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## **Appendix F**

### Paleontological Resources Technical Memorandum

## MEMORANDUM

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**To:** Michael Haberkorn, Gatzke Dillon & Ballance  
**From:** Michael Williams, Ph.D, Paleontologist, Dudek  
**Subject:** SDSU Brawley Sciences Building Project Paleontological Resources Technical Memorandum  
**Date:** August 25, 2023  
**cc:** Sarah Lozano, Alexandra Martini, Sarah Siren, Dudek  
**Attachments:** A – Figures  
B – Confidential SDNHM Paleontological Records Search Results  
C – Site Photos

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Dudek has conducted an evaluation pursuant to the requirements of the California Environmental Quality Act (CEQA), California Public Resources Code 21000, et seq., to determine the presence of and potential impacts related to paleontological resources associated with construction and operation of the proposed San Diego State University (SDSU) Imperial Valley Campus Brawley Sciences Building Building Project (project or proposed project), located east of Brawley, California. This technical memorandum provides the results of the paleontological resources investigation.

To determine the paleontological sensitivity of the project site, Dudek performed a paleontological resources inventory and preconstruction survey in compliance with the CEQA and Society of Vertebrate Paleontology ([SVP] 2010) guidelines. In addition to reviewing the certified environmental impact report (EIR) prepared for the approved 2003 Campus Master Plan, the inventory consisted of a San Diego Natural History Museum (SDNHM) paleontological records search and a review of geological mapping and geological and paleontological literature. The results of the paleontological records search were negative for paleontological resources within the project site and the one-mile radius buffer; however, the SDNHM indicated that the presence of Lake Cahuilla sediments underlying the project site have high paleontological sensitivity and recommended a complete paleontological mitigation program if planned excavations will impact undisturbed Lake Cahuilla sediments.

## 1 Project Location and Setting

The project is located at 560 California State Route (SR) 78 (also referred to as Ben Hulse Highway) in Imperial County, east of the City of Brawley (see Attachment A: Figure 1, Project Location). Regional access to the campus is provided by SR 111 and SR 86 to the west and northwest, respectively, and SR 115 to the east. (See Figure 1.) The proposed project site is surrounded by agricultural uses to the north, south, and west. Undeveloped land and a solar farm are located directly east of the proposed project site. The proposed building would be constructed northeast of existing campus Building 101, and the associated parking lot. Project construction staging areas would occupy the area of campus located southeast of the site and north of SR 78 (see Figure 2, and Attachment A: Figure 2 Project Area).

## 2 Project Description

In September 2003, CSU certified an environmental impact report and approved a Campus Master Plan for development of the SDSU Brawley Campus (Brawley Campus or campus), which would serve as an extension of the existing SDSU Imperial Valley Campus (IVC) located in Imperial County. The IVC is an extension of SDSU's main campus located in San Diego and furthers the university's regional educational mission to provide additional educational opportunities to the outlying communities of Imperial County. The approved Campus Master Plan and certified EIR provided sufficient environmental analysis and authorization necessary for enrollment of up to 850 full-time equivalent (FTE) students and corresponding faculty and staff and a framework for development of the facilities necessary to serve the approved campus enrollment.

The Brawley Campus is approximately 200 acres in size and is located east of the city of Brawley (city). See Figure 1. Currently, the Campus has been partially built out with educational and support facilities, although much of the campus remains undeveloped or used for active agriculture. As noted above, the environmental impacts associated with development of the Brawley Campus, including a student enrollment of up to 850 FTE students, were evaluated at a program level of review in the previously certified 2003 SDSU Imperial Valley Campus Master Plan Project EIR (2003 EIR) (SCH 200251010). In CSU's effort to build out the IVC consistent with the previously approved Campus Master Plan, SDSU now proposes construction and operation of a sciences building that would be located on the Brawley Campus.

The proposed project involves the construction and operation of a sciences building (science, technology, engineering, and mathematics) that would house teaching labs, lecture spaces, faculty/administration offices, research spaces, and conference rooms, as well as mechanical, electrical, and telecom support spaces.

The proposed project site is approximately 3.2-acres in size and the construction staging areas would occupy approximately 1-acre in the area of campus located southeast of the site and north of SR 78. The project includes 61,119 sf of on-site landscaping, including the construction of bio-retention areas to capture stormwater runoff from stormwater drainages systems that will be located throughout the project site. Hardscape improvements will include 41,297 sf of sidewalks and pedestrian walkways, which will connect the project site to existing campus buildings and parking lot.

