CHAPTER 8
PUBLIC UTILITIES & SERVICES

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Serving the Community. The Public Infrastructure and Services Chapter identifies public utilities and public services required to serve the future residents of Rio d’Oro. Public utilities include sewer, water, storm drain, gas, electricity, and solid waste. Public services include police protection, fire protection, other life safety services, educational services, and libraries and other public services.

8.1 Purpose and Intent

The Public Facilities and Services Chapter identifies public utilities and public services required to serve the project. Public utilities include sewer, water, storm drain, gas, electricity, and solid waste. Public services include police and fire protection. A key component of sustainable development is the creation of efficient and effective infrastructure systems. Extension of Services to the Specific Plan Area will not only benefit future development within the Specific Plan Area but also existing surrounding uses that currently rely upon septic systems and well water.

GREEN CONCEPT Locate new development within and near existing utilities and infrastructure.
8.2 Domestic Water

The Specific Plan Area lies within the sphere of influence of the South Feather Water and Power (SFWP), and SFWP will be the water purveyor for the site. The existing sphere of influence boundary for the SFWP is coincident with Pacific Heights Road; however, the site is outside the SFWP boundary. The developer will apply to expand the SFWP District boundary and annex the Specific Plan Area into the District.

The water source for SFWP comes from the Sierra Mountains and is diverted upstream by diversionary dams at approximately 3,500 feet, well above developed areas and the watershed is protected. The water from SFWP is clean and does not require extensive treatment. The water from SFWP is treated at their main treatment plant near the middle of the system and distributed from there. Improvements needed to serve Rio d’ Oro would consist of water main size upgrades and main extensions.

SFWP water facilities currently exist east of the project. The project would be required an additional 16-inch water main from the intersection of Pacific Heights Road and Ophir Road running parallel to an existing 8-inch main in Ophir Road and connecting to an existing 14-inch main near the intersection of Baggett Marysville Road and Ophir Road. The looped water line within the project and along Pacific Heights Road would also be a 12-inch main tied into an existing 8-inch main in Palermo Road east of Highway 70. All development within the Specific Plan Area will require connection to the existing SFWP water system.

The conceptual water system plan is shown in Exhibit 8-1: Conceptual Domestic Water Alignment.

The Anticipated Water Demands for the Specific Plan Area shall reach approximately 1,121,250 gpd at total buildout. The assumptions and yearly breakdown are provided in Appendix E. The demand for potable domestic water will be reduced by implementing water conservation techniques including the following:

- Installing high efficiency toilets (dual flush) in all new homes, commercial uses, and schools.
- Installing Water efficient dishwashers.
- Installing water efficient shower heads and faucets in all kitchens and bathrooms.
- Utilizing recycled water for landscaping as described later in this Chapter.
- Installing high efficiency irrigation systems as described later in this Chapter.
- Utilizing native and drought-tolerant plant species in landscaping palettes.

**GREEN CONCEPT**

Install efficient water delivery systems and appliances to reduce the demand for potable domestic water.
8.3 Recycled Water

The Rio d’Oro project proposes the development of a recycled water system to irrigate nearly all community open space, parks, greenways, and landscaping for the proposed Rio d’Oro planned community. This system will divert a portion of treated effluent from the SCOR wastewater treatment plant prior to final discharge near the Thermalito Afterbay for reuse in the Rio d’Oro Project. The diverted water will undergo advanced (tertiary) treatment, disinfection, and storage prior to reuse in accordance with California Title 22 Standards. The Recycled Water System is shown in Exhibit 8-2: Conceptual Recycled Water Alignment.

**GREEN CONCEPT**

Provide recycled water infrastructure within new developments for irrigation and other non-potable uses.

8.3.1 Description of Source Flows & Concentrations

Wastewater generated by homes and businesses within SCOR’s service area is conveyed by the district’s sanitary sewer system to the SCOR wastewater treatment plant on South 5th Street in Oroville, CA. The existing treatment plant serves approximately 15,000 families and numerous industries in the greater Oroville area. This project proposes to utilize the existing sanitary sewer system without need of modification directly related to the proposed reclamation project.

