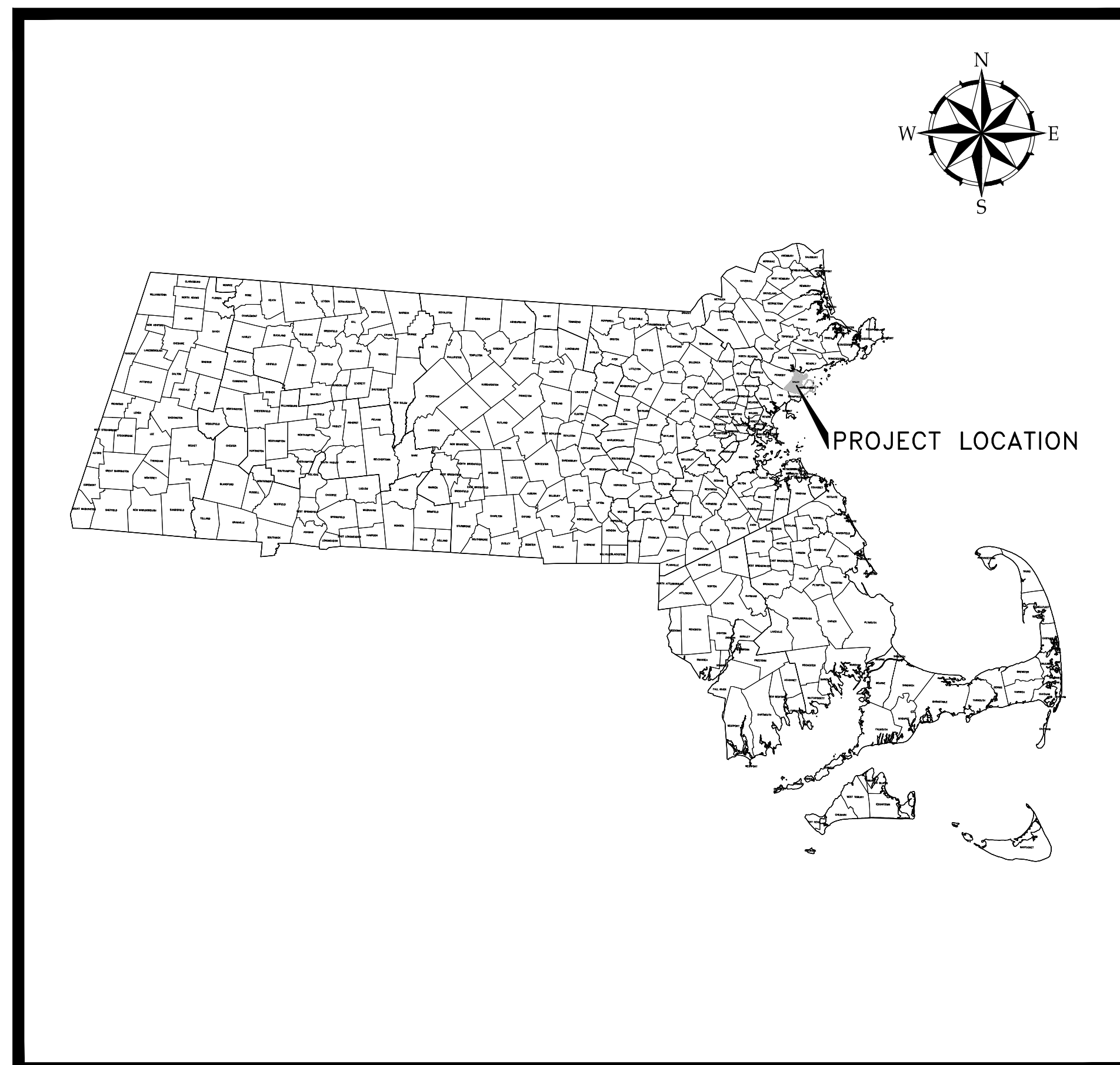


CITY OF SALEM, MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS FOREST RIVER PARK SEAWALL REPAIR PROJECT

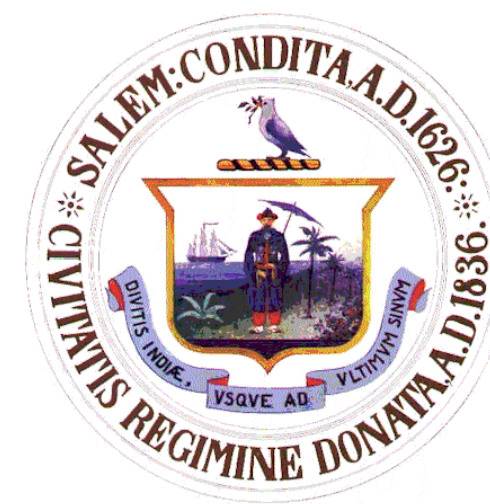
CONTRACT NO. X-XX

Mayor: **KIMBERLEY DRISCOLL**

City Engineer: **DAVID H. KNOWLTON, P.E.**



PROJECT LOCATION MAP

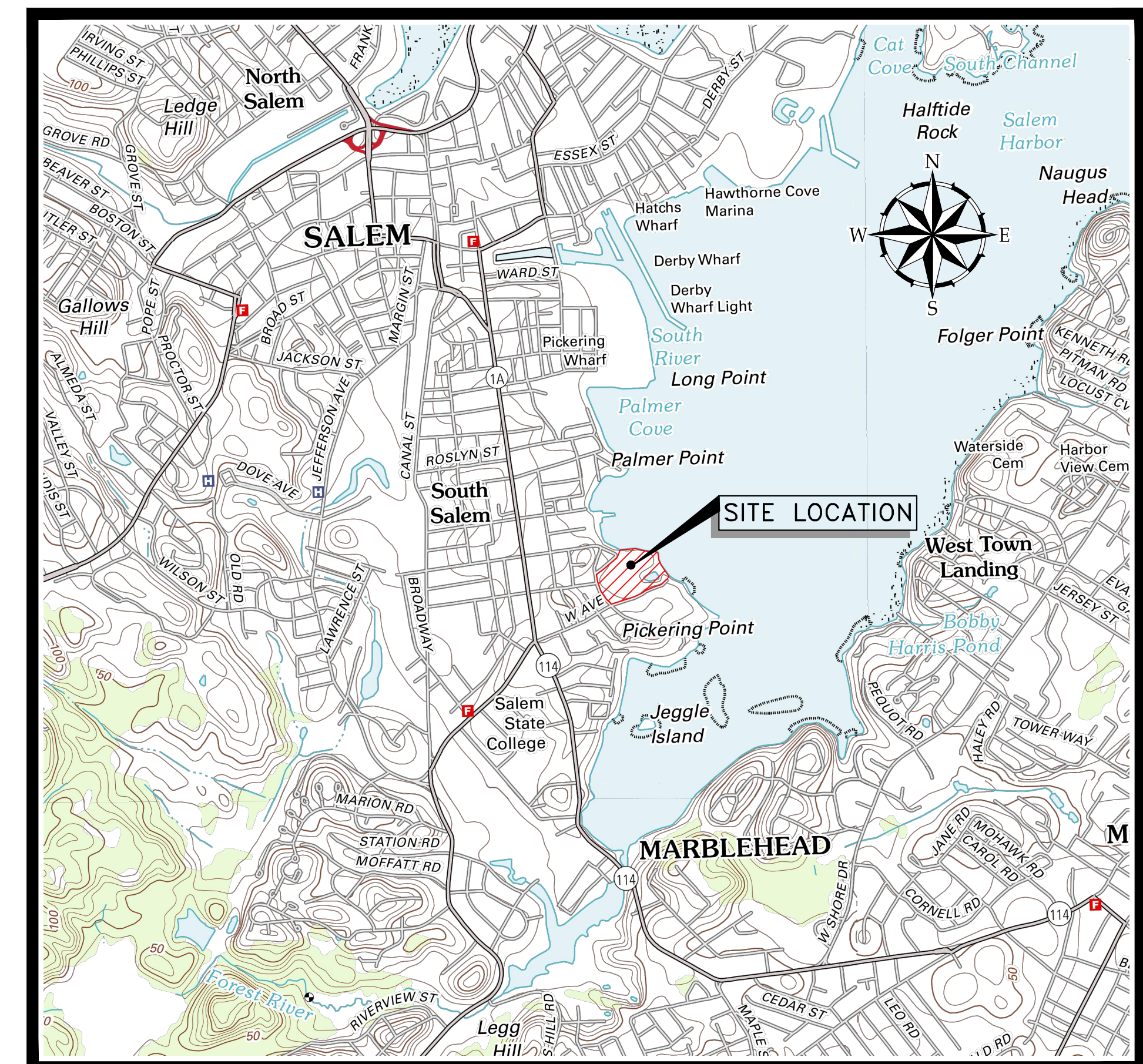


JUNE 30, 2017
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W&C PROJECT NO. 0230529.00



SITE LOCATION MAP

SCALE: 1=1,500'

GENERAL NOTES:

- 1. THESE PLANS WERE PREPARED FROM A COMBINATION OF AERIAL AND ON THE GROUND SURVEYING. AERIAL MAPPING WAS PERFORMED IN MAY 2008, ON THE GROUND SURVEY WAS CONDUCTED BY WSP SELLS BETWEEN OCTOBER 2008, NOV 2015, AND FEB 2017.
2. THE HORIZONTAL DATUM SHOWN HEREON REFERENCES MASSACHUSETTS STATE PLANE COORDINATES (NAD 83).
3. THE VERTICAL DATUM SHOWN HEREON REFERENCES NAVD 1988. BENCHMARK LOCATIONS ARE SHOWN ON PLANS.
4. PROPERTY AND RIGHT OF WAY LOCATIONS SHOWN HEREON ARE APPROXIMATE AND DO NOT REPRESENT A PROPERTY SURVEY.
5. BUILDINGS SHOWN HEREON WERE LOCATED BY MEANS OF AERIAL MAPPING AND SHOULD BE CONSIDERED APPROXIMATE.
6. SOIL BORINGS PERFORMED BY TERRACON CONSULTANTS, INC. WETLANDS DELINEATED BY LEC INC.
7. UTILITY LOCATIONS SHOWN IN THE PLANS AND PROFILES ARE APPROXIMATE BOTH AS TO SIZE AND LOCATION. CONTRACTOR TO INVESTIGATE EXISTING CONDITIONS AND FIELD VERIFY LOCATIONS OF UTILITIES AND SUB-SURFACE STRUCTURES PRIOR TO CONSTRUCTION. CONTACT THE ENGINEER IMMEDIATELY UPON DISCOVERING CONFLICTS WITH THE EXISTING AND PROPOSED UTILITY LOCATIONS. NOT ALL EXISTING UTILITIES ARE SHOWN ON THE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL EXISTING UTILITIES.
8. CONTACT "DIG SAFE", TELEPHONE 888-344-7233, AT LEAST 72 HOURS PRIOR TO CONSTRUCTION. PROTECT, REPAIR DAMAGED UTILITIES.
9. RESTRICT ACCESS TO SITE THROUGH THE USE OF APPROPRIATE SIGNAGE, BARRIERS, FENCES, ETC. IN ACCORDANCE WITH THE GENERAL REQUIREMENTS. SITE SHALL BE LEFT WITH APPROPRIATE SAFETY MEASURES IN PLACE DURING NON-WORKING HOURS. NO TRENCH SHALL BE LEFT OPEN DURING NON-WORKING HOURS. SITE SAFETY IS THE RESPONSIBILITY OF CONTRACTOR. DURING BOTH WORKING AND NON-WORKING HOURS, INCLUDING SNOW REMOVAL WHEN ROAD PLATES USED OR FINAL PAVEMENT HAS NOT BEEN COMPLETED.
10. PROVIDE 4-INCHES OF LOAM AND SEED IN ALL LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATIONS, UNLESS OTHERWISE NOTED ON THE PLANS.
11. CONTRACTOR SHALL REPLACE EXISTING PAVEMENT MARKINGS/STRIPING AS NECESSARY WHERE IMPACTED BY CONSTRUCTION.
12. CONTRACTOR IS RESPONSIBLE FOR PROVIDING MATERIAL STORAGE AND STAGING AREA(S) PER THE GENERAL REQUIREMENTS. ALL MATERIAL TO BE STORED IN THE PRACTICE BASEBALL FIELD.
13. DO NOT IMPEDE ACCESS TO OR STORE EQUIPMENT ON ADJACENT CITY OR PRIVATELY OWNED PROPERTY, UNLESS PERMISSION HAS BEEN GRANTED IN WRITING BY OWNER.
14. WORKERS' PERSONAL VEHICLES MAY NOT BE PARKED WITHIN THE PUBLIC RIGHT OF WAY OR ON PRIVATE OWNERS LOTS, UNLESS PERMISSION HAS BEEN GRANTED IN WRITING BY OWNER.
15. PERFORM WORK WITHIN THE RIGHTS OF WAY OF CITY OF SALEM STREETS IN ACCORDANCE WITH CITY ORDINANCES. PRIOR TO START OF WORK, SUBMIT TRAFFIC CONTROL PLAN PER GENERAL REQUIREMENTS.
16. COORDINATE CONSTRUCTION OF DRAINAGE, SEWER, AND WATER IMPROVEMENTS TO MINIMIZE DISRUPTION OF SERVICE TO RESIDENTS AND BUSINESSES. COORDINATE DISRUPTION OF PRIVATE UTILITY SERVICES WITH AFFECTED RESIDENTS AND BUSINESSES AT LEAST TWO DAYS (48 HOURS) PRIOR TO DISRUPTION. SEE THE GENERAL REQUIREMENTS.
17. PROTECT AND AVOID DISTURBING PROPERTY MARKERS AND BENCHMARKS. PROTECT EXISTING FACILITIES (E.G. CURB STOP BOXES, POLES, LIGHT POSTS, CATCH BASINS, ETC.) AND TREES DURING CONSTRUCTION.
18. OBTAIN REQUIRED PERMITS FOR TEMPORARY AND PERMANENT STOCKPILING OF ANY SURPLUS SOIL AND ROCK AND MEET APPLICABLE SETBACK REQUIREMENTS IN THE CITY ORDINANCES. PROVIDE PROPER STABILIZATION AND EROSION AND SEDIMENT CONTROL MEASURES PER THE GENERAL REQUIREMENTS. ALL MATERIAL TO BE STOCKPILED IN THE UPLAND AREA LOCATED IN THE PRACTICE BASEBALL FIELD.
19. PRIOR TO START OF WORK, DIGITALLY RECORD ON DVD PRE-CONSTRUCTION CONDITIONS IN ACCORDANCE WITH THE GENERAL REQUIREMENTS, INCLUDING SURFACE FEATURES (PAVEMENT, SIDEWALKS, CROSSWALKS, CURBING, PUBLIC PARK, SEAWALL AND RELATED ITEMS). PROVIDE COPIES OF DVD AND WRITTEN LOGS TO THE ENGINEER PRIOR TO COMMENCING WORK.
20. REMOVE AND LEGALLY DISPOSE OF REMOVED AND DEMOLISHED FACILITIES INCLUDING EXISTING PIPE, MANHOLES, HYDRANT ASSEMBLIES, AND CONSTRUCTION DEBRIS.
21. RESTORE AREAS DISTURBED BY CONTRACTOR'S OPERATIONS TO ORIGINAL FINISH OR IN KIND (GRAVEL, PAVEMENT, CURBS, GRASS, ETC.). RESTORE PAVED SURFACES, ROADWAY STRIPING, GRAVEL SURFACES, DRIVEWAYS, AND LAWNS DAMAGED BY CONSTRUCTION ACTIVITIES OUTSIDE OF LIMITS OF WORK INDICATED ON THE DRAWINGS AT NO ADDITIONAL COST TO OWNER.
22. THE LIMITS OF WORK DEPICTED ON THE DRAWINGS REPRESENT THE LIMITS OF SURFACE AND SUBSURFACE DISTURBANCE AND REPLACEMENT OF EXISTING SURFACE FEATURES (SUCH AS PAVEMENTS, AND SEAWALL). NO ADDITIONAL COMPENSATION SHALL BE PROVIDED FOR WORK PERFORMED BEYOND THESE LIMITS. HOWEVER, TEMPORARY USE OF THE PUBLIC RIGHT-OF-WAY OUTSIDE THE LIMIT OF WORK WILL BE ALLOWED FOR LIMITED SPECIFICALLY ALLOWED ACTIVITIES SUCH AS EQUIPMENT AND MATERIAL STORAGE AND CONTRACTOR OPERATIONS IN ACCORDANCE WITH THE PROVISIONS OUTLINED IN DIVISION 1.
23. ALL CONSTRUCTION EQUIPMENT SHALL BE ON THE LANDWARD SIDE OF THE STEEL SHEETING PROPOSED IN C-100. NO CONSTRUCTION EQUIPMENT TO PERFORM FROM SEAWARD SIDE OF THIS STEEL SHEETING.
24. EXISTING SEAWALL DEPTH CALCULATED USING REFERENCE POINTS ALONG WALL. DEPTH WAS APPROXIMATED TO BE SAME ALONG LENGTH OF WALL AND IS NOT EXACT.

SEDIMENTATION & EROSION CONTROL NOTES:

- 1. SOIL AND EROSION CONTROLS SHALL BE PLACED PRIOR TO CONSTRUCTION ACTIVITIES THROUGHOUT THE LIMIT OF WORK OF DISTURBED AREAS. CONTRACTOR TO NOTIFY THE ENGINEER AND THE OWNER AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITIES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING ALL EROSION CONTROL MEASURES NECESSARY TO PREVENT OFF-SITE TRACKING OF EARTH, SEDIMENT AND DEBRIS.
3. EROSION CONTROL MEASURES SHALL BE INSPECTED AT A MINIMUM FREQUENCY OF ONCE EVERY WEEK, AND DURING AND AFTER EVERY RAIN EVENT GREATER THAN 0.5". ANY NECESSARY REPLACEMENT OR REPAIR SHALL BE PERFORMED PROMPTLY BY THE CONTRACTOR.
4. PROVIDE AND MAINTAIN SILT SACK INLET PROTECTION AT ALL CATCH BASINS WITHIN THE PROJECT LIMIT OF WORK AND DOWNSTREAM OF THE LIMIT OF WORK. REMOVE SILT SACKS PRIOR TO LARGE STORM EVENT AND REPLACE SILT SACKS AT END OF STORM EVENT TO PREVENT FLOODING. CONTRACTOR IS RESPONSIBLE FOR REMOVING/REPLACING SILT SACKS DURING BOTH WORK AND NON-WORK HOURS.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING AND MAINTAINING A PROTECTIVE BARRIER AROUND THE SITE PRIOR TO AND DURING CONSTRUCTION.
6. VARIOUS TEMPORARY SOIL EROSION, SEDIMENT AND TURBIDITY CONTROLS AS WELL AS BMPs WILL BE USED AND MAINTAINED DURING CONSTRUCTION FOR STABILIZATION PURPOSES.
7. TEMPORARY STEEL SHEETING IS PROPOSED WITHIN THE COASTAL RESOURCE AREAS AS A MITIGATING MEASURE TO CONFINE THE LIMIT OF WORK AND TO PROTECT THE ADJACENT RESOURCE AREAS DURING SOIL EXCAVATING AND CONCRETE POURING ACTIVITY.
8. THERE WILL BE NO CONSTRUCTION-RELATED, SEDIMENT-PRODUCING ACTIVITY TO CAUSE TURBIDITY IN FLOWING TIDAL WATERS DUE TO THIS SUBSTANTIVE MITIGATING MEASURE.
9. EXCAVATED SOIL WILL BE STOCKPILED ON-SITE AT THE PREVIOUSLY APPROVED UPLAND LOCATION WITHIN FOREST RIVER PARK. SOIL WILL BE TEMPORARILY STOCKPILED AND STABILIZED AS NECESSARY TO PREVENT EROSIONAL POTENTIAL.
10. UPON COMPLETION OF SEAWALL CONSTRUCTION, THE SOIL WILL BE RE-ESTABLISHED WITHIN THE APPROPRIATE COASTAL RESOURCE FROM WHICH IT WAS EXCAVATED (COASTAL BEACH, ROCKY INTERTIDAL SHORE, AND SALT MARSH). FINAL GRASSES WILL BE RESTORED TO APPROXIMATE PRE-CONSTRUCTION ELEVATIONS AND CONTOURS.
11. SALT MARSH RESTORATION SHALL PROCEED IN ACCORDANCE WITH THE DETAIL ON SHEET C-300.
12. WHERE DEWATERING IS NECESSARY DURING EXCAVATIONS AND POURING OPERATIONS, A DEWATERING PLAN SHALL BE SUBMITTED TO THE COMMISSION BY THE CONTRACTOR.
13. THE DEWATERING PLAN SHALL BE DESIGNED TO ENSURE NO CONSTRUCTION-RELATED, SEDIMENT-PRODUCING ACTIVITY TO CAUSE TURBIDITY IN FLOWING TIDAL WATERS DUE TO PROPOSED DEWATERING.

