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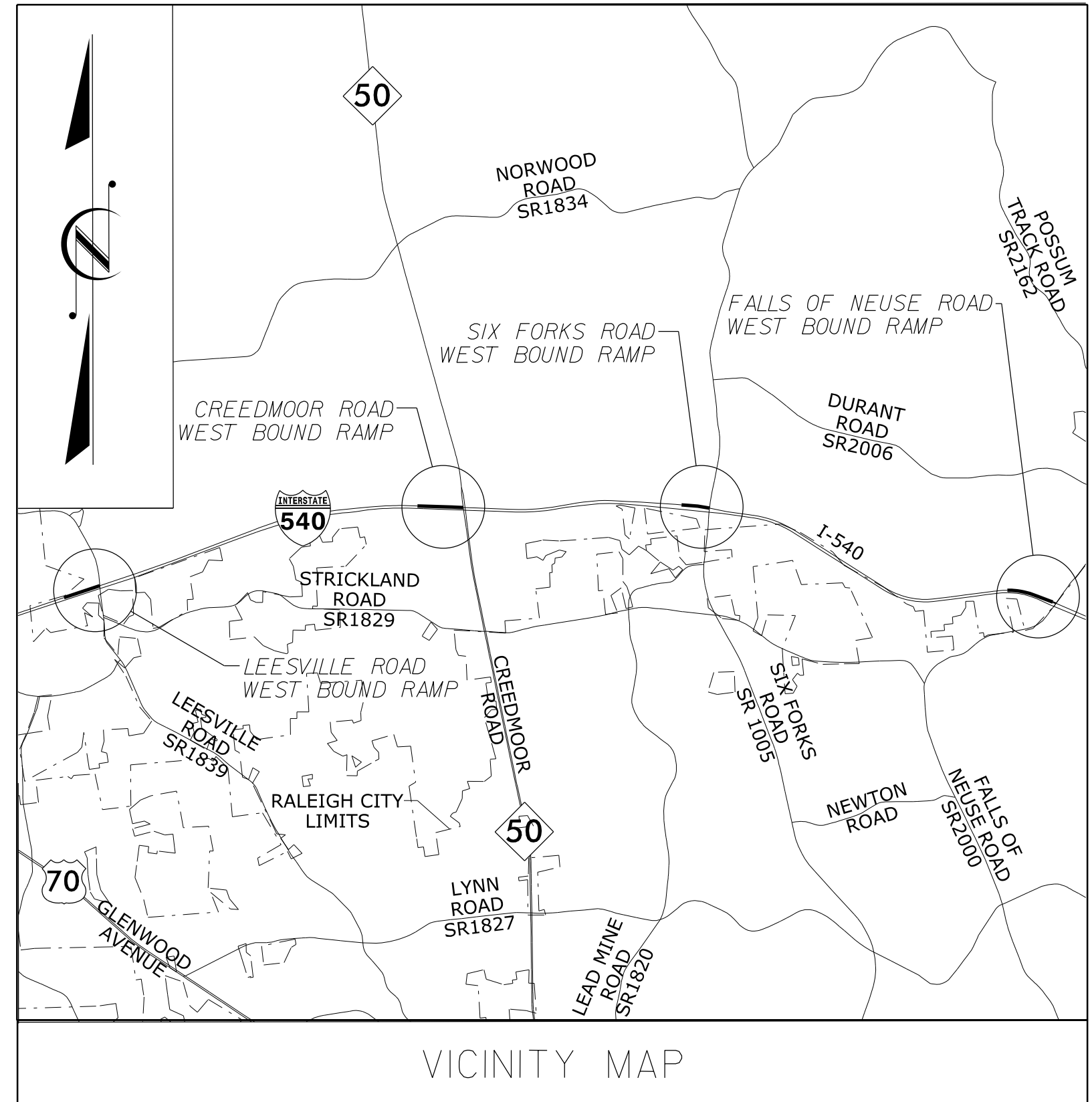
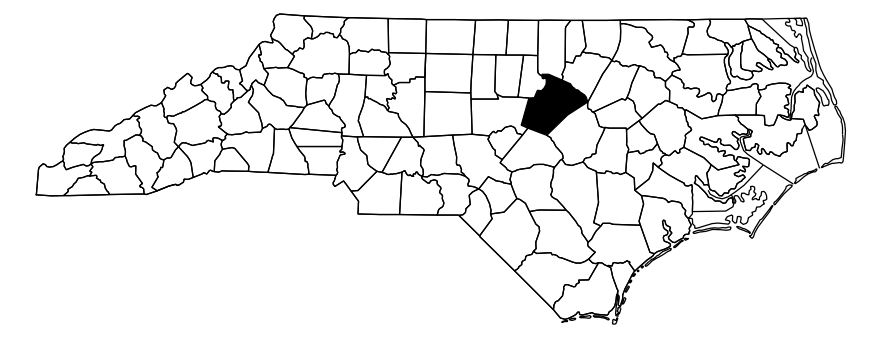
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 T:\Production\ITS\NCDOT\100042047 I-540 Ramp Meter Design\Mobility and Safety TO\ITS Task 3 and 4 - ITS Plans\ITS-01 Title.dgn
 WILE2054 AT DUS300019

CONTRACT: C203791 TIP PROJECT: I-5710

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5710	ITS-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50125.1.FSI	NHPP-0540(30)	PE	
50125.3.FSI	NHPP-0540(30)	CONSTR.	

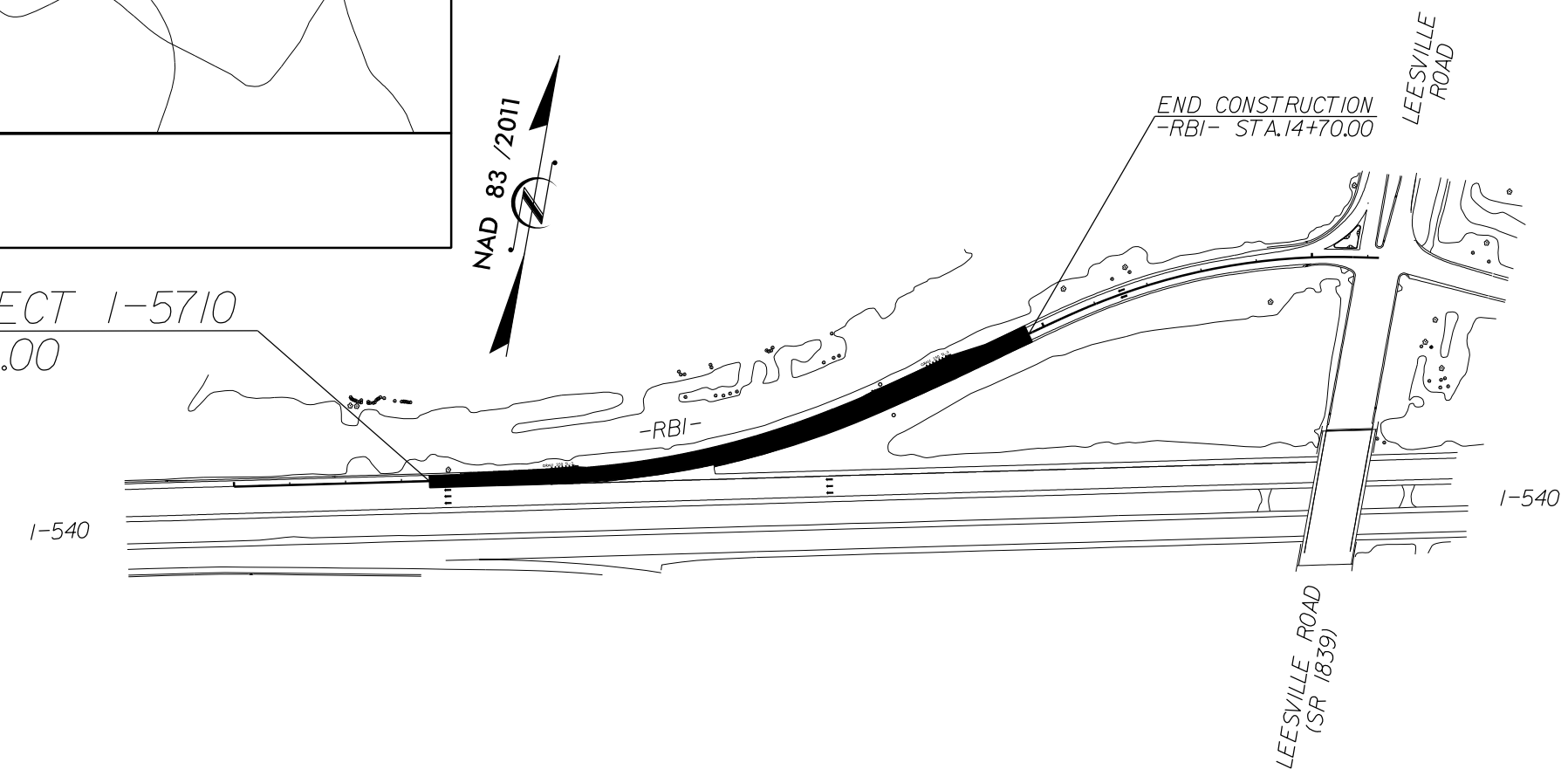


VICINITY MAP

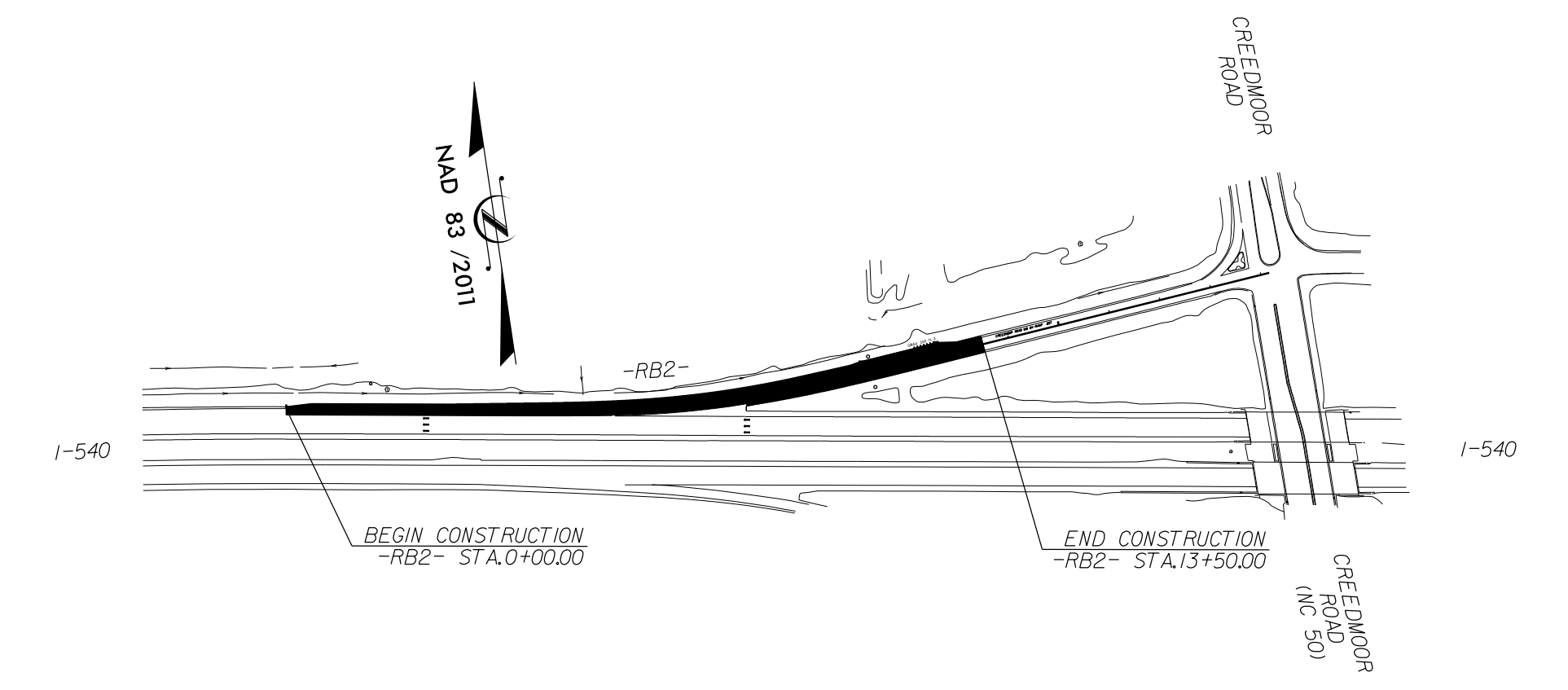
LOCATION: WEST BOUND RAMP ALONG I-540 AT SR 1839 (LEESVILLE ROAD), NC 50 (CREEDMOOR ROAD), SR 1005 (SIX FORKS ROAD), AND SR 2000 (FALLS OF NEUSE ROAD).

TYPE OF WORK: INSTALLING RAMP METERS - WIDENING, GRADING, PAVING, DRAINAGE, RETAINING WALL, ITS, AND SIGNALS

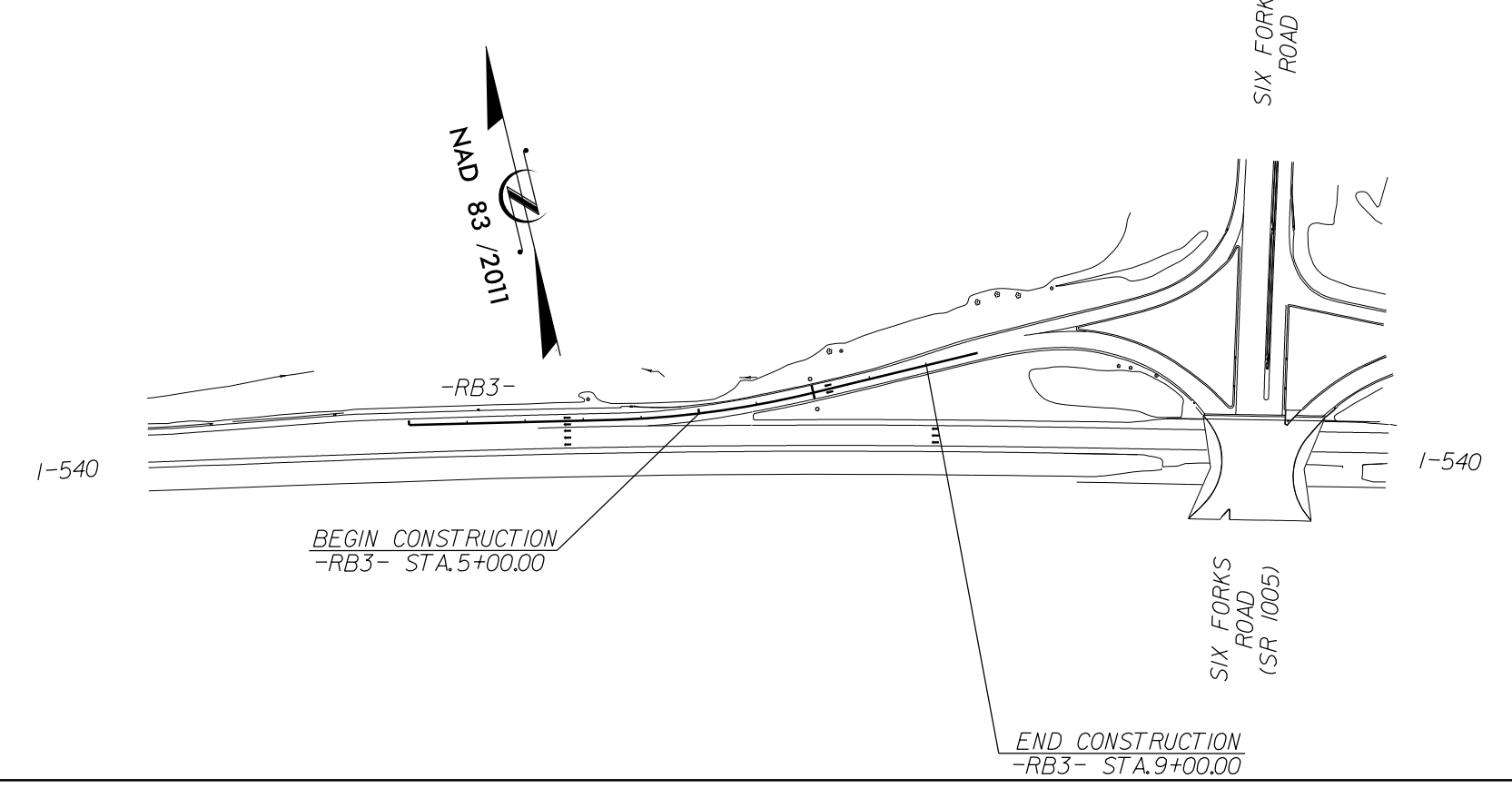
LEESVILLE ROAD - ITS-12 - ITS-14



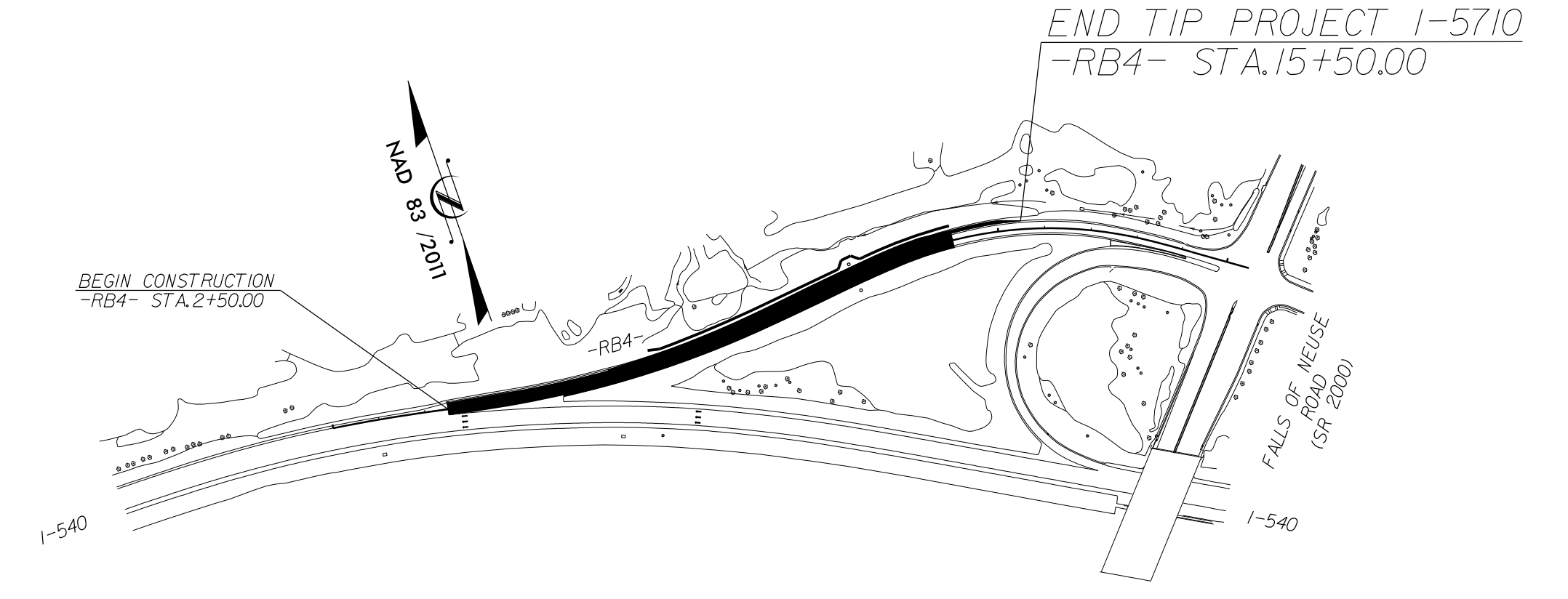
CREEDMOOR ROAD - ITS-15 - ITS-17



SIX FORKS ROAD - ITS-18 - ITS-20



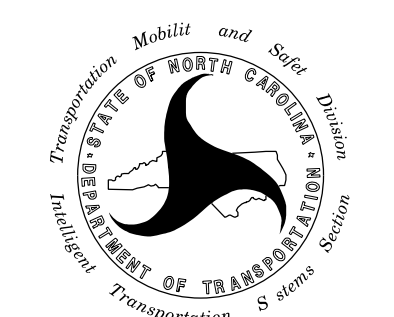
FALLS OF NEUSE ROAD - ITS-21 - ITS-23



2012 STANDARD SPECIFICATIONS

LETTING DATE: SEPT. 20, 2016

PROJECT LENGTH = 0.761 MILES



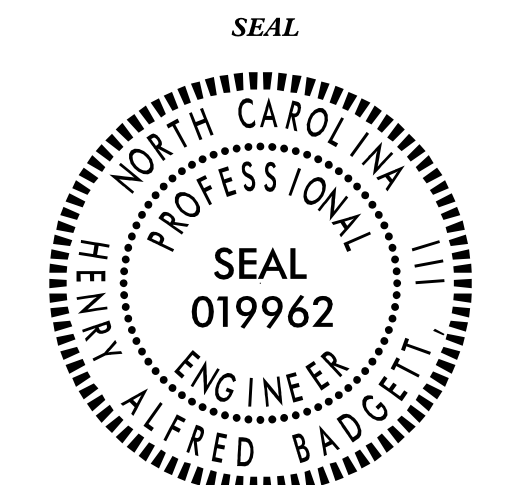
750 Greenfield Parkway, Garner, NC 27529
NCDOT CONTACTS:
TRANSPORTATION MOBILITY & SAFETY DIVISION
INTELLIGENT TRANSPORTATION SYSTEMS SECTION
 GREG A. FULLER, PE - STATE ITS & SIGNALS ENGINEER
 TOM PARKER - ITS PROJECT ENGINEER
 ROB ZIEMBA, PE - CENTRAL REGION SIGNALS ENGINEER

