

APPENDIX E:  
PALEONTOLOGICAL RESOURCES  
REPORT

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# EVANS & DE SHAZO

ARCHAEOLOGY HISTORIC PRESERVATION

## RESULTS OF A PALEONTOLOGICAL RESOURCES STUDY FOR THE PROPOSED PROJECT AT 7842 HEMBREE LANE, WINDSOR, SONOMA COUNTY, CALIFORNIA

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## **INTRODUCTION**

Evans & De Shazo, Inc. (EDS) was retained by Placeworks to complete a Paleontological Resources Study for the proposed project within a vacant 5.19-acre property at 7842 Hembree Lane, Windsor, Sonoma County, California, within Assessor Parcel Number (APN) 163-080-047 (Project Area). The proposed project includes the development of 24 single-family houses and associated infrastructure (Project). The Paleontological Resource Study was requested as part of an Initial Study (IS) for the Project in accordance with the California Environmental Quality Act (CEQA), as the Town of Windsor 2040 General Plan Environmental Impact Report (EIR) identified the Project Area as having a high sensitivity for paleontological resources. Therefore, the Paleontological Resources Study was required to determine whether previously recorded fossil localities, or fossiliferous geologic units known to contain fossils, are present in the Project Area, to develop a baseline paleontological resource inventory of the Project Area, and to establish the paleontological potential of each geologic unit present within and adjacent to the Project Area.

The Paleontological Study was completed by EDS Principal Paleontologist, James Allen, M.Sci., PG, who meets the Society of Vertebrate Paleontology (SVP) (2010) standards for Qualified Professional Paleontologist and has over 22 years of project experience in environmental geology, Paleontological resources (CEQA Compliance) management, and general geological investigations work.

## **PROJECT DESCRIPTION**

The proposed Project includes the development of 24 single-family houses, associated infrastructure, roadways, and landscaping within a 3.2-acre portion of the Project Area, and 2.0 acres will be retained as open space (Figure 1).

## **PROJECT LOCATION**

The Project is located at 7842 Hembree Lane in Windsor, Sonoma County, California, within 163-080-047 (Figure 2). The Project Area is situated within a residential neighborhood and consists of 5.19-acres of vacant land bounded by Hembree Lane on the west, Cornell Street on the north, Robbins Park on the east, and single-family houses on the south.

The Project Area is located on the U.S. Geological Survey (USGS) 7.5-minute Healdsburg, California quadrangle (1993), within Section 18 of Township 8 North, Range 8 West, Mount Diablo Meridian (Figure 3). The Universal Transverse Mercator (UTM) grid coordinates at the approximate center of the Project Area are: 4265300 meters North and 517840 meters East, Zone 10.

