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GEOTECHNICAL ENGINEER

SEAL 032171 NORTH CAROLINA PROFESSIONAL ENGINEER JINYOUNG PARK

DocuSigned by:

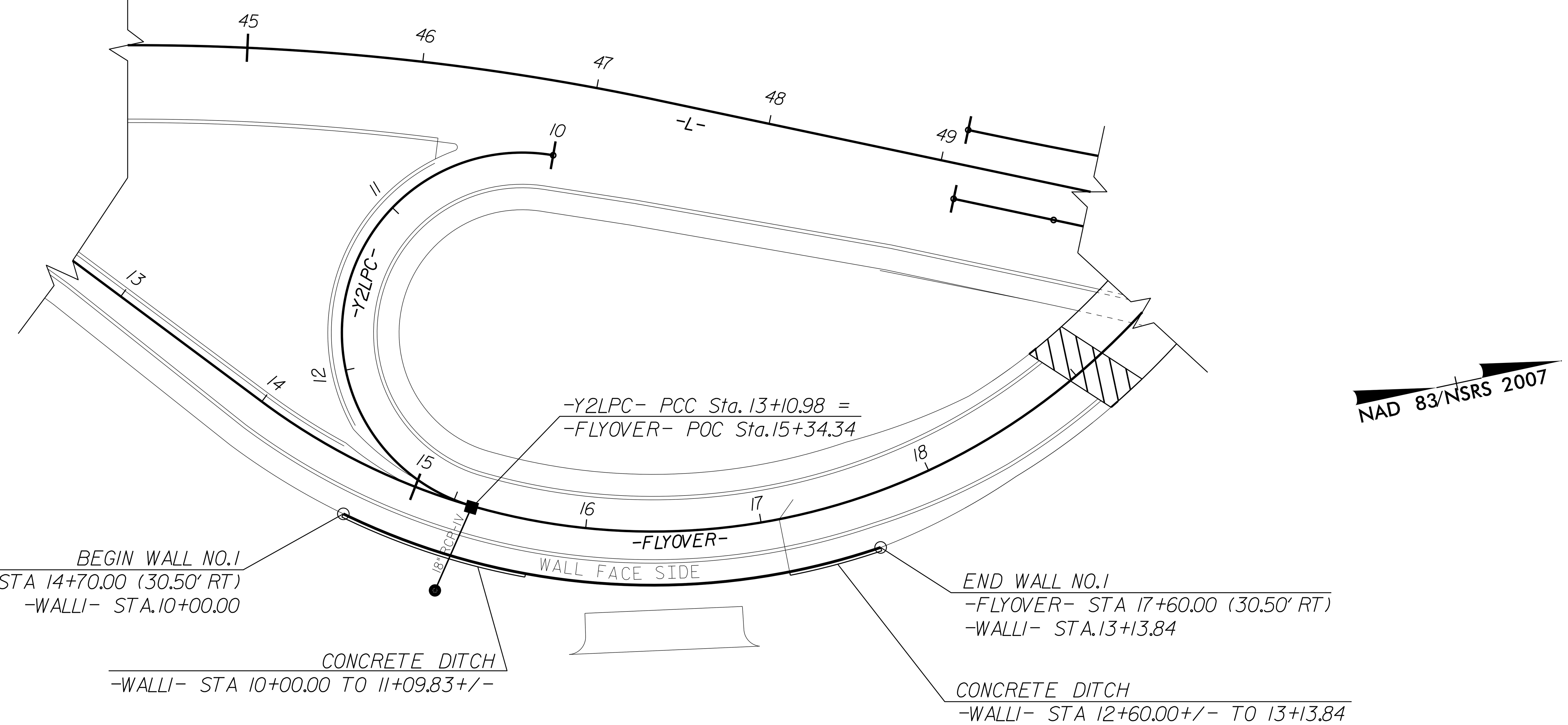
SIGNATURE | DATE 3/29/2016

ENGINEER

SIGNATURE | DATE

-WALL1-

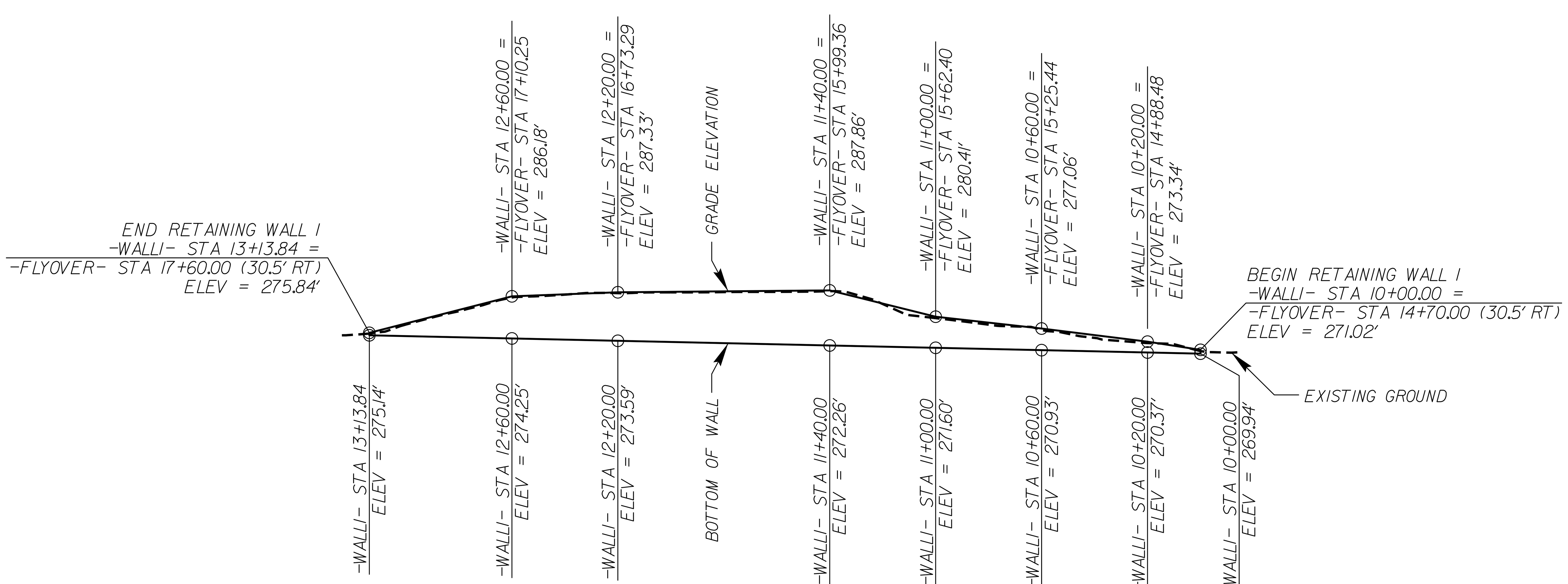
PI Sta.11+65.43
Δ = 44°47' 11.3" (RT)
D = 14°16' 13.6"
L = 313.84'
T = 165.43'
R = 401.50'



PLAN VIEW FOR RETAINING WALL NO. 1

N.T.S.

ESTIMATED RETAINING WALL NO. 1 QUANTITIES	
SOLDIER PILE RETAINING WALL NO. 1	3,595 SF
MSE RETAINING WALL NO. 1 (ALTERNATE)	3,910 SF



WALL ENVELOPE FOR RETAINING WALL NO. 1

EXPOSED WALL FACE VIEW, N.T.S.

PROJECT NO.: B-5121 / B-5317

WAKE COUNTY

STATION: -FLYOVER- 14+70 (WALL NO. 1)

SHEET 1 OF 9

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 1 PLAN VIEW AND WALL ENVELOPE

