5.10 Hydrology and Water Quality

5.10.1 Environmental Setting

Hydrologic System

The proposed project would be located in the Sacramento River Hydrologic Region, which covers approximately 17.4 million acres and serves as the main water supply for much of California's urban and agricultural areas (DWR 2015). It would extend south from the Modoc Plateau and the Cascade Range at the Oregon border, to the Sacramento-San Joaquin Delta. There are 88 individual basins and subbasins located within the Sacramento River Hydrologic Region. The proposed project would be located within the Redding Area Groundwater Basin in the Anderson Subbasin.

Groundwater

The Redding Area Groundwater Basin is bounded by the Cascade Mountains to the east, the Klamath Mountains to the north, and the Coast Ranges to the west, and covers approximately 390,160 acres (DWR 2015). The primary fresh-groundwater-bearing formations in the basin are the Tuscan and Tehama Formations. The Tuscan Formation is derived primarily from mudflow and reworked volcanic deposits, and in the valley, this formation composition consists of interbedded layers of gravel, sand, silt, and clay (DWR 2015). The permeability of the Tuscan Formation is moderate to high, with yields of 100 to 1,000 gallons per minute (gpm) (DWR 2004). The Tehama Formation consists of a series of stacked and overlapping alluvial fan deposits, derived from material eroded from the Coast Ranges and Klamath Mountains, and consist of interbedded gravel, sand, silt, and clay layers (DWR 2015). Permeability of the Tehama Formation is moderate to high, with yields of 100 to 1,000 gpm (DWR 2004). Well yield data indicate that groundwater production in the basin varies between 8 and 2,000 gpm, with an average yield of 288 gpm. The groundwater storage capacity of the 510-square-mile Redding Basin is approximately 5.5 million acre-feet for 200 feet of saturated thickness; specific yield data for the Anderson Subbasin aquifer system are not available to estimate storage capacity at the subbasin level (DWR 2004).

The Anderson Subbasin aquifer system is composed of continental deposits of late Tertiary age, including Pliocene Tehama and Tuscan formations, and Quaternary age, including Holocene alluvium and Pleistocene Modesto and Riverbank formations (DWR 2004). The main sources of recharge for the aquifer system are deep percolation of precipitation and applied water, along with leakage from surface streams (SCWA 2007). The primary source of groundwater discharge from the aquifer is groundwater pumping, along with small subsurface outflow from the basin (SCWA 2007). While monthly measurements show seasonal fluctuations in water levels, over the long term, groundwater levels in the Redding Basin have remained steady (SCWA 2007). The general quality of groundwater in the Redding Basin is good to excellent for most uses, except for water from shallow depths along the margin of the basin; some wells in these areas are above water quality limits (primarily metals, chloride, and sulfide) for drinking (SCWA 2007). Potential hazards to groundwater quality in Shasta County include high concentrations of nitrates and dissolved solids from agricultural practices and septic tank failures (Shasta County 2004).

The California Department of Water Resources (DWR) implemented the California Statewide Groundwater Elevation Monitoring Program in response to legislation enacted in the California Water Code as part of California's 2009 Comprehensive Water package. This program requires the DWR to prioritize California's groundwater basins using the following factors: population, projected population growth, public supply wells, total number of wells, irrigated acreage overlying the basin, groundwater use, and impacts of that use (DWR 2014). The groundwater basin prioritization was developed as a statewide ranking of groundwater basin importance, with rankings ranging from *Very Low* to *High*, with

High being the most important basins. *High and Medium* priority basins account for 96 percent of California's annual groundwater extraction and 88 percent of California's population. The Anderson Subbasin has an overall basin priority-level of *Medium* (DWR 2014).

