

BOWIE MILL BIKE TRAIL
VERTICAL CURVE DATA

HORIZ. SCALE: 1/2" = 1'-0"
VERT. SCALE: 1" = 1'-0"

GENERAL NOTES:

SPECIFICATIONS: MDOT SHA STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, DATED JULY, 2024.

DESIGN: AASHTO LRFD GUIDE SPECIFICATIONS FOR THE DESIGN OF PEDESTRIAN BRIDGES, 2ND EDITION WITH 2015 INTERIM REVISIONS. AASHTO LRFD DESIGN OF BRIDGES, 9TH EDITION.

LOAD RESTRICTIONS: THERE ARE RESTRICTIONS FOR PLACING EQUIPMENT AND MATERIALS ON EXISTING AND NEW STRUCTURE(S). REFER TO SECTION TC 6.14.

CONCRETE: CONCRETE COMPRESSION STRENGTH FOR DESIGN SHALL BE:
f'c = 3000 PSI FOR ELEMENTS USING MIX NO. 3
f'c = 4000 PSI FOR ELEMENTS USING MIX NO. 6

ALL CONCRETE FOR ABUTMENT BACKWALLS, AND DECK SLAB SHALL BE MIX NO. 6 (4500 PSI) CONTAINING SYNTHETIC FIBERS (SEE SECTION 902.15.01).

ALL OTHER CONCRETE SHALL BE MIX NO. 3 (3500 PSI).

REINFORCING STEEL: REINFORCING STEEL SHALL CONFORM TO ASTM A 615 GRADE 60, WITH A YIELD STRENGTH FOR DESIGN OF fy = 60000 psi.

ALL SPLICES, NOT SHOWN, SHALL BE LAPPED AS PER BAR LAP CHARTS.

REINFORCING STEEL SHALL BE EPOXY COATED WHEN NOTED WITH AN EP IN THE PLANS.

MINIMUM CLEAR COVER FOR REINFORCING STEEL SHALL BE 2" UNLESS OTHERWISE NOTED.

LOCATION	CLEAR COVER
BOTTOM OF BRIDGE DECK SLABS.	1 IN.
TOP OF BRIDGE DECK SLABS.	2 1/2 IN.
BOTTOM AND SIDES OF ALL FOOTINGS.	3 IN.

FOR TIES AND STIRRUPS, STANDARD ACI BENDING TOLERANCES ARE MODIFIED TO PLUS (+) ZERO INCHES, MINUS (-) NORMAL ACI BENDING TOLERANCES.

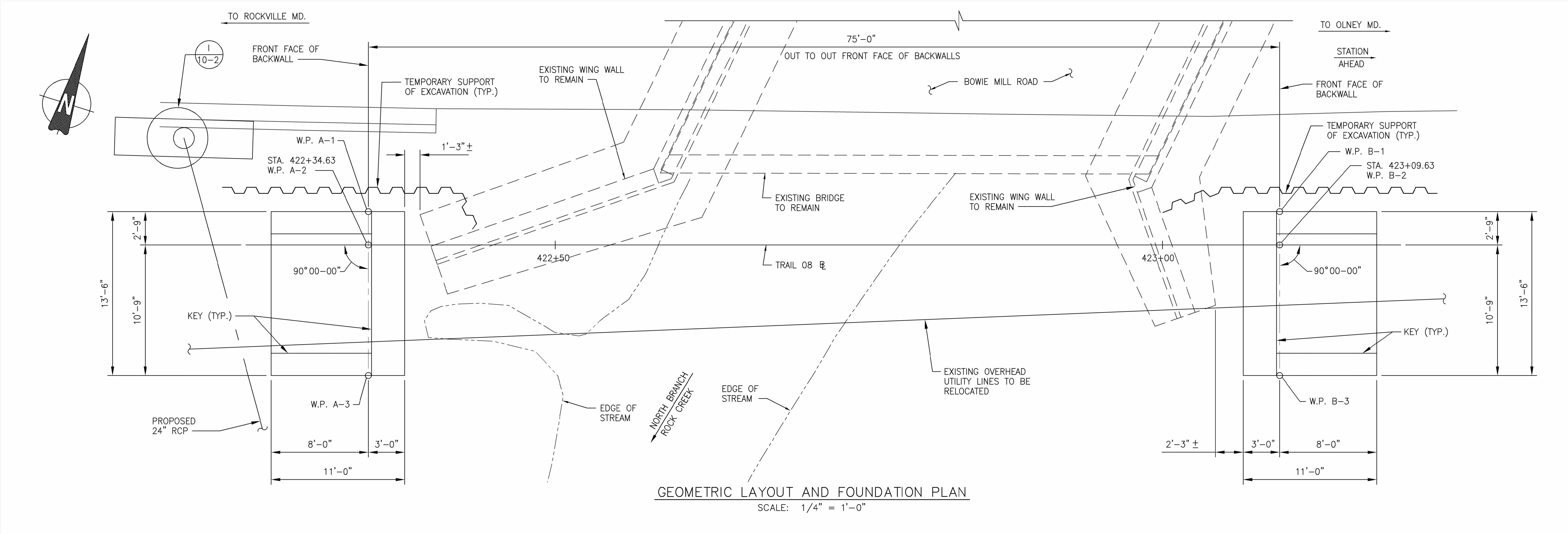
CHAMFER: ALL EXPOSED CORNERS OF CONCRETE SHALL BE CHAMFERED WITH 3/4" x 3/4" MILLED CHAMFER STRIPS.

STRUCTURAL STEEL: STRUCTURAL STEEL SHALL CONFORM TO ASTM A 709 GRADE 50 INCLUDING THE ADDITIONAL REQUIREMENTS FOR CHARPY V-NOTCH TESTING OF M 270 FOR PRIMARY LOAD CARRYING MEMBERS, REFER TO SECTION 909.01 AND SHALL BE GALVANIZED IN ACCORDANCE WITH A 123, A 153, AND SECTION 465 AND PAINTED. THE COLOR FOR THE FINISH COAT SHALL MATCH AMS-STD-595A, COLOR NO. 20045 (BROWN).

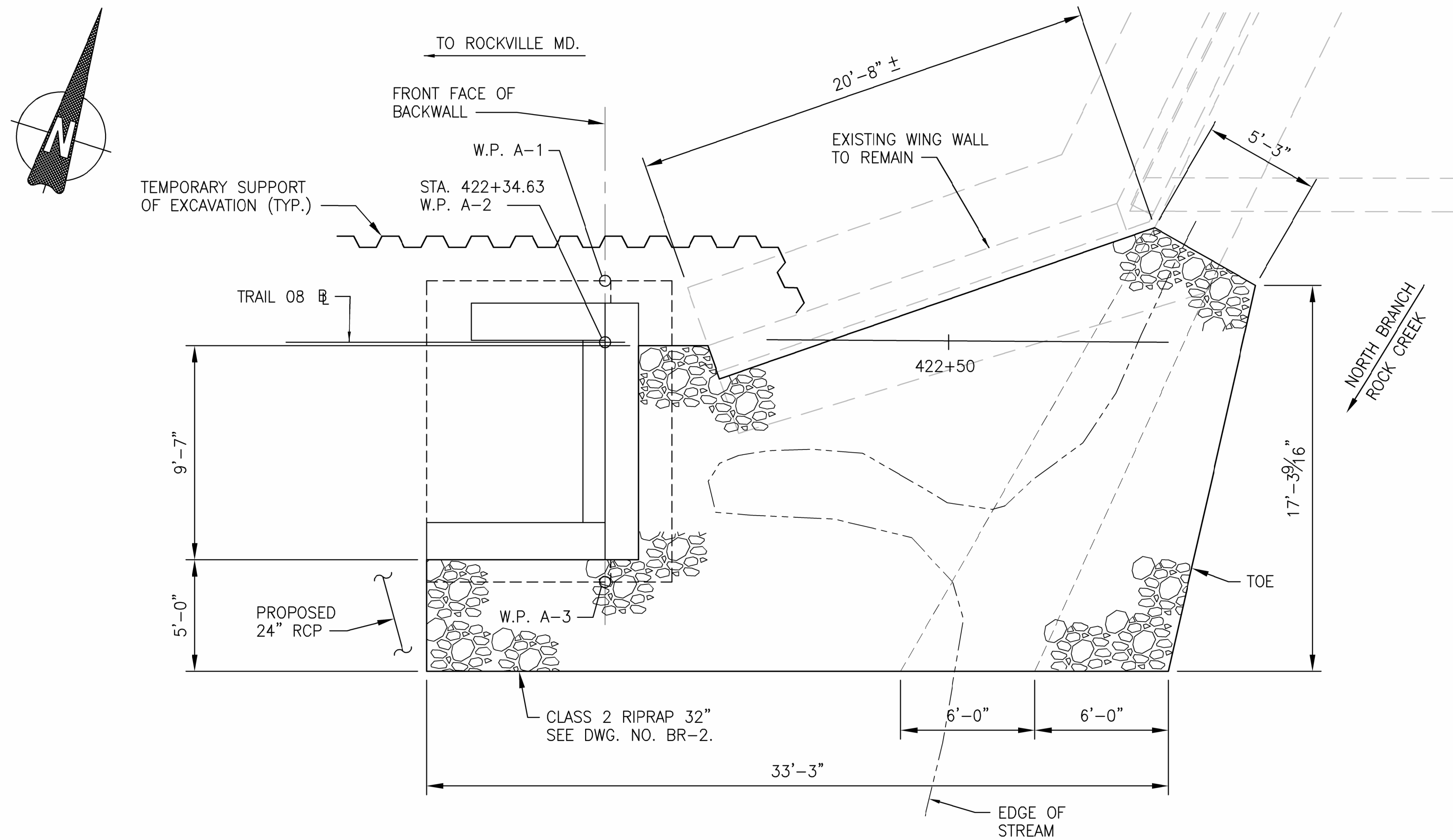
KEYS: ALL KEYS ARE NOMINAL SIZE.

NONREDUNDANT STEEL MEMBERS: THIS STRUCTURE CONTAINS NON REDUNDANT STEEL MEMBERS, SEE DRAWING NO. BR-12 FOR IDENTIFICATION OF THESE MEMBERS. SEE SPECIAL PROVISIONS FOR REQUIREMENTS FOR THESE MEMBERS.

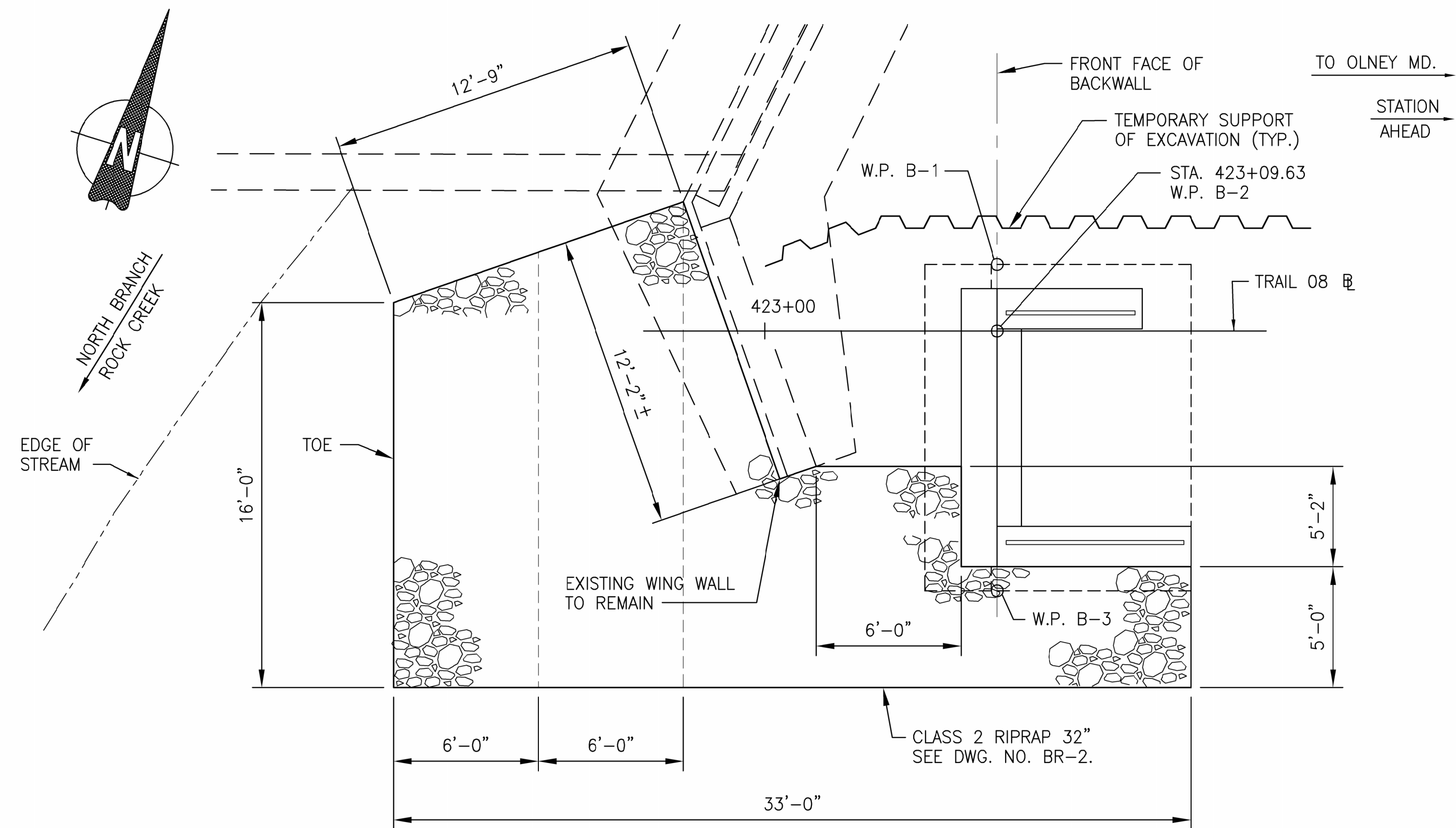
EXISTING STRUCTURES: ALL DIMENSIONS AFFECTED BY THE GEOMETRY AND/OR LOCATION OF THE STRUCTURE(S): EXISTING STRUCTURE(S) SHALL BE CHECKED IN THE FIELD BY THE CONTRACTOR BEFORE ANY MATERIALS IS ORDERED OR FABRICATED OR CONSTRUCTION BEGINS.



