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17 October 2019
File No. 132051-002

Harrison, Temblador, Hungerford & Johnson LLP
2801 T Street
Sacramento, California 95816

Attention: Mr. Adam Guernsey
aguernsey@hthjlaw.com

Subject: Area Q CEQA Geology and Soils Screening Assessment
Vulcan Materials Company Area Q Project
2400 West Highland Avenue
San Bernardino, California

Ladies and Gentlemen:

We are pleased to submit this evaluation letter addressing California Environmental Quality Act (CEQA) Geology and Soils Appendix G criteria concerns for Vulcan Materials Company's (Vulcan) proposed Area Q mining project (Project). In preparing this screening assessment, Haley & Aldrich, Inc. (Haley & Aldrich) has relied, in part, on our geotechnical evaluation report dated 17 October 2019, addressing site geology, potential hazards, and engineering recommendations pertaining to the proposed mine project. The purpose of this letter is to supplement the referenced report with information specifically addressing CEQA requirements.

The Project site is located in unincorporated San Bernardino County, east of Cajon Creek and north of the community of Muscoy. The Project site is bounded by residential neighborhoods to the south, a Southern Pacific rail line to the west, Cajon Boulevard to the east and Vulcan's existing Cajon Creek aggregates mine, specifically Area L, to the north. The Project site is located approximately 2.5 miles away from Vulcan's existing San Bernardino facility, which is located directly north of State Route 210 and Highland Avenue. Nearby communities include Muscoy, the City of San Bernardino (adjacent to the east/north), and the City of Rialto (just over a mile west).

The Project calls for aggregate material extraction and ancillary activities on 187.6-acres within the 196.0-acre Area Q property. As discussed in the referenced geotechnical report, we conclude that mining and future reclamation of the proposed Area Q mine to a depth of 120 feet below ground surface (bgs) at a standard slope configuration of 2:1 (horizontal to vertical) is geotechnically feasible. Projects adhering to CEQA requirements must address several specific topics pertaining to geology and soils; these topics and our responses are presented in the remainder of this letter.

CEQA: Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to California Division of Mines and Geology Special Publication 42 (CDMG SP42).

Response: The referenced Haley & Aldrich geotechnical evaluation report includes a discussion of local and regional faults and describes a 5 May 2018 site visit performed by a California Engineering Geologist to evaluate surface geology features. As discussed in the referenced report, the Glen Helen Fault (part of the San Jacinto Fault zone) trends through the south end of the proposed Area Q Site. The State of California has delineated a Special Studies Zone offset from this fault, as shown on "State of California, Special Studies Zones, San Bernardino North Quadrangle, Official Map," dated 1 July 1974. The Glen Helen Fault trace is not well-defined near Area Q. However, the City and County of San Bernardino Department of Building and Safety considers the concealed fault trend of the Glen Helen Fault a Holocene Fault and suggests that this strand is the most active portion of the San Jacinto Fault system.

The rupture hazard is expected to have "less than significant impact," as the Project does not propose the construction of habitable structures within the special studies zone.

CEQA: Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

Response: During a major earthquake, very strong to severe shaking has the potential to occur at the Site. A probabilistic seismic hazard analysis (PSHA) was performed using the USGS deaggregation website (<https://earthquake.usgs.gov/hazards/interactive/>). The USGS deaggregation utilizes the next generation attenuation (NGA) models and the 2014 USGS/CGS California Fault Model. For our analysis, we used a shear wave velocity (V_{s30}) over the top 100 feet (30 meters) of the site of 360 meters per second. Based on the seismicity of faults that may impact Area Q and the results of the deaggregation analysis, a design earthquake with a moment magnitude (M_w) of 7.9 was selected for the seismic hazard evaluation. The peak horizontal ground acceleration (PHGA), which is based on the Maximum Considered Earthquake (MCE) with a return interval of 2,500 years, or a 2 percent probability of exceedance in 50 years, is 1.63g, where "g" denotes the acceleration of gravity (9.8 meters per second squared). The risk-based site-modified peak ground acceleration (PGA_M) is 0.96g; this value was computed based on procedures outlined in American Society of Civil Engineers (ASCE) 7-16.

The hazard from strong seismic ground shaking is expected to be "less than significant," based on the intended use of the site as an aggregate mine and because there will not be any permanent or habitable structures at the site.

CEQA: Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?

Response: Known near-site faults, including the San Jacinto, San Andreas, and Cucamonga faults, are capable of inducing moderate to strong seismic events, which under some conditions may cause ground

failure and liquefaction. Liquefaction is the process in which saturated, cohesionless soil experiences a temporary loss of strength due to the buildup of excess pore water pressure during cyclic loading resulting from earthquake ground motions. The type of soils most susceptible to liquefaction are loose, clean, saturated, uniformly graded sand and silt that have low clay content. The soil at the Site consists of fine to coarse sand, gravels, and cobbles with some silt and clay; when saturated, these soil types have potential to be susceptible to liquefaction.

