

## C.6 HYDROLOGY AND WATER QUALITY

This chapter describes existing hydrologic conditions in the project area and also describes potential impacts due to the construction and operation of the Proposed Project and Project Alternatives. Topics that are addressed include the surface water drainage network, surface runoff, flooding, surface water quality, erosion and sediment transport, stream channel geomorphology, groundwater hydrology, and groundwater quality conditions.

Hydrologic conditions in the project area were investigated through field visits to the project's creeks and watersheds, reviewing prior studies regarding the project area, and by obtaining information from local city, regional, county, and state water agencies. The impact of the Proposed Project and Project Alternatives on surface water and groundwater was evaluated in terms of required construction activities and the long-term operation and maintenance of the proposed substations and transmission lines. When evaluating the potential project impacts, it was assumed that PG&E Co. would comply with all applicable federal, state, and local regulatory requirements that protect surface water and groundwater.

### C.6.1 ENVIRONMENTAL BASELINE AND REGULATORY SETTING

#### C.6.1.1 Environmental Setting

##### C.6.1.1.1 *Regional Watersheds*

The Proposed Project is located within two regional-scale California watersheds, the Alameda Creek watershed and the Central Valley watershed. These two basins are topographically and hydrologically separated by the Altamont Hills of the California Coast Ranges in the eastern portion of the project area.

Most of the project area lies within the Alameda Creek watershed. This drainage basin encompasses about 633 square miles in Alameda, Contra Costa, and Santa Clara counties. Geographically, the watershed extends from Altamont Pass and Livermore in the east, Mount Diablo and Dublin in the north, Mount Hamilton in the south, and Union City to the west where it outlets into San Francisco Bay. The eastern portion of the watershed includes five incorporated cities: Livermore, Pleasanton, Dublin, and the southeastern portions of Danville and San Ramon.

The project area is more specifically located in the 388-square mile Livermore Basin within the larger Alameda Creek drainage. The major streams in this drainage unit are Arroyo Valle, Arroyo Las Positas, Arroyo Mocho, Alamo Canal, and South San Ramon and Tassajara Creeks. Smaller creeks of the Livermore Basin include Alamo, Cottonwood, Collier Canyon, Cayetano, Altamont, Arroyo Seco, and Dry Creek (See Figure C.6-1).

##### C.6.1.1.2 *Rainfall and Runoff Characteristics*

Similar to many of the interior valleys of California's Coast Ranges, average annual precipitation in the Tri-Valley project area is approximately 16 to 24 inches. Most of this rain falls between November and April, and typically, all precipitation occurs in the form of rain. The mean annual evapo-transpiration

rate is about 40 inches per year, a value that far exceeds annual precipitation. In general, precipitation only exceeds evapo-transpiration during the months of December, January, and February. Particular zones in the project area may experience unique microclimates due to elevation, aspect, or topographic conditions.

The creeks in the project area are ephemeral or intermittent and are supplied by runoff from precipitation and springs (USGS, 1985). However, in recent years (1993-1999) most of the main streams draining to Alameda Creek have experienced perennial flow due to above-average precipitation. Precipitation that exceeds infiltration rates generates runoff. Runoff generally occurs either as surface overland flow or shallow subsurface throughflow and is concentrated in natural swales or channels. In general, in undeveloped areas about 25 percent of the rainfall results as runoff. The remaining precipitation is either absorbed by the soil, or transpired by the grassy and woody vegetation (EIP Associates, 1989; Alameda County, 1993). In undeveloped regions with clay soils, surface saturation occurs more quickly and a greater portion of surface runoff arrives to creeks as streamflow. In urbanized regions the runoff response rate is even higher. This means that a greater portion of total rainfall arrives to creeks as streamflow and a shorter lag time occurs between the time of rainfall and peak discharge.

Historical land use practices in the project area have altered natural rainfall-runoff processes. Intensive and continued grazing on the hillslopes and valley floors of many, if not all, of the tributary basins has led to the alteration and reduction in vegetative cover by converting native perennial grasslands to Mediterranean annual grasses. Grazing has also compacted and degraded the soil. The result of these changing physical conditions has been increased peak runoff rates, destabilized creek banks, and channel incision. To varying degrees, most of the tributary streams of the Livermore Basin are incised. This arroyo cutting is problematic not only in terms of active channel erosion, but it has had the deleterious effects of reducing inundation frequencies of floodplains, de-watering upland valleys by lowering water tables, and degrading riparian plant communities along stream banks.

#### **C.6.1.1.3 *Storm Water Management System***

Urbanized portions of the project area have flood control channels and piped storm drain systems to contain and direct storm water runoff associated with impervious surface areas such as roads and buildings. Most of these pipes and channels feed water to the largest of the natural creeks, which have been channelized in several reaches to accommodate flood flows. Where they pass through urbanized areas, all of the major stream channels are engineered as flood control facilities or, in the case of Arroyo Mocho near El Charro Road, are planned for engineering design in the near future. Most of these flood control channels are operated and maintained by county flood control agencies. The storm drain systems are typically maintained by the cities.

**Placeholder: Figure C.6-1 Waterbodies, Floodplains, and Flood Inundation Areas**

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Figure C.6-1 **Waterbodies, Floodplains, and Flood Inundation Areas** (page 2 of 2)

The Vineyard Substation is located immediately north of the Arroyo Valle flood control channel. In this area, the banks of Arroyo Valle have been raised with levees to control local flooding. At Milepost M-5.1 along the Proposed South Area Route, the transmission line crosses underground beneath Arroyo Valle. The underground segment of the L2 Hartman Road Alternative crosses beneath the Arroyo Las Positas channel.

#### **C.6.1.1.4 *Flooding Potential and Dam Failure Inundation Zone***

Flooding is known to have occurred historically within the Livermore-Amador Valley at the confluence of Arroyo Las Positas and Arroyo Mocho (particularly near El Charro Road). Alamo Canal in the City of Dublin and Arroyo de la Laguna (upstream of its confluence with Arroyo Mocho to the San Francisco Water Department's Bernal Property) have been impacted by flooding or channel damage in the past. These impacts have been limited primarily to channel damage and repair.

The Federal Emergency Management Agency (FEMA) has mapped areas subject to flooding in most of the project areas in the Livermore-Amador Valley and surrounding areas of Contra Costa and Alameda counties. FEMA's Flood Insurance Rate Maps (1997) define the predicted boundaries of 100-year (Zone A) floods. Areas designated by FEMA to be within the predicted 100-year flood zone are shown in Figure C.6-1. In the South Area of the Proposed Project, predicted flood zones of Arroyo Valle include the southern boundary of the existing Vineyard Substation, but the station site itself is not considered to be within the FEMA 100-year flood zone. The Proposed North Livermore Substation is situated on an alluvial plain east of Cayetano Creek, but is not located within the mapped FEMA 100-year floodplain. The Proposed Dublin Substation is located adjacent to an un-named tributary of Tassajara Creek whose floodplain boundaries have not been mapped by FEMA.

To help local jurisdictions develop evacuation plans for areas below dams, the State Office of Emergency Services and the Department of Water Resources have identified areas of potential inundation in the event of dam failures throughout California and have estimated when flood waters would arrive at downstream locations should a failure occur. Projected inundation limits are approximate and assume a severe hypothetical dam failure and resulting flooding. Inundation maps for Del Valle Dam indicate that land up to the approximate 500-foot elevation contour on both sides of Arroyo Valle could be flooded should Del Valle Dam fail. The proposed South Area transmission line between Mileposts M5.1 and M5.3 is within the predicted inundation area. The Vineyard Substation is also within the predicted dam inundation area. However, there are no jurisdictional requirements which regulate development in these areas and the risk of dam failure is relatively small.

#### **C.6.1.1.5 *Surface Water Quality***

Water quality objectives for surface water in the project area are described in the San Francisco Bay Region Basin Plan and the Central Valley Region Basin Plan. The narrative and numerical water quality objectives have been established to protect the existing and potential beneficial uses of surface water, which for Alameda Creek and its tributaries include agricultural supply, fish migration and spawning, groundwater recharge, recreation, and wildlife habitat.

Alameda County Flood Control and Water Conservation District, Zone 7 (Zone 7) monitors surface water quality at several stations in the Livermore Basin. Zone 7 monitoring results indicate that water quality is generally better in the larger creeks originating south of the basin than in the creeks originating north and east of the basin.

The poorer water quality in the northern and eastern creeks has been attributed to the chemistry of the native soils and bedrock, accumulation of salts (particularly boron and chloride) from irrigated farming, and heavy cattle grazing over time. Development and improper land use have increased soil erosion rates in some areas, which has resulted in excessive sediment loads in surface runoff and increased turbidity levels in streams and reservoirs. Rainy season streamflow is generally very turbid due to high bedload transport rates and upstream erosion during peak flow periods. Dry season streamflow is typically spring fed and has lower suspended solids. No water quality information was available from the public agencies for surface water conditions east of Altamont Pass.

The heavily urbanized portions of the Livermore Basin have non-point sources of pollution. For example, oily runoff from parking lots and roads and sediment from construction sites may likely enter the creeks and flood canals in the area. Additionally, accidental releases have been recorded in agency databases in many places within the basin. Consequently, surface water quality varies depending on local activities.

#### **C.6.1.1.6 *Groundwater Hydrology and Quality***

The Livermore-Amador Valley groundwater basin is a deep alluvial sedimentary deposit and groundwater reservoir that is surrounded by bedrock uplands which act as groundwater source areas. Varying geologic conditions, including several faults, act as local impediments to groundwater flow and have effectively divided the basin into several groundwater sub-basins. The California Department of Water Resources (DWR) and Zone 7 have mapped 13 individual groundwater sub-basins that are classified for planning purposes into two divisions: the central Main Basin, and the surrounding Fringe Basins.

The Main Basin underlies the majority of the valley and includes the Amador, Bernal, Mocho II, and Castle sub-basins. The Main Basin has high groundwater capacity in several sand and gravel aquifers, abundant well yields, and generally offers high groundwater quality. The Main Basin is used for irrigation, to supply numerous municipal wells, and to store and distribute high quality imported water. In contrast, the Fringe Basins have thinner sandy aquifers with less storage capacity, lower well yield, and poorer water quality. Groundwater recharge is primarily a function of infiltrated rainfall and runoff. Where the valley's soils are dominated by clay and surface runoff is greater, more groundwater recharge occurs from direct percolation beneath creeks and stream channels. Groundwater recharge is enhanced through the use of percolation ponds and releases from Lake Del Valle into Arroyo Valle.

Groundwater throughout the project area is generally found at depths greater than 30 feet. In areas adjacent to local recharge sources like creeks, springs, and other surface water bodies groundwater

depth is shallower. The primary water-bearing formations are found in the valley floor deposits at depths ranging from 30 to 400 feet below grade (Alameda County, East County Area Plan, 1993).

Groundwater quality in the Main Basin is generally good. However, because there is little groundwater outflow from the Main Basin, salts and other dissolved solids will accumulate over time and ultimately degrade groundwater quality. Existing total dissolved solids (TDS) concentration in the Main Basin is 400-450 mg/l, which is acceptable yet beneath drinking water secondary standards of 500 mg/l. The Fringe Basins have poorer groundwater quality because of higher rates of dissolved solids. High sodium chloride and sodium sulfate levels have been found in groundwater in portions of the eastern Livermore Basin and in an area southeast of Dublin. Elevated concentrations of nitrates, boron, chloride, and total dissolved solids are found at various sites throughout the Livermore Valley and frequently are high enough to render groundwater undesirable for domestic, industrial, or agricultural use (Alameda County, East County Area Plan, 1993). A critical management concern is the potential for poorer quality water from the Fringe Basins to migrate into and adversely affect the higher quality groundwater of the Main Basin.

Groundwater in the Fringe Basins beneath the hills north, south, and east of the Livermore-Amador Valley is used to water stock, but other types of uses are limited due to low productivity and poor water quality. These hills are composed of claystones and siltstones of the Orinda Formation, and are reported to have low permeability and be generally unproductive water supplies. Groundwater quality in these hills is generally reported to be unsuitable for domestic or irrigation purposes because of naturally high dissolved salt concentrations. The small alluvial deposits adjacent to creeks may produce higher quality groundwater (USGS, 1985).

#### ***C.6.1.1.7 Sites with Known or Potential Existing Contamination***

Areas of existing soil and water quality degradation were identified by searching federal and state regulatory agency databases that track sites with known, suspected, or potential hazardous substance contamination (for example, underground storage tanks or landfills). For sites that were identified in these databases, local regulatory agencies were contacted and files were reviewed for specific information regarding existing soil and groundwater conditions. Three properties on or near proposed substations and transmission line routes were identified in regulatory databases of sites with known, suspected, or potential contamination. These sites are shown in Figure C.6-2.

##### ***Leland E. Stanley Farm***

The Leland E. Stanley farm is located at 4270 North Livermore Road, just south of the proposed North Livermore Substation site. The California State Underground Storage Tank database identifies a 1,000-gallon gasoline underground storage tank (UST) on the property, status unknown. The farmyard is unpaved and contains a large collection of abandoned vehicles and farm equipment, many of which are in various stages of being dismantled. No releases have been identified at this property, but there is a potential for releases from vehicle fueling and maintenance and from the UST.

### ***J. Silva Farm***

The J. Silva farm is located at 4871 North Livermore Avenue, just east of the North Livermore Avenue Proposed Route and the P1/P2 Alternatives. The UST database identified a 286-gallon gasoline UST on the property, status unknown. No releases have been identified at this property, but the existence of the UST creates a potential for a fuel release.

### ***Altamont Landfill***

Near Milepost B-10.1 of the North Area proposed transmission line, the route passes by the southern and western boundaries of the active Altamont Landfill. This landfill is owned and operated by Browning-Ferris, Inc. (BFI) as a Class II non-hazardous waste landfill. No releases have been identified at this site, but the existence of a landfill creates a potential for releases of chemicals, pollutants, or contaminants of concern.

In addition to the sites that were identified in environmental databases, portions of the North Area Phase 2 transmission line route would cross railroad rights-of-way. Although no specific sites along these rights-of-way were identified in the environmental databases, railroad routes have historically been linked to localized petroleum and metals contamination due to releases from materials that were transported by the railroad, as well as from fuel releases associated with railroad engine operations (USEPA, 1997).

## **C.6.1.2 Principal Hydrologic Features In Project Areas**

The following sections describe the principal creeks and hydrologic features in the Pleasanton, Dublin, North Livermore, and Tesla regions of the project area.

### **C.6.1.2.1 Pleasanton Area**

Along with their tributaries, Arroyo Valle and Arroyo Mocho are the primary streams in the Pleasanton area of the project. This represents the southwestern portion of the entire project area. Both streams originate in the hills south of the Livermore Valley, southeast of Pleasanton, and flow northwestward to eventually join the Alamo Canal along the western side of the Livermore Basin.

### ***Arroyo Valle***

Arroyo Valle drains an undeveloped area of nearly 150 square miles south of the Livermore Valley. This is the largest contributing watershed to the Livermore Valley. As such, Arroyo Valle is a source of considerable groundwater recharge to the Livermore Basin groundwater supply. Arroyo Valle is the most consistently flowing creek in the Livermore Basin because it is primarily controlled by releases from Del Valle Reservoir. Additional flow arrives from the Dry Creek watershed just north of Del Valle Reservoir. From the reservoir, Arroyo Valle flows northwest, parallel to Arroyo Road, through the Livermore Regional Park District's Veterans and Sycamore Grove Parks. Arroyo Valle then flows parallel to East Vineyard Avenue into the southern Amador Valley and then continues west to join Arroyo de la Laguna west of Pleasanton. Within the valley floor portion of the Livermore Basin, most



**Placeholder: Figure C.6 2 Location of Potential Hazardous Material Sites**

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of Arroyo Valle is contained in a flood control channel (Zone 7 Line E). Quarry operators are currently planning the “Chain of Lakes” quarry reclamation project in the sequence of gravel pits where Arroyo Valle continues north of East Vineyard Avenue. One of the objectives of this project is to use surface water from Arroyo Valle to boost groundwater recharge in eastern Pleasanton for long-term storage and use. The Proposed Project’s South Area transmission line would cross Arroyo Valle near Milepost M5.1 as an underground line.

### ***Del Valle Reservoir***

Arroyo Valle is dammed approximately 1 mile south of the valley-floor, southeast of Pleasanton. The dam forms the Del Valle Reservoir, which has a capacity of about 77 million acre-feet. The dam and reservoir, completed in 1969, comprise a combined water supply and flood control project of the California Department of Water Resources (DWR) and the Corps, respectively. Zone 7 owns the water supply and DWR operates the dam, releasing water when requested by Zone 7. The reservoir is used to regulate South Bay Aqueduct flows, provide flood control storage, and for recreation. The discharge volume is determined by California Department of Fish and Game (CDFG) stream flow requirements, reservoir storage capacity, flow into the reservoir, and groundwater recharge requirements. The Corps regulates discharges during periods of downstream flood conditions. The nearest point of the Proposed Project, the South Area transmission line, will be approximately 4 miles from the Del Valle reservoir.

