STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

December 12, 2017

Addendum No. 1
RE: Contract # C203991
WBS # 45429.3.3
F. A. # STPDA-0540(39)
Wake County (U-5315A, U-5315B)
Morrisville Parkway Extension From West Of Highcroft Drive
To East Of Mills Park Drive In Cary

December 19, 2017 Letting

To Whom It May Concern:

The Bidders attention is directed to the fact that information concerning the "Contractor/Subcontractors on Previous Tolling Project" has been posted on the web along with the other information on this project. This is for informational purposes only and in no way obligates the bidder to utilize these subcontractors. Also, as a matter of information, we are posting the shop drawings from the previous project that show the details of the aesthetic cladding that must be matched on this project.

Reference is made to the plans and proposal form furnished to you on this project.

The following revisions have been made to the Roadway plans:

Sheet No.	Revisions
2A-1 and 2A-3	Revised to add "C6" and "D2" to pavement schedule to require the final layer of surface course be 2" thick within the toll sites
3B-2	Revised the 4" and 5" Posts quantities within the "Summary Of Woven Wire Fence, 47" Fabric"
4	Revised Guardrail and Sidewalk tie-in location at bridge
5	Change gate to 12' width within the Right Of Way fence at Sta. 13+85 -RPB-
TMP-2	Added Step 6A which directs the Contractor to fill the existing rumble strips along NC 540
SIGN-02A	Updated Summary Of Quantities Table
SIGN-02B	Revised Signs 201 and 202 to use Omni-Coupler breakaway supports

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
CONTRACT STANDARDS AND DEVELOPMENT
1591 MAIL SERVICE CENTER
RALEIGH, NC 27699-1591

Telephone: (919) 707-6900
Fax: (919) 250-4127
Customer Service: 1-877-368-4968

Location:
1020 BIRCH RIDGE DR.
RALEIGH, NC 27610

Website: www.ncdot.gov

SIGN-02C	Revised Signs 115 and 117 to remove the use of Omni-Coupler breakaway supports. These signs shall be breakaway
ES-02A	Modified "Design Criteria" to reflect use of "2009 AASHTO Standard Specifications For Structural Supports for Highway Sign, Luminaries, and Traffic Signals (5th Edition)". Added 18" reinforced concrete collar note to junction boxes in legend
ITS-1	Removed "RWIS" callout and leader from Title Sheet
ITS-1A	Revised construction notes 2, 39,40 and 41
ITS-2G thru ITS-2I	Replaced "RWIS" standard drawings with "Sheet Intentionally Left Blank" note
ITS-3D	Modified note, "Existing bore to future RWIS site to be maintained" to "Existing bore to be maintained for future access"
ITS-6	Added "x2" beside construction note 2 to indicated 2 350 MCM feeder conductors
ITS-7	Removed relocated RWIS, conduit and associated construction notes. Revised note 1
ITS-8	Added "x2" beside construction note 2 to indicated 2 350 MCM feeder conductors
ITS-14	Removed splice components for RWIS on splice detail
X-3	Revised cross-sections for Stations 64+00 thru 65+00 to reflect the change to guardrail from revised Plan Sheet 4
New S-1 thru S-3	New sheets added to include details/requirements for sidewalk to be constructed on the existing bridge

Please void the above listed sheets in your plans and staple the revised sheets thereto. Please staple new Sheets S-1 thru S-3 after existing Sheet UO-06.

The following revisions have been made to the proposal:

Page No.	Revisions
Proposal Cover	Note added that reads "Includes Addendum No. 1 Dated 12-12-2017".
Table of Contents	Revised second page of the TOC to include TSC-1 for Structures for adding sidewalk to the existing bridge
G-4	Revised the second paragraph of the project special provision entitled "Intermediate Contract Time Number 6 and Liquidated Damages" concerning the start and end of the 48 hour period.
New R-48 thru R-50	Added new pages to include the project special provision entitled "Diamond Grinding Concrete Pavement"
LT-4 and LT-5	Added requirement for 18" reinforced concrete collar to junction boxes under "5.20 Materials" and "5.4 Measurement and Payment"
ITS-9	Revised "3.4 Measurement and Payment" to address reinforced concrete collar
ITS-15	Revised "7.1 Description" to remove requirement for electrical service to new RWIS site

Page No.	Revisions
ITS-22 and ITS-23	Revised "9.1 General" to remove requirement for installing pole for RWIS and to remove the mention of RWIS pole foundations
ITS-49 thru ITS-51	Revised to change from 'Relocate RWIS Assembly to "**Remove** RWIS Assembly". Renumbered section for "Testing and Acceptance" from "16" to "17"
AET-8 and AET-9	Revised section "2.9 Electrical" to include language about terminating RAW and UPS conductors
New TSC-1 thru TSC-8	New pages added to include the required Structure special provisions for adding sidewalk to the bridge

Please void the above listed pages in your proposal and staple the revised pages thereto. Please staple new Pages No. R-48 thru R-50 after existing Page No. R-47. Please staple New Pages No. TSC-1 thru TSC-8 after existing page AET-11.

On the item sheets the following pay item has been added or changed:

Item	Description	Old Quantity	New Quantity
085-3030000000-E-862	Steel Beam Guardrail	5,237.5 LF	5,200 LF
094-3509000000-E-866	4" Timber Posts, 7'-6" Long	389 EA	385 EA
095-3515000000-E-866	5" Timber Posts, 8'-0" Long	118 EA	125 EA
106-4048000000-E-902	Reinforced Concrete Sign Foundation	8 CY	9 CY
107-4045000000-E-902	Plain Concrete Sign Foundation	1 CY	**DELETED**
109-4060000000-E-903	Supports, Breakaway Steel Beam	9,130 LB	8,991 LB
110-4066000000-E-903	Supports, Simple Steel Beam	1,472 LB	1,434 LB
194-5190000000-E-1410	(**MCM** 4-Wire Copper) Feeder Circuit	1,975 LF	3,950 LF
248-7279000000-E-1715	Tracer Wire	1,580 LF	1,385 LF
250-7300000000-E-1715	Unpaved Trenching (2,2")	955 LF	760 LF
258-7348000000-N-1716	Junction Box (Over-Sized, Heavy Duty)	39 EA	38 EA
261-7528000000-E-1730	Drop Cable	2,765 LF	1,680 LF
266-7613000000-N-SP	Soil Test	7 EA	6 EA
267-7614100000-E-SP	Drilled Pier Foundation	68.355 CY	58.59 CY

Item	Description	Old Quantity	New Quantity
278-79800000000-N-SP	Relocate RWIS Assembly-Change to **Remove** RWIS Assembly	1 EA	1 EA
286-0000400000-N-801	Construction Surveying	**NEW ITEM**	Lump Sum
287-1330000000-E-607	Incidental Milling	**NEW ITEM**	201 SY
288-1891000000-E-SP	Diamond Grinding PCC Pavement	**NEW ITEM**	12,850 SY
289-2591000000-E-848	4" Concrete Sidewalk	**NEW ITEM**	2,700 SY
290-3565000000-E-866	Double Gates, 47" High, 6' Wide, 12' Opening	**NEW ITEM**	1 EA
291-5606000000-E-1515	2" Blow Off	**NEW ITEM**	1 EA
292-8175000000-E-420	Class AA Concrete (Bridge)	**NEW ITEM**	36 CY
293-8224000000-E-425	Epoxy Coated Reinforcing Steel (Bridge)	**NEW ITEM**	1,951 LB
294-8692000000-N-SP	Foam Joint Seal	**NEW ITEM**	Lump Sum

The Contractor's bid must be based on these revised pay item quantities and include the new pay items.

The Expedite File has been updated to reflect these revisions. Please download the Expedite Addendum File and follow the instructions for applying the addendum. Bid Express will not accept your bid unless the addendum has been applied.

The contract will be prepared accordingly.

Sincerely,

DocuSigned by:
Ronald E. Davenport, Jr.
F81B6038A47A442...

Ronald. E. Davenport, Jr., PE
State Contract Officer

RED/jag
Attachments

cc:
Mr. Lamar Sylvester, PE
Mr. Joey Hopkins, PE
Mr. Chris Werner, PE
Mr. Beau Memory
Mr. Ken Kennedy, PE
Mr. Ray Arnold, PE
Mr. Jon Weathersbee, PE
Mr. Dennis Jernigan, PE
Mr. Mike Gwyn
Ms. Penny Higgins
Mr. Mitchell Dixon
Ms. Jaci Kincaide
Ms. Lori Strickland
Project File (2)

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

PROPOSAL

INCLUDES ADDENDUM No. 1 DATED 12-12-2017

DATE AND TIME OF BID OPENING: **DECEMBER 19, 2017 AT 2:00 PM**

CONTRACT ID	C203991
WBS	45429.3.3

FEDERAL-AID NO.	STPDA-0540(39)
COUNTY	WAKE
T.I.P. NO.	U-5315A, U-5315B
MILES	0.492
ROUTE NO.	
LOCATION	MORRISVILLE PKWY EXT FROM WEST OF HIGHCROFT DR TO EAST OF MILLS PARK DR IN CARY.
TYPE OF WORK	GRADING, DRAINAGE, PAVING, SIGNING, TOLL INFRASTRUCTURE, & CULVERT.

NOTICE:

ALL BIDDERS SHALL COMPLY WITH ALL APPLICABLE LAWS REGULATING THE PRACTICE OF GENERAL CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA WHICH REQUIRES THE BIDDER TO BE LICENSED BY THE N.C. LICENSING BOARD FOR CONTRACTORS WHEN BIDDING ON ANY NON-FEDERAL AID PROJECT WHERE THE BID IS $30,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD. BIDDERS SHALL ALSO COMPLY WITH ALL OTHER APPLICABLE LAWS REGULATING THE PRACTICES OF ELECTRICAL, PLUMBING, HEATING AND AIR CONDITIONING AND REFRIGERATION CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA. NOTWITHSTANDING THESE LIMITATIONS ON BIDDING, THE BIDDER WHO IS AWARDED ANY FEDERAL - AID FUNDED PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING.

BIDS WILL BE RECEIVED AS SHOWN BELOW:

THIS IS A ROADWAY & CULVERT PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

STANDARD SPECIAL PROVISIONS

UNIT PROJECT SPECIAL PROVISIONS

PROPOSAL ITEM SHEET

ITEM SHEET(S) (TAN SHEETS)

INTERMEDIATE CONTRACT TIME NUMBER 5 AND LIQUIDATED DAMAGES:
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Phase II, Steps #6 and #7** as shown on Sheets **TMP-2, and TMP-16 thru TMP-20** and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is the date the Contractor elects to begin the work.

The completion date for this intermediate contract time is the date which is **One Hundred Twenty (120)** consecutive calendar days after the date of availability.

The liquidated damages are **Two Thousand Five Hundred Dollars ($ 2,500.00)** per calendar day.

INTERMEDIATE CONTRACT TIME NUMBER 6 AND LIQUIDATED DAMAGES:

For Failure to Perform the Switchover of All ITS Devices and Toll Network Communications to proposed Trunkline

Before the commencement of significant earthwork in the vicinity of the existing Trunkline, the Contractor shall construct the proposed Trunkline and splice into existing Trunkline as shown in the plans. The Contractor shall perform all splicing and testing required to re-establish all ITS and toll network communications along the proposed Trunkline, as shown in the Splicing Details.

The Contractor shall perform the switchover within a single forty-eight (48) hour period that starts no earlier than 12:01 a.m. Saturday and ends no later than 11:59 p.m. Sunday.

Prior to beginning the switchover, the Contractor shall coordinate with, and obtain approval from, the Toll System Integrator (TSI) to ensure connection to the routing switches provided by the TSI are ready for switchover. The Contractor shall inform the Engineer at least two weeks in advance of when the work will be performed.

The liquidated damages are **Two Thousand Five Hundred Dollars ($ 2,500.00)** per occurrence, per twenty-four **(24)** hour period or any portion thereof, until corrected.

INTERMEDIATE CONTRACT TIME NUMBER 7 AND LIQUIDATED DAMAGES:

For Failure to Maintain and / or Repair toll / ITS Devices and Restore Communication

The Contractor shall ensure that an IMSA certified, or equivalent, Level II traffic qualified technician is standing by to provide emergency maintenance services whenever any electrical work is performed. Standby status shall be defined as being able to arrive, fully equipped, at the work site within two hours ready to provide maintenance services.

The Contractor shall provide the Engineer with the name, office telephone number, and cellular (mobile) telephone number of the supervisory employee who will be responsible for maintenance and repair of equipment during all hours.

DIAMOND GRINDING CONCRETE PAVEMENT:

(4-15-08) (Rev 08-16-16) SPI 7-9A

Description

Perform the work covered by this provision including but not limited to diamond grinding and regrinding concrete pavement to meet final surface acceptable smoothness requirements detailed in Article 710-7, selecting diamond tipped saw blades and configuration of cutting head; continual removal of residual slurry from pavement and disposal; furnishing all labor, materials, supplies, tools, equipment and incidentals as necessary. Perform this work on all new concrete pavement or as directed by the Engineer.

Prior to beginning any diamond grinding operations, schedule a pre-grind meeting with grinding subcontractor, Division Construction Engineer, Project Engineer, Area Roadway Engineer, State Pavement Construction Engineer, representatives from the Roadside Environmental Unit and the Materials and Tests Unit.

Equipment

Use equipment with diamond tipped saw blades gang mounted on a power driven self-propelled machine with a minimum wheel base length of 15 feet that is specifically designed to smooth and texture Portland Cement Concrete pavement. Utilize equipment that does not cause ravels; aggregate fracture; spalls or disturbance to the longitudinal or transverse joints; or damage and/or strain to the underlying surface of the pavement. Should any of the above problems occur immediately suspend operations.

Provide a minimum 3 feet wide grinding head with 50 to 60 evenly spaced grooves per foot. Prior to designing the grinding head, evaluate the aggregate hardness of the concrete pavement and select the appropriate diamond size, diamond concentration and bond hardness for the individual saw blades.

Provide vacuuming equipment to continuously remove slurry residue and excess water from the pavement as part of the grinding operation. Transport slurry material off-site and dispose of this material appropriately. Do not allow the slurry material to flow into a travel lane occupied by traffic or into any drainage facility.

Method of Construction

Grind the pavement surface to a uniform appearance with a high skid resistant longitudinal corduroy type texture. Provide grooves between 0.09 and 0.15 inches wide with the land area between the grooves between 0.06 and 0.13 inches wide. Ensure a ridge peak of approximately 0.0625 inches higher than the bottom of the grooves.

Begin and end diamond grinding at lines normal to the pavement centerline. Grind only in the longitudinal direction. All grooves and adjacent passes shall be parallel to each other with no variation. Completely lap adjacent passes with no unground surface remaining between passes and no overlap of more than 1½ inches. Adjacent passes shall be within 1/8 inch of the same height as measured with a 3 foot straightedge. Maintain positive cross-slope drainage for the duration of the grinding operation.

Grind all travel lanes to include auxiliary lanes, ramps and loops with not less than 98 percent of the specified surface being textured by grinding. Grinding of the bridge decks and concrete shoulders will not be required. Remove a minimum 0.0625 inches at all locations except dips. Extra grinding to eliminate minor depressions is not required. It is anticipated that extra grinding will be required on the high side of existing faults in the pavement. There shall be no ridge between lanes. In a separate operation, transition the grinding of any remaining ridges greater than 1/8 inch in height on the outside edge next to the shoulder or at a tie to an existing facility to the satisfaction of the Engineer.

Final surface testing is required on this project in accordance with Article 710-7 of the *2012 Standard Specifications.*

Disposal of Residual Slurry

Diamond grinding slurry disposal shall be in accordance with the Statewide Permit for Land Application of Diamond Grinding Slurry (DGS), Permit No. WQ0035749 dated June 3, 2014. Submit a slurry disposal plan to the Engineer detailing method of handling and disposing of slurry from the diamond grinding operation a minimum of 60 days prior to beginning the diamond grinding operation. Engineer shall review the slurry disposal plan. Plan must be accepted prior to beginning the diamond grinding operation. DGS shall be transported beyond the project limits to an approved permitted site. No additional payment will be made for transporting this slurry material for disposal.

Disposal options are:

(A) Concrete grinding residues (CGR) that are not liquid and otherwise not hazardous may be disposed of in a municipal solid waste landfill or utilized as an alternate daily cover (ADC). The sanitary landfill operator that requests the use of this material as ADC shall contact the N.C. Department of Environmental Quality (DEQ) inspector for approval. The definition of a solid, for solid waste disposal purposes, is a material that passes a Paint Filter test. CGR's may be eligible for disposal or use as ADC in an unlined sanitary landfill or a construction and demolition debris landfill. If CGR is disposed in an unlined-landfill, the Contractor shall submit samples of the material to a certified laboratory to verify that the CGR does not exceed Resource Conservation and Recovery Act (RCRA) regulatory limits for the following metals: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver.

(B) Upon the Engineer's approval, dewatered CGR's may be beneficially reused within the DOT project boundary or areas under DOT control at agronomic rates suitable for the establishment of vegetation. Dewatered CGR's that meet the solid waste definition for inert debris, North Carolina General Statute 130A-290(a)(14), may also be used within the roadbed at rates approved by the Engineer for soil modification purposes. If CGR is disposed as beneficial reuse within DOT project boundaries, the Contractor shall submit samples of the material to a certified laboratory to verify that the CGR does not exceed RCRA regulatory limits for the following metals: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver.

To prevent the migration of any direct discharge from the diamond grinding machine DGS from entering a drainage inlet or structure, the contractor shall install coir fiber wattles and silt fence at the direction of the Engineer. Silt Fence shall be installed in accordance with Section 1605 of the NCDOT *2012 Standard Specifications*

Measurement and Payment

The quantity of *Diamond Grinding PCC Pavement* to be paid for will be the actual number of square yards of pavement which has been satisfactorily diamond ground, measured along the final top surface of the pavement. No separate payment will be made for any overlapping, regrinding, or for extra grinding on the high side of existing faults.

Payment will be full compensation for the work, including but is not limited to grinding, disposal of slurry, final surface testing, furnishing all materials, equipment, labor and all incidentals necessary to satisfactorily complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Diamond Grinding PCC Pavement	Square Yard

install anchor rod assemblies for high mount foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

Install PC18 junction box within 10' of pole foundation. Junction box shall be used as a tee point for feeder circuitry and conductors, and as housing for the pole ground rod.

4.70 MEASUREMENT AND PAYMENT

High Mount Foundations will be measured and paid in cubic yards. High mount standard foundations will be measured as the cubic yards of concrete shown on Standard Drawing No. 1402.01 for the high mount height and wind zone shown in the plans. All other high mount foundations will be measured as the cubic yards of foundation concrete for drilled piers, footings and pedestals shown on the accepted submittals. The contract unit price for *High Mount Foundations* will be full compensation for providing labor, tools, equipment and foundation materials, stabilizing or shoring excavations and supplying concrete, reinforcing steel, conduit, anchor rod assemblies and any incidentals necessary to construct high mount foundations. Subsurface investigations and high mount foundation designs required by the Engineer will be paid as extra work in accordance with Article 104-7 of the *2012 Standard Specifications*.

Payment will be made under:

High Mount Foundations.....Cubic Yard

5.00 ELECTRICAL JUNCTION BOXES

5.10 DESCRIPTION

Same as Article 1411-1.

5.20 MATERIALS

Same as Article 1411-2, except modify referenced Article 1091-5 as follows:

- Page 10-202, revise paragraph starting on line 9 to read "Provide polymer concrete (PC) boxes which have bolted covers and open bottoms. Provide vertical extensions of 6" to 12" as required by project special provisions. Provide an 18" reinforced concrete collar, minimum 4" thick, on all junction boxes, unless boxes are on slopes of 3:1 or steeper. Avoid placing junction boxes on such slopes wherever possible."
- Page 10-202, revise sentence beginning on line 14 to read "Other thermoplastic materials may be used for components which are not normally exposed to sunlight."

5.30 CONSTRUCTION METHODS

Same as Article 1411-3, except add the following:

Install a High Mast Junction Box (HMJB) meeting the requirements of this section and sized as shown in the plans within ten feet (10') of each high mast foundation. Position the junction box

for best routing of underground circuitry. The junction box is used as a tee point for circuitry to the high mast standard.

For single arm or twin arm light standards installed in grassy areas, provide a light standard junction box (LSJB) meeting the requirements of this section and sized as shown in the plans. Install the LSJB within five feet (5') of the standard foundation. The LSJB shall be placed parallel to, or behind the light standard foundation, as viewed from the roadway. The LSJB is used as a tee point for circuitry.

Install a ground rod in the HMJB and the LSJB. Permanently attach grounding conductor from light standard to ground rod in junction box via exothermic weld.

5.40 MEASUREMENT AND PAYMENT

Electrical Junction Boxes ____ will be measured and paid as the actual number of the appropriate type and size junction boxes installed and accepted. Payment for the conduit, duct and wiring will be paid under other contract items. Items used for splicing are incidental to the junction boxes. The 18" reinforced concrete collar is incidental to each junction box.

Payment will be made under:

Electrical Junction Boxes _____..... Each

6.00 LIGHT STANDARDS

6.10 DESCRIPTION

Furnish and install light standards less than 55 ft. high complete with bracket arm(s), when required, and an AASHTO approved impact attenuation device (slip base, frangible base adapter, breakaway base) as shown on the plans.

6.20 MATERIALS

Same as Article 1404-2, except modified as follows:

- Remove the words 'ellipsoidal shaped' from paragraph two.
- Replace paragraph 12 to read "Luminaires may be either direct pole mounted or mounted to a bracket arm. Where bracket arms are required, use bracket arms for each standard which are the length shown in the plans and of the same material as the standard. For direct pole mounted luminaires, minimum setback distances shown in the *2012 Roadway Standard Drawings* must be maintained."

6.30 CONSTRUCTION METHODS

Same as Article 1404-3.

6.40 MEASUREMENT AND PAYMENT

E. Loop Splice Boxes

Provide loop splice boxes and covers with minimum inside dimensions of 36"(l) x 17"(w) x 30"(d) that meet or exceed the Tier 15 requirements of ANSI/SCTE 77. Provide certification that testing methods are compliant with ANSI/SCTE 77.

F. Custom Splice Boxes

Provide larger boxes for specialized use near AET Toll Zones that meet or exceed the Tier 15 requirements of ANSI/SCTE 77. Provide certification that testing methods are compliant with ANSI/SCTE 77.

3.3.CONSTRUCTION METHODS

Comply with Article 1411-3 of the 2012 *Standard Specifications for Roads and Structures*, except as follows:

- Install junction boxes flush with finished grade. Do not install sealant compound between junction boxes and covers.
- Install junction boxes where underground splicing of electrical cable is necessary and where transitioning from below ground to above ground installation or vice-versa.
- Install oversized heavy-duty junction boxes in underground fiber-optic communications cable runs at maximum intervals of 1500 feet for boxes containing fiber-optic cable except those with splice enclosures.
- Install special-sized, heavy-duty junction boxes at all underground fiber-optic splice enclosure locations.
- Install loop splice boxes in AET Toll Zones as shown in the NCTA AET Standard Drawings.
- Route the black and orange conduits into the ITS junction box. Route the white and blue conduit into the Tolls junction box.
- Mark the "Tolls" junction box with a blue plastic disc similarly in size and material to those used at other such boxes on the Triangle Expressway (Toll NC 540).
- Install 18" reinforced concrete collars a minimum of 4" thick around all AET and ITS junction boxes.

3.4.MEASUREMENT AND PAYMENT

Comply with Subarticle 1716-4 of the 2012 *Standard Specifications for Roads and Structures* except for the following changes:

No measurement will be made of reinforced concrete collar, reinforcing steel, or any other materials or labor associated with the construction of reinforced concrete collars around junction boxes as this will be incidental to furnishing and installing junction boxes.

Develop a cable-splicing plan to maximize cable performance and minimize the quantity of cable.

Install underground enclosures with 50 feet of slack cable from each trunk cable entering the enclosure to allow enclosure to be taken out of the special sized heavy-duty junction boxes and extended into a splicing vehicle.

For underground, special-sized heavy duty and junction box facility installations, place the enclosure along with required spare cables in the facility in a neat and workmanship like manner. Neatly coil the spare cable in the special-sized heavy-duty junction boxes. In the AET Toll Zone Vaults, neatly coil the spare cable and secure with tie wraps to the communications rack or cable trays.

6.4.MEASUREMENT AND PAYMENT

Comply with Subarticle 1731-4 of the 2012 *Standard Specifications for Roads and Structures.*

7. ELECTRICAL SERVICE

7.1.DESCRIPTION

Install new electrical service to new ITS cabinets and devices as indicated in the plans for CCTV-8A and MVD-76. MVD-73 and MVD-74 will be powered by the new electrical service at CCVT-8A. MVD-76 will be powered by the new electrical service at MVD-76. Relocate the existing electrical service to the new CCTV-8 site. All new electrical services within the NCDOT or NCTA rights of way shall be underground with pedestal-mounted assemblies, as shown in the ITS Standard Details.

7.2.MATERIALS

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL by the date of equipment installation.

Provide UL-listed 1-inch Schedule 80 conduit for underground runs. If electrical conduit shares a trench with fiber-optic conduit, use conduit color other than black, orange, blue or white.

Provide all materials necessary to form a complete electrical service assembly as shown in 2012 *Roadway Standard Drawing* No. 1700.01, "Electrical Service Options".

Provide an external electrical service disconnect at each new ITS device cabinet location. Furnish external electrical service disconnects with a minimum of a double pole 50 ampere circuit breaker with a minimum of 10,000 RMS symmetrical amperes short circuit current rating in a lockable NEMA 3R enclosure. Ensure service disconnects are listed as meeting UL Standard UL-489 and marked as being suitable for use as service equipment. Fabricate enclosure from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum

Provide a video splitter to provide to the video encoder and the video monitor port simultaneously. The video cables shall interface with the CCTV camera cabinet test point connection and be fitted for interconnection to a BNC receptacle.

Provide a switch for selecting local camera PTZ control. Provide a communication cable for connection to a typical laptop and video monitor for future maintenance activities. The data cable shall consist of an integral USB to RS-232/422 converter as required to support the CCTV camera protocol and shall be compatible with the CCTV camera assembly. The data cable shall plug into the test point connector as provided in the cabinet and into a typical laptop USB data port. Two sets of cables shall be provided; two for data and two for video.

