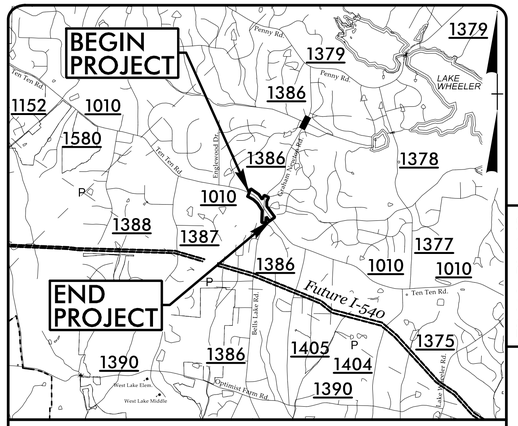
09/08/99

TIP PROJECT: HL-0008L

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Plan Sheet Symbols
See Sheet RW01 Through RW05 For Survey Control and Right-of-Way Sheets



VICINITY MAP

FINAL PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

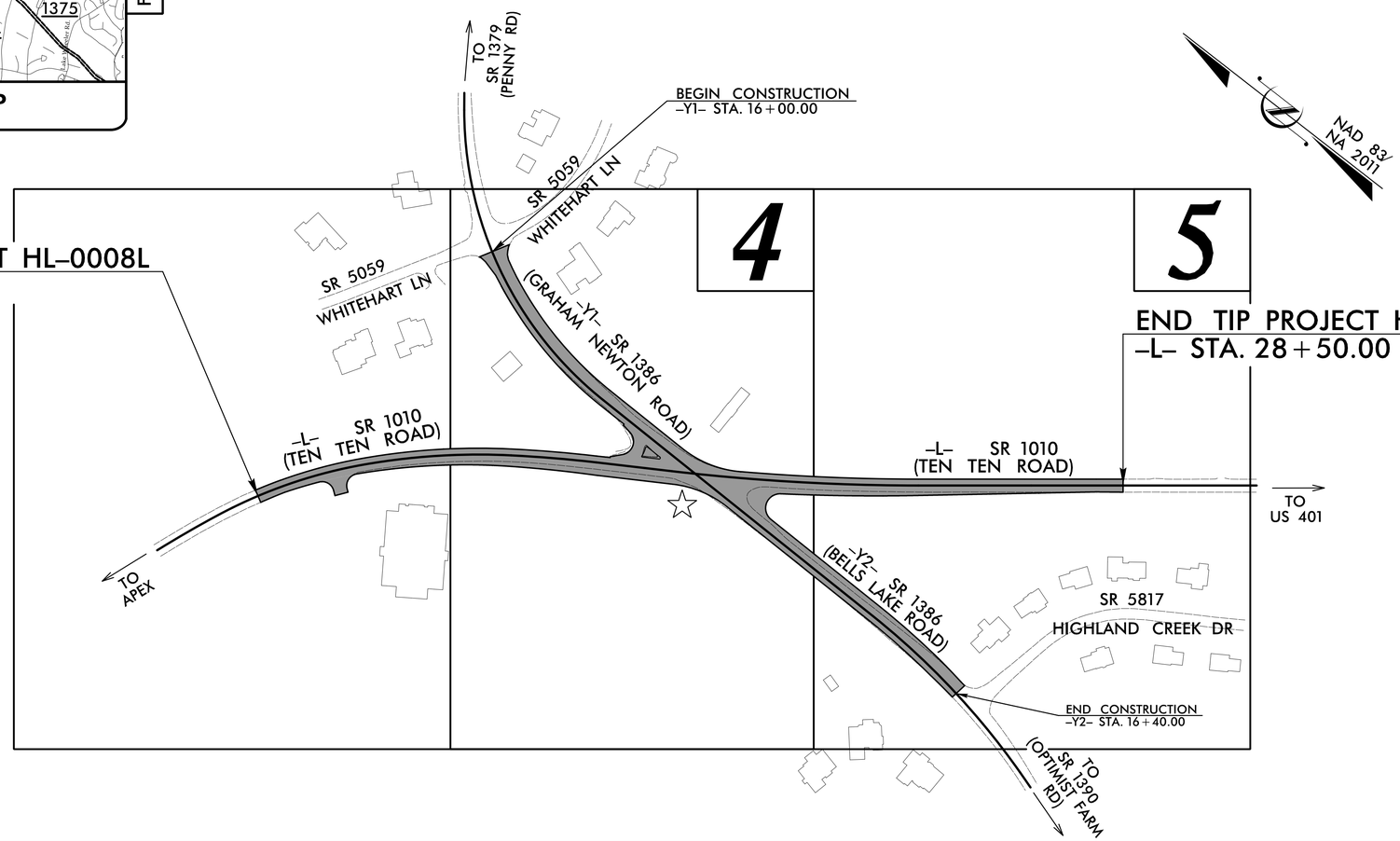
WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HL-0008L	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
49367.1.14		PE
49367.2.15		R/W
49367.2.16		UTIL
49367.3.14		CONST.

LOCATION: TEN TEN ROAD (SR 1010) AT GRAHAM NEWTON ROAD (SR 1386) / BELLS LAKE ROAD (SR 1386).
WIDEN FOR LEFT-TURN LANE ON EACH APPROACH

TYPE OF WORK: GRADING, DRAINAGE, PAVING, WIDENING, AND SIGNAL



☆ UPGRADE EXISTING SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT: DE00379

3/14/2025
C:\Projects\NCDOT\Div 5 HL-0008L\Roadway\Proj\hl0008l_rdy_tsh.dgn
User:mlowery

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2025 = 14100
ADT 2045 = 14600
K = 8%
D = 65%
T = 5% *
V = 50 MPH
* TTST=1% DUAL=4%

FUNC CLASS =
MINOR ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT HL-0008L	=	0.310 mile
TOTAL LENGTH TIP PROJECT HL-0008L	=	0.310 mile

Prepared For:
DIVISION OF HIGHWAYS
815 Stadium Drive, Durham, NC 27704

By:
TGS ENGINEERS
706 HILLSBOROUGH ST
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 4, 2023

LETTING DATE:
MAY 14, 2025

V. MARCUS LOWERY, PE
PROJECT ENGINEER

MATTHEW NOLFO, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024897 ENGINEER John W. Twisdale, Jr.

Signed by: John W. Twisdale, Jr.
06E4ED4C0E304CE...
SIGNATURE: P.E. 3/14/2025

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027418 ENGINEER V. MARCUS LOWERY

DocuSigned by: Marcus Lowery
SIGNATURE: P.E. 3/14/2025

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	1A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027418 ENGINEER MARCUS LOWERY
DocuSigned by: Marcus Lowery
DocuSign Envelope ID: 7D2CE12A-0192-4F64-9E55-BDAFD3470EA7
3/14/2024 | 3:39 PM EDT

INDEX OF SHEETS

GENERAL NOTES

GENERAL NOTES: 2024 SPECIFICATIONS

EFFECTIVE: 01–16–2024
REVISED:

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE–IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104–7.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY (POWER),

DOMINION ENERGY (GAS), AT&T (TELECOM), VERIZON (TELECOM), MCNC (TELECOM),

SPECTRUM (TELECOM), SEGRA (TELECOM), & AQUA (WATER)

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT–OF–WAY MARKERS:

ALL RIGHT–OF–WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

STANDARD DRAWINGS

EFF. 01–16–2024
REV.

2024 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Contracts Standards and Development Unit – N. C. Department of Transportation – Raleigh, N. C., Dated January 16, 2024 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 – EARTHWORK	
200.02	Method of Clearing – Method II
225.02	Guide for Grading Subgrade – Secondary and Local
225.04	Method of Obtaining Superelevation – Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
DIVISION 3 – PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 5 – SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
DIVISION 6 – ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 – INCIDENTALS	
806.01	Concrete Right–of–Way Marker
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin – 12" thru 54" Pipe
840.02	Concrete Catch Basin – 12" thru 54" Pipe
840.03	Frame, Grates and Hood – for Use on Standard Catch Basin
840.04	Concrete Open Throat Catch Basin – 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin – 12" thru 48" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' – 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' – 12" thru 36" Pipe
840.22	Frames and Wide Slot Sag Grates
840.25	Anchorage for Frames – Brick or Concrete or Precast
840.27	Brick Grated Drop Inlet Type 'B' – 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' – 12" thru 36" Pipe
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
846.01	Concrete Curb, Gutter and Curb & Gutter
848.04	Street Turnout
852.01	Concrete Islands
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.01	Rip Rap in Channels and Ditches
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

9/10/2021

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP) — EIP
- Computed Property Corner
- Existing Concrete Monument (ECM) — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil — S
- Potential Contamination Area: Soil — S
- Known Contamination Area: Water — W
- Potential Contamination Area: Water — W
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY & PROJECT CONTROL:

- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Secondary Horiz and Vert Control Point
- Vertical Benchmark
- Existing Right of Way Monument
- Proposed Right of Way Monument (Rebar and Cap)
- Proposed Right of Way Monument (Concrete)
- Existing Permanent Easement Monument
- Proposed Permanent Easement Monument (Rebar and Cap)
- Existing C/A Monument
- Proposed C/A Monument (Rebar and Cap)
- Proposed C/A Monument (Concrete)
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Existing Control of Access Line — CA
- Proposed Control of Access Line — CA
- Proposed ROW and CA Line — RW CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage/Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

** SUE – Subsurface Utility Engineering*
LOS – Level of Service – A,B,C or D (Accuracy)

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line Test Hole (SUE – LOS A)*
- U/G Power Line (SUE – LOS B)* — P
- U/G Power Line (SUE – LOS C)* — P
- U/G Power Line (SUE – LOS D)* — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole
- U/G Telephone Test Hole (SUE – LOS A)*
- U/G Telephone Cable (SUE – LOS B)* — T
- U/G Telephone Cable (SUE – LOS C)* — T
- U/G Telephone Cable (SUE – LOS D)* — T
- U/G Telephone Conduit (SUE – LOS B)* — TC
- U/G Telephone Conduit (SUE – LOS C)* — TC
- U/G Telephone Conduit (SUE – LOS D)* — TC
- U/G Fiber Optics Cable (SUE – LOS B)* — T FO
- U/G Fiber Optics Cable (SUE – LOS C)* — T FO
- U/G Fiber Optics Cable (SUE – LOS D)* — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line Test Hole (SUE – LOS A)*
- U/G Water Line (SUE – LOS B)* — W
- U/G Water Line (SUE – LOS C)* — W
- U/G Water Line (SUE – LOS D)* — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Test Hole (SUE – LOS A)*
- U/G TV Cable (SUE – LOS B)* — TV
- U/G TV Cable (SUE – LOS C)* — TV
- U/G TV Cable (SUE – LOS D)* — TV
- U/G Fiber Optic Cable (SUE – LOS B)* — TV FO
- U/G Fiber Optic Cable (SUE – LOS C)* — TV FO
- U/G Fiber Optic Cable (SUE – LOS D)* — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line Test Hole (SUE – LOS A)*
- U/G Gas Line (SUE – LOS B)* — G
- U/G Gas Line (SUE – LOS C)* — G
- U/G Gas Line (SUE – LOS D)* — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Force Main Line Test Hole (SUE – LOS A)*
- SS Force Main Line (SUE – LOS B)* — FSS
- SS Force Main Line (SUE – LOS C)* — FSS
- SS Force Main Line (SUE – LOS D)* — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line (SUE – LOS B)* — 2UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	2A-1

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027418 ENGINEER MARCUS LOWERY
3/14/2024 | 3:44 PM EDT

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046017 ENGINEER STEPHEN R DAVIDSON
3/15/2024 | 9:02 AM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

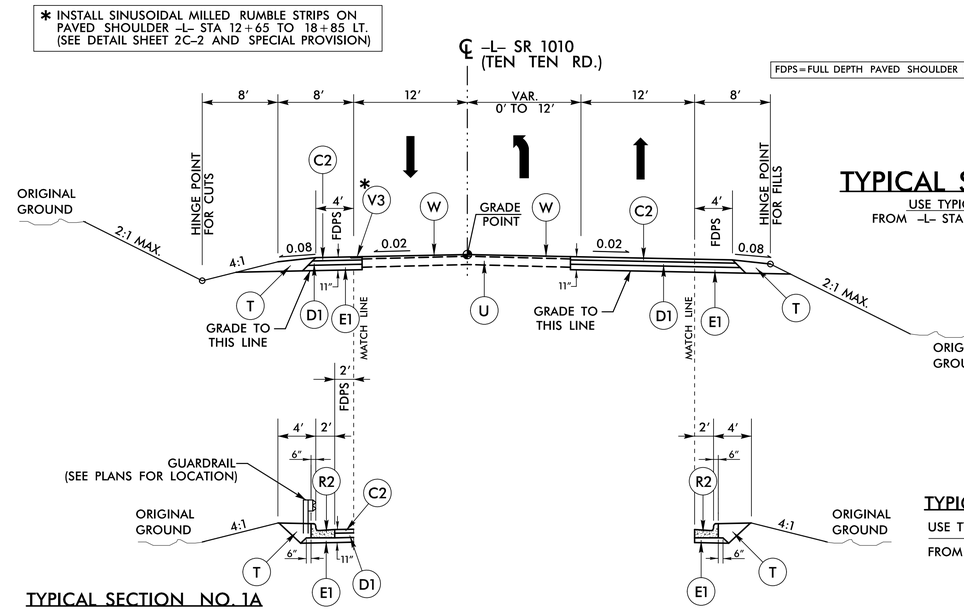
TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

PAVEMENT SCHEDULE

FINAL PAVEMENT DESIGN: AUGUST 25, 2022

C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
L	CLASS IV SUBGRADE STABILIZATION
N	GEOTEXTILE FOR SOIL STABILIZATION
R1	CONCRETE EXPRESSWAY GUTTER
R2	2'-6" CONCRETE CURB & GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V1	MILLING BITUMINOUS PAVEMENT (0" TO 1.5" DEPTH - SEE DETAIL THIS SHEET)
V2	MILLING BITUMINOUS PAVEMENT (1.5" DEPTH)
V3	SINUSOIDAL MILLED RUMBLE STRIPS (SEE DETAIL SHEET 2C-2 AND SPECIAL PROVISION)
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET No. 2A-1)

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



TYPICAL SECTION NO. 1

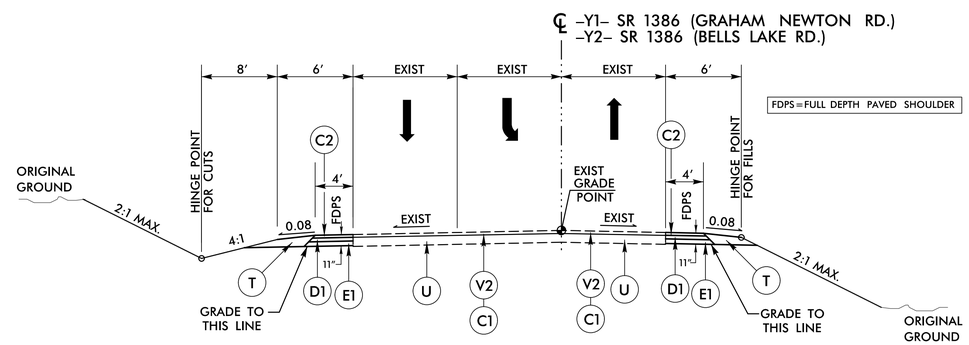
USE TYPICAL SECTION NO. 1:
FROM -L- STA. 12+15.00 TO 28+50.00

TYPICAL SECTION NO. 1A

USE TYPICAL SECTION NO. 1A:
FROM -L- STA. 21+30.81 TO 21+59.51 LT

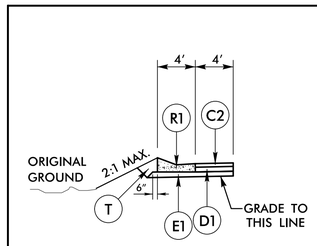
TYPICAL SECTION NO. 1B

USE TYPICAL SECTION NO. 1B:
FROM -L- STA. 12+51.81 TO 20+07.54 RT



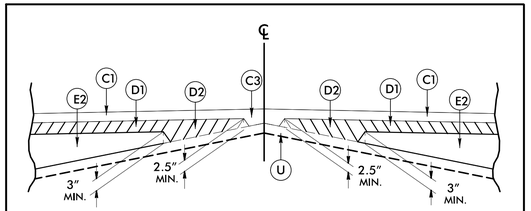
TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2:
FROM -Y1- STA. 16+00.00 TO 16+65.00
FROM -Y2- STA. 16+30.00 TO 16+40.00



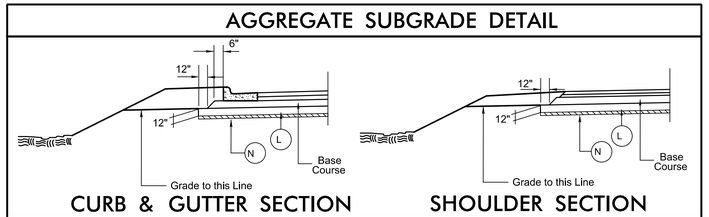
DETAIL FOR EXPRESSWAY GUTTER

USE DETAIL:
FROM -L- STA. 18+83.92 TO
-Y1- STA. 20+09.36



DETAIL SHOWING METHOD OF WEDGING - W FOR -L-, -Y1-, & -Y2-

AGGREGATE SUBGRADE DETAIL

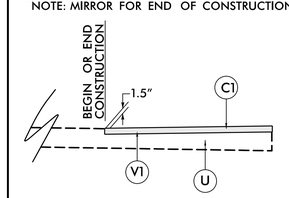


CURB & GUTTER SECTION — SHOULDER SECTION

SEE SHEET 3G-1 "SUMMARY OF AGGREGATE SUBGRADE" TABLE FOR PERTINENT ALIGNMENTS AND STATIONS

INCIDENTAL MILLING DETAIL

NOTE: MIRROR FOR END OF CONSTRUCTION



USE DETAIL AS FOLLOWS:

MILLING AND OVERLAY FOR TIE-INS:
-L- STA. 12+15.00 TO -L- STA. 12+75.00
-L- STA. 27+60.00 TO -L- STA. 28+50.00
-Y1- STA. 16+65.00 TO -Y1- STA. 17+65.00
-Y2- STA. 15+20.00 TO -Y2- STA 16+30.00

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	2A-2

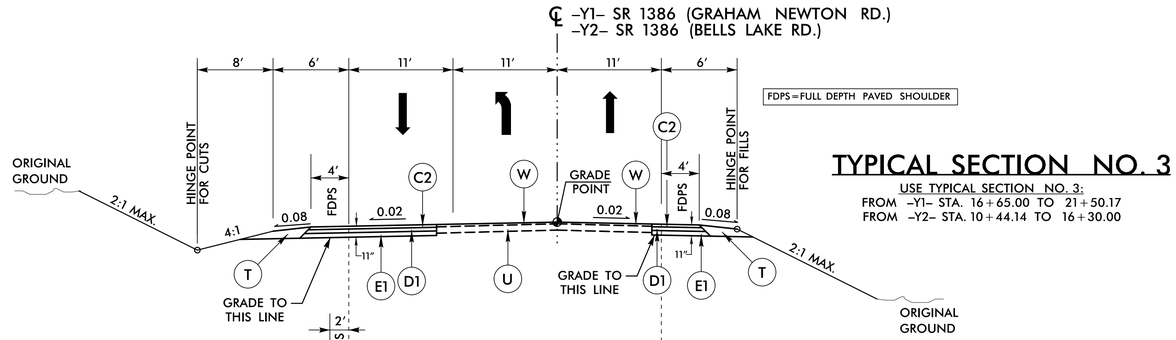
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027418 ENGINEER MARCUS LOWERY
3/14/2024 | 3:44 PM EDT

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046017 ENGINEER STEPHEN R DAVIDSON
3/15/2024 | 9:02 AM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

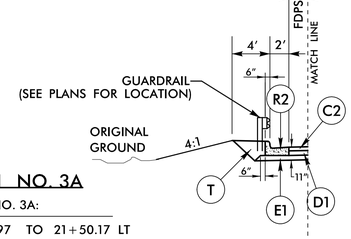
TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

C1	1½" S9.5C
C2	3" S9.5C
C3	VAR. S9.5C
D1	4" I19.5C
D2	VAR. I19.0C
E1	4" B25.0C
E2	VAR. B25.0C
R1	EXPWY. GUTTER
R2	2'-6" C&G
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V1	0"- 1.5" MILLING
V2	1½" MILLING
V3	RUMBLE STRIPS
W	WEDGING



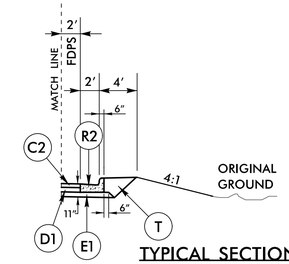
TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3:
FROM -Y1- STA. 16+65.00 TO 21+50.17
FROM -Y2- STA. 10+44.14 TO 16+30.00



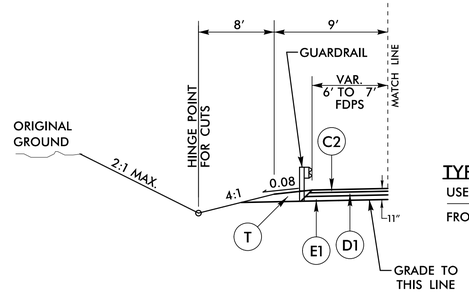
TYPICAL SECTION NO. 3A

USE TYPICAL SECTION NO. 3A:
FROM -Y1- STA. 18+89.97 TO 21+50.17 LT



TYPICAL SECTION NO. 3C

USE TYPICAL SECTION NO. 3C:
FROM -Y2- STA. 10+44.14 TO 12+09.44 RT



TYPICAL SECTION NO. 3B

USE TYPICAL SECTION 3B:
FROM -Y2- STA. 11+64.31 TO 14+01.81 LT

3/13/2024
R:\Roadways\Projects\NCDOT\Div 5 HL-0008L\Roadway\Proj\hl0008l_rdy_typ.dgn
(Lowery)

8/17/99

INTERSECTION DETAILS

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	2B-1
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027418 ENGINEER MARCUS LOWERY

3/14/2024 | 3:39 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

SCALE 0 50 100

NAD 83 NA 2011

-L-

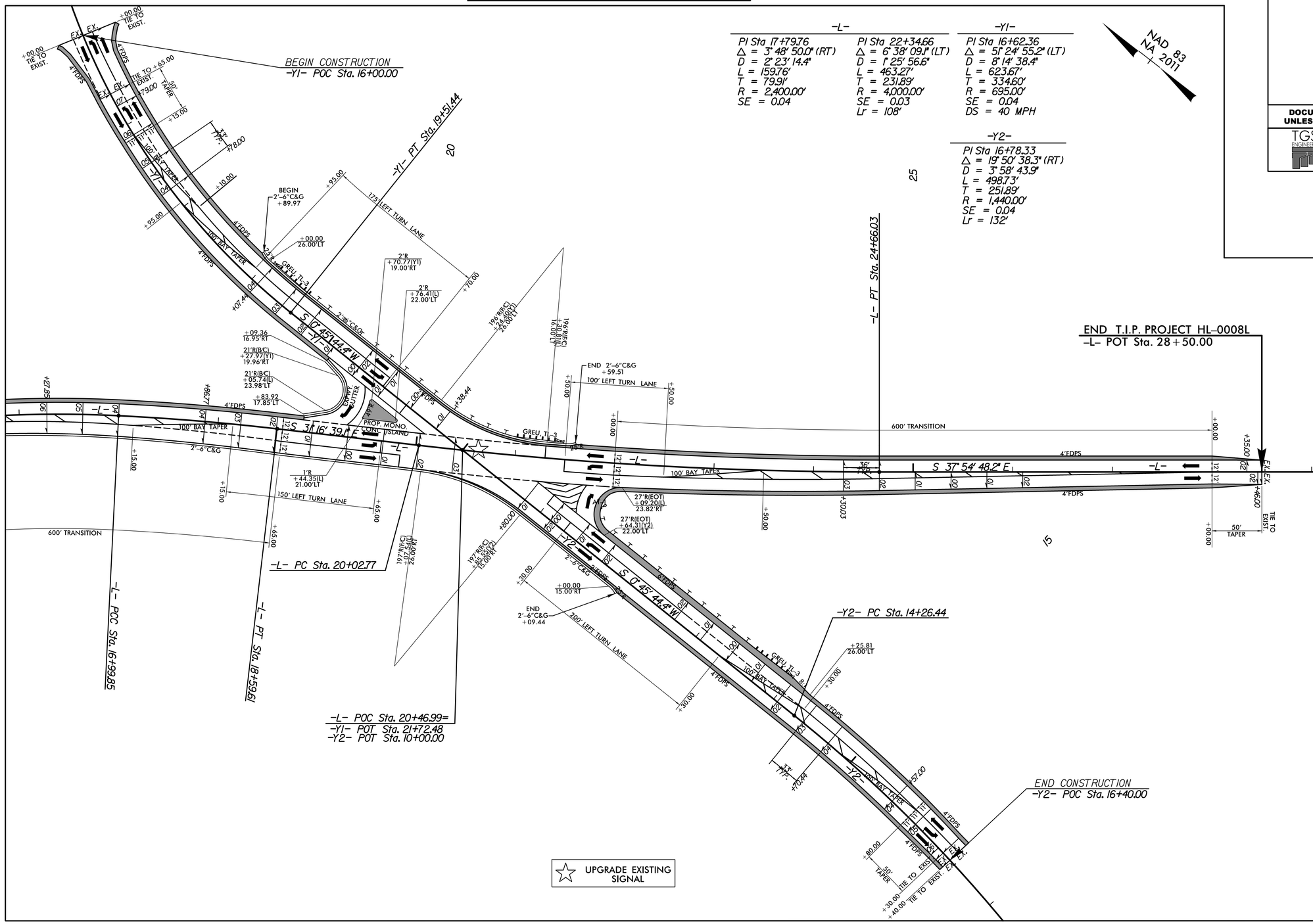
PI Sta 17+79.76	PI Sta 22+34.66
Δ = 3° 48' 50.0" (RT)	Δ = 6° 38' 09.1" (LT)
D = 2° 23' 14.4"	D = 1° 25' 56.6"
L = 159.76'	L = 463.27'
T = 79.91'	T = 231.89'
R = 2,400.00'	R = 4,000.00'
SE = 0.04	SE = 0.03
	Lr = 108'

-Y1-

PI Sta 16+62.36
Δ = 51° 24' 55.2" (LT)
D = 8° 14' 38.4"
L = 623.67'
T = 334.60'
R = 695.00'
SE = 0.04
DS = 40 MPH

-Y2-

PI Sta 16+78.33
Δ = 19° 50' 38.3" (RT)
D = 3° 58' 43.9"
L = 498.73'
T = 251.89'
R = 1,440.00'
SE = 0.04
Lr = 132'



SR 1010 (TEN-TEN RD) (-L-) /
SR 1386 (GRAHAM NEWTON RD) (-Y1-) /
SR 1386 (BELLS LAKE RD) (-Y2-)
INTERSECTION DETAIL

SEE SHEETS 04 & 05 FOR PLAN VIEW

CHANNELIZATION RADII ARE 3' UNLESS OTHERWISE NOTED
RADII DIMENSIONS ARE TO FACE OF CURB (F/C) UNLESS OTHERWISE NOTED

REVISIONS

10/9/2023
D:\Projects\NCDOT\Div 5 HL-0008L\Roadway\Proj\hl0008l_rdy_psh_2b-1.dgn
User:mjlowery

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	2C-1

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

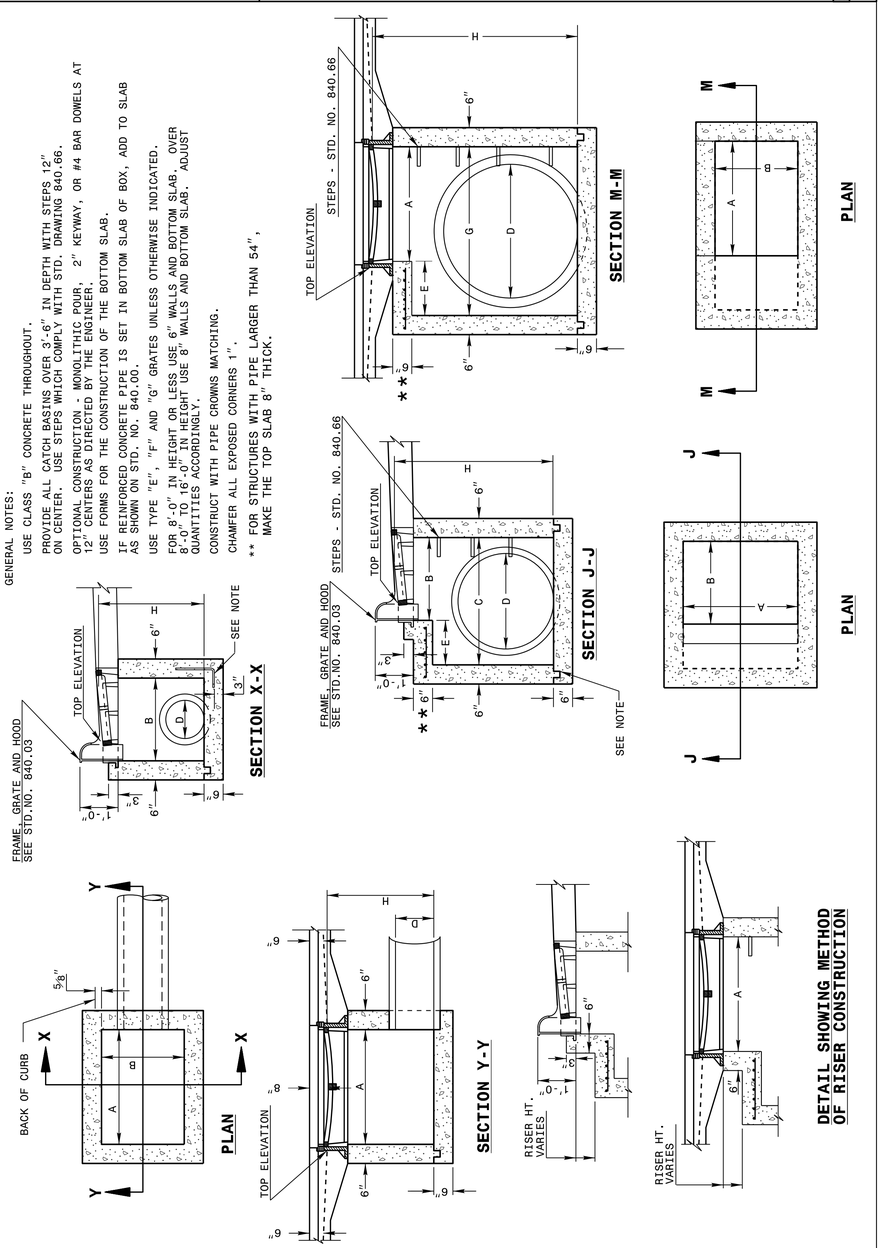
USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.

FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

CONSTRUCT WITH PIPE CROWNS MATCHING.

CHAMFER ALL EXPOSED CORNERS 1".

** FOR STRUCTURES WITH PIPE LARGER THAN 54", MAKE THE TOP SLAB 8" THICK.



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH CONCRETE CATCH BASIN
12" THRU 84" PIPE

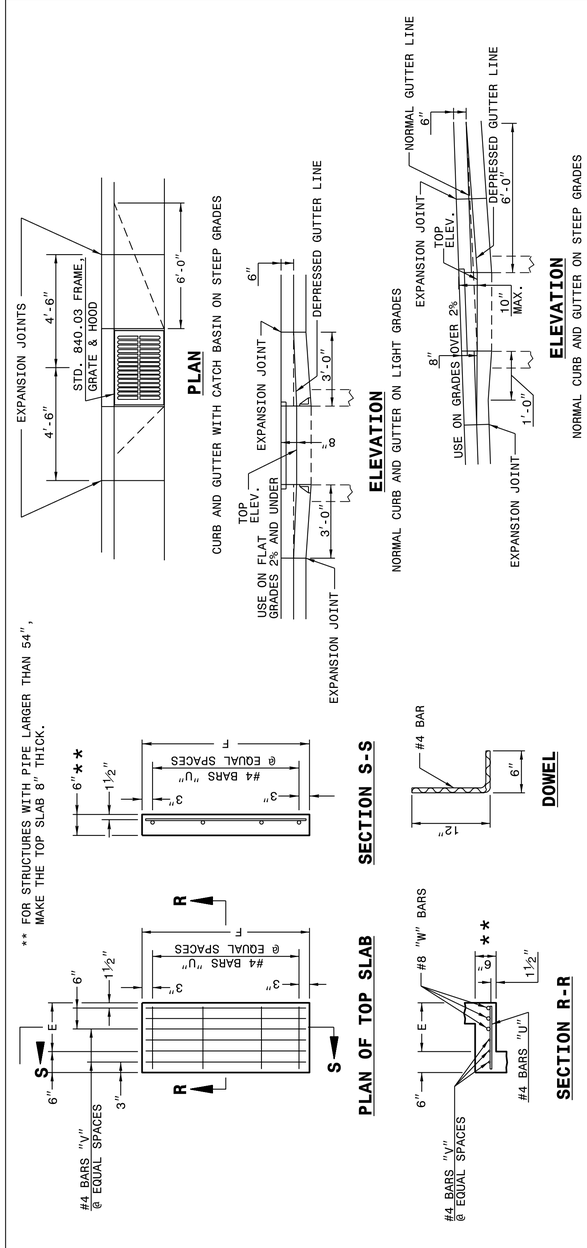
SHEET 1 OF 2 **840D02**

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH CONCRETE CATCH BASIN
12" THRU 84" PIPE

SHEET 1 OF 2 **840D02**

** FOR STRUCTURES WITH PIPE LARGER THAN 54", MAKE THE TOP SLAB 8" THICK.



* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT

MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN(BASED ON MIN. HEIGHT, H, WITH NO RISER) *

PIPE	DIMENSIONS OF BOX AND PIPE						COVER DIMENSION		BARS-U		BARS-V		BARS-W		TOTAL LBS.	CU.YDS. CONC. IN BOX		DEDUCTIONS ONE PIPE	
																TOP SLAB	BOTTOM SLAB	TOT. CONC. PER LIN.FT. HEIGHT	C.M.	R.C.
D	A	B	C	G	H	MIN. HEIGHT	E	F	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH					
12"	3'-0"	2'-2"	--	--	2'-0"	--	--	--	--	--	--	--	--	--	--	0.235	0.772	0.015	0.026
15"	3'-0"	2'-2"			2'-3"											0.235	0.829	0.023	0.036
18"	3'-0"	2'-2"			2'-6"											0.235	0.887	0.033	0.049
24"	3'-0"	2'-2"			3'-1"											0.235	1.001	0.059	0.085
30"	3'-0"	2'-2"	3'-4"	3'-4"	3'-10"	39	1'-2"	4'-4"	4	1'-5"	2	4'-1"	3	4'-1"	39	0.123	0.347	1.433	0.092	0.127
36"	3'-0"	2'-2"	3'-10"	3'-10"	4'-6"	43	1'-8"	4'-10"	4	1'-11"	3	4'-7"	3	4'-7"	43	0.161	0.432	1.714	0.132	0.178
42"	3'-0"	2'-2"	4'-5"	4'-5"	4'-11"	47	2'-2"	5'-5"	5	2'-5"	4	5'-2"	3	5'-2"	47	0.200	0.543	1.738	0.160	0.243
48"	3'-0"	2'-2"	5'-0"	5'-0"	5'-6"	51	2'-10"	6'-0"	5	3'-1"	4	5'-9"	3	5'-9"	51	0.235	0.667	2.052	0.235	0.317
54"	3'-0"	2'-2"	5'-7"	5'-7"	6'-0"	56	3'-5"	6'-7"	6	3'-8"	5	6'-4"	3	6'-4"	56	0.289	0.802	2.387	0.297	0.401
60"	3'-0"	2'-2"	6'-3"	6'-3"	6'-6"	61	4'-1"	7'-3"	6	4'-4"	5	7'-0"	3	7'-0"	61	0.340	0.973	2.722	0.363	0.546
66"	3'-0"	2'-2"	6'-11"	6'-11"	7'-0"	66	4'-9"	7'-11"	7	5'-0"	6	7'-8"	3	7'-8"	66	0.391	1.160	3.057	0.440	0.655
72"	3'-0"	2'-2"	7'-6"	7'-6"	7'-6"	72	5'-3"	8'-6"	7	5'-6"	6	8'-3"	3	8'-3"	72	0.442	1.340	3.392	0.524	0.774
78"	3'-0"	2'-2"	8'-1"	8'-1"	8'-0"	78	5'-11"	9'-1"	8	6'-2"	7	8'-10"	3	8'-10"	78	0.493	1.530	3.727	0.615	0.893
84"	3'-0"	2'-2"	8'-9"	8'-9"	8'-6"	84	6'-7"	9'-9"	8	6'-10"	7	9'-6"	3	9'-6"	84	0.544	1.760	4.062	0.713	1.010

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

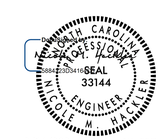
ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH CONCRETE CATCH BASIN
12" THRU 84" PIPE

SHEET 2 OF 2 **840D02**

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH CONCRETE CATCH BASIN
12" THRU 84" PIPE

SHEET 2 OF 2 **840D02**



3/14/2024 | 1:14 PM PDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE PLATE FOR TITLE

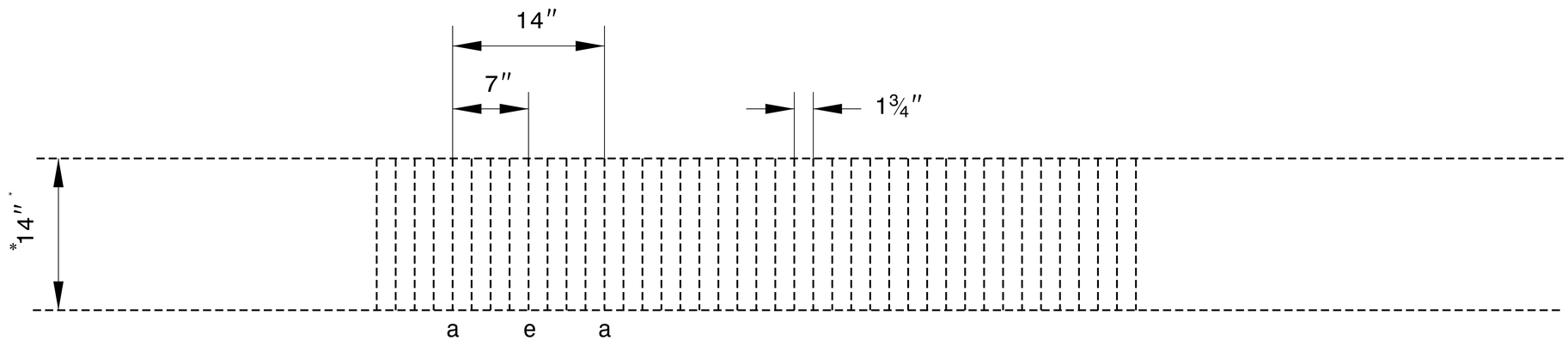
ORIGINAL BY: 2002 Std.840.01 DATE:
MODIFIED BY: E.E. WARD DATE: 3-1-02
CHECKED BY: DATE:
FILE SPEC.: s:Special Details/jhowerton/840d02.dgn

10-AUG-2017 10:11
S:\Contracts\Contracts\Special Details\jhowerton\840d02 Min Depth CB.dgn
jhowerton AT CSD-292595

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	2C-2

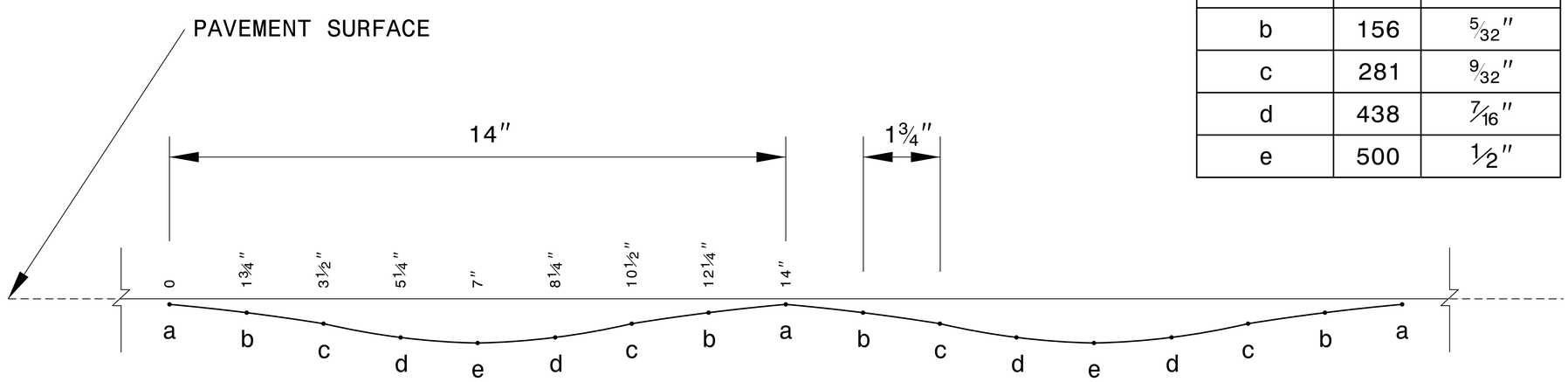
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

*THE WIDTH OF THE MILLED RUMBLE STRIP MAY BE ADJUSTED TO BE PLACED UNDER THE EDGELINE MARKINGS.



