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APPENDIX 4.7-A: PALEONTOLOGICAL RESOURCE ASSESSMENT

October 21, 2024

Mr. Doug Urry
California Energy Practice Lead
Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Email: doug.urry@tetratech.com

RE: Paleontological Resource Assessment for the Corby Battery Energy Storage System (BESS) Project, Solano County, California

Dear Mr. Urry:

ECORP Consulting, Inc. (ECORP) has prepared this Paleontological Resource Assessment for the Corby Battery Energy Storage System (BESS) Project (Project) in Solano County, California (Figure 1). The Proposed Project Site is located outside of the City of Vacaville in rural Solano County. The Project would be constructed on an existing agricultural parcel (Assessor's Parcel Number 0141-030-090) on approximately 40.3 acres to store 300 megawatts of energy. The Proposed Project includes a 300-megawatt BESS facility with an associated onsite substation, inverters, and other ancillary facilities. The Project also includes a 230-kilovolt overhead generation tie line (gen-tie line), which would extend approximately 1.1 miles to interconnect with the Pacific Gas and Electric (PG&E) Vaca-Dixon Substation. Currently, the Project Site is within and surrounded by agricultural uses, with an orchard to the south, irrigated pasture to the east and west, and rural residential to the north.

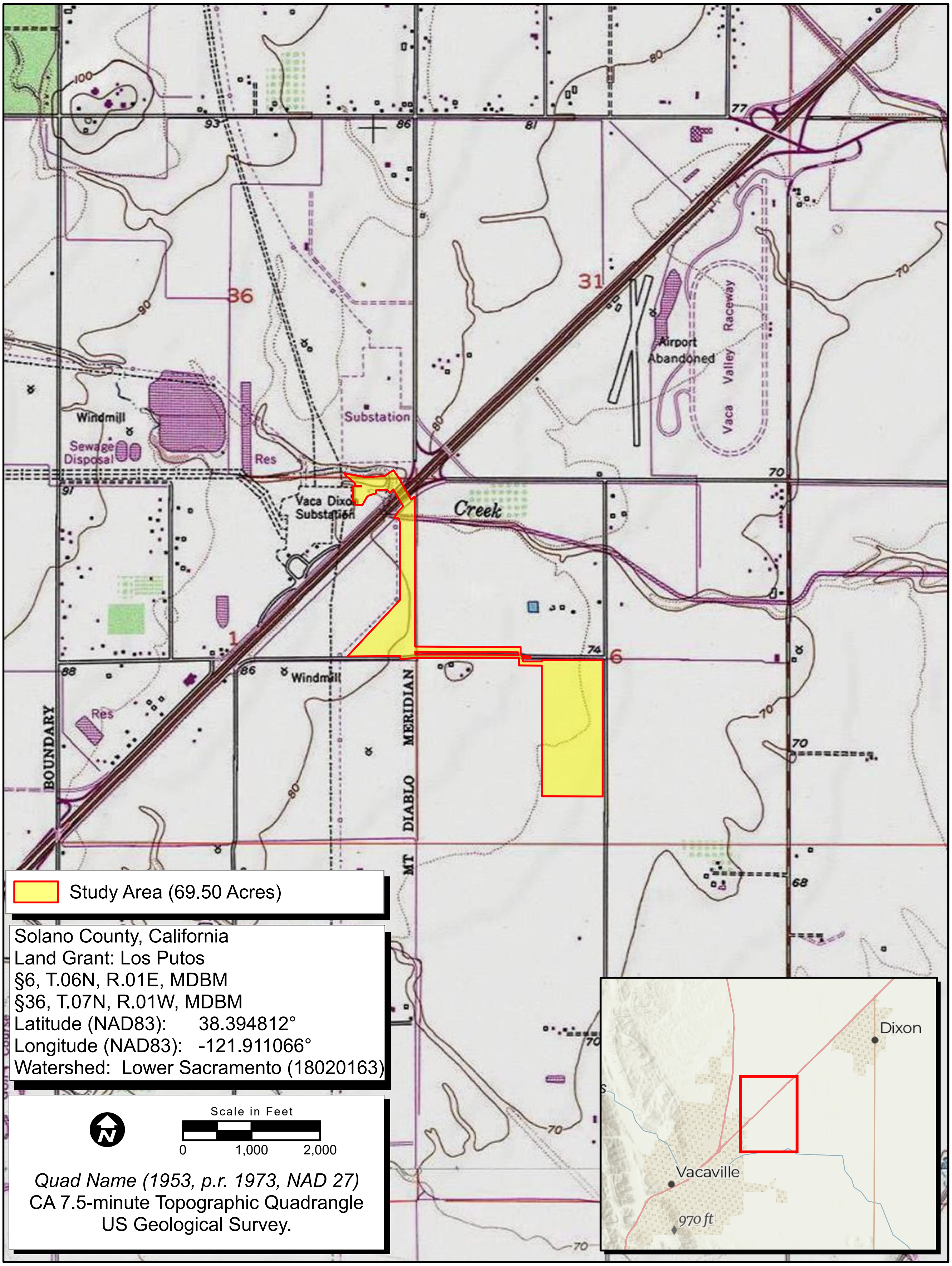
BACKGROUND AND SETTING

The Project Site is located within a geologic region that is known as the Great Valley Geomorphic Province. The Great Valley covers more than 6,500 square miles. It is bounded on the west by the Great Valley fault zone and the Coast Ranges, and on the east by the Sierra Nevada and the Foothills fault zone (Thomasson at el. 1960). Today, much of the surface of the Great Valley is covered with Holocene (11,700 years ago to present) and Pleistocene (2.6 million to 11,700 years ago) alluvium composed of sediments transported by water from the Sierra Nevada to the east and Coast Ranges to the west (Bartow and Nilsen 1990).

Geologic units in Solano County include Quaternary Holocene or recent surficial deposits, early Pleistocene, and older rocks (City of Vacaville 2021). Holocene alluvial deposits overlie the Quaternary older alluvium (Pleistocene in age). The alluvium comprises sand, silt, and gravel deposits that are typically found in fan and flat valley bottoms. The Preliminary geologic map of the Lodi 30′ X 60′ quadrangle, California indicates surficial deposits at the site consists of alluvial fan deposits (Qpf) from the Quaternary Period (Dawson 2009). Geotechnical studies indicate that the surficial deposits at the site contain Holocene aged alluvial fan deposits (RRC 2024) as well. Furthermore, boring log results indicate that many of the samples display clay down to approximate depths of 15-20 feet below ground surface. This clay is interpreted as younger alluvium. On the other hand, Figure 2 depicts that the Study Area consists of surficial Quaternary older alluvium (Qoa) consisting of lake, playa, and terrace deposits. Vertebrate fossils found in Late-Pleistocene alluvium are representative of the Rancholabrean land mammal age from which many taxa are now extinct, including mammoth, ground sloth, saber-toothed cat, bison, and dire wolf, in addition to rodents, birds, reptiles, and amphibians (Walsh 2021).

Due to the uncertainty of where the boundary between Quaternary younger alluvium (Holocene age) and Quaternary older alluvium (Pleistocene age) is, additional literature searches were conducted on other projects within the Sacramento Valley where this has been determined. The Sacramento Valley, including the Project Area, is defined by the Pleistocene Modesto Formation, which lies beneath the Holocene alluvium and typically occurs at depths ranging from 10 to 200 feet below the surface (Helley and Harwood 1985). The Modesto Formation is composed of sand, silt, and clay deposits resulting from fluvial processes. Underlying the Modesto Formation is the Pliocene Tehama Formation (5.4 to 2.4 million years ago). The Tehama Formation has been found as close as Vacaville during the construction of the I-80 and can be 2,000 feet thick, consisting of massive pale greenish gray to buff sandy clays that are typically tuffaceous (Russell and Vander Hoof 1931). Because construction activities are not expected to exceed 100 feet in depth, it is unlikely that the Tehama Formation will be encountered.

