

APPENDIX B

DIKE PROGRESS MEMORANDUM

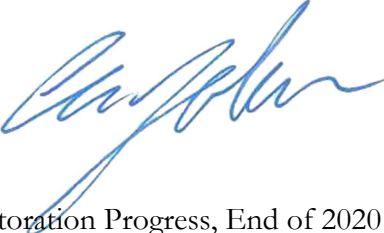




MEMORANDUM

To: Eric Bluhm
U.S. Army Corps of Engineers,
Portland District

Date: October 23, 2020
Project No.: 1653.01.01

From: Cem Gokcora, PE 

RE: AMCCO Dike Restoration Progress, End of 2020 Season Update

This memo discusses the progress of dike restoration work (conducted under 408-FY17-1016 permit approval) at Astoria Marine Construction Company (AMCCO) during the 2020 construction season, as well as the remaining work for the 2021 construction season.

BACKGROUND

As part of the state-mandated cleanup work at 92134 Front Street, Astoria, Oregon (AMCCO Site) and per the 408-FY17-10106 permit, a 700-foot stretch of existing dike, along Lewis and Clark River Levee, Clatsop 5, Segment ID 500508001 (the dike) at AMCCO property along the Lewis and Clark River, is to be restored to the original dike construction elevations. The dike system protects Clatsop County Diking District No. 5 (Diking District) from flooding due to high-water stages of the Lewis and Clark River and the Columbia River, tidal fluctuations, and wind waves.

The remediation of the AMCCO Site includes several elements related to the diking system: (1) removal of contaminated soil from a limited area of the dike and backfill, (2) removal of contaminated sediment at the riverward toe of the dike and backfill, (3) replacement of a floodwall inside the main ship repair building (associated with Marine Way Nos. 3 and 4) with a 150-foot segment of a 6-to-12-foot-tall earthen embankment (to restore the originally authorized dike), (4) replacement of a 200-foot-tall segment of a concrete jersey barrier floodwall with a 1-to-3-foot-tall earthen embankment south of the ship building to restore the originally authorized dike elevation in an operational area, and (5) construction of a stormwater management pond near the landward toe of the dike.

PLANNED SCHEDULE

Based on the Section 408 permit, the allowed work window was from September 1 through October 15, 2020.

The work on the dike was phased in the following manner to manage flood risk to the Diking District:

1. The daily high-tide forecast was monitored and dike construction was sequenced to ensure that daily fill progress exceeded the high-tide elevation predicted for the following 24 hours by a minimum of 1.5 feet.
2. Before starting the dike embankment construction, the construction team verified that the predicted tide and surge would not exceed 8.5 feet North American Vertical Datum 1988 (NAVD88) elevation for the next 24-hour period.
3. Removal of the floodwalls at Marine Way No. 3 (south) and No. 4 (north) was immediately followed by subgrade preparation and placement of backfill to a minimum elevation of 11 feet on the same day.
4. Most of the former Burn Pit area excavation was outside the authorized prism (see the attached figure). In areas where the excavation will encroach on the authorized dike prism, soil was to be backfilled on the same day to ensure the integrity of the full dike.

2020 DIKE RESTORATION CONSTRUCTION

Because of unfavorable tide conditions (high tides exceeding 8.5 feet), the start of dike work was delayed to the second week of September. On September 8, dike restoration work started with removal of the former floodwall, evaluation and scarification of the subgrade, and installation of the first four embankment lifts. The MFA geotechnical subconsultant (GeoDesign) inspector was on site to conduct construction quality assurance inspection, including subgrade evaluation, embankment construction oversight, and nuclear density testing as outlined in the design report and project specifications.

From September 9 through September 11, the construction team was able to construct the dike to an elevation of approximately 12.5 feet from the north end of the former floodwall to the southern end of the dike restoration alignment (see the attached figure). Soil was placed in 8- to 9-inch lifts and then compacted to satisfy the project specifications. At this juncture, the construction team was informed that the remaining dike material at the source was significantly wetter than the optimum moisture content. As a result, the construction team started a search to identify alternative locally available material that met the project specification. Because of wildfires and the hazardous air quality, environmental and geotechnical analyses of the alternative dike material were delayed for three days. Geotechnical analysis indicated that most suitable alternative materials were approximately 10 points wetter than the optimum moisture content.

