# APPENDIX F: PALEONTOLOGICAL TECHNICAL MEMO

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April 1, 2020

Mr. Mike Tunney, Vice President
Howard Industrial Partners
1944 North Tustin Street, Suite 122
Orange, CA 92855
Transmitted via email to mtunney@hipre.net

RE: Paleontological Technical Memorandum for the Bloomington Business Park Specific Plan Project, Community of Bloomington, San Bernardino County, California

Dear Mr. Tunney,

At the request of Howard Industrial Partners, Applied EarthWorks, Inc. (Æ) completed a paleontological resource assessment for the Specific Plan Site and Upzone Site of the Bloomington Business Park Specific Plan Project in the community of Bloomington, San Bernardino County, California (Project).

Æ's scope of work included desktop review of geologic maps, paleontological literature, museum records searches, and preparation of this technical memorandum (memo). This report, which serves as a summary of findings, was written by staff who meet the qualifications standards of the Society of Vertebrate Paleontology (SVP, 2010) and satisfy the requirements of the California Environmental Quality Act (CEQA). The County of San Bernardino (County) is the lead agency for CEQA compliance.

**PROJECT DESCRIPTION AND BACKGROUND**

The Project consists of two development areas within the 213-acre Specific Plan boundary: the initial development area (approximately 144 acres) and the future development area (approximately 69 acres). Additionally, the Project includes the Upzone Site rezoning area (approximately 24 acres). The Project area consists of two discontinuous sites. The Specific Plan site is located south of Interstate 10 (I-10) and generally situated north of Jurupa Avenue, south of Santa Ana Avenue, east of Alder Avenue, and west of Maple Avenue and Linden Avenue within Section 28, Township 1 South, Range 5 West as shown on the Fontana, California 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle map. Elevation ranges from approximately 1, 010 to 1,050 feet above mean sea level. The Upzone Site is located north of I-10 and is generally situated to the east of Locust Avenue between Hawthorne Avenue to the north and San Bernardino Avenue to the south within Section 16, Township 1 South, Range 5 West as shown on the Fontana, California 7.5-minute USGS topographic quadrangle map. Elevation ranges from approximately 1,140 to 1,165 feet above mean sea level.

During the initial development phase of the Project, the Applicant proposes to develop four separate sites within the Specific Plan Boundary for high-cube manufacturing, fulfillment center, warehouse, office use, and other similar uses on a phased plan. The first phase will include Site 1 (37 acres) and Site 2 (59 acres), and the second phase will include Site 3 (38 acres) and Site 4 (10 acres). Additional development includes truck trailer parking lots, landscaping, on-site stormwater quality features and other on-site improvements (e.g., parking, road, and landscaping). Off-site improvements associated

with the first phase of the Project include public roadway widening, utility infrastructure, and an off-site stormwater basin. Average depth of excavations for the Project is anticipated to reach 5 feet below grade. However, improvements to the public storm drain system require a 108-inch-diameter (9-foot) pipe drain with a minimum of 2 feet of cover. Therefore, maximum depth of disturbance for the Project is anticipated to reach 11 feet below ground surface.

The future development area of the Specific Plan (69 acres) is anticipated to be developed over time in a phased manner dependent on market demand for the types of uses proposed in the Specific Plan. From a long-term development perspective, the Specific Plan would accommodate new industrial and business park uses such as manufacturing, office, research and development, e-commerce centers, and general warehousing along with limited supporting commercial uses.

The entire Specific Plan area is not proposed for development at this time, but with anticipation of future development, the Specific Plan area will undergo similar Projects in the future. As such, the Specific Plan area is analyzed in this study at a programmatic level with no Project-specific development proposed. Subsequent development projects following the first phase will, therefore, be subject to the site development approval process established in the Specific Plan and may require additional environmental analysis in compliance with CEQA.