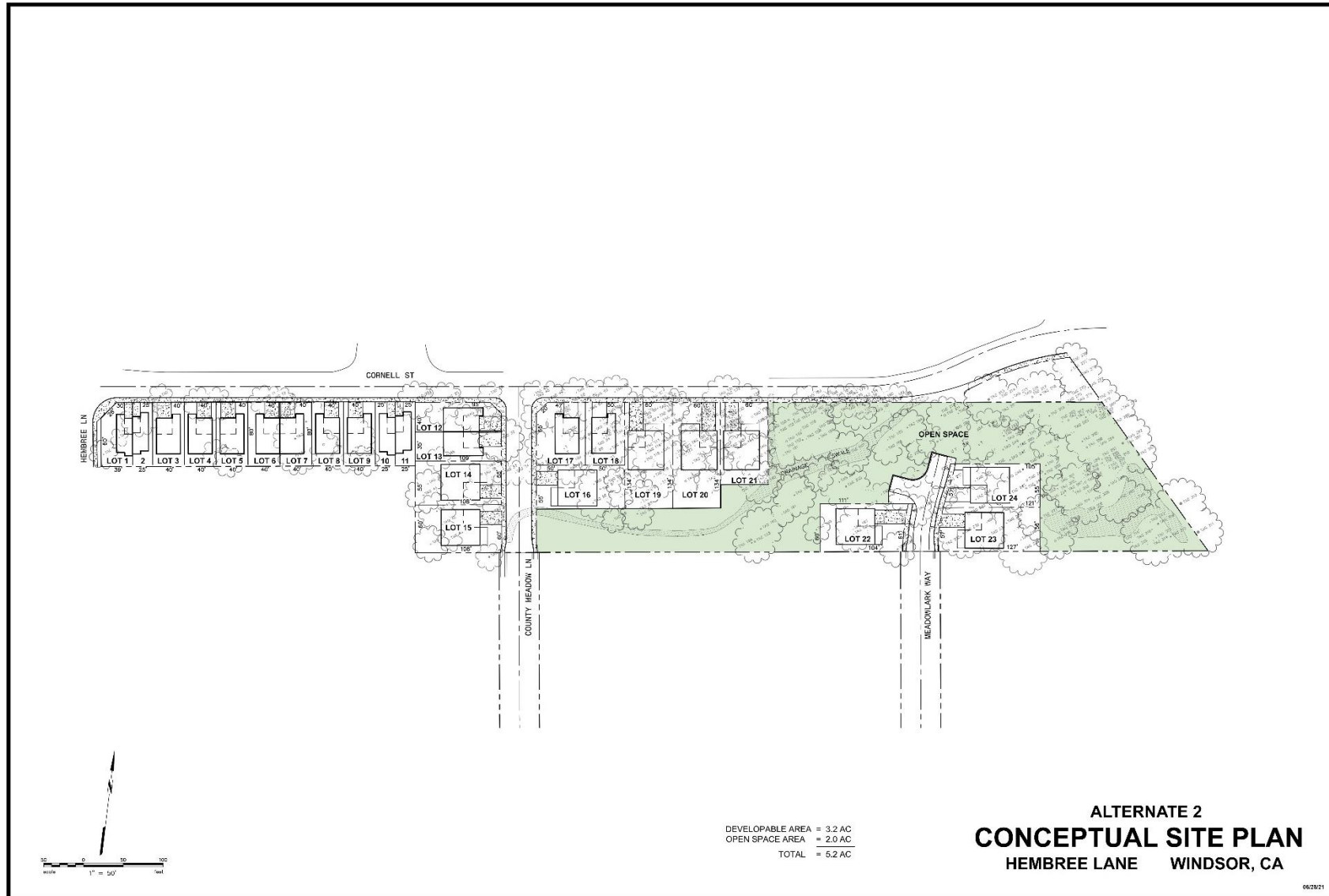


Figure 1: Conceptual site plan (courtesy of Placeworks).