Location: N:\2024\2024-107 Corby BESS\MAPS\Location_Vicinity\Corby BESS LnV.aprx - Corby BESS LnV 20240628 (trotellini - 9/13/2024)



Map Date: 9/13/2024
Sources: ESRI, USGS

Figure 1. Project Location and Vicinity

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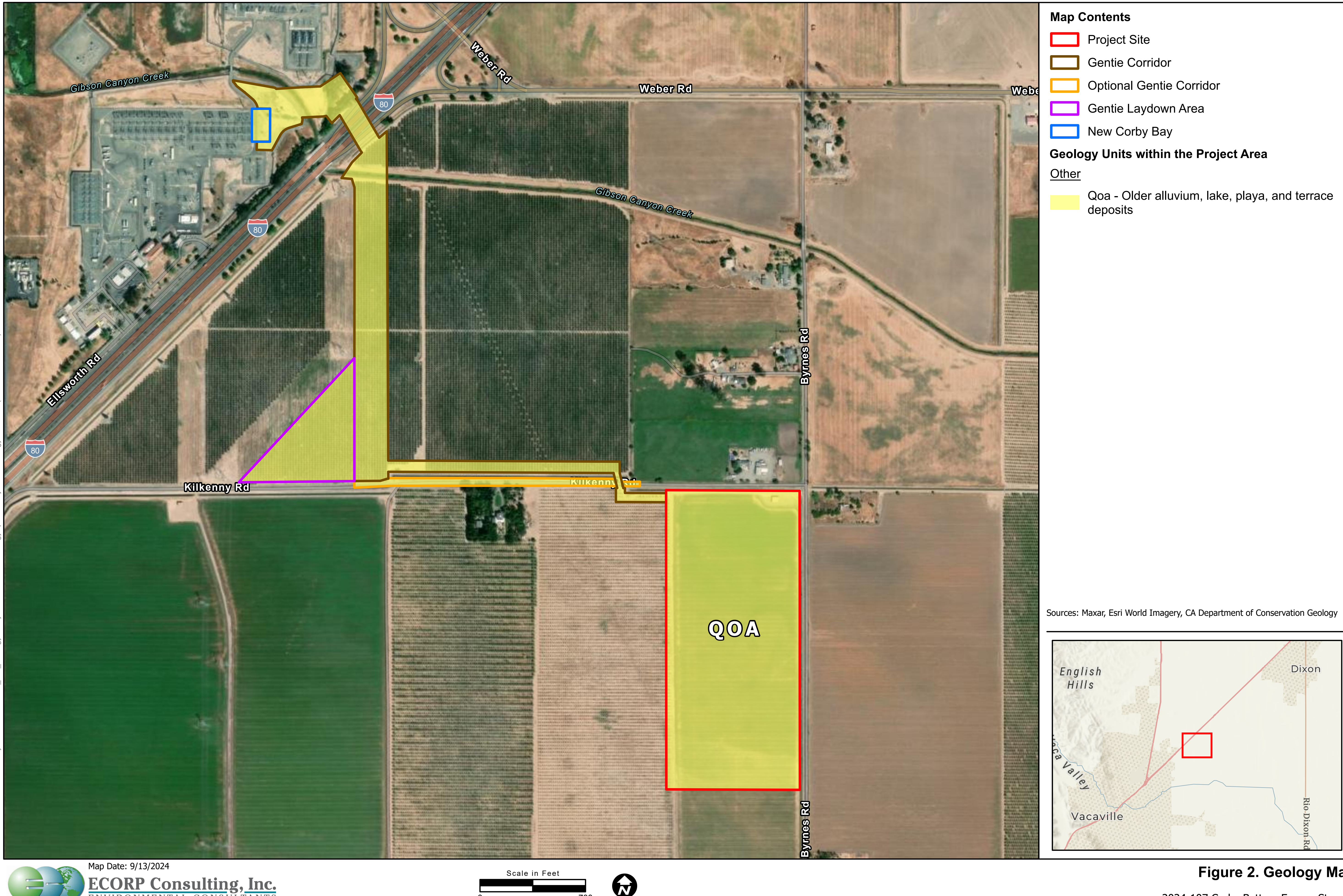

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Figure 2. Geology Map

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PALEONTOLOGICAL RESOURCES AND SENSITIVITY

As defined by the Society of Vertebrate Paleontology (SVP) Guidelines, significant paleontological resources are fossils and fossiliferous deposits, herein defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than approximately 5,000 radiocarbon years) (SVP 2010). Body fossils include bones, teeth, shells, leaves, and wood; trace fossils include trails, trackways, footprints, burrows, coprolites, and eggshells. The fossil record is the only evidence that life on earth has existed for more than 3.6 billion years.

Stratigraphic and Paleontological Inventory Methods

Although no known vertebrate fossil localities are within the Project's footprint; there is potential of encountering Quaternary older alluvium on the Project Site should project excavations reach depths exceeding overlying Holocene alluvium. Should this occur, paleontological resources may possibly be affected. As the thickness of geologic units below the surface can vary laterally, it is not certain as to the thickness of the Holocene alluvium and therefore at which depth Pleistocene deposits may be encountered. ECORP conducted a stratigraphic and paleontological resource inventory to develop a baseline for the Project Site and its vicinity by rock unit, and to assess the potential paleontological productivity of each rock unit.

Inventory methods included a review of published and unpublished literature and a field survey. ECORP reviewed geological maps and reports that cover the geology of the Project Site and its vicinity to determine the exposed rock units and to delineate their respective areal distributions throughout the Project Site. ECORP also reviewed published and unpublished geological and paleontological literature to document the number and locations of previously recorded fossil sites from rock units exposed on and near the Project Site, in addition to the type of fossil remains that each rock unit has produced. ECORP supplemented the literature review with an archival search that was conducted at the University of California Museum of Paleontology (UCMP) in Berkeley, California on July 1, 2024 (Holroyd 2024).

When assessing the paleontological productivity of each geologic unit, ECORP used the Potential Fossil Yield Classification (PFYC) adopted by the Bureau of Land Management (BLM) for assessing paleontological sensitivity on federal land. Appendix A provides the PFYC classification. In the PFYC classification system, geologic units are assigned a class that is based on the relative abundance of significant paleontological resources and their sensitivity to adverse impacts.

The PFYC is classified as follows:

- Class 1: Very Low Potential
- Class 2: Low Potential
- Class 3: Moderate Potential
- Class 4: High Potential
- Class 5: Very High Potential
- Class U: Unknown Potential

Due to the high fossil potential of the underlying older Quaternary deposits, a PFYC of 3 to 4 is assigned.

Paleontological Resource Inventory and Assessment

The potential paleontological importance of the Project Site can be assessed by identifying the paleontological importance of exposed rock units within the Project Site. Because the areal distribution of a rock unit can be easily delineated on a topographic map, this method is conducive to delineating parts of the Project Site that are of higher and lower sensitivity for paleontological resources, in addition to delineating parts of the Project Site that may therefore require monitoring during construction.

A paleontologically important rock unit is one that:

1. has a high potential paleontological productivity rating; and
2. is known to have produced unique, scientifically important fossils.

The potential paleontological productivity rating of a rock unit exposed at the Project Site refers to the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit within and near the Project Site. Exposures of a specific rock unit at the Project Site are most likely to yield fossil remains that represent a particular species in quantities or densities that are similar to those previously recorded from the unit within and near the Project Site. However, well-documented fossil-bearing formations are less likely to yield a unique paleontological resource.

An individual vertebrate fossil specimen may be considered unique or significant if it meets any of the following criteria:

1. Identifiable
2. Complete
3. Well preserved
4. Age diagnostic
5. Useful in paleoenvironmental reconstruction
6. A type or topotypic specimen
7. A member of a rare species
8. A species that is part of a diverse assemblage
9. A skeletal element different from, or a specimen more complete than, those now available for its species

For example, identifiable and complete vertebrate marine and terrestrial fossils are considered scientifically important because they are relatively rare. The value or importance of different fossil groups varies, depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, how complete the skeleton is, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions such as part of a research project. Individual portions of a vertebrate skeleton, such as an individual vertebrate, would not be considered a unique paleontological resource. Marine invertebrates are common and well documented; they would not be considered a unique paleontological resource.

Field Survey and Record Search

ECORP surveyed the Project Site on May 28, 2024 to determine the potential for finding paleontological resources on the surface or within any exposures onsite. Tina Campbell, B.Sc., a BLM- and SVP-qualified paleontologist, conducted the survey using east–west-oriented transects spaced 10 meters apart. Most of the Project Site was covered in vegetation that had been previously plowed and therefore did not have any visible ground surface exposures. Tall dry vegetation also obscured the ground surface in portions of the Project Site. The gen-tie corridor and gen-tie staging area, which is currently an orchard, had some ground visibility; in this area, the paleontologist observed a light brown, poorly sorted, sandy-silt with sub-rounded to rounded pebbles composed mostly of chert. ECORP did not observe any fossils or exposures of fossiliferous strata. Figures 3, 4, and 5 below show the Project Site.

Figure 3. Overview of the Project Site. Note the Tall Vegetation to the Southeast Obscuring the Ground Surface (view south; May 28, 2024).

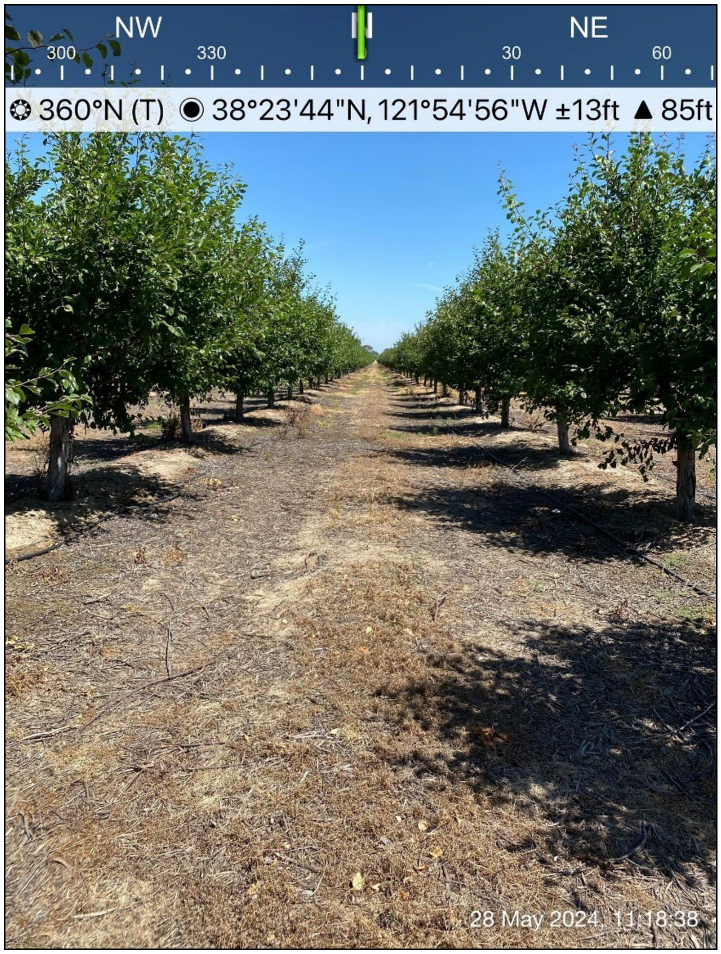

Figure 4. Overview of the Orchard Where the Future Gen-Tie Line and Staging Area are Proposed (view north; May 28, 2024).

