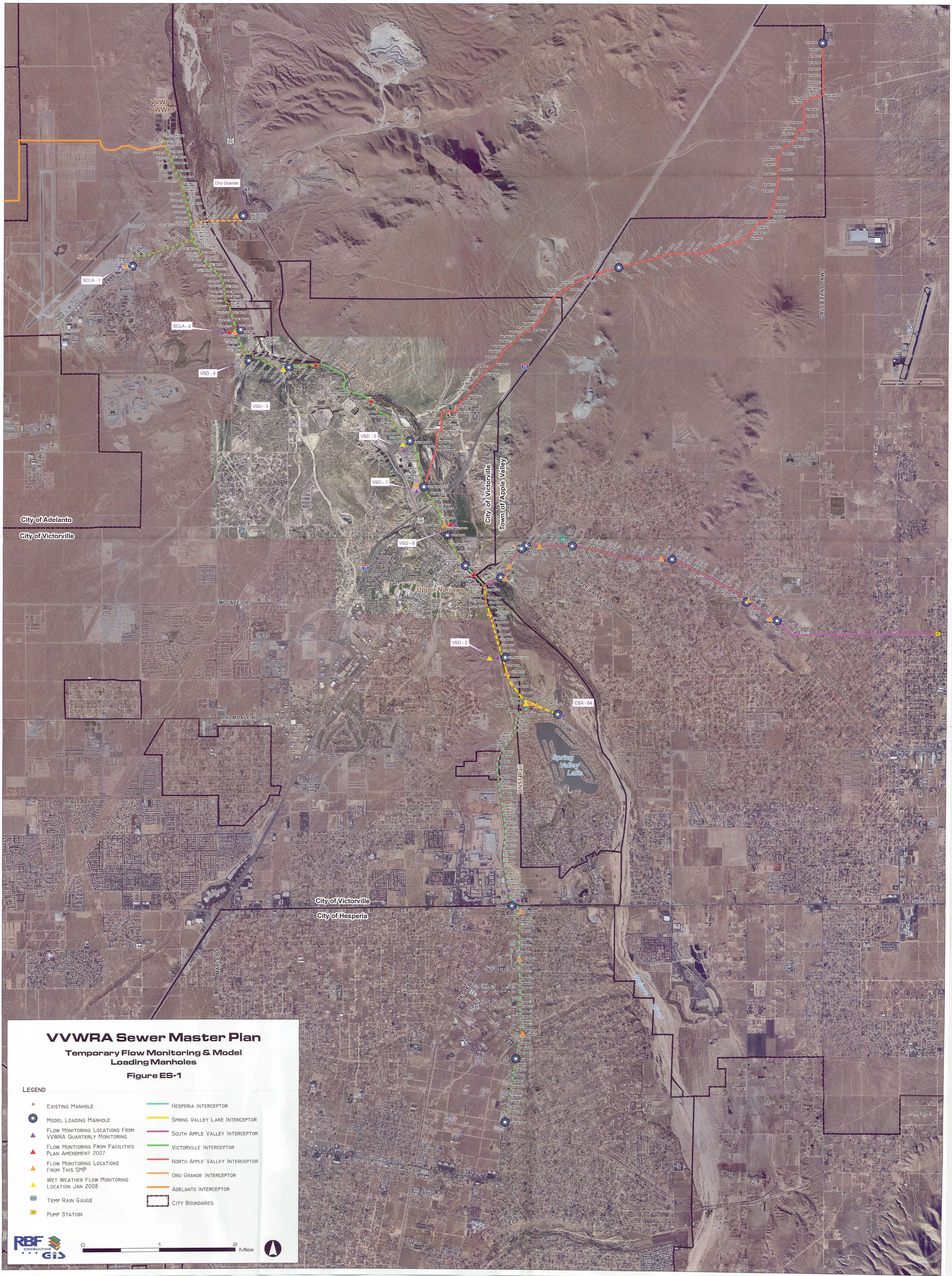
of benchmarks was conducted to generate actual sewer invert elevations and top of manhole elevations for the Interceptor Model.

- A visual assessment of each accessible manhole was conducted with supporting photographs. Lateral connections, flow conditions and manhole configurations were verified. The physical condition of each accessible manhole was assessed and, where required, improvements were recommended. An assessment data sheet was prepared for each manhole that documents the visual assessments and records historical maintenance information.

INTERCEPTOR MODEL CALIBRATION

The existing conditions assessment furnished input data for the VVWRA Interceptor Model. The assessment data was combined with flow monitoring to calibrate the Interceptor Model. Flow monitoring data conducted outside of this SMP was combined with new flow monitoring performed as part of this SMP to provide flow input data to loading manholes in the Interceptor Model. Both dry weather and wet weather flow information was gathered. Figure ES-1 depicts the locations of the extensive flow monitoring conducted and reviewed for this SMP along with the Hydraulic Model flow loading points along each VVWRA Interceptor reach. For Model calibration, Manning's "N" values were adjusted to better approximate existing flow monitored conditions in the Interceptors.