ATKINS

5200 77 CENTER DRIVE, SUITE 500
 CHARLOTTE, NORTH CAROLINA 28217
 (704) 522-7275 NCBES #F-0326

H. ALFRED BADGETT, PE - ATKINS PROJECT MANAGER
 J. TODD BROOKS, PE - ATKINS SENIOR PROJECT ENGINEER
 PHILLIP BLAICKLOCK, PE - ATKINS PROJECT ENGINEER

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DocuSigned by:
H. Alfred Badgett
 SIGNATURE DATE 6/27/2016

INDEX OF SHEETS

ITS-1	TITLE SHEET (PROJECT OVERVIEW)
ITS-2	INDEX OF SHEETS, LEGEND, GENERAL NOTES, AND ABBREVIATIONS
ITS-3	CONSTRUCTION NOTES
ITS-4, ITS-5	SUMMARY OF WORK
ITS-6, ITS-7	SIGNAL EQUIPMENT BLOCK DIAGRAM
ITS-8	CCTV CABINET ASSEMBLY LAYOUT
ITS-9	CCTV CAMERA INSTALLATION
ITS-10	RAMP METER CABINET DISCONNECT
ITS-11	TYPE III HEAVY DUTY SIGNAL PEDESTAL
ITS-12, ITS-13	I-540 WB ENTRANCE RAMP METER AT SR 1839 (LEESVILLE RD.)
ITS-14	ITS PLAN - I-540 WB ENTRANCE RAMP AT SR 1839 (LEESVILLE RD.)
ITS-15, ITS-16	I-540 WB ENTRANCE RAMP METER AT NC 50 (CREEDMOOR RD.)
ITS-17	ITS PLAN - I-540 WB ENTRANCE RAMP METER AT NC 50 (CREEDMOOR RD.)
ITS-18, ITS-19	I-540 WB ENTRANCE RAMP METER AT SR 1005 (SIX FORKS RD.)
ITS-20	ITS PLAN - I-540 WB ENTRANCE RAMP METER AT SR 1005 (SIX FORKS RD.)
ITS-21, ITS-22	I-540 WB ENTRANCE RAMP METER AT SR 2000 (FALLS OF NEUSE RD.)
ITS-23	ITS PLAN - I-540 WB ENTRANCE RAMP METER AT SR 2000 (FALLS OF NEUSE RD.)
ITS-24	CABINET PLACEMENT DETAILS
ITS-25	COMMUNICATIONS DETAILS

PROPOSED	LEGEND	EXISTING
—— FO ——	OVERHEAD FIBER OPTIC CABLE	— EXI —
—— DD ——	DIRECTIONAL DRILLED CONDUIT	N/A
—— B&J ——	NEW BORED AND JACKED CONDUIT	N/A
- - - - -	UNDERGROUND CONDUIT	- - - - -
○	WOOD POLE	●
◻	METAL POLE	◻
□	STANDARD JUNCTION BOX	■
□	OVERSIZED /SPECIAL SIZED JUNCTION BOX	■
E	ELECTRIC JUNCTION BOX	E
▶	CCTV CAMERA ASSEMBLY	▶
⊠	EQUIPMENT CABINET	⊠
S	POLE MOUNTED SPLICE CABINET	S
XX-XXXX	SIGNAL INVENTORY NUMBER	N/A
CCTV-X	CCTV CAMERA NUMBER	N/A
○—○	OVERHEAD SIGN ASSEMBLY	○- - - - ○
S	SPLICE ENCLOSURE	S

GENERAL NOTES

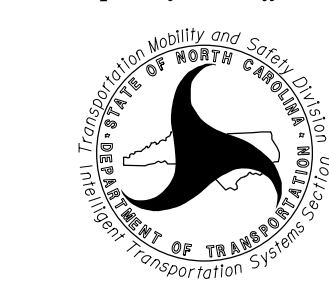

1. THE FIELD LOCATION OF ANY ITEM TO BE INSTALLED AS PART OF THIS PROJECT SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
2. BURIED UTILITIES AND STRUCTURES: PIPELINES, STORM SEWERS, POWER CABLES, UTILITY CABLES, AND OTHER PUBLICLY AND PRIVATELY OWNED UNDERGROUND OBSTRUCTIONS MAY EXIST ADJACENT TO AND WITHIN THE ROADWAY RIGHT-OF-WAY WITHIN THE CONSTRUCTION LIMITS OF THIS PROJECT. INVESTIGATE THE LOCATION OF SUCH BURIED UTILITIES AND STRUCTURES WITH PUBLIC AND PRIVATE UTILITIES.
3. THE PLAN SHEETS HAVE BEEN DEVELOPED AS CLOSE TO SCALE AS PRACTICAL. ACTUAL FIELD CONDITIONS, HOWEVER, SHALL PROVIDE THE BASIS FOR APPLYING THE WORK SHOWN.
4. THE ROADWAY STANDARD DRAWINGS AND THE SPECIFIC DETAILS PROVIDED IN THIS PLAN SET SHALL ALL APPLY TO ALL WORK REQUIRED IN THIS PROJECT. WHETHER A PARTICULAR DETAIL IS SPECIFICALLY REFERENCED TO A WORK ITEM OR NOT, IN THE EVENT OF A CONFLICT, THE ORDER OF PRECEDENCE SHALL BE: THE PROJECT SPECIAL PROVISIONS, THE SPECIAL DETAILS, THE STANDARD DETAILS, THE ROADWAY STANDARD DRAWINGS, AND THEN THE STANDARD SPECIFICATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR APPLYING THE PROPER DETAILS.
5. ANY OF THE CONTRACTOR'S WORK ACTIVITIES WHICH IMPACT ANY UTILITY FACILITY SHALL BE COORDINATED WITH THE OWNER OF ALL AFFECTED UTILITIES. THE CONTRACTOR SHALL FOLLOW ANY AND ALL WORK PROCEDURES THE UTILITY OWNERS MAY REQUIRE.
6. ALL WORK SHOWN ON THESE PLANS SHALL BE PERFORMED BY THE CONTRACTOR UNLESS IT IS SPECIFICALLY NOTED THAT THE WORK WILL BE PERFORMED BY OTHERS.

ABBREVIATIONS

N.T.S.	NOT TO SCALE
CCTV	CLOSED CIRCUIT TELEVISION

ATKINS 5200 77 CENTER DRIVE, SUITE 500
CHARLOTTE, NORTH CAROLINA 28217
(704) 522-7275 NCBEES #F-0326

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	<p>I-540 Ramp Metering Index of Sheets, Legend, General Notes, and Abbreviations</p> <p>Division 5 Wake County Raleigh</p> <p>PLAN DATE: June 2016 REVIEWED BY: H A Badgett</p> <p>PREPARED BY: P M Blaiklock REVIEWED BY: J T Brooks</p>										
<p>N.T.S.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	REVISIONS	INIT.	DATE							<p>Documented by <i>Alfred Badgett</i> 6/29/2016</p> <p>DATE</p> <p>CADD Filename: ITS-02 Index of Sheets</p>
REVISIONS	INIT.	DATE									

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- 1 SIGNAL CABLE
- 2 LOOP LEAD-IN CABLE
- 3 INSTALL #3 AWG CONDUCTOR POWER CABLES
- 3A INSTALL #10 CONDUCTOR POWER CABLES
- 3B INSTALL SERVICE CONDUCTORS
- 4 INSTALL SMFO CABLE
- 5 INSTALL ETHERNET CABLE
- 5A INSTALL COMPOSITE VIDEO CABLE
- 6 INSTALL FIBER-OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 INSTALL UNPAVED TRENCHED CONDUIT
- 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 HEAT SHRINK TUBING
- 13 INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
- 14 INSTALL HIGH DENSITY POLYETHYLENE (HDPE) 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 STUBOUTS
- 22 INSTALL NEW CONDUIT INTO EX CABINET BASE (USE EX CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23 INSTALL NEW RISER INTO CABINET BASE (USE EX CONDUIT STUBOUTS WHEN AVAILABLE)
- 24 INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET
- 25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
- 26 MODIFY EXISTING SPLICE
- 27 INSTALL ETHERNET EDGE SWITCH
- 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
- 29 INSTALL UNDERGROUND SPLICE ENCLOSURE
- 30 INSTALL AERIAL SPLICE ENCLOSURE
- 31 INSTALL POLE MOUNTED SPLICE CABINET
- 32 NOT USED
- 33 REMOVE EXISTING SPLICE CABINET

- 34 INSTALL CABINET FOUNDATION
- 35 INSTALL MICROWAVE VEHICLE DETECTOR ASSEMBLY
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV WOOD POLE
- 38 INSTALL SPECIAL-SIZED JUNCTION BOX
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 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
- 48 REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
- 49 REMOVE EXISTING COMMUNICATIONS CABLE
- 50 INSTALL DIGITAL HARDWARE VIDEO ENCODER
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 50 FEET OF COMMUNICATIONS CABLE (EACH CABLE)
- 54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
- 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 SERVICE DISCONNECT ON 6"x6" TREATED WOOD POST
- 60 POLE GROUND ASSEMBLY AND BOND MESSENGER TO POLE GROUND
- 61 INSTALL AIR CONDITIONED HUB CABINET
- 62 INSTALL POLE MOUNTED CCTV CABINET
- 63 INSTALL RAMP METER CABINET AND CONTROLLER
- 64 INSTALL WIRELESS MODEM
- 65 INSTALL COMMUNICATIONS CABINET
- 66 REPLACE FIBER-OPTIC CONNECTOR PANELS
- 67 INSTALL CABINET BASE EXTENDER
- 68 STORE 100 FEET OF COMMUNICATIONS CABLE (EACH CABLE)
- 69 INSTALL NEW ELECTRICAL SERVICE DISCONNECT ON CCTV POLE

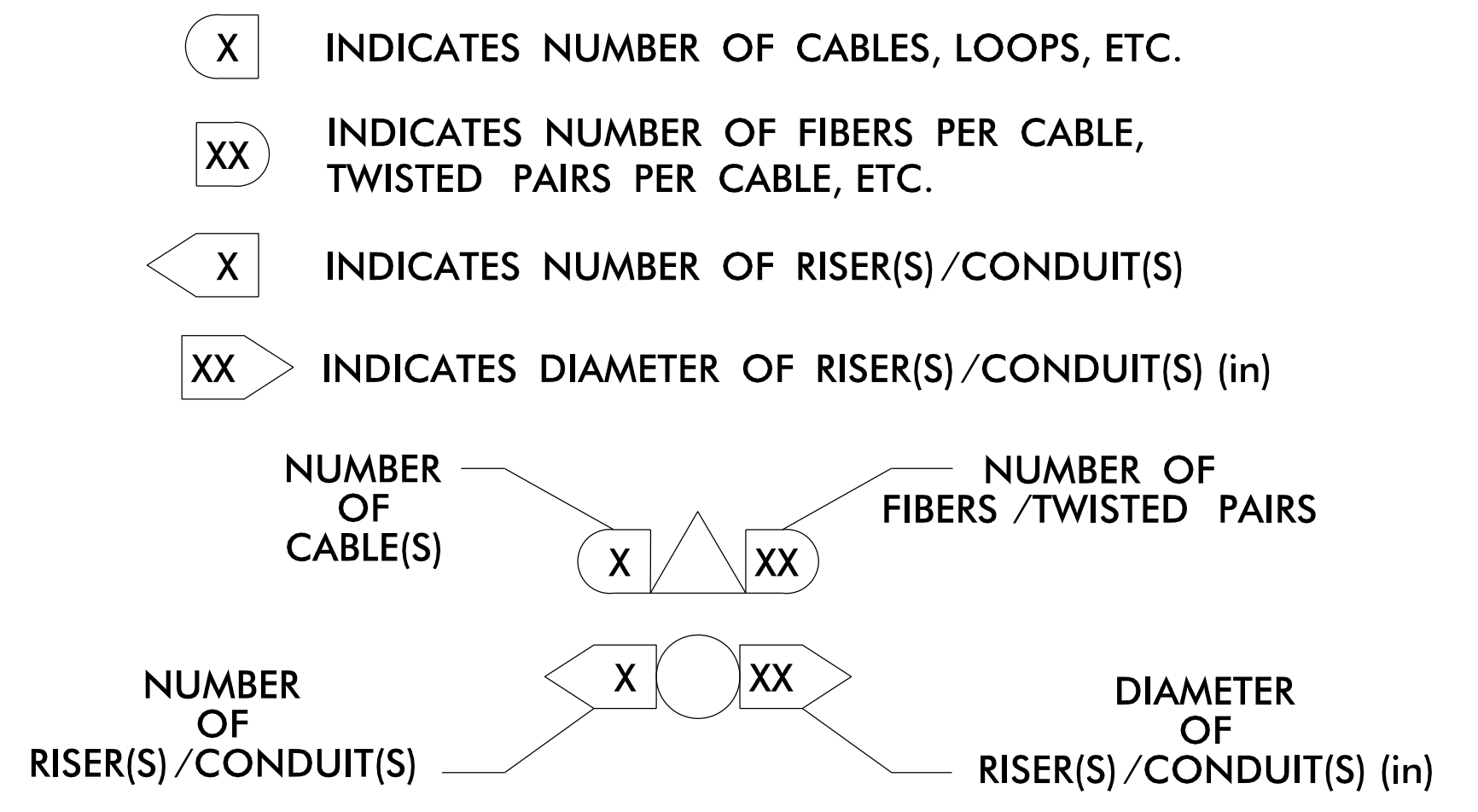
- 70 NOT USED
- 71 INSTALL POWER OVER ETHERNET INJECTOR
- 72 REMOVE EXISTING CCTV ASSEMBLY AND CABINET
- 73 BOND RISER TO POLE GROUND

NOTES:

1. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER, AT ALL JUNCTION BOX/CABINET ENTRANCES.

* CABLES SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS.

CONSTRUCTION NOTE SYMBOLOGY KEY



ATKINS 5200 77 CENTER DRIVE, SUITE 500
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(704) 522-7275 NCBEES #F-0326

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	I-540 Ramp Metering Construction Notes		
	Division 5 Wake County Raleigh PLAN DATE: June 2016 PREPARED BY: P M Blaiklock	REVIEWED BY: H A Badgett REVIEWED BY: J T Brooks	
N.T.S.		DocuSigned by: 6/27/2016	DATE

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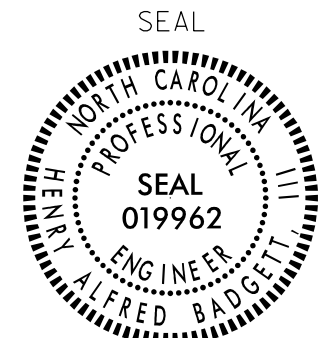
Reference Information				Cabinet						Electrical		Signal Items						
NCDOT Signal Inv. No.	Intersection Name	ITS Plan Sheet Number	Signal Design Sheet Number	Auxiliary Output File	Detector Card (Model 222)	Ramp Meter Controller	Signal Cabinet Foundation	Cabinet Base Extender	Ramp Meter Cabinet	Disconnect with Pedestal Post	5/8" x 10' Grounding Electrode	Signal Head (12", 2 Section)	Signal Head (12", 1 Section)	Signal Cable	Sign for Signals	Inductive Loop Sawcut	Loop Lead-In Cable (14-2)	Type III Pedestal with Foundation
				EA.	EA.	EA.	EA.	EA.	EA.									
05-1852	I-540 at Leesville Road	ITS-14	ITS-12 & 13	1	11	1	1	1	1	1	8	4	4	1075	4	500	2721	4
05-1851	I-540 at Creedmoor Road	ITS-17	ITS-15 & 16	1	11	1	1	1	1	1	8	4	4	962	4	500	2442	4
05-1850	I-540 at Six Forks Road	ITS-20	ITS-18 & 19	1	12	1	1	1	1	2	10	4	8	1828	6	470	2411	6
05-1849	I-540 at Falls of Neuse Road	ITS-23	ITS-21 & 22	1	11	1	1	1	1	2	8	4	4	887	4	500	3110	4
Total				4	45	4	4	4	4	6	34	16	20	4752	18	1970	10684	18

ITS CABLE LAYOUT SHEET NUMBER	UNPAVED TRENCHING (1)(1")	UNPAVED TRENCHING (1)(2")	UNPAVED TRENCHING (2)(2")	UNPAVED TRENCHING (3)(2")	UNPAVED TRENCHING (4)(2")	UNPAVED TRENCHING (5)(2")	DIRECT. DRILL (1)(2")	DIRECT. DRILL (2)(2")	DIRECT. DRILL (3)(2")	DIRECT. DRILL (4)(2")
	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF
ITS-14	30	265	515	250	450	0	235	265	0	50
ITS-17	25	262	450	110	510	0	200	70	0	0
ITS-20	35	15	637	135	510	0	0	160	45	60
ITS-23	45	10	780	675	220	325	0	265	70	50
Total	135	552	2,382	1,170	1,690	325	435	760	115	160

12-AUG-2016 09:30 I:\Product\I-540 Ramp Meter Design\Mobility and Safety TD\ITS Task 3 and 4 - ITS Plans\ITS-04 Summary of Work by Intersection 1.dgn B6007500 AT LUS35273

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(704) 522-7275 NCBEES #F-0326

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	I-540 Ramp Metering	
	Summary of Work (1)	
Division 5 Wake County Raleigh PLAN DATE: June 2016 PREPARED BY: P M Blaiklock REVISIONS:	REVIEWED BY: H A Badgett REVIEWED BY: J T Brooks INIT. DATE:	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019962 ALFRED BADGETT
N.T.S.		DocuSigned by: Alf Badgett 8/12/2016 SIGNATURE DATE CADD Filename: ITS-04 Summary of Work

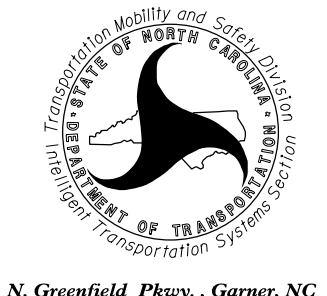
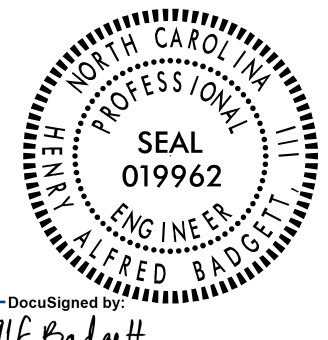
ITS CABLE LAYOUT SHEET NUMBER	3 WIRE FEEDER CONDUCTORS (AWG NO. 3)	3 WIRE FEEDER CONDUCTORS (AWG NO. 12)	3 WIRE SERVICE CONDUCTORS	JUNCTION BOX (STD.)	JUNCTION BOX (OVERSIZED)	2" RISER W/ WEATHERHEAD	COMM. CABLE (12-FIBER)	TRACER WIRE	INTERCONNECT CENTER	ETHERNET COMMUNICATIONS CABLE (FOUR TWISTED-PAIRS)
	LF	LF	LF	EA	EA	EA	LF	LF	EA	LF
ITS-14	899	0	30	12	4	1	680	580	2	0
ITS-17	670	0	25	10	2	1	520	420	2	0
ITS-20	690	195	25	20	0	2	0	0	0	195
ITS-23	795	0	30	13	6	2	1,957	1,807	2	0
Total	3,054	195	110	55	12	6	3,157	2,807	6	195

