NAPA SANITATION DISTRICT SOLAR PROJECT

Addendum to Initial Study / Mitigated Negative Declaration

Prepared for
Napa Sanitation District

March 2016

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1425 N. McDowell Boulevard
Suite 200
Petaluma, CA 94954
707.795.0900
www.esassoc.com

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CHAPTER 1
Background

1.1 Introduction

In December 2015, Napa Sanitation District (the District), approved and adopted the Initial Study/Mitigated Negative Declaration (IS/MND) (NSD 2015a, b) for the Napa Sanitation District Solar Project (the Project). The Project's approval from the District Board of Directors was a discretionary action triggering environmental review of the project by the lead agency (the District) via an IS/MND under the California Environmental Quality Act (CEQA). The Project comprised the proposed construction, operation and eventual decommissioning of a one megawatt (MW) photovoltaic (PV) solar project by SunPower (Figure 1). The Project is proposed for location on property owned by Napa Sanitation District (the Project Site). The Project Site is located within unincorporated Napa County on land adjacent to the existing Napa Sanitation District's Soscol Water Recycling Facility. The Project will generate electricity for use by the District at the Soscol Water Recycling Facility, which would be purchased via a Power Purchase Agreement between SunPower and the District.

Following approval of the IS/MND, SunPower presented the District with a proposed design modification to the project. This modification comprises a realignment of the proposed Alternating Current (AC) run from the Solar Switchboard to the Medium Voltage (MV) tie-in, which connects to the eastern solar array (Figure 2). As presented and evaluated in the IS/MND, the AC run is currently proposed to run directly south from the Solar Switchboard and then via a sharp turn run north east to connect to the tie-in (Figure 1). The proposed design refinement that would be addressed by this Addendum would comprise the construction of the AC run in a direct east-west alignment using a combination of trenching through upland areas and direct drilling under existing wetlands on the Project Site (Figure 2). The refinement would be located entirely within the Project Site and would not require any changes to the construction, operation or decommissioning activities described in the IS/MND, other than those described below.

1.2 Description of Project Modification

The proposed Project Modification would comprise the construction of the AC run in a direct east-west alignment using a combination of trenching through upland areas and direct drilling under existing wetlands on the Project Site (Figure 2).

The AC run would be constructed to the south of the proposed solar array locations (Figure 2). The AC run comprises the following components.

- A new receiving pit would be dug adjacent to the Solar Switchboard on the western portion of the Project Site to a depth of approximately 3 feet. This pit would be located 26 feet from the closest wetland boundary.

- The AC run, which comprises electric cabling within a six-inch plastic conduit pipe, would be directionally drilled at a depth of approximately 3 feet under existing wetlands in a north-north easterly direction from the Solar Switchboard to a bore pit located 76 feet to the east of the existing wetland boundary. This pit would be dug to a depth of 3 feet. The alignment would continue via directional drilling directly east for approximately 125 feet. At this point construction would continue via open-cut trenching in a trench approximately 3 feet deep and 3 feet wide for an additional 250 feet and would then interconnect via the MV tie-in located to the west and directly adjacent to the eastern arrays.

- Prior to construction a wetland biologist will demarcate wetland boundaries using flagging and stakes. Protective fencing would be installed as illustrated on Figure 2 to prevent access to wetlands or surrounding setback areas, which will extend approximately 15 to 50 feet outwards from the wetland boundaries.

- The AC run will be constructed in accordance with standard construction-related Best Management Practices (BMPs), including, but not limited to, the implementation of a Frac-Out and Surface Spill Contingency Plan to manage the potential risk of a "frac-out" (the accidental forcing of drilling fluid vertically towards and onto the surface resulting in surface contamination and ground subsidence).

The Frac-Out and Surface Spill Contingency Plan included as part of the proposed Project Modification is provided in Appendix A. This Plan requires the implementation of protective measures prior to, during and following the use of directional drilling techniques, which are intended to:

- Minimize the potential for a frac-out or spill associated with drilling activities.

- Provide for the timely detection of frac-outs or surface spills that could impact environmental resources, biological resources, surface facilities, or features.

- Facilitate in event a frac-out or spill occurs to minimize adverse effects; and,

- Facilitate that all appropriate notifications are made to relevant agencies within 24 hours.

