4.8 HYDROLOGY AND WATER QUALITY

This Section describes the existing hydrology and water quality and evaluates potential effects on these resources that may result from Project implementation. This evaluation is a summary of a compendium of knowledge regarding hydrology and water quality issues statewide, as well as those issues applicable to regions in which the Project would be implemented.

4.8.1 Environmental Setting

The Project is located in the northern portion of California's Central Valley, within the Lower Cache, Sacramento-Stone Corral, Lower Sacramento, and Lower American watersheds (USGS Hydrologic Units 18020110, 18020104, 18020109, and 18020111, respectively) in Yolo, Sutter, Sacramento, and Placer counties. The Central Valley is bounded on the west by the Coast Range and on the east by the Cascade and Sierra Nevada ranges. The Sacramento River is the main drainage for the northern part of the Central Valley, and receives water from two major river systems near the Project area (the Feather River and the American River) and a number of creeks that flow from the mountain ranges surrounding the valley.

Groundwater supply in the Central Valley comes from the Central Valley aquifer system, an unconsolidated sand and gravel freshwater aquifer located in the continental deposits that overlie about 20,000 feet of marine sediments (which generally contain saline water). The Project area is in the Sacramento Valley subregion of the aquifer, named for its associated surface-water drainage, the Sacramento River. Studies indicate the Central Valley aquifer system is a single system that contains unconfined conditions in the upper few hundred feet, which grades into confined conditions with depth.

The Project area ranges in elevation from approximately 15 to 255 feet, and consists of flat to rolling hill topography. The climate in the Project area is moderate, with average temperatures ranging seasonally from approximately 33 to 97 degrees Fahrenheit (°F), and an average precipitation of approximately 23 inches. Approximately 85 percent of the precipitation falls from November to April. Because the valley receives relatively little precipitation, most of the precipitation that falls on the valley floor evaporates before it can become aquifer recharge. Precipitation in the mountains to the east of the valley can exceed 80 inches annually, and thus the Central Valley aquifer system relies heavily on annual runoff from rainfall and snowmelt from the Cascade and northern Sierra Nevada mountain ranges (most of the runoff from the Coast Range travels west to the Pacific Ocean). Nearly all of the

average annual recharge the valley aquifer system receives (approximately 12 inches) is from the runoff flowing into perennial streams and rivers in the valley. Recharge occurs primarily from surface water seeping downward within these streams and rivers.

The natural hydrology of much of the Project area has been significantly modified for agricultural use. In the western portion of the Project where Line 406 would be constructed, small intermittent creeks and irrigation canals and ditches make up a majority of the water features. Moving east, Line 407 West crosses numerous irrigation canals and ditches, the Yolo Bypass, and the Sacramento River. In the easternmost Project area, Line 407 East crosses two smaller intermittent creeks, Curry Creek, and the Natomas East Main Drainage Canal (Steelhead Creek), in addition to numerous irrigation canals and ditches that supply water for rice production and other grain crops within the Natomas Basin.

From a water quality perspective, the Sacramento River from Knights Landing to the Sacramento-San Joaquin Delta is identified in the 2006 California section 303(d) List and total maximum daily load (TMDL) Priority Schedule as an impaired water body for the following contaminants: mercury and unknown toxicity (RWQCB 2006). The northern portion of the Sacramento-San Joaquin Delta downstream of the Project area has been designated as impaired for a variety of contaminants, including pesticides (chlorpyrifos, dichloro-diphenyl-trichloro-ethane [DDT], diazinon, and Group A pesticides) resulting from agricultural and urban runoff/storm sewers, mercury (from abandoned mine drainage), polychlorinated biphenyls (PCBs), exotic species, and unknown toxicity (unknown cause) (RWQCB 2006). Table 4.8-1 contains the section 303(d) listed water bodies within the Project area.

Table 4.8-1: 303(d) Waters within the Project Area

303(d)-Listed Water	Pollutant	Potential Sources	Miles Affected
Steelhead Creek (Upstream of Arcade Creek)	Polychlorinated biphenyls	Industrial point sources, agriculture, urban runoff/storm sewers	12
Sacramento River (Knights Landing to Delta)	Diazinon, mercury, unknown toxicity	Agriculture, resources extraction, source unknown	16
Source: Central Valley Regional Quality Control Board, 2002.			

Line 406

Line 406 is situated just north of the Cache Creek Watershed in Yolo County, downstream of the Capay Diversion Dam. The general flow of water in this area is west to east, following the flow of Cache Creek. During normal and high flows in late fall and winter (associated from storm runoff from seasonal storms), Cache Creek flows into the Yolo Bypass near the southeast corner of the Cache Creek Settling Basin, just north of Interstate (I) 5. In summer months, the creek upstream of the Cache Creek Settling Basin dries up. Water sources in the Line 406 Project area include the Cache Creek system and groundwater.

Two canals, including Hungry Hollow Canal and Goodnow Slough, would be crossed by this portion of the Project. Cache Creek is situated south of Line 406 and would not be crossed by the Project. According to the Yolo County Flood Control and Water Conservation District, data collected in 1996 show spring groundwater levels in this area to be more than 20 feet below ground elevation. More current groundwater data do not appear to be available.

Line 407 West

Line 407 West runs from just north of the City of Woodland in the Cache Creek watershed east into the Sacramento River watershed, across the Knights Landing Ridge Cut, the Yolo Bypass, and the Sacramento River. The Yolo Bypass is flooded during wet months (fall and winter) by overflow from the Sacramento River. Canals and sloughs in the area fill during these months and eventually drain to leave marsh-like conditions in the summer and fall. Water sources in the area include the Cache Creek system, the Sacramento River, and groundwater.

Several irrigation canals in the Line 407 West segment may be crossed using open-cut methods, but major water features in this area, including two crossings of the Knights Landing Ridge Cut, the Tule Canal (eastern Yolo Bypass), and the Sacramento River, would be horizontal directional drilled (HDD). According to data gathered in spring 1996, groundwater levels in this area rise from around 20 to 30 feet below ground surface near Woodland to approximately 0 to 15 feet below ground surface near the Sacramento River. More current groundwater data do not appear to be available.

Line 407 East

Line 407 East runs through the Natomas Basin from just east of the Sacramento River to just west of the City of Roseville. Line 407 East would cross several irrigation canals, seasonal wetlands, vernal pools, Curry Creek, and Steelhead Creek. The general direction of surface water flow in the Line 407 East segment is east to west, toward the Sacramento River. Groundwater data gathered between 2000 and 2005 shows groundwater levels at approximately 0 to 15 feet below ground surface in the Natomas Basin area. The depth to groundwater increases gradually to the east of the Natomas Basin, to approximately 140 feet below ground surface near the City of Roseville.

Powerline Road Distribution Feeder Main

The Powerline Road Distribution Feeder Main (DFM) is just east of the Sacramento River. There is a high water table in this area, and the line crosses several irrigation canals. Groundwater has been recorded between 0 and 10 feet below ground surface in this area.

4.8.2 Regulatory Setting

Federal

Federal Water Pollution Control Act, or Clean Water Act (CWA)

Compliance with Section 404 of the CWA

Subject to section 404 of the CWA, the United States Army Corps of Engineers (USACE) would assert jurisdiction over all waters and their tributaries which either flow interstate, are navigable or are otherwise used in commerce, as outlined in Title 33 of the Code of Federal Regulations (CFR), section 328.3(a). Impacts to any such 'waters of the United States,' such as the placement of fill within such water, requires that a Section 404 Permit for the discharge of fill be applied for and received from the USACE in advance of such fill.

Compliance with Section 401 of the CWA

In connection with notification to the USACE under section 404 of the (CWA), a written request for CWA Section 401 Water Quality Certification (WQC) must be submitted to the Central Valley RWQCB to ensure that no degradation of water quality would result from the proposed Project associated with impacts to USACE jurisdictional drainages. Subject to CWA section 401(a)(1), the USACE cannot issue

a Section 404 Dredge/Fill Permit until such time as a CWA section 401 WQC has been approved by the applicable RWQCB. Section 401 is set forth in general condition (GC 21) of the USACE Nationwide Permitting Program.

In order to meet the requirements of the RWQCB for issuance of section 401 WQC, the project proponent must provide assurances that the project would not adversely affect the water quality of receiving water bodies. A written request for section 401 WQC would be prepared and submitted to the Central Valley RWQCB for review. The request would include a detailed project description, a description of *potential* impacts from the proposed project, identification and discussion of beneficial uses of affected receiving waters (beneficial uses are described within the appropriate Water Pollution Control Plan (or "basin plan") for the RWQCB), a water quality plan identifying project-specific Best Management Practices (BMPs), discussion of other approvals and certifications being obtained, a conceptual restoration plan, and a completed notification form.

