Date: January 14, 2020
To: Ellen Fairleigh, Planner
City of Bainbridge Island, Planning Division
From: Peter Leon, Principal Scientist
Subject: Manlowe Bulkhead Replacement
10750 NE Broomgerrie Rd
Request for Emergency Authorization under BIMC 2.16.165.E.2.a

OVERVIEW

We request written emergency authorization under **BIMC 2.16.165.E.2.a** to replace the existing bulkhead that was built to protect the primary Manlowe residence located at 10750 NE Broomgerrie Road. The existing bulkhead recently sustained significant damage due to unanticipated conditions and is in a state of accelerating failure. Immediate action is required to protect the primary residence, and there is too little time to provide immediate compliance with Bainbridge Island Shoreline Master Program application requirements.

ANALYSIS

BIMC 2.16.165.E.2.a states, "In the case of an emergency, the administrator may waive this requirement and authorize the use or activity orally or in writing. If authorized orally, the applicant shall submit a required application as soon as possible."

An "emergency" is defined under **BIMC 16.12.080**, which states:

> "Emergency" means an unanticipated and imminent threat to public health, safety, or the environment which requires immediate action within a time too short to allow full compliance with the master program. Emergency construction is construed narrowly as that which is necessary to protect property from the elements and does not include development of new permanent protective structures where none previously existed. Where new protective structures are deemed by the administrator to be the appropriate means to address the emergency situation, upon abatement of the emergency, pursuant to the master program and RCW 90.58.030(3)(e)(iii), WAC 173-27-040(2)(d), or their successors. As a general matter, flooding or other seasonal events that can be anticipated and may occur but that are not imminent are not considered an emergency.

The project geotechnical engineer, Earth Solutions NW, LLC (ESNW) determined that "there is a high degree of certainty that failure of the entire bulkhead is imminent. Based on the compromised nature of the structure that has resulted from scour and undermining, we recommend steps be taken immediately to replace the bulkhead. Given the bulkhead support afforded to the descending slope and associated residence above, an immediate and imminent threat to the property exists."

The project structural engineer, Ellisport Engineering, Inc. (EE) determined that "the complete rock bulkhead must be replaced through an emergency permit process to protect the Manlowe house and property from further damage."

Although the approaching winter storm season is obviously an expected seasonal event, we did not anticipate the recent and abrupt drop in beach elevation (estimated by EE as up to 2 feet) and the rapid damage it caused to the Manlowe's existing bulkhead. Prior to these emergency conditions, we anticipated submitting engineering design plans and application materials under the typical process defined in the Bainbridge Island Shoreline Master Program. Because EE had already initiated the design process to replace the existing bulkhead prior to the current emergency, they were able to expedite finalization of the project plans to support our

request for emergency authorization. We anticipate submitting required application materials soon, but do not want to delay the request for an emergency exemption under **BIMC 2.16.165.E.2.a**.

SUPPORTING INFORMATION

To satisfy requirements defined under **BIMC 2.16.165.E.2.a** (Emergency authorization process), **BIMC 16.12.080** (Emergency definition), and **BIMC 16.12.050.B.9.a.iii** (Geotechnical report demonstrating need), we are providing the following documents provided by ESNW and EE:

- *Geotechnical Evaluation, Failing Bulkhead, 10750 Northeast Broomgerrie Road, Bainbridge Island, Washington* prepared by Earth Solutions NW, LLC (12/17/2019)
- *Manlowe Bulkhead - Emergency Permit* prepared by Ellisport Engineering, Inc. (12/20/2019)
- *Manlowe Comparison Photos 12-9-19* prepared by Ellisport Engineering, Inc. (12/9/2019)
- *Manlowe Bulkhead Emergency Replacement* project design plans prepared by Ellisport Engineering, Inc. (1/10/2020).

CONCLUSION

Both ESNW and EE conclude that the failure of the existing bulkhead constitutes an unanticipated and imminent threat to the Manlowe's primary residence, which requires immediate action within a time too short to allow full compliance with the master program. Immediate replacement of the existing bulkhead is necessary to protect the Manlowe's primary residence from the elements. Although **BIMC 16.12.080** states that anticipated seasonal events that are not imminent are not considered an emergency, the recent damage caused to the Manlowe's existing bulkhead by the abrupt drop in beach elevation was not anticipated. Based upon the immediate risk to the Manlowe's primary residence caused by these unanticipated conditions, we request an emergency authorization to replace the existing bulkhead under **BIMC 2.16.165.E.2.a**.

December 17, 2019
ES-2074.08

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

Robert and Jayne Manlowe
3645 – 92nd Avenue Southeast
Mercer Island, Washington 98040

Subject: Geotechnical Evaluation
Failing Bulkhead
10750 Northeast Broomgerrie Road
Bainbridge Island, Washington

Dear Bob and Jayne:

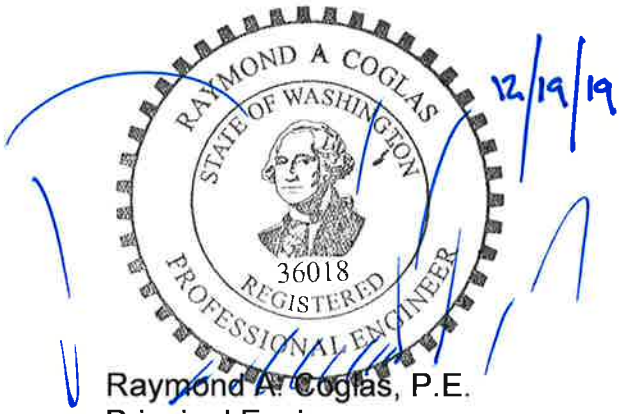
As requested, Earth Solutions NW, LLC (ESNW) has prepared this letter and evaluation of the existing bulkhead alignment along the shoreline frontage of the property. The attached site plan (Plate 1) illustrates the subject site and associated bulkhead structure. A boring log representative of the site geology above the slope is also provided. Indications of bulkhead displacement and related dislodging of boulders has recently been observed. Overall degradation of the decades old bulkhead is also ongoing and has been evident over the past several years. The undersigned ESNW representative visited the site in October 2019 and recently on December 6, 2019. During our October 2019 site visit, the effects of ongoing bulkhead displacement were evident along the beach access trail that descends from the rear yard area of the residence. Most notable were localized areas of downset along the descending slope areas above the bulkhead structure. A follow up visit by the undersigned on December 6, 2019 indicated a worsening of the downset below the trail and obvious additional indications of continued bulkhead displacements. During our December 6, 2019 site visit, a representative of Ellisport Engineering, Inc. was also present. Most concerning at the time of our December site visit was the degree of scour along the bulkhead alignment and the absence of keyway support below the base boulders. A partial collapse of the bulkhead near the north end of the structure was also identified and was determined to have resulted from the ongoing undermining of the structure.

From a geotechnical standpoint, there is a high degree of certainty that failure of the entire bulkhead is imminent. Based on the compromised nature of the structure that has resulted from scour and undermining, we recommend steps be taken immediately to replace the bulkhead. Given the bulkhead support afforded to the descending slope and associated residence above, an immediate and imminent threat to the property exists. Collapse of the bulkhead structure would most certainly result in a progressive failure of the descending (high bank) slope areas, likely resulting in significant impacts to the residential structure above. As such, and given a high degree of certainty that the bulkhead could fail during the current winter storm season, we recommend the owner and engineer immediately engage the services of a bulkhead contractor and contact the City of Bainbridge Island to declare an emergency with respect to the condition of the bulkhead. ESNW will be available, as necessary, to provide geotechnical support during the implementation of repairs and related bulkhead replacement.

We trust this letter and geotechnical evaluation meet your current needs. If you have any questions, or if additional information is required, please call.

