

CalPA Data Request 20.1

The following questions relate to your 2022 WMP Update resubmission (page citations refer to the clean, revised version, dated July 15, 2022).

On page 180 of PacifiCorp's 2022 WMP Update resubmission, PacifiCorp states that:

In general PacifiCorp estimates that undergrounding costs range between \$1 million - \$6 million per line mile based on existing potential projects evaluated to date. However, PacifiCorp recognizes that the range could be much bigger depending on each project and the specific location evaluated.

- (a) Please identify and describe each significant factor that may affect the accuracy of unit cost estimates in your 2022 WMP Update resubmission, for installing underground conductor.
- (b) Please provide the analysis and work papers used to develop the unit cost estimate in your 2022 WMP Update resubmission for installing underground conductor.
- (c) Please identify a potential project that PacifiCorp has evaluated to date, where PacifiCorp estimated unit costs close to \$1 million per line mile.
- (d) Please describe the characteristics of the project identified in subpart (c) that contributed to the relatively low unit costs.
- (e) Please identify a potential project that PacifiCorp has evaluated to date, where PacifiCorp estimated unit costs close to \$6 million per line mile.
- (f) Please describe the characteristics of the project identified in subpart (e) that contributed to the relatively low unit costs.

Response to CalPA Data Request 20.1

- (a) While PacifiCorp has not performed a detailed cost analysis of this specific project, the spend was estimated based on previous experience with undergrounding conductor and based on California investor-owned utility (IOU) projections, as show in Figure 1 below. Significant factors that may affect cost are geology, cultural surveying, cultural monitoring services (if needed), environmental surveys, environmental monitoring services (if needed), environmental offsetting activities (if needed), permitting, significant vegetation work, existing right-of-way (ROW), other utility facilities, and customer density.

CalPA Data Request 20.2

The following questions relate to your 2022 WMP Update resubmission (page citations refer to the clean, revised version, dated July 15, 2022).

On page 181 of PacifiCorp’s 2022 WMP Update resubmission, PacifiCorp states that:

PacifiCorp has completed the engineering design phase on several higher priority circuits, which includes the cost evaluation of covered conductor versus undergrounding, and identified two projects where undergrounding provided the following benefits...

Please provide the following information about each of the potential undergrounding projects for which “PacifiCorp has completed the engineering design phase”.

- (a) Circuit name.
- (b) Circuit-segment (i.e., zone of protection) ID number.
- (c) Circuit voltage.
- (d) HFTD tier of the portion of the circuit that would be undergrounded in the potential project.
- (e) Number of circuit-miles that are included in the potential undergrounding project.
- (f) Number of line-miles that are included in the potential undergrounding project.
- (g) Number of phases on the circuit.
- (h) PacifiCorp’s “cost evaluation of covered conductor versus undergrounding” for the potential project.
- (i) Please provide any work papers PacifiCorp used to estimate the cost of installing underground conductor.
- (j) Please provide any work papers PacifiCorp used to estimate the cost of installing covered conductor.
- (k) Please provide any work papers PacifiCorp used to estimate costs for any other mitigation alternatives considered.
- (l) The current status of the potential project.
- (m) Whether this project is one of the two “identified” projects noted in the quote above.
- (n) A GIS polyline within a geodatabase (.gdb) showing the potential undergrounding project.

Response to CalPA Data Request 20.2

- (a) 5G45/5G83 and 5G79
- (b) PacifiCorp has provided the ZOP ID # in Figure 3 and Figure 4 below. It is important to note that some zone of protections will be broken up into more zone of protections

while some new underground lines will be new zones of protections, no ID # are assigned for these new segments yet:

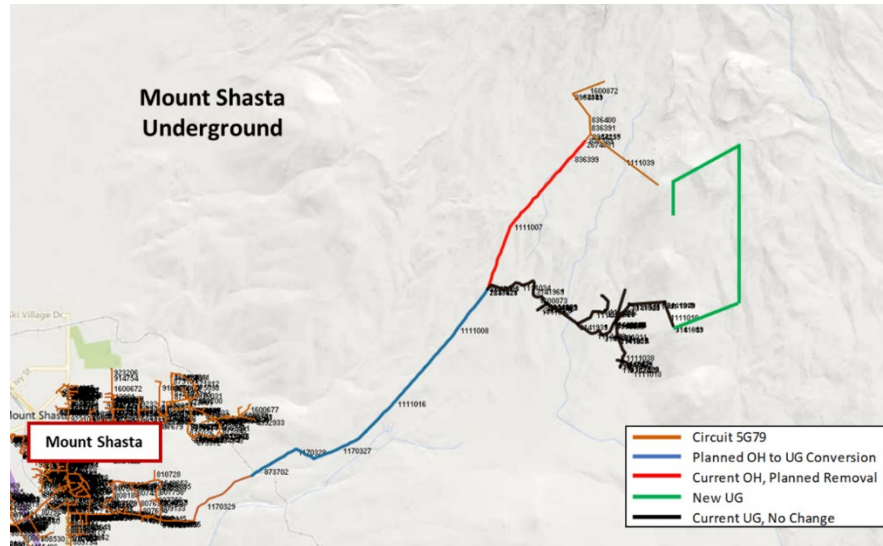


Figure 3: Map of Mt. Shasta Underground project identified to date with ZOP IDs.

ZOP ID List of highlighted project area:

873702, 1170329, 1170328, 1170327, 1111016, 1111008, 2833328, 7248411, 1111017, 2675705, 1111034, 3141963, 3141965, 1600873, 3141959, 2954525, 1111015, 2954521, 2954523, 1111012, 3141961, 1111013, 3141931, 3141933, 3141935, 1114463, 3141937, 3141939, 1114465, 3141943, 3141945, 1114466, 3142439, 3142441, 1561067, 3142443, 1111011, 3141957, 3141953, 1111038, 3142437, 3142431, 1111037, 3142433, 1111036, 1111035, 3142435, 1111009, 3142429, 3142427, 1111018, 3141955, 1111014, 3141947, 1114467, 3142445, 3142447, 1111043, 3142449, 1600874, 3141921, 3141919, 1111042, 3141923, 1111041, 3141917, 3141913, 1111010, 3141951, 3141949, 1111033, 3141915, 1111040, 3141941, 1114464, 7248413, 1111007, 836399, 2674881, 1114461, 3141927, 3141925, 1114460, 3141929, 1114462, 836389, 2954155, 2954153, 836391, 836387, 2954151, 2954149, 1600872, 836400, 6247219, 1111039

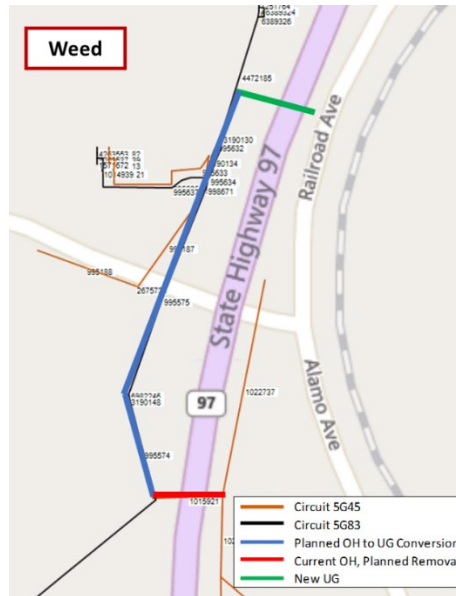


Figure 4: Map of Weed Underground project identified to date with ZOP IDs.

ZOP ID List of highlighted project area:

995189, 995164, 1015921, 1022737, 1027399, 995187, 995634, 3190130, 995632, 998671, 995575, 6982246, 3190148, 995574, 995581, 4472185

- (c) All of the currently identified segments of underground are 12.47 kilovolts (kV).
- (d) All of the currently identified segments of underground are located in Tier 2
- (e) **Mt. Shasta Underground Project** (Circuit: 5G79) – 6 miles.
Weed Substation Project (Circuit: 5G83, 5G45) – 0.25 miles.
- (f) **Mt. Shasta Underground Project** (Circuit: 5G79) – 6 miles.
Weed Substation Project (Circuit: 5G83, 5G45) – 0.25 miles.
- (g) There are three phases.
- (h) **Mt. Shasta Underground Project** (Circuit: 5G79) – The United States Forest Service (USFS) would not permit the construction of additional pole installations which would have been required to install covered conductor. The plan for additional poles was rejected by the USFS due to cultural significance areas.

