CITY OF BELLINGHAM

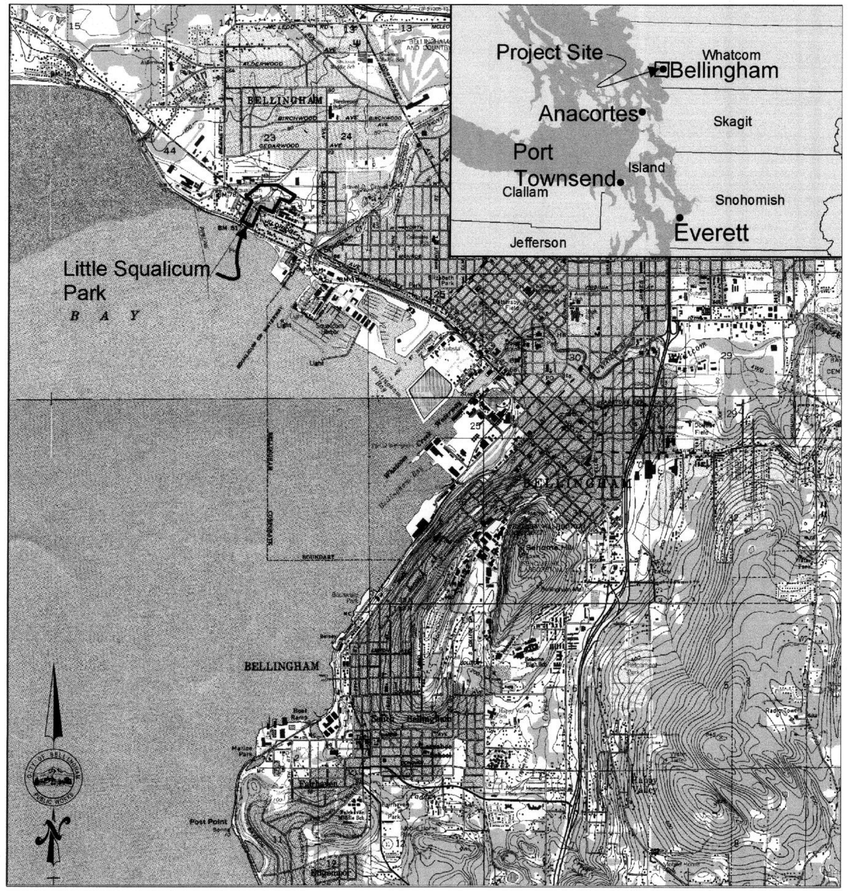
LITTLE SQUALICUM ESTUARY

PROJECT NO. EN-0033

BID No. 34B2017

Update

LOCATION AND VICINITY MAP



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OVERALL PROJECT LAYOUT	G03	(SHEET 3 OF 26)

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EXISTING CONDITIONS – SITE PLAN	C02	(SHEET 5 OF 26)
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THEODORE A. HAFF — 21970 — REGISTERED PROFESSIONAL ENGINEER — STATE OF WASHINGTON

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G01

Date	No.	Revision	By
	4		
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER T.A.H.
DESIGNED/DRAWN J.W.J./A.D.T.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR F.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= NA
Vert. 1"= NA

DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
COVER SHEET - VICINITY MAP AND INDEX

SHEET 1 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900

PROJECT DATUM

HORIZONTAL DATUM: NAD83/ 98 WASHINGTON STATE (NORTH ZONE)
PER CITY OF BELLINGHAM 2005 MODERNIZATION SURVEY.

VERTICAL DATUM: NAVD88 PER CITY OF BELLINGHAM 2009 HEIGHT MODERNIZATION SURVEY

MEAN LOWER LOW WATER (MLLW): -0.48 FT (NAVD88)

MEAN HIGHER HIGH WATER (MHHW): +8.01 FT (NAVD88)

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE LATEST EDITION OF "STANDARD SPECIFICATIONS FOR ROAD BRIDGE AND MUNICIPAL CONSTRUCTION" CURRENT EDITION (WSDOT), THE "CITY OF BELLINGHAM DEVELOPMENT GUIDELINES AND IMPROVEMENT STANDARDS" AND "THE CITY OF BELLINGHAM PARKS AND RECREATION DESIGN STANDARD DETAILS" UNLESS INDICATED OTHERWISE BY THE CONTRACT DOCUMENTS. IN CASE OF A CONFLICT BETWEEN THE REGULATORY SPECIFICATIONS OR STANDARDS, THE MORE STRINGENT REQUIREMENT WILL PREVAIL. ALL REFERENCES TO "SPECIFICATION SECTIONS" REFER TO THE "STANDARD SPECIFICATIONS FOR ROAD BRIDGE AND MUNICIPAL CONSTRUCTION" UNLESS OTHERWISE NOTED.
2. THE BEDDING FOR PVC PIPE SHALL BE PEA GRAVEL, ACCORDING TO CITY OF BELLINGHAM STANDARD PLAN NO. SS-750. ALL TRENCH BACKFILL UNDER EXISTING OR FUTURE PAVING SHALL BE BANK RUN GRAVEL FOR TRENCH BACKFILL AND SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY (MODIFIED PROCTOR).
3. PLUG ALL CULVERTS, SEWERS, AND CONDUITS PRIOR TO ABANDONMENT AS PER STANDARD SPECIFICATIONS SECTION 7-08.3(4), EXCEPT FOR THE DECOMMISSIONED CULVERT.
4. ALL LAWN AND VEGETATED AREAS OUTSIDE THE PROJECT LIMITS DISTURBED BY CONSTRUCTION EQUIPMENT, VEHICLES OR PERSONNEL SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER, AT THE CONTRACTORS EXPENSE.
5. THIS PROJECT MAY REQUIRE VARIOUS PERMITS AS OUTLINED IN THE PROJECT SPECIFICATION'S GENERAL PROVISIONS. ALL WORK SHALL BE PERFORMED IN A MANNER WHICH ENSURES CONFORMANCE WITH ANY PERMIT REQUIREMENTS.
6. THE CONTRACTOR SHALL ATTEND PRE-CONSTRUCTION CONFERENCE WITH THE CITY OF BELLINGHAM ENGINEERING DIVISION PRIOR TO BEGINNING CONSTRUCTION.
7. UNDERGROUND UTILITIES ARE KNOWN TO EXIST IN THE AREA OF CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE UTILITY OWNERS FOR LOCATIONS AND TO NOTIFY THE CITY PROJECT ENGINEER PROMPTLY OF ANY CONFLICT. THE ONE-CALL NUMBER FOR UNDERGROUND UTILITIES IS: 1-800-424-5555.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF ADJACENT UTILITIES WHICH MAY INCLUDE, BUT ARE NOT LIMITED TO, WATER, SEWER, STORM SEWER, POWER, TELEPHONE, CABLE TV, GAS, IRRIGATION, AND STREET LIGHTING.
9. THE CONTRACTOR SHALL NOTIFY RESIDENTS AND BUSINESSES 48 HOURS IN ADVANCE OF ANY WORK AFFECTING ACCESS OR SERVICE AND SHALL MINIMIZE INTERRUPTIONS TO DRIVEWAYS FOR RESIDENTS AND BUSINESSES ADJACENT TO THE PROJECT.
10. PUBLIC RIGHTS-OF-WAY SHALL BE KEPT IN A CLEAN AND SERVICEABLE CONDITION AT ALL TIMES. IN THE EVENT MATERIALS ARE INADVERTENTLY DEPOSITED ON ROADWAYS, THE MATERIAL SHALL BE PROMPTLY REMOVED. MATERIALS ARE TO BE SWEPT AND REMOVED WITH A VACUUM SWEEPER.
11. PUBLIC AND PRIVATE DRAINAGE WAYS SHALL BE PROTECTED FROM POLLUTION. NO MATERIAL IS TO BE DISCHARGED TO, OR DEPOSITED IN STORMWATER SYSTEMS THAT MAY RESULT IN VIOLATION OF STATE OR FEDERAL WATER QUALITY STANDARDS.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTING, MAINTAINING, & REMOVING EROSION CONTROL MEASURES (SILT FENCE, ROCK CHECK DAMS, SILT PONDS, CATCH BASIN FILTERS, ETC...) THROUGHOUT THE DURATION OF THE PROJECT. ALL EROSION CONTROL WORK IS CONSIDERED INCIDENTAL TO THE ITEMS OF WORK IN THE CONTRACT FOR THIS PROJECT. REFER TO THE 'STORM WATER POLLUTION PREVENTION PLAN SHEETS AND BID ITEMS NOTED IN THE CONTRACT PORTION OF THE PROJECT SPECIFICATIONS FOR SPECIFIC EROSION CONTROL NOTES.
13. CONTRACTOR SHALL STAKE OUT SENSITIVE AREAS AS IDENTIFIED ON THE PLANS AND IN THE FIELD BY THE PROJECT ENGINEER FOR APPROVAL BY CITY PROJECT ENGINEER PRIOR TO COMMENCING EARTHWORK.
14. NO STAGING AREA IS PROVIDED FOR THIS PROJECT.
15. ANY TEMPORARY STORAGE OF MATERIALS IN THE RIGHT OF WAY MORE THAN TWO WEEKS PRIOR TO INSTALLATION SHALL REQUIRE APPROVAL OF THE CITY PROJECT ENGINEER.
16. STOCKPILING OF AGGREGATE BASE OR EXCAVATED MATERIALS IN THE RIGHT OF WAY SHALL NOT BE ALLOWED WITHOUT THE CITY PROJECT ENGINEER'S AUTHORIZATION.
17. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS AND AUTHORIZATION FOR STAGING AREAS.
18. CONSTRUCTION EQUIPMENT ACCESS MAY BE FROM LINDBERG AVENUE, OR WEST ILLINOIS.
19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ACCESS AGREEMENTS REQUIRED FROM THE CITY OF BELLINGHAM PARKS DEPARTMENT.
20. ALL MATERIALS HAULING SHALL BE VIA LINDBERG AVENUE ONLY.
21. PROTECTION OF THE ENVIRONMENT: NO CONSTRUCTION RELATED ACTIVITY SHALL CONTRIBUTE TO THE DEGRADATION OF THE ENVIRONMENT, ALLOW MATERIAL TO ENTER SURFACE OR GROUND WATERS, OR ALLOW PARTICULATE EMISSIONS TO THE ATMOSPHERE, WHICH EXCEED STATE OR FEDERAL STANDARDS. ANY ACTIONS THAT POTENTIALLY ALLOW A DISCHARGE TO STATE WATERS MUST HAVE PRIOR APPROVAL OF THE WASHINGTON STATE DEPARTMENT OF ECOLOGY.

LEGEND:

FEATURE	EXISTING	PROPOSED
CONTOURS, MAJOR	------#------	####
CONTOURS, MINOR	------#------	####
CREEK/DRAINAGE		
CONCRETE		
GRAVEL		
SURVEY MONUMENT	###	
PARK BOUNDARY		
PROPERTY LINES		
BNSF RN ROW		
EASEMENT		
OHWM	OHW	
MHHM	MHHW	MHHW
200' SHORELINE BUFFER		
150' HCA BUFFER		
BNSF RW CENTERLINE		
TREE LINE		
WETLANDS		
EXISTING STREAM		
NO GROUND DISTURBANCE AREA		
MULCH		
TOPSOIL		
HYDROSEED		
LARGE WOOD WITH ROOT WAD		
WOOD GUARDRAIL		
BEACH NOURISHMENT		

ABBREVIATIONS

APN	ASSESSOR' S PARCEL NUMBER
BNSF RW	BNSF RAILWAY
CGS	COASTAL GEOLOGIC SERVICES
COB	CITY OF BELLINGHAM
CONC.	CONCRETE
EL./ELEV.	ELEVATION
EX./EXIST.	EXISTING
FT	FEET
MHHW	MEAN HIGHER-HIGH WATER
MLLW	MEAN LOWER-LOW WATER
NAVD88	NORTH AMERICAN VERTICAL DATUM 1988
OHWM	ORDINARY HIGH WATER MARK
RR	RAIL ROAD
R.O.W.	RIGHT OF WAY
SWPPP	STORMWATER POLLUTION PREVENTION PLAN
TBM	TEMPORARY BENCHMARK
TESC	TEMPORARY SEDIMENT AND EROSION CONTROL
TYP.	TYPICAL
WC	WHATCOM COUNTY

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G02

	4		
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT
Date	No	Revision	By

PROJECT ENGINEER T.A.H.
DESIGNED/DRAWN J.W.J./A.D.T
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= NA
Vert. 1"= NA

DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
NOTES - LEGEND - ABBREVIATIONS

SHEET 2 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900

GRAPHIC SCALE
(us survey feet)
0 100
100 50 200
1 inch = 100 feet

WEST ILLINOIS STREET

MARINE DRIVE R.O.W. VARIES

LINDBERG AVENUE

ELDRIDGE AVENUE

B.N.S.F. RAILROAD

BELLINGHAM BAY

LITTLE SQUALICUM PARK
TRAIL ACCESS CLOSED

PROJECT ACCESS

ESTUARY AREA

BEACH WORK ACCESS

BEACH NOURISHMENT AREA -
OPTION SCHEDULE A

LITTLE SQUALICUM PARK
TRAIL ACCESS CLOSED

SHEETS C03, C14

SHEETS C02, C10, C11

SHEETS C01, C09, C13

380223342194
MARK D W &
MICHELLE M W
DOTSON

380223325183
JACQUI W
MACCONNELL

380223327172
DEBORAH M
LOOBER AND
JANE A BURNS

380223321155
PIPER K MERTLE

380223320211
WHATCOM COUNTY
PARKS
& RECREATION
DEPT

380223376152
DAVID J SIDEN

380223365143
BONITA C SIDEN TRUST
DAVID J SIDEN TR

380223376234
COLUMBIA
NORTHWEST CORP
C/O MARVIN F
POER & CO

380223168178
COLUMBIA
NORTHWEST CORP
C/O MARVIN F
POER & CO

380225130445
PORT OF
BELLINGHAM

380223330305
CITY OF BELLINGHAM

380223341168
CITY OF BELLINGHAM

380223341154
CITY OF BELLINGHAM PARKS DEPT

380223317272
LEHIGH NORTHWEST CEMENT CO
C/O MARVIN F POER & CO

USE & OCCUPANCY AGR

THEODORE A. HANSEN
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G03

Date	No	Revision	By
	4		
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
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6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER T.A.H.
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INSPECTOR

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CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR F.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= NA
Vert. 1"= NA

DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
OVERALL PROJECT LAYOUT

SHEET 3 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900

MATCHLINE - SEE SHEET C03

LEGEND:

FEATURE	EXISTING
CONTOURS, MAJOR	#
CONTOURS, MINOR	#
CREEK/DRAINAGE	
CONCRETE	
GRAVEL	
SURVEY MONUMENT	###
PARK BOUNDARY	
PROPERTY LINES	
BNSF RN ROW	
EASEMENT	
OHWM	OHW
MHHM	MHHW
200' SHORELINE BUFFER	
150' HCA BUFFER	
BNSF RW CENTERLINE	
TREE LINE	
WETLANDS	
EXISTING STREAM	
NO GROUND DISTURBANCE AREA	

SURVEY NOTES:

1) SURVEY COMPLETED BY PACIFIC SURVEY AND ENGINEERING MARCH 2016.

2) PURPOSE OF SURVEY: THE PURPOSE OF THIS SURVEY WAS TO PROVIDE DESIGN-LEVEL TOPOGRAPHIC DETAIL IN AREAS PROPOSED TO BE RE-CONSTRUCTED AS PART OF A PLANNED ESTUARY INSTALLATION. NEW SURVEY DATA WAS COMBINED WITH CITY OF BELLINGHAM 2013 LIDAR.

3) DATA FOR THIS SURVEY WAS GATHERED BY FIELD TRAVERSE UTILIZING ELECTRONIC DATA COLLECTION IN MARCH 2016.

4) EQUIPMENT USED: THEOMAT 00'01.5"
EDM: ± 2PPM, ± 3MM

5) HORIZONTAL DATUM: NAD 83/98, WASHINGTON STATE PLANE NORTH ZONE, PER 2007 CITY OF BELLINGHAM CADASTRAL SURVEY & PUBLISHED CONTROL POINTS (SEE CONTROL TABLE FOR COORDINATES)

6) VERTICAL DATUM: NAVD 88, PER CITY OF BELLINGHAM 2009 HEIGHT MODERNIZATION PROJECT & PUBLISHED BENCHMARKS. PRIMARY PROJECT BENCHMARK: CITY OF BELLINGHAM CONTROL POINT #5849, AT THE NORTHEAST QUADRANT OF PATTON AND WEST ILLINOIS. THE PUBLISHED NAVD88 ELEVATION FOR CONTROL POINT #5849 IS 70.461 FEET (OFFSITE, NOT SHOWN). (SEE CONTROL TABLE FOR PROJECT TEMPORARY BENCHMARK ELEVATIONS)

7) SUB-SURFACE UTILITY LOCATES WERE NOT PERFORMED AT THE TIME OF THIS SURVEY. PACIFIC SURVEYING AND ENGINEERING IS NOT RESPONSIBLE FOR ANY SUB-SURFACE CONDITIONS NOT SHOWN.

8) THIS IS NOT A BOUNDARY SURVEY. PARCEL, RIGHT OF WAY, & EASEMENT DETERMINATIONS PER LITTLE SQUALICUM PARK LIDAR VERIFICATION & TOPOGRAPHY MAP PREPARED BY WILSON SURVEYING AND ENGINEERING FOR THE CITY OF BELLINGHAM DEPARTMENT OF PUBLIC WORKS IN APRIL OF 2014. SUPPLEMENTAL INTERIOR SUBJECT PROPERTY LINEWORK PER CITY OF BELLINGHAM G.I.S. NO TITLE REPORT WAS PROVIDED BY THE CLIENT AND NO BOUNDARY MONUMENTATION WAS SET DURING THIS SURVEY.

9) WETLANDS AND ORDINARY HIGH WATER DELINEATION SHOWN PER THE CRITICAL AREAS DELINEATION REPORT FOR LITTLE SQUALICUM PARK ESTUARY RESTORATION PROJECT, PREPARED JUNE 2014 BY NORTHWEST ECOLOGICAL SERVICES, LLC.

10) ADDITIONAL TOPOGRAPHY SHOWN ON SHEETS C03 AND C14 WAS DERIVED FROM THE CITY OF BELLINGHAM'S 2013 LIDAR MAPPING DATA, AS PUBLISHED BY THE PUGET SOUND LIDAR CONSORTIUM.

MATCHLINE - SEE SHEET C02

PRIMARY SURVEY CONTROL TABLE

MON.	NORTHING	EASTING	ELEVATION	DESCRIPTION
202	648707.3341	1234544.5930	27.489	FOUND REBAR WITH ORANGE CAP (TBM)
203	648247.5754	1234269.1870	19.725	FOUND REBAR WITH ORANGE CAP (TBM)
204	648546.8160	1234435.3090	20.098	FOUND REBAR WITH ORANGE CAP (TBM)
210	648126.6086	1234494.9170	16.970	SET REBAR WITH ORANGE CAP (TBM)
1208	649412.6267	1236864.9380	NA	CITY OF BELLINGHAM MON. #1208 (OFFSITE, NOT SHOWN)
2998	649056.3612	1234329.4480	NA	CITY OF BELLINGHAM MON. #2998 (OFFSITE, NOT SHOWN)
5849	–	–	70.461	CITY OF BELLINGHAM MON. #5849 (OFFSITE, NOT SHOWN)

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GRAPHIC SCALE
(us survey feet)
20 0 10 20 40
1 inch = 20 feet

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23370
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C01

Date	No	Revision	By
	4		
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER T.A.H.
DESIGNED/DRAWN J.W.J./A.D.T
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= NA

DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
EXISTING CONDITIONS - SITE PLAN

SHEET 4 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900

MATCHLINE - SEE SHEET C01

SDCULV#10355
IE=16.7, 72"x58" BOX CULVERT

SDCULV#10370
IE=14.9, FAILED
CONC STRUCTURE

WETLAND D
88 SF

WETLAND E
609 SF

WETLAND F
5,767 SF

APPROX. LOCATION OF 40' PORT OF B'HAM EASEMENT
AS SHOWN ON CITY WORKSHEET RS-1033(C)

LITTLE SQUALICUM CREEK

APPROX. LOCATION OF TILBURY CEMENT CO.
PIER ACCESS EASEMENT A.F.N. 202040482

SIGN: TRAIL

GRAVEL TRAIL

GRAVEL TRAIL

GRAVEL TRAIL

SDCULV#10355
IE=18.4, 36"C

MARINE DRIVE R.O.W. VARIES

204

202

E

E'

F

F'

G

G'

A

A'

8+59

LEGEND:

FEATURE	EXISTING
CONTOURS, MAJOR	#
CONTOURS, MINOR	#
CREEK/DRAINAGE	
CONCRETE	
GRAVEL	
SURVEY MONUMENT	###
PARK BOUNDARY	
PROPERTY LINES	
BNSF RN ROW	
EASEMENT	
OHWM	OHW
MHHM	MHHW
200' SHORELINE BUFFER	
150' HCA BUFFER	
BNSF RW CENTERLINE	
TREE LINE	
WETLANDS	
EXISTING STREAM	

GRAPHIC SCALE
(us survey feet)
0 20
20 10 40
1 inch = 20 feet

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THEODORE A. HANSEN
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C02

Date	No	Revision	By
	4		
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER T.A.H.
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INSPECTOR

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CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= NA