Figure 5. View Toward the Existing Vaca-Dixon Substation (view north-northwest; May 28, 2024).

The paleontological record search conducted by the UCMP in 2024 did not reveal any paleontological resources from within the Project footprint. The nearest find was approximately 5 miles southwest of the Project Site, at the I-80/Allison Road interchange. The find was a partial femur from an extinct horse (*Equus* sp.) (UCMP locality V4546) that was found in Pliocene rocks of the Tehama Formation during the construction of I-80 in Vacaville in 1945.

Regulatory Framework

Paleontological resources (fossils) are the remains or traces of prehistoric plants and animals. Fossils are important scientific and educational resources because of their use in:

1. documenting the presence and evolutionary history of particular groups of now extinct organisms;
2. reconstructing the environments in which these organisms lived; and
3. determining the relative ages of the strata in which they occur and of the geologic events that resulted in the deposition of the sediments that formed these strata.

As defined by the SVP (2010), a paleontological resource can be significant if it:

- provides important information on the evolutionary trends among organisms, relating living organisms to extinct organisms;
- provides important information regarding development of biological communities or interaction between botanical and zoological biota;
- demonstrates unusual circumstances in biotic history; or
- is in short supply and in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and is not found in other geographic localities.

As such, paleontological resources are protected under various federal, state, and local laws and regulations.

California Environmental Quality Act of 1970 (Public Resources Code Section 21000 et seq.)

The California Environmental Quality Act (CEQA) Guidelines, Article 1, Section 15002(a)(3) state that CEQA is intended to "prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible." CEQA further states that public or private projects financed or approved by the State of California are subject to environmental review by the State. All such projects, unless entitled to an exemption, may proceed only after this requirement has been satisfied. CEQA requires detailed studies that analyze the environmental effects of a proposed project. In the event that a project is determined to have a potential significant environmental effect, the act requires that alternative plans and mitigation measures be considered. If paleontological resources are identified as being within the Proposed Project

Area, the sponsoring agency must take those resources into consideration when evaluating project effects. The level of consideration may vary with the importance of the resource.

Public Resources Code Section 5097.5

Public Resources Code Section 5097.5 states that no person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological, or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor. Public Resources Code Section 5097.5 defines *public lands* as lands that are owned by, or under the jurisdiction of, the State, or any city, county, district, authority, or public corporation, or any agency thereof.

County Laws, Ordinances, Regulations, and Standards

Solano County does not have mitigation requirements that specifically address potential adverse impacts to paleontological resources.

Professional Standards

The SVP, which is a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation. Most practicing professional paleontologists in the U.S. adhere to the SVP's assessment, mitigation, and monitoring requirements, as specifically spelled out in its standard guidelines (SVP 2010).

RECOMMENDATIONS

Impacts to Paleontological Resources

Due to the highly sensitive geologic units that underlie the Project Site (i.e., Quaternary older alluvium of the Modesto Formation), there is potential to impact paleontological resources with depth during Project construction. Impacts can be minimized if paleontological mitigation measures are implemented to protect and recover these resources for their scientific significance. The following sections provide recommended mitigation measures to be implemented during ground-disturbing activities:

Worker's Environmental Awareness Training

Prior to the start of construction, a Paleontological Resources Specialist (PRS) or qualified paleontological monitor will provide an environmental awareness training to all construction personnel involved with ground-disturbing activities. The training will provide information about the potential for encountering fossils during construction, how to identify fossils, and the protocols to follow in the case of any fossil discoveries, including proper notification procedures.

Unanticipated Discovery

Because the thickness of Holocene alluvium may vary in depth from 15 to 20 feet from the surface, full-time paleontological monitoring is not recommended. Prior to construction, the PRS will review the excavation plans to determine where paleontologically sensitive stratigraphic units will be disturbed by Project-related ground-disturbing activities based on depths of construction activities. Should an unanticipated paleontological resource be discovered, the PRS will be contacted to assess the scientific significance of the fossil find. A temporary 50-foot buffer around the fossil will be established until the find has been examined. If the PRS determines that the find is significant, then they will establish a Paleontological Resources Mitigation and Monitoring Plan (PRMMP). Monitoring will not take place in areas where the ground has been previously disturbed, in areas underlain by artificial fill, or in areas where exposed sediment will be buried but not disturbed.

Paleontological Resources Mitigation and Monitoring Plan

The PRS will develop a PRMMP if any significant paleontological resources are found. The PRMMP will outline monitoring procedures, emergency discovery procedures, sampling and data recovery, museum storage coordination with an accredited institution or facility for any specimen and data recovered, and final reporting.

If you have any questions regarding this report and would like to discuss further, please contact me at nkottachchi@ecorpconsulting.com.

Sincerely,

NKottachchi

Niranjala Kottachchi
Paleontological Resources Manager

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APPENDIX A

Potential Fossil Yield Classification

Potential Fossil Yield Classification (PFYC) System.

Occurrences of paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping can be used for assessing the potential for the occurrence of paleontological resources.

Using the Potential Fossil Yield Classification (PFYC) system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. This classification is applied to the geologic formation, member, or other distinguishable unit, preferably at the most detailed mappable level. It is not intended to be applied to specific paleontological localities or small areas within units. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment.

The PFYC system is meant to provide baseline guidance for predicting, assessing, and mitigating paleontological resources. The classification should be considered at an intermediate point in the analysis, and should be used to assist in determining the need for further mitigation assessment or actions.

The descriptions for the classes below are written to serve as guidelines rather than as strict definitions. Knowledge of the geology and the paleontological potential for individual units or preservational conditions should be considered when determining the appropriate class assignment. Assignments are best made by collaboration between land managers and knowledgeable researchers.

Class 1 – **Very Low**. Geologic units that are not likely to contain recognizable fossil remains.

- Units that are igneous or metamorphic, excluding reworked volcanic ash units.
- Units that are Precambrian in age or older.

(1) Management concern for paleontological resources in Class 1 units is usually negligible or not applicable.

(2) Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances.

The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is non-existent or extremely rare.

Class 2 – **Low**. Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils.

- Vertebrate or significant invertebrate or plant fossils not present or very rare.
- Units that are generally younger than 10,000 years before present.
- Recent aeolian deposits.
- Sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration).

(1) Management concern for paleontological resources is generally low.

(2) Assessment or mitigation is usually unnecessary except in rare or isolated circumstances.

The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities would be managed on a case-by-case basis.

Class 3 – **Moderate** or **Unknown**. Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential.

- Often marine in origin with sporadic known occurrences of vertebrate fossils.
- Vertebrate fossils and scientifically significant invertebrate or plant fossils known to occur intermittently; predictability known to be low.

  (or)
- Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.

Class 3a – **Moderate Potential.** Units are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low, but is somewhat higher for common fossils.

Class 3b – **Unknown Potential.** Units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this Class may eventually be placed in another Class when sufficient survey and research is performed. The unknown potential of the units in this Class should be carefully considered when developing any mitigation or management actions.

(1) Management concern for paleontological resources is moderate; or cannot be determined from existing data.

(2) Surface-disturbing activities may require field assessment to determine appropriate course of action.

This classification includes a broad range of paleontological potential. It includes geologic units of unknown potential, as well as units of moderate or infrequent occurrence of significant fossils. Management considerations cover a broad range of options as well, and could include pre-disturbance surveys, monitoring, or avoidance. Surface-disturbing activities will require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.

Class 4 – **High**. Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface disturbing activities may adversely affect paleontological resources in many cases.

Class 4a – Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from surface disturbing actions. Illegal collecting activities may impact some areas.

Class 4b – These are areas underlain by geologic units with high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

- Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
- Areas of exposed outcrop are smaller than two contiguous acres.
- Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
- Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 4 is moderate to high, depending on the proposed action.

(2) A field survey by a qualified paleontologist is often needed to assess local conditions.

(3) Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered.

(4) Class 4 and Class 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geologic mapping at an appropriate scale is not available. Resource assessment, mitigation, and other management considerations are similar at this level of analysis, and impacts and alternatives can be addressed at a level appropriate to the application.

