STATE OF NORTH CAROLINA C204553
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

CONTRACT AND
CONTRACT BONDS

FOR CONTRACT NO. C204553

WBS	40237.3.3 STATE FUNDED
T.I.P NO.	R-3300B
COUNTY OF	PENDER
THIS IS THE	ROADWAY & STRUCTURE CONTRACT
ROUTE NUMBER	NC 417 LENGTH 6.916 MILES
LOCATION	NC-417 (HAMPSTEAD BYPASS) FROM SOUTH OF NC-210 TO NORTH OF SR-1563 (SLOOP POINT LOOP RD).
CONTRACTOR	CONTI CIVIL, LLC
ADDRESS	2045 LINCOLN HIGHWAY EDISON, NJ 08817
BIDS OPENED	JANUARY 18, 2022
CONTRACT EXECUTION	_____

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

PROPOSAL

INCLUDES ADDENDUM No. 3 DATED 1-13-2022

DATE AND TIME OF BID OPENING: **JANUARY 18, 2022 AT 2:00 PM**

CONTRACT ID	C204553
WBS	40237.3.3

FEDERAL-AID NO.	STATE FUNDED
COUNTY	PENDER
T.I.P. NO.	R-3300B
MILES	6.916
ROUTE NO.	NC 417
LOCATION	NC-417 (HAMPSTEAD BYPASS) FROM SOUTH OF NC-210 TO NORTH OF SR-1563 (SLOOP POINT LOOP RD).
TYPE OF WORK	GRADING, DRAINAGE, PAVING, SIGNALS, AND STRUCTURES.

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 & STRUCTURE PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

PROPOSAL FOR THE CONSTRUCTION OF

CONTRACT No. C204553 IN PENDER COUNTY, NORTH CAROLINA

Date_____ 20_____

DEPARTMENT OF TRANSPORTATION,

RALEIGH, NORTH CAROLINA

The Bidder has carefully examined the location of the proposed work to be known as Contract No. **C204553** has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Board of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2018 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No. **C204553** in **Pender County**, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2018* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

If the proposal is accepted and the award is made, the contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except over the signature of the said Contract Officer.

The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.

An increase or decrease in the quantity of an item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

Accompanying this bid is a bid bond secured by a corporate surety, or certified check payable to the order of the Department of Transportation, for five percent of the total bid price, which deposit is to be forfeited as liquidated damages in case this bid is accepted and the Bidder shall fail to provide the required payment and performance bonds with the Department of Transportation, under the condition of this proposal, within 14 calendar days after the written notice of award is received by him, as provided in the *Standard Specifications*; otherwise said deposit will be returned to the Bidder.

State Contract Officer

DocuSigned by:
Ronald E. Davenport, Jr.
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01/13/2022

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UNIT PROJECT SPECIAL PROVISIONS

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PROJECT SPECIAL PROVISIONS

GENERAL

CONTRACT TIME AND LIQUIDATED DAMAGES:
(8-15-00) (Rev. 12-18-07) 108 SP1 G07 A(Rev)

The date of availability for this contract is **February 28, 2022, except Area 2 is February 28, 2023, Areas 3 & 4 are August 27, 2022, and Area 5 is August 30, 2023,** and except that work in jurisdictional waters and wetlands shall not begin until a meeting between the DOT, Regulatory Agencies, and the Contractor is held as stipulated in the permits contained elsewhere in this proposal. This delay in availability has been considered in determining the contract time for this project.

The completion date for this contract is **March 14, 2027**.

Except where otherwise provided by the contract, observation periods required by the contract will not be a part of the work to be completed by the completion date and/or intermediate contract times stated in the contract. The acceptable completion of the observation periods that extend beyond the final completion date shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are **Two Hundred Dollars ($ 200.00)** per calendar day. These liquidated damages will not be cumulative with any liquidated damages which may become chargeable under Intermediate Contract Time Number 1.

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:
(7-1-95) (Rev. 2-21-12) 108 SP1 G13 A(Rev)

Except for that work required under the Project Special Provisions entitled *Planting, Reforestation* and/or *Permanent Vegetation Establishment*, included elsewhere in this proposal, the Contractor will be required to complete all work included in this contract and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is **February 28, 2022, except Area 2 is February 28, 2023, Areas 3 & 4 are August 27, 2022, and Area 5 is August 30, 2023.**

The completion date for this intermediate contract time is **September 15, 2026**.

The liquidated damages for this intermediate contract time are **Seven Thousand Dollars ($ 7,000.00)** per calendar day.

Upon apparent completion of all the work required to be completed by this intermediate date, a final inspection will be held in accordance with Article 105-17 and upon acceptance, the Department will assume responsibility for the maintenance of all work except *Planting, Reforestation* and/or *Permanent Vegetation Establishment*. The Contractor will be responsible for and shall make corrections of all damages to the completed roadway caused by his planting operations, whether occurring prior to or after placing traffic through the project.

INTERMEDIATE CONTRACT TIME NUMBERS 2 AND 3 LIQUIDATED DAMAGES:
(2-20-07) 108 SP1 G14 A

The Contractor shall complete the required work of installing, maintaining, and removing the traffic control devices for lane closures and restoring traffic to the existing traffic pattern. The Contractor shall not close or narrow a lane of traffic on **US 17, NC 210, and/or Hoover Road** during the following time restrictions:

DAY AND TIME RESTRICTIONS

ICT #2	**US 17**	**Monday thru Sunday**	**6:00 AM to 7:00 PM**
ICT #3	**NC 210, Hoover Road**	**Monday thru Friday**	**6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM**

In addition, the Contractor shall not close or narrow a lane of traffic on **US 17, NC 210, and/or Hoover Road**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.

2. For **New Year's Day**, between the hours of **6:00 AM** December 31st and **7:00 PM** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **7:00 PM** the following Tuesday.

3. For **Easter**, between the hours of **6:00 AM** Thursday and **7:00 PM** Monday.

4. For **Memorial Day**, between the hours of **6:00 AM** Friday and **7:00 PM** Tuesday.

5. For **Independence Day**, between the hours of **6:00 AM** the day before Independence Day and **7:00 PM** the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **6:00 AM** the Thursday before Independence Day and **7:00 PM** the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of **6:00 AM** Friday and **7:00 PM** Tuesday.

7. For **Thanksgiving**, between the hours of **6:00 AM** Tuesday and **7:00 PM** Monday.

8. For **Christmas**, between the hours of **6:00 AM** the Friday before the week of Christmas Day and **7:00 PM** the following Tuesday after the week of Christmas Day.

Holidays and holiday weekends shall include New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. The Contractor shall schedule his work so that lane closures will not be required during these periods, unless otherwise directed by the Engineer.

The time of availability for this intermediate contract work shall be the time the Contractor begins to install all traffic control devices for lane closures according to the time restrictions listed herein.

The completion time for this intermediate contract work shall be the time the Contractor is required to complete the removal of all traffic control devices for lane closures according to the time restrictions stated above and place traffic in the existing traffic pattern.

Liquidated Damages for **Intermediate Contract Time Number 2** for the above lane narrowing, lane closure, holiday and special event time restrictions for US 17 are **One Thousand Two Hundred Fifty Dollars ($ 1,250.00)** per fifteen **(15)** minute time period.

Liquidated Damages for **Intermediate Contract Time Number 3** for the above lane narrowing, lane closure, holiday and special event time restrictions for NC 210 and/or Hoover Road are **Five Hundred Dollars ($ 500.00)** per hour.

INTERMEDIATE CONTRACT TIME NUMBER 4 AND LIQUIDATED DAMAGES:
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Area 5, Phase I, Steps #2B thru #3B** as shown on Sheet **TMP-3B** 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 Five (105)** consecutive calendar days after and including the date of availability.

The liquidated damages are **One Thousand Dollars ($ 1,000.00)** per calendar day.

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

The Contractor shall complete the work required of **Area 5, Phase 2, Step #1A** as shown on Sheet **TMP-3C** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday** at **6:00 PM** that the Contractor begins the work.

The completion time for this intermediate contract time is the following **Monday** at **6:00 AM**, which is **sixty (60)** consecutive hours after the time of availability

The liquidated damages are **Five Hundred Dollars ($ 500.00)** per hour.

INTERMEDIATE CONTRACT TIME NUMBER 6 AND LIQUIDATED DAMAGES:
(6-18-13) 108 SP1 G14 L

The Contractor shall complete **all** work required of **the Pay Item: Field Office** as described in the **Field Office (Contractor Designed) Special Provision**, **and shall provide the final Certificate of Occupancy.**

The date of availability for this intermediate contract time is **February 28, 2022**.

The completion date for this intermediate contract time is **November 30, 2022**.

The liquidated damages are **Two Hundred Dollars ($ 200.00)** per calendar day.

PERMANENT VEGETATION ESTABLISHMENT:
(2-16-12) (Rev. 10-15-13) 104 SP1 G16

Establish a permanent stand of the vegetation mixture shown in the contract. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish permanent vegetation on all erodible areas within the project limits, as well as, in borrow and waste pits. This work shall include erosion control device maintenance and installation, repair seeding and mulching, supplemental seeding and mulching, mowing, and fertilizer topdressing, as directed. All work shall be performed in accordance with the applicable section of the *2018 Standard Specifications*. All work required for initial vegetation planting shall be performed as a part of the work necessary for the completion and acceptance of the Intermediate Contract Time (ICT). Between the time of ICT and Final Project acceptance, or otherwise referred to as the vegetation establishment period, the Department will be responsible for preparing the required National Pollutant Discharge Elimination System (NPDES) inspection records.

Once the Engineer has determined that the permanent vegetation establishment requirement has been achieved at an 80% vegetation density (the amount of established vegetation per given area to stabilize the soil) and no erodible areas exist within the project limits, the Contractor will be notified to remove the remaining erosion control devices that are no longer needed. The Contractor will be responsible for, and shall correct any areas disturbed by operations performed in permanent vegetation establishment and the removal of temporary erosion control measures, whether occurring prior to or after placing traffic on the project.

Payment for *Response for Erosion Control*, *Seeding and Mulching, Repair Seeding*, *Supplemental Seeding, Mowing, Fertilizer Topdressing, Silt Excavation,* and *Stone for Erosion Control* will be made at contract unit prices for the affected items. Work required that is not represented by contract line items will be paid in accordance with Articles 104-7 or 104-3 of the *2018 Standard Specifications*. No additional compensation will be made for maintenance and removal of temporary erosion control items.

CONSTRUCTION MORATORIUM (Bats):
(1-19-16) SP1 G18C

No tree cutting will be allowed when **temperature is 40 degrees or less**.

DELAY IN RIGHT OF ENTRY:
(7-1-95) 108 SP1 G22 B

The Contractor will not be allowed right of entry to the following parcels prior to the listed dates unless otherwise permitted by the Engineer.

Parcel No.	Property Owner	Date
17	Richard B. Griffith	12//31/2021
049	Barbara Z. Graybill	12/31/2021
50Z	Lot-N-Land, Inc.	12/31/2021
114	Holiday Drive	12/31/2021
118	John W. Honeycutt	03/01/2022
053	Lance Phalen	01/01/2022
055	Thomas E. McFee	01/01/2022
081	Duke Energy Progress	01/01/2022
088	Rocky Point Topsoil Water & Sewer District	01/01/2022
093	Caroline S. Baldwin	01/01/2022
099	Caroline S. Baldwin	01/01/2022
84Z	Jamestown Pender (NCDOT)	02/01/2022
96Z	Coastal Mini Storage (NCDOT)	02/01/2022
903	Last Resort Properties, Inc	03/01/2022
181	AT&T	03/01/2022
109	Jeffery L. Morris	03/01/2022
89	Andrews Mortuary, Inc.	03/01/2022
92	C. M. H. Homes, Inc.	03/01/2022
183	Hampstead Investors, LLC	03/01/2022
115	Vista Lane	01/01/2022
116	Leeward Lane	01/01/2022
218	Pender County (School Site)	03/01/2022
175	Pender County Schools	03/01/2022
091	Andrews Properties, Inc.	03/01/2022

MAJOR CONTRACT ITEMS:
(2-19-02) 104 SP1 G28

The following listed items are the major contract items for this contract (see Article 104-5 of the *2018 Standard Specifications*):

Line #		Description
14	—	Borrow Excavation

SPECIALTY ITEMS:

(7-1-95)(Rev. 7-20-21) 108-6 SP1 G37

Items listed below will be the specialty items for this contract (see Article 108-6 of the *2018 Standard Specifications*).

Line #	Description
134-151	Guardrail
152-157	Fencing
161-189	Signing
207-212, 221-223	Long-Life Pavement Markings
213	Removable Tape
224-225	Permanent Pavement Markers
231-270, 424	Utility Construction
271-307, 309, 425-426	Erosion Control
308	Reforestation
310-366, 429-430	Signals/ITS System

AWARD OF CONTRACT:

Revise the 2018 *Standard Specifications* as follows:

Page 1-23, Subarticle 103-4 (A) General, first paragraph, replace the 3rd and 4th sentences with the following:

Where award is to be made, the notice of award will be issued within 60 days after the opening of bids or upon issuance of any necessary debt instrument, whichever is later, but not to exceed 120 days; except with the consent of the lowest responsible bidder the decision to award the contract to such bidder may be delayed for as long a time as may be agreed upon by the Department and such bidder. In the absence of such agreement, the lowest responsible bidder may withdraw his bid at the expiration of 120 days without penalty if no notice of award has been issued.

FUEL PRICE ADJUSTMENT:

(11-15-05) (Rev. 7-20-21) 109-8 SP1 G43

Revise the *2018 Standard Specifications* as follows:

Page 1-87, Article 109-8, Fuel Price Adjustments, add the following:

The base index price for DIESEL #2 FUEL is **$ 2.6786** per gallon. Where any of the following are included as pay items in the contract, they will be eligible for fuel price adjustment.

The pay items and the fuel factor used in calculating adjustments to be made will be as follows:

Description	Units	Fuel Usage Factor Diesel
Unclassified Excavation	Gal/CY	0.29
Borrow Excavation	Gal/CY	0.29
Class IV Subgrade Stabilization	Gal/Ton	0.55
Aggregate Base Course	Gal/Ton	0.55
Sub-Ballast	Gal/Ton	0.55

Asphalt Concrete Base Course, Type ____	Gal/Ton	0.90 or 2.90
Asphalt Concrete Intermediate Course, Type ____	Gal/Ton	0.90 or 2.90
Asphalt Concrete Surface Course, Type ____	Gal/Ton	0.90 or 2.90
Open-Graded Asphalt Friction Course	Gal/Ton	0.90 or 2.90
Permeable Asphalt Drainage Course, Type ____	Gal/Ton	0.90 or 2.90
Sand Asphalt Surface Course, Type ____	Gal/Ton	0.90 or 2.90
Aggregate for Cement Treated Base Course	Gal/Ton	0.55
Portland Cement for Cement Treated Base Course	Gal/Ton	0.55
__" Portland Cement Concrete Pavement	Gal/SY	0.245
Concrete Shoulders Adjacent to __" Pavement	Gal/SY	0.245

For the asphalt items noted in the chart as eligible for fuel adjustments, the bidder may include the *Fuel Usage Factor Adjustment Form* with their bid submission if they elect to use the fuel usage factor. The *Fuel Usage Factor Adjustment Form* is found at the following link:

https://connect.ncdot.gov/letting/LetCentral/Fuel%20Usage%20Factor%20Adjustment%20Form.pdf

Select either 2.90 Gal/Ton fuel factor or 0.90 Gal/Ton fuel factor for each asphalt line item on the *Fuel Usage Factor Adjustment Form*. The selected fuel factor for each asphalt item will remain in effect for the duration of the contract.

Failure to complete the *Fuel Usage Factor Adjustment Form* will result in using 2.90 gallons per ton as the Fuel Usage Factor for Diesel for the asphalt items noted above. The contractor will not be permitted to change the Fuel Usage Factor after the bids are submitted.

PAYOUT SCHEDULE:

(1-19-10) (Rev. 1-17-12) 108 SP1 G57

Submit an Anticipated Monthly Payout Schedule prior to beginning construction. The Anticipated Monthly Payout Schedule will be used by the Department to monitor funding levels for this project. Include a monthly percentage breakdown (in terms of the total contract amount) of the work anticipated to be completed. The schedule should begin with the date the Contractor plans to begin construction and end with the anticipated completion date. Submit updates of the Anticipated Monthly Payout Schedule on March 15, June 15, September 15, and December 15 of each calendar year until project acceptance. Submit the original Anticipated Monthly Payout Schedule and all subsequent updates to the Resident Engineer with a copy to the State Construction Engineer at 1 South Wilmington Street, 1543 Mail Service Center, Raleigh, NC 27699-1543.

SCHEDULE OF ESTIMATED COMPLETION PROGRESS:

(7-15-08) (Rev. 5-13-19) 108-2 SP1 G58

The Contractor's attention is directed to the Standard Special Provision entitled *Availability of Funds Termination of Contracts* included elsewhere in this proposal. The Department of Transportation's schedule of estimated completion progress for this project as required by that Standard Special Provision is as follows:

	Fiscal Year	**Progress (% of Dollar Value)**
2022	(7/01/21 - 6/30/22)	**12**% of Total Amount Bid

2023	(7/01/22 - 6/30/23)	**25**% of Total Amount Bid
2024	(7/01/23 - 6/30/24)	**24**% of Total Amount Bid
2025	(7/01/24 - 6/30/25)	**22**% of Total Amount Bid
2026	(7/01/25 - 6/30/26)	**15**% of Total Amount Bid
2027	(7/01/26 - 6/30/27)	**2**% of Total Amount Bid

The Contractor shall also furnish his own progress schedule in accordance with Article 108-2 of the *2018 Standard Specifications*. Any acceleration of the progress as shown by the Contractor's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE:

(10-16-07)(Rev. 8-17-21) 102-15(J) SP1 G66

Description

The purpose of this Special Provision is to carry out the North Carolina Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with State funds.

Definitions

Additional MBE/WBE Subcontractors - Any MBE/WBE submitted at the time of bid that will not be used to meet the Combined MBE /WBE Goal. No submittal of a Letter of Intent is required.

Combined MBE/WBE Goal: A portion of the total contract, expressed as a percentage that is to be performed by committed MBE/WBE subcontractors.

Committed MBE/WBE Subcontractor - Any MBE/WBE submitted at the time of bid that is being used to meet the Combined MBE /WBE goal by submission of a Letter of Intent. Or any MBE or WBE used as a replacement for a previously committed MBE or WBE firm.

Contract Goal Requirement - The approved participation at time of award, but not greater than the advertised Combined MBE/WBE contract goal.

Goal Confirmation Letter - Written documentation from the Department to the bidder confirming the Contractor's approved, committed participation along with a listing of the committed MBE and WBE firms.

Manufacturer - A firm that operates or maintains a factory or establishment that produces on the premises, the materials or supplies obtained by the Contractor.

MBE Participation (Anticipated) - A portion of the total contract, expressed as a percentage that is anticipated to be performed by committed MBE subcontractor(s).

Minority Business Enterprise (MBE) - A firm certified as a Disadvantaged Minority-Owned Business Enterprise through the North Carolina Unified Certification Program.

Regular Dealer - A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone, and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Brokers and packagers are not regarded as manufacturers or regular dealers within the meaning of this section.

Replacement / Substitution – A full or partial reduction in the amount of work subcontracted to a committed (or an approved substitute) MBE/WBE firm.

North Carolina Unified Certification Program (NCUCP) - A program that provides comprehensive services and information to applicants for MBE/WBE certification. The MBE/WBE program follows the same regulations as the federal Disadvantaged Business Enterprise (DBE) program in accordance with 49 CFR Part 26.

United States Department of Transportation (USDOT) - Federal agency responsible for issuing regulations (49 CFR Part 26) and official guidance for the DBE program.

WBE Participation (Anticipated) - A portion of the total contract, expressed as a percentage, that is anticipated to be performed by committed WBE subcontractor(s).

Women Business Enterprise (WBE) - A firm certified as a Disadvantaged Women-Owned Business Enterprise through the North Carolina Unified Certification Program.

Forms and Websites Referenced in this Provision

Payment Tracking System - On-line system in which the Contractor enters the payments made to MBE and WBE subcontractors who have performed work on the project. https://apps.dot.state.nc.us/Vendor/PaymentTracking/

DBE-IS *Subcontractor Payment Information* - Form for reporting the payments made to all MBE/WBE firms working on the project. This form is for paper bid projects only. https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf

RF-1 *MBE/WBE Replacement Request Form* - Form for replacing a committed MBE or WBE. http://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Request%20Form.pdf

SAF *Subcontract Approval Form* - Form required for approval to sublet the contract. http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip

JC-1 *Joint Check Notification Form* - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks.

http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf

Letter of Intent - Form signed by the Contractor and the MBE/WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE/WBE for the estimated amount (based on quantities and unit prices) listed at the time of bid.
http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf

Listing of MBE and WBE Subcontractors Form - Form for entering MBE/WBE subcontractors on a project that will meet the Combined MBE/WBE goal. This form is for paper bids only.
http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx

Subcontractor Quote Comparison Sheet - Spreadsheet for showing all subcontractor quotes in the work areas where MBEs and WBEs quoted on the project. This sheet is submitted with good faith effort packages.
http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls

Combined MBE/WBE Goal

The Combined MBE/WBE Goal for this project is **8.0 %**

The Combined Goal was established utilizing the following anticipated participation for Minority Business Enterprises and Women Business Enterprises:

(A) Minority Business Enterprises **4.0 %**

(1) *If the anticipated MBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that MBEs participate in at least the percent of the contract as set forth above.

(2) *If the anticipated MBE participation is zero*, the Contractor shall make an effort to recruit and use MBEs during the performance of the contract. Any MBE participation obtained shall be reported to the Department.

(B) Women Business Enterprises **4.0 %**

(1) *If the anticipated WBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that WBEs participate in at least the percent of the contract as set forth above.

(2) *If the anticipated WBE participation is zero*, the Contractor shall make an effort to recruit and use WBEs during the performance of the contract. Any WBE participation obtained shall be reported to the Department.

The Bidder is required to submit only participation to meet the Combined MBE/WBE Goal. The Combined Goal may be met by submitting all MBE participation, all WBE participation, or a combination of MBE and WBE participation.

Directory of Transportation Firms (Directory)

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as MBE and WBE certified shall be used to meet the Combined MBE/WBE Goal. The Directory can be found at the following link.
https://www.ebs.nc.gov/VendorDirectory/default.html

The listing of an individual firm in the directory shall not be construed as an endorsement of the firm's capability to perform certain work.

Listing of MBE/WBE Subcontractors

At the time of bid, bidders shall submit all MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the Combined MBE/WBE Goal will be considered committed, even though the listing shall include both committed MBE/WBE subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE subcontractor participation above the goal will follow the banking guidelines found elsewhere in this provision. All other additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of MBE and WBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

Bidders shall submit a listing of MBE and WBE participation in the appropriate section of the electronic submittal file.

(1) Submit the names and addresses of MBE and WBE firms identified to participate in the contract. If the bidder uses the updated listing of MBE and WBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the firms.

(2) Submit the contract line numbers of work to be performed by each MBE and WBE firm. When no figures or firms are entered, the bidder will be considered to have no MBE or WBE participation.

(3) The bidder shall be responsible for ensuring that the MBE and WBE are certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.

(B) Paper Bids

(1) *If the Combined MBE/WBE Goal is more than zero,*

(a) Bidders, at the time the bid proposal is submitted, shall submit a listing of MBE/WBE participation, including the names and addresses on *Listing of MBE and WBE Subcontractors* contained elsewhere in the contract documents in order for the bid to be considered responsive. Bidders shall indicate the total dollar value of the MBE and WBE participation for the contract.

(b) If bidders have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Bids submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.

(c) The bidder shall be responsible for ensuring that the MBE/WBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE Goal.

(2) *If the Combined MBE/WBE Goal is zero,* entries on the *Listing of MBE and WBE Subcontractors* are not required for the zero goal, however any MBE or WBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in the special provision.

MBE or WBE Prime Contractor

When a certified MBE or WBE firm bids on a contract that contains a Combined MBE/WBE goal, the firm is responsible for meeting the goal or making good faith efforts to meet the goal, just like any other bidder. In most cases, a MBE or WBE bidder on a contract will meet the Combined MBE/WBE Goal by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the MBE or WBE bidder and any other similarly certified subcontractors will count toward the goal. The MBE or WBE bidder shall list itself along with any MBE or WBE subcontractors, if any, in order to receive credit toward the goal.

MBE/WBE prime contractors shall also follow Sections A and B listed under *Listing of MBE/WBE Subcontractor* just as a non-MBE/WBE bidder would.

Written Documentation – Letter of Intent

The bidder shall submit written documentation for each MBE/WBE that will be used to meet the Combined MBE/WBE Goal of the contract, indicating the bidder's commitment to use the

MBE/WBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. of the sixth calendar day following opening of bids, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed MBE and WBE to be used toward the Combined MBE/WBE Goal, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the Combined MBE/WBE Goal. If the lack of this participation drops the commitment below the Combined MBE/WBE Goal, the Contractor shall submit evidence of good faith efforts for the goal, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 10:00 a.m. on the eighth calendar day following opening of bids, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

Banking MBE/WBE Credit

If the bid of the lowest responsive bidder exceeds $500,000 and if the committed MBE/WBE participation submitted exceeds the algebraic sum of the Combined MBE /WBE Goal by $1,000 or more, the excess will be placed on deposit by the Department for future use by the bidder. Separate accounts will be maintained for MBE and WBE participation and these may accumulate for a period not to exceed 24 months.

When the apparent lowest responsive bidder fails to submit sufficient participation by MBE and WBE firms to meet the advertised goal, as part of the good faith effort, the Department will consider allowing the bidder to withdraw funds to meet the Combined MBE/WBE Goal as long as there are adequate funds available from the bidder's MBE and WBE bank accounts.

Submission of Good Faith Effort

If the bidder fails to meet or exceed the Combined MBE/WBE Goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach that specific goal.

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of bids unless the sixth day falls on an official state holiday. In that situation, it would be due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day. If the contractor cannot send the information electronically, then one complete set and 5 copies of this information shall be received under the same time constraints above.

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were

solicited. Documentation of MBE/WBE quotations shall be a part of the good faith effort submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

Consideration of Good Faith Effort for Projects with a Combined MBE/WBE Goal More Than Zero

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient MBE/WBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought MBE/WBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goals and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

(A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified MBEs/WBEs that are also prequalified subcontractors. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the MBEs/WBEs to respond to the solicitation. Solicitation shall provide the opportunity to MBEs/WBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the MBEs/WBEs are interested by taking appropriate steps to follow up initial solicitations.

(B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the Combined MBE/WBE Goal will be achieved.

(1) Where appropriate, break out contract work items into economically feasible units to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.

(2) Negotiate with subcontractors to assume part of the responsibility to meet the advertised goal when the work to be sublet includes potential for MBE/WBE participation (2nd and 3rd tier subcontractors).

(C) Providing interested certified MBEs/WBEs that are also prequalified subcontractors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(D) (1) Negotiating in good faith with interested MBEs/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE subcontractors and suppliers, so as to facilitate MBE/WBE participation. Evidence of such negotiation includes the names,

addresses, and telephone numbers of MBEs/WBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBEs/WBEs to perform the work.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBE subcontractors, and would take a firm's price and capabilities as well as the advertised goal into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the contract goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from MBEs/WBEs if the price difference is excessive or unreasonable.

(E) Not rejecting MBEs/WBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

(F) Making efforts to assist interested MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.

(G) Making efforts to assist interested MBEs/WBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

(H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs/WBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the bidder's inability to get MBE or WBE quotes.

(I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the advertised goal.

In addition, the Department may take into account the following:

(1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the Combined MBE/WBE Goal.

(2) The bidders' past performance in meeting the contract goal.

(3) The performance of other bidders in meeting the advertised goal. For example, when the apparent successful bidder fails to meet the goal, but others meet it, you

may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the advertised goal, but meets or exceeds the average MBE and WBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the Combined MBE/WBE Goal can be met or that an adequate good faith effort has been made to meet the advertised goal.

Non-Good Faith Appeal

The State Prequalification Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the State Prequalification Engineer or at DBE@ncdot.gov. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

Counting MBE/WBE Participation Toward Meeting the Combined MBE/WBE Goal

(A) Participation

The total dollar value of the participation by a committed MBE/WBE will be counted toward the contract goal requirements. The total dollar value of participation by a committed MBE/WBE will be based upon the value of work actually performed by the MBE/WBE and the actual payments to MBE/WBE firms by the Contractor.

(B) Joint Checks

Prior notification of joint check use shall be required when counting MBE/WBE participation for services or purchases that involves the use of a joint check. Notification shall be through submission of Form JC-1 *(Joint Check Notification Form)* and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

A MBE/WBE may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted toward the anticipated MBE participation. The same holds true for work that a WBE subcontracts to another WBE firm. Work that a MBE/WBE subcontracts to a non-MBE/WBE firm does <u>not</u> count toward the contract goal requirement. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the MBE or WBE participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified firms and there is no interest or availability,

and they can get assistance from other certified firms, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE breakdown. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the MBE or WBE is not performing a commercially useful function.

(D) Joint Venture

When a MBE or WBE performs as a participant in a joint venture, the Contractor may count toward its contract goal requirement a portion of the total value of participation with the MBE or WBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the MBE or WBE performs with its forces.

(E) Suppliers

A contractor may count toward its MBE/ WBE requirement 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from a MBE or WBE regular dealer and 100 percent of such expenditures from a MBE or WBE manufacturer.

(F) Manufacturers and Regular Dealers

A contractor may count toward its MBE/ WBE requirement the following expenditures to MBE/WBE firms that are not manufacturers or regular dealers:

(1) The fees or commissions charged by a MBE/WBE firm for providing a *bona fide* service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees or commissions are determined to be reasonable and not excessive as compared with fees and commissions customarily allowed for similar services.

(2) With respect to materials or supplies purchased from a MBE/WBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

Commercially Useful Function

(A) MBE/WBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE/WBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually

performing, managing, and supervising the work involved. To perform a commercially useful function, the MBE/WBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a MBE/WBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the MBE/WBE credit claimed for its performance of the work, and any other relevant factors. If it is determined that a MBE or WBE is not performing a Commercially Useful Function, the contractor may present evidence to rebut this presumption to the Department.

(B) MBE/WBE Utilization in Trucking

The following factors will be used to determine if a MBE or WBE trucking firm is performing a commercially useful function:

(1) The MBE/WBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting the Combined MBE/WBE Goal.

(2) The MBE/WBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.

(3) The MBE/WBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.

(4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE participation breakdown.

(5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-MBE/WBE is entitled to credit for the total value of transportation services

provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the MBE/WBE and the Contractor will not count towards the MBE/WBE contract requirement.

(6) A MBE/WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE/WBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the MBE/WBE, so long as the lease gives the MBE/WBE absolute priority for use of the leased truck. This type of lease may count toward the MBE/WBE's credit as long as the driver is under the MBE/WBE's payroll.

(7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE/WBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

MBE/WBE Replacement

When a Contractor has relied on a commitment to a MBE or WBE subcontractor (or an approved substitute MBE or WBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE subcontractor for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another MBE/WBE subcontractor, a non-MBE/WBE subcontractor, or with the Contractor's own forces or those of an affiliate.

The Contractor must give notice in writing both by certified mail and email to the MBE/WBE subcontractor, with a copy to the Engineer of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor must give the MBE/WBE subcontractor five (5) business days to respond to the Contractor's Notice of Intent to Request Termination and/or Substitution. If the MBE/WBE subcontractor objects to the intended termination/substitution, the MBE/WBE, within five (5) business days must advise the Contractor and the Department of the reasons why the action should not be approved. The five-day notice period shall begin on the next business day after written notice is provided to the MBE/WBE subcontractor.

A committed MBE/WBE subcontractor may only be terminated after receiving the Department's written approval based upon a finding of good cause for the proposed termination and/or substitution. For purposes of this section, good cause shall include the following circumstances:

(a) The listed MBE/WBE subcontractor fails or refuses to execute a written contract;
(b) The listed MBE/WBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the MBE/WBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;

(c) The listed MBE/WBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
(d) The listed MBE/WBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
(e) The listed MBE/WBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;
(f) The listed MBE/WBE subcontractor is not a responsible contractor;
(g) The listed MBE/WBE voluntarily withdraws from the project and provides written notice of withdrawal;
(h) The listed MBE/WBE is ineligible to receive MBE/WBE credit for the type of work required;
(i) A MBE/WBE owner dies or becomes disabled with the result that the listed MBE/WBE contractor is unable to complete its work on the contract;
(j) Other documented good cause that compels the termination of the MBE/WBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a MBE/WBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the MBE/WBE contractor was engaged or so that the prime contractor can substitute another MBE/WBE or non-MBE/WBE contractor after contract award.

The Contractor shall comply with the following for replacement of a committed MBE/WBE:

(A) Performance Related Replacement

When a committed MBE/WBE is terminated for good cause as stated above, an additional MBE/WBE that was submitted at the time of bid may be used to fulfill the MBE/WBE commitment to meet the Combined MBE/WBE Goal. A good faith effort will only be required for removing a committed MBE/WBE if there were no additional MBE/WBEs submitted at the time of bid to cover the same amount of work as the MBE/WBE that was terminated.

If a replacement MBE/WBE is not found that can perform at least the same amount of work as the terminated MBE/WBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

(1) Copies of written notification to MBE/WBEs that their interest is solicited in contracting the work defaulted by the previous MBE/WBE or in subcontracting other items of work in the contract.

(2) Efforts to negotiate with MBE/WBEs for specific subbids including, at a minimum:

(a) The names, addresses, and telephone numbers of MBE/WBEs who were contacted.
(b) A description of the information provided to MBE/WBEs regarding the plans and specifications for portions of the work to be performed.

(3) A list of reasons why MBE/WBE quotes were not accepted.

(4) Efforts made to assist the MBE/WBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

(B) Decertification Replacement

(1) When a committed MBE/WBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement MBE/WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.

(2) When a committed MBE/WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE/WBE firm, the Contractor shall take all necessary and reasonable steps to replace the MBE/WBE subcontractor with another MBE/WBE subcontractor to perform at least the same amount of work to meet the Combined MBE/WBE goal requirement. If a MBE/WBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

(3) Exception: If the MBE/WBE's ineligibility is caused solely by its having exceeded the size standard during the performance of the contract, the Department will not require the Contractor to solicit replacement MBE/WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement and overall goal.

All requests for replacement of a committed MBE/WBE firm shall be submitted to the Engineer for approval on Form RF-1 *(DBE Replacement Request)*. If the Contractor fails to follow this procedure, the Contractor may be disqualified from further bidding for a period of up to 6 months.

Changes in the Work

When the Engineer makes changes that result in the reduction or elimination of work to be performed by a committed MBE/WBE, the Contractor will not be required to seek additional participation. When the Engineer makes changes that result in additional work to be performed by a MBE/WBE based upon the Contractor's commitment, the MBE/WBE shall participate in additional work to the same extent as the MBE/WBE participated in the original contract work.

When the Engineer makes changes that result in extra work, which has more than a minimal impact on the contract amount, the Contractor shall seek additional participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed MBE/WBE, the Contractor shall seek participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a MBE/WBE, the Contractor shall seek additional participation by MBEs/WBEs equal to the reduced MBE/WBE participation caused by the changes.

Reports and Documentation

A SAF (*Subcontract Approval Form*) shall be submitted for all work which is to be performed by a MBE/WBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving MBE/WBE subcontractors.

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

Within 30 calendar days of entering into an agreement with a MBE/WBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for MBE/WBE credit.

Reporting Minority and Women Business Enterprise Participation

The Contractor shall provide the Engineer with an accounting of payments made to all MBE/ WBE firms, including material suppliers and contractors at all levels (prime, subcontractor, or second tier subcontractor). This accounting shall be furnished to the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in the following action:

(A) Withholding of money due in the next partial pay estimate; or

(B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to MBEs/WBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from being approved for work on future DOT projects until the required information is submitted.

Contractors reporting transportation services provided by non-MBE/WBE lessees shall evaluate the value of services provided during the month of the reporting period only.

At any time, the Engineer can request written verification of subcontractor payments.

The Contractor shall report the accounting of payments through the Department's Payment Tracking System.

Failure to Meet Contract Requirements

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2018 Standard Specifications* may be cause to disqualify the Contractor.

CONTRACTOR'S LICENSE REQUIREMENTS:

(7-1-95) 102-14 SP1 G88

If the successful bidder does not hold the proper license to perform any plumbing, heating, air conditioning, or electrical work in this contract, he will be required to sublet such work to a contractor properly licensed in accordance with *Article 2 of Chapter 87 of the General Statutes* (licensing of heating, plumbing, and air conditioning contractors) and *Article 4 of Chapter 87* of the *General Statutes* (licensing of electrical contractors).

RESTRICTIONS ON ITS EQUIPMENT AND SERVICES:

(11-17-20) SP01 G090

All telecommunications, video or other ITS equipment or services installed or utilized on this project must be in conformance with UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS FOR FEDERAL AWARDS **2 CFR, § 200.216 Prohibition on certain telecommunications and video surveillance services or equipment.**

USE OF UNMANNED AIRCRAFT SYSTEM (UAS):

(8-20-19) SP1 G092

The Contractor shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes but is not limited to US 14 CFR Part 107 *Small UAS Rule*, NC GS 15A-300.2 *Regulation of launch and recovery sites,* NC GS 63-95 *Training required for the operation of unmanned aircraft systems*, NC GS 63-96 *Permit required for commercial operation of unmanned aircraft system,* and NCDOT UAS Policy. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, a NC UAS Operator Permit as well as operating a UAS registered with the FAA.

Prior to beginning operations, the Contractor shall complete the NCDOT UAS – Flight Operation Approval Form and submit it to the Engineer for approval. All UAS operations shall be approved by the Engineer prior to beginning the operations.

All contractors or subcontractors operating UAS shall have UAS specific general liability insurance to cover all operations under this contract.

The use of UAS is at the Contractor's discretion. No measurement or payment will be made for the use of UAS. In the event that the Department directs the Contractor to utilize UAS, payment will be in accordance with Article 104-7 Extra Work.

EQUIPMENT IDLING GUIDELINES:

(1-19-21) 107 SP1 G096

Exercise reduced fuel consumption and reduced equipment emissions during the construction of all work associated with this contract. Employees engaged in the construction of this project should turn off vehicles when stopped for more than thirty (30) minutes and off-highway equipment should idle no longer than fifteen (15) consecutive minutes.

These guidelines for turning off vehicles and equipment when idling do not apply to:

1. Idling when queuing.
2. Idling to verify the vehicle is in safe operating condition.
3. Idling for testing, servicing, repairing or diagnostic purposes.
4. Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane, mixing concrete, etc.).
5. Idling required to bring the machine system to operating temperature.
6. Emergency vehicles, utility company, construction, and maintenance vehicles where the engines must run to perform needed work.
7. Idling to ensure safe operation of the vehicle.
8. Idling when the propulsion engine is providing auxiliary power for other than heating or air conditioning. (such as hydraulic systems for pavers)
9. When specific traffic, safety, or emergency situations arise.
10. If the ambient temperature is less than 32 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants (e.g. to run the heater).
11. If the ambient temperature is greater than 90 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants of off-highway equipment (e.g. to run the air conditioning) no more than 30 minutes.
12. Diesel powered vehicles may idle for up to 30 minutes to minimize restart problems.

Any vehicle, truck, or equipment in which the primary source of fuel is natural gas or electricity is exempt from the idling limitations set forth in this special provision.

SUBSURFACE INFORMATION:

(7-1-95) 450 SP1 G112 C

Subsurface information is available on the roadway and structure portions of this project.

PORTABLE CONCRETE BARRIER - (Partial Payments for Materials):

(7-1-95) (Rev. 8-16-11) 1170-4 SP1 G121

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of portable concrete barrier, provided that these materials have been delivered on the project and stored in an acceptable manner, and further provided the documents listed in Subarticle 109-5(C) of the *2018 Standard Specifications* have been furnished to the Engineer.

The provisions of Subarticle 109-5(B) of the *2018 Standard Specifications* will apply to the portable concrete barrier.

REMOVABLE PAVEMENT MARKINGS - (Partial Payments for Materials):
(7-1-95) (Rev. 8-16-11) 1205-10 SP1 G124

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of pavement marking tape, provided that these materials have been delivered on or in the vicinity of the project, stored in an acceptable manner, not to exceed the shelf life recommended by the manufacturer, and further provided the documents listed in Subarticle 109-5(C) of the *2018 Standard Specifications* have been furnished to the Engineer.

The Contractor shall be responsible for the material and the satisfactory performance of the material when used in the work.

The provisions of Article 109-6 of the *2018 Standard Specifications* will not apply to removable pavement marking materials.

MAINTENANCE OF THE PROJECT:
(11-20-07) (Rev. 1-17-12) 104-10 SP1 G125

Revise the *2018 Standard Specifications* as follows:

Page 1-39, Article 104-10 Maintenance of the Project, line 25, add the following after the first sentence of the first paragraph:

All guardrail/guiderail within the project limits shall be included in this maintenance.

Page 1-39, Article 104-10 Maintenance of the Project, line 30, add the following as the last sentence of the first paragraph:

The Contractor shall perform weekly inspections of guardrail and guiderail and shall report damages to the Engineer on the same day of the weekly inspection. *Where damaged guardrail or guiderail is repaired or replaced as a result of maintaining the project in* accordance with this article, such repair or replacement shall be performed within 7 consecutive calendar days of such inspection report.

Page 1-39, Article 104-10 Maintenance of the Project, lines 42-44, replace the last sentence of the last paragraph with the following:

The Contractor will not be directly compensated for any maintenance operations necessary, except for maintenance of guardrail/guiderail, as this work will be considered incidental to the work covered by the various contract items. The provisions of Article 104-7, Extra Work, and Article 104-8, Compensation and Record Keeping will apply to authorized maintenance of guardrail/guiderail. Performance of weekly inspections of guardrail/guiderail, and the damage reports required as described above, will be considered to be an incidental part of the work being paid for by the various contract items.

COOPERATION BETWEEN CONTRACTORS:
(7-1-95) 105-7 SP1 G133

The Contractor's attention is directed to Article 105-7 of the *2018 Standard Specifications*.

R-3300A (New Hanover & Pender Counties) is located adjacent to this project and is anticipated for a September 15, 2026 letting.

W-5803B (DPOC - Onslow & Pender Counties) is located adjacent to this project and is anticipated for an October 31, 2022 letting.

The Contractor on this project shall cooperate with the Contractor working within or adjacent to the limits of this project to the extent that the work can be carried out to the best advantage of all concerned.

ELECTRONIC BIDDING:
(2-19-19) 101, 102, 103 SP1 G140

Revise the *2018 Standard Specifications* as follows:

Page 1-4, Article 101-3, DEFINITIONS, BID (OR PROPOSAL) ***Electronic Bid,*** **line 1,** replace "Bid Express®" with "the approved electronic bidding provider".

Page 1-15, Subarticle 102-8(B), Electronic Bids, lines 39-40, replace "to Bid Express®" with "via the approved electronic bidding provider".

Page 1-15, Subarticle 102-8(B)(1), Electronic Bids, line 41, delete "from Bid Express®"

Page 1-17, Subarticle 102-9(C)(2), Electronic Bids, line 21, replace "Bid Express® miscellaneous folder within the .ebs" with "electronic submittal".

Page 1-29, Subarticle 103-4(C)(2), Electronic Bids, line 32, replace ".ebs miscellaneous data file of Expedite" with "electronic submittal file"

BID DOCUMENTATION:
(1-1-02) (Rev.8-18-15) 103 SP1 G142

General

The successful Bidder (Contractor) shall submit the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation used to prepare the bid for this contract to the Department within 10 days after receipt of notice of award of contract. Such documentation shall be placed in escrow with a banking institution or other bonded document storage facility selected by the Department.

The Department will not execute the contract until the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation has been received by the Department.

Terms

Bid Documentation - Bid Documentation shall mean all written information, working papers, computer printouts, electronic media, charts, and all other data compilations which contain or reflect information, data, and calculations used by the Bidder in the preparation of the bid. The term *bid documentation* includes, but is not limited to, contractor equipment rates, contractor overhead rates, labor rates, efficiency or productivity factors, arithmetical calculations, and quotations from subcontractors and material suppliers to the extent that such rates and quotations were used by the Bidder in formulating and determining the bid. The term *bid documentation* also includes any manuals, which are standard to the industry used by the Bidder in determining the bid. Such manuals may be included in the bid documentation by reference. Such reference shall include the name and date of the publication and the publisher. *Bid Documentation* does not include bid documents provided by the Department for use by the Bidder in bidding on this project. The Bid Documentation can be in the form of electronic submittal (i.e. thumb drive) or paper. If the Bidder elects to submit the Bid Documentation in electronic format, the Department requires a backup submittal (i.e. a second thumb drive) in case one is corrupted.

Contractor's Representative - Officer of the Contractor's company; if not an officer, the Contractor shall supply a letter signed and notarized by an officer of the Contractor's company, granting permission for the representative to sign the escrow agreement on behalf of the Contractor.

Escrow Agent - Officer of the select banking institution or other bonded document storage facility authorized to receive and release bid documentation.

Escrow Agreement Information

A draft copy of the Escrow Agreement will be mailed to the Bidder after the notice of award for informational purposes. The Bidder and Department will sign the actual Escrow Agreement at the time the bid documentation is delivered to the Escrow Agent.

Failure to Provide Bid Documentation

The Bidder's failure to provide the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation within 10 days after the notice of award is received may be just cause for rescinding the award of the contract and may result in the removal of the Bidder from the Department's list of qualified bidders for a period of up to 180 days. Award may then be made to the next lowest responsible bidder or the work may be readvertised and constructed under the contract or otherwise, as the Department may decide.

Submittal of Bid Documentation

(A) Appointment – Email specs@ncdot.gov or call 919.707.6900 to schedule an appointment.

(B) Delivery - A representative of the Bidder shall deliver the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation to the Department, in a container suitable for sealing, within 10 days after the notice of award is received.

(C) Packaging – The container shall be no larger than 15.5 inches in length by 12 inches wide by 11 inches high and shall be water resistant. The container shall be clearly marked on the face and the back of the container with the following information: Bid Documentation, Bidder's Name, Bidder's Address, Date of Escrow Submittal, Contract Number, TIP Number if applicable, and County.

Affidavit

Bid documentation will be considered a certified copy if the Bidder includes an affidavit stating that the enclosed documentation is an EXACT copy of the original documentation used by the Bidder to determine the bid for this project. The affidavit shall also list each bid document with sufficient specificity so a comparison may be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed for escrow. The affidavit shall attest that the affiant has personally examined the bid documentation, that the affidavit lists all of the documents used by the Bidder to determine the bid for this project, and that all bid documentation has been included. The affidavit shall be signed by a chief officer of the company, have the person's name and title typed below the signature, and the signature shall be notarized at the bottom of the affidavit.

Verification

Upon delivery of the bid documentation, the Department's Contract Officer and the Bidder's representative will verify the accuracy and completeness of the bid documentation compared to the affidavit. Should a discrepancy exist, the Bidder's representative shall immediately furnish the Department's Contract Officer with any other needed bid documentation. The Department's Contract Officer upon determining that the bid documentation is complete will, in the presence of the Bidder's representative, immediately place the complete bid documentation and affidavit in the container and seal it. Both parties will deliver the sealed container to the Escrow Agent for placement in a safety deposit box, vault, or other secure accommodation.

Confidentiality of Bid Documentation

The bid documentation and affidavit in escrow are, and will remain, the property of the Bidder. The Department has no interest in, or right to, the bid documentation and affidavit other than to verify the contents and legibility of the bid documentation unless the Contractor gives written notice of intent to file a claim, files a written claim, files a written and verified claim, or initiates litigation against the Department. In the event of such written notice of intent to file a claim, filing of a written claim, filing a written and verified claim, or initiation of litigation against the Department, or receipt of a letter from the Contractor authorizing release, the bid documentation and affidavit may become the property of the Department for use in considering any claim or in litigation as the Department may deem appropriate.

Any portion or portions of the bid documentation designated by the Bidder as a *trade secret* at the time the bid documentation is delivered to the Department's Contract Officer shall be protected from disclosure as provided by *G.S. 132-1.2*.

Duration and Use

The bid documentation and affidavit shall remain in escrow until 60 calendar days from the time the Contractor receives the final estimate; or until such time as the Contractor:

(A) Gives written notice of intent to file a claim,
(B) Files a written claim,
(C) Files a written and verified claim,
(D) Initiates litigation against the Department related to the contract; or
(E) Authorizes in writing its release.

Upon the giving of written notice of intent to file a claim, filing a written claim, filing a written and verified claim, or the initiation of litigation by the Contractor against the Department, or receipt of a letter from the Contractor authorizing release, the Department may obtain the release and custody of the bid documentation.

The Bidder certifies and agrees that the sealed container placed in escrow contains all of the bid documentation used to determine the bid and that no other bid documentation shall be relevant or material in litigation over claims brought by the Contractor arising out of this contract.

Release of Bid Documentation to the Contractor

If the bid documentation remains in escrow 60 calendar days after the time the Contractor receives the final estimate and the Contractor has not filed a written claim, filed a written and verified claim, or has not initiated litigation against the Department related to the contract, the Department will instruct the Escrow Agent to release the sealed container to the Contractor.

The Contractor will be notified by certified letter from the Escrow Agent that the bid documentation will be released to the Contractor. The Contractor or his representative shall retrieve the bid documentation from the Escrow Agent within 30 days of the receipt of the certified letter. If the Contractor does not receive the documents within 30 days of the receipt of the certified letter, the Department will contact the Contractor to determine final dispersion of the bid documentation.

Payment

The cost of the escrow will be borne by the Department. There will be no separate payment for all costs of compilation of the data, container, or verification of the bid documentation. Payment at the various contract unit or lump sum prices in the contract will be full compensation for all such costs.

TWELVE MONTH GUARANTEE:

(7-15-03) 108 SP1 G145

(A) The Contractor shall guarantee materials and workmanship against latent and patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve months following the date of final acceptance of the work for maintenance and shall replace such defective materials and workmanship without cost to the Department. The Contractor will not be responsible for damage due to faulty design, normal wear and tear, for negligence on the part of the Department, and/or for use in excess of the design.

(B) Where items of equipment or material carry a manufacturer's guarantee for any period in excess of twelve months, then the manufacturer's guarantee shall apply for that particular piece of equipment or material. The Department's first remedy shall be through the manufacturer although the Contractor is responsible for invoking the warranted repair work with the manufacturer. The Contractor's responsibility shall be limited to the term of the manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

This guarantee provision shall be invoked only for major components of work in which the Contractor would be wholly responsible for under the terms of the contract. Examples would include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to force the Contractor to return to the project to make repairs or perform additional work that the Department would normally compensate the Contractor for. In addition, routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders,) are not parts of this guarantee.

Appropriate provisions of the payment and/or performance bonds shall cover this guarantee for the project.

To ensure uniform application statewide the Division Engineer will forward details regarding the circumstances surrounding any proposed guarantee repairs to the Chief Engineer for review and approval prior to the work being performed.

OUTSOURCING OUTSIDE THE USA:

(9-21-04) (Rev. 5-16-06) SP1 G150

All work on consultant contracts, services contracts, and construction contracts shall be performed in the United States of America. No work shall be outsourced outside of the United States of America.

Outsourcing for the purpose of this provision is defined as the practice of subcontracting labor, work, services, staffing, or personnel to entities located outside of the United States.

The North Carolina Secretary of Transportation shall approve exceptions to this provision in writing.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 12-15-20) 105-16, 225-2, 16 SP1 G180

General

Schedule and conduct construction activities in a manner that will minimize soil erosion and the resulting sedimentation and turbidity of surface waters. Comply with the requirements herein regardless of whether or not a National Pollution discharge Elimination System (NPDES) permit for the work is required.

Establish a chain of responsibility for operations and subcontractors' operations to ensure that the *Erosion and Sediment Control/Stormwater Pollution Prevention Plan* is implemented and maintained over the life of the contract.

(A) *Certified Supervisor* - Provide a certified Erosion and Sediment Control/Stormwater Supervisor to manage the Contractor and subcontractor operations, insure compliance with Federal, State and Local ordinances and regulations, and manage the Quality Control Program.

(B) *Certified Foreman* - Provide a certified, trained foreman for each construction operation that increases the potential for soil erosion or the possible sedimentation and turbidity of surface waters.

(C) *Certified Installer* - Provide a certified installer to install or direct the installation for erosion or sediment/stormwater control practices.

(D) *Certified Designer* - Provide a certified designer for the design of the erosion and sediment control/stormwater component of reclamation plans and, if applicable, for the design of the project erosion and sediment control/stormwater plan.

Roles and Responsibilities

(A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:

(1) Manage Operations - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.

(a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.

(b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.

(c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.

(d) Implement the erosion and sediment control/stormwater site plans requested.

(e) Provide any needed erosion and sediment control/stormwater practices for the Contractor's temporary work not shown on the plans, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.

(f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Contractor in jurisdictional areas.

(g) Conduct all erosion and sediment control/stormwater work in a timely and workmanlike manner.

(h) Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.

(i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor's operations.

(j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces or any location where sediment leaves the Right-of-Way.

(k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.

(2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements are, but are not limited to:

(a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.

(b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days and within 24 hours after a rainfall event equal to or greater than 1.0 inch that occurs within a 24 hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.

(c) Maintain an onsite rain gauge or use the Department's Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.
(d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.
(e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.
(f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.
(g) Provide secondary containment for bulk storage of liquid materials.
(h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.
(i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.

(3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:

(a) Follow permit requirements related to the Contractor and subcontractors' construction activities.
(b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
(c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
(d) Conduct the inspections required by the NPDES permit.
(e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.
(f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
(g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
(h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
(i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
(j) The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.

(B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:

(1) Foreman in charge of grading activities
(2) Foreman in charge of bridge or culvert construction over jurisdictional areas
(3) Foreman in charge of utility activities

The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.

The Contractor may request to name a single Level II Foreman to oversee multiple construction activities on small bridge or culvert replacement projects. This request shall be approved by the Engineer prior to work beginning.

(C) *Certified Installers* - Provide at least one onsite, Level I Certified Installer for each of the following erosion and sediment control/stormwater crew:

(1) Seeding and Mulching
(2) Temporary Seeding
(3) Temporary Mulching
(4) Sodding
(5) Silt fence or other perimeter erosion/sediment control device installations
(6) Erosion control blanket installation
(7) Hydraulic tackifier installation
(8) Turbidity curtain installation
(9) Rock ditch check/sediment dam installation
(10) Ditch liner/matting installation
(11) Inlet protection
(12) Riprap placement
(13) Stormwater BMP installations (such as but not limited to level spreaders, retention/detention devices)
(14) Pipe installations within jurisdictional areas

If a Level I *Certified Installer* is not onsite, the Contractor may substitute a Level II Foreman for a Level I Installer, provided the Level II Foreman is not tasked to another crew requiring Level II Foreman oversight.

(D) *Certified Designer* - Include the certification number of the Level III Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if applicable, the certification number of the Level III Certified Designer on the design of the project erosion and sediment control/stormwater plan.

Preconstruction Meeting

Furnish the names of the *Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers* and *Certified Designer* and notify the Engineer of changes in certified personnel over the life of the contract within 2 days of change.

Ethical Responsibility

Any company performing work for the North Carolina Department of Transportation has the ethical responsibility to fully disclose any reprimand or dismissal of an employee resulting from improper testing or falsification of records.

Revocation or Suspension of Certification

Upon recommendation of the Chief Engineer to the certification entity, certification for *Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* may be revoked or suspended with the issuance of an *Immediate Corrective Action (ICA), Notice of Violation (NOV),* or C*ease and Desist Order* for erosion and sediment control/stormwater related issues.

The Chief Engineer may recommend suspension or permanent revocation of certification due to the following:

(A) Failure to adequately perform the duties as defined within this certification provision.
(B) Issuance of an ICA, NOV, or Cease and Desist Order.
(C) Failure to fully perform environmental commitments as detailed within the permit conditions and specifications.
(D) Demonstration of erroneous documentation or reporting techniques.
(E) Cheating or copying another candidate's work on an examination.
(F) Intentional falsification of records.
(G) Directing a subordinate under direct or indirect supervision to perform any of the above actions.
(H) Dismissal from a company for any of the above reasons.
(I) Suspension or revocation of one's certification by another entity.

Suspension or revocation of a certification will be sent by certified mail to the certificant and the Corporate Head of the company that employs the certificant.

A certificant has the right to appeal any adverse action which results in suspension or permanent revocation of certification by responding, in writing, to the Chief Engineer within 10 calendar days after receiving notice of the proposed adverse action.

Chief Engineer
1536 Mail Service Center
Raleigh, NC 27699-1536

Failure to appeal within 10 calendar days will result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified will result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process.

The Chief Engineer will hear the appeal and make a decision within 7 days of hearing the appeal. Decision of the Chief Engineer will be final and will be made in writing to the certificant.

If a certification is temporarily suspended, the certificant shall pass any applicable written examination and any proficiency examination, at the conclusion of the specified suspension period, prior to having the certification reinstated.

Measurement and Payment

Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers and *Certified Designer* will be incidental to the project for which no direct compensation will be made.

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:

(2-20-07) (Rev. 4-5-19) 105-16, 230, 801 SP1 G181

Water discharge from borrow pit sites shall not cause surface waters to exceed 50 NTUs (nephelometric turbidity unit) in streams not designated as trout waters and 10 NTUs in streams, lakes or reservoirs designated as trout waters. For lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTUs. If the turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased.

If during any operating day, the downstream water quality exceeds the standard, the Contractor shall do all of the following:

(A) Either cease discharge or modify the discharge volume or turbidity levels to bring the downstream turbidity levels into compliance, or

(B) Evaluate the upstream conditions to determine if the exceedance of the standard is due to natural background conditions. If the background turbidity measurements exceed the standard, operation of the pit and discharge can continue as long as the stream turbidity levels are not increased due to the discharge.

(C) Measure and record the turbidity test results (time, date and sampler) at all defined sampling locations 30 minutes after startup and at a minimum, one additional sampling of all sampling locations during that 24-hour period in which the borrow pit is discharging.

(D) Notify DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the *2018 Standard Specifications*, the Contractor shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of

wetland surfaces from suspended clay particles, occurring after evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

The Engineer will perform independent turbidity tests on a random basis. These results will be maintained in a log within the project records. Records will include, at a minimum, turbidity test results, time, date and name of sampler. Should the Department's test results exceed those of the Contractor's test results, an immediate test shall be performed jointly with the results superseding the previous test results of both the Department and the Contractor.

The Contractor shall use the *NCDOT Turbidity Reduction Options for Borrow Pits Matrix,* available at https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/TurbidityReductionOptionSheet.pdf to plan, design, construct, and maintain BMPs to address water quality standards. Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWQ's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the Contractor exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

The Contractor may use cation exchange capacity (CEC) values from proposed site borings to plan and develop the bid for the project. CEC values exceeding 15 milliequivalents per 100 grams of soil may indicate a high potential for turbidity and should be avoided when dewatering into surface water is proposed.

No additional compensation for monitoring borrow pit discharge will be paid.

CONTROL OF NOISE:

The Contractor shall minimize the noise impact on adjoining properties throughout Areas #1 thru #4 between 9:00 p.m. on any night and 6:00 a.m. the following morning. The exterior noise level resulting from the work shall not exceed eighty (80) decibels or shall not exceed the background noise by more than five (5) decibels, whichever is greater. Background noise shall be defined as the measured ambient noise level associated with all existing environmental, transportation, and community noise sources in the absence of any audible construction activity. Noise levels shall be measured at the right of way line adjacent to occupied residential property at a height of five (5) feet above the ground.

Work shall be performed in a manner to prevent nuisance conditions such as noise which exhibits a specific audible frequency or tone (e.g. back-up alarms, improperly maintained equipment, brake squeal, etc.) or impact noise (e.g. jackhammers, hoe rams, truck tailgates, pile drivers, rock drilling, concrete pavement demolition, etc.). The Engineer will determine whether or not nuisance noise conditions exist. All equipment shall be operated in accordance with the

manufacturer's specifications and be equipped with all noise reducing equipment in proper operating condition.

NOTES TO CONTRACTOR:

Construction Delays of Entry are required to facilitate Utility Relocations. Access will be available at current grade from -Y30- (NC 210), -Y38- (Holiday Drive), -Y31- (Hoover Road), -L- (US 17) & -L1 and L1 Northern- (NC 417). See plan sheets TMP-3 thru TMP-3C for durations of these Areas.

Construction traffic can only access -L1- and -L1- Northern- (NC 417) via State Maintained Roads – -Y30- (NC 210), -Y38- (Holiday Drive), -Y31- (Hoover Road), -L- (US 17).

Extend State Maintained Road at -Y38- (Holiday Drive) to include work limits of -Y38-. Install 1.5" overlay prior to final acceptance. No construction activity or vehicles allowed beyond limits of -Y38- (Holiday Drive) on non-state-maintained roadway.

DO NOT DISTURB One Story Brick Dwelling on Parcel 069 (Survey Station 42+00, Survey Line –Y-31 LT) until directed by the Engineer. Dwelling shall be demolished by the Contractor when directed by the Engineer.

Parcels 82 and 87 are owned by NCDOT and may be evaluated for borrow at the contractor's risk. The Department shall not provide any guarantee of availability or acceptance and it is the contractor's responsibility if pursuing borrow at this site to meet all NCDOT and environmental agency requirements.

PROJECT SPECIAL PROVISIONS

ROADWAY

METHOD OF CLEARING – MODIFIED METHOD III:

(4-6-06) (Rev.8-18-15) 200 SP2 R02B(Revised)

Perform clearing on this project to the limits established by Modified Method "III" shown on Sheet 2C-01 of the plans. Conventional clearing methods may be used unless permit drawings or conditions have been included in the proposal which require certain areas to be cleared by hand methods.

DEMOLITION OF BUILDINGS AND APPURTENANCES:

(1-1-02) (Rev. 1-17-12) 210 SP2 R10

Demolish the buildings and appurtenances listed below in accordance with Section 210 of the *2018 Standard Specifications*:

Building Removal 1
Survey Station , 45+50, Survey Line -Y30- LT
Parcel #15
Metal Shed / Garage

Building Removal 2
Survey Station , 46+00 Survey Line -Y30- RT
Parcel #17
Shed 1

Building Removal 3
Survey Station , 46+00 Survey Line -Y30- RT
Parcel #17
Shed 2

Building Removal 4
Survey Station , 46+00 Survey Line -Y30- RT
Parcel #17
Shed 3

Building Removal 5
Survey Station 651+00, Survey Line –L-RT
Parcel #43
Dilapidated Shed

Building Removal 6
Survey Station 657+00, Survey Line – L1-RT
Parcel #47
Single family residence on crawl space with brick skirting

Building Removal 7
Survey Station 24+00, Survey Line –Y38-LT
Parcel #51
Single frame mobile home

Building Removal 8
Survey Station 669+00, Survey Line –L1-RT&LT
Parcel #53
(2) Single frame Dwelling

Building Removal 9
Survey Station 27+00, Survey Line –Y31-LT
Parcel #55
Single frame dwelling

Building Removal 10
Survey Station 27+00, Survey Line –Y31-LT
Parcel #55
Shed 1

Building Removal 11
Survey Station 27+00, Survey Line –Y31-LT
Parcel #55
Shed 2

Building Removal 12
Survey Station 676+00, Survey Line –L1-LT
Parcel #56
2 SFD

Building Removal 13
Survey Station 676+00, Survey Line –L1-RT
Parcel #56
Shed

Building Removal 14
Survey Station 679+00, Survey Line –L1-RT
Parcel #57
Two-Story Single-Family Dwelling

Building Removal 15
Survey Station 676+00, Survey Line –L1-RT
Parcel #57
Barn

Building Removal 16
Survey Station 679+00, Survey Line – L1-RT
Parcel #57
Shed

Building Removal 17
Survey Station 697+00, Survey Line –L1-RT
Parcel #58
Barn

Building Removal 18
Survey Station 702+00, Survey Line –
Parcel #59
Single family residence

Building Removal 19
Survey Station 33+00, Survey Line –Y31- RT
Parcel #64
Shed 1

Building Removal 20
Survey Station 33+00, Survey Line –Y31- RT
Parcel #64
Shed 2

Building Removal 21
Survey Station 39+00, Survey Line – Y-31 RT
Parcel #65
Manufactured Home

Building Removal 22
Survey Station 42+00, Survey Line – Y-31 RT
Parcel #66
Single Family Dwelling

Building Removal 23
Survey Station 43+00, Survey Line –Y31-RT

Parcel #67
Single frame dwelling

Building Removal 24
Survey Station 43+00, Survey Line –Y31-RT
Parcel #67
Shed

Building Removal 25
Survey Station 15+00, Survey Line –Y31-LT
Parcel #72
HTR

Building Removal 26
Survey Station 15+00, Survey Line –Y31-LT
Parcel #72
Shed – Turkey Pen

Building Removal 27
Survey Station 25+00, Survey Line –Y31-LT
Parcel #73
HTR

Building Removal 28
Survey Station 25+00, Survey Line –Y31-LT
Parcel #73
HTR

Building Removal 29
Survey Station 25+00, Survey Line –Y31-RT
Parcel #74
Abandoned wooden barn

Building Removal 30
Survey Station 12+00 , Survey Line – Y31-Lt
Parcel #77
One story brick dwelling

Building Removal 31
Not shown on plans
Parcel #82

1SFD

Building Removal 32
Not shown on plans
Parcel #82
Stable barn

Building Removal 33
Survey Station 45+00, Survey Line – Y-32 LT
Parcel #96
Office and 10 Metal Storage buildings

Building Removal 34
Survey Station 14+50, Survey Line – Y-19 LT&RT
Parcel #109
SWMH

TEMPORARY DETOURS:

(7-1-95) (Rev. 11-19-13) 1101 SP2 R30B(Rev)

Construct temporary detours required on this project in accordance with the typical sections in the plans or as directed.

After the detours have served their purpose, remove the portions deemed unsuitable for use as a permanent part of the project as directed by the Engineer. Salvage and stockpile the aggregate base course removed from the detours at locations within the right of way, as directed by the Engineer, for removal by State Forces. Place pavement and earth material removed from the detour in embankments or dispose of in waste areas furnished by the Contractor.

Aggregate base course, rock plating, and earth material that is removed will be measured and will be paid at the contract unit price per cubic yard for *Unclassified Excavation*. Pavement that is removed will be measured and will be paid at the contract unit price per square yard for *Removal of Existing _____ Pavement*. Pipe culverts removed from the detours remain the property of the Contractor. Pipe culverts that are removed will be measured and will be paid at the contract unit price per linear foot for *Pipe Removal*. Payment for the construction of the detours will be made at the contract unit prices for the various items involved.

Such prices and payments will be full compensation for constructing the detours and for the work of removing, salvaging, and stockpiling aggregate base course; removing pipe culverts; and for placing earth material and pavement in embankments or disposing of earth material and pavement in waste areas.

SHOULDER AND FILL SLOPE MATERIAL:

(5-21-02) 235, 560 SP2 R45 B

Description

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 560 and Section 235 of the *2018 Standard Specifications*.

Measurement and Payment

When the Contractor elects to obtain material from an area located beneath a proposed fill sections which does not require excavation for any reason other than to generate acceptable shoulder and fill slope material, the work of performing the excavation will be considered incidental to the item of *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow* or *Shoulder Borrow* in the contract, this work will be considered incidental to *Unclassified Excavation*. Stockpile the excavated material in a manner to facilitate measurement by the Engineer. Fill the void created by the excavation of the shoulder and fill slope material with suitable material. Payment for material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow Excavation* or *Shoulder Borrow*, then the material will be paid for at the contract unit price for *Unclassified Excavation*. The material used to fill the void created by the excavation of the shoulder and fill slope material will be made at the contract unit price for *Unclassified Excavation*, *Borrow Excavation*, or *Shoulder Borrow*, depending on the source of the material.

Material generated from undercut excavation, unclassified excavation or clearing and grubbing operations that is placed directly on shoulders or slope areas, will not be measured separately for payment, as payment for the work requiring the excavation will be considered adequate compensation for depositing and grading the material on the shoulders or slopes.

When undercut excavation is performed at the direction of the Engineer and the material excavated is found to be suitable for use as shoulder and fill slope material, and there is no area on the project currently prepared to receive the material generated by the undercut operation, the Contractor may construct a stockpile for use as borrow at a later date. Payment for the material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*.

When shoulder material is obtained from borrow sources or from stockpiled material, payment for the work of shoulder construction will be made at the contract unit price per cubic yard for *Borrow Excavation* or *Shoulder Borrow* in accordance with the applicable provisions of Section 230 or Section 560 of the *2018 Standard Specifications*.

MANUFACTURED QUARRY FINES IN EMBANKMENTS:

(01-17-17) 235 SP02 R72

Description

This specification addresses the use of manufactured quarry fines that are not classified as select materials. The specification allows the Contractor an option, with the approval of the Engineer, to use manufactured quarry fines (MQFs) in embankments as a substitute for conventional borrow material. Furnish and place geotextile for pavement stabilization in accordance with the Geotextile for Pavement Stabilization special provision and detail. Geotextile for pavement stabilization is required to prevent pavement cracking and provide separation between the subgrade and pavement

section at embankment locations where manufactured quarry fines are utilized and as directed by the Engineer.

Materials

Manufactured Quarry Fines.

Site specific approval of MQFs material will be required prior to beginning construction as detailed in the preconstruction requirements of this provision.

The following MQFs are unacceptable:

(A) Frozen material,

(B) Material with a maximum dry unit weight of less than 90 pounds per cubic foot when tested in accordance with AASHTO T-99 Method A or C.

(C) Material with greater than 80% by weight Passing the #200 sieve

Collect and transport MQFs in a manner that will prevent nuisances and hazards to public health and safety. Moisture condition the MQFs as needed and transport in covered trucks to prevent dusting. If MQFs are blended with natural earth material, follow Borrow Criteria in Section 1018 of the *Standard Specifications.*

Geotextiles

Areas of embankment where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. If the Geotextile for Pavement Stabilization special provision is not included elsewhere in this contract, then it along with a detail will be incorporated as part of the contractors request to use. Notification of subgrade elevation, sampling and waiting period as required in the Construction Methods section of the Geotextile for Pavement Stabilization special provision are not required.

Preconstruction Requirements

When MQFs are to be used as a substitute for earth borrow material, request written approval from the Engineer at least ninety (90) days in advance of the intent to use MQFs and include the following details:

(A) Description, purpose and location of project.

(B) Estimated start and completion dates of project.

(C) Estimated volume of MQFs to be used on project with specific locations and construction details of the placement.

(D) The names, address, and contact information for the generator of the MQFs.

(E) Physical location of the site at which the MQFs were generated.

The Engineer will forward this information to the State Materials Engineer for review and material approval.

Construction Methods

Place MQFs in the core of the embankment section with at least 4 feet of earth cover to the outside limits of the embankments or subgrade.

Construct embankments by placing MQFs in level uniform lifts with no more than a lift of 10 inches and compacted to at least a density of 95 percent as determined by test methods in AASHTO T-99, Determination of Maximum Dry Density and Optimum Moisture Content,

Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4 percent of optimum but not greater than one percent above optimum as determined by AASHTO T-99, Method A or C.

Areas of embankment where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. See Geotextile for Pavement Stabilization special provision for geotextile type and construction method.

Measurement and Payment

Borrow Excavation will be measured by truck volume and paid in cubic yards in accordance with Article 230-5 of the *2018 Standard Specifications*. As an alternate weigh tickets can be provided and payment made by converting weight to cubic yards based on the verifiable unit weight.
Where the pay item of *Geotextile for Pavement Stabilization* is included in the original contract the material will be measured and paid in square yards (see Geotextile for Pavement Stabilization special provision). Where the pay item of *Geotextile for Pavement Stabilization* is not included in the original contract then no payment will be made for this item and will be considered incidental to the use of MQFs in embankment.

FLOWABLE FILL:

(9-17-02) (Rev 1-17-12) 300, 340, 1000, 1530, 1540, 1550 SP3 R30

Description

This work consists of all work necessary to place flowable fill in accordance with these provisions, the plans, and as directed.

Materials

Refer to Division 10 of the *2018 Standard Specifications*.

Item	Section
Flowable Fill	1000-6

Construction Methods

Discharge flowable fill material directly from the truck into the space to be filled, or by other approved methods. The mix may be placed full depth or in lifts as site conditions dictate. The Contractor shall provide a method to plug the ends of the existing pipe in order to contain the flowable fill.

Measurement and Payment

At locations where flowable fill is called for on the plans and a pay item for flowable fill is included in the contract, *Flowable Fill* will be measured in cubic yards and paid as the actual number of cubic yards that have been satisfactorily placed and accepted. Such price and payment will be full compensation for all work covered by this provision including, but not limited to, the mix design, furnishing, hauling, placing and containing the flowable fill.

Payment will be made under:

Pay Item	Pay Unit
Flowable Fill	Cubic Yard

CORRUGATED ALUMINUM ALLOY CULVERT PIPE:

(9-21-21) 305, 310 SP3 R34

Revise the *Standard Specifications* as follows:

Page 3-5, Article 305-2, MATERIALS, add the following after line 16:

Item	Section
Waterborne Paint	1080-9
Hot Bitumen	1081-3

Page 3-5, Article 305-3, CONSTRUCTION METHODS, add the following after line 24:

Coating must be applied to the aluminum when in contact with concrete. Immediately prior to coating, aluminum surfaces to be coated shall be cleaned by a method that will remove all dirt, oil, grease, chips, and other foreign substances. Aluminum to be coated shall be given one coat of suitable quality coating such as:

Approved waterborne paint (Section 1080-9)
Approved Hot Bitumen (Section 1081-3)

Other coating materials may be submitted to the Engineer for approval.

Page 3-7, Article 310-6, MEASUREMENT AND PAYMENT, lines 6-11, delete the fourth sentence and replace with the following:

Select bedding and backfill material and coating will be included in the cost of the installed pipe. Such price and payment will be full compensation for all materials, labor, equipment, and other incidentals necessary to complete the work.

PIPE ENDWALL WITH LOAD-CARRYING GRATE:

Description

This work consists of the manufacture and installation of precast concrete pipe endwall with load-carrying grate in accordance with Section 1032-6 and 310 of the *Standard Specifications*, at the locations as shown on the plans, and as directed by the Engineer.

Materials

When pipe endwall with load-carrying grates are required in the contract plans, the precast concrete pipe end section shall meet the requirements of Section 1032-6(C), Section 310 and any other applicable parts of the *Standard Specifications*. Pipe end sections shall meet all material requirements pertaining to reinforced concrete pipes.

Materials and fabrication methods for the hinged load-carrying grates shall conform to requirements of Sections 1070, 1072, 1074 and 1081 of the *Standard Specifications*. The hinged load-carrying grate shall be constructed of Grade 60 reinforcing steel bars in accordance with Section 1070 of the Standard Specifications. The hinged load-carrying grate shall be fully welded in accordance with plans and galvanized in accordance with Section 1076 of the Standard Specifications. The hinged load-carrying grate shall be anchored to the proposed pipe end section by using anchor bolts in accordance with Section 420 of the Standard Specifications. All hardware shall be galvanized steel.