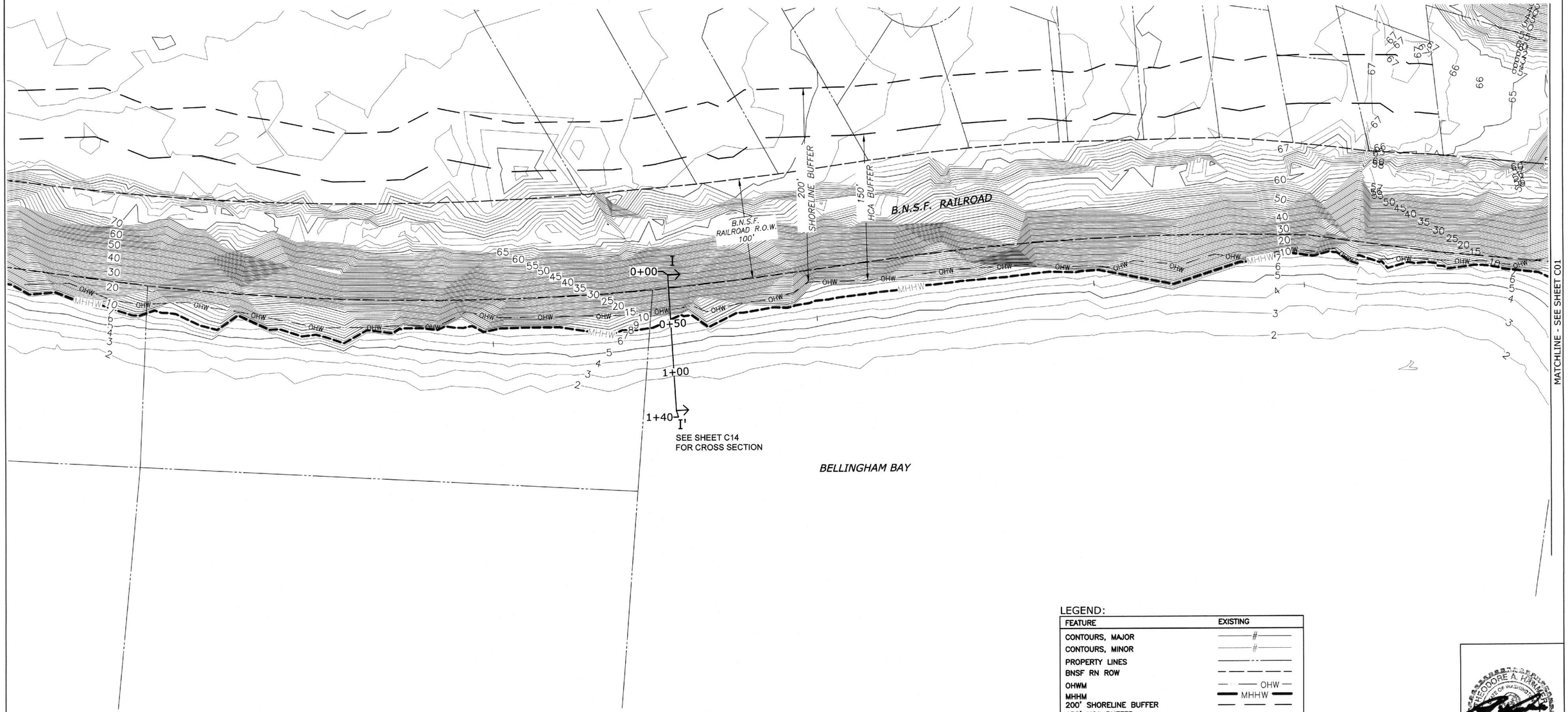
DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
EXISTING CONDITIONS - SITE PLAN

SHEET 5 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900



LEGEND:

FEATURE	EXISTING
CONTOURS, MAJOR	#
CONTOURS, MINOR	#
PROPERTY LINES	
BNSF RN ROW	
OHWM	OHW
MHHM	MHHW
200' SHORELINE BUFFER	
150' HCA BUFFER	

GRAPHIC SCALE
(us survey feet)
0 30
30 25 100
1 inch = 30 feet

811 Call 811 two business days before you dig

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C03

Date	No	Revision	By
	4		
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

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DESIGNED/DRAWN J.W.J./A.D.T
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 50'
Vert. 1"= NA

DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
EXISTING CONDITIONS - OPTION A- BEACH NOURISHMENT

SHEET 6 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900

TREE SALVAGE LEGEND:

LARGE TREES

Site #	Species	Diameter (in)
1	Alder	13
2	Black Cottonwood	40
3	Alder	17
4	Big Leaf Maple	7
5	Alder	12
6	Alder	15
7	Alder	17
8	Alder	15
9	Alder	14
10	Alder?	19
11	Alder	24
12	Black Cottonwood	23
13	Alder	17
14	Red Alder	18
15	Red Alder	19

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C04

Date	No	Revision	By
	4		
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER	T.A.H.
DESIGNED/DRAWN	J.W.J./A.D.T
INSPECTOR	
DIRECTOR PUBLIC WORKS	T.A.C.
CITY ENGINEER	C.M.A.S.
ASSISTANT DIRECTOR	E.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= NA

DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
TREE SALVAGE PLAN

SHEET 7 OF 26

CONTACT PERSON: FREEMAN ANTHONY PROJECT ENGINEER AT (360)-778-7900

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.

B.N.S.F. RAILROAD
150' HCA BUFFER
200' SHORELINE BUFFER
END SILT FENCE
BEGIN HI VIS. FENCE
HIGH VISIBILTY CONSTRUCTION FENCE
AREA OF STREAM FILL/ MEADOW CREATION (DEPICTED BY HATCH)
OPTIONAL STOCKPILE AREA
EXISTING STREAM CHANNEL (TO BE FILLED)
TEMP. CONCRETE ECO-BLOCK WALL
HIGH VISIBILTY CONSTRUCTION FENCE
DIRECT TO STOCKPILE: AREA OF 3 FT OVER-EXCAVATION, BUFFER FROM DESIGN GRADES TO BE DIRECTED TO SAMPLED STOCKPILE AND SAMPLED BY OWNER'S REPRESENTATIVE. CONTRACTOR TO STAKE AREA FOR APPROVAL PRIOR TO EXCAVATION
INSTALL BIODEGRADABLE EROSION CONTROL BLANKET ON EXPOSED EARTH UPSTREAM OF CULVERT. MATERIAL SPEC. PER WSDOT 9-14.5(2) INSTALLATION: WSDOT 8-01.3(4)
TEMP. BERM: COFFER DAM PER WSDOT 8-01.3(1) FILLED WITH GRAVEL W/ VISQUEEN COVER
AREA OF NO GROUND DISTURBANCE ACTIVITIES- CONTRACTOR TO STAKE 25 FT. OFFSET AROUND AREA FOR APPROVAL PRIOR TO EXCAVATION
OHW
FEMA ZONE V
PROPOSED 10 FT GRAVEL PATH W/ 1 FT SHOULDERS
APPROX. OHW
HIGH VISIBILTY CONSTRUCTION FENCE
END HI VIS. FENCE
FISH FENCE IN STREAM BED
SEE NOTE #1, CONCRETE WORK BOX CULVERT
EXISTING TRAIL
LSC-1B BASELINE TURBIDITY MONITORING STATION 50' UPSTREAM OF FISH FENCE
DEWATERING PUMP (AS NEEDED)
APPROX. OHW
MATCH TO EXISTING TRAIL
PROPOSED CONC BOX CULVERT W/WING WALLS
PROPOSED 10' GRAVEL PATH 1 FT SHOULDERS MATCH EXISTING TRAIL.
LSC-2C COMPLIANCE/ MONITORING STATION AT END OF DISCHARGE PIPE.
BEGIN HI VIS. FENCE
EXCAVATION MONITORING AREA- CONTRACTOR TO STAKE AREA FOR APPROVAL PRIOR TO EXCAVATION
MHHW 8.01 FT
MHHW 8.01 FT
INITIAL AREA FOR STOCKPILING AND SORTING EXCAVATED MATERIAL
HIGH VISIBILTY CONSTRUCTION FENCE
PROPOSED 5' GRAVEL PATH NO SHOULDERS
LEAVE UPLAND EMBANKMENT IN PLACE UNTIL FINAL GRADING & STABILIZATION IS COMPLETE.
SILT FENCE
ESTUARY DEWATERING / SEDIMENTATION TANKS, PUMPS AND OIL WATER SEPARATION FACILITIES (LOCATION SUGGESTED & SUBJECT TO CHANGE WITH EXCAVATION.)
MARINE DRIVE
DIRECT TO STOCKPILE: AREA OF 3 FT OVER-EXCAVATION, BUFFER FROM DESIGN GRADES TO BE DIRECTED TO SAMPLED STOCKPILE AND SAMPLED BY OWNER'S REPRESENTATIVE. CONTRACTOR TO STAKE AREA FOR APPROVAL PRIOR TO EXCAVATION
BB-2C COMPLIANCE MONITORING STATION FOR TURBIDITY 150' FROM DISTURBING IN-WATER ACTIVITY AND ESTUARY INLET/OUTLET CHANNEL.
PROPOSED 5' TRAIL
TEMPORARY CONSTRUCTION EXIT CITY OF BELLINGHAM DETAIL EC-600
CATCH BASIN INSERT
BEGIN SILT FENCE END HI VIS. FENCE
HIGH VISIBILITY CONSTRUCTION FENCE
FEMA FLOOD HAZARD ZONE V: BASE ELEVATION NOT DEFINED ON FEMA FIRM. LOCATION OF LINE IS APPROXIMATE
NPDES COMPLIANCE END OF PIPE MONITORING- TYPICAL DISCHARGE POINT.
CONTRACTOR TO IMPLEMENT APPROPRIATE SEDIMENT CONTROLS DURING SHEET PILE INSTALLATION INCLUDING WORKING IN THE DRY DURING LOW TIDE CYCLES AS FEASIBLE.
LINDBERGH AVE.
EXISTING PAVEMENT APRON
CATCH BASIN INSERT
BB-1B BASELINE MONITORING STATION 300' TO THE SOUTHWEST OF PROJECT AREA.
FEMA ZONE V

CONCRETE WORK NOTES:

NOTE 1: CONCRETE BOX CULVERT TO BE INSTALLED IN UPLAND AREA-CREEK FLOWS WILL NOT BE INTRODUCED UNTIL AFTER CONCRETE IS CURED.

NOTE 2: PREFABRICATED BRIDGE- CONCRETE ABUTMENTS. THE EXISTING ISOLATED FRESHWATER WETLAND WITHIN THE FOOTPRINT OF BRIDGE INSTALLATION WILL BE REPLACED AS AN ESTUARINE WETLAND AT PROJECT COMPLETION

NOTES 1 & 2: DEWATERING WILL BE IMPLEMENTED TO ENSURE THAT NO CONCRETE WORK WILL OCCUR IN "WET" CONDITIONS.

SUGGESTED STREAM BYPASS MEASURES

1. INSTALL FISH FENCE AT EACH END OF OF WORK AREA & DEFISH STREAM.
2. INSTALL ECOLOGY BLOCK WALL BETWEEN STREAM AND CUVERT WORK SITE.
3. COMPLETE ALL CONSTRUCTION OUTSIDE OF EXISTING STREAM (ESTUARY EXCAVATION, FISH CULVERT CONSTRUCTION, SHEET PILE WALLS, ETC.)
4. INSTALL TEMP. BERM AND DEWATERING PUMP AT UPSTREAM END OF WORK SITE.
5. REMOVE ECOLOGY BLOCK WALL; EXCAVATE STREAM CHANNEL; INSTALL STREAM GRAVEL; STABILIZE STREAM BANKS.
6. DECOMMISSION CULVERT NEAR R.R. TRESTLE.
7. REMOVE STREAM DEWATERING PUMP AND UPSTREAM BERM.

RYAN A. LONG — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER
5-3-2018

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

CO5

No	Date	Revision	By
4			
3	5/04/18	BID SUBMITTAL – COB COMMENTS	AT
2	9/22/17	BID SUBMITTAL	AT
1	6/26/17	DRAFT DESIGN	AT

PROJECT ENGINEER R.L.
DESIGNED/DRAWN R.L. / D.N.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.L.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 30'
Vert. 1"= N/A

DATUM
NAD 83/98
NAVD88

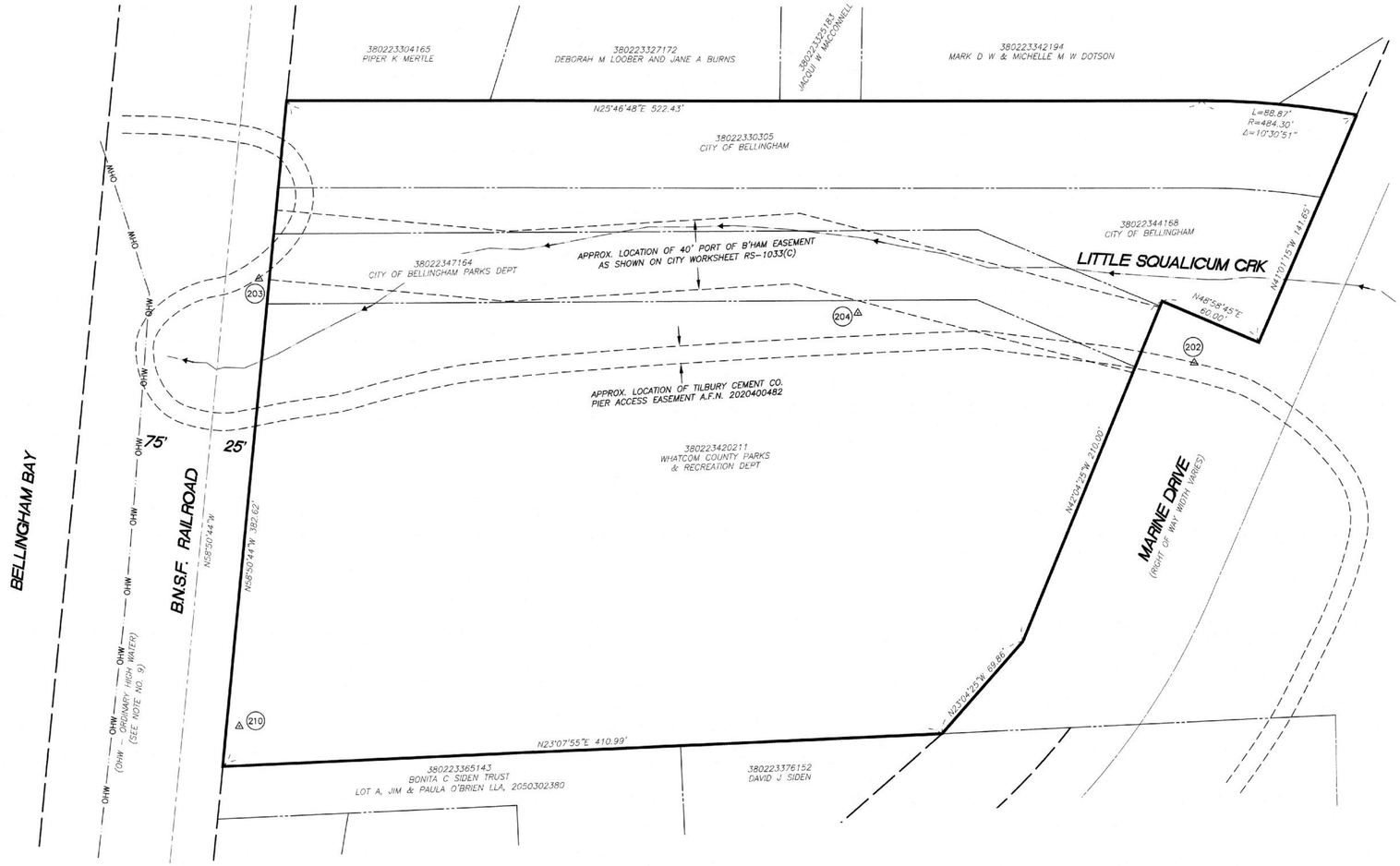
Job. No.
Date 05/04/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
SWPPP PLAN

SHEET 8 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT 778-7900

C:\cy\2016\16002 Little Squalicum\ACAD\Submittal-Drawings-2017-09-15\04-06-Swppp-notes_ reconvet.dwg, 5/3/2018 2:17:56 PM, D New



SURVEY NOTES:

1) SURVEY COMPLETED BY PACIFIC SURVEY AND ENGINEERING MARCH 2016.

2) PURPOSE OF SURVEY: THE PURPOSE OF THIS SURVEY WAS TO PROVIDE DESIGN-LEVEL TOPOGRAPHIC DETAIL IN AREAS PROPOSED TO BE RE-CONSTRUCTED AS PART OF A PLANNED ESTUARY INSTALLATION. NEW SURVEY DATA WAS COMBINED WITH CITY OF BELLINGHAM 2013 LIDAR.

3) DATA FOR THIS SURVEY WAS GATHERED BY FIELD TRAVERSE UTILIZING ELECTRONIC DATA COLLECTION IN MARCH 2016.

4) EQUIPMENT USED: THEOMAT 00'01.5"
EDM: ± 2PPM, ± 3MM

5) HORIZONTAL DATUM: NAD 83/98, WASHINGTON STATE PLANE NORTH ZONE, PER 2007 CITY OF BELLINGHAM CADASTRAL SURVEY & PUBLISHED CONTROL POINTS (SEE CONTROL TABLE FOR COORDINATES)

6) VERTICAL DATUM: NAVD 88, PER CITY OF BELLINGHAM 2009 HEIGHT MODERNIZATION PROJECT & PUBLISHED BENCHMARKS. PRIMARY PROJECT BENCHMARK: CITY OF BELLINGHAM CONTROL POINT #5849, AT THE NORTHEAST QUADRANT OF PATTON AND WEST ILLINOIS. THE PUBLISHED NAVD88 ELEVATION FOR CONTROL POINT #5849 IS 70.461 FEET (OFFSITE, NOT SHOWN). (SEE CONTROL TABLE FOR PROJECT TEMPORARY BENCHMARK ELEVATIONS)

7) SUB-SURFACE UTILITY LOCATES WERE NOT PERFORMED AT THE TIME OF THIS SURVEY. PACIFIC SURVEYING AND ENGINEERING IS NOT RESPONSIBLE FOR ANY SUB-SURFACE CONDITIONS NOT SHOWN.

8) THIS IS NOT A BOUNDARY SURVEY. PARCEL, RIGHT OF WAY, & EASEMENT DETERMINATIONS PER LITTLE SQUALICUM PARK LIDAR VERIFICATION & TOPOGRAPHY MAP PREPARED BY WILSON SURVEYING AND ENGINEERING FOR THE CITY OF BELLINGHAM DEPARTMENT OF PUBLIC WORKS IN APRIL OF 2014. SUPPLEMENTAL INTERIOR SUBJECT PROPERTY LINEWORK PER CITY OF BELLINGHAM G.I.S. NO TITLE REPORT WAS PROVIDED BY THE CLIENT AND NO BOUNDARY MONUMENTATION WAS SET DURING THIS SURVEY.

9) WETLANDS AND ORDINARY HIGH WATER DELINEATION SHOWN PER THE CRITICAL AREAS DELINEATION REPORT FOR LITTLE SQUALICUM PARK ESTUARY RESTORATION PROJECT, PREPARED JUNE 2014 BY NORTHWEST ECOLOGICAL SERVICES, LLC.

10) ADDITIONAL TOPOGRAPHY SHOWN ON SHEETS C03 AND C14 WAS DERIVED FROM THE CITY OF BELLINGHAM'S 2013 LIDAR MAPPING DATA, AS PUBLISHED BY THE PUGET SOUND LIDAR CONSORTIUM.

PRIMARY SURVEY CONTROL TABLE

MON.	NORTHING	EASTING	ELEVATION	DESCRIPTION
202	648707.3341	1234544.5930	27.489	FOUND REBAR WITH ORANGE CAP (TBM)
203	648247.5754	1234269.1870	19.725	FOUND REBAR WITH ORANGE CAP (TBM)
204	648546.8160	1234435.3090	20.098	FOUND REBAR WITH ORANGE CAP (TBM)
210	648126.6086	1234494.9170	16.970	SET REBAR WITH ORANGE CAP (TBM)
1208	649412.6267	1236864.9380	NA	CITY OF BELLINGHAM MON. #1208 (OFFSITE, NOT SHOWN)
2998	649056.3612	1234329.4480	NA	CITY OF BELLINGHAM MON. #2998 (OFFSITE, NOT SHOWN)
5849	–	–	70.461	CITY OF BELLINGHAM MON. #5849 (OFFSITE, NOT SHOWN)

CITY OF BELLINGHAM PUBLIC WORKS

GRAPHIC SCALE
(us survey feet)
0 10
40 20 80
1 inch = 40 feet

ADAM SCOTT MOBERG
STATE OF WASHINGTON
40825
REGISTERED PROFESSIONAL LAND SURVEYOR
11/22/17

PSE

811 Call 811 two business days before you dig

C06

No	Date	Revision	By
4			–
3			–
2			–
1			–

PROJECT ENGINEER R.L
DESIGNED/DRAWN R.L./D.N.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 40'
Vert. 1"= NA

DATUM
NAD 83/98
NAVD88

Job. No.
Date 11.22.17
Field Bk.

LITTLE SQUALICUM ESTUARY
SURVEY CONTROL

SHEET 9 OF 26

CONTACT PERSON: FREEMAN ANTHONY , PROJECT ENGINEER AT 778-7900

EROSION CONTROL REQUIREMENTS FOR LITTLE SQUALICUM PARK ESTUARY

Note: Items in *Italics* are taken directly from the WSDOE Stormwater Manual general requirements for erosion control. Items in bold text are site specific prescriptions generated by the Engineer.

REFERENCE ALSO PLAN SHEET SC1–C3

ELEMENT 1: MARK CLEARING LIMITS

• Before beginning land disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.

• Retain the duff layer, native top soil, and natural vegetation in an undisturbed state to the maximum degree practical.

Additional Guidance

• Plastic, metal, or fabric fence may be used to mark the clearing limits. [Note: the difference between the practical use and proper installation of silt fencing and the proper use of clearing boundary fencing.]

• If it is not practical to retain the duff layer in place, then stockpile it on–site, cover it to prevent erosion, and replace it immediately when you finish disturbing the site.

Prior to beginning construction, the limits of disturbance shall be staked on the site by the project surveyor. Flagging and Silt Fence will be installed around the perimeter of the site along the limits of disturbance as shown on the approved Plan (Sheet C1), and shall be maintained throughout construction.

NOTE: CONTRACTOR TO STAKE 25' OFF SET OF NO DISTURBANCE AREAS

BMP C233 Reinforced Silt Fence
BMP C103 High Visibility Fencing

ELEMENT 2: ESTABLISH CONSTRUCTION ACCESS

•Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

• Limit construction vehicle access and exit to one route, if possible.
Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs, to minimize tracking sediment onto roads.
• Locate wheel wash or tire baths on site, if the stabilized construction entrance is not effective in preventing tracking sediment onto roads.
If sediment is tracked off site, clean the affected roadway thoroughly at the end of each day, or more frequently as necessary (for example, during wet weather). Remove sediment from
• roads by shoveling, sweeping, or pick up and transport the sediment to a controlled sediment
• disposal area.
Conduct street washing only after sediment is removed in accordance with the above bullet.
Control street wash wastewater by pumping back on site or otherwise preventing it from discharging into systems tributary to waters of the State.
•

Additional Guidance

Minimize construction site access points along linear projects, such as roadways. Street washing may require local jurisdiction approval.

Access to the site shall be by way of the existing trail / access road off of Lindbergh Ave near Marine Drive. A temporary construction exit shall be constructed at this location.