The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the surface disturbing action will usually be necessary. On-site monitoring or spot-checking may be necessary during construction activities.

Class 5 – **Very High**. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.

Class 5a – Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface disturbing actions. Unit is frequently the focus of illegal collecting activities.

Class 5b – These are areas underlain by geologic units with very high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

- Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
- Areas of exposed outcrop are smaller than two contiguous acres.
- Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
- Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 5 areas is high to very high.

(2) A field survey by a qualified paleontologist is usually necessary prior to surface disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions.

(3) Official designation of areas of avoidance, special interest, and concern may be appropriate.

The probability for impacting significant fossils is high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. On-the-ground surveys prior to authorizing any surface disturbing activities will usually be necessary. On-site monitoring may be necessary during construction activities.

APPENDIX 4.7-B: WATER EROSION CALCULATIONS

Rainfall-Runoff Erosivity Factor	R Number	23.5
from --> https://efotg.sc.egov.usda.gov/references/public/CA/Rusle2Precip_DixonB.pdf		

Assumed Management	Cropland Data	Wheat, Winter CMZ 34
from --> USDA National Agricultural Statistics Service (NASS) 2023 Cropland Data Layer		

	Area	Scenario	Segment	Soil Unit	Soil Area	Horizontal Distance	Vertical Height	Average Slope	Unit Soil Loss	Total Soil Loss	Unit Sediment Delivery	Total Sediment Delivery
					(acres)	(feet)	(feet)	(%)	(tons/ac./year)	(tons/year)	(tons/ac./year)	(tons/year)
BESS, Substation & Laydown Areas	BESS Drain Path 1	Agriculture - CMZ 34\a. Single Year - Grain\Wheat, Winter CMZ 34	Segment 1	SfA		577.10	0.25	0.04	0.15		0.15	
			Segment 2	Yr		138.80	0.29	0.21	0.50		0.22	
			Segment 3	SfA		283.30	0.03	0.01	-0.40		0.04	
			Segment 4	SeA		199.30	0.31	0.15	0.29		0.08	
			Segment 5	Cc		61.78	0.02	0.03	0.09		0.08	
			Segment 6	SeA		48.48	0.00	0.00	-1.50		0.02	
			Segment 7	Cc		76.90	0.06	0.07	0.11		0.03	
			Segment 8	SeA		240.70	0.29	0.12	0.25		0.06	
			TOTAL	**N/A**	**19.24**	**1626.36**	**1.24**	**0.07**	**0.22**	**4.21**	**0.06**	**1.18**
	BESS Drain Path 2		Segment 1	SfA		256.90	0.06	0.02	0.14		0.14	
			Segment 2	SeA		971.10	1.25	0.13	0.26		0.23	
			Segment 3	CeA		344.10	0.61	0.18	0.17		0.22	
			TOTAL		**21.07**	**1572.10**	**1.92**	**0.12**	**0.22**	**4.64**	**0.22**	**4.64**
		Totals for the BESS Area			**40.31**					**8.85**		**5.82**
Gentie Corridor & Gentie Laydown Areas	Gentie Corridor Drain Path 1	Agriculture - CMZ 34\a. Single Year - Vineyards and Orchards\Tree Rows\Stone Fruits, tree row*	Segment 1	Yr		394.30	0.07	0.02	0.10		0.10	
			Segment 2	CeA		772.50	0.72	0.09	0.17		0.15	
			TOTAL		**4.11**	**1166.80**	**0.78**	**0.50**	**0.15**	**0.61**	**0.15**	**0.61**
	Gentie Corridor Drain Path 2		Segment 1	Yr		405.80	0.24	0.06	0.10		0.10	
			Segment 2	SeA		397.60	0.70	0.18	0.11		0.10	
			Segment 3	CeA		200.90	0.79	0.39	0.10		0.10	
			Segment 4	SeA		539.30	3.01	0.56	0.27		0.16	
			TOTAL		**5.96**	**1543.60**	**4.74**	**0.31**	**0.16**	**0.96**	**0.16**	**0.96**
	Gentie Corridor Drain Path 3		**TOTAL**	**SeA**	**1.27**	**266.20**	**4.00**	**1.50**	**0.57**	**0.73**	**0.57**	**0.73**
	Gentie Corridor Drain Path 4	Existing Undisturbed Vegetative Cover\Grass and forbs, 25 to 35 pct Canopy	**TOTAL**	**SeA**	**1.60**	**412.80**	**2.66**	**0.64**	**0.49**	**0.78**	**0.49**	**0.78**
	Gentie Corridor Drain Path 5	Existing Undisturbed Vegetative Cover\Grass and forbs, 0 to 25 pct Canopy	**TOTAL**	**SfA**	**2.64**	**377.30**	**3.67**	**0.97**	**1.10**	**2.91**	**1.10**	**2.91**
	Gentie Laydown Area Drain Path	Agriculture - CMZ 34\a. Single Year - Vineyards and Orchards\Tree Rows\Stone Fruits, tree row*	**TOTAL**	**CeA**	**7.17**	**696.10**	**0.93**	**0.13**	**0.05**	**0.35**	**0.05**	**0.35**
	Gentie Underground Section Drain Path 1	Agriculture - CMZ 34\a. Single Year - Vineyards and Orchards\Tree Rows\Almond or Pistachio, tree row	Segment 1	SfA		190.80	0.29	0.15	0.10		0.10	
			Segment 2	Yr		787.20	0.51	0.06	0.08		0.08	
			Segment 3	SfA		489.70	1.34	0.27	0.15		0.10	
			Segment 4	SeA		475.50	0.67	0.14	0.10		0.10	
			TOTAL	**N/A**	**5.80**	**1943.20**	**2.82**	**0.14**	**0.11**	**0.63**	**0.10**	**0.59**
	Gentie Underground Section Drain Path 2	Agriculture - CMZ 34\a. Single Year - Vineyards and Orchards\Tree Rows\Almond or Pistachio, tree row	**TOTAL**	**SeA**	**0.57**	**560.28**	**0.65**	**0.12**	**0.07**	**0.04**	**0.07**	**0.04**
		Totals for the Gen-Tie Areas			**29.13**					**7.01**		**6.97**
TOTAL ACREAGE OF PROJECT					69.43	**TOTAL SOIL LOSS UNDER EXISTING CONDITIONS**				24.71		

Rainfall-Runoff Erosivity Factor	R Number	23.5
from --> https://efotg.sc.egov.usda.gov/references/public/CA/Rusle2Precip_DixonB.pdf		

