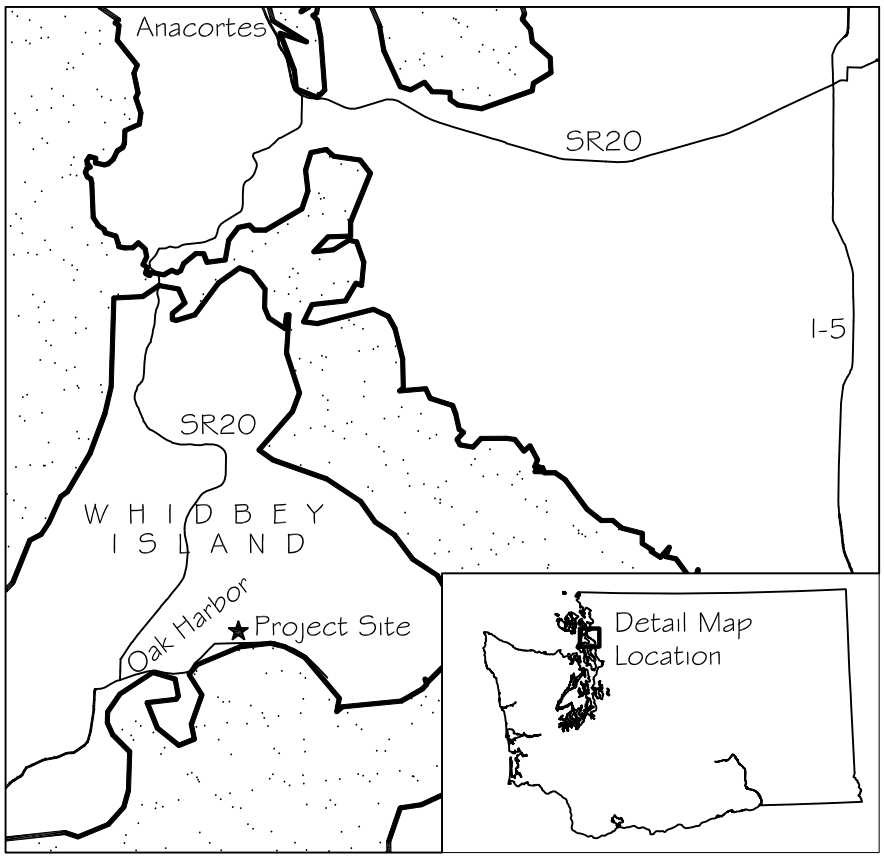
Crescent Harbor Salt Marsh Habitat Restoration

Naval Air Station Whidbey Island, Environmental Affairs Dept.
1155 E. Lexington St., Bldg. 113, Oak Harbor WA 98278-3800

Project Description and Purpose:

The project will restore tidal hydrology to approximately 200 acres of isolated salt marsh by breaching dikes, replacing a culvert, removing fill, constructing a new channel through the beach berm, and planting 1.7 acres of native plants.

Site Location



Sec. 31, T 33N, R 2E, Island Co. Wash., Lat. 48.301°N, Lon. 122.610°W

Directions to the Project Site

From I-5, take SR20 west to Oak Harbor. Drive east on SE Pioneer Way to NAS Whidbey Island gate. Drive northeast on Torpedo Road to E. Pioneer Way. The site is in the vicinity of the Oak Harbor Wastewater Treatment Plant along E. Pioneer Way.

Index of Drawings

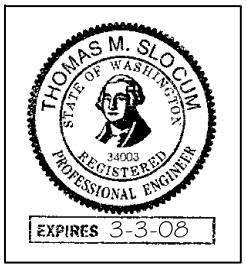
General Notes

These drawings are intended for permitting purposes only. The proposed construction work plan is listed in Sheets 15, 16 and 17. The estimated quantities of excavation, fill, and other work items listed in the drawings may not necessarily represent the actual as-built quantities for the completed project.

Project Designed By:

Skagit River System Cooperative
c/o Steve Hinton
PO Box 368
LaConner, WA 98257
Tel. (360) 466-7243, email: shinton@skagitcoop.org

Whidbey Island Conservation District
c/o Tom Slocum, PE
2021 E. College Way, Ste. 203
Mount Vernon, WA 98273
Tel. (360) 428-4313, email: tom@skagitcd.org



Property owner:
NAS Whidbey Island

Adjacent property owners:
NAS Whidbey Island

Sheet No. 1 of 17

Date: 1-21-08

USACE Ref. No.

Cover Sheet

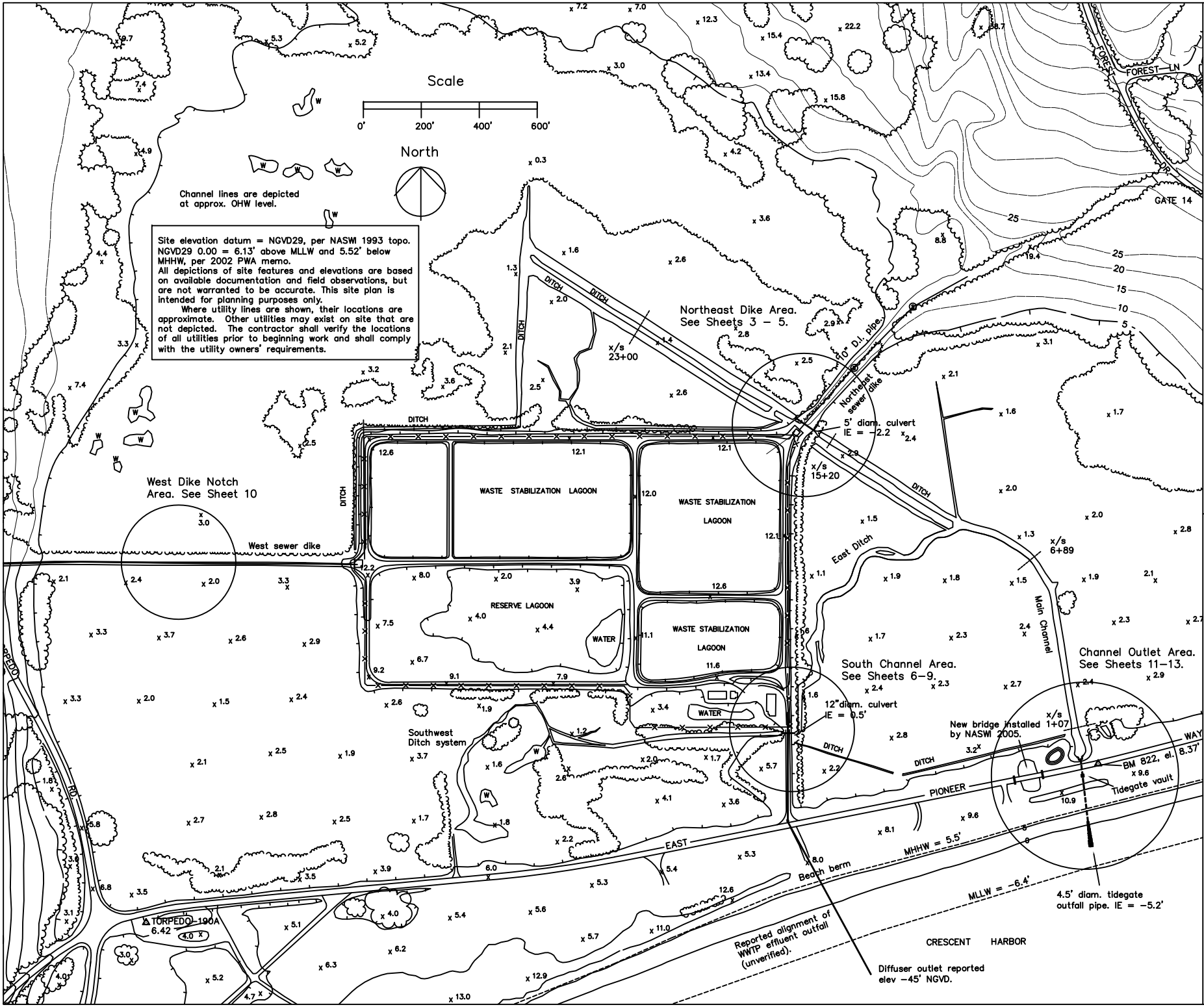
Application by:
Naval Air Station Whidbey Island
Environmental Affairs Dept.
1155 W. Lexington St. Bldg. 113
Oak Harbor WA 98278-38005

Breach dikes, excavate channels and fill

Purpose: Salt marsh habitat restoration

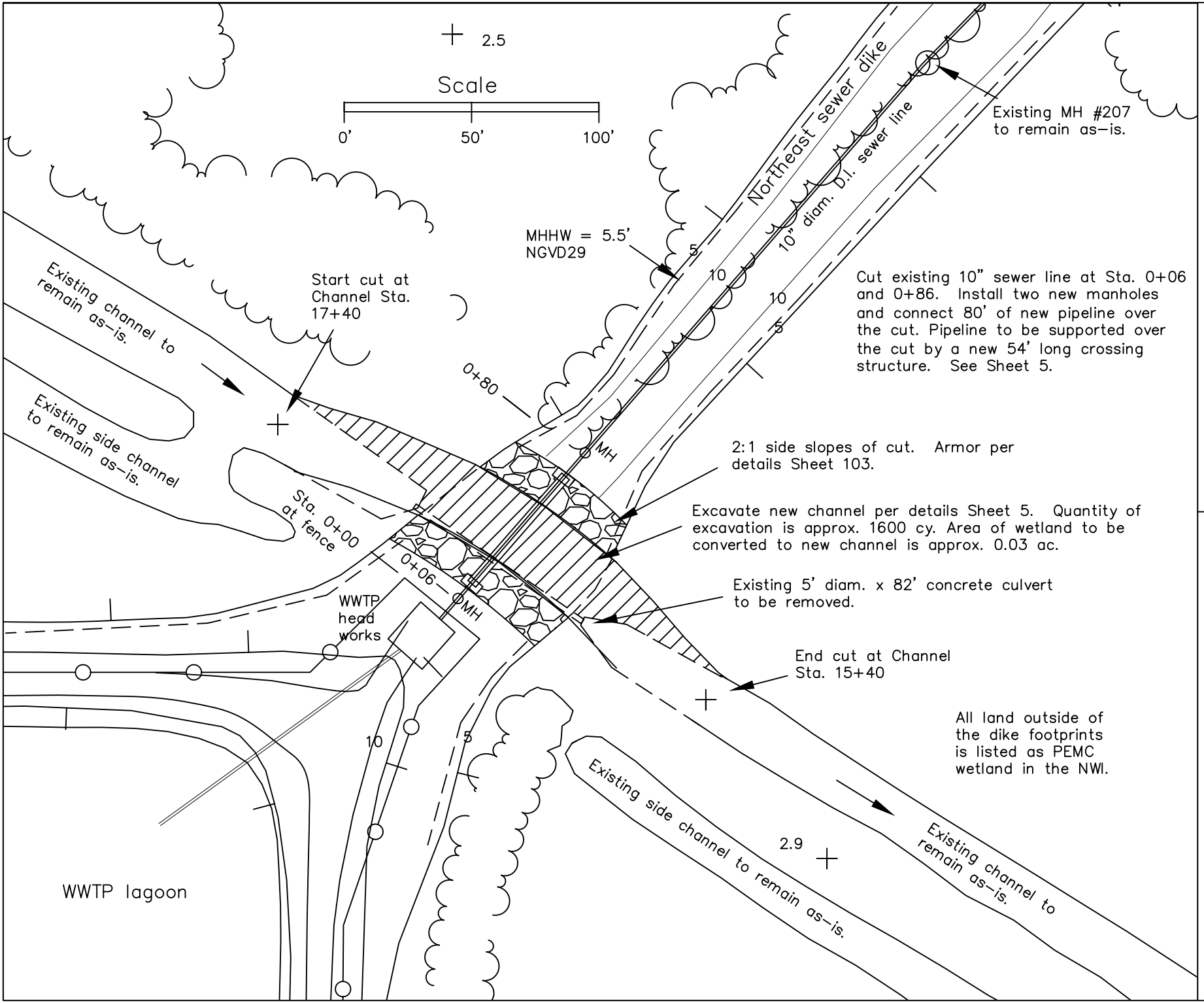
Datum: NGVD29 = 0.0'