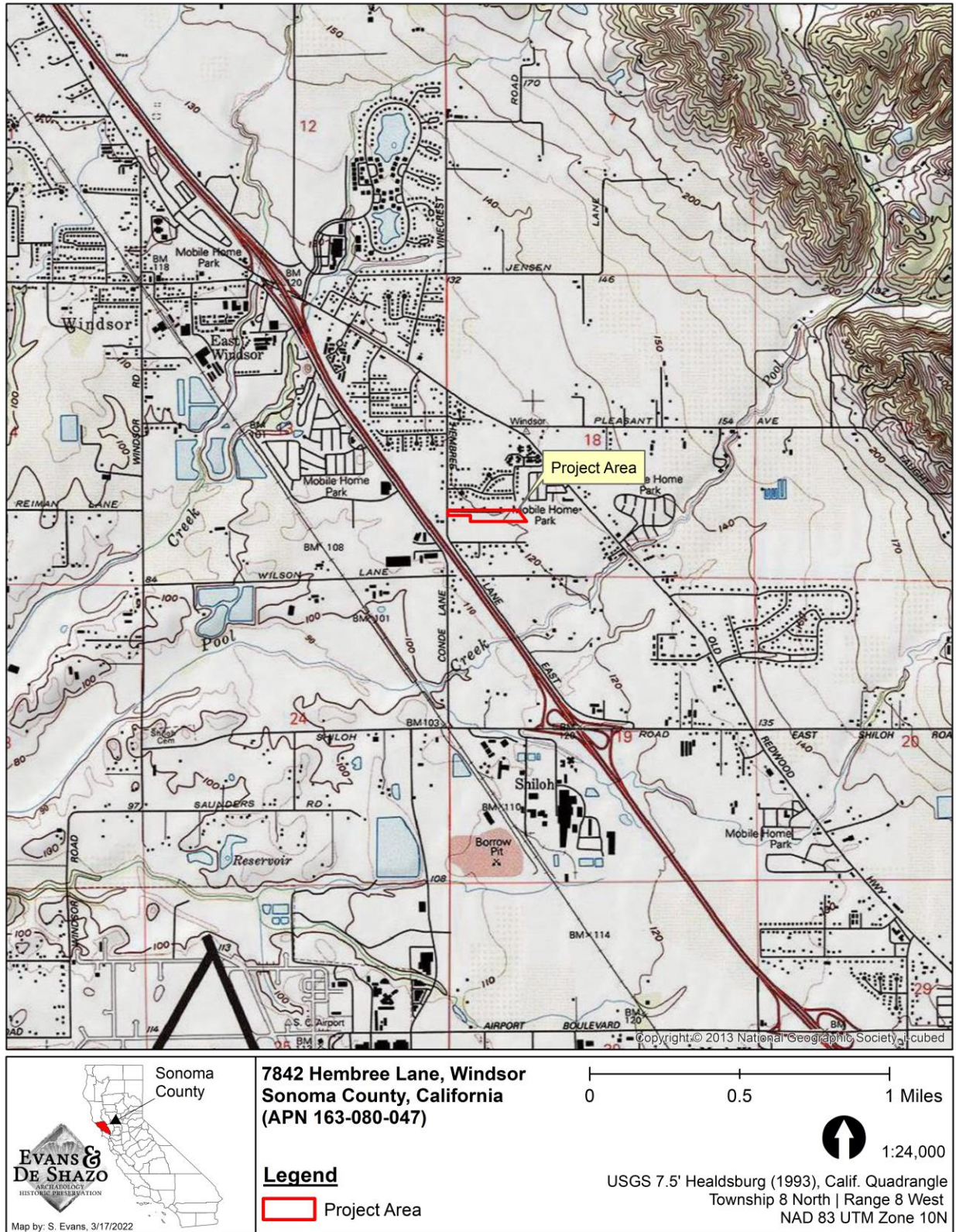


Figure 2: Project Area shown on the USGS 7.5' Healdsburg, Calif. (1993) quadrangle.



Figure 3: Project Area shown on a 2018 aerial photograph.





## REGULATORY CONTEXT

### FEDERAL LAWS AND REGULATIONS

A variety of Federal statutes specifically address paleontological resources. These laws and regulations become applicable to specific projects if the delivery crosses Federal lands or involves a Federal agency's license, permits, approval, or funding.

#### **Antiquities Act of 1906**

The Antiquities Act of 1906 (Public Law [P.L.] 59-209; 16 United States Code [USC] 431-433, 34 Statute 225) has been cited in past efforts to protect paleontological resources on federal lands, and it is recognized for regulation of collecting "any object of antiquity," which includes fossils, on land managed by the Bureau of Land Management, National Park Service, Forest Service, Department of Energy, and other federal agencies. This Act also establishes criminal sanctions for unauthorized appropriation or destruction of antiquities.