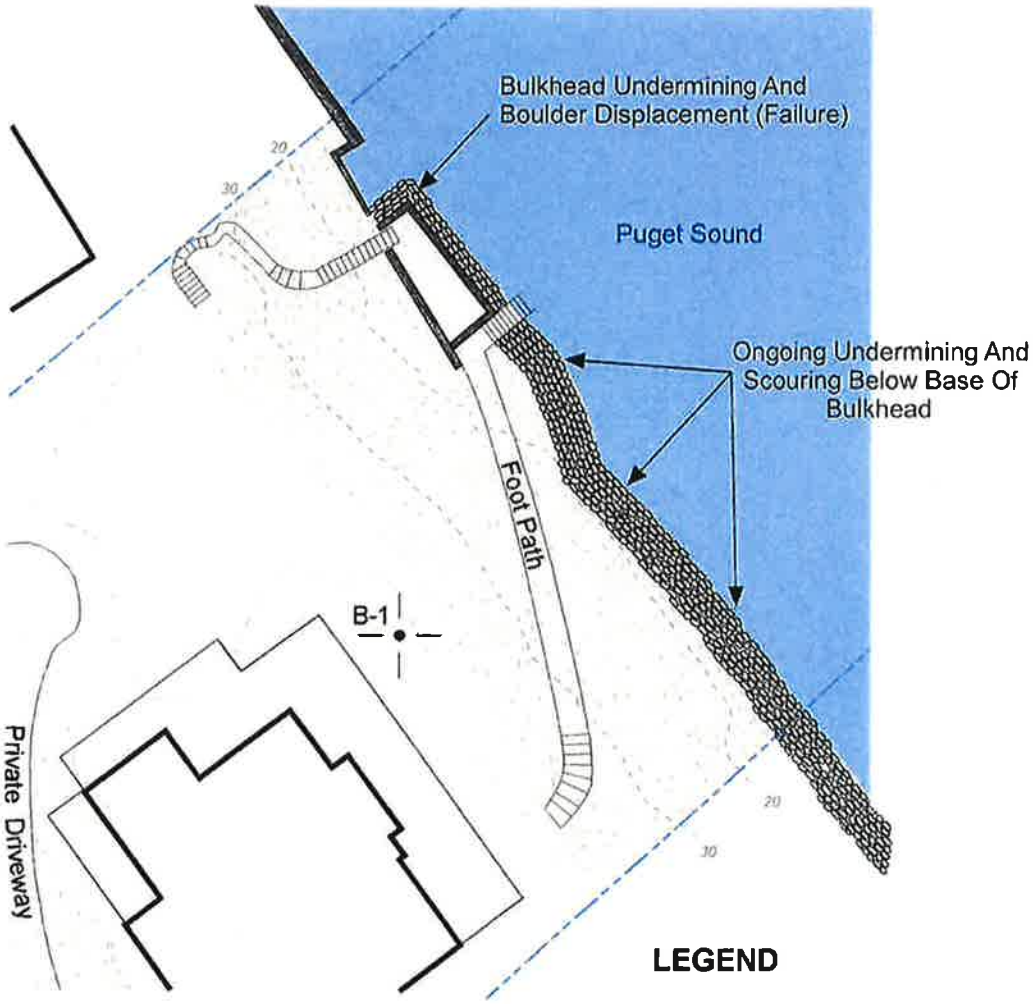
Sincerely,

EARTH SOLUTIONS NW, LLC



Raymond A. Coglas, P.E.
Principal Engineer

Attachments: Bulkhead Site Plan (Plate 1)
Boring Log



LEGEND

B-1 — Approximate Location of ESNW Boring, Proj. No. ES-2074.02, Sept. 2019

Subject Site

Existing Building

NORTH

NOT - TO - SCALE

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Bulkhead Site Plan
Manlowe SFR
Bainbridge Island, Washington

Drwn. MRS	Date 12/12/2019	Proj. No. 2074.08
Checked RAC	Date Dec. 2019	Plate 1

Earth Solutions NW
1805 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-284-3300

BORING NUMBER B-1

CLIENT Bob Manlowe
PROJECT NAME 10750 & 10760 - N.E. Broomgerrie Road
PROJECT NUMBER 2074.02
PROJECT LOCATION Bainbridge Island, Washington
DATE STARTED 9/25/12 **COMPLETED** 9/25/12
GROUND ELEVATION 37 ft **HOLE SIZE**
DRILLING CONTRACTOR Boretec
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY BTS **CHECKED BY** SSR
AT END OF DRILLING ---
NOTES Grass
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TPSL		Brown TOPSOIL / SOD 4"-6" thickness
0.5							36.5
							Brown silty SAND with gravel, loose to medium dense, moist
5	SS	100	8-6-12 (18)	MC = 11.50% Fines = 31.30%			-becomes medium dense -mottled texture
					SM		
	SS	100	4-9-9 (18)	MC = 11.50% Fines = 29.90%			-becomes gray with mottled texture
10	SS	100	6-8-7 (15)	MC = 10.70%			
	SS	100	6-9-10 (19)	MC = 12.10%			
14.0							-increase silt content
							23.0
15							Grades to silty fine SAND with gravel, medium dense, moist
	SS	100	6-9-12 (21)	MC = 13.30%			-slight increase in moisture -increase in gravel
					SM		
	SS	100	4-4-6 (10)	MC = 12.60%			-becomes loose
20							

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Bellevue, Washington 98005
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BORING NUMBER B-1

CLIENT Bob Manlowe
PROJECT NAME 10750 & 10760 - N.E. Broomgerrie Road
PROJECT NUMBER 2074.02
PROJECT LOCATION Bainbridge Island, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20	SS	100	11-13-13 (26)	MC = 11.00%	SM		Grades to silty fine SAND with gravel, medium dense, moist *(continued)* -4" layer of poorly graded fine to medium sand
25	SS	100	6-8-10 (18)	MC = 11.00%			
30	SS	100	5-6-6 (12)	MC = 11.50%			-silt and sand layers -sand layers, perched seepage
35	SS	100	4-6-9 (15)	MC = 13.50%	SP-SM		35.0 2.0 Grades to gray poorly graded fine to coarse SAND with silt, medium dense, wet
40	SS	100	5-8-7 (15)				-very little recovery

GENERAL BH / TP / WELL 2074-2.GPJ GINT US.GDT 10/18/12

Earth Solutions NW
1805 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-284-3300

BORING NUMBER B-1

CLIENT Bob Manlowe
PROJECT NAME 10750 & 10760 - N.E. Broomgerrie Road
PROJECT NUMBER 2074.02
PROJECT LOCATION Bainbridge Island, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
45					SP-SM		Grades to gray poorly graded fine to coarse SAND with silt, medium dense, wet *(continued)*
							45.0 -8.0
	SS	100	5-8-11 (19)	MC = 30.70%	ML		Gray clayey SILT with pockets of very fine sand, very stiff, moist
50							50.0 -13.0
	SS	100	5-9-11 (20)	MC = 34.00%	CL		Gray CLAY with silt, very stiff, moist
							51.5 -14.5
							Boring terminated at 51.5 feet below existing grade. Groundwater seepage encountered at 30.0 and 35.0 feet during drilling. Boring backfilled with bentonite. Bottom of hole at 51.5 feet.

GENERAL BH / TP / WELL 2074-2.GPJ GINT US.GDT 10/18/12

Ellisport Engineering, Inc.

December 20, 2019

To: To Whom It May Concern

Subject: Manlowe Bulkhead – Emergency Permit

Location: 10750 Broomgerrie Road
Bainbridge Island, WA 98110

Reference: - *Manlowe Comparison Photos 12-9-19* pdf memo by Ellisport Engineering, Inc.
- *Geotechnical Engineering Study 10750 and 10760 Northeast Broomgerrie Road* by Earth Solutions NW LLC, October 19, 2012 and revised December 12, 2012.
- *Geotechnical Evaluation Failing Bulkhead* by Earth Solutions NW, 12/17/19

It is our opinion that the Manlowe rock bulkhead is in a state of progressive failure and should be replaced immediately through an emergency permit.