National Pollutant Discharge Elimination System (NPDES) Permits

Section 402 of the CWA regulates construction-related stormwater discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by the U.S. Environmental Protection Agency (EPA). In California, the State Water Resources Control Board (SWRCB) is authorized by EPA to oversee the NPDES program through the RWQCBs. The proposed Project is under the jurisdiction of the Central Valley RWQCB. The NPDES program provides both General Permits, which include those that cover a number of similar or related activities, and Individual Permits. Most construction projects that disturb more than one acre of land are required to obtain coverage under the NPDES General Permit for Construction Activities, which requires the Applicant to file a public notice of intent to discharge stormwater and to prepare and implement a Stormwater Pollution Prevention Plan that includes BMPs to be implemented during all phases of development (as discussed in further detail below under SWRCB Board General Construction Permit).

State

California Fish and Game Code Section 1602

In the public interest of protection and conservation of fish and wildlife resources of the state, Fish and Game Code section 1602 requires any person, state or local governmental agency, or public utility to notify the California Department of Fish and

Game (CDFG) before beginning any activity that will do one or more of the following: (1) substantially obstruct or divert the natural flow of a river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake. CDFG's jurisdiction includes ephemeral, intermittent, and perennial watercourses, including dry washes, characterized by:

- The presence of hydrophytic vegetation;
- The location of definable bed and banks; and
- The presence of existing fish or wildlife resources.

Before any impacts are made to such features, a Fish and Game Code section 1602 Streambed Alteration Agreement (SAA) must be applied for and obtained from the CDFG.

Furthermore, CDFG jurisdiction includes the "bed, bank, or channel," which can be interpreted to include habitats adjacent to watercourses, such as oak woodlands in canyon bottoms or willow woodlands that function as part of the riparian system. Historic court cases have further extended CDFG jurisdiction to include watercourses that seemingly disappear, but re-emerge elsewhere. However, the CDFG does not regulate isolated wetlands under Fish and Game Code section 1600 et seq.; that is, those that are not associated with a river, stream, or lake.

CDFG Regulated Activities

The CDFG regulates activities that involve diversions, obstruction, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or wildlife resources. When a project requires such activities, a Section 1602 Streambed Alteration Notification would be prepared and submitted to the CDFG for review. The request would include a detailed project description, a description of proposed impacts, a conceptual mitigation plan, and completed notification forms. Typically, the CDFG would be able to complete the agreement within 60-90 days of the completion of the CEQA process.

State Water Resources Control Board General Construction Permit

The SWRCB implements aspects of the Federal CWA, including section 402 of the Act as discussed above. In California, any projects that disturb one acre or more of

soil, or any projects that disturb less than one acre but are part of a larger common plan of development that disturbs one acre or more, is required to be covered by the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ). A Notice of Intent (NOI) package must be submitted to the SWRCB and a site specific Storm Water Pollution Prevention Plan (SWPPP) must be prepared to address construction phase related stormwater discharge issues.

The SWPPP would include a site map, or maps, showing the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection, and discharge points, general topography before and after construction, and drainage patterns across the Project site. The SWPPP would also identify erosion controls, runon, and runoff controls, sediment controls, sediment tracking, and 'good housekeeping' practices related to controlling stormwater runoff. It would also contain sections on materials handling, development of stormwater performance standards, training, and required qualifications of maintenance staff. The implementation of the SWPPP during construction-phase activities would ensure that the Project does not violate state water quality standards. The SWPPP would also depict graphically and in list form the BMPs that would be utilized to control and prevent storm water runoff from the construction site. The SWPPP would also contain a visual monitoring plan.

BMPs that may be identified in the SWPPP include the following: placement of silt fences and sand and gravel bags; stabilization of entry and exit points; construction of berms; installation of geofabric; revegetation of areas by hydroseeding and mulching; actions for control of potential fuel or drill tailing release; use of trench stabilizing and de-watering and requirements for disposal (i.e., location, quality); designation of solid waste container sites; and the identification of storage areas for chemicals, paint, solvents and other construction materials. Once prepared, a copy of the SWPPP would be kept available at the construction site headquarters for review and approval by visiting members of the SWRCB or the Central Valley RWQCB. Copies of the SWPPP would also be made available to residing City and County jurisdictions if requested, and shall be available for review, if requested and applicable, by City and County Engineering Departments.

Porter-Cologne Water Quality Act

Section 13260(a) of the California Water Code ("Water Code," or "Porter Cologne") requires that any person discharging waste or proposing to discharge waste within

any region, other than to a community sewer system, which could affect the quality of the waters of the State, file a report of waste discharge (ROWD). The discharge of dredged or fill material may constitute a discharge of waste that could affect the quality of waters of the State (Defined in Water Code section13050(e)).

Typically, the State of California relies upon its authority under section 401 of the Federal CWA (33 U.S.C. section 1341) to regulate discharges of dredged or fill material to California waters that are also within the jurisdiction of the USACE. Given the WQC process employed under section 401, waste discharge requirements under Porter Cologne are typically waived for those projects requiring a water quality certification. In 2001 the U.S. Supreme Court decision in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001) (SWANCC) invalidated the Army Corp's use of the "Migratory Bird Rule" to establish Federal jurisdiction over isolated waters. Since 2001, the State of California has reasserted its authority under State law to assert jurisdiction over isolated waters for water quality purposes by requiring a ROWD.

Local

Water Quality Control Plan

The Central Valley RWQCB (Region 5) protects the beneficial uses of water resources within the Central Valley, including Yolo, Sutter, Sacramento, and Placer counties. In 1998, the Central Valley RWQCB adopted The Water Quality Control Plan for the Sacramento River Basin and San Joaquin River Basin (Basin Plan), Fourth Edition. A revised version of the Basin Plan was released in August 2006. The plan sets forth implementation policies, goals, and water management practices in accordance with the Porter-Cologne Water Quality Control Act and the Federal CWA, and establishes standards and objectives for water quality specific to the Central Valley region aimed at protecting aquatic resources. Based on the Project being located within the jurisdiction of the Central Valley RWQCB, all discharges to surface water or groundwater from Project activities are subject to the requirements of the Basin Plan.

4.8.3 Significance Criteria

General

An adverse impact on water quality is considered significant and would require mitigation if Project construction or operation would:

1. Result in violation of Federal or State Agency quantitative or qualitative water quality criteria, standards, or objectives (including objectives promulgated by the CVRWQCB and criteria set forth in the Proposed California Toxics Rule); or

2. Otherwise degrade or impair beneficial uses designated by the CVRWQCB.

Groundwater

An adverse impact on groundwater resources is considered significant and would require mitigation if Project construction or operation would:

1. Alter the flow of groundwater to local springs or wetland areas;

2. Interrupt or degrade groundwater used for private or municipal purposes; or

3. 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.

Surface Water

An adverse impact on surface water resources is considered significant and would require mitigation if Project construction or operation would:

1. Result in increased sedimentation or erosion that adversely affects the operation of irrigation water control structures, gates, or valves or the quality of municipal water supply reservoirs;

2. Result in increased sedimentation or erosion such that degradation of channel stability or water quality results;

3. Substantially alter the existing drainage pattern of the site or area, including through the alteration of a course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in on-site or off-site flooding;

4. Place permanent structures within the 100-year floodplain that would be damaged by flooding; or

5. Degrade the integrity of structures, such as bridges, pipelines, and utilities due to erosion and improper conveyance of stormwater during construction and operation.

4.8.4 Applicant Proposed Measures

Applicant Proposed Measures (APMs) have been identified by PG&E in its Environmental Analysis prepared for the CSLC. APMs that are relevant to this Section are presented below. This impact analysis assumes that all APMs would be implemented as defined below. Additional mitigation measures are recommended in this Section if it is determined that APMs do not fully mitigate the impacts for which they are presented.

APM HWQ-1. PG&E will implement BMPs from the Water Quality Construction Best Management Practices Manual to prevent project-related erosion and sedimentation. A monitoring program will be established to ensure that the prescribed BMPs are followed throughout pipeline construction. Examples of these BMPs include:

- Preparation, training, and maintenance for clear work site practices, tracking controls, and materials management to minimize the direct work impacts on soil and erosion;
- Installation of temporary silt fences and other containment features, including gravel bags and fiber rolls, surrounding work areas to prevent the loss of soil during rain events and other disturbances;
- Utilization of storm drain inlet protection, including sediment filters and ponding barriers, in order to retain sediments on-site and prevent excess discharge into storm drains; and
- Implementation of soil erosion controls, including preservation of existing vegetation, temporary soil stabilization through hydro seeding, mulching, and other techniques.