The Project also includes the rezoning of a residentially zoned area (Upzone Site) to a higher residential density zone that would offset the loss of residential unit capacity within the Specific Plan area. The Specific Plan area is currently zoned for single residential. Based on the zoning in effect on January 1, 2018, a total of approximately 213 residential units could potentially be developed within the Specific Plan area. Since the Specific Plan would change the zoning of the area within the 213-acre boundary from residential to nonresidential, a net loss of residential unit capacity in Bloomington could result. Senate Bill 330, also known as the Housing Crisis Act of 2019, requires replacement capacity for any displaced residential unit potential at the time of a project's approval based on the zoning of the site in effect on January 1, 2018. In conformance with Senate Bill 330, the change of land use designation in the Upzone Site from Low Density Residential (LDR) to Medium Density Residential (MDR) and the residential zoning from Residential Single (RS-20M) to Residential Multiple (RM) would increase residential density to avoid a net loss of residential unit capacity.

## REGULATORY CONTEXT

This Project is subject to both state laws and local goals and policies. The following section provides an overview of the relevant laws and regulations.

### State

At the state level, paleontological resources are protected under CEQA, which requires detailed studies that analyze the environmental effects of a proposed project. If a project is determined to have a potential significant environmental effect, the act requires that alternative plans and mitigation measures be considered. Specifically, Section VII(f) of Appendix G of the CEQA Guidelines, the Environmental Checklist Form, poses the question, "Will the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" 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.

**Local**

Cultural and paleontological resources within the county also are addressed. In the *County of San Bernardino General Plan, Section V—Conservation Element* (URS Corporation, 2014: Page V-18 - V-22); the following objective and policies are set forth, including programs therein:

> **GOAL CO 3.** The County will preserve and promote its historic and prehistoric cultural heritage.
>
> **CO 3.1** Identify and protect important archaeological and historic cultural resources in areas of the County that have been determined to have known cultural resource sensitivity.
>
> **CO 3.2** Identify and protect important archaeological and historic cultural resources in all lands that involves disturbance of previously undisturbed ground.
>
> **CO 3.3** Establish programs to preserve the information and heritage value of cultural and historical resources.
>
> **CO 3.4** The County will comply with Government Code Section 65352 (SB 18) by consulting with tribes as identified by the California Native American Heritage Commission on all General Plan and specific plan actions.

Paleontological resources are addressed specifically under items 4–6 of the Program for this policy (URS Corporation, 2014: Page V-18 - V-22):

> In areas of potential but unknown sensitivity, field surveys prior to grading will be required to establish the need for paleontologic [*sic*] monitoring.
>
> Projects requiring grading plans that are located in areas of known fossil occurrences or demonstrated in a field survey to have fossils present, will have all rough grading (cuts greater than 3 feet) monitored by trained paleontologic [*sic*] crews working under the direction of a qualified professional, so that fossils exposed during grading can be recovered and preserved. Fossils include large and small vertebrate fossils, the latter recovered by screen washing of bulk samples.
>
> A report of findings with an itemized accession inventory will be prepared as evidence that monitoring has been successfully completed. A preliminary report will be submitted and approved prior to granting of building permits, and a final report will be submitted and approved prior to granting of occupancy permits. The adequacy of paleontologic [*sic*] reports will be determined in consultation with the Curator of Earth Science, San Bernardino County Museum.
>
> **CO 3.5** Ensure that important cultural resources are avoided or minimized to protect Native American beliefs and traditions.

## PALEONTOLOGICAL RESOURCE POTENTIAL

Most professional paleontologists in California adhere to the guidelines set forth by the SVP (2010) to determine the course of paleontological mitigation for a given project on privately owned lands, unless

specific city, county, state, or federal guidelines are available and required. The SVP's guidelines establish detailed protocols for the assessment of the paleontological sensitivity of a project area and outline measures to follow in order to mitigate adverse impacts to known or unknown fossil resources during project development (SVP, 2010).

Following the SVP's established process, baseline information is used to assign the paleontological sensitivity of a geologic unit(s) (or members thereof) to one of four categories—No Potential, Undetermined, Low, and High (SVP, 2010). Geologic units are considered to be "sensitive" for paleontological resources and have a High Potential if vertebrate or significant invertebrate, plant, or trace fossils have been recovered anywhere in their extent, even if outside the project area; or if the units are sedimentary rocks that are temporally or lithologically suitable for the preservation of significant fossils. The SVP considers significant fossils as those that contribute new and useful taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data (SVP, 2010).