ABBREVIATIONS*

Table listing abbreviations and their corresponding full names, such as AB ANCHOR BOLTS, AGGR AGGREGATE, ALT ALTERNATE, ALUM ALUMINUM, ANSI AMERICAN NATIONAL STANDARDS INSTITUTE, APPROX: ± APPROXIMATELY, BLDG BUILDING, BOF BOTTOM OF FOOTING, BOS BOTTOM OF SILL, BOT BOTTOM, BW BASE OF WALL, etc.

LEGEND

Legend table showing symbols for EXISTING and PROPOSED features. Includes symbols for contours, sanitary sewer, force main, storm drain, underdrain, water main, underground electric, underground telephone, underground television, gas line, overhead electric, abandoned sewer, abandoned water main, property line, right of way, easement, edge of vegetation, fence, centerline, retaining wall, stonewall, curb, edge of pavement, edge of gravel, guardrail, railroad tracks, drainage ditch / swale, storm drain pipe & catch basin, wetland flag w/ corresponding flag no., 50 ft. wetland buffer, 100 ft. wetland/coastal bank buffer, green engineering flood plain, coir logs (temp. erosion control), cofferdam (temp. erosion control), steel sheeting (temp. erosion control), limit of work, abandon in place, remove and dispose (R&D), remove and dispose pavement, culvert, house service / lateral, sanitary sewer manhole, drainage manhole, telephone manhole, catch basin, property monument, spot elevation, gate valve box, gate valve, mail box, light pole, utility pole, hydrant, reducer, coupling, water shut off, street and miscellaneous signs, telephone stand box, deciduous tree/shrub, coniferous tree/shrub, test pit, ledge probe/boring.

SHEET INDEX table listing sheet numbers and titles, such as G-000 COVER, G-001 GENERAL NOTES, ABBREVIATIONS, LEGEND, & SHEET INDEX, CIVIL, EX-100 EXISTING CONDITIONS PLAN, C-100 SITE PREPARATION PLAN, C-200 LAYOUT & GRADING PLAN, C-201 SEAWALL PLAN AND PROFILE, C-300 CIVIL DETAILS 1, C-301 CIVIL SECTION DETAILS, STRUCTURAL, S-100 ACCESS RAMP STRUCTURAL PLAN, S-101 SEAWALL ELEVATIONS, S-102 ACCESS RAMP SECTIONS & DETAILS.

*THESE ARE GENERAL ABBREVIATIONS. NOT ALL APPEAR ON THESE DRAWINGS.

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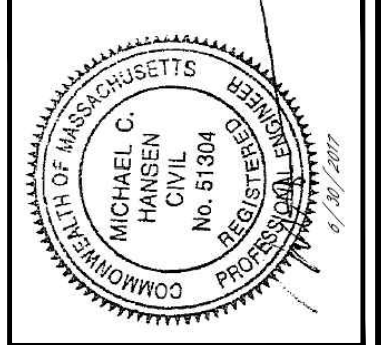


Table with columns for REV, DESCRIPTION, DATE, and CHECKED BY. Includes entries for updated sheet index and legend.

GENERAL NOTES, ABBREVIATIONS, LEGEND, & SHEET INDEX

CITY OF SALEM, MASSACHUSETTS, 93 WASHINGTON STREET, SALEM, MA 01970. FOREST RIVER PARK SEAWALL.

JOB NO.: 0230529.00, DATE: JUNE 30, 2017, SCALE: AS NOTED, SHEET: 2 OF 11.

G-001

100% DESIGN SUBMITTAL

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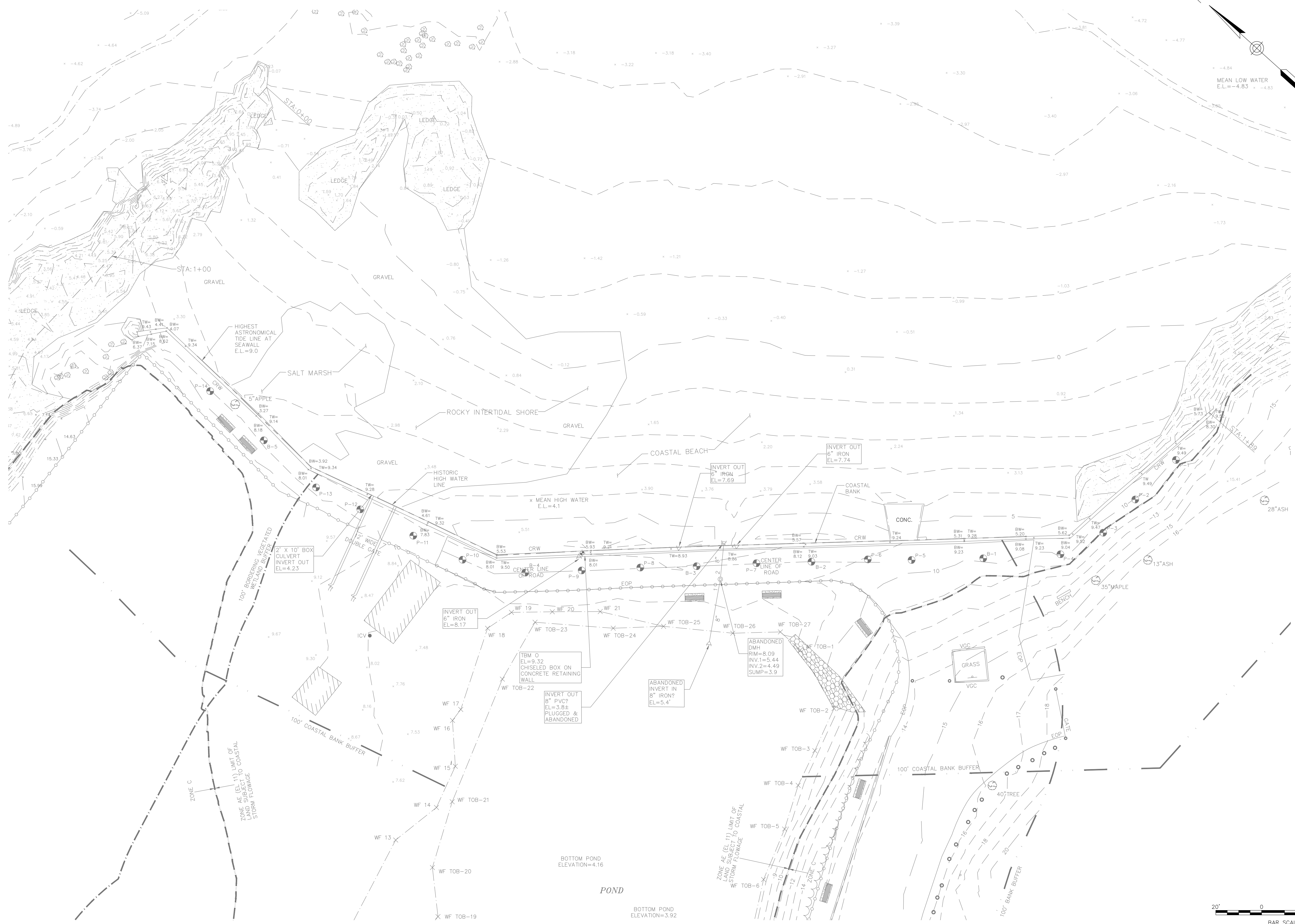
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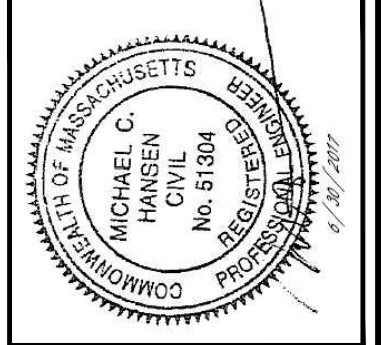
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DRAWN BY: MJE

EXISTING CONDITIONS PLAN

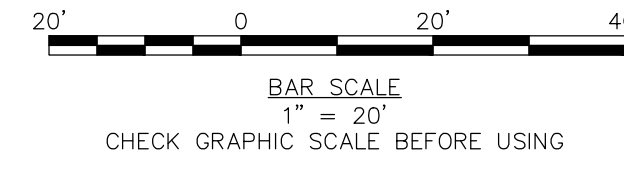
CITY OF SALEM, MASSACHUSETTS
93 WASHINGTON STREET
SALEM, MA 01970

FOREST RIVER PARK SEAWALL

JOB NO.: 0230529.00
DATE: JUNE 30, 2017
SCALE: 1" = 20'
SHEET: 3 OF 11

EX-100

\\woodardcurran.net\shared\Projects\0230529.00 Salem MA Forest River Park Seawall Report.wpd\Drawings\Civil\0230529.00-EX-100.dwg, Feb. 27, 2018 - 1:10pm



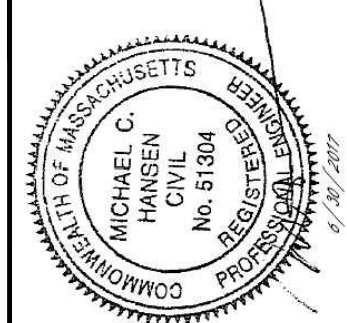
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REV	DESCRIPTION	DATE
1	REVISED COFFERDAM LINE TYPE	06/30/17
2	REVISED COFFERDAM LINE TYPE	06/22/17

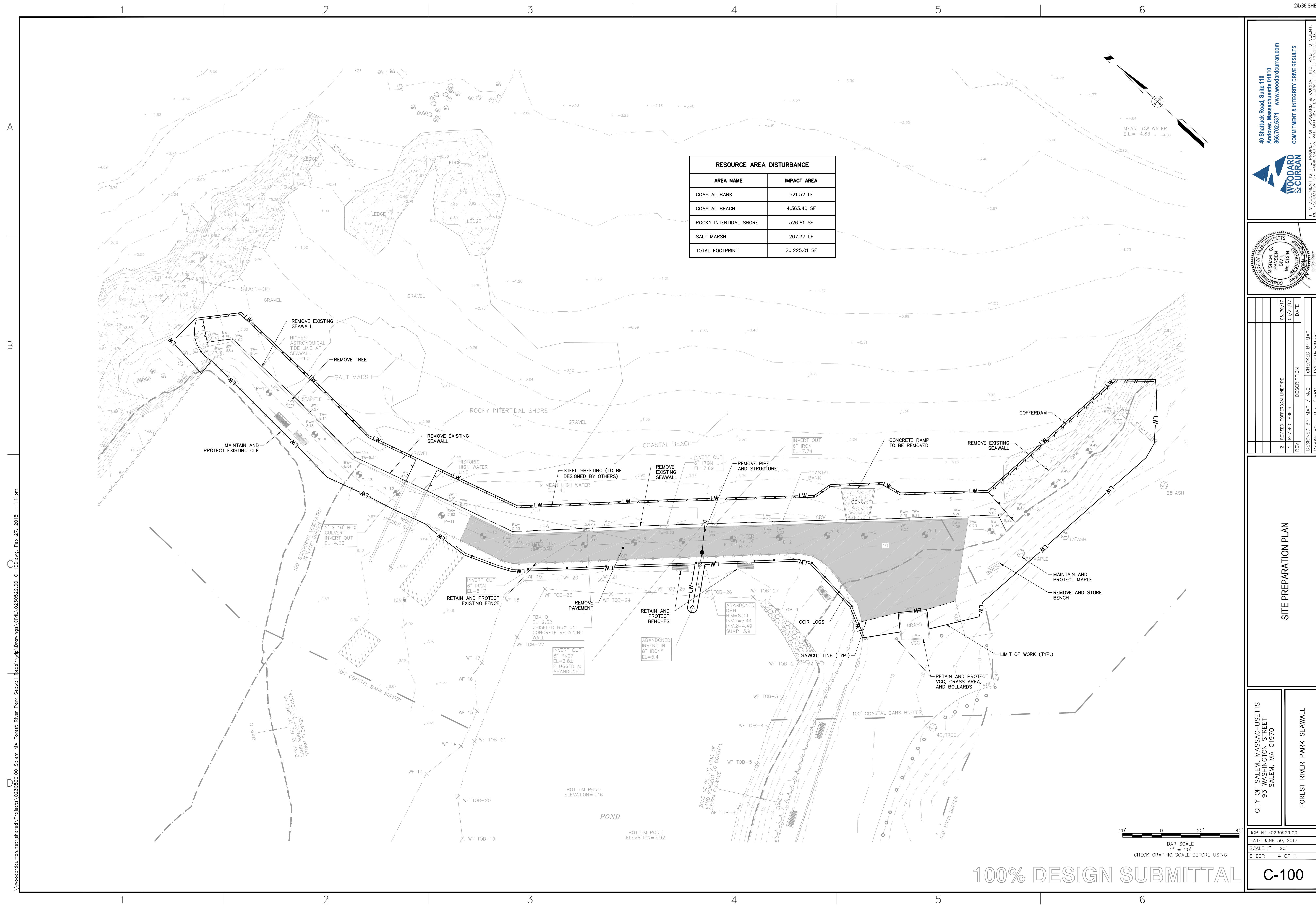
SITE PREPARATION PLAN

CITY OF SALEM, MASSACHUSETTS
93 WASHINGTON STREET
SALEM, MA 01970

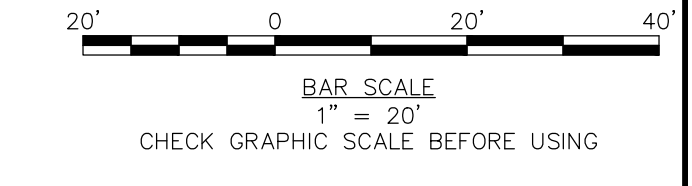
FOREST RIVER PARK SEAWALL

JOB NO.: 0230529.00
DATE: JUNE 30, 2017
SCALE: 1" = 20'
SHEET: 4 OF 11

C-100



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A

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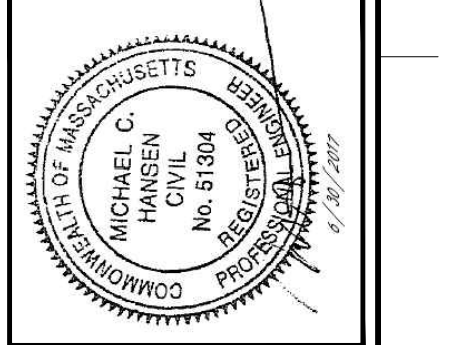
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REV	DESCRIPTION	DATE
3	ADDED POTENTIAL DEWATERING LOCATIONS	07/19/17