When hazardous air conditions abated, agreements were in place for the procurement of the selected material to allow work to resume. On September 28, new material was imported and the contractor started moisture conditioning the recently imported dike material. Due to a cooling of overnight and daytime air temperatures (high temperatures below the mid-70s, overnight lows in the 50s with significant moisture) and limited laydown area, farming of the soil could not dry a sufficient quantity

of material to complete the project. On September 30, the contractor attempted to install lifts under the geotechnical inspector's oversight. The inspector determined that the material was still not within the allowed tolerance of the optimum moisture content. Since the dike construction had satisfied compaction requirements in excess of the 100-year flood elevation (12.00 feet) and weather conditions were not projected to improve, the construction team consulted with the Diking District manager, Steve Bower. The parties agreed to proceed with nonconforming lifts to provide freeboard in preparation for winterization. Two subsequent nonconforming lifts (not meeting the specified optimum moisture content of 31 percent or the required 92 percent relative compaction per Standard Proctor) were installed, bringing the interim crest elevation of the restored section of the dike to 13.8 feet, which generally meets or exceeds the top elevation of the existing dike north of the building and throughout the rest of the Diking District. For winterization and interim stabilization, a 6-to-12-inch lift of crushed rock was placed on the top of separation fabric over the dike crest and side slopes. The interim dike crest elevation was brought up to approximately 14.2 feet with the crushed rock surface.

Diking District manager Steve Bower visited the AMCCO Site periodically during dike restoration work, and agreed with the proposed winterization work.

DIKE REMEDIATION/EXCAVATION

During historical site operations, soil fill and burned debris had been placed in the overbuild zone of the riverward dike face north of the main ship repair building, at a location called the Burn Pit. During the week of October 5, approximately 2,000 cubic yards of contaminated soils and burned debris were removed from the Burn Pit area. Up to 10 feet of material were removed to expose the pre-existing dike fill soil. The excavation was backfilled with clean dike soil and seeded; satisfying the specifications established in the design report. Excavations were laid out to avoid disturbance to the dike prism. Approximately 400 cubic yards of contaminated nearshore sediments to a depth of 4 feet was removed at the toe of the existing dike (within Zone C) and then backfilled with clean sand.

A photo log with preexisting, and construction photos is attached for reference.

2021 CONSTRUCTION SEASON

The uncertified lifts in the new dike section (embankment above elevation 12.5 feet) will be removed/reworked to meet project specs. Up to 2-feet of additional dike soil will be placed within the agreed project limits. Separation fabric will be placed on the crest and then crushed rock will be placed in accordance with the design report to raise the top of dike to the federally authorized elevation. The dike slopes will be cleared of winterization rock and separation fabric, so that they may be seeded with the Diking District approved seed mix.

CRITICAL ELEVATIONS

Below is a list of critical elevations to help in discussion of the completed work. All elevations listed in this memo are in NAVD88:

1. 12.0 ft—100-year flood elevation;
2. 13.08 ft—Standard Project Flood per Flood Damage Reduction Study by the COE, a 500-year-frequency event
3. 12.3 ft—top elevation of the preexisting floodwall inside the ship building—lowest crest elevation/highest flood risk.
4. 12.5 ft—lowest elevation of the dike north of the building
5. 13 to 13.5 ft—elevation of the dike next to the ship building and the surrounding Diking District (anecdotal observation, survey not available)
6. 15.0 ft—Authorized levee elevation (as-built condition)

2020 As-Built Condition

1. 12.5 ft—top elevation of new dike clay embanked to specification (certified)
2. 13.5 ft—top elevation of interim dike clay placed, wetter than optimum (nonconforming)
3. 14.2 ft—top elevation of interim surface rock for 2020/2021 season

RISK DISCUSSION

As a result of the weather and hazardous air conditions caused by extreme wildfire events, the dike restoration could not be completed to the design elevation of 15 feet during the 2020 season. However, flood risk to the local diking district community was significantly reduced during the interim period (winter 2020 and spring 2021) by the following factors:

1. Construction during this season has left the local dike at the AMCCO Site in a significantly improved condition. This is due to the removal of the former concrete and steel floodwall (12.3-foot crest elevation) and construction of the new earthen embankment (14.2-foot interim crest road elevation; 12.5-foot crest of certified fill).
2. The interim dike elevation at the AMCCO facility (14.2-foot interim crest road elevation; 12.5-foot crest of certified fill) is as high or higher than the dike in other areas of the Diking District (anecdotally observed to be between 13 and 13.5 feet). There is no increased flood risk to the community at this location.
3. When the restoration of the dike is completed at the AMCCO facility in 2021, the dike will be completed to the authorized elevation (15 feet), and will be the highest point on the dike alignment within the local diking district.

Please let us know if you have any questions.

Eric Bluhm
U.S. Army Corps of Engineers, Portland District
October 23, 2020
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ATTACHMENTS

Figure
Photo Log

AQUATIC
CONSERVATION 2
ZONE

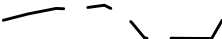
1937 AUTHORIZED DIKE PRISM
TOP EL= 10.6' MSL
= 15.0' NAVD88
CREST = 8' WIDE

RURAL
COMMUNITY
RESIDENTIAL ZONE

DITCH GRIT REMOVAL
SEE SHT C5.0

UPLAND SOIL CAP
SEE SHT C5.2

REMEDIATION PLAN LEGEND

- | | |
|---|--|
|  | DOCK PILING |
|  | EXISTING ASPHALT |
|  | EXISTING DOCK |
|  | EXISTING GRAVEL SURFACE |
|  | ACCESS ROAD ABOVE LEVEE |
|  | UPLAND GRAVEL CAP |
|  | HOT SPOT EXCAVATION |
|  | GRIT EXCAVATION |
|  | EMNR SAND FILL |
|  | SEDIMENT DREDGING |
|  | BERM |
|  | EXISTING MINOR CONTOUR |
|  | EXISTING MAJOR CONTOUR |
|  | LOT LINE |
|  | MEAN HIGH WATER LINE - 7.93' (NAVD) |
|  | HIGH TIDE LINE - 8.63' (NAVD) |
|  | HIGHEST MEASURED TIDE - 11.9' (NAVD) |
|  | INTERIOR WALL TO BE PARTIALLY DEMOLISHED |
|  | DIKE EASEMENT |

DIKE EXTENSION NOTES

SEQUENCING

1. DIKE EMBANKMENT SHOULD PROCEED UPON COMPLETION OF ALL IN-WATER WORKS (DEMOLITION OF IN-WATER STRUCTURES, SEDIMENT DREDGING, AND PLACEMENT OF EMNR SAND LAYER) AND EXCAVATION AND BACKFILL OF DIKE HOT SPOT.
2. CONSTRUCT DIKE EMBANKMENT.
3. CONSTRUCT TOP OF DIKE ROAD.