Proposed in:
Crescent Harbor marsh, Oak Harbor, Island Co. Wash.
Sec. 31 T33N R2E
Lat. 48.301°N, Lon. 122.610°W.



In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 2 of 17 Date: 1–21–08

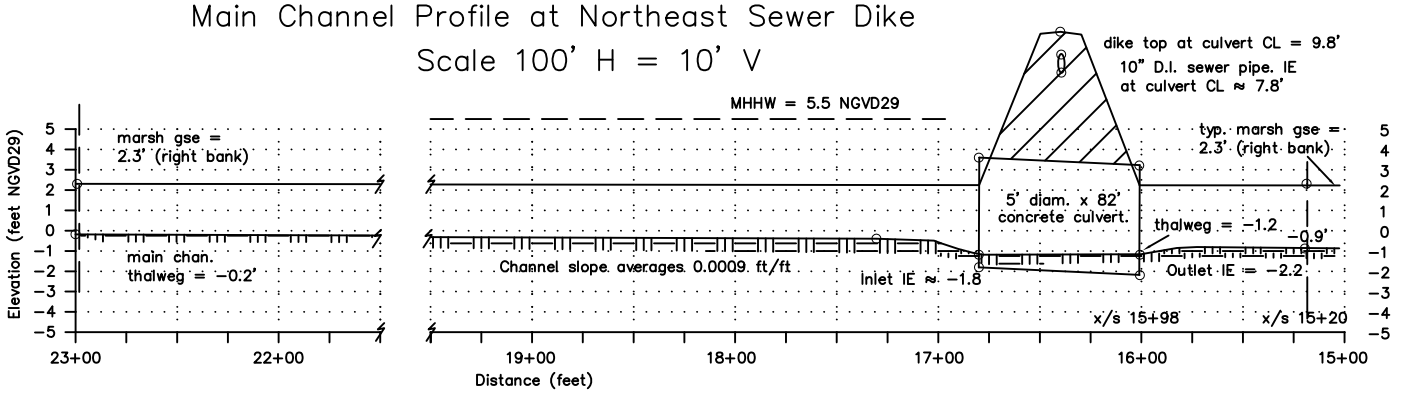
Exhibit:
Existing Site Plan
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration



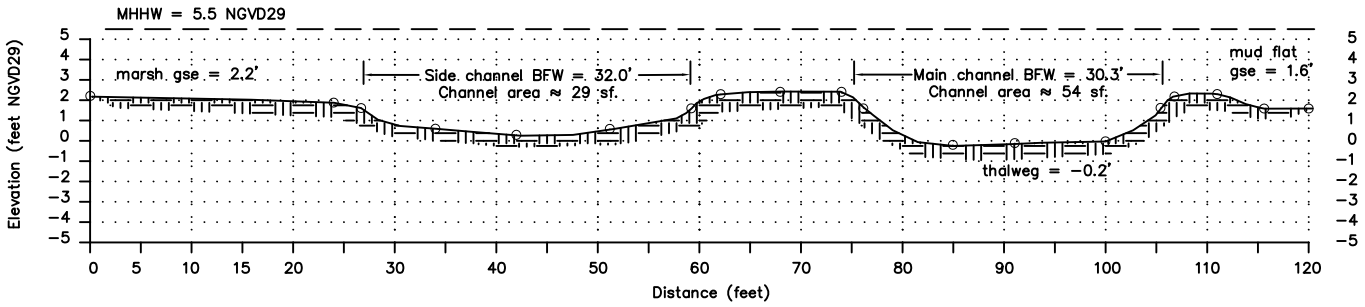
In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 3 of 17 Date: 1-21-08

Exhibit:
Northeast Dike Area Proposed Site Plan
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

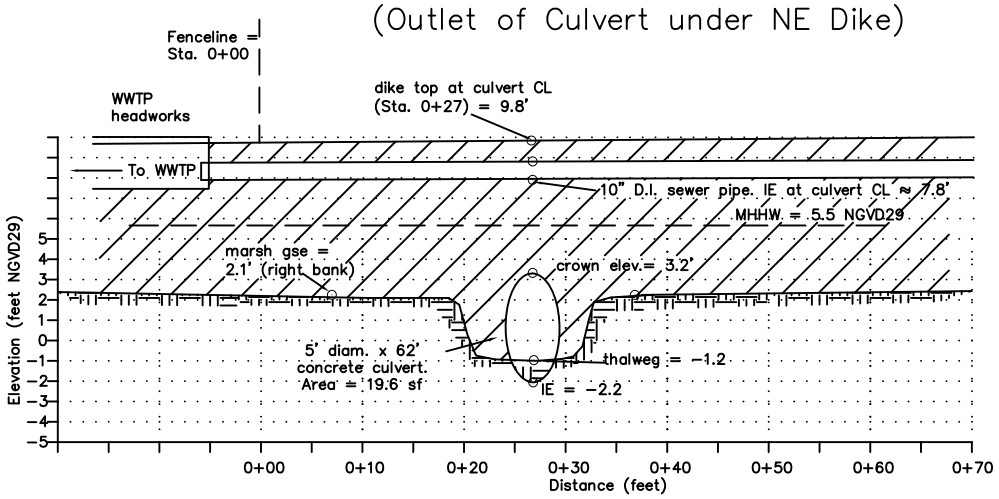
Existing Conditions: Northeast Sewer Dike Area
Main Channel Profile at Northeast Sewer Dike
Scale 100' H = 10' V



Main Channel Cross Section at Sta. 23+00. Scale 20' H = 10' V



Main Channel Cross Section at Sta. 15+98. Scale 20' H = 10' V
(Outlet of Culvert under NE Dike)



Depictions of elevations are based on field observations and available as-built documentation but are not warranted to be accurate. To be used for planning purposes only.

Main Channel Cross Section at Sta. 15+20. Scale 1H = 2V

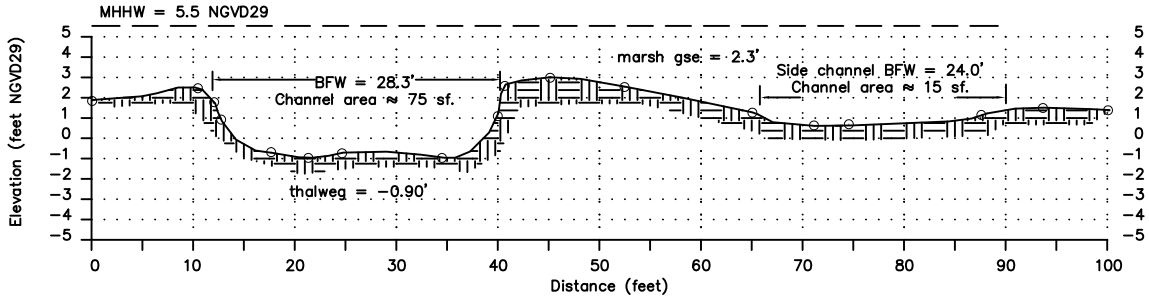
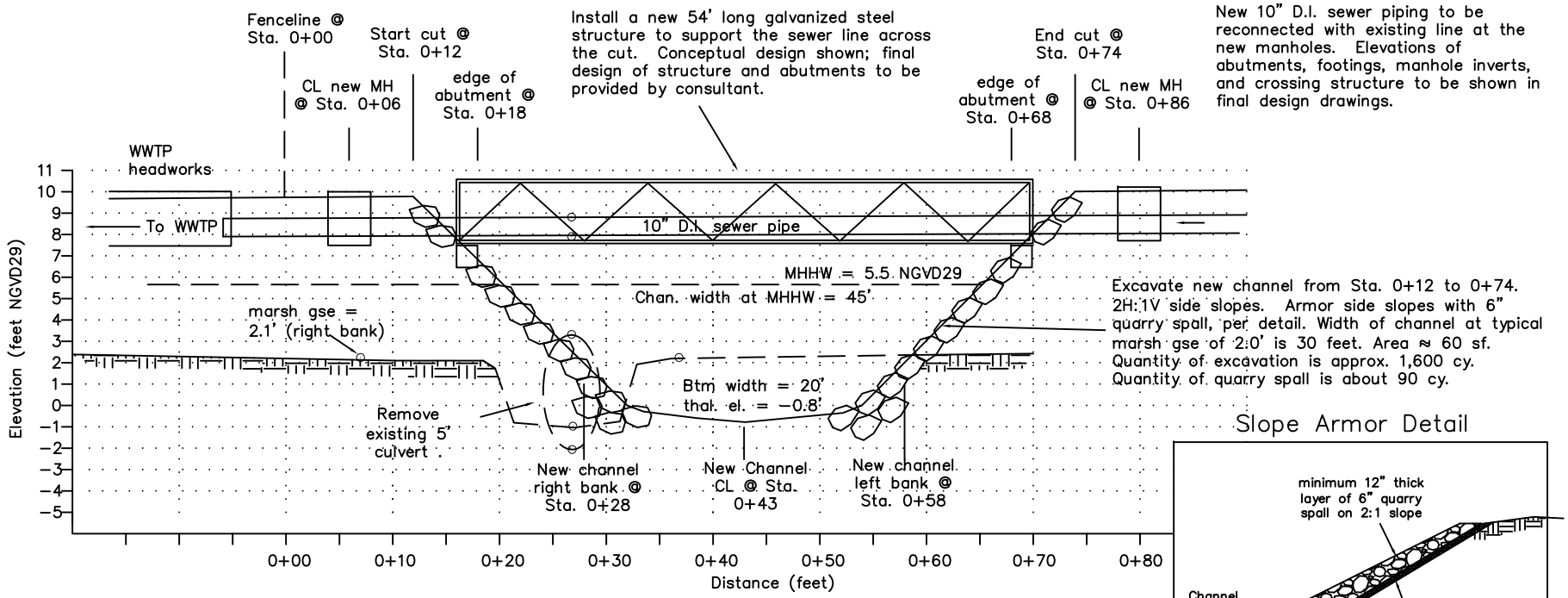