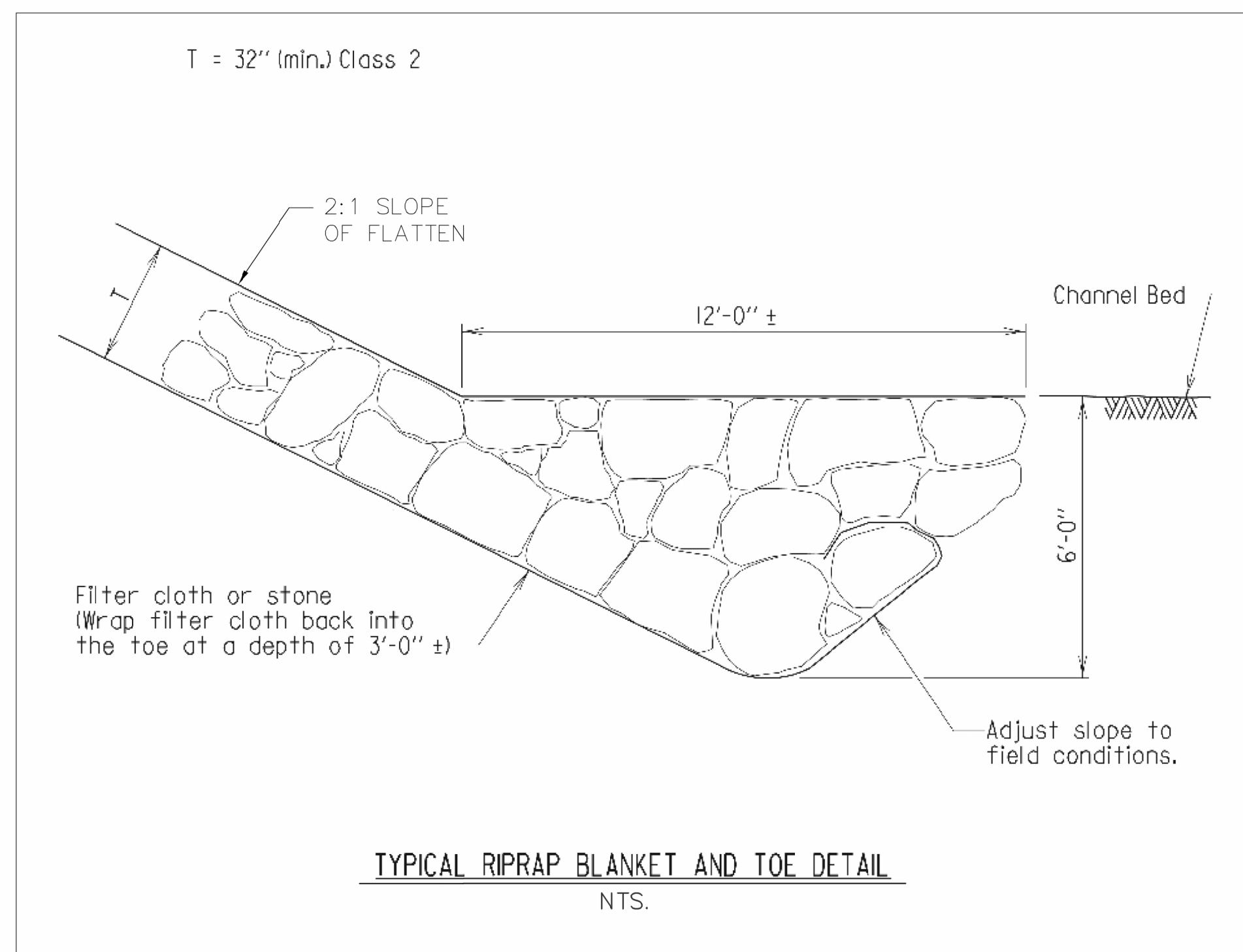
WORK POINT TABLE				
W.P. NO.	STATION	OFFSET	COORDINATE	
			EASTING	NORTHING
A-1	422+35.63	2.50' LT.		
A-2	422+35.63	0.00' LT.		
A-3	422+35.63	10.50' RT.		
B-1	423+08.63	2.50' LT.		
B-2	423+08.63	0.00' LT.		
B-3	423+08.63	10.50' RT.		



ABUTMENT A - RIPRAP LAYOUT
SCALE: 1/4" = 1'-0"

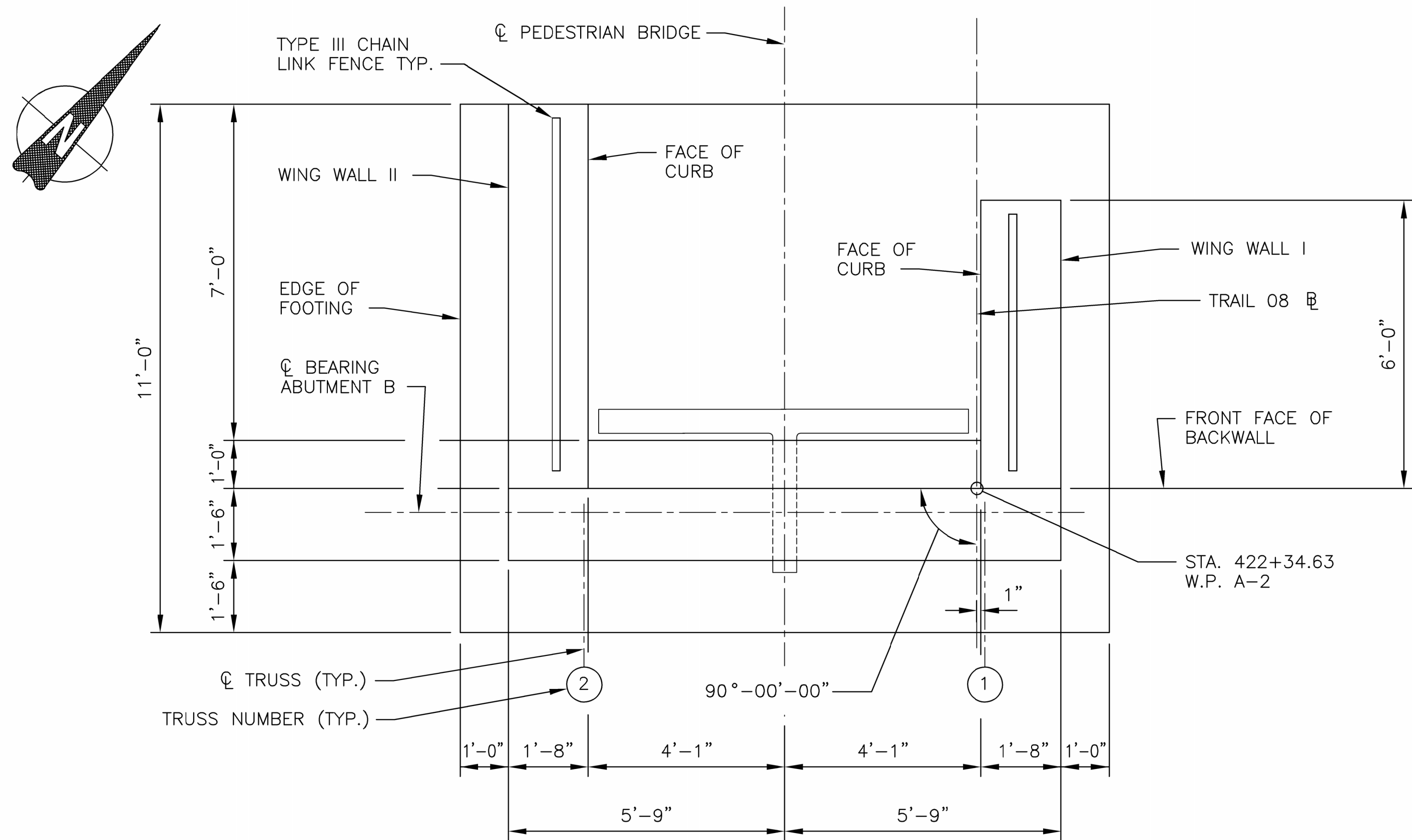


ABUTMENT B - RIPRAP LAYOUT
SCALE: 1/4" = 1'-0"



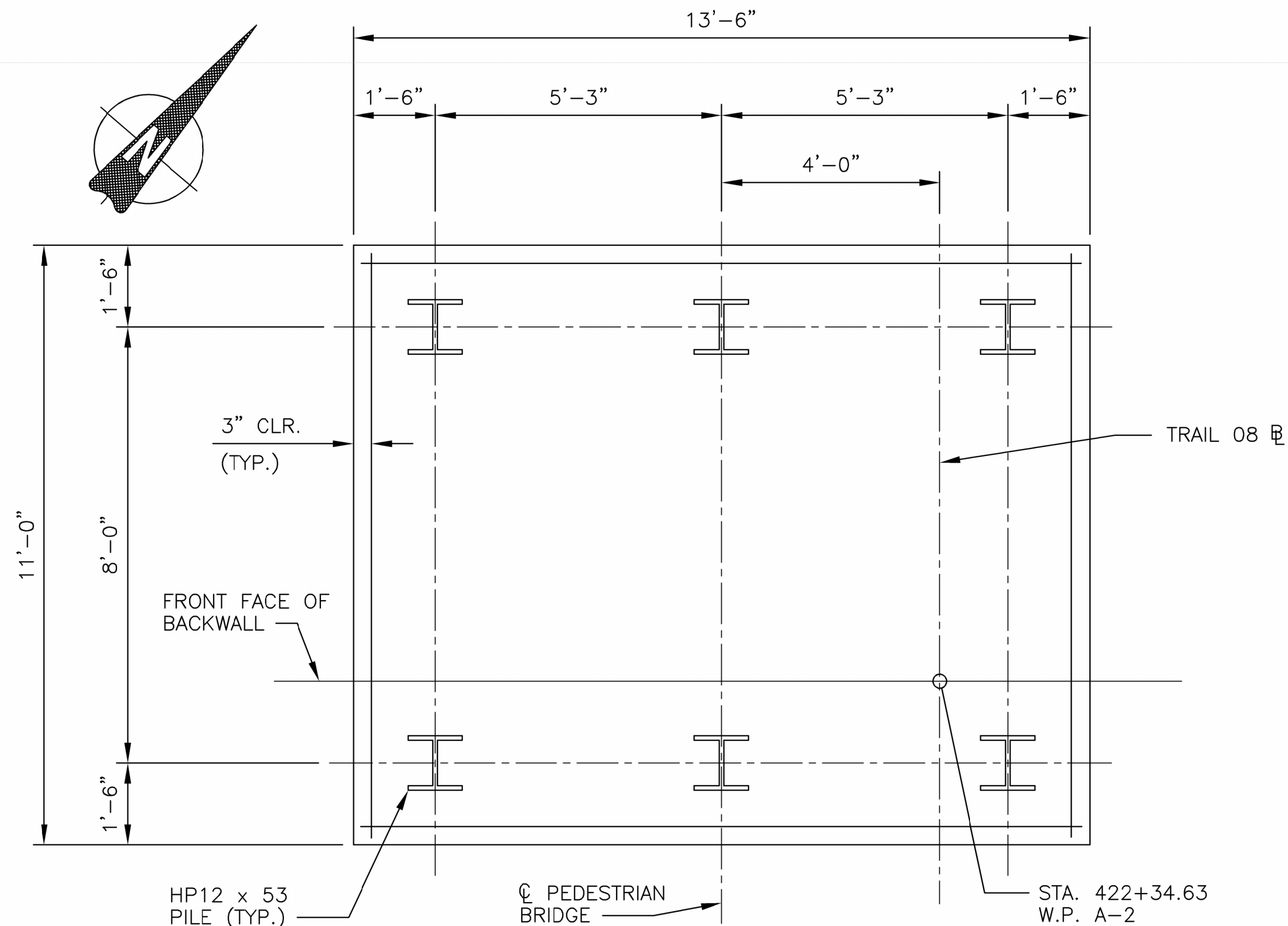
TYPICAL RIPRAP BLANKET AND TOE DETAIL
NTS.

<p>90% DESIGN NOT FOR CONSTRUCTION</p> <p>ALA Athavale, Lystad & Associates 6720-B Rockledge Drive, Suite 160 Bethesda, MD 20817</p>				<p>MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION GAITHERSBURG, MARYLAND</p>				<p>BR-04 PEDESTRIAN BRIDGE NO. P-XX RIPRAP LAYOUT PLAN AND DETAILS</p>			
				<p>RECOMMENDED FOR APPROVAL</p>				<p>BOWIE MILL ROAD BIKEWAY M-NCPPC PERMIT NO. <u>MR2023016</u></p>			
				<p>Chief, Design Section APPROVED</p>				<p>DATE: APRIL 2025</p>			
				<p>Chief, Division of Transportation Engineering</p>				<p>Project No. : <u>502108</u></p>			
<p>NO. REVISION DATE BY</p>				<p>Designed by: <u>MW</u> Drawn by: <u>JE</u> Checked by: <u>KA</u></p>				<p>Sheet <u>191</u> of <u>393</u></p>			



ABUTMENT A - PLAN

SCALE: 1/2" = 1'-0"

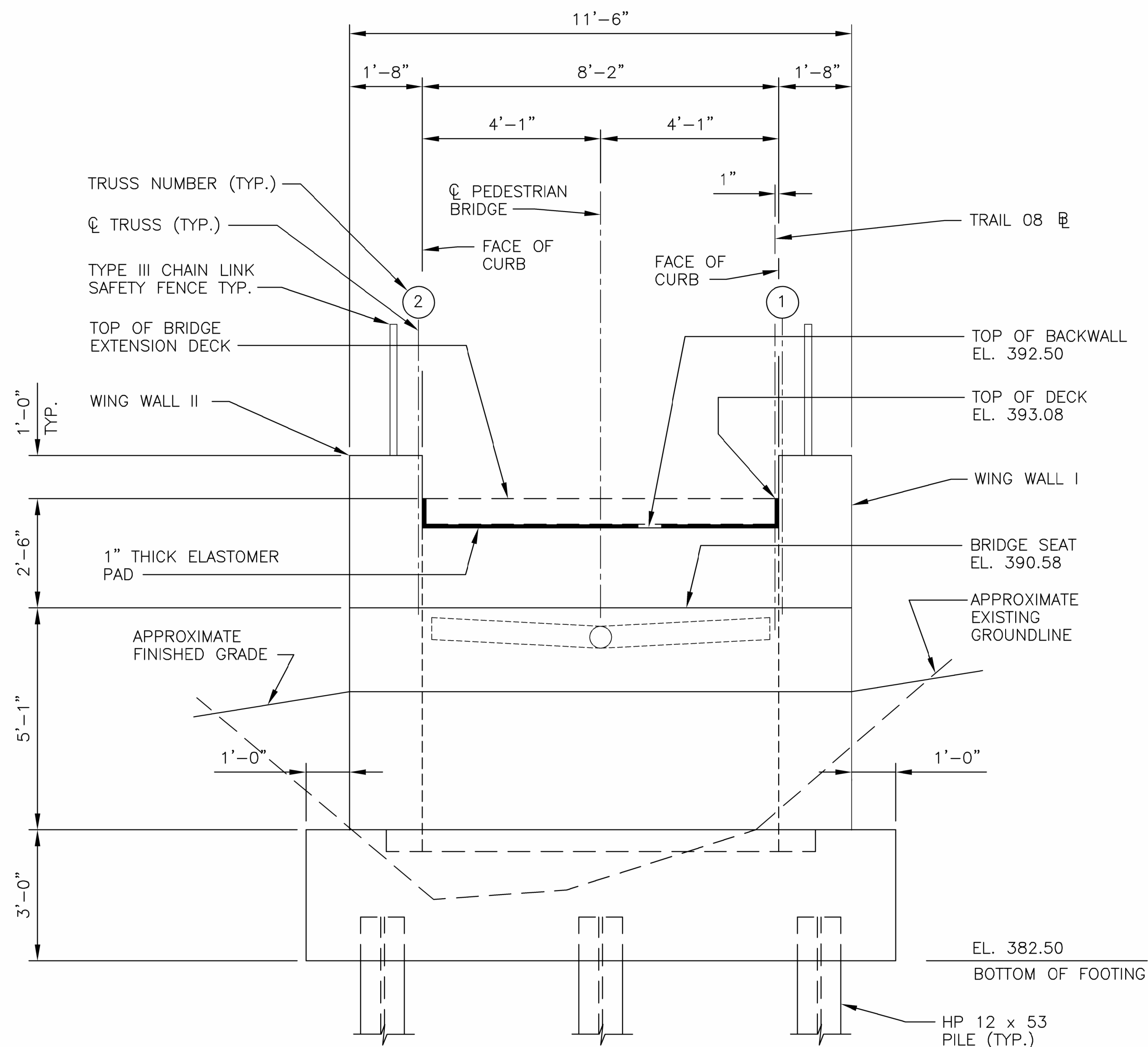


ABUTMENT A - PILE LAYOUT PLAN

SCALE: 1/2" = 1'-0"