The Site groundwater level is expected to be over 200 feet bgs. Groundwater levels measured from 2011 to 2017 ranged between elevations 1328.5 and 1263.1 feet (217.5 to 282.9 feet bgs), as reported by the State of California Department of Water Resources for a well approximately 200 feet south of the Site. Similarly, data provided by San Bernardino Valley Municipal Water District reports that the depth to groundwater at the Site in Fall 2010 was between 250 and 300 feet bgs. Groundwater levels may fluctuate with time due to seasonal rainfall changes.

Based on the currently proposed excavation depth of 120 feet bgs, we conclude the potential for liquefaction-related secondary effects, such as sand boils, lurch cracking, and lateral spreading to develop at the site following the design seismic event is low, based on the depth of the proposed pit and the depth to groundwater conditions.

Therefore, the hazard from seismic-related ground failure, including liquefaction is expected to be “less than significant” for the proposed project.

CEQA: Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?

Response: Haley & Aldrich performed a stability analysis of the proposed project slopes using RocScience *Slide 7.0*, as described in our geotechnical evaluation report. The proposed mine will include grading of new slopes at a maximum inclination of 2:1 (horizontal: vertical), according to the proposed mine and reclamation plan. Mine slopes are expected to reach a depth of 120 feet bgs.

As discussed in the referenced geotechnical report, the proposed slopes were analyzed by the limit equilibrium (method of slices) method, using circular searches with Simplified Bishop’s Method to calculate the factor of safety against sliding (FOS). The analysis included both static and pseudo-static (seismic) analyses. The pseudostatic analysis was performed by the Seed (1979) method, using a horizontal seismic coefficient of 0.15. The calculated static and pseudostatic factors of safety for the proposed mine slopes were found to be equal to 1.87 and 1.34, respectively. These values exceed the target values of 1.50 and 1.15 for static and pseudostatic conditions, respectively, indicating that the proposed slopes will remain stable in static and seismic conditions. It is noted that under the Seed (1979) method, slope movements of up to 3.3 feet (1 meter) may occur. These factors of safety are considered acceptable for the proposed project design features and considered representative of stable slope configurations.

The hazard from landsliding is expected to be “less than significant,” as the calculated factors of safety for the proposed slopes are acceptable based on California Geological Survey Special Publication 117A.

CEQA: Would the project result in substantial soil erosion or the loss of topsoil?

Response: The site is located in a wash area, that is not used agriculturally. Haley & Aldrich performed a site visit on 5 May 2018, during which time we assessed visible surface geology conditions at the site and at the adjacent Area L and Area M pits. Our observations of the exposed site geology generally coincide with the description on the USDA Soil Survey Map covering the site area, which maps site geology consisting of Soboba Stony Loamy Sand (SoC) and the Tujunga Gravelly Loamy Sand (TvC). The Soboba Stony Loamy Sand consists of coarse sand, sand to loamy sand to fine loamy sand with gravels, and cobbles. The Tujunga Gravelly Loamy Sand (TvC) consists of fine sand and sandy loam.

The proposed project will incise a mine pit in Area Q, which will collect drainage from the affected area in the pit and reduce the potential for eroded material to leave the site. The pit walls will be benched, which will reduce erosion from the walls.

Therefore, this project is expected to have “less than significant impact” on soil erosion or the loss of topsoil.

CEQA: Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Response: The site subsurface consists primarily of alluvial deposits of various ages and thicknesses, which correspond to different flood events during large rainstorms. As discussed in the referenced geotechnical report, borings performed at the site to a depth of 200 feet bgs revealed sediments consisting of moist to slightly moist sands and gravels with cobbles as large as 6 inches. Though not encountered, larger cobbles and even boulders could be present throughout the sediment layers. Based on these lithologies, the existing geologic unit that the Project is located on is stable.

Landsliding and liquefaction-related hazards are addressed above in this letter.

The proposed project will remove large volumes of soil from the excavation area, reducing overburden pressures. Therefore, the project is expected to have “no impact” on inducing subsidence or collapse of geologic units at the site.

CEQA: Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Response: Haley & Aldrich performed a site visit on 5 May 2018, during which time we assessed visible surface geology conditions at the site and at adjacent Area L and Area M pits. Our observations of the exposed site geology generally coincide with the description on the USDA Soil Survey Map covering the site area, which maps site geology consisting of Soboba Stony Loamy Sand (SoC) and the Tujunga Gravelly Loamy Sand (TvC). The Soboba Stony Loamy Sand consists of coarse sand, sand to loamy sand to fine loamy sand with gravels, and cobbles. The Tujunga Gravelly Loamy Sand (TvC) consists of fine

sand and sandy loam. Neither of these soil types includes expansive clay, nor did we observe significant amounts of expansive clay within exposed soils during our site visit.