Discussion

We have twice visited the Manlowe site (May and December 2019) to observe the condition of the existing rock bulkhead. Our pdf document, Manlowe Comparison Photos, shows the changes in the beach and bulkhead changes in the ensuing 7 months. The most startling December change is the drastic lowering of the beach, exposing the bottom of the base rocks of the existing bulkhead (which were embedded in May). Reference the *Manlowe Comparison Photos* memo pictures while reviewing the following findings:

- The beach sand level has dropped between 18"-24". The base rocks are completely exposed, no longer embedded below beach level. This leaves them prone to sliding.
- The undermined base rocks are moving/settling/tilting/shifting due to tidal/wave action.
- The geotechnical engineer's evaluation discussed the hill "downset" below the trail, resulting from the rock bulkhead movement. He further discusses that failure of the entire bulkhead is "imminent", resulting "in a progressive failure of the descending slope areas, likely resulting in significant impacts to the residential structure above". He recommends that "steps be taken immediately to replace the bulkhead" because "the bulkhead could fail during the current winter storm season."
- The geotech report discusses that the rock bulkhead protects soils that are not glacially compacted, but instead are "landslide/colluvium" deposits. These soils are prone to rapid erosion, should the bulkhead be lost.
- The bulkhead has experienced a partial collapse at the northern end. We believe that a primary cause was the loss of beach sands covering the base rock, allowing the rocks to move and topple.
- We noted additional undermining and rock movement at the existing concrete stairs.

20501 81st Ave. S.W.
Vashon, WA 98070
Telephone (206) 463-5311
FAX (206) 463-2578
email@ellisportengineering.com
www.ellisportengineering.com

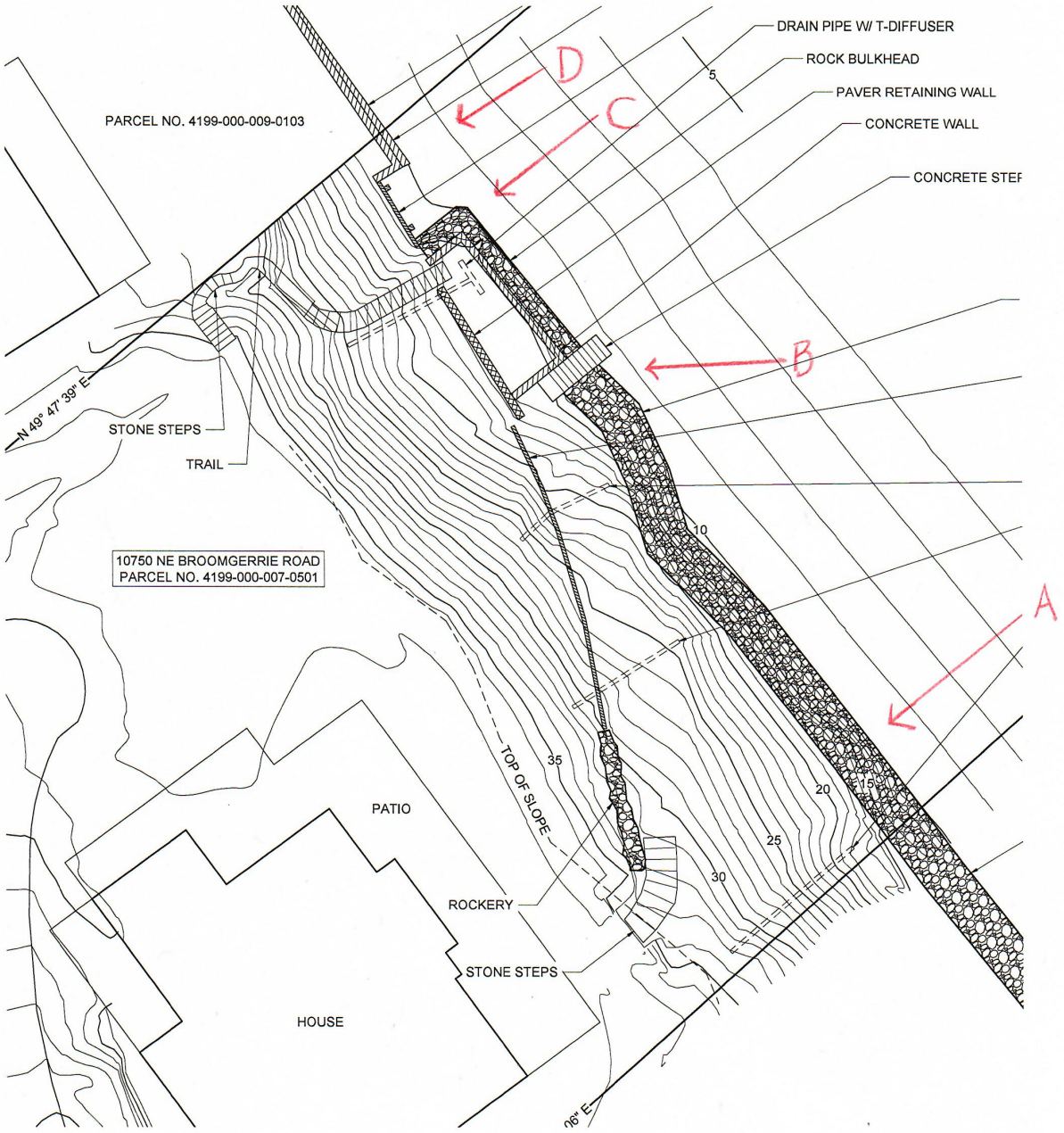
- Using the design soils information from the 2012 ESNW geotechnical study, we've calculated twelve spreadsheet rock stability analyses at different stations along the length of the bulkhead. These analyses incorporate estimates of the size of rock, height of bulkhead, and assumption that the toe rock is completely exposed (no passive soil pressure to resist sliding). Note that we did not include any dynamic effects caused by wave action, nor the buoyant forces on the rock.
- The rock bulkhead height varies from about 6' to approximately 17'. In nearly all cases, our analysis found the rock sliding factor of safety is less than the required minimum of 1.5. For rock 12' or higher, the sliding factor of safety is 1.0 or less. Also, for rock 12' or higher, the rock overturning factor of safety is less than the required minimum of 1.5.
- We believe that a progressive failure of the existing rock bulkhead is presently occurring, and that failure of large sections of the bulkhead is possible during this current winter storm season. We agree with the geotechnical engineer that bulkhead failure is imminent. If the bulkhead fails, soil erosion of the bank will progress quickly towards the house, threatening both the structure and occupants.
- Even if the migratory beach sands return to cover the bulkhead toe rocks, damage to the bulkhead will remain through voids, unconsolidated toe soils, and rock movement/shifting/instability.

To address the above issues, the complete rock bulkhead must be replaced through an emergency permit process to protect the Manlowe house and property from further damage. We have provided engineered drawings to support this work.

Please feel free to contact if you have questions. Thank you.

