9. Alternative 5 (Partial Underground): Impacts and Mitigation Measures

The following section describes Hydrology and Water Quality impacts of Alternative 5 (Partial Underground), as determined by the significance criteria listed in Section 4.1. Mitigation measures are introduced where necessary in order to reduce significant impacts to less-than-significant levels.

9.1 Direct and Indirect Effects Analysis

This alternative would follow the same route as the proposed Project through the Northern and Central Regions. In the Southern Region, Alternative 5 would place 3.5 miles of Segment 8A underground beneath the same corridor as the proposed aboveground T/L, from MP 21.9 to MP 25.4. Under this alternative, the existing 220-kV T/L along Segment 8A would be left in place from MP 21.9 to MP 25.4. Several streams that would be crossed by the proposed Project along Segment 8A, between MP 21.9 to MP 25.4, would not be crossed by Alternative 5 because the transmission infrastructure would be placed well below those streams. Table 2.6-1 lists the streams that would be avoided under this alternative. In addition, this alternative would come in contact with the underlying groundwater basin because the transmission infrastructure would be placed below the depth to groundwater. Table 2.6-1 lists the groundwater basin (Chino Subbasin of the Upper Santa Ana Valley) that would be encountered under this alternative but avoided under the proposed Project.

Water Quality Violations, Waste Discharges, or Polluted Runoff (Criterion HYD1)

Impacts associated with Criterion HYD1 for Alternative 5 would be similar to the impacts associated with this criterion for the proposed Project. This alternative places a portion of the proposed transmission line underground through the City of Chino Hills. As shown in Table 2.6-1, this alternative would avoid eight stream crossings that would otherwise be crossed by the proposed Project, including three unnamed streams and five crossings of Little Chino Creek. Aside from the eight stream crossings that would be avoided, all remaining stream crossings for Alternative 5 are the same as for the proposed Project, and as such, Tables 2.3-1 through 2.3-3 present the streams and groundwater basins that could potentially be affected by impacts of Alternative 5. Additionally, because this alternative would place transmission infrastructure between 100 and 400 feet below ground, the Chino Subbasin of the Upper Santa Ana Valley Groundwater Basin would be encountered. These impacts and their associated mitigation measures that fall under Criterion HYD1 are summarized in the following paragraphs. Please see Section 6.1 (Direct and Indirect Effects Analysis) for additional description of these impacts, as they are similar to the proposed Project.

Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) for this alternative is nearly identical to Impact H-1 for the proposed Project. Although this alternative places a portion of Segment 8A underground in the Southern Region, through the City of Chino Hills, the vast majority of the surface water resources that would be impacted by the proposed Project would also be impacted by Alternative 5, with the exception of the eight stream crossings listed in Table 2.6-1. The overall impact of Alternative 5 on erosion and sedimentation would remain unchanged compared to Impact H-1 for the proposed Project, and therefore would require implementation of the following mitigation measures: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits), H-1b (Dry weather construction), and B-2 (Implement RCA Treatment Plan).

With implementation of the mitigation measures listed above and described in detail in Section 6.1, Impact H-1 for Alternative 5 would be less than significant (Class II).

Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) for this alternative is nearly identical to Impact H-2 for the proposed Project, with the exception of the undergrounded portion of Segment 8A. Although this alternative would avoid eight stream crossings in the Southern Region, the vast majority of the water resources that could be degraded through the accidental release of potentially harmful or hazardous materials under the proposed Project could also be degraded under this alternative. The most substantial difference between Impact H-2 as described for the proposed Project and Impact H-2 for this alternative is the increased potential for degradation of the groundwater in the Chino Subbasin through the accidental release of potentially harmful or hazardous materials. Depth to groundwater along the eastern portion of the undergrounded section is approximately 75 feet bgs, and the planned excavation depth for the eastern access shaft is approximately 100 feet. Therefore, construction activities will likely come in direct contact with the groundwater in that area, which would increase the potential for degradation of groundwater quality through release of potentially harmful or hazardous materials, such as hydraulic fluid, engine oil, and lubricants. Dewatering of the eastern access shaft construction site may be necessary to reduce the potential for contamination of the groundwater through the accidental release of potentially harmful or hazardous materials. Contact with the groundwater would be limited to construction of the eastern access shaft. Groundwater would not be encountered at the western access shaft because no groundwater underlies that shaft. Additionally, no groundwater would be encountered during construction of the horizontal tunnel because tunnel construction would utilize pressurized-face tunnel boring machines, which would prevent groundwater intrusion. Although construction of the underground portion of Alternative 5 could degrade groundwater through accidental release of potentially harmful or hazardous materials, the overall impact of Alternative 5 on water quality would remain mostly unchanged compared to Impact H-2 for the proposed Project, and therefore would require implementation of the following mitigation measures: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits) and H-1b (Dry weather construction). By requiring demonstrated compliance with water quality permits (such as the NPDES General Permit or other required dewatering discharge permits), Mitigation Measure H-1a would ensure proper design and implementation of any dewatering activities, and would substantially reduce the likelihood that groundwater supplies would be contaminated. With implementation of the mitigation measures listed above and described in detail in Section 6.1, Impact H-2 for Alternative 5 would be less than significant (Class II).

Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) for this alternative is nearly identical to Impact H-3 for the proposed Project. Although this alternative requires undergrounding a small portion of Segment 8A in the Southern Region, and would result in eight fewer stream crossings, the overall operational impact of Alternative 5 on water quality would remain unchanged compared to Impact H-3 for the proposed Project. Although construction of the underground portion of Alternative 5 would likely come in contact with groundwater, the completed tunnel and access shafts would be impervious to groundwater; therefore, operation and maintenance activities would not have the potential to degrade groundwater quality through the accidental release of potentially harmful or hazardous materials. Impact H-3 for Alternative 5 would be less than significant (Class III).

Impact H-6: Discharge of contaminated groundwater during dewatering operations would degrade surface water quality.

Impact H-6 (Discharge of contaminated groundwater during dewatering operations would degrade surface water quality) for Alternative 5 would result from the improper discharge of dewatered contaminated groundwater. As described in Section 3.8.2.2, the Chino Subbasin exceeds MCLs for TDS, inorganics, radiology, nitrates, pesticides, VOCs and perchlorate. Construction of the eastern access shaft for this alternative would require excavation down to 100 feet, and the groundwater level is at approximately 75 feet bgs in that area. Therefore, dewatering likely would be required. Improper design and/or implementation of a dewatering plan could result in discharge of contaminated groundwater to a surface waterbody, which would subsequently lead to degradation of surface water quality. A proper dewatering plan would include testing of the groundwater to be dewatered, and subsequent treatment of that groundwater prior to discharge if contamination is discovered. Discharge of the dewatered effluent would be regulated under the NPDES permit required by the appropriate Regional Water Quality Control Board. Compliance with the conditions of the NPDES permit would ensure that contaminated groundwater is properly tested and treated, if necessary, prior to discharge to any surface water. See Section 3.8.3 for more information on the NPDES permit requirements.

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Impact H-6 for Alternative 5 would require implementation of the following mitigation measure: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits). Mitigation Measure H-1a would ensure proper design and implementation of any dewatering activities through demonstrated compliance with NPDES requirements, and would substantially reduce the likelihood that surface water would be contaminated. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-6 for Alternative 5 would be less than significant (Class II).

No further impacts would be introduced by Alternative 5 under Criterion HYD1. As mentioned, please see Section 3.8.6.1 for a detailed description of Impacts H-1 through H-3 and the associated mitigation measures.

Depletion of Groundwater Supplies or Interference with Groundwater Recharge (Criterion HYD2)

Should groundwater be encountered during construction-related excavation, dewatering of the construction site would be required. For Alternative 5, depth to groundwater is approximately 75 feet bgs in the southwestern portion of the Chino Subbasin, and the eastern access shaft will be excavated to 100 feet. Therefore excavation of the eastern access shaft would likely require dewatering of the construction site. In accordance with APM HYD6 (Drilling and Construction Site Dewatering Management), dewatering operations would follow applicable state and local regulatory requirements, including as designated in the California Stormwater Quality Association's (CASQA) California Stormwater BMP Handbook – Construction (CASQA, 2003). Any required dewatering activities would involve very low quantities of groundwater relative to the Chino Subbasin's storage and capacity, would occur at the edge of the groundwater basin, would continue for a short period of time, and would not substantially change groundwater levels. No other portion of Alternative 5 would be expected to result in the encountering of the main groundwater table; however, it is possible that perched groundwater may be encountered, thus necessitating dewatering procedures specified under APM HYD6. Any groundwater encountered during construction would be returned to the subsurface as a part of the dewatering process. Such activities

would not contribute to the depletion of groundwater supplies or the interference with groundwater recharge.