PILE TIP DATA				
	DESIGN DATA		ACTUAL FIELD DATA	
SUBSTRUCTURE UNIT	MINIMUM TIP ELEVATION	ESTIMATED TIP ELEVATION	AVERAGE ACTUAL MINIMUM TIP ELEVATION	AVERAGE ACTUAL MAXIMUM TIP ELEVATION
ABUTMENT A	352.0 *	352.0

* OR REFUSAL




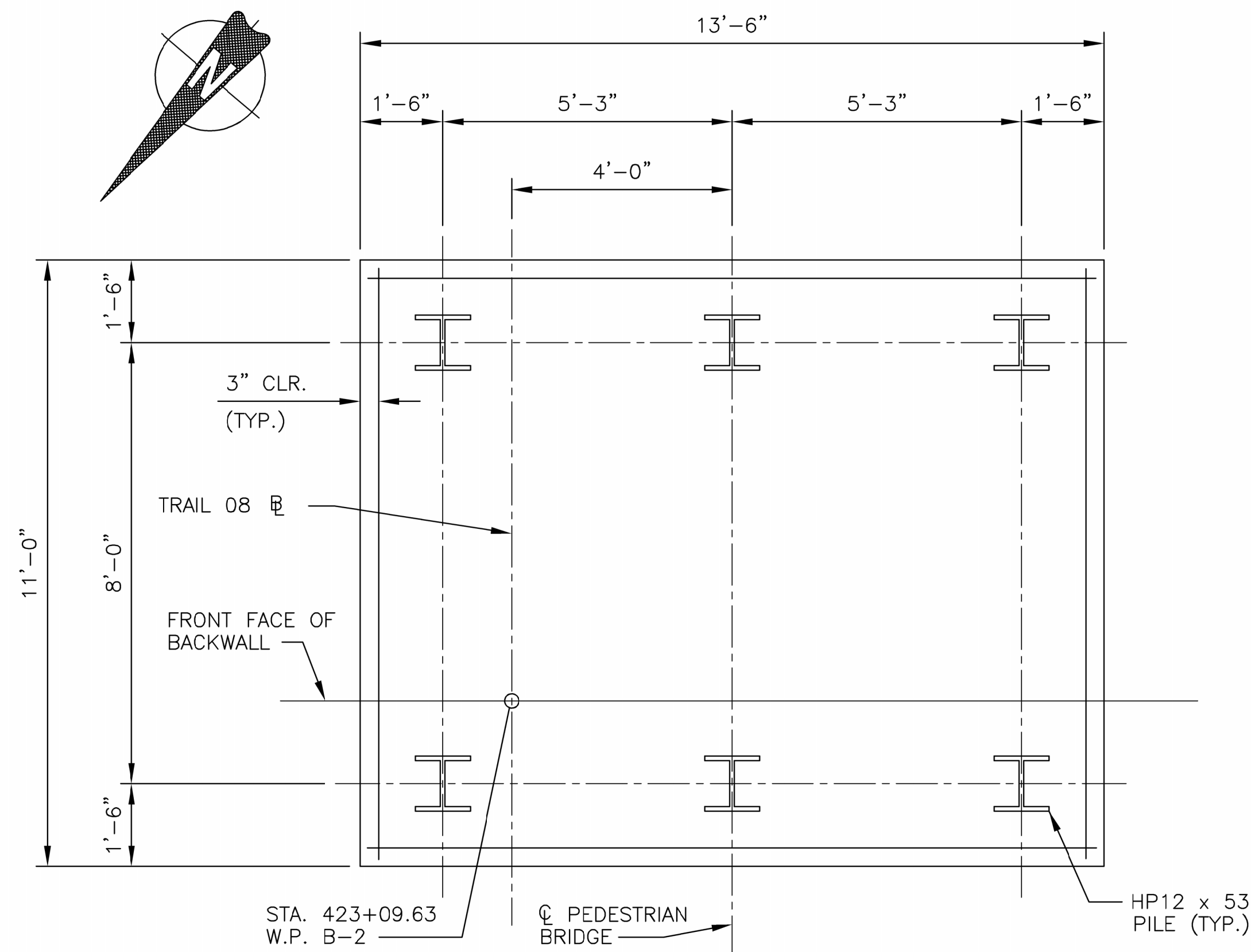
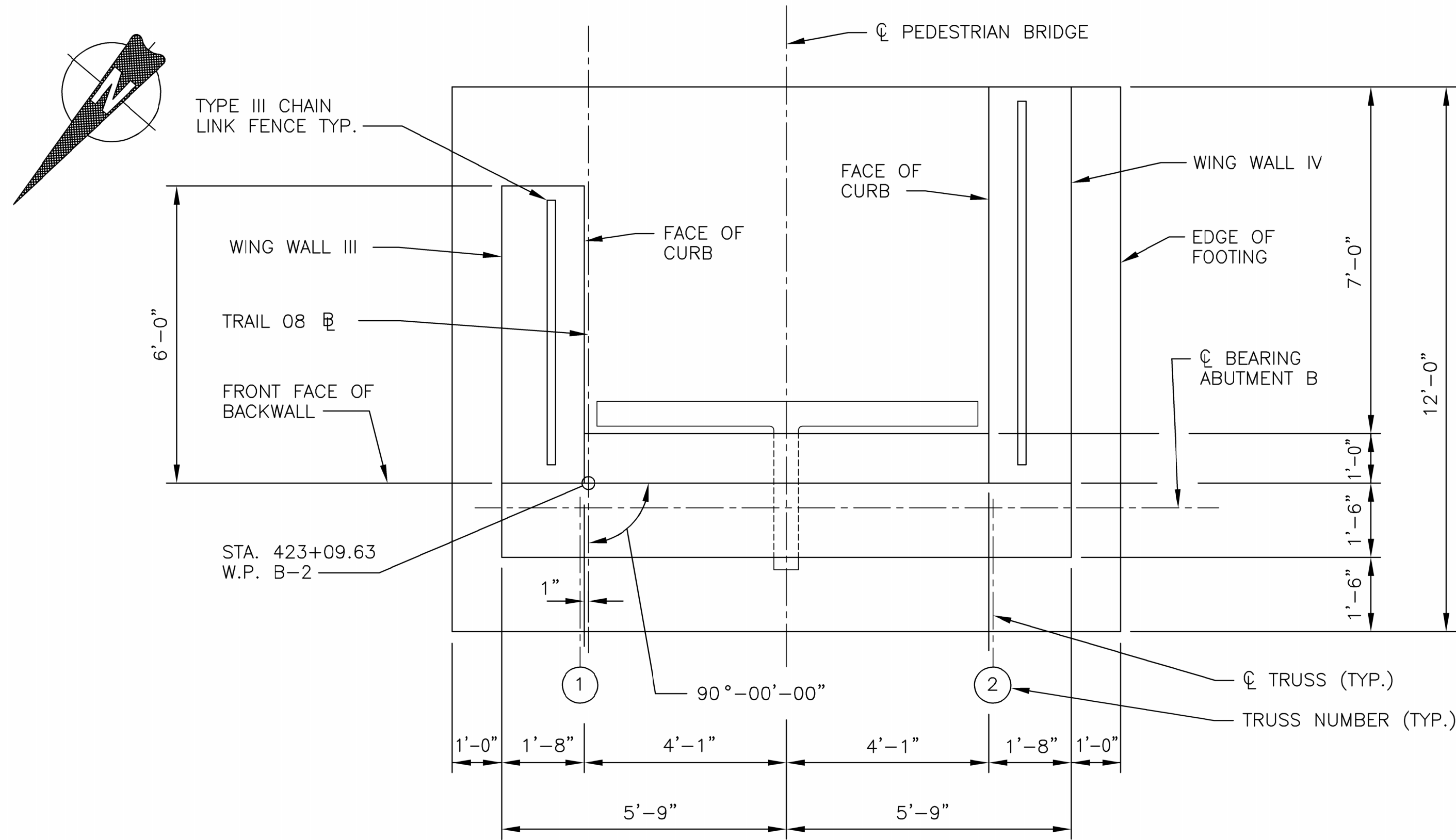
ABUTMENT A - ELEVATION

SCALE: 1/2" = 1'-0"

NOTES:

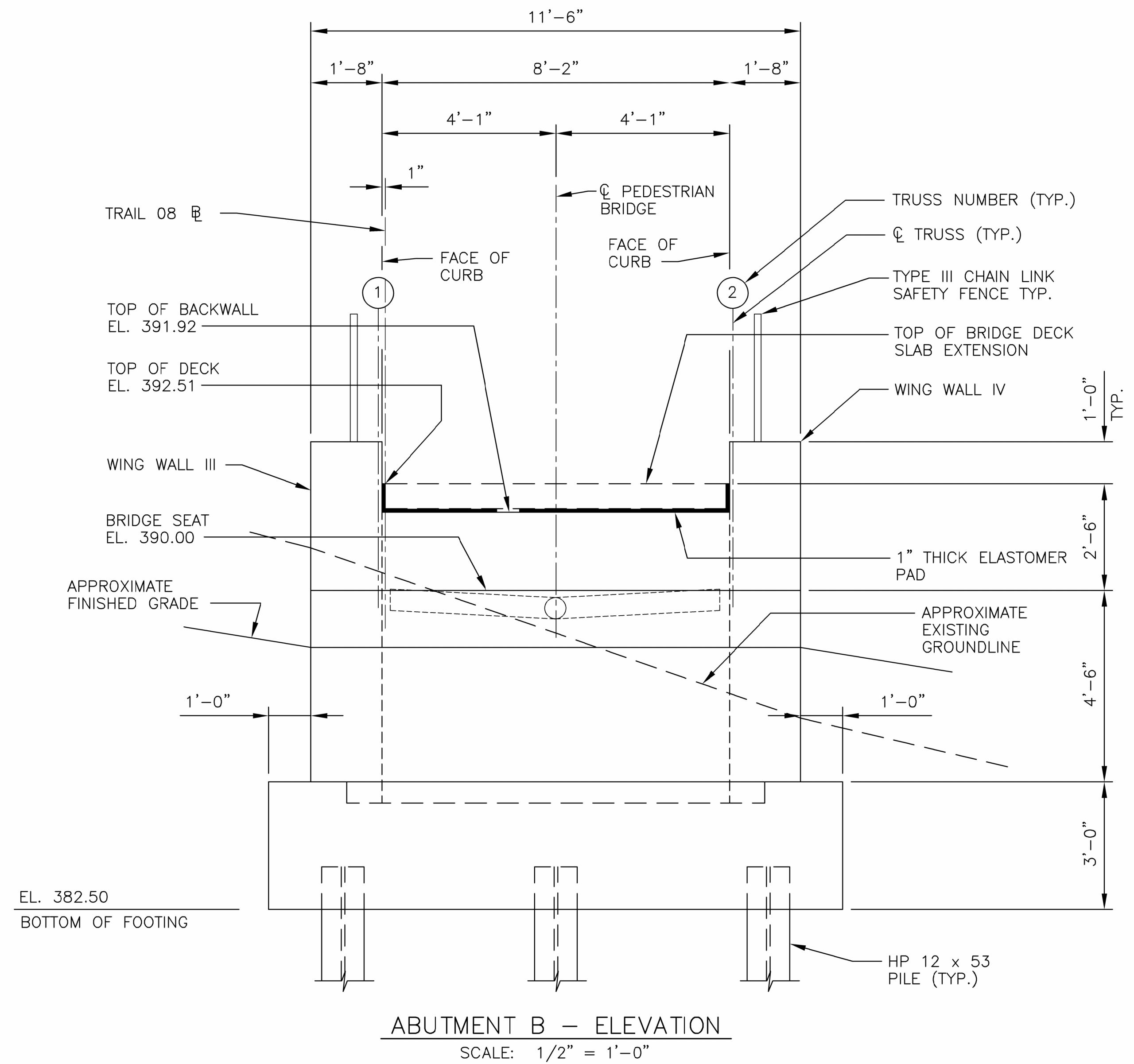
- FOR GENERAL NOTES, SEE DWG. NO. BR-02.
- FOR GEOMETRIC AND FOOTING LAYOUT, SEE DWG. NO. BR-03.
- FOR BORINGS AND DRIVE TESTS, SEE DWG. NO. BR-14.
- ALL PILES TO BE HP 12 x 53 STEEL PILES ASTM A709 GRADE 50 DRIVEN TO NOMINAL CAPACITY OF 310 KIPS. NOMINAL CAPACITY IS BASED UPON FACTORED (SAFE) CAPACITY OF 200 KIPS AND A RESISTANCE FACTOR OF 0.65.
- THE MINIMUM SAFE BEARING VALUE AND THE MINIMUM TIP ELEVATION SHOWN ON THESE PLANS MUST BE ACHIEVED FOR EACH PILE. IF THE ESTIMATED TIP ELEVATION IS NOT REACHED OR IS EXCEEDED WHILE ACHIEVING THE MINIMUM SAFE BEARING VALUE AND THE MINIMUM TIP ELEVATION, THE PILE WILL BE CONSIDERED SATISFACTORY. IF REFUSAL OCCURS BEFORE REACHING MINIMUM TIP ELEVATION, CONTACT THE ENGINEER.
- THE ESTIMATED TIP ELEVATIONS SHOWN ARE FOR ESTIMATING PURPOSES ONLY. ACTUAL ORDERED PILE LENGTHS SHALL BE DETERMINED AFTER DRIVING TEST PILES.
- SHOP PLANS SHALL SHOW HOW REINFORCING BARS ARE TO BE TIED AS WELL AS HOW THEY WILL BE HELD IN PLACE ABOVE PILING WHILE POUR IS BEING MADE.
- FOR ADDITIONAL PILE DETAILS, SEE MDOT SHA DETAIL NO. FND-PF-202, FND-PF-301 AND FND-PF-304.