BMP C105: Stabilized Construction Entrance/Exit
BMP C106: Wheel Wash
BMP C107: Construction Road/Parking Area Stabilization

ELEMENT 3: CONTROL FLOW RATES

•Construction Stormwater General Permit and Municipal Stormwater Permits Requirements
flow rate of stormwater runoff from the project site, as required by local plan approval authority.
•Protect properties and waterways downstream of development sites from erosion and the
•associated discharge of turbid waters due to increases in the velocity and peak volumetric

Where necessary to comply with the bullet above, construct stormwater retention or
•detention facilities as one of the first steps in grading. Assure that detention facilities function properly before constructing site improvements (e.g. impervious surfaces).

If permanent infiltration ponds are used for flow control during construction, protect these facilities from siltation during the construction phase.

Because the project is adjacent to Bellingham Bay it will not cause streambank erosion due to any increase of stormwater flow rates due to construction. Care will need to be taken to control the turbidity of water leaving the site. All storm runoff should be directed to a "Baker tank" or tanks shown on the SWPPP plan.

Recommended BMPs
BMP C240: Sediment Trap
BMP C240: Temporary Sediment Pond

Note: The anticipated 10–year storm runoff flow rate from the 2.9 acre work site 0.43 cfs. The dewatering inflow rate may exceed this rate.

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

ELEMENT 4: INSTALL SEDIMENT CONTROLS

The Permittee must design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, the Permittee must design, install and maintain such controls to:

• Construct sediment control BMPs (sediment ponds, traps, filters, etc.) as one of the first steps in grading. These BMPs shall be functional before other land disturbing activities take place.

• Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.

• Direct stormwater runoff from disturbed areas through a sediment pond or other appropriate sediment removal BMP, before the runoff leaves a construction site or before discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but must meet the flow control performance standard in Element #3, bullet #1.

• Locate BMPs intended to trap sediment on site in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off channel areas or drainages.

• Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal, and maximize stormwater infiltration, unless infeasible.

• Where feasible, design outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column.

Additional Guidance

• Outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column are for the construction period only. If the pond using the construction outlet control is used for permanent stormwater controls, the appropriate outlet structure must be installed after the soil disturbance has ended.

• Seed and mulch earthen structures such as dams, dikes, and diversions according to the timing indicated in Element #5.

• Full stabilization includes concrete or asphalt paving; quarry spalls used as ditch lining; or the use of rolled erosion products, a bonded fiber matrix product, or vegetative cover in a manner that will fully prevent soil erosion.

• The Local Permitting Authority may inspect and approve areas fully stabilized by means other than pavement or quarry spalls.

• If installing a floating pump structure, include a stopper to prevent the pump basket from hitting the bottom of the pond.

Sediment removal BMPs to be used on this site include:

BMP C232: Gravel Filter Berm
BMP C233 Silt Fence.
BMP C240 Sediment Trap
BMP C240 Temporary Sediment Pond

ELEMENT 5: STABILIZE SOILS

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

• Stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include, but are not limited to: temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base early on areas to be paved, and dust control.

•Control stormwater volume and velocity within the site to minimize soil erosion.

• Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.

• Soils must not remain exposed and unworked for more than the time periods set forth below to prevent erosion.

• During the dry season (May 1 Sept. 30): 7 days

• During the wet season (October 1 – April 30): 2 days

• Stabilize soils at the end of the shift before a holiday or weekend if needed based on the weather forecast.

• Stabilize soil stockpiles from erosion, protect with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.

• Minimize the amount of soil exposed during construction activity.

• Minimize the disturbance of steep slopes.

• Minimize soil compaction and, unless infeasible, preserve topsoil.

Additional Guidance

•Soils must not remain exposed and unworked for more than the time periods set forth above to prevent erosion for linear projects.

•Soil stabilization measures should be appropriate for the time of year, site conditions, estimated duration of use, and potential water quality impacts that stabilization agents may have on downstream waters or ground water.

•Ensure that gravel base used for stabilization is clean and does not contain fines or sediment.

Soil stabilization BMPs to be used on this site include:

BMP C120 Temporary and Permanent Seeding
BMP C121 Mulching
BMP C124 Sodding
BMP C130 Surface Roughening
BMP C140 Dust Control.

SITE ELEMENT 6: PROTECT SLOPES

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

• Design and construct cut and fill slopes in a manner to minimize erosion. Applicable – practices include, but are not limited to, reducing continuous length of slope with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).

• Divert off – site stormwater (run) or ground water away from slopes and disturbed areas with interceptor d ikes, pipes, and/or swales. Off – site stormwater should be managed separately from stormwater generated on the site.

• At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion.

• Temporary pipe slope drains must handle the peak 10 minute velocity of flow from a Type 1A, 10 – year, 24 hour frequency storm for the developed condition. Alternatively, the 10 year, 1 – hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as "landscaped" area.

• Place excavated material on the uphill side of trenches, consistent with safety and space considerations.

• Place check dams at regular intervals within constructed channels that are cut down a slope.

Additional Guidance

• Where 15 – minute time steps are available in an approved continuous runoff model, they may be used directly without a correction factor.

• Consider soil type and its potential for erosion.

• Stabilize soils on slopes, as specified in Element #5.

• BMP combinations are the most effective method of protecting slopes with disturbed soils. For example use both mulching and straw erosion control blankets in combination.

Recommended BMPs
BMP C120: Temporary and Permanent Seeding
BMP C121: Mulching
BMP C122: Nets and Blankets
BMP C130: Surface Roughening
BMP C200: Interceptor Dike and Swale
BMP C201: Grass Lined Channels

NOTE:
EVEN THOUGH WSDOE BMPS ALLOW FOR USE OF STRAW TO COVER BARE EARTH, NO STRAW IS TO BE USED ON THIS JOB SITE.

BMP C203: Triangular Silt Dike (Geotextile Encased Check Dam)

ELEMENT 7: PROTECT DRAIN INLETS

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

•Protect all storm drain inlets made operable during construction so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.

• Clean or remove and replace inlet protection devices when sediment has filled one third of the available storage (unless a different standard is specified by the product manufacturer).

Additional Guidance

•Where possible, protect all existing storm drain inlets so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.

• Keep all approach roads clean. Do not allow sediment and street wash water to enter storm drains without prior and adequate treatment unless treatment is provided before the storm drain discharges to waters of the State.

• Inlets should be inspected weekly at a minimum and daily during storm events.

Recommended BMPs
BMP C220: Storm Drain Inlet Protection
Bellingham Detail EC – 820 Catch Basin Insert

Three catchbasin inserts will be required near the site entrance: Two on Lindbergh Ave. and one on Marine Drive.

ELEMENT 8: STABILIZE CHANNELS AND OUTLETS

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

• Design, construct, and stabilize all on site conveyance channels to prevent erosion from the following expected peak flows:

• Channels must handle the peak 10 minute velocity of flow from a Type 1A, 10 year, 24 hour frequency storm for the developed condition. Alternatively, the 10 year, 1 hour flow rate indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as "landscaped" area.

• Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent streambanks, slopes, and downstream reaches at the outlets of all conveyance systems.

Additional Guidance

The best method for stabilizing channels is to completely line the channel with a blanket product first, then add check dams as necessary to function as an anchor and to slow the flow of water.

The 15 – minute time step WWHM predicted flow rate in Little Squalicum Creek for the 10 – year recurrent storm event is 106 cfs. Because of the difficulty of pumping this volume of water around the site, the regrading of the stream channel and connection to the estuary should be avoided until after the estuary is completely excavated, and the fish culvert completed. The re grading of the stream channel should be done at the absolute driest time of the year, and in accordance with the HPA issued by WDFW.

Also, construction of the trail ramp, which requires fill material to be placed in the streambed should be delayed until the stream has been diverted to the estuary. OR, alternatively a temporary 42" culvert may be placed under the trail and meadow fill.

Recommended BMPs:
BMP C202: Channel Lining
BMP C122: Nets and Blankets

ELEMENT 9: CONTROL POLLUTANTS

- *Construction Stormwater General Permit and Municipal Stormwater Permits Requirements*
- *Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants.*
- *Handle and dispose of all pollutants, including waste materials and demolition debris that occur on site in a manner that does not cause contamination of stormwater.*

• Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. On site fueling tanks must include secondary containment. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110% of the volume contained in the largest tank within the containment structure. Double walled tanks do not require additional secondary containment.

• Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.

• Discharge wheel wash or tire bath wastewater to a separate on site treatment system that prevents discharge to surface water, such as closed loop recirculation or upland land application, or to the sanitary sewer, with local sewer district approval.

• Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Follow manufacturers' label requirements for application rates and procedures.

• Use BMPs to prevent contamination of stormwater runoff by pH modifying sources. The sources for this contamination include, but are not limited to: bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, concrete pumping and mixer washout waters.

• Adjust the pH of stormwater if necessary to prevent violations of the water quality standards.

• Assure that washout of concrete tr ucks is performed off – site or in designated concrete washout areas only. Do not wash out concrete trucks onto the ground, or into storm drains, open ditches, streets, or streams. Do not dump excess concrete on site, except in designated concrete washout areas. Concrete spillage or concrete discharge to surface waters of the State is prohibited.

• Obtain written approval from Ecology before using chemical treatment other than CO2 or dry ice to adjust pH.

Additional Guidance

• Wheel wash or tire bath wastewater should not include wastewater from concrete washout areas.

• Do not use upland land applications for discharging wastewater from concrete washout areas.

• Woody debris may be chopped and spread on site.

• Conduct oil changes, hydraulic system drain down , solvent and de – greasing cleaning operations, fuel tank drain down and removal, and other activities which may result in discharge or spillage of pollutants to the ground or into stormwater runoff using spill prevention measures, such as drip pans.

• Clean contaminated surfaces immediately following any discharge or spill incident. Emergency repairs may be performed on – site using temporary plastic placed beneath and, if raining, over the vehicle.

Recommended BMPs:
BMP C151: Concrete Handling
BMP C153: Materials Delivery, Storage and Containment
BMP C154 Concrete Washout Area
BMP C251 Construction Stormwater Filtration
BMP C253 pH Control for High pH Water

ELEMENT 10: CONTROL DEWATERING

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

• Discharge foundation, vault, and trench dewatering water, which have characteristics similar to stormwater runoff at the site, into a controlled conveyance system before discharge to a sediment trap or sediment pond.

• Discharge clean, non turbid de watering water, such as well point ground water, to systems tributary to, or directly into surface waters of the State, as specified in Element #8, provided the de – watering flow does not cause erosion or flooding of receiving waters or interfere with the operation of the system. Do not route clean dewatering water through stormwater sediment ponds. Note that "surface waters of the State" may exist on a construction site as well as off site; for example, a creek running through a site.

• Handle highly turbid or contaminated dewatering water separately from stormwater.

• Other treatment or disposal options may include:

1. Infiltration.

2. Transport off – site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.

3. Ecology–approved on site chemical treatment or other suitable treatment technologies.

4. Sanitary or combined sewer discharge with local sewer district approval, if there is no other option.

5. Use of a sedimentation bag with outfall to a ditch or swale for small volumes of localized dewatering.

Additional Guidance

• Channels must be stabilized, as specified in Element #8.

• Construction equipment operation, clamshell digging, concrete tremie pour, or work inside a cofferdam ca create highly turbid or contaminated dewatering water.

• Discharging sediment–laden (muddy) water into waters of the State likely constitutes violation of water quality standards for turbidity. The easiest way to avoid discharging muddy water is throughinfiltration and preserving vegetation.

It is expected that dewatering of the estuary excavation area will be required because of perched ground water and tidal incursion through course material anticipated in the deeper parts of the pit. This water will need to be pumped to the "Baker tank" as shown on the SWPPP plan.

ELEMENT 11: MAINTAIN BMPs

Construction Stormwater General Permit and Municipal Stormwater Permits Requirements

• Maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function in accordance with BMP specifications.

• Remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

Additional Guidance

• Note: Some temporary erosion and sediment control BMPs are bio degradable and designed to remain in place following construction such as compost socks.

• Provide protection to all BMPs installed for the permanent control of stormwater from sediment and compaction. All BMPs that are to remain in place following completion of construction shall be examined and placed in full operating conditions. If sediment enters the BMPs during construction, it shall be removed and the facility shall be returned to the conditions specified in the construction documents.

• Remove or stabilize trapped sediment on site. Permanently stabilize disturbed soil resulting from removal of BMPs or vegetation.

Recommended BMPs:
BMP C150: Materials On Hand
BMP C160: Certified Erosion and Sediment Control Lead

ELEMENT 12: MANAGE THE PROJECT

Construction Stormwater General Permit and Municipal Stormwater Permit Requirements

- *Phase development projects to the maximum degree practicable and take into account seasonal work limits*
- *Inspection and monitoring Inspect, maintain, and repair all BMPs as needed to assure continued performance of their intended function. Conduct site inspections and monitoring in accordance with the Construction Stormwater General Permit or local plan approval authority.*
- *Maintaining an updated construction SWPPP Maintain, update, and implement the SWPPP in accordance with the Construction Stormwater General Permit.*

Municipal Stormwater Permit Requirements

- *Projects that disturb one or more acres mus t have, site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL). Project sites less than one acre (not part of a larger common plan of development or sale) may have a person without CESCL certification conduct inspections. By the initiation of construction , the SWPPP must identify the CESCL or inspector, who shall be present on site or on – call at all times.*

Additional Guidance for Site Inspections

- *The CESCL or inspector (project sites less than one acre) must have the skills to assess the:*
- *Site conditions and construction activities that could impact the quality of stormwater.*
- *Effectiveness of erosion and sediment control measures used to control the 25 quality of stormwater discharges.*
- *The CESCL or inspector must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. They must evaluate the effectiveness of BMPs and determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.*

Based on the results of the inspection, construction site operators must correct the 31 problems identified by:

- *Reviewing the SWPPP for compliance with the 13 construction S WPPP elements and making appropriate revisions within 7 days of the inspection.*
- *Immediately beginning the process of fully implementing and maintaining appropriate source control and/or treatment BMPs as soon as possible, addressing the problems no later than within 10 days of the inspection. If installation of necessary treatment Bmp's is not feasible within 10 days, the construction site operator may request an extension within the day response period.*

- *Documenting BMP implementation and maintenance in the site log book (sites larger than 1 acre).*
- *The CESCL or inspector must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual discharge events that last more than one day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one inspection is required that week.) The CESCL or inspector may reduce the inspection frequency for temporary stabilized, inactive sites to once every calendar month*

Additional Guidance

- *Phasing of Construction.*

Phase development projects where feasible in order to prevent soil erosion and, to the maximum extent practical, and prevent transporting sediment from the site during construction. Revegetate exposed areas and maintain that vegetation as an integral part of the clearing activities for any phase.

Clearing and grading activities for developments shall be permitted only if conducted using an approved site development plan (e.g., subdivision approval) that establishes permitted areas of clearing, grading, cutting, and filling. Minimize removing trees and disturbing or compacting native soils when establishing permitted clearing and grading areas. Show on the site plans and the development site permitted clearing and grading areas and any other areas required to preserve critical or sensitive areas, buffers, native growth pro tection easements, or tree retention areas as may be required by local jurisdictions.

- *Seasonal Work Limitations*

From October 1 through April 30, clearing, grading, and other soil disturbing activities is permitted only if shown to the satisfaction of the local permitting authority that the site operator will prevent silt – laden runoff from leaving the site through a combination of the following:

1. Site conditions including existing vegetative coverage, slope, soil type, and proximity to receiving waters.

2. Limit activities and the extent of disturbed areas.

3. Proposed erosion and sediment control measures.

Based on the information provided and/or local weather conditions, the local permitting authority may expand or restrict the seasonal limitation on site disturbance. The local permitting authority has the authority to take enforcement action such as a notice of violation, administrative order, penalty, or stop–work order under the following circumstances:

- *If, during the course of any construction activity or soil disturbance during the seasonal limitation period, sediment leaves the construction site causing a violation of the surface water quality standard; or*
- *If clearing and grading limits or erosion and sediment control measures shown in the approved plan are not maintained.*

The following activities are exempt from the seasonal clearing and grading limitations:

1. Routine maintenance and necessary repair of erosion and sediment control BMPs;

2. Routine maintenance of public facilities or existing utility structures that do not expose the soil or result in the removal of the vegetative cover to soil.

3. Activities where there is one hundred percent infiltration of surface water runoff within the site in approved and installed erosion and sediment control facilities.

- *Coordination with Utilities and Other Contractors*

The primary project proponent shall evaluate, with input from utilities and other contractors, the stormwater management requirements for the entire project, including the utilities, when preparing the Construction SWPPP.

- *Inspection and Monitoring*

All BMPs must be inspected, maintained, and repaired as needed to assure continued performance of their intended function. Site inspections must be conducted by a person knowledgeable in the principles and practices of erosion and sediment control. The person must have the skills to 1) assess the site conditions and construction activities that could impact the quality of stormwater, and 2) assess the effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.

For construction sites one acre or larger that discharge stormwater to surface waters of the state, a CESCL must be identified in the construction SWPPP: this person must be on site or on–call at all times. Certification must be obtained through an approved training program that meets the erosion and sediment control training standards established by Ecology.

Appropriate BMPs or design changes shall be implemented as soon as possible whenever inspection and/or monitoring reveals that the BMPs identified in the Construction SWPPP are inadequate, due to the actual discharge of / or potential to discharge a significant amount of any pollutant.

- *Maintaining an Updated Construction SWPPP*

Retain the Construction SWPPP on – site or within reasonable access to the site.

Modify the SWPPP whenever there is a change in the design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.

The SWPPP must be modified if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. Modify the SWPPP as necessary to include additional or modified BMPs designed to correct problems identified. Complete revisions to the SWPPP within seven (7) days following the inspection.

Recommended BMPs:
BMP C150: Materials On Hand
BMP C160: Certified Erosion and Sediment Control Lead
BMP C162 Scheduling

ELEMENT 13: PROTECT LOW IMPACT DEVELOPMENT BMPs

Municipal Stormwater Permits Requirements

- *Protect all Bioretention and Rain Garden BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into the Bioretention and/orRain Garden BMPs. Restore the BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the BMP must include removal of sediment and any sediment–laden Bioretention/rain garden soils, and replacing the removed soils with soils meeting the design specification.*
- *Prevent compacting Bioretention and rain garden BMPs by excluding construction equipment and foot traffic. Protect completed lawn and landscaped areas from compaction due to construction equipment.*
- *Control erosion and avoid introducing sediment from surrounding land uses onto permeable pavements. Do not allow muddy construction equipment on the base material or pavement. Do not allow sediment – laden runoff onto permeable pavements.*
- *Pavements fouled with sediments or no longer passing an initial infiltration test must be cleaned using procedures from the local stormwater manual or the manufacturer's procedures.*
- *Keep all heavy equipment off existing soils under LID facilities that have been excavated to final grade to retain the infiltration rate of the soils.*

No low impact BMPs are planned for this project.

NOTE:
THE FOLLOWING PERMITS HAVE REQUIREMENTS THAT GIVE ADDITIONAL STIPULATIONS TO THE SWPPP MEASURES DELINEATED HERE. THESE MAY BE FOUND IN LITTLE SQUAILCUM ESTUARY BID SPECIFICATIONS VOLUME #2.

HYDRAULIC PROJECT APPROVAL PERMIT (HPA) (2017–4–367+01)
SHORELINE SUBSTANCIAL DEVELOPMENT PERMIT (SHX2016–00151)
SEPA DETERMINATION (SEP2016–00117)
404 INDIVIDUAL PERMIT (NWS–2016–764)
WATER QUALITY CERTIFICATION ORDER #14010
LAND DISTURBANCE PERMIT (LDP2017–00010)
ADMINISTRATIVE ORDER #15723 NPDES CONSTRUCTION GENERAL PERMIT (WAR306222)
CWA 401 PERMIT

RYAN A. LONG — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER
5-3-2018

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

811 Call 811 two business days before you dig

CO7

Date	No	Revision	By
5/04/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT
	4		

PROJECT ENGINEER R.L.
DESIGNED/DRAWN R.L. / D.N.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.L.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= N/A
Vert. 1"= N/A

DATUM
NAD 83/98
NAVD88

Job. No.
Date 05/04/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
SWPPP NOTES - WHATCOM COUNTY

SHEET 10 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT 778–7900

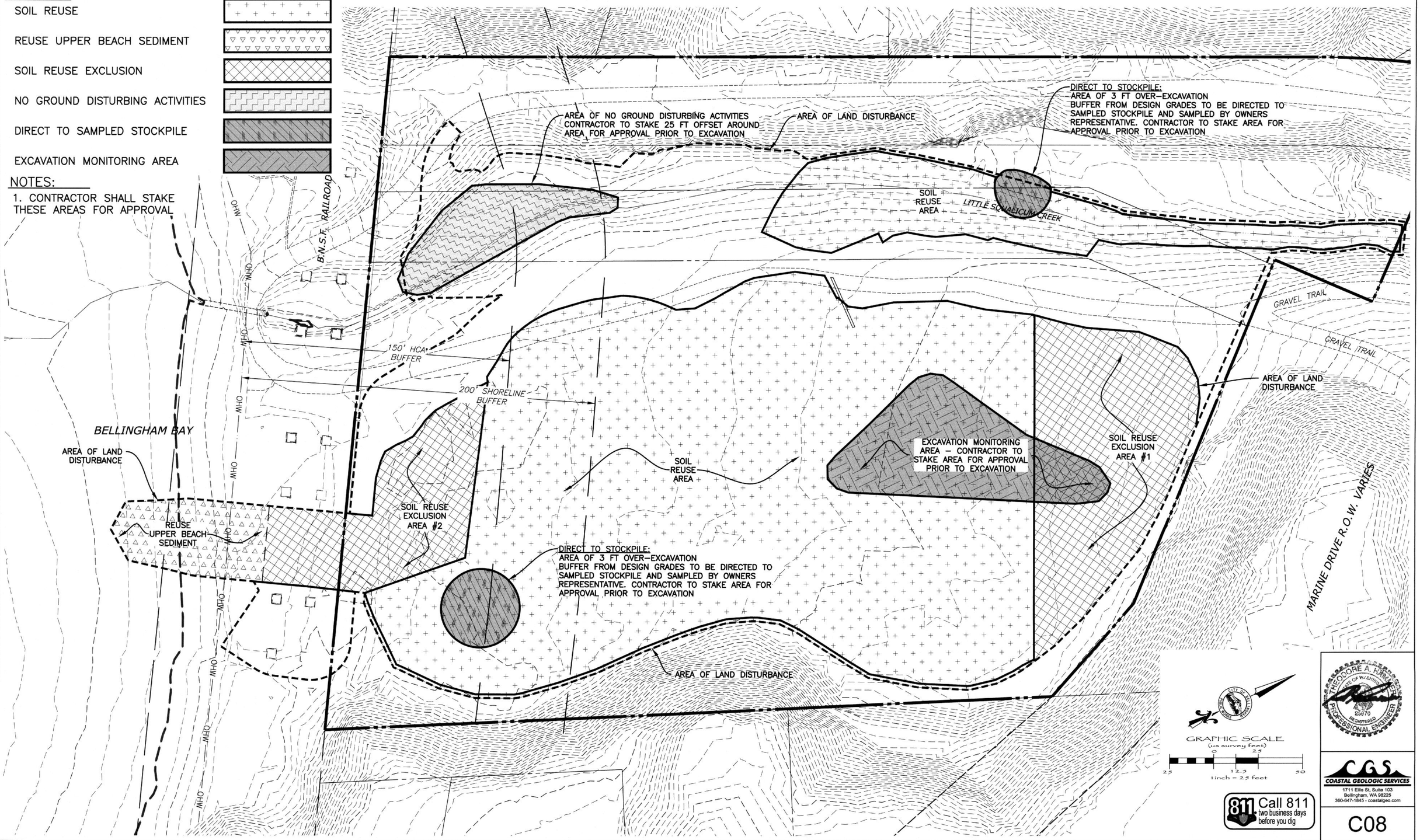
O:\yr2016\16002 Little Squalicum\ACAD\Submittal-Drawings-2017-09-15\04-06-Swppp-notes_ mcover_ mcover.dwg, 5/3/2018 2:14:31 PM, D New