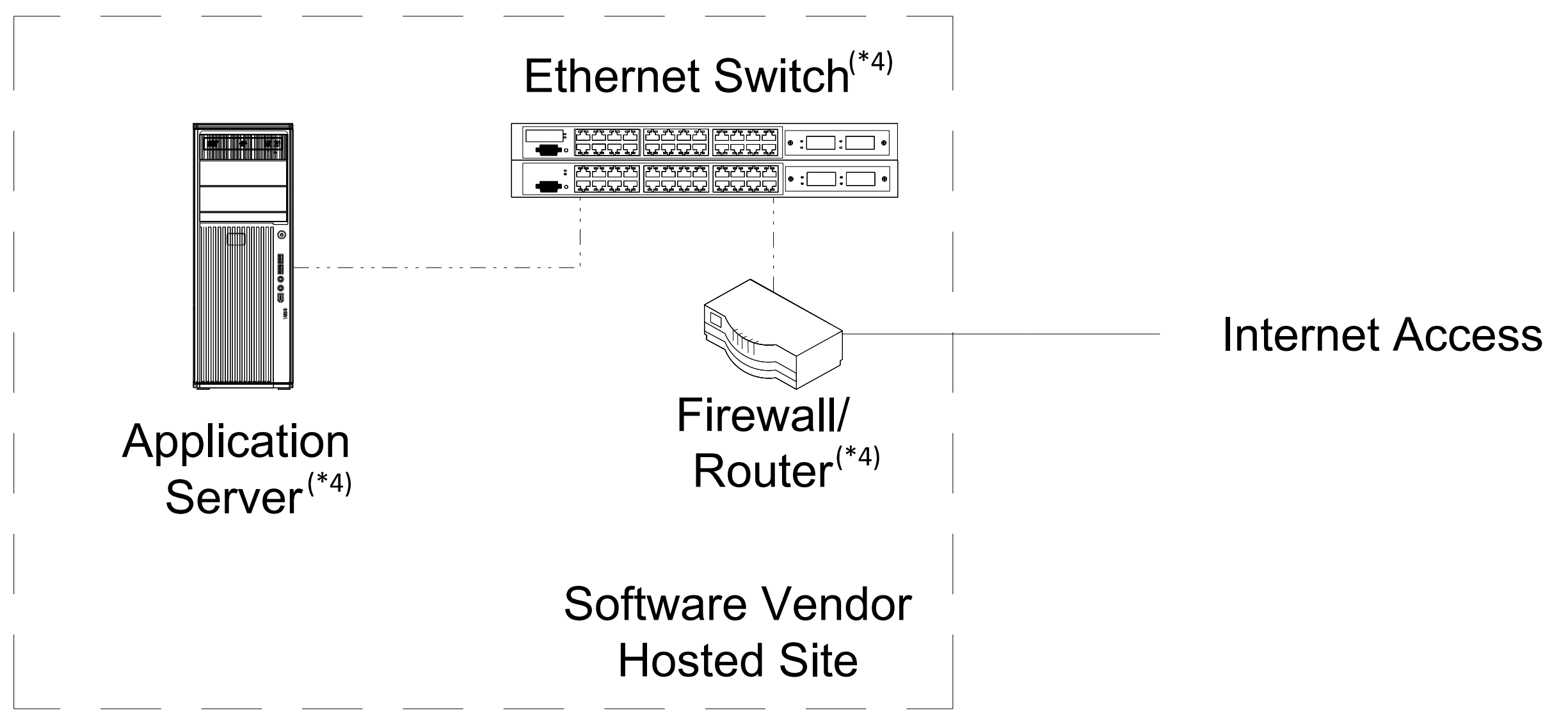
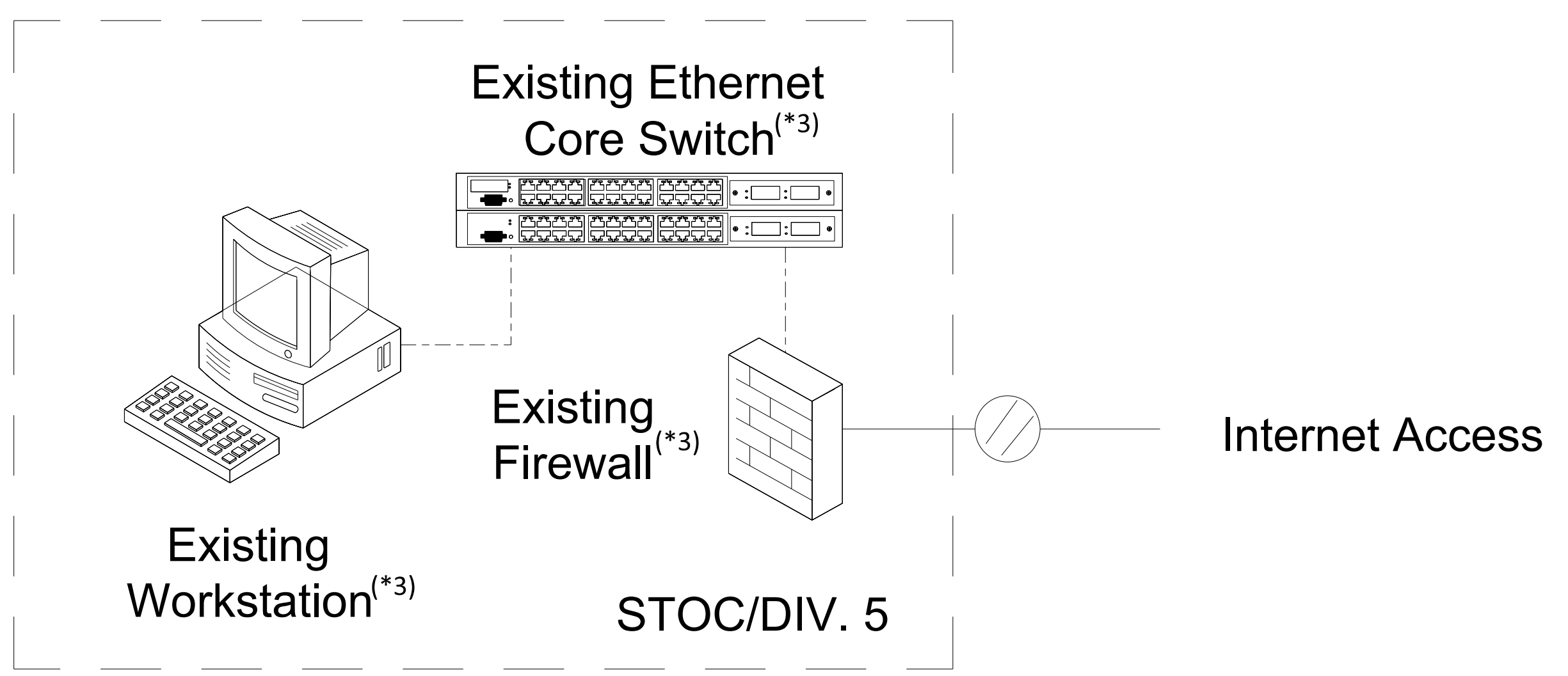
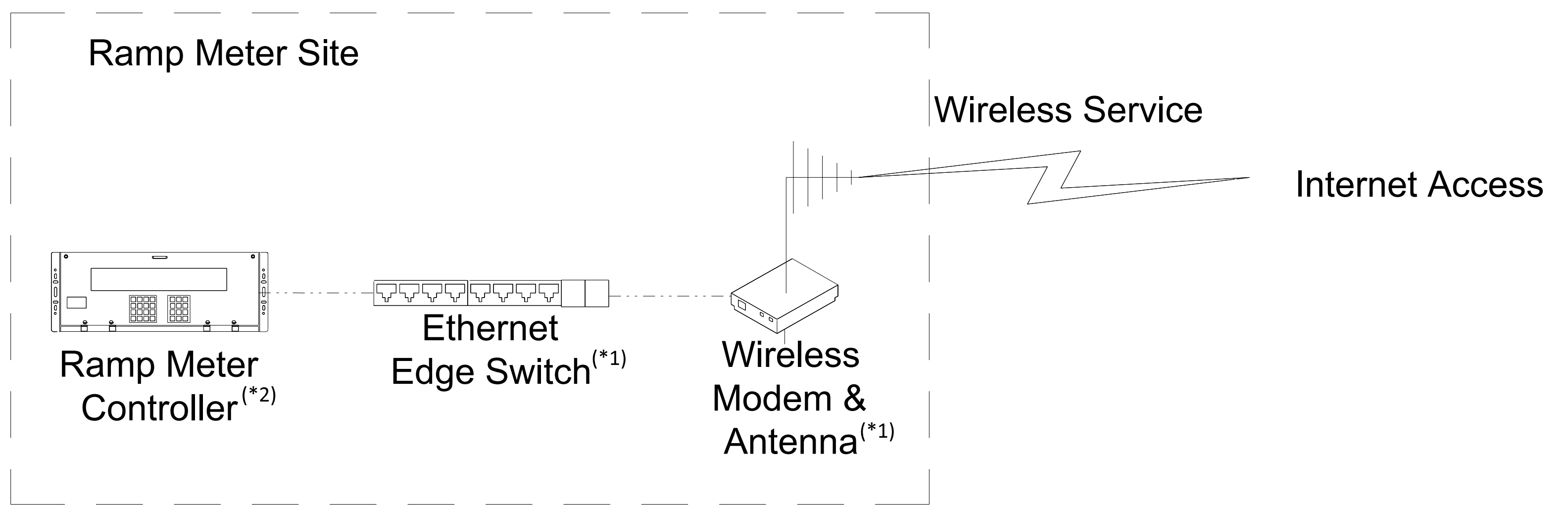
ITS CABLE LAYOUT SHEET NUMBER	NEW ELEC. SERVICE	MODIFY ELEC. SERVICE	5/8" X 10' GROUNDING ELCTRODE	DELINEATOR MARKER	ETHERNET EDGE SWITCH	CCTV CABINET (POLE MOUNT)	CCTV CAMERA ASSEMBLY	COMPOSITE VIDEO CABLE	CCTV WOOD POLE (55')	DIGITAL HARDWARE VIDEO ENCODER (INSTALL)
	EA	EA	EA	EA	EA	EA	EA	LF	EA	EA
ITS-14	2	0	4	4	1	1	1	45	0	1
ITS-17	1	0	4	3	1	1	1	45	1	1
ITS-20	1	1	4	0	1	1	1	45	1	1
ITS-23	1	0	4	4	1	1	1	45	1	1
Total	5	1	16	11	4	4	4	180	3	4

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 (704) 522-7275 NCBEES #F-0326

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Prepared for the Offices of:  750 N. Greenfield Pkwy., Garner, NC 27529	I-540 Ramp Metering Summary of Work (2)		SEAL  ALFRED BADGETT ENGINEER
	Division 5 Wake County Raleigh PLAN DATE: June 2016 PREPARED BY: P M Blaiklock REVISIONS:	REVIEWED BY: H A Badgett REVIEWED BY: J T Brooks INIT. DATE	
N.T.S.	CADD Filename: ITS-05 Summary of Work		



- *1) Contractor Furnished, Installed, and Maintained
- *2) Contractor Furnished and Installed, NCDOT Maintained
- *3) State Maintained
- *4) Contractor Owned and Maintained Equipment

Connection Legend

- 100 Base TX Ethernet
- 1000 Base TX Ethernet
- → → Analog Video
- Digital Video
- ⊗ Fiber Optic Cable
- 2 — Number of fiber-optic strands used

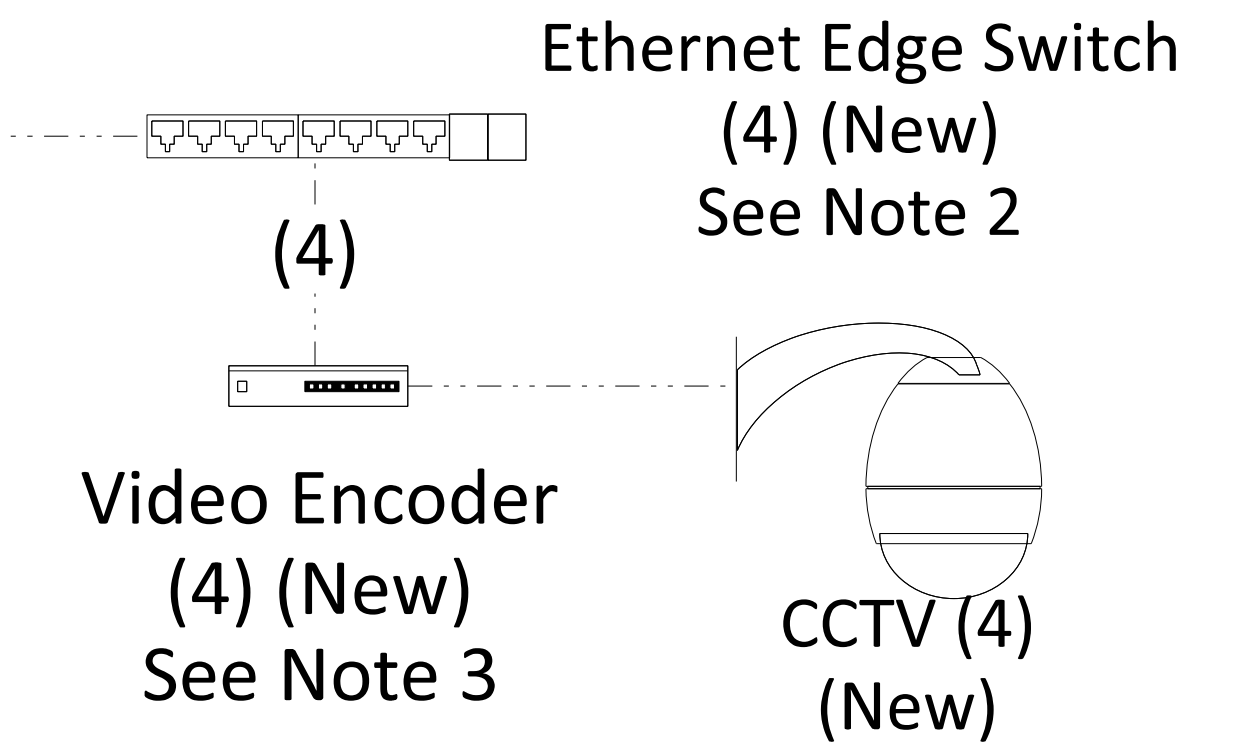
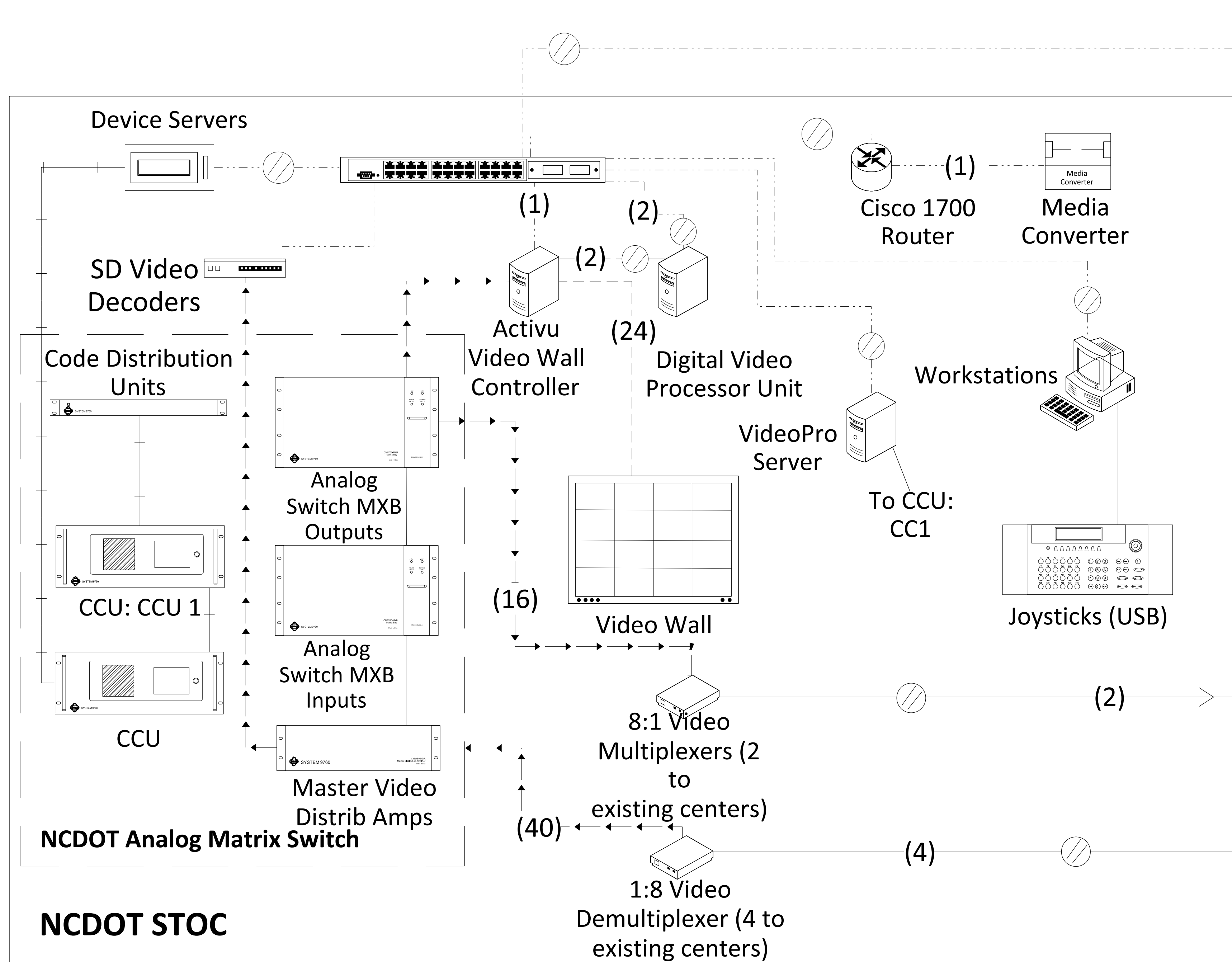
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 (704) 522-7275 NCBEES #F-0326

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	I-540 Ramp Metering Signal Equipment Block Diagram (1 of 2)		
	Division 5	Wake County	
PLAN DATE:	June 2016	REVIEWED BY:	H A Badgett
PREPARED BY:	P M Blaiklock	REVIEWED BY:	J T Brooks
REVISIONS		INIT.	DATE
N.T.S.			
		DocuSigned by: 6/27/2016 DATE	

CADD Filename: ITS-06 Signal Equipment



- Notes:
1. All devices and connections are existing unless otherwise noted.
 2. Furnished and installed by NCDOT.
 3. Furnished by NCDOT, Contractor Installed.

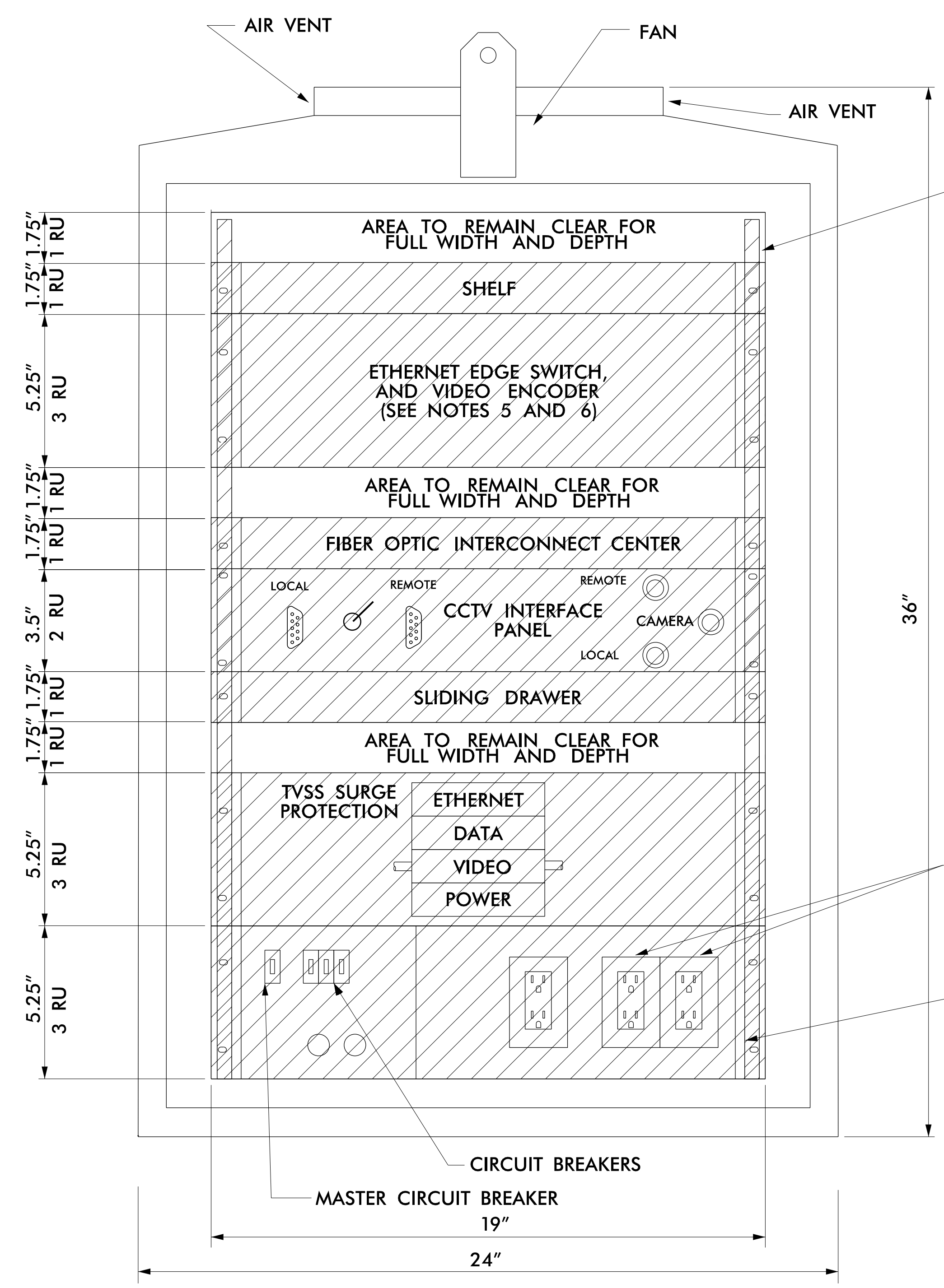
Connection Legend			
-----	100 Base TX Ethernet	-----	100 Base FX Ethernet
-----	1000 Base TX Ethernet	-----	1000 Base FX Ethernet
→→→	Analog Video	-----	USB
-----	Digital Video	-----	RS-232/422/485
-----	Fiber Optic Cable	-----	(1) Number of device ports used
-----	2 Number of fiber-optic strands used		

ATKINS 5200 77 CENTER DRIVE, SUITE 500
CHARLOTTE, NORTH CAROLINA 28217
(704) 522-7275 NCBEES #F-0326

Prepared for the Offices of:		I-540 Ramp Metering Signal Equipment Block Diagram (2 of 2)	
Division 5 Wake County Raleigh		SEAL	
PLAN DATE: June 2016	REVIEWED BY: H A Badgett		
PREPARED BY: P M Blaiklock	REVIEWED BY: J T Brooks		
REVISIONS		INIT.	DATE
N.T.S.			6/27/2016

DocuSigned by: *Alfred Badgett*
DATE: 6/27/2016
CADD Filename: ITS-07 Signal Equipment

27-JUN-2016 15:55
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WLE2054 AT DUS300019

