SACRAMENTO AREA
SEWER DISTRICT
SERVING YOU 24/7

Sewer System Capacity Plan
2010 Update

SACRAMENTO AREA SEWER DISTRICT

SEWER SYSTEM CAPACITY PLAN 2010 UPDATE

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SACRAMENTO AREA
SEWER DISTRICT
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1. INTRODUCTION

1.1 Objectives and Scope

The primary objective of the Sacramento Area Sewer District (SASD) 2010 Sewer System Capacity Plan (2010 SCP) update was to develop a high-level planning and dynamic sewer capacity plan that addresses existing, mid-range, and buildout sewer capacity needs. Existing capacity needs are based on SASD's current sewer system conditions. The mid-range capacity needs are based on plans to provide sewer service to SASD's service area within the next 10 years. The buildout capacity needs are based on providing sewer service to the entire SASD service area.

One of the goals of the 2010 SCP was to provide updated capital costs and capacity-based funding projection information for SASD's service areas. According to SASD's Sewer Ordinance, the *service area is divided into two geographical areas: the relief area and the expansion area*. In the expansion area, the 2010 SCP also provides updated conceptual plans for providing sewer service to undeveloped areas.

The 2010 SCP considered SASD's previous trunk system planning efforts, as presented in the SASD Sewerage Facilities Master Plan 2006 Update report (2006 SCP), as well as revisions to:

- SASD's planning criteria (e.g., flow generation parameters).
- Performance criteria for SASD's existing sewer systems.
- SASD trunk sewer shed delineations.
- SASD's relief area trunk sewer systems due to potential capacity deficiencies.
- SASD's expansion area trunk sewer systems.

In SASD's relief area, the focus of the 2010 SCP was to identify potential capacity deficiencies and develop preliminary solutions to restore system performance. The preliminary solutions were mainly developed so that capital costs may be estimated for funding projections. A more in-depth evaluation to restoring system performance will be conducted using SASD's Under Capacity Failure Mode Strategy (UCFMS) and through SASD's project development plan (PDP) process. After the PDP reports are finalized, the approved recommendations and results may be appended (via addendum) to the 2010 SCP final report.

In SASD's expansion area, the focus of the 2010 SCP was to update expansion alternatives from previous SASD planning documents (e.g., 2006 SCP and recently completed mid-range planning reports). The alternatives identified in the 2010 SCP will then be further evaluated through more detailed sewer studies and/or mid-range planning efforts.

1.2 Background

SASD provides wastewater collection and conveyance to the urbanized, unincorporated areas of Sacramento County, the cities of Citrus Heights, Elk Grove, and Rancho Cordova, and portions of the cities of Sacramento and Folsom. The existing service area, shown in ***Figure 1-1***, covers 270 square miles and serves over 1,100,000 people.

SASD is the largest of the four contributing agencies of the Sacramento Regional County Sanitation District (SRCSD). Wastewater from SASD is discharged into the SRCSD interceptor system and treated at SRCSD's Sacramento Regional Wastewater Treatment Plant (SRWTP). SASD also provides wastewater collection for the Rio Cosumnes Correctional Center (RCCC) and the delta communities of Courtland and Walnut Grove.

The main SASD collection system includes over 3,000 miles of sewer pipelines ranging in size from 6 to 75 inches in diameter. The collection system pipelines are categorized based on size, function, and hydraulic capacity. Sewer collectors generally receive flow directly from individual homes and businesses and are designed to carry less than one million gallons per day (MGD) of peak wet-weather flow (PWWF). In general, collector sewers are 10 inches and smaller in diameter and comprise the majority (over 85 percent) of the pipes in the collection system. Trunk sewers carry 1 mgd of PWWF or more to the SRCSD interceptor system. Trunk sewers are generally 12 inches in diameter. ***Figure 1-2*** shows the existing SASD collection system (including RCCC and the delta communities) and the SRCSD interceptor system. ***Table 1-1*** summarizes the SASD collection system statistics.

TABLE 1-1. SASD COLLECTION SYSTEM STATISTICS (EXISTING CONDITIONS)

Sewer System Component	Statistic
Square Miles of SASD Service Area	270
Mainline Pipes (miles)	3000
Manholes	65,000
Pumping Stations	104
Lower Lateral Pipes (miles)*	1,300
Service Connections	283,000
Total ESDs (Equivalent Single-Family Dwelling Units)	400,260

** Lower lateral pipes are the portion of the sewer lateral from main line to the downstream end of the upper lateral (from the building cleanout to the SASD's cleanout).*

Since the 2006 SCP, the following planning updates have revised SASD's and SRCSD's capacity plans. These updates prompted the need for this SCP update:

- *2011 SCRSD Interceptor Sequencing Study Report*
- *East Rancho Cordova Mid-Range Planning (September 2010)*
- *North-Watt Corridor Project, PDP-1 Report (January 2010)*
- *Rio Linda Interceptor PDP*
- *Dry Creek Relief PDP*

1.3 Disclaimer

For the expansion area, the future sewer flows were estimated based on: 1) Flows from the initial phase of the development (as mentioned in sewer studies and other planning documents available) and 2) Assumptions of future growth within the next 10 years and through buildout. The flow capacities considered for each area of development are not guaranteed and were used only for planning purposes. SASD does not reserve capacity for any development until sewer impact fees are paid.

Since the 2010 SCP is a high level planning document, the expansion trunk projects developed in this study may not be the final projects. Expansion project alternatives may be further evaluated and developed through SASD's mid-range planning efforts if necessary.

1.4 Project Team and Technical Oversight

The 2010 SCP was conducted and accomplished entirely by SASD staff. The following staff contributed to the preparation of this report:

- Ligaya Kohagura, Senior Civil Engineer, 2010 SCP Project Manager
- Li-Kai Huang, Associate Civil Engineer, 2010 SCP Project Engineer and Hydraulic Modeling Lead

- Xuyen Phung, Associate Civil Engineer, 2010 SCP Hydraulic Modeling Lead
- Mark Wilcox, Assistant Civil Engineer
- Katie Nham, Assistant Civil Engineer
- Chris Penales, Assistant Civil Engineer
- My Huynh, Assistant Civil Engineer, 2010 SCP Costing Lead
- Sonny Lunde, Senior Civil Engineer, 2010 SCP Costing QA/QC Reviewer

The 2010 SCP's evaluations and report were completed under the guidance of a Technical Advisory Committee (TAC) and a Leadership Committee. Members of the TAC and Leadership Committee are noted in ***Table 1-2***. The TAC reviewed the project team's recommendations prior to submittal to the Leadership Committee for final approval.

TABLE 1-2. 2010 SCP TECHNICAL OVERSIGHT COMMITTEES

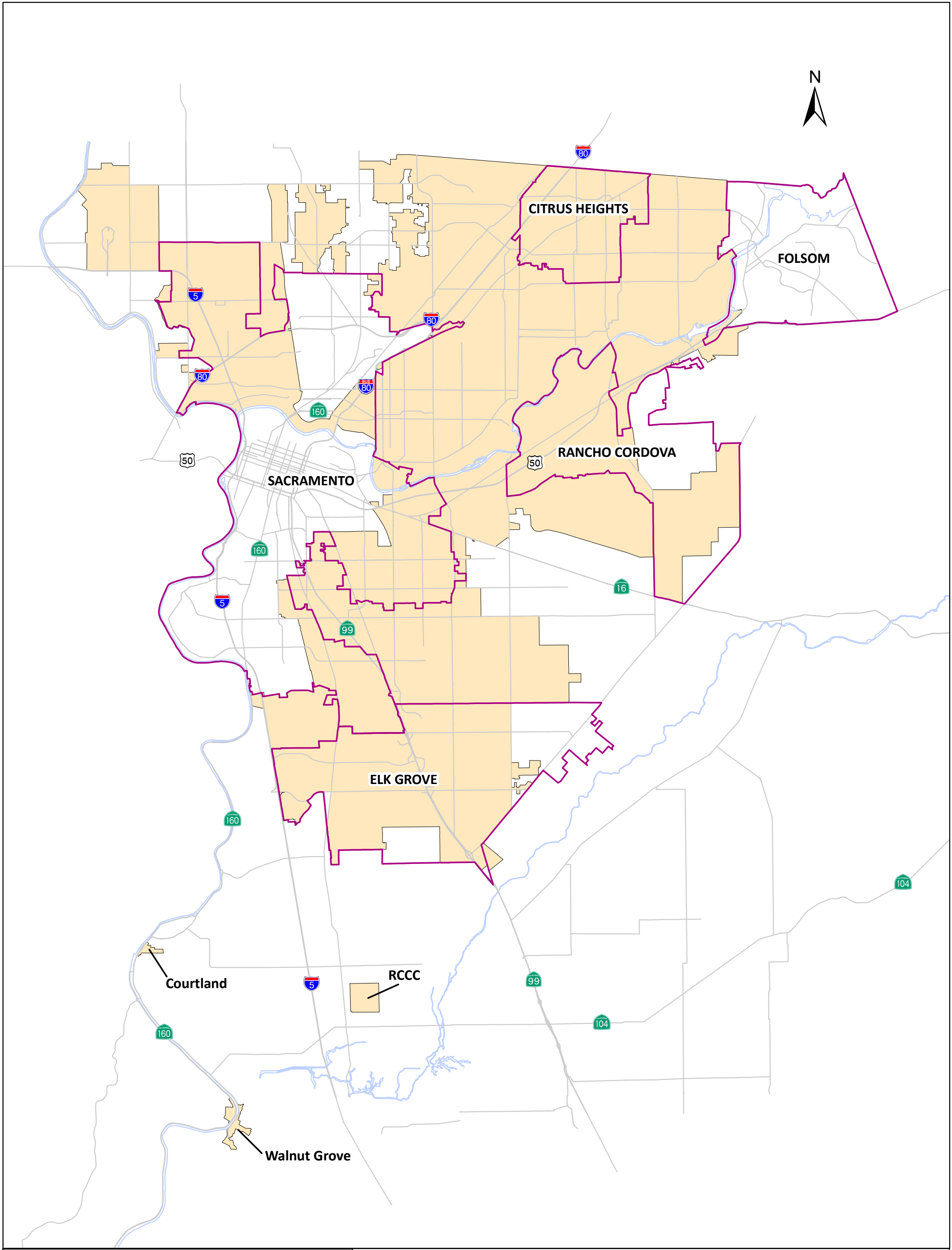
Committee	Members
Technical Advisory Committee	Rosemary Clark Erin Harper Ligaya Kohagura Sonny Lunde Roy Carlson Patrick Schroeder Dave Meier Mike Meyer *(Policy & Planning)* Steve Norris *(Policy & Planning)* Kyle Frazier *(SRCSD Engineering)*
SCP Leadership Committee	Stan Dean *(SDA Administrator)* Christoph Dobson *(SASD Operations)* Prabhakar Somavarapu *(Policy & Planning)* Ruben Robles *(SRCSD Operations)*

1.5 Abbreviations

To conserve space and ease readability, the following abbreviations have been used in this report:

ADWF	Average Dry-Weather Flow
AP (APN)	Assessor Parcel (Assessor Parcel Number)
CFP	Capital Funding Projections
CMMS	Computerized Maintenance Management System
d/D	Ratio of Flow Depth to Pipe Diameter
dia.	Diameter
ENR	Engineering News Record
ESD	Equivalent Single-Family Dwelling Unit
fps	Feet Per Second
GIS	Geographic Information System
gpd	Gallons Per Day
gpm	Gallons Per Minute
GW	Groundwater
GWI	Groundwater Infiltration

I/I	Infiltration And Inflow
ID	Identifier Number
IDF	Intensity-Duration-Frequency
ISS	SRCSD Interceptor Sequencing Study
LAFCo	Sacramento Local Agency Formation Commission
M&O	Maintenance and Operations
mgd	Million Gallons Per Day
PDP	Project Development Plan
PWWF	Peak Wet-Weather Flow
RCCC	Rio Cosumnes Correctional Center
RDI/I	Rainfall-Dependent Infiltration And Inflow
RTC	Real Time Control
SACOG	Sacramento Area Council of Governments
SASD	Sacramento Area Sewer District
SCP	System Capacity Plan
SOI	Sphere of Influence
SPA	Special Planning Area
SRCSD	Sacramento Regional County Sanitation District
SRWTP	Sacramento Regional Wastewater Treatment Plant
SSO	Sanitary Sewer Overflow
TAC	Technical Advisory Committee
UCFMS	SASD's Under-Capacity Failure Mode Strategy
UPA	Urban Policy Area
UPRR	Union Pacific Railroad
USB	Urban Services Boundary
USGS	United States Geological Survey



Legend

SASD Existing Service Area

City Limits

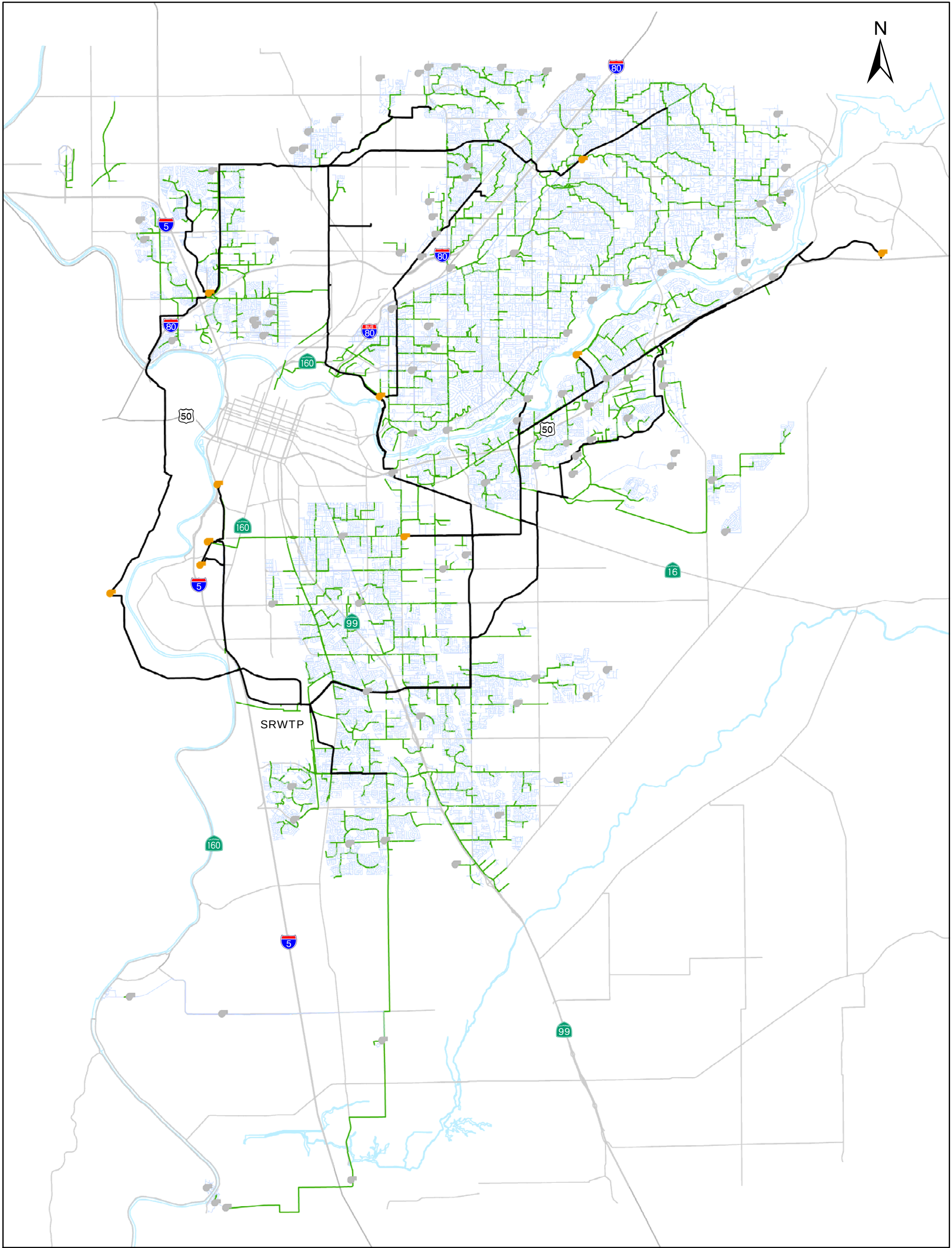
SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

SASD Existing Service Area

Figure 1-1

Date last revised 9/13/2011



Legend

SASD

- Pipes smaller than 10"
- Pipes 10" or Larger
- Pump Station

SRCSD

- Interceptor
- Pump Station

SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

SASD and SRCSD Existing Sewer System

Figure 1-2

Date last revised 10/26/2011

2. LAND USE UPDATE

Planning for future SASD facilities begins with updating existing land use information and projections in its service area. The service area's wastewater flow rates are directly related to the type of land use. Growth projections provide an overall assessment of current and future land use and an estimate of timing of specific developments.

SASD does not have jurisdiction to make land use planning decisions within its service area. Instead, SASD relies on the land use plans created by jurisdictions within its boundaries. The SASD service area includes:

- Unincorporated areas of Sacramento County
- City of Citrus Heights
- City of Rancho Cordova
- City of Elk Grove
- Portions of the City of Sacramento
- Portions of the City of Folsom
- Delta Communities of Courtland and Walnut Grove

SASD also considers growth projections from the Sacramento Area Council of Governments. SASD used the jurisdictions' latest land use plans and growth projections to estimate the sewer system's future capacities and to evaluate locations where population growth may require new collector and trunk facilities.

2.1 Study Area

Before developing future land use projections, the project team defined the boundaries of SASD's future service area. This future service area boundary represents the study area for the 2010 SCP. Certain planning boundaries defined in the Sacramento County General Plan are important in defining the study area:

- **Urban Policy Area (UPA)**. The UPA identifies areas within Sacramento County that are anticipated to develop within the 20-year planning period of the County's General Plan. In 2010, the County of Sacramento was in the process of updating their General Plan. The County anticipates completing their General Plan update in 2011. The update will include proposed UPA and Urban Services Boundary expansions, an extension on the planning horizon from 2030 to 2035, a new complete community concept, and a growth management strategy to limit "leap frog" development. The proposed land use policies in the UPA will direct future development and investment towards: 1) Urbanized communities and 2) New growth in strategically located areas (e.g., Jackson Highway and Grant Line Road area.
- **Urban Services Boundary (USB)**. The USB identifies the limits of the area where urban growth is expected to occur beyond the 20-year General Plan planning period. The purpose of the USB is to allow for the planning of necessary infrastructure, such as sewer pipelines, which have service lives longer than 20 years. It is important to note that the USB is a *political boundary*, not a physical boundary, subject to revision by land use jurisdictions. There are numerous pending requests to expand the USB and over time it is likely to change.
  - For the 2010 SCP, Sacramento County's USB was considered to be defined by the Sacramento Local Agency Formation Commission (LAFCo) legal description as of September 2010.

2.1.1 2010 SASD SCP Study Area

SASD's approved Sphere of Influence (SOI) is the service area officially designated for SASD's future planning. SASD's SOI corresponds to Sacramento County's USB with the exception of the areas served by the Cities of Sacramento and Folsom and by the Rancho Murieta Community Services District.

The following criteria were used to establish the 2010 SCP study area:

- Include all of SASD's current service area.
- Include areas inside the County's USB unless sewer service is currently or will be provided by a city or private development.

See ***Figure 2-1*** for the study area considered in the 2010 SCP.

2.2 Planning Updates

2.2.1 Development Timing Scenarios

The 2010 SCP considered the planning scenarios in ***Table 2-1*** to forecast development timing and growth within the study area.

TABLE 2-1. 2010 SCP PLANNING SCENARIOS AND PROJECTED ESDS.

SASD Hydraulic Model	SCP Planning Scenario	ESDs
2010 Model	Year 2010 (Existing)	400,260
2020 Model	Year 2020 (Mid-Range Planning)	423,130
Buildout Model	Buildout (Long-Range Planning)	1,101,680

The Year 2010 scenario (existing condition) will evaluate SASD's current sewer system capacity. The Year 2020 scenario will consider the 10-year outlook (from 2010 through 2020). There is more certainty in planning and making projections for the next 10 years versus planning through buildout of SASD's service area. Because of this, SASD has defined its mid-range planning period to be the 10-year outlook. The buildout scenario will be the basis for SASD's long-range planning evaluations.

2.2.2 Planning Issues

While SASD has based this update on the most current land use planning documents and information available at the present time, SASD has no control over the planning decisions made by the County or by the cities within its service area. This includes potential annexations of land currently outside of SASD's current SOI, as well as the possible future incorporation of other communities. SASD will respond to those planning decisions as they arise, and changes in planning boundaries and land use plans will be reflected in future updates of this SCP.

The land use issues that are of particular concern to this SCP update are:

- **Location of Development**. Areas proposed for urban development must be identified and located with respect to the SASD service area.
- **Type of Development**. In order to anticipate future wastewater flow rates, it is necessary to identify the future land use composition of development areas. This includes distinguishing different types of land uses (residential, commercial, industrial, etc.) and the anticipated density of development.
- **Timing of Development**. SASD will be required to support and serve new development areas within the UPA over the next 20 years and ultimately within the USB. Therefore, it is necessary to predict when new development will occur so that facilities can be financed accordingly.

For this SCP update, information addressing these planning issues was compiled through the following methods:

- **Review of the 2006 SCP Update**. The 2006 SCP update contains a comprehensive summary of existing and proposed land use through 2005.
- **Review of current planning documents**. These documents include the General, Community, and Specific Plans adopted or in the process of being adopted by the County and cities, and development plans currently undergoing the review and approval process. This step was important for compiling both current and future land uses. The General and Community plans were used to gain an overall picture of current land use composition, as well as identify potential development areas. Specific Plans and development plans provided detailed information of the proposed land uses in each planned development area.
- **Update digital land use mapping in geographic information system (GIS) format**. Staff used the most current GIS land use coverage for the County and cities.
- **Meet with key planning personnel**. SASD staff met with planners from the County of Sacramento, City of Sacramento, City of Citrus Heights, City of Elk Grove, and City of Rancho Cordova planning departments. Staff also met with planners from the Sacramento Area Councils of Government. Information regarding existing and future land use composition, density, location, and timing was addressed at these meetings. Staff did not meet with the City of Folsom since the small area within Folsom (served by SASD) is already built out.

The following sections summarize the information obtained from meetings with the various jurisdiction staff. ***Figure 2-2*** shows the locations of the major, currently planned or conceived development areas in the study area, along with city boundaries.

2.2.3 Sacramento County (Unincorporated) Planning Update

The County of Sacramento Planning and Community Development Department has jurisdiction over land use planning in the unincorporated portions of the County, which includes the northern and eastern portions of the SASD service area.

Besides the General Plan, the County maintains land use maps in the form of Community Plans. The County also prepares and approves more detailed land use plans for specific areas in the form of Specific Plans, and Comprehensive Plans.

SPECIFIC PLANS

The following paragraphs discuss the current status of Sacramento County's approved Specific Plans for the various parts of the unincorporated portions of the study area.

Elverta Specific Plan

The Elverta Specific Plan was finalized in 2007. The area is comprised of roughly 1,744 acres of relatively flat terrain in north-central Sacramento County. Located about ten miles northeast of downtown Sacramento, the site is roughly bounded on the east by Gibson Ranch, on the south by U-Street, on the west by 9th Street, and on the north by the Placer County line. Adjacent lands surrounding the site (except to the north) are subject to the uses and policies associated with the Rio Linda and Elverta Community Plans.

The Elverta Specific Plan identifies a total of 4,950 residential units. The residential units are identified as a combination of 880 acres of urban residential and 552 acres of agricultural residential development.

Florin-Vineyard Gap Plan

The Florin-Vineyard Community Plan area is located within the community planning areas of both Vineyard and South Sacramento. The boundaries of the Florin-Vineyard Community Plan are generally Elder Creek Road on the north, Bradshaw Road on the east, the Churchill Downs neighborhood to the south, and the Union Pacific Railroad tracks on the west.

