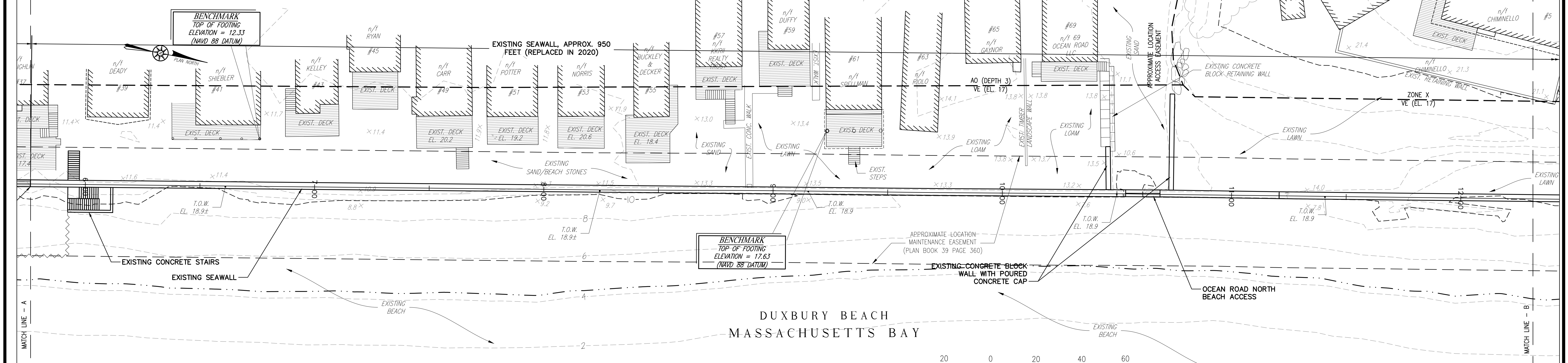


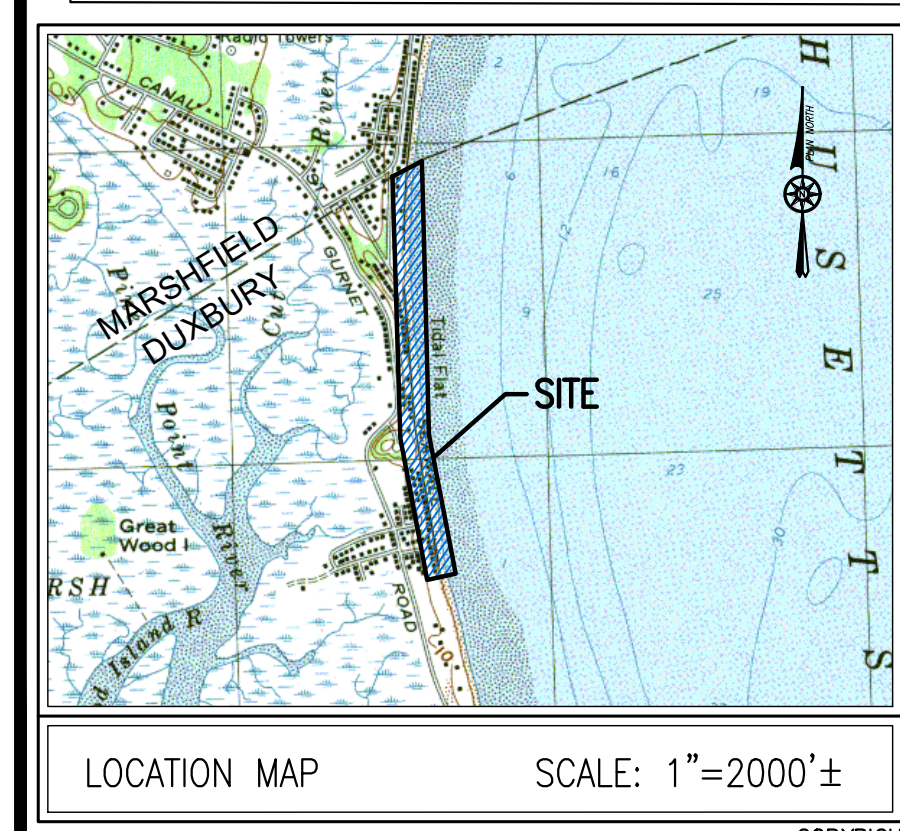
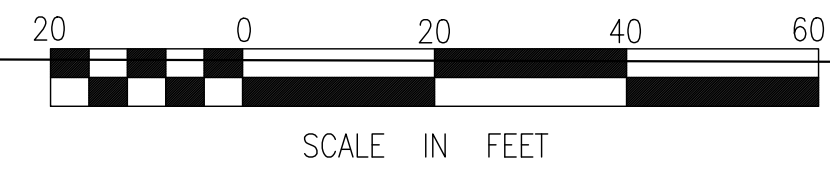
**OCEAN ROAD SOUTH & OCEAN ROAD NORTH WALL**

SCALE: 1" = 20'-0"



**OCEAN ROAD NORTH & CABLE HILL WAY WALL**

SCALE: 1" = 20'-0"



- NOTES:**
- EXISTING CONDITIONS BASE PLANS BY GRADY CONSULTING L.L.C.
  - EASEMENT LINE INFORMATION IS SHOWN AS APPROXIMATE BASED ON "DUXBURY BEACH SEAWALL EASEMENT PLAN OF LAND", BY BRYANT ASSOCIATES, INC., DATED JUNE 24, 1994 AND RECORDED WITH PLYMOUTH COUNTY REGISTRY OF DEEDS PLAN BOOK 39 PAGE 360
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  - ALL ELEVATIONS ARE BASED ON NAVD 1988 DATUM.

**FLOOD NOTE:**  
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**SUMMARY OF WORK:**

- PROPOSED SEAWALL REPLACEMENT:**
- STA. 04+00 TO STA. 54+78
  - STA. 15+19 TO STA. 29+53
  - STA. 32+96 TO STA. 41+46
- REMOVE REVETMENT STONE:**
- STA. 33+53 TO STA. 36+65
  - STA. 15+20 TO STA. 15+69

DATUM RELATIONSHIPS FOR STATION 8446166 DUXBURY, MA:

4.31	MEAN HIGH WATER (MHW)
0.00	NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)
-0.44	MEAN SEA LEVEL (MSL)
-0.64	MEAN TIDE LEVEL (MTL)
-5.59	MEAN LOW WATER (MLW)
-5.93	MEAN LOWER-LOW WATER (MLLW)

REVISIONS		
NO.	ITEM	DATE
1.	MEPA REVIEW COMMENTS	9/20/23
2.	END WALL PROTECTION & COBBLE BERM ISSUED FOR BIDDING	12/12/23
3.		7/31/24



**PGB ENGINEERING, LLC**  
 MARSHFIELD, MASSACHUSETTS

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 CHECKED BY: PGB

FILE NAME: AS SHOWN  
 JOB NO.: 23-135  
 DATE: 7/10/23

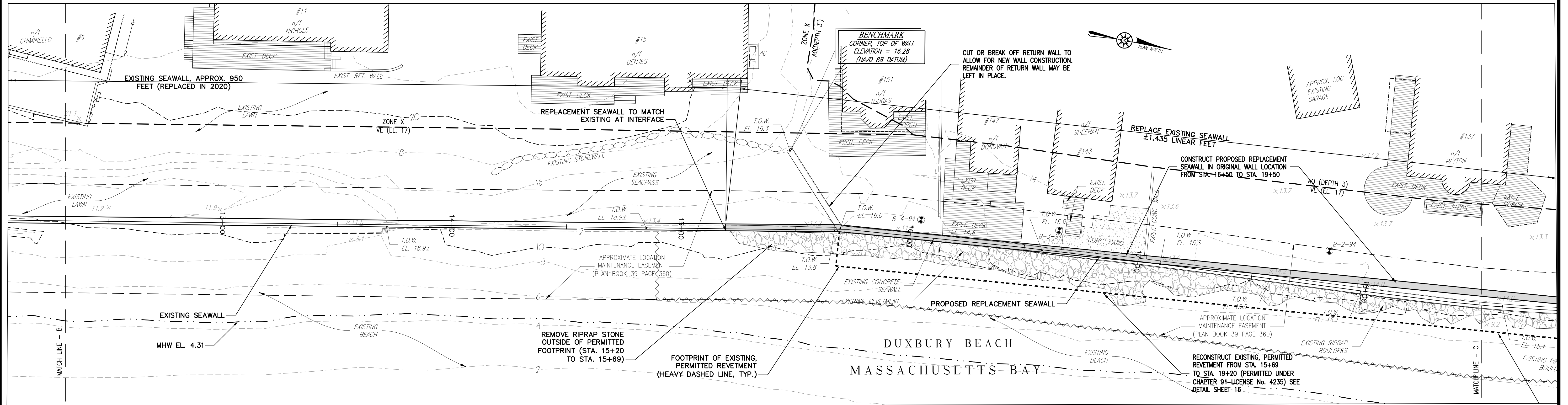
SCALE: AS SHOWN  
 DWG. NO.: \*\*  
 CONTRACT: 2024-II

DEPARTMENT OF PUBLIC WORKS  
 DUXBURY, MASSACHUSETTS

PROPOSED REPAIRS  
 DUXBURY BEACH SEAWALLS - PHASE II  
 OCEAN ROAD SOUTH, OCEAN ROAD NORTH  
 & CABLE HILL WAY

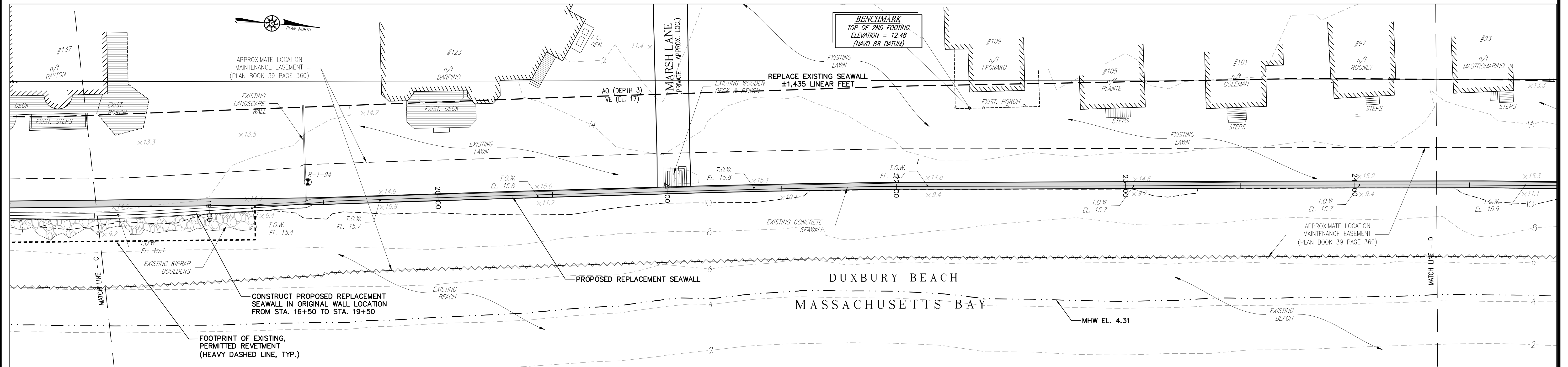
CIVIL  
 SHEET  
 1 OF 6

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**CABLE HILL WAY & GURNET ROAD WALL**