#### **National Registry of Natural Landmarks**

The National Natural Landmarks Program (16 USC 461-467), established in 1962 under the authority of the Historic Sites Act of 1935, recognizes and encourages the conservation of outstanding examples of our country's natural history. As the only natural areas program of national scope that identifies and recognizes the best examples of biological and geological features in both public and private ownership, National Natural Landmarks (NNLs) are designated by the Secretary of the Interior, with the owner's concurrence, as being of national significance. NNLs are defined as being one of the best examples of a biological community or geological feature within a natural region of the U.S., including terrestrial communities, landforms, geological features and processes, habitats of native plant and animal species, or fossil evidence of the development of life (36 Code of Federal Regulations [CFR] 62.2). The National Park Service administers the NNL Program, and if requested, assists NNL owners and managers with the conservation of these important sites.

#### **Paleontological Resources Preservation Act of 2009**

The Paleontological Resources Preservation Act (PRPA) is part of the Omnibus Public Land Management Act of 2009 (Public Law 111-011, Title VI Subtitle D). This act directs the Secretary of the Interior or the Secretary of Agriculture to manage and protect paleontological resources on federal land, and develop plans for inventorying, monitoring, and deriving the scientific and educational use of such resources. It prohibits the removal of paleontological resources from federal land without a permit issued under this act, establishes penalties for violation of this act, and establishes a program to increase public awareness about such resources. The bill imposes criminal penalties for violating this act, which includes serving up to 10 years in prison if convicted.



## STATE LAWS AND REGULATIONS

Several state laws, ordinances, regulations, and standards (LORS) protect paleontological resources on state lands as well as projects undertaken by state agencies. A summary of these LORS follows.

### California Environmental Quality Act

The primary California state environmental law protecting fossils is CEQA (Public Resources Code Section 21000 et seq.). CEQA requires that public agencies and private interests identify the environmental consequences of their proposed projects on any object or site of significance to the scientific annals of California (Division I, California Public Resources Code Section 5020.1 [b]). Pertinent sections of the Act include the following. CEQA (Chapter 1, Section 21002) states:

*“It is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available that would substantially lessen the significant environmental effects of such projects, and that the procedures required are intended to assist public agencies in systematically identifying both the significant effects of proposed projects and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects.”*

Administrative regulations for the implementation of CEQA are set forth in California Code of Regulations (CCR) 15000 et seq., commonly known as the “CEQA Guidelines.” The Guidelines define procedures, types of activities, persons, and public agencies required to comply with the 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.”*

Appendix G of the Guidelines provides an Environmental Checklist of questions that a lead agency should normally address if relevant to a project’s environmental impacts. One of the questions to be answered in this Environmental Checklist (CCR Section 15063; Appendix G, Section V, c) is the following:

*“Would the project directly or indirectly destroy a unique paleontological resource or site...?”*

CEQA Guidelines Section XVII of the Environmental Checklist asks a second question equally applicable to paleontological resources: “Does the project have the potential to eliminate important examples of the major periods of California history or pre-history?” Fossils are important examples of the major periods of California prehistory. To be in compliance with CEQA, environmental impact assessments, statements, and reports must answer both these questions in the Environmental Checklist. If the answer to either question is yes or possibly, a mitigation and monitoring plan must be designed and implemented to protect significant paleontological resources. The CEQA lead agency that has jurisdiction over a project is responsible to ensure that significant paleontological resources are protected in compliance with CEQA and other applicable statutes. CEQA Section 21081.6 requires that



the lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process. Other state requirements for paleontological resource management are in California Public Resources Code Chapter 1.7, Section 5097.5 (Statutes 1965, Chapter 1136, Page 2792), titled Archaeological, Paleontological, and Historical Sites. This statute defines any unauthorized disturbance or removal of a fossil site or fossil remains on public land as a misdemeanor and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on publicly owned lands to preserve or record paleontological resources.

#### **Public Resources Code Section 5097.5**

California Public Resources Code Section 5097.5 prohibits excavation or removal of any “vertebrate paleontological site, 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 and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on publicly owned lands to preserve or record paleontological resources.” Public lands are defined to include lands owned by or under the jurisdiction of the state or any city, county, district, authority, or public corporation, or any agency thereof. Section 5097.5 states that any unauthorized disturbance or removal of archaeological, historical, or paleontological materials or sites located on public lands is a misdemeanor.