## METHODOLOGY

To assess the paleontological sensitivity of geologic units exposed at the ground surface and those likely to occur in the subsurface of the Project area, Æ reviewed published geologic maps and paleontological literature, and conducted museum records searches. For the records searches, Æ retained the Natural History Museum of Los Angeles County (NHMLAC) and the Western Science Center (WSC) in Hemet, California, to conduct a search of fossil localities recorded in their collections (McLeod, 2020; Radford, 2020). Although the San Bernardino County Museum (SBCM) is closer to the Project area than NHMLAC or WSC, it was not included in the scope of this Project. Therefore, Æ did not request a records search from the SBCM. Æ requested a search for only vertebrate paleontological localities from the NHMLAC collections as the geologic units in the Project area are more conducive to their preservation than significant invertebrate, plant, and trace fossils. Furthermore, the NHMLAC's paleontology department was not conducting combined vertebrate and invertebrate records searches at the time of Æ's request. The WSC's paleontology collections are integrated, although heavily skewed toward vertebrate fossils.

To augment these results, Æ also conducted searches of the online Paleobiology Database (PBDB), the University of California Museum of Paleontology (UCMP), and the Raymond M. Alf Museum of Paleontology (RAM). The PBDB lists a large collection of museum records and publications of fossil material, while the UCMP is the largest repository of fossils on the West Coast of the United States with an older history of collection than several other regional natural history museums. The RAM collections database has an extensive listing of fossil occurrences in Southern California.

## RESOURCE CONTEXT

The Project area is in the eastern portion of the San Bernardino Valley south of the San Bernardino mountains, which comprise the easternmost portion of the Transverse Ranges geomorphic province (California Geological Survey, 2002). A geomorphic province is a region of unique topography and geology that is distinguished from other regions based on its landforms and tectonic history (American Geological Institute, 1976). North of the San Bernardino Valley, the Transverse Ranges are an east–west-trending series of mountain ranges and valleys, which extend from offshore portions in the west, including the San Miguel, Santa Rosa, and Santa Cruz islands, to the San Bernardino Mountains in the east (California Geological Survey, 2002). South of the San Bernardino Valley, the Peninsular Ranges

consist of several northwest-trending mountain ranges separated by valleys, extending from offshore portions in the west, including the Santa Catalina, Santa Barbara, San Clemente, and San Nicolas islands, to the Salton Trough in the east (California Geological Survey, 2002).

The regional geology of the San Bernardino Valley consists of Neogene alluvial deposits and Quaternary alluvial, eolian, and landslide deposits above Cretaceous plutonic rocks of the Peninsular Ranges batholith and metasedimentary rocks and batholith remnants from the Paleozoic Era (Morton et al., 2006). Other geologic maps that include the Project area are from Dibblee and Minch (2004) and Morton (2003). The geologic units discussed below are from the Morton et al. (2006) map, which is the most recent and detailed of the three geologic maps.

The surficial geology of the Specific Plan Site is primarily Holocene- and Pleistocene-age alluvial sediments originating from the San Gabriel Mountains to the north (Clarke, 1989; Morton et al., 2006). In Site 1, the mapped surficial geology consists almost entirely of Late Pleistocene alluvial ($Qof_3$) sediments (Morton et al., 2006). In Site 2, Holocene alluvial sediments ($Qyf_5$) of the Lytle Creek alluvial fan almost entirely comprise the mapped surficial geology (Clarke, 1989; Morton et al., 2006), with older Middle Pleistocene alluvial sediments ($Qof_1$) in the southwest corner and $Qof_3$ in the southeast corner. In Sites 3 and 4, the mapped surficial geology is primarily Late Holocene $Qyf_5$ sediments, with surficial deposits of $Qof_1$ directly south but within the Specific Plan Site. The surficial geology of the Upzone Site consists entirely of Late Holocene $Qyf_5$ sediments, with surficial deposits of $Qof_3$ directly to the east (Morton et al., 2006).

