
6.0 Infrastructure

This chapter describes the basic infrastructure required to serve the Plan Area and includes a discussion on "backbone" sewer, water and drainage systems. It addresses both the build-out condition and possible interim solutions that will allow phasing of development.

6.1 SEWER

The following section summarizes the information contained within the "*Preliminary Sewer Master Plan for the LRSP*" prepared by Wood-Rodgers and approved by CSD-1. The Preliminary Sewer Master Plan is augmented by a "*Sewer Design Report*" prepared by Wood-Rodgers. These documents are part of the technical studies on file prepared in support of the Specific Plan and EIR. The sewer system is designed to be consistent with General Plan policies and District standards. Laguna Ridge is located within the Sacramento County Sanitation District No. 1 (CSD-1) and the Sacramento Regional County Sanitation District (SRCSD).

6.1.1 Existing Conditions

At the time this plan was prepared the only existing public sewer facilities in the area were several sewer mains and trunks ranging in size from 6" to 15" in diameter located just north of Elk Grove Boulevard and the Plan Area. These laterals are located in Bruceville Road, Big Horn Boulevard and Laguna Springs Drive. These public sewage facilities have limited remaining capacity and therefore are unable to adequately serve the Plan Area. The existing residences within the Plan Area rely on septic systems for sewer service.

6.1.2 Sewer System Overview

The following provides a brief summary of the sewer sheds analyzed for the LRSP, the proposed ultimate "backbone" sewer system and reviews possible interim solutions to provide service to portions of the Plan Area on phased basis.

(A) Service Area Limits

As discussed in the Preliminary Sewer Master Plan, the Laguna Ridge Plan Area is located within into two major sewer shed areas, the Northern Shed (Sub-Shed "C") and the Southern Shed (Sub-Shed "D"). Sub-Sheds A and B are contained within the EFSP. The sewer system proposed to serve the LRSP has been coordinated with the EFSP, also located south of Elk Grove Boulevard, because in the ultimate build-out condition, sewer will gravity flow from LRSP in an interceptor facility extending across the EFSP to a major permanent lift station at Franklin Boulevard. Sub-Shed "C" is mostly located north of Old Poppy Ridge Road, east of Bruceville Road, south of Elk Grove Boulevard and west of Highway 99. Sub-Shed "D" includes the balance of the LRSP as well as the Southeast Study Area and the Lent Ranch Mall site and is located mostly south of Old Poppy Ridge Road, east of Bruceville Road, north of Kammerer Road and west of Highway 99.

A 27-inch sewer trunk line is proposed to be extended to near the intersection of Whitelock Parkway and Bruceville Road to service the projected build-out of the Northern Shed, and is sized to carry 4.90 million gallons per day (mgd) at peak wet weather flow. The Southern Shed is proposed to be serviced by a 36-inch sewer interceptor line located 2,600 feet north of Bilby Road at Bruceville Road. This 36-inch sewer line has been sized to carry an ultimate capacity of approximately 10 mgd.

(B) Flow Estimates

The Plan Area at full buildout will generate in an estimated peak wet weather flow of 8.17 million gallons per day (mgd).

(C) *Proposed Backbone Layout*

The backbone sewer system proposed for the Plan Area has been located within existing and proposed road right-of-ways. In the build-out condition, the entire Plan Area can be served by a gravity sewer system connecting to a permanent regional lift station located to the west in the EFSP, 1,300 feet south of the intersection of Franklin Boulevard and Elk Grove Boulevard. The backbone sewer system within LRSP is illustrated in Figure 6-1. Off-site systems are discussed in the Sewer Master Plan. In addition to the backbone sewer lines shown by this exhibit, there will be a network of smaller sewer collection lines located throughout the Plan Area. The size and location of these additional lines will be determined at the time Tentative Subdivision Maps are approved, and final maps and improvement plans are prepared.

A phased program of planned sewer system extensions outside the Plan Area will provide adequate capacity to accommodate the phased development of the Specific Plan. This phasing is discussed by the following.