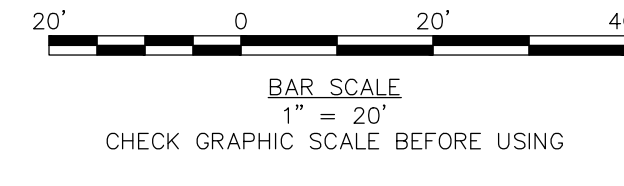
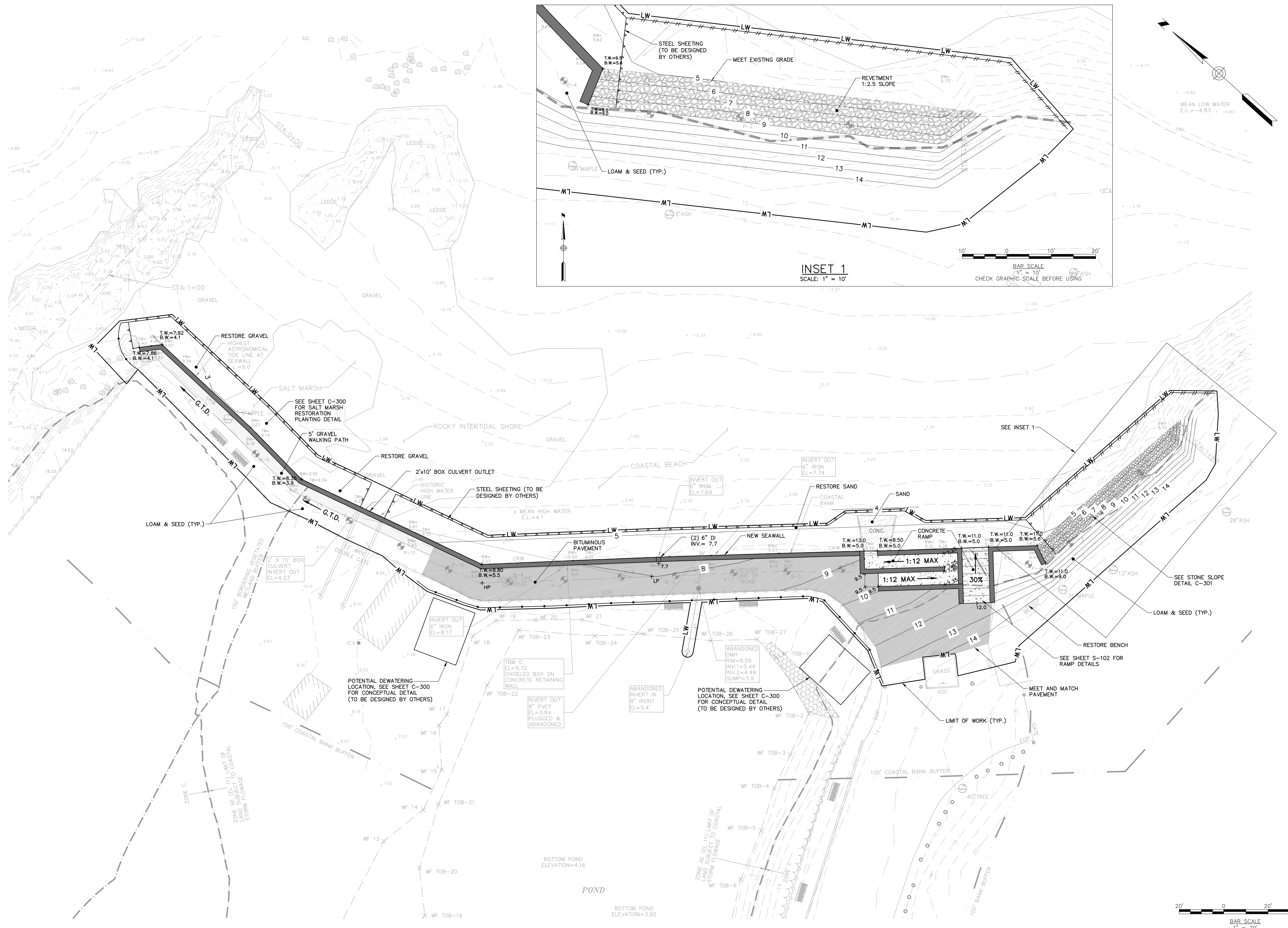
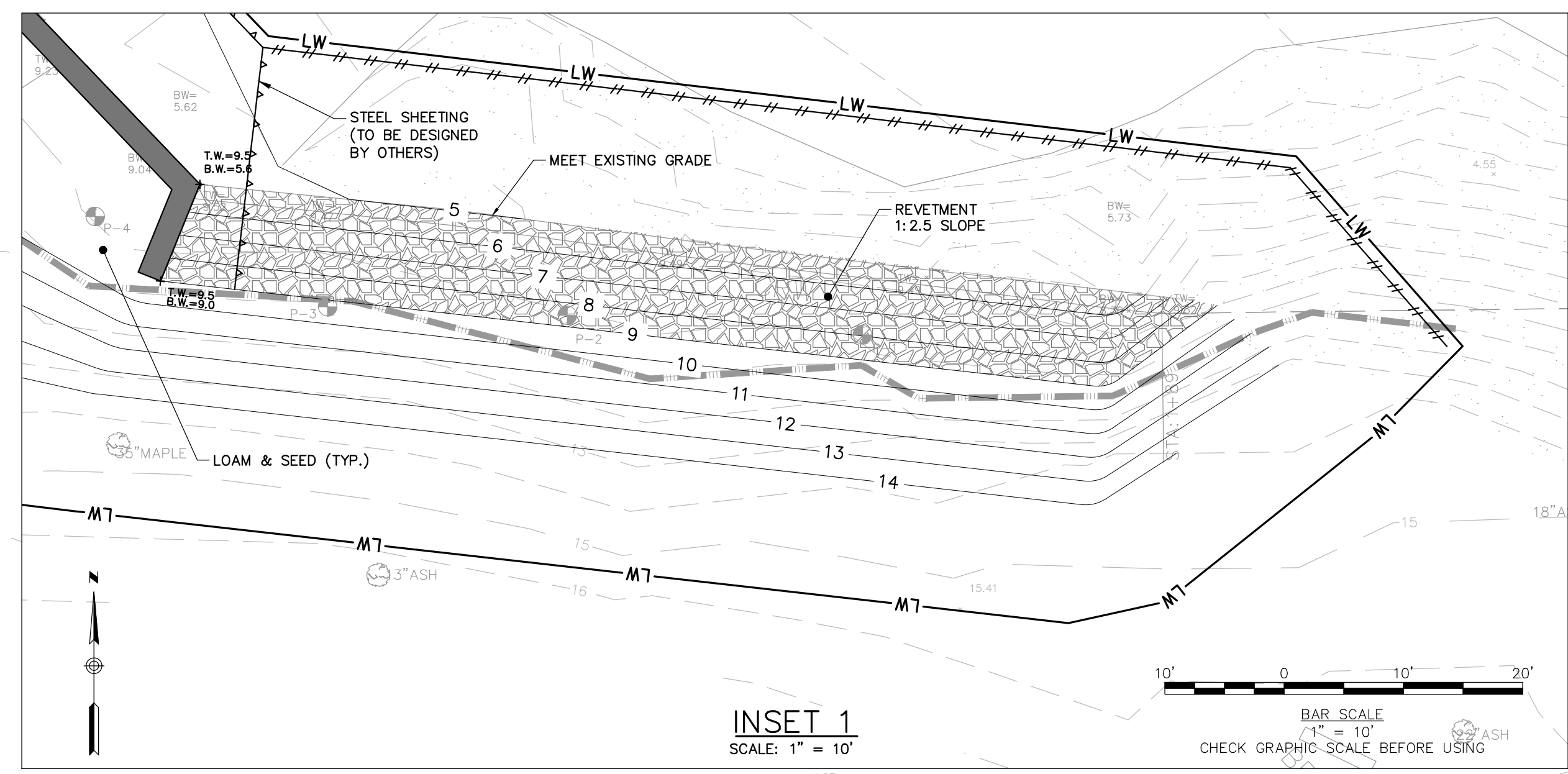
DESIGNED BY: MAP / MJE / MFM
CHECKED BY: MAP
DRAWN BY: MJE / MFM

LAYOUT & GRADING PLAN

CITY OF SALEM, MASSACHUSETTS
93 WASHINGTON STREET
SALEM, MA 01970

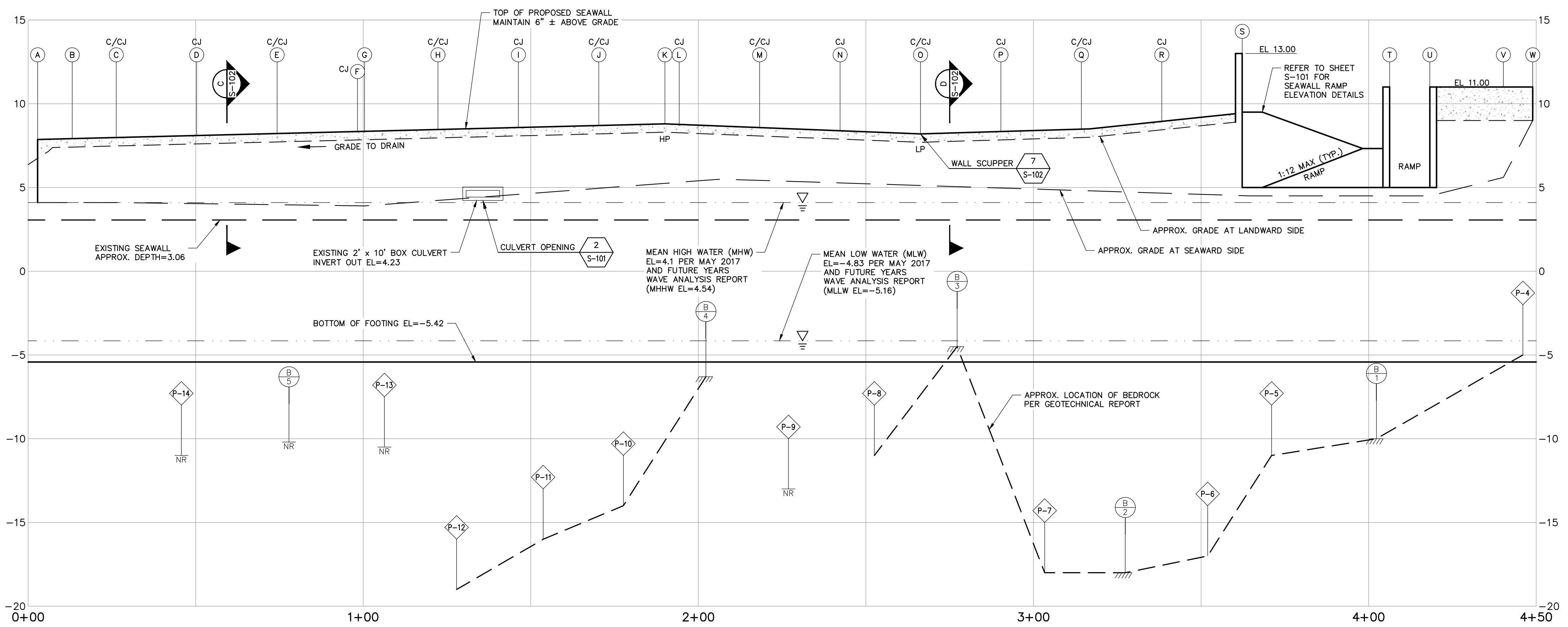
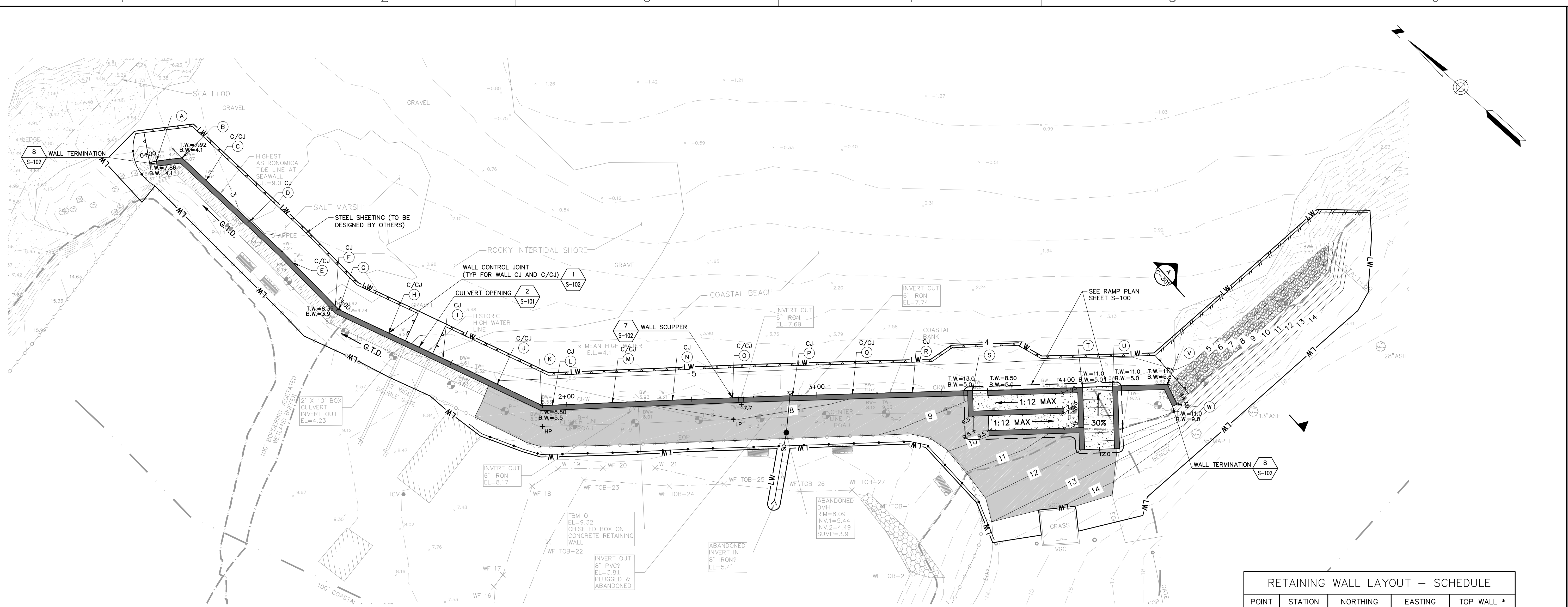
FOREST RIVER PARK SEAWALL

JOB NO.: 0230529.00
DATE: JUNE 30, 2017
SCALE: 1" = 20'
SHEET: 5 OF 11
C-200



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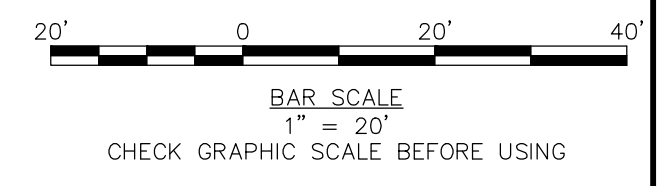
\\woodardcurran.net\shared\Projects\0230529.00 Salem MA Forest River Park Seawall_Sewall_Report.dwg, Feb 27, 2018 - 11:13pm



RETAINING WALL LAYOUT - SCHEDULE

POINT	STATION	NORTHING	EASTING	TOP WALL *
A	0+02.83	3010845.63	822033.31	7.86
B	0+13.17	3010838.86	822041.12	7.92
C	0+26.28	3010825.75	822040.88	7.98
D	0+50.28	3010801.75	822040.43	8.10
E	0+74.28	3010777.77	822039.70	8.22
F	0+98.28	3010753.81	822038.18	8.34
G	1+00.38	3010751.72	822038.05	8.35
H	1+22.28	3010730.76	822044.41	8.46
I	1+46.28	3010707.78	822051.33	8.58
J	1+70.28	3010684.79	822058.22	8.70
K	1+90.02	3010665.88	822063.88	8.80
L	1+94.28	3010662.79	822066.77	8.77
M	2+18.28	3010645.64	822083.57	8.58
N	2+42.28	3010628.48	822100.35	8.39
O	2+66.28	3010611.30	822117.11	8.20
P	2+90.28	3010594.02	822133.76	8.34
Q	3+14.28	3010576.68	822150.35	8.48
R	3+38.28	3010559.31	822166.92	8.95
S	3+62.28	3010541.94	822183.47	13.00
T	4+06.28	3010510.05	822213.79	11.00
U	4+18.28	3010501.53	822222.23	11.00
V	4+40.22	3010485.67	822237.40	11.00
W	4+48.98	3010477.55	822234.10	11.00

NOTES:
 * TOP OF WALL SHALL BE SET AS REQUIRED TO MAINTAIN A 6" REVEAL ABOVE WALKING TRAIL FINISH GRADE. CONTRACTOR SHALL FIELD VERIFY ELEVATIONS SUCH THAT THIS 6" REVEAL IS CONTINUOUSLY MAINTAINED.
 STATIONING BASED ON SEAWARD FACE OF PROPOSED WALL.
 REFER TO GEOTECHNICAL REPORT FOR BORING AND PROBE INFORMATION.
 # WALL LAYOUT REFERENCE POINT, SEE RETAINING WALL LAYOUT SCHEDULE THIS SHEET (TYP.)
 B TEST BORING HOLE
 P-# TEST PROBE HOLE



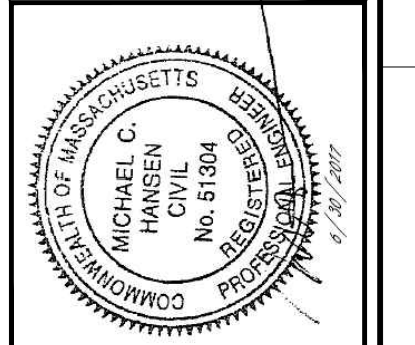
PROPOSED SEAWALL 0+00 TO STA. 4+50
 HORIZONTAL SCALE: 1" = 20'
 VERTICAL SCALE: 1" = 4'

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REV	DESCRIPTION	DATE	CHECKED BY	DATE
2	REVISED SCHEDULE, PLAN AND PROFILE	06/30/17	MJE/MFM	

DESIGNED BY: MAP / MJE
 DRAWN BY: MJE/MFM

SEAWALL PLAN AND PROFILE

CITY OF SALEM, MASSACHUSETTS
 93 WASHINGTON STREET
 SALEM, MA 01970

FOREST RIVER PARK SEAWALL

JOB NO.: 0230529.00
 DATE: JUNE 30, 2017
 SCALE: AS NOTED
 SHEET: 6 OF 11

C-201

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A

B

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D

A

B

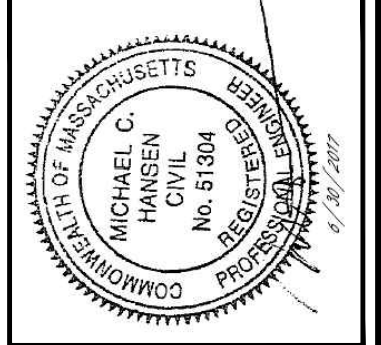
C

D

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REV	DESCRIPTION	DATE	CHECKED BY: MAF	DATE
3	ADDED CONCEPTUAL DEWATERING DETAIL	07/19/17		
2	REVISED COFFERDAM NOTE	06/20/17		
1	ADDED COFFERDAM DETAIL	06/22/17		

DESIGNED BY: MAF / MJE
DRAWN BY: MJE

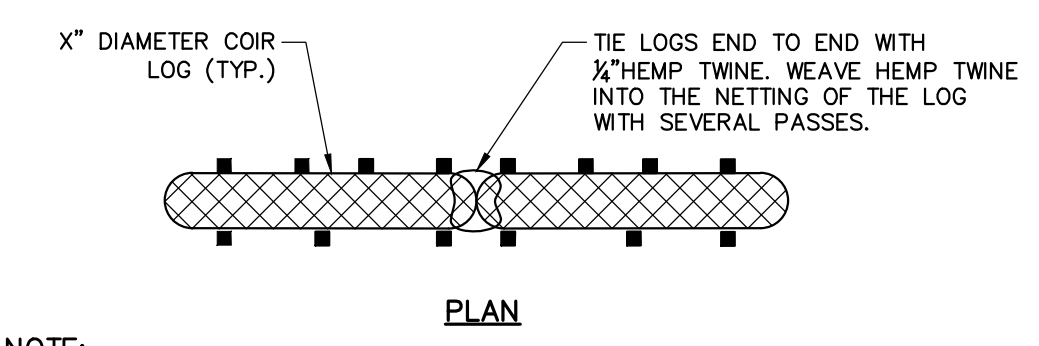
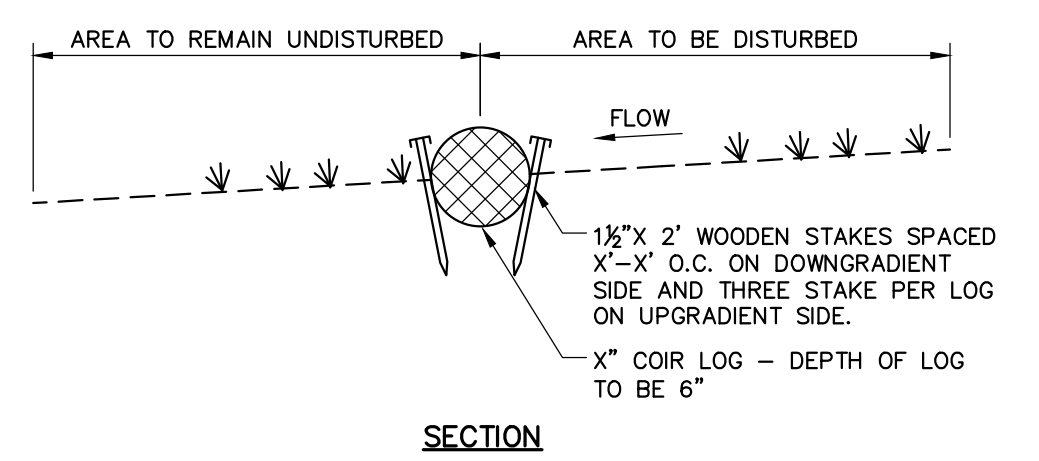
CIVIL DETAILS 1

CITY OF SALEM, MASSACHUSETTS
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SALEM, MA 01970

FOREST RIVER PARK SEAWALL

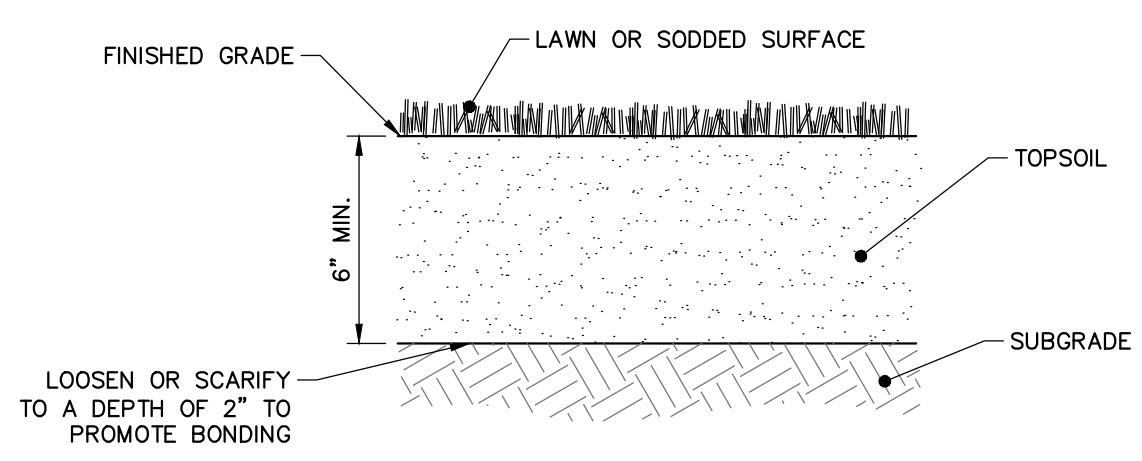
JOB NO.: 0230529.00
DATE: JUNE 30, 2017
SCALE: AS NOTED
SHEET: 7 OF 11

C-300



NOTE:
1. COIR LOG SIZE, STAKE SPACING AND STAKE DEPTH TO BE DETERMINED BY STATE EROSION AND SEDIMENT CONTROL MANUAL AND MANUFACTURER'S REQUIREMENTS.

