

## Memorandum

|         |  |                |          |
|---------|--|----------------|----------|
| To      | CPRA and Weeks Marine  | Page           | 1        |
| CC      |  |                |          |
| Subject | Grand Liard - Measurement for Payment - Sheet Pile Closure #19 |                |          |
| From    | AECOM  |                |          |
| Date    | February 27, 2015  | Project Number | 60315916 |

### 1. Introduction

This memorandum details the calculation of sand fill volume placed within sheet pile closure #19 located on the north side of Marsh Area C. Sand volume was calculated for the purpose of payment (i.e., within design template).

Sand volume was calculated using the average end area method. A cross-sectional survey of the sand berm was provided by Weeks Marine in an AutoCAD format. This calculation is based on the difference between the pre and post-construction surveys that were also used for final CPRA approval of sand placement.

### 2. Sand Volume

Sand volume for payment calculated the area of sand placed within the design template. Template assumptions include:

- Placement to a maximum crest elevation of +3 feet NAVD88.
- Placement to a minimum base elevation of -6 feet NAVD88.
- Crest width of 5 feet (i.e., 2.5 feet on each side of the SC centerline).
- Side slopes of 5:1 (horizontal: vertical) extending from the crest, including tolerance, to the sediment surface.
- Payable over placement tolerance of 0.5 feet above crest elevation (i.e., an elevation of +3.5 feet NAVD88) continuing design side slopes.

Sand volume placed within SC #19 was calculated using the pre and post-construction sand placement surveys. This survey was also used by CPRA to approve sand placed with the SC. Table 1 shows the sand volume for SC #19 in cubic yards (CY), and also includes all other SCs for reference.

**Table 1: Sheet Pile Closure Sand Fill Volumes**

| Sheet Pile Closure | Volume for Payment (CY) |
|--------------------|-------------------------|
| SC 11              | 0                       |
| SC 12              | 189                     |
| SC 13              | 1,442                   |
| SC 14              | 317                     |
| SC 15              | 4,946                   |
| SC 16              | 715                     |
| SC 17              | 4,487                   |
| SC 18              | 359                     |
| SC 19              | 1,045                   |
| <b>Total</b>       | <b>13,500</b>           |