SCOR’s wastewater treatment plant is designed to treat an average dry weather flow of 6.5 million gallons per day (MGD). Typical average dry weather flows are reported as 3.2 MGD; however, flow patterns at the plant indicate peak flows arrive between 3 and 6 pm, with minimum flows occurring between 6 and 9 am.

SCOR’s current discharge permit limits monthly average effluent for BOD and TSS to 20 mg/L, with weekly average limits of 25 mg/L, a daily maximum limit of 40 mg/L, and a monthly overall average removal rate of 85 percent. However, based on recently reported data typical effluent concentrations for BOD and TSS are 3.1 and 1.2 mg/L, respectively.

8.3.2 Scope of Water Reclamation Project

The Rio d’Oro reclamation project proposes the construction of an Advanced Wastewater Treatment Plant (AWTP) designed to provide tertiary treatment and disinfection for the reclamation of up to 1.0 MGD of wastewater for the purpose of unrestricted irrigation of the proposed Rio d’Oro community. Recycled water produced at the Rio d’Oro AWTP will meet the most stringent irrigation requirements.
Exhibit 8-2: Conceptual Recycled Water Alignment
outlined in Title 22 of the California Water Code, while providing the necessary capacity to meet projected irrigation demands. The treatment plant will be housed in an architecturally compatible building approximately 2,000 sf. Several options are available for the actual wastewater treatment, including microfiltration and conventional mixed media filtration. Based on preliminary review of feed water quality as well as capital and operational costs, the use of a conventional mixed media filter provides the most cost effective solution. However, considering this project is still in its infancy, a more thorough cost analysis is recommended prior to final selection as the cost of technology in the area of water reclamation is rapidly changing.

8.3.3 Proposed Treatment Method & Requirements

The proposed Rio d’ Oro AWTP will draw flows from the SCOR outfall pipe on the north side of the project boundary near Pacific Heights Road and Hwy 70. Effluent which has already been treated to a high level by traditional biological processes will be diverted from the SCOR outfall pipe and enter a wet well where it will be pumped approximately 0.25 miles to the proposed Rio d’ Oro AWTP located in the Commercial/Retail Village 1. It’s anticipated the Rio d’ Oro AWTP will consist of parallel mixed media filters, each having a capacity of 0.5 MGD, followed by redundant ultraviolet (UV) disinfection. Provisions can (and should) be included in the initial design for a third 0.5 MGD mixed media filter to allow ease of maintenance without limiting throughput.

Collection of discharge from the SCOR outfall will be done via a wet well which will be designed as an extended basin off of the SCOR outfall pipe. A vertical Pump located adjacent to the wet well will convey feed water into the treatment building for treatment using conventional mixed media filtrations. Following filtration, filtered water will pass through banks of UV lights for disinfection. Based on current regulation, the Rio d’ Oro reclamation plant is anticipated to meet effluent standards of 2.2 MPN for Total Coliforms and less than 0.2 NTU for Turbidity.

8.3.4 Operations and Maintenance

Products from the routine backwash of filters will be discharged into the community sewer and returned to SCOR where the treatment process is started anew. The proposed treatment system will require a certified wastewater treatment plant operator to provide oversight. This requirement can be addressed during establishment of the responsible entity. Preliminary annual operating costs for the treatment system indicate an average cost of approximately 0.6 cents per 1,000 treated gallons; however, these costs are likely to increase slightly when costs for an operator, sampling, and lab work are completely factored in.
8.3.5 Proposed Storage & Distribution

Following disinfection, reclaimed water is anticipated to be stored in an above ground steel storage tanks for use in landscape irrigation. Based on preliminary estimates from the landscape architect, irrigation demands for common areas of the proposed Rio d’ Oro community are not anticipated to exceed 1.0 MGD based on the worst case demand (minimal relative humidity and high temperatures, etc.). Given the project irrigation demands, it’s proposed a minimum of one day reserve capacity should be made available to meet irrigation demands. At present, the County of Butte has prohibitions on the use of impoundments for recycled water; therefore, storage is limited to tanks.

The proposed community will require a dual plumbing system, with conventional water pipe utilized for potable water distribution and purple pipe utilized for recycled water distribution. Regulations restrict any physical connections between the two distribution systems, including using the potable water system as backup for the recycled water irrigation system, which may necessitate the installation of a dedicated irrigation well for system backup.