Construction Methods

Precast concrete pipe endwall with load-carrying grates shall be mitered to fit fill slope for safe passage of an errant vehicle as shown on the plans. Install in accordance with Section 310 of the *Standard Specifications*, at the locations as shown on the plans.

Measurement and Payment

Pipe Endwall with Load-Carrying Grate will be measured and paid as the actual number of each of these items manufactured and installed into the completed and accepted work. Such price and payment will be full compensation for all work and will include, but not be limited to, furnishing all labor, materials, equipment and other incidentals necessary to complete this work.

Payment will be made under:

Pay Item	**Pay Unit**
___" Pipe Endwall with Load-Carrying Grate	Each

POLYPROPYLENE CULVERT PIPE:

(8-20-19) 305,310 SP3 R35

Revise the *2018 Standard Specifications* as follows:

Page 3-5, Article 305-1 DESCRIPTION, lines 12-14, replace with the following:

Where shown in the plans, the Contractor may use reinforced concrete pipe, aluminum alloy pipe, aluminized corrugated steel pipe, HDPE pipe, Polypropylene Pipe, or PVC pipe in accordance with the following requirements.

Page 3-5, Article 305-2 MATERIALS, add the following after line 16:

Item	**Section**
Polypropylene Pipe	1032-9

Page 3-6, Article 310-2 MATERIALS, add the following after line 9:

Item	**Section**
Polypropylene Pipe	1032-9

Page 3-6, Article 310-4 SIDE DRAIN PIPE, lines 24-25, replace the first sentence of the second paragraph with the following:

Where shown in the plans, side drain pipe may be Class II reinforced concrete pipe, aluminized corrugated steel pipe, corrugated aluminum alloy pipe, polypropylene pipe, HDPE pipe or PVC pipe.

Page 3-7, Article 310-5 PIPE END SECTIONS, lines 2-4, replace the second sentence with the following:

Both corrugated steel and concrete pipe end sections will work on concrete pipe, corrugated steel pipe, polypropylene pipe, and HDPE smooth lined corrugated plastic pipe.

Page 3-7, Article 310-6 MEASUREMENT AND PAYMENT, add the following after line 14:

Pay Item	**Pay Unit**
__″ Polypropylene Pipe	Linear Foot

Page 10-60, add Article 1032-9:

(A) General

Use polypropylene pipe from sources participating in the Department's Polypropylene Pipe QA/QC Program. A list of participating sources is available from the Materials and Tests Unit. The Department will remove a manufacturer of polypropylene pipe from this program if the monitoring efforts indicated that non-specification material is being provided or test procedures are not being followed.

Use polypropylene culvert pipe that meets AASHTO M 330 for Type S or Type D, or ASTM F2881 or ASTM F2764 Double or Triple wall; and has been evaluated by NTPEP.

(B) End Treatments, Pipe Tees and Elbows

End treatments, pipe tees and elbows shall meet AASHTO M 330, Section 7.7, or ASTM F2764, Section 6.6.

(C) Marking

Clearly mark each section of pipe, end section, tee and elbow and other accessories according to the Department's Polypropylene Pipe QC/QA Program:

(1) AASHTO or ASTM Designation
(2) The date of manufacture
(3) Name or trademark of the manufacturer

When polypropylene pipe, end sections, tees and elbows have been inspected and accepted a sticker will be applied to the inside of the pipe. Do no use pipe sections, flared end sections, tees or elbows which do not have this seal of approval.

BRIDGE APPROACH FILLS:
(10-19-10) (Rev. 1-16-18) 422 SP4 R02A

Description

Bridge approach fills consist of backfilling behind bridge end bents with select material or aggregate to support all or portions of bridge approach slabs. Install drains to drain water from bridge approach fills and geotextiles to separate approach fills from embankment fills, ABC and natural ground as required. For bridge approach fills behind end bents with mechanically stabilized earth (MSE) abutment walls, reinforce bridge approach fills with MSE wall reinforcement connected to end bent caps. Construct bridge approach fills in accordance with the contract, accepted submittals and 2018 Roadway Standard Drawing Nos. 422.01 or 422.02 or Roadway Detail Drawing No. 422D10.

Define bridge approach fill types as follows:

Approach Fills – Bridge approach fills in accordance with 2018 Roadway Standard Drawing Nos. 422.01 or 422.02 or Roadway Detail Drawing No. 422D10;

Standard Approach Fill – Type I Standard Bridge Approach Fill in accordance with 2018 Roadway Standard Drawing No. 422.01;

Modified Approach Fill – Type II Modified Bridge Approach Fill in accordance with 2018 Roadway Standard Drawing No. 422.02 and

Reinforced Approach Fill – Type III Reinforced Bridge Approach Fill in accordance with Roadway Detail Drawing No. 422D10.

Materials

Refer to Division 10 of the *2018 Standard Specifications*.

Item	Section
Geotextiles, Type 1	1056
Portland Cement Concrete	1000
Select Materials	1016
Subsurface Drainage Materials	1044

Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for standard and modified approach fills. For an approach fill behind a bridge end bent with an MSE abutment wall, backfill the reinforced approach fill with the same aggregate type approved for the reinforced zone in the accepted MSE wall submittal. For MSE wall aggregate, reinforcement and connector materials, see the *Mechanically Stabilized Earth Retaining Walls* provision. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

Construction Methods

Excavate as necessary for approach fills in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place separation geotextiles or aggregate until approach fill dimensions and foundation material are approved.

For reinforced approach fills, cast MSE wall reinforcement or connectors into end bent cap backwalls within 3" of locations shown in the accepted MSE wall submittals. Install MSE wall reinforcement with the orientation, dimensions and number of layers shown in the accepted MSE wall submittals. If a reinforced approach fill is designed with geogrid reinforcement embedded in an end bent cap, cut geogrids to the required lengths and after securing ends of geogrids in place, reroll and rewrap portions of geogrids not embedded in the cap to protect geogrids from damage. Before placing aggregate, pull geosynthetic reinforcement taut so that it is in tension and free of kinks, folds, wrinkles or creases.

Attach separation geotextiles to end bent cap backwalls and wing walls with adhesives, tapes or other approved methods. Overlap adjacent separation geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with separation geotextiles or MSE wall reinforcement.

Install continuous perforated PVC drain pipes with perforations pointing down in accordance with 2018 Roadway Standard Drawing Nos. 422.01 or 422.02. Connect drain pipes to outlet pipes just beyond wing walls. Connect PVC pipes, fittings and outlet pipes with solvent cement in accordance with Article 815-3 of the *2018 Standard Specifications* and place outlet pads in accordance with 2018 Roadway Standard Drawing No. 815.03.

Install drain pipes so water drains towards outlets. If the groundwater elevation is above drain pipe elevations, raise drains up to maintain positive drainage towards outlets. Place pipe sleeves in or under wing walls so water drains towards outlets. Use sleeves that can withstand wing wall loads.

Place select material or aggregate in 8" to 10" thick lifts. Compact fine aggregate for reinforced approach fills in accordance with Subarticle 235-3(C) of the *2018 Standard Specifications* except compact fine aggregate to a density of at least 98%. Compact select material for standard or modified approach fills and coarse aggregate for reinforced approach fills with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geosynthetics, MSE wall reinforcement or drains when placing and compacting select material or aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics or drain pipes until they are covered with at least 8" of select material or aggregate. Replace any damaged geosynthetics or drains to the satisfaction of the Engineer. When approach fills extend beyond bridge approach slabs, wrap separation geotextiles over select material or aggregate as shown in 2018 Roadway Standard Drawing No. 422.01 or 2018 Roadway Detail Drawing No. 422D10.

Measurement and Payment

Type I Standard Approach Fill, Station ____, *Type II Modified Approach Fill, Station ____* and *Type III Reinforced Approach Fill, Station ____* will be paid at the contract lump sum price. The lump sum price for each approach fill will be full compensation for providing labor, tools, equipment and approach fill materials, excavating, backfilling, hauling and removing excavated materials, installing geotextiles and drains, compacting backfill and supplying select material, aggregate, separation geotextiles, drain pipes, pipe sleeves, outlet pipes and pads and any incidentals necessary to construct approach fills behind bridge end bents.

The contract lump sum price for *Type III Reinforced Approach Fill, Station ____* will also be full compensation for supplying and connecting MSE wall reinforcement to end bent caps but not designing MSE wall reinforcement and connectors. The cost of designing reinforcement and connectors for reinforced approach fills behind bridge end bents with MSE abutment walls will be incidental to the contract unit price for *MSE Retaining Wall No. __*.

Payment will be made under:

Pay Item	**Pay Unit**
Type I Standard Approach Fill, Station ____	Lump Sum
Type II Modified Approach Fill, Station ____	Lump Sum
Type III Reinforced Approach Fill, Station ____	Lump Sum

AUTOMATED FINE GRADING:

(1-16-96) 610 SP5 R05

On mainline portions and ramps of this project, prepare the subgrade and base beneath the pavement structure in accordance with the applicable sections of the *2018 Standard Specifications* except use an automatically controlled fine grading machine using string lines, laser controls or other approved methods to produce final subgrade and base surfaces meeting the lines, grades and cross sections required by the plans or established by the Engineer.

No direct payment will be made for the work required by this provision as it will be considered incidental to other work being paid for by the various items in the contract.

AGGREGATE SUBGRADE:

(5-15-18) 505 SP5 R8

Revise the *2018 Standard Specifications* as follows:

Page 5-8, Article 505-1 DESCRIPTION, lines 4-6, replace the paragraph with the following:

Construct aggregate subgrades in accordance with the contract. Install geotextile for soil stabilization and place Class IV subgrade stabilization at locations shown in the plans and as directed.

Undercut natural soil materials if necessary to construct aggregate subgrades. Define “subbase” as the portion of the roadbed below the Class IV subgrade stabilization. For Type 2 aggregate subgrades, undercut subbases as needed. The types of aggregate subgrade with thickness and compaction requirements for each are as shown below.

Type 1 – A 6 to 24 inch thick aggregate subgrade with Class IV subgrade stabilization compacted to 92% of AASHTO T 180 as modified by the Department or to the highest density that can be reasonably obtained.

Type 2 – An 8 inch thick aggregate subgrade on a proof rolled subbase with Class IV subgrade stabilization compacted to 97% of AASHTO T 180 as modified by the Department.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, line 12, insert the following after the first sentence of the first paragraph:

For Type 2 aggregate subgrades, proof roll subbases in accordance with Section 260 before installing geotextile for soil stabilization.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, lines 16-17, replace the last sentence of the first paragraph with the following:

Compact ABC as required for the type of aggregate subgrade constructed.

Page 5-8, Article 505-4 MEASUREMENT AND PAYMENT, line 26, insert the following after the last sentence of the first paragraph:

Undercut Excavation of natural soil materials from subbases for Type 2 aggregate subgrades will be measured and paid in accordance with Article 225-7 or 226-3. No measurement will be made for any undercut excavation of fill materials from subbases.

STABILIZATION OF COASTAL PLAIN SANDS:
(11-18-14) 510 SP5 R12

Description

As directed by the Engineer, stabilize sandy subgrade material with Class IV aggregate to prevent rutting of the subgrade prior to paving directly on the subgrade. Remove material as needed in cut areas prior to placing the Class IV aggregate.

Materials

Refer to Division 10.

Item	Section
Select Material, Class IV	1016

Use Class IV Select Material for Class IV Aggregate Stabilization.

Construction Methods

Class IV Aggregate Stabilization

As directed by the Engineer, place aggregate by end dumping aggregate on approved subgrade

soils to provide a working platform and reduce wheel rutting of subgrade material. Place the Class IV aggregate stabilization to a thickness of 2 to 3 inches.

Maintenance

Maintain aggregate stabilization in an acceptable condition and minimize the use of heavy equipment on aggregate in order to avoid damaging the subgrade. Provide and maintain drainage ditches and drains as required to prevent entrapping water in aggregate stabilization.

Measurement and Payment

Class IV Aggregate Stabilization will be measured and paid in tons. Aggregate will be measured by weighing in trucks in accordance with Article 106-7. The contract unit price for *Class IV Aggregate Stabilization* will be full compensation for furnishing, hauling, handling, placing, mixing, compacting and maintaining aggregate.

The work to excavate material to place Class IV Aggregate Stabilization below subgrade is considered incidental to the work of placing the aggregate and no separate payment will be made.

Payment will be made under:

Pay Item	**Pay Unit**
Class IV Aggregate Stabilization	Ton

PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:
(11-21-00) 620 SP6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the *2018 Standard Specifications.*

The base price index for asphalt binder for plant mix is **$ 509.55** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **November 1, 2021**.

MILLING ASPHALT PAVEMENT:
(1-15-19) 607 SP6 R59

Revise the *2018 Standard Specifications* as follows:

Page 6-5, Article 607-2, EQUIPMENT, lines 14-16, delete the seventh sentence of this Article and replace with the following:

Use either a non-contacting laser or sonar type ski system with a minimum of three referencing stations mounted on the milling machine at a length of at least 24 feet.

ASPHALT CONCRETE PLANT MIX PAVEMENTS:
(2-20-18) (Rev.1-15-19) 610, 1012 SP6 R65

Revise the *2018 Standard Specifications* as follows:

Page 6-14, Table 609-3, LIMITS OF PRECISION FOR TEST RESULTS, replace with the following:

TABLE 609-3 LIMITS OF PRECISION FOR TEST RESULTS	
Mix Property	**Limits of Precision**
25.0 mm sieve (Base Mix)	± 10.0%
19.0 mm sieve (Base Mix)	± 10.0%
12.5 mm sieve (Intermediate & Type P-57)	± 6.0%
9.5 mm sieve (Surface Mix)	± 5.0%
4.75 mm sieve (Surface Mix)	± 5.0%
2.36 mm sieve (All Mixes, except S4.75A)	± 5.0%
1.18 mm sieve (S4.75A)	± 5.0%
0.075 mm sieve (All Mixes)	± 2.0%
Asphalt Binder Content	± 0.5%
Maximum Specific Gravity (G_{mm})	± 0.020
Bulk Specific Gravity (G_{mb})	± 0.030
TSR	± 15.0%
QA retest of prepared QC Gyratory Compacted Volumetric Specimens	± 0.015
Retest of QC Core Sample	± 1.2% (% Compaction)
Comparison QA Core Sample	± 2.0% (% Compaction)
QA Verification Core Sample	± 2.0% (% Compaction)
Density Gauge Comparison of QC Test	± 2.0% (% Compaction)
QA Density Gauge Verification Test	± 2.0% (% Compaction)

Page 6-17, Table 610-1, MIXING TEMPERATURE AT THE ASPHALT PLANT, replace with the following:

TABLE 610-1 MIXING TEMPERATURE AT THE ASPHALT PLANT	
Binder Grade	**JMF Temperature**
PG 58-28; PG 64-22	250 - 290°F
PG 76-22	300 - 325°F

Page 6-17, Subarticle 610-3(C), Job Mix Formula (JMF), lines 38-39, delete the fourth paragraph.

Page 6-18, Subarticle 610-3(C), Job Mix Formula (JMF), line 12, replace “SF9.5A” with “S9.5B”.

Page 6-18, Table 610-3, MIX DESIGN CRITERIA, replace with the following:

TABLE 610-3 MIX DESIGN CRITERIA					
Mix Type			**Compaction Levels**	**Max. Rut**	**Volumetric Properties [B]**

	Design ESALs millions [A]	Binder PG Grade	G_{mm} @ N_{ini}	G_{mm} @ N_{des}	Depth (mm)	VMA % Min.	VTM %	VFA Min.-Max.	$\%G_{mm}$ @ N_{ini}
S4.75A	< 1	64 - 22	6	50	11.5	16.0	4.0 - 6.0	65 - 80	≤ 91.5
S9.5B	0 - 3	64 - 22	6	50	9.5	16.0	3.0 - 5.0	70 - 80	≤ 91.5
S9.5C	3 - 30	64 - 22	7	65	6.5	15.5	3.0 - 5.0	65 - 78	≤ 90.5
S9.5D	> 30	76 - 22	8	100	4.5	15.5	3.0 - 5.0	65 - 78	≤ 90.0
I19.0C	ALL	64 - 22	7	65	-	13.5	3.0 - 5.0	65 - 78	≤ 90.5
B25.0C	ALL	64 - 22	7	65	-	12.5	3.0 - 5.0	65 - 78	≤ 90.5
	Design Parameter					**Design Criteria**			
All Mix Types	Dust to Binder Ratio ($P_{0.075}$ / P_{be})					0.6 - 1.4 [C]			
	Tensile Strength Ratio (TSR) [D]					85% Min. [E]			

A. Based on 20 year design traffic.
B. Volumetric Properties based on specimens compacted to N_{des} as modified by the Department.
C. Dust to Binder Ratio ($P_{0.075}$ / P_{be}) for Type S4.75A is 1.0 - 2.0.
D. NCDOT-T-283 (No Freeze-Thaw cycle required).
E. TSR for Type S4.75A & B25.0C mixes is 80% minimum.

Page 6-19, Table 610-5, BINDER GRADE REQUIREMENTS (BASED ON RBR%), replace with the following:

TABLE 610-5
BINDER GRADE REQUIREMENTS (BASED ON RBR%)

Mix Type	%RBR ≤ 20%	21% ≤ %RBR ≤ 30%	%RBR ≥ 30%
S4.75A, S9.5B, S9.5C, I19.0C, B25.0C	PG 64-22	PG 64-22[A]	PG-58-28
S9.5D, OGFC	PG 76-22[B]	n/a	n/a

A. If the mix contains any amount of RAS, the virgin binder shall be PG 58-28.
B. Maximum Recycled Binder Replacement (%RBR) is 18% for mixes using PG 76-22 binder.

Page 6-20, Table 610-6, PLACEMENT TEMPERATURES FOR ASPHALT, replace with the following:

TABLE 610-6
PLACEMENT TEMPERATURES FOR ASPHALT

Asphalt Concrete Mix Type	Minimum Surface and Air Temperature
B25.0C	35°F
I19.0C	35°F
S4.75A, S9.5B, S9.5C	40°F [A]
S9.5D	50°F

A. For the final layer of surface mixes containing recycled asphalt shingles (RAS), the minimum surface and air temperature shall be 50°F.

Page 6-21, Article 610-8, SPREADING AND FINISHING, lines 34-35, delete the second sentence and replace with the following:

Use an MTV for all surface mix regardless of binder grade on Interstate, US Routes, and NC Routes (primary routes) that have 4 or more lanes and median divided.

Page 6-21, Article 610-8, SPREADING AND FINISHING, lines 36-38, delete the fourth sentence and replace with the following:

Use MTV for all ramps, loops, Y-line that have 4 or more lanes and are median divided, full width acceleration lanes, full width deceleration lanes, and full width turn lanes that are greater than 1000 feet in length.

Page 6-23, Table 610-7, DENSITY REQUIREMENTS, replace with the following:

TABLE 610-7 DENSITY REQUIREMENTS	
Mix Type	**Minimum % G_{mm} (Maximum Specific Gravity)**
S4.75A	85.0 [A]
S9.5B	90.0
S9.5C, S9.5D, I19.0C, B25.0C	92.0

A. Compaction to the above specified density will be required when the S4.75A mix is applied at a rate of 100 lbs/sy or higher.

Page 6-24, Article 610-13, FINAL SURFACE TESTING, lines 35-36, delete the second sentence and replace with the following:

Final surface testing is not required on ramps, loops and turn lanes.

Page 6-26, Subarticle 610-13(A)(1), Acceptance for New Construction, lines 29-30, delete the second sentence and replace with the following:

Areas excluded from testing by the profiler may be tested using a 10-foot straightedge in accordance with Article 610-12.

Page 6-27, Subarticle 610-13(B), Option 2- North Carolina Hearne Straightedge, lines 41-46, delete the eighth and ninth sentence of this paragraph and replace with the following:

Take profiles over the entire length of the final surface travel lane pavement exclusive of structures, approach slabs, paved shoulders, tapers, or other irregular shaped areas of pavement, unless otherwise approved by the Engineer. Test in accordance with this provision all mainline travel lanes, full width acceleration or deceleration lanes and collector lanes.

Page 6-28, Subarticle 610-13(B), Option 2- North Carolina Hearne Straightedge, lines 1-2, delete these two lines.

Page 6-32, Article 610-16 MEASUREMENT AND PAYMENT, replace with the following:

Pay Item	**Pay Unit**
Asphalt Concrete Base Course, Type B25.0C	Ton
Asphalt Concrete Intermediate Course, Type I19.0C	Ton
Asphalt Concrete Surface Course, Type S4.75A	Ton
Asphalt Concrete Surface Course, Type S9.5B	Ton
Asphalt Concrete Surface Course, Type S9.5C	Ton
Asphalt Concrete Surface Course, Type S9.5D	Ton

Page 10-30, Table 1012-1, AGGREGATE CONSENSUS PROPERTIES, replace with the following:

TABLE 1012-1
AGGREGATE CONSENSUS PROPERTIES[A]

Mix Type	Coarse Aggregate Angularity[B]	Fine Aggregate Angularity % Minimum	Sand Equivalent % Minimum	Flat and Elongated 5 : 1 Ratio % Maximum
Test Method	*ASTM D5821*	*AASHTO T 304*	*AASHTO T 176*	*ASTM D4791*
S4.75A; S9.5B	75 / -	40	40	-
S9.5C; I19.0C; B25.0C	95 / 90	45	45	10
S9.5D	100 / 100	45	50	10
OGFC	100 / 100	45	45	10
UBWC	100 / 85	45	45	10

A. Requirements apply to the design aggregate blend.
B. 95 / 90 denotes that 95% of the coarse aggregate has one fractured face and 90% has 2 or more fractured faces.

AUTOMATED MACHINE GUIDANCE

(1-2-11) 801 SP8 R01

General

This Special Provision contains requirements to be followed if the Contractor elects to use Global Positioning System (GPS) machine control grading and shall be used in conjunction with Section 801 of the *Standard Specifications*. The use of this technology is referenced as Automated Machine Guidance (AMG).

All equipment using AMG shall be able to generate end results that meet the *Standard Specifications*. Perform test sections for each type of work to be completed with AMG to demonstrate that the system has the capability to achieve acceptable results. If acceptable results cannot be achieved, conform to the requirements for conventional stakeout.

The Contractor shall be responsible for all errors resulting from the use of AMG and shall correct deficiencies to the satisfaction of the Engineer at no cost to the Department.

Submittals

If the Contractor elects to use AMG, a Digital Terrain Model (DTM) of the design surface and all intermediate surfaces shall be developed and submitted to the Engineer for review.

At least 90 days prior to beginning grading operations, the Contractor shall submit to the Engineer an AMG work plan to include, but not limited to, proposed equipment, control software manufacturer and version, types of work to be completed using AMG, project site calibration report, repetitive calibration methods for construction equipment and rover units to be used for the

duration of the project, and local GPS base station to be used for broadcasting differential correction data to rover units (this may include the NC Network RTK). All surveys must be tied to existing project control as established by NCDOT.

Inspection

The Engineer will perform quality assurance checks of all work associated with AMG. If it is determined that work is not being performed in a manner that will assure accurate results, the Engineer may require corrective action at no cost to the Department.

The Contractor shall provide the Engineer with one GPS rover unit for use during the duration of the contract. The rover will be loaded with the same model that is used with the AMG and have the same capability as rover units used by the Contractor. The rover will be kept in the possession of the Engineer and will be returned to the Contractor upon completion of the contract. Any maintenance or repairs required for the rover will be the responsibility of the Contractor. Formal training of at least 8 hours shall be provided to the Engineer by the Contractor on the use of the proposed AMG system.

Subgrade and Base Controls

If the Contractor elects to use AMG for fine grading and placement of base or other roadway materials, the GPS shall be supplemented with a laser or robotic total station. Include details of the proposed system in the AMG work plan. In addition, the following requirements apply for the use of AMG for subgrade and base construction.

Provide control points at intervals along the project not to exceed 1,000 feet. The horizontal position of these points shall be determined by static GPS sessions or by traverse connection from the original base line control points. The elevation of these control points shall be established using differential leveling from project benchmarks, forming closed loops where practical. A copy of all new control point information shall be provided to the Engineer prior to construction activities.

Provide control points and conventional survey grade stakes at 500 foot intervals and at critical points such as, but not limited to, PCs, PTs, superelevation transition points, and other critical points as requested by the Engineer.

Provide hubs at the top of the finished subgrade at all hinge points on the cross section at 500 foot intervals. These hubs shall be established using conventional survey methods for use by the Engineer to check the accuracy of construction.

Measurement and Payment

No direct payment will be made for work required to utilize this provision. All work will be considered incidental to various grading operations.

SUPPLEMENTAL SURVEYING:

(4-20-21) 801 SP8 R03

Revise the *2018 Standard Specifications* as follows:

Page 8-7, Article 801-3 MEASUREMENT AND PAYMENT, lines 10-11, replace with the following:

Supplemental Surveying Office Calculations will be paid at the stated price of $85.00 per hour. *Supplemental Field Surveying* will be paid at the stated price of $145.00 per hour. The

CONVERT EXISTING CATCH BASIN TO TRAFFIC BEARING JUNCTION BOX:
(1-1-02) (Rev. 7-18-06) 840, 859 SP8 R50

At the proper phase of construction, convert the existing catch basin at locations indicated in the plans or where directed, to traffic bearing junction box in accordance with the details in the plans and the applicable requirements of Sections 840 and 859 of the *2018 Standard Specifications*.

Convert Existing Catch Basin to Traffic Bearing Junction Box will be measured and paid as each, completed and accepted. Such price and payment is considered full compensation for all equipment, materials, labor, tools, and incidentals necessary to complete each conversion satisfactorily.

Payment will be made under:

Pay Item	Pay Unit
Convert Existing Catch Basin to Traffic Bearing Junction Box	Each

GUARDRAIL END UNITS, TYPE - TL-2:
(10-21-08) (Rev. 7-1-17) 862 SP8 R64

Description

Furnish and install guardrail end units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2018 Standard Specifications*, and at locations shown in the plans.

Materials

Furnish guardrail end units listed on the NCDOT Approved Products List at https://apps.dot.state.nc.us/vendor/approvedproducts/ or approved equal.

Prior to installation the Contractor shall submit to the Engineer:

(A) FHWA acceptance letter for each guardrail end unit certifying it meets the requirements of the AASHTO Manual for Assessing Safety Hardware, Test Level 2 in accordance with Article 106-2 of the *2018 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each guardrail end unit in accordance with Article 105-2 of the *2018 Standard Specifications*.

No modifications shall be made to the guardrail end unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2018 Standard Specifications* and is incidental to the cost of the guardrail end unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Guardrail End Units, Type TL-2	Each

GUARDRAIL END UNITS, TYPE - TL-3:

(4-20-04) (Rev. 7-1-17) 862 SP8 R65

Description

Furnish and install guardrail end units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2018 Standard Specifications*, and at locations shown in the plans.

Materials

Furnish guardrail end units listed on the NCDOT Approved Products List at https://apps.dot.state.nc.us/vendor/approvedproducts/ or approved equal.

Prior to installation the Contractor shall submit to the Engineer:

(A) FHWA acceptance letter for each guardrail end unit certifying it meets the requirements of the AASHTO Manual for Assessing Safety Hardware, Test Level 3, in accordance with Article 106-2 of the *2018 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each guardrail end unit in accordance with Article 105-2 of the *2018 Standard Specifications*.

No modifications shall be made to the guardrail end unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting

applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2018 Standard Specifications* and is incidental to the cost of the guardrail end unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Guardrail End Units, Type TL-3	Each

GUARDRAIL ANCHOR UNITS AND TEMPORARY GUARDRAIL ANCHOR UNITS:

(1-16-2018) 862 SP8 R70

Guardrail anchor units will be in accordance with the details in the plans and the applicable requirements of Section 862 of the *2018 Standard Specifications*.

Revise the *2018 Standard Specifications* as follows:

Page 8-42, Article 862-6 MEASUREMENT AND PAYMENT, add the following:

Guardrail Anchor Units, Type ___ and Temporary Guardrail Anchor Units Type ___ will be measured and paid as units of each completed and accepted. No separate measurement will be made of any rail, terminal sections, posts, offset blocks, concrete, hardware or any other components of the completed unit that are within the pay limits shown in the plans for the unit as all such components will be considered to be part of the unit.

Payment will be made under:

Pay Item	Pay Unit
Guardrail Anchor Units, Type ____	Each
Temporary Guardrail Anchor Units, Type ___	Each

IMPACT ATTENUATOR UNITS, TYPE TL-3:

(4-20-04) (Rev. 12-18-18) SP8 R75

Description

Furnish and install impact attenuator units and any components necessary to connect the impact attenuator units in accordance with the manufacturer's requirement, the details in the plans and at locations shown in the plans.

Materials

Furnish impact attenuator units listed on the Approved Products List at https://apps.dot.state.nc.us/vendor/approvedproducts/ or approved equal. Prior to installation the Contractor shall submit to the Engineer:

(A) FHWA acceptance letter for each impact attenuator unit certifying it meets the requirements of the Manual for Assessing Safety Hardware (MASH-16), Test Level 3, in accordance with Article 106-2 of the *2018 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each impact attenuator unit in accordance with Article 105-2 of the *2018 Standard Specifications*.

No modifications shall be made to the impact attenuator unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans and details and assembling instructions furnished by the manufacturer.

Construction Methods

If the median width is 40 feet or less, the Contractor shall supply NON-GATING Impact Attenuator Units.

If the median width is greater than 40 feet, the Contractor may use GATING or NON-GATING Impact Attenuator Units.

Measurement and Payment

Impact Attenuator Unit, Type TL-3 will be measured and paid at the contract unit price per each. Such prices and payment will be full compensation for all work covered by this provision including, but not limited to, furnishing, installing and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Impact Attenuator Units, Type TL-3	Each

PORTLAND CEMENT CONCRETE PRODUCTION AND DELIVERY:

(9-15-20) 1000, 1014, 1024 SP10 R01

Revise the *2018 Standard Specifications* as follows:

Page 10-6, Table 1000-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1000-1
REQUIREMENTS FOR CONCRETE

Class of Concrete	Min. Compressive Strength at 28 days	Maximum Water-Cement Ratio				Consistency Maximum Slump		Cement Content			
		Air-Entrained Concrete		Non-Air-Entrained Concrete		Vibrated	Non-Vibrated	Vibrated		Non-Vibrated	
		Rounded Aggregate	Angular Aggregate	Rounded Aggregate	Angular Aggregate			Min.	Max.	Min.	Max.
Units	*psi*					*inch*	*inch*	*lb/cy*	*lb/cy*	*lb/cy*	*lb/cy*
AA	4500	0.381	0.426	---	---	3.5[A]	---	639	715	---	---
AA Slip Form	4500	0.381	0.426	---	---	1.5	---	639	715	---	---
Drilled Pier	4500	---	---	0.450	0.450	---	5 – 7 dry 7 - 9 wet	---	---	640	800
A	3000	0.488	0.532	0.550	0.594	3.5 [A]	4.0	564	---	602	---
B	2500	0.488	0.567	0.559	0.630	1.5 machine placed 2.5 [A] hand placed	4.0	508	---	545	---
Sand Light-weight	4500	---	0.420	---	---	4.0 [A]	---	715	---	---	---
Latex Modified	3000 (at 7 days)	0.400	0.400	---	---	6.0	---	658	---	---	---
Flowable Fill excavatable	150 max. (at 56 days)	as needed	as needed	as needed	as needed	---	Flowable	---	---	40	100
Flowable Fill non-excavatable	125	as needed	as needed	as needed	as needed	---	Flowable	---	---	100	as needed
Pavement	4500 Design, field 650 flexural, design only	0.559	0.559	---	---	1.5 slip form 3.0 hand placed	---	526	---	---	---
Precast	See Table 1077-1	as needed	as needed	---	---	6.0	as needed	as needed	as needed	as needed	as needed
Prestressed	per contract	See Table 1078-1	See Table 1078-1	---	---	8.0	---	564	as needed	---	---

A. The slump may be increased to 6 inches, provided the increase in slump is achieved by adding a chemical admixture conforming to Section 1024-3. In no case shall the water-cement ratio on the approved design be exceeded. Concrete exhibiting segregation and/or excessive bleeding will be rejected. Utilizing an Admixture to

modify slump does not relinquish the contractor's responsibility to ensure the final product quality and overall configuration meets design specifications. Caution should be taken when placing these modified mixes on steep grades to prevent unintended changes to the set slope.

HIGH STRENGTH CONCRETE FOR DRIVEWAYS:

(11-21-00) (Rev. 1-17-12) 848 SP10 R02

Use high early strength concrete for all driveways shown in the plans and as directed by the Engineer. Provide high early strength concrete that meets the requirements of Article 1000-5 of the *2018 Standard Specifications*.

Measurement and payment will be in accordance with Section 848 of the *2018 Standard Specifications*.

THERMOPLASTIC PAVEMENT MARKING MATERIAL – COLOR TESTING:

3-19-19 1087 SP10 R05

Revise the *2018 Standard Specifications* as follows:

Pages 10-183 and 10-184, Subarticle 1087-7(D)(1)(b) Yellow, lines 9-11, delete and replace with the following:

Obtain Color Values Y,x,y per ASTM E1349 using C/2° illuminant/observer.
Results shall be Y ≥ 45%, and x,y shall fall within PR#1 chart chromaticity limits.

POLYUREA PAVEMENT MARKING MATERIAL – TYPE 2 TYPICAL CERTIFIED MILL TEST REPORT:

3-19-19 1087 SP10 R06

Amend the *2018 Standard Specifications* as follows:

Page 10-184, Subarticle 1087-8 Material Certification, in accordance with Subarticle 106-3 provide a Type 2 Typical Certified Mill Test Report and a Type 3 Manufacturer's Certification for Polyurea pavement marking material.

When tested, the material shall meet the physical and chemical characteristics provided by the manufacturer. NCDOT reserves the right to compare these test results to baseline test results gathered by the NCDOT Materials and Test Unit.

NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKERS:

10-19-21 (Rev. 11-16-21) 1086, 1250, 1253 SP10 R08

Revise the *2018 Standard Specifications* as follows:

Pages 10-177 and 10-178, Subarticle 1086-3 SNOWPLOWABLE PAVEMENT MARKERS, delete items (A), (B) and (C)(1) and replace with the following:

(A) General

Use non-cast iron snowplowable pavement markers evaluated by NTPEP. The non-cast iron snowplowable pavement marker shall consist of a housing with one or more glass or plastic face lens type reflective lenses to provide the required color designation. The marker shall be designed or installed in a manner that minimizes damage from snowplow blades. Plastic lens faces shall use an abrasion resistant coating.

(B) Housings

(1) Dimensions
The dimension, slope and minimum area of reflecting surface shall conform to dimensions as shown in the plans. The minimum area of each reflecting surface shall be 1.44 sq.in.

(2) Materials
Use non-cast iron snowplowable pavement markers that are on the NCDOT Approved Products List.

(3) Surface
The surface of the housing shall be free of scale, dirt, rust, oil, grease or any other contaminant which might reduce its bond to the epoxy adhesive.

(4) Identification
Mark the housing with the manufacturer's name and model number of marker.

(C) Reflectors

(1) General
Laminate the reflector to an elastomeric pad and attach with adhesive to the housing. The thickness of the elastomeric pad shall be 0.04".

Pages 12-14, Subarticle 1250-3(C) Removal of Existing Pavement Markers, lines 19-29, delete and replace with the following:

Remove the existing raised pavement markers or the snowplowable pavement markers including the housings, before overlaying an existing roadway with pavement. Repair the pavement by filling holes as directed by the Engineer.

When traffic patterns are changed in work zones due to construction or reconstruction, remove all raised pavement markers or snowplowable markers including housings that conflict with the new traffic pattern before switching traffic to the new traffic pattern. Lens removal in lieu of total housing removal is not an acceptable practice for snowplowable markers.

Properly dispose of the removed pavement markers. No direct payment will be made for removal or disposal of existing pavement markers or repair of pavement, as such work will be incidental to other items in the contract.

Pages 12-16, Subarticle 1253-1 DESCRIPTION, lines 4-5, delete and replace with the following:

Furnish, install and maintain non-cast iron snowplowable pavement markers in accordance with the contract.

Pages 12-16 and 12-17, Subarticle 1253-3 CONSTRUCTION METHODS, delete items (A), (B) and (C) and replace with the following:

(A) General

Bond marker housings to the pavement with epoxy adhesive. Mechanically mix and dispense epoxy adhesives as required by the manufacturer's specifications. Place the markers immediately after the adhesive has been mixed and dispensed.

If saw cutting, milling, or grooving operations are used, promptly remove all resulting debris from the pavement surface. Install the marker housings within 7 calendar days after saw cutting, milling, or grooving the pavement. Remove and dispose of loose material from the slots by brushing, blow cleaning, or vacuuming. Dry the slots before applying the epoxy adhesive. Install non-cast iron snowplowable pavement markers according to the manufacturer's recommendations.

Protect the non-cast iron snowplowable pavement markers until the epoxy has initially cured and is track free.

(B) Reflector Replacement

In the event that a reflector is damaged, replace the damaged reflector by using adhesives and methods recommended by the manufacturer of the markers and approved by the Engineer. This work is considered incidental if damage occurs during the initial installation of the marker housings and maintenance of initial non-cast iron snowplowable markers specified in this section. This work will be paid for under the pay item for the type of reflector replacement if the damage occurred after the initial installation of the non-cast iron snowplowable pavement marker.

Missing housings shall be replaced. Broken housings shall be removed and replaced. In both cases the slot for the housings shall be properly prepared prior to installing the new housing; patch the existing marker slots as directed by the Engineer and install the new marker approximately one foot before or after the patch. Removal of broken housings and preparation of slots will be considered incidental to the work of replacing housings.

Pages 12-17, Subarticle 1253-4 MAINTENANCE, lines 5, delete and replace with the following:

Maintain all installed non-cast iron snowplowable pavement markers until acceptance.

Pages 12-17, Subarticle 1253-5 MEASUREMENT AND PAYMENT, lines 7-8, delete and replace with the following:

Non-Cast Iron Snowplowable Pavement Markers will be measured and paid as the actual number of non-cast iron snowplowable pavement markers satisfactorily placed and accepted by the Engineer.

Pages 12-17, Subarticle 1253-5 MEASUREMENT AND PAYMENT, lines 11, delete and replace with the following:

Payment will be made under:

Pay Item	Pay Unit
Non-Cast Iron Snowplowable Pavement Marker	Each
Replace Snowplowable Pavement Marker Reflector	Each

MATERIALS FOR PORTLAND CEMENT CONCRETE:

(9-15-20) 1000, 1024 SP10 R24

Revise the *2018 Standard Specifications* as follows:

Page 10-52, Article 1024-4, WATER, lines 3-6, delete and replace with the following:

Test water from wells at all locations. Test public water supplies from all out of state locations and in the following counties: Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrell and Washington unless the Engineer waives the testing requirements.

Page 10-52, Table 1024-2, PHYSICAL PROPERTIES OF WATER, replace with the following:

Property	Requirement	Test Method
Compression Strength, minimum percent of control at 3 and 7 days	90%	ASTM C1602
Time of set, deviation from control	From 1:00 hr. earlier to 1:30 hr. later	ASTM C1602
pH	4.5 to 8.5	ASTM D1293 *
Chloride Ion Content, Max.	250 ppm	ASTM D512 *
Total Solids Content (Residue), Max.	1,000 ppm	SM 2540B *
Resistivity, Min.	0.500 kohm-cm	ASTM D1125 *

*Denotes an alternate method is acceptable. Test method used shall be referenced in the test report.

TEMPORARY SHORING:

(2-20-07) (Rev. 10-19-21) SP11 R02

Description

Temporary shoring includes cantilever, braced and anchored shoring and temporary mechanically stabilized earth (MSE) walls. Temporary shoring does not include trench boxes. At the Contractor's option, use any type of temporary shoring unless noted otherwise in the plans or as directed. Design and construct temporary shoring based on actual elevations and shoring dimensions in accordance with the contract and accepted submittals. Construct temporary shoring at locations shown in the plans and as directed. Temporary shoring is required to maintain traffic when a 2:1 (H:V) slope from the top of an embankment or bottom of an excavation will intersect the existing ground line less than 5 feet from the edge of pavement of an open travelway. This provision does not apply to pipe, inlet or utility installation unless noted otherwise in the plans.

Positive protection includes concrete barrier and temporary guardrail. Provide positive protection for temporary shoring at locations shown in the plans and as directed. Positive protection is required if temporary shoring is located in the clear zone in accordance with the *AASHTO Roadside Design Guide.*

(A) Cantilever and Braced Shoring

Cantilever shoring consists of steel sheet piles or H-piles with timber lagging. Braced shoring consists of sheet piles or H-piles with timber lagging and bracing such as beams, plates, walers, struts, rakers, etc. Define "piles" as sheet piles or H-piles.

(B) Anchored Shoring

Anchored shoring consists of sheet piles with walers or H-piles with timber lagging anchored with ground or helical anchors. Driven anchors may be accepted at the discretion of the Engineer. A ground anchor consists of a grouted steel bar or multi-strand tendon with an anchorage. A helical anchor consists of a lead section with a central steel shaft and at least one helix steel plate followed by extensions with only central shafts (no helixes) and an anchorage. Anchorages consist of steel bearing plates with washers and hex nuts for bars or steel wedge plates and wedges for strands. Use a prequalified Anchored Wall Contractor to install ground anchors. Define "anchors" as ground, helical or driven anchors.

(C) Temporary MSE Walls

Temporary MSE walls include temporary geosynthetic and wire walls. Define "temporary wall" as a temporary MSE wall and "Temporary Wall Vendor" as the vendor supplying the temporary MSE wall. Define "reinforcement" as geotextile, geogrid, geostrip, welded wire grid or metallic strip reinforcement.

Temporary geosynthetic walls consist of geotextiles or geogrids wrapped behind welded wire facing or geostrips connected to welded wire facing. Define "temporary geotextile wall" as a temporary geosynthetic wall with geotextile reinforcement, "temporary geogrid wall" as a temporary geosynthetic wall with geogrid reinforcement and "temporary geostrip wall" as a temporary geosynthetic wall with geostrip reinforcement.

Temporary wire walls consist of welded wire grid or metallic strip reinforcement connected to welded wire facing. Define "Wire Wall Vendor" as the vendor supplying the temporary wire wall.

(D) Embedment

Define "embedment" for cantilever, braced and anchored shoring as the pile depth below the grade in front of shoring. Define "embedment" for temporary walls as the wall embedment below the grade at the wall face.

(E) Positive Protection

Define "unanchored or anchored portable concrete barrier" as portable concrete barrier (PCB) that meets 2018 Roadway Standard Drawing No. 1170.01. Define "concrete barrier" as unanchored or anchored PCB or an approved equal. Define "temporary guardrail" as temporary steel beam guardrail that meets 2018 Roadway Standard Drawing No. 862.02.

Materials

Refer to the *2018 Standard Specifications*.

Item	**Section**
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Grout, Type 1	1003
Portland Cement	1024-1
Portland Cement Concrete	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Plates	1072-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Water	1024-4
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials in accordance with Article 106-3 of the *2018 Standard Specifications*. Use Class IV select material for temporary guardrail and Class A concrete that meets Article 450-2 of the *2018 Standard Specifications* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least 3 inches and a bending stress of at least 1,000 pounds per square inch for timber lagging. Provide steel bracing that meets ASTM A36.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use A-2-4 soil for backfill around culverts.

(B) Anchors

Store anchor materials on blocking a minimum of 12 inches above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store anchor materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

(1) Ground Anchors

Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the *2018 Standard Specifications*. Splice bars in accordance with Article 1070-9 of the *2018 Standard Specifications*. Do not splice strands. Use bondbreakers, spacers and centralizers that meet Article 6.3.5 of the *AASHTO LRFD Bridge Construction Specifications*.

Use neat cement grout that only contains cement and water with a water cement ratio of 0.4 to 0.5 which is approximately 5.5 gallons of water per 94 pounds of Portland cement. Provide grout with a compressive strength at 3 and 28 days of at least 1,500 and 4,000 psi, respectively.

(2) Helical Anchors

Use helical anchors with an ICC Evaluation Service, Inc. (ICC-ES) report. Provide couplers, thread bar adapters and bolts recommended by the Anchor Manufacturer to connect helical anchors together and to piles.

(3) Anchorages

Provide steel plates for bearing plates and steel washers, hex nuts, wedge plates and wedges recommended by the Anchor Manufacturer.

(C) Temporary Walls

(1) Welded Wire Facing

Use welded wire reinforcement for welded wire facing, struts and wires. For temporary wire walls, provide welded wire facing supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. For temporary wire walls with separate reinforcement and facing components, provide connectors (e.g., bars, clamps, plates, etc.) and fasteners (e.g., bolts, nuts, washers, etc.) required by the Wire Wall Vendor.

(2) Geotextiles

Provide Type 2 geotextile for separation and retention geotextiles. Provide Type 5 geotextile for geotextile reinforcement with ultimate tensile strengths in accordance with the accepted submittals.

(3) Geogrid and Geostrip Reinforcement

Use geogrids with a roll width of at least 4 feet. Use geogrids for geogrid reinforcement and geostrips for geostrip reinforcement with an “approved” status code in accordance with the NCDOT Geosynthetic Reinforcement Evaluation Program. The list of approved geogrids and geostrips is available from: connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Provide geogrids and geostrips with design strengths in accordance with the accepted submittals. Geogrids and geostrips are approved for short-term design strengths (3-year design life) in the machine direction (MD) and cross-machine direction (CD) based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

(4) Welded Wire Grid and Metallic Strip Reinforcement

Provide welded wire grid and metallic strip reinforcement supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *2018 Standard Specifications* and metallic strip reinforcement ("straps") that meet ASTM A572 or A1011.

Preconstruction Requirements

(A) Concrete Barrier

Define "clear distance" behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor's option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of temporary shoring except for barrier above temporary walls. Concrete barrier with the minimum required clear distance is required above temporary walls.

(B) Temporary Guardrail

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and temporary shoring. At the Contractor's option or if clear distance for cantilever, braced and anchored shoring is less than 4 feet, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above temporary walls.

(C) Temporary Shoring Designs

Before beginning temporary shoring design, survey existing ground elevations in the vicinity of shoring locations to determine actual design heights (H). Submit PDF files of working drawings and design calculations for temporary shoring designs in accordance with Article 105-2 of the *2018 Standard Specifications*. Submit working drawings showing plan views, shoring profiles, typical sections and details of temporary shoring design and construction sequence. Do not begin shoring construction until a design submittal is accepted.

Have cantilever and braced shoring designed, detailed and sealed by an engineer licensed in the state of North Carolina. Use a prequalified Anchored Wall Design Consultant to design anchored shoring. Provide anchored shoring designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for an Anchored Wall Design Consultant. Include details in anchored shoring working drawings of anchor locations and lock-off loads, unit grout/ground bond strengths for ground anchors or minimum installation torque and torsional strength rating for helical anchors and if necessary, obstructions extending through shoring or interfering with anchors. Include details in the anchored shoring construction sequence of pile and anchor installation, excavation and anchor testing.

Provide temporary wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the Temporary Wall Vendor. Include details in temporary wall working drawings of geotextile and reinforcement types, locations and directions and obstructions extending through walls or interfering with reinforcement.

(1) Soil Parameters

Design temporary shoring for the assumed soil parameters and groundwater or flood elevations shown in the plans. Assume the following soil parameters for shoring backfill:

(a) Unit weight (γ) = 120 pcf,

(b)

Friction Angle (ϕ)	**Shoring Backfill**
30°	A-2-4 Soil
34°	Class II, Type 1 or Class III Select Material
38°	Class V or VI Select Material

(c) Cohesion (c) = 0 psf.

(2) Traffic Surcharge

Design temporary shoring for a traffic surcharge of 250 pounds per square foot if traffic will be above and within H of shoring. This traffic surcharge does not apply to construction traffic. Design temporary shoring for any construction surcharge if construction traffic will be above and within H of shoring. Design temporary shoring for a traffic (live load) surcharge in accordance with Article 11.5.6 of the *AASHTO LRFD Bridge Design Specifications*.

(3) Cantilever, Braced and Anchored Shoring Designs

Use shoring backfill for fill sections and voids between cantilever, braced and anchored shoring and the critical failure surface. Use concrete or Type 1 grout for embedded portions of drilled-in H-piles. Do not use drilled-in sheet piles.

Define “top of shoring” for cantilever, braced and anchored shoring as where the grade intersects the back of sheet piles or H-piles and timber lagging. Design

cantilever, braced and anchored shoring for a traffic impact load of 2,000 pounds per foot applied 18 inches above top of shoring if concrete barrier is above and next to shoring or temporary guardrail is above and attached to shoring. Extend cantilever, braced and anchored shoring at least 32 inches above top of shoring if shoring is designed for traffic impact. Otherwise, extend shoring at least 6 inches above top of shoring.

Design cantilever, braced and anchored shoring for a maximum deflection of 3 inches if the horizontal distance to the closest edge of pavement or structure is less than H. Otherwise, design shoring for a maximum deflection of 6 inches. Design cantilever and braced shoring in accordance with the plans and *AASHTO Guide Design Specifications for Bridge Temporary Works*.

Design anchored shoring in accordance with the plans and Article 11.9 of the *AASHTO LRFD Bridge Design Specifications*. Use a resistance factor of 0.80 for tensile resistance of anchors with bars, strands or shafts. Extend the unbonded length for ground anchors and the shallowest helix for helical anchors at least 5 feet behind the critical failure surface. Do not extend anchors beyond right-of-way or easement limits. If existing or future obstructions such as foundations, guardrail posts, pavements, pipes, inlets or utilities will interfere with anchors, maintain a clearance of at least 6 inches between obstructions and anchors.

(4) Temporary Wall Designs

Use shoring backfill in the reinforced zone of temporary walls. Separation geotextiles are required between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, separation geotextiles are also required between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Design temporary walls in accordance with the plans and Article 11.10 of the *AASHTO LRFD Bridge Design Specifications*. Embed temporary walls at least 18 inches except for walls on structures or rock as determined by the Engineer. Use a uniform reinforcement length throughout the wall height of at least 0.7H or 6 feet, whichever is longer. Extend the reinforced zone at least 6 inches beyond end of reinforcement. Do not locate the reinforced zone outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads in accordance with the AASHTO LRFD specifications. For geotextile reinforcement, use geotextile properties approved by the Department or default values in accordance with the AASHTO LRFD specifications. For geogrid and geostrip reinforcement, use approved geosynthetic reinforcement properties available from the website shown elsewhere in this provision. Use geosynthetic properties for the direction reinforcement will be installed, a 3-year design life and shoring backfill to be used in the reinforced zone.

Do not use more than 4 different reinforcement strengths for each temporary geosynthetic wall. Design temporary geotextile walls for a reinforcement coverage ratio (R_c) of 1.0. For temporary geogrid walls with an R_c of less than 1.0, use a maximum horizontal clearance between geogrids of 3 feet and stagger reinforcement so geogrids are centered over gaps in the reinforcement layer below.

For temporary geosynthetic walls, use "L" shaped welded wire facing with 18 to 24 inch long legs. Locate geosynthetic reinforcement so reinforcement layers are at the same level as the horizontal legs of welded wire facing. Use vertical reinforcement spacing equal to facing height. Wrap geotextile or geogrid reinforcement behind welded wire facing and extend reinforcement at least 3 feet back behind facing into shoring backfill. Attach geostrip reinforcement to welded wire facing with a connection approved by the Department.

For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing with a connection approved by the Department. For temporary geogrid, geostrip and wire walls, retain shoring backfill at welded wire facing with retention geotextiles and extend geotextiles at least 3 feet back behind facing into backfill.

(D) Preconstruction Meeting

The Engineer may require a shoring preconstruction meeting to discuss the construction, inspection and testing of the temporary shoring. If required and if this meeting occurs before all shoring submittals have been accepted, additional preconstruction meetings may be required before beginning construction of temporary shoring without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and Shoring Contractor Superintendent will attend preconstruction meetings.

Construction Methods

Control drainage during construction in the vicinity of shoring. Direct run off away from shoring and shoring backfill. Contain and maintain backfill and protect material from erosion.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing Nos. 862.01, 862.02 and 862.03.

(A) Tolerances

Construct shoring with the following tolerances:

(1) Horizontal wires of welded wire facing are level in all directions,

(2) Shoring location is within 6 inches of horizontal and vertical alignment shown in

the accepted submittals, and

(3) Shoring plumbness (batter) is not negative and within 2 degrees of vertical.

(B) Cantilever, Braced and Anchored Shoring Installation

If overexcavation behind cantilever, braced or anchored shoring is shown in the accepted submittals, excavate before installing piles. Otherwise, install piles before excavating for shoring. Install cantilever, braced or anchored shoring in accordance with the construction sequence shown in the accepted submittals. Remove piles and if applicable, timber lagging when shoring is no longer needed.

(1) Pile Installation

Install piles with the minimum required embedment and extension in accordance with Subarticles 450-3(D) and 450-3(E) of the *2018 Standard Specifications* except that a pile driving equipment data form is not required. Piles may be installed with a vibratory hammer as approved by the Engineer.

Do not splice sheet piles. Use pile excavation to install drilled-in H-piles. After filling holes with concrete or Type 1 grout to the elevations shown in the accepted submittals, remove any fluids and fill remaining portions of holes with flowable fill. Cure concrete or grout at least 7 days before excavating.

Notify the Engineer if refusal is reached before pile excavation or driven piles attain the minimum required embedment. When this occurs, a revised design submittal may be required.

(2) Excavation

Excavate in front of piles from the top down in accordance with the accepted submittals. For H-piles with timber lagging and braced and anchored shoring, excavate in staged horizontal lifts with a maximum height of 5 feet. Remove flowable fill and material in between H-piles as needed to install timber lagging. Position lagging with at least 3 inches of contact in the horizontal direction between the lagging and pile flanges. Do not excavate the next lift until timber lagging for the current lift is installed and if applicable, bracing and anchors for the current lift are accepted. Backfill behind cantilever, braced or anchored shoring with shoring backfill.

(3) Anchor Installation

If applicable, install foundations located behind anchored shoring before installing anchors. Fabricate and install ground anchors in accordance with the accepted submittals, Articles 6.4 and 6.5 of the *AASHTO LRFD Bridge Construction Specifications* and the following unless otherwise approved:

(a) Materials in accordance with this provision are required instead of materials

conforming to Articles 6.4 and 6.5.3 of the AASHTO LRFD Specifications,

(b) Encapsulation-protected ground anchors in accordance with Article 6.4.1.2 of the AASHTO LRFD specifications are not required, and

(c) Corrosion protection for unbonded lengths of ground anchors and anchorage covers are not required.

(d) Mix and place neat cement grout in accordance with Subarticles 1003-5, 1003-6 and 1003-7 of the *2018 Standard Specifications*. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Install helical anchors in accordance with the accepted submittals and Anchor Manufacturer's instructions. Measure torque during installation and do not exceed the torsional strength rating of the helical anchor. Attain the minimum required installation torque and penetration before terminating anchor installation. When replacing a helical anchor, embed last helix of the replacement anchor at least 3 helix plate diameters past the location of the first helix of the previous anchor.

(4) Anchor Testing

Proof test and lock-off anchors in accordance with the accepted submittals and Article 6.5.5 of the *AASHTO LRFD Bridge Construction Specifications* except for the acceptance criteria in Article 6.5.5.5. For the AASHTO LRFD specifications, "ground anchor" refers to a ground or helical anchor and "tendon" refers to a bar, strand or shaft.

(a) Anchor Acceptance

Anchor acceptance is based in part on the following criteria.

(i) For ground and helical anchors, total movement is less than 0.04 inches between the 1 and 10 minute readings or less than 0.08 inches between the 6 and 60 minute readings.
(ii) For ground anchors, total movement at maximum test load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(b) Anchor Test Results

Submit PDF files of anchor test records including movement versus load plots for each load increment within 24 hours of completing each row of anchors. The Engineer will review the test records to determine if the anchors are acceptable.

If the Engineer determines an anchor is unacceptable, revise the anchor design or installation methods. Submit a revised anchored shoring design for acceptance and provide an acceptable anchor with the revised design or installation methods. If required, replace the anchor or provide additional anchors with the revised design or installation methods.

(C) Temporary Wall Installation

Excavate as necessary for temporary walls in accordance with the plans and accepted submittals. If applicable, install foundations located in the reinforced zone before placing shoring backfill or reinforcement unless otherwise approved. Notify the Engineer when foundation excavation is complete. Do not place shoring backfill or reinforcement until excavation dimensions and foundation material are approved.

Erect welded wire facing so the wall position is as shown in the plans and accepted submittals. Set welded wire facing adjacent to each other in the horizontal and vertical direction to completely cover the wall face with facing. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Attach geostrip reinforcement to welded wire facing and wrap geotextile reinforcement and retention geotextiles behind welded wire facing as shown in the plans and accepted submittals. Cover geotextiles with at least 3" of shoring backfill. Overlap adjacent geotextile reinforcement and retention and separation geotextiles at least 18 inches with seams oriented perpendicular to the wall face. Hold geotextiles in place with wire staples or anchor pins as needed.

Place reinforcement within 3 inches of locations shown in the plans and accepted submittals. Before placing shoring backfill, pull geosynthetic reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Install reinforcement with the direction shown in the plans and accepted submittals. For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing as shown in the accepted submittals. Do not splice or overlap reinforcement so seams are parallel to the wall face. Contact the Engineer when unanticipated existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with reinforcement.

Place shoring backfill in the reinforced zone in 8 to 10 inch thick lifts. Compact A-2-4 soil and Class II, Type 1 and Class III select material in accordance with Subarticle 235-3(C) of the *2018 Standard Specifications*. Use only hand operated compaction equipment to compact backfill within 3 feet of welded wire facing. At a distance greater than 3 feet, compact shoring backfill with at least 4 passes of an 8 to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting backfill. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting shoring backfill. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8 inches of shoring backfill. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for temporary walls outside the reinforced zone in accordance with Article 410-8 of the *2018 Standard Specifications*. Bench temporary walls into the sides of excavations where applicable. For temporary geosynthetic walls with top of wall within 5 feet of finished grade, remove top facing and incorporate top reinforcement layer into fill when placing fill in front of wall. Temporary walls remain in place permanently unless otherwise required.

Measurement and Payment

Temporary Shoring will be measured and paid in square feet. Temporary walls will be measured as the square feet of exposed wall face area. Cantilever, braced or anchored shoring will be measured as the square feet of exposed shoring face area with the shoring height equal to the difference between the top and bottom of shoring elevations. Define "top of shoring" as where the grade intersects the back of sheet piles or H-piles and timber lagging. Define "bottom of shoring" as where the grade intersects front of sheet piles or H-piles and timber lagging. No measurement will be made for any embedment, shoring extension above top of shoring or pavement thickness above temporary walls.

The contract unit price for *Temporary Shoring* will be full compensation for providing shoring designs, submittals and materials, excavating, backfilling, hauling and removing excavated materials and supplying all labor, tools, equipment and incidentals necessary to construct temporary shoring.

No payment will be made for temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience. No value engineering proposals will be accepted based solely on revising or eliminating shoring locations shown in the plans or estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

PCB will be measured and paid in accordance with Section 1170 of the *2018 Standard Specifications*. No additional payment will be made for anchoring PCB for temporary shoring. Costs for anchoring PCB will be incidental to temporary shoring.

Temporary guardrail will be measured and paid for in accordance with Section 862 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	**Pay Unit**
Temporary Shoring	Square Foot

MATERIAL AND EQUIPMENT STORAGE & PARKING OF PERSONAL VEHICLES:

11-17-21 1101 SP11 R03

Revise the *2018 Standard Specifications* as follows:

Page 11-2, Article 1101-8 MATERIAL AND EQUIPMENT STORAGE, line 35-38, delete and replace with the following:

When work is not in progress, keep all personnel, equipment, machinery, tools, construction debris, materials and supplies away from active travel lanes that meets Table 1101-1.

TABLE 1101-1
MATERIAL AND EQUIPMENT STORAGE FROM ACTIVE TRAVEL LANES

Posted Speed Limit (mph)	Distance (ft)
40 or less	≥ 18
45-50	≥ 28
55	≥ 32
60 or higher	≥ 40

When vehicles, equipment and materials are protected by concrete barrier or guardrail, they shall be offset at least 5 feet from the barrier or guardrail.

Page 11-2, Article 1101-9 PARKING OF PERSONAL VEHICLES, line 40-41, delete and replace with the following:

Provide staging areas for personal vehicle parking in accordance with section 1101-8 or as directed by the Engineer before use.

WORK ZONE INSTALLER:

(7-20-21) 1101, 1150 SP11 R04

Provide the service of at least one qualified work zone installer during the setup, installation, and removal of temporary traffic control within the highway right of way. The qualified work zone installer shall serve as crew leader and shall be on site and directing the installation and removal of temporary traffic control. If multiple temporary traffic control installations or removals are occurring simultaneously, then each shall have a qualified work zone installer.

The work zone installer shall be qualified by an NCDOT approved training agency in the safe and competent set up of temporary traffic control. For a complete listing of approved training agencies, see the Work Zone Safety Training webpage.

A work zone supervisor, in accordance with Article 1101-13 of the *Standard Specifications*, may fulfill the role of the work zone installer during the setup, installation, and removal of temporary traffic control within the highway right of way provided they are on site and directing the installation and removal of temporary traffic control.

All other individuals participating in the setup, installation, and removal of temporary traffic control within the highway right of way shall be certified as a qualified flagger in accordance with Article 1150-3 of the *Standard Specifications*, even if flagging is not being performed as part of the traffic control.

Provide the name and contact information of all qualified work zone installers to the Engineer prior to or at the preconstruction conference. Additionally, provide a qualification statement that all other individuals participating in the setup, installation, and removal of temporary traffic control are qualified flaggers that have been properly trained through an NCDOT approved training agency.

EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS:

3-19-19 1205 SP12 R05

Revise the *2018 Standard Specifications* as follows:

Page 12-6, Subarticle 1205-4(A)(1) General, lines 5-8, delete the second sentence and replace with the following:

Use application equipment that provides multiple width settings ranging from 4 inches to 12 inches and multiple thickness settings to achieve a minimum pavement marking thickness of 0.090 inch above the surface of the pavement.

Page 12-7, Table 1205-3, THICKNESS REQUIREMENTS FOR THERMOPLASTIC, replace with the following:

TABLE 1205-3
MINIMUM THICKNESS REQUIREMENTS FOR THERMOPLASTIC

Thickness	Location
240 mils	In-lane and shoulder-transverse pavement markings (rumble strips). May be placed in 2 passes.
90 mils	Center lines, skip lines, transverse bands, mini-skip lines, characters, bike lane symbols, crosswalk lines, edge lines, gore lines, diagonals, and arrow symbols

PERMANENT SEEDING AND MULCHING:

(7-1-95) 1660 SP16 R02

The Department desires that permanent seeding and mulching be established on this project as soon as practical after slopes or portions of slopes have been graded. As an incentive to obtain an early stand of vegetation on this project, the Contractor's attention is called to the following:

For all permanent seeding and mulching that is satisfactorily completed in accordance with the requirements of Section 1660 in the *2018 Standard Specifications* and within the following percentages of elapsed contract times, an additional payment will be made to the Contractor as an incentive additive. The incentive additive will be determined by multiplying the number of acres of seeding and mulching satisfactorily completed times the contract unit bid price per acre for Seeding and Mulching times the appropriate percentage additive.

Percentage of Elapsed Contract Time	Percentage Additive
0% - 30%	30%
30.01% - 50%	15%

Percentage of elapsed contract time is defined as the number of calendar days from the date of availability of the contract to the date the permanent seeding and mulching is acceptably completed divided by the total original contract time.

STANDARD SPECIAL PROVISION
AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08) Z-2

General Statute 143C-6-11. (h) Highway Appropriation is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in *General Statute 143C-6-11(c)*. Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(D) of the *2018 Standard Specifications*.

STANDARD SPECIAL PROVISION
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

(5-17-11) Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any re-labeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sicklepod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

Restricted Noxious **Weed**	Limitations per Lb. Of Seed	Restricted Noxious **Weed**	Limitations per Lb. of Seed
Blessed Thistle	4 seeds	Cornflower (Ragged Robin)	27 seeds
Cocklebur	4 seeds	Texas Panicum	27 seeds
Spurred Anoda	4 seeds	Bracted Plantain	54 seeds
Velvetleaf	4 seeds	Buckhorn Plantain	54 seeds
Morning-glory	8 seeds	Broadleaf Dock	54 seeds
Corn Cockle	10 seeds	Curly Dock	54 seeds
Wild Radish	12 seeds	Dodder	54 seeds
Purple Nutsedge	27 seeds	Giant Foxtail	54 seeds
Yellow Nutsedge	27 seeds	Horsenettle	54 seeds
Canada Thistle	27 seeds	Quackgrass	54 seeds
Field Bindweed	27 seeds	Wild Mustard	54 seeds
Hedge Bindweed	27 seeds		

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall

not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)
Kobe Lespedeza
Korean Lespedeza
Weeping Lovegrass
Carpetgrass
Bermudagrass
Browntop Millet
German Millet – Strain R
Clover – Red/White/Crimson

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)
Kentucky Bluegrass (all approved varieties)
Hard Fescue (all approved varieties)
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Centipedegrass
Crownvetch
Pensacola Bahiagrass
Creeping Red Fescue
Japanese Millet
Reed Canary Grass
Zoysia

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 5% inert matter; maximum 144 restricted noxious weed seed per pound.

Barnyard Grass
Big Bluestem
Little Bluestem
Bristly Locust
Birdsfoot Trefoil
Indiangrass
Orchardgrass
Switchgrass
Yellow Blossom Sweet Clover

STANDARD SPECIAL PROVISION

ERRATA

(10-16-18) (Rev.1-18-22) Z-4

Revise the *2018 Standard Specifications* as follows:

Division 6

Page 6-7, Article 609-1 DESCRIPTION, line 29, replace article number "609-10" with "609-9".

Division 7

Page 7-27, Article 725-1 MEASUREMENT AND PAYMENT, line 4, replace article number "725-1" with "724-4".

Page 7-28, Article 725-1 MEASUREMENT AND PAYMENT, line 10, replace article number "725-1" with "725-3".

Division 10

Page 10-78, Article 1056-4 GEOTEXTILES, TABLE 1056-1, Permittivity, Type 2, replace "Table 6[D]" with "Table 7[D]" and **Permittivity, Type 3[B],** replace "Table 7[D]" with "Table 8[D]".

Page 10-121, Article 1076-7, REPAIR OF GALVANIZING, line 8, replace article number "1080-9" with "1080-7".

Page 10-162, Article 1080-50 PAINT FOR VERTICAL MARKERS, line 1, replace article number "1080-50" with "1080-10".

Page 10-162, Article 1080-61 EPOXY RESIN FOR REINFORCING STEEL, line 5, replace article number "1080-61" with "1080-11".

Page 10-162, Article 1080-72 ABRASIVE MATERIALS FOR BLAST CLEANING STEEL, line 22, replace article number "1080-72" with "1080-12".

Page 10-163, Article 1080-83 FIELD PERFORMANCE AND SERVICES, line 25, replace article number "1080-83" with "1080-13".

Division 17

Page 17-15, Article 1715-4 MEASUREMENT AND PAYMENT, lines 42-44, replace the second sentence with the following:

An example is an installation of a single 1.25 inch HDPE conduit would be paid as:

Directional Drill (1)(1.25″) Linear Foot

Page 17-15, Subarticle 1715-3(E) Bore and Jack, line 5, replace article number "1540-4" with "1550-4".

Page 17-15, Subarticle 1715-3(E) Bore and Jack, lines 10 & 11, replace "*NCDOT Policies and Procedures for Accommodating Utilities on Highway Rights of Way*" with "*NCDOT Utilities Accommodations Manual*".

STANDARD SPECIAL PROVISION

PLANT AND PEST QUARANTINES
(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, Guava Root Knot Nematode, And Other Noxious Weeds)

(3-18-03) (Rev. 5-21-19) Z-04a

Within Quarantined Area

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

Originating in a Quarantined County

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-707-3730, or *https://www.ncagr.gov/plantindustry/Plant/quaran/table2.htm* to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed, emerald ash borer, guava root knot nematode, or other noxious weeds.

STANDARD SPECIAL PROVISION

MINIMUM WAGES

(7-21-09) Z-5

FEDERAL: The Fair Labor Standards Act provides that with certain exceptions every employer shall pay wages at the rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

STATE: The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees, wages at a rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all unskilled labor on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

This determination of the intent of the application of this act to the contract on this project is the responsibility of the Contractor.

The Contractor shall have no claim against the Department of Transportation for any changes in the minimum wage laws, Federal or State. It is the responsibility of the Contractor to keep fully informed of all Federal and State Laws affecting his contract.

STANDARD SPECIAL PROVISION

TITLE VI AND NONDISCRIMINATION:

(6-28-77)(Rev 6/19/2018) Z-6

Revise the *2018 Standard Specifications* as follows:

Replace Article 103-4(B) with the following:

The North Carolina Department of Transportation is committed to carrying out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts.

The provisions of this section related to United States Department of Transportation (US DOT) Order 1050.2A, Title 49 Code of Federal Regulations (CFR) part 21, 23 United States Code (U.S.C.) 140 and 23 CFR part 200 (or 49 CFR 303, 49 U.S.C. 5332 or 49 U.S.C. 47123) are applicable to all North Carolina Department of Transportation (NCDOT) contracts and to all related subcontracts, material supply, engineering, architectural and other service contracts, regardless of dollar amount. Any Federal provision that is specifically required not specifically set forth is hereby incorporated by reference.

(1) **Title VI Assurances (USDOT Order 1050.2A, Appendix A)**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

(a) Compliance with Regulations

The contractor (hereinafter includes consultants) shall comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

(b) Nondiscrimination

The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

(c) Solicitations for Subcontractors, Including Procurements of Materials and Equipment

In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.

(d) Information and Reports

The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts,

Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor shall so certify to the Recipient or the FHWA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance:
In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it and/or the FHWA may determine to be appropriate, including, but not limited to:
(i) Withholding payments to the contractor under the contract until the contractor complies; and/or
(ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions
The contractor shall include the provisions of paragraphs (a) through (f) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor shall take action with respect to any subcontract or procurement as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

(2) **Title VI Nondiscrimination Program (23 CFR 200.5(p))**
The North Carolina Department of Transportation (NCDOT) has assured the USDOT that, as a condition to receiving federal financial assistance, NCDOT will comply with Title VI of the Civil Rights Act of 1964 and all requirements imposed by Title 49 CFR part 21 and related nondiscrimination authorities to ensure that no person shall, on the ground of race, color, national origin, limited English proficiency, sex, age, or disability (including religion/creed or income-level, where applicable), be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any programs, activities, or services conducted or funded by NCDOT. Contractors and other organizations under contract or agreement with NCDOT must also comply with Title VI and related authorities, therefore:

(a) During the performance of this contract or agreement, contractors (e.g., subcontractors, consultants, vendors, prime contractors) are responsible for complying with NCDOT's Title VI Program. Contractors are not required to prepare or submit Title VI Programs. To comply with this section, the prime contractor shall:
1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.
2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.
3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:
"The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 US.C. §§

2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award."

4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.
5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.
6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.

(b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))

(c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))

(d) The Contractor is responsible for notifying subcontractors of NCDOT's External Discrimination Complaints Process.

1. Applicability
   Title VI and related laws protect participants and beneficiaries (e.g., members of the public and contractors) from discrimination by NCDOT employees, subrecipients and contractors, regardless of funding source.
2. Eligibility
   Any person—or class of persons—who believes he/she has been subjected to discrimination based on race, color, national origin, Limited English Proficiency (LEP), sex, age, or disability (and religion in the context of employment, aviation, or transit) may file a written complaint. The law also prohibits intimidation or retaliation of any sort.
3. Time Limits and Filing Options
   Complaints may be filed by the affected individual(s) or a representative and must be filed no later than 180 calendar days after the following:
   (i) The date of the alleged act of discrimination; or
   (ii) The date when the person(s) became aware of the alleged discrimination; or
   (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

   Title VI and related discrimination complaints may be submitted to the following entities:

- North Carolina Department of Transportation, Office of Civil Rights, Title VI Program, 1511 Mail Service Center, Raleigh, NC 27699-1511; toll free 1-800-522-0453
- Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010
- US Department of Transportation, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070

4. Format for Complaints
   Complaints must be in writing and signed by the complainant(s) or a representative, and include the complainant's name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages, including Braille.
5. Discrimination Complaint Form
   Contact NCDOT Civil Rights to receive a full copy of the Discrimination Complaint Form and procedures.
6. Complaint Basis
   Allegations must be based on issues involving race, color, national origin (LEP), sex, age, disability, or religion (in the context of employment, aviation or transit). "Basis" refers to the complainant's membership in a protected group category.

TABLE 103-1
COMPLAINT BASIS

Protected Categories	Definition	Examples	Applicable Nondiscrimination Authorities
Race and Ethnicity	An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group	Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. *(Executive Order 13166)*
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.	
National Origin *(Limited English Proficiency)*	Place of birth. Citizenship is not a factor. (*Discrimination based on language or a person's accent is also covered)*	Mexican, Cuban, Japanese, Vietnamese, Chinese	
Sex	Gender. The sex of an individual. *Note:* Sex under this program does not include sexual orientation.	Women and Men	1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Age	Persons of any age	21-year-old person	Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990

Religion (in the context of employment) *(Religion/ Creed in all aspects of any aviation or transit-related construction)*	An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. ***Note:*** Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.	Muslim, Christian, Sikh, Hindu, etc.	Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. *(49 U.S.C. 5332(b);* *49 U.S.C. 47123)*

(3) **Pertinent Nondiscrimination Authorities**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

(a) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.

(b) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

(c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);

(d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;

(e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);

(f) Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

(g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

(h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

(i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

(j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with

disproportionately high and adverse human health or environmental effects on minority and low-income populations;

(k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

(l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

(m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

(4) **Additional Title VI Assurances**

***The following Title VI Assurances (Appendices B, C and D) shall apply, as applicable*

(a) Clauses for Deeds Transferring United States Property (1050.2A, Appendix B)

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4.

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.

The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:
   (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. *
3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

(c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

The following clauses will be included in deeds, licenses, permits, or similar instruments/ agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):

1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non¬ discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. *
3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

STANDARD SPECIAL PROVISION

ON-THE-JOB TRAINING

(10-16-07) (Rev. 4-21-15) Z-10

Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.\

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.

MECHANICALLY STABILIZED EARTH RETAINING WALLS (10-19-21)

1.0 GENERAL

Construct mechanically stabilized earth (MSE) retaining walls consisting of steel or geosynthetic reinforcement in the reinforced zone connected to vertical facing elements. Use precast concrete panels for vertical facing elements and coarse aggregate in the reinforced zone unless noted otherwise in the plans. Provide reinforced concrete coping and pile sleeves as required. Design and construct MSE retaining walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified MSE Wall Installer to construct MSE retaining walls.