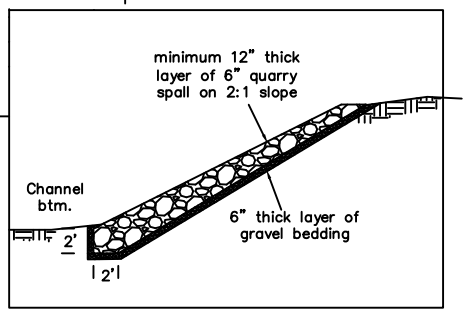
Exhibit:
NE Dike Breach Existing Sections & Profiles
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 4 of 17 Date: 11-20-07

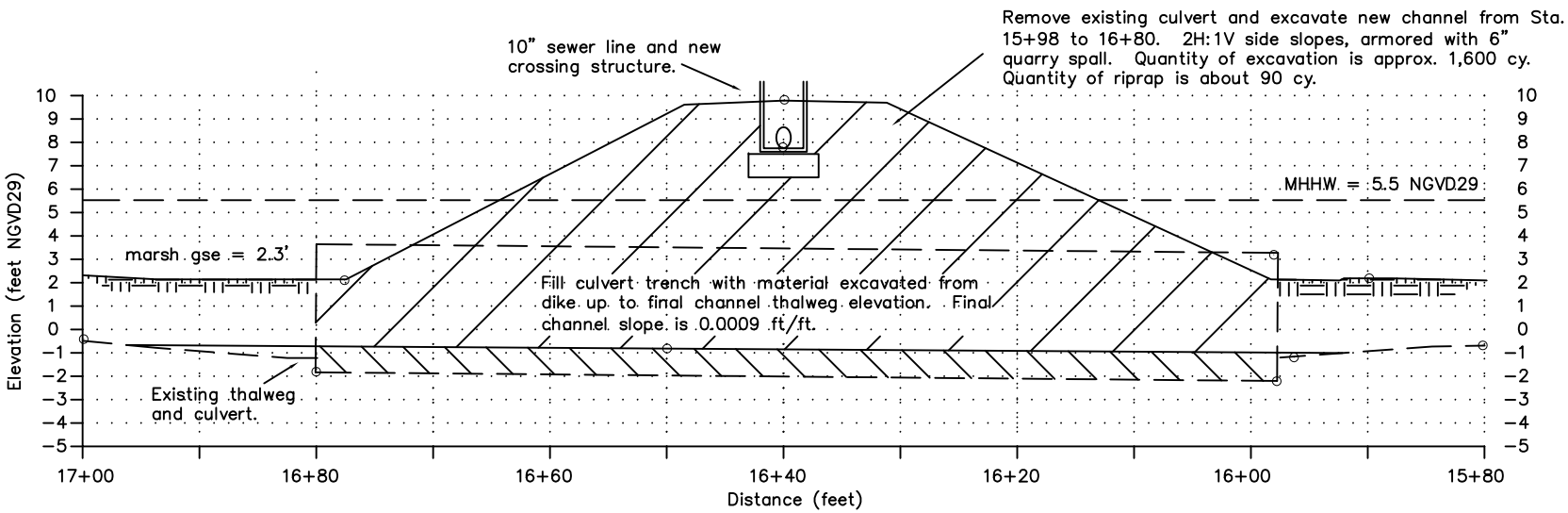
Proposed Main Channel Cross Section and Sewer Line Crossing Structure Schematic at NE Dike Breach (Sta. 16+40). Scale 20'H = 10' V



Slope Armor Detail



Proposed Main Channel Profile at NE Dike Breach Scale 20' H = 10' V



In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 5 of 17 Date: 11-20-07

Exhibit:
NE Dike Breach Proposed Section & Profile
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

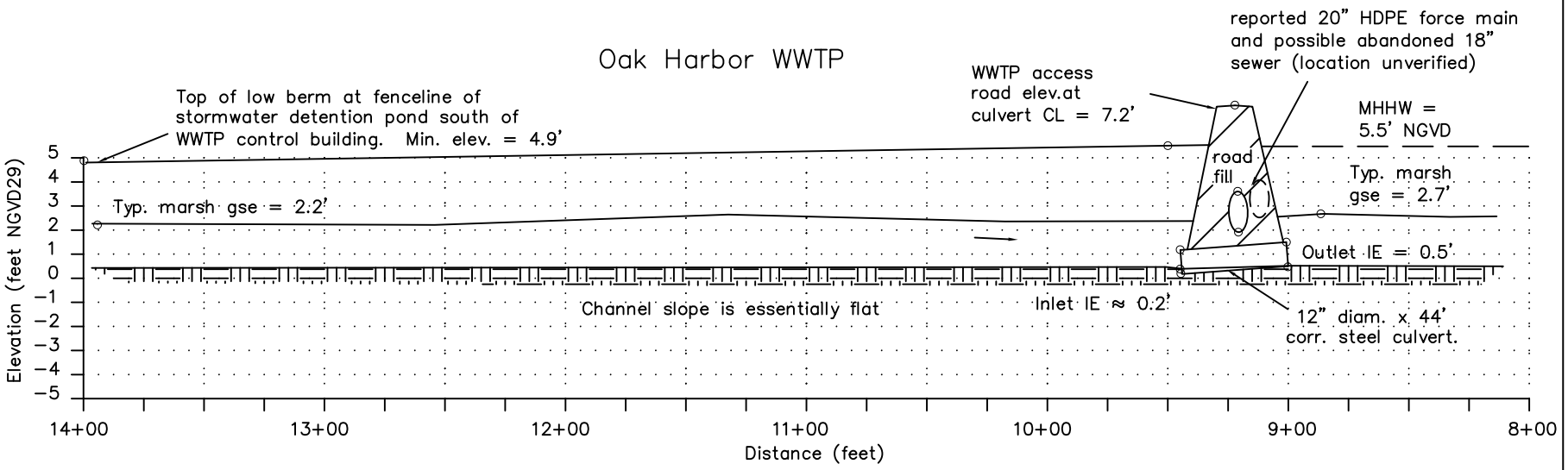
In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.3011°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 6 of 17 Date: 1-21-08

Exhibit:
South Channel Area Proposed Plan View

Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

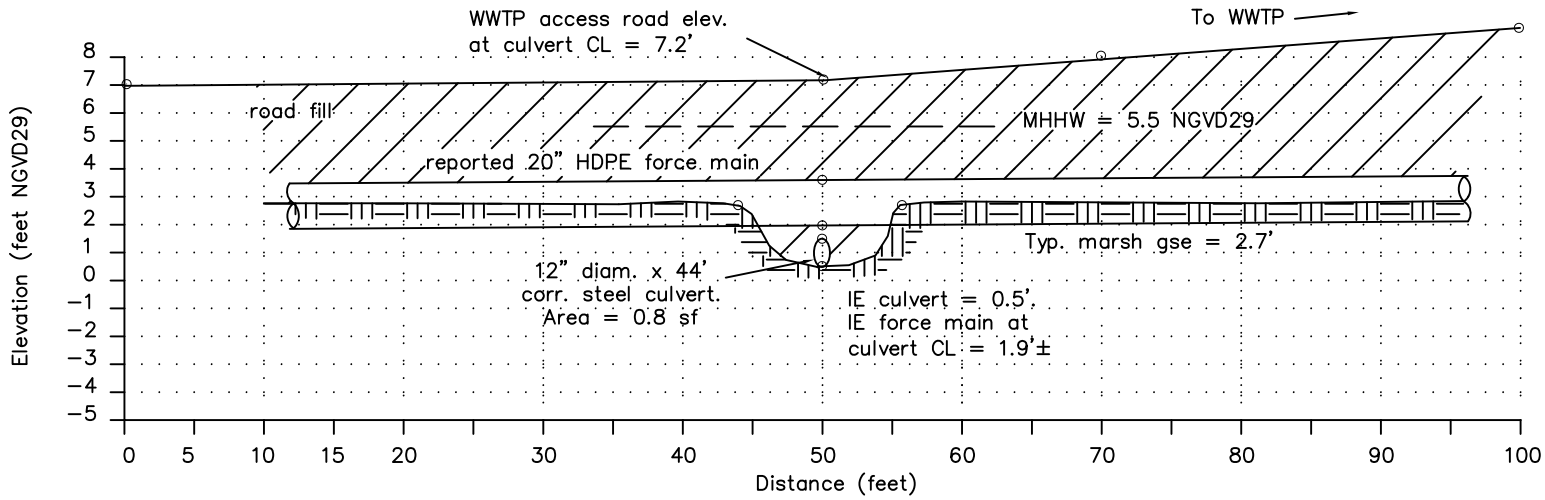
Existing Conditions – South Channel Area

South Channel Profile Sta. 14+00 to 8+00. Scale 100' H = 10' V



Depictions of elevations are based on field observations and available as–built documentation, but are not warranted to be accurate. To be used for planning purposes only.