LEGEND:

- SOIL REUSE
- REUSE UPPER BEACH SEDIMENT
- SOIL REUSE EXCLUSION
- NO GROUND DISTURBING ACTIVITIES
- DIRECT TO SAMPLED STOCKPILE
- EXCAVATION MONITORING AREA

NOTES:

1. CONTRACTOR SHALL STAKE THESE AREAS FOR APPROVAL



GRAPHIC SCALE
(us survey feet)
0 25
25 12.5 50
1 inch = 25 feet

811 Call 811 two business days before you dig

THEODORE A. HANSEN
STATE OF WASHINGTON
23670
REGISTERED PROFESSIONAL ENGINEER

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

C08

Date	No	Revision	By
	4		
5/4/18	3	BID SUBMITTAL - COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER T.A.H.
DESIGNED/DRAWN J.W.J./A.D.T
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= NA

DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
SOIL HANDLING PLAN

SHEET 11 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900

MATCHLINE - SEE SHEET C14

SEE SHEET C10

PROPOSED CONDITIONS NOTES

1. PROJECT WORK AREA – CLEARING LIMITS
2. EXTENT OF ESTUARY EXCAVATION – DAYLIGHT
3. NEW SHEET PILE WALL AND ABUTMENTS – SEE S SHEETS
4. EXCAVATE ESTUARY
5. REALIGNED GRAVEL TRAIL – SEE DETAIL, SHEET C13
6. NEW GRAVEL TRAIL – SEE SHEET C13
7. NEW BOX CULVERT AND WING WALLS – SEE S SHEETS
8. REALIGN CREEK – SEE SHEETS C10, C11 AND C12
9. DECOMMISSION CULVERT – SEE SHEET C05 AND C13
10. PREFABRICATED PEDESTRIAN BRIDGE – SEE S SHEETS

LEGEND:

FEATURE	EXISTING	PROPOSED
CONTOURS, MAJOR	---#---	---#---
CONTOURS, MINOR	---#---	---#---
CREEK/DRAINAGE		
CONCRETE		
GRAVEL		
SURVEY MONUMENT	△ (###)	
PARK BOUNDARY		
PROPERTY LINES		
BNSF RN ROW		
EASEMENT		
OHWM	OHW	
MHHM	MHHW	MHHW
200' SHORELINE BUFFER		
150' HCA BUFFER		
BNSF RW CENTERLINE		
TREE LINE		
EXISTING STREAM		
NO GROUND DISTURBANCE AREA		

ALL PIER SUPPORTS AND PILES TO BE MAINTAINED AND AVOIDED

PIER APPROX.

TRAIL CONTINUES

AREA OF NO GROUND DISTURBANCE

SDCULV#10961 IE=7.9, 36"CONC

SDCULV#10964 IE=8.1, 36"CONC

SDCULV#10370 IE=14.9, FAILED CONC STRUCTURE

IE=16.7, 72"x

SIGN: BEACH RULES

GARBAGE CAN

GARBAGE CAN

150' HCA BUFFER

200' SHORELINE BUFFER

8x10 BENCH BUMP OUT LOCATION TO BE CONFIRMED IN THE FIELD BY COB STAFF

BELLINGHAM BAY

REMOVE ANY LARGE WOOD WITHIN WORK AREA AND REDISTRIBUTE ON BEACH AT SAME ELEVATION OUTSIDE OF EXCAVATION AREA

BNSF RR TRESTLE FOOTING (TYPICAL)

VAULT/LINE: FIBER OPTIC RELOCATION BY OTHERS

B.N.S.F. RAILROAD

200' SHORELINE BUFFER

Proposed Estuary OHW = +9.77' (MLLW datum) per CGS based on approximate of USACE HTL using 10-year average for the Bellingham NOAA Station

811 Call 811 two business days before you dig

GRAPHIC SCALE (us survey feet)
0 20 40
1 inch = 20 feet

Date	No	Revision	By
	4		
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER T.A.H.
DESIGNED/DRAWN J.W.J./A.D.T
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= NA

DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
PROPOSED CONDITIONS - ESTUARY GRADING PLAN

SHEET 12 OF 26

THEODORE A. HAMMAN — STATE OF WASHINGTON — 25370 — REGISTERED PROFESSIONAL ENGINEER

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Bellingham, WA 98225
360-647-1845 - coastalgeo.com

C09

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900

SEE SHEET C09

LEGEND:

FEATURE	EXISTING	PROPOSED
CONTOURS, MAJOR	---#---	---#---
CONTOURS, MINOR	---#---	---#---
CREEK/DRAINAGE		
CONCRETE		
GRAVEL		
SURVEY MONUMENT	△ (###)	
PARK BOUNDARY		
PROPERTY LINES EASEMENT		
OHWM	OHW	
MHHW TREE LINE	MHHW	MHHW
EXISTING STREAM		

PROPOSED CONDITIONS NOTES

1. PROJECT WORK AREA – CLEARING LIMITS
2. EXTENT OF ESTUARY EXCAVATION – DAYLIGHT
3. ~~NEW SHEET PILE WALL AND ABUTMENTS – SEE S SHEETS~~ - NOT USED THIS SHEET
4. EXCAVATE ESTUARY
5. REALIGNED GRAVEL TRAIL – SEE DETAIL, SHEET C13
6. ~~NEW GRAVEL TRAIL – SEE SHEET C13~~ - NOT USED THIS SHEET
7. NEW BOX CULVERT AND WING WALLS – SEE S SHEETS
8. REALIGN CREEK – SEE SHEETS C10, C11 AND C12
9. ~~DECOMMISSION CULVERT – SEE SHEET C05 AND C13~~ - NOT USED THIS SHEET
10. ~~PREFABRICATED PEDESTRIAN BRIDGE – SEE S SHEETS~~ - NOT USED THIS SHEET
11. STABILIZED CONSTRUCTION ENTRANCE – SEE DETAIL, SHEET C17

Proposed Estuary OHW = +9.77' (MLLW datum) per CGS based on approximate of USACE HTL using 10-year average for the Bellingham NOAA Station

SDCULV#10355 IE=16.7, 72"x58" BOX CULVERT

SDCULV#10370 IE=14.9, FAILED CONC. STRUCTURE

SDCULV#10355 IE=18.4, 36"CP

WETLAND D 88 SF

WETLAND E 609 SF

WETLAND F 5,767 SF

LITTLE SQUALICUM CREEK

GRAVEL TRAIL

MARINE DRIVE R.O.W. VARIES

GRAPHIC SCALE (us survey feet)
0 20
20 0 10 40
1 inch = 20 feet

811 Call 811 two business days before you dig

THEODORE A. HIMMER — STATE OF WASHINGTON — 25270 — REGISTERED PROFESSIONAL ENGINEER

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Bellingham, WA 98225
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C10

No	Date	Revision	By
4			
3	5/4/18	BID SUBMITTAL – COB COMMENTS	AT
2	9/22/17	BID SUBMITTAL	AT
1	6/26/17	DRAFT DESIGN	AT

PROJECT ENGINEER T.A.H.
DESIGNED/DRAWN J.W.J./A.D.T
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= NA

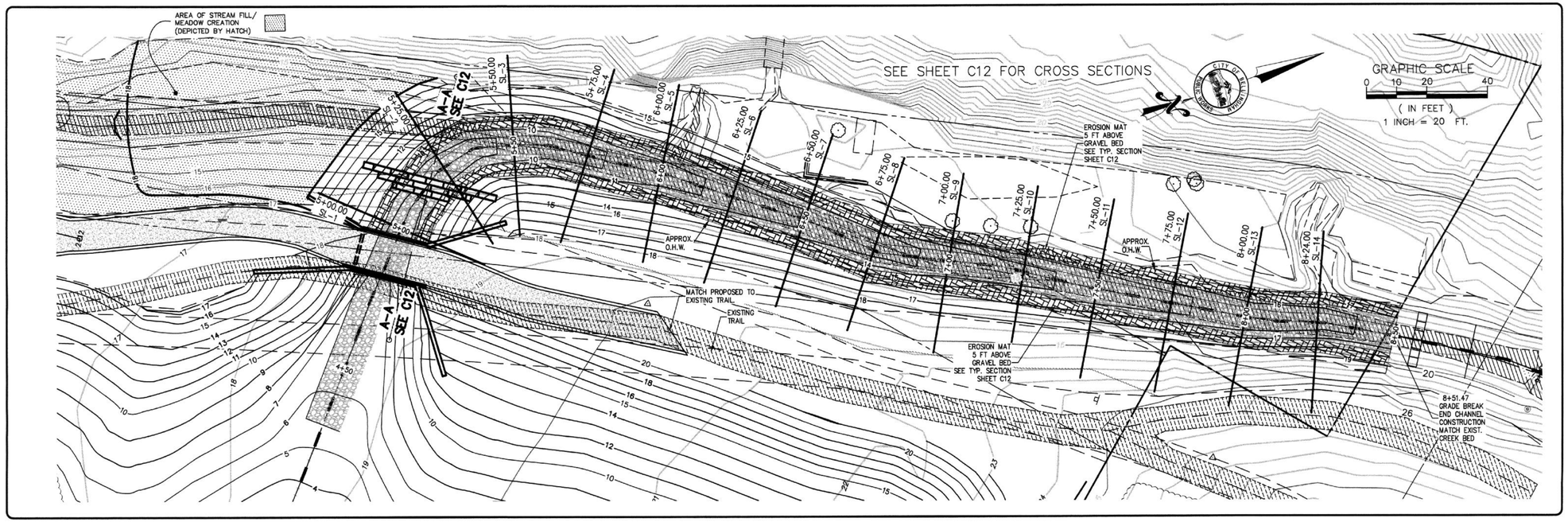
DATUM
NAD 83/98
NAVD88

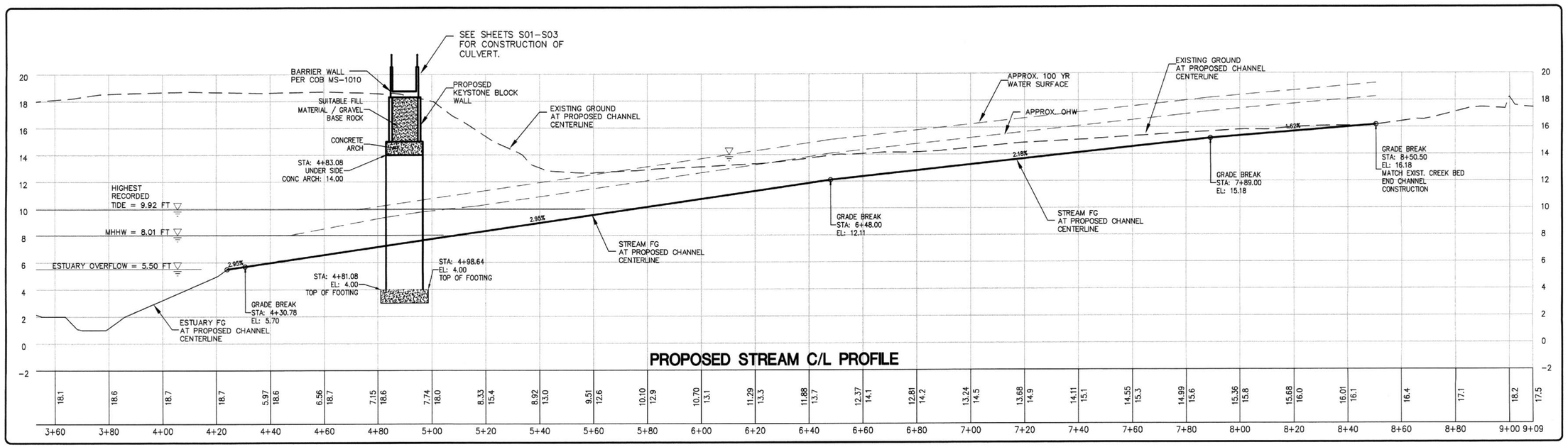
Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
PROPOSED CONDITIONS - ESTUARY GRADING PLAN

SHEET 13 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900





DATE: 5 MAY 2018

Call 811 two business days

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

C11

Date	No	Revision	By
5/04/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER R.L.
DESIGNED/DRAWN R.L. / D.N.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.L.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= 4'

DATUM
NAD 83/98
NAVD88

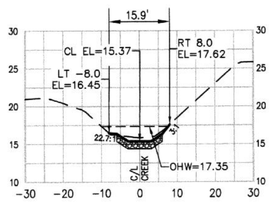
Job. No.
Date 5/04/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
STREAM REGRADE PLAN & PROFILE

SHEET 14 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT 778-7900

Q:\yr2016\16002 Little Squalicum\ACAD\Submittal Drawings-2017-09-15\10-13-Trail-Stream-Grd_ Sections bak__mcover__mcover.dwg, 9/3/2018 2:04:48 PM, D New



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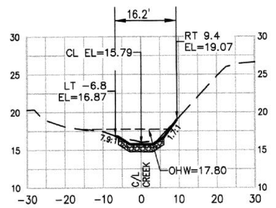

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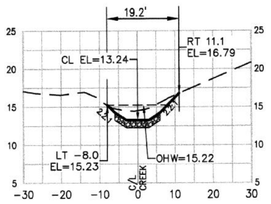

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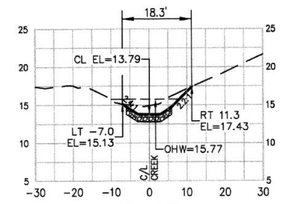

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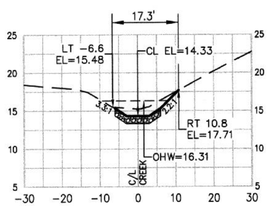

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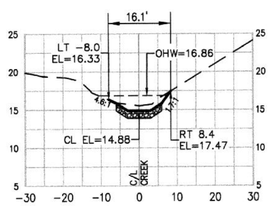

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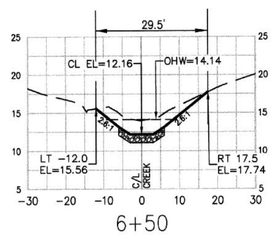
6+00

6+25



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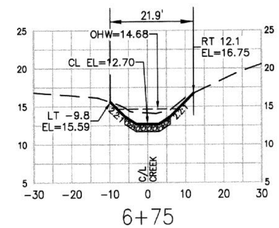

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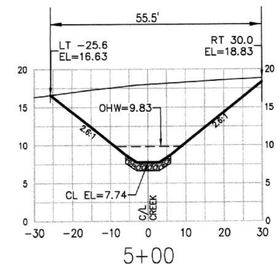

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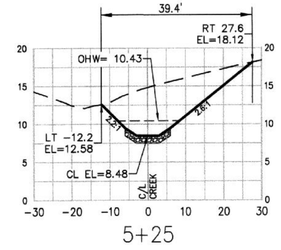

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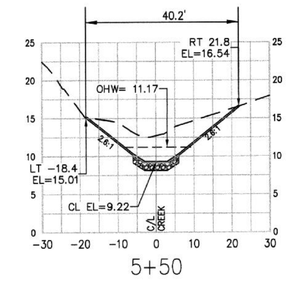
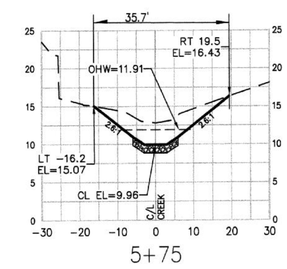
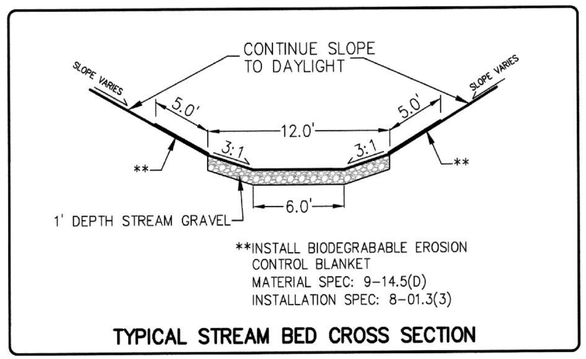


5+50



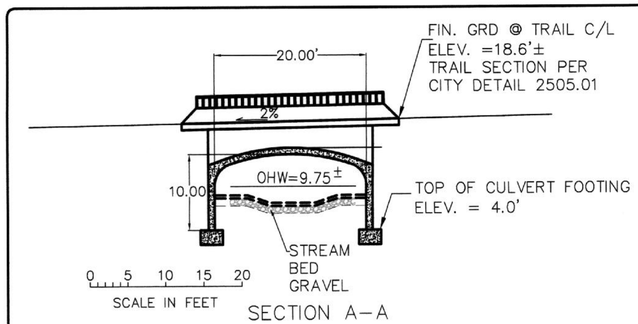
5+75

CHANNEL CROSS SECTIONS



**INSTALL BIODEGRABABLE EROSION CONTROL BLANKET
MATERIAL SPEC: 9-14.5(D)
INSTALLATION SPEC: 8-01.3(3)

TYPICAL STREAM BED CROSS SECTION



SECTION A–A
CULVERT CROSS SECTION
STREAM STA 4+83±–4+96±

STREAM BED GRAVEL
DESIGN CRITERIA

D_{100}	3.0'
D_{84}	1.25'
D_{50}	0.50'
D_{16}	0.16' (2")

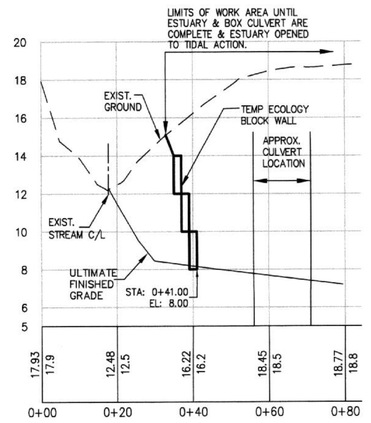
5% MIN TO 10% MAX MUST BE STREAM BED SEDIMENT MIX

SIEVE SIZE	PERCENT PASSING
2.5" SQUARE	100%
2" SQUARE	65-100%
1" SQUARE	50-85%
U.S. NO. 4	26-44%
U.S. NO. 40	16% MAX.
U.S. NO. 200	5.0-9.0%

ALL PERCENTAGES ARE BY MASS

STREAM BED GRAVEL
CONSTRUCTION SPEC.