The calibrated Interceptor Model produced results that were very close to flow monitoring data. The methodology for building and calibrating the model relies on flow monitoring data that has a level of inaccuracy associated with it, based on quality of installation and calibration of equipment; therefore, to provide a level of conservatism to the results, the Model was calibrated such that predicted sewage depth levels in the pipelines are approximately 5%-10% higher than recorded monitoring data.



VVWRA Sewer Master Plan
Temporary Flow Monitoring & Model
Loading Manholes
Figure ES-1

LEGEND

- | | |
|---|----------------------------------|
| • EXISTING MANHOLE | — HESPERIA INTERCEPTOR |
| ★ MODEL LOADING MANHOLE | — SPRING VALLEY LAKE INTERCEPTOR |
| ▲ FLOW MONITORING LOCATIONS FROM VVWRA QUARTERLY MONITORING | — SOUTH APPLE VALLEY INTERCEPTOR |
| ▲ FLOW MONITORING LOCATIONS FROM FACILITIES PLAN AMENDMENT 2007 | — VICTORVILLE INTERCEPTOR |
| ▲ FLOW MONITORING LOCATIONS FROM THIS SMP | — NORTH APPLE VALLEY INTERCEPTOR |
| ▲ WET WEATHER FLOW MONITORING LOCATION JAN 2008 | — ORO GRANDE INTERCEPTOR |
| ■ TEMP RAIN GAUGE | — ADELANTO INTERCEPTOR |
| ■ PUMP STATION | — CITY BOUNDARIES |



SCENARIO ANALYSES

The calibrated VVWRA Interceptor Model was used to assess Interceptor capacity under future scenario possibilities. Future scenario possibilities correspond to improvement projects listed in the VVWRA Capital Improvements Plan. The VVWRA Service Area Flow Projection was used as the assumption basis for the future flow projections associated with each scenario. The flow projection is shown graphically on Figure ES-2. Figure ES-2 has been updated from the April 2009 study to reflect the most recently monitored flows in the system and resultant updated projections for both Oro Grande (CSA-42) and the SCLA development in Victorville. These updates have resulted in a slightly higher projected flow and resultant average annual growth rate than depicted in the April 2009 Service Area Flow Projection. The proposed Victorville diversion of 1.5 mgd of flow is shown in Figure ES-2.

The following scenarios were analyzed:

1. The capacity of the existing Interceptor in each of its principal sections.
2. Capacity in the Hesperia Interceptor from Hercules St to Bear Valley Road after construction of the Santa Fe Bypass.
3. Principal sections capacity after construction of the Hesperia Relief Interceptor from Bear Valley Road to Spring Valley Lake.
4. Principal sections capacity after construction of the SVL/CSA-64 Relief Interceptor.
5. Principal sections capacity after construction of the Hesperia WRP-1.
6. Principal sections capacity after construction of the Apple Valley WRP.
7. Principal sections capacity after construction of the Eastside WRP.

The VVWRA Interceptor was first constructed in 1980. The Service Area has grown considerably since that time and several segments of the existing Interceptor are nearing their capacity limit. Figure ES-3 shows the capacity limitation in relation to the