	Area	Scenario	Management	Segment	Soil Unit	Soil Acres	Horizontal Distance (feet)	Vertical Height (feet)	Average Slope (%)	Unit Soil Loss (tons/ac./year)	Total Soil Loss (tons/year)	Unit Sediment Delivery (tons/ac./year)	Total Sediment Delivery (tons/year)
BESS & Laydown Areas	BESS Drain Path 1	Grading (w/o BMPs)	Assumes bare cut slope, smooth	Segment 1	SeA		68.80		0.50	0.61		0.61	
				Segment 2	Yr		214.74		0.51	0.91		0.84	
				TOTAL	N/A	6.19	283.54		0.51	0.84	5.17	0.84	5.17
		Construction (w/o BMPs)	Assumes bare fill slope, track walked	Segment 1	SeA		68.80		0.50	0.60		0.60	
				Segment 2	Yr		214.74		0.51	0.89		0.82	
				TOTAL	N/A	6.19	283.54		0.51	0.82	5.08	0.82	5.08
		Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	Segment 1	SeA		68.80		0.50	0.11		0.11	
				Segment 2	Yr		214.74		0.51	0.16		0.15	
				TOTAL	N/A	6.19	283.54		0.51	0.15	0.94	0.15	0.94
		Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	Segment 1	SeA		68.80		0.50	0.61		0.61	
				Segment 2	Yr		214.74		0.51	0.91		0.84	
				TOTAL	N/A	6.19	283.54		0.51	0.84	5.17	0.84	5.17
		Post-Construction	Assumes gravel on site and impoundment at end of drainage	Segment 1	SeA		68.80		0.50	0.10		0.10	
				Segment 2	Yr		214.74		0.51	0.14		0.13	
				TOTAL	N/A	6.19	283.54		0.51	0.13	0.80	0.01	0.04
	BESS Drain Path 2	Grading (w/o BMPs)	Assumes bare cut slope, smooth	**TOTAL**	SeA	10.70	603.50		0.60	0.82	8.79	0.82	8.79
		Construction (w/o BMPs)	Assumes bare fill slope, track walked	**TOTAL**	SeA	10.70	603.50		0.60	0.81	8.63	0.81	8.63
		Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	**TOTAL**	SeA	10.70	603.50		0.60	0.14	1.51	0.14	1.51
		Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	**TOTAL**	SeA	10.70	603.50		0.60	0.82	8.79	0.82	8.79
		Post-Construction	Assumes gravel on site and impoundment at end of drainage	**TOTAL**	SeA	10.70	603.50		0.60	0.12	1.27	0.01	0.06
	BESS Access Road	Grading (w/o BMPs)	Assumes bare cut slope, smooth	**TOTAL**	CeA	0.04	25.80		2.35	1.27	0.05	1.27	0.05
		Construction (w/o BMPs)	Assumes bare fill slope, track walked	**TOTAL**	CeA	0.04	25.80		2.35	1.23	0.05	1.23	0.05
		Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	**TOTAL**	CeA	0.04	25.80		2.35	0.23	0.01	0.23	0.01
		Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	**TOTAL**	CeA	0.04	25.80		2.35	1.27	0.05	1.27	0.05
		Post-Construction	Assumes gravel on site and impoundment at end of drainage	**TOTAL**	CeA	0.04	25.80		2.35	0.20	0.01	0.03	0.00
	BESS North Laydown Area	Grading (w/o BMPs)	Assumes bare cut slope, smooth	**TOTAL**	SfA	4.50	821.30	0.99	0.12	0.22	0.99	0.22	0.99
		Construction (w/o BMPs)	Assumes bare fill slope, track walked	**TOTAL**	SfA	4.50	821.30	0.99	0.12	0.22	0.98	0.22	0.98
		Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	**TOTAL**	SfA	4.50	821.30	0.99	0.12	0.03	0.16	0.03	0.16
		Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	**TOTAL**	SfA	4.50	821.30	0.99	0.12	0.22	0.99	0.22	0.99
		Post-Construction	Assumes gravel on site and impoundment at end of drainage	**TOTAL**	SfA	4.50	821.30	0.99	0.12	0.04	0.16	0.01	0.03
	BESS South Laydown Area	Grading (w/o BMPs)	Assumes bare cut slope, smooth	Segment 1	SfA		341.50	0.33	0.10	0.19		0.19	
				Segment 2	SeA		367.30	0.33	0.09	0.18		0.19	
				TOTAL	N/A	8.77	708.80	0.66	0.10	0.19	1.65	0.19	1.65
		Construction (w/o BMPs)	Assumes bare fill slope, track walked	Segment 1	SfA		341.50	0.33	0.10	0.19		0.19	
				Segment 2	SeA		367.30	0.33	0.09	0.18		0.19	
				TOTAL	N/A	8.77	708.80	0.66	0.10	0.19	1.64	0.19	1.63
		Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	Segment 1	SfA		341.50	0.33	0.10	0.03		0.03	
				Segment 2	SeA		367.30	0.33	0.09	0.03		0.03	
				TOTAL	N/A	8.77	708.80	0.66	0.10	0.03	0.27	0.03	0.26
		Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	Segment 1	SfA		341.50	0.33	0.10	0.19		0.19	
				Segment 2	SeA		367.30	0.33	0.09	0.18		0.19	
				TOTAL	N/A	8.77	708.80	0.66	0.10	0.19	1.65	0.19	1.64

Rainfall-Runoff Erosivity Factor	R Number	23.5
from --> https://efotg.sc.egov.usda.gov/references/public/CA/Rusle2Precip_DixonB.pdf		

	Area	Scenario	Management	Segment	Soil Unit	Soil Acres	Horizontal Distance (feet)	Vertical Height (feet)	Average Slope (%)	Unit Soil Loss (tons/ac./year)	Total Soil Loss (tons/year)	Unit Sediment Delivery (tons/ac./year)	Total Sediment Delivery (tons/year)
		Post-Construction	Assumes gravel on site and impoundment at end of drainage	Segment 1	SfA		341.50	0.33	0.10	0.03		0.03	
				Segment 2	SeA		367.30	0.33	0.09	0.03		0.03	
				TOTAL	N/A	8.77	708.80	0.66	0.10	0.03	0.27	0.00	0.03
Substation Areas	Substation	Grading (w/o BMPs)	Assumes bare cut slope, smooth	Segment 1	SeA		75.79		0.53	0.64		0.64	
				Segment 2	SfA		171.81		0.53	0.70		0.68	
				Segment 3	Yr		25.98		0.53	0.96		0.71	
				TOTAL	N/A	9.87	273.58		0.53	0.71	6.98	0.71	6.98
		Construction (w/o BMPs)	Assumes bare fill slope, track walked	Segment 1	SeA		75.79		0.53	0.63		0.63	
				Segment 2	SfA		171.81		0.53	0.68		0.67	
				Segment 3	Yr		25.98		0.53	0.94		0.69	
				TOTAL	N/A	9.87	273.58		0.53	0.69	6.85	0.69	6.85
		Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	Segment 1	SeA		75.79		0.53	0.12		0.12	
				Segment 2	SfA		171.81		0.53	0.12		0.12	
				Segment 3	Yr		25.98		0.53	0.17		0.13	
				TOTAL	N/A	9.87	273.58		0.53	0.13	1.24	0.13	1.24
		Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	Segment 1	SeA		75.79		0.53	0.64		0.64	
				Segment 2	SfA		171.81		0.53	0.70		0.68	
				Segment 3	Yr		25.98		0.53	0.96		0.71	
				TOTAL	N/A	9.87	273.58		0.53	0.71	6.98	0.71	6.98
		Post-Construction	Assumes gravel on site and impoundment at end of drainage	Segment 1	SeA		75.79		0.53	0.10		0.10	
				Segment 2	SfA		171.81		0.53	0.11		0.10	
				Segment 3	Yr		25.98		0.53	0.15		0.11	
				TOTAL	N/A	9.87	273.58		0.53	0.11	1.07	0.00	0.05
	Substation Access Road	Grading (w/o BMPs)	Assumes bare cut slope, smooth	Segment 1	SeA		21.15		0.88	0.92		0.92	
				Segment 2	Cc		90.53		0.88	0.66		0.71	
				Segment 3	SeA		44.78		0.88	1.10		0.83	
				TOTAL	N/A	0.22	156.46		0.88	0.83	0.19	0.83	0.19
		Construction (w/o BMPs)	Assumes bare fill slope, track walked	Segment 1	SeA		21.15		0.88	0.91		0.91	
				Segment 2	Cc		90.53		0.88	0.64		0.69	
				Segment 3	SeA		44.78		0.88	1.10		0.82	
				TOTAL	N/A	0.22	156.46		0.88	0.82	0.18	0.82	0.18
		Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	Segment 1	SeA		21.15		0.88	0.17		0.17	
				Segment 2	Cc		90.53		0.88	0.12		0.13	
				Segment 3	SeA		44.78		0.88	0.19		0.15	
				TOTAL	N/A	0.22	156.46		0.88	0.15	0.03	0.15	0.03
		Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	Segment 1	SeA		21.15		0.88	0.92		0.92	
				Segment 2	Cc		90.53		0.88	0.66		0.71	
				Segment 3	SeA		44.78		0.88	1.10		0.83	
				TOTAL	N/A	0.22	156.46		0.88	0.83	0.19	0.83	0.19
		Post-Construction	Assumes gravel on site and impoundment at end of drainage	Segment 1	SeA		21.15		0.88	0.15		0.15	
				Segment 2	Cc		90.53		0.88	0.10		0.11	
				Segment 3	SeA		44.78		0.88	0.16		0.13	
				TOTAL	N/A	0.22	156.46		0.88	0.13	0.03	0.01	0.00
	Gen Tie Corridor Drain Path 1	Grading (w/o BMPs))	Assumes bare cut slope, smooth	Segment 1	Yr		394.30	0.07	0.02	0.17		0.17	
				Segment 2	CeA		772.50	0.72	0.09	0.10		0.12	
				TOTAL	N/A	4.11	1,166.80	0.78	0.07	0.12	0.50	0.12	0.50
		Construction (w/o BMPs)	Assumes bare fill slope, track walked	Segment 1	Yr		394.30	0.07	0.02	0.17		0.17	
				Segment 2	CeA		772.50	0.72	0.09	0.10		0.12	
				TOTAL	N/A	4.11	1,166.80	0.78	0.07	0.12	0.49	0.12	0.49
		Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	Segment 1	Yr		394.30	0.07	0.02	0.03		0.03	
				Segment 2	CeA		772.50	0.72	0.09	0.02		0.02	
				TOTAL	N/A	4.11	1,166.80	0.78	0.07	0.02	0.09	0.02	0.09
		Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	Segment 1	Yr		394.30	0.07	0.02	0.17		0.17	
				Segment 2	CeA		772.50	0.72	0.09	0.10		0.12	
				TOTAL	N/A	4.11	1,166.80	0.78	0.07	0.12	0.50	0.12	0.50
		Post-Construction	Assumes gravel on site and impoundment at end of drainage	Segment 1	Yr		394.30	0.07	0.02	0.03		0.03	
				Segment 2	CeA		772.50	0.72	0.09	0.02		0.02	
				TOTAL	N/A	4.11	1,166.80	0.78	0.07	0.02	0.08	0.00	0.01

Rainfall-Runoff Erosivity Factor	R Number	23.5
from --> https://efotg.sc.egov.usda.gov/references/public/CA/Rusle2Precip_DixonB.pdf		