Mount the digital video encoder in the 19" equipment rack inside the cabinet in accordance with the "Central Video Equipment" section of the Special Provisions.

8.4.MEASUREMENT AND PAYMENT

Cabinet (___, Pole Mounted) will be measured and paid as the actual number of each type of cabinets of each type that are furnished, installed, and accepted, subject to the following conditions: 90% of the payment will be made upon acceptance of the unit; 10% of the payment will be made following final acceptance of the integrated system (including completion of the observation period).

No measurement will be made for grounding systems or any hardware and fasteners required for mounting cabinets to poles as these items will be considered incidental to the cabinet.

No measurement will be made of sealing conduits with duct plugs, mechanical sealing devices and duct and conduit sealer as such work will be considered incidental to furnishing and installing cabinets.

No measurement will be made of collecting and recording GPS coordinates for cabinets and junction boxes and compiling this data in the prescribed Microsoft Excel® spreadsheet as such work will be considered incidental to installing cabinets.

Payment will be made under:

CABINET (TYPE 5052-H32 ALUM. NEMA 3S, POLE MOUNTED) ..... Each

CABINET (TYPE 336, POLE MOUNTED) ..... Each

9. METAL CCTV CAMERA AND MVDS POLES

9.1.GENERAL

Furnish and install new MVDS poles, CCTV poles with lowering devices, grounding systems, and all necessary hardware. Relocate existing CCTV-8 pole with lowering device. The work covered by the Special Provision includes requirements for the design, fabrication, and installation of custom / site specifically designed CCTV and MVDS poles and associated foundations. The minimum CCTV camera mounting height shall be 45' above the adjacent roadway whether it is

the mainline, ramp or crossing roadway, whichever is higher. The minimum mounting height and resultant pole length of the MVDS above the roadway edge of pavement shall be established by the manufacturer's recommended guidelines. For cases where the pole location is well above the grade of the roadway, a shorter pole will be allowed if the Contractor documents there will be no loss of functionality or intended field of view.

Remove the existing CCTV-8 pole foundations, and cut the existing conduits below final grade.

The Contractor may use NCDOT's standard strain poles and foundations for the CCTV camera and MVDS poles or they may custom design the poles and foundations using the design procedures described in this Special Provision. Screw, auger or helix pole foundations shall not be used for CCTV camera poles.

Provide MVDS poles that contain no guy assemblies, struts, or stay braces. Provide designs of completed assemblies with hardware that equals or exceeds the requirements of the 6th Edition of the 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals", including the latest interim specifications. Provide assemblies with a round cross-sectional design.

Ensure that materials and construction are in accordance with Section 12 of the "Project Special Provisions for Signals and Intelligent Transportation Systems". Ignore references to mast-arm poles and traffic signal related equipment. Replace references to "signal poles" with "CCTV camera and MVDS poles".

9.2.MATERIALS

A. General

Furnish poles and foundations that meet or exceed the following functional requirements with all CCTV camera and / or MVDS units, power meter, service disconnect, and all equipment cabinets attached and all risers, condulets, and weather head accessories in place:

- Maximum deflection at top of pole in 30 mph, non-gusting wind: one inch
- Ultimate load: 100 mph wind with a 30% gust factor

Furnish poles and foundations that sustain the dead load of all equipment attached to the pole with a safety factor of 1.65.

Furnish MVDS poles that when erected in foundation and completely installed are at a minimum height as recommended by the MVDS manufacturer.

B. Metal Pole

Design poles according to the ITS Standard Details.

Furnish hot-dipped galvanized steel poles to mount CCTV cameras / MVDS units and equipment cabinets that meet or exceed the requirements of the 2012 *Standard Specifications for Roads and Structures,* unless otherwise noted in the ITS Standard Details or the Special Provisions.

15. RELOCATION OF EXISTING ITS DEVICES

15.1. DESCRIPTION

Relocate CCTV-8 as shown on the plans. If cables and connectors are damaged during dismantling and relocating CCTV-8, the contractor must replace damaged equipment with new equipment at no additional cost to the Department.

CCTV-8

Dismantle and relocate one existing CCTV camera in accordance with these Project Special Provisions and as indicated in the Plans. Use the existing metal pole, pole mounted equipment cabinet and all existing equipment contained inside the equipment cabinet.

15.2. MATERIALS

GENERAL

Install all necessary cable, connectors and incidental hardware to make a complete and operable system. Reuse all existing hardware for attaching ITS devices to their pole/structure. All equipment on the pole/structure must be protected by grounded metal oxide varistors connecting each power and control conductor to ground as outlined elsewhere in these Special Provisions.

15.3. CONSTRUCTION METHODS

CCTV-8

Before significant construction starts in proximity to the existing CCTV-8, the Contractor shall relocate the CCTV-8 camera, pole, cabinet, and ancillary equipment to a new foundation at the location indicated in the Plans. After all junction boxes, conduits, and fiber-optic cable has been installed, the Contractor shall perform the switchover of the CCTV assembly with a 48-hour period that starts no earlier than midnight Friday and ends no later than midnight Sunday. The Contractor shall coordinate the switchover with the Department and provide a minimum of 2 weeks' notice for performing the switchover work.

Ground all equipment as called for in the Standard Specifications, these Special Provisions, and NCTA grounding details. Install surge protectors on all ungrounded conductors entering the CCTV enclosure. House the protectors in the CCTV equipment cabinet in a manner approved by the Engineer. The air terminal ground wire must not pass through this cabinet.

15.4. MEASUREMENT AND PAYMENT

Relocate CCTV assembly will be measured and paid in actual number of CCTV assemblies relocated, installed, integrated, and accepted. No separate measurement will be made for cabling, connectors, CCTV camera attachment assemblies, relocation of the existing field equipment cabinet, conduit, condulets, grounding equipment, surge protectors, or any other equipment or labor required to relocate and install the CCTV assembly and integrate it with the existing CCTV camera system as these will be considered incidental to relocating the CCTB assembly.

Payment will be made under:

Relocate CCTV Assembly ..... Each

16. REMOVAL OF EXISTING ITS DEVICES

16.1. DESCRIPTION

Remove RWIS as shown on the plans.

RWIS

Disconnect and remove one existing RWIS assembly in accordance with these Project Special Provisions and as indicated in the Plans.

16.2. MATERIALS

GENERAL

Disconnect, remove, and dispose of RWIS assembly and all associated equipment including hardware, pole, cable, connectors, incidental hardware, and electrical service.

16.3. CONSTRUCTION METHODS

RWIS

Before significant construction starts in proximity to the existing RWIS, the Contractor shall disconnect, remove, and dispose of the RWIS equipment, pole, cabinet, ancillary equipment, and electrical service as indicated in the Plans.

16.4. MEASUREMENT AND PAYMENT

Remove RWIS assembly will be measured and paid in actual number of RWIS assemblies disconnected, removed, and disposed. No separate measurement will be made for removal of associated cabling, connectors, cabinets, conduit, condulets, electrical service, grounding equipment,

surge protectors, or any other equipment or labor required to remove and dispose of the RWIS assembly as this will be considered incidental to removing the RWIS assembly.

Payment will be made under:

Remove RWIS Assembly ..... Each

17. TESTING AND ACCEPTANCE

17.1. GENERAL

Identify the test organization including the roles and responsibilities of the quality assurance organization. For each piece of equipment that requires testing, a test plan shall delineate the following:

- Test procedures with test values and desired outcomes
- Submittal schedule of test procedures
- Start time of each level of testing
- Test duration including any re-tests that are required or anticipated
- Submittal of the completed and signed off test report
- Revisions to the test plan shall be provided to the Department monthly

All testing shall be performed by the Contractor and will be observed by the Engineer. The Engineer may perform additional testing at any time during the project.

Conduct and successfully complete the following progressive series of tests before acceptance: factory acceptance testing, field demonstration test prior to installation, installed standalone device tests, system test of the network hardware, management software and an observation period. Develop a comprehensive series of test plans for each device to determine the equipment was correctly installed and meets the requirements of materials, workmanship, performance, and functionality required in the plans and these Special Provisions. The test plans shall describe the functions to be tested, purpose of test, setup requirements, procedures to be followed, any inputs and expected outputs for each test, criteria for pass / fail and any required tools or test equipment. Any software testers shall be pre-approved by the Department.

Develop as part of the test plan a traceability matrix of all the individual subsystem functional requirements to be used to cross-reference each planned test to a specific contract requirement to be verified. This Test Evaluation / Traceability Matrix shall be used by the Engineer to crosscheck the functional requirements and the results.

A key element of test plans, where appropriate, shall be the introduction of forced errors into the functional test. The test plan shall check the actual result of the forced error against the

2.8.AET Toll Zone Conduit and Junction Boxes

Construct required conduits and cabling infrastructure necessary to establish the communications path between fiber-optic trunk line, AET Toll Zone Vaults, gantries, cabinets, and junction boxes. Install the number and size of conduits, boxes and related equipment specified in the AET plans and the NCTA AET Standard Drawings.

Ensure junction boxes are provided such that the last set of junction boxes before a conduit route enters a vault are not placed higher in elevation than the vault slab itself. This will prevent water-filled boxes from draining into the vault.

Provide an 18" reinforced concrete collar, minimum 4" thick, on all junction boxes, unless boxes are on slopes of 3:1 or steeper. Avoid placing junction boxes on such slopes wherever possible.

Install 1" conduit stubouts from loop box to paved shoulder in accordance with the Plans.

Coordinate with the Department throughout the conduit and junction box installation.

Provide separation between power and communications conduit as specified in the NCTA AET Standard Drawings.

Provide underground concrete-encased conduit duct bank when crossing new roadways. Install conduit duct banks such that there is a minimum of 18 inches of cover from pavement subgrade to the top of the duct bank. For duct bank crossings of existing roads, bore or open-cut as site conditions dictate. Trenched conduit, directional bores or jack and bore shall be in accordance with the 2012 *Standard Specifications for Roads and Structures*.

Terminate conduit through the floor slab of AET Toll Zone Vaults above finished floor elevation.

Furnish conduits stubbed out at all concrete pads with plastic bushings (or comparable material) to prevent cables from being damaged when being pulled through conduits or shifting during use. Clearly label each end of the conduits and include conduit plugs, pull line in each conduit, and tracer wire (if needed) per Article 1091-3 of the 2012 *Standard Specifications for Roads and Structures*.

Provide galvanized metallic conduit in above ground installations.

2.9.Electrical

Provide electrical service to the AET Toll Zone Vault.

- Electrical service to the AET Toll Zone Vault shall be 120/240V single-phase service.

- Provide an operating voltage of 120/240V, at a minimum, 200 amps, unless otherwise approved.
- Provide electrical power panel in a conventional NEMA 1 surface mount panel board enclosure, which supplies power to the electronic toll equipment.
- Provide, at a minimum, a 200 amp Main Breaker with a minimum of 24 circuits.
- Provide, at a minimum, one (1) two-pole breaker for UPS, coordinated with the TSI and 20% installed spare breakers at 20 amps rated, at a minimum, 18K AIC.
- Provide a main ground bus bar connected to the building grounding system
- Provide a Main Distribution Panel at the AET Toll Zone T16 (Vault) to power AET Toll Zone T15.

Provide electrical subpanels at AET Toll Zone T15 site as shown in the AET Standard Drawings. Run UPS and raw power electrical conductors from AET Toll Zone T16 to AET Toll Zone T15 as shown in the ITS Plans. One 350 MCM sized 4-Wire Conductor shall be installed for raw power and shall be terminated in the subpanel. One 350 MCM sized 4-Wire Conductor shall be installed for UPS power, coiled at both ends and not terminated in the subpanel.

Coordinate with the TSI and the Department in the design of the electrical loading, ampere capacity rating, circuit poles, etc. for the final power panel design.

Coordinate with the TSI and the Department to establish electrical power and communication / data service requirements for each toll gantry.

Provide building electrical power to lights, switches, receptacles, HVAC system and other infrastructure items for operating and managing the AET Toll Zone Vault.

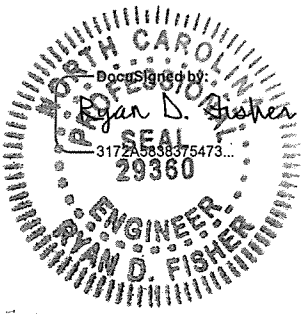
Provide the AET Toll Zone Vaults with 125 volt rated duplex receptacles at approximately 10-foot centers at 18 inches above finished floor, as shown on the NCTA AET Standard Drawings. (Field-adjust, as needed, to accommodate the conduit risers)

Coordinate with the local utility company(ies), make application(s) in the name of NC Turnpike Authority, and pay all deposit fees to provide necessary electrical and communication services for the AET Toll Zones. The Contractor shall be responsible for all application and connection fees. The Contractor shall be responsible for any utility service installation from the power meter to the AET Toll Zone Vaults' power panels. The Contractor will not be responsible for paying the monthly power bills.

Install concrete equipment pads as shown in the AET Plans.

2.10. Grounding

Provide a master grounding system at all new and revised AET Toll Zone Vault electrical service points, unless otherwise specified. In addition to National Electrical Code (latest edition) requirements, test grounding electrode resistance at connection point to electrical service ground



12/11/2017

THERMAL SPRAYED COATINGS (METALLIZATION) (9-30-11)

1.0 DESCRIPTION

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces as specified herein when called for on the plans or by other Special Provisions, or when otherwise approved by the Engineer in accordance with the SSPC-CS 23.00/AWS C2.23/NACE No. 12 Specification. Only Arc Sprayed application methods are used to apply TSC coatings, the Engineer must approve other methods of application.

2.0 QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the following requirements:

1. The capability of blast cleaning steel surfaces to SSPC SP-5 and SP-10 Finishes.

2. Employ Spray Operator(s) qualified in accordance with AWS C.16/C2.16M2002 and Quality Control Inspector(s) who have documented training in the applicable test procedures of ASTM D-3276 and SSPC-CS 23.00.

A summary of the contractor's related work experience and the documents verifying each Spray Operator's and Quality Control Inspector's qualifications are submitted to the Engineer before any work is performed.

3.0 MATERIALS

Provide wire in accordance with the metallizing equipment manufacturer's recommendations. Use the wire alloy specified on the plans which meets the requirements in Annex C of the SSPC-CS 23.00 Specification. Have the contractor provide a certified analysis (NCDOT Type 2 Certification) for each lot of wire material.

Apply an approved sealer to all metallized surfaces in accordance with Section 9 of SSPC-CS 23. The sealer must either meet SSPC Paint 27 or is an alternate approved by the Engineer.

4.0 SURFACE PREPARATION AND TSC APPLICATION

Grind flame cut edges to remove the carbonized surface prior to blasting. Bevel all flame cut edges in accordance with Article 442-10(D) regardless of included angle. Blast clean surfaces to be metallized with grit or mineral abrasive in accordance with Steel Structures Painting Council SSPC SP-5/10(as specified) to impart an angular surface profile of 2.5 - 4.0 mils. Surface preparation hold times are in accordance with Section 7.32 of SSPC-CS 23. If flash rusting occurs prior to metallizing, blast clean the metal surface again. Apply the thermal sprayed coating only when the surface temperature of the steel is at least 5°F above the dew point.

At the beginning of each work period or shift, conduct bend tests in accordance with Section 6.5 of SSPC-CS 23.00. Any disbonding or delamination of the coating that exposes the substrate requires corrective action, additional testing, and the Engineer's approval before resuming the metallizing process.

Apply TSC with the alloy to the thickness specified on the plans or as provided in the table below. All spot results (the average of 3 to 5 readings) must meet the minimum requirement. No additional tolerance (as allowed by SSPC PA-2) is permitted. (For Steel Beams: For pieces with less than 200 ft^2 measure 2 spots/surface per piece and for pieces greater than 200 ft^2 add 1 additional spots/surface for each 500 ft^2).

Application	Thickness	Alloy	Seal Coat
Pot Bearings	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil
Armored Joint Angles	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil
Modular Joints	8 mil	99.99% Zn (W-Zn-1)	0.5 mil
Expansion Joint Seals	8 mil	99.99% Zn (W-Zn-1)	0.5 mil
Optional Disc Bearings	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil

When noted on the plans or as specified in the above chart, apply the sealer to all metallized surfaces in accordance with the manufacturer's recommendations and these provisions. Apply the seal coat only when the air temperature is above 40°F and the surface temperature of the steel is at least 5°F above the dew point. If the sealer is not applied within eight hours after the final application of TSC, the applicator verifies acceptable TSC surfaces and obtains approval from the Engineer before applying the sealer.

5.0 INSPECTION FREQUENCY

The TSC Contractor must conduct the following tests at the specified frequency and the results documented in a format approved by the Engineer.

Test/Standard	Location	Frequency	Specification
Ambient Conditions	Site	Each Process	5°F above the dew point
Abrasive Properties	Site	Each Day	Size, angularity, cleanliness
Surface Cleanliness SSPC Vis 1	All Surfaces	Visual All Surfaces	SSPC-SP-10 Atmospheric Service SSPC-SP - 5 Immersion Service
Surface Profile ASTM D-4417 Method C	Random Surfaces	3 per 500 ft^2	2.5 - 4.0 mils
Bend Test SSPC-CS 23.00	Site	5 per shift	Pass Visual
Thickness SSPC PA-2R SSPC-CS 23.00	Each Surface	Use the method in PA-2 Appendix 3 for Girders and Appendix 4 for frames and miscellaneous steel. See Note 1.	Zn - 8 mils minimum Al - 8 mils minimum Zn Al - 8 mils minimum Areas with more than twice the minimum thickness are inspected for compliance to the adhesion and cut testing requirements of this specification.
Adhesion ASTM 4541	Random Surfaces Splice Areas	1 set of 3 per 500 ft^2	Zn > 500 psi Al > 1000 psi Zn Al > 750 psi
Cut Test - SSPC-CS 23.00	Random Surfaces	3 sets of 3 per 500 ft^2	No peeling or delamination
Job Reference Std. SSPC-CS 23.00	Site	1 per job	Meets all the above requirements

6.0 REPAIRS

All Repairs are to be performed in accordance with the procedures below, depending on whether the repair surface is hidden or exposed. As an exception to the following, field welded splices on joint angles and field welding bearing plates to girders may be repaired in accordance with the procedures for hidden surfaces.

For hidden surfaces (including but not limited to interior girders, interior faces of exterior girders, and below-grade sections of piles):

1. Welding of metallized surfaces may be performed only if specifically permitted by the Engineer. Remove metallizing at the location of field welds by blast cleaning (SSPC SP-6 finish), or hand (SSPC SP-2 finish) or power tool cleaning (SSPC SP-3 finish) just prior to welding. Clean sufficiently to prevent contamination of the weld. All repairs to welded connections are metallized in accordance with SSPC CS 23.00.

2. Minor areas less than or equal to 0.1 ft^2 exposing the substrate are metallized in accordance with SSPC CS 23.00 or painted in accordance with ASTM A780, "Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings."

3. Large areas greater than 0.1 ft^2 exposing the substrate are metallized in accordance with SSPC CS 23.00.

4. Damaged (burnished) areas not exposing the substrate with less than the specified coating thickness are metallized in accordance with SSPC CS 23.00 or painted in accordance with ASTM A780, "Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings."

5. Damaged (burnished) areas not exposing the substrate with more than the specified coating thickness are not repaired.

6. Defective coating is repaired by either method 2 or 3 depending on the area of the defect.

For Exposed Surfaces (including but not limited to exterior faces of exterior girders and above-grade sections of piles):

1. Welding of metallized surfaces may be performed only if specifically permitted by the Engineer. Remove metallization at the location of field welds by blast cleaning (SSPC SP-6 finish), or hand (SSPC SP-2 finish) or power tool cleaning (SSPC SP-3 finish) just prior to welding. Clean sufficiently to prevent contamination of the weld. All repairs to welded connections are metallized in accordance with SSPC CS 23.00.

2. All areas exposing the substrate are metallized in accordance with SSPC CS 23.00

3. Defective coating is repaired by either method 2 or 3 depending on the area of the defect.

7.0 Twelve Month Observation Period

The contractor maintains responsibility for the coating system for a twelve (12) month observation period beginning upon the satisfactory completion of all the work required in the plans or as directed by the engineer. The contractor must guarantee the coating system under the payment and performance bond (refer to Article 109-10). To successfully complete the observation period, the coating system must meet the following requirements after twelve(12) months service:

- No visible rust, contamination or application defect is observed in any coated area.
- Painted surfaces have a uniform color and gloss.
- Surfaces have an adhesion of no less than 500 psi when tested in accordance with ASTM D-4541.

8.0 Basis of Payment

The contract price bid for the bridge component to which the coating is applied will be full compensation for the thermal sprayed coating.

FOAM JOINT SEALS (9-27-12)

1.0 SEALS

Use preformed seals compatible with concrete and resistant to abrasion, oxidation, oils, gasoline, salt and other materials that are spilled on or applied to the surface. Use a resilient, UV stable, preformed, impermeable, flexible, expansion joint seal. The joint seal shall consist of low-density, closed cell, cross-linked polyethylene non-extrudable, foam. The joint seal shall contain no EVA (Ethylene Vinyl Acetate). Cell generation shall be achieved by being physically blown using nitrogen. No chemical blowing agents shall be used in the cell generation process.

Use seals manufactured with grooves 1/8"± wide by 1/8"± deep and spaced between 1/4" and 1/2" apart along the bond surface running the length of the joint. Use seals with a depth that meets the manufacturer's recommendation, but is not less than 70% of the uncompressed width. Provide a seal designed so that, when compressed, the center portion of the top does not extend upward above the original height of the seal by more than 1/4". Provide a seal that has a working range of 30% tension and 60% compression and meets the requirements given below.

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D3575-08, Suffix T	110 – 130 psi
Compression Set	ASTM D1056 Suffix B, 2 hr recovery	10% - 16%
Water Absorption	ASTM D3575	< 0.03 lb/ft^2
Elongation at Break	ASTM D3575	180% - 210%
Tear Strength	ASTM D624 (D3575-08, Suffix G)	14 – 20 pli
Density	ASTM D3575-08, Suffix W, Method A	1.8 – 2.2 lb/ft^3
Toxicity	ISO-10993.5	Pass (not cytotoxic)

Have the top of the joint seal clearly shop marked. Inspect the joint seals upon receipt to ensure that the marks are clearly visible before installation.

2.0 BONDING ADHESIVE

Use a two component, 100% solid, modified epoxy adhesive supplied by the joint seal manufacturer that meets the requirements given below.

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D638	3000 psi (min.)
Compressive strength	ASTM D695	7000 psi (min.)
Hardness	Shore D Scale	75-85 psi
Water Absorption	ASTM D570	0.25% by weight max.
Elongation to Break	ASTM D638	5% (max.)
Bond Strength	ASTM C882	2000 psi (min.)

Use an adhesive that is workable to 40°F. When installing in ambient air or surface temperatures below 40°F or for application on moist, difficult to dry concrete surfaces, use an adhesive specified by the manufacturer of the joint seal.

3.0 SAWING THE JOINT

The joint opening shall be initially formed to the width shown on the plans including the blockout for the elastomeric concrete.

The elastomeric concrete shall have sufficient time to cure such that no damage can occur to the elastomeric concrete prior to sawing to the final width and depth as specified in the plans.

When sawing the joint to receive the foam seal, always use a rigid guide to control the saw in the desired direction. To control the saw and to produce a straight line as indicated on the plans, anchor and positively connect a template or a track to the bridge deck. Do not saw the joint by visual means such as a chalk line. Fill the holes used for holding the template or track to the deck with an approved, flowable non-shrink, non-metallic grout.

Saw cut to the desired width and depth in one or two passes of the saw by placing and spacing two metal blades on the saw shaft to the desired width for the joint opening.

The desired depth is the depth of the seal plus 1/4" above the top of the seal plus approximately 1" below the bottom of the seal. An irregular bottom of sawed joint is permitted as indicated on the plans. Grind exposed corners on saw cut edges to a 1/4" chamfer.

Saw cut a straight joint, centered over the formed opening and to the desired width specified in the plans. Prevent any chipping or damage to the sawed edges of the joint.

Remove any staining or deposited material resulting from sawing with a wet blade to the satisfaction of the Engineer.

4.0 PREPARATION OF SAWED JOINT FOR SEAL INSTALLATION

The elastomeric concrete shall cure a minimum of 24 hours prior to seal installation.

After sawing the joint, the Engineer will thoroughly inspect the sawed joint opening for spalls, popouts, cracks, etc. All necessary repairs will be made by the Contractor prior to blast cleaning and installing the seal.

Clean the joints by sandblasting with clean dry sand immediately before placing the bonding agent. Sandblast the joint opening to provide a firm, clean joint surface free of curing compound, loose material and any foreign matter. Sandblast the joint opening without causing pitting or uneven surfaces. The aggregate in the elastomeric concrete may be exposed after sandblasting.

After blasting, either brush the surface with clean brushes made of hair, bristle or fiber, blow the surface with compressed air, or vacuum the surface until all traces of blast products and abrasives are removed from the surface, pockets, and corners.

If nozzle blasting is used to clean the joint opening, use compressed air that does not contain detrimental amounts of water or oil.

Examine the blast cleaned surface and remove any traces of oil, grease or smudge deposited in the cleaning operations.

Bond the seal to the blast cleaned surface on the same day the surface is blast cleaned.

5.0 SEAL INSTALLATION

Install the joint seal according to the manufacturer's procedures and recommendations and as recommended below. Do not install the joint seal if the ambient air or surface temperature is below 45°F. Have a manufacturer's certified trained factory representative present during the installation of the first seal of the project.

Before installing the joint seal, check the uninstalled seal length to insure the seal is the same length as the deck opening. When the joint seal requires splicing, use the heat welding method by placing the joint material ends against a teflon heating iron of 425-475°F for 7 - 10 seconds, then pressing the ends together tightly. Do not test the welding until the material has completely cooled.

Begin installation by protecting the top edges of the concrete deck adjacent to the vertical walls of the joint as a means to minimize clean up. After opening both cans of the bonding agent, stir each can using separate stirring rods for each component to prevent premature curing of the bonding agent. Pour the two components, at the specified mixing ratio, into a clean mixing bucket. Mix the components with a low speed drill (400 rpm max.) until a uniform gray color is achieved without visible marbling. Apply bonding agent to both sides of the elastomeric concrete as well as both sides of the joint seal, making certain to completely fill the grooves with epoxy. With gloved hands, compress the joint seal and

with the help of a blunt probe, push the seal into the joint opening until the seal is recessed approximately 1/4" below the surface. When pushing down on the joint seal, apply pressure only in a downward direction. Do not push the joint seal into the joint opening at an angle that would stretch the material. Seals that are stretched during installation shall be removed and rejected. Once work on placing a seal begins, do not stop until it is completed. Clean the excess epoxy from the top of the joint seal immediately with a trowel. Do not use solvents or any cleaners to remove the excess epoxy from the top of the seal. Remove the protective cover at the joint edges and check for any excess epoxy on the surface. Remove excess epoxy with a trowel, the use of solvents or any cleaners will not be allowed.