1.3 CEQA Compliance

This Addendum to the Napa Sanitation District Solar Project IS/MND has been prepared in compliance with CEQA to address the minor Project Modification described in Section 1.2.

Addenda are intended for minor design modifications to a previously approved project (CEQA Guidelines Section 15164), as follows:

> *(b) An addendum to an adopted negative declaration may be prepared if only minor technical changes or additions are necessary or none of the conditions described in Section 15162 calling for the preparation of a subsequent EIR or negative declaration have occurred*
>
> *(c) An addendum need not be circulated for public review with the final EIR or adopted negative declaration but can be included in or attached to the final EIR or adopted negative declaration*
>
> *(d) The decision making body shall consider the addendum with the final EIR or adopted negative declaration prior to making a decision on the project*

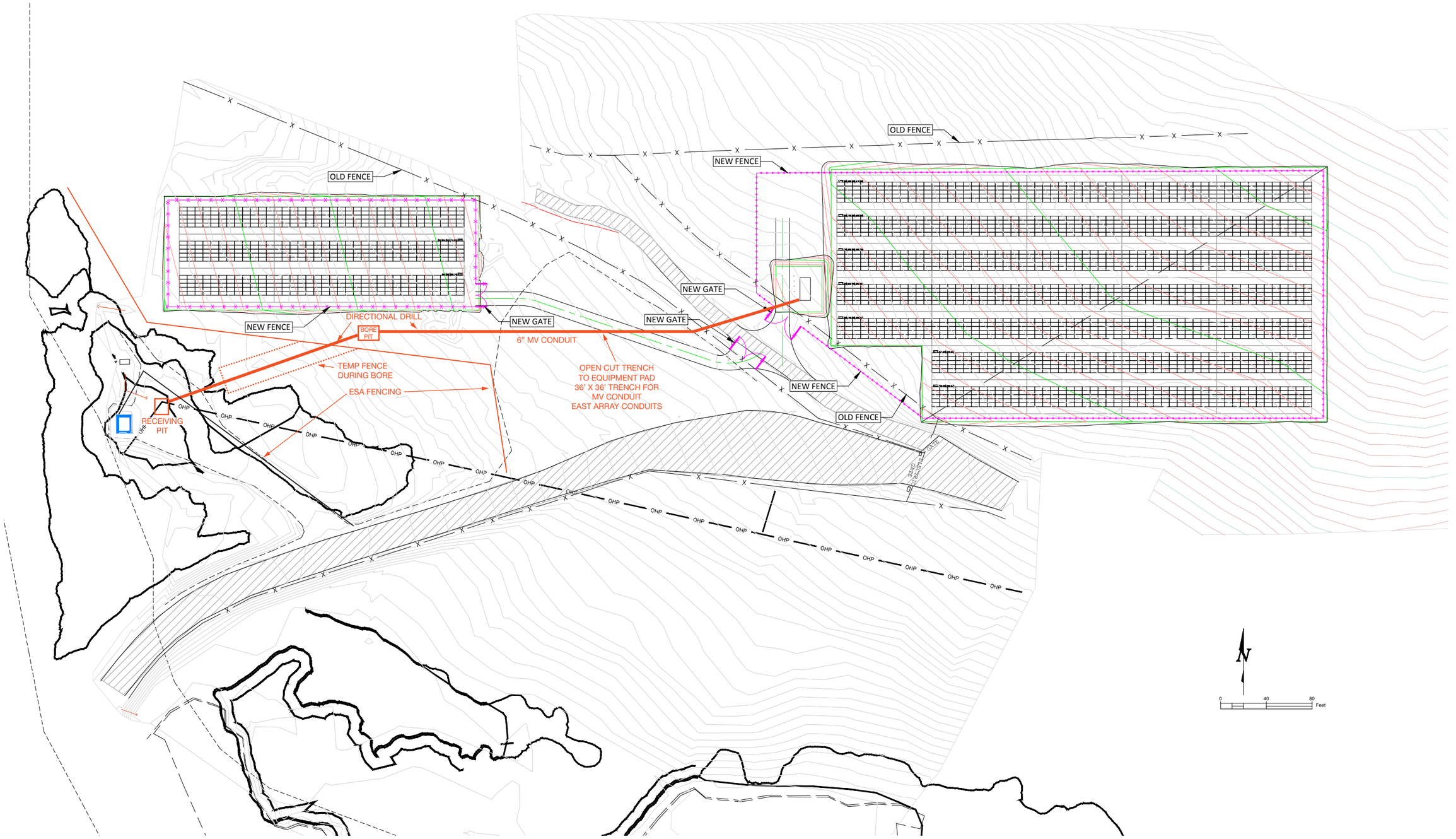
The proposed design refinement can be addressed by an Addendum because it would not trigger the requirement for the preparation of a subsequent EIR or negative declaration as set out in CEQA Guidelines Section 15162 i.e. the proposed design refinement would not result in a substantial change in the project which would either cause new significant effects or result in substantial increases in the severity of previously identified effects, or the identification of new information of substantial importance which was not known/available at the time the previous CEQA document was certified/adopted.