Gentie Corridor & Gentie Laydown Areas

Area	Scenario	Management	Segment	Soil Unit	Soil Acres	Horizontal Distance (feet)	Vertical Height (feet)	Average Slope (%)	Unit Soil Loss (tons/ac./year)	Total Soil Loss (tons/year)	Unit Sediment Delivery (tons/ac./year)	Total Sediment Delivery (tons/year)
Gen Tie Corridor Drain Path 2	Grading (w/o BMPs)	Assumes bare cut slope, smooth	Segment 1	Yr		405.80	0.24	0.06	0.23		0.23	
			Segment 2	SeA		397.60	0.70	0.18	0.35		0.29	
			Segment 3	CeA		200.90	0.79	0.39	0.33		0.29	
			Segment 4	SeA		539.30	3.01	0.56	0.96		0.53	
			TOTAL	N/A	5.96	1,543.60	4.74	0.31	0.53	3.14	0.53	3.14
	Construction (w/o BMPs)	Assumes bare fill slope, track walked	Segment 1	Yr		405.80	0.24	0.06	0.19		0.19	
			Segment 2	SeA		397.60	0.70	0.18	0.29		0.24	
			Segment 3	CeA		200.90	0.79	0.39	0.28		0.25	
			Segment 4	SeA		539.30	3.01	0.56	0.81		0.45	
			TOTAL	N/A	5.96	1,543.60	4.74	0.31	0.45	2.66	0.45	2.66
	Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	Segment 1	Yr		405.80	0.24	0.06	0.03		0.03	
			Segment 2	SeA		397.60	0.70	0.18	0.04		0.04	
			Segment 3	CeA		200.90	0.79	0.39	0.04		0.04	
			Segment 4	SeA		539.30	3.01	0.56	0.11		0.06	
			TOTAL	N/A	5.96	1,543.60	4.74	0.31	0.06	0.38	0.06	0.38
	Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	Segment 1	Yr		405.80	0.24	0.06	0.19		0.19	
			Segment 2	SeA		397.60	0.70	0.18	0.29		0.24	
			Segment 3	CeA		200.90	0.79	0.39	0.28		0.25	
			Segment 4	SeA		539.30	3.01	0.56	0.82		0.45	
			TOTAL	N/A	5.96	1,543.60	4.74	0.31	0.45	2.68	0.45	2.67
	Post-Construction	Assumes gravel on site and impoundment at end of drainage	Segment 1	Yr		405.80	0.24	0.06	0.03		0.03	
			Segment 2	SeA		397.60	0.70	0.18	0.05		0.04	
			Segment 3	CeA		200.90	0.79	0.39	0.04		0.04	
			Segment 4	SeA		539.30	3.01	0.56	0.12		0.07	
			TOTAL	N/A	5.96	1,543.60	4.74	0.31	0.07	0.40	0.00	0.03
Gen Tie Corridor Drain Path 3	Grading (w/o BMPs)	Assumes bare cut slope, smooth	**TOTAL**	SeA	1.27	266.20	4.00	1.50	1.97	2.51	1.97	2.51
	Construction (w/o BMPs)	Assumes bare fill slope, track walked	**TOTAL**	SeA	1.27	266.20	4.00	1.50	1.96	2.50	1.96	2.50
	Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	**TOTAL**	SeA	1.27	266.20	4.00	1.50	0.26	0.33	0.26	0.33
	Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	**TOTAL**	SeA	1.27	266.20	4.00	1.50	1.97	2.51	0.07	0.09
	Post-Construction	Assumes gravel on site and impoundment at end of drainage	**TOTAL**	SeA	1.27	266.20	4.00	1.50	0.27	0.34	0.01	0.01
Gen Tie Corridor Drain Path 4	Grading (w/o BMPs)	Assumes bare cut slope, smooth	**TOTAL**	SeA	1.60	412.80	2.66	0.64	0.84	1.34	0.84	1.34
	Construction (w/o BMPs)	Assumes bare fill slope, track walked	**TOTAL**	SeA	1.60	412.80	2.66	0.64	0.83	1.33	0.83	1.33
	Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	**TOTAL**	SeA	1.60	412.80	2.66	0.64	0.12	0.19	0.12	0.19
	Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	**TOTAL**	SeA	1.60	412.80	2.66	0.64	0.84	1.34	0.84	1.34
	Post-Construction	Assumes gravel on site and impoundment at end of drainage	**TOTAL**	SeA	1.60	412.80	2.66	0.64	0.12	0.20	0.01	0.01
Gen Tie Corridor Drain Path 5	Grading (w/o BMPs)	Assumes bare cut slope, smooth	**TOTAL**	SfA	2.64	377.30	3.67	0.97	1.27	3.36	1.27	3.36
	Construction (w/o BMPs)	Assumes bare fill slope, track walked	**TOTAL**	SfA	2.64	377.30	3.67	0.97	1.26	3.33	1.26	3.33
	Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	**TOTAL**	SfA	2.64	377.30	3.67	0.97	0.17	0.46	0.17	0.46
	Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	**TOTAL**	SfA	2.64	377.30	3.67	0.97	1.27	3.36	1.27	3.36
	Post-Construction	Assumes gravel on site and impoundment at end of drainage	**TOTAL**	SfA	2.64	377.30	3.67	0.97	0.18	0.48	0.01	0.02
Gen Tie Laydown Area	Grading (w/o BMPs)	Assumes bare cut slope, smooth	**TOTAL**	CeA	7.17	696.10	0.93	0.13	0.12	0.87	0.12	0.87
	Construction (w/o BMPs)	Assumes bare fill slope, track walked	**TOTAL**	CeA	7.17	696.10	0.93	0.13	0.12	0.86	0.12	0.86
	Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	**TOTAL**	CeA	7.17	696.10	0.93	0.13	0.02	0.14	0.02	0.14
	Construction (with BMPs)	Assumes leveling and filling and installation of silt fence reinforced with straw bales	**TOTAL**	CeA	7.17	696.10	0.93	0.13	0.12	0.87	0.12	0.87
	Post-Construction	Assumes gravel on site and impoundment at end of drainage	**TOTAL**	CeA	7.17	696.10	0.93	0.13	0.02	0.14	0.01	0.04

Rainfall-Runoff Erosivity Factor	R Number	23.5
from --> https://efotg.sc.egov.usda.gov/references/public/CA/Rusle2Precip_DixonB.pdf		

Area	Scenario	Management	Segment	Soil Unit	Soil Acres	Horizontal Distance (feet)	Vertical Height (feet)	Average Slope (%)	Unit Soil Loss (tons/ac./year)	Total Soil Loss (tons/year)	Unit Sediment Delivery (tons/ac./year)	Total Sediment Delivery (tons/year)
Gen Tie Underground Section Drain Path 1	Grading (w/o BMPs)	Assumes bare cut slope, smooth	Segment 1	SfA		190.80	0.29	0.15	0.25		0.25	
			Segment 2	Yr		787.20	0.51	0.06	0.18		0.19	
			Segment 3	SfA		489.70	1.34	0.27	0.41		0.26	
			Segment 4	SeA		475.50	0.67	0.14	0.25		0.26	
			TOTAL	N/A	5.80	1,943.20	2.82	0.14	0.27	1.55	0.26	1.51
	Construction (w/o BMPs)	Assumes ripping/ridging 12 in. depth	Segment 1	SfA		190.80	0.29	0.15	1.10		1.10	
			Segment 2	Yr		787.20	0.51	0.06	0.62		0.71	
			Segment 3	SfA		489.70	1.34	0.27	1.90		1.10	
			Segment 4	SeA		475.50	0.67	0.14	1.10		1.10	
			TOTAL	N/A	5.80	1,943.20	2.82	0.14	1.23	7.13	1.12	6.49
	Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	Segment 1	SfA		190.80	0.29	0.15	0.05		0.05	
			Segment 2	Yr		787.20	0.51	0.06	0.03		0.03	
			Segment 3	SfA		489.70	1.34	0.27	0.07		0.05	
			Segment 4	SeA		475.50	0.67	0.14	0.05		0.05	
			TOTAL	N/A	5.80	1,943.20	2.82	0.14	0.05	0.29	0.05	0.27
	Construction (with BMPs)	Assumes ripping/ridging 12 in. depth and installation of silt fence reinforced with straw bales	Segment 1	SfA		190.80	0.29	0.15	1.00		1.10	
			Segment 2	Yr		787.20	0.51	0.06	0.73		0.78	
			Segment 3	SfA		489.70	1.34	0.27	1.90		1.20	
			Segment 4	SeA		475.50	0.67	0.14	1.10		1.20	
			TOTAL	N/A	5.80	1,943.20	2.82	0.14	1.25	7.25	1.16	6.73
	Post-Construction	Assumes gravel on site and impoundment at end of drainage	Segment 1	SfA		190.80	0.29	0.15	0.04		0.04	
			Segment 2	Yr		787.20	0.51	0.06	0.03		0.03	
			Segment 3	SfA		489.70	1.34	0.27	0.06		0.04	
			Segment 4	SeA		475.50	0.67	0.14	0.04		0.04	
			TOTAL	N/A	5.80	1,943.20	2.82	0.14	0.04	0.25	0.00	0.02
Gen Tie Underground Section Drain Path 2	Grading (w/o BMPs)	Assumes bare cut slope, smooth	**TOTAL**	SeA	0.57	560.28	0.65	0.12	0.22	0.12	0.22	0.12
	Construction (w/o BMPs)	Assumes ripping/ridging 12 in. depth	**TOTAL**	SeA	0.57	560.28	0.65	0.12	0.38	0.21	0.38	0.21
	Grading (with BMPs)	Assumes hydroseeding, grain or annual rye with fiber emulsion	**TOTAL**	SeA	0.57	560.28	0.65	0.12	0.03	0.02	0.03	0.02
	Construction (with BMPs)	Assumes ripping/ridging 12 in. depth and installation of silt fence reinforced with straw bales	**TOTAL**	SeA	0.57	560.28	0.65	0.12	0.39	0.22	0.35	0.20
	Post-Construction	Assumes gravel on site and impoundment at end of drainage	**TOTAL**	SeA	0.57	560.28	0.65	0.12	0.04	0.02	0.01	0.00
TOTAL ACREAGE OF PROJECT					69.41							