$Qyf_5$ sediments are composed of unconsolidated sand- to boulder-sized clasts of modern braided river deposits deposited throughout the valley floor. The $Qof_3$ deposits consist of moderately dissected and consolidated interbeds of sand and gravel, capped by $B_t$ soil horizons. $Qof_1$ deposits are lithologically similar to $Qof_3$ but exhibit a thicker soil cap. $Qof_3$ and $Qof_1$ deposits also can be differentiated from the younger $Qyf_5$ deposits by sediment size, consolidation, and a reddish-brown color. Igneous and metamorphic remnants of the Jurupa Mountains are mapped from surface exposures southwest of the Project area (Kt; Morton et al., 2006).

Although the Late Holocene sands and gravels ($Qyf_5$) are typically too young for fossilization (Scott and Springer, 2003; SVP, 2010), these may form only thin layers above older alluvial fan deposits where present, as the sediments were deposited by recent stream channels that cut through the older deposits. The extensive surface exposures of Pleistocene alluvial fan deposits ($Qof_1$, $Qof_3$) within the Project area suggest these deposits are likely to be encountered at shallow depths throughout. Similar deposits elsewhere among inland valleys of Riverside and San Bernardino counties are highly fossiliferous (Reynolds and Reynolds, 1991) and have yielded a wide variety of Pleistocene megafauna, such as mammoths, ground sloths, dire wolves, saber-toothed cats, horses, camels, and bison, as well as numerous invertebrate and plant taxa (Scott, 2007; Springer et al., 2009).

## RECORDS SEARCH RESULTS

McLeod (2020) reports no fossil localities from the NHMLAC vertebrate collections within the Project area. However, he lists a few nearby localities from older Quaternary deposits similar to those that occur in the Project Area.

The closest locality is LACM 8062, which is southwest of the Project area and west of Mira Loma (now officially part of the City of Jurupa Valley). This locality yielded specimens of multiple mammals at shallow but unstated depths that correlate to the Rancholabrean North American Land Mammal Age (NALMA). The next closest locality is LACM 7811, farther west-southwest of the Project area. This locality yielded a fossil specimen of a coachwhip snake (*Masticophis flagellum)* at 9–11 feet bgs. Lastly, LACM 1207, farther to the southwest between the cities of Corona and Norco, yielded a specimen of fossil deer (*Odocoileus*) at an unstated depth. Records search results from NHMLAC and other institutions are detailed in Table 1.

**Table 1**
**Fossil Localities Closest to the Project Area**

| Locality | Taxon | Depth | Approximate Distance from Project Area |
|---|---|---|---|
| LACM 8062 | Proboscidea (elephant)<br>*Ursus* (bear)<br>*Canis dirus* (dire wolf)<br>*Equus* (horse)<br>*Camelops* (camel)<br>*Bison* (bison) | Unstated (shallow) | 7 miles |
| LACM 7811 | *Masticophis flagellum* (coachwhip snake) | 9–11 ft | 8 miles |
| LACM 1207 | *Odocoileus* (deer) | Unstated | 11 miles |
| WSC (Vanderham Project) | *Camelops* (camel) | Unstated | 8 miles |
| PBDB 200328 | *Mammut pacificus* (mastodon) | Unstated | 4 miles |
| UCMP V65248 | *Mammuthus* (mammoth) | Unstated | 8 miles |

McLeod (2020) concludes very shallow excavations in the soil and Late Holocene alluvial deposits likely will not uncover significant vertebrate fossils, although deeper excavations into older Quaternary deposits may encounter significant vertebrate fossil remains.

The WSC records search results indicate no fossil localities within the Project area. However, several fossil localities have been reported from sedimentary units similar to those mapped within Project area (Radford, 2020). Localities associated with the Vanderham Project, approximately 8 miles southwest of the Project area elsewhere in the City of Jurupa Valley, yielded multiple specimens of camel (*Camelops* sp.) from Pleistocene alluvial units with high paleontological sensitivity.