Define MSE wall terms as follows:
Geosynthetic Reinforcement – Polyester Type (PET), HDPE or Polypropylene (PP) geosynthetic grids, i.e., geogrid reinforcement or polymer straps, i.e., geostrip reinforcement,
Geogrid – PET, HDPE or PP geogrid,
Reinforcement – Steel or geosynthetic reinforcement,
Aggregate – Coarse or fine aggregate,
Panel – Precast concrete panel,
Coping – Precast or CIP concrete coping,
Design Height (H) – Wall height + wall embedment as shown in the plans,
MSE Wall – Mechanically stabilized earth retaining wall,
MSE Wall Vendor – Vendor supplying the chosen MSE wall system,
MSE Panel Wall – MSE wall with panels,
MSE Segmental Wall – MSE wall with segmental retaining wall (SRW) units and
Abutment Wall – MSE wall with bridge foundations in any portion of the reinforced zone or an MSE wall connected to an abutment wall (even if bridge foundations only penetrate a small part of the reinforced zone, the entire MSE wall is considered an abutment wall).

For bridge approach fills behind end bents with MSE abutment walls, design reinforcement connected to end bent caps in accordance with the plans and this provision. Construct Type III Reinforced Bridge Approach Fills in accordance with the *Bridge Approach Fills* provision and Roadway Detail Drawing No. 422D10.

Use an approved MSE wall system in accordance with the plans and any NCDOT restrictions or exceptions for the chosen system. Value engineering proposals for other MSE wall systems will not be considered. Do not use MSE wall systems with an "approved for provisional use" status for MSE walls with design heights greater than 35 ft or walls supporting or adjacent to railroads or interstate highways. The list of approved MSE wall systems with approval status is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

2.0 MATERIALS

Refer to the *Standard Specifications*.

Item	Section

Aggregate	1014
Asphalt Concrete Base Course, Type B25.0C	620
Corrugated Steel Pipe	1032-3
Epoxy, Type 3A	1081
Geosynthetics	1056
Grout, Type 3	1003
Joint Materials	1028
Portland Cement Concrete, Class A	1000
Precast Retaining Wall Coping	1077
Reinforcing Steel	1070
Retaining Wall Panels	1077
Segmental Retaining Wall Units	1040-4
Select Material, Class V	1016
Shoulder Drain Materials	816-2
Steel Pipe	1036-4(A)

Use galvanized corrugated steel pipe with a zinc coating weight of 2 oz/sf (G200) for pile sleeves. Provide Type 2 geotextile for filtration and separation geotextiles. Use Class A concrete for CIP coping, leveling concrete and pads. Use galvanized steel pipe, threaded rods and nuts for the PET geogrid reinforcement vertical obstruction detail. Provide galvanized Grade 36 anchor rods and Grade A hex nuts that meet AASHTO M 314 for threaded rods and nuts.

Use panels and SRW units from producers approved by the Department and licensed by the MSE Wall Vendor. Provide steel strip connectors embedded in panels fabricated from structural steel that meets the requirements for steel strip reinforcement. Unless required otherwise in the contract, produce panels with a smooth flat final finish that meets Article 1077-11 of the *Standard Specifications*. Accurately locate and secure reinforcement connectors in panels and maintain required concrete cover. Produce panels within 1/4" of the panel dimensions shown in the accepted submittals.

Damaged panels or SRW units with excessive discoloration, chips or cracks as determined by the Engineer will be rejected. Do not damage reinforcement connection devices or mechanisms in handling or storing panels and SRW units.

Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Handle and store geosynthetics in accordance with Article 1056-2 of the *Standard Specifications*. Load, transport, unload and store MSE wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

A. Aggregate

Use standard size No. 57, 57M, 67 or 78M that meets Table 1005-1 of the *Standard Specifications* for coarse aggregate and the following for fine aggregate:

1. Standard size No. 1S, 2S, 2MS or 4S that meets Table 1005-2 of the *Standard*

Specifications or

2. Gradation that meets Class III, Type 3 select material in accordance with Article 1016-3 of the *Standard Specifications*.

Fine aggregate is exempt from mortar strength in Subarticle 1014-1(E) of the *Standard Specifications*. Use fine aggregate with a maximum organic content of 1.0%. Provide aggregate with chemical properties that meet the following requirements:

AGGREGATE pH REQUIREMENTS		
Aggregate Type (in reinforced zone)	**Reinforcement or Connector Material**	**pH**
Coarse or Fine	Steel	5 – 10
Coarse or Fine	Geosynthetic	4.5 – 9

AGGREGATE ELECTROCHEMICAL REQUIREMENTS (Steel Reinforcement/Connector Materials Only)			
Aggregate Type (in reinforced zone)	**Resistivity**	**Chlorides**	**Sulfates**
Coarse	≥ 5,000 Ω · cm	≤ 100 ppm	≤ 200 ppm
Fine	≥ 3,000 Ω · cm		

Use aggregate from sources participating in the Department's Aggregate QC/QA Program as described in Section 1006 of the *Standard Specifications*. Sample and test aggregate in accordance with the *Mechanically Stabilized Earth Wall Aggregate Sampling and Testing Procedures*.

B. Reinforcement

Provide steel or geosynthetic reinforcement supplied by the MSE Wall Vendor or a manufacturer approved or licensed by the vendor. Use reinforcement approved for the chosen MSE wall system. The list of approved reinforcement for each MSE wall system is available from the website shown elsewhere in this provision.

1. Steel Reinforcement

Provide Type 1 material certifications in accordance with Article 106-3 of the *Standard Specifications* for steel reinforcement. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *Standard Specifications* and steel strip reinforcement ("straps") that meet ASTM A572, A1011 or A463. Use 10 gauge or heavier structural steel Grade 50 or higher for steel strip reinforcement. Galvanize steel reinforcement in accordance with Section 1076 of the *Standard Specifications* or provide aluminized steel strip reinforcement that meet ASTM A463, Type 2-100.

2. Geosynthetic Reinforcement

Provide Type 1 material certifications and identify geosynthetic reinforcement in accordance with Article 1056-3 of the *Standard Specifications*. Define machine direction (MD) and cross-machine direction (CD) for geogrids per Article 1056-3 of the *Standard Specifications*.

Use HDPE or PP geogrid for geogrid reinforcement cast into backwalls of end bent caps. Use PET or HDPE geogrid for geogrid reinforcement connected directly to SRW units and only HDPE geogrid for geogrid reinforcement cast into panels.

Provide extruded geogrids produced in the United States and manufactured from punched and drawn polypropylene sheets for PP geogrids that meet the following:

PP GEOGRID REQUIREMENTS		
Property	**Requirement[1]**	**Test Method**
Aperture Dimensions[2]	1" x 1.2"	N/A
Minimum Rib Thickness[2]	0.07" x 0.07"	N/A
Tensile Strength @ 2% Strain[2]	580 lb/ft x 690 lb/ft	ASTM D6637, Method B
Tensile Strength @ 5% Strain[2]	1,200 lb/ft x 1,370 lb/ft	
Ultimate Tensile Strength[2]	1,850 lb/ft x 2,050 lb/ft	
Junction Efficiency[3] (MD)	93%	ASTM D7737
Flexural Rigidity[4]	2,000,000 mg–cm	ASTM D7748
Aperture Stability Modulus[5]	0.55 lb–ft/degrees	ASTM D7864
UV Stability (Retained Strength)	100% (after 500 hr of exposure)	ASTM D4355

1. MARV per Article 1056-3 of the *Standard Specifications* except dimensions and thickness are nominal.
2. Requirement for MD x CD.
3. Junction Efficiency (%) = (Average Junction Strength ($X_{J_{ave}}$) / Ultimate Tensile Strength in the MD from ASTM D6637, Method A) × 100.
4. Test specimens two ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs, and sufficiently long to enable measurement of the overhang dimension.
5. Applied moment of 17.7 lb–inch (torque increment).

C. Bearing Pads

For MSE panel walls, use preformed ethylene propylene diene monomer rubber bearing pads that meet ASTM D2000 Grade 2, Type A, Class A with a durometer hardness of 60 or 80 ± 5. Provide bearing pads with thicknesses that meet the following:

BEARING PAD THICKNESS	
Facing Area per Panel (A)	**Minimum Pad Thickness After Compression (based on 2 times panel weight above pads)**
$A \leq 30$ sf	1/2"
30 sf $< A \leq 75$ sf	3/4"

D. Miscellaneous Components

Miscellaneous components may include connectors (e.g., anchors, bars, clamps, pins, plates, ties, etc.), fasteners (e.g., bolts, nuts, washers, etc.) and any other MSE wall components not included above. Use 10 gauge or heavier structural steel Grade 50 or higher for steel strip panel anchors and connectors. Galvanize steel components in accordance with Section 1076 of the *Standard Specifications*. Provide miscellaneous components approved for the chosen MSE wall system. The list of approved miscellaneous components for each MSE wall system is available from the website shown elsewhere in this provision.

3.0 PRECONSTRUCTION REQUIREMENTS

A. MSE Wall Surveys

The Retaining Wall Plans show a plan view, typical sections, details, notes and an elevation or profile view (wall envelope) for each MSE wall. Before beginning MSE wall design, survey existing ground elevations shown in the plans and other elevations in the vicinity of MSE wall locations as needed. For proposed slopes above or below MSE walls, survey existing ground elevations to at least 10 ft beyond slope stake points. Based on these elevations, finished grades and actual MSE wall dimensions and details, submit revised wall envelopes for acceptance. Use accepted wall envelopes for design.

B. MSE Wall Designs

For MSE wall designs, submit PDF files of working drawings and design calculations at least 30 days before the preconstruction meeting. Note name and NCDOT ID number of the panel or SRW unit production facility on working drawings. Do not begin MSE wall construction until a design submittal is accepted.

Use a prequalified MSE Segmental Wall Design Consultant to design MSE segmental walls. Provide MSE segmental wall designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the MSE Segmental Wall Design Consultant. Provide MSE panel wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the MSE Wall Vendor.

Design MSE walls in accordance with the plans, *AASHTO LRFD Bridge Design Specifications* and any NCDOT restrictions for the chosen MSE wall system unless otherwise required. For abutment walls only, design MSE walls for seismic if wall sites meet either or both of the following:

- Wall site is in seismic zone 2 based on Figure 2-1 of the *Structure Design Manual*,
- Wall site is classified as AASHTO Site Class E, as noted in the plans, and is in or west of Pender, Duplin, Wayne, Johnston, Wake, Durham or Person County.

Connect reinforcement to panels or SRW units with methods or devices approved for the chosen system. Use a uniform reinforcement length throughout the height of the

wall of at least 0.7H or 6 ft, whichever is longer, unless noted otherwise in the plans. Extend the reinforced zone at least 6" beyond end of reinforcement. Do not locate drains, the reinforced zone or leveling pads outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads and design parameters approved for the chosen MSE wall system or default values in accordance with the AASHTO LRFD specifications. Design steel components including reinforcement and connectors for the design life noted in the plans and aggregate type in the reinforced zone. If an MSE wall system with geosynthetic reinforcement includes any steel parts for obstructions, bin walls, connections or other components, design steel exposed to aggregate for the design life noted in the plans and aggregate type in the reinforced zone. Use “loss of galvanizing” metal loss rates for nonaggressive backfill in accordance with the AASHTO LRFD specifications for galvanized and aluminized steel and metal loss rates for carbon steel in accordance with the following:

CARBON STEEL CORROSION RATES	
Aggregate Type (in reinforced zone)	**Carbon Steel Loss Rate (after coating depletion)**
Coarse	0.47 mil/year
Fine (except abutment walls)	0.58 mil/year
Fine (abutment walls)	0.70 mil/year

For PET or HDPE geogrid and geostrip reinforcement and geosynthetic connectors, use approved geosynthetic properties for the design life noted in the plans and aggregate type in the reinforced zone. For geogrid reinforcement connected to end bent caps, embed reinforcement or connectors in caps as shown in the plans. For PP geogrid reinforcement connected to end bent caps, use the following design parameters for the aggregate type in the reinforced approach fill.

PP GEOGRID REINFORCEMENT DESIGN PARAMETERS				
Aggregate Type (in reinforced zone)	**T_{al} (MD)**	**F***	**α**	**ρ**
Coarse	400 lb/ft	0.70	0.8	32.0°
Fine	428 lb/ft	0.54	0.8	28.35°

Where,

T_{al} = long-term design strength (LTDS),
F* = pullout resistance factor,
α = scale effect correction factor and
ρ = soil-geogrid friction angle.

When noted in the plans, design MSE walls for a live load (traffic) surcharge of 250 psf in accordance with Figure C11.5.6-3(b) of the AASHTO LRFD specifications. For steel beam guardrail with 8 ft posts or concrete barrier rail above MSE walls, analyze top 2 reinforcement layers for traffic impact loads in accordance with Section 7.2 of *FHWA Design and Construction of Mechanically Stabilized Earth Walls and*

Reinforced Soil Slopes – Volume I (Publication No. FHWA-NHI-10-024) except use the following for geosynthetic reinforcement rupture:

$$\phi\, T_{al}\, R_c \geq T_{max} + (T_I / RF_{CR})$$

Where,

ϕ = resistance factor for tensile resistance in accordance with Section 7.2.1 of the FHWA MSE wall manual,

T_{al} = long-term geosynthetic design strength approved for chosen MSE wall system,

R_c = reinforcement coverage ratio = 1 for continuous geosynthetic reinforcement,

T_{max} = factored static load in accordance with Section 7.2 of the FHWA MSE wall manual,

T_I = factored impact load in accordance with Section 7.2 of the FHWA MSE wall manual and

RF_{CR} = creep reduction factor approved for chosen MSE wall system.

When shown in the plans for abutment walls, use pile sleeves to segregate piles from aggregate in the reinforced zone. If existing or future obstructions such as foundations, guardrail, fence or handrail posts, moment slabs, pavements, pipes, inlets or utilities will interfere with reinforcement, maintain a clearance of at least 3" between obstructions and reinforcement unless otherwise approved. Design reinforcement for obstructions and locate reinforcement layers so all of reinforcement length is within 3" of corresponding connection elevations. Modify PET geogrid reinforcement for obstructions as shown in the plans.

Use 6" thick CIP unreinforced concrete leveling pads beneath panels and SRW units that are continuous at steps and extend at least 6" in front of and behind bottom row of panels or SRW units. Unless required otherwise in the plans, embed top of leveling pads in accordance with the following requirements:

WALL EMBEDMENT REQUIREMENTS		
Front Slope[1] (H:V)	**Minimum Embedment Depth[2] (whichever is greater)**	
6:1 or flatter (except abutment walls)	H/20	1 ft for H ≤ 10 ft 2 ft for H > 10 ft
6:1 or flatter (abutment walls)	H/10	2 ft
> 6:1 to < 3:1	H/10	2 ft
3:1 to 2:1	H/7	2 ft

1. Front slope is as shown in the plans.
2. H is the maximum design height per wall.

When noted in the plans, locate a continuous aggregate shoulder drain along the base of the reinforced zone behind the aggregate. Provide wall drainage systems consisting of drains and outlet components in accordance with Roadway Standard Drawing No. 816.02.

For MSE panel walls, cover joints at back of panels with filtration geotextiles at least 12" wide. If the approval of the chosen MSE wall system does not require a minimum number of bearing pads, provide the number of pads in accordance with the following:

NUMBER OF BEARING PADS		
Facing Area per Panel (A)	**Maximum Height of Wall Above Horizontal Panel Joint**	**Minimum Number of Pads per Horizontal Panel Joint**
A ≤ 30 sf	25 ft	2
	35 ft[1]	3
30 sf < A ≤ 75 sf	25 ft	3
	35 ft[1]	4

1. Additional bearing pads per horizontal panel joint may be required for wall heights above joints greater than 35 ft.

For MSE segmental walls, coarse aggregate is required in any SRW unit core spaces and between and behind SRW units for a horizontal distance of at least 18".

Separation geotextiles are required between the aggregate and overlying fill sections. When noted in the plans, separation geotextiles are also required at the back of the reinforced zone between the aggregate and backfill or natural ground. When placing pavement sections directly on the reinforced zone, cap aggregate with 4" of asphalt concrete base course. Unless required otherwise in the plans, use reinforced concrete coping at top of walls that meets the following requirements:

1. Coping dimensions as shown in the plans,
2. At the Contractor's option, coping that is precast or CIP concrete for MSE panel walls unless CIP coping is required as shown in the plans,
3. CIP concrete coping for MSE segmental walls and
4. At the Contractor's option and when shown in the plans, CIP concrete coping that extends down back of panels or SRW units or connects to panels or SRW units with dowels.

For MSE segmental walls with dowels, attach dowels to top courses of SRW units in accordance with the following:

1. Set dowels in core spaces of SRW units filled with grout instead of coarse aggregate or
2. Embed adhesively anchored dowels in holes of solid SRW units with epoxy.

For MSE panel walls with coping, connect CIP concrete coping or leveling concrete for precast concrete coping to top row of panels with dowels cast into panels. When concrete barrier rail is required above MSE walls, use concrete barrier rail with moment slab as shown in the plans.

Submit working drawings and design calculations for acceptance in accordance with

Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles with foundation pressures, typical sections with reinforcement and connection details, aggregate locations and types, geotextile locations and details of leveling pads, panels or SRW units, coping, bin walls, slip joints, pile sleeves, etc. If necessary, include details on working drawings for concrete barrier rail with moment slab, reinforcement splices if allowed for the chosen MSE wall system, reinforcement connected to end bent caps, curved MSE walls with tight (short) radii and obstructions extending through walls or interfering with reinforcement, leveling pads, barriers or moment slabs. Submit design calculations for each wall section with different surcharge loads, geometry or material parameters. At least one analysis is required for each wall section with different reinforcement lengths. When designing MSE walls with computer software other than MSEW, use MSEW manufactured by ADAMA Engineering, Inc. to verify the design. At least one MSEW analysis is required per 100 ft of wall length with at least one analysis for the wall section with the longest reinforcement. Submit electronic MSEW input files and PDF output files with design calculations.

C. Preconstruction Meeting

Before starting MSE wall construction, hold a preconstruction meeting to discuss the construction and inspection of the MSE walls. If this meeting occurs before all MSE wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of MSE walls without accepted submittals. The Resident or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and MSE Wall Installer Superintendent will attend preconstruction meetings.

4.0 CORROSION MONITORING

Corrosion monitoring is required for MSE walls with steel reinforcement. The Engineer will determine the number of monitoring locations and where to install the instrumentation. Contact M&T before beginning wall construction. M&T will provide the corrosion monitoring instrumentation kits and if necessary, assistance with installation.

5.0 SITE ASSISTANCE

Unless otherwise approved, an MSE Wall Vendor representative is required to assist and guide the MSE Wall Installer on-site for at least 8 hours when the first panels or SRW units and reinforcement layer are placed. If problems are encountered during construction, the Engineer may require the vendor representative to return to the site for a time period determined by the Engineer.

6.0 CONSTRUCTION METHODS

Control drainage during construction in the vicinity of MSE walls. Direct run off away from MSE walls, aggregate and backfill. Contain and maintain aggregate and backfill and protect material from erosion.

Excavate as necessary for MSE walls in accordance with the accepted submittals. If applicable and at the Contractor's option, use temporary shoring for wall construction instead of temporary slopes to construct MSE walls. Define "temporary shoring for wall construction" as temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience.

Unless required otherwise in the plans, install foundations and if required, pile sleeves located in the reinforced zone before placing aggregate or reinforcement. Brace piles in the reinforced zone to maintain alignment when placing and compacting aggregate. Secure piles together with steel members near top of piles. Clamp members to piles instead of welding if bracing is at or below pile cut-off elevations.

Notify the Engineer when foundation excavation is complete. Do not place leveling pad concrete, aggregate or reinforcement until excavation dimensions and foundation material are approved.

Construct CIP concrete leveling pads at elevations and with dimensions shown in the accepted submittals and in accordance with Section 420 of the *Standard Specifications*. Cure leveling pads at least 24 hours before placing panels or SRW units.

Erect and support panels and stack SRW units so the final wall position is as shown in the accepted submittals. Stagger SRW units to create a running bond by centering SRW units over joints in the row below as shown in the accepted submittals. Space bearing pads in horizontal panel joints as shown in the accepted submittals and cover all panel joints with filtration geotextiles as shown in the accepted submittals. Attach filtration geotextiles to back of panels with adhesives, tapes or other approved methods.

Construct MSE walls with the following tolerances:

A. SRW units are level from front to back and between units when checked with a 4 ft long level,

B. Vertical joint widths are 1/4" maximum for SRW units and 3/4", ±1/4" for panels,

C. Final wall face is within 3/4" of horizontal and vertical alignment shown in the accepted submittals when measured along a 10 ft straightedge and

D. Final wall plumbness (batter) is not negative (wall face leaning forward) and within 0.5° of vertical unless otherwise approved.

Place reinforcement at locations and elevations shown in the accepted submittals and within 3" of corresponding connection elevations. Install reinforcement with the direction shown in the accepted submittals. Before placing aggregate, pull geosynthetic reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Reinforcement may be spliced once per reinforcement length if shown in the accepted submittals. Use reinforcement pieces at least 6 ft long. Contact the Engineer when unanticipated existing or future obstructions such as foundations, guardrail, fence or handrail posts, pavements, pipes, inlets or utilities will interfere with reinforcement. To avoid obstructions, deflect, skew or modify reinforcement as shown in the accepted submittals.

Place aggregate in the reinforced zone in 8" to 10" thick lifts. Compact fine aggregate in accordance with Subarticle 235-3(C) of the *Standard Specifications*. Use only hand operated compaction equipment to compact aggregate within 3 ft of panels or SRW units. At a distance greater than 3 ft, compact aggregate with at least 4 passes of an 8 ton to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting aggregate. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8" of aggregate. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for MSE walls outside the reinforced zone in accordance with Article 410-8 of the *Standard Specifications*. If a drain is required, install wall drainage systems as shown in the accepted submittals and in accordance with Section 816 of the *Standard Specifications*. If pile sleeves are required, fill sleeves with loose uncompacted sand before constructing end bent caps.

Install dowels as necessary for SRW units and place and construct coping and leveling concrete as shown in the accepted submittals. Construct leveling concrete in accordance with Section 420 of the *Standard Specifications*. Construct CIP concrete coping in accordance with Subarticle 452-4(B) of the *Standard Specifications*. When single faced precast concrete barrier is required in front of and against MSE walls, stop coping just above barrier so coping does not interfere with placing barrier up against wall faces. If the gap between a single faced barrier and wall face is wider than 2", fill gap with Class V select material (standard size No. 78M stone). Otherwise, fill gap with backer rod and seal joint between barrier and MSE wall with silicone sealant.

When separation geotextiles are required, overlap adjacent geotextiles at least 18" and hold geotextiles in place with wire staples or anchor pins as needed. Seal joints above and behind MSE walls between coping and concrete slope protection with silicone sealant.

7.0 MEASUREMENT AND PAYMENT

MSE Retaining Wall No. __ will be measured and paid in square feet. MSE walls will be measured as the square feet of wall face area with the pay height equal to the difference between top of wall and top of leveling pad elevations. Define “top of wall” as top of coping or top of panels or SRW units for MSE walls without coping.

The contract unit price for *MSE Retaining Wall No. __* will be full compensation for providing designs, submittals, labor, tools, equipment and MSE wall materials, excavating, hauling and removing excavated materials, placing and compacting aggregate and backfill material and supplying site assistance, leveling pads, panels, SRW units, reinforcement, aggregate, wall drainage systems, geotextiles, aggregate concrete base course, bearing pads, coping, miscellaneous components and any incidentals necessary to construct MSE walls. The contract unit price for *MSE Retaining Wall No. __* will also be full compensation for reinforcement and connector design for reinforcement connected to end

bent caps, wall modifications for obstructions, pile sleeves filled with sand, joints sealed with silicone sealant and gaps between barriers and MSE walls filled with backer rod or No. 78M stone, if required.

No separate payment will be made for temporary shoring for wall construction. Temporary shoring for wall construction will be incidental to the contract unit price for *MSE Retaining Wall No. __*.

The contract unit price for *MSE Retaining Wall No. __* does not include the cost for ditches, fences, handrails, barrier or guardrail associated with MSE walls as these items will be paid for elsewhere in the contract. The contract unit price for *MSE Retaining Wall No. __* also does not include the cost for constructing bridge approach fills behind end bents with MSE abutment walls. See *Bridge Approach Fills* provision for measurement and payment of Type III Reinforced Bridge Approach Fills.

Where it is necessary to provide backfill material behind the reinforced zone from sources other than excavated areas or borrow sources used in connection with other work in the contract, payment for furnishing and hauling such backfill material will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*. Placing and compacting such backfill material is not considered extra work but is incidental to the work being performed.

Payment will be made under:

Pay Item	**Pay Unit**
MSE Retaining Wall No. __	Square Foot

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TEMPORARY SURCHARGE WALLS: **(SPECIAL)**

Description

The temporary surcharge walls are designed for a surcharge load during the bridge waiting period. Install drains, welded wire facing and geotextiles and backfill approach fills and temporary walls with select material as required. Define "geotextiles" as separation or reinforcement geotextiles, "temporary surcharge wall" as a temporary MSE wall with Type 5 geotextile reinforcement that meets the Standard Specifications.

Materials

Refer to the *Standard Specifications*.

Item	Section
Geosynthetics	1056
Select Materials	1016
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for materials.

For temporary surcharge walls, use welded wire reinforcement for welded wire facing, struts and wires with the dimensions and minimum wire sizes shown in the Retaining Wall Plans. Provide Type 1 geotextile for separation and retention geotextiles.

Provide Type 5 geotextile for geotextile reinforcement with a mass per unit area of at least 8 oz/sy in accordance with ASTM D5261 and ultimate tensile strength(s) as shown in the Retaining Wall Plans.

Provide Coarse Aggregate in the reinforced zone consisting of Class V Select Material.

Preconstruction Requirements

Before beginning construction, survey existing ground elevations in the vicinity of temporary wall locations to determine actual design heights (H). Submit 8 copies of working drawings and 3 copies of design calculations and a PDF copy of each for temporary wall designs in accordance with Article 105-2 of the 2018 Standard Specifications. Submit working drawings showing plan views and temporary wall profiles and construction sequence. Do not begin temporary wall construction until a design submittal is accepted.

The Engineer may require a preconstruction meeting to discuss the construction, inspection and testing of the temporary walls. If required, schedule this meeting after all temporary wall submittals have been accepted. The Resident, District or Bridge Maintenance Engineer, Construction Engineer, Geotechnical Operations Engineer, Contractor and Temporary Wall Contractor Superintendent will attend this preconstruction meeting.

Construction Methods

Control drainage during construction in the vicinity of temporary wall. Direct run off away from temporary wall and temporary wall backfill. Contain and maintain backfill and protect material from erosion.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *2018 Standard Specifications* and Standard Drawing No. 1170.01 of the 2018 Roadway Standard Drawings. Use temporary guardrail in accordance with

Section 862 of the *2018 Standard Specifications* and Standard Drawing No. 862.01, 862.02 and 862.03 of the 2018 Roadway Standard Drawings.

(A) Tolerances

Construct temporary wall with the following tolerances:

(1) Horizontal wires of welded wire facing are level in all directions,

(2) Temporary wall location is within 6" of horizontal and vertical alignment shown in the accepted submittals, and

(3) Temporary wall plumbness (batter) is within 2° of vertical.

(B) Temporary Wall Installation

Excavate as necessary for temporary walls in accordance with the plans and accepted submittals. Do not place temporary wall backfill or reinforcement until excavation dimensions and foundation material are approved.

Erect welded wire facing with no negative batter (wall face leaning forward) so the wall position is as shown in the plans and accepted submittals. Set welded wire facing adjacent to each other in the horizontal and vertical direction to completely cover the wall face with facing. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Wrap geotextile reinforcement and retention geotextiles behind welded wire facing as shown in the plans and accepted submittals and cover geotextiles with at least 3" of temporary wall backfill. Overlap adjacent geotextile reinforcement and retention and separation geotextiles at least 18" with seams oriented perpendicular to the wall face. Hold geotextiles in place with wire staples or anchor pins as needed.

Place reinforcement within 3" of locations shown in the plans and accepted submittals and in slight tension free of kinks, folds, wrinkles or creases. Install reinforcement with the direction shown in the plans and accepted submittals. For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing as shown in the accepted submittals. Do not splice or overlap reinforcement so seams are parallel to the wall face. Contact the Engineer when unanticipated existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with reinforcement.

Place temporary wall backfill in the reinforced zone in 8" to 10" thick lifts. Use only hand operated compaction equipment to compact backfill within 3 ft of welded wire facing. At a distance greater than 3 ft, compact temporary wall backfill with at least 4 passes of an 8 ton to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting backfill. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting temporary wall backfill. End dumping directly on geotextile reinforcement is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8" of temporary backfill. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for temporary walls outside the reinforced zone in accordance with Article 410-8

of the *2018 Standard Specifications*. Bench temporary walls into the sides of excavations where applicable. After bridge waiting period, remove the portion of temporary walls above the approach slab. The portion of temporary walls below the approach slab remain in place permanently unless otherwise required. Reinforcement layer dimensions for the permanent portion must also be in accordance with the Retaining Wall Plans and Type A – Alternate Approach Fill for Integral Abutment (Roadway Standard Drawing No. 422.03).

Installation

Construct walls with the minimum required reinforcement length and number of reinforcement layers for each wall section in accordance with the Retaining Wall Plans.

For standard temporary walls with interior angles less than 90°, wrap geotextiles at acute corners as directed by the Engineer. Place geotextiles as shown in the retaining wall plans. Place separation geotextiles between temporary wall backfill and backfill, natural ground or permanent retaining wall reinforced zone below, on top of and at the back of the reinforced zone.

Measurement and Payment

Temporary Surcharge Wall No. ___ will be measured and paid in square feet. *Temporary Surcharge Wall No. ___* will be measured as the square feet of exposed wall face area with the pay height equal to the difference between the top of surcharge elevation and the bottom of approach slab elevation. No measurement will be made for any portion of temporary wall perpendicular to the primary wall face, temporary wall below the bottom of approach slab, or temporary wall extension above top of surcharge elevation. The contract unit price for *Temporary Surcharge Wall No. ___* will be full compensation for providing designs, submittals and materials, excavating, backfilling, hauling and removing excavated materials and supplying all labor, tools, equipment and incidentals necessary to construct Temporary Surcharge Walls.

Pay Item	**Pay Unit**
Temporary Surcharge Wall No. ___	Square Foot

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CONTINUOUS FLIGHT AUGER PILES FOR SOUND BARRIER WALLS (SPECIAL)

1.0 GENERAL

Continuous flight auger (CFA) piles are constructed by drilling a borehole with a continuous flight hollow stem auger and filling the borehole by pumping grout through the auger as it is withdrawn. After completing grout placement, reinforcement is inserted into the column of fluid grout. At the Contractor's option, construct CFA piles for sound barrier walls instead of pile excavation. Install CFA piles with the required depth in accordance with the contract and accepted submittals. Use a prequalified CFA Pile Subcontractor for CFA pile work. Define "pile" as a CFA pile and "reinforcement" as pile extending out of CFA pile.

2.0 INSTALLATION PLAN SUBMITTAL

Provide 4 copies and a PDF copy of the CFA pile installation plan submittal. Submit the installation plan at least 15 days before starting CFA pile construction. Do not begin pile construction until the CFA pile installation plan is accepted.

Provide detailed project specific information in the installation plan that includes the following:

1. List and sizes of proposed equipment including CFA drilling rigs, augers and other drilling tools and grouting equipment;
2. Step-by-step description of CFA pile installation and sequence of pile construction;
3. Methods for placing reinforcement with procedures for supporting and positioning the reinforcement;
4. Minimum grout volume factor;
5. Equipment and procedures for monitoring and recording grout volume;
6. Examples of construction records to be provided that meet Section 6.0 of this provision;
7. Procedures for containment and disposal of drilling spoils and waste grout;
8. Approved packaged grout or grout mix design that meets Section 1003 of the *Standard Specifications*; and
9. Other information shown in the plans or requested by the Engineer.

If alternate installation procedures are proposed or necessary, a revised CFA pile installation plan submittal may be required. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend CFA pile construction until a revised plan is accepted.

3.0 MATERIALS

Use Type 2 grout that meets Section 1003 of the *Standard Specifications*.

Use piles extending out of CFA piles that meet the *Sound Barrier Wall* provision.

4.0 PRECONSTRUCTION MEETING

Before starting CFA pile construction, hold a preconstruction meeting to discuss the installation and monitoring of the piles. Schedule this meeting after the CFA Pile Subcontractor mobilizes to the site. If this meeting occurs before all CFA pile submittals have been accepted, additional preconstruction meetings may be required before beginning construction of CFA piles without accepted submittals. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and CFA Pile Subcontractor Superintendent and Project Manager will attend preconstruction meetings.

5.0 CONSTRUCTION METHODS

Use equipment and methods accepted in the CFA pile installation plan or approved by the Engineer. Inform the Engineer of any deviations from the accepted plan.

Dispose of drilling spoils and waste grout as directed and in accordance with Section 802 of the *Standard Specifications*. Drilling spoils consist of all excavated material and fluids removed from boreholes.

A. Drilling

Use CFA piling rigs capable of drilling to the dimensions and depths shown in the plans or required otherwise by the Engineer. Install CFA piles with tip elevations no higher than shown in the plans or approved by the Engineer.

Use single helix hollow stem augers with uniform diameters and continuous flights from the top of the auger to the bottom tip of the cutting face. Provide augers with flights and teeth that cut the bottom of the borehole flat. Augers with outside diameters at least 97% of the pile design diameter are required. Augers capable of installing piles to a depth 20% greater than plan depth are also required.

Unless piles are installed with a hydraulic fixed mast installation platform and the stem to which the auger is fixed has an outside diameter 10" (250 mm) or greater, at least one guide connected to the leads of the CFA piling rig is required. Prevent the leads from rotating during drilling and grouting.

Seal the grout injection port to prevent entry during drilling. Keep the hollow stem of augers clean when drilling. Clearly mark augers or leads every foot (0.3 m) along their length with markings visible to the unaided eye from the ground. Check for correct pile location and alignment before beginning drilling. Do not begin drilling until enough grout to complete the pile is on the project site.

Advance the auger into the ground at a continuous rate. Do not raise the auger until beginning grout placement. Control the auger rotation speed to prevent excess spoil from being transported to the ground surface and surrounding soil being drawn laterally into the borehole.

If muck, organics, soft soil or other unsuitable materials are encountered within 5 ft (1.5 m) of the ground surface, contact the Engineer as these materials can cause problems with top of pile construction. If auger refusal is encountered before reaching plan depth, stop the auger rotation and inform the Engineer. Unless it is determined otherwise, define refusal as less than 1 ft (0.3 m) of auger penetration per minute.

B. Grouting

Remove oil, rust inhibitors, residual drilling slurries and similar foreign materials from holding tanks/hoppers, stirring devices, pumps and lines and all other equipment in contact with grout before use.

Place a screen between the ready mix truck and the grout pump to remove large particles or cement balls using a mesh that has openings no larger than ¾" (19 mm).

Use a positive displacement piston type pump with a known volume per stroke that can develop peak pressures at the pump of at least 350 psi (2.4 MPa). Size the pump to maintain a smooth continuous delivery of grout while limiting pressure variations (particularly pressure drops) due to pump strokes. At the beginning of construction, provide the grout volume delivered by each pump stroke and verify this value is within 3% of the actual volume. Recalibrate the grout volume per pump stroke during construction as necessary or directed.

Measure grout temperature and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform flow field tests in the presence of the Engineer in accordance with ASTM C939 (Flow Cone).

Place grout in accordance with the contract and accepted submittals. Pump grout without difficulty to fill any soft or porous zones and with sufficient pressure to ensure a continuous monolithic pile with at least the plan cross section from the maximum borehole depth to the top of the grout column. Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).

Begin placing grout within 5 minutes after the auger has reached plan depth. At the beginning of grout placement, lift the auger 6" to 12" (150 mm to 300 mm) and remove the sealing device by applying grout pressure or with a steel bar. Do not lift the auger beyond this range in order to minimize soil movement. After initiating grout flow, reinsert the auger to the original depth.

Pump grout continuously while extracting the auger at a smooth steady rate. Maintain a positive grout pressure at the auger injection point at all times. If rotation occurs while removing the auger, rotate the auger in the same direction as during drilling. If grout placement is suspended for any reason, inform the Engineer and redrill the CFA pile.

Monitor the depth of the auger injection point while counting pump strokes during grouting. Record the grout volume and factor versus depth of the auger injection point in increments of 5 ft (1.5 m) or less. The grout volume factor is the grout volume placed

divided by the theoretical grout volume for each depth increment. A grout volume factor of at least 1.15 is required.

C. Top of Pile Finishing and Protection

After placing grout, remove all excess grout and spoil from and place a temporary form within the top of the grout column. Use a form 3 ft to 5 ft (1 m to 1.5 m) long with a diameter equal to or larger than the pile diameter. Place the form with equal lengths above and below the ground surface. Recheck the top of the grout and remove any foreign material. After the Engineer determines that grout reaches initial set, remove the form without disturbing the ground surface around the pile.

After inserting reinforcement, square the top of the CFA pile with the pile axis while grout is still fluid or by cutting off hardened grout. Construct the top of CFA pile to the elevation shown in the plans.

D. Reinforcement

Provide reinforcement for CFA piles consisting of piles shown in the plans and accepted submittals. Insert reinforcement as a unit while the grout is still fluid. Lower or gently push reinforcement into the grout. Do not vibrate or drive the reinforcement. Support the reinforcement at the ground surface until the grout strength reaches 2,500 psi (17.2 MPa). Contact the Engineer if reinforcement cannot be properly inserted to the required depth.

6.0 CONSTRUCTION RECORDS

Provide 2 copies of CFA pile construction records after completing each pile. Include the following in construction records:

1. Names of CFA Pile Subcontractor, Superintendent, Drill Rig Operator and Project Manager;
2. Project description, county, Department’s contract, TIP and WBS element number;
3. Wall station and number and pile location and identifier;
4. The grout volume and factor versus depth of the auger injection point in increments of 5 ft (1.5 m) or less;
5. CFA pile diameter, length and tip elevation, top of pile and ground surface elevations;
6. Auger diameter and theoretical volume of the borehole;
7. Grout temperature and flow records;
8. Size, length, top elevation and grade of reinforcement;
9. Date and time drilling begins and ends, grout is mixed and arrives on-site, pumping grout begins and ends and reinforcement is placed;
10. Weather conditions including air temperature at time of grout placement; and
11. All other pertinent details related to CFA pile construction.

After completing CFA piles for each sound barrier wall, provide a PDF copy of all corresponding construction records.

7.0 CFA Pile Acceptance

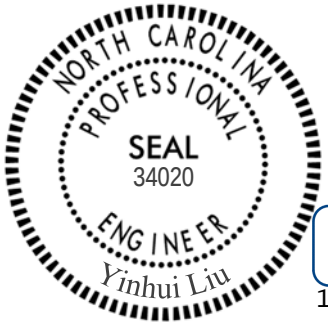
CFA pile acceptance is based in part on the following criteria.

1. Grout volume factor is greater than the minimum required for any 5 ft (1.5 m) depth increment.
2. Grout is properly placed and does not have any evidence of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).
3. CFA pile and reinforcement location, alignment and elevations are within tolerances for sound barrier walls for pile excavation and reinforcement is in accordance with the contract and accepted submittals.

If the Engineer determines a CFA pile is unacceptable, additional testing, remedial measures or replacement piles are required at no additional cost to the Department. Do not being remediation work until remediation plans are approved.

8.0 Measurement And Payment

CFA piles for sound barrier walls will be paid at the contract unit price for *Sound Barrier Wall*. No separate payment will be made for CFA piles. The contract unit price for *Sound Barrier Wall* will be full compensation for all costs for submittals, monitoring and recording, labor, tools, equipment, reinforcement and grout complete and in place and all incidentals necessary to drill and construct CFA piles in accordance with this provision. No payment will be made for any costs associated with unacceptable CFA piles.



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CATLIN Project Engineer

ALTERNATE BRIDGE APPROACH FILLS FOR INTEGRAL ABUTMENTS:
(SPECIAL) 422

Description

Use Type A Alternate Bridge Approach Fills instead of Type I or II Bridge Approach Fills to support bridge approach slabs for integral bridge abutments. An alternate bridge approach fill consists of constructing an approach fill with a temporary geotextile wall before placing all or a portion of the concrete for the backwall and wing walls of the integral end bent cap. The temporary geotextile wall is designed for a crane surcharge, remains in place and aligned so the wall face functions as a form for the end bent cap backwall and wing walls. Install drains, welded wire facing and geotextiles and backfill approach fills and temporary walls with select material as required. Define "geotextiles" as separation or reinforcement geotextiles, "temporary wall" as a temporary geotextile wall and "alternate approach fill" as a Type A Alternate Bridge Approach Fill in accordance with the Retaining Wall Plans and 2018 Roadway Standard Drawing No. 422.03.

Materials

Refer to Division 10 of the *2018 Standard Specifications*.

Item	Section
Geosynthetics	1056
Portland Cement Concrete	1000
Select Materials	1016
Subsurface Drainage Materials	1044
Welded Wire Reinforcement	1070-3

For temporary walls, use welded wire reinforcement for welded wire facing and Type 5 geotextile for reinforcement geotextiles. Use Type 5 geotextile with lengths and an ultimate tensile strength as shown in the Retaining Wall Plans and 2018 Roadway Standard Drawing No. 422.03. Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V select material for alternate approach fills and temporary walls. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

Construction Methods

Excavate as necessary for alternate approach fills and temporary walls in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place geotextiles until approach fill dimensions and foundation material are approved.

Install geotextiles as shown in the Retaining Wall Plans and 2018 Roadway Standard Drawing No. 422.03. Attach separation geotextiles to end bent cap backwalls and wing walls as needed with adhesives, tapes or other approved methods. Overlap adjacent geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geotextiles.

Install continuous perforated PVC drain pipes with perforations pointing down in accordance with the Retaining Wall Plans and 2018 Roadway Standard Drawing No. 422.03. Connect drain pipes to outlet pipes just beyond wing walls. Connect PVC pipes, fittings and outlet pipes with solvent cement in accordance with Article 815-3 of the *2018 Standard Specifications* and place outlet pads in accordance with 2018 Roadway Standard Drawing No. 815.03.

Install drain pipes so water drains towards outlets. If the groundwater elevation is above drain pipe elevations, raise drains up to maintain positive drainage towards outlets. Place pipe sleeves in or under wing walls so water drains towards outlets. Use sleeves that can withstand wing wall loads.

At the Contractor's option, construct bottom portion of integral end bents before temporary walls as shown in 2018 Roadway Standard Drawings No. 422.03. Erect and set welded wire facing so facing functions as a form for the end bent cap backwall. Place welded wire facing adjacent to each other in the horizontal and vertical directions to completely cover the temporary wall face. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Wrap reinforcement geotextiles at the temporary wall face in accordance with the Retaining Wall Plans and 2018 Roadway Standard Drawing No. 422.03 and cover geotextiles with at least 3" of select material. Place layers of reinforcement geotextiles within 3" of locations shown in the Retaining Wall Plans and 2018 Roadway Standard Drawing No. 422.03. Before placing select material, pull reinforcement geotextiles taut so they are in tension and free of kinks, folds, wrinkles or creases. Install reinforcement geotextiles with the direction shown in the Retaining Wall Plans and 2018 Roadway Standard Drawing No. 422.03. Do not splice or overlap reinforcement geotextiles so seams are parallel to the temporary wall face.

Place select material in 8" to 10" thick lifts and compact select material with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geotextiles or drains when placing and compacting select material. End dumping directly on geotextiles is not permitted. Do not operate heavy equipment on geotextiles or drain pipes until they are covered with at least 8" of select material. Replace any damaged geotextiles or drains to the satisfaction of the Engineer. When alternate approach fills extend beyond bridge approach slabs, wrap separation geotextiles over select material as shown in 2018 Roadway Standard Drawing No. 422.03.

Temporary walls are designed for a surcharge pressure in accordance with 2018 Roadway Standard Drawing No. 422.03. If the crane surcharge will exceed the wall design, contact the Engineer before positioning the crane over reinforcement geotextiles.

Measurement and Payment

Alternate approach fills will be paid at the contract lump sum for *Modified Type A Bridge Approach Fill, Station ____*. The lump sum price for each approach fill will be full compensation for providing labor, tools, equipment and alternate approach fill materials, excavating, backfilling, hauling and removing excavated materials, constructing temporary walls, installing wall facing,

geotextiles and drains, compacting backfill and supplying select material, separation and reinforcement geotextiles, welded wire facing, drain pipes, pipe sleeves, outlet pipes and pads and any incidentals necessary to construct alternate approach fills for integral abutments.

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INSTALLATION OF VERTICAL WICK DRAINS AND DRAINAGE LAYER

(SPECIAL)

1.0 GENERAL

Furnish, place and install vertical wick drains, including augering, and Select Material, Class III in accordance with the details in the plans and as specified in the provisions, or as directed by the Engineer. Select Material, Class III is the same as Select Granular Material, Class III within this provision and plans.

2.0 MATERIALS

A. Wick Drain

The wick drains must be a prefabricated type composed of a drainage plastic core. The core must be fabricated with suitable drainage channels. The assembled drain shall be band-shaped with an aspect ratio (width divided by thickness) not exceeding 50, and it shall have a minimum equivalent diameter of 2.4 inches using the following definition of equivalent diameter:

$dw = (w+t)/2$ where, dw = diameter of a circular drain equivalent to the band shape w = width of a band shaped drain
t = thickness of a band shaped drain

The plastic core must be wrapped in a filter of a non-woven polyester material. The filter fabric material used must meet the following minimum requirements:

Item	ASTM Standard	Min. Roll Value
Grab Tensile Strength	D4632 90 lbf	
Trapezoidal Tear	D4533 40.5 lbf	
Puncture Strength	D3787 35 lbf	
Mullen Burst	D3786 9.4 tsf	
Permeability	D4491 0.01 inch/sec	

Furnish to the Engineer a Type 2 Typical Certified Mill Test Report for the wick drain in accordance with Section 106-3 of the NCDOT Standard Specification. All wick drain materials shall, however, be subject to inspection, test or approval by the Engineer. At least four (4) weeks before construction of wick drains, provide a sample of 5 feet long wick drain to the Engineer for review and approval.

B. Select Material

Select Material, Class III, must meet the requirements of Section 1016 of the Standard Specifications.

C. Geotextile for Soil Stabilization

Geotextile for Soil Stabilization must meet the requirement of Section 1056 of the Standard Specifications.

3.0 EQUIPMENT

Select the proper size and amount of equipment to provide the desired results but provide the following basic items. The type of carrier to be used will depend on the desired installation force, but it must be equipped with a mandrel or sleeve of minimum cross-sectional area not to exceed 10 square inches.

Submit to the Engineer for review and approval full details on all equipment proposed for drain installation at least two weeks before beginning work. Replace or supplement any equipment found unsatisfactory. All equipment approved for use will be on a trial basis. If after a short test section, the equipment proves unsatisfactory, it must be removed, replaced or supplemented as deemed necessary to accomplish the desired results.

4.0 CONSTRUCTION METHODS

At least four weeks prior to the installation of wick drains, submit to the Engineer for his review and approval, details regarding the sequence of construction and method of installation. Approval by the Engineer of the sequence and method of installation will not necessarily constitute acceptance for the duration of the project. If, at any time, the Engineer considers that the method of installation is not satisfactory, the Contractor must alter his method and/or equipment as necessary to comply with the requirements.

If installation of wick drains through overlying layers and/or obstructions cannot be accomplished with the proper equipment, the Contractor will be permitted to use augering or other approved methods. Any holes augured must have a minimum diameter required to permit the mandrel or sleeve carrying the wick and wick anchorage to penetrate into the underlying soft soils. Penetration of more than 2 feet into the soft layer will not be allowed.

Install the wick drains after placement of the Geotextile for Soil Stabilization and drainage layer. The drainage layer must consist of Select Granular Material, Class III. Install wick drains at the designated locations using a mandrel or sleeve which completely encloses the wick drain, thereby protecting it from tears, cuts, and abrasions during installation. Provide the mandrel or sleeve with an anchor plate or similar arrangement at the bottom to prevent the soil from entering the bottom of the mandrel during installation of the drain, and to anchor the drain tip at the required depth at the time of mandrel withdrawal. Push the mandrel into the ground to the depth indicated on the plans unless otherwise directed by the Engineer. Retract the mandrel leaving the wick in place to function as a vertical drain. Cut the wick neatly at its upper end with 6 inches of wick material protruding above the drainage layer.

Splices or connections of the wick drain material must be done in a workmanlike manner to ensure the hydraulic continuity of the drain. One (1) splice per wick drain location is permitted. Overlap the jacket and core a minimum of 6 inches per splice. Form the splice by

inserting the bottom side of the wick drain into the upper end to ensure continuous full flow. Use a minimum of ten (10) staples (4 on each side and 2 in the middle) to hold the splice.

Installed wicks must not deviate more than 1 inch per foot from the vertical. Wicks that are out of their proper location by more than 6 inches, damaged in construction or improperly completed will be rejected by the Engineer.

Provide a suitable means of making a linear determination of the depth of the Wick drain at any time during installation. Each wick drain length that is complete and in place will be recorded and used to determine total quantity of vertical wick drains for payment purposes.

Provide the necessary steps to protect the instrumentation devices. Any devices that are damaged or become unreliable must be replaced at no additional cost to the Department.

5.0 MEASUREMENT AND PAYMENT

Wick drain will be measured and paid for at the contract unit price per linear foot for "Wick Drains" complete and in place. Payment will be full compensation for work required to install the wick drains, including any augering required and furnishing all labor, equipment, tools, and incidentals necessary to complete the work.

Augering for wick drains installation will be considered to be incidental to the cost of wick drains, and no separate measurement for payment will be made.

Geotextile for Soil Stabilization will be measured and paid for at the contract unit price per square yard. Geotextile for Soil Stabilization will be measured by in place measurement of the geotextile placed in the work. Payment will be full compensation for work required to install the Geotextile for Soil Stabilization and furnishing all labor, equipment, tools, and incidentals necessary to complete the work.

Select Material, Class III will be paid for as Select Granular Material, Class III unless the material is obtained from the same source as the borrow material and the contract includes a pay item for Borrow Excavation. When this occurs, Select Granular Material will be paid for as Borrow Excavation in accordance with Article 230-5 of the Standard Specifications and no payment for Select Granular Material, Class III will be made.

Select Granular Material, Class III will be measured and paid for in cubic yard. Select Granular Material will be measured by in place measurement in accordance with Article 230-5 of the Standard Specifications or by weighing material in trucks in accordance with Article 106-7 of the Standard Specifications as determined by the Engineer. When Select Granular Material is weighed in trucks, a unit weight of 130 lb/ft3 will be used to convert the weight of Select Granular Material to cubic meters. At the measurement in accordance with Article 230-5 of the Standard Specifications may be used in lieu of weighing material in trucks. The contract unit price for Select Granular Material, Class III or as described above will be full compensation for furnishing, hauling, handling, placing, compacting and maintaining Select Granular Material.

Payment will be made under:

Pay Items: Wick Drains……Linear Foot
Select Granular Material, Class III…… Cubic Yard
Geotextile for Soil Stabilization……Square Yard

Yinhui Liu, Ph.D., P.E.

CATLIN Project Engineer

STANDARD SHORING: (10-19-21)

Description

Standard shoring includes standard temporary shoring and standard temporary mechanically stabilized earth (MSE) walls. At the Contractor's option, use standard shoring as noted in the plans or as directed. When using standard shoring, a temporary shoring design submittal is not required. Construct standard shoring based on actual elevations and shoring dimensions in accordance with the contract and Geotechnical Standard Detail No. 1801.01 or 1801.02.

Define "standard temporary shoring" as cantilever shoring that meets the standard temporary shoring detail (Geotechnical Standard Detail No. 1801.01). Define "standard temporary wall" as a temporary MSE wall with geotextile or geogrid reinforcement that meets the standard temporary wall detail (Geotechnical Standard Detail No. 1801.02). Define "standard temporary geotextile wall" as a standard temporary wall with geotextile reinforcement and "standard temporary geogrid wall" as a standard temporary wall with geogrid reinforcement.

Provide positive protection for standard shoring at locations shown in the plans and as directed. See *Temporary Shoring* provision for positive protection types and definitions.

Materials

Refer to the *Standard Specifications*.

Item	Section
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Grout, Type 1	1003
Portland Cement Concrete, Class A	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials. Use Class IV select material for temporary guardrail. Use Class A concrete that meets Article 450-2 of the *Standard Specifications* or Type 1 grout for drilled-in piles.

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, use sheet piles with the minimum required section modulus or H-piles with the sizes shown in Geotechnical Standard Detail No. 1801.01. Use untreated timber with a thickness of at least 3" and a bending stress of at least 1,000 psi for timber lagging.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use the following:

(1) A-2-4 soil for backfill around culverts,

(2) A-2-4 soil in the reinforced zone of standard temporary walls with a back slope and

(3) Class VI select material in the reinforced zone of standard temporary geotextile walls.

(B) Standard Temporary Walls

Use welded wire reinforcement for welded wire facing, struts and wires with the dimensions and minimum wire sizes shown in Geotechnical Standard Detail No. 1801.02. Provide Type 2 geotextile for separation and retention geotextiles. Do not use more than 4 different reinforcement strengths for each standard temporary wall.

(1) Geotextile Reinforcement

Provide Type 5 geotextile for geotextile reinforcement with a mass per unit area of at least 8 oz/sy in accordance with ASTM D5261. Based on actual wall height, groundwater elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geotextile wall location, provide geotextiles with ultimate tensile strengths as shown in Geotechnical Standard Detail No. 1801.02.

(2) Geogrid Reinforcement

Use geogrids for geogrid reinforcement with a roll width of at least 4 ft and an "approved" status code in accordance with the NCDOT Geosynthetic Reinforcement Evaluation Program. The list of approved geogrids is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Based on actual wall height, groundwater or flood elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geogrid wall location, provide geogrids for geogrid reinforcement with short-term design strengths as shown in Geotechnical Standard Detail No. 1801.02. Geogrids are approved for short-term design strengths (3-year design life) in the machine direction (MD) and cross-machine direction (CD) based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

Preconstruction Requirements

(A) Concrete Barrier

Define "clear distance" behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor's option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of standard shoring except for barrier above standard temporary walls. Concrete barrier with the minimum required clear distance is required above standard temporary walls.

(B) Temporary Guardrail

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and standard shoring. At the Contractor's option or if clear distance for standard temporary shoring is less than 4 ft, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above standard temporary walls.

(C) Standard Shoring Selection Forms

Before beginning standard shoring construction, survey existing ground elevations in the vicinity of standard shoring locations to determine actual shoring or wall heights (H). Submit a standard shoring selection form for each location at least 7 days before starting standard shoring construction. Standard shoring selection forms are available from: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx

Construction Methods

Construct standard shoring in accordance with the *Temporary Shoring* provision.

(A) Standard Temporary Shoring Installation

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, install piles with the minimum required embedment and extension for each shoring section in accordance with Geotechnical Standard Detail No. 1801.01. For concrete barrier above and next to standard temporary shoring and temporary guardrail above and attached to standard temporary shoring, use "surcharge case with traffic impact" in accordance with Geotechnical Standard Detail No. 1801.01. Otherwise, use "slope or surcharge case with no traffic impact" in accordance with Geotechnical Standard Detail No. 1801.01. If refusal is reached before driven piles attain the minimum required embedment, use drilled-in H-piles with timber lagging for standard temporary shoring.

(B) Standard Temporary Walls Installation

Based on actual wall height, groundwater elevation, slope or surcharge case, geotextile or geogrid reinforcement and shoring backfill in the reinforced zone at each standard temporary wall location, construct walls with the minimum required reinforcement length and number of reinforcement layers for each wall section in accordance with Geotechnical Standard Detail No. 1801.02. For standard temporary walls with pile foundations in the reinforced zone, drive piles through reinforcement after constructing temporary walls.

For standard temporary walls with interior angles less than 90°, wrap geosynthetics at acute corners as directed by the Engineer. Place geosynthetics as shown in Geotechnical Standard Detail No. 1801.02. Place separation geotextiles between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, place separation geotextiles between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Measurement and Payment

Standard shoring will be measured and paid in accordance with the *Temporary Shoring* provision.

DocuSigned by:
Jeremy R Hamm
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11/19/2021

BOX CULVERT EXCAVATION **(9-8-21)**

Revise the *2018 Standard Specifications* as follows:

Page 4-21, Article 414-2, Materials, line 13, in materials table, add material "Geotextiles, Type 4 Section 1056"

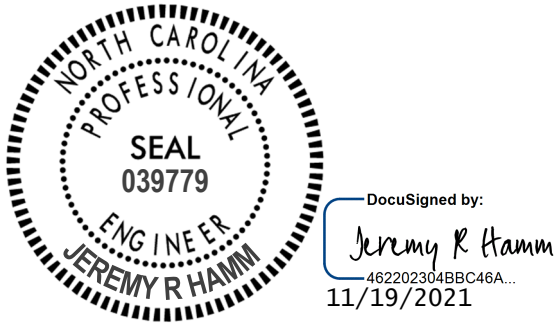
Page 4-21, Article 414-2, Materials, line 14, add "Provide foundation conditioning geotextile and geotextile to wrap cold joints in accordance with Article 1056 for Type 4 geotextile."

Page 4-21, Article 414-4, Conditioning Culvert Foundation, line 31, add "Encapsulate the foundation conditioning material with foundation conditioning geotextile before constructing culvert."

Page 4-22, Article 414-7, Backfilling and Filling, line 5, add "For stage-constructed culverts, wrap geotextile around sides and top of cold joints. Extend geotextile at least 12 inches beyond each side of the joint. Secure geotextile against the outside of the culvert by methods approved by the Engineer."

Page 4-22, Article 414-9, Measurement and Payment, line 45, add "*Foundation Conditioning Geotextile* will be measured and paid in square yards. The measurement will be based on the theoretical calculation using length of culvert installed and cross-sectional perimeter of the foundation conditioning material. No separate measurement will be made for overlapping geotextile."

Page 4-23 Article 414-9, Measurement and Payment, line 3, in pay item table, add pay item "Foundation Conditioning Geotextile" with pay unit "Square Yard"



CUSTOM BARRIER RAIL **(SPECIAL)**

Material requirements and construction methods shall be in accordance with section 460 of the Standard Specifications.

1.0 MEASUREMENT AND PAYMENT

Custom Barrier Rail will be measured and paid as the number of linear feet of custom barrier rail estimated in the plans as being necessary to complete the project.

Payment will be made under:

Custom Barrier Rail ..... Linear Foot

11/18/2021

PROJECT SPECIAL PROVISIONS
GEOENVIRONMENTAL

CONTAMINATED SOIL (2/20/2020)

The Contractor's attention is directed to the fact that soil contaminated with petroleum hydrocarbon compounds may exist within the project area. The known areas of contamination are indicated on corresponding plans sheets. Information relating to these contaminated areas, sample locations, and investigation reports will be available at the following web address by navigating to the correct letting year and month then selecting, "Plans and Proposals", "R-3300B", "Individual Sheets/520 GeoEnvironmental":

http://dotw-xfer01.dot.state.nc.us/dsplan/

Petroleum contaminated soil may be encountered during any earthwork activities on the project. The Contractor shall only excavate those soils that the Engineer designates necessary to complete a particular task. The Engineer shall determine if soil is contaminated based on areas shown on the plans, petroleum odors, and unusual soil staining. Contaminated soil not required to be excavated is to remain in place and undisturbed. Undisturbed soil shall remain in place, whether contaminated or not. The Contractor shall transport all contaminated soil excavated from the project to a facility licensed to accept contaminated soil.

In the event that a stockpile is needed, the stockpile shall be created within the property boundaries of the source material and in accordance with the Diagram for Temporary Containment and Treatment of Petroleum-Contaminated Soil per North Carolina Department of Environmental Quality's (NCDEQ) Division of Waste Management UST Section GUIDELINES FOR EX SITU PETROLEUM CONTAMINATED SOIL REMEDIATION. If the volume of contaminated material exceeds available space on site, the Contractor shall obtain a permit from the NCDEQ UST Section's Regional Office for off-site temporary storage. The Contractor shall provide copies of disposal manifests completed per the disposal facilities requirements and weigh tickets to the Engineer.

Measurement and Payment:

The quantity of contaminated soil hauled and disposed of shall be the actual number of tons of material, which has been acceptably transported and weighed with certified scales as documented by disposal manifests and weigh tickets. The quantity of contaminated soil, measured as provided above, shall be paid for at the contract unit price per ton for "Hauling and Disposal of Petroleum Contaminated Soil".

The above price and payment shall be full compensation for all work covered by this section, including, but not limited to stockpiling, loading, transportation, weighing, laboratory testing, disposal, equipment, decontamination of equipment, labor, and personal protective equipment.

Payment shall be made under:

Pay Item	Pay Unit
Hauling and Disposal of Petroleum Contaminated Soil	Ton

DocuSigned by:
John Pilipchuk
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2/20/2020

10/26/2021

NORTH CAROLINA PROFESSIONAL SEAL 29449 ENGINEER BETSY L. WATSON

DocuSigned by:
Betsy L. Watson
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Document not considered final unless all signatures completed.

Prepared By: JBH
9-Sep-21

VERTICAL PANEL TYPE 3 OBJECT MARKERS – OM3-L, OM3-C, AND OM3-R:

(A) General

Provide a vertical marker with sheeting for a Type 3 Object Marker – OM3-L, OM3-C, and OM3-R at locations shown in the Signing Plans. The vertical marker support post shall be affixed to a base capable of restoring the marker to the vertical position if struck by a vehicle.

(B) Crash Testing

The vertical panel shall be crash tested and meet requirements for a NCHRP 350 or MASH-16 Category II device. The vertical marker shall be capable of sustaining a minimum of twenty (20) direct wheel-over impacts at 55 MPH without damage to the vertical marker or reflective sheeting applied to the vertical marker.

(C) Construction

The vertical marker shall be composed of UV-stabilized high impact plastic. The vertical marker shall be 12 inches wide, 36 inches tall, and shall be mounted a minimum of 48 inches above the travel way when installed as shown in NCDOT Roadway Standard Drawing #1264.02 (Sheet 1 of 1); "Type 1 or Type 3 Object Markers for Obstructions Within the Roadway".. The vertical marker will consist of a flat panel, retro-reflective sheeting, support post, and permanent base. The post shall be attached to the base with a flexible mount or similar device capable of restoring the marker to the vertical position if struck by a vehicle.

(D) Reflective Sheeting

The vertical marker flat panel shall accommodate a minimum of 12 inches x 36 inches of Grade C, high intensity, retroreflective sheeting or better that meets the requirements of Section 1092 of the Standard Specifications for Roads and Structures (January 2018). The retro-reflective sheeting shall meet the color and stripe patterns for Type 3 Object Markers –OM3-L, OM3-C, and OM3-R per requirements of the Manual on Uniform Traffic Control Devices (2009 Edition).

(E) Installation

The vertical markers shall be installed per manufacturer's instructions.

(F) Approval

All materials are subject to the approval of the Engineer prior to installation.

(G) Measurement and Payment

No measurement will be made of mounting base, attachment hardware, or support posts as these will be considered incidental to furnishing and erecting the Type 3 Object Marker.

Payment will be made under:

Pay Item	Pay Unit
Vertical Panel Type 3 Object Marker – OM3-L	each
Vertical Panel Type 3 Object Marker – OM3-C	each
Vertical Panel Type 3 Object Marker – OM3-R	each

DocuSigned by:
Matthew V. Springer
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8/27/2020

POLYUREA PAVEMENT MARKING MEDIA AND THICKNESS:
(08-27-20)

Amend the *NCDOT 2018 Standard Specifications* as follows:

Page 12-8, Subarticle 1205-5(B), lines 14-16, replace with the following:

Produce polyurea pavement marking lines that have a minimum dry thickness of 20 mils above the pavement surface when placed on concrete and asphalt pavements. Produce polyurea pavement marking lines that have a minimum dry thickness of 30 mils above the pavement surface on textured surfaces such as OGFC and on surfaces where the polyurea will be placed over a previously removed pavement marking.

Page 12-9, replace **Table 1205-4 Minimum Reflectometer Requirement for Polyurea** with the following:

TABLE 1205-4
MINIMUM REFLECTOMETER REQUIREMENTS
FOR POLYUREA

Item	Color	Reflectivity
Standard Glass Beads	White	375 mcd/lux/m^2
	Yellow	250 mcd/lux/m^2

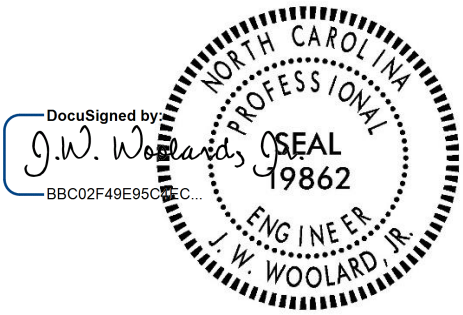
The installer may choose to use an AASHTO Type 4/Type 1 or AASHTO Type 3/Type 1 double drop system, but no price adjustment will be made, and these systems will be incidental to the polyurea pavement marking.

Pay Item	Pay Unit
Polyurea Pavement Marking Lines,___",_____mils (Standard Glass Beads)	Linear Foot

TC-1

R-3300B Pender County

WORK ZONE TRAFFIC CONTROL
Project Special Provisions
Table of Contents



10/27/2021

TC-2

R-3300B Pender County

TRAFFIC CONTROL DEVICES TO REMAIN ON PROJECT:
(02/05/2013)

Description

Furnish, install, maintain during the life of the project, and leave Traffic Control Devices on the project at its completion in accordance with the plans and specifications.

Construction Methods

Install and leave on the project the Traffic Control Devices necessary to accommodate the traffic pattern shown on sheet **TMP-15B, 15C, ABD 15E** of the Traffic Control Plan, unless otherwise directed by the Engineer. All **PORTABLE CHANGEABLE MESSAGE SIGNS (pay item # 4420000000-N)** used on the project, **minimum of seven (7),** shall remain on the project.

Provide devices to remain on the project, which meet the requirements of their respective specifications in the 2018 Standard Specifications or their respective special provisions.

Provide devices to remain on the project that are in good condition and subject to the approval of the Engineer.

The devices required to remain on the project at its completion will become the property of the Department.

Basis of Payment

No additional payment will be made specifically for leaving devices on the project. These devices will be paid under their respective pay items in the Contract which will include full compensation for furnishing, installing, maintaining during the life of the project, and leaving the devices on the project at its completion.

WORK ZONE DIGITAL SPEED LIMIT SIGNS
(5/10/2021)

Description

Furnish and install Work Zone Digital Speed Limit Signs on interstates and freeways with speed limits of 55 mph or greater. These signs are regulatory speed limit signs with LED displays for the speed limit numbers.

Materials

TC-3

Digital Speed Limit Signs shall be a minimum 36” wide x 48” high. The speed limit sign (R2-1) shall be black on white with high intensity white prismatic sheeting.

The Digital Speed Limit Sign shall be mounted such that the bottom of the sign is 7’ above roadway.

The LED panel shall be a minimum of 28” wide x 18” high. The display on the LED panel shall be amber or white.

The LED numbers shall have a minimum 5 wide by 7 high pixel array with a minimum height of 18”.

The LED panel shall have auto brightness/dimming capability.

The black on orange “WORK ZONE” sign shall be mounted above the speed limit sign. It shall be 36” wide x 24” high with high intensity prismatic orange sheeting.

The black on white “$250 FINE” sign shall be mounted below the speed limit sign. It shall be 36” wide x 24” high with high intensity prismatic white sheeting.

All digital speed limit systems shall have operational software and wireless communications that allows for remote operation and data monitoring. It shall be configured to allow access by the Engineer or their designee to change each sign independently or change the speed limit on all signs at once from a PC, tablet or cellular phone application.

Radar equipment to detect approaching speeds on the digital speed limit systems is optional. However, if the systems have radar, they will be equipped to store the detected speed data, this information should be available in a spreadsheet format and accessed remotely from a secure cloud location.

The Work Zone Digital Speed Limit systems shall have flashing beacons. The beacons are to be a minimum of 8” diameter LED circular yellow. They shall be mounted above and below the sign assemblies and are to be centered. The beacons shall alternately flash at rates not less than 50 or more than 60 times per minute.

In addition, the flashing beacons shall be mounted in such a manner that the $250 FINE sign is not obscured when in operation.

Digital Speed Limit Signs may be trailer mounted or stationary mounted. The unit shall be solar powered and have the ability to operate continuously. It shall be supplemented with a battery backup system which includes a 110/120 VAC powered on-board charging system.

The batteries, when fully charged, shall be capable of powering the display for 20 continuous days with no solar power. The unit shall be capable of being powered by standard 110/120 VAC power source.

Store the battery bank and charging system in a lockable, weather and vandal resistant box.

All Work Zone Digital Speed Limit Sign equipment shall be on the NCDOT Approved Products List.

Digital Speed Limit Displays

The speed limit shall be continuously displayed on the signs. All other stationary speed limit signs shall be covered when Digital Speed Limit systems are in operation.

Reduced Speed Limit Displays

The Digital Speed Limit systems shall have beacons activated when the work zone speed limit is reduced. Otherwise, the beacons are to remain off.

IF THE DIGITAL SPEED LIMIT SYSTEM IS EQUIPPED WITH RADAR: The Digital Speed Limit Signs shall display the reduced work zone speed limit without flashing the LED speed limit number unless approaching speeds are detected to be 6 MPH or higher than the displayed speed limit. If speeds are detected 6 MPH or above the displayed Speed Limit, then the LED shall flash the speed limit until the speeds are within the 6 MPH tolerance.

Existing Speed Limit Displays

When the existing speed limit is displayed on the Digital Speed Limit Signs, the beacons are to remain off.

IF THE DIGITAL SPEED LIMIT SYSTEM IS EQUIPPED WITH RADAR: The speed limit number is not to flash unless the approaching speeds are detected to be 6 MPH or higher than the displayed speed limit.

Other Construction Methods

The speed limits are the sole authority of the NCDOT. An ordinance by the State Traffic Engineer is required for all speed limits in order to have a lawfully enforceable speed limit.

The Regional Traffic Engineering Office and the Division Construction Engineer in coordination with the Work Zone Traffic Control Section will provide all work zone speed limit recommendations based on activities and conditions.

The Contractor will be responsible for coordinating with the Engineer when the work zone speed limits are to be changed and will have to seek approval by the Engineer or their designee before the speed limit is changed.

Whenever possible, each trailer mounted unit shall be placed on the paved shoulder and shall have the capability of being leveled.

TC-5

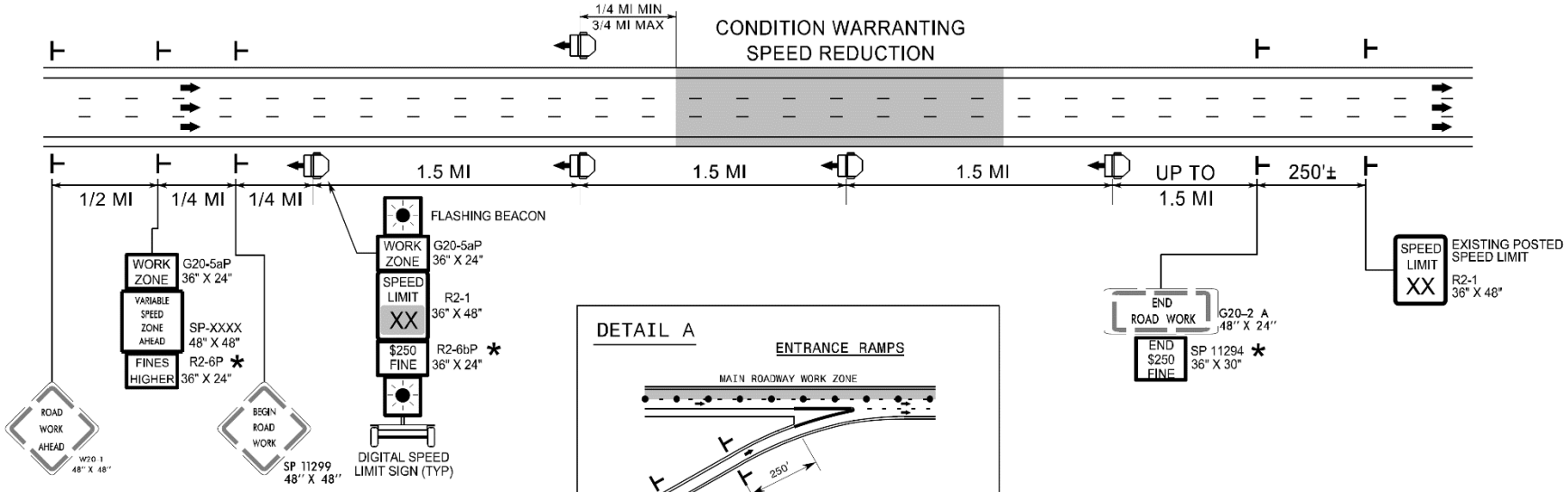
R-3300B Pender County

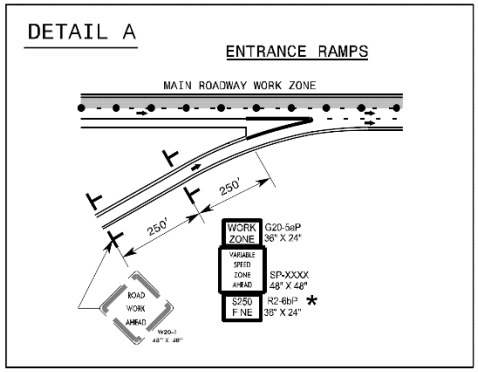
Measurement and Payment

Work Zone Digital Speed Limit Signs will be measured and paid as the maximum number of Work Zone Digital Speed Limit Signs satisfactorily installed according to the attached detail and properly functioning at any one time during the life of the project.

This includes all materials and labor to install, maintain and remove all the Work Zone Digital Speed Limit Signs.

Pay Item	**Pay Unit**
Work Zone Digital Speed Limit Signs	Each





* USE ONLY IF ORDINANCED. SEE NOTE 5 BELOW.

NOTES

1. THE DIGITAL SPEED LIMITS SIGNS WILL BE INSTALLED (TRAILER MOUNTED OR STATIONARY MOUNTED) IN ADVANCE OF AND SPACED APPROXIMATELY 1.5 MILES THROUGHOUT THE THE PROJECT LIMITS, UNLESS DIRECTED OTHERWISE.
2. WITHIN ¼ TO ¾ MILE UPSTREAM OF CONDITION WARRANTING A SPEED REDUCTION, PLACE A DIGITAL SPEED LIMIT SIGN ON BOTH THE INSIDE AND OUTSIDE SHOULDERS, UNLESS DIRECTED OTHERWISE BY THE ENGINEER. AT ALL OTHER LOCATIONS DOWNSTREAM, PLACE A SINGLE DIGITAL SPEED LIMIT SIGN ON THE OUTSIDE SHOULDER.