APM HWQ-2. PG&E will implement a Hazardous Substances Control and Emergency Response Plan for preventing, controlling, and cleaning up hazardous material spills.

APM HWQ-3. PG&E will perform open-cut crossings of waterbodies using a dry-crossing method (coffer dams with temporary water diversion).

APM HWQ-4. PG&E will cross larger and/or more sensitive waterways with HDD or bores.

APM HWQ-5. PG&E will prepare an HDD Fluid Release Contingency Plan that will specify procedures to contain and clean up any drilling mud released into waterways in the event of a frac-out.

4.8.5 Impact Analysis and Mitigation

Impact Discussion

Because the Project would be constructed underground and the disturbed surfaces restored (aside from the regulating and metering stations), there would be no long-term impacts to hydrology and water quality. Potential adverse impacts to water quality would be short-term and temporary. Impacts to water quality during construction of the Project would be minimized by the implementation of best management practices (BMPs) proposed in APM HWQ-1 and APM BIO-7. The analysis presented in this Section focuses on the potential impacts from construction of the Project.

CVRWQCB Beneficial Uses

The Project would not otherwise degrade or impair beneficial uses designated by the CVRWQCB. As stated below for Impact HWQ-1, implementation of APM BIO-35 would ensure that PG&E acquire all necessary permits from the CVRWQCB, and that all additional avoidance or mitigation measures that are agreed upon during the permitting process with regard to water quality are implemented. Discharge and dewatering activities would be strictly regulated by Project permit conditions. A specific discharge permit would be obtained, and the requirements would be adhered to, and therefore, beneficial uses would not be impacted (less than significant, Class III).

Groundwater Flow

Groundwater recharge in the Central Valley aquifer system occurs mainly within perennial streams and rivers fed by mountain runoff. The Project would not alter the flow of groundwater to local springs or wetland areas. Any potential impacts on groundwater flow from this Project would occur as a result of changes in

groundwater recharge due to stream flow changes in streams and rivers where recharge occurs. Dry open-cut trenching or HDD methodologies would be used in the crossing of water features that influence groundwater recharge to local springs or wetland areas. Open cuts would be excavated on county roads and small irrigation canals and dams. These trench excavations would be opened, filled with a pipeline, and closed the same day or covered by a plate during non-construction hours. Waterbodies with low flows would be crossed using a dry-crossing method, such as coffer-dams with temporary water diversions. HDD would be used to install approximately 15,568 linear feet of pipe beneath the Sacramento River, Yolo Bypass (including Tule Creek), Knights Landing Ridge Cut, I-5, I-505, and other sensitive areas. HDD is carried out by utilizing a powerful horizontal drilling rig supported by a drilling mud tank and a power unit. HDD would allow for non-intrusive preparation and installation of the proposed pipeline beneath features containing or contributing to water resources in the area, and would not result in an alteration of the flow of groundwater to local springs or wetland areas.

As proposed in APM HWQ-3 and APM HWQ-4, and in APM BIO-20 and APM BIO-21, the Project incorporates design features and construction techniques that reduce potential impacts to groundwater flow to less than significant. As discussed in Section 4.4, Biological Resources, implementation of APM BIO-5, APM BIO-7, APM BIO-13, APM BIO-16, and APM BIO-23 would further reduce potential impacts to groundwater flow to less than significant (Class III).

Groundwater Supply

The Project would not 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. All Project trenching or directional drilling would take place in accordance with APM HWQ-3, APM HWQ-4, as well as APM BIO-20, and APM BIO-21 (further described in Section 4.4, Biological Resources), and would not result in the development of any additional impermeable surfaces and would not significantly alter the existing topography or its drainage characteristics. Therefore, the overall infiltration characteristics would remain essentially unchanged during and after Project completion, and the quantity of groundwater for extraction and supply would remain the same.

As part of construction, the Project would require 7.26 million gallons of water for hydrostatic testing of the pipeline. The discharge of this water would occur in the

groundwater recharge area for the Central Valley aquifer system that occurs mainly within perennial streams and rivers. The hydrostatic testing would result in one time discharges for each of the four segments as they are completed.

Water utilized during hydrostatic testing would be disposed of via the following methods, as described in PG&E's Pre-Construction Review report (PG&E 2007b):

- Discharged into sanitary sewer systems; or
- Discharged into storm drains, drainage ditches, creeks, or rivers (carbon filtering or other form of water conditioning may be required).

The method to be utilized would be determined by the availability and capacity of the systems in the area, requirements of governing agencies, and condition of water after hydrostatic testing. Water quality would be measured from the water source prior to use and after use during discharge to assure that water quality is not compromised as a result of the test. All hydrostatic testing water would be discharged using a flow manifold and energy dissipater to control the rate of discharge and to minimize erosion and turbidity to meet the standards set forth under the terms and conditions of the NPDES permit and the General Order for Dewatering and Other Low Threat Discharges to Surface Waters, to be issued by the CVRWQCB.

Based on past experience with similar projects, PG&E anticipates that no contaminants would be introduced to the surface water during the testing process and that all samples would meet standards for gray water and that the water discharged from the hydrostatic test would pose no threat to any plants, fish, or animals. Therefore, impacts to groundwater supplies by the hydrostatic testing would be temporary and less than significant (Class III).

Sedimentation or Erosion - Reservoirs

The Project would not result in increased sedimentation or erosion that adversely affects the operation of irrigation water control structures, gates, or valves or the quality of municipal water supply reservoirs. There are no municipal water supply reservoirs within the vicinity, or downstream of the Line 406 and Line 407 pipelines. As proposed in APM HWQ-1, APM HWQ-2, and APM BIO-7, the Project would employ BMPs that would minimize erosion and subsequent sedimentation, and therefore maintain water quality. Therefore, potential impacts to irrigation water

control structures, gates, or valves and municipal water supply reservoirs would be less than significant (Class III).

Sedimentation or Erosion - Channels

Increased erosion and sedimentation would have the potential to occur if Project activities result in soil disturbance and runoff carrying erosion from those areas into streams. In APM HWQ-4, APM BIO-20, and APM BIO-21, the Project proposes that the crossing of major waterways and floodplain areas along the proposed alignment would be conducted using HDD methodologies. Entrance and exit locations would be set back from streams and channels. As proposed in APM HWQ-5, APM BIO-23, and MM HWQ-1, the Project would implement a HDD Fluid Release Contingency Plan that would require that any drilling fluids inadvertently released into waterways or wetlands during HDD procedures would be cleaned up.

Open-cut trenching is proposed during the dry months within county roads and small irrigation canals along the proposed alignment. These activities would have the potential to increase erosion and sedimentation if they are not re-contoured and restored before the wet season. Because open-cut trenching would be temporary and would be restricted to the summer dry months, no sedimentation or erosion into active waterways are anticipated. Open trenches would be backfilled, re-contoured, and compacted immediately following excavation and installation of pipeline sections. Restoration of affected areas would occur during the same dry season, thereby preventing the exposure of unsettled substrate to streamflow within the affected areas during the wet season.

As discussed in Impact HWQ-1, implementation of APM BIO-5 would ensure that PG&E acquires all necessary permits from the USACE, the CVRWQCB, and the CDFG for potential stream channel impacts. There may be some additional avoidance or mitigation measures that are required by the CVRWQCB or the CDFG during the permitting process with regard to water quality criteria, standards, or objectives that would be implemented.

Implementation of APM HWQ-1 and APM BIO-7 would ensure that the Project adheres to BMPs during the construction phase to avoid or minimize potential adverse impacts to water quality. Implementation of the PG&E Water Quality Construction Best Management Practices Manual and the Erosion Control and Sediment Transport Plan would ensure the avoidance or minimization of potential

impacts to water quality from erosion and sedimentation. Therefore, impacts would be less than significant (Class III).

Drainage Pattern

The Project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of a course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in on-site or off-site flooding. As proposed in APM HWQ-3, APM HWQ-4, APM BIO-20, and APM BIO-21, Project impacts to drainage patterns would be avoided along the majority of the proposed alignment through the implementation of HDD methods. Any potential impacts to surface water drainage patterns resulting from dry season open-cut trenching would be minor and temporary in nature. Temporary stream channel impacts associated with open-cut trenching would be restricted to irrigation canals and smaller ephemeral waterways, and would not increase the rate or amount of surface runoff or result in on-site or off-site flooding. The Project would not result in any additional impermeable surfaces and would not significantly alter the existing topography or its drainage characteristics.

As proposed in APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, and APM BIO-22, temporary impact areas resulting from open-cut trenching would be restored and re-contoured to pre-Project conditions such that biological and hydrology functions and values of affected areas, and areas downstream of affected areas, are retained. Existing channel material would be replaced during the backfilling of all trenches such that channel infiltration characteristics would remain essentially unchanged during and after Project completion.