The Florin-Vineyard Gap Plan proposes land uses to support nearly 5,700 new units on about 2,200 acres with associated commercial, office and open space. The plan area is approximately 3,400 acres with an existing 556 dwelling units.

Cordova Hills

Cordova Hills is a 2,600-acre master planned community located east of Grant Line Road in the unincorporated Sacramento County south of Douglas Road. Planned with a major town center and residential villages, a private university, commercial and open space, it is currently in the application and environmental review process. No subdivision maps are rendered yet. Once approved, some facilities and infrastructure are planned to start construction within the next 10 years including a private university.

Easton Project

The Easton Project is a master planned community designed by GenCorp that encompasses approximately 6,400 acres located in the unincorporated Sacramento County. Two planned areas in the project are Glenborough at Easton and Easton Place. The area is approximately 1,400 acres located along the south side of Highway 50 between Hazel Avenue and Prairie City Road. Improvement plans are being developed and construction is expected within the next 10 years.

Jackson Highway Vision

The Jackson Highway Vision project area includes approximately 22,000 acres of undeveloped land along Jackson Highway in the unincorporated area of Sacramento County. The project area focuses on the expansion of approximately 12,000 acres of the Urban Policy Area (UPA). The vision addresses land use, economic development, transportation, natural resource conservation, jobs-housing balance, smart growth objectives, urban/rural interface and buffering issues.

Currently, the project has allocated 1000 units for the construction of Western Inn and 2700 units of community mixed used commercial. Aspen II located along Watt Ave by the Teichert property line may be next to develop. Aspen II is all residential, multi-family, parks and schools. The County anticipates that the development will move eastward on Jackson Highway.

CORRIDOR STUDIES

Corridor redevelopment studies were developed by the County to help generate economic development and revitalize the urban areas. Each corridor study focuses on the overall improvement of that corridor and the quality of that corridor and the communities where they exist. Currently budgeted for three studies, the County is focused on the following corridors: Watt Avenue, Fair Oaks Boulevard, and Florin Road. The corridors will have new zones and regulations. The County is encouraging developers to come into these areas and develop.

2.2.4 City of Sacramento Planning Update

SASD serves about one-third of the properties within the City limits. The remaining properties are served by the City of Sacramento, with the downtown area served by a combined sewer/storm sewer system. The City of Sacramento adopted their 2030 General Plan in March 2009. The City used a straight line projection for their

population growth projections for 5-year increments. The City is scheduled to update their General Plan in 2014. The General Plan identifies Special Study areas and incorporates ten Community Plans to address land use planning for the entire city with areas of future annexation. Much of the City of Sacramento is already developed. The General Plan identifies Delta Shores, Greenbriar and the Panhandle as areas of planned development.

SPECIFIC PLANS

Arden Arcade Community Plan - Arden Fair Mall

The Arden Fair Mall retail area is expected to continue to intensify. It is currently not selected for redevelopment by the City. The city's concern for this area is the issue with the freeway interchange by the mall.

Arden Arcade Community Plan - Cal Expo

According to the city, SASD may need to plan for additional capacity needs from potential redevelopment of Cal Expo. It is currently at low density, but may increase if redevelopment effort is accepted by the City. The parking areas in the northwest (off Business 80) and northeast portion (off Ethan Way) of the property may be included in any redevelopment effort. The developers are a few years away from a plan. Redevelopment is also dependent upon the local economy.

Arden Arcade Community Plan - Point West

Point West is the area between Cal Expo and Arden Fair Mall, located with professional offices, hotels and multi-family residences. There is interest in intensifying the area in the future.

CENTRAL CITY COMMUNITY PLAN

River District

Located north of the River yard and off Richards Boulevard, originally part of the Richards Boulevard Redevelopment Project Area, the River District is envisioned as a mixed-use community with light rail transit, bike and pedestrian pathways, and a network of local streets. This Plan calls for redevelopment of approximately 773 acres of land. The land is mostly developed with 400 separate parcels and over 200 property owners. The Plan was approved by the City of Sacramento in February 2011.

EAST SACRAMENTO COMMUNITY PLAN

Innovation/Technology Village "Tech Village"

The specific plan is anticipated to be complete by summer 2012. The Tech Village is located south of US Highway 50, east of Union Pacific Railroad (UPRR) and west of Power Inn Road at the UPRR Crossing. It is intended to be a mid-rise industrial commercial area with a research and development lab with some housing. California Youth Authority closed down their 25 acre property. The City will prepare a development plan to provide to utility providers.

FRUITRIDGE/BROADWAY COMMUNITY PLAN

65th Street/University Village

This area is designated for mixed use. The property was previously owned by SMUD and leased by the California State University to provide multi-residential student housing.

NORTH NATOMAS COMMUNITY PLAN

Metro Airpark and Greenbriar

Metro Airpark, which is part of the area known as Greenbriar, was annexed to the city in 2010. The Schumacher property, located between Interstate 5 and Highway 99 interchange, has been granted entitlements but has not begun construction.

Panhandle

The Panhandle area has not been annexed into the City. It is still part of the County of Sacramento. It is currently in the process of being annexed to the City and rezoned. Currently due to the economic slowdown, the progress has been slow. This area is subject to a building moratorium due to flooding concerns. The moratorium restricts development until 2014. It is expected to develop after 10 years.

SPECIAL STUDY AREAS

Arden Arcade Study Area

The study area encompasses 10,168 acres. It is one of the most developed areas of unincorporated Sacramento County. Most of the area consists of suburban residential neighborhoods and intensely developed commercial corridors.

East Study Area

The study area encompasses 9,191 acres. The north part of the study is the suburban area of Rosemont which is mostly built out. The City of Sacramento is considering annexing the Rosemont area to preserve existing neighborhood character and consolidate urban services. The middle and south part of the study are mostly aggregate mining sites undergoing reclamation for future mining reuse and infill urbanization, as well as open space and some scattered industrial uses.

Fruitridge Florin Study Area

The area encompasses 9,490 acres. The City and the County are involved in collaborating planning efforts on high density and mixed use projects adjacent to the train stations, along transit corridors, and mixed use commercial corridors. In the City, they have rezoned 56 parcels and changed land use designations for one parcel. Most of the rezones are minor, but some changed from commercial designations to mixed use designations.

Town of Freeport Study Area

The town of Freeport, which is located along the Sacramento River just 10 miles south of downtown Sacramento along Highway 160, has approximately 197 acres. Because it is located outside of the city limits, the city is not able to serve the town unless the town gets annexed to the City. Annexation was previously scheduled in 2009, but the annexation efforts stalled due to concerns from residents. The City must wait for the annexation to be completed before it can move forward with improving the infrastructure of the town.

NEXT 10 YEARS

The City is anticipating that these areas: East Sacramento, North Natomas, 65th Street, Arden Fair Mall and Cal Expo will most likely start development or redevelopment within the next 10 years.

2.2.5 City of Citrus Heights Planning Update

The City of Citrus Heights (Citrus Heights) adopted their original General Plan in November 2000 with updates in 2005 and updates on sustainability in 2009. Sustainability includes an update on climate issues, complete street

concept and water quality functions. The preliminary draft was published in October 2010 and a final draft for public review was released in March 2011.

SPECIFIC PLANS

Boulevard Plan

In February 2005, the Boulevard Plan was adopted to reinvent the Auburn Boulevard Corridor. The plan is focused on the 112 acres of parcels including commercial and residential uses that front Auburn Boulevard. Separated into four districts: Gateway, Rusch Park, Lincoln 40 and the Sylvan Corners Village Square, each are focused on their distinctive land use and design role in the revitalization plan. Gateway District is more focused on a residential mixed-use and commercial center with employment opportunities. Since Fall 2010, the City has been obtaining easements and right-of-way to start phase 1 of the plan.

Sunrise Golf Course

The project is located on the east side of Sunrise Boulevard and north of Greenback Lane. Most of this land is identified as open space on the existing General Plan map. No applications have been submitted for this land, but the owner has in the past talked about developing this land with about 800 residential dwelling units, and 30,000 square feet of office and retail.

Sunrise Mall Redevelopment Project

The project includes redeveloping Sunrise Mall by adding additional square footage to the mall to form outlying buildings and a movie theater. The total increase to the existing mall is about 174,000 square feet. Of this amount, about 70,000 would be for the theater, the rest would be retail and restaurants.

Stock Ranch

Most of Stock Ranch Specific Plan area has been built. A few vacant commercial and office parcels are yet to be built.

NEXT 10 YEARS

In the next 10 years, Citrus Heights will continue to follow their approved General Plan. The city is looking forward to the Sunrise Mall Redevelopment Project to generate more business. They will continue to plan towards revitalizing their old corridors and continue the efforts of a complete street concept.

2.2.6 City of Elk Grove Planning Update

The City of Elk Grove (Elk Grove) General Plan was adopted in 2003. This General Plan's study area originally included a large portion outside of the City's Sphere of Influence. Since adopting the General Plan, Elk Grove has reduced their study area and is focusing on growth areas south of the existing city limits and east to the Cosumnes River. This new growth is discussed below.

In addition to the General Plan, Elk Grove has approved several Specific Plans identifying planned growth within the City's limits. All of these plans were included in the previous 2006 SCP update.

Elk Grove adopted an area designated as Rural Residential with minimum lot sizes of 2 acres and specifically limited the extension of public utilities to ensure that the area remained rural in character. In the event that Elk Grove changes the land use in this designated area, utility providers including the District may have service connection concerns since the closest utility may be miles away.

SPECIFIC PLANS

East Elk Grove Specific Plan

The plan was approved in February 1996 and includes 1440 acres. This plan assumes the highest density range possible. The City continues to recommend the high density land units. In March 2010, the Fieldstone South map was approved and updated with 30 more units totaling 130 residential units.

East Franklin Specific Plan – Franklin Crossing

The plan was approved in April 2000 and includes 2474 acres. The developer has currently started on the Improvement Plans for 600 residential units. The plan was approved years ago, but now, the developer is requesting an increase in units.

Laguna Ridge Specific Plan

The plan was approved in June 2004 and includes 1900 acres. The City received inquiries from developers to reduce land use unit densities. This plan is expected to build in the next 10 years. Currently there are 600 residential units constructed. According to the City, it is safe to assume that in the next 10 years, there will be approximately 6000 units.

Elk Grove Promenade

Approved in June 2001, the plan includes 295 acres. The plan is divided into five land uses consisting of a regional mall, community commercial, office and entertainment, visitor commercial, and multi-family residential uses. Although construction has been stalled on the regional mall, the planned land use remains commercial. The City is encouraging development in the area and the City is willing to work with any interested developers to build in that area.

Old Town Special Planning Area

Approved in August 2005, the plan provides policy and design guideline for redeveloping Old Town Elk Grove, which is located along Elk Grove Boulevard between Elk Grove Florin Road and Waterman Road. A city ordinance was recently adopted that includes policy changes and design guideline changes that consider Old Town as a redevelopment area. The City Council has a vision for redevelopment but they are not certain of what type and land use they will be recommending. The Council wants the area to attract more tourism and businesses. It could possibly be designated as multi-family or mix-used. No timeline has been set.

SOUTH AREA SPECIFIC PLAN

The plan was approved in December 2006 and includes 1194 acres. The developer withdrew application and the plan is no longer being processed. However, the land use proposed in plan does reflect the land use (mixed commercial/residential/office). This area will most likely not develop within the next 10 years.

Triangle Special Planning Area

The plan was approved in April 2004 and includes 710 acres. Each residential lot is a minimum of 1 acre. A few subdivisions have been built. Some small commercial development may be proposed.

NEXT 10 YEARS

In the next 10 years, Elk Grove will follow their General Plan as it is currently approved. The City Council has a vision beyond 10 years to get the job and housing plan to a balance and to get more commercial development in the City. Areas that would most likely develop in the next 10 years would be Franklin Crossing and the Laguna

Ridge Specific Plan. Areas in the south like Elk Grove Promenade and Southeast Policy Area, which is located to the west of Elk Grove Promenade, will most likely develop after 10 years.

2.2.7 City of Rancho Cordova Planning Update

The City of Rancho Cordova (Rancho Cordova) completed their latest General Plan in 2006. The Rancho Cordova General Plan identifies sixteen planning areas and identifies anticipated timing of development for each.

In July 2010, the City annexed an unincorporated portion of Sacramento County. The city expanded its boundaries by annexing an approximately 1.2 mile stretch of land located south of Highway 50 (from Sunrise Boulevard to Hazel Avenue) that included the Folsom Corridor and the Sunrise corridor south to White Rock Road.

SPECIFIC PLANS

Arboretum-Waegell

This plan is located east of Sunrise Blvd, north of Jackson Highway, south of Kiefer Road, and west of Grant Line Road. The plan proposes 1,349 acres of residential housing, public, retail and commercial land use including 48 acres of retail and commercial, and 450 acres of stream corridor, reservoir, and vernal pool reserves. There is preliminary land use map for this area and development is planned for 2015.

Folsom Boulevard

The area includes the Folsom Boulevard corridor between Bradshaw Road and Sunrise Boulevard. In total, it plans to provide 7,980 dwelling units and employment opportunities. Originally adopted in 2006, the specific plan had revisions in 2008 to include more detailed information to guide development. The latest amendment in January 2010 expanded the ability to utilize existing commercial buildings in residential zoning districts. It is planned to have high density commercial infill for this area.

Rio Del Oro

The city has adopted the final plan for Rio Del Oro that includes approximately 3,828 acres of mixed-use community located south of White Rock Road, north of Douglas Road, and east of Sunrise Blvd in the City.

Westborough

Westborough has a combined residential and commercial plan. Currently, the City is performing commercial analysis for the appropriate percentage for commercial from the City Manager's office. In this area, the City is focusing on the center concept rather than corridor concept.

OTHER

The city currently does not have comprehensive growth projections for development. The city is estimating approximately 300 ESD/year of development within their jurisdiction. The General Plan's mandatory housing update is planned for 2015. Currently, the number of land use units developed has been going down. Density projections with in the open space area have been going up.

NEXT 10 YEARS

For the next 10 years, the City is focused on the following areas of development:

- South of Douglas area
- Rio Del Oro starting in the northwest area moving east
- Sun Creek
- Arboretum

2.2.8 Sacramento Area Council of Governments Planning Update

The Sacramento Area Councils of Government (SACOG) is an association of local governments in the six-county Sacramento Region. Its members include the counties of El Dorado, Placer, Sacramento, Sutter, Yolo, Yuba as well as 22 cities. SACOG provides transportation planning and funding for the region, and serves as a forum for the study and resolution of regional issues. SACOG prepares the region's long range transportation plan and approves the distribution of affordable housing and assists in planning for transit, bicycle networks, clean air and airport land uses.

SACOG plans to update the Blueprint, a regional growth projection report, every 4 years and RHNA (Regional Housing Needs Assessment for affordable housing) every 8 years. SACOG recommends using their growth projections for all units forecasted. Currently, SACOG is looking at Senate Bill 375 (SB375) to support the redevelopment and infill projects, to streamline projects and make development more attractive. SACOG intends to synchronize SB375 with the federal 4-year land use transportation plan schedule.

SACOG recommends using the high end of their development projections to provide a conservative estimate. They also recommend land jurisdictions to plan one year after the SACOG projections.

2.3 Land Use Map and Projections

The types of land uses and their respective densities are used to estimate unit wastewater flow rates for future developments. For the 2010 SCP, SASD updated the 2006 SCP consolidated land-use information. The following approach was used to update the land-use map and categories:

- Begin with SRCSD's 2011 Interceptor Sequencing Study (ISS).
- Include the latest sewer study information
- Update the open space and corridor layers.
- Include any new information collected from meetings with jurisdiction staff including current information from various County, city, and developer land use plans and maps.

A consolidated land use map reflects a uniform set of land use categories. See ***Figure 2-3***. This map shows assumed densities for the land use categories (under buildout conditions). The densities are expressed in units of equivalent single family dwelling units (ESDs) per acre, where one ESD represents the wastewater generation equivalent of one single family residence.

For the 2010 SCP, the ESD densities were selected based on the following criteria (listed in order of precedence):

- Use 0 ESD/acre for dedicated open spaces and areas that are "not likely to ever be sewered."
- Use ESD data from the latest sewer studies and planning documents.
- If no ESD data, use ESD densities from ***Table 2-2***.
- No densification to currently connected parcels until infill development is planned. Therefore, buildout density equals existing density for currently connected parcels.

The ESD densities from the consolidated land use map (***Figure 2-3***) will only be applied to parcels that are currently vacant and/or planned for redevelopment (e.g., corridors). The ESD densities will be used to estimate wastewater flows from these parcels under buildout conditions. For currently connected parcels, the 2010 SCP considered no densification unless a redevelopment plan was proposed. In other words, currently connected parcels will have the same density under buildout conditions as under existing conditions.

Table 2-2 includes a new land use category: *Corridors and Town Centers*. This category applies to special planning zones that include mixed use developments and sustainable communities. The SRCSD 2011 ISS report included a land use map that included corridor locations. The SCP land use map was based on this ISS map and

updated to include current information on corridor redevelopment information from Sacramento County planners and town center development information from other jurisdiction staff.

TABLE 2-2. 2010 SCP LAND USE CATEGORIES AND DESIGN ESD DENSITIES

Description	ESDs per acre
Medium Low Density Residential	10
Medium Density Residential	15
Medium High Density Residential	22
High Density Residential	30
Corridors and Town Centers	20
Open Space (non-sewered areas): • Elk Grove Rural Residential • Parks, Greenbelts, Public Open Spaces, Resource Conservation Areas • Manmade Lakes, Storm Water Detention Ponds, Storm Water Canals, Drainage Parkway, Detention Basins • Flood Plains, Waterways, Levees, Drainage Ditches, Irrigation Canals • American River Parkway, Natural Preserve, Urban Reserves (non-sewered), Wetland Buffers, Wastelands • Bike Path Corridors, Landscape Corridors, • Cemeteries • Roadways, Streets	0
All Other Land uses: • Residential • Commercial/Office • Industrial • Public/Quasi-public/Schools • Mixed/Special Planning Area/Urban Reserve	6

2.3.1 Land Use Projections

Parcels are used to define the areas contributing flow to the sewer system. For each parcel, the model requires the population in ESDs, and an estimation of the contributing area. The contributing area is used to calculate groundwater infiltration (GWI), storm water runoff, and rainfall-dependent infiltration/inflow (RDI/I).

To calculate contributing areas and ESDs for the existing land use scenario, each sewer account is first associated with an assessor parcel or sub-parcel. To “populate” the parcel database with current sewer connection data, the total ESDs for each parcel (including sub-parcels associated with the parcel) were determined from a data file “dumped” from the County’s utility billing system. In addition, the total contributing area of each parcel was determined based on the parcel size in GIS. For large connected but underdeveloped parcels, it was assumed that, at most, one acre per ESD represented the current contributing area of the parcel. This assumption was made so as not to overestimate the I/I-contributing portion of the parcel.

To calculate contributing areas and ESDs for the buildout land use scenario, it was assumed that the contributing areas and ESDs for current sewer connections would remain the same at buildout unless redevelopment plans were proposed. At buildout, it was also assumed all currently unconnected parcels would be developed to receive sewer service, except those designated as open space land use. ESDs at buildout were computed for each unconnected parcel based on the 2010 SCP's Consolidated Land-Use Map. The contributing area for a currently unconnected parcel, designated as non-open space at buildout, was considered to be the parcel size in GIS.

SERVICE AREA GROWTH AND DEVELOPMENT TIMING

The relative rate of growth in different portions of the SASD service area and the anticipated timing of major developments impact the capital funding projections for sewer system improvements. The following sources were used in this SCP update to identify when sewer facilities will be required:

- SASD development experience.
- County and city planning staff's predictions of when major developments will begin.
- Developer's predictions as discussed with SASD Development Services staff.

To determine when the initial infrastructure in new development areas will be needed, SASD staff solicited input from planning staff of the County and the Cities of Sacramento, Elk Grove, and Rancho Cordova. The results are maps showing anticipated development by Year 2020 and anticipated redevelopment at buildout. See the following figures:

- ***Figure 2-4.*** New Developments by Year 2020
- ***Figure 2-5.*** Percent Buildout by Year 2020
- ***Figure 2-6.*** Redevelopment Areas under Buildout Conditions

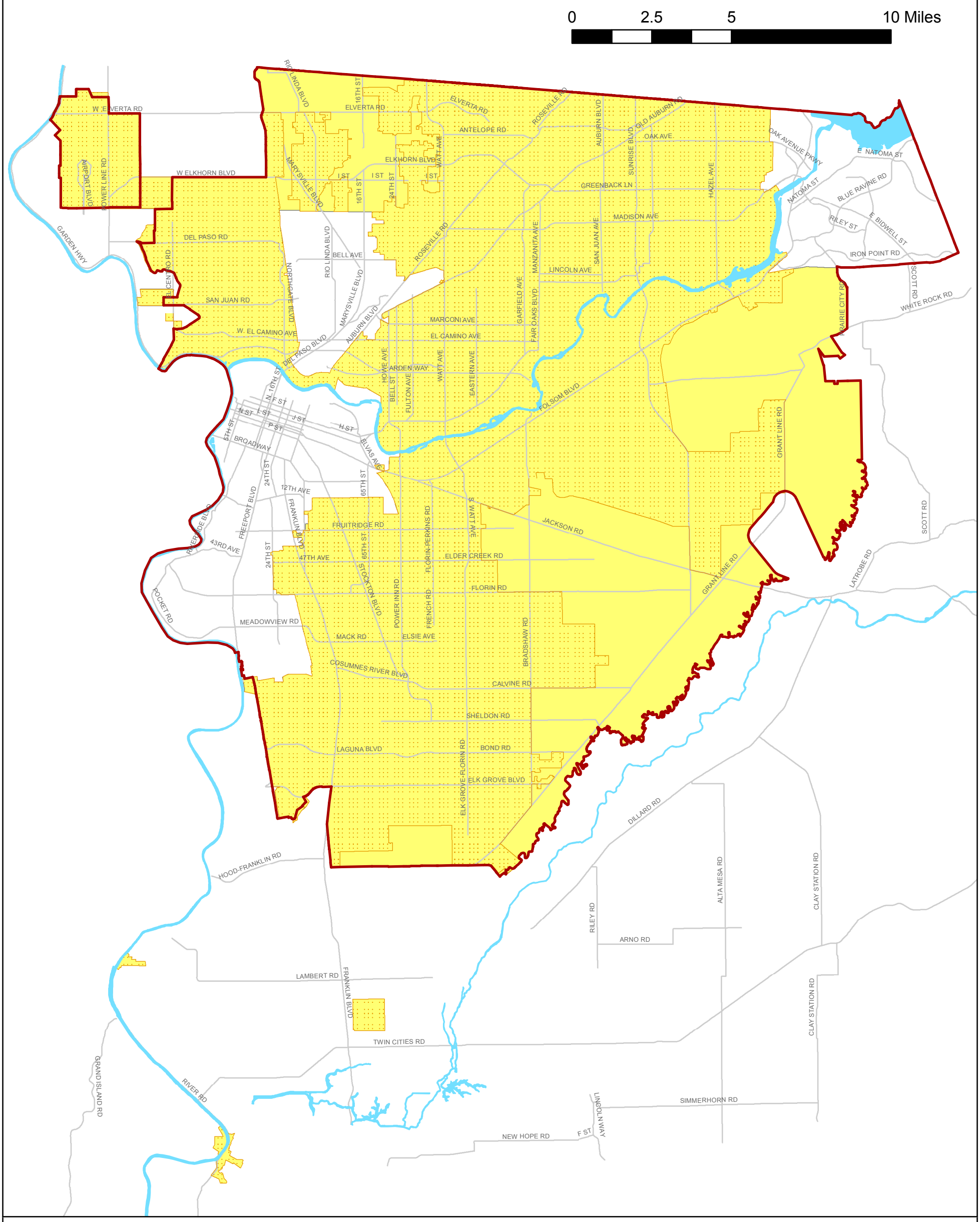
In ***Figure 2-4***, the new developments anticipated by Year 2020 were categorized into four different types of developments:

- Densification of currently subdivided lots.
- County corridors, including the Watt Avenue North, Fair Oaks Boulevard Central, and the Florin Road corridors.
- City of Sacramento's Tier 1 Opportunity Areas, including the Arden Fair and 65th Street North areas
- Developments identified from sewer studies and applications.

