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Memorandum

date April 21, 2021

to Carol Bach (Port of San Francisco)

cc Erica Peterson (Port of San Francisco)

from Eddie Divita, PE (CA Civil Eng. Lic. # 81281)

subject Estimated Cost for Heron's Head Beach Material

This memorandum provides a brief summary of the process to select the aggregate material to be used to construct the proposed beach at the Heron's Head Shoreline Resilience Project. ESA recommends the use of the Hanson Aggregates pea gravel material, which Hanson has proposed to provide to the Port as an in-kind donation.

This memorandum also documents the basis for the estimated value of the proposed in-kind donation. As described in this memo, ESA estimates the value of the donated material to be \$41.70/CY or \$417,000 for approximately 10,000 CY of material.

Background

The Heron's Head Shoreline Resilience Project ("Project") proposes to install a coarse gravel beach along the southern shoreline of Heron's Head Park in order to address ongoing shoreline erosion which has led to the loss of tidal marsh and tidal pond habitats. ESA has conducted an alternatives analysis which finds that the proposed gravel beach design provides an acceptable level of erosion resistance and that the resulting beach landscape would provide habitat values similar to the existing shoreline and appropriate for the ecological setting of the park shoreline. The Project design has been informed by similar projects constructed at Aramburu Island (in Marin County) and at Pier 94 (in San Francisco, 1/2 mile north of Heron's Head Park). The project design calls for the placement of a large quantity (approximately 12000 cubic yards [CY]) of natural rounded marine sand and gravel with a sufficiently large grain size to resist erosive waves.

Suppliers

In the fall of 2018, my colleague Joel Darnell and I reached out to local suppliers to identify products that might be used for the construction of the proposed gravel beach at the Heron's Head Park Shoreline.

ESA contacted several local aggregate materials suppliers and identified 3 potential suppliers for the beach material.

Hanson Aggregates Pea Gravel

Supplier: Hanson Aggregates provided pea gravel material used at Pier 94 project).

Location: Hanson Facility at Pier 92/94

Material: Rounded gravels and shell generated from screening marine sand dredge material. (Note: This material was used for the successful Pier 94 shoreline project).

Cost: No quote provided. Material is a byproduct generated by Hanson's process for creating clean sands for concrete and other industrial applications. Hanson has proposed to provide this material to Port of SF as in-kind donation.

Syar Aggregates Rounded Cobble

Supplier: Syar aggregates provided cobble material used for the Aramburu Island beach project in Marin County.

Location: Healdsburg, delivered to site by truck.

Material: 2" to 4" rounded cobble mined from Russian River cobble deposits. (Note: this material is significantly larger than required for shoreline stability, however Aramburu Island reference site indicates that rounded cobble provides some foraging value for shorebirds)

Cost:

Purchase cost: \$37/ton (\$44/CY) based on quote provided by Larrisa Hebbler by phone on January 7, 2020.

Delivery cost: \$100/CY estimated by ESA based on RS Means values for equipment and crew costs for 80 mile (one-way) haul, plus bridge tolls.

Total cost: \$137/CY

Lind Marine/Jericho Products Sand and Gravel

Supplier: Lind Marine was one of the suppliers used to provide sand to the Crown Beach site in Alameda County.

Location: Suisun Bay and Sacramento River near Pittsburgh/Collinsville, delivered to site by barge.

Material: Mixed sand and gravel

Cost: "\$400,000 + Tax" for purchase and delivery of 10,000CY to project site, based on quote provided by Christian Lind by phone in April, 2018, as documented in "Attachment B1 – Heron's Head Shoreline Resiliency Project: Contractor Outreach" memorandum dated May 18, 2020.

Based on an assumed tax rate of 4.25%, total cost for this material is estimated to be \$417,000 (\$41.70/CY).

Additional potential suppliers contacted:

ESA also reached out to Vulcan Materials, Dutra and Granite Rock quarries but these suppliers did not have natural rounded material available in the desired quantities.

Rounded gravel is also available from landscape supply retailers (typically for ornamental landscaping applications). These materials are sourced from river gravel mines in the Sierra Foothills or in Central California. The cost for purchase of this material at retail prices is approximately \$100/CY, and while costs might be cheaper than retail prices for a bulk purchase, after accounting for expected haul and delivery costs it is apparent that these materials would be significantly more expensive than Hanson or Lind Marine materials and so these suppliers were not pursued further.

Estimated Value of Hanson Aggregates In-Kind Donation

The donated Hanson Aggregates pea gravel is estimated to have a value to the project equal to the lowest quoted value for purchase and delivery of a comparable material from an alternate supplier. The lowest quote received from an alternate material supplier was from Lind Marine/Jericho Products, and that quote supports an estimated value of \$41.70/CY or \$417,000 for 10,000 CY of material.