The installed system shall be watertight and will be monitored until final inspection and approval. Do not place pavement markings on top of foam joint seals.

6.0 BASIS OF PAYMENT

Payment for all foam joint seals will be at the lump sum contract price bid for "Foam Joint Seals". Prices and payment will be full compensation for furnishing all material, including elastomeric concrete, labor, tools and equipment necessary for installing these units in place and accepted.

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
			ROADWAY ITEMS			
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum	L.S.	
0003	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUBBING	2 ACR		
0004	0015000000-N	205	SEALING ABANDONED WELLS	16 EA		
0005	0022000000-E	225	UNCLASSIFIED EXCAVATION	161,970 CY		
0006	0036000000-E	225	UNDERCUT EXCAVATION	2,400 CY		
0007	0106000000-E	230	BORROW EXCAVATION	78,490 CY		
0008	0134000000-E	240	DRAINAGE DITCH EXCAVATION	2,880 CY		
0009	0141000000-E	240	BERM DITCH CONSTRUCTION	2,900 LF		
0010	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	1,020 SY		
0011	0163000000-E	250	REMOVAL OF EXISTING CONCRETE PAVEMENT	7,820 SY		
0012	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	1,680 SY		
0013	0195000000-E	265	SELECT GRANULAR MATERIAL	1,600 CY		
0014	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	2,750 SY		
0015	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	610 TON		
0016	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	1,900 SY		
0017	0342000000-E	310	**" SIDE DRAIN PIPE (30")	40 LF		
0018	0343000000-E	310	15" SIDE DRAIN PIPE	32 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0019	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (30", V)	296 LF		
0020	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (42", V)	272 LF		
0021	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	2,916 LF		
0022	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	544 LF		
0023	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	168 LF		
0024	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	448 LF		
0025	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	88 LF		
0026	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	196 LF		
0027	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	720 LF		
0028	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (15", 0.064")	24 EA		
0029	0995000000-E	340	PIPE REMOVAL	552 LF		
0030	0996000000-N	350	PIPE CLEAN-OUT	5 EA		
0031	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0032	1115000000-E	SP	GEOTEXTILE FOR PAVEMENT STA-BILIZATION	9,570 SY		
0033	1121000000-E	520	AGGREGATE BASE COURSE	24,700 TON		
0034	1154000000-E	540	AGGREGATE FOR CEMENT TREATED BASE COURSE	320 TON		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0035	1165000000-E	540	PORTLAND CEMENT FOR CEMENT TREATED BASE COURSE	13 TON		
0036	1209000000-E	543	ASPHALT CURING SEAL	70 GAL		
0037	1275000000-E	600	PRIME COAT	1,840 GAL		
0038	1489000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0B	4,670 TON		
0039	1498000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B	7,090 TON		
0040	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	6,110 TON		
0041	1525000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	590 TON		
0042	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	955 TON		
0043	1847000000-E	710	***** PORT CEM CONC PAVEMENT, THROUGH LANES (WITH DOWELS) (13-1/2")	9,570 SY		
0044	1881000000-E	SP	GENERIC PAVING ITEM MILLED RUMBLE STRIPS (CONCRETE SHOULDERS)	5,390 LF		
0045	1902000000-N	710	SURFACE TESTING CONCRETE PAVEMENT	Lump Sum	L.S.	
0046	1913000000-E	720	CONCRETE SHOULDERS ADJACENT TO ****** PAVEMENT (13-1/2")	3,272 SY		
0047	2000000000-N	806	RIGHT OF WAY MARKERS	25 EA		
0048	2020000000-N	806	CONTROL OF ACCESS MARKERS	28 EA		
0049	2022000000-E	815	SUBDRAIN EXCAVATION	336 CY		
0050	2033000000-E	815	SUBDRAIN FINE AGGREGATE	252 CY		
0051	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	1,500 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0052	2070000000-N	815	SUBDRAIN PIPE OUTLET	3 EA		
0053	2077000000-E	815	6" OUTLET PIPE	18 LF		
0054	2099000000-E	816	SHOULDER DRAIN	3,700 LF		
0055	2110000000-E	816	4" SHOULDER DRAIN PIPE	3,650 LF		
0056	2121000000-E	816	4" OUTLET PIPE FOR SHOULDER DRAINS	190 LF		
0057	2132000000-N	816	CONCRETE PAD FOR SHOULDER DRAIN PIPE OUTLET	6 EA		
0058	2143000000-E	818	BLOTTING SAND	10 TON		
0059	2209000000-E	838	ENDWALLS	9 CY		
0060	2253000000-E	840	PIPE COLLARS	3.062 CY		
0061	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	50 EA		
0062	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	33.1 LF		
0063	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	6 EA		
0064	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	4 EA		
0065	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	16 EA		
0066	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	3 EA		
0067	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	1 EA		
0068	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	3 EA		
0069	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	7 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0070	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	7 EA		
0071	2396000000-N	840	FRAME WITH COVER, STD 840.54	3 EA		
0072	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	8 EA		
0073	2473000000-N	SP	GENERIC DRAINAGE ITEM TIE PROPOSED PIPE TO EXIST DRAINAGE STRUCTURE	3 EA		
0074	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	4,440 LF		
0075	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	5,380 LF		
0076	2556000000-E	846	SHOULDER BERM GUTTER	527 LF		
0077	2605000000-N	848	CONCRETE CURB RAMP	2 EA		
0078	2619000000-E	850	4" CONCRETE PAVED DITCH	70 SY		
0079	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	560 SY		
0080	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	110 LF		
0081	2738000000-E	SP	GENERIC PAVING ITEM BRICK PAVERS FOR ISLANDS AND ROUNDABOUTS	1,920 SY		
0082	2752000000-E	SP	GENERIC PAVING ITEM MEDIAN HAZARD PROTECTION	200 LF		
0083	2815000000-N	858	ADJUSTMENT OF DROP INLETS	1 EA		
0084	3000000000-N	SP	IMPACT ATTENUATOR UNIT, TYPE 350	2 EA		
0085	3030000000-E	862	STEEL BM GUARDRAIL	5,200 LF		
0086	3045000000-E	862	STEEL BM GUARDRAIL, SHOP CURVED	437.5 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0087	3105000000-N	862	STEEL BM GUARDRAIL TERMINAL SECTIONS	2 EA		
0088	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	46 EA		
0089	3210000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE CAT-1	11 EA		
0090	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	16 EA		
0091	3317000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE B-77	7 EA		
0092	3345000000-E	864	REMOVE & RESET EXISTING GUARD-RAIL	310 LF		
0093	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	6,340 LF		
0094	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	385 EA		
0095	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	125 EA		
0096	3628000000-E	876	RIP RAP, CLASS I	3,006 TON		
0097	3635000000-E	876	RIP RAP, CLASS II	80 TON		
0098	3649000000-E	876	RIP RAP, CLASS B	220 TON		
0099	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	3,868 SY		
0100	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (A)	2,135.5 SF		
0101	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (B)	218.75 SF		
0102	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (D)	104.5 SF		
0103	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (E)	508.5 SF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0104	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (MILEMARKER)	73.5 SF		
0105	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (OVERLAY)	4 SF		
0106	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	9 CY		
0108	4057000000-E	SP	OVERHEAD FOOTING	105.4 CY		
0109	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	8,991 LB		
0110	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	1,434 LB		
0111	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1,447 LF		
0112	4096000000-N	904	SIGN ERECTION, TYPE D	9 EA		
0113	4102000000-N	904	SIGN ERECTION, TYPE E	68 EA		
0114	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	9 EA		
0115	4114000000-N	904	SIGN ERECTION, MILEMARKERS	5 EA		
0116	4116000000-N	904	SIGN ERECTION, OVERLAY (GROUND MOUNTED)	1 EA		
0117	4149000000-N	907	DISPOSAL OF SIGN SYSTEM, OVERHEAD	4 EA		
0118	4152000000-N	907	DISPOSAL OF SIGN SYSTEM, STEEL BEAM	3 EA		
0119	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	6 EA		
0120	4360000000-N	SP	GENERIC SIGNING ITEM SIGN ERECTION, TOLL ROUTE ASSEMBLY	13 EA		
0121	4361000000-E	SP	GENERIC SIGNING ITEM REINFORCING STEEL (AESTHETIC COLUMNS ONLY)	42,859 LB		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0122	4365000000-E	SP	GENERIC SIGNING ITEM CLASS A CONCRETE (AESTHETIC COLUMNS ONLY)	251.1 CY		
0123	4366000000-E	SP	GENERIC SIGNING ITEM CONTRACTOR FURNISHED, TOLL ROUTE ASSEMBLY	484.25 SF		
0124	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+14(GNTRY T16 IN, TRUSS ONLY)	Lump Sum	L.S.	
0125	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+64(GNTRY T16 OUT, TRUSS ONLY)	Lump Sum	L.S.	
0126	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+66(GNTRY T15 OUT, TRUSS ONLY)	Lump Sum	L.S.	
0127	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 21+16(GNTRY T15 IN, TRUSS ONLY)	Lump Sum	L.S.	
0128	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 475+00 (A, TRUSS ONLY)	Lump Sum	L.S.	
0129	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 527+50 (B, TRUSS ONLY)	Lump Sum	L.S.	
0130	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 550+00 (C, TRUSS ONLY)	Lump Sum	L.S.	
0131	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 590+21 (D, TRUSS ONLY)	Lump Sum	L.S.	
0132	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 655+00 (E, TRUSS ONLY)	Lump Sum	L.S.	
0133	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 691+50 (F, TRUSS ONLY)	Lump Sum	L.S.	
0134	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	504 SF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0135	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	352 SF		
0136	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	70 SF		
0137	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	1 EA		
0138	4430000000-N	1130	DRUMS	100 EA		
0139	4435000000-N	1135	CONES	43 EA		
0140	4445000000-E	1145	BARRICADES (TYPE III)	192 LF		
0141	4455000000-N	1150	FLAGGER	180 DAY		
0142	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	1 EA		
0143	4470000000-N	1160	RESET TEMPORARY CRASH CUSHION	2 EA		
0144	4480000000-N	1165	TMA	2 EA		
0145	4485000000-E	1170	PORTABLE CONCRETE BARRIER	4,240 LF		
0146	4500000000-E	1170	RESET PORTABLE CONCRETE BARRIER	8,070 LF		
0147	4510000000-N	SP	LAW ENFORCEMENT	120 HR		
0148	4600000000-N	SP	GENERIC TRAFFIC CONTROL ITEM REMOVE & REPLACE SNOWPLOWABLE PAVEMENT MARKER REFLECTOR	222 EA		
0149	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	351 EA		
0150	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	4,764 LF		
0151	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	5,703 LF		
0152	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	8,258 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0153	4690000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 120 MILS)	227 LF		
0154	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	918 LF		
0155	4697000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS)	115 LF		
0156	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	200 LF		
0157	4702000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 120 MILS)	55 LF		
0158	4710000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)	144 LF		
0159	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	88 EA		
0160	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	1,000 LF		
0161	4775000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (6") (IV)	22,102 LF		
0162	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	22,501 LF		
0163	4815000000-E	1205	PAINT PAVEMENT MARKING LINES (6")	18,308 LF		
0164	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	1,940 LF		
0165	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	620 LF		
0166	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	288 LF		
0167	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	149 EA		
0168	4847000000-E	1205	POLYUREA PAVEMENT MARKING LINES (4", **********) (HIGHLY REFLECTIVE ELEMENTS)	812 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0169	4847100000-E	1205	POLYUREA PAVEMENT MARKING LINES (6", **********) (HIGHLY REFLECTIVE ELEMENTS)	23,476 LF		
0170	4847120000-E	1205	POLYUREA PAVEMENT MARKING LINES (12", **********) (HIGHLY REFLECTIVE ELEMENTS)	2,015 LF		
0171	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	408 LF		
0172	4855000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (6")	17,684 LF		
0173	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	113 EA		
0174	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	248 EA		
0175	4955000000-N	1264	OBJECT MARKERS (END OF ROAD)	6 EA		
0176	5005000000-E	1401	80' HIGH MOUNT STANDARD	1 EA		
0177	5010000000-E	1401	100' HIGH MOUNT STANDARD	6 EA		
0178	5020000000-N	1401	PORTABLE DRIVE UNIT	1 EA		
0179	5025000000-E	SP	HIGH MOUNT FOUNDATIONS	46.6 CY		
0180	5050000000-N	1404	LIGHT STANDARD, TYPE MTLT ********** (40' MH, 17" SA)	30 EA		
0181	5070000000-N	1405	STANDARD FOUNDATION ********* (R1)	28 EA		
0182	5070000000-N	1405	STANDARD FOUNDATION ********* (R2)	2 EA		
0183	5120000000-N	1407	ELECTRIC SERVICE POLE **** ******** (30' CLASS 4)	1 EA		
0184	5125000000-E	1407	ELECTRIC SERVICE LATERAL ********** (3 #1/0 USE)	25 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0185	5145000000-N	1408	LIGHT CONTROL EQUIPMENT, TYPE RW ********** (240/480 V)	1 EA		
0186	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (2")	396 LF		
0187	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (3")	101 LF		
0188	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (3")	783 LF		
0189	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (4")	379 LF		
0190	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (6")	95 LF		
0191	5170000000-E	1410	** #8 W/G FEEDER CIRCUIT (2)	630 LF		
0192	5180000000-E	1410	** #4 W/G FEEDER CIRCUIT (2)	180 LF		
0193	5185000000-E	1410	** #2 W/G FEEDER CIRCUIT (2)	1,700 LF		
0194	5190000000-E	1410	********** FEEDER CIRCUIT (MCM 4-WIRE COPPER)	3,950 LF		
0195	5205000000-E	1410	** #8 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	4,100 LF		
0196	5215000000-E	1410	** #4 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	1,410 LF		
0197	5220000000-E	1410	** #2 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	10,000 LF		
0198	5270000000-N	SP	GENERIC LIGHTING ITEM 100' HIGH MOUNT LUMINAIRE - LED	36 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0199	5270000000-N	SP	GENERIC LIGHTING ITEM 80' HIGH MOUNT LUMINAIRE - LED	8 EA		
0200	5270000000-N	SP	GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC18	51 EA		
0201	5270000000-N	SP	GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC24	9 EA		
0202	5270000000-N	SP	GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC36	2 EA		
0203	5270000000-N	SP	GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMINAIRE - 240V, 208W LED	4 EA		
0204	5270000000-N	SP	GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMINAIRE - 480V, 208W LED	26 EA		
0205	5325800000-E	1510	8" WATER LINE	390 LF		
0206	5326600000-E	1510	16" WATER LINE	2,980 LF		
0207	5546000000-E	1515	8" VALVE	1 EA		
0208	5558600000-E	1515	16" VALVE	2 EA		
0209	5589200000-E	1515	2" AIR RELEASE VALVE	3 EA		
0210	5666000000-E	1515	FIRE HYDRANT	3 EA		
0211	5810000000-E	1530	ABANDON 16" UTILITY PIPE	980 LF		
0212	5906000000-E	SP	GENERIC UTILITY ITEM DUCTILE IRON WATER PIPE FITTINGS	5,435 LB		
0213	6000000000-E	1605	TEMPORARY SILT FENCE	20,650 LF		
0214	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	175 TON		
0215	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	2,045 TON		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0216	6012000000-E	1610	SEDIMENT CONTROL STONE	2,400 TON		
0217	6015000000-E	1615	TEMPORARY MULCHING	52 ACR		
0218	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	3,400 LB		
0219	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED-ING	18.5 TON		
0220	6024000000-E	1622	TEMPORARY SLOPE DRAINS	1,865 LF		
0221	6029000000-E	SP	SAFETY FENCE	1,600 LF		
0222	6030000000-E	1630	SILT EXCAVATION	11,460 CY		
0223	6036000000-E	1631	MATTING FOR EROSION CONTROL	49,020 SY		
0224	6037000000-E	SP	COIR FIBER MAT	100 SY		
0225	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	610 SY		
0226	6042000000-E	1632	1/4" HARDWARE CLOTH	2,550 LF		
0227	6046000000-E	1636	TEMPORARY PIPE FOR STREAM CROSSING	25 LF		
0228	6069000000-E	1638	STILLING BASINS	322 CY		
0229	6071012000-E	SP	COIR FIBER WATTLE	2,940 LF		
0230	6071020000-E	SP	POLYACRYLAMIDE (PAM)	1,165 LB		
0231	6071030000-E	1640	COIR FIBER BAFFLE	3,025 LF		
0232	6071050000-E	SP	"" SKIMMER (1.5")	6 EA		
0233	6071050000-E	SP	"" SKIMMER (2")	7 EA		
0234	6071050000-E	SP	"" SKIMMER (2.5")	1 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0235	6084000000-E	1660	SEEDING & MULCHING	51 ACR		
0236	6087000000-E	1660	MOWING	30 ACR		
0237	6090000000-E	1661	SEED FOR REPAIR SEEDING	550 LB		
0238	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	1.5 TON		
0239	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	1,175 LB		
0240	6108000000-E	1665	FERTILIZER TOPDRESSING	35.25 TON		
0241	6111000000-E	SP	IMPERVIOUS DIKE	76 LF		
0242	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR		
0243	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	25 EA		
0244	6120000000-E	SP	CULVERT DIVERSION CHANNEL	413 CY		
0245	6123000000-E	1670	REFORESTATION	0.77 ACR		
0246	6132000000-N	SP	GENERIC EROSION CONTROL ITEM CONCRETE WASHOUT STRUCTURE	3 EA		
0247	6135000000-E	SP	GENERIC EROSION CONTROL ITEM COMPOST BLANKET	5 ACR		
0248	7279000000-E	1715	TRACER WIRE	1,385 LF		
0249	7300000000-E	1715	UNPAVED TRENCHING (**********) (1, 2")	715 LF		
0250	7300000000-E	1715	UNPAVED TRENCHING (**********) (2, 2")	760 LF		
0251	7300000000-E	1715	UNPAVED TRENCHING (**********) (4, 3")	1,060 LF		
0252	7300000000-E	1715	UNPAVED TRENCHING (**********) (4,1")	2,680 LF		
0253	7301000000-E	1715	DIRECTIONAL DRILL (**********) (2, 2")	335 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0254	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 2" & 4, 3")	470 LF		
0255	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 2")	535 LF		
0256	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 3")	165 LF		
0257	7312000000-N	1716	JUNCTION BOX (**********) (36"X 24"X24')	7 EA		
0258	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEA-VY DUTY)	38 EA		
0259	7484000000-N	SP	MICROWAVE VEHICLE DETECTOR	4 EA		
0260	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER) (72)	8,850 LF		
0261	7528000000-E	1730	DROP CABLE	1,680 LF		
0262	7540000000-N	1731	SPLICE ENCLOSURE	7 EA		
0263	7552000000-N	1731	INTERCONNECT CENTER	2 EA		
0264	7575142200-N	SP	NEW ELECTRICAL SERVICE	2 EA		
0265	7575160000-E	1734	REMOVE EXISTING COMMUNICATIONS CABLE	6,630 LF		
0266	7613000000-N	SP	SOIL TEST	6 EA		
0267	7614100000-E	SP	DRILLED PIER FOUNDATION	58.59 CY		
0268	7960000000-N	SP	METAL POLE FOUNDATION REMOVAL	3 EA		
0269	7972000000-N	SP	METAL POLE REMOVAL	2 EA		
0270	7980000000-N	SP	GENERIC SIGNAL ITEM CABINET, TYPE 336, POLE MOUNT-ED	2 EA		
0271	7980000000-N	SP	GENERIC SIGNAL ITEM CABINET, TYPE 5052 H-32 ALUM NEMA 3S, POLE MOUNTED	3 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0272	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV CAMERA ASSEMBLY	1 EA		
0273	7980000000-N	SP	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	2 EA		
0274	7980000000-N	SP	GENERIC SIGNAL ITEM METAL ITS POLE DESIGN	6 EA		
0275	7980000000-N	SP	GENERIC SIGNAL ITEM METAL POLE FOR ITS DEVICE	5 EA		
0276	7980000000-N	SP	GENERIC SIGNAL ITEM MVD TERMINAL SERVER ASSEMBLY	2 EA		
0277	7980000000-N	SP	GENERIC SIGNAL ITEM RELOCATE CCTV ASSEMBLY	1 EA		
0278	7980000000-N	SP	GENERIC SIGNAL ITEM REMOVE RWIS ASSEMBLY	1 EA		
0279	7985000000-N	SP	GENERIC SIGNAL ITEM AET TOLL ZONE SITES	Lump Sum	L.S.	
0280	7985000000-N	SP	GENERIC SIGNAL ITEM TRAINING	Lump Sum	L.S.	
0281	7990000000-E	SP	GENERIC SIGNAL ITEM RS-485 CABLE	5,230 LF		
0286	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0287	1330000000-E	607	INCIDENTAL MILLING	201 SY		
0288	1891000000-E	SP	GENERIC PAVING ITEM DIAMOND GRINDING PCC PAVEMENT	12,850 SY		
0289	2591000000-E	848	4" CONCRETE SIDEWALK	2,700 SY		
0290	3565000000-E	866	DOUBLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 6', 12')	1 EA		
0291	5606000000-E	1515	2" BLOW OFF	1 EA		
0292	8175000000-E	420	CLASS AA CONCRETE (BRIDGE)	36 CY		

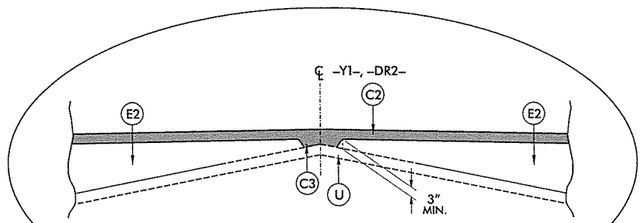
Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0293	8224000000-E	425	EPOXY COATED REINFORCING STEEL (BRIDGE)	1,951 LB		
0294	8692000000-N	SP	FOAM JOINT SEALS	Lump Sum	L.S.	
			CULVERT ITEMS			
0282	8126000000-N	414	CULVERT EXCAVATION, STA ****** (83+04.00-L-)	Lump Sum	L.S.	
0283	8133000000-E	414	FOUNDATION CONDITIONING MATERIAL, BOX CULVERT	135 TON		
0284	8196000000-E	420	CLASS A CONCRETE (CULVERT)	181.8 CY		
0285	8245000000-E	425	REINFORCING STEEL (CULVERT)	37,027 LB		

6/2/99

PAVEMENT SCHEDULE

A1	13 ½" PORTLAND CEMENT CONCRETE PAVEMENT WITH DOWELS	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT GREATER THAN 3" IN DEPTH OR LESS THAN 5·½" IN DEPTH.	U	EXISTING PAVEMENT.
A2	11" PORTLAND CEMENT CONCRETE PAVEMENT	J1	PROP. 8" AGGREGATE BASE COURSE.	V	RUMBLE STRIPS.
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.	J2	PROP. 10" AGGREGATE BASE COURSE.		
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.IN EACH OF TWO LAYERS	J3	PROP. VAR. DEPTH AGGREGATE BASE COURSE.		
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT GREATER THAN 2" IN DEPTH.	N	GEOTEXTILE FOR PAVEMENT STABILIZATION		
C4	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 330 LBS. PER SQ. YD.IN EACH OF TWO LAYERS	P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YARD		
C5	PROP. APPROX. 1¼" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 275 LBS. PER SQ. YD.	R1	2'-6" CONCRETE CURB AND GUTTER.		
C6	PROP. APPROX. 3½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT A RATE OF 168 LBS. PER SQ. YD. FOR THE FIRST LIFT AND A RATE OF 224 LBS. PER SQ. YD. FOR THE FINAL LIFT.	R2	1'-6" MOUNTABLE CONCRETE CURB AND GUTTER.		
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R3	SHOULDER BERM GUTTER		
D2	PROP. APPROX. 3½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 399 LBS. PER SQ. YD.	S	10' MULTI-USE PATH		
E1	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	T	EARTH MATERIAL.		