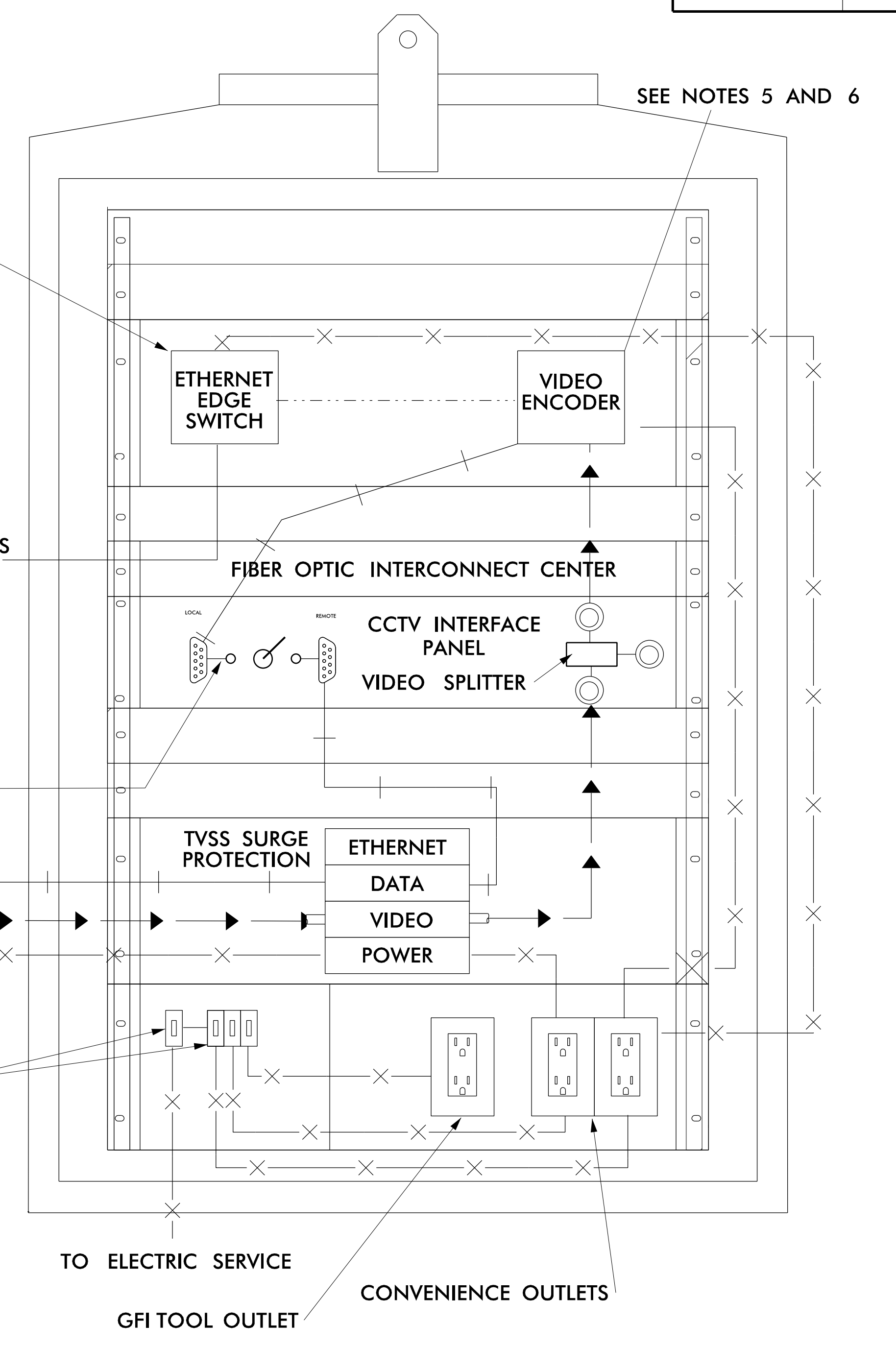
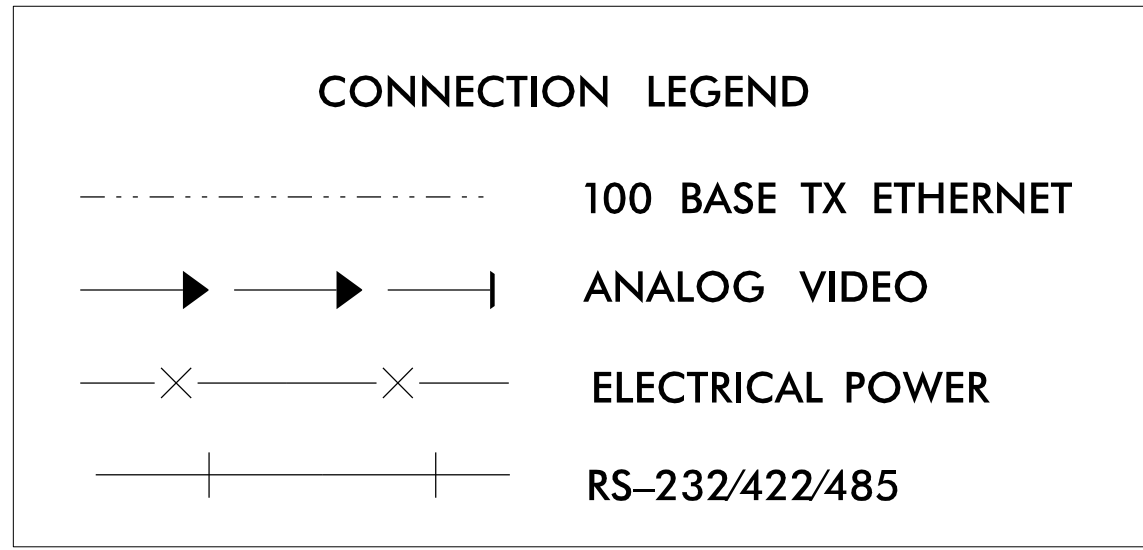


FRONT VIEW

19" EIA RACK WITH TAPPED 10-32 THREADED HOLES

TVSS PROTECTED OUTLETS (2) FOR EQUIPMENT

POWER DISTRIBUTION ASSEMBLY SERVICE ENTRANCE, BREAKER, PRIMARY AC POWER FILTER, TERMINAL BLOCKS, GROUND BUS BAR



CABINET WIRING VIEW

NOTES

- ALL DIMENSIONS AND SCALE ARE APPROXIMATE.
- CABINETS WILL BE CALTRANS TYPE 336
- CONDUIT ENTRANCES SHALL BE IN BOTTOM OF CABINET.
- THERE WILL BE FRONT AND REAR DOORS. BOTH DOORS SHALL HAVE THE HINGE-SIDE NEXT TO THE POLE WHEN POLE MOUNTED.
- NCDOT WILL FURNISH AND INSTALL ETHERNET EDGE SWITCH AS SHOWN IN PLANS.
- NCDOT TO FURNISH DIGITAL VIDEO ENCODER AND CONTRACTOR TO INSTALL.

27-JUN-2016 15:55 T:\Product\I-540 Ramp Meter Design\Mobility and Safety TD\ITS Task 3 and 4 - ITS Plans\ITS-08 SD-03_CCTV Cabinet Assembly Layout.dgn WILE2054 AT DUS300019

ATKINS 5200 77 CENTER DRIVE, SUITE 500 CHARLOTTE, NORTH CAROLINA 28217 (704) 522-7275 NCBEES #F-0326

Prepared for the Offices of:		I-540 Ramp Metering CCTV Cabinet Assembly Layout	
Division 5		Wake County	Raleigh
PLAN DATE:	June 2016	REVIEWED BY:	H A Badgett
PREPARED BY:	P M Blaiklock	REVIEWED BY:	J T Brooks
REVISIONS	INIT.	DATE	
N.T.S.			

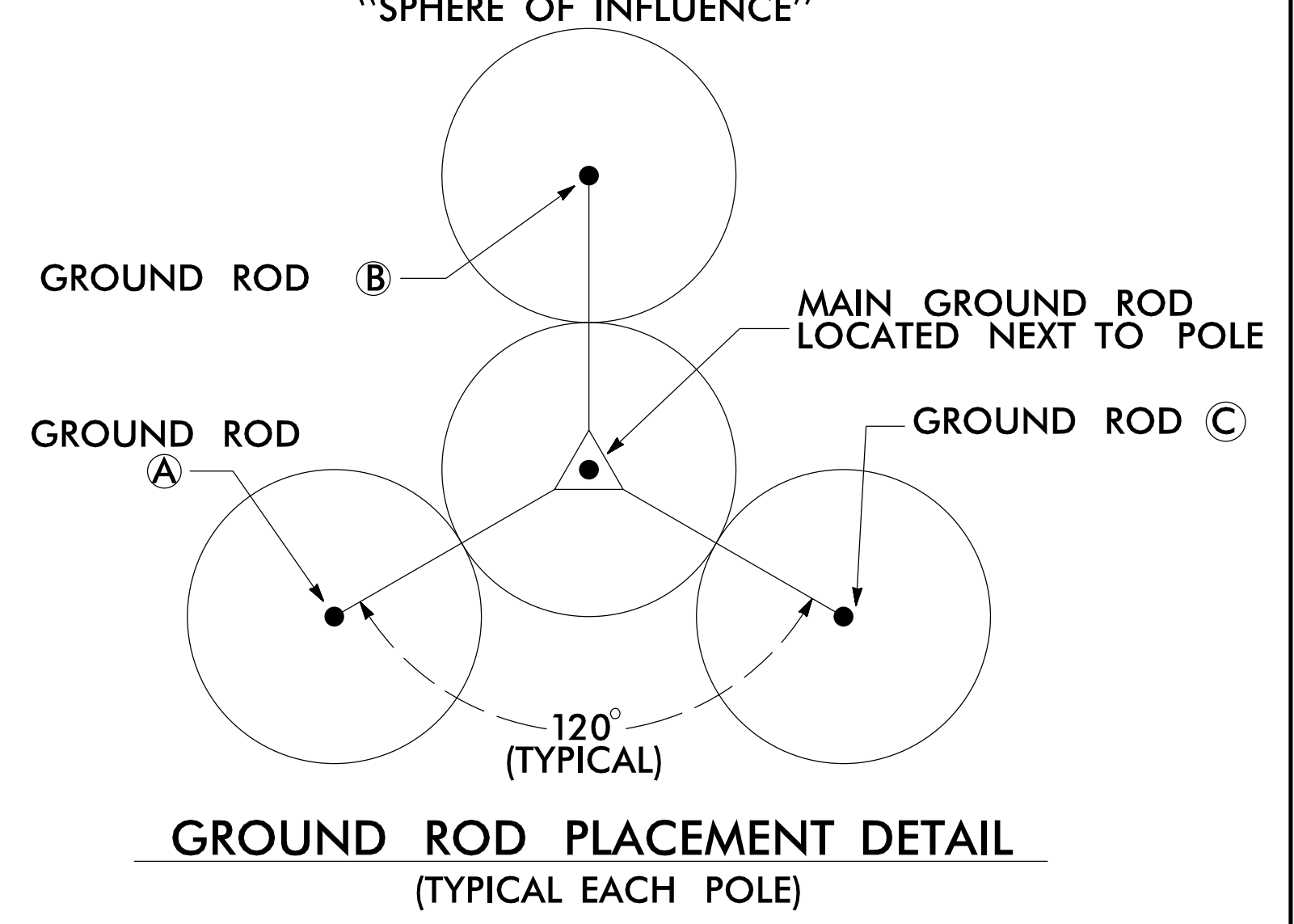
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SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
ALFRED BADGETT
019962

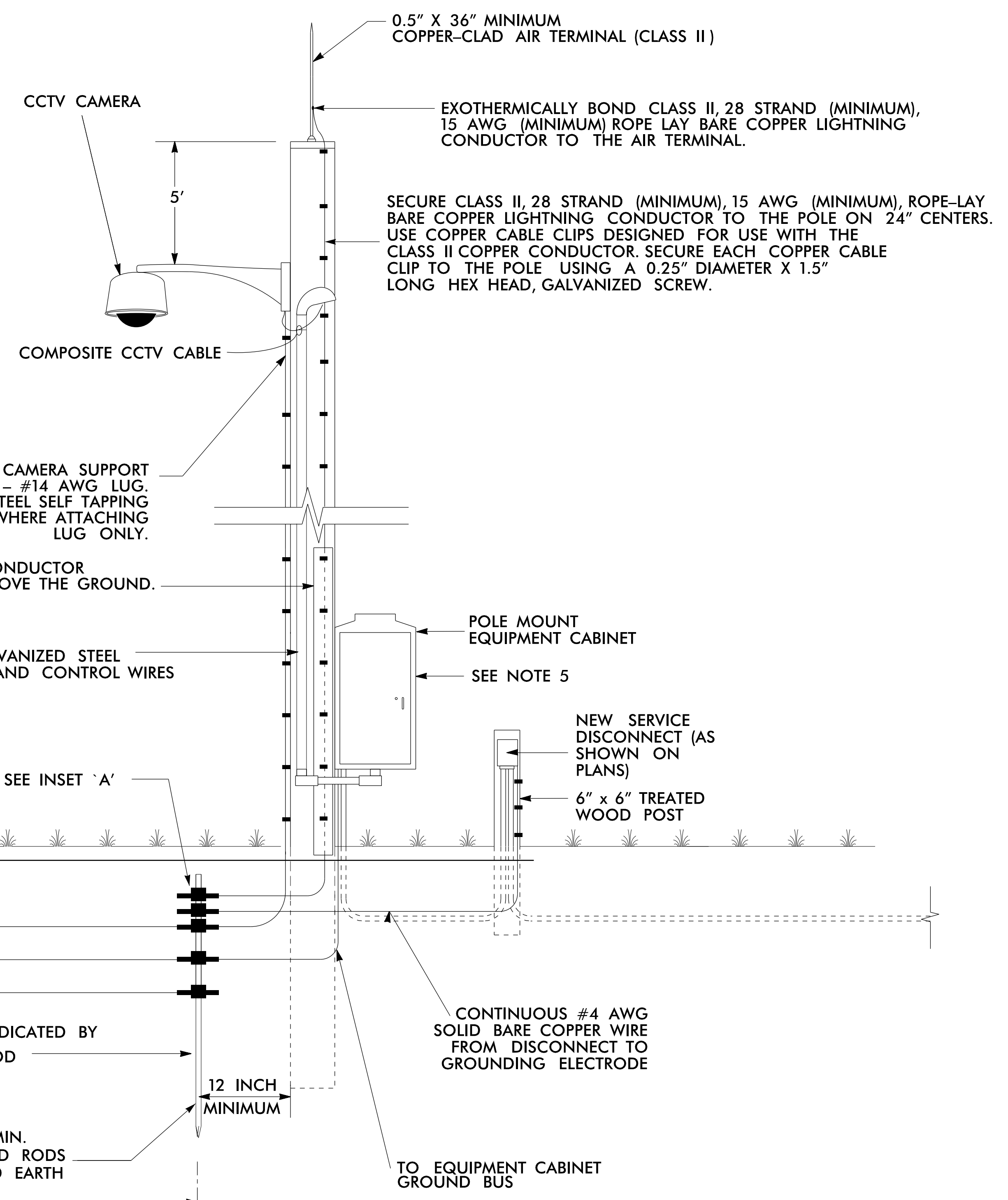
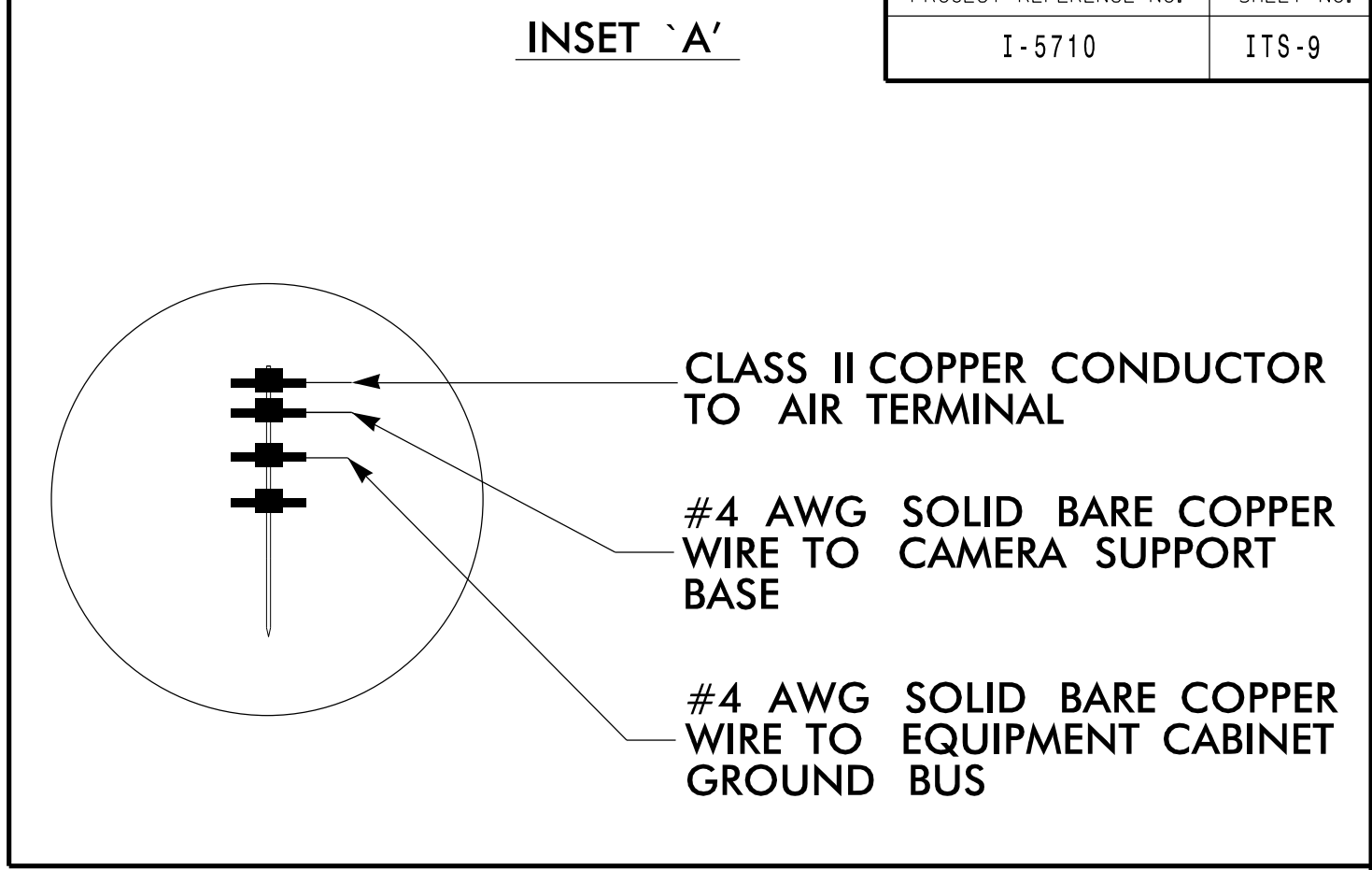
DocuSigned by:
Alfred Badgett
6/27/2016

CADD Filename: ITS-08 SD-03_CCTV Cabinet

10 FOOT RADIUS EACH "SPHERE OF INFLUENCE"



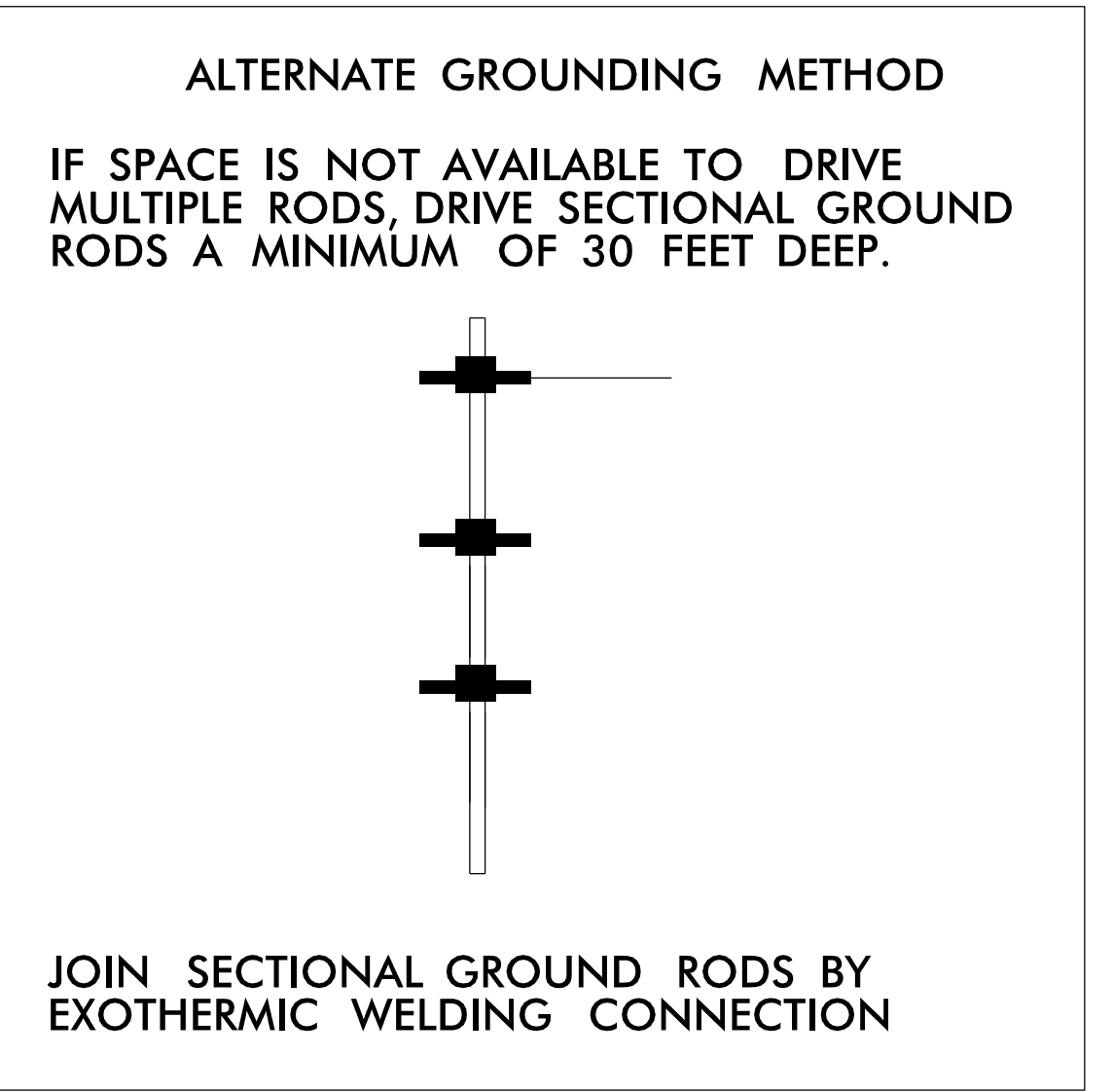
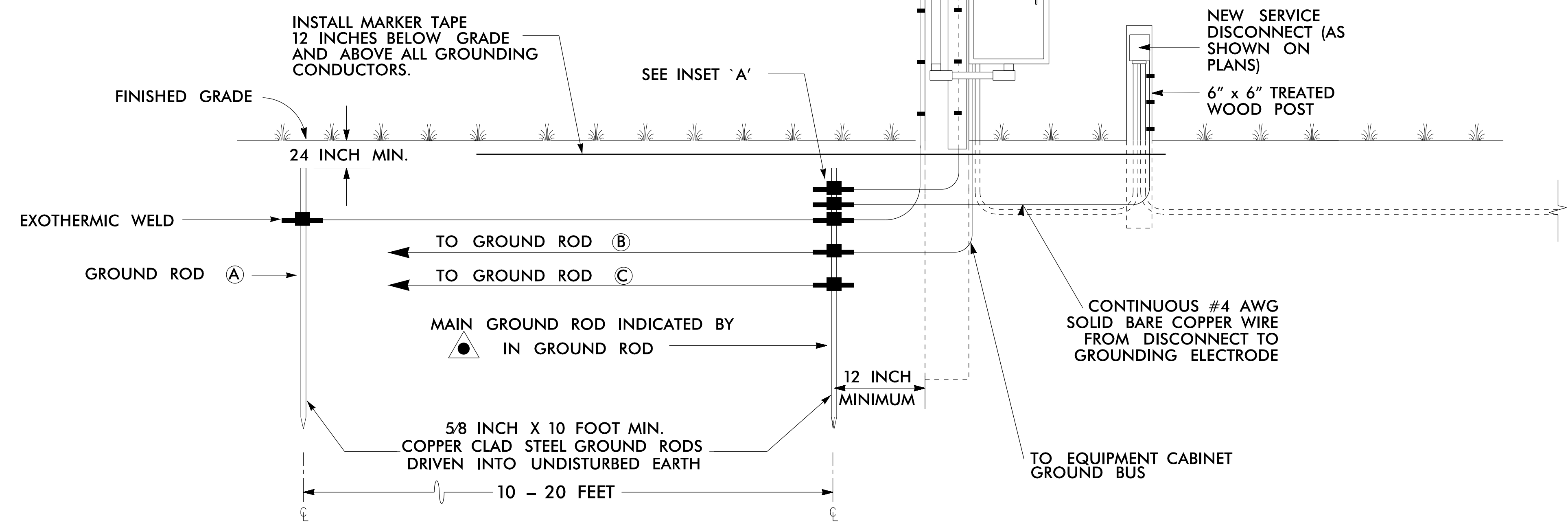
GROUND ROD PLACEMENT DETAIL (TYPICAL EACH POLE)



BOND #4 AWG SOLID BARE COPPER WIRE TO CAMERA SUPPORT BASE BY AN ALUMINUM TO COPPER #2 - #14 AWG LUG. ATTACH TO CAMERA BASE WITH A STAINLESS STEEL SELF TAPPING SCREW. REMOVE PAINT OR PROTECTIVE COATING WHERE ATTACHING LUG ONLY.