(D) *Construction Phasing*

Build-out Condition: In the build-out condition a 72-inch diameter sewer interceptor line will be constructed to extend from the Sacramento Regional Wastewater Treatment Plant to the south along the Western Pacific Railroad Line to serve the East Franklin and Laguna Ridge Plan Areas. This 72-inch line will connect a future permanent lift station located approximately 1,300 feet south of Elk Grove Boulevard at Franklin Boulevard. The EFSP and LRSP will gravity flow to this lift station in the ultimate condition. The construction of the 72-inch interceptor is currently scheduled as part of the County's Phase V Capital Sewerage Expansion projects after 2014, however discussions with staff indicate that the construction of the interceptor may be accelerated to as early as 2005.

A 66-inch gravity sewer line will extend from this future permanent lift station further to the south to Whitelock Parkway, before heading east through the EFSP in a dedicated corridor located on the north side of Poppy Ridge Road. This major east-west sewer line through the EFSP will transition to a 48-inch line before splitting to serve the north and south portions of the Laguna Ridge Plan Area. At build-out, it will provide a 27-inch connection at Whitelock Parkway and Bruceville Road to serve the north portion of the Plan Area, and a 36-inch connection 2,600 feet north of Bilby Road at Bruceville Road to serve the south portion of the Plan Area as shown on Figure 6-1. A 24-inch sewer line connects to the north and then traverses across the northwest and northeast sub-areas within the LRSP, while a 33-inch sewer line serves the southern portion of the Plan Area.

Interim Condition: Several scenarios were examined by the Preliminary Sewer Master Plan to provide service on an interim basis. For the northern portion of the LRSP, most likely scenario is to provide interim service by constructing a temporary (2.0 to 6.7 mgd) lift station near the intersection of Whitelock Parkway and Bruceville Road. From this temporary lift station, a 12-inch and a 16-inch force main could be installed to convey sewage north along Bruceville Road to the intersection with Laguna Boulevard. From this intersection there are two routes to the SRWTP that will be utilized. The first is to connect into an existing 39-inch line, which travels west a ½ mile and then north via a 42-inch line to the SRWTP. This route will be utilized until the proposed 60-inch "Laguna" interceptor is installed to allow existing dry lines to be utilized. Once this interceptor is installed the second route can be utilized. This system connects to a 42-inch dry line that travels west along Laguna Boulevard. A 60-inch dry line, and then connects to the north along Franklin Boulevard to the proposed 60-inch Laguna interceptor. For the southern portion of the Plan Area, interim sewer service could be provided by constructing a temporary 4.0 mgd lift station 1,300 feet north of Bilby Road at Bruceville Road, and then installing a 12-inch force main along Bruceville Road, connecting to the north temporary lift station or gravity sewer at Poppy Ridge Road.

Insert Figure 6-1 Backbone Sewer Master Plan

6.1.3 Sewer Service Standards and Guidelines:

1. The City of Elk Grove General Plan Citywide policy mandates public sewer service for new residential developments of densities greater than one-half unit per acre. Consistent with this policy, the Specific Plan will be served by a public sewer system.
2. Building permits or improvement plans for proposed projects shall not be approved until an approved Sewer Study is completed and a Public Facilities/Financing Plan has been adopted for the Plan Area.
3. Construction of public trunk and collector sewers shall be required to the satisfaction of the City of Elk Grove and CSD-1.
4. Interim facilities shall be designed in consultation with CSD-1 and SRCSD.
5. Development projects shall participate in the cost of constructing master infrastructure facilities. Determination of fair share costs, timing and funding mechanisms for master infrastructure facilities shall be determined by the adoption of a Financing Plan for the Plan Area.

6.2 DRAINAGE & HYDROLOGY

The following section summarizes the information contained within the "*Drainage Master Plan for the LRSP*" prepared by Wood-Rodgers. This document is part of the technical studies on file prepared in support of the Specific Plan and EIR. This document was reviewed and approved by the Sacramento County Department of Water Resources (SCDWR) and the City of Elk Grove, and the proposed system has been designed to be consistent with General Plan policies and existing improvement standards.