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



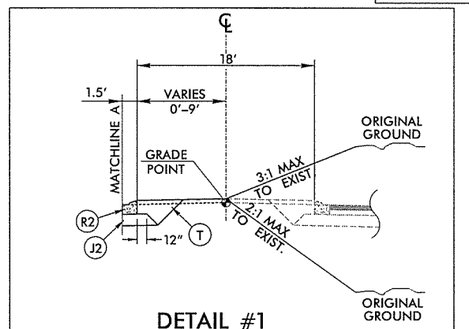
Detail Showing Method of Wedging No. 1 for –Y1– & –DR2–

PROJECT REFERENCE NO.	SHEET NO.
U–5315 A&B	2A–1

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 23982 ENGINEER STEPHEN E. ROBERTS — DocuSigned by: 12/7/2017 — Stephen E. Roberts

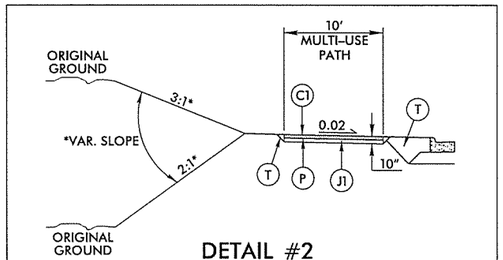
PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 039779 ENGINEER JEREMY R. HAMM — DocuSigned by: 12/8/2017 — Jeremy R Hamm

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

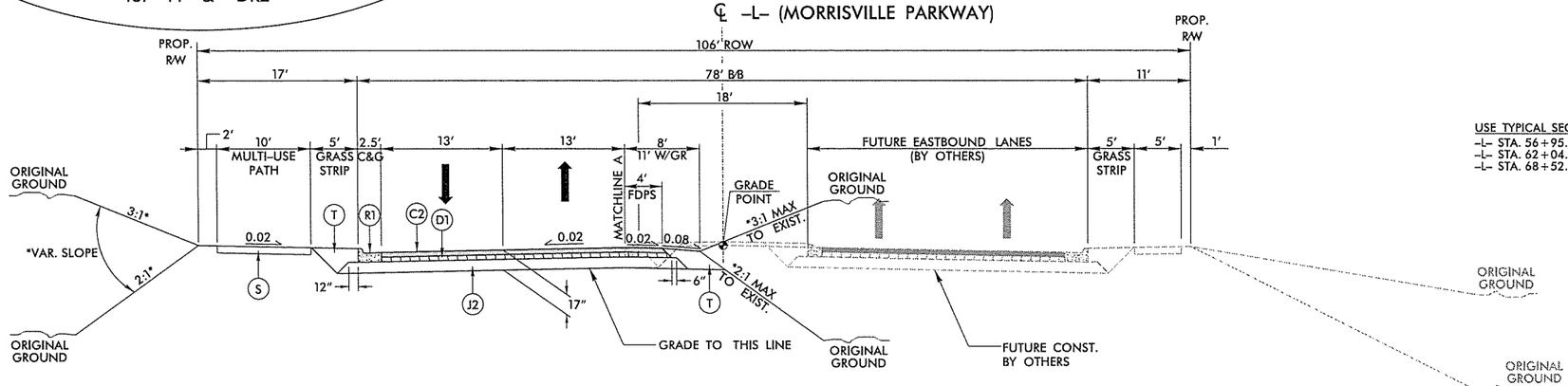


DETAIL #1
USE WITH TYPICAL SECTION NO. 1

–L– STA. 56+95.00 TO –L– STA. 57+35.55 RT
–L– STA. 65+45.00 TO –L– STA. 66+49.63 RT (BEGIN BRIDGE)
–L– STA. 68+52.63 (END BRIDGE) TO –L– STA. 69+83.00 RT



DETAIL #2
MULTI–USE PATH



TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
–L– STA. 56+95.00 TO 60+74.77 (BEGIN ROUNDABOUT)
–L– STA. 62+04.40 (END ROUNDABOUT) TO 66+49.63 (BEGIN BRIDGE)
–L– STA. 68+52.63 (END BRIDGE) TO 73+12.97 (BEGIN ROUNDABOUT)

NOTES:
SEE PLANS FOR LOCATION OF CONCRETE ISLANDS, AUXILIARY LANES, AND TAPERS.

*4:1 MAX INSIDE INTERCHANGE

12/7/2017
R:\Roadway\Proj\u5315_Rdy_typ.dgn
dgnrs

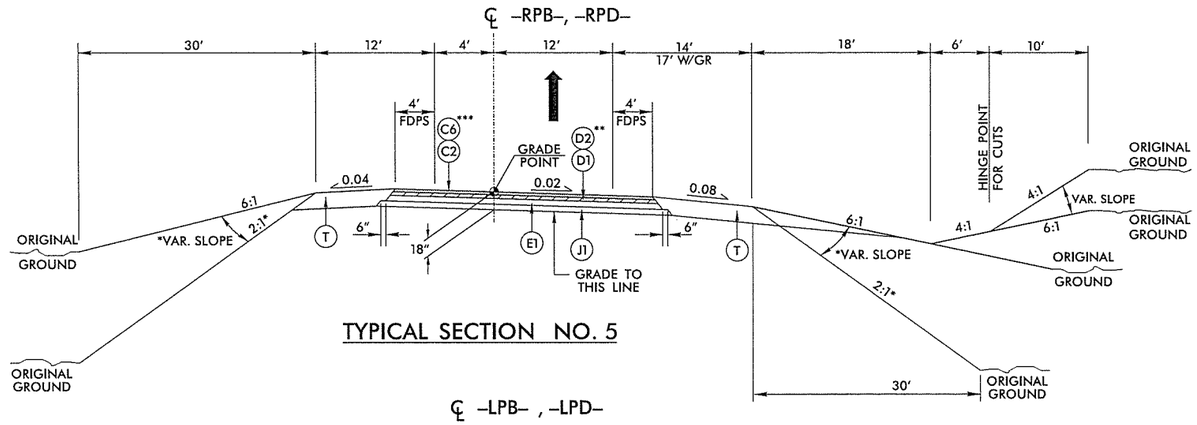
PLANS PREPARED BY :

RK&K

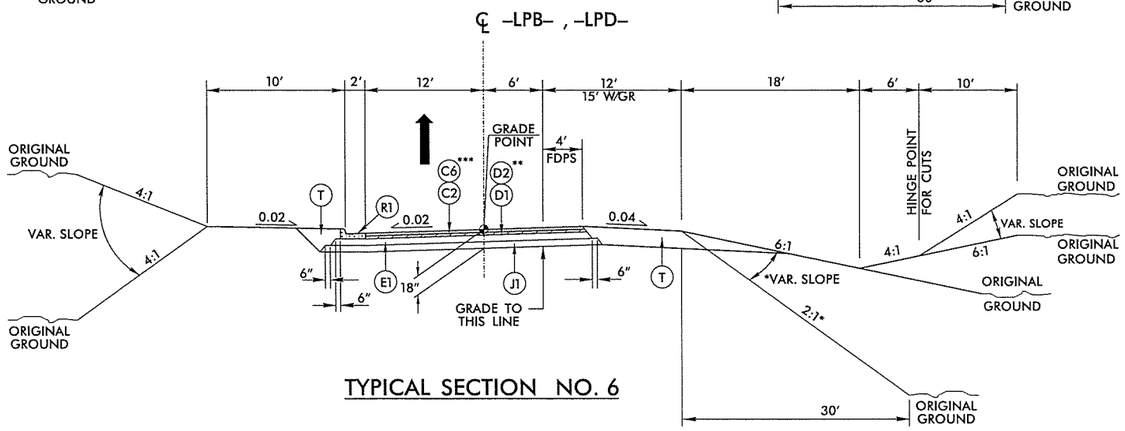
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609–3960
NC LICENSE NO. F–0112 • (919) 878–9560

6/2/99

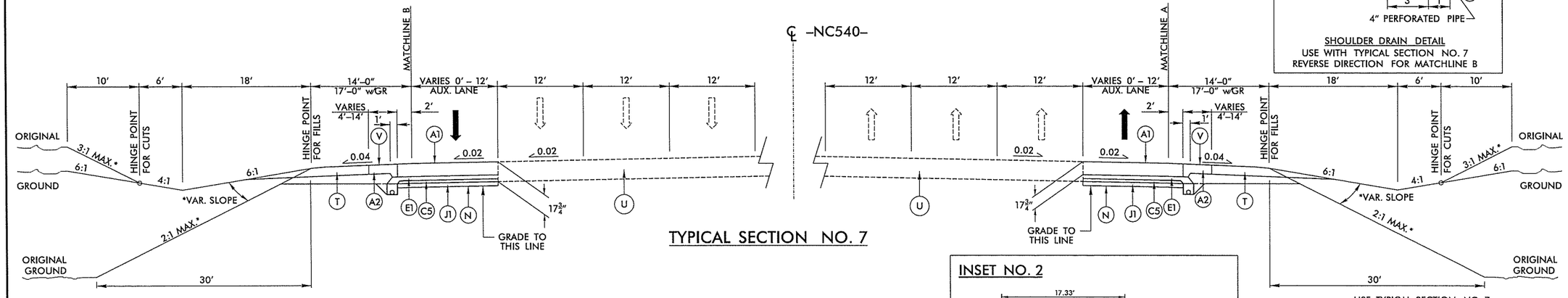
PAVEMENT SCHEDULE	
A1	13½" PCCP
A2	11" PCCP
C1	2" TYPE S9.5B
C2	3" TYPE S9.5B
C5	1¼" TYPE SF9.5A
C6	3½" TYPE S9.5B
D1	4" TYPE I19.0B
D2	3½" TYPE I19.0B
E1	3" TYPE B25.0B
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
R1	2'-6" CONC. C&G
R2	1'-6" MOUNT. CONC. C&G
R3	SBG
S	10' MULTI-USE PATH
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	RUMBLE STRIPS



TYPICAL SECTION NO. 5

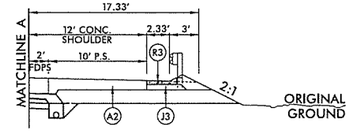


TYPICAL SECTION NO. 6



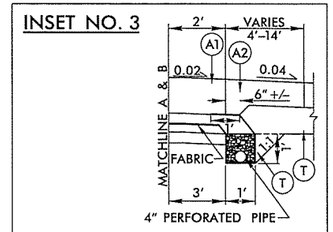
TYPICAL SECTION NO. 7

INSET NO. 2



USE WITH TYPICAL SECTION NO. 7
–RPB– STA. 11+00.00 TO –NC540– 593+50.00 LT

INSET NO. 3



SHOULDER DRAIN DETAIL
USE WITH TYPICAL SECTION NO. 7
REVERSE DIRECTION FOR MATCHLINE B

PAVEMENT DESIGN ENGINEER FOR –NC540– PAVEMENT DESIGN
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
12/9/2017
DocuSigned by: Clark S. Morrison
50B6A10DD1E0B4C4...

PROJECT REFERENCE NO. U-5315 A&B
SHEET NO. 2A-3

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 23982 ENGINEER STEPHEN E. ROBERTS
DocuSigned by: 12/7/2017
Stephen C. Roberts

PAVEMENT DESIGN ENGINEER FOR ALL OTHER PAVEMENT DESIGNS
NORTH CAROLINA PROFESSIONAL SEAL 039779 ENGINEER JEREMY R. HAHN
DocuSigned by: 12/8/2017
Jeremy R. Hahn

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

USE TYPICAL SECTION NO. 5
–RPB– STA. 14+64.50 TO 29+25.25
–RPD– STA. 14+47.30 TO 30+33.64

USE –NC540– PAVEMENT DESIGN
–RPB– STA. 10+00.00 TO 14+64.50
–RPD– STA. 10+00.00 TO 14+47.30

** FOR –RPB– STA 19+00.00 TO 22+00.00, USE 3.5" I19.0B.
*** FOR –RPB– STA 19+00.00 TO 22+00.00, USE 3.5" S9.5B.
FINAL SURFACE LIFT SHALL BE 2.0" THICK IN THIS AREA.

USE TYPICAL SECTION NO. 6
–LPB– STA. 12+19.55 TO 20+97.64
–LPD– STA. 12+24.51 TO 22+88.66

USE –NC540– PAVEMENT DESIGN
–LPB– STA. 10+00.00 TO 12+19.55
–LPD– STA. 10+00.00 TO 12+24.51

** FOR –LPD– STA 19+75.00 TO 22+88.66, USE 3.5" I19.0B.
*** FOR –LPD– STA 19+75.00 TO 22+88.66, USE 3.5" S9.5B.
FINAL SURFACE LIFT SHALL BE 2.0" THICK IN THIS AREA.

USE TYPICAL SECTION NO. 7
–NC540– STA. 545+66.00 TO 557+34.64 RT.
–NC540– STA. 557+49.14 TO 576+17.62 LT.
–NC540– STA. 566+51.94 TO 585+29.12 RT.
–NC540– STA. 585+58.35 TO 593+31.25 LT.

NOTES:
SEE PLANS FOR LOCATION OF CONCRETE ISLANDS, AUXILIARY LANES, AND TAPERS.

*4:1 MAX INSIDE INTERCHANGE

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

12/7/2017
R:\Roadway\Proj\u5315_Rdy_typ.dgn
dsparr

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	3B-2

COMPUTED BY: ASH DATE: 9/23/16
CHECKED BY: JLB DATE: 7/28/17
REVISED BY: JMH DATE: 10/3/17
CHECKED BY: CSH DATE: 10/9/17

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT
FLARE LENGTH = DISTANCE FROM LAST SECTION OF GUARDRAIL TO END OF GUARDRAIL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS					IMPACT ATTENUATOR TYPE 350			SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & RESET EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU TL-3	CAT-1	AT-1	B-77	TES	No.	G	NG				
-L-	63+92.59	66+04.63	RT	212.50				66+04.63	2'-6"	5'-13.5'	50				1			1							
-L-	68+97.63	69+85.05	RT	87.50			68+97.63		2'-5'	10'-13.5'	50	100	2		1			1							
-L-	74+20.00	77+50.00	RT	246.04	129.11			76+50.00	14'	16'						1									
-L-	81+50.00	85+00.00	RT	350.00			82+50.00	84+00.00	14'	16'	50				1	1									
-L-	65+07.57	66+04.63	LT	100.00			66+04.63	65+07.57	7'-18'	9'-20'		50		1	1			1							
-L-	68+97.63	76+66.15	LT	411.20	299.36			68+97.63	7'-19.5'	9'-19'					1			1							
-L-	81+43.75	85+00.00	LT	356.25			84+50.00	81+50.00	33.5'	35.5'	100		2		1	1									
-NC540-	546+95.04	551+26.29	RT	431.25			550+00.00		6'-13'	7'-14'	100		2		1			1							
-NC540-	551+26.29	551+83.29	RT																				57.00		
-NC540-	547+10.25	550+04.00	MED RT	293.75			550+00.00		12'						1	1									
-NC540-	557+48.53	567+00.00	LT	862.50			557+49.00	565+50.00	14'	17'					1										
-NC540-	572+58.33	573+04.83	LT																				46.50		
-NC540-	573+04.83	574+98.58	LT	193.75			573+04.83		6'	9'	100		2		1			1							
-NC540-	576+50.00	579+06.24	RT	256.25			578+04.00	579+00.00	14'	17'					1	1									
-NC540-	589+85.10	593+60.10	MED LT	375.00			590+21.21		12'		100		2			1		1							
-NC540-	589+87.50	593+31.25	LT	343.75			590+22.00		14'		100		2			1									
-RPB-	18+54.75	20+86.00	LT	231.25					12'	15'					1	1									
-RPB-	19+90.00	20+86.00	LT						14'	15'-17'	100	100	2	2											DOUBLE POSTED = 12 ADDITIONAL POSTS
-RPB-	18+54.75	20+86.00	RT	231.25					14'	15'-17'	100	50	2	1	1	1									
-RPB-	19+90.00	20+86.00	RT						14'	15'-17'	100	50	2	3											DOUBLE POSTED = 12 ADDITIONAL POSTS
-RPB-	22+33.00	26+64.25	RT	450.00			22+50.00	25+43.00	14'	17'		50		1	1	1									
-RPD-	24+14.00	29+64.00	RT	525.00			25+14.00		12'	7'-23'	50		1		1										
-LPD-	20+42.25	22+48.50	LT	206.25					12	7'-23'		50		1	1	1									
-LPD-	20+42.25	21+40.00	LT																						DOUBLE POSTED = 12 ADDITIONAL POSTS
-LPD-	20+58.20	21+58.20	RT						12'	15'-17'	100	50	2	3								2	0.00		
-DR2-	13+57.93		CL	24.60															2						
-NC540-	569+45.31	572+49.81	RT																					304.5	
PROJECT SUBTOTALS				6,188.09	428.48										16	11	0	7	2		0	2	103.50	0.00	304.50	
GUARDRAIL UNIT DEDUCTIONS																									
GREU-350 @ 50' EACH				-800.00																					
CAT-1 @ 6.25' EACH				-68.75																					
B-77 @ 18.75' EACH				-131.25																					
TES @ 2.3' EACH				-4.60																					
PROJECT TOTALS				5,188.09	428.48										16	11	0	7	2	0	0	2	103.50	0.00	304.50	ADDITIONAL POSTS OVERALL PROJECT = 10
GRAND TOTALS				**5,200.00**	**437.50**										**16**	**11**	**0**	**7**	**2**	**0**	**0**	**2**	**110**	**0**	**310**	**ADDITIONAL POSTS = 46**

SUMMARY OF WOVEN WIRE FENCE, 47" FABRIC

STATION TO STATION	LT. OR RT.	A FABRIC L.F.	B END BRACE	C CORNER BRACE	D LINE BRACE	E 4" POSTS	F 5" POSTS
-L- Sta. 57+15 TO 61+07	RT.	392.00	2	1		24	7
-L- Sta. 61+67 TO 65+44	RT.	377.00	2	1		23	7
-L- Sta. 57+15 TO 59+75	LT.	270.00	1	1		17	5
-NC540- Sta. 591+40.50 TO -RPB- 30+10	RT.	2,084.00	5	1	8	129	37
-L- Sta. 68+98 TO 73+68	LT.	496.00	2	2	1	28	13
-L- Sta. 74+33 TO 76+25	LT.	199.00	1	1		12	5
-L- Sta. 74+73 TO 79+00	RT.	462.00	2	3		26	13
-L- Sta. 77+95 TO 79+00	LT.	105.00	1	1		5	5
-Y1- Sta. 10+60 TO 11+75	LT.	108.00	1			7	2
-Y1- Sta. 10+58 TO 11+75	RT.	141.00	1	1		7	5
-RPD- Sta. 12+54 TO 29+65	RT.	1,700.00	1	2	6	107	26
TOTAL		6,334.00				384	125
SAY		6,340				385	125

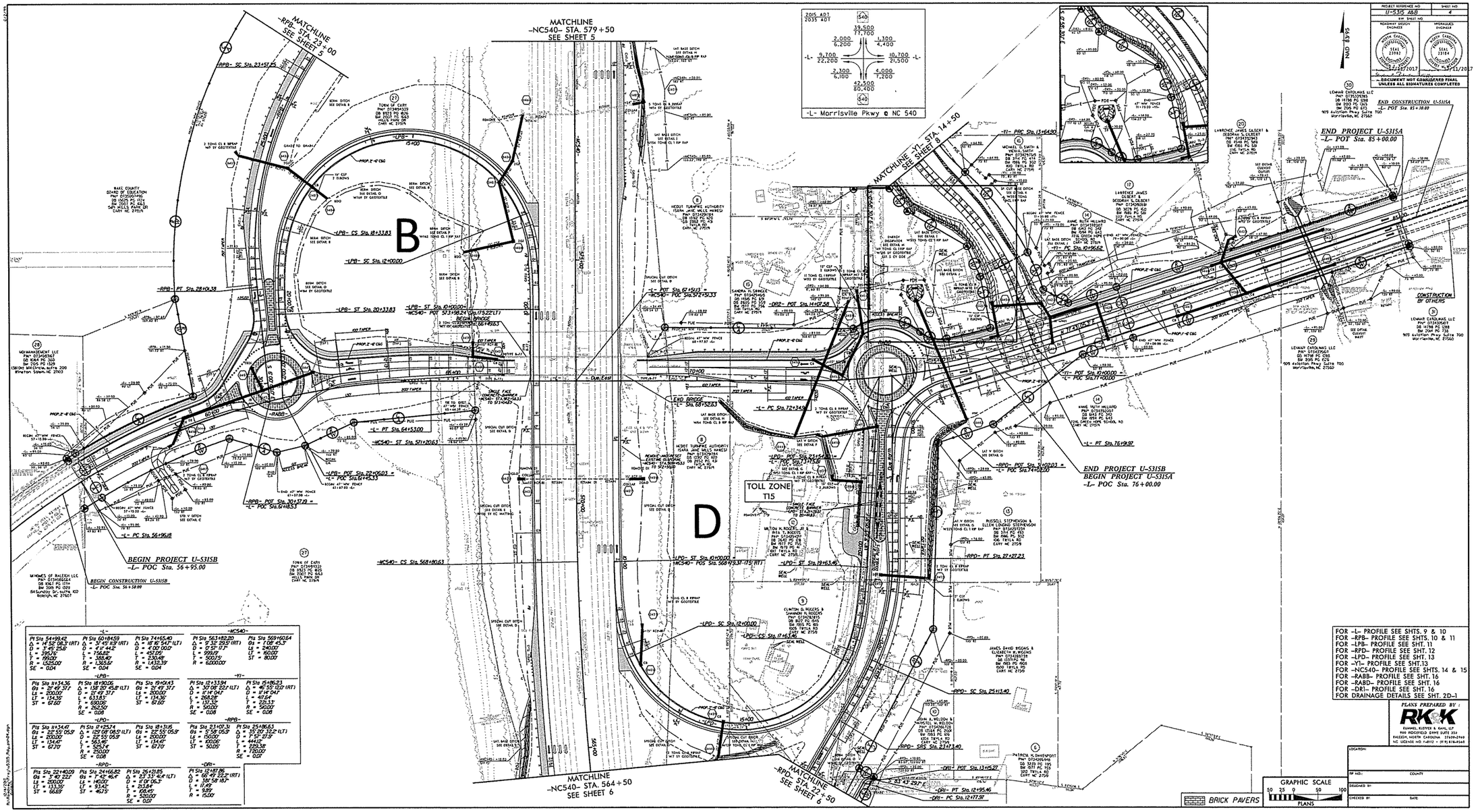
SUMMARY OF SHOULDER DRAIN OUTLET LOCATIONS

LINE	STATION TO STATION			LOCATION	SHOULDER DRAIN PIPE	SHOULDER DRAINS	OUTLET STRUCTURE			
							4" PIPE	OUTLET STATION	DRAINAGE STRUCT. & NO.	CONCRETE PAD
-NC540-	572+00.00	-	576+17.62	SBL - Outside	417.62	417.62	29.0	575+00.00		1
-NC540-	585+58.35	-	592+50.00	SBL - Outside	691.65	691.65	5.0	592+50.00	514	
-NC540-	545+66.00	-	547+50.00	NBL - Outside	184.00	184.00	25.0	547+50.00		1
-NC540-	547+50.00	-	551+00.00	NBL - Outside	350.00	350.00	17.6	551+00.00	701	
-NC540-	551+00.00	-	552+50.00	NBL - Outside	150.00	150.00	5.0	672+42.00	601	
-NC540-	566+51.94	-	570+50.00	NBL - Outside	398.06	398.06	24.0	570+50.00	427	
-NC540-	570+50.00	-	574+50.00	NBL - Outside	400.00	400.00	29.0	574+50.00		1
-NC540-	574+50.00	-	578+00.00	NBL - Outside	350.00	350.00	10.0	578+00.00		1
-NC540-	578+00.00		581+50.00	NBL - Outside	350.00	350.00	20.0	581+50.00		1
-NC540-	581+50.00		585+00.00	NBL - Outside	350.00	350.00	20.0	585+00.00		1
		Total:			3,641	3,641	185			6
		Say			3,650	3,700	190			6

ABBREVIATIONS: CP – CONCRETE PAD
2GI – DRAINAGE STRUCTURE

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

12/1/2017
R:\Roadway\Proj\u5315_Rdy_psh03B_2.dgn
jhinson



PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	5
R/W SHEET NO.	

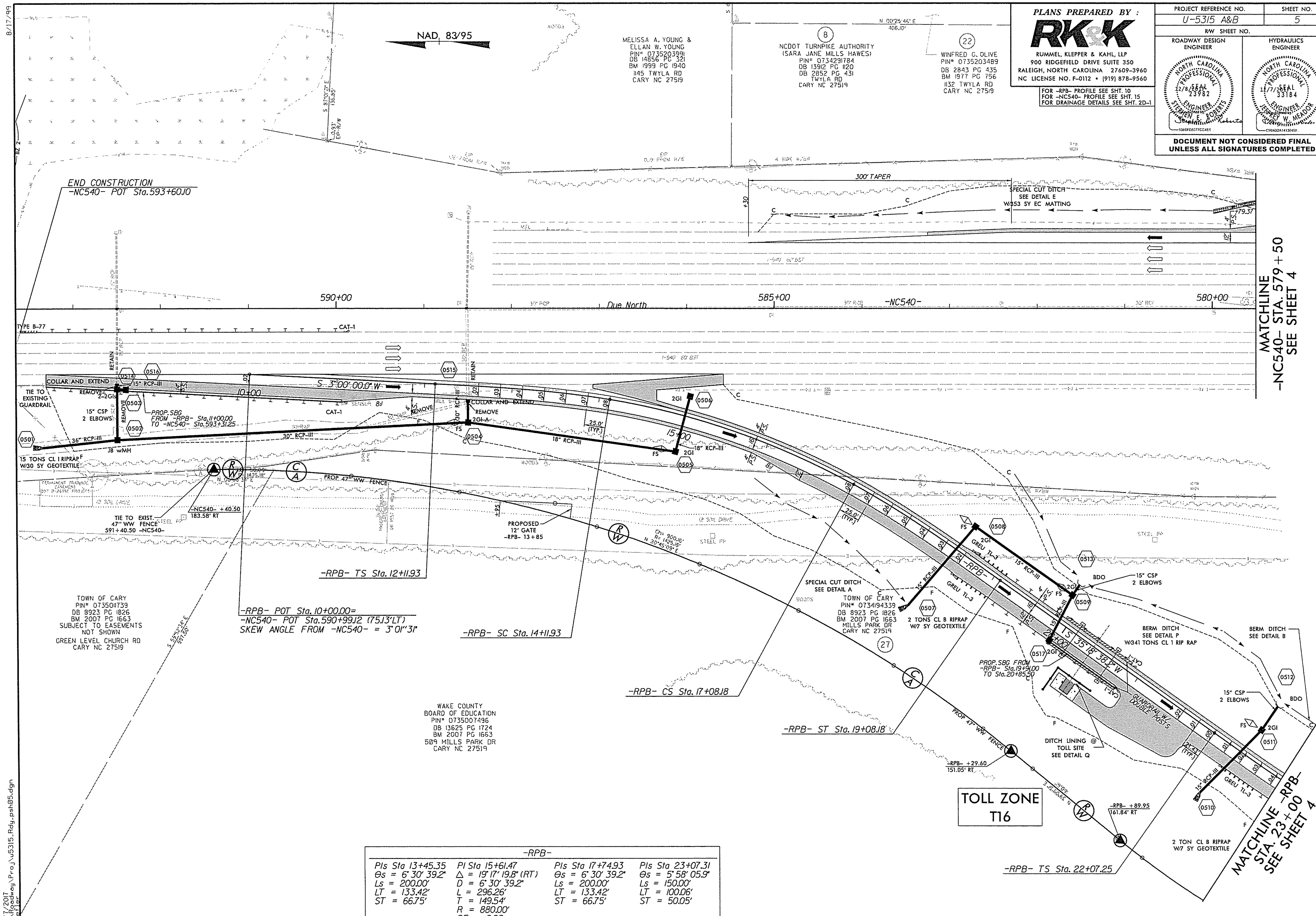
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

FOR -RPB- PROFILE SEE SHT. 10
FOR -NC540- PROFILE SEE SHT. 15
FOR DRAINAGE DETAILS SEE SHT. 2D-1

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23982, STEPHEN E. ROBERTS, 12/8/2017

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33184, JEFFREY W. MEADOR, 12/7/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