REVISIONS								SHEET NO.
NO.	BY	DATE	NO.	BY	DATE			W-1
1			3					
2			4					

PREPARED BY: J. PARK	DATE: 03 / 2016
REVIEWED BY: J. BATTS	DATE: 03 / 2016

GEOTECHNICAL ENGINEER

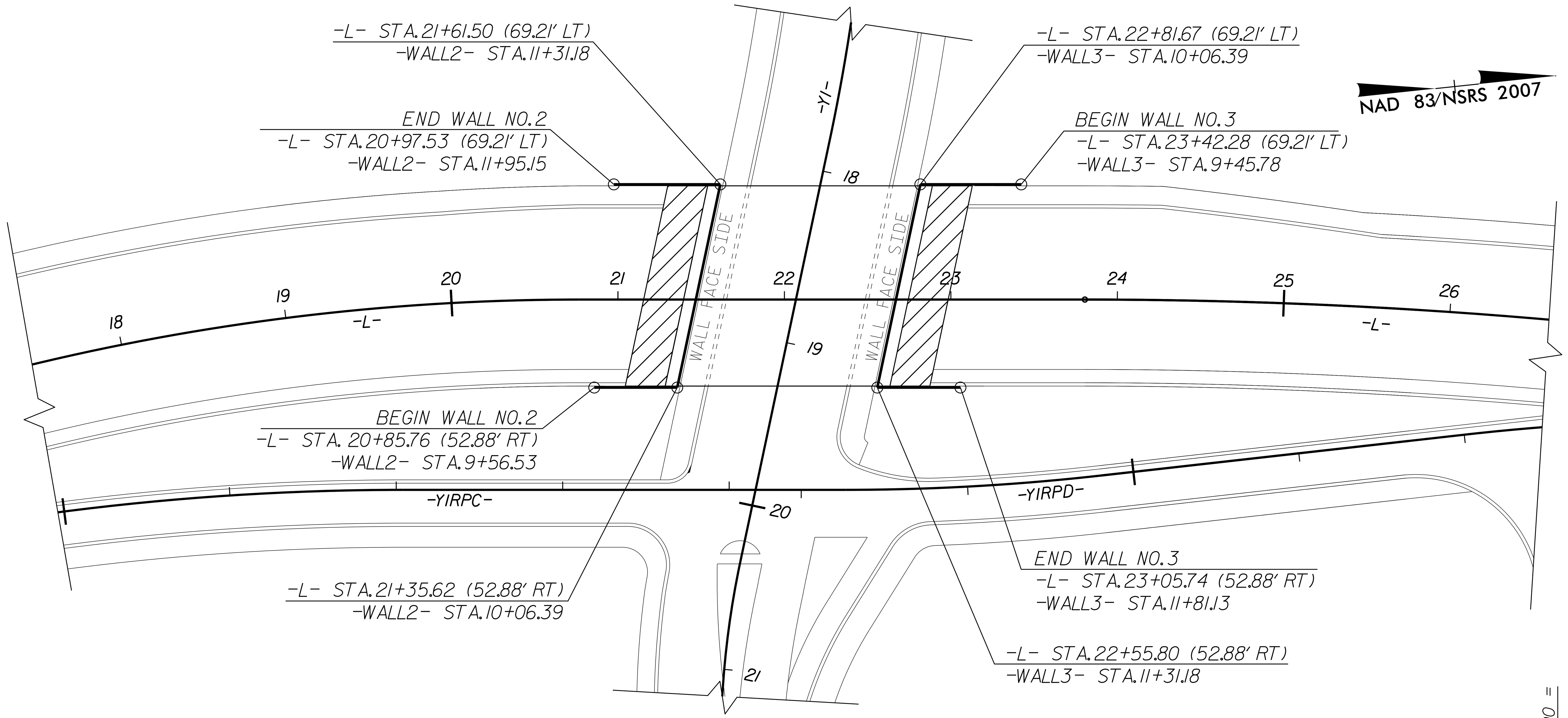
NORTH CAROLINA PROFESSIONAL SEAL 032171 ENGINEER JINYOUNG PARK

DocuSigned by: 3/29/2016

SIGNATURE DATE

ENGINEER

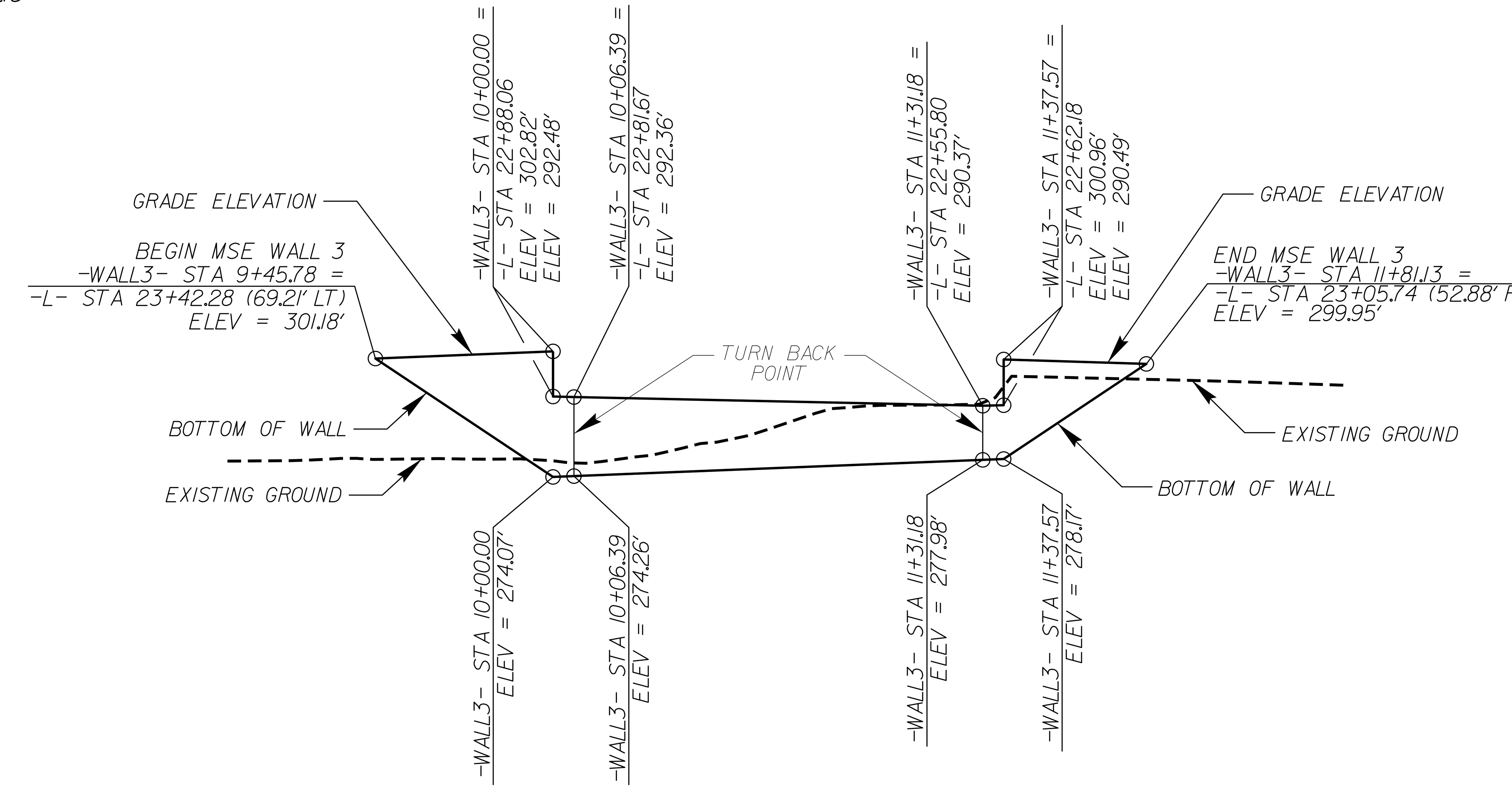
SIGNATURE DATE



PLAN VIEW FOR RETAINING WALL NO. 2 & NO. 3

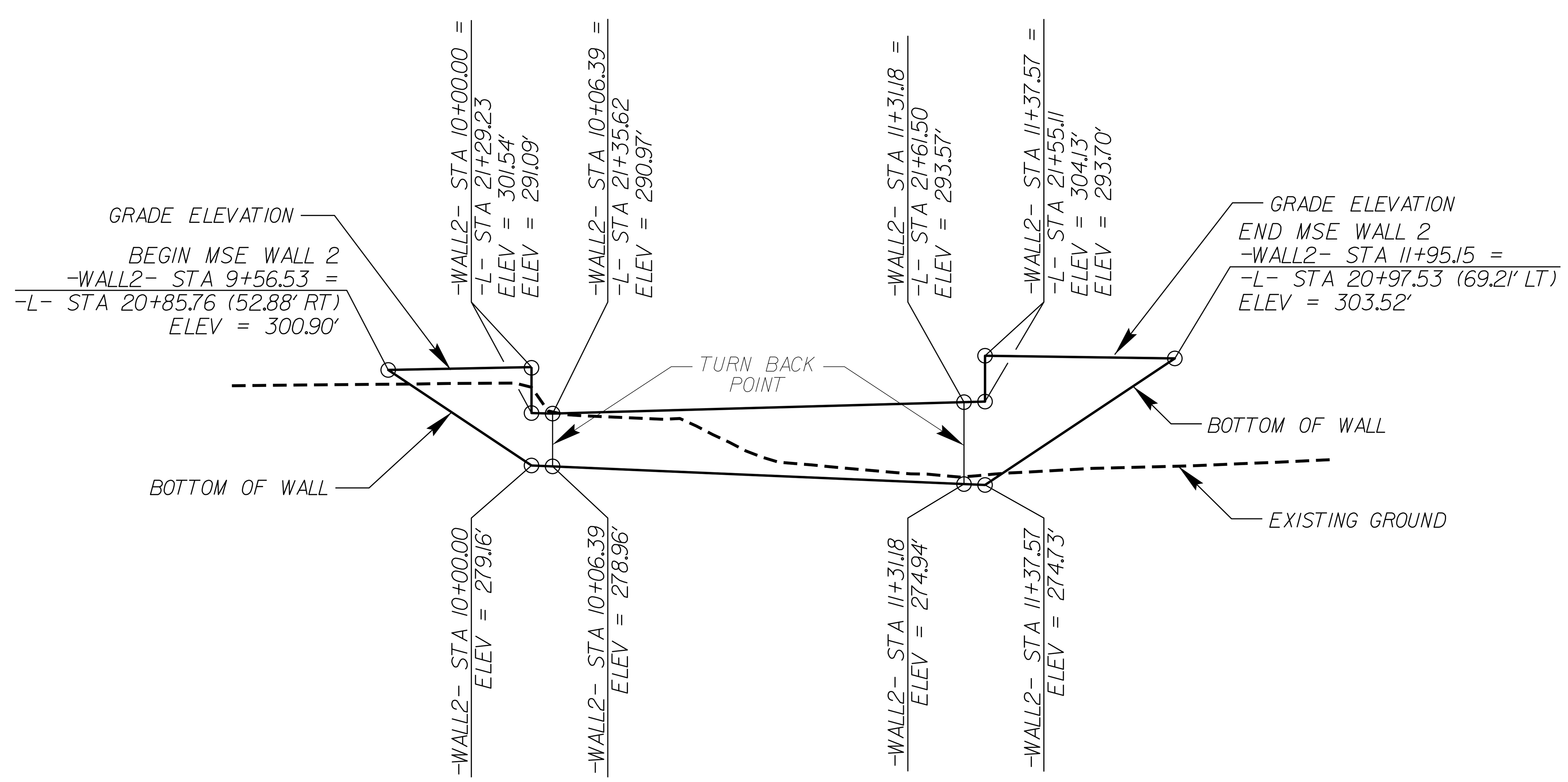
N.T.S.

ESTIMATED RETAINING WALL QUANTITIES	
MSE RETAINING WALL NO. 2	4,230 SF
MSE RETAINING WALL NO. 3	4,150 SF



WALL ENVELOPE FOR RETAINING WALL NO. 3

EXPOSED WALL FACE VIEW, N.T.S.



WALL ENVELOPE FOR RETAINING WALL NO. 2

EXPOSED WALL FACE VIEW, N.T.S.

