County: **Skagit County**
Grant No: **SEANWS-204-SkCoPW-0003**

PROJECT TITLE: **Northwest Straits Project: Skagit County MRC Operations and Projects**

TASK NUMBER: **5.5**

DELIVERABLE: **Bowman Bay Nearshore Restoration Project Design**

PERIOD COVERED: **Oct 1, 2014 – June 30, 2015**

DATE SUBMITTED: **July 16, 2015**


This project has been funded wholly or in part by the United States Environmental Protection Agency. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

# Bowman Bay Bulkhead Removal
# Special Provisions Specifications
# Final

**Prepared for: Northwest Straits Marine Conservation Foundation & Skagit MRC**

**Prepared by: Coastal Geologic Services Inc.**

**April 30, 2015**

## Introduction and Purpose

The purpose of this document is to briefly detail the technical specifications pertaining to bulkhead removal and shoreline restoration/enhancement for Bowman Bay, a pocket beach located at Deception Pass State Park in Skagit County, Washington. Responsibilities of the contractor during construction, best management practices and technical specifications for design are detailed within this document.

## Contractor Responsibilities During Construction

The Contractor shall continue to inform the Owner's Representative of changes in the construction plans or schedule once construction has commenced. The Contractor shall notify the Owner's Representative of upcoming ground disturbing activities a minimum of 24 business hours in advance of planned construction.

All utilities shall be located before construction to ensure utilities are not damaged.

Archaeological or historical objects or materials that may have significance from a historical or scientific standpoint, which may be encountered by the Contractor, shall not be further disturbed. The Contractor shall immediately notify the Owner's Representative of any such finds.

The Contractor shall be watchful for indicators of unidentified cultural materials. These indicators will be discussed in the Pre-Construction briefing. If indicators are present at any time, the Contractor shall immediately notify the Owner's Representative.

The activities described above are considered incidental to the Contract. There will be no separate measurement or payment for these activities.

## Best Management Practices (BMPs)

The Contractor shall control its work to comply with all federal, state, and local project permits for the protection of wildlife and the environment.

BMPs include but are not limited to the following:

- The Contractor shall schedule all activities to minimize the length of time during which there is in-water work to minimize impacts to aquatic resources
- Timing of construction activities is to occur during daylight hours
- The contractor shall have a spill containment kit on-site
- The Contractor shall access the project from the uplands during low tide cycles
- Install temporary erosion control BMPs
- When feasible, the Contractor shall reduce the potential for soil compaction from equipment use and transport by sequencing construction phases to initiate work at locations further from the project access point and then working to "back out" of the site at final project completion
- The Contractor shall comply with all timing restrictions as specified by the permits

BMPs shall be followed to reduce erosion, reduce environmental impact, and maintain a safe work area. There shall be no separate payment for BMPs. No additional payment shall be made for BMPs. This work shall be incidental to the Lump Sum Bid Item included in "Mobilization".

# Technical Specifications for Design

Design elements detailed within this specification document include rock bulkhead removal, storm drain protection, regrading, sediment import, limited area shore stabilization using reuse rock near the pier, trail realignment, large wood import, park infrastructure relocation, and stabilized construction entrance. Sediment import details beach nourishment, backshore fill, and topsoil.

## Mobilization

This item shall consist of preparation work and operations performed by the Contractor. Mobilization shall also include Demobilization in accordance with the pay schedule identified herein. In addition, all costs for acquiring, preparing, and cleaning up the staging area for the project will be considered part of this item. Based on the lump sum contract price for, "Mobilization", partial payments can be made.

Payment for "Mobilization" shall be per lump sum. Mobilization shall include moving and removing equipment to the job site, inspections and testing; acquisition and payment for permits, fees, bonds and insurance.

## Clearing and Grubbing

This item shall consist of clearing and grubbing for construction and cleanup as shown on the plans. Included in this item is the removal and disposal of all vegetation, concrete pads, gravel trail, and other materials within the clearing limits. Some materials shall be salvaged and stockpiled for reuse in the project.

The clearing limits shall be marked in the field by the Contractor and shall be approved by the Owner's Representative before commencing work.

Park infrastructure within the clearing limits such as benches, picnic tables, and BBQ pits shall be removed, salvaged, and stored in a dry protected location. Park infrastructure damaged during removal and storage shall be replaced at no cost or expense to the Owner. Gravel in the current trail within the clearing limits can be salvaged, stockpiled, and used in the new trail as described in the later section.

Payment for "Clearing and Grubbing" shall be per lump sum basis. The lump sum price shall be full compensation for all costs incurred for clearing, grubbing, removing, and disposing or stockpiling as specified.

## Bulkhead Removal

Approximately 1,330 cubic yards (CY) of rock (both armor stone and quarry spall) within the current bulkhead will be removed. The bulkhead within seven (7) ft north or south of the pier and associated concrete spillway shall remain as per plan. All armor stone and quarry spall shall be removed within the bulkhead removal area. Approximately 25 CY of rock will be reused within the limited area shore stabilization structure around the pier connection to the shore discussed later in this document. The largest armor stones within the current bulkhead that meet specifications below shall be reused in the pier connection. Up to 19 CY of quarry spall will be reused in the shore stabilization construction near the pier. Rock reuse is detailed in *Shore Stabilization* later in this document.

All removed material will be disposed of in an approved upland disposal area or transported to a facility designated by State Parks as follows:

- All quarry spall will be removed and transported to the Cornet Bay retreat center.
- All armor stone rock between the sizes of 8 and 12 cubic feet will be removed and transported to the storage area at the Hoypus Point storage area located at the Cornet Bay Day Use Area.
- All other rock will be removed and transported as directed by Parks.

All large wood within the bulkhead removal area shall be stockpiled during bulkhead removal and replaced within the project area as details in the Large Wood section later in this document.

Payment for "Bulkhead Removal" shall be per lump sum. The unit price per lump sum shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to remove, load, and dispose of the bulkhead.

## Storm Drain Protection

Care shall be taken when excavating near the known 18-inch storm drain within the bulkhead removal area. The storm drain alignment will not change with this project. The existing storm drain shall be protected in place. Hand excavation will be required around storm drain in the bulkhead removal and regrading area.

The activities described are considered incidental to the Contract. There will be no separate measurement or payment for these activities.

## Regrading

The voids left by bulkhead removal will be graded for a consistent slope of 5:1 (H:V) slope. The toe of the bulkhead removal area shall begin at 9.5 ft MLLW and will maintain a consistent slope of 5:1 (H:V) to 14 ft MLLW.

There shall be no separate payment for regrading. Regrading activities are included in the unit ton price for sediment import materials described in the following section.

## Sediment Import: Beach Nourishment, Backshore Fill and Topsoil

Approximately 1,350 tons of beach nourishment sediment shall be imported to fill the uppermost 2 ft of voids left by bulkhead removal to maintain the consistent 5:1 slope from +9.5 ft MLLW to +14 ft MLLW.