### ***Arroyo Mocho***

Arroyo Mocho originates in the mountains east of Arroyo Valle’s headwaters and drains a 40 square mile watershed. The stream flows northwest out of the hills and enters the valley floor in residential portions of Livermore. Entering the town of Livermore near Wentz Street, Arroyo Mocho is an actively aggrading cobble bed stream with abundant sediment load (Philip Williams & Associates, July 1999). Downstream of Livermore, Arroyo Mocho flows westward across the Livermore Valley confined in a flood control channel with levees along most of its length (Zone 7 Line G). Unlike conditions upstream, in these lower reaches of Arroyo Mocho, the active stream bed is often incised about 15 to 20 feet below the top of the banks. Arroyo Mocho continues west across the Livermore and Amador valleys (parallel to Stanley Boulevard) and flows past gravel mines, passes through the City of Pleasanton, and ultimately discharges into the Alamo Canal near Interstate 680. Three flood control channels (Zone 7 Line G-3, Line K/Tassajara Creek, and Line G-1/Chabot Canal) contribute surface runoff to Arroyo Mocho as it passes through the City of Pleasanton. Like Arroyo Valle, Arroyo Mocho is also a major recharge source for the Livermore Basin groundwater supply. Flow in Arroyo Mocho is usually perennial. Flows are expected to continue at about 4 to 5 cubic feet per second for the next several years due to discharge from de-watering gravel mines (ESA, 1998). The Vineyard Substation is the nearest point of the Proposed Project to Arroyo Mocho and is approximately 1.4 miles southwest of the stream. The D1 (South Dublin) and L2 (Hartman Road) Alternatives cross over Arroyo Mocho as overhead lines.

**C.6.1.2.2 Dublin Area*****Alamo Creek, Tassajara Creek, Cottonwood Creek***

These three creeks drain upland basins north of the Livermore Valley and discharge southward into either Arroyo Las Positas, Arroyo Mocho, or the Alamo Canal. In the hills north of the valley these creeks are primarily non-engineered channels. These creeks and their tributaries have been severely affected by grazing, with the banks denuded of native vegetation, and with highly eroded and disturbed creek bottoms. Currently, Alamo Creek is undergoing restoration in conjunction with a large suburban development project in that area (Philip Williams & Associates, May 2000). The lower reaches of Alamo, Tassajara and Cottonwood creeks are contained within flood control channels (Zone 7 Line F, Line L, Line M, and Line N), most of which are deeply incised. The North Area transmission line of the Proposed Project would cross Cottonwood Creek, near Milepost B16.1. The transmission line of the D2 Alternative would cross Alamo Creek near Milepost B21. Most critical though, the Proposed Dublin Substation is located immediately adjacent to a deeply incised un-named tributary of Tassajara Creek.

***South San Ramon Creek***

South San Ramon Creek originates in Watson Canyon north of the project area, and drains the southern San Ramon and Dublin areas. The creek receives storm water runoff from developed areas in the San Ramon Valley. It flows through urbanized areas east of and parallel to Interstate 680, and discharges into the Alamo Canal near Dublin Boulevard. It is completely contained within an artificial drainage channel designed for flood control. The nearest point of the Proposed Project, the Dublin Substation, will be approximately 4 miles east of South San Ramon Creek. The existing San Ramon Substation, which would be slightly modified under the D2 Alternative, is located immediately east of the South San Ramon Creek.

***Alamo Canal***

Alamo Creek becomes the channelized Alamo Canal in the vicinity of Dublin Boulevard. The canal captures flows from creeks to the west like Dublin Creek and from creeks to the north like South San Ramon Creek. The channelized Alamo Canal has a bed width of about 20 ft and is commonly incised 15 to 20 feet throughout its course. Alamo Canal flows southward into Arroyo de la Laguna at the Arroyo Valle confluence near the southwest border of the City of Pleasanton. Alamo Canal is 2.5 miles south of the transmission line in the D2 Alternative and over 3 miles west of the South Dublin Alternative (D1) Substation.

**C.6.1.2.3 North Livermore Area*****Arroyo Las Positas***

Several creeks drain the hillslopes and uplands north of the Livermore Valley. In the North Livermore section of the project area these tributaries generally flow southward out of the hills and join Arroyo Las Positas, the west flowing trunk stream for the northern Livermore Valley. Similar to Arroyo Valle and Arroyo Mocho in the south, Arroyo Las Positas is considered a major source of recharge to the Livermore Basin groundwater supply. Arroyo Las Positas originates at the confluence of Altamont

Creek and Arroyo Seco, just north of Interstate 580 near Springtown Boulevard. It flows approximately 9 miles west, parallel to Interstate 580, until it discharges into Arroyo Mocho, approximately 1 mile west of the Livermore Airport. Portions of Arroyo Las Positas have been channelized to control flooding. For example, in the channelized reach of Arroyo Las Positas, between Airway and Kitty Hawk streets just north of the Livermore Airport, abundant deposition in this broad channel has aggraded the bed several feet (Philip Williams & Associates, July 1999). Further downstream, west of the golf course and driving range but still upstream of the Arroyo Mocho confluence, the channel is deeply incised 15-20 feet. Arroyo Las Positas is usually dry in summer months. The nearest point of the Proposed Project, the North Livermore Substation, is approximately 2 miles north of Arroyo Las Positas. The D1 (South Dublin) Alternative crosses Arroyo Las Positas as an overhead line and the L2 (Hartman Road) Alternative crosses Arroyo Las Positas as an underground line.

### ***Altamont Creek***

The eastern portion of the Arroyo Las Positas watershed is drained by Altamont Creek, which originates in the Altamont Hills east of the Livermore Valley and flows approximately 3 miles west through the valley until it joins Arroyo Las Positas. In the Altamont Hills section, the creek channel is flanked by railroad tracks and Altamont Pass Road and is locally channelized to accommodate intersections with these structures. In the Livermore Valley, Altamont Creek is channelized through residential areas, like Springtown, to control flooding. The North Area Phase 2 transmission line would cross Altamont Creek west of Milepost B-6.

### ***Arroyo Seco***

Arroyo Seco originates in the mountains southeast of the Livermore-Amador Valley, where it drains a watershed approximately 14 square miles in size. It flows northwest, parallel to a portion of Tesla Road, crosses over the South Bay Aqueduct, passes through Lawrence Livermore National Laboratory and residential Livermore, and then continues northwestward under Interstate 580 to join Arroyo Las Positas. The upper reaches are contained in a natural creek bed, while portions of the lower reaches have been channelized for flood control. Another flood control channel (Zone 7 Line P-1) collects surface runoff from central portions of the eastern Livermore area and drains into Arroyo Seco near its intersection with Patterson Pass Road. The nearest point of the Proposed Project, the North Livermore Substation, will be approximately 2.5 miles north of Arroyo Seco. The Stanislaus Corridor (Phase 2) Alternative would cross Arroyo Seco east of Milepost V-8.

### ***Cayetano and Collier Creeks***

Cayetano and Collier creeks flow southward into Arroyo Las Positas, similar to Cottonwood Creek further west. These creeks are moderately incised at their mouths, and this incision continues headward up their valleys. The North Area transmission line of the Proposed Project would cross Collier Creek near Milepost B14.8 and cross tributaries of Cayetano Creek at Mileposts B12.7, 13.2, and 14.1. The Proposed North Livermore Substation is located about 1,800 ft east of Cayetano Creek and is outside of the mapped FEMA floodplain (Figure C.6-1).

***Springtown Alkali Sink***

The Springtown Alkali Sink, located in the northeast portion of the Livermore Valley, is a unique and complex mosaic of streams, vernal pools, alkali flats, mounds, and grasslands that support a very significant remnant parcel of alkali sink vegetation. This alkali sink hosts the largest remaining population of the endangered palmate-bracted bird's-beak (*Cordylanthus palmatus*) in California (Coats et al., 1993). For more details on the biological resources, please see Section C.3.

The Springtown Alkali Sink has formed on a gently sloping alluvial valley which is bound by steeper uplands to the north and east and some low hills to the south (Figure C.6-3). Moderately sloping alluvial aprons link the sink to its surrounding uplands. Well-defined tributary channels in the upland slopes become poorly defined along the alluvial apron towards the sink. Sediments eroded from parent shale and sandstone rocks in the uplands underlie the sink as interbedded sands, silts, and clays. Parent rocks upslope are high in soluble salts, particularly sodium chloride and boron, and these fine salts have also arrived to the sink downstream. The sink is characterized by a distinctive mound and swale morphology with about 6 feet of local relief. This undulating topography offers significant habitat diversity.

As described above, the Livermore Valley experiences a large moisture deficit in terms of the annual cycle where net evapo-transpiration of 57 inches far exceeds the average annual precipitation of 14 inches. The hydrologic system supplying water to the Springtown Alkali Sink is a product of both surface water and groundwater that is generated in the surrounding uplands and is transported to the sink with varying temporal and spatial trends.

The majority of surface water arrives to the sink via culverts beneath roadways that are linked to drainage ditches and some small channels. During large storms this surface drainage network supplies runoff to the sink directly. Most of this surface flow is derived from the four contributing sub-basins to the north and west (Figure C.6-3). Once in the sink, much of this flow is directed towards the southwest portion of the Alkali Sink. At one time, periodic overbank flooding from Altamont Creek (which flows westward directly through the sink), would also bring water directly to the sink. However, since its initial channelization in 1968 and subsequent enlargement in 1985, Altamont Creek rarely overtops its banks and floods the Alkali Sink.

Groundwater flows preferentially towards the sink in coarser gravel and sand bodies of the subsurface alluvium. In contrast, clay-rich beds act as a barrier to groundwater movement and direct flows towards more permeable sediments. Four groundwater sub-basins have been identified as contributing groundwater to the Alkali Sink from the northwest, north, and northeast uplands. It is believed that a fault located southwest of the sink acts as a barrier and prevents groundwater from exiting down gradient to the west. This fault restricts groundwater outflow from the sink. Groundwater which passes southward through the Alkali Sink daylight as surface flow in Altamont Creek.

An important distinction is made between shallow unconfined subsurface flows, located above a cemented clay hardpan roughly 6-10 foot beneath the surface, and deeper groundwater confined beneath the clay hardpan (Figure C.6-3). The upper layer is a seasonal water-bearing zone where groundwater

levels are near the ground surface during the wet season and can be completely dry by the end of the summer dry season (North Livermore Specific Plan EIR, 2000). Observations suggest that in January, depth to groundwater ranges from about one foot below the surface at the central sink, and about 4-6 feet below the surface in the higher surrounding areas (North Livermore Specific Plan EIR, 2000). By April, groundwater levels drop two feet, and by September, the upper shallow groundwater layer is commonly dry. Other studies have noted that even during the dry season, the shallow groundwater level can lie close to the ground surface. Coats et al. (1993) found that in June 1988, during the second of two very dry years, shallow groundwater was still within 2-4 feet of the ground surface in the lower sink areas.

The deeper, confined groundwater layer is perennial and does not fluctuate as much. Since Altamont Creek has now deepened (13-15 feet below banks) below the clay hardpan it now intercepts groundwater from both the upper unconfined and lower layers. Capturing this deeper groundwater has diminished available moisture for the adjacent wetlands and increased their seasonality.

A particularly important element of shallow groundwater movement into the Springtown Alkali Sink is the presence of preferential flow paths (or permissive flow paths) in relict paleo-channels that have been filled with coarse sediments and transport groundwater more readily than the surrounding landscape. These preferential flow paths appear as poorly defined swales and their locations have been mapped (Figure C.6-3).

Groundwater quality in the Alkali Sink area is poor due to high salt concentrations. The northern and eastern contributing sub-basins are the source areas for the higher salt concentrations. Salinity concentrations in the Alkali Sink do fluctuate seasonally with lower values during the wet season and higher values during the dry season. In general, salinity levels in the sink have declined in recent years due to several impacts including: channelization, grazing, and the diversion of summer flows. Regarding surface water quality in the Alkali Sink area, contamination from manure has led to increased nitrate concentrations in stormwater. Local grazing has also led to increases in suspended sediment loads and stream turbidity.

The overhead transmission line of the North Area Proposed Route crosses an upland alluvial plain/fan roughly 8,000 feet north of the Springtown Alkali Sink. The P2 underground variant follows the Proposed Route, also 8,000 feet north of the sink. Most critical to the Alkali Sink is the L1 Alternative, where an underground segment follows Raymond Avenue and is immediately adjacent to the Alkali Sink.

**Placeholder: Figure C.6-3 Springtown Alkali Sink**



#### **C.6.1.2.4 Tesla Connection**

##### ***North Area (Phase 2)***

The Project's Phase 2 overhead line crosses the un-named tributary exiting the Bushy Peak Reserve east of Milepost B.9 and crosses the larger Altamont Creek west of Milepost B.6. Once across the larger watershed divide into the Central Valley Basin side of the Altamont Hills, the Phase 2 line crosses Mountain House Creek west of Milepost B.4 near the I-580. Phase 2 also crosses additional tributaries of Mountain House Creek that drain northeastward towards the Old River channel of the San Joaquin River Delta. An unnamed stream directs runoff past the existing Tesla Substation towards the east, but it dissipates before it enters another surface water body.

##### ***South Area (Stanislaus Corridor)***

The Stanislaus Corridor alternative crosses Arroyo Seco about a mile southeast of where the Tesla-Newark corridor crosses Arroyo Seco, east of Milepost V.8, and then ascends the Altamont Hills to the east.

#### **C.6.1.3 Applicable Regulations, Plans, and Standards**

Federal, State, and county agencies will coordinate permitting, assist developing mitigation plans, and monitor mitigation measures because the Proposed Project will traverse several streams, wetlands, and other lands under a variety of jurisdictions. The principal Federal agencies involved will be the U.S. Army Corps of Engineers (Corps), the U.S. Department of Interior, Fish and Wildlife Service (USFWS), and the U.S. Environmental Protection Agency (U.S. EPA). The principal State agencies will be the California Public Utilities Commission (CPUC); the Department of Water Resources (DWR); the California Department of Fish and Game (CDFG), Central Coast Region; and the California Regional Water Quality Control Board (CRWQCB), San Francisco Bay and Central Valley Regions. Additionally, the Alameda County Flood Control and Water Conservation District (ACFCWCD) and the Contra Costa County Flood Control District (CCCFCD) will oversee local entitlement issues.

##### ***C.6.1.3.1 Federal and State Requirements***

###### **Section 404**

Waters of the United States (including wetlands) are subject to U.S. Army Corps of Engineers (Corps) jurisdiction under Section 404 of the Federal Clean Water Act (CWA). Section 404 regulates the filling and dredging of U.S. waters. The limits of nontidal waters extend to the Ordinary High Water (OHW) line, defined as the line on the shore established by the fluctuation of water and indicated by physical characteristics such as a natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, presence of litter or debris, or other appropriate means. Most of the floodplains of perennial stream channels crossed by the project would be considered waters of the United States as defined by the ordinary high-water mark of the individual channels. In general, ditches excavated on dry land that do not convey flows from historical streams are considered nonjurisdictional. This is determined by the Corps on a case-by-case basis. A Section 404 permit would be required for project construction activities involving excavation of, or placement of fill

material into, waters of the United States or adjacent wetlands. The Corps, in reviewing 404 Permit applications, stresses avoidance of impacts, minimization of unavoidable impacts, and mitigation of unavoidable impacts. A Water Quality Certification pursuant to Section 401 of the CWA is required for Section 404 permit actions. If applicable, construction would also require a request for Water Quality Certification (or Waiver thereof) from the RWQCB.

### **Sections 1601 and 1603**

As further discussed in Section C.3 (Biological Resources), the California Department of Fish and Game (CDFG) has direct jurisdiction, under California Fish and Game Code Sections 1601-1603, over any activities that will divert or obstruct natural flow or change the bed, channel, or bank of any river, stream, or lake designated by the California Department of Fish and Game (CDFG) in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. The CDFG Code requires that formal notification and subsequent agreement, including mitigation measures, must be completed prior to initiating such changes. General project plans must be submitted to CDFG that are sufficient to indicate the nature of a project for construction if the project would: divert, obstruct, or change a streambed; use material from the streambeds; or result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a stream. The 1601 and 1603 codes are similar to the Corps' 404 Permit, but the area of jurisdiction is typically defined on a case-by-case basis for the location, nature and extent of disturbance, and mitigation.

### ***Storm Water Pollution Prevention Plan (SWPPP)***

As mandated by the 1987 amendments to the Federal Clean Water Act, discharge of stormwater from developed areas is regulated under the National Pollutant Discharge Elimination System (NPDES). In California, the State Water Resources Control Board (SWRCB) administers the NPDES program via the Regional Water Quality Control Boards (Regional Boards). In addition, the State Porter-Cologne Act requires the development of Basin Plans for drainage basins within California. The Basin Plans are implemented through the NPDES program.

The project applicant must submit a Notice of Intent (NOI) to the State Water Resources Control Board (SWRCB) to be covered by the General Construction Activity Storm Water Permit prior to initiating construction. The General Permit requires the implementation of a Storm Water Pollution Prevention Plan (SWPPP), which must be prepared before construction begins. The SWPPP will include:

- Specifications for best management practices (BMPs) that will be implemented during project construction to minimize the potential for accidental releases or contamination, and to minimize runoff from the construction areas, including storage and maintenance areas and building materials laydown areas. Best Management Practices pertain to, but are not limited to, dry crossings of streams; seeding or revegetation of disturbed areas according to an established revegetation and landscaping plan; using water bars, diversion channels, and terraces to control erosion on steep terrain; maintaining construction sites in sanitary condition; disposal of wastes at appropriate locations; and control of stream sediments with straw bales, fabric filters, or other appropriate techniques.

- A description of a plan for communicating appropriate work practices to field workers.
- A plan for monitoring, inspecting, and reporting any release of hazardous materials.

During construction, the relevant RWQCB will oversee and inspect the project for the SWRCB.