Channel Cross Section at WWTP Access Road – Scale 20' H = 10' V

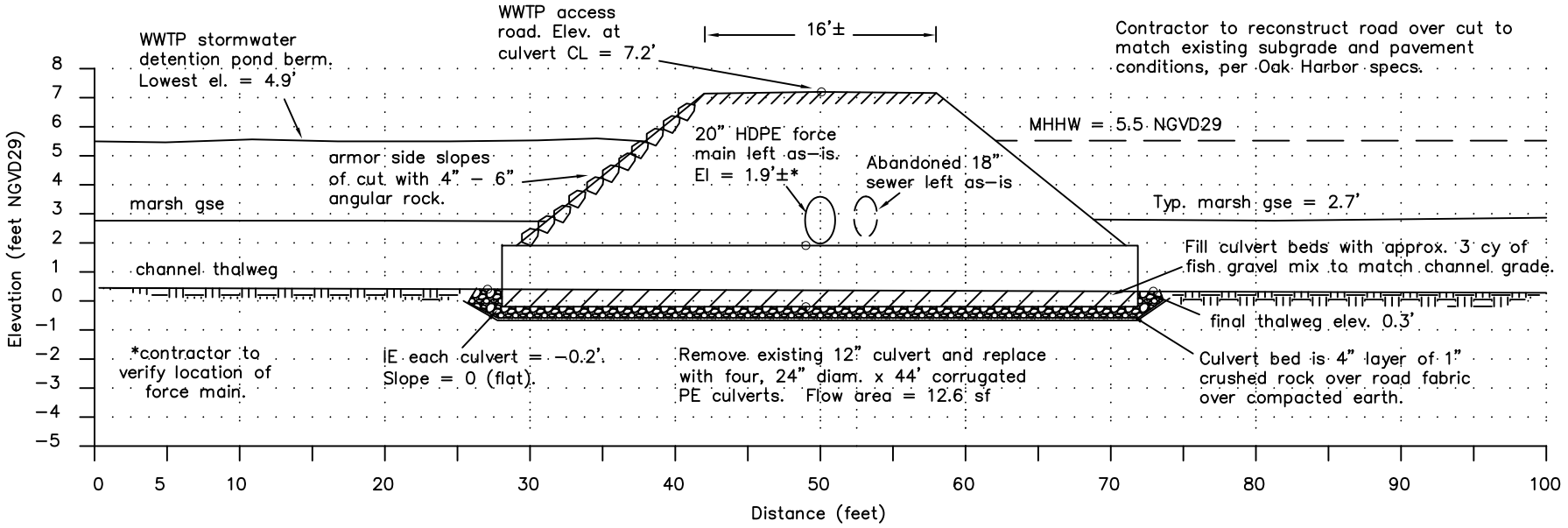


In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 7 of 17 Date: 12–15–07

Exhibit:
South Culvert Existing Section & Profile
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

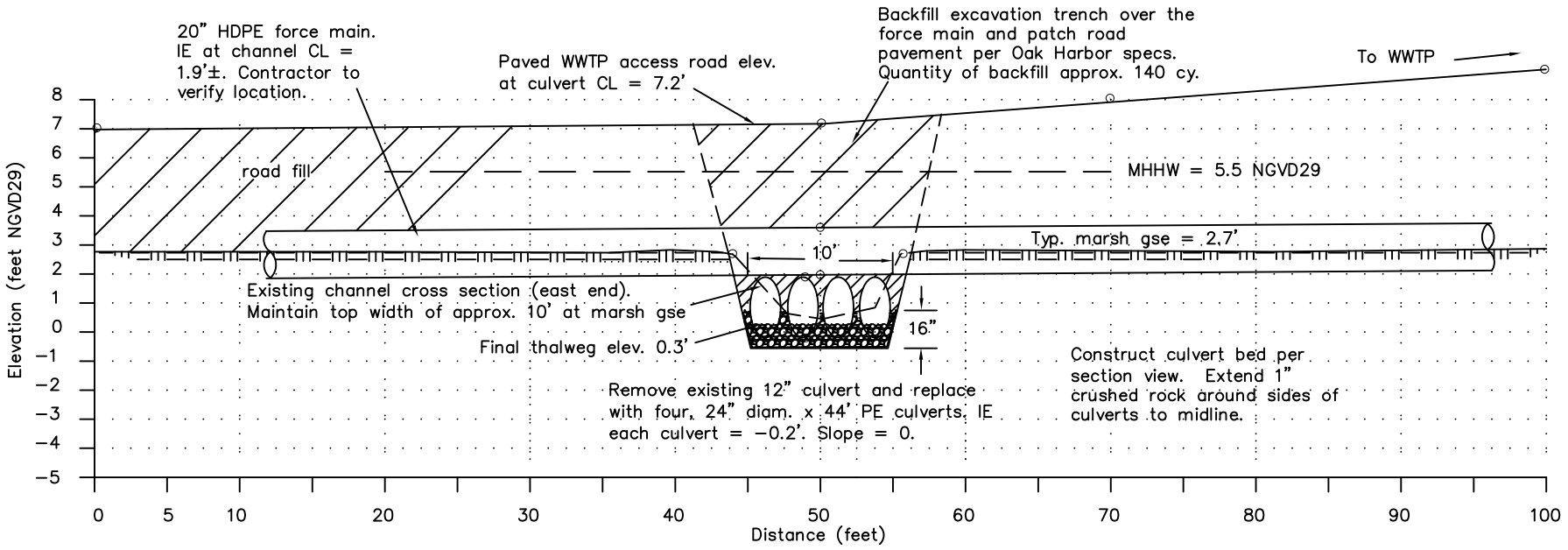
Profile View of Proposed New Culverts at WWTP Access Road

Scale 20' H = 10' V



Channel Cross Section at WWTP Access Road

Scale 20' H = 10' V

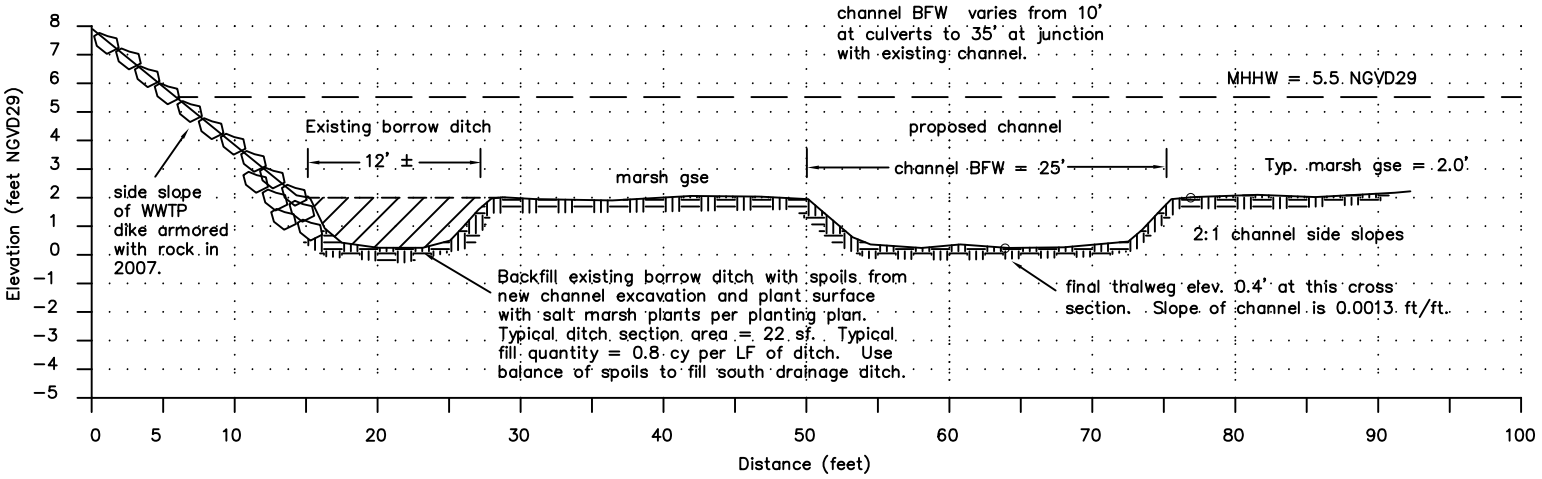


In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 8 of 17 Date: 12-15-07

Exhibit:
Proposed South Culvert Section & Profile
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

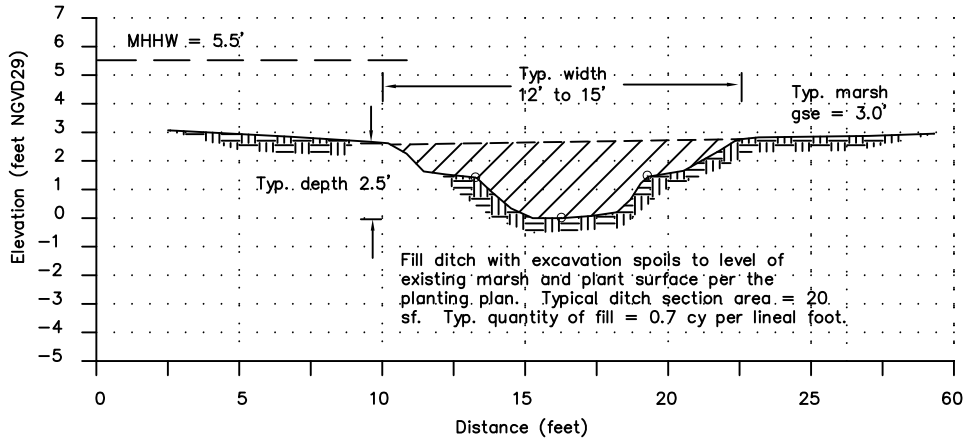
Typical Cross Section View of Proposed SE Channel

Scale 20' H = 10' V



Typical Cross Section View of SE Area Drainage Ditch Fill

Scale 1' H = 1' V

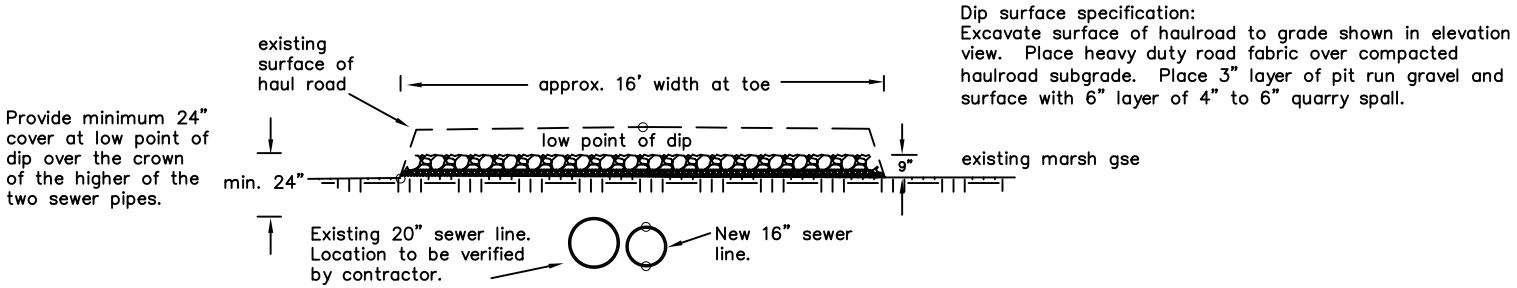


In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 9 of 17 Date: 12-15-07

Exhibit:
Proposed South Channel and Ditch Fill Details
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