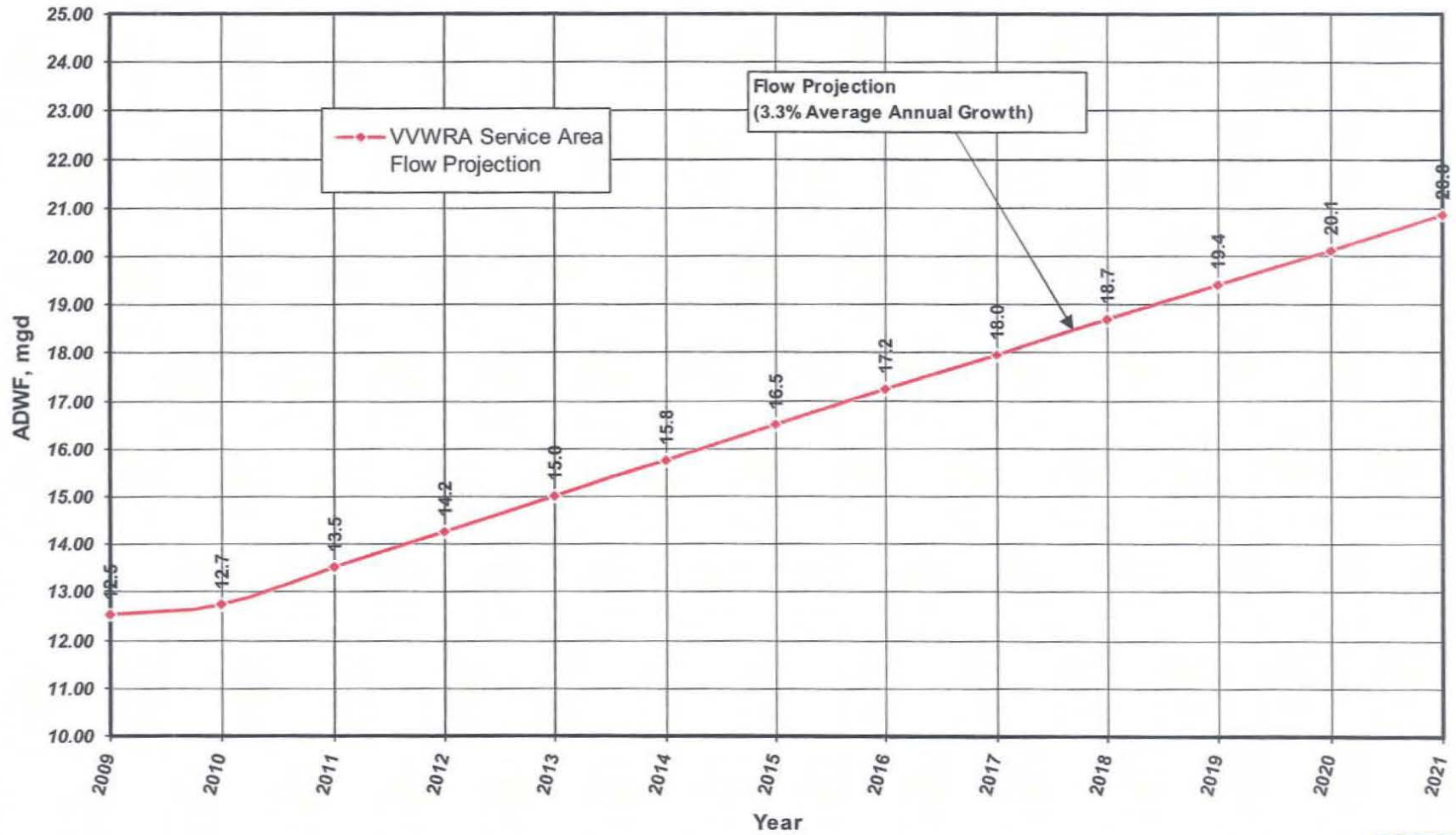


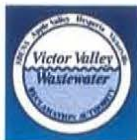
anticipated year, and the corresponding projected service area flow, when capacity will be exceeded.

Each improvement scenario will relieve capacity constraints in at least one portion of the Interceptor through 2021. The composite of all improvements will bring the entire Interceptor in compliance with VVWRA design criteria through 2021.



FIGURE ES-2
VVWRA - Service Area Flow Projection





RECYCLED WATER OPTIONS

An independent technical memorandum was prepared for VVWRA that compared the capital costs for two general options for unloading of the Interceptor and production of Recycled Water (does not include distribution):

1. Construct Interceptors and Treatment Plant Improvements to treat all wastewater at the existing Regional Wastewater Reclamation Facility (RWWRF) to Title 22 standards.
2. Construct new subregional reclamation plants in Hesperia and Apple Valley along with a limited Interceptor upgrade program.

The technical memorandum has been attached to this SMP in Appendix D. It found capital costs for Option 2 to be lower than those associated with Option 1.

RECOMMENDATIONS

Improvements were developed to address overcapacity issues in the VVWRA Interceptor. These improvements included projects for the Interceptor itself, and construction of regional water reclamation plants that will permanently divert flow from the Interceptor; thereby increasing Interceptor capacity.