#### **C.6.1.3.2 County Requirements**

##### **Alameda County**

The majority of the Proposed Project is located within Alameda County. Surface water and groundwater quality and use in Alameda County are under the jurisdiction of the Alameda County Flood Control and Water Conservation District, Zone 7 (Zone 7) and the San Francisco Bay RWQCB. Zone 7 monitors water quality at a network of stream stations and supply wells and manages flood protection in the Cities of Livermore, Dublin, and Pleasanton and in the surrounding unincorporated areas.

Zone 7 administers the Alameda County Watercourse Protection Ordinance, which was enacted in 1982 to restrict discharge of polluted materials into watercourses and to restrict encroachment of new development into the watercourse area. It prohibits discharges into the watercourses and establishes a 20-foot minimum setback from the top of the bank to contain flow from a 100-year storm event and to avoid impacts of new developments on waterways.

The County's Storm Water Management Plan addresses most surface water quality issues by requiring strict measures to control erosion and sedimentation and non-point source pollution from urban runoff. New development may be required to construct permanent retention basins and infiltration trenches. The retention basins, if required, must be designed such that they are safe, do not pose a threat to groundwater quality, and do not create nuisance issues (for example, increased mosquito habitat) (Alameda County, East County Area Plan, 1993). An erosion control and sediment transport control plan may be required by the county for the project.

Zone 7 does not monitor surface water or groundwater east of the Altamont Hills because the water is not presently an important supply source. This portion of the project area will be included in the Storm Water Pollution Prevention Plan (SWPPP) for the entire project under the authority of the Central Valley RWQCB.

##### **Contra Costa County**

The proposed Dublin Substation is in Contra Costa County. Water quality and flood control issues in this area are under the jurisdiction of the San Francisco Bay RWQCB and the Contra Costa County Flood Control District (CCCFCD). Drainage and flood plain permits are required by the CCCFCD before construction of certain facilities can begin. The plans are required to contain measures that keep peak 200-year storm flows at pre-development levels. The CCCFCD identifies flood control improvements required of new development and applies fees to make such improvements based on the amount of new impervious surface created.

## **C.6.2 ENVIRONMENTAL IMPACT ANALYSIS AND APPLICANT PROPOSED MEASURES**

### **C.6.2.1 Introduction**

The following sections (C.6.2 through 6.6.8) identify and assess the significance of surface water and groundwater hydrology and water quality impacts for the Proposed Project and Alternatives. This analysis begins with a discussion of significance criteria used for determining the severity of impacts (section C.6.2.2) and then reviews the Mitigation Measures proposed by the Applicant to reduce the significance of impacts identified by the Applicant (section C.6.2.3). Following this, a more detailed impact analysis is presented for each of the geographic areas of the entire project region including: Pleasanton Area (section C.6.3); Dublin Area (section C.6.4); North Livermore Area (section C.6.5); and the Tesla Connection-Phase 2 (section C.6.6). For each of these geographic areas, the Proposed Project is briefly described, hydrologic impacts are identified, and Mitigation Measures are offered, followed by the same for the Alternatives. The Mitigation Monitoring Program for hydrologic impacts is summarized in Table C.6-1, at the end of this section.

### **C.6.2.2 Definition and Use of Significance Criteria**

Appendix G of the CEQA Guidelines generally defines impacts to surface water and groundwater quantity and quality as being significant if they were to:

- Permanently decrease the capacity of drainages or alter drainage patterns
- Cause a detrimental increase in site erosion or downstream siltation
- Increase the potential for substantial flood damage
- Expose people or structures to flooding in the event of a dam failure
- Result in a substantial degradation of surface or groundwater quality to the extent that beneficial uses are impacted or water quality criteria are exceeded
- Substantially decrease the available groundwater supply or affect groundwater recharge

More specifically, the CEQA checklist asks if the Proposed Project would:

- Violate any water quality standards or waste discharge requirements?
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted?)
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or offsite?
- 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?
- Otherwise substantially degrade water quality?

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows?
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

The following significance criteria have been additionally recommended in response to the specific nature of the Proposed Project. These significance criteria are derived from the CEQA checklist and are based on experience from previous transmission line projects and studies in California. The impacts to the quantity and quality of surface and groundwater would be considered significant if:

- Tower structures or substations constructed in conjunction with the transmission line would be subjected to a substantial risk of damage through flooding or erosion, which is defined as an increase of 1 foot per second in 100-year flow velocity.
- Lateral erosion, stream-bed scour, or long-term channel degradation would result in short- or long-term exposure of the structure or substation foundations to air or flowing water.
- Flooding or scour would result in significant damage to access roads/bridges or to other structures related to the Proposed Project. Significant damage to these structures could place the transmission line at risk of failure, and is defined by lateral erosion which outflanks the structure, vertical scour which extends deeper than the structure piers or abutments, and overtopping of the structure.
- Construction activities would violate State or federal water quality standards or objectives, or would result in the discharge of contaminants (such as gasoline or diesel fuel) into the surface flow of a stream.
- Construction would divert or reduce subsurface flow to wetland areas, springs, or aquifers.
- The Proposed Project or alternatives would result in a long-term substantial increase in the sediment load of a stream (e.g., post-project construction).
- Construction would result in a short-term, direct discharge of sediment into a flowing stream in excess of the minimum necessary to divert flows around the construction site.

When evaluating the potential project impacts, it was assumed that PG&E Co. would comply with all applicable federal, state, and local regulatory requirements that protect surface water and groundwater. For example, poles will not be placed within the waterway protection corridors that are defined by city and county codes, and therefore will not impact these waterways. In accordance with the Clean Water Act, PG&E Co. will prepare and implement a SWPPP that will include BMPs to minimize construction impacts on surface water and groundwater quality. The SWPPP will be prepared once the project is approved and after project facilities are sited and designed. The SWPPP will then be approved by Alameda and Contra Costa Counties.

### C.6.2.3 Applicant Proposed Measures

The following measures were described by the Applicant in the PEA (November 1999). The numbering convention used below is that of the PEA and should not be confused with mitigation measures recommended in Sections C.6.3-C.6.7.

**Measure 8.1.** An erosion control and sediment transport control plan will be submitted to Alameda County and Contra Costa County along with grading permit applications. This plan will be prepared in accordance with the standards provided in the Manual of Erosion and Sedimentation Control Measures (ABAG, 1981) and in compliance with practices recommended by the Natural Resources Conservation Service. Implementation of the plan will help stabilize graded areas and waterways, and reduce erosion and sedimentation. The plan will designate BMPs that will be adhered to during construction activities. Erosion minimizing efforts such as hay bales, water bars, covers, sediment fences, sensitive area access restrictions (for example, flagging), vehicle mats in wet areas, and retention/settlement ponds will be installed before extensive clearing and grading begins. Mulching, seeding, or other suitable stabilization measures will be used to protect exposed areas during construction activities. Revegetation plans, the design and location of retention ponds, and grading plans will be submitted to the CDFG for review in the event of construction near waterways.

The plan will incorporate stipulations of the Alameda County grading erosion and sediment control ordinance, which requires that “trenching and grading associated with the construction and installation of underground pipelines be backfilled and the surface restored to its original condition, including reseeded or otherwise restoring vegetation on all disturbed slopes exceeding 2 percent,” as soon as possible after such grading work is completed.

Non-hazardous trench spoils from the underground transmission line will be stockpiled and used to backfill the trench. Open portions of the trench will be covered when not under active construction. Standard erosion and dust control practices will be used during construction according to Best Management Practices to protect biological and hydrological resources.

**Measure 8.2.** An environmental training program will be established to communicate environmental concerns and appropriate work practices, including spill prevention and response measures, to all field personnel. A monitoring program will be implemented to ensure that the plans are followed throughout the period of construction.

**Measure 8.3.** PG&E Co. will prepare a Hazardous Substance Control and Emergency Response Plan which will include preparations for quick and safe cleanup of accidental spills. This plan will be submitted with the grading permit application. It will prescribe hazardous materials handling procedures for reducing the potential for a spill during construction, and will include an emergency response program to ensure quick and safe cleanup of accidental spills. The plan will identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted.

**Measure 8.4.** Oil-absorbent material, tarps, and storage drums will be used to contain and control any minor releases of transformer oil. In the event that excess water and liquid concrete escapes from pole foundations during pouring, it will be directed to bermed areas adjacent to the borings where the water will infiltrate or evaporate and the concrete will remain and begin to set. Once the excess concrete has been allowed to set up (but before it is dry), it will be removed and transported to an approved landfill for disposal.

**Measure 8.5.** Soil sampling and potholing will be conducted before construction begins, and soil information will be provided to construction crews to inform them about soil conditions and potential hazards. If hazardous materials are encountered in trench soils, work will be stopped until the material is properly characterized and appropriate measures are taken to protect human health and the environment. If excavation of hazardous materials is required, they will be handled, transported, and disposed of in accordance with federal, state, and local regulations.

Prior to initiating excavation activities at pole locations near the Altamont Landfill, soil borings will be advanced to ensure that groundwater will not be contacted. If groundwater is encountered within the depths of the proposed foundations, samples will be collected and submitted for laboratory analysis of metals and halogenated volatile organic compounds. If necessary, groundwater will be collected during construction, stored in Baker tanks, and disposed of in accordance with state and local regulations. Appropriate personal protective equipment will be used and soils management will be performed in accordance with state and county regulations.

**Measure 8.6.** If groundwater is encountered while excavating or constructing the underground transmission line, it will be checked for contaminants, and if none are found, will either be released to one of Kaiser Sand and Gravel's sediment ponds (with approval), released to the City of Pleasanton's storm water drainage system (with approval), or contained in a tank and disposed of in accordance with all applicable federal, state, and local regulations.

### **C.6.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: PLEASANTON AREA**

#### **C.6.3.1 Proposed Project**

In the Pleasanton Area, the Proposed Project consists of a 2.8 mile overhead 230 kV line, a 2.7 mile underground 230 kV line, modifications to the existing Vineyard Substation to accommodate the new transmission line, and the installation of new 21 kV distribution circuits from the Vineyard substation. The location of these proposed modifications are seen in Figure B-13 (Pleasanton Area Map) and described more thoroughly in Section B, Project Description and Alternatives.

##### ***C.6.3.1.1 Construction of Overhead Transmission Line, Underground Transmission Line and Substation Upgrade***

###### ***Overhead Transmission Line***

Installing 2.8 miles of new overhead transmission line between the existing Tesla-Newark corridor and the Proposed Transition Structure will require the construction of approximately 14 lattice towers

between mileposts M-0.0 and M-2.8 (Applicant's Topographic Map Atlas, December 1999). Construction of the overhead line will follow a 4-stage process which includes: site access preparation; installing supporting structure foundations; erecting support structures; and conductor stringing. These steps are described in the PEA, pages 2-42 to 2-44. In addition, 0.8 miles of new all weather (gravel) road is required in the area to the north and south of milepost M-2.0 (Figure B-11). This new road will include approximately 4-6 culverts to drain ephemeral streams that the new road will cross (field visit with Applicant Representative, July 28, 2000).

**Impact 6-1:** Increased runoff from tower construction and road building activities (**Class III**).

Surface soil compaction and the reduction of available pore water space will occur as a result of scraping, grading, and other mechanized and vehicular traffic activities. This work will also remove the protective cover of vegetation, which acts as an important rainfall interceptor during storm events. The net result of increased compaction and reduced vegetation is a reduced infiltration capacity which will generate greater surface runoff during precipitation events. This impact will be strongest at new road locations, pole locations, material lay-down areas, and at pull and tension sites where construction activities are most intense. Construction and traffic activities occurring when the ground is wet or saturated will also increase the runoff potential.

The potential net increase in runoff due to increased impervious surfaces associated with new tower footings and the gravel road along the transmission line route is not considered significant because of the relatively small area impacted (**Class III**).

**Impact 6-2:** Increased stream channel erosion, sediment transport, and alteration of the existing drainage pattern due to road building activities (**Class II**).

Approximately between mileposts M-1.8 and M-2.6, a gravel access road will be constructed along the base of the east-facing hillslope. This road will run in a north-south orientation, generally parallel to the main valley stream channel (Applicant's Topographic Map Atlas, 1999). It is understood from field visits that the constructed roadway will be situated west of the channel and outside the immediate floodplain area of the creek. However, this proposed access road would cross 4-6 ephemeral tributaries that drain eastward down the hillslope. Apparently, corrugated metal pipe culverts will be used to convey flow beneath the proposed access road. Potential impacts of road construction and culvert emplacement include concentrating flow which could increase stream erosion and sediment transport through channel incision. The overall increase in runoff due to the increased impervious surfaces of the roadway is not that significant, as described for Impact 6-1. However, the impact to runoff becomes significant when this flow is concentrated to a few locations.

Field observations at this location (July 28, 2000) revealed that the valley trunk stream and steeper side valley tributaries are prone to gulleying-type incision under current land use conditions. This was particularly apparent at the downstream end of the wetland referred to as Pond B in the Applicant's Wetland Survey (DiVittorio, June 2000). At this location just downstream from Pond B, a poorly designed road crossing and culvert has caused up to 12 feet of vertical channel incision. Besides



gulleys, poorly designed crossings and culverts can negatively impact the existing drainage pattern through flow blockage or the redirection of tributary flow, also known as channel capture.

These potential impacts of concentrated flow and increased erosion associated with road crossings of ephemeral streams are considered significant but mitigable through the application of Mitigation Measure H-1 and H-2.

**H-1** Culverts designed to convey flow through this road shall be designed for the specific hydrologic and hydraulic conditions occurring at the site. Culvert design should follow standard practices (Caltrans Highway Design Manual, 1999) and should also include energy dissipation practices (Federal Highway Administration, 1983) and other best management practices. It is important that flow velocities are maintained below levels which are capable of causing channel erosion downstream or headward channel incision upstream.

**Impact 6-3:** Potential for tower construction and road building activities to accelerate hillslope erosion, increase sediment loading to local channels, and reduce surface water quality (**Class II**).

During construction of the 230kV transmission line, adverse surface water quality impacts due to sediment loading of excavated spoils could occur in creeks and wetlands adjacent to the construction area or immediately downstream. Tower construction activities that include scraping, excavating, grading, backfilling, excess soil disposal, and topsoil handling and replacement are likely to generate sediment. In particular, excavation activities needed to prepare the concrete foundations for the towers will bring soil, sediment, rock, and perhaps water, to the surface. The potential for excavated spoils to enter the surface water drainage network is greatest near creek crossings and wetlands. Note that besides the several ephemeral streams in the grassy hillslope terrain between mileposts M-0.0 and M-2.8, there is at least one small pond (Pond B: Applicant's Wetland Survey, DiVittorio, June 2000) with open water and freshwater marsh habitat that could be impacted by sediment loading in the area.

The potential for construction-related sediment and excavated spoils to enter the surface water drainage network represents a significant water quality impact. Additionally, this impact can have an accumulative effect of reducing the flood-carrying capacity of downstream channels.

Several State and county permitting requirements should reduce this sediment loading impact to a non-significant level (**Class II**). Many of these permitting conditions were specified in the Proponent's Environmental Assessment (PEA). Specific erosion control practices were described in the Proponent's Measure 8.1.

Construction-induced sediment and excavated spoils shall be managed in accordance with the requirements of the State Water Resources Control Board General NPDES Permit for storm water runoff associated with construction activities ("general permit"). The State's general permit outlines requirements for filing a Notice of Intent prior to construction, and for developing a SWPPP that outlines "best management practices" to control discharges from the construction area.

In compliance with the NPDES Permit, an Erosion Control Plan (ECP) shall be developed to complement the SWPPP and prevent the runoff of construction-related and excavated materials into the drainage system. The ECP will be submitted to Alameda County (and Contra Costa County where needed) along with grading permit applications. Implementation of the Erosion Control Plan will help stabilize graded areas and waterways, and reduce erosion and sedimentation.

The Proponent's Measure 8.1 describes that the ECP will also incorporate stipulations of the Alameda County grading erosion and sediment control ordinance, which requires that "trenching and grading associated with the construction and installation of underground pipelines be backfilled and the surface restored to its original condition, including reseeding or otherwise restoring vegetation on all disturbed slopes exceeding 2 percent," as soon as possible after such grading work is completed. This plan will be prepared in accordance with the standards provided in the Manual of Erosion and Sedimentation Control Measures (ABAG, 1981) and in compliance with practices recommended by the Natural Resources Conservation Service. The ECP will designate BMPs that will be adhered to during construction activities. Erosion minimizing efforts such as hay bales, water bars, covers, sediment fences, sensitive area access restrictions (for example, flagging), vehicle mats in wet areas, and retention/settlement ponds will be installed before extensive clearing and grading begins. Mulching, seeding, or other suitable stabilization measures will be used to protect exposed areas during construction activities. Revegetation plans, the design and location of retention ponds, and grading plans will be submitted to the CDFG for review in the event of construction near waterways.

Mitigation Measure H-2 offers additional requirements to reduce erosion and sediment transport impacts to non significant levels.

- H-2** Excavated or disturbed soil shall be temporarily collected and placed in a controlled area surrounded by siltation fencing, hay bales, or a similarly effective erosion control technique that prevents the transport of sediment
- The Storm Water Pollution Prevention Plan (SWPPP) shall be designed specifically for the hydrologic setting of the Proposed Project, which includes upland slopes, tributary creeks, and larger streams.
  - The staging of construction materials, equipment, and excavation spoils will be performed at least 100 feet outside of drainage channels or tributaries
  - Where tower or substation construction activities occur near a creek or channel, sediment containment methods shall be performed at least 100 feet from the channel
  - Upon completion of construction activities, excavated soil shall be replaced and graded to match the surroundings
  - Surplus soil shall be transported from the site and disposed of appropriately.