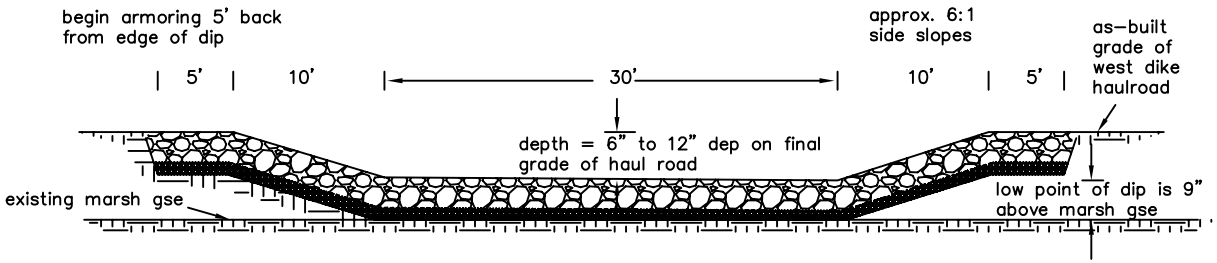
West Dike Notch Work Area Plans

Cross Section View of Dip – Scale 1' H = 1' V

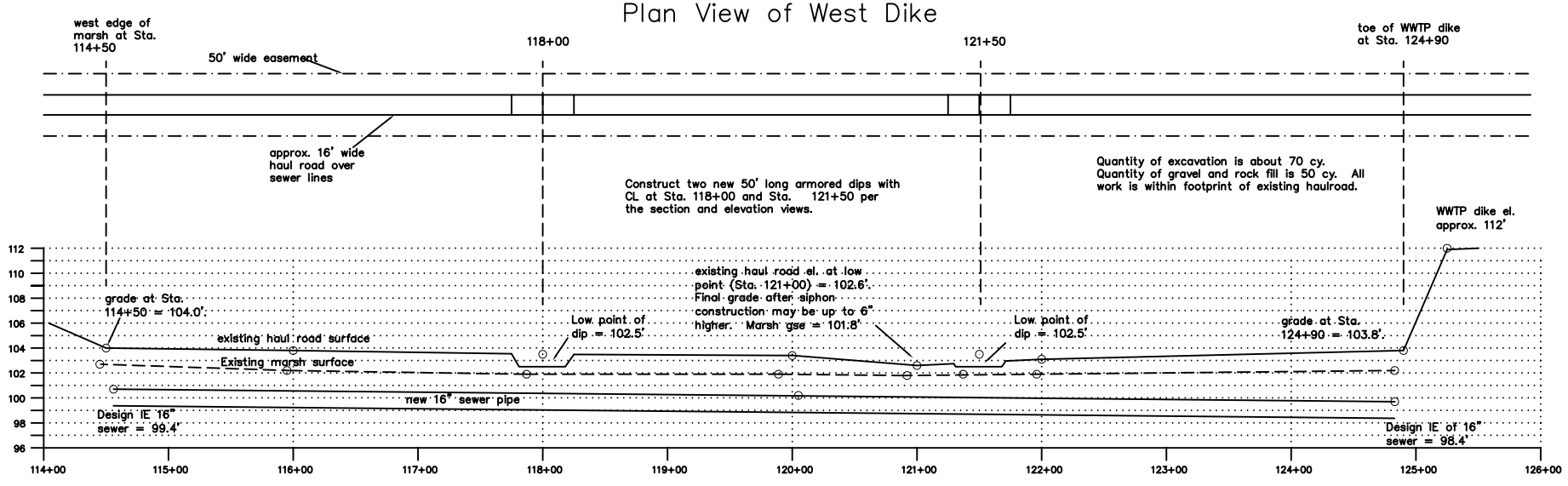


Dip surface specification:
Excavate surface of haulroad to grade shown in elevation view. Place heavy duty road fabric over compacted haulroad subgrade. Place 3" layer of pit run gravel and surface with 6" layer of 4" to 6" quarry spall.

Elevation View of Dip – Scale 1'H = 2' V



Plan View of West Dike



Note: Staion and elevation datums correspond to City of Oak Harbor standards' for its 2007 WWTP upgrade project. 100.00' ≈ 0.3' NGVD29.

Elevation View of West Dike – Scale 100'H = 10'V

In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N,
Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 10 of 17 Date: 1–21–08

Exhibit: West Dike Notch Plan and Detail Views
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

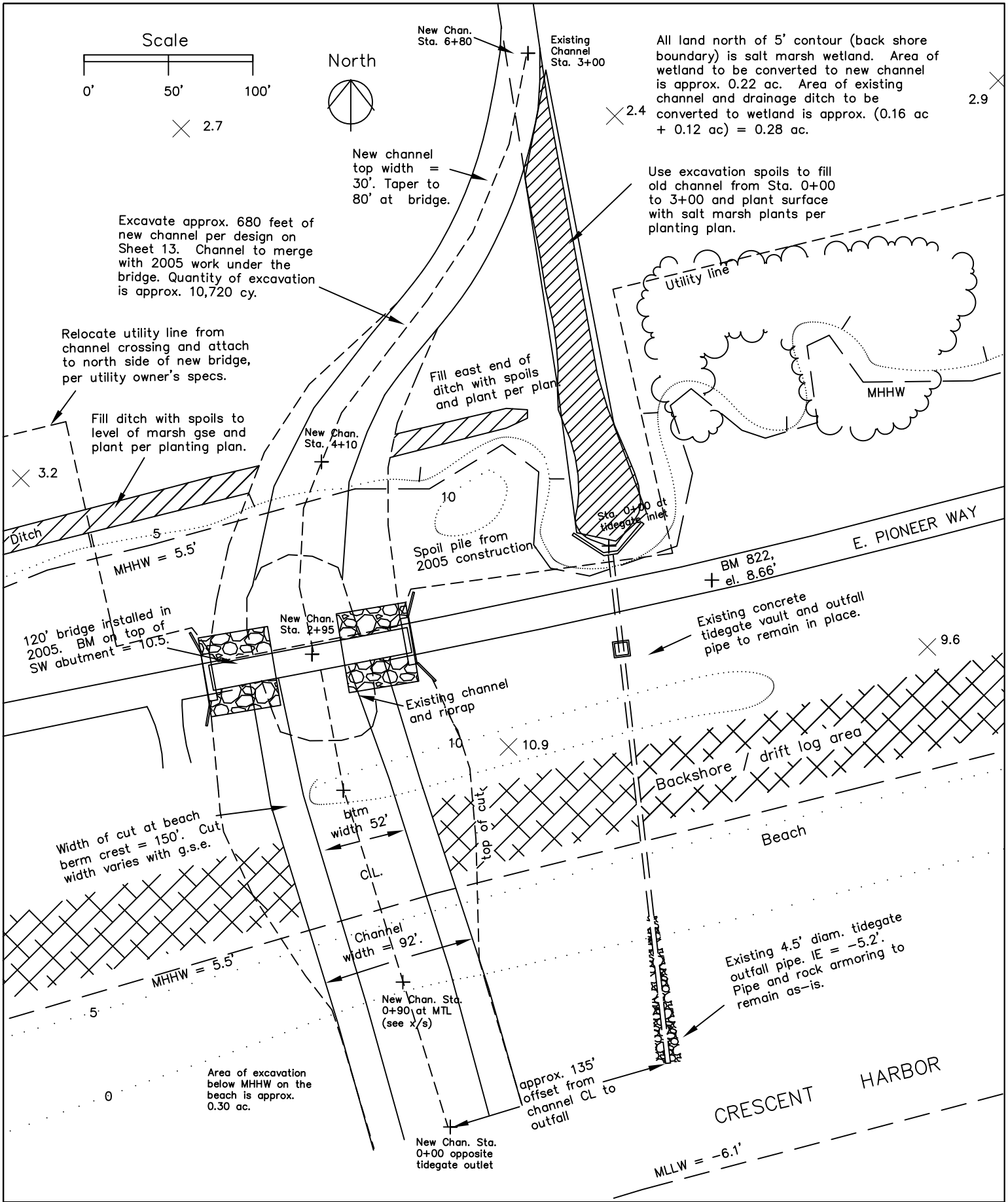


Exhibit:

Channel Outlet Area Proposed Plan View

Reference No.:

Proposed: Breach dikes, excavate channels and fill

Purpose: Salt marsh habitat restoration

In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'

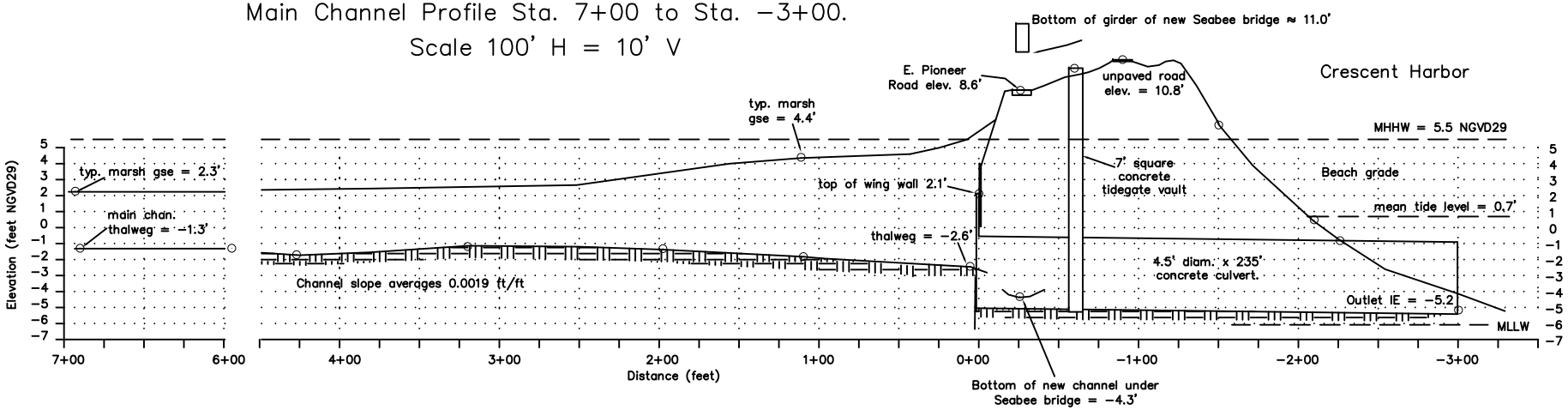
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E

Applicant: Naval Air Station Whidbey Island

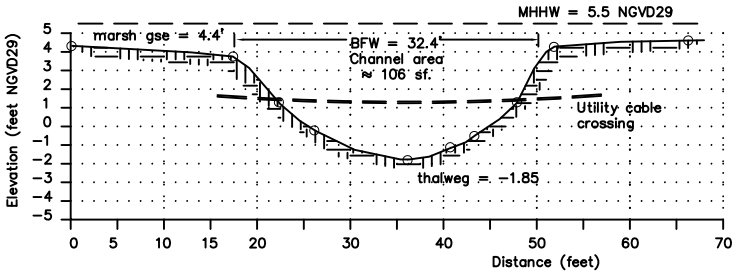
Sheet: 11 of 17 Date: 1-21-08

Existing Conditions – Channel Outlet Area

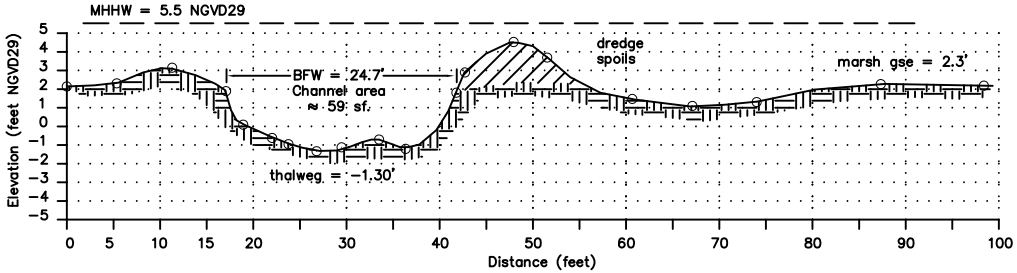
Main Channel Profile Sta. 7+00 to Sta. −3+00.
Scale 100' H = 10' V



