

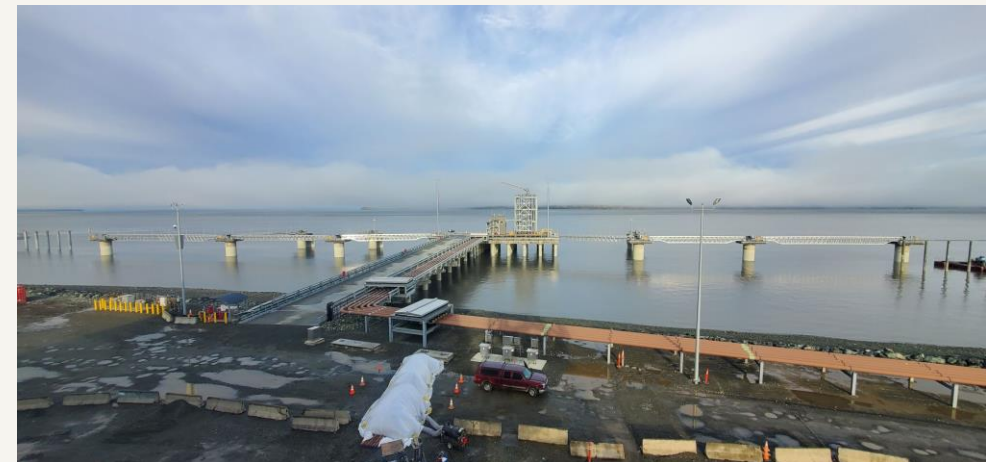
Pacific Pile & Marine

Port of Alaska Petroleum & Cement Terminal Phase 2 Project – Access Dredging

Authors: Shane Hautanen, Zach Wallace,
Stewart Willis and Hannah Norris

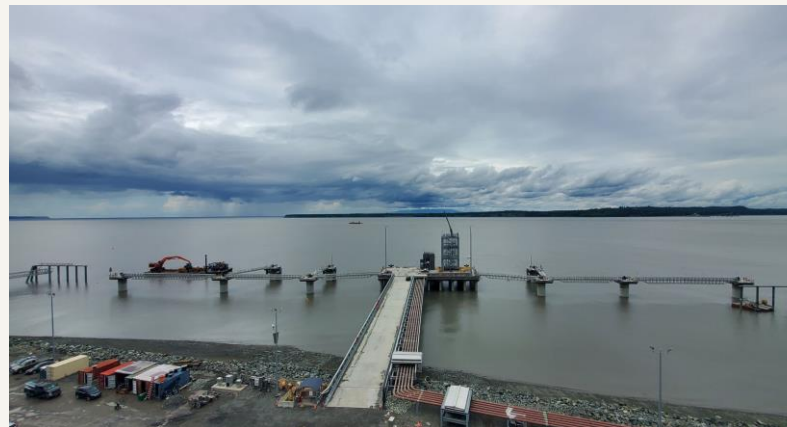
Project Overview

- **Port of Alaska (POA) Petroleum and Cement Terminal Project (PCT)**
 - **Phase 1** – \$43 million (2020)
 - Access trestle and loading platform
 - **Phase 2** - \$63 million (2021-2022)
 - 12' diameter mooring and breasting dolphins, fuel lines, operations building
 - Access dredging
 - **General Contractor:** Pacific Pile & Marine, L.P.
 - **Client:** Municipality of Anchorage/Port of Alaska
 - **Designer:** COWI
 - **Port Modernization Program Representatives:** HDR and Jacobs
 - **Critical Infrastructure**
 - POA handles 75% of all inbound cargo to Alaska
 - Current infrastructure is not seismically resilient and has outlived working lifetime



Challenges of Working in Cook Inlet

- **Extreme Tides**
 - Average tide is approximately 28' with up to a 40' range – second largest in the world
- **Winter work restrictions**
 - Ice flows limit in-water construction to 6 months out of the year