SCALE: 1" = 20'-0"



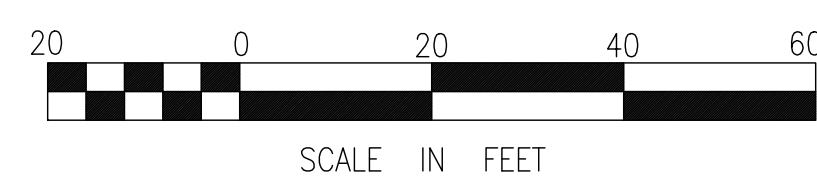
**GURNET ROAD WALL**

SCALE: 1" = 20'-0"

- NOTES:**
- EXISTING CONDITIONS BASE PLANS BY GRADY CONSULTING L.L.C.
  - EASEMENT LINE INFORMATION IS SHOWN AS APPROXIMATE BASED ON "DUXBURY BEACH SEAWALL EASEMENT PLAN OF LAND", BY BRYANT ASSOCIATES, INC., DATED JUNE 24, 1994 AND RECORDED WITH PLYMOUTH COUNTY REGISTRY OF DEEDS PLAN BOOK 39 PAGE 360
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- EXISTING PERMITTED REVETMENT LIMITS TO BE RECONSTRUCTED:**
- STA. 15+69 TO STA. 19+20
  - STA. 36+65 TO STA. 41+50 (MARSHFIELD TOWN LINE)

**SUMMARY OF WORK:**

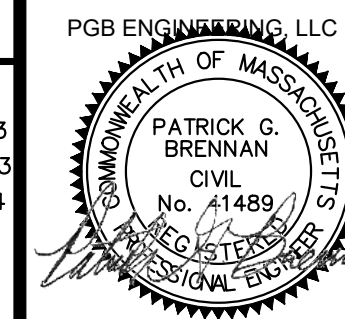
- PROPOSED SEAWALL REPLACEMENT:**
- STA. 04+00 TO STA. 5+76
  - STA. 15+19 TO STA. 29+53
  - STA. 32+96 TO STA. 41+46

- REMOVE REVETMENT STONE:**
- STA. 33+53 TO STA. 36+65
  - STA. 15+20 TO STA. 15+69

**DATUM RELATIONSHIPS FOR STATION 8446166 DUXBURY, MA:**

- 4.31 HIGH TIDE LINE (HTL) IS FACE OF EXISTING SEAWALL
- 4.31 MEAN HIGH WATER (MHW)
- 0.00 NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)
- 0.44 MEAN SEA LEVEL (MSL)
- 0.64 MEAN TIDE LEVEL (MTL)
- 5.59 MEAN LOW WATER (MLW)
- 5.93 MEAN LOWER-LOW WATER (MLLW)

REVISIONS		
NO.	ITEM	DATE
1.	MEPA REVIEW COMMENTS	9/20/23
2.	END WALL PROTECTION & COBBLE BERM	12/12/23
3.	ISSUED FOR BIDDING	7/31/24



DATE: JULY 31, 2024

**PGB ENGINEERING, LLC**  
MARSHFIELD, MASSACHUSETTS

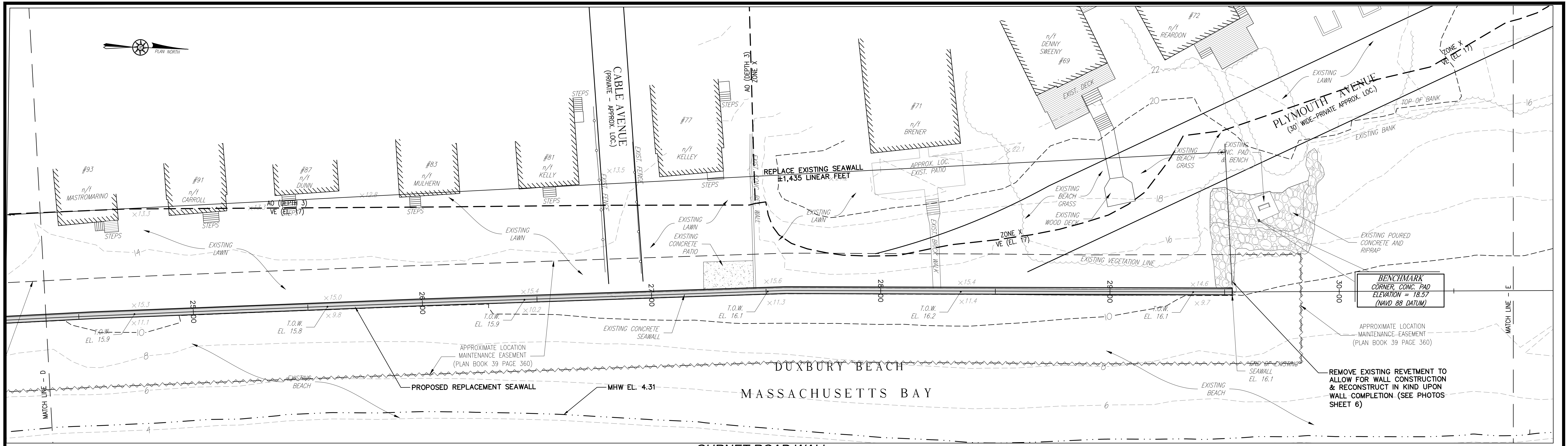
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DESIGNED BY: PGB	JOB NO.: 23-135	DWG. NO.: **
CHECKED BY: PGB	DATE: 7/10/23	CONTRACT: 2024-II

DEPARTMENT OF PUBLIC WORKS  
DUXBURY, MASSACHUSETTS

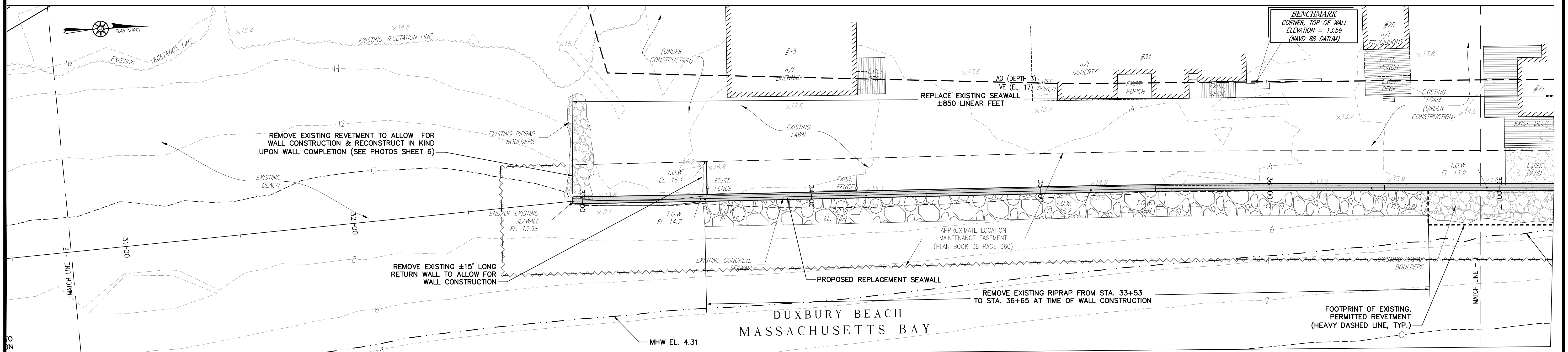
PROPOSED REPAIRS  
DUXBURY BEACH SEAWALLS - PHASE II

CABLE HILL WAY & GURNET ROAD

CIVIL SHEET 2 OF 6



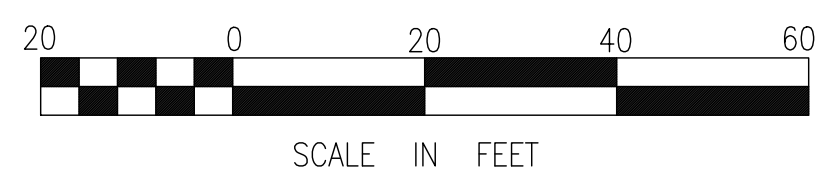
**GURNET ROAD WALL**  
SCALE: 1" = 20'-0"



**BAY AVENUE WALL**  
SCALE: 1" = 20'-0"

- NOTES:**
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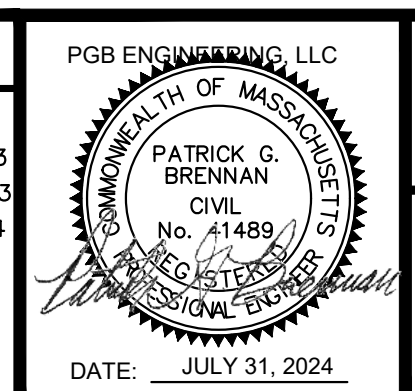
- EXISTING PERMITTED REVETMENT LIMITS TO BE RECONSTRUCTED:**
- STA. 15+69 TO STA. 19+20
  - STA. 36+65 TO STA. 41+50 (MARSHFIELD TOWN LINE)

- SUMMARY OF WORK:**
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- STA. 04+00 TO STA. 5+76
  - STA. 15+19 TO STA. 29+53
  - STA. 32+96 TO STA. 41+46
- REMOVE REVETMENT STONE:**
- STA. 33+53 TO STA. 36+65
  - STA. 15+20 TO STA. 15+69

**DATUM RELATIONSHIPS FOR STATION 8446166 DUXBURY, MA:**

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-5.59	MEAN LOW WATER (MLW)
-5.93	MEAN LOWER-LOW WATER (MLLW)

REVISIONS		
NO.	ITEM	DATE
1.	MEPA REVIEW COMMENTS	9/20/23
2.	END WALL PROTECTION & COBBLE BERM	12/12/23
3.	ISSUED FOR BIDDING	7/31/24



**PGB ENGINEERING, LLC**  
MARSHFIELD, MASSACHUSETTS

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DESIGNED BY: PGB  
CHECKED BY: PGB