NAD 83/95
END CONSTRUCTION
-NC540- POT Sta.593+60.10
MELISSA A. YOUNG &
ELLAN W. YOUNG
PIN# 0735203991
DB 14856 PG 321
BM 1999 PG 1940
1145 TWYLA RD
CARY NC 27519
NCDOT TURNPIKE AUTHORITY
(SARA JANE MILLS HAWES)
PIN# 0734291784
DB 13912 PG 1120
DB 2852 PG 431
TWYLA RD
CARY NC 27519
WINFRED G. OLIVE
PIN# 0735203489
DB 2843 PG 435
BM 1977 PG 756
1132 TWYLA RD
CARY NC 27519
300' TAPER
SPECIAL CUT DITCH
SEE DETAIL E
W/353 SY EC MATTING
590+00
585+00
580+00
-NC540-
Due North
MATCHLINE -NC540- STA. 579+50 SEE SHEET 4
TYPE B-77
CAT-1
COLLAR AND EXTEND
TIE TO EXISTING GUARDRAIL
15" CSP 2 ELBOWS
PROP. SBG FROM -RPB- Sta.11+00.00 TO -NC540- Sta.593+31.25
S 3°00'00.0" W
10+00
15+00
36" RCP-III
30" RCP-III
18" RCP-III
15" RCP-III
15 TONS CL I RIPRAP W/30 SY GEOTEXTILE
TIE TO EXIST. 47" WW FENCE 591+40.50 -NC540-
-NC540- +40.50 183.58' RT
PROP. 47" WW FENCE
PROPOSED 12' GATE -RPB- 13+85
-RPB- TS Sta. 12+11.93
-RPB- POT Sta. 10+00.00=
-NC540- POT Sta.590+99.12 (75.13'LT)
SKEW ANGLE FROM -NC540- = 3°01'31"
-RPB- SC Sta. 14+11.93
TOWN OF CARY
PIN# 0735011739
DB 8923 PG 1826
BM 2007 PG 1663
SUBJECT TO EASEMENTS NOT SHOWN
GREEN LEVEL CHURCH RD
CARY NC 27519
SPECIAL CUT DITCH SEE DETAIL A
TOWN OF CARY
PIN# 0734194339
DB 8923 PG 1826
BM 2007 PG 1663
MILLS PARK DR
CARY NC 27519
2 TONS CL B RIPRAP W/7 SY GEOTEXTILE
BERM DITCH SEE DETAIL P W/341 TONS CL 1 RIP RAP
BERM DITCH SEE DETAIL B
PROP. SBG FROM -RPB- Sta.19+91.00 TO Sta.20+85.50
GUARDRAIL W/ DOUBLE POSTS
DITCH LINING @ TOLL SITE SEE DETAIL Q
-RPB- CS Sta. 17+08.18
-RPB- ST Sta. 19+08.18
WAKE COUNTY
BOARD OF EDUCATION
PIN# 0735007496
DB 13625 PG 1724
BM 2007 PG 1663
509 MILLS PARK DR
CARY NC 27519
TOLL ZONE T16
-RPB- +29.60 151.05' RT.
-RPB- +89.95 161.84' RT
2 TON CL B RIPRAP W/7 SY GEOTEXTILE
-RPB- TS Sta. 22+07.25
MATCHLINE -RPB- STA. 23+00 SEE SHEET 4

-RPB-

PIs Sta 13+45.35	PI Sta 15+61.47	PIs Sta 17+74.93	PIs Sta 23+07.31
Θs = 6° 30' 39.2"	Δ = 19° 17' 19.8" (RT)	Θs = 6° 30' 39.2"	Θs = 5° 58' 05.9"
Ls = 200.00'	D = 6° 30' 39.2"	Ls = 200.00'	Ls = 150.00'
LT = 133.42'	L = 296.26'	LT = 133.42'	LT = 100.06'
ST = 66.75'	T = 149.54'	ST = 66.75'	ST = 50.05'
	R = 880.00'		
	SE = 0.08		

12/7/2017
R:\Roadway\Proj\u5315_Rdy_psh05.dgn

PROJ. REFERENCE NO.	SHEET NO.
U-5315 A & B	TMP-2

MANAGEMENT STRATEGIES

PHASE I

- CONSTRUCT PROPOSED NC 540 LOOPS AND RAMPS.
- MAINTAINING EXISTING TRAFFIC, CONSTRUCT -L-.
- MAINTAINING EXISTING TRAFFIC, CONSTRUCT -Y1- AND -DR2-.

PHASE II

- ALTERNATING LANE CLOSURES, TIE IN -Y1- AND -DR2-, PLACE PAVEMENT MARKINGS, AND OPEN TO TRAFFIC. PERMANENTLY CLOSE TWYLA RD SOUTH OF MORRISVILLE PKWY AND CONSTRUCT CUL-DE-SAC.
- SHIFT THE NORTHBOUND LANES OF NC 540 TO THE MEDIAN SHOULDER IN 3 - 11' LANES. PLACE PORTABLE CONCRETE BARRIER ALONG THE OUTSIDE TRAVEL LANE AND CONSTRUCT NORTHBOUND NC 540 WIDENING.
- SHIFT THE SOUTHBOUND LANES OF NC 540 TO THE MEDIAN SHOULDER IN 3 - 11' LANES. RESET THE PORTABLE CONCRETE BARRIER FROM NORTHBOUND NC 540 ALONG THE OUTSIDE TRAVEL LANE AND CONSTRUCT SOUTHBOUND NC 540 WIDENING.
- REMOVE THE PORTABLE CONCRETE FROM NC 540 AND CONSTRUCT THE REMAINING SECTIONS OF THE NC 540 LOOPS AND RAMPS.

PHASE III

- REMOVE PAVEMENT PER THE ROADWAY PLAN.
- PLACE FINAL LAYER OF SURFACE COURSE, FINAL PAVEMENT MARKINGS, AND OPEN ALL ROADS TO TRAFFIC IN THE FINAL PATTERN.

TRAFFIC CONTROL PHASING

PHASE I

STEP 1:

ERECT ADVANCE WORK ZONE WARNING SIGNS IN ACCORDANCE WITH RDWY STD 1101.01 ON -L- MORRISVILLE PARKWAY, NC 540 AND -Y1- TWYLA RD.

STEP 2:

AWAY FROM TRAFFIC ***BEGIN*** CONSTRUCTION EXCLUDING THE FINAL LAYER OF SURFACE COURSE AS FOLLOWS: (SEE TMP-3 THROUGH TMP-9)

- -L- STA 56+95 TO STA 66+26
- -L- STA 68+77 TO STA 72+00
- -L- STA 75+28 TO STA 85+00 INCLUDING TEMPORARY PAVEMENT IN THE MEDIAN FROM -L- STA 76+70 TO STA 77+35
- -RPD- STA 14+47 TO STA 22+00
- -LPD- STA 12+25 TO STA 16+00
- -LPB- STA 12+20 TO STA 22+06
- -RPB- STA 14+64 TO STA 30+37

STEP 3:

USING RDWY STD 1101.02 CONSTRUCT EXCLUDING THE FINAL LAYER OF SURFACE COURSE AS FOLLOWS: (SEE TMP-4 AND TMP-9)

- -Y1- STA 10+00 TO STA 18+86
- -DR2- STA 10+00 TO STA 11+00

TRAFFIC CONTROL PHASING, CONTINUED

PHASE II

STEP 1:

USING RDWY STD 1101.02 CLOSE THE MEDIAN AND MIDDLE LANES OF NB NC 540 AND FILL THE EXISTING RUMBLE STRIPS AS DIRECTED BY THE ENGINEER.

COMPLETE PHASE II STEPS 2 AND 3 IN 120 CALENDAR DAYS

STEP 2:

USING RDWY STD 1101.02 CLOSE THE MEDIAN AND MIDDLE TRAVEL LANES OF NB NC 540 AND REMOVE THE EXISTING PAVEMENT MARKINGS AND REPLACE WITH TEMPORARY MARKINGS AND MARKERS IN 11' TRAVEL LANES. SHIFT NB 540 INTO ITS TEMPORARY PATTERN TO THE MEDIAN AND MIDDLE TRAVEL LANES. CLOSE THE MIDDLE AND OUTSIDE TRAVEL LANES OF NB NC 540 AND PLACE PORTABLE CONCRETE BARRIER AS SHOWN, (SEE TMP-10 AND TMP-12 THRU TMP-14).

BEHIND BARRIER CONSTRUCT EXCLUDING THE FINAL LAYER OF SURFACE COURSE AS FOLLOWS, (SEE TMP-10 AND TMP-12 THRU TMP-14):

- NB -NC540- STA 545+66 TO STA 557+36
- -RPD- STA 10+00 TO STA 14+47
- NB -NC540- STA 566+52 TO STA 585+29
- -LPD- STA 10+00 TO STA 12+25

STEP 3:

USING RDWY STD 1101.02 CLOSE THE MIDDLE AND OUTSIDE TRAVEL LANES OF NB NC 540 AND REMOVE THE PORTABLE CONCRETE BARRIER FROM NB NC 540. REMOVE THE TEMPORARY PAVEMENT MARKINGS AND MARKERS AND REPLACE WITH FINAL MARKINGS AND MARKERS IN ITS PROPOSED TRAFFIC PATTERN. REMOVE THE REMAINING TEMPORARY PAVEMENT MARKINGS FROM THE MEDIAN LANE AND MEDIAN SHOULDER. PLACE THE REMAINING FINAL MARKINGS ON NB NC 540 AND OPEN THE NB NC 540 TRAVEL LANES. THE NEWLY CONSTRUCTED AUXILIARY LANES SHALL REMAIN CLOSED AND DELINEATED WITH DRUMS, (SEE TMP-16 THROUGH TMP-19, AND PAVEMENT MARKING PLANS).

STEP 4:

USING ALTERNATING LANE CLOSURES TIE IN -Y1- AND -DR2-, PLACE PAVEMENT MARKINGS, AND OPEN THE ROADWAYS TO TRAFFIC. UPON COMPLETION, CLOSE EXISTING TWYLA RD. AND CONSTRUCT THE PROPOSED "T" TURN-AROUND, CUL-DE-SAC, AND -DR1- ON TWYLA RD. (SEE TMP-11, TMP-13 AND TMP-15).

STEP 5:

CONSTRUCT EXCLUDING THE FINAL LAYER OF SURFACE COURSE AS FOLLOWS (SEE TMP-11 AND TMP-13):

- -RPD- STA 22+00 TO STA 31+02
- -LPD- STA 16+00 TO STA 23+54
- -L- STA 72+00 TO STA 75+28

STEP 6A:

USING RDWY STD 1101.02 CLOSE THE MEDIAN AND MIDDLE LANES OF SB NC 540 AND FILL THE EXISTING RUMBLE STRIPS AS DIRECTED BY THE ENGINEER.

COMPLETE PHASE II STEPS 6 AND 7 IN 120 CALENDAR DAYS

STEP 6:

UPON COMPLETION OF STEP 3 AND USING RDWY STD 1101.02 CLOSE THE MEDIAN AND MIDDLE TRAVEL LANES OF SB NC 540 AND REMOVE THE EXISTING PAVEMENT MARKINGS AND REPLACE WITH TEMPORARY MARKINGS AND MARKERS IN 11' TRAVEL LANES. SHIFT SB 540 INTO ITS TEMPORARY PATTERN TO THE MEDIAN AND MIDDLE TRAVEL LANES. CLOSE THE MIDDLE AND OUTSIDE TRAVEL LANES OF SB NC 540 AND PLACE PORTABLE CONCRETE BARRIER AS SHOWN, (SEE TMP-16 THRU TMP-20).

BEHIND BARRIER CONSTRUCT EXCLUDING THE FINAL LAYER OF SURFACE COURSE AS FOLLOWS, (SEE TMP-16 THRU TMP-20):

- SB -NC540- STA 557+49 TO STA 576+18
- -LPB- STA 10+00 TO STA 12+20
- SB -NC540- STA 585+59 TO STA 593+31
- -RPB- STA 10+00 TO STA 14+64

STEP 7:

USING RDWY STD 1101.02 CLOSE THE MIDDLE AND OUTSIDE TRAVEL LANES OF SB NC 540 AND REMOVE THE PORTABLE CONCRETE BARRIER FROM SB NC 540. REMOVE THE TEMPORARY PAVEMENT MARKINGS AND MARKERS AND REPLACE WITH FINAL MARKINGS AND MARKERS IN ITS PROPOSED TRAFFIC PATTERN. REMOVE THE REMAINING TEMPORARY PAVEMENT MARKINGS FROM THE MEDIAN LANE AND MEDIAN SHOULDER. PLACE THE REMAINING FINAL MARKINGS ON SB NC 540 AND OPEN THE SB NC 540 TRAVEL LANES. THE NEWLY CONSTRUCTED AUXILIARY LANES SHALL REMAIN CLOSED AND DELINEATED WITH DRUMS (SEE TMP-16 THROUGH TMP-20).

STEP 8:

COMPLETE ALL REMAINING CONSTRUCTION AS BEGUN IN PHASE I.

PHASE III

STEP 1:

USING RDWY STD 1101.02 AS NEEDED, REMOVE EXISTING AND TEMPORARY PAVEMENT. CONSTRUCT REMAINING MEDIAN CURB AND GUTTER ON -L- MORRISVILLE PKWY.

STEP 2:

USING LANE CLOSURES AND FLAGGERS AS NEEDED, PLACE THE FINAL LAYER OF SURFACE COURSE AND FINAL PAVEMENT MARKINGS ON -L- MORRISVILLE PARKWAY. REMOVE ALL TRAFFIC CONTROL DEVICES AND OPEN ALL LANES TO TRAFFIC IN THE FINAL PATTERN, (SEE TMP-21 THRU TMP-26).

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APPROVED: C. Byron Holden DATE: 12/8/2017

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 033753 ENGINEER C. BYRON HOLDEN

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

TRAFFIC CONTROL PHASING

12/8/2017
u5315_tcp_tmp02.dgn
bholden

TIP NO.	SHEET NO.
U-5315 A&B	SIGN-02A

APPROVED: _____

DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036073 ENGINEER BARRY L. BRANDT

DocuSigned by: Barry Brandt 12/8/2017

DocuSigned by:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUMMARY OF QUANTITIES

ITEM NO.		ITEM DESCRIPTION	QUANTITY	UNIT
DESC. NO.	SECT. NO.			
4025000000	901	CONTRACTOR FURNISHED, TYPE A SIGN	2135.5	SF
4025000000	901	CONTRACTOR FURNISHED, TYPE B SIGN	218.75	SF
4025000000	901	CONTRACTOR FURNISHED, TYPE D SIGN	104.5	SF
4025000000	901	CONTRACTOR FURNISHED, TYPE E SIGN	508.5	SF
4025000000	901	CONTRACTOR FURNISHED, TYPE SIGN (OVERLAY)	4	SF
4366000000	SP	CONTRACTOR FURNISHED, TOLL ROUTE ASSEMBLY	484.25	SF
4025000000	901	CONTRACTOR FURNISHED, TYPE MILE MARKER SIGN	73.5	SF
4048000000	902	REINFORCED CONCRETE SIGN FOUNDATIONS	9	CY
4060000000	903	SUPPORTS, BREAKAWAY STEEL BEAM	8991	LB
4066000000	903	SUPPORTS, SIMPLE STEEL BEAM	1434	LB
4072000000	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1447	LF
4096000000	904	SIGN ERECTION, TYPE D	9	EA
4102000000	904	SIGN ERECTION, TYPE E	68	EA
4109000000	904	SIGN ERECTION, TYPE A (GROUND MOUNTED)	9	EA
4366000000	SP	SIGN ERECTION, TOLL ROUTE ASSEMBLY	13	EA
4114000000	904	SIGN ERECTION, MILEMARKERS	5	EA
4116000000	904	SIGN ERECTION, OVERLAY (GROUND MOUNTED)	1	EA
4149000000	907	DISPOSAL OF SIGN SYSTEM, OVERHEAD	4	EA
4152000000	907	DISPOSAL OF SIGN SYSTEM, STEELBEAM	3	EA
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	6	EA
4955000000	1264	OBJECT MARKERS (END OF ROAD)	6	EA

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
862.01	GUARDRAIL PLACEMENT
862.02	GUARDRAIL INSTALLATION
862.03	STRUCTURE ANCHOR UNITS
901.10	TYPE 'A' SIGNS
901.20	TYPE 'B' SIGNS
901.50	ARROWS AND SHIELDS
901.60	RIVET SPACING FOR OVERLAYED SIGNS
901.70	SIGN STRINGERS AND SUPPORT SPACING
901.80	SIGN MOUNTING DETAILS - FOR TYPE A AND TYPE B SIGNS
903.10	GROUND MOUNTED SIGN SUPPORTS (EXCEPT 1 OF 3 WHICH IS REPLACED WITH SIGN-02D AND 2 OF 3 WHICH IS REPLACED WITH SIGN-02E IN THE PLANS)
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.20	SECONDARY SIGN MOUNTING
904.40	MILEPOST AND PLACEMENT (REPLACED WITH SIGN-02F IN THE PLANS)
904.50	MOUNTING OF TYPE 'D', 'E' AND 'F' SIGNS ON 'U' CHANNEL POSTS
1264.01	OBJECT MARKERS
1264.02	OBJECT MARKERS

CONSTRUCTION NOTES

1 DISPOSAL OF SIGN SYSTEM, U-CHANNEL
2 DISPOSAL OF SIGN SYSTEM, OVERHEAD
3 DISPOSAL OF SIGN SYSTEM, STEEL BEAM
4 SIGN ERECTION, TYPE A (OVERHEAD)
5 SIGN ERECTION, TYPE B (OVERHEAD)
6 SIGN ERECTION, TYPE A (GROUND MOUNTED)
7 SIGN ERECTION, TYPE B (GROUND MOUNTED)
8 SIGN ERECTION, MILEMARKERS
9 SIGN ERECTION, TYPE D OR E
10 SIGN ERECTION, TOLL ROUTE SIGN ASSEMBLIES ON STEEL SUPPORTS
11 SIGN ERECTION, OVERLAY (GROUND MOUNTED)
12 OBJECT MARKERS, END OF ROAD

GENERAL NOTES

. SIGNING PLANS DO NOT INCLUDE TEMPORARY CONSTRUCTION SIGNING OR PAVEMENT MARKINGS. SEE TRAFFIC CONTROL PLANS AND PAVEMENT MARKINGS PLANS FOR DETAILS.

. ALL TYPE 'D' SIGNS SHALL BE MOUNTED ON TWO U-CHANNEL POSTS UNLESS OTHERWISE INDICATED ON THE PLANS.

. IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.

. WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' AND 'F' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER.

. ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.

. WHEN EXISTING SIGNS ARE REMOVED AND INSTALLED ON NEW SUPPORTS, THE RE-ERECTION SHALL IMMEDIATELY FOLLOW THE REMOVAL.

. THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.

. DO NOT BEGIN FABRICATION FOR TYPES A & B SIGNS MOUNTED ON OVERHEAD STRUCTURES OR STEEL SUPPORTS UNTIL "S" DIMENSIONS HAVE BEEN FIELD VERIFIED.

. SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.

. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL EXISTING UTILITIES AND STORM DRAINS PRIOR TO CONSTRUCTION.

. EXIT GORE SIGNS SHALL BE ERECTED ON OMNI-DIRECTIONAL BREAKAWAY SUPPORTS.

. IF THE GROUNDWATER IS ENCOUNTERED AT A DEPTH SHALLOWER THAN 7 FEET, THE SIGN FOUNDATION MUST BE REDESIGNED BASED UPON THE ACTUAL FIELD CONDITIONS. THE FOUNDATION DESIGN DOES NOT APPLY TO VERY SOFT OR LOOSE SOIL, MUCK, WEATHERED ROCK, OR HARD ROCK.

. VHB TAPE SHALL ONLY BE USED ON TOLL ROUTE SIGN ASSEMBLIES ON STEEL SUPPORTS AS INDICATED ON SHEETS SIGN-02G AND SIGN-02H.

. REFER TO OVERHEAD STRUCTURE DRAWINGS (SIGN-21, SIGN-22, SIGN-24, SIGN-25, SIGN-27, SIGN-28, SIGN-29, AND SIGN-32) FOR OVERHEAD SIGN STRUCTURE TRUSS, FOUNDATION AND AESTHETIC COLUMN DESIGNS AND QUANTITIES.

. REFER TO OVERHEAD STRUCTURE DRAWINGS (SIGN-21, SIGN-23, SIGN-26, SIGN-27, SIGN-30, AND SIGN-31) FOR OVERHEAD GANTRY STRUCTURE TRUSS, FOUNDATION, AND AESTHETIC COLUMN DESIGNS AND QUANTITIES.

12/8/2017
R:\Traffic\Signing\CADD\Signing Layout Plans\Pages\u5315_sgn_5-02A.dgn
NJH

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 (919) 878-9560
FOR
THE NORTH CAROLINA TURNPIKE AUTHORITY

NOTES AND STANDARD DRAWINGS

TIP NO.	SHEET NO.
U-5315 A&B	SIGN-02B

APPROVED: _____

DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036073 ENGINEER BARRY L. BRANDT

DocuSigned by: Barry Brandt 12/8/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

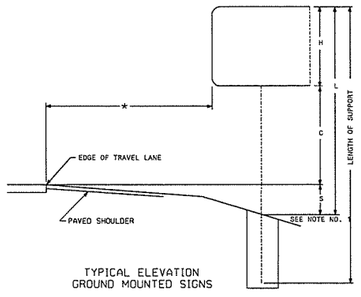
Version: 3.0 Posted: 9/14/2016

SIGN																												FIELD VERIFIED
		SIZE (in.)											LENGTH (ft)												SUPPORT WEIGHTS		FOOTINGS				
NUMBER	TYPE	w	x	h	ROADWAY STATION	NUMBER OF SUPPORTS	BEAM SECTION	SUPPORT TYPE BA or S	OMNI COUPLER	ATTACHMENT METHOD	MOUNTING METHOD	HORIZONTAL CLEARANCE* (ft.)	SUPPORT SPACING	SNS HT "H"	MTG HT "C"	EMBED-MENT	LEFT SUPPORT (ft) S	L	LENGTH	CENTER SUPPORT (ft) S	L	LENGTH	RIGHT SUPPORT (ft) S	L	LENGTH	B/A (lbs.)	SIMPLE (lbs.)	DIAMETER (ft.)	DEPTH (ft.)	REINFORCED (c.y.)	PLAIN (c.y.)	SEE NOTE 2 (mm/dd/yy)
101	A	132	x	66	-LPD- 22+18	2	W6x9	BA	N/A	N/A	N/A	18.00	6.45	5.50	7.00	3.0	1.80	14.30	17.30	0.00	0.00	0.00	3.41	15.91	18.91	389.89	0	1.5	3.5	0.46	0.00	_____
102	A	156	x	108	-LPD- 21+56	2	W6x16	BA	N/A	N/A	N/A	18.00	7.62	9.00	7.00	4.0	1.90	17.90	21.90	0.00	0.00	0.00	3.81	19.81	23.81	825.36	0	1.5	4.5	0.59	0.00	_____
103	A	132	x	66	-RPB- 17+00	2	W6x12	BA	N/A	N/A	N/A	25.00	6.45	5.50	7.00	3.0	4.44	16.94	19.94	0.00	0.00	0.00	6.05	18.55	21.55	575.88	0	1.5	3.5	0.46	0.00	_____
104	A	156	x	108	-RBP- 19+00	2	W6x16	BA	N/A	N/A	N/A	25.00	7.62	9.00	7.00	4.0	4.24	20.24	24.24	0.00	0.00	0.00	6.78	22.78	26.78	910.32	0	1.5	4.5	0.59	0.00	_____
105	A	180	x	72	-NC540- 519+00	2	W6x16	S	N/A	N/A	N/A	21.00	8.79	6.00	7.00	3.5	3.24	16.24	19.74	0.00	0.00	0.00	7.14	20.14	23.64	0.00	694.08	1.5	4	0.52	0.00	_____
106	A	180	x	72	-NC540- 640+00	2	W6x16	S	N/A	N/A	N/A	20.00	8.79	6.00	7.00	4.0	3.87	16.87	20.87	0.00	0.00	0.00	8.34	21.34	25.34	0.00	739.36	1.5	4.5	0.59	0.00	_____
107	A	162	x	78	-NC540- 719+00	2	W6x12	BA	N/A	N/A	N/A	20.00	7.91	6.50	7.00	3.5	0.76	14.26	17.76	0.00	0.00	0.00	4.34	17.84	21.34	547.20	0	1.5	4	0.52	0.00	_____
201	A	78	x	60	-NC540- 556+70	2	S3x5.7	BA	YES	N/A	N/A	Δ	3.81	5.00	7.00	0.0	0.22	12.22	12.22	0.00	0.00	0.00	0.21	12.21	12.21	139.25	0	1.5	2.5	0.33	0.00	_____
202	A	78	x	60	-NC540- 586+10	2	S3x5.7	BA	YES	N/A	N/A	Δ	3.81	5.00	7.00	0.0	0.99	12.99	12.99	0.00	0.00	0.00	0.35	12.35	12.35	144.44	0	1.5	2.5	0.33	0.00	_____
																										TOTAL 3532.34	TOTAL 1433.44			TOTAL 4.39	TOTAL 0.00	
																										USE: 3533.00	1434.00			5.00	0.00	

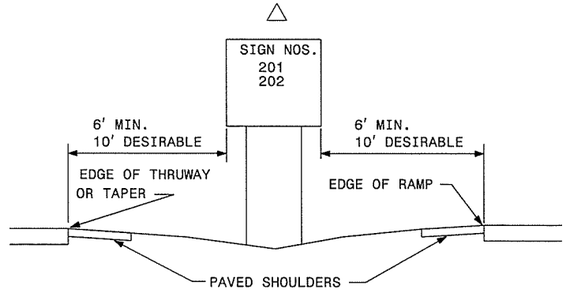
PROJECT NOTES

NOTES

1. DIMENSION "S" REPRESENTS AN INCREASE (+), OR A DECREASE (-) IN POLE LENGTH, RELATIVE TO THE ELEVATION OF THE EDGE OF PAVEMENT.
2. FIELD VERIFICATIONS SHALL BE REQUIRED FOR ALL SUPPORTS, SEE (*) ARTICLE 903-3. FABRICATORS SHALL BE AISC CERTIFIED IN CATEGORY 1, SEE (*) ARTICLE 1072-1. (*) = N.C.D.O.T. STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES
3. PLAN LOCATIONS FOR EXISTING UTILITIES ARE BASED ON THE BEST AVAILABLE INFORMATION AND, THEREFORE MAY NOT BE PRECISELY ACCURATE. THEREFORE, IT IS INCUMBENT UPON THE CONTRACTOR TO DETERMINE THE EXACT LOCATION OF UTILITIES BEFORE BEGINNING WORK IN A LOCATION.