SOURCE: Sunpower

Napa Sanitation District Solar Project . 140895

Figure 1

Project Layout Evaluated in ISMND



SOURCE: Sunpower

Napa Sanitation District Solar Project . 140895

Figure 2

Project Modification

CHAPTER 2
Environmental Analysis

2.1 Introduction

In order to focus the evaluation on resources that may be potentially affected by the proposed Project Modification, resource categories in which the Project and proposed Project Modification would have no impacts are not discussed further. These categories are:

- Land Use and Land Use Planning (see IS/MND Section 2.2.10).
- Mineral Resources (See IS/MND Section 2.2.11).
- Public Services (see IS/MND Section 2.2.14).

For a discussion of the environmental setting for resources, refer to sections 2.2.1 through 2.2.17 of the IS/MND (NSD 2015a).

Resources that could potentially be affected by the proposed Project Modification are discussed below. Each section (2.2 through 2.16) presents an evaluation of the Project Modification and identifies any new or more severe environmental effects that could result from its implementation in comparison to those effects already discussed in the IS/MND.

As described in detail in Section 1.2, the following analysis reflects that the proposed Project Modification would be constructed within the same project site analyzed in the IS/MND and that construction, operation and decommissioning activities associated with its implementation would be virtually identical to those associated with the Project.

2.2 Aesthetics

During construction, operation and decommissioning the proposed Project Modifications would not affect any other visual resources other than those evaluated in the IS/MND (see IS/MND Section 2.2.1 pp. 2-3 to 2-5). As for the Project, the Project Modification would not affect scenic vistas and would have less than significant impacts on scenic resources or as a result of substantial light or glare. As for the Project, the Project Modification would be visible during construction as a result of the presence of construction equipment, vehicles and personnel, but these impacts would be short-term and temporary. Similar to the original AC run alignment, the proposed modified alignment would not be visible during project operation and operational

project impacts would be identical to those evaluated in the IS/MND. With the implementation of mitigation measures presented in the IS/MND, the Project Modification would not result in any new aesthetic impact or increase the severity of previously identified aesthetic impacts.

2.3 Agriculture and Forestry

Similar to the Project, the Project Modification would not have any impacts on farmland or forestland, as no forestry or farming occurs on the Project Site and therefore the Project Modification would not result in any impacts related to agricultural or forest land conversion. There would also not be any impacts related to Williamson Act contracts, as there is no Williamson Act contract in place for the Project Site. As for the Project, although the Project Site is zoned as Agricultural Watershed/Airport Compatibility pursuant to the Napa County Zoning Map, the Project Modification would not increase the severity of impacts associated with agricultural zoning identified in the IS/MND (see IS/MND Section 2.2.2 pp. 2-6 to 2-7).

2.4 Air Quality

The construction, operation and decommissioning of the Project Modification would use similar equipment and vehicles as evaluated in the IS/MND and would be completed within the same timeframe. Project-related construction and decommissioning emissions would not change with the proposed Project Modification as the modification would not result in an increase in duration or extent of construction activities over and above those evaluated in the IS/MND. The use of direct drilling techniques could require a few additional truck trips associated with removal of drilling spoils but these would result in a very small net increase in emissions over and above those already identified for the Project and would be limited to the duration of the construction period. As for the Project, during operation the Project Modification would not result in any impacts to air quality. With the implementation of mitigation measures presented in the IS/MND, the Project Modification would not result in any new air quality impacts or increase the severity of previously identified air quality resource impacts (see IS/MND Section 2.2.3, pp. 2-7 to 2-11).