Stephen T. Kicinski

Stephen T. Kicinski, PE



PARTIAL SITE PLAN

NOT TO SCALE

5/30/19

Location A

12/6/19

Location A

5/30/19

Location B

12/6/19

Location B

5/30/19

Location C

12/6/19

Location C

5/30/19

Location D

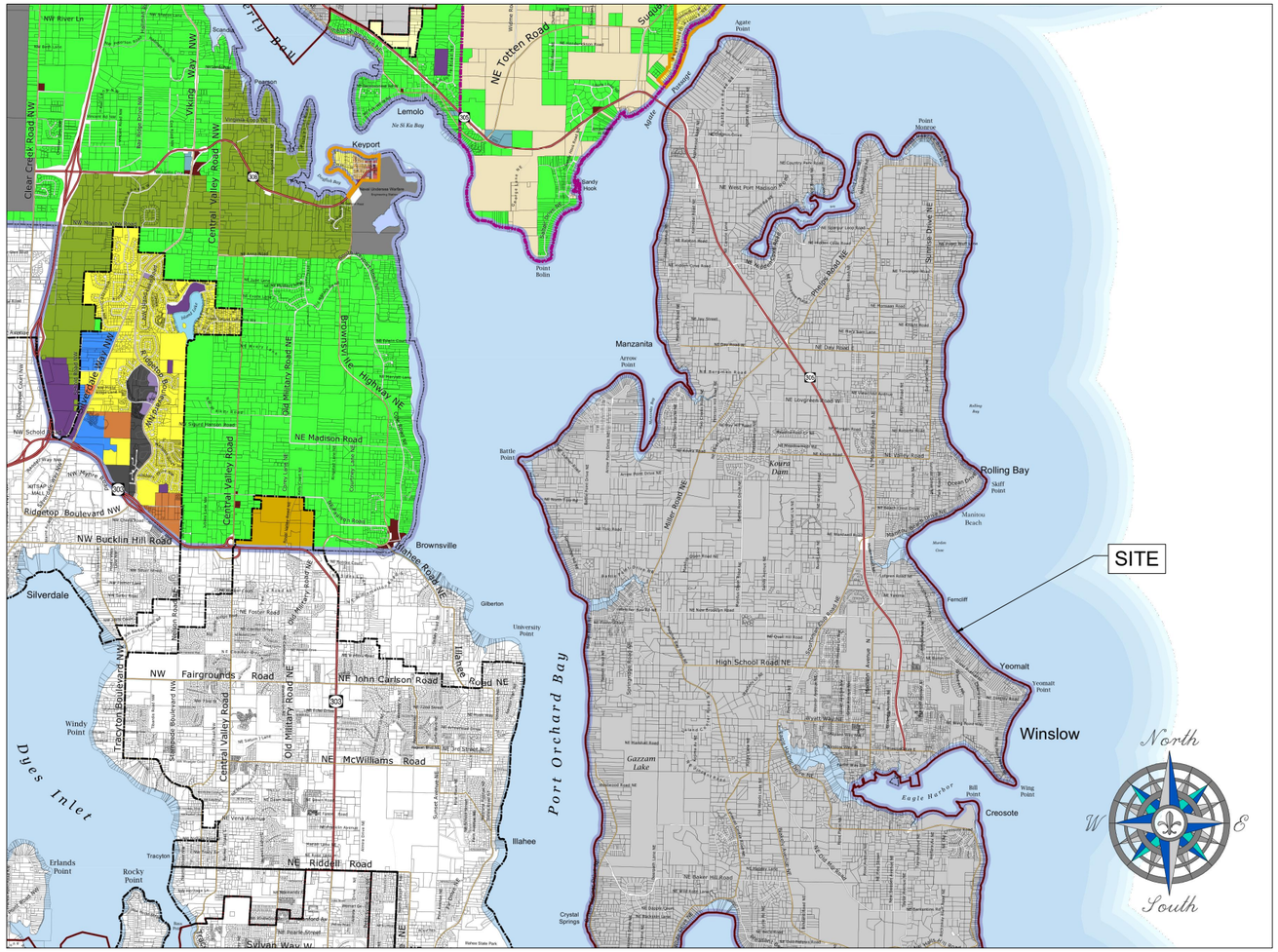
12/6/19

Location D

MANLOWE BULKHEAD EMERGENCY REPLACEMENT

KITSAP COUNTY, WASHINGTON

SECTION 23, TOWNSHIP 25 NORTH, RANGE 02 EAST



VICINITY MAP

NOT TO SCALE

SITE ADDRESS

10750 NE BROOMGERRIE ROAD
BAINBRIDGE ISLAND, WA 98110

PARCEL NO. 4199-000-007-0501

OWNER / DEVELOPER

ROBERT & JAYNE MANLOWE
3645 92ND AVENUE SE
MERCER ISLAND, WA 98040

CONTRACTOR

T.B.D.

CIVIL ENGINEER

ELLISPORT ENGINEERING, INC
20501 81ST AVENUE SW
VASHON, WA 98070
(206) 463-5311

BENCHMARK AND DATUM

DATUM IS ASSUMED:
TOPOGRAPHIC AND BOUNDARY INFORMATION IS BASED ON INFORMATION PROVIDED BY KITSAP COUNTY GIS. THE TOPOGRAPHY WAS GENERALLY CONFIRMED IN THE FIELD. CONTENT PROVIDED HEREIN MAY BE DEEMED RELIABLE BUT IS NOT GUARANTEED. THIS IS NOT A SURVEY.
VALUES FOR OHW AND MHHW ARE RELATIVE TO A DATUM OF MLLW = 0.

LEGAL DESCRIPTION

THOSE PORTIONS OF LOTS 7B, 8A & 8B IN THE REPLAT OF LOTS 7 THROUGH 10 DINGLEY'S FIRST ADDITION TO YEOMALT POINT AS RECORDED IN VOLUME 3 OF PLATS, PAGE 93, RECORDS OF KITSAP COUNTY, WASHINGTON, SITUATE IN SECTION 23, TOWNSHIP 25 NORTH, RANGE 2 EAST, W.M., LYING NORTHEASTERLY OF THE FOLLOWING DESCRIBED LINE: BEGINNING AT THE MOST WESTERLY CORNER OF SAID LOT 7B; THENCE ALONG THE SOUTHWESTERLY BOUNDARY OF SAID LOT 7B, SOUTH 39°05'10 EAST 19.1 FEET TO AN IRON PIPE; THENCE RUNNING PARALLEL WITH THE NORTHWESTERLY BOUNDARY OF SAID LOT 7B, NORTH 46°49' EAST 126.17 FEET TO AN IRON PIPE AND THE TRUE POINT OF BEGINNING OF THIS DESCRIBED LINE; THENCE NORTH 43°11' WEST 124.4 FEET, MORE OR LESS, TO THE NORTHWESTERLY BOUNDARY OF SAID LOT 8B AND THE TERMINUS. TOGETHER WITH SECOND CLASS TIDELANDS ADJOINING AND SUBJECT TO EXCEPTIONS AND RESERVATIONS EXPRESSED IN DEED FROM THE STATE OF WASHINGTON. TOGETHER WITH AND SUBJECT TO THE EASEMENTS AND WATER RIGHTS SET FORTH IN THAT CERTAIN EASEMENT AND WATER RIGHTS AGREEMENT DATED OCTOBER 3, 1991.

CONTRACTOR NOTE

ALL EXISTING UTILITIES SHOWN ON PLANS ARE TO BE VERIFIED HORIZONTALLY AND VERTICALLY PRIOR TO ANY CONSTRUCTION. ALL EXISTING FEATURES INCLUDING BURIED UTILITIES ARE SHOWN AS INDICATED ON RECORD MAPS AND SURVEY FURNISHED BY OTHERS. WE ASSUME NO LIABILITY FOR THE ACCURACY OF THOSE RECORDS AND SURVEY, FOR THE FINAL LOCATION OF EXISTING UTILITIES IN AREAS CRITICAL TO CONSTRUCTION CONTACT THE UTILITY OWNER/AGENCY.

SHEET INDEX

PRIVATE IMPROVEMENTS

_____
DEVELOPMENT ENGINEER DATE

BAINBRIDGE ISLAND ORDINANCE NUMBER(S) _____

THESE ACTIONS MUST BE COMPLETED PRIOR TO BEGINNING CONSTRUCTION:

1. CONTACT THE APPLICANT'S RETAINED ENGINEER TO COORDINATE REQUIRED INSPECTIONS.

2. APPOINT A TRAINED ESC LEAD WHO SHALL BE PROVIDED A COPY OF THE ESC PLAN & INSPECTION SCHEDULE.

3. CONTACT _____, THE AREA INSPECTOR, AT ____-____-____, TO COORDINATE THE PRECONSTRUCTION MEETING AND COUNTY INSPECTIONS.

FAILURE TO OBTAIN REQUIRED INSPECTIONS MAY ENDANGER OR DELAY PROJECT APPROVAL.

ALL WORK IN THE PUBLIC RIGHT-OF-WAY REQUIRES A PERMIT FROM THE BAINBRIDGE ISLAND PUBLIC WORKS DEPARTMENT.