***Beach nourishment sediment specifications are as follows:***

- Materials shall be free from dirt, clay, sand, rock fines, fractured rock, and other materials not meeting the requirements of this section.
- Materials shall be naturally occurring.
- Beach nourishment material shall be composed of sound durable rock with less than 15% having any cleavage or fractures.
- Materials shall be free of thin, flat and elongated pieces
- Materials shall not contain organic matter considered objectionable by the Engineering Geologist.
- Material samples must be submitted and approved by the Owner and Engineering Geologist.
- Specifications by weight for beach nourishment material are as follows:

| Screen/Sieve | Percent Passing |
|---|---|
| 6 IN | 100 |
| 2 IN | 90-100 |
| 1 IN | 55-80 |
| ½ IN | 10-30 |
| #10 (2.0mm) | 0-10 |
| #100 | 0-5 |

Beach nourishment material shall also be placed within the small boat access corridor near the parking lot as detailed in the *Small Boat Access Corridor* section.

Payment for "Beach Nourishment" shall be per ton based on truck ticket from certified scale. No change in unit price will be given for quantity overruns or underruns. The unit price per ton shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to import, place, and grade as per plan.

Approximately 290 tons of imported beach fill material can be used to fill the void left by bulkhead removal below the uppermost 2 ft of the finished beach surface as per plan.

***Beach fill specifications are as follows:***

- Materials shall be naturally occurring.
- Onsite salvage material from regrading is allowed for beach fill materials as long as the salvaged material does not contain organic material. Quarry spall maybe not be used as beach fill.
- Material samples must be submitted and approved by the Owner and Engineering Geologist.
- Beach fill material can be pit-run.
- Specifications by weight for beach fill material are as follows:

| Screen/Sieve | Percent Passing |
|---|---|

| | |
|---|---|
| 6 IN | 75-100 |
| 1 ½ IN | 70-85 |
| ¾ IN | 40-80 |
| ¼ IN | 30-55 |
| #10 (2.0mm) | 0-20 |
| #40 (0.42mm) | 0-10 |
| #100 | 0-5 |

Payment for "Beach fill" shall be per ton based on truck ticket from certified scale. No change in unit price will be given for quantity overruns or underruns. The unit price per ton shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to import, place, and grade as per plan.

***Approximately 300 tons of topsoil will be used within the regraded planting areas above +14 ft MLLW to 6 IN depth as per plan. Topsoil specifications are as follows:***

- Materials shall be naturally occurring.
- Materials shall be screened and weed free.
- Materials shall approximate natural soil conditions (i.e. sandy loam with <30% compost).
- Material samples must be submitted and approved by the Owner's Representative.

Payment for "Topsoil" shall be per ton based on truck ticket from certified scale. No change in unit price will be given for quantity overruns or underruns. The unit price per ton shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to import, place, and grade as per plan.

## Shore Stabilization

Approximately 16 of the largest rocks (at least four man rock as per WSDOT 9-13.7-1) within the current bulkhead shall be salvaged and reused to extend the bulkhead landward at the connection of the pier to the trail as per plan. Approximately 6 CY of reuse three man rock from the current bulkhead shall be used for shore stabilization under the pier as per plan. Approximately 250 square feet (SF) of geotextile coverage will be needed for shore stabilization construction (50 SF under the pier and 200 SF landward of the current bulkhead). Up to 19 CY of quarry spall (2 to 4 CY under the pier and 6.5 to 13 CY landward of the current bulkhead) will be needed for bulkhead extension construction. Care shall be taken when excavating under the pier and around the pier supports. Any material immediately adjacent to creosoted wood pier supports shall be disposed of appropriately.

The bulkhead within ten (10) ft north or south of pier and associated concrete spillway shall remain as per plan.

Shore stabilization specifications are:

- The sediment adjacent to the pier landward of the current bulkhead shall be excavated at minimum of 4 ft below finished grade.

- The sediment under the pier and landward of the pile shall be excavated at a minimum of 4 ft to allow for 1 ft thickness of quarry spall and 3 ft thickness of 3 man rock. The existing piles shall be protected in place.
- The subgrade of the bulkhead extension shore stabilization structure will be covered with nonwoven geotextile filter fabric (Mirafi, FW400 or FW402, or US Fabrics US670) with at least 2.0 ft of additional geotextile material on the top and bottom. Overlap geotextile fabric a minimum of 3.0 ft. Notwithstanding the above, Geotextiles shall conform to WSDOT 2014 Section 9-33.2 Table 3. Owner's Representative must approve of geotextile placement during periodic inspections.
- A minimum of 1.0 ft thickness of quarry spall should be placed on top of the filter fabric and compacted with the bucket of the excavator to achieve a firm, unyielding level of compaction with a near-horizontal top surface. The placement and compaction must be approved by the Owner's Representative. The extra geotextile shall be folded over the quarry spall.
- All rock used as armor stone within the north revetment wall shall be sound, hard, angular, and durable. Armor rock shall be free from laminations or weak cleavages. Sedimentary material is not acceptable. The rock shall be free from thin, shabby pieces having a maximum dimension of more than three and one half times (3.5 x) the least dimension.
- Reuse armor rocks are to be tightly stacked with a minimum of 3 points of contact.
- Place armor rocks to required thickness and grades, generally individually placing stone to ensure that exposed rock has a minimum of voids, limited to less than 6 by 6 IN. Owner's Representative must approve of bedding layer compaction and thickness as well as armor stone placement during periodic inspections.
- Final placement must be approved of by Owner's Representative.
- Armor rock descriptions follow 2014 WSDOT standard specifications Division 9-13.7(1)

Payment for "Shore Stabilization" shall be per lump sum. The unit price per lump sum shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to remove select rock from bulkhead head, onsite handling, import materials such as geotextile, minor excavation, and place rock and geotextile as per plan.

## Trail

Salvaged gravel courses from demolished existing gravel trail can be used in the new trail as per plan. Crushed surfacing base course depth and size of aggregate shown is minimum requirement. The lower layer shall have 6 IN depth using 1.5 IN minus crushed surfacing base course to 95% compaction. The base course of the new trail shall have 3 IN depth using 5/8 IN minus to 95% compaction. The new 6 ft wide trail shall have a 2% slope to a centerline crown with 1 ft shoulder on each side under proposed grade as per plan.

Payment for "Trail Realignment" shall be per square foot installed. The unit price per square foot shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to salvage existing gravel within current trail, onsite handling, materials import, and placement. No change in unit price will be given for quantity overruns or underruns.

## Large Wood Import and Placement

At least nine (9) pieces of large wood shall be procured and placed with this project installation. Large wood pieces shall be at least 18 IN in diameter and at least 16 ft long. Large wood pieces shall not be treated with any chemicals. Large wood shall be placed within the proposed dunegrass planting area at

approximately 12 ft to 14 ft MLLW elevation as per plan. Boom sticks can be used for large wood pieces if all other specifications are met. The lower one third of the cross sectional area of each log shall be placed below adjacent grade.

All large wood currently within the project area shall be stockpiled during bulkhead removal and replaced within the project site at similar elevations as imported large wood. Onsite wood cannot be used to supplement required nine (9) imported pieces.