The implementation of APM BIO-5 would ensure that PG&E acquires all necessary permits from the regulatory agencies for any impacts to waters and wetlands that occur along the proposed alignment. Project permitting would ensure that all temporary disturbances to drainage patterns that are jurisdictional under section 1600 are mitigated. This would include permitting with the CDFG and acquisition of a Streambed Alteration Agreement for the Project. Additional avoidance or mitigation measures that are required by CDFG during the permitting process with regard to alteration of drainage patterns would be implemented and adhered to and impacts would be less than significant (Class III).

Structure Integrity

The Project would not degrade the integrity of structures, such as bridges, pipelines, and utilities due to erosion and improper conveyance of stormwater during construction and operation. The proposed alignment runs along various roads and associated rights-of-way (ROW) that contain existing structures. As proposed, HDD methods would be employed in the crossing of larger waterways and major roads, including I-5, I-505, State Route (SR) 113, Powerline Road, and SR-99/70. All structures associated with these areas would be avoided.

During excavation activities for open-cut trenching and pipe installation, it is anticipated that construction would occur in the immediate vicinity of existing structures. As proposed in APM HWQ-1, MM HWQ-1, and APM BIO-7, PG&E would implement measures contained within the Water Quality Construction Best Management Practices Manual, in addition to an Erosion Control and Sediment Transport Plan and Storm Water Pollution Prevention Plan for the Project, and any subsequent permit obligations pertaining to water quality. Discharge and dewatering activities would be strictly regulated by Project permit conditions. Collectively, these measures would ensure that all water quality plans are implemented and BMPs are employed to prevent erosion and improper conveyance of stormwater during construction and operation. Impacts would be less than significant (Class III).

Impact HWQ-1: Federal or State Water Quality Standards

The Project could result in violation of Federal or State Agency quantitative or qualitative water quality criteria, standards, or objectives (including objectives promulgated by the CVRWQCB and criteria set forth in the Proposed California Toxics Rule) (Potentially Significant, Class II).

Inadvertent erosion that results in increased sediment in streams or discharge of other materials into waterbodies as a result of Project construction activities could result in adverse impacts to water quality. As proposed in APM HWQ-1 and APM BIO-7, PG&E would implement BMPs during the construction phase to avoid and minimize potential adverse impacts to water quality. Implementation of the PG&E Water Quality Construction Best Management Practices Manual and the Erosion Control and Sediment Transport Plan would ensure the avoidance and minimization of potential impacts to water quality. As proposed in APM BIO-5, PG&E would acquire all necessary permits from the USACE, the CVRWQCB, and the CDFG, and would implement additional avoidance or mitigation measures that are required by

the CVRWQCB, the CDFG and/or the USFWS during the permitting process related to protection of water quality. Discharge associated with dewatering activities would be strictly regulated by Project permit conditions. Permits include the General Construction Permit (99-08-DWQ) which is required for discharges of storm water associated with construction activity and includes a site specific SWPPP and a list of BMPs to be implemented. Prior to construction, a discharge permit (Order No. 5-00-175) would be required of and adhered to by PG&E. The permit would require that the flow rates be limited to 0.25 million gallons per day during dry months. Limiting the flow rates during dry months would minimize impacts to downstream channel characteristics.

Improper use and storage of hazardous materials and pollutants associated with Project construction could potentially result in adverse impacts to water quality. As proposed in APM HWQ-1 and APM BIO-13, hazardous materials and pollutants near waterbodies that could result in a threat to life or damage to property would be stored and handled in accordance with the Project's Hazardous Substances Control and Emergency Response Plan. Implementation of this plan, in addition to implementation of Project construction BMPs, would ensure that potential impacts to water quality are either avoided or minimized.

A frac-out is possible during HDD, which could degrade water quality as a result of drilling muds being discharged into a stream or river. As proposed in APM HWQ-5 and APM BIO-23, PG&E would develop an HDD Fluid Release Contingency Plan that would require mitigation in the unlikely event of a frac-out resulting in discharge of drilling mud that would potentially result in adverse impacts to water quality. The plan would include measures to contain and clean up any drilling mud inadvertently released into waterways. However, since there are insufficient details in APM HWQ-5 to ensure that potential impacts would be minimized, MM HWQ-1 is required to be implemented prior to any construction activities.

Potential impacts to quantitative or qualitative water quality criteria, standards, or objectives, including objectives promulgated by the CVRWQCB and criteria set forth in the Proposed California Toxics Rule, would be short-term, and temporary. The potential impacts would be reduced to less than significant through the implementation of the APMs discussed above and through MM HWQ-1 below.

Mitigation Measures for Impact HWQ-1: Federal or State Water Quality Standards

MM HWQ-1. Response to Unanticipated Release of Drilling Fluids. Sixty days prior to the commencement of HDD activities near water

crossings, PG&E shall prepare and submit for CSLC, RWQCB, and CDFG approval, an HDD frac-out prevention and response plan that contains the following provisions:

- HDD crews shall strictly monitor drilling fluid pressures;
- Obtain site-specific geotechnical data at all water crossings where HDD is to be used to determine the appropriate depth below bed of waterway;
- Implement sizing techniques (move bores back and forth slowly to keep track of potential frac-outs);
- Consider potential application of surface casings to add a protective outer layer;
- Conduct Geotech bores in locations that would prevent drilling mud from escaping through boreholes;
- Prohibit nighttime drilling near sensitive noise receptors unless absolutely required;
- Maintain containment equipment for drilling fluids on site;
- Monitor turbidity downstream of the drill site;
- Cease work immediately if a seep into a stream is detected, such as by a loss in pressure or visual observation of changes in turbidity or surface sheen;
- Immediately report all bentonite seeps into waters of the State or sensitive habitat to the Project's resource coordinator, the CSLC, and the appropriate resource agencies (i.e., NOAA, USFWS, CDFG, USACE, applicable RWQCBs, local County, and DWR);
- Use non-toxic fluorescent dye in the drilling mud to allow easier identification of frac-outs;
- Maintain onsite boats with monitors where appropriate;
- In the event of a release during construction, PG&E shall assess the extent of potential damage to fisheries and carry out

appropriate mitigation/compensation procedures. Impacts to consider include curtailment of access to fishing areas, contamination of fish and habitat, and loss of income to commercial fishing interests and businesses. Procedures for assessing damage should include field surveys to determine the extent of damage during and soon after the release and long-term monitoring to determine long-term effects to habitat, fish, and fishing interests; and

- A 3,000-gallon vacuum truck shall be available on call in case a spill or frac-out occurs.

Rationale for Mitigation

The procedures outlined in the HDD frac-out prevention and response plan would ensure that any drilling fluids released into or near waterways are immediately cleaned up in the event of a frac-out. With this measure, potential impacts would be reduced to less than significant.

Impact HWQ-2: Groundwater for Private or Municipal Purposes

The Project could interrupt or degrade groundwater used for private or municipal purposes (Potentially Significant, Class II).

There are rural residences, agricultural properties and undeveloped properties located within the Project area. Private water wells, irrigation wells, and water pipelines may be located within and extend into the Project construction areas or construction staging areas. Mitigation is proposed below to determine well locations and to test each well located within 200 feet of construction. The criteria to test wells within 200 feet of the Project was established based upon the local soils, as well as construction methods. Since the Project trenching would be relatively shallow in comparison to the assumed well depths, the influence the Project may have on the aquifer supplying the wells drops off drastically as a function of distance from the excavation. If, during monitoring, it is determined that wells are affected within the 200-foot separation distance, PG&E will extend the distance until it is determined that wells are no longer affected. Implementation of MM-HWQ-2 would reduce impacts to private wells to less than significant.

Water required for hydrostatic testing, HDD operations, and dust control would be obtained from the following sources:

- Public/Private water system (via fire hydrants and irrigation wells);
- Waterways (canals, creeks, or rivers); or
- Water brought in by truck or storage tanks.

The preferred source of water for hydrostatic testing along the route would come from irrigation wells. If irrigation wells could not be secured as a source of water, one of the other sources would be used. PG&E does not plan to acquire water rights, but would negotiate with landowners for water from agricultural wells, or purchase water from irrigation districts or other commercial water sources. Final sources would be determined after drawings are completed and hydrotest procedures are detailed.

As discussed above under Groundwater Flow, potential impacts on groundwater flow would be minimized through the implementation of APM HWQ-3 and APM HWQ-4, as well as APM BIO-20 and APM BIO-21 (further described in Section 4.4, Biological Resources). These APMs would also minimize potential impacts to surface water quality, thereby reducing or eliminating potential contamination of groundwater from Project-related pollutants.