Area	Scenario	Duration	Unmitigated			Mitigated			Post-Construction,
		(years)	(tons/year)	(tons)	Totals (tons)	(tons/year)	(tons)	Totals (tons)	
BESS Drain Path 1	Grading	0.25	5.17	1.29	5.95	0.94	0.24	4.98	0.80
	Other Construction Activities	0.92	5.08	4.66		5.17	4.74		
BESS Drain Path 2	Grading	0.25	8.79	2.20	10.10	1.51	0.38	8.43	1.27
	Other Construction Activities	0.92	8.63	7.91		8.79	8.05		
Total for BESS Area		-	-	-	**16.05**	-	-	**13.41**	**2.07**
BESS Access Road	Grading	0.00	0.05	0.00	0.03	0.01	0.00	0.03	0.01
	Other Construction Activities	0.67	0.05	0.03		0.05	0.03		
Total for BESS Access Road		-	-	-	**0.03**	-	-	**0.03**	**0.01**
BESS N Laydown Area	Grading	0.25	0.99	0.25	1.15	0.16	0.04	0.95	0.16
	Other Construction Activities	0.92	0.98	0.90		0.99	0.91		
Total for BESS N Laydown Area		-	-	-	**1.15**	-	-	**0.95**	**0.16**
BESS S Laydown Area	Grading	0.25	1.65	0.41	1.91	0.27	0.07	1.58	0.27
	Other Construction Activities	0.92	1.64	1.50		1.65	1.51		
Total for BESS S Laydown Area		-	-	-	**1.91**	-	-	**1.58**	**0.27**
Substation	Grading	0.25	6.98	1.74	8.02	1.24	0.31	6.71	1.07
	Other Construction Activities	0.92	6.85	6.28		6.98	6.40		
Total for Substation Area		-	-	-	**8.02**	-	-	**6.71**	**1.07**
Substation Access Road	Grading	0.00	0.19	0.00	0.12	0.03	0.00	0.12	0.03
	Other Construction Activities	0.67	0.18	0.12		0.19	0.12		
Total for Substation Access Road		-	-	-	**0.12**	-	-	**0.12**	**0.03**
Gentie Drain Path 1	Grading	0.08	0.50	0.04	0.21	0.09	0.01	0.17	0.08
	Other Construction Activities	0.33	0.49	0.16		0.50	0.17		
Gentie Drain Path 2	Grading	0.08	3.14	0.26	1.15	0.38	0.03	0.92	0.40
	Other Construction Activities	0.33	2.66	0.89		2.68	0.89		
Gentie Drain Path 3	Grading	0.08	2.51	0.21	1.04	0.33	0.03	0.86	0.34
	Other Construction Activities	0.33	2.50	0.83		2.51	0.84		
Gentie Drain Path 4	Grading	0.08	1.34	0.11	0.56	0.19	0.02	0.46	0.20
	Other Construction Activities	0.33	1.33	0.44		1.34	0.45		
Gentie Drain Path 5	Grading	0.08	3.36	0.28	1.39	0.46	0.04	1.16	0.48
	Other Construction Activities	0.33	3.33	1.11		3.36	1.12		
Total for Gentie (over ground)		-	-	-	**4.34**	-	-	**3.58**	**1.49**
Gentie Underground Drain Path 1	Grading	0.08	1.55	0.13	2.51	0.29	0.02	2.44	0.25
	Other Construction Activities	0.33	7.13	2.38		7.25	2.42		
Gentie Underground Drain Path 2	Grading	0.08	0.12	0.01	0.10	0.02	0.00	0.09	0.02
	Other Construction Activities	0.40	0.21	0.09		0.22	0.09		
Total for Gentie (below ground)		-	-	-	**2.60**	-	-	**2.53**	**0.27**
Gentie Laydown Area	Grading	0.25	0.87	0.22	1.01	0.14	0.03	0.83	0.14
	Other Construction Activities	0.92	0.86	0.79		0.87	0.80		
Total for Gentie Laydown Area		-	-	-	**1.01**	-	-	**0.83**	**0.14**

APPENDIX 4.7-C: WIND EROSION CALCULATIONS

Background:

The estimation process followed various methodologies from the WRAP Fugitive Dust manual (CE 2006). Calculations were performed for soil losses due to (A) general construction, Chapter 3, (B) vehicle traffic on unpaved roads, Chapter 6, and (C) open area wind erosion, Chapter 8.

Available input values for the selected calculation methods include:

1) the size (in acres) of the specific "areas" or segments within the Project site;

Responses below are based on the following defined areas:

- Project Site = 40.3 acres, inclusive of detention basins, fence, and drainage channel encircling the facility.
- Limits of Grading (L.O.G.) = 18.5 acres, incudes Project site plus all cut/fill slopes - does not include access road, laydown, gen-tie).
- Project Disturbance footprint = 65.9 acres, includes L.O.G. plus laydown, gen-tie, access road.

BESS pad area (primarily a fill area, includes only the surface created for placement of battery storage units and Project substation)	11.4 acres
Project site laydown areas (area used for laydown purposes during construction)	13.3 acres
Stormwater management infrastructure (includes two stormwater detention ponds)	2.1 acres
Site access roads (roads to site and substation) (main road to facility/construction site and road to substation)	0.3 acres
Cut slopes (area outside of BESS pad where excavations occur)	0.5 acres
Fill slopes (only sloping area outside of BESS pad surface)	2.1 acres
Gen-tie below ground (portion of the gen-tie line to be constructed with trenching, directional drilling and line installation underground, linear feature)	3.1 acres
Gen-tie above ground (portion of the gen-tie line to be constructed with overhead lines, linear feature)	19.2 acres
Gen-tie laydown area (area used for laydown purposes during construction)	7.2 acres

2) the project duration;

(period includes all of the grading activity needed to build the BESS pad, drainage system, detention ponds and permanent access roads)	14 months

3) the silt content of road surface material (for unpaved road calculations); and

Main site and substation access road 4.8 percent
(estimated mean value for a plant road, sand and gravel processing [CE 2006] from Table 6-1)

4) vehicle use details (for unpaved road calculations):

Mean vehicle weight 3.5 tons
(average value estimated for daily personal vehicle use to access site, assume half are autos and half are pickups)

Vehicle miles traveled 1,543 miles
(personal vehicles, within project area only, for the duration)

Soil Loss Estimating Methods:

A. Soil Loss from General Construction Activity:

Calculating soil loss to the atmosphere (i.e. wind erosion) for general construction activities used a Level 2 analysis from Table 3-2 of Chapter 3 of the Fugitive Dust Handbook (CE 2006). This analysis applies an emission factor for fine particle emissions (PM_{10}), with total emissions calculated based on the area under construction and the duration of the construction period (see Equation A-1). Assumes that all heavy equipment use is incorporated into this calculation, thus vehicle weight and distance traveled for all heavy construction equipment is covered here, and is not included in the unpaved road travel calculation.

$$ET_c = f_{10} * A * t_1 \quad \text{[resulting value is in tons]} \quad \text{[A-1]}$$

where

ET_c	=	PM_{10} emission total from construction (tons)
f_{10}	=	emission factor (tons per acre per month)
A	=	size of area (segment) under consideration (acres)
t_1	=	duration of time period under consideration (months)

To estimate the total suspended particulate (TSP) matter lost (i.e. eroded) due to general construction activity, the accepted ratio of PM_{10} to TSP is used. The ratio, demonstrated through lab analysis, says that the smaller size fraction (PM_{10}) generally represents approximately 64 percent of the total (TSP); this is the coversion factor (C_{TSP}). Therefore, a calculation (Equation A-2) is used to convert PM10 emissions into the TSP loss (USEPA 1995).

$$TSP = ET_c / 0.64 \quad \text{[resulting value is in tons]} \quad \text{[A-2]}$$

where

TSP	=	Total suspended particle emissions for a specific area and period (tons)
C_{TSP}	=	Conversion factor; total wind erosion based on PM10 estimate (%)

Mitigating wind-blown soil loss during general construction activity is most consistently accomplished by applying water to exposed areas at regular intervals and maintaining a certain level of soil moisture. The frequency of the watering schedule is a significant factor in determining the efficiency of the mitigation. A control efficiency of 65 percent was assumed for the project based on a watering interval of 3 hours.

Therefore, soil loss due to wind erosion, can be reduced to 35 percent of the calculated values without mitigation (see Equation A-3).