To allow for common bids, nine (9) pieces has been assumed. Actual number of large wood pieces placed will depend on budget and price provided by the contractor.

Payment for "Large Wood Import and Placement" shall be per each. The unit price per each shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to import and place large wood pieces. No change in unit price will be given for quantity overruns or underruns.

## Small Boat Access Corridor

A 30 ft wide area between the boat ramp and the vegetation area on the northern extent of the bulkhead removal area will be unvegetated to allow for small boat access to the beach from the parking lot as per plan. This area will be 1 ft thick of beach nourishment material import.

There shall be no separate payment for small boat access corridor. Small boat access corridor activities are included in the unit ton price for sediment import materials described in the Sediment Import section.

## Park Infrastructure Salvage, Protect, and Relocate

The four current picnic tables and BBQ stands within the trail realignment area shall be relocated as per plan. The current picnic table and BBQ stand concrete pads will be demolished and recycled. If recycling is not an option, the demolished materials shall be disposed of in an approved contractor-chosen upland location.

The concrete slabs will have a minimum of 6 IN thickness with #3 rebar on 18 IN centers each way. Concrete shall be as per WSDOT Specification 6-02. The subgrade of the concrete pads shall be 3 IN thickness of compacted to 95%.

Two benches will be relocated as per plan. The relocated benches will be placed within the proposed bench extensions of the gravel trail. Ensure the bench with Elizabeth Rose Gould name plaque is relocated closest to the small boat access corridor. Hardware needed for installation is included in the per each unit price.

Park infrastructure shall be stored in a dry protected location. Park infrastructure damaged during removal and storage shall be replaced at no cost or expense to the Owner.

Hardware needed for import and park infrastructure placement on concrete pads are included in the per each unit price.

Payment for" Picnic Table and BBQ stands" shall be per each. The unit price per each shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to demolish existing pads, disposal, protect park infrastructure, import materials, form the concrete

including rebar, pour concrete, finish concrete, and park infrastructure placement. The unit price per each includes both the picnic table and the BBQ stand as one.

Payment for "Park Bench" shall be per each. The unit price per each shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to demolish existing pads, disposal, protect park infrastructure, import materials, form the concrete including rebar, pour concrete, finish concrete, and park infrastructure placement.

## Stabilized Construction Entrance

Temporary stabilized construction entrance shall be constructed as per plan prior to beginning any clearing, grubbing, embankment or excavation. All quarry spall material used for stabilized construction entrance shall be free of extraneous materials that may cause or contribute to track out.

When the stabilized entrance no longer prevents track out of sediment or debris, the Contractor shall either rehabilitate the existing entrance to original condition, or construct a new entrance.

Payment for "Stabilized Construction Entrance" shall be per lump sum. The unit price of lump sum shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to construct, operate, maintain and remove the stabilized construction entrance.

## Optional Bid Item - Temporary Fence

Approximately 750 linear ft of temporary fence shall be placed as per plan or directed by the Owner's Representative. Temporary fence shall be made from commercially available post and two rail wood fence of good quality fir, hemlock or equivalent material, treated to resist rot, as approved by the Owner's Representative. Posts shall be 5 IN to 6 IN average diameter and at least 6 ft long. The posts shall be spaced 8 ft on center and sunk securely at least 2 ft into the ground so that the top of the post is at least 36 IN above round. The base of the post shall have a sturdy cross piece, rebar pin, or equivalent method to anchor the post below ground. The top of each post shall be cut on a bevel to drain off water. Rails shall be 3 IN to 4 IN average diameter, spaced at 20 IN on center and 40 IN on center above the ground respectively. The posts shall be notched to fit the rails and the rails bolted into the notches using galvanized lag bolts.

Temporary fence is an optional bid item.

Payment for "Temporary Fence" shall be per linear foot. The unit price of linear foot shall be full compensation for all costs incurred for all material, labor, tools, equipment, and incidentals required to import materials, onsite handling, and placement. No change in unit price will be given for quantity overruns or underruns.

## Logistics and Planning

Upland access is feasible for bulkhead removal and nearshore enhancement. The expected general construction sequencing would be the following:

1. Prepare the site for access
2. Mobilize to the project site
3. Install temporary erosion control BMPs
4. Demolish the bulkhead
5. Sort out acceptable armor stone and quarry spall for shore stabilization near pier connection

6. Load the debris for export to an approved upland disposal location if not feasible for recycling
7. Import beach fill
8. Fill voids with regraded sediment and beach fill import
9. Prepare subgrade for beach nourishment import
10. Import, place, and grade beach nourishment
11. Prepare trail realignment and picnic pad/bench relocation areas
12. Relocate picnic tables and benches
13. Import and place topsoil
14. Place large wood
15. Clean-up the site and reestablish disturbed lawn areas.

## Limitations of This Report

This report was prepared for the specific conditions present at the subject property to meet the needs of specific individuals. No one other than the client should apply this report for any purposes other than that originally contemplated without first conferring with CGS. The findings and recommendations presented in this report were reached based on a brief field visit. This report does not reflect detailed examination of sub-surface conditions present at the site, or drainage system designs, which are not known to exist. It is based on examination of surface features, bank exposures, soil characteristics, vegetation characteristics, and beach processes. In addition, conditions may change at the site due to human influences, floods, groundwater regime changes, or other factors.

## References

WSDOT. 2014. Standard Specifications for Road, Bridge and Municipal Construction, www.wsdot.wa.gov/publications/manuals/m41-10.htm.

**Coastal Geologic Services, Inc.**

**ATTACHMENTS:**

**Sheet 1.** Bowman Bay Nearshore Restoration Cover Sheet

**Sheet 2.** Site Plan – Existing Conditions

**Sheet 3.** Site Plan – Erosion Control Plan

**Sheet 4.** Site Plan – Proposed Conditions

**Sheet 5.** Cross Sections

**Sheet 6.** Details

# BOWMAN BAY
## NEARSHORE RESTORATION

SURVEY NOTES:

HORIZONTAL DATUM: COORDINATE SYSTEM CARRIED FROM DRAWINGS FOR SEPTIC REPAIRS; BASED ON LOCATION OF WA STATE PARKS MONUMENTS (WSP1 AND WSP2)

VERTICAL DATUM: LOCAL MEAN LOWER LOW WATER (MLLW) BASED ON ELEVATION STAMPED ON MONUMENTS WSP1 AND WSP2 IN NAVD88. CONVERSION FACTOR:0 FT NAVD88 = 0.39 FT MLLW

TOPOGRAPHIC DATA OBTAINED BY COASTAL GEOLOGIC SERVICES, INC. 1/21/14 USING LIECA TCR-1105 TOTAL STATION WITH DIRECT ROD MEASUREMENTS.

ADDITIONAL TOPOGRAPHIC DATA OBTAINED FROM WASHINGTON STATE PARKS PROVIDED SEPTIC SYSTEM REPAIRS AS-BUILT AUTOCAD DRAWINGS DATED JUNE, 2013.