6.2.1 Existing Conditions and Planned Developments

The LRSP is located within two larger sheds that continue to the west toward the Beach Stone Lakes area located west of Interstate 5. These sheds have been identified as Local Drainage Area B (northerly shed) and Local Drainage Area C (southerly shed) in the Drainage Master Plan. The boundary between these two sheds is located along Old Poppy Ridge Road, and continues south along Bruceville Road and then west along Bilby Road. The north shed within LRSP contains approximately 1,440 acres, while the south shed includes 468 acres.

The Laguna Ridge Plan Area is essentially flat, with an average slope across the Plan Area of approximately 0.15 percent. On-site elevations range from 43 feet above mean sea level (msl) near Highway 99 to 27 feet msl near Bruceville Road, and surface flows move in roughly an east-to-west fashion. Most of the natural drainage courses in the area have been altered by agricultural activities, and surface water flows are directed into agricultural and roadside ditches.

The City and SCDWR directed that the LRSP Drainage Master Plan be designed to divert and direct drainage from its North Shed into the Central Shed as proposed in the East Franklin Specific Plan (EFSP). An open channel located on the north side of Whitelock Parkway will serve to convey water through this Central Shed. This diversion is due to a number of factors including the constriction that occurs on the existing North Shed due to an existing Union Pacific Railroad Bridge near Franklin Boulevard, and the desire of the City SCDWR to consolidate flows into one central system.

Figure 6-2 - Backbone Drainage Plan

6.2.2 Drainage System Overview

The proposed Drainage Master Plan for the LRSP has been designed to redirect storm water runoff in the northerly shed toward the proposed Central Drainage Channel located north of Whitelock Parkway. Storm flows will be directed from north to south to this channel before continuing west, instead of from east to west as they currently do. This Central Drainage Channel will provide an open channel that connects from LRSP in the east to the EFSP central drainage channel. Runoff in the southerly shed will be directed toward Bilby Road, and will ultimately outfall to the south into the Beach Stone Lakes area. A 10.0 acre water quality and detention basin is proposed adjacent to the outfall to mitigate post development flows.

Several options were explored for drainage facilities east of Big Horn Boulevard. The first proposes an open channel connecting across the entire Laguna Ridge Plan Area on the north side of Whitelock Parkway, running straight from Bruceville Road to Highway 99. The second option proposes to pipe the storm flows east of Big Horn Boulevard internalizing them within twin 72-inch drain pipes and thereby eliminate the open channels adjacent to the proposed High School & Middle School Site, however an overland release path will be maintained within the landscaped Laguna South Parkway that is adjacent to the north side of to Whitelock Parkway. These alternatives will be evaluated upon submittal of Tentative Subdivision Maps for this Area. Figure 6-2 illustrates the first option.

6.2.3 Water Quality and Detention Facilities

In the southern shed, the City and SCDWR has recommended that the developments in this area attenuate their flows to existing pre-development levels to minimize downstream impacts. Two other developments, Lent Ranch and Southpointe, are also within the South Shed. As such, the LRSP should coordinate any design for a detention pond with these two developments. All basins propose to utilize gravity drainage, however pump stations were also discussed as an option by the Report.

It is anticipated that the open channel drainage systems will provide the necessary water quality benefits, since they will be landscaped with grasses and other plant materials, and water velocities are very low due to the flatness of the Plan Area.

6.2.3 Drainage Standards and Guidelines:

1. The LRSP shall utilize and expand the existing drainage system as the LRSP area develops.
2. Proponents of the LRSP and EFSP shall combine their efforts to obviate any drainage problems.
3. Where detention facilities are required, they shall be designed to ensure that the peak post development flows are attenuated to the pre-development peak flow.