TYPICAL ELEVATION
GROUND MOUNTED SIGNS



PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 (919) 878-9560

FOR
THE NORTH CAROLINA TURNPIKE AUTHORITY

TYPE "A" AND "B" GROUND MOUNTED SIGN CHART

12/8/2017
R:\Traffic\Signing\CADD\Signing Layout Plans\Pages\u5315_sgn_S-028.dgn
NJM

TIP NO.	SHEET NO.
U-5315 A&B	SIGN-02C

APPROVED: _____

DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036073 ENGINEER BARRY L. BRANDT

DocuSigned by: Barry Brandt 12/8/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Version: 3.0 Posted: 9/14/2016

SIGN					ROADWAY	NUMBER	BEAM	SUPPORT	OMNI	ATTACHMENT	MOUNTING	HORIZONTAL	SUPPORT	LENGTH (ft)			LEFT SUPPORT (ft)			CENTER SUPPORT (ft)			RIGHT SUPPORT (ft)			SUPPORT WEIGHTS		FOOTINGS				FIELD
NUMBER	* TYPE	SIZE (in.) w	x	h	STATION	OF SUPPORTS	SECTION	TYPE BA or S	COUPLER	METHOD	METHOD	CLEARANCE* (ft.)	SPACING	SNS HT "H"	MTG HT "C"	EMBED-MENT	S	L	LENGTH	S	L	LENGTH	S	L	LENGTH	B/A (lbs.)	SIMPLE (lbs.)	DIAMETER (ft.)	DEPTH (ft.)	REINFORCED (c.y.)	PLAIN (c.y.)	VERIFIED SEE NOTE 2 (mm/dd/yy)
108	B	36	x	114	-L- 52+00	1	W6x16	BA	N/A	N/A	N/A	12.00	0.00	9.50	9.06	3.0	0.00	0.00	0.00	-2.06	16.50	19.50	0.00	0.00	0.00	359.00	0	1.5	3.5	0.23	0.00	
109	A	74	x	133	-L- 59+25	2	W6x12	BA	N/A	N/A	N/A	14.50	3.61	11.08	7.00	3.0	1.82	19.90	22.90	0.00	0.00	0.00	2.35	20.43	23.43	634.04	0	1.5	3.5	0.46	0.00	
110	B	36	x	133	-L- 63+00	1	W6x16	BA	N/A	N/A	N/A	19.50	0.00	11.08	8.33	3.0	0.00	0.00	0.00	-1.33	18.08	21.08	0.00	0.00	0.00	384.33	0	1.5	3.5	0.23	0.00	
111	B	36	x	133	-LPB- 20+50	1	W6x16	BA	N/A	N/A	N/A	18.50	0.00	11.08	9.65	3.5	0.00	0.00	0.00	-2.65	18.08	21.58	0.00	0.00	0.00	392.33	0	1.5	4	0.26	0.00	
112	A	74	x	133	-L- 62+00	2	W6x12	BA	N/A	N/A	N/A	15.00	3.61	11.08	7.00	3.0	1.73	19.81	22.81	0.00	0.00	0.00	2.23	20.31	23.31	631.52	0	1.5	3.5	0.46	0.00	
113	B	36	x	133	-L- 72+00	1	W6x16	BA	N/A	N/A	N/A	16.00	0.00	11.08	7.00	3.0	0.00	0.00	0.00	2.78	20.86	23.86	0.00	0.00	0.00	428.81	0	1.5	3.5	0.23	0.00	
114	B	36	x	133	-LPD- 22+71	1	W6x16	BA	N/A	N/A	N/A	12.00	0.00	11.08	7.00	3.0	0.00	0.00	0.00	2.25	20.33	23.33	0.00	0.00	0.00	420.33	0	1.5	3.5	0.23	0.00	
115	A	74	x	133	-L- 76+50	2	W6x9	BA	N/A	N/A	N/A	7.42	3.61	11.08	7.70	3.0	-0.70	18.08	21.08	0.00	0.00	0.00	-0.57	18.21	21.21	444.67	0	1.5	3.5	0.46	0.00	
116	A	74	x	133	-L- 73+25	2	W6x12	BA	N/A	N/A	N/A	27.55	3.61	11.08	7.00	3.0	1.31	19.39	22.39	0.00	0.00	0.00	2.81	20.89	23.89	633.44	0	1.5	3.5	0.46	0.00	
117	B	36	x	114	-L- 85+00	1	W6x16	BA	N/A	N/A	N/A	10.00	0.00	9.50	7.00	3.0	0.00	0.00	0.00	1.52	18.02	21.02	0.00	0.00	0.00	383.32	0	1.5	3.5	0.23	0.00	
118	B	36	x	74	-NC540- 649+50	1	W6x12	BA	N/A	N/A	N/A	20.00	0.00	6.17	7.00	2.5	0.00	0.00	0.00	1.64	14.81	17.31	0.00	0.00	0.00	246.68	0	1.5	3	0.20	0.00	
119	B	36	x	74	-NC540- 585+00	1	W6x12	BA	N/A	N/A	N/A	20.00	0.00	6.17	7.00	2.5	0.00	0.00	0.00	2.08	15.25	17.75	0.00	0.00	0.00	251.96	0	1.5	3	0.20	0.00	
120	B	36	x	74	-NC540- 555+00	1	W6x12	BA	N/A	N/A	N/A	20.00	0.00	6.17	7.00	2.5	0.00	0.00	0.00	1.64	14.81	17.31	0.00	0.00	0.00	246.68	0	1.5	3	0.20	0.00	

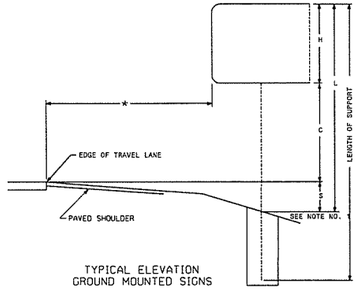
		TOTAL	TOTAL		TOTAL TOTAL
		5457.12	0.00		3.83 0.00
USE:		5458.00	0.00		4.00 0.00

* SIGN TYPE, BASED ON OVERALL WINDLOAD AREA AS SHOWN ON SHEET SIGN-04H, USED FOR CALCULATIONS. SIGN PANELS WILL FOLLOW SPECIFICATIONS FOR TYPE "B" SIGNS, EXCEPT FOR MOUNTING METHODS AND SILK SCREENING.

PROJECT NOTES

NOTES

1. DIMENSION "S" REPRESENTS AN INCREASE (+), OR A DECREASE (-) IN POLE LENGTH, RELATIVE TO THE ELEVATION OF THE EDGE OF PAVEMENT.
2. FIELD VERIFICATIONS SHALL BE REQUIRED FOR ALL SUPPORTS, SEE (*) ARTICLE 903-3. FABRICATORS SHALL BE AISC CERTIFIED IN CATEGORY 1, SEE (*) ARTICLE 1072-1. (*) = N.C.D.O.T. STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES
3. PLAN LOCATIONS FOR EXISTING UTILITIES ARE BASED ON THE BEST AVAILABLE INFORMATION AND, THEREFORE MAY NOT BE PRECISELY ACCURATE. THEREFORE, IT IS INCUMBENT UPON THE CONTRACTOR TO DETERMINE THE EXACT LOCATION OF UTILITIES BEFORE BEGINNING WORK IN A LOCATION.



TYPICAL ELEVATION
GROUND MOUNTED SIGNS

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 (919) 878-9560

FOR
THE NORTH CAROLINA TURNPIKE AUTHORITY

TOLL ROUTE SIGN ASSEMBLIES STEEL SUPPORT CHART

12/8/2017
R:\Traffic\Signing\CADD\Signing Layout Plans\Pages\u5315_sgn_S-02C.dgn
NJH

TIP NO.	SHEET NO.
U-5315 A&B	ES-02A

APPROVED: _____

DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036073 ENGINEER BARRY L BRANDT

DocuSigned by: Barry Brandt 12/9/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

△ NOTES

△1 AT THESE LOCATIONS, PROVIDE ELECTRICAL DUCT IN ACCORDANCE WITH NEC REQUIREMENTS FOR AN APPROVED RACEWAY FOR ELECTRICAL CIRCUITS. WHEN MORE THAN ONE CIRCUIT IS INSTALLED IN A SINGLE RACEWAY, A SINGLE EQUIPMENT GROUNDING CONDUCTOR SIZED AS REQUIRED FOR THE LARGEST CIRCUIT SHALL BE USED. SEE TABLE "C".

△2 LOCATE PROPOSED CONTROL SYSTEM IN AN AREA ACCESSIBLE FOR MAINTENANCE VEHICLES AND OUTSIDE OF CLEAR ZONE AS DEFINED BY THE 2011 AASHTO ROADSIDE DESIGN GUIDE.

△3 INSTALL ALL BORE PITS OUTSIDE THE CLEAR ZONE, AS DEFINED BY THE 2011 AASHTO ROADSIDE DESIGN GUIDE OR AS DIRECTED BY THE ENGINEER.

△4 LOCATE ALL JUNCTION BOXES OUTSIDE CLEAR ZONE IN AN AREA UNLIKELY TO BE USED BY TRAFFIC.

△5 INSTALL RIGID GALVANIZED CONDUIT (RGC) ABOVE GROUND AND POLYVINYL CHLORIDE (PVC) SCHEDULE 40 CONDUIT UNDERGROUND, EXCEPT AS MODIFIED ON THESE PLAN SHEETS OR IN APPLICABLE SECTIONS OF THE ROADWAY STANDARD DRAWINGS FOR THIS PROJECT.

△6 TYPE LSJB JUNCTION BOX – 18" L X 12" W X 18" H.

△7 TYPE HMJB JUNCTION BOX – 18" L X 12" W X 18" H.

△8 TYPE PC18 JUNCTION BOX – 18" L X 12" W X 18" H.

△9 TYPE PC24 JUNCTION BOX – 18" L X 24" W X 18" H.

△10 TYPE PC36 JUNCTION BOX – 36" L X 24" W X 18" H.

△11 LIGHT STANDARD SHALL BE INSTALLED BEHIND THE PROPOSED SIDEWALK.

△12 PROPOSED JUNCTION BOX SHALL BE INSTALLED WITHIN 15' FROM PROPOSED LIGHT STANDARD. THIS JUNCTION BOX WILL SERVE AS THE LIGHT STANDARD JUNCTION BOX (LSJB) SHOWN ON STANDARD DRAWING 1404D01 ON SHEET ES-03A.

△13 CONNECT LUMINAIRE CIRCUIT TO PHOTOCELL AND CIRCUIT FOR PARKING AREA LIGHTING FROM 120/240V PANEL INSIDE TOLL VAULT. LUMINAIRE OPERATING VOLTAGE SHALL BE 240V. REFER TO ITS PLANS FOR ADDITIONAL DETAILS.

△14 CONNECT LUMINAIRE CIRCUIT TO NEW 2-POLE, 20 AMP BREAKER FOR LIGHTING IN THE 120/240V RAW POWER PANEL. INSTALL PHOTOCELL ON THE LUMINAIRE. LUMINAIRE OPERATING VOLTAGE SHALL BE 240V. REFER TO ITS PLANS FOR ADDITIONAL DETAILS.

SCOPE OF WORK

PLACE ROADWAY LIGHTING INTO SERVICE BY DESIGNING, FURNISHING AND INSTALLING HIGH MAST AND SINGLE-ARM STANDARDS WITH LED LUMINAIRES, UNDERGROUND CIRCUITRY, CONTROL SYSTEMS AND JUNCTION BOXES.

LIGHTING IS INCLUDED AT THE INTERCHANGE OF NC 540 AND MORRISVILLE PARKWAY.

DESIGN CRITERIA

PHOTOMETRIC DESIGN CRITERIA:
NC 540 TRAVEL LANES AND RAMPS:
- AVERAGE ILLUMINANCE: 0.7 FC
- AVERAGE TO MINIMUM (UNIFORMITY RATIO): 3.5:1

MORRISVILLE PARKWAY TRAVEL LANES:
- AVERAGE ILLUMINANCE: 0.6 FC
- AVERAGE TO MINIMUM (UNIFORMITY RATIO): 4:1

ROUNDABOUT TRAVEL LANES:
- AVERAGE ILLUMINANCE: 1.2 FC
- AVERAGE TO MINIMUM (UNIFORMITY RATIO): 3:1

TOLL PLAZA SERVICE PULL-OFF AREAS:
- AVERAGE ILLUMINANCE: 1.75 FC
- AVERAGE TO MINIMUM (UNIFORMITY RATIO): 4:1

2005 AASHTO ROADWAY LIGHTING DESIGN GUIDE

2009 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, 5TH EDITION AND LATEST INTERIM SPECIFICATIONS VALID AT THE TIME OF LETTING

2014 NATIONAL ELECTRIC CODE

2011 AASHTO ROADSIDE DESIGN GUIDE

FATIGUE CATEGORY II SHALL BE USED IN DESIGN

DESIGN HIGH MOUNT STANDARD FOUNDATION FOR BASIC WIND SPEED OF 110 MPH

DESIGN HIGH MOUNT STANDARD SUPPORT FOR BASIC WIND SPEED OF 110 MPH

ROADWAY STANDARDS

THE FOLLOWING ROADWAY ENGLISH STANDARDS AS APPEAR IN "NCDOT ROADWAY STANDARD DRAWINGS", ROADWAY DESIGN UNIT-N.C. DEPARTMENT OF TRANSPORTATION RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD NO.	TITLE
1401.01	HIGH MOUNT STANDARD (USE DETAIL 1401.01 ON SHEET ES-03B IN LIEU OF STANDARD DRAWING 1401.01)
1402.01	HIGH MOUNT FOUNDATION (USE DETAIL 1402D01 ON SHEET ES-03C IN LIEU OF STANDARD DRAWING 1402.01)
1403.01	HIGH MOUNT LUMINAIRE (USE DETAIL 1403D01 ON SHEET ES-03C IN LIEU OF STANDARD DRAWING 1403.01)
1404.01	LIGHT STANDARDS (USE DETAIL 1404D01 ON SHEET ES-03A IN LIEU OF STANDARD DRAWING 1404.01 SHEET 1)
1405.01	STANDARD FOUNDATION
1406.01	LIGHT STANDARD LUMINAIRE (USE DETAIL 1406D01 ON SHEET ES-03A IN LIEU OF STANDARD DRAWING 1406.01)
1407.01	ELECTRIC SERVICE POLE AND LATERAL
1408.01	LIGHT CONTROL SYSTEM
1409.01	ELECTRICAL DUCT
1410.01	FEEDER CIRCUITS
1411.01	ELECTRICAL JUNCTION BOXES

ALL WORK SHALL BE IN CONFORMANCE WITH DIVISION 14 OF THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, DATED JANUARY 2012.

LEGEND

- PROPOSED 40' LIGHT STANDARD TYPE MTLT WITH 17" BRACKET ARM, 208 WATT MAX, LED, B3-U0-G4, TYPE III, 23,250 INITIAL LUMENS, WITH TYPE R1 OR R2 FOUNDATION UNLESS OTHERWISE NOTED
- 6 — PROPOSED 100' HIGH MAST STANDARD W/HM FOUNDATION & (6) HM LUMINAIRES 550 WATT MAX, LED, ARRANGED AT 60 DEGREE SPACING, B5-U0-G5, TYPE V, 57,690 INITIAL LUMENS, SEE DETAIL ON SHEET ES-03C
- 8 — PROPOSED 80' HIGH MAST STANDARD W/HM FOUNDATION & (8) HM LUMINAIRES 320 WATT MAX, LED, ARRANGED AT 45 DEGREE SPACING, B5-U0-G3, TYPE V, 29,000 INITIAL LUMENS, SEE DETAIL ON SHEET ES-03C
- PROPOSED CONTROL SYSTEM WITH PC36 JUNCTION BOX. BREAKER SIZE SHOWN IN LOAD SCHEDULES.
- JB-1 — PROPOSED ELECTRICAL JUNCTION BOX WITH 18" REINFORCED CONCRETE COLLAR, MINIMUM 4" DEEP. SEE NOTES, THIS SHEET, AND TABLE B ON SHEET ES-02B.
- △1 — REFERENCE TO CORRESPONDING NOTE AS NUMBERED
- A1 / 6 — PROPOSED FEEDER CIRCUIT CONTROL SYSTEM(A), CIRCUIT(1) PLAN SYMBOL (6) SEE TABLE A, THIS SHEET
- 3#1/0 USE 2"C — PROPOSED SERVICE POLE AND LATERAL 30' CLASS 4 3#1/0 USE CONDUCTORS 2" CONDUIT
- 2", 3" OR 4" ELEC. DUCT JA & BD — PROPOSED ELECTRICAL DUCT SIZE 2", 3" OR 4" TYPE (JA) OR (BD). SEE TABLE C ON SHEET ES-02B
- POLE NAMING CONVENTION — CONTROL SYSTEM-POLE NUMBER-CIRCUIT NUMBER

TABLE "A"
CIRCUITRY CONDUCTOR CONDUIT TYPE & SIZE

PLAN SYMBOL	DESCRIPTION		CONTRACT ITEM
8	2 #8Ø 1 #10G 1.5" C	2 AWG SIZE 8 CONDUCTOR (BK & RD) 1 AWG SIZE 10 GROUNDING CONDUCTOR 1.5" PVC CONDUIT	2 – 8 W/G FEEDER CIRCUIT IN 1.5" CONDUIT
*8	2 #8Ø 1 #10G	2 AWG SIZE 8 CONDUCTOR (BK & RD) 1 AWG SIZE 10 GROUNDING CONDUCTOR	2 – 8 W/G FEEDER CIRCUIT
4	2 #4Ø 1 #6G 1.5" C	2 AWG SIZE 4 CONDUCTOR (BK & RD) 1 AWG SIZE 6 GROUNDING CONDUCTOR 1.5" PVC CONDUIT	2 – 4 W/G FEEDER CIRCUIT IN 1.5" CONDUIT
*4	2 #4Ø 1 #6G	2 AWG SIZE 4 CONDUCTOR (BK & RD) 1 AWG SIZE 6 GROUNDING CONDUCTOR	2 – 6 W/G FEEDER CIRCUIT
2	2 #2Ø 1 #4G 1.5" C	2 AWG SIZE 2 CONDUCTOR (BK & RD) 1 AWG SIZE 4 GROUNDING CONDUCTOR 1.5" PVC CONDUIT	2 – 2 W/G FEEDER CIRCUIT IN 1.5" CONDUIT
*2	2 #2Ø 1 #4G	2 AWG SIZE 2 CONDUCTOR (BK & RD) 1 AWG SIZE 4 GROUNDING CONDUCTOR	2 – 2 W/G FEEDER CIRCUIT

ABBREVIATIONS

BD	BURIED	PVC	PVC SCHEDULE 40 CONDUIT
LT	LEFT	RGC	RIGID GALVANIZED STEEL CONDUIT
RT	RIGHT	C	CONDUIT
JA	JACKED	CKT	CIRCUIT
MH	MOUNTING HEIGHT	N	NEUTRAL
Ø	PHASE	G	GROUND
SER LAT	SERVICE LATERAL	HM	HIGH MAST
AL	ARM LENGTH	USE	UNDERGROUND SERVICE ENTRANCE
WM	WALL MOUNT		

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 (919) 878-9560
FOR
THE NORTH CAROLINA TURNPIKE AUTHORITY

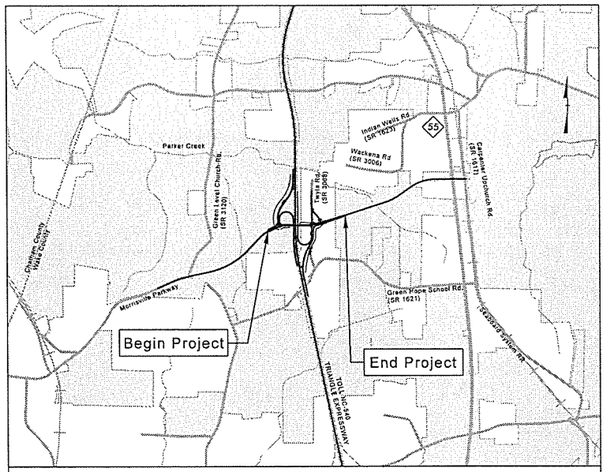
LIGHTING NOTES AND LEGEND

12/8/2017
R:\LightingElectrical\Lighting Design\U5315_es_dsn_ES-02A.dgn
MHJ

09/08/99

TIP PROJECT: U-5315 A&B

CARY PROJECT: ST 1123/1220



VICINITY MAP N.T.S.

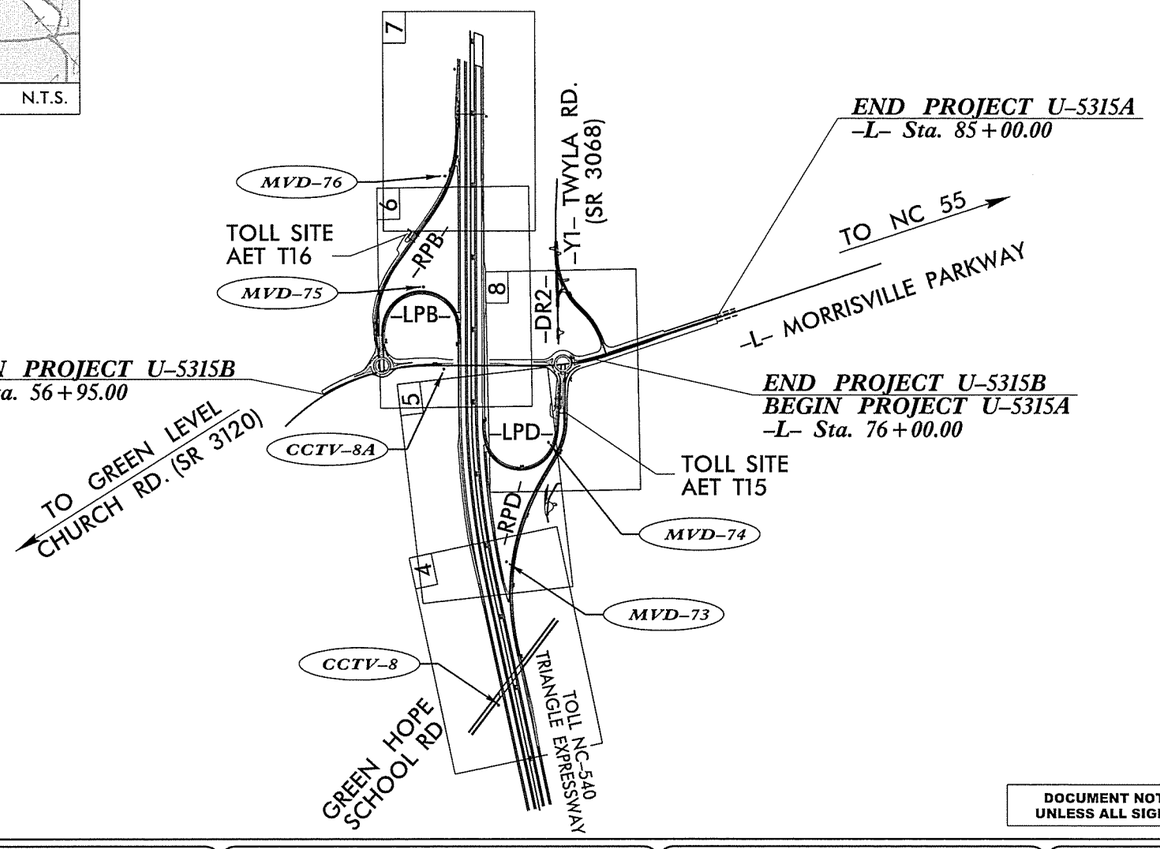
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.		SHEET NO.	TOTAL SHEETS
N.C.	U-5315A/U-5315B		ITS-1	
STATE PROJ. NO.		F. A. PROJ. NO.	DESCRIPTION	
U-5315A	45429.1.F2	STPDA-0503(19)	PE	
U-5315A	45429.2.2	STPDA-0540(38)	R/W, UTILITIES	
U-5315B	45429.1.F3	STPDA-0503(19)	PE	
U-5315B	45429.2.3	STPDA-0540(39)	R/W, UTILITIES	
U-5315A&B	45429.3.3	STPDA-0540(39)	CONST.	
U-5315B	45429.5.TA1		TURNPIKE CONST.	
U-5315B	45429.5.TA3		TURNPIKE ROW	

LOCATION: MORRISVILLE PARKWAY EXTENSION AND NC 540 INTERCHANGE
FROM WEST OF HIGHCROFT DRIVE TO EAST OF MILLS PARK DRIVE IN CARY
TYPE OF WORK: COMMUNICATIONS CABLE, CONDUIT ROUTING, CLOSED CIRCUIT TELEVISION CAMERAS AND MICROWAVE VEHICLE DETECTORS

NAD 83/95



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

INDEX OF SHEETS

PREPARED IN THE OFFICE OF:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. F-0112
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

LETTING DATE:
DECEMBER 19, 2017

C. BYRON HOLDEN, P.E.
PROJECT ENGINEER

DAVID SEARS, P.E.
PROJECT DESIGN ENGINEER

NCDOT CONTACTS:
NORTH CAROLINA TURNPIKE AUTHORITY
DENNIS JERNIGAN, P.E.