8.3.6 Proposed Uses & Restrictions

Anticipated uses of the tertiary treated and disinfected recycled water include irrigation of all common areas of the community including; village parks, medians & greenways, school grounds, and commercial area landscaping. Additional uses to be considered include water supply for fire protection within the villages, commercial toilet & urinal flushing, and commercial car washes if present; however, inclusion of these use areas may necessitate additional storage capacity, although not necessarily in a single tank.

General requirements for the use of recycled water include appropriate signage indicating the water in use is recycled and not for consumption. In addition, no hose bibs are allowed on recycled water lines in areas accessible to the general public. The use of recycled water shall be contained to the area of use, unless it is deemed the recycled water poses no threat to public health by the regulatory authority (RWQCB). Appropriate rules and regulations regarding the maintenance and use of the recycled water system should be established jointly by the RWQCB and system owner.
8.3.6 Landscape Irrigation

Irrigation systems are required to establish and maintain landscape plantings. Water conservation guidelines will establish the optimum water usage for a given landscape design. Following is a series of equations that establish the maximum allowance and the 20% savings.

MAXIMUM IRRIGATION ALLOWANCE

The objective at Rio d’ Oro is to establish the maximum irrigation allowance, based on State of California and local standards, and design landscapes that use 20% less than the maximum irrigation allowance. The Maximum Applied Water Allowance: the calculation that quantifies the maximum gallons of irrigation water per year that a garden design may use. This calculation assumes that extra water is required in a new landscape and factors in the water demand based on plant demands. This equation includes two variables and two constants. The variables are the landscape area and the rate of water loss through plant evapo-transpiration [ETo]. The constants are 0.8 [irrigation efficiency] and 0.62 [conversion factor to gallons]. Since all gardens at Rio d’ Oro are located in the same ETo area, which is 51.5 [inches of water lost each year], the only variable remaining is the size of the garden. For example, if the garden area is measured at 5,000 square feet, then the calculation to measure the maximum water allowed for that area is: 51.5 x 0.8 x 5,000 x 0.62 = 127,720 gallons per year. This maximum irrigation allowance requires that the average water demand for any garden design must be medium, or the average of high, medium, and low water-demanding plant groupings or hydrozones.

ESTIMATING IRRIGATION DEMAND

The next step is to estimate the applied water use, based on a designed landscape such that the water use is a minimum of 20% under the maximum allowance. The equation to calculate water demand is:

\[ \text{ETo} \times \text{Plant Factor (water demand of a particular plant)} \times \text{HA (hydrozone area)} \times \frac{0.62}{0.625} \text{ (irrigation efficiency factor)} \]

To do this for the above example, we will assume that 25% of the landscape area is lawn (hydrozone ‘A’), which has a water use factor of 0.7 (high water demand). The remaining landscape area will use low water-demanding plants (hydrozone ‘B’), which has a factor of 0.2.
For the Hydrozone ‘A’ – lawn area: \((51.5 \times 0.7 \times 1,250 \text{ sf} \times 0.62)/0.625 = 44,702\) gallons per year.

For the Hydrozone ‘B’ – shrub area: \((51.5 \times 0.2 \times 3,750 \text{ sf} \times 0.62)/0.625 = 38,316\) gallons per year.

The percentage of the maximum allowance = \((44,702 + 38,316) / 127,720 = 0.65\). In this example, the estimated water use is 35% under the allowance.

Native plantings may require less water than ornamental plants and should be irrigated separately. For Plant Lists and plant species water demand, see Appendix C.

Each yard should have a full coverage, automatic irrigation system installed and maintained by the homeowner. Both spray and bubbler (or drip) systems may be used. Trees should be irrigated with a separate bubbler system.