   IF SIGNS ARE NOT HIGHLY VISIBLE TO ALL MOTORISTS, SUPPLEMENTAL DIGITAL SPEED LIMIT SIGNS ARE PERMITTED ON THE MEDIAN SHOULDER.
3. THE DIGITAL SPEED LIMIT SIGNS TAKE PRECEDENCE OVER EXISTING SPEED LIMIT SIGNS AND SHOULD REMAIN UPRIGHT AND VISIBLE AT ALL TIMES. ALL EXISTING SPEED LIMIT SIGNS SHALL BE COVERED OR REMOVED FOR DURATION OF THE PROJECT.
4. NCDOT HAS SOLE AUTHORITY OF THE SPEED LIMITS DISPLAYED ON THE DIGITAL SPEED LIMIT SIGNS.
5. THE WORK ZONE VARIABLE SPEED LIMIT AND THE $250 SPEEDING PENALTY ARE SEPARATE ORDINANCES THAT MUST BE SIGNED BY THE STATE TRAFFIC ENGINEER TO BE VALID AND ENFORCEABLE. WITHOUT SIGNED ORDINANCES, THE SPEED LIMIT ON A FACILITY SHALL REMAIN UNCHANGED AND/OR HIGHER FINES SIGNS SHALL NOT BE USED.
6. THE REDUCED SPEED SHALL BE DISPLAYED A MINIMUM OF ¼ MILE AND A MAXIMUM OF ¾ MILE IN ADVANCE OF AND THROUGHOUT THE AREA MEETING CONDITIONS LISTED IN THE CHART. THE EXISTING SPEED LIMIT SHALL BE DISPLAYED ON ALL OTHER DIGITAL SPEED LIMIT SIGNS.
7. THE SPEED DISPLAYED SHALL BE THE LOWER OF THE EXISTING SPEED LIMIT OR THE SPEED IN THE WORK ZONE CONDITION CHART.
8. THE BEACONS ON THE DIGITAL SPEED LIMIT SIGNS SHALL ONLY FLASH DURING TIMES THE SPEED IS REDUCED, AND REMAIN OFF AT ALL OTHER TIMES.

	WORK ZONE CONDITIONS	SPEED TO DISPLAY (SEE NOTE 6 & 7)
LANE CLOSURES	2 LANES REDUCED TO 1 LANE	55
	3 LANES REDUCED TO 1 LANE	55
	3 LANES REDUCED TO 2 LANES	60
	4 LANES REDUCED TO 1 LANE	55
	4 LANES REDUCED TO 2 LANES	60
	4 LANES REDUCED TO 3 LANES	65
CONTINUOUS BARRIER (LENGTH OF BARRIER GREATER THAN 1 MILE)	1 OPEN LANE WITH CONTINUOUS BARRIER ON BOTH SHOULDERS	55
	1 OPEN LANE WITH CONTINUOUS BARRIER ON 1 SHOULDER	60
	3 OR 2 OPEN LANES WITH CONTINUOUS BARRIER ON BOTH SHOULDERS	60
	3 OR 2 OPEN LANES WITH CONTINUOUS BARRIER ON 1 SHOULDER	65
	4 OPEN LANES WITH BARRIER CONTINUOUS ON BOTH SHOULDERS	65
	4 OPEN LANES WITH BARRIER CONTINUOUS ON 1 SHOULDER	EXISTING
	UNEVEN LANES	60

SIGN NUMBER: WZTC
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 4′-0″
HEIGHT: 4′-0″
TOTAL AREA: 16.0 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.47″
WIDTH: 0.63″
RADII: 1.5″

NO. Z BARS: 2
LENGTH: 40.0

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

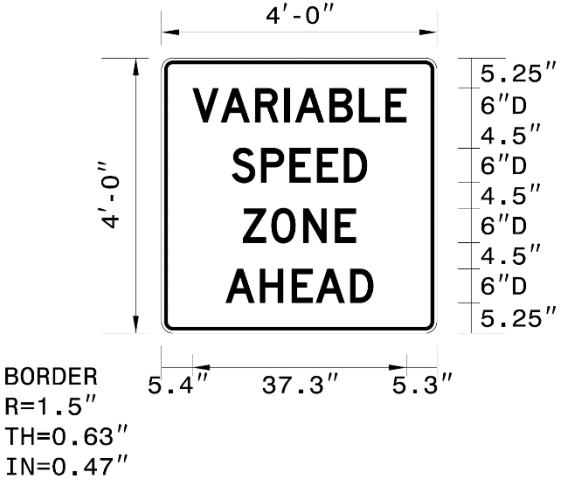
SYMBOL	X	Y	WID	HT

MAT′L: 0.080″ (2.0 mm) ALUMINUM

DESIGN BY: J.Navarrete
PROJECT ID:

CHECKED BY:
LOCATION:

May 13, 2019
DIV: DIV



USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

																										Series/Size Text Length
	V	A	R	I	A	B	L	E																		D 2000
5.4	4.9	6	5.1	1.9	6	5.1	4.6	3.7	5.3																	37.3
	S	P	E	E	D																					D 2000
12.2	5.1	5	4.7	4.7	4.1	12.1																				23.6
	Z	O	N	E																						D 2000
14.2	5	5.6	5.5	3.7	14																					19.8
	A	H	E	A	D																					D 2000
11.2	6	5.5	4.2	6	4.1	11																				25.8

FILENAME: Special Signs 7

NORTH CAROLINA D.O.T. SIGN DETAIL

PROJECT SPECIAL PROVISIONS
Utility Construction

Stantec Consulting Services Inc.
1 W 4th St, Suite 820
Winston-Salem, NC 27101
336-276-1617
Firm License No.: F-0672

NORTH CAROLINA PROFESSIONAL SEAL 023500 ENGINEER LINDA L. PASS
DocuSigned by: B791110BDE7D4F8...
11/12/2021
SEAL NOT VALID UNLESS SIGNED AND DATED

STV 100 Years STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991
(704) 372-1885 FAX: (704) 372-3393

NORTH CAROLINA PROFESSIONAL SEAL 025221 ENGINEER ANDREW S. VANE
DocuSigned by: Andrew S. Vane 7A9EE7299AED4F1...
11/12/2021

Utility Owner:
Water
Pender County Utilities
605 E Fremont Street
Burgaw, North Carolina 28425

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Revise the 2018 Standard Specifications as follows:

Page 10-63, Article 1036-5, DUCTILE IRON PIPE AND FITTINGS, after Line 12, add the following paragraph:

"Pipe joints shall be either Type II or Type III in accordance with Federal Specification WW-P-42 IC except where flanged ends are specifically required."

Page 10-63, Article 1036-6, FIRE HYDRANTS, in Lines 14 and 15, delete "4 ½ inch diameter valve opening" and insert the following:

"5 1/4" diameter main valve opening"

Page 10-63, Article 1036-6, FIRE HYDRANTS, in Line 19 after the words "the owner's standard color.", add the following sentences:

"Fire hydrants shall be painted with a reflective two-tone color scheme; red hydrant with

silver caps and bonnet. The hydrants shall be cleaned, primed, and painted with a minimum of a two-coat system. The fire hydrant top and all caps shall receive the reflective paint."

Page 10-63, Sub-article 1036-7, (A) Gate Valves, after Line 29, insert the following paragraph:

"Sixteen inch (16") valves and larger shall be equipped with a bevel gear operator and bypass line with valve. The bypass line and valve shall be 3" diameter for valves under 24" and 4" diameter for valves 24" and larger. The gear mechanism shall be totally enclosed with watertight gear case, suitable for underground installation. The valves shall be designed for installation in a horizontal position and shall be equipped with track, scrappers, and rollers or trunnions. Valve interior coating shall be the industry standard unless otherwise specified in this section. Valves for non-buried service shall have the exterior prime coated only."

Page 10-63, Sub-article 1036-7, (C) Tapping Valves, after this paragraph, add the following Sub-article:

"**(D) Valve Boxes**

Adjustable 2-piece valve boxes shall be gray cast iron in conformance with ASTM A48, Class 30. Lids shall be heavy-duty traffic weight with the word "WATER" cast into the lid. Provide cast-iron screw type top section of length required for depth of burial of valve and bottom section with base of size to fit over valve. Valve boxes shall be coated inside and out with asphalt."

Page 10-63, Sub-article 1036-8, (A) Tapping Sleeves, after Line 41, add the following paragraph:

"Tapping saddles shall be banded type, with two (2) bands for ductile iron pipe and hinged type for PVC pipe, suitable for bolting in place on the pipe to be tapped. Sleeve shall have a single rubber gasket cemented in place on the inside of the sleeve body. Sleeve shall meet all the requirements of ANSI/AWWA C110/A21.10 and C111/A21.1.

Tapping sleeves greater than 2" diameter shall be stainless steel with carbon steel flanged outlet, and conform to the following:

1. Body, straps, and UNC threaded studs are made of 18-8 Type 304 stainless steel. Flange can be either ASTM A240 Type 304 stainless steel or ASTM carbon steel.
2. All sleeves shall be fully passivated for corrosion resistance.
3. Tapping sleeves shall be rated for 250 psi working pressure on 2" – 12" lines.
4. Outlet gasket shall be Buna-N rubber per ASTM D2000.
5. Sleeve shall be UL Classified to ANSI/NSF Standard 61."

Page 10-64, Sub-article 1036-8, (B) Transition Sleeves and Couplings, after Line 2, add the following paragraph and Sub-article (C):

"Use an HDPE Mechanical Joint (MJ) Fusion Adapter type coupling with a 16" X 12" MJ reducer to transition between the 16" Outside Diameter (OD) HDPE (DR 11) Pipe and 12" Inside Diameter (ID) PVC Pipe or DI Pipe."

(C) Joint Material

Gaskets for pipe and fitting shall be continuous ring of rubber material compounded to resist deterioration and of a texture to assure a permanent and watertight seal. They shall have smooth surfaces, free from pitting, blisters, porosity or any other defects. Gaskets shall conform to the requirements of AWWA Specification C301 and Federal Specification WW-P4211.

Gasket lubricant shall be a potable hydrogenated vegetable oil, insoluble in cold water, non-toxic, shall not support the growth of bacteria, and shall not impart taste or odor to the water. It shall not contain detergents, soaps, organic solvents, or other deleterious ingredients and shall have no deterioration effects on the gaskets. The lubricant shall be semi-paste, easily applicable, readily adherent to the inside of the bell, and shall remain in a usable state throughout the range of temperature in which pipe is normally installed. Lubricant shall be delivered to the job site in unopened containers bearing the manufacturer's name and trade name or trademark, NSF approved."

Page 10-64, Article 1036-9, SERVICE LINE VALVES AND FITTINGS, after Line 8, add the following paragraph:

"Tapping saddles are not allowed when connecting main diameter is 50% or larger than existing main to be tapped."

Page 15-1, Article 1500-2, COOPERATION WITH THE UTILITY OWNER, in Line 17, delete the words "one week" and insert the following:

"three business days".

Page 15-1, Article 1500-2, COOPERATION WITH THE UTILITY OWNER, after Line 19, insert the following:

"The utility owner is Pender County Utilities. The contact person is Kenny Keel, PE, Director of Pender County Utilities and Solid Waste, and he can be reached by phone at (910) 259-0212."

Page 15-2, Article 1500-7, SUBMITTALS AND RECORDS, in Line 30, delete the sentence "Provide 2 copies to the utility owner and 2 copies to the Engineer." and insert the following

sentences:

"Plans should also include water profiles showing any utility crossings along with the aforementioned information."

"Digital as-built information shall be provided by the Engineer of Record in AutoCAD and PDF format and shall include all information required on the as-built drawings. Digital pictures of all items of interest such as utility crossings and separations shall be included."

Page 15-2, Article 1500-9, PLACING PIPELINES INTO SERVICE, in Line 42 delete the words "8 hours." and insert the following sentences:

"6 hours between 10 PM and 4 AM. Absolutely no shutdowns of the existing water system shall occur at any time between Memorial Day and Labor Day in any given year unless given approval by the Owner. Contractor shall plan shutdowns to tie-in to existing water lines outside of these dates."

Page 15-6, Article 1510-2, MATERIALS, after Line 2, add the following paragraph:

"The tape shall be buried a maximum of 12" below the ground surface directly above the water line with printed side up. The Contractor shall take necessary precaution to ensure that the tape is not pulled, distorted or otherwise misplaced in completing the trench backfill.

Page 15-6, Sub-article 1510-3, (B) Testing and Sterilization, in Line 32 delete the words "for 2 hours", and insert the words and sub-paragraph as follows:

", or least 150% the working pressure at the point of testing, whichever is greater, for 2 hours for sections installed by open cut installation and 24 hours for sections installed by horizontal directional drilling.

Test Pressure Restrictions: Test pressures shall be:

(i) Not exceed pipe or thrust restraint design pressures.
(ii) Be of at least 2-hour duration for sections installed by open cut installation. Be of at least 24- hour duration for sections installed by horizontal directional drilling.
(iii) Not vary by more than plus or minus 5 psi.
(iv) Not exceed twice the rated pressure of the valve or hydrants when the pressure boundary of the test section includes closed gate valves or hydrants.
(v) Not exceed the rated pressure of the valves if resilient-seated butterfly valves are used.

When hydrants are in the test section, the test shall be made against the hydrant.

When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/hr/in. of nominal valve size shall be allowed."

Page 15-7, Sub-article 1510-3, (B) Testing and Sterilization, in Line 13 after the words "existing water mains" add the following paragraphs:

"Valves should be operated to direct discharge to the selected fire hydrants used for blow off. Flushing shall continue until the Engineer determines that the residual chlorine is reduced to the same level as in the existing water mains. Chlorinated water will be treated prior to release into environment.

The maximum flow rate that can be extracted from the Owner's system is 200 gallons per minute. A higher flow rate for flushing large diameter lines will be allowed at certain times of the day and week as approved by the Owner.

Upon completion of sterilization, the water line shall be refilled with water. Generally, a sample will be taken every 2,000' for distribution lines and every 4,000' on transmission lines. Samples may be taken at new service connections, at air valve stations, or through any other connection to the line 1" or smaller in diameter. Samples shall not be taken at fire hydrants. The samples shall be taken in standard sterilized bacteria sample bottles marked with the project name and sample location. Bacteriological samples collected following new water main disinfection should be performed by a North Carolina State Certified Laboratory, per Rule .1001 of the *Rules Governing Public Water Systems.* Results of the analysis shall be furnished to the Owner."

Page 15-7, Sub-article 1510-3, (B) Testing and Sterilization, in Line 14 delete the words "after approval of all testing and flushing" and insert the following:

"within 5 business days of successful bacteriological test".

PROJECT SPECIAL PROVISIONS
Utilities by Others

General:

The following utility companies have facilities that will be in conflict with the construction of this project:

A) Four County EMC - Power
B) Duke - Distribution
C) Duke - Transmission
D) AT&T - Distribution
E) AT&T – Transmission
F) Spectrum
G) CenturyLink
H) MCNC
I) Four County EMC - fiber

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owners. All utilities are shown on the plans from the best available information.

The Contractor's attention is directed to Article 105-8 of the 2018 Standard Specifications.

Utilities Requiring Adjustment:

Utility relocations are shown on the Utilities by Others Plans.

A) Four County EMC - Power Distribution

- -Y30- (NC 210) - Four County EMC relocations in this area will be complete 365 days after Construction Date of Availability.
- -Y38- (Holiday Dr.) - Four County EMC relocations in this area will be complete 180 days after Construction Date of Availability.
- Contact person for Four County EMC is Harry Buckner at 919-256-5908, hbuckner@pike.com

PROJECT SPECIAL PROVISIONS
Utilities by Others

B) Duke - Distribution

- -Y31- (Hoover Rd) - Duke Distribution relocations in this area will be complete 180 days after Construction Date of Availability.
-
- -L- Sta 220+33 to -L- Sta 327+00 (US 17) - Duke Distribution relocations in this area will be complete 548 days after Construction Date of Availability.
- Contact person for Duke – Distribution is Matt Lashley at 919-654-6675, mlashley@pike.com

C) Duke - Transmission

- Duke Transmission relocations are complete at -L1- Sta 786+00
- Contact person for Duke – Transmission is Jamie Loy at 919-546-6034, jamie.loy@duke-energy.com

D) AT&T - Distribution

- Along -Y30- (NC 210) - AT&T Distribution relocations in this area will be complete 365 days after Construction Date of Availability.
- Along -Y38- (Holiday Drive) - AT&T Distribution relocations in this area will be complete 180 days after Construction Date of Availability.
- -Y31- (Hoover Rd) - AT&T relocations in this area will be completed 180 days after Construction Date of Availability
- -L- Sta 220+33 to -L- Sta 327+00 (US 17) - AT&T Distribution relocations in this area will be complete 548 days after Construction Date of Availability.
- Contact person for AT&T Distribution is Chrissy Coston at 910-341-7664, cc6265@att.com

E) AT&T - Transmission

- -L- Sta 220+33 to -L- Sta 327+00 (US 17) - AT&T Transmission relocations in this area will be complete 548 days after Construction Date of Availability.
- Contact person for AT&T Transmission is Homer Marona at 910-638-1798, hmarona@embarqmail.com

PROJECT SPECIAL PROVISIONS
Utilities by Others

F) Spectrum

- -Y30- (NC 210) - Spectrum relocations in this area will be complete by Spectrum relocations in this area will be complete 365 days after Construction Date of Availability.
- -Y38- (Holiday Dr.) - Spectrum relocations in this area will be complete 180 days after Construction Date of Availability.
- -Y31- (Hoover Rd) - Spectrum relocations in this area will be complete 180 days after Construction Date of Availability.
- -L- Sta 220+33 to -L- Sta 327+00 (US 17) - Spectrum relocations in this area will be complete 548 days after Construction Date of Availability.
- Contact persons for Spectrum is Steve Barnette at 910-772-5755, steve.barnette@charter.com

G) CenturyLink

- -L- Sta 220+33 to -L- Sta 327+00 (US 17) - CenturyLink relocations in this area will be complete 548 days after Construction Date of Availability.
- Contact person for CenturyLink is Kevin Godwin at 910-366-2142, kevin.godwin@centurylink.com

H) MCNC

- -L- Sta 220+33 to -L- Sta 327+00 (US 17) - MCNC relocations in this area will be complete 548 days after Construction Date of Availability.
- Contact person for MCNC is Bob Davis at 336-285-7497, bob@tprcbroadband.com

I) Four County EMC - Fiber

- -Y30- (NC 210) - Four County EMC Fiber relocations in this area will be complete 365 days after Construction Date of Availability.
- Contact person for FCEMC Fiber is Jared James at 843-509-2922, jared.james@palmettoeng.com

Prepared and Submitted by SAM

Freddie Bunn

Digitally signed by Freddie Bunn
DN: C=US, E=fbunn@sam.biz, CN=Freddie Bunn
Date: 2021.11.17 15:42:49-05'00'

Project Special Provisions
Erosion Control

STABILIZATION REQUIREMENTS:

(4-30-2019)

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective April 1, 2019 issued by the North Carolina Department of Environmental Quality Division of Water Resources. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

SEEDING AND MULCHING: (East)

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

All Roadway Areas

March 1 - August 31		**September 1 - February 28**	
50#	Tall Fescue	50#	Tall Fescue
10#	Centipede	10#	Centipede
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Waste and Borrow Locations

March 1 – August 31		**September 1 - February 28**	
75#	Tall Fescue	75#	Tall Fescue
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer’s request.

Approved Tall Fescue Cultivars

06 Dust	Escalade	Justice	Serengeti
2nd Millennium	Essential	Kalahari	Shelby
3rd Millennium	Evergreen 2	Kitty Hawk 2000	Sheridan
Apache III	Falcon IV	Legitimate	Signia
Avenger	Falcon NG	Lexington	Silver Hawk
Barlexas	Falcon V	LSD	Sliverstar
Barlexas II	Faith	Magellan	Shenandoah Elite
Bar Fa	Fat Cat	Matador	Sidewinder
Barrera	Festnova	Millennium SRP	Skyline
Barrington	Fidelity	Monet	Solara
Barrobusto	Finelawn Elite	Mustang 4	Southern Choice II
Barvado	Finelawn Xpress	Ninja 2	Speedway
Biltmore	Finesse II	Ol' Glory	Spyder LS
Bingo	Firebird	Olympic Gold	Sunset Gold
Bizem	Firecracker LS	Padre	Taccoa
Blackwatch	Firenza	Patagonia	Tanzania
Blade Runner II	Five Point	Pedigree	Trio
Bonsai	Focus	Picasso	Tahoe II
Braveheart	Forte	Piedmont	Talladega
Bravo	Garrison	Plantation	Tarheel
Bullseye	Gazelle II	Proseeds 5301	Terrano
Cannavaro	Gold Medallion	Prospect	Titan ltd
Catalyst	Grande 3	Pure Gold	Titanium LS
Cayenne	Greenbrooks	Quest	Tracer
Cessane Rz	Greenkeeper	Raptor II	Traverse SRP
Chipper	Gremlin	Rebel Exeda	Tulsa Time
Cochise IV	Greystone	Rebel Sentry	Turbo
Constitution	Guardian 21	Rebel IV	Turbo RZ
Corgi	Guardian 41	Regiment II	Tuxedo RZ
Corona	Hemi	Regenerate	Ultimate
Coyote	Honky Tonk	Rendition	Venture
Darlington	Hot Rod	Rhambler 2 SRP	Umbrella
Davinci	Hunter	Rembrandt	Van Gogh
Desire	Inferno	Reunion	Watchdog
Dominion	Innovator	Riverside	Wolfpack II
Dynamic	Integrity	RNP	Xtremegreen
Dynasty	Jaguar 3	Rocket	
Endeavor	Jamboree	Scorpion	

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching **(East)**

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

March 1 - August 31		**September 1 - February 28**	
18#	Creeping Red Fescue	18#	Creeping Red Fescue
6#	Indiangrass	6#	Indiangrass
8#	Little Bluestem	8#	Little Bluestem
4#	Switchgrass	4#	Switchgrass
25#	Browntop Millet	35#	Rye Grain
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Approved Creeping Red Fescue Cultivars:

Aberdeen Boreal Epic Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Measurement and Payment

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications.*

All areas seeded and mulched shall be tacked with asphalt. Crimping of straw in lieu of asphalt tack shall not be allowed on this project.

CRIMPING STRAW MULCH:

Crimping shall be required on this project adjacent to any section of roadway where traffic is to be maintained or allowed during construction. In areas within six feet of the edge of pavement, straw is to be applied and then crimped. After the crimping operation is complete, an additional application of straw shall be applied and immediately tacked with a sufficient amount of undiluted emulsified asphalt.

Straw mulch shall be of sufficient length and quality to withstand the crimping operation.

Crimping equipment including power source shall be subject to the approval of the Engineer providing that maximum spacing of crimper blades shall not exceed 8".

TEMPORARY SEEDING:

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. Sweet Sudan Grass, German Millet or Browntop Millet shall be used in summer months and Rye Grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

FERTILIZER TOPDRESSING:

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20- 20 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis and as directed.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16- 8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, with the exception that no centipede seed will be used in the seed mix for supplemental seeding. The rate of application for supplemental seeding may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

MOWING:

The minimum mowing height on this project shall be 4 inches.

LAWN TYPE APPEARANCE:

All areas adjacent to lawns must be hand finished as directed to give a lawn type appearance. Remove all trash, debris, and stones ¾" and larger in diameter or other obstructions that could interfere with providing a smooth lawn type appearance. These areas shall be reseeded to match their original vegetative conditions, unless directed otherwise by the Field Operations Engineer.

REFORESTATION:

Description

Reforestation will be planted within interchanges and along the outside borders of the road, and in other areas as directed. *Reforestation* is not shown on the plan sheets. See the Reforestation Detail Sheet.

All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated with native woody species.

The entire *Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.

Materials

Reforestation shall be bare root seedlings 12"-18" tall.

Construction Methods

Reforestation shall be shall be planted as soon as practical following permanent S*eeding and Mulching*. The seedlings shall be planted in a 16-foot wide swath adjacent to mowing pattern line, or as directed.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay (kaolin) or a superabsorbent that is designated as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal Limitations: *Reforestation* shall be planted from November 15 through March 15.

Measurement and Payment

Reforestation will be measured and paid for in accordance with Article 1670-17 of the *Standard Specifications*.

RESPONSE FOR EROSION CONTROL:

Description

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

Section	Erosion Control Item	Unit
1605	Temporary Silt Fence	LF
1606	Special Sediment Control Fence	LF/TON
1615	Temporary Mulching	ACR
1620	Seed - Temporary Seeding	LB
1620	Fertilizer - Temporary Seeding	TN
1631	Matting for Erosion Control	SY
SP	Coir Fiber Mat	SY
1640	Coir Fiber Baffles	LF
SP	Permanent Soil Reinforcement Mat	SY
1660	Seeding and Mulching	ACR
1661	Seed - Repair Seeding	LB
1661	Fertilizer - Repair Seeding	TON
1662	Seed - Supplemental Seeding	LB
1665	Fertilizer Topdressing	TON
SP	Safety/Highly Visible Fencing	LF
SP	Response for Erosion Control	EA

Construction Methods

Provide an approved subcontractor who performs an erosion control action as described in the NPDES Inspection Form SPPP30. Each erosion control action may include one or more of the above work items.

Measurement and Payment

Response for Erosion Control will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

Pay Item	**Pay Unit**
Response for Erosion Control	Each

HIGH QUALITY WATERS:

Description

The Nixons Creek has been identified as high quality waters. This designation requires special procedures to be used for clearing and grubbing, temporary stream crossings, and grading operations within the High Quality Water Zone and as designated by the Engineer. The High Quality Water Zones are identified on the plans as Environmentally Sensitive Areas. This also requires special procedures to be used for seeding and mulching and staged seeding.

The High Quality Water Zone/Environmentally Sensitive Area shall be defined as a 50-foot buffer zone on both sides of the stream measured from top of streambank.

Construction Methods

(A) Clearing and Grubbing

In areas identified as High Quality Water Zones/Environmentally Sensitive Areas, the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Article 200-1 of the *Standard Specifications*. Only clearing operations (not grubbing) shall be allowed in this buffer zone until immediately prior to beginning grading operations. Erosion control devices shall be installed immediately following the clearing operation.

(B) Grading

Once grading operations begin in identified High Quality Water Zones/ Environmentally Sensitive Areas, work shall progress in a continuous manner until complete. All construction within these areas shall progress in a continuous manner such that each phase is complete and areas are permanently stabilized prior to beginning of next phase. Failure on the part of the Contractor to complete any phase of construction in a continuous manner in High Quality Water Zones/ Environmentally Sensitive Areas will be just cause for the Engineer to direct the suspension of work in accordance with Article 108-7 of the *Standard Specifications*.

(C) Temporary Stream Crossings

Any crossing of streams within the limits of this project shall be accomplished in accordance with the requirements of Subarticle 107-12 of the *Standard Specifications.*

(D) Seeding and Mulching

Seeding and mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment. No appreciable time shall lapse into the contract time without stabilization of slopes, ditches and other areas within the High Quality Water Zones/Environmentally Sensitive Areas.

(E) Stage Seeding

The work covered by this section shall consist of the establishment of a vegetative cover on cut and fill slopes as grading progresses. Seeding and mulching shall be done in stages on cut and fill slopes that are greater than 20 feet in height measured along the slope, or greater than 2 acres in area. Each stage shall not exceed the limits stated above.

Additional payments will not be made for the requirements of this section, as the cost for this work shall be included in the contract unit prices for the work involved.

MINIMIZE REMOVAL OF VEGETATION:

The Contractor shall minimize removal of vegetation within project limits to the maximum extent practicable. Vegetation along stream banks and adjacent to other jurisdictional resources outside the construction limits shall only be removed upon approval of Engineer. No additional payment will be made for this minimization work.

STOCKPILE AREAS:

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed.

ACCESS AND HAUL ROADS:

At the end of each working day, the Contractor shall install or re-establish temporary diversions or earth berms across access/haul roads to direct runoff into sediment devices. Silt fence sections that are temporarily removed shall be reinstalled across access/haul roads at the end of each working day.

CONSTRUCTION MATERIALS MANAGEMENT

(3-19-19) (rev. 04-27-19)

Description

The requirements set forth shall be adhered to in order to meet the applicable materials handling requirements of the NCG010000 permit. Structural controls installed to manage construction materials stored or used on site shall be shown on the E&SC Plan. Requirements for handling materials on construction sites shall be as follows:

Polyacrylamides (PAMS) and Flocculants

Polyacrylamides (PAMS) and flocculants shall be stored in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures designed to protect adjacent surface waters. PAMS or other flocculants used shall be selected from the NC DWR List of Approved PAMS/Flocculants The concentration of PAMS and other flocculants used shall not exceed those specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions. The NC DWR List of Approved PAMS/Flocculants is available at:

https://files.nc.gov/ncdeq/Water%20Quality/Environmental%20Sciences/ATU/ApprovedPAMS4_1_2017.pdf

Equipment Fluids

Fuels, lubricants, coolants, and hydraulic fluids, and other petroleum products shall be handled and disposed of in a manner so as not to enter surface or ground waters and in accordance with applicable state and federal regulations. Equipment used on the site must be operated and maintained properly to prevent discharge of fluids. Equipment, vehicle, and other wash waters shall not be discharged into E&SC basins or other E&SC devices. Alternative controls should be provided such that there is no discharge of soaps, solvents, or detergents.

Waste Materials

Construction materials and land clearing waste shall be disposed of in accordance with North Carolina General Statutes, Chapter 130A, Article 9 - Solid Waste Management, and rules governing the disposal of solid waste (15A NCAC 13B). Areas dedicated for managing construction material and land clearing waste shall be at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. Paint and other liquid construction material waste shall not be dumped into storm drains. Paint and other liquid construction waste washouts should be located at least 50 away from storm drain inlets unless there is no alternative. Other options are to install lined washouts or use portable, removable bags or bins. Hazardous or toxic waste shall be managed in accordance with the federal Resource Conservation and Recovery Act (RCRA) and NC Hazardous Waste Rules at 15A NCAC, Subchapter 13A. Litter and sanitary waste shall be managed in a manner to prevent it from entering jurisdictional waters and shall be disposed of offsite.

Herbicide, Pesticide, and Rodenticides

Herbicide, pesticide, and rodenticides shall be stored and applied in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act, North Carolina Pesticide Law of 1971 and labeling restrictions.

Concrete Materials

Concrete materials onsite, including excess concrete, must be controlled and managed to avoid contact with surface waters, wetlands or buffers. No concrete or cement slurry shall be discharged from the site. (Note that discharges from onsite concrete plants require coverage under a separate NPDES permit – NCG140000.) Concrete wash water shall be managed in accordance with the *Concrete Washout Structure* provision. Concrete slurry shall be managed and disposed of in accordance with

NCDOT DGS and HOS DCAR Distribution of Class A Residuals Statewide (Permit No. WQ0035749). Any hardened concrete residue will be disposed of, or recycled on site, in accordance with state solid waste regulations.

Earthen Material Stock Piles

Earthen material stock piles shall be located at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available.

Measurement and Payment

Conditions set within the *Construction Materials Management* provision are incidental to the project for which no direct compensation will be made.

WASTE AND BORROW SOURCES:

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices that may be required on a commercial borrow or waste site will be done at the Contractor's expense.

All offsite Staging Areas, Borrow and Waste sites shall be in accordance with "Borrow and Waste Site Reclamation Procedures for Contracted Projects" located at:

https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/ContractedReclamationProcedures.pdf

All forms and documents referenced in the "Borrow and Waste Site Reclamation Procedures for Contracted Projects" shall be included with the reclamation plans for offsite staging areas, and borrow and waste sites.

TEMPORARY DIVERSION:

This work consists of installation, maintenance, and cleanout of *Temporary Diversions* in accordance with Section 1630 of the *Standard Specifications*. The quantity of excavation for installation and cleanout will be measured and paid for as *Silt Excavation* in accordance with Article 1630-3 of the *Standard Specifications*.

CLEAN WATER DIVERSION:

Description

This work consists of installing, maintaining, and removing any and all material required for the construction of clean water diversions. The clean water diversions shall be used to direct water flowing from offsite around/away from specific area(s) of construction.

Materials

Refer to Division 10

Item	**Section**
Geotextile for Soil Stabilization, Type 4	1056

Construction Methods

The Contractor shall install the clean water diversions in accordance with the details in the plans and at locations indicated in the plans, and as directed. Upon installation, the excavated material shall be immediately stabilized as provided in Section 1620 of the *Standard Specifications*. Other stabilization methods may be utilized with prior approval from the Engineer.

Line clean water diversion with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope geotextile edge in a trench at least 5" deep and tamp securely. Make vertical overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile.

Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Stabilization of the excavated material will be paid for as *Temporary Seeding* as provided in Section 1620 of the *Standard Specifications*.

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of the clean water diversions.

SAFETY FENCE AND JURISDICTIONAL FLAGGING:

Description

Safety Fence shall consist of furnishing materials, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary, or other boundaries located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland, endangered vegetation, culturally sensitive areas or water. The fence shall be installed prior to any land disturbing activities.

Interior boundaries for jurisdictional areas noted above shall be delineated by stakes and highly visible flagging.

Jurisdictional boundaries at staging areas, waste sites, or borrow pits, whether considered outside or interior boundaries shall be delineated by stakes and highly visible flagging.

Materials

(A) Safety Fencing

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer. The fence material shall have an ultraviolet coating.

Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 5 ft. in length with a minimum nominal 2" x 2" cross section. Steel posts shall be at least 5 ft. in length, and have a minimum weight of 0.85 lb/ft of length.

(B) Boundary Flagging

Wooden stakes shall be 4 feet in length with a minimum nominal 3/4" x 1-3/4" cross section. The flagging shall be at least 1" in width. The flagging material shall be vinyl and shall be orange in color and highly visible.

Construction Methods

No additional clearing and grubbing is anticipated for the installation of this fence. The fence shall be erected to conform to the general contour of the ground.

(A) Safety Fencing

Posts shall be set at a maximum spacing of 10 ft., maintained in a vertical position and hand set or set with a post driver. Posts shall be installed a minimum of 2 ft. into the ground. If hand set, all backfill material shall be thoroughly tamped. Wood posts may be sharpened to a dull point if power driven. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30-degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence geotextile shall be attached to the wood posts with one 2" galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

Place construction stakes to establish the location of the safety fence in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications.* No direct pay will be made for the staking of the safety fence. All stakeouts for safety fence shall be considered incidental to the work being paid for as "Construction Surveying", except that where there is no pay item for construction surveying, all safety fence stakeout will be performed by state forces.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

(B) Boundary Flagging

Boundary flagging delineation of interior boundaries shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Interior boundaries may be staked on a tangent that runs parallel to buffer but must not encroach on the buffer at any location. Interior boundaries of hand clearing shall be identified with a different colored flagging to distinguish it from mechanized clearing.

Boundary flagging delineation of interior boundaries will be placed in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for delineation of the interior boundaries. This delineation will be considered incidental to the work being paid for as *Construction Surveying*, except that where there is no pay item or construction surveying the cost of boundary flagging delineation shall be included in the unit prices bid for the various items in the contract. Installation for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Additional flagging may be placed on overhanging vegetation to enhance visibility but does not substitute for installation of stakes.

Installation of boundary flagging for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall be performed in accordance with Subarticle 230-4(B)(5) or Subarticle 802-2(F) of the *Standard Specifications*. No direct pay will be made for this delineation, as the cost of same shall be included in the unit prices bid for the various items in the contract.

The Contractor shall be required to maintain alternative stakes and highly visible flagging in a satisfactory condition for the duration of the project as determined by the Engineer.

Measurement and Payment

Safety Fence will be measured and paid as the actual number of linear feet of polyethylene or polypropylene fence installed in place and accepted. Such payment will be full compensation including but not limited to furnishing and installing fence geotextile with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete this work.

Payment will be made under:

Pay Item	**Pay Unit**
Safety Fence	Linear Foot

PERMANENT SOIL REINFORCEMENT MAT:

Description

This work consists of furnishing and placing *Permanent Soil Reinforcement Mat*, of the type specified, over previously prepared areas as directed.

Materials

The product shall be a permanent erosion control reinforcement mat and shall be constructed of synthetic or a combination of coconut and synthetic fibers evenly distributed throughout the mat between a bottom UV stabilized netting and a heavy duty UV stabilized top net. The matting shall be stitched together with UV stabilized polypropylene thread to form a permanent three-dimensional structure. The mat shall have the following minimum physical properties:

Property	**Test Method**	*Value*	**Unit**
Light Penetration	ASTM D6567	9	%
Thickness	ASTM D6525	0.40	in
Mass Per Unit Area	ASTM D6566	0.55	lb/sy
Tensile Strength	ASTM D6818	385	lb/ft
Elongation (Maximum)	ASTM D6818	49	%
Resiliency	ASTM D1777	>70	%
UV Stability *	ASTM D4355	$\geq$80	%
Porosity (Permanent Net)	ECTC Guidelines	$\geq$85	%
Maximum Permissible Shear Stress (Vegetated)	Performance Bench Test	$\geq$8.0	lb/ft^2
Maximum Allowable Velocity (Vegetated)	Performance Bench Test	$\geq$16.0	ft/s

*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure.

Submit a certification (Type 1, 2, or 3) from the manufacturer showing:

(A) the chemical and physical properties of the mat used, and
(B) conformance of the mat with this specification.

Construction Methods

Matting shall be installed in accordance with Subarticle 1631-3(B) of the *Standard Specifications.*

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660 of the *Standard Specifications*. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

Measurement and Payment

Permanent Soil Reinforcement Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which Permanent Soil Reinforcement Mat is installed and accepted. Overlaps will not be included in the measurement, and will be considered as incidental to the work. Such payment shall be full compensation for furnishing and installing the mat, including overlaps, and for all required maintenance.

Payment will be made under:

Pay Item	Pay Unit
Permanent Soil Reinforcement Mat	Square Yard

SKIMMER BASIN WITH BAFFLES: (East)

Description

Provide a skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Skimmer Basin with Baffles Detail sheet provided in the erosion control plans. Work includes constructing sediment basin, installation of temporary slope drain pipe and coir fiber baffles, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing a geotextile spillway liner, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drain, coir fiber baffles, geotextile liner and skimmer device, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

Materials

Item	Section
Stone for Erosion Control, Class B	1042
Geotextile for Soil Stabilization, Type 4	1056
Fertilizer for Temporary Seeding	1060-2
Seed for Temporary Seeding	1060-4
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Coir Fiber Mat	1060-14
Temporary Slope Drain	1622-2
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4” diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

The geotextile for the spillway liner shall meet the following minimum physical properties for low permeability, woven polypropylene geotextiles:

Property	Test Method	Value	Unit
Tensile Strength	ASTM D-4632	315	lb.
Tensile Elongation (Maximum)	ASTM D-4632	15	%
Trapezoidal Tear	ASTM D-4533	120	lbs.

CBR Puncture	ASTM D-6241	900	lbs.
UV Resistance (% retained at 500 hrs.)	ASTM D-4355	70	%
Apparent Opening Size (AOS)	ASTM D-4751	40	US Std. Sieve
Permittivity	ASTM D-4491	0.05	sec^{-1}
Water Flow Rate	ASTM D-4491	4	$gal/min/ft^2$

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate basin according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Install temporary slope drain pipe and construct the primary spillway according to the Skimmer Basin with Baffles Detail sheet in the erosion control plans. Temporary slope drain pipe at inlet of basin may be replaced by Type 4 geotextile as directed. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*.

Install skimmer device according to manufacturer recommendations. Install 4” Schedule 40 PVC pipe into dam on the lower side of basin 1 ft. from the bottom of the basin and according to the detail, and extend the pipe so the basin will drain. Attach a 6 ft. arm pipe to the coupling connection and skimmer according to manufacturer recommendations. The coupling shall be rigid and non-buoyant and not exceed a diameter of 4” and 12” in length. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in skimmer basin. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12” in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

Line primary spillway with low permeability polypropylene geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least 5" deep and tamp firmly. If geotextile for the primary spillway is not one continuous piece of material, make horizontal overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile. Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically. Geotextile shall be placed to the bottom and across the entire width of the basin according to the Skimmer Basin with Baffles detail. Place sealant inside basin around barrel pipe on top of geotextile with a minimum width of 6 in.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart.

All bare side slope sections of the skimmer basin shall be seeded with a temporary or permanent seed mix as directed and in accordance with Articles 1620-3, 1620-4, 1620-5, 1660-4, 1660-5 and 1660-7 of the *Standard Specifications.* Straw or excelsior matting shall be installed on all bare side slope sections immediately upon the completion of seeding and in accordance with Article 1631-3 of the *Standard Specifications*.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications,* as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Low Permeability Geotextile will be measured and paid for as the actual number of square yards measured along the surface of the spillway over which the geotextile is installed and accepted.

Coir Fiber Baffles will be measured and paid for in accordance with Article 1640-4 of the *Standard Specifications*.

__" Skimmer will be measured in units of each. *__" Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Barrel and arm pipe, cleanout, relocation and reinstallation of *__" Skimmer* is considered incidental to the measurement of the quantity of *__" Skimmer* and no separate payment will be made. No separate payment shall be made if *__" Skimmer*, barrel and/or arm pipe(s) are damaged by ice accumulation.

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along

the surface of the ground over which coir fiber mat is installed and accepted.

Temporary Slope Drain will be measured and paid for in accordance with Article 1622-4 of the *Standard Specifications*.

Stone for Erosion Control, Class __ will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications.*

Seeding and Mulching will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

Seed for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Fertilizer for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Matting for Erosion Control will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	**Pay Unit**
__" Skimmer	Each
Coir Fiber Mat	Square Yard
Low Permeability Geotextile	Square Yard

TIERED SKIMMER BASIN WITH BAFFLES: **(East)**

Description

Provide a tiered skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Tiered Skimmer Basin Detail sheet provided in the erosion control plans. Tiered Skimmer Basins shall be installed in areas where topography creates a large elevation difference between the inlet and outlet of a single skimmer basin. Work includes constructing sediment basins, installation of coir fiber baffles, installation of temporary slope drain pipe, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing geotextile spillway liners, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drain pipe, coir fiber baffles, geotextile liner and skimmer device, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

Materials

Item	**Section**
Stone for Erosion Control, Class B	1042

Fertilizer for Temporary Seeding	1060-2
Seed for Temporary Seeding	1060-4
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Coir Fiber Mat	1060-14
Temporary Slope Drain	1622-2
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4” diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

The geotextile for the spillway liner shall meet the following minimum physical properties for low permeability, woven polypropylene geotextiles:

Property	**Test Method**	**Value**	**Unit**
Tensile Strength	ASTM D-4632	315	lb.
Tensile Elongation (Maximum)	ASTM D-4632	15	%
Trapezoidal Tear	ASTM D-4533	120	lbs.
CBR Puncture	ASTM D-6241	900	lbs.
UV Resistance (% retained at 500 hrs.)	ASTM D-4355	70	%
Apparent Opening Size (AOS)	ASTM D-4751	40	US Std. Sieve
Permittivity	ASTM D-4491	0.05	sec^{-1}
Water Flow Rate	ASTM D-4491	4	$gal/min/ft^2$

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate basins according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Install temporary slope drain pipe and construct the primary spillways according to the Tiered Skimmer Basin Detail sheet in the erosion control plans. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*. Multiple upper basins, or Modified Silt Basins Type 'B' as labeled on the detail, may be required based on site conditions and as directed.

Install skimmer device according to manufacturer recommendations. Install 4" Schedule 40 PVC pipe into dam on the lower side of basin 1 ft. from the bottom of the basin and according to the detail, and extend the pipe so the basin will drain. Attach a 6 ft. arm pipe to the coupling connection and skimmer according to manufacturer recommendations. The coupling shall be rigid and non-buoyant and not exceed a diameter of 4" and 12" in length. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in skimmer basin. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12" in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

Line primary spillways with low permeability polypropylene geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least 5" deep and tamp firmly. If geotextile for primary spillways is not one continuous piece of material, make horizontal overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile. Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically. Geotextile shall be placed to the bottom and across the entire width of the basin according to the Tiered Skimmer Basin with Baffles detail.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart. Place sealant inside basin around barrel pipe on top of geotextile with a minimum width of 6 in.

All bare side slope sections of the skimmer basin shall be seeded with a temporary or permanent seed mix as directed and in accordance with Articles 1620-3, 1620-4, 1620-5, 1660-4, 1660-5 and 1660-7 of the *Standard Specifications.* Straw or excelsior matting shall be installed on all bare side slope

sections immediately upon the completion of seeding and in accordance with Article 1631-3 of the *Standard Specifications*.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications,* as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Low Permeability Geotextile will be measured and paid for as the actual number of square yards measured along the surface of the spillway over which the geotextile is installed and accepted.

Coir Fiber Baffles will be measured and paid for in accordance with Article 1640-4 of the *Standard Specifications*.

__" *Skimmer* will be measured in units of each. __" *Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Barrel and arm pipe, cleanout, relocation and reinstallation of __" *Skimmer* is considered incidental to the measurement of the quantity of __" *Skimmer* and no separate payment will be made. No separate payment shall be made if __" *Skimmer*, barrel and/or arm pipe(s) are damaged by ice accumulation.

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

Temporary Slope Drain will be measured and paid for in accordance with Article 1622-4 of the *Standard Specifications*.

Stone for Erosion Control, Class __ will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications.*

Seeding and Mulching will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

Seed for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Fertilizer for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Matting for Erosion Control will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications.*

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	**Pay Unit**

__" Skimmer	Each
Coir Fiber Mat	Square Yard
Low Permeability Geotextile	Square Yard

STORMWATER BASIN EROSION CONTROL:

Description

Provide a skimmer to remove sediment from construction site runoff in permanent stormwater basins at locations shown in the erosion control plans. Work includes constructing basin, installation of coir fiber baffles, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, stabilizing side slopes of basin with matting and seed, disposing of excess materials, removing coir fiber baffles, and skimmer device.

Materials

Item	Section
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4” diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

Construction Methods

Construct permanent stormwater basin according to the plans with basin surface free of obstructions, debris, and pockets of low-density material. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*.

Install skimmer device according to manufacturer recommendations. Install the coupling connection provided with the skimmer 1 ft. from the bottom of the basin and attach to permanent stormwater drainage structure. Attach the 6 ft. arm pipe to the coupling connection and skimmer according to manufacturer recommendations. The coupling shall be rigid and non-buoyant and not exceed a diameter of 4” and 12” in length. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in basin. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12” in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

All bare side slope sections of the stormwater basin shall be seeded with a permanent seed mix as directed and in accordance with Articles 1660-4, 1660-5 and 1660-7 of the *Standard Specifications*. Straw or excelsior matting shall be installed on all bare side slope sections immediately upon the completion of seeding and in accordance with Article 1631-3 of the *Standard Specifications*.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Coir Fiber Baffles will be measured and paid for in Accordance with Article 1640-4 of the *Standard Specifications*.

__" *Skimmer* will be measured in units of each. __*" Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Barrel and arm pipe, cleanout, relocation and reinstallation of __*" Skimmer* is considered incidental to the measurement of the quantity of __*" Skimmer* and no separate payment will be made. No separate payment shall be made if __*" Skimmer*, barrel and/or arm pipe(s) are damaged by ice accumulation.

Stone for Erosion Control, Class __ will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications.*

Seeding and Mulching will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

Matting for Erosion Control will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	**Pay Unit**
__" Skimmer	Each

<u>COIR FIBER WATTLES WITH POLYACRYLAMIDE (PAM):</u>

Description

Coir Fiber Wattles are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting. Coir Fiber Wattles are used on slopes or channels to intercept runoff and act as a velocity break. Coir Fiber Wattles are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of coir fiber wattles, matting installation, PAM application, and removing wattles.

Materials

Coir Fiber Wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12 in.
Minimum Density	3.5 lb/ft^3 +/- 10%
Net Material	Coir Fiber
Net Openings	2 in. x 2 in.
Net Strength	90 lbs.
Minimum Weight	2.6 lbs./ft. +/- 10%

Anchors: Stakes shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes a minimum of 2-ft. long with a 2 in. x 2 in. nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving down into the underlying soil.

Matting shall meet the requirements of Article 1060-8 of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the wattles will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each wattle. The PAM product used shall be listed on the North Carolina Department of Environmental Quality Division of Water Resources web site as an approved PAM product for use in North Carolina.

Construction Methods

Coir Fiber Wattles shall be secured to the soil by wire staples approximately every 1 linear foot and at the end of each section of wattle. A minimum of 4 stakes shall be installed on the downstream side of the wattle with a maximum spacing of 2 linear feet along the wattle, and according to the detail. Install a minimum of 2 stakes on the upstream side of the wattle according to the detail provided in the plans. Stakes shall be driven into the ground a minimum of 10 in. with no more than 2 in. projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Only install coir fiber wattle(s) to a height in ditch so flow will not wash around wattle and scour ditch slopes and according to the detail provided in the plans and as directed. Overlap adjoining sections of wattles a minimum of 6 in.

Installation of matting shall be in accordance with the detail provided in the plans, and in accordance

with Article 1631-3 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Apply PAM over the lower center portion of the coir fiber wattle where the water is going to flow over at a rate of 2 ounces per wattle, and 1 ounce of PAM on matting on each side of the wattle. PAM applications shall be done during construction activities after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the coir fiber wattles until the project is accepted or until the wattles are removed, and shall remove and dispose of silt accumulations at the wattles when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

Coir Fiber Wattles will be measured and paid for by the actual number of linear feet of wattles which are installed and accepted. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the *Coir Fiber Wattles*.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Polyacrylamide(PAM) will be measured and paid for by the actual weight in pounds of PAM applied to the coir fiber wattles. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

Pay Item	**Pay Unit**
Polyacrylamide(PAM)	Pound
Coir Fiber Wattle	Linear Foot

SILT FENCE COIR FIBER WATTLE BREAK:
(8-21-12) 1605,1630

Description

Silt fence coir fiber wattle breaks are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting and used in conjunction with temporary silt fence at the toe of fills to intercept runoff. Silt fence coir fiber wattle breaks are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation, maintenance and removing Silt fence coir fiber wattle breaks.

Materials

Coir fiber wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12"
Minimum Length	10 ft
Minimum Density	3.5 lb/cf ± 10%
Net Material	Coir Fiber
Net Openings	2" x 2"
Net Strength	90 lb.
Minimum Weight	2.6 lb/ft ± 10%

Stakes shall be used as anchors. Provide hardwood stakes a minimum of 2-ft long with a 2" x 2" nominal square cross section. One end of the stake shall be sharpened or beveled to facilitate driving down into the underlying soil.

Provide staples made of 0.125" diameter new steel wire formed into a U-shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate a trench the entire length of each wattle with a depth of 1" to 2" for the wattle to be placed. Secure silt fence coir fiber wattle breaks to the soil by wire staples approximately every linear foot and at the end of each wattle. Install at least 4 stakes on the downslope side of the wattle with a maximum spacing of 2 linear feet and according to the detail. Install at least 2 stakes on the upslope side of the silt fence coir fiber wattle break according to the detail provided in the plans. Drive stakes into the ground at least 10" with no more than 2" projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Install temporary silt fence in accordance with Section 1605 of the *Standard Specifications* and overlap each downslope side of silt fence wattle break by 6".

Maintain the silt fence coir fiber wattle breaks until the project is accepted or until the silt fence coir fiber wattle breaks are removed, and remove and dispose of silt accumulations at the silt fence coir fiber wattle breaks when so directed in accordance with Section 1630 of the *Standard Specifications*.

Measurement and Payment

Coir Fiber Wattle will be measured and paid as the actual number of linear feet of wattles installed and accepted. Such price and payment will be full compensation for all work covered by this provision, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the silt fence coir fiber wattle break.

Payment will be made under:

Pay Item	**Pay Unit**
Coir Fiber Wattle	Linear Foot

TEMPORARY ROCK SILT CHECK TYPE A WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM):

Description

Temporary Rock Silt Checks Type A with Excelsior Matting and Polyacrylamide (PAM) are devices utilized in temporary and permanent ditches to reduce runoff velocity and incorporate PAM into the construction runoff to increase settling of sediment particles and reduce turbidity of runoff. Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of Temporary Rock Silt Checks Type A, matting installation, PAM application, and removing Temporary Rock Silt Checks Type A with Excelsior Matting and PAM.

Materials

Structural stone shall be class B stone that meets the requirements of Section 1042 of the *Standard Specifications* for Stone for Erosion Control, Class B.

Sediment control stone shall be #5 or #57 stone, which meets the requirements of Section 1005 of the *Standard Specifications* for these stone sizes.

Matting shall meet the requirements of Excelsior Matting in Subarticle 1060-8(B) of the *Standard Specifications,* or shall meet specifications provided elsewhere in this contract.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each Temporary Rock Silt Check Type A. The PAM product used shall be listed on the North Carolina Department of Environmental Quality Division of Water Resources web site as an approved PAM product for use in North Carolina.

Construction Methods

Temporary Rock Silt Checks Type A shall be installed in accordance with Subarticle 1633-3(A) of the *Standard Specifications,* Roadway Standard Drawing No. 1633.01 and the detail provided in the plans.

Installation of matting shall be in accordance with the detail provided in the plans, and anchored by placing Class B stone on top of the matting at the upper and lower ends.

Apply PAM at a rate of 4 ounces over the center portion of the Temporary Rock Silt Checks Type A and matting where the water is going to flow over. PAM applications shall be done during construction activities and after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM until the project is accepted or until the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are removed, and shall remove and dispose of silt accumulations at the Temporary

Rock Silt Checks Type A with Excelsior Matting and PAM when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

Temporary Rock Silt Checks Type A will be measured and paid for in accordance with Article 1633-5 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Polyacrylamide(PAM) will be measured and paid for by the actual weight in pounds of PAM applied to the Temporary Rock Silt Checks Type A. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

Pay Item	Pay Unit
Polyacrylamide(PAM)	Pound

BORROW PIT DEWATERING BASIN:
(3-17-09) (Rev 3-2-11)

Description

Water discharge from borrow pit sites shall not cause surface waters to exceed 50 NTUs (nephelometric turbidity unit) in streams not designated as trout waters and 10 NTUs in streams, lakes or reservoirs designated as trout waters. For lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTUs. If the turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased.

Construct, maintain and remove earth embankments used to reduce turbidity from dewatering borrow sites. Work includes providing porous coir fiber baffle, filtration geotextile, stone and outlet structures; cleaning out, maintaining, removing and disposing of the borrow pit dewatering basin and all components; and reshaping, dressing, seeding and mulching the area.

Materials

Refer to Division 10

Item	Section
Riprap, Class A, B, 1, and 2	1042
Geotextile for Drainage, Type 2	1056
Coir Fiber Baffle	1640-2

Use suitable excavated materials, as specified in Sections 225, 230 and 240 of the *Standard*

Specifications in the construction of earth embankments for borrow pit dewatering basins, except where otherwise specified.

Construction Methods

Construct borrow pit dewatering basins according to the detail in the erosion control plans, and at locations shown on Reclamation Plans or in areas as directed.

The volume of the borrow pit dewatering basin will be based on a 2 hour retention time. The pump rate shall not exceed 1,000 GPM. The Contractor, at his option, may use a greater retention time for managing turbidity.

The straight line distance between the inlet and outlet shall be divided to include a forebay chamber in the upper quarter cell. Install one porous coir fiber baffle across the full width of the basin to delineate the forebay chamber. Do not use earthen or rock baffle. Install filtration geotextile on the interior side slopes and the floor of the forebay.

The water pumped from the borrow pit into the dewatering basin shall be obtained from the top of the water column and shall be discharged into the forebay in a non-erodible manner.

The borrow pit dewatering basin outlet shall be a vertical non-perforated riser pipe or flash board riser attached with a watertight connection to a barrel that carries the water through the embankment.

Maintenance and Removal

Maintain the borrow pit dewatering basin, coir fiber baffle, and remove and dispose of silt accumulations in accordance with Article 1630-3 of the *Standard Specifications*. The Contractor may include a drain device for maintenance and removal at his discretion.

Remove the borrow pit dewatering basin once dewatering operations are completed. Grade, seed, and mulch the area after removal of the borrow pit dewatering basin in accordance with Section 1660 of the *Standard Specifications*. The area shall be stabilized with an approved groundcover before final acceptance of the site.

Measurement and Payment

No direct payment will be made for borrow pit dewatering basins with the exception of the work of silt removal during dewatering basin operation and the work of seeding and mulching after removal of the dewatering basin. All other work and materials required for installation, maintenance and removal of borrow pit dewatering basins shall be incidental to *Borrow Excavation*. Such price and payments will be full compensation for the work of constructing, maintaining and removing the borrow pit dewatering basin including, but not limited to, the construction and removal of the borrow pit dewatering basin; furnishing of the outlet structure, baffle, filtration geotextile, stone and optional drain devices; and removal of all such items once dewatering operations are completed.

Removal and disposal of silt accumulations during dewatering operations will be measured and paid at the contract unit price per cubic yard for *Silt Excavation* in accordance with Article 1630-4 of the *Standard Specifications.*

Grading, seeding, and mulching the area after removal of the borrow pit dewatering basin will be measured and paid at the contract unit price per acre for *Seeding and Mulching* in accordance with Section 1660-8 of the *Standard Specifications*.

CULVERT DIVERSION CHANNEL:

Description

This work consists of providing a *Culvert Diversion Channel* to detour the existing stream around the culvert construction site at locations shown on the plans. Work includes constructing the diversion channel, disposing of excess materials, providing and placing geotextile liner, maintaining the diversion area in an acceptable condition, removing geotextile liner, backfilling diversion channel area with suitable material, and providing proper drainage when diversion channel area is abandoned.

Materials

Refer to Division 10

Item	Section
Geotextile for Soil Stabilization, Type 4	1056

Construction Methods

Grade channel according to the plans with channel surface free of obstructions, debris, and pockets of low-density material. Utilize suitable material and provide disposal area for unsuitable material.

Line channel with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope geotextile edge in a trench at least 5" deep and tamp securely. Make vertical overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile.

Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically.

Measurement and Payment

Culvert Diversion Channel will be measured and paid for as the actual number of cubic yards excavated, as calculated from the typical section throughout the length of the diversion channel as shown on the final approved plans.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of *Culvert Diversion Channel*.

Payment will be made under:

Pay Item	Pay Unit
Culvert Diversion Channel	Cubic Yard

IMPERVIOUS DIKE:

Description

This work consists of furnishing, installing, maintaining, and removing an *Impervious Dike* for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed.

Materials

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious geotextile.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

Measurement and Payment

Impervious Dike will be measured and paid as the actual number of linear feet of impervious dike(s) constructed, measured in place from end to end of each separate installation that has been completed and accepted. Such price and payment will be full compensation for all work including but not limited to furnishing materials, construction, maintenance, and removal of the impervious dike.

Payment will be made under:

Pay Item	Pay Unit
Impervious Dike	Linear Foot

TEMPORARY PIPE FOR CULVERT CONSTRUCTION:

Description

This work consists of furnishing, installing, maintaining and removing any and all temporary pipe used on this project in conjunction with the culvert construction.

Construction Methods

The Contractor shall install temporary pipe in locations shown on the plans in such a manner approved by the Engineer. The temporary pipe shall provide a passageway for the stream through the work-site. The minimum size requirements will be as stated on the erosion control plans.

Measurement and Payment

__" *Temporary Pipe* will be measured and paid for at the contract unit price per linear foot of temporary pipe approved by the Engineer and measured in place from end to end. Such price and payment will be full compensation for all work covered by this section including but not limited to furnishing all materials required for installation, construction, maintenance, and removal of temporary pipe.

Payment will be made under:

Pay Item	**Pay Unit**
__" Temporary Pipe	Linear Foot

COIR FIBER MAT:

Description

Furnish material, install and maintain coir fiber mat in locations shown on the plans or in locations as directed. Work includes providing all materials, excavating and backfilling, and placing and securing coir fiber mat with stakes, steel reinforcement bars or staples as directed.

Materials

Item	**Section**
Coir Fiber Mat	1060-14

Anchors: Stakes, reinforcement bars, or staples shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Place the coir fiber mat immediately upon final grading. Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the mat with the soil. Unroll the mat and apply without stretching such that it will lie smoothly but loosely on the soil surface.

For stream relocation applications, take care to preserve the required line, grade, and cross section of the area covered. Bury the top slope end of each piece of mat in a narrow trench at least 6 in. deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6 in. overlap. Construct check trenches at least 12 in. deep every 50 ft. longitudinally along the edges of the mat or as directed. Fold over and bury mat to the full depth of the trench, close and tamp firmly. Overlap mat at least 6 in. where 2 or more widths of mat are installed side by side.

Place anchors across the mat at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the mat 3 ft. apart.

Adjustments in the trenching or anchoring requirements to fit individual site conditions may be required.

Measurement and Payment

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

No measurement will be made for anchor items.

Payment will be made under:

Pay Item	**Pay Unit**
Coir Fiber Mat	Square Yard

CONCRETE WASHOUT STRUCTURE:
(12-10-20)

Description

Concrete washout structures are enclosures above or below grade to contain concrete waste water and associated concrete mix from washing out ready-mix trucks, drums, pumps, or other equipment. Concrete washouts must collect and retain all the concrete washout water and solids, so that this material does not migrate to surface waters or into the ground water. These enclosures are not intended for concrete waste not associated with wash out operations.

The concrete washout structure may include constructed devices above or below ground and or commercially available devices designed specifically to capture concrete wash water.

Materials

Item	**Section**
Temporary Silt Fence	1605

Safety Fence shall meet the specifications as provided elsewhere in this contract.

Geomembrane basin liner shall meet the following minimum physical properties for low permeability; it shall consist of a polypropylene or polyethylene 10 mil think geomembrane. If the minimum setback dimensions can be achieved the liner is not required. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

Construction Methods

Build an enclosed earthen berm or excavate to form an enclosure in accordance with the details and as directed.

Install temporary silt fence around the perimeter of the enclosure in accordance with the details and as directed if structure is not located in an area where existing erosion and sedimentation control devices are capable to containing any loss of sediment.

Post a sign with the words "Concrete Washout" in close proximity of the concrete washout area, so it is clearly visible to site personnel. Install safety fence as directed for visibility to construction traffic.

The construction details for the above grade and below grade concrete washout structures can be found on the following web page link:

https://connect.ncdot.gov/resources/roadside/SoilWaterDocuments/ConcreteWashoutStructuredetail.pdf

Alternate details for accommodating concrete washout may be submitted for review and approval.

The alternate details shall include the method used to retain and dispose of the concrete waste water within the project limits and in accordance with the minimum setback requirements. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

Maintenance and Removal

Maintain the concrete washout structure(s) to provide adequate holding capacity plus a minimum freeboard of 12 inches. Remove and dispose of hardened concrete and return the structure to a functional condition after reaching 75% capacity.

Inspect concrete washout structures for damage and maintain for effectiveness.

Remove the concrete washout structures and sign upon project completion. Grade the earth material to match the existing contours and permanently seed and mulch area.

Measurement and Payment

Concrete Washout Structure will be paid for per each enclosure installed in accordance with the details. If alternate details or commercially available devices are approved, then those devices will also be paid for per each approved and installed device.

Temporary Silt Fence will be measured and paid for in accordance with Article 1605-5 of the *Standard Specifications*.

Safety Fence shall be measured and paid for as provided elsewhere in this contract.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	Pay Unit
Concrete Washout Structure	Each

PUMP AROUND OPERATION:

Description

The work covered by this section consists of furnishing, installing, maintaining and removing any and all pump around systems used on this project. The Contractor shall install a pump around system in locations as shown in the plans and in other locations approved by the Engineer. The pump around system shall provide a passageway for the stream flow around the work site.

The quantity of pump around systems may be increased, decreased, or eliminated entirely as directed. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work. See NCDOT *Best Management Practices for Construction and Maintenance Activities* manual for example pump around operation.

Materials

Item	Section
Special Stilling Basin	1639

Impervious Dike shall meet the specifications as provided elsewhere in this contract.

Pumps shall be of sufficient size to divert the stream flow around the work area, as approved by the Engineer.

Construction Methods

Install *impervious dike(s)* as shown on the plans or as directed. Pump water around the work site. If the water is turbid or exposed to bare soil, pump through a *special stilling basin*. Once the work is complete in an area remove the *impervious dike(s)* and pump system, and stabilize the area.

Measurement and Payment

Impervious Dike will be measured and paid for as provided elsewhere in this contract.

Special Stilling Basin will be measured and paid for in accordance with Article 1639-4 of the *Standard Specifications*.

Payment for pumping operations shall be considered incidental to the work of installing pipes and culverts. The pumping operations shall include but not be limited to, diverting the stream flow around the work area and pumping runoff from the work area into a stilling basin, special stilling basin or other sediment control device. No additional payment will be made for furnishing materials or maintenance of the pumping operations for the installation of pipes and culverts.

The above prices and payments will be full compensation for all work covered by this section including, but not limited to furnishing all of the necessary materials, construction, maintenance and removal of the impervious dike and pump around system.

POND DRAINAGE PLAN REQUIREMENT:

The Contractor shall develop a Pond Drainage Plan for all ponds that are required to be drained for the construction of this project and submit the plan to the Engineer at the preconstruction conference for approval. The Pond Drainage Plan shall include but not be limited to procedures and rate of water drawdown, sediment control measures, water quality monitoring, fish and wildlife relocation plan, shall address procedures avoiding the inundation of a receiving body of water with deoxygenated or nutrient rich water resulting in impacts to aquatic life or algae bloom and procedures for maintaining downstream channel stability. If such ponds to be drained are on the NC DEQ Dam Safety Inventory List, all NC DEQ Dam Safety procedures must be followed.

Any erosion control devices or permanent seeding and mulching in areas where ponds have been drained will be paid for at the contract unit price for the item required. All additional erosion and sediment control practices not included in the contract documents that may be required on a pond drainage site will be done at the Contractor's expense.

No direct payment will be made for developing or implementing the Pond Drainage Plan as the cost of such shall be included in the lump sum price bid for *Clearing and Grubbing*.

VEGETATIVE SHELF PLANTING

All Vegetative Shelf Planting shall be in accordance with the requirements set forth in plan sheet 2D-5 and the following provisions.

1. General

a. The Contractor shall provide, or subcontract with, a Planting Supervisor that has one of the following credentials: Certified Plant Professional, or Registered Forester, or Registered Landscape Contractor, or otherwise approved by NCDOT.

b. The Planting Supervisor will be responsible for managing all activities involving permanent planting, including but not limited to the following: site preparation for planting, exotic plant removal, seedling handling and storage, planting operations, quality control inspections, managing plant competition.

c. The planting stock shall be grown by nurseries within 300 miles of the project site. The seed sources for the plant material shall also match the physiographic province of the area to be planted and be collected from within 200 miles of the project site.

d. Store all plants in a manner that prevents increased stress. This includes preventing drying out or freezing.

e. The Contractor shall extend warranty of 80% for all Vegetative Shelf Planting vegetation against defects including mortality and poor growth, except for defects resulting from abuse by other parties and abnormal weather conditions.

2. Soil Preparation

a. Compacted Soil - Upon completion of grading and before any topsoil applications, the site shall be evaluated to determine areas with non-designed compacted soils. If areas of non-designed compacted soils are present, then the compacted areas to be planted shall be ripped with a "v" ripper tillage tool to a minimum depth of 18 inches (46 cm). Each sequential swath of the equipment shall be consistent in spacing and shall have a maximum of 20 inches (51 cm) between ripper (shank) rows. The "v" ripper tillage tool shall have a minimum of three (3) shanks spaced a maximum of 20 inches (51 cm) apart and have shanks of sufficient length capable of providing a minimum depth of 18 inches (46 cm). The tractor used to perform this work shall be of sufficient size and horsepower capable of pulling this implement to the minimum specifications stated above.

b. Topsoil

i. **Definition -** Topsoil in general shall be a fertile, friable natural loam soil. It shall be of uniform composition, free of stones, lumps, subsoil, noxious weeds, roots, lime, concrete, ashes, slag, toxic substances, and all materials and substances that may be harmful and or hinder grading, planting, establishment, and maintenance operations. It shall have a pH of 5.0 to 7.0 and contain not less than 3% organic matter. It shall be capable

of sustaining vigorous plant growth. Topsoil that is suitable for use on site may be stockpiled at the site. Additional topsoil shall be provided from off- site locations if on-site topsoil is insufficient to meet the needs of the project. Off-site topsoil shall be similar in characteristics to that found at the project site and shall not be taken from wetlands.

ii. Application

(1) All areas, denoted on the plans to have topsoil amendments, must be rough graded below the final elevation equal to the depth of topsoil to be placed in the area.
(2) Scarify the subsoil of the area to receive the topsoil to a depth of 3 inches. If topsoil is to be placed over a designed liner that prevents water infiltration, then care should be used to lightly scarify the surface so that the intended reduction in infiltration is not harmed.
(3) Spread a uniform layer of topsoil 4 inches thick. Topsoil to be from stockpiled material or approved borrow source. Bond the topsoil to the subsoil by rolling with a light roller or by tamping. Hand rake the final surface. Some unevenness is acceptable.
(4) Topsoil applications should not take place until seeding, sodding, or planting can immediately commence following the application.
(5) The topsoil shall be applied or removed until the final contours and grades shown on the drawings are met.
(6) All topsoil applications must be blended into all adjacent land that does not have the topsoil application. Blending shall be done so that a discernable change in elevation or soil firmness is not obvious.

c. Approval for Planting - Upon completion of final grading and topsoil applications, the Planting Supervisor shall conduct a site assessment to determine if the soil is appropriately prepared for planting. If any problems exist, they shall be noted and corrected before planting may commence.

3. <u>Fertilizer, Lime, and Mulch</u>

a. Soil Test – If a soil test is obtained, use the results of the soil test to apply lime and fertilizer.

b. No Soil Test – If no soil test is performed, then make the following application of fertilizer and lime.

i. **Fertilizer** – Apply 1,000 lb/acre of 10-10-10 fertilizer
ii. **Lime** – Apply 2,000 lb/acre of ground agricultural limestone

c. Rake – Hand rake the fertilizer and lime into the upper soil surface. Lightly roll the soil and water with a fine spray.

d. No portion of the wet pond should be fertilized after the first initial fertilization that is required to establish the plants on the vegetated shelf.

4. Vegetation Planting Techniques

a. Plugs

i. A plug is considered a plant growing in containers holding 4 to 10 cubic inches of media.
ii. Plugs must be robust healthy growing plants.
iii. The root system must be vigorous and dense enough to hold the plug shape once removed from the growing container without being root bound.
iv. Plugs must be stored in the shade and kept moist until installation.
v. If soil is compacted, the area of planting shall be loosened to a depth equal to that of the root ball for a radius of one (1) foot around each plant.
vi. Install plugs only when soil is moist and/or wet.
vii. Before installation, remove any damaged roots and loosen any circlingor compacted roots.
viii. Install plugs using an appropriate implement such that a hole is created that will allow the plug to be inserted without any bending, binding, or breaking of roots.
ix. The plug shall be planted to a depth equal to the depth grown at the nursery.
x. After installation, firm the soil around the plug so that no air pockets remain, so that they will not float away, or be easily plucked by geese.
xi. Planting will not take place on 'Severe Days' as defined by the NC Division of Forest Resources' (NCFS)*Pocket Guide To Seedling Care and Planting Standards.*

5. Timing of Plant Installation

a. It is important for the success of plants to time the installation of plants when seasonal and daily weather conditions are appropriate.

b. The following are the weather and soil conditions that must be present at the site during all planting activities.

i. Temperature greater than 35^0F and less than 85^0F
ii. Relative Humidity greater than 30%
iii. Wind less than 10 miles/hour
iv. Soil is moist to the surface
v. Soil is not compacted

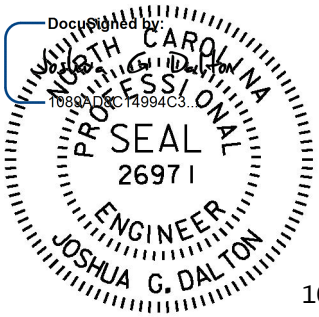
6. Plant Density

a. Plant density is called out on plan sheet 2D-6.

Vegetative Shelf Planting will be measured in square feet and paid as the actual number of square feet that have been satisfactorily placed and accepted. Such price and payment will be full compensation for all work covered by this provision.

Payment will be made under:

Pay Item	**Pay Unit**
Vegetative Shelf Planting	Square Foot



10/28/2021

PLACEMENT OF NATIVE MATERIAL: (SPECIAL)

1.0 DESCRIPTION:

Native material shall consist of material that is excavated from the stream bed or flood plain at the project site during culvert excavation. The material shall be stockpiled on the jobsite for use in backfilling the high flow barrels as shown on the contract plans.

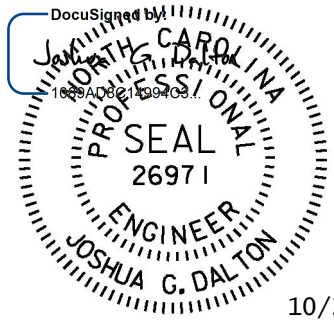
If enough native material is not available to backfill the high flow barrels, Class B Rip Rap may be used to supplement the native material. If rip rap is used to supplement the native material, it shall be placed in the bottom of the culvert barrels and topped with a minimum 6" layer of native material.

The top surface of the native material shall be placed and leveled to a flat surface to allow for animal passage.

Native material is subject to approval by the Engineer and may be subject to permit conditions.

2.0 BASIS OF PAYMENT

Payment for placement of the native material will be at the contract lump sum price bid for "Placement of Native Material". Such lump sum price will be full compensation for placing all native material, Class B Rip Rap, labor, tools, and equipment necessary to complete the item.



10/28/2021

DRAWDOWN PIPE AND VALVE FOR WET DETENTION OUTLET CONTROL STURUCTURE

DESCRIPTION

This work consists of furnishing and installing a 6” drawdown pipe with 6” valve on a wet detention outlet control structure.

MATERIALS

Refer to Division 10.

Item	Section
Ductile Iron Pipe and Fittings	1036-5
Water Valves	1036-7

CONSTRUCTION METHODS

Install 6” drawdown pipe with 6” valve as shown on plan sheet 2D-4, or as directed by the Engineer.

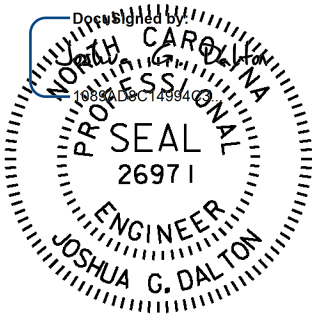
Provide connections for pipes and fittings that are watertight and suitable for gravity flow conditions. Provide a watertight connection between drawdown pipe and outlet control structure.

MEASUREMENT AND PAYMENT

6“ Valve will be measured and paid in units of each for the actual number of 6” drawdown pipe with 6” valve installed in a wet detention outlet control structure, and incorporated into the completed and accepted work. Such price and payment will be full compensation for all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
6” Valve	Each



11/1/2021

Document not considered final unless all signatures completed.

Signals and Intelligent Transportation Systems
Project Special Provisions
(Version 18.3)

12-Jan-22

DocuSigned by:
Betsy L. Watson
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1/12/2022

Contents

1. 2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES

The 2018 Standard Specifications are revised as follows:

1.1. GENERAL REQUIREMENTS – Construction Methods (1700-3(K))

Page 17-4, revise sentence starting on line 14 to read "Modify existing electrical services, as necessary, to meet the grounding requirements of the NEC, these *Standard Specifications, Standard Drawings,* and the project plans."