INSTALL 2-INCH PVC U-GUARD OVER COPPER CONDUCTOR FROM GROUND LEVEL TO 10 FEET (MINIMUM) ABOVE THE GROUND.

2-INCH RIGID GALVANIZED STEEL RISER FOR POWER AND CONTROL WIRES



- NOTES**
1. BOND CLASS II, 28 STRAND (MINIMUM), 15 AWG (MINIMUM) ROPE-LAY BARE COPPER CONDUCTOR TO THE MAIN GROUND ROD BY AN EXOTHERMIC WELD METHOD. MAINTAIN MAXIMUM HORIZONTAL SEPARATION BETWEEN COPPER CONDUCTOR AND RISER.
 2. EXOTHERMICALLY WELD ALL CONNECTIONS TO GROUND RODS.
 3. THE CONTRACTOR MAY, UPON APPROVAL OF THE ENGINEER, INSTALL A 30' SECTIONAL GROUND ROD FOR INSTANCES WHEN CONDITIONS WILL NOT ALLOW FOR THE INSTALLATION OF THE 3 - RADIAL GROUND RODS.
 4. INSTALL MARKER TAPE DIRECTLY ABOVE ALL GROUNDING ELECTRODES AND CONDUCTORS AT A DEPTH OF 12".
 5. REMOVE BONDING JUMPER BETWEEN EQUIPMENT CABINET GROUND BUS AND NEUTRAL BUS.
 6. PERMANENTLY IDENTIFY AND LABEL MAXIMUM FAULT CONTENT AVAILABLE.

27-JUN-2016 15:55 T:\Product\Tort\ITS\NCDOT\00042047 1-540 Ramp Meter Design\Mobility and Safety TD\ITS Task 3 and 4 - ITS Plans\ITS-09 Special Detail\2_CCTV Camera Installation.dgn WLE2054 AT DUS300019

ATKINS 5200 77 CENTER DRIVE, SUITE 500 CHARLOTTE, NORTH CAROLINA 28217 (704) 522-7275 NCBEES #F-0326

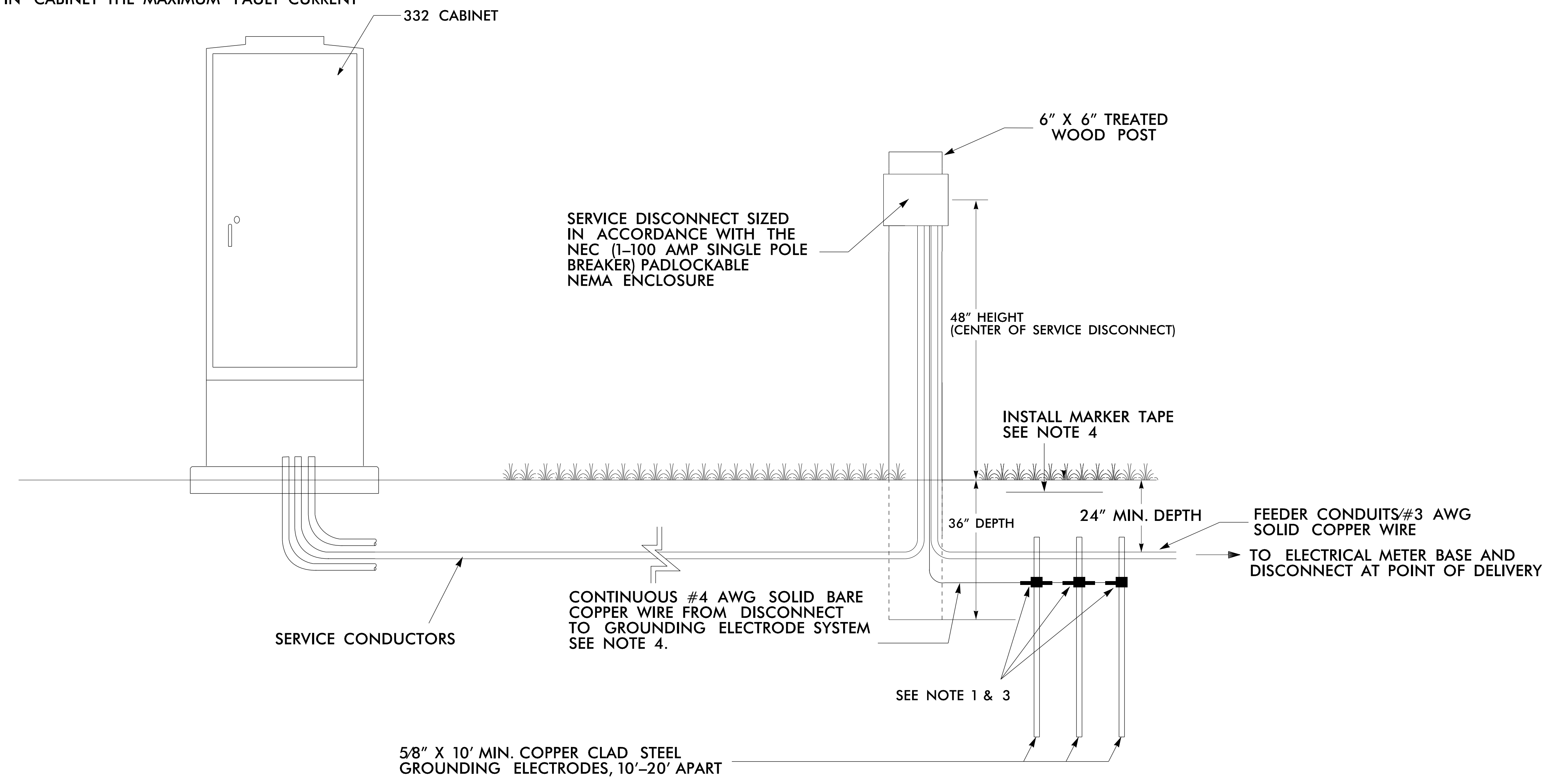
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of: 750 N. Greenfield Pkwy., Garner, NC 27529	I-540 Ramp Metering CCTV Camera Installation		
	Division 5 Wake County Raleigh	PLANNED BY: June 2016 REVIEWED BY: H A Badgett	
N.T.S.	PREPARED BY: P M Blaiklock	REVIEWED BY: J T Brooks	DATE: _____

CADD Filename: ITS-09 Special Detail

NOTES

1. INSTALL A MINIMUM OF THREE GROUND RODS SPACED A MINIMUM OF 10 FEET APART. ENSURE THAT EXISTING UNDERGROUND FACILITIES ARE NOT DAMAGED DURING INSTALLATION.
2. TEST GROUNDING SYSTEM USING AN APPROVED METHOD. SYSTEM SHALL MEASURE TWENTY (20) OHMS OR LESS. ADDITIONAL GROUND RODS SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER TO MEET THIS REQUIREMENT.
3. EXOTHERMICALLY WELD ALL CONNECTIONS TO GROUND RODS.
4. INSTALL MARKER TAPE DIRECTLY ABOVE ALL GROUNDING ELECTRODES AND CONDUCTORS AT A DEPTH OF 12 INCHES.
5. REMOVE BONDING JUMPER IN EQUIPMENT CABINET IF INSTALLED BETWEEN AC NEUTRAL AND EQUIPMENT GROUND.
6. BOND ALL RIGID GALVANIZED STEEL CONDUITS ENTERING THE CABINET TO EQUIPMENT GROUND.
7. INSTALL CONDUIT BETWEEN CABINET DISCONNECT AND CABINET.
8. ENSURE EQUIPMENT GROUND IS ELECTRICALLY BONDED TO EQUIPMENT CABINET.
9. PERMANENTLY IDENTIFY AND LABEL IN CABINET THE MAXIMUM FAULT CURRENT AVAILABLE.



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 WLE2054 AT DUS300019

ATKINS 5200 77 CENTER DRIVE, SUITE 500
 CHARLOTTE, NORTH CAROLINA 28217
 (704) 522-7275 NCBEES #F-0326

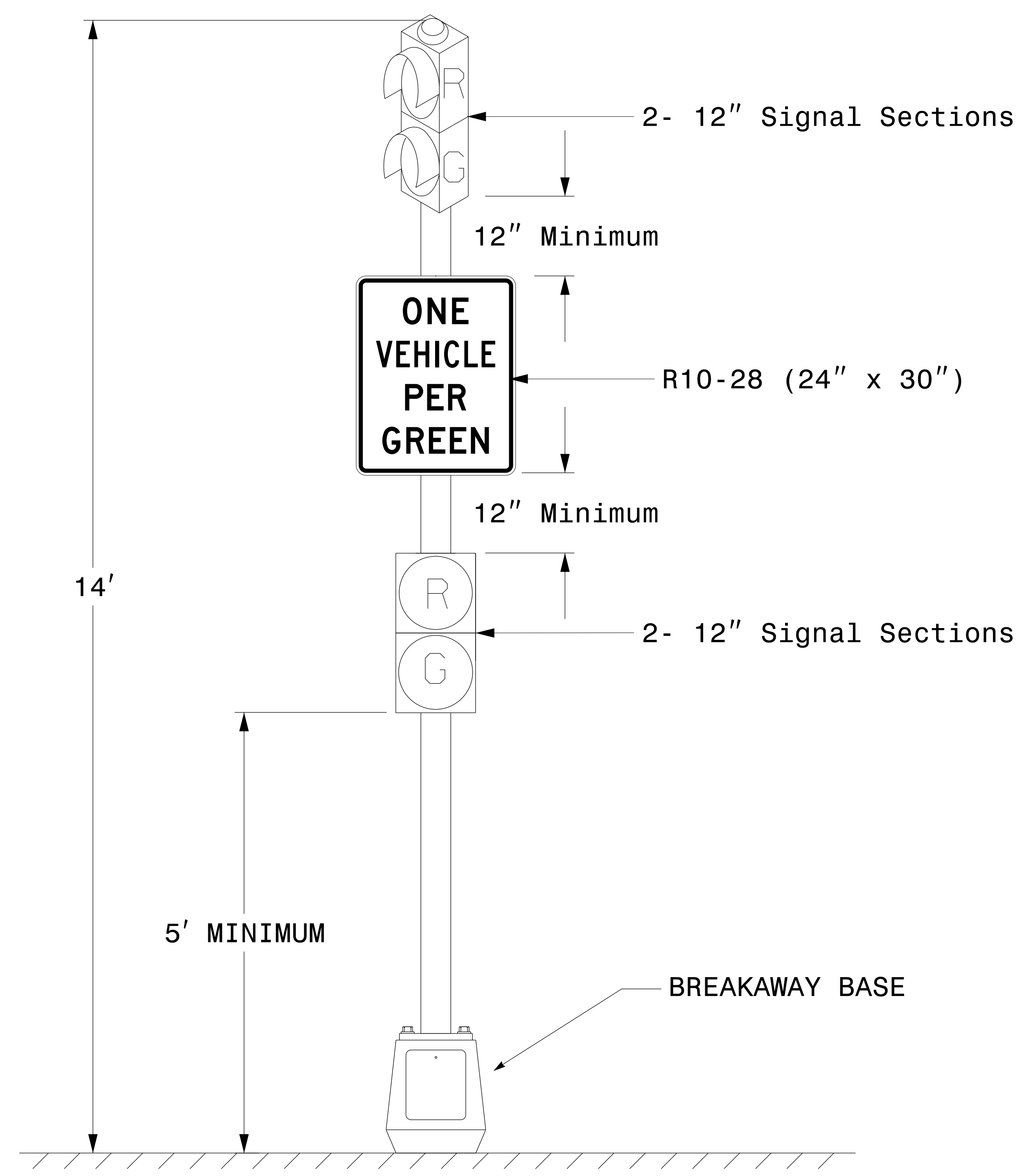
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 UNLESS ALL SIGNATURES COMPLETED**

	I-540 Ramp Metering Ramp Meter Cabinet Disconnect	
	Division 5 Wake County Raleigh	PLAN DATE: June 2016 PREPARED BY: P M Blaiklock
N.T.S.	REVISIONS INIT. DATE	DocuSigned by: 6/27/2016

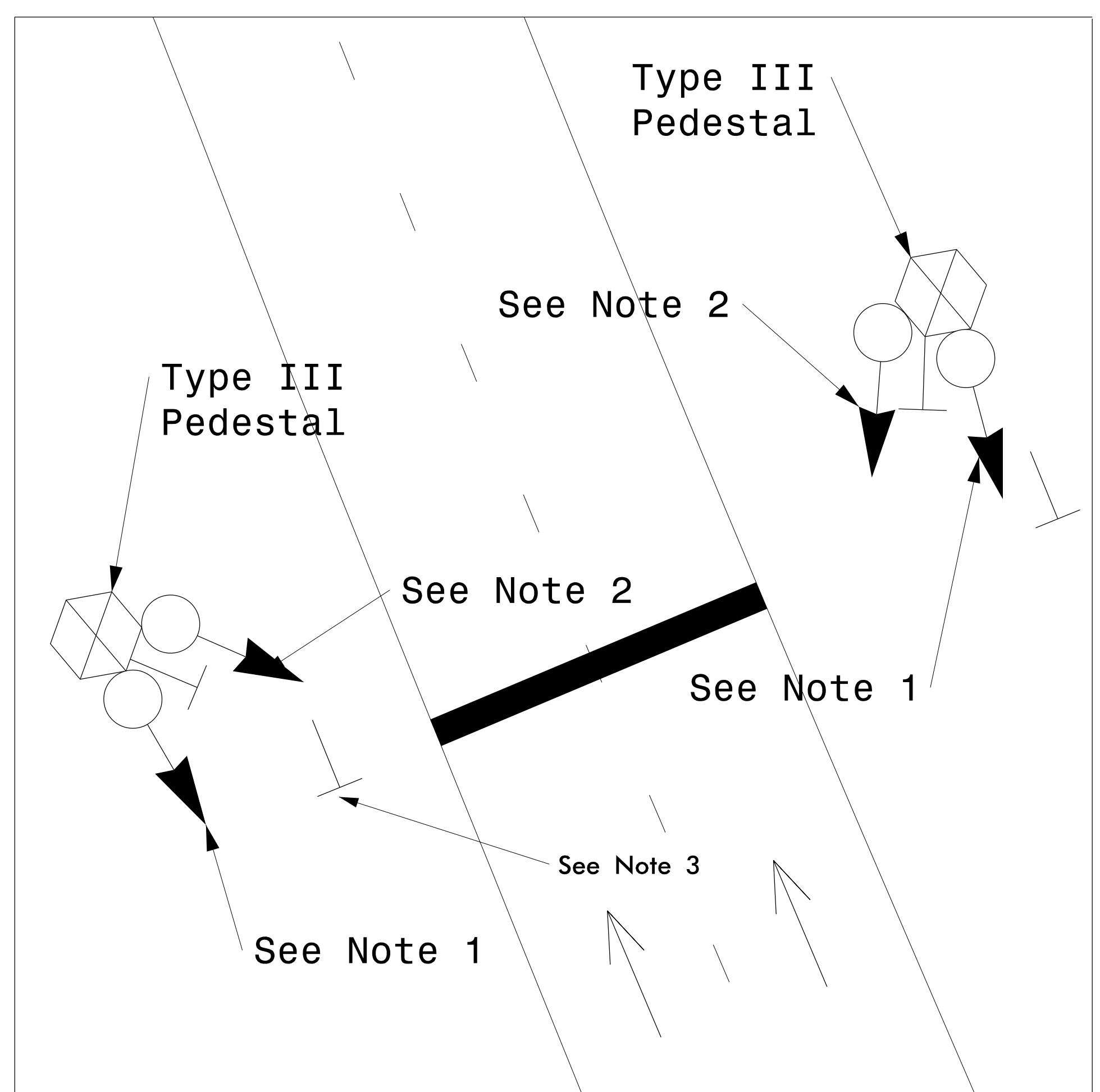
CADD Filename: ITS-10 Special Detail

NOTES:

1. TOP SIGNAL HEAD TO FACE UPSTREAM TRAFFIC ON RAMP.
2. BOTTOM SIGNAL HEAD AND SIGN R10-28 TO FACE TRAFFIC AT STOP BAR.
3. THE CONTRACTOR SHALL ADJUST THE POSITION OF "STOP HERE ON RED" SIGN SO AS NOT TO OBSTRUCT MOTORIST VIEW OF THE "ONE VEHICLE PER GREEN" SIGN MOUNTED ON THE SIGNAL PEDESTAL AS DIRECTED BY THE ENGINEER.