The automatic irrigation system should be designed in accordance with current local and state laws, rules and regulations governing or relating to irrigation systems, and to meet all water conservation design criteria as described above. Water conservation equipment and techniques include:

- Sprinkler heads which will, when properly spaced, provide precipitation rates less than one half inch (1/2") per hour, i.e., low-flow rate sprinkler heads.
- Use of drip and/or bubbler irrigation rather than spray heads, especially on slope areas.
- Anti-drain valves installed just upstream of the lowest sprinkler head on each valve to prevent line drainage and erosion.
- Pressure regulators where water pressure is excessive.
- Program controllers to promote water conservation. Controllers should have features such as dual program and multiple repeat controllers, automatic rain switch for controller turn off, moisture-sensing devices in the soil where necessary, and other weather monitoring features.
- Water conserving planting design. Berms and turf berms particularly shall be used only in large areas and only in the highest visual impact areas and shall not exceed 25% in landscape area.
- All above ground irrigation equipment should be screened from public view with plant material and/or placed behind fences.
8.5 Sanitary Sewer

The City of Oroville or Lake Oroville Area Public Utility District (LOAPUD) will be the Sanitary Sewer conveyance provider for the Rio d’ Oro project.

The sewer treatment plant, run by SC-OR (Sewerage Commission – Oroville Region) which is owned by a tripartite of: the City of Oroville, Thermalito Sewer and Water District (TSWD), and the Lake Oroville Area Public Utility District (LOAPUD). SCOR is undergoing a capacity expansion review and they also expect to have capacity to serve the project. The plant expansion will likely be ready for the first occupancies sometime in 2012.

The projected flow of the proposed sanitary sewer system is expected to be approximately 799,800 gpd at full build out. The assumptions and yearly breakdown are provided in Appendix E.

The site itself contains a varied geography with sporadic elevation changes in excess of 50 feet. The site generally slopes from northeast to southwest and therefore the lowest elevation on site is at mid point of the project on Pacific Heights Road. Consequently, a lift station will be required for the project. The lift station located on Pacific Heights Road in proximity of the Hilgers Road, would “pump” the generated sewage from the project northeasterly along Pacific Heights Road or through the project to a second lift station in the vicinity of Pacific Heights Road and Ophir Road.

The Rio d’ Oro development will require connection to a public sewer conveyance system. This will be accomplished through one of three alternatives:

Alternative 1 (Preferred Alternative) would construct a force main in Pacific Heights Road crossing Highway 70 to a planned City of Oroville lift station at the intersection of Ophir Road and Power House Hill Road. The wastewater would then flow approximately 1.4 miles east and then northeast in new sewer lines along Ophir Road and Bagget Marysville Road, then west approximately 2,000 feet along a new sewer line in Georgia Pacific Way to South 5th Avenue, then approximately one mile north along a new sewer line in South 5th Avenue to the SC-OR treatment plant.

Alternative 2 would construct an on-site lift and force main and gravity sewer line north along Pacific Heights Road from the proposed lift station at the Pacific Heights and Ophir Road intersection north approximately 1 mile to the intersection of Pacific heights Road and Georgia Pacific Way; then approximately 2,500 feet east along the north side of Georgia Pacific Way to an existing lift station approximately 1,200 feet
Exhibit 8-3: Conceptual Sanitary Sewer Alignment - Alternative 1 (Preferred Alternative)
Exhibit 8-4: Conceptual Sanitary Sewer Alignment - Alternative 2
Exhibit 8-5: Conceptual Sanitary Sewer Alignment - Alternative 3
east of 7th Avenue. The project may require upsizing the existing lift station and force main along Georgia Pacific Way. A new one mile long trunk line would be constructed north along South 5th Avenue to the SC-OR Plant.

Alternative 3 would construct a pump station on the east side of Pacific Heights Road near the proposed Storm Drain Basin, from where wastewater would flow south in a sewer force main along Pacific Heights Road to another pump station on the northeast corner of Palermo Road and Highway 70, then east in a proposed sewer line along Palermo Road and then south along Occidental Avenue approximately 0.6 miles to a proposed pump station, where the wastewater would then be routed in a sewer force main north along Occidental Drive and through open country approximately two miles to Baggett Palermo Road, then north along Baggett Palermo Road and Baggett Marysville Road to a point approximately ¼ mile north of its intersection with Georgia Pacific Way, then north approximately ¾ mile through open country to an existing wastewater line located approximately ¾ mile east-northeast of the SC-OR treatment plant.

