6.6 GEOLOGY AND SOILS

	Potentially Significant Impact	*Less than Significant with Mitigation Incorporation*	*Less than Significant Impact*	*No Impact*
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on strata or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

6.6.1 Approach to Analysis

The impact assessment used a qualitative analysis to address soil resources, geologic hazards and primary and secondary effects of earthquakes. Geologic and seismic hazards that, because of the conduit installation project, would expose people to injury and infrastructure to damage were

considered in terms of an adverse public safety impact. Loss of soil resources from erosion and sedimentation caused by the project were considered in terms of depletion or as having other adverse effects on soil resources. The proposed project elements were evaluated in terms of the level of significance and whether the impacts were considered not significant, less than significant or significant.

6.6.2 Impact Significance Criteria

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions within the area affected by the project. *CEQA Guidelines* lists several geology-related impacts that would normally be considered significant. These include exposing people or structures to major geologic hazards (expansive soils, landslides) and seismic hazards (fault rupture, groundshaking, liquefaction); erosion or siltation; causing substantial changes in topography; adversely affecting unique geologic or topographic features; or inundation due to dam failure, seiche, or tsunami. The analysis of significance of impacts on geology and soils is based on professional judgment and on criteria VI. a-e in the environmental checklist.

6.6.3 Impact Mechanisms

Geology, seismicity, and soil impact mechanisms include damage to Metromedia's System infrastructure by seismic events, static soil movement and erosion. Groundshaking from seismic events can cause secondary hazards such as surface fault rupture, liquefaction and settlement of soils. Settlement can also occur in improperly placed artificial fills and compressible soils when subject to static loads. Initiation of shallow landslides and accelerated erosion can be caused by soil disturbance during the installation of the cable and other system facilities. However, proposed engineering practices include designing a system that minimizes geologic hazards or seismic risk to reduce potential damage to Metromedia's System or to the surrounding environment.

6.6.4 Impact Assessment

This section describes impacts and mitigation measures, where appropriate, pertaining to geologic, seismic, and soil conditions along the project routes. Potential water quality impacts caused by erosion and resulting sedimentation are described in Hydrology and Water Quality (section 6.8) and impacts on mineral resources and on agricultural lands are described in Mineral Resources (section 6.10) and Agricultural Resources (section 6.2).

6.6.4.1 San Francisco Bay Area Network

a. Would the proposed project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving surface fault rupture, seismic groundshaking, liquefaction or landsliding?

Impact GS-1: In the event of a major earthquake, the area within the causative Alquist-Priolo Fault Hazard Zone would be susceptible to surface fault rupture. (Less than Significant)

The San Andreas Fault Zone and the Hayward fault are closest to the San Francisco Bay Area Network. The Sierra Madre Fault Zone, Elsinore fault and Newport-Inglewood fault lie in close proximity to the Los Angeles Basin Network. These faults have the highest potential for significant

fault rupture (see Tables 5.6.-1 and 5.6-3, Figures 5.6-1 and 5.6-2). Potentially active faults are located within close proximity to both Metromedia Network areas. Although surface rupture can not be entirely ruled out on potentially active faults, it is more likely to occur on the along a trace of an active fault. An earthquake on an active Bay Area and Southern California fault could possibly trigger failure along potentially active faults. The potential and occurrence of surface fault rupture is highest closer to the causative trace of an active fault.

In the event of a regional San Andreas Fault Zone earthquake, fault surface rupture could affect Point of Presence (POP) buildings, pavement, utilities and roads within both Metromedia Network areas. When fault rupture occurs on a fault like the San Andreas, the surface displaces not only laterally, but also sometimes vertically. Surface rupture can damage or collapse buildings, cause severe damage to roads and pavement structures and cause failure of overhead as well as underground utilities. As a result of the damage, buildings could become uninhabitable, roads would be closed and utility service disrupted.

Ground surface rupture and displacement of active or potentially active fault traces could damage the fiber optic cable system where the cable passes through faults or where the POP is placed over a causative trace. Damage from earthquake activity could temporarily disrupt cable network operation and result in periods of interrupted service while the system is inspected and repaired. The surface fault rupture impact severity would be reduced because the cable system design will incorporate elements that allow the cable and other facilities to compensate for surface offsets such as flexible joints in cable segments to offset. Geotechnical studies during the final design phase would determine susceptibility to geologic and seismic hazards in areas of proposed POP building construction. Design and construction of POP buildings would be in accordance with geotechnical recommendations that incorporate applicable Uniform Building Code Standards required by local building departments for the particular seismic region. The presence of Metromedia facilities across active traces of earthquake faults would not increase the human or environment exposure to the impact of surface fault rupture. Therefore, the potential project impact relating to surface fault rupture is considered less than significant.