Page 17-4, revise sentence beginning on line 21 to read "Furnish and install additional ground rods to grounding electrode system as necessary to meet the *Standard Specifications, Standard Drawings*, and test requirements."

1.2. WOOD POLES – Construction Methods (1720-3)

Page 17-18, revise sentence starting on line 13 to read "On new Department-owned poles, install a grounding system consisting of #6 AWG solid bare copper wire that is mechanically crimped using an irreversible compression tool with die to a single ground rod installed at base of pole or to the electrical service grounding electrode system located within 10 feet of the pole."

2. SIGNAL HEADS

2.1. MATERIALS

A. General

Fabricate vehicle signal head housings and end caps from die-cast aluminum. Fabricate 16-inch pedestrian signal head housings and end caps from die-cast aluminum. Provide visor mounting screws, door latches, and hinge pins fabricated from stainless steel. Provide interior screws, fasteners, and metal parts fabricated from stainless steel.

Fabricate tunnel and traditional visors from sheet aluminum.

Paint all surfaces inside and outside of signal housings and doors. Paint outside surfaces of tunnel and traditional visors, wire outlet bodies, wire entrance fitting brackets and end caps when supplied as components of messenger cable mounting assemblies, pole and pedestal mounting assemblies, and pedestrian pushbutton housings. Have electrostatically-applied, fused-polyester paint in highway yellow (Federal Standard 595C, Color Chip Number 13538) a minimum of 2.5 to 3.5 mils thick. Do not apply paint to the latching hardware, rigid vehicle signal head mounting brackets for mast-arm attachments, messenger cable hanger components or balance adjuster components.

Have the interior surfaces of tunnel and traditional visors painted an alkyd urea black synthetic baking enamel with a minimum gloss reflectance and meeting the requirements of MIL-E-10169, "Enamel Heat Resisting, Instrument Black."

Where required, provide polycarbonate signal heads and visors that comply with the provisions pertaining to the aluminum signal heads listed on the QPL with the following exceptions:

Fabricate signal head housings, end caps, and visors from virgin polycarbonate material. Provide UV stabilized polycarbonate plastic with a minimum thickness of 0.1 ± 0.01 inches that is highway yellow (Federal Standard 595C, Color Chip 13538). Ensure the color is incorporated into the plastic material before molding the signal head housings and end caps. Ensure the plastic

formulation provides the following physical properties in the assembly (tests may be performed on separately molded specimens):

Test	Required	Method
Specific Gravity	1.17 minimum	ASTM D 792
Flammability	Self-extinguishing	ASTM D 635
Tensile Strength, yield, PSI	8500 minimum	ASTM D 638
Izod impact strength, ft-lb/in [notched, 1/8 inch]	12 minimum	ASTM D 256

For pole mounting, provide side of pole mounting assemblies with framework and all other hardware necessary to make complete, watertight connections of the signal heads to the poles and pedestals. Fabricate the mounting assemblies and frames from aluminum with all necessary hardware, screws, washers, etc. to be stainless steel. Provide mounting fittings that match the positive locking device on the signal head with the serrations integrally cast into the brackets. Provide upper and lower pole plates that have a 1 ¼-inch vertical conduit entrance hubs with the hubs capped on the lower plate and 1 ½-inch horizontal hubs. Ensure that the assemblies provide rigid attachments to poles and pedestals so as to allow no twisting or swaying of the signal heads. Ensure that all raceways are free of sharp edges and protrusions, and can accommodate a minimum of ten Number 14 AWG conductors.

For pedestal mounting, provide a post-top slipfitter mounting assembly that matches the positive locking device on the signal head with serrations integrally cast into the slipfitter. Provide stainless steel hardware, screws, washers, etc. Provide a minimum of six 3/8 X 3/4-inch long square head bolts for attachment to pedestal. Provide a center post for multi-way slipfitters.

For light emitting diode (LED) traffic signal modules, provide the following requirements for inclusion on the Department's Qualified Products List for traffic signal equipment.

1. Sample submittal,
2. Third-party independent laboratory testing results for each submitted module with evidence of testing and conformance with all of the Design Qualification Testing specified in section 6.4 of each of the following Institute of Transportation Engineers (ITE) specifications:
   - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement
   - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement
   - Pedestrian Traffic Control Signal Indications –Light Emitting Diode (LED) Signal Modules.

   (Note: The Department currently recognizes two approved independent testing laboratories. They are Intertek ETL Semko and Light Metrics, Incorporated with Garwood Laboratories. Independent laboratory tests from other laboratories may be considered as part of the QPL submittal at the discretion of the Department,
3. Evidence of conformance with the requirements of these specifications,
4. A manufacturer's warranty statement in accordance with the required warranty, and

5. Submittal of manufacturer's design and production documentation for the model, including but not limited to, electrical schematics, electronic component values, proprietary part numbers, bill of materials, and production electrical and photometric test parameters.
6. Evidence of approval of the product to bear the Intertek ETL Verified product label for LED traffic signal modules.

In addition to meeting the performance requirements for the minimum period of 60 months, provide a written warranty against defects in materials and workmanship for the modules for a period of 60 months after installation of the modules. During the warranty period, the manufacturer must provide new replacement modules within 45 days of receipt of modules that have failed at no cost to the State. Repaired or refurbished modules may not be used to fulfill the manufacturer's warranty obligations. Provide manufacturer's warranty documentation to the Department during evaluation of product for inclusion on Qualified Products List (QPL).

B. Vehicle Signal Heads

Comply with the ITE standard "Vehicle Traffic Control Signal Heads". Provide housings with provisions for attaching backplates.

Provide visors that are 10 inches in length for 12-inch vehicle signal heads.

Provide a termination block with one empty terminal for field wiring for each indication plus one empty terminal for the neutral conductor. Have all signal sections wired to the termination block. Provide barriers between the terminals that have terminal screws with a minimum Number 8 thread size and that will accommodate and secure spade lugs sized for a Number 10 terminal screw.

Mount termination blocks in the yellow signal head sections on all in-line vehicle signal heads. Mount the termination block in the red section on five-section vehicle signal heads.

Furnish vehicle signal head interconnecting brackets. Provide one-piece aluminum brackets less than 4.5 inches in height and with no threaded pipe connections. Provide hand holes on the bottom of the brackets to aid in installing wires to the signal heads. Lower brackets that carry no wires and are used only for connecting the bottom signal sections together may be flat in construction.

For messenger cable mounting, provide messenger cable hangers, wire outlet bodies, balance adjusters, bottom caps, wire entrance fitting brackets, and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the messenger cable. Fabricate messenger cable hanger components, wire outlet bodies and balance adjuster components from stainless steel or malleable iron galvanized in accordance with ASTM A153 (Class A) or ASTM A123. Provide serrated rings made of aluminum. Provide messenger cable hangers with U-bolt clamps. Fabricate washers, screws, hex-head bolts and associated nuts, clevis pins, cotter pins, U-bolt clamps and nuts from stainless steel.

For mast-arm mounting, provide rigid vehicle signal head mounting brackets and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the mast arms and to provide a means for vertically adjusting the vehicle signal heads to proper alignment. Fabricate the mounting assemblies from aluminum, and provide serrated rings made of aluminum. Provide stainless steel cable attachment assemblies to secure the brackets to the mast arms. Ensure all fastening hardware and fasteners are fabricated from stainless steel.

Provide LED vehicular traffic signal modules (hereafter referred to as modules) that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp for use in traffic signal

sections. Use LEDs that are aluminum indium gallium phosphorus (AlInGaP) technology for red and yellow indications and indium gallium nitride (InGaN) for green indications. Install the ultra bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to +165°F. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

For the modules, provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard signal head. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Tint the red, yellow and green lenses to correspond with the wavelength (chromaticity) of the LED. Transparent tinting films are unacceptable. Provide a lens that is integral to the unit with a smooth outer surface.

1. LED Circular Signal Modules

Provide modules in the following configurations: 12-inch circular sections. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2018 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Circular Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red circular	17	11
12-inch green circular	15	15

For yellow circular signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to ensure power required at 77° F is 22 Watts or less for the 12-inch circular module.

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

2. LED Arrow Signal Modules

Provide 12-inch omnidirectional arrow signal modules. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2018 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the requirements for 12-inch omnidirectional modules specified in the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement" dated July 1, 2007 (hereafter referred to as VTCSH Arrow Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Arrow Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red arrow	12	9
12-inch green arrow	11	11

For yellow arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Arrow Supplement to ensure power required at 77° F is 12 Watts or less.

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of an arrow traffic signal module. Power may also be derived from voltage, current and power factor measurements.

3. LED U-Turn Arrow Signal Modules

Provide modules in the following configurations: 12-inch left u-turn arrow signal modules and 12-inch right u-turn arrow signal modules.

Modules are not required to be listed on the ITS and Signals Qualified Products List. Provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) and other requirements stated in this specification.

Provide modules that have minimum maintained luminous intensity values that are not less than 16% of the values calculated using the method described in section 4.1 of the VTCSH Circular Supplement.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Circular Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red u-turn arrow	17	11
12-inch green u-turn arrow	15	15

For yellow u-turn arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to ensure power required at 77° F is 22 Watts or less.

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

C. Pedestrian Signal Heads

Provide pedestrian signal heads with international symbols that meet the MUTCD. Do not provide letter indications.

Comply with the ITE standard for "Pedestrian Traffic Control Signal Indications" and the following sections of the ITE standard for "Vehicle Traffic Control Signal Heads" in effect on the date of advertisement:

- Section 3.00 - "Physical and Mechanical Requirements"
- Section 4.01 - "Housing, Door, and Visor: General"
- Section 4.04 - "Housing, Door, and Visor: Materials and Fabrication"
- Section 7.00 - "Exterior Finish"

Provide a double-row termination block with three empty terminals and number 10 screws for field wiring. Provide barriers between the terminals that accommodate a spade lug sized for number 10 terminal screws. Mount the termination block in the hand section. Wire all signal sections to the terminal block.

Where required by the plans, provide 16-inch pedestrian signal heads with traditional three-sided, rectangular visors, 6 inches long. Where required by the plans, provide 12-inch pedestrian signal heads with traditional three-sided, rectangular visors, 8 inches long.

Provide 2-inch diameter pedestrian pushbuttons with weather-tight housings fabricated from die-cast aluminum and threading in compliance with the NEC for rigid metal conduit. Provide a weep hole in the housing bottom and ensure that the unit is vandal resistant.

Provide push-button housings that are suitable for mounting on flat or curved surfaces and that will accept 1/2-inch conduit installed in the top. Provide units that have a heavy-duty push-button assembly with a sturdy, momentary, normally-open switch. Have contacts that are electrically insulated from the housing and push-button. Ensure that the pushbuttons are rated for a minimum of 5 mA at 24 volts DC and 250 mA at 12 volts AC.

Provide standard R10-3 signs with mounting hardware that comply with the MUTCD in effect on the date of advertisement. Provide R10-3E signs for countdown pedestrian heads and R10-3B for non-countdown pedestrian heads.

Design the LED pedestrian traffic signal modules (hereafter referred to as modules) for installation into standard pedestrian traffic signal sections that do not contain the incandescent signal section reflector, lens, eggcrate visor, gasket, or socket. Provide modules that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp. Use LEDs that are of the latest aluminum indium gallium phosphorus (AlInGaP) technology for the Portland Orange hand and countdown displays. Use LEDs that are of the latest indium gallium nitride (InGaN) technology for the Lunar White walking man displays. Install the ultra-bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to +165°F. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

Design all modules to operate using a standard 3 - wire field installation. Provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard pedestrian signal housing. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Provide modules in the following configuration: 16-inch displays which have the solid hand/walking man overlay on the left and the countdown on the right, and 12-inch displays which have the solid hand/walking man module as an overlay. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2018 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the ITE "Pedestrian Traffic Control Signal Indicators - Light Emitting Diode (LED) Signal Modules" dated August 04, 2010 (hereafter referred to as PTCSI Pedestrian Standard) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the PTCSI Pedestrian Standard:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
Hand Indication	16	13
Walking Man Indication	12	9
Countdown Indication	16	13

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

Provide module lens that is hard coated or otherwise made to comply with the material exposure and weathering effects requirements of the Society of Automotive Engineers (SAE) J576. Ensure all exposed components of the module are suitable for prolonged exposure to the environment, without appreciable degradation that would interfere with function or appearance.

Ensure the countdown display continuously monitors the traffic controller to automatically learn the pedestrian phase time and update for subsequent changes to the pedestrian phase time.

Ensure the countdown display begins normal operation upon the completion of the preemption sequence and no more than one pedestrian clearance cycle.

D. Signal Cable

Furnish 16-4 and 16-7 signal cable that complies with IMSA specification 20-1 except provide the following conductor insulation colors:

- For 16-4 cable: white, yellow, red, and green
- For 16-7 cable: white, yellow, red, green, yellow with black stripe tracer, red with black stripe tracer, and green with black stripe tracer. Apply continuous stripe tracer on conductor insulation with a longitudinal or spiral pattern.

Provide a ripcord to allow the cable jacket to be opened without using a cutter. IMSA specification 19-1 will not be acceptable. Provide a cable jacket labeled with the IMSA specification number and provide conductors constructed of stranded copper.

3. CONTROLLERS WITH CABINETS

3.1. MATERIALS – GENERAL CABINETS

Provide a moisture resistant coating on all circuit boards.

Provide one 20 mm diameter radial lead UL-recognized metal oxide varistor (MOV) between each load switch field terminal and equipment ground. Electrical performance is outlined below.

PROPERTIES OF MOV SURGE PROTECTOR	
Maximum Continuous Applied Voltage at 185° F	150 VAC (RMS) 200 VDC
Maximum Peak 8x20µs Current at 185° F	6500 A
Maximum Energy Rating at 185° F	80 J
Voltage Range 1 mA DC Test at 77° F	212-268 V
Max. Clamping Voltage 8x20µs, 100A at 77° F	395 V
Typical Capacitance (1 MHz) at 77° F	1600 pF

Provide a power line surge protector that is a two-stage device that will allow connection of the radio frequency interference filter between the stages of the device. Ensure that a maximum continuous current is at least 10A at 120V. Ensure that the device can withstand a minimum of 20 peak surge current occurrences at 20,000A for an 8x20 microsecond waveform. Provide a maximum clamp voltage of 395V at 20,000A with a nominal series inductance of 200µh. Ensure that the voltage does not exceed 395V. Provide devices that comply with the following:

Frequency (Hz)	Minimum Insertion Loss (dB)
60	0
10,000	30
50,000	55
100,000	50
500,000	50
2,000,000	60
5,000,000	40
10,000,000	20
20,000,000	25

3.2. MATERIALS – TYPE 170E CABINETS

A. Type 170 E Cabinets General

Conform to the city of Los Angeles' Specification No. 54-053-08, *Traffic Signal Cabinet Assembly Specification* (dated July 2008), except as required herein.

Furnish model 336S pole mounted cabinets configured for 8 vehicle phases, 4 pedestrian phases, and 6 overlaps. Do not reassign load switches to accommodate overlaps unless shown on electrical details. Provide 336S pole mounted cabinets that are 46" high with 40" high internal rack assemblies.

Furnish model 332 base mounted cabinets configured for 8 vehicle phases, 4 pedestrian phases, and 6 overlaps. When overlaps are required, provide auxiliary output files for the overlaps. Do not reassign load switches to accommodate overlaps unless shown on electrical details.

Provide model 200 load switches, model 222 loop detector sensors, model 252 AC isolators, and model 242 DC isolators according to the electrical details. As a minimum, provide one (1) model 2018 conflict monitor, one (1) model 206L power supply unit, two (2) model 204 flashers, one (1) DC isolator (located in slot I14), and four (4) model 430 flash transfer relays (provide seven (7) model 430 flash transfer relays if auxiliary output file is installed) with each cabinet.

B. Type 170 E Cabinet Electrical Requirements

Provide a cabinet assembly designed to ensure that upon leaving any cabinet switch or conflict monitor initiated flashing operation, the controller starts up in the programmed start up phases and start up interval.

Furnish two sets of non-fading cabinet wiring diagrams and schematics in a paper envelope or container and placed in the cabinet drawer.

All AC+ power is subject to radio frequency signal suppression.

Provide surge suppression in the cabinet for each type of cabinet device. Provide surge protection for the full capacity of the cabinet input file. Provide surge suppression devices that

operate properly over a temperature range of -40º F to +185º F. Ensure the surge suppression devices provide both common and differential modes of protection.

Provide a pluggable power line surge protector that is installed on the back of the PDA (power distribution assembly) chassis to filter and absorb power line noise and switching transients. Ensure the device incorporates LEDs for failure indication and provides a dry relay contact closure for the purpose of remote sensing. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs)……..20,000A

Occurrences (8x20µs waveform)……..10 minimum @ 20,000A

Maximum Clamp Voltage…….395VAC

Operating Current……..15 amps

Response Time……..< 5 nanoseconds

Provide a loop surge suppressor for each set of loop terminals in the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (6 times, 8x20µs)

(Differential Mode)…….400A

(Common Mode)……1,000A

Occurrences (8x20µs waveform)……..500 min @ 200A

Maximum Clamp Voltage

(Differential Mode @400A)……35V

(Common Mode @1,000A)…….35V

Response Time……..< 5 nanoseconds

Maximum Capacitance……..35 pF

Provide a data communications surge suppressor for each communications line entering or leaving the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs)……..10,000A

Occurrences (8x20µs waveform)……..100 min @ 2,000A

Maximum Clamp Voltage…….Rated for equipment protected

Response Time……..< 1 nanosecond

Maximum Capacitance…….1,500 pF

Maximum Series Resistance…….15Ω

Provide a DC signal surge suppressor for each DC input channel in the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs)……..10,000A

Occurrences (8x20µs waveform)……..100 @ 2,000A

Maximum Clamp Voltage…….30V

Response Time……..< 1 nanosecond

Provide a 120 VAC signal surge suppressor for each AC+ interconnect signal input. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs)……..20,000A

Maximum Clamp Voltage…….350VAC

Response Time……..< 200 nanoseconds

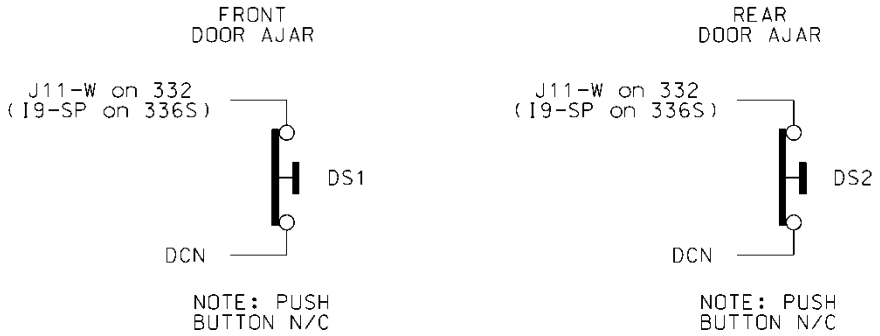
Discharge Voltage……<200 Volts @ 1,000A

Insulation Resistance…….≥100 MΩ

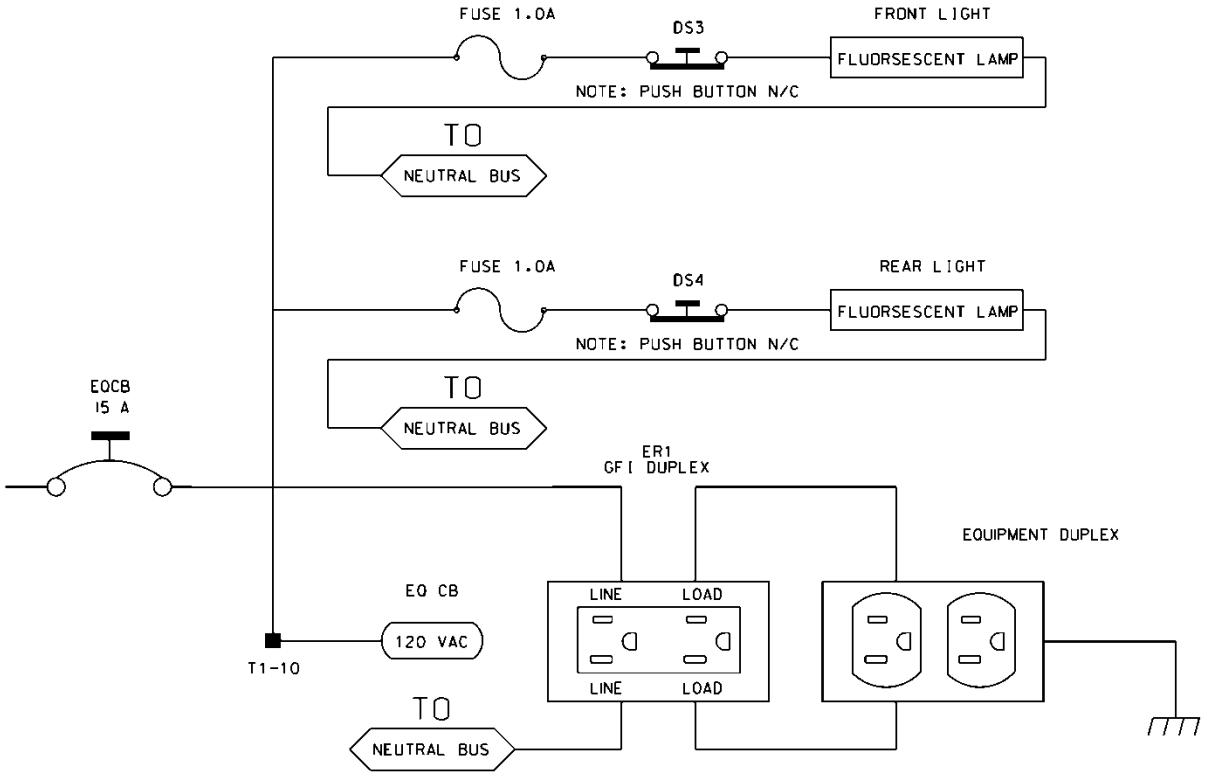
Provide conductors for surge protection wiring that are of sufficient size (ampacity) to withstand maximum overcurrents which could occur before protective device thresholds are attained and current flow is interrupted.

If additional surge protected power outlets are needed to accommodate fiber transceivers, modems, etc., install a UL listed, industrial, heavy-duty type power outlet strip with a minimum rating of 15 A / 125 VAC, 60 Hz. Provide a strip that has a minimum of 3 grounded outlets. Ensure the power outlet strip plugs into one of the controller unit receptacles located on the rear of the PDA. Ensure power outlet strip is mounted securely; provide strain relief if necessary.

Provide a door switch in the front and a door switch in the rear of the cabinet that will provide the controller unit with a Door Ajar alarm when either the front or the rear door is open. Ensure the door switches apply DC ground to the Input File when either the front door or the rear door is open.



Furnish a fluorescent fixture in the rear across the top of the cabinet and another fluorescent fixture in the front across the top of the cabinet at a minimum. Ensure that the fixtures provide sufficient light to illuminate all terminals, labels, switches, and devices in the cabinet. Conveniently locate the fixtures so as not to interfere with a technician's ability to perform work on any devices or terminals in the cabinet. Provide a protective diffuser to cover exposed bulbs. Install 16 watt T-4 lamps in the fluorescent fixtures. Provide a door switch to provide power to each fixture when the respective door is open. Wire the fluorescent fixtures to the 15 amp ECB (equipment circuit breaker).



Furnish a police panel with a police panel door. For model 336S cabinets, mount the police panel on the rear door. Ensure that the police panel door permits access to the police panel when the main door is closed. Ensure that no rainwater can enter the cabinet even with the police panel door open. Provide a police panel door hinged on the right side as viewed from the front. Provide a police panel

door lock that is keyed to a standard police/fire call box key. In addition to the requirements of LA Specification No. 54-053-08, provide the police panel with a toggle switch connected to switch the intersection operation between normal stop-and-go operation (AUTO) and manual operation (MANUAL). Ensure that manual control can be implemented using inputs and software such that the controller provides full programmed clearance times for the yellow clearance and red clearance for each phase while under manual control.

Provide a 1/4-inch locking phone jack in the police panel for a hand control to manually control the intersection. Provide sufficient room in the police panel for storage of a hand control and cord.

Ensure the 336S cabinet Input File is wired as follows:

336S Cabinet

Port-Bit/C-1 Pin Assignment

Slot #	1	2	3	4	5	6	7	8	9	10	11	12	13	14
C-1 (Spares)	59	60	61	62	63	64	65	66	75	76	77	78	79	80
Port	3-2	1-1	3-4	1-3	3-1	1-2	3-3	1-4	2-5	5-5	5-6	5-1	5-2	6-7
C-1	56	39	58	41	55	40	57	42	51	71	72	67	68	81
Port	2-1	1-5	2-3	1-7	2-2	1-6	2-4	1-8	2-6	5-7	5-8	5-3	5-4	6-8
C-1	47	43	49	45	48	44	50	46	52	73	74	69	70	82

For model 332 base mounted cabinets, ensure terminals J14-E and J14-K are wired together on the rear of the Input File. Connect TB9-12 (J14 Common) on the Input Panel to T1-2 (AC-) on the rear of the PDA.

Provide detector test switches mounted at the top of the cabinet rack or other convenient location which may be used to place a call on each of eight phases based on the chart below. Provide three positions for each switch: On (place call), Off (normal detector operation), and Momentary On (place momentary call and return to normal detector operation after switch is released). Ensure that the switches are located such that the technician can read the controller display and observe the intersection.

Connect detector test switches for cabinets as follows:

336S Cabinet		332 Cabinet	
Detector Call Switches	**Terminals**	**Detector Call Switches**	**Terminals**
Phase 1	I1-F	Phase 1	I1-W
Phase 2	I2-F	Phase 2	I4-W
Phase 3	I3-F	Phase 3	I5-W
Phase 4	I4-F	Phase 4	I8-W
Phase 5	I5-F	Phase 5	J1-W
Phase 6	I6-F	Phase 6	J4-W
Phase 7	I7-F	Phase 7	J5-W
Phase 8	I8-F	Phase 8	J8-W

Provide the PCB 28/56 connector for the conflict monitor unit (CMU) with 28 independent contacts per side, dual-sided with 0.156-inch contact centers. Provide the PCB 28/56 connector contacts with solder eyelet terminations. Ensure all connections to the PCB 28/56 connector are soldered to the solder eyelet terminations.

Ensure that all cabinets have the CMU connector wired according to the 332 cabinet connector pin assignments (include all wires for auxiliary output file connection). Wire pins 13, 16, R, and U of the CMU connector to a separate 4 pin plug, P1, as shown below. Provide a second plug, P2, which will mate with P1 and is wired to the auxiliary output file as shown below. Provide an additional plug, P3, which will mate with P1 and is wired to the pedestrian yellow circuits as shown below. When no auxiliary output file is installed in the cabinet, provide wires for the green and yellow inputs for channels 11, 12, 17, and 18, the red inputs for channels 17 and 18, and the wires for the P2 plug. Terminate the two-foot wires with ring type lugs, insulated, and bundled for optional use.

	P1		P2		P3	
PIN	**FUNCTION**	**CONN TO**	**FUNCTION**	**CONN TO**	**FUNCTION**	**CONN TO**
1	CH-9G	CMU-13	OLA-GRN	A123	2P-YEL	114
2	CH-9Y	CMU-16	OLA-YEL	A122	4P-YEL	105
3	CH-10G	CMU-R	OLB-GRN	A126	6P-YEL	120
4	CH-10Y	CMU-U	OLB-YEL	A125	8P-YEL	111

Do not provide the P20 terminal assembly (red monitor board) or red interface ribbon cable as specified in LA Specification No. 54-053-08.

Provide a P20 connector that mates with and is compatible with the red interface connector mounted on the front of the conflict monitor. Ensure that the P20 connector and the red interface

connector on the conflict monitor are center polarized to ensure proper connection. Ensure that removal of the P20 connector will cause the conflict monitor to recognize a latching fault condition and place the cabinet into flashing operation.

Wire the P20 connector to the output file and auxiliary output file using 22 AWG stranded wires. Ensure the length of these wires is a minimum of 42 inches in length. Provide a durable braided sleeve around the wires to organize and protect the wires.

Wire the P20 connector to the traffic signal red displays to provide inputs to the conflict monitor as shown below. Ensure the pedestrian Don't Walk circuits are wired to channels 13 through 16 of the P20 connector. When no auxiliary output file is installed in the cabinet, provide wires for channels 9 through 12 reds. Provide a wire for special function 1. Terminate the unused wires with ring type lugs, insulated, and bundled for optional use.

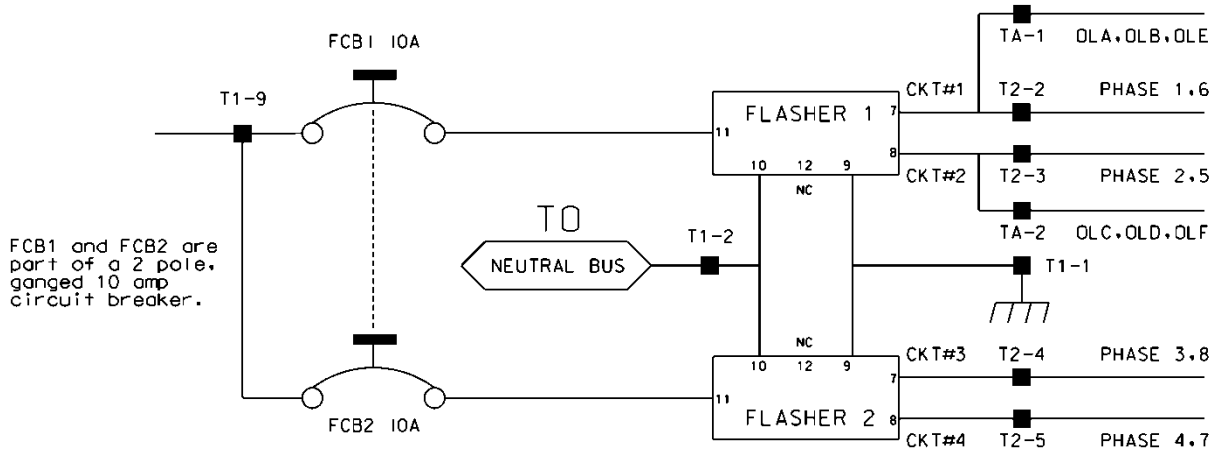
	P20 Connector				
PIN	**FUNCTION**	**CONN TO**	**PIN**	**FUNCTION**	**CONN TO**
1	Channel 15 Red	119	2	Channel 16 Red	110
3	Channel 14 Red	104	4	Chassis GND	01-9
5	Channel 13 Red	113	6	N/C	
7	Channel 12 Red	AUX 101	8	Spec Function 1	
9	Channel 10 Red	AUX 124	10	Channel 11 Red	AUX 114
11	Channel 9 Red	AUX 121	12	Channel 8 Red	107
13	Channel 7 Red	122	14	Channel 6 Red	134
15	Channel 5 Red	131	16	Channel 4 Red	101
17	Channel 3 Red	116	18	Channel 2 Red	128
19	Channel 1 Red	125	20	Red Enable	01-14

Ensure the controller unit outputs to the auxiliary output file are pre-wired to the C5 connector. When no auxiliary output file is installed in the cabinet, connect the C5 connector to a storage socket located on the Input Panel or on the rear of the PDA.

Do not wire pin 12 of the load switch sockets.

In addition to the requirements of LA Specification No. 54-053-08, ensure relay K1 on the Power Distribution Assembly (PDA) is a four-pole relay and K2 on the PDA is a two-pole relay.

Provide a two pole, ganged circuit breaker for the flash bus circuit. Ensure the flash bus circuit breaker is an inverse time circuit breaker rated for 10 amps at 120 VAC with a minimum of 10,000 RMS symmetrical amperes short circuit current rating. Do not provide the auxiliary switch feature on the flash bus circuit breaker. Ensure the ganged flash bus circuit breaker is certified by the circuit breaker manufacturer to provide gang tripping operation.



Ensure auxiliary output files are wired as follows:

AUXILIARY OUTPUT FILE TERMINAL BLOCK TA ASSIGNMENTS	
POSITION	**FUNCTION**
1	Flasher Unit #1, Circuit 1/FTR1 (OLA, OLB)/FTR3 (OLE)
2	Flasher Unit #1, Circuit 2/FTR2 (OLC, OLD)/FTR3 (OLF)
3	Flash Transfer Relay Coils
4	AC -
5	Power Circuit 5
6	Power Circuit 5
7	Equipment Ground Bus
8	NC

Provide four spare load resistors mounted in each cabinet. Ensure each load resistor is rated as shown in the table below. Wire one side of each load resistor to AC-. Connect the other side of each resistor to a separate terminal on a four (4) position terminal block. Mount the load resistors and terminal block either inside the back of Output File No. 1 or on the upper area of the Service Panel.

ACCEPTABLE LOAD RESISTOR VALUES	
VALUE (ohms)	**WATTAGE**
1.5K – 1.9 K	25W (min)
2.0K – 3.0K	10W (min)

Provide Model 200 load switches, Model 204 flashers, Model 242 DC isolators, Model 252 AC isolators, and Model 206L power supply units that conform to CALTRANS' "*Transportation Electrical Equipment Specifications*" dated March 12, 2009 with Erratum 1.

C. Type 170 E Cabinet Physical Requirements

Do not mold, cast, or scribe the name "City of Los Angeles" on the outside of the cabinet door as specified in LA Specification No. 54-053-08. Do not provide a Communications Terminal Panel as specified in LA Specification No. 54-053-08. Do not provide terminal block TBB on the Service Panel. Do not provide Cabinet Verification Test Program software or associated test jigs as specified in LA Specification No. 54-053-08.

Furnish unpainted, natural, aluminum cabinet shells. Ensure that all non-aluminum hardware on the cabinet is stainless steel or a Department approved non-corrosive alternate.

Ensure the lifting eyes, gasket channels, police panel, and all supports welded to the enclosure and doors are fabricated from 0.125-inch minimum thickness aluminum sheet and meet the same standards as the cabinet and doors.

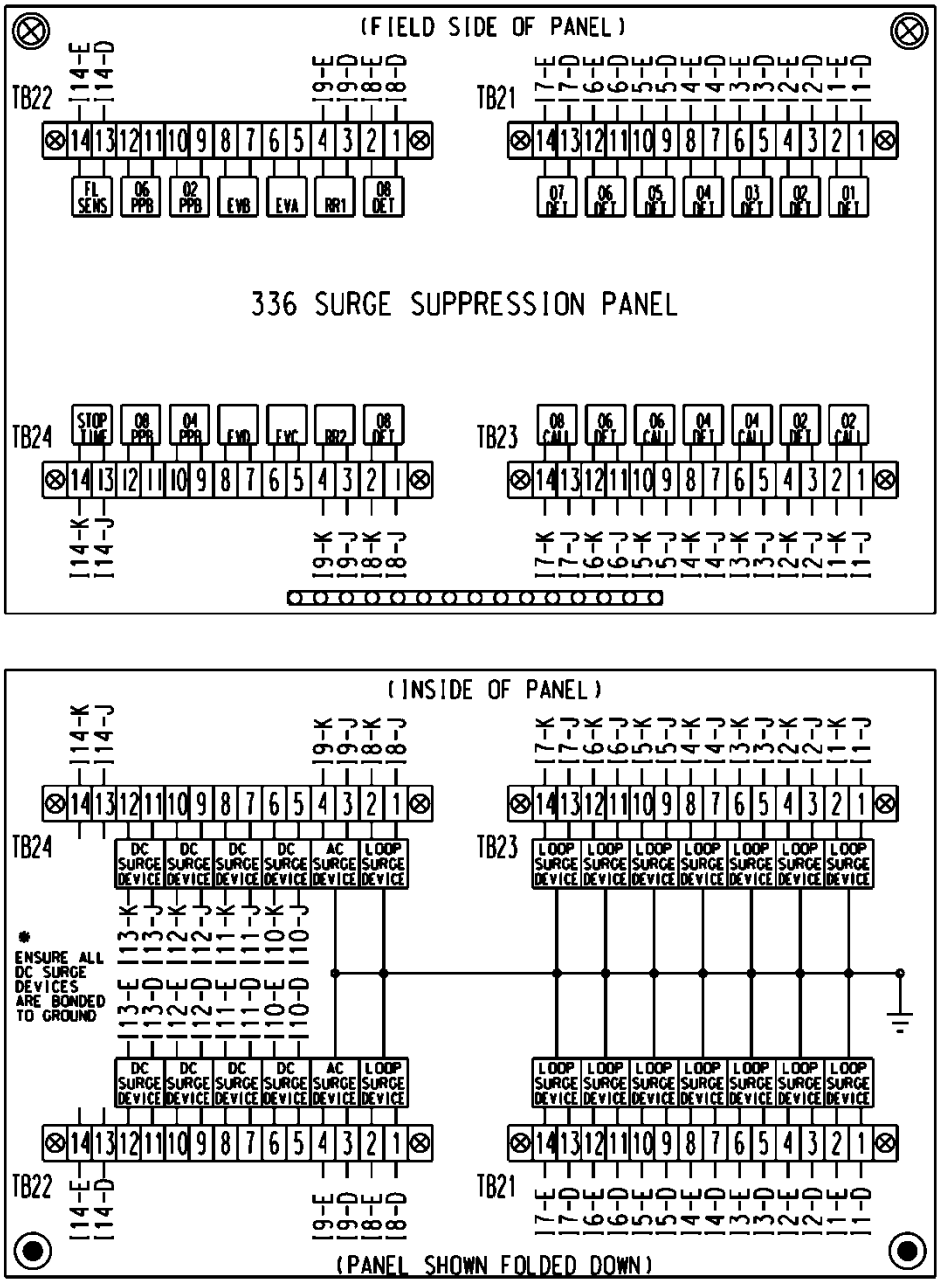
Provide front and rear doors with latching handles that allow padlocking in the closed position. Furnish 0.75-inch minimum diameter stainless steel handles with a minimum 0.5-inch shank. Place the padlocking attachment at 4.0 inches from the handle shank center to clear the lock and key. Provide an additional 4.0 inches minimum gripping length.

Provide Corbin #2 locks on the front and rear doors. Provide one (1) Corbin #2 and one (1) police master key with each cabinet. Ensure main door locks allow removal of keys in the locked position only.

Provide a surge protection panel with 16 loop surge protection devices and designed to allow sufficient free space for wire connection/disconnection and surge protection device replacement. For model 332 cabinets, provide an additional 20 loop surge protection devices. Provide an additional two AC+ interconnect surge devices to protect one slot and eight DC surge protection devices to protect four slots. Provide no protection devices on slot I14.

For pole mounted cabinets, mount surge protection devices for the AC+ interconnect inputs, inductive loop detector inputs, and low voltage DC inputs on a swing down panel assembly fabricated from sturdy aluminum. Attach the swing down panel to the bottom rear cabinet rack assembly using thumb screws. Ensure the swing down panel allows for easy removal of the input file without removing the surge protection panel assembly or its parts. Have the surge protection devices mounted horizontally on the panel and soldered to the feed through terminals of four 14 position terminal blocks with #8 screws mounted on the other side. Ensure the top row of terminals is connected to the upper slots and the bottom row of terminals is connected to the bottom slots. Provide a 15-position copper equipment ground bus attached to the field terminal side (outside) of

the swing down panel for termination of loop lead-in shield grounds. Ensure that a Number 4 AWG green wire connects the surge protection panel assembly ground bus to the main cabinet equipment ground.



For base mounted cabinets, mount surge protection panels on the left side of the cabinet as viewed from the rear. Attach each panel to the cabinet rack assembly using bolts and make it easily removable. Mount the surge protection devices in vertical rows on each panel and connect the

devices to one side of 12 position, double row terminal blocks with #8 screws. For each surge protection panel, terminate all grounds from the surge protection devices on a copper equipment ground bus attached to the surge protection panel. Wire the terminals to the rear of a standard input file using spade lugs for input file protection.

Provide permanent labels that indicate the slot and the pins connected to each terminal that may be viewed from the rear cabinet door. Label and orient terminals so that each pair of inputs is next to each other. Indicate on the labeling the input file (I or J), the slot number (1-14) and the terminal pins of the input slots (either D & E for upper or J & K for lower).

Provide a minimum 14 x 16 inch pull out, hinged top shelf located immediately below controller mounting section of the cabinet. Ensure the shelf is designed to fully expose the table surface outside the controller at a height approximately even with the bottom of the controller. Ensure the shelf has a storage bin interior which is a minimum of 1 inch deep and approximately the same dimensions as the shelf. Provide an access to the storage area by lifting the hinged top of the shelf. Fabricate the shelf and slide from aluminum or stainless steel and ensure the assembly can support the 2070L controller plus 15 pounds of additional weight. Ensure shelf has a locking mechanism to secure it in the fully extended position and does not inhibit the removal of the 2070L controller or removal of cards inside the controller when fully extended. Provide a locking mechanism that is easily released when the shelf is to be returned to its non-use position directly under the controller.

D. Model 2018 Enhanced Conflict Monitor

Furnish Model 2018 Enhanced Conflict Monitors that provide monitoring of 18 channels. Ensure each channel consists of a green, yellow, and red field signal input. Ensure that the conflict monitor meets or exceeds CALTRANS' Transportation Electrical Equipment Specifications dated March 12, 2009, with Erratum 1 (hereafter referred to as CALTRANS' 2009 TEES) for a model 210 monitor unit and other requirements stated in this specification.

Ensure the conflict monitor is provided with an 18-channel conflict programming card. Pin EE and Pin T of the conflict programming card shall be connected together. Pin 16 of the conflict programming card shall be floating. Ensure that the absence of the conflict programming card will cause the conflict monitor to trigger (enter into fault mode) and remain in the triggered state until the programming card is properly inserted, and the conflict monitor is reset.

Provide a conflict monitor that incorporates LED indicators into the front panel to dynamically display the status of the monitor under normal conditions and to provide a comprehensive review of field inputs with monitor status under fault conditions. Ensure that the monitor indicates the channels that were active during a conflict condition and the channels that experienced a failure for all other per channel fault conditions detected. Ensure that these indications and the status of each channel are retained until the Conflict Monitor is reset. Furnish LED indicators for the following:

- AC Power (Green LED indicator)
- VDC Failed (Red LED indicator)
- WDT Error (Red LED indicator)
- Conflict (Red LED indicator)
- Red Fail (Red LED indicator)
- Dual Indication (Red LED indicator)

- Yellow/Clearance Failure (Red LED indicator)
- PCA/PC Ajar (Red LED indicator)
- Monitor Fail/Diagnostic Failure (Red LED indicator)
- 54 Channel Status Indicators (1 Red, 1 Yellow, and 1 Green LED indicator for each of the 18 channels)

Provide a switch to set the Red Fail fault timing. Ensure that when the switch is in the ON position the Red Fail fault timing value is set to 1350 +/- 150 ms (2018 mode). Ensure that when the switch is in the OFF position the Red Fail fault timing value is set to 850 +/- 150 ms (210 mode).

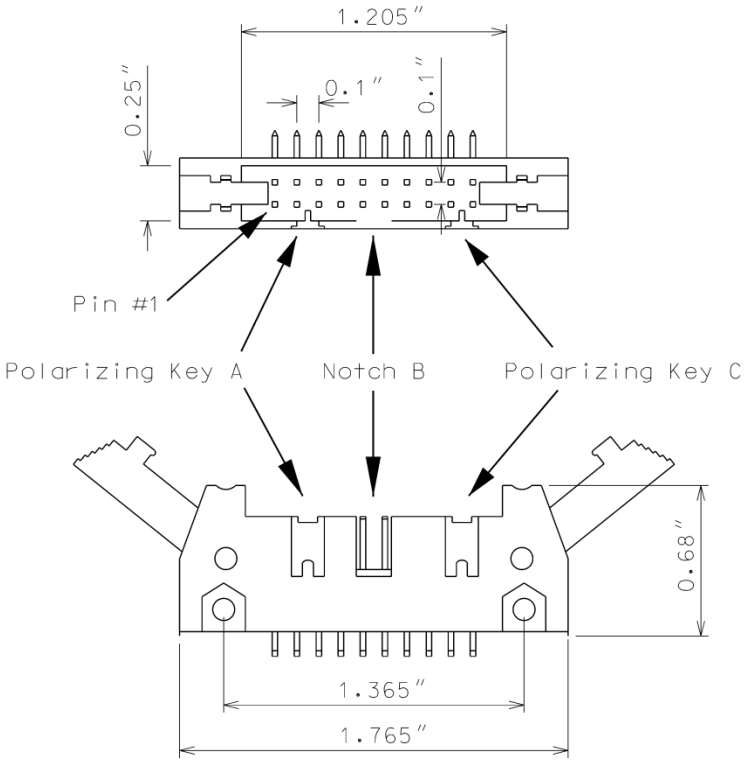
Provide a switch to set the Watchdog fault timing. Ensure that when the switch is in the ON position the Watchdog fault timing value is set to 1.0 +/- 0.1 s (2018 mode). Ensure that when the switch is in the OFF position the Watchdog fault timing value is set to 1.5 +/- 0.1 s (210 mode).

Provide a jumper or switch to set the AC line brown-out levels. Ensure that when the jumper is present or the switch is in the ON position the AC line dropout voltage threshold is 98 +/- 2 Vrms, the AC line restore voltage threshold is 103 +/- 2 Vrms, and the AC line brown-out timing value is set to 400 +/- 50ms (2018 mode). Ensure that when the jumper is not present or the switch is in the OFF position the AC line dropout voltage threshold is 92 +/- 2 Vrms, the AC line restore voltage threshold is 98 +/- 2 Vrms, and the AC line brown-out timing value is set to 80 +/- 17 ms (210 mode).

Provide a jumper or switch that will enable and disable the Watchdog Latch function. Ensure that when the jumper is not present, or the switch is in the OFF position the Watchdog Latch function is disabled. In this mode of operation, a Watchdog fault will be reset following a power loss, brownout, or power interruption. Ensure that when the jumper is present, or the switch is in the ON position the Watchdog Latch function is enabled. In this mode of operation, a Watchdog fault will be retained until a Reset command is issued.

Provide a jumper that will reverse the active polarity for pin #EE (output relay common). Ensure that when the jumper is not present pin #EE (output relay common) will be considered ‘Active’ at a voltage greater than 70 Vrms and ‘Not Active’ at a voltage less than 50 Vrms (Caltrans mode). Ensure that when the jumper is present pin #EE (output relay common) will be considered ‘Active’ at a voltage less than 50 Vrms and ‘Not Active’ at a voltage greater than 70 Vrms (Failsafe mode).

In addition to the connectors required by CALTRANS’ 2009 TEES, provide the conflict monitor with a red interface connector mounted on the front of the monitor. Ensure the connector is a 20 pin, right angle, center polarized, male connector with latching clip locks and polarizing keys. Ensure the right-angle solder tails are designed for a 0.062” thick printed circuit board. Keying of the connector shall be between pins 3 and 5, and between 17 and 19. Ensure the connector has two rows of pins with the odd numbered pins on one row and the even pins on the other row. Ensure the connector pin row spacing is 0.10” and pitch is 0.10”. Ensure the mating length of the connector pins is 0.24”. Ensure the pins are finished with gold plating 30µ” thick.



Ensure the red interface connector pins on the monitor have the following functions:

Pin #	Function	Pin #	Function
1	Channel 15 Red	2	Channel 16 Red
3	Channel 14 Red	4	Chassis Ground
5	Channel 13 Red	6	Special Function 2
7	Channel 12 Red	8	Special Function 1
9	Channel 10 Red	10	Channel 11 Red
11	Channel 9 Red	12	Channel 8 Red
13	Channel 7 Red	14	Channel 6 Red
15	Channel 5 Red	16	Channel 4 Red
17	Channel 3 Red	18	Channel 2 Red
19	Channel 1 Red	20	Red Enable

Ensure that removal of the P20 cable connector will cause the conflict monitor to recognize a latching fault condition and place the cabinet into flashing operation.

Provide Special Function 1 and Special Function 2 inputs to the unit which shall disable only Red Fail Monitoring when either input is sensed active. A Special Function input shall be sensed active when the input voltage exceeds 70 Vrms with a minimum duration of 550 ms. A Special Function input shall be sensed not active when the input voltage is less than 50 Vrms or the duration is less than 250 ms. A Special Function input is undefined by these specifications and may or may not be sensed active when the input voltage is between 50 Vrms and 70 Vrms or the duration is between 250 ms and 550 ms.

Ensure the conflict monitor recognizes field signal inputs for each channel that meet the following requirements:

- consider a Red input greater than 70 Vrms and with a duration of at least 500 ms as an "on" condition;
- consider a Red input less than 50 Vrms or with a duration of less than 200 ms as an "off" condition (no valid signal);
- consider a Red input between 50 Vrms and 70 Vrms or with a duration between 200 ms and 500 ms to be undefined by these specifications;
- consider a Green or Yellow input greater than 25 Vrms and with a duration of at least 500 ms as an "on" condition;
- consider a Green or Yellow input less than 15 Vrms or with a duration of less than 200 ms as an "off" condition; and
- consider a Green or Yellow input between 15 Vrms and 25 Vrms or with a duration between 200 ms and 500 ms to be undefined by these specifications.

Provide a conflict monitor that recognizes the faults specified by CALTRANS' 2009 TEES and the following additional faults. Ensure the conflict monitor will trigger upon detection of a fault and will remain in the triggered (in fault mode) state until the unit is reset at the front panel or through the external remote reset input for the following failures:

1. **Red Monitoring or Absence of Any Indication (Red Failure):** A condition in which no "on" voltage signal is detected on any of the green, yellow, or red inputs to a given monitor channel. If a signal is not detected on at least one input (R, Y, or G) of a conflict monitor channel for a period greater than 1000 ms when used with a 170 controller and 1500 ms when used with a 2070 controller, ensure monitor will trigger and put the intersection into flash. If the absence of any indication condition lasts less than 700 ms when used with a 170 controller and 1200 ms when used with a 2070 controller, ensure conflict monitor will not trigger. Red fail monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. Have red monitoring occur when all of the following input conditions are in effect:
    a. Red Enable input to monitor is active (Red Enable voltages are "on" at greater than 70 Vrms, off at less than 50 Vrms, undefined between 50 and 70 Vrms), and
    b. Neither Special Function 1 nor Special Function 2 inputs are active.
    c. Pin #EE (output relay common) is not active
2. **Short/Missing Yellow Indication Fault (Clearance Error):** Yellow indication following a green is missing or shorter than 2.7 seconds (with ± 0.1-second accuracy). If a channel fails to detect an "on" signal at the Yellow input for a minimum of 2.7 seconds

(± 0.1 second) following the detection of an "on" signal at a Green input for that channel, ensure that the monitor triggers and generates a clearance/short yellow error fault indication. Short/missing yellow (clearance) monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. This fault shall not occur when the channel is programmed for Yellow Inhibit, when the Red Enable signal is inactive or pin #EE (output relay common) is active.

3. **Dual Indications on the Same Channel:** In this condition, more than one indication (R, Y,G) is detected as "on" at the same time on the same channel. If dual indications are detected for a period greater than 500 ms, ensure that the conflict monitor triggers and displays the proper failure indication (Dual Ind fault). If this condition is detected for less than 200 ms, ensure that the monitor does not trigger. G-Y-R dual indication monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. G-Y dual indication monitoring shall be enabled for all channels by use of a switch located on the conflict monitor. This fault shall not occur when the Red Enable signal is inactive or pin #EE (output relay common) is active.
4. **Configuration Settings Change:** The configuration settings are comprised of (as a minimum) the permissive diode matrix, dual indication switches, yellow disable jumpers, any option switches, any option jumpers, and the Watchdog Enable switch. Ensure the conflict monitor compares the current configuration settings with the previous stored configuration settings on power-up, on reset, and periodically during operation. If any of the configuration settings are changed, ensure that the conflict monitor triggers and causes the program card indicator to flash. Ensure that configuration change faults are only reset by depressing and holding the front panel reset button for a minimum of three seconds. Ensure the external remote reset input does not reset configuration change faults.

Ensure the conflict monitor will trigger and the AC Power indicator will flash at a rate of 2 Hz ± 20% with a 50% duty cycle when the AC Line voltage falls below the "drop-out" level. Ensure the conflict monitor will resume normal operation when the AC Line voltage returns above the "restore" level. Ensure the AC Power indicator will remain illuminated when the AC voltage returns above the "restore" level. Should an AC Line power interruption occur while the monitor is in the fault mode, then upon restoration of AC Line power, the monitor will remain in the fault mode and the correct fault and channel indicators will be displayed.

Provide a flash interval of at least 6 seconds and at most 10 seconds in duration following a power-up, an AC Line interruption, or a brownout restore. Ensure the conflict monitor will suspend all fault monitoring functions, close the Output relay contacts, and flash the AC indicator at a rate of 4 Hz ± 20% with a 50% duty cycle during this interval. Ensure the termination of the flash interval after at least 6 seconds if the Watchdog input has made 5 transitions between the True and False state and the AC Line voltage is greater than the "restore" level. If the watchdog input has not made 5 transitions between the True and False state within 10 ± 0.5 seconds, the monitor shall enter a WDT error fault condition.

Ensure the conflict monitor will monitor an intersection with a minimum of four approaches using the four-section Flashing Yellow Arrow (FYA) vehicle traffic signal as outlined by the NCHRP 3-54 research project for protected-permissive left turn signal displays. Ensure the conflict monitor will operate in the FYA mode and FYAc (Compact) mode as specified below to monitor each channel pair for the following fault conditions: Conflict, Flash Rate Detection, Red Fail, Dual

Indication, and Clearance. Provide a switch to select between the FYA mode and FYAc mode. Provide a switch to select each FYA phase movement for monitoring.

FYA mode

FYA Signal Head	Phase 1	Phase 3	Phase 5	Phase 7
Red Arrow	Channel 9 Red	Channel 10 Red	Channel 11 Red	Channel 12 Red
Yellow Arrow	Channel 9 Yellow	Channel 10 Yellow	Channel 11 Yellow	Channel 12 Yellow
Flashing Yellow Arrow	Channel 9 Green	Channel 10 Green	Channel 11 Green	Channel 12 Green
Green Arrow	Channel 1 Green	Channel 3 Green	Channel 5 Green	Channel 7 Green

FYAc mode

FYA Signal Head	Phase 1	Phase 3	Phase 5	Phase 7
Red Arrow	Channel 1 Red	Channel 3 Red	Channel 5 Red	Channel 7 Red
Yellow Arrow	Channel 1 Yellow	Channel 3 Yellow	Channel 5 Yellow	Channel 7 Yellow
Flashing Yellow Arrow	Channel 1 Green	Channel 3 Green	Channel 5 Green	Channel 7 Green
Green Arrow	Channel 9 Green	Channel 9 Yellow	Channel 10 Green	Channel 10 Yellow

If a FYA channel pair is enabled for FYA operation, the conflict monitor will monitor the FYA logical channel pair for the additional following conditions:

1. **Conflict:** Channel conflicts are detected based on the permissive programming jumpers on the program card. This operation remains unchanged from normal operation except for the solid Yellow arrow (FYA clearance) signal.

2. **Yellow Change Interval Conflict:** During the Yellow change interval of the Permissive Turn channel (flashing Yellow arrow) the conflict monitor shall verify that no conflicting channels to the solid Yellow arrow channel (clearance) are active. These conflicting channels shall be determined by the program card compatibility programming of the Permissive Turn channel (flashing Yellow arrow). During the Yellow change interval of the Protected Turn channel (solid Green arrow) the conflict monitor shall verify that no conflicting channels to the solid Yellow arrow channel (clearance) are active as determined by the program card compatibility programming of the Protected Turn channel (solid Green arrow).
3. **Flash Rate Detection:** The conflict monitor unit shall monitor for the absence of a valid flash rate for the Permissive turn channel (flashing Yellow arrow). If the Permissive turn channel (flashing Yellow arrow) is active for a period greater than 1600 milliseconds, ensure the conflict monitor triggers and puts the intersection into flash. If the Permissive turn channel (flashing Yellow arrow) is active for a period less than 1400 milliseconds, ensure the conflict monitor does not trigger. Ensure the conflict monitor will remain in the triggered (in fault mode) state until the unit is reset at the front panel or through the external remote reset input. Provide a jumper or switch that will enable and disable the Flash Rate Detection function. Ensure that when the jumper is not present, or the switch is in the OFF position the Flash Rate Detection function is enabled. Ensure that when the jumper is present, or the switch is in the ON position the Flash Rate Detection function is disabled.
4. **Red Monitoring or Absence of Any Indication (Red Failure):** The conflict monitor unit shall detect a red failure if there is an absence of voltage on all four of the inputs of a FYA channel pair (RA, YA, FYA, GA).
5. **Dual Indications on the Same Channel:** The conflict monitor unit shall detect a dual indication if two or more inputs of a FYA channel pair (RA, YA, FYA, GA) are “on” at the same time.
6. **Short/Missing Yellow Indication Fault (Clearance Error):** The conflict monitor unit shall monitor the solid Yellow arrow for a clearance fault when terminating both the Protected Turn channel (solid Green arrow) interval and the Permissive Turn channel (flashing Yellow arrow) interval.

Ensure that the conflict monitor will log at least nine of the most recent events detected by the monitor in non-volatile EEPROM memory (or equivalent). For each event, record at a minimum the time, date, type of event, status of each field signal indication with RMS voltage, and specific channels involved with the event. Ensure the conflict monitor will log the following events: monitor reset, configuration, previous fault, and AC line. Furnish the signal sequence log that shows all channel states (Greens, Yellows, and Reds) and the Red Enable State for a minimum of 2 seconds prior to the current fault trigger point. Ensure the display resolution of the inputs for the signal sequence log is not greater than 50 ms.

For conflict monitors used within an Ethernet communications system, provide a conflict monitor with an Ethernet 10/100 Mbps, RJ-45 port for data communication access to the monitor by a local notebook computer and remotely via a workstation or notebook computer device connected to the signal system local area network. The Ethernet port shall be electrically isolated from the conflict monitor’s electronics and shall provide a minimum of 1500 Vrms isolation. Integrate

monitor with Ethernet network in cabinet. Provide software to retrieve the time and date from a network server in order to synchronize the on-board times between the conflict monitor and the controller. Furnish and install the following Windows based, graphic user interface software on workstations and notebook computers where the signal system client software is installed: 1) software to view and retrieve all event log information, 2) software that will search and display a list of conflict monitor IP addresses and IDs on the network, and 3) software to change the conflict monitor's network parameters such as IP address and subnet mask.

For non-Ethernet connected monitors, provide a RS-232C/D compliant port (DB-9 female connector) on the front panel of the conflict monitor in order to provide communications from the conflict monitor to the 170/2070 controller or to a Department-furnished laptop computer. Electrically isolate the port interface electronics from all monitor electronics, excluding Chassis Ground. Ensure that the controller can receive all event log information through a controller Asynchronous Communications Interface Adapter (Type 170E) or Async Serial Comm Module (2070). Furnish and connect a serial cable from the conflict monitor's DB-9 connector to Comm Port 1 of the 2070 controller. Ensure conflict monitor communicates with the controller. Provide a Windows based graphic user interface software to communicate directly through the same monitor RS-232C/D compliant port to retrieve and view all event log information to a Department-furnished laptop computer. The RS-232C/D compliant port on the monitor shall allow the monitor to function as a DCE device with pin connections as follows:

Conflict Monitor RS-232C/D (DB-9 Female) Pinout		
Pin Number	**Function**	**I/O**
1	DCD	O
2	TX Data	O
3	RX Data	I
4	DTR	I
5	Ground	-
6	DSR	O
7	CTS	I
8	RTS	O
9	NC	-

MONITOR BOARD EDGE CONNECTOR

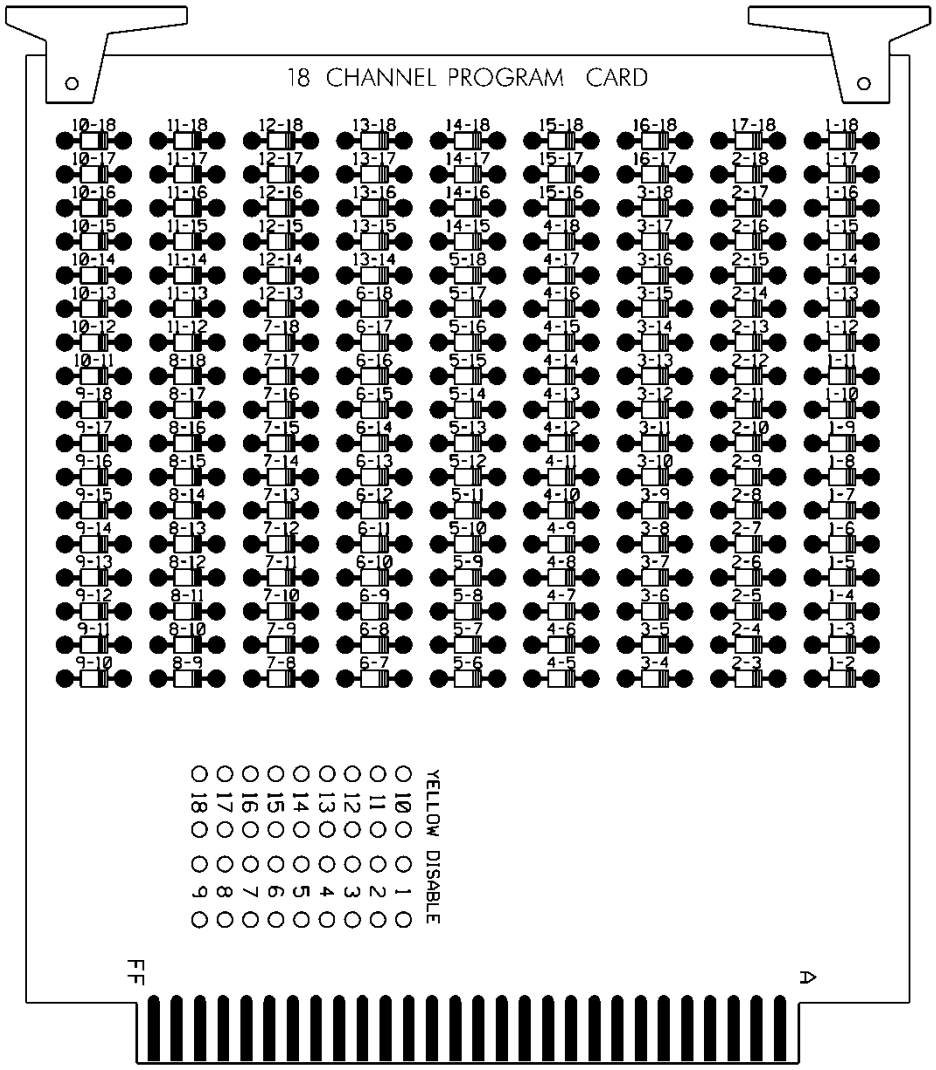
Pin #	Function (Back Side)	Pin #	Function (Component Side)
1	Channel 2 Green	A	Channel 2 Yellow
2	Channel 13 Green	B	Channel 6 Green
3	Channel 6 Yellow	C	Channel 15 Green
4	Channel 4 Green	D	Channel 4 Yellow
5	Channel 14 Green	E	Channel 8 Green
6	Channel 8 Yellow	F	Channel 16 Green
7	Channel 5 Green	H	Channel 5 Yellow
8	Channel 13 Yellow	J	Channel 1 Green
9	Channel 1 Yellow	K	Channel 15 Yellow
10	Channel 7 Green	L	Channel 7 Yellow
11	Channel 14 Yellow	M	Channel 3 Green
12	Channel 3 Yellow	N	Channel 16 Yellow
13	Channel 9 Green	P	Channel 17 Yellow
14	Channel 17 Green	R	Channel 10 Green
15	Channel 11 Yellow	S	Channel 11 Green
16	Channel 9 Yellow	T	Channel 18 Yellow
17	Channel 18 Green	U	Channel 10 Yellow
--		--	
18	Channel 12 Yellow	V	Channel 12 Green
19	Channel 17 Red	W	Channel 18 Red
20	Chassis Ground	X	Not Assigned
21	AC-	Y	DC Common
22	Watchdog Timer	Z	External Test Reset
23	+24VDC	AA	+24VDC
24	Tied to Pin 25	BB	Stop Time (Output)
25	Tied to Pin 24	CC	Not Assigned
26	Not Assigned	DD	Not Assigned
27	Relay Output, Side #3, N.O.	EE	Relay Output, Side #2,Common
28	Relay Output, Side #1, N.C.	FF	AC+

-- Slotted for keying between Pins 17/U and 18/V

CONFLICT PROGRAM CARD PIN ASSIGNMENTS

Pin #	Function (Back Side)	Pin #	Function (Component Side)
1	Channel 2 Green	A	Channel 1 Green
2	Channel 3 Green	B	Channel 2 Green
3	Channel 4 Green	C	Channel 3 Green
4	Channel 5 Green	D	Channel 4 Green
5	Channel 6 Green	E	Channel 5 Green
6	Channel 7 Green	F	Channel 6 Green
7	Channel 8 Green	H	Channel 7 Green
8	Channel 9 Green	J	Channel 8 Green
9	Channel 10 Green	K	Channel 9 Green
10	Channel 11 Green	L	Channel 10 Green
11	Channel 12 Green	M	Channel 11 Green
12	Channel 13 Green	N	Channel 12 Green
13	Channel 14 Green	P	Channel 13 Green
14	Channel 15 Green	R	Channel 14 Green
15	Channel 16 Green	S	Channel 15 Green
16	N/C	T	PC AJAR
17	Channel 1 Yellow	U	Channel 9 Yellow
18	Channel 2 Yellow	V	Channel 10 Yellow
19	Channel 3 Yellow	W	Channel 11 Yellow
20	Channel 4 Yellow	X	Channel 12 Yellow
21	Channel 5 Yellow	Y	Channel 13 Yellow
22	Channel 6 Yellow	Z	Channel 14 Yellow
23	Channel 7 Yellow	AA	Channel 15 Yellow
24	Channel 8 Yellow	BB	Channel 16 Yellow
--		--	
25	Channel 17 Green	CC	Channel 17 Yellow
26	Channel 18 Green	DD	Channel 18 Yellow
27	Channel 16 Green	EE	PC AJAR (Program Card)
28	Yellow Inhibit Common	FF	Channel 17 Green

-- Slotted for keying between Pins 24/BB and 25/CC



3.3. MATERIALS – TYPE 2070E CONTROLLERS

Furnish model 2070E controller units that conform to CALTRANS *Transportation Electrical Equipment Specifications* (TEES) (dated March 12, 2009, plus Errata 1 dated January 21, 2010 and Errata 2 dated December 5, 2014) except as required herein.

The Department will provide software at the beginning of the burning-in period. Contractor shall give 5 working days notice before needing software. Program software provided by the Department.

Provide model 2070E controllers with OS-9 release 1.3.1 or later with kernel edition #380 or later operating software and device drivers, composed of the unit chassis and at a minimum the following modules and assemblies:

- MODEL 2070-1E, CPU Module, Single Board, with 8Mb Datakey (blue in color)
- MODEL 2070-2E+, Field I/O Module (FI/O)
    - Note: Configure the Field I/O Module to disable both the External WDT Shunt/Toggle Switch and SP3 (SP3 active indicator is “off”)

- MODEL 2070-3B, Front Panel Module (FP), Display B (8x40)
- MODEL 2070-4A, Power Supply Module, 10 AMP
- MODEL 2070-7A, Async Serial Com Module (9-pin RS-232)

4. MICROWAVE VEHICLE DETECTION SYSTEM - MULTIPLE DETECTION ZONES

4.1. DESCRIPTION

Design, furnish and install a microwave vehicle detection system with the manufacturer recommended cables and hardware in accordance to the plans and specifications. Ensure the detection system provides multiple detection zones.

4.2. MATERIALS

Provide design drawings showing design details and microwave sensor locations for review and acceptance before installation. Provide mounting height and location requirements for microwave sensor units on the design based on a site survey. Design microwave vehicle detection system with all necessary hardware. Indicate all necessary poles, spans, mast arms, luminaire arms, cables, microwave sensor mounting assemblies and hardware to achieve the required detection zones where Department owned poles are not adequate to locate the microwave sensor units. Do not design for the installation of poles in medians.

Obtain the Engineer's approval before furnishing microwave vehicle detection system. The contractor is responsible for the final design of microwave vehicle detection system. Review and acceptance of the designs by the Department does not relieve the contractor from the responsibility to provide fully functional systems and to ensure that the required detection zones can be provided. With the exception of contractor-furnished poles, mast arms, and luminaire arms, furnish material, equipment, and hardware under this section that is pre-approved on the ITS and Signals QPL. Submit and obtain Engineer's approval of shop drawings for any poles, mast arms, and luminaire arms provided by the contractor prior to ordering from manufacturer.

Provide a detector for either side-fire or forward-fire configuration. Ensure the detector will detect vehicles in sunny, cloudy, rainy, snowy, and foggy weather conditions. Ensure the detector can operate from the voltage supplied by a NEMA TS-1/TS-2 or Type 332 or 336 traffic signal cabinet. Ensure the detector can provide detection calls to the traffic signal controller within a NEMA TS-1/TS-2 or Type 332 or 336 cabinet. Ensure the detection system provides a constant call in the event of a component failure or loss of power. Ensure the detector has an operating temperature range of -30 to 165 degrees F and operates within the frequency range of 10 to 25 GHz. Ensure the detector is provided with a water-tight housing offering NEMA 4X protection and operates properly in up to 95% relative humidity, non-condensing.

Provide each detector unit to allow the placement of at least 8 detection zones with a minimum of 8 detection channel outputs. When the microwave vehicle detection system requires an integrated card rack interface(s), provide only enough interface cards to implement the vehicle detection shown on the signal plans. Provide a means acceptable to the Engineer to configure traffic lanes and detection zones. Provide each channel output with a programmable means to delay the output call upon activation of a detection zone that is adjustable in one second increments (maximum) over the range of 0 to 25 seconds. Provide each channel output with a programmable means to extend the

output call that is adjustable in one second increments (maximum) over the range of 0 to 25 seconds. Ensure both delay and extend timing can be set for the same channel output.

For advance detection system, ensure the detector senses vehicles in motion at a range of 50 to 400 feet from the detector unit for forward-fire configuration and a range of 50 to 200 feet from the detector unit for side-fire configuration with an accuracy of 95% for both configurations. Ensure the advance detection system provides each channel output call of at least 100 ms in duration.

For stop bar presence detection system, ensure the detector outputs a constant call while a vehicle is in the detection zone and removes the call after all vehicles exit the detection zone. Ensure the presence detector unit can cover a detection zone as shown on the plans and has an effective range of 10 to 120 feet from the detector unit.

For units without an integrated card rack interface, provide Form C output relay contacts rated a minimum of 3A, 24VDC.

If a laptop is used to adjust detector settings, ensure that software is licensed for use by the Department and by any other agency responsible for maintaining or operating the microwave detection system. Provide the Department with a license to duplicate and distribute the software as necessary for design and maintenance support.

After initial detector configuration and installation, ensure routine adjustments or calibration are not needed to maintain acceptable performance.

4.3. CONSTRUCTION METHODS

Install the microwave vehicle detection system in accordance with the manufacturer's recommendations.

Monitor and maintain each detector unit during construction to ensure microwave vehicle detection system is functioning properly and aimed for the detection zone shown in the plans. Refer to Subarticle 1700-3 (D) Maintenance and Repair of Materials of the *Standard Specifications* for failure to maintain the microwave detection system.

4.4. MEASUREMENT AND PAYMENT

Actual number of microwave vehicle detection systems – multiple zones furnished, installed, and accepted.

No measurement will be made of cables or hardware, as these will be considered incidental to furnishing and installing microwave vehicle detection systems.

Payment will be made under:

Pay Item	Pay Unit
Microwave Vehicle Detection System – Multiple Zones	Each

5. TRAFFIC SIGNAL SUPPORTS

5.1. METAL TRAFFIC SIGNAL SUPPORTS – ALL POLES

A. General

Furnish and install metal poles with mast arms, grounding systems, and all necessary hardware. The work covered by this special provision includes requirements for the design, fabrication, and installation of both standard and custom/site specifically designed metal traffic signal supports and associated foundations.

Provide metal traffic signal support systems that contain no guy assemblies, struts, or stay braces. Provide designs of completed assemblies with hardware that equals or exceeds AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* 6th Edition, 2013 (hereafter called 6th Edition AASHTO), including the latest interim specifications. Provide assemblies with a round or near-round (18 sides or more) cross-section, or a multi sided cross section with no less than six sides. The sides may be straight, convex, or concave.

Pole heights shown on signal plans are estimated from available data for bid purposes. Prior to furnishing metal signal poles, use field measurements and adjusted cross-sections to determine whether pole heights are sufficient to obtain required clearances. If pole heights are not sufficient, the Contractor should immediately notify the Engineer of the required revised pole heights.

Ensure that metal signal poles permit cables to be installed inside poles and any required mast arms. For holes in the poles and arms used to accommodate cables, provide full-circumference grommets. Arm flange plate wire access holes should be deburred, non grommeted, and oversized to fit around the 2” diameter grommeted shaft flange plate wire access hole.

After fabrication, have steel poles, required mast arms, and all parts used in the assembly hot-dip galvanized per section 1076. Design structural assemblies with weep holes large enough and properly located to drain molten zinc during the galvanization process. Provide hot-dip galvanizing on structures that meets or exceeds ASTM Standard A-123. Provide galvanizing on hardware that meets or exceeds ASTM Standard A-153. Ensure that threaded material is brushed and retapped as necessary after galvanizing. Perform repair of damaged galvanizing that complies with the following:

Repair of Galvanizing.....Article 1076-7

Standard Drawings for Metal Poles are available that supplement these project special provisions. These drawings are located on the Department’s website:

https://connect.ncdot.gov/resources/safety/pages/ITS-Design-Resources.aspx

Comply with article 1098-1B of the *2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES*, hereinafter referred to as the *Standard Specifications* for submittal requirements. Furnish shop drawings for approval. Provide the copies of detailed shop drawings for each type of structure as summarized below. Ensure that shop drawings include material specifications for each component and identify welds by type and size on the detail drawing only, not in table format. **Do not release structures for fabrication until shop drawings have been approved by NCDOT**. Provide an itemized bill of materials for all structural components and associated connecting hardware on the drawings.

Comply with article 1098-1A of the *Standard Specifications* for Qualified Products List (QPL) submittals. All shop drawings must include project location description, signal inventory number(s) and a project number or work order number on the drawings.

Summary of information required for metal pole review submittal:

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Sealed, Approved Signal Plan/Loading Diagram	1	1	All structure design information needs to reflect the latest approved signal plans
Custom Pole Shop Drawings	4 sets	1 set	Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a unique drawing number for each project and identified for multiple pages.
Standard Pole Shop Drawings (from the QPL)	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a unique drawing number for each project and identified for multiple pages.
Structure Calculations	1 set	1 set	Not required for Standard QPL Poles
Standard Pole Foundation Drawings	1 set	1 set	Submit drawings on 11" x 17" format media. Submit a completed Standard Foundation Selection form for each pole using foundation table on Metal Pole Drawing M-8.
Custom Foundation Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a unique drawing number for each project and identified for multiple pages. If QPL Poles are used, include the corresponding QPL pole shop drawings with this submittal.
Foundation Calculations	1	1	**Submit copies of LPILE input, output and pile tip deflection graph per Section 11.4 of this specification for each foundation.** Not required for Standard QPL Poles
Soil Boring Logs and Report	1	1	Report should include a location plan and a soil classification report including soil capacity, water level, hammer efficiency, soil bearing pressure, soil density, etc. for each pole.