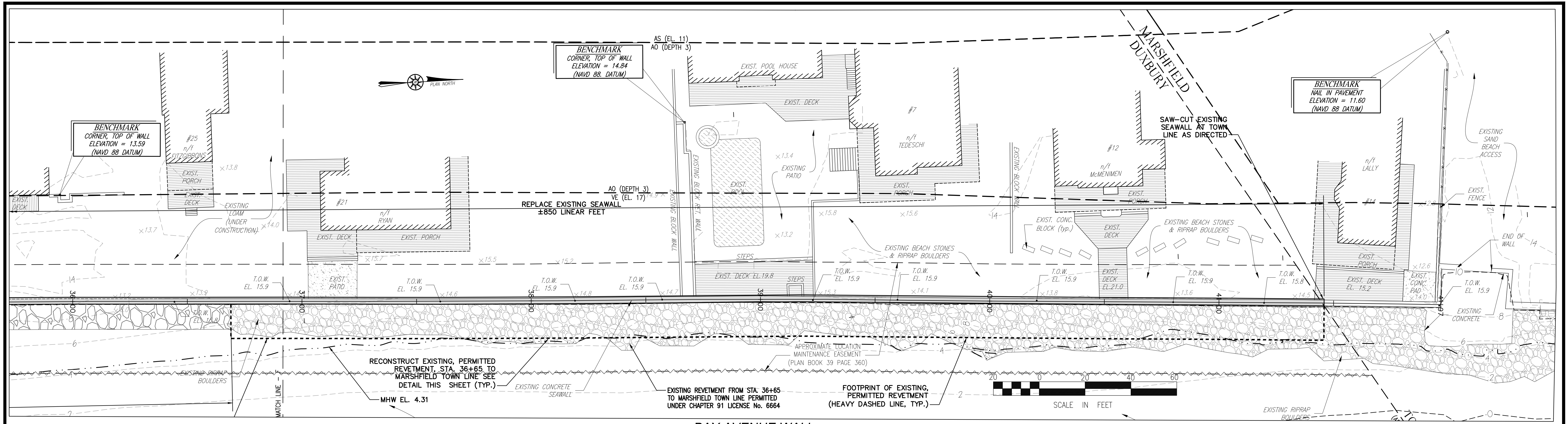
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JOB NO.: 23-135  
DATE: 7/10/23

SCALE: AS SHOWN  
DWG. NO.: \*\*  
CONTRACT: 2024-II

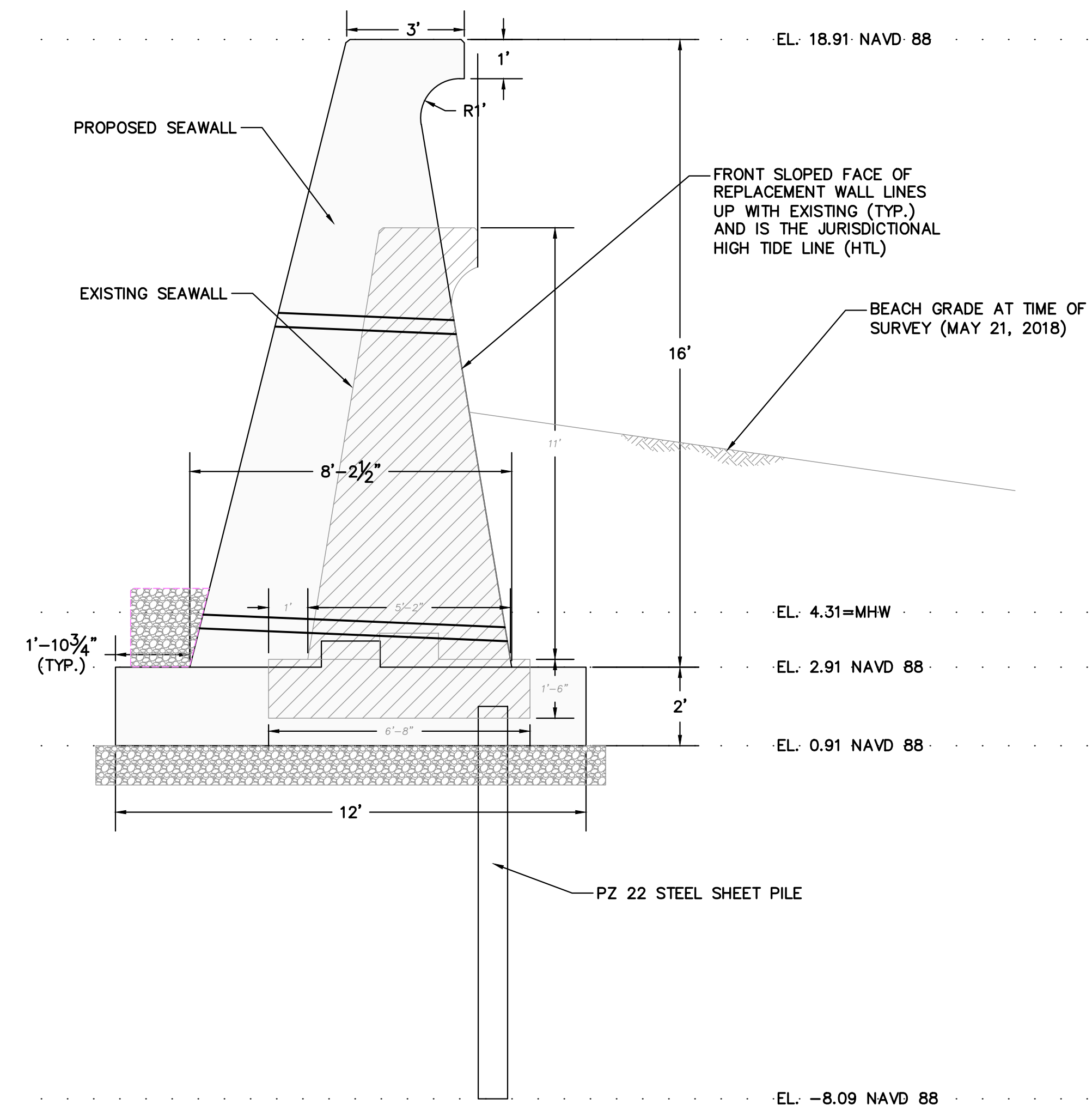
DEPARTMENT OF PUBLIC WORKS  
DUXBURY, MASSACHUSETTS

PROPOSED REPAIRS  
DUXBURY BEACH SEAWALLS - PHASE II  
GURNET ROAD, PLYMOUTH AVENUE  
& BAY AVENUE

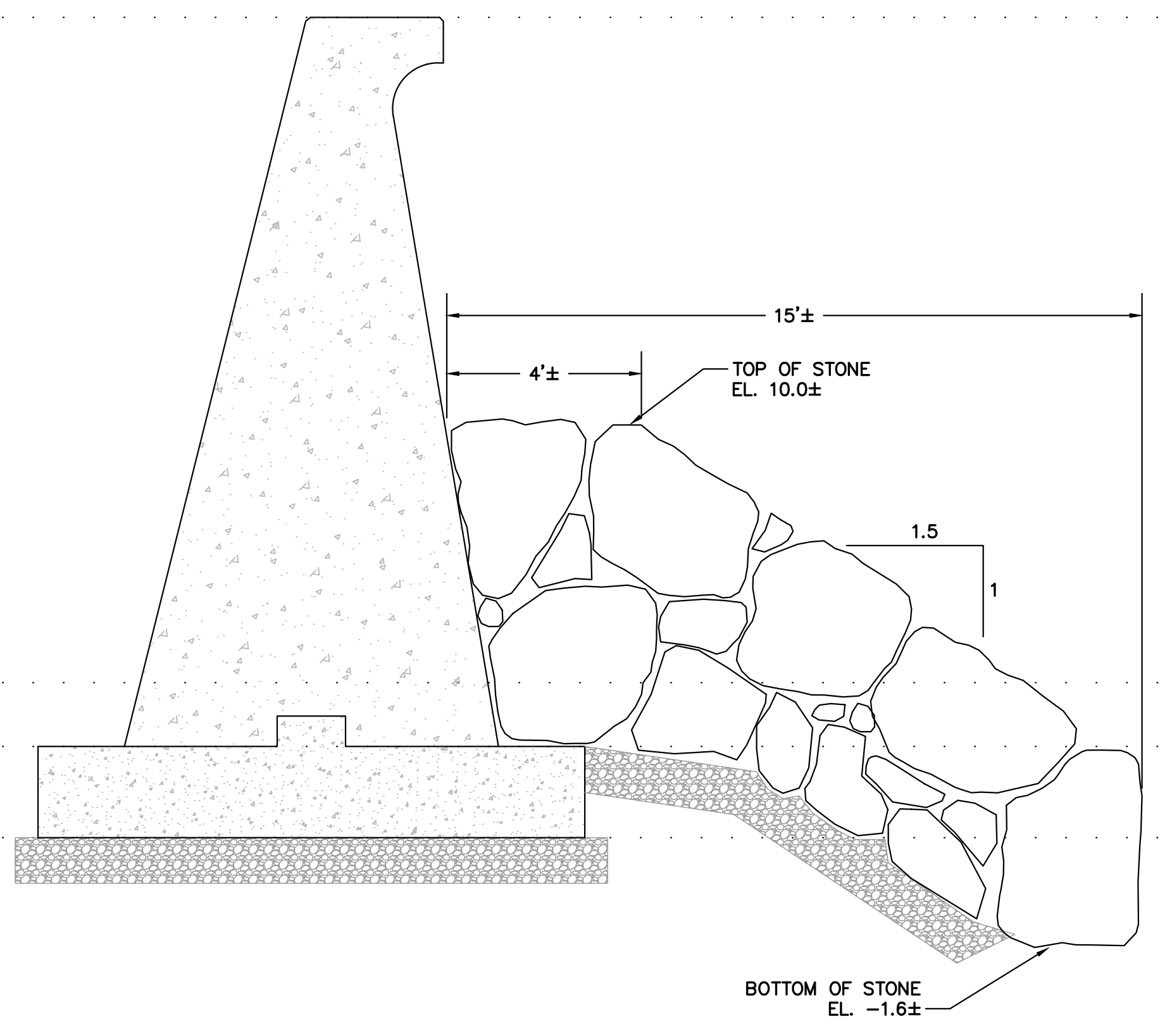
CIVIL SHEET  
3 OF 6



**BAY AVENUE WALL**  
SCALE: 1" = 20'-0"



**WALL COMPARISON DETAIL**  
SCALE: 3/8" = 1'-0"



**RETVEMENT RECONSTRUCTION DETAIL**  
STA. 15+69 TO 19+20 & STA. 36+65 TO 41+46  
SCALE: 3/8" = 1'-0"

- NOTES:**
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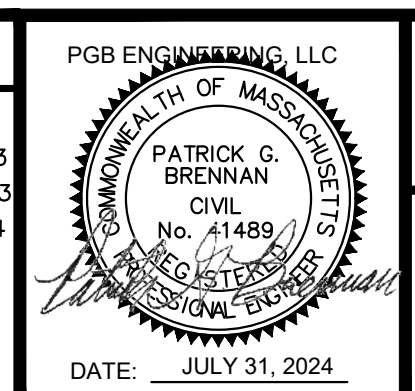
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  - STA. 15+19 TO STA. 29+53
  - STA. 32+96 TO STA. 41+46
- REMOVE REVETMENT STONE:**
- STA. 33+53 TO STA. 36+65
  - STA. 15+20 TO STA. 15+69