2-03 SP	MATERIAL REUSE AS STREAM BED GRAVEL	150 CY
9-03.11	STREAM BED AGGREGATE	15 TON
9-03.11(2)	STREAM BED COBBLE IMPORT (12")	45 TON
9-03.11(2)	STREAM BED COBBLE IMPORT (8")	183 TON
9-03.11(3)	STREAM BED BOULDERS, EQUAL MIX OF 1, 2, & 3 MAN ROCKS	50 TON



SECTION A–A

RYAN A. LONG
STATE OF WASHINGTON
REGISTERED
PROFESSIONAL ENGINEER
5-3-2018

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

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C12

	4		
5/04/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT
Date	No	Revision	By

PROJECT ENGINEER R.L.
DESIGNED/DRAWN R.L. / D.N.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.L.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= 4'

DATUM
NAD 83/98
NAVD88

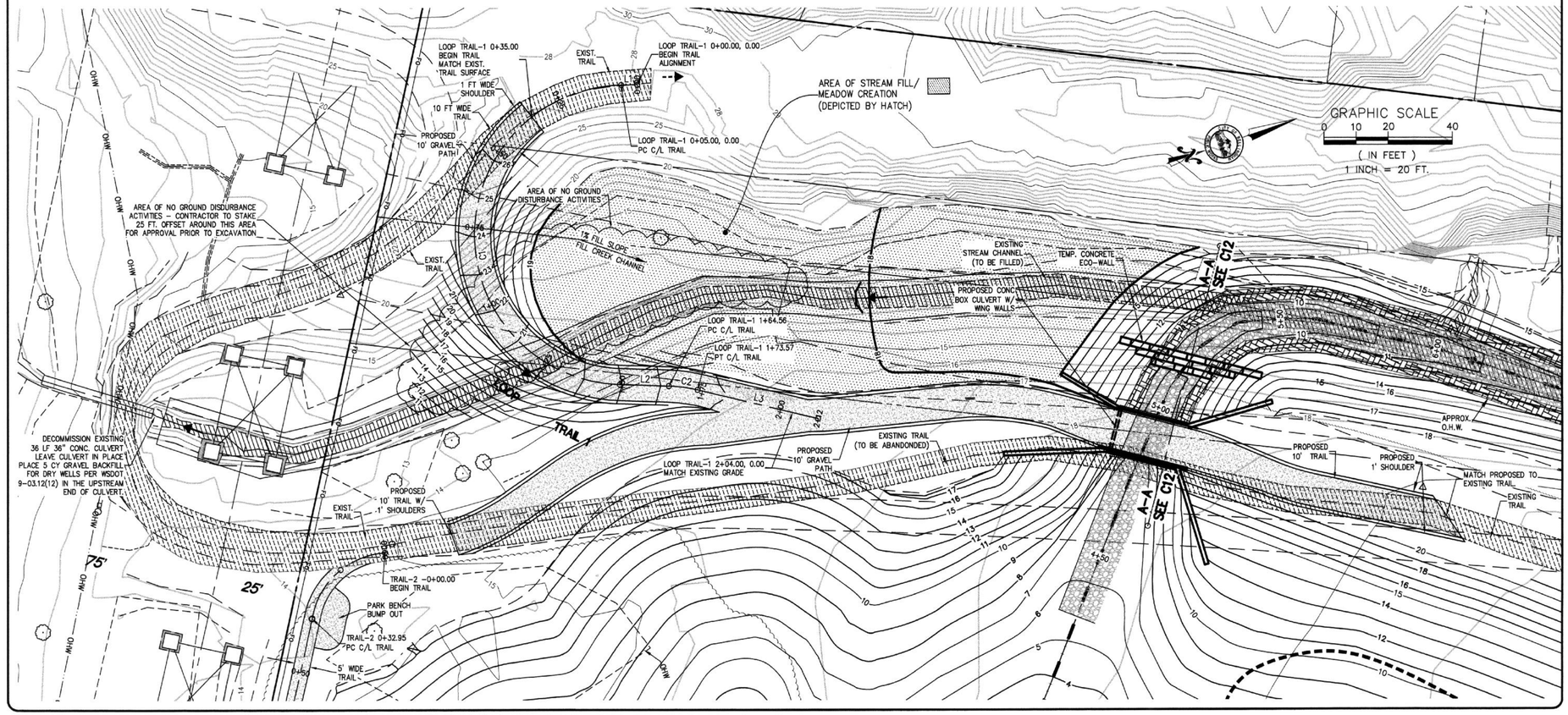
Job. No.
Date 5/04/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
CHANNEL CROSS SECTIONS

SHEET 15 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT 778-7900

C:\yr2016\16002 Little Squalicum\ACAD\Submittal Drawings-2017-08-15\C11-SECTIONS.dwg, 5/3/2018 2:21:17 PM, D New

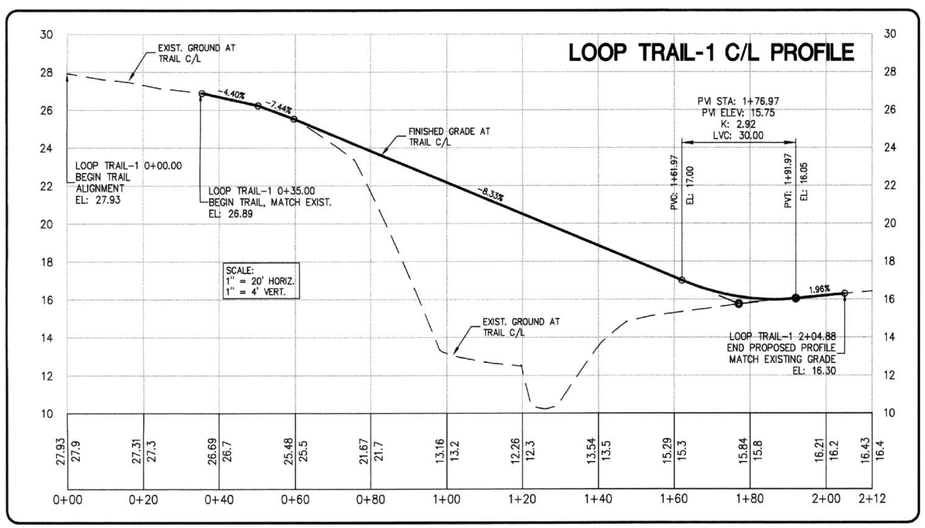


LEGEND

- EXISTING GROUND CONTOUR (412)
- DESIGN FINISHED GROUND CONTOUR (518)
- TRAIL IMPROVEMENTS
- STREAM FILL / MEADOW CREATION
- BIODEGRADABLE EROSION CONTROL BLANKET
- STREAM GRAVEL
- DAYLIGHT LINE
- DIVISION/BOUNDARY
- CENTERLINE
- EASEMENT (AS NOTED)
- SILT FENCE SEDIMENT BARRIER

LINE DESCRIPTION TABLE		
LINE #	BEARING	LENGTH
L1	S17°39'13"W	5.00
L2	N20°37'22"E	15.26
L3	N32°19'54"E	38.57

CENTERLINE CURVE DATA			
NO.	RADIUS	LENGTH	DELTA
C1	46.70	144.30	177°01'51"
C2	44.09	9.01	11°42'31"



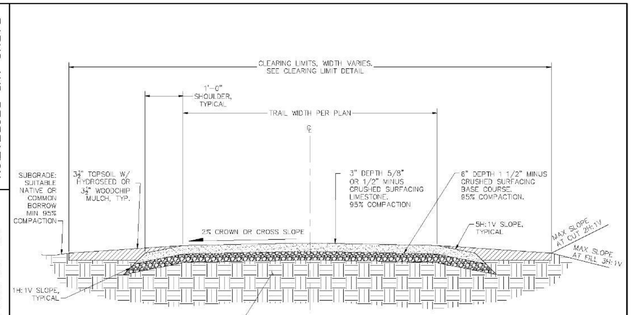
NOTES:

1. THERE SHALL BE NO EXCAVATION OF SURFACE IN WAY OF LOOP TRAIL FILL.
2. IN TRAIL FILL AREA REMOVE ALL VEGETATION TO GROUND SURFACE, THEN COMPACT SURFACE.
3. PLACE ORANGE OR RED COLORED GEO-TECH FABRIC ON PREPARED SURFACE BEFORE PLACING TRAIL EMBANKMENT FOR LOOP TRAIL AREA IN AREA OF NO GROUND DISTURBANCE ACTIVITIES.
4. TRAIL EMBANKMENT TO BE CONSTRUCTED FROM SUITABLE FILL MATERIAL EXCAVATED FROM PROJECT AS DETERMINED BY GEOTECHNICAL CONSULTANT (WSDOT 9-03.14(3) COMMON BORROW, OPTION 1).
5. TRAIL EMBANKMENT TO BE COMPACTED IN ACCORDANCE WITH METHOD "C" PER WSDOT 2-03.3(14)C, METHOD "C" COMPACTION.
6. ESTIMATE FILL REQUIREMENT: 660 CY.
7. CULVERT IN OLD STREAM CHANNEL TO WEST OF RAIL TRESTLE TO BE DECOMMISSIONED AND TRAIL/ROADWAY OVER CULVERT TO BE RESTORED.
8. TRAIL-2 TO EXTEND FROM EXISTING TRAIL TO PROPOSED PEDESTRIAN BRIDGE.
9. SEE PARKS DETAIL 2505.01 FOR TRAIL SECTIONS
10. ANY ACTION IN AREA OF NO GROUND DISTURBANCE SHALL BE OBSERVED BY PROFESSIONAL ARCHEOLOGIST AND STAKED FOR APPROVAL.

PARKS AND RECREATION DESIGN AND DEVELOPMENT October 19, 2011

CITY OF BELLINGHAM TRAIL SECTION 3/8" = 1'-0"

DRAWING 2505.01



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RYAN A. LONG, STATE OF WASHINGTON, 21581, REGISTERED PROFESSIONAL ENGINEER
5-3-2018

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

C13

DATE	No	Revision	By
9/22/17	4	BID SUBMITTAL	
6/26/17	3	DRAFT DESIGN	
1/17/17	2	WHATCOM COUNTY COMMENTS	
9/15/16	1	USACE COMMENTS	

PROJECT ENGINEER: R.L.
DESIGNED/DRAWN: R.L. / D.N.
INSPECTOR:

DIRECTOR PUBLIC WORKS: T.A.C.
CITY ENGINEER: C.M.A.S.
ASSISTANT DIRECTOR: E.C.L.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= 4'

DATUM
NAD 83/98
NAVD88

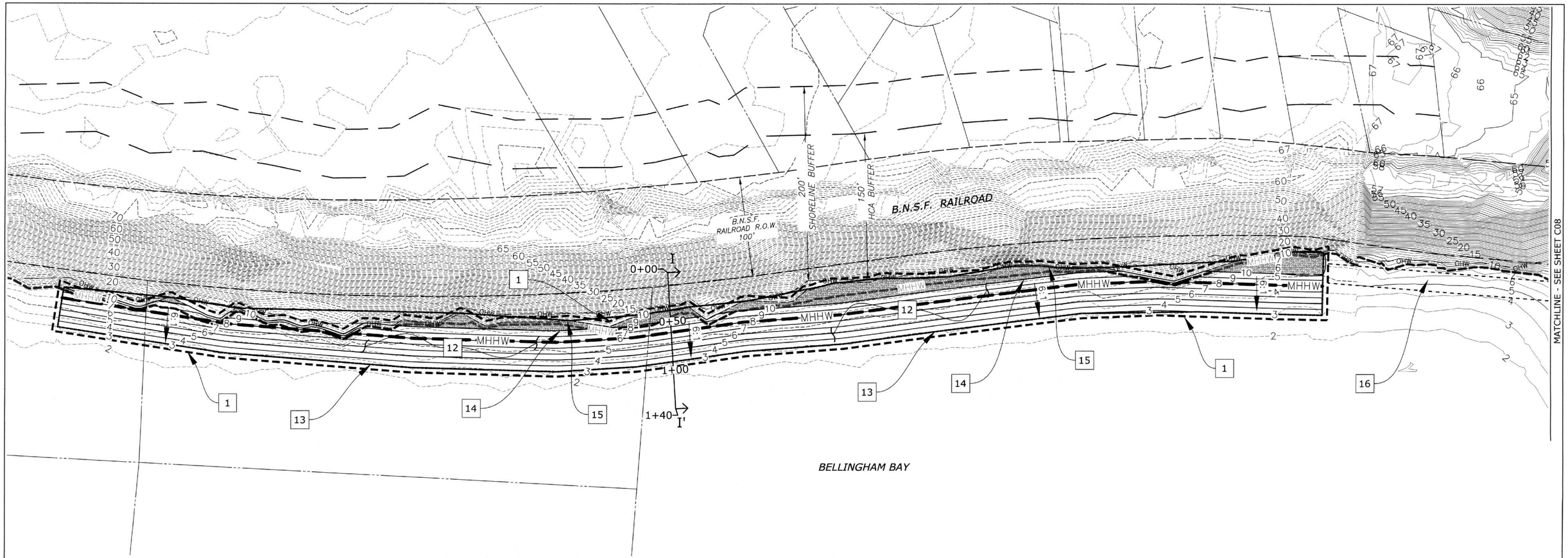
Job. No.
Date 05/04/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
TRAIL PLAN & PROFILE

SHEET 16 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT 778-7900

O:\pr2016\16002 Little Squalicum\ACAD\Submittal\Drawings-2017-09-15\15-13-Trail-Stream-Grd__Sections.bak__recover__recover.dwg, 5/3/2018 2:09:36 PM, D New

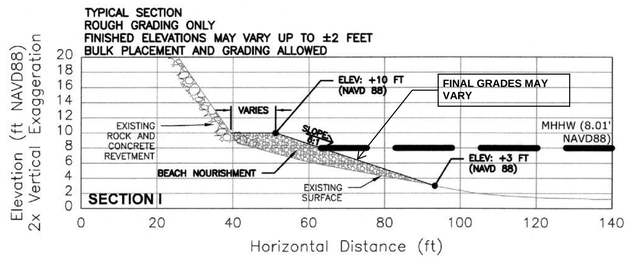


PROPOSED CONDITIONS NOTES

1	PROJECT WORK AREA – CLEARING LIMITS
~~2~~	~~EXTENT OF ESTUARY EXCAVATION – DAYLIGHT~~ - NOT USED THIS SHEET
~~3~~	~~NEW SHEET PILE WALL AND ABUTMENTS – SEE S SHEETS~~ - NOT USED THIS SHEET
~~4~~	~~EXCAVATE ESTUARY~~ - NOT USED THIS SHEET
~~5~~	~~REALIGNED GRAVEL TRAIL – SEE DETAIL, SHEET C15~~ - NOT USED THIS SHEET
~~6~~	~~NEW GRAVEL TRAIL – SEE SHEET C15~~ - NOT USED THIS SHEET
~~7~~	~~NEW BOX CULVERT AND WING WALLS – SEE S SHEETS~~ - NOT USED THIS SHEET
~~8~~	~~REALIGN CREEK – SEE SHEETS C10, C11 AND C12~~ - NOT USED THIS SHEET
~~9~~	~~DECOMMISSION CULVERT – SEE SHEET C05 AND C15~~ - NOT USED THIS SHEET
~~10~~	~~PREFABRICATED PEDESTRIAN BRIDGE – SEE S SHEETS~~ - NOT USED THIS SHEET
~~11~~	~~STABILIZED CONSTRUCTION ENTRANCE – SEE DETAIL, SHEET C17~~ - NOT USED THIS SHEET
12	PLACE BEACH NOURISHMENT SEDIMENT
13	BEACH NOURISHMENT TOE +3 FT NAVD88
14	BEACH NOURISHMENT TOP +10 FT NAVD88
15	BEACH NOURISHMENT LANDWARD EXTENT
16	BEACH NOURISHMENT ACCESS CORRIDOR, 25 FT WIDTH

LEGEND:

FEATURE	EXISTING	PROPOSED
CONTOURS, MAJOR	####	####
CONTOURS, MINOR	####	####
PROPERTY LINES		
BNSF RN ROW		
MHHW	MHHW	MHHW
200' SHORELINE BUFFER		
BEACH NOURISHMENT		



BEACH NOURISHMENT NOTES:

1. BEACH NOURISHMENT MATERIAL SHALL BE PLACED OVER INTERTIDAL BEACH DOWN AS LOW AS +3 FT ELEVATION, INCLUDING OVER EXISTING ROCK AND CONCRETE REVETMENT AND SCATTERED ROCKS AND CONCRETE.
2. BEACH NOURISHMENT MATERIAL SHALL NOT BE PLACED ATOP LARGE WOOD THAT EXCEEDS 12" IN DIAMETER.
3. LARGE WOOD ON THE BEACH THAT EXCEED 12" IN DIAMENTER SHALL BE MOVED ASIDE PRIOR TO SEDIMENT PLACEMENT, AND REPLACED ON UPPER MOST BEACH AFTER.

GRAPHIC SCALE
(us survey feet)
0 50
50 25 100
1 inch = 50 feet

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THEODORE A. FREEMAN STATE OF WASHINGTON 22570 REGISTERED PROFESSIONAL ENGINEER

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

C14

	4		
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT
Date	No	Revision	By

PROJECT ENGINEER T.A.H.
DESIGNED/DRAWN J.W.J./A.D.T
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 50'
Vert. 1"= NA

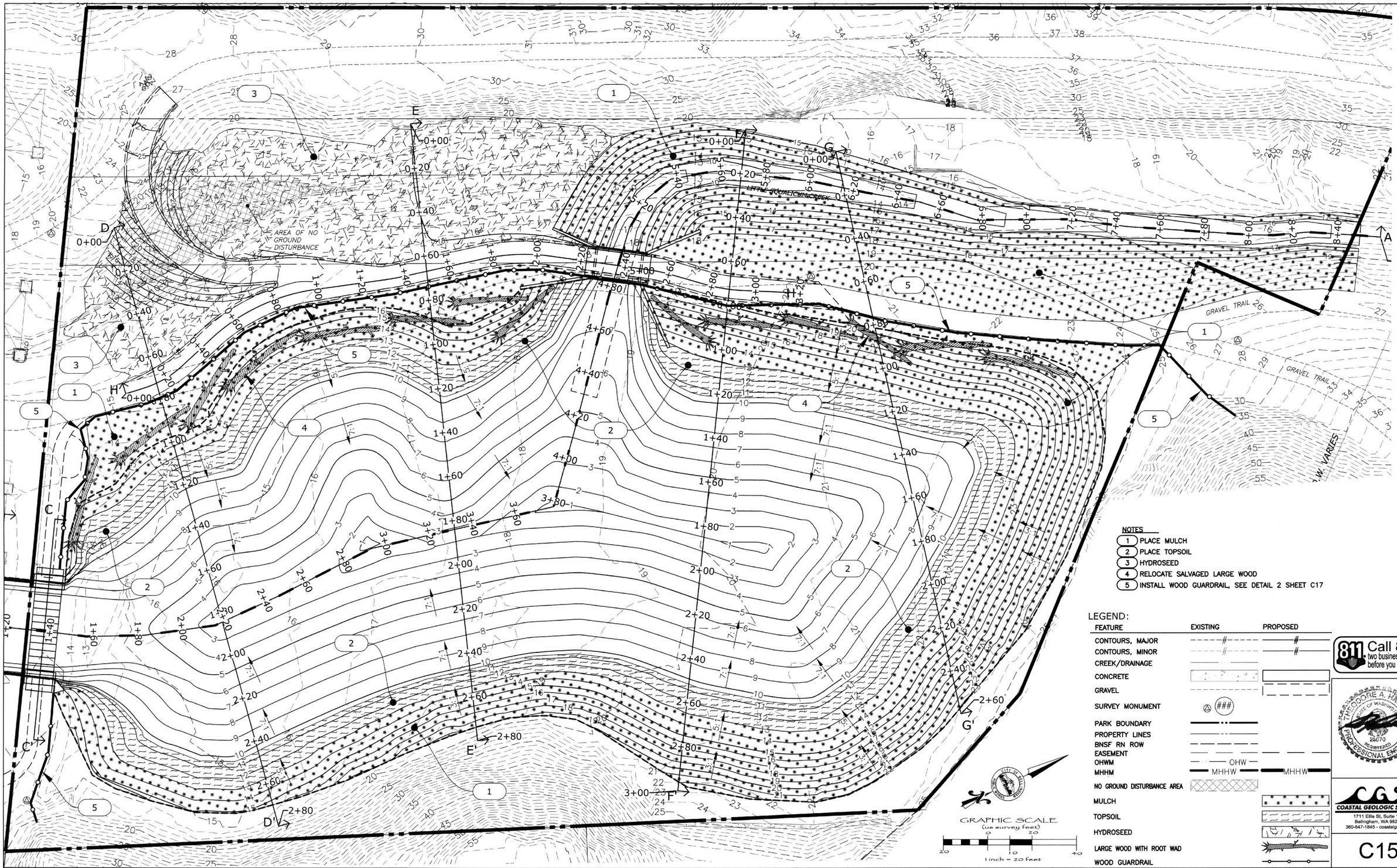
DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
PROPOSED CONDITIONS - BEACH NOURISHMENT

SHEET 17 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900



NOTES

1. PLACE MULCH
2. PLACE TOPSOIL
3. HYDROSEED
4. RELOCATE SALVAGED LARGE WOOD
5. INSTALL WOOD GUARDRAIL, SEE DETAIL 2 SHEET C17

LEGEND:

FEATURE	EXISTING	PROPOSED
CONTOURS, MAJOR	#	#
CONTOURS, MINOR	#	#
CREEK/DRAINAGE		
CONCRETE		
GRAVEL		
SURVEY MONUMENT	###	
PARK BOUNDARY		
PROPERTY LINES		
BNSF RN ROW		
EASEMENT		
OHWM	OHW	
MHHM	MHHW	MHHW
NO GROUND DISTURBANCE AREA		
MULCH		
TOPSOIL		
HYDROSEED		
LARGE WOOD WITH ROOT WAD		
WOOD GUARDRAIL		

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THEODORE A. HANSEN — STATE OF WASHINGTON — 22670 — REGISTERED PROFESSIONAL ENGINEER

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Bellingham, WA 98225
360-647-1845 - coastalgeo.com

C15

Date	No	Revision	By
	4		
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER	T.A.H.
DESIGNED/DRAWN	J.W.J./A.D.T
INSPECTOR	
DIRECTOR PUBLIC WORKS	T.A.C.
CITY ENGINEER	C.M.A.S.
ASSISTANT DIRECTOR	F.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= NA

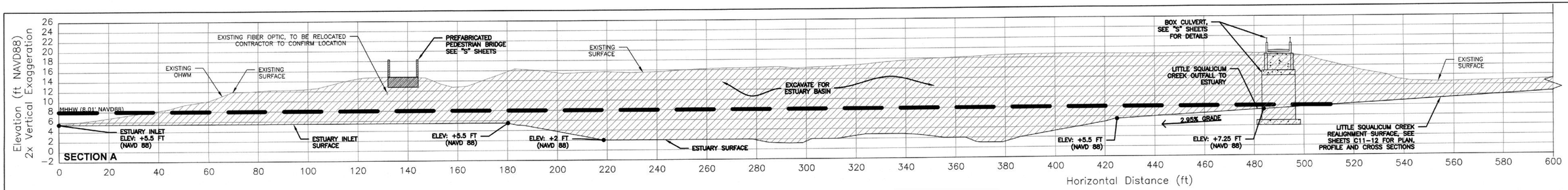
DATUM
NAD 83/98
NAVD88

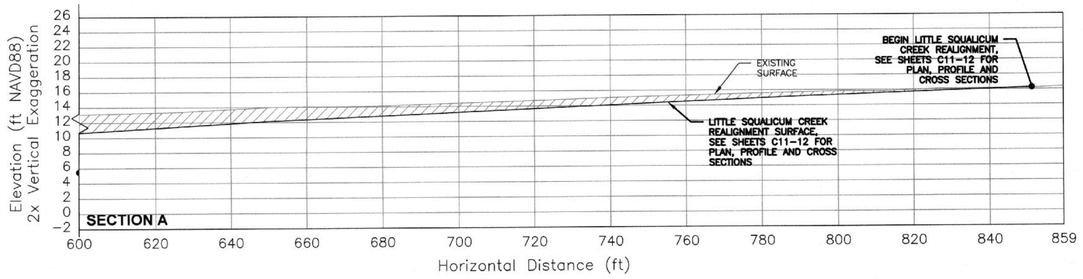
Job. No.
Date 5/4/2018
Field Bk.