Surface Waters

The majority of the water supply in Shasta County comes from surface flows and is collected in the mountainous regions of the county and carried by streams, creeks, and rivers to lower elevations to be stored in lakes, reservoirs, and groundwater basins (Shasta County 2004). The primary surface water resources in Shasta County are impounded within or conveyed through Lake Shasta (16 miles northeast of Igo) and Whiskeytown Reservoir (6.5 miles north of Igo). Surface water represents 77 percent (258,550 acre-feet) of all diversions, groundwater represents 16 percent (77,124 acre-feet), and reclaimed water 0.3 percent (1,160 acre-feet). In total, 565,572 acre-feet are diverted for beneficial use in Shasta County, such as agricultural supply and municipal and domestic supply.

Potential hazards to surface water quality in the county include high turbidity from sediment resulting from erosion of improperly graded construction projects, high concentration of nitrates and dissolved solids from agriculture or surfacing septic tank failures, contaminated street and lawn run-off from urban areas, and warm water drainage discharges into cold water streams (Shasta County 2004).

The proposed project would cross 29 waterways and ~~eight~~ nine wetlands (see Figure 5.10-1). All waterways in the proposed project area are ephemeral except for perennial Dry Creek at the west end of the proposed project area near Igo (Tierra ROW 2015, Appendix D). Although no formal wetland and waterway delineations were completed, all wetlands in the proposed project area are potentially state- and federally jurisdictional. All non-wetland waterways, with the exception of the Happy Valley Ditch and Happy Valley Canal, are considered to be jurisdictional under both the state and federal Clean Water Acts (CWAs). The Happy Valley Ditch and Happy Valley Canal are likely jurisdictional solely under the California CWA.

Precipitation

Precipitation and temperature range widely in Shasta County due to the relatively large difference in elevation between the valley floor and the highlands. Average annual rainfall in the Redding Basin varies from 25 to 50 inches (SCWA 2007).

Federal Emergency Management Agency-Designated 100-Year Flood Zone

The entire proposed project area would be located within Flood Zone X, meaning it is outside of the 0.2 percent annual chance floodplain (FEMA 2011).

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Figure 5.10-1
Wetlands and Waterways in the Project Area

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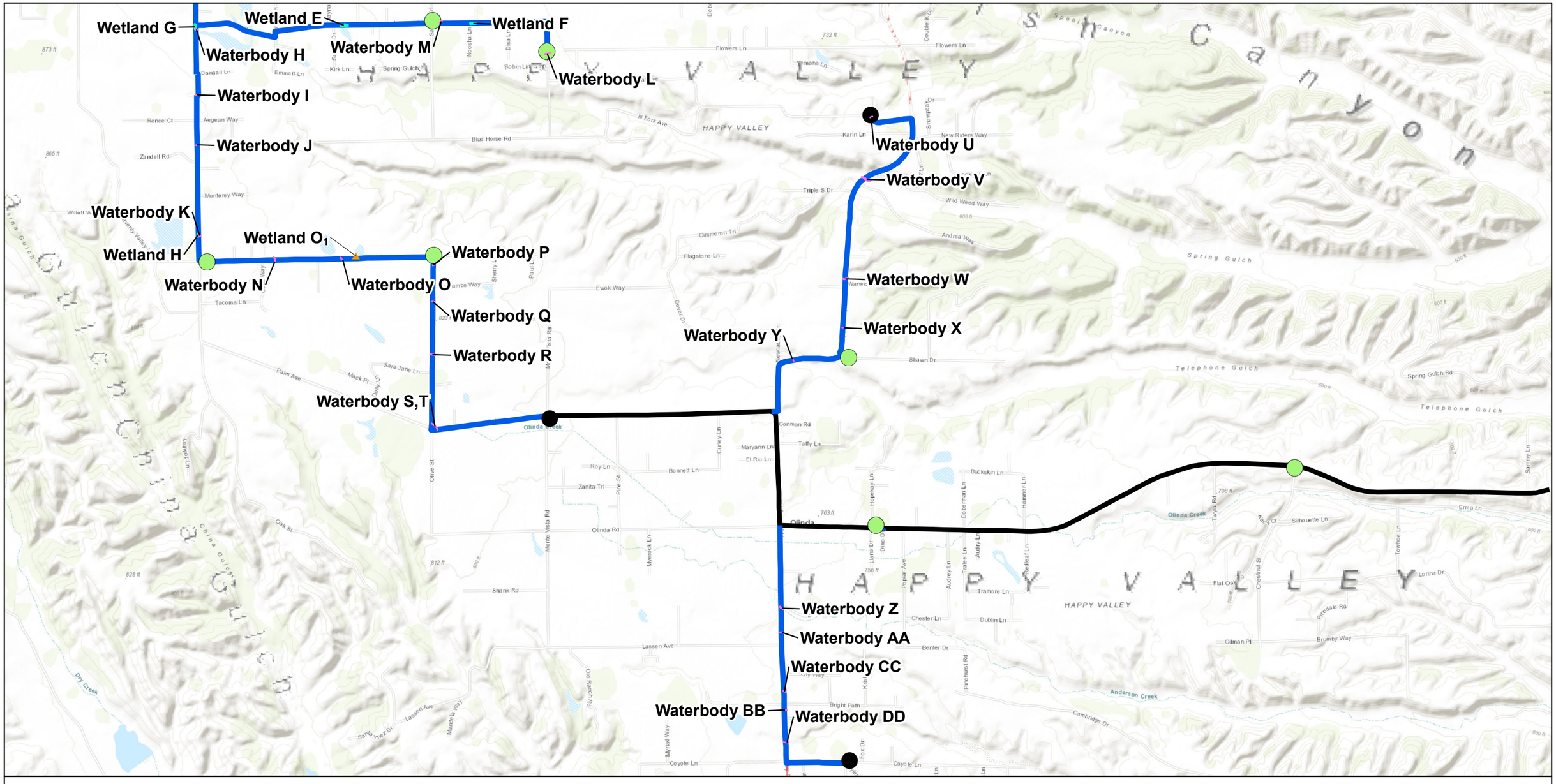