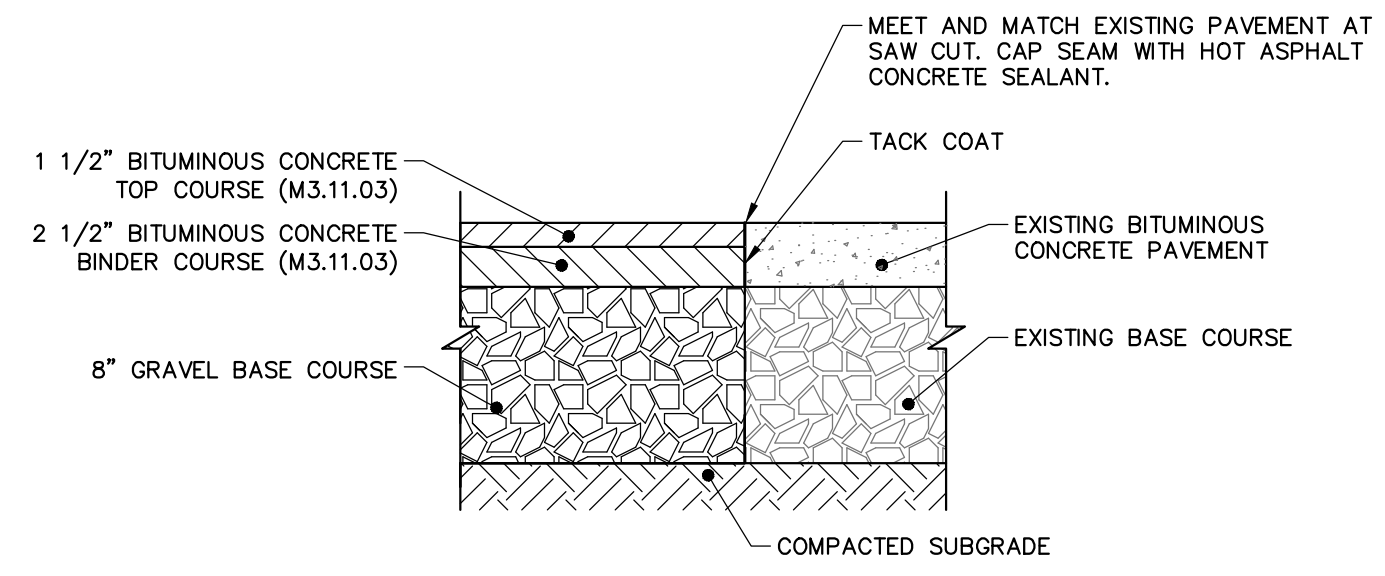
COIR LOG
NOT TO SCALE



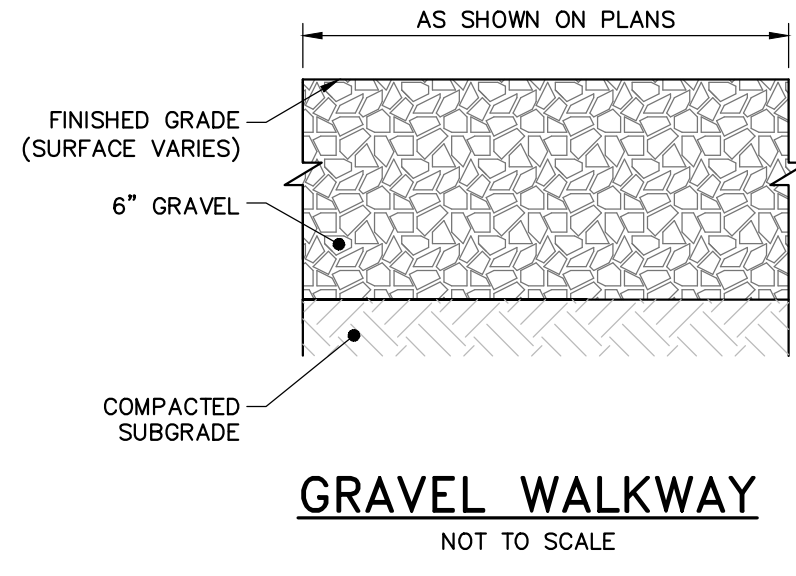
- NOTES:**
- TOPSOIL SHALL BE FERTILE, FRIABLE SOIL, TYPICAL OF PRODUCT SOILS IN THE SURROUNDING AREA AND SHALL CONTAIN BETWEEN 5% AND 20% ORGANIC MATTER.
 - TOPSOIL SHALL HAVE A MAXIMUM STONE SIZE OF 1" AND SHALL CONFORM TO THE FOLLOWING GRADATION:

SIEVE	% PASSING
1"	100
NO. 4	85-100
NO. 40	60-85
NO. 100	38-60
NO. 200	28-40
 - TOPSOIL SHALL NOT BE DISTRIBUTED OVER PARTLY OR FULLY FROZEN, MUDDY, SNOWY, ICY OR EXCESSIVELY WET SURFACES.
 - OVERLY COMPACTED SOILS SHALL BE DECOMPACTED TO A MINIMUM DEPTH OF 12".
 - SOD AND SEED MIXTURE(S) SHALL BE APPROPRIATE FOR GROWING SEASON, CLIMATE AND SOIL CONDITIONS, AND SURFACE USAGE. REFER TO STATE GUIDELINES.
 - SEED SHALL BE APPLIED AT RATES RECOMMENDED BY STATE GUIDELINES.
 - APPLY MULCH OVER SEEDED AREAS IN ACCORDANCE WITH STATE GUIDELINES.
 - SODDING SHALL BE INSTALLED IN ACCORDANCE WITH SUPPLIER'S GUIDELINES. AT A MINIMUM, LAY SOD IN STAGGERED ROWS OVER DAMPENED AND LOOSENED/SCARIFIED TOPSOIL. PLACE STRIPS PERPENDICULAR TO THE DIRECTION OF FLOW, ON SLOPES, ANCHOR SOD TO HOLD IN PLACE UNTIL SECURED BY PLANT GROWTH.

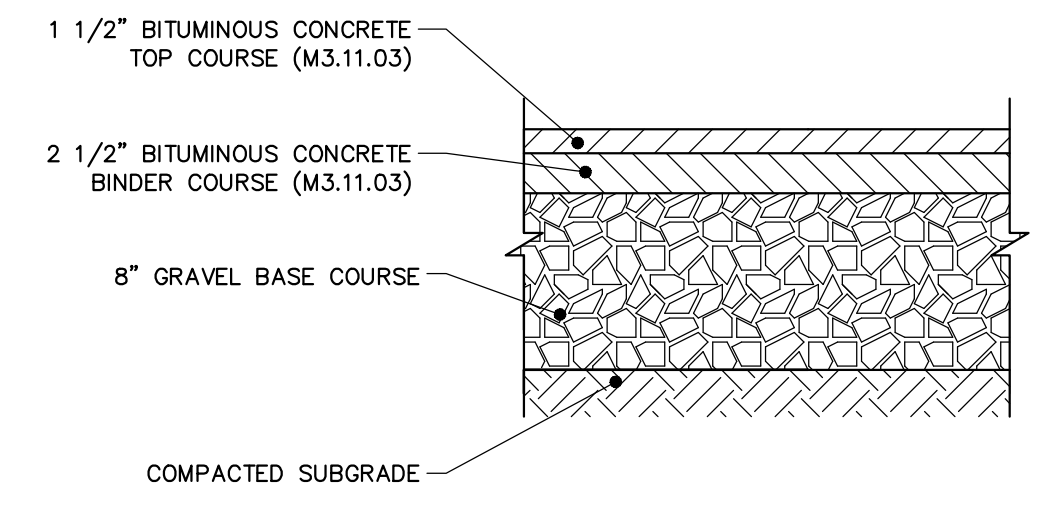
PERMANENT VEGETATIVE SOIL
NOT TO SCALE



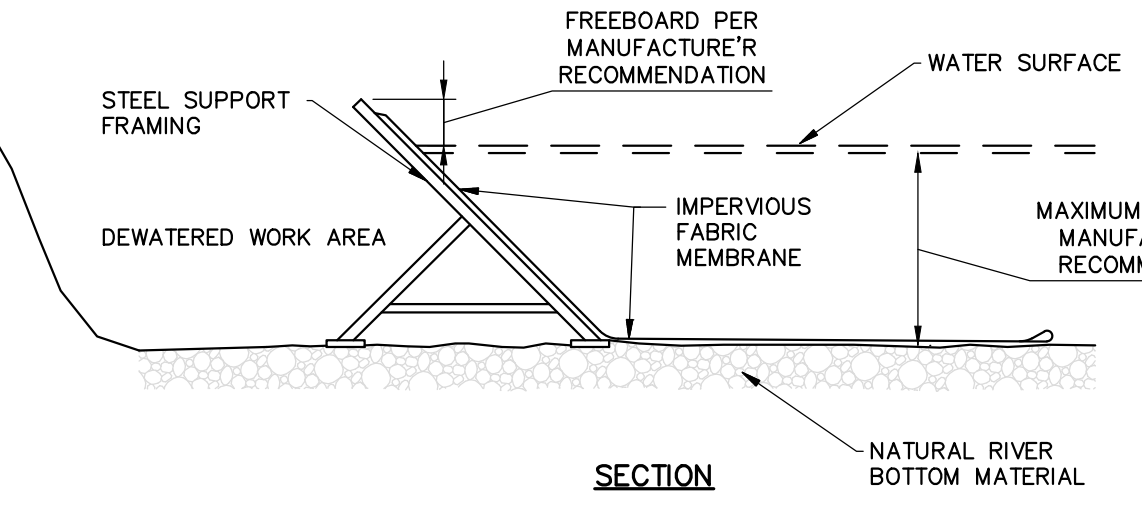
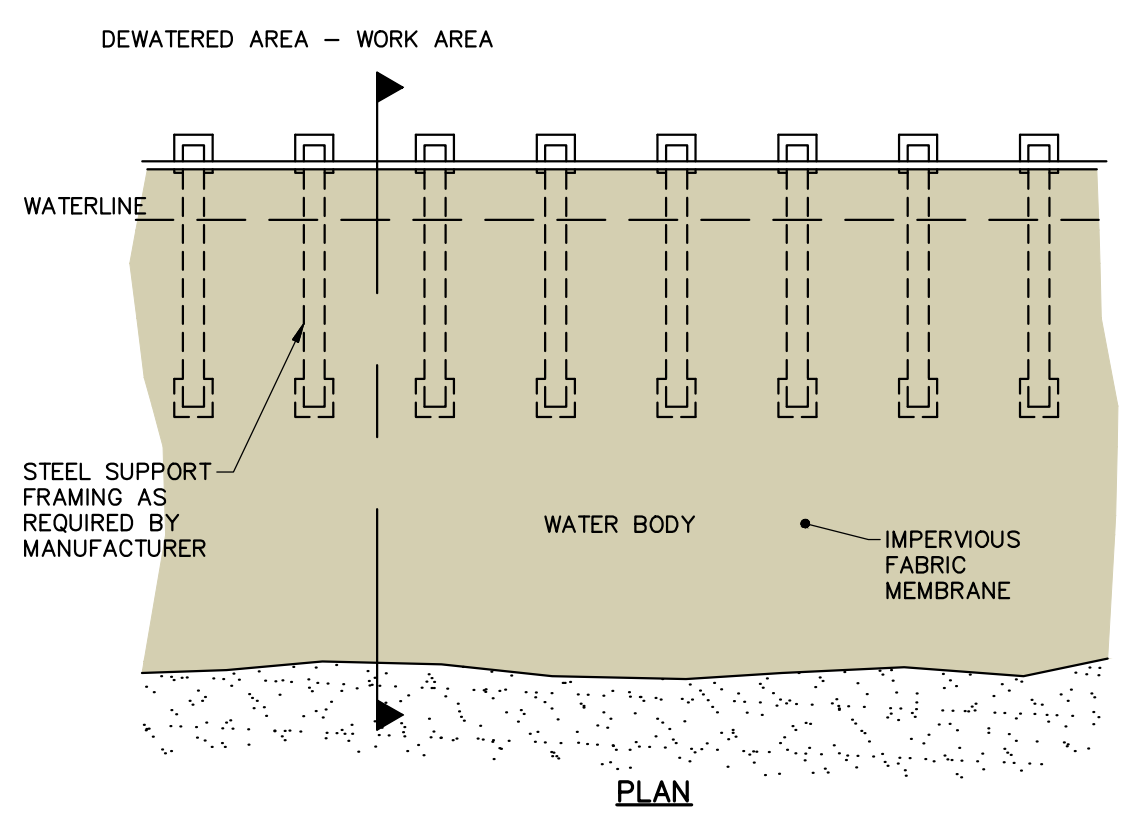
PAVEMENT REPLACEMENT AT SAWCUT LINE
NOT TO SCALE



GRAVEL WALKWAY
NOT TO SCALE

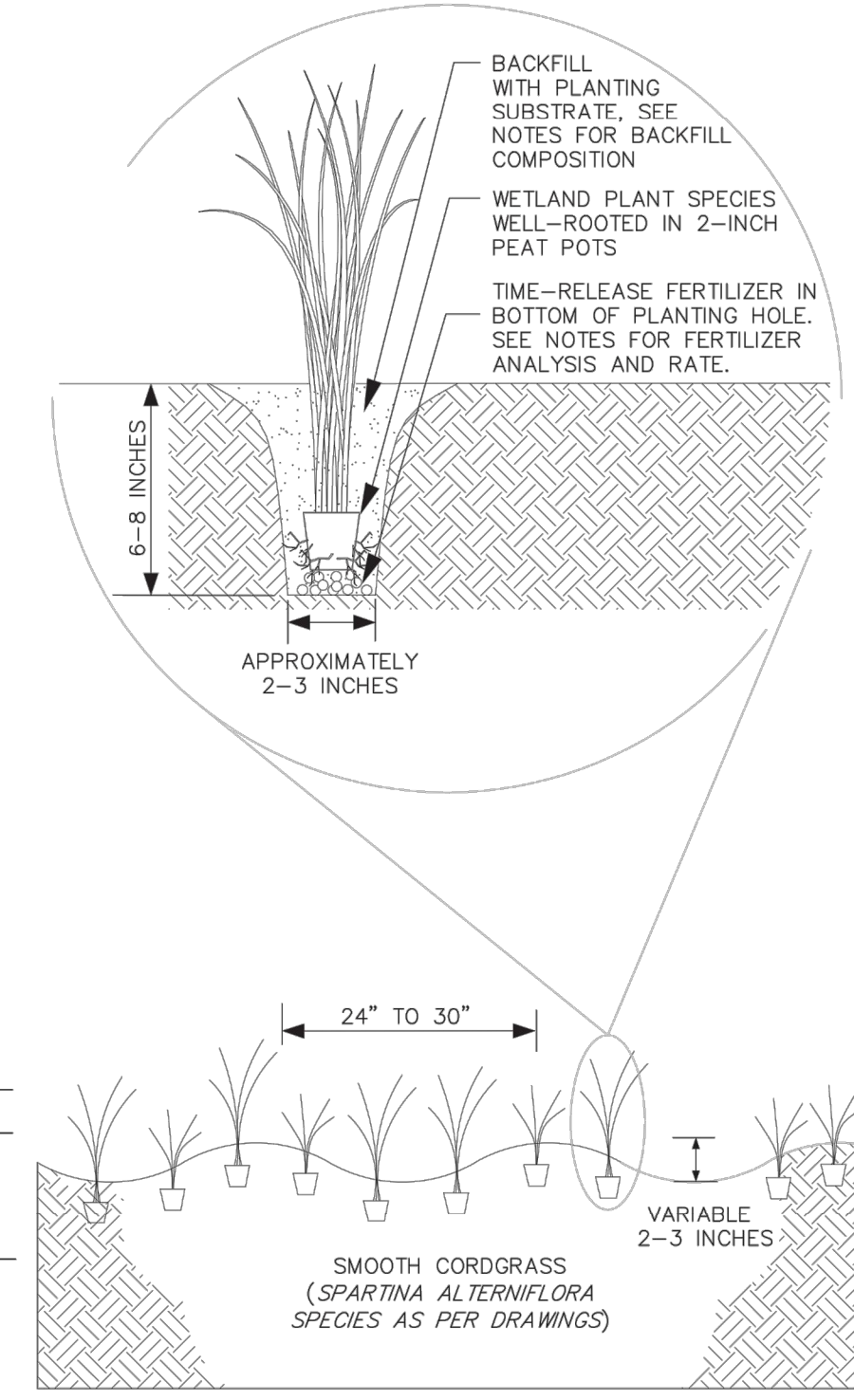


BITUMINOUS CONCRETE PAVEMENT SECTION
NOT TO SCALE



NOTE:
COFFERDAM DETAIL SHOWN FOR REFERENCE PURPOSES. CONTRACTOR SHALL PROVIDE DESIGN OF TEMPORARY COFFERDAMS, STAMPED BY A LICENSED PROFESSIONAL ENGINEER IN THE COMMONWEALTH OF MASSACHUSETTS.