Additionally, the project would require new points of connection to domestic water, fire water, and sewer lines from existing utility lines to serve the new building, as well as new domestic water line infrastructure. Potable water will be provided by the City of Brawley, as well as sewer and wastewater collection services. New utility infrastructure will also be required to support electrical services for the building, as well as a back-up diesel operated generator.

The proposed project building would have an area of 36,900 gross sf and would be approximately 35 feet in height. The project is expected to be built over the course of 19 months, with construction estimated to begin in 2024. Construction and equipment staging would require 1-acre of space within the campus, directly east of existing Building 101 and the parking lot. The project would involve site preparation, grading, and excavation associated with project construction. Excavation depths are anticipated to be 2-5 feet. Waste (i.e., excavated gravel/soil) generated during project construction would be balanced within the site.

### 3 Analysis Methodology

The analysis presented here considers the potential environmental impacts of the proposed project relative to existing conditions. Establishment of the project site's existing paleontological conditions have been informed by published geological maps, as well as published and unpublished reports reviewed to identify geological units located on the project site and determine their paleontological sensitivity.

As described above, a paleontological records search request was sent to the SDNHM on October 24, 2022. The records search area included the project site and a one-mile radius buffer. The purpose of the records search was to determine whether there are any known fossil localities in or near the project site to aide in determining whether a paleontological mitigation program is warranted to avoid or minimize potential adverse effects of construction on paleontological resources.

In addition to the records search, Dudek staff conducted an intensive level pedestrian survey of the project site on February 22, 2023, to determine if Lake Cahuilla sediments and/or fossils are present on the surface of the project site.

### 4 Paleontological Resources

Paleontological resources are the remains or traces of plants and animals that are preserved in the earth's crust, and per SVP (2010) guidelines, are older than written history or older than approximately 5,000 years. They are limited, nonrenewable resources of scientific and educational value and are afforded protection under state laws and regulations. This analysis complies with guidelines and significance criteria specified by CEQA and SVP (2010). Table 1, Paleontological Resource Sensitivity Criteria, provides definitions for high, undetermined, low, and no paleontological resource potential, or sensitivity, as set forth in and by the SVP (2010) Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources.

**Table 1. Paleontological Resource Sensitivity Criteria**

Resource Sensitivity / Potential	Definition
High	Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rock units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcanoclastic formations (e. g., ashes or tephtras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e. g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.). Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.
Undetermined Potential	Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist (see “definitions” section in this document) to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.
Low Potential	Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e. g. basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.
No Potential	Some rock units have no potential to contain significant paleontological resources, for instance high- grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection nor impact mitigation measures relative to paleontological resources.

Source: SVP (2010)

## 4.1 Regulatory Framework

### The California Environmental Quality Act

This paleontological resources evaluation was completed to satisfy the requirements of the California Environmental Quality Act (CEQA). The CEQA Guidelines require that all private and public activities not specifically exempted be evaluated against the potential for environmental impacts, including effects to paleontological resources. Paleontological resources, which are limited, nonrenewable resources of scientific, cultural, and educational value, are recognized as part of the environment under these state guidelines. This study satisfies project requirements in accordance with CEQA (13 PRC [Public Resources Code], 21000 et seq.).

Paleontological resources are explicitly afforded protection by CEQA, specifically in Section VII(f) of CEQA Guidelines Appendix G, the “Environmental Checklist Form,” which addresses the potential for adverse impacts to “unique paleontological resource[s] or site[s] or ... unique geological feature[s].” This provision covers fossils of significant importance – remains of species or genera new to science, for example, or fossils exhibiting features not previously recognized for a given animal group – as well as localities that yield fossils significant in their abundance, diversity, preservation, and so forth.

### California Public Resources Code Section 5097.5

In addition to CEQA’s requirements, Public Resources Code Section 5097.5 (Stats 1965, c 1136, p. 2792) regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.

## 4.2 Environmental Setting

### Geological Map Review

The project site lies within the Colorado Desert Geomorphic Province, which is bound by a southern extension of the Mojave Desert Geomorphic Province on the east, the Peninsular Ranges Geomorphic Province on the west, the eastern Transverse Ranges and Mojave Desert Geomorphic Provinces to the north, and the United States – Mexico border on the south (CGS 2002).