General Notes

No.	Revision/Issue	Date

Firm Name and Address

ELLISPORT ENGINEERING, INC.
20501 81st Ave SW
Vashon, WA 98070
206.463.5311 - phone
206.463.2578 - fax

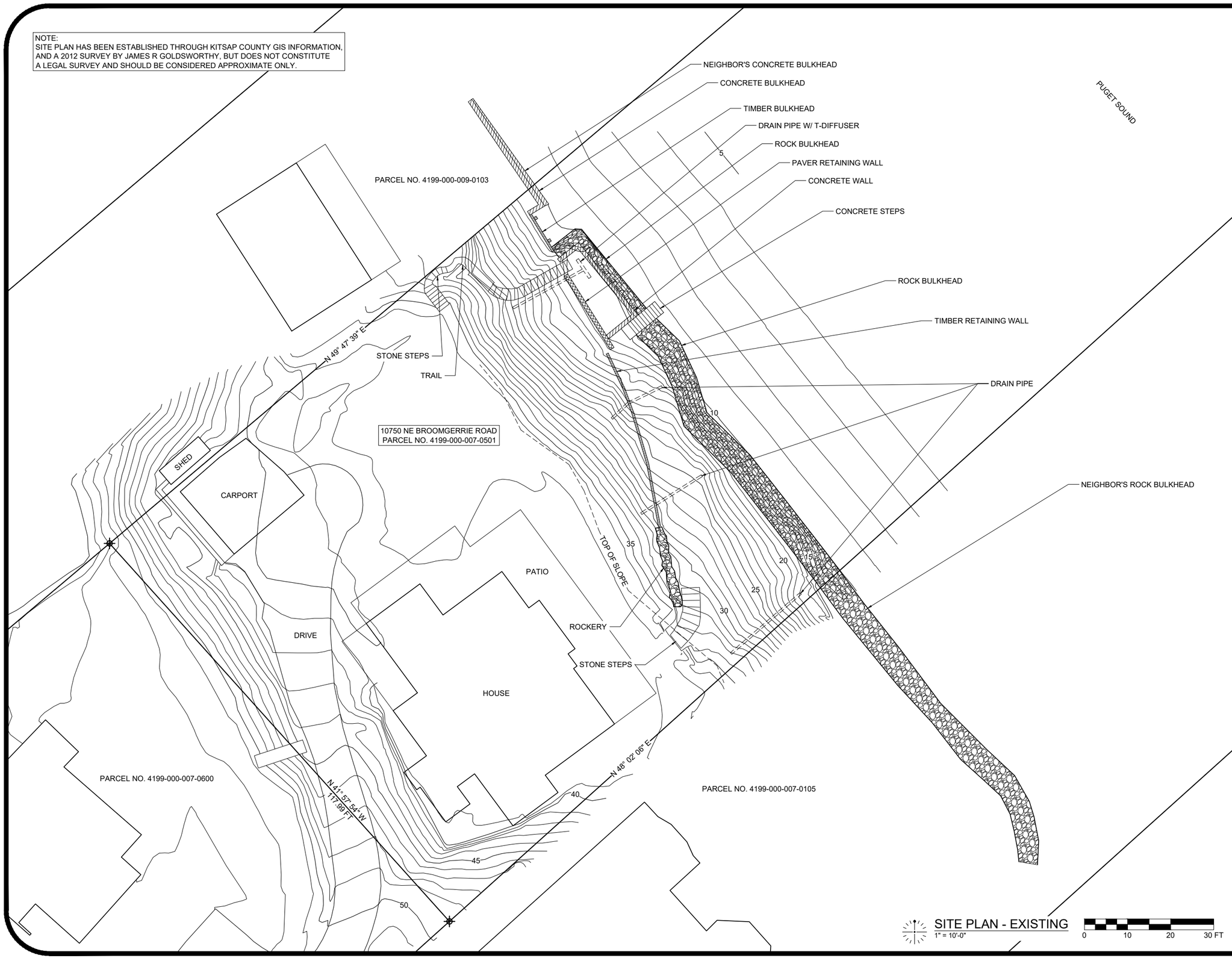
Stephen T. Klocznski
STATE OF WASHINGTON
25752
REGISTERED PROFESSIONAL ENGINEER

Project Name and Address

MANLOWE BULKHEAD REPLACEMENT
10750 NE Broomgerrie Road
Bainbridge, WA 98110

Project: MANLOWE	Sheet: C1
Date: 10 JAN 2020	
Drafter: DSD	Engineer: STK

NOTE:
SITE PLAN HAS BEEN ESTABLISHED THROUGH KITSAP COUNTY GIS INFORMATION, AND A 2012 SURVEY BY JAMES R GOLDSWORTHY, BUT DOES NOT CONSTITUTE A LEGAL SURVEY AND SHOULD BE CONSIDERED APPROXIMATE ONLY.



SITE PLAN - EXISTING
1" = 10'-0"

0 10 20 30 FT

General Notes

No.	Revision/Issue	Date

Firm Name and Address

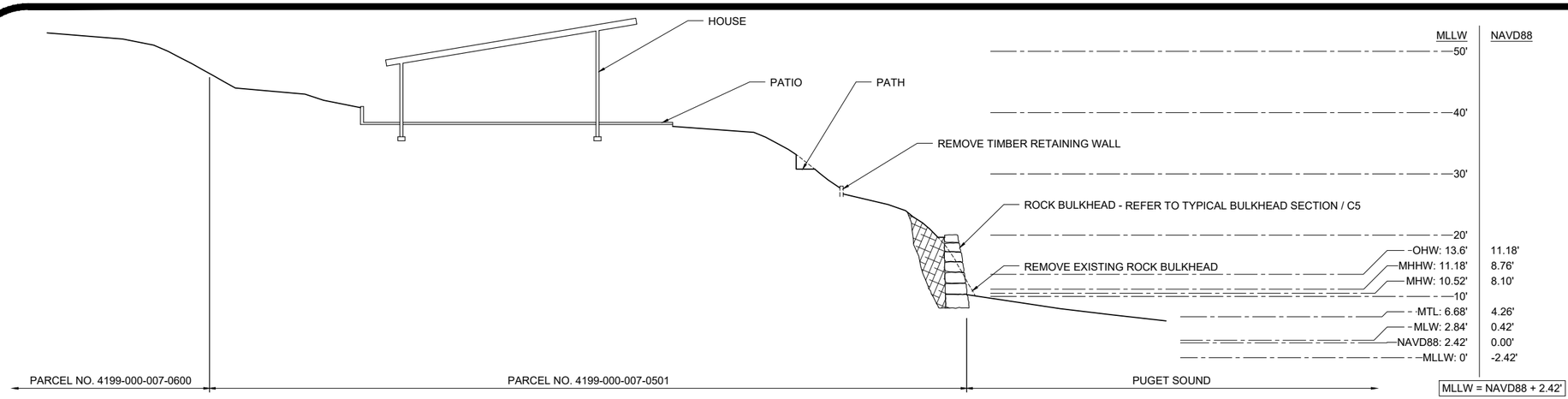
ELLISPORT ENGINEERING, INC.
20501 81st Ave SW
Vashon, WA 98070
206.463.5311 - phone
206.463.2578 - fax

