



June 29, 2016

VIA EMAIL TRANSMISSION

Mr. Matthew Young
Planning and Development
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123 East Anapamu Street
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Subject: Response to the Lancaster (2015) Study Regarding Movement of Gravel and Other Coarse Material by Wind at Shell Guadalupe Dunes Gravel Remediation Project Site

Mr. Young,

As requested, I have reviewed the report prepared by Nicholas Lancaster, PhD on behalf of Hollister & Brace, the attorneys for the Gordon Sand Company. Although the report is entitled, "Movement of Gravel and Other Coarse Material by Wind at the Shell Guadalupe Dunes Gravel Remediation Project Site", the discussion in the report regarding wind transport of sediments focuses primarily on sand-size particles. Referenced materials in the report are used to present a potential mechanism for wind transport of particle sizes up to 3 millimeters (mm), which can be classified as sand or gravel depending on the classification system that is used (Unified Soil Classification System: maximum sand particle size = 4.75 mm; Wentworth Scale: maximum sand particle size = 2 mm). More importantly, the report provides no discussion of the prevailing wind direction at the site, which is the primary mechanism for transport and sorting of the sand that comprises the Guadalupe Dunes. The effects and direction of the west-northwest (WNW) prevailing winds are clearly visible in the linear shape of vegetation and other surface features shown on the attached Figure 2. The possible wind transport mechanism briefly outlined in the report suggests that transport [and associated sorting] of particle sizes up to 3 mm (coarse sand or very fine gravel) could potentially occur from the existing imported gravel and cobble deposits. However, photographs of the imported gravel deposits included in the report show no apparent evidence of any significant transport or sorting of these materials in any direction from the relatively discreet localized deposits shown in the photos. There are no known natural processes at the Project site that would account for transport of gravel and cobbles (e.g., up to 6-inches in diameter) in a southwesterly direction and any apparent movement of those materials in that direction (i.e., near perpendicular to the prevailing wind direction) must be manmade or anthropologically influenced.

A secondary gravity mechanism is suggested in the report for possible transport of particle sizes larger than 3 mm (i.e., larger than coarse sand [USCS] or very fine gravel [WS]). As described in the report, this would occur due to undermining of the larger clasts by wind erosion of the surrounding sand and ultimately possible gravity movement down any slopes created by the wind erosion. The information in the report essentially describes a potential mechanism for localized incremental dispersion of the particles, but not significant transport (e.g., up to and exceeding 500

feet). This conclusion is consistent with the localized concentration of the imported gravel deposits shown in the photographs included in the report.

In summary, the report provided by Hollister & Brace provides no information or evidence that supports significant wind transport of the imported gravel and cobble deposits observed at the Project site.

Amec Foster Wheeler Environment & Infrastructure, Inc.

Scott T. Kerwin, PG, CEG

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Enclosed:

- Figure 2, Prevailing Wind Direction and Gravel Movement Direction