Figure 2-5 illustrates the percent buildout assumptions used to determine the Year 2020 ESDs for the new developments mentioned above.

2.3.2 Summary

Future wastewater flows in the SASD system are quantified based on land use estimates from land use plans received from Sacramento County and the cities within the SASD service area. Information from these various sources are consolidated into a common set of land use categories and densities, which facilitate the use of GIS technology to quantify land uses and wastewater flows. For areas outside of the urbanized area (addressed in the County's current General Plan), the 2010 SCP assumed that potential densities could be similar to those projected for near-term urban development. Therefore, an average density of 6 ESDs per acre was assumed for these areas, except for the open spaces. Jurisdictions' planning staff and the development community provided information used to make growth projections within the SASD service area and to estimate timing of specific development. This information will be used to estimate the 2010 SCP capital funding projections for relief area system improvements and expansion area projects.



Legend

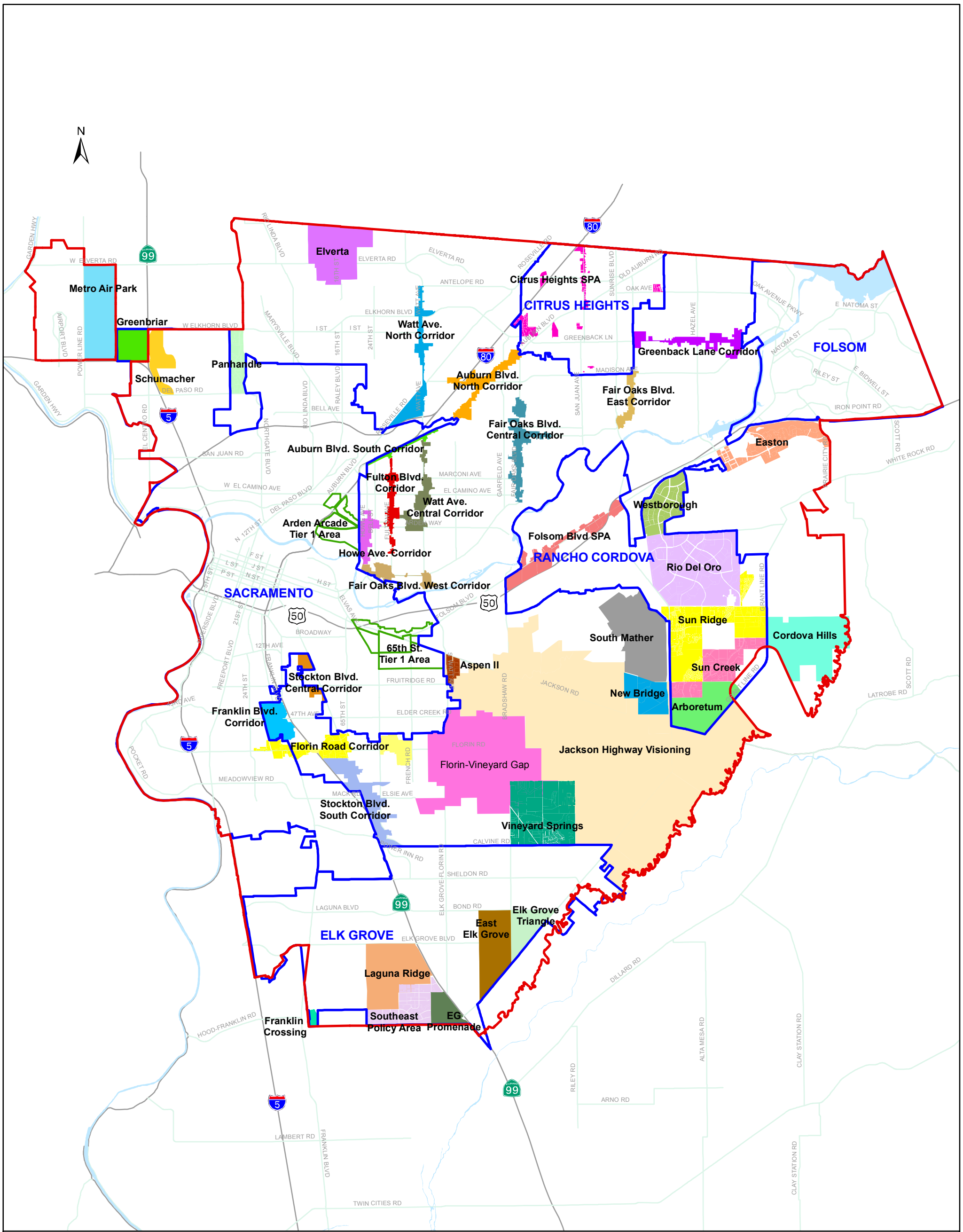
- Urban Services Boundary
- SASD Service Area
- 2010 SASD SCP Study Area

SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

Study Area

FIGURE 2-1



SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

Legend

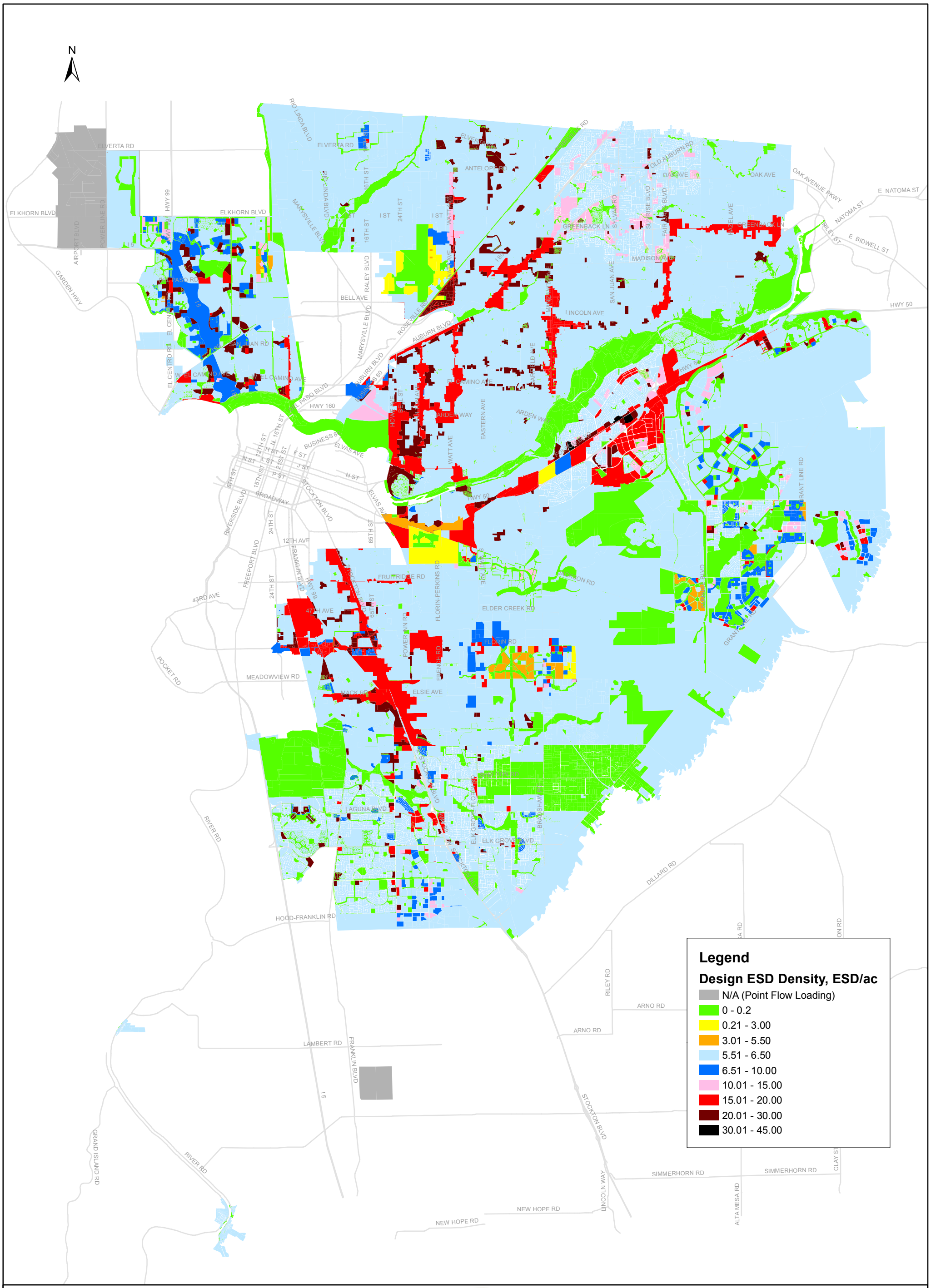
Urban Services Boundary

City Boundary

Planned Development Areas

FIGURE 2-2

Date last revised: 10/06/2011



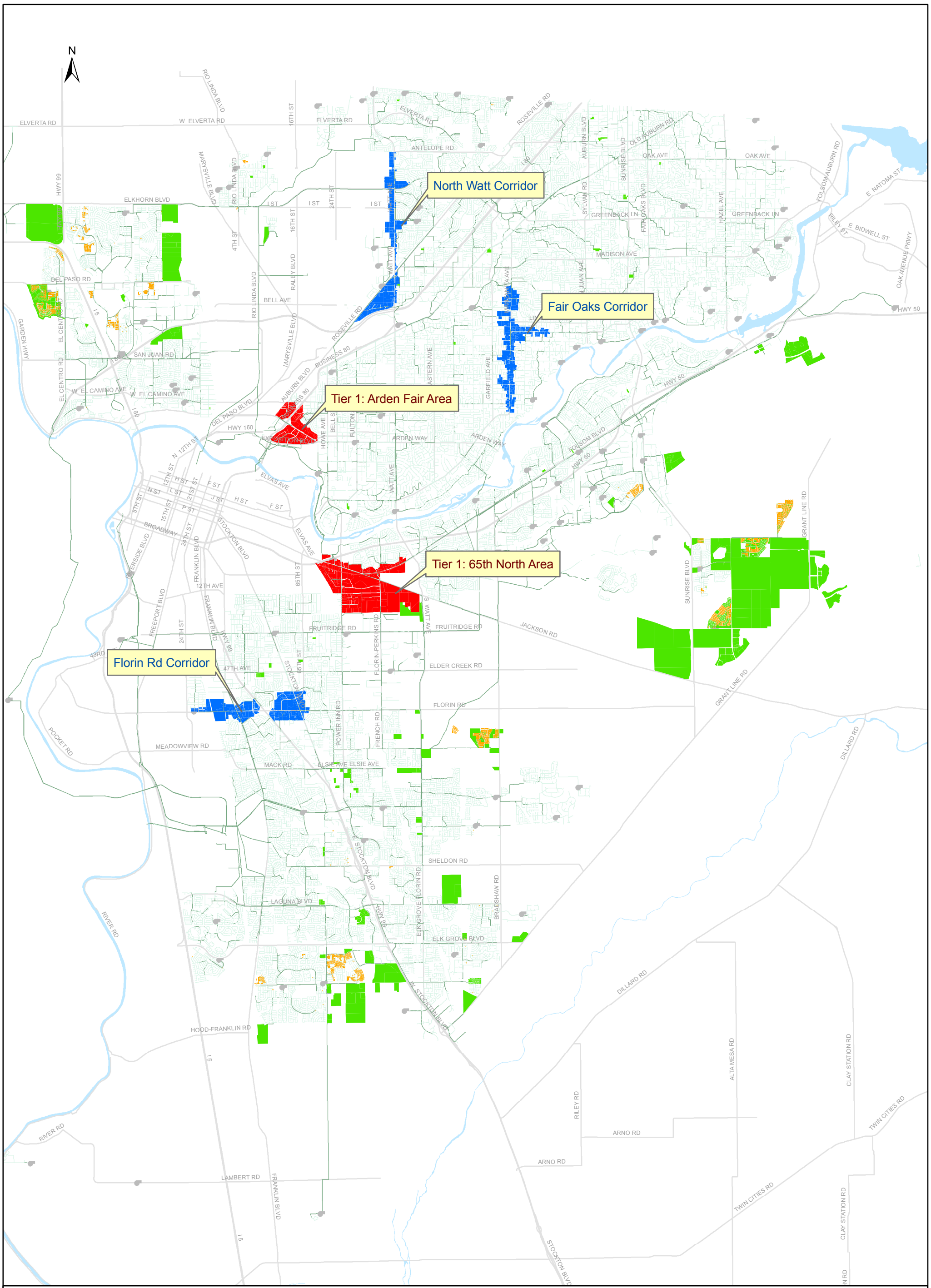
SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

Consolidated Land Use Map

FIGURE 2-3

Date last revised: 9/7/2011



Legend

New Developments by 2020

- Subdivided lot
- Corridor
- City of Sacramento's Tier 1 Area
- Potential development from planning documents

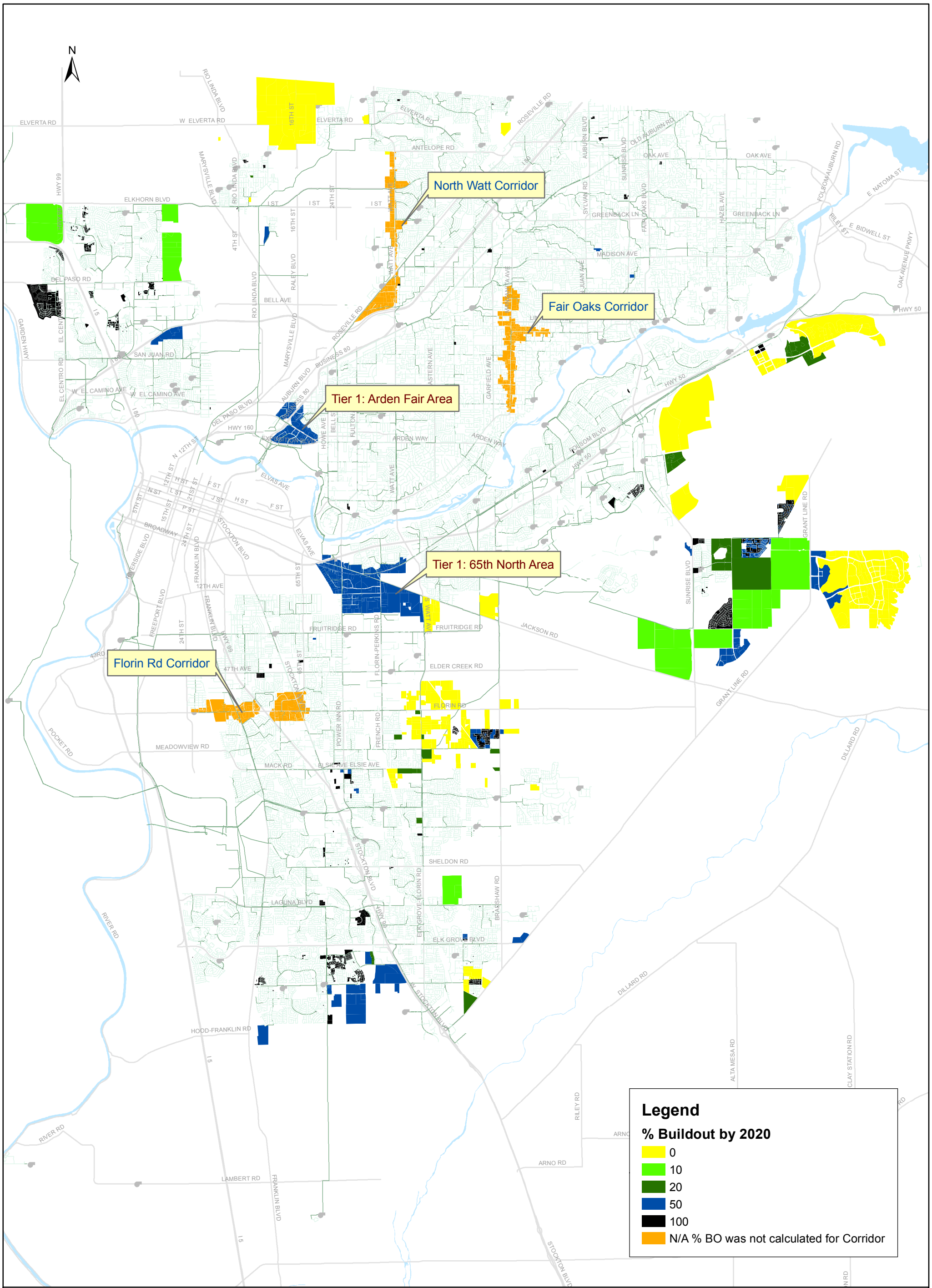
SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

New Developments By 2020

FIGURE 2-4

Date last revised: 9/8/2011



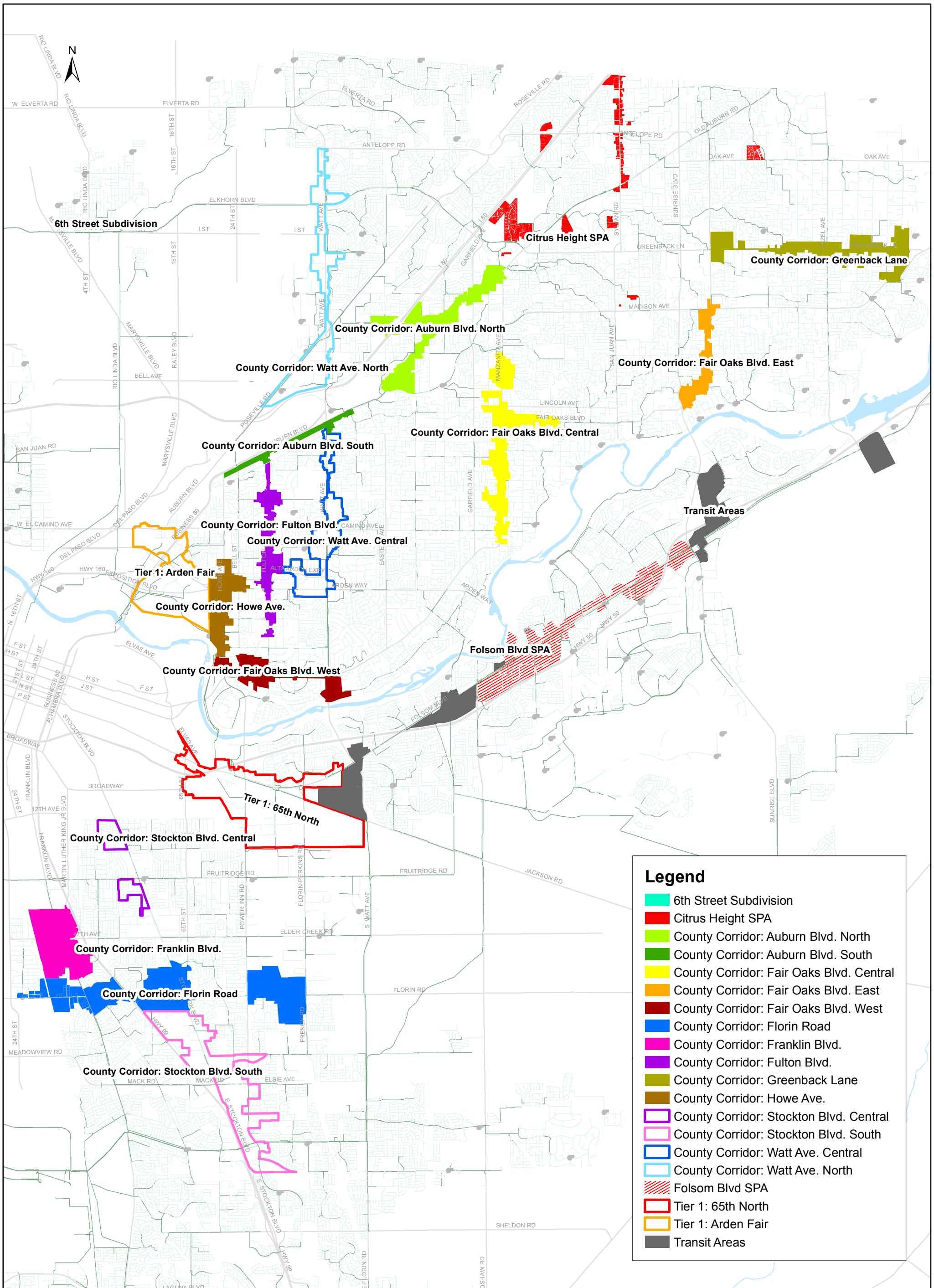
SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

Anticipated Percent Buildout by 2020 for New Developments

FIGURE 2-5

Date last revised: 9/12/2011



SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

Redevelopment Areas

FIGURE 2-6

Date last revised: 10/31/2011

3. ASSUMPTIONS AND CRITERIA

This section presents the assumptions and criteria established for the 2010 SCP's flow parameters and performance measures. Establishing these capacity criteria is necessary for determining:

- Where sewer improvements are needed in SASD's existing facilities to meet SASD's performance criteria.
- Which new facilities (including future facilities) may be needed in SASD's service area.
- What design sizes should be considered for sewer improvements and new facilities.

3.1 Flow Parameters

In the 2010 SCP, wastewater flow rates were estimated based on:

- Land use projections.
- Flow Parameters developed for the 2010 SCP.

The land use projections are described in Section 2 of this report. Flow parameters are used to estimate sewer flows generated from population, rainfall, and groundwater. Flow parameters of an existing sewer system can be estimated through flow monitoring and model calibration.

The following approach and assumptions were used to establish SASD's 2010 SCP's flow parameters:

- Review flow parameter assumptions used in recent SASD projects (e.g., January 2010 North Watt Corridor Mid-Range Planning Study, Under-Capacity Failure Mode Strategy Evaluation Reports, and the 2006 SCP).
- Identify SASD sewer systems that have hydraulic models that have been calibrated using recent, available flow monitoring data. Systems with well calibrated models will provide higher confidence level results.
- Determine if additional flow-monitoring should be conducted for the 2010 SCP. Perform additional flow monitoring from October 2010 through April 2011.

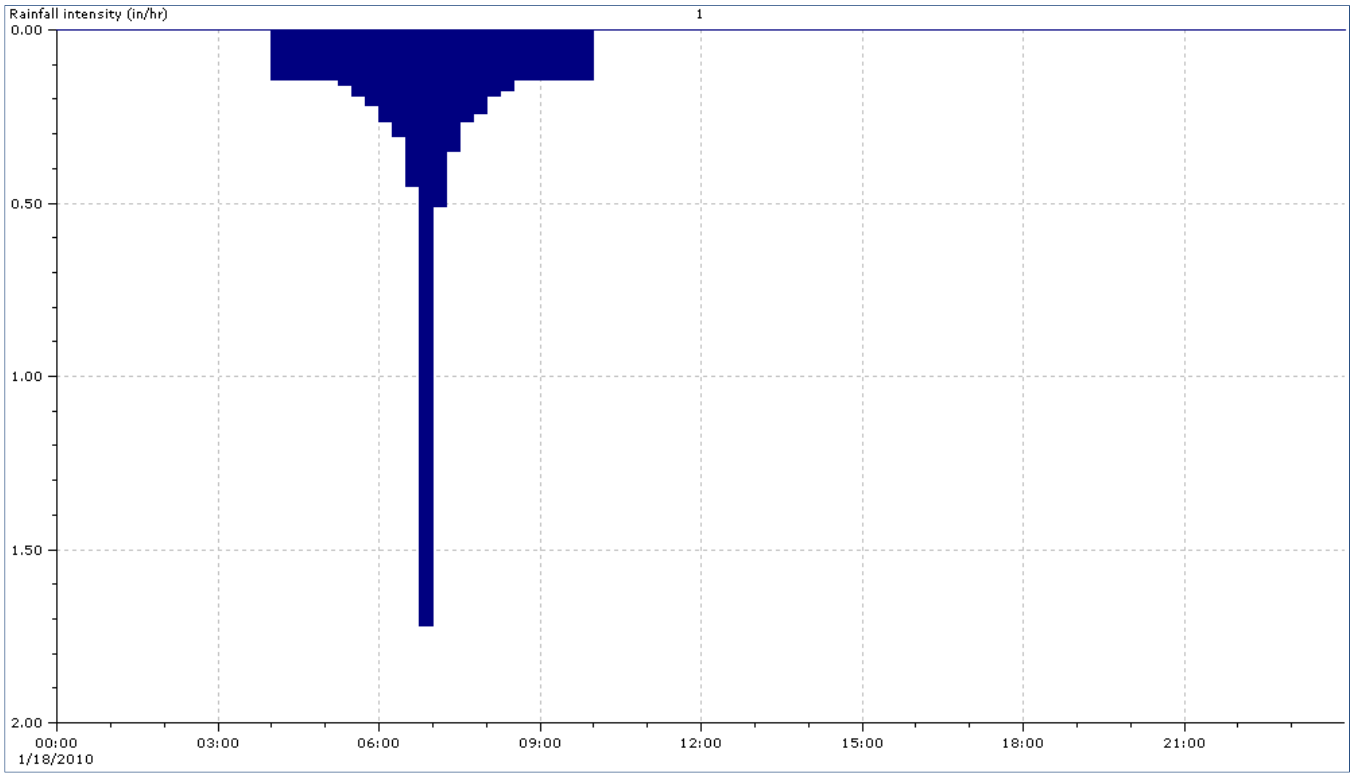
Section 4 includes a more detailed description of the flow monitoring information used in this SCP update.