Mitigation Measure for Impact HWQ-2: Private Water Wells

MM HWQ-2. **Verify Well Locations.** Prior to construction of the proposed Project, well locations within 200 feet of the excavation, construction staging areas, and aboveground facility locations shall be verified by PG&E through field surveys to determine if private water wells and water pipelines are currently in use and if their area of influence intersects the proposed Project site. With the landowner's permission, PG&E shall test the wells to determine baseline flow conditions and monitor these wells during construction of the proposed Project. If, through monitoring, it is determined that Project construction is affecting well production, PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner. Surveys shall be conducted by PG&E prior to construction to ensure that any unidentified springs are avoided during construction.

Rationale for Mitigation

The mitigation proposed above would ensure that Project construction activities would avoid potential conflicts with private water wells, irrigation wells, and water pipelines. With this measure, potential impacts would be reduced to less than significant.

Impact HWQ-3: 100-Year Floodplain

The Project would place permanent structures within the 100-year floodplain that would be damaged by flooding (Potentially Significant, Class II).

One-hundred-year special flood hazard areas exist in Hungry Hollow (north of Esparto), and a contiguous area beginning at the western end of the Yolo Bypass, extending east through the Natomas Basin area to Sorento Road (just west of the Placer/Sutter county boundary). Figure 4.8-1 depicts the 100-year flood boundaries in the Project area. Western portions of Line 406 that are within Hungry Hollow, west of Dunnigan Hills, traverse many 100-year flood hazard areas. Additionally, all of Line 407 West within and east of the Yolo Bypass would be in 100-year special flood hazard areas, as well as all of the proposed Powerline Road DFM and the portion of Line 407 East situated west of Sorento Road. Other portions of Line 406 and Lines 407 East and West would be outside of flood hazard areas.

As proposed, the pipeline would be installed during the dry season, and no portions of the conduit would be exposed to 100-year floods during Project construction or operation. However, the Powerline Road Pressure Regulating Station and the Powerline Road Main Line Valve structure would potentially be exposed to flooding at their proposed locations. Mitigation is proposed below to flood-proof any structures proposed to be constructed within a 100-year floodplain. Both proposed structures would be no more than 10 feet in height without the flood-proofing. Flood-proofing would require the structures to be raised approximately 1 foot above the 100-year storm flood profile level.

Mitigation Measures for Impact HWQ-3: 100-Year Floodplain

MM HWQ-3 **Flood-Proof Pump Houses Within 100-year Floodplain.** If any structures (pump stations, aboveground valve housing) associated with the buried pipeline are placed within the 100-year flood zone, the structure shall be “flood-proofed” in their foundation design and raised in elevation to a minimum of 1 foot above the 100-year storm

flood profile level, to reduce the risk that they would be damaged during such an event.

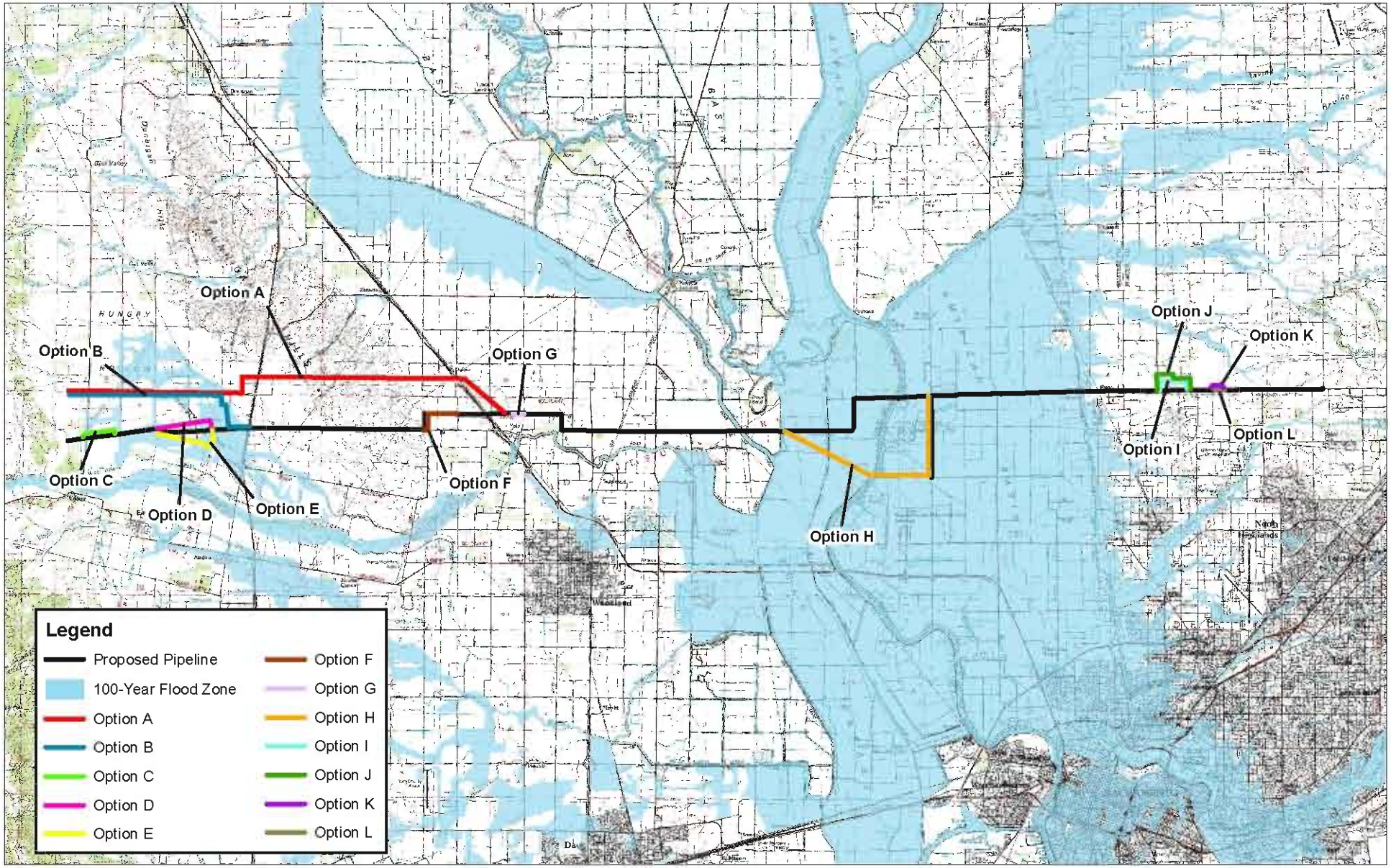
Rationale for Mitigation

The mitigation would reduce the risk that a 100-year flood would catastrophically damage the housing of a pump station, pump, valve, or associated infrastructure, thereby allowing these facilities to continue functioning even during adverse flood conditions. The "flood-proofing" measures may increase the exposed surface area of any pump station, however, the total area would still be not be large enough to impede or redirect flood flows to any significant degree. Implementation of MM HWQ-3 would improve the design of these structures and reduce potential impacts relating to flood damage to less than significant.

4.8.6 Impacts of Alternatives

A No Project Alternative as well as twelve options have been proposed for the alignment in order to minimize or eliminate environmental impacts of the proposed Project and to respond to comments from nearby landowners. The twelve options, labeled A through L, have been analyzed in comparison to the portion of the proposed route that has been avoided as a result of the option. Descriptions of the options can be found in Section 3.0, Alternatives and Cumulative Projects, and are depicted in Figure 3-2A through Figure 3-2G.

For any Project, significant short-term impacts to water quality, groundwater flow, groundwater supply, sedimentation or erosion, drainage and flood patterns, and structural integrity could result from the installation of pipelines, the construction of aboveground stations, and other construction-related activities within the Project site.



Source: Adapted from PG&E 2008, FEMA Q3 Flood Data, USGS 100k Scale DRGs.

NORTH

0 2.5 5 10 Miles

Michael Brandman Associates

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Figure 4.8-1
100-Year Flood Boundaries in the Project Area

No Project Alternative

Under the No Project Alternative, no impacts to hydrology or water quality would result. A No Project Alternative would eliminate any potential direct or indirect impacts to water quality, groundwater flow, groundwater supply, sedimentation or erosion, drainage and flood patterns, and structural integrity that could result from the installation of pipelines, the construction of aboveground stations, and other construction-related activities. Potential short-term direct impacts to, or the placement of fill within, jurisdictional waters would not occur. Potential long-term indirect impacts to hydrology and water quality as a result of open-cut trenching and construction disturbance within waterways would not occur. Lastly, potential indirect impacts resulting from the unlikely event of a frac-out during horizontal directional drilling procedures, including water quality impairment, would not occur.