90% DESIGN NOT FOR CONSTRUCTION				<div>MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION GAITHERSBURG, MARYLAND</div> <div>RECOMMENDED FOR APPROVAL</div> <div>Chief, Design Section APPROVED _____ Date _____</div> <div>Chief, Division of Transportation Engineering APPROVED _____ Date _____</div> <div>Designed by: <u>MW</u> Drawn by: <u>JE</u> Checked by: <u>KA</u></div>				BR-05 PEDESTRIAN BRIDGE NO. P-XX ABUTMENT A PLAN, ELEVATION & PILE LAYOUT BOWIE MILL ROAD BIKEWAY M-NCPPC PERMIT NO. <u>MR2023016</u> DATE: APRIL 2025			
<div> Athavale, Lystad & Associates 6720-B Rockledge Drive, Suite 160 Bethesda, MD 20817</div>								Project No. : <u>502108</u> Sheet <u>192</u> of <u>393</u>			
NO.	REVISION	DATE	BY								




PILE TIP DATA				
	DESIGN DATA		ACTUAL FIELD DATA	
SUBSTRUCTURE UNIT	MINIMUM TIP ELEVATION	ESTIMATED TIP ELEVATION	AVERAGE ACTUAL MINIMUM TIP ELEVATION	AVERAGE ACTUAL MAXIMUM TIP ELEVATION
ABUTMENT B	354.0 *	354.0

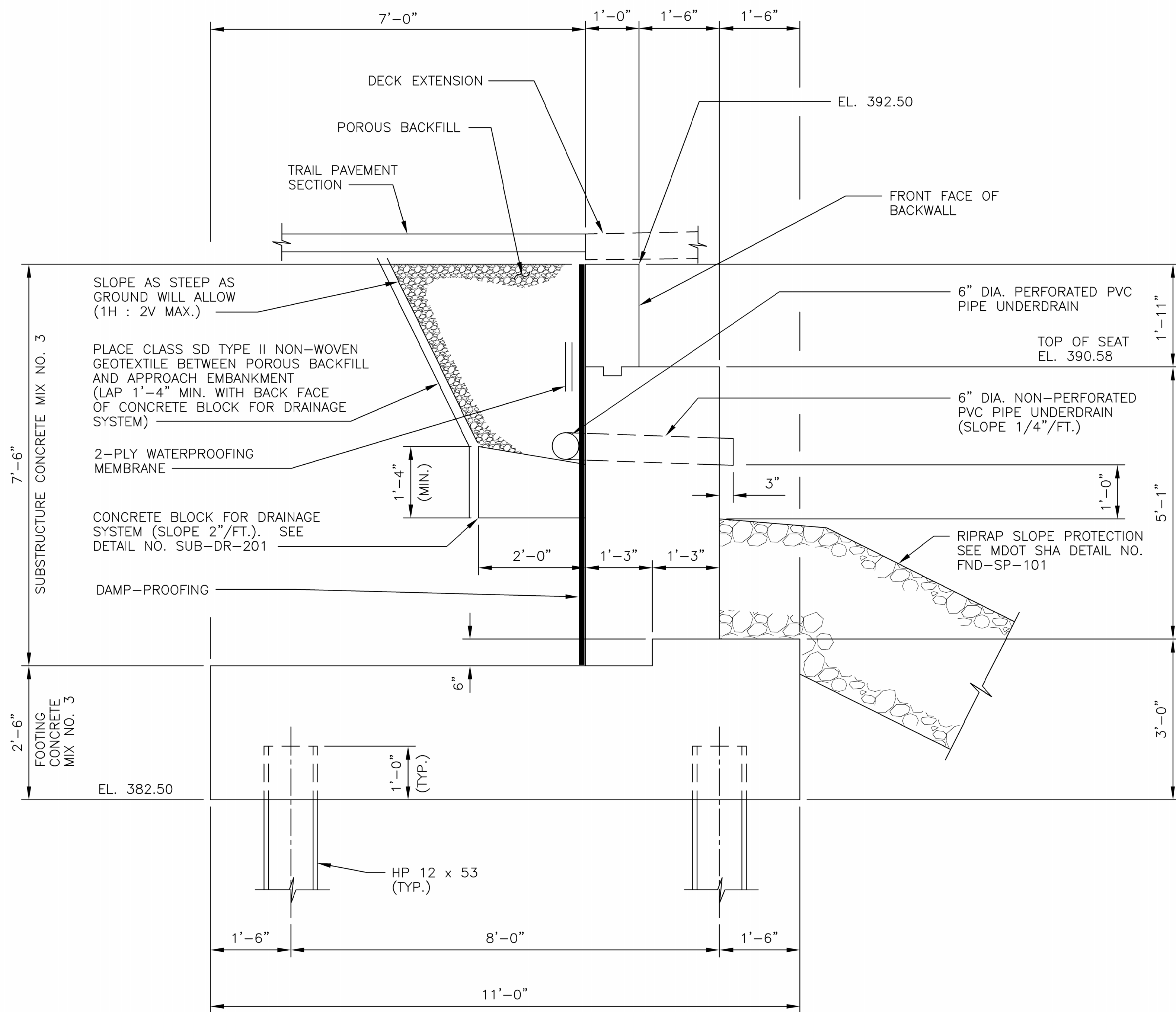
* OR REFUSAL



NOTES:

- FOR GENERAL NOTES, SEE DWG. NO. BR-02.
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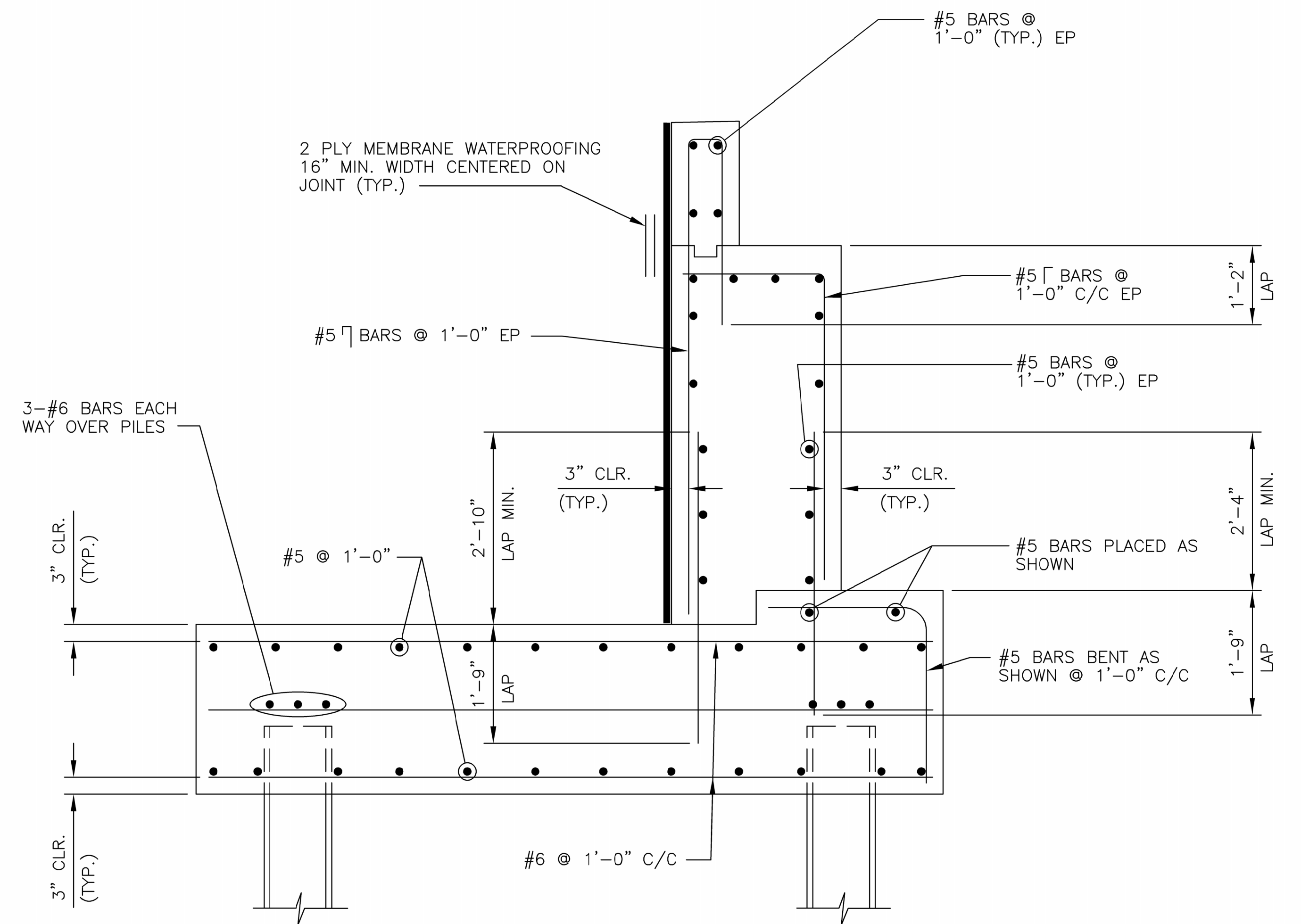
90% DESIGN NOT FOR CONSTRUCTION  Athavale, Lystad & Associates 6720-B Rockledge Drive, Suite 160 Bethesda, MD 20817				MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION GAITHERSBURG, MARYLAND		BR-06 PEDESTRIAN BRIDGE NO. P-XX ABUTMENT B PLAN, ELEVATION & PILE LAYOUT BOWIE MILL ROAD BIKEWAY M-NCPPC PERMIT NO. <u>MR2023016</u> DATE: APRIL 2025	
				RECOMMENDED FOR APPROVAL Chief, Design Section APPROVED _____ Date _____ Chief, Division of Transportation Engineering _____ Date _____ Designed by: <u>MW</u> Drawn by: <u>JE</u> Checked by: <u>KA</u>			
NO.	REVISION	DATE	BY			Project No. : <u>502108</u>	Sheet <u>193</u> of <u>393</u>



ABUTMENT A — SECTION
SCALE: 3/4" = 1'-0"

NOTES:

1. FOR BRAINAGE DETAILS BEHIND ABUTMENT, SEE SHA STANDARD DETAILS NO. SUB-DR-201.
2. FOR TYPE III CHAIN LINK FENCE DETAILS, SEE SHA STANDARD DETAIL NO. SUP-FR(FN)-302.
3. FOR TRAIL PAVEMENT SECTION SEE ROADWAY PLANS.



ABUTMENT A — REINFORCING SECTION
SCALE: 3/4" = 1'-0"

90% DESIGN
NOT FOR CONSTRUCTION

ALA
**Athavale, Lystad
& Associates**
6720-B Rockledge Drive, Suite 160
Bethesda, MD 20817

MONTGOMERY COUNTY
DEPARTMENT OF TRANSPORTATION
GAITHERSBURG, MARYLAND

RECOMMENDED FOR APPROVAL

Chief, Design Section
APPROVED

Date

Chief, Division of Transportation Engineering

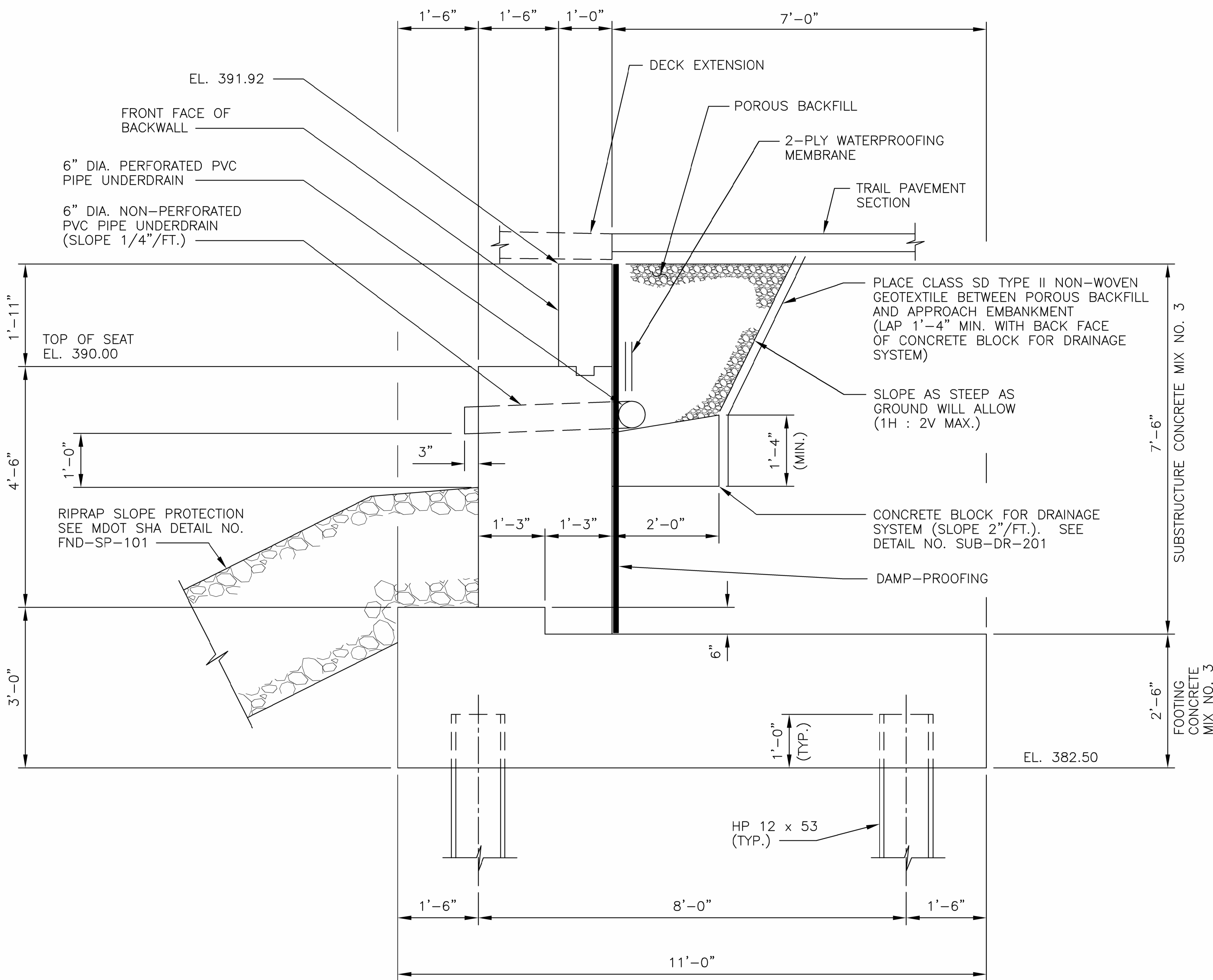
Date

Designed by: MW Drawn by: JE Checked by: KA

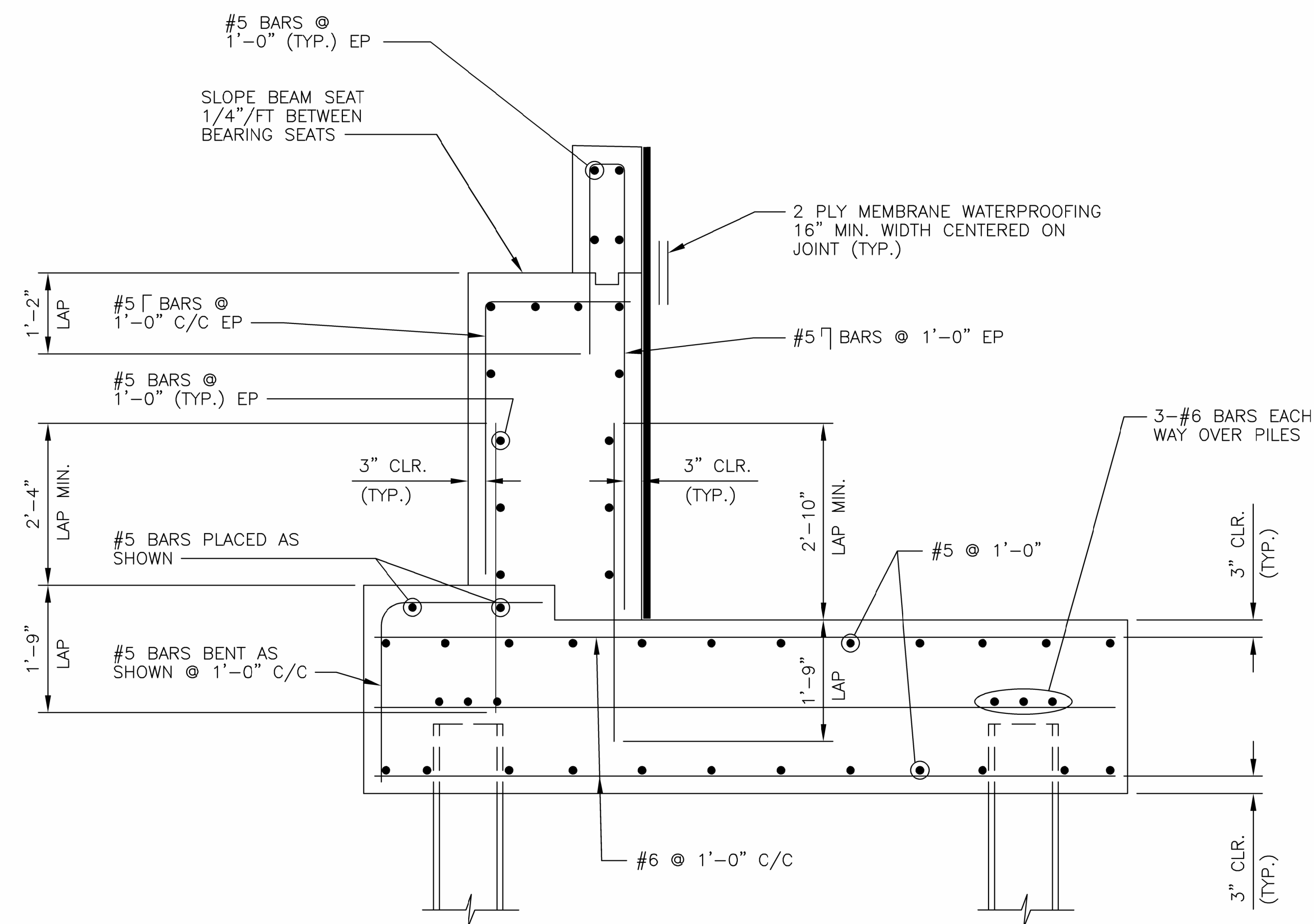
BR-07
PEDESTRIAN BRIDGE — PXX
ABUTMENT A
SECTIONS
BOWIE MILL ROAD BIKEWAY
M-NCPPC PERMIT NO. MR2023016