DIKE CONSTRUCTION NOTES

1. REMOVAL OF EXISTING FLOODWALL BETWEEN MARINE WAYS NO. 3 AND 4 SHOULD BE SCHEDULED FOR A PERIOD WHEN THE PROJECTED HIGH TIDE OVER FIVE SUCCESSIVE DAYS IS NOT IN EXCESS OF 8 FEET (NAVD 88), UNLESS ALTERNATIVE MEASURES ARE INSTALLED TO PROTECT THE DIKING DISTRICT FROM FLOODING.
2. SAWCUT CONCRETE SLAB AND REMOVE CONCRETE SLAB/FOUNDATION STRUCTURES WITHIN THE FOOTPRINT OF THE PROPOSED EARTHEN DIKE, TO THE LIMITS SHOWN ON THIS PLAN SHEET.
3. CONDUCT DEFLECTION TESTING IN ACCORDANCE WITH ODOT TM 158 TO EVALUATE SUBGRADE CONDITIONS ALONG DIKE EXTENSION ALIGNMENT.
4. REMOVE UNACCEPTABLE (SUBGRADE THAT YIELDS OVER 1-INCH AFTER 5 PASSES WITH A MINIMUM 13-TON WATER TRUCK) SUBGRADE MATERIAL (ORGANICS, GRAVEL, ETC.), SCARIFY THE TOP OF THE SUBGRADE AND EACH SUBSEQUENT SOIL LIFT PRIOR TO COMPACTION OF THE NEXT SOIL LIFT TO ENSURE CONTINUITY OF THE COMPACTED SOIL STRUCTURE.
5. COORDINATE (NOTIFY 72 HRS IN ADVANCE) SUBGRADE EVALUATION WITH ENGINEER PRIOR TO PLACEMENT OF FIRST LIFT.
6. PLACE DIKE EMBANKMENT MATERIAL IN LAYERS NOT EXCEEDING 8-INCH PER LIFT.
7. MOISTURE CONDITION AND COMPACT EACH LIFT WITH SHEEPSFOOT ROLLER (BY A MINIMUM 5 PASSES). VERIFY COMPACTION TO 95% STANDARD PROCTOR PER ASTM D698.
8. CONSTRUCT EARTHEN DIKE TO ELEVATION OF 15.0 FEET WITH RIVERWARD SLOPE AT 3H:1V (HORIZONTAL TO VERTICAL) AND LANDWARD SLOPE AT 3H:1V.
9. COORDINATE TOP OF DIKE EVALUATION WITH ENGINEER PRIOR TO START OF DIKE ROAD CONSTRUCTION.
10. UPON ENGINEER'S APPROVAL OF DIKE EMBANKMENT CONSTRUCTION, PLACE SEPARATION FABRIC TO SUPPORT MAINTENANCE VEHICLES, CONSISTENT WITH CURRENT CONSTRUCTION STANDARDS.
11. CONSTRUCT 10-FOOT-WIDE, 6-INCH CRUSHED ROCK FOR TOP OF DIKE ROAD AND COMPACT BY MINIMUM OF 5 PASSES WITH A DRUM ROLLER, SETTING THE TOP OF DIKE ROAD ELEVATION TO APPROXIMATELY 15.5 FEET.
12. VEGETATE EXPOSED EARTHEN FACES OF CONSTRUCTED DIKE WITH DIKE SEED MIX.

MATERIALS (AND EQUIPMENT)

1. DIKE EMBANKMENT MATERIAL: LOCAL CLAY LOAM MATERIAL (OR EQUAL) TO MATCH EXISTING DIKE CONSTRUCTION.
2. DIKE ROAD WOVEN SEPARATION GEOTEXTILE.
3. CRUSHED ROCK FOR TOP OF DIKE ROAD: AGGREGATE BASE IN ACCORDANCE WITH ODOT SPECIFICATIONS SECTION 00640. ALTERNATIVELY, 3 TO 4 INCH PIT RUN AS BASE COURSE, OVERLAIN 2 TO 3 INCH $\frac{3}{4}$ " MINUS OR 1.5 INCH MINUS CRUSHED ROCK.
4. DIKE SEED MIX: DIKING DISTRICT'S SPECIFIED SEED MIX FOR DIKE MAINTENANCE PROJECTS (TO BE APPLIED WITH HYDROMULCH).
5. SHEEPSFOOT ROLLER FOR EMBANKMENT PLACEMENT.
6. VIBRATORY DRUM ROLLER FOR GRAVEL ROAD PLACEMENT.

SUBMITTALS

1. SD-01 (PRECONSTRUCTION SUBMITTALS):
 - a. DIKE CONSTRUCTION WORK PLAN DESCRIBING THE PROPOSED METHODS OF CONSTRUCTION, SEQUENCING, FLOOD PROTECTION MEASURES, MATERIAL SOURCES, AND SCHEDULE.
 - b. FIFTY-POND SAMPLES OF IMPORTED MATERIAL PROPOSED FOR USE AS DIKE EMBANKMENT AND DIKE ROAD MATERIAL TO THE ENGINEER IDENTIFIED BY THE OWNER AT LEAST 10 DAYS PRIOR TO USE. THE CONTRACTOR SHALL NOT USE MATERIALS UNTIL APPROVED BY THE ENGINEER.
 - c. A WRITTEN STATEMENT INDICATING THE SOURCE, CHARACTER, AND PROPOSED USE OF ALL IMPORTED MATERIALS WITH THE SAMPLES. BY SUBMITTING SAMPLES, THE CONTRACTOR AGREES THAT THE FILL MATERIAL WILL CONFORM WITH THE MATERIAL SAMPLES SUPPLIED TO THE GEOTECHNICAL ENGINEER.
 - d. CERTIFICATION OF TEST RESULTS, SOURCE, AND SAMPLES OF IMPORTED MATERIALS.
 - e. LIST OF PROPOSED EQUIPMENT.
 - f. MOISTURE-CONDITIONING METHODOLOGY (INCLUDING, BUT NOT LIMITED TO, AERATION) AND CONTRACTOR'S EXPERIENCE WITH THE METHOD(S).