Section 30244 requires reasonable mitigation for impacts on paleontological resources where development might adversely impact paleontological resources, as identified by the State Historic Preservation Officer.

#### **PALEONTOLOGICAL RESOURCES MITIGATION REQUIREMENTS FOR THE PROJECT**

The Town of Windsor (Town) 2040 General Plan Mitigation Monitoring and Reporting Program (MMRP) lists the following mitigation measures for developments facilitated by the 2040 general Plan that have the potential to impact paleontological resources to ensure that impacts would be less than significant.

- **CR-3 Paleontological Resource Studies.** For any development in Windsor that occurs within high sensitivity geologic units, whether they are mapped at the surface or hypothesized to occur in the subsurface, the Town shall require a paleontological assessment, and avoidance and/or mitigation for potential impacts to paleontological resources. The Town shall require the following specific requirements for projects that could disturb geologic units with high paleontological sensitivity, whether they are mapped at the surface or hypothesized to occur in the subsurface.
  1. **Retain a Qualified Paleontologist.** Prior to initial ground disturbance that occurs within highly sensitive geologic units, the applicant shall retain a project paleontologist, defined as a paleontologist who meets the SVP (2010) standards for Qualified Professional Paleontologist, to direct all mitigation measures related to paleontological resources. A qualified paleontologist (Principal Paleontologist) is defined by the SVP standards as an individual with an M.S. or Ph.D. in paleontology or geology who is experienced with paleontological



procedures and techniques, who is knowledgeable in the geology of California, and who has worked as a paleontological mitigation project supervisor for a least one year.

2. **Paleontological Mitigation and Monitoring Program.** Prior to construction activity, a qualified paleontologist should prepare a Paleontological Mitigation and Monitoring Program to be implemented during ground disturbance activity for the proposed project. This program should outline the procedures for construction staff Worker Environmental Awareness Program (WEAP) training, paleontological monitoring extent and duration, salvage and preparation of fossils, the final mitigation, and monitoring report, and paleontological staff qualifications.
3. **Paleontological Worker Environmental Awareness Program (WEAP).** Prior to the start of construction, the project paleontologist or their designee shall conduct training for construction personnel regarding the appearance of fossils and the procedures for notifying paleontological staff should fossils be discovered by construction staff. The WEAP shall be fulfilled at the time of a preconstruction meeting at which a qualified paleontologist shall attend. In the event of a fossil discovery by construction personnel, all work in the immediate vicinity of the find shall cease and a qualified paleontologist shall be contacted to evaluate the find before restarting work in the area. If it is determined that the fossil(s) is (are) scientifically significant, the qualified paleontologist shall complete the following conditions to mitigate impacts to significant fossil resources.
4. **Paleontological Monitoring.** Ground disturbing construction activities (including grading, trenching, foundation work, and other excavations) at the surface in areas mapped as high paleontological sensitivity and exceeding 5 feet in depth in areas overlying potentially high paleontological sensitivity units should be monitored on a full-time basis by a qualified paleontological monitor during the initial ground disturbance. The Paleontological Mitigation and Monitoring Program shall be supervised by the project paleontologist. Monitoring should be conducted by a qualified paleontological monitor, who is defined as an individual who has experience with the collection and salvage of paleontological resources. The duration and timing of the monitoring will be determined by the project paleontologist. If the project paleontologist determines that full-time monitoring is no longer warranted, they may recommend that monitoring be reduced to periodic spot-checking or cease entirely. Monitoring would be reinstated if any new or unforeseen deeper ground disturbances are required, and reduction or suspension would need to be reconsidered by the Supervising Paleontologist. Ground disturbing activity that does not occur in areas mapped as high sensitivity or that do not exceed 5 feet in depth in areas overlying potentially high sensitivity units would not require paleontological monitoring.
5. **Salvage of Fossils.** If significant fossils are discovered, the project paleontologist or paleontological monitor should recover them. Typically, fossils can be safely salvaged quickly by a single paleontologist and not disrupt construction activity. In some cases, larger fossils (such as complete skeletons or large mammal fossils) require more extensive excavation and