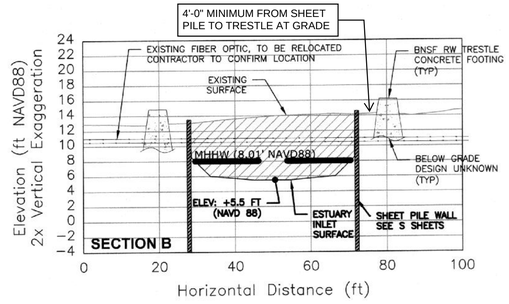
LITTLE SQUALICUM ESTUARY
PROPOSED CONDITIONS - LARGE WOOD, MULCHING AND TOPSOIL PLAN

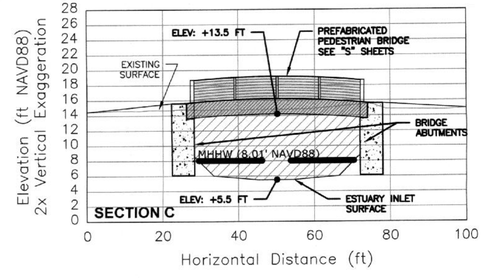
SHEET 18 OF 26

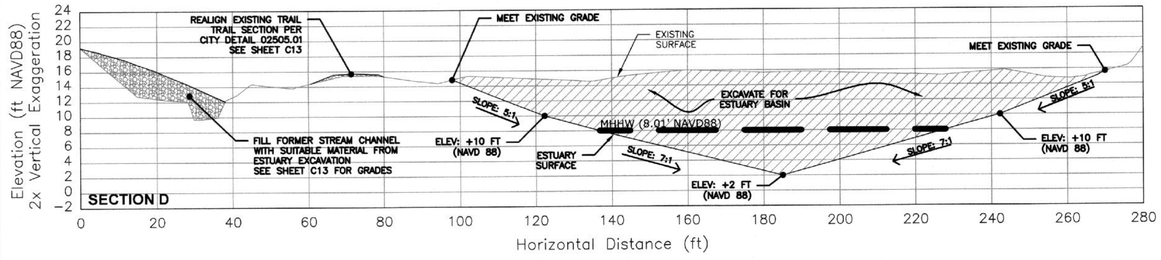
CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900

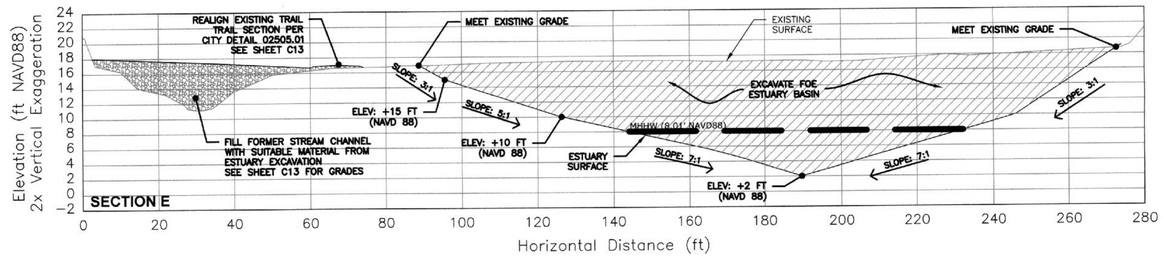


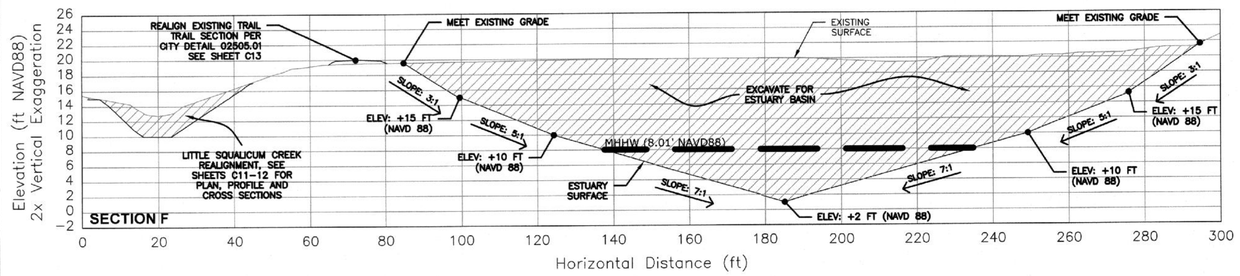


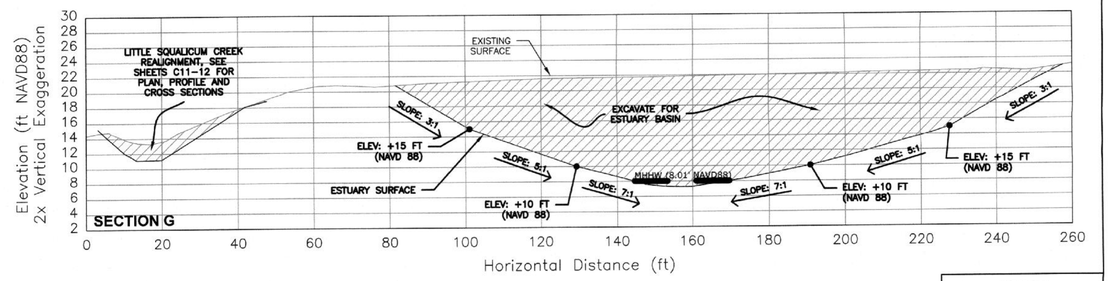


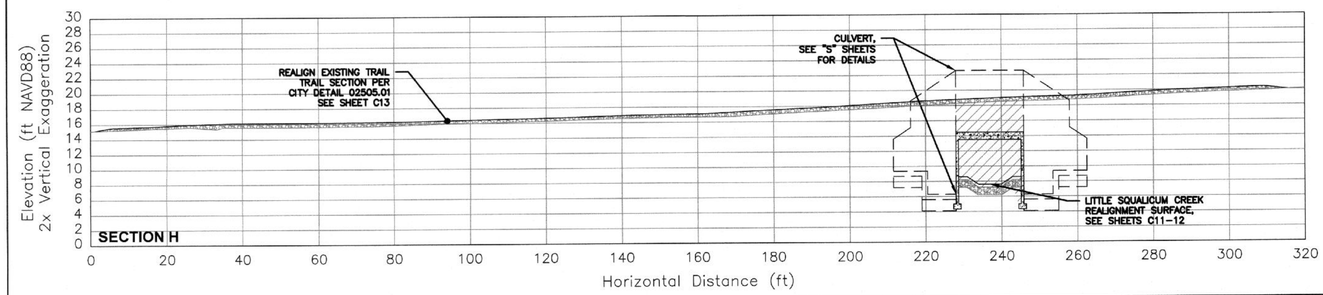












THEODORE A. HAMMER
STATE OF WASHINGTON
22170
REGISTERED
PROFESSIONAL ENGINEER

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C16

Date	No	Revision	By
5/4/18	3	BID SUBMITTAL – COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER T.A.H.
DESIGNED/DRAWN J.W.J/A.D.T.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR F.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= 10'

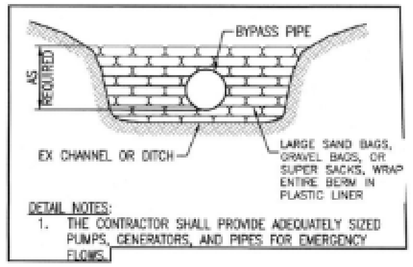
DATUM
NAD 83/98
NAVD88

Job. No.
Date 5/4/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
PROPOSED CONDITIONS - CROSS SECTIONS

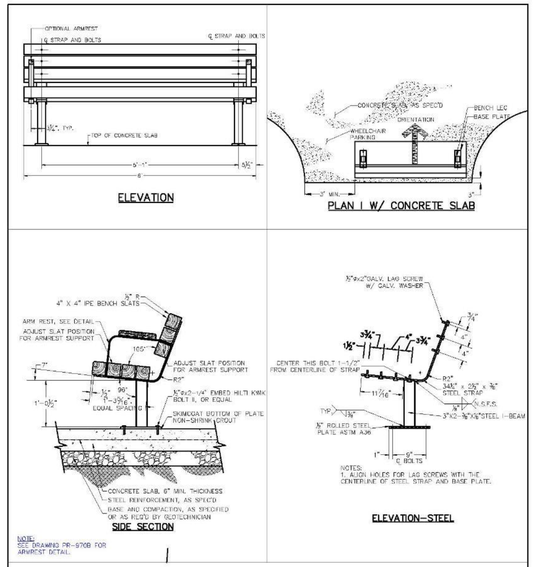
SHEET 19 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900

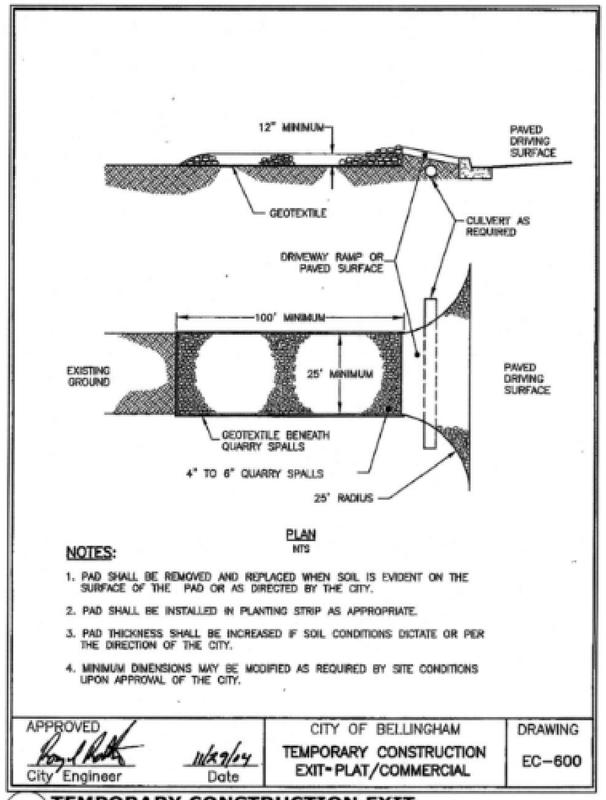


1 COFFER DAM DETAIL

NOT TO SCALE



PARKS AND RECREATION DESIGN AND DEVELOPMENT	CITY OF BELLINGHAM STANDARD PARK BENCH DETAIL	DRAWING 2870.01 DATE: 10/11/06



PLAN
NTS

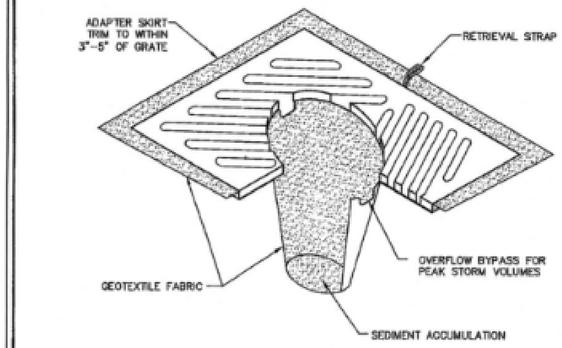
NOTES:

1. PAD SHALL BE REMOVED AND REPLACED WHEN SOIL IS EVIDENT ON THE SURFACE OF THE PAD OR AS DIRECTED BY THE CITY.
2. PAD SHALL BE INSTALLED IN PLANTING STRIP AS APPROPRIATE.
3. PAD THICKNESS SHALL BE INCREASED IF SOIL CONDITIONS DICTATE OR PER THE DIRECTION OF THE CITY.
4. MINIMUM DIMENSIONS MAY BE MODIFIED AS REQUIRED BY SITE CONDITIONS UPON APPROVAL OF THE CITY.

APPROVED City Engineer — 11/29/04 Date	CITY OF BELLINGHAM TEMPORARY CONSTRUCTION EXIT-PLAT/COMMERCIAL	DRAWING EC-600

3 TEMPORARY CONSTRUCTION EXIT

NOT TO SCALE



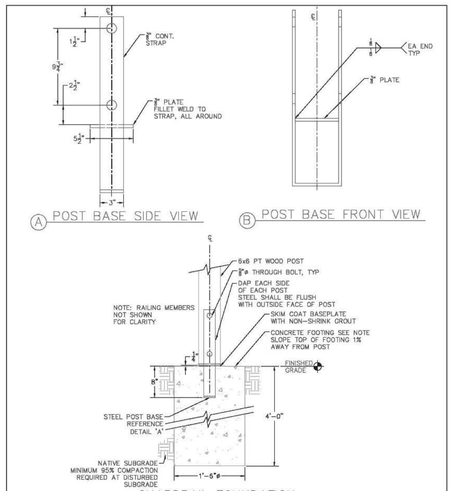
NOTES:

1. INSERT SHALL BE INSTALLED PRIOR TO CLEARING AND GRADING ACTIVITY, OR UPON PLACEMENT OF A NEW CATCH BASIN.
2. SEDIMENT SHALL BE REMOVED FROM THE UNIT WHEN IT BECOMES HALF FULL.
3. SEDIMENT REMOVAL SHALL BE ACCOMPLISHED BY REMOVING THE INSERT, EMPTYING, AND RE-INSERTING IT INTO THE CATCH BASIN.

APPROVED City Engineer — 11/29/04 Date	CITY OF BELLINGHAM CATCH BASIN INSERT	DRAWING EC-620

4 CATCH BASIN INSERT

NOT TO SCALE



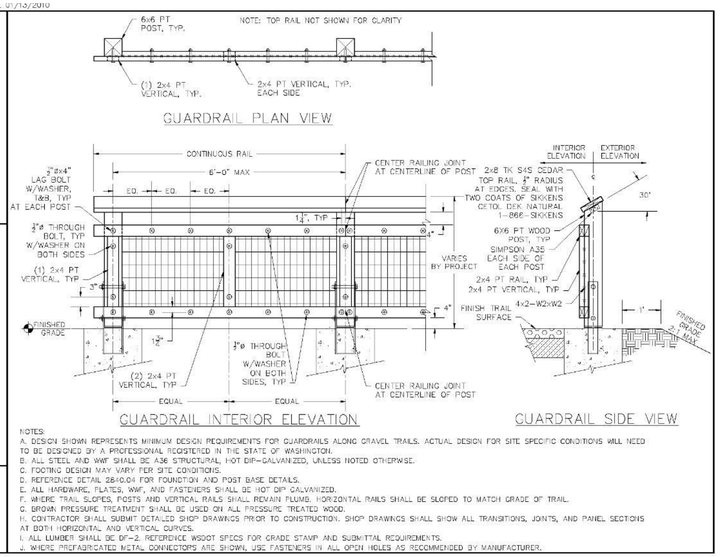
PARKS AND RECREATION DESIGN AND DEVELOPMENT	CITY OF BELLINGHAM WOOD GUARDRAIL FOUNDATION & POST BASE	DRAWING 2840.04

ROAD APPROVAL 01/13/2010

PARKS AND RECREATION DESIGN AND DEVELOPMENT February 4, 2010

CITY OF BELLINGHAM WOOD GUARDRAIL ELEVATION Scale: 1/2" = 1'-0"

DRAWING 2840.03



CGS
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C17

Date	No	Revision	By
5/4/18	3	BID SUBMITTAL — COB COMMENTS	AT
9/22/17	2	BID SUBMITTAL	AT
6/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER	T.A.H.
DESIGNED/DRAWN	J.W.J/A.D.T
INSPECTOR	
DIRECTOR PUBLIC WORKS	T.A.C.
CITY ENGINEER	C.M.A.S.
ASSISTANT DIRECTOR	F.C.J.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE: Horiz. 1"= 20' Vert. 1"= 10'

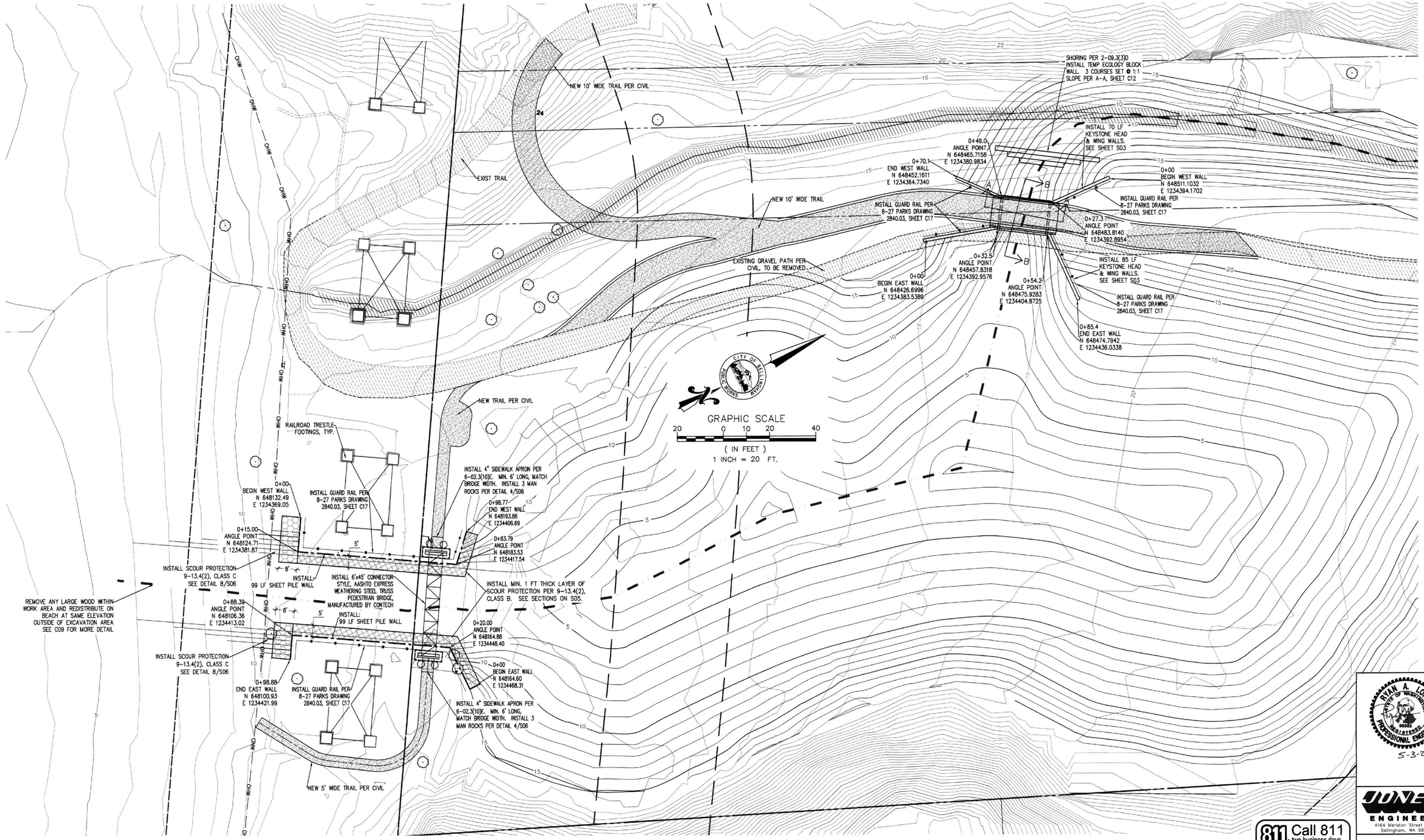
DATUM: NAD 83/98 NAVD88

Job. No. Date 5/4/2018 Field Bk.

LITTLE SQUALICUM ESTUARY
DETAILS

SHEET 20 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT (360)-778-7900



RYAN A. LONG — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER
5-3-2018

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

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S01

Date	No	Revision	By
05/04/18	3	BID SUBMITTAL – COB COMMENTS	AT
09/22/17	2	BID SUBMITTAL	AT
06/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER R.L.
DESIGNED/DRAWN R.L. / D.N.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.L.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= N/A

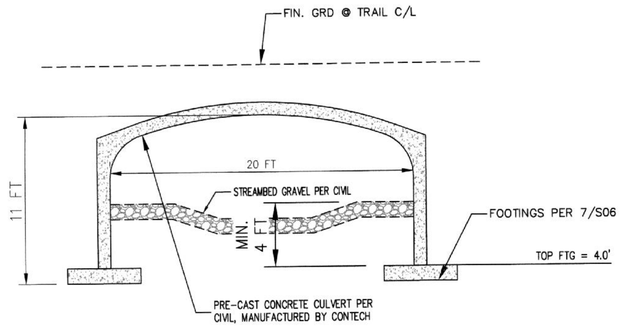
DATUM
NAD 83/98
NAVD88

Job. No.
Date 05/04/2018
Field Bk.

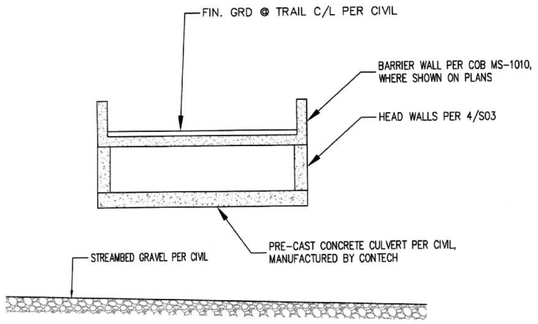
LITTLE SQUALICUM ESTUARY
SHEET PILE & HEADWALL PLAN

SHEET 21 OF 26

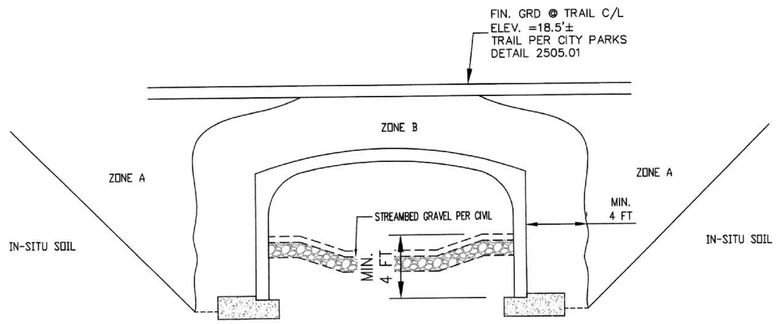
CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT 778-7900



SECTION A-A THROUGH CULVERT



SECTION B-B THROUGH CULVERT

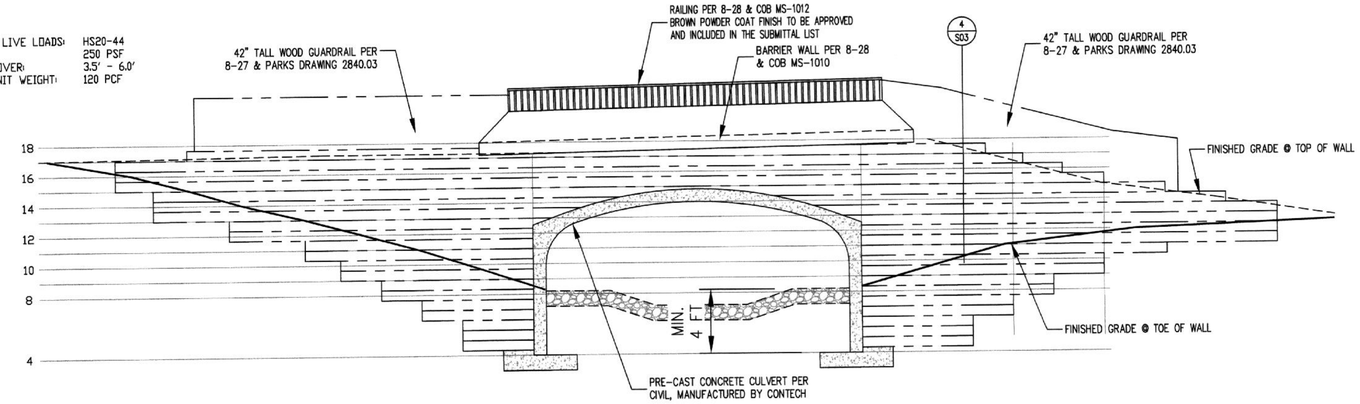


ZONE A: SUITABLE NATIVE OR COMMON BORROW SUITABLE CONFORMING TO 9-03.14(3) COMPACTED TO 95% MDD PER 2-03.3(14)C, METHOD B.