STEPHEN T. KIGHTLINGER
STATE OF WASHINGTON
25752
REGISTERED
PROFESSIONAL ENGINEER

Project Name and Address

MANLOWE BULKHEAD REPLACEMENT
10750 NE Broomgerrie Road
Bainbridge, WA 98110

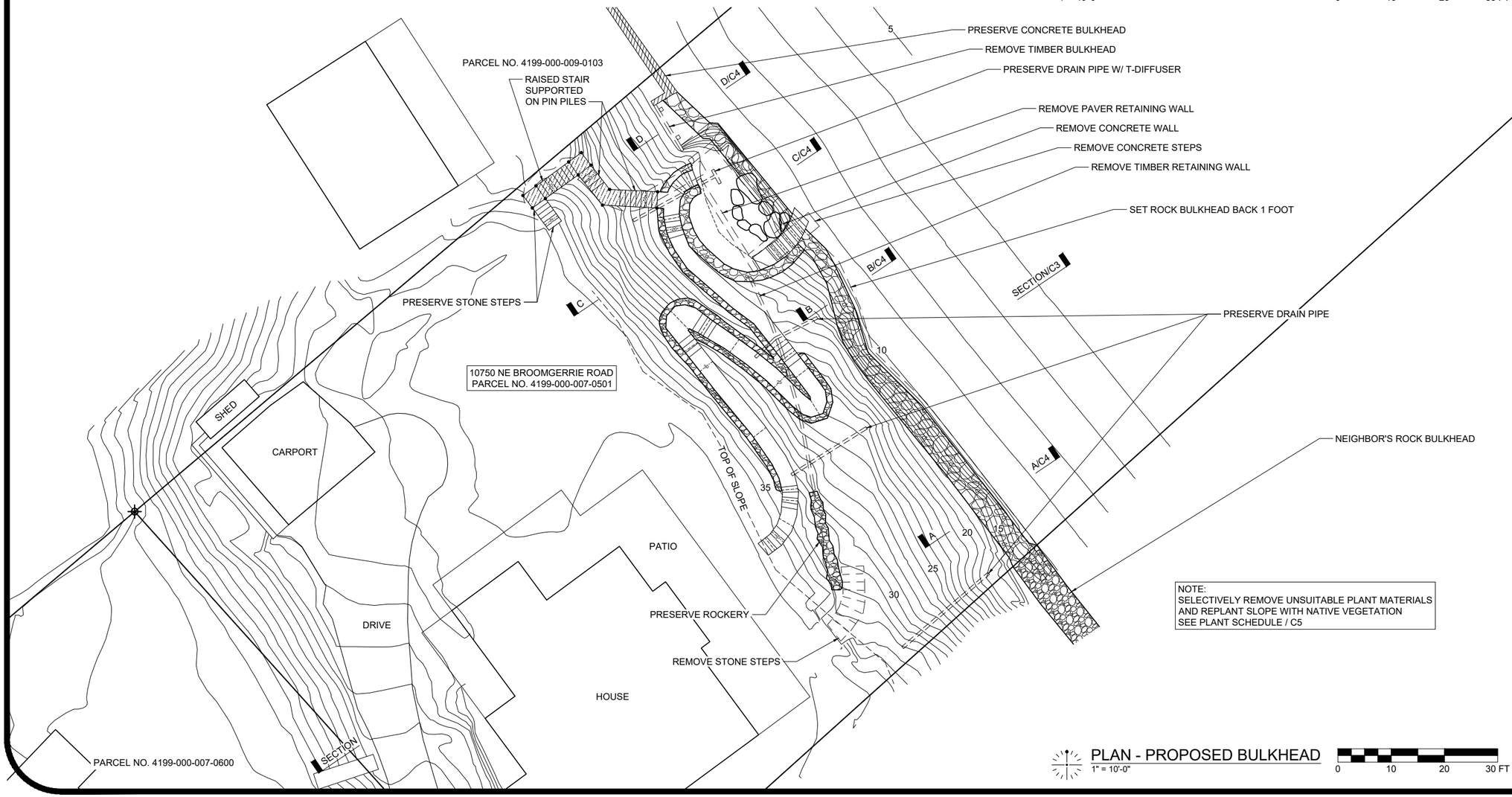
Project	Sheet
MANLOWE	C2
Date: 10 JAN 2020	
Drafter: DSD / Engineer: STK	



SECTION - PROPOSED BULKHEAD

1" = 10'-0"

0 10 20 30 FT



NOTE:
SELECTIVELY REMOVE UNSUITABLE PLANT MATERIALS
AND REPLANT SLOPE WITH NATIVE VEGETATION
SEE PLANT SCHEDULE / C5

PLAN - PROPOSED BULKHEAD

1" = 10'-0"

0 10 20 30 FT

General Notes

No.	Revision/Issue	Date

Firm Name and Address

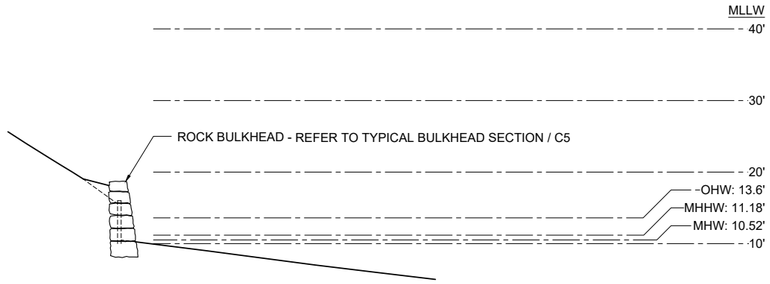
ELLISPORT ENGINEERING, INC.
20501 81st Ave SW
Vashon, WA 98070
206.463.5311 - phone
206.463.2578 - fax

Stephen T. Kucinski
STATE OF WASHINGTON
25752
REGISTERED
PROFESSIONAL ENGINEER

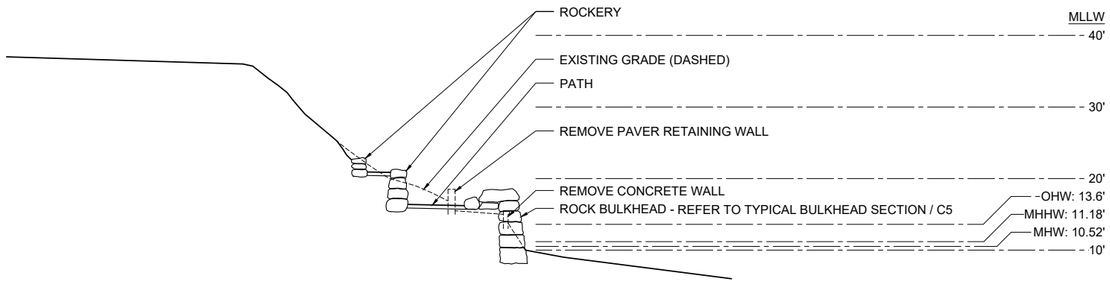
Project Name and Address

MANLOWE BULKHEAD REPLACEMENT
10750 NE Broomgerrie Road
Bainbridge, WA 98110

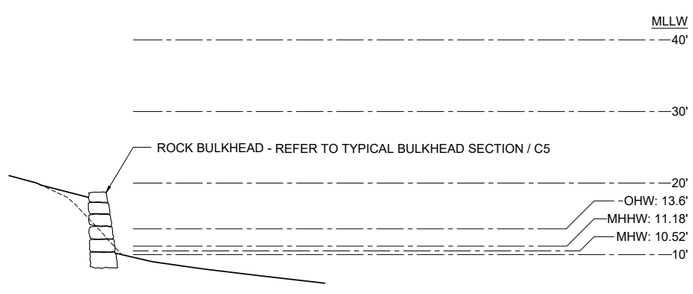
Project	Sheet
MANLOWE	C3
Date: 10 JAN 2020	
Drafter: DSD / Engineer: STK	



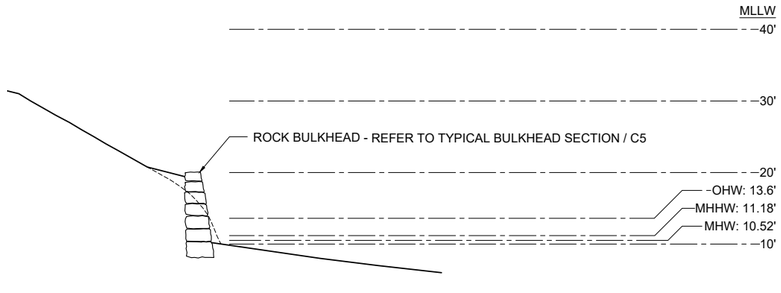
SECTION D-D
1" = 10'-0"
0 10 20 30 FT



SECTION C-C
1" = 10'-0"
0 10 20 30 FT



SECTION B-B
1" = 10'-0"
0 10 20 30 FT



SECTION A-A
1" = 10'-0"
0 10 20 30 FT

General Notes

No.	Revision/Issue	Date

Firm Name and Address

ELLISPORT ENGINEERING, INC.
20501 81st Ave SW
Vashon, WA 98070
206.463.5311 - phone
206.463.2578 - fax

STEPHEN T. KICZENSKI
STATE OF WASHINGTON
25752
REGISTERED
PROFESSIONAL ENGINEER

Project Name and Address

MANLOWE BULKHEAD REPLACEMENT
10750 NE Broomgerrie Road
Bainbridge, WA 98110

Project	Sheet
MANLOWE	C4
Date: 10 JAN 2020	
Drafter: DSD / Engineer: STK	

PART 1: GENERAL

1. THE CONTRACTOR SHALL OBTAIN AND CONFORM TO ALL LOCAL AND STATE PERMITS REQUIRED TO COMPLETE THE WORK. IF PERMIT REQUIREMENTS CONFLICT WITH THESE PLANS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND ENGINEER OF RECORD OF ANY CONFLICTS, SO THAT MODIFICATIONS TO THE PLANS CAN BE PROVIDED, AS APPROPRIATE.