longer salvage periods. In this case the paleontologist should have the authority to temporarily direct, divert or halt construction activity to ensure that the fossil(s) can be removed in a safe and timely manner. Work may continue outside of a buffer zone around the fossil, usually 50-100 feet (specific distance may be determined by the project paleontologist).

6. **Preparation and Curation of Recovered Fossils.** Once salvaged, significant fossils should be identified to the lowest possible taxonomic level, prepared to a curation-ready condition and curated in a scientific institution with a permanent paleontological collection (such as the University of California Museum of Paleontology), along with all pertinent field notes, photos, data, and maps. Fossils of undetermined significance at the time of collection may also warrant curation at the discretion of the project paleontologist.
7. **Final Paleontological Mitigation Report.** Upon completion of ground disturbing activity (and curation of fossils if necessary) the qualified paleontologist should prepare a final mitigation and monitoring report outlining the results of the mitigation and monitoring program. The report should include discussion of the location, duration and methods of the monitoring, stratigraphic sections, any recovered fossils, and the scientific significance of those fossils, and where fossils were curated.

## METHODS

To develop a baseline paleontological resource assessment of the Project Area and to establish the paleontological sensitivity (potential) of each geologic unit present within and adjacent to the Project Area, the following tasks were completed.

### RECORD SEARCH AND LITERATURE REVIEW

Geologic maps and available published and unpublished geological and paleontological literature covering the bedrock and surficial geology and paleontology of the Project Area and surrounding area, were reviewed to determine what exposed and/or subsurface rock units are present, and to assess the potential paleontological productivity of each rock unit in respect to the Project Area. This research identified the geologic units, previous paleontological studies, fossil localities (i.e., locations at which paleontological resources have been documented), and types of fossils in geologic units that may be within or adjacent to the Project area.

An online fossil locality search of the University of California Museum of Paleontology (UCMP) Database was completed on May 2, 2022.

### SITE VISIT

EDS Principal Paleontologist, James Allen, M.Sci., PG completed a site visit on April 9, 2022, to document the presence of sediments suitable for containing fossil remains, and the presence of any previously unrecorded fossil sites.



## **PALEONTOLOGICAL POTENTIAL**

After completing the previously described tasks, each geologic unit mapped within or near the Project Area was assigned a paleontological potential based on the number of previously recorded fossil sites it contains and the scientific importance of the fossil remains recorded. These methods are consistent with SVP (2010) criteria and guidelines for assessment and mitigation of adverse impacts to paleontological resources in areas of potential environmental effect and areas of critical environmental concern.

Paleontological potential is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, geologic history of the rock unit in preserving and producing significant fossils, and fossil localities that are recorded from that unit. Paleontological potential is derived from the fossil data collected from the entire geologic unit, not just from a specific survey. A four-tiered classification system (Class a-d) for paleontological potential, recommended by SVP (2010) and recognized in California is listed below:

### **(a) High Potential**

Indicates rock units that have the potential for yielding abundant or significant fossils, such as significant vertebrate and/or invertebrate, plant or trace fossils, or microfossils, and the potential to yield important scientific data. These units are temporally (middle Holocene in age or older) and lithologically suitable for fossil preservation, such as fine grained fluvial, marine, and lacustrine sediments, and paleosols, and volcanic (airfall/volcaniclastic) or low-grade metamorphic rocks.

### **(b) Undetermined Potential**

Unknown or undetermined sensitivity indicates that the rock unit has not been sufficiently studied or lacks good exposures to warrant a definitive rating. This rating is treated initially as having a high sensitivity or potential. After study or monitoring, the unit may fall into one of the other categories. According to the SVP (2010) *“A field survey by a qualified professional paleontologist 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”*.