Type III Pedestal
R10-28 (24"x 30")
w/ 12" Heads

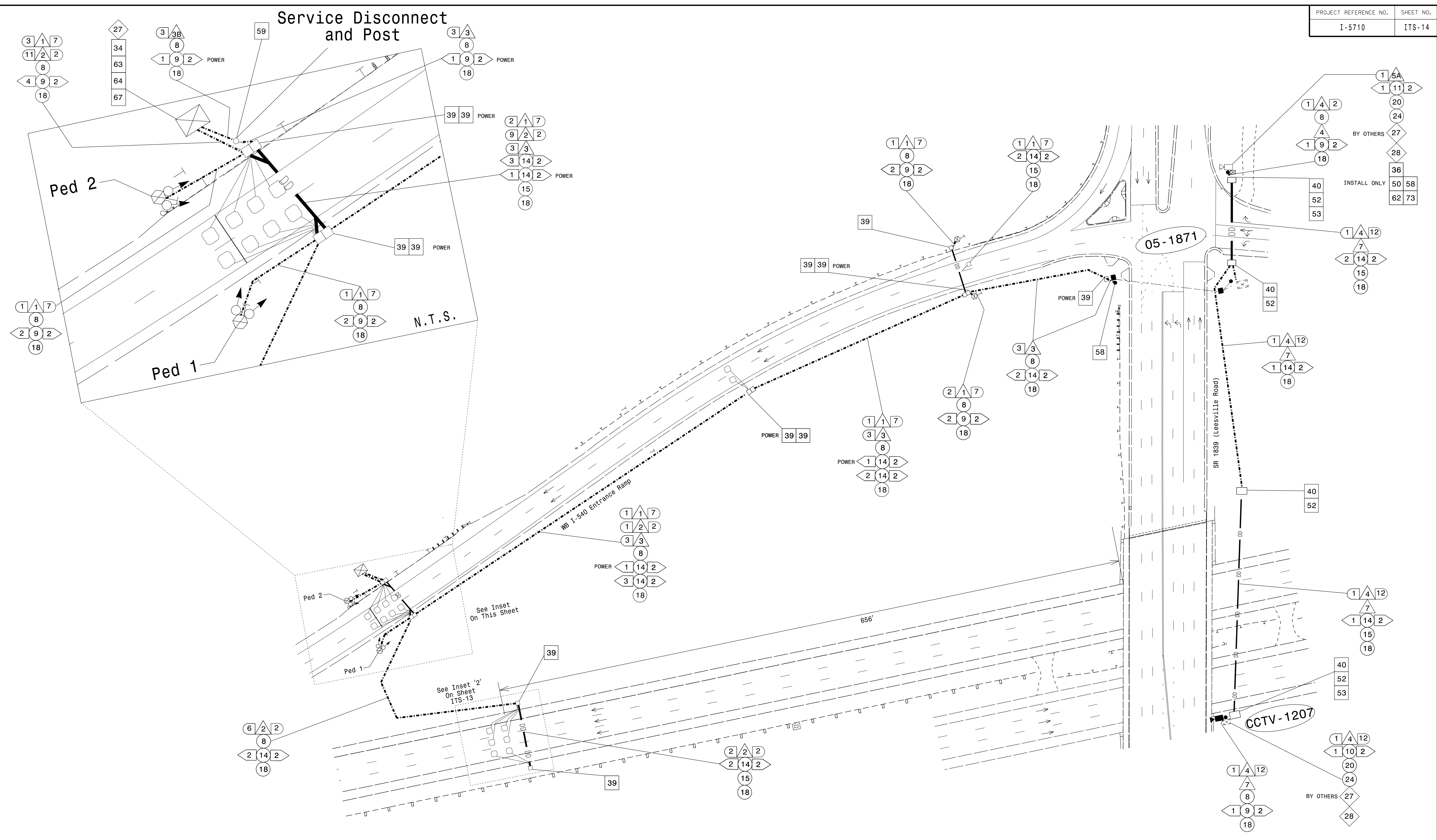


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CHARLOTTE, NORTH CAROLINA 28217
(704) 522-7275 NCBEES #F-0326

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	I-540 Ramp Metering Type III Heavy Duty Signal Pedestal		
	Division 5 Wake County Raleigh	PLAN DATE: June 2016 REVIEWED BY: H A Badgett	
PREPARED BY: P M Blaiklock	REVISIONS	REVIEWED BY: J T Brooks	DocuSigned by: DATE: 6/27/2016
N.T.S.	INIT. DATE	DATE	CAD Filename: ITS-11 Signal Pedestal

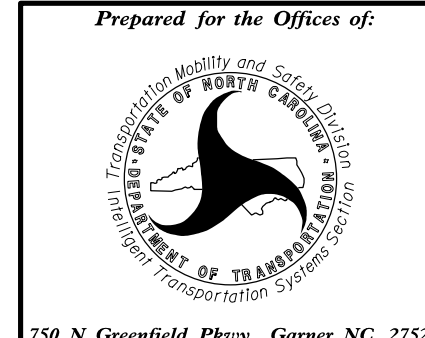
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ITS Plan

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

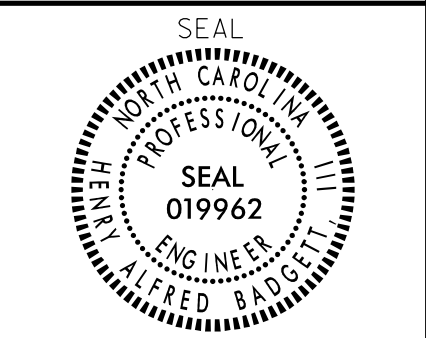


**I-540 WB Entrance Ramp
at SR 1839 (Leesville Road)**

Division 5 Wake County Raleigh

PLAN DATE: June 2016 REVIEWED BY: H A BADGETT

PREPARED BY: J O ENSLEY REVIEWED BY: J T BROOKS



750 N. Greenfield Pkwy., Garner, NC 27529

ATKINS

5200 77 CENTER DR., SUITE 500
CHARLOTTE, NC 28217
704.665.4411 NCBEES #F-0326

REVISIONS

INIT. DATE

0 50
1"=50'

DocuSigned by:
H.A. Badgett
6/27/2016

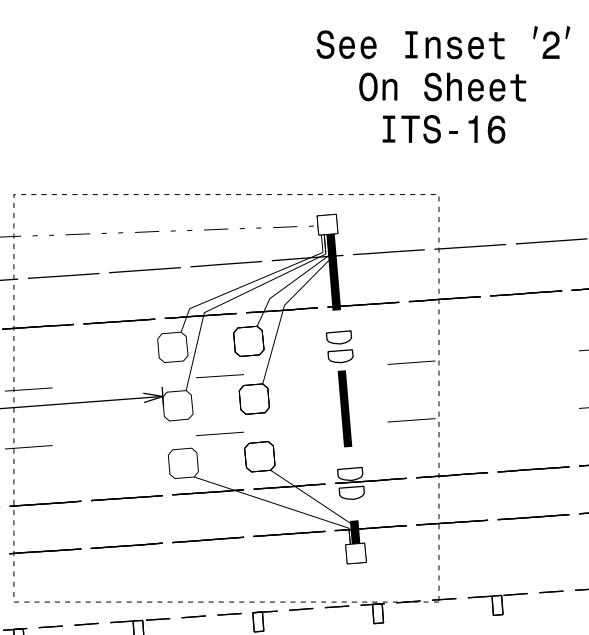
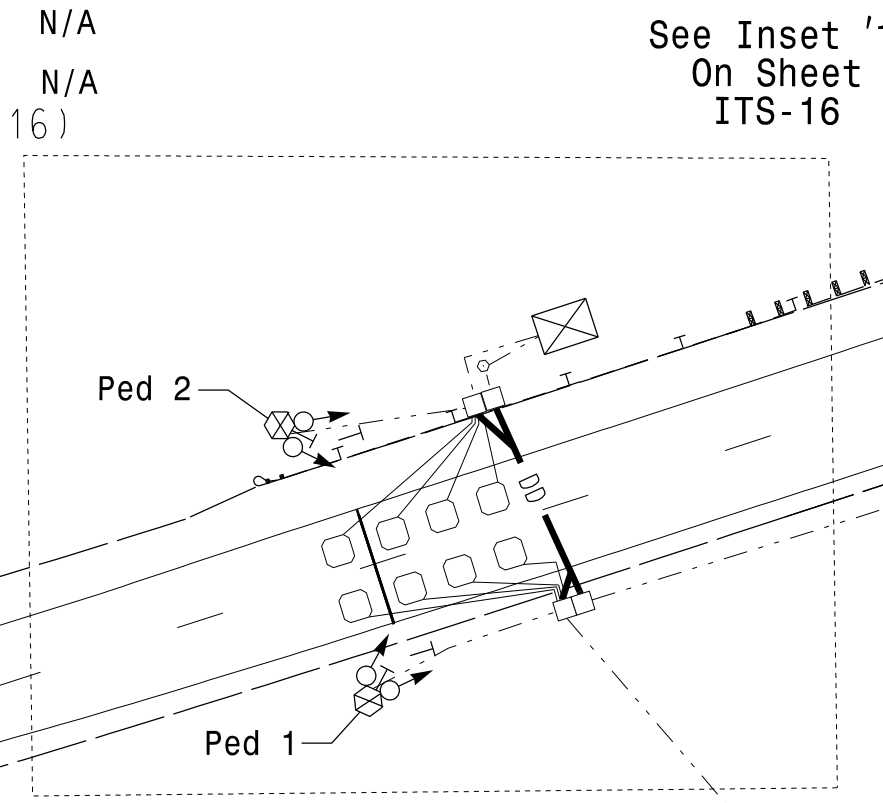
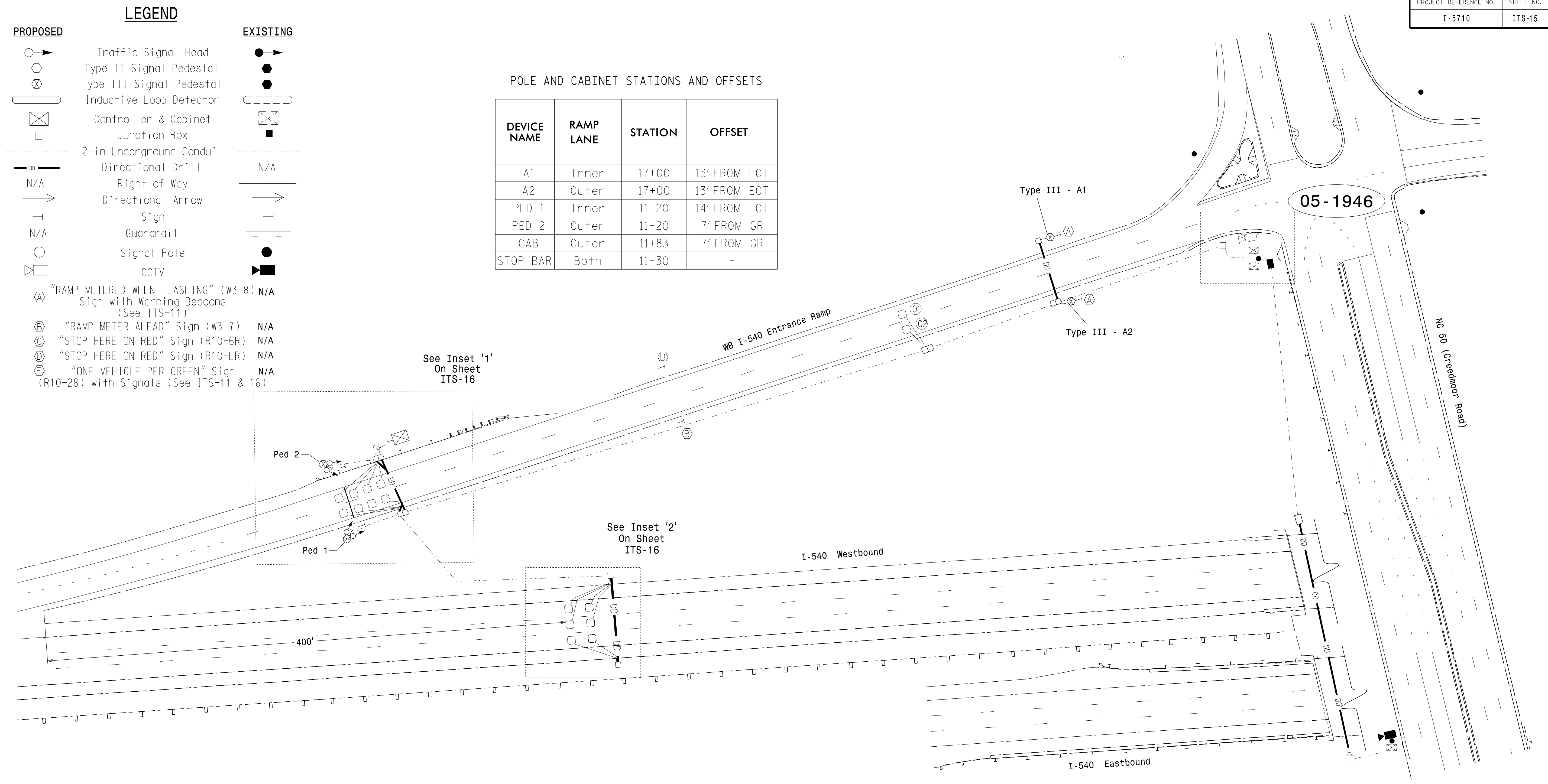
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LEGEND

PROPOSED	EXISTING
	N/A
	N/A
	N/A
	N/A
	N/A
	N/A

POLE AND CABINET STATIONS AND OFFSETS

DEVICE NAME	RAMP LANE	STATION	OFFSET
A1	Inner	17+00	13' FROM EOT
A2	Outer	17+00	13' FROM EOT
PED 1	Inner	11+20	14' FROM EOT
PED 2	Outer	11+20	7' FROM GR
CAB	Outer	11+83	7' FROM GR
STOP BAR	Both	11+30	-



Ramp Meter (System-wide Traffic Responsive)

NOTES

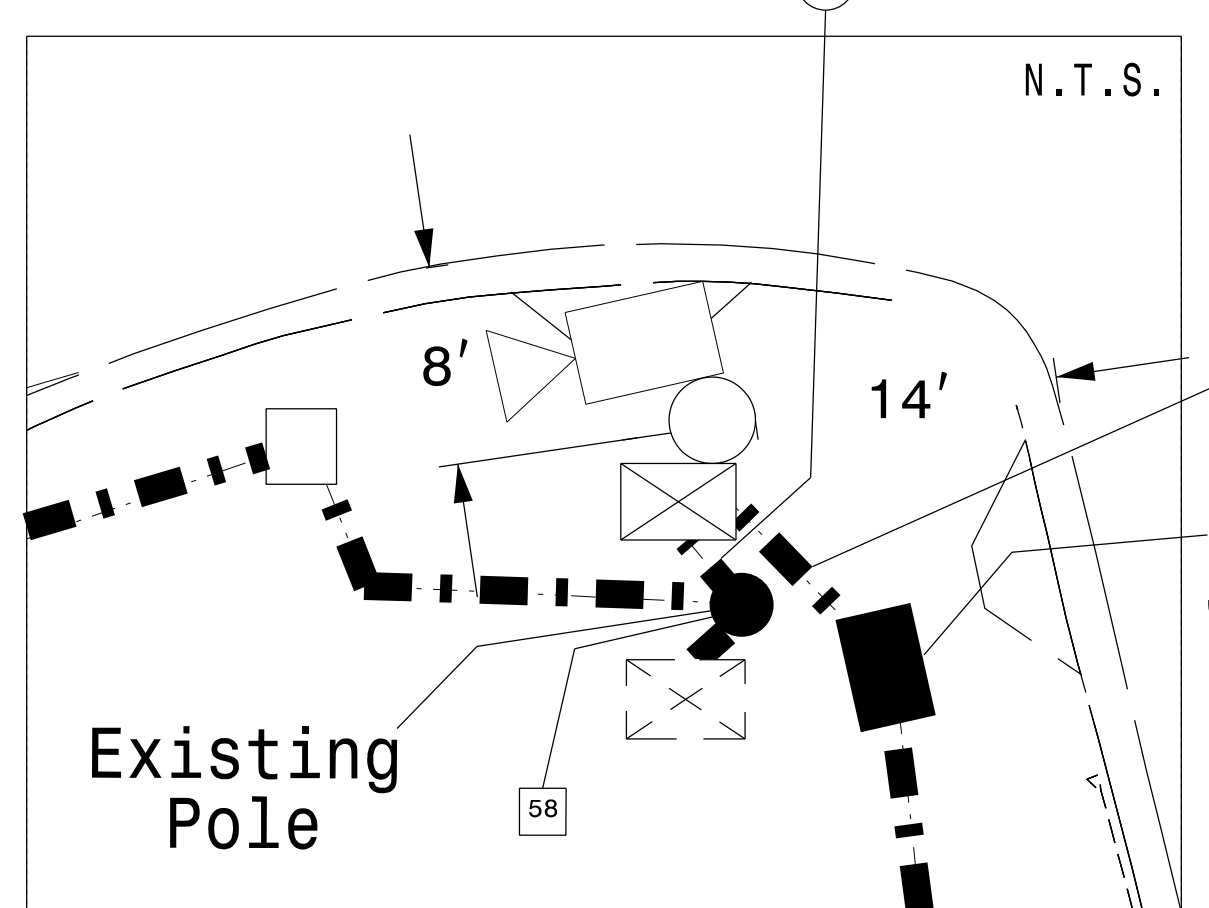
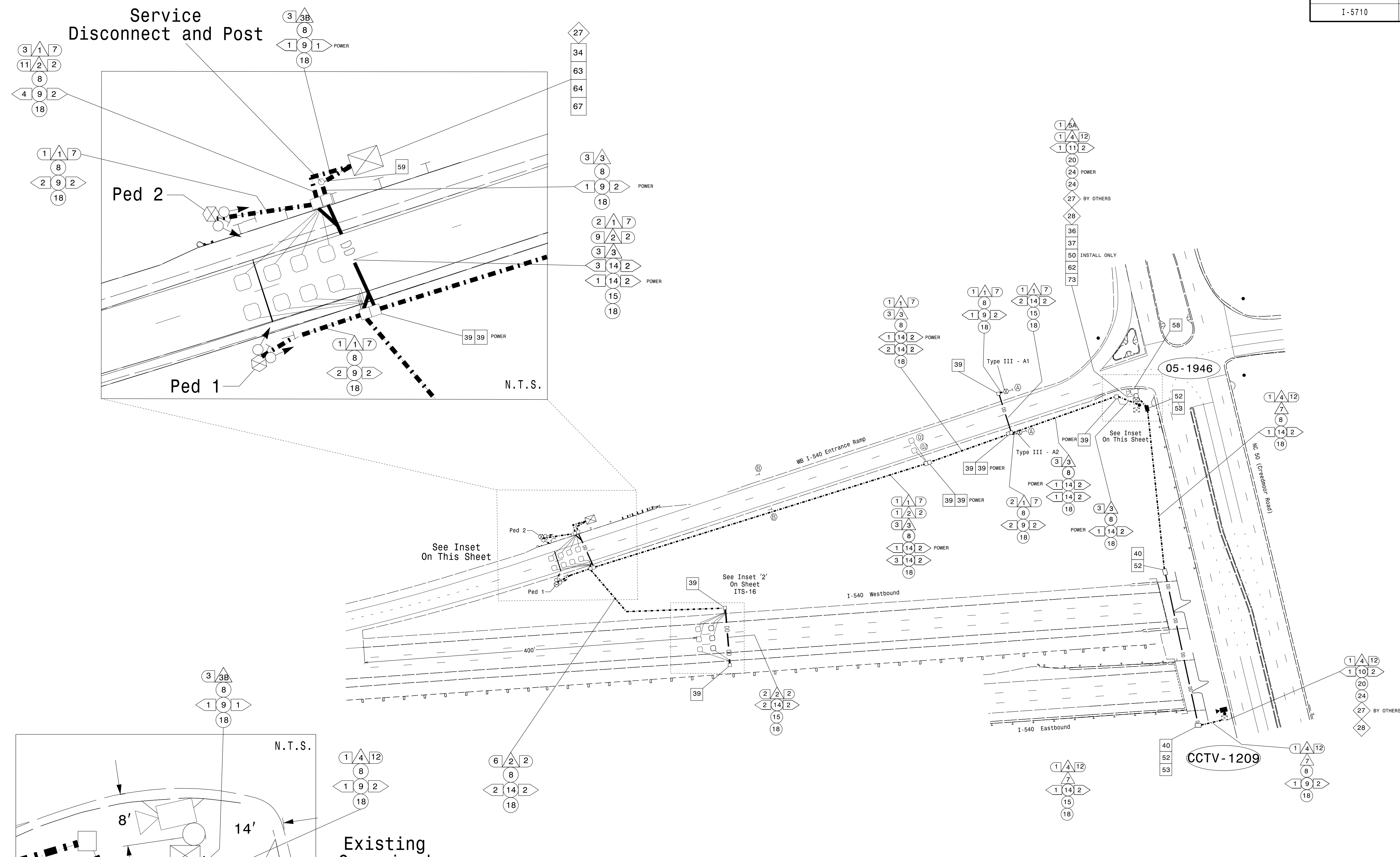
1. Refer to "Roadway Standards Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures dated January 2012.
2. Ramp Meter shall operate Traffic Responsive.
3. Each lane shall operate alternately, one car per one green.
4. Loops Q1 and Q2 serve as queue backup detection. After 10 seconds of constant actuation, the detector units shall put in a call to the controller to activate alternate metering rate.
5. The Division Traffic Engineer shall determine the hours of operation.
6. Pavement markings are proposed.
7. Set all detector units to presence mode.