2.5 Biological Resources

As for the Project, the Project Modification would not result in any impacts on riparian habitat or conflict with the provisions of any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. With respect to special status species, including habitat, migration and breeding, with the with the implementation of mitigation measures presented in the IS/MND, the Project Modification would not result in any new biological resource impacts or increase the severity of previously identified biological resource impacts over and above those identified in the IS/MND.

With respect to wetlands, the Project Modification requires direct drilling under wetlands on the Project Site which would have been avoided under the Project. This could adversely affect these resources as a result of indirect impacts associated with erosion, spill or runoff of drilling fluid

and other pollutants. As described in the IS/MND in Section 2.2.6, as part of the Project a Storm Water Pollution Prevention Plan (SWPPP) would be implemented in accordance with a National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities. The SWPPP would include soil and erosion-control Best Management Practices (BMPs) that would control and reduce soil erosion. BMPs are individual or combined measures that can be implemented in a practical and effective manner on the Project Site which, when applied, would prevent or minimize the potential erosion and displacement of soil. BMPs would include dewatering procedures storm water runoff quality control measures, watering for dust control, and construction of perimeter silt fences, as needed. As needed, soil compaction would be used during construction to further reduce soil and erosion control. After construction and following decommissioning, the site would be re-seeded/re-vegetated with low-growing appropriate species.

With the implementation of the SWPPP and the Frac-Out Plan (see Appendix A) implemented as part of the Project Modification, similar to the Project, the Project Modification would not result in any new wetland impacts or increase the severity of previously identified wetland impacts over and above those identified in the IS/MND (see IS/MND Section 2.2.4, pp. 2-12 to 2-24).

2.6 Cultural Resources

As for the Project, the Project Modification would not result in any impacts related to a change in the significance of a historical resource, as no buildings or structures are present on or in the area surrounding the Site that could be considered historical resources as defined by CEQA Section 15064.5). With respect to other cultural resource impacts described in the IS/MND; impacts on the significance of an archaeological resource, destruction of a paleontological resource or disturbance of human remains, with the implementation of mitigation measures presented in the IS/MND, the Project Modification would not result in any new cultural resource impacts or increase the severity of previously identified cultural resource impacts over and above those identified in the IS/MND (see IS/MND Section 2.2.5, pp. 2-24 to 2-28).

2.7 Geology, Soils and Seismicity

As for the Project, the Project Modification would not result in any impacts related to potential location on expansive soils or associated with use of septic tanks or alternative wastewater disposal systems. With respect to other geological, soils and seismicity impacts, impacts associated with the proposed Project Modification would be similar to those evaluated in the IS/MND, and the Project Modification would not result in any new impacts or increase the severity of previously identified geological, soils and seismicity impacts over and above those identified in the IS/MND (see IS/MND Section 2.2.6, pp. 2-29 to 2-32).

2.8 Greenhouse Gases

As for the Project, the Project Modification would not result in any impacts related to indirect or direct greenhouse gas (GHG) emissions, or conflict with an applicable plan, policy or regulation aimed at reducing such emissions beyond those already evaluated in the IS/MND. Construction and decommissioning of the Project Modification would be undertaken within the same short time frames as the Project (three months or less). The use of direct drilling techniques could require a few additional truck trips associated with removal of drilling spoils but these would result in a very small net increase in GHG emissions over and above those already identified for the Project and would be limited to the duration of the construction period. During operation, similar to the Project the Project Modification would not result in any GHG emissions. Impacts associated with the proposed Project Modification would be similar to those evaluated in the IS/MND, and the Project Modification would not result in any new impacts or increase the severity of previously identified impacts associated with GHG emissions over and above those identified in the IS/MND (see IS/MND Section 2.2.7, pp. 2-32 to 2-33).