Figure 5.10-1B
Wetlands and Waterways in the Project Area

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Water Supply

In 2003, the Redding Area Water Council released the *Phase 2C Report*, as part of the Redding Basin Water Resources Management Plan, which detailed the needs of individual water districts within the basin. The Clear Creek Community Services District (CSD) would provide water for the proposed project, and draws its water from the Whiskeytown Reservoir. The Clear Creek CSD consists of a gravity system with three storage tanks, which have a combined capacity of 5.3 million gallons, as well as three groundwater wells, each with a capacity of 2.2 million gallons per day. As of 2003, it was predicted that in the year 2015 the Clear Creek CSD would have a demand of between 9,500 and 10,000 acre-feet, with a supply of 15,300 acre-feet during normal-year operating conditions (Redding Area Water Council 2003). Following heavy rains throughout the 2016–2017 winter season, surface water and snow pack near the proposed project area were above historical averages, and on April 2, 2017, California State Governor Jerry Brown lifted the drought emergency in California (USGS 2018). Therefore, it is assumed that the proposed project would be under construction during normal-year operating conditions for water resources.

5.10.2 Regulatory Setting

Federal

Clean Water Act (33 U.S.C. 1251 *et seq.*). The CWA regulates discharge of pollutants into the waters of the U.S. with the objective of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Under Section 404 of the CWA, the U.S. Army Corps of Engineers (USACE) is authorized to regulate the discharge of fill or dredged material into waters of the U.S., which includes wetlands. Wetlands are defined as lands that are "inundated or saturated by surface or ground water at a frequency or duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 Code of Federal Regulations [CFR] 328.3; 40 CFR 230.3). The USACE requires a project proponent to obtain a Section 404 Nationwide or Individual Permit if the project proposes to dredge or fill waters that fall within the jurisdiction of the CWA.