TEMPORARY FRAME & FABRIC COFFERDAM DETAIL
NOT TO SCALE
TO BE INSTALLED AROUND WORK AREA IN ACCORDANCE WITH CONTRACTOR'S WORK PLAN

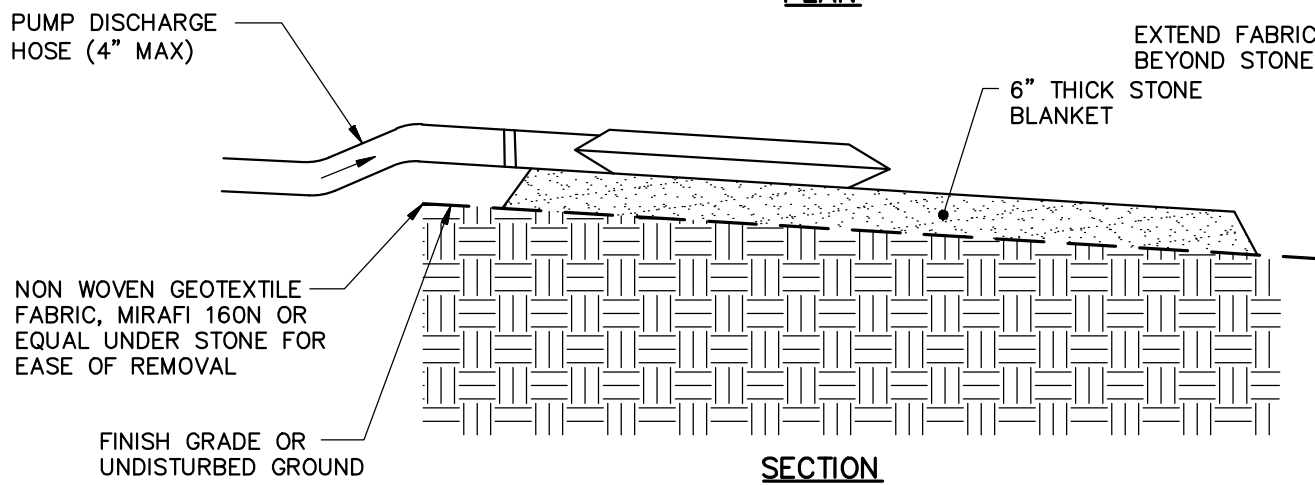
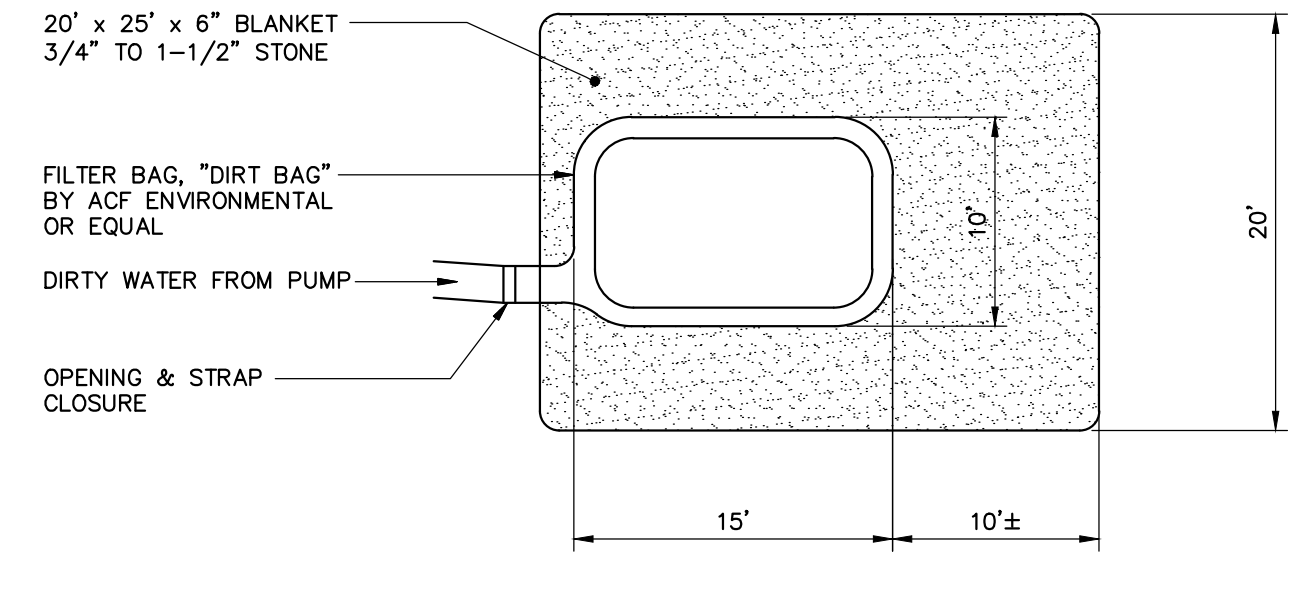


TRANSVERSE VIEW

SALT MARSH PLANTING
NOT TO SCALE

NOTE: GROUND COVER THROUGHOUT SALT MARSH ENHANCEMENT AREA SHALL BE PLANTED WITH SMOOTH CORDGRASS WITH 2" PEAT POTS PLANTED 12" ON CENTER.

- NOTES:**
- LOCATE DISCHARGE SITE ON FLAT UPLAND AREAS AS FAR AWAY AS POSSIBLE FROM STREAMS, WETLANDS, OTHER RESOURCES AND POINTS OF CONCENTRATED FLOW.
 - DISCHARGE NOT PERMITTED WITHIN 200' OF A STREAM OR 100' OF A WETLAND.
 - DOWNGRADIENT RECEIVING AREA MUST BE WELL VEGETATED OR OTHERWISE STABLE FROM EROSION, I.E. FOREST FLOOR OR COARSE GRAVEL/STONE.
 - NEVER DISCHARGE TO AREAS THAT ARE BARE OR NEWLY VEGETATED.
 - DIRT BAG MATERIAL BASED ON PARTICLE SIZE IN DIRTY WATER, I.E., FOR COARSE PARTICLES A WOVEN MATERIAL; FOR SILTS/CLAYS A NON-WOVEN MATERIAL.
 - DO NOT OVER PRESSURIZE DIRT BAG OR USE BEYOND CAPACITY.
 - CHANNELS DUG FOR DISCHARGING WATER FROM THE EXCAVATED AREA NEED TO BE STABLE. IF FLOW VELOCITIES CAUSE EROSION WITHIN THE CHANNEL, THEN A DITCH LINING SHOULD BE USED.
 - BUCKETED WATER SHOULD BE DISCHARGED IN A STABLE MANNER TO THE SEDIMENT REMOVAL AREA. A SPLASH PAD OF RIPRAP UNDERLAIN WITH GEOTEXTILE MAY BE NECESSARY TO PREVENT SCOURING OF SOIL.
 - DEWATERING IN PERIODS OF INTENSE, HEAVY RAIN, WHEN THE INFILTRATIVE CAPACITY OF THE SOIL IS EXCEEDED, SHOULD BE AVOIDED.
 - INSTALL DIVERSION DITCHES OR BERMS TO MINIMIZE THE AMOUNT OF CLEAN STORMWATER RUNOFF ALLOWED INTO THE EXCAVATED AREA.
 - DURING THE ACTIVE DEWATERING PROCESS, INSPECTION OF THE DEWATERING FACILITY SHOULD BE REVIEWED FREQUENTLY. SPECIAL ATTENTION SHOULD BE PAID TO THE BUFFER AREA FOR ANY SIGN OF EROSION AND CONCENTRATION OF FLOW THAT MAY COMPROMISE THE BUFFER AREA. OBSERVE WHERE POSSIBLE THE VISUAL QUALITY OF THE EFFLUENT AND DETERMINE IF ADDITIONAL TREATMENT CAN BE PROVIDED.
 - EROSION CONTROL REQUIRED AROUND DEWATERING DISCHARGE SEDIMENT CONTROL DEVICE.



DEWATERING DISCHARGE SEDIMENT CONTROL DEVICE*
***CONCEPTUAL DETAIL**
NOT TO SCALE
TO BE INSTALLED AROUND WORK AREA IN ACCORDANCE WITH CONTRACTOR'S DEWATERING PLAN

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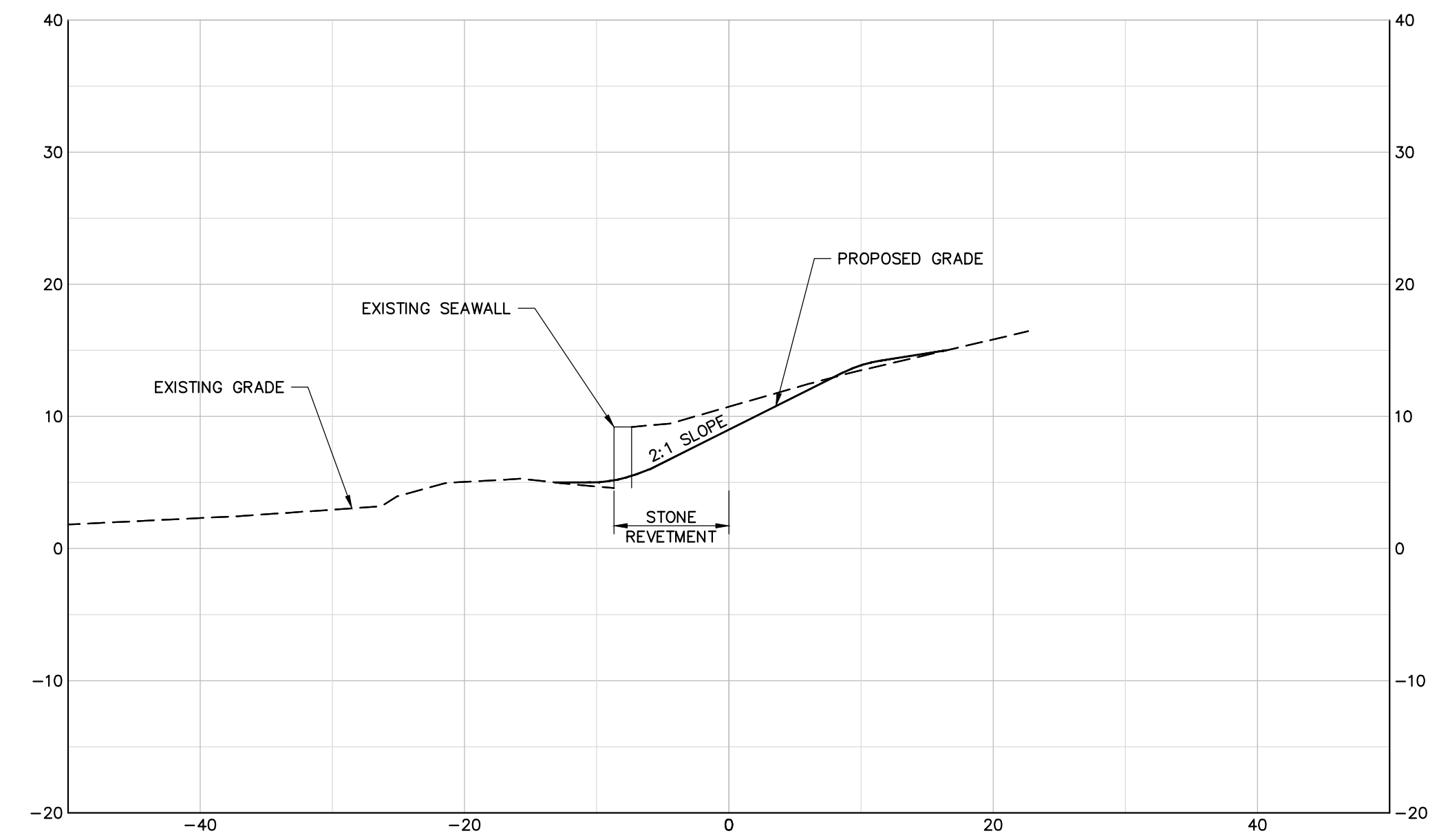
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B

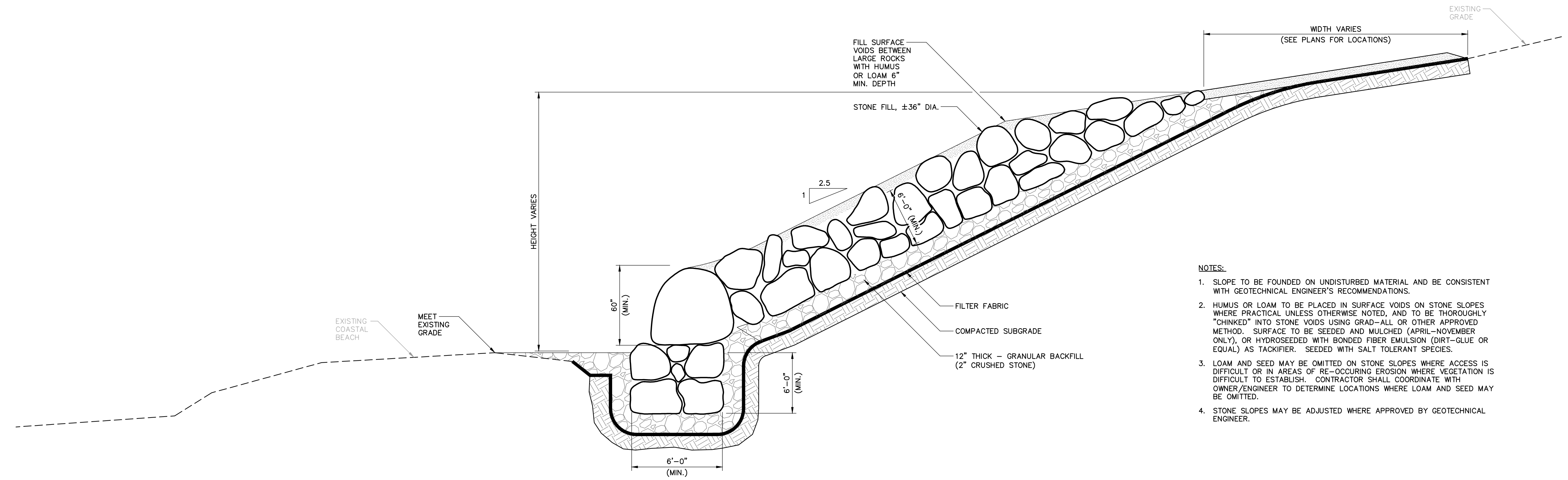
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\\woodardcurran.net\shared\Projects\0230529.00 Salem MA Forest River Park Seawall_Beach.dwg, Feb 27, 2018, 1:15pm



SECTION A
SCALE: 1"=10'



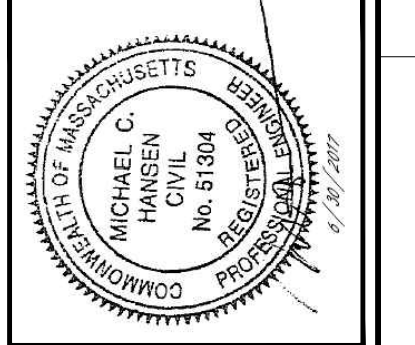
STONE SLOPE
NOT TO SCALE

- NOTES:**
1. SLOPE TO BE FOUNDED ON UNDISTURBED MATERIAL AND BE CONSISTENT WITH GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
 2. HUMUS OR LOAM TO BE PLACED IN SURFACE VOIDS ON STONE SLOPES WHERE PRACTICAL UNLESS OTHERWISE NOTED, AND TO BE THOROUGHLY "CHINKED" INTO STONE VOIDS USING GRAD-ALL OR OTHER APPROVED METHOD. SURFACE TO BE SEEDED AND MULCHED (APRIL-NOVEMBER ONLY), OR HYDROSEEDED WITH BONDED FIBER EMULSION (DIRT-GLUE OR EQUAL) AS TACKIFIER. SEEDED WITH SALT TOLERANT SPECIES.
 3. LOAM AND SEED MAY BE OMITTED ON STONE SLOPES WHERE ACCESS IS DIFFICULT OR IN AREAS OF RE-OCCURRING EROSION WHERE VEGETATION IS DIFFICULT TO ESTABLISH. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER TO DETERMINE LOCATIONS WHERE LOAM AND SEED MAY BE OMITTED.
 4. STONE SLOPES MAY BE ADJUSTED WHERE APPROVED BY GEOTECHNICAL ENGINEER.

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REV.	DESCRIPTION	DATE

DESIGNED BY: MAP / MJE / MRM CHECKED BY: MAP / MRM
DRAWN BY: MJE / MRM 0230529.00-C-301-301.dwg

CIVIL SECTION DETAILS

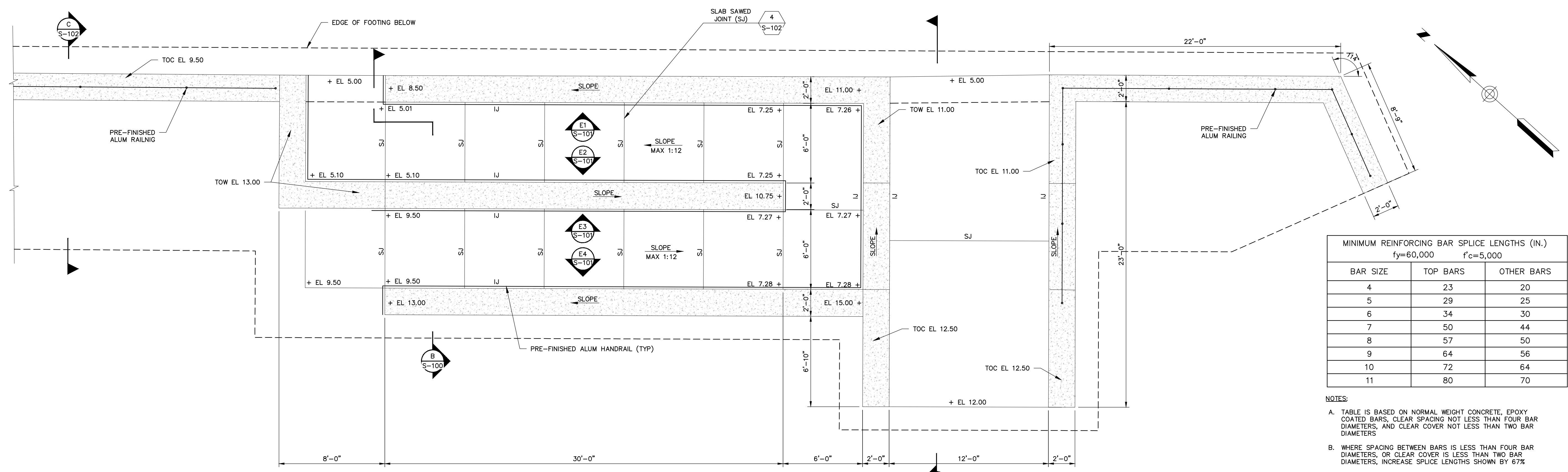
CITY OF SALEM, MASSACHUSETTS
93 WASHINGTON STREET
SALEM, MA 01970

FOREST RIVER PARK SEAWALL

JOB NO.: 0230529.00
DATE: JUNE 30, 2017
SCALE: AS NOTED
SHEET: 8 OF 11

100% DESIGN SUBMITTAL

C-301



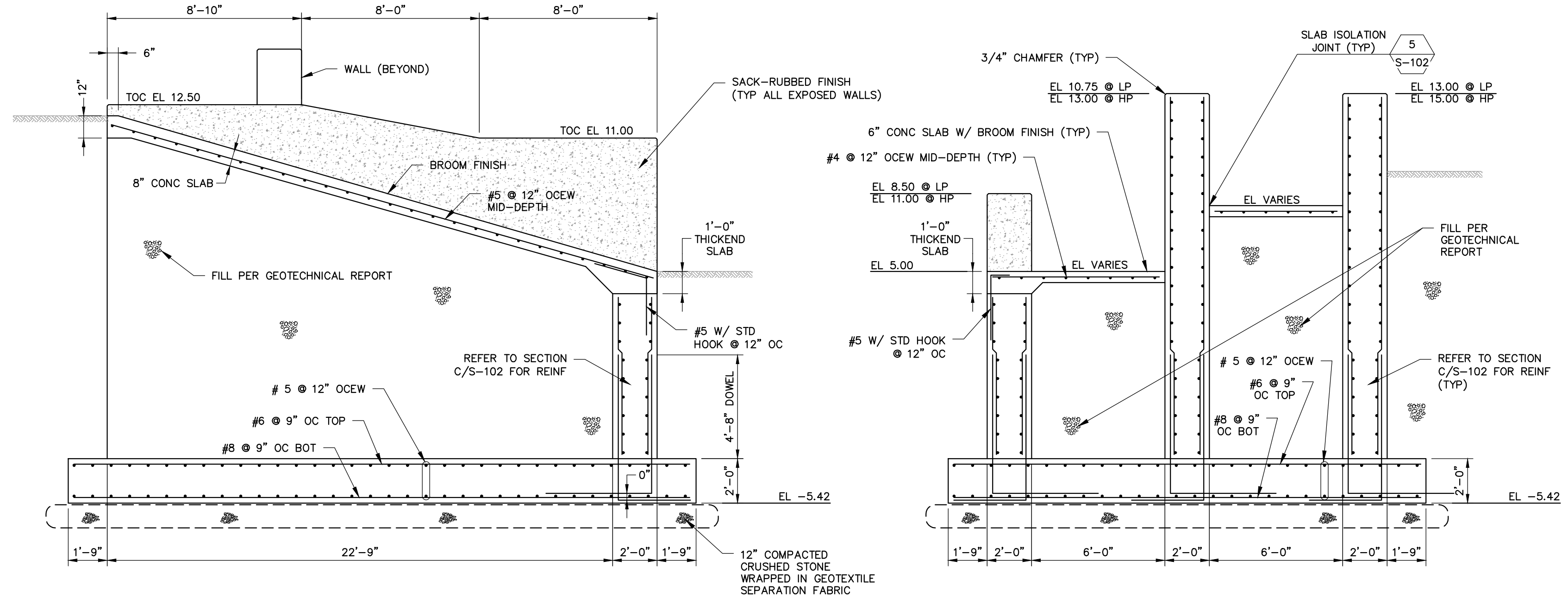
ACCESS RAMP PLAN
SCALE: 1/4" = 1'-0"

MINIMUM REINFORCING BAR SPLICE LENGTHS (IN.)		
BAR SIZE	f _y = 60,000 f _c = 5,000	
	TOP BARS	OTHER BARS
4	23	20
5	29	25
6	34	30
7	50	44
8	57	50
9	64	56
10	72	64
11	80	70

- NOTES:**
- TABLE IS BASED ON NORMAL WEIGHT CONCRETE, EPOXY COATED BARS, CLEAR SPACING NOT LESS THAN FOUR BAR DIAMETERS, AND CLEAR COVER NOT LESS THAN TWO BAR DIAMETERS.
 - WHERE SPACING BETWEEN BARS IS LESS THAN FOUR BAR DIAMETERS, OR CLEAR COVER IS LESS THAN TWO BAR DIAMETERS, INCREASE SPLICE LENGTHS SHOWN BY 67%.
 - TOP BARS = HORIZONTAL SLAB BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BARS. NOT APPLICABLE TO HORIZONTAL WALL REINFORCING.
 - FOR CONCRETE COMPRESSIVE STRENGTH, f_c, OTHER THAN 5,000 PSI, MULTIPLY THE VALUES BY THE SQUARE ROOT OF 5,000 DIVIDED BY THE SQUARE ROOT OF f_c.