DATE: APRIL 2025

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ABUTMENT B – SECTION
SCALE: 3/4" = 1'-0"



ABUTMENT B – REINFORCING SECTION
SCALE: 3/4" = 1'-0"

NOTES:

1. FOR BRAINAGE DETAILS BEHIND ABUTMENT, SEE SHA STANDARD DETAILS NO. SUB-DR-201.
2. FOR TYPE III CHAIN LINK FENCE DETAILS, SEE SHA STANDARD DETAIL NO. SUP-FR(FN)-302.
3. FOR TRAIL PAVEMENT SECTION SEE ROADWAY PLANS.

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& Associates**
6720-B Rockledge Drive, Suite 160
Bethesda, MD 20817

MONTGOMERY COUNTY
DEPARTMENT OF TRANSPORTATION
GAITHERSBURG, MARYLAND

RECOMMENDED FOR APPROVAL

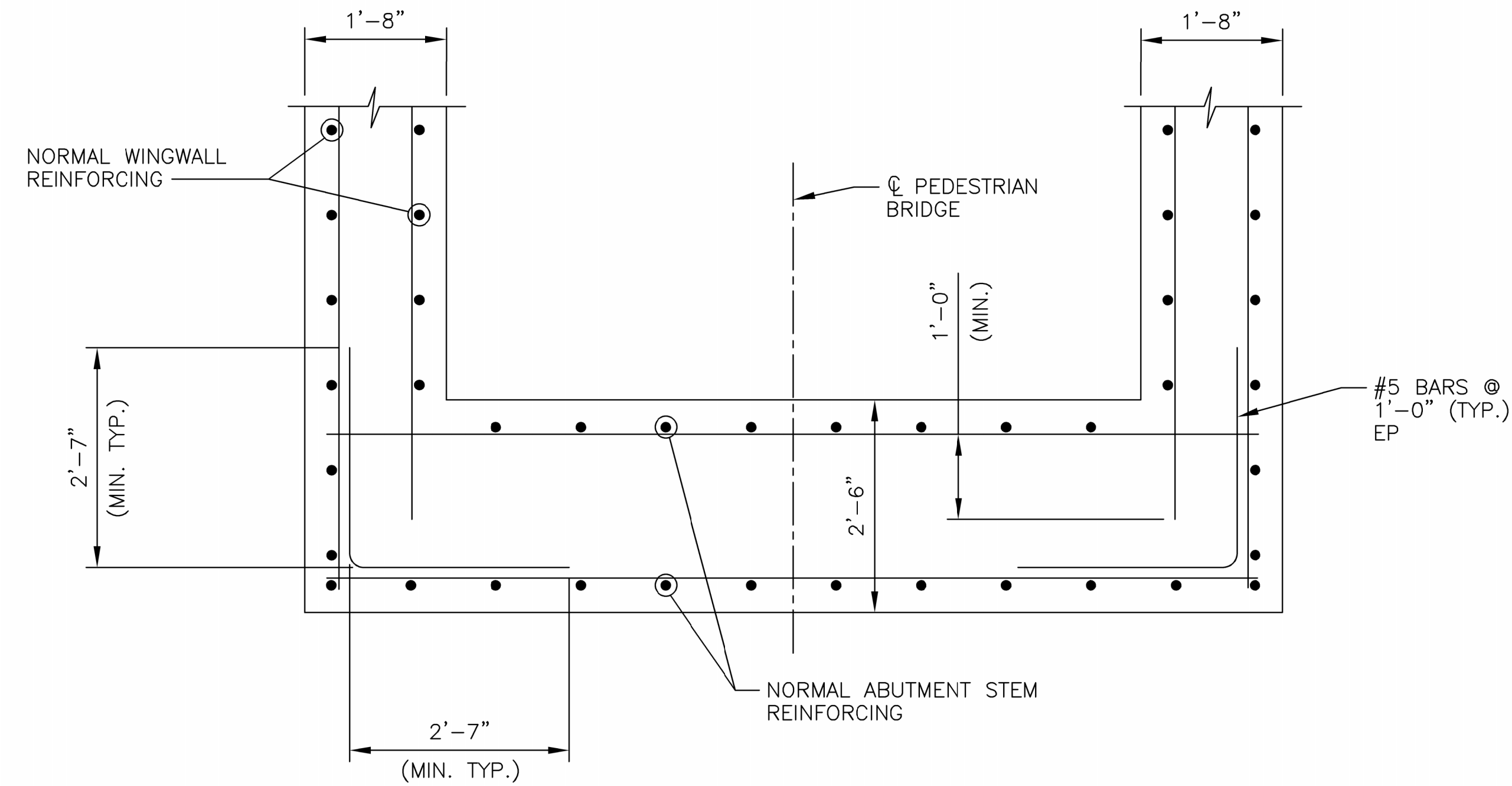
Chief, Design Section
APPROVED _____ Date _____

Chief, Division of Transportation Engineering
APPROVED _____ Date _____

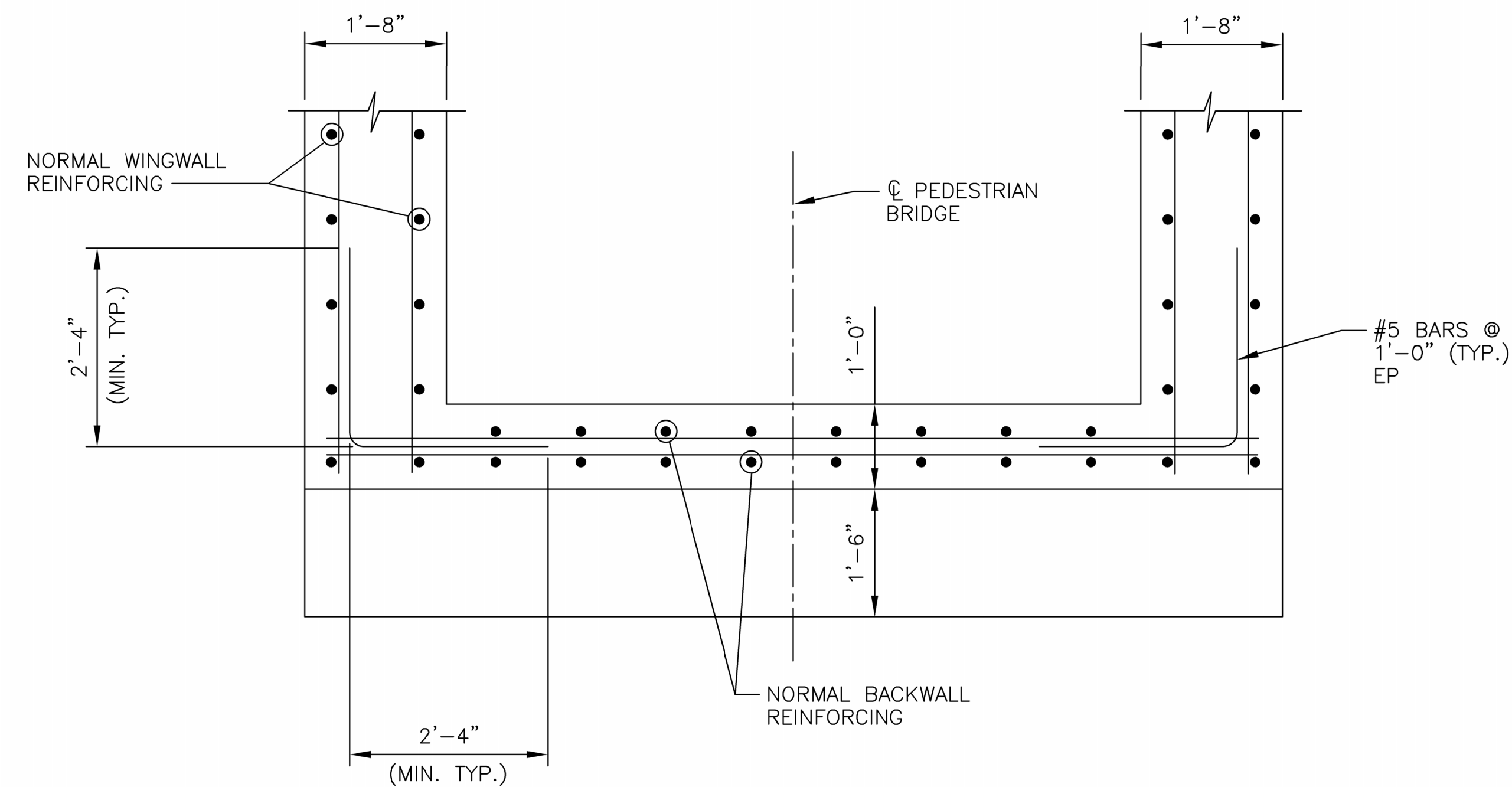
Designed by: MW Drawn by: JE Checked by: KA

BR-08
PEDESTRIAN BRIDGE NO. P-XX
ABUTMENT B
SECTIONS
BOWIE MILL ROAD BIKEWAY
M-NCPPC PERMIT NO. MR2023016

DATE: APRIL 2025
Project No. : 502108 Sheet 195 of 393



SECTION BELOW BEAM SEAT
SCALE: 3/4" = 1'-0"



SECTION ABOVE BEAM SEAT
SCALE: 3/4" = 1'-0"

NOTE:

1. FOR NORMAL ABUTMENT REINFORCING, SEE SHEET NO. BR-07 ABUTMENT A SECTIONS AND SHEET NO. BR-08 ABUTMENT B SECTIONS.

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& Associates**
6720-B Rockledge Drive, Suite 160
Bethesda, MD 20817

MONTGOMERY COUNTY
DEPARTMENT OF TRANSPORTATION
GAITHERSBURG, MARYLAND

RECOMMENDED FOR APPROVAL

Chief, Design Section
APPROVED

Date

Chief, Division of Transportation Engineering

Date

Designed by: MW Drawn by: JE Checked by: KA

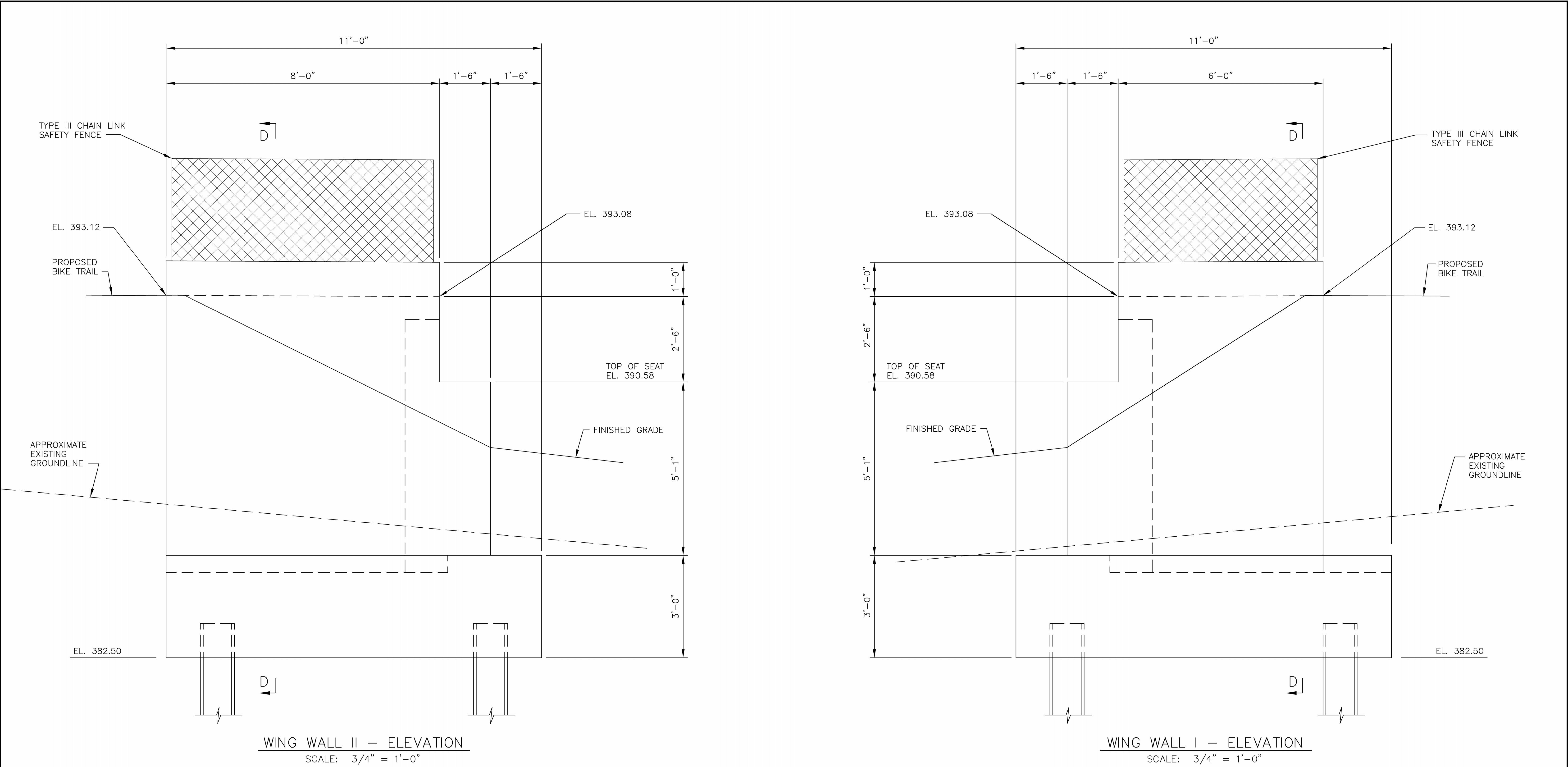
BR-09
PEDESTRIAN BRIDGE NO. P-XX
ABUTMENT DETAILS