**DATUM RELATIONSHIPS FOR STATION 8446166 DUXBURY, MA:**

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-5.93	MEAN LOWER-LOW WATER (MLLW)

REVISIONS		
NO.	ITEM	DATE
1.	MEPA REVIEW COMMENTS	9/20/23
2.	END WALL PROTECTION & COBBLE BERM	12/12/23
3.	ISSUED FOR BIDDING	7/31/24

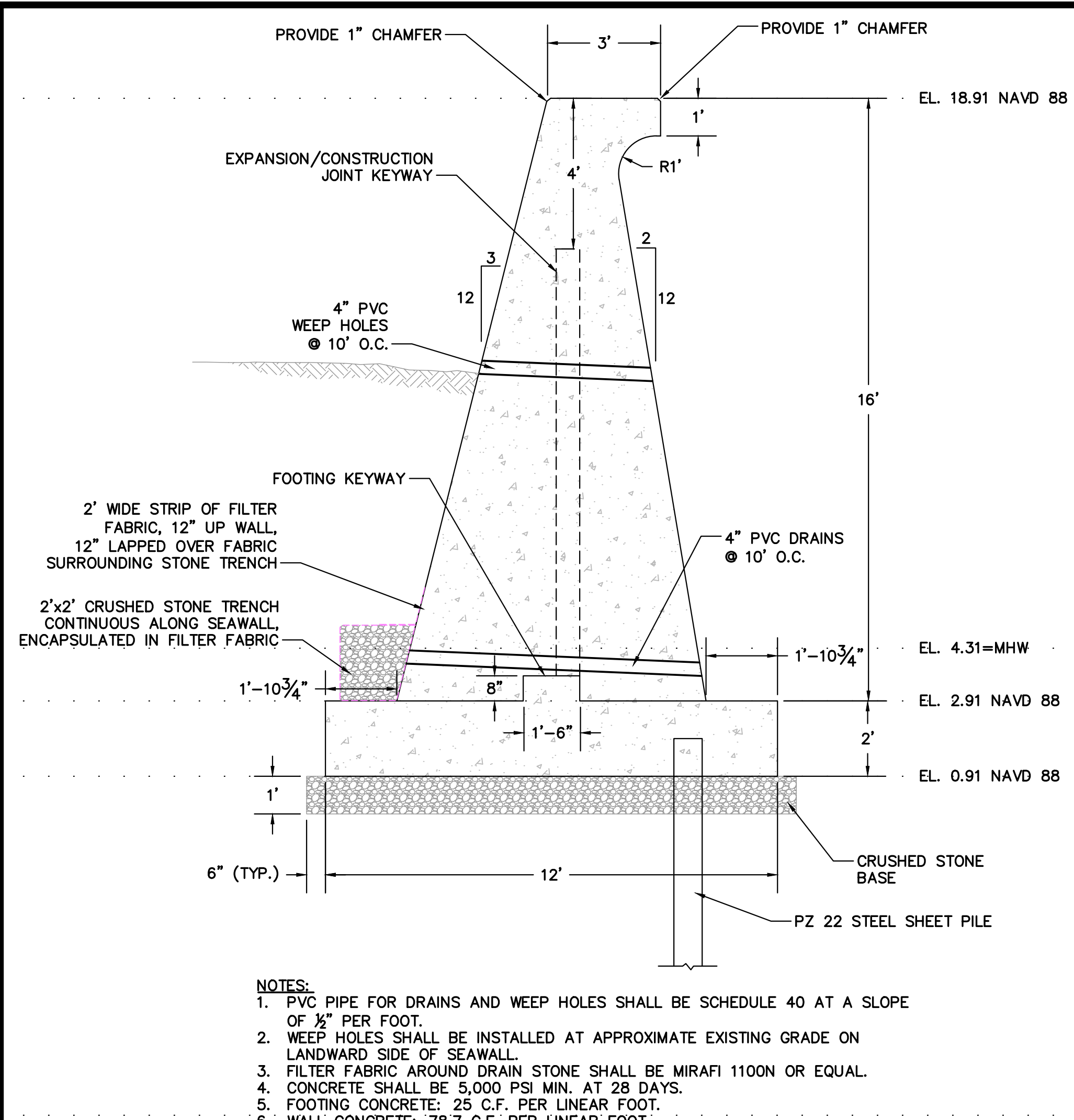


**PGB ENGINEERING, LLC**  
MARSHFIELD, MASSACHUSETTS

DRAWN BY:	PGB	FILE NAME:	AS SHOWN	SCALE:	AS SHOWN
DESIGNED BY:	PGB	JOB NO.:	23-135	DWG. NO.:	**
CHECKED BY:	PGB	DATE:	7/10/23	CONTRACT:	2024-II

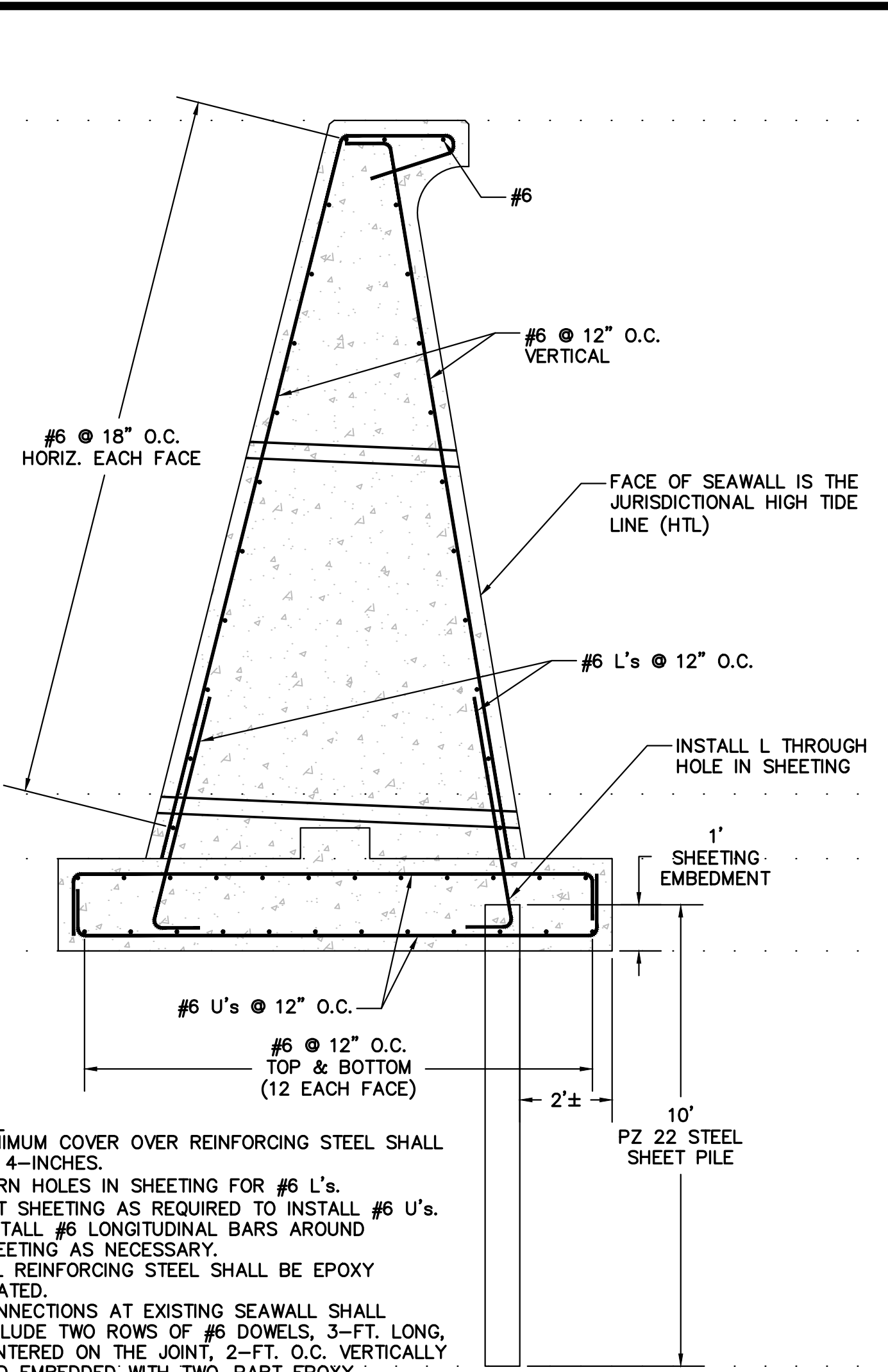
DEPARTMENT OF PUBLIC WORKS DUXBURY, MASSACHUSETTS		CIVIL
PROPOSED REPAIRS DUXBURY BEACH SEAWALLS - PHASE II PLAN - BAY AVENUE & DETAIL		SHEET 4 OF 6