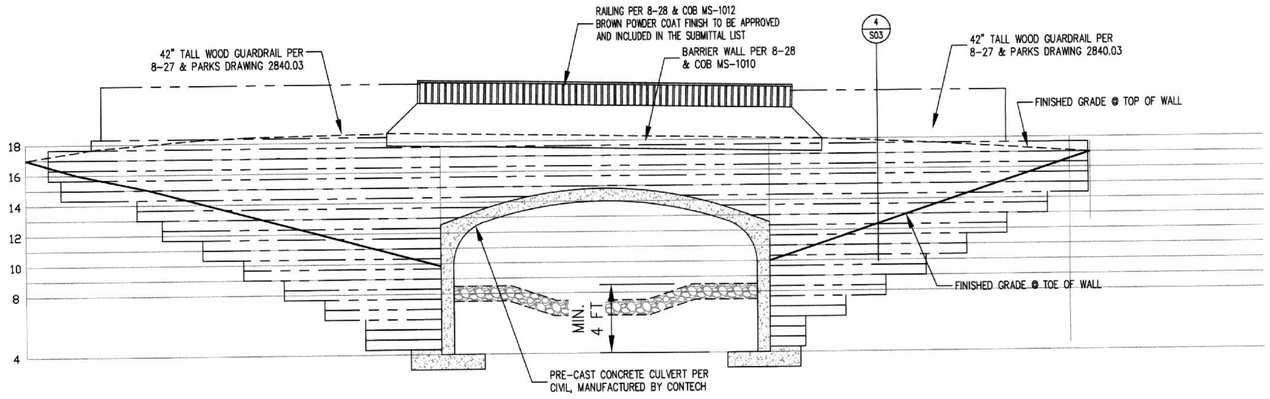
ZONE B: STRUCTURAL BACKFILL PER CONTECH & GEOTECH SPECIFICATIONS. PERMEABLE BALLAST PER 9-03.9(2) COMPACTED TO 95% MDD PER 2-03.3(14)C, METHOD C.

TYPICAL BACKFILL AROUND CON/SPAN BRIDGE

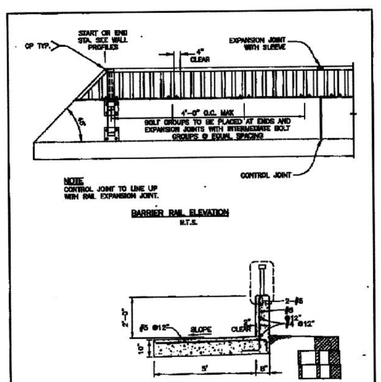
DESIGN LIVE LOADS: HS20-44
250 PSF
SOIL COVER: 3.5' - 6.0'
SOIL UNIT WEIGHT: 120 PCF



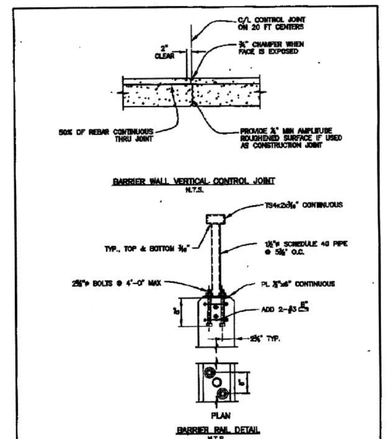
DOWNSTREAM WALL PROFILE



UPSTREAM WALL PROFILE



APPROVED		CITY OF BELLINGHAM	DRAWING
City Engineer	Date	BARRIER WALL WITH RAIL	MS-1010



APPROVED		CITY OF BELLINGHAM	DRAWING
City Engineer	Date	BARRIER WALL WITH RAIL	MS-1012

RYAN A. LONG — STATE OF WASHINGTON — 22333 — REGISTERED PROFESSIONAL ENGINEER — 5-3-2018

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

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S02

No	Date	Revision	By
4			
3	05/04/18	BID SUBMITTAL - COB COMMENTS	AT
2	09/22/17	BID SUBMITTAL	AT
1	06/26/17	DRAFT DESIGN	AT

PROJECT ENGINEER R.L.
DESIGNED/DRAWN R.L. / D.N.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.L.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 20'
Vert. 1"= N/A

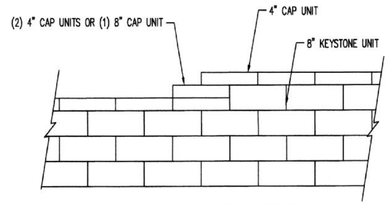
DATUM
NAD 83/98
NAVD88

Job. No.
Date 05/04/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
CULVERT SECTIONS & HEADWALL PROFILES

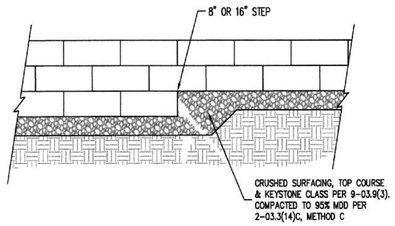
SHEET 22 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT 778-7900

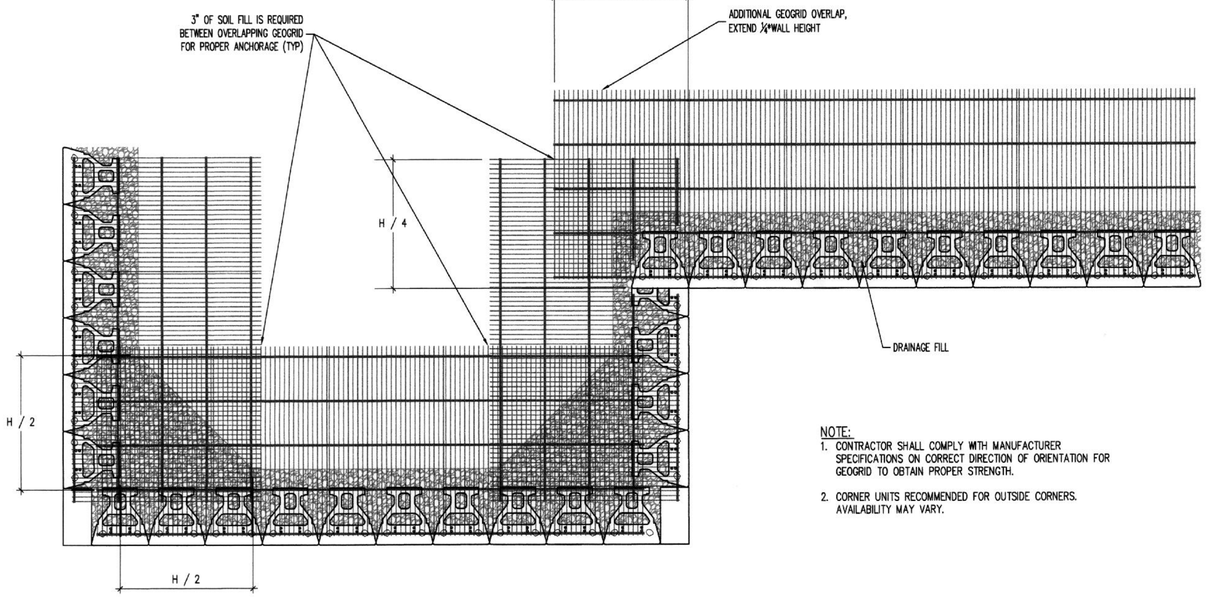


NOTE: SECURE ALL CAP UNITS WITH KEYSTONE KAPSEAL OR EQUAL.

1 / S03 KEYSTONE – STEP IN WALL TOP
SCALE: N.T.S.



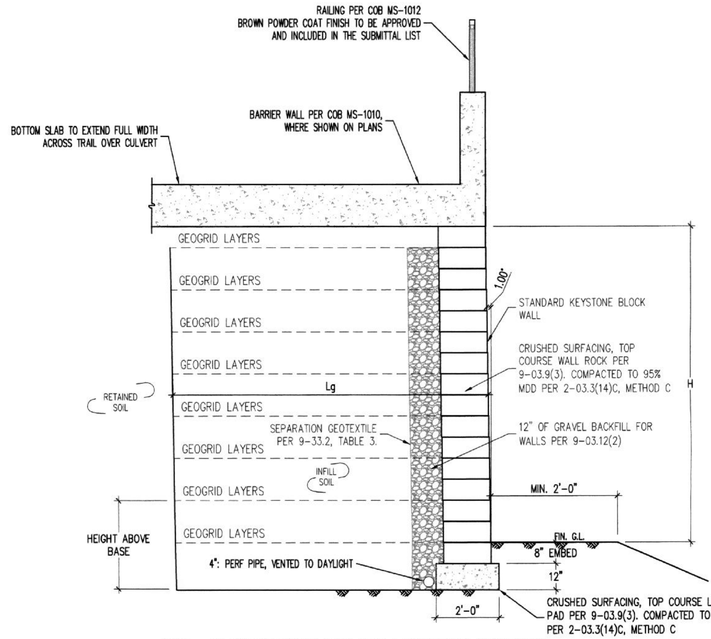
2 / S03 KEYSTONE – STEP IN WALL BOTTOM
SCALE: N.T.S.



NOTE:
1. CONTRACTOR SHALL COMPLY WITH MANUFACTURER SPECIFICATIONS ON CORRECT DIRECTION OF ORIENTATION FOR GEOGRID TO OBTAIN PROPER STRENGTH.
2. CORNER UNITS RECOMMENDED FOR OUTSIDE CORNERS. AVAILABILITY MAY VARY.

3 / S03 GEOGRID AT CORNERS
SCALE: N.T.S.

NOTE: ALL KEYSTONE BLOCKS TO BE TAN WITH A SPLIT FACE FINISH



NOTE: ALL KEYSTONE WALLS SHALL HAVE A SITE SPECIFIC GEOTECHNICAL INVESTIGATION TO DETERMINE ADEQUACY OF SOIL BEARING CAPACITY.

GEOGRID SCHEDULE

Ø = 32°	SOIL WEIGHT = 120 PCF WALL WEIGHT = 130 PCF		GEOGRID			
H (FT)	ANGLE β (DEGREES)	MINIMUM BEARING (PSF)	TYPE	ABOVE COURSE NUMBERS	HEIGHT ABOVE BASE (FT)	LENGTH Lg (FT)
0 – 4	1	1500	STRATAGRID SG200	1, 3, 5, 6	0.67, 2.00, 3.33, 4.00	5.5
6'–0"	1	2000	STRATAGRID SG200	1, 3, 5, 7, 9	0.67, 2.00, 3.33, 4.67, 6.00	6.0
8'–0"	1	2500	STRATAGRID SG200 STRATAGRID SG350	5, 7, 9, 11, 12 1, 3	3.33, 4.67, 6.00, 7.33, 8.00 0.67, 2.0,	7.5
10'–0"	1	2500	STRATAGRID SG200 STRATAGRID SG350	7, 9, 11, 13, 14 1, 3, 5	4.67, 6.00, 7.33, 8.67, 9.33 0.67, 2.00, 3.33,	8.5 10.0
12'–0"	1	3000	STRATAGRID SG200 STRATAGRID SG350	9, 11, 13, 15, 17 1, 3, 5, 7	6.00, 7.33, 8.67, 10.0, 11.33 0.67, 2.00, 3.33, 4.67	8.5 10.0
14'–0"	1	3000	STRATAGRID SG200 STRATAGRID SG350	11, 13, 15, 17, 19 1, 2, 3, 5, 7, 9	7.33, 8.67, 10.0, 11.33, 12.67 0.67, 1.33, 2.00, 3.33, 4.67, 6.00	9.0 10.0

INFILL SOILS SHALL BE CRUSHED SURFACING BASE COURSE PER 9-03.9(3). COMPACTED TO 95% MDD PER 2-03.3(14)C, METHOD C.
RETAINED SOILS MAY BE UNDISTURBED NATIVE SOILS OR COMMON BORROW PER 9-03.14(3), OPTION 1 COMPACTED TO 95% MDD PER 2-03.3(14)C, METHOD A SEE CIVIL FOR COMMON BORROW PLACED UNDER TRAILS.

4 / S03 KEYSTONE WALL – TYPICAL SECTION
SCALE: N.T.S.

RYAN A. LONG — STATE OF WASHINGTON — 55362 — REGISTERED PROFESSIONAL ENGINEER
5-3-2018

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

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S03

Date	No	Revision	By
	4		
05/04/18	3	BID SUBMITTAL – COB COMMENTS	AT
09/22/17	2	BID SUBMITTAL	AT
06/26/17	1	DRAFT DESIGN	AT

PROJECT ENGINEER R.L.
DESIGNED/DRAWN R.L. / D.N.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.L.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= 2'
Vert. 1"= 2'

DATUM
NAD 83/98
NAVD88

Job. No.
Date 05/04/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
HEADWALL DETAILS

SHEET 23 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT 778-7900

STRUCTURAL NOTES

1. REFERENCE CODES & STANDARDS

International Building Code (IBC) 2015 Edition
Washington State Building Code (Washington Administrative Code (WAC) Title 51)
American Concrete Institute, ACI 318-14
Minimum Design Loads for Buildings and Other Structures, ASCE 7-10

2. DESIGN LOADS AND CRITERIA

Culvert Loads HS20-44 Loading - 16 KIP Wheel Loads

Seismic Design Category	D
Seismic Site Class	D
Foundation Allowable Soil Bearing Capacity (DL + LL)	2000 psf
Foundation Soil Coefficient Of Friction	0.35
Unsaturated Soil Unit Weight	120 PCF
Saturated Soil Unit Weight	140 PCF
Lateral Pressures	
Above Water Table (Active)	45 PCF
Above Water Table (At Rest)	100 PCF
Below Water Table (At Rest)	120 PCF
Passive Pressure	200 PCF

3. SPECIFICATIONS

3.1 Design, material and workmanship shall be in accordance with the latest version of the following Codes And Standards contained herein, unless otherwise modified on the drawings or specifications.

ACI 211	Standard Practice For Selecting Proportions For Normal, Heavyweight, & Mass Concrete
ACI 301	Specifications For Structural Concrete For Buildings
ACI 305	Hot Weather Concreting
ACI 306	Standard Specification For Cold Weather Concreting
ACI 308	Standard Practice For Curing Concrete
ACI 318-14	Building Code Requirements For Reinforced Concrete
ACI 347	Guide To Formwork For Concrete
ACI SP-66	Detailing Manual
CRSI-PI	Recommended Practice For "Placing Reinforcing Bars" 1992, 6th Ed.

4. CAST-IN-PLACE CONCRETE

4.1 Cast-in-place normal-weight concrete materials, mixing, placing, and testing shall conform to 9-01, with mix design in conformance with ACI 211.1 & 301.

4.2 Material specifications, unless noted otherwise:

USE	MIN. 28-DAY	MAX. WATER-CEMENT RATIO	
		NON-AIR ENTRAINED	AIR ENTRAINED
CULVERT FOOTING & BRIDGE ABUTMENT	4000 PSI	0.45	0.40

Use Type I cement per 9-01.2(1) unless noted otherwise. Use Type I-A cement where air entrainment is required. Slump shall be 4½ inches plus or minus 1 inch per ASTM C94-17a.

4.3 Chemical Admixtures conforming to 9-23.6 may be incorporated in the concrete design mixes and must be used in strict accordance with the manufacturer's recommendations, subject to Engineer's approval.

4.4 During periods of cold weather, batching, placing, and curing of concrete shall conform to ACI 306R. Do not place concrete on frozen subgrade or in contact with forms, reinforcing, or embeds that are less than 35F.

4.5 During periods of hot weather, batching, placing, and curing of concrete shall conform to ACI 305R.

4.6 Concrete shall be maintained in a moist condition for a minimum of five days after placement or sealed with a curing compound applied in two coats at right angles per 9-23.1 & 9-23.2. Follow manufacturer's application instructions and do not exceed recommended coverage.

4.7 Pumping or pneumatic conveying equipment shall be of suitable kind with adequate pumping capacity. Pneumatic placement shall be controlled so that segregation is not apparent in the discharge concrete. The loss of slump in pumping or pneumatic conveying equipment shall not exceed 2 inches. Concrete shall not be conveyed through pipe made of aluminum or aluminum alloy.

5. ANCHOR BOLTS IN CONCRETE

5.1 Use galvanized threaded parts, bolts, nuts, and washers where exposed to weather per 9-00.7.

5.2 Material specifications shall be as follows per 9-06.5(4), unless noted otherwise:

Anchor Bolts:	ASTM F1554, Grade 36; or as indicated per plan
Threaded rod:	ASTM A36
Nuts:	ASTM A563
Washers:	ASTM F436

5.3 Provide anchor bolt configuration as shown including diameter, spacing, projection, embedment, and end configuration. Anchor bolts shall be placed per 6-02.3(18).

6. REINFORCING STEEL IN CONCRETE

6.1 All reinforcing steel shall conform to 9-07 and shall be free from loose rust and other coatings that would inhibit reinforcing bond PER 6-02.3(24)B.

6.2 Bar detailing and support of reinforcing bars in forms shall conform to the CRSI Manual Of Standard Practice, unless shown otherwise on the plans.

6.3 Reinforcing steel shall not be bent or displaced for the convenience of other trades unless approved by the Engineer.

6.4 Fabrication and placement of reinforcing in concrete shall conform to 9-07.1(2). Lap all reinforcing bars at all splices, corners, and intersecting walls per table below, unless noted otherwise:

CONCRETE STRENGTH (psi)		
	4,000	
	TOP	OTHER
#4 (#13)	25	19
#5 (#16)	31	24

Use "TOP" reinforcing values for horizontal bars with more than 12" of concrete below them in the casting position. Lap lengths, in inches, are based on normal weight concrete and a minimum 2 D_b spacing and 1 D_b cover, per ACI 318-14. The sizes shown (#xx) are the corresponding metric bar sizes. Wire all the lap splices.

6.5 Minimum cover over reinforcement per 6-02.3(24)C, unless noted otherwise:

Concrete placed on earth:	3 inches
Concrete exposed to earth or weather:	2 inches
Other conditions, u.n.o.:	1½ inches

6.6 Reinforcing bars, bolts, anchors, dowels, & metal inserts shall be securely tied in position prior to concrete placement per 6-02.3(24)C. Reinforcing shall be supported on chairs or slab bolsters (with distribution plates if required) or concrete dobies prior to concrete placement. Support spacing shall not exceed 10 feet in each direction.

GENERAL NOTES

7. GENERAL CONDITIONS

7.1 All materials and construction shall conform to the drawings, these notes, and any specifications for this project.

7.2 During the construction period, the Contractor shall be responsible for the safety of the construction project, including all excavation procedures. The Contractor shall provide adequate lagging, shoring, underpinning, bracing, guys and protection of adjacent property, structures, streets, and utilities in accordance with all national, state, and local safety ordinances.

7.3 DO NOT SCALE DRAWINGS.

7.4 All information shown on the drawings relative to existing conditions is given as the best present knowledge, but without guarantee of accuracy. Where actual conditions conflict with the drawings they shall be reported to the Engineer so that the proper revisions may be made. Construction modifications shall not be made without written approval of the Engineer.

7.5 Good standards and workmanship shall be employed throughout the entire project. See the specifications for detailed material and methods. In case of conflict between these structural drawings and the specifications, the most specific will govern.

7.6 No deviations from the contract documents shall be made without written consent of the engineer. If deviations from the plans are made without notification to and approval from the engineer, the General Contractor shall release Jones Engineers, Inc. from any and all claims that are in any way related to this project. The General Contractor shall further agree to defend, hold harmless and indemnify Jones Engineers, Inc. from any and all claims by any third persons that are in any way related to the project.

8. PROJECT COORDINATION

8.1 The Contractor is responsible for coordinating the work of all trades and shall check all dimensions. The Contractor shall ensure that subcontractors and fabricators receive all applicable design information including geotechnical reports, drawings, notes, and specifications. Any discrepancies shall be called to the attention of the Engineer and be resolved before proceeding with the work.

8.2 Civil drawings shall be used to define detail configurations for items to be embedded in concrete or otherwise incorporated in the structural work.

9. TESTING AND INSPECTION

9.1 In addition to the inspections made by the Building Official per IBC Section 110, all special inspection and testing shall comply with IBC Sections 1704, 1705 and other applicable building code sections. Special inspections are required for the following work:

TESTS & SPECIAL INSPECTIONS	
Concrete	Placement, Slump, Air Content, And Cylinders For Compressive Strength Tests Per IBC 1705.3
Inserts & Embedded Items	Placement, Cover, Site And Number As Per Plans.
Reinforcing	Cover, Site, Number, Laps And Placement.

9.2 Special inspectors and testing laboratories shall be provided by the Contractor. The Contractor shall coordinate special inspections as well as standard building inspections with the construction schedule and is responsible for facilitating access to areas to be inspected. Special inspectors and testing laboratories shall be certified by the Washington Association of Building Officials (WABO) and approved by the Building Official.

9.3 The special inspector shall observe the work for conformance with the design drawings and specifications and furnish inspection reports to the Building Official and the Engineer. All discrepancies shall be brought to the immediate attention of the Contractor, Engineer, and the Building Official. The special inspector shall submit a final signed report stating whether the inspected work was in conformance with the design drawings and specifications and the applicable provisions of the building code.

10. EXCAVATION AND FILL

10.1 All footings shall bear on undisturbed ground or structural fill and shall be a minimum of 18 inches below grade unless noted otherwise on the drawings. The soil bearing capacity shall be at least 2500 psf as tested by a qualified geotechnical engineer. The contractor shall allow for the geotechnical professional to do the testing.

10.2 Footings shall not be located over subsurface utility lines, tanks, large organic deposits, or other obstructions. If footing excavations reveal subsurface objects, the area shall be over excavated, the objects shall be removed, and the excavation backfilled as noted below.

10.3 Foundation excavations shall be examined and approved by the Engineer or a testing laboratory approved by the Owner, and the Building Official prior to the placement of any reinforcing steel or concrete.

10.4 Unless noted otherwise, the material for filling and backfilling shall consist of Gravel Backfill for Foundations per 9-03.12(1)A and shall be free of organic matter, trash, lumber, or other debris and shall be compacted to 95% MDD per 2-03.3(14)C, Method C. Each lift shall be tested for compliance with compaction requirements by an approved laboratory.