**Impact 6-4:** Construction-related surface water and groundwater contamination (**Class II**).

Construction of the proposed transmission lines would require the use of a variety of motorized heavy equipment, including trucks, cranes, dozers, air compressors, graders, backhoes, and drill rigs. This equipment requires job site replenishment of hazardous chemicals in the form of fuels, oils, grease, coolants, and other fluids. The accidental spill of these, or other, construction-related materials could lead to the discharge of contaminants into the drainage system. Conveyance of contaminants could take place directly at the time of the spill or until a runoff event delivered them to a water course later, or they could infiltrate into the soil and groundwater below. A chemical spill affecting a stream channel, wetland area, or groundwater reserve would be a significant impact. However, various permitting conditions, Applicant proposed measures and mitigation measures would reduce the impact of spilled and transported contaminants to a less than significant level (**Class II**).

In addition to permitting conditions specified above in reference to Impact 6-3, the Applicant will develop Best Management Practices (BMPs) as part of the requirements for a National Pollutant Discharge Elimination System (NPDES) permit by the State Water Resources Control Board. BMPs shall be approved by the CPUC, Regional Water Quality Control Board, and affected public agencies prior to permit issuance. They will be modified as necessary during construction to minimize the possibility of contaminated discharge into surface waters. Any spill occurring during construction activities shall be contained and immediately cleaned up.

The Applicant's Measure 8.2 requires that an environmental training program will be established to communicate environmental concerns and appropriate work practices, including spill prevention and response measures, to all field personnel. A monitoring program will be implemented to ensure that the plans are followed throughout the period of construction. Mitigation Measure H-3 specifies further that:

**H-3** The training program prescribed in Applicant Proposed Measure 8.2 shall not only describe general environmental concerns and procedures, but shall emphasize site-specific physical conditions to improve hazard prevention. For example, all flow paths to the nearest water bodies should be identified to workers and where hazardous materials may specifically impact the site shall be identified.

Additionally, Applicant Measure 8.4 described that in the event that excess water and liquid concrete escapes from pole foundations during pouring, it will be directed to bermed areas adjacent to the borings where the water will infiltrate or evaporate and the concrete will remain and begin to set. Once the excess concrete has been allowed to set up (but before it is dry), it will be removed and transported to an approved landfill for disposal.

The Applicant's Measure 8.3 requires the preparation of a Hazardous Substance Control and Emergency Response Plan (HSCERP) that will include preparations for quick and safe cleanup in the event of accidental spills.

These construction practices, training programs, and hazardous substance control plans should prevent contaminated water from exiting the construction site and entering into the drainage or groundwater system. Mitigation Measure H-4 is offered as an additional preventive measure to reduce the potential for a contamination impact.

**H-4** All refueling, lubrication, and other machinery or vehicular maintenance activities shall be performed at least 100 feet from any tributary or stream channel.

**Impact 6-5:** Tower construction impacts to groundwater hydrology (**Class III**).

The foundation of each lattice tower will require digging four holes that will be filled with steel and concrete. Each hole is about 4 feet in diameter and about 11-15 feet deep. Depth to groundwater in the ridge and hillslope terrain of the Proposed Project between mileposts M-0.0 and M-2.8 is considered to be far deeper than the base of the tower foundations. Therefore, there is no appreciable impact to groundwater hydrology in such areas. Where tower locations are not on the ridges but are lower in alluvial valleys, groundwater is likely shallower.

Since the footprint of each foundation is quite small relative to the size of the groundwater body, impacts to groundwater hydrology are not considered to be significant (**Class III**). Although not expected in this area, if digging of the tower foundation holes reaches groundwater, the PG&E Co. construction team may be required to pump groundwater to dewater the excavation. If this occurs, pumped groundwater would be disposed of according to the SWPPP. Although minor, short-term localized changes (e.g. drawdown) in groundwater flow could occur as a result of dewatering during drilled pier construction, impacts would be temporary and less than significant (**Class III**).

**Impact 6-6:** Tower foundations and impacts to groundwater quality (**Class II**).

Groundwater quality in the project area could be significantly impacted if borings and tower foundations penetrated areas with pre-existing poor soil or water quality. Construction activities could thereby create a cross-contamination between polluted layers and other (deeper or shallower) non-polluted groundwater zones. The information gathered from hazardous material databases for the Applicant's PEA did not identify any known contaminated sites adjacent to or within close proximity of the proposed transmission line route in the Pleasanton area. Therefore, the potential impact of groundwater cross-contamination (due to pre-existing contamination) in the Pleasanton Area is not likely.

However, groundwater quality could be significantly impacted if surface contaminants, either from soil or construction-related materials, were to invade excavations that had bored into shallow groundwater bodies. This is quite similar to Impact 6-4 described above, but occurs in the tower footings rather than at the surface. State and county permitting requirements, the Applicant's proposed measures, and the application of Mitigation Measures H-2, H-3, and H-4 would reduce potential impacts to a less than significant level (**Class II**).

### ***Underground Transmission Line***

The Proposed Project includes 2.7 miles of underground 230kV double-circuit transmission line between milepost 2.8 and the Vineyard Substation. As explained in the Project Description (Section B), a trench approximately 3 feet wide and 6-8 feet deep will be dug to contain the concrete duct bank. The duct bank is a 7.1 square feet arrangement containing nine 6-inch PVC conduits which will hold the cables. Sampling will be conducted prior to trenching to inform the construction team about soil conditions and utility locations. Once the duct bank is in place the trench will be backfilled, compacted, and capped with either a rock mix or concrete. Cables will then be pulled through the ducts and spliced at joining locations. Construction techniques for the underground transmission lines are described in detail in Section B.3.

**Impact 6-7:** Construction of underground transmission line and impacts to surface water hydrology and quality (**Class II**).

The cross-sectional area of duct excavation (21 square feet) multiplied by the length of the underground path (2.7 miles) suggests that roughly 300,000 ft<sup>3</sup> of earth will be excavated in digging the underground trench. Although spoils will be removed by truck to an adequate disposal site prior to backfilling the trench with selected imported material, there is a potential opportunity for a portion of this abundant amount of earth material to be transported as sediment into the local drainage system.

To reduce these potential impacts, the Applicant specifies construction practices whereby trenching spoils shall be removed to an off-site location, and/or temporarily collected and placed in a controlled area surrounded by siltation fencing, hay bales, or a similarly effective erosion control technique that prevents the transport of sediment. Upon completion of trenching activities, excavated soil would be replaced and graded to match the surroundings. Surplus soil would be transported from the site and disposed of appropriately. The Applicant's Measure 8.1 further requires that open portions of the trench will be covered when not under active construction. Standard erosion and dust control practices will be used during construction according to Best Management Practices to protect biological and hydrological resources. The application of these construction and mitigation measures, as well as Mitigation Measure H-5 shall reduce this impact to a less than significant level (**Class II**).

**H-5** The staging of underground trench related construction materials, equipment, and excavation spoils will occur at least 100 feet outside of tributaries, creeks, or drainage channels.

Construction-related water contamination impacts due to potential fuel spills, machinery operation, and trenching could have a significant impact but are avoidable through BMP's required through the permitting process, the Applicant's proposed measures, and Mitigation Measures H-2, H-3, H-4, and H-5. Additionally, the construction of 0.4 miles of new roadway above the underground segment between the transition structure and the existing road near the water tank above Benedict Court creates impacts similar to Impacts 6-1, 6-2, 6-3, and 6-4 described above, that would be reduced to a less than significant level through the application of Mitigation Measures H-1, H-2, H-3, and H-4 in addition to the Applicant's Proposed Measures.

**Impact 6-8:** Construction of underground transmission line and impacts to groundwater hydrology (Class II).

Impacts to groundwater hydrology associated with the underground transmission line are potentially significant in areas with a shallow groundwater depth. Several other factors could also influence the potential for groundwater contact during construction, including: the volume of spilled fluid released, antecedent soil moisture conditions, soil infiltration rates, and standing time of spilled fluids on the surface. Shallow groundwater depths are not expected for the upland areas along most of the Proposed Underground Route, but nearer to the Arroyo Valle crossing, shallower groundwater depths may be experienced depending upon runoff/recharge conditions and water surface elevations in the creek. Increased compaction of soils above and below the duct bank, as well as the increased impermeability of the duct bank itself can potentially form a barrier to shallow groundwater flow. The significance of flow blockage is related to the depth and direction of groundwater flow.

Mitigation Measure 8.5 proposed by the Applicant calls for soil sampling and the identification of hazardous soil materials. This measure also requires that groundwater levels shall be evaluated near the Altamont Landfill site. However, for the rest of the project area outside of the Altamont Landfill area, the acquiring of information regarding the depth and location of groundwater is not specified. Mitigation Measure H-6 is offered, in addition to the Applicant's Proposed Measure 8.5, to reduce this groundwater hydrology impact to a less than significant level (Class II).

**H-6** Groundwater levels along the underground transmission line route shall be tested by drilling pilot borings. The location, distribution, or frequency of such tests shall be determined to give adequate representation of the conditions along the underground line. For example, along the route south of Arroyo Valle, tests could be conducted at four locations at 500-foot intervals. North of Arroyo Valle, one test could occur between the creek and the Vineyard Substation. In the other project areas (Dublin, North Livermore) suitable testing locations may also be determined (for example at 1,000 or 1,500 ft intervals). Locations where groundwater depth is less than 8 ft deep shall be identified prior to trenching activities and avoided, where possible, for the underground route. Avoidance is especially recommended where shallow groundwater flow direction is not parallel to the orientation of the underground line. Where avoidance is not possible, PG&E Co. shall consider construction in a shallower trench, depending upon structural requirements of the underground method and other practical concerns. PG&E Co. shall document results of test drilling in a letter report to the CPUC at least 30 days before construction starts and shall propose specific means to minimize the impact on groundwater if shallow groundwater is found. These measures must be approved by the CPUC prior to the start of construction of the underground segment.

**Impact 6-9:** Construction of underground transmission line and impacts to groundwater quality (Class II).

Potential construction impacts to groundwater quality could occur if during construction activities contaminants like fuels, coolant, or oil were to contact and penetrate into groundwater reservoirs. Conversely, a significant hazard exists if pre-existing contaminated groundwater is exposed and contacted during the construction process. The exposure of contaminated groundwater or soil to

humans or the ground surface is a significant potential hazard. Additionally, contamination could be spread to other areas through cross penetration of contaminated groundwater or soil layers or by the movement and transport of contaminated trenching spoils at the surface. This impact is similar to Impact 6-6, which addressed water quality issues due to the construction of tower foundations.

Implementation of Mitigation Measures H-2, H-3, H-4, and H-5, in addition to the Applicant's Proposed Measures, would prevent the likelihood of groundwater contamination and reduce this impact to a less than significant level (**Class II**). Particularly relevant to Impact 6-9 is Measure 8.6 proposed by the Applicant. This measure offers an evaluation and disposal plan to follow if groundwater is contacted during the underground trenching process.

**Impact 6-10:** Impact to streambed due to horizontal dry boring of Arroyo Valle (**Class II**).

As described in the PEA (November, 1999), two steel casings (30-42 inch diameters) would be installed horizontally 5 feet beneath the creek bed. After the casings are in place, the conduit bundles with the transmission lines would be pulled through beneath the creek. Excavated spoils from the boring would be removed by truck and potential sediment loading and contamination impacts would be mitigated through Applicant Proposed Measures and Mitigation Measures H-2, H-3, H-4, H-5, and H-6 as described above.

Potential impact of the creek crossing relates to the longer-term behavior of Arroyo Valle. Potential scour of the stream bed could expose the buried steel casings. Several other streams of the Livermore Valley, like Arroyo Las Positas, are incised across the valley floor. Therefore, there is concern that a similar condition could occur at Arroyo Valle due to hydrologic responses to changes in land use or other unforeseen geomorphic responses. The Applicant addressed this issue in the *Responses to Second Completeness Review of March 16, 2000*, suggesting that the geomorphic behavior of Arroyo Valle is fundamentally different from some of the other regional streams because its flow is governed by managed releases from the Del Valle Reservoir. Additionally, the Applicant suggested that this reach of Arroyo Valle, where the transmission line will cross the creek, is historically more depositional than erosional. Although these statements are sound, it is still uncertain how the creek will change its form in the coming decades considering the extensive development in the region. For example, future development in source areas not governed by the Del Valle Reservoir may contribute more erosive storm flows with higher peak discharges. Since the potential for scour in the stream does exist, yet its occurrence is not expected, Mitigation Measure H-7 is offered as a prudent measure to ensure Impact 6-10 is less than significant (**Class II**).

**H-7** A cross-sectional channel survey will be conducted across the bed of Arroyo Valle, above the placement of the underground line, prior to and following the dry boring process. Subsequently, the Applicant shall repeat this cross-sectional survey once every five years, or following a 30-year discharge event on the stream (whichever occurs first), and report the results of this monitoring effort to the Zone 7 Water District. If streambed erosion occurs such that the steel casings are emergent, the Corps and Zone 7 shall be notified immediately.

***Vineyard Substation Upgrade***

New concrete footings and slabs will be added to the Vineyard Substation to accommodate new transformer banks, circuit switches, and cable termination stations. These modifications will occur within the existing footprint of the substation.

**Impact 6-11:** Vineyard Substation Upgrade construction-related erosion and sediment transport impacts (**Class III**).

Potential construction-related erosion and sediment transport impacts at the Vineyard Substation site are considered non-significant due to the limited scale of construction. The Applicant's Measure 8.1, as well as, the application of Mitigation Measures H-2 and H-3 as described above shall reduce the severity of erosional impacts.

**Impact 6-12:** Vineyard Substation Upgrade construction and surface water quality and groundwater quality impacts (**Class II**).

Potential construction-related impacts to surface water and groundwater quality at the Vineyard Substation site are mostly related to contamination through the spill of fuels and other fluids. This impact is very similar to Impact 6-4 described for the construction of the overhead transmission lines. However, in comparison to the transmission towers, potential impacts are greater at the substation site due to the immediate proximity of Arroyo Valle and the likelihood of shallower groundwater depths at the station's floodplain location. Potential construction impacts to surface water and groundwater quality would be reduced to a less than significant level (**Class II**) through the application of Mitigation Measures H-2, H-3, H-4, and H-6 as described above, as well as the Applicant's Measures 8.1 and 8.2.

***C.6.3.1.2 Operation and Maintenance of Overhead Transmission Line, Underground Transmission Line and Substation Upgrade***

**Impact 6-13:** Operational impacts to surface and groundwater hydrology at tower, underground line, and Vineyard Substation locations (**Class III**).

At each tower site, a concrete foundation approximately 4 feet in diameter and up to 15 feet deep will be constructed. Placement of this impervious material restricts storm water infiltration. However, this impact is considered less than significant (**Class III**) because the total area impacted by pole foundations is small. This issue was also addressed in Impact 6-1.

Between Mileposts M-5.1 and M-5.3, the underground transmission line is located in a dam inundation zone. However, the project does not include development of any towers or inhabited structures in this zone and would not increase exposure of people or structures to flooding. Likewise, increases to flood elevations due to the operation of the underground line or substation modifications are not expected, nor is potential flooding (100-year) expected to harm or damage the substation because this structure is outside of the mapped flood zone. Potential channel scour that would expose the underground line through Arroyo Valle would be monitored through Mitigation Measure H-7. In terms of groundwater, although the duct bank of the underground line may impede some shallow subsurface flows, no



significant impacts to wetlands or other aquatic habitat are expected because of the alignment and location of the route (**Class III**).

Since the modifications to the Vineyard Substation will occur within the existing footprint of the substation, no significant operational impacts to hydrology are expected (**Class III**).

**Impact 6-14:** Operational impacts to surface and groundwater quality at substation (**Class II**).

Future operation of the new equipment in the modified areas of the Vineyard Substation (and the other proposed substations) could result in the release of fuels and oil thereby creating a significant surface water quality impact. In particular, the release of mineral oil from oil-filled electrical equipment, either from slow leaks or catastrophic failure, could wash into the nearby Arroyo Valle or infiltrate into the water table.

The Federal Clean Water Act and the State Porter-Cologne Water Quality Control Act prohibit the release of any oil to waters of the state. The use of oil-absorbent material, tarps, and storage drums will be used to contain and control any minor releases of transformer oil to the site. Larger spills shall be controlled through the implementation of a Spill Prevention Containment and Countermeasure (SPCC) pond as noted in the description of Applicant's Impact 8.6 (PEA) and further specified in Mitigation Measure H-8 below. Existing SPCC plans for the Vineyard Substation will be revised to include the new equipment and the expanded area of the substation. Incorporation of SPCC measures into the project design will reduce impacts to a less than significant level (**Class II**).

**H-8** A spill prevention containment and countermeasure (SPCC) pond will be designed to collect all runoff from the substation (Vineyard, Dublin, San Ramon, North Livermore, Hartman Rd., or Tesla), including the proposed modifications. Surface drains and subsurface piping will convey runoff to the lined on-site SPCC pond. Water held in the SPCC pond shall be tested for contaminant levels prior to its release. Released water from the SPCC pond should pass through an oil/water separator. If contaminated water is allowed to evaporate on-site in the pond, then the pond lining shall be inspected and cleaned according to standard procedure prior to subsequent runoff events. SPCC ponds shall be designed specifically for site runoff conditions and how discharge enters receiving creeks or drainage channels.