Creation of new impervious surfaces through construction of Alternative 5 could interfere with groundwater recharge by reducing the amount of surface area through which precipitation and surface water percolates to underground aquifers. However, impervious surfaces that would result from construction of Alternative 5 would cover very small areas and would be distributed over a large geographic region, and therefore would not substantially interfere with groundwater recharge.

Operation of Alternative 5 would consist of transmission of electric current though the transmission line as well as periodic maintenance which would consist of driving construction vehicles along or within the transmission ROW and underground tunnel, and would have no effect on groundwater recharge. Therefore, all impacts related to Criterion HYD2 would be very similar to those for the proposed Project and, as described under Criterion HYD2 in Section 6.1, no impact would occur.

Siltation, Erosion, or Other Flood Related Damage from Impeding or Redirecting Flood Flows through Placement of a Structure in a Stream or Flood Hazard Area (Criterion HYD3)

Impacts associated with Criterion HYD3 for Alternative 5 would be very similar to the impacts associated with this criterion for the proposed Project, but of a slightly greater magnitude. Encroachment of a Project structure into a stream channel or floodplain could result in flooding of or erosion damage to the encroaching structure, diversion of flows and increased flood risk for adjacent property, or increased erosion on adjacent property. Although this alternative introduces an undergrounded portion of Segment 8A in the Southern Region, the existing aboveground towers would be left in place and would have a similar potential to impede or redirect flood flows compared to the towers that would be installed under the proposed Project. The impediment of flood flows is most likely to occur where transmission towers or other permanent Project features are constructed in or closely adjacent to a watercourse. Alternative 5 crosses a stream eight fewer times than the proposed Project. It is not expected that infrastructure associated with Alternative 5 would be situated within a watercourse; however, some towers would be placed in areas subject to periodic overland flow and flooding, such as the Santa Fe Flood Control Basin, the Whittier Narrows Flood Control Basin, and some broad, ephemeral washes in the Northern Region. Additionally, the aboveground structure associated with the eastern access shaft for the underground portion of Segment 8A would be placed within a Flood Hazard Area. If not properly designed, this structure could impede or redirect flood flows. However, placement of the eastern access shaft aboveground structure within a Flood Hazard Area would not substantially alter the overall potential for the impediment or redirection of flood flows, compared to the proposed Project. Therefore, the Hydrology and Water Quality impacts of Alternative 5 that fall under Criterion HYD3 would be very similar to the proposed Project. This impact and its associated mitigation measures are summarized in the following paragraph. Please see Section 6.1 (Direct and Indirect Effects Analysis) for a detailed description of this impact, as it is mostly the same as for the proposed Project.

Impact H-4 (Project structures would cause erosion, sedimentation, or other flood-related damage by impeding flood flows) for this alternative is nearly identical to Impact H-4 for the proposed Project. Although this alternative undergrounds a small portion of Segment 8A in the Southern Region, and would place an additional structure in a Flood Hazard Area, the overall impact of Alternative 5 on flooding would remain unchanged compared to Impact H-4 for the proposed Project, and therefore would require

implementation of the following mitigation measure: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits). With implementation of the mitigation measure listed above and described in detail in Section 6.1, Impact H-4 for Alternative 5 would be less than significant (Class II).

Flooding from Increased Rate or Amount of Surface Runoff (Criterion HYD4)

The amount of surface runoff is determined by the amount of precipitation and other imported water that enters a watershed, minus the amount of precipitation and imported water that infiltrates into the groundwater. Infiltration is determined by several factors, including soil type, antecedent soil moisture, rainfall intensity, the amount of impervious surfaces within a watershed, and topography. The rate of surface runoff is largely determined by topography and the storm hydrograph (the intensity of rainfall over a given period of time). Alternative 5 would not alter any precipitation amounts or intensities, nor would it require any additional water to be imported into the proposed Project area. Although Alternative 5 would include an underground portion of the proposed transmission line in the Southern Region, this alternative would create mostly the same amount and distribution of impervious surfaces as the proposed Project, and therefore would have the same effect on groundwater infiltration as described for the proposed Project under Section 6.1.

Alternative 5 would not substantially alter precipitation amounts or intensities, or the amount of precipitation or imported water that infiltrates into the groundwater. Therefore, all impacts related to Criterion HYD4 would be exactly the same as those for the proposed Project and, as described under Criterion HYD4 in Section 6.1, no impact would occur.