PROJECT NO.: B-5121 / B-5317

WAKE COUNTY

STATION: 21+00 -L- (WALL NO. 2 & 3)

SHEET 2 OF 9

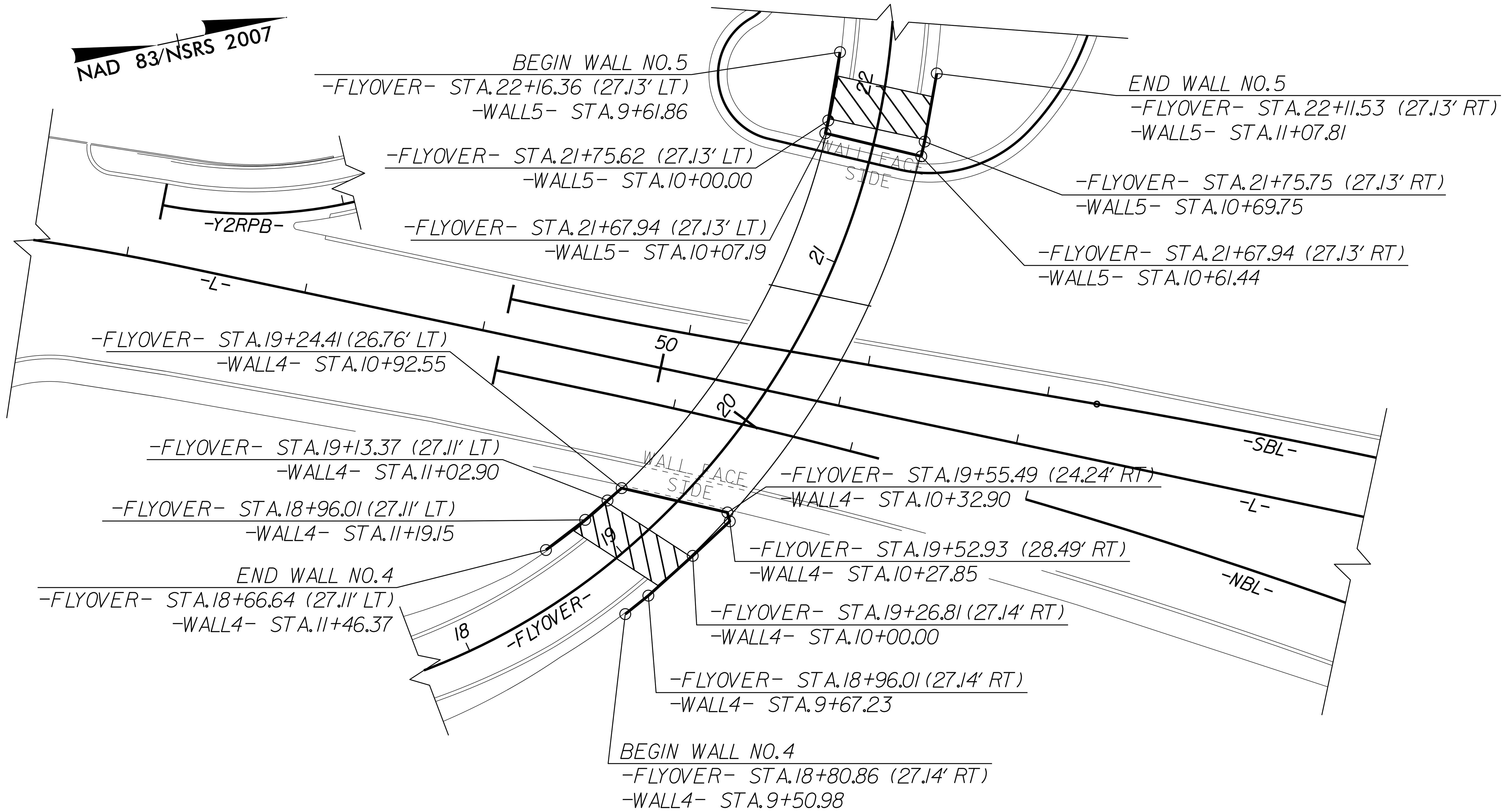
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 2 & 3
PLAN VIEW AND
WALL ENVELOPES

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-2
1	-	-	3	-	-	
2	-	-	4	-	-	

PREPARED BY: J. PARK	DATE: 03 / 2016
REVIEWED BY: J. BATTS	DATE: 03 / 2016



PLAN VIEW FOR RETAINING WALL NO. 4 & NO. 5

N.T.S.

-W4-

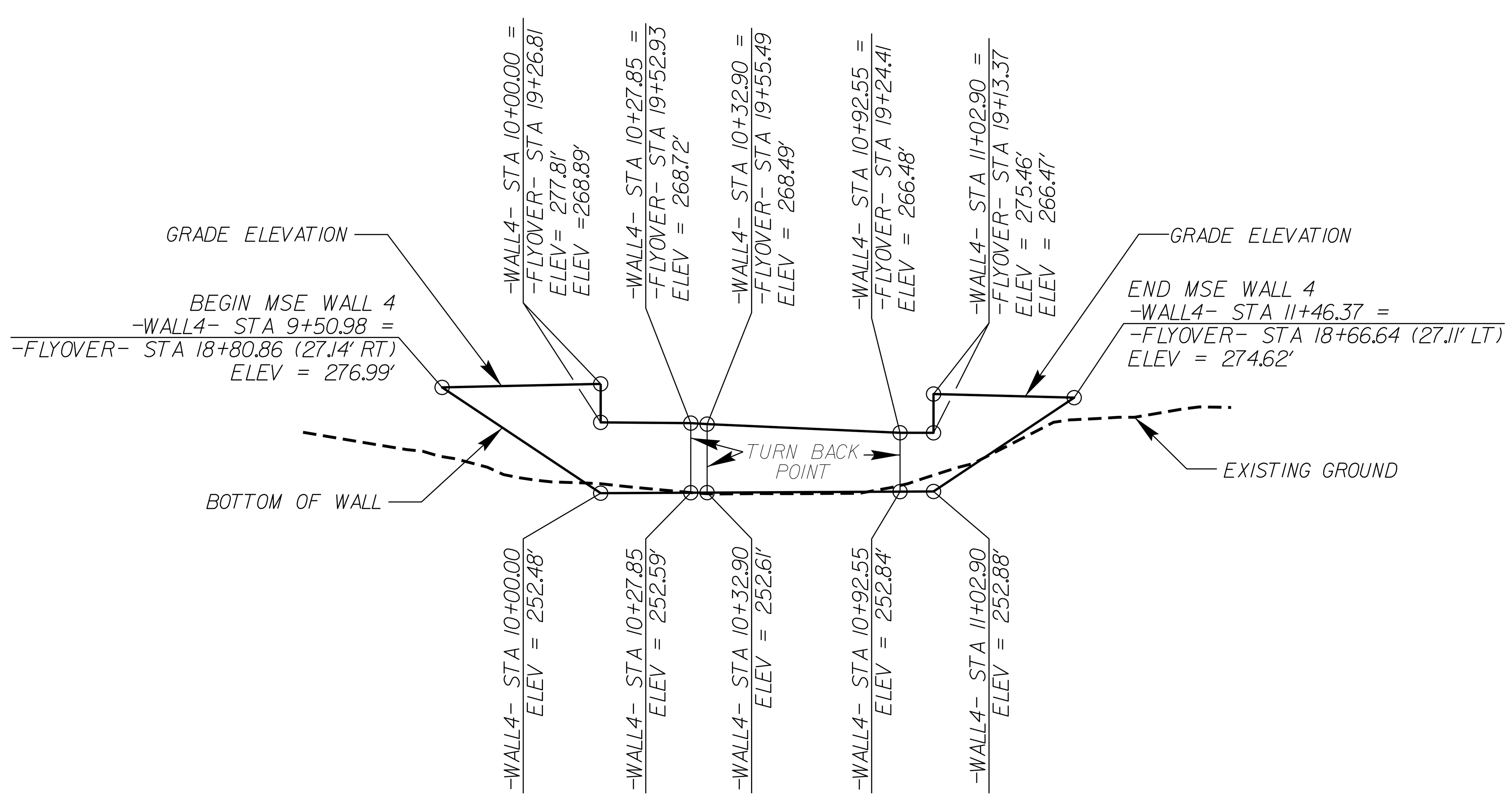
PI Sta.9+09.04	PI Sta.9+83.62
Δ = 16°52' 13.6" (LT)	Δ = 4°09' 11.6" (LT)
D = 14°23' 27.1"	D = 12°40' 19.5"
L = 117.23'	L = 32.77'
T = 59.04'	T = 16.39'
R = 398.14'	R = 452.14'

PI Sta.11+11.02	PI Sta.11+70.15
Δ = 2°20' 27.2" (RT)	Δ = 16°52' 13.6" (RT)
D = 14°23' 59.0"	D = 16°39' 38.7"
L = 16.26'	L = 101.26
T = 8.13'	T = 51.00'
R = 397.89'	R = 343.90'

-W5-

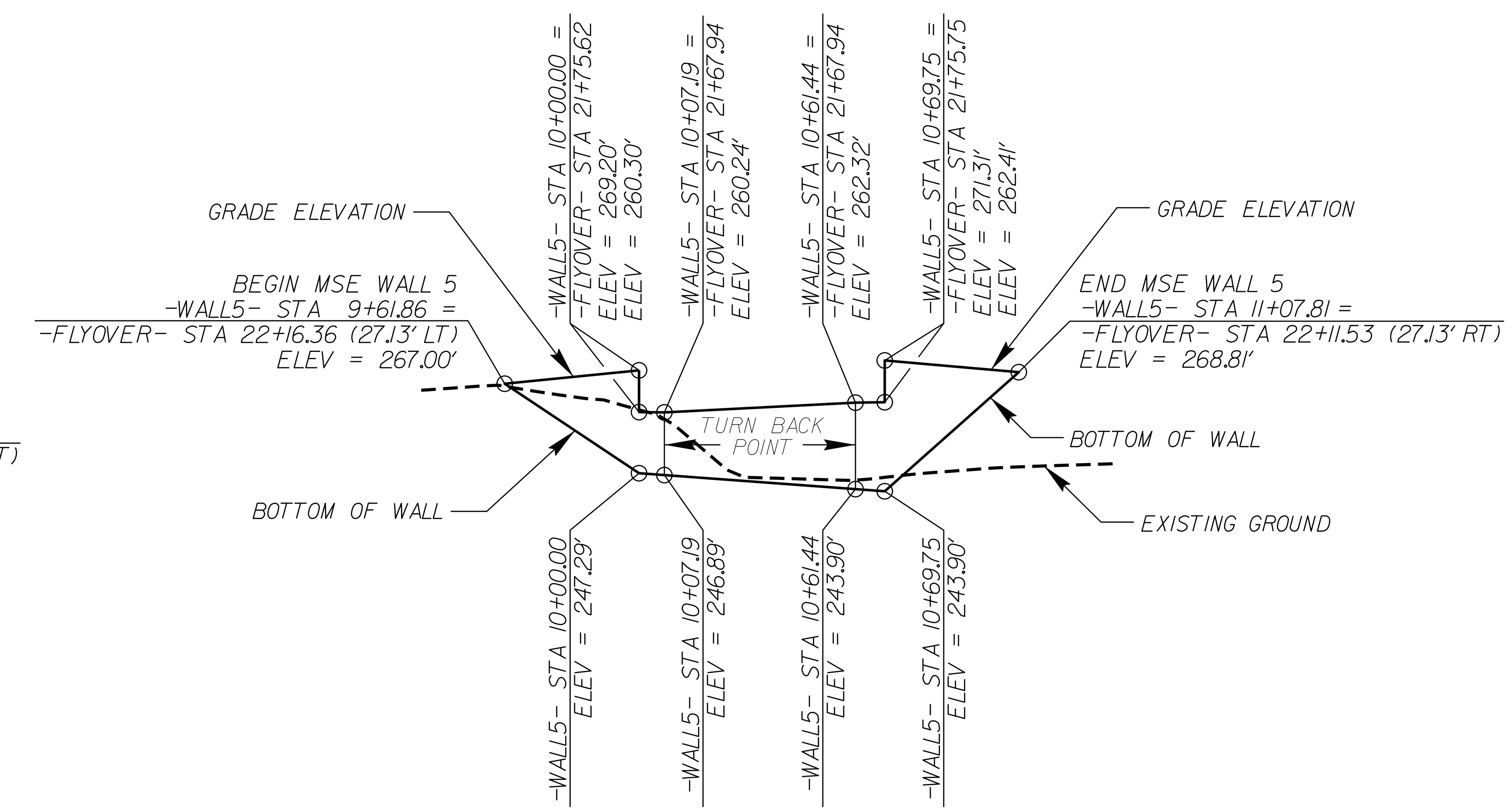
PI Sta.9+60.14	PI Sta.11+15.29
Δ = 11°31' 13.3" (RT)	Δ = 11°30' 11.1" (LT)
D = 14°24' 01.6"	D = 12°40' 21.2" (LT)
L = 80.00'	L = 90.77'
T = 40.14'	T = 45.54'
R = 397.88'	R = 452.13'