Mitigation Measure: No mitigation is required.

Impact GS-2: In the event of a major earthquake in the region, seismic groundshaking could potentially injure people and cause collapse or structural damage to proposed facilities and structures. Groundshaking could potentially expose people and property to seismic-related hazards, including localized liquefaction and related ground failure. (Less than Significant)

Both Metromedia project areas will likely experience at least one major earthquake (greater than moment magnitude 7) within the next 30 years. The intensity of such an event will depend on the causative fault and the distance to the epicenter, the moment magnitude and the duration of shaking. Damage due to groundshaking could disturb or cause breakage of cable conduit or cause damage to equipment operated within the POPs.

The project routes passes through areas that are subject to strong earthquake-induced ground shaking. Damage could occur in the cable conduit or POP buildings if constructed on improperly engineered fills, unconsolidated, saturated alluvium or artificial fills. Geotechnical studies during the final design phase would determine susceptibility to geologic and seismic hazards in areas of proposed POP building construction. Design and construction of POP buildings would be in

accordance with geotechnical recommendations that incorporate applicable Uniform Building Code Standards required by the appropriate local building department. The prefabricated POP structures will not be inhabited and are certified by the manufacturer to meet necessary seismic design standards. Therefore any damage will not affect humans or the environment. Groundshaking is considered a less than significant impact because the proposed project would not increase the amount of people exposed to potential adverse effects of groundshaking or increase the severity of the groundshaking in the project area.

Liquefaction potential is highest in the areas underlain by bay fills, "bay mud" and saturated unconsolidated alluvium. Liquefaction could damage foundations, disrupt utility service and cause damage to roadways. The project routes pass through a few areas that are subject to earthquake-induced liquefaction. Liquefaction and resulting differential ground settlement and lateral spreading could damage the cable system. If damage from liquefaction failures were to occur, it could temporarily disrupt cable network operation and result in periods of interrupted service while the system is inspected and repaired. The impact severity of liquefaction ground failures would be reduced because the cable system would be placed primarily within existing roadways and railroad easements that contain engineered fills and could withstand adverse effects of liquefaction and other seismically-induced ground failure. Geotechnical studies during the final design phase would determine susceptibility to liquefaction hazards in areas of proposed POP building construction. Design and construction of POP buildings would be in accordance with geotechnical recommendations that incorporate applicable Uniform Building Code Standards required by local building departments. The project would not increase the human or environment exposure to liquefaction of other seismic ground failure, therefore, the impact from groundshaking is considered less than significant.

Mitigation Measure: No mitigation is required.

b. Would the proposed project result in soil erosion or the loss of topsoil?

Impact GS-3: Initial construction operations and periodic repair projects on the Metromedia fiber-optic cable network could result in temporary accelerated erosion and sedimentation from soil disturbance and / or vegetation removal. (Less than Significant)

Soils along the project routes, many of which are already disturbed, vary widely with respect to their erosion hazard. Ground-disturbing activities, including removal of vegetation, can cause increased water runoff rates and concentrated flows and may cause accelerated erosion, with a consequent loss of soil productivity. The eroded material could degrade the quality of receiving waters. Metromedia would prepare and implement Storm Water Pollution Prevention Plans (SWPPPs) for all of the project routes, which will include mitigation measures to control accelerated erosion and sedimentation. (The San Francisco Bay Area SWPPP is included as an example in Appendix C; the Los Angeles Basin SWPPP would be very similar.) SWPPPs are required to be prepared for proposed projects that involve soil disturbance of 5 acres or more and are submitted to the applicable RWQCB for approval before proposed project commencement. Because the area of soil disturbance will be small within a given area, there will not be a significant opportunity for erosion to occur, except for those routes that are aligned on steep slopes. The erosion and sediment control measures, if properly prescribed, implemented, and maintained, are expected to reduce erosion rates during and after construction to near pre-construction rates. By implementing these SWPPP mitigation measures, this impact is considered less than significant.