2. WORK SHALL INCLUDE FURNISHING ALL MATERIALS, LABOR, EQUIPMENT, AND SUPERVISION FOR CONSTRUCTION OF THE ROCK BULKHEAD IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS, AND IN GENERAL CONFORMANCE WITH THE LINES, GRADES, DESIGN, AND DIMENSIONS SHOWN ON THE DRAWINGS OR AS ESTABLISHED BY THE OWNER OR THE OWNERS' REPRESENTATIVE.

3. THE CONTRACTOR SHALL CONTACT THE ONE-CALL UNDERGROUND UTILITY LOCATION SERVICE AT 1-800-424-5555 TO HAVE ANY AND ALL UTILITIES LOCATED AT LEAST 2 FULL BUSINESS DAYS PRIOR TO BEGINNING SITE EXCAVATION.

4. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE CONTRACT DOCUMENTS, NOTES AND THE INTERNATIONAL BUILDING CODE.

5. DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE ADJACENT PROPERTIES AND DOWNGRADE AREAS.

6. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION PROCEDURES INCLUDING EXCAVATION OF EXCESS SOIL, PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS, AND UTILITIES IN ACCORDANCE WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL SAFETY REGULATIONS.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF ALL TRADES, AND SHALL CHECK AND VERIFY ALL DIMENSIONS. ALL DISCREPANCIES SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER *IN WRITING* AND SHALL BE RESOLVED BEFORE PROCEEDING WITH THE WORK.

8. THE DRAWINGS INDICATE THE TYPICAL DETAILS OF CONSTRUCTION. WHERE CONDITIONS ARE NOT SPECIFICALLY INDICATED, BUT ARE OF SIMILAR CHARACTER TO DETAILS SHOWN, SIMILAR DETAILS OF CONSTRUCTION SHALL BE USED SUBJECT TO REVIEW BY THE STRUCTURAL ENGINEER.

9. ALL INFORMATION SHOWN ON THE DRAWINGS RELATIVE TO EXISTING CONDITIONS IS GIVEN AS THE BEST PRESENT KNOWLEDGE BUT WITHOUT ANY GUARANTEE OF WARRANTY OF ACCURACY. WHERE ACTUAL CONDITIONS CONFLICT WITH THE DRAWINGS, THEY SHALL BE REPORTED IN WRITING TO THE STRUCTURAL ENGINEER SO THAT PROPER REVISIONS MAY BE DEVELOPED. MODIFICATIONS OF DETAILS OF CONSTRUCTION SHALL NOT BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.

10. ANY AND ALL CONTRACTOR INITIATED CHANGES SHALL BE SUBMITTED IN WRITING TO THE ENGINEER FOR APPROVAL PRIOR TO IMPLEMENTATION OF THE CONSTRUCTION.

11. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS AND THE METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES REQUIRED TO PERFORM THE WORK.

12. VEGETATION REMOVAL UPSLOPE FOR THE BULKHEAD SHALL BE MINIMIZED. PRESERVE ALL TREES.

13. AT CONSTRUCTION COMPLETION, THE CONTRACTOR SHALL PERFORM FINAL CLEANUP OF THE SITE.

14. THE OWNER OR OWNERS REPRESENTATIVE SHALL WALK THROUGH WITH THE CONTRACTOR WHEN FINAL CLEANUP IS COMPLETE.

PART 2: MATERIALS

1. BULKHEAD ROCK SHALL BE NON-WEATHERED, HARD, SOUND, AND DURABLE. ROCK SHALL BE FREE OF SEAMS, CRACKS, AND OTHER DEFECTS THAT REDUCE ITS RESISTANCE TO WEATHER. ROCK SHALL HAVE A MINIMUM DENSITY OF 160 POUNDS PER CUBIC FOOT. THE ROCK TYPE IDENTIFIED BY THE CONTRACTOR SHALL BE APPROVED BY THE OWNER PRIOR TO MOBILIZATION. APPROXIMATE ROCK SIZE IS PRESENTED IN THE TABLE BELOW.

2. QUARRY SPALLS SHALL CONSIST OF 2 TO 6 INCH CRUSHED ROCK THAT CONFORMS TO SECTION 9-13.7(2) OF THE 2018 WSDOT STANDARD SPECIFICATIONS.

3. PERMEABLE BALLAST SHALL CONFORM TO SECTION 9-03.9(2) OF THE 2018 WSDOT STANDARD SPECIFICATIONS.

4. STORMWATER DISPERSION PIPE SHALL CONSIST OF NOMINAL 6-INCH DIAMETER PERFORATED CORRUGATED DOUBLE WALL N-12 HIGH DENSITY POLYETHYLENE (HDPE) PIPE, 6-INCH NOMINAL DIAMETER SDR11 PERFORATED SOLID WALL HDPE PIPE, OR NOMINAL 6-INCH DIAMETER SCHEDULE 40 PVC PIPE. THE PERFORATED DISPERSION PIPE SHALL HAVE A MINIMUM WATER INLET AREA (WIA) OF 1.5 SQUARE INCHES PER LINEAR FOOT OF PIPE. DISPERSION PIPE AND PIPE JOINTS SHALL BE COMPATIBLE WITH REROUTED STORM WATER TIGHTLINE PIPES.

5. GEOTEXTILE FILTER FABRIC SHALL CONSIST OF MIRAFI FW403, OR APPROVED EQUIVALENT.

6. BEACH NOURISHMENT MATERIAL AND PLACEMENT SHALL CONFORM TO WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE PROJECT PERMIT REQUIREMENTS.

PART 3: DESIGN CRITERIA

1. ALLOWABLE BEARING CAPACITY OF 1500 PSF BASED ON THE 2015 INTERNATIONAL BUILDING CODE, UNLESS A SITE-SPECIFIC GEOTECHNICAL ENGINEERING REPORT IS PROVIDED.

2. SITE PLAN TOPOGRAPHY WAS OBTAINED FROM THE KITSAP COUNTY GIS WEBSITE, WHICH USES NAVD88 AS THE VERTICAL DATUM.

3. THE MEAN HIGHER HIGH WATER ELEVATION OF 11.18 FEET AND THE ORDINARY HIGH WATER ELEVATION ESTIMATE OF 13.6 FEET WERE PROVIDED BY WILLIAM REHE, THE PROJECT ENVIRONMENTAL CONSULTANT.

PART 4: EXECUTION

1. VERIFICATION OF EXISTING SITE CONDITIONS

   1) THE CONTRACTOR SHALL VERIFY ON-SITE GRADES AND CONDITIONS PRIOR TO CONSTRUCTION. THE OWNER AND THE ENGINEER-OF-RECORD SHALL BE IMMEDIATELY NOTIFIED IF ON-SITE CONDITIONS DIFFER FROM THE BULKHEAD DESIGN DRAWINGS.

2. EXCAVATION

   1) THE CONTRACTOR SHALL EXCAVATE TO THE LINES AND GRADES REQUIRED FOR CONSTRUCTION OF THE BULKHEAD, AS SHOWN ON THE DESIGN DRAWINGS.

   2) THE CONTRACTOR SHALL DIVERT SURFACE WATER AND PROVIDE TEMPORARY DEWATERING AS REQUIRED TO PREPARE THE BULKHEAD'S SUBGRADE SOILS.

   3) THE CONTRACTOR SHALL PROTECT EXISTING SITE FEATURES, OFF-SITE FEATURES, AND SITE IMPROVEMENTS FROM DAMAGE DURING CONSTRUCTION INCLUDING, BUT NOT LIMITED TO, THE LARGE TREE NEAR THE BULKHEAD. TEMPORARY EXCAVATION STABILITY AND SHORING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

   4) THE EXISTING SITE SOILS ALONG THE SHORELINE, PRONE TO WAVE AND TIDAL EROSION WHEN EXPOSED, SHALL BE REMOVED FROM THE SITE UNLESS DISPERSAL OF THE SOIL ON THE BEACH AS NOURISHMENT IS PERMITTED BY THE WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE.