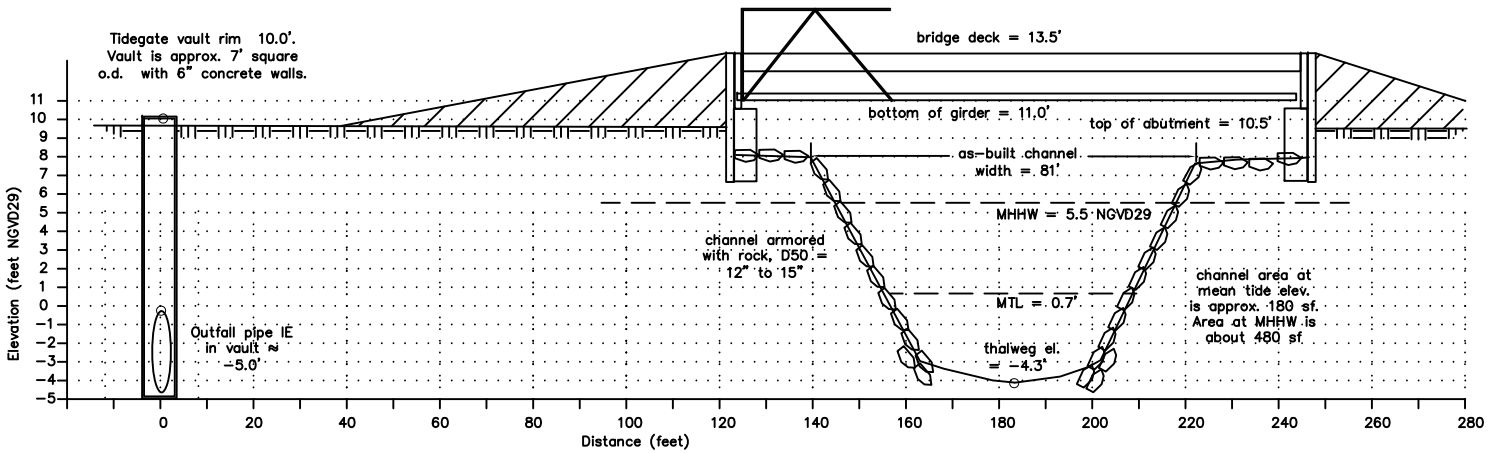
Main Channel Cross Section at Sta. 1+07.
Scale 20' H = 10' V



Main Channel Cross Section at Sta. 6+89. Scale 20' H = 10' V



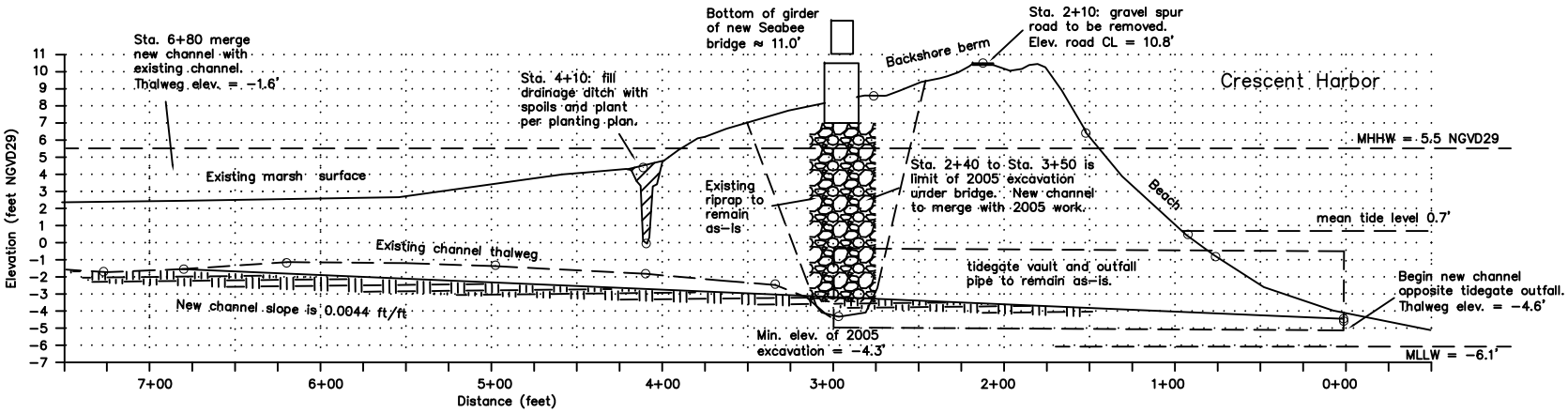
Main Channel Cross Section at the New SeaBee Bridge. Scale 40' H = 10' V



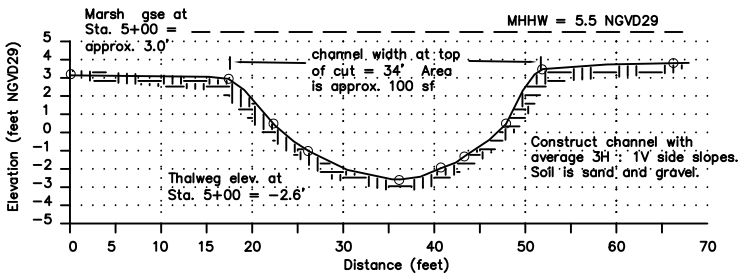
In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 12 of 17 Date: 11–20–07

Exhibit: Channel Outlet Area: Existing Section & Profiles
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

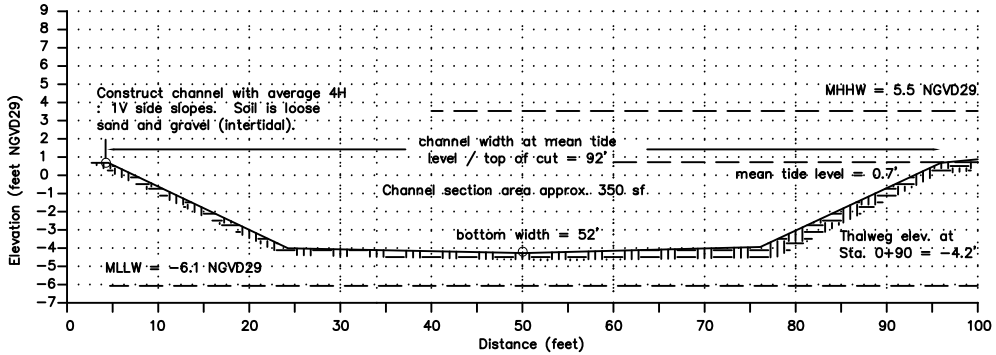
Proposed New Outlet Channel Profile Scale 100'H = 10' V



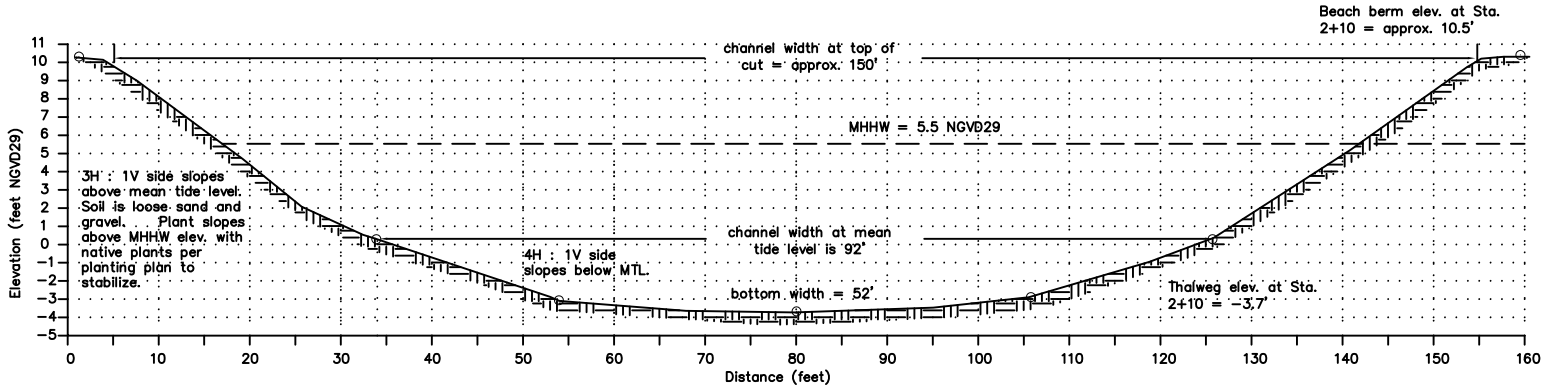
Typical Proposed Outlet Channel Cross Section Upstream End (Sta. 5+00). Scale 20' H = 10' V



Typical Proposed Outlet Channel Cross Section at MTL on Beach (Sta. 0+90) Scale 20' H = 10' V