The PBDB online database lists numerous vertebrate, invertebrate, and plant fossil localities from San Bernardino County, including one specimen of mastodon (*Mammut pacificus*) within a 10-mile radius of the Project area. The PBDB does not list any vertebrate, invertebrate, or plant fossils within the Project area or within a 10-mile radius.

The UCMP database lists numerous vertebrate, invertebrate, and plant fossil localities from San Bernardino County, including one specimen of mammoth (*Mammuthus*) within a 10-mile radius of the Project area. The UCMP database does not list any fossil localities within the Project area or any invertebrate and plant fossil localities within a 10-mile radius.

The RAM online database lists 11 localities for vertebrate fossils from San Bernardino County and one locality from Riverside County. The database does not include any localities in the Project area or within 10 miles, and most occur to the east on the other side of the San Andreas Fault Zone. The closest among these localities is VI-2010005, a Pleistocene ore deposit with camel, bison, horse, and mammoth bones.

## FINDINGS AND RECOMMENDATIONS

Æ reviewed geologic maps, paleontological literature, and records search results to determine the paleontological sensitivity of the Project area. As a result of the desktop and museum records search findings, Æ assigns a ranking of High Potential for paleontological sensitivity to the entire Project area. Fossils may be encountered, if present, from the present ground surface where $Qof_3$ is mapped (i.e., Sites 1 and 2) to unknown depths as shallow as near-surface beneath surface exposures of unit $Qyf_5$ (i.e., Sites 1, 2, 3, 4, and Upzone Site).

McLeod (2020)and Radford (2020) advise that any substantial excavations in the Project area should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the presence/absence of fossils in small-fraction and microscopic grain sizes within the Project area. Fossils uncovered during mitigation activities should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations. Æ agrees with their recommendations and extends them to the Upzone Site because of its mapped surface geology and inferred subsurface geology.

For construction monitoring, Æ recommends a paleontological resource impact mitigation program (PRIMP) be prepared by a qualified professional paleontologist who meets the SVP's (2010) standards (Project Paleontologist). The PRIMP must be completed prior to issuance of grading permits. The purpose of the document is to establish mitigation monitoring procedures and discovery protocols, based on industrywide best practices (Murphey et al., 2019), for any paleontological resources encountered as a result of earth-disturbing activities during construction of the Project. For instance, Worker's Environmental Awareness Program (WEAP) training should be prepared prior to the start of Project-related ground disturbance and presented in person to all field personnel to describe the types of fossils that may occur and the procedures to follow if any are encountered in the Project area. A PRIMP also will indicate where construction monitoring will be required for the Project and the frequency of required monitoring (i.e., full time, spot checks, etc.). The collection and processing (e.g., wet- or dry-screening) of sediment samples to analyze for presence/absence of small-fraction and microscopic fossils also would be addressed in a PRIMP. In addition to monitoring and sampling procedures, a PRIMP also will provide details about fossil collection, analysis, and preparation for permanent curation at an approved repository such as the WSC. Lastly, the PRIMP describes the different reporting standards to be used for monitoring with negative findings versus monitoring resulting in fossil discoveries.

The average depth of Project-related ground disturbance will be 5 feet bgs, with the exception of public storm drain improvement subareas where the maximum depth of disturbance will be 11 feet bgs. Therefore, Æ recommends initial full-time monitoring for all ground-disturbing activities in subareas where unit $Qof_3$ and $Qof_1$ are exposed and for ground-disturbing activities of 4 feet or greater bgs where unit $Qyf_5$ is exposed. Monitoring may be reduced to spot checks or discontinued at the discretion of the Project Paleontologist if no intact and significant paleontological resources are encountered after the initial period of full-time monitoring.

It has been a pleasure assisting you with this Project. If you have any questions, please do not hesitate to contact me at (626) 578-0119 x402.

Sincerely,

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Edited and Approved By:

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Encl. References

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