Mitigation Measure: No mitigation is required.

c. Would the proposed project be located on strata that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

Impact GS-4: The project area could be subjected to geologic hazards including settlement, and slope failure. (Less than Significant)

Soil settlement presents a hazard in areas with variable thickness of previous and new fills, as well as natural variations in the thickness and compressibility of the soils. Static or seismically-induced settlement of soils could damage Metromedia system facilities over the life of the project. Settlement would typically be expected to adversely affect Metromedia system facility structures rather than the fiber cable. Structures impose additional weight on the soil and can induce settlement. The impact of settlement is considered less than significant because proper engineering and construction techniques will eliminate this hazard and because any damage that does occur will not have an adverse physical effect on humans or the environment.

The susceptibility of land (slope) failure is dependent on the slope and geology, as well as the amount of rainfall, excavation or seismic activities. Areas most susceptible to landsliding are characterized by steep slopes and include most existing landslides with substantial evidence of down-slope creep of surface materials. Landslides are least susceptible in areas that are topographically low alluvial fans and at the margin of the San Francisco Bay.

Most of the project routes are located in gently sloping and stable terrain within existing roads, and railroad easements. Typically, applicable geotechnical engineering remedies were previously incorporated into the roadway and railroad design to reduce the likelihood of soil failure. However, in a few areas the installation will require excavation into steep slopes, some of which are subject to mass movement (i.e., landsliding, debris flows). The areas of existing and potential instability will be avoided to the extent practicable. Geotechnical analysis would be conducted in areas where the proposed project route must pass through a potentially unstable area.. Geotechnical recommendations may include cable rerouting or methods to stabilize the cable route in areas with unstable slopes. Geotechnical studies during the final design phase would determine susceptibility to slope instability in areas of proposed POP building construction. Design and construction of POP buildings would be in accordance with geotechnical recommendations that incorporate Uniform Building Code Standards required by the local building departments for construction. The proposed project itself would not increase the potential for slope failures and would not result in exposing people, property or the environment to additional slope stability hazards. Therefore, this impact is considered less than significant.

Mitigation Measure: No mitigation is required.

d. Would the proposed project be located on expansive soil defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?

Impact GS-5: The proposed project area could be subjected to geologic hazards relating to expansive soils. (Less than Significant)

Some of the project routes pass through areas with soils that are considered expansive by the Uniform Building Code and by the U.S. Natural Resources Conservation Service. Expansive soils could be encountered in various locations underlain fine-grained alluvial soils containing primarily clay. The effects of expansive soils could damage foundations of aboveground structures, paved roads and streets, and concrete slabs. Structural damage may result from this process over a long duration of time. Surface structures with foundations constructed in expansive soils would experience expansion and contraction depending on the season and the amount of surface water infiltration. The expansion and contraction could exert enough pressure on the structures to result in cracking, settlement, and uplift. If not properly engineered, seasonal soil expansion and contraction could damage the cable system. Geotechnical recommendations to overcome the adverse effects of expansive soils would be incorporated into the final design and construction of the cable system and related POP buildings and would be in accordance with geotechnical recommendations that incorporate Uniform Building Code Standards as required by local building departments. The impact of expansive soils is considered less than significant because proper engineering and construction techniques will eliminate this hazard and because any damage that does occur will not have an adverse physical effect on humans or the environment.

Mitigation Measure: No mitigation is required.

e. Would the proposed project leave soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of waste water?

No septic tanks or alternative wastewater disposal systems will be installed as part of the proposed project. No impacts will occur.

6.6.4.2 Los Angeles Basin Network

Northern California and Southern California share a similar topographic, geologic, and seismic regime in that they are both densely populated, seismically active regions that have comparable types and occurrences of alluvial soils and bedrock. Therefore, the geologic, seismic, and soil resource impact analysis for the San Francisco Bay Area Network also applies to the Los Angeles Basin Network.

a. Would the proposed project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving surface fault rupture, seismic groundshaking, liquefaction or landsliding?

The impact and mitigation would be the same for the Los Angeles Basin Network as for the San Francisco Bay Area Network. Please refer to Impacts GS-1 and GS-2.

b. Would the proposed project result in soil erosion or the loss of topsoil?

The impact and mitigation would be the same for the Los Angeles Basin Network as for the San Francisco Bay Area Network. Please refer to Impact GS-3.

c. Would the proposed project be located on strata that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

The impact and mitigation would be the same for the Los Angeles Basin Network as for the San Francisco Bay Area Network. Please refer to Impact GS-4.

d. Would the proposed project be located on expansive soil defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?

The impact and mitigation would be the same for the Los Angeles Basin Network as for the San Francisco Bay Area Network. Please refer to Impact GS-5.

e. Would the proposed project leave soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of waste water?

No septic tanks or alternative wastewater disposal systems will be installed as part of the proposed project. No impacts would occur.