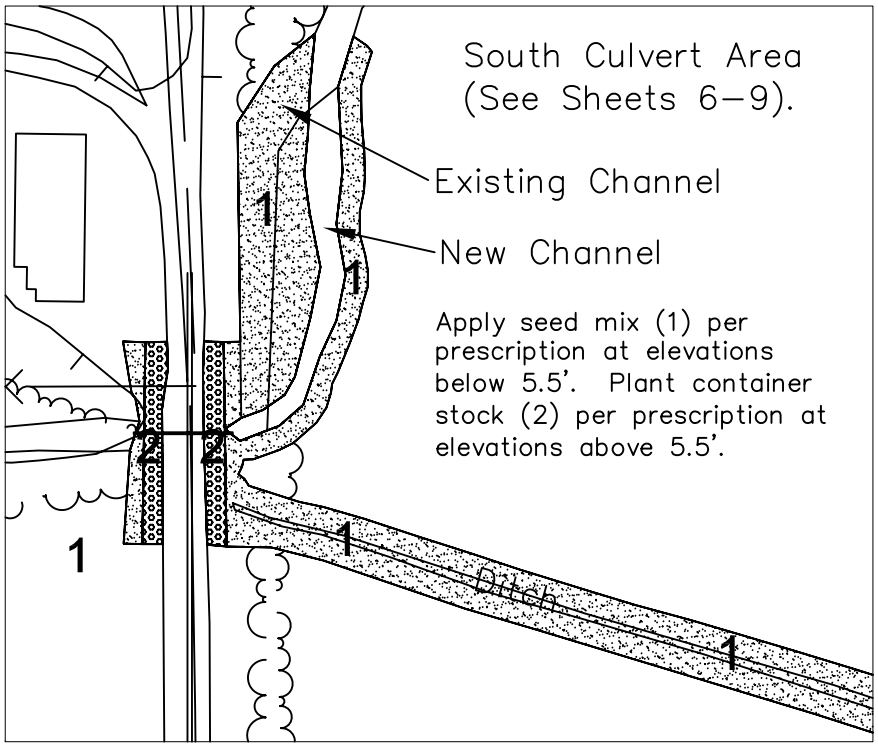


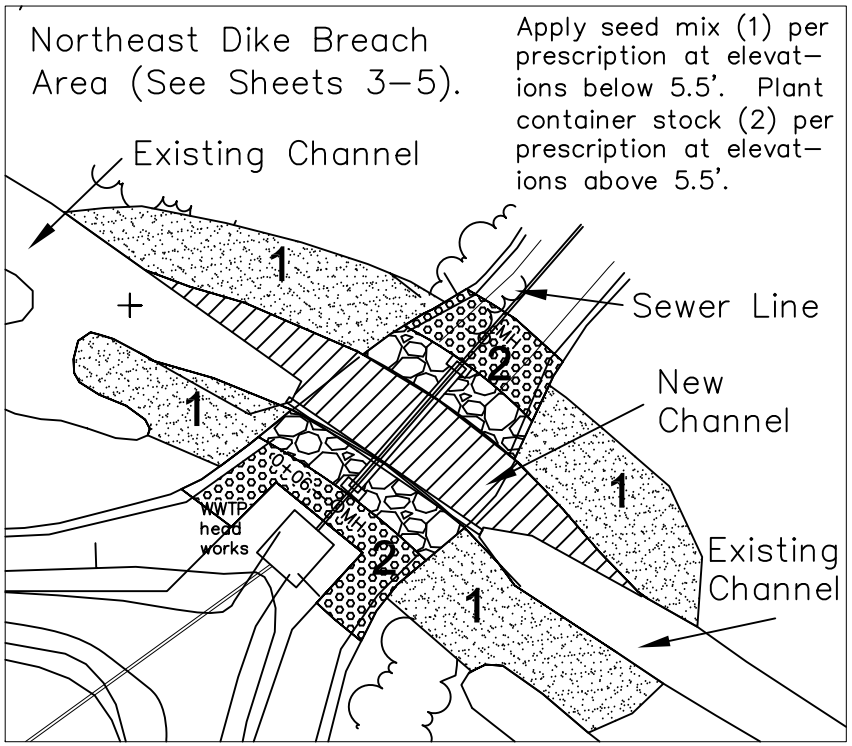
Typical Proposed Outlet Channel Cross Section at Beach Berm Crest (Sta. 2+10) Scale 20' H = 10' V

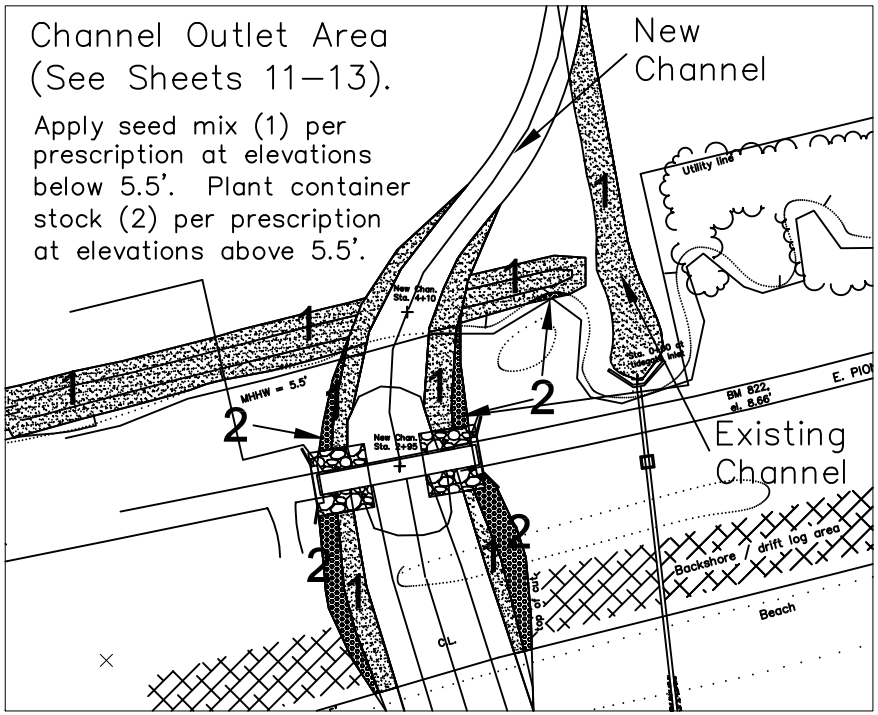


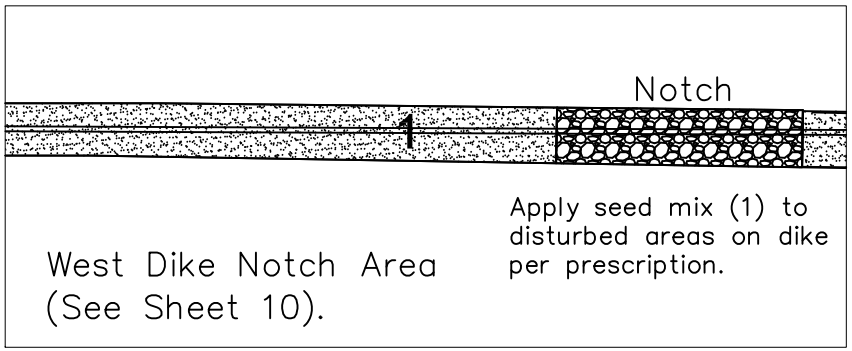
In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 13 of 17 Date: 12-15-07

Exhibit:
Proposed Outlet Channel Section & Profile
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration









Planting Key

Code	Description	Qty
1	Equal ratio seed mix of *Salicornia l.*, *Distichlis spicata, Atriplex patula, and Agrostis stolonifera*, spread at 3.5 lbs/acre.	5.3lbs seed
2	Equal ratio container-grown stock mix of *Rosa nootkana, Lonicera involucrata, and Salix spp.*, planted at 4' separation.	3x150 stems

In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
Applicant: Naval Air Station Whidbey Island
Sheet: 14 of 17 Date: 1-21-08

Exhibit:
Proposed Planting Plan
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

Construction Plan and Temporary Erosion and Sediment Control Plan

Overview

The construction and TESC plan is organized according to the four work areas at the Crescent Harbor site: 1) northeast sewer dike breach, 2) south channel area, 3) west dike notches and 4) outlet channel area. All work will be done during dry weather conditions between July and September, in accordance with all conditions of the Section 404 permit and WDFW HPA.

Prior to beginning any excavation work, the existing tidegate at the marsh outlet channel will be closed after the ebb of a very low tide, when most of the water in the marsh's tidal channels has drained out. The tidegate will be kept closed for the duration of the construction work. In the unlikely event that heavy rain refills the channels, work will be stopped and the tidegate reopened on a low tide to drain the accumulated runoff.

Work will be done using the equipment described for the four distinct work areas. Equipment shall operate "in the dry" (drive trains shall not contact water) and shall follow a spill prevention and control plan to be developed as part of the permit conditions.

The following table summarizes the estimated quantities of excavation and fill, areas of wetland impacted, and other relevant work quantities. Each work item is described in the text for the associated work area.

Summary of Estimated Work Quantities

Item	NE Dike Breach	South Channel Area	West Dike Notches	Channel Outlet Area	Total
Length of new channel excavated	200 LF	210 LF	0	680 LF	1,090 LF
Length of ditch and existing channel filled	0	530 LF	0	700 LF	1,230 LF
Area of wetland converted to open channel	0.03 ac.	0.11 ac.	0	0.22 ac.	0.36 ac.
Area of ditch & exist. channel converted to wetland	0	0.17 ac.	0	0.28 ac.	0.45 ac
Quantity of total excavation	1,600 cy	510 cy	70 cy	10,720 cy	12,900 cy
Quantity of excavation in wetland or below MHHW	70 cy	350 cy	0	2,850 cy	3,270 cy
Quantity of fill placed in exist. channels & ditches	0	410 cy	0	1,480 cy	1,890 cy
Quantity of other fill (not in channels)	90 cy rock armor	140 cy backfill	50 cy rock armor	0	280 cy
Balance of excavated soil left over					10,870 cy

Northeast Sewer Dike Breach Area (See Sheets 3–5)

1. Work will be done using a tracked excavator loading a dump truck. Both will operate on the existing dikes. Access to the work area will be along the road on the east side of the WWTP lagoon. The excavator will start on the far (north) side of the cut and work backwards towards the WWTP. In general, the excavator will not drive across the marsh, except when it excavates the new channel on either side of the dike breach, when it will make temporary soil ramps out onto the marsh. The ramps will be removed after the new channel is excavated. No equipment will operate in the channel itself.
2. Prior to beginning excavation, approx. 300 feet of temporary bypass sewer will be installed from Manhole #207 to the WWTP headworks. The bypass will consist of 6" flexible PE drain pipe attached to a pump. The temporary pipe and pump will be moved around as needed during excavation of the dike breach. After setting up the bypass, the existing 10" sewer line will be cut on either side of the dike breach.
3. The new manhole and bridge abutments on the north side of the breach will be constructed and the new, prefabricated pipe crossing structure will be placed on the north side.
4. The excavator will excavate soil from the breach and new channel sections, moving backwards towards the WWTP as it goes along. Soil will be loaded into the dump truck and temporarily dumped at the staging area at the pullout along the WWTP driveway (see Figure 2). Rock armoring will be placed on the sides of the cut in the same sequence as excavation. Estimated quantity of dike excavation is 1,530 cy. Estimated quantity of marsh soil excavated = 30 cy. Total = 1,600 cy. Area of wetland excavated/converted to open channel = 0.03 ac. No fill placed in wetland or channel.
5. After completing the excavation and armoring, the new manhole and bridge abutments will be constructed on the south side. The crossing structure will be pulled across the breach and bolted in place to the abutments.
6. Approx. 72 feet of new, 10" diameter ductile iron sewer pipe will be installed between the two new manholes. The cut ends of the existing sewer pipe will be attached to the manholes. Installation can be done from the new crossing structure. After completion, the temporary sewer bypass will be removed.