STRUCTURAL GENERAL NOTES

- EXCAVATION AND BACKFILL:**
 - REFER TO THE APPENDIX OF THE SPECIFICATIONS FOR "GEOTECHNICAL ENGINEERING REPORT, FOREST RIVER PARK SEAWALL IMPROVEMENTS, SALEM, MASSACHUSETTS" PROJECT NO. 04175021, DATED APRIL 28, 2017, PREPARED BY TERRACON, WHICH INCLUDES FIELD EXPLORATIONS, GROUNDWATER CONDITIONS, LEDGE BORING LOGS, AND GEOTECHNICAL DESIGN RECOMMENDATIONS. REPORT RECOMMENDATIONS SHALL BE FOLLOWED BY THE CONTRACTOR, UNLESS NOTED OTHERWISE IN THE CONTRACT DOCUMENTS.
 - ALL BEDROCK ELEVATIONS PROVIDED ARE FOR INFORMATION ONLY, AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
 - BELOW AND WITHIN THE ENTIRE FOOTPRINT OF THE RETAINING WALL FOOTING, CONTRACTOR SHALL EXCAVATE AND PROPERLY DISPOSE OF ALL EXISTING SOILS COMPLETELY DOWN TO ELEVATION SHOWN IN SECTIONS. IF ENCOUNTERED, BEDROCK SURFACE SHALL BE THOROUGHLY CLEANED AND POWER-WASHED PRIOR TO FOOTING PLACEMENT.
 - PREPARATION OF BEDROCK SUBGRADES SHALL INCLUDE REMOVAL OF ALL LOOSE, FRAGMENTED, DECOMPOSED, HIGHLY WEATHERED, AND OTHERWISE UNSOUND ROCK, AS APPROVED BY THE ENGINEER. IT IS EXPECTED THAT THE BEDROCK SURFACE WILL BE IRREGULAR AND MIGHT EXTEND BELOW PROPOSED BOTTOM OF FOOTING ELEVATIONS IN SOME AREAS. AT THE CONTRACTOR'S OPTION, CONCRETE LEVELING PADS MAY BE USED TO PROVIDE A UNIFORM SURFACE FOR PLACEMENT OF FOOTINGS.
 - FOR ANY LOCATIONS BELOW THE FOOTING FOOTPRINT WHERE THE SLOPE OF THE EXISTING BEDROCK PROFILE EXCEEDS 4H:1V, CONTRACTOR SHALL REMOVE BEDROCK TO FLATTEN PROFILE AS REQUIRED TO ACHIEVE A SLOPE OF 4H:1V OR LESS, AS APPROVED BY THE ENGINEER. REFER TO WALL CROSS SECTIONS FOR FURTHER DETAILS.
 - BASED ON THE DEPTH TO AND TIDAL NATURE OF THE GROUNDWATER ENCOUNTERED IN THE EXPLORATIONS, TEMPORARY DEWATERING WILL BE REQUIRED FOR SEAWALL FOUNDATION CONSTRUCTION. DEWATERING CAN LIKELY BE ACCOMPLISHED BY SHIELDING THE CONSTRUCTION AREA WITH A TEMPORARY COFFERDAM, SUCH AS A PORTDAM SYSTEM OR THE LIKE, AND USING MULTIPLE FILTERED PUMPS IN A BED OF CRUSHED STONE. GROUNDWATER MAY NEED TO BE LOWERED A COUPLE OF FEET BELOW BOTTOM OF EXCAVATION TO ALLOW FOR SUBGRADE PREPARATION. THE CONTRACTOR SHALL MAINTAIN A STABLE SUBGRADE DURING CONSTRUCTION. THE CONTRACTOR SHALL PREVENT GROUNDWATER AND SURFACE WATER RUNOFF FROM COLLECTING IN THE EXCAVATION. SUBGRADE SOILS THAT BECOME UNSTABLE BECAUSE OF WATER AND/OR REWORKING BY CONSTRUCTION ACTIVITY SHALL BE REPLACED WITH COMPACTED STRUCTURAL FILL, AS NECESSARY.
 - CONTRACTOR SHALL PROVIDE STEPPED FOOTING(S) AS PER STANDARD DETAILS IF BEDROCK PROFILE VARIES GREATLY FROM PROFILE OBTAINED FROM GEOTECHNICAL REPORT.
 - WALLS SHALL NOT BE BACKFILLED UNTIL CONCRETE HAS ACHIEVED 28-DAY DESIGN STRENGTH AS AS VERIFIED BY FIELD CYLINDERS, BUT IN NO CASE LESS THAN 7 DAYS.
- DESIGN CRITERIA:**
 - ALLOWABLE BEDROCK BEARING CAPACITY = 3,000 PSF (BEARING ON SOIL) 8,000 PSF (BEARING ON BEDROCK)
 - UNIFORM VEHICLE SURCHARGE = 300 PSF
 - GROUNDWATER TABLE = N/A (FOOTING WEEPHOLES PROVIDED)
 - LATERAL EARTH PRESSURE: K_a = 0.5; γ_{soil} = 125 PCF
 - WIND LOAD: V = 105 MPH; EXPOSURE C; I = 1.00
 - GROUND SNOW LOAD: 50 PSF
 - SEISMIC LOAD: S_s = 0.31; S_i = 0.071
 - SITE CLASS = C SEISMIC DESIGN CATEGORY = B
 - FLOOD LOADS: SWEL = 11.70 (PROJECTED 2100 SEA LEVEL RISE)
 - P_{max} = 1,509 PSF (MAX BREAKING WAVE PRESSURE)
 - V = 16.5 FPS (MAX FLOOD WATER VELOCITY)
 - γ_w = 64 PCF
- RETAINING WALL:**
 - PROVIDE WALL AND FOOTING CONTROL JOINTS (CJ) AT MAXIMUM 24'-0" OC AS SHOWN, UNO (REFER TO REFERENCE POINTS ON SHEET C-201). PROVIDE WALL AND FOOTING CONSTRUCTION / CONTROL JOINTS (C/CJ) AT MAXIMUM 48'-0" OC AS SHOWN, UNO (REFER TO REFERENCE POINTS ON SHEET C-201).
- CONTRACTOR SHALL SUBMIT THE FOLLOWING TO THE ENGINEER FOR APPROVAL AFTER ACTUAL BEDROCK PROFILE IS EXPOSED:**
 - PROVIDE A MARK-UP OF THE RETAINING WALL PLAN AND PROFILE SHEET SHOWING ANY MODIFICATIONS TO PROPOSED FOOTING AND BEDROCK ELEVATIONS, SUBJECT TO ENGINEER'S APPROVAL.
 - IF RETAINING WALL STEM EXCEEDS 12'-11" NOTIFY ENGINEER - REDESIGN OF RETAINING WALL MAY BE NECESSARY.
- REINFORCED CONCRETE:**
 - COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS - 5000 PSI; AIR CONTENT 6± 1%; W/C RATIO 0.40 MAXIMUM; SLUMP 4" MAXIMUM AFTER ALL WATER HAS BEEN ADDED. SUBMIT TEST RESULTS TO THE ENGINEER.
 - ALL DESIGN IN ACCORDANCE WITH ACI 318 CONCRETE BUILDING CODE, LATEST EDITION. ALL CONCRETE SHALL BE PROVIDED, PLACED, AND MOIST CURED (MINIMUM 7 DAYS) AS PER ALL APPLICABLE SECTIONS OF THE ACI, AS APPROVED BY THE ENGINEER.
 - REINFORCEMENT: ASTM A615 GRADE 60 WITH EPOXY COATING PER ASTM A775 - ALL SPLICES CLASS B (UNO). REINFORCEMENT SHALL BE DETAILED, FABRICATED, AND PLACED AS PER ACI 315 DETAILING MANUAL. ANY DAMAGE TO EPOXY COATING SHALL BE REPAIRED IN THE FIELD WITH A TWO COMPONENT, 70% SOLIDS EPOXY COATING SPECIFICALLY MANUFACTURED TO TOUCH UP DAMAGED EPOXY COATED REBAR PRIOR TO CONCRETE PLACEMENT.
 - PROVIDE 3/4" CHAMFER ON EXPOSED EDGES OF CONCRETE, UNO.
 - SUBMIT PLAN TO ENGINEER FOR APPROVAL SHOWING ALL PROPOSED CONSTRUCTION JOINT AND CONTROL JOINT LOCATIONS AND PLACEMENT SEQUENCE FOR ALL CONCRETE WORK.
 - PROVIDE "SACK-RUBBED FINISH" IMMEDIATELY UPON STRIPPING FORMS AS SPECIFIED IN SECTION 03 30 20 FOR ALL CONCRETE SURFACES EXPOSED TO VIEW INCLUDING, BUT NOT LIMITED TO: RETAINING WALLS ABOVE GRADE ON BOTH SIDES AND TOP OF WALL; CONCRETE RAMPS.
 - CONCRETE FINISH FOR RAMPS: BROOM FINISH TRANSVERSE TO TRAFFIC.
 - CONCRETE FINISH FOR TOP OF WALLS: TROWEL
 - CONCRETE CURING AND SEAL COMPOUND:
- MISCELLANEOUS METALS:**
 - RAILINGS - PREFINISHED BLACK ALUMINUM PER SPECIFICATION 05 52 00
 - WELDS: PER AWS D1.2
 - EXPANSION BOLTS: 316 STAINLESS STEEL WITH STANDARD EMBEDMENT (UNO), SIZE AS SHOWN ON THE DRAWINGS.
 - ALL ALUMINUM ITEMS EMBEDDED OR IN CONTACT WITH CONCRETE SHALL BE COATED WITH BITUMASTIC PAINT.



SECTION A
SCALE: 1/4" = 1'-0"

SECTION B
SCALE: 1/4" = 1'-0"

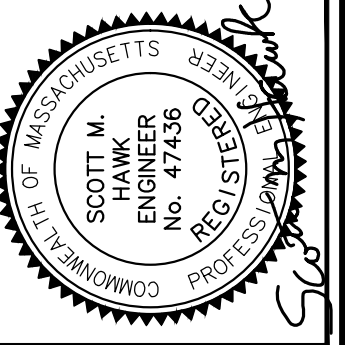
ABBREVIATIONS

AT	NUMBER	IN	INCH
ALUM	ALUMINUM	IJ	ISOLATION JOINT
ASTM	AMERICAN SOCIETY OF TESTING MATERIALS	MAX	MAXIMUM
AWS	AMERICAN WELDING SOCIETY	MIN	MINIMUM
BOT	BOTTOM	MPH	MILES PER HOUR
C/CJ	CONSTRUCTION/CONTROL JOINT	OC	ON CENTER
CJ	CONTROL JOINT	OC/EW	ON CENTER EACH WAY
CLR	CLEAR	OC/F	ON CENTER FACE
CONC	CONCRETE	N/A	NOT APPLICABLE
DBS/DI	DOWEL BAR SPLICE/DOWEL INSERT	NTS	NOT TO SCALE
DWGS	DRAWINGS	PCF	POUNDS PER CUBIC FOOT
EA	EACH	PSF	POUNDS PER SQUARE FOOT
EF	EACH FACE	REINF	REINFORCING
EL	ELEVATION	SJ	SAWED JOINT
EXIST	EXISTING	SS	STAINLESS STEEL
EXP	EXPANSION	STD	STANDARD
f _c	COMPRESSIVE STRENGTH	TOC	TOP OF CONCRETE
f _y	YIELD STRENGTH	TOW	TOP OF WALL
		TYP	TYPICAL
		UNO	UNLESS NOTED OTHERWISE
		W/	WITH
		W/C	WATER/CEMENT RATIO

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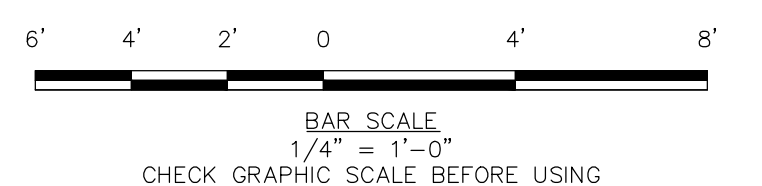
**ACCESS RAMP
STRUCTURAL PLAN**

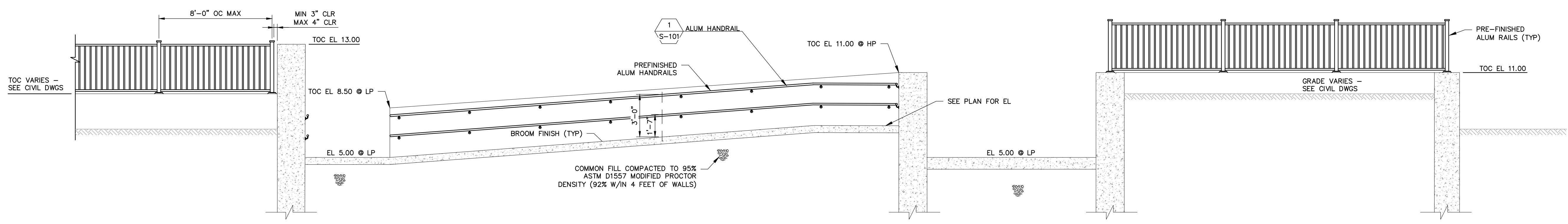
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FOREST RIVER PARK SEAWALL

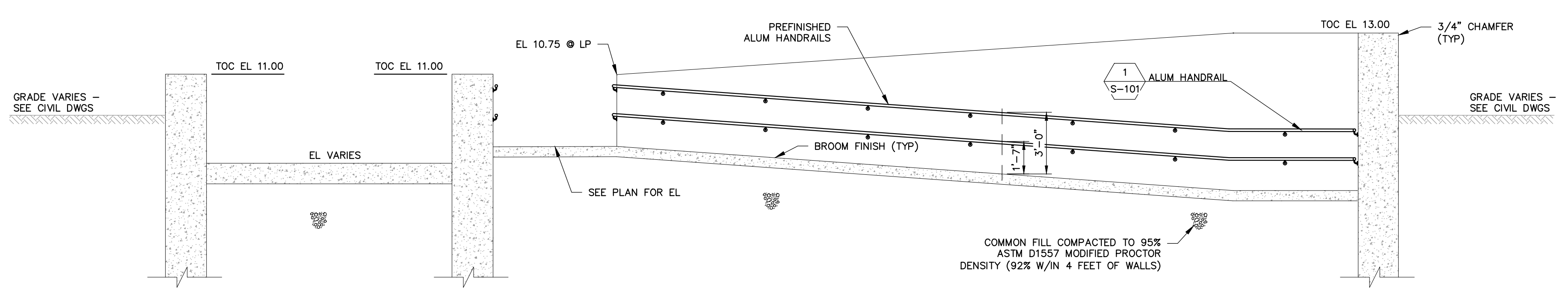
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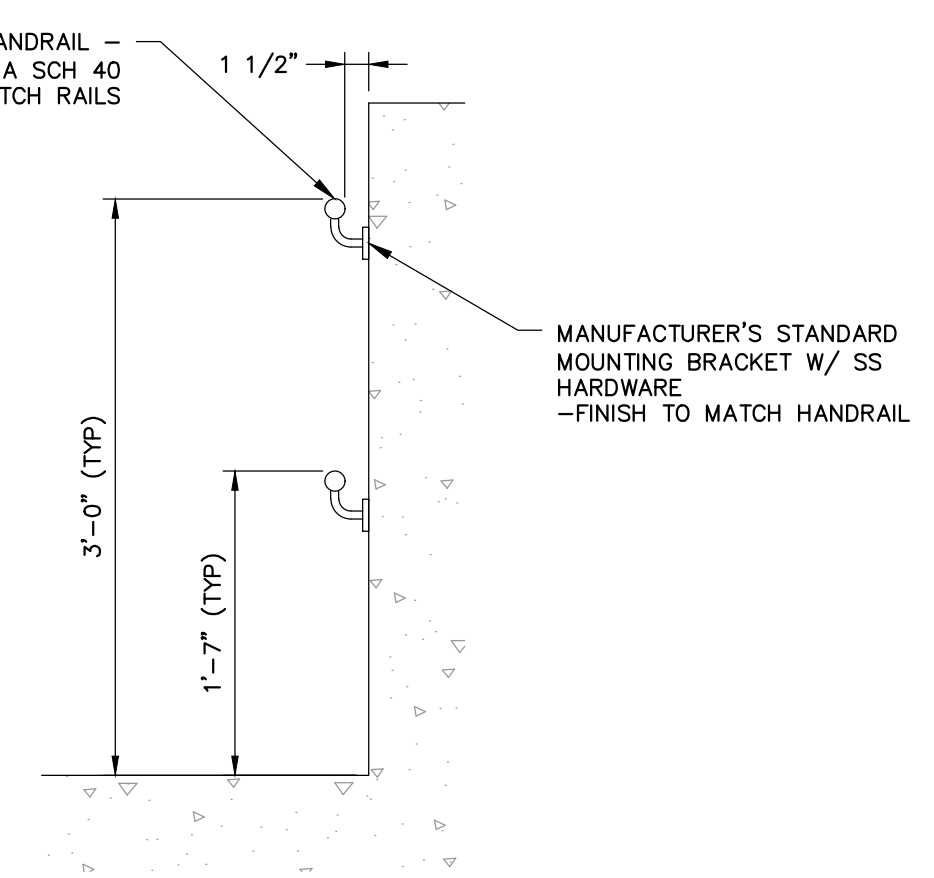