VICINITY MAP:


INDEX TO DRAWINGS:



MONUMENT LIST:

| NAME | EASTING | NORTHING | ELEV. |
|---|---|---|---|
| WSP1 | 1199209.6019' | 521822.9043' | 14.649' |
| WSP2 | 1198580.9727' | 522592.1244' | 22.596' |
| TBM 9 | 1199118.1770' | 521524.9907' | 14.377' |

DRIVING DIRECTIONS:

FROM WA-20 SOUTHWEST TURN RIGHT ONTO ROSARIO RD. TAKE THE 1ST LEFT ONTO BOWMAN BAY RD. TAKE THE 1ST LEFT.

Proposed: Nearshore Restoration
In: Anacortes
County: Skagit
State: Washington
Application By:
Northwest Straits
Marine Conservation Foundation
1155 N State Street, Suite 402
Bellingham, WA 98225

LAT/LONG: 48°24'57.83" N. LAT.
122°39'3.55"W. LONG.

DATUM
MLLW= 0
MHHW= 7.8'

**60% DESIGN**
**NOT FOR CONSTRUCTION**


COASTAL GEOLOGIC SERVICES
1711 Ellis St, suite 103
Bellingham, WA 98225
360-647-1845 - coastalgeo.com


REVISIONS

DRAWN BY: ADT
DESIGNED BY: ACB
CHECKED BY: JWJ
DATE SURVEYED: 1/21/2014
SURVEYED BY: JFW

BOWMAN BAY NEARSHORE RESTORATION
COVER SHEET / VICINITY MAP
PROJECT NOTES
NORTHWEST STRAITS MARINE CONSERVATION FOUNDATION

DATUM
MLLW= 0'
MHHW= 7.8'

SCALE:
DATE: 6/11/2014
SHEET: 1
OF: 6

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EXISTING RESTROOMS
EXISTING SEPTIC TANKS AND LINES
EXISTING SEPTIC DRAINFIELD
EXISTING LAWN
WSP 1
EXISTING PLAYGROUND
EXISTING STORM DRAIN MANHOLE: IE: 8.85' 18"Ø STORM DRAIN N,S,E,W
EXISTING 18"Ø STORM DRAIN
OUTLINE OF SUBSURFACE CONCRETE
EXISTING DRINKING FOUNTAIN
EXISTING DUNEGRASS
EXISTING PAVED PARKING AREA
GRAVEL PARKING
EXISTING PICNIC TABLES AND GRILL PADS(TYP.)
EXISTING DRINKING FOUNTAIN
GRAVEL PARKING
GRAVEL PARKING
EXISTING LAWN
OHWM
MHHW
TBM 9
EXISTING CONC. SPILLWAY TO REMAIN
EDGE OF MIDDEN AND LW EDGE OF BULKHEAD
EXISTING PIER
OUTFALL OF EXISTING 18"Ø STORM DRAIN (BURIED)
EXISTING CONC. BOAT RAMP
EXISTING DUNEGRASS WITH BOULDERS INTERMIXED
EXISTING BEACH LOG WATERWARD EXTENT
BOWMAN BAY

MONUMENT LIST:

| NAME | EASTING | NORTHING | ELEV. |
|---|---|---|---|
| WSP 1 | 1199209.6019' | 521822.9043' | 14.649' |
| WSP 2 | 1198580.9727' | 522592.1244' | 22.596' |
| TBM 9 | 1199118.1770' | 521524.9907' | 14.377' |

60' 0 30' 60' 120'
SCALE: 1"=60'

LEGEND:

- BUILDINGS/STRUCTURES (EXISTING)
- EDGE OF PAVEMENT (EXISTING)
- EDGE OF GRAVEL PARKING (EXISTING)
- GRAVEL TRAIL (EXISTING)
- CONCRETE (EXISTING)
- OUTLINE OF SUBSURFACE CONCRETE
- WATERWARD EXTENT OF DRIFT LOGS (EXISTING)
- LANDWARD EXTENT OF DRIFT LOGS/EDGE LAWN (EXISTING)
- OHWM (EXISTING)
- MHHW (+7.8 FT MLLW)
- CONTOUR EXISTING
- ROCK BULKHEAD (EXISTING)
- QUARRY SPALLS WITH GRASS INTERMIXED

**60% DESIGN**
**NOT FOR CONSTRUCTION**

COASTAL GEOLOGIC SERVICES
1711 Ellis St, suite 103
Bellingham, WA 98225
360-647-1845 - coastalgeo.com

REVISIONS

DRAWN BY: ADT
DESIGNED BY: ACB
CHECKED BY: JWJ
DATE SURVEYED: 1/21/2014
SURVEYED BY: JFW

# BOWMAN BAY NEARSHORE RESTORATION
## EXISTING CONDITIONS
SITE PLAN
NORTHWEST STRAITS MARINE CONSERVATION FOUNDATION

MLLW= 0'
MHHW= 7.8'

SCALE: 1"=60'
DATE: 6/11/2014
SHEET: 2
OF: 6

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EXISTING RESTROOMS
EXISTING SEPTIC TANKS AND LINES
EXISTING SEPTIC DRAINFIELD
EXISTING LAWN
WSP 1
EXISTING PLAYGROUND
EXISTING PAVED PARKING AREA
GRAVEL PARKING
RELOCATED PICNIC TABLES AND GRILL PADS(4) SEE DETAILS 2 & 3, SHEET 6
EXISTING STORM DRAIN MANHOLE: IE: 8.85' 18"Ø STORM DRAIN N,S,E,W
OUTLINE OF SUBSURFACE CONCRETE
EXISTING 18"Ø STORM DRAIN
FUTURE TOP OF BANK
HYROSEED TRAIL MARGIN
RELOCATED BENCH
EXISTING PICNIC TABLES AND GRILL PADS(TYP.)
REALIGNED 6 FT WIDE GRAVEL TRAIL SEE DETAIL 1, SHEET 6
REMOVE EXISTING
GRAVEL TRAIL
EXISTING DRINKING FOUNTAIN
NEW BACKSHORE PLANTING AREA WITH IMPORTED TOPSOIL
RELOCATED E. R. GOULD BENCH
PROVIDE SMALL BOAT ACCESS CORRIDOR WITH 1' DEPTH BEACH NOURISHMENT
RELOCATE EXISTING BENCH
GRAVEL PARKING
EXISTING LAWN
OHWM
MHHW
GRADE BEACH NOURISHMENT PROFILE TO 5:1 SLOPE
BEGIN BEACH NOURISHMENT PLACEMENT AT 9' ELEVATION
RELOCATE EXISTING BENCH
OUTFALL OF EXISTING 18"Ø STORM DRAIN (BURIED)
EXISTING 18" STORM DRAIN TO REMAIN PROTECT IN PLACE DURING BULKHEAD REMOVAL
EDGE OF MIDDEN AND LW EDGE OF BULKHEAD
PLACE LARGE WOOD MINIMUM 16"Ø, 16' LENGTH (TYPICAL)
EXISTING CONC. BOAT RAMP
EXISTING DUNEGRASS WITH BOULDERS INTERMIXED
EXISTING BEACH LOG WATERWARD EXTENT
BOWMAN BAY
EXTEND REALIGNED TRAIL TO EXISTING PIER
EXISTING DRINKING FOUNTAIN
REMOVE EXISTING QUARRY SPALLS WITH GRASS INTERMIXED
CONNECT REALIGNED TRAIL TO EXISTING TRAIL
EXISTING DUNEGRASS
EXISTING GRAVEL TRAIL
NEW BACKSHORE PLANTING AREA WITH IMPORTED TOPSOIL
TBM 9
EXISTING CONC. SPILLWAY TO REMAIN
ARMOR TO PROTECT EXISTING PIER SEE DETAILS 4 & 5 SHEET 6
EXISTING PIER
A
A'
B
B'
C
C'
D
D'
E
E'
F
F'

