Appendix G-2

Supplemental Memorandum

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Brian Gorda
Lockhart Solar PV II, LLC
11455 El Camino Real, Suite 160
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Dear Mr. Gorda:

Westwood Professional Services is pleased to present this technical memorandum to Lockhart Solar PV II, LLC to supplement our Geotechnical Investigation Report (Report; dated August 19, 2021) prepared for the proposed Lockhart Solar PV II Project (Project).

Regional Geologic Description

The Project Site is located within the Central Mojave Desert Physiographic Province. This portion of the Mojave Desert is characterized as a large wedge-shaped structural block. The boundaries of the elevated block are the left-slip Garlock fault on the north; the right-slip San Andreas fault on the southwest; and the Basin and Range Province on the east. The Project Site lies near the central portion of the alluviated intermontane Harper Lake Basin. This elongated northwest-trending basin has a drainage area of 514 square miles. Harper Lake, a playa (dry) lake, lies to the east of the Project Site.

Topographically, the floor of Harper Valley is of very low relief with a generally smooth surface. The terrain grades at shallow angles toward the playa from the surrounding mountains and hills. The Gravel and Mud Hills bound the valley to the northeast and attain an elevation of 4,000 feet (2, 000 feet above the valley floor). A discontinuous series of low hills known as the Kramer Hills trend to the northeast along the southwest margin of the valley. Northwest of the site is another series of low-relief discontinuous hills, referred to locally as The Buttes. These bedrock hills rise to 200 feet above the surrounding valley floor.

A variety of rock types are present within and around the valley. The Gravel and Mud Hills are composed of mostly nonmarine Miocene age sedimentary units overlain locally by a thick section of Pleistocene age basalt flows. The Kramer Hills are composed primarily of Pleistocene sediments. The Buttes, near the Project Site, consist of Precambrian gneiss and marble metamorphics intruded by Cretaceous granitic rooks.

Lithologic units filling the valley consist of Pleistocene and Holocene stream deposited alluvium and Lacustrine (lakebed) and aeolian (windblown) sand deposits. Both older and recent alluvium covers most of the valley floor from the hill fronts to the playa in the form of broad alluvial fans. The alluvium is composed of lenses and beds of mixed sand, silt, and gravel. The playa is immediately underlain by several hundred feet of lake beds consisting of thinly stratified silt, sand, and clay. Wind-blown sand (dunes) has accumulated in patches on the playa and immediately to the east. Deep water wells drilled in the playa area indicate the lacustrine-alluvial deposits are at least 1,100 feet thick and possibly thicker and overlie Precambrian metamorphic (gneiss) basement rocks.

As shown in Exhibit 5 of the Report, several major Quaternary northwest-trending faults project through the region of Harper Valley. The Harper Fault zone traverses the southwest side of the Gravel and Mud Hills. About four miles east of the Harper fault zone is a parallel fault system referred to as the Blackwater-Mud

Hills fault zone. The Lockhart Fault also trends northwest parallel to the Harper Fault and traverses the valley floor approximately 1 mile south of the Project Site. Several spurs of the Lockhart Fault lie north and south of the main trace. The faults described above are a part of a much larger system known as the Mojave Desert faults, some of which have lengths up to 100 miles. All show predominantly right-slip displacements with generally minor vertical movements. Most of these faults have been demonstrated to have been active in Quaternary time and have been responsible for uplift of the adjacent hills and mountains and depression of the basin areas, such as the Harper Valley Basin (Jennings, 1975).

Subsidence

In general, when groundwater elevations decline within a basin, the potential for subsidence increases. There is potential for long-term subsidence in the vicinity of the Project Site due to regional groundwater withdrawal over the design life of the Project. The Project Site is located within the Harper Lake Basin, which lies within the larger Mojave River groundwater basin. According to the USGS (Brandt & Sneed, 2017; USGS, 2021), groundwater levels have declined as much as 50 feet in the Harper Lake Basin within the last 60 years, resulting in observed land subsidence in the Harper Lake Basin.

Soil collapse occurs when a relatively loose, dry, low density material is inundated with water and subjected to a load. Loess and alluvially deposited silty material are particularly prone to collapse, as their depositional environment facilitates a loose, low density profile.

Discussion

Although ground subsidence due to groundwater extraction has been observed throughout the region, the effects of subsidence in the Harper Lake Basin are regional in scale and unlikely to be isolated to the Project Site. While the likelihood of collapse occurring beneath the property is generally considered low due to the relatively dense soil conditions, the potential does exist for collapse to occur in un-stabilized (e.g., uncompacted and potentially loose at the surface) areas when subjected to large quantities of applied surface water (e.g., significant rain events with greater than 1 inch of rainfall). Surface water application would only be nominal amounts as needed for dust suppression in compliance with the Project-approved dust control plan.

The information obtained from soil borings performed onsite by Choice Drilling of Pacoima (retained by Westwood to perform soil borings at the Project Site) indicate that the soil onsite is relatively dense (see associated boring logs in Appendix A of the Report). It should be noted that low density soils may be encountered at or near the ground surface periodically throughout the Project Site, which may be susceptible to collapse.

Recommendations

If deemed necessary based on final design conditions, conduct additional site-specific soil tests during the design phase of the Project within the planned foundation areas to evaluate the potential for subsidence and differential settlement from collapse as well as seismically induced differential ground settlement. Structures constructed on the site shall conform with the currently adopted revision of the California Building Code at the time of construction.

Sincerely,
WESTWOOD PROFESSIONAL SERVICES

Nate Viste, P.E.
Director, Solar and Storage

REGISTERED PROFESSIONAL ENGINEER
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References

Brandt, J., and Sneed, M. 2017. Land Subsidence in the Southwestern Mojave Desert, California, 1992 – 2009. Accessed from: https://pubs.usgs.gov/fs/2017/3053/fs20173053.pdf

Jennings, C.W., 1975, Fault map of California with location of volcanoes, thermal springs and thermal wells: California Division of Mines and Geology, Geological Data map no. 1, scale 1:750,000.

USGS. 2017. California Water Science Center: Mojave Groundwater Resources – Mojave Land-Subsidence Studies. Accessed from: https://ca.water.usgs.gov/mojave/mojave-land-subsidence.html