3.1.1 Design Storm

Wastewater collection systems are typically sized for a specific "design" condition, often represented by a design storm, which is a wet weather event occurring within the study area. The design storm is based on long-term rainfall data. Typically, rainfall intensity-duration-frequency (IDF) relationships are available through county flood control districts for use in developing appropriate design rainfall amounts and intensities for drainage facilities.

SASD has historically used a 6-hour duration, 10-year frequency synthetic rainfall event as the design storm for sewer system planning. See ***Figure 3-1*** for the hydrograph used in SASD's hydraulic modeling evaluations of peak wet weather conditions. SASD's design storm is based on the methodology set forth in the Hydrology Standards of the Sacramento City/County Drainage Manual (December 1996). This design storm is not based on actual historical storm data. SASD believes its design storm adequately reduces the risk of overflows during wet weather events. *The 2010 SCP continued the use of SASD's synthetic design storm considered in the 2006 SCP*.

FIGURE 3-1. SASD'S DESIGN STORM HYDROGRAPH (6-HOUR DURATION, 10-YEAR FREQUENCY)



3.1.2 Wastewater Flow Components

Wastewater flows are composed of several components:

- Domestic Flows
- Groundwater infiltration
- Rainfall-dependent infiltration/inflow

The latter two components are collectively referred to as infiltration/inflow (I/I). Infiltration is extraneous groundwater and storm water runoff that indirectly enters the collection system. Inflow is storm water that enters into the collection system at points of direct connection.

DOMESTIC FLOWS (AVERAGE DRY-WEATHER FLOWS)

Domestic wastewater flows originate from residential, commercial, industrial, and institutional users. For SCP purposes, the domestic flow rates (excluding industrial discharges) are comparable to the average dry weather flow (ADWF) rates. Domestic flows are determined by type of land use and are affected by the service area's growth and development. Domestic flows may also be impacted by water use practices such as water conservation. Domestic wastewater flows vary in magnitude throughout the day but generally follow predictable diurnal patterns. For the 2010 SCP, the domestic flow factors are defined as noted in ***Table 3-1***.

TABLE 3-1. 2010 SCP'S DOMESTIC FLOW FACTOR AND DIURNAL CURVE CRITERIA

SASD Service Area Description	Domestic Flow Factor *	Diurnal Curve
Future Development Parcels *(new and existing system)*	310 gpd/ESD	SASD's Standard Residential Diurnal Curve
Currently Connected Parcels *(with ADDITIONAL flow monitoring & model calibration)*	By latest model calibration	Curve developed from the latest model calibration
Currently Connected Parcels *(NO recent flow monitoring & model calibration)*	310 gpd/ESD	SASD's Standard Residential Diurnal Curve

*gpd/ESD = Gallons per Day (gpd) per Equivalent Single-Family Dwelling (ESD) Unit

The design domestic flow factor of 310 gpd per ESD is higher than most measured flows in the SASD system.

The daily variations in domestic wastewater flow rates can be represented by various diurnal curves. For sewer systems whose hydraulic model was *not recently calibrated to flow monitoring data*, the 2010 SCP applied SASD's standard residential diurnal curve. The 2006 SCP also used SASD's standard residential diurnal curve, which is appropriate to estimate the wastewater flow generated by small "sewer sheds" in the collection system.

GROUNDWATER INFILTRATION

GWI is groundwater that indirectly enters the sewer system, usually through joints in pipes and manhole walls. The magnitude of GWI depends on the condition of the sewers as well as on the depth of the groundwater table with respect to the local sewer system. Therefore, GWI is highly dependent on location and topography. Sewers in low-lying areas, particularly along streams and near rivers, typically exhibit higher GWI rates.

In California, GWI varies seasonally (lowest in summer and early fall, highest in late winter and spring), as well as from year to year depending on rainfall patterns, but may not vary significantly on a day-to-day basis. For SCP purposes, GWI is considered to be infiltration that occurs during non-rainfall periods to distinguish it from RDI/I. However, rainfall clearly has long-term impacts on GWI rates, as evidenced by measurable increases in GWI after prolonged periods of rainfall.

GWI is expressed on a unit area basis (gpd per acre) and varies by location in the system. ***Table 3-2*** summarizes the GWI factor considered in the 2010 SCP.

TABLE 3-2. 2010 SCP GROUNDWATER INFILTRATION FACTORS

SASD Service Area Description	Groundwater Infiltration (GWI) Factor
Future Development Parcels *(new and existing system)*	0 to 500 gpd/gross acre *(depending on location)*
Currently Connected Parcels *(with ADDITIONAL flow monitoring & model calibration)*	GWI factor developed from the latest model calibration
Currently Connected Parcels *(NO recent flow monitoring & model calibration)*	0 to 500 gpd/gross acre *(depending on location)*

For areas of *future development and currently connected parcels with no flow monitoring data*, design GWI rates are based on gross acreage and range from 0 to 500 gpd per acre, depending on location (see ***Figure 3-2***):

- Natomas service area located west of the Main Drainage Canal: 500 gpd per acre
- Natomas area located generally west of the Union Pacific Railroad right-of-way: 200 gpd per acre
- Orangevale area: 200 gpd per acre
- Remainder of SASD's service area: Zero GWI rate (i.e., no additional GWI above the base infiltration included in the 310 gpd per ESD domestic flow).

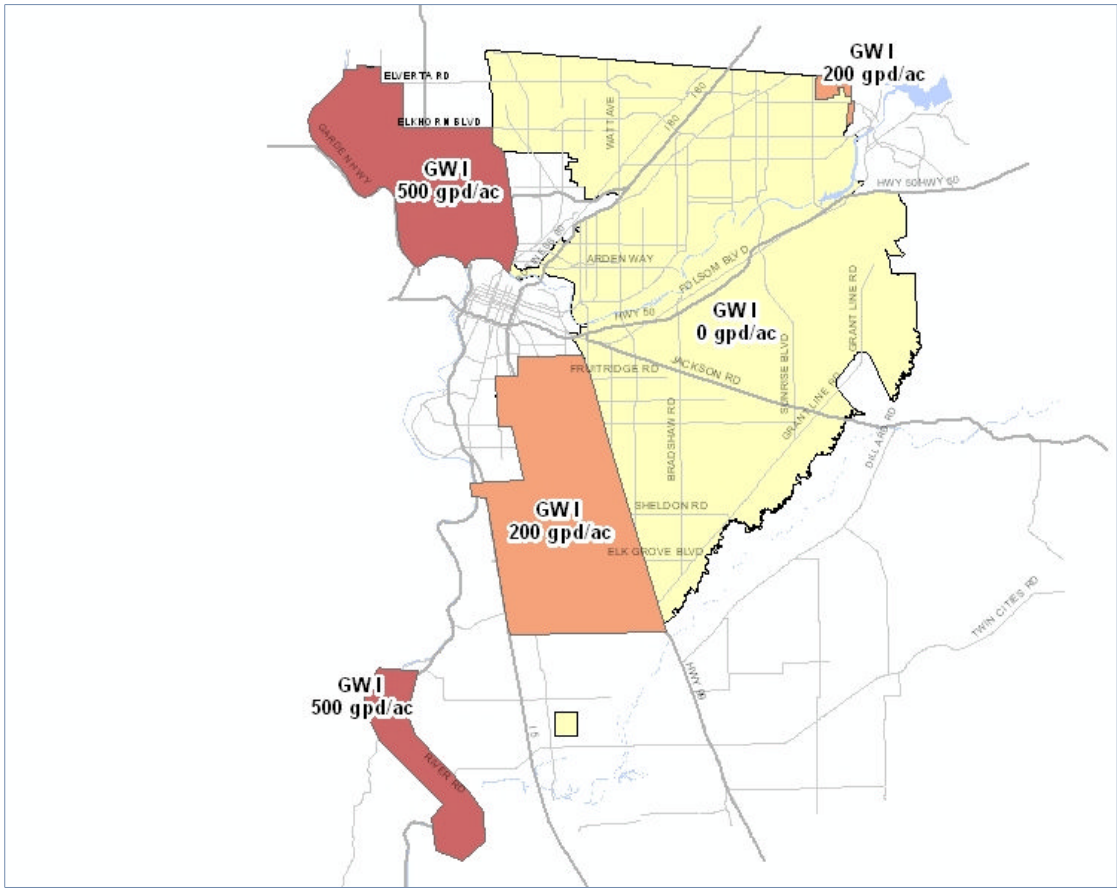
Note that for computing GWI and RDI/I flows, contributing acreage includes only land uses considered to contribute wastewater flows and does not include non-sewered open space uses such as parks, natural preserves, cemeteries, etc. Net acreage does not include the area occupied by streets and roads. Gross acreage includes local streets and roads but not major highways.

RAINFALL-DEPENDENT INFILTRATION/INFLOW

RDI/I is infiltration and inflow that is directly related to rainfall events. RDI/I may also enter the sewer system through joints in pipes and manholes, as well as through direct surface drainage connections such as illegally connected roof and yard drains or storm drain cross connections. The magnitude of RDI/I flows are related to the following:

- Intensity and duration of the rainfall
- Relative soil moisture at the time of the rainfall event
- Condition of the sewers
- Other factors

FIGURE 3-2. GRAPHICAL REPRESENTATION OF GWI ZONES



In most areas, peak flows during rainfall events are the highest flow rates that occur in the collection system. Peak design flows include the projected RDI/I expected to be generated by SASD's design storm (6-hour, 10-year recurrence frequency). RDI/I flows are generated by applying runoff parameters (RDI/I volume percentages and hydrograph shapes) to the design storm rainfall using the hydrologic routines in the hydraulic model. The runoff parameters are represented as a set of three volume percentages:

- Fast RDI/I response to rainfall
- Medium RDI/I response to rainfall
- Slow RDI/I response to rainfall

Each runoff parameter represents the volume of RDI/I as a percentage of the total volume of rainfall falling on an area during the design storm. Each runoff parameter also has a corresponding hydrograph shape.

The 2010 SCP's RDI/I rates are summarized in ***Table 3-3***.

TABLE 3-3. 2010 SCP RAIN-DEPENDANT INFILTRATION/INFLOW RATES

SASD Service Area Description	Rainfall-Dependant Infiltration/Info Rates
Future Development Parcels *(new and existing system)*	0.6% fast RDI/I response
Currently Connected Parcels *(with ADDITIONAL flow monitoring & model calibration)*	RDI/I rate developed from the latest model calibration (0.6% minimum fast RDI/I response)
Currently Connected Parcels *(NO recent flow monitoring & model calibration)*	RDI/I rates used in the 2006 SCP

For future areas of development, the RDI/I rate was assumed to be similar to typical areas of recent development in the existing system. The assumed RDI/I volume percentage for future areas of development is 0.6 percent based on gross acreage.

Runoff parameters (for the currently connected parcels with flow monitoring data) were established based on model calibration to actual flow monitoring data. Design storm RDI/I hydrographs were developed by applying runoff parameters to the contributing acreage. The RDI/I hydrographs will be updated, as needed, based on additional flow monitoring data collected and as hydraulic models are calibrated to the additional data.

For the 2010 SCP, it has been assumed that future I/I rates in the existing system will remain similar to existing rates. I/I rates in the expansion area were assumed to not increase beyond those currently seen in relatively new areas of the system (i.e., areas that are less than 20 years old). In reality, some expansion areas may deteriorate quicker, resulting in increased I/I flow. Conversely, as SASD increases its rehabilitation efforts, some segments of the existing system may experience slower deterioration rates and less I/I flow. SASD will continue to monitor flows in the system and target rehabilitation efforts in areas that show increases in I/I flows. I/I rates will continue to be re-evaluated periodically as part of future SCP updates.

3.1.3 Peak Wet Weather Flows

Per SASD Standards, sewer systems are designed to have capacity (without surcharge) to accommodate the PWWF. The SASD Standards calculate design PWWF rates using wastewater equations. These equations are based on ADWF and I/I factors.

In the 2010 SCP evaluations, PWWF rates were determined by using the hydraulic model to simulate the flows in the system during a 10-year design storm. The timing of the storm is set so that the *peak RDI/I response* in the upstream sewer sheds *occurs at the time of the morning diurnal peak* domestic flow rate. The hydraulic model determined the PWWF rates for existing, Year 2020, and buildout condition scenarios (see discussions on development of the hydraulic model in Section 4 and presentation of model results in Section 5).

3.1.4 Flow Parameter Summary

Table 3-4 summarizes the flow parameters used in the 2010 SCP. For future developments, the flow parameters results in flow rates similar in magnitude to applying the SASD Standards' design wastewater equations.

For currently connected parcels, the 2010 SCP's flow parameters use the best available information if recent flow monitoring data is available. By using actual flow monitoring data, the domestic flow factors for currently connected parcels maybe higher or lower than the 310 gpd/ESD flow factor used in the 2006 SCP. For currently connected parcels with no recent flow monitoring data, the 310 gpd/ESD domestic flow factor will be uniformly applied.

The 2010 SCP flow parameters were entered into SASD's dynamic sewer hydraulic models. The results of these modeling evaluations are presented in Sections 5 and 6 of this report.

TABLE 3-4. 2010 SCP FLOW PARAMETERS

SASD Service Area Description	Domestic Flow Factor *	Diurnal Curve	Groundwater Infiltration (GWI) Factor	Rainfall-Dependant Infiltration/Info Rates
Future Development Parcels *(new and existing system)*	310 gpd/ESD	SASD's Standard Residential Diurnal Curve	0 to 500 gpd/gross acre *(depending on location)*	0.6% fast RDI/I response
Currently Connected Parcels *(with ADDITIONAL flow monitoring & model calibration)*	By latest model calibration	Curve developed from the latest model calibration	GWI factor developed from the latest model calibration	RDI/I rate developed from the latest model calibration *(0.6% minimum fast RDI/I response)*
Currently Connected Parcels *(NO recent flow monitoring & model calibration)*	310 gpd/ESD	SASD's Standard Residential Diurnal Curve	0 to 500 gpd/gross acre *(depending on location)*	RDI/I rates used in the 2000 SCP

3.2 Performance Criteria

The 2010 SCP established performance criteria for the following purposes:

- Evaluate system performance and identify potentially capacity deficient locations in SASD's system.
- Develop preliminary solutions to improve performance in SASD's system.
- Size new facilities in SASD's expansion area.

The performance criteria adopted for the 2010 SCP is appropriate for a planning level evaluation. The 2010 SCP criteria is more conservative than the criteria used in SASD's UCFMS, which is part of SASD's Sewer System Management Plan. The sewer systems identified as "potentially capacity deficient" in the 2010 SCP will eventually undergo the UCFMS' more in-depth investigation.

In developing the performance criteria for the 2010 SCP, the project team reviewed the performance criteria used in recent SASD projects (e.g., January 2010 North Watt Corridor Mid-Range Planning Study, Under-Capacity Failure Mode Strategy Evaluation Reports, and the 2006 SCP). In particular, the project team considered the UCFMS, which introduced the concept of a "capacity target performance range" (see ***Figure 3-3***).
The 2010 SCP's performance criteria will result in SASD's sewer system performing within the UCFMS' capacity target performance range. See ***Figure 3-4*** for a *graphical* representation of the 2010 SCP's performance with respect to the UCFMS's performance range.

FIGURE 3-3. CAPACITY PERFORMANCE CRITERIA FROM SASD'S UNDER-CAPACITY FAILURE MODE STRATEGY

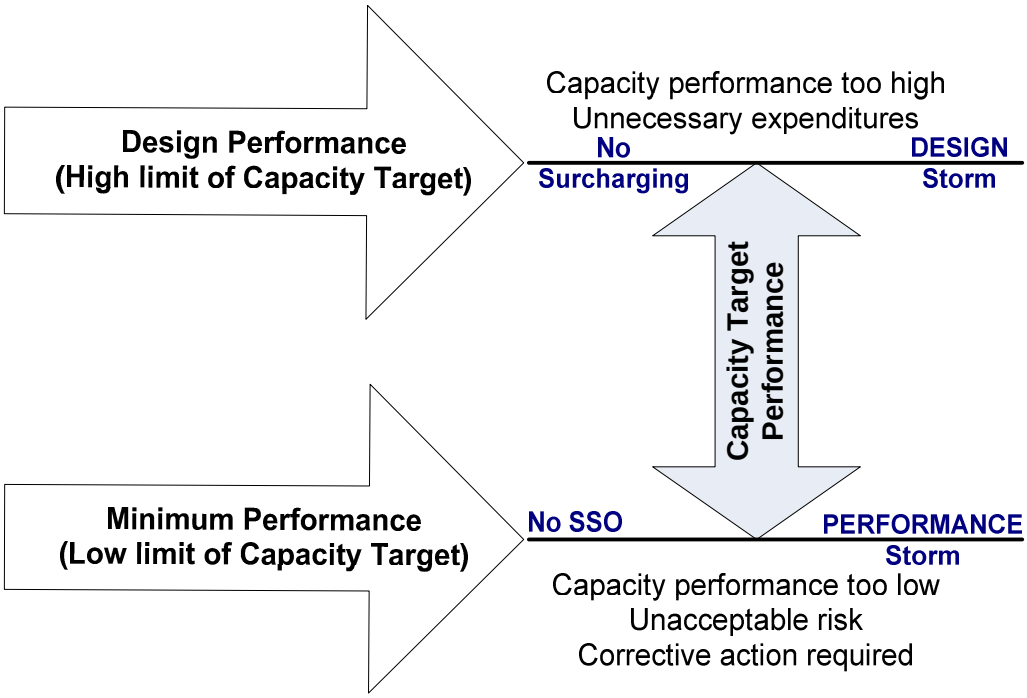


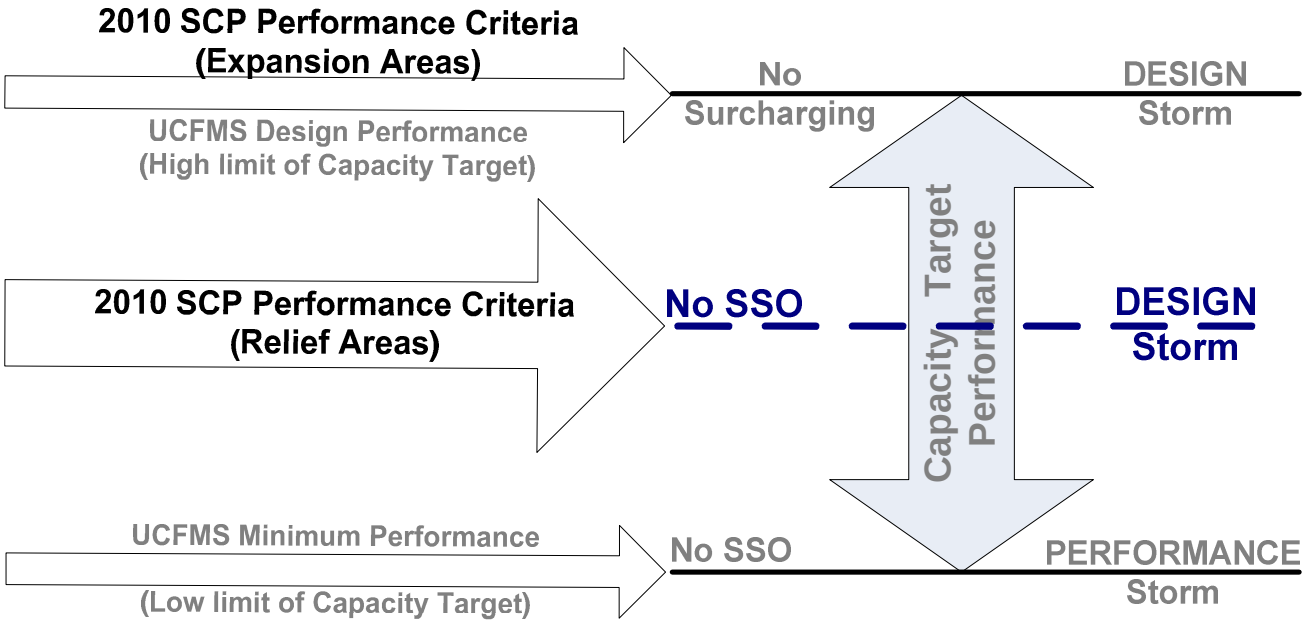
Table 3-5 presents the performance criteria approved by the 2010 SCP TAC and Leadership Committee. The *2010 SCP's performance criteria focus on eliminating model-predicted SSOs*. This approach is consistent with SASD's asset management principles that *"manage assets at the optimal cost of ownership while delivering the level of service customers' desire, and considering risk and impacts to future generations."* For relief area projects, the 2010 SCP's performance criteria is less conservative than the 2006 SCP performance criteria, which considered elimination of model-predicted surcharge conditions under buildout scenario flows.

The 2010 SCP's performance criteria were applied in the hydraulic modeling evaluations performed for SASD's relief area and expansion area. The results of these modeling evaluations are presented in Sections 5 and 6 of this report.

TABLE 3-5. 2010 SCP'S PERFORMANCE CRITERIA *(USING SASD'S 10-YEAR DESIGN STORM CONDITION)*.

SASD Area	Purpose	Performance Criteria *(based on hydraulic modeling results)*
Relief	*Identify* potential capacity deficiencies	SSOs are predicted
Relief	*Develop* preliminary solutions to improve system performance	Predicted SSOs are eliminated
Expansion	*Size* new facilities	No surcharging in sewer system

FIGURE 3-4. 2010 SCP'S PERFORMANCE CRITERIA GRAPHICAL REPRESENTATION



Note: GRAPHICAL representation with respect to the UCFMS' Capacity Target Performance range

4. HYDRAULIC MODELING

4.1 Introduction

Developing dynamic hydraulic models of the SASD sewer system was a major component of the 2010 SCP. The sewer models were used to:

- Assess the hydraulic performance of the SASD sewer system.
- Identify potential capacity deficiencies in the SASD system.
- Develop preliminary solutions to improve performance of potentially capacity deficient systems
- Develop expansion projects to serve future development areas.

This section describes the efforts to construct and calibrate the hydraulic models.

4.2 SASD's Hydraulic Modeling Software – Infoworks ICM

SASD's sewer hydraulic models were constructed and are maintained entirely by SASD staff since 2002. Initially, the 2010 SCP models were created using the InfoWorks CS modeling software. Mid-way through the project, SASD upgraded from InfoWorks CS (CS) to InfoWorks ICM (ICM), which is the next generation sewer hydraulic modeling software developed by Innovyze (formerly known as MWH Soft). Next, the 2010 SCP models were converted from CS to ICM files.

SASD switched its modeling program from CS to ICM during the 2010 SCP development because:

- ICM program allowed for more efficient construction of large comprehensive models such as SASD's buildout model.
- ICM has version control and multi-user editing capabilities that expedite model construction and validation work.