60' 0 30' 60' 120'

SCALE: 1"=60'

LEGEND:

- BUILDINGS/STRUCTURES (EXISTING)
- EDGE OF PAVEMENT (EXISTING)
- EDGE OF GRAVEL PARKING (EXISTING)
- GRAVEL TRAIL (EXISTING)
- CONCRETE (EXISTING)
- OUTLINE OF SUBSURFACE CONCRETE
- WATERWARD EXTENT OF DRIFT LOGS (EXISTING)
- LANDWARD EXTENT OF DRIFT LOGS/EDGE LAWN (EXISTING)
- OHWM (EXISTING)
- MHHW (+7.8 FT MLLW)
- CONTOUR EXISTING
- ROCK BULKHEAD (EXISTING)
- QUARRY SPALLS WITH GRASS INTERMIXED
- DUNEGRASS (EXISTING)
- CONTOUR PROPOSED
- REALIGNED 8 FT WIDE GRAVEL TRAIL
- NEW BACKSHORE PLANTING AREA
- BEACH NOURISHMENT/REGRADE AREA
- SHORELINE ARMOR TO PROTECT EX. PIER
- RELOCATED PICNIC TABLE CONCRETE PADS

**60% DESIGN**
**NOT FOR CONSTRUCTION**

COASTAL GEOLOGIC SERVICES
1711 Ellis St, suite 103
Bellingham, WA 98225
360-647-1845 - coastalgeo.com

REVISIONS

DRAWN BY: ADT
DESIGNED BY: ACB
CHECKED BY: JWJ
DATE SURVEYED: 1/23/2014
SURVEYED BY: JFW

# BOWMAN BAY NEARSHORE RESTORATION
## PROPOSED CONDITIONS
SITE PLAN
NORTHWEST STRAITS MARINE CONSERVATION FOUNDATION

MLLW= 0'
MHHW= 7.8'

SCALE: AS SHOWN

DATE: 6/11/2014

SHEET: 3

OF: 6

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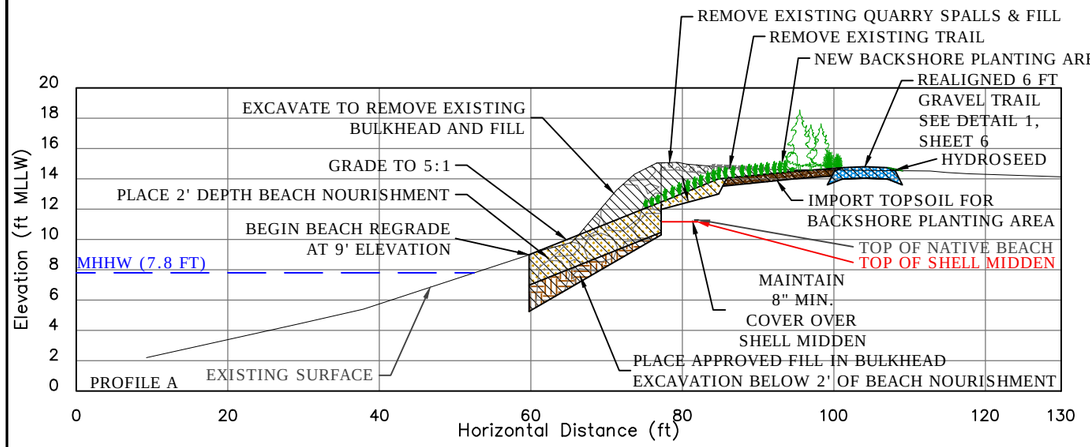