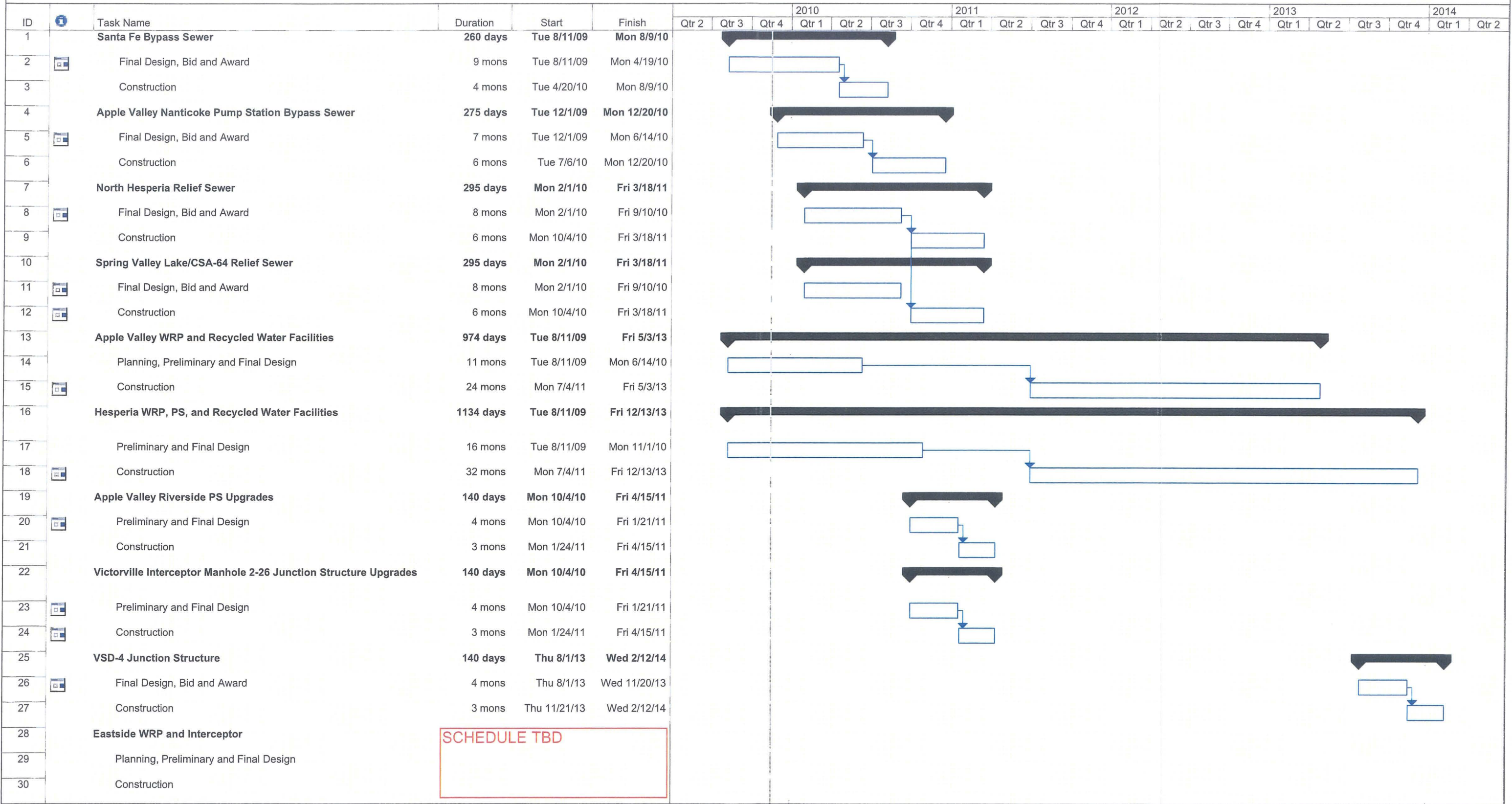
Table ES-1 summarizes the improvements and estimate of probable capital cost. Figure ES-4 provides the recommended schedule for improvements.



Table ES-1
Capacity Improvements Cost Summary

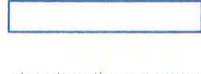
Recommended Project	Capital Cost	Cost Source
Apple Valley Brewster Park WRP and Nanticoke Bypass Sewer	\$37,327,000	VVWRA and RBF Nanticoke Bypass Sewer, Draft PDR
Hesperia WRP-1 and Pump Station	\$35,444,000	VVWRA
Eastside Regional WRP and Interceptor	\$54,855,000	VVWRA CIP
Santa Fe Bypass Relief Interceptor	\$3,006,000	VVWRA CIP
North Hesperia Relief Interceptor	\$2,963,000	VVWRA SMP
Spring Valley Lake/CSA-64 Relief Interceptor	\$2,010,000	VVWRA SMP
South Apple Valley Riverside #2 Pump Station Upgrades	\$250,000	VVWRA SMP
Junction Structure Upgrades at Manhole VV2-26/VV	\$150,000	VVWRA SMP
New Junction Structure at VSD-4 Connection	\$250,000	VVWRA SMP
Total	\$136,255,000	

Figure ES-4
VWRA Sewer Master Plan
Preliminary Improvements Schedule



Project: Improvements Schedule
Date: Tue 11/17/09

Task
Split



Progress
Milestone



Summary
Project Summary



External Tasks
External Milestone

Deadline