### **C.6.3.2 Alternative S1: Vineyard-Isabel-Stanley**

Regarding hydrologic impacts, the key distinction between the Proposed Route and the S1 Alternative is the nature of the terrain over which the two routes cross. The Proposed Route passes over rugged hillslopes and canyons between the Vallecitos Research Center to the south and the Kottinger Ranch neighborhood in Pleasanton to the north. In contrast, the S1 Alternative avoids these hills and valleys by tapping into Tesla-Newark line further to the northeast and then arriving to the Vineyard Substation from the east, following an existing transportation/utility corridor. The S1 Route is primarily located in the flatter valley floor terrain of the Livermore Valley and this has several advantages and disadvantages in terms of hydrologic impacts.

Impacts 6-1 through 6-10 are briefly described below for the S1 Route. Impacts 6-11 through 6-14, regarding modifications to the Vineyard Substation and operational impacts, are identical for both the Proposed and S1 Routes and are not repeated.

**Impact 6-1:** Increased runoff from tower construction and road building activities (**Class III**).

Due to the limited area affected, this impact is not considered significant for the S1 Alternative. The magnitude of this impact is less for the S1 Alternative than the Proposed Project because no road building activities are associated with the S1 Alternative.

**Impact 6-2:** Increased stream channel erosion, sediment transport, and alteration of the existing drainage pattern due to road building activities (Not relevant).

This impact is not relevant to the S1 Alternative because no road building activities are associated with the S1 Alternative.

**Impact 6-3:** Potential for tower construction and road building activities to accelerate hillslope erosion, increase sediment loading to local channels, and reduce surface water quality (**Class II**).

The S1 Alternative requires 5.6 miles of overhead transmission line and supporting towers, although no new road building is proposed. Similar to the Proposed Route, the potential for erosion exists at each tower construction and pull-down location. Because slope declivity is a key determinant to erosion and sediment yield, construction sites on the flatter terrain of the S1 Route should cause less erosion (per tower) than construction sites in the steep terrain of the Proposed Route (all other things being equal). However, the greater length of the S1 Alternative and the increased number of towers may outweigh the issue of slope in terms of net potential erosion. The application of appropriate SWPPP and ECP plans (as described in the Applicant's Measure 8.1 and Mitigation Measure H-2) shall reduce the potential erosion and sediment transport impacts to a less than significant level. In particular, where the S1 Route approaches Arroyo Valle in the Sycamore Grove Park, the condition of Mitigation Measure H-2 which specifies that *"where tower or substation construction activities occur near a creek or channel, sediment containment methods shall be performed at least 100 feet from the channel"* is very important.

**Impact 6-4:** Construction-related surface water and groundwater contamination (**Class II**).

The potential contamination impacts described above for the Proposed Route are also relevant for the S1 Alternative. The implementation of Mitigation Measures H-2, H-3, and H-4 (in addition to the Applicant's Measures 8.2, 8.3, and 8.4) would reduce the impact of spilled and transported contaminants to a less than significant level. The condition of Mitigation Measure H-4, which states, "all refueling and lubrication activities shall be performed at least 100 feet from any tributary or stream channel" is particularly important considering the proximity of the S1 Route to the arroyo. The longer S1 route may require the use of more fuels and contaminants for construction purposes, thereby increasing the potential risk of spill. However, the S1 route saves fuel and contaminant usage in that it

does not involve road building activities and generally offers more favorable construction access (existing corridor) than the Proposed Route.

**Impact 6-5:** Tower construction impacts to groundwater hydrology (**Class III**).

Potential impacts to groundwater hydrology for the S1 Alternative are similar to those described above for the Proposed Route, although there are two additional considerations. First, the S1 Route involves more towers than the Proposed Route. More importantly, the lower valley location of the S1 Route generally involves areas with shallower groundwater depth than the Proposed Route. Therefore, the likelihood of groundwater interaction during the construction of tower footings is greater. As explained earlier, if groundwater is contacted during the digging of tower foundations, the PG&E Co. construction team may be required to pump groundwater to dewater the excavation. If this occurs, pumped water would be disposed of according to the SWPPP. Although minor, short-term localized changes (e.g. drawdown) in groundwater flow could occur as a result of dewatering during drilled pier construction, impacts would be temporary and less than significant (**Class III**).

**Impact 6-6:** Tower foundations and impacts to groundwater quality (**Class II**).

Potential impacts to groundwater quality for the S1 Route are similar to those described above for the Proposed Route. The implementation of Mitigation Measures H-2, H-3, and H-4 (in addition to the Applicant's Measures 8.2, 8.3, and 8.4) would reduce potential impacts to a less than significant level (**Class II**).

**Impact 6-7:** Underground transmission line and impacts to surface water hydrology and quality (**Class II**).

Alternative S1 includes 1.1 miles of underground line along Vineyard Avenue. The potential sediment transport and water contamination impacts for the underground portion of the S1 Route are quite similar to those described for the Proposed Route. State and county permitting requirements, the Applicant's proposed Mitigation Measures, and the implementation of Mitigation Measures H-2, H-3, and H-4 would reduce potential impacts to a less than significant level (**Class II**).

**Impacts 6-8/6-9:** Underground transmission line and impacts to groundwater hydrology and quality (**Class II**).

Similar to the Proposed Route, impacts to groundwater hydrology and quality could occur if construction-related contaminants were to contact groundwater. Mitigation Measures H-2, H-3, H-4, H-5, and H-6 (which involves groundwater depth testing) shall be performed to prevent the likelihood of groundwater contamination. In addition, the Applicant's Measure 8.6 specifies a procedure for handling encountered groundwater. Taken together, these measures would reduce this potential impact to a less than significant level (**Class II**).

**Impact 6-10:** Horizontal dry boring of Arroyo Valle (Not relevant).

This impact is not relevant to the S1 Alternative because no horizontal dry boring beneath Arroyo Valle would occur.

### **C.6.3.3 Alternative S2: Vineyard Avenue**

The first 1.1 miles of the S2 Route are aboveground and identical to the S1 Route, as are the impacts. The remaining 4.5 miles of the S2 Route are underground and mostly follow Vineyard Avenue. Towards the west, at Bernal Road, the S2 Route is identical to the Proposed Route; heading north on Bernal and then crossing beneath Arroyo Valle into the Vineyard Substation. The impacts associated with dry-boring Arroyo Valle for the S2 Route are the same as described above for the Proposed Route. The primary difference between the S2 Route and the Proposed Route is the length and location of the underground component.

In terms of surface water impacts, the potential increase of sediment transport due to trench spoils (Impact 6-7) is possible along the entire underground length of the S2 Route. The Applicant's described construction practices and Measure 8.1 in addition to Mitigation Measure H-5 would manage this impact and prevent it from becoming significant. The potential surface water contamination impacts described for the Proposed Route are also relevant for the S2 Alternative. The implementation of Mitigation Measures H-2, H-3, and H-4 (in addition to the Applicant's Mitigation Measures 8.2, 8.3, and 8.4) would reduce the impact of spilled and transported contaminants to a less than significant level. The condition of Mitigation Measure H-4, which states, "all refueling and lubrication activities shall be performed at least 100 feet from any tributary or stream channel", is particularly important considering the proximity of the S2 Route to Arroyo Valle.

In respect to groundwater hydrology, the potential impact for the underground duct bank to block or divert groundwater flow is potentially significant considering that the location of much of the S2 Route is along the lower valley lands adjacent to Arroyo Valle. Testing for groundwater depths, as described in Mitigation Measure H-11, shall be employed along the length of the S2 Route to specify groundwater conditions prior to construction. Similar to the Proposed Route, impacts to groundwater quality could occur if construction-related contaminants were to contact groundwater. Implementation of Mitigation Measures H-3, H-4, and H-5, as well as Mitigation Measure H-11, would reduce this impact to a less than significant level (**Class II**).

### **C.6.3.4 Alternative S4: Eastern Open Space**

The S4 Alternative incorporates the first 2.2 miles of the Proposed Route and the final 2.1 miles of the S1 Route. What is new to S4 is a 1.9 mile section (1.2 mi overhead/0.7 mi underground) through the hills west of the Ruby Hill development. Essentially, this new segment links the Proposed and S1 routes. The hydrologic impacts of the S4 alternative are thus very similar to those already described for the Proposed and S1 routes. Likewise, the Mitigation Measures described to reduce the significance of impacts are also appropriate for the S4 Route. The S4 Alternative does not introduce any new type

or style of impact, although the magnitude of the impacts may vary from the Proposed and S1 routes due to location and the relative length of the routes. For example, impacts associated with road building activities (Impacts 6-2 and 6-3) required for the Proposed Route between mileposts 1.8 and 2.6 would be somewhat reduced with the S4 Route because it “taps in” to the Proposed Route at Milepost 2.2. A field visit along the S4 Route (August 23, 2000) indicated that this alternative alignment could make use of an existing trail along most of its length for construction access. Therefore, the S4 Route would eliminate the need for further road building beyond Milepost 2.2 of the Proposed Route. Some brush and trees may require removal, but permanent road construction appears not to be necessary. If a permanent road would be required to facilitate the construction of the S4 Route, the environmental review team should be notified, and additional impacts should be addressed.

#### **C.6.4 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: DUBLIN AREA**

##### **C.6.4.1 Proposed Project**

In the Dublin area, the Proposed Project consists of building a new 5-acre substation (Figure B-5) along an eastern tributary to Tassajara Creek (Figure C.6-1) and a 6.9 mile overhead 230 kV line which would connect the Proposed Dublin Substation to the existing Contra Costa-Newark transmission line to the east. The location of these proposed modifications are seen in Figure B-14 (Dublin Area Map) and described more thoroughly in Section B (Project Description and Alternatives).

Understanding the geomorphic setting for the Dublin Substation is critical to assess its potential hydrologic impacts. The site is located on a parcel of sloping rangeland that is found between steeper uplands to the north and west and a lower tributary creek immediately to the southeast. The parcel itself slopes moderately (roughly 10-15%) towards the southeast and sits as a bluff above the deeply incised (~ 20 ft) adjacent creek (reference map of Dublin Substation site).

Impacts associated with the construction and operation of the proposed North Area overhead transmission line in the Dublin Area are similar, except for location, to the impacts described for the proposed overhead transmission lines in the Pleasanton Area. Impacts for the western portion of this transmission line (Dublin Substation to Milepost B-14) are addressed herein, and conditions regarding the eastern portion of this transmission line (east of Milepost B14) will be described further in section C.6.5 (North Livermore Area). There is no underground segment proposed by PG&E Co. in the Dublin Area.

##### **C.6.4.1.1 Construction of Dublin Substation and Transmission Line**

###### ***Dublin Substation***

**Impact 6-15:** Dublin Substation construction-related erosion and sediment transport impacts (**Class II**).

The construction of the Dublin Substation will require a significant amount of grading, scraping, and concrete and pavement work to create a suitable pad and foundation for the site plan shown in Figure B-5. In addition, road building activities will occur to link the Proposed Substation to an existing county road. Such intensive earth moving work occurring in close proximity to the tributary creek

could result in accelerated sediment delivery to the creek channel, erosion in the transitional slope area between the construction site and the northern stream bank, and destabilization of the stream bank itself. The development of an appropriate Erosion Control Plan (ECP) as described in the Applicant's Measures 8.1 and Mitigation Measure H-2 would reduce the potential construction impacts to a less than significant level (**Class II**). In particular, where the substation site encroaches upon the creek, the condition of Mitigation Measure H-2, which specifies that "*where tower or substation construction activities occur near a creek or channel, sediment containment methods shall be performed at least 100 feet from the channel*" is very important.

**Impact 6-16:** Creek Crossing at Dublin Substation (**Class II**).

A creek crossing structure will be required across the un-named tributary channel to allow access to build the last tower south of the Proposed Substation (Applicant's Response to Second Completeness Review, March 16, 2000: page 32). The construction of a bridge or other type of crossing will significantly impact the creek, however the application of Mitigation Measure H-9 would reduce this impact to a less than significant level (**Class II**).

**H-9** A site-specific Erosion Control Plan shall be written in coordination with the design and construction of the creek crossing near the Proposed Dublin Substation. This plan shall outline techniques and methods to reduce immediate erosional impacts to the stream's banks and bed during the construction process. Longer term considerations about preserving creek stability and channel form shall also be considered as part of the design process for this creek crossing. The site-specific erosion control plan and the design of the crossing shall be approved by the relevant local jurisdiction (Alameda County Flood Control and Water Conservation District, Zone 7 or the Contra Costa County Flood Control District).

Additionally, the post-construction presence of a creek crossing will alter stream hydraulics and may have continuing impacts to creek flows and sediment transport. This potential impact is addressed in Impact 6-18 and Mitigation Measure H-10, involving the operation and maintenance of the Proposed Substation.

**Impact 6-17:** Dublin Substation construction-related surface water quality and groundwater quality impacts (**Class II**).

Potential construction-related impacts to surface water and groundwater quality at the Dublin Substation site are mostly related to contamination through the potential spill of fuels and other fluids. This impact is very similar to Impacts 6-4 and 6-13 described for the construction of overhead transmission lines and modifications at the Vineyard Substation. Construction impacts at the Dublin Substation site are intensified due to the immediate proximity of the adjacent tributary creek. Potential construction impacts to surface water and ground water quality would be reduced to a less than significant level through the application of Mitigation Measures H-2, H-3, and H-4 as described previously, as well as, the Applicant's Measures 8.1 and 8.2. These measures include BMPs through the NPDES permitting requirements, a Hazardous Substance Control and Emergency Response Plan (HSCERP), and an environmental training program, which should emphasize the site's proximity to a water body and the

potential impact of hazardous materials in the tributary creek. Particular attention should be given to the condition of Mitigation Measure H-4, which specifies that “*all refueling and lubrication activities shall be performed at least 100 feet from any tributary or stream channel.*” These mitigation measures would prevent contaminated water from exiting the construction site and entering into the drainage or groundwater system.

### ***Overhead Transmission Line***

Impacts to hydrology and water quality associated with construction of the proposed overhead transmission line in the Dublin Area (from the Proposed Dublin Substation east to milepost B-14) are very similar to the impacts described for transmission lines in the Pleasanton Area. Impacts 6-1, 6-2, 6-3, 6-4, 6-5, and 6-6 described previously, are also applicable to the Dublin Area. Similar to the Pleasanton Area, in the Dublin Area these impacts are also considered to be either temporary and non-significant (**Class III**) or significant but mitigable (**Class II**) through the application of Mitigation Measures H-1, H-2, H-3, and H-4.

Existing farm roads will be used for access whenever possible in the Dublin Area, but some road building activities will likely occur to gain access to specific tower locations. An existing crossing of Collier Creek will be utilized to gain access to the hill areas east of Collier Canyon. It is believed that the majority of road building activities in the Dublin Area occur near, or at, the Proposed Substation site. Impacts associated with these potential road building activities are described above for Impacts 6-1 through 6-6 and are mitigated through the implementation of Mitigation Measures H-1 through H-4, in addition to the Applicant’s measure 8.1.

#### ***C.6.4.1.2 Operation and Maintenance of Dublin Substation and Transmission Line***

##### ***Dublin Substation***

**Impact 6-18:** Increased runoff and channel erosion due to Dublin Substation (**Class I**).

Construction of the Dublin Substation results in the replacement of a grassy slope cover with a more impermeable surface which includes gravel, concrete and pavement. The existing grass land-cover is far from pristine, having been compacted and denigrated due to intensive cattle grazing. Nonetheless, the transition to a more impervious land cover will reduce storm water infiltration capacities and result in increased peak runoff rates and flow volumes in the adjacent tributary. Although locally generated runoff will pass through a storm drain pond (Figure B-5) as part of the SPCC plan, it is uncertain how much of a retention effect this pond will have on storms of a greater magnitude than the estimated annual flood. Also uncertain is the downstream effect of this expected flow increase. In other words, will the increased flows be a localized impact where flows are quickly attenuated downstream, or not? To answer these questions requires a detailed hydrologic analysis which has not yet been conducted.

The significance of this impact of increased runoff from the proposed substation site is compounded by the currently degraded condition of the adjacent tributary channel. As noted above, in the vicinity of the Proposed Dublin Substation site, the channel is incised roughly 20 ft. Similar to creek conditions throughout the Tri-Valley region, this stream incision is most likely a historic product of grazing, soil

compaction, and the reduction and conversion of grass cover. Other things being equal, higher stormflow peak rates from the Proposed Substation on the adjacent bluff would likely exacerbate the channel incision problem.

This impact of increased runoff and erosion due to the Dublin Substation is considered significant (**Class I**) until a better understanding of the Proposed Substation and its hydrologic consequences, as prescribed in Mitigation Measure H-10, is known. The outcome of Mitigation Measure H-13 may result in this increased runoff and erosion impact being considered significant but mitigable to a non-significant level (**Class II**).

**H-10** Mitigation Measure H-10 directs a more thorough hydrologic and geomorphic analysis of the Proposed Dublin Substation and creek crossing and an evaluation of the magnitude of potential increases in runoff and channel erosion in the adjacent tributary channel. Analytical methods including hydrologic, hydraulic, and sediment transport modeling which are acceptable to the Contra Costa County Flood Control District shall be utilized to assess the significance of the substation on the 5, 10, 25, and 100-year runoff events. This site-specific information should then be used to evaluate, and modify if needed, the design of the substation, the on-site storm basin, and the creek crossing. If the analysis suggests potential creek instability, concepts and methods to provide additional stream stability shall be included in the final substation and creek crossing design that shall be reviewed and approved by the Flood Control District and the CPUC (including the analysis required by this Mitigation Measure).