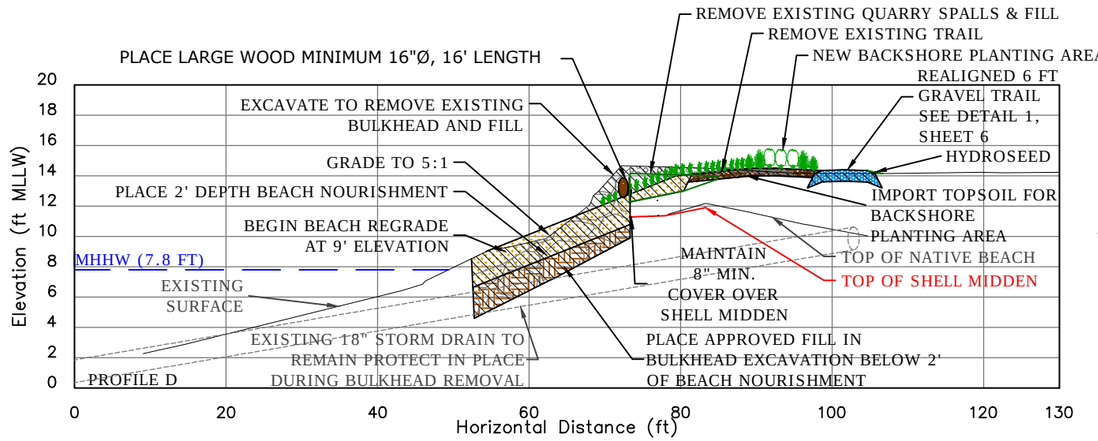


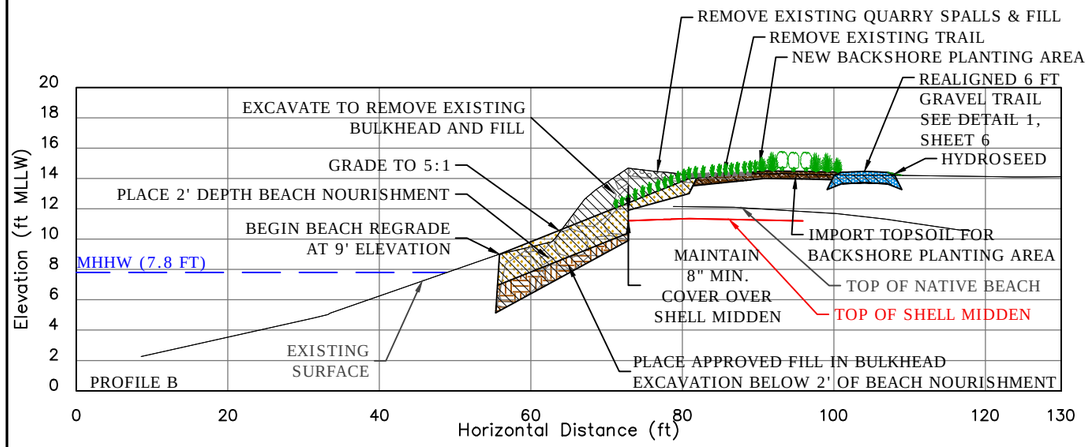


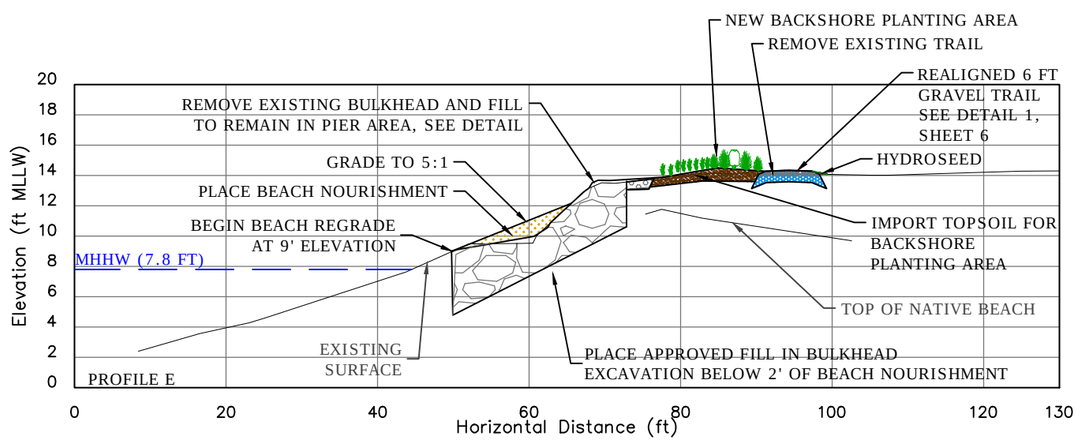


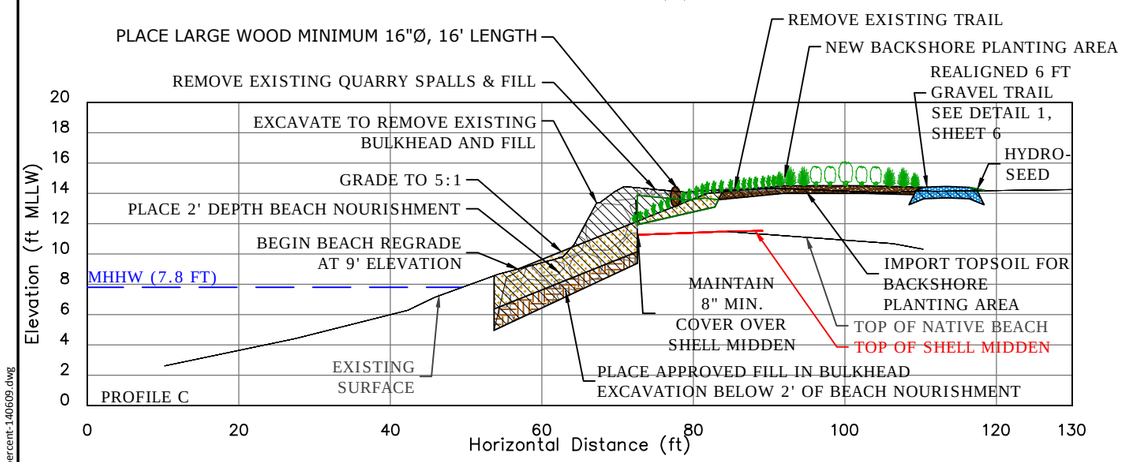


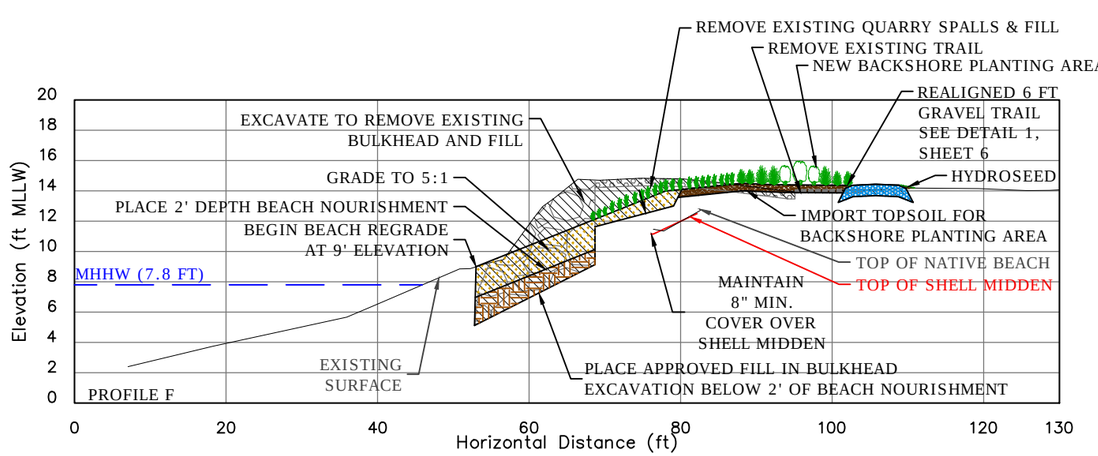


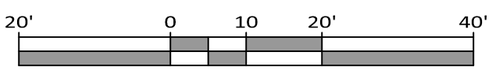


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REVISIONS

| DRAWN BY: | DESIGNED BY: | CHECKED BY: | DATE SURVEYED: | SURVEYED BY: |
|---|---|---|---|---|
| ADT | ACB | JWJ | 1/23/2014 | JFW |