ESTIMATED RETAINING WALL QUANTITIES	
MSE RETAINING WALL NO. 4	3,305 SF
MSE RETAINING WALL NO. 5	2,535 SF



WALL ENVELOPE FOR RETAINING WALL NO. 4

EXPOSED WALL FACE VIEW, N.T.S.



WALL ENVELOPE FOR RETAINING WALL NO. 5

EXPOSED WALL FACE VIEW, N.T.S.

GEOTECHNICAL ENGINEER — SEAL 032171, NORTH CAROLINA PROFESSIONAL ENGINEER, JINYOUNG PARK — DocuSigned by: [signature] — 3/29/2016

ENGINEER

PROJECT NO.: B-5121 / B-5317

WAKE COUNTY

STATION: 18+80 -FLYOVER- (WALL NO. 4 & 5)

SHEET 3 OF 9

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 4 & 5
PLAN VIEW AND
WALL ENVELOPES

PREPARED BY: J. PARK	DATE: 03 / 2016	
REVIEWED BY: J. BATTS	DATE: 03 / 2016	

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	-	-	3	-	-
2	-	-	4	-	-

SHEET NO. W-3

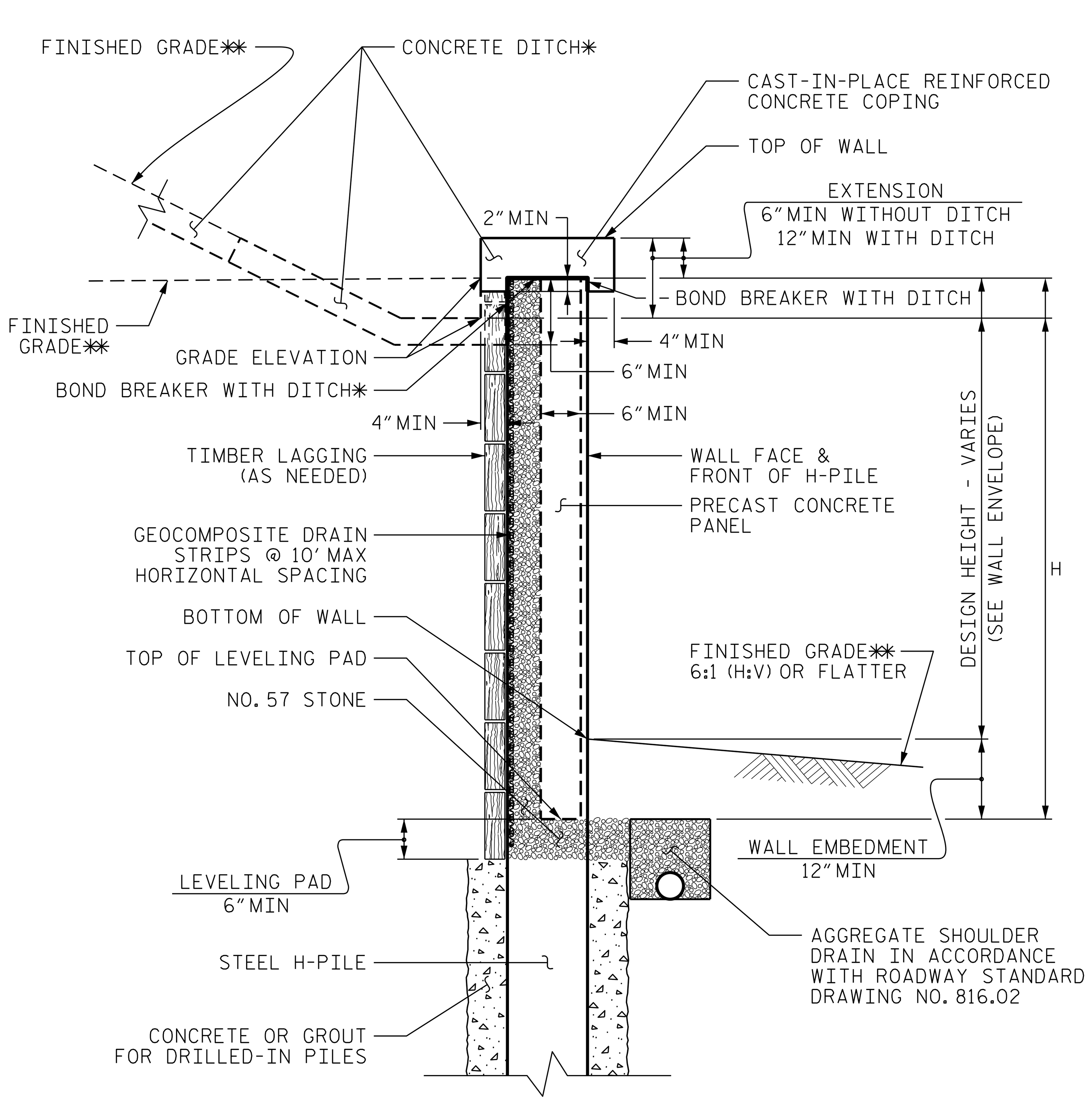
GEOTECHNICAL ENGINEER

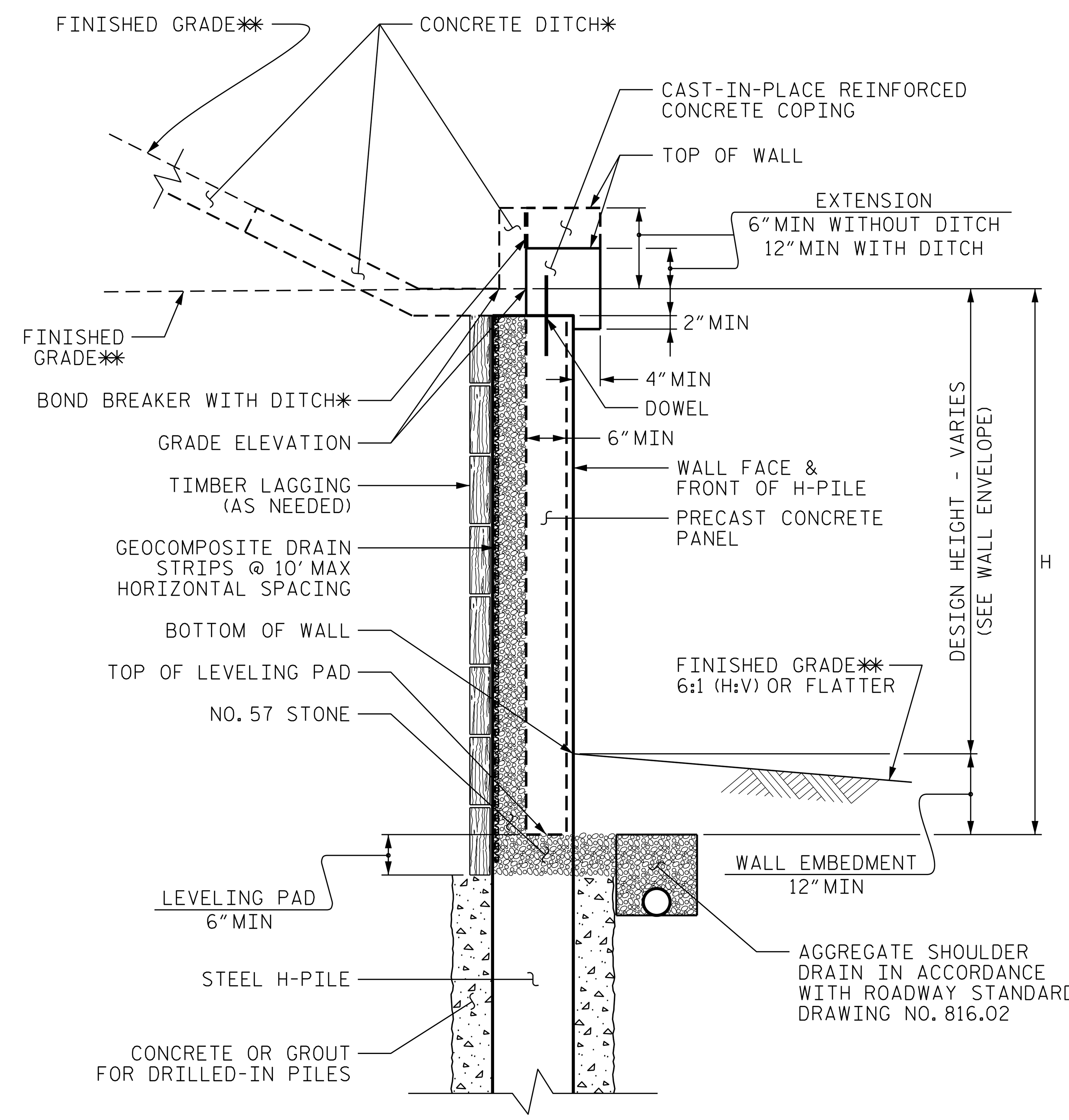
DocuSigned by:

SIGNATURE 3/29/2016 DATE

ENGINEER

SIGNATURE DATE





SOLDIER PILE WALL WITH PRECAST PANEL - TYPICAL SECTION

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS AND PILES.
*SEE CONCRETE DITCH BEHIND WALL DETAILS.
**SEE PLANS FOR FINISHED GRADE.