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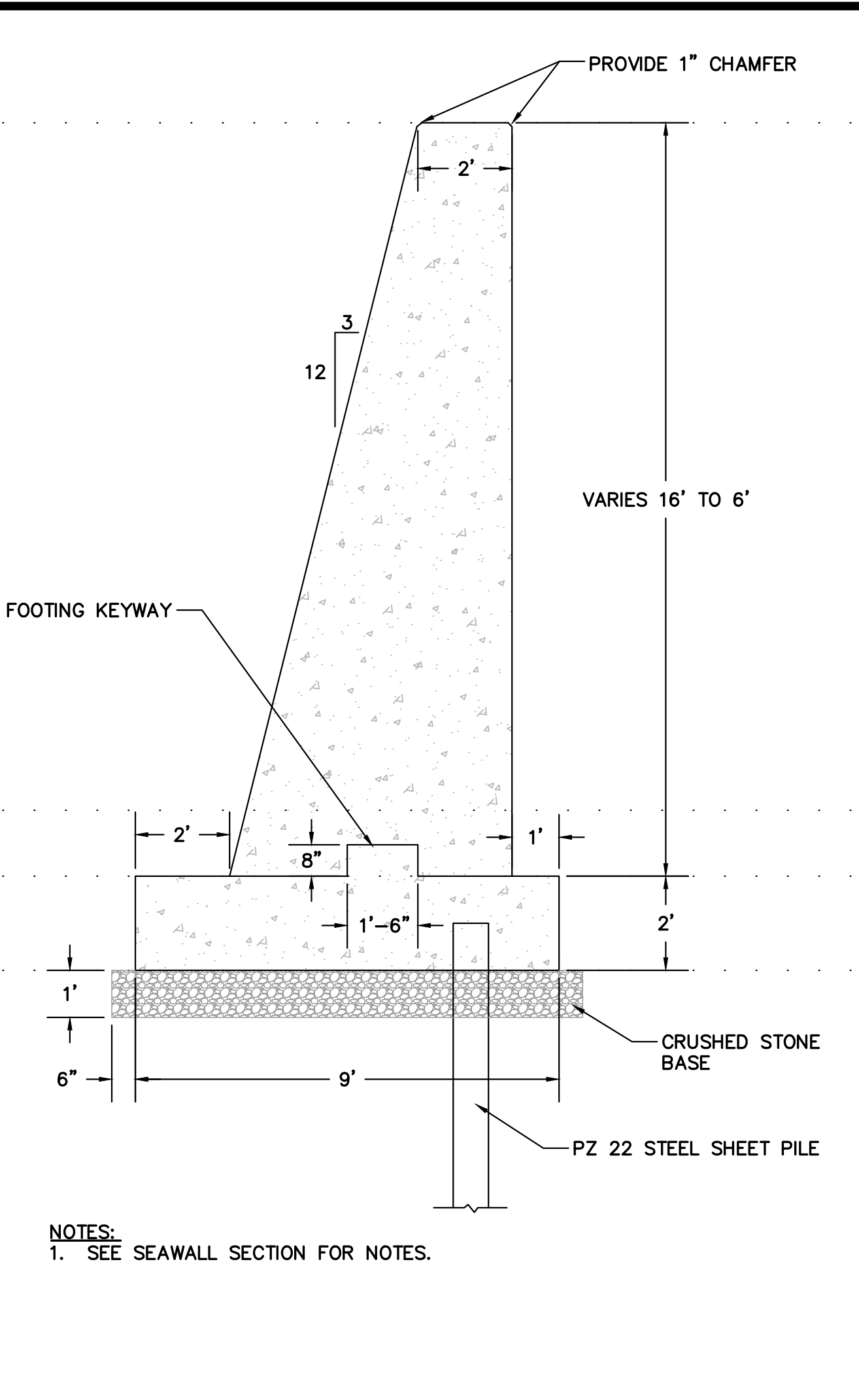
- NOTES:**
- PVC PIPE FOR DRAINS AND WEEP HOLES SHALL BE SCHEDULE 40 AT A SLOPE OF 1/2" PER FOOT.
  - WEEP HOLES SHALL BE INSTALLED AT APPROXIMATE EXISTING GRADE ON LANDWARD SIDE OF SEAWALL.
  - FILTER FABRIC AROUND DRAIN STONE SHALL BE MIRAFI 1100N OR EQUAL.
  - CONCRETE SHALL BE 5,000 PSI MIN. AT 28 DAYS.
  - FOOTING CONCRETE: 25 C.F. PER LINEAR FOOT.
  - WALL CONCRETE: 78.7 C.F. PER LINEAR FOOT.

**SEAWALL SECTION**  
SCALE: 3/8" = 1'-0"



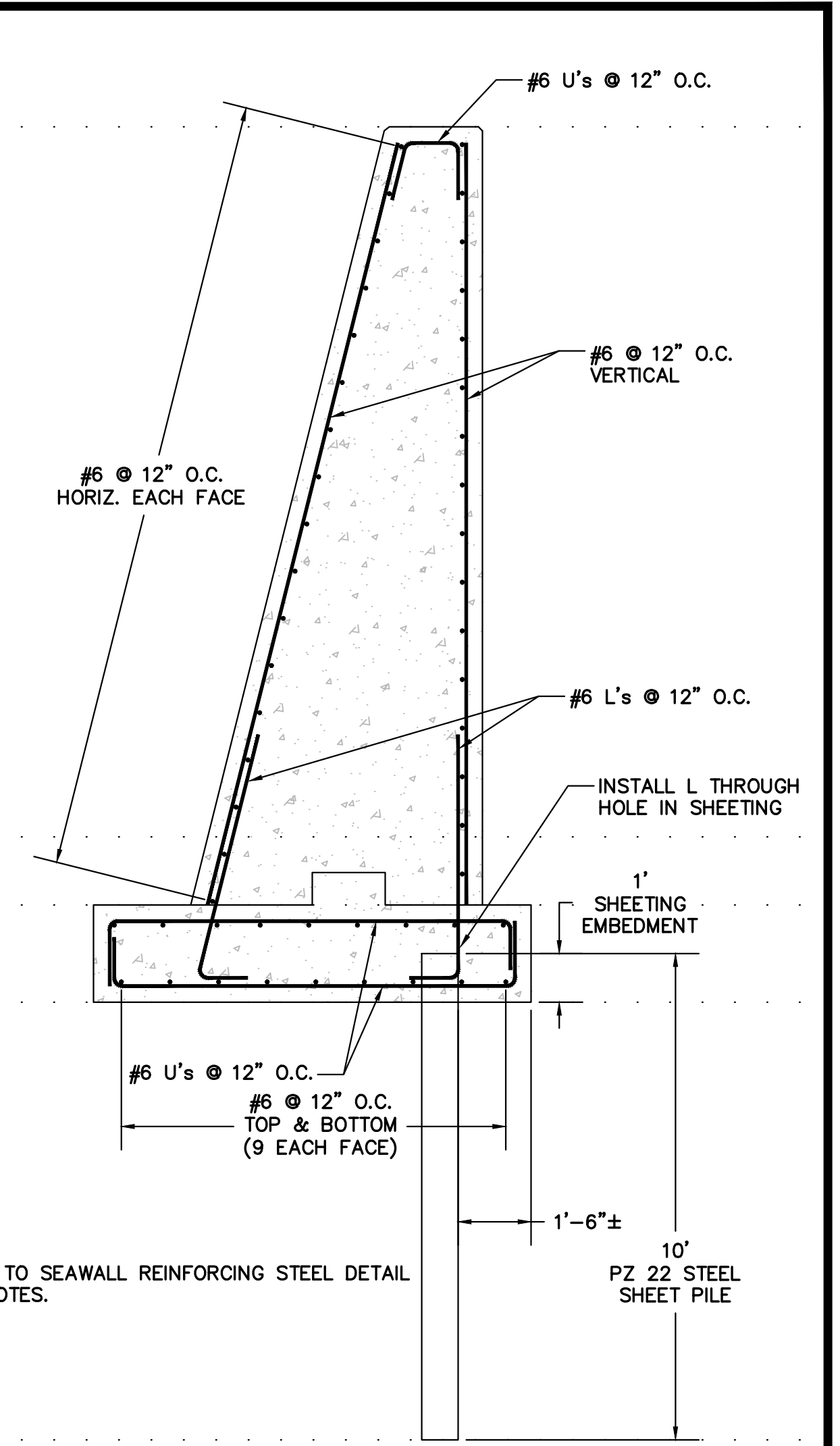
- NOTES:**
- MINIMUM COVER OVER REINFORCING STEEL SHALL BE 4-INCHES.
  - BURN HOLES IN SHEETING FOR #6 L's.
  - CUT SHEETING AS REQUIRED TO INSTALL #6 U's.
  - INSTALL #6 LONGITUDINAL BARS AROUND SHEETING AS NECESSARY.
  - ALL REINFORCING STEEL SHALL BE EPOXY COATED.
  - CONNECTIONS AT EXISTING SEAWALL SHALL INCLUDE TWO ROWS OF #6 DOWELS, 3-FT. LONG, CENTERED ON THE JOINT, 2-FT. O.C. VERTICALLY AND EMBEDDED WITH TWO-PART EPOXY.

**SEAWALL REINFORCING STEEL**  
SCALE: 3/8" = 1'-0"



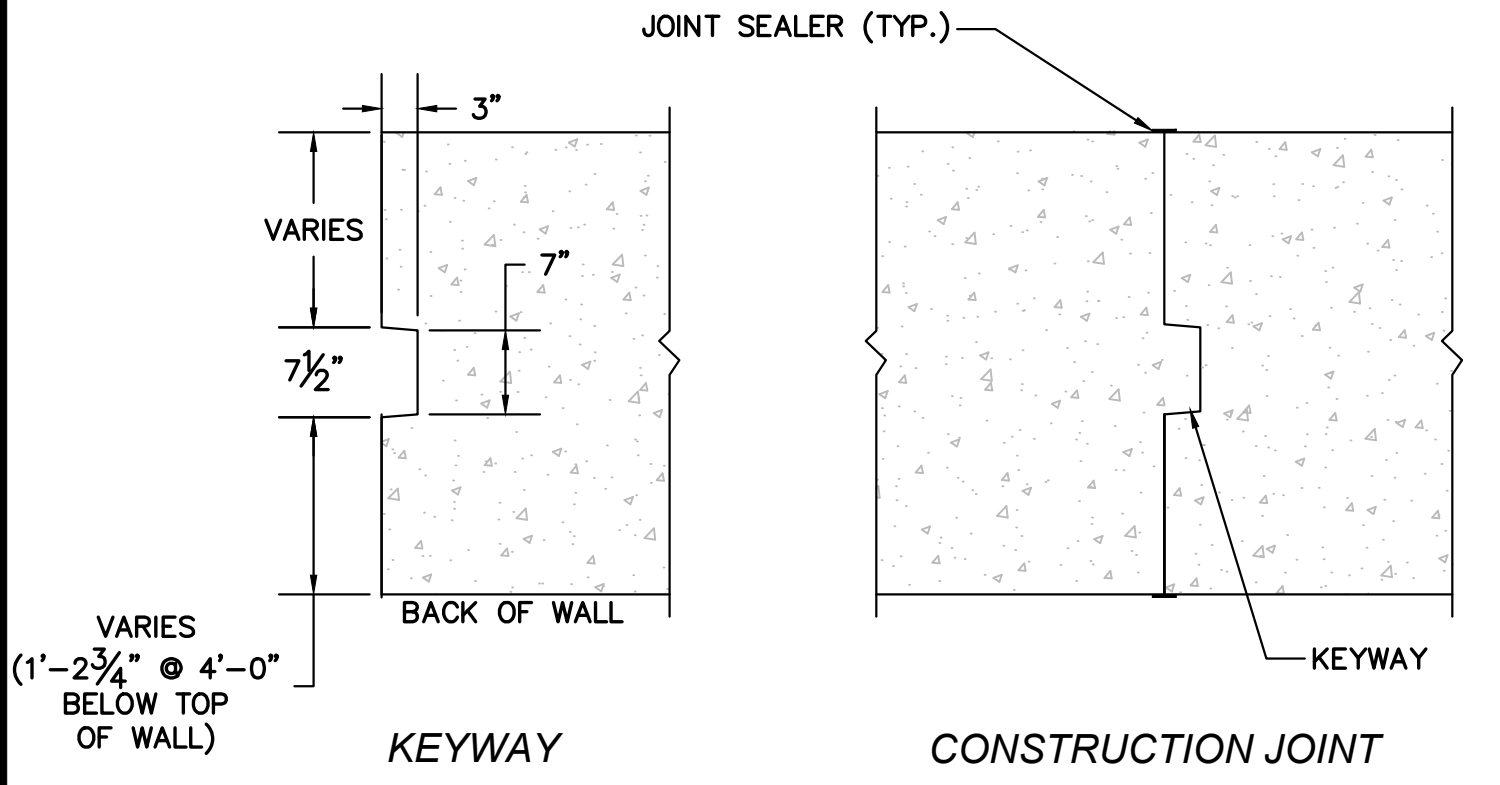
- NOTES:**
- SEE SEAWALL SECTION FOR NOTES.