# BOWMAN BAY NEARSHORE RESTORATION
## PROPOSED CONDITIONS
PROFILES
NORTHWEST STRAITS MARINE CONSERVATION FOUNDATION

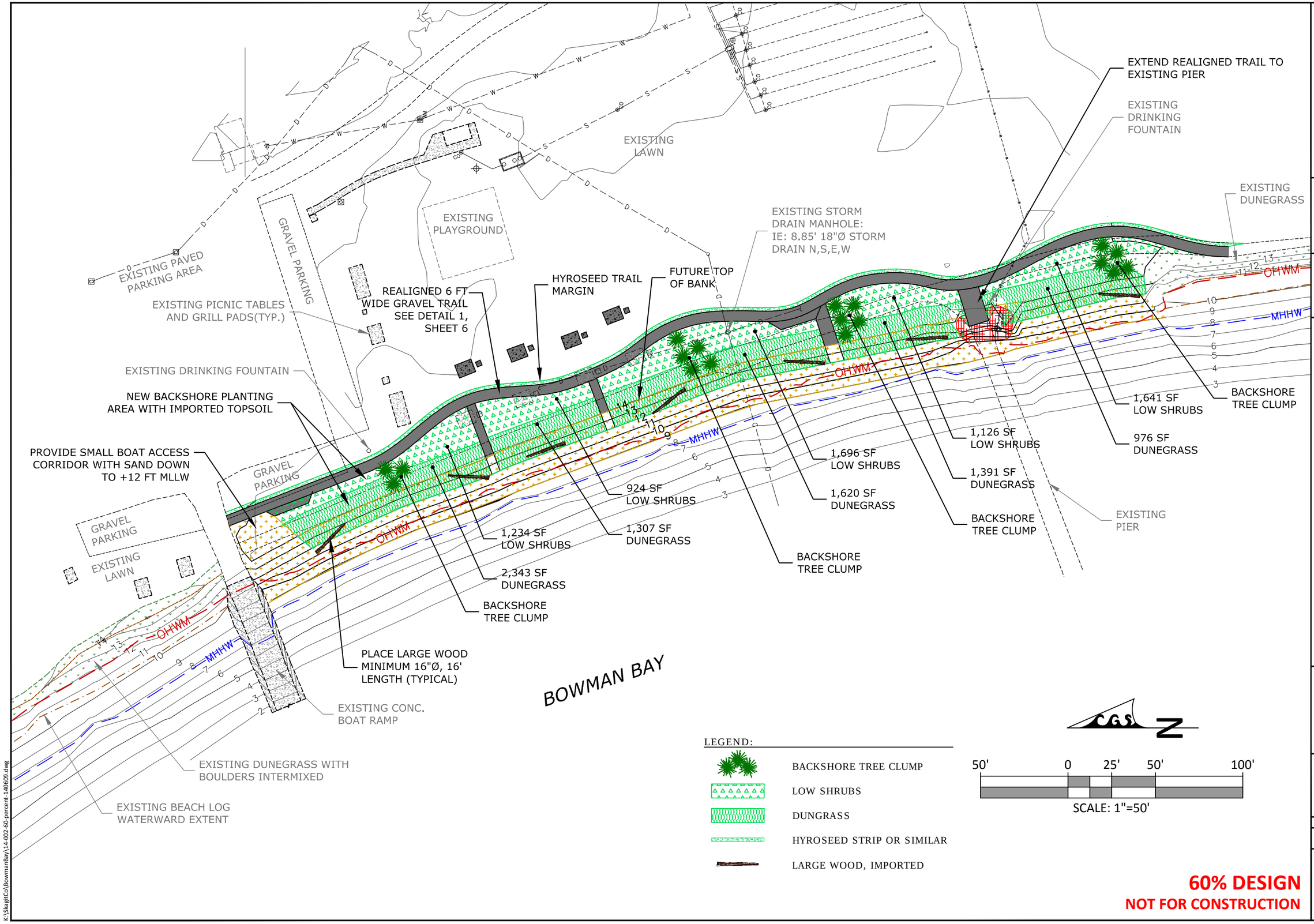
MLLW= 0'
MHHW= 7.8'

SCALE: AS SHOWN

DATE:
6/11/2014

SHEET:
4

OF: 6

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REVISIONS

DRAWN BY: ADT
DESIGNED BY: SFEG
CHECKED BY: JWJ
DATE SURVEYED: 1/23/2014
SURVEYED BY: JFW

# BOWMAN BAY NEARSHORE RESTORATION
## PROPOSED CONDITIONS
PLANTING PLAN
NORTHWEST STRAITS MARINE CONSERVATION FOUNDATION

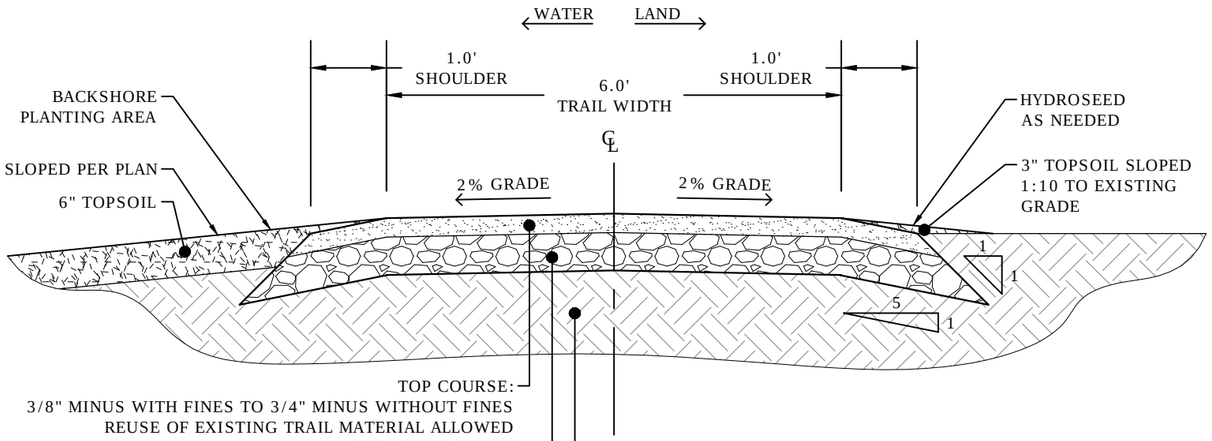
MLLW= 0'
MHHW= 7.8'

