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TECHNICAL MEMORANDUM

DATE July 3, 2024

TO Hydrostor

CC Jeremy Paris, David Stein

FROM Scott Crawford **EMAIL scott.crawford@wsp.com**

WETLAND METHODOLOGY

Scott Crawford is a senior biologist who has been conducting biological resource surveys and preparing technical documents since 1994. He completed his Wetland Delineation Training with Charles Newling with the Wetland Training Institute in 1998. He has prepared numerous jurisdictional delineations throughout southern California in both the Mojave and Sonoran Deserts. Mr. Crawford has completed and assisted in submitting regulatory agency permitting applications and is thoroughly familiar with the United States Army Corps of Engineers regulations under Section 404 of the Clean Water Act, the Regional Water Quality Control Board regulations under Section 401 of the Clean Water Act as well as the Porter-Cologne Act, and the California Department of Fish and Wildlife (CDFW) regulations under Section 1600 of the California Fish and Game Code. He is also familiar with more specialized survey methods such as the CRAM Analysis and the Brady and Vyverberg method.

The following is a detailed description of the methods used to map the existing drainage features within the Willow Rock Energy Storage Project. The methods used to delineate CDFW limits of jurisdiction associated with on-site drainage features were not considered the standard methods to document jurisdictional limits under Section 1600 of the California Fish and Game Code. As the project is located within a desert ecosystem with infrequent and often severe rain events, isolated erosion features and intermittent evidence of flows are often difficult to identify unless those features are specifically searched for during the field effort. This effort is started with a more in-depth literature review followed by a strategic evaluation of on-site conditions identified below.

Our jurisdictional delineation effort began with a literature review which included the following:

- Current and historical aerial photographs (Google Earth April 2023) of the study area at a scale of 1:1800 to determine the potential locations of jurisdictional waters or wetlands
- USGS topographic maps to determine the presence of any “blue line” drainages or other mapped water features (USGS 2023)
- U.S. Department of Agriculture (USDA) soil mapping data (USDA 2023)
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map to identify areas mapped as wetland features (USFWS 2023)
- National Hydrography Dataset (USGS 2023)

- FEMA's National Flood Hazard Map (2024)
- Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-scale Solar Power Plants (Brady and Vyverberg 2014)
- Preliminary Hydrology & Hydraulic Analysis for the Willow Rock Energy Storage Center (Kiewit 2024)

Based on this information, all potential drainage features were identified for field verification. Prior to conducting the field work specifically for the Jurisdictional Delineations, the project site, additional work areas, and gen-tie lines were surveyed for Burrowing Owl, Sensitive Plants, Desert Tortoise, Crotch's bumble bee, Mohave ground squirrel, and Swainson's hawk. Our team of biologists and wetland scientists were instructed to map any evidence of drainage features during these surveys. Biologists and wetland scientists walked 10-meter transects along the entire project footprint providing a 100% cover. During the performance of these surveys, biologists, and wetland scientists identified only a single drainage feature within the study area.

Field verification started on the east side of the project site along the western edge of the existing rail line, as the portion of the Project Parcel east of the rail line will not be part of the project site. Wetland scientists identified a drainage feature on the eastern side of the rail line east of the project site. The Assessor's parcel for the project site extends east of the rail line. This portion of the project parcel is not proposed for development, therefore, it was excluded from the previous jurisdictional delineation report. This feature was also identified as a FEMA Sensitive Flood Hazard Area (See attached Figure 1) and an NWI drainage. We will include this drainage in the revised Jurisdictional Delineation Report, but the drainage will be completely avoided during all aspects of the project.

There were several potential drainage features within the main project site identified on the Preliminary Hydrology & Hydraulic Analysis that were inspected and determined to have no identifiable characteristics of flow. The jurisdictional delineator stopped at each potential drainage feature to determine the existence, and if present, the extent of the jurisdictional feature. Each feature identified either on the aerial photo, on the NWI Map, on the FEMA Sensitive Flood Hazard Map, or independently observed during the survey was field checked by walking 200 feet upstream and downstream to determine if any evidence of flow existed.

If no evidence of flow occurs, the feature was determined to have no jurisdictional limits and was removed from further consideration. Drainage features that were identified within the survey area were mapped based on their potential to covey flows during large storm events. Typically, these features will have a low-flow channel with a clearly defined bed and bank or a noticeable change in vegetation and/or soil composition. Meandering transects were walked along the 200-foot length of the identified drainage features, both upstream and downstream, to determine the lateral extent of the feature such as those found in braided channels or channels that tend to sheet flow and meander within a larger active floodplain.

A GPS point was taken at each location where a drainage feature was positively identified within the project site and/or crossing a gen-tie right-of-way. The wetland specialist walked meandering transects 200 feet upstream and 200 feet downstream of where the drainage entered the project site or crossed the gen-tie right-of-way. In some instances, the drainage was undetectable prior to reaching the end of the 200-foot survey area. The drainage feature widths were measured at the outermost extent of any evidence of flows including but not limited to shelving, change in vegetation, change in soil texture, sediment deposition, wracking, or other indicators of flow.

Soil pits were dug at each feature to determine the extent of sand soil deposits, which were the primary streambed sediments. Typically, with these types of sandy soils with no organic streaking, soil pits are not required for a standard wetland delineation, as there are no wetland indicators. However, soil pits are identified as part of the Brady and Vyverberg 2014 methods.

Under the Brady and Vyverberg 2014 method, soil pits are described as 1-meter long, a half meter wide, and a meter deep. However, due to the length of time to dig each pit (45 minutes to an hour), it was not identified as a requirement in the 2014 methodology. Under standard wetland delineation methods, drainages that do not contain hydrophytic vegetation or hydrology indicators, do not require excavation of soils pits to determine if hydric soils are present. To better understand the soil composition within the channels identified as active, soils pits were excavated, but a smaller scale than the Brady and Vyverberg 2014 method. Each pit was approximately 1-foot wide by 1-foot long and approximately 18-inches deep.

Areas with challenging site features, such as frequent human disturbance and/or development, were allowed additional time to understand the localized flow regime to map the extent of potential flows during storm events and how that may have been affected by man-made channelization, flowing along previously graded access roads, and/or other unnatural conditions.