BOWIE MILL ROAD BIKEWAY
M-NCPPC PERMIT NO. MR2023016


DATE: APRIL 2025

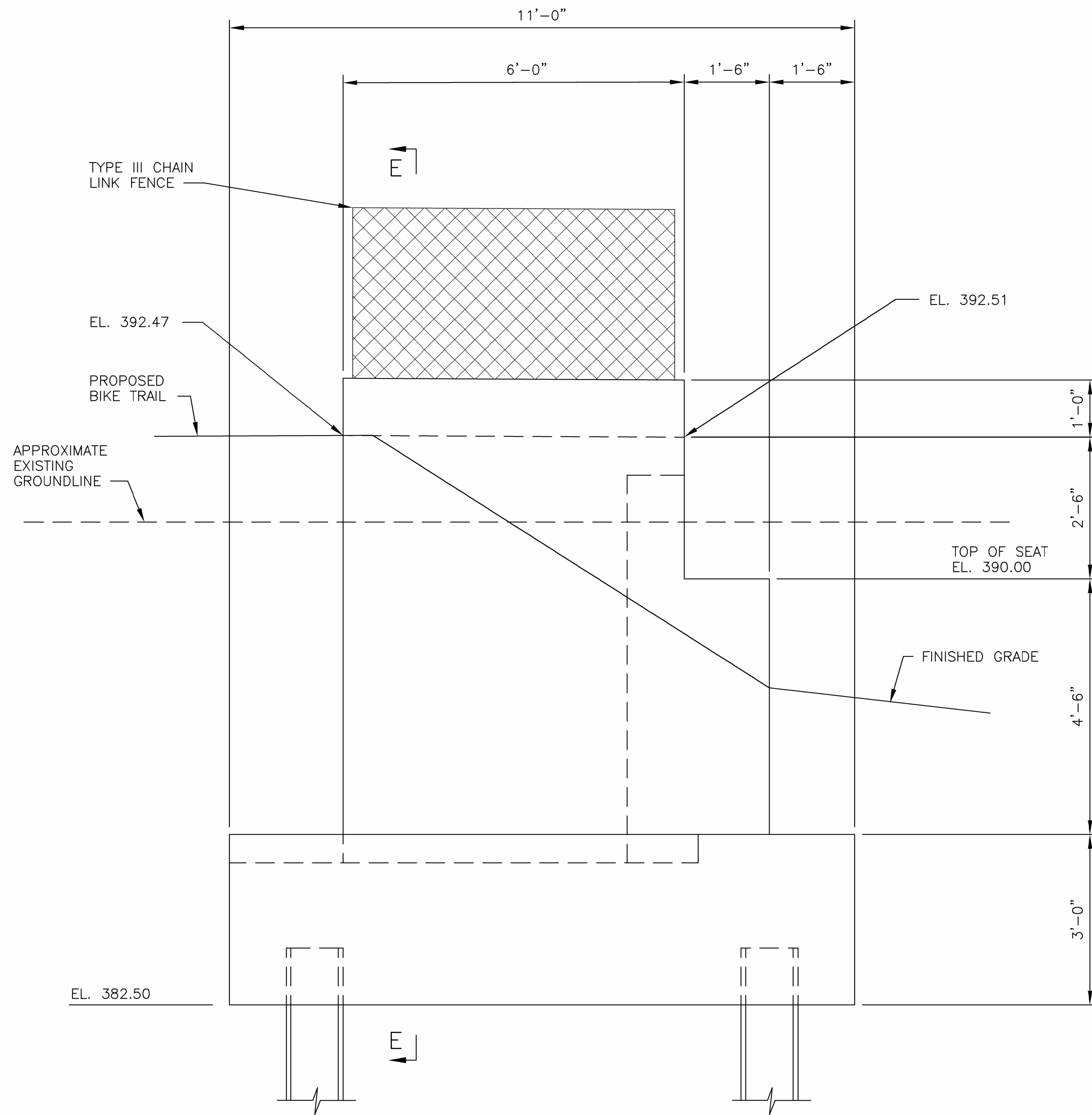
Project No. : 502108

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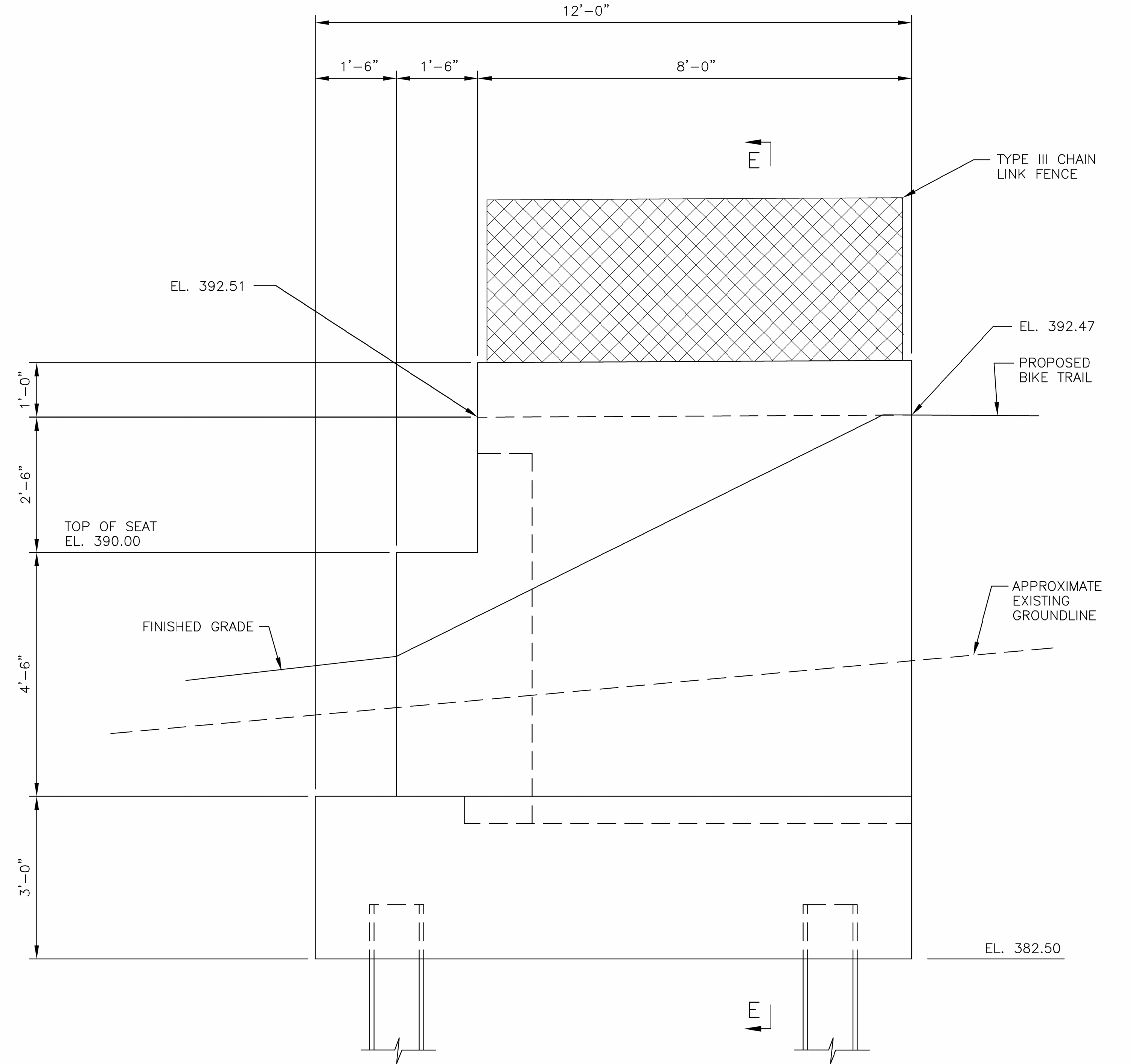


- NOTES:
- FOR BRAINAGE DETAILS BEHIND ABUTMENT, SEE SHA STANDARD DETAILS NO. SUB-DR-201.
 - FOR TYPE III CHAIN LINK FENCE DETAILS, SEE SHA STANDARD DETAIL NO. SUP-FR(FN)-302.

90% DESIGN NOT FOR CONSTRUCTION				MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION GAITHERSBURG, MARYLAND				BR-10 PEDESTRIAN BRIDGE NO. P-XX ABUTMENT A WING WALL ELEVATIONS BOWIE MILL ROAD BIKEWAY M-NCPPC PERMIT NO. <u>MR2023016</u> <div>DATE: APRIL 2025</div>			
<div> Athavale, Lystad & Associates 6720-B Rockledge Drive, Suite 160 Bethesda, MD 20817</div>				RECOMMENDED FOR APPROVAL				<div>Project No. : <u>502108</u></div> <div>Sheet <u>197</u> of <u>393</u></div>			
				Chief, Design Section APPROVED _____ Date _____							
				Chief, Division of Transportation Engineering _____ Designed by: <u>MW</u> Drawn by: <u>JE</u> Checked by: <u>KA</u>							
NO.	REVISION	DATE	BY								




WING WALL III — ELEVATION
SCALE: 3/4" = 1'-0"

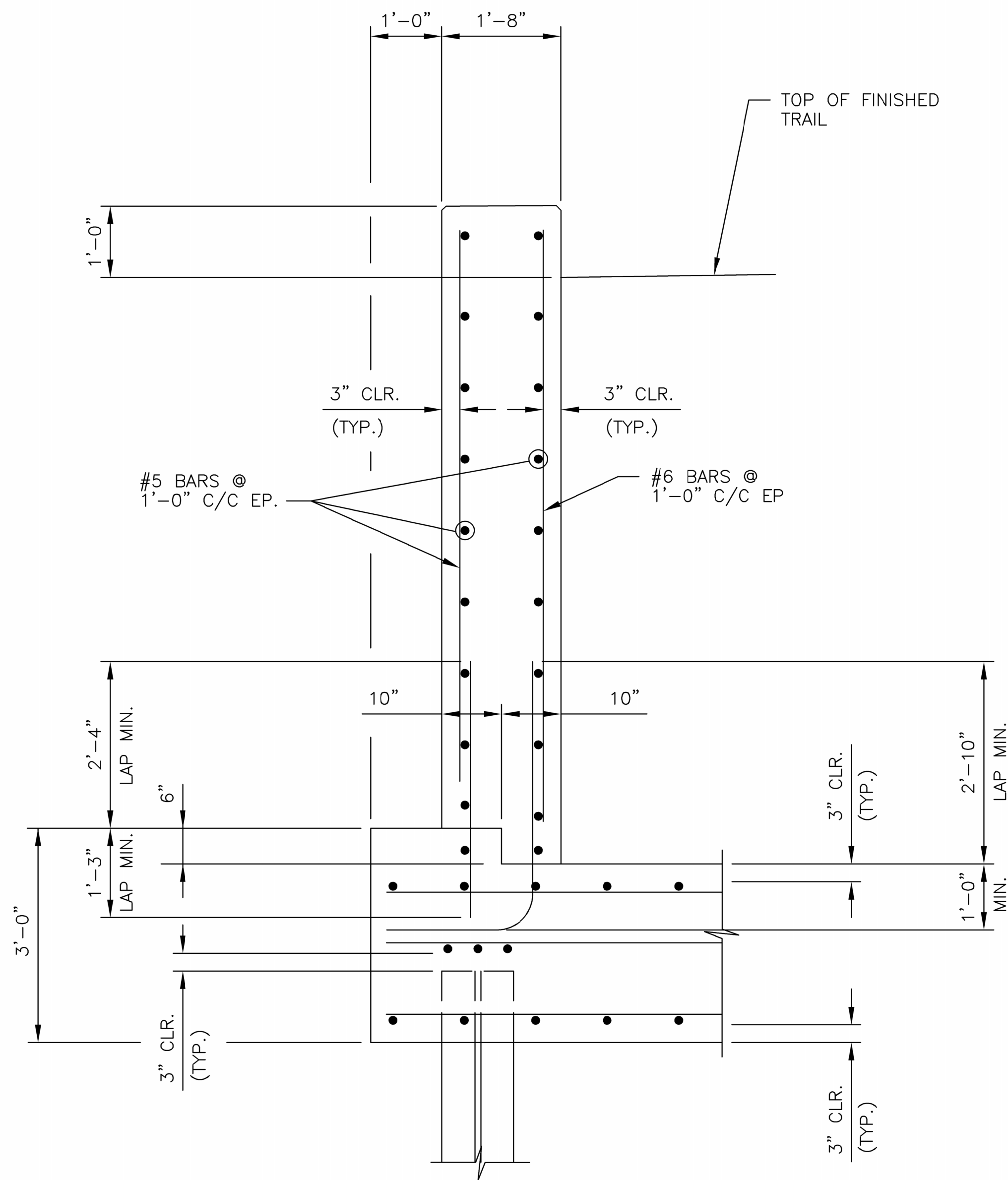


WING WALL IV — ELEVATION
SCALE: 3/4" = 1'-0"

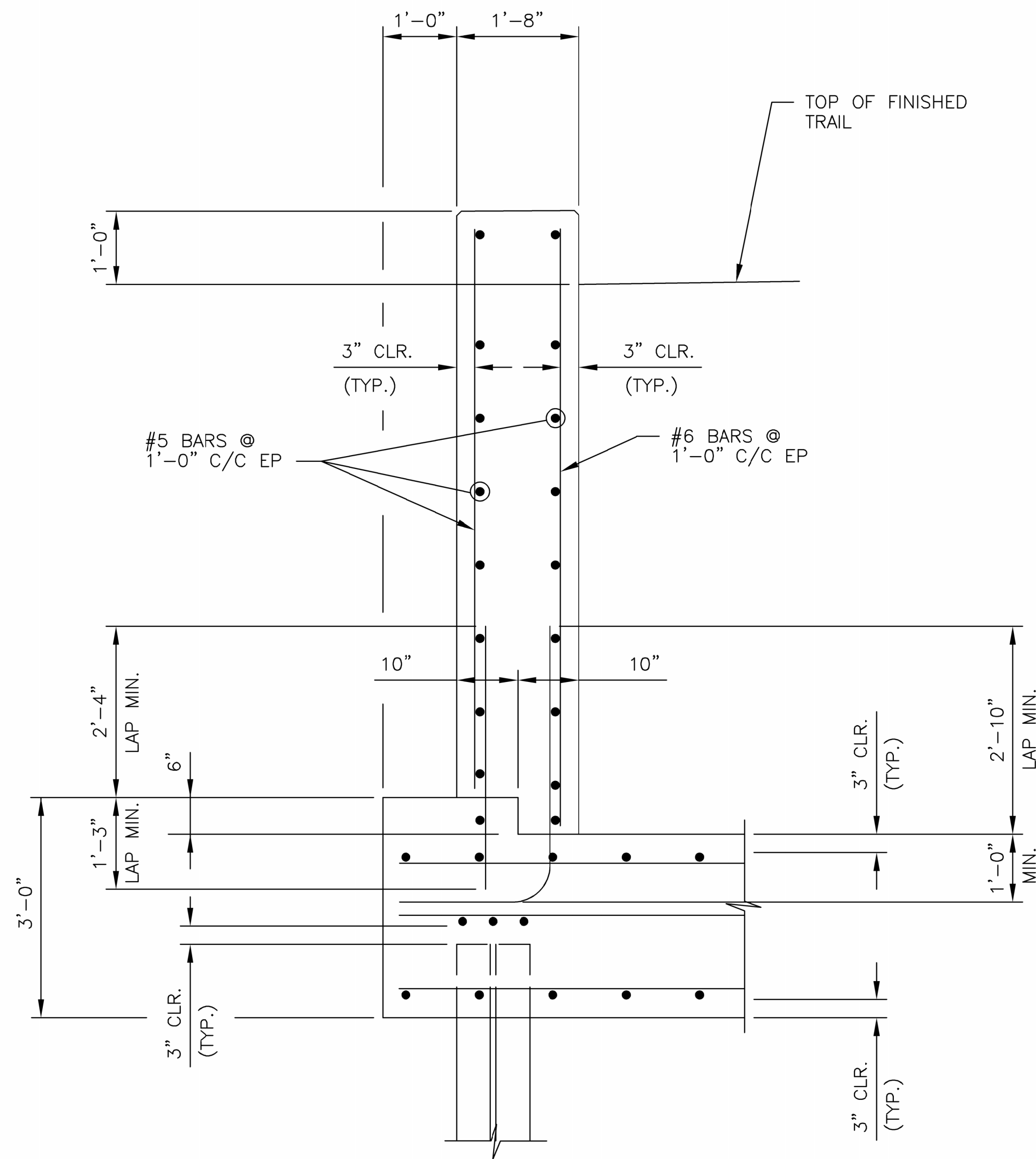
NOTES:

1. FOR BRAINAGE DETAILS BEHIND ABUTMENT, SEE SHA STANDARD DETAILS NO. SUB-DR-201.
2. FOR TYPE III CHAIN LINK FENCE DETAILS, SEE SHA STANDARD DETAIL NO. SUP-FR(FN)-302.