More specifically, the project site lies within the Salton Trough, a northwesterly- trending tectonic basin located between the Peninsular Ranges on the west and the Chocolate Mountains on the east. The area is characterized by numerous northwest-trending strike-slip faults, including the San Andreas, San Jacinto, and Elsinore faults. Roughly 2,000 square miles of the Salton Basin lie below sea level, and in many respects, the area can be considered a landward extension of the Gulf of California. In fact, if it were not for the modern Colorado River delta damming the sediments, the marine waters of the Gulf of California would extend all the way to Riverside County. The project site lies below sea level.

According to surficial geological mapping by Strand (1962) at a 1:250,000 scale, the project site is underlain by late Pleistocene (approximately 129,000 years ago to 11,700 years ago; Cohen et al. [2022]) to Holocene (<11,700

years ago; Cohen et al. [2022]) lake deposits (map unit QI). Lake deposits in this area are associated with former Lake Cahuilla.

## Literature Review

Repeated inundation and desiccation sequences are recorded in lacustrine and fluvial sediments associated with Lake Cahuilla within the Salton Trough. These freshwater inundation and desiccation events bring with them assemblages of fossils and subfossils, freshwater invertebrates and vertebrates, that provide a snapshot of the biota living in a given location at a time in the distant past.

The late Pleistocene to Holocene (Li and others 2008) Lake Cahuilla sediments have an extensive record of preserving freshwater invertebrate and terrestrial vertebrate taxa. According to stratigraphic sections of boring walls examined by CRM TECH for the nearby Imperial Solar Energy Center West (ISECW) project, sediments derived from Lake Cahuilla vary in thickness from approximately five to fifteen feet and indicate shallow water deposition (Quinn, 2015). Quinn and Dahdul (2014) reported *Anodonta* sp., *Helisoma newberryi*, *Physa humerosa*, and *Tryonia protea* from geotechnical work on the ISECW project; Quinn and Kerridge (2015) reported *Planorbella tenuis*, *Physa humerosa*, *Physa* like *P. watti*, *Physa* sp., *Tryonia protea*, *Tryonia* sp., *Fluminicola* sp., and *Anodonta* sp. from boring in the southern part of the ISEC West Project; and Siren (2017) reported *Pyrgulopsis longinqua*, *P. californiensis*, *Tryonia porrecta* (*T. protea*), *Physa* sp., *Helisoma* sp., *Ferrissia* sp., *Anodonta californiensis*, and *Chionactis* cf. *Chionactis occipitalis* salvaged during paleontological monitoring for the ISECW project. Finally, Stewart (2008) reported *Tryonia protea*, *Fluminicola* sp., *Physella* cf. *P. humerosa*, *Valvata* sp., *Anodonta californiensis*, unidentified ostracods, cyprinid and centrarchid fish, a rodent tibia, and large mammal rib fragment from Lake Cahuilla sediments sampled from a gas turbine plant project in Niland, California.

## Paleontological Records Search

The SDNHM paleontological records search results were received on November 4, 2022 (Confidential Attachment B). The SDNHM did not report any fossil localities from within the project site or the one-mile radius buffer; however, they did cite geological mapping by Jennings (1967) and indicated the project site is underlain by late Pleistocene to Holocene Lake Cahuilla sediments that have produced significant paleontological resources in the area and are assigned high paleontological sensitivity. Given Lake Cahuilla sediments have produced significant paleontological resources in the area and are considered to have high paleontological sensitivity or potential, the SDNHM recommended a complete paleontological resource mitigation program if significant excavations are planned that could impact undisturbed Lake Cahuilla Deposits (Confidential Attachment B).

## Intensive Pedestrian Survey

Dudek staff conducted an intensive level pedestrian survey of the proposed project site on February 22, 2023. All survey work was conducted employing standard archaeological/paleontological procedures and techniques. During the pedestrian survey, the ground surface was examined for Lake Cahuilla sediments as indicated by the presence of freshwater invertebrate shells.

The project area is flat and has been previously disturbed from the construction of the existing campus structures, parking lot, shaded seating area, earthen irrigation ditches, access dirt roads, storage area, and active agricultural field. Little to no vegetation was observed within the southern section of the proposed building project area and staging area and ground visibility was excellent (100 percent). The northern section of the project area consists of



an active agricultural field and ground visibility was fair at (60-70 percent). Within the sciences building project area, a chain-linked fence separates the southern portion from the active agricultural field. A shaded seating area with gravel shows evidence of disturbance from vehicle tire tracks (Attachment C: Photo 1). North of the chain-linked fence is a graded dirt access road (Attachment C: Photo 2), with an earthen irrigation ditch with a culvert pipe to the north of the road (Attachment C: Photo 3). North of the ditch is another dirt access road, and plastic pipes are observed within the cut of the access road and the agricultural field (Attachment C: Photo 4). The northern half of the project area consists of an active agricultural field (Attachment C: Photo 5).