2.9 Hazards and Hazardous Materials

As for the Project, the Project Modification would not result in any impacts associated with the effects of hazardous materials on a school or private airstrip or be located on a listed hazardous materials site. Similarly, it would not have any effect on the implementation of any emergency plans or expose people or structures to a wildfire hazard. With respect to impacts associated with the use of hazardous materials, construction and decommissioning of the Project Modification would involve the transport, use and disposal of similar materials that would be used for the Project. The Project Modification would involve the use of direct drilling which requires the use of drilling fluid and other hazardous materials which could adversely affect soil and groundwater in the event of a spill and which could pose a hazard to site workers or the public, the Project Modification has been designed to include the implementation of BMPs as part of construction activities which would ensure that that this would not result in any adverse effects over and above those identified in the IS/MND (see IS/MND Section 2.2.8, pp. 2-34 to 2-37).

2.10 Hydrology and Water Quality

The Project Modification would not have any impacts associated with existing groundwater volumes, drainage patterns, flood hazard areas, flooding or exposure of people or structures to any risk or loss/injury beyond those already evaluated in the IS/MND. With respect to water quality and runoff, although the Project Modification would involve the use of direct drilling which requires the use of drilling fluid and other hazardous materials which could adversely affect soil and groundwater in the event of a spill, the Project Modification has been designed to include the implementation of BMPs as part of construction activities which would ensure that that this would not result in any adverse effects over and above those identified in the IS/MND (see IS/MND Section 2.2.9, pp. 2-37 to 2-41).

2.11 Noise

The Project Modification would not have any impacts associated with noise beyond those already evaluated in the IS/MND. The construction, operation and decommissioning of the Project Modification would use similar type of equipment and vehicles as evaluated in the IS/MND and would be completed within the same timeframe. Project-related construction and decommissioning noise would not change with the proposed Project Modification as the modification would not result in an increase in duration or extent of construction activities over and above those evaluated in the IS/MND. As for the Project, during operation the Project Modification would not result in any impacts associated with noise. The Project Modification would therefore not result in any new noise impacts or increase the severity of previously identified noise impacts over and above those identified in the IS/MND (see IS/MND Section 2.2.12, pp. 2-43 to 2-47).

2.12 Population and Housing

As for the Project, the Project Modification would not result in any impacts related to displacement of existing housing or people. The Project Modification, as for the Project, would not result in increased employment or housing opportunities or result in any permanent relocation of construction workers to the area. With respect to population growth inducement, the proposed Project Modification would result in the same impacts as the Project, and would not result in any new impacts or increase the severity of impacts previously identified in the IS/MND (see IS/MND Section 2.2.13, pp. 2-47 to 2-48).

2.13 Recreation

As for the Project, the Project Modification would not result in any impacts related to the construction or expansion of recreational facilities. With respect to use of existing recreational facilities, the proposed Project Modification would result in the same impacts as the Project, and would not result in any new impacts or increase the severity of impacts previously identified in the IS/MND (see IS/MND Section 2.2.14, pp. 2-49 to 2-50).

2.14 Transportation and Traffic

The Project Modification would not have any impacts associated with transportation and traffic beyond those already evaluated in the IS/MND. The construction, operation and decommissioning of the Project Modification would be undertaken using similar equipment and vehicles as evaluated in the IS/MND. Construction and decommissioning of the Project Modification would be undertaken within the same short time frames as the Project (three months or less). The use of direct drilling techniques could require a few additional truck trips associated with removal of drilling spoils but these would result in a very small net increase in traffic over and above those already identified for the Project and would be limited to the duration of the construction period. During operation the Project Modification would not result in any additional

impacts associated with traffic over and above those identified for the Project. The Project Modification would therefore not result in any traffic or transportation impacts or increase the severity of noise impacts previously identified in the IS/MND (see IS/MND Section 2.2.16, pp. 2-51 to 2-54).

2.16 Utilities and Service Systems

As for the Project, the Project Modification would not result in any impacts related to utilities or service systems. As for the Project, there would be no impacts associated with water supply, water or wastewater treatment, drainage facilities or solid waste. With respect to use of a landfill for solid waste disposal, the Project Modification would result in a slight increase in solid waste generation associated with removal of drilling spoils but this would not result in any new impacts or increase the severity of impacts previously identified in the IS/MND (see IS/MND Section 2.2.17, pp. 2-54 to 2-56).

2.17 Conclusion

With the implementation of mitigation presented in IS/MND the Project Modification would not result in any new impacts or increase the severity of impacts previously identified in the IS/MND.