FROM -WALL1- STA. 10+00.00 TO -WALL1- STA. 13+13.84

NOTES:

FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS PROVISION.

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

DRILLED-IN H-PILES ARE REQUIRED FOR RETAINING WALL NO. 1.

USE A SOLDIER PILE RETAINING WALL WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO. 1.

PAINT GALVANIZED H-PILES GRAY IN ACCORDANCE WITH ARTICLE 442-12 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO. 1.

BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALL NO. 1, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MINIMUM WALL EMBEDMENT = 1.0 FT
4) MINIMUM PILE PENETRATION INTO ROCK = 5 FT
5) IN-SITU ASSUMED MATERIAL PARAMETERS ABOVE ELEVATION 278± FT:
   UNIT WEIGHT, γ = 115 LB/CF
   FRICTION ANGLE, f = 28 DEGREES
   COHESION, c = 0 LB/SF
6) IN-SITU ASSUMED MATERIAL PARAMETERS BELOW ELEVATION 278± FT:
   UNIT WEIGHT, γ = 120 LB/CF
   FRICTION ANGLE, f = 30 DEGREES
   COHESION, c = 0 LB/SF
7) IN-SITU ASSUMED MATERIAL PARAMETERS BELOW ELEVATION 269± FT:
   ROCK MASS SHEAR STRENGTH, Sm = 3,000 LB/SF

DESIGN RETAINING WALL NO. 1 FOR A PIPE EXTENDING UNDER OR THROUGH THE WALL AS SHOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING SOLDIER PILE WALL DESIGN OR CONSTRUCTION.

PROJECT NO.: B-5121 / B-5317

WAKE COUNTY

STATION: SEE WALL NO. 1

SHEET 4 OF 9

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SOLDIER PILE RETAINING WALL NOTES AND DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-4
1	–	–	3	–	–	
2	–	–	4	–	–	

PREPARED BY: J. PARK	DATE: 03 / 2016
REVIEWED BY: J. BATTS	DATE: 03 / 2016

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032171 ENGINEER JINYOUNG PARK

DocuSigned by: JINYOUNG PARK — 3/29/2016

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NOTES:

MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION (SPECIAL).

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

A CONCRETE PARAPET WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO. 2 THROUGH NO. 5. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 1 (ALTERNATE) THROUGH NO. 5.

USE RECTANGULAR PANELS WITH A TEXTURE DIMENSIONED ON THE FRONT FACE OF THE PANELS AS SHOWN ON THE PLANS FOR RETAINING WALL NO. 2 THROUGH NO. 5. SEE THE FITZGERALD FORMLINER PATTERN NO. 1464] (HTTP://WWW.FORMLINERS.COM), OR APPROVED EQUAL. THE JOINTS OF THE PANELS SHALL BE ALIGNED HORIZONTALLY AND VERTICALLY. ANY DEVIATION OF THE SURFACE DETAIL DIMENSIONS OR PATTERN SHALL BE APPROVED BY THE ENGINEER.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 1 (ALTERNATE) THROUGH NO. 5.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 1 (ALTERNATE) THROUGH NO. 5.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1 (ALTERNATE) THROUGH NO. 5, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 (ALTERNATE) THROUGH NO. 5 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION = 3,590 LB/SF, 7,600 LB/SF, 7,470 LB/SF, 6,780 LB/SF AND 7,310 LB/SF FOR RETAINING WALL NO. 1 (ALTERNATE) THROUGH NO. 5, RESPECTIVELY.
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT, WHICHEVER IS LONGER
5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

6) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO. 2 THROUGH NO. 5 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN RETAINING WALL NO. 1 (ALTERNATE) FOR A PIPE EXTENDING THROUGH THE WALL AS SHOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING MSE WALL DESIGN OR CONSTRUCTION.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L) SHOWN. CAST REINFORCEMENT CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 1 LOCATED AT STATION 21+39.41 -L-, END BENT NO. 2 LOCATED AT STATION 22+74.41 -L-, END BENT NO. 1 LOCATED AT STATION 19+19.50 -FLYOVER- AND END BENT NO. 2 LOCATED AT STATION 21+76.69 -FLYOVER-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN CONNECTORS AND REINFORCING STEEL IN CAP.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1 (ALTERNATE) THROUGH NO. 5.

FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION 21+39.41 -L-, END BENT NO. 2 LOCATED AT STATION 22+74.41 -L-, END BENT NO. 1 LOCATED AT STATION 19+19.50 -FLYOVER- AND END BENT NO. 2 LOCATED AT STATION 21+76.69 -FLYOVER- WILL INTERFERE REINFORCEMENT FOR RETAINING WALL NO. 2 THROUGH NO. 5, RESPECTIVELY. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

INSTALL 16 GAUGE 24 INCH DIAMETER CORRUGATED STEEL PIPES FOR HP12X53 STEEL PILE FOUNDATIONS OF END BENT NO. 2 LOCATED AT STATION 21+76.69 -FLYOVER- FOR RETAINING WALL NO. 5. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

THE COST FOR THE 16 GAUGE 24 INCH DIAMETER CORRUGATED STEEL PIPES FOR END BENT NO. 2 LOCATED AT STATION 21+76.69 -FLYOVER- IS INCIDENTAL TO MSE RETAINING WALL NO. 5.

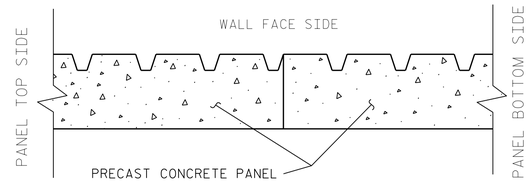
CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR THE VERTICAL EDGES WHERE RETAINING WALL NO. 2 THROUGH NO. 5 TIE TO BACKWALL.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 1 (ALTERNATE) THROUGH NO. 5 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

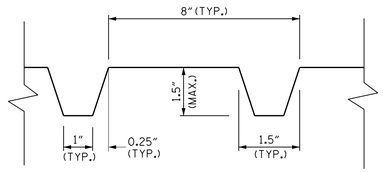
WHEN TEMPORARY SLOPE IS NOT APPLICABLE TO CONSTRUCT THE RETAINING WALL NO. 1 (ALTERNATE), USE "TEMPORARY SHORING FOR WALL CONSTRUCTION" TO MAINTAIN ACCESS TO PARKING LOT. SEE MSE RETAINING WALLS PROVISION FOR TEMPORARY SHORING FOR WALL CONSTRUCTION.

IF THE LOCATION OF THE TEMPORARY SHORING FOR THE MSE RETAINING WALL NO. 1 (ALTERNATE) IS WITHIN THE CLEAR ZONE OF ANY OPEN ROAD, THEN TEMPORARY POSITIVE PROTECTION WILL NEED TO BE INSTALLED BEFORE ANY WORK ON THE TEMPORARY SHORING CAN BEGIN. THE CONTRACTOR SHALL SUBMIT SEALED DRAWINGS OF THE TEMPORARY POSITIVE PROTECTION DESIGN TO ENGINEER MINIMUM 30 DAYS BEFORE THE CONTRACTOR INSTALLS TEMPORARY POSITIVE PROTECTION. DO NOT INSTALL THE TEMPORARY POSITIVE PROTECTION UNTIL THE TEMPORARY POSITIVE PROTECTION DESIGN IS APPROVED. THE CONTRACTOR SHALL PROVIDE, INSTALL, MAINTAIN , RESET, AND REMOVE THE POSITIVE PROTECTION FOR THE TEMPORARY SHORING.

THE COST FOR TEMPORARY SHORING FOR WALL CONSTRUCTION AND TEMPORARY POSITIVE PROTECTION FOR THE TEMPORARY SHORING IS INCIDENTAL TO MSE RETAINING WALL NO.1 (ALTERNATE).

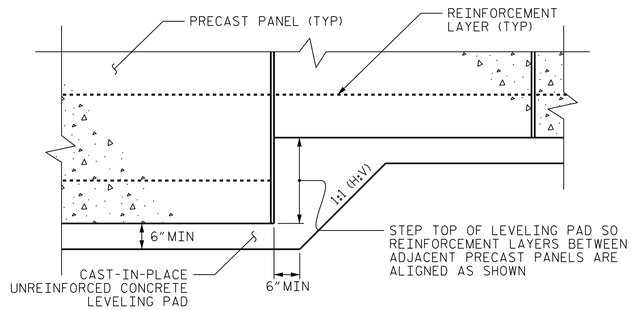


TYPICAL SECTION (NTS)



SURFACE DETAILS (NTS)

WALL PANEL FINISH DETAILS



PRECAST CONCRETE PANELS

LEVELING PAD STEP DETAILS

PROJECT NO.: B-5121 / B-5317

WAKE COUNTY

STATION: SEE WALL NO. 1 TO NO. 5

SHEET 5 OF 9

PREPARED BY: J. PARK	DATE: 03 / 2016
REVIEWED BY: J. BATTS	DATE: 03 / 2016

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NOTES AND DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	–	–	3	–	–	W-5
2	–	–	4	–	–	