6.3 WATER

The following section summarizes the information contained within the "*Laguna Ridge Specific Plan Area Water Study*" prepared by Wood-Rodgers. This document is part of the technical studies on file prepared in support of the Specific Plan and EIR. This water study was prepared to be consistent with General Plan policies and was reviewed and approved by the appropriate agencies. It analyzed two scenarios for water supply: solely groundwater, and the combined use of groundwater and surface water. Combined use is the preferred scenario. The LRSP also proposes a recycled water system, as

discussed in section 6.4, to provide irrigation water for landscaped areas. Such conjunctive use and conservation strategies will provide for reliable and sustainable supplies.

The Laguna Ridge Plan Area is not currently within the boundaries of a public or private water purveyor, and therefore prior to receiving service must annex into Zone-40 of the Sacramento County Water Agency (SCWA) and the Sacramento County Water Maintenance District (SCWMD). The SCWA Zone-40 will serve as the water wholesaler and the SCWMD will operate and maintain the distribution system in the Plan Area, providing adequate supplies of treated water for municipal and industrial use. SCWA will own and operate all water production, transmission, storage, and distribution facilities providing service to users located within the Plan Area. The SCWA operates and maintains several water systems in close proximity to the Plan Area, which are within the SCWMD. These systems include: The Vineyard, Laguna, and Country Creek Estates systems within the Zone 40 service area. The EFSP is also being served by Zone-40.

6.3.1 Existing Conditions

The Plan Area has limited water service through the existing water distribution system in the Laguna area. There is an existing 18-inch water line in Bruceville Road and a 14-inch line in Elk Grove Boulevard. Private wells, located on the site, also pump groundwater for agricultural and residential uses.

6.3.2 Water Supply

Water supply issues are a primary concern of the SCWA, and the agency is actively involved in acquiring and developing new surface water supply sources. In order to effectively manage local groundwater use, SCWA authorized several studies with the purpose of quantifying safe yields of aquifers within the region and to determine the feasibility of importing surface water to areas now experiencing declining groundwater levels.

SCWA is actively negotiating with SMUD, the U.S. Bureau of Reclamation (USBR), and the City of Sacramento to secure supplemental surface water supply sources, and tentative agreements have been formulated with these parties. In April 1999, SCWA entered into a long-term water supply contract with the USBR for 15,000 afy of Central Valley Project water, which will be wheeled to Zone 40. It is anticipated that SCWA will be the lead agency for securing future surface water supply sources.

The 1987 Water Supply Master Plan identified the safe yield for groundwater extraction within the Zone 40 area. This safe yield has not been exceeded based on the supply identified in the 1993 Sacramento County Phase 1 Groundwater Study. SCWA is committed to monitoring the 1987 Master Plan and to updating the necessary elements to reflect changing conditions within the Zone 40 service area.

The Water Study prepared by Wood-Rodgers addresses both surface water quantity and quality and identifies the infrastructure needed to supply the Plan Area with surface water.

The Plan Area will be served by wells until an adequate source of surface water is secured, developed and delivered to the Plan Area. The water agencies indicate that with proper management, there is adequate water supply to serve LRSP. Groundwater extracted from the proposed wells within the Plan Area will require treatment. Figure 6-3 *Backbone Water Plan* identifies the potential well sites and treatment facilities. The water storage and transmission system will initially be fed entirely by wells, but are designed for the inclusion of future surface water deliveries. While not currently proposed, the SCWA has indicated that if necessary in the future, some of the proposed wells may be

"injection" wells, allowing water to be recharged into the aquifer during surplus periods, thereby allowing the opportunity to replenish the groundwater supply.

6.3.3 Planned Improvements

(A) Demand Estimates

Water demand projections for the Plan Area were calculated based on the projected land use plan according to the County's standard methodology.

Factors that determine water use in the Plan Area (e.g. mean average rainfall and temperature, topography, demographics, type of water system, average system pressures, and construction of the water system) are expected to be similar to those of SCWA's other service areas. Therefore, for the purposes of estimating demand, it is anticipated that water use within the Plan Area will be similar to existing water use within SCWA's Laguna and Vineyard Service Areas.