TRANSPORTATION AND MOBILITY
INTELLIGENT TRANSPORTATION SYSTEMS SECTION
SHERRY YOW

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 033753 ENGINEER C. BYRON HOLDEN

DocuSigned by: C. Byron Holden
SIGNATURE
12/10/2017
DATE

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section

750 N. Greenfield Pkwy., Garner, NC 27529

12/10/2017
R:\Traffic\ITS\DGN\u5315_ITS_tsh.dgn
bholden

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	ITS-1A

1. INSTALL RS–485 CABLE
2. INSTALL SIZE 350 MCM 4–WIRE COPPER FEEDER CONDUCTORS
3. INSTALL 3–WIRE COPPER FEEDER CONDUCTORS
4. INSTALL SMFO CABLE
5. INSTALL MMFO CABLE
6. INSTALL FIBER OPTIC DROP CABLE
7. INSTALL TRACER WIRE
8. TRENCH
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12. INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13. INSTALL OUTER–DUCT POLYETHYLENE CONDUIT
14. INSTALL POLYETHYLENE CONDUIT
15. DIRECTIONAL DRILL CONDUIT
16. BORE AND JACK CONDUIT
17. INSTALL CABLE(S) IN EXISTING CONDUIT
18. INSTALL CABLE(S) IN NEW CONDUIT
19. INSTALL CABLE(S) IN EXISTING RISER
20. INSTALL CABLE(S) IN NEW RISER
21. INSTALL CABLE(S) IN EXISTING CONDUIT STUBOUTS
22. INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
23. INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
24. INSTALL NEW CONDUIT INTO NEW POLE MOUNTED CABINET
25. INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26. TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
27. INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET OR RACK IN VAULT
29. INSTALL UNDERGROUND SPLICE ENCLOSURE
30. INSTALL AERIAL SPLICE ENCLOSURE
31. INSTALL POLE MOUNTED SPLICE CABINET
32. INSTALL BASE MOUNTED SPLICE CABINET
33. REMOVE EXISTING SPLICE CABINET
34. INSTALL CABINET FOUNDATION
35. REMOVE EXISTING CABINET FOUNDATION
36. INSTALL CCTV CAMERA ASSEMBLY
37. INSTALL CCTV CAMERA WOOD POLE
38. INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
39. INSTALL JUNCTION BOX WITH 18" REINFORCED CONCRETE COLLAR 4" THICK MIN.
40. INSTALL OVERSIZED JUNCTION BOX WITH 18" REINFORCED CONCRETE COLLAR 4" THICK MIN.
41. INSTALL OVERSIZED SPLICE BOX WITH 18" REINFORCED CONCRETE COLLAR 4" THICK MIN.
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 TELEPHONE SERVICE
51. INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
52. INSTALL DELINEATOR MARKER
53. STORE 50 FEET OF EACH COMMUNICATIONS 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 ETHERNET SWITCH
60. INSTALL MVD ASSEMBLY
61. INSTALL MVD METAL POLE AND FOUNDATION
62. INSTALL EQUIPMENT CABINET
63. INSTALL MVD TERMINAL SERVER ASSEMBLY
64. REMOVE EXISTING JUNCTION BOXES

CONTRACTOR SHALL INSTALL AND UTILIZE CONDUITS AS SHOWN.

CONDUIT	USE
BLUE	TOLL FOC
WHITE	TOLL SPARE
BLACK	ITS FOC
ORANGE	ITS SPARE

LEGEND

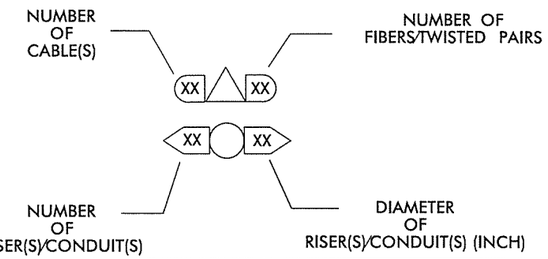
- EXISTING COMMUNICATIONS CABLE
- EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW CONDUIT
- EXISTING CONDUIT
- NEW DIRECTIONAL DRILLED CONDUIT
- NEW OVERSIZED, HEAVY DUTY JUNCTION BOX WITH 18" REINFORCED CONCRETE APRON 4" THICK MIN.
- NEW OVERSIZED, HEAVY DUTY SPLICE BOX WITH 18" REINFORCED CONCRETE APRON 4" THICK MIN.
- C — NEW TOLL SITE COMMUNICATIONS GROUND BOX WITH 18" REINFORCED CONCRETE APRON 4" THICK MIN.
- P — NEW TOLL SITE POWER GROUND BOX WITH 18" REINFORCED CONCRETE APRON 4" THICK MIN.
- S — NEW TOLL SITE LOOP SPLICE BOX WITH 18" REINFORCED CONCRETE APRON 4" THICK MIN.
- EXISTING OVERSIZED, HEAVY DUTY JUNCTION BOX
- S — NEW SPLICE ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV CAMERA ASSEMBLY
- EXISTING CCTV CAMERA ASSEMBLY
- NEW MICROWAVE DETECTOR (MVD) ASSEMBLY
- EXISTING MICROWAVE DETECTOR (MVD) ASSEMBLY
- NEW RWIS ASSEMBLY
- EXISTING RWIS ASSEMBLY
- EXISTING FIELD EQUIPMENT CABINET
- NEW FIELD EQUIPMENT CABINET

ABBREVIATIONS

CCTV	CLOSED–CIRCUIT TELEVISION
ITS	INTELLIGENT TRANSPORTATION SYSTEM
MVD	MICROWAVE VEHICLE DETECTION
AET	ALL–ELECTRONIC TOLLING

CONSTRUCTION NOTE SYMBOLOGY KEY

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



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609–3960
NC LICENSE NO. F–0112 • (919) 878–9560

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

SCALE
N/A

MORRISVILLE PARKWAY PLANS NOTES

DIVISION 05 WAKE COUNTY TOWN OF CARY
PLAN DATE: DECEMBER 2017 REVIEWED BY: C.B.HOLDEN
PREPARED BY: D.T. SEARS REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL
SEAL 033753
ENGINEER
C. BYRON HOLDEN

DocuSigned by: C. Byron Holden 12/10/2017
SIGNATURE DATE

CADD FILE NAME:U5315_ITS_PSH01a.DGN

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	ITS-2G

SHEET INTENTIONALLY LEFT BLANK

12/10/2017
R:\Traffic\TIS\DOH\U5315_ITS_standarddetails.dgn
bholden

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Prepared for the Offices of:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION — Transportation Mobility and Safety Division — Integrated Transportation Systems Section

759 N. Greenfield Pkwy., Garner, NC 27529

SCALE

N/A

NORTH CAROLINA
TURNPIKE AUTHORITY
ITS STANDARD DETAIL

DIVISION 05 WAKE COUNTY TOWN OF CARY

PLAN DATE:	NOVEMBER 2017	REVIEWED BY:	C.B. HOLDEN
PREPARED BY:	D.T. SEARS	REVIEWED BY:	

REVISIONS	INIT.	DATE

CADD Filename: u5315_its_standarddetails.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	ITS-2H

SHEET INTENTIONALLY LEFT BLANK

12/10/2017
R:\Traffic\ITS\DGN\U5315_ITS_standarddetails.dgn
bnolan

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Prepared for the Offices of:

750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
N/A

NORTH CAROLINA
TURNPIKE AUTHORITY
ITS STANDARD DETAIL

DIVISION 05 WAKE COUNTY TOWN OF CARY

PLAN DATE:	NOVEMBER 2017	REVIEWED BY:	C.B. HOLDEN
PREPARED BY:	D.T. SEARS	REVIEWED BY:	

REVISIONS	INIT.	DATE

CADD Filename: U5315_ITS_standarddetails.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	ITS-2I

SHEET INTENTIONALLY LEFT BLANK

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Prepared for the Offices of:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N. Greenfield Pkwy., Garner, NC 27529

SCALE

N/A

NORTH CAROLINA
TURNPIKE AUTHORITY
ITS STANDARD DETAIL

DIVISION 05 WAKE COUNTY TOWN OF CARY

PLAN DATE:	NOVEMBER 2017	REVIEWED BY:	C.B. HOLDEN
PREPARED BY:	D.T. SEARS	REVIEWED BY:	

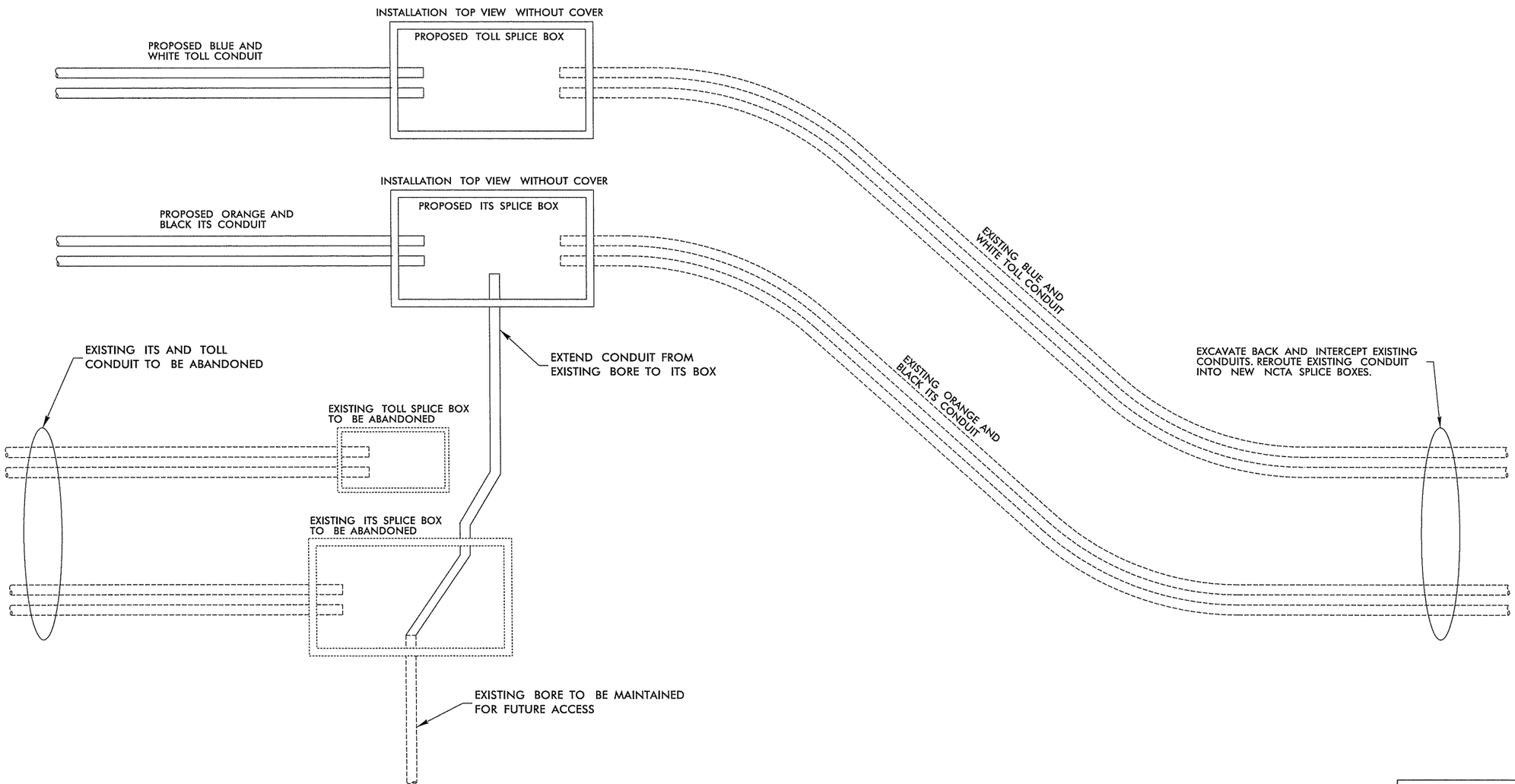
REVISIONS	INIT.	DATE

CADD Filename: u5315_its_standarddetails.dgn

12/10/2017
R:\Traffic\ITS\dgn\u5315_ITS_standarddetails.dgn
bholden

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	ITS-3D

MODIFICATION TO EXISTING CONDUIT SYSTEM
TYPE C



NOTES:
CONTRACTOR TO COORDINATE MODIFICATION TO EXISTING CONDUIT SYSTEM WITH THE GRADING OPERATION TO ENSURE NO DAMAGE TO THE EXISTING FIBER OPTIC TRUNK LINE. SEE TRANSPORATION MANAGEMENT PLAN FOR CONSTRUCTION PHASING.

12/10/2017
R:\Traffic\ITS\ROW\U5315_ITS_PSH03B.dgn
bholden

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

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

SCALE
N/A

MORRISVILLE PARKWAY
MODIFICATION TO EXISTING
CONDUIT DETAILS

DIVISION 05 WAKE COUNTY TOWN OF CARY
PLAN DATE: DECEMBER 2017 REVIEWED BY: C.B. HOLDEN
PREPARED BY: A. TUTT REVIEWED BY:

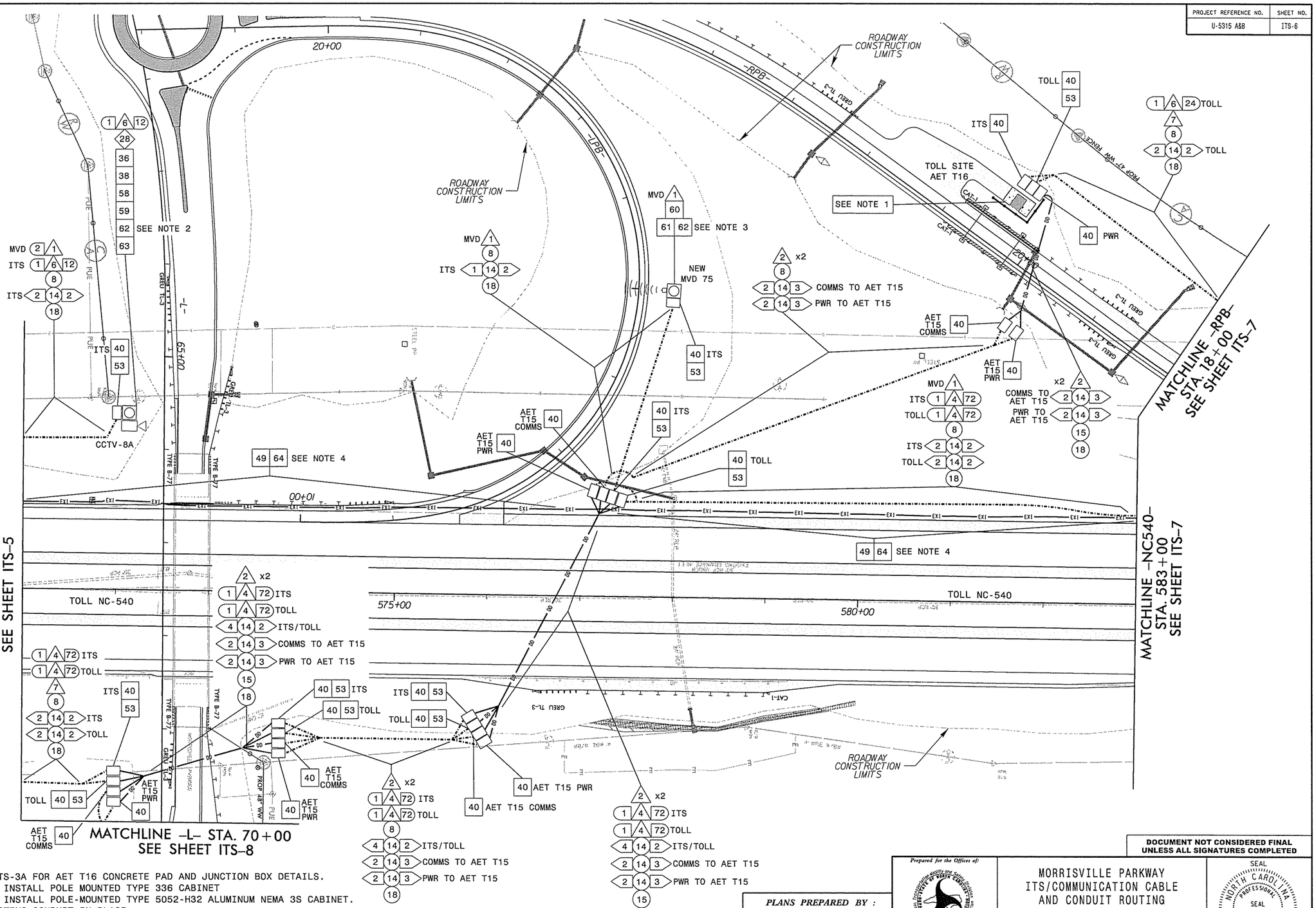
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 033753 ENGINEER C. BYRON HOLDEN

DocuSigned by:
C. Byron Holden 12/10/2017
SIGNATURE DATE

CADD Filename: U5315_ITS_splicedetails.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	ITS-6



NOTES:

1. SEE SHEET ITS-3A FOR AET T16 CONCRETE PAD AND JUNCTION BOX DETAILS.
2. FURNISH AND INSTALL POLE MOUNTED TYPE 336 CABINET
3. FURNISH AND INSTALL POLE-MOUNTED TYPE 5052-H32 ALUMINUM NEMA 3S CABINET.
4. ABANDON EXISTING CONDUIT IN PLACE.
5. ONE BLUE CONDUIT AND ONE WHITE CONDUIT SHALL BE USED FOR ALL TOLL DEVICES.
6. ONE BLACK CONDUIT AND ONE ORANGE CONDUIT SHALL BE USED FOR ALL ITS TECHNOLOGY DEVICES.
7. CONTRACTOR TO REFERENCE SIGNING AND LIGHTING PLANS FOR PROPOSED SIGN AND LIGHT LOCATIONS PRIOR TO CONDUIT INSTALLATION.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Prepared for the Offices of:

North Carolina Department of Transportation — Integrated Mobility and Rail Division

750 N. Greenfield Pkwy., Garner, NC 27529

MORRISVILLE PARKWAY ITS/COMMUNICATION CABLE AND CONDUIT ROUTING

DIVISION 05 WAKE COUNTY TOWN OF CARY

PLAN DATE:	DECEMBER 2017	REVIEWED BY:	C.B. HOLDEN
PREPARED BY:	D.T. SEARS	REVIEWED BY:	

REVISIONS	INIT.	DATE

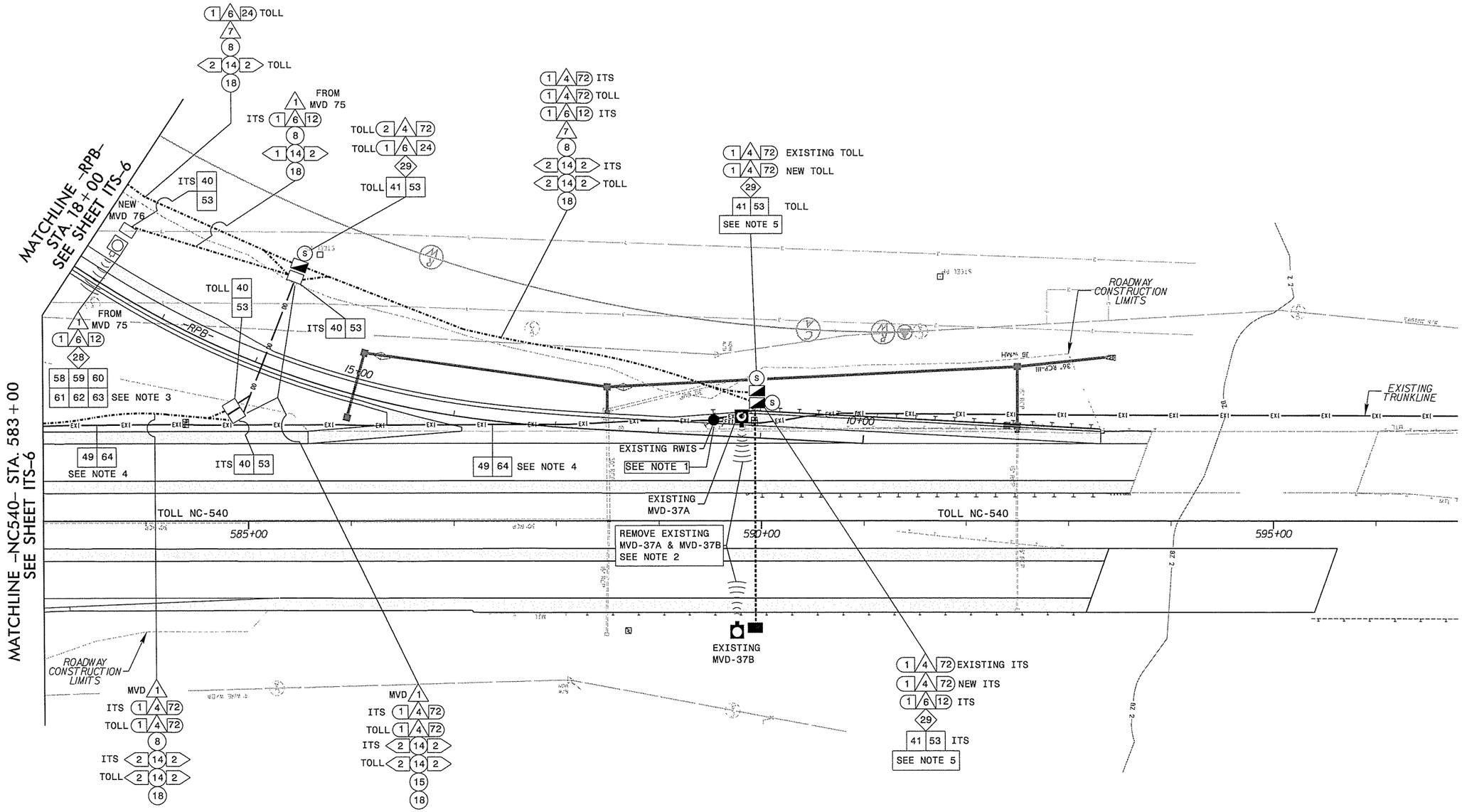
SCALE 0 50 1"=50'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033753 C. BYRON HOLDEN

DocuSigned by: C. Byron Holden 12/10/2017
SIGNATURE DATE

CADD Filename: U5315_ITS_psh05.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	ITS-7



NOTES:

1. REMOVE AND DISPOSE OF EXISTING RWIS ASSEMBLY, METAL POLE, COMMUNICATIONS EQUIPMENT, EQUIPMENT CABINET, AND ELECTRICAL SERVICE. REMOVE EXISTING JUNCTION BOXES AND DROP CABLE. ABANDON EXISTING CONDUIT USED FOR DROP CABLE IN PLACE.
2. CONTRACTOR SHALL DELIVER MVD SENSOR, POLE, AND CABINET TO SITE DESIGNATED BY NCTA FOR STORAGE. THE METAL POLE FOUNDATION FOR MVD-37B ONLY, MAY REMAIN IN PLACE.
3. FURNISH AND INSTALL POLE-MOUNTED TYPE 336 CABINET.
4. ABANDON EXISTING CONDUIT IN PLACE.
5. INTERCEPT EXISTING ITS TRUNKLINE AND SPLICE TO NEW 72-FIBER ITS TRUNKLINE. INTERCEPT EXISTING TOLL TRUNKLINE AND SPLICE TO NEW 72-FIBER TOLL TRUNKLINE. SEE SHEET ITS-3D FOR DETAILS.
6. ONE BLUE CONDUIT AND ONE WHITE CONDUIT SHALL BE USED FOR ALL TOLL DEVICES.
7. ONE BLACK CONDUIT AND ONE ORANGE CONDUIT SHALL BE USED FOR ALL ITS TECHNOLOGY DEVICES.
8. CONTRACTOR TO REFERENCE SIGNING AND LIGHTING PLANS FOR PROPOSED SIGN AND LIGHT LOCATIONS PRIOR TO CONDUIT INSTALLATION.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Prepared for the Offices of:
North Carolina Department of Transportation Turnpike Authority
750 N. Greenfield Pkwy., Garner, NC 27529

MORRISVILLE PARKWAY
ITS/COMMUNICATION CABLE
AND CONDUIT ROUTING

DIVISION 05 WAKE COUNTY TOWN OF CARY
PLAN DATE: DECEMBER 2017 REVIEWED BY: C.B. HOLDEN
PREPARED BY: D.T. SEARS REVIEWED BY:

SCALE 0 50 1"=50'

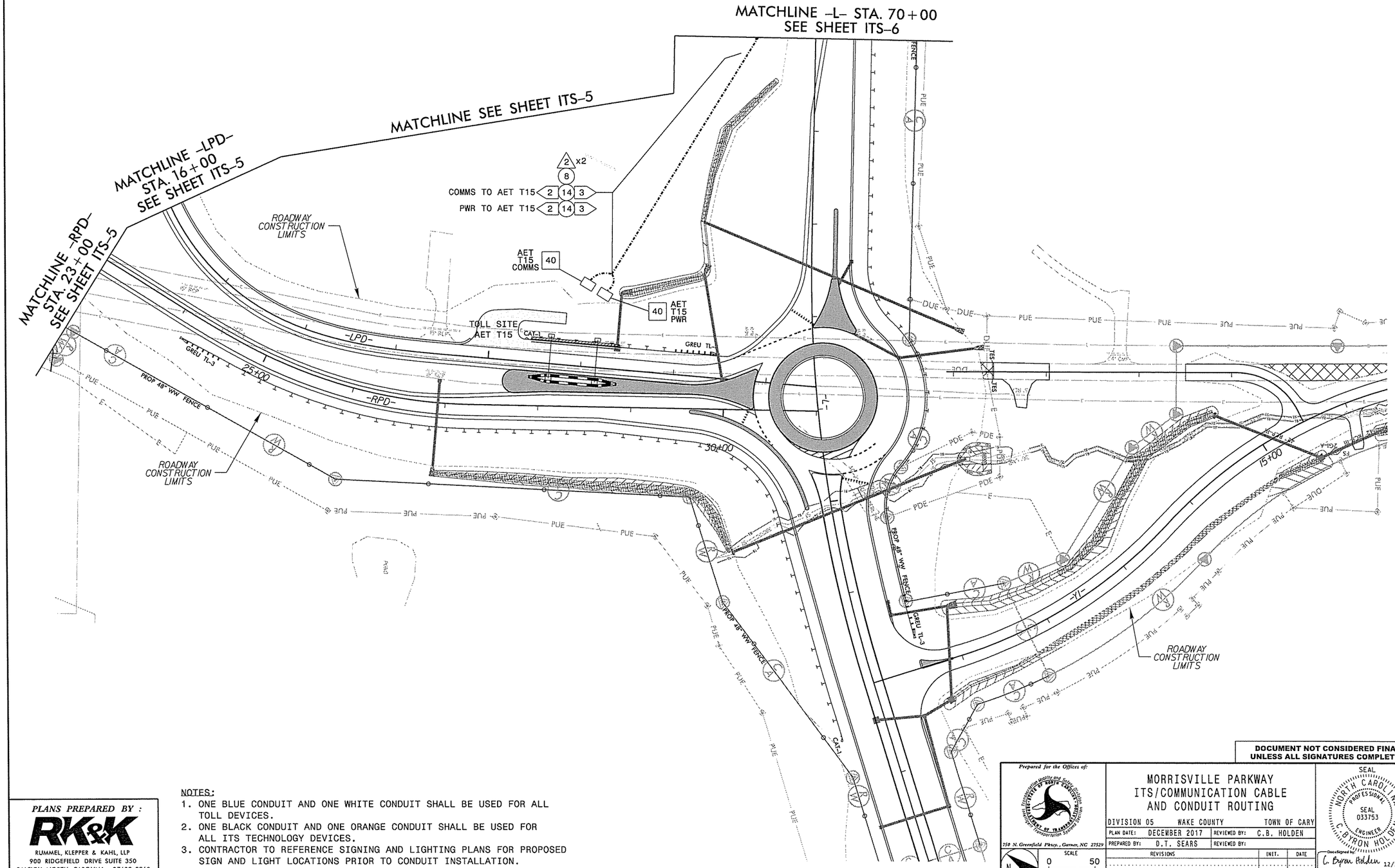
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033753 C. BYRON HOLDEN

Docusigned by: C. Byron Holden 12/10/2017
SIGNATURE DATE

CADD Filename: U5315_ITS_psh07.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	ITS-8



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

NOTES:
1. ONE BLUE CONDUIT AND ONE WHITE CONDUIT SHALL BE USED FOR ALL TOLL DEVICES.
2. ONE BLACK CONDUIT AND ONE ORANGE CONDUIT SHALL BE USED FOR ALL ITS TECHNOLOGY DEVICES.
3. CONTRACTOR TO REFERENCE SIGNING AND LIGHTING PLANS FOR PROPOSED SIGN AND LIGHT LOCATIONS PRIOR TO CONDUIT INSTALLATION.