**RETURN WALL SECTION**  
SCALE: 3/8" = 1'-0"



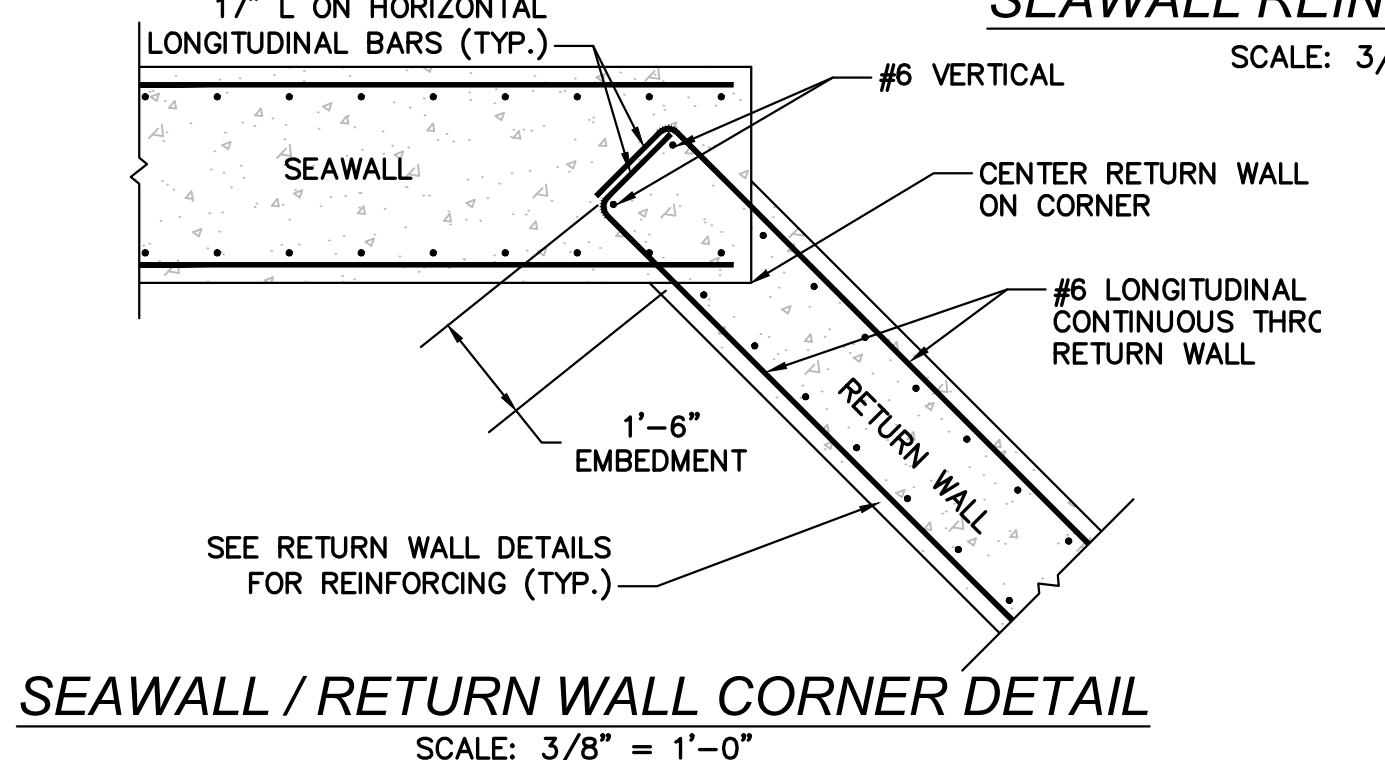
- NOTES:**
- REFER TO SEAWALL REINFORCING STEEL DETAIL FOR NOTES.

**RETURN WALL REINFORCING STEEL**  
SCALE: 3/8" = 1'-0"

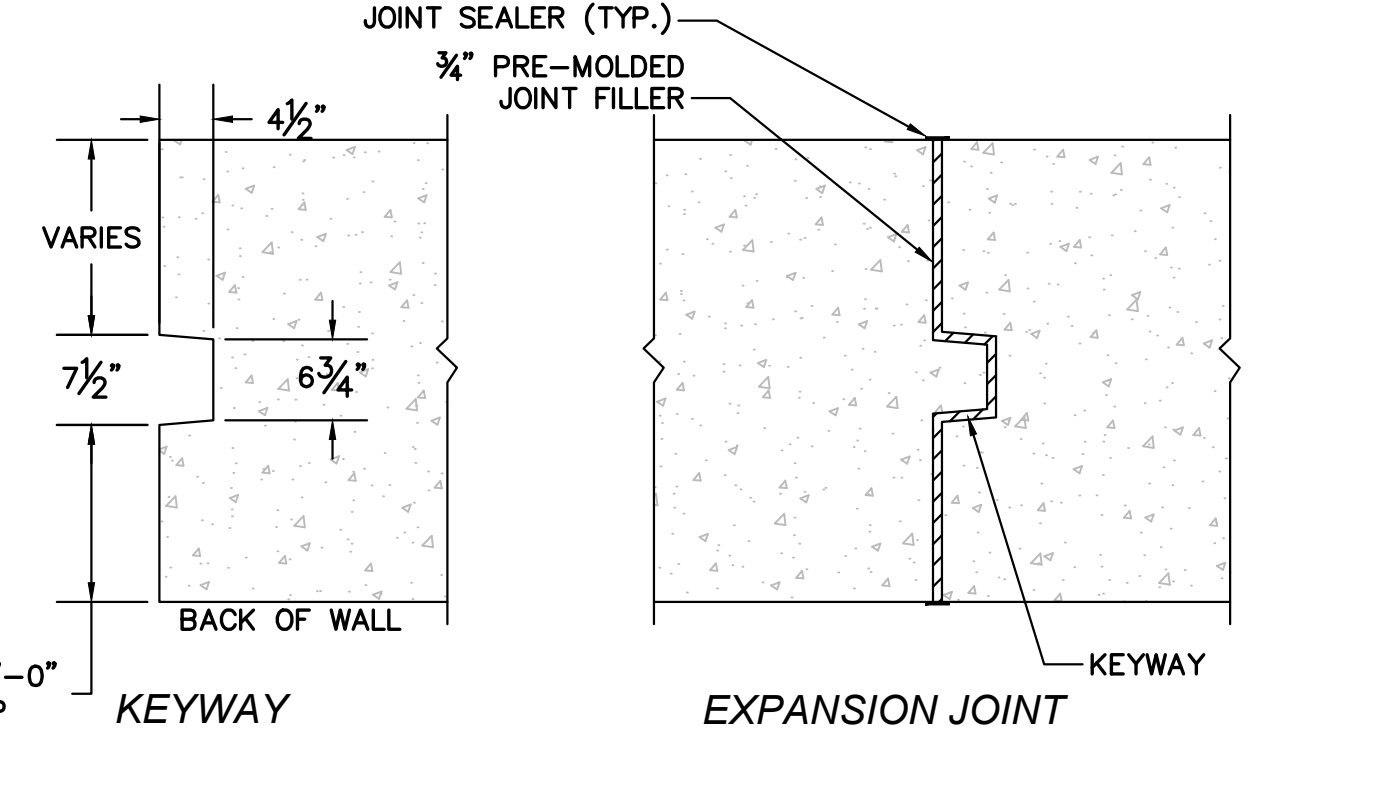


- NOTES:**
- MAXIMUM CONSTRUCTION JOINT SPACING SHALL BE 25 FEET.
  - KEYWAY SHALL TERMINATE FOUR FEET BELOW TOP OF WALL.
  - JOINT FILLER SHALL EXTEND TO TOP OF WALL.
  - JOINT SEALER SHALL BE APPLIED AT ALL EXTERIOR JOINT SURFACES.
  - WALL AND FOOTING CONSTRUCTION JOINTS SHALL BE OFFSET A MINIMUM OF FIVE FEET.
  - REINFORCING BARS ARE NOT CONTINUOUS THROUGH THE CONSTRUCTION AND EXPANSION JOINTS OF THE SEAWALL. HOWEVER, REINFORCING BARS SHALL BE CONTINUOUS THROUGH THE FOOTING CONSTRUCTION AND EXPANSION JOINTS.