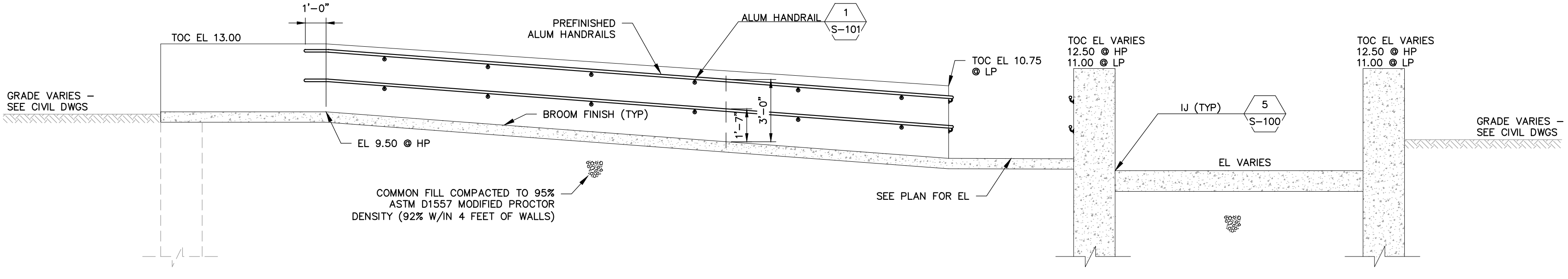
RAMP ELEVATION E1
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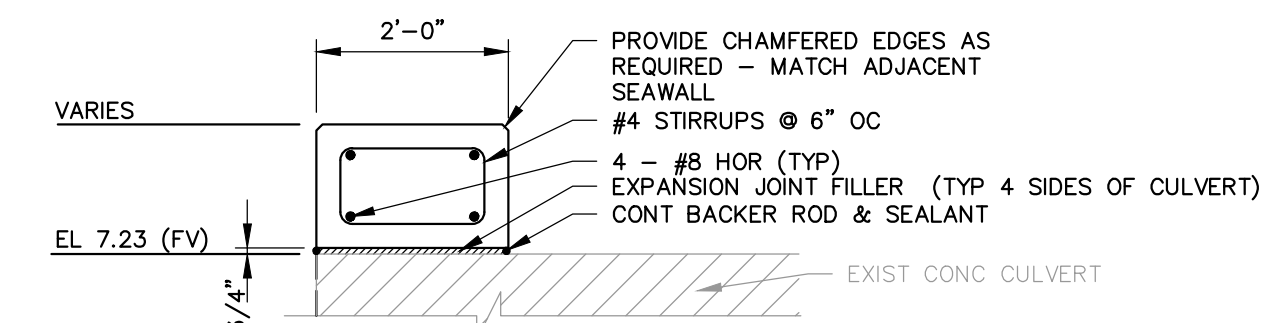
RAMP ELEVATION E2
SCALE: 1/4" = 1'-0"



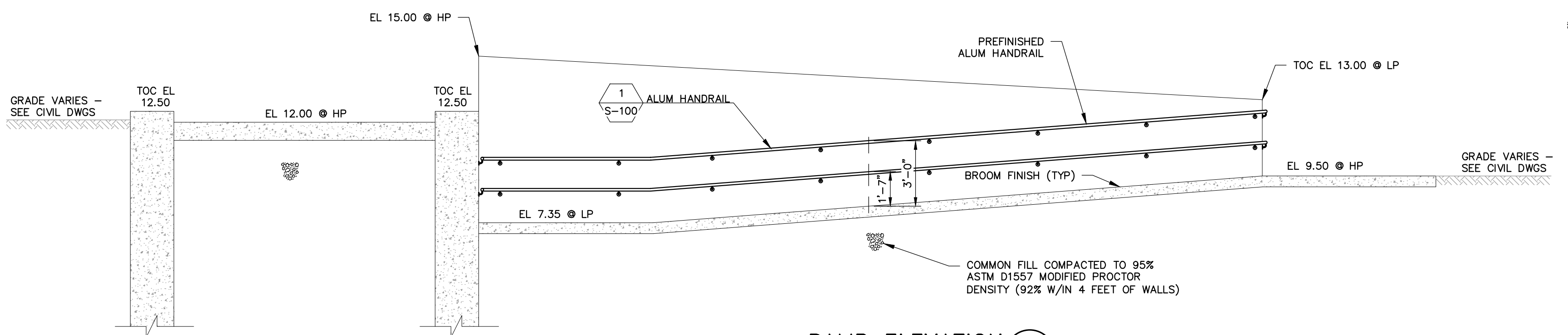
1 ALUM. HANDRAIL
SCALE: 3/4" = 1'-0"



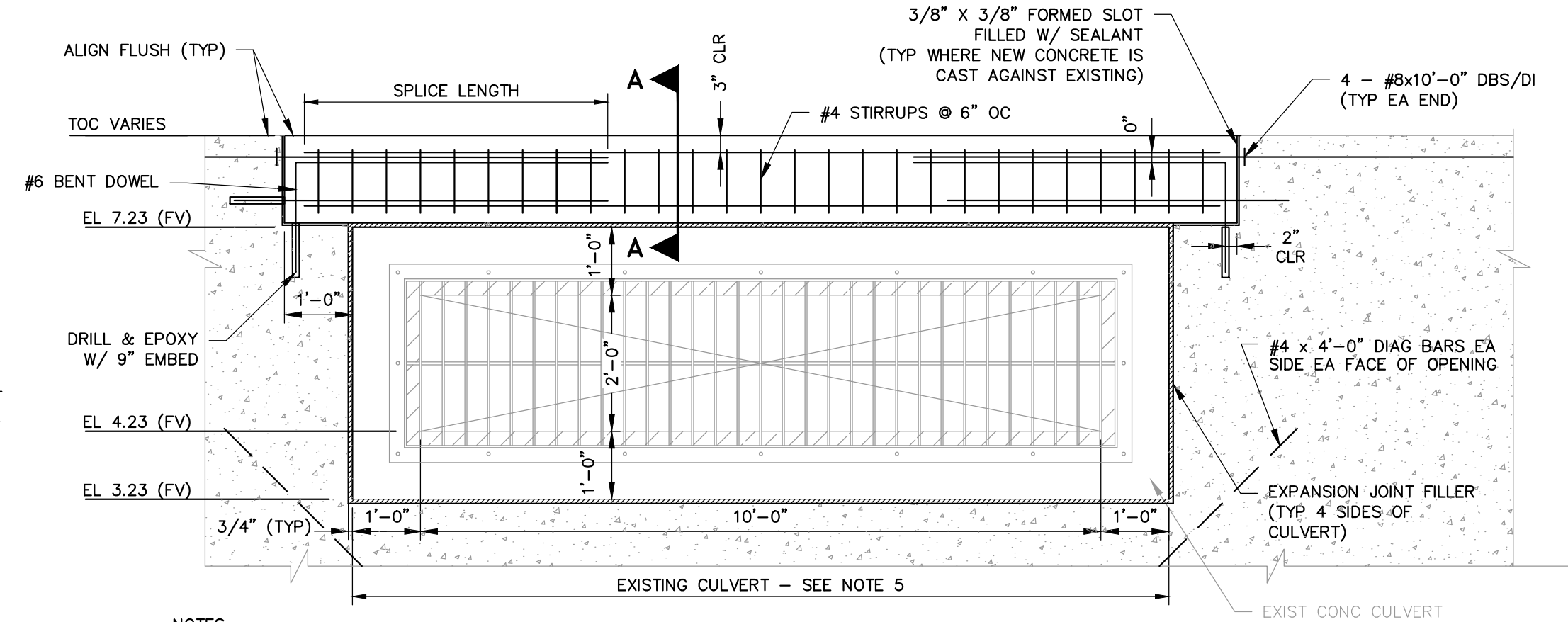
RAMP ELEVATION E3
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SECTION A-A
SCALE: 1/2" = 1'-0"

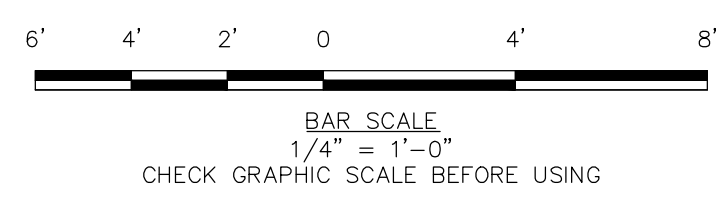


RAMP ELEVATION E4
SCALE: 1/4" = 1'-0"



2 EXIST CULVERT OPENING
SCALE: 1/2" = 1'-0"

- NOTES:
- CULVERT IS AN EXISTING STRUCTURE INSTALLED AS PART OF A PREVIOUS CONTRACT.
 - DEMOLISH EXISTING SEAWALL AND BEAM SURROUNDING CULVERT WITHOUT HARMING CULVERT.
 - FACE OF NEW WALL SHALL ALIGN FLUSH WITH FACE OF EXISTING CULVERT.
 - CULVERT INVERT ELEVATION SHALL BE VERIFIED PRIOR TO CONSTRUCTION AND SHALL MATCH EXISTING CONDITIONS AFTER CONSTRUCTION OF NEW SEAWALL.
 - CONTRACTOR SHALL TEMPORARILY SUPPORT OR REMOVE, STORE, PROTECT, AND REINSTALL EXIST CULVERT SECTIONS - NOTIFY ENGINEER IMMEDIATELY SHOULD SETTLING OCCUR.

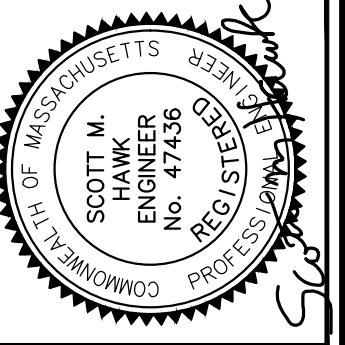


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SEAWALL ELEVATIONS

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93 WASHINGTON STREET
SALEM, MA 01970

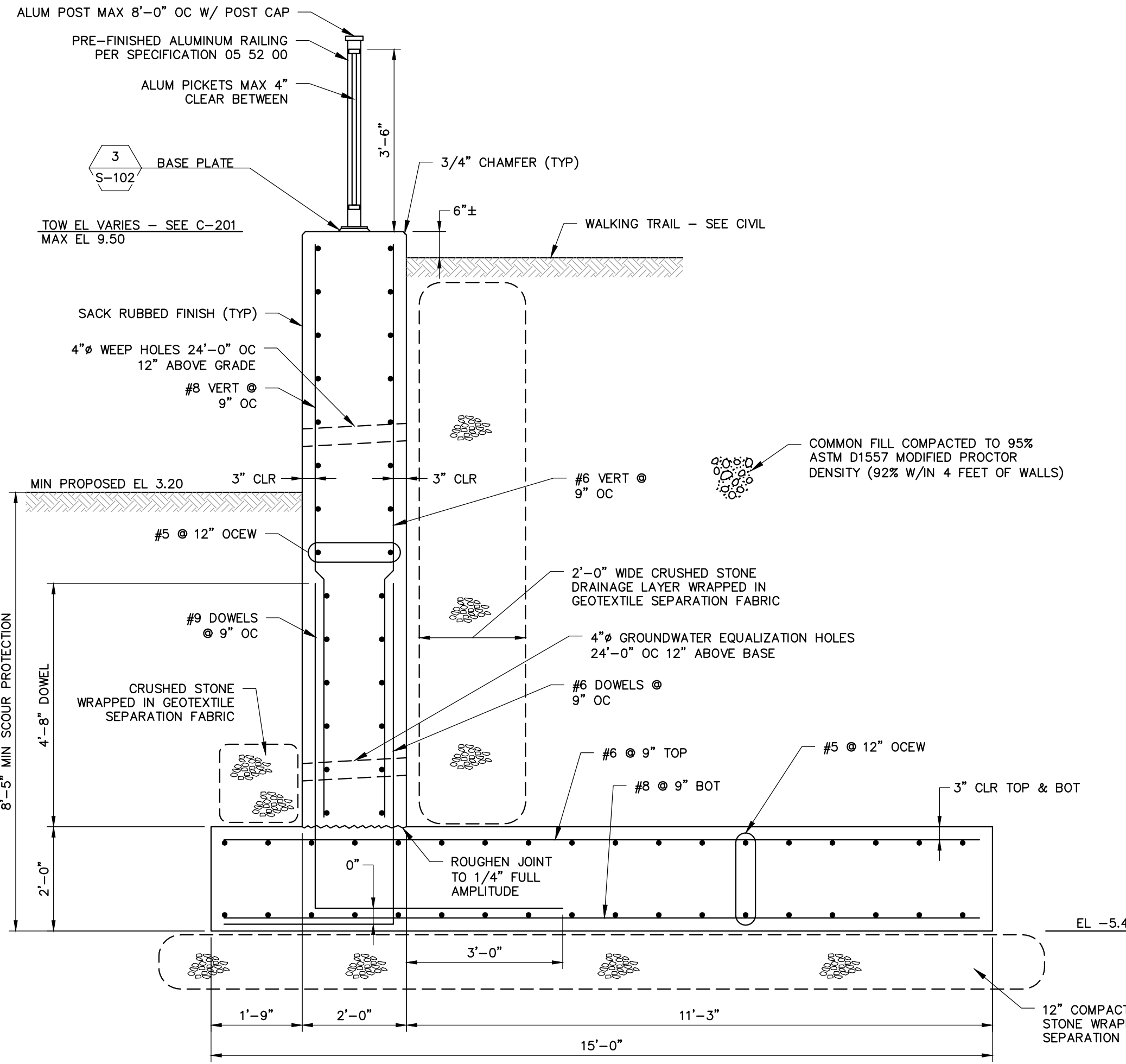
FOREST RIVER PARK SEAWALL

JOB NO.: 0230529.00
DATE: JUNE 30, 2017
SCALE: AS NOTED
SHEET: 10 OF 11

S-101

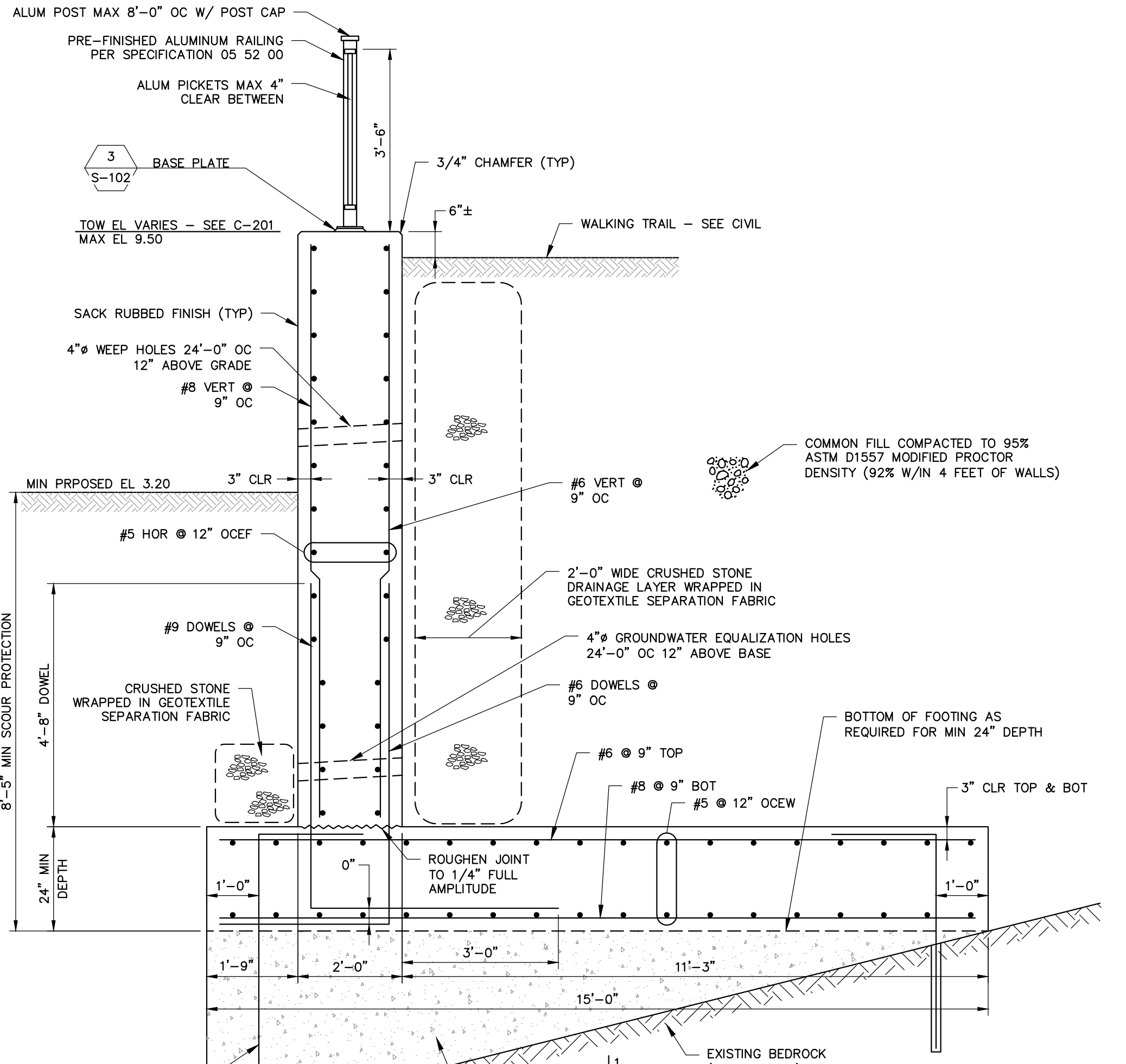
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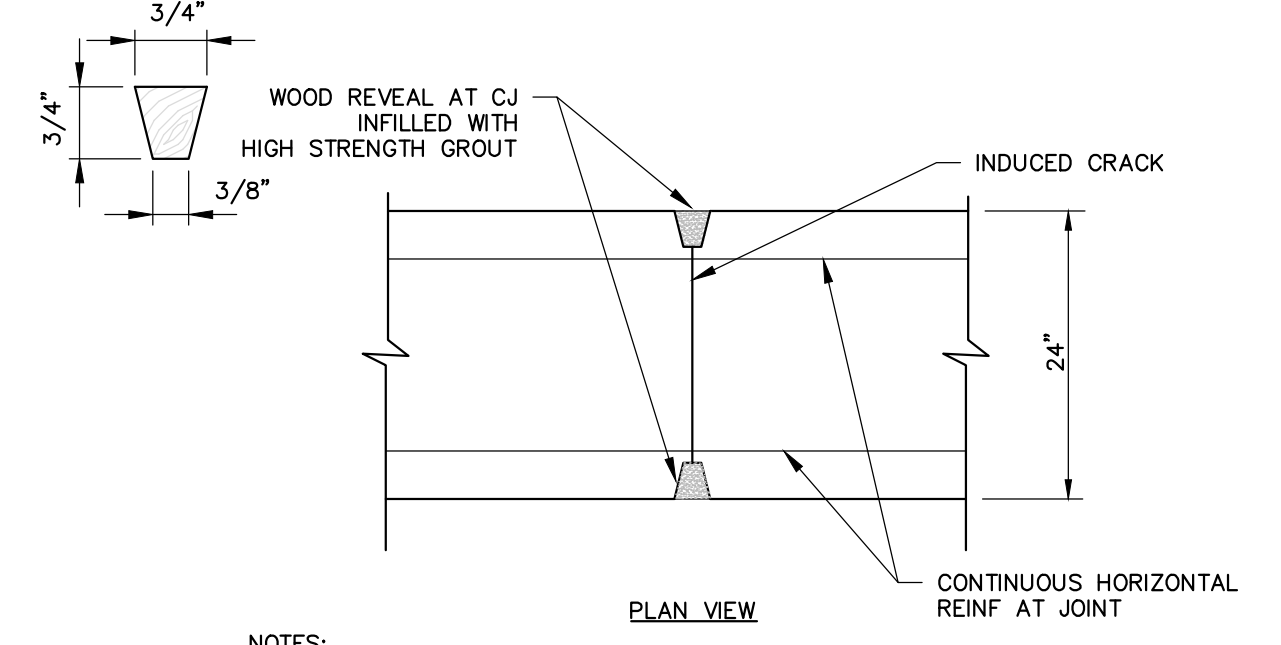
- NOTES:**
1. ALL REBAR EPOXY COATED PER ASTM A775.
 2. PROVIDE WALL CONTROL OR CONSTRUCTION/CONTROL JOINTS WITH SEALANT EACH FACE - LOCATIONS SHOWN ON PLAN.
 3. PROVIDE CONCRETE CURING/SEALING COMPOUND FOR ALL CONCRETE SURFACES.