4.3 Model Construction

4.3.1 2010 SCP SASD Hydraulic Models

To achieve the goals of the 2010 SCP, the following sets of SASD hydraulic models were created:

- 2010 Model
- 2020 Model
- Buildout Model
- Solution/Buildout Models.

The 2010 model simulated flows in the existing system. This model was constructed based on existing land use conditions and was used to assess the current hydraulic performance of the SASD sewer system.

The 2020 model was built from the 2010 model and included the following:

- New developments anticipated by Year 2020.
- Expansion facilities needed to serve these new developments.
- Projects anticipated to be completed by the McClellan Business Park in the next few years including ARD-6, ARD-7, and lift station 706.

Detailed description of the new developments, including their locations and the percent buildout assumptions by Year 2020, was presented in Section 2.3 of this report.

The buildout model reflects the service area's projected buildout land use conditions and includes both existing facilities and future expansion facilities. Section 2.3 of this report describes the buildout land use assumptions considered during model construction. The buildout model was constructed based on two assumptions:

- Assumption 1: All of the flows from the Cripple Creek trunk, the C-line trunk, and the Upper Northwest Interceptor Section 9 will be diverted to the Van Maren Pump Station to relieve the Mission Trunk.
- Assumption 2: The Dry Creek Interceptor Relief will be constructed by buildout.

The buildout model was used to identify potential capacity deficiencies in the SASD system for the buildout scenario. Preliminary relief solutions were developed to improve system performance in potentially capacity deficient systems under the existing, near term, and buildout conditions.

The preliminary relief solutions were then incorporated into the buildout model to create the *final set of the SCP model - the solution/buildout model*. The solution/buildout model simulated buildout flows in the *ultimate SASD facilities*. This model was also used to study the impacts of surcharged flows from the SRCSD interceptor system on the SASD system under buildout conditions.

4.3.2 Basic Components of Model Data

The model data consist of three basic components:

- **Nodes**: This component includes manholes and pump station wet wells. The primary data for nodes is ground elevation. Pump station wet wells also have other attribute data like chamber roof elevations, chamber floor elevations, and cross sectional areas.
- **Links**: The model represents physical connections between two nodes as links. Links are mostly pipes but also include flow control structures such as pumps, weirs, sluice gates, and orifices. A model link requires an upstream and a downstream node. Attribute data for pipes also include pipe type (gravity or force main), length, diameter, upstream and downstream invert elevations, Manning's roughness coefficient, and headloss coefficient. Modeling pump operation requires discharge flow rate data (or pump curves for actual pumps) and pump on and off levels. For other flow control structures, the model also requires dimensional inputs.
- **Subcatchments**: These are the sewer sheds tributary to a node. Attribute data for subcatchments include loading node identification (ID), ESDs, contributing acreage, and land use ID. Land use ID information are specific wastewater diurnal flow pattern, ESD flow factor, GWI, and RDI/I parameters assigned to a particular shed. Wastewater flows are generated from the subcatchments and routed through the piping network.

In addition to the wastewater flows generated by the subcatchments, flows from permitted industrial dischargers also enter the SASD sewer system. They are called trade flows and are modeled as point source loads based on their locations, permitted discharge rates, and duration. A total of 113 trade flows were included in the SCP models.

4.3.3 Best Information Available for Model Construction

The best available information was used to construct the sewer hydraulic models. The following summarizes how the best available information was obtained:

- SASD's GIS database provided the latest node, pipe, and parcel data for modeling the existing sewer system.
- Several "sealed" manholes were identified in the previous SCP models. During the construction of the 2010 SCP models, these sealed manholes were checked against as-built plans.
- Questionable model data were field verified by SASD's Capacity Management staff.

- Existing pump station data was obtained from SASD's SCADA system, as-built drawings, and SASD's Maintenance and Operation staff most familiar with the operations of SASD's various pump stations.
- Flow diversion structure information (including weirs, sluice gates, orifices, and plugs) were taken from previous SCP models, the UCFMS models, as-built drawings, and field memos.
- Industrial discharge data was provided by the SASD's Capacity Management Group who performed capacity analyses for all industrial discharge permits.

4.3.4 Modeled Sewer Systems

SASD's SCPs provide high-level planning information. Therefore, the SCP models mostly consist of sewer pipes 10 inch or larger in diameter. Unlike the 2002 and 2006 SCPs, the 2010 SCP models also contain some 8 inch or smaller collector sewer pipes that were included in recently completed UCFMS models. Detailed UCFMS model information was incorporated into the SCP models to more accurately predict the hydraulic performance of the systems.

The UCFMS further investigates potentially capacity deficient systems identified by the SCP. The UCFMS models are constructed based on comprehensive flow monitoring data. The UCFMS models also include all critical pipes within the specific sewer system being evaluated. The UCFMS project alternatives include the collector pipes to obtain better estimates of the relief costs.

Figure 4-1 shows the modeled system for the existing sewer conditions. It is the map view of the 2010 model mentioned in Section 4.3.1 above. With the new InfoWorks ICM software, model simulations were performed on the entire 2010 model without dividing the model into smaller individual trunk shed networks as was done in the previous SCP updates.

4.3.5 Flow Monitoring and Model Calibration

A critical component of model development is to determine the system flow parameters from flow monitoring and model calibration. Flow parameters include domestic flow factors, diurnal curves, GWI factors, percentages of fast, medium, and slow RDI/I responses. These parameters affect how flows are generated in the models.

During model calibration, rainfall data (from the same flow monitoring period) is run through the hydraulic model to allow for comparison of the model's simulated flows against the measured flows from flow monitoring. The model flow parameters are adjusted until the simulated flows match well with the measured flows. SASD staff performed the model calibrations using at least one season of flow data, which contains both dry and wet weather flow data. SASD also used rainfall information to calibrate the models. SASD purchased gage-adjusted radar rainfall data from the OneRain company for model calibration.

Since 2007, SASD has installed over 200 meters in various locations throughout SASD's service area. SASD rotates its meters throughout the service area based on the following strategy:

- First, install meters to monitor the critical systems (e.g., the systems identified as potentially capacity deficient in the 2006 SCP)
- Next, move meters to less critical systems.
- Install meters in areas needed for specific SASD projects.

Since the 2006 SCP, approximately one third of SASD's sewer system has been calibrated to recent storm flow data. All of the critical systems (identified as "Category 1" systems in the 2006 SCP) have been monitored. SASD continues to rotate its meters and plans to eventually collect sufficient flow data from its entire system so that the entire SASD service area has a calibrated hydraulic model.

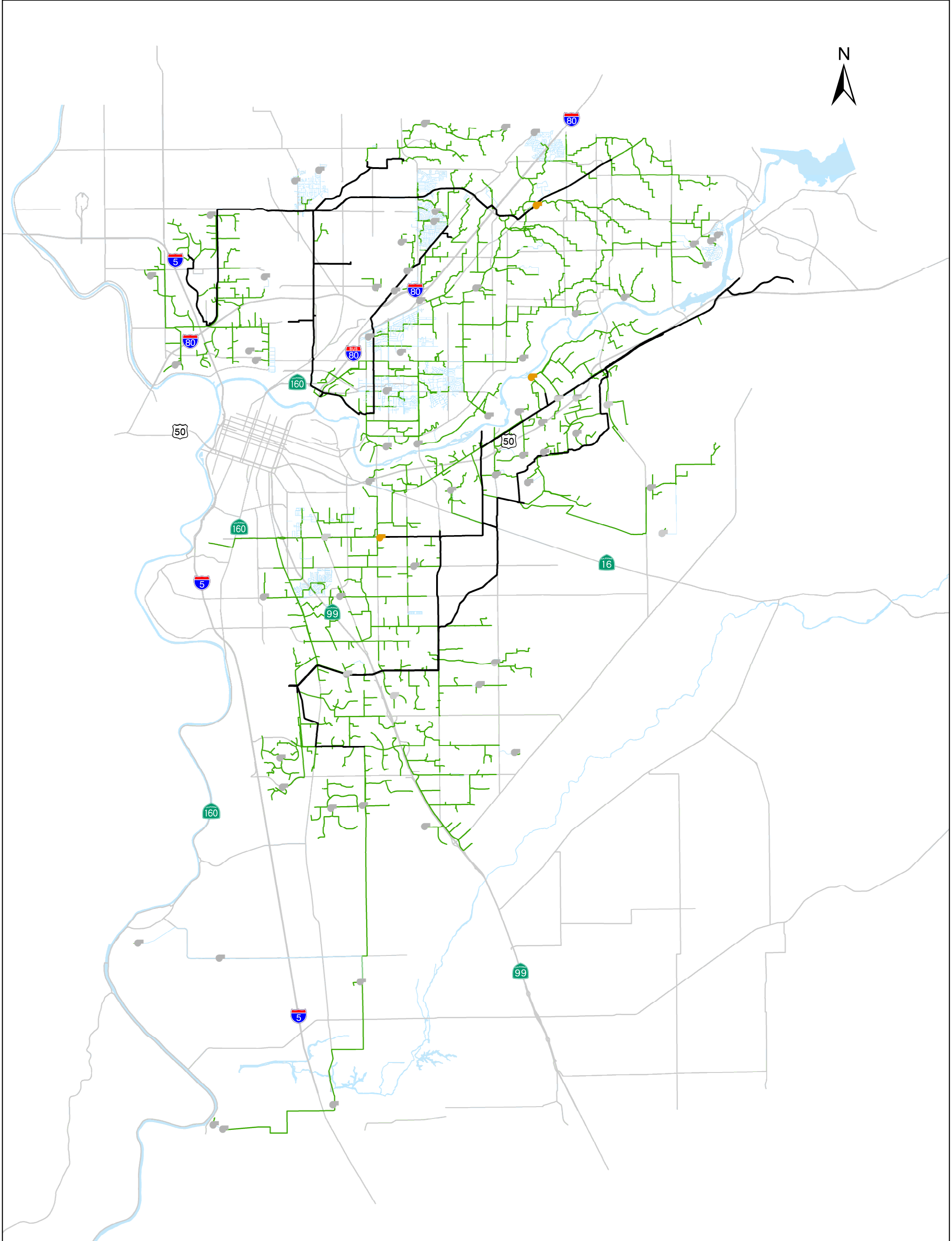
System flow parameters determined from recent flow monitoring and model calibration were incorporated into the 2010 SCP models. These flow parameters are presented in ***Table 3-4***. This table also includes flow parameters used to construct the 2010 SCP future models.

4.3.6 Hydraulic Boundary Conditions

Partial SRCSD interceptor systems were included in the SASD SCP models to provide network connectivity. ***Figure 4-1*** shows the interceptor systems included in the SCP 2010 model. *However, non-SASD flows were not initially modeled*. The model did not include flows from SRCSD's other contributing agencies (that contribute to the interceptor system flows) including the City of Folsom, City of Sacramento, and City of West Sacramento. As a result, several interceptors in the 2010 SCP models (such as the Bradshaw, Central, Folsom, Folsom East, and Lower Dry Creek Interceptors) do not include all of the anticipated interceptor flows. Therefore, the 2010 SCP models may not reflect the actual hydraulic boundary conditions at the SASD trunk discharge locations into the SRCSD Interceptors.

SASD developed relief area preliminary solutions and expansion area projects using the 2010 SCP models that do not have all of the anticipated flows in the interceptor systems. This means that free outfall conditions were assumed for some SASD trunk connections into the interceptor system. Expansion trunks were sized to carry flows generated by their contributing areas regardless if there's backup surcharge from the interceptors.

After the relief solutions and expansion projects were developed, SASD further studied the potential impacts of surcharged flows from the interceptor systems on the SASD trunk systems. Flows from SRCSD's non-SASD contributing areas were included into the 2010 SCP models. See ***Section 6.7*** for more discussion on the modeling evaluation and predicted results.



Legend

SASD

- Pipes smaller than 10"
- Pipes 10" or Larger
- Pump Station

SRCSD

- Interceptor
- Pump Station

SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

SASD 2010 Modeled System

Figure 4-1

Date last revised 9/14/2011

5. RELIEF AREA EVALUATION

5.1 Introduction

In SASD's relief area, the goals of the 2010 SCP were to:

- Assess the hydraulic performance of the SASD system
- Identify potential capacity deficiencies
- Develop preliminary solutions for this SCP's capital funding projections (CFP).

Unlike the previous SCPs, the 2010 SCP does not include detailed information on potential relief projects. Instead, the 2010 SCP primarily identifies potentially capacity deficient systems in the SASD relief area. The 2010 SCP also developed preliminary solutions to meet system performance criteria so that planning-level costs can be estimated for SASD's updated CFP. The systems flagged to be potentially capacity deficient will be further investigated through SASD's UCFMS.

This section presents:

- Results of the system hydraulic performance evaluations.
- 2010 SCP's approach to developing preliminary solutions in SASD's relief area.

5.2 System Capacity Evaluation & Results

To assess the hydraulic performance of the SASD system under existing, mid-range, and buildout conditions, the 2010, 2020, and buildout models were created respectively. The capacity analysis involved applying the SASD 10-year design storm through the models to see how the systems perform under different conditions. As discussed in Section 3.2 (Performance Criteria), the 2010 SCP defined system capacity deficiency as model predicted overflows under the 10-year design storm. Potentially capacity deficient systems were divided into three different planning periods:

- ***Planning Period 1:*** Model predicted overflows under existing conditions.
- ***Planning Period 2:*** Model predicted overflows under 2020 conditions (excluding Planning Period 1 systems).
- ***Planning Period 3:*** Model predicted overflows under buildout conditions (excluding Planning Periods 1 and 2 systems).

5.2.1 Planning Period 1 Results

Figure 5-1 presents the 2010 model results showing how the SASD system performed hydraulically under the existing condition PWWF. Back-up surcharged pipes are shown in orange and throttle surcharge pipes are in red. Back-up surcharge is due to flows backing-up from downstream constrained systems. Throttle surcharge occurs where the system is undersized (capacity constrained) to convey peak flows. The blue water droplet symbols represent model predicted overflow locations.

For systems with model predicted overflows, the 2010 SCP flagged them as potentially capacity deficient, and each system was labeled with a unique identifier (e.g., NEA-5, ARD-10). The model results indicated more potentially capacity deficient systems in the northern area of the SASD system (especially within the NEA and ARD trunk sheds) as compared to the south area. A total of eight systems were identified for Planning Period 1 and labeled in ***Figure 5-1***.

5.2.2 Planning Period 2 Results

The 2020 model results are presented in ***Figure 5-2***. Only *additional* potentially capacity deficient systems (where the model predicted new SSOs) were identified in ***Figure 5-2***. The model did not predict any additional overflows under the 2020 conditions (as compared to the 2010 scenario), and hence, no Planning Period 2 system was labeled in ***Figure 5-2***.

By comparing the results, the 2010 and 2020 model results looked very similar. The new developments anticipated between 2010 and 2020 did not greatly impact the existing system nor cause any additional predicted overflow.

5.2.3 Planning Period 3 Results

The buildout model results are presented in ***Figure 5-3***. Again, only additional potentially capacity deficient systems are identified in ***Figure 5-3***. As shown in ***Figure 5-3***, the model predicted 16 additional systems may be potentially capacity deficient under buildout conditions. The buildout model predicted more surcharging and overflows due to infill development and densification projected to occur between 2020 and buildout.

Table 5-1 summarizes the potentially capacity deficient systems flagged for each planning period listed above.

TABLE 5-1. SUMMARY OF POTENTIAL CAPACITY DEFICIENT SYSTEMS FOR EACH PLANNING PERIOD.

Planning Period 1	Planning Period 2	Planning Period 3
ARD-4&5		ARD-4&5
RIO-4		RIO-4
ARD-10		ARD-12
ARD-11		ARD-23
ARD-17		ELK-20
NEA-5		NEA-19
NEA-51		NEA-22
SEA-11		NEA-43
		NEA-52
		NEA-40
		NEA-62
		RIO-3
		COR-1
		SEA-13
		RCCC-1
		WG-1
Total 8 systems	*0 systems*	*Total 16 systems*

5.3 Relief Solution Development

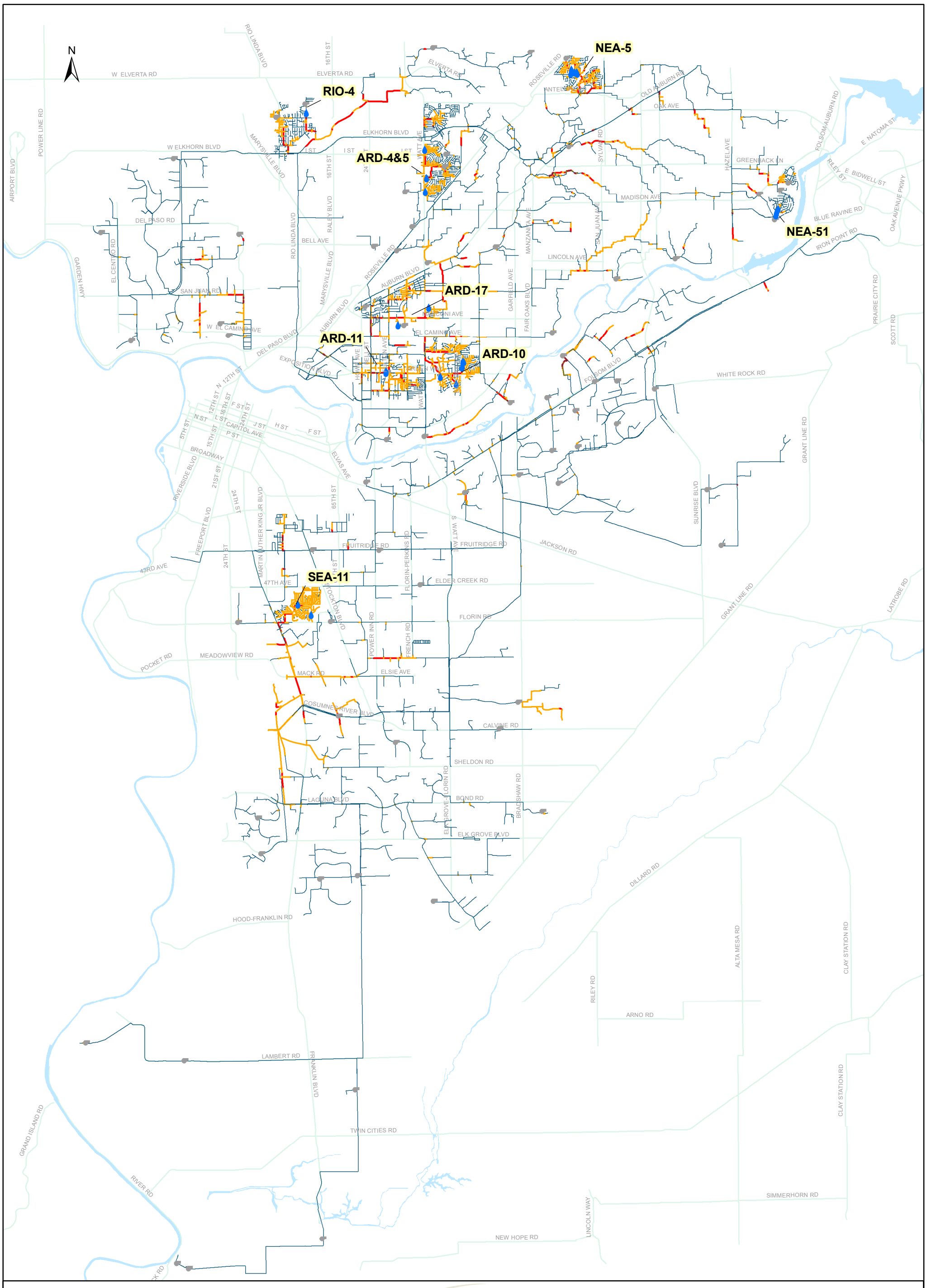
So that cost information is available for funding projections, SASD developed preliminary solutions to improve system performance after flagging potentially capacity deficient systems. See Section 7 for cost information associated with each flagged system in SASD's relief area. The following approach was used to develop the preliminary solutions:

- Develop a valid relief solution that returns the system hydraulic performance to "no predicted overflows under the 10-year design storm". Refer to Section 3.2 for details of the performance criteria established for the 2010 SCP. See ***Figure 3-4*** for a graphical representation of the 2010 SCP performance criteria.

- Check that the preliminary solution first relieves the smaller upstream sewer system branches, then relieves the downstream branches that feed the major trunks. This ensures that all of the upstream sewer flows can reach the downstream pipes without leaving the systems (i.e., overflowing).
- Check that the preliminary solution eliminates model predicted overflows under the buildout scenario, assuming that all of the necessary future trunks and interceptors (per the ISS) will be constructed.
  - In a few special cases, like the ARD-4&5 and RIO-4 Planning Period 1 systems, constructing the buildout condition solutions in the near-term was not feasible or cost effective because the ultimate solutions would rely on SRCSD's construction of future interceptors.
  - Therefore, the existing condition solutions were only sized to eliminate overflows under existing and near term conditions, while the buildout condition solutions were developed to eliminate overflows at buildout.
  - The ARD-4&5 and RIO-4 systems are shown in both ***Figure 5-1*** and ***Figure 5-3***.
    - ***Figure 5-1*** shows the **EXISTING CONDITION SOLUTIONS** for the ARD-4&5 system and the RIO-4 system. These solutions only work for existing and near term conditions.
    - ***Figure 5-3*** shows the **BUILDOUT CONDITION SOLUTION** for the ARD-4&5 system and the RIO-4 system. These solutions were developed to meet the buildout scenario requirements in each system.
- SASD considered different types of relief options including:
  - Pipe upsizing
  - Diversion to other existing or future sewers and/or interceptors
  - Pipe storage
  - Sealing manholes
  - Pump station upgrades
- SASD considered the SASD Design Standards when developing preliminary solutions.
- SASD looked for ways to restore system performance that avoided long relief pipes or avoided existing alignments that may present difficult construction challenges.

For the NEA-22 system flagged for Planning Period 3 in ***Table 5-1***, the 2010 SCP proposes a Sunrise Relief Trunk as an alternative to the Sunrise Interceptor included in SRCSD's ISS evaluation. Using the SCP performance criteria, a relief trunk solution was sufficient to restore performance in the NEA trunk system.

Section 7.2 of this report presents the estimated costs to restore system performance in each flagged system.



