

Anderson Island Electrical Cable Replacement Detailed Project Description

After repair of the submarine electrical cable between the Nisqually Flats and Anderson Island in March of 2009 and based on an examination of the cable condition, it was determined that it would be prudent to replace the existing cable entirely as further failures are likely. Six alternate routes were hypothesized. One route to Ketron Island was found to be fatally flawed for technical reasons. Therefore, five alternate routes were evaluated as possible new cable routes to Anderson Island. Two of these routes were from the south end of Anderson Island; one crossed the Nisqually Reach to landfall adjacent to the present cable landing near Luhr Beach boat launch; the second left the island from its southwest shoreline and crossed to a landfall to the northwest of Nisqually Reach. A third option was to run the cable from the west side of Anderson Island over to Devil's Head on the Long Branch peninsula. The fourth option was to run the cable from the north shore of Anderson Island over to McNeil Island. The fifth route was to run from the eastern-most tip of Anderson Island over to the Dupont gravel pit dock area, just south of Fort Lewis shoreline near Tatsolo Point.

Based on financial, logistical, and environmental considerations, the decision was made to replace the cable in essentially the same location as the current cable, running from near Luhr Beach on the Nisqually side to Thompson Cove on Anderson Island. To allow for future repair without complications with the existing cable, the new preferred route will be offset to the northwest of the existing route by approximately the same number of feet as the depth of the water (e.g., where water depth is -50 feet (ft) mean lower low water [MLLW], the separation will be at least 50 feet). In addition, the cable alignment will be further shifted to the northwest on the Nisqually beach to avoid shell middens discovered during an archeological survey by Northwest Archeological Associates, Inc. (2009). The archeological field survey further verified that the new entry point will not disturb any shell middens in the area. Another adjustment to the route in the vicinity of Luhr Beach was to move the routes slightly to avoid eel grass. This final adjustment was done in consultation with the Washington State Dept. of Fish and Wildlife. Therefore, under the proposed action, a 4-inch 3-phase submarine electrical cable will be run between the Nisqually Flats and Anderson Island. The new cable will utilize the current end point vaults on both the mainland and the Island; however, as indicated above, it will be placed north and west of the present alignment, allowing sufficient distance for future repairs, if needed.

The cable will be installed using a combination of remotely operated equipment, divers and directional drilling. With these methods, a barge will be anchored offshore of Anderson Island. A directional bore pit will be installed outside of the shoreline management area (200 feet back) and the drilling rig will drill or bore from a location near the existing power vault on Anderson Island down at an angle so that it exits into salt water at an elevation of -25 feet below MLLW. This will allow the installation of the cable on the Anderson Island side to avoid any impact on eelgrass which was found through survey work to be located only at depths shallower than -25 feet MLLW. The directional boring process uses a drilling rig that pumps a drilling fluid to remove

loosened materials and allow them to be collected back at the bore pit. The drilling fluid will be selected to be environmentally benign and not harm terrestrial and aquatic life. The drilling fluid pressure will be monitored during the drilling process to insure that a “blow-out” does not happen or if it does happen that the drilling is immediately stopped. This will prevent harm to aquatic life. Furthermore, the drilling fluid and loosened material being collected from the drilling operation will be monitored for any archeological or cultural materials and will be stopped (and appropriate officials immediately notified) should any be found. Drilling fluids and materials will be hauled off-site to an approved disposal area. Archeological field work found no archeological or cultural artifacts at this location, which is one reason it was chosen as the project route. The new directional bore will start out at a distance of 3 to 5 feet from the existing 1975-vintage power cable and then at the -25 foot water level be approximately 25 feet to the north of the existing 1975-vintage power cable. Divers will attach a pulling rope from the Anderson Island shore to the end of the directional drill conduit and the cable will be pulled off a spool on the barge, through the conduit, to the Anderson Island electrical vault. This method will prevent disturbances to existing eelgrass beds, as well as other ecologically valuable intertidal and littoral habitats on the Anderson Island side.

From the deep end of the conduit, the cable will be hydro-plowed into the sediments. The hydro-plow uses seawater to cut a trench before the cable, while simultaneously laying the cable in the trench as the cable is fed off the barge. Divers are likely to assist in the deployment and recovery of the hydro-plow. The cable will be embedded to a depth of approximately 1 meter (i.e., between 3 and 5 feet) below the seafloor. The amount of burial has not yet been determined but will be from approximately -25 feet MLLW to -80 feet MLLW on the Anderson Island side. This depth range will easily allow divers to assist in the control of the hydro-plow. The purpose of the burial is to protect the cable from anchors being dragged and physically damaging the cable and to allow recovery of the benthic assemblages that now occupy the proposed route.