Section 401 of the CWA stipulates that a federal agency cannot issue a permit or license for an activity that may result in a discharge to waters of the U.S. unless the state or tribe where the discharge would originate has granted or waived Section 401 water quality certification. The state or tribe may grant, grant with conditions, deny, or waive certification. In California, the Regional Water Quality Control Board (RWQCB) administers the Section 401 Water Quality Certification Program. Section 401 certification is required before the USACE may issue a Section 404 permit for discharge of dredged or fill material into waters of the U.S. Many states, including California, rely on Section 401 certification as a primary regulatory tool for protecting wetlands and other aquatic resources.

State

National Pollution Discharge Elimination System. Under the National Pollution Discharge Elimination System (NPDES), the applicable RWQCB, in this case the Central Valley RWQCB, requires an application under the Construction Activities Storm Water General Permit (Order 2009-009-DWQ) for stormwater discharges associated with any construction activity, including clearing, grading, and excavation, that results in the disturbance of at least 1 acre of total land area. Because the proposed project would disturb more than 1 acre, a NPDES permit and Stormwater Pollution Prevention Plan (SWPPP) would be required. The Porter-Cologne Water Quality Control Act also necessitates Waste Discharge Requirements for discharges where state—but not federal—jurisdictional waters are affected.

Water Quality Control Plan for the California Regional Water Quality Control Board, Central Valley Region. The State of California Water Board coordinates with nine statewide RWQCBs regarding

regional water resource management. The proposed project area is part of the Sacramento River Basin, which is within the RWQCB's Central Valley Region. The Water Quality Control Plan (Basin Plan) for the RWQCB Central Valley Region describes the hydrological conditions of the region, outlines prohibited activities within that region, and defines water quality objectives for inland surface waters (California RWQCB Central Valley Region 2018). The following water quality objective is recommended:

- ***3.1.15 Sediment:*** *The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.*

Local

Shasta County General Plan, Water Resources Element. The projected total water demands for the year 2030 are 671,850 acre-feet for Shasta County and 342,350 acre-feet for the Redding Basin. These numbers represent an increase from 579,900 acre-feet for Shasta County and 280,460 acre-feet for the Redding Basin in 1995. In order to meet future water supply needs for both areas, the following objectives and policies are recommended:

- *Policy W-a: Sedimentation and erosion from proposed developments shall be minimized through grading and hillside development ordinances and other similar safeguards as adopted and implemented by the County.*

Shasta County General Plan, Flood Protection Element. The purpose of the Flood Protection Element is to reduce damage to public health and property resulting from flooding. Flood protection is required as part of a General Plan by Government Code Section 63202(a). The proposed project would not be located within a floodplain boundary, and there is a low potential for flooding in the proposed project area; therefore, none of the objectives and policies discussed in the Flood Protection Element apply to the proposed project.

5.10.3 Environmental Impacts and Mitigation Measures

The impact analysis below identifies and describes the proposed project's potential impacts on hydrology and water quality within the proposed project area. Potential impacts were evaluated according to significance criteria based on the checklist items presented in Appendix G of the CEQA Guidelines and listed at the start of each impact analysis section below. Both the construction and maintenance/operations phases were considered; however, because the construction phase could result in physical changes to the environment, analysis of construction phase effects warranted a more detailed evaluation.

Operation/maintenance activities associated with the proposed project would include occasional visits by the applicant's technicians to the Digital Loop Carrier (DLC) sites to check on equipment cabinets and connect or disconnect customers. These activities would occur within existing roads and rights-of-way and would not include substantial ground disturbance or use of heavy machinery. As such, these activities do not have the potential to significantly impact water quality in a way that would violate any water quality standards or waste discharge requirements, substantially decrease groundwater supplies, or otherwise degrade water quality.

Applicant Proposed Measures

The applicant has not incorporated applicant proposed measures (APMs) to specifically minimize or avoid impacts on hydrology and water quality; however, APMs proposed from other resource sections, further described below, would mitigate impacts regarding hydrology and water quality. Mitigation

Measure (MM) GEN-1 requires implementation of these APMs to mitigate impacts, and the impact analysis in this section applies these APMs to reduce impacts. A list of all project APMs is included in Table 4-2 in Chapter 4.