Legend

- Model Predicted Overflow
- Modeled Pump Station

Surcharge Condition

- No Surcharge
- Back-Up Surcharge
- Throttle Surcharge

SACRAMENTO AREA SEWER DISTRICT

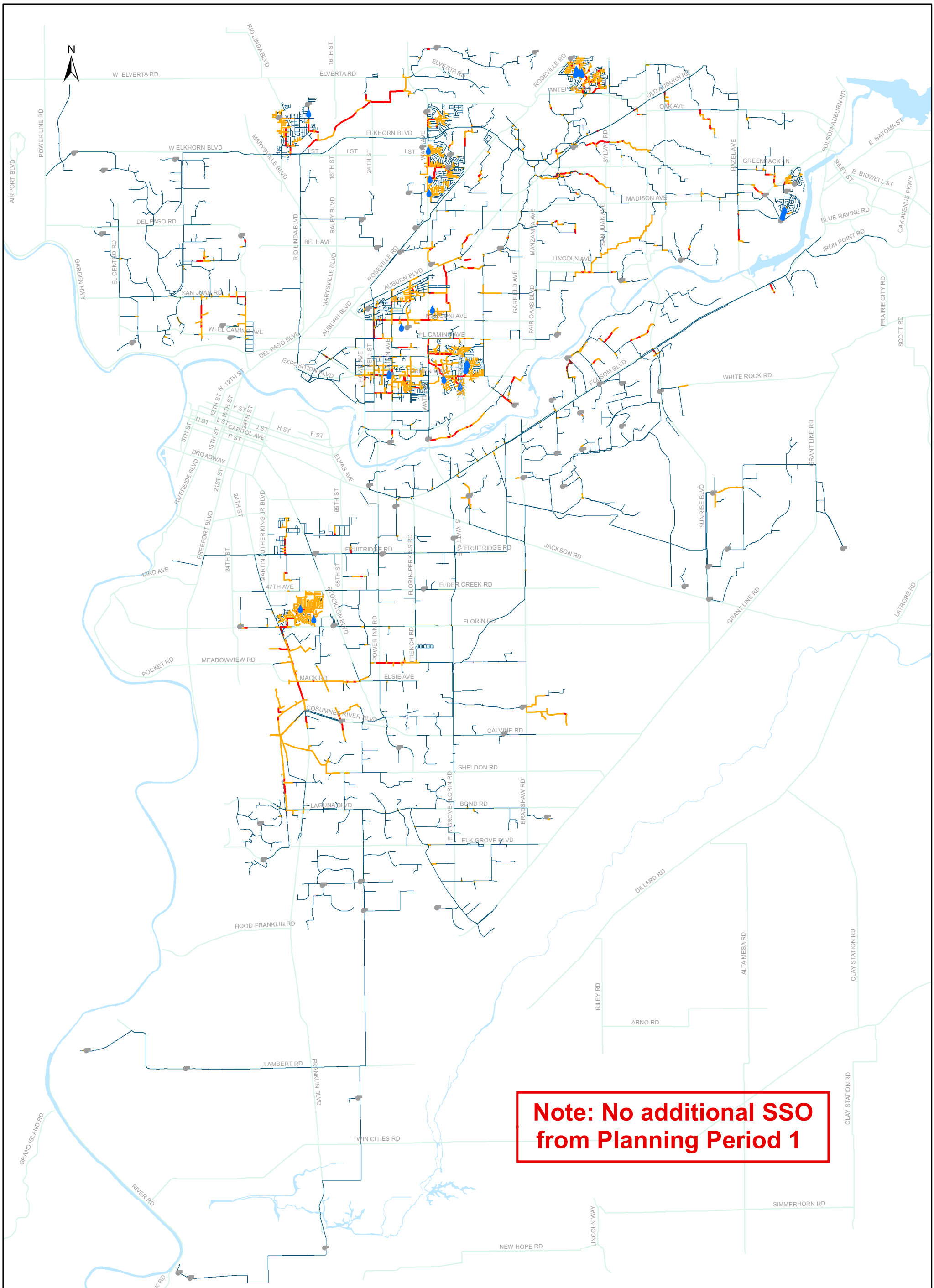
2010 SASD SYSTEM CAPACITY PLAN

2010 Model Results For 10-Year Design Storm Without Relief Projects

(Planning Period 1 systems are labeled)

FIGURE 5-1

Date last revised: 8/8/2011



Legend

- Model Predicted Overflow
- Modeled Pump Station

Surcharge Condition

- No Surcharge
- Back-Up Surcharge
- Throttle Surcharge

SACRAMENTO AREA SEWER DISTRICT

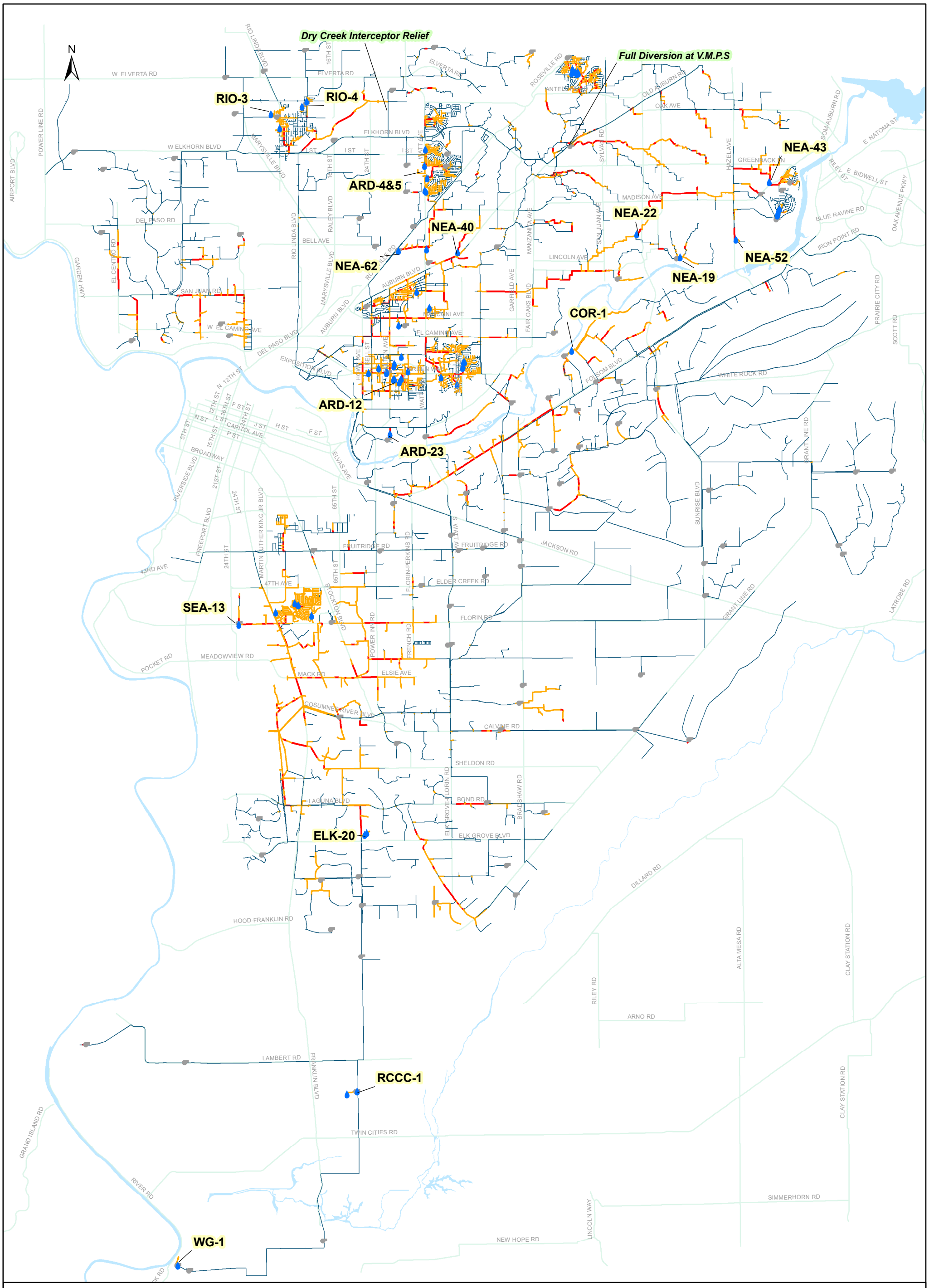
2010 SASD SYSTEM CAPACITY PLAN

2020 Model Results For 10-Year Design Storm Without Relief Projects

(No Planning Period 2 systems are identified)

FIGURE 5-2

Date last revised: 8/28/2011



Legend

- Model Predicted Overflow
- Modeled Pump Station

Surcharge Condition

- No Surcharge
- Back-Up Surcharge
- Throttle Surcharge

SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

Buildout Model Results For 10-Year Design Storm Without Relief Projects

(Planning Period 3 systems are labeled)

FIGURE 5-3

Date last revised: 9/8/2011

6. EXPANSION AREA EVALUATION

6.1 Introduction

Development within SASD's service area is projected to expand significantly through buildout. Ultimately, at buildout, the 2010 SCP considered providing sewer service to the entire SCP study area as defined in ***Figure 2-1***. In order to plan for the orderly and systematic expansion of the sewer system, the SASD expansion area was divided into several expansion trunk sheds. A detailed trunk system expansion plan (called "Expansion Trunk Shed Plan") was developed for each trunk shed. In this 2010 SCP, the expansion trunk sheds are defined based on their discharge points into an existing SRCSD interceptor system.

This section presents the methodology used to develop the Expansion Trunk Shed Plans. The detail plans are presented in ***Appendix A***: Expansion Area Trunk Shed Plans.

6.2 SASD Expansion Area Definition

According to the SASD Sewer Ordinance, the SASD service area is divided into two geographical areas: the relief area and the expansion area. The relief area is a geographical area within the SASD service area that discharged into the existing trunk sized sewer collection system, **AS OF 1999**, and is presented in Section 12 of the Sewer Ordinance. The expansion area is a geographical area within the SASD planning area that is not part of the relief sewer area, and is also presented in Section 12 of the Sewer Ordinance. The 2010 SCP adopted the definitions of relief and expansion areas from the SASD Sewer Ordinance.

The future expansion projects presented in this section are projects anticipated to further expand the existing SASD sewer system to serve the expansion area.

6.3 Delineation of Expansion Trunk Sheds

The SASD expansion area was divided into individual trunk sheds by sewer tracing. Each trunk shed was characterized by its downstream **EXISTING** interceptor connection. In the past, expansion trunk sheds were characterized by their downstream interceptor connections regardless if they were existing or future interceptors. Naming an expansion trunk shed by its downstream **FUTURE** interceptor can be a problem if the future interceptor plans change.

Starting from its discharge point into an existing interceptor, a sewer shed was selected by performing upstream traces. In the 2010 SCP, an expansion trunk shed name consists of: 1) Its corresponding existing interceptor abbreviation and 2) The shed location. For example, the trunk shed name of "*BR East Rancho*" indicates that this trunk system discharges into the existing *Bradshaw Interceptor* and it is located in the *East Rancho area*.

Figure 6-1 shows all the trunk sheds within the 2010 SCP study area:

- SASD expansion area trunk sheds (labeled in red).
- SASD relief area trunk sheds (labeled in blue)
- Trunk sheds that did not belong to either the relief or expansion area (labeled in green):
  - As of 2010 SASD Sewer Ordinance, the following areas were not definitively associated with either the SASD relief or expansion area: McClellan Business Park, Mather Business Park, SRWTP, RCCC, Courtland, and Walnut Grove
  - In the near future, SASD anticipates determining if these sheds should be associated with a "relief" or "expansion" area.

6.4 Design Criteria for Expansion Project Development

Design criteria serve as a basis for establishing the alignments, sizes, and elevations of future facilities, including gravity trunk sewers, pump stations, and forcemains. Below are the elements that made up the design criteria for developing the expansion projects in this 2010 SCP.

- Performance criteria from Section 3.2.
- Flow parameter criteria from Section 3.1.4.
- Buildout ESD assumptions from Section 2.3.
- SASD Design Standards dated June 22, 2011.

Based on the performance criteria from Section 3.2, future expansion trunk facilities should perform with no surcharging under the SASD 10-year design storm conditions. In other words, the future expansion trunk facilities should be sized to accommodate design PWWF within its full pipe capacity (e.g., d/D $\leq$ 1.0). No sewer pipes, under design peak flow conditions, should exceed the full pipe capacity.

Flow parameters for new developments are summarized in ***Table 3-4***. The SASD 10-year design storm is run through the model to generate design PWWF in the system. Generally, future expansion facilities are sized for their buildout PWWF rates with the exception of the initial phase facilities. Some facilities in the 2020 model are only sized for their projected *INITIAL* development flows. In most of these cases, the facilities are allowed to discharge into the existing systems *ONLY* until their ultimate facilities are constructed. The initial phase facilities may be either upsized in the future to handle the buildout flows or abandoned when the ultimate solution is available.

To aid in the development of the future expansion facilities, the 2010 SCP referred to the current SASD Design Standards. The proposed facilities were verified that they meet SASD's hydraulic design criteria (e.g., pipe diameter, velocity, pipe slope, and depth requirements) specified in the Standards. In the 2010 SCP, gravity sewers were developed with minimum schematic slopes instead of fixed slopes.

6.5 Development of Expansion Trunk Projects

Before developing the expansion projects, the 2010 SCP consolidated the latest planning information from different sources into the hydraulic model. Since the 2006 SCP, SRCSD and SASD have modified their plans to serve the expansion area, especially the eastern area of Sacramento County. The elimination of the future Laguna Creek, Mather, and Grant Line Interceptors (originally planned to serve the eastern expansion area) completely changed the sewer system design in the eastern area.

Therefore, the 2010 SCP focused on updating the expansion alternatives from previous SASD planning documents. Information used to construct the base model (for expansion project development) include the 2006 SCP, East Rancho Cordova and North Watt mid-range planning studies, SRCSD ISS, sewer studies, and other relevant planning documents.

After construction of the base model, the modelers reviewed the consolidated expansion trunk shed plans with the following questions in mind:

- Are there better ways to serve the community?
- Are the flows routed efficiently through the system according to the topography?
- Are SASD's expansion plans flexible in serving new developments?

For developments with approved sewer studies or mid-range planning completed by SASD, the studies' recommended expansion facilities were mostly retained in the 2010 SCP model. For developments that did not

have detailed studies completed or approved, the 2010 SCP considered any previous sewer system plans and re-designed the plans, if necessary, to better serve the community.

After developing the expansion area trunk shed plans and determining the loadings for each expansion trunk shed, the modelers applied the hydraulic requirements of the SASD Design Standards. The sewer facility alignments, sizes, and elevations were adjusted as needed to comply with the design standards.

6.5.1 Year 2020 Expansion Plan

To forecast new development between 2010 and 2020, SASD's Development Services Group reviewed over 150 sewer studies and development applications to predict which developments may occur in the next 10 years. For each possible development area, Development Services staff estimated (for Year 2020 conditions) the percent completion and the number of ESDs.

Besides information from sewer studies and applications, the 2010 SCP also considered the following redevelopment areas (see to ***Figure 2-4*** for the locations):

- Sacramento County's redevelopment corridors (i.e., the North Watt, Fair Oaks, and Florin Corridors)
- City of Sacramento's Tier 1 Opportunity Areas (i.e., the Arden Fair and 65th St. North)
- Densification of currently vacant, non-open space subdivided lots.

All of the development information was incorporated into the existing model to create the 2020 scenario model. The 2020 model was then used to develop the future facilities needed to serve the new developments. ***Figure 6-2*** shows the developments and future expansion facilities identified for the Year 2020. The 2020 expansion plans may be similar to the buildout plans for some areas such as LA Laguna Ridge, FE Folsom (*Glenborough development*), and NN Greenbriar, but may be different for other areas such as the BR East Rancho trunk shed (*Cordova Hills, Arboretum, Sun Creek, and Rio Del Oro developments*).

The ultimate solution for the BR East Rancho trunk shed would require the construction of the future interceptors which will not likely to be built when the developments start. Therefore, the 2020 plans for this area proposed multiple pumping station facilities that would pump their initial phase flows to the Chrysanthy pumping station on an interim basis. The Rio Del Oro's initial phase development would connect to the existing sewer in White Rock Road that discharges into SASD's existing S070 pump station.

6.5.2 Buildout Expansion Plan

Figure 6-3 shows all of the anticipated future expansion facilities and future interceptors in the buildout SCP model. The future expansion facilities are color-coded purple, and the future interceptors are color-coded orange. The future interceptor information was obtained from the SRCSD ISS model and the SRCSD East Rancho Mid Range Planning model; these models include the Aerojet-2, Douglas, White Rock, Florin, Rio Linda, and South Interceptor. The Dry Creek Interceptor Relief was also included in the 2010 SCP buildout model.

2010 SCP BUILDOUT MODEL MODIFICATIONS (as compared to recent planning documents)

The 2010 SCP buildout model identified a new interceptor (carrying a PWWF greater than 10 mgd) along Elder Creek Road that was not included in the SRCSD ISS model and report. The Elder Creek Interceptor is approximately 4100 ft long and connects directly to the Bradshaw Interceptor.

The 2010 SCP also proposed replacing the Sheldon Interceptor system (included in the SRCSD ISS model and report) with three independent trunk sized pumping systems. The 2010 SCP alternative provides more flexibility to meet the development area's initial sewer needs. ***Figure 6-4*** shows the new and the original design of the Sheldon Interceptor system. SASD and SRCSD are aware of the differences between the SRCSD ISS model and

the 2010 SCP model. Both the new and original designs of the Sheldon Interceptor system are viable. Both options may be further considered and evaluated (e.g, cost impacts) in a mid-range planning report for this sewer shed.

Sewer system planning is an iterative process and improvements are based upon the latest and best available information.

6.6 Expansion Trunk Shed Plans

Presented in ***Figure 6-1*** and ***Table 6-1*** are the 29 expansion trunk sheds identified by the 2010 SCP.

- In eight of these sheds, all the trunks have already been constructed; therefore, their Expansion Trunk Shed Plans are not included in the 2010 SCP report.
- For the remaining 21 trunk sheds, the Expansion Trunk Shed Plans are included in ***Appendix A***: Expansion Area Trunk Shed Plans.

Each Trunk Shed Plan includes the following:

- Summary description of the trunk shed, including description of the shed boundary and the proposed expansion trunk facilities.
- Table showing the pipe attribute data and model results for the proposed trunk sewers.
- The Year 2020 Expansion Plan Map (if applicable), showing the proposed 2020 expansion facilities. An example of the 2020 Expansion Plan Map is shown in ***Figure 6-5***.
- Buildout Expansion Plan Map, showing the proposed buildout expansion facilities. An example of the Buildout Expansion Plan Map is shown in ***Figure 6-6***.
- Sewer Shed Map, showing the proposed trunk sewers and sizes, modeled manhole IDs, and the tributary sewer sheds. An example of the Sewer Shed Map is shown in ***Figure 6-7***.

6.7 Study of Potential Impacts from Interceptor Surcharge Conditions

As mentioned in ***Section 4.3.6*** of this report, the 2010 SCP models initially did not include flows from SRCSD's non-SASD sheds that contribute flows to the interceptor system. The non-SASD flows were not modeled during the SCP's relief and expansion project development, and therefore, the actual hydraulic boundary conditions were not reflected at several SASD trunk connections to the interceptors.

However, after developing the preliminary relief and expansion projects, SASD proceeded with the evaluation of potential impacts of surcharged flows from the interceptors on the SASD system. Flows from non-SASD contributing areas were incorporated into the 2010 SCP model. This section discusses the approach of this follow-up evaluation and the model predicted potential impacts.

6.7.1 Approach to Study Impacts

The SRCSD's non-SASD sheds were added to the SASD solution/buildout model, which contains all preliminary relief and expansion projects developed from Sections 5 and 6, to create a comprehensive buildout model of the Interceptor and SASD system. See ***Figure 6-8*** for location of the non-SASD sheds (Cities of Folsom, Sacramento, West Sacramento, and South Elk Grove). Flow information for the non-SASD sheds were obtained from the ISS buildout models. Flows were point loaded directly into the interceptors included in the SCP's comprehensive buildout model.

The ISS buildout models used the hydraulic boundary condition of -9.0 ft at the SRWTP's Influent Junction Structure (IJS). Thus, this assumption was also used in the SCP buildout evaluation to set the boundary condition at the IJS.

TABLE 6-1. EXPANSION TRUNK SHEDS IDENTIFIED BY THE 2010 SCP

Expansion Trunk Sheds - ALL Trunks Constructed	Expansion Trunk Sheds - Need Future Trunks
NN Metro Air	BR Bond Sheldon
NN Natomas	BR Calvine
DR Antelope	BR East Rancho
BR Zinfandel	BR Elder Creek
CE Vintage Park	BR Florin
BR Sheldon Park Bruceville	BR Gerber
LA Hwy 9/Sheldon	BR Gravel East
LA Elliot Ranch	BR Mather East
	CE Elk Grove Florin
	CE Gravel West
	DRY Rio Linda SE
	FE Folsom
	LA East Franklin
	LA Elk Grove
	LA Laguna Ridge
	NN Greenbriar
	UN Elverta
	UN Orangevale
	UN Rio Linda East
	UN Rio Linda SW
	UN Rio Linda West

Unlike the 2010 SCP, the ISS had two buildout assumptions: the Realistic and Conservative buildout criteria. These criteria affect the ESD projection and flow generation in the ISS models. The ISS also used a different storm condition from the 2010 SCP. The ISS used the 2006 New Year storm to evaluate the interceptors' hydraulic performance while the SCP used the SASD's 10-year design storm for evaluation.

Therefore, when SASD studied the impacts of back-up flows from the interceptors to the SASD system, it considered both Realistic and Conservative criteria. SASD also evaluated the hydraulic performance using both the SASD 10-year design storm and the 2006 New Year storm. SASD applied the SASD criteria to the SASD sheds and the ISS Realistic/Conservative criteria to the SRCSD's non-SASD sheds.

Below outlines the buildout scenarios modeled:

- Scenario 1: Apply SASD criteria to the SASD sheds, ISS **REALISTIC** criteria to the non-SASD sheds, and use **SASD 10-YEAR DESIGN STORM** simulations
- Scenario 2: Apply the SASD criteria to the SASD sheds, ISS **CONSERVATIVE** criteria to the non-SASD sheds, and use **SASD 10-YEAR DESIGN STORM** simulations

- Scenario 3: Apply the SASD criteria to the SASD sheds, ISS **REALISTIC** criteria to the non-SASD sheds, and use **2006 NEW YEAR STORM** simulations
- Scenario 4: Apply the SASD criteria to the SASD sheds, ISS **CONSERVATIVE** criteria to the non-SASD sheds, and use **2006 NEW YEAR STORM** simulations

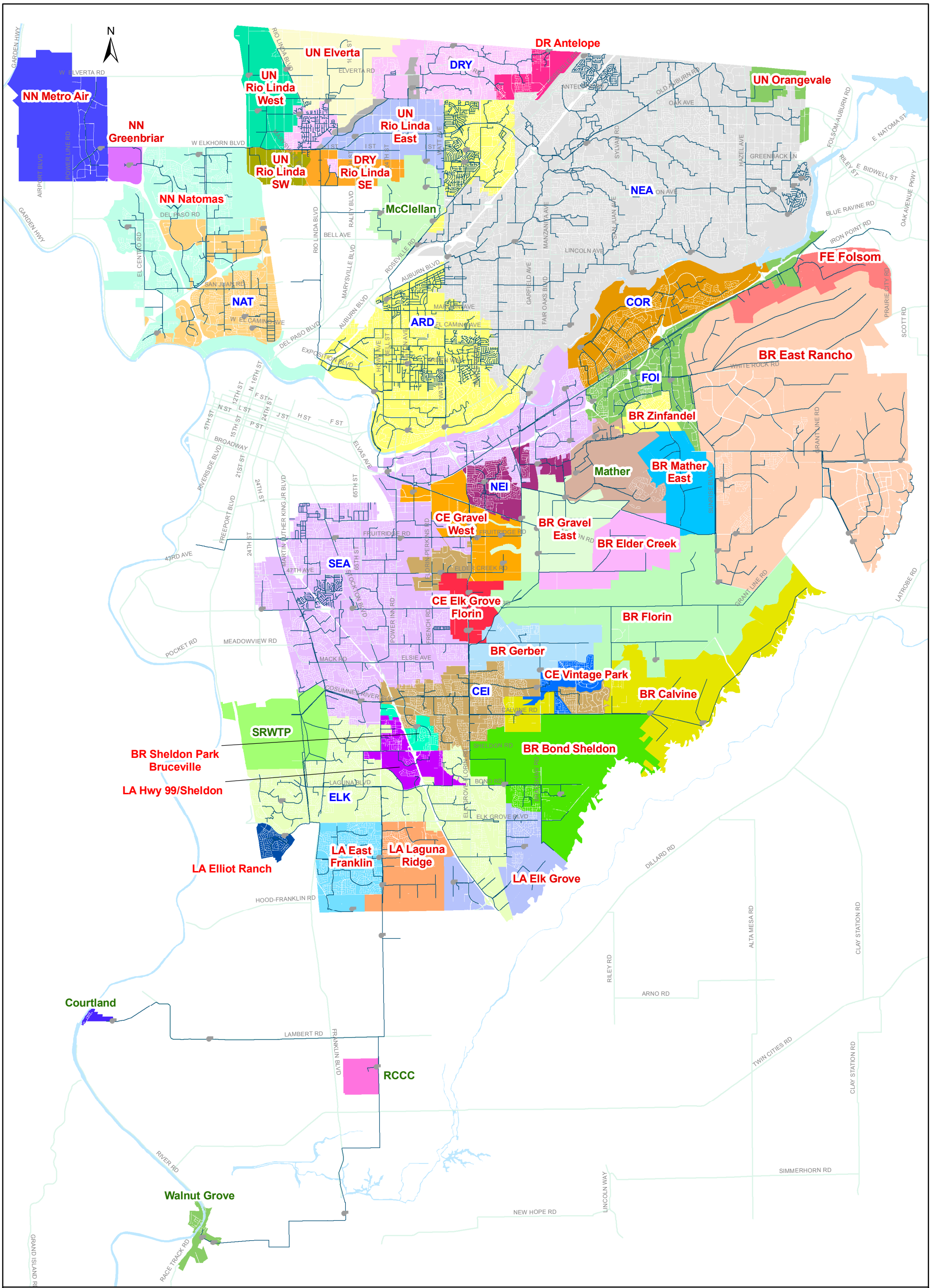
Only buildout conditions were considered since ISS modeling evaluations predicted the interceptors may be surcharged under buildout conditions only (no surcharge predicted under near term conditions). Under near-term conditions, only the Upper Dry Creek Interceptor may be potentially capacity constrained and may impact the SASD system. However, the Upper Dry Creek Interceptor serves only the SASD sheds, so its flows were already included in the SCP model. Impacts of back-up flows from the Upper Dry Creek Interceptor to the SASD trunks can be seen in the 2010 and 2020 model results (see ***Figure 5-1*** and ***Figure 5-2***). SASD anticipates that the Upper Dry Creek Interceptor will be relieved in the future by the Dry Creek Relief Interceptor.