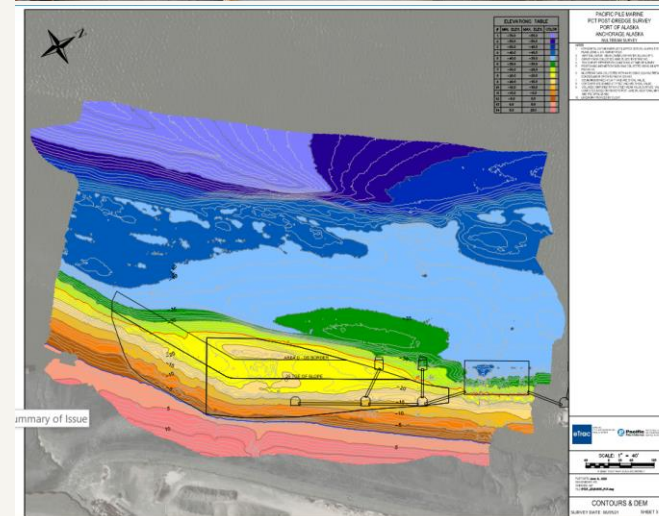
Dredging Overview

- Maintenance Dredging
 - USACE contracts yearly maintenance suction dredging in front of the Port facilities
 - Contract currently held by Manson Construction – (separate from PCT dredging)
 - Unable to remove consolidated material
- PCT Dredging
 - Key Equipment/Methods
 - Hitachi 1200-6 Excavator with custom made 25' stick to dredge up to 50' below tracks.
 - Material loaded onto a 200' x 16' flat deck materials barge with a 2000 ton capacity. Towed to offshore disposal site and offloaded with loaders



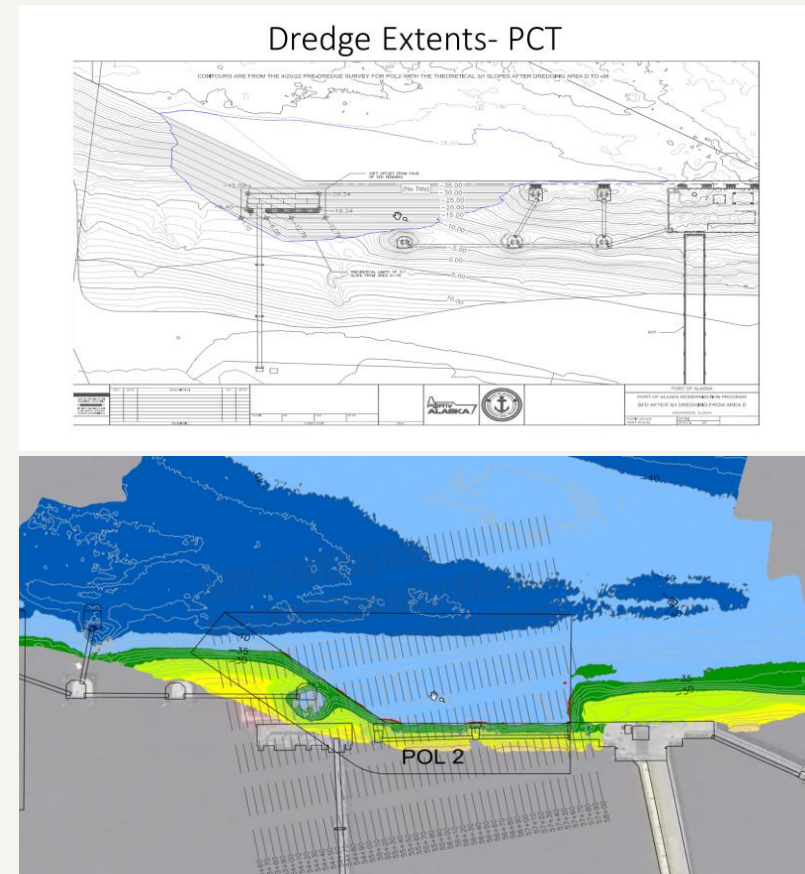
Dredging – 2021 Season

- Dredging in 2021 was conducted to provide the necessary access for PPM's barges and equipment to complete the construction of the Petroleum & Cement Terminal.
- Existing bathymetry adjacent to new dock location was too shallow to facilitate movement of construction vessels required to install large diameter (12-foot) piles.
- Additionally, dredging was performed at the Port's adjacent POL #2 dock to maintain USACE basin depths to allow for fuel ships to moor without issue.
- Approximately 30,000 CY of material removed