Significance Criteria

Table 5.10-1 describes the significance criteria from Appendix G of the CEQA Guidelines' hydrology and water quality section, which the CPUC used to evaluate the environmental impacts of the proposed project.

Table 5.10-1 Hydrology and Water Quality Checklist

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	☐	☒	☐	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: i. Result in substantial erosion or siltation on- or off-site; ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or iv. Impede or redirect flood flows?	☐	☒	☐	☐
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☒	☐	☐

a. Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Construction of the proposed project would involve ground disturbance and trenching that has the potential to increase sediment erosion and transport within the proposed project area, possibly degrading the quality of receiving waters within and adjacent to the proposed project area; however, all waterways and wetlands crossed by the proposed project would be bored beneath and avoided during construction. Spoil piles not covered and secured could also cause sediment transport, especially during a rain event. As discussed in Section 5.8, "Hazards and Hazardous Materials," construction would also include the

storage, use, transport, and disposal of hazardous materials, such as fuels and oils, used for construction equipment and vehicles. Any spills or leaks from equipment could affect water quality if these materials enter local surface waters within or near the proposed project area.

To avoid or minimize impacts on water quality standards and waste discharge, the applicant would implement the following APMs in accordance with the requirements of the State of California RWQCB and NPDES permits for stormwater runoff associated with construction activities. The applicant would implement **APM GEO-1**, which would require the contractor to manage construction-induced sediment and excavated spoils along with these permit requirements. **APM GEO-2** would require the development and implementation of a SWPPP that outlines best management practices (BMPs) to control discharges from construction areas. **APM BIO-2** and **APM BIO-3** would require the applicant to completely avoid wetlands and waterways and their associated riparian vegetation during telecom line installation through the use of horizontal boring and bore pit setbacks. **APM HAZ-5** would require spill clean-up kits to be provided and kept on site during construction. **MM GEN-1** would ensure that the applicant would implement all proposed APMs. With the implementation of **APM GEO-1, APM GEO-2**, **APM BIO-2**, **APM BIO-3**, **APM HAZ-5,** and **MM GEN-1,** impacts to water quality would be less than significant under this criterion.

Significance: Less than significant with mitigation.

b. Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The proposed project may require the use of local water resources for dust suppression and track-out removal. As mentioned above in Section 5.10.1, the water supply for the proposed project would be obtained from the Clear Creek Community Service District (CCCSD), which relies on surface water supply obtained from Whiskeytown Reservoir. When operating under normal-year conditions, CCCSD would likely have an excess supply of approximately 5,000 acre-feet per year (Redding Area Water Council 2003). Project construction would occur over a 60- to 120-day period and would not require quantities of water that could feasibly substantially decrease groundwater supplies. Similarly, project activities would not interfere substantially with groundwater recharge. Therefore, impacts would be less than significant under this criterion.

Significance: Less than significant.

c. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i. ***Result in substantial erosion or siltation on- or offsite;***

ii. ***Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;***

iii. ***Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or***

iv. ***Impede or redirect flood flows?***

The majority of the proposed project would involve the installation of fiber-optic telecommunications cable underground, which would not alter the existing drainage patterns of the area. Approximately 10.3 miles of the cable alignment would be installed in open trenches. However, no more than 1,000 linear feet

of disturbance would be allowed at any time; therefore, open trenches would not remain open long enough to alter existing drainage patterns. The installation of seven new DLC cabinets would introduce new impervious surfaces. However, each equipment cabinet measures only 2 by 3 feet and would have a negligible effect on both the rate and quantity of surface runoff from the proposed project area. Furthermore, the proposed project would not be located in a 100-year floodplain. Therefore, installation of these new impervious surfaces is not expected to alter existing drainage patterns of the site or area, substantially increase surface runoff quantities, or impede or redirect flood flows.