6.7.2 Findings from the Capacity Analysis:

The following summarizes the predicted potential impacts.

- ***Modeling results for the Realistic and Conservative scenarios are similar***.
  - The volume difference in the flows entering the SRWTP IJS is less than 3%.
  - For each storm condition, the hydraulic grade line profiles are also similar.
  - The results are due to the ISS Realistic and Conservative criteria being applied only to the non-SASD sheds. The non-SASD sheds only contribute approximately 30% of the total flow to the SRWTP while the SASD sheds contribute the remaining 70%.
  - Another reason for the similarity is that both Realistic and Conservative criteria (applied to non-SASD sheds) use the same RDI/I rate.
- ***Bradshaw and Central Interceptors:***
  - **BOTH INTERCEPTORS WERE PREDICTED TO SURCHARGE** under buildout conditions during the SASD 10-year design storm and the 2006 New Year storm.
  - From the comparison of the SASD 10-year design storm and the 2006 New Year storm results, the *surcharged levels due to the SASD 10-year design storm are slightly lower* than the surcharged levels due to the 2006 New Year storm, as expected since the 2006 New Year storm results in higher rainfall volume.
  - **NO OVERFLOWS WERE PREDICTED IN THESE INTERCEPTORS UNDER BOTH STORM EVENTS.**
  - The *SCP results are different* from the results of the previous SRCSD's *East Rancho Cordova mid-range planning (MRP) efforts*, which adopted the ISS land use and flow generation criteria for both SASD and non-SASD sheds.
    - The SCP model predicted no SSOs in the Central Interceptor while the SRCSD's MRP model predicted an SSO in the Central Interceptor (under the 2006 New Year storm and conservative buildout conditions).
    - The SCP generated flows by using the SASD criteria for the SASD sheds and the ISS criteria for the non-SASD sheds. These flows are slightly lower than the flows generated by the MRP evaluation, which used the ISS criteria for both SASD and non-SASD sheds.
    - Note: The SCP consolidated land use map has been updated with more detailed information from sewer studies as compared to the ISS consolidated land use map, which was used in the MRP evaluation.

- ***Impact to SASD System (buildout conditions):***
  - **SURCHARGE IN THE INTERCEPTORS IS PREDICTED TO BACK-UP INTO THE SASD SYSTEM.**
    - *Three SASD systems were identified to be significantly impacted by the surcharging in the Bradshaw Interceptor*. These systems include the future Westborough Expansion Trunk, Sunrise Relief Trunk, and COR-1 Diversion Pipes.
  - Using the ***SASD 10-year design storm***, the model **PREDICTED NO SSOS** in the SASD system due to interceptor back-up flows.
  - Using the ***2006 New Year storm*** condition, the model **PREDICTED AN SSO IN THE SUNRISE RELIEF TRUNK** due to back-up flows from the Bradshaw Interceptor.
  - Back-up flow impacts on the SASD systems will need further evaluation in the future when the proposed projects are in design and construction or when better flow information is available for more detailed evaluation.



Legend

Blue Label: Relief Area Shed

Red Label: Expansion Area Shed

Green Label: To be Determined

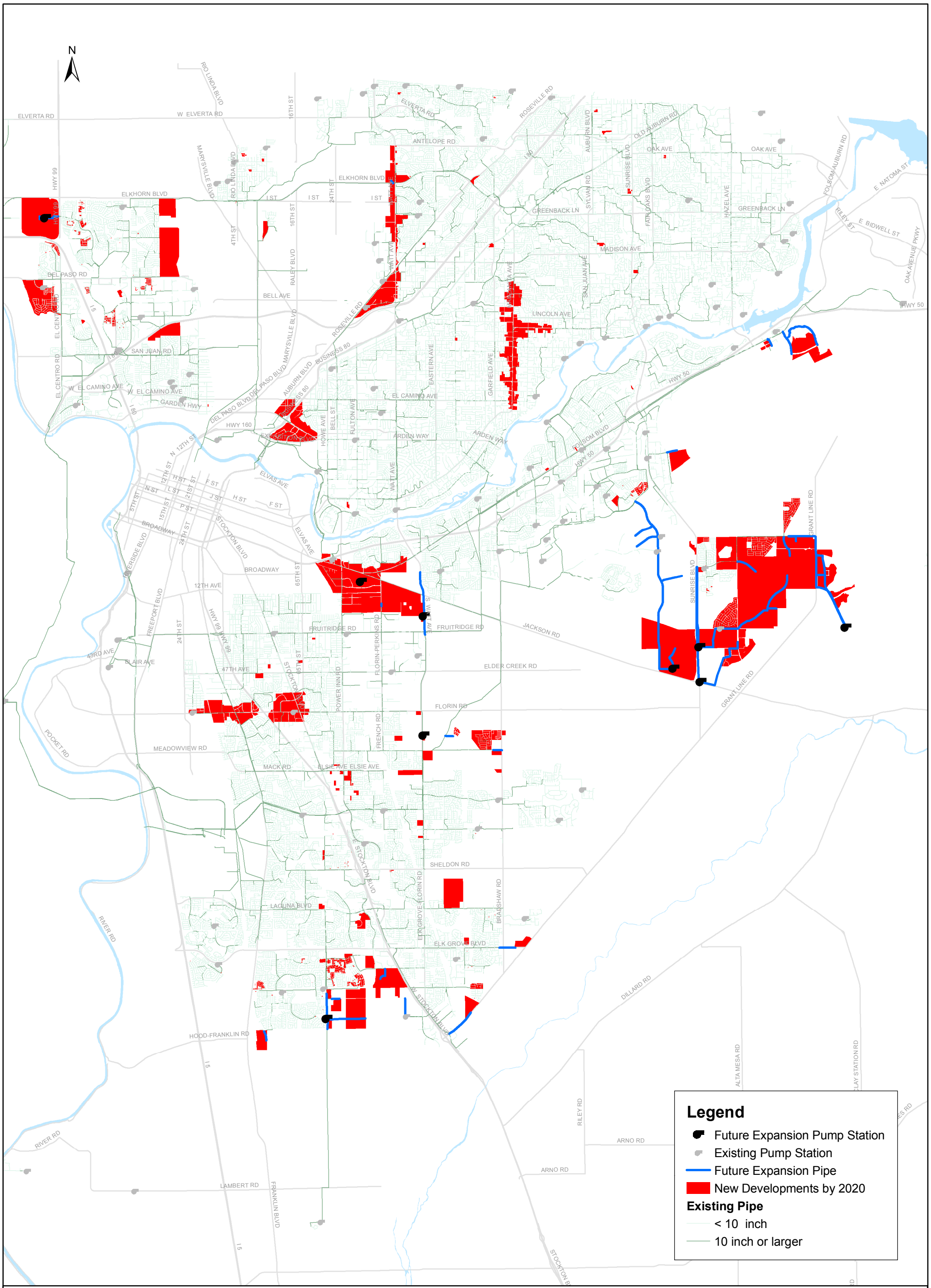
SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

Trunk Sheds Map

FIGURE 6-1

Date last revised: 9/6/2011



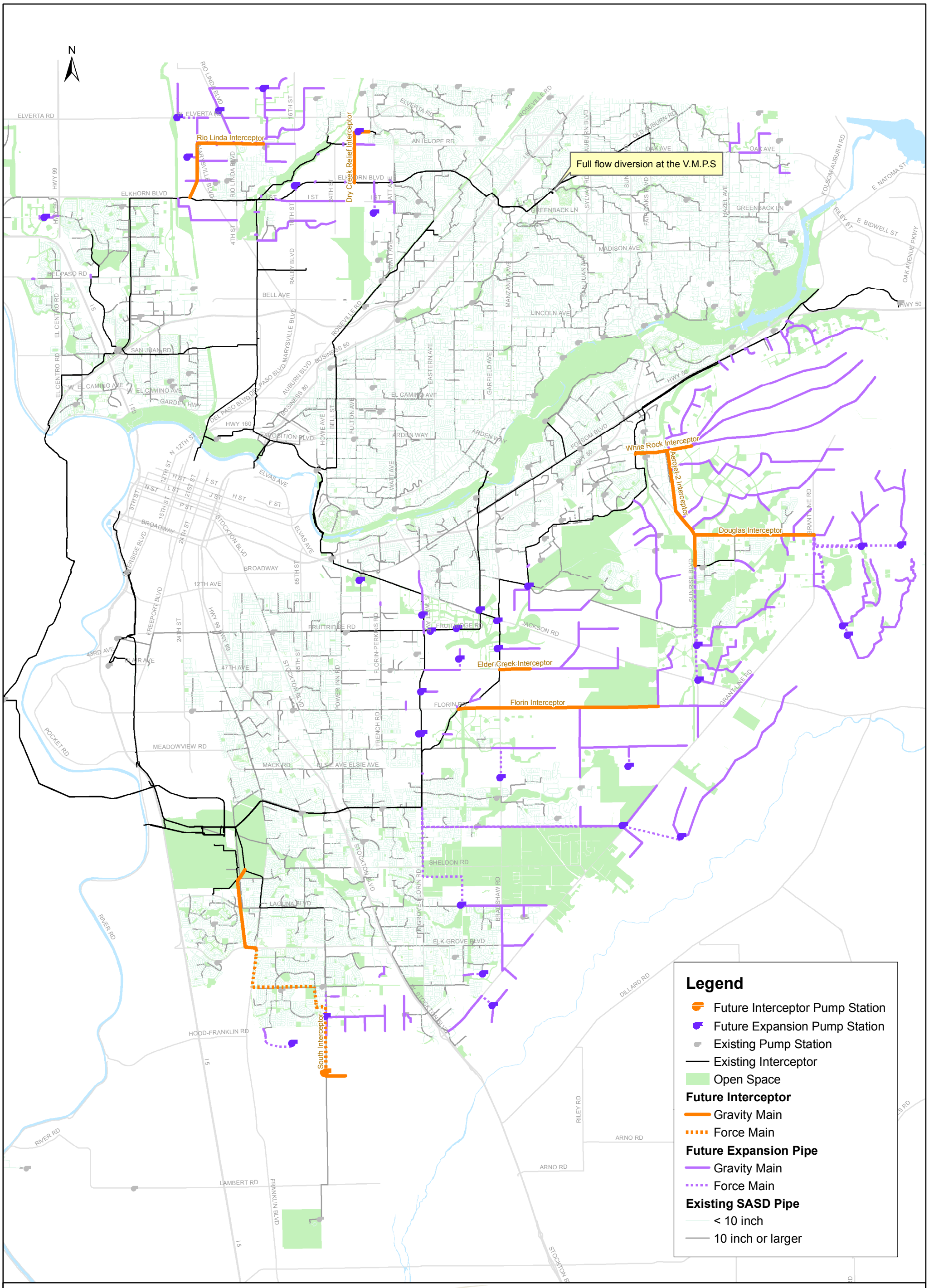
SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

Potential Future Expansion Facilities Needed By 2020

FIGURE 6-2

Date last revised: 9/8/2011



SACRAMENTO AREA SEWER DISTRICT

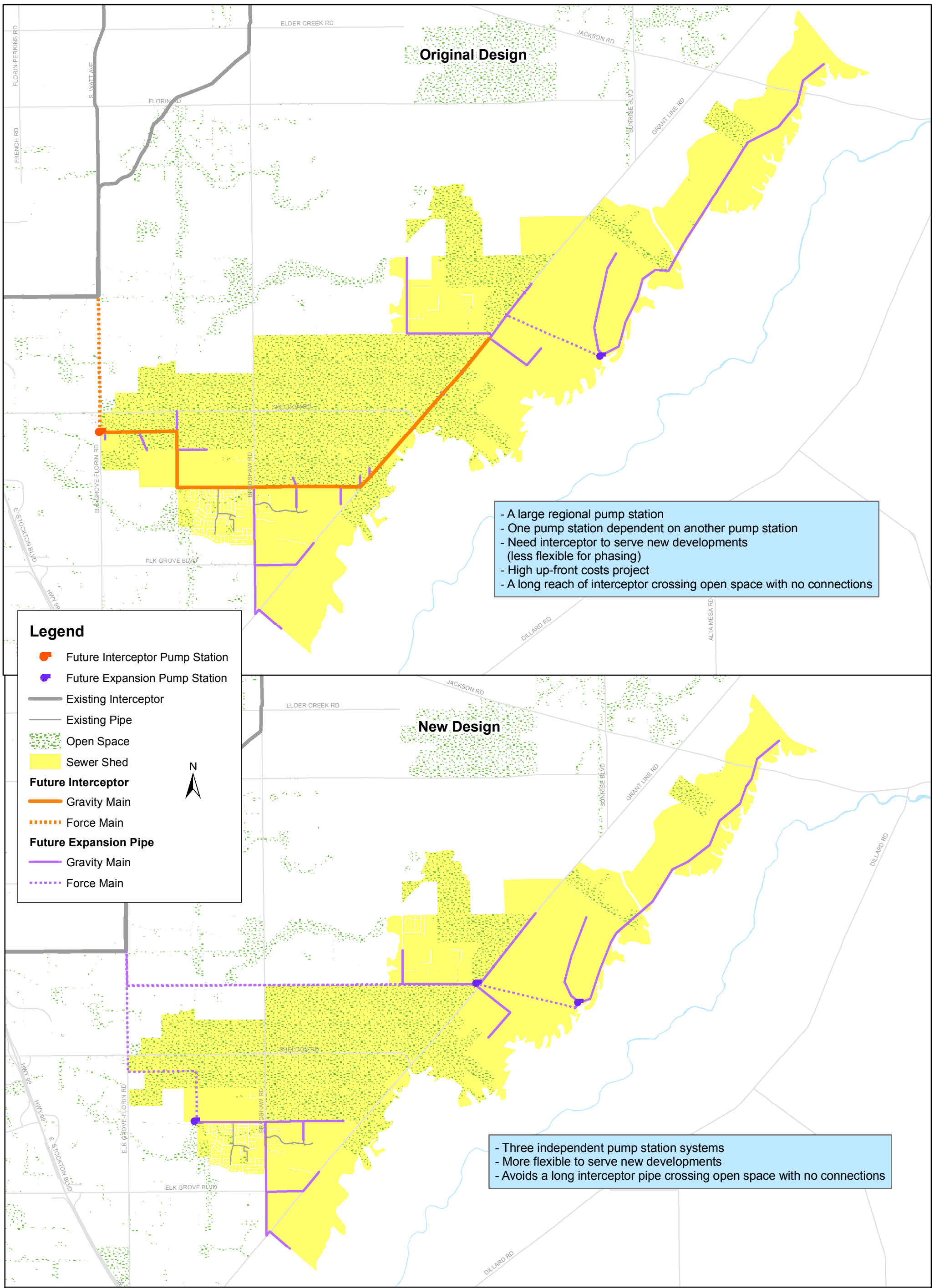
2010 SASD SYSTEM CAPACITY PLAN

Future Expansion Facilities & Interceptors

(Buildout Conditions)

FIGURE 6-3

Date last revised: 10/26/2011



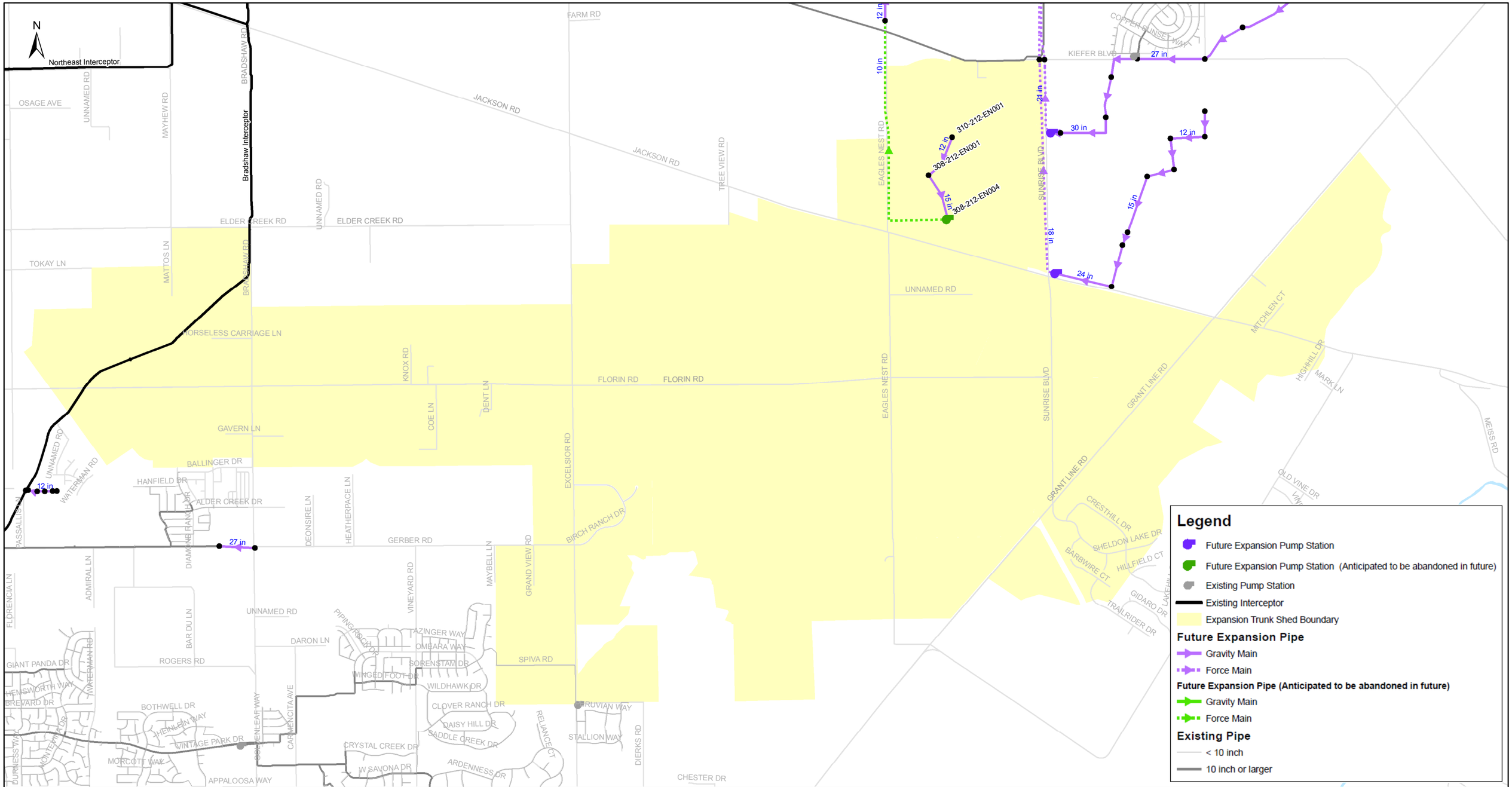
SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