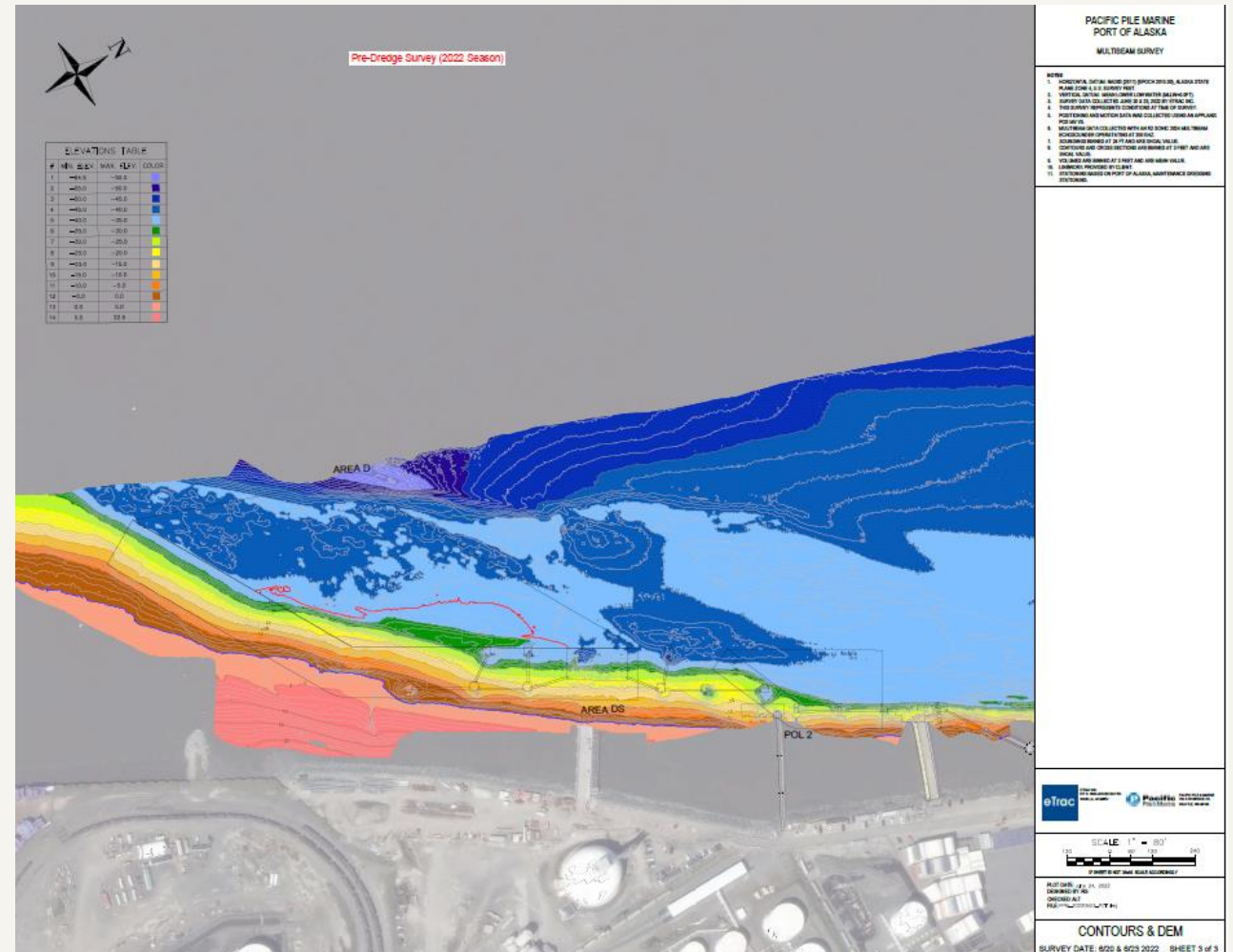
Dredging – 2022 Season

- Dredging in 2022 was conducted following the completion of the construction of the PCT.
- The berthing region in front of the dock was dredged to a basin elevation of -38' to allow for the docking of fuel and cement ships at the new terminal.
- The depth of dredging coupled with the extreme tidal conditions meant that PPM could only dredge at certain hours of the day.
- Approximately 35,000 CY of payable material removed.