According to the Water Study the average day demand is projected to be 4,086 gallons per minute (gpm), 5.9 million gallons per day (mgd) or 6,594 acre feet per year (afy). The proposed water system has been designed and sized to service this demand.

(B) On-Site Water Facilities Master Plan

Figure 6-3 *Backbone Water Plan* identifies three water storage and treatment sites. The first site has been located on a 6.0-acre property southeast of the intersection of Old Poppy Ridge Road and Bruceville Road. The second site is conceptually located north of Whitelock Parkway in the eastern part of the Plan Area, however this site has not yet been acquired. The need, sizing and location of this site will be evaluated as development occurs and the water system is monitored by SCWA. A third water treatment site is proposed east of the intersection of Big Horn Boulevard and Elk Grove Boulevard. This site is intended to address existing water treatment issues in the area and north of Elk Grove Boulevard. These sites have been positioned in coordination with SCWA's overall master plan for the Elk Grove area.

These proposed storage and treatment sites will include reservoirs with an ultimate storage capacity of 3.5 million gallons, a booster pump with a capacity of 13,800 gpm, and water treatment facilities. In conjunction with each of these sites six deep wells are proposed to provide groundwater. One well will be located on-site, and the other five wells will be dispersed away from the site to provide a reliable supply of groundwater. A total of eighteen wells are proposed. The well locations will be determined up submittal of subsequent development applications such as Tentative Subdivision Maps.

The water distribution system (as illustrated by Figure 6-3) proposes a network of water mains following proposed arterial roadways. These mains include 16-inch, 18-inch, 20-inch, and 24-inch lines that at build-out will provide a well-connected, looped system. These lines have been sized according to the Cybernet Water Modeling prepared for the Water Study, but sizing may be adjusted slightly as more detailed engineering plans are prepared. This system was designed in coordination with the EFSP Water Study and potential off-site connections are shown. Within each sub-area of the

Figure 6-3 Backbone Water Plan

LRSP, a system of 12-inch water lines will provide service. The final configuration and sizing of these lines will be determined with the submittal of subsequent development applications and engineering improvement plans.

6.3.4 Water Service Standards and Guidelines:

1. The City of Elk Grove requires new residential subdivisions (2-acre lot size, or higher densities) to be served by a public water system. The design of this system shall operate to meet all the criteria established by SCWA. This criteria includes the following:
 - Minimal residual system pressure is greater than 40 psi.
 - Fire flows must be provided with a minimum residual pressure of 20 psi or greater under maximum day scenario.
 - The maximum system pressure shall be 90 psi.
 - Total head loss per 1,000 lf of pipeline shall not exceed 5.0 feet.

The current system cannot meet these requirements. To address this deficiency, the plan includes a strategy that includes constructing three storage/treatment facilities and up to eighteen new wells.

1. Prior to tentative map approval, a project-level Water Supply Master Plan will be prepared by the applicants to the satisfaction of the SCWA and submitted to the City of Elk Grove for approval.
2. Prior to obtaining Tentative Subdivision, Parcel Map or Development Plan approvals, the proponent shall be required to demonstrate the adequate quantity and quality of water consistent with the Elk Grove General Plan. Well sites shall be identified by SCWA.
3. Groundwater shall be used to meet the demands until a surface water supply is secured and developed. Groundwater shall be obtained from wells located within one of the well fields with the project area.
4. In the ultimate build-out condition a mixture of ground and surface water shall be used to provide water to the site, as developed by the appropriate water agencies.
5. The SCWA shall develop reservoirs to serve the site and these reservoirs shall be strategically located to maintain system pressures. Development fees will provide funding for water facilities.