90% DESIGN NOT FOR CONSTRUCTION								MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION GAITHERSBURG, MARYLAND				BR-11 PEDESTRIAN BRIDGE NO. P-XX ABUTMENT B WING WALL ELEVATIONS BOWIE MILL ROAD BIKEWAY M-NCPPC PERMIT NO. <u>MR2023016</u> DATE: APRIL 2025			
 Athavale, Lystad & Associates 6720-B Rockledge Drive, Suite 160 Bethesda, MD 20817								RECOMMENDED FOR APPROVAL							
								Chief, Design Section APPROVED _____		Date _____					
								Chief, Division of Transportation Engineering _____ Designed by: <u>MW</u>		Date _____ Drawn by: <u>JE</u>					
Project No. : <u>502108</u>				Checked by: <u>KA</u>				Sheet <u>198</u> of <u>393</u>							




TYPICAL WINGWALL SECTION D-D
SCALE: 3/4" = 1'-0"

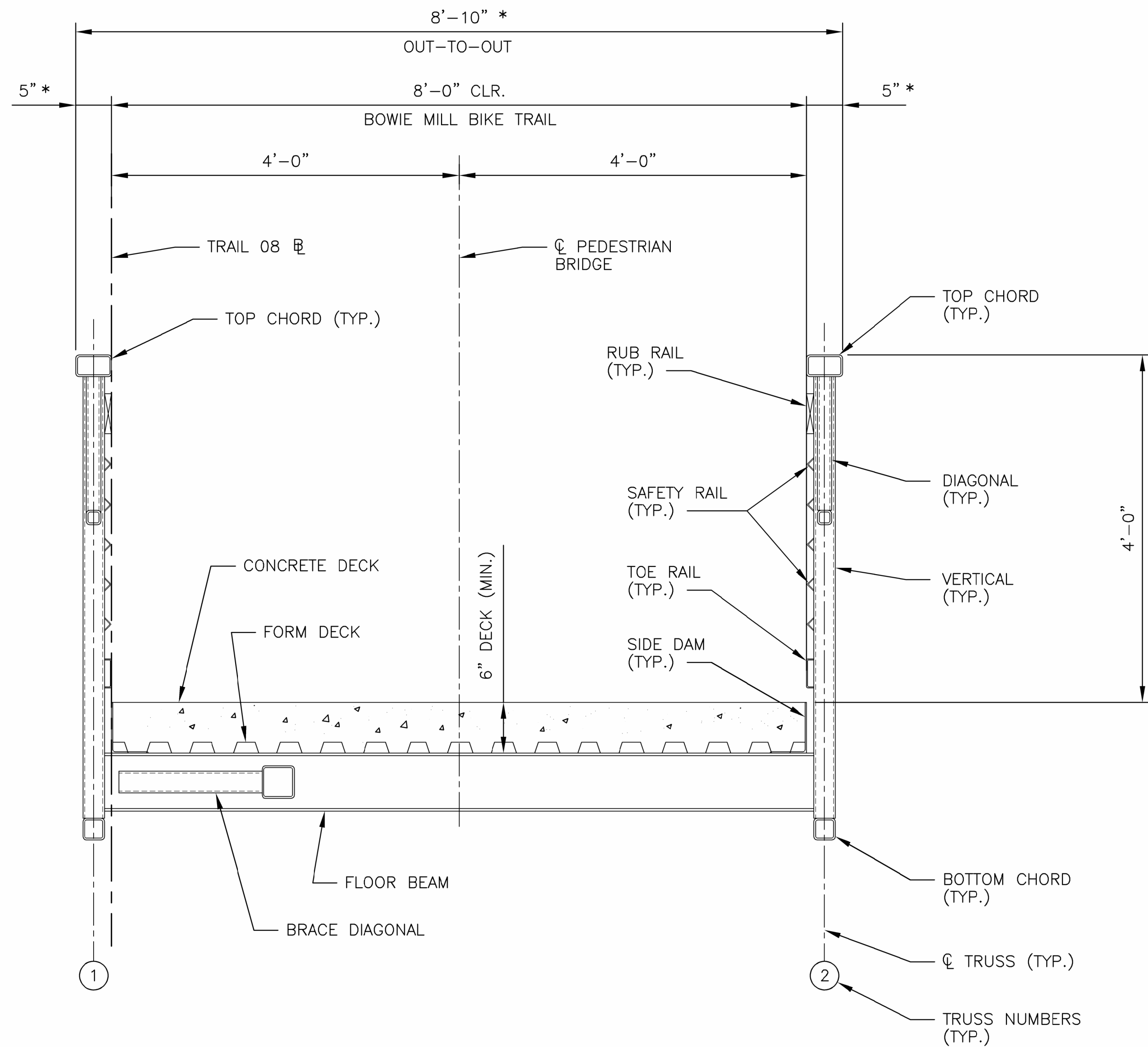


TYPICAL WINGWALL SECTION E-E
SCALE: 3/4" = 1'-0"

NOTES:

- FOR BRAINAGE DETAILS BEHIND ABUTMENT, SEE SHA STANDARD DETAILS NO. SUB-DR-201.
- FOR TYPE III CHAIN LINK FENCE DETAILS, SEE SHA STANDARD DETAIL NO. SUP-FR(FN)-302.

<div>90% DESIGN NOT FOR CONSTRUCTION</div> <div><div>Athavale, Lystad & Associates</div><div>6720-B Rockledge Drive, Suite 160 Bethesda, MD 20817</div></div>								<div>MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION GAITHERSBURG, MARYLAND</div> <div>RECOMMENDED FOR APPROVAL</div> <div><div>Chief, Design Section APPROVED</div><div>Date</div></div> <div><div>Chief, Division of Transportation Engineering</div><div>Date</div></div> <div>Designed by: <u>MW</u> Drawn by: <u>JE</u> Checked by: <u>KA</u></div>				<div>BR-12 PEDESTRIAN BRIDGE NO. P-XX WING WALL SECTIONS</div> <div>BOWIE MILL ROAD BIKEWAY</div> <div>M-NCPPC PERMIT NO. <u>MR2023016</u></div> <div>DATE: APRIL 2025</div> <div>Project No. : <u>502108</u> Sheet <u>199</u> of <u>393</u></div>																																							
<table><tr><td>NO.</td><td>REVISION</td><td>DATE</td><td>BY</td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></table>				NO.	REVISION	DATE	BY																																												
NO.	REVISION	DATE	BY																																																



TYPICAL SECTION
SCALE: 1" = 1'-0"

* TO BE CONFIRMED BY THE
CONTRACTOR BASED ON CHOSEN
SUPERSTRUCTURE SUPPLIER.


NOTES:

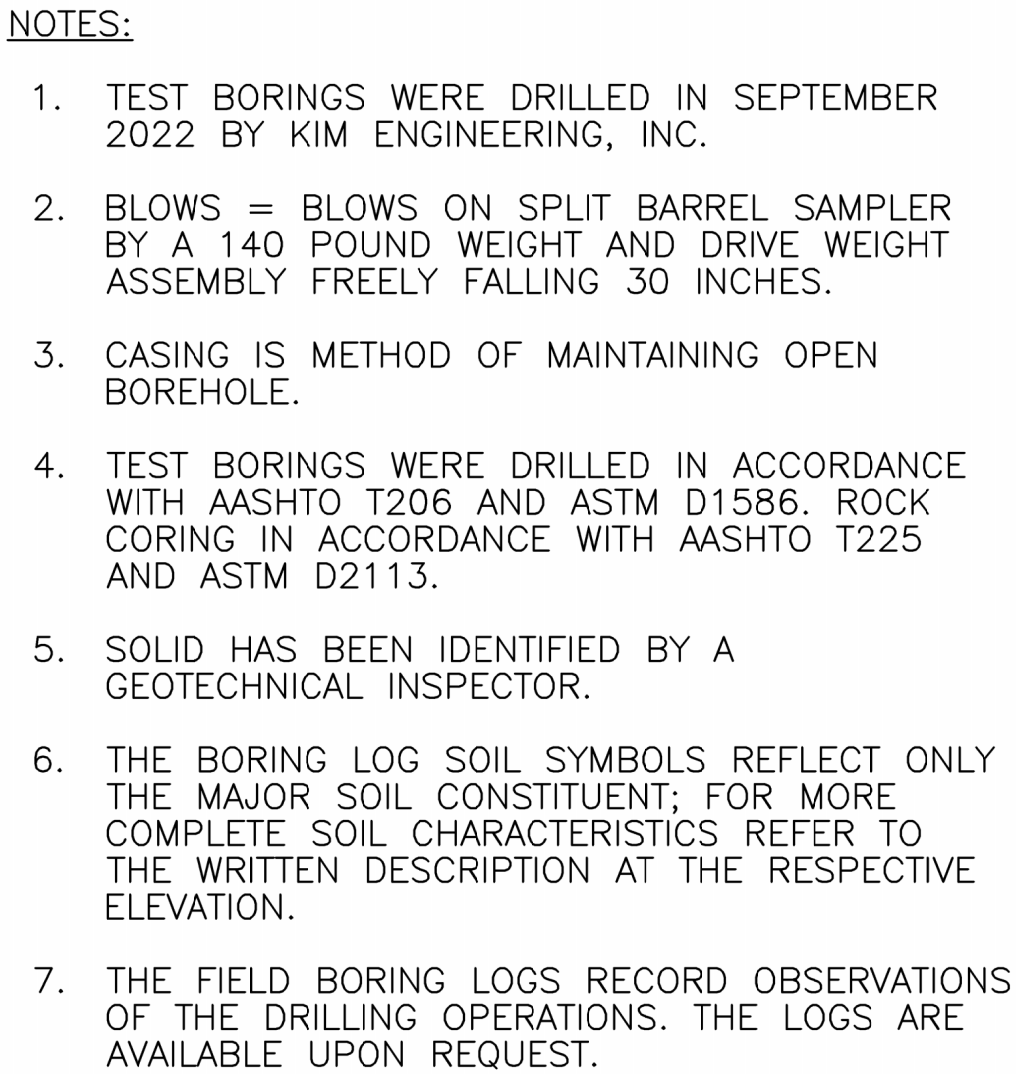
1. THE SUPERSTRUCTURE (INCLUDING BEARING DEVICES) FOR THE PROPOSED PEDESTRIAN BRIDGE SHALL BE DESIGNED BY ONE OF THE SUPPLIERS NOTED BELOW, OR APPROVED EQUAL.

PRATT AND WARREN TRUSS
MANUFACTURER: BRIDGE BROTHERS
57 OLD IVY SQ.
ATLANTA, GA. 30342
TEL: 540-266-8473

CONNECTOR
MANUFACTURER: CONTECH
9205 CENTRE POINT DRIVE
WEST CHESTER, OH. 45069
TEL: 770-315-3248

CAMBRIDGE TRUSS
MANUFACTURER: US BRIDGE
345 HAEFNER DRIVE
WEXFORD, PA. 15090
TEL: 412-445-7661
2. THE TRUSS BOTTOM CHORDS ARE FRACTURE-CRITICAL MEMBERS, OTHER MEMBERS AND/OR THE FLOORBEAMS MAY BE CONSIDERED FRACTURE-CRITICAL MEMBERS DEPENDING ON THE DETAILS OF THE CHOSEN SUPERSTRUCTURE SUPPLIER.
3. FOR GENERAL PLAN AND ELEVATION AND GENERAL NOTES, SEE DRAWING NO. BR-01.
4. SEE THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.
5. ALL REINFORCING STEEL BARS IN DECK SLAB BE EPOXY COATED.

90% DESIGN NOT FOR CONSTRUCTION				MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION GAITHERSBURG, MARYLAND		BR-13 PEDESTRIAN BRIDGE NO. P-XX TYPICAL SECTION	
 Athavale, Lystad & Associates 6720-B Rockledge Drive, Suite 160 Bethesda, MD 20817				RECOMMENDED FOR APPROVAL		BOWIE MILL ROAD BIKEWAY M-NCPPC PERMIT NO. <u>MR2023016</u>	
				Chief, Design Section APPROVED		Date	DATE: APRIL 2025
				Chief, Division of Transportation Engineering		Date	
				Designed by: <u>MW</u> Drawn by: <u>JE</u> Checked by: <u>KA</u>		Project No. : <u>502108</u>	
NO.	REVISION	DATE	BY			Sheet <u>200</u> of <u>393</u>	



SCALE: $1/16" = 1'-0"$

LOCATION CATEGORY A										
BAR SIZE	CENTER TO CENTER SPACING									
	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
#4	2'-5"	3'-1"	2'-5"	2'-10"	2'-5"	2'-10"	2'-5"	2'-10"	2'-5"	2'-10"
#5	3'-1"	4'-0"	3'-0"	3'-10"	3'-0"	3'-7"	3'-0"	3'-7"	3'-1"	3'-7"
#6	4'-5"	5'-9"	3'-7"	4'-8"	3'-7"	4'-8"	3'-7"	4'-8"	3'-7"	4'-8"
#7	6'-0"	7'-10"	4'-6"	5'-11"	4'-2"	5'-5"	4'-2"	5'-5"	4'-2"	5'-5"
#8	7'-10"	10'-3"	5'-11"	7'-8"	4'-9"	6'-2"	4'-9"	6'-2"	4'-9"	6'-2"
#9	10'-0"	13'-0"	7'-6"	9'-9"	6'-0"	7'-10"	5'-10"	7'-8"	5'-10"	7'-8"
#10	-	-	9'-6"	12'-5"	7'-7"	9'-11"	7'-2"	9'-5"	7'-2"	9'-5"
#11	-	-	11'-8"	15'-3"	9'-4"	12'-3"	8'-8"	11'-4"	8'-8"	11'-4"

Location Category A - Bars in horizontal layers in top of pour with 12" or more of concrete below them such as in footings, pier caps, etc.