Hydrographic Surveys

- All submitted surveys performed by a third party contractor (eTrac)
- Conducted weekly or as-requested to monitor dredging progress



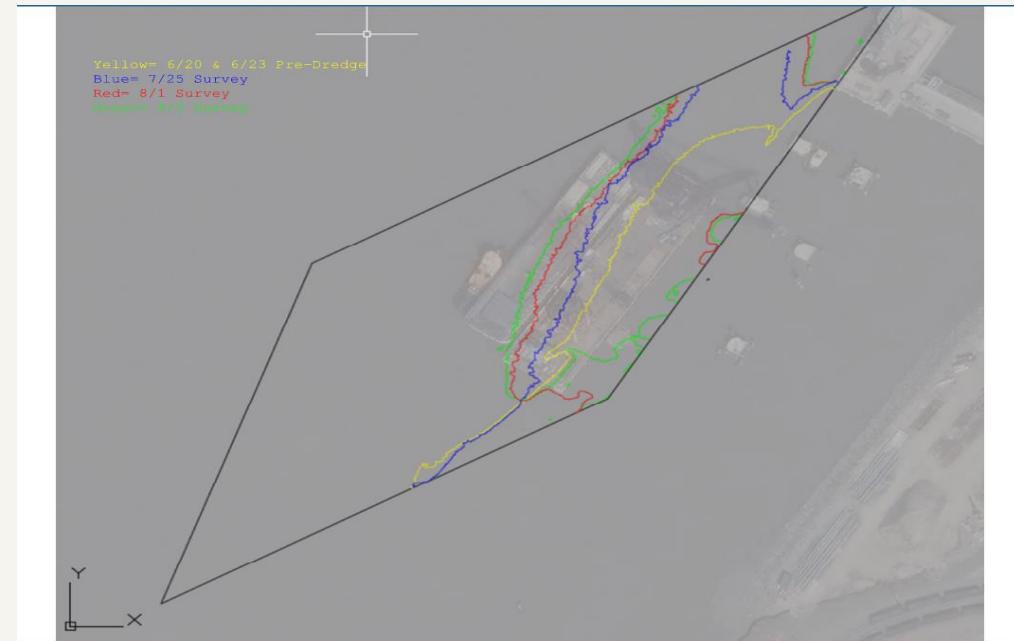
Marine Mammal Monitoring

- All in-water dredging work was performed under the surveillance of professional marine mammal observers to limit the project impact to protected species such as Beluga Whales.
- Cook Inlet belugas are an isolated, endangered population of whales.
- No dredging or disposals were allowed when whales were within 50 m of work activity
- Additional permit modifications required to support additional dredging work