Weed Substation Project (Circuit: 5G83, 5G45) – When re-conductoring, it is required to re-permit work. Hwy 97 is a CALTRANS highway, and CALTRANS requested that instead of granting permission to go over the highway, that PacifiCorp

Despite PacifiCorp's diligent efforts, certain information protected from disclosure by the attorney-client privilege or other applicable privileges or law may have been included in its responses to these data requests. PacifiCorp did not intend to waive any applicable privileges or rights by the inadvertent disclosure of protected information, and PacifiCorp reserves its right to request the return or destruction of any privileged or protected materials that may have been inadvertently disclosed. Please inform PacifiCorp immediately if you become aware of any inadvertently disclosed information.

- underground the conductor.
- (i) PacifiCorp did not prepare formal work papers and / or perform analysis for these estimates, however, PacifiCorp did review the California Public Utilities Commission (CPUC) provided estimates from the investor owned utilities (IOU), as shown and described in the Company's response to Cal Advocates Data Request 20.1 subpart (a).
 - (j) Similar to undergrounding, the costs were estimated based on previous experience with covered conductor installations.
 - (k) PacifiCorp did not prepare formal work papers and / or perform analysis for costs estimates of alternatives.
 - (l) **Mt. Shasta Underground Project** (Circuit: 5G79) – Currently in the permitting process and scheduled for construction to begin in the summer of 2023.
Weed Substation Project (Circuit: 5G83, 5G45) – Currently in the design phase, moving into the permitting and construction phases by end of year 2022.
 - (m) Yes, both are described.
 - (n) The Company's response for this subpart will be provided in a supplemental response by August 22, 2022.

CalPA Data Request 20.3

The following questions relate to your 2022 WMP Update resubmission (page citations refer to the clean, revised version, dated July 15, 2022).

For each of the two “identified” underground projects¹ addressed in the previous question:

- (a) Please identify the underground construction method selected.
- (b) Please provide the analysis and work papers used to evaluate and compare different underground construction methods.
- (c) Please state the forecast total cost of the project.
- (d) Please provide the estimated cost per line-mile.
- (e) Please provide the estimated cost per circuit-mile.
- (f) Please provide the number of phases on each circuit.

Response to CalPA Data Request 20.3

The Company assumes that the reference to “in the previous question” is intended to be a reference to CalPA Data Request 20.2. Based on the foregoing assumption, the Company responds as follows:

- (a) For PacifiCorp undergrounding projects, open trench and/or directional drilling construction methods may be used.
- (b) Underground construction methods are selected by the construction company doing the work, PacifiCorp does not prescribe the methodology.
- (c) PacifiCorp forecasts at the project level, where a single Line Rebuild project can include covered conductor and undergrounding. Therefore, PacifiCorp cannot provide a forecast for the underground segment of the project but has provided the entire project forecast for the two projects which currently include undergrounding.

Mt. Shasta Underground Project (Circuit: 5G79) – Entire 11.3 miles = \$9,928,893 forecast which includes 6.9 miles of underground and 4.4 miles of covered conductor.

¹ PacifiCorp’s 2022 WMP Update resubmission, page 181.

Weed Substation Project (Circuit: 5G45, 5G83) – Entire 22.5 miles = \$14,292,002 forecast which includes 0.25 miles of underground and 22.25 miles of covered conductor.

(d) **Mt. Shasta Underground Project** (Circuit: 5G79) – underground is forecast to cost \$1 million per mile (\$ million/mile).

Weed Substation Project (Circuit: 5G45, 5G83) – underground is forecast to cost \$2 million/mile.

(e) Please refer to the Company's response subpart (d) above.

(f) There are three phases.

Underground Conversion Costs

What is the typical cost range for conversion of overhead electric lines to underground per mile?

According to PG&E, SCE and SDG&E, the costs for undergrounding overhead distribution infrastructure can range anywhere from \$1.8 million to \$6.1 million per mile. These costs represent all costs associated with the undergrounding effort: trenching, conduit, substructures, cabling and connections, meter panel modifications, cutover work, and finally removal from service of poles and wires.