PLAN

	DEPTH	
LOCATION	MIL	INCHES
a	62.5	1/16″
b	156	5/32″
c	281	9/32″
d	438	7/16″
e	500	1/2″



PROFILE

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SINUSOIDAL MILLED RUMBLE STRIPS

ORIGINAL BY: K.A.KEMPF DATE: 08/02/17
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: sinusodial rumble strips.dgn

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICOLE M. HACKLER

3/14/2024 | 1:14 PM PDT

08-APR-2019 16:53
S:\Contracts\Contracts\Special Details\kkempf\english\sinusodial rumble stripsdgn
kkempf AT CSD-292596

SUMMARY OF EARTHWORK
IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	*EMBT+%	*BORROW	WASTE
-L- 12+15.00 TO 28+50.00	954		1678	724	
-Y1- 16+00.00 TO 21+50.17	108		342	234	
-Y2- 10+44.14 TO 16+40.00	307		292		15
SUBTOTAL	1369		2311	958	15
MATERIAL FOR SHOULDER CONSTRUCTION					
LOSS DUE TO CLEARING & GRUBBING					
ADDITIONAL UNDERCUT					
WASTE IN LIEU OF BORROW				-15	-15
PROJECT TOTAL	1369		2311	942	
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT				47	
GRAND TOTAL	1369		2311	989	
SAY	1510			1090	

DDE = 25 CY
PER GEOTECHNICAL RECOMMENDATIONS:
ESTIMATED UNDERCUT = 200 CY (CONTINGENCY, AS DIRECTED BY THE ENGINEER)
SELECT GRANULAR MATERIAL = 200 CY (CONTINGENCY, AS DIRECTED BY THE ENGINEER)
GEOTEXTILE FOR SOIL STABILIZATION = 200 SY (CONTINGENCY, AS DIRECTED BY THE ENGINEER)
(SEE GEOTECHNICAL SUMMARIES ON SHEET 3G-1 FOR FURTHER INFORMATION)

Earthwork quantities are calculated by the Engineer.
These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

Approximate quantities only. Clearing and Grubbing, Unclassified Excavation, Borrow Excavation, Fine Grading, and Removal of Existing Asphalt Pavement will be paid for at the contract lump sum price for "Grading".

PAVEMENT REMOVAL SUMMARY
IN SQUARE YARDS

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SY
-L-	16+50	20+21	RT	64.6
-L-	16+67	20+01	LT	121.3
-L-	20+76	25+13	LT	45.7
-L-	21+47	25+13	RT	66.8
-Y1-	18+86	21+03	RT	213.2
-Y1-	19+15	21+72	LT	30.0
-Y2-	10+00	12+86	RT	45.8
-Y2-	10+99	16+30	LT	43.0
			TOTAL:	630.4
			SAY:	640

"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 SHOUL. 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	TYPE GREU, TL-3	CAT-1	AT-1	TYPE III	B-77					EA	G	NG				
-L-/-Y1-	21+47.69	19+05.26	LT/LT	350.00'			20+06.44 (-Y1-)		4'-0"	8'	50'	50'	1'	1'	2															
-Y2-	14+01.81	11+45.55	LT	243.75'	25.00'		11+00.22 (-DRW1-)		6'-0"	9'	50'	6.25	1'	4'	1		1													R = 21.00'
		SUBTOTAL (LF)		593.75'	25'							TOTAL ANCHORS OR ATTENUATORS (EA)			3		1													
		LESS ANCHORS (LF)		156.25'																										
		TOTAL GUARDRAIL (LF)		437.50'	25'							ANCHOR UNIT LENGTH (LF)			50'	6.25'	6.25'	18.75'	18.75'											
		SAY GUARDRAIL (LF)		437.50'	25'		ADDITIONAL GUARDRAIL POSTS: SAY 10 EA					DEDUCTION PER TYPE (LF)			150'		6.25'													
												TOTAL DEDUCTION (LF)			156.25'															

TGSLTW1019

COMPUTED BY:	REL	DATE:	12/12/2022
CHECKED BY:	JWT	DATE:	12/12/2022

PROJECT NO.	SHEET NO.
HL-0008L	3D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION SIZE THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE) 12	15	18	24	30	36	42	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	DO NOT USE PP PIPE	C. S. PIPE 12 .064	15 .064	18 .064	24 .064		R. C. PIPE CLASS III 12	15	18	24	30	36	42	R. C. PIPE CLASS IV 12	15	18	24	30	36	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE		ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24		FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 17+48	24 RT	0400		428.8																																										1			1			1																					
		0400	0401		425.5	424.7																													116																																						
L 16+31	21 RT	0401		428.0																																										1	2.8		1	1																								
		0401	0409		420.2	416.2	0.3																														40																																				
L 16+25	21 RT	0402		427.9																																										1			1	1																								
		0402	0401		424.9	424.8	0.3																											4																																							
L 12+09	20 RT	0403		429.4																																										1																			1				1							2GI Type D
		0403	0404		427.5	427.2			52																																																															
L 12+63	14 RT	0404		431.0																																										1			1		1																							
		0404	0405		427.2	426.9																												68																																							
L 13+33	15 RT	0405		430.2																																										1			1		1																							
		0405	0406		426.9	426.2																												108																																							
L 14+44	18 RT	0406		429.2																																										1			1		1																							
		0406	0407		426.2	425.3																												92																																							
L 15+39	19 RT	0407		428.3																																										1			1		1																							
		0407	0402		425.3	424.9																												84																																							
L 16+35	31 LT	0408		427.5																																										1																		1					1							
		0408	0401		423.5	423.3																															52																																				
L 16+43	60 RT	0409		420.3																																										1										1																		4-OTCB
L 16+27	31 LT	0410		427.6																																										1																		1					1							
		0410	0408		424.6	424.6			8																																																															
L 22+09	45 RT	0500		432.5																																										1																			1				1							2GI Type D
		0500	0501		430.6	429.4			40																																																														
Y2 12+00	39 LT	0501		431.3																																										1																			1				1							2GI Type D
		0501	0502		429.1	428.9																													52																																						
Y2 12+00	15 RT	0502		433.5																																										1			1			1																						
		0502	0504		428.9	428.4																													88																																						
Y2 12+15	25 RT	0503		433.0																																																																							
		0503	0502		431.6	430.3				20																																																														
Y2 11+13	15 RT	0504		433.3																																										1			1	1																								
		0504	0505		428.4	428.0																													80																																						
L 20+61	35 RT	0505		432.9																																										1			1			1																						
		0505	0506		428.0	427.8																													52																																						
L 20+08	26 RT	0506		432.5																																										1			1			1																						
		0506	0507		427.8	427.1																													148																																						
L 18+59	26 RT	0507		430.4																																										1			1			1																						
		0507	0400		427.1	425.5																													108																																						
Y1 18+75	36 LT	0508		435.0																																																																							
		0508	0509		433.1	431.3				28																																																														
Y1 19+03	26 LT	0509		433.8																																										1			1			1																					Min Depth CB (840D02)
		0509	0510		431.3	429.0																													108																																						
Y1 20+13	26 LT	0510		431.5																																										1			1			1																						
		0510	0517		428.5	428.3				20																																																														
Y1 20+50	26 LT	0511		431.2																																										1			1	1																								Min Depth CB (840D02)
		0511	0510		428.9	428.5																												36																																							
Y1 21+38	27 LT	0512		432.0																																										1			1		1																							Min Depth CB (840D02)
		0512	0511		429.8	428.9																												88																																							
L 20+80	22 LT	0513		432.4																																										1			1		1																							Min Depth CB (840D02)
		0513	0512		430.1	429.8																												52																																							
L 21+21	16 LT	0514		432.5																																										1			1		1																							Min Depth CB (840D02)
SHEET TOTALS									100	68																								532	752		92									24	2.8		18	4	7	7				1					2	3				5							
PROJECT TOTALS									124	68																								600	752		92									25	2.8		19	4	8	7				1					2	3				5			5		0.090	144	

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

TGSLTW1019

COMPUTED BY:	REL	**DATE:**	12/12/2022
CHECKED BY:	JWT	**DATE:**	12/12/2022

PROJECT NO.	SHEET NO.
HL-0008L	3D-2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION SIZE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE) 12	15	18	24	30	36	42	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	DO NOT USE PP PIPE	C. S. PIPE 12	15	18	24	
THICKNESS OR GAUGE																					.064	.064	.064	.064	
		0514	0513		430.3	430.1																			
L 21+50	16 LT	0515		432.9																					
		0515	0514		430.6	430.3																			
L 21+72	27 LT	0516		432.7																					
		0516	0515		431.4	430.6			24																
L 13+65	25 LT																								
L 16+34	0 CL																								
L 16+47	52 RT																								
SHEET TOTALS									24																
PROJECT TOTALS									124	68															

LINE & STATION	OFFSET	FROM	TO	R. C. PIPE CLASS III 12	15	18	24	30	36	42	R. C. PIPE CLASS IV 12	15	18	24	30	36	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE		ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G	
		0514	0513									40																			
L 21+50	16 LT	0515																						1			1		1		
		0515	0514									28																			
L 21+72	27 LT	0516																													
		0516	0515																												
L 13+65	25 LT																														
L 16+34	0 CL																														
L 16+47	52 RT																														
SHEET TOTALS												68												1			1		1		
PROJECT TOTALS												600	752		92									25	2.8		19	4	8	7	

LINE & STATION	OFFSET	FROM	TO	CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	CONCRETE TRANSITIONAL SECTION C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24		FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
		0514	0513																				
L 21+50	16 LT	0515																					Min Depth CB (840D02)
		0515	0514																				
L 21+72	27 LT	0516																					
		0516	0515																				
																			5				
																					0.090		
L 13+65	25 LT																					72	18" RCP Pipe removal
L 16+34	0 CL																					57	18" RCP Pipe removal
L 16+47	52 RT																					15	30" RCP Pipe removal
SHEET TOTALS																			5		0.090	144	
PROJECT TOTALS						1					2	3				5			5		0.090	144	

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

COMPUTED BY: Alex Jones. LG DATE: 3/7/2023
CHECKED BY: Jinyoung Park,PE DATE: 3/7/2023

(2-3-23)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
49367.1.14 (HL-0008L)	3G-1

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY					500
				TOTAL LF:	500

*UD = Underdrain
*BD = Blind Drain
*SD = Subsurface Drain

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Subgrade Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU (1)	12"	200	400	600		
			TOTAL CY/TONS/SY:		200	400**	600**	0	0

*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)
*AST = Aggregate Stabilization
**Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Subgrade Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	04
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027418 ENGINEER
Marcus Lowery
3/14/2024 | 3:39 PM EDT

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 024897 ENGINEER
John W. Twisdale
3/14/2024 | 3:53 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

-L-

PI Sta 10+66.33
△ = 3° 33' 06.5" (RT)
D = 2° 40' 42.3"
L = 132.61'
T = 66.33'
R = 2,139.17'

PI Sta 12+77.50
△ = 18° 05' 37.0" (RT)
D = 6° 17' 46.5"
L = 287.37'
T = 144.89'
R = 910.00'
SE = 0.06

PI Sta 15+60.51
△ = 12° 55' 55.0" (RT)
D = 4° 37' 14.3"
L = 279.87'
T = 140.53'
R = 1,240.00'
SE = 0.06

PI Sta 17+79.76
△ = 3° 48' 50.0" (RT)
D = 2° 23' 14.4"
L = 159.76'
T = 79.91'
R = 2,400.00'
SE = 0.04

NAD 83 NA 2011

BEGIN T.I.P. PROJECT HL-0008L
-L- POC Sta. 12+15.00

MATCHLINE SEE SHEET 05

MATCHLINE SEE SHEET 05

MATCHLINE -L- STA.17+50.00 SEE SHEET 05

DUNN, JEFFREY B. AND WIFE, DUNN, JULIE A. DB 12529 PG 1274 BM 2000 PG 1502

COCHRAN, JAMES AND WIFE, COCHRAN, THERESA DB 8492 PG 2735 BM 1999 PG 1829

PATAKY, BRIAN JOSEPH DB 16358 PG 628 BM 2000 PG 1502

1 MCKAY, TRENT W.& MCKAY, DEBORAH B. DB 14689 PG 1430 BM 1999 PG 437

VILLAGE OF WYNCHESTER ASSOCIATION, INC. DB 9932 PG 1785 BM 2000 PG 1502

3 JENNIFER SIMMONS REVOCABLE TRUST DB 11687 PG 658 BM 2000 PG 1502

4 THOMPSON, CARL AND THOMPSON, JENNIFER D. DB 15831 PG 783 BM 2000 PG 1502

5 PEREZ, PATRICK C. & PEREZ, EDI G. DB 10910 PG 2031 BM 2000 PG 1502

6 VILLAGE OF WYNCHESTER ASSOCIATION, INC. DB 9932 PG 1785 BM 2000 PG 1502

2 FAIRVIEW BAPTIST CHURCH OF APEX DB 11175 PG 952 BM 1998 PG 1538 BM 2000 PG 456

-L- PCC Sta. 10+00.00

-L- PCC Sta. 11+32.61

-L- PCC Sta. 14+19.98

-L- PCC Sta. 16+99.85

DETAIL 4A
CUT DITCH
(Not to Scale)
Natural Ground, 2:1, D, 4:1 or Flatter, Front Ditch Slope
Min. D=1.5 Ft.
FROM STA.12+15 TO STA.17+50-L- Lt.

DETAIL 4B
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow, 10:1, 20:1, 2.0', 0.5' Min. 1.0' Max, GI etc.
S=Ditch Slope
℄ Proposed Ditch
STA. 12+22-L- RT.

SEE SHEET 06 FOR -L- PROFILE

REVISIONS

8/17/99

3/13/2024
R:\Roadways\Projects\NCDOT\Div 5 HL-0008L\Roadway\Proj\hl0008l_rdy_psh_04.dgn
(Marcus Lowery)

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	05
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027418 ENGINEER MARCUS LOWERY
3/14/2025

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 024897 ENGINEER John W. Twisdale Jr.
3/14/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

-Y1- SR 1386 GRAHAM NEWTON RD — 2025 ADT 7,500 / 12,000
-L- SR 1010 — 14,100 / 14,600 — 1,700 / 4,200 — 1,500 / 1,000 — 2,700 / 5,200 — 800 / 2,800 — 12,000 / 9,000 — 7,800 / 14,800
-Y2- SR 1386 BELLS LAKE RD

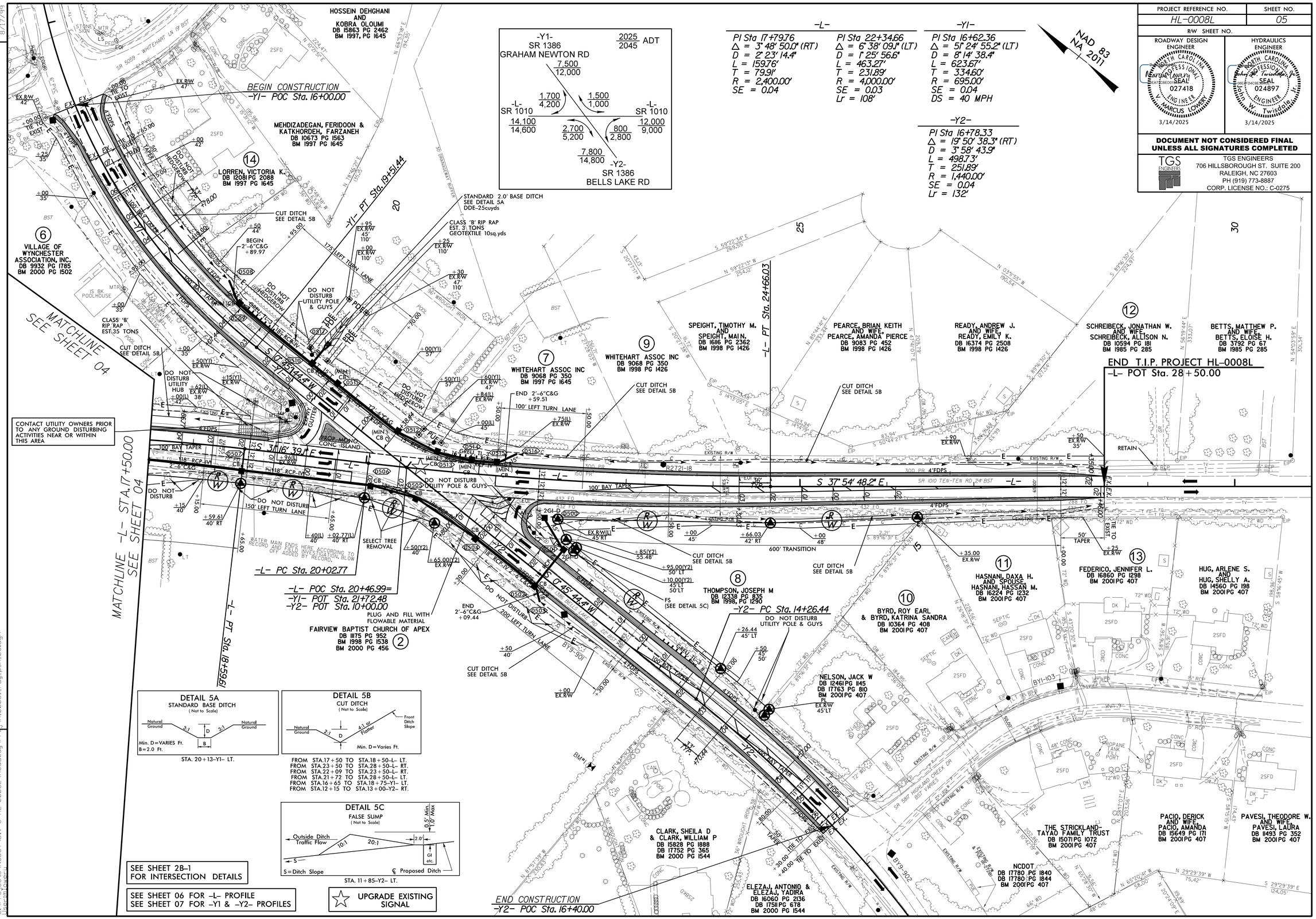
-L-
PI Sta 17+79.76
Δ = 3° 48' 50.0" (RT)
D = 2° 23' 14.4"
L = 159.76'
T = 79.91'
R = 2,400.00'
SE = 0.04

PI Sta 22+34.66
Δ = 6° 38' 09.1" (LT)
D = 1° 25' 56.6"
L = 463.27'
T = 231.89'
R = 4,000.00'
SE = 0.03
Lr = 108'

-Y1-
PI Sta 16+62.36
Δ = 51° 24' 55.2" (LT)
D = 8° 14' 38.4"
L = 623.67'
T = 334.60'
R = 695.00'
SE = 0.04
DS = 40 MPH

-Y2-
PI Sta 16+78.33
Δ = 19° 50' 38.3" (RT)
D = 3° 58' 43.9"
L = 498.73'
T = 251.89'
R = 1,440.00'
SE = 0.04
Lr = 132'

NAD 83 NA 2011



REVISIONS

3/14/2025
R:\Hydraulics\Projects\NCDOT\Div 5 HL-0008L\Roadway\Proj\hl0008l_rdy_psh_05.dgn
(User: mlowery)

5/28/99

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

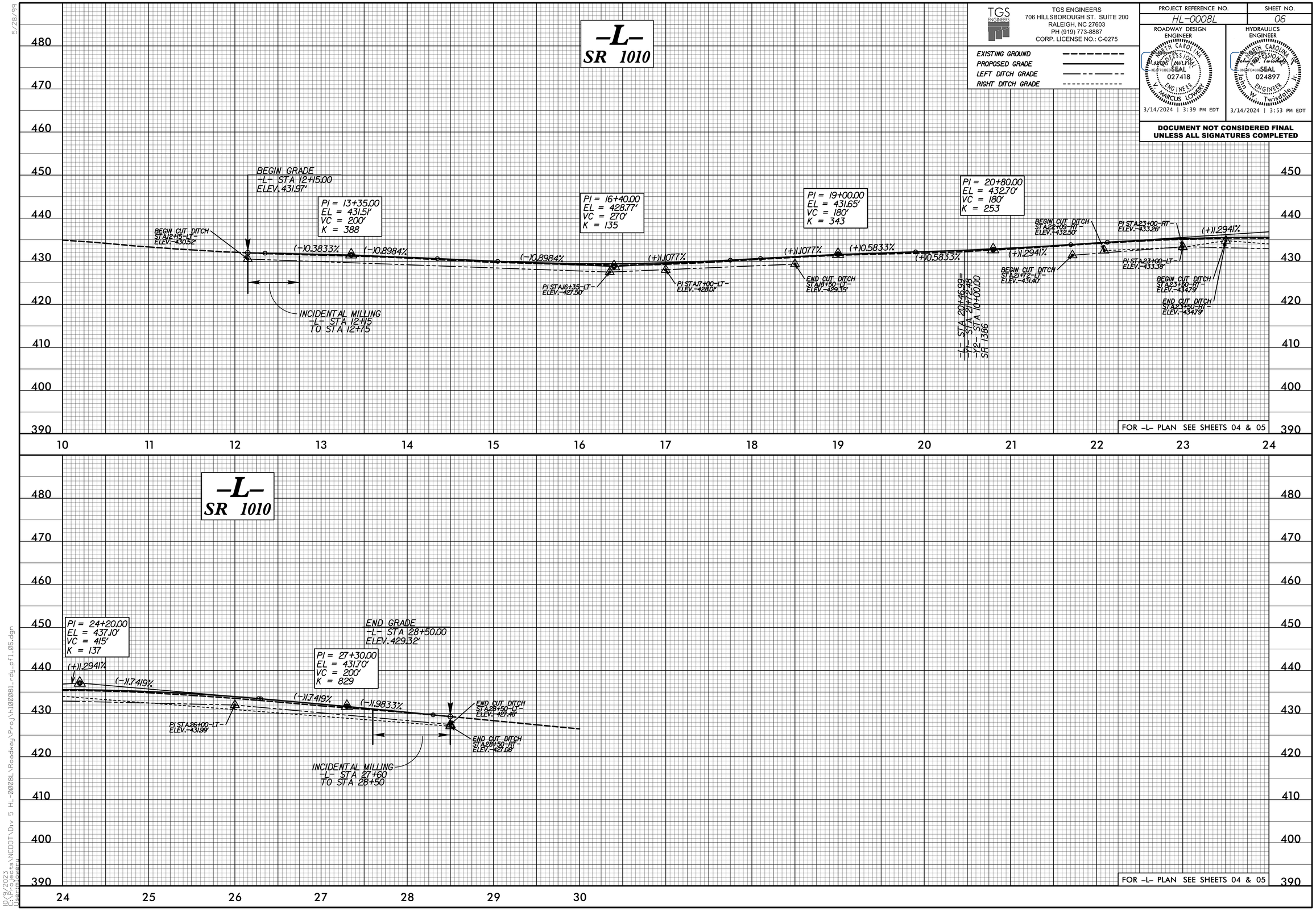
PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	06

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027418 ENGINEER J. MARCUS LOWERY
3/14/2024 | 3:39 PM EDT

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 024897 ENGINEER John W. Twisdale
3/14/2024 | 3:53 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE



10/9/2023
09:07:07 a
Users\NCDOT\Div 5 HL-0008L\Roadway\Proj\hl0008l_rdy_pfl_06.dgn
Hermin Lopez

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

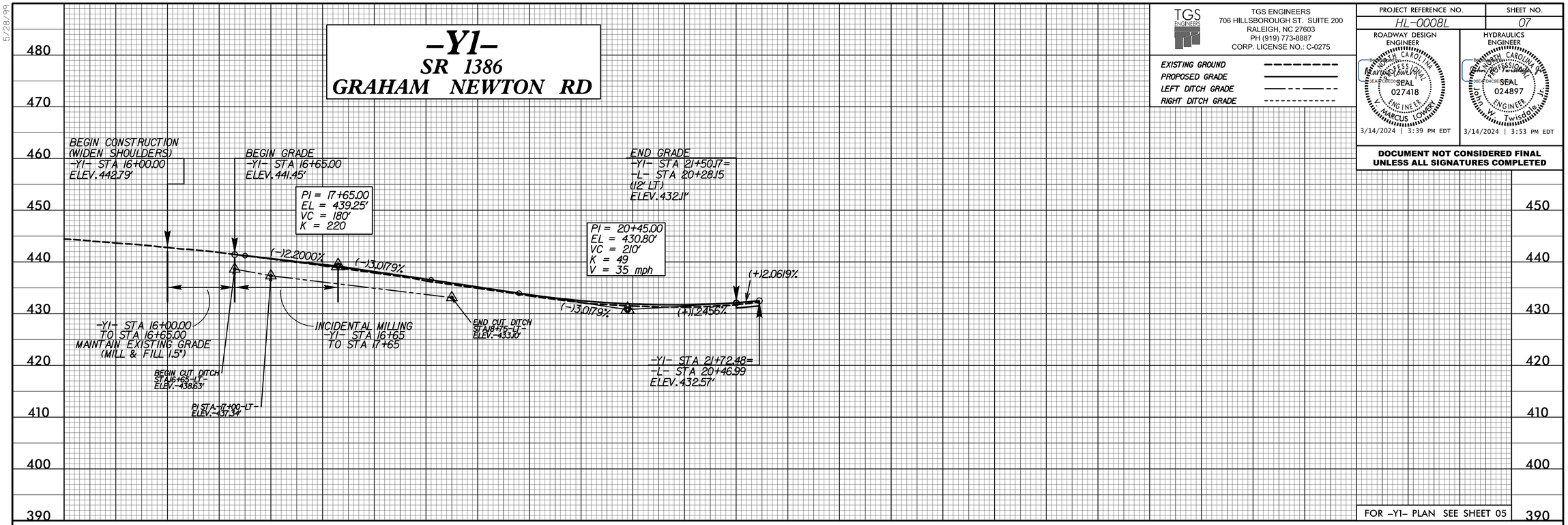
PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	07

ROADWAY DESIGN ENGINEER
3/14/2024 | 3:39 PM EDT

HYDRAULICS ENGINEER
3/14/2024 | 3:53 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE



09/08/99

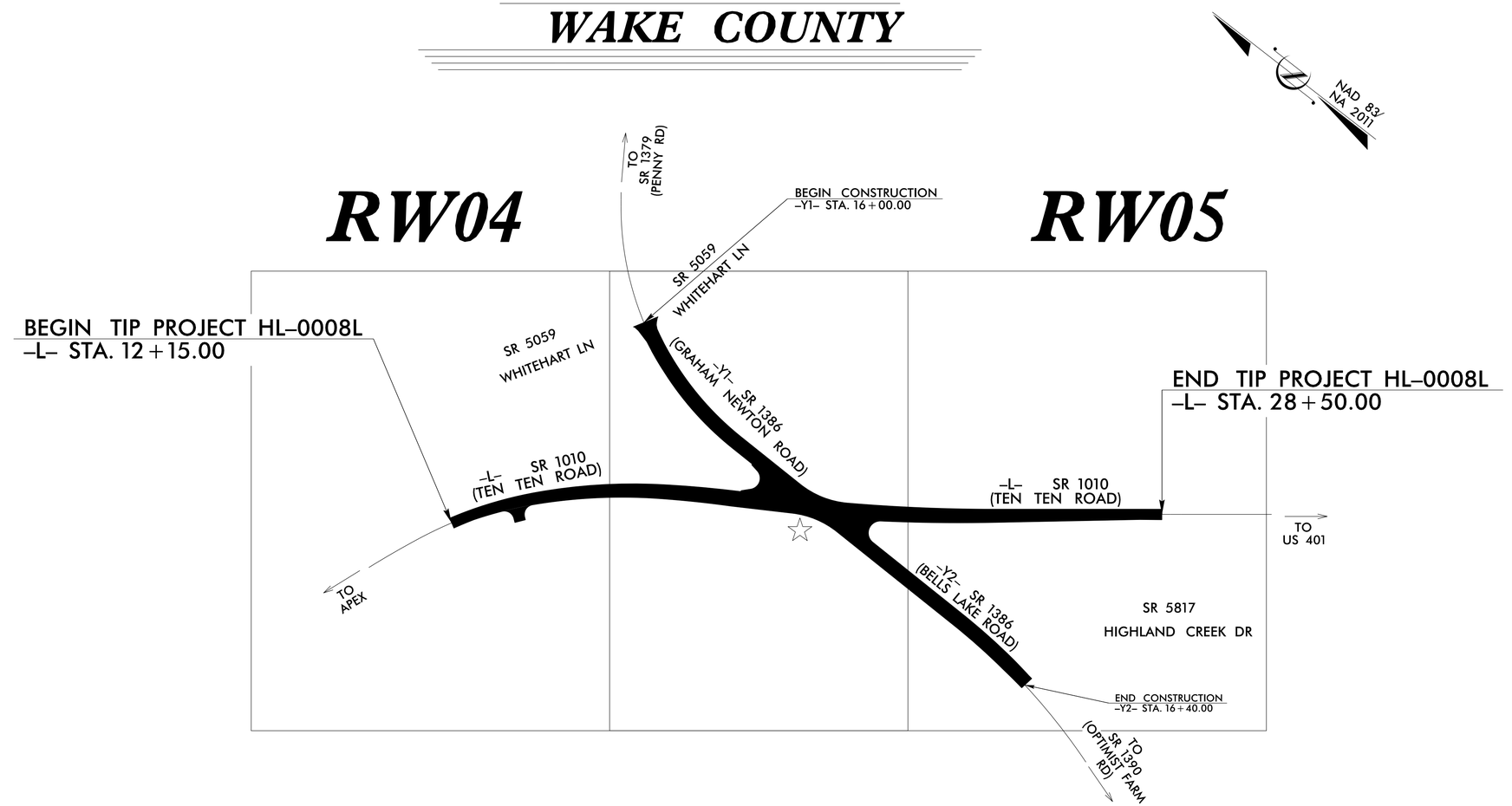
TIP PROJECT: HL-0008L

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HL-0008L	RW01	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASEMENTS AND PROPERTY TIES

WAKE COUNTY



GRAPHIC SCALE

50 25 0 50 100

PLANS

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NV5 ENGINEERS & CONSULTANTS FOR MONUMENT "R2721AZ-1"
WITH NAD 83/NSRS 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 697,986.543(ft) EASTING: 2,070,504.812(ft)
ELEVATION: 434.11(ft) BASED ON MONUMENT "R2721-18"
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99988804
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"R2721AZ-1" TO -L- STATION 13+00 IS
N 42°21'20" E 7959.10(ft)
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

Prepared in the Office of:

McKIM&CREED
1730 VARSITY DRIVE
RALEIGH, NC 27606
(P) 919-233-8091

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: 05/04/2023

LETTING DATE:

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-4234 LAND SURVEYOR JEFFREY D. AKER

DocuSigned by: Jeff Aker 13883A59F70E41D...

SIGNATURE: Date:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

$$$$SYSTIME$$$$DGN$$$$USERNAME$$$$

6/2/99

HL-0008L

PROPOSED ALIGNMENT CONTROL

L

TYPE	STATION	NORTH	EAST
PC	10+00.00	703999.4840	2075598.2590
PCC	11+32.61	703949.5861	2075721.0990
PCC	14+19.98	703794.0158	2075961.2997
PCC	16+99.85	703585.0326	2076146.5660
PT	18+59.61	703451.3556	2076233.9900
PC	20+02.77	703329.0068	2076308.3136
PT	24+66.03	702947.8649	2076571.2012
POT	31+00.54	702447.2770	2076961.0860

Y1

TYPE	STATION	NORTH	EAST
POT	10+00.00	704253.1000	2076862.0880
PC	13+27.77	704052.1072	2076603.1781
PT	19+51.44	703512.3625	2076334.4240
POT	21+72.48	703291.3370	2076331.4830

Y2

TYPE	STATION	NORTH	EAST
POT	10+00.00	703291.3370	2076331.4830
PC	14+26.44	702864.9378	2076325.8092
PT	19+25.17	702377.2965	2076233.8066
POT	21+86.51	702132.6796	2076141.8304

RIGHT OF WAY CONTROL

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	14+19.98	40.00	703764.2791	2075934.5466
L	14+19.98	29.98	703771.7285	2075941.2485
L	16+99.85	40.00	703562.0372	2076113.8365
L	18+59.61	40.00	703430.5882	2076199.8035
L	20+02.77	40.00	703308.2394	2076274.1271
L	26+35.00	35.10	702792.9913	2076647.3305
L	24+66.03	42.00	702922.0572	2076538.0657
L	22+24.11	45.00	703117.6528	2076391.2973

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y2	10+65.00	30.00	703226.7419	2076300.6208
Y2	11+95.00	-50.00	703095.6890	2076378.8841
Y2	12+10.00	-45.00	703080.7569	2076373.6850
Y2	12+10.00	-50.00	703080.6903	2076378.6845
Y2	14+26.44	-45.00	702864.3390	2076370.8053
Y2	14+97.01	-45.00	702791.6159	2076368.0542
Y2	14+97.44	-36.23	702791.7269	2076359.2740

PERMANENT EASEMENT CONTROL

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y1	20+00.00	-38.93	703463.2877	2076372.7012
Y1	20+25.00	-38.82	703438.2913	2076372.2615
Y1	20+00.00	-110.00	703462.3421	2076443.7681
Y1	20+25.00	-110.00	703437.3443	2076443.4355
Y1	21+60.00	-38.24	703303.3110	2076369.8867
Y1	21+60.00	-47.00	703303.1944	2076378.6449

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	16+10.00	-35.13	703678.8414	2076119.4970
L	16+10.00	-50.00	703688.2505	2076131.0159
L	16+25.00	40.00	703620.0177	2076070.4288
L	16+30.00	70.00	703597.6262	2076049.8996
L	16+50.00	-45.00	703652.5672	2076152.8442
L	16+50.00	-35.25	703646.6461	2076145.0983
L	16+55.00	70.00	703578.9731	2076064.3380
L	16+55.00	40.00	703597.0960	2076088.2453
L	20+84.00	-32.10	703277.2302	2076378.2811

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED 05/26/23 TO 06/06/23 .
4. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
5. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	RW02D-1

Location and Surveys

McKIM&CREED
1730 VARSITY DRIVE
RALEIGH, NC 27606
(P) 919-233-8091

NORTH CAROLINA PROFESSIONAL SEAL L-4234 LAND SURVEYOR JEFFREY D. AKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I, Jeffrey D. Aker, PLS, certify that the data compiled came from available surveys/mapping performed by others and provided to me by NCDOT and do not certify to the accuracy or quality of the individual data sources:
I,certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 05/26/23 to 06/06/23, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 16th day of January, 2025.

DocuSigned by:
Jeff Aker
13883A59F70E41D...

Professional Land Surveyor L-4234

16-JAN-2025 16:16
\\mckimcreed.com\nasun\Data\Proj\00482\1158\Geometics\80-Drawings\Delivery\250116\hl0008l_ls_rw02d-1.dgn
Ekelvington AT MC07985-2

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	RW04

Location and Surveys

McKIM&CREED
1730 VARSITY DRIVE
RALEIGH, NC 27606
(P) 919-233-8091

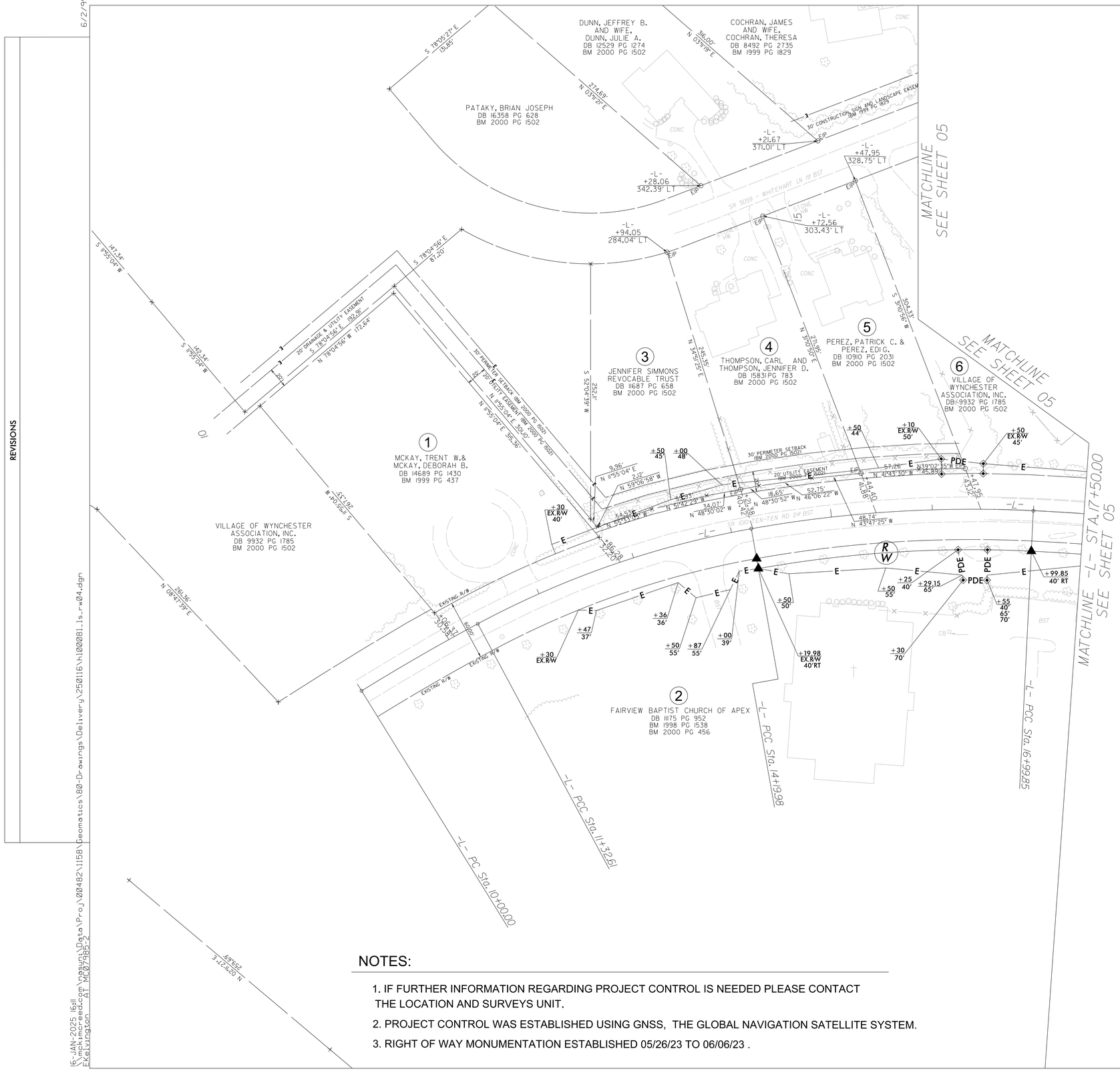
NORTH CAROLINA PROFESSIONAL SEAL L-4234 LAND SURVEYOR JEFFREY D. AKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I , Jeffrey D. Aker , certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 5/26/23 to 06/06/23, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 16th day of January, 2025.

DocuSigned by:
Jeff Aker
Professional Land Surveyor L-4234



NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED 05/26/23 TO 06/06/23 .

REVISIONS

6/2/99

16-JAN-2025 16:11
\\mckimcreed.com\nasun\Data\Proj\00482\1158\Geomatics\80-Drawings\Delivery\250116\hl00081_ls_rw04.dgn
EKelvington AT MC07985-2

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	RW05

Location and Surveys

McKIM & CREED
1730 VARSITY DRIVE
RALEIGH, NC 27606
(P) 919-233-8091

NORTH CAROLINA PROFESSIONAL SEAL L-4234 LAND SURVEYOR JEFFREY D. AKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

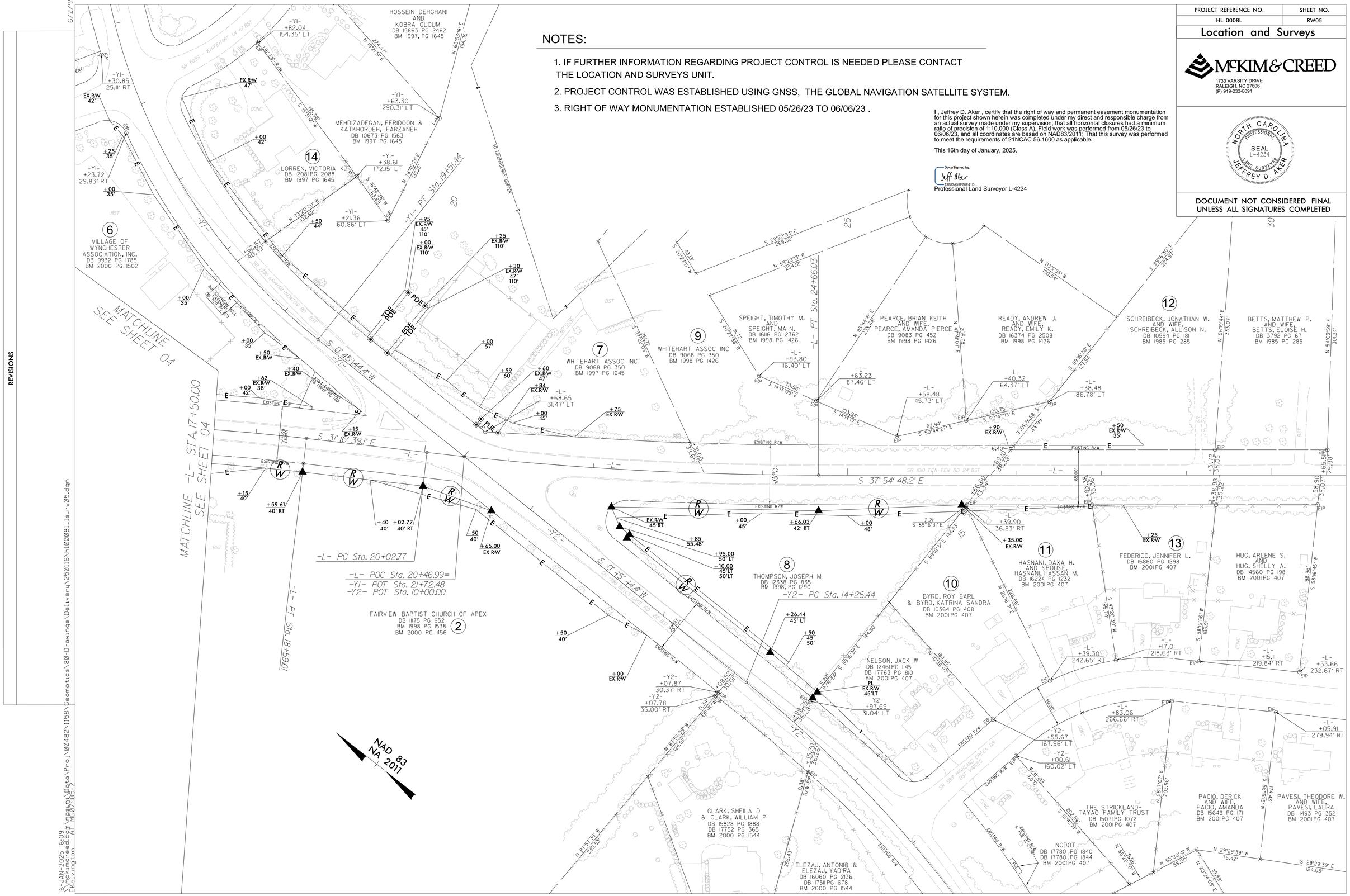
NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED 05/26/23 TO 06/06/23 .

I , Jeffrey D. Aker , certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 05/26/23 to 06/06/23, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 16th day of January, 2025.

DocuSigned by:
Jeff Aker
13883A59F70E41D...
Professional Land Surveyor L-4234



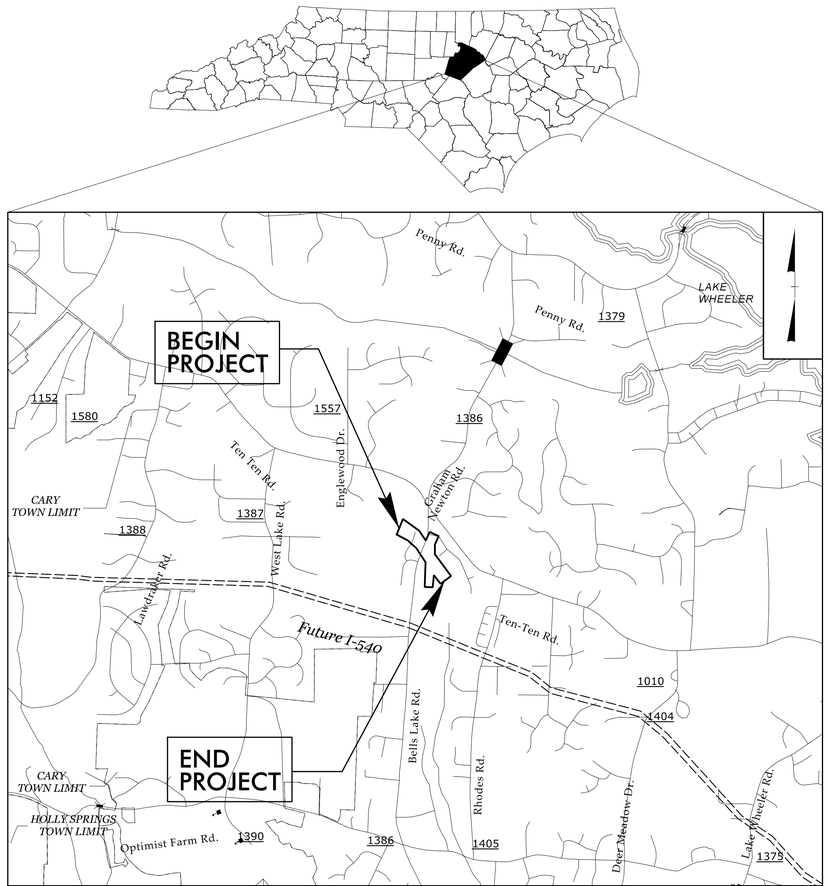
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

WAKE COUNTY

LOCATION: TEN TEN ROAD (SR 1010) AT GRAHAM NEWTON ROAD (SR 1386) / BELLS LAKE ROAD (SR 1386).

TYPE OF WORK: WIDEN FOR LEFT-TURN LANE ON EACH APPROACH GRADING, DRAINAGE, PAVING, WIDENING, AND SIGNAL



VICINITY MAP

INDEX OF SHEETS

SHEET NO.
TMP-1

TIP PROJECT:HL-0008L

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

PLANS PREPARED BY:

D. A. PARKER, P.E.
PROJECT ENGINEER

CODA BRANNAN, E.I.
PROJECT DESIGN ENGINEER

NCDOT CONTACT:

S. REID DAVIDSON, P.E.
PROJECT ENGINEER
NCDOT DIVISION

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

APPROVED: DocuSigned by: Don A. Parker 75DB8E90ADEF440...

DATE: 3/11/2024 | 9:24 AM EDT

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

3/8/2024
X:\NCDOT\Div 5 HL-0008L\Traffic\TrafficControl\TCP\HL-0008L_TC_TMP_01_TSH.dgn
User:cbrannan

PROJ. REFERENCE NO.	SHEET NO.
HL-0008L	TMP-1A

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.05	WORK ZONE VEHICLE ACCESSES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1130.01	DRUMS
1135.01	CONES
1150.01	FLAGGING DEVICES
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTILANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - (PERMANENT AND TEMPORARY)

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)
- WORK AREA
- REMOVAL

SIGNALS

- EXISTING
- PROPOSED
- TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM
- SKINNY DRUM
- TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

PAVEMENT MARKERS

- CRYSTAL/CRYSTAL
- CRYSTAL/RED
- YELLOW/YELLOW

PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

APPROVED: DocuSigned by: Don A. Parker 75DB9E90ADEF440...

DATE: 3/11/2024 | 9:24 AM EDT

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

ROADWAY STANDARD DRAWINGS & LEGEND

PROJ. REFERENCE NO.	SHEET NO.
HL-0008L	TMP-1B

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAILS, DRAWINGS,STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

TIME RESTRICTIONS

A) DO NOT CLOSE OR NARROW TRAVEL LANES AS FOLLOWS:

ROAD NAME	DAY AND TIME RESTRICTIONS
ALL ROADS	MONDAY TO FRIDAY 6:00 A.M. TO 9:00 A.M. 3:00 P.M. TO 7:00 P.M.

B) DO NOT CLOSE OR NARROW TRAVEL LANES DURING HOLIDAYS AND SPECIAL EVENTS AS FOLLOWS:

ROAD NAME
ALL ROADS

HOLIDAY

1. FOR ANY UNEXPECTED OCCURRENCE THAT CREATES UNUSUALLY HIGH TRAFFIC VOLUMES, AS DIRECTED BY THE ENGINEER.

2. FOR NEW YEAR'S, BETWEEN THE HOURS OF 6:00 A.M. DECEMBER 31st TO 7:00 P.M. JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 7:00 P.M. THE FOLLOWING TUESDAY.

3. FOR EASTER, BETWEEN THE HOURS OF 6:00 A.M. THURSDAY AND 7:00 P.M. MONDAY.

4. FOR MEMORIAL DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY TO 7:00 P.M. TUESDAY.

5. FOR INDEPENDENCE DAY, BETWEEN THE HOURS OF 6:00 A.M. THE DAY BEFORE INDEPENDENCE DAY AND 7:00 P.M. THE DAY AFTER INDEPENDENCE DAY.

   IF INDEPENDENCE DAY IS ON A FRIDAY, SATURDAY, SUNDAY OR MONDAY THEN BETWEEN THE HOURS OF 6:00 A.M. THE THURSDAY BEFORE INDEPENDENCE DAY AND 7:00 P.M. THE TUESDAY AFTER INDEPENDENCE DAY.

6. FOR LABOR DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY AND 7:00 P.M. TUESDAY.

7. FOR THANKSGIVING DAY, BETWEEN THE HOURS OF 6:00 A.M. TUESDAY TO 7:00 P.M. MONDAY.

8. FOR CHRISTMAS, BETWEEN THE HOURS OF 6:00 A.M. THE FRIDAY BEFORE THE WEEK OF CHRISTMAS DAY AND 7:00 P.M. THE FOLLOWING TUESDAY AFTER THE WEEK OF CHRISTMAS.

LANE AND SHOULDER CLOSURE REQUIREMENTS

C) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.

D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

E) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

F) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

G) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

PAVEMENT EDGE DROP OFF REQUIREMENTS

H) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:

   BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.

   BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.

   BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.

I) DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) IN ACCORDANCE WITH RSD 1101.11.

TRAFFIC PATTERN ALTERATIONS

J) NOTIFY THE ENGINEER THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

K) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

L) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

M) INSTALL BLACK ON ORANGE "DIP" SIGNS (W8-2) AND/OR "BUMP" SIGNS (W8-1) ACCORDING TO RSD 1101.11, OR AS DIRECTED BY THE ENGINEER.

TRAFFIC CONTROL DEVICES

N) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT,10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

PAVEMENT MARKINGS AND MARKERS

O) INSTALL TEMPORARY PAVEMENT MARKINGS AND TEMPORARY PAVEMENT MARKERS ON INTERIM LAYERS OF PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING	MARKER
ALL ROADS	PAINT	NONE

P) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE.

Q) PLACE ONE APPLICATION OF PAINT FOR TEMPORARY TRAFFIC PATTERNS. PLACE A SECOND APPLICATION OF PAINT SIX (6) MONTHS AFTER THE INITIAL APPLICATION AND EVERY SIX MONTHS AS DIRECTED BY THE ENGINEER.

R) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

S) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

T) TRACE THE PROPOSED MONOLITHIC ISLAND LOCATIONS WITH PROPER COLOR PAVEMENT MARKINGS PRIOR TO INSTALLATION. PLACE CONES TO DELINEATE ANY PROPOSED MONOLITHIC ISLANDS BEFORE INSTALLATION.

MISCELLANEOUS

U) LAW ENFORCEMENT MAY BE USED TO MAINTAIN TRAFFIC THROUGH THE WORK AREA AND/OR INTERSECTIONS AS DIRECTED BY THE ENGINEER.

MANAGEMENT STRATEGIES

THE FOLLOWING LISTED WORK ZONE STRATEGIES ARE RECOMMENDED FOR INCLUSION WITHIN THIS TRANSPORTATION MANAGEMENT PLAN (TMP).

RECOMMENDED STRATEGIES:

LANE SHIFTS OR CLOSURES
ONE-LANE, TWO WAY OPERATION (FLAGGING)
WORK HOUR RESTRICTIONS FOR PEAK TRAVEL
TEMPORARY TRAFFIC SIGNALS

APPROVED: DocuSigned by: Don A. Parker 75DB9E90ADEF440...

DATE: 3/11/2024 | 9:24 AM EDT

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

TRANSPORTATION OPERATIONS PLAN

3/8/2024
X:\NCDOT\Div 5 HL-0008L\Traffic\TrafficControl\TCP\HL-0008L_TC_TMP_01B.dgn
User:cbrannan

TEMPORARY TRAFFIC CONTROL PHASING

PROJ. REFERENCE NO.	SHEET NO.
HL-0008L	TMP-2

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

PHASE I

NOTE: UNLESS STATED OTHERWISE, RETURN TRAFFIC TO THE EXISTING PATTERN AT THE END OF EACH WORK PERIOD.

MAINTAIN ACCESS TO RESIDENCE AND BUSINESS AT ALL TIMES

CONDUCT GRADING AND PAVING OPERATIONS IN A MANNER THAT DOES NOT POND WATER

STEP 1. INSTALL WORK ZONE ADVANCE WARNING SIGNS (SEE RSD 1101.01).

STEP 2. USING FLAGGERS OR LAW ENFORCEMENT INSTALL AND ACTIVATE TEMPORARY SIGNAL 1 (EXISTING TRAFFIC PATTERN) (SEE SIGNAL PLANS).

NOTE: STEP 3 MAY BE PERFORMED CONCURRENTLY WITH STEPS 4-7

STEP 3. INSTALL FINAL SIGNAL (FINAL TRAFFIC PATTERN) WITH HEADS COVERED (SEE SIGNAL PLANS).

STEP 4. BEGIN GRADING AND PROPOSED DRAINAGE INSTALLATION INCLUDING STRUCTURES, TRUNK LINES, AND CROSSPIPES (SEE RSD 1101.02 AND TMP-3).

STEP 5. REMOVE EXISTING CONCRETE ISLAND AND PATCH WITH TEMPORARY ASPHALT (SEE RSD 1101.02 AND TMP-3).

STEP 6. PLACE BASE COURSE AND INSTALL CURB AND GUTTER AND EXPRESSWAY GUTTER.

DURING EXPRESSWAY GUTTER CONSTRUCTION, CLOSE EXISTING RIGHT TURN SLIP LANE. USE SPACE CREATED BY ISLAND REMOVAL TO DELINEATE A SHARED THRU/RIGHT TURN WITH DRUMS. (SEE RSD 1101.02 AND TMP-3).

STEP 7. COMPLETE WIDENING AND PAVING UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE (SEE RSD 1101.02 AND TMP-3).

INSTALL PROPOSED GUARDRAIL (SEE RSD 1101.02).

INSTALL AND COVER PERMANENT SIGNING (SEE SIGNING PLAN).

PHASE II

STEP 1. ON THE MONDAY PRIOR TO THE WEEKEND TRAFFIC SHIFT, PLACE PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) (SHORT TERM) ON BOTH DIRECTIONS OF TEN-TEN RD. 1000 FT IN ADVANCE OF THE PROJECT LIMITS WITH THE FOLLOWING MESSAGE:

MESSAGE 1	MESSAGE 2
TRAFFIC	EXPECT
SHIFT	DELAYS
THIS WKD	

COMPLETE THE WORK OF PHASE II, STEP 2 BETWEEN THE HOURS OF FRIDAY AT 7:00 PM AND THE FOLLOWING MONDAY AT 6:00 AM (SEE INTERMEDIATE CONTRACT TIME AND LIQUIDATED DAMAGES).

STEP 2. USING FLAGGERS AND/OR LAW ENFORCEMENT, PLACE THE FIRST LAYER OF SURFACE COURSE AND TEMPORARY PAINT PAVEMENT MARKINGS (SINGLE APPLICATION) IN THE FINAL PATTERN (SEE FINAL PAVEMENT MARKING PLAN).

ACTIVATE PROPOSED SIGNAL AND UNCOVER PROPOSED SIGNING AND OPEN TO FINAL TRAFFIC PATTERN. (SEE SIGNAL AND SIGNING PLANS).

REVISE PCMS MESSAGING TO THE FOLLOWING:

MESSAGE 1	MESSAGE 2
NEW	USE
TRAFFIC	CAUTION
PATTERN	

DISPLAY MESSAGE FOR 14 DAYS FOLLOWING THE TRAFFIC SHIFT BEFORE REMOVAL.

STEP 3. REMOVE EXISTING SIGNAL.

STEP 4. USING FLAGGERS, CONSTRUCT PROPOSED CONCRETE ISLAND AND PLACE THE FINAL LAYER OF SURFACE COURSE AND FINAL PAVEMENT MARKINGS (SEE RSD 1101.02 AND FINAL PAVEMENT MARKING PLAN).

STEP 5. REMOVE ALL TRAFFIC CONTROL DEVICES.

APPROVED: DocuSigned by: Don A. Parker 75DB9E90ADEF440...

DATE: 3/11/2024 | 9:24 AM EDT

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

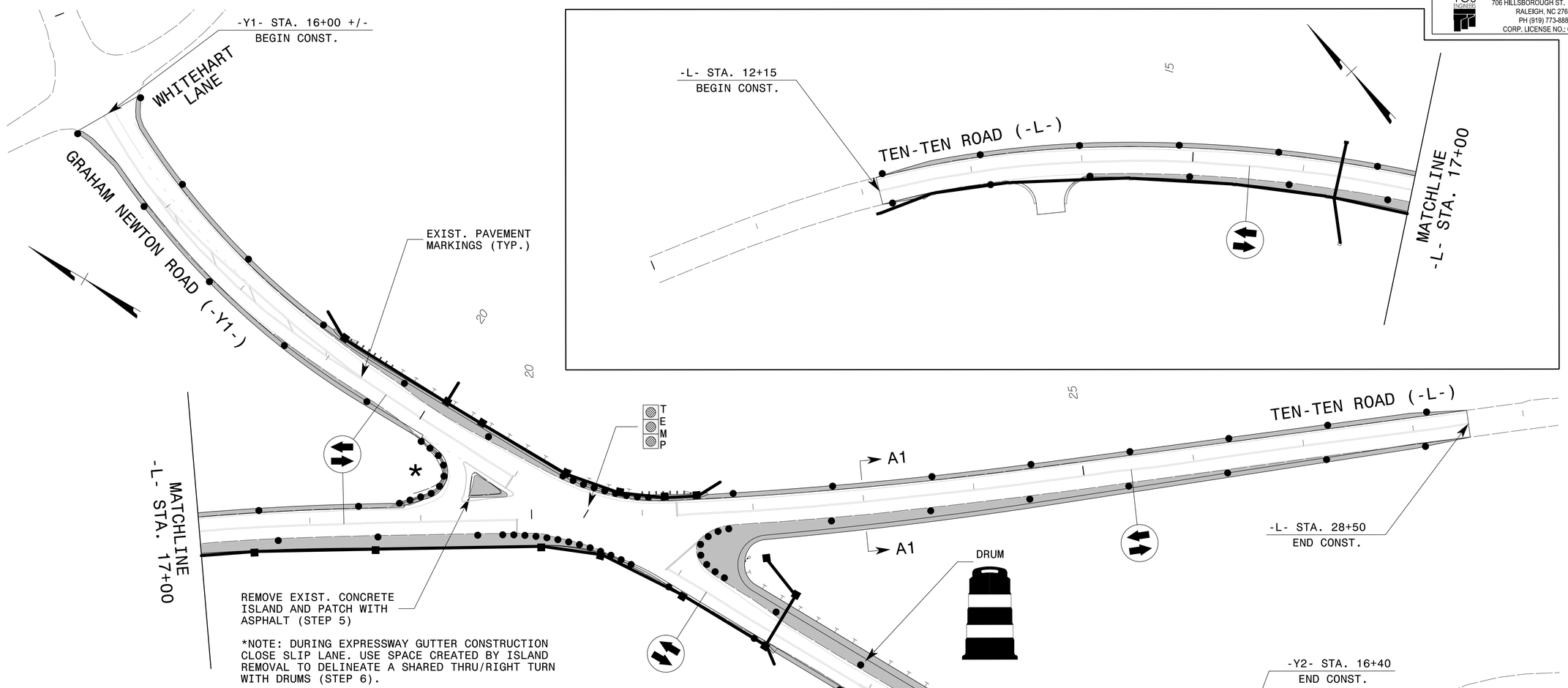
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

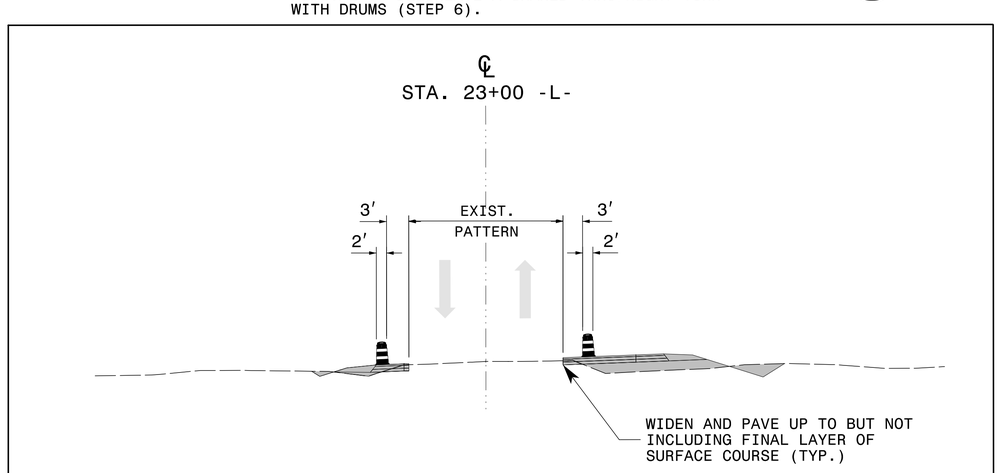
DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

PHASING

PROJ. REFERENCE NO.	SHEET NO.
HL-0008L	TMP-3

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275





SECTION A1-A1

APPROVED: Don A. Parker (DocuSigned by: 75DB9E90ADEF440...)

DATE: 3/11/2024 | 9:24 AM EDT

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A PARKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

PHASE I DETAILS

3/8/2024
X:\NCDOT\Div. 5 HL-0008L\Traffic\TrafficControl\TCP\HL-0008L_TC_TMP_03.dgn
User:cbrannan

T.I.P.: HL-0008L

TIP NO.	SHEET NO.
HL-0008L	PMP-1

APPROVED: DocuSigned by: Don A. Parker 75DB9E90ADEF440...

DATE: 3/15/2024 | 10:03 AM EDT

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN
WAKE COUNTY

LOCATION: TEN TEN ROAD (SR 1010) AT GRAHAM NEWTON ROAD (SR 1386)/ BELLS LAKE ROAD (SR 1386).

GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
SR 1010 (TEN TEN RD.) SR 1836 (GRAHAM NEWTON RD.) SR 1386 (BELLS LAKE RD.)	THERMOPLASTIC	NONE

B) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

C) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.

D) PASSING ZONES WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.

E) UNLESS OTHERWISE SPECIFIED, HEATED-IN-PLACE THERMOPLASTIC MAY BE USED IN LIEU OF EXTRUDED THERMOPLASTIC FOR STOP BARS, SYMBOLS, CHARACTERS AND DIAGONALS. IF HEATED-IN-PLACE IS USED, IT SHALL BE PAID FOR USING THE EXTRUDED THERMOPLASTIC PAY ITEM.

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

INDEX

PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
PAVEMENT MARKINGS	
THERMOPLASTIC (4", 90 MILS)	
T1	WHITE EDGELINE
T2	WHITE SOLID LANE LINE
T4	3 FT. - 9 FT./SP WHITE MINISKIP
T5	2 FT. - 6 FT./SP WHITE MINISKIP
T13	YELLOW DOUBLE CENTER
THERMOPLASTIC (6", 90 MILS)	
T20	WHITE EDGELINE
THERMOPLASTIC (8", 90 MILS)	
T40	WHITE GORELINE
THERMOPLASTIC (12", 90 MILS)	
T51	WHITE DIAGONAL
T52	YELLOW DIAGONAL
THERMOPLASTIC (24", 90 MILS)	
T61	WHITE STOPBAR
THERMOPLASTIC PAVEMENT MARKING SYMBOLS (90 MILS)	
T70	LEFT TURN ARROW
T71	RIGHT TURN ARROW
T72	STRAIGHT ARROW
T74	COMBO RIGHT/STRAIGHT ARROW
T103	24" YIELD LINE TRIANGLE (90 MIL)

PLAN SUBMITTED TO: NCDOT

S. REID DAVIDSON — DIVISION 5 PROJECT MANAGER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PLAN PREPARED BY: TGS ENGINEERS

DON A. PARKER, P.E. — PROJECT ENGINEER

CODA BRANNAN, E.I. — DESIGN ENGINEER

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

TIP NO.	SHEET NO.
HL-0008L	PMP-2

APPROVED: DocuSigned by: Don A. Parker 75DB9E90ADEF440...

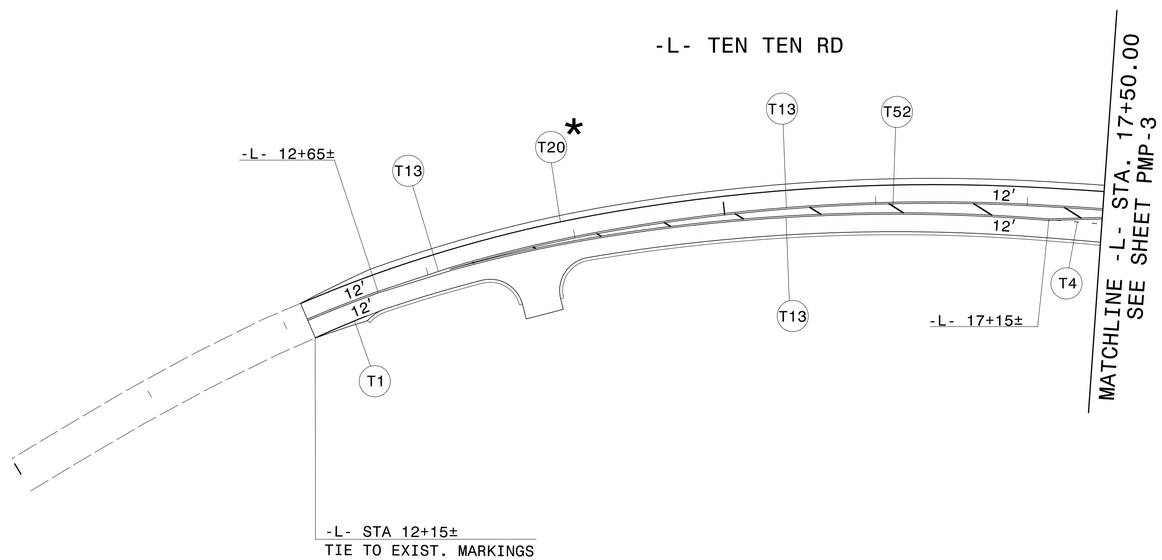
DATE: 3/15/2024 | 10:11 AM EDT

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275



* INSTALL SINUSOIDAL MILLED RUMBLE STRIPS ON PAVED SHOULDER ADJACENT TO 6" WHITE EDGELINE FROM -L- STA. 12+65 TO -L- STA. 18+85. SEE ROADWAY SHEET 2C-2 AND SPECIAL PROVISION.

PAVEMENT MARKING DETAIL

TIP NO.	SHEET NO.
HL-0008L	PMP-3

APPROVED: DocuSigned by: Don A. Parker 75DB9E90ADEF440...

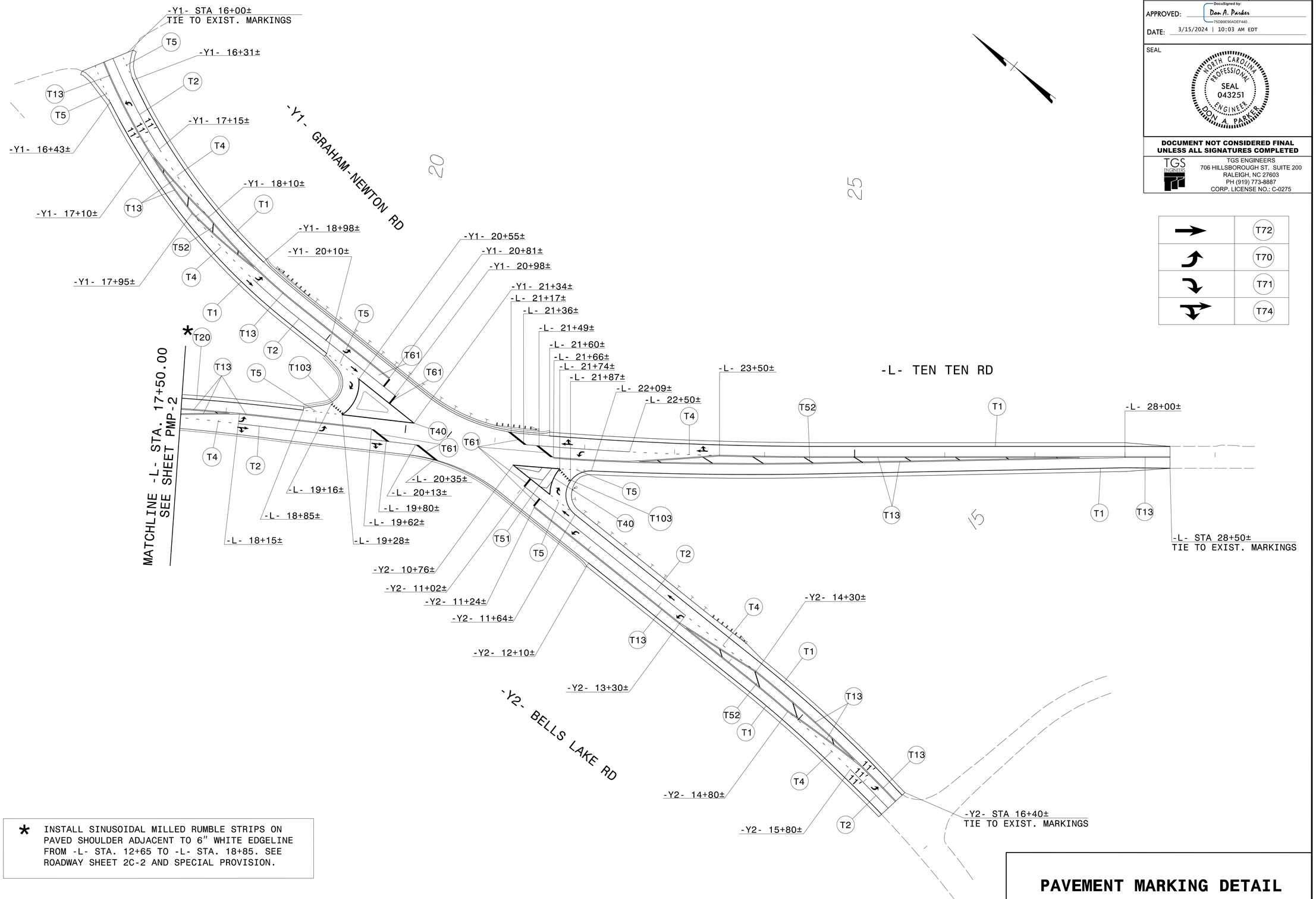
DATE: 3/15/2024 | 10:03 AM EDT

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH ST. SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275



* INSTALL SINUSOIDAL MILLED RUMBLE STRIPS ON PAVED SHOULDER ADJACENT TO 6" WHITE EDGELINE FROM -L- STA. 12+65 TO -L- STA. 18+85. SEE ROADWAY SHEET 2C-2 AND SPECIAL PROVISION.

PAVEMENT MARKING DETAIL

3/15/2024
X:\NCDOT\Div 5 HL-0008L\Traffic\Pavement Markings\HL-0008L_Sgn_PMP_03.dgn
User:cbrannan

TIP PROJECT: HL-0008L

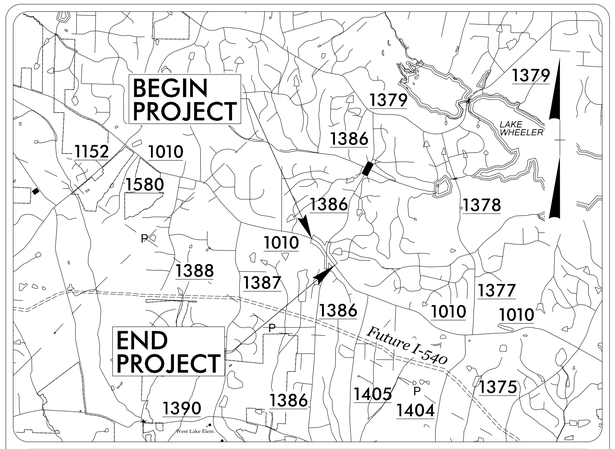
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HL-0008L	EC-1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

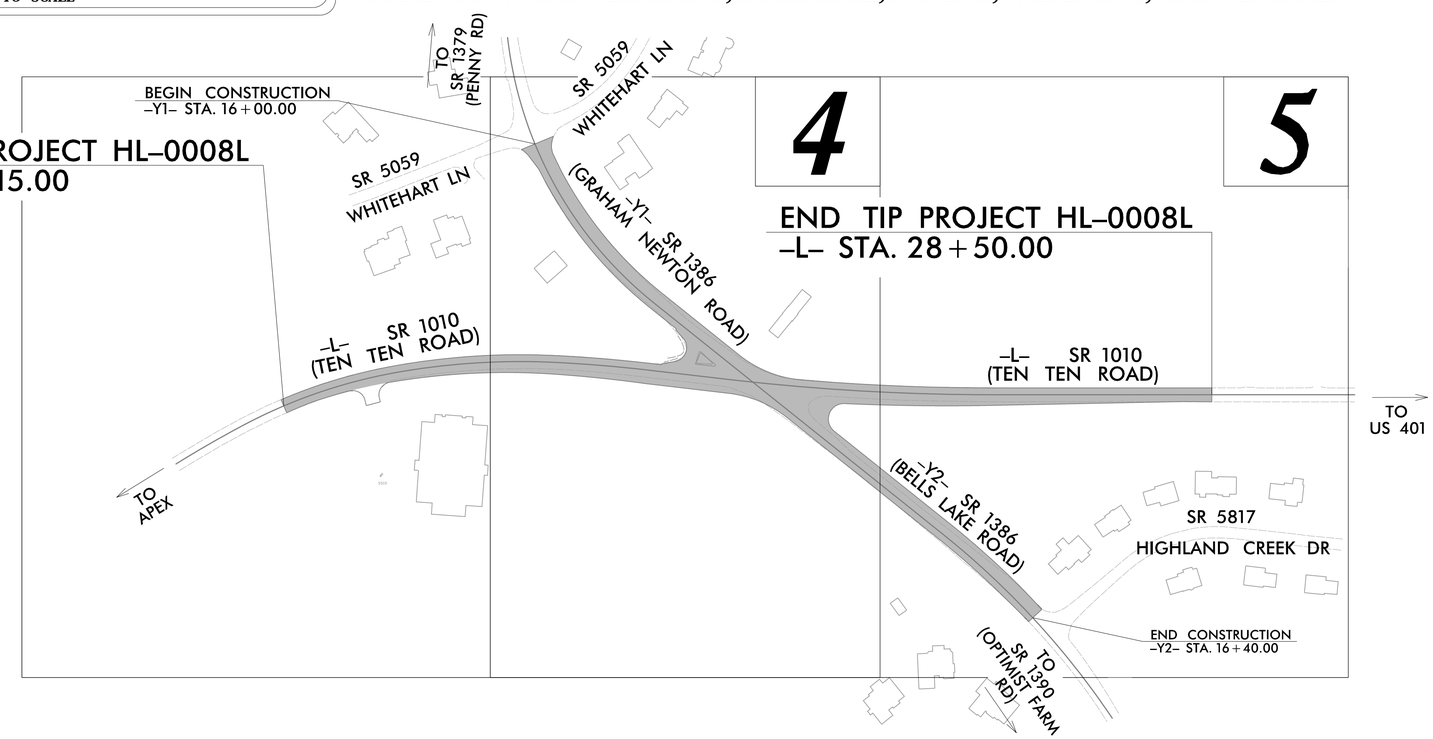
WAKE COUNTY



VICINITY MAP
NOT TO SCALE

LOCATION: TEN TEN ROAD (SR 1010) AT GRAHAM NEWTON ROAD (SR 1386) /BELLS LAKE ROAD (SR 1386). WIDEN FOR LEFT-TURN LANE ON EACH APPROACH

TYPE OF WORK: GRADING, DRAINAGE, PAVING, WIDENING, AND SIGNAL



THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

GRAPHIC SCALE

50 25 0 50 100
PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE APPLICABLE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE APRIL 1, 2019 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER RESOURCES.

TGS ENGINEERS

Prepared in the Office of:

TGS ENGINEERS
706 HILLSBOROUGH ST. - SUITE 200
RALEIGH, NC 27603

Designed by:

Ben Henegar, PE — NAME
3564 — LEVEL III CERTIFICATION NO.

Roadway Standard Drawings

The "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2024 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	EC-2
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

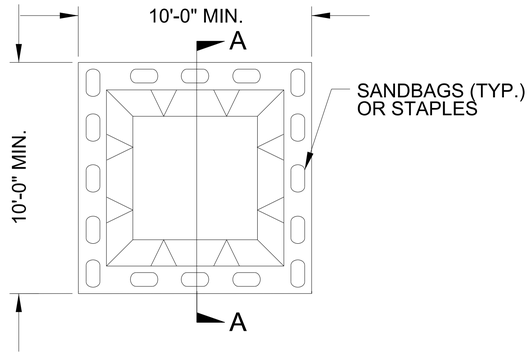
EROSION & SEDIMENT CONTROL LEGEND

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1630.03	Temporary Silt Ditch	TSD
1630.04	Stilling Basin	
1630.05	Temporary Diversion	TD
1630.06	Special Stilling Basin	
1630.07	Skimmer Basin	
1630.08	Tiered Skimmer Basin	
1630.09	Earthen Dam with Skimmer	
	Infiltration Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C

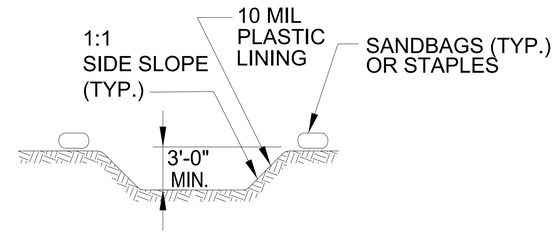
Std. #	Description	Symbol
1633.01	Temporary Rock Silt Check Type A	
1633.02	Temporary Rock Silt Check Type B	
1633.03	Temporary Rock Silt Check Type A with Excelsior Matting and Flocculant	
1634.01	Temporary Rock Sediment Dam Type A	
1634.02	Temporary Rock Sediment Dam Type B	
1635.01	Rock Pipe Inlet Sediment Trap Type A	A
1635.02	Rock Pipe Inlet Sediment Trap Type B	B
1636.01	Excelsior Wattle Check	
1636.01	Excelsior Wattle Check with Flocculant	
1636.01	Coir Fiber Wattle Check	
1636.01	Coir Fiber Wattle Check with Flocculant	
1636.02	Silt Fence Excelsior Wattle Break	EW
	Silt Fence Coir Fiber Wattle Break	CFW
1636.03	Excelsior Wattle Barrier	EW EW EW
1636.03	Coir Fiber Wattle Barrier	CFW CFW CFW

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	EC-2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



PLAN



SECTION A-A

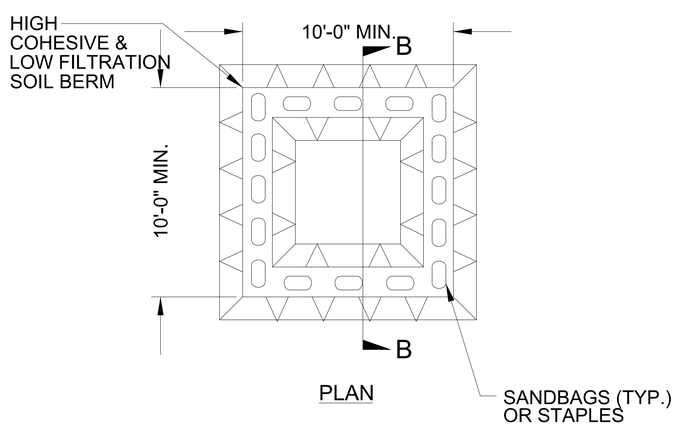
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

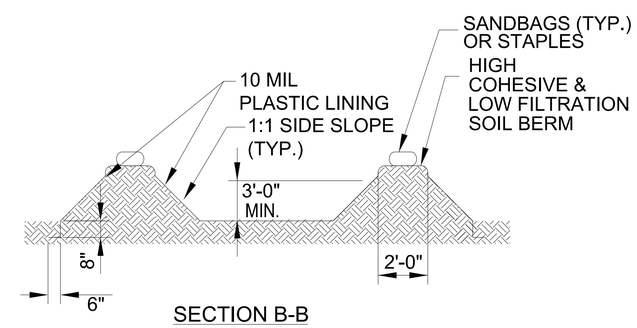
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

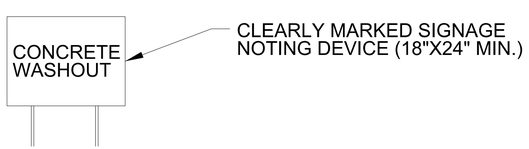
NOT TO SCALE



PLAN



SECTION B-B



NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

ABOVE GRADE WASHOUT STRUCTURE

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	EC-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 TO 4:1	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH WITH SLOPES STEEPER THAN 4:1. 7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND HQW ZONES.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND HQW ZONES.

MATTING FOR EROSION CONTROL (DITCHES)

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
5	-Y1-	16+65	18+75	LT	225
5	-Y1-	20+13	-	LT	65
5	-Y1-	16+50	20+00	RT	480
5	-Y2-	12+15	13+00	RT	90
5	-L-	21+72	23+00	LT	135
5	-L-	26+00	28+50	LT	265
5	-L-	23+50	28+50	RT	525
				SUBTOTAL	1,785
				MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER	965
				TOTAL	2,750
				SAY	2,750

Wake County
SR 1010 (Ten Ten Rd.)

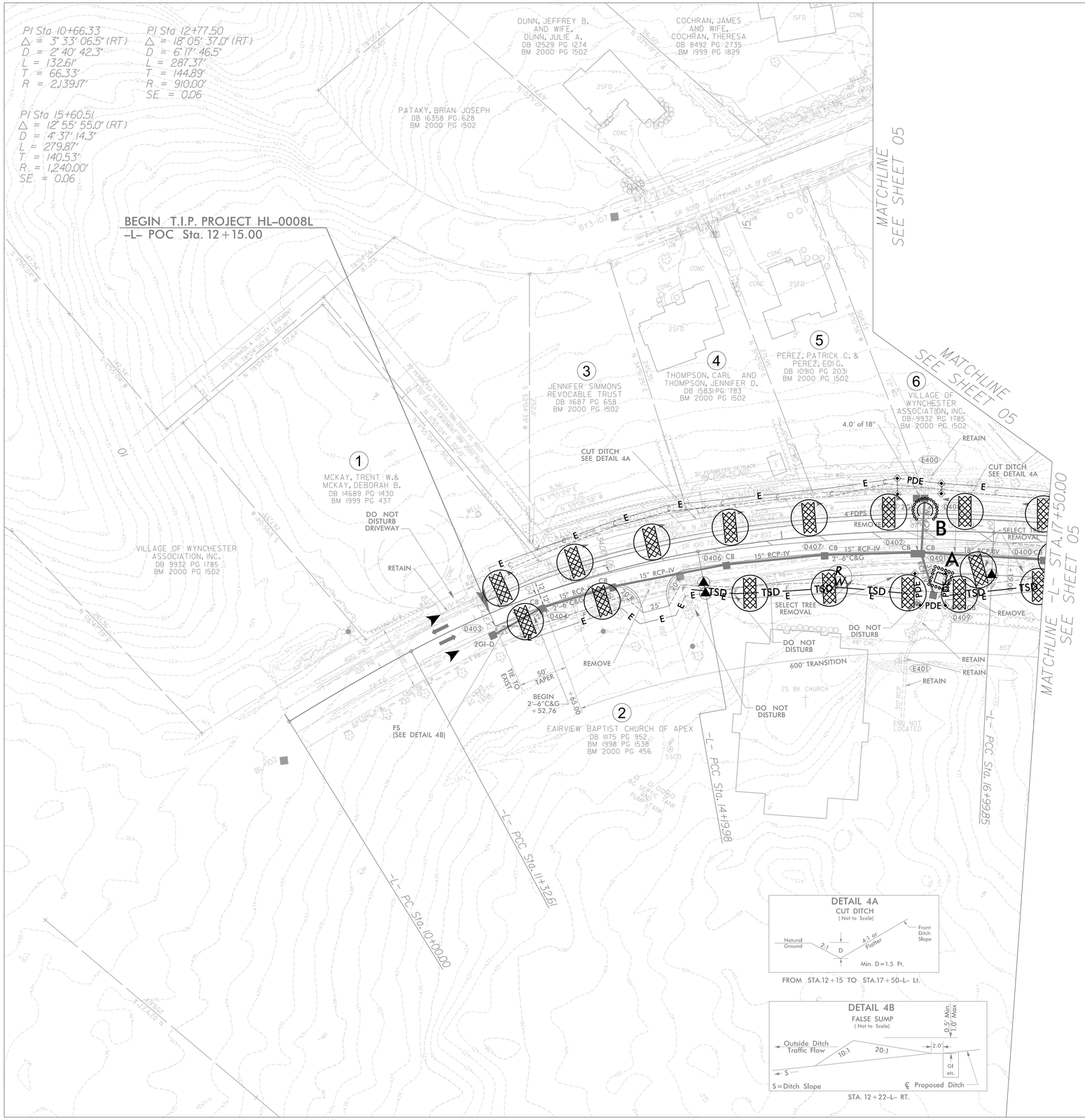
PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	EC-4/CONST.4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

NAD 83
NA 2011

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.



Wake County
SR 1010
(Ten Ten Rd.)

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	EC-5/CONST.5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

NAD 83
NA 2011

-L-
PI Sta 17+79.76
Δ = 3° 48' 50.0" (RT)
D = 2° 23' 14.4"
L = 159.76'
T = 79.91'
R = 2,400.00'
SE = 0.04

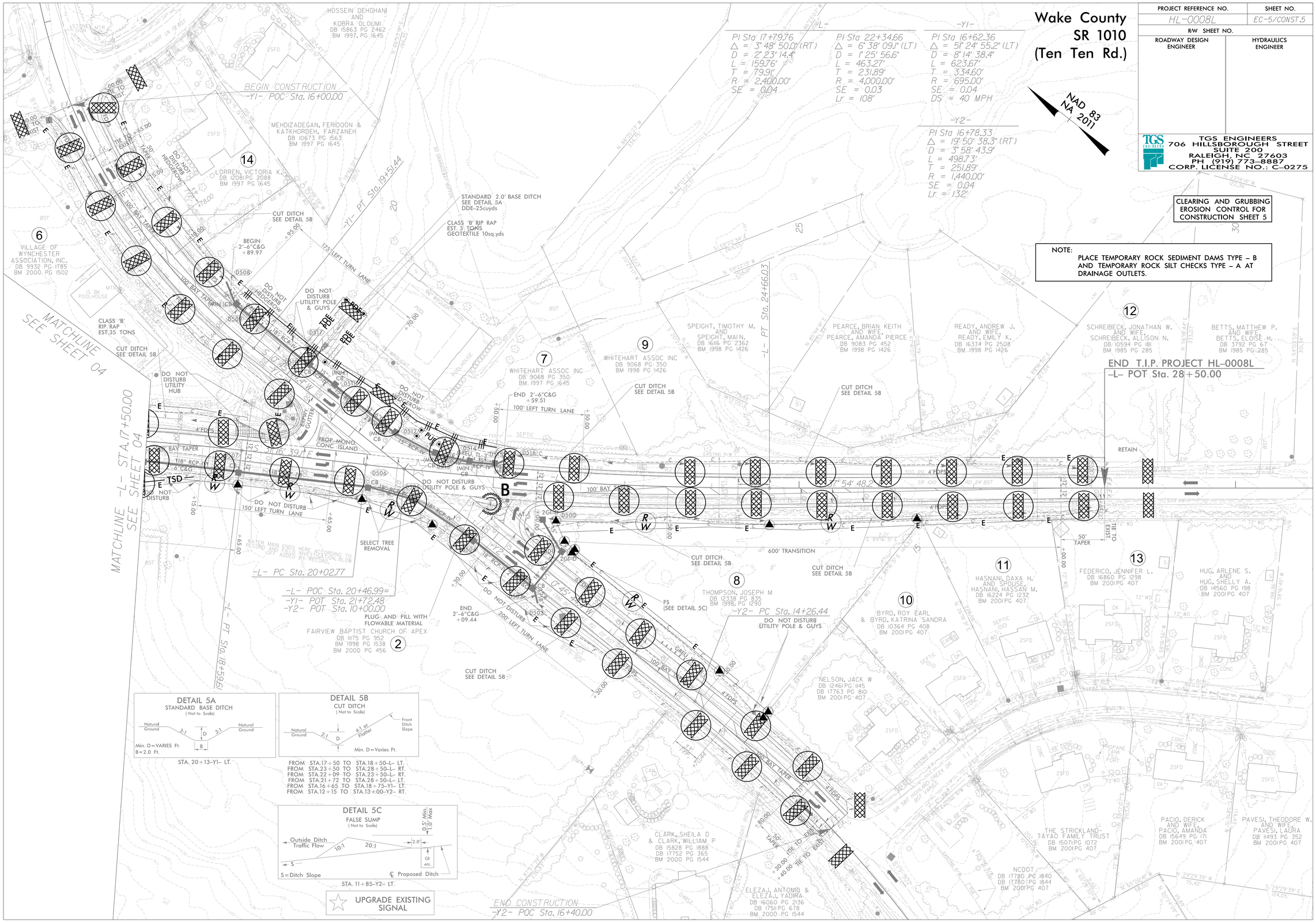
PI Sta 22+34.66
Δ = 6° 38' 09.1" (LT)
D = 1° 25' 56.6"
L = 463.27'
T = 231.89'
R = 4,000.00'
SE = 0.03
Lr = 108'

-Y1-
PI Sta 16+62.36
Δ = 51° 24' 55.2" (LT)
D = 8° 14' 38.4"
L = 623.67'
T = 334.60'
R = 695.00'
SE = 0.04
DS = 40 MPH

-Y2-
PI Sta 16+78.33
Δ = 19° 50' 38.3" (RT)
D = 3° 58' 43.9"
L = 498.73'
T = 251.89'
R = 1,440.00'
SE = 0.04
Lr = 132'

CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 5

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.



DETAIL 5A
STANDARD BASE DITCH
(Not to Scale)

STA. 20+13-Y1- LT.

DETAIL 5B
CUT DITCH
(Not to Scale)

FROM STA.17+50 TO STA.18+50-L- LT.
FROM STA.23+50 TO STA.28+50-L- RT.
FROM STA.22+09 TO STA.23+50-L- RT.
FROM STA.21+72 TO STA.28+50-L- LT.
FROM STA.16+65 TO STA.18+75-Y1- LT.
FROM STA.12+15 TO STA.13+00-Y2- RT.

DETAIL 5C
FALSE SUMP
(Not to Scale)

STA. 11+85-Y2- LT.

UPGRADE EXISTING SIGNAL

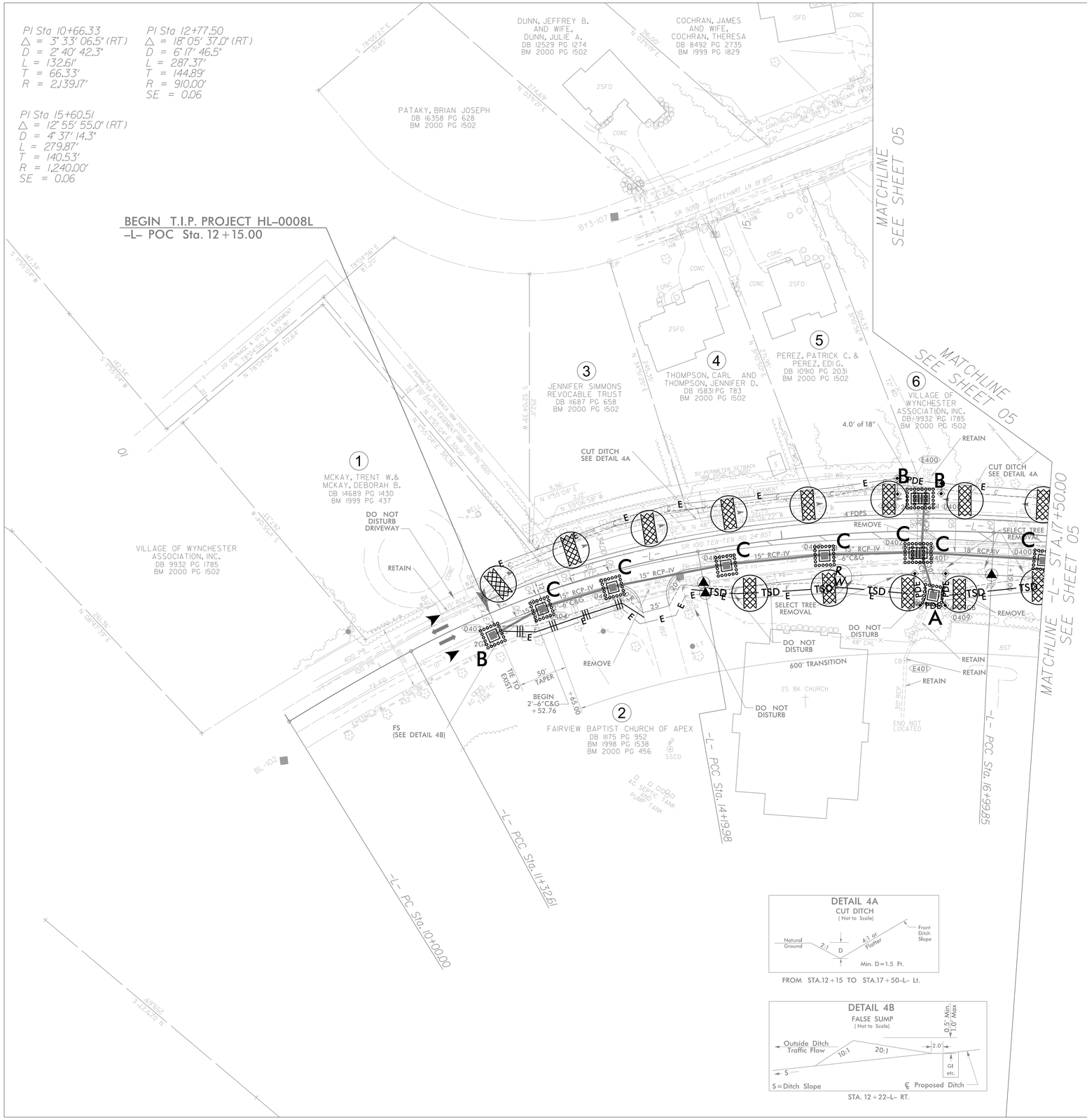
Wake County
SR 1010 (Ten Ten Rd.)

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	EC-6/CONST.4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

NAD 83
NA 2011

IN LIEU OF ROCK INLET SEDIMENT TRAP TYPE C, UTILIZE FABRIC INSERT INLET PROTECTION DEVICES IN AREAS WHERE WATER MAY POND ON ROAD OPEN TO LIVE TRAFFIC.



DETAIL 4A
CUT DITCH
(Not to Scale)

FROM STA.12+15 TO STA.17+50-L- Lt.

DETAIL 4B
FALSE SUMP
(Not to Scale)

STA. 12+22-L- RT.

Wake County
SR 1010
(Ten Ten Rd.)

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	EC-7/CONST.5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

NAD 83
NA 2011

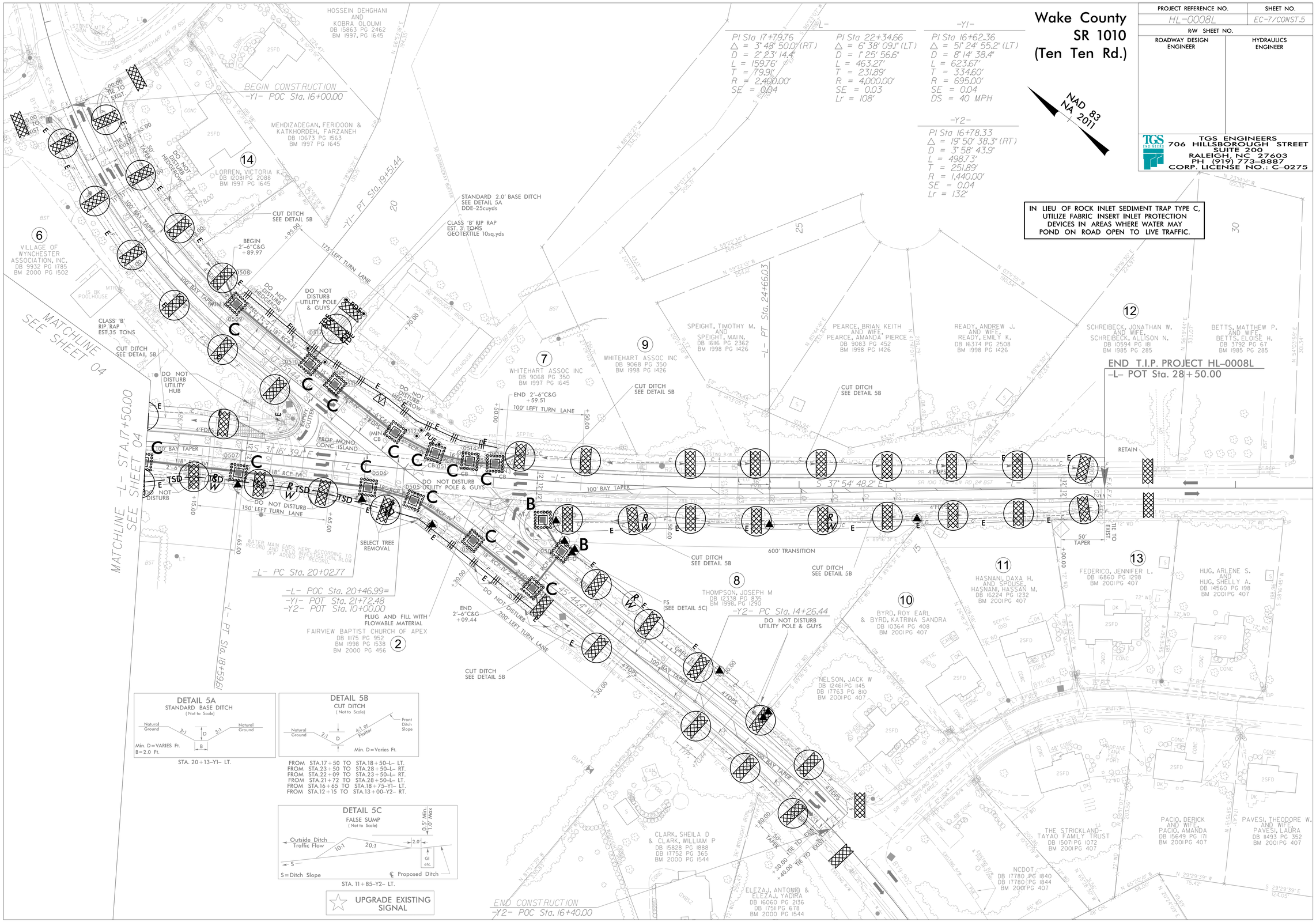
IN LIEU OF ROCK INLET SEDIMENT TRAP TYPE C, UTILIZE FABRIC INSERT INLET PROTECTION DEVICES IN AREAS WHERE WATER MAY POND ON ROAD OPEN TO LIVE TRAFFIC.

-L-
PI Sta 17+79.76
Δ = 3° 48' 50.0" (RT)
D = 2° 23' 14.4"
L = 159.76'
T = 79.91'
R = 2,400.00'
SE = 0.04

PI Sta 22+34.66
Δ = 6° 38' 09.1" (LT)
D = 1° 25' 56.6"
L = 463.27'
T = 231.89'
R = 4,000.00'
SE = 0.03
Lr = 108'

-Y1-
PI Sta 16+62.36
Δ = 51° 24' 55.2" (LT)
D = 8° 14' 38.4"
L = 623.67'
T = 334.60'
R = 695.00'
SE = 0.04
DS = 40 MPH

-Y2-
PI Sta 16+78.33
Δ = 19° 50' 38.3" (RT)
D = 3° 58' 43.9"
L = 498.73'
T = 251.89'
R = 1,440.00'
SE = 0.04
Lr = 132'



DETAIL 5A
STANDARD BASE DITCH
(Not to Scale)

STA. 20+13-Y1- LT.

DETAIL 5B
CUT DITCH
(Not to Scale)

FROM STA.17+50 TO STA.18+50-L- LT.
FROM STA.23+50 TO STA.28+50-L- RT.
FROM STA.22+09 TO STA.23+50-L- RT.
FROM STA.21+72 TO STA.28+50-L- LT.
FROM STA.16+65 TO STA.18+75-Y1- LT.
FROM STA.12+15 TO STA.13+00-Y2- RT.

DETAIL 5C
FALSE SUMP
(Not to Scale)

STA. 11+85-Y2- LT.

UPGRADE EXISTING SIGNAL

T.I.P.: HL-0008L

TIP NO.	SHEET NO.
HL-0008L	SIGN-1

APPROVED: DocuSigned by: Don A. Parker 75DB9E90ADEF440...

DATE: 3/11/2024 | 9:33 AM EDT

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SIGNING PLAN
WAKE COUNTY

LOCATION: TEN TEN ROAD (SR 1010) AT GRAHAM NEWTON ROAD (SR 1386)/ BELLS LAKE ROAD (SR 1386).

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.50	MOUNTING OF TYPE 'D', 'E' AND 'F' SIGNS ON 'U' CHANNEL POSTS

GENERAL NOTES

- SIGNS FURNISHED BY STATE
- CONFIRM IN WRITING AT LEAST 4 MONTHS IN ADVANCE, THE ACTUAL DATE THE DEPARTMENT FURNISHED SIGNS WILL BE REQUIRED.
- IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.
- WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER
- ALL EXISTING SIGNS ON "U" CHANNEL POST SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.
- THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.
- SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.

SUMMARY OF QUANTITIES

ITEM NO. DESC. NO.	ITEM NO. SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT
4072000000	903	SUPPORTS, 3 LB STEEL U-CHANNEL	L.F.	172.5
4102000000	904	SIGN ERECTION, TYPE E	EA.	18
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	EA.	13

INDEX

PLAN SUBMITTED TO: NCDOT

S. REID DAVIDSON — DIVISION 5 PROJECT MANAGER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PLAN PREPARED BY: TGS ENGINEERS

DON A. PARKER, P.E. — PROJECT ENGINEER

CODA BRANNAN, E.I. — DESIGN TECHNICIAN

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

TIP NO.	SHEET NO.
HL-0008L	SIGN-2

APPROVED: DocuSigned by: Don A. Parker 75DB9E90ADEF440...

DATE: 3/11/2024 | 9:33 AM EDT

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
(SUITE 200)
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

(400) QUANTITY REQ'D _4_

18 x 24
W1-8R

ONE "U" POST PER SIGN
MOUNT BACK TO BACK WITH SIGN 404 IN FOUR INSTALLATIONS

(405) QUANTITY REQ'D _2_

36 X 36 X 36
R1-2

ONE "U" POST PER SIGN

(401) QUANTITY REQ'D _4_

30 x 36
R2-1

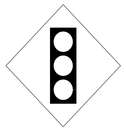
ONE "U" POSTS PER SIGN

(406) QUANTITY REQ'D _1_

36 x 36
W1-2aR

ONE "U" POST PER SIGN

(402) QUANTITY REQ'D _2_



30 x 30
W3-3

ONE "U" POST PER SIGN

(403) QUANTITY REQ'D _1_

36 x 36
W1-2aL

ONE "U" POST PER SIGN

(404) QUANTITY REQ'D _4_

18 x 24
W1-8L

ONE "U" POST PER SIGN
MOUNT BACK TO BACK WITH SIGN 400 IN FOUR INSTALLATIONS

TYPE "E" SIGNS

TIP NO.	SHEET NO.
HL-0008L	SIGN-3

APPROVED: DocuSigned by: Don A. Parker 75DB9E90ADEF440...

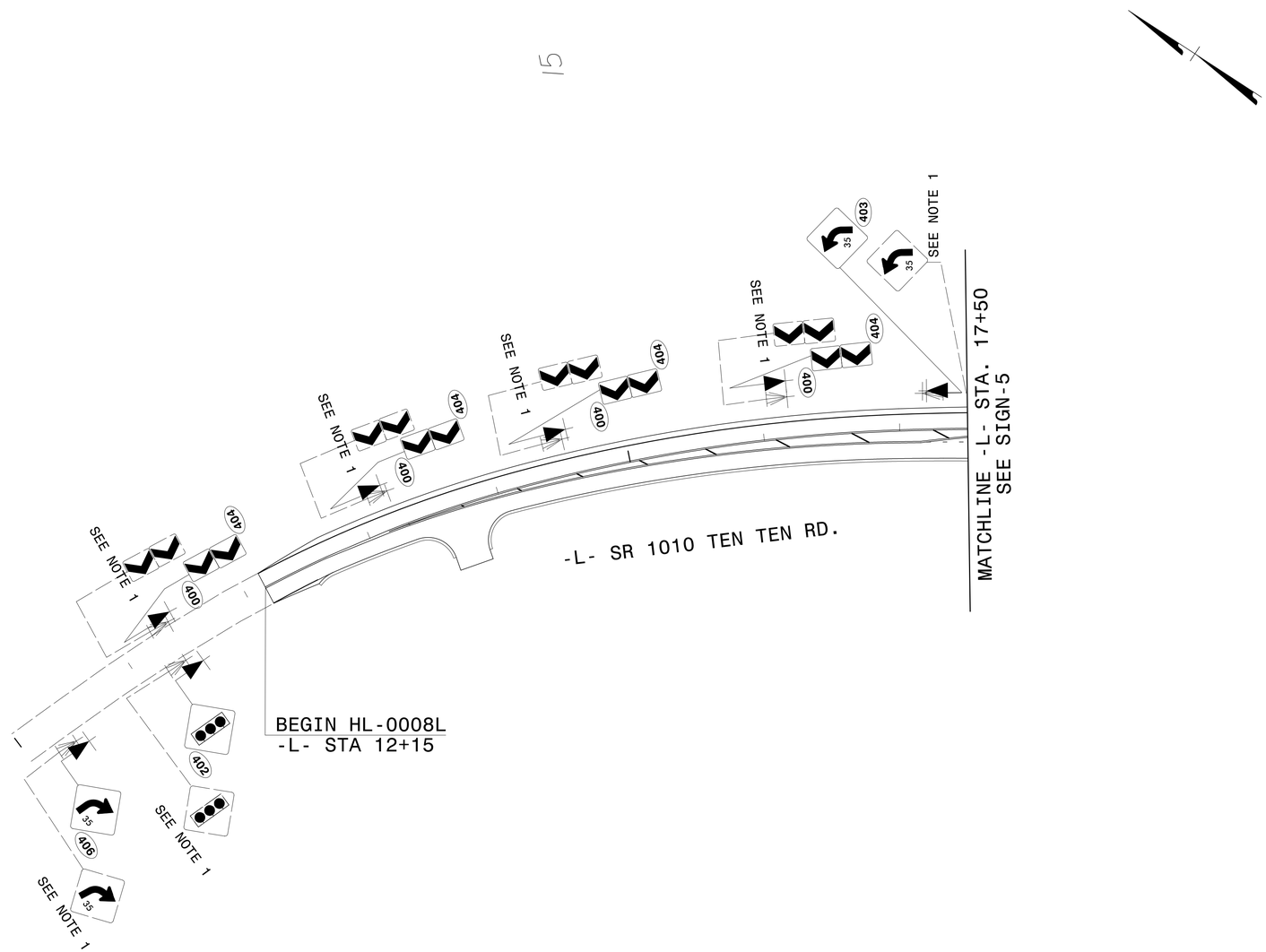
DATE: 3/11/2024 | 9:33 AM EDT

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
(SUITE 200)
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275



PROJECT NOTES

1. DISPOSAL OF SIGN SYSTEM, U-CHANNEL

EXISTING AND PROPOSED SIGNS FROM -L- 12+15 TO 17+50

TIP NO.	SHEET NO.
HL-0008L	SIGN-4

APPROVED: DocuSigned by: Don A. Parker 75DB9E98ADEF440... 3/11/2024 | 9:33 AM EDT

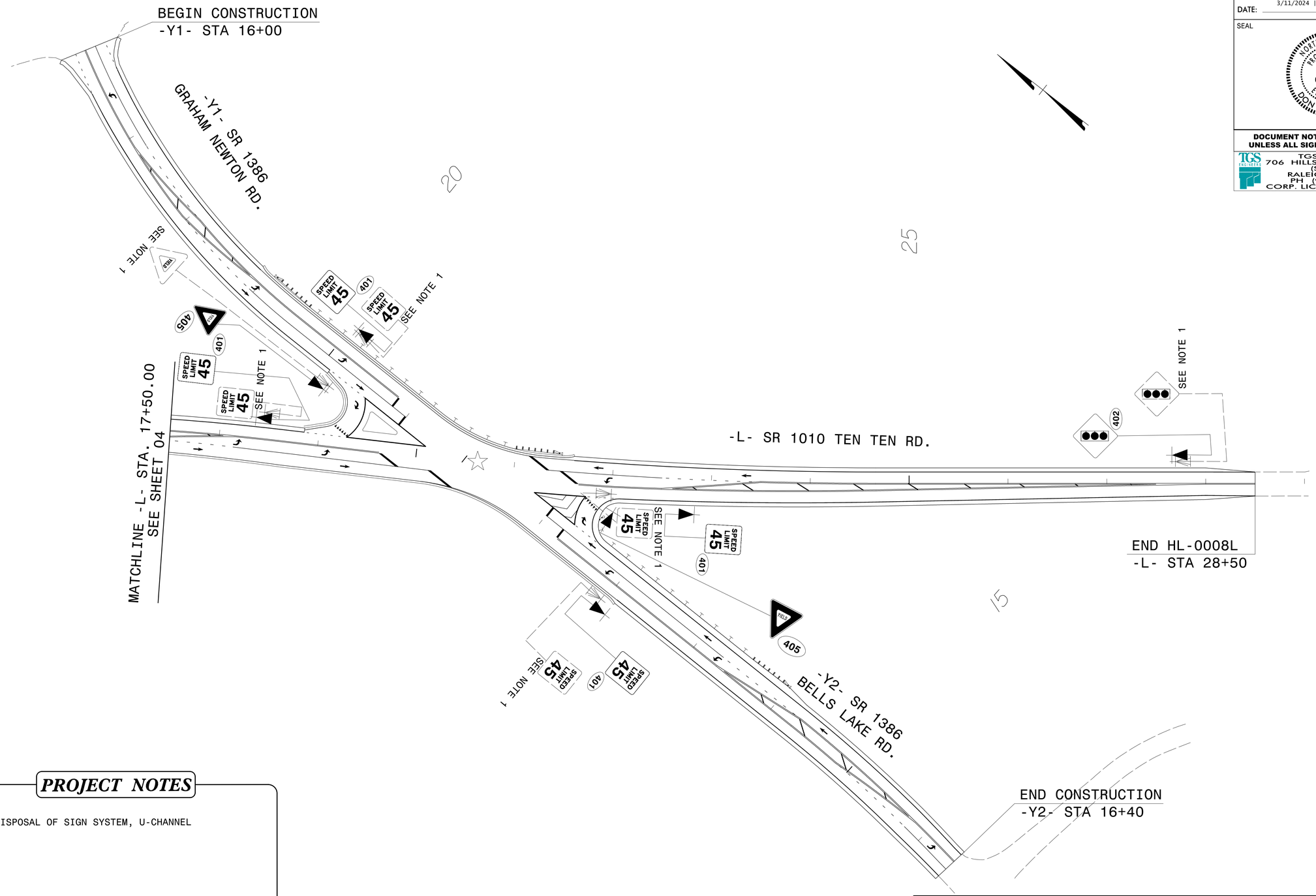
DATE:

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
(SUITE 200)
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275



PROJECT NOTES

1. DISPOSAL OF SIGN SYSTEM, U-CHANNEL

EXISTING AND PROPOSED SIGNS
FROM -L- STA. 20+47 TO 28+50
FROM -Y1- STA. 16+00 TO -Y2- 16+40

03/08/24
X:\NCDOT\Div 5 HL-0008L\Traffic\Signing\CADD\Signing Layout Plans\HL-0008L_Sgn_SGN_Sign04.dgn
User:cbrannon

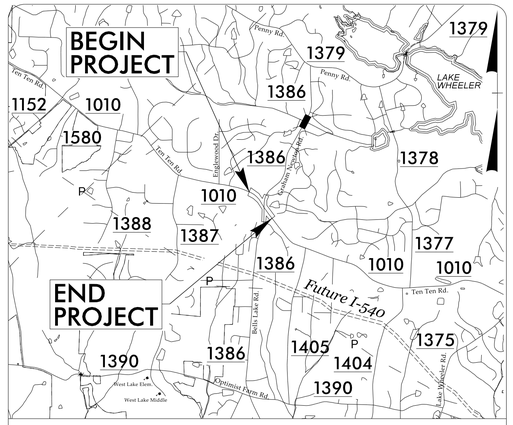
09/08/99

PROJECT: HL-0008L

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HL-0008L	Sig. 1	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

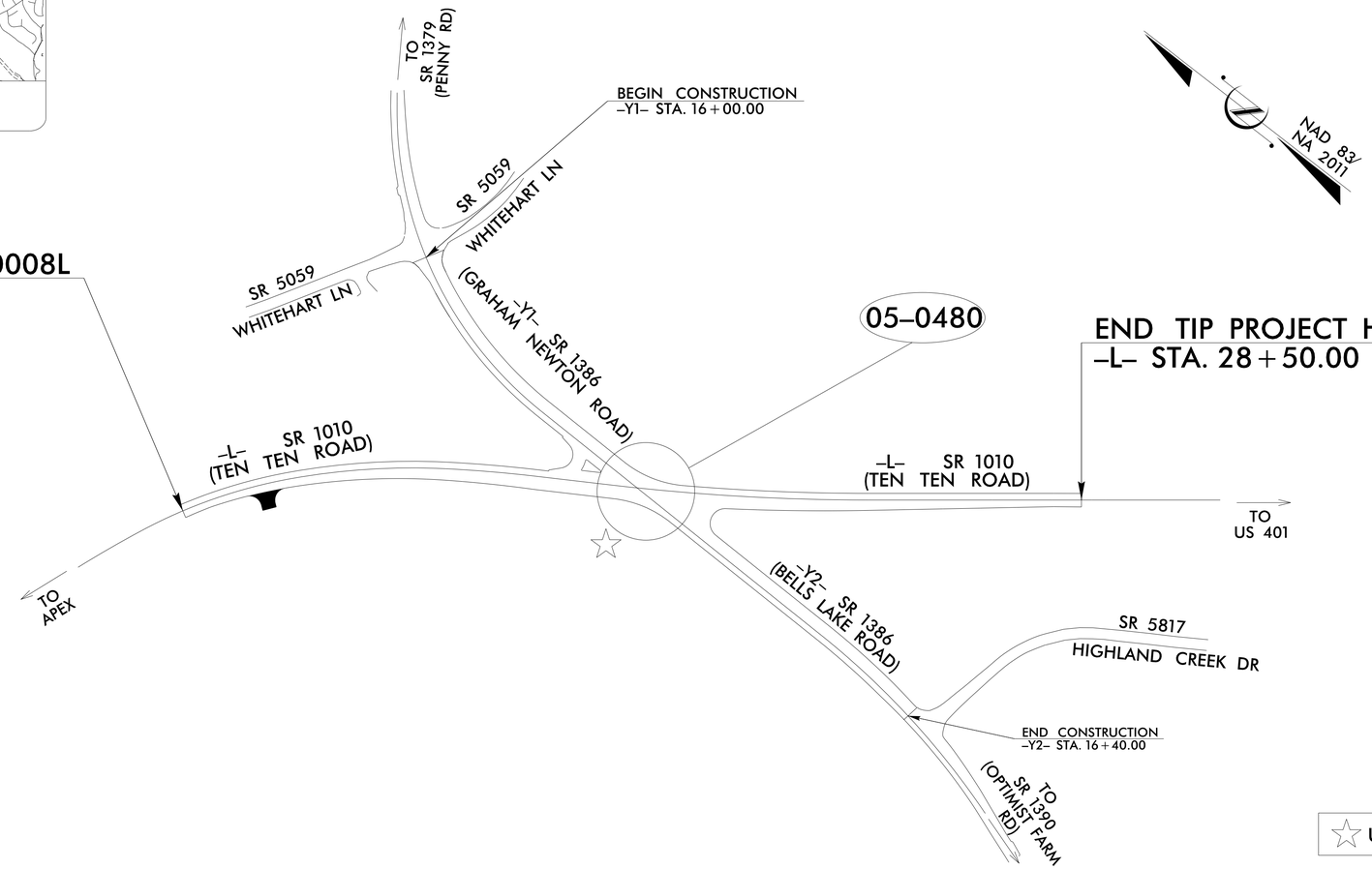
WAKE COUNTY



VICINITY MAP

LOCATION: SR 1010 (TEN TEN ROAD) AT SR 1386 (GRAHAM NEWTON ROAD/ BELLS LAKE ROAD).
WIDEN FOR LEFT-TURN LANE ON EACH APPROACH

TYPE OF WORK: TRAFFIC SIGNAL UPGRADE



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

☆ UPGRADE EXISTING SIGNAL

Index of Plans

Sheet #	Inventory #	Description
Sig. 1.0	--------	Title Sheet
Sig. 2.0-3.2	05-0480	SR 1010 (Ten Ten Rd) at SR 1386 (Graham Newton Road /Bells Lake Rd)

LEGEND

(XX-XXXX) - SIGNAL INVENTORY NUMBER

SIGNAL DESIGN SECTION - TSMO UNIT
Contacts:

Rob Ziemba, PE, CPM
Signals Engineer, Central Region

Keith Mims, PE
Signals Equipment Design Engineer

Prepared for the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY DIVISION
Transportation Mobility and Safety Division · State of North Carolina · Department of Transportation · Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
5410 Trinity Road
Suite 102
Raleigh, NC 27607
Tel:919.866.4951
Fax:919.859.5663
License: C-1652

Jeff Hochanadel, PE, PTOE
Transportation Engineer

Chuck Jones, PE
Transportation Engineer

Quenton Watkins, EI
Transportation Designer

APPROVED: _____
DATE: _____

NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY B. HOCHANADEL

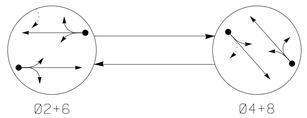
DocuSigned by: Jeff Hochanadel
DA21838TB6794EA...
3/11/2024

10/3/2023
L:\208\207\3885L003-HL-0008L_Traffic_Signals\DWG\hl0008l_sig_tsh.dgn
Chuck.Jones

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	Sig. 2.0

2 Phase
Fully Actuated
Bells Lake Road @ NC 540
Signal System Number: D05-31_Apex

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+6	PHASE 04+8	FLASH
21,22,23	G	R	Y
41,42	R	G	R
61,62,63	G	R	Y
81,82,83	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

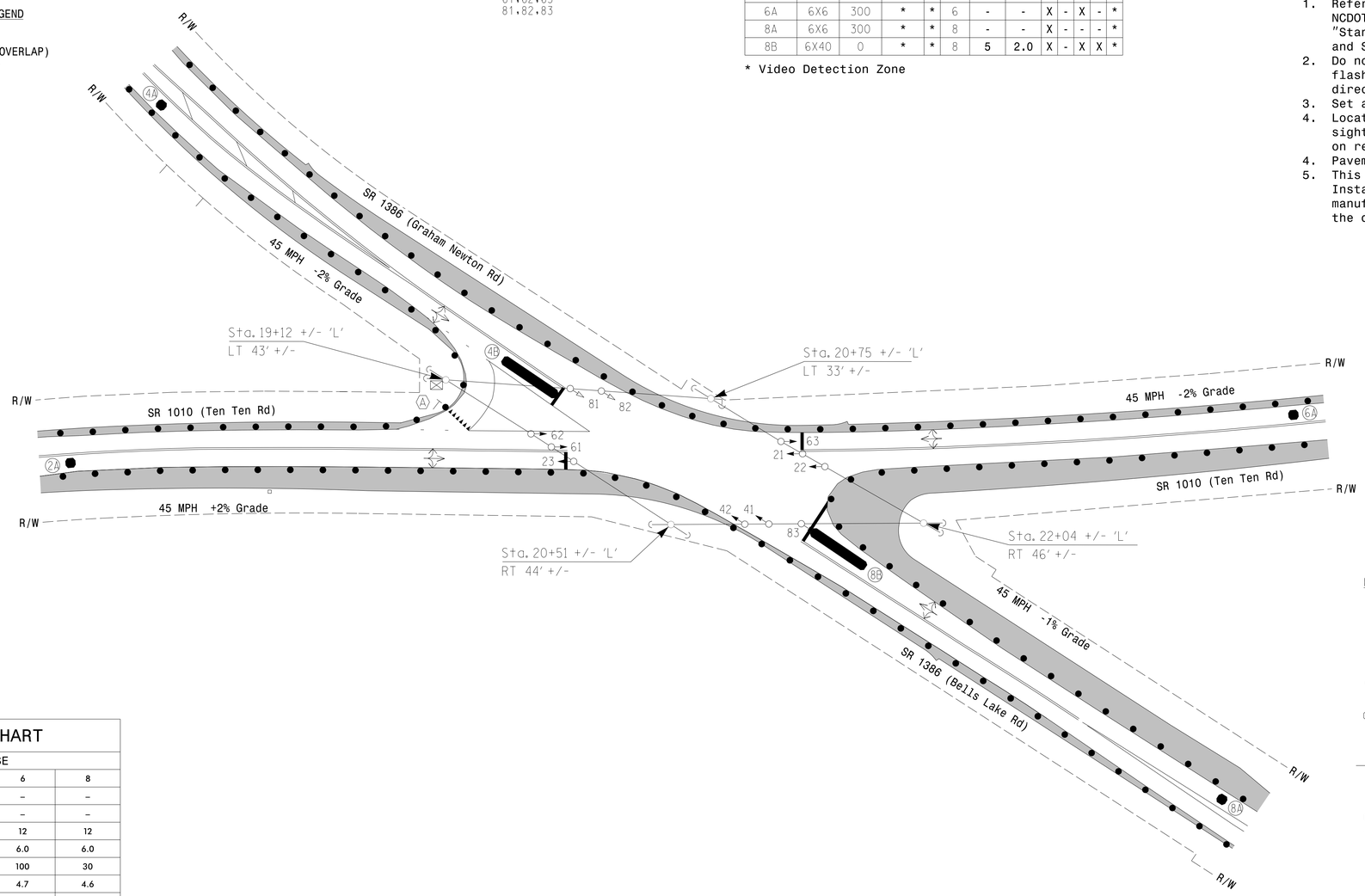
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	*	*	2	-	-	X	-	X	-	*
4A	6X6	300	*	*	4	-	-	X	-	-	-	*
4B	6X40	0	*	*	4	5	2.0	X	-	X	X	*
6A	6X6	300	*	*	6	-	-	X	-	X	-	*
8A	6X6	300	*	*	8	-	-	X	-	-	-	*
8B	6X40	0	*	*	8	5	2.0	X	-	X	X	*

* Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Pavement markings are existing.
5. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Video Detection Area	
	Construction Zone Drums	
	Construction Zone	
A	"YIELD" Sign (R1-2)	A

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Walk *	–	–	–	–
Ped Clear *	–	–	–	–
Min Green	12	12	12	12
Passage *	6.0	6.0	6.0	6.0
Max 1 *	100	30	100	30
Yellow Change	4.3	4.7	4.7	4.6
Red Clear	1.6	1.4	1.9	1.9
Added Initial *	2.5	–	2.5	–
Maximum Initial *	34	–	34	–
Time Before Reduction *	15	5	15	5
Time To Reduce *	45	20	45	20
Minimum Gap	3.0	3.0	3.0	3.0
Advance Walk	–	–	–	–
Non Lock Detector	–	X	–	X
Vehicle Recall	MIN RECALL	–	MIN RECALL	–
Dual Entry	–	X	–	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

10/2/2023
11:20:26 AM
Chuck.Jones
I:\PROJECTS\38851.003-HL-0008L_Traffic.Signals\MWGW05-0480gt.dgn

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
5410 Trinity Road
Suite 102
Raleigh, NC 27607
Tel:919.866.4951
Fax:919.859.5663
License: C-1652

Signal Upgrade - Temporary Design

Prepared for the Offices of:
Transportation Mobility and Safety Division
State of North Carolina Department of Transportation
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1010 (Ten Ten Rd)
at
SR 1386 (Graham Newton Rd / Bells Lake Rd)

Division 5 Wake County Cary

PLAN DATE: October 2023 REVIEWED BY: J Hochanadel
PREPARED BY: C Jones REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

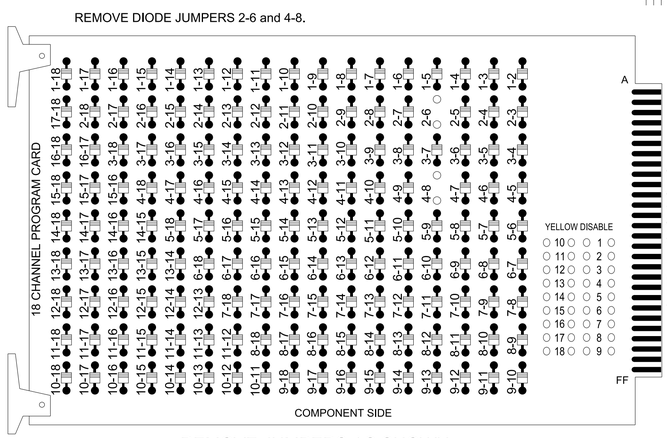
DocuSigned by:
Jeff Hochanadel
DA2183875B794EA...
SIGNATURE 3/11/2024 DATE

SIG. INVENTORY NO. 05-0480T

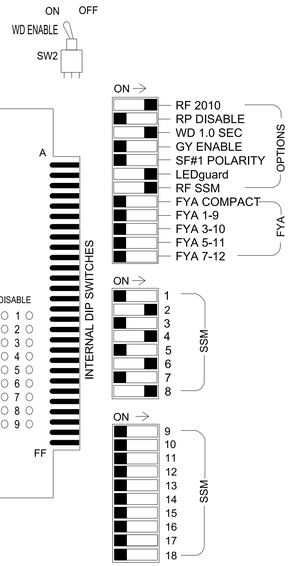
PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	Sig. 2.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
5. The cabinet and controller are part of the Bells Lake Road @ NC 540 Signal System Number: D05-31 Apex.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S2, S5, S8, S11
Phases Used.....2,4,6,8
Overlap "1".....NOT USED
Overlap "2".....NOT USED
Overlap "3".....NOT USED
Overlap "4".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22 23	NU	NU	41,42	NU	NU	61,62 63	NU	NU	81,82 83	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
FLASHING YELLOW ARROW																		
GREEN ARROW																		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTES

1. For detector zones 2A, 2B, 4A, 4B, 6A, 6B, 8A, and 8B, install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0480T
DESIGNED: October 2023
SEALED: 3/11/2024
REVISED:

Electrical Detail - Temporary Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

SR 1010 (Ten Ten Road)
at
SR 1386 (Graham Newton Road/ Bells Lake Road)

Division 5 | Wake County | Cary

PLAN DATE: October 2023 | REVIEWED BY: J Hochanadel
PREPARED BY: C Jones | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

DocuSigned by: Jeff Hochanadel
DA21B3B7B67B4EA...
SIGNATURE 3/11/2024 DATE

SIG. INVENTORY NO. 05-0480T

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

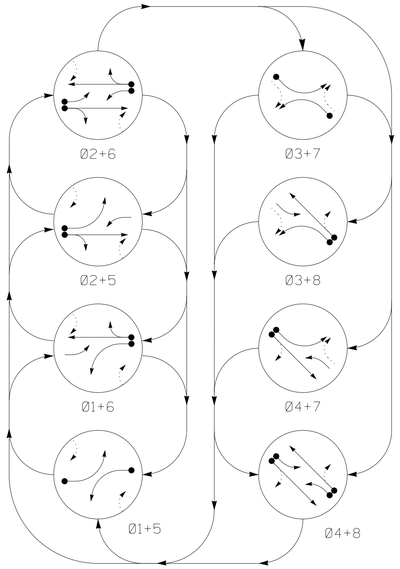
5410 Trinity Road
Suite 102
Raleigh, NC 27607
Tel:919.866.4951
Fax:919.859.5663
License: C-1652

10/2/2023
U:\2018\0172438851.003-HL-0008L_Traffic_Signals\DWG\D05-0480et.dgn
Chuck.Jones

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	Sig. 3.0

8 Phase
Fully Actuated
Bells Lake Road @ NC 540
Signal System Number: D05-31_Apex

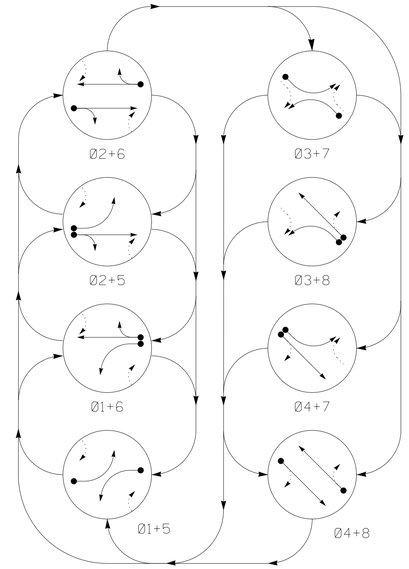
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	F Y	F Y	R	R	R	R	Y
21,22,23	R	R	G	G	R	R	R	Y	
31	R	R	R	R	←	←	F Y	F Y	R
41,42	R	R	R	R	R	R	G	G	R
51	←	F Y	←	F Y	R	R	R	R	Y
61,62,63	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	←	F Y	←	F Y	R
81,82,83	R	R	R	R	R	G	R	G	R

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	R	R	R	R	R	R	Y
21,22,23	R	R	G	G	R	R	R	Y	
31	R	R	R	R	←	←	R	R	R
41,42	R	R	R	R	R	R	G	G	R
51	←	R	←	R	R	R	R	R	Y
61,62,63	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	←	R	←	R	R
81,82,83	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

11
31
51
71

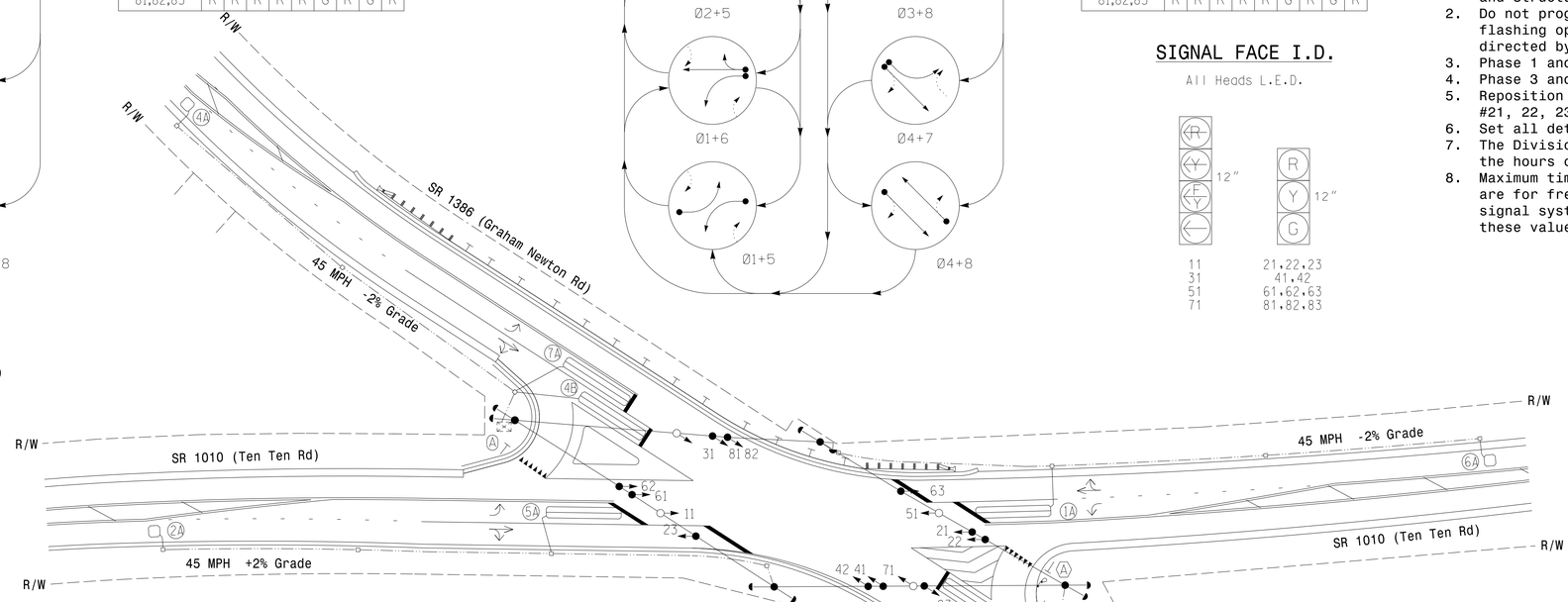
21,22,23
41,42
61,62,63
81,82,83

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal heads numbered #21, 22, 23, 41, 42, 61, 62, 81, and 82.
6. Set all detector units to presence mode.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	X	1	15*	-	X	-	X	-	X
					6#	3	-	X	-	X	X	X
2A	6X6	300	6	X	2	-	-	X	X	X	-	X
3A	6X40	0	2-4-2	X	3	15*	-	X	-	X	-	X
					8#	3	-	X	-	X	-	X
4A	6X6	300	4	X	4	-	-	X	-	-	-	X
4B	6X40	0	2-4-2	X	4	5	2.0	X	-	X	X	X
5A	6X40	0	2-4-2	X	5	15*	-	X	-	X	-	X
					2#	3	-	X	-	X	X	X
6A	6X6	300	6	X	6	-	-	X	X	X	-	X
7A	6X40	0	2-4-2	X	7	15*	-	X	-	X	-	X
					4#	3	-	X	-	X	-	X
8A	6X6	0	2-4-2	X	8	-	-	X	-	-	-	X
8B	6X40	300	6	X	8	5	2.0	X	-	X	X	X

*Reduce delay to 3 seconds during Alternate Phasing Operation.
#Disable Phase Call for loops during Alternate Phasing Operation.

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Walk *	–	–	–	–	–	–	–	–
Ped Clear *	–	–	–	–	–	–	–	–
Min Green	7	12	7	12	7	12	7	12
Passage *	2.0	6.0	2.0	6.0	2.0	6.0	2.0	6.0
Max 1 *	20	100	20	30	20	100	20	30
Yellow Change	3.0	4.7	3.2	4.7	3.0	4.7	3.3	4.7
Red Clear	2.4	1.7	3.5	2.2	2.4	1.7	3.6	2.2
Added Initial *	–	2.5	–	–	–	2.5	–	–
Maximum Initial *	–	34	–	–	–	34	–	–
Time Before Reduction *	–	15	–	5	–	15	–	5
Time To Reduce *	–	45	–	20	–	45	–	20
Minimum Gap	–	3.0	–	3.0	–	3.0	–	3.0
Advance Walk	–	–	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	X	–	X	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–	–
Dual Entry	–	–	–	X	–	–	–	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
	"YIELD" Sign (R1-2)	

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
5410 Trinity Road
Suite 102
Raleigh, NC 27607
Tel:919.866.4951
Fax:919.859.5663
License: C-1652

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40
1"=40'

SR 1010 (Ten Ten Rd)
at
SR 1386 (Graham Newton Rd / Bells Lake Rd)

Division 5 Wake County Cary

PLAN DATE:	October 2023	REVIEWED BY:	J Hochanadel
PREPARED BY:	C Jones	REVIEWED BY:	C Lawson

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY A. HOCHANADEL

DocuSigned by: Jeff Hochanadel
DA218387B6794EA
3/11/2024
SIGNATURE DATE

SIG. INVENTORY NO. 05-0480

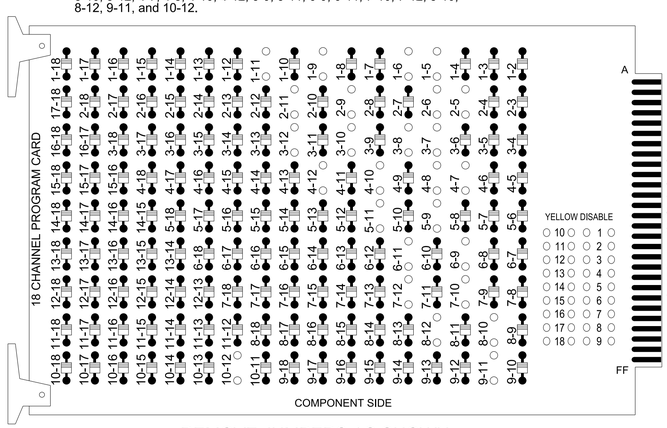
10/2/2023
L:\Projects\#38851.003-HL-0008L_Traffic_Signals\DGN\D05-0480g.dgn
Chuck Jones

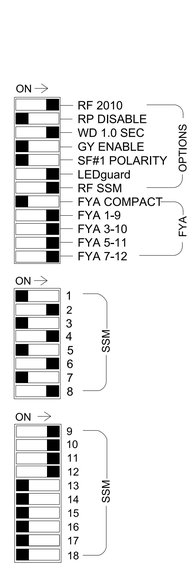
PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	Sig. 3.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.





REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Load the default database prior to programming the controller.
3. Program phases 4 and 8 for Dual Entry.
4. Program controller to start up in phases 2 Green No Walk and 6 Green No Walk.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the Bells Lake Road @ NC 540 Signal System Number: D05-31_Apex.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S4, S5, S7, S8, S10, S11
AUX S1, AUX S2, AUX S4, AUX S5
Phases Used.....1, 2, 3, 4, 5, 6, 7, 8
Overlap "1".....1+2
Overlap "2".....3+4
Overlap "3".....5+6
Overlap "4".....7+8

*See overlap programming detail on sheet 2

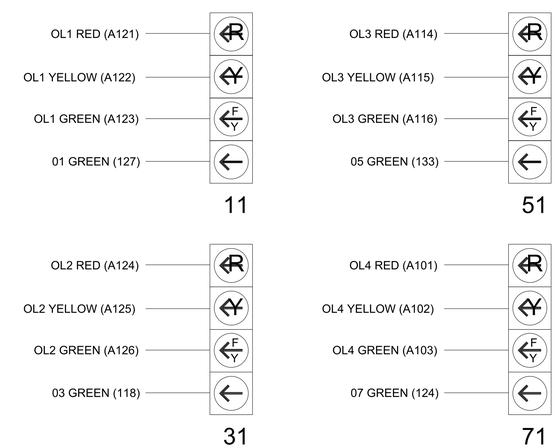
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22 23	NU	31★	41,42	NU	51★	61,62 63	NU	71★	81,82 83	NU	11★	31★	NU	51★	71★	NU
RED		128			101			134			107							
YELLOW	*	129		*	102		*	135		*	108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127			118			133			124								

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.
★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	ø 1 1A	ø 2 2A	SLOT EMPTY	SLOT EMPTY	ø 3 3A	ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED			NOT USED	ø 4 4B								ST DC ISOLATOR
FILE "J"	U	ø 5 5A	ø 6 6A	SLOT EMPTY	SLOT EMPTY	ø 7 7A	ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED			NOT USED	ø 8 8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6	3		X		X	X
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
3A	TB4-5,6	I5U	58	20	7 ★	3	15		X		X	
				-	30 ★	8	3		X		X	
4A	TB4-9,10	I6U	41	3	8	4			X			
4B	TB4-11,12	I6L	45	7	9	4	5	2.0	X		X	X
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2	3		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
7A	TB5-5,6	J5U	57	19	21 ★	7	15		X		X	
				-	32 ★	4	3		X		X	
8A	TB5-9,10	J6U	42	4	22	8			X			
8B	TB5-11,12	J6L	46	8	23	8	5	2.0	X		X	X

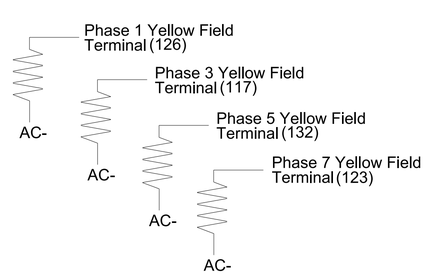
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0480
DESIGNED: October 2023
SEALED: 3/11/2024
REVISED:

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
5410 Trinity Road
Suite 102
Raleigh, NC 27607
Tel:919.866.4951
Fax:919.859.5663
License: C-1652

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

SR 1010 (Ten Ten Road)
at
SR 1386 (Graham Newton Rd / Bells Lake Rd)

Division 5 | Wake County | Cary

PLAN DATE: October 2023 | REVIEWED BY: J Hochanadel
PREPARED BY: C Jones | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

DocuSigned by: Jeff Hochanadel
DA21B1B7B6784EA...
SIGNATURE | DATE 3/11/2024
SIG. INVENTORY NO. 05-0480

10/2/2023
L:\29058_2018\38851.003-HL-0008L_Traffic_Signals\DWG\#D5-0480a.dgn
Chuck.Jones

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	Sig. 3.2

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 3A, 5A & 7A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

1A

Detector	Call Phase	Delay
1	1	0
29	0	3

3A

Detector	Call Phase	Delay
7	3	0
30	0	3

5A

Detector	Call Phase	Delay
15	5	0
31	0	3

7A

Detector	Call Phase	Delay
21	7	0
32	0	3

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases for heads 11, 31, 51, and 71 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division and/or Town Traffic Engineer.

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	-	-	-	-
Modifier Phases	1	3	5	7
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

NOTICE INCLUDED PHASE

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8
Modifier Phases	1	3	5	7
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0480
DESIGNED: October 2023
SEALED: 3/11/2024
REVISED:

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
5410 Trinity Road
Suite 102
Raleigh, NC 27607
Tel:919.866.4951
Fax:919.859.5663
License: C-1652

Electrical and Programming Details For:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SR 1010 (Ten Ten Road)
at
SR 1386 (Graham Newton Rd / Bells Lake Rd)

Division 5 | Wake County | Cary

PLAN DATE:	October 2023	REVIEWED BY:	J Hochanadel
PREPARED BY:	C Jones	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

DocuSigned by: Jeff Hochanadel
DA2183878673 4EA
SIGNATURE 3/11/2024 DATE

SIG. INVENTORY NO. 05-0480

10/2/2023
L:\480\201\33851.003-HL-0008L_Traffic_Signals\DGNS\05-0480a.dgn
Chuck.Jones

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	SCP. 1

1 INSTALL COAX CABLE
2 INSTALL ETHERNET CABLE
3 EXISTING ETHERNET (OR COAX) CABLE
4 INSTALL SMFO CABLE
5 EXISTING SMFO CABLE
6 INSTALL FIBER OPTIC DROP CABLE
7 INSTALL TRACER WIRE
8 TRENCH
9 INSTALL PVC CONDUIT
10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12 INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13 INSTALL OUTER–DUCT POLYETHYLENE CONDUIT
14 INSTALL POLYETHYLENE CONDUIT
15 DIRECTIONAL DRILL CONDUIT
16 BORE AND JACK CONDUIT
17 INSTALL CABLE(S) IN EXISTING CONDUIT
18 INSTALL CABLE(S) IN NEW CONDUIT
19 INSTALL CABLE(S) IN EXISTING RISER
20 INSTALL CABLE(S) IN NEW RISER
21 INSTALL CABLE(S) IN EXISTING CONDUIT STUB–OUTS
22 INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
23 INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
24 INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26 INSTALL NEW ETHERNET EDGE SWITCH
27 INSTALL NEW FIBER OPTIC TRANSCEIVER
28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPLICE CABLE IN CABINET
29 INSTALL UNDERGROUND SPLICE ENCLOSURE
30 INSTALL AERIAL SPLICE ENCLOSURE
31 MODIFY EXISTING INTERCONNECT CENTER /SPLICE ENCLOSURE
32 INSTALL POLE MOUNTED SPLICE CABINET
33 INSTALL BASE MOUNTED SPLICE CABINET
34 INSTALL CABINET FOUNDATION
35 INSTALL CCTV CAMERA POLE MOUNTED CABINET
36 INSTALL CCTV CAMERA ASSEMBLY
37 INSTALL CCTV CAMERA WOOD POLE
38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
39 INSTALL JUNCTION BOX
40A INSTALL OVERSIZED JUNCTION BOX
40B INSTALL SPECIAL OVERSIZED JUNCTION BOX (36″ x 24″ x 24″)
41 REMOVE EXISTING JUNCTION BOX
42 INSTALL WOOD POLE
43 REMOVE EXISTING WOOD POLE
44 INSTALL AERIAL GUY ASSEMBLY
45 INSTALL STANDARD GUY ASSEMBLY
46 INSTALL SIDEWALK GUY ASSEMBLY
47 INSTALL MESSENGER CABLE
48A REMOVE EXISTING MESSENGER CABLE
48B REMOVE EXISTING COMMUNICATIONS CABLE
49 BACK PULL EXISTING COMMUNICATIONS CABLE
50 INSTALL CELL MODEM AND ANTENNA
51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
52A INSTALL DELINEATOR MARKER
52B INSTALL JUNCTION BOX MARKER
53A STORE 20 FEET OF COMMUNICATIONS CABLE
53B STORE 50 FEET OF EACH COMMUNICATIONS CABLE
54 LASH CABLE(S) TO EXISTING COMMUNICATIONS CABLE AND MESSENGER
55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
56 LASH CABLE(S) TO NEW MESSENGER CABLE
57 MODIFY EXISTING ELECTRICAL SERVICE
58 INSTALL NEW ELECTRICAL SERVICE
59 INSTALL NEW EQUIPMENT CABINET DISCONNECT
60 BOND TRACER WIRE TO EQUIPMENT GROUND BUS
61 DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS
62 BOND RISER AND MESSENGER CABLE TO POLE GROUND
63 BOND RISER TO POLE GROUND
64 BOND MESSENGER CABLE TO POLE GROUND
65 INSTALL HEAT SHRINK TUBING RETROFIT KIT
66 INSTALL MOLDABLE DUCT SEAL
67 SLACK SPAN

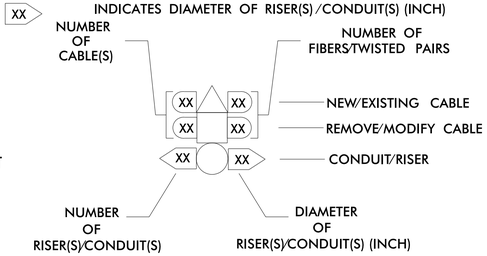
LEGEND

FO — NEW FIBER OPTIC COMMUNICATIONS CABLE
EXI — EXISTING COMMUNICATIONS CABLE
REM — EXISTING COMMUNICATIONS CABLE TO BE REMOVED
NEW AERIAL GUY ASSEMBLY
NEW CONDUIT
EXISTING CONDUIT
DD — NEW DIRECTIONAL DRILLED CONDUIT

NEW		EXISTING
	OVERSIZED JUNCTION BOX	
	WOOD POLE	
S	AERIAL SPLICE ENCLOSURE	S
S	UNDERGROUND SPLICE ENCLOSURE	S
	METAL POLE	
	CCTV ASSEMBLY	
	STANDARD GUY ASSEMBLY	
	SIDEWALK GUY ASSEMBLY	
	CABLE STORAGE RACKS (SNOW SHOES)	
	SIGNAL/EQUIPMENT CABINET	
S	SPLICE CABINET	S
	FLAT PANEL ANTENNA (SINGLE)	
	YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION	
	YAGI ANTENNA (SINGLE)	
	OMNI ANTENNA	
SP	SIGNAL POLE	SP
XX–XXXX	SIGNAL INVENTORY NUMBER	XX–XXXX

CONSTRUCTION NOTE SYMBOLOGY KEY

XX — INDICATES NUMBER OF CABLES, LOOPS, ETC.
XX — INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
XX — INDICATES NUMBER OF RISER(S)/CONDUIT(S)
XX — INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



ATTACHMENT POINT:

XX″/SS / YYY — DISTANCE ABOVE (IN)/ATTACHMENT POINT REFERENCE POINT
YYY / XX″/SS — REFERENCE POINT DISTANCE BELOW (IN)/ATTACHMENT POINT

"SS" REFERENCE LOCATION	
FS =	FRONT SIDE OF POLE
BS =	BACK SIDE OF POLE

NC Dept of Transportation
Division of Highways
Final Drawing Date: 3/15/2024
DocuSigned by: Robert J Stone
ITS & Signals Unit

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
5410 Trinity Road
Suite 102
Raleigh, NC 27607
Tel:919.866.4951
Fax:919.859.5663
License: C-1652

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONSTRUCTION NOTES

Division 5 Wake County Cary

PLAN DATE:	October 2023	REVIEWED BY:	J Hochanadel
PREPARED BY:	N Pradhan	REVIEWED BY:	

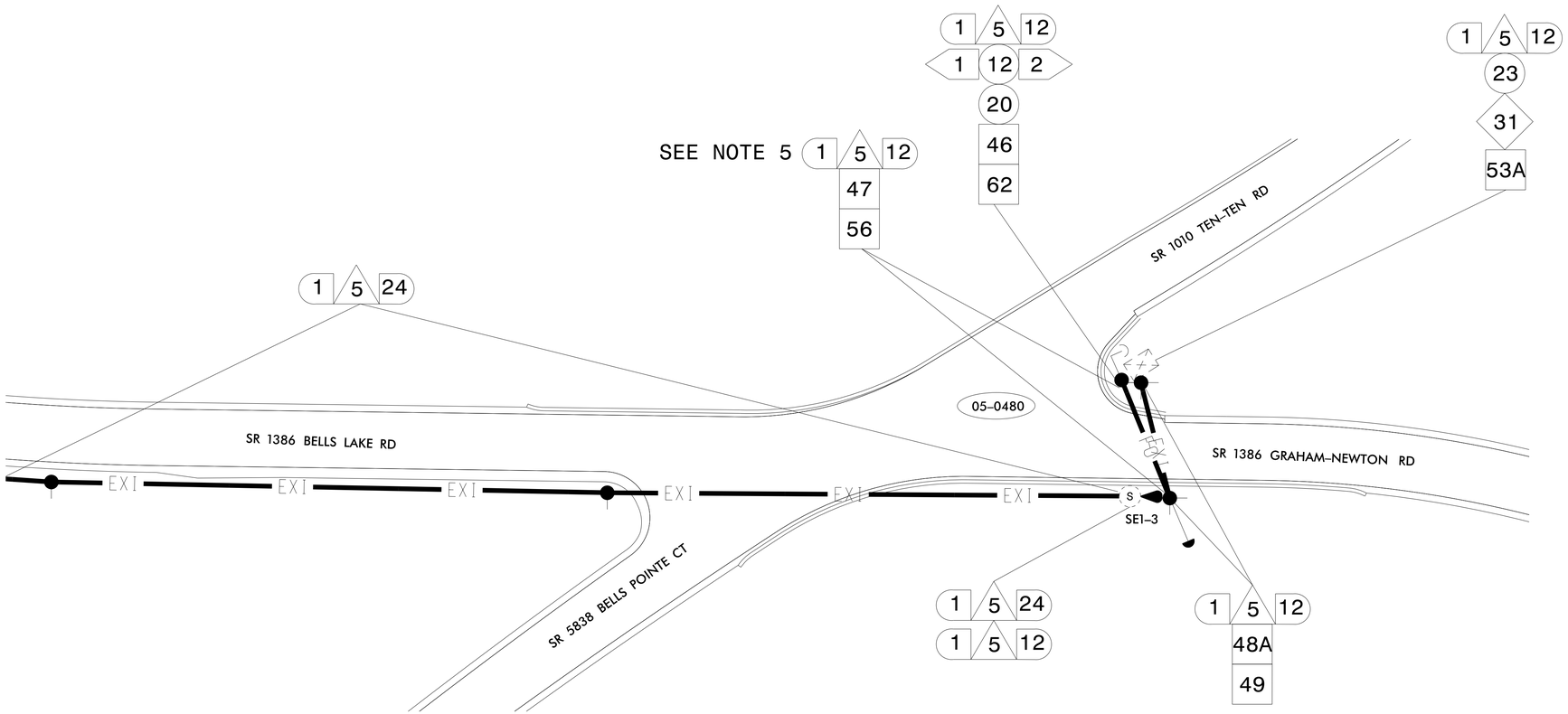
SCALE: NTS

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

DocuSigned by: Jeff Hochanadel
DA218387B6704EA...
SIGNATURE 3/11/2024 DATE

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	SCP. 2



NOTES:

1) NOTIFY THE NCDOT DIVISION 5 TRAFFIC ENGINEER, AT 919-536-4000 EIGHT (8) WEEKS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEM COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) UNLESS OTHERWISE NOTED, ALL CABLE ATTACHMENT POINTS SHALL BE 40" BELOW POWER LINES.

4) RE-USE EXISTING FIBER OPTIC DROP CABLES, INTERCONNECT CENTER, PATCH PANEL, JUMPERS, FUSION SPLICE CABLE AND ETHERNET SWITCH.

5) DISCONNECT THE EXISTING 12-FIBER DROP FROM THE CABINET PATCH PANEL. BACKPULL THE DISCONNECTED 12-FIBER DROP TO THE EXISTING AERIAL SPLICE ENCLOSURE (SE1-3). REROUTE BACK PULLED CABLE TO EXISTING CABINET AS SHOWN.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 3/15/2024
DocuSigned by:
ITS & Signals Unit

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
5410 Trinity Road
Suite 102
Raleigh, NC 27607
Tel:919.866.4951
Fax:919.859.5663
License: C-1652

Prepared for the Offices of:
Transportation Mobility and Safety Division
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 NTS

SIGNAL SYSTEM D05-31_Apex
COMMUNICATIONS CABLE
AND CONDUIT ROUTING PLAN

Division 5 Wake County Cary
PLAN DATE: October 2023 REVIEWED BY: J Hochanadel
PREPARED BY: N Pradhan REVIEWED BY:

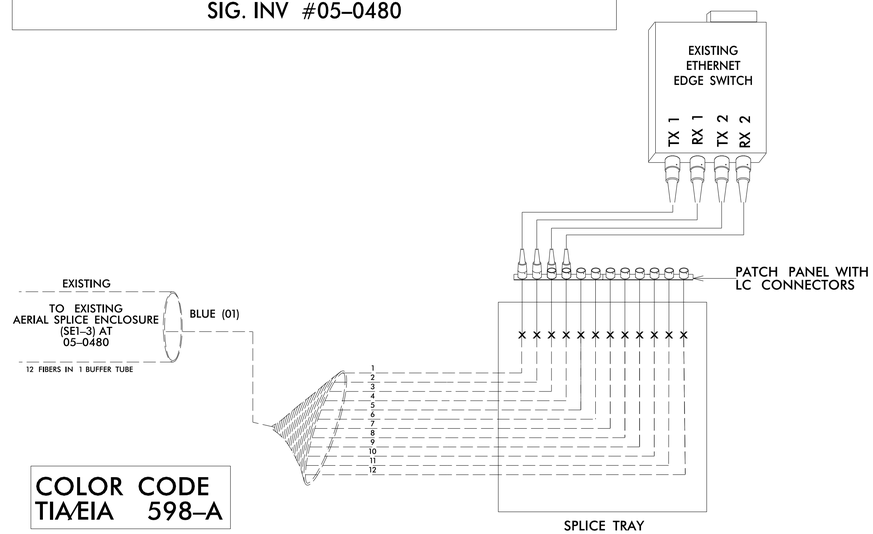
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL
DocuSigned by: Jeff Hochanadel
DA218587867844EA
SIGNATURE 3/11/2024 DATE
SIG. INVENTORY NO.

10/18/23
L:\42854207\38851.003-HL-0008L_Traffic_Signals\DWG\03 - Cable Routing\CR Plans.dgn
Chuck.Jones

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	SCP. 3

EXISITNG CONTROLLER CABINET
BELLS LAKE RD /GRAHAM NEWTON RD /
BELLS POINTE CT
SIG. INV #05-0480



COLOR CODE
TIA/EIA 598-A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND

X = FUSION SPLICE
C = CAP IN TRAY
E = EXISTING SPLICE

NOTES:

1) NOTIFY THE NCDOT DIVISION 5 TRAFFIC ENGINEER, AT 919-536-4000 EIGHT (8) WEEKS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEM COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

   1) SPLICE LOCATION
   2) DATE
   3) COMPANY
   5) NAME OF INDIVIDUAL PERRORMING THE SPLICING

   PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

4) SEE CABLE ROUTING PLANS FOR SPLICE LOCATION.

5) REUSE EXISTING ETHERNET SWITCH.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 3/15/2024
DocuSigned by:
ITS & Signals Unit

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
5410 Trinity Road
Suite 102
Raleigh, NC 27607
Tel:919.866.4951
Fax:919.859.5663
License: C-1652

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE
0
NTS

SIGNAL SYSTEM D05-31_APEX
COMMUNICATION CABLE
AND CONDUIT ROUTING PLANS

Division 5 Wake County Cary

PLAN DATE:	October 2023	REVIEWED BY:	J Hochanadel
PREPARED BY:	N Pradhan	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL
DocuSigned by:
Jeff Hochanadel
DA218387B6784EA
3/11/2024
SIGNATURE DATE
SIG. INVENTORY NO.

10/18/23
L:\2016\2074\38851.003-HL-0008L_Traffic_Signals\DWG\3 - Cable Routing\CR Plans.dgn
Chuck.Jones

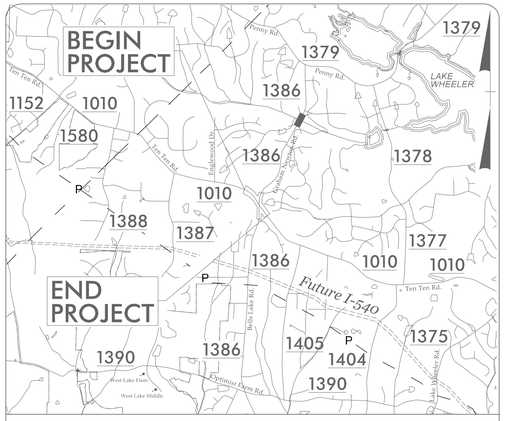
TIP PROJECT: HL-0008L

T.I.P. NO.	SHEET NO.
HL-0008L	UO-1

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET IS DONE BY OTHERS.
NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

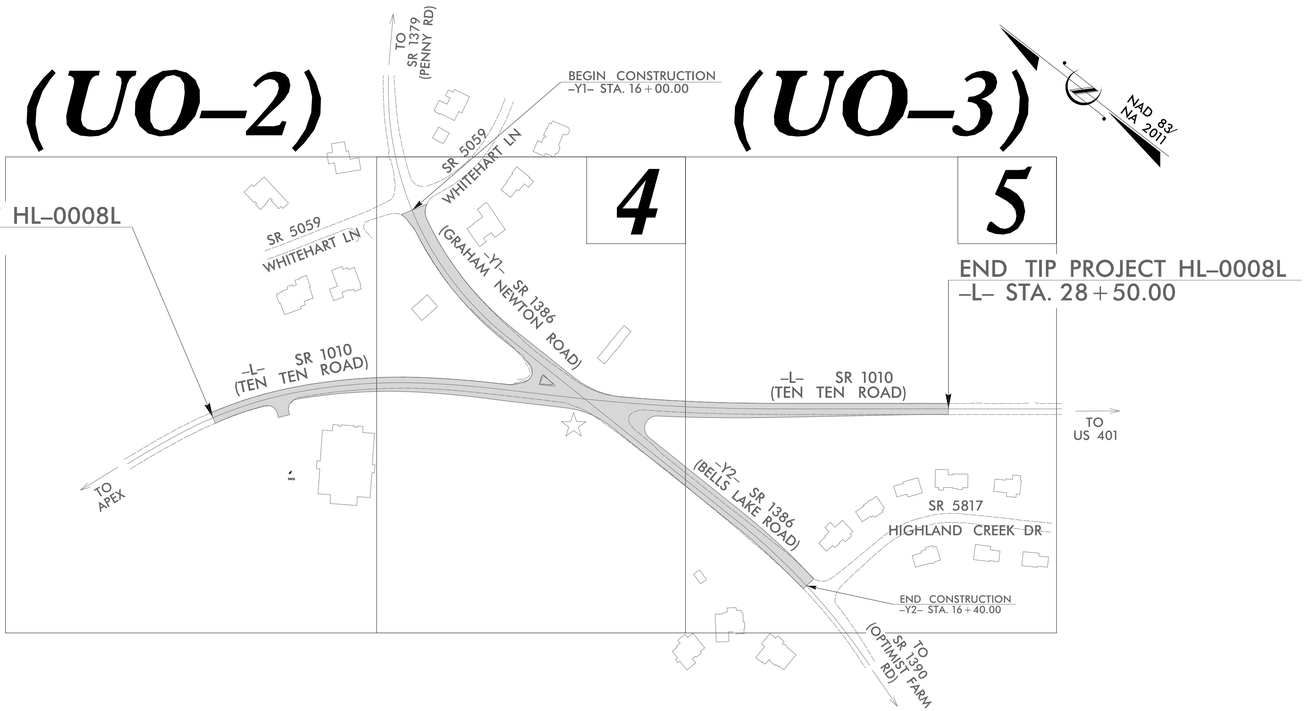
UTILITIES BY OTHERS PLANS
WAKE COUNTY



VICINITY MAP

LOCATION: TEN TEN ROAD (SR 1010) AT GRAHAM NEWTON ROAD (SR 1386) /BELLS LAKE ROAD (SR 1386). WIDEN FOR LEFT TURN LANE ON EACH APPROACH

TYPE OF WORK: UTILITIES BY OTHERS RELOCATIONS



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2 THRU UO-3	UBO PLAN SHEETS

UTILITY OWNERS WITH CONFLICTS

(A) TELECOM - MCNC
(B) WATER - AQUA (PRIVATE)
(C) TELECOM - AT&T
(D) TELECOM - CHARTER SPECTRUM

PREPARED IN THE OFFICE OF:

HINDE ENGINEERING
License No. C-2639
401 Harrison Oaks Blvd., Suite 220 Cary, NC 27513
(919)-653-0001

Clint L. Stevens, PE	UTILITY COORDINATION PROJECT MANAGER
Harris Winters	PROJECT UTILITY COORDINATOR
James N. Arnold	PROJECT UTILITY DESIGNER

DIVISION OF HIGHWAYS
DIVISION 5
2612 DUKE STREET
DURHAM, NC 27704
PHONE (919) 317-4700
FAX (919) 317-4710

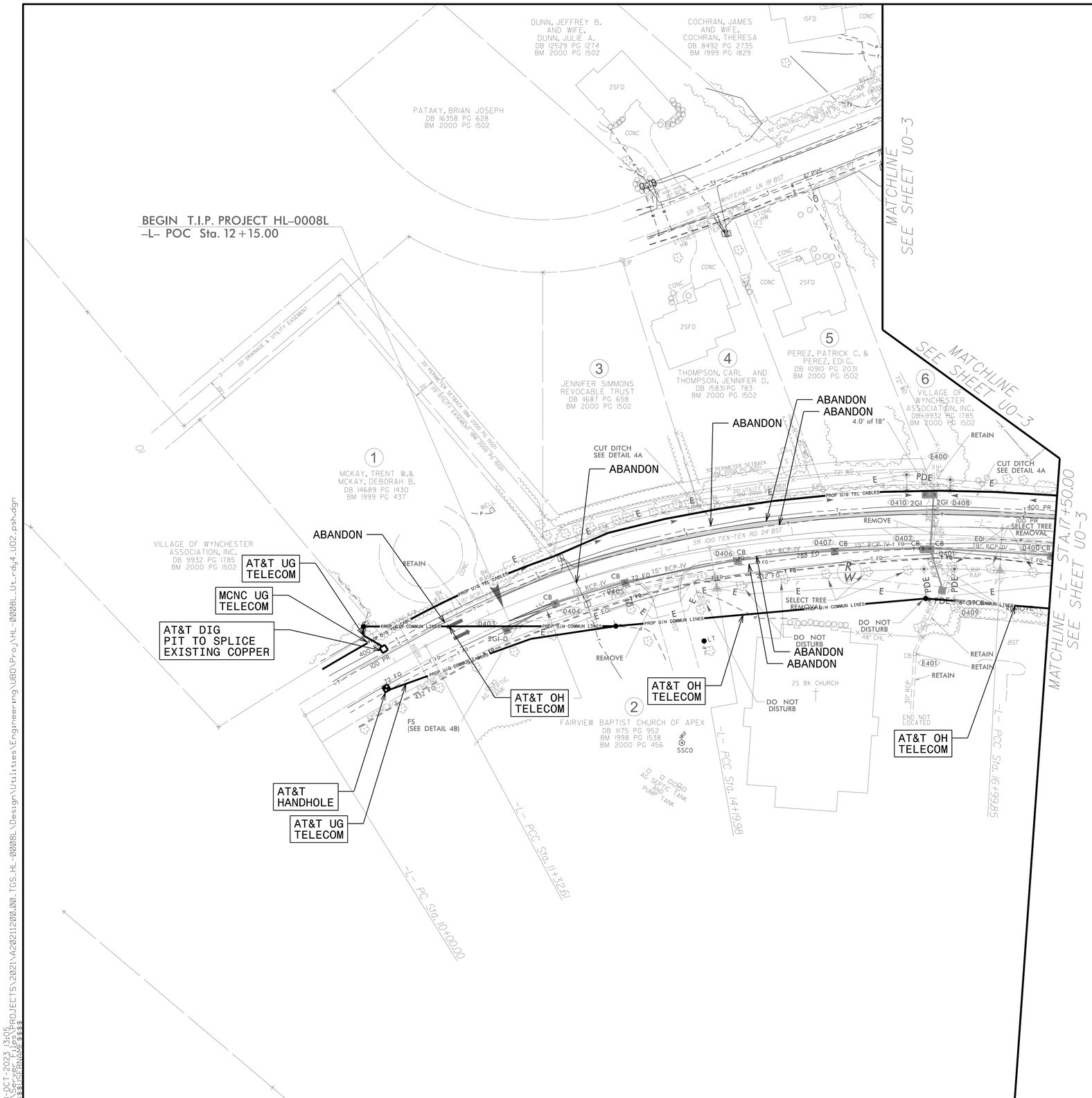
Beth Quinn, P.E.	TEAM LEAD
S. Reid Davidson, P.E.	DIVISION PROJECT MANAGER
Donald Proper	DIVISION UTILITY ENGINEER
James Swinson	DIVISION UTILITY ENGINEER

04-OCT-2023 13:04
S:\Server Files\PROJECTS\2021\A2021I200.00_TGS_HL-0008L\Design\Utilities\Engineering\UBO\Proj\HL-0008L_Ut_tsh_U01_psh.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	U0-2
THIS SHEET CORRESPONDS TO RDY-4	

UTILITIES BY OTHERS

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

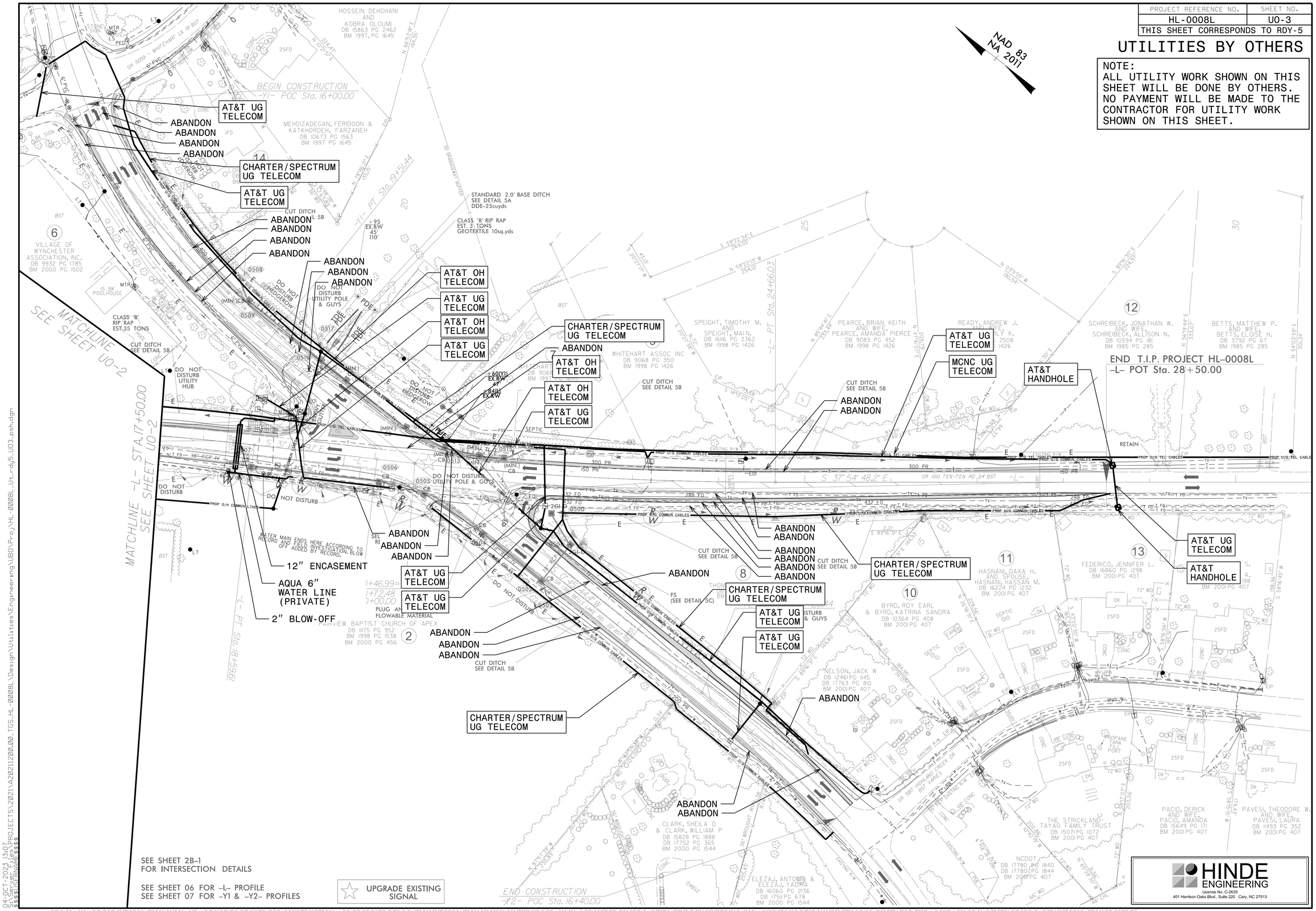


HINDE ENGINEERING
License No. C-2639
401 Harrison Oaks Blvd., Suite 220 Cary, NC 27513

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	U0-3
THIS SHEET CORRESPONDS TO RDY-5	

UTILITIES BY OTHERS

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.



HINDE ENGINEERING
License No. C-2639
401 Harrison Oaks Blvd., Suite 220 Cary, NC 27513

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

INDEX OF CROSS SECTION SHEETS

PROJ. REFERENCE NO.	SHEET NO.
HL-0008L	X-1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

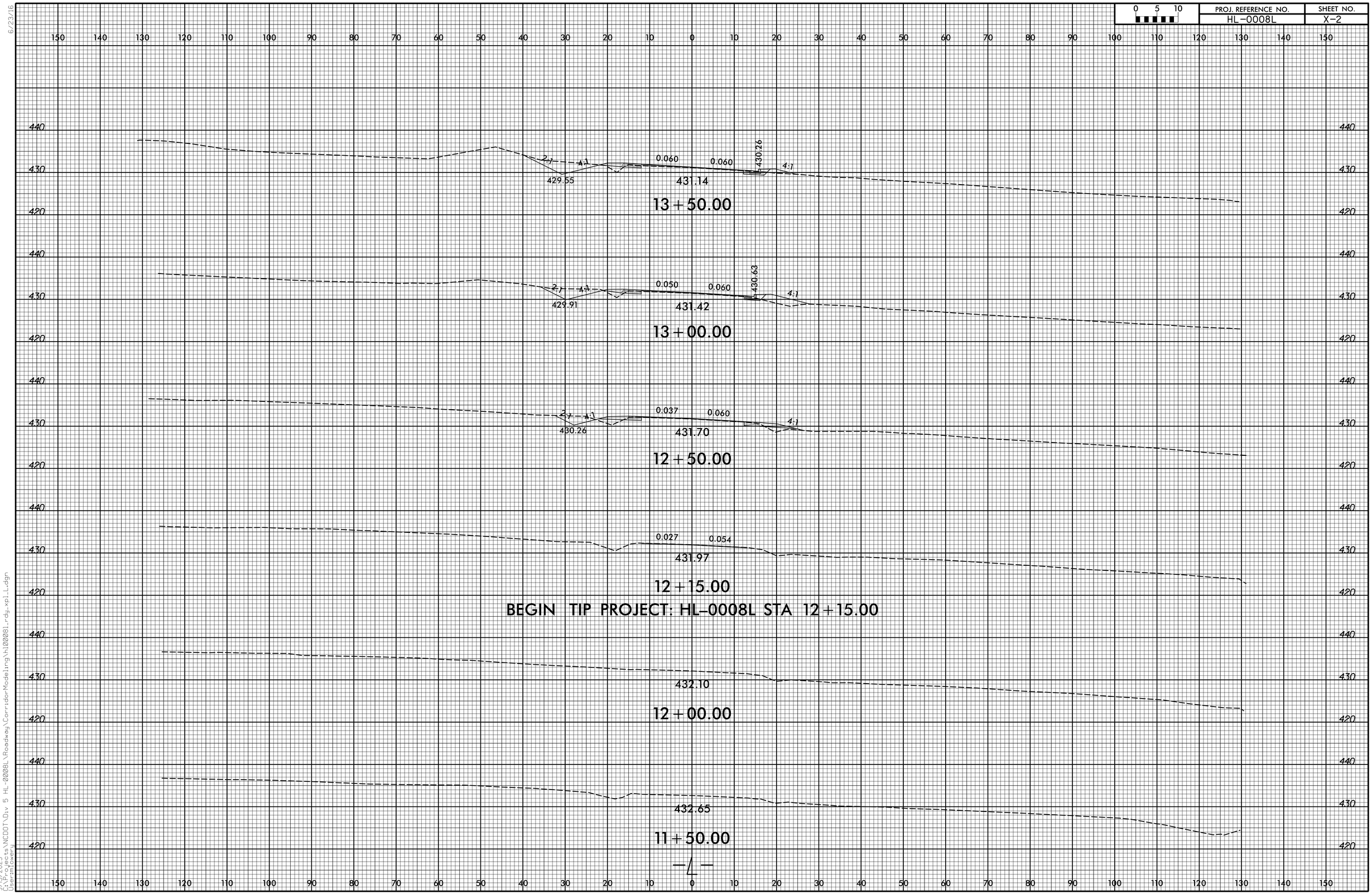
CROSS-SECTION SUMMARY

Approximate quantities only. Unclassified excavation, borrow excavation, shoulder borrow, fine grading, clearing and grubbing, breaking of existing pavement and removal of existing pavement will be paid for at the lump sum price for "Grading".

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)	Station Y2	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
12+15.00	0	0	10+44.14	0	0
12+50.00	11	6	10+50.00	0	5
13+00.00	38	25	11+00.00	0	40
13+50.00	51	23	11+50.00	1	40
14+00.00	59	15	12+00.00	20	48
14+50.00	52	39	12+50.00	51	35
15+00.00	42	60	13+00.00	63	14
15+50.00	39	69	13+50.00	54	12
16+00.00	48	94	14+00.00	37	12
16+50.00	45	206	14+50.00	29	9
17+00.00	33	229	15+00.00	18	9
17+50.00	33	109	15+50.00	10	10
18+00.00	36	45	16+00.00	11	7
18+50.00	38	21	16+30.00	9	2
19+00.00	25	13	16+40.00	4	0
19+50.00	35	15			
20+00.00	29	36			
20+50.00	1	27			
21+00.00	4	2			
21+50.00	7	14			
22+00.00	9	25			
22+50.00	16	30			
23+00.00	20	39			
23+50.00	14	41			
24+00.00	13	42			
24+50.00	24	40			
25+00.00	33	36			
25+50.00	33	28			
26+00.00	32	17			
26+50.00	33	14			
27+00.00	30	15			
27+50.00	28	12			
28+00.00	28	8			
28+50.00	15	3			

Station Y1	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
16+00.00	0	0
16+50.00	14	7
16+65.00	3	4
17+00.00	9	12
17+50.00	13	19
18+00.00	14	17
18+50.00	16	16
19+00.00	11	19
19+50.00	8	22
20+00.00	10	18
20+50.00	7	22
21+00.00	3	51
21+50.17	0	78

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HL-0008L	X-2

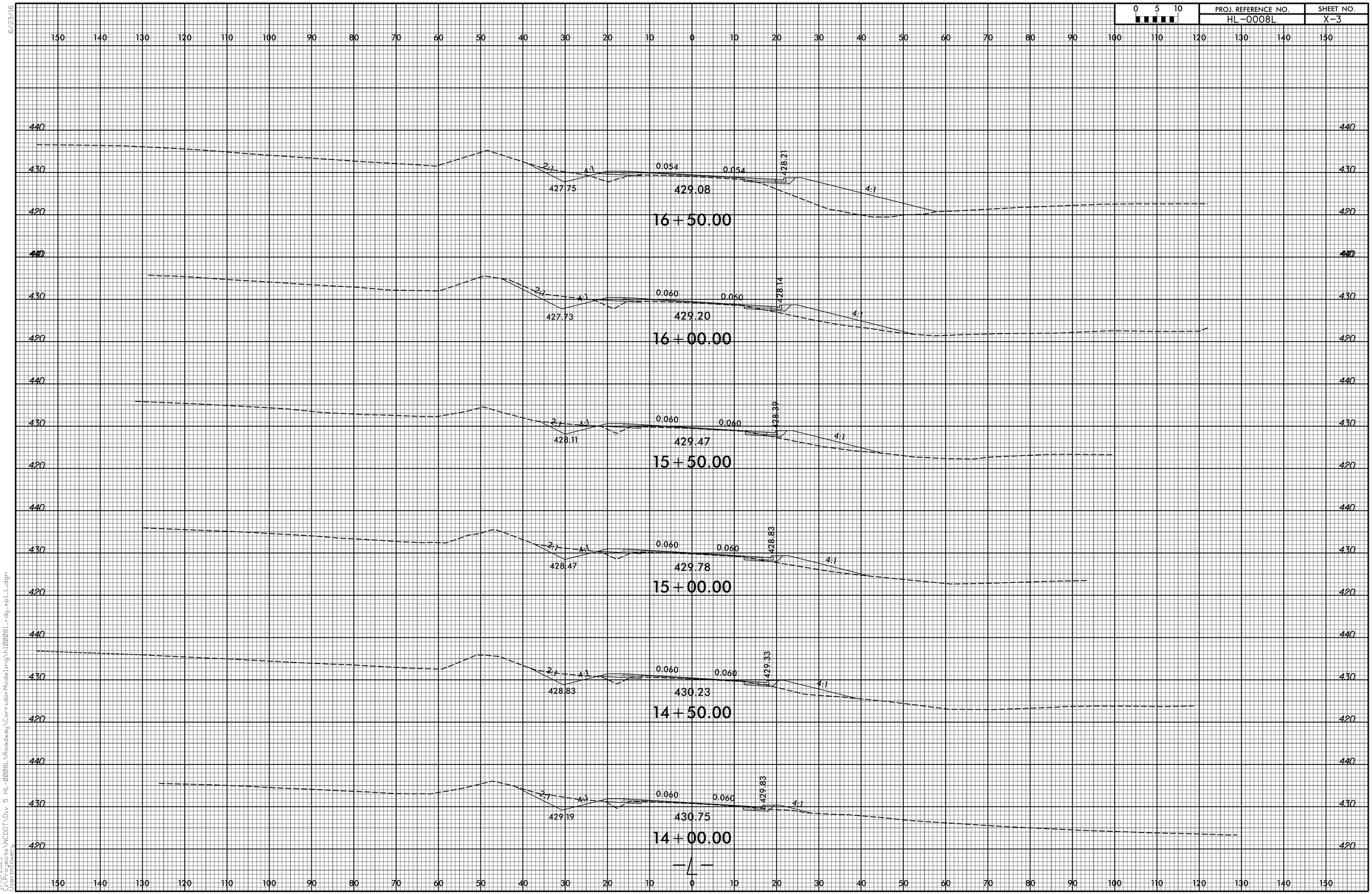


-4-

6/23/16

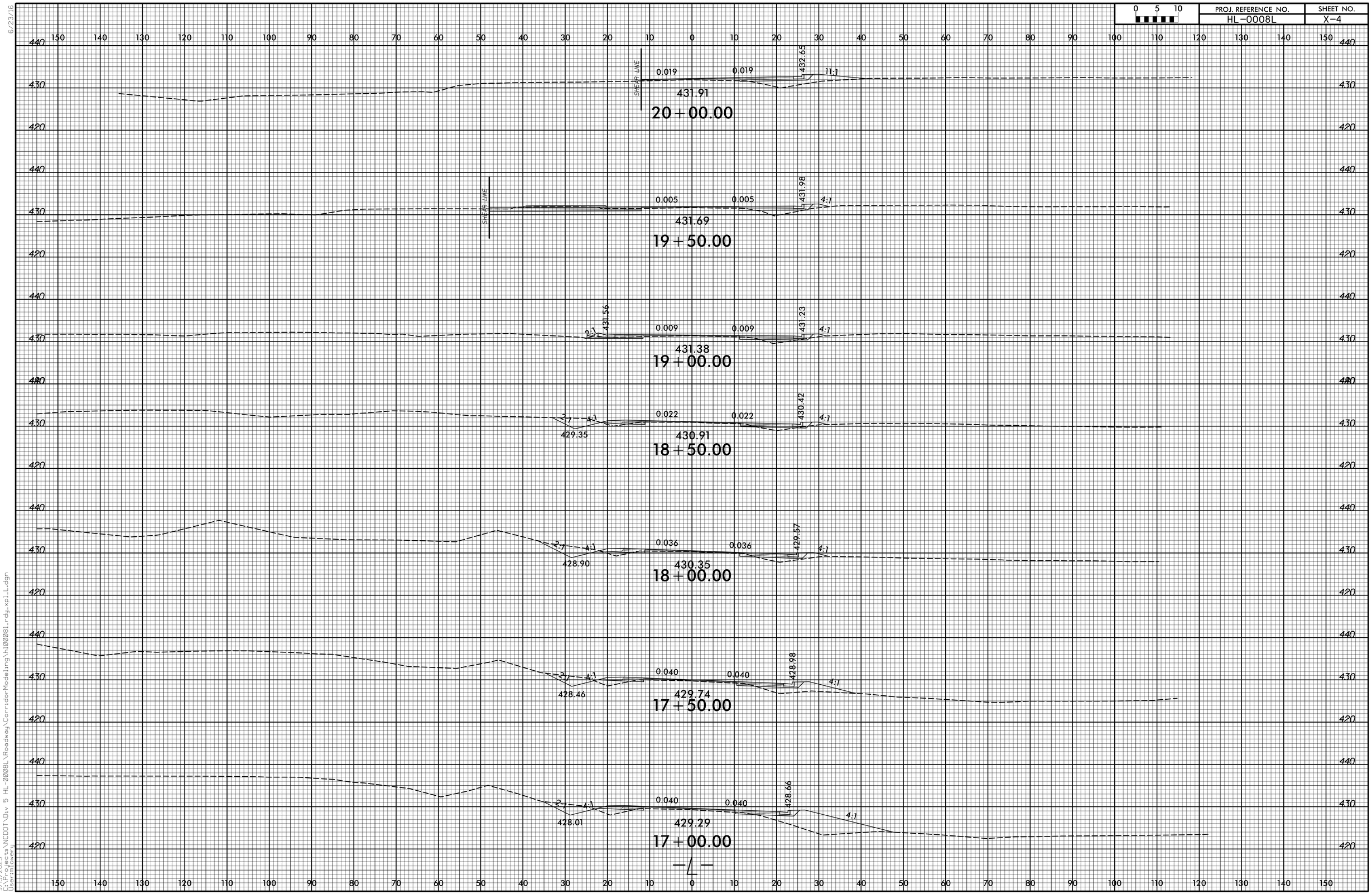
9/13/2023
C:\Projects\NCDOT\Div 5 HL-0008L\Roadway\CorridorModeling\hl0008l_rdy_xpl_L.dgn
User:mlowery

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HL-0008L	X-3



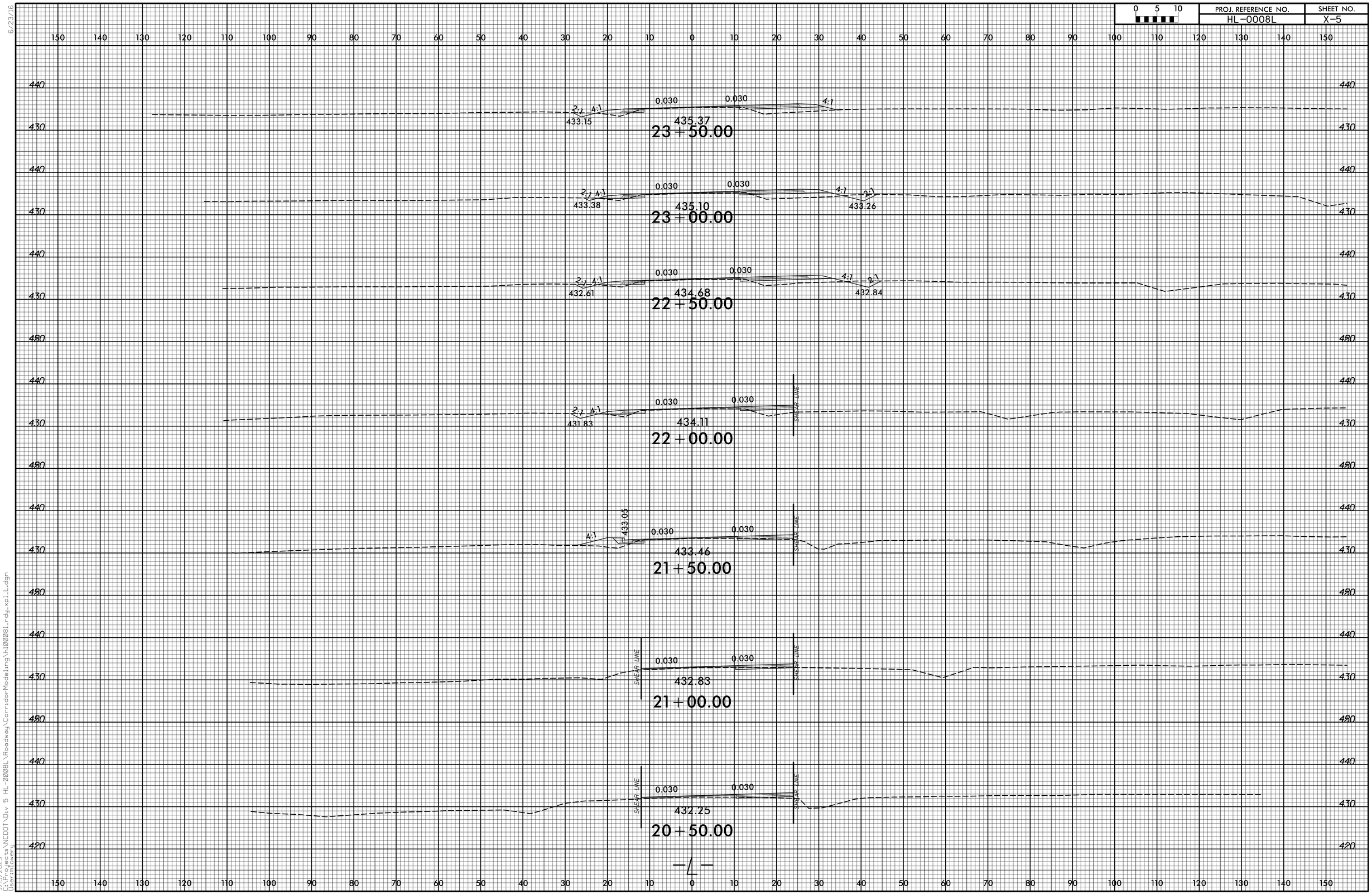
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HL-0008L	X-4



9/13/2023
C:\Projects\NCDOT\Div 5 HL-0008L\Roadway\CorridorModeling\hl0008l_rdy_xpl_L.dgn
User:mlowery

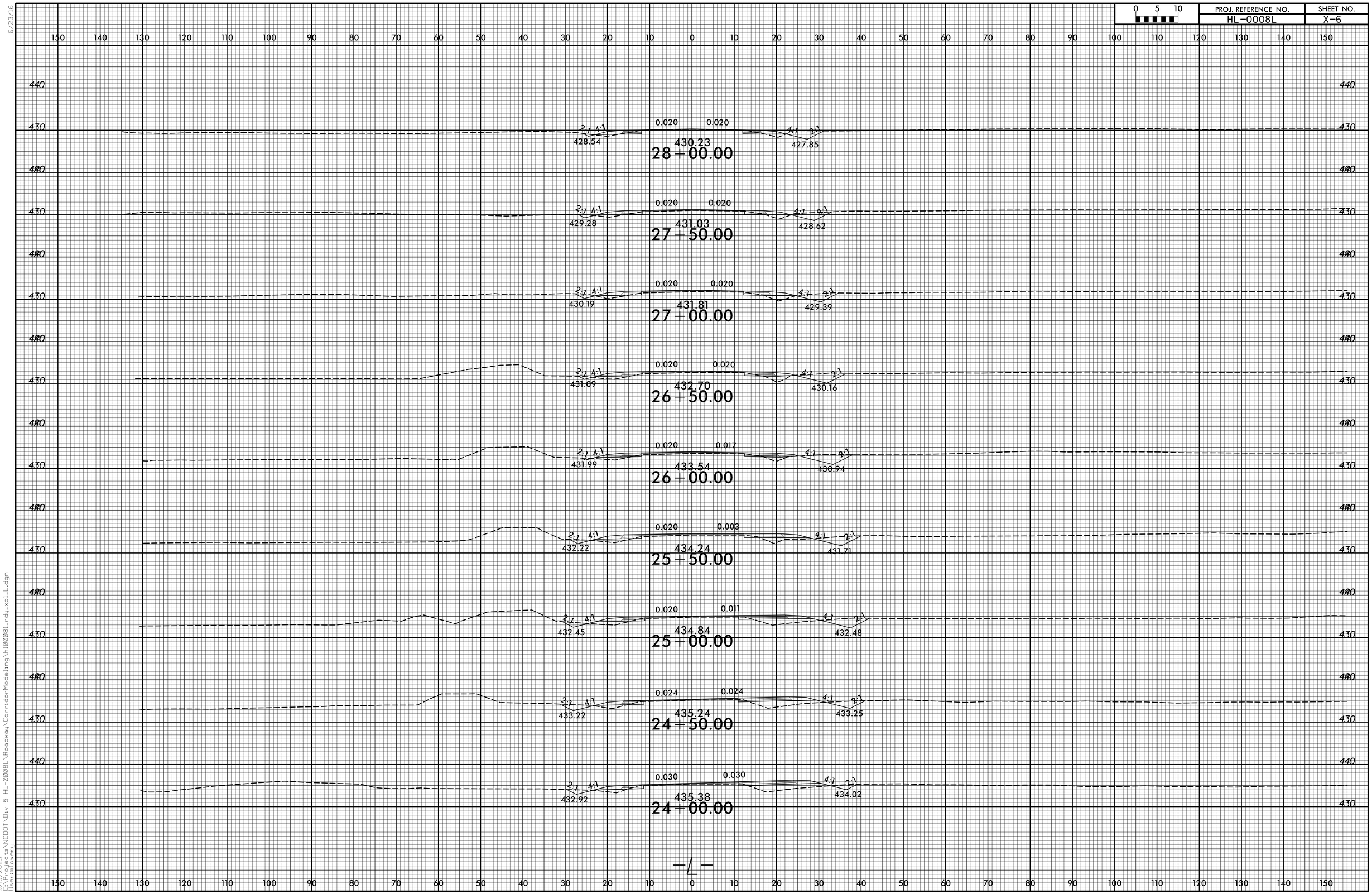
PROJ. REFERENCE NO.	SHEET NO.
HL-0008L	X-5



6/23/16

9/13/2023
C:\Projects\NCDOT\Div 5 HL-0008L\Roadway\CorridorModeling\hl0008l_rdy_xpl_L.dgn
User:mlowery

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HL-0008L	X-6

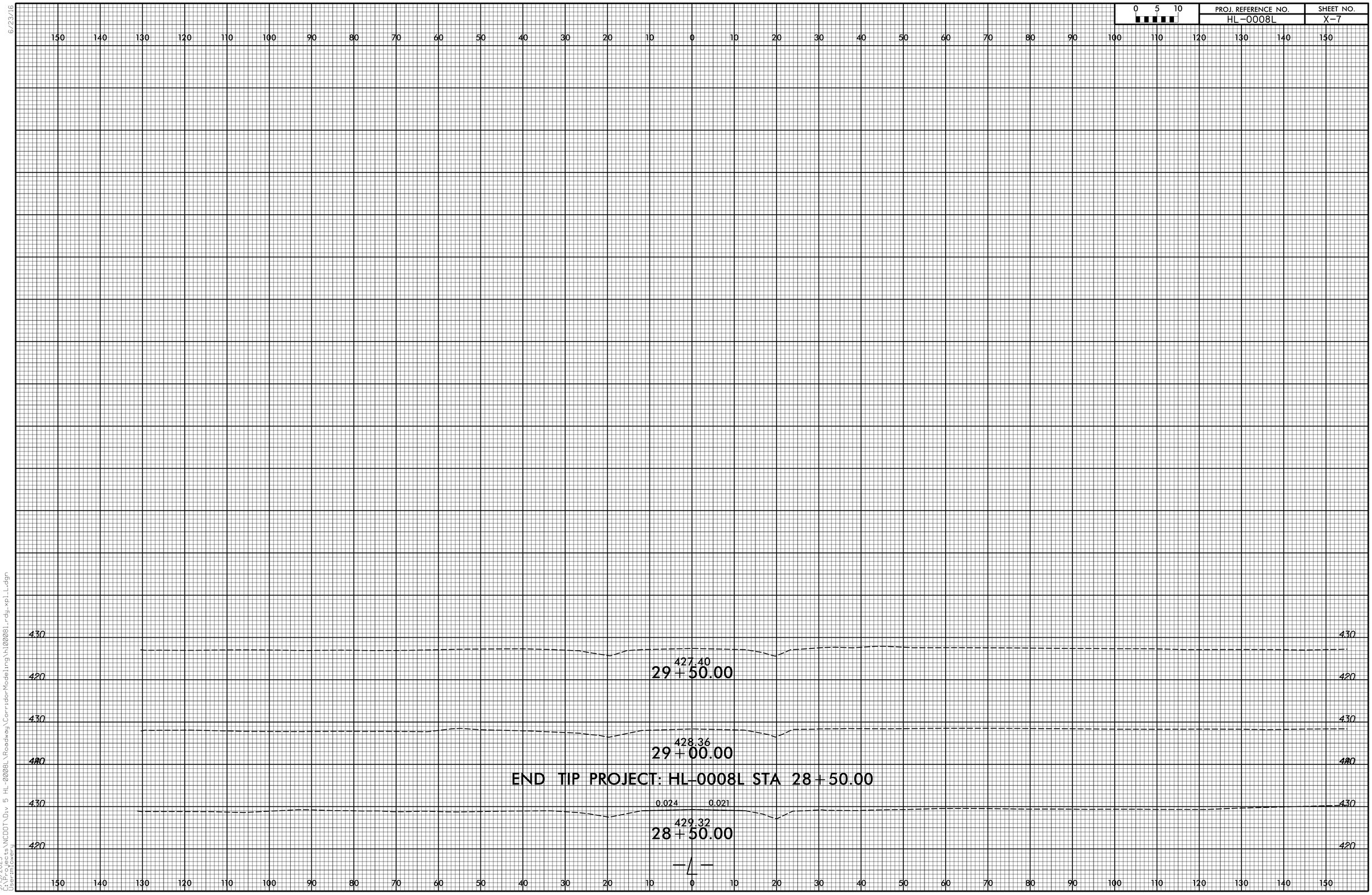


6/23/16

9/13/2023
C:\Projects\NCDOT\Div 5 HL-0008L\Roadway\CorridorModeling\hl0008l_rdy_xpl_L.dgn
User:mlowery

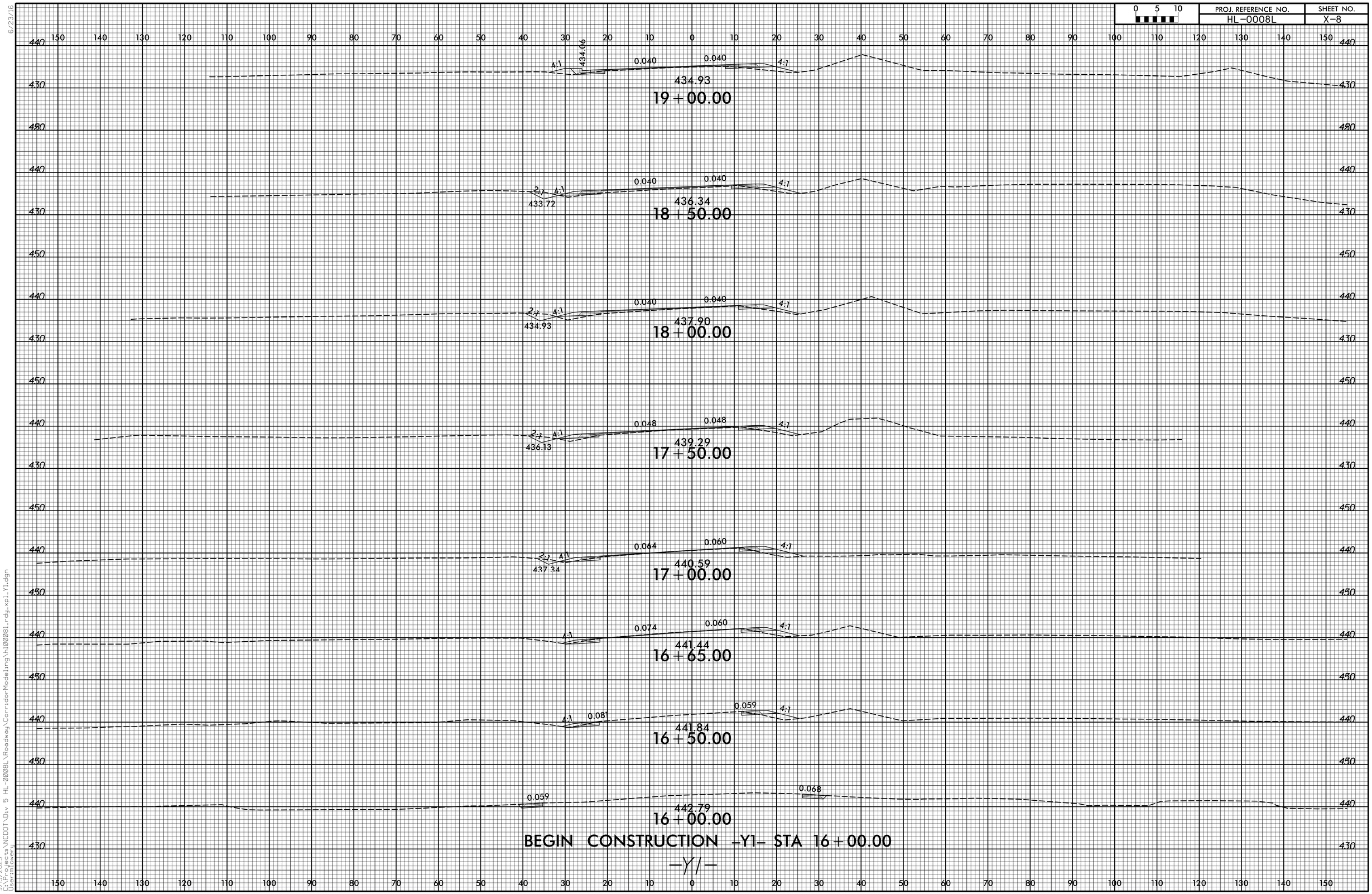
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HL-0008L	X-7



9/13/2023
C:\Projects\NCDOT\Div 5 HL-0008L\Roadway\CorridorModeling\hl0008l_rdy_xpl_L.dgn
User:mlowery

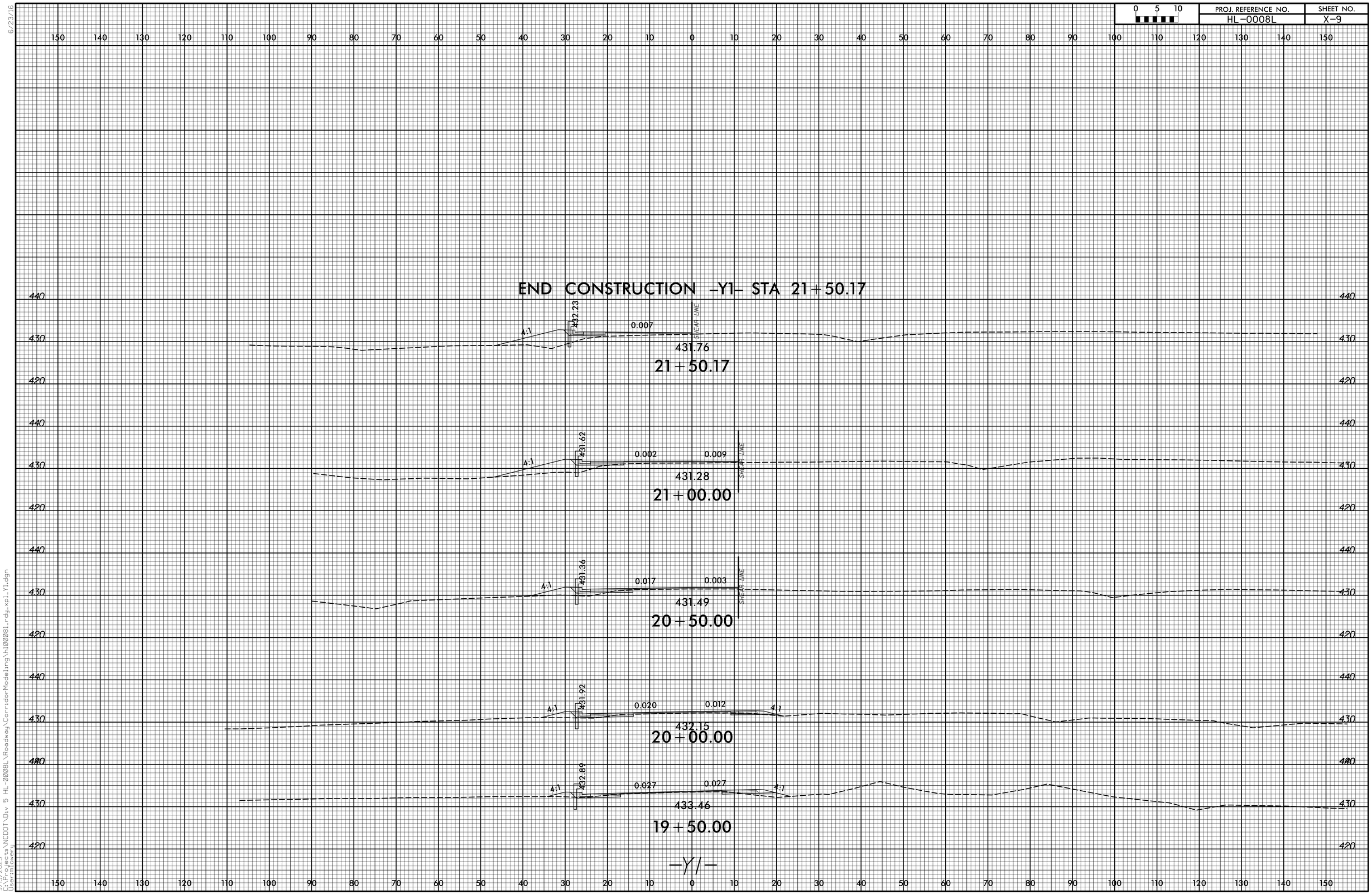
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HL-0008L	X-8



6/23/16

9/13/2023
C:\Projects\NCDOT\Div 5 HL-0008L\Roadway\CorridorModeling\hl0008l_rdy_xpl_Y1.dgn
User:mlowery

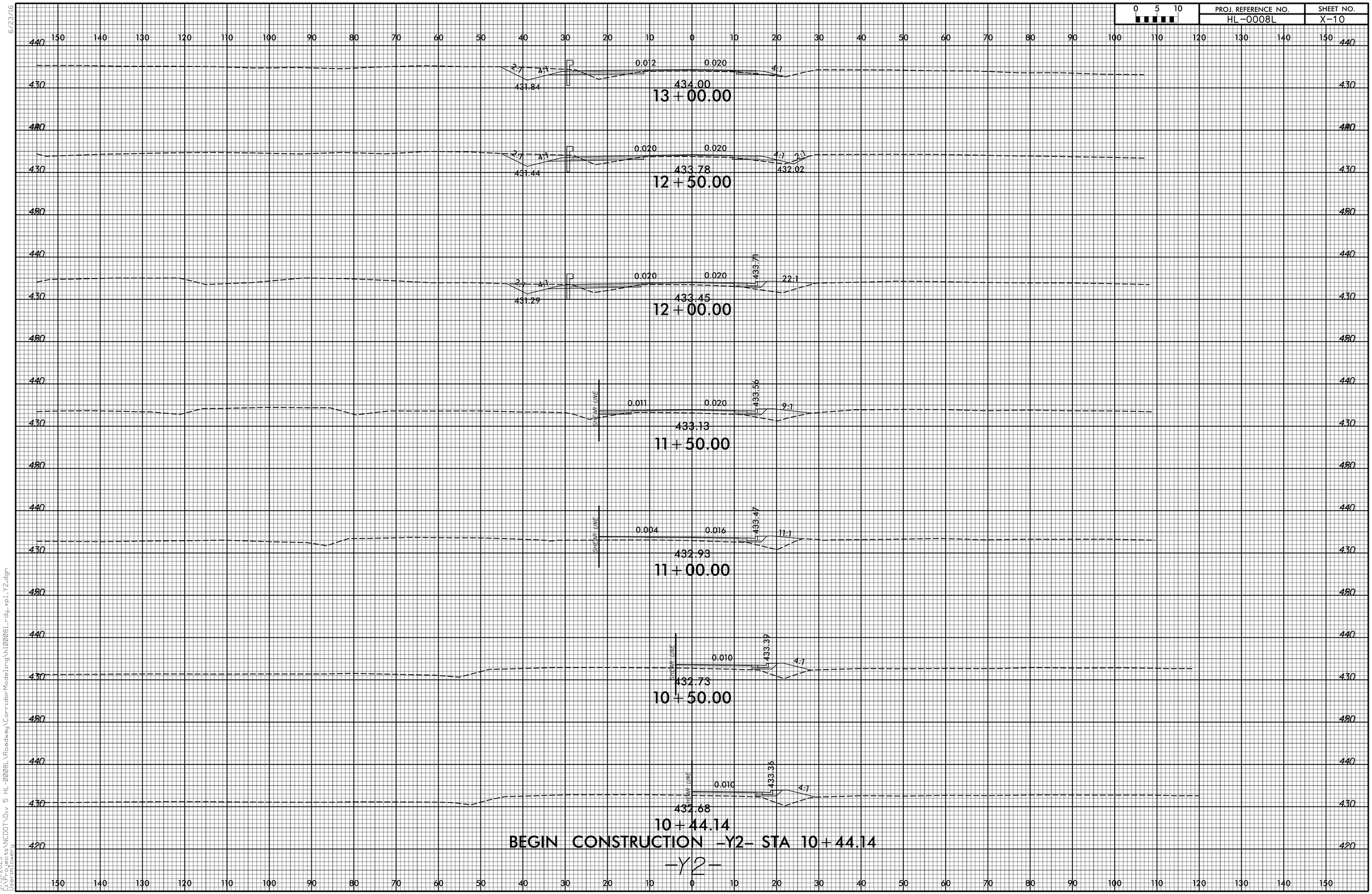
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HL-0008L	X-9



6/23/16

9/13/2023
C:\Projects\NCDOT\Div 5 HL-0008L\Roadway\CorridorModeling\hl0008l_rdy_xpl_Y1.dgn
User:mlowery

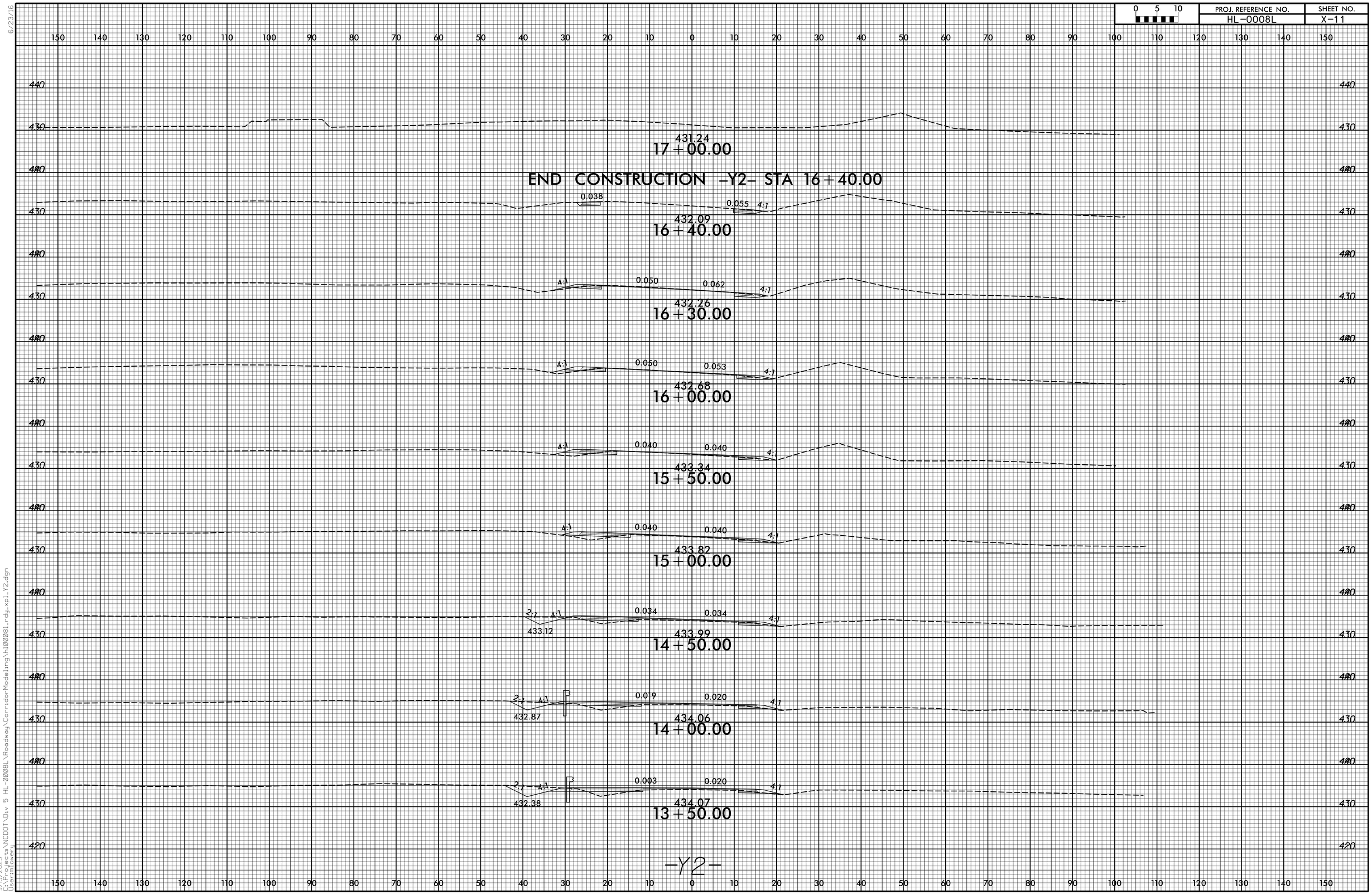
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	HL-0008L	X-10



6/23/16

9/13/2023
C:\Projects\NCDOT\Div 5 HL-0008L\Roadway\CorridorModeling\hl0008l_rdy_xpl_Y2.dgn
User:mlowery

PROJ. REFERENCE NO.	SHEET NO.
HL-0008L	X-11



6/23/16

9/13/2023
CVP-Projects\NCDOT\Div 5 HL-0008L\Roadway\CorridorModeling\hl0008l_rdy_xpl_Y2.dgn
User:mlowery

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HL-0008L	1	11

REFERENCE: HL-0008L

PROJECT: 49367

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN
-L-	12+15 TO 28+50	4-5
-Y1-	16+65 TO 21+73	5
-Y2-	10+00 TO 16+30	5

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	16+00 TO 18+50	6-7
-L-	21+00 TO 22+00	8-9
-L-	23+50 TO 24+50	9
-Y1-	20+50 TO 21+50	10
-Y2-	12+50 TO 13+50	11

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *WAKE*

PROJECT DESCRIPTION *TEN TEN ROAD (SR 1010) AT GRAHAM NEWTON ROAD (SR 1386) /BELLS LAKE ROAD (SR 1386)*

INVENTORY

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

A. N. JONES

INVESTIGATED BY *A. N. JONES*

DRAWN BY *A. N. JONES*

CHECKED BY *N. T. ROBERSON*

SUBMITTED BY *N. T. ROBERSON*

DATE *MARCH 2023*

DocuSigned by:
Alexandria Jones 03/07/2023
4349EF40... SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
MATERIAL PASSING #40 LL	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
GRAIN SIZE IN.: 12 | 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE ____" STEEL TEETH
- [ ] TRICONE ____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [ ] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B _____
- [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: N/A

ELEVATION: N/A FEET

NOTES:

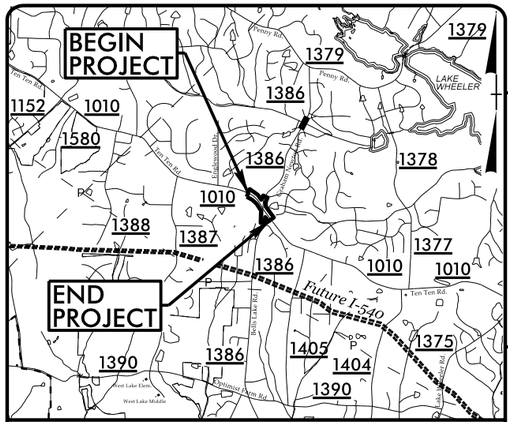
BORING ELEVATIONS TAKE FROM h100081_ls_tin_210824.tin FILE DATED 12/2/2021.

DATE: 8-15-14

09/08/99

TIP PROJECT: HL-0008L

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Plan Sheet Symbols
See Sheet RW01 Through RW07 For Survey Control and Right-of-Way Sheets



VICINITY MAP

25% APPROVED PLANS

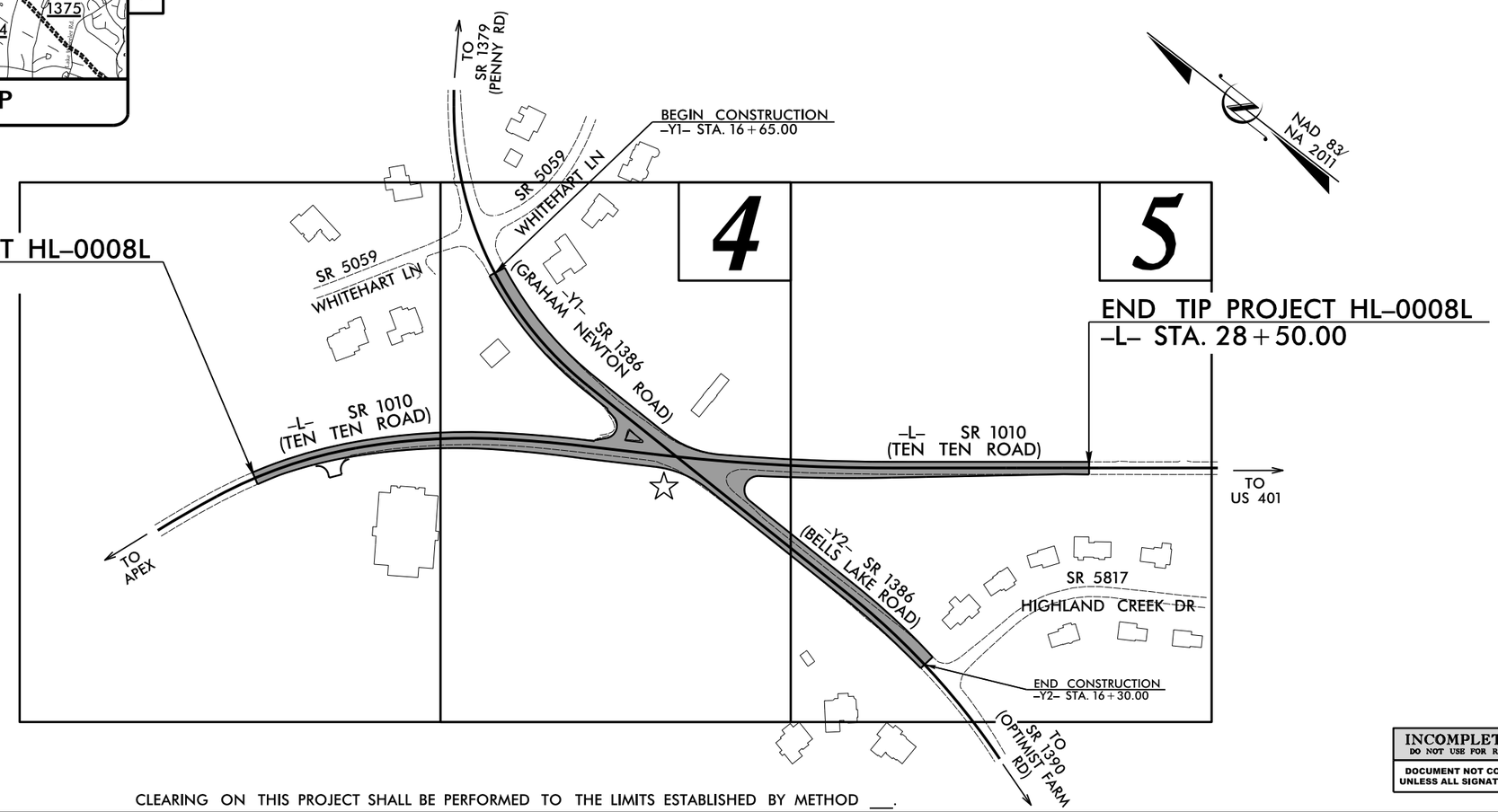
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HL-0008L	3	11

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
49367.1.1		PE

LOCATION: TEN TEN ROAD (SR 1010) AT GRAHAM NEWTON ROAD (SR 1386) / BELLS LAKE ROAD (SR 1386).
WIDEN FOR LEFT-TURN LANE ON EACH APPROACH
TYPE OF WORK: GRADING, DRAINAGE, PAVING, WIDENING, AND SIGNAL



☆ UPGRADE EXISTING SIGNAL

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ___.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2024 = 14100
ADT 2044 = 14600
K = 8%
D = 65%
T = 5% *
V = 50 MPH
* TTST=1% DUAL=4%

FUNC CLASS =
MINOR ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT HL-0008L	=	0.310 mile
TOTAL LENGTH TIP PROJECT HL-0008L	=	0.310 mile

Prepared For:
DIVISION OF HIGHWAYS
815 Stadium Drive, Durham, NC 27704

By:
TGS ENGINEERS
706 HILLSBOROUGH ST
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 3, 2023

LETTING DATE:
JUNE 18, 2024

V. MARCUS LOWERY, PE
PROJECT ENGINEER

S. REID DAVIDSON, PE
NCDOT CONTACT

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

24-FEB-2023 09:58
S:\ERO\Raleigh\Investigation\TIP\HL0008L_GEO_RDWY\CADD_GEOTECH\PlanProf\hl0008l_rdy_tsh.dgn
$$$$USERNAME$$$$

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

February 28, 2023

STATE PROJECT: 49367.1.1 (HL-0008L)
FEDERAL PROJECT: N/A
COUNTY: WAKE

DESCRIPTION: Ten Ten Road (SR 1010) at Graham Newton Road (SR 1386) / Bells Lake Road (SR 1386)

SUBJECT: Geotechnical Report – Inventory

The Geotechnical Engineering Unit has completed a subsurface investigation for this project and presents the following inventory.

Project Description

This project consists of improving the intersection of Ten Ten Road (SR 1010) and Graham Newton Road (SR 1386) / Bells Lake Road (SR 1386)

A geotechnical investigation was conducted during February of 2023. Six hand-auger borings were performed by the Geotechnical Engineering Unit. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the Materials and Tests Unit.

The following alignments, totaling 0.310 miles, were investigated.

Line	Stations
-L-	12+15 to 28+50
-Y1-	16+65 to 21+73
-Y2-	10+00 to 16+30

Physiography and Geology

The project is located approximately 5 miles south of Raleigh city limits and within the Coastal Plain physiographic province of North Carolina. Coastal Plain soils in this area are derived from the Middendorf Formation. The topography is relatively flat. The widening project consists of a mixture of residential and wooded areas.

Soils Properties

Soils encountered during this investigation are Roadway Embankment, Undivided Coastal Plain, and Coastal Plain.

Roadway Embankment soils are found throughout the entire project. These soils primarily consist of orange-brown, moist, very soft to stiff, sandy clay and sandy silt with trace gravel (A-6, A-4). The sample results for this soil yielded a plastic index of 31.

Undivided Coastal Plain soils are present throughout the entire project. These soils are characterized by tan-orange, moist to saturated, very soft to medium stiff, silty clay with trace gravel (A-7). Plastic indices for these soils range from 19 to 20.

Coastal Plain soils are present throughout the entire project. These soils are characterized by red and orange mottled, moist, medium stiff to stiff, silty clay (A-7). The sample results for this soil yielded a plastic index of 19.

Groundwater

Groundwater measurements were taken during February of 2023 during average rainfall conditions. Groundwater was present in all boring, ranging from 0.6’ to 2.6’ below existing grade.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

Telephone: 984-920-8900
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
3301 JONES SAUSAGE RD. SUITE 100
GARNER, NC 27529

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	04
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH ST, SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

NAD 83
NA 2011

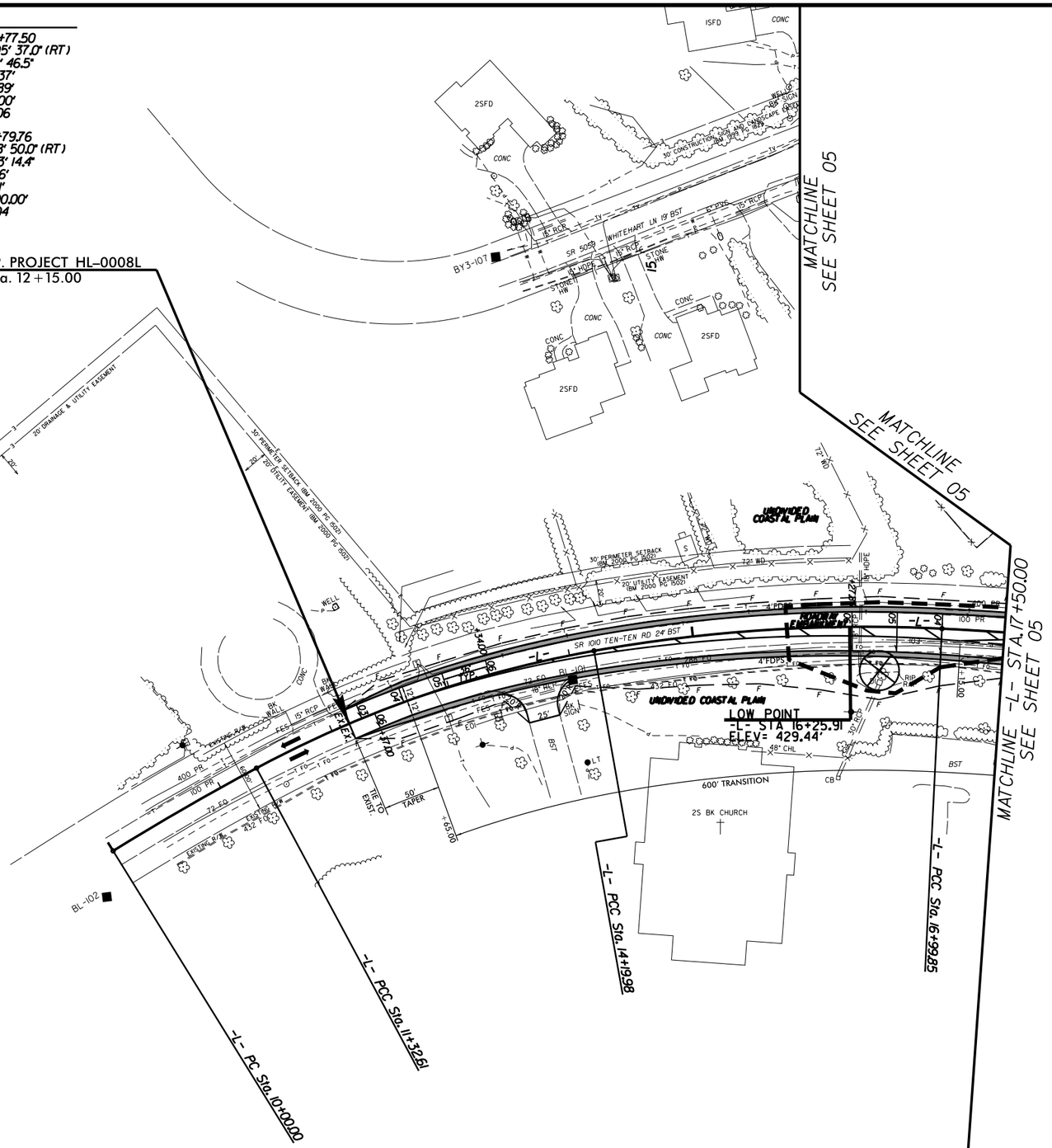
-L-

PI Sta 10+66.33
Δ = 3° 33' 06.5" (RT)
D = 2° 40' 42.3"
L = 132.61'
T = 66.33'
R = 2,139.17'

PI Sta 12+77.50
Δ = 18° 05' 37.0" (RT)
D = 6° 17' 46.5"
L = 287.37'
T = 144.89'
R = 910.00'
SE = 0.06

PI Sta 15+60.51
Δ = 12° 55' 55.0" (RT)
D = 4° 37' 14.3"
L = 279.87'
T = 140.53'
R = 1,240.00'
SE = 0.06

PI Sta 17+79.76
Δ = 3° 48' 50.0" (RT)
D = 2° 23' 14.4"
L = 159.76'
T = 79.91'
R = 2,400.00'
SE = 0.04



SEE SHEET 06 FOR -L- PROFILE

REVISIONS

8/17/99

23-FEB-2023 14:46
S:\ERD\Raleigh Investigation\TIP\HL0008L_GEO_RDWY\CADD_GEOTECH\PlanProf\hl0008l_rdy_psh_04.dgn
$$$$$$ENGINEER$$$$$

PROJECT REFERENCE NO.	SHEET NO.
HL-0008L	05
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH ST, SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

NAD 83
NA 2011

-L-

PI Sta 17+79.76
Δ = 3° 48' 50.0" (RT)
D = 2° 23' 14.4"
L = 159.76'
T = 79.91'
R = 2,400.00'
SE = 0.04

PI Sta 22+34.66
Δ = 6° 38' 09.1" (LT)
D = 1° 25' 56.6"
L = 463.27'
T = 231.89'
R = 4,000.00'
SE = 0.03
Lr = 108'

-Y1-

PI Sta 16+62.36
Δ = 51° 24' 55.2" (LT)
D = 8° 14' 38.4"
L = 623.67'
T = 334.60'
R = 695.00'
SE = 0.04
DS = 40 MPH

-Y2-

PI Sta 16+78.33
Δ = 19° 50' 38.3" (RT)
D = 3° 58' 43.9"
L = 498.73'
T = 251.89'
R = 1,440.00'
SE = 0.04
Lr = 132'

-Y1- SR 1386 GRAHAM NEWTON RD
2024 / 2044 ADT
7,300 / 11,800
1,600 / 1,550
-L- SR 1010: 4,100 / 1,050 -L- SR 1010
14,100 / 14,600
2,600 / 5,100
700 / 2,700
12,150 / 9,150
7,450 / 14,450
-Y2- SR 1386 BELLS LAKE RD

BEGIN CONSTRUCTION
-Y1- POC Sta. 16+65.00

-Y1- PT Sta. 19+51.44

LOW POINT
-Y1- STA 20+88.65
ELEV= 431.73'

MATCHLINE -L- STA.17+50.00
SEE SHEET 04

MATCHLINE
SEE SHEET 04

-L- PT Sta. 24+66.03

END T.I.P. PROJECT HL-0008L
-L- POT Sta. 28+50.00

-L- PC Sta. 20+02.77

-L- POC Sta. 20+46.99=
-Y1- POT Sta. 21+72.48
-Y2- POT Sta. 10+00.00

-L- PT Sta. 18+59.61

HIGH POINT
-L- STA 23+89.39
ELEV= 435.56'

-Y2- PC Sta. 14+26.44

HIGH POINT
-Y2- STA 13+60.10
ELEV= 434.45'

END CONSTRUCTION
-Y2- POC Sta. 16+30.00

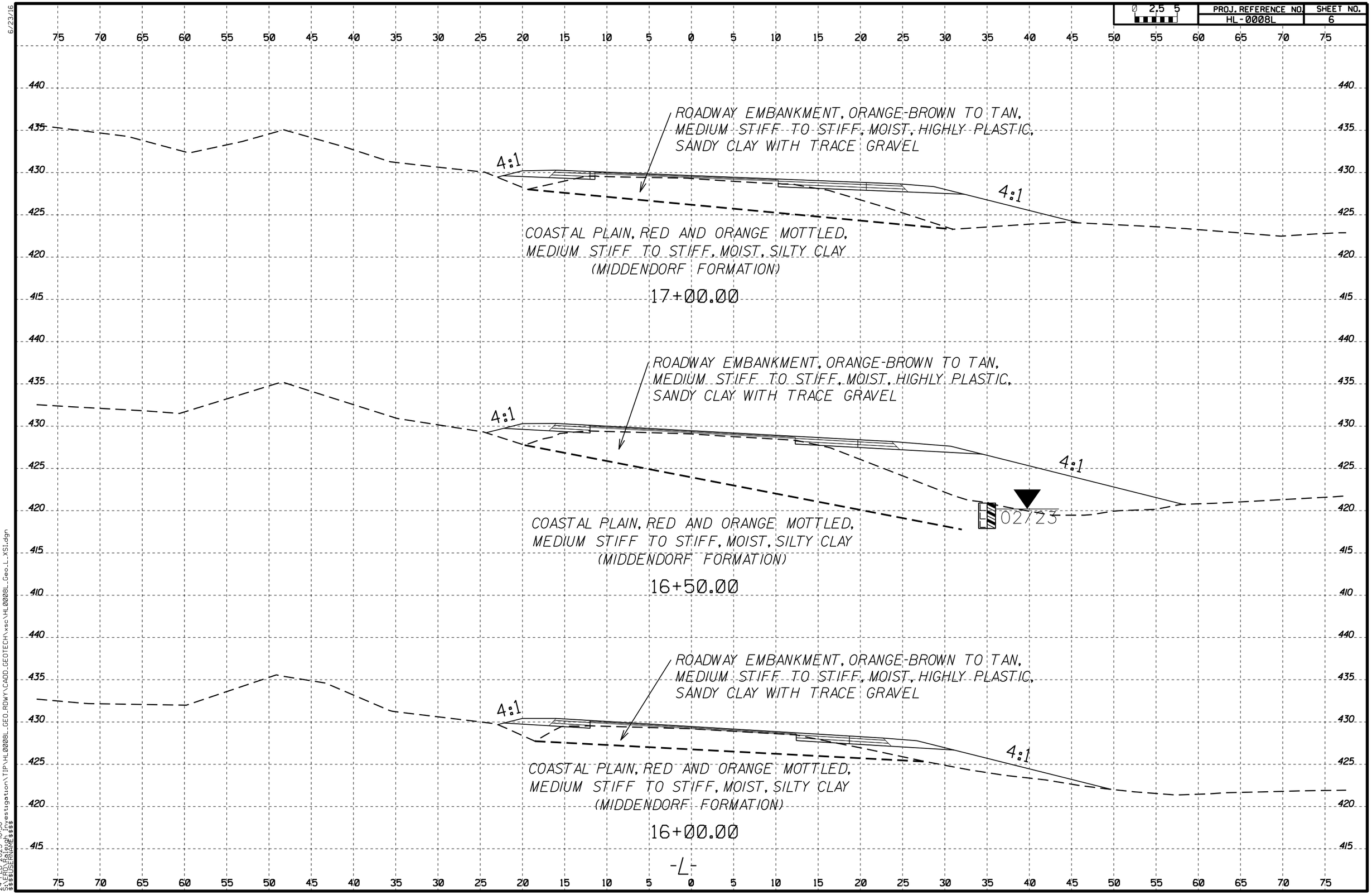
UPGRADE EXISTING SIGNAL

REVISIONS

8/17/99

23-FEB-2023 14:56
S:\ERO\Raleigh Investigation\TIP\HL0008L_GEO_ROWY\CADD_GEOTECH\PlanProf\hl0008l_rdy_psh_05.dgn
$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.
HL-0008L	6

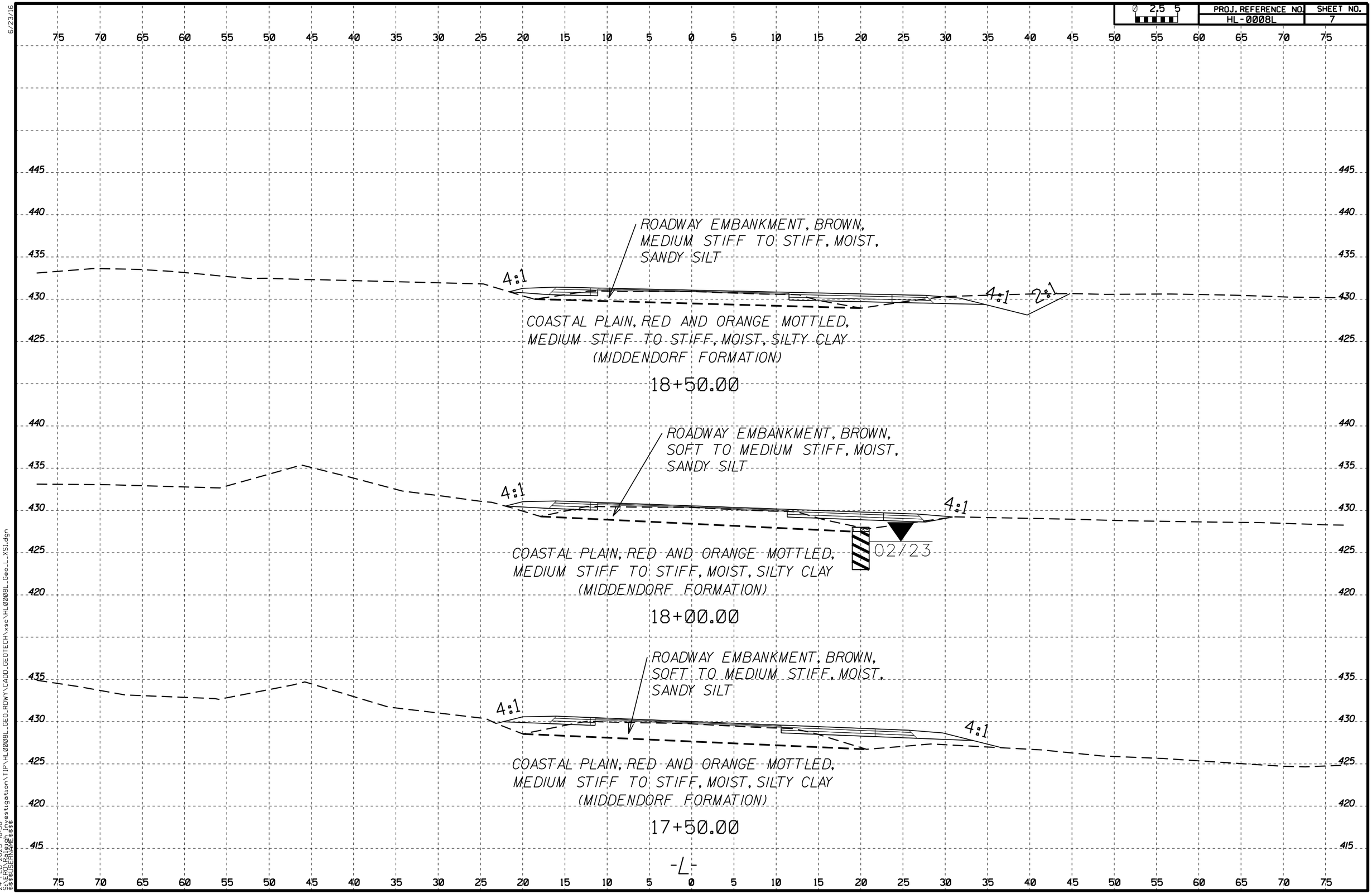


6/23/16

24-FEB-2023 10:36
S:\FRO\Raleigh Investigation\TIP\HL0008L_GEO_RDWY\CADD_GEOTECH\xsc\HL0008L_Geo_L_XS1.dgn
$$$$USERNAME$$$$

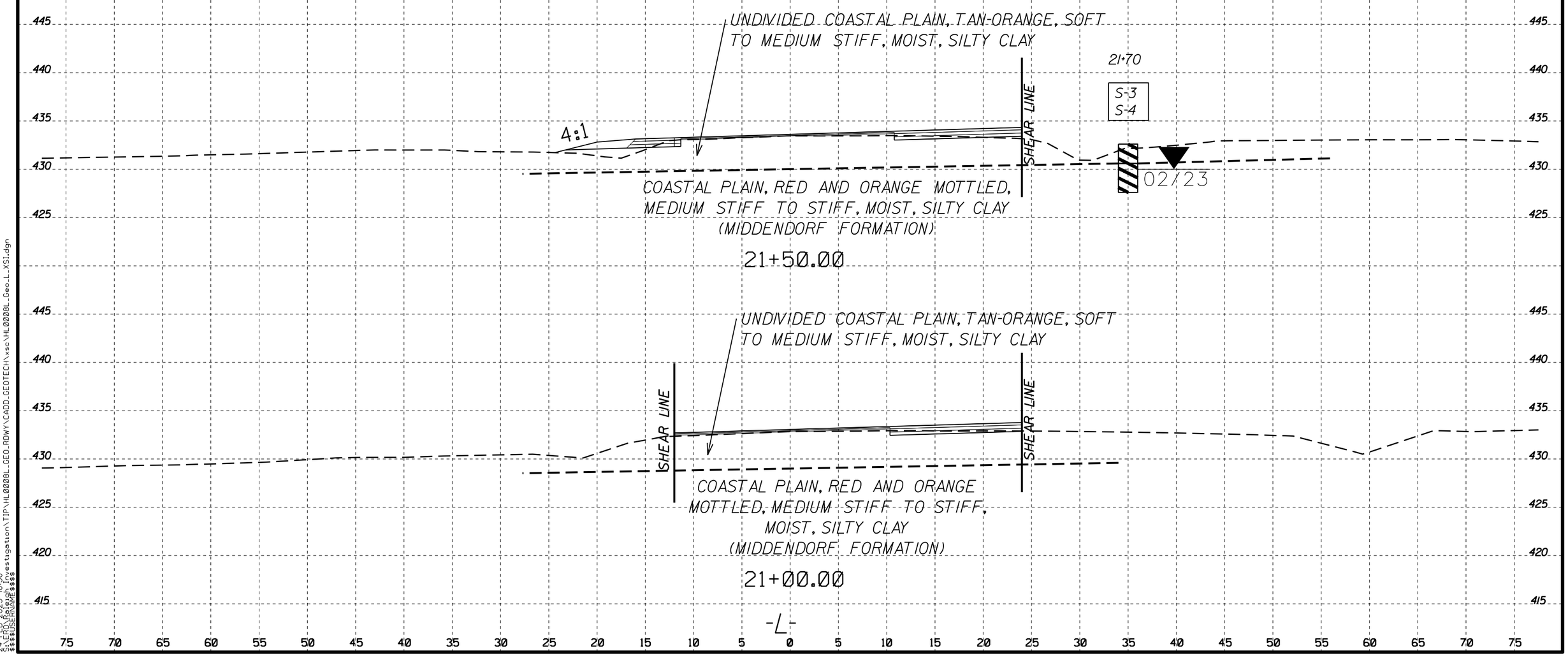
PROJ. REFERENCE NO.	SHEET NO.
HL-0008L	7

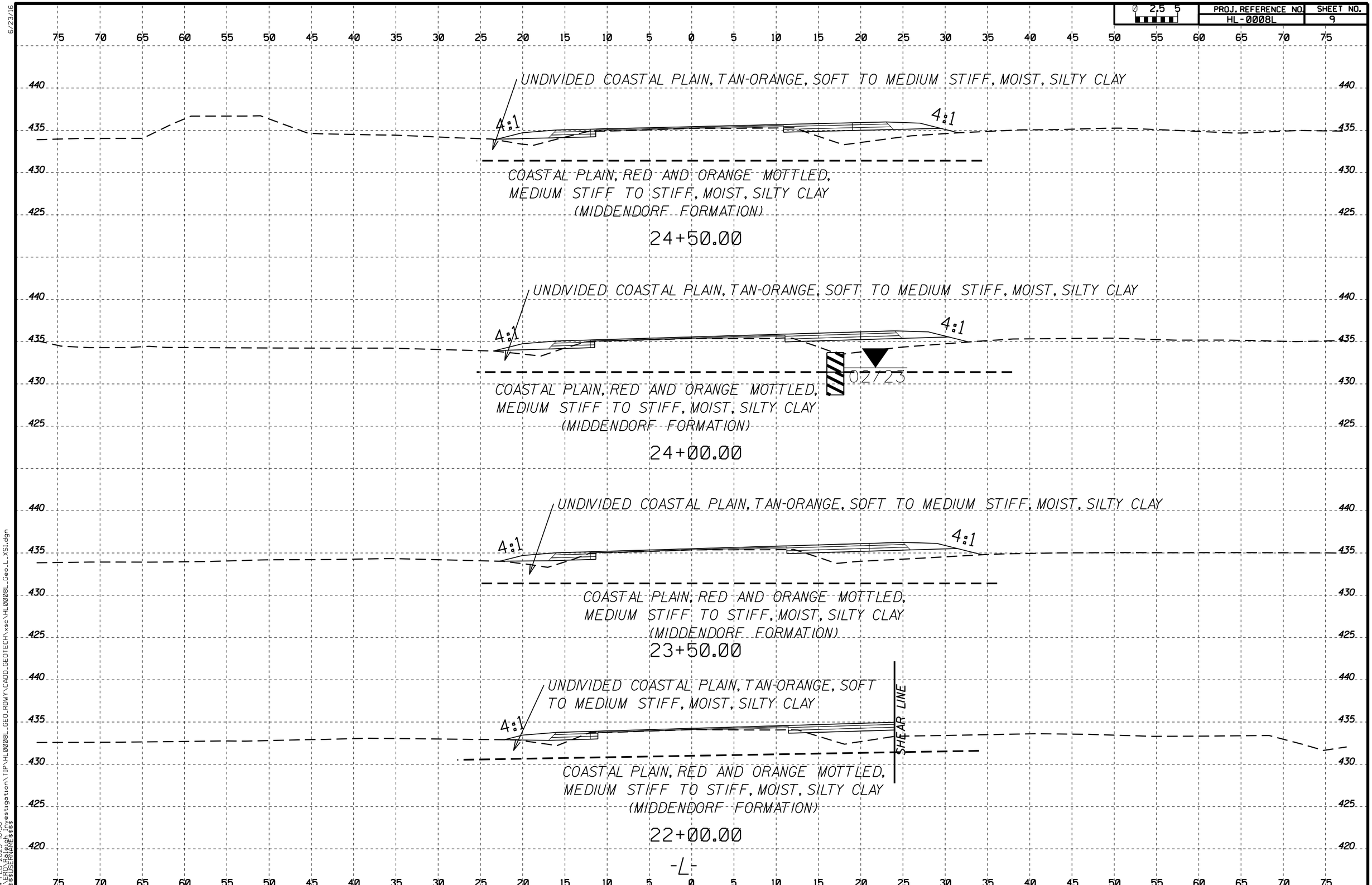
0 2.5 5

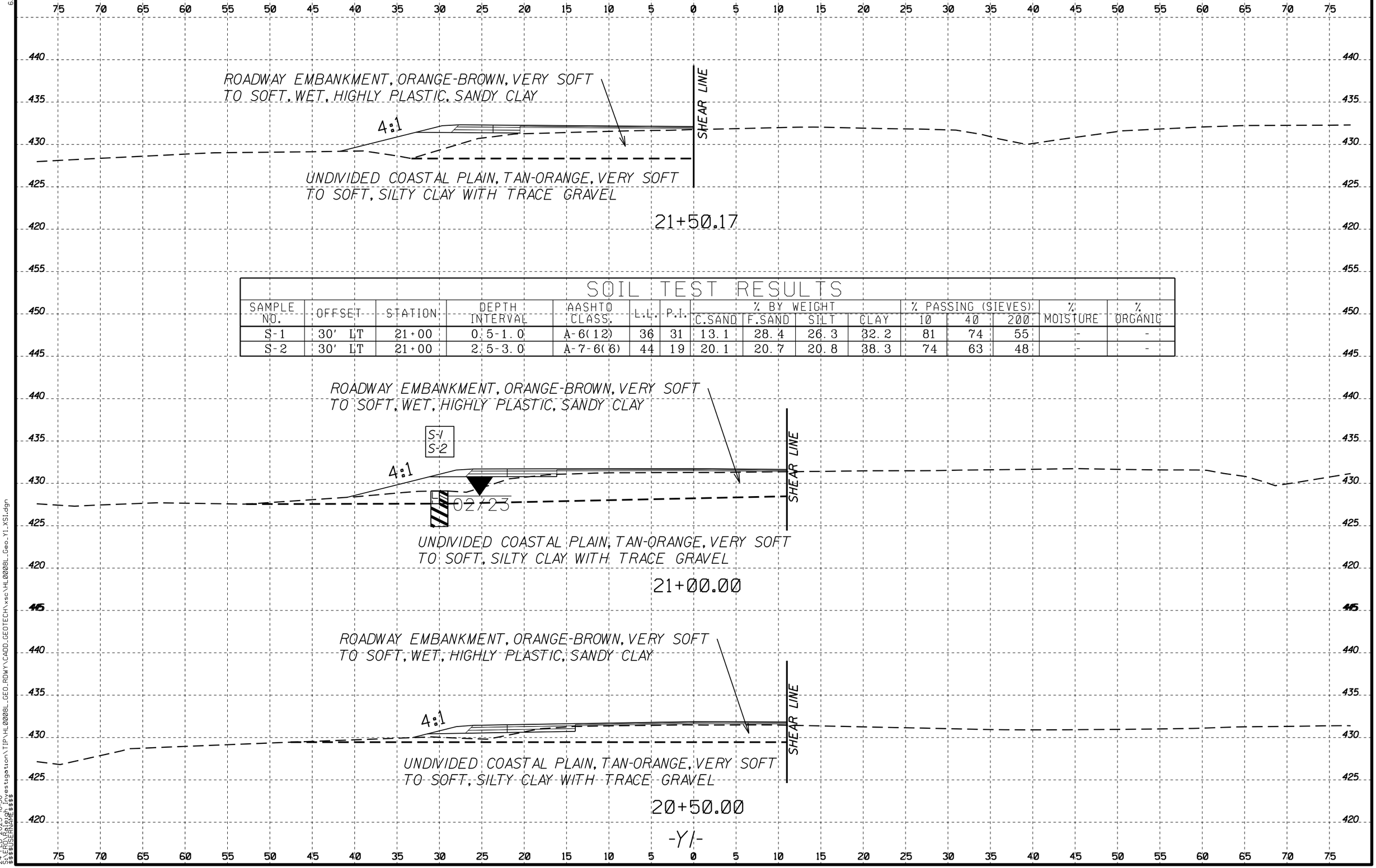


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-3	35' RT	21+70	1.0-1.5	A-7-5(13)	50	20	12.3	18.9	18.4	50.4	88	80	65	-	-
S-4	35' RT	21+70	4.0-4.5	A-7-5(15)	61	19	15.9	19.7	28.1	36.3	97	86	68	-	-



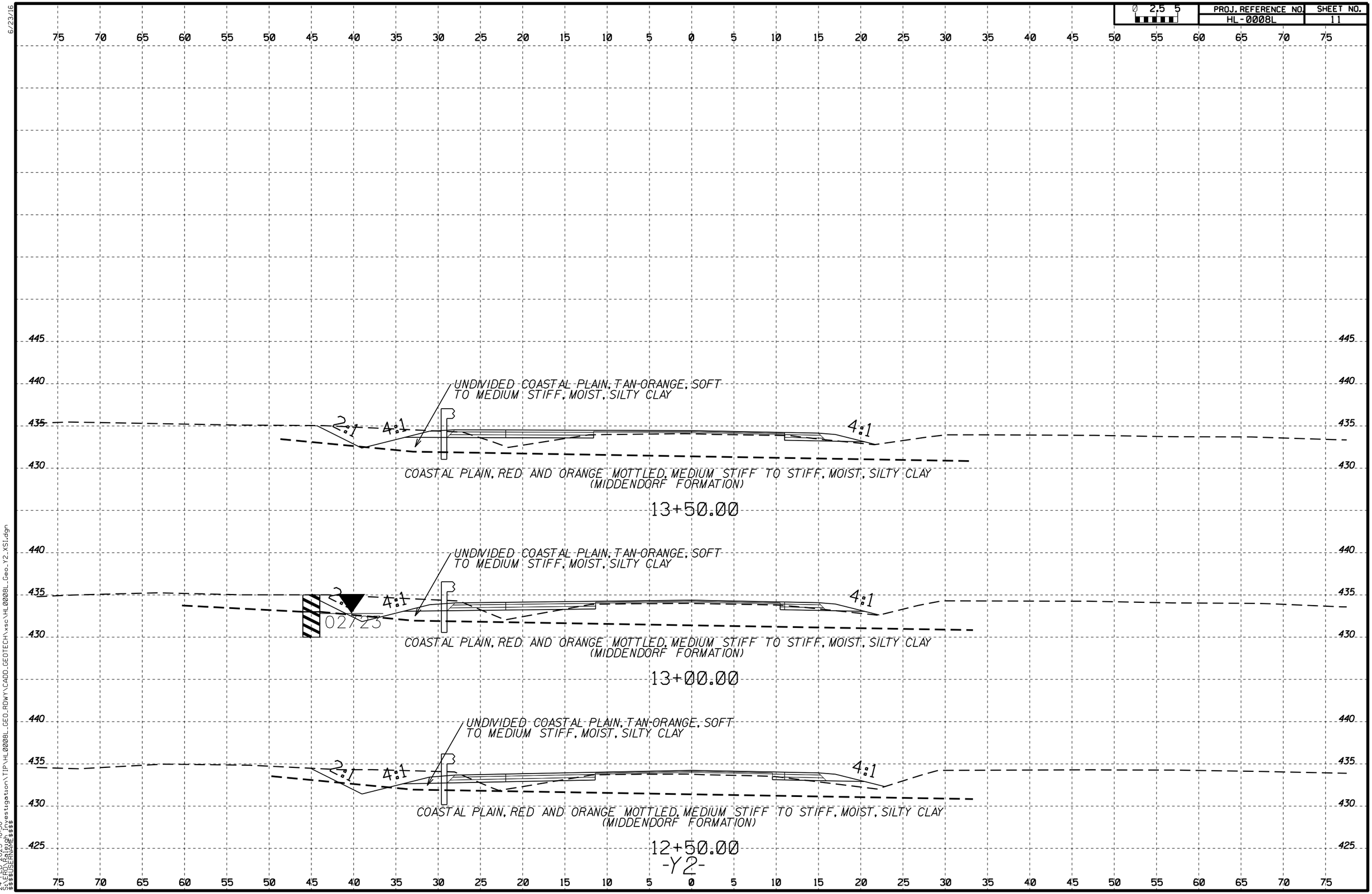




SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-1	30' LT	21+00	0.5-1.0	A-6(12)	36	31	13.1	28.4	26.3	32.2	81	74	55	-	-
S-2	30' LT	21+00	2.5-3.0	A-7-6(6)	44	19	20.1	20.7	20.8	38.3	74	63	48	-	-

PROJ. REFERENCE NO.	SHEET NO.
HL-0008L	11



6/23/16

24-FEB-2023 10:36
S:\FRO\Raleigh Investigation\TIP\HL0008L_GEO_RDWY\CADD_GEOTECH\xsc\HL0008L_Geo_Y2_XSI.dgn
$$$$USERNAME$$$$