GEOTECHNICAL ENGINEER

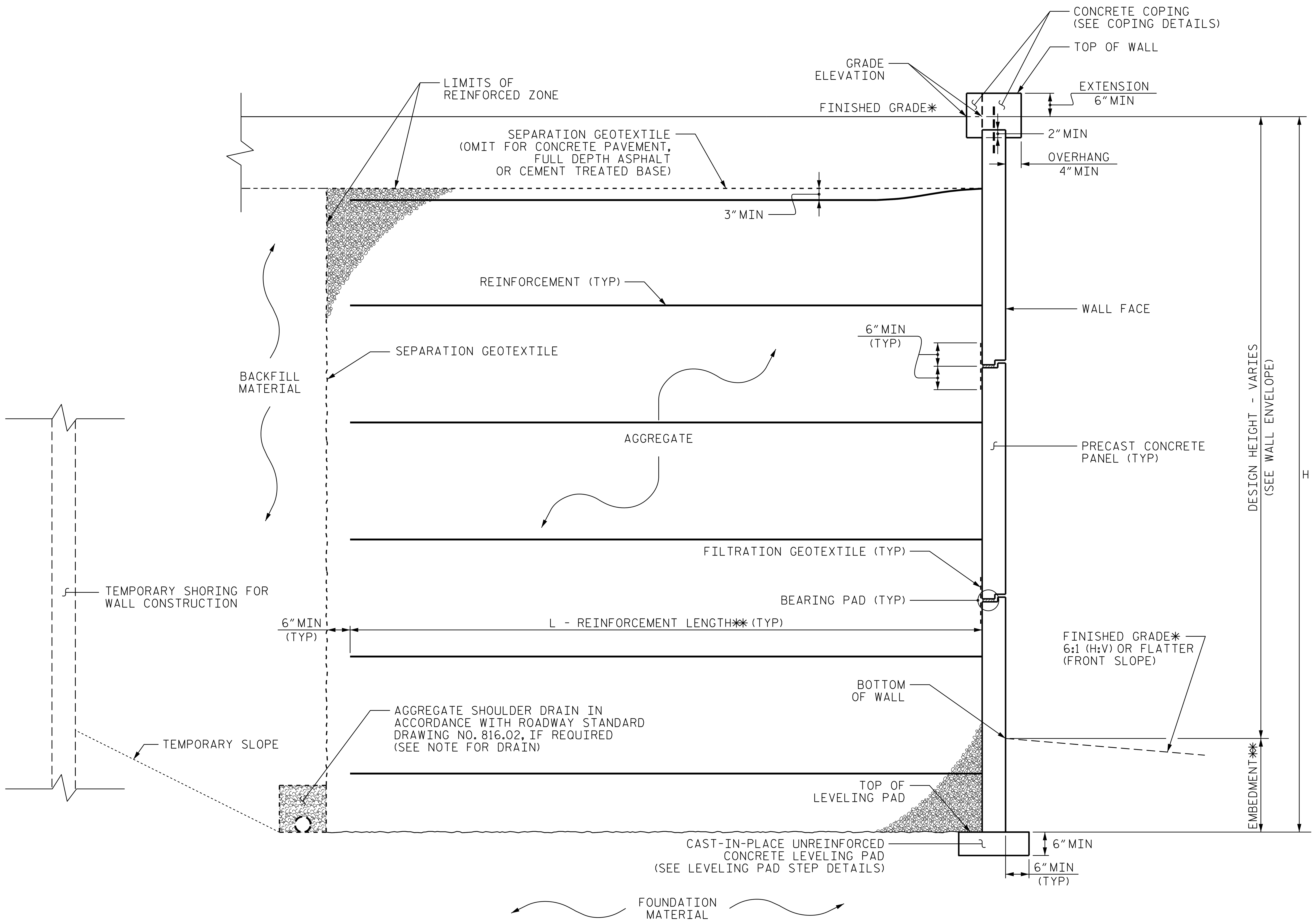
SEAL 032171 NORTH CAROLINA PROFESSIONAL ENGINEER JINYOUNG PARK

DocuSigned by: 3/29/2016

SIGNATURE DATE

ENGINEER

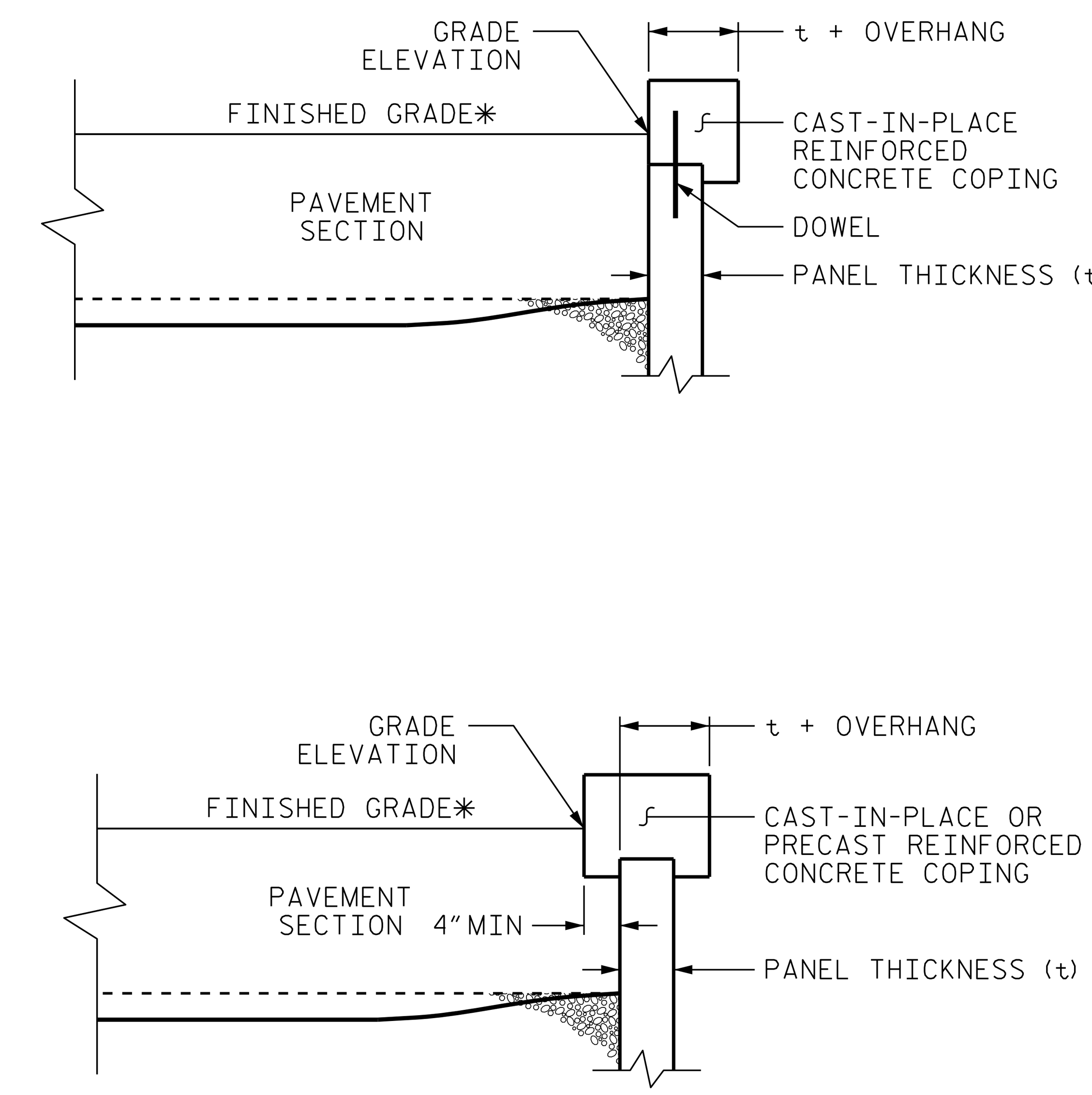
SIGNATURE DATE



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS SPECIAL PROVISION FOR EMBEDMENT AND REINFORCEMENT LENGTH.

FROM -WALL1- STA 11+09.83+/- TO 12+60.00+/-



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: B-5121 / B-5317

WAKE COUNTY

STATION: SEE WALL NO. 1

SHEET 6 OF 9

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL DETAILS

PREPARED BY: J. PARK	DATE: 03 / 2016
REVIEWED BY: J. BATTS	DATE: 03 / 2016

REVISIONS

NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
1	_	_	3	_	_	W-6
2	_	_	4	_	_	

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032171 ENGINEER JINYOUNG PARK

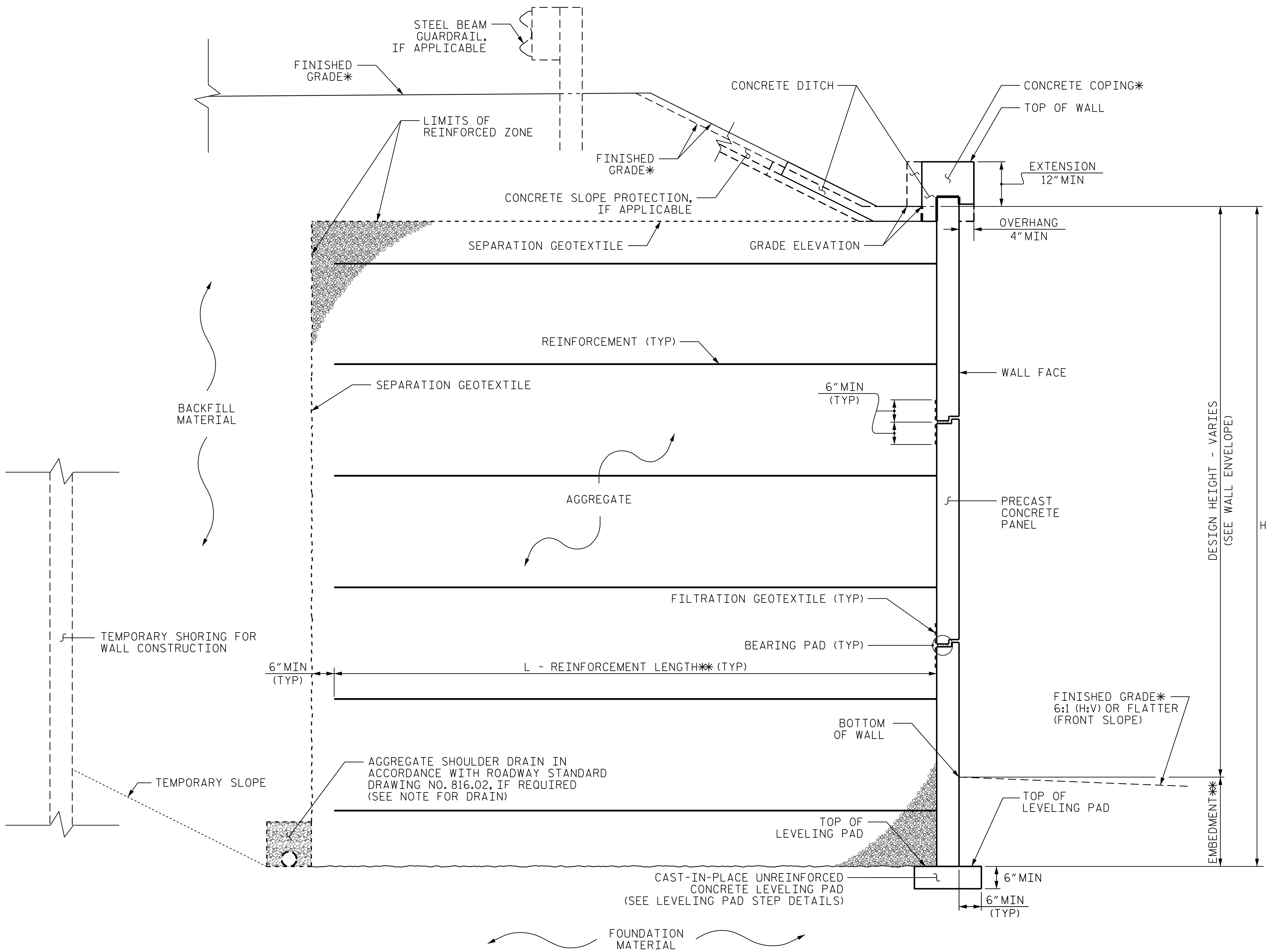
DocuSigned by:

3/29/2016

SIGNATURE DATE

ENGINEER

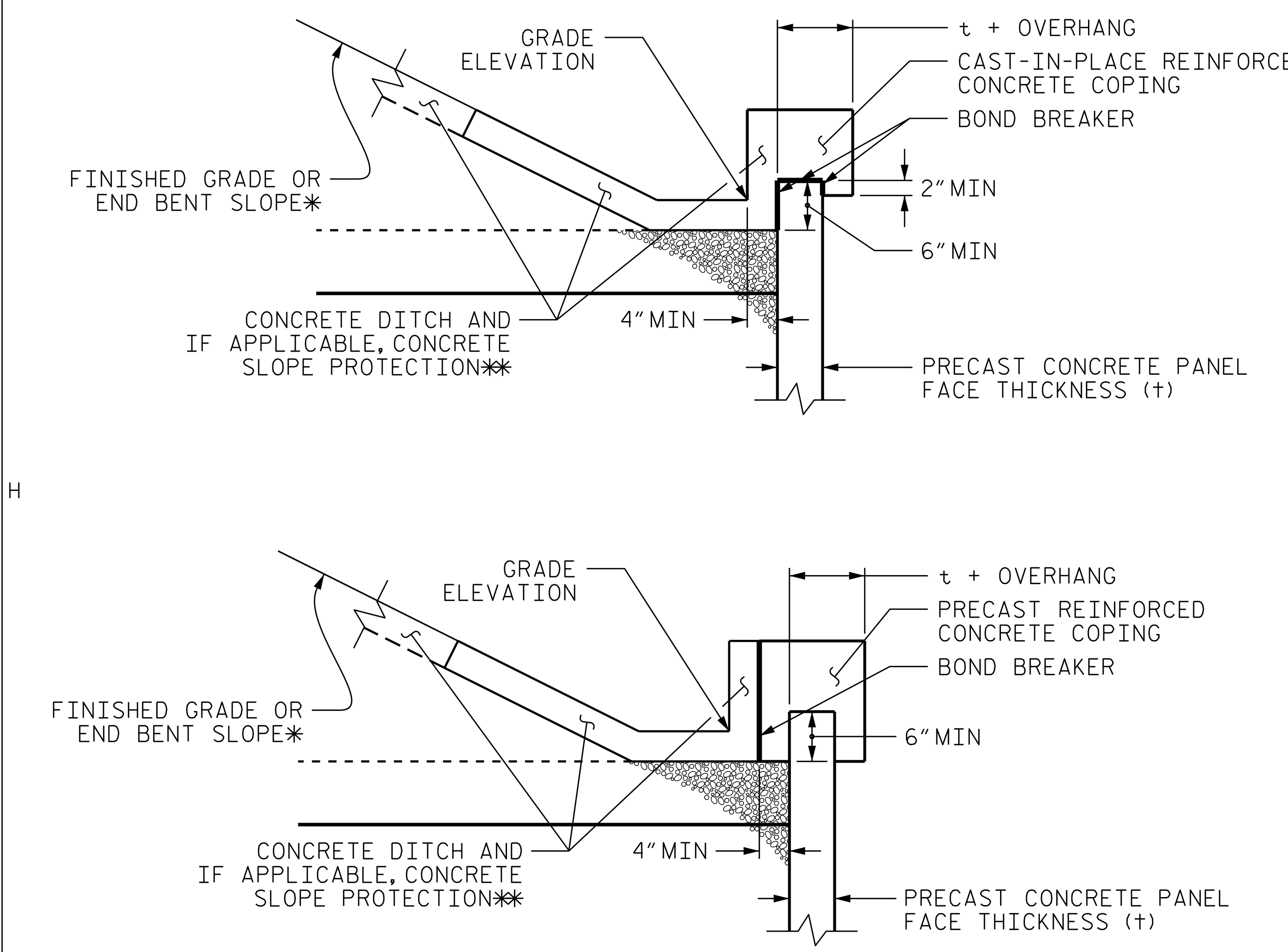
SIGNATURE DATE



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

✱SEE COPING DETAILS AND PLANS FOR FINISHED GRADE
✱✱SEE MSE RETAINING WALLS SPECIAL PROVISION FOR EMBEDMENT AND REINFORCEMENT LENGTH.

-WALL1- STA 10+00.00 TO 11+09.83+/-
-WALL1- STA 12+60.00+/- TO 13+13.84



COPING DETAILS

✱SEE PLANS FOR FINISHED GRADE.
✱✱SEE CONCRETE DITCH BEHIND WALL DETAILS.

PROJECT NO.: B-5121 / B-5317

WAKE COUNTY

STATION: SEE WALL NO. 1

SHEET 7 OF 9

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-7
1	-	-	3	-	-	
2	-	-	4	-	-	

PREPARED BY: J. PARK	DATE: 03 / 2016
REVIEWED BY: J. BATTS	DATE: 03 / 2016

GEOTECHNICAL ENGINEER

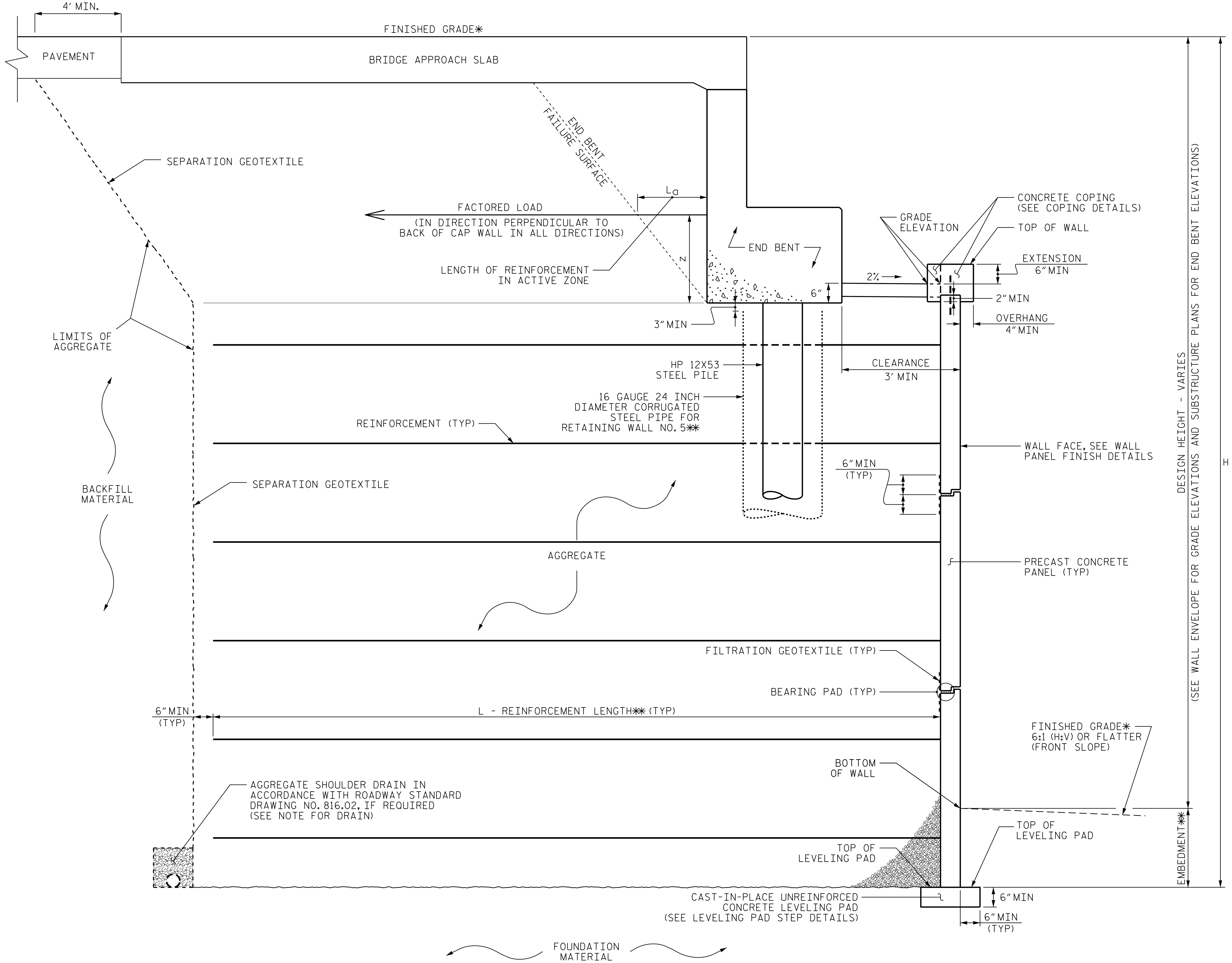
SEAL 032171 — NORTH CAROLINA PROFESSIONAL ENGINEER — JINYOUNG PARK

DocuSigned by: [signature] 3/29/2016

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

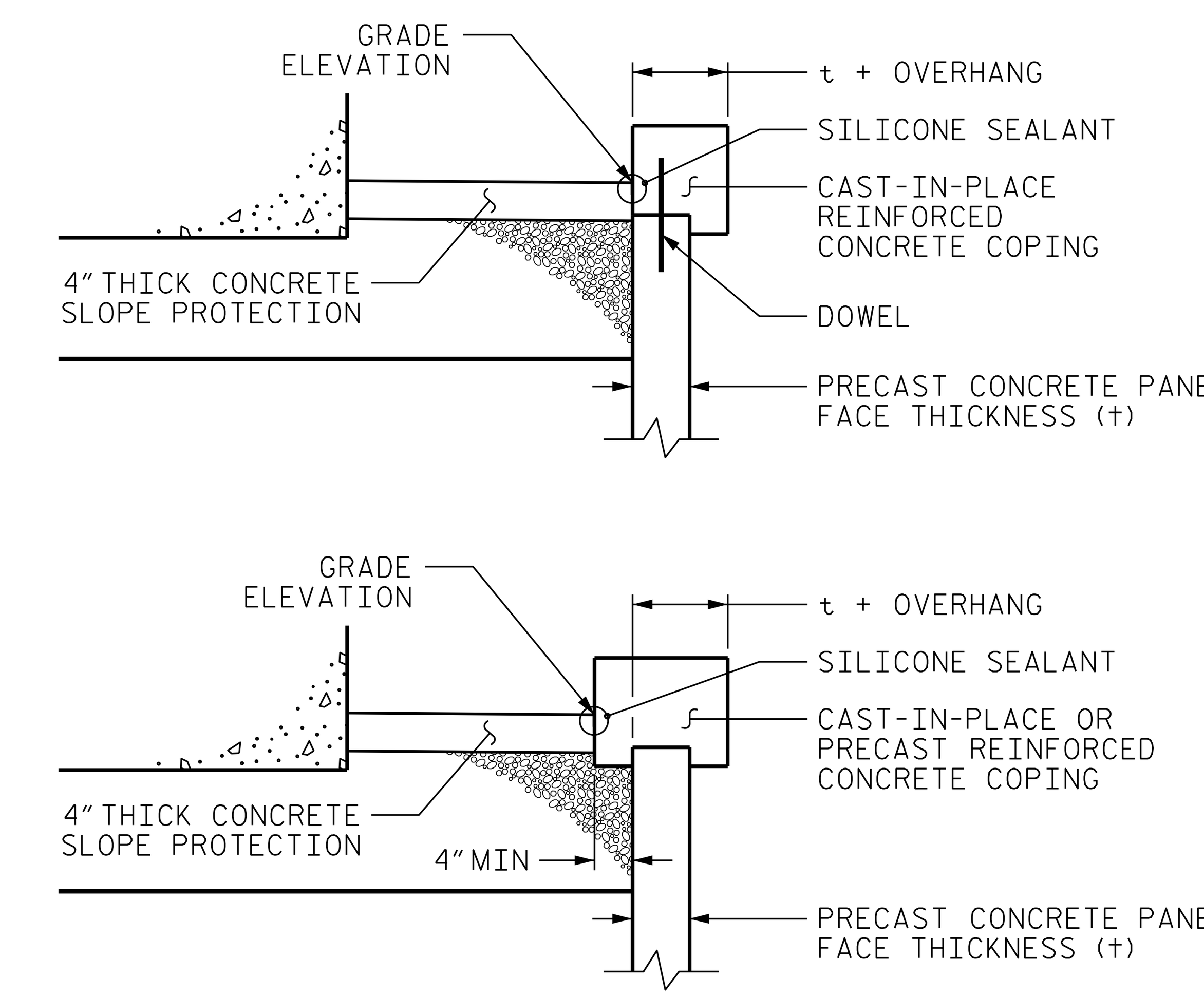


MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

✻SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
✻✻SEE MSE RETAINING WALLS SPECIAL PROVISION FOR EMBEDMENT, REINFORCEMENT LENGTH AND STEEL PIPE.

FROM -WALL2- STA. 10+00.00 TO -WALL2- STA. 11+37.57
FROM -WALL3- STA. 10+00.00 TO -WALL3- STA. 11+37.57
FROM -WALL4- STA. 10+00.00 TO -WALL4- STA. 11+02.90
FROM -WALL5- STA. 10+00.00 TO -WALL5- STA. 10+69.75

FACTORED LOAD AND LOCATION OF STRAP LOAD			
STATION	BENT NO.	FACTORED LOAD (KIPS/FT)	Z (FT)
-L- 21+39.41	END BENT 1	2.4	3.53
-L- 22+74.41	END BENT 2	2.4	3.51
-FLYOVER- 19+19.50	END BENT 1	3.7	2.90
-FLYOVER- 21+76.69	END BENT 2	3.4	2.90



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

PROJECT NO.: B-5121 / B-5317

WAKE COUNTY

STATION: SEE WALL NO. 2 TO NO. 5

SHEET 8 OF 9

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

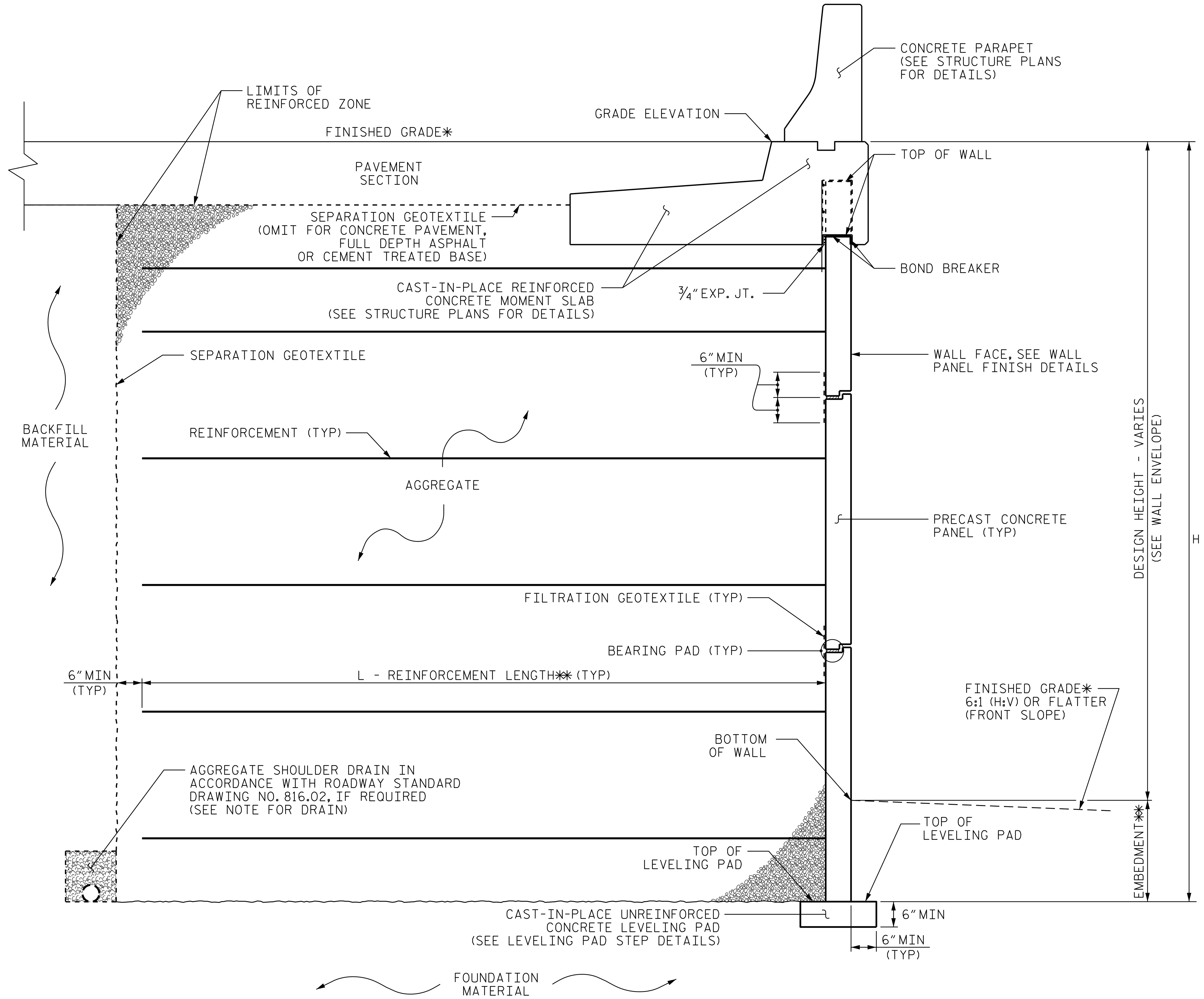
GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL DETAILS

REVISIONS						
NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
1	-	-	3	-	-	W-8
2	-	-	4	-	-	

PREPARED BY: J. PARK	DATE: 03 / 2016
REVIEWED BY: J. BATTS	DATE: 03 / 2016

GEOTECHNICAL ENGINEER
SEAL 032171
JINYOUNG PARK
DocuSigned by:
3/29/2016
SIGNATURE DATE
ENGINEER
SIGNATURE DATE



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

✱SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
✱✱SEE MSE RETAINING WALLS SPECIAL PROVISION FOR EMBEDMENT AND REINFORCEMENT LENGTH.

FROM -WALL2- STA. 9+56.53 TO -WALL2- STA. 10+00.00
FROM -WALL2- STA. 11+37.57 TO -WALL2- STA. 11+95.15
FROM -WALL3- STA. 9+45.78 TO -WALL3- STA. 10+00.00
FROM -WALL3- STA. 11+37.57 TO -WALL3- STA. 11+81.13
FROM -WALL4- STA. 9+50.98 TO -WALL4- STA. 10+00.00
FROM -WALL4- STA. 11+02.90 TO -WALL4- STA. 11+46.37
FROM -WALL5- STA. 9+61.86 TO -WALL5- STA. 10+00.00
FROM -WALL5- STA. 10+69.75 TO -WALL5- STA. 11+07.81

PROJECT NO.: B-5121 / B-5317
WAKE COUNTY
STATION: SEE WALL NO. 2 TO NO. 5
SHEET 9 OF 9

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL DETAILS

REVISIONS

NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
1	–	–	3	–	–	W-9
2	–	–	4	–	–	

PREPARED BY: J. PARK	DATE: 03 / 2016
REVIEWED BY: J. BATTS	DATE: 03 / 2016

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF	
STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION	
GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR	
UNTREATED - EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (c) RGW REV. 5-7-03 RWW (c) JTE REV. 10-1-11 MAA (c) GM
REV. 8-16-99 RWW (c) LES REV. 5-1-06 TLA (c) GM

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