**Impact 6-19:** Operational impacts to surface and groundwater quality at Dublin Substation (**Class II**).

Operational impacts to surface and groundwater quality, primarily through the release of fuels and oil, associated with the Dublin Substation are identical to those described in Impact 6-14 for the modifications to the Vineyard Substation. A Spill Prevention Containment and Countermeasure (SPCC) pond, as described in Mitigation Measure H-8 and the Applicant's Impact 8.6 (illustrated in Figure B-5), shall be incorporated into the project design to reduce potential water quality impacts to a less than significant level (**Class II**).

#### ***Overhead Transmission Line***

Hydrologic impacts associated with the operation of the overhead transmission line in the Dublin Area are considered less than significant (**Class III**). The reduction of infiltration or the increase in runoff attributable to pole foundations is negligible due to the small areas involved. This is identical to the conditions described in Impact 6-13 for the Pleasanton Area.

#### **C.6.4.2 Alternative D1: South Dublin**

The South Dublin Substation would be located on a relatively flat to gentle sloping lowland between the I-580 freeway corridor to the south and upland hills to the north. Unlike the proposed Dublin Substation, the South Dublin site is not adjacent to a creek or arroyo. In contrast to the proposed Dublin Substation, a significant degree of earth moving work (beyond basic grading) would not be required at the South Dublin Substation site to prepare the site for substation construction. These two important



differences in the geomorphic settings of the proposed Dublin and South Dublin substation sites explain most of the differences in the magnitude of the hydrologic impacts between the two stations.

Construction-related impacts to erosion and sediment transport at the South Dublin Substation alternative are considered significant but mitigable (**Class II**) through the development of an Erosion Control Plan (ECP) as described in Applicant's Measure 8.1 and Mitigation Measure H-2. The gentler gradient and non-adjacency to a creek yields the logical conclusion that erosional impacts at the South Dublin Substation will be less than at the Proposed Dublin Substation.

Potential construction-related impacts to surface water quality and groundwater quality at the South Dublin Substation are similar to those described above for the Vineyard and Dublin substations (Impacts 6-4, 6-12, and 6-17), and are mostly related to water contamination through the spill of fuels and other fluids. The implementation of Mitigation Measures H-2, H-3, and H-4 (in addition to the Applicant's Measures 8.2, 8.3, and 8.4) would reduce the potential impacts to a less than significant level.

Potential erosional impacts associated with the construction of the overhead transmission line segment of the South Dublin Alternative are not very similar to Impacts 6-1, 6-2, and 6-3 previously described for the proposed Pleasanton and Dublin overhead routes. In those more rugged areas, the potential for increases in runoff, stream channel erosion, hillslope erosion, and sediment transport is more considerable due to steeper gradients, clearing and scraping practices, and the need for road building activities. These potential impacts are not as relevant to the South Dublin Alternative Route because new access roads are not needed and the terrain is relatively flat on the base of the Amador Valley.

However, Impacts 6-4, 6-5, and 6-6, which involve impacts to surface water quality, groundwater quality, and groundwater hydrology are applicable to the South Dublin Alternative and are considered significant but mitigable (**Class II**) through the use of Mitigation Measures H-2, H-3, and H-4 in addition to the Applicant's measures. Both Arroyo Las Positas and Arroyo Mocho will be crossed by the overhead line segment along the Gravel Mine access road and no site-specific impacts or mitigation measures are suggested apart from those already mentioned.

Potential impacts due to the construction of the underground segment for the South Dublin Alternative are very similar to impacts 6-7, 6-8, and 6-9 described in the Pleasanton Area. The significance of these impacts is reduced to non-significant levels (**Class II**) through the use of Mitigation Measures H-5 and H-6 (and Applicant Measures 8.1 and 8.5). Impact 6-10, which described the horizontal dry boring of Arroyo Valle, is not exactly applicable to the South Dublin Route, since no creeks will be tunneled beneath, but the construction practices used to bore beneath Arroyo Valle are nearly identical to those proposed for the boring beneath the I-580 freeway.

Operational and maintenance impacts of the South Dublin Substation are identical to those described above in Impact 6-14 for the modifications to the Vineyard Substation. A Spill Prevention Containment and Countermeasure (SPCC) pond, as described in the Applicant's Impact 8.6 (illustrated in Figure B-5), and described in Mitigation Measure H-8 above shall be incorporated into the project design to

reduce potential water quality impacts (primarily through the release of fuels and oil) to a less than significant level (**Class II**). Impact 6-18, which described how increased runoff generated from the Proposed Dublin Substation could erode, incise, and negatively impair the adjacent creek, is not relevant for the South Dublin Substation Alternative. Hydrologic impacts due to the operation and maintenance of the overhead and underground segments of the South Dublin Route are quite similar to the conditions described for Impact 6-13 in the Pleasanton Area, and are also considered non-significant (**Class III**).

#### **C.6.4.3 Alternative D2: Dublin-San Ramon**

Alternative D2 supplies the Proposed Dublin Substation with energy from the existing San Ramon Substation to the west rather than tapping into the Newark-Contra Costa Line to the east. This alternative requires roughly 1 mile of underground line and 4 miles of overhead transmission line between the San Ramon and Proposed Dublin substations, and may include the reconductoring of the San Ramon-Pittsburg line, and minor modifications within the existing San Ramon Substation.

Hydrologic impacts associated with constructing the San Ramon substation modifications are considered non-significant (**Class III**) due to their limited scale within the substation. However, the operation of the substation could potentially cause significant impacts. If substantial areas of the substation that are currently pervious become impervious then runoff generated at the substation will be greater and the existing Storm Water Pollution Prevention Plan (SWPPP) should be modified to accommodate the proposed changes. Likewise, if it is anticipated that the volume of oils, fuels, and other industrial/chemical fluids used at the San Ramon Substation will significantly increase, then the existing Spill Prevention Containment and Countermeasure (SPCC) Pond or drainage system should be modified. These operational impacts are very similar to the conditions described for Impact 6-14 and are reduced to less than significant levels through the application of Mitigation Measure H-8 (**Class II**).

Hydrologic impacts due to the underground and overhead segments of the D2 Route are very similar to Impacts 6-4, 6-5, 6-6, 6-7, and 6-8 described previously. If road building activities are required in the steeper hillslope areas between Alamo and Tassajara creeks, then Impacts 6-1, 6-2, and 6-3 (involving runoff and erosion issues) are also relevant to the D2 Route. Impacts 6-1 through 6-8 are considered significant but mitigable through the application of Mitigation Measures H-1, H-2, H-3, H-4, H-5, and H-6 (as well as the Applicant's Proposed Measures) (**Class II**).

Potential hydrologic impacts caused by reconductoring the San Ramon-Pittsburg line are construction-related and temporary in nature. Vehicles and machinery used to facilitate the "pulling" of the new transmission line could potentially cause surface erosion or surface soil compaction. BMP's as outlined in Mitigation Measures H-2, H-3, and H-4 (in addition to Applicant's Measure 8.1) would reduce this impact to a less than significant level (**Class II**).

## C.6.5 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: NORTH LIVERMORE AREA

### C.6.5.1 Proposed Project

In the North Livermore Area, the Proposed Project consists of building a new 5-acre substation (Figure B-5) roughly 60 ft west of North Livermore Avenue, just south of the intersection with May School Road (about 1 mi south of Manning Road). The site occupies a flat to gently sloping alluvial plain about 1,800 ft east of Cayetano Creek (Figure C.6-1). The site is east of the mapped jurisdictional 100-year FEMA Floodplain bordering Cayetano Creek. The second component of the Proposed Project in this area is an overhead 230 kV line which would connect the Proposed North Livermore Substation to the existing Contra Costa-Newark transmission line. The location of these proposed modifications are seen in Figure B-16 (North Livermore Area Map) and described more thoroughly in Section B, Project Description.

Several of the impacts described previously for the Proposed Dublin Substation are not as severe for the Proposed North Livermore Substation because of the site's relatively flat position several hundred feet away from the nearest stream channel. Impacts associated with the construction and operation of the proposed overhead transmission line in North Livermore Area are similar, except for location, to the impacts described for the proposed overhead transmission lines in the Pleasanton and Dublin Areas. Impacts from the portion of the transmission line east of Milepost B-14 are addressed here in section C.6.5. (Impacts due to the transmission line between the Proposed Dublin Substation and Milepost B-14 are addressed in section C.6.4.) There is no underground segment proposed in the North Livermore Area.

#### C.6.5.1.1 Construction (Substation and Transmission Line)

##### *North Livermore Substation*

**Impact 6-20:** North Livermore Substation construction-related erosion and sediment transport impacts (**Class III**).

Only minimal grading will be required during construction of the proposed substation and there are no existing stream channels or swales on (or adjacent) to the site which would be significantly impacted by potential erosion or sediment transport. Erosional impacts at the Proposed North Livermore site would be temporary and less than significant (**Class III**).

**Impact 6-21:** North Livermore Substation construction-related surface water quality and groundwater quality impacts (**Class II**).

Potential construction-related impacts to surface water and groundwater quality at the North Livermore Substation site are mostly related to contamination through the potential spill of fuels and other fluids. This impact is very similar to Impacts 6-4, 6-12, and 6-17 described previously for the construction of overhead transmission lines and the Vineyard and Dublin substations. Potential construction impacts to surface water and ground water quality would be reduced to a less than significant level (**Class II**) through the application of Mitigation Measures H-2, H-3, H-4, and H-6 as described above, as well as

the Applicant's Measures 8.1 and 8.2. These measures include BMPs through the NPDES permitting requirements, a Hazardous Substance Control and Emergency Response Plan (HSCERP), and an environmental training program. These mitigation measures would prevent contaminated water from exiting the construction site and entering into the drainage or groundwater system.

***North Livermore Area Overhead Transmission Line***

Impacts to hydrology and water quality associated with construction of the proposed overhead transmission line in the North Livermore Area are very similar to the impacts described above for transmission lines in the Pleasanton and Dublin areas. Impacts 6-1, 6-2, 6-3, 6-4, 6-5, and 6-6, are also applicable to the North Livermore Area. Similar to the Pleasanton and Dublin areas, in the North Livermore Area these impacts are also considered to be either temporary and non-significant (**Class III**) or significant but mitigable (**Class II**) through the application of Mitigation Measures H-1, H-2, H-3, and H-4 (as well as Applicant Measure 8.1). Existing farm roads will be used for access whenever possible in the North Livermore Area, but some road building activities may occur to gain access to specific tower locations. Impacts associated with road building activities are included in Impacts 6-1 through 6-6 and Mitigation Measures H-1 through H-5. Note that construction of a bridge or other type of stream crossing will not be required to allow access to build towers near the western tributary of Cayetano Creek. Existing farm roads will be used on both sides of Cayetano Creek (near Milepost B-14) and the creek should not be significantly impacted.

***C.6.5.1.2 Operation and Maintenance (Substation and Transmission Line)***

***North Livermore Substation***

**Impact 6-22:** Increased runoff due to North Livermore Substation (**Class III**).

Construction of the North Livermore Substation would result in the replacement of a grassy rangeland type land-cover with a more impermeable surface which includes gravel, concrete and pavement. The transition to a more impervious land cover will reduce storm water infiltration capacities on the site. However, because the site is relatively flat and not adjacent to a creek, increases in runoff due to these land surface changes are considered to be non-significant (**Class III**) at the North Livermore Substation site. Additionally, local substation generated runoff will pass through a storm drain pond as part of the SPCC plan (Figure B-5).

**Impact 6-23:** Operational impacts to surface and groundwater quality at North Livermore Substation (**Class II**).

Operational impacts to surface and groundwater quality, primarily through the release of fuels and oil, associated with the North Livermore Substation are identical to those described above in Impact 6-14 and 6-19 for the Dublin and Vineyard substations. A Spill Prevention Containment and Countermeasure (SPCC) pond, as described in Mitigation Measure H-8 and Applicant's Impact 8.6 (and illustrated in Figure B-5), shall be incorporated into the project design to reduce potential water quality impacts to a less than significant level (**Class II**).

***Overhead Transmission Line***

Hydrologic impacts associated with the operation of the overhead transmission line in the North Livermore Area are considered less than significant (**Class III**). The reduction of infiltration or the increase in runoff attributable to pole foundations is negligible due to the small areas involved. This is identical to the conditions described above for impacts in the Pleasanton and Dublin areas.

**C.6.5.2 North Livermore Variant P1**

The P1 Alternative is identical to the Proposed North Livermore Route, except that the 1-mile overhead segment along North Livermore Road would be replaced with an underground transmission line. Construction impacts to surface water hydrology and water quality due to the potential mobility of trenching spoils are identical to Impact 6-7 in the Pleasanton Area. The application of Mitigation Measure H-5, as well as Applicant Measure 8.1, would reduce this impact to a less than significant level (**Class II**).

Construction-related surface water contamination impacts due to potential fuel spills, machinery operation, and trenching could have a significant impact but are avoidable through Mitigation Measures H-2, H-3, and H-4 in addition to Applicant Measures 8.2, 8.3, and 8.4. The potential for such construction-related contaminants to contact groundwater is influenced by the volume of fluid released, antecedent soil moisture conditions, soil infiltration rates, standing time on the surface, time of year, and the depth to groundwater. The application of Mitigation Measure H-7 would reduce this potential impact to a less than significant level (**Class II**).

**Impact 6-24:** Groundwater hydrology impacts due to the operation of the P1 Alternative Route (**Class III**).

Operational impacts for the P1 Alternative are primarily concerned with how the duct bank of the underground line may impede shallow subsurface groundwater flows. Because the north-south orientation of the P1 Route (along North Livermore Road) is roughly parallel with the south-southeasterly trending shallow groundwater flow path in the area (Figure C.6-3), it is not anticipated that the P1 Route would significantly disrupt groundwater hydrology. Therefore, the underground P1 Route is not expected to cause any significant disruption of groundwater delivery to the Springtown Alkali Sink found to the southeast (**Class III**).

It is noted that the P1 route would cross through one of the mapped preferential flow paths (NLSP EIR Fig 10-4). This crossing is oblique and located at the southernmost edge of the P1 Route near the May School Road intersection. Although impeded, flows along this individual preferential flow path could successfully continue to flow towards the Springtown Alkali Sink, although flow may be diverted slightly to the south near the May School Road intersection.

**C.6.5.3 P2 Variant Alternative**

The P2 Alternative follows the Proposed Route but would replace two overhead portions of the Proposed Route with underground lines. The first element of the P2 Alternative is identical to the P1

Route and involves a 1-mile segment parallel to North Livermore Road. Impacts of this segment can be reviewed in C.6.5.2. The other element of the P2 Route involves replacing 2.8 miles of the east-west trending Proposed Route's overhead line (between Milepost 13.2 and the Contra Costa tap point at Milepost 10.4) with an underground line.

Construction-related impacts for the P2 underground segments to surface water hydrology, surface water quality, and groundwater quality are identical to those described for the P1 Route. Impacts due to the mobility of trenching spoils, fuel spills, and machinery use are mitigated through the application of Mitigation Measures H-2, H-3, H-4, and H-5, as well as Applicant Measures 8.1, 8.2, 8.3, and 8.4. Potential impacts to groundwater hydrology for the P2 Route are different than for the P1 Route and are described next in Impact 6-25.

**Impact 6-25:** Groundwater hydrology impacts due to the operation of the P2 Alternative Route (**Class II**).

As in the case of the P1 Route, operational impacts of the P2 Alternative are primarily concerned with potential interferences with groundwater flow. In contrast to the P1 segment, which was oriented roughly parallel to flow direction, the east-west P2 route is aligned perpendicular to the southward flow direction (Figure C.6-3). Following the excavation, trenching, and duct-bank installation activities, the 6-8 ft underground trench will be backfilled, compacted and capped. The result of these activities will be to create a soil barrier which is less porous and less permeable to shallow groundwater flows.

In order to assess the significance of this impact, one must know the depth to groundwater along the east-west component of the P2 Route. A cross-sectional diagram, which describes the extent of water bearing zones in the project vicinity (Figure C.6-3), suggests that subsurface flows are shallow (less than 15 ft) along the path of the underground line (~ 600 ft elevation contour). If subsurface flows are concentrated in the shallow unconfined zone above the (6-8 ft) depth of the underground line's soil impact zone, then the underground line could be a significant impediment to groundwater transmissibility. The ecological significance of this impact increases, considering that the east-west P2 Route crosses flow paths that are critical source areas for the Springtown Alkali Sink (Figure C.6-3). Mitigation Measure H-11 is offered as a prudent measure to reduce Impact 6-25 to a less than significant level, by identifying site-specific groundwater hydrology conditions along the east-west segment of the P2 Alternative.

**H-11** Several groundwater test borings shall be made between Mileposts B-11 and B-13 of the P2 Route. PG&E Co. shall document results of test drilling in a letter report to the CPUC and shall propose specific means to minimize the impact on groundwater if shallow groundwater is found. These measures must be approved by the CPUC prior to the start of construction of the underground segment. Test borings should be focused towards the alluvial fan/plain geomorphic areas and are not required on the steeper hillslope zones along the P2 Route. Groundwater depths along the P2 Route should also be sampled within the preferential flow pathways that lead to the Springtown Alkali Sink (Figure C.6-3). Groundwater depths shall be evaluated during winter/spring seasons when recharge to the Springtown Alkali Sink is most critical.

As specified previously in Mitigation Measure H-7, areas with shallow groundwater (i.e. less than the depth required for the duct bank) should be avoided, where possible, for the underground route. Where avoidance is not possible, PG&E Co. shall consider construction in a shallower trench, depending upon structural requirements of the underground method and other practical concerns.