NOTE – All shop drawings and custom foundation design drawings must be sealed by a Professional Engineer licensed in the state of North Carolina. All geotechnical information must be sealed by either a Professional Engineer or geologist licensed in the state of North Carolina. Include a title block and revision block on the shop drawings and foundation drawings showing the NCDOT inventory number.

Shop drawings and foundation drawings may be submitted together or separately for approval. However, shop drawings must be approved before foundations can be reviewed. Foundation designs will be returned without review if the associated shop drawing has not been approved. Boring reports should include the following: Engineer's summary, boring location maps, soil classification per AASHTO Classification System, hammer efficiency, and Metal Pole Standard Foundation Selection Form. Incomplete submittals will be returned without review. The Reviewer has the right to request additional analysis and copies of the calculations to expedite the approval process.

B. Materials

Fabricate metal pole and arm shaft from coil or plate steel to meet the requirements of ASTM A 595 Grade A tubes. For structural steel shapes, plates and bars use A572 Gr 50 min or ASTM A709 Gr 50 min. Provide pole and arm shafts that are round in cross section or multisided tubular shapes and have a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single ply plate or coil so there are no circumferential weld splices. Galvanize in accordance with AASHTO M 111 or an approved equivalent.

Use the submerged arc process or other NCDOT previously approved process suitable for pole shaft and arms to continuously weld pole shafts and arm shafts along their entire length. The longitudinal seam weld will be finished flush to the outside contour of the base metal. Ensure shafts have no circumferential welds except at the lower end joining the shaft to the pole base and arm base. Use full penetration groove welds with backing ring for all tube-to-transverse-plate connections in accordance with 6th Edition AASHTO. Provide welding that conforms to Article 1072-18 of the *Standard Specifications*, except that no field welding on any part of the pole will be permitted unless approved by a qualified engineer.

Refer to Metal Pole Standard Drawing Sheets M2 through M5 for fabrication details. Fabricate anchor bases and mast arm connecting plates from plate steel meeting, as a minimum, the requirements of ASTM A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr50, or an approved equivalent. Conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

Ensure all hardware is galvanized steel or stainless steel. The Contractor is responsible for ensuring that the designer/fabricator specifies connecting hardware and/or materials that do not create a dissimilar metal corrosive reaction.

Provide a minimum of four (4) 1-1/2" diameter high strength bolts for connection between arm plate and pole plate. Increase number of bolts to six (6) 1-1/2" diameter high strength bolts when arm lengths are greater than 50'-0" long.

Unless otherwise required by the design, ensure each anchor rod is 2" diameter and 60" length. Provide 10" minimum thread projection at the top of the rod, and 8" minimum at the bottom of the rod. Use anchor rod assembly and drilled pier foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For each structural bolt and other steel hardware, hot dip galvanizing shall conform to the requirements of AASHTO M 232 (ASTM A 153). Ensure end caps for poles or mast arms are constructed of cast aluminum conforming to Aluminum Alloy 356.0F.

Provide a circular anchor bolt lock plate that will be secured to the anchor bolts at the embedded end with 2 washers and 2 nuts. Provide a base plate template that matches the bolt circle diameter of the anchor bolt lock plate. Construct plates and templates from ¼" minimum thick steel with a minimum width of 4". Galvanizing is not required for both plates.

Provide 4 heavy hex nuts and 4 flat washers for each anchor bolt. For nuts, use AASHTO M291 grade 2H, DH, or DH3 or equivalent material. For flat washers, use AASHTO M293 or equivalent material.

C. Construction Methods

Erect signal support poles only after concrete has attained a minimum allowable compressive strength of 3000 psi. Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For further construction methods, see construction methods for Metal Pole with Mast Arm.

Connect poles to grounding electrodes and bond them to the electrical service grounding electrodes.

For holes in the poles used to accommodate cables, install grommets before wiring pole or arm. Do not cut or split grommets.

Attach the terminal compartment cover to the pole by a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cover to hang clear of the compartment opening when the cover is removed, and is strong enough to prevent vandalism. Ensure the chain or cable will not interfere with service to the cables in the pole base.

Attach cap to pole with a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cap to hang clear of the opening when the cap is removed.

Perform repair of damaged galvanizing that complies with the *Standard Specifications*, Article 1076-7 "Repair of Galvanizing."

Install galvanized wire mesh around the perimeter of the base plate to cover the gap between the base plate and top of foundation for debris and pest control.

Install a ¼" thick plate for concrete foundation tag to include: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation.

5.2. METAL POLE UPRIGHTS (VERTICAL MEMBERS)

A. Materials

- Provide tapered tubular shafts and fabricated of steel conforming to ASTM A-595 Grade A or an approved equivalent.
- Hot-dip galvanize poles in accordance with AASHTO M 111 or an approved equivalent.
- Have shafts that are continuously welded for the entire length by the submerged arc process, and with exposed welds ground or rolled smooth and flush with the base metal.

Provide welding that conforms to Article 1072-18 of the *Standard Specification* except that no field welding on any part of the pole will be permitted.

- Have Shafts with no circumferential welds except at the lower end joining the shaft to the base.
- Have anchor bases for steel poles fabricated from plate steel meeting as a minimum the requirements of ASTM A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr 50, or an approved equivalent.

Provide a grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 or #6 AWG wire to bond messenger cables to the pole in order to provide an effective ground fault circuit path. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

Have poles permanently stamped above the hand holes with the identification tag details as shown on Metal Pole Standard Drawing Sheet M2.

Provide liquid tight flexible metal conduit (Type LFMC), liquid tight flexible nonmetallic conduit (Type LFNC), high density polyethylene conduit (Type HDPE), or approved equivalent to isolate conductors feeding luminaires.

Fabricate poles from a single piece of steel or aluminum with single line seam weld with no transverse butt welds. Fabrication of two-ply pole shafts is unacceptable with the exception of fluted shafts. Provide tapers for all shafts that begin at base and that have diameters which decrease uniformly at the rate of not more than 0.14 inch per foot (11.7 millimeters per meter) of length.

Provide four anchor nuts and four washers for each anchor bolt. Ensure that anchor bolts have required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

Provide a terminal compartment with cover and screws in each pole that encompasses the hand hole and contains a 12-terminal barrier type terminal block. Provide two terminal screws with a removable shorting bar between them for each termination. Furnish terminal compartment covers attached to the pole by a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cover to hang clear of the compartment opening when the cover is removed, and is strong enough to prevent vandals from being able to disconnect the cover from the pole. Ensure that the chain or cable will not interfere with service to the cables in the pole base.

Install grounding lugs that will accept #4 or #6 AWG wire to electrically bond messenger cables to the pole. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

For each pole, provide a 1/2-inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate #6 AWG ground wire. Ensure that the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

Provide a removable pole cap with stainless steel attachment screws for the top of each pole. Ensure that the cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the pole with a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cap to hang clear of the pole-top opening when the cap is removed.

When required by the plans, furnish couplings 42 inches above the bottom of the base for mounting of pedestrian pushbuttons. Provide mounting points consisting of 1-1/2 inch internally

threaded half-couplings that comply with the NEC and that are mounted within the poles. Ensure that couplings are essentially flush with the outside surfaces of the poles and are installed before any required galvanizing. Provide a threaded plug in each mounting point. Ensure that the surface of the plug is essentially flush with the outer end of the mounting point when installed and has a recessed hole to accommodate a standard wrench.

5.3. MAST ARM POLE SHAFTS

Ensure that allowable pole deflection does not exceed that allowed per 6th Edition AASHTO. Ensure that maximum angular rotation of the top of the mast arm pole does not exceed 1 degree 40 minutes (1°40').

A. Construction Methods

Install metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Install metal poles so that when the pole is fully loaded it is within 1 degree 40 minutes (1°40') of vertical. Install poles with the manufacturer's recommended "rake." Use threaded leveling nuts to establish rake if required.

5.4. MAST ARMS

Provide pole plates and associated gussets and fittings for attachment of required mast arms. As part of each mast arm attachment, provide a cable passage hole in the pole to allow passage of signal cables from the pole to the arm.

Ensure that allowable mast arm deflection does not exceed that allowed per 6th Edition AASHTO. Also, when arm is fully loaded, tip of the arm shall not go below the arm attachment point with the pole for all load conditions per 6th Edition AASHTO.

Furnish all arm plates and necessary attachment hardware, including bolts and brackets.

Provide two extra bolts for each arm.

Provide grommet holes on the arms to accommodate cables for the signals.

Provide arms with weatherproof connections for attaching to the shaft of the pole.

Provide hardware that is galvanized steel, stainless steel, or corrosive-resistant aluminum.

Provide a removable end cap with stainless steel attachment screws for the end of each mast arm. Ensure that the cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the arm with a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cap to hang clear of the arm end opening when the cap is removed.

A. Materials

After all fabricating, cutting, punching, and welding are completed, hot-dip galvanize the structure in accordance with the AASHTO M 111 or an approved equivalent.

B. Construction Methods

Install horizontal-type arms with sufficient manufactured rise to keep arm from deflecting below the arm attachment height.

Attach cap to the mast arm with a sturdy chain or cable. Ensure that the chain or cable is long enough to permit the cap to hang clear of the arm opening when the cap is removed.

For mast arm poles, use full penetration welds with back-up ring at the pole base and at the arm base connection.

5.5. DRILLED PIER FOUNDATIONS FOR METAL TRAFFIC SIGNAL POLES

Analysis procedures and formulas shall be based on AASHTO 6th Edition, latest ACI code and the *Drilled Shafts: Construction Procedures and Design Methods* FHWA-NHI-10-016 manual. Design methods based on engineering publications or research papers needs to have prior approval from NCDOT. The Department reserves the right to accept or disapprove any method used for the analysis.

Use a Factor of Safety of 1.33 for torsion and 2.0 for bending for the foundation design.

Foundation design for lateral load shall not exceed 1" lateral deflection at top of foundation.

For lateral analysis, use LPILE Plus V6.0 or later. Inputs, results and corresponding graphs are to be submitted with the design calculations.

Skin Friction is to be calculated using the α-method for cohesive soils and the β-method for cohesion-less soils (**Broms method will not be accepted**). Detailed descriptions of the "α" and "β" methods can be found in *FHWA-NHI-10-016*.

Omit first 2.5ft for cohesive soils when calculating skin friction.

When hammer efficiency is not provided, assume a value of 0.70.

Design all custom foundations to carry the maximum capacity of each metal pole. For standard case strain poles only, if a custom foundation is designed, use the actual shear, axial and moment reactions from the Standard Foundation Selection Table shown on Standard Drawing No. M8.

When poor soil conditions are encountered which could create an excessively large foundation design, consideration may be given to allowing an exemption to the maximum capacity design. The contractor must gain approval from the engineer before reducing a foundation's capacity. On projects where poor soil is known to be present, it is advisable that the contractor consider getting foundations approved before releasing poles for fabrication.

Have the contractor notify the engineer if the proposed foundation is to be installed on a slope other than 8H: 1V or flatter.

A. Description

Furnish and install foundations for NCDOT metal poles with all necessary hardware in accordance with the plans and specifications.

Metal Pole Standards have been developed and implemented by NCDOT for use at signalized intersections in North Carolina. If the plans call for a standard pole, then a standard foundation may be selected from the plans. However, the Contractor is not required to use a standard foundation. If the Contractor chooses to design a non-standard site-specific foundation for a standard pole or if the plans call for a non-standard site-specific pole, design the foundation to conform to the applicable provisions in the NCDOT Metal Pole Standard Drawings and Section B7 (Non-Standard Foundation Design) below. If non-standard site-specific foundations are designed for standard QPL approved strain poles, the foundation designer must use the design moment specified by load case on Metal Pole Standard Drawing Sheet M8. Failure to conform to this requirement will be grounds for rejection of the design.

If the Contractor chooses to design a non-standard foundation for a standard pole and the soil test results indicate a standard foundation is feasible for the site, the Contractor will be paid the cost of the standard foundation (drilled pier and wing wall, if applicable). Any additional costs associated with a non-standard site-specific foundation including additional materials, labor and equipment will be considered incidental to the cost of the standard foundation. All costs for the non-standard foundation design will also be considered incidental to the cost of the standard foundation.

B. Soil Test and Foundation Determination

1. General:

Drilled piers are reinforced concrete sections, cast-in-place against in situ, undisturbed material. Drilled piers are of straight shaft type and vertical.

Some standard drilled piers for supporting poles with mast arms may require wing walls to resist torsional rotation. Based upon this provision and the results of the required soil test, a drilled pier length and wing wall requirement may be determined and constructed in accordance with the plans.

For non-standard site-specific poles, the contractor-selected pole fabricator will determine if the addition of wing walls is necessary for the supporting foundations.

2. Soil Test:

Perform a soil test at each proposed metal pole location. Complete all required fill placement and excavation at each signal pole location to finished grade before drilling each boring. Soil tests performed that are not in compliance with this requirement may be rejected and will not be paid. Drill one boring to a depth of 26 feet within a 25-foot radius of each proposed foundation.

Perform standard penetration tests (SPT) in accordance with ASTM D 1586 at depths of 1, 2.5, 5, 7.5, 10, 15, 20 and 26 feet. Discontinue the boring if one of the following occurs:

- A total of 100 blows have been applied in any 2 consecutive 6-in. intervals.
- A total of 50 blows have been applied with < 3-in. penetration.

Describe each intersection as the "Intersection of (*Route or SR #*), *(Street Name)* and (*Route or SR #*), *(Street Name)*, _____ County, Signal Inventory No. _____". Label borings with "B-*N, S, E, W, NE, NW, SE or SW*" corresponding to the quadrant location within the intersection. Pole numbers should be made available to the Drill Contractor. Include pole numbers in the boring label if they are available. If they are not available, ensure the boring labels can be cross-referenced to corresponding pole numbers. For each boring, submit a legible (handwritten or typed) boring log signed and sealed by a licensed Geologist or Professional Engineer registered in North Carolina. Include on each boring the SPT blow counts and N-values at each depth, depth of the boring, hammer efficiency, depth of water table and a general description of the soil types encountered using the AASHTO Classification System.

3. Standard Foundation Determination:

Use the following method for determining the Design N-value:

$$N_{AVG} = \frac{(N@1' + N@2.5' + \ldots\ldots\ldots N@\text{Deepest Boring Depth})}{\text{Total Number of N-values}}$$

$$Y = (N@1')^2 + (N@2.5')^2 + \ldots\ldots\ldots (N@\text{Deepest Boring Depth})^2$$

$$Z = (N@1' + N@2.5' + \ldots\ldots\ldots N@\text{Deepest Boring Depth})$$

$$N_{STD\ DEV} = \left(\frac{(\text{Total Number of N-values} \times Y) - Z^2}{(\text{Total Number of N-values}) \times (\text{Total Number of N-values} - 1)} \right)^{0.5}$$

Design N-value equals lesser of the following two conditions:

$N_{AVG} - (N_{STD\ DEV} \times 0.45)$

Or

$$\text{Average of First Four N-Values} = \frac{(N@1' + N@2.5' + N@5' + N@7.5')}{4}$$

Note: If less than 4 N-values are obtained because of criteria listed in Section 2 above, use average of N-values collected for second condition. Do not include the N-value at the deepest boring depth for above calculations if the boring is discontinued at or before the required boring depth because of criteria listed in Section 2 above. Use N-value of zero for weight of hammer or weight of rod. If N-value is greater than 50, reduce N-value to 50 for calculations.

If standard NCDOT strain poles are shown on the plans and the Contractor chooses to use standard foundations, determine a drilled pier length, "L," for each signal pole from the Standard Foundations Chart (sheet M 8) based on the Design N-value and the predominant soil type. For each standard pole location, submit a completed "Metal Pole Standard Foundation Selection Form" signed by the Contractor's representative. Signature on form is for verification purposes only. Include the Design N-value calculation and resulting drilled pier length, "L," on each form.

If non-standard site-specific poles are shown on the plans, submit completed boring logs collected in accordance with Section 2 (Soil Test) above along with pole loading diagrams from the plans to the contractor-selected pole fabricator to assist in the pole and foundation design.

If one of the following occurs, the Standard Foundations Chart shown on the plans may not be used and a non-standard foundation may be required. In such case, contact the Engineer.

- The Design N-value is less than 4.
- The drilled pier length, "L", determined from the Standard Foundations Chart, is greater than the depth of the corresponding boring.

In the case where a standard foundation cannot be used, the Department will be responsible for the additional cost of the non-standard foundation.

Foundation designs are based on level ground around the traffic signal pole. If the slope around the edge of the drilled pier is steeper than 8:1 (H:V) or the proposed foundation will be less than 10 feet from the top of an embankment slope, the Contractor is responsible for providing slope information to the foundation designer and to the Engineer so it can be considered in the design.

The "Metal Pole Standard Foundation Selection Form" may be found at:

http://www.ncdot.gov/doh/preconstruct/highway/geotech/formdet/misc/MetalPole.pdf

If assistance is needed, contact the Engineer.

4. Non-Standard Foundation Design:

Design non-standard foundations based upon site-specific soil test information collected in accordance with Section 2 (Soil Test) above. Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*. Use the computer software LPILE version 6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Use the computer software gINT V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide a drilled pier foundation for each pole with a length and diameter that result in a horizontal lateral movement of less than 1 inch at the top of the pier and a horizontal rotational movement of less than 1 inch at the edge of the pier. Contact the Engineer for pole loading diagrams for standard poles to be used for non-standard foundation designs. Submit any non-standard foundation designs including drawings, calculations, and soil boring logs to the Engineer for review and approval before construction.

C. Drilled Pier Construction

Construct drilled pier foundation and Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* Standard Special Provision SP09-R005 located at:

https://connect.ncdot.gov/resources/Specifications/Pages/2018-Specifications-and-Special-Provisions.aspx

5.6. METAL POLE REMOVALS

A. Description:

Remove and dispose of existing metal support poles, and remove and dispose of existing foundations, associated anchor bolts, electrical wires and connections.

B. Construction Methods:

1. Foundations:

Remove and promptly dispose of the metal support pole foundations including reinforcing steel, electrical wires, and anchor bolts to a minimum depth of 2 feet below the finished ground elevation. At the Contractor’s option, remove the complete foundation.

2. Metal Poles:

Consult Division Traffic Services regarding ownership of poles. If the Division chooses to maintain these structures in their inventory for future use, permanently mark the pole with the signal inventory number, asset inventory number or some identifying information that identifies where the pole came from

Remove the metal support poles, and promptly transport the metal support poles from the project. Use methods to remove the metal support poles and attached equipment that will not result in damage to other portions of the project or facility. Repair damages that are a result of the Contractor's actions at no additional cost to the Department.

Transport and properly dispose of the materials.

Backfill and compact disturbed areas to match the finished ground elevation. Seed unpaved areas.

Use methods to remove the foundations that will not result in damage to other portions of the project or facility. Repair damages that are a result of the Contractor's actions at no cost to the Department.

5.7. CUSTOM DESIGN OF TRAFFIC SIGNAL SUPPORTS

A. General

Design traffic signal supports with foundations consisting of metal poles with mast arms.

The lengths of the metal signal poles shown on the plans are estimated from available data for bid purposes. Determine the actual length of each pole from field measurements and adjusted cross-sections. Furnish the revised pole heights to the Engineer. Use all other dimensional requirements shown on the plans.

Ensure each pole includes an identification tag with information and location positions as defined on Metal Pole Standard Drawing Sheets M2, M3 and M4. All pole shaft tags must include the NCDOT Inventory number followed by the pole number shown on the traffic signal or ITS (non-signalized locations) plan.

Design all traffic signal support structures using the following 6th Edition AASHTO specifications:

- Design for a 50-year service life as recommended by Table 3.8.3-2.
- Use the wind pressure map developed from 3-second gust speeds, as provided in Article 3.8.
- Ensure signal support structures include natural wind gust loading and truck-induced gust loading in the fatigue design, as provided for in Articles 11.7.1.2 and 11.7.1.3, respectively. Designs need not consider periodic galloping forces.
- Assume the natural wind gust speed in North Carolina is 11.2 mph. For natural wind fatigue stress calculations, utilize a drag coefficient (C_d) computed for 11.2 mph wind velocity and not the basic wind speed velocity.
- Design for Category II fatigue, as provided for in Article 11.6, unless otherwise specified.
- Calculate all stresses using applicable equations from Section 5. The Maximum allowable stress ratios for all signal support designs are 0.9.
- Conform to article 10.4.2 and 11.8 for all deflection requirements.

Ensure that the design permits cables to be installed inside poles and mast arms.

Unless otherwise specified by special loading criteria, the computed surface area for ice load on signal heads is:

- 3-section, 12-inch, Surface area: 26.0 ft^2 (17.0 ft^2 without back plate)
- 4-section, 12-inch, Surface area: 32.0 ft^2 (21.0 ft^2 without back plate)
- 5-section, 12-inch, Surface area: 42.0 ft^2 (29.0 ft^2 without back plate)

The ice loading for signal heads defined above includes the additional surface area that back plates will induce. Special loading criteria may be specified in instances where back plates will not

be installed on signal heads. Refer to the Loading Schedule on each Metal Pole Loading Diagram for revised signal head surface areas. The pole designer should revise ice loads accordingly in this instance. Careful examination of the plans when this is specified is important as this may impact sizing of the metal support structure and foundation design which could affect proposed bid quotes. All maximum stress ratios of 0.9 still apply.

Assume the combined minimum weight of a messenger cable bundle (including messenger cable, signal cable and detector lead-in cables) is 1.3 lbs/ft. Assume the combined minimum diameter of this cable bundle is 1.3 inches.

Ensure that designs provide a removable pole cap with stainless steel attachment screws for each pole top and mast arm end.

B. Metal Poles

Submit design drawings for approval including pre-approved QPL pole drawings. Show all the necessary details and calculations for the metal poles including the foundation and connections. Include NCDOT inventory number on design drawings. Include as part of the design calculations the ASTM specification numbers for the materials to be used. Provide the types and sizes of welds on the design drawings. Include a Bill of Materials on design drawings. Ensure design drawings and calculations are signed, dated, and sealed by the responsible professional engineer licensed in the state of North Carolina. Immediately bring to the attention of the Engineer any structural deficiency that becomes apparent in any assembly or member of any assembly as a result of the design requirements imposed by these specifications, the plans, or the typical drawings. Said Professional Engineer is wholly responsible for the design of all poles and arms. Review and acceptance of these designs by the Department does not relieve the said Professional Engineer of his responsibility. **Do not fabricate the assemblies until receipt of the Department's approval of the design drawings.**

For mast arm poles, provide designs with provisions for pole plates and associated gussets and fittings for mast arm attachment. As part of each mast arm attachment, provide a grommeted 2" diameter hole on the shaft side of the connection to allow passage of the signal cables from the pole to the arm.

Where ice is present, assume wind loads as shown in Figure 3.9.4.2-3 of the 6th Edition AASHTO Specification for Group III loading.

For each strain pole, provide two messenger cable clamps and associated hardware to attach the messenger support cable. Ensure that the diameter of the clamps is appropriately designed to be adjustable from 1'-6" inches below the top, down to 6'-6" below the top of the pole. Do not attach more than one messenger support cable to a messenger cable clamp.

Provide a grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 or #6 AWG wire to bond messenger cables to the pole in order to provide an effective ground fault circuit path. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

Design tapers for all pole shafts that begin at the base with diameters that decrease uniformly at the rate of 0.14 inch per foot of length.

Design a base plate on each pole. The minimum base plate thickness for all poles is determined by the following criteria:

Case 1 Circular or rectangular solid base plate with the upright pole welded to the top surface of base plate with full penetration butt weld, and where no stiffeners are provided. A base plate with a small center hole, which is less than 1/3 of the upright diameter, and located concentrically with the upright pole, may be considered as a solid base plate.

The magnitude of bending moment in the base plate, induced by the anchoring force of each anchor bolt is $M = (P \times D_1) / 2$, where

M = bending moment at the critical section of the base plate induced by one anchor bolt

P = anchoring force of each anchor bolt

D_1 = horizontal distance between the anchor bolt center and the outer face of the upright, or the difference between the bolt circle radius and the outside radius of the upright

Locate the critical section at the face of the anchor bolt and perpendicular to the bolt circle radius. The overlapped part of two adjacent critical sections is considered ineffective.

Case 2 Circular or rectangular base plate with the upright pole socketed into and attached to the base plate with two lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/3 of the upright diameter.

The magnitude of bending moment induced by the anchoring force of each anchor bolt is $M = P \times D_2$,

where P = anchoring force of each anchor bolt

D_2 = horizontal distance between the face of the upright and the face of the anchor bolt nut

Locate the critical section at the face of the anchor bolt top nut and perpendicular to the radius of the bolt circle. The overlapped part of two adjacent critical sections is considered ineffective.

If the base plate thickness calculated for Case 2 is less than Case 1, use the thickness calculated for Case 1.

The following additional owner requirements apply concerning pole base plates.

- Ensure that whichever case governs as defined above, the anchor bolt diameter is set to match the base plate thickness. If the minimum diameter required for the anchor bolt exceeds the thickness required for the base plate, set the base plate thickness equal to the required bolt diameter.
- For dual mast arm supports, or for single mast arm supports 50’ or greater, use a minimum 8 bolt orientation with 2” diameter anchor bolts, and a 2” thick base plate.
- For all metal poles with mast arms, use a full penetration groove weld with a backing ring to connect the pole upright component to the base. Refer to Metal Pole Standard Drawing Sheet M4.

Ensure that designs have anchor bolt holes with a diameter 1/4 inch larger than the anchor bolt diameters in the base plate.

Ensure that the anchor bolts have the required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

Provide designs with a 6 x 12-inch hand hole with a reinforcing frame for each pole.

Provide designs with a terminal compartment with cover and screws in each pole that encompasses the hand hole and contains provisions for a 12-terminal barrier type terminal block.

For each pole, provide designs with provisions for a 1/2-inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate a #6 AWG ground wire. Ensure the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

When required, design couplings on the pole for mounting pedestrian pushbuttons at a height of 42 inches above the bottom of the base. Provide mounting points consisting of 1-1/2 inch internally threaded half-couplings that comply with the NEC that are mounted within the poles. Ensure the couplings are essentially flush with the outside surfaces of the poles and are installed before any required galvanizing. Provide a threaded plug for each half coupling. Ensure that the surface of the plug is essentially flush with the outer end of the mounting point when installed and has a recessed hole to accommodate a standard wrench.

C. Mast Arms

Design all arm plates and necessary attachment hardware, including bolts and brackets as required by the plans.

Design for grommeted holes on the arms to accommodate the cables for the signals if specified.

Design arms with weatherproof connections for attaching to the shaft of the pole.

Always use a full penetration groove weld with a backing ring to connect the mast arm to the pole. Refer to Metal Pole Standard Drawing Sheet M5.

Capacity of tapped flange plate must be sufficient to develop the full capacity of the connecting bolts. In all cases the flange plate of both arm and shaft must be at least as thick as the arm connecting bolts are in diameter.

1. Foundations:

Remove and promptly dispose of the metal signal pole foundations including reinforcing steel, electrical wires, and anchor bolts to a minimum depth of two feet below the finished ground elevation. At the Contractor’s option, remove the complete foundation.

2. Metal Poles:

Assume ownership of the metal signal poles, remove the metal signal poles, and promptly transport the metal signal poles from the project. Use methods to remove the metal signal poles and attached traffic signal equipment that will not result in damage to other portions of the project or facility. Repair damages that are a result of the Contractor's actions at no additional cost to the Department.

Transport and properly dispose of the materials.

Backfill and compact disturbed areas to match the finished ground elevation. Seed unpaved areas.

Use methods to remove the foundations that will not result in damage to other portions of the project or facility. Repair damages that are a result of the Contractor's actions at no cost to the Department.

5.8. POLE NUMBERING SYSTEM

A. New Poles

Attach an identification tag to each pole shaft and mast arm section as shown on Metal Pole Standard Drawing Sheet M2 “Typical Fabrication Details Common To All Metal Poles”.

5.9. MEASUREMENT AND PAYMENT

Actual number of metal poles with single mast arms furnished, installed, and accepted.

Actual number of metal poles with dual mast arms furnished, installed, and accepted.

Actual number of soil tests with SPT borings drilled furnished and accepted.

Actual volume of concrete poured in cubic yards of drilled pier foundation furnished, installed and accepted.

Actual number of designs for mast arms with metal poles furnished and accepted.

Actual number of metal signal pole foundations removed and disposed.

Actual number of metal signal poles removed and disposed.

No measurement will be made for foundation designs prepared with metal pole designs, as these will be considered incidental to designing signal support structures.

Payment will be made under:

Pay Item	Pay Unit
Metal Pole with Single Mast Arm	Each
Metal Pole with Dual Mast Arm	Each
Soil Test	Each
Drilled Pier Foundation	Cubic Yard
Mast Arm with Metal Pole Design	Each
Metal Pole Foundation Removal	Each
Metal Pole Removal	Each

6. ETHERNET EDGE SWITCH

Furnish and install a managed Ethernet edge switch as specified below that is fully compatible, interoperable, and completely interchangeable and functional within the existing City or Division traffic signal system communications network.

6.1. DESCRIPTION

A. Ethernet Edge Switch

Furnish and install a hardened, field Ethernet edge switch (hereafter “edge switch”) for traffic signal controllers as specified below. Ensure that the edge switch provides wire-speed, fast Ethernet connectivity at transmission rates of 100 megabits per second from each remote ITS device location to the routing switches.

Contact the City or Division to arrange for the programming of the new Field Ethernet Switches with the necessary network configuration data, including but not limited to, the Project IP Address, Default Gateway, Subnet Mask and VLAN ID information. Provide a minimum five (5) days working notice to allow the City or Division to program the new devices.

B. Network Management

Ensure that the edge switch is fully compatible with the City's or Division's existing Network Management Software.

6.2. MATERIALS

A. General

Ensure that the edge switch is fully compatible and interoperable with the trunk Ethernet network interface and that the edge switch supports half and full duplex Ethernet communications.

Furnish an edge switch that provide 99.999% error-free operation, and that complies with the Electronic Industries Alliance (EIA) Ethernet data communication requirements using single-mode fiber-optic transmission medium and copper transmission medium. Ensure that the edge switch has a minimum mean time between failures (MTBF) of 10 years, or 87,600 hours, as calculated using the Bellcore/Telcordia SR-332 standard for reliability prediction.

B. Compatibility Acceptance

The Engineer has the authority to require the Contractor to submit a sample Field Ethernet Switch and Field Ethernet Transceiver along with all supporting documentation, software and testing procedures to allow a compatibility acceptance test be performed prior to approving the proposed Field Ethernet Switch and Field Ethernet Transceiver for deployment**. The Compatibility Acceptance testing will ensure that the proposed device is 100% compatible and interoperable with the existing City Signal System network, monitoring software and Traffic Operations Center network hardware.** Allow fifteen (15) working days for the Compatibility Acceptance Testing to be performed

C. Standards

Ensure that the edge switch complies with all applicable IEEE networking standards for Ethernet communications, including but not limited to:

- IEEE 802.1D standard for media access control (MAC) bridges used with the Spanning Tree Protocol (STP);
- IEEE 802.1Q standard for port-based virtual local area networks (VLANs);
- IEEE 802.1P standard for Quality of Service (QoS);
- IEEE 802.1w standard for MAC bridges used with the Rapid Spanning Tree Protocol (RSTP);
- IEEE 802.1s standard for MAC bridges used with the Multiple Spanning Tree Protocol;
- IEEE 802.1x standard for port based network access control, including RADIUS;
- IEEE 802.3 standard for local area network (LAN) and metropolitan area network (MAN) access and physical layer specifications;
- IEEE 802.3u supplement standard regarding 100 Base TX/100 Base FX;
- IEEE 802.3x standard regarding flow control with full duplex operation; and
- IFC 2236 regarding IGMP v2 compliance.
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)

- IEEE 802.3ad Ethernet Link Aggregation
- IEEE 802.3i for 10BASE-T (10 Mbit/s over Fiber-Optic)
- IEEE 802.3ab for 1000BASE-T (1Gbit/s over Ethernet)
- IEEE 802.3z for 1000BASE-X (1 Gbit/s Ethernet over Fiber-Optic)

D. Functional

Ensure that the edge switch supports all Layer 2 management features and certain Layer 3 features related to multicast data transmission and routing. These features shall include, but not be limited to:

- An STP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1D standard.
- An RSTP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1w standard.
- An Ethernet edge switch that is a port-based VLAN and supports VLAN tagging that meets or exceeds specifications as published in the IEEE 802.1Q standard, and has a minimum 4-kilobit VLAN address table (254 simultaneous).
- A forwarding/filtering rate that is a minimum of 14,880 packets per second for 10 megabits per second and 148,800 packets per second for 100 megabits per second.
- A minimum 4-kilobit MAC address table.
- Support of Traffic Class Expediting and Dynamic Multicast Filtering.
- Support of, at a minimum, snooping of Version 2 & 3 of the Internet Group Management Protocol (IGMP).
- Support of remote and local setup and management via telnet or secure Web-based GUI and command line interfaces.
- Support of the Simple Network Management Protocol version 3 (SNMPv3). Verify that the Ethernet edge switch can be accessed using the resident EIA-232 management port, a telecommunication network, or the Trivial File Transfer Protocol (TFTP).
- Port security through controlling access by the users. Ensure that the Ethernet edge switch has the capability to generate an alarm and shut down ports when an unauthorized user accesses the network.
- Support of remote monitoring (RMON-1 & RMON-2) of the Ethernet agent.
- Support of the TFTP and SNTP. Ensure that the Ethernet edge switch supports port mirroring for troubleshooting purposes when combined with a network analyzer.

E. Physical Features

Ports: Provide 10/100/1000 Mbps auto-negotiating ports (RJ-45) copper Fast Ethernet ports for all edge switches. Provide auto-negotiation circuitry that will automatically negotiate the highest possible data rate and duplex operation possible with attached devices supporting the IEEE 802.3 Clause 28 auto-negotiation standard.

Optical Ports: Ensure that all fiber-optic link ports operate at 1310 or 1550 nanometers in single mode. Provide Type LC connectors for the optical ports, as specified in the Plans or by the Engineer. Do not use mechanical transfer registered jack (MTRJ) type connectors.

Provide an edge switch having a minimum of two optical 100/1000 Base X ports capable of transmitting data at 100/1000 megabits per second. Ensure that each optical port consists of a pair of fibers; one fiber will transmit (TX) data and one fiber will receive (RX) data. Ensure that the optical ports have an optical power budget of at least 15 dB.

Copper Ports: Provide an edge switch that includes a minimum of four copper ports. Provide Type RJ-45 copper ports and that auto-negotiate speed (i.e., 10/100/1000 Base) and duplex (i.e., full or half). Ensure that all 10/100/1000 Base TX ports meet the specifications detailed in this section and are compliant with the IEEE 802.3 standard pinouts. Ensure that all Category 5E unshielded twisted pair/shielded twisted pair network cables are compliant with the EIA/TIA-568-B standard.

*Port Security***:** Ensure that the edge switch supports/complies with the following (remotely) minimum requirements:

- Ability to configure static MAC addresses access;
- Ability to disable automatic address learning per ports; know hereafter as Secure Port. Secure Ports only forward; and
- Trap and alarm upon any unauthorized MAC address and shutdown for programmable duration. Port shutdown requires administrator to manually reset the port before communications are allowed.

F. Management Capabilities

Ensure that the edge switch supports all Layer 2 management features and certain Layer 3 features related to multicast data transmission and routing. These features shall include, but not be limited to:

- An STP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1 D standards;
- An RSTP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1w standard;
- An Ethernet edge switch that is a port-based VLAN and supports VLAN tagging that meets or exceeds specifications as published in the IEEE 802.1Q standard, and has a minimum 4-kilobit VLAN address table (254 simultaneous);
- A forwarding/filtering rate that is a minimum of 14,880 packets per second for 10 megabits per second, 148,800 packets per second for 100 megabits per second and 1,488,000 packets per second for 1000 megabits per second;
- A minimum 4-kilobit MAC address table;
- Support of Traffic Class Expediting and Dynamic Multicast Filtering.
- Support of, at a minimum, snooping of Version 2 & 3 of the Internet Group Management Protocol (IGMP);

- Support of remote and local setup and management via telnet or secure Web-based GUI and command line interfaces; and
- Support of the Simple Network Management Protocol (SNMP). Verify that the Ethernet edge switch can be accessed using the resident EIA-232 management port, a telecommunication network, or the Trivial File Transfer Protocol (TFTP).

*Network Capabilities***:** Provide an edge switch that supports/complies with the following minimum requirements:

- Provide full implementation of IGMPv2 snooping (RFC 2236);
- Provide full implementation of SNMPv1, SNMPv2c, and/or SNMPv3;
- Provide support for the following RMON–I groups, at a minimum:
  - Part 1: Statistics
  - Part 2: History
  - Part 3: Alarm
  - Part 9: Event
- Provide support for the following RMON–2 groups, at a minimum:
  - Part 13: Address Map
  - Part 16: Layer Host
  - Part 17:Layer Matrix
  - Part 18:User History
- Capable of mirroring any port to any other port within the switch;
- Meet the IEEE 802.1Q (VLAN) standard per port for up to four VLANs;
- Meet the IEEE 802.3ad (Port Trunking) standard for a minimum of two groups of four ports;
- Password manageable;
- Telnet/CLI;
- HTTP (Embedded Web Server) with Secure Sockets Layer (SSL); and
- Full implementation of RFC 783 (TFTP) to allow remote firmware upgrades.

*Network Security***:** Provide an edge switch that supports/complies with the following (remotely) minimum network security requirements:

- Multi-level user passwords;
- RADIUS centralized password management (IEEE 802.1X);
- SNMPv3 encrypted authentication and access security;
- Port security through controlling access by the users: ensure that the Ethernet edge switch has the capability to generate an alarm and shut down ports when an unauthorized user accesses the network;
- Support of remote monitoring (RMON-1&2) of the Ethernet agent; and
- Support of the TFTP and SNTP. Ensure that the Ethernet edge switch supports port mirroring for troubleshooting purposes when combined with a network analyzer.

G. Electrical Specifications

Ensure that the edge switch operates, and power is supplied with 115 volts of alternating current (VAC). Ensure that the edge switch has a minimum operating input of 110 VAC and a maximum operating input of 130 VAC. Ensure that if the device requires operating voltages other than 120 VAC, supply the required voltage converter. Ensure that the maximum power consumption does not exceed 50 watts. Ensure that the edge switch has diagnostic light emitting diodes (LEDs), including link, TX, RX, speed (for Category 5E ports only), and power LEDs.

H. Environmental Specifications

Ensure that the edge switch performs all of the required functions during and after being subjected to an ambient operating temperature range of -30 degrees to 165 degrees Fahrenheit as defined in the environmental requirements section of the NEMA TS 2 standard, with a noncondensing humidity of 0 to 95%.

Provide certification that the device has successfully completed environmental testing as defined in the environmental requirements section of the NEMA TS 2 standard. Provide certification that the device meets the vibration and shock resistance requirements of Sections 2.1.9 and 2.1.10, respectively, of the NEMA TS 2 standard. Ensure that the edge switch is protected from rain, dust, corrosive elements, and typical conditions found in a roadside environment.

The edge switch shall meet or exceed the following environmental standards:

- IEEE 1613 (electric utility substations)
- IEC 61850-3 (electric utility substations)
- IEEE 61800-3 (variable speed drive systems)
- IEC 61000-6-2 (generic industrial)
- EMF – FCC Part 15 CISPR (EN5502) Class A

I. Ethernet Patch Cable

Furnish a factory pre-terminated/pre-connectorized Ethernet patch cable with each edge switch. Furnish Ethernet patch cables meeting the following physical requirements:

- Five (5)-foot length
- Category 5e or better
- Factory-installed RJ-45 connectors on both ends
- Molded anti-snag hoods over connectors
- Gold plated connectors

Furnish Fast Ethernet patch cords meeting the following minimum performance requirements:

- TIA/EIA-568-B-5, Additional Transmission Performance Specifications for 4-pair 100 Ω Enhanced Category 5 Cabling
- Frequency Range: 1-100 MHz
- Near-End Crosstalk (NEXT): 30.1 dB
- Power-sum NEXT: 27.1 dB
- Attenuation to Crosstalk Ratio (ACR): 6.1 dB
- Power-sum ACR: 3.1 dB
- Return Loss: 10dB
- Propagation Delay: 548 nsec

6.3. CONSTRUCTION METHODS

A. General

Ensure that the edge switch is UL listed.

Verify that network/field/data patch cords meet all ANSI/EIA/TIA requirements for Category 5E and Category 6 four-pair unshielded twisted pair cabling with stranded conductors and RJ45 connectors.

Contact the Signal Shop a minimum of 5 days prior to installation for the most current edge switch IP Address, VLAN, subnet mask, default gateway and configuration files.

B. Edge Switch

Mount the edge switch inside each field cabinet by securely fastening the edge switch to the upper end of the right rear vertical rail of the equipment rack using manufacturer-recommended or Engineer-approved attachment methods, attachment hardware and fasteners.

Ensure that the edge switch is mounted securely in the cabinet and is fully accessible by field technicians without blocking access to other equipment. Verify that fiber-optic jumpers consist of a length of cable that has connectors on both ends, primarily used for interconnecting termination or patching facilities and/or equipment.

6.4. MEASURMENT AND PAYMENT

Ethernet edge switch will be measured and paid as the actual number of Ethernet edge switches furnished, installed, and accepted.

No separate measurement will be made for Ethernet patch cable, power cord, mounting hardware, nuts, bolts, brackets, or edge switch programming as these will be considered incidental to furnishing and installing the edge switch.

Payment will be made under:

Pay Item	Pay Unit
Ethernet Edge Switch	Each

7. DMS ELECTRICAL SERVICE

7.1. DESCRIPTION

Install new electrical service equipment as shown in the Plans. The first item of work on this project is the installation of all electrical service pedestals, poles, and meter base/disconnect combination panels to expedite the power service connections. Comply with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the Standard Specifications, the Project Special Provisions, and all local ordinances. All work involving electrical service shall be coordinated with the appropriate utility company and the Engineer.

Obtain the maximum available ground fault current from the utility company. Print this information on a durable label and adhere to the dead front of the disconnect.

7.2. MATERIALS

A. Meter Base/Disconnect Combination Panel

Furnish and install new meter base/disconnect combination panels as shown in the Plans. Provide meter base/disconnect combination panels that have a minimum of eight (8) spaces in the disconnect. Furnish a double pole 100A circuit breaker at the DMS-1 & DMS-2 and at the DMS-3 & DMS-4 locations. Furnish each with a minimum of 10,000 RMS symmetrical amperes short circuit current rating in a lockable NEMA 3R enclosure. Ensure meter base/ disconnect combination panel is listed as meeting UL Standard UL-67 and marked as being suitable for use as service equipment. Ensure circuit breakers are listed as meeting UL-489 and ensure circuit breakers comply with the calculated maximum available ground fault current provided by the power company. Fabricate the enclosure from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum thickness of 2.4 mils. All exterior surfaces must be powder coated steel. Provide ground bus and neutral bus with a minimum of four terminals and a minimum wire capacity range of number 8 through number 3/0 AWG.

Furnish NEMA Type 3R combinational panels rated 100 Ampere minimum for overhead services and 200 Ampere minimum for underground services that meet the requirements of the local utility. Provide meter base with sockets' ampere rating based on sockets being wired with a minimum of 167 degrees F insulated wire. Furnish 4 terminal, 600-volt, single phase, 3-wire meter bases that comply with the following:

- Line, Load, and Neutral Terminals accept 4/0 AWG and smaller Copper/Aluminum wire
- With or without horn bypass
- Made of galvanized steel
- Listed as meeting UL Standard US-414
- Overhead or underground service entrance specified.

Furnish 1.5" watertight hub for threaded rigid conduit with meter base.

At the main service disconnect, furnish and install UL-approved lightning arrestors that meet the following requirements:

Type of design	Silicon Oxide Varistor
Voltage	120/240 Single Phase, 3 wire
Maximum current	100,000 amps
Maximum energy	3000 joules per pole
Maximum number of surges	Unlimited
Response time one milliamp test	5 nanoseconds
Response time to clamp 10,000 amps	10 nanoseconds
Response time to clamp 50,000 amps	25 nanoseconds

Leak current at double the rated voltage	None
Ground wire	Separate

B. Equipment Cabinet Disconnect

Provide new equipment cabinet disconnects at the locations shown in the Plans. Furnish double pole 50A circuit breakers at DMS locations. Furnish panels that have a minimum of four (4) spaces in the disconnect. Furnish circuit breakers with a minimum of 10,000 RMS symmetrical amperes short circuit current rating in a lockable NEMA 3R enclosure. Ensure meter base/ disconnect combination panel is listed as meeting UL Standard UL-67 and marked as being suitable for use as service equipment. Ensure circuit breakers are listed as meeting UL-489. Fabricate enclosure from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum thickness of 2.4 mils. All exterior surfaces must be powder coated steel. Provide ground bus and neutral bus with a minimum of four terminals and a minimum wire capacity range of number 8 through number 3/0 AWG.

C. Grounding System

Furnish 5/8”x10’ copper clad steel grounding electrodes (ground rods) and #4 AWG solid bare copper conductors for grounding system installations. Secure the copper conductor to the ground rod with an irreversible compression coupling using a ratcheting compression tool. Comply with the NEC, Standard Specifications, these Project Special Provisions, and the Plans.

D. Wood Pedestal

Furnish 6” x 6” wood pedestals for electrical service equipment as shown in the Plans.

7.3. CONSTRUCTION METHODS

A. General

Coordinate with the Engineer and the utility company to de-energize an existing service temporarily prior to starting any modifications.

Permanently label cables at all access points using nylon tags labeled with permanent ink. Ensure each cable has a unique identifier. Label cables immediately upon installation. Use component name and labeling scheme approved by the Engineer.

B. Meter Base/Disconnect Combination Panel

Install meter base/disconnect combination panels with lightning arrestors as called for in the Plans. At all new DMS locations, route the feeder conductors from the meter base/disconnect to the DMS equipment cabinet in conduit. Provide rigid galvanized conduit for above ground and PVC or HDPE for below ground installations.

C. Electrical Service Disconnect

Install equipment cabinet disconnects and circuit breakers as called for in the Plans. Install THWN stranded copper feeder conductors as shown in Plans between the electrical service disconnect and the equipment cabinet disconnect. Route the conductors from the equipment cabinet disconnect to the equipment cabinet in rigid galvanized steel conduit. Bond the equipment cabinet

disconnect in accordance with the NEC. Ensure that the grounding system complies with the grounding requirements of these Project Special Provisions, the Standard Specifications and the Plans.

D. Grounding System

Install ground rods as indicated in the Plans. Connect the #4 AWG grounding conductor to ground rods using an exothermic welding process. Test the system to ensure a ground resistance of 20-ohms or less is achieved. Drive additional ground rods as necessary or as directed by the Engineer to achieve the proper ground resistance.

7.4. MEASUREMENT AND PAYMENT

DMS Electrical Service will be measured and paid as the actual number of complete and functional DMS electrical service locations furnished, installed, tested, and accepted.

No measurement will be for meter base/disconnect combination panels, equipment cabinet disconnects, circuit breakers, copper service entrance conductors, copper feeder conductors, grounding electrodes, grounding conductors, risers, conduits from disconnect to cabinet, wood pedestals, and any additional material necessary for the installation of the new DMS electrical service as they will be considered incidental to furnishing and installing the new DMS electrical service.

Payment will be made under:

Pay Item	Pay Unit
DMS Electrical Service	Each

8. DYNAMIC MESSAGE SIGN (DMS)

8.1. DESCRIPTION

Furnish and install two (2) DMS mounted back to back on a single support structure.

DMSs used on the State Highway System shall be preapproved on the current NCDOT ITS & Signals 2018 Qualified Products List (QPL) by the date of installation. DMSs not preapproved will not be allowed for use on the project. To ensure compatibility with the existing DMS Control Software deployed in the State, furnish NTCIP compliant DMSs that are fully compatible with Daktronics, Inc. Vanguard V4 software (also referred to hereinafter as the “Control Software”).

Furnish and install DMSs compliant with UL standards 48, 50, and 879.

Add and configure the new DMSs in the system using the Control Software and computer system. Furnish, install, test, integrate and make fully operational the new DMSs at locations shown in the Plans.

Contact the Engineer to confirm all DMS locations prior to beginning construction.

Furnish operating DMS systems consisting of, but not limited to, the following:

- Front Access DMS
    - Full Matrix, Full Color, 96 pixels high by 208 pixels wide front access LED DMS
    - Pedestal type DMS support structures and mounting hardware

- DMS controllers, Uninterruptible Power Supplies (UPS), cabinets and accessories with interconnect and power cabling and conduit
- Branch circuit conductors and related equipment
- All other equipment and incidentals required for furnishing, installing, and testing the DMS system and system components

Use only UL listed and approved electronic and electrical components in the DMS system.

8.2. MATERIALS

A. Environmental Requirements

Construct the DMS and DMS controller cabinets so the equipment within is protected against moisture, dust, corrosion, and vandalism.

Design the DMS system to comply with the requirements of Section 2.1 (Environmental and Operating Standards) of NEMA TS 4-2005.

B. Full Matrix Led Dynamic Message Sign (DMS)

Construct the DMS to display at least three lines of text that, when installed, are clearly visible and legible to a person with 20/20 corrected vision from a distance of 900 feet in advance of the DMS at an eye height of 3.5 feet along the axis.

When displaying three lines, each line must display at least 8 equally spaced and equally sized alphanumeric individual characters. Each character must be at least 18 inches in height and composed from a luminous dot matrix. Provide an entire LED matrix that is a minimum of 98 pixels high and 208 pixels wide.

1. DMS Enclosure

Comply with the requirements of Section 3 (Sign Mechanical Construction) of NEMA TS 4-2005 as it applies to front access enclosures. The following requirements complement TS 4-2005:

- Construct the DMS with a metal front-access enclosure excluding the face. Construct the enclosure of welded aluminum type 6061-T6, 5052-H38, 5052-H34, or of an Engineer approved alternate at least 1/8-inch thick. Perform all welding of aluminum and aluminum alloys in accordance with the latest edition of AWS D1.2, Structural Welding Code - Aluminum. Continuously weld the seams using Gas Metal Arc Welding (GMAW).
- Provide all exterior and interior DMS enclosure surfaces with natural, mill-finish aluminum. Remove all grind marks and discoloration from the surfaces.
- Provide corrosion resistant nuts, bolts, washers, and other mounting and bonding parts and components used on the exterior of the DMS enclosure and ensure they are sealed against water intrusion.
- Provide one access door for each 10 to 15-pixel wide section of the sign enclosure. Vertically hinge the doors and design to swing out from the face to provide access to the enclosure interior. Extend each door the full height of the display matrix.

- Provide a retaining latch mechanism for each door to hold the door open at a 90-degree angle.
- Each door will form the face panel for a section of the sign. Mount the LED modules to the door such that they can be removed from the door when in the open position. Other sign components can be located inside the sign enclosure and be accessible through the door opening.
- Provide for each door a minimum of two (2) screw-type captive latches to lock them in the closed position and pull the door tight and compress a gasket located around the perimeter of each door. Install the gasket around the doors to prevent water from entering the cabinet.
- Do not place a manufacturer name, logo, or other information on the front face of the DMS or shield visible to the motorist.
- Provide power supply monitoring circuitry to detect power failure in the DMS and to automatically report this fault to the Control Software. This requirement is in addition to reporting power failure at the controller cabinet.
- Do not paint the stainless-steel bolts on the Z-bar assemblies used for mounting the enclosure.

2. DMS Interior Environment Control

Install a minimum of one (1) temperature sensor that is mounted near the top of the DMS interior. The sensor(s) will measure the temperature of the air in the enclosure over a minimum range of -40°F to +176ºF. Ensure the DMS controller will continuously monitor the internal temperature sensor output and report to the DMS control software upon request.

Design the DMS with systems for enclosure ventilation, face panel fog and frost prevention, and safe over-temperature shutdown.

Design the DMS ventilation system to be thermostatically controlled and to keep the internal DMS air temperature lower than +140°F, when the outdoor ambient temperature is +115°F or less.

The ventilation system will consist of two or more air intake ports located near the bottom of the DMS rear wall. Cover each intake port with a filter that removes airborne particles measuring 500 microns in diameter and larger. Mount one or more ball bearing-type fans at each intake port. These fans will positively pressure the DMS enclosure.

Design the fans and air filters to be removable and replaceable from inside the DMS housing. To ease serviceability, mount the fans no more than four (4) feet from the floor of the DMS enclosure.

Provide each ventilation fan with a sensor to monitor its rotational speed, measured in revolutions per minute and report this speed to the sign controller upon request.

The ventilation system will move air across the rear of the LED modules in a manner such that heat is dissipated from the LED’s. Design the airflow system to move air from the bottom of the enclosure towards the top to work with natural convection to move heat away from the modules.

Install each exhaust port near the top of the rear DMS wall. Provide one exhaust port for each air intake port. Screen all exhaust port openings to prevent the entrance of insects and small animals.

Cover each air intake and exhaust port with an aluminum hood attached to the rear wall of the DMS. Thoroughly seal all intakes and exhaust hoods to prevent water from entering the DMS.

Provide a thermostat near the top of the DMS interior to control the activation of the ventilation system.

The DMS shall automatically shut down the LED modules to prevent damaging the LEDs if the measured internal enclosure air temperature exceeds a maximum threshold temperature. The threshold temperature shall be configurable and shall have a default factory setting of 140°F.

3. Front Panel

Protect the DMS face with contiguous, weather-tight, removable panels. These panels must be a polycarbonate material that is ultraviolet protected, have an antireflection coating, and are a minimum of 1/8- inch thick.

Furnish polycarbonate panels with the following characteristics:

- Tensile Strength, Ultimate: 10,000 PSI
- Tensile Strength, Yield: 9,300 PSI
- Tensile Strain at Break: 125%
- Tensile Modulus: 330,000 PSI
- Flexural Modulus: 330,000 PSI
- Impact Strength, Izod (1/8”, notched): 17 ft-lbs/inch of notch
- Rockwell Hardness: M75, R118
- Heat Deflection Temperature Under Load: 264 PSI at 270F and 66 PSI at 288F
- Coefficient of Thermal Expansion: 3.9X10-5 in/in/F
- Specific Heat: 0.30 BTU/lb/F
- Initial Light Transmittance: 85% minimum
- Change in Light Transmittance, 3 years exposure in a Southern latitude: 3%
- Change in Yellowness Index, 3 years exposure in a Southern latitude: less than 5%

For substitutes, submit one 12” x 12” sample of the proposed material together with a description of the material attributes to the Engineer for review and approval. Install a .09” aluminum mask on the front of the panel (facing the motorists) that contains a circular opening for each LED pixel. Prime and coat the front side of the aluminum mask, which faces the viewing motorists, with automotive-grade flat black acrylic enamel paint or an approved equivalent. Guarantee all painted surfaces provide a minimum outdoor service life of 20 years.

Design the panels so they will not warp nor reduce the legibility of the characters. Differential expansion of the DMS housing and the front panel must not cause damage to any

DMS component or allow openings for moisture or dust. Glare from sunlight, roadway lighting, commercial lighting, or vehicle headlights must not reduce the legibility or visibility of the DMS. Install the panels so that a maintenance person can easily remove or open them for cleaning.

4. Display Modules

Manufacture each display module with a standard number of pixels, not to exceed an array of 9 x 5, which can be easily removed. Assemble the modules onto the DMS assemblies contiguously to form a continuous matrix to display the required number of lines, characters, and character height.

Design display modules that are interchangeable and replaceable without using special tools. Provide plug-in type power and communication cables to connect to a display module.

Construct each display module as a rectangular array of 5 horizontal pixels by 7 to 9 vertical pixels. Provide the module with an equal vertical and horizontal pitch between pixels, and columns that are perpendicular to the rows (i.e., no slant). Design each module to display:

- All upper- and lower-case letters.
- All punctuation marks.
- All numerals 0 to 9.
- Special user-created characters.

Display upper-case letters and numerals over the complete height of the module. Optimize the LED grouping and mounting angle within a pixel for maximum readability.

Furnish two (2) spare display modules per each DMS installed for emergency restoration.

5. Discrete LEDs

Provide discrete LEDs with a nominal viewing cone of 30 degrees with a half-power angle of 15 degrees measured from the longitudinal axis of the LED. Make certain, the viewing cone tolerances are as specified in the LED manufacturer's product specifications and do not exceed +/- 3 degrees half-power viewing angle of 30 degrees.

Provide LEDs that are untinted, non-diffused, high output solid state lamps utilizing indium gallium aluminum phosphide (InGaAlP) technology. No substitutions will be allowed. Provide T1 ¾, 0.2-inch size LEDs that emit a true amber color at a wavelength of 590 ± 5 nm.

Provide LEDs with a MTBF (Mean Time Before Failure) of at least 100,000 hours of permanent use at an operating point of 140° F or below at a specific forward current of 20mA. Discrete LED failure is defined as the point at which the LED's luminous intensity has degraded to 50% or less of its original level.

Obtain the LEDs used in the display from a single LED manufacturer that have a single part number. Obtain them from batches sorted for luminous output, where the highest luminosity LED is not more than fifty percent more luminous than the lowest luminosity LED when the LEDs are driven at the same forward current. Do not use more than two successive and overlapping batches in the LED display. Document the procedure to be used to comply with this requirement as part of the material submittal.

Individually mount the LEDs on circuit boards that are at least 1/16" thick FR-4 fiberglass, flat black printed circuit board in a manner that promotes cooling. Protect all exposed metal on

both sides of the LED pixel board (except the power connector) from water and humidity exposure by a thorough application of acrylic conformal coating. Design the boards so bench level repairs to individual pixels, including discrete LED replacement and conformal coating repair is possible.

Operate the LED display at a low internal DC voltage not to exceed 24 Volts.

Design the LED display operating range to be –20° F to +140° F at 95% relative humidity, non-condensing.

Supply the LED manufacturer's technical specification sheet with the material submittals.

6. LED Power Supplies

Power the LED Display by means of multiple regulated switching DC power supplies that operate from 120 volts AC input power and have an output of 48 volts DC or less. Wire the supplies in a redundant parallel configuration that uses multiple power supplies per display. Provide the supplies with current sharing capability that allows equal amounts of current to their portion of the LED display. Provide power supplies rated such that if one supply fails the remaining supplies will be able to operate their portion of the display under full load conditions (i.e. all pixels on at maximum brightness) and at a temperature of 140° F.

Provide power supplies to operate within a minimum input voltage range of +90 to +135 volts AC and within a temperature range of –22° F to 140° F. Power supply output at 140° F must not deteriorate to less than 65% of its specified output at 70° F. Provide power supplies that are overload protected by means of circuit breakers, that have an efficiency rating of at least 75%, a power factor rating of at least .95, and are UL listed. Provide all power supplies from the same manufacturer and with the same model number. Design the power driver circuitry to minimize power consumption.

Design the field controller to monitor the operational status (normal or failed) of each individual power supply and be able to display this information on the Client Computer screen.

7. LED Pixels

A pixel is defined as the smallest programmable portion of a display module that consists of a cluster of closely spaced discrete LEDs. Design each pixel to be a maximum of 2 inches in diameter.

Construct the pixels with two strings of LEDs. It is the manufacturer's responsibility to determine the number of LEDs in each string to produce the candela requirement as stated herein.

Ensure each pixel produces a luminous intensity of 40 Cd when driven with an LED drive current of 20 mA per string.

Power the LEDs in each pixel in strings. Use a redundant design so that the failure of an LED in one string does not affect the operation of any other string within the pixel. Provide the sign controller with the ability to detect the failure of any LED string and identify which LED string has failed. Submit a complete schematic of the LED power and driver circuits with the material submittals.

8. Character Display

Design display modules to be easily removable without the use of tools. Position cooling fans so they do not prevent removal of an LED pixel board or driver board.

Use continuous current to drive the LEDs at the maximum brightness level. Design the light levels to be adjustable for each DMS / controller so the Engineer may set levels to match the luminance requirements at each installation site.

Design the controller to automatically detect failed LED strings or drivers and initiate a report of the event to the Control Software. Design the controller to be able to read the internal temperature of the DMS enclosure and the ambient temperature outside the DMS enclosure and report these to the Control Software.

9. Display Capabilities

Design the DMS with at least the following message displays:

- Static display
- Flashing display with Dynamic flash rates
- At least two alternating Static and / or Flashing sequences (multi-page messages)

10. DMS Mini Controller

Furnish and install a mini controller inside the DMS that is interconnected with the main controller using a fiber optic cable, CAT-5 cable, or an approved alternate. The mini controller will enable a technician to perform all functions available from the main controller. Provide the mini controller with an LCD/keypad interface. Size the LCD display screen to allow preview of an entire one-page message on one screen. Provide a 4 X 4 keypad.

Alternatively, install an EIA/TIA-232E port inside the DMS enclosure to enable a maintenance technician to communicate with the DMS main controller and obtain access to and perform all functions of the main controller using a laptop computer.

C. DMS Enclosure Structure Mounting

Mount the DMS enclosure and interconnect system securely to the supporting structures. Design the DMS enclosure supports and structure to allow full access to the DMS enclosure inspection door.

Furnish and install U-bolt connections of hanger beams to overhead assembly truss chords with a double nut at each end of the U-bolt. Bring the double nuts tight against each other by the use of two wrenches.

Submit plans for the DMS enclosure, structure, mounting description and calculations to the Engineer for approval. Have such calculations and drawings approved by a Professional Engineer registered in the state of North Carolina, and bear his signature, seal, and date of acceptance.

Provide removable lifting eyes or the equivalent on the DMS enclosure rated for its total weight to facilitate handling and mounting the DMS enclosure.

Design the DMS structure to conform to the applicable requirements of the *Standard Specifications for Structural Supports for Highway Signs, Luminaires*, and the section titled “DMS Assemblies” of these Project Special Provisions.

D. DMS / DMS Controller Interconnect

Furnish and install all necessary cabling, conduit, and terminal blocks to connect the DMS and the DMS controller. Use approved manufacturer's specifications and the Plans for cable and conduit types and sizes. Use fiber optic cable to interconnect sign and controller. Install fiber optic interconnect centers in the sign enclosure and cabinet to securely install and terminate the fiber optic cable. Submit material submittal cut sheets for the interconnect center.

E. DMS Controller and Cabinet

Furnish and install one DMS controller with accessories per DMS in a protective cabinet. Mount the controller cabinet on the DMS support structure. Install cabinet so that the height from the ground to the middle of the cabinet is 4 feet. Ensure a minimum of 3 feet level working surface under each cabinet that provides maintenance technicians with a safe working environment.

Provide the DMS controller as a software-oriented microprocessor and with resident software stored in non-volatile memory. The Control Software, controller and communications must comply with the NTCIP Standards identified in these Project Special Provisions. Provide sufficient non-volatile memory to allow storage of at least 500 multi-page messages and a test pattern program.

Furnish the controller cabinet with, but not limited to, the following:

- Power supply and distribution assemblies
- Power line filtering hybrid surge protectors
- Radio Interference Suppressor
- Communications surge protection devices
- Industrial-Grade UPS system and local disconnect
- Microprocessor-based controller
- Display driver and control system (unless integral to the DMS)
- Industrial-grade telephone line surge and lightning protector
- Serial interface port for local laptop computer
- Local user interface
- Interior lighting and duplex receptacle
- Adjustable shelves as required for components
- Temperature control system
- All interconnect harnesses, connectors, and terminal blocks
- All necessary installation and mounting hardware

Furnish the DMS controller and associated equipment completely housed in a NEMA 3R cabinet made from 5052-H32 sheet aluminum at least 1/8” thick. Use natural aluminum cabinets. Perform all welding of aluminum and aluminum alloys in accordance with the latest edition of AWS D1.2, Structural Welding Code - Aluminum. Continuously weld the seams using Gas Metal Arc Welding (GMAW).

Slant the cabinet roof away from the front of the cabinet to prevent water from collecting on it.

Do not place a manufacturer name, logo, or other information on the faces of the controller cabinet visible to the motorist.

Provide cabinets capable of housing the components and sized to fit space requirement. Design the cabinet layout for ease of maintenance and operation, with all components easily accessible. Submit a cabinet layout plan for approval by the Engineer.

Locate louvered vents with filters in the cabinet to direct airflow over the controller and auxiliary equipment, and in a manner that prevents rain from entering the cabinet. Fit the inside of the cabinet, directly behind the vents, with a replaceable, standard-size, commercially available air filter of sufficient size to cover the entire vented area.

Provide a torsionally rigid door with a continuous stainless-steel hinge on the side that permits complete access to the cabinet interior. Provide a gasket as a permanent and weather resistant seal at the cabinet door and at the edges of the fan / exhaust openings. Use a non-absorbent gasket material that will maintain its resiliency after long-term exposure to the outdoor environment. Construct the doors so that they fit firmly and evenly against the gasket material when closed. Provide the cabinet door with louvered vents and air filters near the bottom as described in the paragraph above.

The cabinet shall contain a full-height standard EIA 19-inch rack. The rack shall be secured within the cabinet by mounts at the top and bottom.

The rack shall contain a minimum of one (1) pullout drawer. The drawer shall be suitable for storing manuals and small tools, such as screwdrivers. The drawer shall be able to latch in the out position to function as a laptop/utility shelf.

Provide a convenient location on the inside of the door to store the cabinet wiring diagrams and other related cabinet drawings. Provide a Corbin #2 main door lock made of non-ferrous or stainless-steel material. Key all locks on the project alike, and provide 10 keys to the Engineer. In addition, design the handle to permit padlocking.

Provide the interior of the cabinet with ample space for housing the controller and all associated equipment and wiring; use no more than 75% of the useable space in the cabinet. Provide ample space in the bottom of the cabinet for the entrance and exit of all power, communications, and grounding conductors and conduit.

Arrange the equipment so as to permit easy installation of the cabling through the conduit so that they will not interfere with the operation, inspection, or maintenance of the unit. Provide adjustable metal shelves, brackets, or other support for the controller unit and auxiliary equipment. Leave a 3-inch minimum clearance from the bottom of the cabinet to all equipment, terminals, and bus bars.

Provide power supply monitoring circuitry to detect power failure and to automatically report the occurrence to the Control Software.

Install two 15-watt fluorescent light strips with shields, one in the top of the cabinet and the other under the bottom shelf. Design both lights to automatically turn on when the cabinet door is opened and turn off when the door closes.

Mount and wire a 120V ($\pm$10%) GFCI duplex receptacle of the 3-wire grounding type in the cabinet in a location that presents no electrical hazard when used by service personnel for the operation of power tools and work lights.

No cabinet resident equipment may utilize the GFCI receptacle. Furnish one spare non-GFCI receptacle for future equipment.

Mount a bug-proof and weatherproof thermostatically controlled fan and safety shield in the top of the cabinet. Size the fan to provide at least for two air exchanges per minute. Fuse the fan at 125% of the capacity of the motor. The magnetic field of the fan motor must not affect the performance of the control equipment. Use a fan thermostat that is manually adjustable to turn on between 80°F and 160°F with a differential of not more than 10°F between automatic turn-on and turn-off. Mount it in an easily accessible location, but not within 6 inches of the fan.

Install additional fans and/or heaters as needed to maintain the temperature inside the cabinet within the operating temperature range of the equipment within the cabinet as recommended by equipment manufacturer(s).

1. Wiring

The requirements stated herein apply wherever electrical wiring is needed for any DMS system assemblies and subassemblies such as controller cabinet, DMS enclosure, electrical panel boards and etc.

Neatly arrange and secure the wiring inside the cabinet. Where cable wires are clamped to the walls of the control cabinet, provide clamps made of nylon, metal, plastic with rubber or neoprene protectors, or similar. Lace and jacket all harnesses, or tie them with nylon tie wraps spaced at 6 inches maximum to prevent separation of the individual conductors.

Individually and uniquely label all conductors. Ensure all conductor labels are clearly visible without moving the conductor. Connect all terminal conductors to the terminal strip in right angles. Remove excess conductor before termination of the conductor. Mold the conductor in such a fashion as to retain its relative position to the terminal strip if removed from the strip. Do not run a conductor across a work surface with the exception of connecting to that work surface. No conductor bundles can be support by fasteners that support work surfaces. Install all connectors, devices and conductors in accordance to manufactures guidelines. Comply with the latest NEC guideline in effect during installation. No conductor or conductor bundle may hang loose or create a snag hazard. Protect all conductors from damage. Ensure all solder joints are completed using industry accepted practices and will not fail due to vibration or movement. Protect lamps and control boards from damage.

No splicing will be allowed for feeder conductors and communication cables from the equipment cabinet to the DMS enclosure.

Insulate all conductors and live terminals so they are not hazardous to maintenance personnel.

Route and bundle all wiring containing line voltage AC and / or shield it from all low voltage control circuits. Install safety covers to prevent accidental contact with all live AC terminals located inside the cabinet.

Use industry standard, keyed-type connectors with a retaining feature for connections to the controller.

Label all equipment and equipment controls clearly.

Supply each cabinet with one complete set of wiring diagrams that identify the color-coding or wire tagging used in all connections. Furnish a water-resistant packet adequate for storing wiring diagrams, operating instructions, and maintenance manuals with each cabinet.

2. Power Supply and Circuit Protection

Design the DMS and controller for use on a system with a line voltage of 120V ± 10% at a frequency of 60 Hz + 3 Hz. Under normal operation, do not allow the voltage drop between no load and full load of the DMS and its controller to exceed 3% of the nominal voltage.

Blackout, brownout, line noise, chronic over-voltage, sag, spike, surge, and transient effects are considered typical AC voltage defects. Protect the DMS system equipment so that these defects do not damage the DMS equipment or interrupt their operation. Equip all cabinets with devices to protect the equipment in the cabinet from damage due to lightning and external circuit power and current surges.

3. Circuit Breakers

Protect the DMS controller, accessories, and cabinet utilities with thermal magnetic circuit breakers. Provide the controller cabinet with a main circuit breaker sized according to the NEC. Use appropriately sized branch circuit breakers to protect the controller and accessories and for servicing DMS equipment and cabinet utilities.

4. Surge Suppressor

Install and clearly label filtering hybrid power line surge protectors on the load side of the branch circuit breakers in a manner that permits easy servicing. Ground and electrically bond the surge protector to the cabinet within 2 inches.

Provide power line surge protector that meets the following requirements:

Peak surge current occurrences	20 minimum
Peak surge current for an 8 x 20 microsecond waveshape	50,000 amperes
Energy Absorption	> 500 Joules
Clamp voltage	240 volts
Response time	<1 nanosecond
Minimum current for filtered output	15 amperes for 120VAC*
Temperature range	-40ºF to +158ºF

*Capable of handling the continuous current to the equipment

5. Radio Interference Suppressor

Provide each controller cabinet with sufficient electrical and electronic noise suppression to enable all equipment in it to function properly. Provide one or more radio interference suppressors (RIS) connected between the stages of the power line surge suppressor that minimize interference generated in the cabinet in both the broadcast and the aircraft frequencies. Each RIS must provide a minimum attenuation of 50 decibels over a frequency range of 200 KHz to 75 MHz. Clearly label the suppressor(s) and size them at least at the rated current of the main circuit breaker but not less than 50 amperes.

Provide RIS that are hermetically sealed in a substantial metal case which is filled with a suitable insulating compound and have nickel-plated 10/24 brass stud terminals of sufficient external length to provide space to connect #8 AWG wires. Mount them so that the studs cannot

be turned in the case. Properly insulate ungrounded terminals from each other, and maintain a surface linkage distance of not less than ¼" between any exposed current conductor and any other metallic parts. The terminals must have an insulation factor of 100-200 MΩ, dependent on external circuit conditions. Use RIS designed for 120 VAC ± 10%, 60Hz, and which meet the standards of UL and the Radio Manufacturers Association.

6. Communications Surge Protector

Equip the cabinet with properly labeled hybrid data line surge protectors that meet the following general requirements:

Surge current occurrences at 2000 ampere, 8 x 20 microsecond waveform	> 80
Surge current occurrences at 400 ampere, 10x700 microsecond waveform	> 80
Peak surge current for 8 x 20 microsecond waveform	10,000 A (2500 A/line)
Peak surge current for 10x700 microsecond waveform	500 A/line
Response time	< 1 nanosecond
Series resistance	< 15 Ω
Average capacitance	1500 pF
Temperature range	-10°F to 150°F
Clamp Voltage	As required to match equipment in application

7. Lightning Arrester

Protect the system with an UL-approved lightning arrester installed at the main service disconnect that meets the following requirements:

Type of design	Silicon Oxide Varistor
Voltage	120/240 Single phase, 3 wires
Maximum current	100,000 amps
Maximum energy	3000 joules per pole
Maximum number of surges	Unlimited

Response time one milliamp test	5 nanoseconds
Response time to clamp 10,000 amps	10 nanoseconds
Response time to clamp 50,000 amps	25 nanoseconds
Leak current at double the rated voltage	None
Ground Wire	Separate

8. Uninterruptible Power Supply (UPS)

Provide the cabinet with an industrial grade power conditioning UPS unit to supply continuous power to operate the equipment connected to it if the primary power fails. The UPS must detect a power failure and provide backup power within 20 milliseconds. Transition to the UPS source from primary power must not cause loss of data or damage to the equipment being supplied with backup power. Provide an UPS with at least three outlets for supplying conditioned AC voltage to the DMS controller. Provide a unit to meet the following requirements:

- Input Voltage Range: 120VAC +12%, -25%
- Power Rating: 1000 VA, 700 Watts
- Input Frequency: 45 to 65 Hz
- Input Current: 7.2A
- Output Voltage: 120VAC +/- 3%
- Output Frequency: 50/60 +/-1 Hz
- Output Current: 8.3A
- Output Crest Factor Ration: @50% Load Up to 4.8:1
  @75% Load Up to 3.2:1
  @100% Load Up to 2.4:1
- Output THD: 3% Max. (Linear)
  5% Max. (Non-Linear)
- Output Overload: 110% for 10 min; 200% for 0.05 sec.
- Output Dynamic Response: +/- 4% for 100% Step Load Change
  0.5 ms Recovery Time.
- Output Efficiency @ 100% Load: 90% (Normal Mode)
- Operating Temperature: -40 ºF to +165 ºF
- Humidity: 0% to 95% Non-condensing
- Remote Monitoring Interface: RS-232
- Protection: Input/Output Short Circuit

Input/Output Overload

Excessive Battery Discharge

- Specifications: UL1778, FCC Class A, IEEE 587

Provide the UPS unit capable of supplying 30 minutes of continuous backup power to the equipment connected to it when the equipment is operating at full load.