6.4 RECYCLED WATER

A recycled water system is included as a component of the water supply and water management strategy. A recycled water line will be extended from the Sacramento Regional Wastewater Treatment Plant to the south approximately 2 miles along the Western Pacific Railroad right-of-way or Franklin Boulevard to the EFSP. The Laguna South Public Facilities Fee Program will provide funding. From the EFSP this line will extend approximately 2 miles to the east along Poppy Ridge Road to provide a 16-inch connection to the LRSP at the intersection of Whitelock Parkway and Bruceville Road. From this point the recycled water system will extend through the Laguna Ridge Plan Area along Whitelock Parkway, with connections up Big Horn Boulevard and up Laguna Ridge Road as depicted by Figure 6-4 *Recycled Water Plan*. A loop is provided back to the EFSP 1,300 feet south of Elk Grove Boulevard on Bruceville Road.

Figure 6-4 – Recycled Water Plan

The object is to make recycled water available for the irrigation of active recreational areas and landscaped corridors. Lateral lines are proposed to the community park site each of the neighborhood park sites. The final alignment and sizing of these laterals will be determined upon the submittal of more detailed development applications and engineering improvement plans. The cost to install this recycled water system is provided for by the Laguna South Public Facilities Fee Program (LSPFFP).

The use of recycled water for irrigation of landscape areas is dependent upon a number of factors including the cost of this water in comparison to potable water supplies, the availability of a consistent supply, and the requirement of its use by local agencies. To offset the additional cost of installing irrigation systems to meet the state mandated recycled water requirements, the cost of recycled water is typically priced less than potable supplies, thereby encouraging its use.

6.4.1 *Recycled Water Standards and Guidelines:*

1. Irrigation systems for landscape corridors adjacent to arterial roads, and adjacent to residential development and parks, should be designed to include the use of recycled water or allow for the conversion to recycled water once it becomes available.

6.5 *DRY UTILITIES*

The following section describes the existing public or "dry" utilities in the vicinity of the Plan Area, including electricity, natural gas, and telecommunications (i.e. telephone and cable), and lists guidelines and standards. Each of the utility service providers listed has indicated that adequate infrastructure exists or can be readily extended to serve the Plan Area.

6.5.1 *ELECTRICAL POWER*

Sacramento Municipal Utility District (SMUD) currently operates overhead 69 kilovolt (Kv) power lines along the north side of Elk Grove Boulevard and along the north side of Bilby Road. A new 69 kv line will be installed along the west side of Bruceville Road to a sub-station located near the intersection of Poppy Ridge Road and Bruceville Road. These lines will provide electricity service to the Plan Area. Additional lines will be installed by SMUD as demand requires.

6.5.2 *NATURAL GAS*

Natural gas is available from PG&E in the Plan Area and extension of facilities may be initiated upon completion and execution of line extension agreements. However, as with electrical service, the appropriate land use plans, zoning, and phasing exhibits must be submitted to PG&E in order for PG&E to obtain the expected loading requirements and initiate the planning and design process.

6.5.3 *TELECOMMUNICATIONS*

Citizens Utilities Company of California has existing underground telephone service at the intersection of Elk Grove Boulevard and Bruceville Road. Additionally, the company maintains overhead telephone lines along Bruceville Road, Bilby Road and Poppy Ridge Road. These overhead lines currently provide service to homes and farms within the Plan Area.

Sacramento Cable Television Company facilities also exist at the intersection of Bruceville Road and Whitelock Parkway. No underground cable service currently exists within the Plan Area. Sprint,

Pacific Telephone, and MCI underground fiber optic cables are located nearby. With the development of the Plan Area, these utilities would be installed in the joint trench.

6.5.1.1 Dry Utility Guidelines and Standards

1. Tentative Subdivision Maps and Development Plans shall be submitted by the City to the appropriate utilities to confirm the location and availability of service.
2. Builders shall coordinate with utility providers regarding precise design requirements upon the preparation of improvement plans.
3. Telecommunication services shall be provided to every home within the Plan Area, enhancing the opportunity for tele-commuting and home occupations, and thereby reducing the impacts on the transportation system and air quality.
4. All new electrical and telecommunication services, excluding primary transmission lines and substations, shall be installed underground.
5. Undergrounding of existing overhead facilities is required to the extent practical.
6. The service standards for utility providers are established and administered by the California Public Utilities Commission.