This Addendum is adopted pursuant to CEQA Guidelines Section 15164 based on the Final Initial Study / Mitigated Negative Declaration (IS/MND) and Mitigation Monitoring and Reporting (MMRP) Document for the Napa Sanitation District Solar Project dated November 20, 2015. Through the adoption of this Addendum and related IS/MND, the District determines that the Project Modification is a minor project change that does not require a subsequent EIR or MND under CEQA Guidelines Section 15162. The District further determines the IS/MND, together with this Addendum, adequately addresses the potential environmental impacts of the Project and proposed Project Modification.

As provided in Section 15164 of the Guidelines, this Addendum need not be circulated for public review but shall be considered with the IS/MND by the District in making its final decision on this project. The IS/MND, supporting documents and all resolutions cited above are incorporated herein by reference.

References

Napa Sanitation District 2015a, *Initial Study / Mitigated Negative Declaration (IS/MND) and Mitigation Monitoring and Reporting (MMRP) Document for the Napa Sanitation District Solar Project*

Napa Sanitation District 2015b, *Final Initial Study / Mitigated Negative Declaration (IS/MND) and Mitigation Monitoring and Reporting (MMRP) Document for the Napa Sanitation District Solar Project*

APPENDIX A

3500 American River Drive
Sacramento, CA 95864
(916) 484-3011

TEICHERT PIPELINES, INC.

January 13, 2016

SunPower
Mr. Robert Hensley

RE: Napa Sanitation District 1.0962 MW Solar Project

The following Memorandum provides a Frac-out and Surface Spill Contingency Plan prepared for your Napa Sanitation District Solar Project, Medium Voltage HDD bore.

Scope

Surface Spill and Frac-out Contingency Plan.

Plan Elements

Elements of this plan include methods to:

- Minimize the risks of spills or frac-outs coming into contact with sensitive environmental, or biological resources.
- Facilitate vigilant observation and inspection to rapidly detect any spills or frac-outs.
- Facilitate prompt and complete containment and cleanup of any accidental spills or frac-outs that may occur, in spite of these precautions.

Plan Objectives

The specific objectives required of the Plan are to:

- Minimize the potential for a frac-out or spill associated with HDD activities.
- Provide for the timely detection of frac-outs or surface spills that could impact environmental resources, biological resources, surface facilities, or features.
- Facilitate in event a frac-out or spill occurs.
- Facilitate that all appropriate notifications are made to the agencies within 24 hours and document.

Responsibilities

Specific requirements

- Monitoring for hydraulic fracturing during the performance of the work.
- Detection of any frac-outs or spill associated with HDD activities.
- Containment of the frac-out or spill material.
- Cleanup of the frac-out or spill material.
- Documentation of the frac-out of spill material.
- Notification of frac-out or spill to permitting and regulatory agencies and stakeholders.

Preconstruction Frac-Out Prevention

Frac-out and Spill prevention operations begin well before the mobilization of the construction equipment to the project site. To this end, the HDD Company employs skilled competent workers who are familiar with HDD construction and have performed multiple crossing of various complexities. The HDD Co. crew scheduled for the Project is comprised of the following:

The HDD Company maintains its drill rigs, mud recovery system, pumps, and cleanup equipment in good working order. Prior to conducting work on the site, the HDD Company will review its recent maintenance history against its equipment maintenance requirements. Where required, the HDD Company will perform required maintenance on its major equipment to ensure that the equipment maintenance is current and or remains current during the performance of the Project.

The composition of proposed drilling fluids to be used during the performance of the work have been submitted for the SRCSD approval. The fluids proposed dominantly consist of water and bentonite clay. Additives proposed for the project will be submitted as considered appropriate for the Project by the HDD Company. Additives may be used to modify the basic drilling fluid properties to achieve desired qualities specific to the conditions anticipated or encountered during the performance of the Project. The basic drilling fluid properties of concern include:

- Viscosity
- Fluid density (in the hole and out of the hole)
- Sand content

The HDD Company maintains drilling fluid monitoring equipment on site (and crew members who are skilled in their use) to evaluate fluid properties and adjust fluid quality as necessary. Adjustment of the basic drilling fluid properties may be desired in certain circumstances to match the slurry properties with the soil type to achieve a more stable borehole, improve cuttings return, or to reduce frac-out potential during difficult drilling circumstances. In special circumstances, the HDD Company will employ the services of a mud engineer to address abnormal drilling fluid requirements.