The proposed staging area is located southeast of the proposed sciences building project area. The area is flat, mostly unvegetated, and shows evidence of disturbance from vehicle tire tracks and a chain-linked fence which surrounds the perimeter of the area (Attachment C: Photo 6). Metal, pieces of modern glass, irrigation pipes, and guywire are observed throughout the staging area (Attachment C: Photo 7). More evidence of disturbance can be observed throughout the staging area in the form of bioturbation, erosion, and buried irrigation pipes (Attachment C: Photo 8). No Lake Cahuilla sediments were observed during the survey.

## 5 Impact Analysis and Conclusions

### 5.1 Thresholds of Significance

The thresholds of significance used to evaluate the impacts of the proposed project related to paleontological resources are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. A significant impact under CEQA would occur if the proposed project would:

- a) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

### 5.2 Impact Analysis

- a) ***Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature***

The IS prepared for the 2003 EIR determined that no impacts to unique paleontological resources or sites or unique geologic features would occur.

No paleontological resources were identified within the project site or a one-mile radius buffer as a result of the institutional records search, paleontological survey, or desktop geological and paleontological review. Lake Cahuilla sediments underlying the project site at an undetermined depth have high paleontological sensitivity and disturbed surficial sediments have low paleontological sensitivity. Based on the records search results and map and literature review, the project site has high potential to produce paleontological resources during planned construction activities in areas underlain by Lake Cahuilla sediments. In the event that intact paleontological resources are discovered on the project site, ground-disturbing activities associated with construction of the project, such as grading and large diameter drilling during site preparation and trenching for utilities, have the potential to destroy a unique paleontological resource or site. The potential for project activities to damage paleontological resources during construction would result in a potentially significant impact. Mitigation Measure GEO-1, presented below, would reduce



potentially significant impacts to a **less-than-significant** level by requiring preparation of a Paleontological Resources Impact Mitigation Program which would involve pre-construction worker awareness training as well as paleontological monitoring and discovery protocol, treatment, reporting, and collection management.

GEO-1:Paleontological Resources Impact Mitigation Program and Paleontological Monitoring. Prior to commencement of any grading activity on site, SDSU or its designee shall retain a qualified paleontologist per the Society of Vertebrate Paleontology (SVP) 2010 guidelines to prepare a Paleontological Resources Impact Mitigation Program (PRIMP) for the project. The PRIMP shall be consistent with the SVP 2010 guidelines and outline requirements for: preconstruction meeting attendance and worker environmental awareness training; where paleontological monitoring is required within the project site based on construction plans and/or geotechnical reports; and, procedures for adequate paleontological monitoring and discoveries treatment, including paleontological methods (including sediment sampling for microinvertebrate and microvertebrate fossils), reporting, and collections management. The PRIMP shall also include a statement that any fossil lab or curation costs (if necessary due to fossil recovery) are the responsibility of SDSU or its designee.

In addition, a qualified paleontological monitor shall be on site during initial rough grading and other significant ground-disturbing activities (including augering) in areas underlain by Lake Cahuilla sediments. No paleontological monitoring is necessary during ground disturbance within artificial fill, if determined to be present. In the event that paleontological resources (e.g., fossils) are unearthed during grading, the paleontological monitor will temporarily halt and/or divert grading activity to allow recovery of paleontological resources. The area of discovery will be roped off with a 50-foot radius buffer. Once documentation and collection of the find is completed, the monitor will allow grading to recommence in the area of the find.