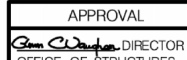
LOCATION CATEGORY B										
BAR SIZE	CENTER TO CENTER SPACING									
	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
#4	1'-10"	2'-9"	1'-10"	2'-2"	1'-10"	2'-2"	1'-10"	2'-2"	1'-10"	2'-2"
#5	2'-5"	3'-7"	2'-4"	3'-5"	2'-4"	2'-9"	2'-4"	2'-9"	2'-4"	2'-9"
#6	3'-5"	5'-1"	2'-9"	4'-1"	2'-9"	4'-1"	2'-9"	4'-1"	2'-9"	4'-1"
#7	4'-8"	6'-11"	3'-6"	5'-3"	3'-2"	4'-9"	3'-2"	4'-9"	3'-2"	4'-9"
#8	6'-1"	9'-1"	4'-7"	6'-10"	3'-8"	5'-5"	3'-8"	5'-5"	3'-8"	5'-5"
#9	7'-8"	11'-6"	5'-9"	8'-8"	4'-8"	6'-11"	4'-6"	6'-9"	4'-6"	6'-9"
#10	-	-	7'-4"	10'-11"	5'-10"	8'-9"	5'-7"	8'-4"	5'-7"	8'-4"
#11	-	-	9'-0"	13'-6"	7'-2"	10'-9"	6'-8"	10'-0"	6'-8"	10'-0"

Location Category B - All bars not in Location Category A.

= Non-epoxy coated = Epoxy coated

- Note:
- When bar lap is not specified on the Plans, the above dimensions shall be used.
 - These bar laps do not apply when bar is in lightweight concrete. Greater lengths are required for this material.
 - These bar laps only apply where the General Notes indicate Reinforcing Steel Design, fy = 60 ksi, and Concrete Design, f'c = 3000 psi.
 - These bar laps assume cover of 2". Greater lap lengths will be required for cover less than 2".
 - These bar laps are Class B splices based on the development lengths in Det.No.REBAR-DL-101, Class B splices are 1.3 times the development length.
 - Class A splices may be used when (a) the area of reinforcement provided is at least twice that

required by analysis over the entire length of the lap splice and (b) one-half or less of the total reinforcement is spliced within the required lap splice length. Class A splices are 1.0 times the development length.

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
	
DATE: 03/21/2017	
VERSION	
1.0	
BAR LAP DIMENSIONS FOR GRADE 60 REINFORCING STEEL IN MIX NO.3 (3500 P.S.I.) CONCRETE	
DETAIL NO. REBAR-BL-101	SHEET <u> </u> OF <u> </u>

REBAR - BAR LAP

LOCATION CATEGORY A										
BAR SIZE	CENTER TO CENTER SPACING									
	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
#4	2'-1"	2'-8"	2'-1"	2'-6"	2'-1"	2'-6"	2'-1"	2'-6"	2'-1"	2'-6"
#5	2'-8"	3'-6"	2'-7"	3'-4"	2'-7"	3'-1"	2'-7"	3'-1"	2'-7"	3'-1"
#6	3'-10"	5'-0"	3'-1"	4'-0"	3'-1"	4'-0"	3'-1"	4'-0"	3'-1"	4'-0"
#7	5'-3"	6'-10"	3'-11"	5'-1"	3'-7"	4'-8"	3'-7"	4'-8"	3'-7"	4'-8"
#8	6'-10"	8'-11"	5'-1"	6'-8"	4'-1"	5'-4"	4'-1"	5'-4"	4'-1"	5'-4"
#9	8'-8"	11'-3"	6'-6"	8'-6"	5'-2"	6'-9"	5'-1"	6'-7"	5'-1"	6'-7"
#10	-	-	8'-3"	10'-9"	6'-7"	8'-7"	6'-3"	8'-2"	6'-3"	8'-2"
#11	-	-	10'-11"	13'-3"	8'-1"	10'-7"	7'-6"	9'-9"	7'-6"	9'-9"

Location Category A - Bars in horizontal layers in top of pour with 12" or more of concrete below them such as in footings, pier caps, etc.

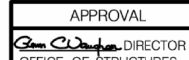
LOCATION CATEGORY B										
BAR SIZE	CENTER TO CENTER SPACING									
	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
#4	1'-7"	2'-5"	1'-7"	1'-11"	1'-7"	1'-11"	1'-7"	1'-11"	1'-7"	1'-11"
#5	2'-1"	3'-1"	2'-0"	3'-0"	2'-0"	2'-5"	2'-0"	2'-5"	2'-0"	2'-5"
#6	3'-0"	4'-5"	2'-5"	3'-7"	2'-5"	3'-7"	2'-5"	3'-7"	2'-5"	3'-7"
#7	4'-0"	6'-0"	3'-0"	4'-6"	2'-9"	4'-2"	2'-9"	4'-2"	2'-9"	4'-2"
#8	5'-3"	7'-10"	3'-11"	5'-11"	3'-2"	4'-9"	3'-2"	4'-9"	3'-2"	4'-9"
#9	6'-8"	10'-0"	5'-0"	7'-6"	4'-0"	6'-0"	3'-11"	5'-10"	3'-11"	5'-10"
#10	-	-	6'-4"	9'-6"	5'-1"	7'-7"	4'-10"	7'-2"	4'-10"	7'-2"
#11	-	-	7'-10"	11'-8"	6'-3"	9'-4"	5'-9"	8'-8"	5'-9"	8'-8"

Location Category B - All bars not in Location Category A.

= Non-epoxy coated = Epoxy coated

- Note:
- When bar lap is not specified on the Plans, the above dimensions shall be used.
 - These bar laps do not apply when bar is in lightweight concrete. Greater lengths are required for this material.
 - These bar laps only apply where the General Notes indicate Reinforcing Steel Design, fy = 60 ksi, and Concrete Design, f'c = 4000 psi.
 - These bar laps assume cover of 2". Greater lap lengths will be required for cover less than 2".
 - These bar laps are Class B splices based on the development lengths in Det.No.REBAR-DL-103, Class B splices are 1.3 times the development length.
 - Class A splices may be used when (a) the area of reinforcement provided is at least twice that

required by analysis over the entire length of the lap splice and (b) one-half or less of the total reinforcement is spliced within the required lap splice length. Class A splices are 1.0 times the development length.

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
	
DATE: 03/21/2017	
VERSION	
1.0	
BAR LAP DIMENSIONS FOR GRADE 60 REINFORCING STEEL IN MIX NO.6 (4500 P.S.I.) CONCRETE	
DETAIL NO. REBAR-BL-103	SHEET <u> </u> OF <u> </u>

REBAR - BAR LAP

LOCATION CATEGORY A										
BAR SIZE	CENTER TO CENTER SPACING									
	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
#4	1'-10"	2'-5"	1'-10"	2'-2"	1'-10"	2'-2"	1'-10"	2'-2"	1'-10"	2'-2"
#5	2'-5"	3'-1"	2'-4"	3'-0"	2'-4"	2'-9"	2'-4"	2'-9"	2'-4"	2'-9"
#6	3'-5"	4'-5"	2'-9"	3'-7"	2'-9"	3'-7"	2'-9"	3'-7"	2'-9"	3'-7"
#7	4'-8"	6'-1"	3'-6"	4'-7"	3'-2"	4'-2"	3'-2"	4'-2"	3'-2"	4'-2"
#8	6'-1"	7'-11"	4'-1"	5'-11"	3'-8"	4'-9"	3'-8"	4'-9"	3'-8"	4'-9"
#9	7'-8"	10'-0"	5'-9"	7'-6"	4'-8"	6'-0"	4'-6"	5'-11"	4'-6"	5'-11"
#10	-	-	7'-4"	9'-6"	5'-10"	7'-8"	5'-7"	7'-3"	5'-7"	7'-3"
#11	-	-	9'-0"	11'-9"	7'-2"	9'-5"	6'-8"	8'-8"	6'-8"	8'-8"

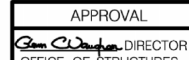
Location Category A - Bars in horizontal layers in top of pour with 12" or more of concrete below them such as in footings, pier caps, etc.

LOCATION CATEGORY B										
BAR SIZE	CENTER TO CENTER SPACING									
	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
#4	1'-5"	2'-1"	1'-5"	1'-8"	1'-5"	1'-8"	1'-5"	1'-8"	1'-5"	1'-8"
#5	1'-10"	2'-9"	1'-9"	2'-8"	1'-9"	2'-1"	1'-9"	2'-1"	1'-9"	2'-1"
#6	2'-8"	3'-11"	2'-1"	3'-2"	2'-1"	3'-2"	2'-1"	3'-2"	2'-1"	3'-2"
#7	3'-7"	5'-4"	2'-8"	4'-0"	2'-6"	3'-8"	2'-6"	3'-8"	2'-6"	3'-8"
#8	4'-8"	7'-0"	3'-6"	5'-3"	2'-10"	4'-2"	2'-10"	4'-2"	2'-10"	4'-2"
#9	5'-11"	8'-10"	4'-5"	6'-8"	3'-7"	5'-4"	3'-6"	5'-2"	3'-6"	5'-2"
#10	-	-	5'-8"	8'-5"	4'-6"	6'-9"	4'-3"	6'-5"	4'-3"	6'-5"
#11	-	-	6'-11"	10'-4"	5'-7"	8'-4"	5'-2"	7'-8"	5'-2"	7'-8"

Location Category B - All bars not in Location Category A.

= Non-epoxy coated = Epoxy coated

- Note:
- When development length is not specified on the Plans, the above dimensions shall be used.
 - These development lengths do not apply when bar is in lightweight concrete. Greater lengths are required for this material.
 - These development lengths only apply where the General Notes indicate Reinforcing Steel Design, fy = 60 ksi, and Concrete Design, f'c = 3000 psi.
 - These development lengths assume cover of 2". Greater development lengths will be required for cover less than 2".
 - The Excess Reinforcement Factor was assumed to be 1.0 when calculating these dimensions.
 - Atr was assumed to be 0 when calculating the Reinforcement Confinement Factor.
 - If depth of member does not allow bar development length indicated in Location Categories A and B; then hooks shall be added to all bars not conforming, as per D, E, and F per Det.No. REBAR-DL-201.

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
	
DATE: 03/21/2017	
VERSION	
1.0	
DEVELOPMENT LENGTH DIMENSIONS FOR GRADE 60 REINFORCING STEEL IN MIX NO.3 (3500 P.S.I.) CONCRETE	
DETAIL NO. REBAR-DL-101	SHEET <u> </u> OF <u> </u>

REBAR - DEVELOPMENT LENGTH

LOCATION CATEGORY A										
BAR SIZE	CENTER TO CENTER SPACING									
	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
#4	1'-7"	2'-1"	1'-7"	1'-11"	1'-7"	1'-11"	1'-7"	1'-11"	1'-7"	1'-11"
#5	2'-1"	2'-8"	2'-0"	2'-7"	2'-0"	2'-5"	2'-0"	2'-5"	2'-0"	2'-5"
#6	3'-0"	3'-10"	2'-5"	3'-1"	2'-5"	3'-1"	2'-5"	3'-1"	2'-5"	3'-1"
#7	4'-0"	5'-3"	3'-0"	3'-11"	2'-9"	3'-7"	2'-9"	3'-7"	2'-9"	3'-7"
#8	5'-3"	6'-10"	3'-11"	5'-2"	3'-2"	4'-1"	3'-2"	4'-1"	3'-2"	4'-1"
#9	6'-8"	8'-8"	5'-0"	6'-6"	4'-0"	5'-3"	3'-11"	5'-1"	3'-11"	5'-1"
#10	-	-	6'-4"	8'-3"	5'-11"	6'-7"	4'-10"	6'-3"	4'-10"	6'-3"
#11	-	-	7'-10"	10'-2"	6'-3"	8'-2"	5'-9"	7'-6"	5'-9"	7'-6"

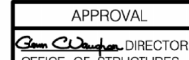
Location Category A - Bars in horizontal layers in top of pour with 12" or more of concrete below them such as in footings, pier caps, etc.

LOCATION CATEGORY B										
BAR SIZE	CENTER TO CENTER SPACING									
	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
#4	1'-3"	1'-10"	1'-3"	1'-6"	1'-3"	1'-6"	1'-3"	1'-6"	1'-3"	1'-6"
#5	1'-7"	2'-5"	1'-6"	2'-3"	1'-6"	1'-10"	1'-6"	1'-10"	1'-6"	1'-10"
#6	2'-3"	3'-5"	1'-10"	2'-9"	1'-10"	2'-9"	1'-10"	2'-9"	1'-10"	2'-9"
#7	3'-1"	4'-8"	2'-4"	3'-6"	2'-2"	3'-2"	2'-2"	3'-2"	2'-2"	3'-2"
#8	4'-0"	6'-0"	3'-0"	4'-6"	2'-5"	3'-8"	2'-5"	3'-8"	2'-5"	3'-8"
#9	5'-2"	7'-8"	3'-10"	5'-9"	3'-1"	4'-7"	3'-0"	4'-6"	3'-0"	4'-6"
#10	-	-	4'-11"	7'-4"	3'-11"	5'-10"	3'-9"	5'-7"	3'-9"	5'-7"
#11	-	-	6'-0"	9'-0"	4'-10"	7'-2"	4'-5"	6'-8"	4'-5"	6'-8"

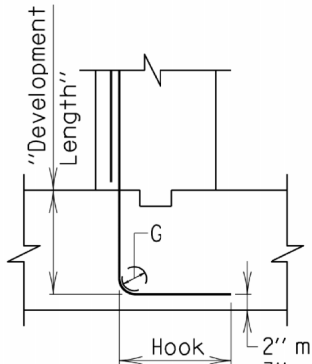
Location Category B - All bars not in Location Category A.

= Non-epoxy coated = Epoxy coated

- Note:
- When development length is not specified on the Plans, the above dimensions shall be used.
 - These development lengths do not apply when bar is in lightweight concrete. Greater lengths are required for this material.
 - These development lengths only apply where the General Notes indicate Reinforcing Steel Design, fy = 60 ksi, and Concrete Design, f'c = 4000 psi.
 - These development lengths assume cover of 2". Greater development lengths will be required for cover less than 2".
 - The Excess Reinforcement Factor was assumed to be 1.0 when calculating these dimensions.
 - Atr was assumed to be 0 when calculating the Reinforcement Confinement Factor.
 - If depth of member does not allow bar development length indicated in Location Categories A and B; then hooks shall be added to all bars not conforming, as per D, E, and F per Det.No. REBAR-DL-203.

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
	
DATE: 03/21/2017	
VERSION	
1.0	
DEVELOPMENT LENGTH DIMENSIONS FOR GRADE 60 REINFORCING STEEL IN MIX NO.6 (4500 P.S.I.) CONCRETE	
DETAIL NO. REBAR-DL-103	SHEET <u> </u> OF <u> </u>

REBAR - DEVELOPMENT LENGTH



STANDARD 90° HOOK