Option A

Water Quality

Similar to Line 406, Option A would cross the Hungry Hollow Canal, Goodnow Slough and approximately four smaller agricultural canals. Option A would also cross Smith Creek within the Dunnigan Hills area, whereas Line 406 would not cross this feature.

Similar to Line 406, Option A would cross water features using open-cut trenching or jack-and-bore methods and would require similar regulatory permits from appropriate jurisdictions overseeing the waterways. Because of the additional Smith Creek crossing by Option A, the magnitude of potential water quality impacts would be greater than the proposed Project. However, impacts to water quality under Option A would still be less than significant (Class III) with implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23. Further, should HDD methods be used to cross water features or highways in the vicinity of water features for Option A, implementation of MM HWQ-1 would be required to reduce potential impacts to less than significant.

Groundwater

Option A would cross approximately 5 fewer private residential parcels than Line 406. Since groundwater wells are commonly associated with residences, it is assumed that the area crossed by Option A would contain fewer groundwater wells than the area crossed by Line 406. Nonetheless, wells used for both residential and

agricultural purposes may be present within 200 feet of Option A, resulting in potentially significant impacts (Class II) to groundwater should pipeline construction impact well production or water quality.

Similar to the proposed project, Option A would require implementation of APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option A would also require implementation of MM HWQ-2, which requires PG&E to locate, test and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production, PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

While Option A would traverse approximately 4,640 feet less of the area designated as being within the 100-year floodplain than Line 406, similar to Line 406, Option A would not construct any permanent aboveground facilities in the 100-year floodplain. Similar to the proposed alignment, Option A would be installed during the dry season and would be completely buried after installation. As such, no portions of the buried pipeline would be exposed to 100-year floods during Project construction or operation. Neither the Capay Metering Station at the western terminus of the pipeline or any substitute station located at the western terminus of Option A would be located within the 100-year floodplain. Similar to Line 406, floodplain-related impacts associated with Option A would be less than significant.

Based on the additional crossing of Smith Creek, Option A would have a greater potential effect on hydrology and water quality than the proposed Project. However, similar to Line 406, impacts would be reduced to less than significant through the implementation of BMPs and mitigation. As such, impacts to hydrology and water quality would be similar to the proposed project.

Option B

Water Quality

Similar to Line 406, Option B would cross the Hungry Hollow Canal and approximately four smaller agricultural canals. Option B pipeline crossings of water features would be conducted using open-cut trenching or jack-and-bore methods and would require similar regulatory permits from appropriate jurisdictions

overseeing the waterways. Similar to Line 406, potential water quality impacts associated with Option B would be less than significant (Class III) with implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23. Further, should HDD methods be used to cross water features or highways in the vicinity of water features for Option B, implementation of MM HWQ-1 would be required to reduce potential impacts to less than significant.

Groundwater

Option B would cross approximately two more private residential parcels than Line 406. Since groundwater wells are commonly associated with residences, it is assumed that the area crossed by Option B may contain more groundwater wells than the area crossed by Line 406. Similar to Line 406, wells used for agricultural purposes may also be present within 200 feet of Option B. Potentially significant impacts to groundwater would occur should pipeline construction affect well production or water quality (Class II). Option B would require implementation of APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22, thereby reducing impacts to groundwater flows and quality. Option B would also require implementation of MM HWQ-2, which requires PG&E to locate, test and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Option B would traverse approximately 3,757 feet more of the area designated as being within the 100-year floodplain than Line 406. Similar to the proposed alignment, Option B would be installed during the dry season and would be completely buried after installation. As such, no portions of the buried pipeline would be exposed to 100-year floods during Project construction or operation. Neither the Capay Metering Station at the western terminus of the pipeline or any substitute station located at the western terminus of Option B would be located within the 100-year floodplain. Similar to the impacts described above for Line 406, floodplain-related impacts associated with Option B would be less than significant.

Based on the similarities and extent of potential impacts, Option B would have no more or no less of an effect on hydrology and water quality than the proposed Project after the implementation of appropriate APMs and MMs.

Option C

Water Quality

Option C would cross the Hungry Hollow Canal at a location approximately 450 feet north of the proposed Line 406 crossing.

Similar to Line 406, the Option C crossing of Hungry Hollow Canal would employ open-cut trenching. However, Option C would run parallel to the canal for approximately 450 feet, which would result in a greater distance of trenching along the canal. This would result in increased opportunities for erosion to affect the Canal. Impacts to water quality under the proposed alignment would be less than significant due to the implementation APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23. These APMs would also be implemented under Option C, resulting in a less than significant impact to water quality.

Groundwater

Both Option C and the corresponding portion of Line 406 are not within 200 feet of a private residential parcel. As such, it can be assumed that no groundwater wells are located in this area. However, wells used for agricultural purposes may be present within 200 feet of both Option C and Line 406. Potentially significant impacts to groundwater would occur should pipeline construction impact well production or water quality (Class II). Similar to the proposed project, Option C would implement APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option C would also require implementation of MM HWQ-2, which requires PG&E to locate, test and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Option C would traverse approximately 215 feet more of the area designated as being within the 100-year floodplain than Line 406. Similar to the proposed alignment, Option C would be installed during the dry season and would be completely buried after installation. As such, no portions of the buried pipeline would be exposed to 100-year floods during Project construction or operation. Similar to

the impacts described above for Line 406, floodplain-related impacts associated with Option C would be less than significant.

Based on the greater extent of potential impacts along Hungry Hollow Canal, Option C would have a greater potential effect on hydrology and water quality than the proposed Project. However, similar to Line 406, impacts would be reduced to less than significant through the implementation of BMPs and mitigation. As such, impacts to hydrology and water quality would be similar to the proposed project.

Option D

Water Quality

Option D would traverse approximately 6 unnamed irrigation canals whereas Line 406 would cross approximately 11 unnamed irrigation canals.

Similar to Line 406, Option D pipeline crossings of water features would be conducted using open-cut trenching or jack-and-bore methods and would require similar regulatory permits from appropriate jurisdictions overseeing the waterways. Impacts to water quality under the proposed alignment would be less than significant (Class III) due to the implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23. These APMs would also be implemented under Option D, resulting in a less than significant impact to water quality.

Groundwater

Option D would cross approximately 5 more private residential parcels than Line 406. Since groundwater wells are commonly associated with residences, it is assumed that the area crossed by Option D would contain more groundwater wells than the area crossed by Line 406. Similar to Line 406, wells used for agricultural purposes may also be present within 200 feet of Option D. Potentially significant impacts to groundwater would occur should pipeline construction impact well production or water quality (Class II). Similar to the proposed project, Option D would implement APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option D would also require implementation of MM HWQ-2, which requires PG&E to locate, test and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction

activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Option D would traverse approximately 235 feet more of the area designated as being within the 100-year floodplain than Line 406. Similar to the proposed alignment, Option D would be installed during the dry season and would be completely buried after installation. As such, no portions of the buried pipeline would be exposed to 100-year floods during Project construction or operation. Similar to the impacts described above for Line 406, floodplain-related impacts associated with Option D would be less than significant.

Based on the similarities and extent of potential impacts, Option D would have no more or less of an effect on hydrology and water quality than the proposed Project after the implementation of appropriate APMs and MMs.

Option E

Water Quality

Option E would traverse approximate 9 unnamed irrigation canals whereas Line 406 would cross approximately 11 unnamed irrigation canals.

Similar to Line 406 Option E pipeline crossings of water features would be conducted using open-cut trenching or jack-and-bore methods and would require similar regulatory permits from appropriate jurisdictions overseeing the waterways. Impacts to water quality under the proposed alignment would be less than significant (Class III) due to the implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23. These APMs would also be implemented under Option E, resulting in a less than significant impact to water quality.

Groundwater

Option E would cross approximately 3 more private residential parcels than Line 406. Since groundwater wells are commonly associated with residences it is assumed that the area crossed by Option E would contain more groundwater wells than the area crossed by Line 406. Similar to Line 406, wells used for agricultural purposes may also be present within 200 feet of Option E. Potentially significant impacts to groundwater would occur should pipeline construction impact well

production or water quality (Class II). Similar to the proposed project, Option E would implement APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option E would also require implementation of MM HWQ-2, which requires PG&E to locate, test, and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Option E would traverse approximately 1,732 feet more of the area designated as being within the 100-year floodplain than Line 406. Similar to the proposed alignment, Option E would be installed during the dry season and would be completely buried after installation. As such, no portions of the buried pipeline would be exposed to 100-year floods during Project construction or operation. Similar to the impacts described above for Line 406, floodplain-related impacts associated with Option E would be less than significant.

Based on the similarities and extent of potential impacts, Option E would have no more or less of an effect on hydrology and water quality than the proposed Project after the implementation of appropriate APMs and MMs.