Original vs. New Design for Sheldon Interceptor System

FIGURE 6-4

Date last revised: 9/9/2011



SACRAMENTO AREA SEWER DISTRICT

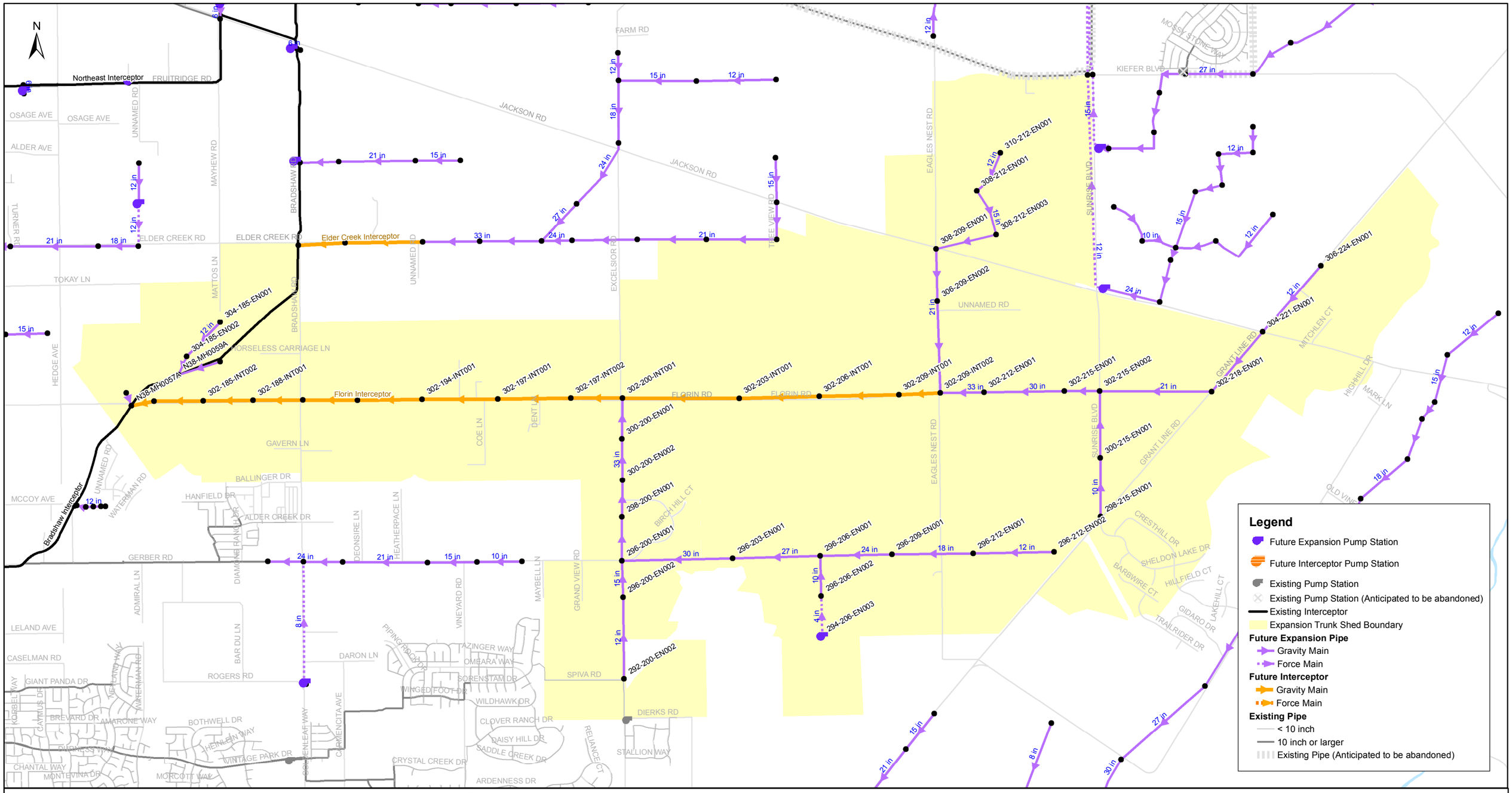
2010 SASD SYSTEM CAPACITY PLAN

BR Florin

Year 2020 Expansion Plan

FIGURE 6-5

Date last revised: 10/12/2011



SACRAMENTO AREA SEWER DISTRICT

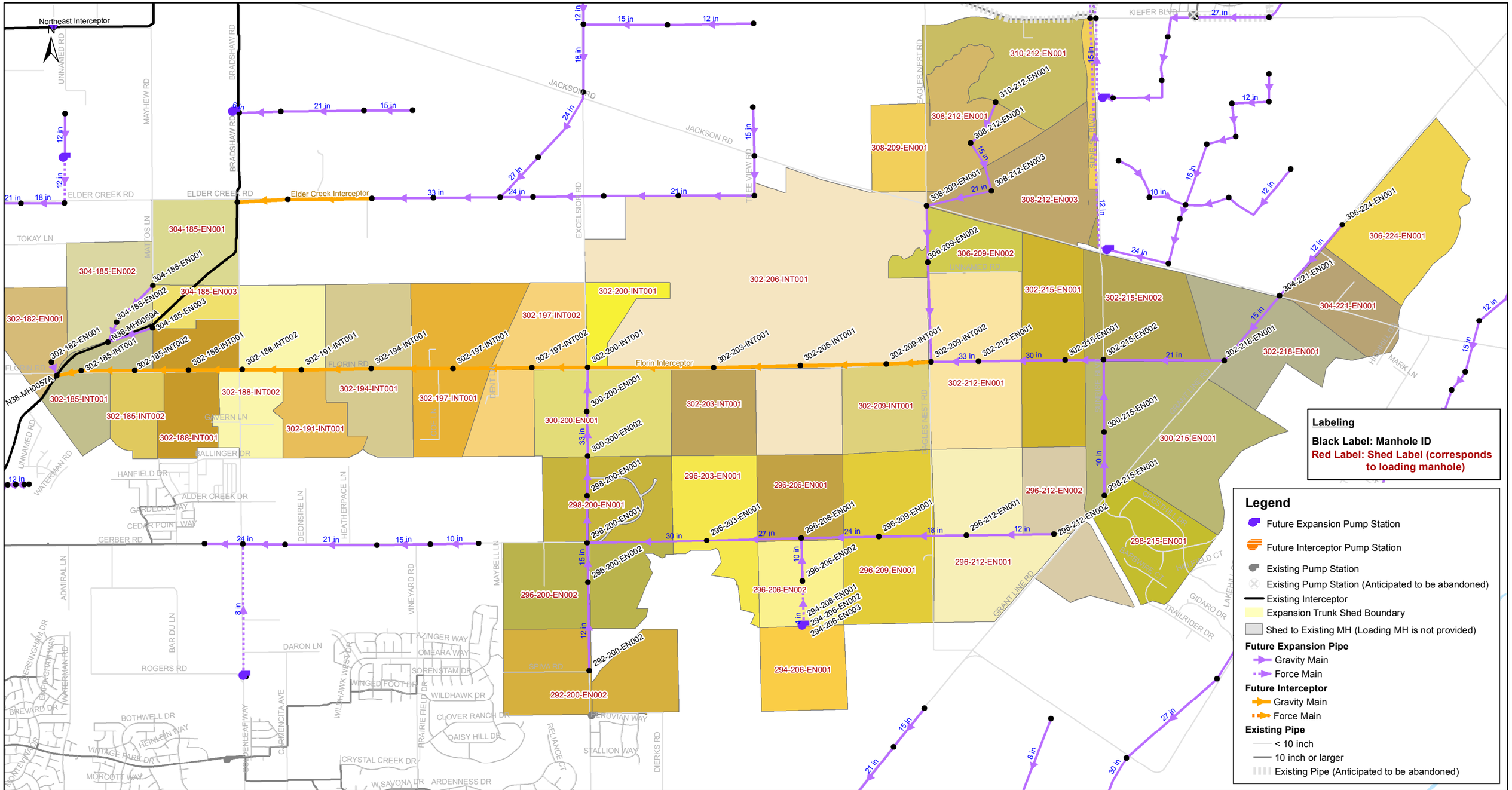
2010 SASD SYSTEM CAPACITY PLAN

BR Florin

Buildout Expansion Plan

FIGURE 6-6

Date last revised: 10/12/2011

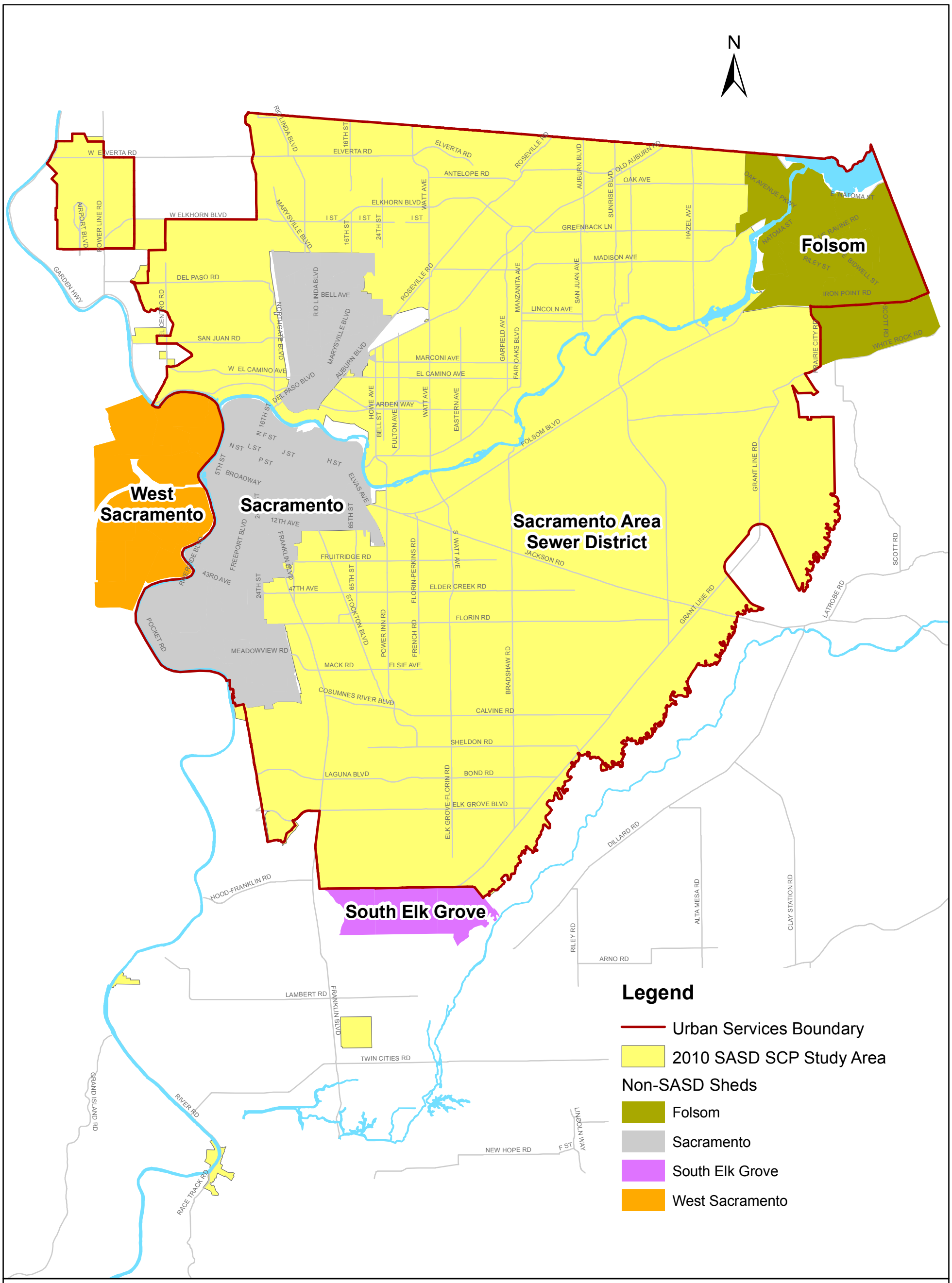


SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

BR Florin
Sewer Shed Map
Buildout Expansion Plan
FIGURE 6-7

Date last revised: 10/12/2011



SACRAMENTO AREA SEWER DISTRICT

2010 SASD SYSTEM CAPACITY PLAN

Non-SASD Sheds Included in SASD's Solution/Buildout Model

FIGURE 6-8

Date last revised 11/1/2011

7. 2010 SCP CAPITAL FUNDING PROJECTIONS

This section presents the methodology used to develop the 2010 SCP report's CFP. The 2010 SCP CFP is based on ***planning level*** construction cost estimates for capacity related system improvements in SASD's relief and expansion areas. The preliminary capacity-related solutions in the relief area are presented in Section 5 of this report. The capacity related projects in the expansion area are presented in Section 6.

7.1 Construction Cost Assumptions and Criteria

The following approach was used to develop the 2010 SCP CFP cost criteria:

- Reviewed unit cost criteria and cost factors from the 2000 and 2006 SCP.
- Reviewed actual construction costs for SASD projects from 2000 to 2010. Also reviewed construction bids for projects in other urban areas in California.
- Update criteria and factors to reflect current SASD design and construction standards.
- Updated unit cost assumptions to reflect how project costs are typically estimated by SASD and advertised for bid.
- Estimated baseline construction costs based on open-cut gravity sewer trunks, force mains, and trenchless pipe construction methods.
  - Excluded pipe bursting from trenchless pipe installation method.
  - Include depth categories to estimate costs for bore and jack pits.
- For pumping stations, estimate baseline costs according to firm capacity and anticipated total dynamic head (low, medium, or high head conditions).
- Excluded real estate acquisition from the Engineering, Administrative, and Legal Cost markup.
- Relief projects are assumed to have a mitigated negative declaration environmental clearance. Cost for environmental clearance and minor mitigation measures are included in the Engineering, Administrative, and Legal Cost mark up and in the typical cost of construction. Expansion projects are typically designed and constructed by private developers. Mitigation and environmental clearance cost is typically paid for by the developer.
- For developer funded projects (primarily projects in SASD expansion area), assumed zero costs for right-of-way and/or easement acquisitions.

All costs presented in this report have been adjusted to an Engineering News Record construction cost index of 9527, which represents the average of the January 2011 ENR cost indexes for the San Francisco area (10116) and the "20-Cities" ENR average (8938).

For the 2010 SCP, estimates of the capital costs are *order of magnitude estimates*. An order of magnitude estimate is one that is made without detailed engineering data, and uses techniques such as cost curves and scaling factors from similar projects. *The overall expected level of accuracy of the cost estimates is approximately ±30 percent*.

The estimated costs were developed using a baseline pipe construction cost with added cost and markups for related items. An example cost estimate sheet for a hypothetical project is presented in ***Figure 7-1***.

FIGURE 7-1. COST ESTIMATE SHEET EXAMPLE

	Baseline Pipe Construction Costs
+	Additional Costs for Geotechnical Factors
+	Additional Costs for Traffic Control
+	Additional Costs for Productivity Factors
+	Surface Restoration Costs
+	Costs for Special Structures and Pump Stations
=	Subtotal
+	5% Mobilization/Demobilization
=	Estimated Construction Cost Subtotal
+	30% Contingencies for Unknown Conditions
=	**ESTIMATED CONSTRUCTION COST**
+	Right-of-Way/Easement Acquisition (if applicable)
+	25% Engineering, Administration, and Legal Cost
=	**TOTAL PROJECT COST**

The construction and total project costs were estimated based on cost criteria developed specifically for this SCP update. The unit cost criteria are summarized in ***Table 7-1***. More details on the cost criteria development can be found in ***Appendix B***.

TABLE 7-1 – 2010 SCP'S SUMMARY OF ESTIMATED UNIT COST

Item	Description	Unit Cost Range
Baseline Construction		
Open Cut Gravity Sewer	8 to 42-inch diameter, 8 to 28 feet deep	$160 to $680/lf
Open Cut DIP Force Main	4 to 18-inch diameter, 4 to 16 feet deep	$140 to $430/lf
Trenchless Pipe Construction	Bore and Jack, Microtunnel, Pipe Ramming. With and without casing	$305 to $1,700/lf
Geotechnical Factors		
Additional Dewater	Deep well system	$45 to $60/lf
Additional Sheeting and Shoring	Trench boxes, solid shoring, and sheet piles	$30 to $710/lf
Cobble Areas	Developed Areas	100% of baseline cost
	Undeveloped Areas	20% of baseline cost
Hard Rock Areas	Northeastern part of service area	100% of baseline cost

Item	Description	Unit Cost Range
Traffic Control		
Additional Traffic Control	For pipe alignments along major roads with four or more lanes of traffic.	$45/lf
Productivity Factors		
Congested Traffic/Utility Corridor	For pipe alignments along major roads with four or more lanes of traffic.	15% of baseline cost
Remove and Replace Delay Factor	For pipe alignments to be upsized in place.	25% of baseline cost
Surface Restoration		
Pavement Restoration	Final Paving and patch paving 15 feet width	$100/lf
Landscape Restoration	Replanting in medians and landscaped area 40 feet width	$3.00/sf
Revegetation	Hydroseeding in open areas 80 feet width	$0.25/sf
Creek Restoration	Replanting and minor bank erosion control 40 feet width	$12/sf
Sewer Structures		
Junction Structures	Junction, transition, and turning structure	$25,000 to $850,000 per structure
Pump Stations	10 MGD or less firm capacity Based on low, medium, and high total dynamic heads.	$0.5 to $6.1M
Mobilization/Demobilization	% of subtotal	5%
Contingencies	% of Estimated Construction Cost Subtotal	30%
Easement Acquisition		
Acquisition Cost	Title reports, appraisals, real estate staff time	$7,000 per parcel
Easements in Newly Constructed Development	Granted to SASD as condition of development	No Cost to SASD
Temporary Construction Easements	80 feet width	$0.80/sf
Permanent Easement	20 feet width	$4.00/sf
Engineering, Administration, and Legal Costs	% of Estimated Construction Cost	25%

7.2 Relief Area Capital Funding Projections

As described in Section 5, SASD's relief area was evaluated to identify sewer systems that may be potentially capacity deficient. Each sewer system was then assigned to either Planning Period 1 (existing flow conditions), Planning Period 2 (Year 2020 flow conditions), or Planning Period 3 (buildout flow conditions).

For the 2010 SCP CFP, each sewer system identified was also assigned to a funding period. The funding period coincides with the planning period since the 2010 SCP anticipates that system improvements will be needed to restore capacity to within SASD's capacity target performance range (see ***Figure 3-4***) as growth occurs. The relief area funding periods are presented in ***Table 7-2***.

TABLE 7-2. FUNDING PERIODS FOR SASD'S RELIEF AREA (WITH RESPECT TO PLANNING PERIODS)

Relief Area Planning Period	*System Performance* (based on model predictions)*	Funding Period	
1	*SSOs under 2010 flow conditions*	*1*	Projects anticipated between **2011 TO 2016** (***near-term planning***)
2	*SSOs under 2020 flow conditions*	*2*	Projects anticipated by **YEAR 2020** (***mid-range planning***)
3	*SSOs under buildout flow conditions*	*3*	Projects anticipated by **BUILDOUT** *(after Year 2020)* (***long-range planning***)

** Using SASD's 10-year design storm.*

Table 7-4 summarizes the 2010 SCP CFP. This table includes the estimated costs for each potentially capacity deficient trunk shed system identified in each CFP funding period. For the SASD relief area, the total cost allocation to existing and future users is indicated at the bottom of this table.

Table 7-5 lists the potentially capacity deficient sewer systems in SASD's relief area and their respective:

- Estimated cost
- Funding period
- Estimated cost allocation to existing and future users

COST ALLOCATION TO EXISTING AND FUTURE USERS

The cost allocation process is based on current users (as of August 2011) and future developments identified for this SCP update. To determine the relative percentage of costs to be allocated to current and future users, the numbers of existing and future ESD's tributary to a sewer system were counted as follows:

- Sewer replacement or pump upsizing improvements: ESD count included all those in the deficient sewer system upstream of the throttle manhole.
- Improvements involving flow diversions: ESD count included all those in the deficient sewer system upstream of the back-up point, and downstream to a diversion point or outfall into an interceptor or pump station.

7.3 Expansion Area Capital Funding Projections

Table 7-4 lists each expansion trunk shed in SASD's expansion area and its respective estimated capital cost and funding period. Appendix B of this report includes the Expansion Trunk Shed Plans for each trunk shed in the SASD expansion area. ***Figure 6-3*** in Section 6 shows all the anticipated future expansion facilities and future interceptors.

The trunk system expansion projects were assigned to funding periods based on the anticipated timing of development as presented in Section 2. See ***Table 7-3*** for the SASD Expansion Area funding periods considered in this SCP update. Unlike previous SCP updates, the *2010 SCP did not assume that all facilities will be funded at the time of the initial development of the area*. Instead, the 2010 SCP CFP is based on providing funding for facilities needed to serve each development area's growth during each planning scenarios (e.g., Near-Term, Mid-Range, or Long-Range).

TABLE 7-3. FUNDING PERIODS FOR SASD'S EXPANSION AREA (WITH RESPECT TO DEVELOPMENT TIMING)

Expansion Area Development Timing	Funding Period	
Year 2010 (Existing)	***1***	Projects anticipated by **YEAR 2016** (***near-term planning***)
Year 2020	***2***	Projects anticipated by **YEAR 2020** (***mid-range planning***)
Buildout	***3***	Projects anticipated by **BUILDOUT** *(after Year 2020)* (***long-range planning***)

** Using SASD's 10-year design storm.*

TABLE 7-4. 2010 SCP'S TRUNK SYSTEM CAPITAL FUNDING PROJECTIONS

RELIEF AREA: Potentially Capacity Deficient Sewer Systems				
Trunk Shed	Funding Pd 1 2011 to 2016 *(Near-Term Planning)*	Funding Pd 2 By Year 2020 *(Mid-Range Planning)*	Funding Pd 3 Buildout (after Year 2020) *(Long-Range Pln)*	Total All Funding Periods
ARD	$14,200,000	$0	$9,900,000	$24,100,000
COR	$0	$0	$7,200,000	$7,200,000
ELK	$0	$0	$2,700,000	$2,700,000
NEA	$5,200,000	$0	$42,410,000	$47,610,000
RCCC	$0	$0	$3,100,000	$3,100,000
RIO	$400,000	$0	$900,000	$1,300,000
SEA	$1,400,000	$0	$600,000	$2,000,000
Walnut Grove	$0	$0	$1,800,000	$1,800,000
RELIEF AREA TOTAL	**$21,200,000**	**$0**	**$68,610,000**	**$89,810,000**
Allocation to Existing Users	**$16,768,000**	**$0**	**$35,249,000**	**$52,017,000**
Allocation to Future Users	**$4,432,000**	**$0**	**$33,361,000**	**$37,793,000**

EXPANSION AREA: Trunk System Expansion Projects				
Trunk Shed	Funding Pd 1 2011 to 2016 *(Near-Term Planning)*	Funding Pd 2 By Year 2020 *(Mid-Range Planning)*	Funding Pd 3 Buildout (after Year 2020) *(Long-Range Pln)*	Total All Funding Periods
Future Development Areas - North of American River				
DRY Rio Linda SE			$6,900,000	$6,900,000
NN Greenbriar		$4,100,000		$4,100,000
UN Elverta			$32,300,000	$32,300,000
UN Orangevale			$19,400,000	$19,400,000
UN Rio Linda East			$16,400,000	$16,400,000
UN Rio Linda SW			$7,400,000	$7,400,000
UN Rio Linda West			$13,200,000	$13,200,000
Future Development Areas - South of American River				
BR Bond Sheldon			$53,100,000	$53,100,000
BR Calvine			$109,000,000	$109,000,000
BR East Rancho		$59,900,000	$254,000,000	$313,900,000
BR Elder Creek			$36,200,000	$36,200,000
BR Florin		$8,300,000	$47,900,000	$56,200,000
BR Gerber		$6,400,000	$4,000,000	$10,400,000
BR Gravel East			$27,100,000	$27,100,000
BR Mather East		$32,800,000		$32,800,000
CE Elk Grove Florin		$1,800,000	$3,000,000	$4,800,000
CE Gravel West			$22,700,000	$22,700,000
FE Folsom		$8,600,000	$9,700,000	$18,300,000
LA East Franklin		$690,000	$5,300,000	$5,990,000
LA Elk Grove		$4,900,000	$6,300,000	$11,200,000
LA Laguna Ridge		$17,000,000	$2,600,000	$19,600,000
EXPANSION AREA TOTAL	**$0**	**$144,490,000**	**$676,500,000**	**$820,990,000**

SASD SERVICE AREA SUMMARY				
SASD TOTAL (Relief + Expansion Areas)	**$21,200,000**	**$144,490,000**	**$745,110,000**	**$910,800,000**
Total Allocation to Exist. Users (Relief Area Only)	**$16,768,000**	**$0**	**$35,249,000**	**$52,017,000**
Total Allocation to Future Users (Relief + Expansion Areas)	**$4,432,000**	**$144,490,000**	**$709,861,000**	**$858,783,000**

TABLE 7-5. SASD RELIEF AREA: POTENTIALLY CAPACITY DEFICIENT SEWER SYSTEMS

Sewer System	Funding Period	Estimated Capital Cost	Percent Allocation		Cost Allocation	
			EXISTING User	FUTURE User	EXISTING User	FUTURE User
ARD-4&5 (Existing Cond. Solution)	1	$6,100,000	100%	0%	$6,100,000	$0
ARD-4&5 (Buildout Cond. Solution)	3	$6,100,000	56%	44%	$3,398,000	$2,702,000
ARD-10	1	$1,800,000	86%	14%	$1,554,000	$246,000
ARD-11	1	$1,900,000	44%	56%	$830,000	$1,070,000
ARD-12	3	$3,700,000	61%	39%	$2,241,000	$1,459,000
ARD-17	1	$4,400,000	60%	40%	$2,651,000	$1,749,000
ARD-23	3	$100,000	71%	29%	$71,000	$29,000
COR-1	3	$7,200,000	56%	44%	$4,034,000	$3,166,000
ELK-20	3	$2,700,000	18%	82%	$497,000	$2,203,000
NEA-5	1	$4,000,000	83%	17%	$3,334,000	$666,000
NEA-19	3	$1,100,000	49%	51%	$543,000	$557,000
NEA-22	3	$35,100,000	57%	43%	$19,853,000	$15,247,000
NEA-40	3	$4,400,000	48%	52%	$2,109,000	$2,291,000
NEA-43	3	$1,500,000	33%	67%	$488,000	$1,012,000
NEA-51	1	$1,200,000	95%	5%	$1,143,000	$57,000
NEA-52	3	$10,000	73%	27%	$7,000	$3,000
NEA-62	3	$300,000	4%	96%	$12,000	$288,000
RCCC-1	3	$3,100,000	24%	76%	$736,000	$2,364,000
RIO-3	3	$700,000	66%	34%	$463,000	$237,000
RIO-4 (Existing Cond. Solution)	1	$400,000	100%	0%	$400,000	$0
RIO-4 (Buildout Cond. Solution)	3	$200,000	66%	34%	$132,000	$68,000
SEA-11	1	$1,400,000	54%	46%	$756,000	$644,000
SEA-13	3	$600,000	38%	62%	$229,000	$371,000
WG-1	3	$1,800,000	24%	76%	$436,000	$1,364,000
Relief Area Totals:		**$89,810,000**			**$52,017,000**	**$37,793,000**

8. APPENDICES

8.1 Appendix A: Expansion Area Trunk Shed Plans

8.2 Appendix B: Technical Memorandums

8.2.1 TM - Summary of Land use Planning Information

8.2.2 TM - Cost Criteria Evaluation

9. ADDENDUMS – MRP AND PDP REPORTS (COMPLETED AFTER 2010 SCP COMPLETION)

This section is reserved for future inclusion of MRP and PDP Final Reports that have been approved by SASD.