9. Controller Communications Interface

Provide the controller with the following interface ports:

- An EIA/TIA-232E port for remote communication using NTCIP
- An 10/100 Ethernet port for remote communication using NTCIP
- An EIA/TIA-232E port for onsite access using a laptop
- An EIA/TIA-232E auxiliary port for communication with a field device such as a UPS
- Fiber Optic ports for communication with the sign
- RJ45 ports for communication with the sign using CAT-5 cable
- RJ45 ports for communication with mini controller located inside the sign enclosure

10. Controller Local User Interface

Provide the controller with a Local User Interface (LUI) for at least the following functions:

- On / Off Switch: controls power to the controller.
- Control Mode Switch: for setting the controller operation mode to either remote or local mode.
- LCD Display and Keypad: Allow user to navigate through the controller menu for configuration (display, communications parameter, etc) running diagnostics, viewing peripherals status, message creation, message preview, message activation, and etc. Furnish an LCD display with a minimum size of 240x64 dots with LED back light.

11. Controller Address

Assign each DMS controller a unique address. Preface all commands from the Control Software with a particular DMS controller address. The DMS controller compares its address with the address transmitted; if the addresses match, then the controller processes the accompanying data.

12. Controller Functions

Design the DMS controller to continuously control and monitor the DMS independent of the Control Software. Design the controller to display a message on the sign sent by the Control Software, a message stored in the sign controller memory, or a message created on-site by an operator using the controller keypad.

Provide the DMS controller with a watchdog timer to detect controller failures and to reset the microprocessor, and with a battery backed-up clock to maintain an accurate time and date

reference. Set the clock through an external command from the Control Software or the Local User Interface.

13. DMS Controller Memory

Furnish each DMS controller with non-volatile memory. Use the non-volatile memory to store and reprogram at least one test pattern sequence and 500 messages containing a minimum of two pages of 45 characters per page. The Control Software can upload messages into and download messages from each controller's non-volatile memory remotely.

Messages uploaded and stored in the controller's non-volatile memory may be erased and edited using the Control Software and the controller. New messages may be uploaded to and stored in the controller's non-volatile memory using the Control Software and the controller.

F. Photo-Electric Sensors

Install three photoelectric sensors with ½ inch minimum diameter photosensitive lens inside the DMS enclosure. Use sensors that will operate normally despite continual exposure to direct sunlight. Place the sensors so they are accessible and field adjustable. Point one sensor north or bottom of the sign. Place the other two, one on the back wall and one on the front wall of the sign enclosure. Alternate designs maybe accepted, provided the sensor assemblies are accessible and serviceable from inside the sign enclosure.

Provide controls so that the Engineer can field adjust the following:

- The light level emitted by the pixels elements in each Light Level Mode.
- The ambient light level at which each Light Level Mode is activated.

G. Equipment List

Provide a general description of all equipment and all information necessary to describe the basic use or function of the major system components. Include a general "block diagram" presentation. Include tabular charts listing auxiliary equipment, if any is required. Include the nomenclature, physical and electrical characteristics, and functions of the auxiliary equipment unless such information is contained in an associated manual; in this case include a reference to the location of the information. Include an itemized list of equipment costs.

Include a table itemizing the estimated average and maximum power consumption for each major piece of equipment.

H. Physical Description

Provide a detailed physical description of size, weight, center of gravity, special mounting requirements, electrical connections, and all other pertinent information necessary for proper installation and operation of the equipment.

I. Parts List

Provide a parts list that contains all information needed to describe the characteristics of the individual parts, as required for identification. Include a list of all equipment within a group and a list of all assemblies, sub-assemblies, and replacement parts of all units. Arrange this data in a table, in alpha-numerical order of the schematic reference symbols, which gives the associated description, manufacturer's name, and part number, as well as alternate manufacturers and part numbers. Provide a table of contents or other appropriate grouping to identify major components, assemblies, etc.

J. Character Set Submittal

Submit an engineering drawing of the DMS character set including 26 upper case and lower case letters, 10 numerals, an asterisk (*), a dash, a plus sign (+), a designated lane diamond, a slash, an ampersand, and arrows at 0, 45, 90, 135, 180, 225, 270, and 315 degrees.

K. Wiring Diagrams

Provide a wiring diagram for each DMS and each controller cabinet, as well as interconnection wiring diagrams for the system as a whole.

Provide complete and detailed schematic diagrams to component level for all DMS assemblies and subassemblies such as driver boards, control boards, DMS controller, power supplies, and etc. Ensure that each schematic enables an electronics technician to successfully identify any component on a board or assemblies and trace its incoming and outgoing signals.

L. Routine of Operation

Describe the operational routine, from necessary preparations for placing the equipment into operation to securing the equipment after operation. Show appropriate illustrations with the sequence of operations presented in tabular form wherever applicable. Include in this section a total list of the test instruments, aids and tools required to perform necessary measurements and measurement techniques for each component, as well as set-up, test, and calibration procedures.

M. Maintenance Procedures

Specify the recommended preventative maintenance procedures and checks at pre-operation, monthly, quarterly, semi-annual, annual, and "as required" periods to assure equipment operates reliably. List specifications (including tolerances) for all electrical, mechanical, and other applicable measurements and / or adjustments.

N. Repair Procedures

Include in this section all data and step-by-step procedures necessary to isolate and repair failures or malfunctions, assuming the maintenance technicians are capable of analytical reasoning using the information provided in the section titled “Wiring Diagrams and Theory of Operation.”

Describe accuracy, limits, and tolerances for all electrical, physical, or other applicable measurements. Include instructions for disassemblies, overhaul, and re-assemblies, with shop specifications and performance requirements.

Give detailed instructions only where failure to follow special procedures would result in damage to equipment, improper operation, danger to operating or maintenance personnel, etc. Include such instructions and specifications only for maintenance that specialized technicians and engineers in a modern electromechanical shop would perform. Describe special test set-up, component fabrication, and the use of special tools, jigs, and test equipment.

O. Field Trial

At the request of the Engineer, supply a three-character demonstration module with characters of the size and type specified for the project, an appropriate control device and power supply to allow character display within 30 working days of the request. Perform a field trial on this module at a time and location selected by the Engineer.

This trial will allow the Engineer or his selected representatives to test the readability of the DMS at the maximum distance required for specified character size. Test the module with the sun directly above the DMS, and near the horizon in front of and behind the DMS (washout and back-lit conditions).

8.3. CONSTRUCTION METHODS

A. Description

This article establishes practices and procedures and gives minimum standards and requirements for the installation of Dynamic Message Sign systems, auxiliary equipment and the construction of related structures.

Provide electrical equipment described in this specification that conforms to the standards of NEMA, UL, or Electronic Industries Association (EIA), wherever applicable. Provide connections between controllers and electric utilities that conform to NEC standards. Express wire sizes according to the American Wire Gauge (AWG).

Provide stainless steel screws, nuts, and locking washers in all external locations. Do not use self-tapping screws unless specifically approved by the Engineer. Use parts made of corrosion-resistant materials, such as plastic, stainless steel, brass, or aluminum. Use construction materials that resist fungus growth and moisture deterioration. Separate dissimilar metals by an inert dielectric material.

B. Layout

The Engineer will establish the actual location of each Dynamic Message Sign assemblies. It is the Contractor’s responsibility to ensure proper elevation, offset, and orientation of all DMS assemblies. The location of service poles as well as conduit lengths shown in the Plans, are approximate based on available project data. Make actual field measurements to place conduit and equipment at the required location.

C. Construction Submittal

When the work is complete, submit "as built" plans, inventory sheets, and any other data required by the Engineer to show the details of actual construction and installation and any modifications made during installation.

The "as built" plans will show: the DMS, controller, and service pole locations; DMS enclosure and controller cabinet wiring layouts; and wire and conduit routing. Show all underground conduits and cables dimensioned from fixed objects.

Include detailed drawings that identify the routing of all conductors in the system by cable type, color code, and function. Clearly label all equipment in the DMS system, controller cabinet, and DMS enclosure.

D. Conduit

Install the conduit system in accordance with section 1715 of Standard Specification and NEC requirements for an approved watertight raceway.

Make bends in the conduit so as not to damage it or change its internal diameter. Install watertight and continuous conduit with as few couplings as standard lengths permit.

Clean conduit before, during, and after installation. Install conduit in such a manner that temperature changes will not cause elongation or contraction that might damage the system.

Attach the conduit system to and install along the structural components of the DMS structure assemblies with beam clamps or stainless-steel strapping. Install strapping according to the strapping manufacturer's recommendations. Do not use welding or drilling to fasten conduit to structural components. Space the fasteners at no more than 4 feet for conduit 1.5 inches and larger or 6 feet for conduit smaller than 1.25 inches. Place fasteners no more than 3 feet from the center of bends, fittings, boxes, switches, and devices.

Flexible conduit will only be allowed when the conduits transition from the horizontal structure segment to the horizontal truss segment and from the horizontal truss segment to the rear entrance of the DMS when installing the DMS communications and feeder cables. The maximum length of flexible conduit allowed at each transition will be 5 feet.

Locate underground conduit as shown in the Plans in a manner consistent with these Project Special Provisions.

Do not exceed the appropriate fill ratio on all cable installed in conduit as specified in the NEC.

E. Wiring Methods

Do not pull permanent wire through a conduit system until the system is complete and has been cleaned.

Color-code all conductors per the NEC. Use approved marking tape, paint, sleeves or continuous colored conductors for No.8 AWG and larger. Do not mark a white conductor in the cable assemblies any other color.

Bury underground circuits at the depth shown in the Plans and surround it with at least 3 inches of sand or earth back-fill free of rocks and debris. Compact backfill in 6-inch layers. Do not splice underground circuits unless specifically noted in the Plans.

F. Equipment and Cabinet Mounting

Mount equipment securely at the locations shown in the Plans, in conformance with the dimensions shown. Install fasteners as recommended by the manufacturer and space them evenly. Use all mounting holes and attachment points for attaching DMS enclosures and controller cabinets to the structures.

Drill holes for expansion anchors of the size recommended by the manufacturer of the anchors and thoroughly clean them of all debris.

Provide one key-operated, pin tumbler, dead bolt padlock, with brass or bronze shackle and case, conforming to Military Specification MIL-P-17802E (Grade I, Class 2, Size 2, Style A) for each electrical panel and switch on the project. Key all padlocks alike, and provide 10 keys to the Engineer.

Provide cabinets with all mounting plates, anchor bolts, and any other necessary mounting hardware in accordance with these Project Special Provisions and the Plans.

Seal all unused conduit installed in cabinets at both ends to prevent water and dirt from entering the conduit and cabinet with approved sealing material.

Install a ground bushing attached inside the cabinet on all metal conduits entering the cabinet. Connect these ground bushings to the cabinet ground bus.

G. Work Site Clean-Up

Clean the site of all debris, excess excavation, waste packing material, wire, etc. Clean and clear the work site at the end of each workday. Do not throw waste material in storm drains or sewers.

8.4. MEASUREMENT AND PAYMENT

DMS will be measured and paid as the actual number of 96 X 208 front access DMS furnished, installed, and accepted. Each DMS consists of an LED Dynamic Message Sign, spare display modules communications equipment, strapping hardware, controller, UPS, controller cabinet, conduit, fittings, couplings, sweeps, conduit bodies, wire, flexible conduit, power conductors and communications cable between the controller cabinet and the DMS enclosure, connectors, circuit protection equipment, photo-electric sensors, tools, materials, all related testing, cost of labor, cost of transportation, incidentals, and all other equipment necessary to furnish and install the DMS system.

Payment will be made under:

Pay Item	Pay Unit
DMS	Each

9. NTCIP REQUIREMENTS

This section defines the detailed NTCIP requirements for the DMSs covered by these Project Special Provisions and Plans.

9.1. REFERENCES

This specification references several standards through their NTCIP designated names. The following list provides the full reference to the current version of each of these standards.

Implement the most recent version of the standard including any and all Approved or Recommended Amendments to these standards for each NTCIP Component covered by these project specifications.

Table 1: NTCIP Standards

Abbreviated Number	Full Number	Title
NTCIP 1101	**NTCIP 1101:1997**	*Simple Transportation Management Framework*
NTCIP 1201	**NTCIP 1201:1997**	*Global Object Definitions*
NTCIP 1203	**NTCIP 1203:1997**	*Object Definitions for Dynamic Message Signs*
NTCIP 2001	**NTCIP 2001:1997**	*Class B Profile*
NTCIP 2101	**NTCIP 2101**	*SP-PMPP/232* *Subnet Profile for PMPP over RS-232*
NTCIP 2102	**NTCIP 2102**	*SP-PMPP/FSK* *Subnet Profile for PMPP over FSK Modem*
NTCIP 2103	**NTCIP 2103**	*SP-PPP/232* *Subnetwork Profile for PPP over RS232 (Dial Up)*
NTCIP 2104	**NTCIP 2104**	*SP-Ethernet* *Subnet Profile for Ethernet*
NTCIP 2201	**NTCIP 2201**	*TP-Null* *Transport Profile*
NTCIP 2202	**NTCIP 2202**	*TP-Internet* *Internet Transport Profile (TCP/IP and UDP/IP)*
NTCIP 2301	**NTCIP 2301**	AP-STMF AP for Simple Transportation Management Framework

A. General Requirements

1. Subnet Level

Ensure each serial port on each NTCIP Component supports NTCIP 2103 over a dial-up connection with a contractor provided external modem with data rates of 28.8 kbps, 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps, and 300 bps. Enable the NTCIP Component to make outgoing and receive incoming calls as necessary and support the following modem command sets:

- Hayes AT - Command Set
- MNP5
- MNP10
- V.42bis

Ensure each serial port on each NTCIP Component supports NTCIP 2103 over a null-modem connection with data rates of 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps, and 300 bps.

Ensure each serial port on each NTCIP Component supports NTCIP 2101 with data rates of 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps, and 300 bps.

Ensure NTCIP components support NTCIP 2102 and NTCIP 2104.

NTCIP Components may support additional Subnet Profiles at the manufacturer's option. At any one time, make certain only one Subnet Profile is active on a given serial port of the NTCIP Component. Ensure the NTCIP Component can be configured to allow the field technician to activate the desired Subnet Profile and provide a visual indication of the currently selected Subnet Profile.

2. Transport Level

Ensure each NTCIP Component complies with NTCIP 2201 and 2202.

NTCIP Components may support additional Transport Profiles at the manufacturer's option. Ensure Response datagrams use the same Transport Profile used in the request. Ensure each NTCIP Component supports the receipt of datagrams conforming to any of the identified Transport Profiles at any time.

3. Application Level

Ensure each NTCIP Component complies with NTCIP 1101 and 2301 and meets the requirements for Conformance Level 1 (NOTE - See Amendment to standard).

Ensure each NTCIP Component supports SNMP traps. An NTCIP Component may support additional Application Profiles at the manufacturer's option. Ensure Responses use the same Application Profile used by the request. Ensure each NTCIP Component supports the receipt of Application data packets at any time allowed by the subject standards.

4. Information Level

Guarantee each NTCIP Component provides Full, Standardized Object Range Support of all objects required by these Special Provisions unless otherwise indicated below. Make certain the maximum Response Time for any object or group of objects is 200 milliseconds.

Design the DMS to support all mandatory objects of all mandatory Conformance Groups as defined in NTCIP 1201 and NTCIP 1203. Table 2 indicates the modified object requirements for these mandatory objects.

Table 2: Modified Object Ranges for Mandatory Objects

Object	Reference	Project Requirement
ModuleTableEntry	NTCIP 1201 Clause 2.2.3	Contains at least one row with moduleType equal to 3 (software). The moduleMake specifies the name of the manufacturer, the moduleModel specifies the manufacturer's name of the component and the modelVersion indicates the model version number of the component.
MaxGroupAddresses	NTCIP 1201 Clause 2.7.1	At least 1
CommunityNamesMax	NTCIP 1201 Clause 2.8.2	At least 3
DmsNumPermanentMsg	NTCIP 1203 Clause 2.6.1.1.1.1	At least 1*
DmsMaxChangeableMsg	NTCIP 1203 Clause 2.6.1.1.1.3	At least 21
DmsFreeChangeableMemory	NTCIP 1203 Clause 2.6.1.1.1.4	At least 20 when no messages are stored.
DmsMessageMultiString	NTCIP 1203 Clause 2.6.1.1.1.8.3	The DMS supports any valid MULTI string containing any subset of those MULTI tags listed in Table 4
DmsControlMode	NTCIP 1203 Clause 2.7.1.1.1.1	Support at least the following modes: Local External central CentralOverride

* Ensure the Permanent Messages display the content shown in Table 3.

Ensure the sign blanks if a command to display a message contains an invalid Message CRC value for the desired message.

Table 3: Content of Permanent Messages

Perm. Msg. Num.	Description
1	Permanent Message #1 blanks the display (i.e., consist of and empty MULTI string). It has a run-time priority of one (1).

Table 4: Required MULTI Tags

Code	Feature
f1	field 1 - time (12hr)
f2	field 2 - time (24hr)
f8	field 8 – day of month
f9	field 9 – month
f10	field 10 - 2 digit year
f11	field 11 - 4 digit year
fl (and /fl)	flashing text on a line by line basis with flash rates controllable in 0.5 second increments.
fo	Font
jl2	Justification – line – left
jl3	Justification – line – center
jl4	Justification – line – right
jl5	Justification – line – full
jp2	Justification – page – top
jp3	Justification – page – middle
jp4	Justification – page – bottom
Mv	moving text
Nl	new line
Np	new page, up to 2 instances in a message (i.e., up to 3 pages/frames in a message counting first page)
Pt	page times controllable in 0.5 second increments.

The NTCIP Component implements all mandatory and optional objects of the following optional conformance groups with FSORS.

5. Test Heading

a. Time Management

As defined in NTCIP 1201

b. Timebase Event Schedule

As defined in NTCIP 1201. The following list indicates the modified object requirements for this conformance group.

Table 5: Modified Object Ranges for the Timebase Event Schedule Conformance Group

Object	Reference	Project Requirement
MaxTimeBaseScheduleEntries	NTCIP 1201 Clause 2.4.3.1	At least 28
maxDayPlans	NTCIP 1201 Clause 2.4.4.1	At least 14
maxDayPlanEvents	NTCIP 1201 Clause 2.4.4.2	At least 10

c. Report

As defined in NTCIP 1201. The following list indicates the modified object requirements for this conformance group.

Table 6: Modified Object Ranges for the Report Conformance Group

Object	Reference	Project Requirement
maxEventLogConfigs	NTCIP 1201 Clause 2.5.1	At least 50
eventConfigurationMode	NTCIP 1201 Clause 2.4.3.1	The NTCIP Component supports the following Event Configuration Modes: onChange greaterThanValue smallerThanValue
MaxEventLogSize	NTCIP 1201 Clause 2.5.3	At least 200
MaxEventClasses	NTCIP 1201 Clause 2.5.5	At least 16

d. PMPP

e. Font Configuration

As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.

Table 7: Modified Object Ranges for the Font Configuration Conformance Group

Object	Reference	Project Requirement
NumFonts	NTCIP 1203 Clause 2.4.1.1.1.1	At least 4*
MaxFontCharacters	NTCIP 1203 Clause 2.4.1.1.1.3	At least 127**

*Upon delivery, the first font is a standard 18” font. The second font is a double-stroke 18” font. The third font is a 28” font. The fourth font is empty.

**Upon delivery, the first three font sets are configured in accordance with the ASCII character set for the following characters:

- “A” thru “Z”- All upper-case letters.
- “0" thru “9"- All decimal digits.
- Space (i.e., ASCII code 0x20).
- Punctuation marks shown in brackets [. , ! ? - ‘ ’ “ ” / ( )]
- Special characters shown in brackets [# & * +< >]

f. DMS Configuration

As defined in NTCIP 1203.

g. MULTI Configuration

As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.

Table 8: Modified Object Ranges for the MULTI Configuration Conformance Group

Object	Reference	Project Requirement
DefaultBackgroundColor	NTCIP 1203 Clause 2.5.1.1.1.1	The DMS supports the following background colors: black
DefaultForegroundColor	NTCIP 1203 Clause 2.5.1.1.1.2	The DMS supports the following foreground colors: amber
DefaultJustificationLine	NTCIP 1203 Clause 2.5.1.1.1.6	The DMS supports the following forms of line justification: left center right full
defaultJustificationPage	NTCIP 1203 Clause 2.5.1.1.1.7	The DMS supports the following forms of page justification: top middle bottom
defaultPageOnTime	NTCIP 1203 Clause 2.5.1.1.1.8	The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds
defaultPageOffTime	NTCIP 1203 Clause 2.5.1.1.1.9	The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds
defaultCharacterSet	NTCIP 1203 Clause 2.5.1.1.1.10	The DMS supports the following character sets: eightBit

h. Default Message Control as defined in NTCIP 1203
i. Pixel Service Control as defined in NTCIP 1203
j. MULTI Error Control as defined in NTCIP 1203
k. Illumination/Brightness Control

As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.

Table 9: Modified Object Ranges for the Illumination/Brightness Control Conformance Group

Object	Reference	Project Requirement
dmsIllumControl	NTCIP 1203 Clause 2.8.1.1.1.1	The DMS supports the following illumination control modes: photocell timer manual
dmsIllumNumBrightLevels	NTCIP 1203 Clause 2.8.1.1.1.4	At least 16

l. Auxiliary I/O

m. Scheduling

As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.

Table 10: Modified Object Ranges for the Scheduling Conformance Group

Object	Reference	Project Requirement
NumActionTableEntries	NTCIP 1203 Clause 2.9.1.1.1.1	At least 21

n. Sign Status as defined in NTCIP 1203

o. Status Error as defined in NTCIP 1203

p. Pixel Error Status as defined in NTCIP 1203

q. Fan Error Status as defined in NTCIP 1203

r. Power Status as defined in NTCIP 1203

s. Temperature Status as defined in NTCIP 1203

Install necessary hardware for the support of items q, r, and s above.

Table 11: Some Optional Object Requirements

Object	Reference	Project Requirement
DefaultFlashOn	NTCIP 1203 Clause 2.5.1.1.1.3	The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds
DefaultFlashOff	NTCIP 1203 Clause 2.5.1.1.1.4	The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds
DmsMultiOtherErrorDescription	NTCIP 1203 Clause 2.7.1.1.1.20	If the vendor implements any vendor-specific MULTI tags, the DMS shall provide meaningful error messages within this object whenever one of these tags generates an error.

6. Documentation

Supply software with full documentation, including a CD-ROM containing ASCII versions of the following MIB files in Abstract Syntax Notation 1 (ASN.1) format:

- The relevant version of each official standard MIB Module referenced by the device functionality.
- If the device does not support the full range of any given object within a Standard MIB Module, a manufacturer specific version of the official Standard MIB Module with the supported range indicated in ASN.1 format in the SYNTAX and/or DESCRIPTION fields of the associated OBJECT TYPE macro. Name this file identical to the standard MIB Module, except that it will have the extension ".man".
- A MIB Module in ASN.1 format containing any and all manufacturer-specific objects supported by the device with accurate and meaningful DESCRIPTION fields and supported ranges indicated in the SYNTAX field of the OBJECT-TYPE macros.
- A MIB containing any other objects supported by the device.

Allow the use of any and all of this documentation by any party authorized by the Department for systems integration purposes at any time initially or in the future, regardless of what parties are involved in the systems integration effort.

B. NTCIP Acceptance Testing

Test the NTCIP requirements outlined above by a third-party testing firm. Submit to the Engineer for approval a portfolio of the selected firm. Include the name, address, and a history of the selected firm in performing NTCIP testing along with references. Also provide a contact person's name and phone number. Submit detailed NTCIP testing plans and procedures, including a

list of hardware and software, to the Engineer for review and approval 10 days in advance of a scheduled testing date. Develop test documents based on the NTCIP requirements of these Project Special Provisions. The acceptance test will use the NTCIP Exerciser, and/or other authorized testing tools and will follow the guidelines established in the ENTERPRISE Test Procedures. Conduct the test in North Carolina on the installed system in the presence of the Engineer. Document and certify the results of the test by the firm conducting the test and submit the Engineer for review and approval. In case of failures, remedy the problem and have the firm retest in North Carolina. Continue process until all failures are resolved. The Department reserves the right to enhance these tests as deemed appropriate to ensure device compliance.

9.2. MEASUREMENT AND PAYMENT

There will be no direct payment for the work covered by this section.

Payment for this work will be covered in the applicable sections of these Project Special Provisions at the contract unit price for "DMS" and will be full compensation for all work listed above.

10. DMS ASSEMBLIES

10.1. DESCRIPTION

This section includes all design, fabrication, furnishing, and erection of the DMS assemblies, and attachment of the DMS enclosures to the structures in accordance with the requirements of these Project Special Provisions and the Plans. Fabricate the supporting DMS assemblies from tubular steel. Furnish pedestal type DMS assemblies as shown in the Plans. Cantilevered and monotube (horizontal truss) DMS structures will not be allowed.

For the two (2) DMS mounted back to back, provide one pedestal structure with a minimum of 20 feet clearance from the high point of the road to the bottom of the DMS enclosure. DMS assemblies must allow for field adjustment with shims (horizontal & vertical tilting) +/- 3 degrees of the DMS enclosure to ensure optimum legibility from all travel lanes.

For DMS assemblies, design the new DMS assemblies (including footings) and submit shop drawings for approval. A Professional Engineer that is registered in the state of North Carolina will prepare such computations and drawings. These must bear his signature, seal, and date of acceptance.

For future CCTV camera location, install extension pole at the dual-sided DMS location shown in the plans.

The provisions of Section 900 of the Standard Specifications apply to all work covered by this section.

It is the Contractor's responsibility to provide DMS S-dimension elevation drawings for the DMS locations to the Engineer for approval.

10.2. MATERIALS

Use materials that meet the following requirements of the Standard Specifications:

Structural Steel	Section 1072
Overhead Sign Structures	Section 1096

Signing Materials	Section 1092
Organic-Zinc Repair Paint	Article 1080-9
Reinforcing Steel	Sub-article 1070
Direct Tension Indicators	Sections 440 and 1072

10.3. CONSTRUCTION METHODS

A. General

Fabricate the new DMS assemblies in accordance with the details shown in the approved shop drawings and the requirements of these Project Special Provisions.

No welding, cutting, or drilling in any manner will be permitted in the field, unless approved by the Engineer.

Drill bolt holes and slots to finished size. Holes may also be punched to finished size, provided the diameter of the punched holes are at least twice the thickness of the metal being punched. Flame cutting of bolt holes and slots is not permitted.

Erect DMS in accordance with the requirements indicated on the Plans and in these Project Special Provisions. Field drill two holes per connection in the Z bars for attaching the DMS to the structure. Use two bolts at each connection. Provide two (2) U-bolts at each U-bolt connection such as 1) each truss chord to sign hanger, or 2) each truss chord to platform support. Provide two (2) U-bolts at each U-bolts connection where ends of truss chords are supported. Minimum diameter of all U-bolts is to be ½ inch.

Use two coats of a zinc-rich paint to touch up minor scars on all galvanized materials. See Standard Specifications for Roads and Structures Section 1076-6.

For high strength bolted connections, provide direct tension indicator washer.

B. Shop Drawing

Submit to the Engineer for approval a complete design for the DMS assemblies (including footings), DMS assembly hardware, and brackets for supporting the DMS. Base the design on the line drawings and correct wind speed in accordance with the latest edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals, 6th Edition, 2013" with the latest interim revisions.

The manufacturer of the DMS assembly must ensure that design of the assembly is compatible with the DMS for mounting and attachment.

Submit six copies of complete detailed shop drawings and one copy of the design computations for the DMS assembly to the Engineer for approval prior to fabrication. Show in the shop drawings complete design and fabrication details including foundations, provisions for attaching the DMS to supporting structures, applicable material specifications, and any other information necessary for procuring and replacing any part of the complete DMS assembly.

Allow a minimum of 40 working days for shop drawing approval after the Engineer receives them. If revised drawings are necessary, allow appropriate additional time for review and approval of final shop drawings.

Approval of shop drawings by the Engineer will not relieve the Contractor of his responsibility for the correctness of drawings, or for the fit of all shop and field connections and anchors.

C. Design and Fabrication

1. Dynamic Message Sign Assembly

- Design must be in accordance with the Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013, and the latest Interim Revisions.
- The wind pressure map that is developed from the 3-second gust speeds, as provided in Article 3.8, shall be used.
- The natural wind gust speed in North Carolina shall be assumed to be 5 meters per second or 11.6 mph for inland areas, and 7 meters per second or 15.7 mph for coastal areas. The coastal area shall be defined as any area within 2 miles from the waterfront facing the ocean or sound and all area where the design basic wind speed is above 120 mph, as shown in Figure 3-2.
- The fatigue importance category used in the design, for each type of structure, as provided for in Article 11.6, Fatigue Importance Factors, shall be Category II unless otherwise shown on the contract plans.
- Wind drag coefficient for Dynamic Message Sign enclosures shall be 1.7.

The following Specification interpretations or criteria shall be used in the design of overhead sign assemblies:

- For design of supporting upright posts or columns, the effective length factor for columns "K", as provided for in Appendix B, Section B.5, shall be taken as the following, unless otherwise approved by the Engineer:

  Case 1 For a single upright post of span type overhead sign structure, the effective column length factor, "K", shall be taken as 2.0.

  Case 2 For twin post truss-type upright post with the post connected to one chord of a horizontal truss, the effective column length factor for that column shall be taken as 2.0.

  Case 3 For twin post truss-type upright post with the post connected to two truss chords of a horizontal tri-chord or box truss, the effective column length factor for that column shall be taken as 1.65.

- For twin post truss-type upright post, the unbraced length shall be from the chord to post connection to the top of base plate.
- For twin post truss-type upright post that is subject to axial compression, bending moment, shear, and torsion the post shall satisfy Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals Equations 5-17, 5-18 and 5-19. To reduce the effects of secondary bending, in lieu of Equation 5-18, the following equation may be used:

$$\frac{f_a}{F_a} + \frac{f_b}{\left(1 - \frac{0.6 f_a}{F_{\acute{e}}}\right) F_b} + \left(\frac{f_v}{F_v}\right)^2 \leq 1.0$$

Where
fa = Computed axial compression stress at base of post

- The base plate thickness for all uprights and poles shall be a minimum of 2" but not less than that determined by the following criteria and design.

  Case 1 Circular or rectangular solid base plates with the upright pole welded to the top surface of base plate with full penetration butt weld, and where no stiffeners are provided. A base plate with a small center hole, which is less than 1/5 of the upright diameter, and located concentrically with the upright pole, may be considered as a solid base plate.

  The magnitude of bending moment in the base plate, induced by the anchoring force of each anchor bolt shall be calculated using equation $M = (P \times D_1) / 2$.

  Case 2 Circular or rectangular base plate with the upright pole socketed into and attached to the base plate with two lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/5 of the upright diameter.

  The magnitude of bending moment induced by the anchoring force of each anchor bolt shall be calculated using equation $M = P \times D_2$.

  – M, bending moment at the critical section of the base plate induced by one anchor bolt

  – P, anchoring force of each anchor bolt

  – D_1, horizontal distance between the center of the anchor bolt and the outer face of the upright, or the difference between the radius of the bolt circle and the outside radius of the upright

  – D_2, horizontal distance between the face of the upright and the face of the anchor bolt nut

- The critical section shall be located at the face of the anchor bolt and perpendicular to the radius of the bolt circle. The overlapped part of two adjacent critical sections shall be considered ineffective.
- The thickness of base plate of Case 1 shall not be less than that calculated based on formula for Case 2.
- Uprights, foundations, and trusses shall be designed in accordance with the DMS Foundation Special Provision for the effects of torsion. Torsion shall be considered from dead load

eccentricity of these attachments, as well as for attachments such as walkway platforms, supporting brackets, etc., that add to the torsion in the assembly. Truss vertical and horizontal truss diagonals in particular and any other assembly members shall be appropriately sized for these loads.

- Uprights, foundations, and trusses shall be designed for the proposed sign wind area and future wind areas. The design shall consider the effect of torsion induced by the eccentric force location of the center of wind force above (or below) the center of the supporting truss. Truss vertical and horizontal truss diagonals in particular and any other assembly members shall be appropriately sized for these loads.

Fabricate the supporting structures using tubular members of either aluminum or steel, using only one type of material throughout the project.

Horizontal components of the supporting structures for overhead DMS must be of a truss design to support the DMS. Truss centerline must coincide with centerline of the DMS design area shown on the structure line drawing. Provide permanent camber in addition to dead load camber in accordance with the "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals." Indicate on the shop drawings the amount of camber provided and the method employed in the fabrication of the support to obtain the camber.

For all U-bolt connections of hanger beams to overhead assembly truss chords, provide all U-bolts with a flat washer, a lock washer and double nuts at each end of the U-bolts. All double nuts that are on any U-bolt shall be the same thickness and weight. When assembled, the double nuts shall be brought tight against each other by the use of two wrenches.

Fabricate attachment assemblies for the mounting DMS in a manner that allows easy removal of each sign independently.

2. CCTV Camera Extension Pole

At the locations shown in the plans, design the DMS assembly with provisions to allow for the attachment of a CCTV camera assembly. Design the CCTV camera extension pole to provide an attachment height of 45 feet above finished grade. Design the maximum deflection at the top of the CCTV supporting member for 30 mph, non-gusting wind with no more than 1 inch in any direction. The ultimate design load for the CCTV camera extension pole shall be AASHTO 2002 50 year wind speed for the area plus 50 labs camera deadload. Design the CCTV camera extension pole as an integral part of the DMS assembly and submit the design along with the structural calculation for review and approval by the Engineer.

10.4. MEASUREMENT AND PAYMENT

DMS will be measured and paid as the actual number of dynamic message sign assemblies furnished, installed, and accepted. Payment includes all design, fabrication, construction, transportation, and attachment of the complete dynamic message sign assemblies for the independent attachment of two (2) signs, supporting structure, hardware, direct tension indicators, preparing and furnishing shop drawings, additional documentation, incidentals, and all other equipment and features necessary to furnish the system described above.

CCTV Camera Extension Pole will be measured and paid as the actual number of CCTV camera extension poles furnished, installed and accepted. Payment includes design, fabrication, and hardware as described above.

Payment will be made under:

Pay Item	Pay Unit
DMS Structure	Each
CCTV Camera Extension Pole	Each

11. SOIL TEST FOR DMS FOUNDATION

11.1. DESCRIPTION

Perform a soil test for each DMS foundation location according to the requirements described below.

It is assumed that all foundation designs will be drilled pier foundations unless site-specific soil test information does not allow for a drilled pier foundation design. If an alternative foundation design is required, notify the Engineer immediately. Prior approval from the Engineer is required to receive additional compensation for an alternate foundation design.

Design all custom foundations to carry the maximum capacity of each DMS structure.

When poor soil conditions are encountered, which could create an excessively large foundation design, consideration may be given to allowing an exemption to the maximum capacity design. The contractor must gain approval from the Engineer before reducing a foundation's capacity. Where poor soil is known to be present, it is advisable that the contractor receive approval for foundation designs before releasing poles for fabrication.

11.2. SOIL TEST

A. General

Drilled piers are reinforced concrete sections, cast in place against in situ, undisturbed material. Drilled piers are of straight shaft type and vertical.

The contractor-selected pole fabricator is responsible for determining if the addition of wing walls is necessary for the supporting foundations.

B. Soil Test

Perform a soil test at each proposed DMS pedestal location. Complete all required fill placement and excavation at each pedestal location to finished grade before drilling each boring. Soil tests performed that are not in compliance with this requirement may be rejected and will not be paid. Drill one boring to a depth of 26 feet within a 25-foot radius of each proposed foundation.

Perform standard penetration tests (SPT) in accordance with ASTM D 1586 at depths of 1, 2.5, 5, 7.5, 10, 15, 20 and 26 feet. Discontinue the boring if one of the following occurs:

- A total of 100 blows have been applied in any 2 consecutive 6-in. intervals
- A total of 50 blows have been applied with < 3-in. penetration

Submit completed boring logs collected in accordance with these Project Special Provisions DMS load information to the contractor-selected pedestal fabricator to assist in the pedestal and foundation design.

Describe each DMS pedestal location along the project corridor in a manner that is easily discernible to both the contractor's designer and NCDOT reviewers. If a DMS pedestal is at an intersection, label the boring the "Intersection of (*Route or SR #*), *(Street Name)* and (*Route or SR #*), *(Street Name)*, _____ County. Label borings with "B- *N, S, E, W, NE, NW, SE or SW*" corresponding to the quadrant location within the intersection.

Pedestal numbers should be made available to the geotechnical drilling Contractor. Include pedestal numbers in the boring label if they are available. If they are not available, ensure the boring labels can be cross-referenced to corresponding pedestal numbers or pedestal locations.

For each boring, submit a legible (handwritten or typed) boring log signed and sealed by a licensed Geologist or Professional Engineer registered in North Carolina. Include on each boring the SPT blow counts and N-values at each depth, depth of the boring, and a general description of the soil types encountered.

Borings that can't be easily related to their specific pedestal location will be returned to the contractor for clarification, or if approved by the Engineer, the foundation may be designed using the worst-case soil condition obtained as part of this project.

11.3. MEASUREMENT AND PAYMENT

Soil test for DMS foundation will be measured and paid as the actual number of Soil Tests with SPT borings drilled, furnished and accepted.

Payment will be made under:

Pay Item	Pay Unit
Soil Test for DMS Foundation	Each

12. FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES

12.1. DESCRIPTION

Foundations for metal poles include foundations for signals, cameras, overhead and dynamic message signs (DMS) and high mount and light standards supported by metal poles or upright trusses. Foundations consist of footings with pedestals and drilled piers with or without grade beams or wings. Anchor rod assemblies consist of anchor rods (also called anchor bolts) with nuts and washers on the exposed ends of rods and nuts and a plate or washers on the other ends of rods embedded in the foundation.

Construct concrete foundations with the required resistances and dimensions and install anchor rod assemblies in accordance with the contract and accepted submittals. Construct drilled piers consisting of cast-in-place reinforced concrete cylindrical sections in excavated holes. Provide temporary casings or polymer slurry as needed to stabilize drilled pier excavations. Use a prequalified Drilled Pier Contractor to construct drilled piers for metal poles. Define "excavation" and "hole" as a drilled pier excavation and "pier" as a drilled pier.

This provision does not apply to foundations for signal pedestals; see Section 1743 of the *2018 Standard Specifications* and Standard Drawing No. 1743.01 of the *2018 Roadway Standard Drawings*.

12.2. MATERIALS

Refer to the *2018 Standard Specifications*.

Item	Section
Conduit	1091-3
Grout, Type 2	1003
Polymer Slurry	411-2(B)
Portland Cement Concrete	1000
Reinforcing Steel	1070
Rollers and Chairs	411-2(C)
Temporary Casings	411-2(A)

Provide Type 3 material certifications in accordance with Article 106-3 of the *2018 Standard Specifications* for conduit, rollers, chairs and anchor rod assemblies. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store foundation and anchor rod assembly materials so materials are kept clean and free of damage. Damaged or deformed materials will be rejected.

Use conduit type in accordance with the contract. Use Class A concrete for footings and pedestals, Class Drilled Pier concrete for drilled piers and Class AA concrete for grade beams and wings including portions of drilled piers above bottom of wings elevations. Corrugated temporary casings may be accepted at the discretion of the Engineer. A list of approved polymer slurry products is available from:

connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Provide anchor rod assemblies in accordance with the contract consisting of the following:

A. Straight anchor rods,

B. Heavy hex top and leveling nuts and flat washers on exposed ends of rods, and

C. Nuts and either flat plates or washers on the other ends of anchor rods embedded in foundations.

Do not use lock washers. Use steel anchor rods, nuts and washers that meet ASTM F1554 for Grade 55 rods and Grade A nuts. Use steel plates and washers embedded in concrete with a nominal thickness of at least 1/4". Galvanize anchor rods and exposed nuts and washers in accordance with Article 1076-4 of the *2018 Standard Specifications*. It is not necessary to galvanize nuts, plates and washers embedded in concrete.

12.3. CONSTRUCTION METHODS

Install the required size and number of conduits in foundations in accordance with the plans and accepted submittals. Construct top of piers, footings, pedestals, grade beams and wings flat, level

and within 1" of elevations shown in the plans or approved by the Engineer. Provide an Ordinary Surface finish in accordance with Subarticle 825-6(B) of the *2018 Standard Specifications* for portions of foundations exposed above finished grade. Do not remove anchor bolt templates or pedestal or grade beam forms or erect metal poles or upright trusses onto foundations until concrete attains a compressive strength of at least 3,000 psi.

A. Drilled Piers

Before starting drilled pier construction, hold a predrill meeting to discuss the installation, monitoring and inspection of the drilled piers. Schedule this meeting after the Drilled Pier Contractor has mobilized to the site. The Resident or Division Traffic Engineer, Contractor and Drilled Pier Contractor Superintendent will attend this predrill meeting.

Do not excavate holes, install piles or allow equipment wheel loads or vibrations within 20 ft of completed piers until 16 hours after Drilled Pier concrete reaches initial set.

Check for correct drilled pier alignment and location before beginning drilling. Check plumbness of holes frequently during drilling.

Construct drilled piers with the minimum required diameters shown in the plans. Install piers with tip elevations no higher than shown in the plans or approved by the Engineer.

Excavate holes with equipment of the sizes required to construct drilled piers. Depending on the subsurface conditions encountered, drilling through rock and boulders may be required. Do not use blasting for drilled pier excavations.

Contain and dispose of drilling spoils and waste concrete as directed and in accordance with Section 802 of the *2018 Standard Specifications*. Drilling spoils consist of all materials and fluids removed from excavations.

If unstable, caving or sloughing materials are anticipated or encountered, stabilize holes with temporary casings and/or polymer slurry. Do not use telescoping temporary casings. If it becomes necessary to replace a temporary casing during drilling, backfill the excavation, insert a larger casing around the casing to be replaced or stabilize the excavation with polymer slurry before removing the temporary casing.

If temporary casings become stuck or the Contractor proposes leaving casings in place, temporary casings should be installed against undisturbed material. Unless otherwise approved, do not leave temporary casings in place for mast arm poles and cantilever signs. The Engineer will determine if casings may remain in place. If the Contractor proposes leaving temporary casings in place, do not begin drilling until a casing installation method is approved.

Use polymer slurry and additives to stabilize holes in accordance with the slurry manufacturer's recommendations. Provide mixing water and equipment suitable for polymer slurry. Maintain the required polymer slurry at all times except for sand content.

Define a "sample set" as slurry samples collected from mid-height and within 2 ft of the bottom of holes. Take sample sets from excavations to test polymer slurry immediately after filling holes with slurry, at least every 4 hours thereafter and immediately before placing concrete. Do not place Drilled Pier concrete until both slurry samples from an excavation meet the required polymer slurry properties. If any slurry test results do not meet the requirements, the Engineer may suspend drilling until both samples from a sample set meet the required slurry properties.

Remove soft and loose material from bottom of holes using augers to the satisfaction of the Engineer. Assemble rebar cages and place cages and Drilled Pier concrete in accordance with Subarticle 411-4(E) of the 2018 *Standard Specifications* except for the following:

1) Inspections for tip resistance and bottom cleanliness are not required,
2) Temporary casings may remain in place if approved, and
3) Concrete placement may be paused near the top of pier elevations for anchor rod assembly installation and conduit placement or
4) If applicable, concrete placement may be stopped at bottom of grade beam or wings elevations for grade beam or wing construction.

If wet placement of concrete is anticipated or encountered, do not place Drilled Pier concrete until a concrete placement procedure is approved. If applicable, temporary casings and fluids may be removed when concrete placement is paused or stopped in accordance with the exceptions above provided holes are stable. Remove contaminated concrete from exposed Drilled Pier concrete after removing casings and fluids. If holes are unstable, do not remove temporary casings until a procedure for placing anchor rod assemblies and conduit or constructing grade beams or wings is approved.

Use collars to extend drilled piers above finished grade. Remove collars after Drilled Pier concrete sets and round top edges of piers.

If drilled piers are questionable, pile integrity testing (PIT) and further investigation may be required in accordance with Article 411-5 of the *2018 Standard Specifications*. A drilled pier will be considered defective in accordance with Subarticle 411-5(D) of the *2018 Standard Specifications* and drilled pier acceptance is based in part on the criteria in Article 411-6 of the *2018 Standard Specifications* except for the top of pier tolerances in Subarticle 411-6(C) of the *2018 Standard Specifications*.

If a drilled pier is under further investigation, do not grout core holes, backfill around the pier or perform any work on the drilled pier until the Engineer accepts the pier. If the drilled pier is accepted, dewater and grout core holes and backfill around the pier with approved material to finished grade. If the Engineer determines a pier is unacceptable, remediation is required in accordance with Article 411-6 of the *2018 Standard Specifications*. No extension of completion date or time will be allowed for remediation of unacceptable drilled piers or post repair testing.

Permanently embed a plate in or mark top of piers with the pier diameter and depth, size and number of vertical reinforcing bars and the minimum compressive strength of the concrete mix at 28 days.

B. Footings, Pedestals, Grade Beams and Wings

Excavate as necessary for footings, grade beams and wings in accordance with the plans, accepted submittals and Section 410 of the *2018 Standard Specifications*. If unstable, caving or sloughing materials are anticipated or encountered, shore foundation excavations as needed with an approved method. Notify the Engineer when foundation excavation is complete. Do not place concrete or reinforcing steel until excavation dimensions and foundation material are approved.

Construct cast-in-place reinforced concrete footings, pedestals, grade beams and wings with the dimensions shown in the plans and in accordance with Section 825 of the *2018 Standard Specifications*. Use forms to construct portions of pedestals and grade beams protruding above

finished grade. Provide a chamfer with a 3/4" horizontal width for pedestal and grade beam edges exposed above finished grade. Backfill and fill in accordance with Article 410-8 of the *2018 Standard Specifications*. Proper compaction around footings and wings is critical for foundations to resist uplift and torsion forces.

C. Anchor Rod Assemblies

Size anchor rods for design and the required projection above top of foundations. Determine required anchor rod projections from nut, washer and base plate thicknesses, the protrusion of 3 to 5 anchor rod threads above top nuts after tightening and the distance of one nut thickness between top of foundations and bottom of leveling nuts.

Protect anchor rod threads from damage during storage and installation of anchor rod assemblies. Before placing anchor rods in foundations, turn nuts onto and off rods past leveling nut locations. Turn nuts with the effort of one workman using an ordinary wrench without a cheater bar. Report any thread damage to the Engineer that requires extra effort to turn nuts.

Arrange anchor rods symmetrically about center of base plate locations as shown in the plans. Set anchor rod elevations based on required projections above top of foundations. Securely brace and hold rods in the correct position, orientation and alignment with a steel template. Do not weld to reinforcing steel, temporary casings or anchor rods.

Install top and leveling (bottom) nuts, washers and the base plate for each anchor rod assembly in accordance with the following procedure:

1) Turn leveling nuts onto anchor rods to a distance of one nut thickness between the top of foundation and bottom of leveling nuts. Place washers over anchor rods on top of leveling nuts.
2) Determine if nuts are level using a flat rigid template on top of washers. If necessary, lower leveling nuts to level the template in all directions or if applicable, lower nuts to tilt the template so the metal pole or upright truss will lean as shown in the plans. If leveling nuts and washers are not in full contact with the template, replace washers with galvanized beveled washers.
3) Verify the distance between the foundation and leveling nuts is no more than one nut thickness.
4) Place base plate with metal pole or upright truss over anchor rods on top of washers. High mount luminaires may be attached before erecting metal poles but do not attach cables, mast arms or trusses to metal poles or upright trusses at this time.
5) Place washers over anchor rods on top of base plate. Lubricate top nut bearing surfaces and exposed anchor rod threads above washers with beeswax, paraffin or other approved lubricant.
6) Turn top nuts onto anchor rods. If nuts are not in full contact with washers or washers are not in full contact with the base plate, replace washers with galvanized beveled washers.
7) Tighten top nuts to snug-tight with the full effort of one workman using a 12" wrench. Do not tighten any nut all at once. Turn top nuts in increments. Follow a star pattern cycling through each nut at least twice.

8) Repeat (7) for leveling nuts.

9) Replace washers above and below the base plate with galvanized beveled washers if the slope of any base plate face exceeds 1:20 (5%), any washer is not in firm contact with the base plate or any nut is not in firm contact with a washer. If any washers are replaced, repeat (7) and (8).

10) With top and leveling nuts snug-tight, mark each top nut on a corner at the intersection of 2 flats and a corresponding reference mark on the base plate. Mark top nuts and base plate with ink or paint that is not water-soluble. Use the turn-of-nut method for pretensioning. Do not pretension any nut all at once. Turn top nuts in increments for a total turn that meets the following nut rotation requirements:

NUT ROTATION REQUIREMENTS (Turn-of-Nut Pretensioning Method)	
Anchor Rod Diameter, inch	**Requirement**
≤ 1 1/2	1/3 turn (2 flats)
> 1 1/2	1/6 turn (1 flat)

Follow a star pattern cycling through each top nut at least twice.

11) Ensure nuts, washers and base plate are in firm contact with each other for each anchor rod. Cables, mast arms and trusses may now be attached to metal poles and upright trusses.

12) Between 4 and 14 days after pretensioning top nuts, use a torque wrench calibrated within the last 12 months to check nuts in the presence of the Engineer. Completely erect mast arm poles and cantilever signs and attach any hardware before checking top nuts for these structures. Check that top nuts meet the following torque requirements:

TORQUE REQUIREMENTS	
Anchor Rod Diameter, inch	Requirement, ft-lb
7/8	180
1	270
1 1/8	380
1 1/4	420
≥ 1 1/2	600

If necessary, retighten top nuts in the presence of the Engineer with a calibrated torque wrench to within ± 10 ft-lb of the required torque. Do not overtighten top nuts.

13) Do not grout under base plate.

12.4. MEASUREMENT AND PAYMENT

Foundations and anchor rod assemblies for metal poles and upright trusses will be measured and paid for elsewhere in the contract.

No payment will be made for temporary casings that remain in drilled pier excavations. No payment will be made for PIT. No payment will be made for further investigation of defective piers. Further investigation of piers that are not defective will be paid as extra work in accordance with Article 104-7 of the *2018 Standard Specifications*. No payment will be made for remediation of unacceptable drilled piers or post repair testing.

13. OVERHEAD AND DYNAMIC MESSAGE SIGN FOUNDATIONS

13.1. DESCRIPTION

Sign foundations include foundations for overhead and dynamic message signs (DMS) supported by metal poles or upright trusses. Sign foundations consist of footings with pedestals or drilled piers with or without grade beams or wings, conduit and anchor rod assemblies. Construct sign foundations in accordance with the contract and accepted submittals. Define "cantilever sign" as an overhead cantilever sign support in accordance with Figure 1-1 of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

13.2. MATERIALS

Use sign foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

A. Assumed Subsurface Conditions

Assume the following soil parameters and groundwater elevation for sign foundations unless these subsurface conditions are not applicable to sign locations:

A. Unit weight (γ) = 120 lb/cf,

B. Friction angle (ϕ) = 30°,

C. Cohesion (c) = 0 lb/sf, and

D. Groundwater 7 ft below finished grade.

A subsurface investigation is required if the Engineer determines these assumed subsurface conditions do not apply to a sign location and the sign cannot be moved. Subsurface conditions requiring a subsurface investigation include but are not limited to weathered or hard rock, boulders, very soft or loose soil, muck or shallow groundwater. No extension of completion date or time will be allowed for subsurface investigations.

B. Subsurface Investigations

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each sign location requiring a subsurface investigation. Rough grade sign locations to within 2 ft of finished grade before beginning drilling. Drill borings to 2 drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.

Use the computer software gINT version 8.0 or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide boring logs sealed by a geologist or engineer licensed in the state of North Carolina.

C. Sign Foundation Designs

Design sign foundations for the wind zone and clearances shown in the plans and the slope of finished grade at each sign location. Use the assumed soil parameters and groundwater elevation

above for sign foundation designs unless a subsurface investigation is required. For sign locations requiring a subsurface investigation, design sign foundations for the subsurface conditions at each sign location. Design footings, pedestals, drilled piers, grade beams and wings in accordance with the 6th Edition of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*. In some instances, conflicts with drainage structures may dictate sign foundation types.

Design footings in accordance with Section 4.4 of the *AASHTO Standard Specifications for Highway Bridges*. Do not use an allowable bearing pressure of more than 3,000 lb/sf for footings.

Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges* except reduce ultimate side resistance by 25% for uplift. Use the computer software LPILE version 5.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 1" at top of piers. For cantilever signs with single drilled pier foundations supporting metal poles, use wings to resist torsion forces. Provide drilled pier designs with a factor of safety of at least 2.0 for torsion.

For drilled pier sign foundations supporting upright trusses, use dual drilled piers connected with a grade beam having a moment of inertia approximately equal to that of either pier. The Broms' method is acceptable to analyze drilled piers with grade beams instead of LPILE. Use a safety factor of at least 3.5 for the Broms' design method in accordance with C13.6.1.1 of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

Submit boring logs, if any, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *2018 Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for sign foundation design submittals. Have sign foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

13.3. CONSTRUCTION METHODS

Construct footings, pedestals, drilled piers, grade beams and wings and install anchor rod assemblies for sign foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

13.4. MEASUREMENT AND PAYMENT

Overhead Footings will be measured and paid in cubic yards. Sign foundations will be measured as the cubic yards of foundation concrete for footings, pedestals, drilled piers, grade beams and wings shown on the accepted submittals. The contract unit price for *Overhead Footings* 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 sign foundations. Subsurface investigations required by the Engineer will be paid as extra work in accordance with Article 104-7 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Overhead Footings	Cubic Yards

14. REMOVAL AND DISPOSAL OF EXISTNG DMS COMPONENTS

14.1. DESCRIPTION

Remove and dispose of one (1) existing DMS and one (1) existing DMS structure shown in the Plan.

Perform the work required by this section in accordance with Section 907 of the Standard Specifications.

Contractor to provide the Engineer a two week notice before anticipated removal of the sign to allow Division Traffic personnel adequate time to salvage all usable parts from the sign enclosure and the equipment cabinet.

14.2. REMOVAL AND DISPOSAL OF EXISTING DMS

Remove and dispose of the one existing DMS. Remove and dispose of all other DMS power and communication cables.

Comply with Section 907-2(C) of the Standard Specifications.

14.3. REMOVE AND DISPOSAL OF DMS STRUCTURE AND FOUNDATIONS

Remove and dispose of the existing full-span overhead structure as shown in the Plans. Remove and dispose of all conduits attached to structures. Ensure conduits are removed to 24-inches below finished grade. Comply with Section 907-2(C) of the Standard Specifications. Remove and dispose of the existing foundations.

14.4. REMOVE AND DISPOSAL OF EXISTING ELECTRICAL SERVICE

Remove and dispose of existing electrical service as shown in the Plans. Coordinate with the utility company to de-energize the service and remove the meter. Remove and dispose of the existing meter base, service disconnect equipment, feeder conductors and conduits. Comply with Section 907-2(C) of the Standard Specification.

14.5. MEASUREMENT AND PAYMENT

Disposal of Existing DMS will be measured and paid as the actual number of DMSs and cabinets remove and disposed according with Section 14.2 above.

Disposal of Existing DMS Structure and Foundations will be measured and paid as the actual number of DMS structures and foundations removed and disposed according with Section 14.3 above.

Disposal of Existing Electrical Service will be measured and paid as the actual number of electrical services removed and disposed according with Section 14.4 above.

Payment will be made under:

Pay Item	Pay Unit
Disposal of Existing DMS	Each
Disposal of Existing DMS Structure and Foundations	Each
Disposal of Existing Electrical Service	Each

15. DIGITAL CCTV FIELD EQUIPMENT

15.1. DESCRIPTION

Furnish and install High Definition (1080p) CCTV field equipment described in these Project Special Provisions. Furnish equipment that is compatible, interoperable, and completely interchangeable with existing equipment currently in use by the Division. Ensure that the equipment is fully compatible with all features of the existing video management software currently in use by the Division.

This unit also includes all associated hardware, including stainless steel banding with screw clamps for attaching the pole adapter bracket to the pole and a 1.5-inch NTP external thread pipe adapter for attaching the dome camera to the camera mounting arm.

Straight, liquid tight, aluminum, strain relief cable connectors shall be provided to seal the cable opening in the camera mounting arm and pole. The connectors shall have a ¾" N.P.T. hub and shall accommodate a cord diameter of 0.125" to 0.25".

Also provided are aluminum or stainless steel washers and locknuts to secure the connectors and seal the openings. This unit covers drilling a hole in the aluminum pole to accommodate the cable connector. The hole will be drilled 2' from the top of the pole in line with the camera mounting position. An access hole will be provided in the pole for securing the connector with a locknut.

The patch cable between a new or existing switch and the PoE midspan, will be a 3' long shielded, outdoor-rated CAT5e cable pre-terminated with male RJ45 gold-plated connectors with snagless boots, eight (8) 24 AWG conductors and tested to a minimum of 350 MHz.

15.2. MATERIAL

A. General

Furnish and install a new CCTV camera assembly at the location shown on the Plans. This assembly consists of the following:

1. Dome CCTV camera that contains in a single enclosed unit the following:

CCTV color digital signal processing camera unit with zoom lens, filter, control circuit, and accessories

2. Motorized pan, tilt, and zoom

All necessary cable, connectors, and incidental hardware to make a complete and operable system

Built-in video encoder capable of H.264/MPEG-4 compression for video-over-IP transmission.

Lightning arrestors installed in-line between the CCTV camera and the equipment cabinet components.

A NEMA Type 4 enclosure constructed of aluminum with a clear acrylic dome or approved equal Camera Unit housing.

B. Camera and Lens

Cameras

Furnish new Complementary Metal-Oxide-Semiconductor (CMOS) sensor-equipped color cameras. Furnish cameras that meet the following minimum requirements:

Video format: .....NTSC compatible resolution, user selectable up to a maximum of 1920x1080 (1080p),

Focus: .....Automatic with manual override, Electronic Image Stabilization (EIS),

White balance: .....Automatic through the lens with manual override,

Shutter: .....Electronic shutter with manual control from 1/2 of a second to 1/30,000th of a second,

Overexposure protection: .....The camera must have built-in circuitry or a protection device to prevent any damage to the camera when pointed at strong light sources, including the sun,

Sensitivity: .....0.6 lux at 90% scene reflectance

Input/Output Connection: .....Single 10BASE-T/100BASE-T compatible outdoor-rated Cat5e cable for video, control, and Power over Ethernet; IP66-rated RJ45 connector,

Power: .....High Power over Ethernet (High PoE), 74W max

Zoom Lens

Furnish each camera with a motorized zoom lens that is integrated in a high-performance dome system, or approved equivalent, with automatic iris control and manual override. Furnish lenses that meet the following optical specifications:

Aperture .....f/1.6 – f/2.9,

Focal length: .....4.45 mm (wide) and 89 mm (tele.), minimum,

Horizontal viewing angle: .....55.4° (wide) and 2.9° (tele), minimum,

Zoom .....30X optical, 12X digital, minimum

Preset positioning: .....64 Presets, minimum.

The lens must be capable of both automatic and remote manual control iris and focus override operation. The lens must be equipped for remote control of zoom and focus, including automatic movement to any of the preset zoom and focus positions. Mechanical or electrical means must be provided to protect the motors from overrunning in extreme positions. The operating voltages of the lens must be compatible with the outputs of the camera control.

C. Camera Housing

Furnish new dome style enclosure for the CCTV assemblies. The enclosures must be equipped with a sunshield and a strip heater, and be fabricated from corrosion resistant aluminum and finished in a neutral color of weather resistant enamel. The enclosure must meet or exceed NEMA 4X and IP66 ratings. The viewing area of the enclosure must be constructed of clear acrylic, polycarbonate, or an approved equivalent.

Furnish removable dome enclosures that are secured to the camera housing using stainless steel set screws. Ensure that camera housing assembly is completely sealed with a rubber O-ring gasket to prevent dust and moisture intrusion.

Environmental Operating Conditions: -50ºF to 122ºF, 10-100% RH (condensing) humidity

D. Pan and Tilt Unit

Equip each new dome style assembly with a pan and tilt unit. The pan and tilt unit must be integral to the high performance integrated dome system. The pan and tilt unit must be rated for outdoor operation, provide dynamic braking for instantaneous stopping, prevent drift, and have minimum backlash. The pan and tilt units must meet or exceed the following specifications:

Pan: .....Continuous 360 Degrees,

Tilt:.....Up/down 180 degrees minimum,

Motors:.....Two-phase induction type, continuous duty, instantaneous reversing,

Preset Positioning: .....64 PTZ presets per camera.

E. Video Ethernet Encoder

Furnish cameras with a built-in digital video Ethernet encoder to allow video-over-IP transmission. The encoder units must be built into the camera housing and require no additional equipment to transmit encoded video over IP networks.

Encoders must have the following minimum features:

- Network Interface: Ethernet 10/100Base-T (RJ-45 connector)
- Protocols: IPv4, IPv6, HTTP, HTTPS, SSL, QoS, FTP, SMTP, UPnP, SNMP v2c/v3, DNS, NTP, RTSP, RTP, TCP, UDP, IGMP, and DHCP,
- Security: SSL, SSH, 802.1x, HTTPS encryption with password controlled browser interface
- Video Streams: 2 simultaneous streams, user configurable
- Compression: H.264 (MPEG-4 Part 10/AVC)
- Resolution Scalable; NTSC-compatible 320x176 to 1920x1080 (HDTV 1080p, 16:9 aspect ratio)
- Frame Rate: 1-30 FPS programmable (full motion)
- Bandwidth 30 kbps – 6 Mbps, configurable depending on resolution

- Edge Storage: SD/SDHC/SDXC slot supporting up to 64GB memory card

F. Ethernet Cable

Provide, at a minimum, Category 5 Enhanced (5e) Ethernet cable that complies with ANSI/TIA-568-B-5 standards for four-pair shielded twisted copper for Ethernet communications. The cable shall meet all of the mechanical requirements of ANSI/ECEA S-80-576. The Ethernet cable must be rated for medium-power, network-powered broadband communications circuits and must be Type BMU network-powered broadband communications medium-power cable.

Provide 4-pair twisted copper Ethernet cable and connectors rated for an ambient operating temperature range of -30º F to 165º F. The cable shall be shielded, outdoor-rated, and have a UV-resistant jacket. The void between the insulated copper pairs and the polyethylene outer jacket shall be injected with a water-resistant flooding compound.

G. Control Receiver/Driver

Provide each new camera unit with a control receiver/driver that is integral to the CCTV dome assembly. The control receiver/driver will receive serial asynchronous data initiated from a camera control unit, decode the command data, perform error checking, and drive the pan/tilt unit, camera controls, and motorized lens. As a minimum, the control receiver/drivers must provide the following functions:

- Zoom in/out
- Automatic focus with manual override
- Tilt up/down
- Automatic iris with manual override
- Pan right/left
- Minimum 64 preset positions for pan, tilt, and zoom

In addition, each control receiver/driver must accept status information from the pan/tilt unit and motorized lens for preset positioning of those components. The control receiver/driver will relay pan, tilt, zoom, and focus positions from the field to the remote camera control unit. The control receiver/driver must accept “goto” preset commands from the camera control unit, decode the command data, perform error checking, and drive the pan/tilt and motorized zoom lens to the correct preset position. The preset commands from the camera control unit will consist of unique values for the desired pan, tilt, zoom, and focus positions.

H. CCTV Camera Attachment to Pole

At locations shown in the Signal Communication Plans where new CCTV cameras are to be installed on new metal CCTV poles, and proposed DMS support structure for DMS-03 and DMS-04, furnish an attachment assembly for each CCTV camera unit. Submit shop drawings for review and approval by the Engineer prior to installation.

Furnish CCTV attachments that allow for the removal and replacement of the CCTV enclosure as well as providing a weatherproof, weather tight, seal that does not allow moisture to enter the enclosure.

Furnish a CCTV Camera Attachment Assembly that is able to withstand wind loading at the maximum wind speed and gust factor called for in these Special Provisions and can support a minimum camera unit dead load of 45 pounds (20.4 kg).

I. Surge Suppression

Protect all equipment at the top of the pole with grounded metal oxide varistors connecting each power conductor to ground.

15.3. CONSTRUCTION METHOD

A. General

Mount the digital CCTV camera unit at 35 feet above ground level on the new CCTV metal poles (40'). For CCTV camera to be mounted on the DMS extension pole attached to proposed DMS support structure for DMS-03 and DMS-04, provide an attachment height of 45 feet above finished grade (Reference: *DMS Assemblies* section of these Project Special Provisions).

Mount the CCTV camera unit such that a minimum 5 feet of clearance is maintained between the camera and the top of the pole.

Mount CCTV camera on the side of pole nearest intended field of view. Avoid occluding the view with the pole.

B. Electrical and Mechanical Requirements

Install Power over Ethernet (PoE) injector in new signal cabinet, and run an outdoor-rated Cat5e Ethernet cable through the existing conduit and up the pole to the CCTV assembly as shown in the Signal Communications Plans. Take all precautions necessary to ensure the Ethernet cable is not damaged during storage and installation. Do not step on the cable nor run over the cable with vehicles or equipment. Do not pull the cable over or around obstructions or along the ground. Install the cables according to the latest version of the manufacturer's cable installation procedures and the industry-accepted installation standards, codes, and practices, or as directed by the Engineer.

Ground all equipment as called for in the Standard Specifications, these Special Provisions, and the Plans.

Install surge protectors on all ungrounded conductors entering the CCTV enclosure. House the protectors in a small, ventilated weatherproof cabinet attached near the CCTV attachment point in a manner approved by the Engineer.

Furnish all tools, equipment, materials, supplies, and hardware necessary to install a fully operational CCTV camera system as depicted in the plans.

15.4. MEASUREMENT AND PAYMENT

Digital CCTV Camera Assembly will be measured and paid as the actual number of Digital CCTV Camera Assemblies furnished, installed, integrated, and accepted. No separate measurement will be made for necessary cabling, PoE cable, connectors, CCTV camera attachment assemblies, conduit, condulets, grounding equipment, surge protectors, CCTV control software, or any other equipment or labor required to install the CCTV assembly.

Payment will be made under:

Pay Item	Pay Unit
Digital CCTV Camera Assembly	Each

16. FIELD EQUIPMENT CABINET

16.1. DESCRIPTION

Furnish 336 pole mounted cabinets to house the CCTV (Analog and/or Digital) control and communications equipment. The cabinets must consist of a cabinet housing, 19-inch EIA mounting cage, and power distribution assembly (PDA #3 as described in the CALTRANS TSCES).

The cabinet housing must conform to sections 6.2.2 (Housing Construction), 6.2.3 (Door Latches and Locks), 6.2.4 (Housing Ventilation), and 6.2.5 (Hinges and Door Catches) of the CALTRANS TSCES. Do not equip the cabinet housings with a police panel.

The cabinet cage must conform to section 6.3 of the CALTRANS TSCES.

Terminal blocks on the PDA #3 Assembly have internal wiring for the Model 200 switch pack sockets. Do not use terminal blocks on PDA #3 as power terminals for cabinet devices. Do not furnish cabinet with "Input Panels" described in section 6.4.7.1 of the TSCES. Do furnish cabinet with "Service Panels" as described in section 6.4.7.1 of the TSCES and as depicted on drawing TSCES-9 in the TSCES. Use service panel #2.

Furnish terminal blocks for power for cabinet CCTV and communications devices as needed to accommodate the number of devices in the cabinet.

Do not furnish cabinets with C1, C5, or C6 harness, input file, output file, monitor units, model 208 unit, model 430 unit, or switch packs.

Furnish all conduits, shelving, mounting adapters, and other equipment as necessary to route cabling, mount equipment, and terminate conduit in equipment cabinet.

16.2. MATERIAL

A. Shelf Drawer

Provide a pull out, hinged-top drawer, having sliding tracks, with lockout and quick disconnect feature in the equipment cabinet. Furnish a pullout drawer that extends a minimum of 14 inches that is capable of being lifted to gain access to the interior of the drawer. Minimum interior dimensions of the drawer are to be 1 inch high, 13 inches deep, and 16 inches wide. Provide drawers capable of supporting a 40-pound device or component when fully extended.

B. Cabinet Light

Each cabinet must include two (2) fluorescent lighting fixtures (one front, one back) mounted horizontally inside the top portion of the cabinet. The fixtures must include a cool white lamp, and must be operated by normal power factor UL-listed ballast. A door-actuated switch must be installed to turn on the applicable cabinet light when the front door or back door is opened. The lights must be mounted not to interfere with the upper door stay.

C. Surge Protection for System Equipment

Each cabinet must be provided with devices to protect the CCTV and communications equipment from electrical surges and over voltages as described below.

1. Main AC Power Input

Each cabinet must be provided with a hybrid-type, power line surge protection device mounted inside the power distribution assembly. The protector must be installed between the applied line voltage and earth ground. The surge protector must be capable of reducing the effect of lighting transient voltages applied to the AC line. The protector must be mounted inside the Power Distribution Assembly housing facing the rear of the cabinet. The protector must include the following features and functions:

- Maximum AC line voltage: 140 VAC.
- Twenty pulses of peak current, each of which must rise in 8 microseconds and fall in 20 microseconds to ½ the peak: 20000 Amperes.
- The protector must be provided with the following terminals:
  - Main Line (AC Line first stage terminal).
  - Main Neutral (AC Neutral input terminal).
  - Equipment Line Out (AC line second state output terminal, 19 amps).
  - Equipment Neutral Out (Neutral terminal to protected equipment).
  - GND (Earth connection).
- The Main AC line in and the Equipment Line out terminals must be separated by a 200 Microhenry (minimum) inductor rated to handle 10 AMP AC Service.
- The first stage clamp must be between Main Line and Ground terminals.
- The second stage clamp must be between Equipment Line Out and Equipment Neutral.
- The protector for the first and second stage clamp must have an MOV or similar solid state device rated at 20 KA and must be of a completely solid state design (i.e., no gas discharge tubes allowed).
- The Main Neutral and Equipment Neutral Out must be connected together internally and must have an MOV similar solid state device or gas discharge tube rated at 20 KA between Main Neutral and Ground terminals.
- Peak Clamp Voltage: 350 volts at 20 KA. (Voltage measured between Equipment Line Out and Equipment Neutral Out terminals. Current applied between Main Line and Ground Terminals with Ground and Main Neutral terminals externally tied together).
- Voltage must never exceed 350 volts.
- The Protector must be epoxy-encapsulated in a flame-retardant material.
- Continuous service current: 10 Amps at 120 VAC RMS.
- The Equipment Line Out must provide power to cabinet CCTV and communications equipment and to the 24V power supply.

2. Ground Bus

Provide a neutral bus that is not connected to the earth ground or the logic ground anywhere within the cabinet. Ensure that the earth ground bus and the neutral ground bus each have ten compression type terminals, each of which can accommodate wires ranging from number 14 through number 4 AWG.

3. Uninterruptible Power Supply (UPS)

Furnish and install one rack mounted UPS in each new cabinet that meet the following minimum specifications:

Output

Output Power Capacity	480 Watts / 750 VA
Max Configurable Power	480 Watts / 750 VA
Nominal Output Voltage	120V
Output Voltage Distortion	Less than 5% at full load
Output Frequency (sync to mains)	57 - 63 Hz for 60 Hz nominal
Crest Factor	up to 5:1
Waveform Type	Sine wave
Output Connections	(4) NEMA 5-15R
Input	
Nominal Input Voltage	120V
Input Frequency	50/60 Hz +/- 3 Hz (auto sensing)
Input Connections	NEMA 5-15P
Cord Length	6 feet
Input voltage range for main operations	82 - 144V
Input voltage adjustable range for mains operation	75 -154 V
Battery Type	
Maintenance-free sealed Lead-Acid battery with suspended electrolyte, leak-proof.	
Typical recharge time	2 hours
Communications & Management	
Interface Port(s)	DB-9 RS-232, USB
Control panel	LED status display with load and battery bar-graphs
Surge Protection and Filtering	
Surge energy rating	480 Joules
Environmental	
Operating Environment	32 - 104 °F
Operating Relative Humidity	0 - 95%
Storage Temperature	5 - 113 °F
Storage Relative Humidity	0 - 95%
Conformance	
Regulatory Approvals	FCC Part 15 Class A, UL 1778

16.3. CONSTRUCTION METHODS

For each equipment cabinet installation, use stainless steel banding or other method approved by the Engineer to fasten cabinet to pole. Install equipment cabinets so that the height to the middle of the enclosure is 4 feet from ground level. No risers shall enter the top or sides of the equipment cabinet.

Install all conduits, condulets, and attachments to equipment cabinets in a manner that preserves the minimum bending radius of cables and creates water proof connections and seals.

Install a UPS in each cabinet and power all CCTV cameras from the UPS.

16.4. MEASUREMENT AND PAYMENT

Field Equipment Cabinet will be measured and paid as the actual number of equipment cabinets furnished, installed and accepted.

No payment will be made for the UPS, cabling, connectors, cabinet attachment assemblies, conduit, condulets, risers, grounding equipment, surge protectors, or any other equipment or labor required to install the equipment cabinet and integrate the cabinet with the CCTV camera equipment.

Payment will be made under:

Pay Item	Pay Unit
Field Equipment Cabinet	Each

17. ELECTRICAL SERVICE (CCTV CABINETS)

17.1. DESCRIPTION

At locations called out in the Plans, install a new electrical service for the new CCTV Camera (Analog and/or Digital) consisting of a new meter and service disconnect, service entrance conductors, and feeder conductors, grounding, conduits and risers, etc.

Comply with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the *Standard Specifications*, these Project Special Provisions, and all local ordinances. Coordinate all work involving electrical service with the appropriate utility company and the Engineer.

17.2. MATERIALS

A. Electrical Service

Provide material, equipment and hardware under this section that is pre-approved on the 2018 ITS and Signals QPL by the date of equipment installation.

Provide all materials necessary to form a complete electrical service assembly as shown in the Plans. Furnish new external electrical service disconnects, meter bases, and required grounding. Install new electrical service feeder conductors and conduits between the disconnects and the equipment cabinets as required.

Provide all electrical service disconnects with a space/expansion slots, covered by a knockout or removable blank cover, designed to allow the future installation of at least one additional circuit breaker.

Provide inverse time circuit breaker with at least 10,000 RMS symmetrical amperes short circuit current rating in a lockable NEMA 3R enclosure.

For overhead services furnish 3-wire stranded #3 AWG copper service entrance conductors with THWN rating for supplying power to the meter base/disconnects. Provide conductors with black, red, and white insulation that are intended for power circuits at 600 V or less and comply with the following:

- Listed as meeting UL Standard UL-83
- Meets ASTM B-3 and B-8 or B-787 standards.

Furnish 3-wire stranded copper feeder conductors with THWN rating for supplying power to the equipment cabinets. Provide conductors with black, white, and green insulation that are intended for power circuits at 600 V or less and comply with the following:

- Listed as meeting UL Standard UL-83
- Meets ASTM B-3 and B-8 or B-787 standards.

As indicated below, provide the following:

CCTV Camera Cabinet:

- 1 single-pole 15A breaker
- 1 spare slot/space (minimum)
- 3-wire stranded #12 AWG copper feeder conductors with THWN rating

Furnish 1" rigid galvanized conduit between the disconnect and the equipment cabinets as required. For underground runs greater than 10 feet in length, the Contractor may transition from 1" rigid galvanized conduit to 1" PVC conduit for the remainder of the underground run beyond the initial 10 feet. Furnish Schedule 40 PVC female adapters to connect the PVC conduit to the threaded end of the rigid galvanized conduit. The interior surface of one end of the PVC female adapter shall be compatibly threaded to connect it to the threaded end of the rigid metallic riser without the aid of additional fittings, hardware or adhesives. The opposite end of the adapter shall be non-threaded to permit a slip fit, glued connection to the underground PVC conduit.