Option F

Option F would traverse approximately 3 irrigation ditches, the same as Line 406.

Water Quality

Similar to Line 406, Option F pipeline crossings of water features would be conducted using open-cut trenching or jack-and-bore methods and would require similar regulatory permits from appropriate jurisdictions overseeing the waterways. Impacts to water quality under the proposed alignment would be less than significant (Class III) due to the implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23. These APMs would also be implemented under Option F, resulting in a less than significant impact to water quality.

Groundwater

Option F would cross 1 less private residential parcel than the corresponding portion of Line 406. Similar to Line 406, wells used for agricultural purposes may be present within 200 feet of Option F. Potentially significant impacts to groundwater would occur should pipeline construction impact well production or water quality (Class II). Similar to the proposed project, Option F would implement APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option F would also require implementation of MM HWQ-2, which requires PG&E to locate, test, and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Neither Option F or the corresponding portion of Line 406 would traverse an area designated as being within the 100-year floodplain. Similar to the proposed project, impacts would be less than significant.

Based on the similarities and extent of potential impacts, Option F would have no more or less of an effect on hydrology and water quality than the proposed Project after the implementation of appropriate APMs and MMs..

Option G

Water Quality

The alignment considered for Option G would cross the same irrigation ditches as the proposed alignment.

Similar to Line 406, Option G pipeline crossings of water features would be conducted using open-cut trenching or jack-and-bore methods and would require similar regulatory permits from appropriate jurisdictions overseeing the waterways. Impacts to water quality under the proposed alignment would be less than significant (Class III) due to the implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23. These APMs would also be implemented under Option G, resulting in a less than significant impact to water quality.

Groundwater

Option G would run between three private residential parcels, where the proposed Project would traverse an area slightly to the north of these residences. Since groundwater wells are commonly associated with residences, it is assumed that the area crossed by Option G would likely be in closer proximity to any existing wells than the area crossed by Line 406. Similar to Line 406, wells used for agricultural purposes may also be present within 200 feet of Option G. Potentially significant impacts to groundwater would occur should pipeline construction impact well production or water quality (Class II). Similar to the proposed project, Option G would implement APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option G would also require implementation of MM HWQ-2, which requires PG&E to locate, test and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Neither Option G or the corresponding portion of Line 406 would traverse an area designated as being within the 100-year floodplain. Similar to the proposed project, impacts would be less than significant (Class III).

Based on the similarities and extent of potential impacts, Option G would have no more or less of an effect on hydrology and water quality than the proposed Project after the implementation of appropriate APMs and MMs.

Option H

Water Quality

Both Option H and the proposed Project would cross the East Yolo Bypass Drainage, Spangler Canal and Sacramento River via HDD methods. However, the proposed project would cross approximately 10 irrigation ditches while Option H would cross 15 ditches.

Similar to the proposed Project, Option H pipeline crossings of water features would be conducted using open-cut trenching, jack-and-bore or HDD methods and would require similar regulatory permits from appropriate jurisdictions overseeing the waterways. Impacts to water quality under the proposed Project would be less than

significant (Class III) due to the implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23 as well as MM HWQ-1. These APMs and MM HWQ-1 would also be implemented under Option H, resulting in a less than significant impact to water quality.

Groundwater

Option H would cross approximately 3 fewer private residential parcels than Line 406. Since groundwater wells are commonly associated with residences it is assumed that the area crossed by Option H would contain less groundwater wells than the area crossed by Line 406. Similar to Line 406, wells used for agricultural purposes may also be present within 200 feet of Option H. Potentially significant impacts to groundwater would occur should pipeline construction impact well production or water quality (Class II). Similar to the proposed project, Option H would implement APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option H would also require implementation of MM HWQ-2, which requires PG&E to locate, test, and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Option H would traverse approximately 3,175 feet less of the area designated as being within the 100-year flood plan than Line 407 West. Similar to the proposed alignment, Option H would be installed during the dry season and would be completely buried after installation. As such, no portions of the buried pipeline would be exposed to 100-year floods during Project construction or operation. Similar to the proposed Project, both the Power Line Road Regulating Station and the Power Line Road Main Line Valve would be located within the 100-year floodplain. As such, impacts would be Potentially significant (Class II) and require MM HWQ-3 included in the proposed project. MM HWQ-3 would require the flood proofing of any structures associated with the above ground stations, including but not limited to, the elevation of structures to 1-foot above the 100-year storm flood profile level. Implementation of MM HWQ-3 in both the proposed project and Option H would reduce impacts to less than significant.

Based on the similarities and extent of potential impacts, Option H would have no more or less of an effect on hydrology and water quality than the proposed Project after the implementation of appropriate APMs and MMs.

Option I

Water Quality

Option I would require crossing 2 irrigation ditches that the proposed alignment would not cross. Furthermore, Option I would cross agricultural fields that may be used as rice fields. Similar to the proposed Project, Option I would require waterbody crossing over at least one part of Steelhead Creek, a 303(d) designated waterbody (PG&E 2009, Appendix C-1).

Similar to Line 407 East, Option I pipeline crossings of water features would be conducted using open-cut trenching or jack-and-bore methods and would require similar regulatory permits from appropriate jurisdictions overseeing the waterways. Impacts to water quality under the proposed alignment would be less than significant due to the implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23. These APMs would also be implemented under Option I, resulting in a less than significant impact to water quality.

Groundwater

Option I would cross approximately 5 fewer private residential parcels than Line 407 East. Since groundwater wells are commonly associated with residences, it is assumed that the area crossed by Option I would contain fewer groundwater wells than the area crossed by Line 406. Nonetheless, wells used for both residential and agricultural purposes may be present within 200 feet of Option I resulting in potentially significant impacts to groundwater should pipeline construction impact well production or water quality (Class II). Similar to the proposed project, Option I would implement APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option I would also require implementation of MM HWQ-2, which requires PG&E to locate, test and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Neither Option I nor the corresponding portion of Line 407 East would traverse an area designated as being within the 100-year floodplain. Similar to the proposed project, impacts would be less than significant.

Based on the similarities and extent of potential impacts, Option I would have no more or less of an effect on hydrology and water quality than the proposed Project after the implementation of appropriate APMs and MMs.

Option J

Water Quality

Option J would require crossing 2 irrigation ditches that the proposed alignment would not cross. Furthermore, Option J would cross agricultural fields that may be used as rice fields. Similar to the proposed Project, Option J would require waterbody crossing over at least one part of Steelhead Creek, a 303(d) designated waterbody (PG&E 2009, Appendix C-1).

Similar to Line 406, Option J pipeline crossings of water features would be conducted using open-cut trenching or jack-and-bore methods and would require similar regulatory permits from appropriate jurisdictions overseeing the waterways. Impacts to water quality under the proposed alignment would be less than significant (Class III) due to the implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23. These APMs would also be implemented under Option J, resulting in a less than significant impact to water quality.

Groundwater

Option J would cross approximately 3 fewer private residential parcels than Line 407 East. Since groundwater wells are commonly associated with residences, it is assumed that the area crossed by Option J would contain fewer groundwater wells than the area crossed by Line 406. Nonetheless, wells used for both residential and agricultural purposes may be present within 200 feet of Option J resulting in potentially significant impacts to groundwater should pipeline construction impact well production or water quality (Class II). Similar to the proposed project, Option J would implement APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option J would also require implementation of MM HWQ-2, which requires PG&E to

locate, test, and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Neither Option J nor the corresponding portion of Line 407 East would traverse an area designated as being within the 100-year floodplain. Similar to the proposed project, impacts would be less than significant.

Based on the similarities and extent of potential impacts, Option J would have no more or less of an effect on hydrology and water quality than the proposed Project after the implementation of appropriate APMs and MMs.

Option K

Water Quality

Option K would not require crossing any additional irrigation ditches but would require crossing an additional vernal pool.

Similar to Line 407 East, Option K pipeline crossings of water features would be conducted using open-cut trenching, jack-and-bore or HDD methods and would require similar regulatory permits from appropriate jurisdictions overseeing the waterways. Impacts to water quality under the proposed alignment would be less than significant (Class III) due to the implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23 as well as MM HWQ-1. These APMs and MM HWQ-1 would also be implemented under Option K, resulting in a less than significant impact to water quality.

Groundwater

Both Option K and the corresponding portion of Line 407 East are not within 200 feet of a private residential parcel. As such, it can be assumed that no groundwater wells are located in this area. However, wells used for agricultural purposes may be present with 200 feet of both Option K and Line 407 east. Potentially significant impacts to groundwater would occur should pipeline construction impact well production or water quality (Class II). Similar to the proposed project, Option K would implement APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-

21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option K would also require implementation of MM HWQ-2, which requires PG&E to located, test and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Neither Option K nor the corresponding portion of Line 407 East would traverse an area designated as being within the 100-year floodplain. Similar to the proposed project, impacts would be less than significant.