$TSP_m = ET_c * (1 - M_f)$ [resulting value is in tons] [A-3]

where

TSP_m = Total suspended particle emissions with mitigation (tons)
M_f = Mitigation factor, control efficiency (%)

B. Soil Loss from Unpaved Road Use:

Calculations for soil loss due to traffic on the unpaved roads of a construction site were based on an estimate of the emission of fine particulate matter (PM_{10}) provided by empirical formula (see Equation B-1) from Chapter 6 of the Fugitive Dust Handbook (CE 2006).

$E_U = 1.5(s/12)^{0.9} * (W/3)^{0.45}$ [resulting value is in lb/VMT] [B-1]

where

E_U = PM_{10} emission factor for unpaved roads (lb/VMT)
s = road surface fine material, particles passing No. 200 sieve (%)
W = mean vehicle weight (tons)
VMT = vehicle mile traveled (miles)

To estimate total TSP lost (i.e. eroded) due to vehicle traffic on the unpaved roads, the total amount of PM_{10} emitted over the duration of the project (or phase) first must be calculated using the total miles traveled on the unpaved roads of the project site over the duration of each phase (see Equation B-2).

$ET_U = (M_V * E_U)/2000$ [resulting value is in tons] [B-2]

where

ET_U = PM_{10} emissions total from unpaved roads for a specific period (tons)
M_V = total vehicle miles for the same time period, only on project roads (miles)

Based on an accepted ratio that the smaller size fraction (P_{10}) generally represents 64 percent of the content of TSP, a conversion calculation is used (see Equation B-3) to convert this loss into TSP (USEPA 1995).

$TSP = ET_U / C_{TSP}$ [resulting value is in tons] [B-3]

Mitigation of soil loss due to vehicle traffic on unpaved roads can be achieved with two control measures; first by limiting the speeds used by vehicles to 25 miles per hour and second by watering the roads twice per day. The former can result in a reduction in soil loss of up to 44 percent and the latter can result in a reduction of up to 55 percent (CE 2006). Assuming both control measures are applied to the Project with realistic success, a reduction efficiency of 75 percent has been used to estimate the results of applying mitigations. Therefore, soil loss from unpaved road use, can be reduced to 25 percent of the calculated values without mitigation (see Equation A-3).

C. Soil Loss from Open Area Wind Erosion:

Calculating soil loss due to general wind-initiated particle movement on open areas was accomplished using an emission factor for TSP developed by the USEPA (1995) in Chapter 11, Subsection 11.9 (Western Surface Coal Mining). This is a very general estimate that is based on the size of each area (in acres) from the site plans and the duration of the exposure (as idle land on an annual basis) to potential wind activity based on the project schedule (see Equation C-1). This excludes time already considered for General Construction Activity (see Section A).

$$TSP = A * (t_2 / 12) * f_{TSP} \quad \text{[resulting value is in tons]} \qquad \text{[C-1]}$$

where

- A = size of area (segment) under consideration (acres)
- t_2 = duration of time period open land is idle (months)
- f_{TSP} = TSP emission factor (tons/acre/year)

The areas included in these calculations were only for open land within the construction site for the time period they are not expected to be involved in active construction work.

Mitigation of wind-blown soil loss from open (and idle) areas can be accomplished in two ways, either by keeping the soil moist (i.e. applying water on a regular schedule) or by establishing a protective covering that is not susceptible to detachment by wind (such as with a layer of gravel or vegetative cover). For estimating purposes, we used a layer of gravel which provides a control efficiency of 84 percent (CE 2006). Therefore, the mitigated soil loss would be only 16 percent of the estimated soil loss without mitigation.

Soil Loss Estimates:

Calculation results for the methods described above using site specific data are provided in the following tables:

Table A-1. Soil Loss from General Construction Activity

Project Segment	**Exposed Area** (acres)	**Duration** (months)	**Emission Factor** (tons/acre/month)	**Total PM_{10} Eroded** (tons)
	[A]	[t_1]	[f_{10}]	[$ET_c=f_{10}*A*t_1$]
BESS Pad	11.4	9	0.011	1.13
Project Substation	2.1	6	0.011	0.14
Laydown Areas	20.5	3	0.011	0.68
Stormwater Basins	2.1	3	0.011	0.07
Cut Slopes	0.5	3	0.011	0.02
Fill Slopes	2.1	4	0.011	0.09
Gen-tie (below ground)	3.1	2	0.011	0.07
Gen-tie (above ground)	19.2	2.5	0.011	0.53
TOTALS				2.72

Table A-2. Soil Loss from General Construction Activity – With Mitigation

Project Segment	**PM_{10} Erosion** (tons)	**Conversion Factor** (%)	**Total Erosion** (tons)	**Mitigation Factor** (%)	**Total Mitigated Erosion** (tons)
	[ET_c]	[C_{TSP}]	[$TSP=ET_c/C_{TSP}$]	[M_f]	[$TSP_m=TSP*(1-M_f)$]
BESS Pad	1.13	64%	1.8	65%	0.62
Project Substation	0.14	64%	0.2	65%	0.08
Laydown Areas	0.68	64%	1.1	65%	0.37
Stormwater Basins	0.07	64%	0.1	65%	0.04
Cut Slopes	0.02	64%	0.03	65%	0.01
Fill Slopes	0.09	64%	0.1	65%	0.05
Gen-tie (below ground)	0.07	64%	0.1	65%	0.04
Gen-tie (above ground)	0.53	64%	0.8	65%	0.29
TOTALS	2.72		4.2		1.49

Table B-1. Soil Loss from Unpaved Road Use

Project Segment	**Surface Fines** (%)	**Mean Vehicle Weight** (tons)	**Emission Factor** (lbs/VMT)	**Total Miles** (miles)	**Total PM_{10} Eroded** (tons)
	[s]	[W]	[E_U]$=1.5(s/12)^{0.9}*(W/3)^{0.45}$	[M_V]	[$ET_U=M_V*E_U/2000$]
BESS Access Road	4.8%	3.5	0.011	809	0.0045
Substation Access Road	4.8%	3.5	0.011	735	0.0041
TOTALS					0.0086

Table B-2. Soil Loss from Unpaved Road Use – With Mitigation

Project Segment	**PM_{10} Erosion** (tons)	**Conversion Factor** (%)	**Total Erosion** (tons)	**Mitigation Factor** (%)	**Total Mitigated Erosion** (tons)
	[ET_U]	[C_{TSP}]	[$TSP=ET_U/C_{TSP}$]	[M_f]	[$TSP_m=TSP*(1-M_f)$]
BESS Access Road	0.0045	64%	0.0071	65%	0.0025
Substation Access Road	0.0041	64%	0.0064	65%	0.0022
TOTALS	0.0086		0.0135		0.0047

Table C-1. Soil Loss from Open Area Wind Erosion

Project Segment	**Exposed Area** (acres)	**Duration** (months)	**Emission Factor** (tons/acre/year)	**Total Eroded** (tons)	**Mitigation Factor** (%)
	[A]	[t_2]	[f_{TSP}]	[$TSP=A*(t_2/12)*f_{TSP}$]	[M_f]
BESS Pad	11.4	2	0.38	0.7	85%
Project Substation	2.1	1	0.38	0.1	85%
Laydown Areas	20.5	6.3	0.38	4.1	85%
Stormwater Basins	2.1	5.5	0.38	0.4	85%
Cut Slopes	0.5	7	0.38	0.1	85%
Fill Slopes	2.1	7	0.38	0.5	85%
Gen-tie (below ground)	3.1	4	0.38	0.4	85%
Gen-tie (above ground)	19.2	2	0.38	1.2	85%
TOTALS				7.5	

Table C-2. Soil Loss from Open Area Wind Erosion – With Mitigation

Project Segment	**Exposed Area** (acres)	**Duration** (months)	**Emission Factor** (tons/acre/year)	**Total Eroded** (tons)	**Mitigated Erosion Totals** (tons)
	[A]	[t_1]	[f_{TSP}]	[$TSP=A*(t_2/12)*f_{TSP}$]	[$TSP_m=TSP*(1-M_f)$]
BESS Pad	11.4	2	0.38	0.7	0.11
Project Substation	2.1	1	0.38	0.1	0.01
Laydown Areas	20.5	6.3	0.38	4.1	0.62
Stormwater Basins	2.1	5.5	0.38	0.4	0.05
Cut Slopes	0.5	7	0.38	0.1	0.02
Fill Slopes	2.1	7	0.38	0.5	0.07
Gen-tie (below ground)	3.1	4	0.38	0.4	0.06
Gen-tie (above ground)	19.2	2	0.38	1.2	0.18
TOTALS				7.5	1.12

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Subsection 11.9 (Western Surface Coal Mining) updated 1998
Subsection 13.2.1 (Paved Roads) updated 2002, 2003, 2011
Subsection 13.2.2 (Unpaved Roads) updated 2003, 2006
Subsection 13.2.3 (Heavy Construction Operations) not updated
Subsection 13.2.4 (Aggregate Handling and Storage Piles) updated 2006
Subsection 13.2.5 (Industrial Wind Erosion) updated 2006