SOIL BEARING SECTION (C)
SCALE: 1/2" = 1'-0"
S-100



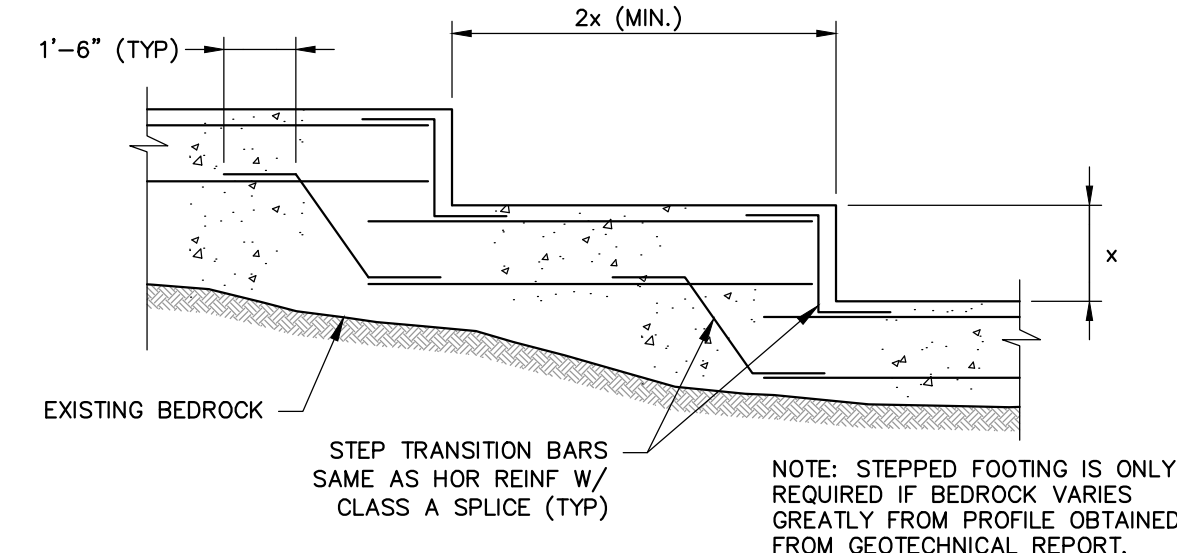
- NOTES:**
1. ALL REBAR EPOXY COATED PER ASTM A775.
 2. PROVIDE WALL CONTROL OR CONSTRUCTION/CONTROL JOINTS - LOCATIONS SHOWN ON PLAN.
 3. PROVIDE CONCRETE CURING/SEALING COMPOUND FOR ALL CONCRETE SURFACES.

BEDROCK BEARING SECTION (D)
SCALE: 1/2" = 1'-0"
S-100

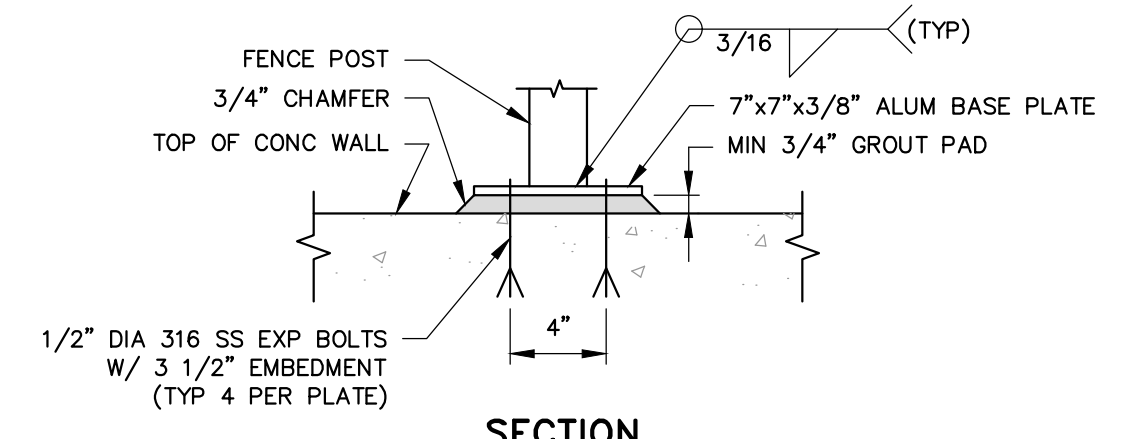


- NOTES:**
1. LOCATE RETAINING WALL VERTICAL CONTROL JOINTS CENTERED AT ALL WEEP HOLE PENETRATIONS THRU WALL. MAX SPACING BETWEEN CONTROL JOINTS SHALL NOT EXCEED 24 FEET.

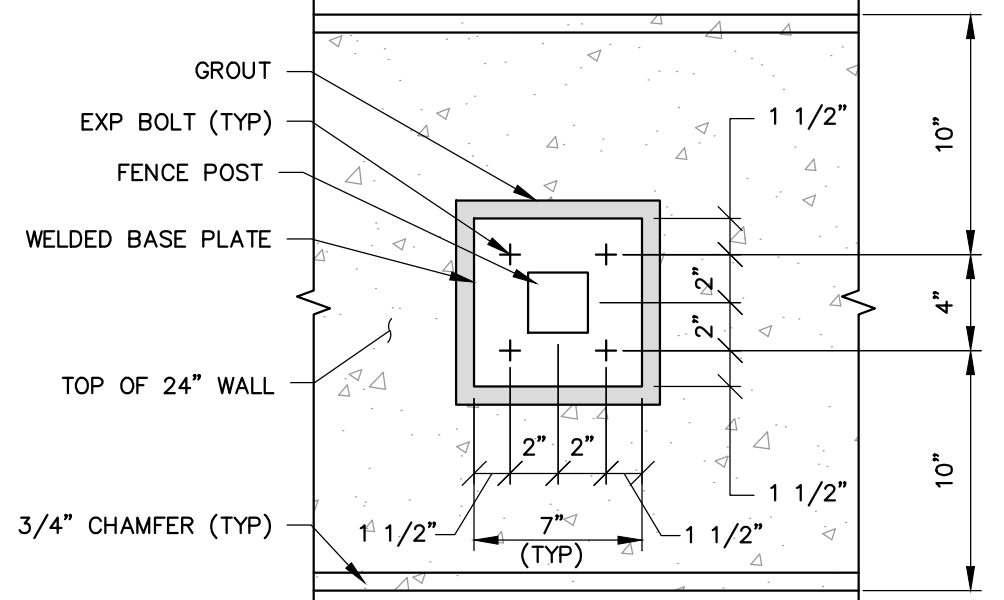
1 WALL CONTROL JOINT
SCALE: NTS
(TYP FOR WALL CJ AND C/CJ)
S-100



2 STEPPED FOOTING
SCALE: NTS
S-100

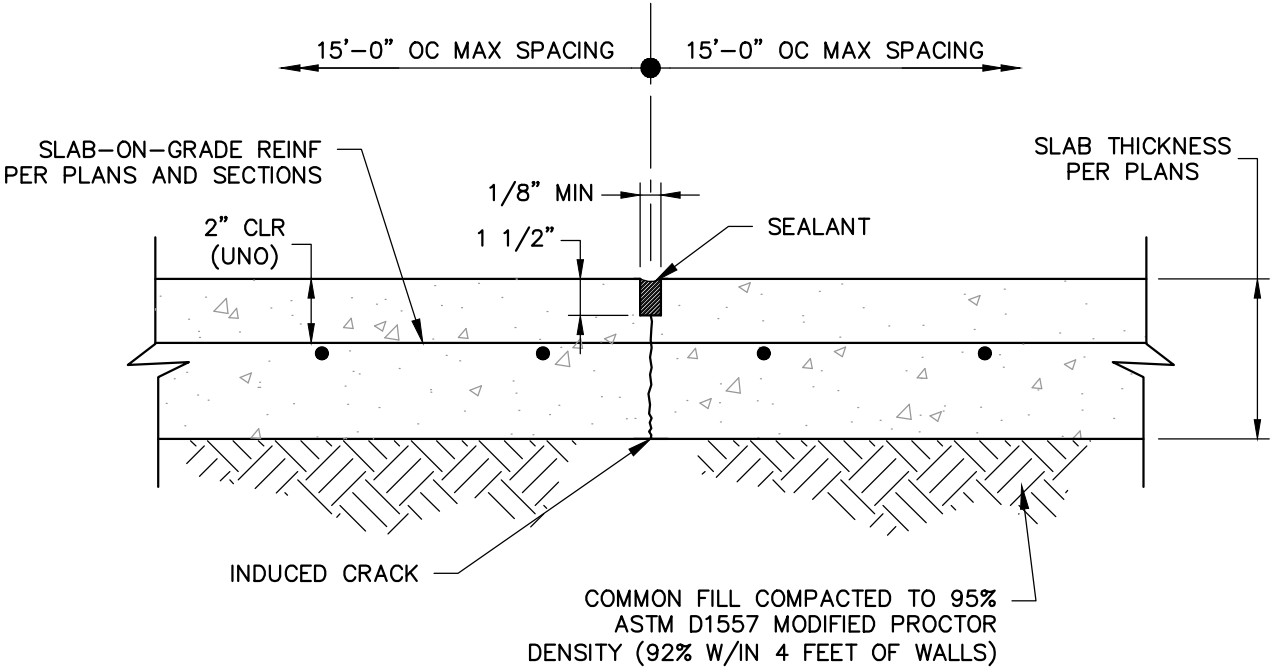


SECTION



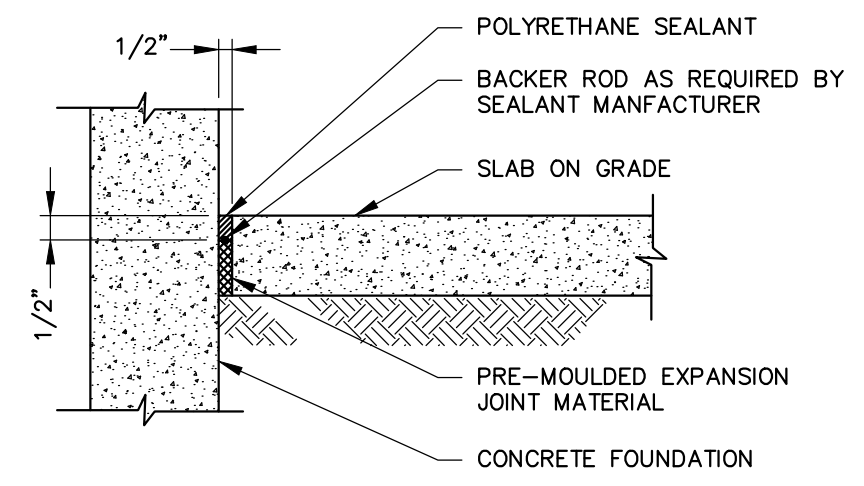
PLAN

3 BASE PLATE
SCALE: 1 1/2" = 1'-0"
S-102

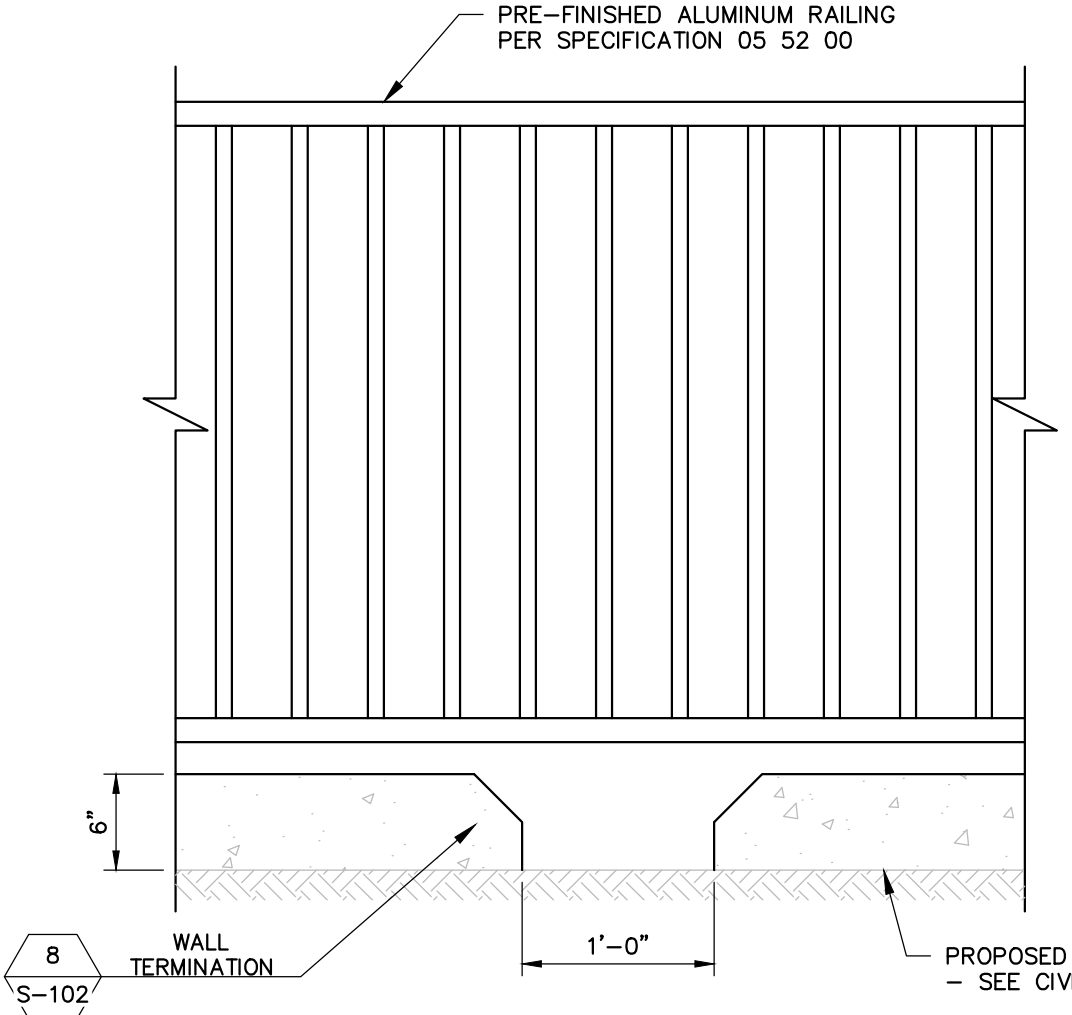


- NOTES:**
1. DO NOT CUT THROUGH TOP LAYER OF REINFORCEMENT
 2. JOINT SHALL BE SAWN WITHIN 4 TO 12 HOURS AFTER PLACEMENT

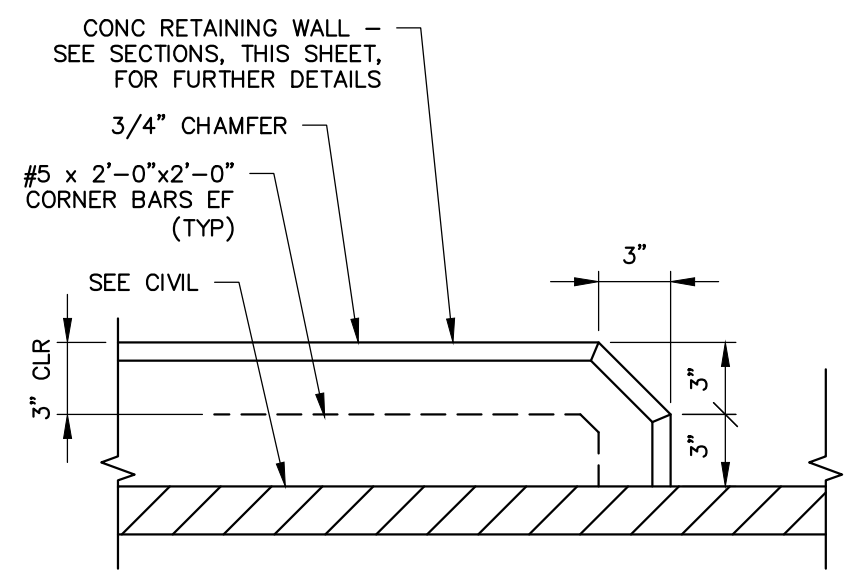
4 SLAB SAWED JOINT (SJ)
SCALE: NTS
S-100



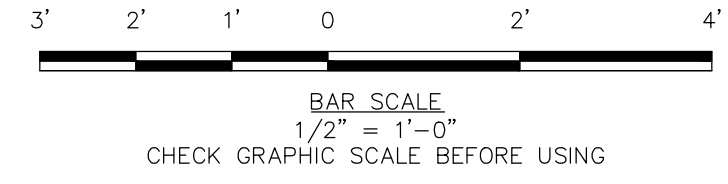
5 SLAB ISOLATION JOINT (IJ)
SCALE: NTS
S-100



7 WALL SCUPPER
SCALE: 1 1/2" = 1'-0"
S-102



8 WALL TERMINATION
SCALE: 1 1/2" = 1'-0"
C-201 S-102



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SEALING
SCOTT M. SCOTT
REGISTERED PROFESSIONAL ENGINEER
NO. 47436
STATE OF MASSACHUSETTS
EXPIRES 12/31/2017

REV	DESCRIPTION	DATE

DESIGNED BY: SJT
DRAWN BY: DMB
CHECKED BY: JPS
10/26/2016 09:50:04 AM

SEAWALL SECTIONS & DETAILS

CITY OF SALEM, MASSACHUSETTS
93 WASHINGTON STREET
SALEM, MA 01970

FOREST RIVER PARK SEAWALL

JOB NO.: 0230529.00
DATE: JUNE 30, 2017
SCALE: AS NOTED
SHEET: 11 OF 11

S-102

100% DESIGN SUBMITTAL