While ground-disturbing activities such as trenching would increase the potential for sediment-polluted runoff during project construction, as discussed in detail under criterion (a), the proposed project would not direct runoff in excess of current quantities into existing or planned stormwater drainage systems. Therefore, neither construction nor operation of the proposed project would exceed existing or planned stormwater drainage system capacity. However, any quantity of runoff water could carry sediment-polluted water from proposed project work areas off site, including into stormdrain systems.

To minimize the potential for sediment-polluted runoff from being carried off site, the applicant would implement **APM GEO-1**, which requires the contractor to manage construction-induced sediment and excavated spoils along with these permit requirements. The applicant would additionally implement **APM GEO-2**, which would require the development and implementation of a SWPPP that outlines BMPs to control discharges from construction areas. Although the proposed project would not alter the existing drainage patterns of the site or area, alter the course of any waterway, or result in a substantial increase in impervious surfaces, the applicant would implement **APM GEO-7** to minimize any impacts. **APM GEO-7** would ensure that, following cable installation, areas disturbed by construction would be recontoured and restored to preexisting conditions. Finally, the applicant would implement **MM GEN-1**, which would ensure that the applicant would implement all proposed APMs. Impacts would be less than significant under this criterion.

Significance: Less than significant with mitigation.

d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

The proposed project would be located inland, approximately 100 miles from the Pacific Ocean, and in an area with relatively flat topography. While the proposed project area is located in a seismically active region, there are no nearby waterbodies capable of generating seiches or tsunamis. Due to the relatively flat topography found throughout much of the proposed project area, slopes capable of generating mudflows are not present, nor would they be created by the construction of the proposed project.

Additionally, the proposed project would not be located within any flood zones, flood hazard areas, or dam inundation areas. Furthermore, the final operational project facilities would be limited to fiber optic cable buried underground within an existing roadway right-of-way, and DLC cabinets, splice boxes, and line markers installed aboveground. None of these aboveground facilities contain hazardous materials that could be released in the unexpected event of project inundation. Therefore, the proposed project would not result in an increased risk of pollutant release in the event of a flood, tsunami, or seiche, and there would be no impact under this criterion.

Significance: No impact.

e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The proposed project falls within the Central Valley RWQCB planning and management boundaries. Local water management plans must, at a minimum, comply with water quality thresholds and measures as defined by the RWQCB. The Water Quality Control Plan for the RWQCB Central Valley Region recommends that suspended sediment load and discharge not be elevated such that it can be considered a nuisance, or such that the sediment load adversely affects other beneficial uses of the impacted water resource.

Locally, the proposed project area is covered by the Shasta County General Plan, Water Resources Element and the Shasta County General Plan, Flood Protection Element. Because the proposed project area does not fall within a 100-year floodplain, it does not conflict with any of the policies or objectives described in the Flood Protection Element. However, the Shasta County General Plan, Water Resources Element describes objectives and policies intended to maintain water quality throughout the county. Policy W-a requires that proposed development projects incorporate safeguards that would minimize sedimentation and erosion. While the proposed project is not a development project, construction would involve ground disturbance and trenching that could potentially increase sediment erosion and transport within the proposed project area, possibly degrading the water quality of receiving waters within and adjacent to the proposed project area.

In accordance with the requirements of the State of California RWQCB and NPDES permits for stormwater runoff associated with construction activities, the applicant would implement **APM GEO-1**, which would require the contractor to manage construction-induced sediment and excavated spoils along with these permit requirements. **APM GEO-2** would require the development and implementation of a SWPPP that outlines BMPs to control discharges from construction areas. **MM GEN-1** would ensure that the applicant would implement all proposed APMs. With the implementation of **APM GEO-1, APM GEO-2**, and **MM GEN-1**, project activities would not conflict with the intent of the Shasta County General Plan, Water Resources Element, and impacts would be less than significant under this criterion.

Significance: Less than significant with mitigation.

Mitigation Measures

See Section 5.3, “Air Quality” for **MM GEN-1**.