Prepared for the Offices of:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Intelligent Transportation Systems Section

750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50 1"=50'

MORRISVILLE PARKWAY ITS/COMMUNICATION CABLE AND CONDUIT ROUTING

DIVISION 05 WAKE COUNTY TOWN OF GARY

PLAN DATE: DECEMBER 2017 REVIEWED BY: C.B. HOLDEN

PREPARED BY: D.T. SEARS REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 033753
ENGINEER
C. BYRON HOLDEN

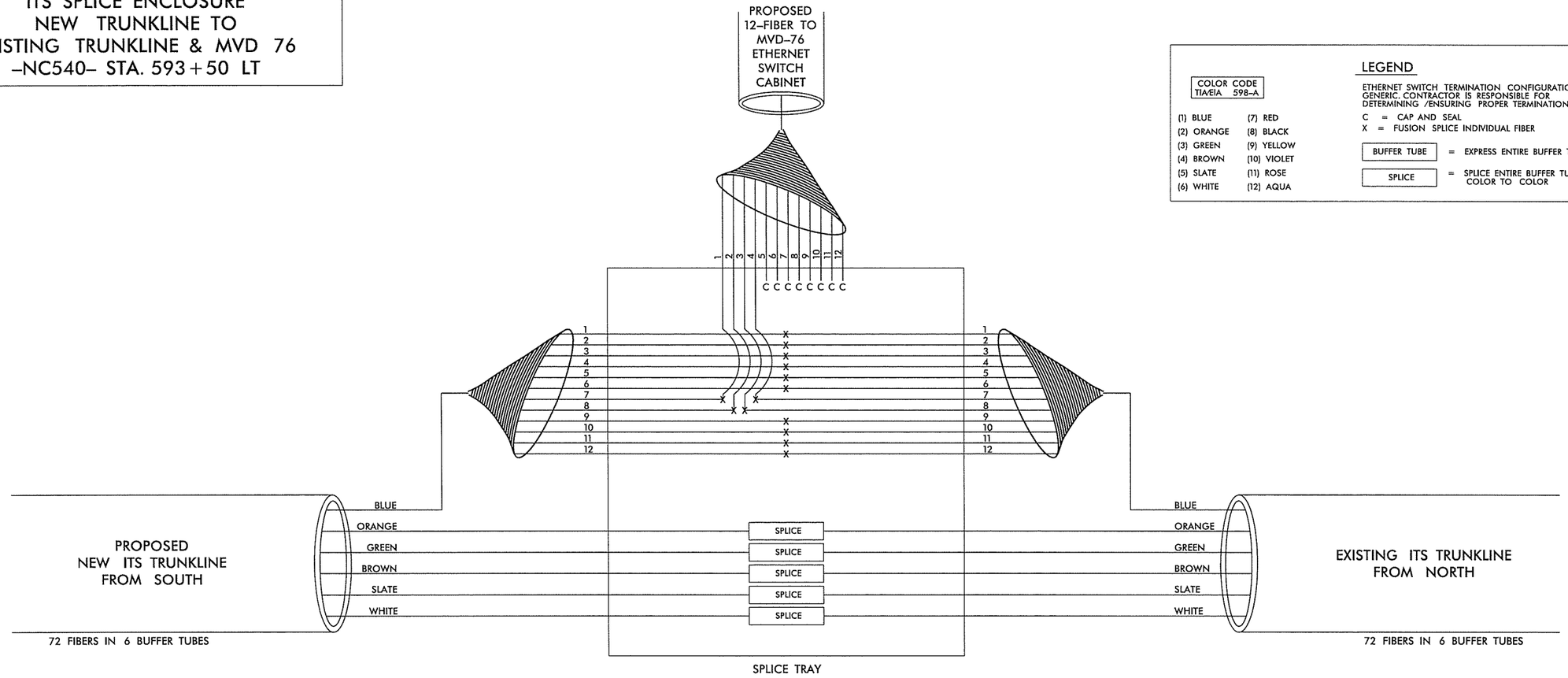
DocuSigned by: C. Byron Holden 12/10/2017
SIGNATURE DATE

CADD Filename: U5315_ITS_psh08.dgn

FIBER OPTIC CABLE

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	ITS-14

ITS SPLICE ENCLOSURE
NEW TRUNKLINE TO
EXISTING TRUNKLINE & MVD 76
–NC540– STA. 593+50 LT



LEGEND

COLOR CODE TIA/EIA 598–A

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

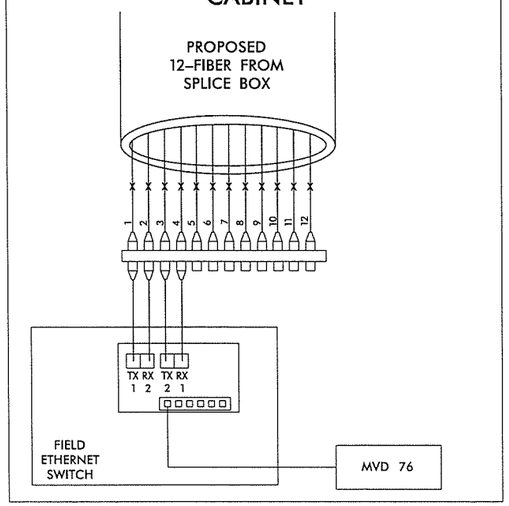
ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING /ENSURING PROPER TERMINATION.

C = CAP AND SEAL
X = FUSION SPLICE INDIVIDUAL FIBER

BUFFER TUBE = EXPRESS ENTIRE BUFFER TUBE

SPLICE = SPLICE ENTIRE BUFFER TUBE COLOR TO COLOR

MVD–76 ETHERNET SWITCH CABINET



NOTES:

1. FIBER INTERCONNECT CENTER RACKS ARE SCHEMATIC ONLY, ACTUAL EQUIPMENT FORM MAY VARY.
2. CONTRACTOR MAY PROVIDE 6–FIBER DROP CABLES IN LIEU OF 12–FIBER AND MAY PROVIDE 6–FIBER PRE–TERMINATED DROP CABLES IN LIEU OF DROP CABLES AND INTERCONNECT CENTER.

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609–3960
NC LICENSE NO. F–0112 • (919) 878–9560

Prepared for the Offices of:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MORRISVILLE PARKWAY
SPLICE DETAILS

DIVISION 05 WAKE COUNTY TOWN OF CARY
PLAN DATE: DECEMBER 2017 REVIEWED BY: C.B. HOLDEN
PREPARED BY: D.T. SEARS REVIEWED BY:

SCALE N/A

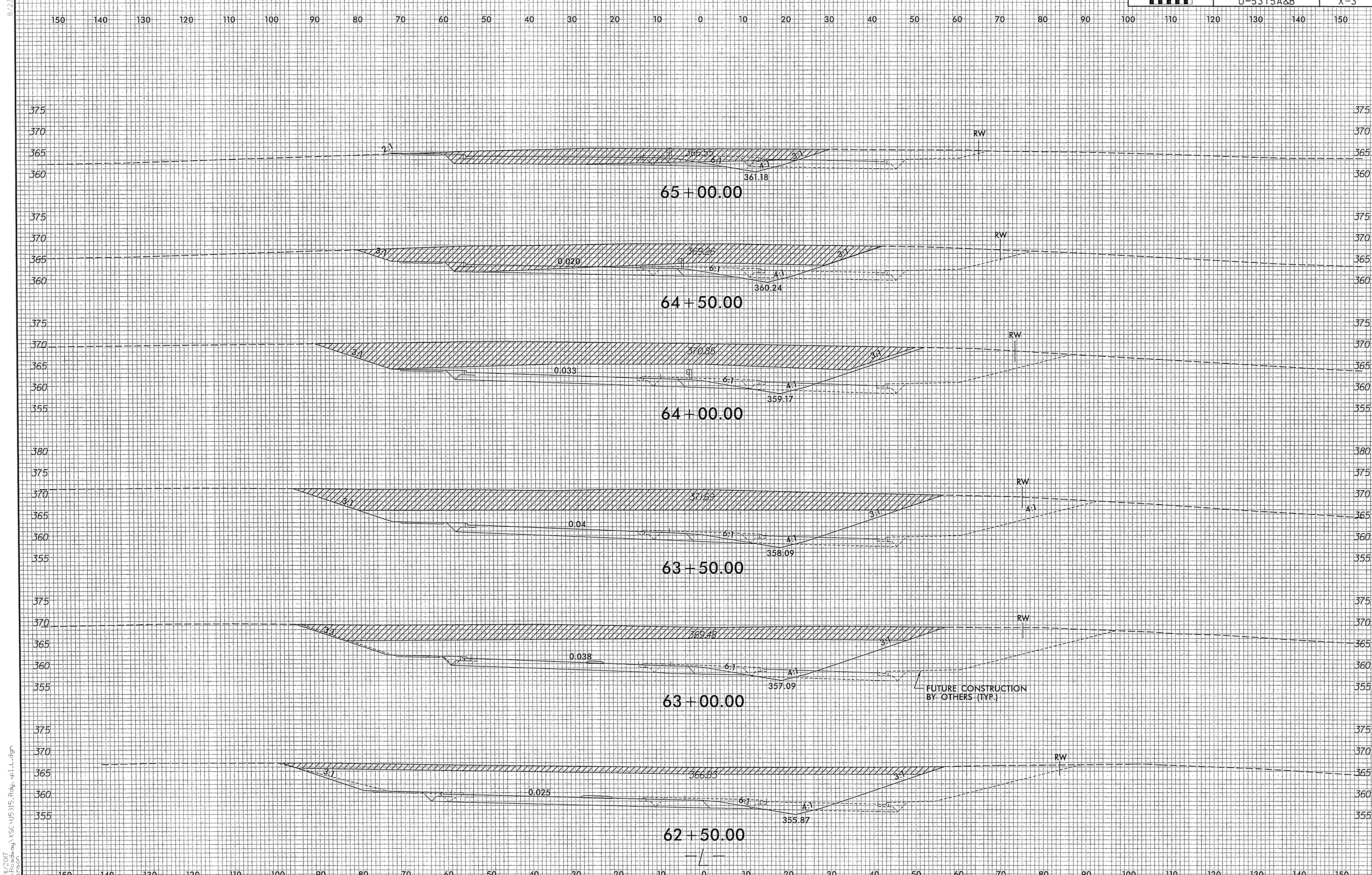
REVISIONS	INIT.	DATE

SEAL 033753 NORTH CAROLINA PROFESSIONAL ENGINEER C. BYRON HOLDEN
DocuSigned by: C. Byron Holden 12/10/2017
SIGNATURE DATE

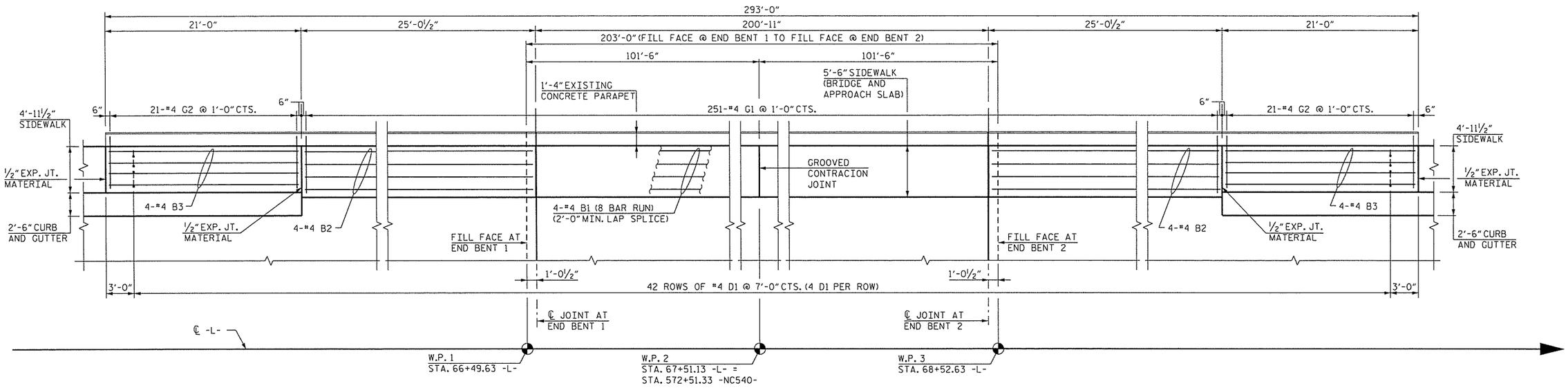
CADD Filename: U5315_ITS_splicedetails.dgn

12/10/2017
R:\projects\C4115400\MU5315_ITS_splicedetails.dgn
bholden

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-5315A&B	X-3



12/11/2017
R:\Roadway\XSC\U5315_Rdy_xpl_L.dgn



SIDEWALK PLAN

TOTAL BILL OF MATERIAL

	CLASS AA CONCRETE (BRIDGE)	EPOXY COATED REINFORCING STEEL (BRIDGE)	FOAM JOINT SEALS (SIDEWALK)
	CU.YDS.	LBS.	LUMP SUM
SUPERSTRUCTURE	36.0	1,951	LUMP SUM
END BENT 1	———	———	———
BENT 1	———	———	———
END BENT 2	———	———	———
TOTAL	36.0	1,951	LUMP SUM

NOTES:

ALL REINFORCING IN SIDEWALK SHALL BE EPOXY COATED.

FOAM JOINT SEALS SHALL BE PLACED FOR SIDEWALK AT END BENT 1 AND END BENT 2. FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

GROOVED CONTRACTION JOINT, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8FT. TO 10FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

DRILL HOLES IN CONCRETE AND FILL THEM WITH AN ADHESIVE BONDING MATERIAL TO INSTALL D1 DOWELS. NO FIELD TESTING IS REQUIRED.

PROJECT NO. U-5315 A & B

WAKE COUNTY

STATION: 67+51.13 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SIDEWALK DETAILS
BRIDGE ON MORRISVILLE PARKWAY OVER WESTERN WAKE FREEWAY

RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NC 27609-3960 (919) 878-9560
NC LICENSE NUMBER: F-0112

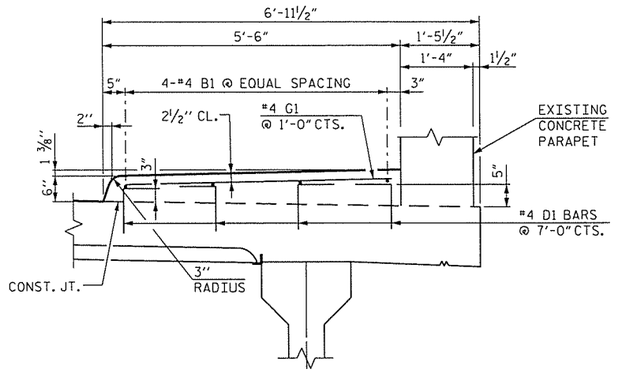
NORTH CAROLINA PROFESSIONAL SEAL 29360 ENGINEER RYAN D. FISHER
12/9/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

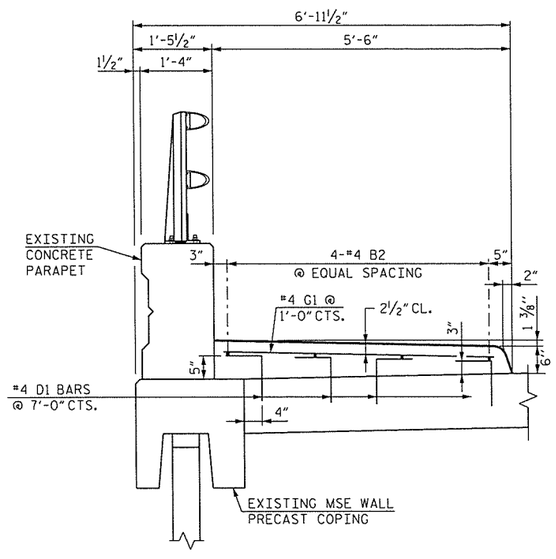
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			3

DRAWN BY : B. A. HAAG DATE : DEC 2017
CHECKED BY : R. D. FISHER DATE : DEC 2017
DESIGN ENGINEER OF RECORD : R. D. FISHER DATE : DEC 2017

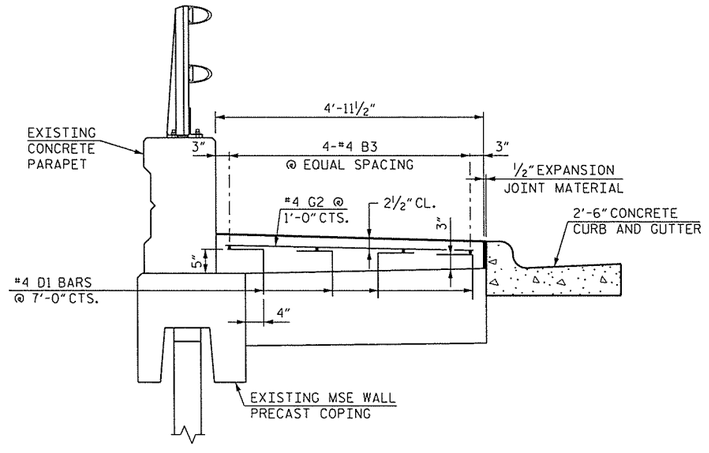
default
12/9/2017 R:\DGN\Sidewalk\11050_SD_SW_01.dgn



SECTION THRU SIDEWALK ON BRIDGE

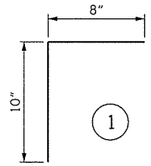


SECTION THRU APPROACH SLAB



SECTION THRU MOMENT SLAB

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

SIDEWALK

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	32	#4	STR.	26'-11"	575
B2	8	#4	STR.	24'-6"	131
B3	8	#4	STR.	20'-7"	110
D1	168	#4	1	1'-6"	168
G1	251	#4	STR.	5'-0"	838
G2	42	#4	STR.	4'-7"	129

EPOXY COATED REINFORCING STEEL	1,951 LB.
CLASS AA CONCRETE	36.0 C.Y.

PROJECT NO. U-5315 A & B

WAKE COUNTY

STATION: 67+51.13 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SIDEWALK DETAILS

RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NC 27609-3960 (919) 878-9560
NC LICENSE NUMBER: F-0112

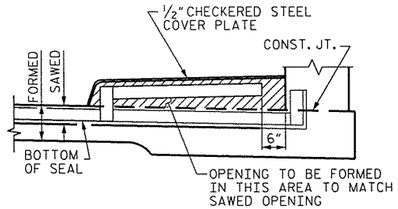
NORTH CAROLINA PROFESSIONAL SEAL 29360 ENGINEER RYAN D. FISHER
12/9/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

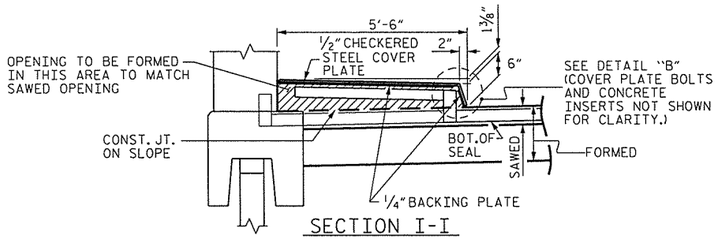
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			3

DRAWN BY : B. A. HAAG DATE : DEC 2017
CHECKED BY : R. D. FISHER DATE : DEC 2017
DESIGN ENGINEER OF RECORD : R. D. FISHER DATE : DEC 2017

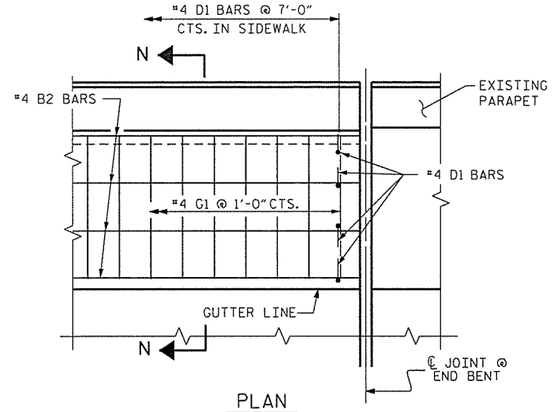
default
12/9/2017 R:\DGN\Sidewalk\11050_SD_SW_02.dgn



SECTION H-H

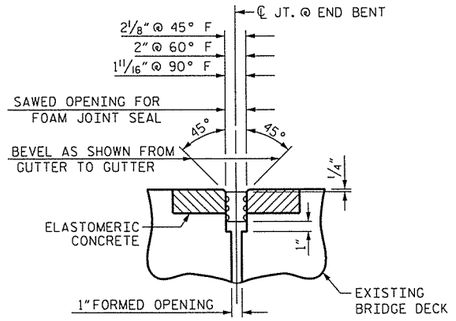


SECTION I-I



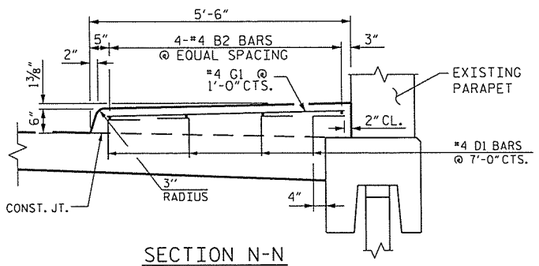
PLAN

DETAILS OF SIDEWALK ON APPROACH SLAB



SECTION C-C
THROUGH EXISTING
EXPANSION JOINT

FOAM JOINT SEAL
(FOR FOAM JOINT SEAL, SEE SPECIAL PROVISIONS)



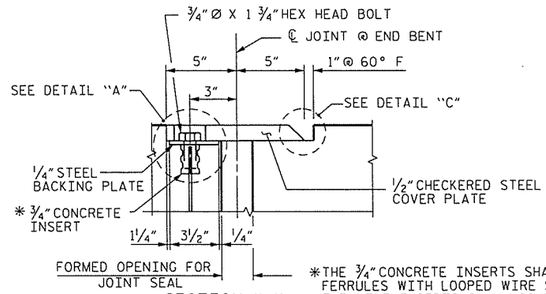
SECTION N-N

SIDEWALK DETAILS

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALLY BLAST CLEANED AND EITHER COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC-RICH PAINT, GALVANIZED OR METALLIZED TO A MINIMUM THICKNESS OF 6 MILS INACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

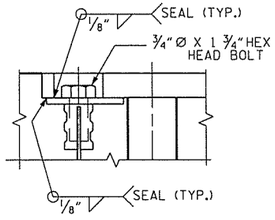
THE ¾" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "FOAM JOINT SEALS".

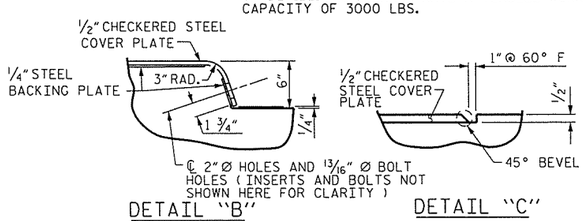


SECTION K-K

*THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

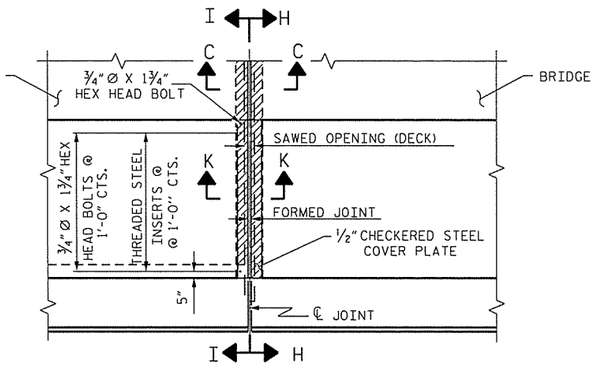


DETAIL "A"



DETAIL "B" DETAIL "C"

JOINT SEAL DETAILS @ END BENT



PLAN OF FOAM JOINT SEAL @ END BENT

PROJECT NO. U-5315 A & B

WAKE COUNTY

STATION: 67+51.13 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SIDEWALK DETAILS

BRIDGE APPROACH SLAB DETAILS

RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NC 27609-3960 (919) 878-9560
NC LICENSE NUMBER: F-0112

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29360 RAN D. FISHER
12/9/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			3

DRAWN BY : B. A. HAAG DATE : DEC 2017
CHECKED BY : R. D. FISHER DATE : DEC 2017
DESIGN ENGINEER OF RECORD : R. D. FISHER DATE : DEC 2017

default
12/9/2017 R:\DGN\Sidewalk\11050_SD_SW_03.dgn