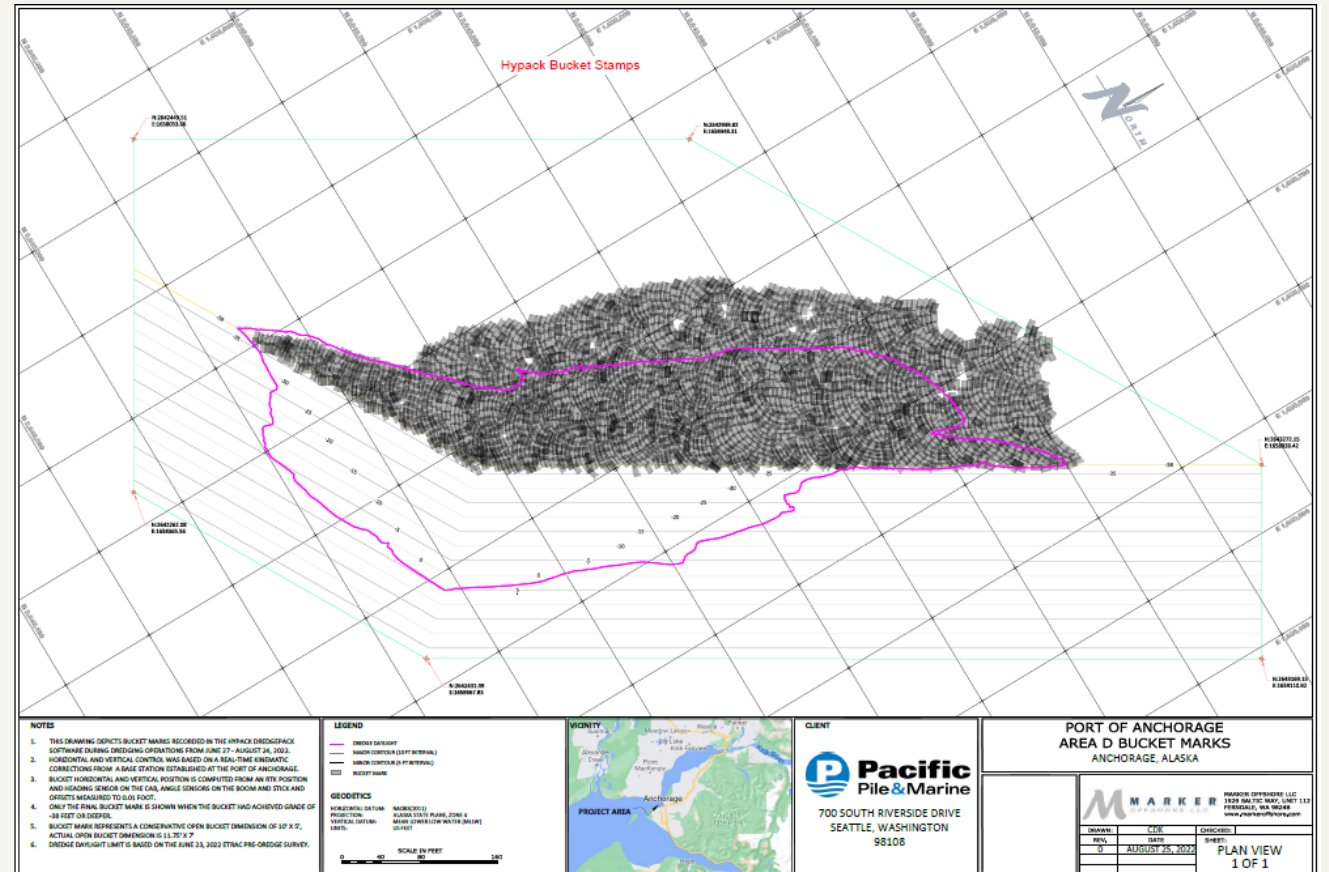
Shoaling

- Pre-Dredge survey outlined a total available yardage of 38,093 CY, including 2-feet of over-dredge. Design based on achieving -38' basin elevation.
- In 3 weeks, there was 7,366 CY of shoaling (19% of the originally available volume). Based on displacement, PPM dredged 10,732 CY in this time for a net of only 3,366 CY.
- Due to continued shoaling, PPM was not able to provide a single post-dredge survey showing everything at a -38' elevation or below. An alternate means of acceptance needed to be developed



Shoaling Survey Solution

- Bucket stamps are geolocated points which can be created by the Hypack Dredgepack system on the excavator.
 - These points outline the date, time, location coordinates and depth of the dredge bucket when obtained. Bucket stamp is scaled to the physical dimensions of the 5-yard clamshell bucket in use.
 - PPM's dredging excavator utilizes RTK GPS positioning (+/- 5cm of accuracy) Regular QC Checks of bucket positioning and elevation are conducted. Bucket readings can easily be checked against independent tide data to confirm elevation is accurate.
 - PPM has used this methodology successfully in past sediment capping projects in BC, Canada and in Washington State (WSDOT, King County) to prove full coverage and thickness of sediment capping lifts.
- Bucket stamps documented that PPM's dredging reached a -38' grade throughout the dredge prism.



Final Conclusions

- **Adapting to challenging environmental conditions**
- **Interagency Cooperation**
- **Creative Uses of Technology**



Questions