Damage from Inundation by Mudflow (Criterion HYD5)

Impacts associated with Criterion HYD5 for Alternative 5 would be the same as impacts associated with this criterion for the proposed Project. Mudflows are a type of mass wasting or landslide, where earth and surface materials are rapidly transported downhill under the force of gravity. Mudflow events are caused by a combination of factors, including soil type, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result, soil and rock materials become unstable and eventually slide away from their existing location, in a mudflow event. Although this alternative introduces an underground portion of the proposed transmission line in the Southern Region, it would still pass through the same steep terrain and soils susceptible to mudflow through the Puente and Chino Hills. Therefore, the Hydrology and Water Quality impacts of Alternative 5 that fall under Criterion HYD5 would be mostly the same as the proposed Project. This impact and its associated mitigation measures are summarized in the following paragraph. Please see Section 6.1 (Direct and Indirect Effects Analysis) for a detailed description of this impact, as it is mostly the same as for the proposed Project.

Impact H-5 (Project structures would be inundated by mudflow) for this alternative is nearly identical to Impact H-5 for the proposed Project. Although this alternative requires an underground portion of Segment 8A in the Southern Region, and would cross a stream eight fewer times, the overall impact of Alternative 5 on inundation by mudflow would remain unchanged compared to Impact H-5 for the proposed Project, and therefore would require implementation of the following mitigation measure: G-3 (Conduct geological surveys for landslides and protect against slope instability). With implementation of the mitigation measure listed above and described in detail in Section 6.1, Impact H-5 for Alternative 5 would be less than significant (Class II).

9.2 Cumulative Effects Analysis

This section addresses potential cumulative effects that would occur as a result of implementation of Alternative 5 (Partial Underground Alternative). This alternative consists of a short underground portion of the proposed transmission line just east of the Puente and Chino Hills, which would lead to eight fewer stream crossings. The remainder of this alternative route would be identical to that of the proposed Project and would, therefore, result in nearly identical impacts as the proposed Project. The undergrounded portion of the Alternative 5 route follows the exact same ROW as the proposed Project. As a result, this alternative traverses the same land uses as the portion of the proposed Project route it is proposed to replace, and would result in the same operational capacity as the proposed Project. Based on the substantial similarity of Alternative 5 to the proposed Project, this alternative's contribution to cumulative impacts would be nearly identical to that of the proposed Project, with the exception of potential impacts to groundwater.

9.2.1 Geographic Extent

Alternative 5 only differs from the proposed Project for a very small portion of the proposed route in the City of Chino Hills. This area is still encompassed by the geographic extent of the cumulative analysis defined for Alternative 2 in Section 6.2.1. Therefore, the geographic extent of the cumulative analysis for Alternative 5 is exactly the same as that for Alternative 2.

9.2.2 Existing Cumulative Conditions

The existing cumulative conditions for Alternative 5 are exactly the same as for Alternative 2, as described in Section 6.2.2.

9.2.3 Reasonably Foreseeable Future Projects and Changes

Reasonably foreseeable future projects and changes to the cumulative scenario for Alternative 5 would be exactly the same as Alternative 2, described in Section 6.2.3.

9.2.4 Cumulative Impact Analysis

Impacts associated with Alternative 5 would be cumulatively considerable if they would have the potential to combine with impacts of other past, present, or reasonably foreseeable projects. The small underground portion of the proposed transmission line associated with Alternative 5 would not affect this alternative's contribution to cumulative impacts other than potential impacts to groundwater and therefore, cumulative impacts of Alternative 5 would be very similar to cumulative impacts for Alternative 2, as detailed in Section 6.2.4 and described below.

This alternative would introduce one new impact compared to the proposed Project, Impact H-6 (Discharge of contaminated groundwater during dewatering operations would degrade surface water quality). However, Impact H-6 would not be cumulatively considerable because implementation of Mitigation Measure H-1a would require demonstrated compliance with NPDES discharge permits and therefore any dewatered groundwater would be tested and treated prior to discharge. The discharge of clean and/or treated groundwater would not have the potential to combine with impacts from other projects because the clean and/or treated discharge would not contribute to the degradation of surface water.

The following impacts would be cumulatively considerable but less than significant (Class III): Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) and Impact H-5 (Project structures would be inundated by mudflow).

The following impacts would be cumulatively considerable and would combine with similar impacts of other projects to result in impacts that would be significant and unavoidable (Class I): Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) and Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials).

9.2.5 Mitigation to Reduce the Project's Contribution to Significant Cumulative Effects

Mitigation measures introduced for Alternative 5 in Section 9.1 (Direct and Indirect Effects Analysis) would help to reduce this alternative's incremental contribution to cumulative impacts. However, no additional mitigation measures have been identified that would reduce cumulative impacts to a less-than-significant level for Hydrology and Water Quality.