Project Site Monitoring

Monitoring of the project site provides the primary HDD good practice necessary to minimize frac-out potential. The monitoring schedule proposed for the start of the Project is summarized below. The frequency of monitoring may be increased or decreased depending on the conditions of the work and phase of the work (i.e. monitoring frequency may be increased during periods of lost circulation… or reduced when HDD activities have been demonstrated to consistently produce anticipated results).

Frac-Out and Spill Control Monitoring Frequency				
Phase	Item	Description	Normal Monitoring Frequency	Increased Monitoring Frequency
Bore hole construction	A1	Boring Fluid recovery	Hourly	Near Continuous
	A2	Mud properties	Every 4 hours	Every rod
	A3	HDD penetration rate	Occasional	Every rod
	A4	Pump rate and pressures	Occasional	Every rod
	A5	Fluid Return Volume	Occasional	Frequent
	A6	Bore path position	Every rod	Every rod
	A7	Frac-outs in site area	Every 4 hours	Near Continuous
	A8	Mud Tank Level	Every rod	Every rod
Reaming	B1	Fluid recovery	Hourly	Near Continuous
	B2	Mud properties	2 times daily	Every rod
	B3	HDD penetration rate	Occasional	Every rod
	B4	Pump rate and pressures	Occasional	Every rod
	B5	Fluid Return Volume	Infrequent	Frequent
	B6	Frac-outs in site area	Every 4 hours	Near Continuous
	B7	Mud Tank Level	Every rod	Every rod
Pull Back	C1	Fluid recovery	Hourly	Near Continuous
	C2	Pull force	Every rod	Near Continuous
Other	D3	Frac-out Counter Measure Implementation	Near Continuous	Near Continuous
Mud Recovery Equipment	E3	Spill Containment Measures	Near Continuous	Near Continuous

Loss of Fluid Recovery

Good HDD practices dictate monitoring fluid recovery during the progression of the work. In many cases, the loss or sudden changes in fluid recovery provide an early indication that down hole conditions may be incident to the occurrence of a frac-out. Fluid recovery is therefore monitored on a continuous or near continuous basis.

Plugging of the borehole annulus or the presence of a major formation fracture will typically lead to partial or possible full loss of drilling fluid circulation. While it is impossible to determine the precise nature of this type of fluid loss, it is possible to monitor fluid loss by watching for a significant difference between the rate fluid is being pumped down-hole and the rate it returns to the surface. In accordance with this Plan, the HDD Company will monitor the drilling fluid pumping rate, the drilling fluid solids control tank level, and visually observe the rate of drilling fluid return to the bore pit as identified in the Table above while the drilling is progressing. The driller will soon know if an unusually high volume of drilling fluid is being lost down-hole, depending on the ground conditions encountered in the crossing and taking into account the volume used to fill the borehole. Should the driller believe that circulation is completely lost or it is imminent that circulation may be lost; he will implement the following procedures:

1. Temporarily cease drilling operations, including pump shut down;
2. Dispatch observers as required, to monitor the area along the bore alignment, in the vicinity of the bore, and near the banks of the Sacramento River for inadvertent returns of drilling fluid at the surface.
3. Re-start the pump and pull back and push in the drill string ("stroke" the borehole) in stroke lengths up to 30 feet.

During this procedure the borehole will be stroked in an effort to size the borehole annulus and re-open the circulation pathway. Depending on how well this procedure works, the properties of the drilling fluid may also be altered (i.e. thickened) to aid in re-establishing circulation. The observers will continuously monitor for inadvertent fluid returns as long as the pump remains on. Occasionally, at the driller's discretion, it may be useful to increase the stroke length past the point at which he believes circulation was lost.

If circulation is re-established drilling will proceed as usual and monitoring for inadvertent fluid returns will become more routine as long as circulation is maintained. If circulation is not re-established, monitoring for inadvertent fluid returns to the ground surface and river will continue and drilling will proceed.

