STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5208C	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
50000.1.STR07T1B		P.E./UTIL P.E.
50000.1.STR08T3		P.E./UTIL P.E.
43219.2.STR09P5208		R.O.W.
50000.3.STR01T4A	FRA-FR-HSR-0006-10-01-00	CONST./UTIL. CONST.

PART 2 OF 3

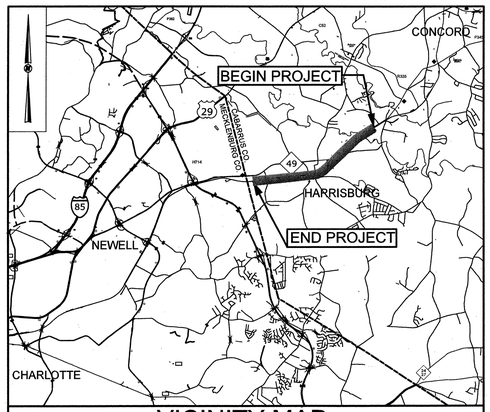
STATE OF NORTH CAROLINA
RAIL DIVISION

CABARRUS COUNTY

LOCATION: NCRR/NS MAINLINE RAILROAD ROADBED FROM SOUTH OF PHARR MILL ROAD (SR 1158, MP 361.9) TO MILLBROOK ROAD (SR 1182, MP 365.5)

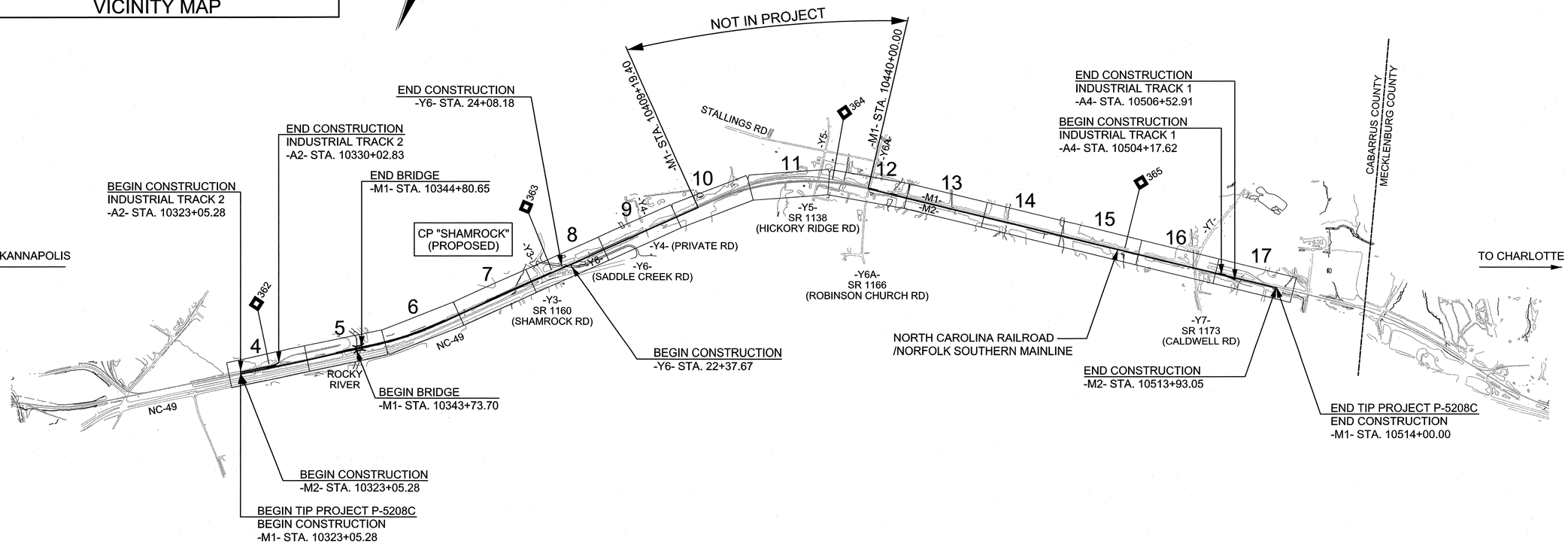
TYPE OF WORK: RAILROAD ROADBED, GRADING, DRAINAGE, PAVING, STRUCTURE

See Sheet 1-A For Index of Sheets



VICINITY MAP

NAD 83/ NSRS 2007



GRAPHIC SCALES

50 0 50 100
PLANS

50 0 50 100
PROFILE (HORIZONTAL)

10 0 10 20
PROFILE (VERTICAL)

PROJECT LENGTH

LENGTH OF RAIL TIP PROJECT	3.013 MILES
LENGTH OF STRUCTURE TIP PROJECT	0.020 MILES
TOTAL LENGTH OF TIP PROJECT	3.033 MILES

Prepared in the Office of:
HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 2012

LETTING DATE:
JULY 16, 2013

COREY VERNIER, P.E.
RAIL PROJECT ENGINEER
ENRICO ROQUE, P.E.
RAIL PROJECT DESIGN ENGINEER
DAVID HAWKINS, P.E.
STRUCTURE PROJECT ENGINEER
JAMES BYRD, P.E.
HYDRAULICS PROJECT ENGINEER
BRAD SMYTHE, P.E.
NCDOT PROJECT MANAGER

RAIL ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNIER
7/05/13
SIGNATURE: Corey P. Vernier P.E.

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER JAMES A. BYRD
7/2/13
SIGNATURE: James A. Byrd P.E.

NC DEPARTMENT OF TRANSPORTATION
RAIL DIVISION
DESIGN AND CONSTRUCTION

TIP PROJECT: P-5208C

CONTRACT: C203206

REVISIONS
REVISION #1 (7/5/2013): REVISED STATIONING FOR -Y6- SADDLE CREEK RD CONSTRUCTION LIMITS.

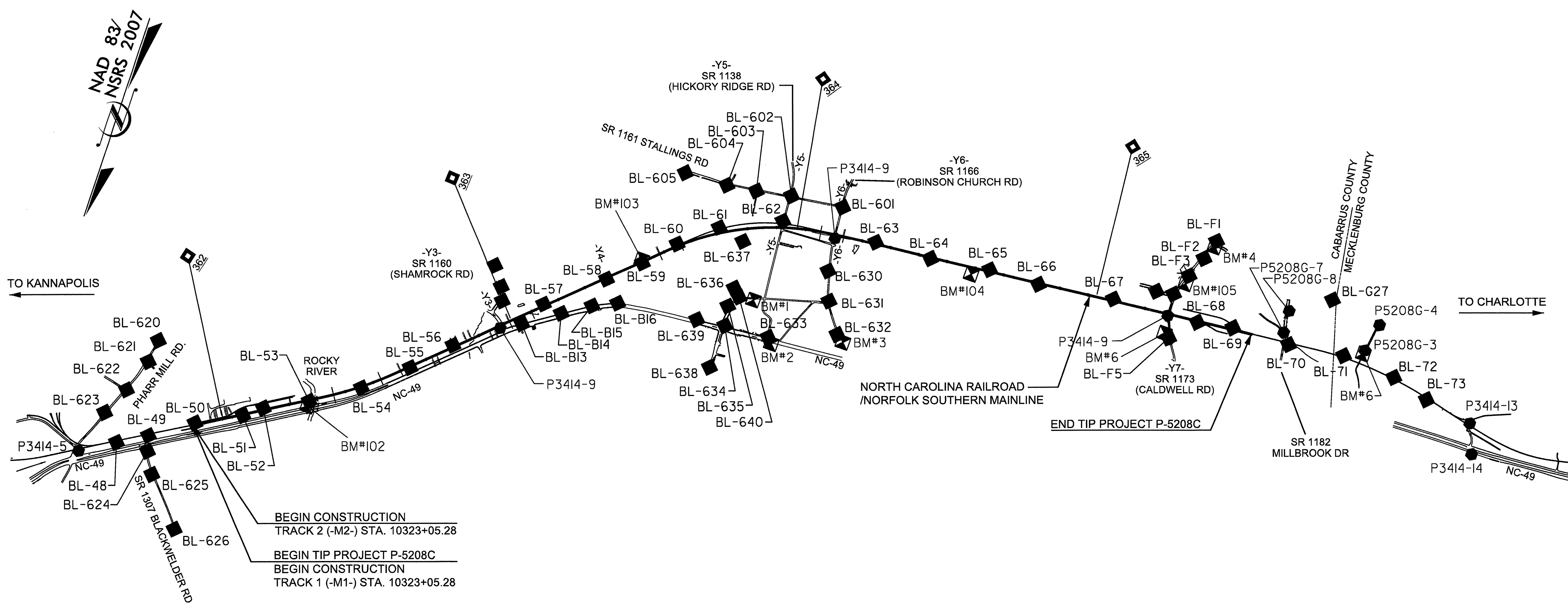
DGN 0041DEL_P10a1 0001ADD_P10a1

11:31:05 AM
$$$$USERNAME$$$$ $$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$

DCN 0041DEL_P10a1 9/18/12

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	1A
Location and Surveys	

SURVEY CONTROL SHEET



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "P3414-15"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 572927.0137(ft) EASTING: 1490817.4654(ft)
ELEVATION: 700.64(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998439800
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "P3414-15" TO -TRACK 1- STATION 10323+05.28 IS
N 72°40'50.3" E 27636.055'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/*

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   P5208C_LS_CONTROL.TXT
   P5208C_LS_LOCAL.TXT

2. *SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.*

3. *PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM, UTILIZING THE NCGS RTN SYSTEM (VRS).*

   MONUMENTS USED OR SET FOR PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT:

● *INDICATES GEODETIC CONTROL MONUMENTS FOR HORIZONTAL CONTROL*
■ *INDICATES BASELINE MONUMENTS FOR HORIZONTAL PROJECT CONTROL*
⊠ *INDICATES BENCHMARKS FOR VERTICAL CONTROL*

BM1 ELEVATION = 629.35
N 575640 E 1507955
M1C STATION 10424+55 1254 RIGHT
RR-SPIKE IN BASE OF POWER POLE

BM2 ELEVATION = 634.87
N 576245 E 1507413
M1C STATION 10428+72 2025 RIGHT
RR-SPIKE IN BASE OF POWER POLE

BM3 ELEVATION = 677.93
N 575813 E 1506260
M1C STATION 10445+87 1789 RIGHT
RR-SPIKE IN BASE OF POWER POLE

BM4 ELEVATION = 610.31
N 572125 E 1500771
M1C STATION 10504+26 1316 LEFT
RR SPIKE IN 14" OAK

BM5 ELEVATION = 637.97
N 572892 E 1501035
M1C STATION 10500+84 580 LEFT
RR SPIKE IN 9" OAK

BM6 ELEVATION = 669.30
N 573828 E 1501094
M1C STATION 10499+30 344 RIGHT
RR SPIKE IN 10" ELM

BM102 ELEVATION = 560.79
N 579923 E 1514578
M1C STATION 10343+12 95 RIGHT
CHISLED SQUARE IN SE MOST CORNER OF SE MOST WW OF THE NORTH BOUND BRIDGE OF US HWY 49 OVER ROCKY RIVER

BM103 ELEVATION = 598.58
N 575624 E 1509999
M1C STATION 10405+88 28 LEFT
RR SPIKE SET IN ROOT OF A 24" BEECH TREE, SOUTHSIDE OF TRACK

BM104 ELEVATION = 595.08
N 573969 E 1504570
M1C STATION 10464+58 128 RIGHT
CHISLED SQUARE IN CONC. COVER OF A MH. MH IS 100' NORTH OF TRACK, 70' SOUTH OF A RETENTION POND & WEST OF HARRISBURG PARK

BM105 ELEVATION = 664.51
N 573014 E 1497744
M1C STATION 10514+00
S 80°33'25.9" W DIST 1949.31
RR-SPIKE SET IN FIRST JOINT OF CONC. C&G AT EOP ON EAST SIDE OF PRIVATE DRIVE LEADING TO SEWER PLANT. 165 +/- SOUTH OF TRACKS

BL

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
P34145	P3414-5	581959.8295	1518046.2455	572.74	OUTSIDE PROJECT LIMITS	
BL48	BL-48	581609.3046	1517477.9676	577.00	OUTSIDE PROJECT LIMITS	
BL49	BL-49	581315.2151	1516997.0119	579.44	OUTSIDE PROJECT LIMITS	
BL50	BL-50	580839.3114	1516315.0884	574.41	10323+52.12	26.45 LT
BL51	BL-51	580448.9259	1515576.0104	571.28	10331+86.38	24.87 RT
BL52	BL-52	580215.0253	1515287.2568	565.66	10335+54.68	24.56 LT
BL53	BL-53	579842.5600	1514579.4346	566.33	10343+52.93	25.80 RT
BL54	BL-54	579324.2409	1513807.8634	569.16	10352+79.96	26.79 RT
BL55	BL-55	578713.2960	1513134.7649	572.51	10361+86.87	24.78 RT
BL56	BL-56	578099.7332	1512568.6763	578.14	10370+20.20	25.01 LT
P34147	P3414-7	577551.9729	1511897.8101	585.96	10378+83.43	45.27 RT
BL57	BL-57	576911.6508	1511333.8543	591.44	10387+33.77	25.28 LT
BL58	BL-58	576141.6138	1510457.1011	598.38	10398+99.47	27.53 RT
BL59	BL-59	575669.5364	1509968.6202	601.39	10405+78.79	25.92 RT
BL60	BL-60	575160.9206	1509514.8140	602.65	10412+57.49	29.80 LT
BL61	BL-61	574644.1286	1508928.8503	609.28	10420+26.66	91.02 LT
BL62	BL-62	574169.0195	1507934.6229	609.98	10431+06.18	109.03 LT
P34149	P3414-9	574162.3541	1506986.4491	610.51	10440+33.66	71.82 RT
BL63	BL-63	573993.0230	1506301.8672	609.70	10447+32.41	26.02 LT
BL64	BL-64	573942.7297	1505320.4362	611.81	10457+13.81	24.79 RT
BL65	BL-65	573786.4207	1504296.0301	616.65	10467+48.86	25.43 LT
BL66	BL-66	573746.7595	1503421.1030	624.88	10476+23.23	25.02 RT
BL67	BL-67	573561.6555	1502118.5391	637.77	10489+37.92	25.27 LT
P341411	P3414-11	573520.1777	1501138.6901	648.83	10499+16.85	34.15 RT
BL68	BL-68	573459.3581	1500620.8578	651.17	10504+38.19	26.86 RT
BL69	BL-69	573344.8679	1500009.1839	657.23	10510+58.39	24.17 LT
BL70	BL-70	573293.4073	1499011.1322	654.09	OUTSIDE PROJECT LIMITS	
BL71	BL-71	573157.7204	1498054.5231	664.68	OUTSIDE PROJECT LIMITS	
BL72	BL-72	573217.8908	1497115.1322	673.06	OUTSIDE PROJECT LIMITS	
BL73	BL-73	573391.5827	1496458.1881	678.06	OUTSIDE PROJECT LIMITS	
P341413	P3414-13	573517.0917	1495622.0121	688.41	OUTSIDE PROJECT LIMITS	

BL061

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
BL620	BL-620	579715.5321	1517382.2101	595.86	OUTSIDE PROJECT LIMITS	
BL621	BL-621	580116.7946	1517425.1879	616.38	OUTSIDE PROJECT LIMITS	
BL622	BL-622	580700.8687	1517615.6022	600.50	OUTSIDE PROJECT LIMITS	
BL623	BL-623	581190.4377	1517842.3591	578.41	OUTSIDE PROJECT LIMITS	
EQ5	P3414-5	581959.8295	1518046.2455	572.74	OUTSIDE PROJECT LIMITS	
EQ48	BL-48	581609.3046	1517477.9676	577.00	OUTSIDE PROJECT LIMITS	
BL624	BL-624	581574.6942	1516923.6579	584.70	OUTSIDE PROJECT LIMITS	
BL625	BL-625	581928.4940	1516718.8299	598.89	OUTSIDE PROJECT LIMITS	
BL626	BL-626	582680.1943	1516045.4699	581.75	OUTSIDE PROJECT LIMITS	

BL062

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
BL605	BL-605	573942.7030	1509795.3120	588.38	10417+37.56	1156.14 LT
BL604	BL-604	573904.8890	1509049.2600	594.76	10422+69.45	790.82 LT
BL603	BL-603	573829.9270	1508537.2350	597.66	10426+93.07	635.72 LT
BL602	BL-602	573710.2000	1507939.0870	595.10	10432+24.16	549.98 LT
BL601	BL-601	573599.5210	1507042.3300	594.51	10440+38.81	493.75 LT
EQ9	P3414-9	574162.3541	1506986.4491	610.51	10440+33.66	71.82 RT
BL630	BL-630	574731.1019	1506912.2285	628.17	10440+46.53	645.26 RT
BL631	BL-631	575220.5869	1506721.4329	655.79	10441+88.93	1151.94 RT
BL632	BL-632	575720.0581	1506396.9927	673.52	10444+60.34	1682.10 RT

ADDITIONAL POINTS

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
G3	P5208G-3	572951.7770	1497740.7380	662.36	OUTSIDE PROJECT LIMITS	
G4	P5208G-4	572458.3860	1497643.0170	623.74	OUTSIDE PROJECT LIMITS	
P341414	P3414-14	574005.9756	1495416.0977	688.57	OUTSIDE PROJECT LIMITS	

BL2

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
BLF5	BL-F5	573874.1983	1500999.0037	672.99	10500+19.42	400.65 RT
EQ11	P3414-11	573520.1777	1501138.6901	648.83	10499+16.85	34.15 RT
BLF4	BL-F4	573131.3088	1501171.0561	639.84	10499+24.61	355.98 LT
BLF3	BL-F3	572742.5686	1501025.1103	625.10	10501+09.72	727.67 LT
BLF2	BL-F2	572373.7576	1500881.2505	615.35	10502+90.72	1079.75 LT
BLF1	BL-F1	572024.8982	1500775.0431	604.30	10504+32.21	1415.85 LT

BL3

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
BLB16	BL-B16	576472.9861	1510137.4508	593.11	10399+00.14	487.94 RT
BLB15	BL-B15	576663.6642	1510535.8983	592.95	10394+80.78	349.16 RT
BLB14	BL-B14	576964.9980	1510992.9465	593.23	10389+42.49	249.50 RT
BLB13	BL-B13	577361.7592	1511571.8694	593.57	10382+50.20	134.13 RT
EQ34147	P3414-7	577551.9729	1511897.8101	585.96	10378+83.43	45.27 RT
BLB17	B.SPIKE	577096.3976	1512022.5756	583.08	10381+09.32	369.56 LT
BLB12	BL-B12	576867.3901	1512122.1957	585.30	10381+96.28	603.67 LT
BLB11	BL-B11	576557.6771	1512348.0052	589.04	10382+48.23	983.43 LT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
EQ61	BL-61	574644.1286	1508928.8503	609.28	10420+26.66	91.02 LT
BL637	BL-637	574740.7894	1508463.3042	627.04	10423+90.53	221.91 RT
BL636	BL-636	575551.6093	1508334.6384	616.19	10420+61.31	993.26 RT
BL635	BL-635	575883.2517	1508334.8871	607.75	10418+15.85	1271.43 RT
BL634	BL-634	576225.1226	1508269.9879	618.32	10415+92.57	1585.98 RT
BL638	BL-638	576984.2878	1508280.1983	615.95	10408+84.25	2143.94 RT

BY1A

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
BL640	BL-640	575672.8469	1508205.4315	619.54	10421+26.14	1163.66 RT
EQ634	BL-634	576225.1226	1508269.9879	618.32	10415+92.57	1585.98 RT

BY1B

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
BL633	BL-633	576163.1733	1507499.8614	635.31	10427+77.27	1916.86 RT
EQ0634	BL-634	576225.1226	1508269.9879	618.32	10415+92.57	1585.98 RT
BL639	BL-639	576286.5080	1508759.4794	607.92	10410+26.91	1308.67 RT

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
EQF4	BL-F4	573131.3088	1501171.0561	639.84	10499+24.61	355.98 LT
BLF6	BL-F6	573185.6688	1501467.8690	636.32	10496+23.78	332.41 LT

BY1G

POINT	DESC.	NORTH	EAST	ELEVATION	M1C STATION	OFFSET
EQG27	BL-G27	572315.8039	1498552.7952	650.87	OUTSIDE PROJECT LIMITS	
G8	P5208G-8	572750.1980	1499190.8950	646.28	OUTSIDE PROJECT LIMITS	
G7	P5208G-7	573126.9750	1499158.1490	650.70	OUTSIDE PROJECT LIMITS	

NOTE: DRAWING NOT TO SCALE

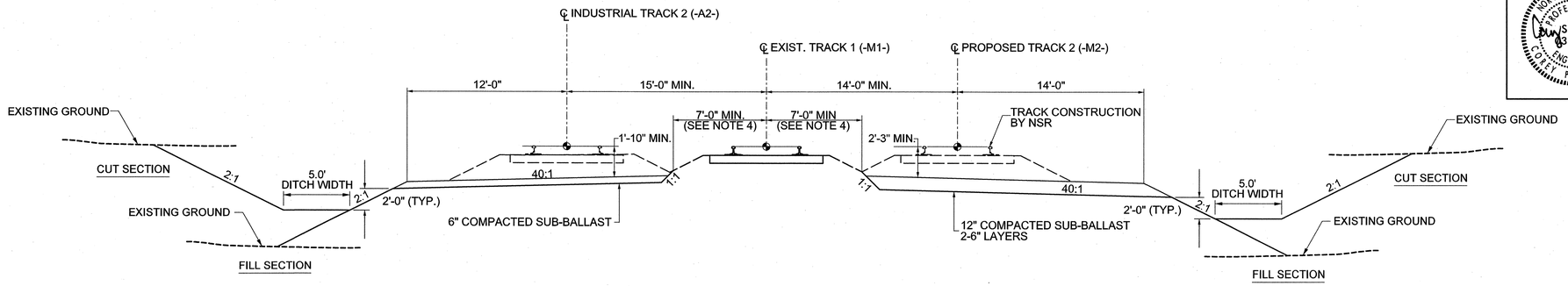
1:30:50 PM
...\p5208c_rr_psh_1c.dgn
$$$$USERNAME$$$$

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

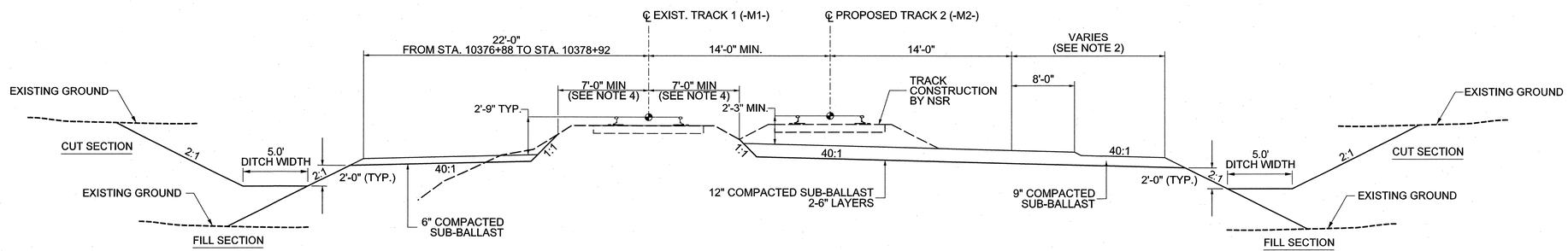
PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2
R/W SHEET NO.	

RAIL DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037992 COREY P. YERKIES
7/05/13



TYPICAL SECTION #1 - EXISTING TRACK (-M1-) BETWEEN PROPOSED TRACK #2 (-M2-) AND INDUSTRIAL TRACK #2 (-A2-)

-M1- STA. 10323+05.28 TO STA. 10330+00



TYPICAL SECTION #2 - PROPOSED TRACK #2 (-M2-) ADDED ADJACENT TO EXISTING TRACK #1 (-M1-)

-M1- STA. 10330+00 TO STA. 10342+25
-M1- STA. 10344+81 TO STA. 10409+19 (SEE NOTE 3)
-M1- STA. 10440+00 TO STA. 10475+00
-M1- STA. 10476+00 TO STA. 10490+00
-M1- STA. 10499+00 TO STA. 10514+00

NOTES

1. TRACK CONSTRUCTION, INCLUDING BALLAST, TIE, AND RAIL INSTALLATION IS BY NSR.

2. ADDITIONAL ROADBED WIDTH IS PROPOSED FOR PERMANENT ACCESS AS FOLLOWS:

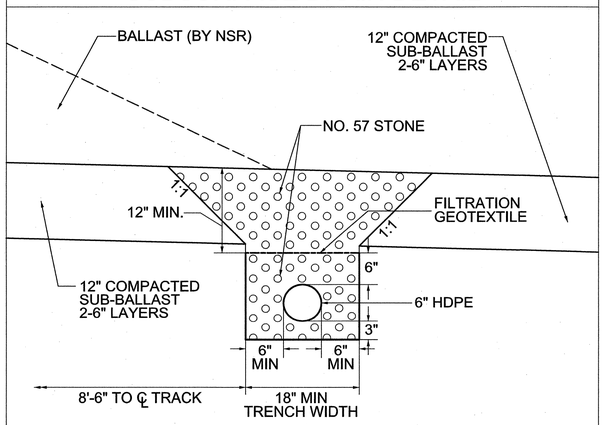
-M1- STA 10365+47 TO STA 10379+08 - VARIES 14'-0" TO 53'-0" (ACCESS RD)
-M1- STA 10461+50 TO STA 10462+50 - 32'-0"
-M1- STA 10484+00 TO STA 10485+00 - 32'-0"

3. MODIFIED TYPICAL SECTION INCLUDING ASPHALT UNDERLAYMENT THROUGH THE LIMITS OF CP "SHAMROCK" IS PROPOSED BETWEEN -M1- STA. 10364+79 AND STA. 10379+15. SEE SHEET 2I FOR DETAIL.

4. ACTUAL LOCATION OF EXCAVATION IS TO BE BASED ON FIELD CONDITIONS AS DETERMINED BY THE NORFOLK SOUTHERN REPRESENTATIVE.

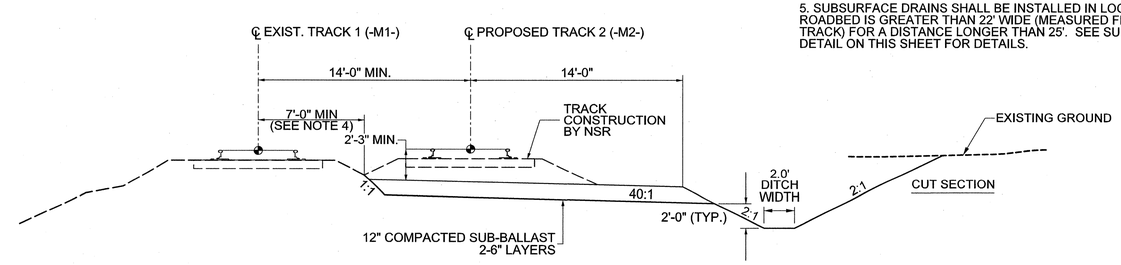
5. SUBSURFACE DRAINS SHALL BE INSTALLED IN LOCATIONS WHERE ROADBED IS GREATER THAN 22' WIDE (MEASURED FROM CENTERLINE OF TRACK) FOR A DISTANCE LONGER THAN 25'. SEE SUBSURFACE DRAIN DETAIL ON THIS SHEET FOR DETAILS.

SUBSURFACE DRAIN DETAIL



*PROVIDE SUBDRAIN OUTLETS AT LOCATIONS SHOWN IN PLANS OR AS DIRECTED BY ENGINEER.

*SUBSURFACE DRAIN SHOWN IS ON RIGHT SIDE, MIRROR IMAGE FOR SUBSURFACE DRAIN ON LEFT SIDE.



TYPICAL SECTION #3 - PROPOSED TRACK #2 (-M2-) ADDED ADJACENT TO EXISTING TRACK #1 (-M1-)

-M1- STA. 10490+00 TO STA. 10499+00

REVISIONS

REVISION #1 (7/5/2013): REVISED SUB-BALLAST THICKNESS ON THE RIGHT SIDE OF TYPICAL SECTION NO. 2.

DGN 0041DEL_P10a1 0001ADD_P10a1

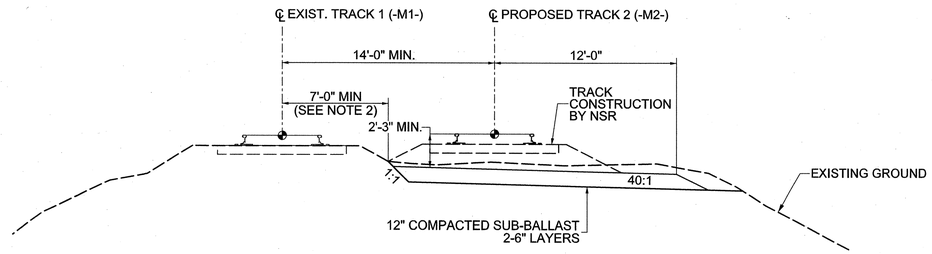
1:52:24 PM
$$$$USERNAME$$$$

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2A
R/W SHEET NO.	

PAVEMENT DESIGN ENGINEER
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD GLENN EDENS, JR. — 7/2/13
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 049824 ENGINEER ERIC COATS ROBERTS — 7/2/13
RAILROAD DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY F. VERNER — 7/05/13



TYPICAL SECTION #4 - PROPOSED TRACK #2 (-M2-) ADDED ADJACENT TO EXISTING TRACK #1 (-M1-) (12' ROADBED)

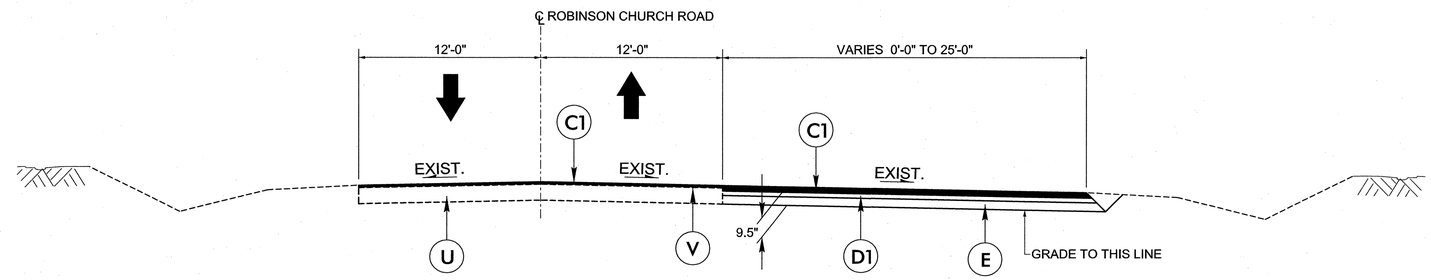
-M1- STA. 10342+25 TO STA. 10343+74
-M1- STA. 10475+00 TO STA. 10476+00

NOTES

1. TRACK CONSTRUCTION, INCLUDING BALLAST, TIE, AND RAIL INSTALLATION IS BY NSR.
2. ACTUAL LOCATION OF EXCAVATION IS TO BE BASED ON FIELD CONDITIONS AS DETERMINED BY THE NORFOLK SOUTHERN REPRESENTATIVE.

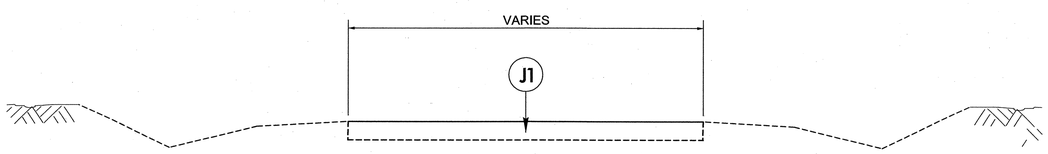
PAVEMENT SCHEDULE	
C1	PROPOSED APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS PER SQ. YARD
C2	PROPOSED APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS PER SQ. YARD IN EACH OF 2 LAYERS
D1	PROPOSED APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS PER SQ. YARD
D2	PROPOSED APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS PER SQ. YARD
E	PROPOSED APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS PER SQ. YARD
J1	PROPOSED 6" AGGREGATE BASE COURSE
J2	PROPOSED 8" AGGREGATE BASE COURSE
U	EXISTING PAVEMENT
V	MILLING, 1.5" DEPTH

ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

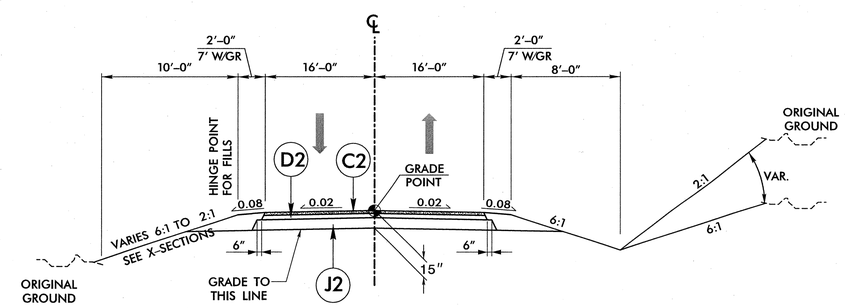


TYPICAL SECTION #5 - PROPOSED TURN-A-ROUNDS AT ROBINSON CHURCH ROAD

-M1- STA. 10439+86 TO STA. 10440+55



TYPICAL SECTION #6 - USE ON ALL GRAVEL DRIVES



TYPICAL SECTION #7 - SADDLE CREEK ROAD (-Y6-)

-Y6- STA. 22+38 TO STA. 24+08

REVISIONS

REVISION #1 (7/5/2013): REVISED ROADWAY TYPICAL SECTIONS AND PAVEMENT SCHEDULE.

DGN 0041DEL_P10a1 0001ADD_P10a1

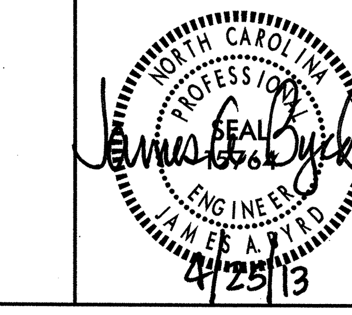
10:24:36 AM
\\ss01\projects\rr-rsh_02a.dgn
$$$$USERNAME$$$$

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

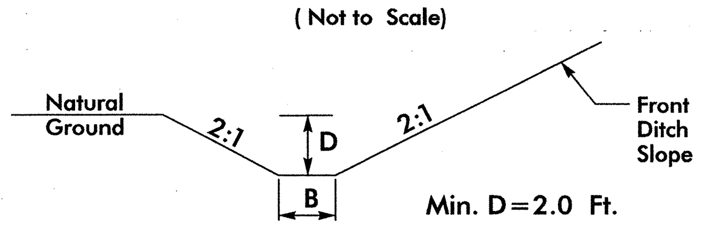
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2B
R/W SHEET NO.	

HYDRAULICS ENGINEER



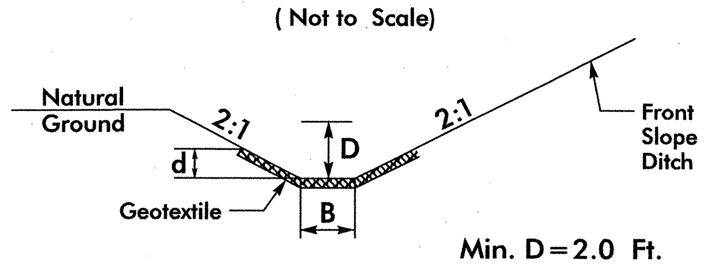
DETAIL A
SPECIAL CUT BASE DITCH
(Not to Scale)



Min. D=2.0 Ft.
B=5.0 Ft.

FROM -M1- STA. 10326+00 TO STA. 10326+50 LT.
FROM -M1- STA. 10323+00 TO STA. 10334+50 RT.
FROM -M1- STA. 10337+00 TO STA. 10341+00 RT.
FROM -M1- STA. 10348+00 TO STA. 10350+50 RT.
FROM -M1- STA. 10368+50 TO STA. 10370+50 LT.
FROM -M1- STA. 10379+19 TO STA. 10381+50 RT.
FROM -M1- STA. 10440+50 TO STA. 10442+75 RT.
FROM -M1- STA. 10450+50 TO STA. 10454+50 RT.
FROM -M1- STA. 10456+00 TO STA. 10460+00 RT.
FROM -M1- STA. 10497+00 TO STA. 10500+00 LT.
FROM -M1- STA. 10497+00 TO STA. 10498+70 RT.
FROM -M1- STA. 10508+00 TO STA. 10513+00 RT.

DETAIL B
SPECIAL CUT BASE DITCH
(Not to Scale)

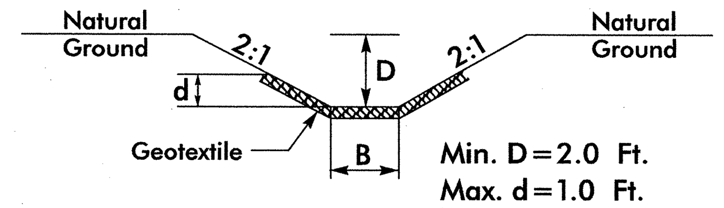


Min. D=2.0 Ft.
Max. d=1.0 Ft.
B=5.0 Ft.

Type of Liner= CL I Rip-Rap

FROM -M1- STA. 10454+50 TO STA. 10456+00 RT.
FROM -M1- STA. 10498+70 TO STA. 10499+50 RT.
FROM -M1- STA. 10507+00 TO STA. 10508+00 RT.

DETAIL C
STANDARD BASE DITCH
(Not to Scale)



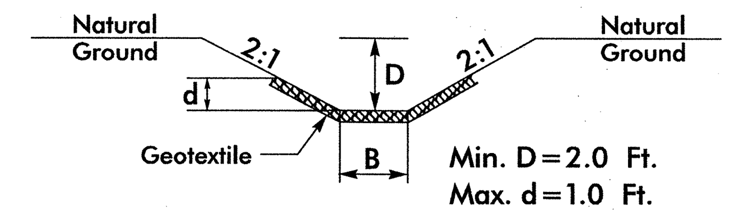
Min. D=2.0 Ft.
Max. d=1.0 Ft.
B=3.0 Ft.

*When B is < 6.0'

Type of Liner= CL I Rip-Rap

FROM -M1- STA. 10455+80 TO STA. 10455+90 RT.
-M1- STA. 10498+63 LT.

DETAIL D
STANDARD BASE DITCH
(Not to Scale)



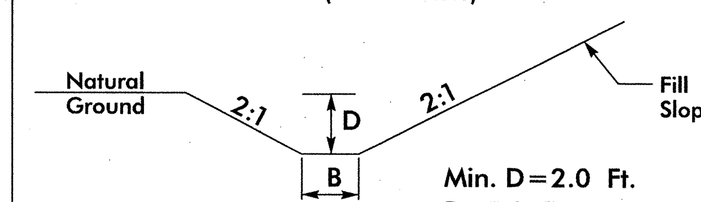
Min. D=2.0 Ft.
Max. d=1.0 Ft.
B=4.0 Ft.

*When B is < 6.0'

Type of Liner= CL 1 Rip-Rap

-M1- STA. 10455+00 LT.
FROM -M1- STA. 10507+50 TO STA. 10507+87 LT.

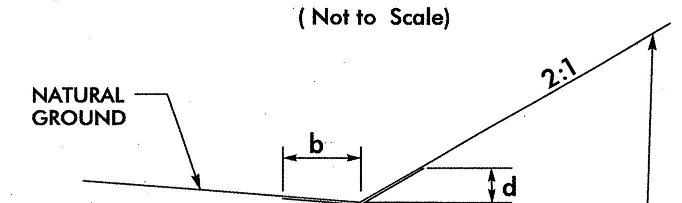
DETAIL E
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D=2.0 Ft.
B=5.0 Ft.

FROM -M1- STA. 10323+00 TO STA. 10326+00 LT.
FROM -M1- STA. 10334+50 TO STA. 10337+00 RT.
FROM -M1- STA. 10363+80 TO STA. 10368+50 LT.
FROM -M1- STA. 10373+50 TO STA. 10378+73 RT.
FROM -M1- STA. 10442+75 TO STA. 10443+00 RT.

DETAIL F
TOE PROTECTION
(Not to Scale)

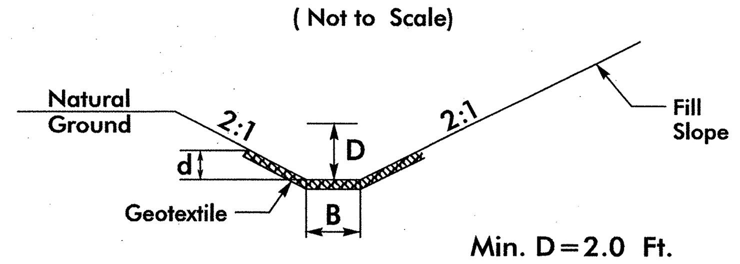


d=1.0 Ft. (MIN)
b=2.0 Ft. (MIN)

Type of Liner= PSRM

FROM -M1- STA. 10363+00 TO STA. 10366+00 RT.
FROM -M1- STA. 10368+00 TO STA. 10372+50 RT.

DETAIL G
SPECIAL LATERAL BASE DITCH
(Not to Scale)

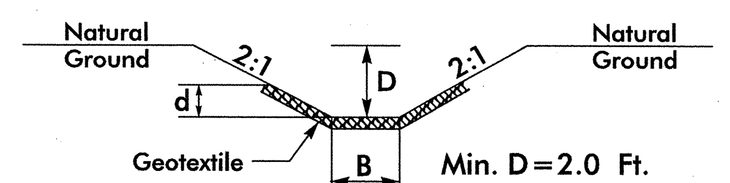


Min. D=2.0 Ft.
Max. d=1.0 Ft.
B=5.0 Ft.

Type of Liner= CL I Rip-Rap

FROM -M1- STA. 10326+50 TO STA. 10327+00 LT.
FROM -M1- STA. 10341+00 TO STA. 10342+34 RT.
FROM -M1- STA. 10347+50 TO STA. 10348+00 RT.
FROM -M1- STA. 10372+88 TO STA. 10373+50 RT.

DETAIL I
STANDARD BASE DITCH
(Not to Scale)



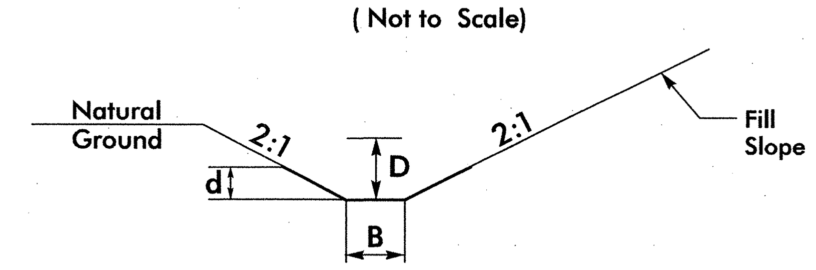
Min. D=2.0 Ft.
Max. d=1.0 Ft.
B=2.0 Ft.

*When B is < 6.0'

Type of Liner= CL II Rip-Rap

-M1- STA. 10507+50 RT.

DETAIL L
SPECIAL LATERAL BASE DITCH
(Not to Scale)

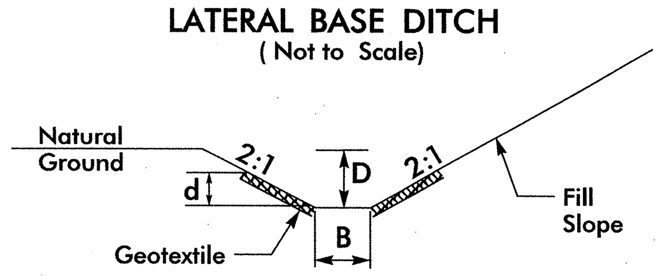


Min. D=2.0 Ft.
Max. d=1.0 Ft.
B=5.0 Ft.

Type of Liner= PSRM

FROM -M1- STA. 10370+50 TO STA. 10372+50 LT.

DETAIL M
LATERAL BASE DITCH
(Not to Scale)



*When B is > 6.0'
Std. No. 876.01

Min. D=2.0 Ft.
Max. d=1.0 Ft.
B=5.0 Ft.

Type of Liner= CL I Rip-Rap

FROM -M1- STA. 10372+50 TO STA. 10374+74 LT.

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2C
R/W SHEET NO.	

HORIZONTAL CURVE GEOMETRY

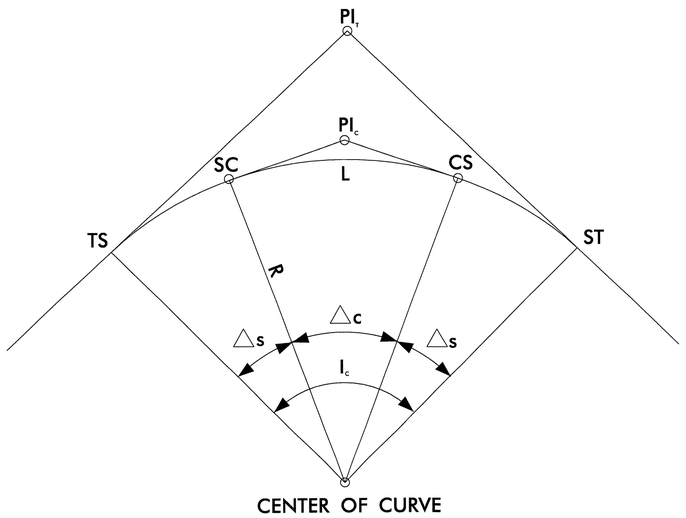


FIGURE A

CIRCULAR CURVE WITH
SPIRAL TRANSITION CURVES

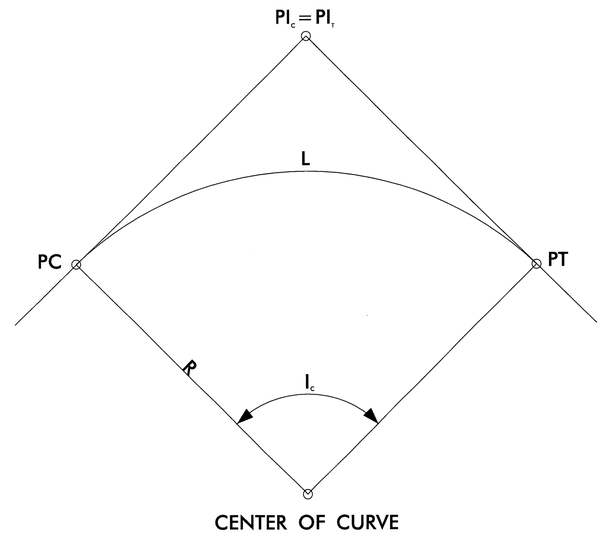


FIGURE B

SIMPLE CIRCULAR CURVE

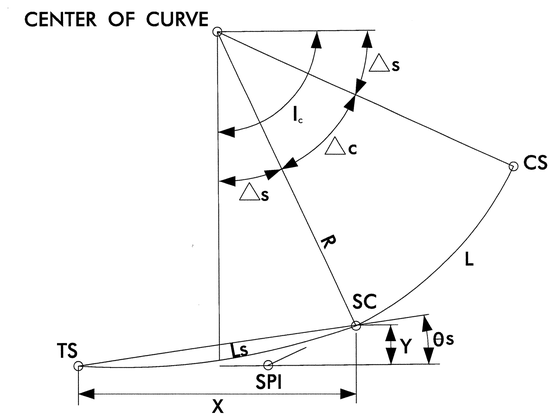


FIGURE C

SPIRAL TRANSITION CURVE

FIGURE D

DEFLECTION BETWEEN TANGENTS

R	RADIUS OF CURVATURE	PI$_c$	POINT OF INTERSECTION (CIRCULAR CURVE)
Dc	DEGREE OF CURVATURE (CHORD DEFINED)	PI$_T$	POINT OF INTERSECTION (TANGENT)
L	LENGTH OF CURVE (CHORD DEFINED)	SPI	POINT OF INTERSECTION (SPIRAL)
I$_c$	TOTAL INTERSECTION ANGLE	PC	TANGENT TO CIRCULAR CURVE
△c	CURVE ANGLE	PT	CIRCULAR CURVE TO TANGENT
△s	SPIRAL ANGLE	TS	TANGENT TO SPIRAL
θs	SPIRAL DEFLECTION	SC	SPIRAL TO CIRCULAR CURVE
Ls	LENGTH OF SPIRAL	CS	CIRCULAR CURVE TO SPIRAL
X	SPIRAL TANGENT LENGTH TO OFFSET	ST	SPIRAL TO TANGENT
Y	SPIRAL TANGENT OFFSET	PINC	POINT OF INTERSECTION NO CURVE

2:04:46 PM
4/5/2013
$$$$USERNAME$$$$
r:\p\p5208c_rr_psh_02c.dgn

0041DEL_P10a1

DGN

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2D
R/W SHEET NO.	

RAIL DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER GREG P. VERNICK 4/11/13

RAILROAD HORIZONTAL ALIGNMENT GEOMETRY

TRACK GEOMETRY CURVE DATA
PROPOSED MAIN TRACK 1 (-M1-)

FEATURE NO.	DESC.	STATION	NORTHING	EASTING	BEARING	DISTANCE (FT)	R (FT)	Dc (CHORD)	L (FT)	T	I	DELTA (CURVE)	DELTA (SPIRAL)	THETA	Ls* (FT)	X (FT)	Y (FT)	Ea (in)
	STA EQ. AH	10323+05.28	580886.2760	1516341.3125														
					S 58° 38' 09.79" W	600.0875												
15	PITO	10329+05.37	580573.9470	1515828.9106														
					S 58° 38' 09.80" W	31.2500												
NO. 10 RH	PS	10329+36.62	580557.6822	1515802.2269														
					S 58° 38' 09.79" W	1479.0408												
	TS	10344+15.66	579787.8823	1514539.3059														
													1° 53' 27.51" (LT)	0°37'49.15"	372.0000	371.9595	4.0921	
	SC	10347+87.66	579590.7934	1514223.8275														
M1C3625	PI	10352+18.32	579354.6313	1513863.6878			5635.7244	1° 01' 00"	859.6612	430.6660	12° 31' 18.21" (LT)	8° 44' 23.19" (LT)						2.5"
	CS	10356+47.32	579066.4891	1513543.6139														
													1° 53' 27.51" (LT)	0°37'49.15"	372.0000	371.9595	4.0921	
	ST	10360+19.32	578811.5880	1513272.6968														
					S 46° 06' 51.58" W	1008.9217												
4	PITO	10370+28.24	578112.1796	1512545.5442														
					S 46° 06' 51.58" W	91.0000												
NO. 24 LH	PS	10371+19.24	578049.0963	1512479.9584														
					S 46° 06' 51.58" W	149.2500												
5	PS	10372+68.49	577945.6326	1512372.3906														
					S 46° 06' 51.58" W	91.0000												
NO. 24 RH	PITO	10373+59.49	577882.5493	1512306.8049														
					S 46° 06' 51.58" W	3559.9136												
	TS	10409+19.40	575414.7330	1509741.0949														
													2° 41' 11.78" (RT)	0°53'43.87"	403.0000	402.9114	6.2979	
	SC	10413+22.40	575139.9644	1509446.3417														
M1C3639	PI	10425+79.63	574311.8558	1508500.3752			4297.2804	1° 20' 00.00"	2446.1293	1257.2257	37° 59' 17.77" (RT)	32° 36' 54.21" (RT)						4.0"
	CS	10437+68.53	574124.1996	1507257.2334														
													2° 41' 11.78" (RT)	0°53'43.87"	403.0000	402.9114	6.2979	
	ST	10441+71.53	574076.5357	1506857.1016														
					S 84° 06' 08.77" W	7228.4658												
	STA EQ. BK	10514+00.00	573333.8091	1499666.8947														

NOTE: SPIRAL LENGTHS ARE BASED ON AREMA FORMULA (Ls=1.22EuV) FOR RIDE COMFORT AT MAXIMUM PROPOSED SPEED ROUNDED UP TO 31 FT INCREMENTS, WHERE GREATER THAN NS STANDARDS.

TRACK GEOMETRY CURVE DATA
PROPOSED MAIN TRACK 2 (-M2-)

FEATURE NO.	DESC.	STATION	NORTHING	EASTING	BEARING	DISTANCE (FT)	R (FT)	Dc (CHORD)	L (FT)	T	I	DELTA (CURVE)	DELTA (SPIRAL)	THETA	Ls* (FT)	X (FT)	Y (FT)	Ea (in)
	STA EQ. AH	10323+05.28	580898.4397	1516333.9031														
					S 58° 38' 09.79" W	2110.8256												
	TS	10344+16.11	579799.8132	1514531.5145														
													1°53'27.51" (LT)	0°37'49.15"	372.0000	371.9595	4.0921	
	SC	10347+88.11	579602.7243	1514216.0362														
M2C3625	PI	10352+18.77	579366.5622	1513855.8965			5635.7244	1° 01' 00"	859.6613	430.6660	12°31'18.21" (LT)	8°44'23.19" (LT)						2.5"
	CS	10356+47.77	579078.4200	1513535.8226														
													1°53'27.51" (LT)	0°37'49.15"	372.0000	371.9595	4.0921	
	ST	10360+19.77	578823.5189	1513264.9055														
					S 46° 06' 51.58" W	584.7181												
3	PS	10366+04.47	578418.1785	1512843.4860														
					S 46° 06' 51.58" W	91.0000												
NO. 24 LH	PITO	10366+95.47	578355.0952	1512777.9002														
					S 46° 06' 51.58" W	1002.9680												
6	PITO	10376+98.44	577659.8140	1512055.0386														
					S 46° 06' 51.58" W	91.0000												
NO. 24 RH	PS	10377+89.44	577596.7306	1511989.4528														
					S 46° 06' 51.58" W	288.6609												
5	PINC	10380+78.11	577396.6282	1511781.4043							0°04'28.97" (LT)							
					S 46° 11' 20.55" W	411.9505												
6	PINC	10384+90.06	577111.4427	1511484.1294							0°04'29.55" (RT)							
					S 46° 06' 51.00" W	2427.1986												
	TS	10409+17.26	575428.8512	1509734.7927														
													2°41'11.78" (RT)	0°53'43.87"	403.0000	402.9114	6.2979	
	SC	10413+20.26	575154.0826	1509440.0395														
M2C3639	PI	10425+77.49	574325.9740	1508494.0730			4297.2804	1° 20' 00.00"	2446.1293	1257.2257	37°59'17.77" (RT)	32°36'54.21" (RT)						4.0"
	CS	10437+66.39	574138.3178	1507250.9312														
													2°41'11.78" (RT)	0°53'43.87"	403.0000	402.9114	6.2979	
	ST	10441+69.39	574090.6539	1506850.7994														
					S 84° 06' 08.77" W	6248.2408												
7	PS	10504+17.63	573448.6457	1500635.6294														
					S 84° 06' 08.77" W	31.2500												
NO. 10 RH	PITO	10504+48.88	573445.4347	1500604.5448														
					S 84° 06' 08.77" W	944.1654												
	STA EQ. BK	10513+93.05	573348.4215	1499665.3766														

NOTE: SPIRAL LENGTHS ARE BASED ON AREMA FORMULA (Ls=1.22EuV) FOR RIDE COMFORT AT MAXIMUM PROPOSED SPEED ROUNDED UP TO 31 FT INCREMENTS, WHERE GREATER THAN NS STANDARDS.

2:04:23 PM
$$$$USERNAME=$$$$

RAILROAD HORIZONTAL ALIGNMENT GEOMETRY

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2E
R/W SHEET NO.	

RAIL DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNIER
4/11/13

TRACK GEOMETRY CURVE DATA
INDUSTRIAL TRACK 2 (-A2-)

FEATURE NO.	DESC.	STATION	NORTHING	EASTING	BEARING	DISTANCE (FT)	R (FT)	Dc (CHORD)	L (FT)	T	I	DELTA (CURVE)	DELTA (SPIRAL)	THETA	Ls* (FT)	X (FT)	Y (FT)	Ea (In)
	STA EQ. AH	10323+05.28	580872.8212	1516349.5137														
					S 58°38'09.79" W	411.6575												
14	PS	10327+16.94	580658.5656	1515998.0095														
					S 58°38'09.79" W	31.2500												
NO. 10 RH	PITO	10327+48.19	580642.3008	1515971.3258														
					S 58°38'09.79" W	89.4480												
	PC	10328+37.64	580595.7456	1515894.9481														
A2C3620	PI	10329+21.22	580552.2411	1515823.5753			478.3386	12°00'00.00"	165.5021	83.5866	19°49'26.30" (LT)	19°49'26.30" (LT)						0.0"
	PT	10330+03.14	580487.1100	1515771.1859														

TRACK GEOMETRY CURVE DATA
INDUSTRIAL TRACK 1 (-A4-)

FEATURE NO.	DESC.	STATION	NORTHING	EASTING	BEARING	DISTANCE (FT)	R (FT)	Dc (CHORD)	L (FT)	T	I	DELTA (CURVE)	DELTA (SPIRAL)	THETA	Ls* (FT)	X (FT)	Y (FT)	Ea (In)
7	PS	10504+17.63	573448.6457	1500635.6294														
					S 84°06'08.77" W	31.2500												
NO. 10 RH	PITO	10504+48.88	573445.4347	1500604.5448														
					S 89°49'37.77" W	93.5370												
	PC	10505+42.42	573445.1526	1500511.0083														
A4C3654	PI	10505+98.02	573444.9848	1500455.4094			478.3386	12°00'00.00"	110.7014	55.5991	13°15'35.66" (RT)	13°15'35.66" (RT)						0.0"
	PT/POL	10506+53.12	573457.5742	1500401.2544														

SHAMROCK ROAD GRADE CROSSING CLOSURE DETAIL

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2F
R/W SHEET NO.	

DATE: APRIL 5, 2013

PLAN SCALE 20 0 20 40

RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNLE 7/05/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 026420 ENGINEER JAMES A. AYRE 7/12/13

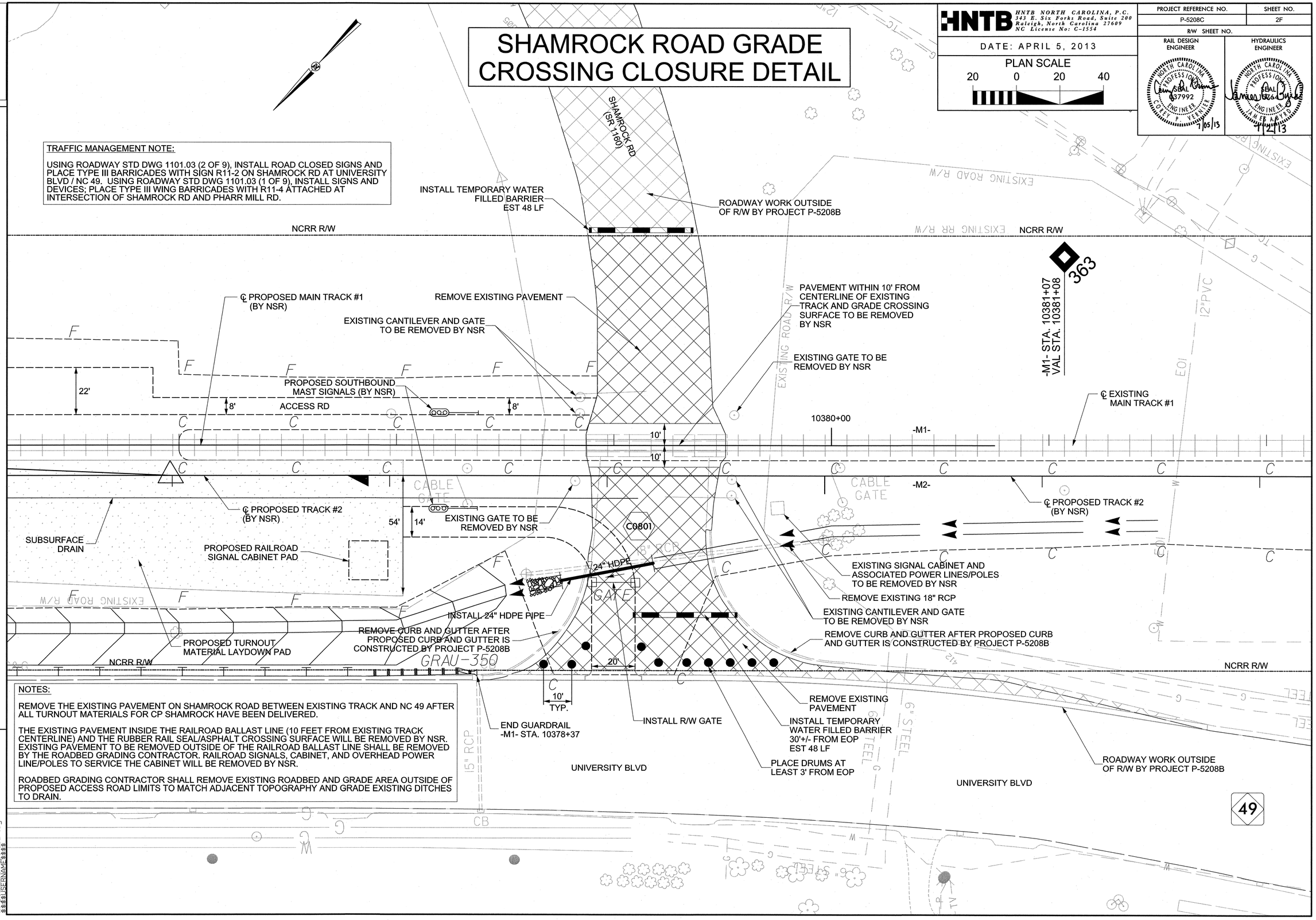
DGN 0041DEL_P10a1 0001ADD_P10a1

REVISIONS

REVISION #1 (7/5/2013): SUBSURFACE DRAIN ADDED.

TRAFFIC MANAGEMENT NOTE:

USING ROADWAY STD DWG 1101.03 (2 OF 9), INSTALL ROAD CLOSED SIGNS AND PLACE TYPE III BARRICADES WITH SIGN R11-2 ON SHAMROCK RD AT UNIVERSITY BLVD / NC 49. USING ROADWAY STD DWG 1101.03 (1 OF 9), INSTALL SIGNS AND DEVICES; PLACE TYPE III WING BARRICADES WITH R11-4 ATTACHED AT INTERSECTION OF SHAMROCK RD AND PHARR MILL RD.



NOTES:

REMOVE THE EXISTING PAVEMENT ON SHAMROCK ROAD BETWEEN EXISTING TRACK AND NC 49 AFTER ALL TURNOUT MATERIALS FOR CP SHAMROCK HAVE BEEN DELIVERED.

THE EXISTING PAVEMENT INSIDE THE RAILROAD BALLAST LINE (10 FEET FROM EXISTING TRACK CENTERLINE) AND THE RUBBER RAIL SEAL/ASPHALT CROSSING SURFACE WILL BE REMOVED BY NSR. EXISTING PAVEMENT TO BE REMOVED OUTSIDE OF THE RAILROAD BALLAST LINE SHALL BE REMOVED BY THE ROADBED GRADING CONTRACTOR. RAILROAD SIGNALS, CABINET, AND OVERHEAD POWER LINE/POLES TO SERVICE THE CABINET WILL BE REMOVED BY NSR.

ROADBED GRADING CONTRACTOR SHALL REMOVE EXISTING ROADBED AND GRADE AREA OUTSIDE OF PROPOSED ACCESS ROAD LIMITS TO MATCH ADJACENT TOPOGRAPHY AND GRADE EXISTING DITCHES TO DRAIN.

10:48:12 AM
$$$$USERNAME$$$$

0041DEL_P10a1

ROBINSON CHURCH ROAD GRADE CROSSING CLOSURE DETAIL

HNTB

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2G
R/W SHEET NO.	

DATE: APRIL 5, 2013

PLAN SCALE 20 0 20 40

ROADWAY DESIGN ENGINEER	RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL ENGINEER FRANCISCO A. ROJAS 4/15/13	NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNLER 4/15/13	NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JAMES A. ARTIS 4/15/13

NOTES:

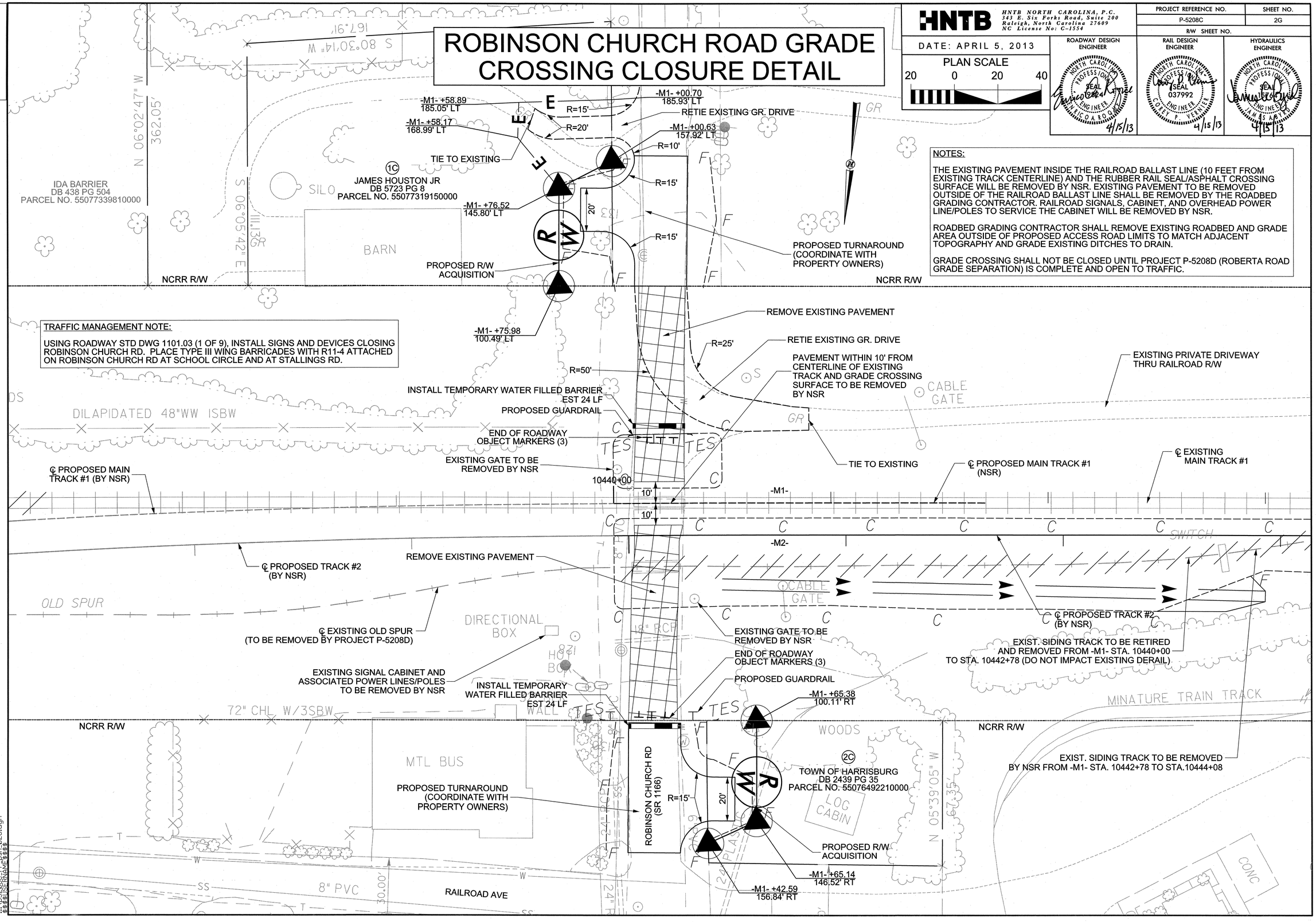
THE EXISTING PAVEMENT INSIDE THE RAILROAD BALLAST LINE (10 FEET FROM EXISTING TRACK CENTERLINE) AND THE RUBBER RAIL SEAL/ASPHALT CROSSING SURFACE WILL BE REMOVED BY NSR. EXISTING PAVEMENT TO BE REMOVED OUTSIDE OF THE RAILROAD BALLAST LINE SHALL BE REMOVED BY THE ROADBED GRADING CONTRACTOR. RAILROAD SIGNALS, CABINET, AND OVERHEAD POWER LINE/POLES TO SERVICE THE CABINET WILL BE REMOVED BY NSR.

ROADBED GRADING CONTRACTOR SHALL REMOVE EXISTING ROADBED AND GRADE AREA OUTSIDE OF PROPOSED ACCESS ROAD LIMITS TO MATCH ADJACENT TOPOGRAPHY AND GRADE EXISTING DITCHES TO DRAIN.

GRADE CROSSING SHALL NOT BE CLOSED UNTIL PROJECT P-5208D (ROBERTA ROAD GRADE SEPARATION) IS COMPLETE AND OPEN TO TRAFFIC.

TRAFFIC MANAGEMENT NOTE:

USING ROADWAY STD DWG 1101.03 (1 OF 9), INSTALL SIGNS AND DEVICES CLOSING ROBINSON CHURCH RD. PLACE TYPE III WING BARRICADES WITH R11-4 ATTACHED ON ROBINSON CHURCH RD AT SCHOOL CIRCLE AND AT STALLINGS RD.



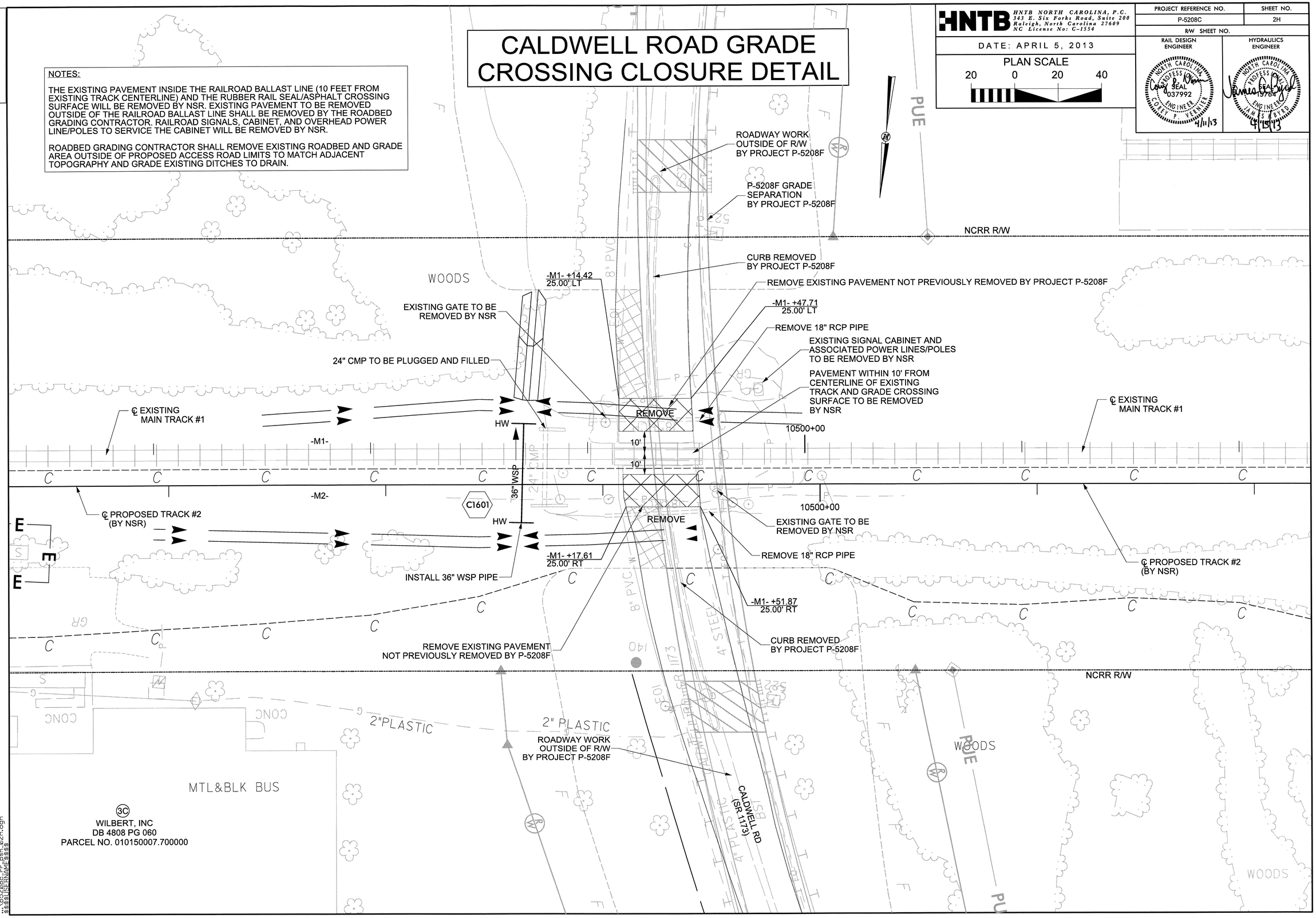
0041DEL_P10a1

CALDWELL ROAD GRADE CROSSING CLOSURE DETAIL

NOTES:

THE EXISTING PAVEMENT INSIDE THE RAILROAD BALLAST LINE (10 FEET FROM EXISTING TRACK CENTERLINE) AND THE RUBBER RAIL SEAL/ASPHALT CROSSING SURFACE WILL BE REMOVED BY NSR. EXISTING PAVEMENT TO BE REMOVED OUTSIDE OF THE RAILROAD BALLAST LINE SHALL BE REMOVED BY THE ROADBED GRADING CONTRACTOR. RAILROAD SIGNALS, CABINET, AND OVERHEAD POWER LINE/POLES TO SERVICE THE CABINET WILL BE REMOVED BY NSR.

ROADBED GRADING CONTRACTOR SHALL REMOVE EXISTING ROADBED AND GRADE AREA OUTSIDE OF PROPOSED ACCESS ROAD LIMITS TO MATCH ADJACENT TOPOGRAPHY AND GRADE EXISTING DITCHES TO DRAIN.



HNTB

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PLAN SCALE
20 0 20 40

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2H
R/W SHEET NO.	

RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER CLIFFORD P. VENNER 4/11/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19764 ENGINEER JAMES A. BRAD 4/15/13

DGN

2:05:39 PM
$$$$USERNAME$$$$

0041DEL_P10a1

ASPHALT UNDERLAYMENT DETAIL

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

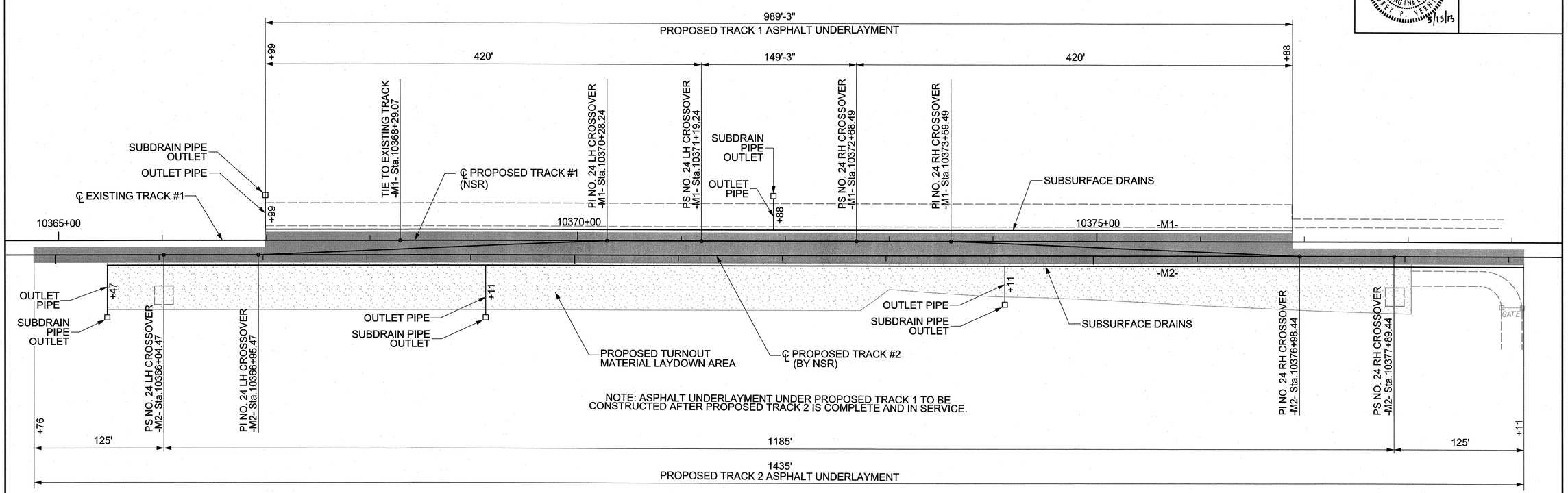
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	21
R/W SHEET NO.	

RAIL DESIGN ENGINEER

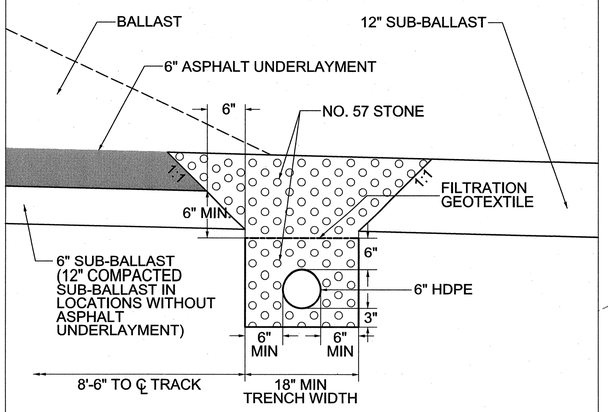
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037992 COREY P. VERNIER 5/15/13

PROPOSED CP "SHAMROCK"



NOTE: ASPHALT UNDERLAYMENT UNDER PROPOSED TRACK 1 TO BE CONSTRUCTED AFTER PROPOSED TRACK 2 IS COMPLETE AND IN SERVICE.

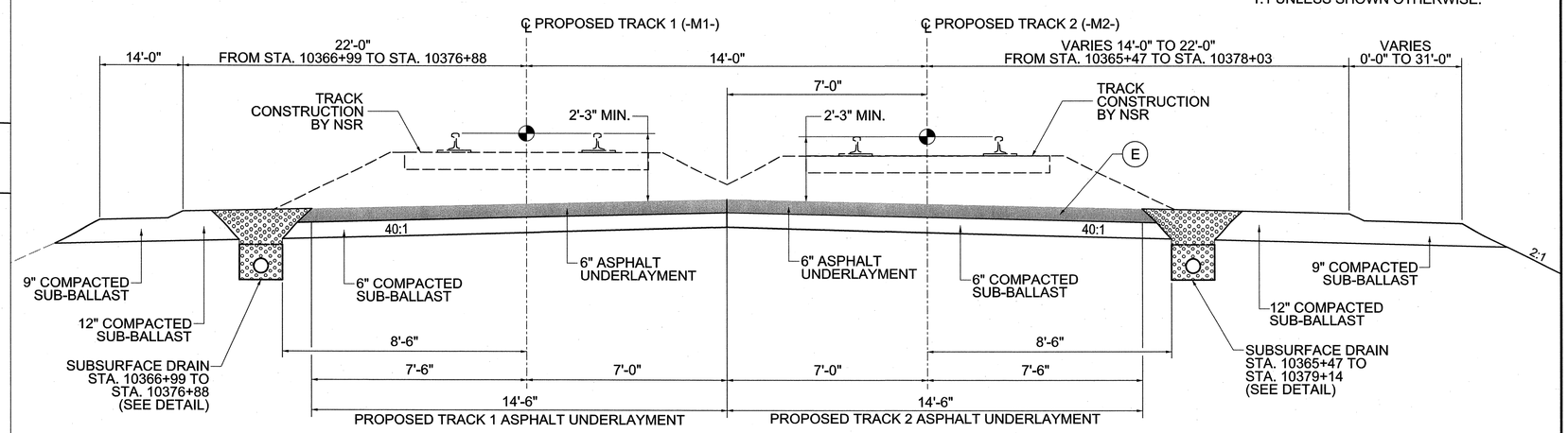
SUBSURFACE DRAIN DETAIL



*PROVIDE SUBDRAIN OUTLETS AT LOCATIONS SHOWN IN PLANS OR AS DIRECTED BY ENGINEER.

PAVEMENT SCHEDULE	
E	PROPOSED 6" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B AT AVERAGE RATE OF 342 LBS PER SY IN TWO LAYERS.

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



I:26:21PM
...\p5208c_rr_psh_021.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

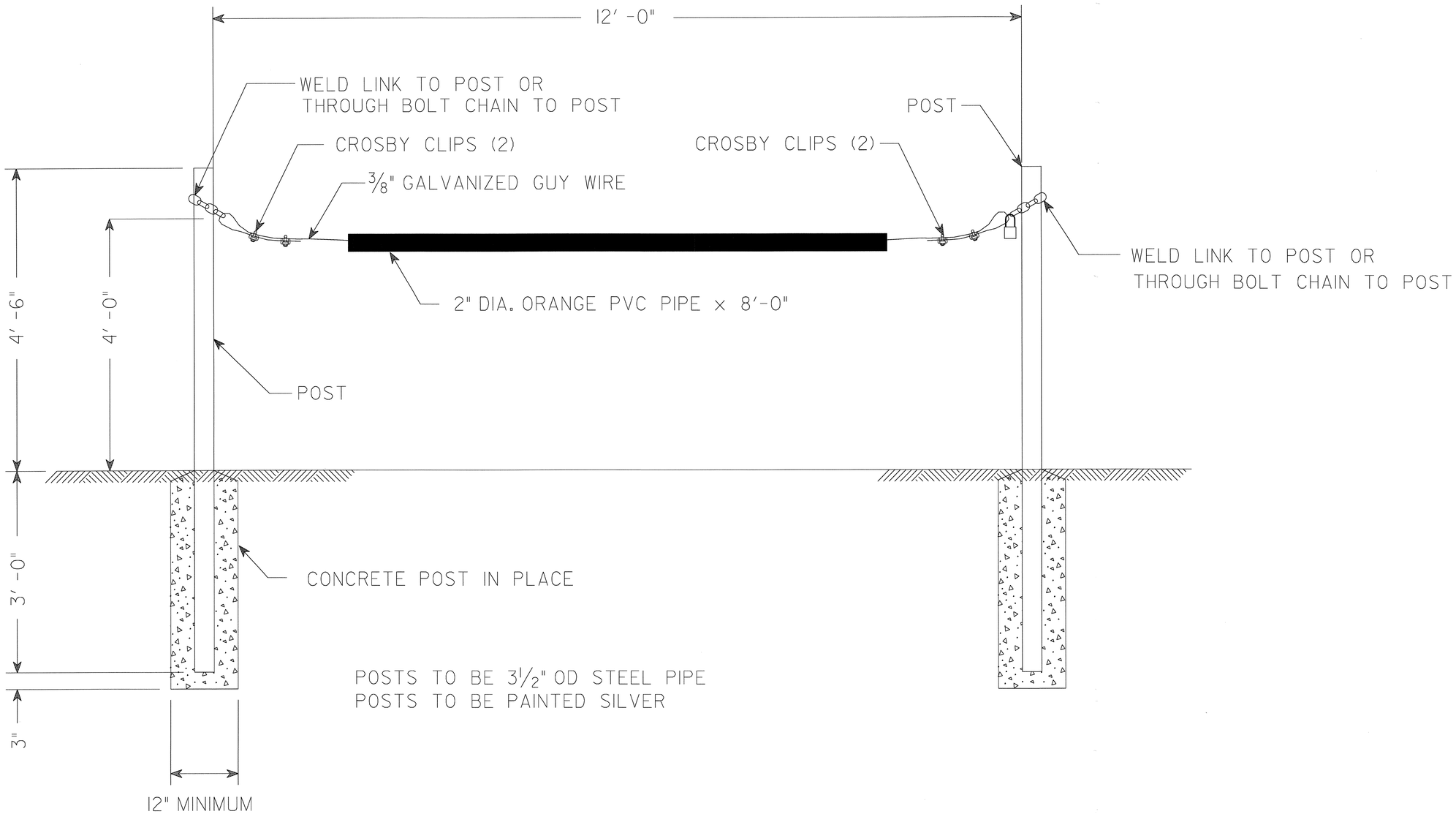
PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2J
R/W SHEET NO.	

RAIL DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNIER

4/11/13

RIGHT OF WAY GATE DETAIL



POSTS TO BE 3 1/2" OD STEEL PIPE
POSTS TO BE PAINTED SILVER

2:05:51 PM
$$$$USERNAME$$$$

0041DEL_P10a1

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

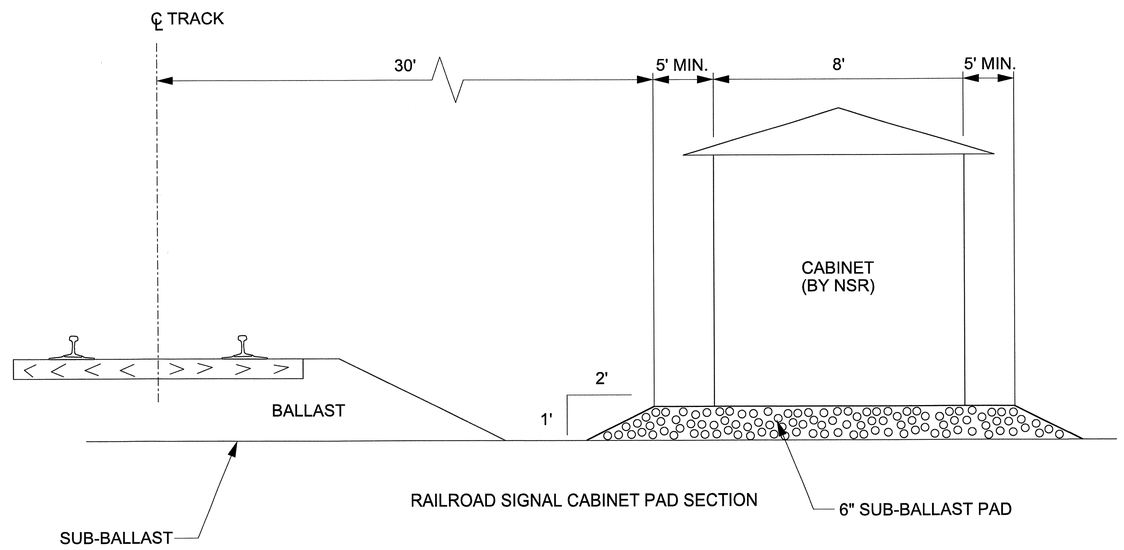
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	2K
R/W SHEET NO.	

RAIL DESIGN ENGINEER

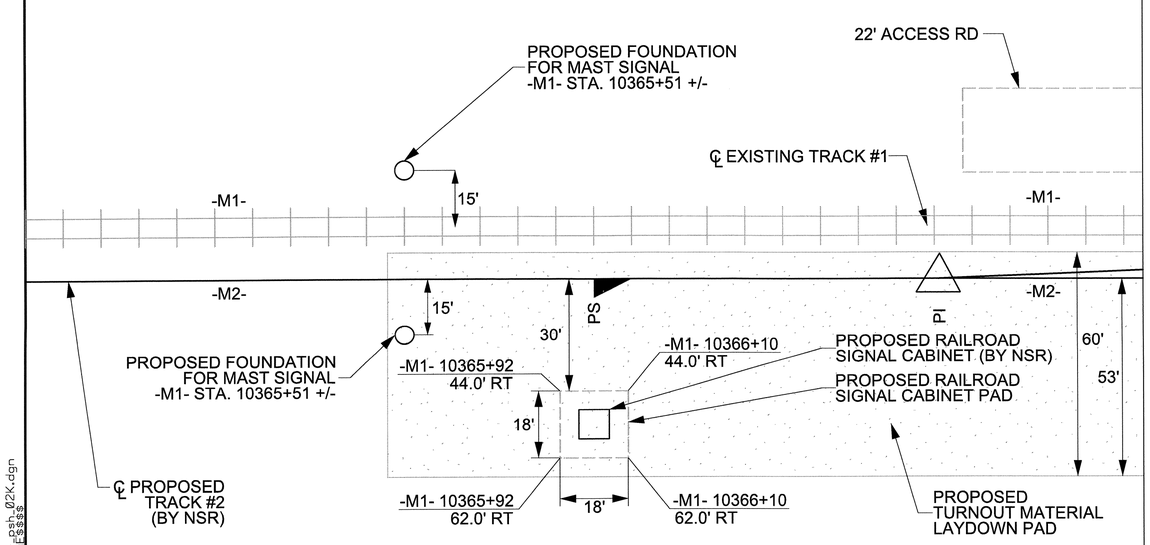
NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER CORY P. VERNIER 4/11/13

RAILROAD SIGNAL CABINET PAD DETAILS

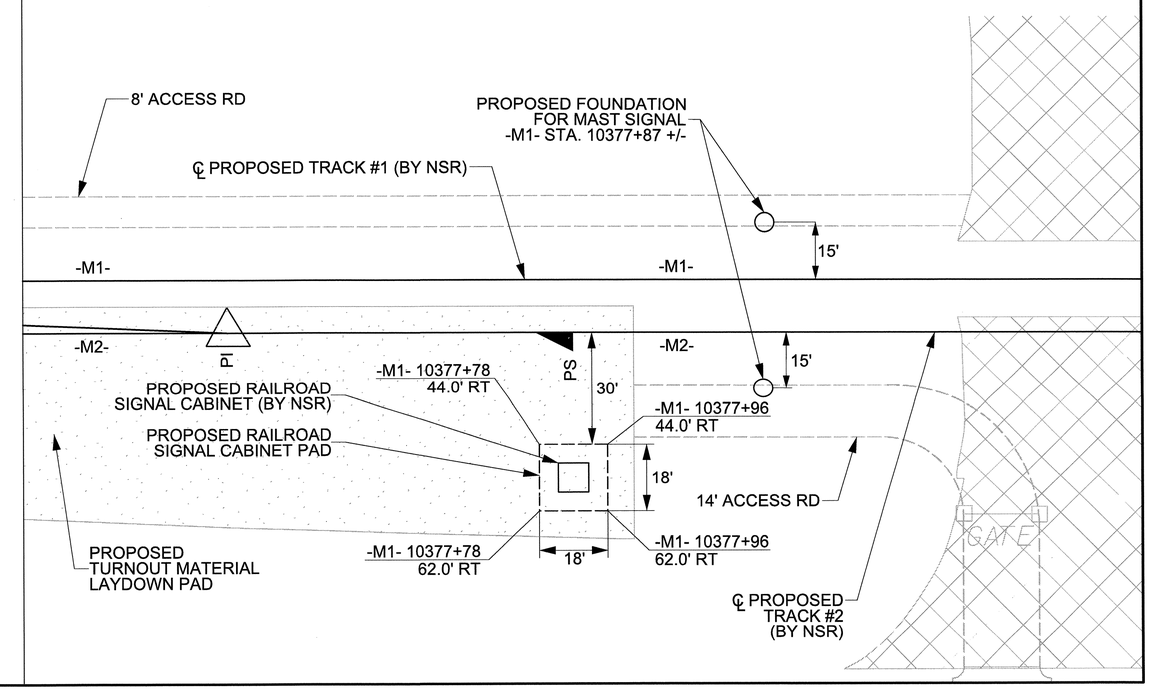


RAILROAD SIGNAL CABINET PAD SECTION

SIGNAL CABINET PAD AT CP "SHAMROCK" (-M1- STA. 10366+01)



SIGNAL CABINET PAD AT CP "SHAMROCK" (-M1- STA. 10377+87)



2:05:57 PM
:\p5208c_rr_psh_02K.dgn
$$$$USERNAME$$$$

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	3A
R/W SHEET NO.	

DATE: APRIL 5, 2013

DGN 0041DEL_P10a1 0001ADD_P10a1

REVISIONS

REVISION #1 (7/5/2013): REVISED 24" HDPE C0802.

COMPUTED BY: RAC DATE:
CHECKED BY: JAB DATE:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

RALD06

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE OR TICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) SIZE 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
10327+00	CL	C0401		565.20	564.88	0.4													
10363+81	CL	C0701		567.35	566.21	2.2													
10372+88	CL	C0702		563.09	561.58	1.2													
10379+00	CL	C0801		578.85	578.11	1.7					43								
10383+50	CL	C0802		585.15	584.24	0.7					125								
10399+00	CL	C0901		594.64	595.12	1.3				36									
10455+00	CL	C1301		603.10	601.08	3.0													
10498+70	CL	C1601		640.70	640.25	1.0													
10507+50	CL	C1701		647.00	646.81	0.4													
SHEET TOTALS										36	168								

STATION	B.C. C.M. PIPE SIZE 6"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE	.064	.064	.064	.064	.075	.079	.109	.109																
10327+00																								
10363+81																								
10372+88																								
10379+00																								
10383+50																								
10399+00																								
10455+00																								
10498+70																								
10507+50																								
SHEET TOTALS																								

STATION	18" WELDED STEEL PIPE 0.312" THICK GRADE B (IN SOIL)	18" WELDED STEEL PIPE 0.312" THICK GRADE B (NOT IN SOIL)	18" WELDED STEEL PIPE 0.312" THICK GRADE B (OPEN CUT)	24" WELDED STEEL PIPE 0.375" THICK GRADE B (IN SOIL)	24" WELDED STEEL PIPE 0.375" THICK GRADE B (NOT IN SOIL)	24" WELDED STEEL PIPE 0.375" THICK GRADE B (OPEN CUT)	30" WELDED STEEL PIPE 0.468" THICK GRADE B (IN SOIL)	30" WELDED STEEL PIPE 0.468" THICK GRADE B (NOT IN SOIL)	30" WELDED STEEL PIPE 0.468" THICK GRADE B (OPEN CUT)	36" WELDED STEEL PIPE 0.532" THICK GRADE B (IN SOIL)	36" WELDED STEEL PIPE 0.532" THICK GRADE B (NOT IN SOIL)	36" WELDED STEEL PIPE 0.532" THICK GRADE B (OPEN CUT)	42" WELDED STEEL PIPE 0.625" THICK GRADE B (IN SOIL)	42" WELDED STEEL PIPE 0.625" THICK GRADE B (NOT IN SOIL)	42" WELDED STEEL PIPE 0.625" THICK GRADE B (OPEN CUT)	48" WELDED STEEL PIPE 0.688" THICK GRADE B (IN SOIL)	48" WELDED STEEL PIPE 0.688" THICK GRADE B (NOT IN SOIL)	48" WELDED STEEL PIPE 0.688" THICK GRADE B (OPEN CUT)	ENDWALLS STD. 838.01 838.11 OR STD. 838.60 (UNLESS NOTED OTHERWISE) CU. YARDS	STD. 838.11 AND CLASS B CONCRETE NOT ALLOWED IN RR ROW.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	LIN. FT. A 5.0' THRU 10.0'	LIN. FT. B 10.0' AND ABOVE	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL. 'B')	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54			REMOVE CB	REMOVE JB	CONC. COLLARS CL. "B" C.Y. NS STD. TA-2006-1	R.CMABLE FILL	PIPE REMOVAL LIN. FT.	REMARKS
10327+00																										6.8																						
10363+81																									20	20	38																					
10372+88																									18	17	18																					
10379+00																					48	47	35					9.0																				
10383+50																												3.0																				
10399+00																												2.0																				
10455+00																								26	25	17		12.0																			5.6		
10498+70																												6.8																				
10507+50																					14	15	18					9.0																			7.3		
SHEET TOTALS																					52	51	74	62	62	53	26	25	17	58.4																	42	137	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	(NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

2:03:51 PM
\\p5208c_rr_psh_03A.dgn
$$$$USERNAME$$$$

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	3B
R/W SHEET NO.	

PARCEL INDEX, REMOVAL OF PAVEMENT AND GUARDRAIL SUMMARIES

PARCEL INDEX

PARCEL NUMBER	PLAN SHEET NUMBER	PROPERTY OWNER NAME
1C	12	JAMES HOUSTON JR
2C	12	TOWN OF HARRISBURG
3C	16	WILBERT, INC
4C	4	CHEMICAL SPECIALTIES, INC (MINERAL RESEARCH & DEVELOPMENT CORP.)

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

LOCATION	REMOVAL OF ASPHALT PAVEMENT	BREAKING OF ASPHALT PAVEMENT
-M1- STA. 10326+14 TO 10326+46 LT	83	
-M1- STA. 10378+88 TO 10379+49 LT	501	
-M1- STA. 10378+58 TO 10380+21 RT	718	
-M1- STA. 10440+09 TO 10440+33 LT	219	
-M1- STA. 10440+06 TO 10440+32 RT	215	
-M1- STA. 10499+14 TO 10499+49 LT	57	
-M1- STA. 10499+16 TO 10499+57 RT	58	
GRAND TOTAL	1851	

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GRAU 350	M-350	XIII	CAT-1	VI MOD	BIC	AT-1	TES	EA	G	NG				
-M1-	10372+31	10378+37	RT	606			10372+85	10378+46	2		50		1				1			1								X			DITCH CLOSE TO EXISTING ROADWAY
-M1-	10440+10	10440+33	LT	25					68															2							ROBINSON CHURCH RD CLOSURE
-M1-	10440+01	10440+47	RT	50					1															2							ROBINSON CHURCH RD CLOSURE
	LESS ANCHOR DEDUCTIONS																														
	CAT-1 @ 6.25'			-6.25																											
	GRAU-350 @ 50'			-50																											
TOTAL				625													1			1				4							
	(5 ADDITIONAL GUARDRAIL POST)																														

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	3C
R/W SHEET NO.	

DATE: APRIL 5, 2013

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT +%	BORROW	WASTE
SUMMARY #1					
-M1- STA 10323+05.28 TO STA 10343+73.70	2,323	0	1,028	0	1,295
#1 TOTAL	2,323	0	1,028	0	1,295
SUMMARY #2					
-M1- STA 10344+80.65 TO STA 10374+00.00	7,889	0	12,871	4,982	0
#2 TOTAL	7,889	0	12,871	4,982	0
SUMMARY #3					
-M1- STA 10374+00.00 TO STA 10404+00	8,014	0	5,969	0	2,045
#3 TOTAL	8,014	0	5,969	0	2,045
SUMMARY #4					
-M1- STA 10404+00.00 TO STA 10409+19.40	449	0	1	0	448
#4 TOTAL	449	0	1	0	448
SUMMARY #5					
-M1- STA 10440+00.00 TO STA 10470+00.00	15,005	0	408	0	14,597
#5 TOTAL	15,005	0	408	0	14,597
SUMMARY #6					
-M1- STA 10470+00.00 TO STA 10500+00.00	25,357	0	130	0	25,227
#6 TOTAL	25,357	0	130	0	25,227
SUMMARY #7					
-M1- STA 10500+00.00 TO STA 10514+00.00	16,396	0	59	0	16,337
#7 TOTAL	16,396	0	59	0	16,337
SUMMARIES 1-9 TOTAL	75,433	0	20,466	4,982	59,949
WASTE TO REPLACE BORROW				4,982	-4,982
EST. LOSS DUE TO CLEARING AND GRUBBING	-750				-750
ESTIMATE 5% TO REPLACE TOPSOIL ON BORROW PIT				0	
GRAND TOTAL	74,683	0		0	54,217
SAY	74,700	0		0	54,300

EST. DDE = 4680 CY

EST. 250 CY OF SLOPE STABILITY UNDERCUT

EST. 250 CY OF SELECT GRANULAR MATERIAL PER GEOTECHNICAL RECOMMENDATION

EST. 50 CY OF SHOULDER BORROW

* THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEER.

REVISIONS

REVISION #1 (7/5/2013): REVISED SELECT GRANULAR MATERIAL QUANTITY BASED ON REVISED GEOTECH REPORT.

DGN 0041DEL_P10a1 0001ADD_P10a1

11:37:51 PM
\\p5208c_rr_pash_03c.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

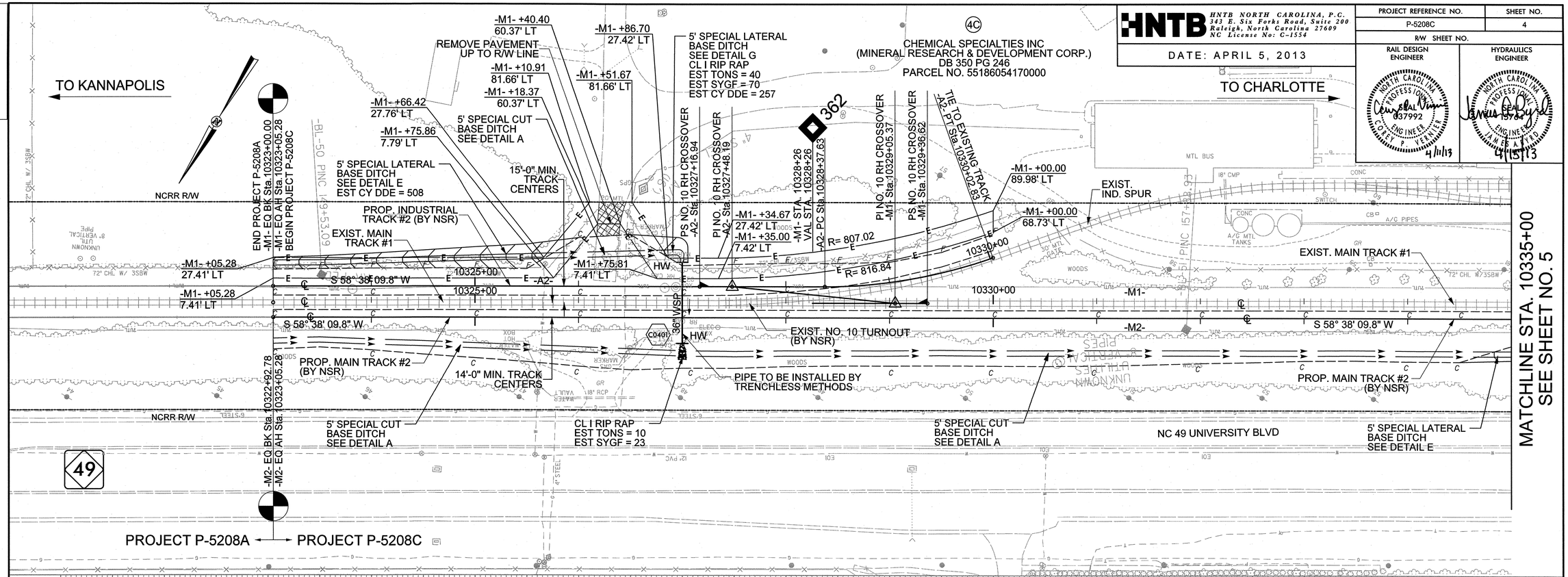
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	4
R/W SHEET NO.	

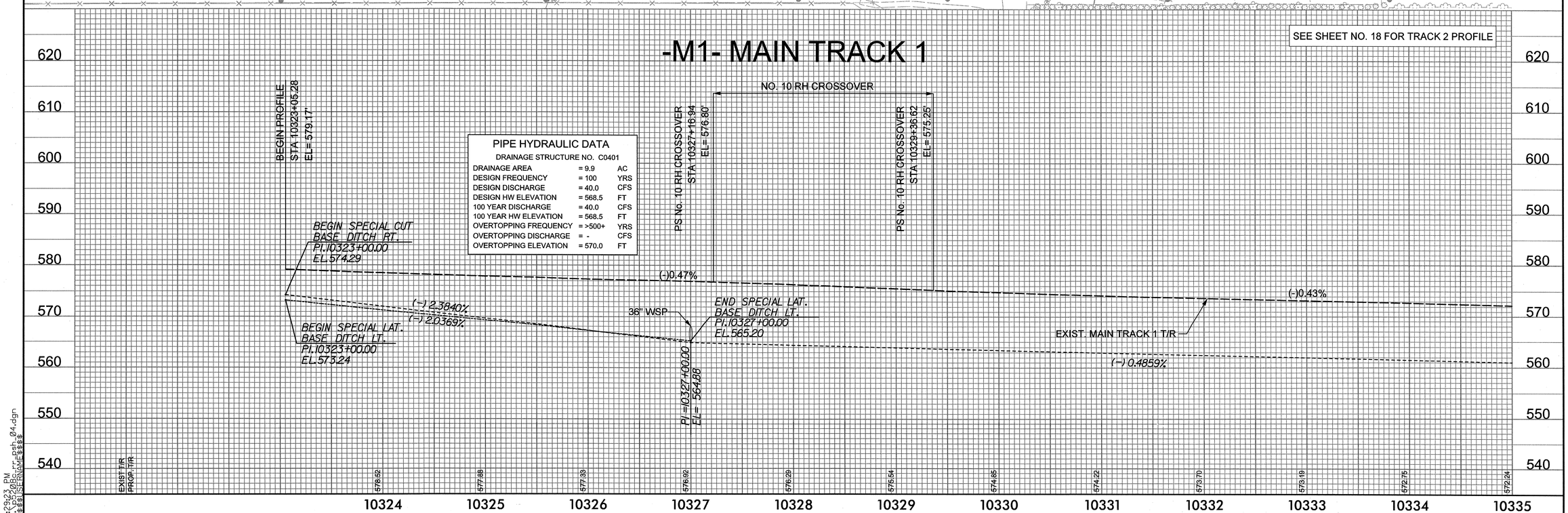
DATE: APRIL 5, 2013

RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037992 — 4/11/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19762 — 4/15/13



SEE SHEET NO. 18 FOR TRACK 2 PROFILE



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. C0401

DRAINAGE AREA	= 9.9	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 40.0	CFS
DESIGN HW ELEVATION	= 568.5	FT
100 YEAR DISCHARGE	= 40.0	CFS
100 YEAR HW ELEVATION	= 568.5	FT
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING DISCHARGE	= -	CFS
OVERTOPPING ELEVATION	= 570.0	FT

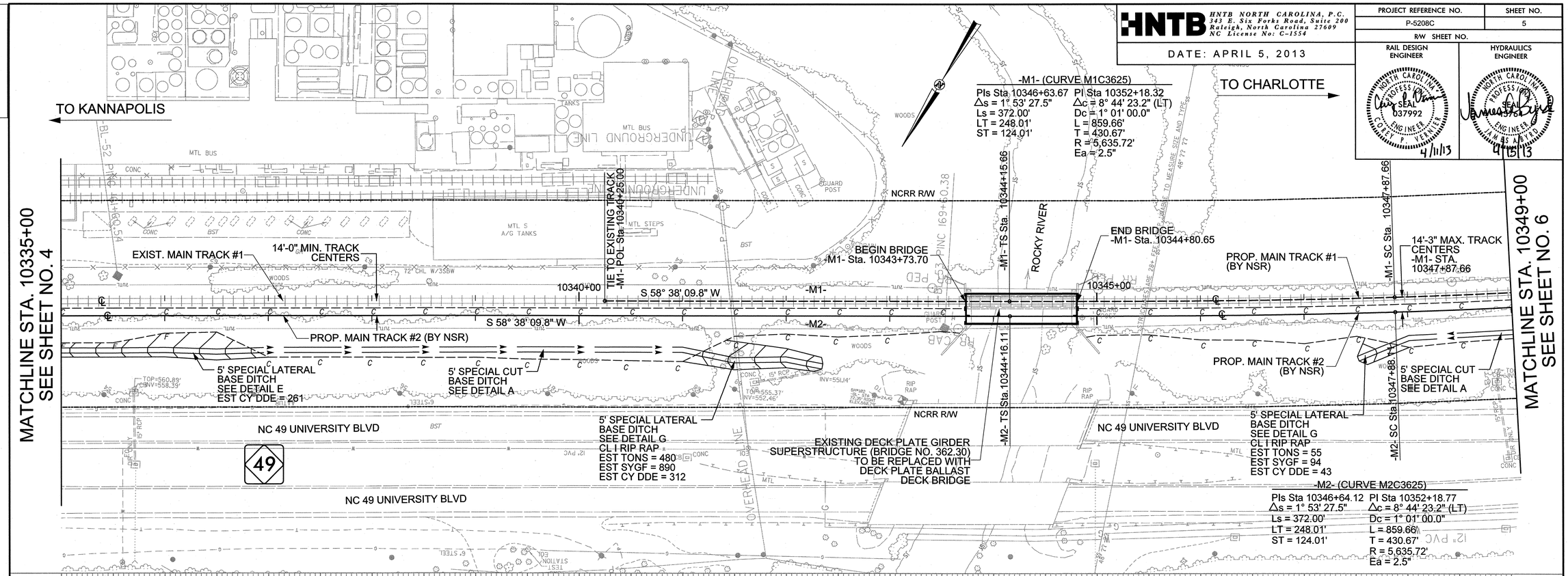
2:29:23 PM
$$$$USERNAME$$$$

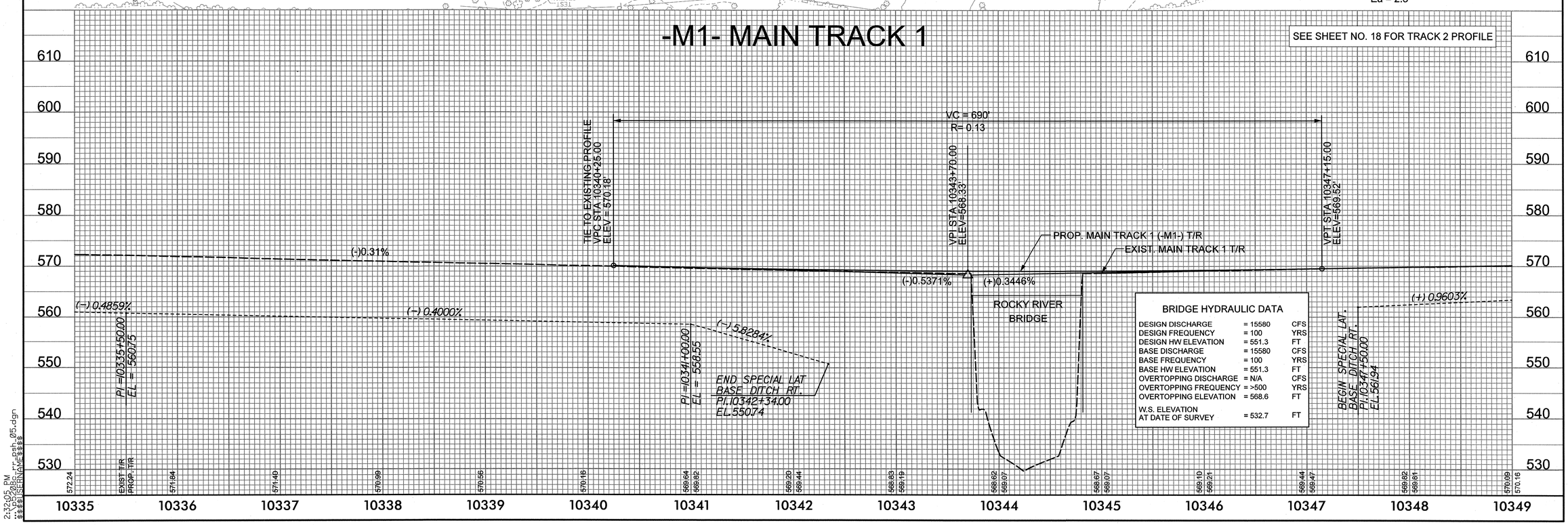
0041DEL_P10a1

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	5
R/W SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER





BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 15580	CFS
DESIGN FREQUENCY	= 100	YRS
DESIGN HW ELEVATION	= 551.3	FT
BASE DISCHARGE	= 15580	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 551.3	FT
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING ELEVATION	= 568.6	FT
W.S. ELEVATION AT DATE OF SURVEY	= 532.7	FT

2:32:05 PM
$$$$USERNAME$$$$

0041DEL_P10a1

DGN

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	6
R/W SHEET NO.	

RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037992 — 4/11/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19768 — 4/15/13

TO KANNAPOLIS

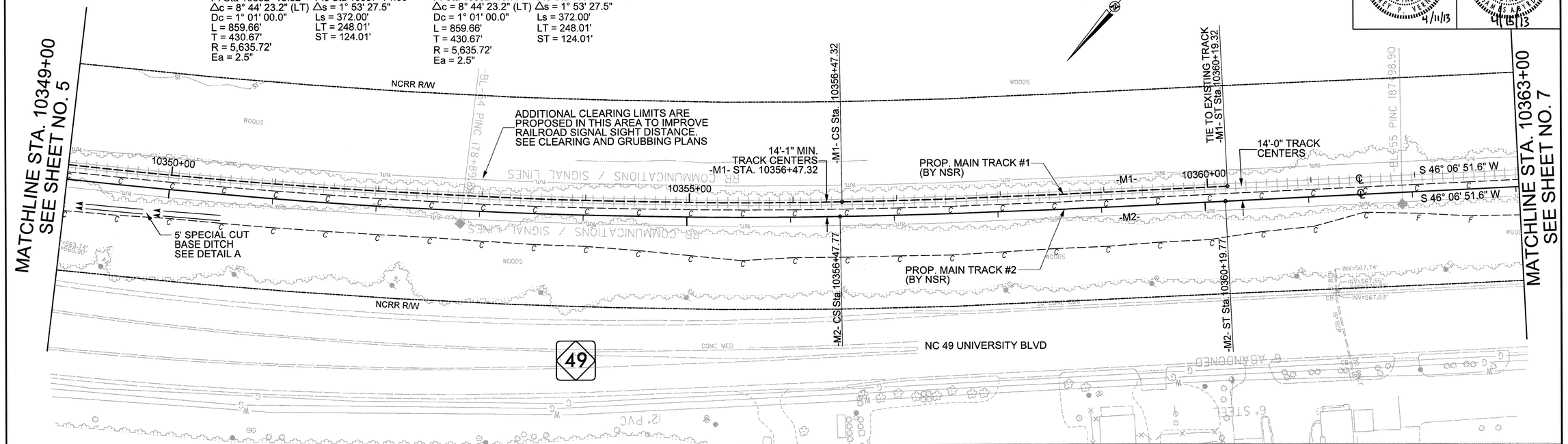
TO CHARLOTTE

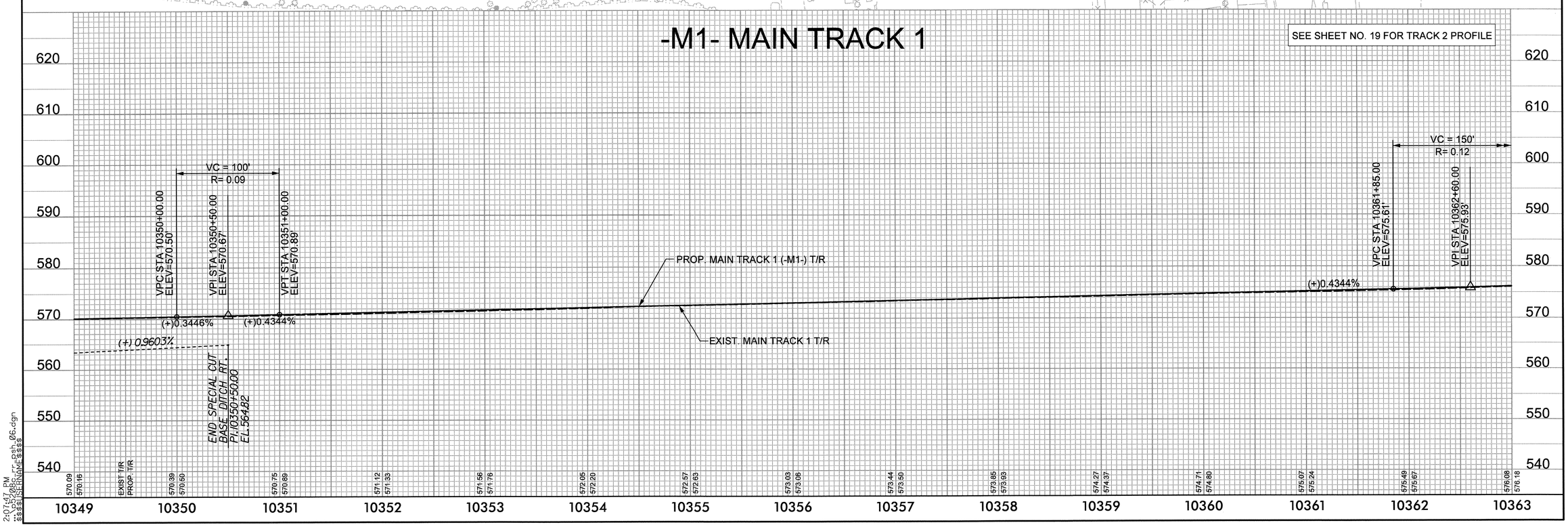
-M1- (CURVE M1C3625)

PI Sta 10352+18.32 — PIs Sta 10357+71.33
△c = 8° 44' 23.2" (LT) — △s = 1° 53' 27.5"
Dc = 1° 01' 00.0" — Ls = 372.00'
L = 859.66' — LT = 248.01'
T = 430.67' — ST = 124.01'
R = 5,635.72'
Ea = 2.5"

-M2- (CURVE M2C3625)

PI Sta 10352+18.77 — PIs Sta 10357+71.78
△c = 8° 44' 23.2" (LT) — △s = 1° 53' 27.5"
Dc = 1° 01' 00.0" — Ls = 372.00'
L = 859.66' — LT = 248.01'
T = 430.67' — ST = 124.01'
R = 5,635.72'
Ea = 2.5"





2:07:47 PM
$$$$USERNAME$$$$

0041DEL_P10a1

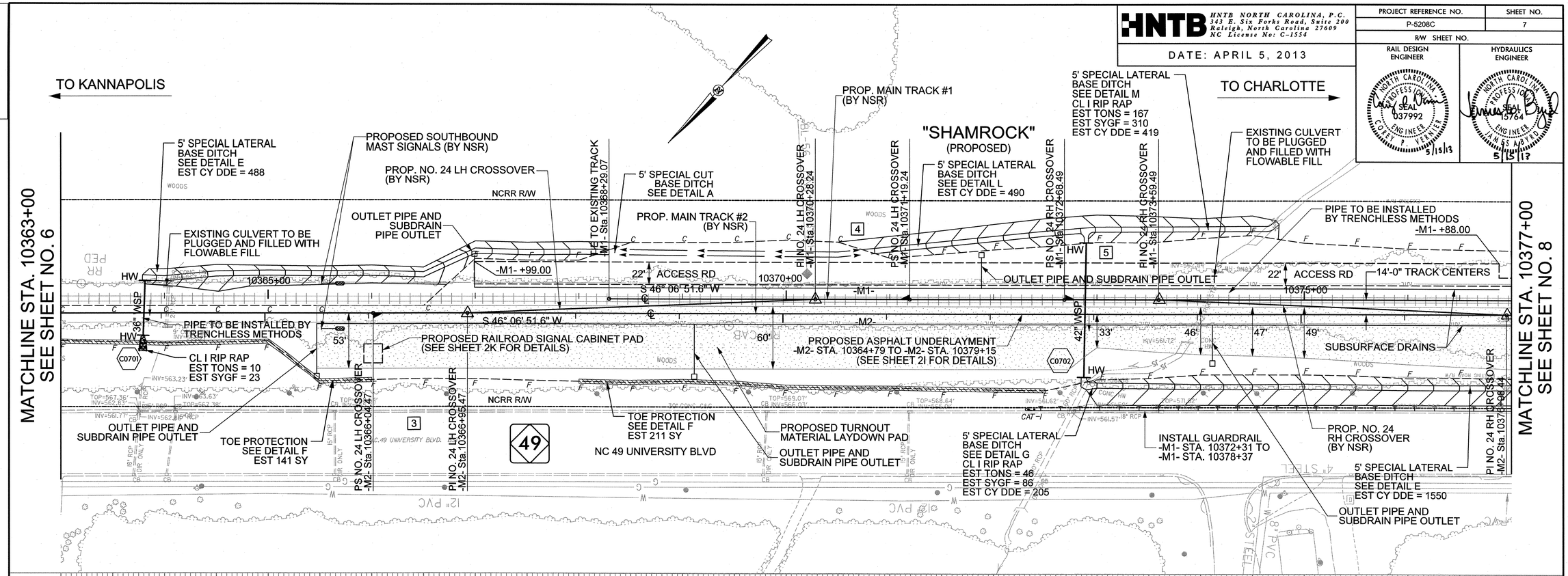
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

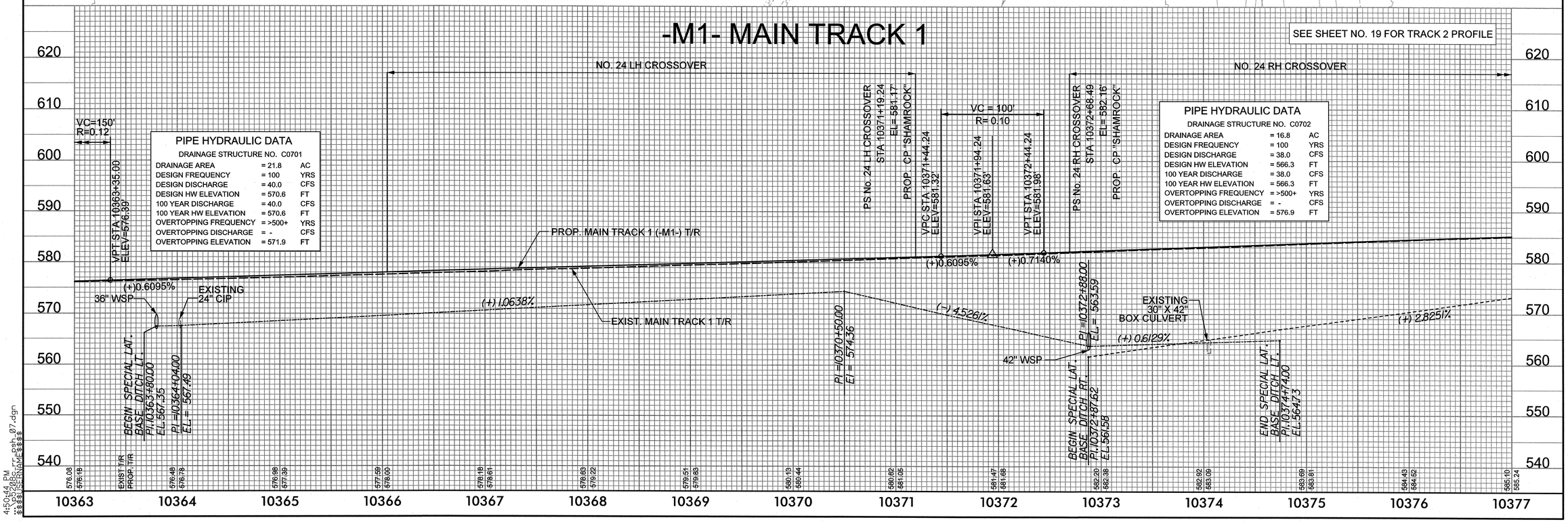
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	7
R/W SHEET NO.	

RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNON 5/15/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER JAMES M. AYRES 5/15/13





PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. C0701

DRAINAGE AREA	= 21.8	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 40.0	CFS
DESIGN HW ELEVATION	= 570.6	FT
100 YEAR DISCHARGE	= 40.0	CFS
100 YEAR HW ELEVATION	= 570.6	FT
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING DISCHARGE	= -	CFS
OVERTOPPING ELEVATION	= 571.9	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. C0702

DRAINAGE AREA	= 16.8	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 38.0	CFS
DESIGN HW ELEVATION	= 566.3	FT
100 YEAR DISCHARGE	= 38.0	CFS
100 YEAR HW ELEVATION	= 566.3	FT
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING DISCHARGE	= -	CFS
OVERTOPPING ELEVATION	= 576.9	FT

4:50:44 PM
$$$$USERNAME$$$$

HNTB

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	8
R/W SHEET NO.	

ROADWAY — NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER RICHARD GLENN EDENS, JR. 7/2/13

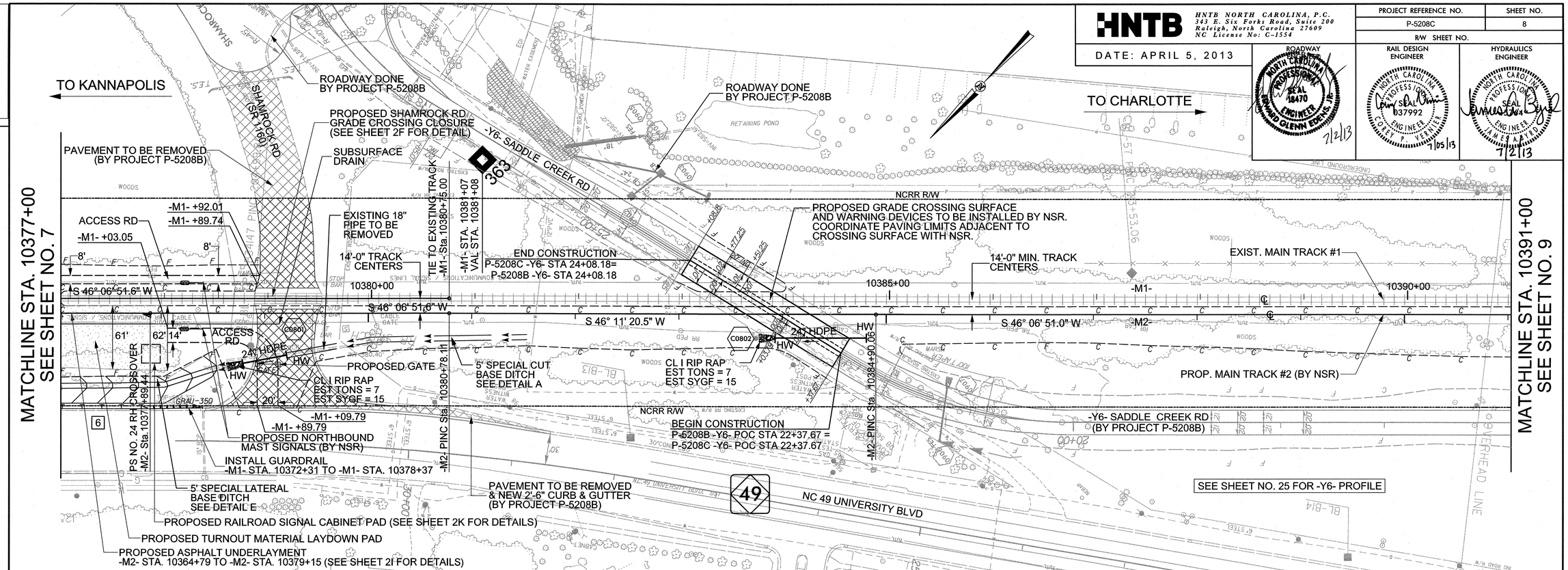
RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VENITZ 7/05/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19041 ENGINEER JAMES A. AYYD 7/2/13

DGN 0041DEL_P10a1 0001ADD_P10a1

REVISIONS

REVISION #1 (7/5/2013): SUBSURFACE DRAIN ADDED. REVISED -Y6- SADDLE CREEK RD ALIGNMENT. REVISED 24" HDPE C0802.



11:48:09 AM
$$$$USERNAME$$$$
c:\pwworking\tip\d0041\p5208c_rr_psh_08.dgn

0041DEL_P10a1

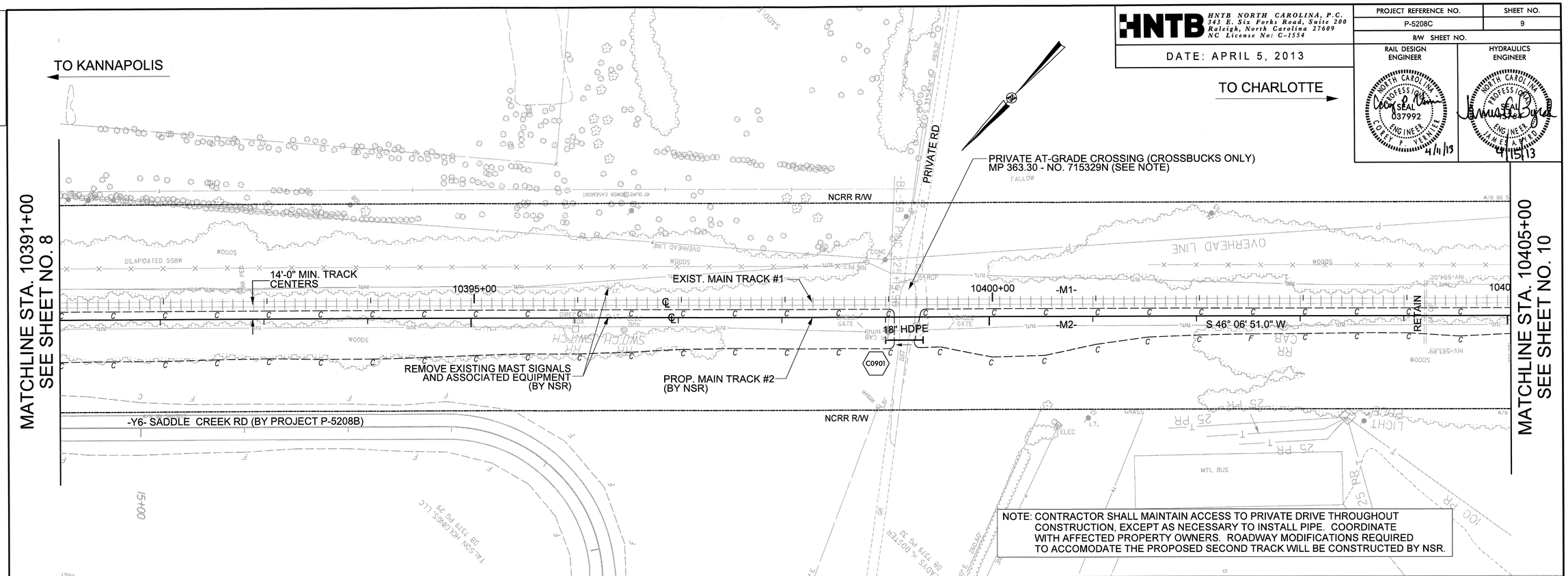
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

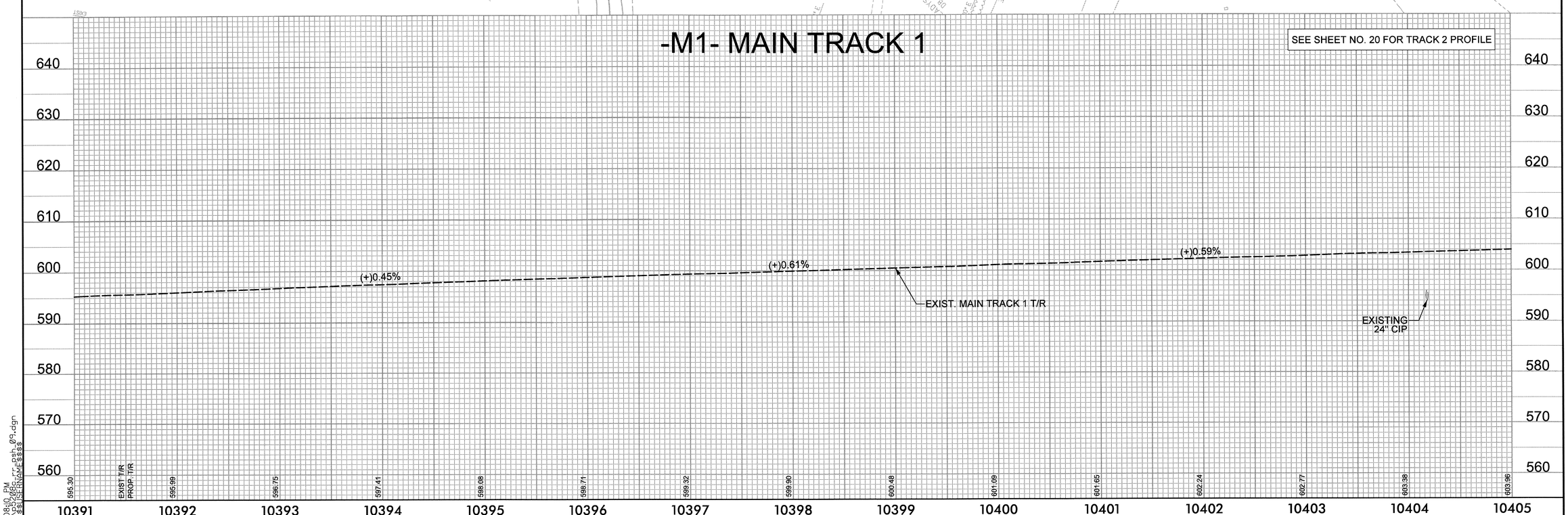
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	9
R/W SHEET NO.	

RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER — 4/11/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 3 ENGINEER — 4/15/13





0041DEL_P10a1

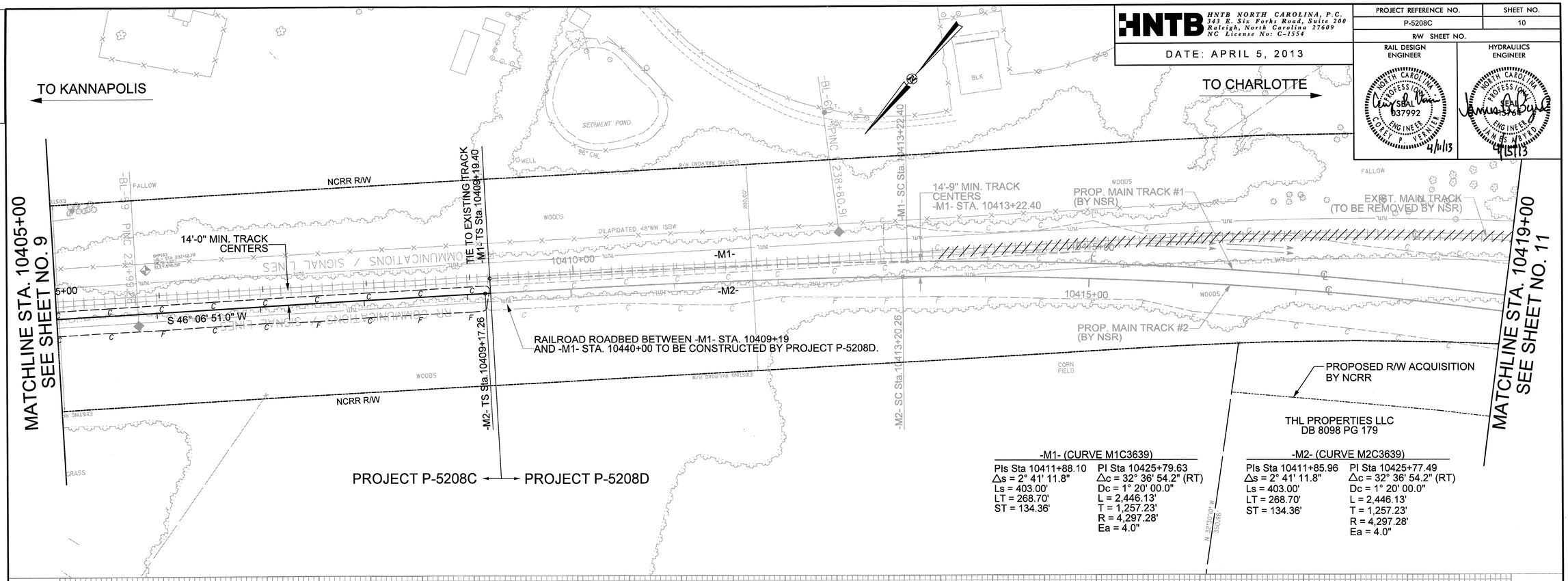
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	10
R/W SHEET NO.	

RAIL DESIGN ENGINEER — SEAL 037992 — 4/11/13

HYDRAULICS ENGINEER — SEAL 13768 — 4/15/13

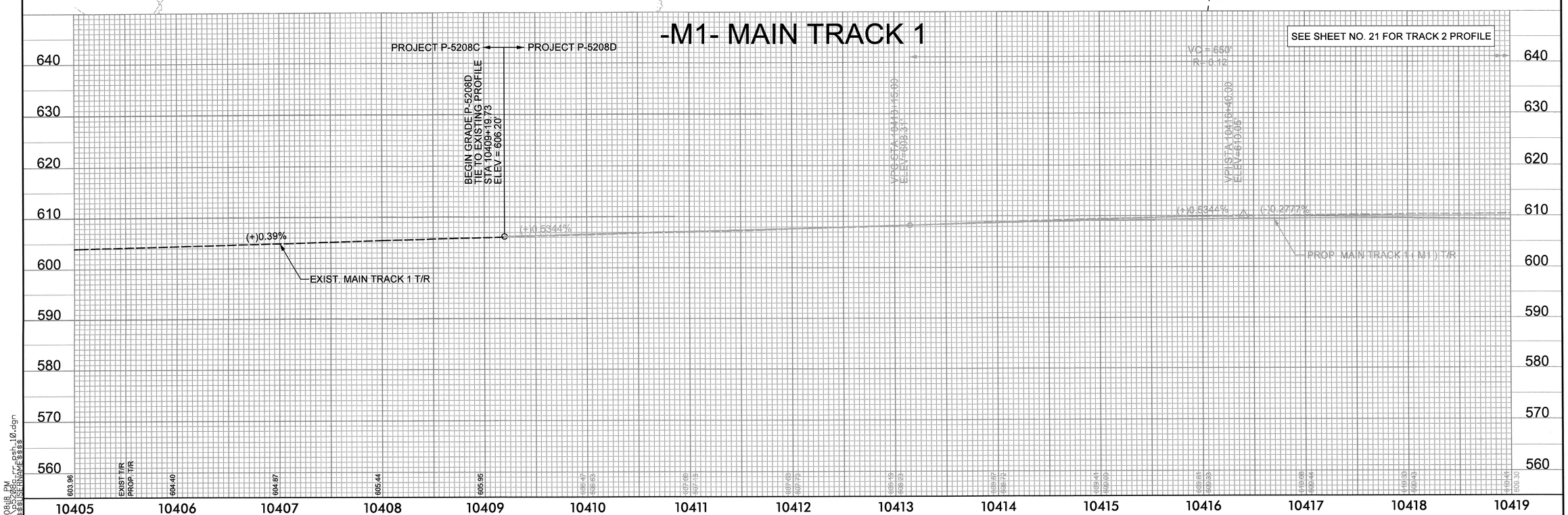


-M1- (CURVE M1C3639)

PIs Sta 10411+88.10	PI Sta 10425+79.63
Δs = 2° 41' 11.8"	Δc = 32° 36' 54.2" (RT)
Ls = 403.00'	Dc = 1° 20' 00.0"
LT = 268.70'	L = 2,446.13'
ST = 134.36'	T = 1,257.23'
	R = 4,297.28'
	Ea = 4.0"

-M2- (CURVE M2C3639)

PIs Sta 10411+85.96	PI Sta 10425+77.49
Δs = 2° 41' 11.8"	Δc = 32° 36' 54.2" (RT)
Ls = 403.00'	Dc = 1° 20' 00.0"
LT = 268.70'	L = 2,446.13'
ST = 134.36'	T = 1,257.23'
	R = 4,297.28'
	Ea = 4.0"



2:08:18 PM
$$$$USERNAME$$$$

0041DEL_P10a1

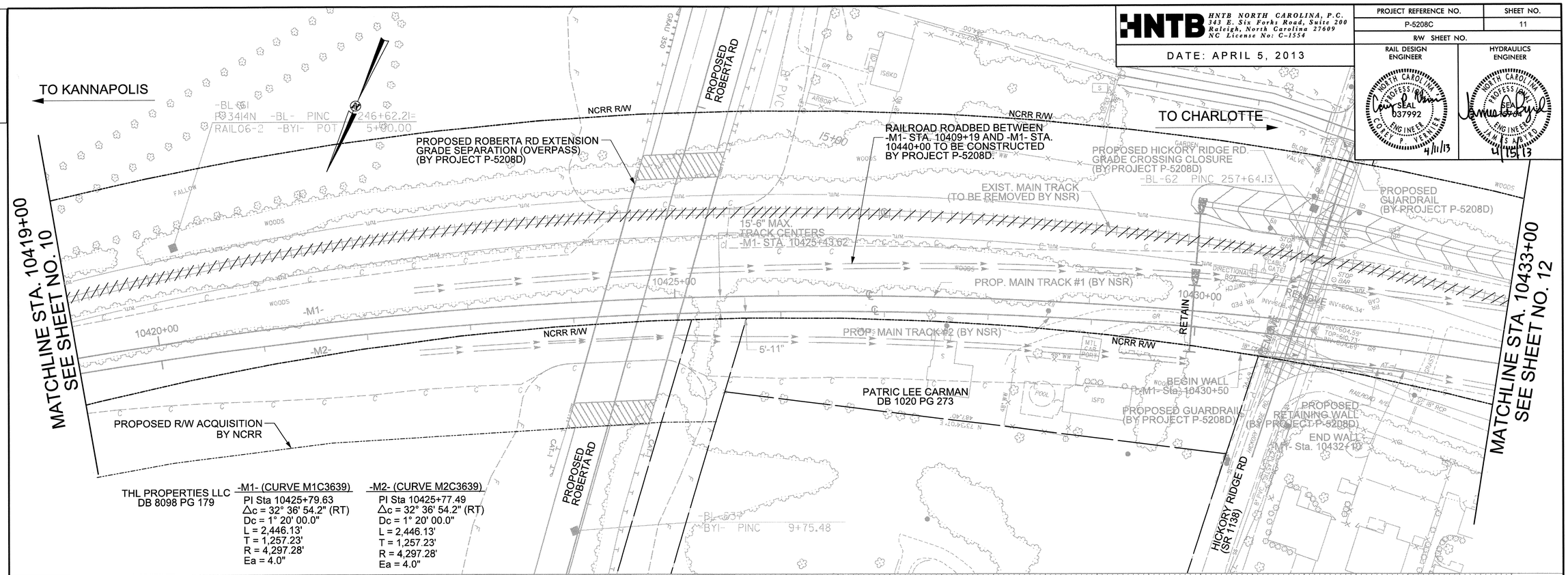
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	11
R/W SHEET NO.	

RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER ROBERT P. VENNER 4/11/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 019 ENGINEER JAMES A. BAIRD 4/11/13

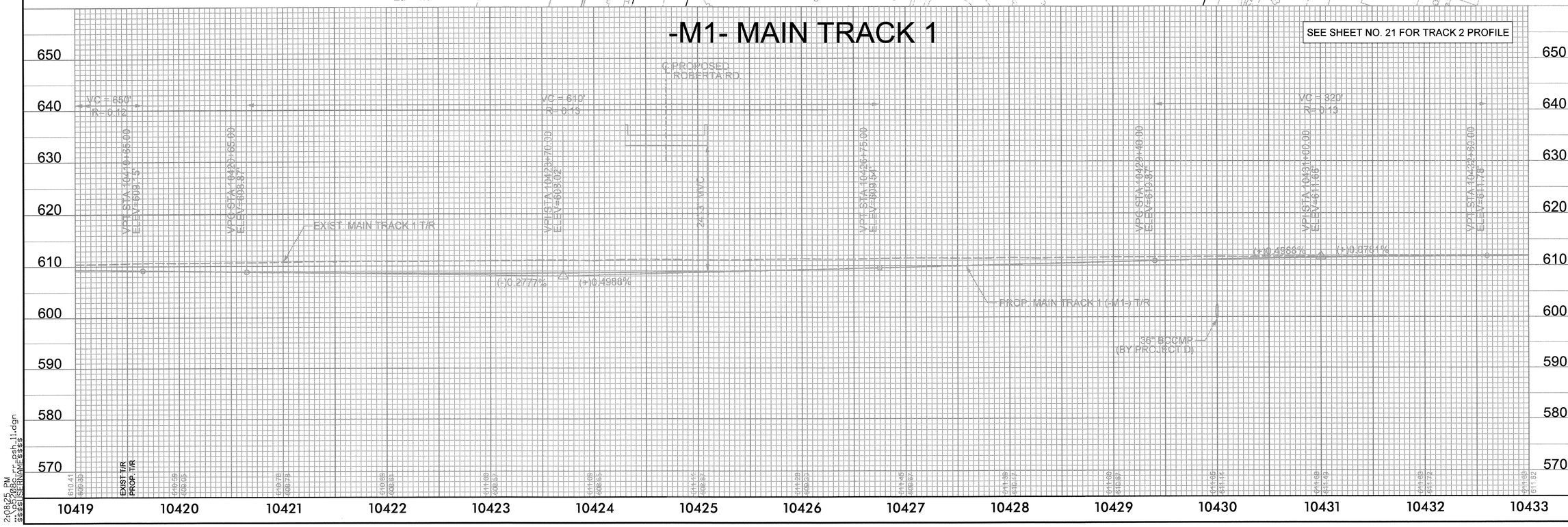


-M1- (CURVE M1C3639)
PI Sta 10425+79.63
Δc = 32° 36' 54.2" (RT)
Dc = 1° 20' 00.0"
L = 2,446.13'
T = 1,257.23'
R = 4,297.28'
Ea = 4.0"

-M2- (CURVE M2C3639)
PI Sta 10425+77.49
Δc = 32° 36' 54.2" (RT)
Dc = 1° 20' 00.0"
L = 2,446.13'
T = 1,257.23'
R = 4,297.28'
Ea = 4.0"

-M1- MAIN TRACK 1

SEE SHEET NO. 21 FOR TRACK 2 PROFILE



2:08:25 PM
$$$$USERNAME$$$$

0041DEL_P10a1

DGN

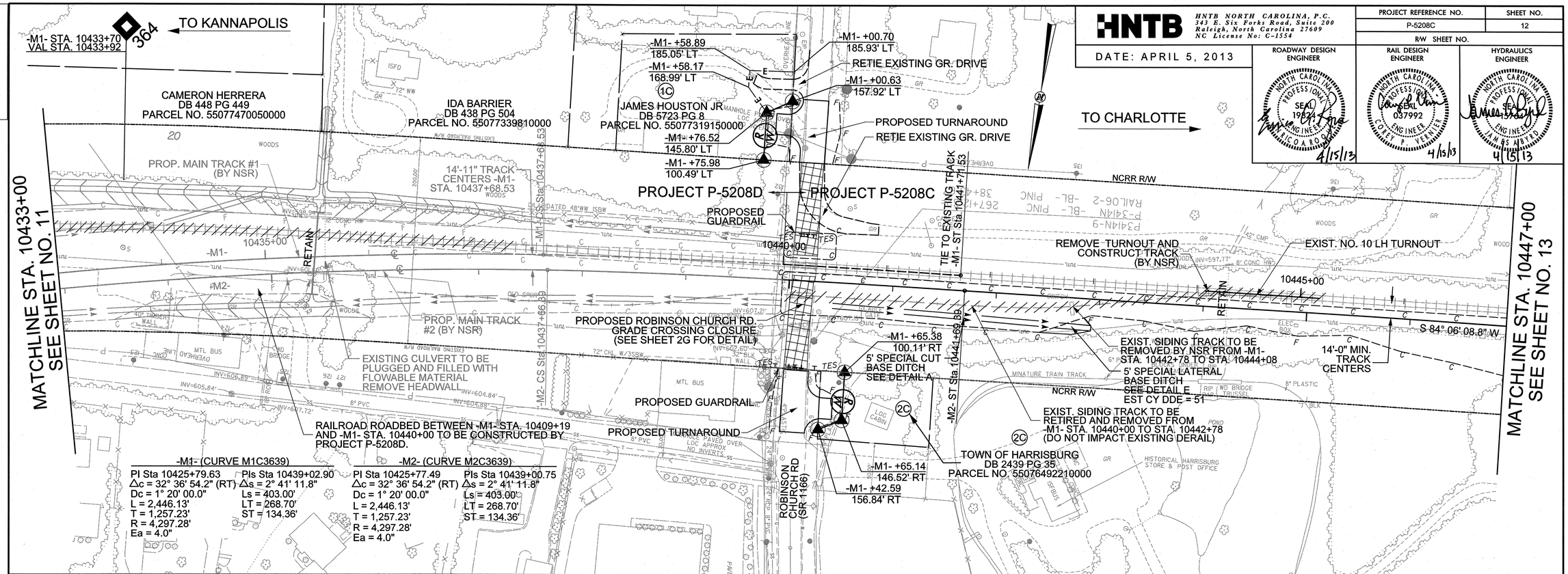
HNTB

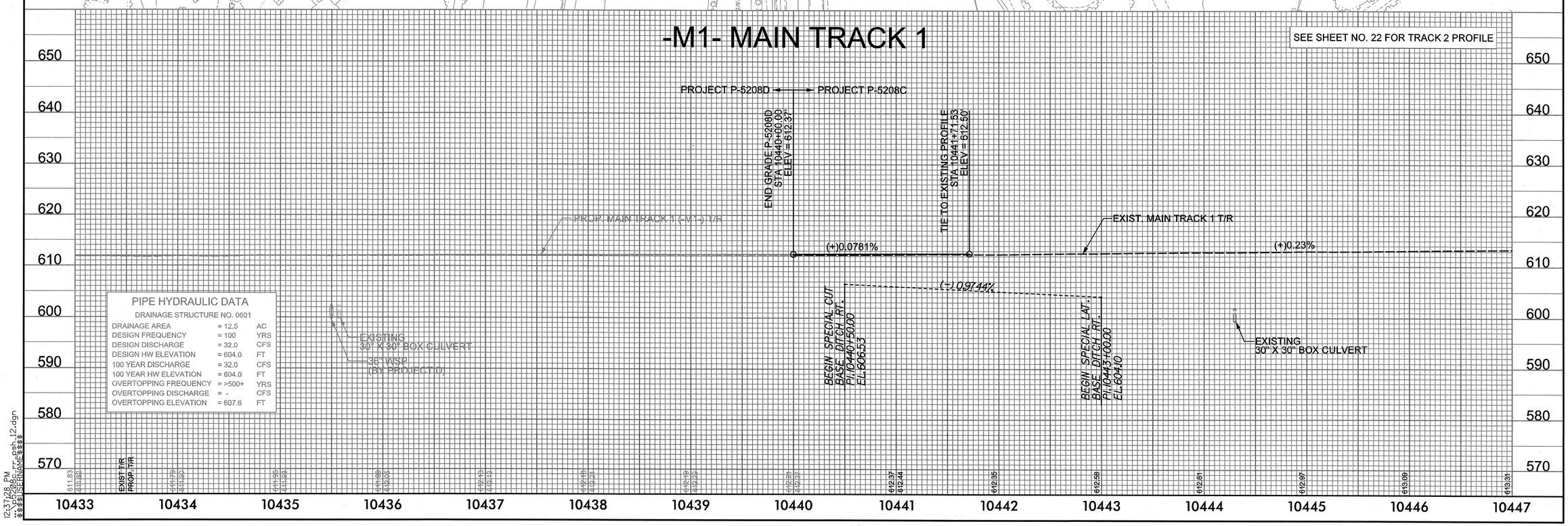
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	12
R/W SHEET NO.	

DATE: APRIL 5, 2013

ROADWAY DESIGN ENGINEER	RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 19021 ENGINEER RICO A. RODRIGUEZ 4/15/13	SEAL 037992 ENGINEER COREY P. VERMILYE 4/15/13	SEAL 19745 ENGINEER JAMES ABERNATHY 4/15/13





PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 0601

DRAINAGE AREA	= 12.5	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 32.0	CFS
DESIGN HW ELEVATION	= 604.0	FT
100 YEAR DISCHARGE	= 32.0	CFS
100 YEAR HW ELEVATION	= 604.0	FT
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING DISCHARGE	= -	CFS
OVERTOPPING ELEVATION	= 607.6	FT

12:37:28 PM
\\pdc2pwcs\pwcs\psh_12.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

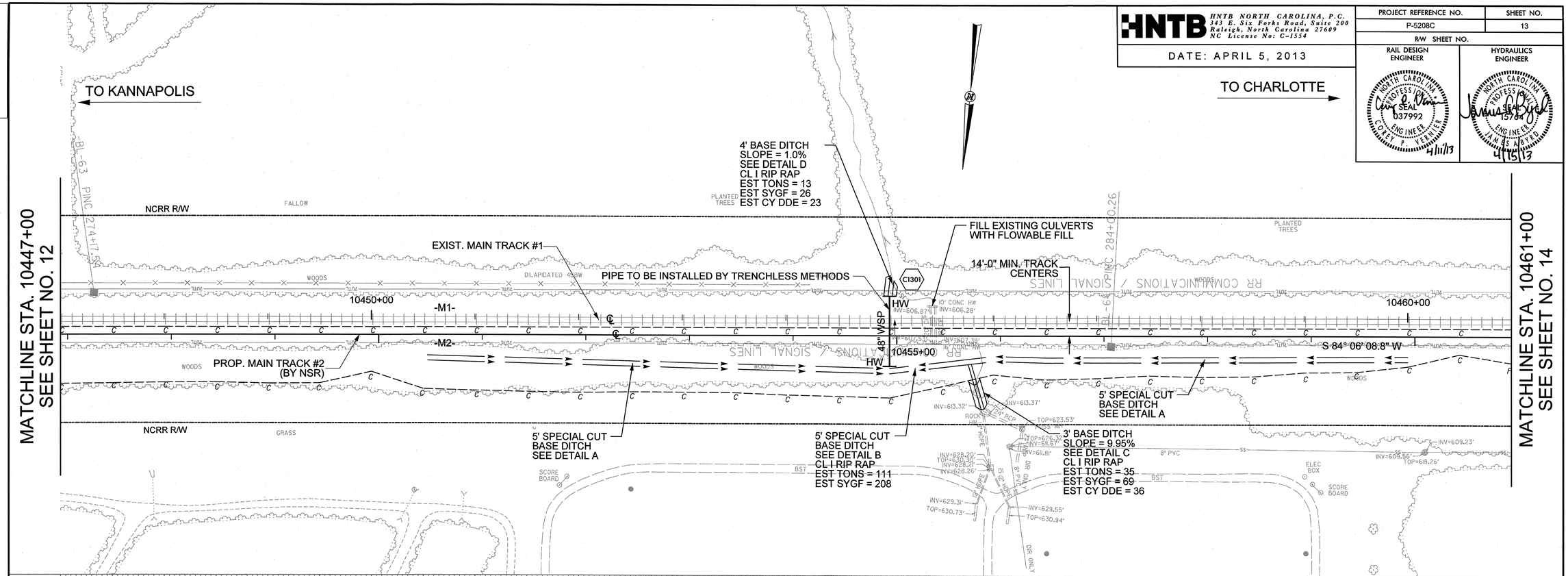
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

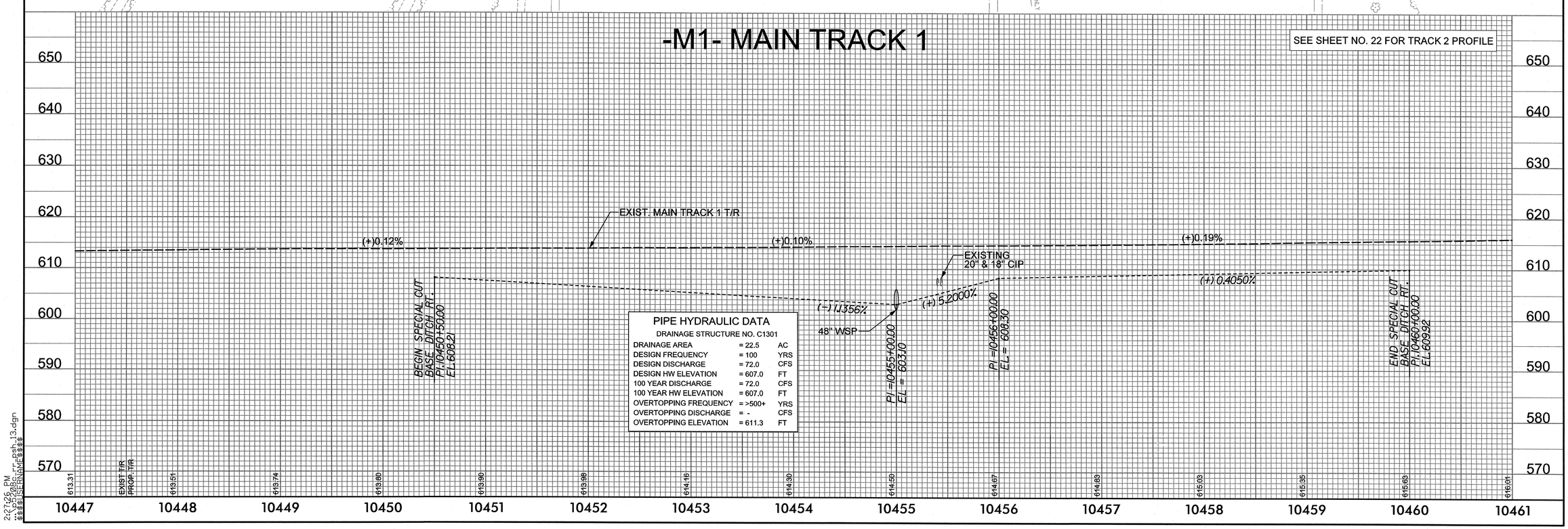
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	13
R/W SHEET NO.	

RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNIER 4/11/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER JAMES A. BYRD 4/15/13





PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. C1301

DRAINAGE AREA	= 22.5	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 72.0	CFS
DESIGN HW ELEVATION	= 607.0	FT
100 YEAR DISCHARGE	= 72.0	CFS
100 YEAR HW ELEVATION	= 607.0	FT
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING DISCHARGE	= -	CFS
OVERTOPPING ELEVATION	= 611.3	FT

2:27:26 PM
...\p5208c_rr_psh_13.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

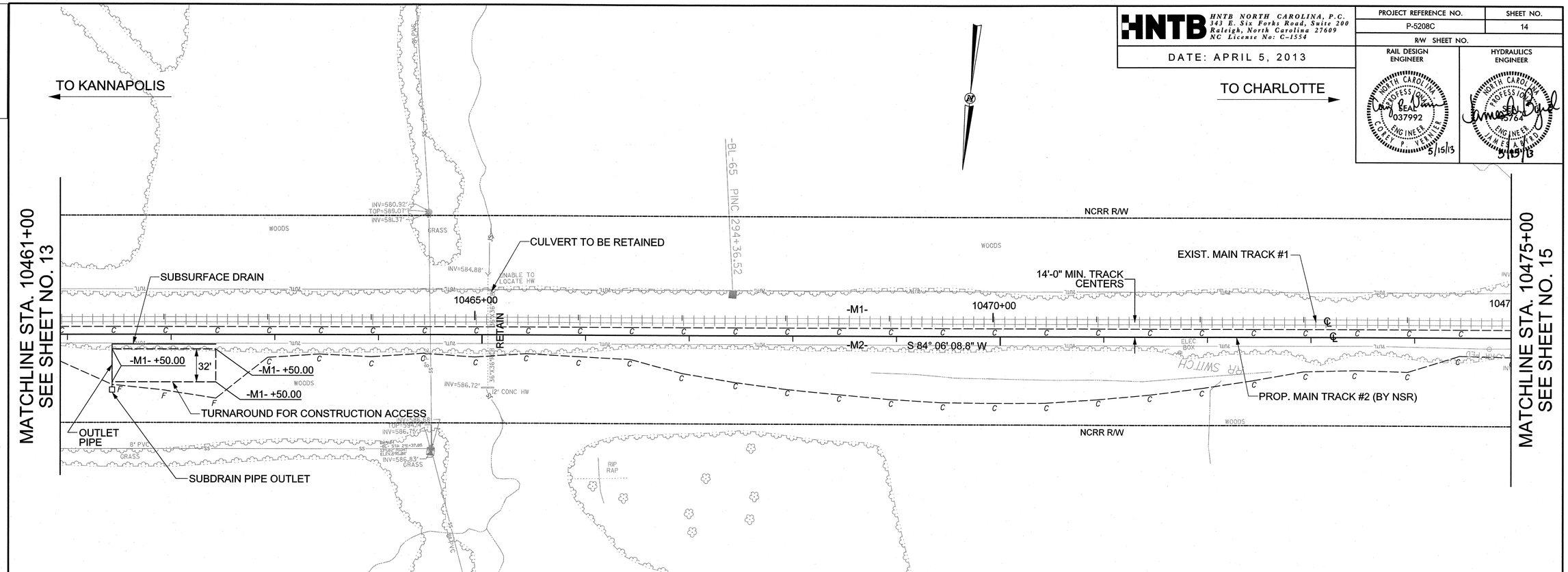
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

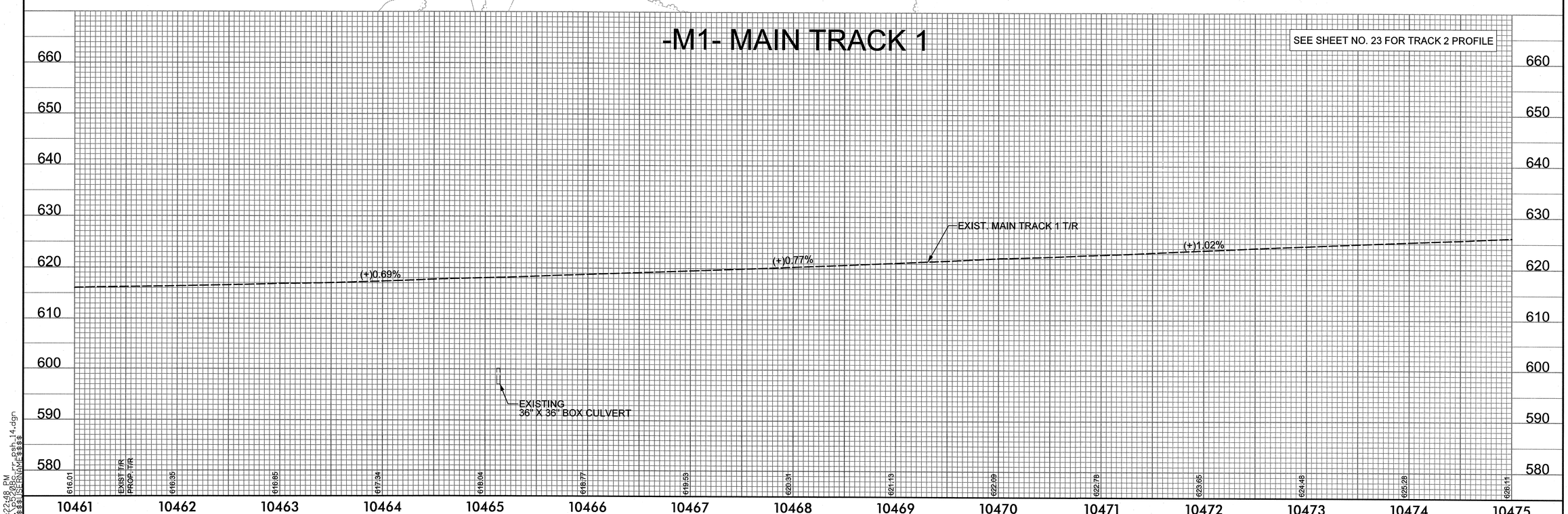
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	14
R/W SHEET NO.	

RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037992 COREY P. VERNIER 5/15/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 45764 JAMES A. BYRD 5/15/13





2:22:48 PM
p5208c_rr_psh_14.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

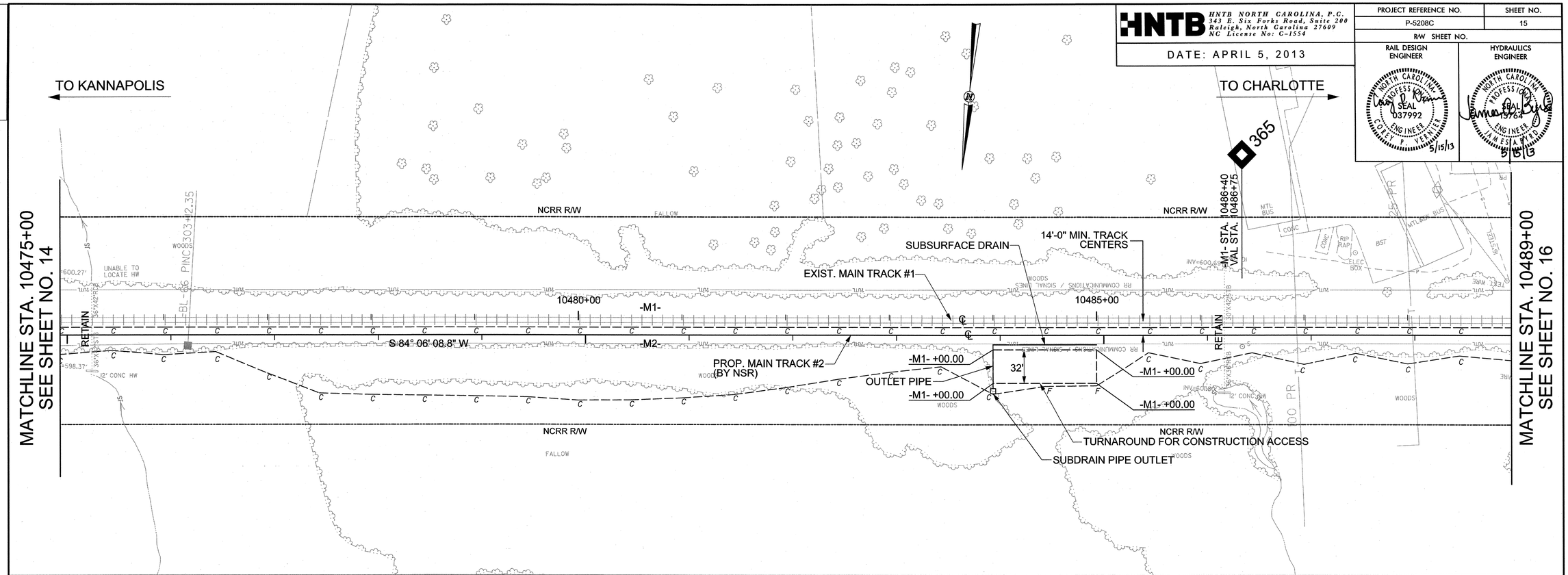
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

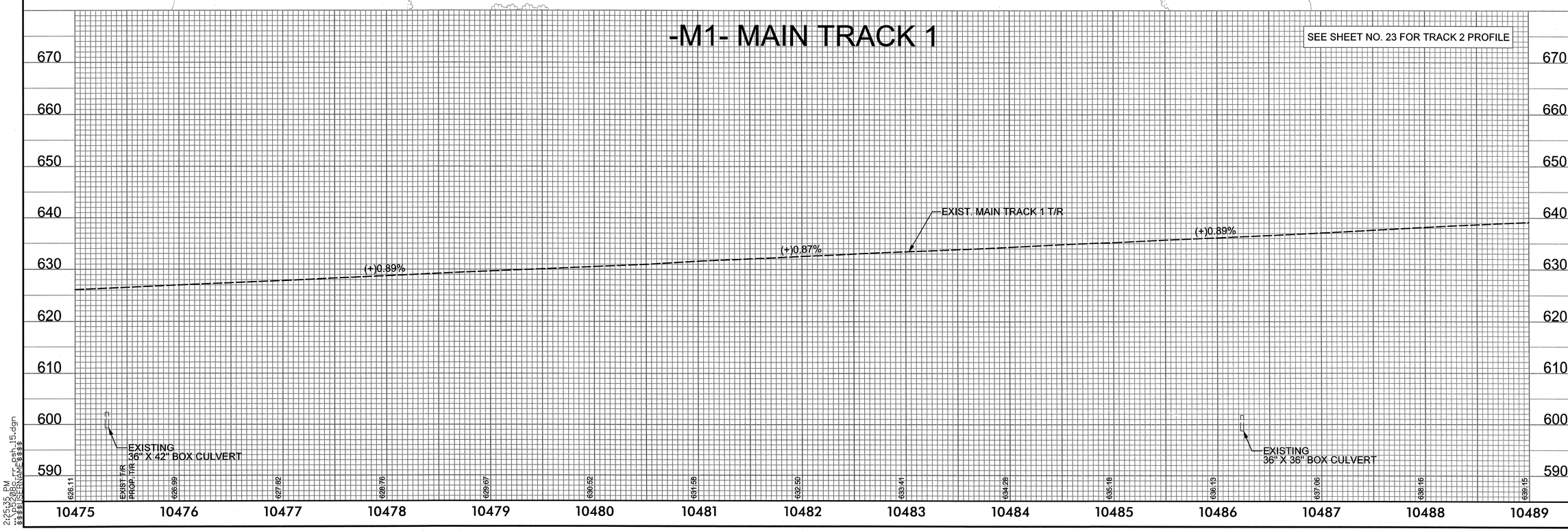
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	15
R/W SHEET NO.	

RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNIER 5/15/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER JAMES A. WARD 5/15/13





2:25:35 PM
$$$$USERNAME$$$$
...\p5208c_rr_psh_15.dgn

0041DEL_P10a1

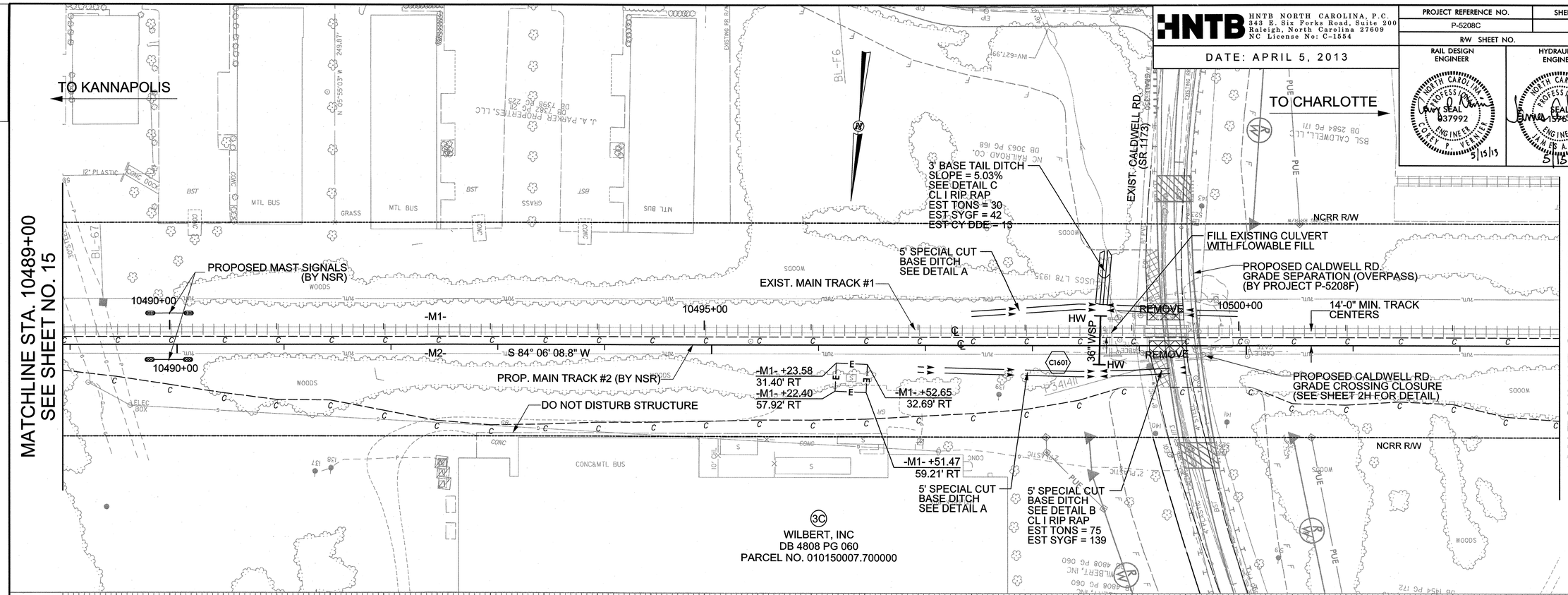
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

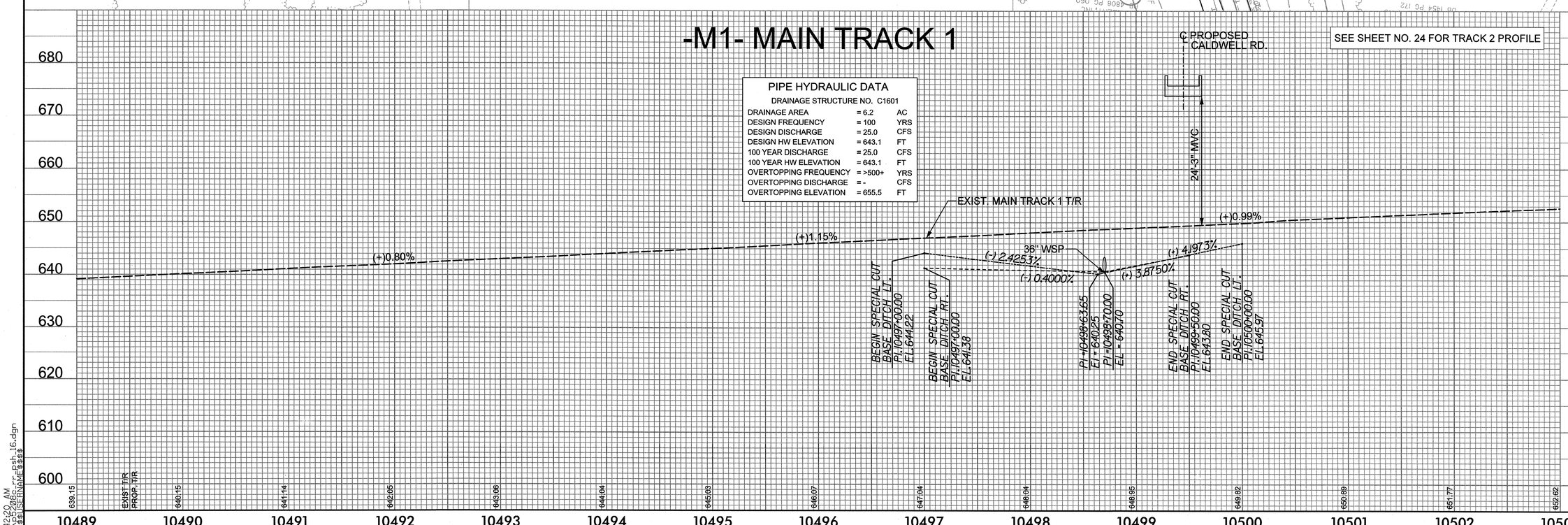
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	16
R/W SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNIER 5/15/13

NORTH CAROLINA PROFESSIONAL SEAL 015764 ENGINEER JAMES A. BYRD 5/15/13





PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. C1601

DRAINAGE AREA	= 6.2	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 25.0	CFS
DESIGN HW ELEVATION	= 643.1	FT
100 YEAR DISCHARGE	= 25.0	CFS
100 YEAR HW ELEVATION	= 643.1	FT
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING DISCHARGE	= -	CFS
OVERTOPPING ELEVATION	= 655.5	FT

9:42:20 AM
...\p5208c_rr_psh_16.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

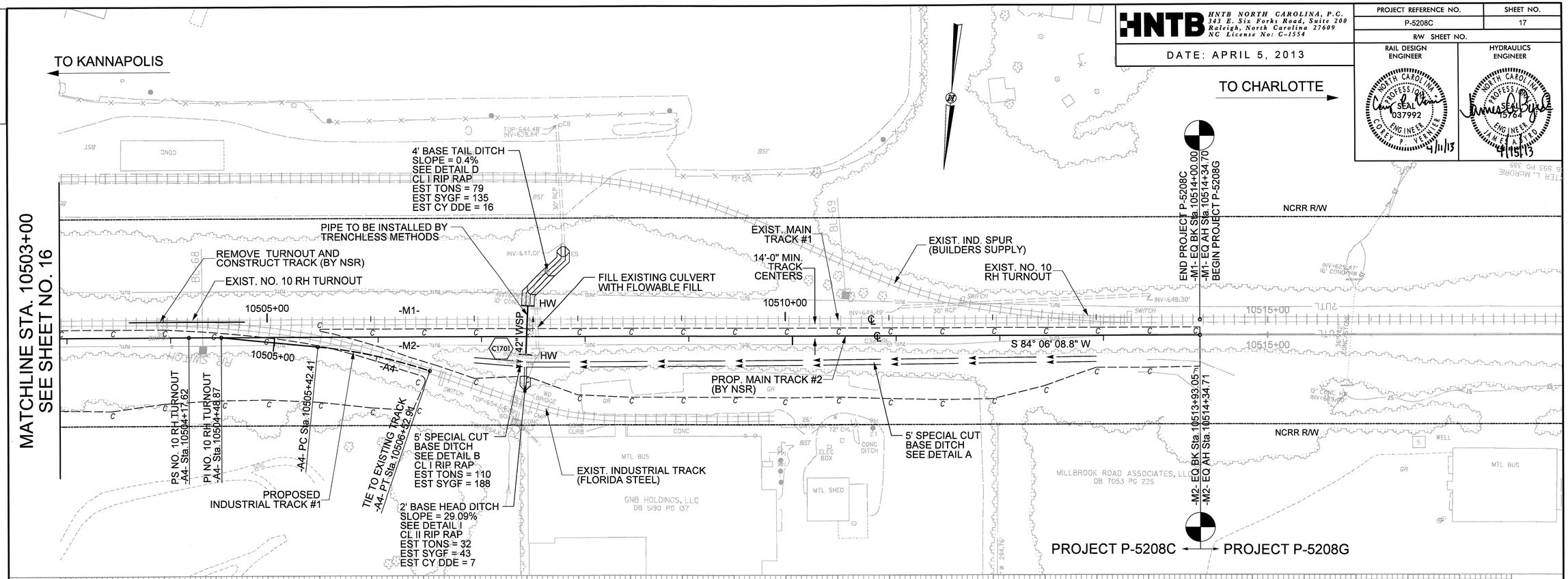
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

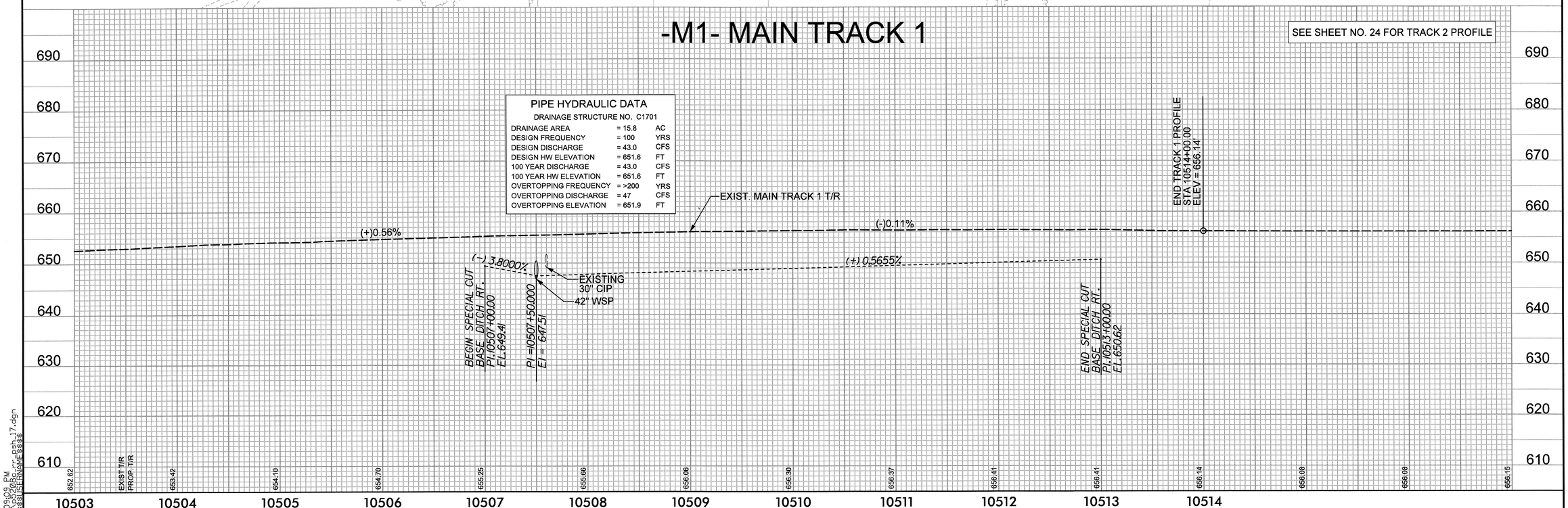
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	17
R/W SHEET NO.	

RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037992 COREY P. VERNER 4/11/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15764 JAMES A. TYRD 4/15/13





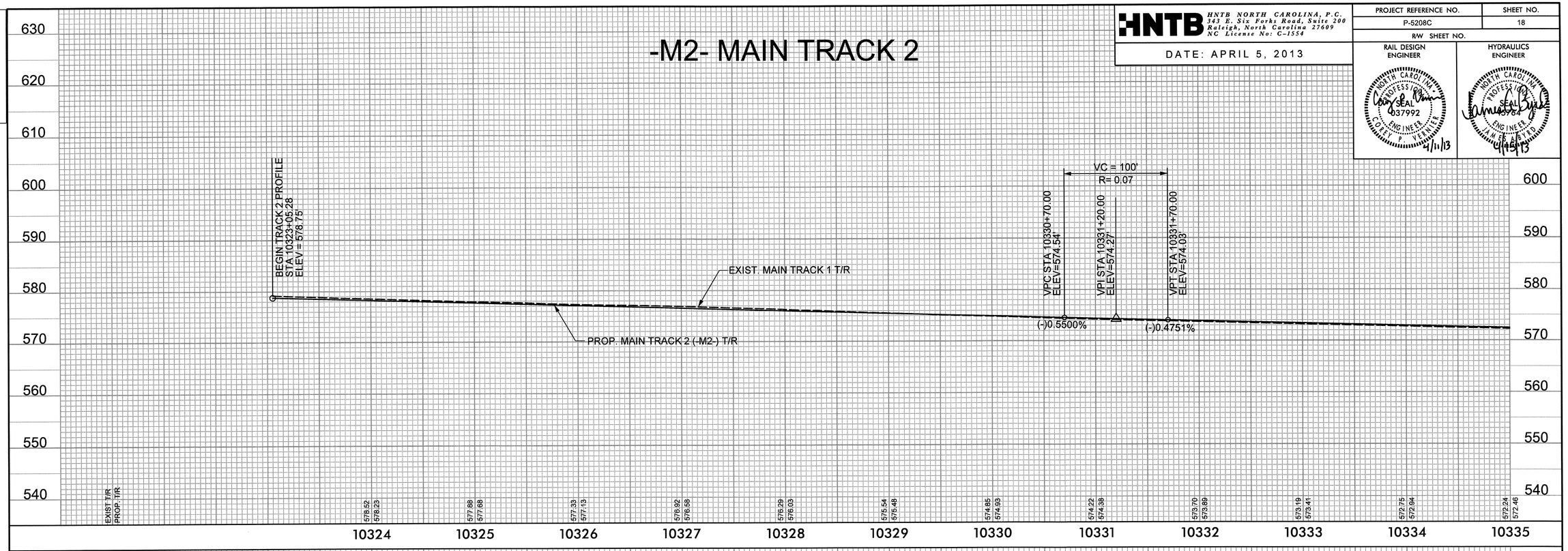
2:09:03 PM
$$$$USERNAME$$$$

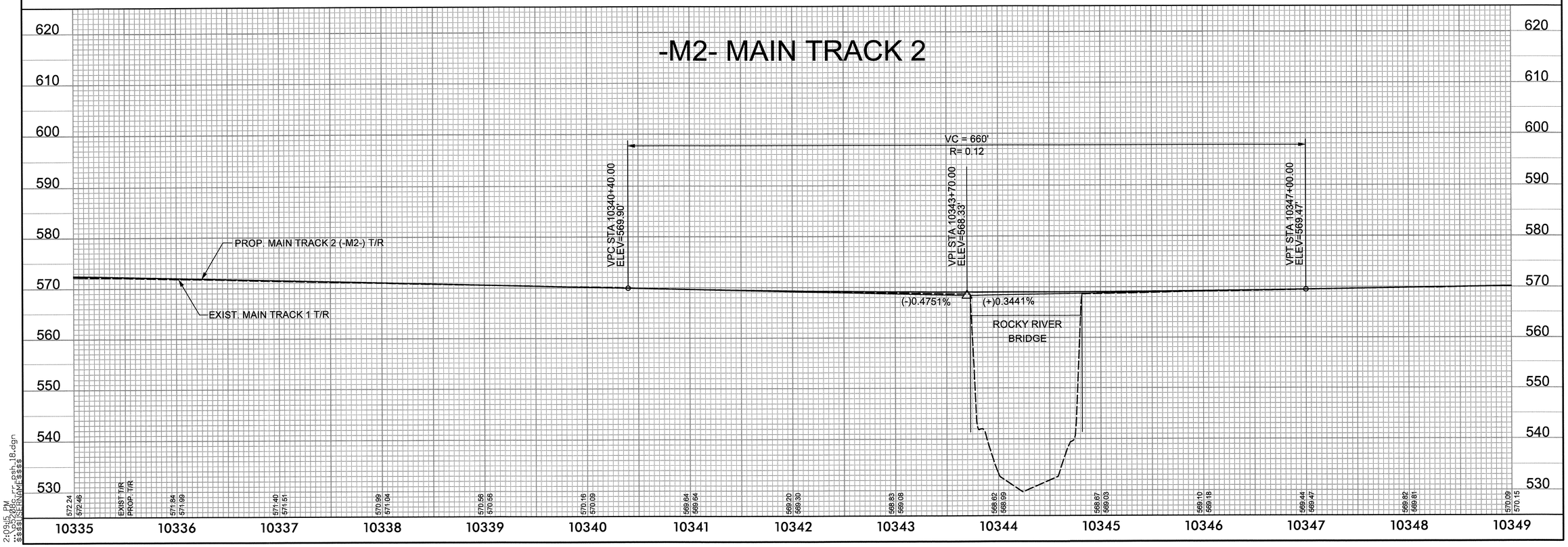
0041DEL_P10a1

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	18
R/W SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER





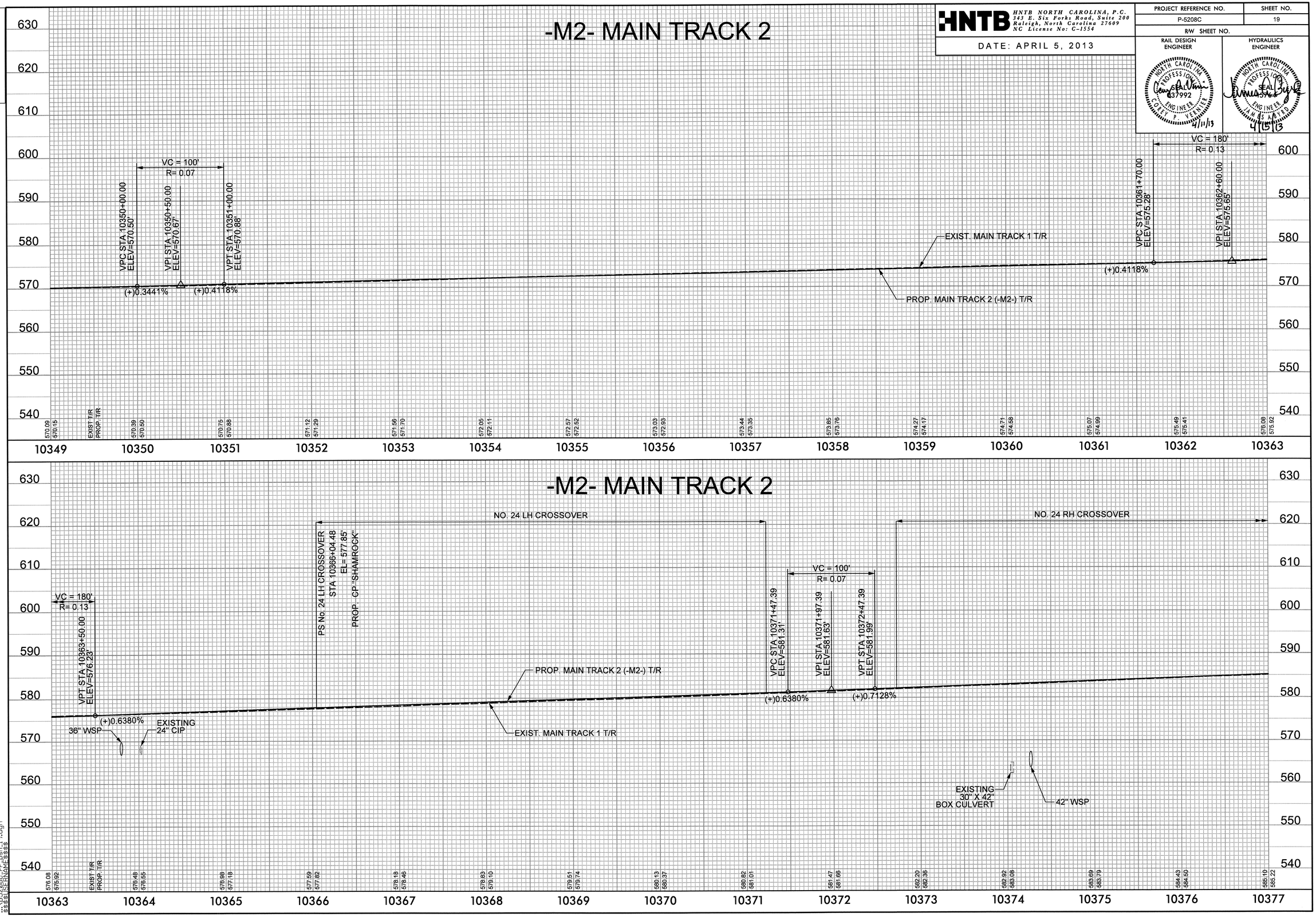
2:09:15 PM
\\p5208c_rr_psh_18.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	19
R/W SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER



2:09:21 PM
...\p5208c_rr_psh_19.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

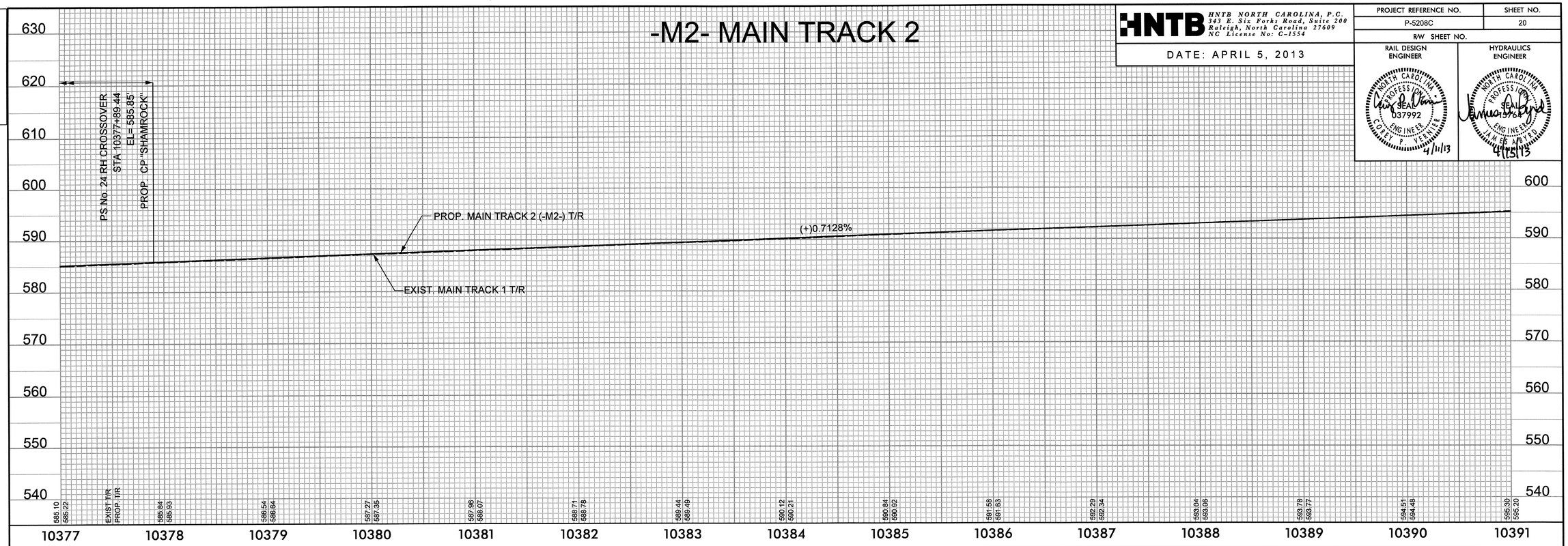
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

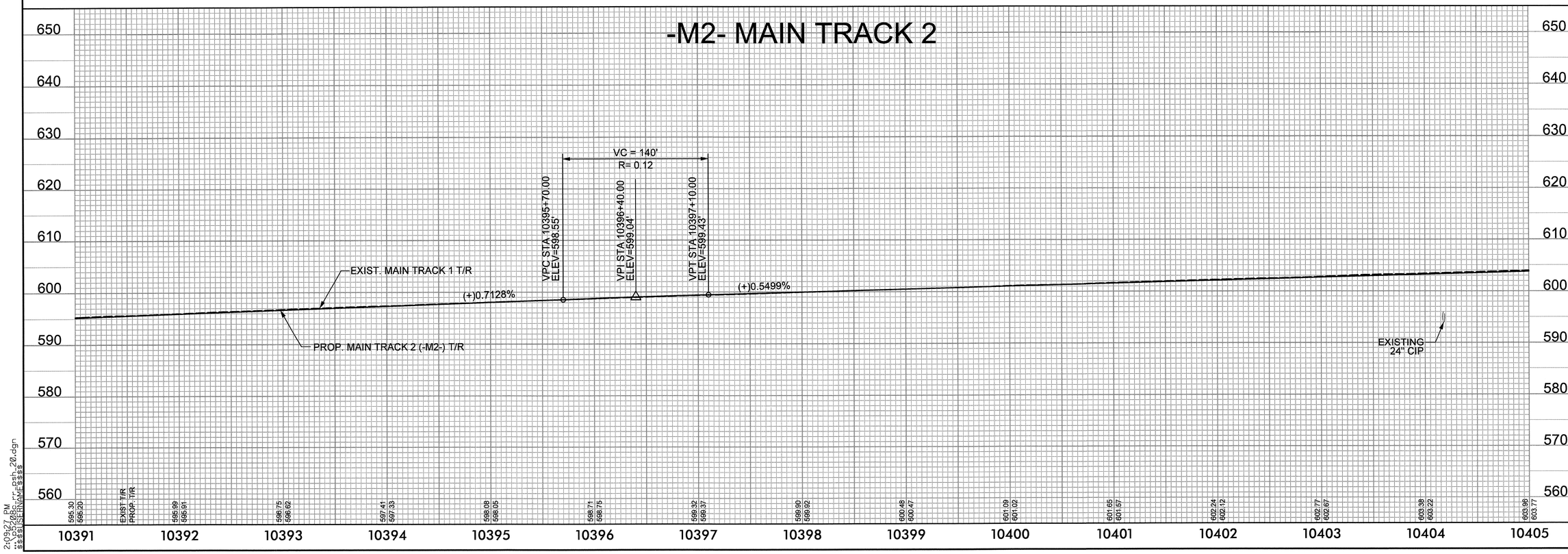
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	20
R/W SHEET NO.	

RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNIER 4/11/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER JAMES A. BYRD 4/15/13





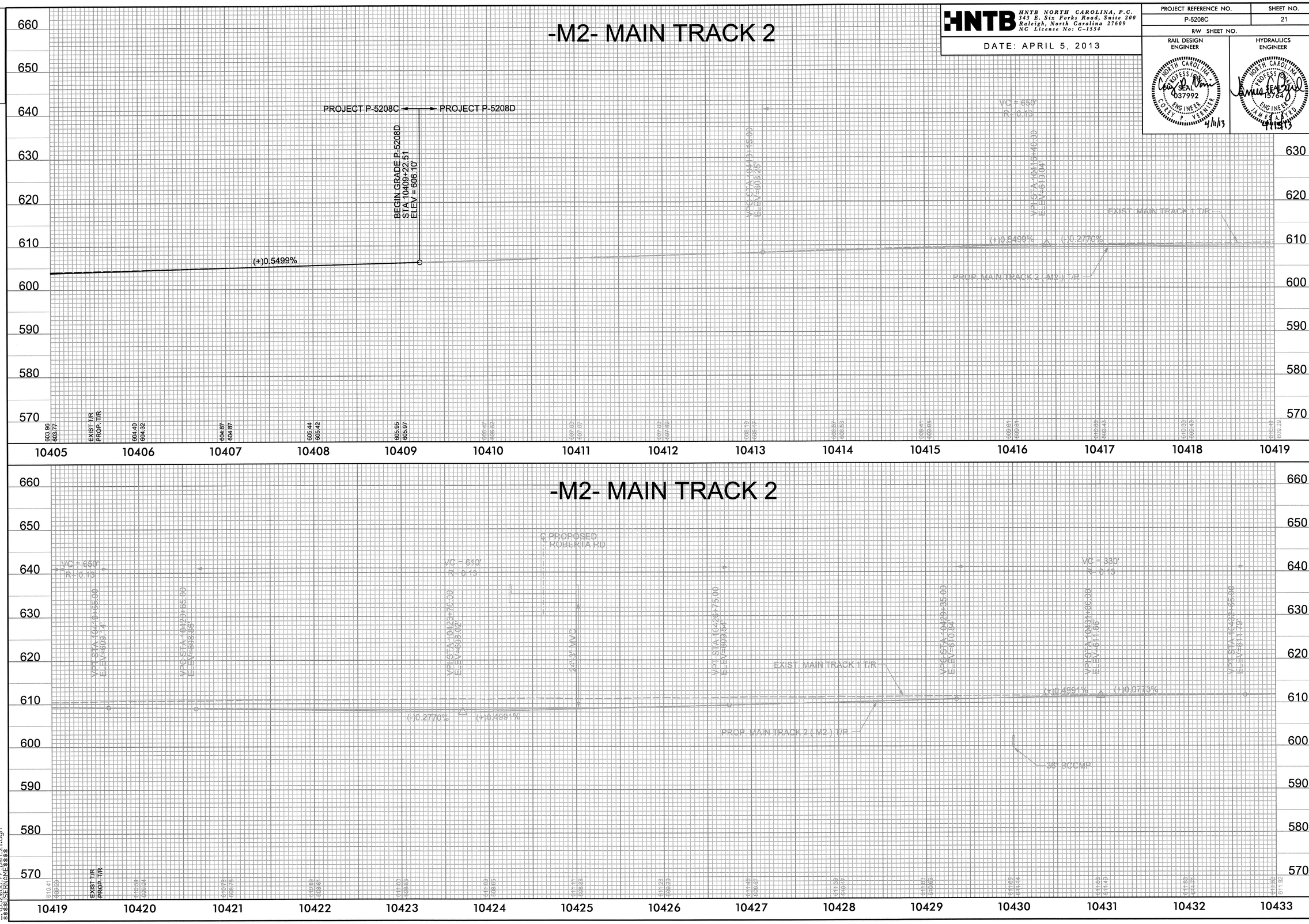
2:09:27 PM
p5208c_rr_psh_20.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	21
R/W SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER



2:09:32 PM
...\p5208c_rr_psh_21.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

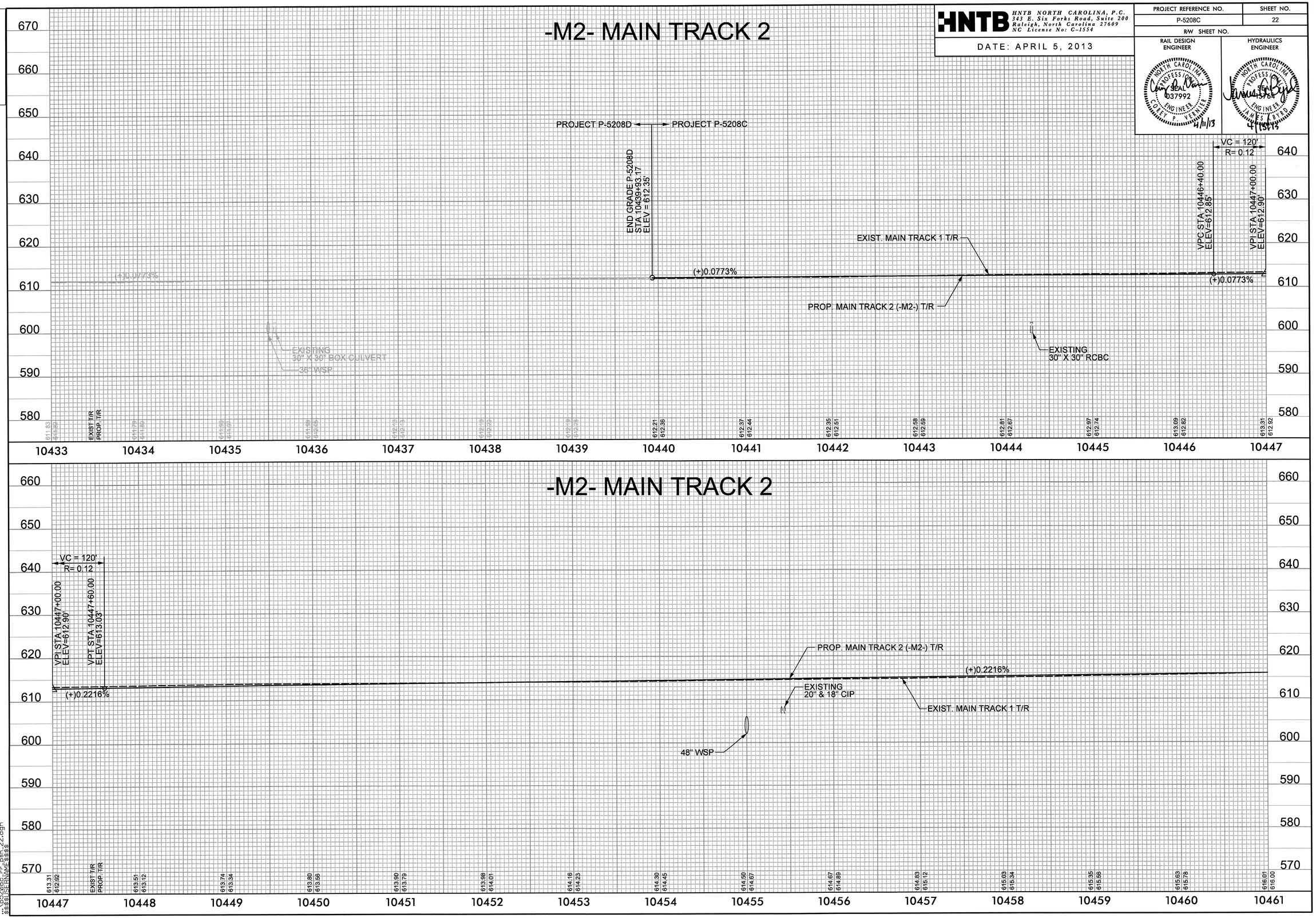
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	22
R/W SHEET NO.	

RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNIER 4/11/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER JAMES A. BYRD 4/15/13



2:09:38 PM
...\p5208c_rr_psh_22.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

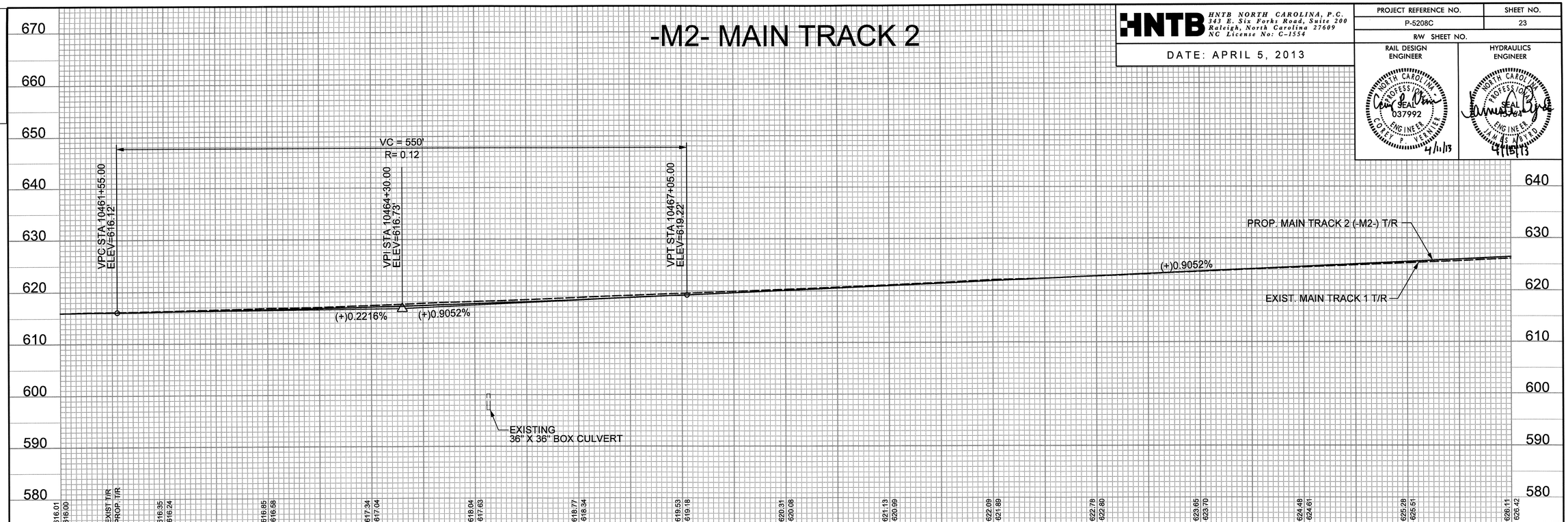
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

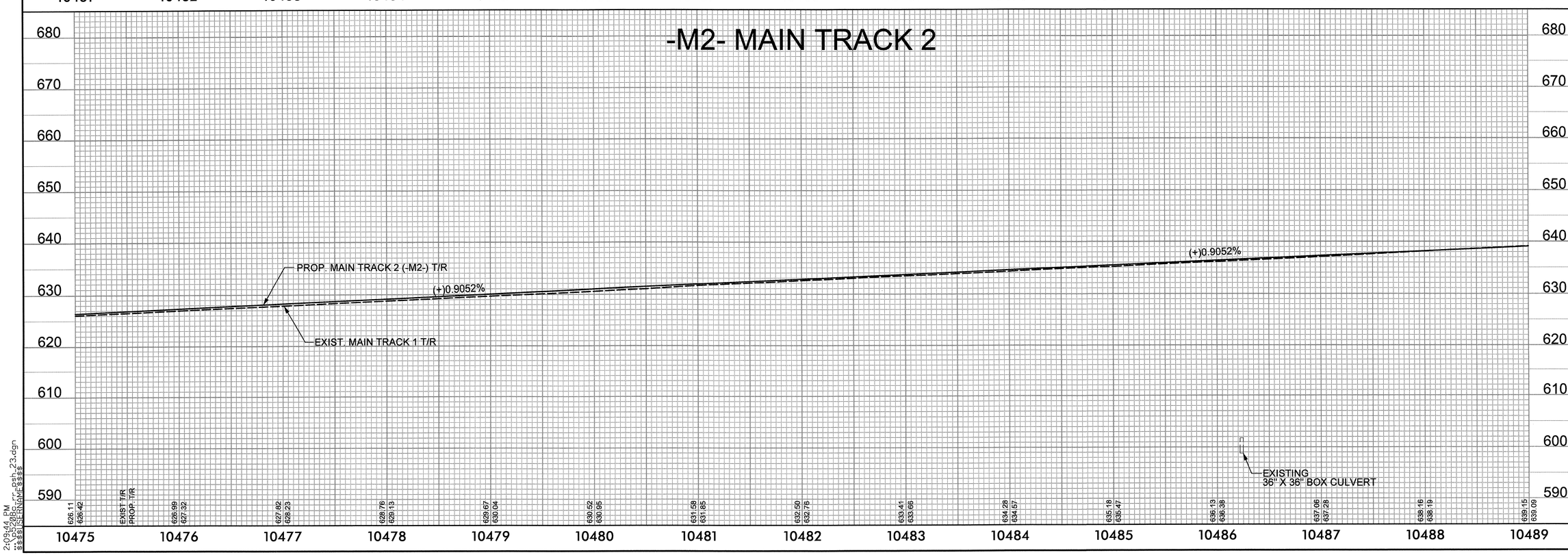
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	23
R/W SHEET NO.	

RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER COREY P. VERNIER 4/11/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 13764 ENGINEER JAMES A. BYRD 4/15/13





2:09:44 PM
p5208c_rr_psh_23.dgn
$$$$USERNAME$$$$

0041DEL_P10a1

DGN

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

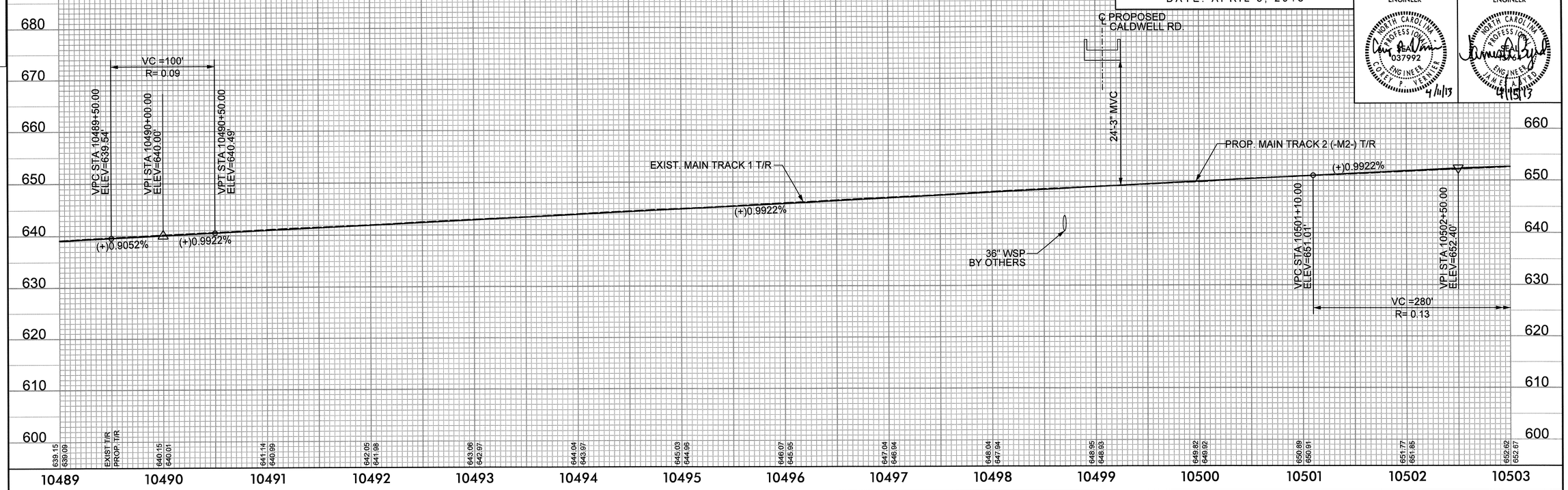
DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	24
R/W SHEET NO.	

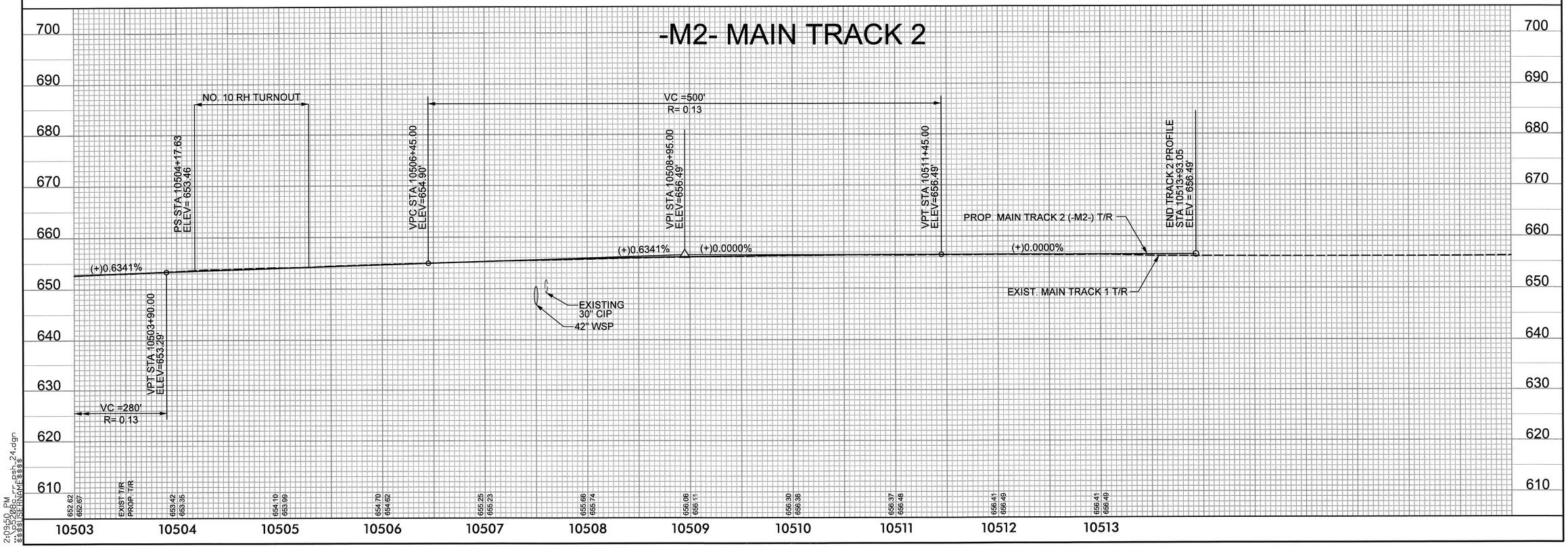
RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037992 — 4/11/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — 4/15/13

-M2- MAIN TRACK 2



-M2- MAIN TRACK 2



2:03:50 PM
$$$$USERNAME$$$$

HNTB

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 5, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	25
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 18470 ENGINEER EDWARD GLENN EDENS, JR. 7/2/13

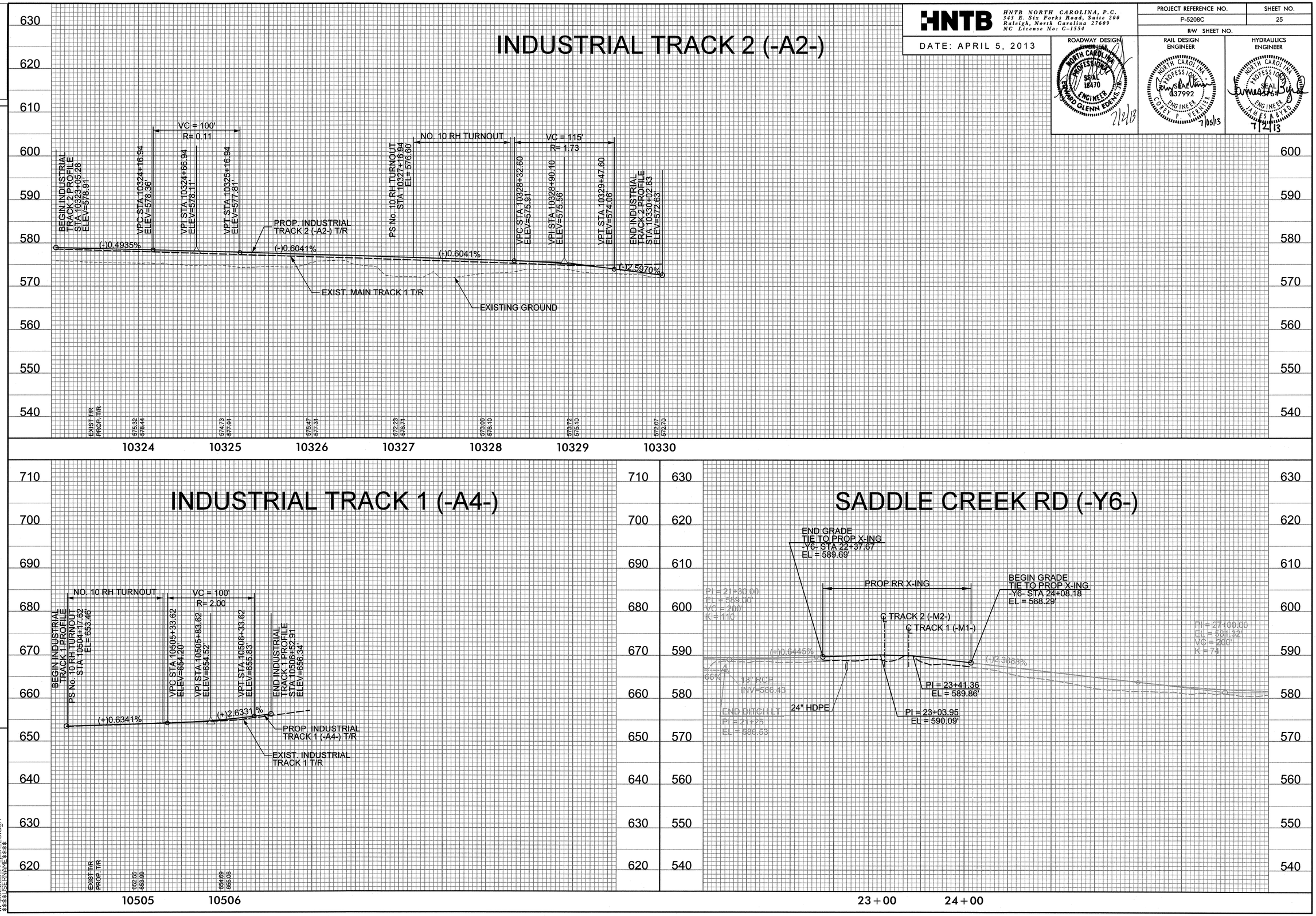
RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 037992 ENGINEER CORY P. VERNIER 7/05/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 3764 ENGINEER JAMES A. BYRD 7/2/13

DCN 0041DEL_P10a1
0001ADD_P10a1

REVISIONS

REVISION #1 (7/5/2013): REVISED -Y6- SADDLE CREEK RD PROFILE.



12:32:28 PM
...\p5208c_rr_psh_25.dgn
$$$$USERNAME$$$$