### **(c) Low Potential**

Indicates significant fossils are not likely to be found because of a random fossil distribution pattern, extreme youth of the rock unit (younger than middle Holocene) and/or the geologic history of rock formation processes, such as alteration by heat and pressure. These rock units will not likely require impact mitigation for fossil protection.

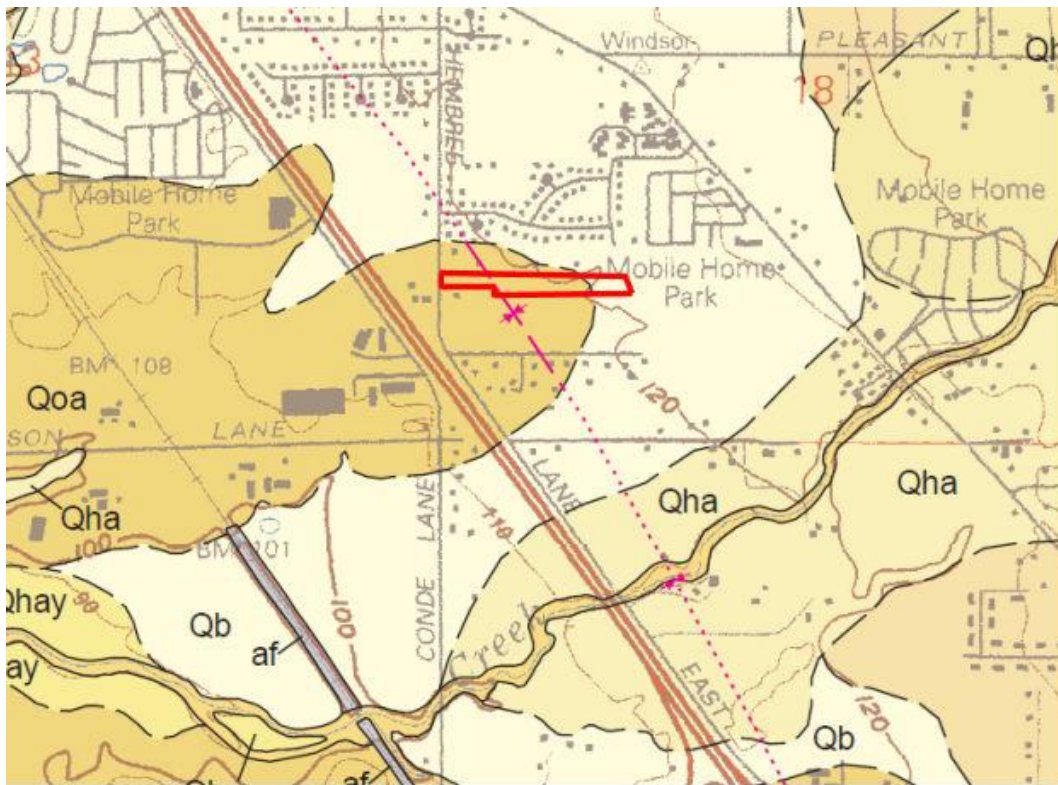
**(d) No Potential**

Indicates significant fossils are not likely to be found because the rock unit is a high grade metamorphic, or plutonic rock that is unsuitable for fossil preservation. These rock units do not typically require protection of impact mitigation for paleontological resources

**STUDY RESULTS**

**RESULTS OF RECORD SEARCH AND LITERATURE REVIEW**

According to the geologic map (Delattre 2011), most of the Project Area is situated on a geologic landform consisting of early to late Pleistocene (2.5 million years to 11,700 years ago) uplifted or deeply dissected older alluvium, fan, and terrace deposits (geologic unit Qoa); and the far eastern portion of the Project Area is situated on a geologic landform consisting of Holocene (11,700 years to present) to late Pleistocene age basin deposits (Qb), which include horizontally stratified sand, silt, and clay sediment accumulated in topographic basins from slow-moving or standing water (Figure 4).