Typically lost circulation has the highest probability of occurring while the pilot hole is being drilled. This is due to the smaller borehole annulus and the relatively large volume of solids being displaced and carried in the drilling fluid. Often times in the course of drilling the pilot hole, circulation may be temporarily lost as the pilot bit is advanced through more permeable sections of the formation and fluid pressures are at a maximum. Under these circumstances, the loss of fluid may not indicate that a frac-out has occurred. As the pilot bit advances beyond the zone of lost circulation, fluid pressure will return to normal and circulation within the borehole will re-establish. It is not uncommon for drilling fluid to leave the borehole and migrate in a direction other than the ground surface and never be observed even if circulation is lost for long periods.

Frac-Out Response

If drilling fluid returns are observed to be surfacing on the ground surface at a location other than the bore pit or recovery pit and at a location that is accessible, the following procedures will be followed:

1. Cease drilling operations;
2. Contain the drilling fluid with sand bags, hay bales, or large diameter conduit such that the drilling fluid cannot migrate across the ground surface;
3. Excavate a small sump pit at the frac-out location and provide a means for the fluid to be returned to either the drilling operations or a disposal site (i.e. pump through hose or vac truck);

4. Continue drilling operations and continue maintaining the integrity of the containment measures and monitoring the fluid returns as required, so that no surface migration occurs;
5. Document the frac-out including estimating the quantity of fluids appearing at the surface and;
6. Notify resource agencies of the frac-out and response measures.

If inadvertent drilling fluid returns are observed to be surfacing on the ground surface at a location that is inaccessible, the following procedures will be followed:

1. Cease drilling operations;
2. Execute all reasonable measures within the limitations of the technology have been taken to re-establish circulation. These measures may include
    a. Trip back to the drill rig to open the borehole,
    b. Use lost circulation material to seal fracture,
    c. Propose a Project change incorporating the use of a wash-over casing,
    d. Propose alternate drilling techniques designed to improve hole circulation, etc.;
3. Continue drilling with the minimum amount of drilling fluid as required to penetrate the formation and successfully install the product line.
4. Propose an alternate bore plan that avoids the problematic formation.
5. Document the frac-out including estimating the quantity of fluids appearing at the surface and;
6. Notify resource agencies of the frac-out and response measures.

It should be noted that often times the drill cuttings generated as a result of the drilling process will naturally bridge and subsequently seal fractures or voids in the formation as drilling progresses thus providing another means of re-establishing circulation. This is particularly likely during the reaming process as higher volumes of larger cuttings are typically generated. Therefore it is often beneficial to proceed with the pilot hole even if circulation has not been re-established since it will likely be re-established at some point during the reaming process.

Frac-Out Control Equipment

In accordance with good HDD practices and the Engineer's Plan, the following frac-out and spill containment and cleanup equipment should be provided on or near the project site and be available within one (1) hour if offsite. Equipment shall include the following:

- Heavy weight sealed plastic bags filled with gravel (minimum of 20 bags)
- Geotek filter bags
- Splash board: three layers of a heavy plastic
- Several 5-gallon hard plastic pails
- One wide heavy-duty push broom
- Flat blade shovels
- Silt fence and T-posts or straw bales, as appropriate
- Chicken wire or connecting material to tie off the perimeter of a dewatering structure
- Two bundles of absorbent pads to use with plastic sheeting for placement beneath motorized equipment while in operation.
- Straw logs (wattles of fiber rolls), at least two 10-foot rolls
- Portable pumps
- A minimum of 100 feet of pump discharge hose
- ~~Vacuum trucks (800 and 3,000-gallon)~~ Vac Trailer will be available ~~for response within one (1) hour of the incident's detection~~ on site.

Resource Agencies

Upon the inadvertent loss of fluids and their emergence as a frac-out, it will be necessary for the HDD Company to document the occurrence and notify regulatory agencies involved in the project. Notification of a frac-out or spill will be provided on the form:

Notification of Frac-Out or Surface Spill

Date: _____

Time incident was identified: _____
Time incident was contained: _____

Estimated Volume of fluid entering environment: _____

Description of incident:

_____
_____
_____
_____
_____
_____

Counter Measures implemented:

_____
_____
_____
_____
_____
_____
_____

Notes or comments:

_____
_____
_____
_____
_____
_____