New Installation Dual Lane Ramp Meter

DOCUMENT NOT CONSIDERED FINAL
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	I-540 WB Entrance Ramp at NC 50 (Creedmoor Road)		
	Division 5 Wake County Raleigh		
PLAN DATE: June 2016 REVIEWED BY: H A BADGETT			
PREPARED BY: J O ENSLEY REVIEWED BY: J T BROOKS			
REVISIONS: _____ INIT: _____ DATE: _____			
Prepared for the Offices of: 		DocuSigned by: 	
750 N. Greenfield Pkwy., Garner, NC 27529 ATKINS 5200 77 CENTER DR., SUITE 500 CHARLOTTE, NC 28217 704.665.4411 NCBEES #F-0326		6/27/2016 DATE	

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Existing Oversized Junction Box

Existing Pole

ITS Plan

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Prepared for the Offices of:



I-540 WB Entrance Ramp at NC 50 (Creedmoor Road)

Division 5 Wake County Raleigh

PLAN DATE: June 2016 REVIEWED BY: H A BADGETT

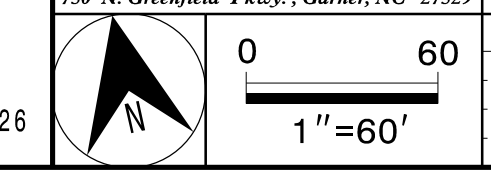
PREPARED BY: J O ENSLEY REVIEWED BY: J T BROOKS

REVISIONS	INIT.	DATE

DocuSigned by: *Henry Alfred Badgett* 6/27/2016

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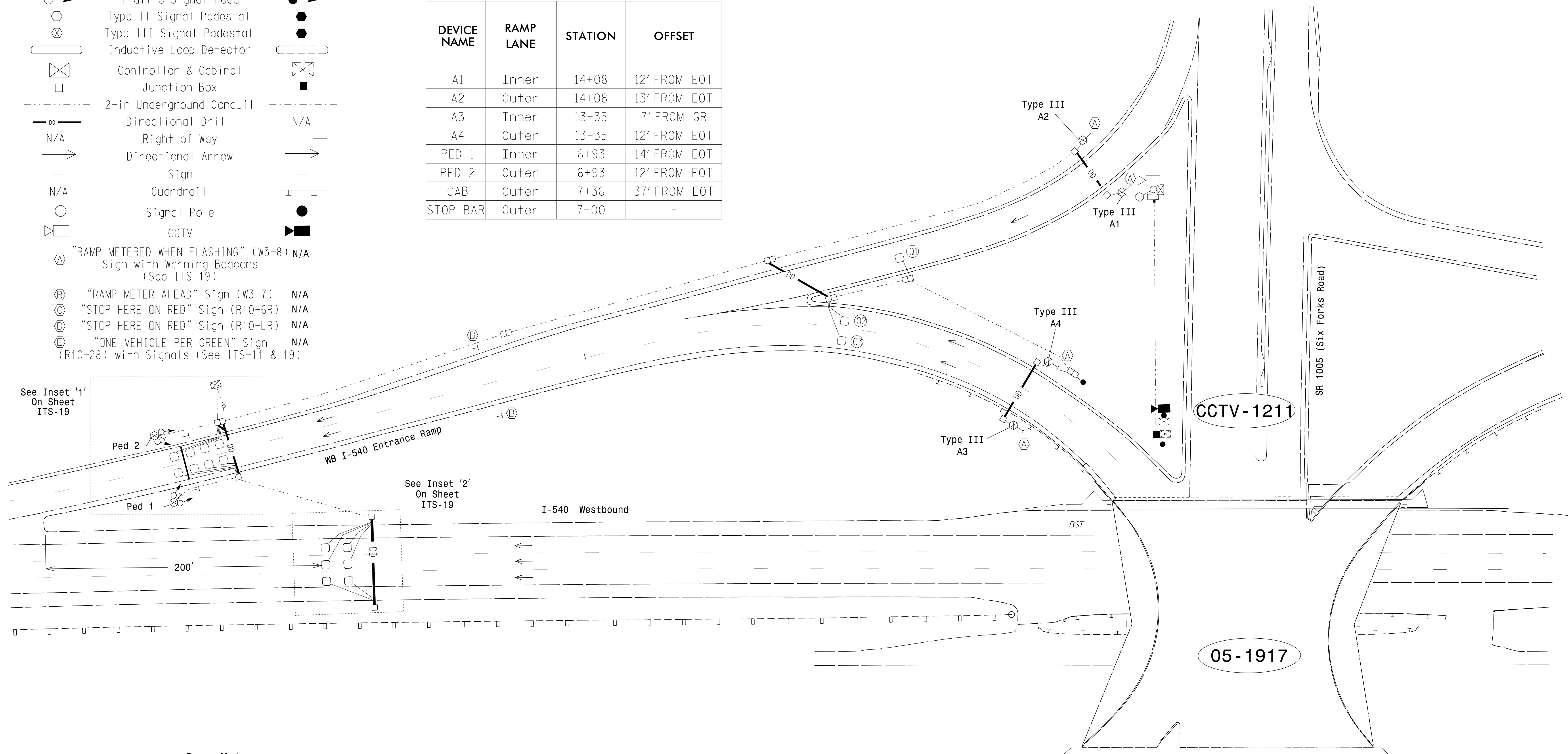
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LEGEND

PROPOSED	EXISTING
	N/A
N/A	
N/A	
	N/A
	N/A
	N/A
	N/A
	N/A

POLE AND CABINET STATIONS AND OFFSETS

DEVICE NAME	RAMP LANE	STATION	OFFSET
A1	Inner	14+08	12' FROM EOT
A2	Outer	14+08	13' FROM EOT
A3	Inner	13+35	7' FROM GR
A4	Outer	13+35	12' FROM EOT
PED 1	Inner	6+93	14' FROM EOT
PED 2	Outer	6+93	12' FROM EOT
CAB	Outer	7+36	37' FROM EOT
STOP BAR	Outer	7+00	-



Ramp Meter (System-wide Traffic Responsive)

NOTES

1. Refer to "Roadway Standards Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures dated January 2012.
2. Ramp Meter shall operate Traffic Responsive.
3. Each lane shall operate alternately, one car per one green.
4. Loops Q1 and Q2 serve as queue backup detection. After 10 seconds of constant actuation, the detector units shall put in a call to the controller to activate alternate metering rate.
5. The Division Traffic Engineer shall determine the hours of operation.
6. Pavement markings are proposed.
7. Set all detector units to presence mode.

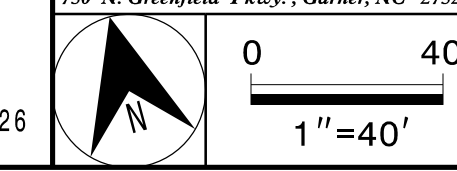
New Installation Dual Lane Ramp Meter

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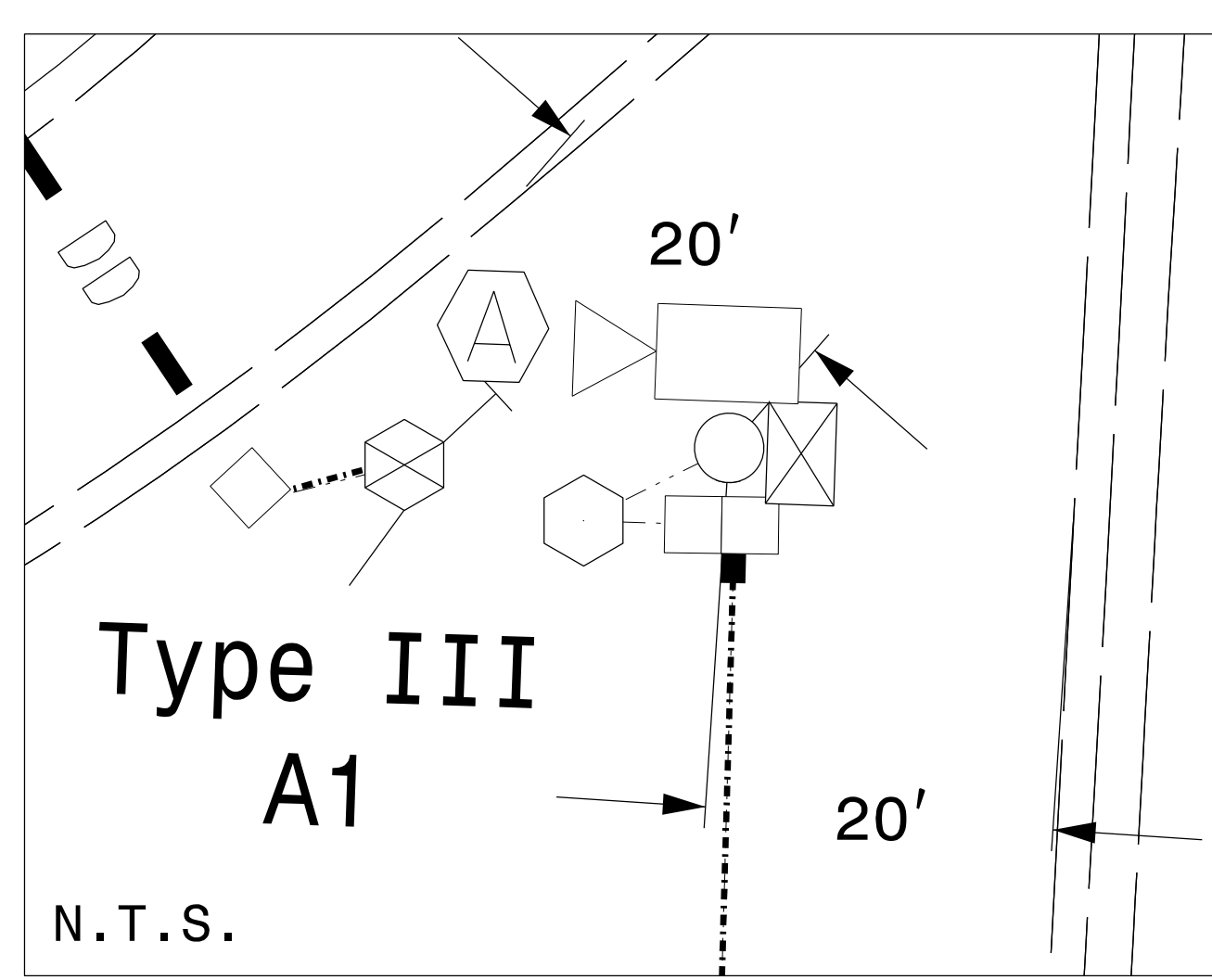
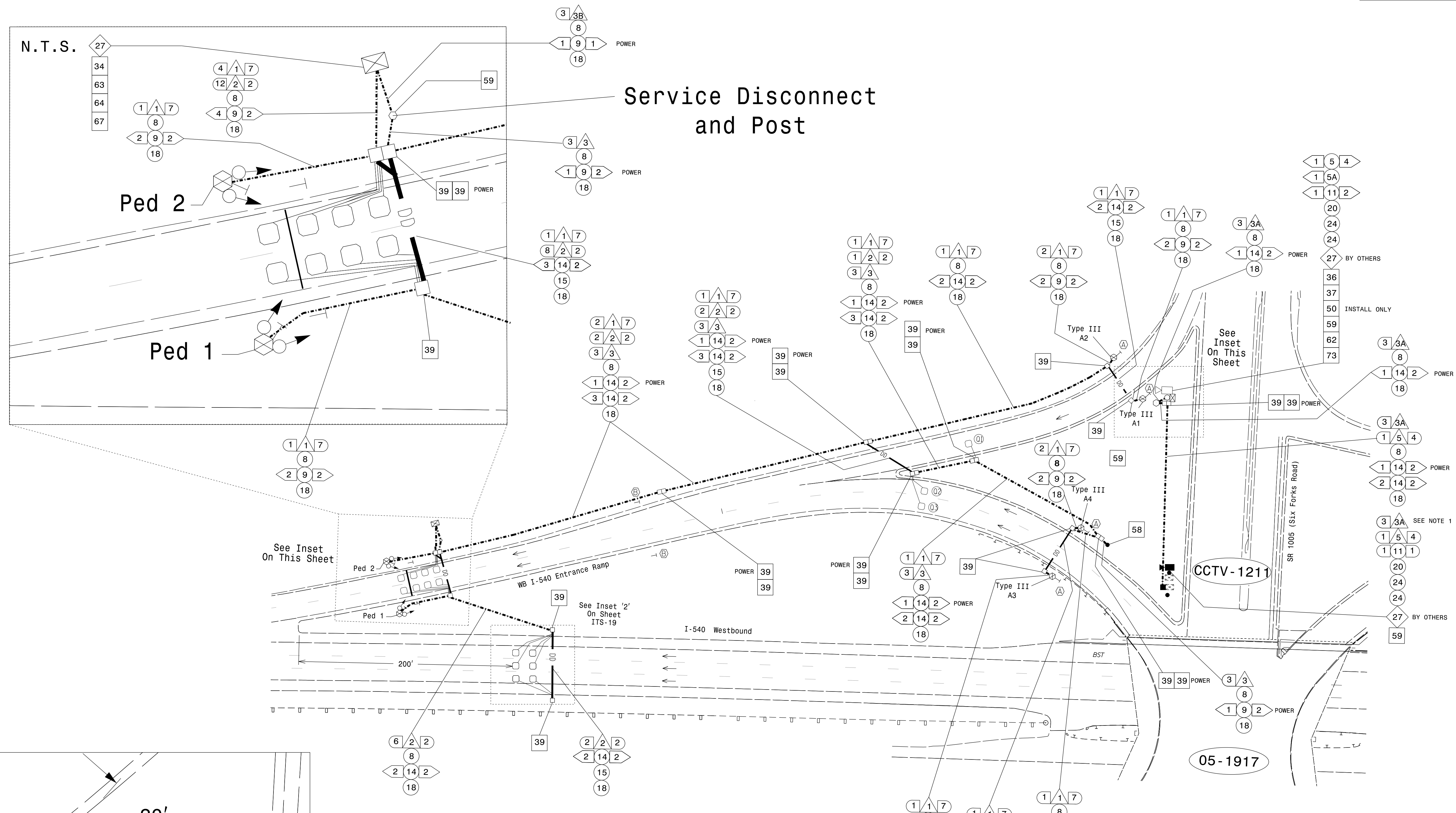
	I-540 WB Entrance Ramp at SR 1005 (Six Forks Road)	
	Division 5 Wake County Raleigh	
PLAN DATE: June 2016 REVIEWED BY: H A BADGETT		
PREPARED BY: J O ENSLEY REVIEWED BY: J T BROOKS		
REVISIONS INIT. DATE		
DocuSigned by: 6/27/2016		

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CHARLOTTE, NC 28217
704.665.4411 NCBEES #F-0326



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WILEG054 AT 005300013



Notes:
1. Connect electrical conductors to existing meter service disconnect on existing CCTV pole.

ITS Plan

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	I-540 at WB Entrance Ramp SR 1005 (Six Forks Road)		
	Division 5 Wake County Raleigh		
PLAN DATE: June 2016		REVIEWED BY: H A BADGETT	
PREPARED BY: J O ENSLEY		REVIEWED BY: J T BROOKS	
REVISIONS		INIT. DATE	
6/27/2016		DATE	

DocuSigned by: *H. A. Badgett* 6/27/2016

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CHARLOTTE, NC 28217
704.665.4411 NCBEES #F-0326

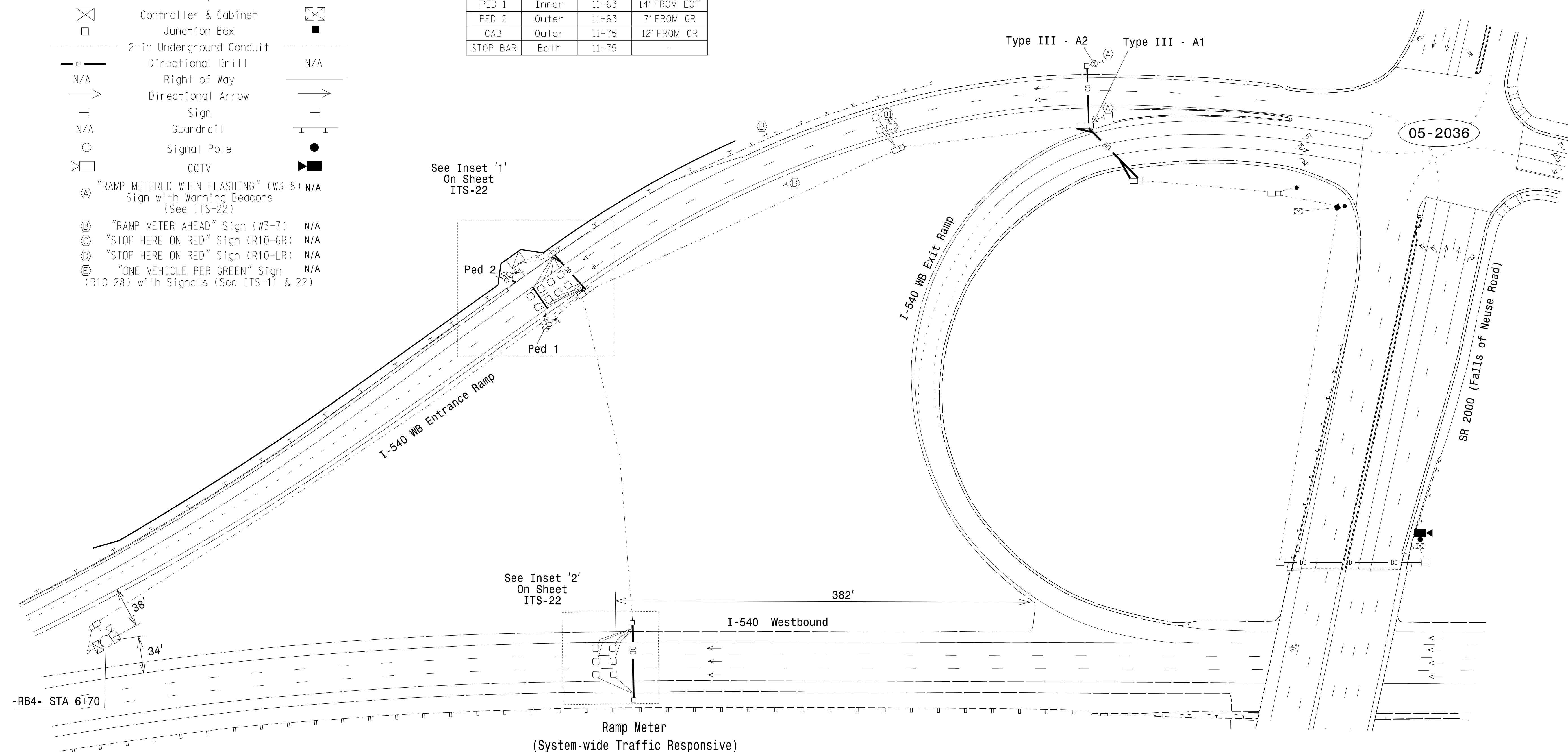
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 WILEG054 A1 005300013

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Type II Signal Pedestal	
	Type III Signal Pedestal	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
	Sign	
N/A	Guardrail	
	Signal Pole	
	CCTV	
	"RAMP METER WHEN FLASHING" (W3-8) Sign with Warning Beacons (See ITS-22)	N/A
	"RAMP METER AHEAD" Sign (W3-7)	N/A
	"STOP HERE ON RED" Sign (R10-6R)	N/A
	"STOP HERE ON RED" Sign (R10-LR)	N/A
	"ONE VEHICLE PER GREEN" Sign (R10-28) with Signals (See ITS-11 & 22)	N/A

POLE AND CABINET STATIONS AND OFFSETS

DEVICE NAME	RAMP LANE	STATION	OFFSET
A1	Inner	17+30	13' FROM EOT
A2	Outer	17+30	13' FROM EOT
PED 1	Inner	11+63	14' FROM EOT
PED 2	Outer	11+63	7' FROM GR
CAB	Outer	11+75	12' FROM GR
STOP BAR	Both	11+75	-



See Inset '2'
On Sheet
ITS-22

See Inset '1'
On Sheet
ITS-22

Ramp Meter (System-wide Traffic Responsive) NOTES

1. Refer to "Roadway Standards Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures dated January 2012.
2. Ramp Meter shall operate Traffic Responsive.
3. Each lane shall operate alternately, one car per one green.
4. Loops Q1 and Q2 serve as queue backup detection. After 10 seconds of constant actuation, the detector units shall put in a call to the controller to activate alternate metering rate.
5. The Division Traffic Engineer shall determine the hours of operation.
6. Pavement markings are proposed.
7. Set all detector units to presence mode.

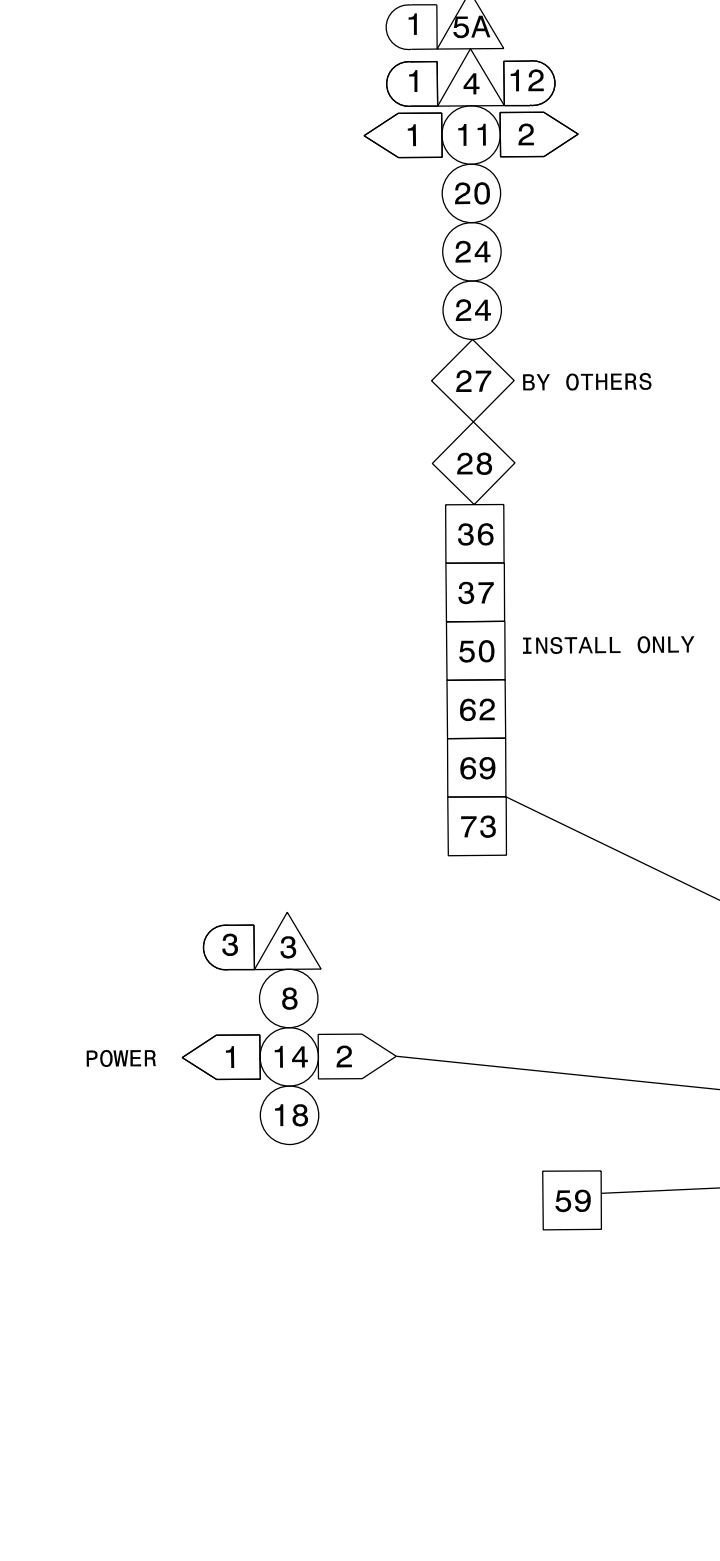
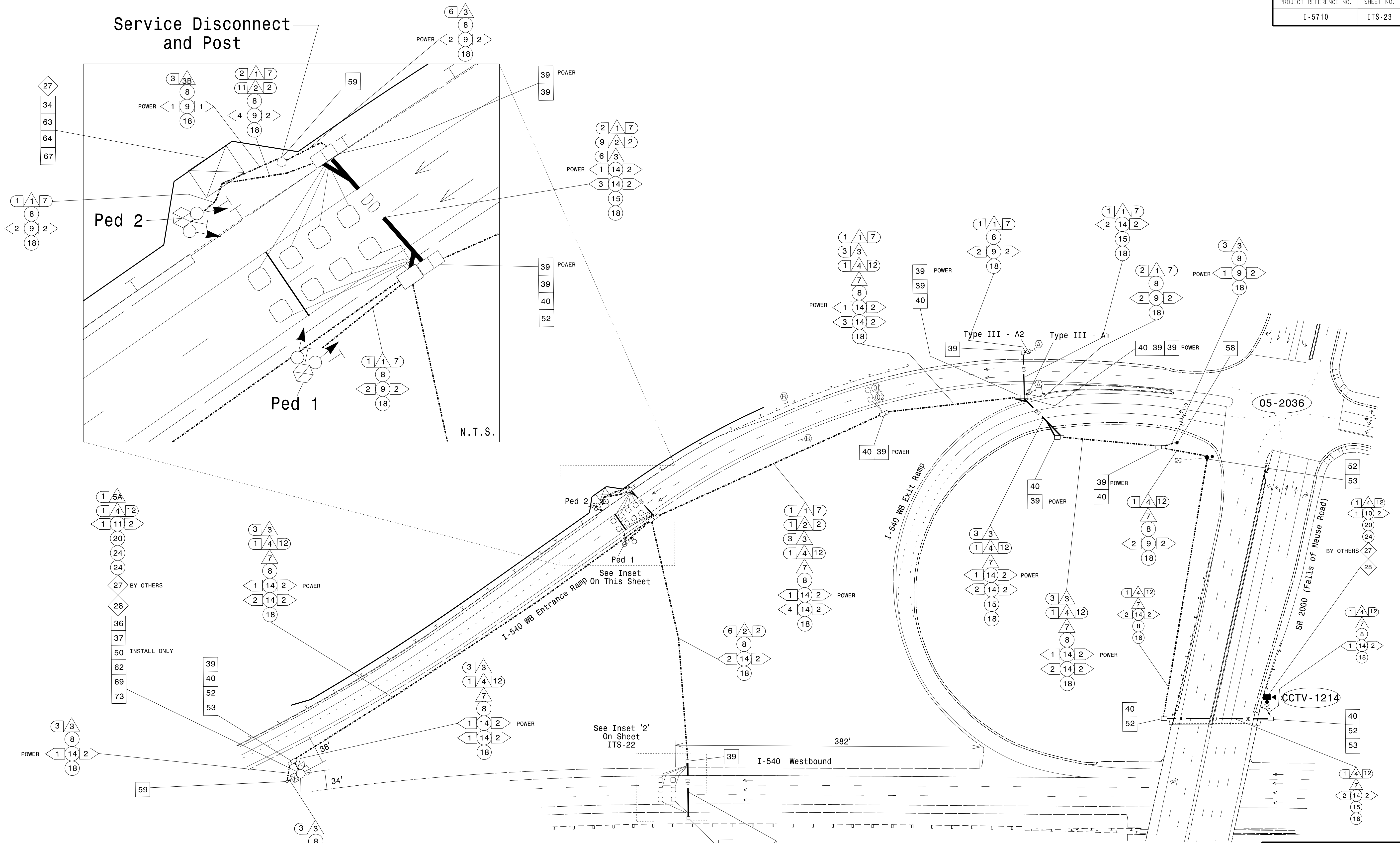
New Installation Dual Lane Ramp Meter