10.5 Drainage backfill shall be compacted per notes above in lifts not to exceed 4 inches for hand-operated equipment. Each lift shall be tested for compliance with compaction requirements by an approved laboratory. Hand tampers shall weigh at least 50 lbs each and shall have a face area not in excess of 64 square inches. Hand tamper may be operated either manually or mechanically and shall be used only where larger power driven compaction equipment cannot be used.

10.6 Do not operate heavy equipment adjacent to the wall within a distance equal to the height of the wall during backfill and compaction. Hand tampers for compaction shall be per notes above.

11. PRODUCT SUBSTITUTION PROCEDURES

11.1 Proposed substitutions for the specified products and materials must be submitted to the Owner and the Engineer for review prior to fabrication or construction. Provide complete documentation that shows equivalency with the specified product or material. Substitutions indicated or implied on shop drawings or product data submittals will not be considered.

11.2 Substitutions are strictly subject to the approval of the Owner and the Engineer. If approved, the Contractor shall bear the cost of any redesign required by the alternate product or material.

12. SUBMITTAL PROCEDURES

12.1 Shop drawings, erection drawings, design-build drawings, product data, and supporting calculations shall be submitted to the Engineer for review as noted below.

12.2 Submit one set of prints and one set of reproducible drawings, or four sets of prints maximum, to the Engineer prior to fabrication or construction. Allow 5 business days for review. All submittals shall include the name, address, and phone number of the manufacturer, fabricator, supplier, and the design engineer, as applicable.

12.3 The Contractor shall review and approve all submittals before release to the Engineer. Reference plans and details as applicable. Deviations from design drawings shall be clearly marked as such. Send one record set of the revised submittal where corrections are noted but resubmittal is not required.

12.4 If the fabricator's drawings are the sole design, differ in design, or add to the design of the structural drawings, they shall be stamped by a Civil Engineer registered in the State of Washington responsible for said design. Calculations submitted are for information only and will not be stamped or returned except at the option of the Engineer.

12.5 Review is only for general conformance with the design concept of the project and general compliance with the information included in the Contract Documents. Any markings or comments are subject to the requirements of the design drawings and specifications. Contractor is responsible for correlating and confirming dimensions, choice of fabrication processes and techniques of construction, coordination of his work with other trades, and performing the work in a safe and satisfactory manner.

12.6 The submittals required for review included, but are not limited to:

Concrete Mix Design	WSDOT Form 350-040 per 6-02.3(2)A
Pedestrian Bridge	6-03.3
Sheet Piles	6-05.2
Concrete Abutment & Footing	Type 2E Working Drawings per 6-11.3(1)
Keystone Wall & Geosynthetic Grid	Type 2 Working Drawings per 6-14.3(2)
Pre-cast Concrete Culvert	Type 2 Working Drawings per 7-02.3(6)
Reinforcing Steel	Manu. Cert. of Compliance per 9-07.1(1)
Non-shrink Grout Mix Design	9-20.3(2)
Elastomeric Pads	9-31.1

RYAN A. LONG
STATE OF WASHINGTON
20062
REGISTERED
PROFESSIONAL ENGINEER
5-3-2018

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

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S04

Date	No	Revision	By
05/04/18	4		—
05/04/18	3	BID SUBMITTAL - COB COMMENTS	AT
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PROJECT ENGINEER R.L.
DESIGNED/DRAWN R.L. / D.N.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.L.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= N/A
Vert. 1"= N/A

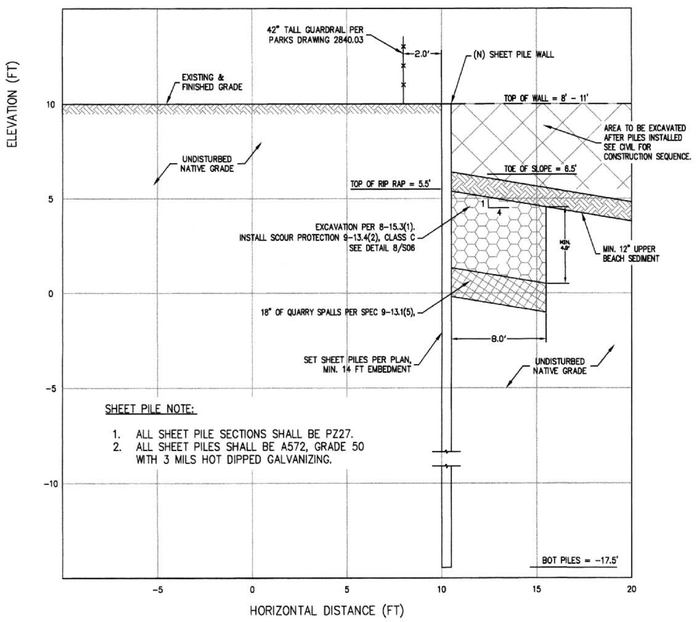
DATUM
NAD 83/98
NAVD88

Job. No.
Date 05/04/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
HEADWALL NOTES

SHEET 24 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT 778-7900



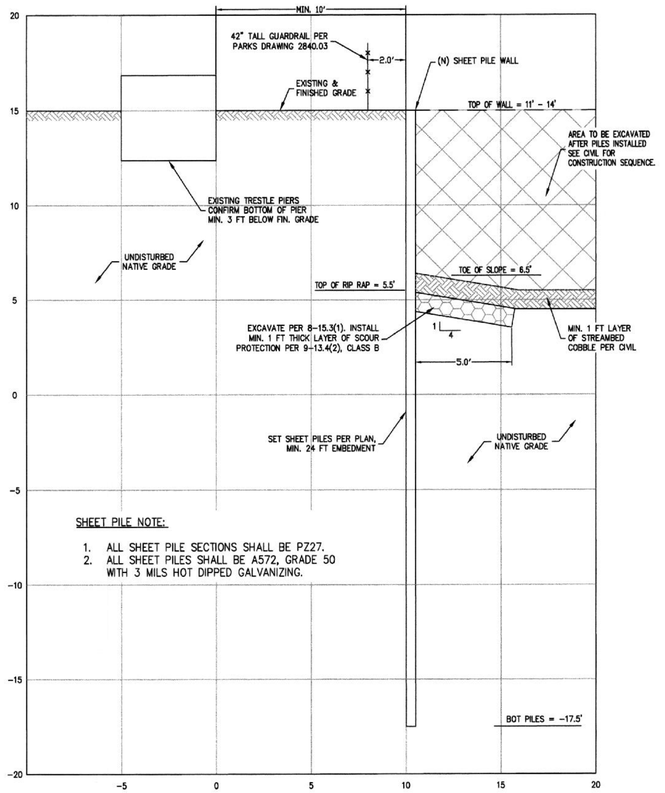
SHEET PILE NOTE:

1. ALL SHEET PILE SECTIONS SHALL BE PZ27.
2. ALL SHEET PILES SHALL BE A572, GRADE 50 WITH 3 MILS HOT DIPPED GALVANIZING.

TYPICAL SECTION THROUGH SHEET PILE WALL @ BEACH
APPROX. STA 0 TO 0+15 (WEST WALL)
APPROX. STA 0+88 TO END (EAST WALL)

GENERAL SHEET PILE CONSTRUCTION SEQUENCE:

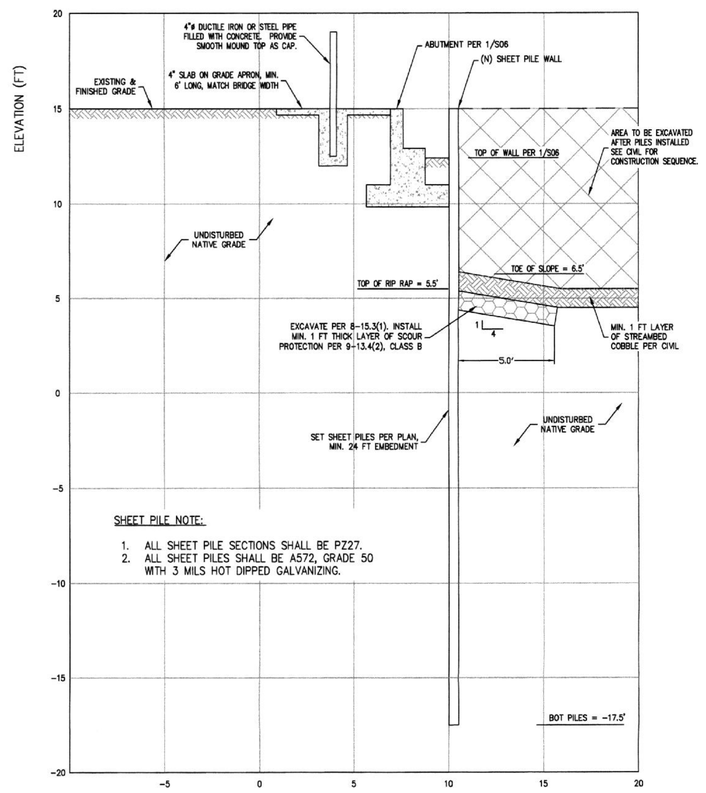
1. DCP TESTS TO 20' BELOW GRADE SHALL BE DONE AT 15' INTERVALS ALONG THE SHEET PILE ALIGNMENTS TO TEST FOR THE PRESENCE OF PEAT OR UNSUITABLE MATERIALS. ALL LOCATIONS WHERE RESULTS EXCEEDING 1 FT IN THICKNESS SHOWING A BLOW COUNT UNDER 10 INDICATE UNSUITABLE MATERIAL. THE UNSUITABLE FOUNDATION EXCAVATION SHALL BE PER 2-03.3(14)E AND REPLACED WITH STRUCTURAL FILL PER 9-03.12(2) GRAVEL BACKFILL FOR WALLS. SUITABLE ON-SITE MATERIALS MAY BE USED AT THE DISCRETION OF THE GEOTECHNICAL ENGINEER.
2. THE DCP TESTS AND GRAVEL BACKFILL FOR WALL SHALL BE OBSERVED BY A GEOTECHNICAL PROFESSIONAL.
3. DRIVE NEW SHEET PILES IN SUITABLE SUBGRADE TO DEPTH SHOWN ON PLAN. PILE SECTIONS UNDER TRESTLE MAY BE SPLICED PER 6-05.3(6).
4. EXCAVATE BETWEEN SHEET PILES AND INSTALL SCOUR PROTECTION PER PLAN.
5. FULL TIME INSPECTION BY A GEOTECHNICAL ENGINEER SHALL BE USED DURING THE EXCAVATION TO FURTHER VERIFY THAT ALL UNSUITABLE MATERIAL WAS REMOVED.



SHEET PILE NOTE:

1. ALL SHEET PILE SECTIONS SHALL BE PZ27.
2. ALL SHEET PILES SHALL BE A572, GRADE 50 WITH 3 MILS HOT DIPPED GALVANIZING.

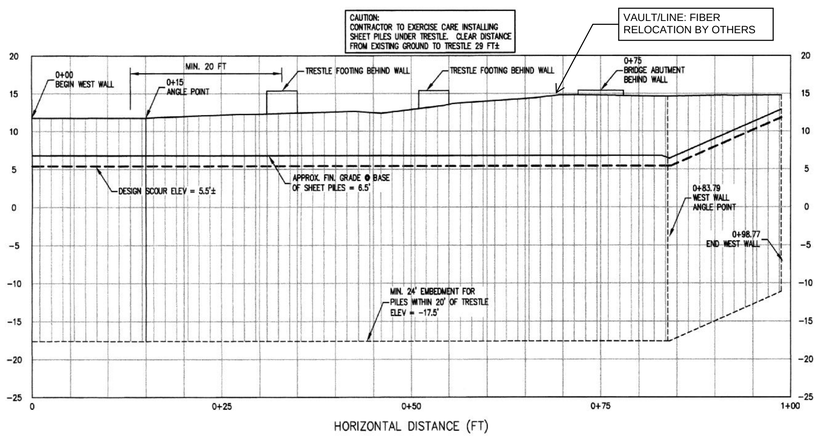
SECTION THROUGH SHEET PILE WALL AT PIERS
APPROX. STA 0+15 TO 0+99 (WEST WALL)
APPROX STA 0+00 TO 0+88 (EAST WALL)



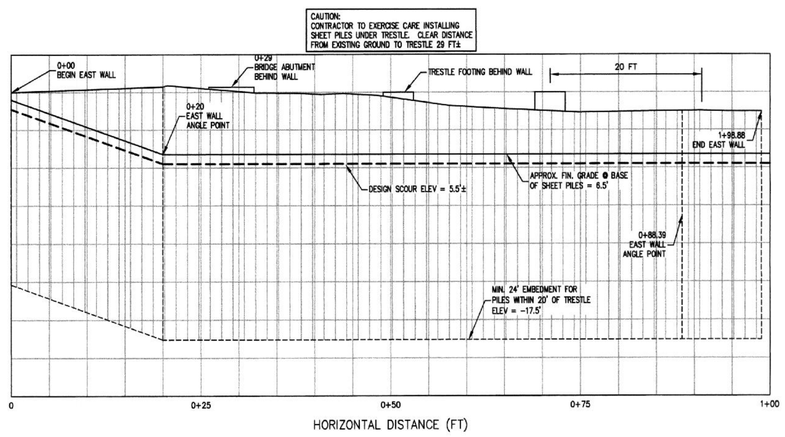
SHEET PILE NOTE:

1. ALL SHEET PILE SECTIONS SHALL BE PZ27.
2. ALL SHEET PILES SHALL BE A572, GRADE 50 WITH 3 MILS HOT DIPPED GALVANIZING.

SECTION THROUGH SHEET PILE WALL AT BRIDGE



WEST SHEET PILE ELEVATION



EAST SHEET PILE ELEVATION

RYAN A. LONG
STATE OF WASHINGTON
REGISTERED
PROFESSIONAL ENGINEER
5-3-2018

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

Call 811 two business days before you dig

S05

	4		—
05/04/18	3	BID SUBMITTAL – COB COMMENTS	AT
09/22/17	2	BID SUBMITTAL	AT
06/26/17	1	DRAFT DESIGN	AT
Date	No	Revision By	

PROJECT ENGINEER R.L.
DESIGNED/DRAWN R.L. / D.N.
INSPECTOR

DIRECTOR PUBLIC WORKS T.A.C.
CITY ENGINEER C.M.A.S.
ASSISTANT DIRECTOR E.C.L.

CITY OF BELLINGHAM, WASHINGTON
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SCALE
Horiz. 1"= N/A
Vert. 1"= N/A

DATUM
NAD 83/98
NAVD88

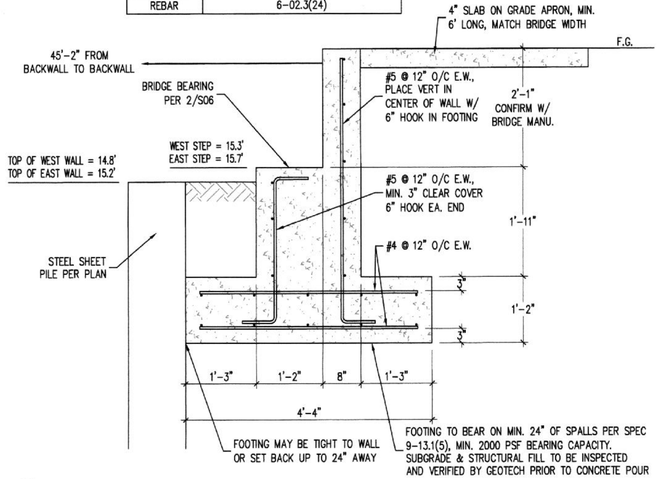
Job. No.
Date 05/04/2018
Field Bk.

LITTLE SQUALICUM ESTUARY
SHEETPILE SECTIONS & ELEVATIONS

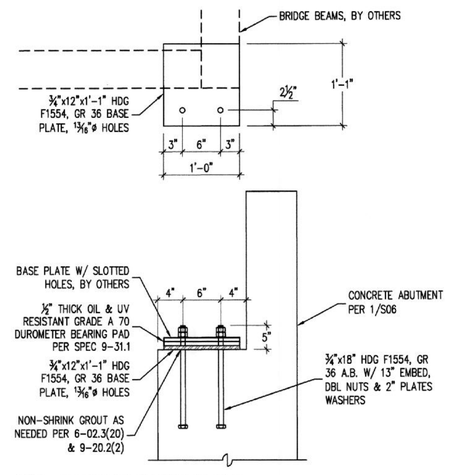
SHEET 25 OF 26

CONTACT PERSON: FREEMAN ANTHONY, PROJECT ENGINEER AT 778-7900

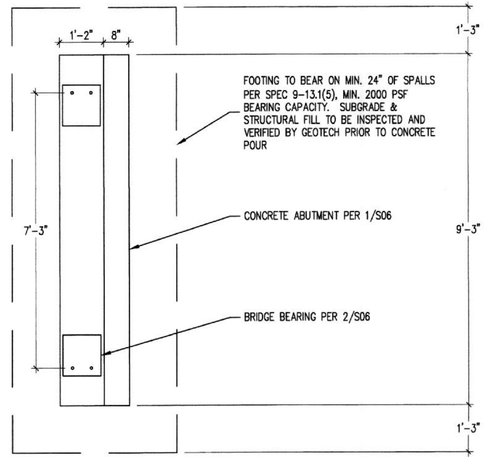
CONCRETE SPECIFICATIONS	
F'c	4000 PSI @ 28 DAYS [4000 CLASS PER 6-02.3(1)]
MIX DESIGN	6-02.3(2)A
BATCH PLANT	6-02.3(4)
SLUMP	4.5" PER 6-02.3(4)C
TEMPERATURE	6-02.3(4)D
TEST METHOD	6-02.3(5)D
SAMPLES FOR TESTING	6-02.3(5)G 6-02.3(5)H
PLACEMENT	6-02.3(6)
CURING	6-02.3(11)
ANCHOR BOLTS	6-02.3(18)
BRIDGE BEARING	6-02.3(19)
GROUT	6-02.3(20)
REBAR	6-02.3(24)



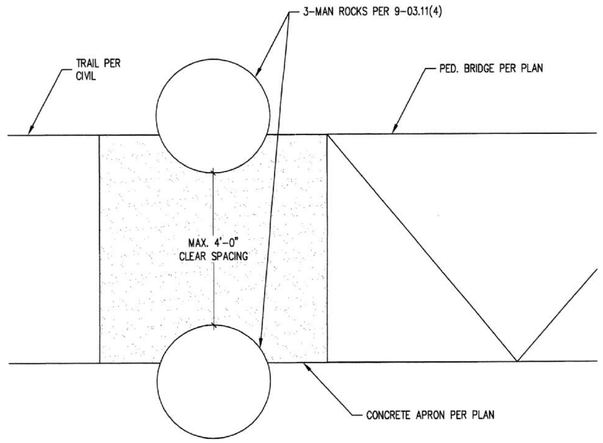
1 / S06 BRIDGE ABUTMENT
SCALE: 3/4" = 1'-0"



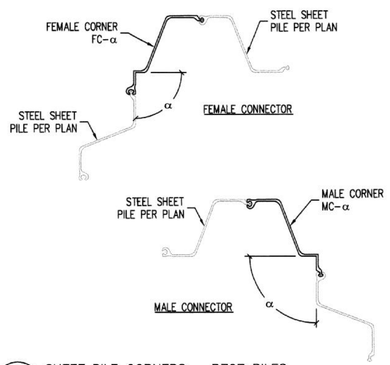
2 / S06 ABUTMENT BEARING PLATES
SCALE: 1" = 1'-0"



3 / S06 ABUTMENT PLAN VIEW
SCALE: 1/2" = 1'-0"

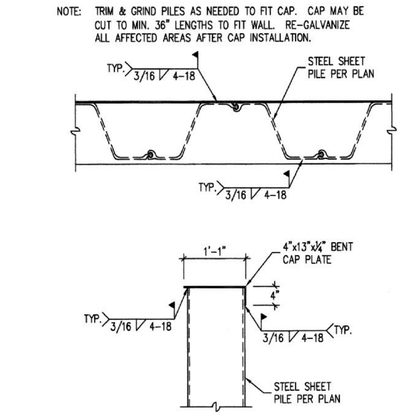


4 / S06 BOLLARD DETAIL
SCALE: 1/2" = 1'-0"

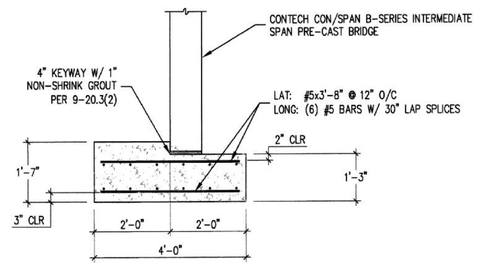


5 / S06 SHEET PILE CORNERS - PZ27 PILES
SCALE: 3/4" = 1'-0"

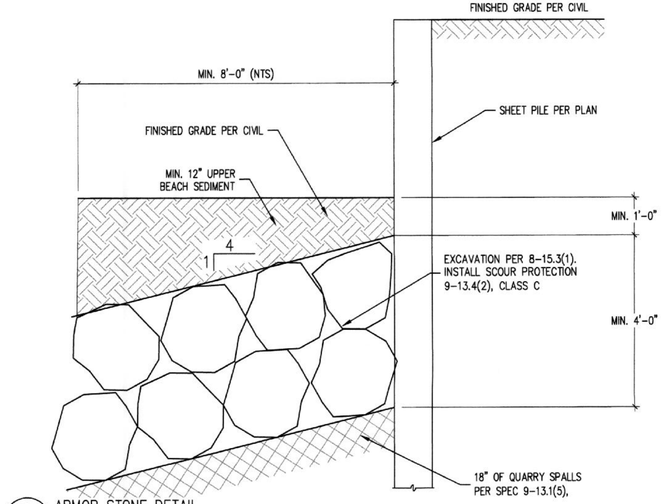
NOTE: TRIM & GRIND PILES AS NEEDED TO FIT CAP. CAP MAY BE CUT TO MIN. 36" LENGTHS TO FIT WALL. RE-GALVANIZE ALL AFFECTED AREAS AFTER CAP INSTALLATION.



6 / S06 SHEET PILE CAPS
SCALE: 3/4" = 1'-0"



7 / S06 FOOTING DETAIL FOR CONTECH BRIDGE
SCALE: 1/2" = 1'-0"



8 / S06 ARMOR STONE DETAIL
SCALE: 1/2" = 1'-0"

811 Call 811 two business days before you dig

RYAN A. LONG — STATE OF WASHINGTON — 38382 — REGISTERED PROFESSIONAL ENGINEER
5-3-2018

JONES ENGINEERS
4164 Meridian Street #304
Bellingham, WA 98226

S06

No	Date	Revision	By
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SHEET PILE & ABUTMENT DETAILS

SHEET 26 OF 26

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