**CONSTRUCTION JOINT DETAIL**  
SCALE: 3/4" = 1'-0"

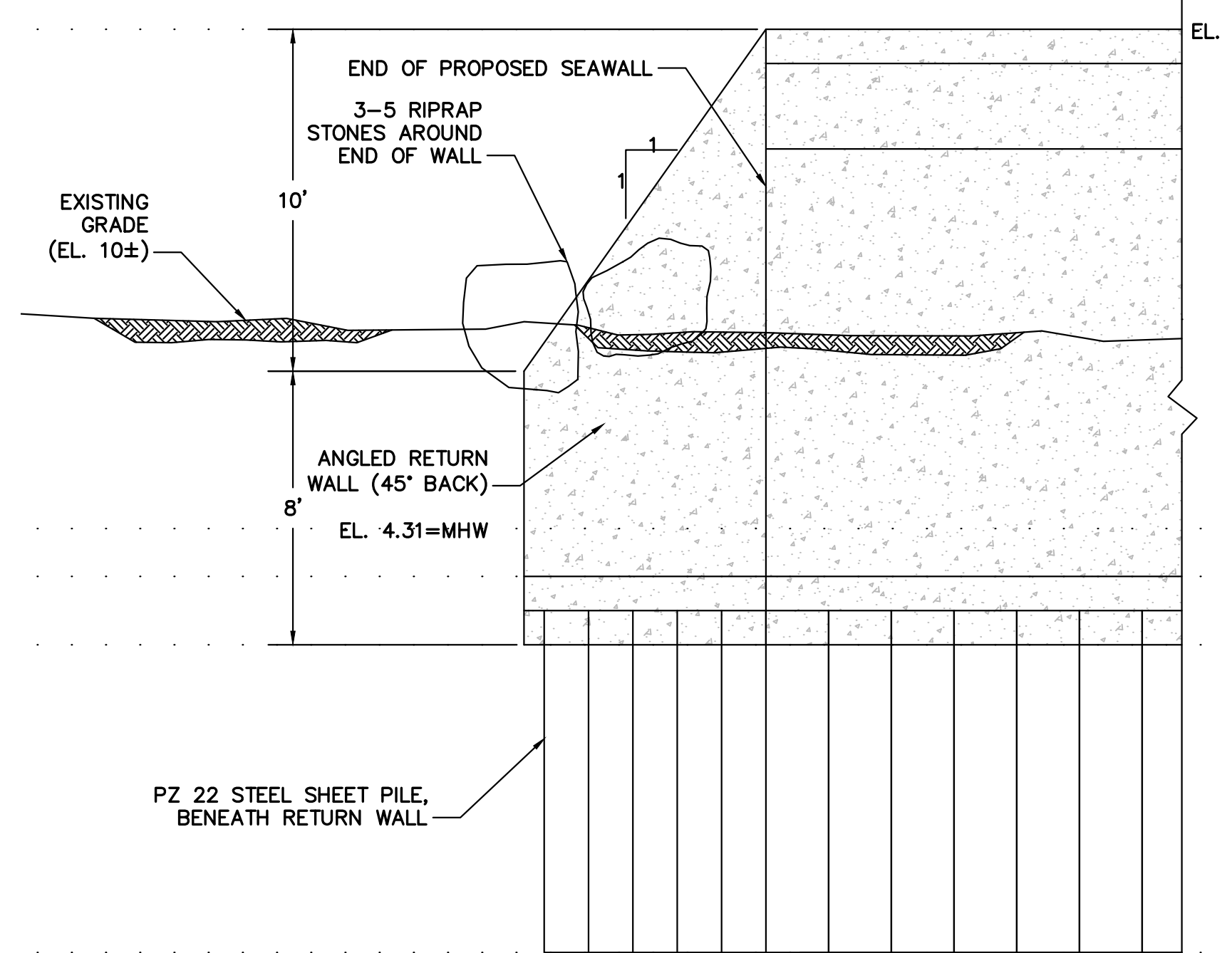


**SEAWALL / RETURN WALL CORNER DETAIL**  
SCALE: 3/8" = 1'-0"

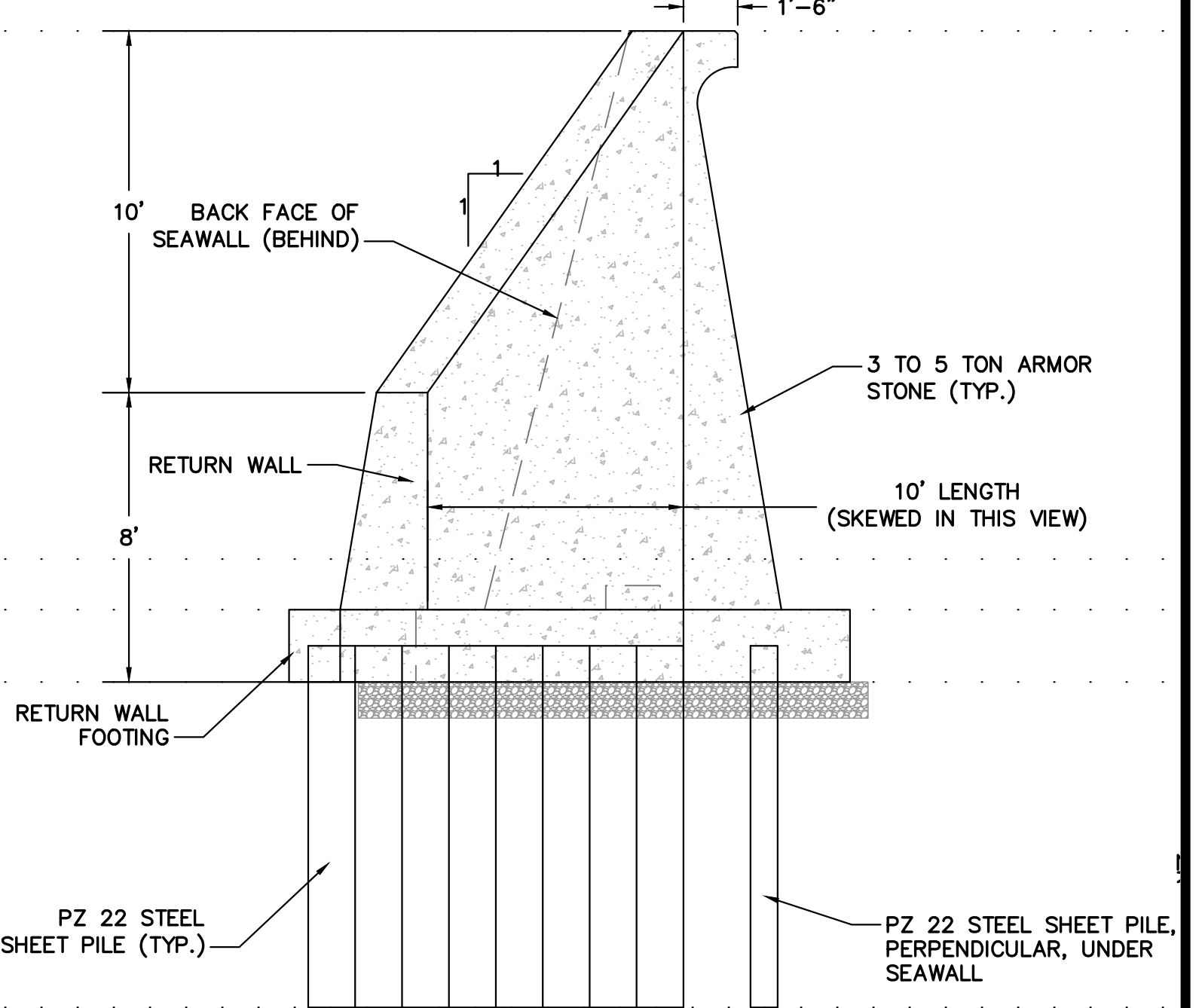


- NOTES:**
- MAXIMUM EXPANSION JOINT SPACING SHALL BE 100 FEET.
  - KEYWAY SHALL TERMINATE FOUR FEET BELOW TOP OF WALL.
  - JOINT FILLER SHALL EXTEND TO TOP OF WALL.
  - JOINT SEALER SHALL BE APPLIED AT ALL EXTERIOR JOINT SURFACES.
  - WALL AND FOOTING EXPANSION JOINTS SHALL BE OFFSET A MINIMUM OF FIVE FEET.
  - REINFORCING BARS ARE NOT CONTINUOUS THROUGH THE CONSTRUCTION AND EXPANSION JOINTS OF THE SEAWALL. HOWEVER, REINFORCING BARS SHALL BE CONTINUOUS THROUGH THE FOOTING CONSTRUCTION AND EXPANSION JOINTS.

**EXPANSION JOINT DETAIL**  
SCALE: 3/4" = 1'-0"



**END WALL PROTECTION DETAIL**  
SCALE: 1/4" = 1'-0"



**END WALL ELEVATION**  
SCALE: 1/4" = 1'-0"

NO.	ITEM	DATE
1.	MEPA REVIEW COMMENTS	9/20/23
2.	END WALL PROTECTION & COBBLE BERM	12/12/23
3.	ISSUED FOR BIDDING	7/31/24