Figure 1 : IOU projection of costs as per : <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/infrastructure/electric-reliability/undergrounding-program-description/cpuc-rule-20-undergrounding-programs---faqs>

- (b) PacifiCorp did not prepare formal work papers and / or perform analysis for these estimates, however, PacifiCorp did review the California Public Utilities Commission provided estimates from the IOUs, as shown in Figure 1 above.
- (c) Please refer to the Mt. Shasta underground project on circuit 5G79 provided in Figure 2 below:

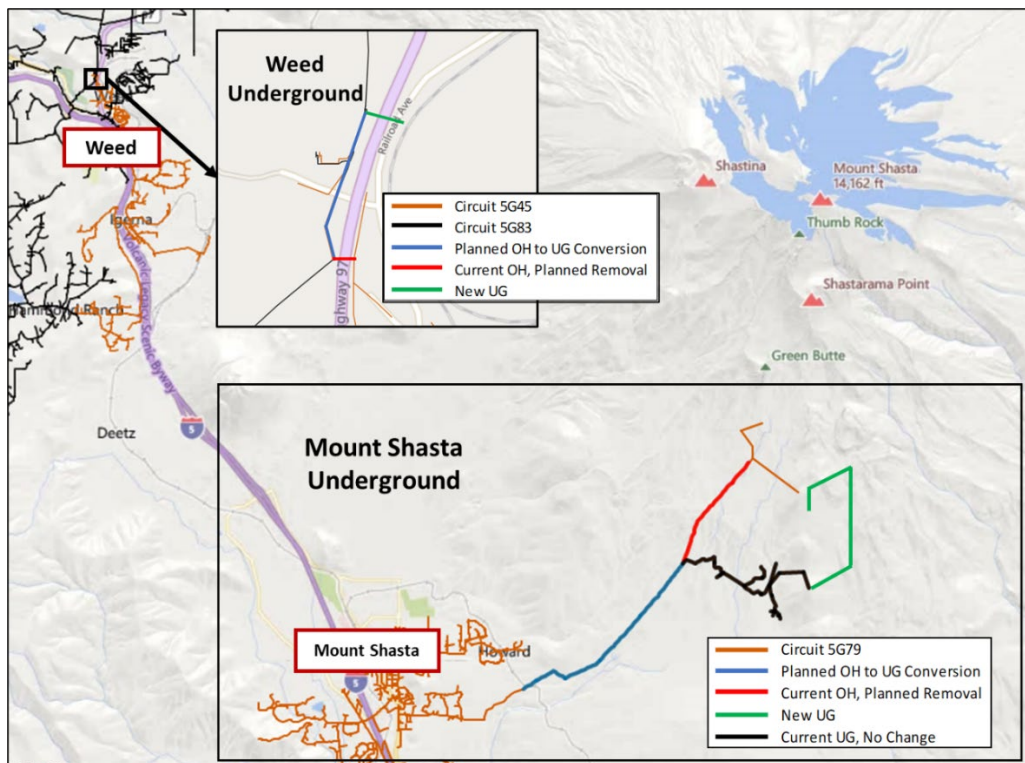


Figure 2: Map of Underground projects identified to date.

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- (d) The characteristics of this project which contributed to the relatively low cost units are:
- Geology – no wetland or heavy rock.
 - Cultural surveying – previously completed along route.
 - Cultural monitoring services (if needed) – based on survey, not needed.
 - Environmental surveys – little to no vegetation.
 - Environmental monitoring services (if needed) – not expected.
 - Environmental offsetting activities (if needed) – not expected.
 - Permitting – United States Forest Service (USFS) preferred route.
 - Significant vegetation work – little to no vegetation, it's in a ski lift/roadway cleared area.
 - Existing ROW – granted by ski resort and USFS.
 - Other utility facilities, and – no other utilities on this route.
 - Customer density – two customers along route; therefore two connections needed (very little).
- (e) A \$6 million per line mile project was an upper end estimate of project costs that could have a high number of customer connections, ROW acquisition costs, and/or environmental costs. No specific project was identified.
- (f) Not applicable. Please refer to the Company's response to subpart (e) above.