Based on the similarities and extent of potential impacts, Option K would have no more or less of an effect on hydrology and water quality than the proposed Project after the implementation of appropriate APMs and MMs.

Option L

Water Quality

Option L would not cross additional irrigation ditches and, similar to the corresponding portion of Line 407 East, would utilize HDD to cross the existing swale.

Similar to Line 407 East, Option L would be constructed using HDD methods in order to reduce impacts to surface water features and would require similar regulatory permits from appropriate jurisdictions overseeing the waterways. Impacts to water quality under the proposed alignment would be less than significant (Class III) due to the implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-5, APM BIO-13, APM BIO-16, APM BIO-17, APM BIO-18, APM BIO-19, APM BIO-22 and APM BIO-23 as well as MM HWQ-1. These APMs and MM HWQ-1 would also be implemented under Option L, resulting in a less than significant impact to water quality.

Groundwater

Both Option L and the corresponding portion of Line 407 East are not within 200 feet of a private residential parcel. As such, it can be assumed that no domestic groundwater wells are located in this area. However, wells used for agricultural purposes may be present with 200 feet of both Option L and Line 407 East.

Potentially significant impacts to groundwater would occur should pipeline construction impact well production or water quality (Class II). Similar to the proposed project, Option L would implement APM HWQ-3, APM HWQ-4, APM BIO-16, APM BIO-20, APM BIO-21 and APM BIO-22 thereby reducing impacts to groundwater flows and quality. Option L would also require implementation of MM HWQ-2, which requires PG&E to locate, test and monitor all wells within 200 feet of the pipeline. If it is determined that Project construction is affecting well production PG&E shall cease construction activities or arrange to supply water at the well location and consult with the landowner thereby reducing impacts to less than significant.

Floodplains

Neither Option L nor the corresponding portion of Line 407 East would traverse an area designated as being within the 100-year floodplain. Similar to the proposed project, impacts would be less than significant. Based on the similarities and extent of potential impacts, Option L would have no more or less of an effect on hydrology and water quality than the proposed Project after the implementation of appropriate APMs and MMs.

Table 4.8-2: Comparison of Alternatives for Hydrology and Water Quality

Alternative	Comparison with Proposed Project
No Project	No Impacts
Option A	Similar Impacts
Option B	Similar Impacts
Option C	Similar Impacts
Option D	Similar Impacts
Option E	Similar Impacts
Option F	Similar Impacts
Option G	Similar Impacts
Option H	Similar Impacts
Option I	Similar Impacts
Option J	Similar Impacts
Option K	Similar Impacts
Option L	Similar Impacts
Source: Michael Brandman Associates 2009.	

4.8.6 Cumulative Projects Impact Analysis

The cumulative environment for water resources includes the Sacramento River Hydrologic Region, which covers approximately 17.4 million acres (27,200 square miles). The proposed Project is situated at the southern end of the Sacramento Valley Groundwater Basin with the primary water bearing formations comprised of sedimentary continental deposits of Late Tertiary (Pliocene) to Quaternary (Holocene) age. From a water quality perspective, the Sacramento River from Knights Landing to the Sacramento-San Joaquin Delta is identified in the 2006 California section 303(d) List and total maximum daily load (TMDL) Priority Schedule as an impaired water body for the following contaminants: mercury and unknown toxicity (RWQCB 2006). The northern portion of the Sacramento-San Joaquin Delta downstream of the Project area has been designated as impaired for a variety of contaminants, including pesticides (chlorpyrifos, dichloro-diphenyl-trichloro-ethane [DDT], diazinon, and Group A pesticides) resulting from agricultural and urban runoff/storm sewers, mercury (from abandoned mine drainage), polychlorinated biphenyls (PCBs), exotic species, and unknown toxicity (unknown cause) (RWQCB 2006).

Other projects within this Project's vicinity that would affect hydrology and water quality include the Sutter Pointe Specific Plan and associated roads projects, the Placer Vineyards Specific Area Plan and associated roads projects, the Sierra Vista Specific Plan, and the Natomas Levee Improvement Plan. The Sutter Pointe Specific Plan and new associated roads projects may potentially result in adverse impacts to Pleasant Grove Creek Canal, the North Main Canal, and a number of unnamed irrigation canals. The Placer Vineyards Specific Area Plan and Sierra Vista Specific Plan and their road improvement projects may result in impacts to Dry Creek and its tributaries. The Natomas Levee Improvement Plan may result in impacts to the Sacramento River. Concurrent with the proposed Project, the construction of these projects would result in an overall increase of potential affects to water resources within the cumulative environment.

Major water crossings for the Project within the cumulative environment include the Sacramento River and several tributaries, as well as the Yolo Basin (including Tule Canal). The crossing of these features could result in water quality impairment relating to erosion and sedimentation. Of the projects that occur in the vicinity of the proposed Project and within the cumulative environment, the Natomas Levee Improvement Plan is the only project that would include potential impacts to the Sacramento River as a result of proposed levee improvements. The Natomas

Levee Improvement Plan includes raising, reinforcing, and reshaping existing levees. Impacts to the Sacramento River and its tributaries resulting from the proposed Project and the Natomas Levee Improvement Plan would be cumulatively considerable and potentially significant due to the considerable and potentially significant effects of the Natomas Levee Improvement Plan.

The proposed Project would employ HDD methodologies in the crossing of the Sacramento River and its major tributaries, thereby avoiding any direct impacts to these features. The potential indirect impacts resulting from construction related runoff and/or the unlikely event of a frac-out would be minimized and reduced to less than significant levels through the implementation of APM HWQ-1, APM HWQ-5, APM BIO-7, APM BIO-13, and APM BIO-23. With the implementation of these measures, the proposed Project's contribution to the cumulative impacts to the Sacramento River and its major tributaries would be considered less than significant, and no additional mitigation would be required above and beyond that which is proposed at the Project level.

Climate change may also have a cumulative effect on water resources. Snow pack in the mountains is expected to decrease, and may subsequently lead to a decrease in streamflow and groundwater recharge (Climate Action Team [CAT] Report March 2006) in the area of this Project. The potential decrease in streamflows, and therefore flooding, would result in a lower risk of stream channel erosion that could expose the pipeline. An exposed pipeline within the stream channel could be ruptured and result in water quality impacts due to natural gas being released into the stream or river. However, because the Project would not result in changes to streamflows or groundwater recharge, and climate change may reduce streamflows and flooding, there would be a reduced risk of water quality impacts from pipeline exposure and rupture.

Another potential result of climate change in the Project area would be an increase in sea levels (CAT Report March 2006) that may potentially increase buoyancy of the pipeline within areas of saltwater intrusion. Increased buoyancy would be a concern because it could lead to a higher risk of pipeline exposure and rupture within the stream channel that could lead to water quality impacts. However, the largest sea level rise predicted of 30 inches (CAT Report March 2006) would not be high enough to affect streams and rivers in the Project area (http://geology.com/sea-level-rise/san-francisco.shtml).

4.8.7 Summary of Impacts and Mitigation Measures

The proposed Project could result in potentially significant impacts in violation of Federal or State Agency quantitative or qualitative water quality criteria, standards, or objectives (including objectives promulgated by the CVRWQCB and criteria set forth in the proposed California Toxics Rule) during the construction phase. Impacts would be less than significant with the implementation of APM HWQ-1, APM HWQ-2, APM HWQ-5, APM BIO-5, APM BIO-7, APM BIO-13, APM BIO-23, and MM HWQ-1

The proposed Project could result in potentially significant impacts to private groundwater supplies as construction of the Project could impact private water wells, irrigation wells, and water pipelines. Impacts would be reduced to less than significant with the implementation of APM HWQ-3, APM HWQ-4, APM BIO-20, APM BIO-21, and MM HWQ-2.

The proposed Project could result in potentially significant impacts through placement of permanent structures within the 100-year floodplain that would be damaged by flooding. Impacts would be reduced to a less than significant level through the implementation of MM HWQ-3.

Table 4.8-3: Summary of Hydrology and Water Quality Impacts and Mitigation Measures

Impact	Mitigation Measure
HWQ-1. Federal or state water quality standards.	**HWQ-1.** Response to unanticipated release of drilling fluids.
HWQ-2. Groundwater for municipal or private purposes.	**HWQ-2.** Verify well locations.
HWQ-3. 100-year floodplain	**HWQ-3.** Flood-proof pump houses within 100-year floodplain.
Source Michael Brandman Associates 2009.	