**PGB ENGINEERING, LLC**  
MARSHFIELD, MASSACHUSETTS

DRAWN BY: PGB  
DESIGNED BY: PGB  
CHECKED BY: PGB

FILE NAME: AS SHOWN  
JOB NO.: 23-135  
DATE: 7/10/23

SCALE: AS SHOWN  
DWG. NO.: \*\*  
CONTRACT: 2024-II

DEPARTMENT OF PUBLIC WORKS  
DUXBURY, MASSACHUSETTS

PROPOSED REPAIRS  
DUXBURY BEACH SEAWALLS - PHASE II

CIVIL  
SHEET  
5 OF 6

DETAILS, SECTIONS AND ELEVATION



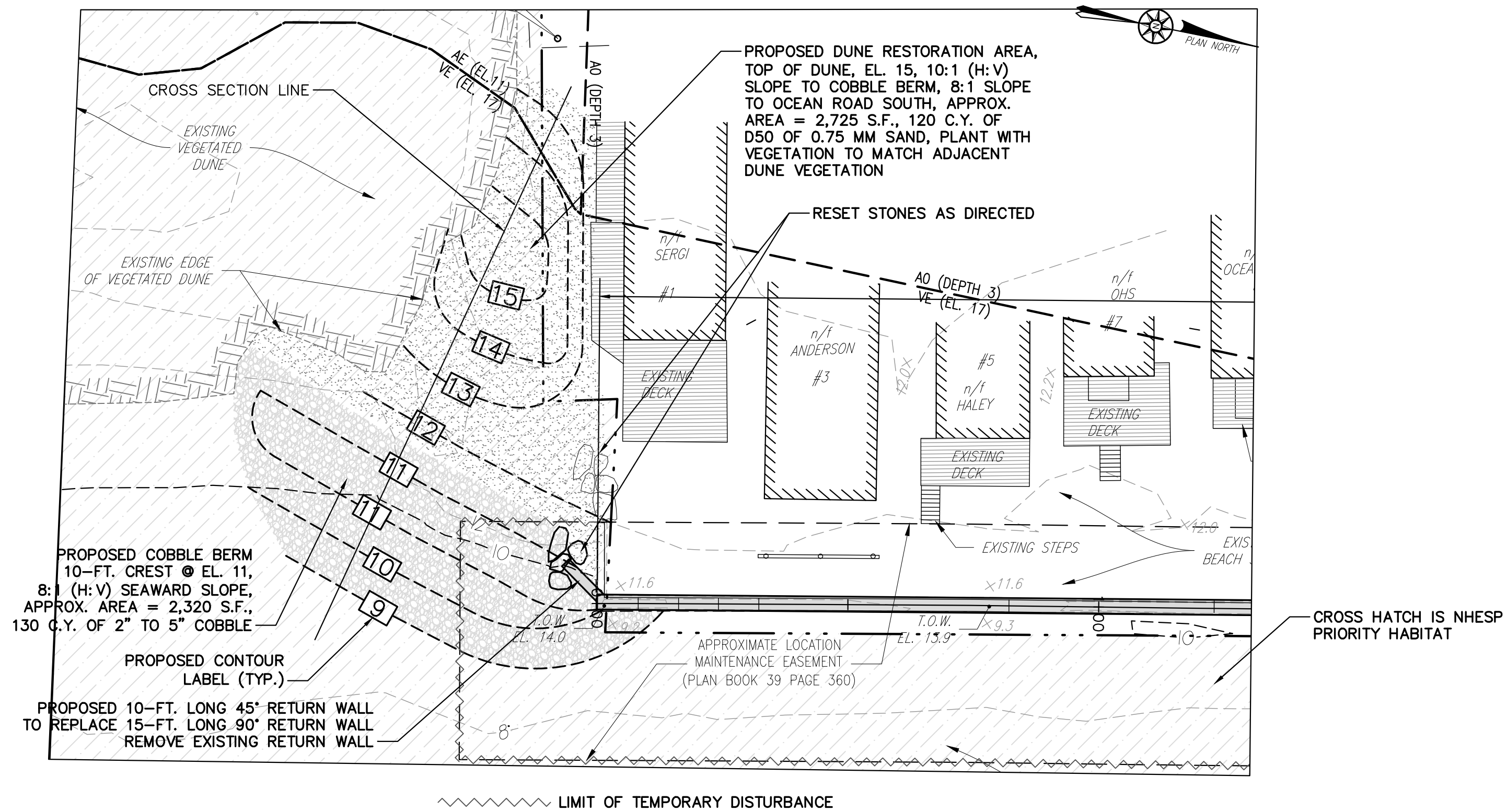
EXISTING SOUTHERN END RETURN WALL



LOCATION OF DUNE PROPOSED RESTORATION



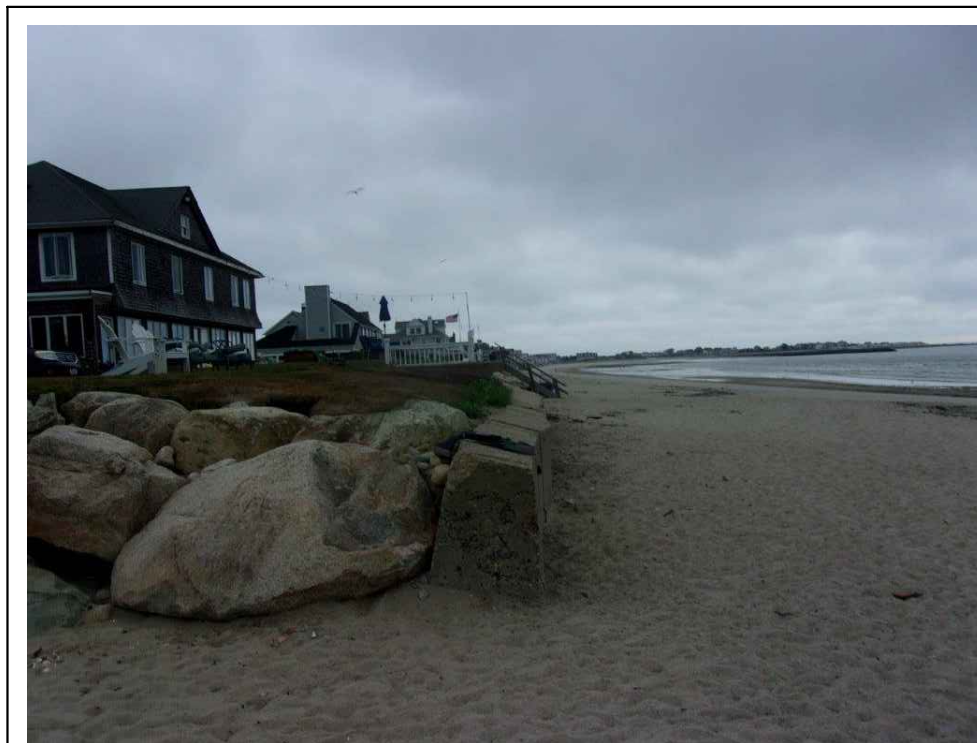
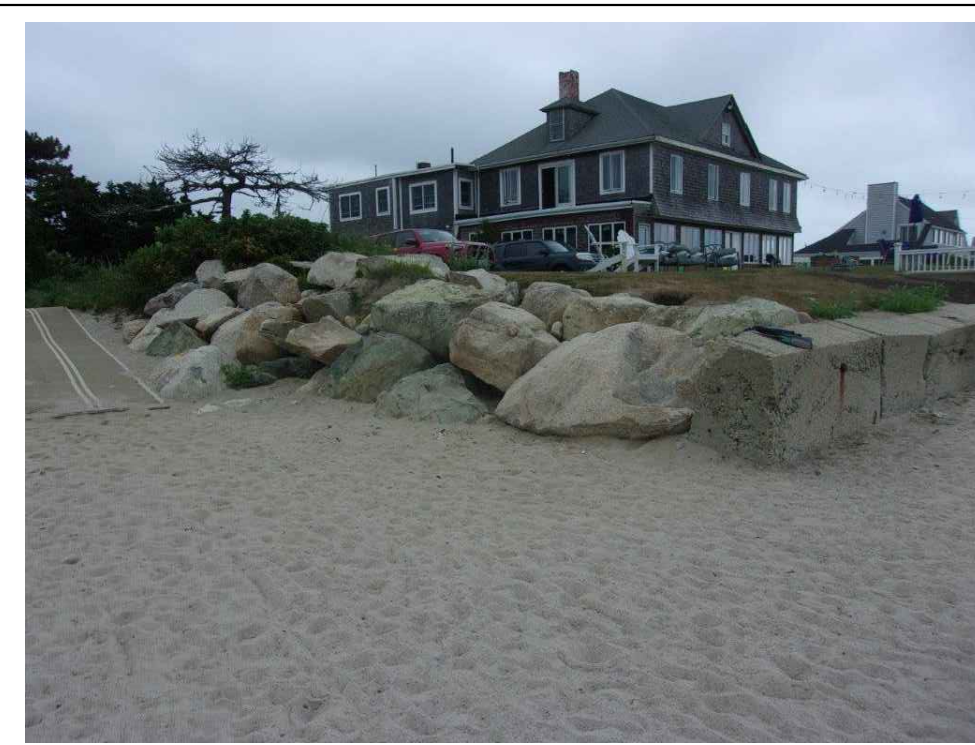
EXAMPLE OF BEACH GRASS PLANTING



EXISTING REVETMENT AT STA. 29+50 TO BE REMOVED & RECONSTRUCTED



EXISTING REVETMENT AT STA. 33+00 TO BE REMOVED & RECONSTRUCTED



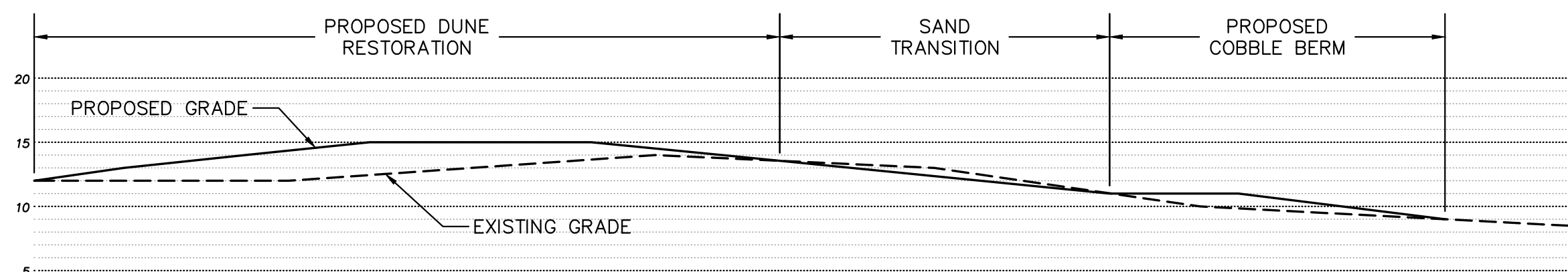
SEAWALL AT STA. 32+96 TO 33+53 WITH STEEL & TIEBACKS (ALSO IN 3 PHOTOS DIRECTLY ABOVE)



- NOTES:**
- EXISTING BEACH GRADE REPRESENTS THE GRADE OF THE BEACH AT THE TIME OF SURVEY (5/21/18). THE GRADE IS IN A STATE OF FLUX AND CONSTANTLY CHANGING. THE PURPOSE OF THE COBBLE BERM IS TO ADD STABILITY TO THE BEACH GRADE AND PROTECT AGAINST SCOUR AT THE END OF THE SEAWALL.
  - CONTRACTOR SHALL SUBMIT COBBLE AND SAND GRAIN SIZE ANALYSES TO ENGINEER FOR APPROVAL PRIOR TO IMPORTING MATERIAL.
  - THE RECONSTRUCTED/RESTORED SAND DUNE SHALL BE PLANTED WITH CAPE AMERICAN BEACH GRASS. THE 25-FOOT WIDE CONSTRUCTION VEHICLE ACCESS ROUTE FROM THE DBR NORTH PARKING LOT STAGING AREA TO THE BEACH SHALL ALSO BE PLANTED WITH CAPE AMERICAN BEACH GRASS. PLANTING SHALL BE TWO TO THREE CULMS PER HOLE SET AT 36 INCHES ON CENTER.
  - THICKNESS OF COBBLE BERM AT CREST SHALL BE A MINIMUM OF THREE FEET. REGRADE EXISTING MATERIAL TO PROVIDE THE MINIMUM THICKNESS. REGRADED MATERIAL SHALL BE USED IN RESTORED SAND DUNE.

**END WALL PROTECTION/BEACH NOURISHMENT PLAN**

SCALE: 1" = 20'-0"



**END WALL PROTECTION/BEACH NOURISHMENT CROSS SECTION**

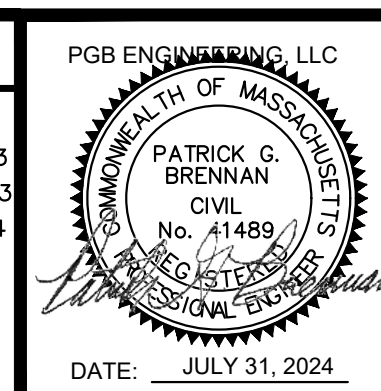
SCALE: 1" = 10'-0"

DATUM RELATIONSHIPS FOR STATION 8446166 DUXBURY, MA:

4.31	MEAN HIGH WATER (MHW)
0.00	NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)
-0.44	MEAN SEA LEVEL (MSL)
-0.64	MEAN TIDE LEVEL (MTL)
-5.59	MEAN LOW WATER (MLW)
-5.93	MEAN LOWER-LOW WATER (MLLW)

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REVISIONS		
NO.	ITEM	DATE
1.	MEPA REVIEW COMMENTS	9/20/23
2.	END WALL PROTECTION & COBBLE BERM ISSUED FOR BIDDING	12/12/23
3.		7/31/24



**PGB ENGINEERING, LLC**  
MARSHFIELD, MASSACHUSETTS

DRAWN BY: PGB	FILE NAME: AS SHOWN	SCALE: AS SHOWN
DESIGNED BY: PGB	JOB NO.: 23-135	DWG. NO.: **
CHECKED BY: PGB	DATE: 7/10/23	CONTRACT: 2024-II

DATE: JULY 31, 2024

DEPARTMENT OF PUBLIC WORKS  
DUXBURY, MASSACHUSETTS

PROPOSED REPAIRS  
DUXBURY BEACH SEAWALLS - PHASE II

PLAN, CROSS SECTION AND PHOTOS