AMCCO UPLAND & SEDIMENT REMEDIATION PLAN

ASTORIA MARINE CONSTRUCTION CO.

ASTORIA, OREGON

[illegible]

PROJECT: 1653.01.01

DESIGNED:C. GOKCORA

DRAWN: Z. PYLE

CHECKED: E. BAKKOM

SCALE _____

NOTE: BAR IS ONE INCH ON ORIGINAL
DRAWING. IF NOT ONE INCH ON THIS

SHEET, ADJUST SCALE ACCORDINGLY.

SHEET TITLE

DIKE RESTORATION

PLAN

SHEET

C6.0



PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Preconstruction Photos

Photo No. 1.

Description

Pre-existing Marine Way No. 3 floodwall in main ship repair building (south side).



Photo No. 2.

Description

Pre-existing Marine Way No. 4 floodwall in main ship repair building (north side).





PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Photo No. 3.

Description

Pre-existing dike crest looking north, toward adjacent property.



Photo No. 4.

Description

Pre-existing dike crest looking south, toward main ship repair building.



PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Photo No. 5.

Description

Pre-existing concrete floodwall south of main ship repair building.



Photo No. 6.

Description

Contractor demolishing the concrete-steel floodwall at Marine Way No. 4.



PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Photo No. 7.

Description

Scarification of dike subgrade at Marine Way Nos. 3 and 4.



Photo No. 8.

Description

Installation of first lift through Marine Way Nos. 3 and 4.





PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Photo No. 9.

Description

Excavated steps for connection to the existing dike on the south side of the former building.



Photo No. 10.

Description

Compaction effort on riverward slopes.



PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Photo No. 11.

Description

End of second day of dike embankment work, four lifts in place and compacted per specifications. Top of embankment shown in this photo was 11 feet.



Photo No. 12.

Description

End of second day, toward the north, new dike embankment (through Marine Way Nos. 3 and 4) connected to the southern side of the existing dike.





PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Photo No. 13.

Description

Dike restoration
south of Marine Way
Nos. 3 and 4, to
southern terminus of
restoration project.



Photo No. 14.

Description

Looking toward
north end of restored
section of dike.
Photo showing top
of certified lifts
(elevation 12.5 ft).



PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Photo No. 15.

Description

End of season top of earthen dike after freeboard embankment installation; crest elevation shown is approximately 13.8 feet. Also shown are vegetated riverward side slopes. Straw bales added for enhanced temporary erosion and sediment control.



Photo No. 16.

Description

End of season top of earthen dike embankment (matching existing top of northern dike) prior to rock placement.





PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Photo No. 17.

Description

Winterization
crushed rock
surfacing installed on
separation fabric
over the restored
dike.



Photo No. 18.

Description

End of season /
winterization crushed
rock installed on
separation fabric on
the restored dike.



PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Photo No. 19.

Description

Burn Pit Hotspot excavation and backfill at overbuilt section of the northern dike.



Photo No. 20.

Description

Burn Pit Hotspot excavation at overbuilt section of the northern dike



PHOTOGRAPHS

Project Name: Astoria Marine Construction Company
Project Number: 1653.01.01
Location: Astoria, Oregon

Photo No. 21.

Description

Burn Pit Hotspot excavation and backfill at overbuilt section of the northern dike. Stepped connection for slope grading on overbuilt section of dike



Photo No. 22.

Description

Burn Pit Hotspot excavation/backfill completed with restored overbuilt slope