SCALE: AS SHOWN

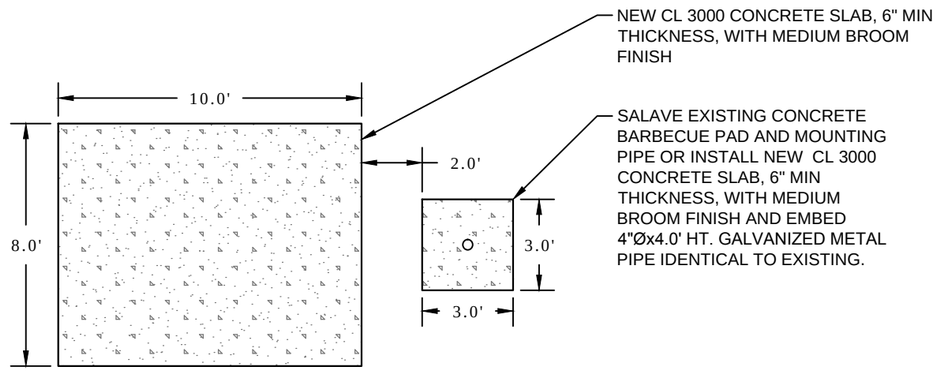
DATE: 6/11/2014

SHEET: 5

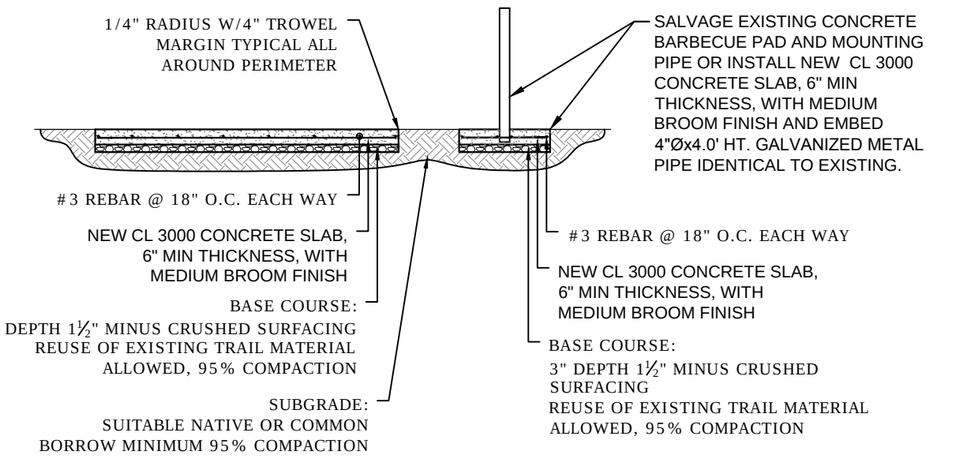
OF: 6



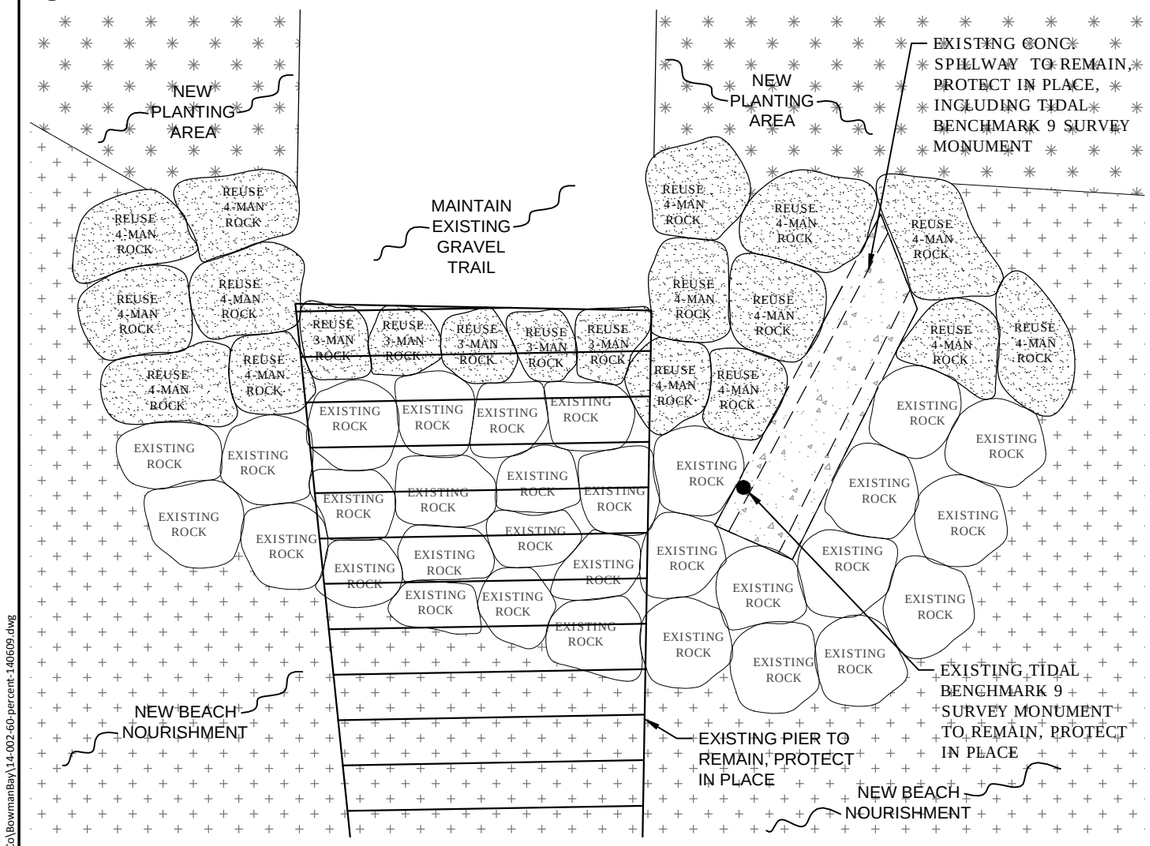

1 TRAIL DETAIL:
N.T.S.



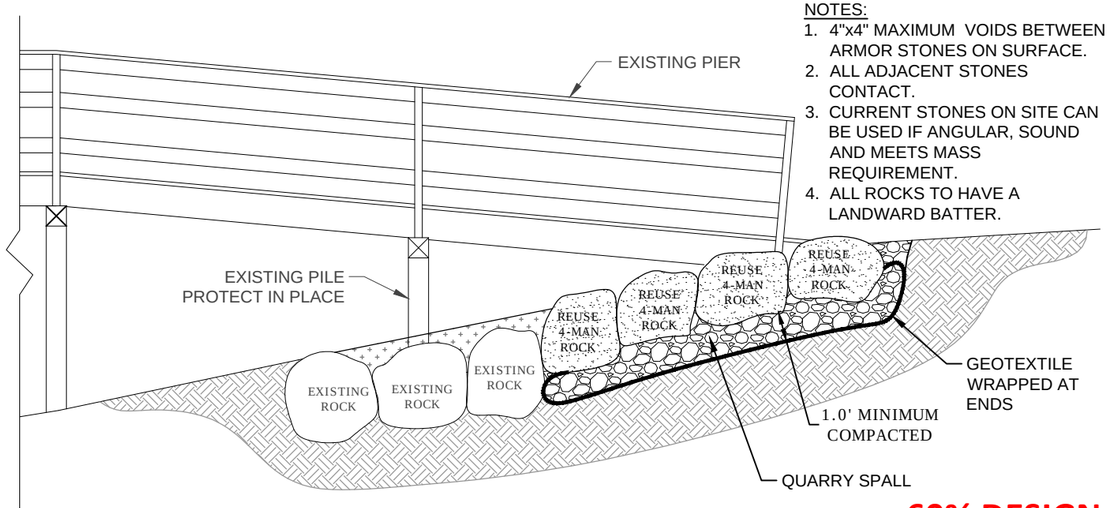

2 PICNIC TABLE & BARBECUE CONCRETE SLAB DETAIL (PLAN VIEW):
N.T.S.




3 PICNIC TABLE & BARBECUE CONCRETE SLAB DETAIL (SECTION VIEW):
N.T.S.




4 PIER PROTECTION DETAIL (PLAN VIEW):
N.T.S.




5 PIER PROTECTION DETAIL (SIDE VIEW):
N.T.S.

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|---|---|---|---|---|
| ADT | ACB | JWJ | 1/23/2014 | JFW |

# BOWMAN BAY NEARSHORE RESTORATION
## PROPOSED CONDITIONS
DETAILS
NORTHWEST STRAITS MARINE CONSERVATION FOUNDATION

MLLW= 0'
MHHW= 7.8'

SCALE: AS SHOWN

DATE:
6/11/2014

SHEET:
6

OF: 6

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