8.6 Stormwater

The storm drain system will be designed in accordance with Butte County standards. The City of Oroville is currently working on narratives for their storm drain standards but they are not complete at this time. Drainage waters shall be detained on-site and/or conveyed to the nearest public drainage channels or facilities. Stormwater discharge shall be in the same location as the preexisting discharge location and there shall be no change to the tributary areas; this ensures that no existing neighbors feel the effect of development. Storm drainage will be conveyed through the site to the Oroville Wildlife Area to the west and ultimately to the Feather River. Since the discharge location is not immediately upstream of an existing property owner, the discharge location and/or the tributary areas may be slightly altered to accommodate one discharge location if necessary. There shall be no increase in the peak flow. One or multiple detention basins may be used on site to attenuate the peak flow to ensure no increase in peak flow leaving the site. The 10-year and 100-year storm events will be used for design.

The Project will comply with the National Pollutant Discharge Elimination System (NPDES) Program and utilize best management practices. The Project will construct storm drainage facilities to an existing natural drainage channel; therefore, the project would be exempt from paying a storm drainage fee as identified in Appendix VIII, Butte County Improvement Standards, October 2006. The Storm Water System is shown in Exhibit 8-6: Conceptual Storm Drain Alignment.
management practices to capture and clean stormwater run-off to prevent pollutants from entering natural watersheds.

8.7 Gas and Electricity

Pacific Gas and Electric (PG&E) is the primary purveyor of gas and electrical service for the Specific Plan Area. Gas and electricity transmission lines will be provided underground within public right-of-ways or public facility easements (PFE). The actual location of these transmission lines and any associated vaults and utility boxes will be determined during the Rio d' Oro design phase.

The Rio d' Oro Specific Plan encourages the installation of photovoltaic panels on new buildings within the Specific Plan Area to generate clean solar energy and reduce the demand for gas and electricity. Although photovoltaic panels are not required, all building shall be at a minimum pre-wired to allow for future installation of photovoltaic panels.

GREEN CONCEPT Provide alternative energy sources to reduce the demand for gas and electricity.

8.8 Solid Waste

Norcal Waste Systems of Butte County, Inc. will provide residential garbage and recycling collection, debris box service, and compactor service for residents in the Rio d' Oro Specific Plan Area. The City of Oroville has commingled curbside trash and recycling collection. After collection, trash is processed at the Oroville Material Recovery Facility where recyclable materials are separated from the trash stream. Residents may also bring recyclable items to a buyback center or a free public drop-off located within the City of Oroville. Green waste, such as yard clippings and compost, may also be dropped off free of charge. A hazardous waste facility is located adjacent to the buyback center where residents can dispose of used motor oil and other hazardous materials by appointment.

GREEN CONCEPT Create recycling programs to reduce solid waste generation.
Solid waste should also be reduced during the construction of each phase within the Specific Plan area. This could be achieved by preparing a construction waste management plan that identifies the materials to be recycled, establishes targets for the amount of materials to be recycled, and identifies how these materials will be transported. Recycling bins and storage areas should be provided at the construction site and workers should be trained on the proper sorting of recycled materials. Recycled materials might include cardboard, concrete, asphalts and wood. Materials selected for recycling should be coordinated with local recycling facilities and haulers prior to commencing construction. The amount of recycled material should be monitored and recorded to ensure compliance with the waste management plan and determine the efficiency of recycling efforts.

**GREEN CONCEPT**

Divert construction and demolition waste from landfills and incinerators by recycling materials.
8.9 Public Safety

The Specific Plan Area will include a Public Safety Center incorporated in the commercial site on the corner of Palermo Road and Highway 70. The center will combine all Public Safety Facilities into one localized area for easy accessibility to the Specific Plan Area and surrounding areas.

8.9.1 Police

The Butte County Sheriff’s Department and California Highway Patrol will provide police protection services to the Specific Plan Area and surrounding areas. The Butte County Sheriff’s Department and California Highway Patrol consists of sworn personnel and volunteers who provide service through various programs including law enforcement, community service, traffic patrol, crime investigation, neighborhood watch, and juvenile services.

8.9.2 Fire

Cal Fire will provide fire protection services to the Specific Plan Area. Cal Fire consists of 42 fire stations that operate 64 fire engines, one ladder truck, two heavy rescues, 17 water tenders, 2 bulldozers, and various other apparatus. The fire department responds to all emergency calls including medical and fire emergencies.