#### **C.6.5.4 Alternative L1: Raymond Road**

Alternative L1 includes a 1-mile underground transmission line which would tap into the Contra Costa – Newark Line near Raymond Road and a substation located just northeast of the Raymond Road and Lorraine Road intersection.

##### ***L1: Raymond Road Substation***

For the Raymond Road Substation Alternative, construction-related impacts to erosion and sediment transport are not considered significant (**Class III**). On these issues, the Raymond Road and Proposed North Livermore sites are very similar. Conditions described above (Impact 6-20) for the Proposed North Livermore Substation are also appropriate for the Raymond Road Substation Alternative. Similarly, construction impacts to surface water and groundwater quality at the Raymond Road site are identical to Impact 6-21 (**Class II**) described for the Proposed North Livermore site. Potential construction impacts to surface water and groundwater quality would be reduced to a less than significant level through the application of Mitigation Measures H-2, H-3, H-4, and H-5 as described above. These measures, along with measures proposed by the Applicant, include BMPs through the NPDES permitting requirements, a Hazardous Substance Control and Emergency Response Plan (HSCERP), and an environmental training program. These mitigation measures should prevent contaminated water from exiting the construction site and entering into the drainage or groundwater system.

Operational hydrologic impacts caused by the Raymond Road Substation are identical to the operational impacts (Impacts 6-22, 6-23) described for the Proposed North Livermore Substation. Anticipated increases in runoff due to the Raymond Road station are not considered significant (**Class III**) because the site is relatively flat and not near a creek. Operational impacts to surface and groundwater quality at the Raymond Road site are identical to those described above in Impacts 6-14, 6-19, and 6-23 for the Dublin, Vineyard, and North Livermore substations. A Spill Prevention Containment and Countermeasure (SPCC) pond, as described in Applicant Impact 8.6 and Mitigation Measure H-8 (illustrated in Figure B-5), shall be incorporated into the project design to reduce potential water quality impacts to a less than significant level (**Class II**).

##### ***L1: Underground transmission line***

Construction-related impacts for the L1 underground segment to surface water hydrology, water quality, and groundwater quality are identical to those described above for the P1 and P2 routes. These impacts due to the mobility of trenching spoils, fuel spills, and machinery use would be mitigated through the application of Mitigation Measures H-2, H-3, H-4, H-5, and H-6. The severity or

significance of impacts to groundwater hydrology are different for the Proposed North Livermore, P1, P2, and L1 alternatives. Impact 6-26 assesses potential groundwater hydrology impacts due to the L1 alternative.

**Impact 6-26:** Groundwater hydrology impacts due to the operation of the Raymond Road underground route (**Class I**).

As in the case of the P1 and P2 Alternatives, the critical operational impact of the L1 Raymond Road Alternative is the potential interference with groundwater flow. The trenching, backfilling, compaction, and capping activities required to install the duct-bank will create a soil barrier which is less porous and less permeable to shallow groundwater flows. The potential significance of this impact at the Raymond Road site is far more severe than either the P1 or P2 routes due to the immediate proximity of the protected Springtown Alkali Sink and the nature and importance of groundwater contribution to this marsh.

Baseline hydrologic conditions of the Springtown Alkali Sink are described above in Section C.6.1.2. Researchers (Coats, et al., 1993) have confirmed the important role that shallow groundwater plays in delivering water to the water-sensitive alkali sink. Preferential flow pathways (Figure C.6-3) are particularly important in delivering groundwater to the alkali sink. These pathways are former alluvial channels and consist of relatively porous and permeable sediments that more readily transmit shallow groundwater flows southward towards the sink. The Raymond Road underground line would cut perpendicularly across four of these groundwater flow pathways.

As in the case of the P2 variant, the critical data needed to accurately assess the potential severity of this impact is the depth to groundwater. The underground line (6-8 ft deep) would impact the upper-layer seasonal water bearing zone. Observations suggest that in January, depth to groundwater ranges from about one foot below the surface at the central alkali sink, and about 4-6 feet below the surface in the higher surrounding areas (North Livermore Specific Plan EIR, 2000). By April, groundwater levels drop two feet, and by September, the upper shallow groundwater layer is commonly dry. Other studies have noted that even during the dry season the shallow ground water level can lie close to the ground surface (Coats et al., 1993).

From these findings it is believed that groundwater along the Raymond Road Route would be severely impeded by the presence of the duct bank and compacted soil. As a result, impeded shallow subsurface flows would be restricted or “dammed” behind this barrier and this would impact the delivery of groundwater to the alkali sink. Potentially, this damming effect could force water to the surface similarly to what occurs at contacts between rock units of varying permeability. If the shallow groundwater were to daylight north of Raymond Road, it would then be additionally impeded by the grade of Raymond Road at the surface. An alternative or additional result to water daylighting at the surface, is for the groundwater impeded by the underground line to be blocked-up and diverted either east or west along the underground line. This would be dependent upon several variables, including flow rates, soil conditions, season, and topography.



Before assigning this impact a significant but non-mitigable status (**Class I**), potential Mitigation Measures were conceptualized to maintain continued delivery of groundwater to the alkali sink. Such concepts included concentrating impeded flows towards culverts or other drainage conduits which would then pass the water through to the south side of Raymond Road. Ultimately, such concepts were considered impractical in light of the potential risk to the alkali sink and its endangered palmte-bracted bird's beak population. Therefore, this impact remains **Class I**.

#### **C.6.5.5 Alternative L2: Hartman Road**

Alternative L2 enters the North Livermore Area from the south rather than from the east. The southern portion of the L2 route follows the S1 Route, but rather than turning west on Stanley Boulevard, the line would continue north along Isabel Ave. as an overhead line for another 0.85 mile. The line would then continue north as an underground line, passing east of the Water Reclamation Plant and the Livermore Airport. North of the airport, the underground line would cross beneath Arroyo Las Positas at the Kitty Hawk Rd. Bridge and then pass beneath the I-580 freeway. North of the freeway the underground line would follow the future alignment of Hartman Rd until reaching the 5-acre L2 Substation Site Study Zone. The total length of the underground line would be 2 to 2.3 miles.

##### ***L2: Overhead transmission line***

Impacts to hydrology and water quality associated with construction of the Proposed L2 overhead transmission line are very similar to the impacts described above for other overhead transmission lines in the Pleasanton, Dublin, and North Livermore areas. Impacts 6-1, 6-3, 6-4, 6-5, and 6-6 described above, are also applicable for the L2 Alternative. As in the case of the Pleasanton, Dublin, and other North Livermore areas, impacts of the L2 Route are considered to be either temporary and non-significant (**Class III**) or significant but mitigable (**Class II**) through the application of Mitigation Measures H-1, H-2, H-3, and H-4 in addition to proposed Applicant Measures.

Construction access should be readily available from the Isabel Ave/Highway 84 corridor and no new road building activities should occur. Arroyo Mocho will be crossed overhead and does not cause any additional impacts. Hydrologic impacts associated with the operation of the L2 overhead transmission line are considered less than significant (**Class III**). The reduction of infiltration or the increase in runoff attributable to pole foundations is negligible due to the small areas involved. This is identical to the conditions described above for impacts in the Pleasanton, Dublin, and other North Livermore areas.

##### ***L2: Underground transmission line***

Construction-related impacts of the L2 underground line to surface water hydrology, water quality, and groundwater are very similar to impacts described above for the P1, P2, and L1 routes, as well as the other underground routes in the other project areas. Construction-related impacts involving trenching spoils, fuel spills, and machinery use are mitigated through the application of Mitigation Measures H-2, H-3, H-4, and H-5, as well as Applicant Measure 8.1. The operational impacts specified above for the P2 and L1 underground lines where groundwater flow would be impeded from reaching the Springtown Alkali Sink are not relevant for the L2 Hartman Rd. Alternative. Although the duct bank of the

underground line may impede some shallow subsurface flows, no significant impacts to wetlands or other aquatic habitat are expected.

**Impact 6-27:** Impact to stream bed due to horizontal dry boring of Arroyo Las Positas and I-580 corridor (**Class II**).

Construction impacts caused by the horizontal dry boring of Arroyo Las Positas and I-580 freeway are similar to impacts caused by the horizontal dry boring of Arroyo Valle (Impact 6-10). Excavated spoils from the creek and freeway borings would be removed by truck and potential sediment loading and contamination impacts would be mitigated through Mitigation Measures H-2, H-3, H-4, and H-5, as well as Applicant Measure 8.1.

Currently, the Kitty Hawk Bridge (and immediate downstream) reach of Arroyo Las Positas is very depositional in nature. Deposition along this reach is largely related to hydraulic conditions at the bridge and downstream reach. Future modifications in the bridge design or downstream channel design could alter stream geomorphology, initiate channel incision, and potentially expose the buried transmission line through the creek. Mitigation measure H-12 would reduce this impact to a less than significant level (**Class II**) through the implementation of a stream monitoring program.

**H-12** A cross-sectional channel survey will be conducted across the bed of Arroyo Las Positas above the underground line prior to and following the dry boring process. Subsequently, the Applicant shall repeat this cross-sectional survey once every five years, or following a 30-year discharge event on the stream (whichever occurs first), and report the results of this monitoring effort to the Zone 7 water agency. If streambed erosion occurs such that the steel casings are emergent, agents from the USACOE and Zone 7 shall be contacted.

**Impact 6-28:** L2 Underground Route and impacts to un-named tributary north of I-580.

An un-named tributary located east of Collier Canyon and west of Cayetano Creek drains southward and joins Arroyo Las Positas near the I-580 freeway. The proposed future alignment of Hartman Rd. and the L2 underground route would occupy this drainage path to the northeast. Because the ultimate position of the underground line is dependent upon the future alignment of Hartman Rd, impacts to the tributary creek are expected to be addressed in an environmental impact assessment for the Hartman Rd. project.

***L2: Substation site***

The construction and operation of the Proposed Hartman Rd. Substation would involve many of the impacts previously described for the Dublin and North Livermore substations. Impacts 6-15/6-20 (construction-related erosion), 6-17/6-21 (water quality issues), 6-18/6-22 (operation and increased runoff/erosion), and 6-19/6-23 (operation and water quality issues) would also be directly applicable to the Proposed Hartman Rd. Substation. The significance and the severity of these hydrologic impacts would largely be determined by the specific conditions of the selected site. Currently, no specific 5-acre site has been selected, but Substation Site Study Zone has been identified. A steep site which is close to a creek channel (as in the case of the Proposed Dublin Substation) would result in more

significant impacts than a flatter site more distant from a stream channel (as in the case of the Proposed North Livermore Substation).

## **C.6.6 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: TESLA CONNECTION**

### **C.6.6.1 Proposed Project - Phase 2**

The Proposed Phase 2 would require roughly 10 miles of new transmission line between Milepost B-10 and the Tesla Substation and some modifications at Tesla (new transformer banks) to accommodate the new line. The Altamont Hills terrain that the Phase 2 Line would pass through is rugged and includes the Altamont Creek canyon, as well as several other intermittent and ephemeral stream channels and their valleys. Although the Proponent has not specified specific road building locations, it is anticipated that some road building may need to occur to provide construction access to tower locations along the Phase 2 Route. Where possible, the Proponent would use existing ranch roads or existing roads to the wind stations for access. Other concerns along the Phase 2 Route include the proximity of the Phase 2 Route to the BFI Altamont Landfill and the Brushy Peak Preserve. There is no underground component to the Phase 2 Route.

#### **C.6.6.1.1 Construction (Transmission Line and Substation Connection)**

Impacts caused by the construction of the Phase 2 overhead route through the Altamont Hills are very similar to construction-related impacts of the proposed overhead route through the hills south of Pleasanton. Impacts 6-1 (increased runoff), 6-2 (channel erosion and altered stream network), 6-3 (hillslope erosion and reduced water quality), 6-4 (surface and groundwater contamination), 6-5 (groundwater hydrology), and 6-6 (groundwater quality) equally apply to the Phase 2 transmission line. Similar to the Pleasanton Area, Impacts 6-1, and 6-5 are considered non-significant and Impacts 6-2, 6-3, 6-4, and 6-6 are considered significant but reduced to a less than significant level through the application of Mitigation Measures H-1, H-2, H-3, H-4, and H-5, in addition to Applicant Measures 8.1, 8.2, 8.3, and 8.4.

**Impact 6-29:** Potential soil and groundwater contamination hazard due to Phase 2 proximity to BFI Altamont Landfill (**Class II**).

Impact 6-6, which addresses the potential for cross contamination if borings or tower foundations were to penetrate areas with poor soil or water quality is relevant for the Phase 2 Route, but needs to be further specified due to the presence of a known contaminated site adjacent to the Phase 2 Route. The BFI Altamont Landfill site may contain or may have leached hazardous materials into the soil or groundwater directly beneath the landfill. If such hazardous materials have entered the soil or groundwater beneath the landfill, it is possible that these contaminants have migrated downgradient through soil and groundwater bodies. Therefore, it is possible that the soil and groundwater beneath the Phase 2 Route, adjacent to the landfill, are contaminated by landfill leachate. Construction activities in this area could potentially expose workers to contaminants, spread the contaminants through the transport of soil or water to other locations, or cause a cross-contamination between the polluted bodies and other sub-surface soil or groundwater horizons. The Applicant's Mitigation

Measure 8.5 requires soil and groundwater tests to occur along the Proposed Route near the BFI landfill. In addition, Applicant Measure 8.6 describes a procedure to follow if groundwater is encountered. These measures should reduce potential contamination impacts near the landfill to a less than significant level (**Class II**).

**Impact 6-30:** Hydrology, water quality, and groundwater impacts caused by modifications at the Tesla Substation to accommodate the Phase 2 Line connection (**Class II**).

Potential construction-related impacts to surface water hydrology, erosion and sediment transport at the Tesla Substation site would be reduced to non significant levels through the application of Mitigation Measures H-2, H-3, and Applicant Measure 8.1 as described previously. Potential construction-related impacts to surface water and groundwater quality at the Tesla Substation site are mostly related to contamination through the spill of fuels and other fluids. This impact is very similar to the conditions of Impact 6-4 described above. Potential construction impacts to surface water and groundwater quality are reduced to a less than significant level through the application of Mitigation Measures H-2, H-3, H-4, and H-5 as described above.

#### ***C.6.6.1.2 Operation and Maintenance (Transmission Line and Substation Connection)***

**Impact 6-31:** Operational impacts to surface and groundwater hydrology along the Proposed Phase 2 Route and at Tesla Substation (**Class III**).

At each tower site, a concrete foundation approximately 4 feet in diameter and up to 15 feet deep will be constructed. Placement of this impervious material restricts storm water infiltration. However, this impact is considered less than significant (**Class III**) because the total area impacted by pole foundations is small. This issue was also addressed above in Impacts 6-1 and 6-13. Modifications to the Tesla Substation will occur within the existing footprint of the substation, therefore operational hydrology impacts will be limited in scale and non-significant (**Class III**).

**Impact 6-32:** Operational impacts to surface and groundwater quality at Tesla Substation.

Future operation of the new equipment in the modified areas of the Tesla Substation could result in the release of fuels and oil thereby creating a significant surface water quality impact (**Class II**). In particular, the release of mineral oil from oil-filled electrical equipment, either from slow leaks or catastrophic failure, could wash into nearby surface drainages or infiltrate into the water table. This impact is identical to Impact 6-14 described previously for the Vineyard Substation and is reduced to a non significant level through the implementation of a Spill Prevention Containment and Countermeasure (SPCC) pond as noted in the description of Applicant's Impact 8.6 (PEA) and further specified in Mitigation Measure H-8.

#### **C.6.6.2 Brushy Peak Alternative**

The Brushy Peak Alternative segment involves a roughly 0.6 mile southward shift of the Proposed Phase 2 Route in the vicinity of the entrance to the Brushy Peak East Bay Regional Park. The overhead

transmission line would cross the stream valley that exits southward out of the park in a more southerly location. In terms of hydrologic, water quality, and groundwater impacts, the Brushy Peak Alternative results in no recognizable or significant difference from the Proposed Phase 2 alignment described above.

### **C.6.6.3 Stanislaus Corridor Alternative (Transmission Line to and Connection to Tesla Substation)**

The Stanislaus Corridor Alternative connects the Tesla Substation to the Proposed Route in the South Area through a more southerly alignment across the Altamont Hills than the Proposed Phase 2 Route. Depending upon which Pleasanton Area alternative is selected (Proposed/S4 or S1/S2) the Stanislaus Corridor Route would either be 14 or 17 miles long from the Tesla Substation to the Pleasanton Area tap-in point.

The Stanislaus Corridor Alternative would make use of an existing transmission line corridor that has been in existence since the early 1900's. A single tower transmission line would replace the older pair of lattice towers. The newer towers would be taller but spaced at greater intervals than the original towers, which would be removed.

The Altamont Hills terrain that the Stanislaus Corridor Route would pass through is rugged and is similar to the North Area Phase 2 Route. Because the Stanislaus Route follows an existing transmission line right of way, it is likely that no additional road construction will be required. Potential contamination concerns regarding the BFI Altamont Landfill are not relevant to the Stanislaus Route. Nor are concerns about the Brushy Peak Reserve relevant to the Stanislaus Route. There is no underground component to the Stanislaus Route. Modifications to the Tesla Substation would be similar to those required for the Proposed Phase 2 Route.