The hydro-plow fluidizes the bottom material using seawater allowing the cable to sink to the bottom of the trench, and the bottom material solidifies over the cable shortly after the hydro-plow passes. A typical installation produces a slight ridge along the sides of the trench, and a slight depression after passage of the hydro-plow. Generally the seafloor disturbance width is less than 5 feet and the height of the two “bumps” adjacent to the cable are less than 6 inches. Typically, tidal action against the seafloor redistributes the seafloor disturbance area to a smooth surface over time.

From -80 feet MLLW, the cable will then be placed on the seafloor, to the north and west of the current cable and across the Nisqually Reach. As the cable approaches the Nisqually shore, it will be played out and floated to shore on small inflatable bladders. It will then be connected to the electrical system located south of the Luhr Beach boat ramp. The hydro-plow will be used beginning at about -80 feet MLLW to install the cable across Luhr Beach northwest of the low tide channel of McAllister Creek. Near the high tide line, the cable will approach the beach through conduit set by directionally boring under the riparian zone, stream channels, and bluff system that separates the upper end of the boat launch parking lot from the beach. The drilling apparatus will be set up

near the northwest corner of the parking lot and the drilling will start in a downward angle from grade and to the northwest. It will gradually be turned to the north to exit onto the beach face (below the beach grade of the bluff) beyond the toe of the bluff and well west of the shell midden. The directional boring process uses a drilling rig that pumps a drilling fluid to remove loosened materials and allow them to be collected back at the bore pit. The drilling fluid will be selected to be environmentally benign and not harm terrestrial and aquatic life. The drilling fluid pressure will be monitored during the drilling process to insure that a “blow-out” does not happen, or if it does happen, that the drilling is immediately stopped. This will prevent harm to the drainage ravine being crossed. The drainage area will also be crossed underneath at a sufficient depth to prevent a “blow-out of drilling fluid. Furthermore, the drilling fluid and loosened material being collected from the drilling operation will be monitored for any archeological or cultural materials and will be stopped (and appropriate officials immediately notified) should any be found. Drilling fluids and materials will be hauled off-site to an approved disposal area. Archeological field work found no archeological or cultural artifacts at this location, which is why it was chosen as our project route.

The drilled hole will be lined with HDPVC or steel conduit through which the 25 kV power cable will be pulled. At the point of exit, a below grade, pre-cast, concrete utility vault will be installed in which the section of power cable coming from the upland will be spliced to the main section of power cable leading to Luhr Beach. The below grade utility vault will not require routine access and will be buried so that the top is 1 to 2 feet below the beach grade. From the box, conduit will be trenched 3 to 5 feet into the beach by tracked equipment, working on portable planking. This trenching will proceed as far out across the beach as possible. Timing for this work will coincide with the in-water work window that runs from approximately July 15th to February 15th and will be coordinated with National Fish and Oyster Company, which is actively harvesting oysters on the Luhr-Beach side tidelands. Beach contours after construction will be returned to pre-construction contours and before and after pictures will be taken to document the process. From the end of the trench, the cable will be pulled from a barge back to the connection box, and then hydroplowed into the sediment down to a depth of approximately -80 feet MLLW.

Because of the extensive intertidal delta on the Nisqually side, directional drilling beneath the intertidal zone is not feasible. An excavator will be used to dig a trench starting from the beach head and extending as far as sediment stability will allow. The hydro-plow will disturb a corridor of intertidal and littoral sediments (0 to -80 feet MLLW) of approximately 5 feet wide by approximately 5,000 feet long, for a total disturbance area of approximately 20,000 square feet (sf), based on an assumption of a 3 ft wide swath of absolute impact and a 2 ft wide swath of partial impact (50 percent or less) for a combined width of disturbance of 5 feet. The cable corridor after its final adjustment is designed to traverse no known existing eelgrass on the Nisqually side.

Pilings and navigation signs will also be installed on the Luhr Beach and Anderson Island sides of the project, as required by the US Army Corps of Engineers, the US Coast Guard, and the State’s Dial Dig program. This installation will entail installing two 10-

inch 20 foot Schedule 40 galvanized steel pilings with galvanized crossties, a 3 foot by 3 foot USCG approved Day Mark Cable Crossing Sign, and a custom Utility warning sign. The Utility warning sign will conform to Washington State Dept. of Transportation standards for utility signs. The pilings and sign on the Luhr Beach side will need to be part of the beach work and will placed close to the toe of the bluff. The pilings and sign on the Anderson Island side will be located above the Ordinary High Water Mark and outside of the 200 ft buffer zone.