DOCUMENT NOT CONSIDERED FINAL
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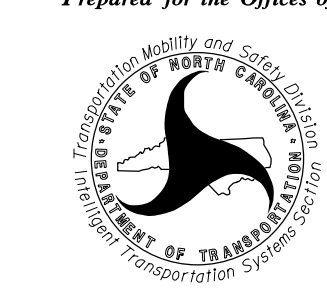
	I-540 WB Entrance Ramp at SR 2000 (Falls of Neuse Road)		
	Division 5 Wake County Raleigh		
PLAN DATE: June 2016	REVIEWED BY: H A BADGETT		
PREPARED BY: J O ENSLEY	REVIEWED BY: J T BROOKS		
REVISIONS	INIT. DATE		
0 50 1" = 50'			
		DocuSigned by: 6/27/2016 DATE	

ATKINS 5200 77 CENTER DR, SUITE 500
CHARLOTTE, NC 28217
704.665.4411 NCBEES #F-0326

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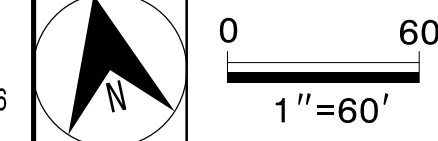


ITS Plan

Prepared for the Offices of: 		SEAL PROFESSIONAL SEAL 019962 ALFRED S. BADGETT	
I-540 WB Entrance at SR 2000 (Falls of Neuse Road)			
Division 5	Wake County	Raleigh	
PLAN DATE: June 2016	REVIEWED BY: H A BADGETT		
PREPARED BY: J O ENSLEY	REVIEWED BY: J T BROOKS		
REVISIONS	INIT.	DATE	
		6/27/2016	

DocuSigned by:
Alfred S. Badgett
6/27/2016

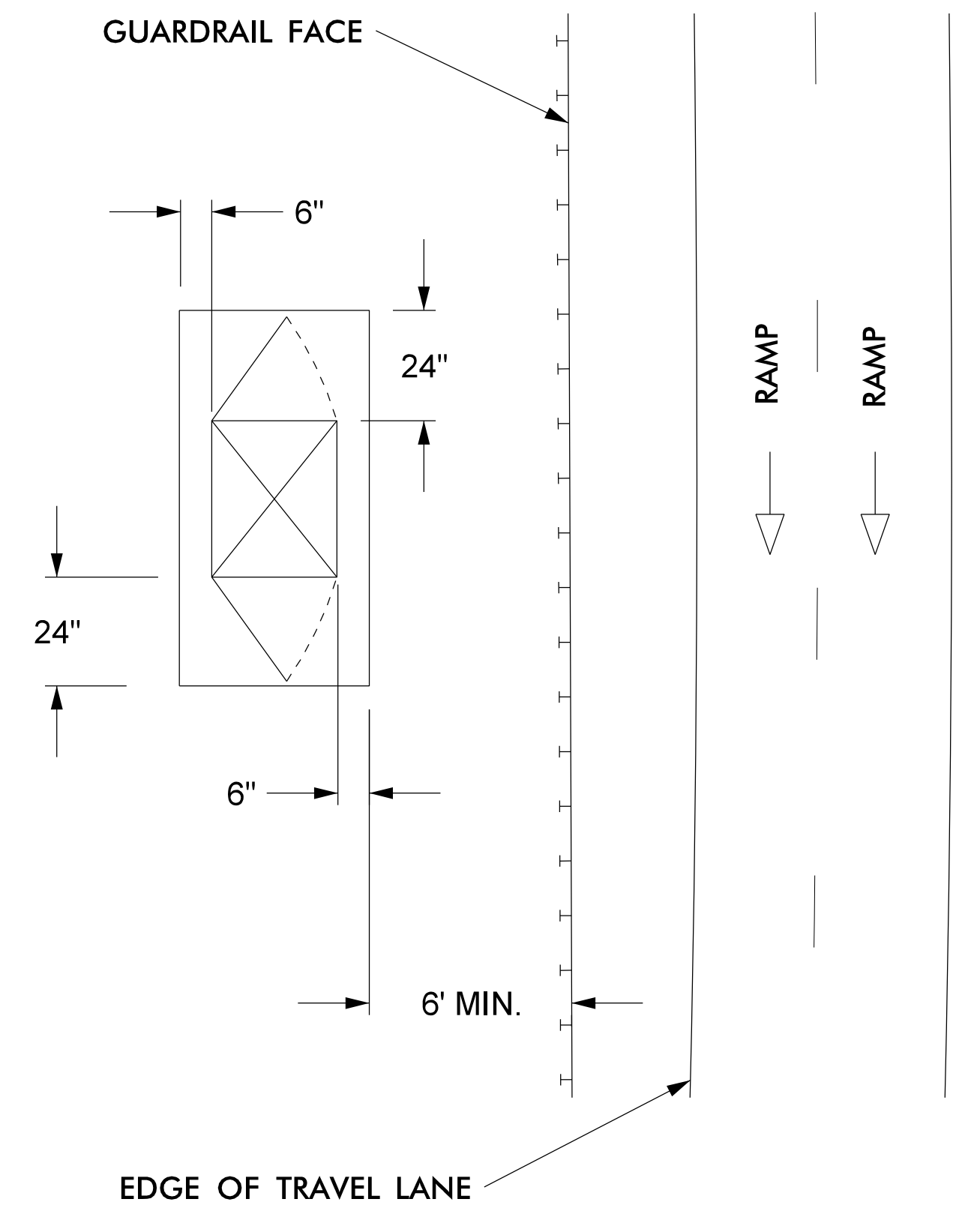
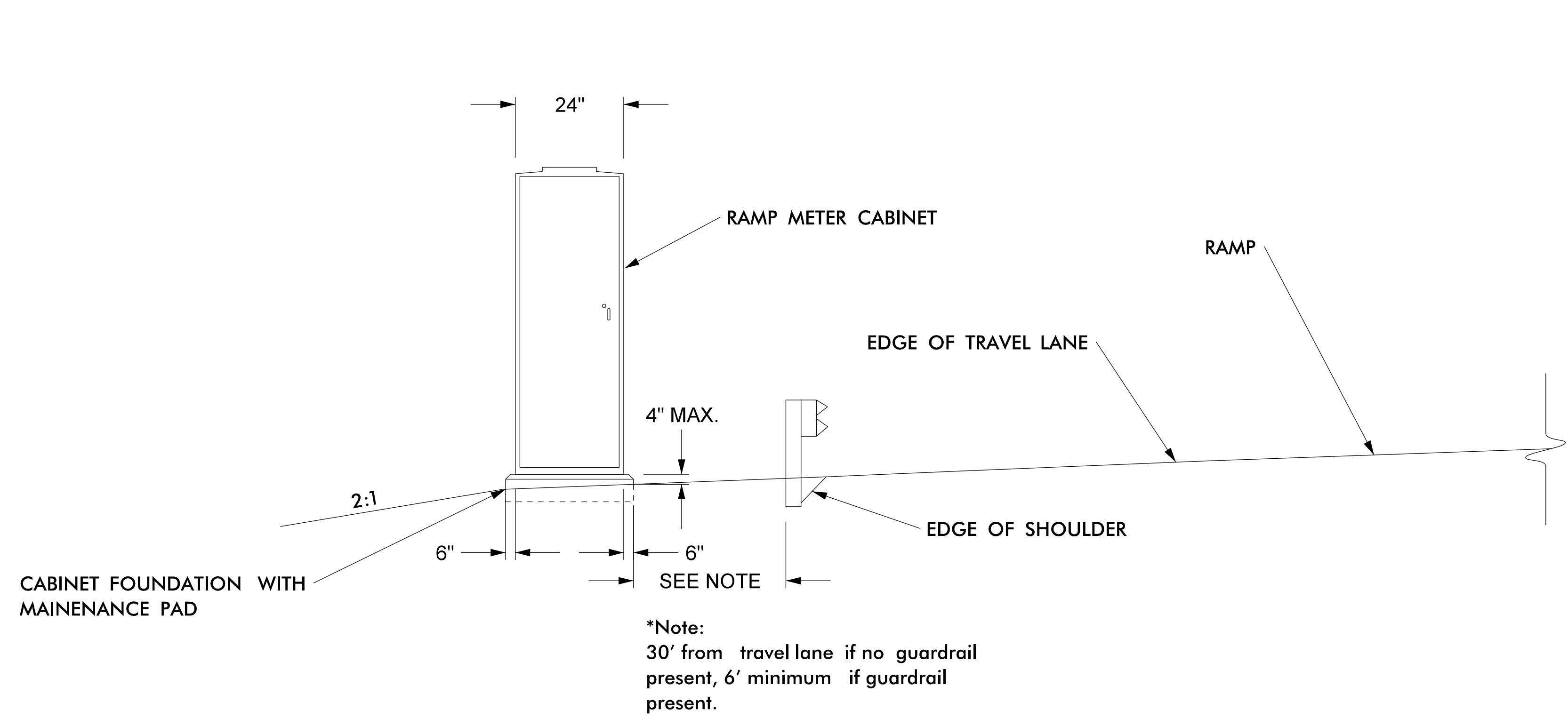
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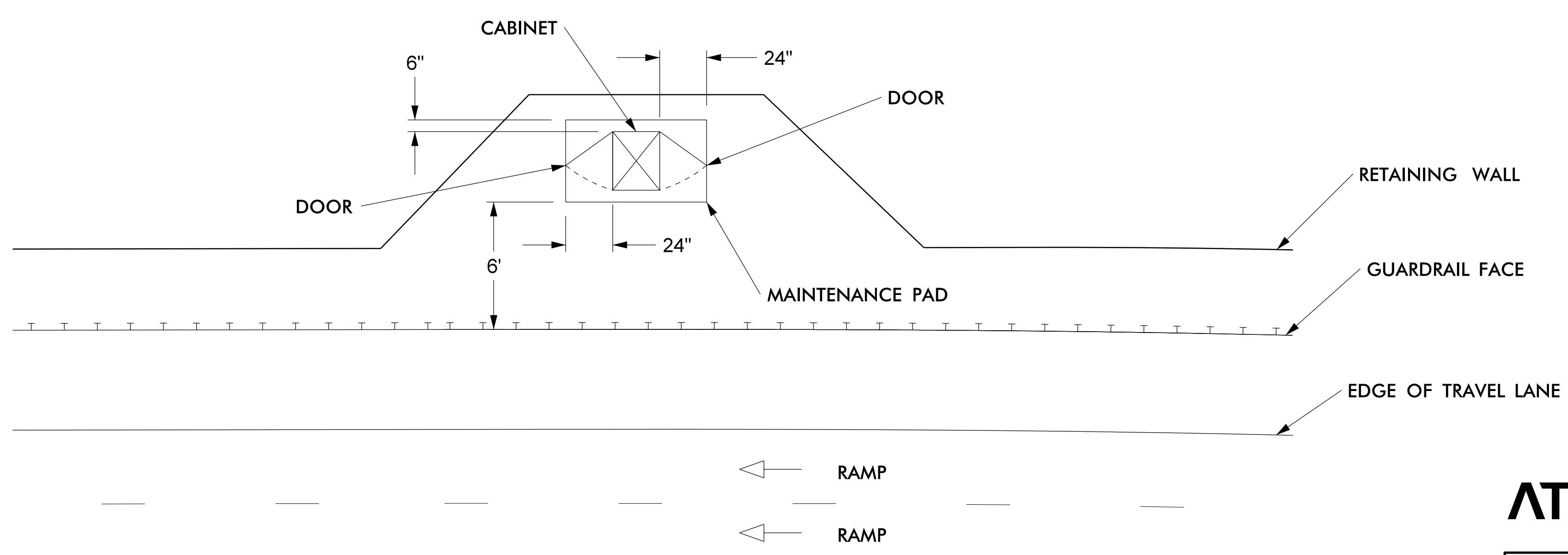
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CHARLOTTE, NC 28217
704.665.4411 NCBEES #F-0326

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D:\proj\2016\06\I-540 WB Entrance\Drawings\ITS\23 15710_TMS_PSH23 Falls of Neuse ITS.dgn
WILECG54 AT DUS500013

**LEESVILLE ROAD, CREEDMOOR ROAD,
AND SIX FORKS ROAD**



FALLS OF NEUSE ROAD



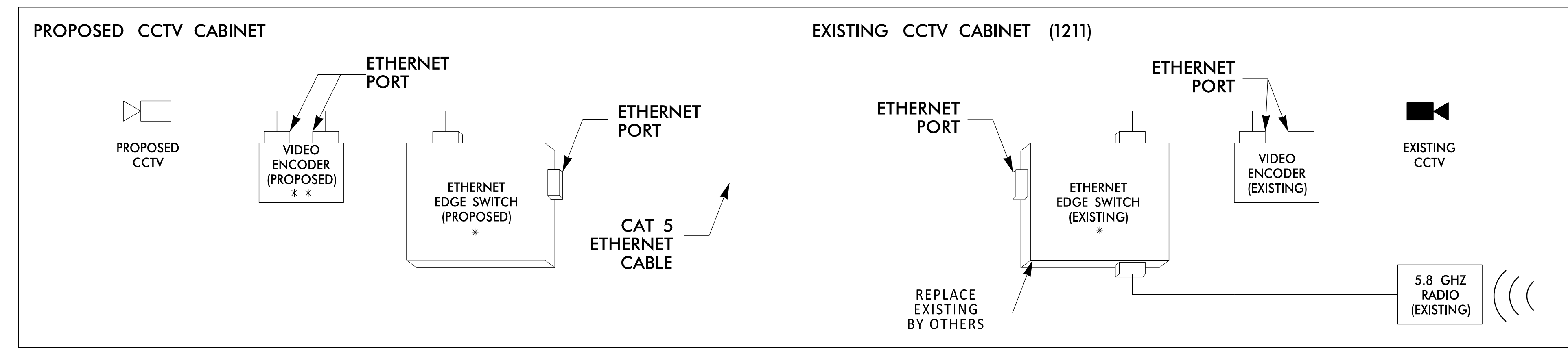
ATKINS 5200 77 CENTER DR., SUITE 500
CHARLOTTE, NC 28217
704.665.4411 NCBEES #F-0326

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

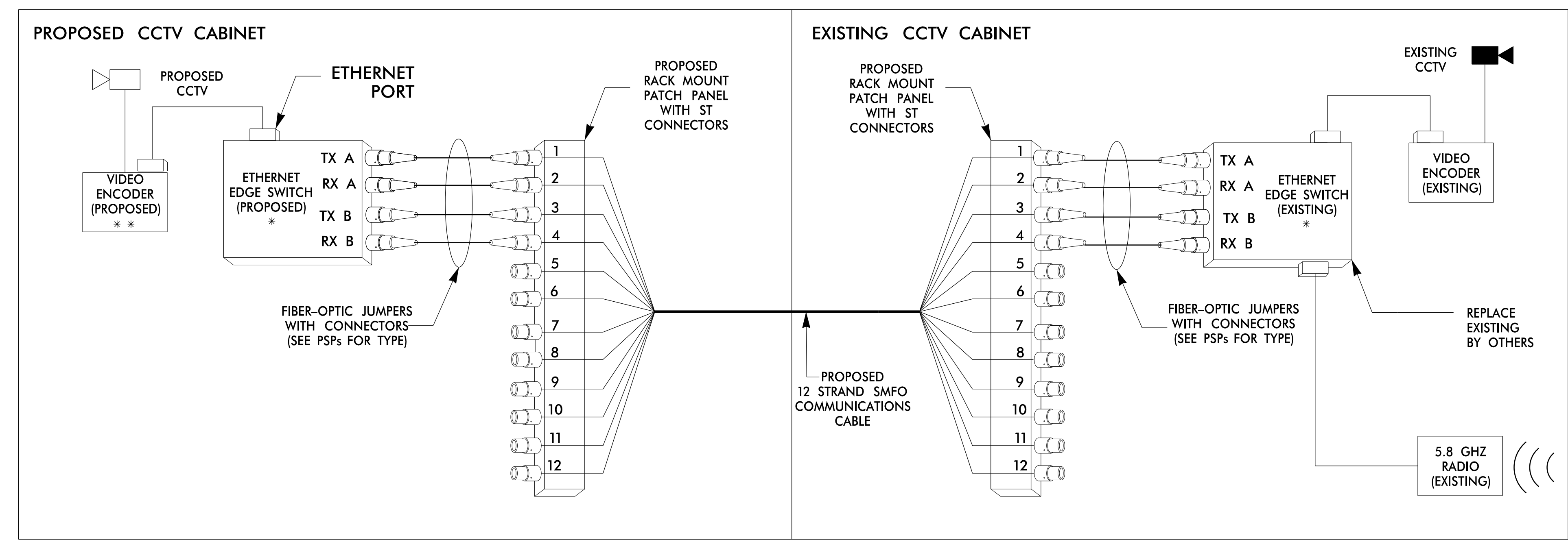
	I-540 Ramp Metering Cabinet Placement Details	
	DIVISION 05 WAKE CO RALEIGH PLAN DATE: JUNE 2016 REVIEWED BY: H A BADGETT PREPARED BY: G B SPELL REVIEWED BY: J T BROOKS	REVISIONS INIT. DATE
N.T.S.	DocuSigned by: DATE: 6/27/2016	SEAL NORTH CAROLINA PROFESSIONAL SEAL 019962 ENGINEER ALFRED BADGETT

27-JUN-2016 15:55
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 WLE2054 AT DUS300019

LOCATION: SIX FORKS ROAD



LOCATION: LEESVILLE ROAD (1207), CREEDMOOR ROAD (1209), & FALLS OF THE NEUSE ROAD (1214)



*FURNISHED AND INSTALLED BY NCDOT
 **FURNISHED BY NCDOT, INSTALLED BY CONTRACTOR

27-JUN-2016 15:55 T:\Product\IT\ITS\NCDOT\00042047 1-540 Ramp Meter Design\Mobility and Safety TD\ITS Task 3 and 4 - ITS Plans\ITS-25 Communications.dgn WLE2054 AT DUS300019

ATKINS 5200 77 CENTER DRIVE, SUITE 500
 CHARLOTTE, NORTH CAROLINA 28217
 (704) 522-7275 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

COLOR CODE	
TIA/EIA	598-B
(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 INDIVIDUAL FIBER
C	CAP AND SEAL
EXPRESS	EXPRESS ENTIRE BUFFER TUBE /FIBERS THROUGH WITHOUT CUTTING
BUFFER SPlice	SPlice ALL FIBERS IN BUFFER TUBE COLOR TO COLOR

NOTES	
1.	UNUSED FIBERS LEFT COILED AND STORED IN SPlice TRAY
2.	UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPlice ENCLOSURE
3.	EDGE SWITCH CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING/ENSURING THE PROPER TERMINATIONS.

	I-540 Ramp Metering	
	Communications Details	
Division 5	Wake County	Raleigh
PLAN DATE: June 2016	REVIEWED BY: H A Badgett	
PREPARED BY: P M Blaiklock	REVIEWED BY: J T Brooks	
REVISIONS	INIT.	DATE
N.T.S.		
		6/27/2016
CADD Filename: ITS-25 Communica...		