#### **C.6.6.3.1 Construction (Transmission Line and Connection to Tesla Substation)**

The hydrologic, water quality, and groundwater impacts caused by the construction of the Stanislaus Corridor Route are very similar to construction-related impacts of the Proposed Phase 2 Route and the Pleasanton Area Proposed Route. Impacts 6-1 (increased runoff), 6-2 (channel erosion and altered stream network), 6-3 (hillslope erosion and reduced water quality), 6-4 (surface and groundwater contamination), 6-5 (groundwater hydrology), and 6-6 (groundwater quality) equally apply to the Stanislaus Corridor transmission line. Similar to the Pleasanton Area, Impacts 6-1, and 6-5 are considered non-significant and Impacts 6-2, 6-3, 6-4, and 6-6 are reduced to a less than significant level (**Class II**) through the application of Mitigation Measures H-1, H-2, H-3, H-4, and H-5 (as well as the previously described Applicant Measures 8.1, 8.2, 8.3, and 8.4).

Impact 6-29 regarding the Proposed Phase 2 Route and potential contamination from the BFI Altamont Landfill is not relevant for the Stanislaus Route. Impact 6-30 that describes hydrologic, water quality, and groundwater impacts caused by the modifications to the Tesla Substation is applicable and also significant (**Class II**) for the Stanislaus Route. This impact is very similar to the conditions of Impact 6-4 described above. Potential construction impacts at the Tesla Substation to surface water and

groundwater quality are reduced to a less than significant level through the application of Mitigation Measures H-2, H-3, H-4, and H-5 as described above.

**C.6.6.3.2 Operation and Maintenance (Transmission Line and Connection to Tesla Substation)**

Operational and maintenance impacts to surface and groundwater hydrology along the Stanislaus Route and at the Tesla Substation are considered non-significant (**Class III**). The conditions described for Impact 6-31 for the Proposed Phase 2 Route are similar and applicable to the Stanislaus Route.

Impact 6-32 (**Class II**), which described operational and maintenance impacts to surface and groundwater quality at the Tesla Substation associated with the Proposed Phase 2 Route, is very similar and directly applicable for the Stanislaus Alternative. Impact 6-32 is reduced to a non-significant level through the implementation of a Spill Prevention Containment and Countermeasure (SPCC) pond as noted in the description of Applicant's Impact 8.6 (PEA) and further specified in Mitigation Measure H-8 above.

**C.6.7 MITIGATION MONITORING PROGRAM**

This section indicates that the Proposed Project (and Alternatives) may have significant impacts on the environment. In addition, some hydrological events and conditions could have significant impacts on the Proposed Project that would inhibit its successful and economic completion and operation. The foregoing sections recommend measures to mitigate these impacts, identify how these measures should be implemented, and who should ensure their effectiveness. Generally, the Applicant is responsible for implementing and financing the mitigation measures, and various Federal, State, and local governmental agencies are responsible for approving plans, for monitoring and implementing these plans, and for judging their effectiveness. The following table (Table C.6-1) summarizes the recommended mitigation measures, responsible monitoring agencies, and methods for monitoring implementation of the mitigation measures.

**Table C.6-1 Mitigation Monitoring Program**

Impact (Class)	Mitigation Measure	Location	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
<b>Proposed Project Pleasanton Area, Alternatives S1, S2, and S4</b>						
<b>6-2</b> Increased stream channel erosion, sediment transport, and alteration of existing drainage pattern due to road building activities ( <b>Class II</b> )	<b>H-1</b> Proposed gravel road and culverts shall be designed for the specific hydrologic and hydraulic conditions occurring at the site. Design should include energy dissipation techniques, BMP's, and maintaining flow velocities below an erosive threshold	Between Mileposts M-1.8 and M-2.6 along Proposed Route in Pleasanton Area.  Potentially along North Area Route and Phase 2 Route as well	Review road and culvert design, construction, operation, and maintenance plan; monitor construction	Compliance with approved plan. Flow networks of existing streams and drainage channels are not extensively altered. Channel erosion is not initiated as a result of construction activities	USACOE ACFCWCD (Zone 7) CCCFC CDFG CPUC	Review design and construction plans prior to construction, inspect during construction
<b>6-3</b> Accelerated hillslope erosion, increased sediment loading, and reduced surface water quality due to tower construction and road building activities ( <b>Class II</b> )	<b>H-2</b> Excavated soils shall be collected and controlled. Construction staging will occur outside of channels. Site specific SWPPP and ECP plans, and Best Management Practices. Construction and sediment containment techniques shall be 100 ft from channels. Surplus soils are transported from site.	All Proposed and Alternative construction sites	Review construction plans, monitor construction	Compliance with Best Management Practices, SWPPP, and ECP. Permits issued; inspections during construction show no significant impacts. Construction-related sediment is prevented from reaching drainage network.	USACOE CDFG ACFCWCD (Zone 7) CCCFC SWRCB SF BAY RWQCB CPUC	Review plans and permits prior to construction, inspect during construction
<b>6-4</b> Construction-related surface water contamination ( <b>Class II</b> )	<b>H-3</b> Environmental training program shall communicate environmental concerns, specific site constraints, and potential impacts and hazards.  <b>H-4</b> All fueling and lubrication activities shall be performed at least 100 ft from any creek, channel, or slough. Excess concrete shall be removed from tower foundations	All Proposed and Alternative construction sites	Review construction plans; monitor construction	Compliance with Best Management Practices. Permits issued; inspections during construction show no significant impacts. Spills effectively cleaned up.	USACOE CDFG ACFCWCD (Zone 7) CCCFC SWRCB SF BAY RWQCB CPUC	During construction  Review plans and permits prior to construction, inspect during construction

**Table C.6-1 Mitigation Monitoring Program**

Impact (Class)	Mitigation Measure	Location	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
6-6 Groundwater quality impacts and construction of tower foundations (Class II)	H-2, H-3, and H-4 (above)	All Proposed and Alternative construction sites	Review construction plans; monitor construction	Compliance with Best Management Practices. Permits issued; inspections during construction show no significant impacts. Spills effectively cleaned up.	USACOE CDFG ACFCWCD (Zone 7) CCCFCD SWRCB SF BAY RWQCB CPUC	During construction  Review plans and permits prior to construction, inspect during construction
6-7 Construction of underground transmission line and impacts to surface water hydrology and quality (Class II)	H-2, H-3, and H-4 (above)  H-5 The staging of underground trench related construction materials, equipment, and excavation spoils will occur at least 100 feet outside of tributaries, creeks, or drainage channels.	All Proposed and Alternative underground transmission line routes.	Review construction plans; monitor construction	Compliance with agency determined soil and groundwater quality standards. Compliance with approved construction plans and procedures. No significant erosion, sediment transport, or contaminants reach stream network.	USACOE CDFG ACFCWCD (Zone 7) CCCFCD SWRCB SF BAY RWQCB CPUC	During construction  Review plans and permits prior to construction, inspect during construction
6-8 Construction of underground transmission line and impacts to groundwater hydrology (Class II)	H-6 Verification of groundwater depth along underground route through pilot borings. Locations with shallow groundwater (<8 ft) shall be avoided	All Proposed and Alternative underground transmission line routes.	Applicant shall document results of test drilling in a letter report to CPUC, shall specify means to minimize groundwater impact. Measures to be approved by CPUC prior to construction	Groundwater depth along underground route is below underground duct bank trench	SWRCB SF BAY RWQCB CPUC	Prior to construction
6-9 Construction of underground transmission line and impacts groundwater quality (Class II)	H-2, H-3, H-4, and H-5 above	All Proposed and Alternative underground transmission line routes.	Applicant shall document results of groundwater contaminant check to CPUC. Applicant shall coordinate with local jurisdiction regarding release of collected groundwater.	Groundwater that is contaminated is treated on-site, collected and removed for off-site treatment. Non contaminated groundwater is released in appropriate manner.	SWRCB SF BAY RWQCB CPUC	During construction
6-10 Horizontal dry-boring beneath Arroyo Valle (Class II)	H-7 Channel survey shall be conducted prior to and following dry boring process. Subsequent channel surveys occur at 5-year intervals or following a 30-year runoff event  H-2, H-3, and H-4	Arroyo Valle crossing	Applicant reports results of surveys and monitoring to Zone 7  Excavated spoils from dry-boring are removed by truck	Significant channel erosion that threatens to expose steel casings of underground line is brought to the attention of Zone 7 officials  Excavated spoils from dry-boring would not enter creek.	ACFCWCD (Zone 7) CPUC  SWRCB RWQCB CPUC	During construction, at 5-year intervals, after 30-year runoff event  During construction



**Table C.6-1 Mitigation Monitoring Program**

Impact (Class)	Mitigation Measure	Location	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
<b>6-11</b> Substation upgrade and impacts to hydrology, erosion, and sediment transport ( <b>Class II</b> )	<b>H-2 and H-3</b> (see above)	Vineyard Substation	Review construction plans; monitor construction	Compliance with Best Management Practices, SWPPP, and ECP. Permits issued; inspections during construction show no significant impacts. Construction-related sediment is prevented from reaching drainage network.	USACOE CDFG ACFCWCD (Zone 7) CCCFCD SWRCB SF BAY RWQCB CPUC	Review plans and permits prior to construction, inspect during construction
<b>6-12</b> Substation upgrade and impacts to surface water and groundwater quality ( <b>Class II</b> )	<b>H-2, H-3, H-4, and H-6</b> above	Vineyard Substation	Review construction plans; monitor construction	Compliance with Best Management Practices, SWPPP, and ECP. Permits issued; inspections during construction show no significant impacts. Construction-related sediment is prevented from reaching drainage network.	USACOE CDFG ACFCWCD (Zone 7) CCCFCD SWRCB SF BAY RWQCB CPUC	Review plans and permits prior to construction, inspect during construction
<b>6-14</b> Operational impacts to surface water and groundwater quality at substation ( <b>Class II</b> )	<b>H-8</b> Spill prevention containment and countermeasure (SPCC) pond will be designed to collect all runoff from the modified and approved substation	Vineyard, Dublin, San Ramon, Hartman Rd., North Livermore, Tesla substations	Review (SPCC) construction, operation, and maintenance plan; monitor construction.	Compliance with approved plans. On-site runoff detention system and pond will be sized according to approved Best Management Practices	SWRCB RWQCB CPUC	Review construction, operation, and maintenance plan prior to construction; monitor construction.

**Table C.6-1 Mitigation Monitoring Program**

Impact (Class)	Mitigation Measure	Location	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
<b>Proposed Project Dublin Area, D1 and D2 Alternatives</b>						
<b>6-15</b> Construction of Dublin Substation and erosion and sediment transport impacts (Class II)	<b>H-2</b> (see above) Sediment containment methods shall occur at least 100 ft from channel	Dublin Substation, South Dublin Substation Alternative	Review construction plans; monitor construction	Compliance with Best Management Practices, SWPPP, and ECP. Permits issued; inspections during construction show no significant impacts. Construction-related sediment is prevented from reaching drainage network.	USACOE CDFG ACFCWCD (Zone 7) CCCFC SWRCB SF BAY RWQCB CPUC	Review plans and permits prior to construction, inspect during construction
<b>6-16</b> Creek crossing at Dublin Substation (Class II)	<b>H-9</b> A specific Erosion Control Plan shall be written in coordination with design of creek crossing at Proposed Dublin Substation	Dublin Substation, South Dublin Substation Alternative	Review Erosion Control Plan, construction plans, monitor construction	Preservation of channel form and creek stability	ACFCWCD (Zone 7) CCCFC	Review plans and permits prior to construction, inspect during construction
<b>6-17</b> Dublin Substation construction and related surface water quality and groundwater quality impacts (Class II)	<b>H-2, H-3, and H-4</b> All refueling and lubrication activities shall be performed at least 100 feet from any tributary or stream channel	Dublin Substation, South Dublin Substation Alternative	Review construction plans; monitor construction	Compliance with Best Management Practices. Permits issued; inspections during construction show no significant impacts. Spills effectively cleaned up.	USACOE CDFG ACFCWCD (Zone 7) CCCFC SWRCB SF BAY RWQCB CPUC	During construction  Review plans and permits prior to construction, inspect during construction
<b>6-18</b> Increased runoff and channel erosion due to operation of Dublin Substation (Class I)	<b>H-10</b> Site specific hydrologic and geomorphic analysis of Dublin Substation to assess how land-use changes shall impact adjacent creek. Results used to refine and modify design of substation, on-site storm basin, and any creek restoration efforts	Dublin Substation, South Dublin Substation Alternative	Applicant shall report results of hydrologic analysis to local jurisdictions and indicate how Proposed Substation will alter runoff and erosion conditions in adjacent tributary	Stormflow peaks are not significantly increased in creek. Creek is not further destabilized due to increased runoff	CCCFC	Review plans and permits prior to construction, inspect during construction
<b>6-19</b> Operational impacts of Dublin Substation to surface water and groundwater quality (Class II)	<b>H-8</b> (see above)	Dublin Substation, South Dublin Substation Alternative	Review (SPCC) construction, operation, and maintenance plan; monitor construction.	Compliance with approved plans. On-site runoff detention system and pond will be sized according to approved Best Management Practices*	SWRCB RWQCB CPUC	Review construction, operation, and maintenance plan prior to construction; monitor construction.

**Table C.6-1 Mitigation Monitoring Program**

Impact (Class)	Mitigation Measure	Location	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
<b>Proposed Project North Livermore Area and P1, P2, L1, and L2 Alternatives</b>						
<b>6-21</b> North Livermore Substation and construction-related water quality and groundwater quality impacts ( <b>Class II</b> )	<b>H-2, H-3, H-4 and H-6</b> (above)  All refueling and lubrication activities shall be performed at least 100 feet from any tributary or stream channel	North Livermore Substation, Raymond Road Alternative, Hartman Road Alternative	Review construction plans; monitor construction	Compliance with Best Management Practices. Permits issued; inspections during construction show no significant impacts. Spills effectively cleaned up.	USACOE CDFG ACFCWCD (Zone 7) CCCFC SWRCB SF BAY RWQCB CPUC	During construction  Review plans and permits prior to construction, inspect during construction
<b>6-23</b> Operational impacts to surface and groundwater quality at North Livermore Substation ( <b>Class II</b> )	<b>H-8</b> (see above)	North Livermore Substation, Raymond Road Alternative, Hartman Road Alternative	Review (SPCC) construction, operation, and maintenance plan; monitor construction.	Compliance with approved plans. On-site runoff detention system and pond will be sized according to approved Best Management Practices*	SWRCB RWQCB CPUC	Review construction, operation, and maintenance plan prior to construction; monitor construction.
<b>6-25</b> Groundwater hydrology impacts due to operation of P2 Route ( <b>Class II</b> )	<b>H-11</b> Several groundwater test borings shall be conducted along P2 Route. Areas with shallow groundwater shall be avoided for underground line	Along P2 Route between Mileposts B-11 and B-13	Applicant shall document results of test drilling in a letter report to CPUC, shall specify means to minimize groundwater impact. Measures to be approved by CPUC prior to construction	Groundwater depth along underground route is below underground duct bank trench	SWRCB SF BAY RWQCB CPUC	Prior to construction
<b>6-27</b> Horizontal dry boring of Arroyo Las Positas ( <b>Class II</b> )	<b>H-2, H-3, H-4 and H-5</b> (above)  <b>H-12</b> Channel survey of Arroyo Las Positas shall be conducted prior to and following dry boring, at 5-yr intervals, and following a 30-yr discharge event	Arroyo Las Positas at Kitty Hawk Rd. bridge	Excavated spoils from dry-boring are removed by truck  Applicant reports results of surveys and monitoring to Zone 7	Excavated spoils from dry-boring would not enter creek.  Significant channel erosion that threatens to expose steel casings of underground line is brought to the attention of Zone 7 officials	SWRCB RWQCB CPUC  ACFCWCD (Zone 7) CPUC	During construction  During construction, at 5-year intervals, after 30-year runoff event

**Table C.6-1 Mitigation Monitoring Program**

Impact (Class)	Mitigation Measure	Location	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
<b>Phase 2 (Tesla Connection) Proposed Project and Project Alternatives</b>						
<b>6-29</b> Potential soil and groundwater contamination hazard due to Phase 2 proximity to BFI Altamont Landfill ( <b>Class II</b> )	H-2, H-3, H-4 (above)	Phase 2 Proposed Route, adjacent to BFI Landfill Area	Results of soil and groundwater tests shall be reviewed by RWQCB prior to construction, review remediation and clean-up operations if necessary	Compliance with agency determined soil and groundwater quality standards I	USACOE CDFG ACFCWCD (Zone 7) CCCFCB SWRCB SF BAY RWQCB CPUC	Testing and (remediation if necessary) prior to construction
<b>6-30</b> Hydrology, water quality, and groundwater impacts caused by modifications at Tesla Substation	H-2, H-3 (above)	Tesla Substation	Review construction plans; monitor construction	Compliance with Best Management Practices. Permits issued; inspections during construction show no significant impacts. Spills effectively cleaned up.	USACOE CDFG ACFCWCD (Zone 7) CCCFCB SWRCB SF BAY RWQCB CPUC	During construction  Review plans and permits prior to construction, inspect during construction
<b>6-32</b> Operation impacts to surface water quality and groundwater quality at Tesla Substation	H-8 Spill prevention containment and countermeasure (SPCC) pond will be designed to collect all runoff from the modified and approved substation	Tesla Substation	Review (SPCC) construction, operation, and maintenance plan; monitor construction.	Compliance with approved plans. On-site runoff detention system and pond will be sized according to approved Best Management Practices*	SWRCB RWQCB CPUC	Review construction, operation, and maintenance plan prior to construction; monitor construction.

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