The proposed project is expected to have “no impact” from expansive soil.

CEQA: Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

Response: The site reclamation plan currently calls for the site to be left as open space without any structures requiring sewage or water facilities at the completion of reclamation. As such, septic tanks or sewer connections will be unnecessary. Therefore, the project is expected to have “no impact” with regard to waste water disposal.

CEQA: Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Response: The summary that follows is taken from a letter dated 3 April 2018 from Dr. Samuel McLeod of the Los Angeles County Natural History Museum regarding vertebrate paleontology resources (Appendix A). The site surface sedimentary deposits consist of late Holocene alluvial deposits in an active wash environment which has been shaped by both deposits and erosion during large rainstorms and corresponding flood events. These deposits are not unique to the site; elsewhere, these deposits typically do not contain significant vertebrate fossils. If mining proceeds to underlying older Quaternary sedimentary deposits (at an unknown depth), it is possible remains of fossil vertebrates may be encountered, as have been found at sites a significant distance (approximately 15-20 miles) south-southwest of the project site. Should vertebrate fossils be encountered during mining, Haley & Aldrich recommends the following: (1) cease further excavation in the immediate area; (2) assess the vertebrate fossil material using a qualified paleontologist; and (3) implement recommendations of the qualified paleontologist, if applicable. However, the project site boundary does not contain sedimentary deposits unique to the surrounding area. There are no unique geological resources present on-site.

With implementation of the recommendations described above, the project would have a “less than significant impact” with respect to paleontological resources or site specific unique geologic features.

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We appreciate the opportunity to provide our services to you on this project. If you have any questions, please call.

Sincerely yours,
HALEY & ALDRICH, INC.



Katy Decker, P.G.
Project Manager



Catherine H. Ellis, P.E., G.E.
Senior Client Leader

Attachment:

Appendix A - Letter dated 3 April 2018 from Dr. Samuel McLeod

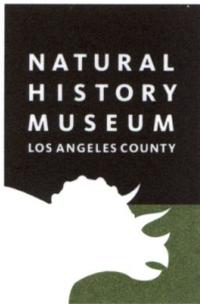
G:\132051 VMC San Bernardino Area Q\Reports, Letters, Transmittals\Final Geotechnical Supplement\2019_10-17_HAI_Final Geotechnical Supplement_Frev4.docx

APPENDIX A

Letter dated 3 April 2018 from Dr. Samuel McLeod

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org



Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

3 April 2018

BCR Consulting
505 West 8th Street
Claremont, CA 91711

Attn: David Brunzell, Principal Investigator / Archaeologist

re: Paleontological resources for the Vertebrate Paleontology Records Search for the proposed Vulcan Area Q Project, near Muscoy, San Bernardino County, project area

Dear David:

I have conducted a thorough check of our paleontology collection records for the locality and specimen data for the proposed Vulcan Area Q Project, near Muscoy, San Bernardino County, project area as outlined on the portion of the San Bernardino North USGS topographic quadrangle map that Nicholas Shepetuk sent to me via e-mail on 20 March 2018. We do not have any vertebrate fossil localities that lie directly within the proposed project area, but we do have localities farther afield from sedimentary deposits similar to those that may occur subsurface in the proposed project area.

Surface deposits in the entire proposed project area are composed of younger Quaternary Alluvium, derived as alluvial fan deposits from the San Gabriel Mountains to the north, primarily via Cajon Wash that currently flows adjacent to the southwestern border of the proposed project area and from Cable Creek that currently flows in a channel forming the southeastern border of the proposed project area. These deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers, but they may be underlain at relatively shallow depth by older sedimentary deposits that do contain significant fossil vertebrate remains. Our closest fossil vertebrate locality from similar older Quaternary deposits is LACM 7811, quite some distance to the west-southwest of the proposed project area west of Mira Loma along Sumner Avenue, that

produced a fossil specimen of whipsnake, *Masticophis*, at a depth of 9 to 11 feet below the surface. Even further to the southwest between Corona and Norco our vertebrate fossil locality LACM 1207 produced a fossil specimen of deer, *Odocoileus*.

Shallow excavations in the younger Quaternary Alluvium exposed throughout the proposed project area are unlikely to encounter significant vertebrate fossils. Deeper excavations that extend down into older Quaternary deposits, however, may well encounter significant remains of fossil vertebrates. Any substantial excavations in the sedimentary deposits in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

A handwritten signature in cursive script that reads "Samuel A. McLeod".

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice