This electronic collection of documents is provided for the convenience of the user and is Not a Certified Document –

The documents contained herein were originally issued and sealed by the individuals whose names and license numbers appear on each page, on the dates appearing with their signature on that page.
This file or an individual page shall not be considered a certified document.

09/08/99

TIP PROJECT: SM–5706G

CONTRACT: DF00411

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

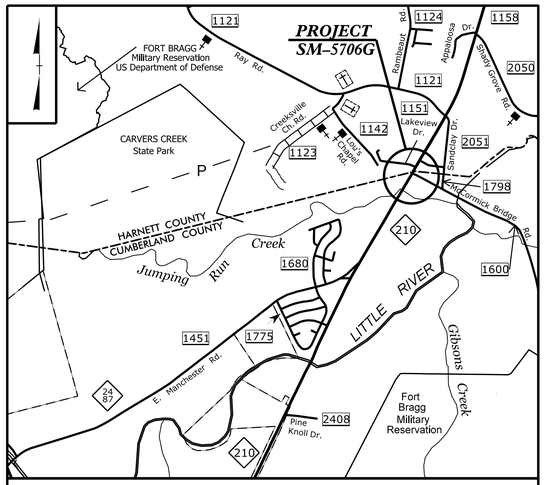
CUMBERLAND COUNTY

LOCATION: NC 210 AT SR 1600 (MCCORMICK BRIDGE ROAD)
TYPE OF WORK: GRADING, PAVING, & SIGNAL

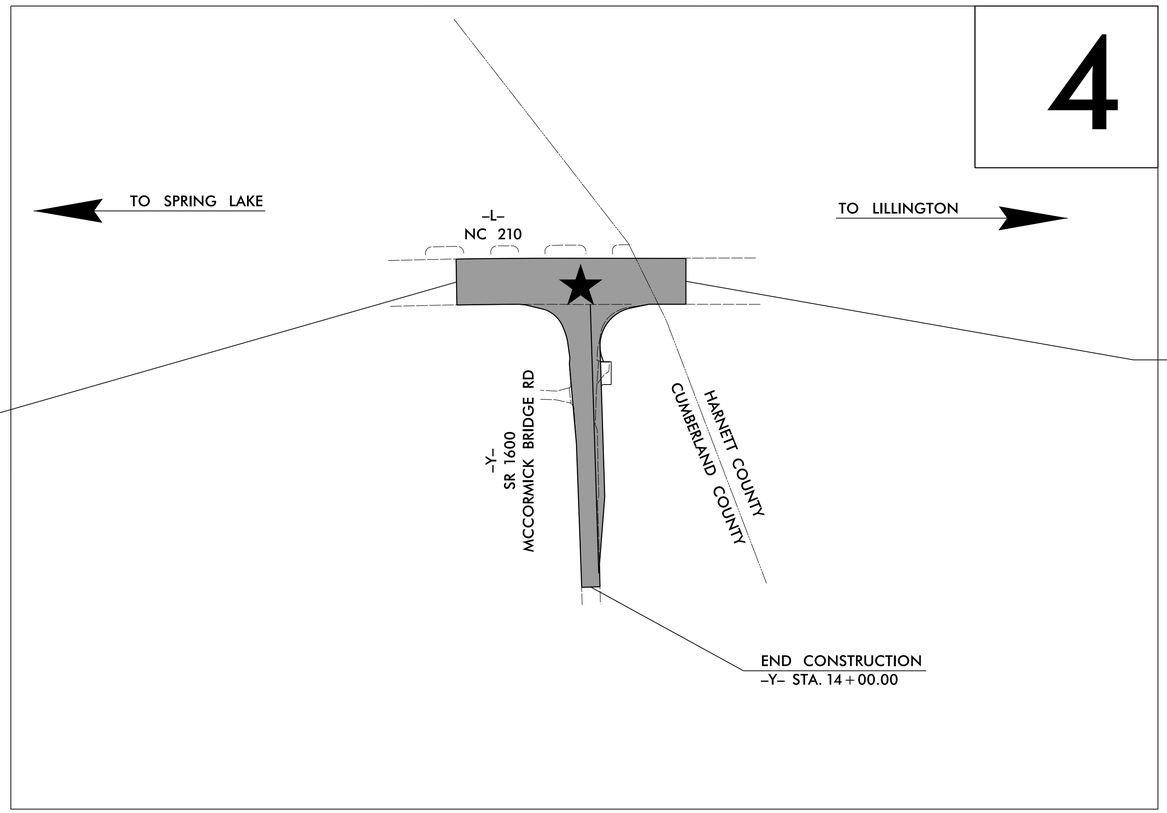
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SM–5706G	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
48906.1.1		PE
48906.2.1		ROW
48906.3.1		CONST

FINAL PLANS



VICINITY MAP N.T.S.



BEGIN STATE PROJECT SM–5706G
–L– STA. 12 + 00.00

END STATE PROJECT SM–5706G
–L– STA. 15 + 00.00

NAD 83/2011

★ PROPOSED SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 2022 = 20,700

V = 50 MPH

FUNC CLASS = MAJOR ARTERIAL

PROJECT LENGTH

TOTAL LENGTH ROADWAY PROJECT SM–5706G = 0.057 MILES

Prepared in the Office of:
DIVISION OF HIGHWAYS
431 TRANSPORTATION DR. FAYETTEVILLE, NC 28301

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 30, 2021

LETTING DATE:
SEPTEMBER 21, 2022

JOHN GAUTHIER
PROJECT ENGINEER

ALEX HENDERSON
PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

31-AUG-2022 10:51
S:\DDC\DDC_Projects\SM-5706G NC 210 at McCormick Bridge_Cumb Co\Roadway\proj\SM-5706G_Rdy_tsh.dgn
$$$$USERNAME$$$$

12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
SM-5706G	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Computed Property Corner
- Property Monument — 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:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — RW
- New Right of Way Line with Pin and Cap — RW
- New Right of Way Line with Concrete or Granite R/W Marker — RW
- New Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- New Control of Access — CA
- Existing Easement Line — E
- New Temporary Construction Easement — E
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New 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:

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 LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- U/G Telephone Cable LOS B (S.U.E.*) — T
- U/G Telephone Cable LOS C (S.U.E.*) — T
- U/G Telephone Cable LOS D (S.U.E.*) — T
- U/G Telephone Conduit LOS B (S.U.E.*) — TC
- U/G Telephone Conduit LOS C (S.U.E.*) — TC
- U/G Telephone Conduit LOS D (S.U.E.*) — TC
- U/G Fiber Optics Cable LOS B (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS C (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS D (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — 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 Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
SM-5706G	2A-1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PAVEMENT SCHEDULE

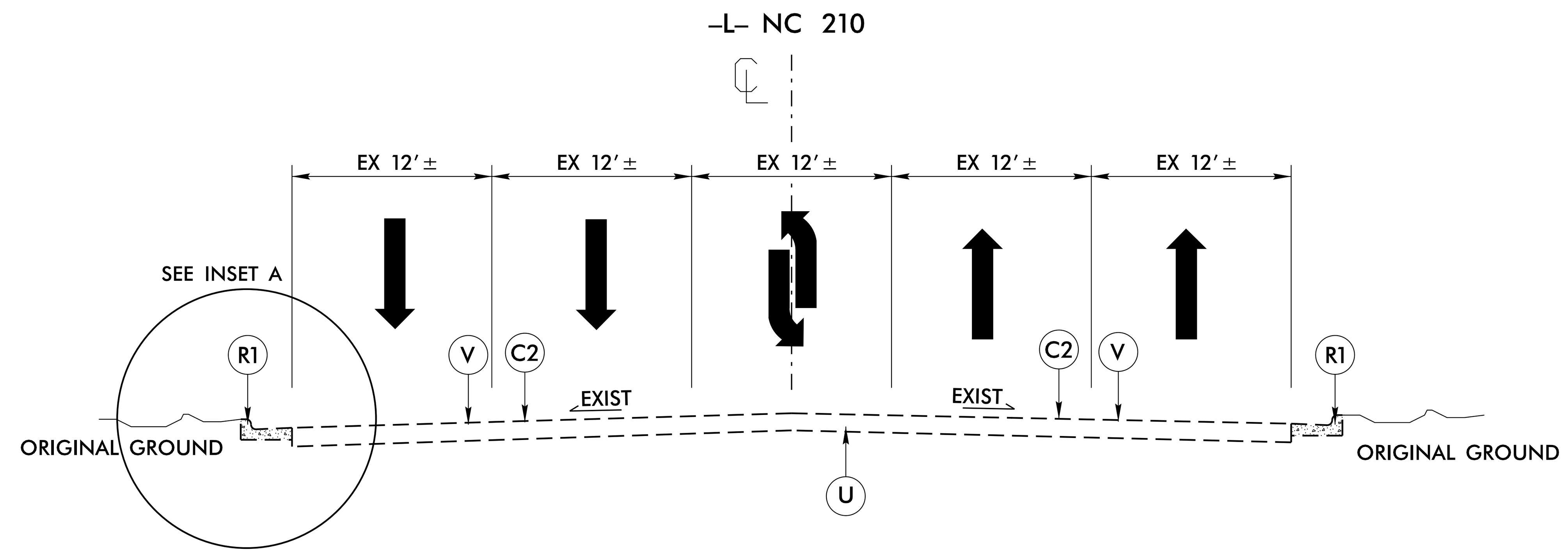
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	C2	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE,TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R1	EXIST CONCRETE CURB & GUTTER	R2	2'-6" CONCRETE CURB & GUTTER
T	EARTH MATERIAL	U	EXISTING PAVEMENT	V	1.5" MILLING

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

CONTRACTOR SHALL COORDINATE WITH LOCAL TRAFFIC SERVICES UNIT FOR PROPOSED SIGNAL DESIGN AND PLACEMENT OF ALL PAVEMENT MARKINGS.

FOR SIGNAL WORK,CONTACT TRAFFIC SERVICES 910-364-0606,28 DAYS PRIOR TO PLACEMENT.

FOR PAVEMENT MARKING AND SIGNING,CONTACT TRAFFIC SERVICES 910-364-0606,14 DAYS PRIOR TO FINAL PLACEMENT.

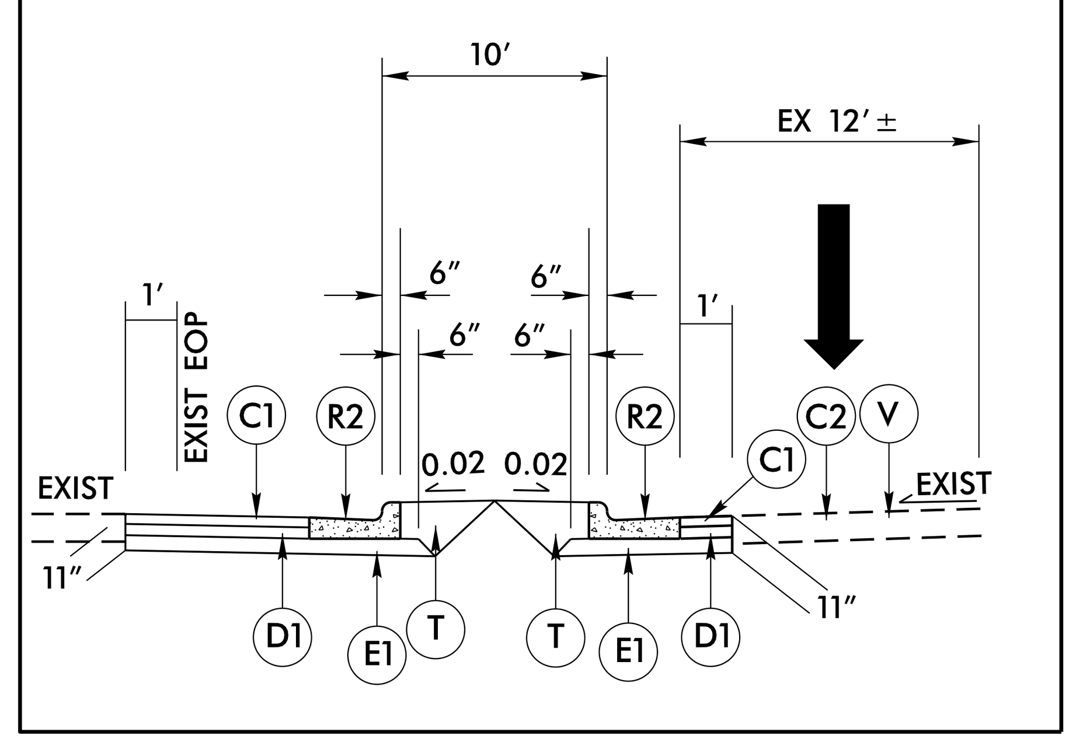


TYPICAL SECTION NO. 1

-L- STA. 12+00.00 TO 15+00.00

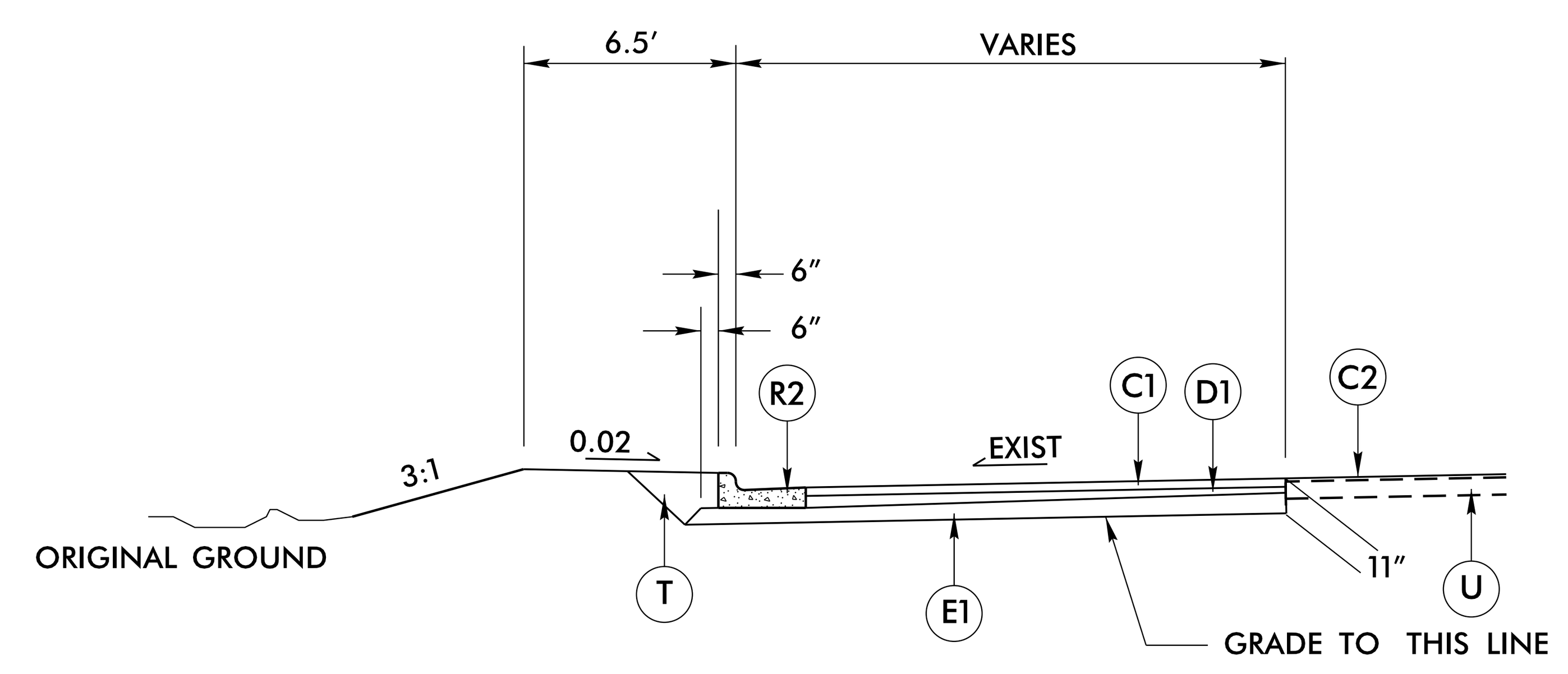
INSET A

-L- STA. 12+45.78 TO 14+32.00 LT



INSET B

-Y- STA. 10+30.44 TO 11+03.19 LT



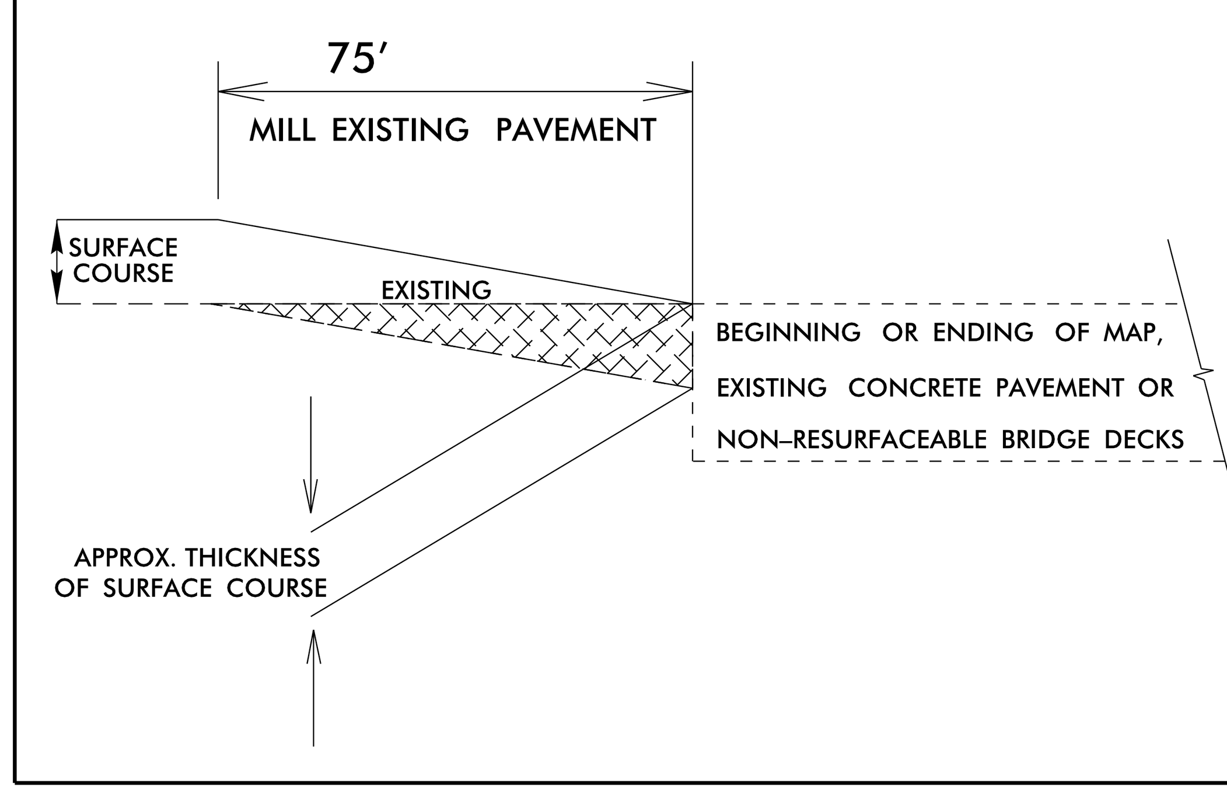
MILLING AT PAVEMENT TIE-INS

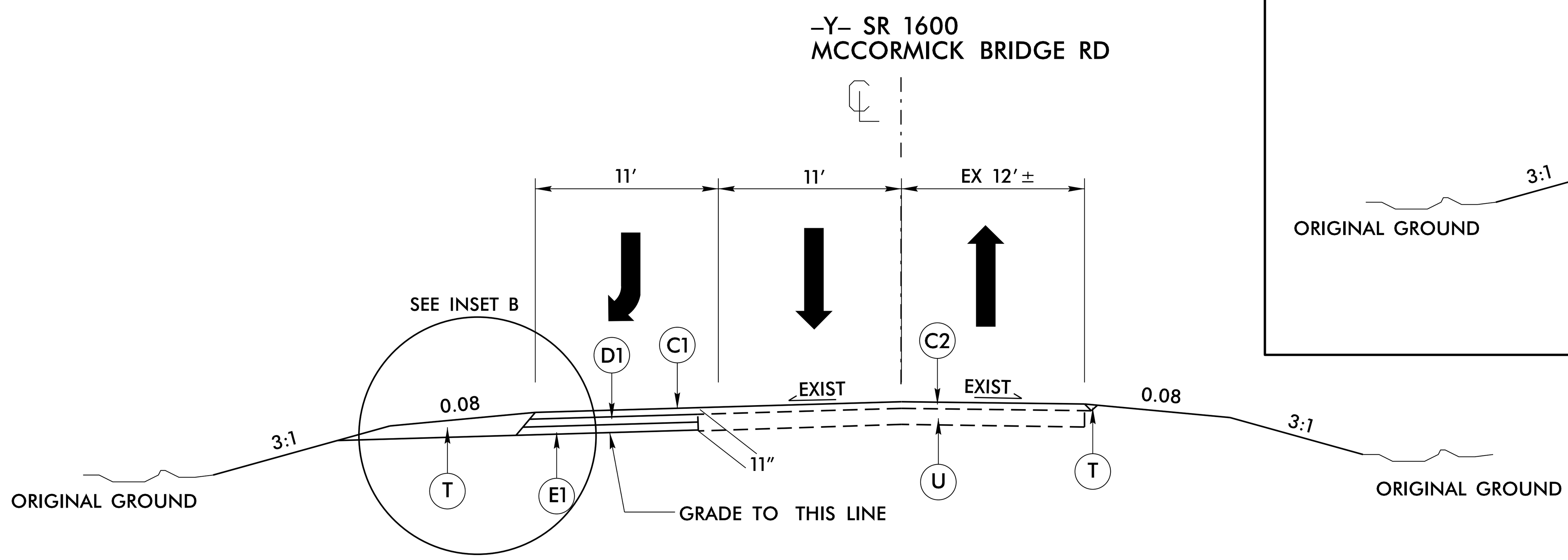
NOTES TO CONTRACTOR

For surface mixes over 1" in thickness, mill the existing pavement in acoordance with the following sketch as directed by the Engineer.

Locations shall include ties into existing concrete pavement, at bridge approaches where the bridge will not be resurfaced, and at the beginning and ending point of each resurfacing map.

Perform the work in accordance with Section 607 of the January 2018 North Carolina Department of Transportation Standard Specifications for Roads and Structures. Resurfacing will be accomplished at the same time as the milling operation.





TYPICAL SECTION NO.2

-Y- STA. 10+30.44 TO 12+82.35

TRANSITIION FROM TS NO. 2 TO EXISTING

-Y- STA. 12+82.35 TO 13+82.35

RESURFACE 1.5" S9.5C

-Y- STA. 13+82.35 TO 14+00.00

PROJECT NOTES

1. The contractor shall not work on both sides of the road simultaneously within the same area.
2. Ingress and egress shall be maintained to all businesses and dwellings on the project.
3. At the end of each workday, the contractor shall be required to backfill any area adjacent to existing travelway that has been graded, leaving no more than a 1" drop-off.
4. A minimum of two-way, two-lane traffic (plus all existing left and right turn lanes) shall be maintained during periods of construction inactivity.
5. The Contractor shall not be allowed to stop traffic for more than 5 minutes at a time in any one direction.
6. During periods of construction inactivity, the difference in elevation between lanes shall not exceed 1-1/2 inch.
7. Access to police and fire stations, fire hydrants, and hospitals shall be maintained at all times.
8. During periods of construction inactivity, place cones/drums 3' from existing edge of pavement (travelway) as directed by the Engineer.
9. Contractor to install and maintain Erosion Control devices as directed by the Engineer.
10. The contractor shall be responsible for the permanent staking of all Proposed Right of Way, Control of Access and Drainage Easements Per NCDOT Division 6 Special Provision in the contract.
11. Contractor shall provide Driveway Turnouts at all soil or gravel drives as directed by Engineer.
12. Signing will be incidental to the project. The Contractor is responsible for relocating , removing, replacing or installing signs as directed by the Engineer. There will be no direct pay for the relocation, removal, replacement or installation of signs.

CONCRETE REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION	SQ YD
L	12+45 +/-	14+32 +/-	LT	88
Y	10+30 +/-	11+04 +/-	LT	33
			TOTAL	121
			SAY	130

SUMMARY OF EARTHWORK

IN CUBIC YARDS

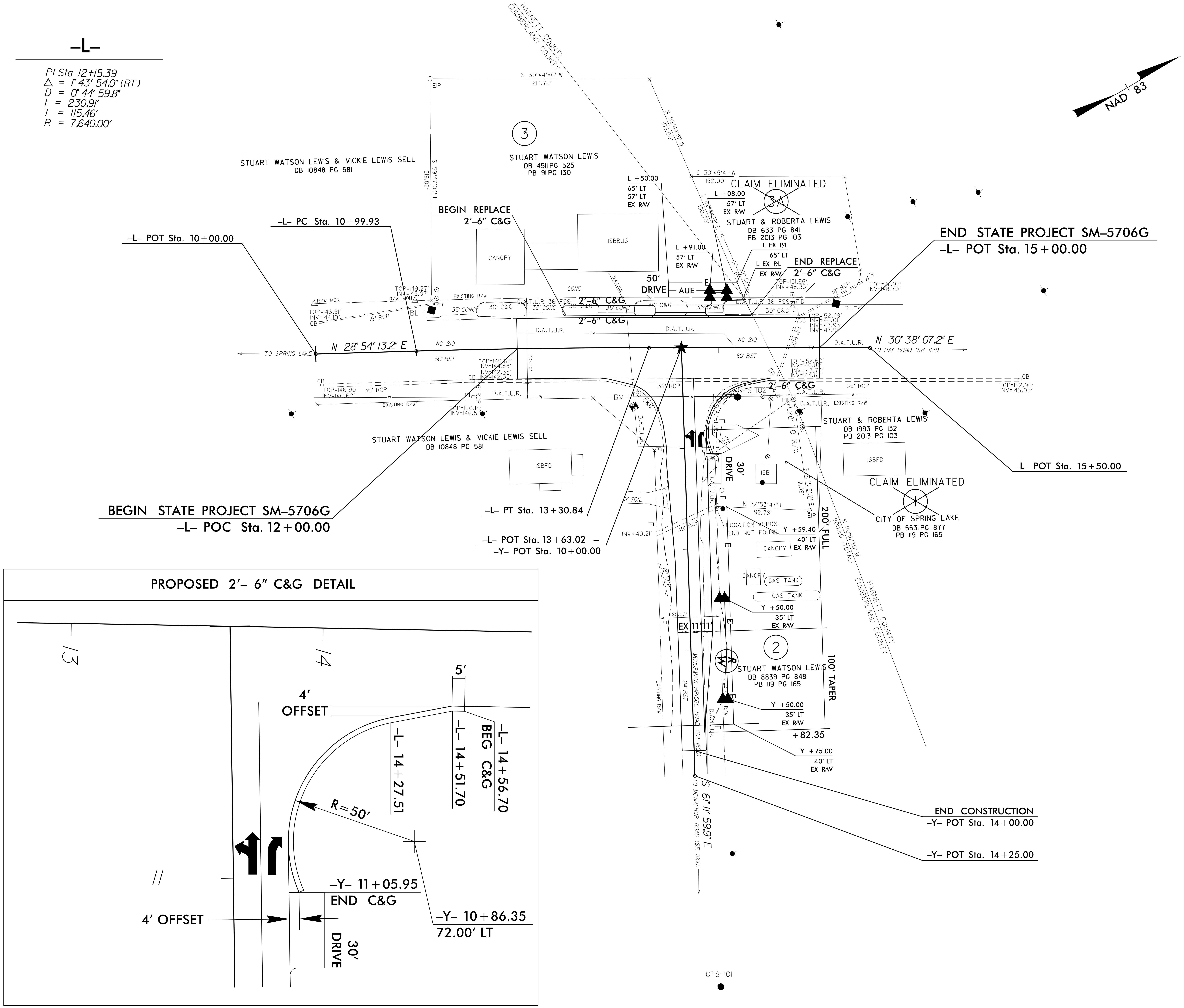
LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
L 12+45 +/- TO 14+32 +/-	110		69		41
Y 10+50 +/- TO 14+00 +/-	75		75	75	75
5% TO REPLACE TOP SOIL ON BORROW PIT				5	
PROJECT TOTAL	185			80	116
SAY	190			90	125

ASPHALT PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION	SQ YD
L	12+45 +/-	14+32 +/-	LT	156
Y	10+30 +/-	11+34 +/-	LT	44
			TOTAL	200
			SAY	215

Note: Approximate quantities only. Unclassified Excavation, Shoulder Borrow, Fine Grading, Clearing and Grubbing, Breaking of Existing Pavement, Removal of Existing Pavement, and Removal of Existing Concrete will be paid for at the contract lump sum price for "Grading." Borrow Excavation will be paid according to Section 230 of the 2018 Standard Specifications as noted in the Contract.

PROJECT REFERENCE NO.	SHEET NO.
SM-5706G	4

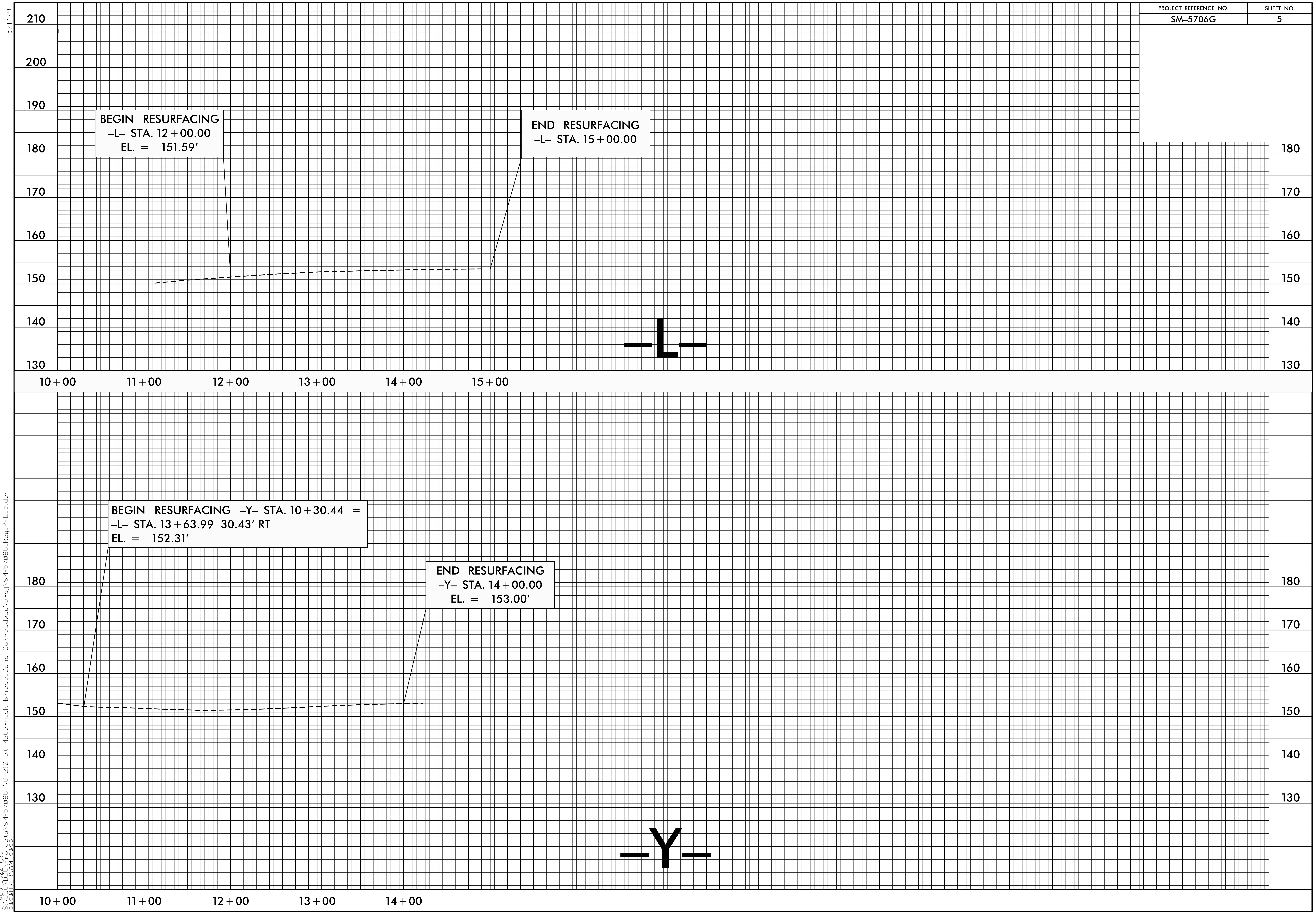


REVISIONS

8/17/99

31-AUG-2022 10:51
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
SM-5706G	5



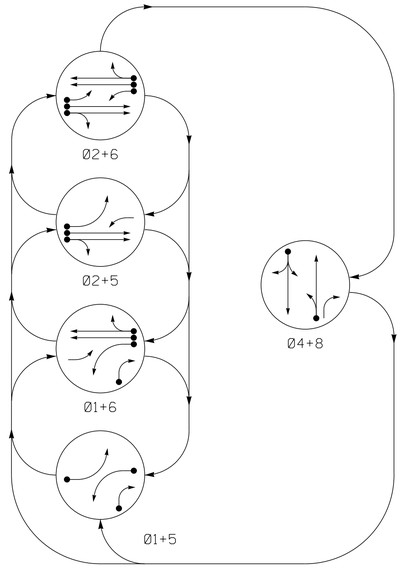
5/14/99

31-AUG-2022 10:51
S:\DDC\DDC\Projects\SM-5706G NC 210 at McCormick Bridge_Cumb Co\Roadway\proj\SM-5706G_Rdy_PFL_5.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
SM-5706G	Sig. 1.0

5 Phase
Fully Actuated
D06-04_Spring Lake

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

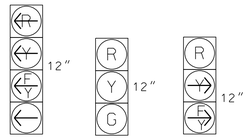
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	~~FY~~	~~FY~~	~~R~~	~~Y~~
21,22,23	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←	~~FY~~	←	~~FY~~	~~R~~	~~Y~~
61,62,63	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
83	~~FY~~	~~FY~~	R	R	~~FY~~	R

SIGNAL FACE I.D.

All Heads L.E.D.



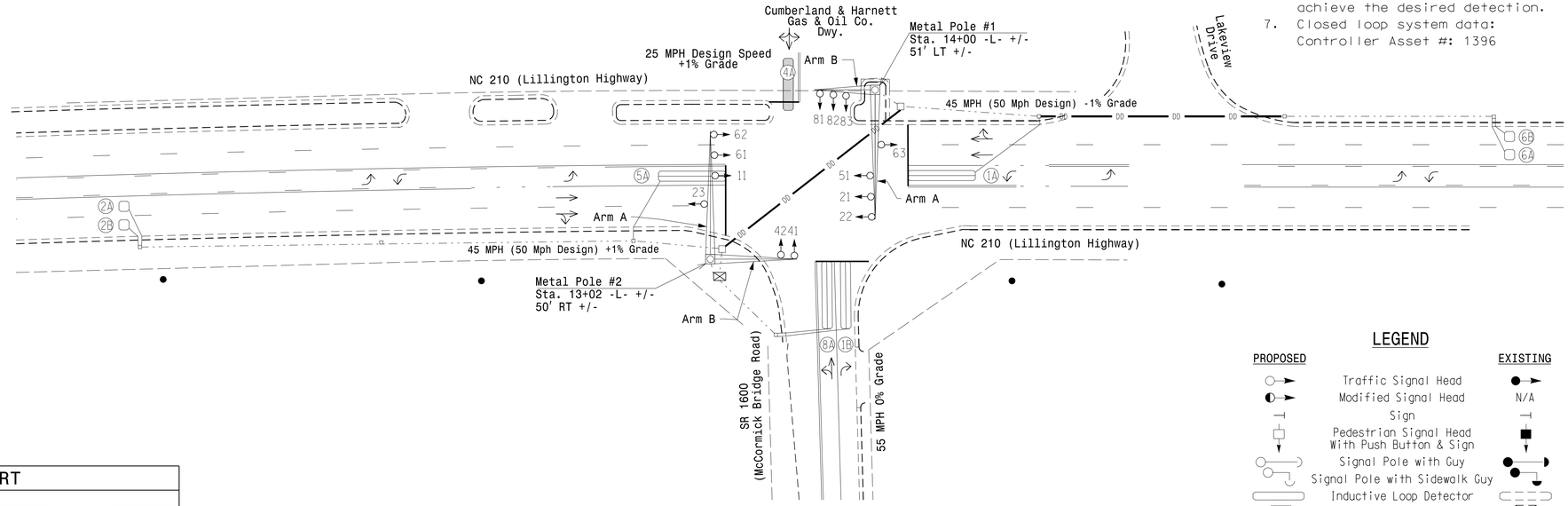
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Yes	-	15	-	N	-	X
					6	Yes	-	3	-	G	-	X
1B	6X40	0	2-4-2	Y	1	Yes	-	15	-	N	-	X
2A	6X6	355	6	Y	2	Yes	-	-	X	N	-	X
2B	6X6	355	6	Y	2	Yes	-	-	X	N	-	X
4A	6X30	+5	*	Y	4	Yes	-	5	-	N	-	X
5A	6X40	0	2-4-2	Y	5	Yes	-	15	-	N	-	X
					2	Yes	-	3	-	G	-	X
6A	6X6	355	5	Y	6	Yes	-	-	X	N	-	X
6B	6X6	355	5	Y	6	Yes	-	-	X	N	-	X
8A	6X40	0	2-4-2	Y	8	Yes	-	3	-	N	-	X

*Multizone Microwave Detection

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
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. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Closed loop system data: Controller Asset #: 1396



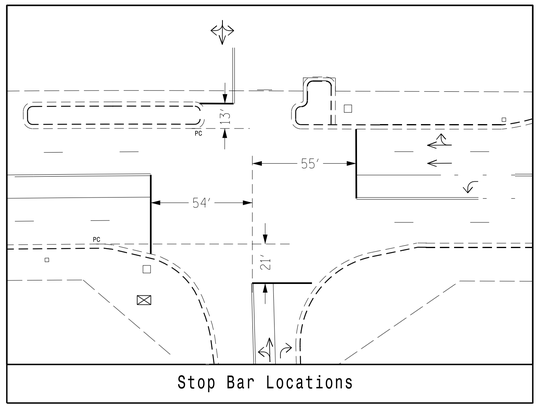
LEGEND

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	
	Multizone Microwave Detection Zone	
DD	Directional Drill	N/A
	Metal Pole with Mastarm	

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	14	7	7	14	7
Delayed Green *	0	0	0	0	0	0
Walk *	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	20	90	25	20	90	25
Yellow	3.0	4.9	3.1	3.0	4.9	5.2
Red Clear	2.4	1.1	2.3	2.1	1.1	1.1
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	0	-	-	0	-
Seconds /Actuation *	-	1.5	-	-	1.5	-
Max Initial *	-	40	-	-	40	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	X	-	-	X	-
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL	-
Dual Entry	-	-	X	-	-	X
Simultaneous Gap	X	X	X	X	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.



Stop Bar Locations

New Installation - Corr. File No. 06-19-56878

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared In the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

NC 210 (Lillington Highway) at SR 1600 (McCormick Bridge Road) / Cumberland & Harnett Gas & Oil

Division 6 Cumberland County Near Spring Lake

PLAN DATE: July 2022 REVIEWED BY: ZML

PREPARED BY: KGP, Jr. REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

DocuSigned by: Zachary Little 08/11/2022
0C21EFD94F5341F...

DATE

SIG. INVENTORY NO. 06-1396

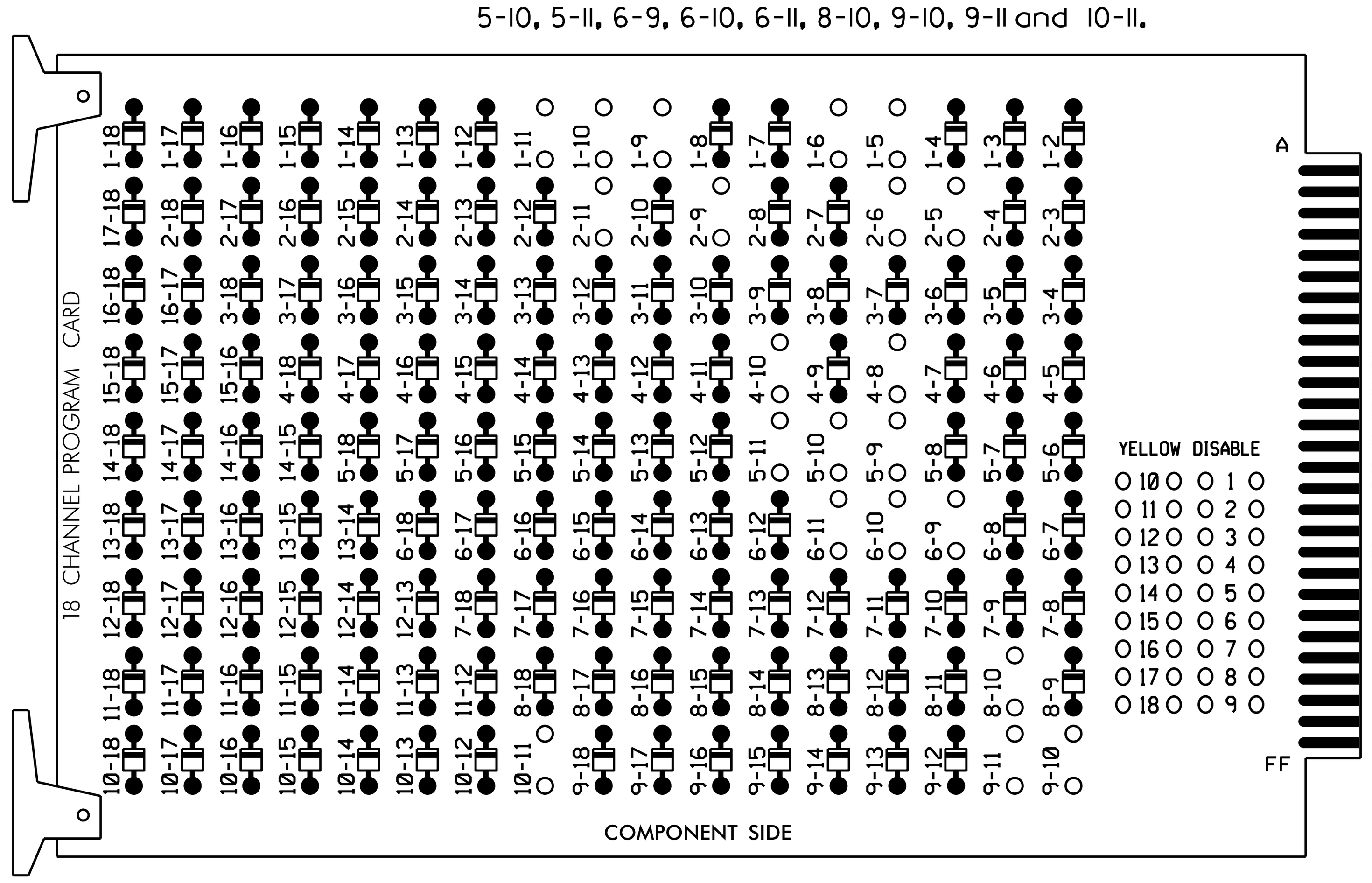
11-AUG-2022 15:25
S:\Traffic\Signals\Signal Design Section\Eastern Region\Div-06\SM-5706G\06-1396\ACAD\06-1396_sig_dsn_20210701.dgn
kgpeedin

PROJECT REFERENCE NO.	SHEET NO.
SM-5706G	Sig. 1.1

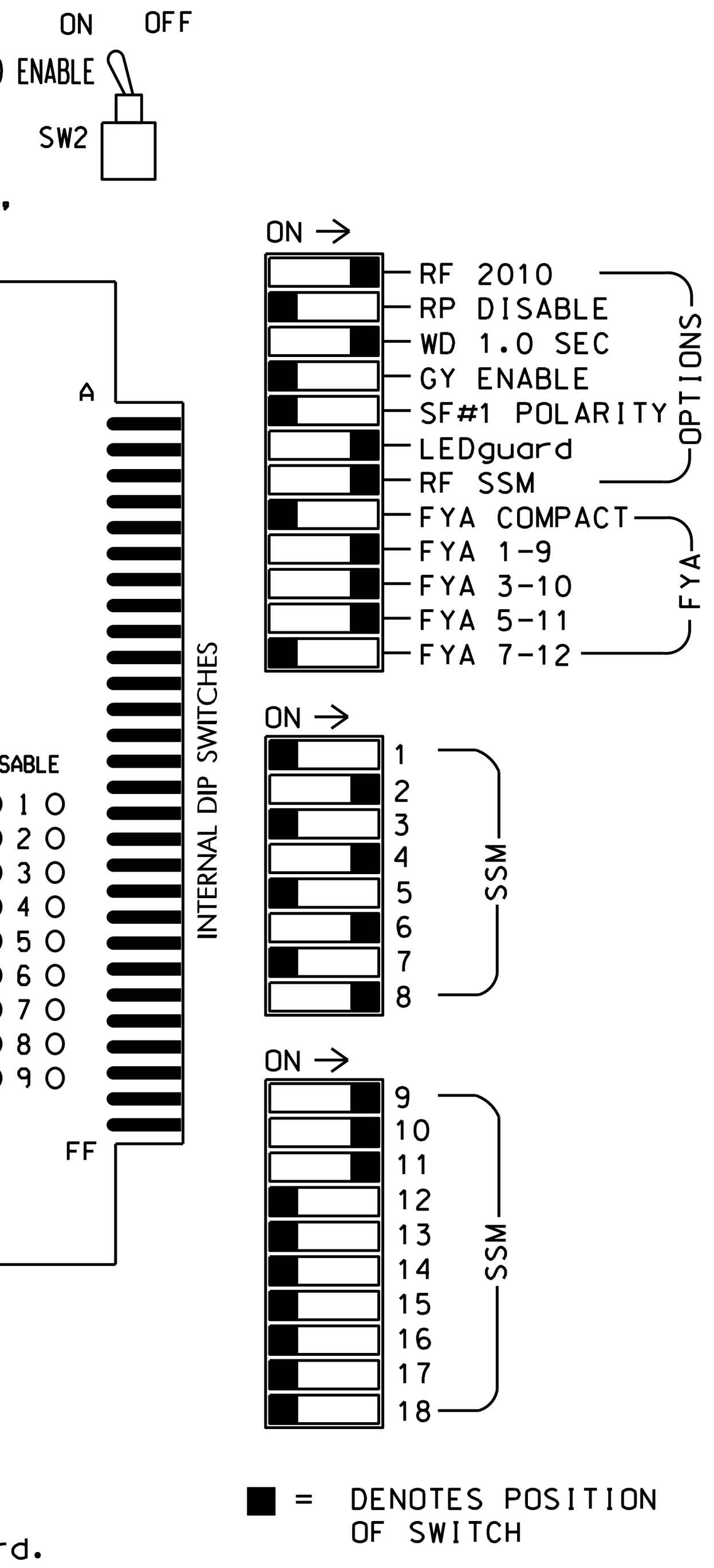
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



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 Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
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 D06-04_Spring Lake Signal System.

EQUIPMENT INFORMATION

CONTROLLER..............2070LX
CABINET.................332 W/AUX
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S5,S7,S8,S11,AUX S1, AUX S2,AUX S4
PHASES USED.............1,2,4,5,6,8
OVERLAP "A".............*
OVERLAP "B".............*
OVERLAP "C".............*
OVERLAP "D".............NOT USED

* 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	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21, 22,23	NU	NU	41,42	NU	51★	61, 62,63	NU	NU	81,82	NU	11★	83★	NU	51★	NU	NU
RED		128			101			134			107			A124				
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122	A125		A115		
FLASHING YELLOW ARROW													A123	A126		A116		
GREEN ARROW	127						133											

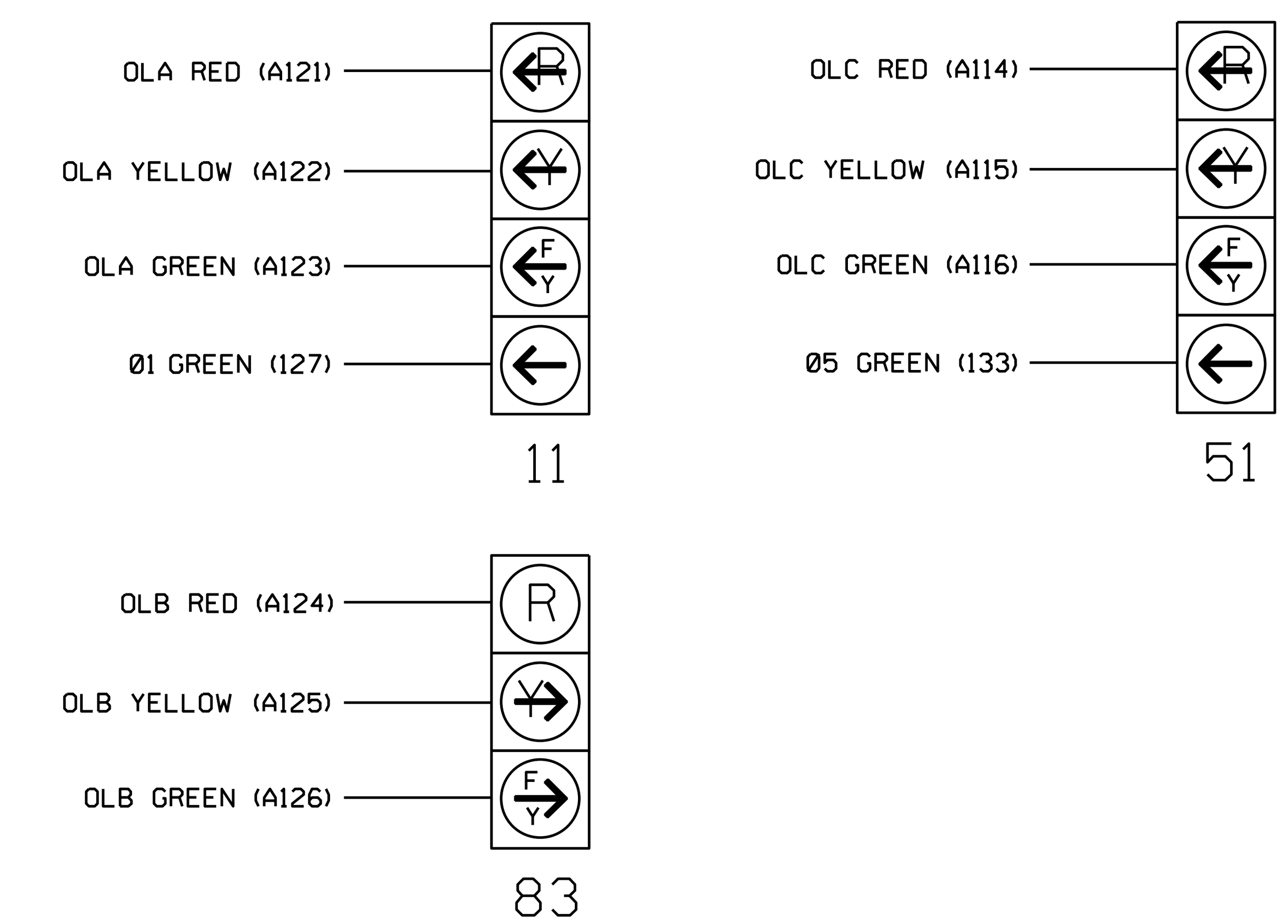
NU = Not Used

* 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	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B												ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B				Ø1 1B								

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A [1]	TB2-1,2	I1U	56	1	1	YES		15		N
	-	J4U	48	26	6	YES		3		G
1B	TB5-11,12	J6L	46	18	1	YES		15		N
2A	TB2-5,6	I2U	39	2	2	YES			X	N
2B	TB2-7,8	I2L	43	12	2	YES			X	N
5A [2]	TB3-1,2	J1U	55	5	5	YES		15		N
	-	I4U	47	22	2	YES		3		G
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	16	6	YES			X	N
8A	TB5-9,10	J6U	42	8	8	YES		3		N

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

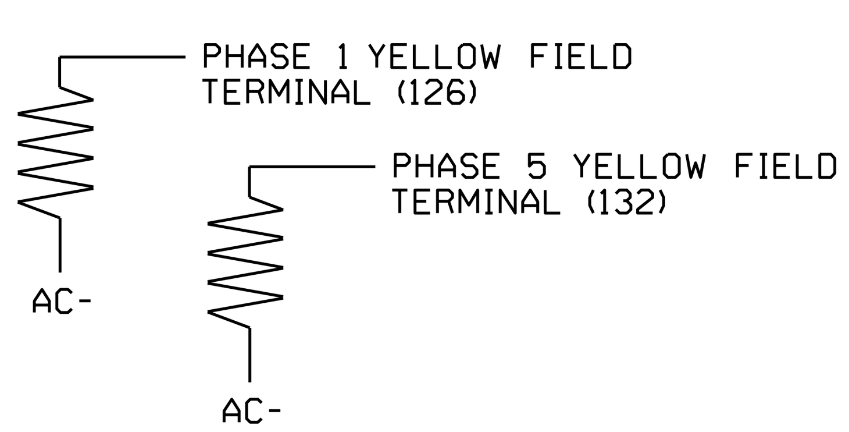
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1396
DESIGNED: July 2022
SEALED: 8/11/2022
REVISED: N/A

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)



SPECIAL DETECTOR NOTE

For detection zone 4A, install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection scheme shown on the Signal Design Plan.

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 210 (Lillington Highway)
at
SR 1600 (McCormick Bridge Road)/
Cumberland & Harnett Gas & Oil

Division 6 Cumberland County Near Spring Lake

PLAN DATE: August 2022 REVIEWED BY:
PREPARED BY: Zarrar Zafar REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared In the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE
DocuSigned by: D. Todd Joyce 08/15/2022
A90CADFDBD4241D...
DATE

SIG. INVENTORY NO. 06-1396

15-AUG-2022 11:43
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Zafar*Plans*061396*061396_sm_ele_2022mmdd.dgn
zzafar

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

```
TMG VEH OVLP...[A] TYPE: .....[PPLT FYA]

PROTECTED LEFT TURN....    PHASE    1
OPPOSING THROUGH.......    PHASE    2

FLASHING ARROW OUTPUT.....CH9  ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

Toggle Once

OVERLAP B

Select TMG VEH OVLP [B] and 'OTHER/ECONOLITE'

TMG VEH OVLP...[B] TYPE: [OTHER/ECONOLITE]

PHASES	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
INCLUDED	X	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.
PROTECT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PED PRTC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NOT OVLP	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FLSH GRN	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
LAG X PH	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LAG 2 PH	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0

Toggle Once

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```
TMG VEH OVLP...[C] TYPE: .....[PPLT FYA]

PROTECTED LEFT TURN....    PHASE    5
OPPOSING THROUGH.......    PHASE    6

FLASHING ARROW OUTPUT.....CH11 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO ENSURE 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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1396
DESIGNED: July 2022
SEALED: 8/11/2022
REVISED: N/A

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 210 (Lillington Highway)
at
SR 1600 (McCormick Bridge Road)/
Cumberland & Harnett Gas & Oil

Division 6 Cumberland County Near Spring Lake

Prepared in the Offices of:
ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

PLAN DATE: August 2022	REVIEWED BY:
PREPARED BY: Zarrar Zafar	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce A90CADFDBD4241D... 08/15/2022 DATE

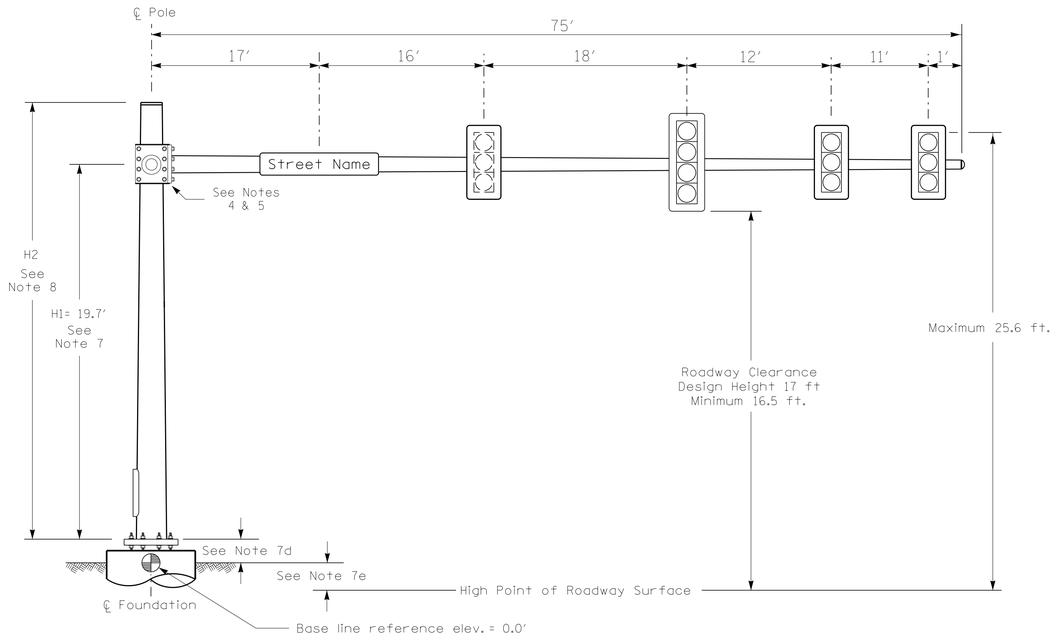
SIG. INVENTORY NO. 06-1396

15-AUG-2022 11:43
.*061396_sm_ele_2022mmdd.dgn
zzafar

METAL POLE No. 1

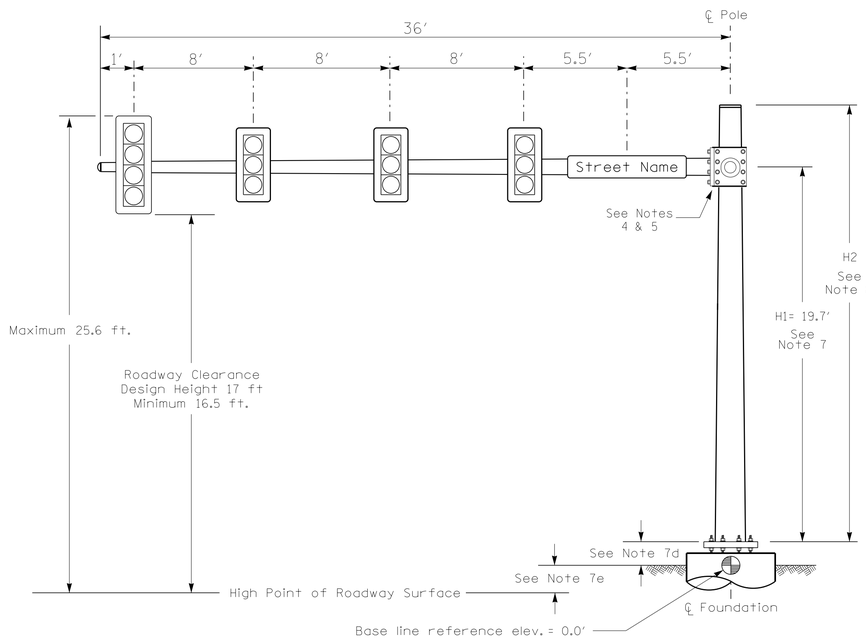
PROJECT REFERENCE NO.	SHEET NO.
SM-5706G	Sig. 1.3

Design Loading for METAL POLE NO. 1, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 1, MAST ARM B



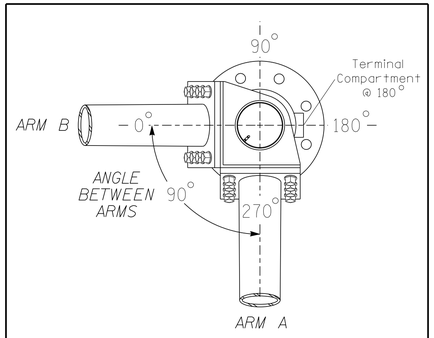
Elevation View @ 0°

SPECIAL NOTE

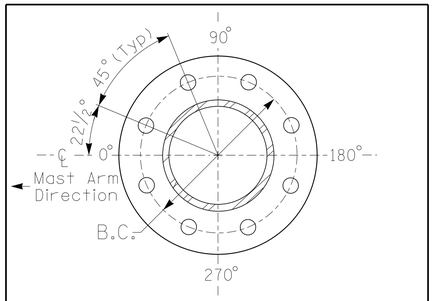
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.7 ft.	-0.4 ft.
Elevation difference at Edge of travelway or face of curb	+0.5 ft.	+0.1 ft.

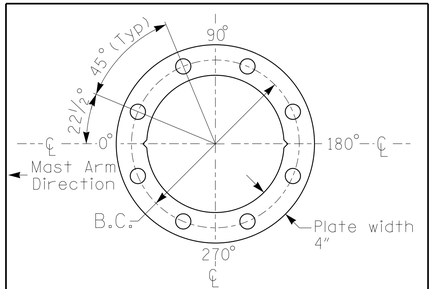


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5"W X 66.0"L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5"W X 52.5"L	60 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2018 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 3 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 210 (Lillington Highway)
at
SR 1600 (McCormick Bridge Road) / Cumberland & Harnett Gas & Oil

Division 6 Cumberland County Near Spring Lake

PLAN DATE:	July 2022	REVIEWED BY:	ZML
PREPARED BY:	KGP, Jr.	REVIEWED BY:	

SCALE: 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

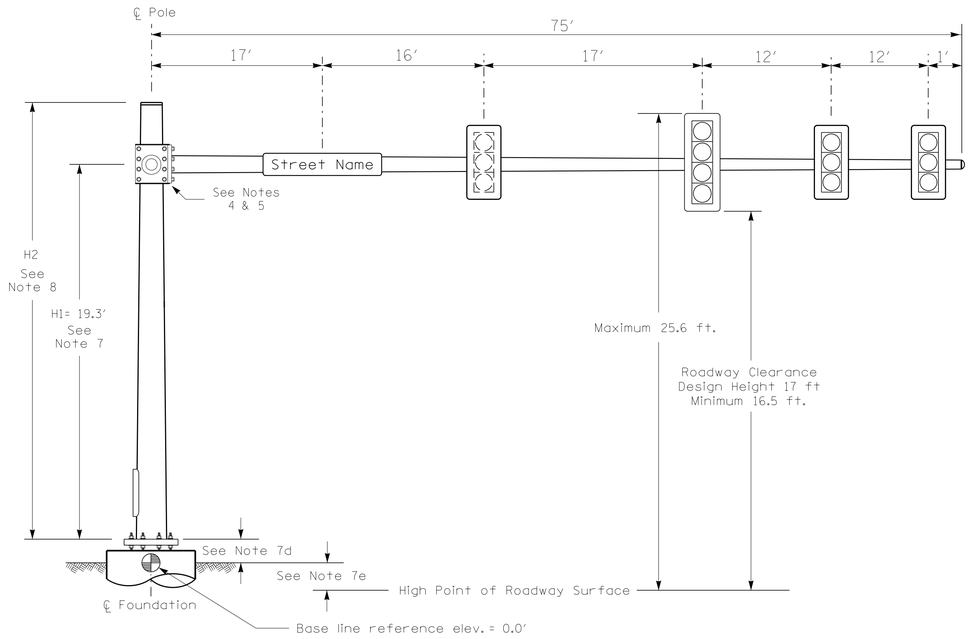
DocuSigned by: Zachary Little 08/19/2022
0C21EFD04F5341F... DATE

SIG. INVENTORY NO. 06-1396

METAL POLE No. 2

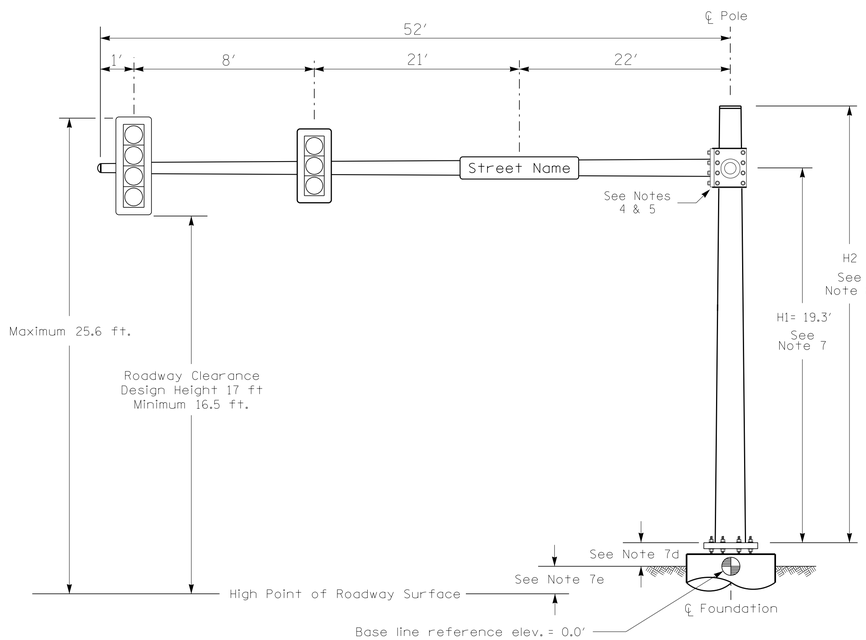
PROJECT REFERENCE NO.	SHEET NO.
SM-5706G	Sig. 1.4

Design Loading for METAL POLE NO. 2, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 2, MAST ARM B



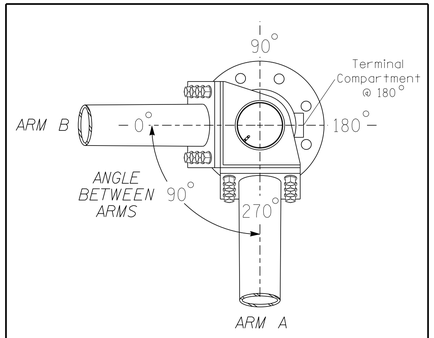
Elevation View @ 0°

SPECIAL NOTE

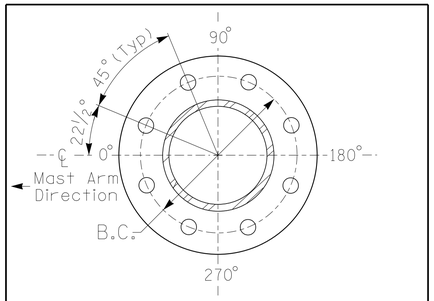
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.3 ft.	-0.4 ft.
Elevation difference at Edge of travelway or face of curb	-0.2 ft.	-0.3 ft.

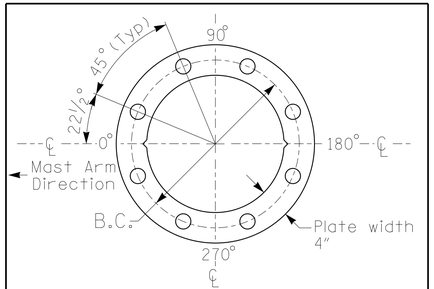


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12″-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5″W X 66.0″L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″W X 52.5″L	60 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2018 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 3 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 210 (Lillington Highway)
at
SR 1600 (McCormick Bridge Road) / Cumberland & Harnett Gas & Oil
Division 6 Cumberland County Near Spring Lake

PLAN DATE:	July 2022	REVIEWED BY:	ZML
PREPARED BY:	KGP, Jr.	REVIEWED BY:	

SCALE: 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

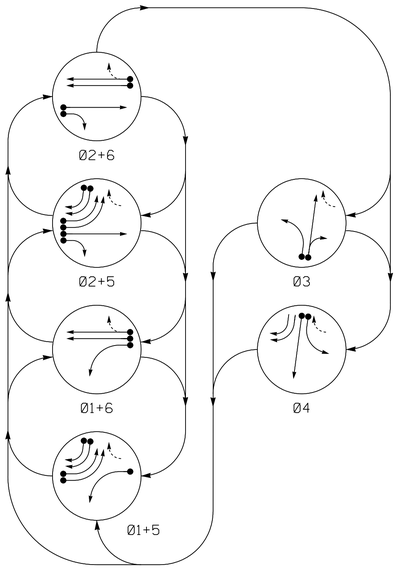
DocuSigned by: Zachary Little 08/19/2022
DC21EFD94F5341F... DATE

SIG. INVENTORY NO. 06-1396

19-AUG-2022 09:12
S:\TISGUI\ITS Signals\Signal Design Section\Eastern Region\Div-06\SM-5706G\06-1396\ADD\06i1396_sig_m2_2022mods.dgn
kgpendin

PROJECT REFERENCE NO.	SHEET NO.
SM-5706G	Sig.2.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

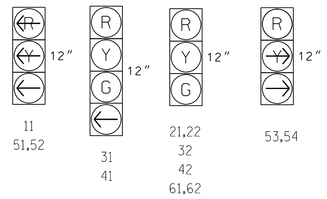
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03	04	FLASH
11	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21,22	R	R	G	G	R	R	Y
31	R	R	R	R	G ←	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G ←	R
42	R	R	R	R	R	G	R
51,52	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~
53,54	→	R	→	R	R	→	R
61,62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



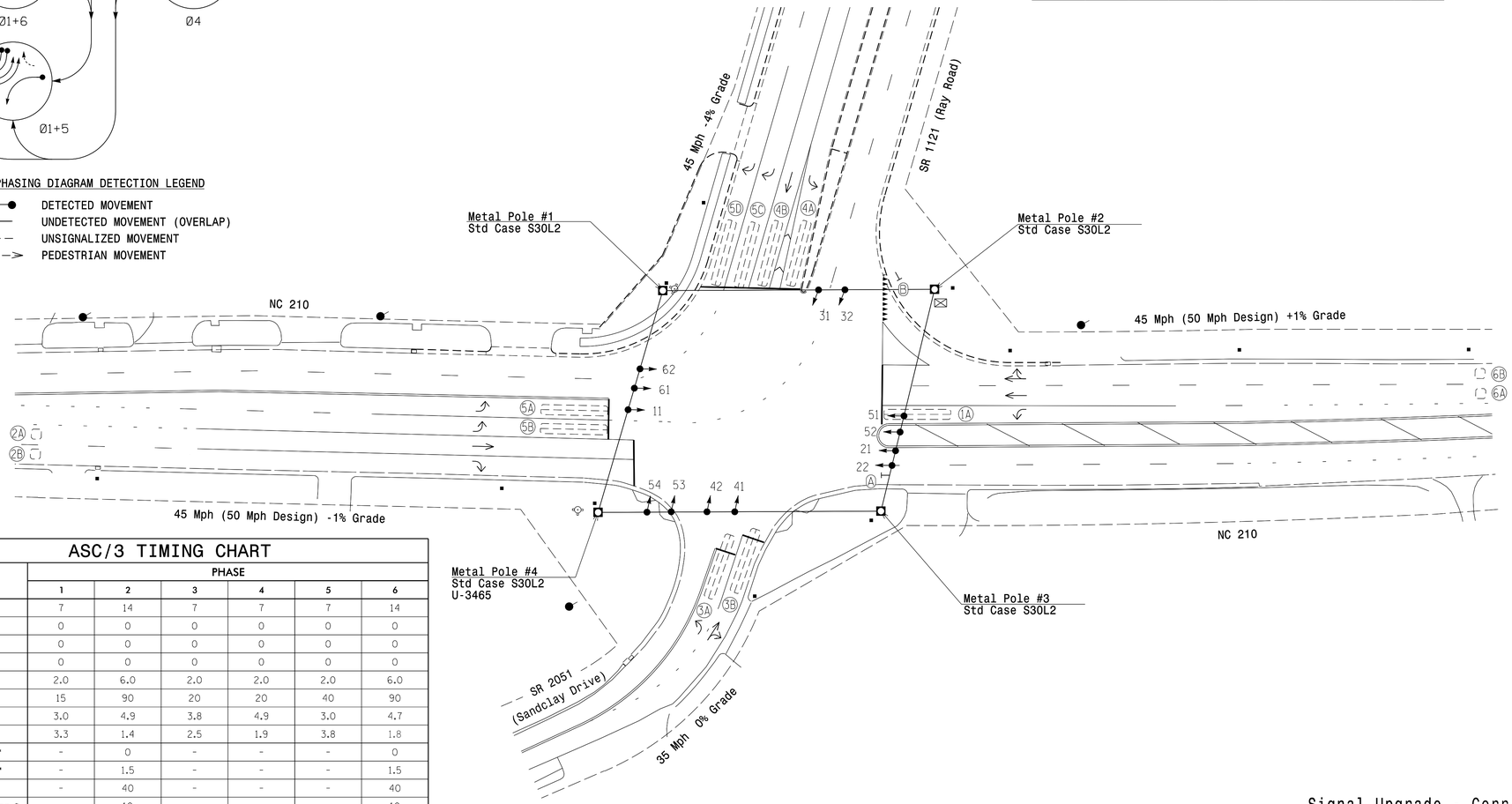
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	-	-	N	-	X
2A	6X6	355	6	-	2	Yes	-	-	X	N	-	X
2B	6X6	355	6	-	2	Yes	-	-	X	N	-	X
3A	6X40	+10	2-4-2	-	3	Yes	-	3	-	N	-	X
3B	6X40	+5	2-4-2	-	3	Yes	-	10	-	N	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	N	-	X
4B	6X40	0	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X40	0	2-4-2	-	5	Yes	-	3	-	N	-	X
5B	6X40	0	2-4-2	-	5	Yes	-	-	-	N	-	X
5C	6X40	0	2-4-2	-	5	Yes	-	15	-	N	-	X
5D	6X40	0	2-4-2	-	5	Yes	-	15	-	N	-	X
6A	6X6	355	4	-	6	Yes	-	-	X	N	-	X
6B	6X6	355	4	-	6	Yes	-	-	X	N	-	X

6 Phase
Fully Actuated
D06-04_Spring Lake

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
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. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Closed loop system data: Controller Asset # 0437.



ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green *	7	14	7	7	7	14
Delayed Green *	0	0	0	0	0	0
Walk *	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	15	90	20	20	40	90
Yellow	3.0	4.9	3.8	4.9	3.0	4.7
Red Clear	3.3	1.4	2.5	1.9	3.8	1.8
Actuations B4 Add *	-	0	-	-	-	0
Seconds /Actuation *	-	1.5	-	-	-	1.5
Max Initial *	-	40	-	-	-	40
Time Before Reduction *	-	10	-	-	-	10
Time To Reduce *	-	20	-	-	-	20
Minimum Gap	-	3.0	-	-	-	3.0
Locking Detector	-	X	-	-	-	X
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	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	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	"YIELD" Sign (R1-2)	B

Signal Upgrade - Corr. File: 06-19-56878

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared In the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

NC 210
At
SR 1121 (Ray Road)/
SR 2051 (Sandclay Road)

Division 6 Harnett County Spring Lake

PLAN DATE: June 2022 REVIEWED BY: ZML
PREPARED BY: KGP, Jr. REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

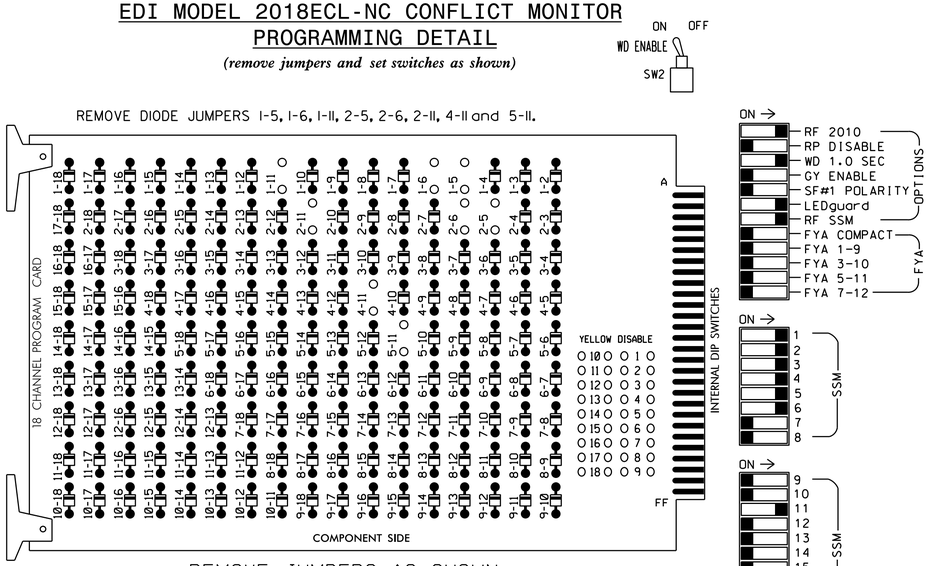
DocuSigned by: Zachary Little DATE 08/17/2022

SIG. INVENTORY NO. 06-0437

PROJECT REFERENCE NO.	SHEET NO.
SW-5706G	Sig. 2.1

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

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 Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 Plans.
2. Program controller to start up in phase 2 Green and 6 Green.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D06-04_Spring Lake Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,AUX S4
PHASES USED.....1,2,3,4,5,6
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....*
OVERLAP "D".....NOT USED

* See overlap programming detail on this sheet

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	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	31	32	41	42	NU	51,52	61,62	NU	NU	NU	NU	NU	NU	NU	53,54	NU	NU
RED		128		116	116	101	101			134								A114		
YELLOW		129		117	117	102	102			135										
GREEN		130		118	118	103	103			136										
RED ARROW	125								131											
YELLOW ARROW	126								132									A115		
GREEN ARROW	127			118		103			133									A116		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B				Ø3 3B	Ø4 4B							ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø5 5D	Ø6 6B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø5 5C	Ø6 6A	NOT USED										

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.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1	1	YES				N
2A	TB2-5,6	I2U	39	2	2	YES			X	N
2B	TB2-7,8	I2L	43	12	2	YES			X	N
3A	TB4-9,10	I6U	41	4	3	YES		3		N
3B	TB4-11,12	I6L	45	14	3	YES		10		N
4A	TB6-1,2	I7U	65	34	4	YES				N
4B	TB6-3,4	I7L	78	44	4	YES				N
5A	TB3-1,2	J1U	55	5	5	YES		3		N
5B	TB3-5,6	J2U	40	6	5	YES				N
5C	TB3-7,8	J2L	44	16	5	YES		15		N
5D	TB3-9,10	J3U	64	36	5	YES		15		N
6A	TB3-11,12	J3L	77	46	6	YES			X	N
6B	TB5-1,2	J4U	48	26	6	YES			X	N

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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.

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

Toggle Twice

OVERLAP C

Select TMG VEH OVLP [C] and 'NORMAL'

```
TMG VEH OVLP...[C] TYPE: ......NORMAL
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . X X . . . . . . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0437
DESIGNED: June 2022
SEALED: 8/17/2022
REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
NC DEPARTMENT OF TRANSPORTATION
Traffic Engineering & Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 210
at
SR 1121 (Ray Road)/
SR 2051 (Sandclay Road)

Division 6 | Harnett County | Spring Lake

PLAN DATE: July 2022	REVIEWED BY:
PREPARED BY: Zarrar Zafar	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

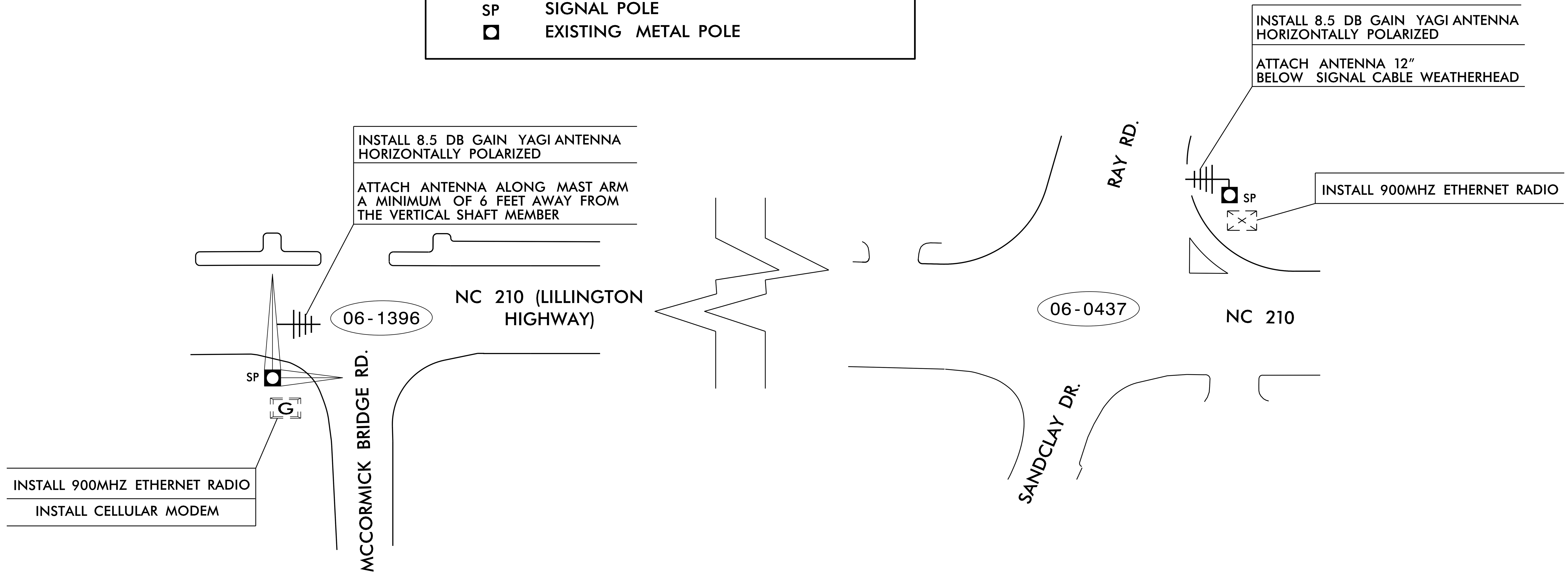
DocuSigned by: D. Todd Joyce 08/18/2022
A90CADFDBD6241D... DATE

SIG. INVENTORY NO. 06-0437

PROJECT REFERENCE NO.	SHEET NO.
SM-5706G	SCP 1

LEGEND

- YAGI ANTENNA (SINGLE)
- EXISTING CONTROLLER AND CABINET
- GATEWAY RADIO LOCATION
- XX-XXXX SIGNAL INVENTORY NUMBER
- EXISTING METAL POLE W/MAST ARM
- SP SIGNAL POLE
- EXISTING METAL POLE



NOTES FOR WIRELESS COMMUNICATIONS:

1. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE DEPUTY DIVISION TRAFFIC ENGINEER AT (910) 364-0606. NOTIFY THE DEPUTY DIVISION TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL WIRELESS CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNALS ARE COMMUNICATING WITH THE CENTRAL SYSTEM.
2. INSTALL COAXIAL CABLE:
   A. ON WOOD POLES, REQUIRING A NEW RIGID GALVANIZED STEEL RISER, INSTALL A 2" RISER WITH WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
   B. ON METAL POLES WITH MAST ARMS, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL A 1/2" HOLE UP THROUGH THE BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
   C. ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
   D. BETWEEN THE POINT OF EXITING THE RISER, METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
3. IF AN EXISTING 2" SPARE RIGID GALVANIZED STEEL RISER IS AVAILABLE, INSTALL THE COAXIAL CABLE IN THE SPARE RISER WITH 2" WEATHERHEAD.
4. INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN. (NOTE: RF WARNING SIGN NOT REQUIRED WHEN ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
5. INSTALL WIRELESS RADIO WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET. (NOTE: RF ANTENNA DISCONNECT SWITCH AND DECAL ARE NOT REQUIRED WHEN THE ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
6. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
7. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."
8. CELL MODEMS TO BE SUPPLIED BY THE DEPARTMENT. CONTACT THE DEPUTY DIVISION TRAFFIC ENGINEER AT (910) 364-0606 TO REQUEST THE CELL MODEM. ALLOW 8 WEEKS LEAD TIME BEFORE ANTICIPATED DEPLOYMENT.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

D06-04 SPRING LAKE

WIRELESS PLAN

DIVISION 6 CUMBERLAND NEAR SPRING LAKE

PLAN DATE: JULY 2022 | REVIEWED BY: DocuSigned by: B. Green 99F8BBEF705A4FA...

PREPARED BY: H.T.BERGGREN, EI

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 042578 ENGINEER MATTHEW T. CARLISLE

DocuSigned by: Matthew T. Carlisle ACFDF35E29734B6...
DATE: 07/27/2022

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	SM-5706G	X-1

0.019 0.020 3:1

151.71
11+25.00

3:1 0.016 0.024

151.90
11+00.00

3:1 0.012 0.033

152.10
10+75.00

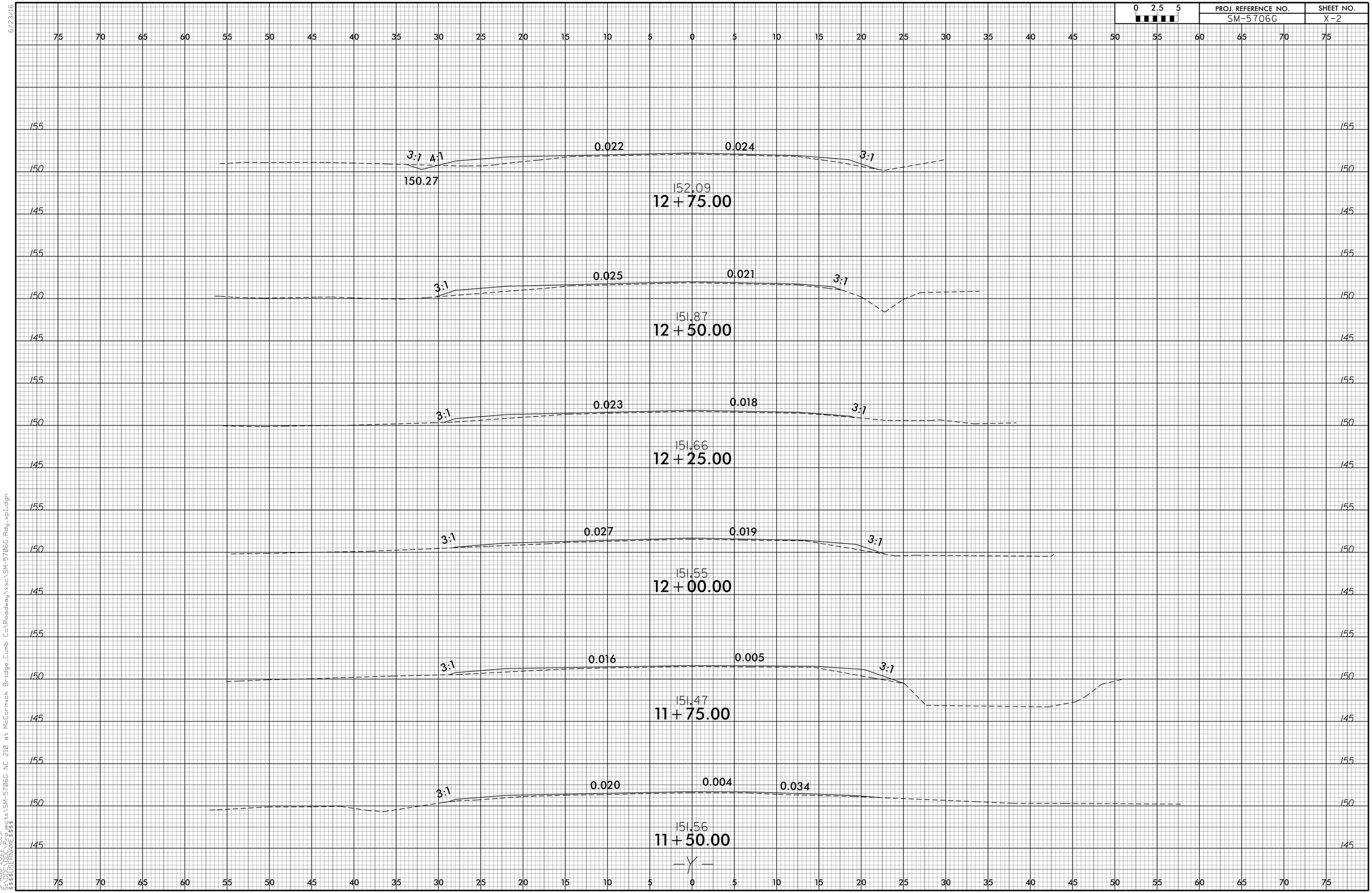
152.20
10+50.00

152.47
10+25.00

153.08
10+00.00

31-AUG-2022 10:51
C:\Projects\SM-5706G NC 210 at McCormick Bridge_Cumb Co\Roadway\xsc\SM-5706G_Rdy_xpl.dgn
$$$$USERNAME$$$$

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	SM-5706G	X-2



6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	SM-5706G	X-3

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

155 150 145

153.00
14+00.00

155 150 145

3:1 0.014 0.021 3:1

152.90
13+75.00

155 150 145

3:1 4:1 0.017 0.024 3:1

150.75

152.76
13+50.00

155 150 145

3:1 4:1 0.017 0.027 3:1

150.52

152.56
13+25.00

155 150 145

3:1 4:1 0.015 0.028 3:1

150.29

152.34
13+00.00

—Y—

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

31-AUG-2022 10:51
$$$$USERNAME$$$$
C:\Projects\SM-5706G NC 210 at McCormick Bridge_Cumb Co\Roadway\xsc\SM-5706G_Rdy_xpl.dgn