   5) SITE EXCAVATIONS SHALL BE COMPLETED IN SECTIONS TO REDUCE THE POTENTIAL FOR TEMPORARY SLOPE INSTABILITY. ONE CONSTRUCTION SECTION SHALL BE EQUAL TO THE LENGTH OF BULKHEAD THAT CAN BE EXCAVATED, BACKFILLED, AND CONSTRUCTED IN ONE WORK DAY.

3. BULKHEAD AND ROCKERY CONSTRUCTION

   1) THE BULKHEAD SHALL BE FOUNDED ON FIRM AND UNYIELDING NATIVE SOILS.

   2) THE BULKHEAD FACE BATTER SHALL BE 6 VERTICAL TO 1 HORIZONTAL, OR FLATTER.

   3) ROCK SIZE SHALL DECREASE IN SIZE FROM THE BOTTOM OF THE BULKHEAD TO THE TOP OF THE BULKHEAD AT A UNIFORM RATE. ROCK AT THE TOP OF THE WALL SHALL BE A MINIMUM FOUR-MAN SIZE OR LARGER. THE BOTTOM ROCK SHALL BE SIX-MAN ROCK.

   4) EMBEDMENT OF THE LOWEST COURSE OF ROCK SHALL BE A MINIMUM OF 24 INCHES INTO FIRM SOILS UNDERLAYING LOOSE BEACH SAND.

   5) THE LONG DIMENSION OF THE ROCK SHALL EXTEND PERPENDICULAR TO THE ROCK FACE.

   6) ROCKS SHALL BE PLACED TO AVOID CONTINUOUS JOINT PLANES IN VERTICAL OR LATERAL DIRECTIONS. EACH ROCK SHALL BEAR ON TWO OR MORE ROCKS BELOW IT, WITH GOOD FLAT-TO-FLAT ROCK CONTACT.

   7) QUARRY SPALL BACKFILL BEHIND THE BULKHEAD SHALL BE PLACED BEHIND EACH COURSE AND TAMPED TO PROVIDE A STABLE CONDITION PRIOR TO PLACING ROCKS FOR THE NEXT SUCCESSIVE COURSE.

   8) GEOTEXTILE FABRIC SHALL COVER THE BOTTOM OF THE WALL EXCAVATION, EXTEND UP THE CUT FACE, AND COVER THE TOP OF THE QUARRY SPALL BACKFILL. GEOTEXTILE FABRIC JOINTS SHALL OVERLAP AT LEAST 18 INCHES.

   9) ROCK WALLS ARE PRIMARILY EROSION CONTROL STRUCTURES. NATIVE MATERIALS MUST BE STABLE AND FREE STANDING IN CUT FACE.

4. QUALITY CONTROL

   1) WE RECOMMEND THAT THE OWNER RETAIN THE ENGINEER-OF-RECORD TO PERFORM PERIODIC OBSERVATIONS DURING CONSTRUCTION.

   2) THE ABOVE FIELD OBSERVATIONS DO NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO MEET THE MORE STRINGENT OF THE DESIGN DRAWINGS, PERMIT REQUIREMENTS, OR OTHER MANUFACTURER'S REQUIREMENTS.

PART 5: SPECIAL DESIGN PROVISIONS

1. THE BULKHEAD SHALL BE COMPLETED IN GENERAL ACCORDANCE WITH THESE PLANS AND THE CURRENT EDITION OF THE ASSOCIATED ROCKERY CONTRACTORS (ARC) STANDARD ROCK WALL CONSTRUCTION GUIDELINES.

2. IF SITE CONDITIONS OR DESIGN PARAMETERS ARE DIFFERENT THAN WHAT HAS BEEN PRESENTED HEREIN, THE OWNER AND ENGINEER-OF-RECORD SHALL BE NOTIFIED IMMEDIATELY.

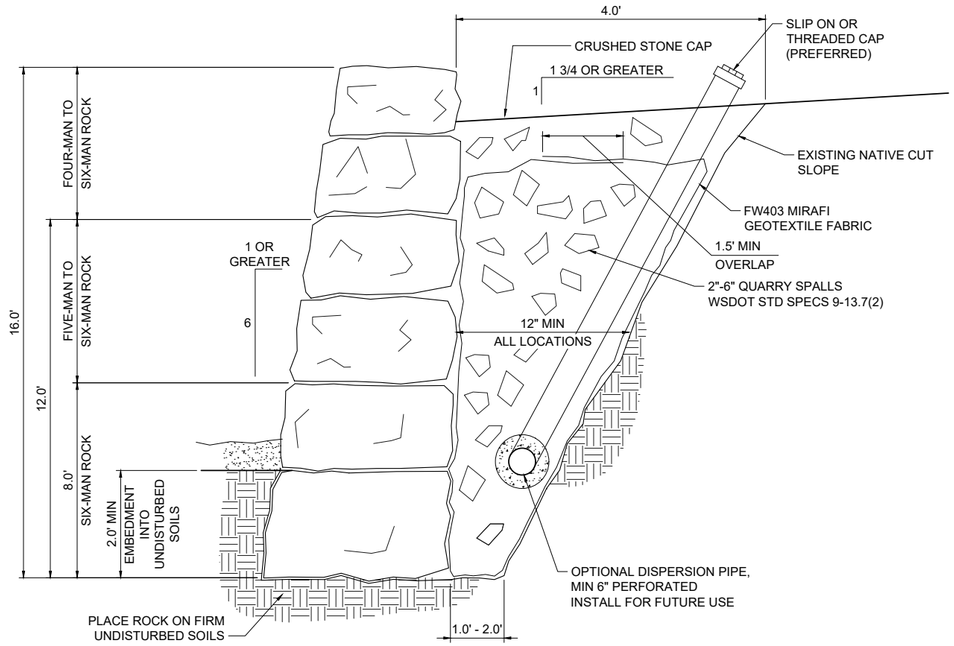
3. ANY REVISIONS TO DESIGN PARAMETERS OR PROPOSED BULKHEAD GEOMETRY MAY REQUIRE DESIGN MODIFICATIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

APPROXIMATE ROCK SIZES		
ROCK SIZE	AVERAGE DIMENSION (IN)	ROCK WEIGHT (LBS)
TWO-MAN	18-28	200-700
THREE-MAN	28-36	700-2,000
FOUR-MAN	36-48	2,000-4,000
FIVE-MAN	48-54	4,000-6,000
SIX-MAN	54-60	6,000-8,000

PLANT CANDIDATE LIST*

SCIENTIFIC NAME	COMMON NAME
TREES	
ACER GLAB[1]RUM VAR. DOUGLASII	DOUGLAS MAPLE
ARBUTUS MEZIESII	PACIFIC MADRONE
PINUS CONTORTA VAR CONTORTA	SHOREPINE
SHRUBS	
AMELANCHIER ALNIFOLIA	SERVICEBERRY
CORYLUS CORNUTA	BEAKED HAZELNUT
GAULTHERIA SHALLON	SALAL
HOLODISCUS DISCOLOR	OCEANSPRAY
MAHONIA AQUIFOLIUM	TALL OREGON GRAPE
ROSA GYMNOCARPA	BALDHIP ROSE
ROSA NUTKANA	NOOTKA ROSE
RIBES SANGUINEUM	RED-FLOWERING CURRANT
SYMPHORICARPOS ALBUS	SNOWBERRY
GRASSES & GROUNDCOVERS	
AMERICA MARITIMA	SEA PINK
ASTER SUBSPICATUS	DOUGLAS ASTER
DECHAMPSIA CESPITOSA	TUFTED HAIRGRASS
ELYMUS MOLLIS	AMERICAN DUNEGRASS
FRAGARIA CHILOENSIS	COASTAL STRAWBERRY
MAHONIA NERVOSA	LOW OREGON GRAPE
POLYSTICHUM MUNITUM	SWORD FERN
POTENTILLA ANSERINE VAR. PACIFICA	SILVERWEED

[1] *PLANTS LISTED MAY BE INCLUDED, BUT NOT LIMITED TO.*



TYPICAL BULKHEAD SECTION
NOT TO SCALE

General Notes

No.	Revision/Issue	Date

Firm Name and Address

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Project Name and Address

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Project	Sheet
MANLOWE	C5
Date: 10 JAN 2020	
Drafter: DSD	Engineer: STK