In: Crescent Harbor Marsh. Datum: NGVD29 = 0.0'
Near: Oak Harbor, Island Co., Wash. Lat. 48.301°N, Lon. 122.610°W, Sec. 31 T33, R2E
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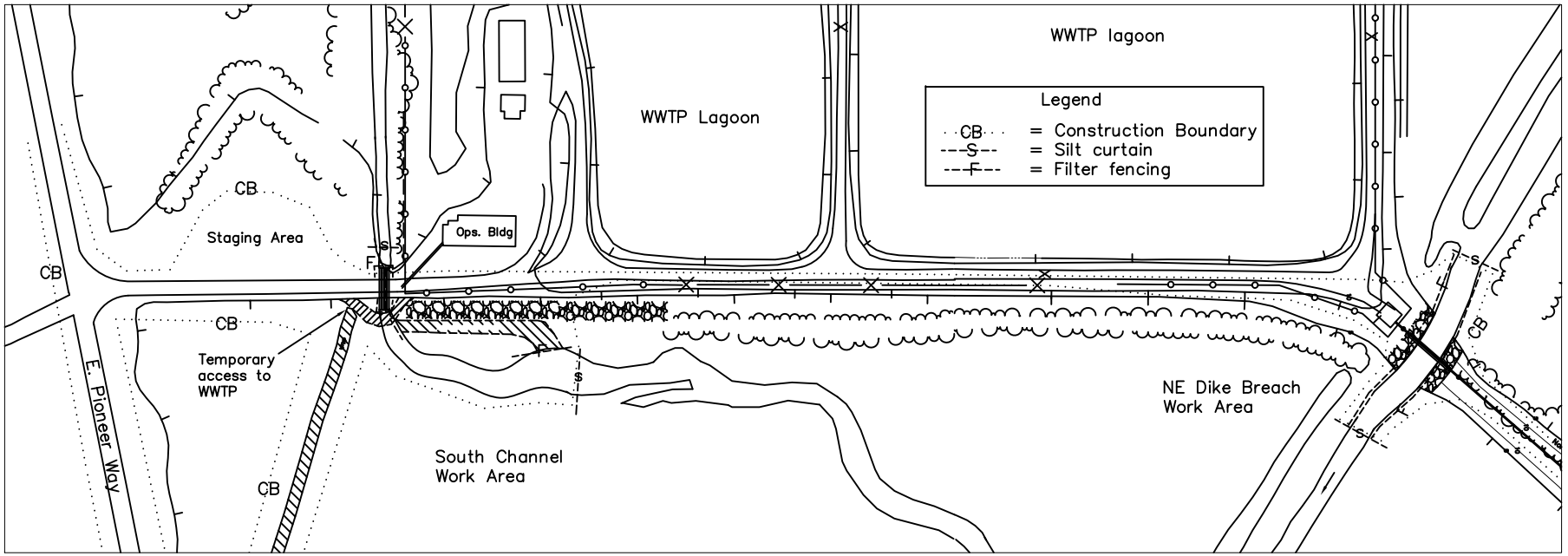
Exhibit:
Construction and TESC Plan
Reference No.:
Proposed: Breach dikes, excavate channels and fill
Purpose: Salt marsh habitat restoration

Construction Plan and TESC Plan (continued)

Water Quality Protection BMPs for NE Dike Area

1. Silt curtain will be placed in the (dry) tidal channel approximately 50 feet upstream and downstream of the dike.
2. The existing 4.5' diameter culvert through the dike will be left in place for as long as possible to allow water to flow out of the upstream marsh in the event of heavy rainfall.
3. During construction of the footings for the rock armoring of the sides of the breach, the footing trenches shall be isolated by means of plastic sheet piling and shall be dewatered with a pump. Pump discharge will be directed to the surrounding marsh.
4. After completion of excavation, fabric filter fencing will be placed around the perimeter of the excavated area. All disturbed soil areas will be seeded with native marsh vegetation per the planting plan.

TESC BMPs: South Channel and NE Dike Breach Work Areas



South Channel Area (See Sheets 6–9)

1. Work will be done using a tracked excavator, a dump truck, a tracked "bobcat" loader and a small bulldozer. The construction of the new culverts will be staged from the WWTP driveway. Temporary access to the WWTP will be provided by filling the channel immediately downstream (east) of the existing culvert and ballasting the surface with crushed rock. This fill material will be removed during construction of the new channel, after the new culverts are in place. No equipment will operate in the channel itself.
2. Prior to beginning excavation, test pits will be dug to locate the exact position of the 20" force main (and the abandoned 18" concrete sewer, if it's still there). The excavator will then carefully dig the cut for the new culverts without damaging the existing sewer pipe(s). The soil located directly under the force main will be removed either by hand or by a small excavator, such as a Kubota, as needed. Timber cribbing will be placed under the force main to support it. The excavation trench will be isolated with plastic sheet piling and dewatered with a pump. Pump discharge will be directed to the staging area south of the cut.
3. After preparing the subgrade, four corrugated PE culverts will be pulled/pushed under the force main using the small excavator and manual labor. Fish gravel will be placed in the culverts and then they will be backfilled to grade using stockpiled excavation spoils. The slopes of the fill will be armored per Sheet 11. The road surface over the cut will be repaved per Oak Harbor specs. Quantity of excavation is 160 cy. Quantity of backfill is 140 cy. Quantity of fish gravel and 4" angular is about 3 cy each.
4. Excavation of the new channel downstream of the new culverts will be done using a tracked excavator operating on mats or large logs to keep it from bogging down and rutting the marsh. The excavator will remove soil from the new channel alignment and dump it in piles. A small bulldozer or the tracked bobcat will then grade the spoils into the existing borrow ditch along the toe of the dike, up to the level of the surrounding marsh. Excess spoils will be loaded onto a dump truck, which will be staged on the WWTP driveway, and then dumped at the staging area at the driveway pullout. Quantity of excavation is about 350 cy. Quantity of fill is about 130 cy. Area of wetland excavated is about 0.11 ac. Area of borrow ditch filled/converted to wetland is about 0.06 ac.
5. The balance of the spoils will be used to fill the drainage ditch located north of E. Pioneer Way. The bobcat will fill the ditch with spoils starting from the west (driveway) end, forming a firm surface to drive on as it goes along. Quantity of fill = 280 cy, including spoils stockpiled from the NE dike breach task. Area of ditch filled/converted to wetland = 0.11 ac.

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Construction Plan and TESC Plan (continued)

Water Quality Protection BMPs for South Channel Area

1. Silt curtain will be placed across the (dry) tidal channel approximately 20 feet upstream and downstream of the construction area.
2. After completion of excavation, fabric filter fencing will be placed around 1) the toe of the culvert work area and 2) along the face of the borrow ditch fill where it intersects the tidal channel.
3. All exposed soil areas (except new channel bed) will be planted with native marsh vegetation per the planting plan.

West Dike Notches (See Sheet 10)

1. Work will be done using a tracked bobcat loader and/or small bulldozer operating on the existing sewer line easement/levee. Work will be staged from the easement on the hillside east of Torpedo Road.
2. The bobcat or dozer will excavate the notches per the design on Sheet 13. Excavated soil will be spread evenly over the surface of the dike or on the easement on the staging area. Quantity of excavation is 70 cy.
3. The loader will place the drain rock (17 cy) and 4" quarry spall (33 cy) on the notches. All work will be done within the footprint of the existing levee; no fill shall be placed in the wetland.

Water Quality Protection BMPs for West Dike Notches

1. Filter fabric fencing will be placed along the toe of the sides of the notches.
2. All exposed soil areas shall be seeded with native cover grass (such as NRCS red fescue mix) and mulched with straw.

Channel Outlet Area (See Sheet 11–13)

1. Work will be done using one or two large, tracked excavators, two dump trucks, a tracked bobcat loader, and a bulldozer. The work will be staged from the gravel haul road in the vicinity of the 2005 Seabee bridge. The excavator(s) will operate on mats or large logs when working in the salt marsh north of E Pioneer Way to avoid rutting the soil and bogging down.
2. Prior to beginning excavation, the existing electrical line that crosses the outlet channel north of E. Pioneer Way will be relocated. The contractor will locate the determine the precise location of the line and shall excavate new utility trenches per the utility owner's requirements, following the general alignment shown on Sheet 6. The line will be cut, routed through the trenches, across the Seabee bridge via a new conduit, and spliced to the rest of the line on the east side of the outlet channel.
3. Excavation of the new channel will start at the upstream end and work towards the beach. A temporary "plug" of undisturbed earth will be left at the confluence of the new and old channels to reduce the amount of water seeping into the new excavation. This plug will be removed just before making the final connection to the beach.
4. Excavation spoils will first be graded into the the existing outlet channel from Sta. 0+00 (i.e. at the tidegate inlet) to Sta. 3+00, up to the level of the surrounding marsh. Spoils will then be graded into the eastern half of the drainge ditch along E. Pioneer Way, using the same method as listed in Item 5 for the South Channel area. The existing tidegate, vault, and outfall pipe will be left in place.
5. Excavation will continue through the back beach area, merging with the existing cut under the Seabee bridge and through the crest of the beach berm. Excess excavation spoils will be loaded into the dump trucks and trucked to the staging area at the pullout along the WWTP driveway. This material will either be used to construct flood protection berms along E. Pioneer Way or at the south side of the WWTP; or will be spread evenly of the existing filled area located south of the WWTP, depending on the results of the supplementatl hydrologic modeling study. In no event shall the spoils be placed in juirisdictional wetlands or below the MHHW line. Total quantity of excavation is approx. 10,720 cy. Total quantity excavated from wetland is approx. 1,040 cy. Quanity excavated from below MHHW on the beach is 1,810 cy. Quantity of fill placed in the channel and drainage ditch is 1,480 cy. Balance of fill hauled to the staging area is approx. 9,240 cy. Area of wetland excavated / converted to open channel is 0.22 ac. Area of existing channel filled is 0.28 ac.
6. Once the excavation reaches the MHHW on the beach, work will be done only during low tides and in accordance with the beach–specific BMPs. Work on the beach will be done using the dozer, pushing the excavated sand and gravel up the beach to the drift log line (EHW line), where an excavator can load it into the dump trucks. The area of excavation below the MHHW line is 0.30 ac.

Water Quality Protection BMPs for Channel Outlet Area

1. A silt curtain will be placed across the outlet channel immediately upstream of the excavation area. Fabric filter fencing will be placed along the edge of the new channel through the salt marsh.
2. All disturbed soil in the salt marsh will be planted with native marsh plants per the planting plan.
3. All work on the beach will be be timed for low tide, so that the drive trains of the equipment do not come into contact with water. .
4. Filter fencing will be placed at the shoreward edge of the beach work.
5. A spill prevention and control plan will be developed and followed as part of the permit conditions.

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