**Figure 4: Geologic landforms within and near the Project Area.**

A fossil locality was conducted for Pleistocene-aged fossils in Sonoma County. Three localities are reported, and they are located in Sonoma Valley and Petaluma (Table 1).

This search did not identify fossil localities within the Project Area, nor within a 2-mile radius, in formations that are present in the Project Area. The literature search did not report fossil discoveries at the site.



**Table 1: Fossil locality search results.**

SPECIMEN ID	SPECIMEN NUMBER	CLASS	GENUS	SPECIES	SUB-SPECIES	PERIOD	EPOCH	LOCALITY ID	LOCALITY NAME
V33047	33047	Mammalia	Glossot-herium	robustus		Quaternary	Pleistocene	V3650	Crandall
V34117	34117	Mammalia	Bison			Quaternary	Pleistocene	V3646	Eureka School
V124432	124432	Mammalia	Bison	bison	antiquus	Quaternary	Pleistocene	V80005	Cardinaux

## RESULTS OF SITE VISIT

The site visit identified latest Pleistocene-Holocene sands and gravels at the surface throughout the Project Area. Evidence of recent geotechnical exploration in the form drill cuttings and test pit back fill was used to visually observed the native geologic deposit. Silty Sand (SC) and Gravels (GP) were observed. Gravel clasts included predominantly basalt and rhyolite with a minor component of recycled obsidian gravels from the older Glen Ellen located east and southeast of the Project Area.

## CONCLUSIONS

The records search and literature review did not reveal any fossil localities within or near the Project Area; however, the geology of the Project Area is defined as latest Pleistocene to Holocene sedimentary deposits (Qoa and Qb) (Delattre 2011; Helley et al. 1979), which have not been sufficiently studied and lack good exposures within the Project Area to warrant a definitive rating. Therefore, due to the latest Pleistocene age of the geologic landform, the potential for latest Pleistocene (Rancho La Brean-aged) fossils to be present, and the lack of good exposures within the Project Area to warrant a definitive rating, it is concluded that the Project Area currently has an undetermined potential for paleontological resources.

## RECOMMENDATIONS

The paleontological review revealed that the Project Area has an undetermined potential for paleontological resources. As such, the following recommendations are provided:

- Prior to the start of construction, a qualified paleontologist, or his or her designee, shall conduct training for construction personnel regarding the appearance of fossils and the procedures for notifying a paleontologist should fossils be discovered by during Project-related ground-disturbing activities.
- It is recommended that a paleontologist be on-call to respond in the event a fossil is recovered and to perform subsequent work to determine whether it can be identified and whether it meets significance criteria. A paleontological cross-trained Archeologist may also respond in the possible event of vertebrate fossil exposure during grading. In the event of a fossil discovery by





construction personnel, all work in the immediate vicinity of the find shall cease until the paleontologist has the opportunity to inspect and evaluate the discovery. If it is determined that the fossil(s) is (are) scientifically significant, the qualified paleontologist shall monitor remaining ground disturbing activities (including grading, trenching, foundation work, and other excavations) on a full-time basis. Monitoring should be conducted by a qualified paleontological monitor, who is defined as an individual who has experience with collection and salvage of paleontological resources. The duration and timing of the monitoring will be determined by the project paleontologist. If the project paleontologist determines that full-time monitoring is no longer warranted, he or she may recommend that monitoring be reduced to periodic spot-checking or cease entirely. Monitoring would be reinstated if any new or unforeseen deeper ground disturbances are required, and reduction or suspension would need to be reconsidered by the Principal Paleontologist. Ground disturbing activity that does not occur in areas mapped as high sensitivity or that do not exceed 5 feet in depth in areas overlying potentially high sensitivity units would not require paleontological monitoring.





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