## 6 References

- California Geological Survey. 2002. California Geomorphic Provinces: Note 36. 4 pp.
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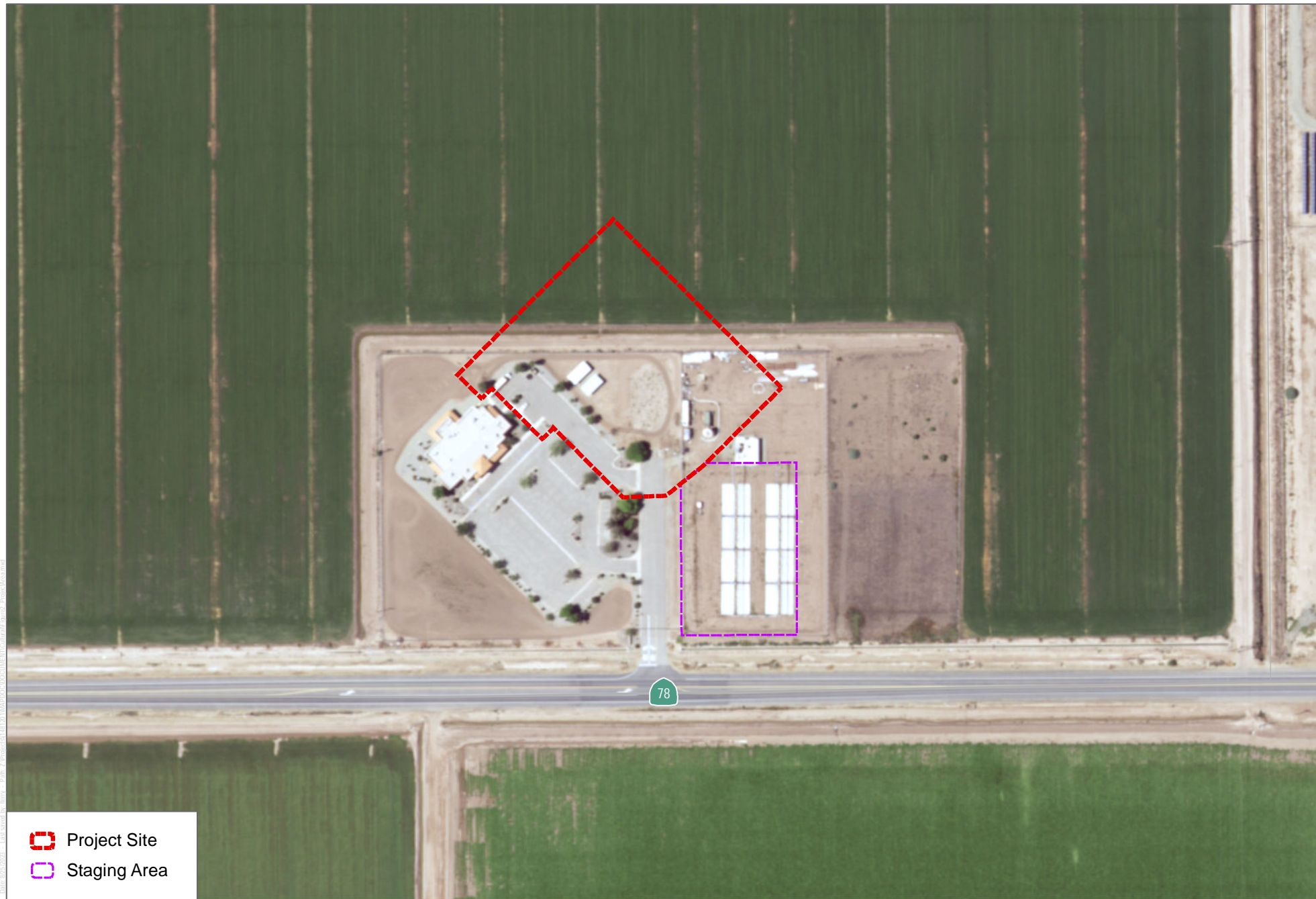
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# Attachment A

## Figures







SOURCE: NAIP 2020

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# **Confidential Attachment B**

SDNHM Paleontological Records Search Results

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# **Attachment C**

## Site Photos





**Photo 1:** View of shaded seating area in the southern half of the project area. View facing west.



**Photo 2:** View of dirt access road in central portion of the project area. view facing west.





**Photo 3:** View of earthen irrigation ditch and adjacent dirt roads in the central portion of the project area. View facing west.





**Photo 4:** View of dirt road and agricultural field in the central portion of the project area. View facing northwest.





**Photo 5:** View of mowed agriculture field in the northern section of the project area. View facing north.



**Photo 6:** View of the proposed staging area located in the western section. View facing south.





**Photo 7:** View of the proposed staging area located in the central section. View facing southeast.





**Photo 8:** View of the proposed staging area located in the central section. View facing south.