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memorandum

date	February 2, 2018
to	Zita Yu, PhD, P.E., West Basin Municipal Water District
cc	
from	ESA
subject	West Basin Municipal Water District Ocean Water Desalination EIR – Geoarchaeological Review

Geology and Soils

The project site is located in the City of El Segundo in the western portion of the Los Angeles Basin (LA Basin). The LA Basin is within the Peninsular Ranges physiographic province, near the intersection of this province with the Transverse Ranges province to the north and the Continental Borderland to the west. The LA Basin overlies a deep structural depression that has been subject to marine and non-marine deposition for roughly 80 million years. At their deepest, sedimentary deposits within the LA Basin extend to more than 9,000 meters, near the confluence of the Los Angeles and Rio Hondo rivers (Yerkes et al., 1965), some six miles east of the Project Area. Since Late Pleistocene, the basin as a whole evolved into an alluviated coastal plain that slopes gently to the south and west.

The project site is within the southwestern structural block of the LA Basin, which is referred to as West Coast Basin. Basement rock of the West Coast Basin consists of Tertiary (65 to 2.5 million years ago) sedimentary and volcanic rocks, which are overlain by more than 1,000 feet of unconsolidated to semi-consolidated marine and non-marine sediments deposited during the Quaternary (approximately the last 2.5 million years).

During the last Ice Age (approximately 26,000 to 12,000 years ago), global sea level was substantially lower than current conditions (approximately -120 m at 15,000 years ago) and the coastal plain in the vicinity of the project site extended several miles offshore of its current location. Melting of glacial ice resulted in rapid rise in eustatic sea level unit approximately 7,000 years ago, after which the rate of sea level rise slowed dramatically (Bickel 1978; Erlandson 1985; Jones 1991). Thus, the project site was well inland at the Late Pleistocene/Early Holocene transition. A portion of the project – an outfall that will extend 1,000 feet into the Pacific Ocean – will be sited on part of the continental shelf that was inundated since the end of the last Ice Age.

The project extends along landforms (including the El Segundo Sand Hills) underlain by near surface Pleistocene and Holocene-aged sedimentary deposits. Mapped sedimentary geological units within the project site include:

- Old Alluvium (Qoa): Fluvial sediments deposited on canyon floors during the Late to Middle Pleistocene
- Old Eolian Deposits (Qos): poorly consolidated wind-blown (eolian) sand dune deposits dating to the Late to Middle Pleistocene.

- Young Alluvium (Qae): poorly consolidated floodplain deposits dating to the Late Pleistocene and Holocene.
- Eolian Beach Sands (Qbs): unconsolidated wind-blown san deposits dating to the Late Holocene.
- Near-shore Sedimentary Deposits: Submerged, unconsolidated sand deposits dating the Pleistocene

Potential for Subsurface Archaeological Deposits

Much of the western portion of the Project site, which includes the western portions of the proposed conveyance pipeline and alternative pipelines, is underlain by the Pleistocene-aged alluvium (Qoa) and sand dunes (Qos). The Late to Middle Pleistocene age of these sediments suggests that they were formed and stabilized entirely prior to the peopling of southern California during the Late Pleistocene and Early Holocene. During the Late Pleistocene and Holocene, the absence of natural depositional processes needed to bury and preserve archaeological remains suggests that these geological units have a low sensitivity for intact prehistoric archeological deposits. Furthermore, historic period disturbances within these areas, including building, road, and utility construction further reduces the sensitivity for intact archeological deposits.

The eastern portions of the proposed conveyance pipeline and alternative alignments are underlain by Young Alluvium (Qae) deposits that include floodplain deposits originating from Dominguez Creek as well as alluvial fan deposits. Dominquez Creek may have been a locus of human activity throughout prehistory due to the periodic fresh water and plant and animal resources it may have provided. Accumulation of deposits through alluvial processes have the potential to have buried archaeological remains, suggesting that these landforms have a higher sensitivity to contain buried, intact archaeological sites.

The proposed desalination plant and onshore component of the ocean water intake system are underlain by Late Holocene Eolian Beach sand deposits (Qbs). These unconsolidated deposits are relatively recent and unstable, when compared with other geological units. Sea level stabilized and reached its approximate current location, by around 4,000 years ago, thus human use of the shoreline has occurred in approximately the same location for the last four millennia suggesting that this landform has a higher sensitivity to contain buried, intact archaeological resources.

The offshore portion of the ocean water intake system which includes the construction of a screened intake facility located 2,500 feet west of the proposed desalination facility is underlain by Pleistocene sedimentary deposits (Qps). Marine borings near the coastal margin near the ESGS Facility have been interpreted as “Recent and Upper Pleistocene” (Holocene and Late Pleistocene) dune sands (California State Lands Commission, 2016). Since current sea level was established approximately 4,000 years ago, the offshore portion appears to have the potential to contain cultural remains dating between approximately 12,000 and 4,000 years ago.

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