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. Provide ground bus and neutral bus with a minimum of four terminals with minimum wire capacity range of number 8 through number 2/0 AWG.

Furnish NEMA Type 3R meter base rated 100A minimum for overhead service and 200A minimum for underground service and that meets the requirements of the local utility. Provide meter base with ampere rating of meter sockets based on sockets being wired with insulated wire rated at least 167°F. With each meter base, provide a blank meter socket cover made from UV stabilized polycarbonate or metal and that is either clear or gray in color to prevent access to interior of meter base until meter is installed by the local power company.

Furnish 4 terminal, 600 volt, single phase, 3 wire meter base that complies with the following:

- Line, Load, and Neutral Terminals accept #8 to 2/0 AWG copper/aluminum wire;
- Ringed or Ringless Type, with or without bypass;

- Made of galvanized steel;
- Listed as meeting UL Standard UL-414; and
- Overhead or underground service entrance as specified.

Provide electrical service enclosures, meter bases, disconnect panels, combination panel enclosures and pedestals with electrostatically applied dry powder paint finish with minimum thickness of 2.4 mils and that is light gray in color. All exterior surfaces must be powder coated steel.

Furnish 1" watertight hub (i.e., meter socket hub) for threaded rigid galvanized conduit with meter base.

If meter base and electrical service disconnect are supplied in the same enclosure (i.e., combination panel), ensure assembly is marked as being suitable for use as service equipment. Ensure combination meter and disconnect mounted in a pedestal for underground service is listed as meeting UL Standard UL-231. Otherwise, ensure combination meter and disconnect is listed as meeting UL Standard UL-67. Provide combination panels with pedestals of sufficient length to attain a minimum embedment depth of 24 inches below grade when installed per the manufacturer's instructions.

Provide a grounding electrode system at all new electrical services. Provide underground marker tape above ground grounding electrodes and buried ground wire. Provide all grounding electrodes and ground wire necessary to ensure that grounding system, whether existing or new, complies with all grounding requirements of these Project Special Provisions.

B. CCTV Cabinet Disconnect

Furnish new CCTV cabinet disconnect with a 15A circuit breaker at the locations shown in the Plans. Provide CCTV cabinet disconnects that have spaces (slots) for at least two breakers (one occupied by the 15A breaker + one future breaker) and a minimum of 10,000 RMS symmetrical amperes short circuit current rating in a lockable NEMA 3R enclosure. Ensure equipment cabinet disconnects are listed as meeting UL Standard UL-489 and marked as being suitable for use as service disconnects. Fabricate enclosure from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum thickness of 2.4 mils. All exterior surfaces must be powder coated steel. Provide ground bus and neutral bus with a minimum of four terminals and a minimum wire capacity range of number 8 through number 2 AWG.

C. Grounding Electrodes (Ground Rods)

Furnish 5/8"x10' copper clad steel grounding electrodes (ground rods), #4 AWG solid bare copper conductors, to make the grounding system installations. Secure the Copper conductor to the ground rod using a irreversible compression coupling using a ratcheting compression tool Comply with the NEC, the *Standard Specifications*, these Project Special Provisions and the Plans.

17.3. CONSTRUCTION METHODS

A. General

All work involving electrical service shall be coordinated with the appropriate electric utility company. Coordinate with the utility company to ascertain the feasibility of installing electrical service at each location before performing any work. Obtain all required local permits before beginning work.

Run feeder conductors separately from all other conductors in a 1-inch rigid galvanized conduit. Do not allow feeder conductors to share conduits with any other conductors or cables. Do not route unfused electrical feeder conductors inside of metal poles. Permanently label conductors at all access points using nylon tags labeled with permanent ink. Ensure each conductor has a unique identifier. Label conductors immediately upon installation. Use component name and labeling scheme approved by the Engineer.

Use rigid galvanized conduit for all underground conduit runs 10 feet or less in length. For underground runs greater than 10 feet in length, the Contractor may transition from 1" rigid galvanized conduit to 1" PVC conduit for the remainder of the run beyond the initial 10 feet using an approved PVC female adapter. Apply thread seal tape to the threads of the rigid galvanized conduit before screwing the PVC adapter onto the threaded male end of the conduit. Connect the threaded female end of the PVC adapter to the threaded end of the rigid galvanized conduit, then connect the not threaded end of the adapter to the PVC conduit using a slip fit, glued connection.

Direct bury pedestals that support combination panel at a minimum embedment depth of 24 inches below grade.

Upon completion of electrical service installation and backfilling of all excavations, restore the disturbed ground to its original condition as determined and approved by the Engineer. For paved areas, replace removed or damaged pavement with in kind materials, matching the elevation, color, texture/finish and general appearance of the surrounding pavement in accordance with the "Equipment Cabinet Foundation" section of these Project Special Provisions. For unpaved areas, backfill excavations with removed material, tamp the backfilled material and rake smooth the top 1½ inches. Finish unpaved areas flush with surrounding natural ground and to match the original contour of the ground. Seed with same type of grass as surrounding area and mulch the newly seeded area. If unpaved area was not grassed, replace the original ground cover in kind as directed by the Engineer.

Complete repairs to and restoration of all ground (paved and unpaved) disturbed for construction within five consecutive calendar days following initial removal. If the Contractor fails to repair and restore the ground in accordance with these Project Special Provisions within the time frame specified, the Department reserves the right to make the necessary repairs, and all expenses incurred by the Department in making the repairs and restoring the ground will be deducted from payment due the Contractor.

Install meter socket covers on new meter bases to block access to the wiring inside until the meter is attached to the meter base by the power company. Use only approved meter socket covers that comply with these Project Special Provisions; do not use cardboard, paper, plywood, sheet plastic, tape, etc. to cover the meter socket opening. Do not leave a meter socket uncovered.

Provide all necessary stainless steel banding hardware and clamps for securely attaching service disconnects, meter bases, combination panels and service conduits and risers to metal poles.

B. New Electrical Service for CCTV

At locations identified in the Plans, install new electrical service for a CCTV cabinet in accordance with the details shown in the Plans. Install a new electrical service comprised of an external service disconnect and a meter base with meter socket cover housed in a combination panel. After installation of the meter base with meter socket cover, the local power company will remove the socket cover and transfer the existing meter or install a new meter and make any necessary connections to the power lines.

Unless the Plans indicate otherwise, have the power company route the service drop underground to combination panel, even where source power lines are overhead.

C. Grounding of Electrical Services

In addition to NEC requirements, test grounding electrode resistance for a maximum of 20 ohms. Furnish and install additional ground rods to grounding electrode system as necessary to meet test requirements. Furnish 5/8" x 10' copper clad steel grounding electrode system (ground rods), #4 AWG solid bare copper conductors, and a irreversible compression coupling for grounding system installations. Comply with NEC, the *Standard Specifications*, these Project Special Provisions and the Plans.

Follow test equipment's procedures for measuring grounding electrode resistance. When using clamp-type ground resistance meters, readings of less than 1 ohm typically indicate a ground loop. Rework bonding and grounding circuits as necessary to remove ground loop circuits and retest. If a ground loop cannot be identified and removed to allow the proper use of a clamp-type ground resistance meter, use the three-point test method.

Submit a completed Inductive Loop & Grounding Test Form available on the Department's website at:

https://connect.ncdot.gov/resources/safety/Pages/ITS-and-Signals.aspx

Install a length of marker tape 6 to 12 inches below finished grade directly over grounding electrodes and conductors.

17.4. MEASUREMENT AND PAYMENT

CCTV Electrical Service will be measured and paid for as the actual number of complete, functional CCTV electrical service locations furnished, installed and tested.

No measurement will be made of risers with weatherheads for CCTV electrical service as they will be considered incidental to furnishing and installing a new CCTV electrical service.

No measurement will be made of short risers (i.e., from disconnect to underground conduit and from underground conduit to bottom of cabinet), meter bases, meter socket covers, service disconnects, additional circuit breakers in new service disconnects where required, underground conduit between service risers and disconnects/meters, conduit for feeder conductors between the service disconnect and the equipment cabinet, PVC female adapters, acquisition of service fees, service entrance conductors, feeder conductors, ground wire, grounding electrodes rods and any remaining hardware and conduit to connect the electrical service to the CCTV equipment cabinet as they will be considered incidental to furnishing and installing new electrical service.

No measurement will be made of restoration of unpaved ground surfaces with like materials, including but not limited to backfill, graded stone, seeding and mulching, as this work will be considered incidental to installation of a new electrical service.

Payment will be made under:

Pay Item	Pay Unit
CCTV Electrical Service	Each

18. TESTING (CCTV)

18.1. DESCRIPTION

Once all hardware for the new CCTV camera assemblies has been installed, test the new cameras locally to ensure functionality. Perform these tests in the presence of the Engineer or a designated representative. After successfully testing the new cameras, integrate into their respective system(s) or the NCDOT STOC.

Perform a System Operational Test, which fully exercises all functions of the new cameras. Submit a test plan a minimum of fifteen (15) days prior to the scheduled start of the test to the Engineer for review and approval. The Engineer will review the test plans and reply within fifteen (15) working-days from the receipt of the test plan.

A. CCTV Camera Field Test

1. Verify that each CCTV camera can be controlled locally at the camera site. The test should exercise all camera functionality as noted below:

- Pan 360 degrees left and right
- Tilt 180 degrees up and down
- Zoom In / Zoom Out
- Focus near / Focus far
- Auto-focus
- Iris open / Iris close
- Auto-iris
- Record and run presets

2. The Contractor should supply a Laptop or PDA loaded with the appropriate CCTV control software and a portable color monitor for use during this test.
3. In addition, the field test will include inspection of the cabinets, electrical service, grounding system, wire & cabling, and all other components installed at each CCTV site.

B. System Integration Test

Upon successfully completion of the CCTV Camera Field Test, test to ensure that the new cameras have been successfully integrated into their respected system(s) (i.e. Closed Loop System, Centracs, NCDOT STOC Center). Make arrangement with the control centers to ensure that communications links for the CCTV Field devices are operational and functioning as designed. As a minimum, ensure that the same tests as conducted during the CCTV Field Test Requirements can be accomplished from the Control Centers.

C. 30-Day Observation Period

Upon completion of all project work, the successful completion of the System Operational Test and the correction of all known deficiencies, including minor installation items, a 30-day Observation Period will commence. This Observation Period will consist of a 30-day period of normal operation without any failures. The purpose of this period is to ensure that all components of the system function in accordance with these Project Special Provisions over an extended length of time.

Respond to system or component failures (or reported failures) that occur during the 30-day Observation Period within 24 hours. Correct said failures within 48 hours. Failures that cannot be corrected within 48 hours will suspend the timing of the 30-day Observation Period beginning at the time when the failure occurred. After the cause of such failures has been corrected, timing of the 30-day Observation Period will resume. Failures that necessitate a redesign of any major component will terminate the Observation Period. Once the components have been redesigned or replaced, the 30-Day Observation Period will be restarted from zero. Failures in any of the components exceeding a total of three (3) occurrences will terminate the 30-day Observation Period. Once the failures have been corrected, the 30-day Observation Period will be restarted from zero.

All documentation must be completed prior to the end of the 30-day Observation Period. The 30-day Observation Period will not be considered part of the contract time. Final acceptance will occur upon the successful completion of the 30-day Observation Period and after all documentation requirements have been fully satisfied.

The system major components are:

- CCTV Camera Assembly

18.2. MEASUREMENT AND PAYMENT

There will be no direct payment for work covered in this section. Payment at contract unit prices for the various items in the contract will be full compensation for all work covered in this section.

19. CCTV METAL POLES

19.1. CCTV METAL POLES

A. General

Furnish and install a new 40’ tapered CCTV metal pole, grounding system, and all necessary hardware. The work covered by this special provision includes requirements for the design, fabrication, and installation of custom designed CCTV metal poles and associated foundations.

Comply with applicable sections of the *2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES*, hereinafter referred to as the *Standard Specifications.* Provide designs of completed assemblies with hardware that equals or exceeds AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals 6*th Edition, 2013 (hereafter called AASHTO), including the latest interim specifications. Provide assemblies with a round or near-round (18 sides or more) cross-section, or a multi sided cross section with no less than six sides. The sides may be straight, convex, or concave.

After fabrication, hot-dip galvanize steel poles, and all parts used in the assembly in accordance with section 1076 of the *Standard Specification*. Design structural assemblies with weep holes large enough and properly located to drain molten zinc during galvanization process. Galvanize structures to meet or exceed AASHTO M 111. Provide galvanizing on hardware that meets or exceeds ASTM Standard A-153. Ensure that threaded material is brushed and re-tapped as necessary after galvanizing. Perform repair of damaged galvanizing that complies with the following:

Repair of Galvanizing.....Article 1076-6

Standard Drawings for Metal Poles are available that supplement these project special provisions. These drawings are located on the Department's website:

https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

Comply with article 1098-1B "General Requirements" of the *Standard Specifications* for submittal requirements. Furnish shop drawings for approval. Provide the copies of detailed shop drawings for each type of structure as summarized below. Ensure that shop drawings include material specifications for each component and identify welds by type and size on the drawing details, not in table format. Do not release structures for fabrication until shop drawings have been approved by NCDOT. Provide an itemized bill of materials for all structural components and associated connecting hardware on the drawings.

Comply with article 1098-1A "General Requirements" of the *Standard Specifications* for Qualified Products List (QPL) submittals. All shop drawings must include project location description, CCTV Asset inventory number(s), and a project number or work order number on the drawings.

Mark final pole locations and receive approval from the Engineer before initiating bore samples and designing foundations.

Summary of information required for metal pole review submittal:

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Sealed, Approved ITS Plan/Loading Diagram	1	1	All structure design information needs to reflect the latest approved ITS plans
Custom Pole Shop Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media Show NCDOT inventory number(s) in or above the title block
Structure Calculations	1 set	1 set	
Custom Foundation Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media.
Foundation Calculations	1	1	Submit L Pile calculations per Section 11.4 of this Project Special Provision.
Soil Boring Logs and Report	1	1	Report should include a location plan and a soil classification report including soil capacity, water level, hammer efficiency, soil bearing pressure, soil density, etc. for each pole.

NOTE – All shop drawings and custom foundation design drawings must be sealed by a professional Engineer licensed in the state of North Carolina. All geotechnical information must be sealed by either a Professional Engineer or geologist licensed in the state of North Carolina. Include a title block and revision block on the shop drawings and foundation designs showing the NCDOT inventory number.

Shop drawings and foundation drawings may be submitted together or separately for approval. However, shop drawings must be approved before foundations can be reviewed. Foundation designs

will be returned without review if the associated shop drawing has not been approved. Incomplete submittals will be returned without review.

19.2. MATERIALS

Fabricate CCTV metal pole from coil or plate steel to meet the requirements of ASTM A 595 Grade A tubes. For structural steel shapes, plates and bars use A572 Gr 50 min or ASTM A709 Gr 50 min.. Provide poles that are round in cross section or multisided tubular shapes and have a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single ply plate or coil so there are no circumferential weld splices. Galvanize in accordance with AASHTO M 111 and/or ASTM A 123 or an approved equivalent.

Ensure that allowable pole deflection does not exceed that allowed per 6th Edition AASHTO. Ensure that maximum deflection at the top of the pole does not exceed 2.0 percent of the pole height.

Use the submerged arc process or other NCDOT previously approved process suitable for poles to continuously weld pole shafts along their entire length. The longitudinal seam weld will be finished flush to the outside contour of the base metal. Ensure shafts have no circumferential welds except at the lower end joining the shaft to the pole base. In the event that a circumferential weld is necessary, prior approval is required from the Engineer and NCDOT Materials and Test Unit. Provide welding that conforms to Article 1072-20 of the *Standard Specifications*, except that no field welding on any part of the pole will be permitted unless approved by a qualified engineer.

Refer to Metal Pole Standard Drawing Sheets M2 through M5 for fabrication details. Fabricate anchor bases from plate steel meeting, as a minimum, the requirements of ASTM A 36M or cast steel meeting the requirements of ASTM A 27M Grade 485-250, AASHTO M270 Gr 36 or an approved equivalent. Conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

Ensure all hardware is galvanized steel or stainless steel. The Contractor is responsible for ensuring that the designer/fabricator specifies connecting hardware and/or materials that do not create a dissimilar metal corrosive reaction.

Unless otherwise required by the design, ensure each anchor rod is 2” diameter and 60” length. Provide 10” minimum thread projection at the top of the rod, and 8” minimum at the bottom of the rod. Use anchor rod assembly and drilled pier foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For each structural bolt and other steel hardware, hot dip galvanizing shall conform to the requirements of AASHTO M 232 (ASTM A 153). Ensure end caps for poles are constructed of cast aluminum conforming to Aluminum Alloy 356.0F.

Provide a circular anchor bolt lock plate that will be secured to the anchor bolts at the embedded end with 2 washers and 2 nuts. Provide a base plate template that matches the bolt circle diameter of the anchor bolt lock plate. Construct plates and templates from ¼” minimum thick steel with a minimum width of 4”. Galvanizing is not required.

Provide 4 heavy hex nuts and 4 flat washers for each anchor bolt. For nuts, use AASHTO M291 grade 2H, DH, or DH3 or equivalent material. For flat washers, use AASHTO M293 or equivalent material.

Provide a 2-inch hole equipped with an associated coupling and weatherhead approximately 5 feet below the top of the pole to accommodate passage of CCTV cables from inside the pole to the CCTV camera.

Provide a 2-inch hole equipped with an associated coupling and conduit fittings/bodies approximately 18 inches above the base of the pole accommodate passage of CCTV cables from the CCTV cabinet to the inside of the pole. Refer to Metal Pole Standard Drawing Sheet M3 for fabrication details.

Have poles permanently stamped above the base hand hole with the identification tag details as shown on Metal Pole Standard Drawing Sheet M2.

For each pole, provide a 1/2-inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate #4 AWG ground wire. Ensure that the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

Provide a removable pole cap with stainless steel attachment screws for the top of each pole. Ensure that the cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the pole with a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cap to hang clear of the pole-top opening when the cap is removed.

19.3. CONSTRUCTION METHODS

Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision (SP09-R005) located on the Department's 2018 Standard Specifications and Provisions website:

https://connect.ncdot.gov/resources/Specifications/Pages/Specifications-and-Special-Provisions.aspx

Erect CCTV metal poles only after concrete has attained a minimum allowable compressive strength of 3000 psi. Final approval of foundation is contingent upon concrete achieving a compressive strength of 4,500 psi strength as required by *Foundations and Anchor Rod Assemblies for Metal Poles* provision. Connect poles to grounding electrodes and bond them to the electrical service grounding electrodes.

For holes in the poles used to accommodate cables, install grommets before wiring pole or arm. Do not cut or split grommets.

Attach the hand hole covers to the pole by a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cover to hang clear of the opening when the cover is removed, and is strong enough to prevent vandalism. Ensure the chain or cable will not interfere with service to the cables in the pole.

Attach cap to pole with a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cap to hang clear of the opening when the cap is removed.

Perform repair of damaged galvanizing that complies with the *Standard Specifications*, Article 1076-7 "Repair of Galvanizing."

Install galvanized wire mesh around the perimeter of the base plate to cover the gap between the base plate and top of foundation for debris and pest control.

Install a ¼" thick plate for concrete foundation tag to include: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation.

Install CCTV metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Install poles so that when the pole is fully loaded it is within .5 degrees of vertical.

19.4. DRILLED PIER FOUNDATIONS FOR METAL POLES

Analysis procedures and formulas shall be based on AASHTO, ACI code and per FHWA Manuals. Design methods based on engineering publications or research papers needs to have prior approval from NCDOT. The Department reserves the right to accept or disapprove any method used for the analysis.

Use a Factor of Safety of 1.33 for torsion and 2.0 for bending for the foundation design.

Foundation design for lateral load shall not exceed 1" lateral deflection at top of foundation.

Design all custom foundations to carry the maximum capacity of each metal pole.

When poor soil conditions are encountered which could create an excessively large foundation design, consideration may be given to allowing an exemption to the maximum capacity design. The contractor must gain approval from the engineer before reducing a foundation's capacity. On projects where poor soil is known to be present, it is advisable that the contractor gain foundation approval before releasing poles for fabrication.

A. Description

Design, furnish and install foundations for CCTV metal poles with all necessary hardware in accordance with the plans and specifications.

Design all CCTV pole foundations using actual soil conditions at each pole location. Perform soil test in accordance with article "B" Soil Test and Foundation Determination of this special provision.

B. Soil Test and Foundation Determination

Drilled piers are reinforced concrete sections, cast-in-place against in situ, undisturbed soil. Drilled piers are of straight shaft type and vertical.

Some drilled piers for supporting metal poles may require wing walls to resist torsional rotation. Based upon this provision and the results of the required soil test, a drilled pier length requirement may be determined and constructed in accordance with the plans.

Soil Test:

Perform a soil test at each proposed metal pole location. Complete all required fill placement and excavation at each signal pole location to finished grade before drilling each boring. Soil tests performed that are not in compliance with this requirement may be rejected and will not be paid. Drill one boring to a depth of 26 feet within a 25-foot radius of each proposed foundation.

Perform standard penetration tests (SPT) in accordance with ASTM D 1586 at depths of 1, 2.5, 5, 7.5, 10, 15, 20 and 26 feet. Discontinue the boring if one of the following occurs:

- A total of 100 blows have been applied in any 2 consecutive 6-in. intervals.
- A total of 50 blows have been applied with < 3-in. penetration.

Describe each CCTV pole location along the project corridor in a manner that is easily discernible to both the contractor's designer and NCDOT reviewers. If a CCTV pole is at an intersection, label the boring the "Intersection of (*Route or SR #*), *(Street Name)* and (*Route or SR #*),

(Street Name), _____ County, Signal Inventory No. _____". Label borings with "B- *N, S, E, W, NE, NW, SE or SW*" corresponding to the quadrant location within the intersection.

If the CCTV pole location is located between intersections, provide a coordinate location and offset, or milepost number and offset. Pole numbers should be made available to the geotechnical drilling Contractor. Include pole numbers in the boring label if they are available. If they are not available, ensure the boring labels can be cross-referenced to corresponding pole numbers or pole locations. For each boring, submit a legible (hand written or typed) boring log signed and sealed by a licensed Geologist or Professional Engineer registered in North Carolina. Include on each boring the SPT blow counts and N-values at each depth, depth of the boring, and a general description of the soil types encountered.

Borings that can't be easily related to their specific pole location will be returned to the contractor for clarification, or if approved by the engineer, the foundation may be designed using the worst-case soil condition obtained as part of r this project.

i. Standard Foundation Determination:

Use the following method for determining the Design N-value:

$$N_{AVG} = \frac{(N@1' + N@2.5' + \ldots\ldots\ldots N@\text{Deepest Boring Depth})}{\text{Total Number of N-values}}$$

$$Y = (N@1')^2 + (N@2.5')^2 + \ldots\ldots\ldots (N@\text{Deepest Boring Depth})^2$$

$$Z = (N@1' + N@2.5' + \ldots\ldots\ldots N@\text{Deepest Boring Depth})$$

$$N_{STD\ DEV} = \left(\frac{(\text{Total Number of N-values} \times Y) - Z^2}{(\text{Total Number of N-values}) \times (\text{Total Number of N-values} - 1)} \right)^{0.5}$$

Design N-value equals lesser of the following two conditions:

$N_{AVG} - (N_{STD\ DEV} \times 0.45)$

Or

$$\text{Average of First Four N-Values} = \frac{(N@1' + N@2.5' + N@5' + N@7.5')}{4}$$

Note: If less than 4 N-values are obtained because of criteria listed in Section 2 above, use average of N-values collected for second condition. Do not include the N-value at the deepest boring depth for above calculations if the boring is discontinued at or before the required boring depth because of criteria listed in Section 2 above. Use N-value of zero for weight of hammer or weight of rod. If N-value is greater than 50, reduce N-value to 50 for calculations.

Submit completed boring logs collected in accordance with Section 2 (Soil Test) above along with pole loading diagrams from the plans to the contractor-selected pole fabricator to assist in the pole and foundation design.

If one of the following occurs, contact the Engineer.

- The Design N-value is less than 4.
- The drilled pier length, "L", is greater than the depth of the corresponding boring.

Foundation designs are based on level ground around the traffic signal pole. If the slope around the edge of the drilled pier is steeper than 8:1 (H:V) or the proposed foundation will be less than 10 feet from the top of an embankment slope, the Contractor is responsible for providing slope information to the foundation designer and to the Engineer, so it can be considered in the design.

If assistance is needed, contact the Engineer.

C. Non-Standard Foundation Design

Design non-standard foundations based upon site-specific soil test information collected in accordance with Section 2 (Soil Test) above. Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*. Use the computer software LPILE version 5.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Use the computer software gINT version 8.0 or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide a drilled pier foundation for each pole with a length and diameter that result in a horizontal lateral movement of less than 1 inch at the top of the pier and a horizontal rotational movement of less than 1 inch at the edge of the pier. Submit and gain approval of foundation designs including drawings, calculations, and soil boring before construction. Foundations installed without prior approval may be rejected.

D. Drilled Pier Construction

Construct drilled pier foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision (SP09 R005). This provision may be located at:

https://connect.ncdot.gov/resources/Specifications/Pages/Specifications-and-Special-Provisions.aspx

19.5. MEASUREMENT AND PAYMENT

Actual number of CCTV Metal Poles (40’) furnished, installed and accepted.

Actual number of Soil Tests with SPT borings performed furnished and accepted.

Actual volume of concrete poured in cubic yards of Drilled Pier Foundation furnished, installed, and accepted.

No measurement will be made for CCTV Metal Pole designs and foundation designs, as these will be considered incidental to CCTV Metal Poles and Drilled Pier Foundations.

Payment will be made under:

Pay Item	Pay Unit
CCTV Metal Pole (40’)	Each
Soil Test for CCTV Pole	Each
Drilled Pier Foundation for CCTV Pole	Cubic Yards

Project Special Provisions

Structures, Culverts, Walls

Table of Contents

MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURES AT STATION 39+82.39 -Y30- **(8-13-04)**

1.0 GENERAL

Maintain traffic on -L1- as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 17'-8" at all times during construction.

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

2.0 PROTECTION OF TRAFFIC

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

3.0 BRACING GIRDERS

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed ½ inch.

4.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURES AT STATION 658+69.17 -L1- **(8-13-04)**

1.0 GENERAL

Maintain traffic on -Y38- as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 15'-4" at all times during construction.

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

2.0 PROTECTION OF TRAFFIC

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

3.0 BRACING GIRDERS

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed ½ inch.

4.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE AT STATION 30+17.11 -Y31- **(8-13-04)**

1.0 GENERAL

Maintain traffic on -L1- as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 17'-9" at all times during construction.

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

2.0 PROTECTION OF TRAFFIC

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

3.0 BRACING GIRDERS

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed ½ inch.

4.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE AT STATION 25+28.04 -Y32- **(8-13-04)**

1.0 GENERAL

Maintain traffic on -L1_Northern- as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 17'-6" at all times during construction.

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

2.0 PROTECTION OF TRAFFIC

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

3.0 BRACING GIRDERS

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed ½ inch.

4.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

STEEL REINFORCED ELASTOMERIC BEARINGS **(6-22-16)**

The 2018 Standard Specifications shall be revised as follows:
In **Section 1079-2(A) – Elastomeric Bearings** add the following after the second paragraph:

Internal holding pins are required for all shim plates when the contract plans indicate the structure contains the necessary corrosion protection for a corrosive site.

Repair laminated (reinforced) bearing pads utilizing external holding pins via vulcanization. Submit product data for repair material and a detailed application procedure to the Materials and Tests Unit for approval before use and annually thereafter.

THERMAL SPRAYED COATINGS (METALLIZATION) (12-1-2017)

1.0 DESCRIPTION

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces in accordance with the Thermal Sprayed Coatings (Metallization) Program and as specified herein when called for on the plans or by other Special Provisions. Use only Arc Sprayed application methods to apply TSC. The Engineer must approve other methods of application.

The Thermal Sprayed Coatings (Metallization) Program is available on the Materials and Tests Unit website.

2.0 QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the requirements outlined in the Thermal Sprayed Coatings (Metallization) Program.

3.0 MATERIALS

Use only materials meeting the requirements of Section 7 of the Thermal Sprayed Coatings (Metallization) Program.

4.0 SURFACE PREPARATION AND TSC APPLICATION

Surface preparation of TSC surfaces shall meet the requirements of Section 8 of the Thermal Sprayed Coatings (Metallization) Program. Apply TSC with the alloy to the thickness specified on the plans or as required by Thermal Sprayed Coatings (Metallization) Program.

5.0 INSPECTION AND TESTING

The TSC Contractor must conduct inspections and tests listed in the Thermal Sprayed Coatings (Metallization) Program.

6.0 REPAIRS

Perform all shop repairs in accordance with the procedures outlined in the Thermal Sprayed Coatings (Metallization) Program.

Repairs associated with field welding shall be made by removing the existing metallizing by blast or power tool cleaning. Affected areas shall be addressed as follows:

- For Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved epoxy mastic coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.

- For Non-Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved organic zinc-rich coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.

    1. **Minor localized areas less than or equal to 0.1 ft^2 with exposed substrate shall be repaired as outlined above for marine and non-marine environments.**

    2. **Large localized areas greater than 0.1 ft^2 with exposed substrate shall require the Contractor to submit a detailed repair procedure to the Engineer for review and approval.**

- Repair methods for areas where the substrate has not been exposed shall be mutually agreed upon between the Contractor and TSC Contractor as approved by the Engineer.

7.0 TWELVE MONTH OBSERVATION PERIOD

All TSC materials applied under the Thermal Sprayed Coatings (Metallization) Program shall be evaluated twelve (12) months after project acceptance for defective materials and workmanship.

8.0 BASIS OF PAYMENT

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

EXPANSION JOINT SEALS (9-30-11)

1.0 GENERAL

The work covered by this Special Provision consists of furnishing and installing the expansion joint seals as shown on the contract drawings. All materials, labor, equipment and incidentals necessary for the proper installation of the expansion joint seals are included.

2.0 MATERIAL

Provide expansion joint seals capable of accommodating a total movement measured parallel to the centerline of the roadway as shown on plans.

Provide an elastomeric component for each expansion joint seal that is a continuous unit for the entire length of the joint. Do not field splice the elastomeric component. Only vulcanized shop splicing of the elastomeric component is permitted. The minimum length of an elastomeric component before shop splicing is 20 feet. However, one piece shorter than 20 feet is permitted. Provide an elastomeric component that is clearly shop marked to indicate the top side and joint location of the elastomeric component. On skewed bridges, or under unsymmetrical conditions, clearly mark the left side of the elastomeric component. Left is defined as being on the left when facing in the direction of increasing station. Inspect the seals upon receipt to ensure that the marks are clearly visible upon installation.

Make sure the convolution of the gland does not project above the top of the hold-down plates when the joint opening is in the most compressed condition. Use either elastic polychloroprene (neoprene) or ethyl propylene diene monomer (EPDM) for the elastomer that meets the following minimum properties:

	ASTM TEST METHOD	REQUIREMENTS
Hardness, Durometer - Shore A	D2240	60 ± 5, Neoprene (upward corrugated shape - fabric reinforced) 75 ± 5, EPDM and Neoprene (upward non-corrugated shape) 80 ± 5, EPDM (upward corrugated shape-fabric reinforced)
Tensile Strength	D412	2000 psi (min.)
Elongation at Break	D412	250% (min.)
Width of Gland in Relaxed Condition	N/A	10" ± 0.25"
Thickness of Upturned portion of gland	N/A	0.25" non-corrugated shape, -0.032" to +0.032"
Thickness of Upturned portion of gland	N/A	0.1875" corrugated shape, -0.032" to +0.032"
Thickness of Flat portion of gland	N/A	0.1563", -0.032" to +0.032"

For fabric reinforced glands, submit one unreinforced sample per lot number, up to 500 feet of Expansion Joint Seal, to the Engineer for testing.

Only field splice hold-down plates at crown points, at abrupt changes in the deck slab cross slope, and on lane lines. Splicing within travel lanes is not permitted and splicing on edge lines is not required. Field splice hold-down plates between the edge line and gutter upturn and where necessary for proper installation and alignment is permitted. Show all splice locations on the working drawings for approval. For the location of lane markings at the expansion joint seal, see the Structure plans. At the splice locations, locate the hold-down bolts 3 inches from the end of the hold-down plate. At splice locations where changes in deck slab cross slope occur, cut the ends of hold-down plates parallel to the bridge centerline for skews less than 80° and greater than 100°.

Do not use welded shop splices in hold-down plates.

3.0 SHOP DRAWINGS

Submit nine sets of working drawings to the Engineer for review, comments and acceptance. Show complete details drawn to scale and include:

- The proposed template details including the makeup of the template

- The proposed method of holding the base angle assembly in place while concrete is cast around it
- The proposed procedure to correct for the effects of beam movement and rotation when setting width of joint opening
- The proposed chronology of installation including the sequence and direction of the concrete casting
- The details of cross connectors between base angles, such as steel bars with slots bolted to angles, to maintain evenness between the adjacent base angles while accommodating movement that occurs when concrete is cast. Indicate when bolts are loosened to allow movement.
- The proposed method for removing the hold-down plate
- A section detail through the joint showing horizontal offset dimensions of the base angles from the centerline joint. This detail is required when the vertical face of the joint opening is not perpendicular to the roadway surface (e.g. when the roadway grade is significant).

Have someone other than the one who prepares the drawing check all detailed drawings and include the signatures of both the drafter and checker on each sheet of the drawings. The Engineer returns unchecked drawings to the Contractor. Provide all completed drawings well in advance of the scheduled installation time for the expansion joint seal.

4.0 INSTALLATION

Provide supports for the base angle assembly at a maximum spacing of 9 feet. Place supports near field splices of base angles to ensure that field splices are straight and even. Provide base angles with ½" diameter weep holes at 12 inch centers to allow bleeding of trapped air and/or water. Do not obstruct the weep holes with falsework. Make the bottom of the trough parallel to grade and the sides parallel to the sides of the expansion joint seal.

For damaged areas, depressions, spalls, cracks, or irregularities of curbs or decks adjacent to the expansion joint, submit a proposed method of repair and repair material specifications for approval.

If the Engineer deems any aspects of the expansion joint seals unacceptable, make necessary corrections.

5.0 INSPECTION

When concrete is cast, use a non-aluminum, 10 foot, true to line straight edge to check and grade the top of the slab on each side of the joint to ensure smooth transition between spans.

Watertight Integrity Test

- Upon completion of an expansion joint seal, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose

delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about 6 inches above the sidewalks, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.

- Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 5 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The expansion joint seal is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not a sign of leakage.
- If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.
- If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no extra cost to the Department.

6.0 BASIS OF PAYMENT

Basis of payment for all expansion joint seals will be at the lump sum contract price for "Expansion Joint Seals" which price and payment will be full compensation for furnishing all material, including any steel accessory plates for sidewalks, medians and rails, labor, tools, and incidentals necessary for installing the expansion joint seal in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

SOUND BARRIER WALL **(8-29-19)**

1.0 DESCRIPTION

This work consists of furnishing precast panels with an architectural surface treatment, structural steel, concrete, handling, transporting, fabricating, galvanizing, storing materials, furnishing erection drawings, pile excavation, backfilling, erecting and installing the sound barrier wall members and all other materials as required by the plans, Standard Specifications and this Special Provision.
Precast panels with an architectural surface treatment shall be constructed using form lining materials and patterns to match the appearance (size, shape, color, texture, pattern, and relief) of the textured finish as specified on the plans and approved by the Engineer.

The contractor is required to use the same form liner and coloration contractor to construct the precast panels with an architectural surface treatment.

The Standard Plans allow pile spacing of 10, 15 or 20 feet. Pile spacing greater than 15 feet will not be allowed for the precast concrete panels detailed in the standard plans. Provide consistent pile spacing for the entire length of the wall. Use odd pile spacing, if necessary, only at the ends of the wall and at turning points as approved by the Engineer. Architectural surface treatment shall not be applied to piles. Piles shall have a smooth, non-textured finish, and remain unstained in their natural color.

A maximum one foot drop or rise in elevation between wall sections is permitted. Elevation changes greater than one foot, if necessary, will be allowed only at the end of the wall. Top of wall elevation changes that result in a jagged appearance will not be allowed.

2.0 QUALIFICATIONS

Prior to beginning work the contractor shall submit the following qualifications to the Engineer for approval:

A. Architectural Surface Treatment Construction
The Contractor shall have a minimum of three years of experience in architectural concrete surface treatment construction on similar types of projects. The Contractor shall furnish to the Engineer 3 references who were responsible for supervision of similar projects. Include name, address, telephone number, and specific type of application.

B. Form Liners and Coloring System
The manufacturer of form liners for the standard textured finishes and coloring system shall have at least five years of experience making molds and color stains to create formed concrete surfaces to match the specified textured finish and colors. The Contractor shall schedule a pre-installation conference with a form liner manufacturer representative and the Engineer to assure understanding of simulated textured finish form liner use, color application, requirements for construction of sample panel(s), and to coordinate the work. The Contractor shall be required to disclose their source of form

liner manufacturer and final coloration contractor prior to the Preconstruction Conference.

3.0 ALTERNATE PILE SPACING FOR STANDARD PRECAST PANELS

As an alternate, the Contractor may submit plans for pile spacings greater than 10 feet and less than 15 feet for review and approval. The pile excavation diameter, excavation depth and reinforcing steel shall be equal to the amount shown on the existing plans for the 15 feet pile spacing. A variance in the reinforcing steel will be allowed for the length of horizontal and number of vertical reinforcement bars in the precast panel for the alternate pile spacing.

Submit two sets of detailed plans for review. Include all details in the plans, including the size and spacing of required reinforcement necessary to fabricate the precast panels. Have a North Carolina registered Professional Engineer check, seal and date the plans. After the plans are reviewed and, if necessary, corrections made, submit one set of reproducible tracings on 22" x 34" sheets to become part of the contract plans.

4.0 ALTERNATE WALL TYPE

Walls that have been assigned "Approved" or "Approved for Provisional Use" status by the Product Evaluation Program will be considered for substitution to the detailed Standard Sound Barrier Wall only when noted on the plans. Alternate wall types, piles and pile spacing must meet the design and construction requirements of the project. Pile spacing greater than 20 feet will not be permitted. Alternate pile and wall structural stability and connection details shall conform to the current edition of the AASHTO LRFD Bridge Design Specifications.

Prior to submittal of Working Drawings, as described herein, submit a copy of the signed NCDOT Product Status Notification Letter and two sets of preliminary plans for review and approval. Include material specifications for all components. Once preliminary plans are approved, submit Working Drawings in accordance with all applicable portions of the requirements herein, including details necessary to fabricate and construct the proposed alternate.

Have a North Carolina registered Professional Engineer check, seal and date the plans and, when requested, provide calculations. After the plans are reviewed and, if necessary, corrections made, submit one set of reproducible tracings on 22" x 34" sheets to become part of the contract plans.

5.0 WORKING DRAWINGS

Submit precast panel casting drawings in accordance with Article 1077-2 of the Standard Specifications prior to casting. Show the inserts, method of handling, and support details used for transportation on the casting drawings. Submit fabrication drawings for approval prior to fabrication of wall components. Submit an erection plan and precast panel placing plan, including location of various heights of panels, for review and acceptance prior to fabrication of forms. Submit five sets of detail drawings on 22" x 34" sheets.

Submit for review and acceptance, wall plan and elevation views and details showing overall simulated textured pattern, joint locations, and end, edge or other special conditions. The drawings should include typical cross sections of precast panels, joints, corners, texture relief, texture size, pitch/working line, mortar joint and bed depths. If necessary, the Contractor shall revise the working drawings until the proposed form liner patterns and arrangement have been accepted by the Engineer. Working drawings should be of sufficient scale to show the detail of all textured finishes and joint patterns. Shop drawings shall be reviewed and approved prior to fabrication of form liners.

6.0 MATERIALS AND FABRICATION OF STANDARD PRECAST PANELS

Provide materials and fabricate members in accordance with the requirements of Division 10 of the Standard Specifications for Roads and Structures. Provide precast panels 4 inches ± ¼ inch thick, excluding relief for a textured finish. Architectural surface treatment shall consist of a standard textured finish and a single color of stain applied to both faces of the precast panels as specified on the plans and approved by the Engineer. Relief of any texture is not to exceed an average depth of 1 inch. No textured finish or stain shall be applied on the uppermost foot of each wall segment and along the vertical edges of the panels. These areas shall have a smooth, non-textured finish, and remain in its natural concrete color.

Furnish three 12” x 12” samples for approval which establish the acceptable variations in color, texture, and uniformity. After the color, texture, and uniformity of the furnished samples are approved, produce a full scale panel unit meeting design requirements. This mock-up and the furnished samples establish the standard quality for determining acceptance of the panels. When producing the final installed panels, use fine and coarse aggregate, retarder, and cement from the same source as those used in the approved sample panels. The standard textured finish shall be constructed using form lining materials. The form liner shall be a high quality, re-useable product manufactured of high strength urethane rubber or other approved material which attaches easily to the form work system, and shall not compress more than ¼ inch when concrete is poured at a rate of 10 vertical feet per hour. The form liners shall be removable without causing deterioration of the surface or underlying concrete.

The form liner shall be patterned such that long continuous horizontal or vertical lines do not occur on the finished exposed surface. The line pattern shall be random in nature and shall conceal construction joint lines.

Prior to each concrete pour, the form liners shall be clean and free of build-up. Each liner shall be visually inspected for blemishes and tears. Repairs shall be made in accordance with the manufacturer’s recommendations. Repairs shall be accepted by the Engineer before being used. Form liner panels that do not perform as intended or are no longer repairable shall be replaced.

Form liners shall be securely attached to forms in accordance with the manufacturer’s recommendations, with less than a ¼ inch seam. Blend form liner butt joints into the textured surface pattern and finish off the final concrete surface. Create no visible vertical

or horizontal seams or conspicuous form liner butt joint marks. At locations where the form liners are joined, carefully blend to match the balance of the textured finish.

Form liners shall be installed to withstand anticipated concrete placement pressures without leakage and without causing physical or visual defects.

When the approved textured finish requires simulated grout pattern joints, construct grout pattern joints to simulate the appearance of mortared joints produced in laid up masonry work. Grout pattern joints shall be produced in accordance with the form liner / concrete color system manufacturer.

The Contractor shall have a technical representative from the form liner manufacturer on site for technical supervision during the installation and removal of form liners. Unless directed by the Engineer, installation and removal of form liners shall not be permitted if the technical representative is not present.

Form release agent shall be a non-staining petroleum distillate free from water, asphaltic, and other insoluble residue, or an equivalent product and shall be applied in accordance with the manufacturer's recommendations. The form release agent shall be compatible with the form liner material, the concrete coloring system, any special surface finish and in accordance with this Special Provision. Form release agent should be worked into all areas, especially pattern recesses.

All form defects in finished uncolored surface shall be filled or repaired within 48 hours of form removal. Use patching materials and procedures in accordance with the manufacturer's recommendations.

Precast concrete shall be finished in accordance with the Standard Specifications, except that curing of concrete should been done to accommodate the application of coloring and surface finish treatment.

7.0 SURFACE COLORING

All surfaces that are to receive coloring agent application shall be free of all laitance, dirt, dust, grease, efflorescence, paint or any other foreign material prior to the application of coloring agent. Cleaning of surfaces to be accomplished by pressure washing with water set at 3,000 psi to remove laitance. The fan nozzle shall be held perpendicular to the surface at a distance of 1 to 2 feet. Sandblasting will not be permitted.

Surface coloring shall be achieved using an approved stain suitable for the purpose intended and applied in a manner consistent with the design intent of the project. Color system shall be a single color of stain in brown or gray tones as specified on the plans and approved by the Engineer. The approved sample panel shall be the basis for determining the appropriate stain application.

The coloring agent shall be a penetrating stain mix or other approved coloring system designed for exterior application on old or new concrete with field evidence of resistance to moisture, acid or alkali, mildew, mold or fungus discoloration or degradation. The coloring

agent shall be breathable, allowing moisture and vapor transmission. Final coloring system and color of stain are subject to approval by the Engineer.

Application of coloring/staining agent to finished precast concrete and patches shall occur at a minimum of 30 days after form liners are removed. Maintain the concrete temperature between 40°F and 85°F during color/stain application and for 48 hours after color/stain application. Consult the manufacturer's recommendations for preparation, application, curing, and storage of coloring agents/stains. The contractor shall provide a Color Application Artist who is experienced in producing realistic surface appearances. Treated surfaces located adjacent to exposed soil or pavement shall be temporarily covered to prevent dirt or soil splatter from rain.

Final surface shall be free of blemishes, discolorations, surface voids, and other irregularities. All patterns should be continuous without visual disruption. Linear butt joints shall be carefully blended into the approved pattern and finished off the final concrete surface. No visible vertical or horizontal seams or conspicuous form marks created by butt joining will be permitted.

Following the completion of all work, repairs of any damage made by other construction operations shall be made to the form lined and colored surfaces as directed by the Engineer.

8.0 CONSTRUCTION METHODS

Complete the final survey of existing ground profile after clearing the wall area but prior to submitting any working drawings. Submit the final groundline survey with the working drawings.

If the Department is responsible for the survey, the Engineer field verifies the existing ground profile along the sound barrier wall. Contact the Engineer to obtain the survey information. Otherwise, complete the existing ground survey prior to submittal of working drawings.

Excavate holes with the diameters shown on the plans. Perform pile excavation to the depths shown on the plans and install piles as shown on the plans or in the accepted submittals with a tolerance of ½ inch per foot from vertical. Backfill excavations with concrete after placing piles.

A. Pile Excavation

Use equipment of adequate capacity and capable of drilling through soil and non-soil including rock, boulders, debris, man-made objects and any other materials encountered. Blasting is not permitted to advance the excavation. Blasting for core removal is only permitted when approved by the Engineer. Dispose of drilling spoils in accordance with Section 802 of the Standard Specifications and as directed by the Engineer. Drilling spoils consist of all excavated material including water removed from the excavation either by pumping or drilling tools.

If unstable, caving or sloughing soils are anticipated or encountered, stabilize excavations with either slurry or steel casing. When using slurry, submit slurry details including

product information, manufacturer's recommendations for use, slurry equipment information and written approval from the slurry supplier that the mixing water is acceptable before beginning drilling. When using steel casing, use either the sectional type or one continuous corrugated or non-corrugated piece. Steel casings should consist of clean watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of ¼ inch.

B. Concrete Placement

Before placing concrete, center and support the pile in the excavation and check the water inflow rate in the excavation after any pumps have been removed. If the inflow rate is less than 6 inches per half hour, remove any water and free fall the concrete into the excavation. Ensure that concrete flows completely around the pile. If the water inflow rate is greater than 6 inches per half hour, propose a concrete placement procedure to the Engineer. The Engineer shall approve the concrete placement procedure before placing concrete.

Fill the excavation with Class A concrete in accordance with Section 1000 of the Standard Specifications except as modified herein. Provide concrete with a slump of 6 to 8 inches. Use an approved high-range water reducer to achieve this slump. Place concrete in a continuous manner and remove all casings.

9.0 METHOD OF MEASUREMENT

The quantity of form liner textured finish and coloring stain to be paid for will be the actual square feet of architectural surface treatment that has been incorporated into the completed and accepted work. The area of architectural surface treatment will be measured by the area of treated panels. Do not include the uppermost foot of each wall segment, panel vertical edges without architectural surface treatment, or piles in the measurement. Area of sample panels shall not be included in the measurement of architectural surface treatment.

The quantity of sound barrier wall to be paid for will be the actual square feet of completed and accepted wall. In any individual section of sound barrier wall or in comparably dimensioned sections, the wall height is from the bottom of the bottom panel to the top of the top panel and the width is the distance between the centerline of the piles at the ends of the section. Include the full width of the piles at the ends of the wall.

10.0 BASIS OF PAYMENT

The quantity of sound barrier wall and architectural surface treatment, measured as provided above, will be paid for at the contract unit price bid per square foot.

The unit price bid per square foot for "Sound Barrier Wall" will be full compensation for work covered by this Special Provision including, but not limited to, furnishing precast panels, steel or concrete piles, miscellaneous structural steel, concrete, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing

erection drawings, backfilling, pile excavation including any casing or slurry, and erecting and installing the sound barrier wall members.

The unit price bid per square foot for "Architectural Surface Treatment" will be full compensation for the architectural treatment covered by this Special Provision including, but not limited to, furnishing architectural detail drawings, sample panels; the construction, finishing, and removal of all equipment, materials, labor, and incidentals necessary for furnishing and use of all form liners to produce approved textured finish and application of approved surface coloring.

Payment will be made under:

Sound Barrier Wall No. ___ ..... Square Foot

Architectural Surface Treatment (Sound Barrier Wall) ..... Square Foot

FALSEWORK AND FORMWORK (4-5-12)

1.0 DESCRIPTION

Use this Special Provision as a guide to develop temporary works submittals required by the Standard Specifications or other provisions; no additional submittals are required herein. Such temporary works include, but are not limited to, falsework and formwork.

Falsework is any temporary construction used to support the permanent structure until it becomes self-supporting. Formwork is the temporary structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Access scaffolding is a temporary structure that functions as a work platform that supports construction personnel, materials, and tools, but is not intended to support the structure. Scaffolding systems that are used to temporarily support permanent structures (as opposed to functioning as work platforms) are considered to be falsework under the definitions given. Shoring is a component of falsework such as horizontal, vertical, or inclined support members. Where the term "temporary works" is used, it includes all of the temporary facilities used in bridge construction that do not become part of the permanent structure.

Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure.

2.0 MATERIALS

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

3.0 DESIGN REQUIREMENTS

A. Working Drawings

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints. Submit the number of copies as called for by the contract.

When required, have the drawings and calculations prepared under the guidance of, and sealed by, a North Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

As an option for the Contractor, overhang falsework hangers may be uniformly spaced, at a maximum of 36 inches, provided the following conditions are met:

Member Type (PCG)	Member Depth, (inches)	Max. Overhang Width, (inches)	Max. Slab Edge Thickness, (inches)	Max. Screed Wheel Weight, (lbs.)	Bracket Min. Vertical Leg Extension, (inches)
II	36	39	14	2000	26
III	45	42	14	2000	35
IV	54	45	14	2000	44
MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

Overhang width is measured from the centerline of the girder to the edge of the deck slab.

For Type II, III & IV prestressed concrete girders (PCG), 45-degree cast-in-place half hangers and rods must have a minimum safe working load of 6,000 lbs.

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 ½" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

The overhang bracket provided for the diagonal leg shall have a minimum safe working load of 3,750 lbs. The vertical leg of the bracket shall extend to the point that the heel bears on the girder bottom flange, no closer than 4 inches from the bottom of the member. However, for 72-inch members, the heel of the bracket shall bear on the web, near the bottom flange transition.

Provide adequate overhang falsework and determine the appropriate adjustments for deck geometry, equipment, casting procedures and casting conditions.

If the optional overhang falsework spacing is used, indicate this on the falsework submittal and advise the girder producer of the proposed details. Failure to notify the Engineer of hanger type and hanger spacing on prestressed concrete girder casting drawings may delay the approval of those drawings.

Falsework hangers that support concentrated loads and are installed at the edge of thin top flange concrete girders (such as bulb tee girders) shall be spaced so as not to exceed 75% of the manufacturer's stated safe working load. Use of dual leg hangers (such as Meadow Burke HF-42 and HF-43) are not allowed on concrete girders with thin top flanges. Design the falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than ¾".

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

1. Wind Loads

   Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

Table 2.2 - Wind Pressure Values

Height Zone feet above ground	Pressure, lb/ft^2 for Indicated Wind Velocity, mph				
	70	80	90	100	110
0 to 30	15	20	25	30	35
30 to 50	20	25	30	35	40
50 to 100	25	30	35	40	45
over 100	30	35	40	45	50

2. Time of Removal

   The following requirements replace those of Article 3.4.8.2.

   Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

   Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina

COUNTY	25 YR (mph)	COUNTY	25 YR (mph)	COUNTY	25 YR (mph)
Alamance	70	Franklin	70	Pamlico	100
Alexander	70	Gaston	70	Pasquotank	100
Alleghany	70	Gates	90	Pender	100
Anson	70	Graham	80	Perquimans	100
Ashe	70	Granville	70	Person	70
Avery	70	Greene	80	Pitt	90
Beaufort	100	Guilford	70	Polk	80
Bertie	90	Halifax	80	Randolph	70
Bladen	90	Harnett	70	Richmond	70
Brunswick	100	Haywood	80	Robeson	80
Buncombe	80	Henderson	80	Rockingham	70
Burke	70	Hertford	90	Rowan	70
Cabarrus	70	Hoke	70	Rutherford	70
Caldwell	70	Hyde	110	Sampson	90
Camden	100	Iredell	70	Scotland	70
Carteret	110	Jackson	80	Stanley	70
Caswell	70	Johnston	80	Stokes	70
Catawba	70	Jones	100	Surry	70
Cherokee	80	Lee	70	Swain	80
Chatham	70	Lenoir	90	Transylvania	80
Chowan	90	Lincoln	70	Tyrell	100
Clay	80	Macon	80	Union	70
Cleveland	70	Madison	80	Vance	70
Columbus	90	Martin	90	Wake	70
Craven	100	McDowell	70	Warren	70
Cumberland	80	Mecklenburg	70	Washington	100
Currituck	100	Mitchell	70	Watauga	70
Dare	110	Montgomery	70	Wayne	80
Davidson	70	Moore	70	Wilkes	70
Davie	70	Nash	80	Wilson	80
Duplin	90	New Hanover	100	Yadkin	70
Durham	70	Northampton	80	Yancey	70
Edgecombe	80	Onslow	100		
Forsyth	70	Orange	70		

B. Review and Approval

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

A. Maintenance and Inspection

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

B. Foundations

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the Engineer conduct load tests to verify bearing capacity values that are marginal or in other high risk situations.

The Engineer reviews and approves the proposed pile and soil bearing capacities.

5.0 REMOVAL

Unless otherwise permitted, remove and keep all temporary works upon completion of the work. Do not disturb or otherwise damage the finished work.

Remove temporary works in conformance with the contract documents. Remove them in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight.

6.0 METHOD OF MEASUREMENT

Unless otherwise specified, temporary works will not be directly measured.

7.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items requiring temporary works will be full compensation for the above falsework and formwork.

SUBMITTAL OF WORKING DRAWINGS (1-29-21)

8.0 GENERAL

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, "submittals" refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the contract. Make submittals that are not specifically noted in this provision directly to the Engineer. Either the Structures Management Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

If a submittal contains variations from plan details or specifications or significantly affects project cost, field construction or operations, discuss the submittal with and submit all copies to the Engineer. State the reason for the proposed variation in the submittal. To minimize review time, make sure all submittals are complete when initially submitted. Provide a contact name and information with each submittal. Direct any questions regarding submittal requirements to the Engineer, Structures Management Unit contacts or the Geotechnical Engineering Unit contacts noted below.

In order to facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

9.0 ADDRESSES AND CONTACTS

For submittals to the Structures Management Unit, use the following addresses:

Via US mail:

Mr. B. C. Hanks, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1581

Attention: Mr. J. L. Bolden, P. E.

Via other delivery service:

Mr. B. C. Hanks, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1000 Birch Ridge Drive
Raleigh, NC 27610

Attention: Mr. J. L. Bolden, P. E.

Submittals may also be made via email.

Send submittals to:

jlbolden@ncdot.gov (James Bolden)

Send an additional e-copy of the submittal to the following address:

eomile@ncdot.gov (Emmanuel Omile)

mrorie@ncdot.gov (Madonna Rorie)

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office address:

Via US mail:

Mr. David Hering, L. G., P. E.
Eastern Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. David Hering, L. G., P. E.
Eastern Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

Via Email: EastGeotechnicalSubmittal@ncdot.gov

For projects in Divisions 8-14, use the following Western Regional Office address:

Via US mail or other delivery service:

Mr. Eric Williams, P. E.
Western Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

Via Email: WestGeotechnicalSubmittal@ncdot.gov

The status of the review of structure-related submittals sent to the Structures Management Unit can be viewed from the Unit's website, via the "Drawing Submittal Status" link.

The status of the review of geotechnical-related submittals sent to the Geotechnical Engineering Unit can be viewed from the Unit's website, via the "Geotechnical Construction Submittals" link.

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact: James Bolden (919) 707 – 6408

(919) 250 – 4082 facsimile

jlbolden@ncdot.gov

Secondary Structures Contacts: Emmanuel Omile (919) 707 – 6451

Madonna Rorie (919) 707 – 6508

Eastern Regional Geotechnical Contact (Divisions 1-7):

David Hering (919) 662 – 4710

dthering@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):

Eric Williams (704) 455 – 8902

ewilliams3@ncdot.gov

10.0 SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structures Management Unit and/or the Geotechnical Engineering Unit.

The first table below covers "Structure Submittals". The Engineer will receive review comments and drawing markups for these submittals from the Structures Management Unit. The second table in this section covers "Geotechnical Submittals". The Engineer will receive review comments and drawing markups for these submittals from the Geotechnical Engineering Unit.

Unless otherwise required, submit one set of supporting calculations to either the Structures Management Unit or the Geotechnical Engineering Unit unless both units require submittal copies in which case submit a set of supporting calculations to each unit. Provide additional copies of any submittal as directed.

STRUCTURE SUBMITTALS

Submittal	Copies Required by Structures Management Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal [1]
Arch Culvert Falsework	5	0	Plan Note, SN Sheet & "Falsework and Formwork"

Box Culvert Falsework [7]	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
Cofferdams	6	2	Article 410-4
Foam Joint Seals [6]	9	0	"Foam Joint Seals"
Expansion Joint Seals (hold down plate type with base angle)	9	0	"Expansion Joint Seals"
Expansion Joint Seals (modular)	2, then 9	0	"Modular Expansion Joint Seals"
Expansion Joint Seals (strip seals)	9	0	"Strip Seals"
Falsework & Forms [2] (substructure)	8	0	Article 420-3 & "Falsework and Formwork"
Falsework & Forms (superstructure)	8	0	Article 420-3 & "Falsework and Formwork"
Girder Erection over Railroad	5	0	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	"Maintenance and Protection of Traffic Beneath Proposed Structure at Station ___"
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings [4,5]	7	0	Article 1072-8
Miscellaneous Metalwork [4,5]	7	0	Article 1072-8
Disc Bearings [4]	8	0	"Disc Bearings"
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions

Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Precast Concrete Box Culverts	2, then 1 reproducible	0	"Optional Precast Reinforced Concrete Box Culvert at Station ___"
Prestressed Concrete Cored Slab (detensioning sequences) [3]	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	5	0	Railroad Provisions
Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	"Modular Expansion Joint Seals"
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & "Sound Barrier Wall"
Sound Barrier Wall Steel Fabrication Plans [5]	7	0	Article 1072-8 & "Sound Barrier Wall"
Structural Steel [4]	2, then 7	0	Article 1072-8
Temporary Detour Structures	10	2	Article 400-3 & "Construction, Maintenance and Removal of Temporary Structure at Station ____"
TFE Expansion Bearings [4]	8	0	Article 1072-8

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.

2. Submittals for these items are necessary only when required by a note on plans.
3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structures Management Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18" or greater.

GEOTECHNICAL SUBMITTALS

Submittal	Copies Required by Geotechnical Engineering Unit	Copies Required by Structures Management Unit	Contract Reference Requiring Submittal [1]
Drilled Pier Construction Plans [2]	1	0	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports [2]	1	0	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms [2,3]	1	0	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports [2]	1	0	Subarticle 450-3(F)(3)
Retaining Walls [4]	1 drawings, 1 calculations	2 drawings	Applicable Provisions
Temporary Shoring [4]	1 drawings, 1 calculations	2 drawings	"Temporary Shoring" & "Temporary Soil Nail Walls"

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.

2. Submit one hard copy of submittal to the Engineer. Submit a second copy of submittal electronically (PDF via email), US mail or other delivery service to the appropriate Geotechnical Engineering Unit regional office. Electronic submission is preferred.

3. The Pile Driving Equipment Data Form is available from:

https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx

See second page of form for submittal instructions.

4. Electronic copy of submittal is required. See referenced provision.

CRANE SAFETY (6-20-19)

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration (OSHA) regulations.

Submit all items listed below to the Engineer prior to beginning crane operations. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

CRANE SAFETY SUBMITTAL LIST

A. **Competent Person:** Provide the name and qualifications of the "Competent Person" responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.

B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.

C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.

D. **Certifications:** Crane operators shall be certified by the National Commission for the Certification of Crane Operators (NCCCO) or the National Center for Construction Education and Research (NCCER). Other approved nationally accredited programs will be considered upon request. In addition, crane operators shall have a current CDL medical card. Submit a list of crane operator(s) and include current certification for each type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

GROUT FOR STRUCTURES (12-1-17)

1.0 DESCRIPTION

This special provision addresses grout for use in pile blockouts, grout pockets, shear keys, dowel holes and recesses for structures. This provision does not apply to grout placed in post-tensioning ducts for bridge beams, girders, decks, end bent caps, or bent caps. Mix and place grout in accordance with the manufacturer's recommendations, the applicable sections of the Standard Specifications and this provision.

2.0 MATERIAL REQUIREMENTS

Unless otherwise noted on the plans, use a Type 3 Grout in accordance with Section 1003 of the Standard Specifications.

Initial setting time shall not be less than 10 minutes when tested in accordance with ASTM C266.

Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

3.0 SAMPLING AND PLACEMENT

Place and maintain components in final position until grout placement is complete and accepted. Concrete surfaces to receive grout shall be free of defective concrete, laitance, oil, grease and other foreign matter. Saturate concrete surfaces with clean water and remove excess water prior to placing grout.

4.0 BASIS OF PAYMENT

No separate payment will be made for "Grout for Structures". The cost of the material, equipment, labor, placement, and any incidentals necessary to complete the work shall be considered incidental to the structure item requiring grout.

ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES **(12-30-15)**

1.0 INSPECTION FOR ASBESTOS CONTAINING MATERIAL

Prior to conducting bridge demolition or renovation activities, the Contractor shall thoroughly inspect the bridge or affected components for the presence of asbestos containing material (ACM) using a firm prequalified by NCDOT to perform asbestos surveys. The inspection must be performed by a N.C. accredited asbestos inspector with experience inspecting bridges or other industrial structures. The N.C. accredited asbestos inspector must conduct a thorough inspection, identifying all asbestos-containing material as required by the Environmental Protection Agency National Emission Standards for Hazardous Air Pollutants (NESHAP) Code of Federal Regulations (CFR) 40 CFR, Part 61, Subpart M.

The Contractor shall submit an inspection report to the Engineer, which at a minimum must include information required in 40 CFR 763.85 (a)(4) vi)(A)-(E), as well as a project location map, photos of existing structure, the date of inspection and the name, N.C. accreditation number, and signature of the N.C. accredited asbestos inspector who performed the inspection and completed the report. The cover sheet of the report shall include project identification information. Place the following notes on the cover sheet of the report and check the appropriate box:

___ ACM was found
___ ACM was not found

2.0 REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIAL

If ACM is found, notify the Engineer. Compensation for removal and disposal of ACM is considered extra work in accordance with Article 104-7 of the Standard Specifications.

An Asbestos Removal Permit must be obtained from the Health Hazards Control Unit (HHCU) of the N.C. Department of Health & Human Services, Division of Public Health, if more than 35 cubic feet, 160 square feet, or 260 linear feet of regulated ACM (RACM) is to be removed from a structure and this work must be completed by a contractor prequalified by NCDOT to perform asbestos abatement. RACM is defined in 40 CFR, Part 61, Subpart M. Note: 40 CFR 763.85 (a)(4) vi)(D) defines ACM as surfacing, TSI and Miscellaneous which does not meet the NESHAP RACM.

3.0 DEMOLITION NOTIFICATION

Even if no ACM is found (or if quantities are less than those required for a permit), a Demolition Notification (DHHS-3768) must be submitted to the HHCU. Notifications and Asbestos Permit applications require an original signature and must be submitted to the HHCU 10 working days prior to beginning demolition activities. The 10 working day period starts based on the post-marked date or date of hand delivery. Demolition that does not begin as originally notified requires submission of a separate revision form HHCU 3768-R to HHCU. Reference the North Carolina Administrative Code, Chapter 10A, Subchapter 41C, Article .0605 for directives on revision submissions.

Contact Information
Health Hazards Control Unit (HHCU)
N.C. Department of Health and Human Services
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: (919) 707-5950
Fax: (919) 870-4808

4.0 SPECIAL CONSIDERATIONS

Buncombe, Forsyth, and Mecklenburg counties also have asbestos permitting and NESHAP requirements must be followed. For projects involving permitted RACM removals, both the applicable county and the state (HHCU) must be notified.

For demolitions with no RACM, only the local environmental agencies must be notified. Contact information is as follows:

Buncombe County
WNC Regional Air Pollution Control Agency
49 Mt. Carmel Road
Asheville, NC 28806
(828) 250-6777

Forsyth County
Environmental Affairs Department
537 N. Spruce Street
Winston-Salem, NC 27101
(336) 703-2440

Mecklenburg County
Land Use and Environmental Services Agency
Mecklenburg Air Quality
700 N. Tryon Street
Charlotte, NC 28202
(704) 336-5430

5.0 ADDITIONAL INFORMATION

Additional information may be found on N.C. asbestos rules, regulations, procedures and N.C. accredited inspectors, as well as associated forms for demolition notifications and asbestos permit applications at the N.C. Asbestos Hazard Management Program website:

https://epi.dph.ncdhhs.gov/asbestos/ahmp.html

6.0 BASIS OF PAYMENT

Payment for the work required in this provision will be at the lump sum contract unit price for "Asbestos Assessment". Such payment will be full compensation for all asbestos inspections, reports, permitting and notifications.

SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED) (SPECIAL)

1.0 DESCRIPTION

This work consists of furnishing planks, structural steel, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, erecting and installing the sound barrier wall members and all other materials as required by the plans, Standard Specifications and this Special Provision.

The plans allow for 15 foot post spacing. Post spacing greater than 15 feet will not be permitted. Provide consistent post spacing the entire length of the wall. Use odd post spacing, if necessary, only at the ends of the wall.

A maximum one foot drop or rise in elevation between wall sections is permitted. Elevation changes greater than one foot, if necessary, will be allowed only at the end of the wall. Top of wall elevation changes that result in a jagged appearance will not be allowed.

2.0 ALTERNATE POST SPACING

As an alternate, the Contractor may submit plans for post spacing greater than 10 feet and less than 15 feet for review and approval. A submittal reducing the post spacing shall include the plank material and design specifications. The submittal shall also include an elevation view depicting the revised post spacing and proposed top of wall elevations. The proposed top of wall elevations shall be equal to or greater than the plan dimensions.

Submit two sets of detailed plans for review. Include all details in the plans, including the size, spacing and materials of required piles. Have a North Carolina Registered Professional Engineer check, seal and date the plans. After the plans are reviewed and, if necessary, the corrections made, submit one set of reproducible tracings on 22” x 34” sheets to become part of the contract plans.

3.0 WALL TYPE

Walls that have been assigned “Approved” or “Approved for Provisional Use” status by the Product Evaluation Program will be considered for use as the Sound Barrier Wall (Bridge Mounted) planks. Wall plank design details and materials must meet the design and construction requirements of the project and the applicable loadings except that the wall is not required to meet the traffic loading requirements. Wall structural stability and connection details shall conform to the current edition of the AASHTO LRFD Bridge Design Specifications, except that traffic loading shall not be applied to the sound barrier wall.

The wall shall meet the following aesthetic requirements. The traffic and non traffic faces of the wall planks shall be configured such that the only the post flanges extend beyond the face of the planks as shown in the plans such that a uniform surface is visible from the traffic an non traffic sides of the wall. This uniform surface appearance is to extend from the top of wall to the bottom of the vertical post members as shown in the plans. The

bottom of the wall shall be detailed for free and complete drainage of wall areas. Additionally the plank configuration proposed shall allow for visual inspection of the post to concrete barrier rail bolts from the bottom of the wall without the need to remove any components.

Prior to submittal of Working Drawings, as described herein, submit a copy of the signed NCDOT Product Status Notification Letter and two sets of preliminary plans for review and approval. Include material specifications for all components. Once preliminary plans are approved, submit Working Drawings in accordance with all applicable portions of the requirements herein, including details necessary to fabricate and construct the proposed components.

Have a North Carolina Registered Professional Engineer check, seal and date the plans and, when requested, calculations. After the plans are reviewed and, if necessary, corrections made, submit one set of reproducible tracings on 22" x 34" sheets to become part of the contract plans.

4.0 MATERIALS AND FABRICATION

Provide materials and fabricate members in accordance with the requirements of Division 10 of the Standard Specifications for Roads and Structures. The structural planks for the Sound Barrier Wall (Bridge Mounted) are to have the following properties:

Flexural Strength	57,000 psi	ASTM D-790
Tensile Strength	60,000 psi	ASTM D-638
Compressive Strength	65,000 psi	ASTM D-695
Tensile Modulus	3,500,000 psi	ASTM D-638
Flexural Modulus	1,600,000 psi	ASTM D-790
Specific Gravity	1.88 (typ)	ASTM D-792

The structural planks are to be colored and shall be uniform throughout the pultruded composite. The color is to be approved by the Engineer before the planks are delivered to the jobsite.

The structural planks shall exhibit good workmanship and shall be free of burrs, cracks or other objectionable marks which would adversely affect the barrier's performance or serviceability. All cracked, discolored, burned or damaged structural planks will be rejected either at the fabrication shop or the construction site even after installation, but prior to acceptance of the project.

The structural settle is to meet the requirements of the Standard Specifications. The posts, backing angles, bolts, nuts and washers are to be pained to match the structural planks. The paint system used is to be System 1 as described in Section 442 of the Standard Specifications, with the exception that the surfaces are not to be cleaned to an SSPC SP-10 finish after being galvanized and the top coat color is to be approved by the Engineer. After erection, the bolts, nuts, and washers are to be primed by brush, then the entire

support system of posts, backing angles, bolts, nuts and washers are to be top-coated. The structural planks are to be masked off so no overspray or spatters occur. The Contractor is to provide 3 samples of paint close to the color of the structural planks to the Engineer for his selection of the final color. The limits of the painting are from the top of the posts to the bottom of the lowest plank.

5.0 CONSTRUCTION METHODS

The erection of the sound barrier components shall not begin until the concrete in the bridge railing has reached a minimum compressive strength of 3,000 psi. Install posts as shown on the plans or in the accepted submittals with a tolerance of 1/2 inch per foot from vertical or as necessary to conform to the plank design if more restrictive.

6.0 WORKING DRAWINGS

Submit plank design calculations and specifications for approval prior to purchasing the plank materials. Submit metalwork fabrication drawings for approval prior to fabrication of steel wall components. This submittal shall clearly indicate access for visual inspection of the post attached bolts. Submit an erection plan and plank support components, for review and acceptance prior to fabrication of metalwork. Submit five sets of detail drawings.

7.0 METHOD OF PAYMENT

The quantity of Sound Absorptive Barrier Wall (Bridge Mounted), to be paid for will be the completed and accepted wall, according to the limits shown on the plans.

8.0 BASIS OF PAYMENT

The quantity of Sound Absorptive Barrier Wall (Bridge Mounted) measured as provided above, will be paid for at the contract unit price for “Sound Absorptive Barrier Wall (Bridge Mounted)”.

The price bid will be full compensation for all work covered by this Special Provision including, but not limited to, furnishing panels, structural steel, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, and erecting and installing the sound barrier wall components.

Payment will be made under:

Item	**Unit**
Sound Absorptive Barrier Wall (Bridge Mounted)	Lump Sum

SOUND ABSORPTIVE BARRIER WALL (SPECIAL)

1.0 DESCRIPTION

Sound absorptive barrier wall surface shall be approved by NCDOT. Unless noted otherwise, sound absorptive noise wall panels and sound absorptive barrier wall construction shall be precast panels as described in "Sound Barrier Wall" construction drawings and special provisions. Sound absorptive wall panels shall have the minimum sound absorptive design parameters:

Noise Absorption: Panels shall have a noise reduction coefficient of 0.85 or greater according to ASTM Method C423-90a.

2.0 BASIS OF PAYMENT

The quantity of sound absorptive barrier wall, measured as provided above, will be paid for at the contract unit price bid per square foot.

The unit price bid per square foot for "Sound Absorptive Barrier Wall" will be full compensation for work covered by this Special Provision including, but not limited to, furnishing precast panels, steel or concrete piles, miscellaneous structural steel, concrete, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, backfilling, pile excavation including any casing or slurry, and erecting and installing the sound absorptive barrier wall members.

Payment will be made under:

Sound Absorptive Barrier Wall No. ___ ..... Square Foot

MODIFIED 54" PRESTRESSED CONCRETE GIRDERS (SPECIAL)

Material requirements, fabrication, and tolerance requirements shall be in accordance with section 1078 of the Standard Specifications.

Girder erection and handling, and installation shall be in accordance with section 430 of the Standard Specifications.

1.0 MEASUREMENT AND PAYMENT

Modified 54" Prestressed Concrete Girders will be measured and paid as the number of linear feet of modified 54" prestressed concrete girders estimated in the plans as being necessary to complete the project.

Payment will be made under:

Modified 54" Prestressed Concrete Girders ..... Linear Foot

SOUND WALL ACCESS DOOR: **(SPECIAL)**

1.0 Description

This work consists of the manufacture and installation of a single exterior hollow core steel door/frame with an associated sloped concrete threshold area and slope protection for personnel access through sound walls at overhead signs having supports located behind the sound wall. The work shall be in accordance with this provision, the *2018 NCDOT Standard Specifications for Roads and Structures,* and conform to the various locations and dimensions shown in the sound wall Plan and as directed by the Engineer.

2.0 Materials

Where a sound wall steel access door/frame is required in the contract Plan, materials and fabrication methods shall meet the following requirements:

- The door/frame shall be manufactured using galvanized carbon steel sheets of commercial quality (16 gauge) which are completely coated with zinc or zinc-alloy complying with ASTM A653, G90 coating, mill phosphatized. Door shall be 1 - 3/4" in thickness.
- A protective polyvinyl fluoride film having a minimum thickness of 1.5mils shall be installed on each side of the galvanized steel sheeting. The galvanized steel sheeting shall be prepared for film coating in accordance with ASTM D6386. This film coat shall be installed via lamination process, utilizing heat and adhesive to provide a uniform and durable coating. The film coat shall be colored to provide optimum color matching with the Federal standard color number indicated on the Plan for the sound wall.
- Door/frame supports and anchors for attachment to the sound wall shall be fabricated of 16-gauge minimum galvanized sheet steel.
- Door lever, cylinder, bolt, box, lock, strike plate, fasteners, inserts, etc. shall be marine grade 316 stainless steel.
- Commercial grade hinges shall be marine grade 316 stainless steel and fully commensurate with the size and weight of the door.
- Concrete sloped doorway threshold and slope protection material shall comply with Section 1000 of the *2018 NCDOT Standard Specifications for Roads and Structures.*

3.0 Submittals - Shop Drawings, Fabrication Drawings, Catalog Cuts

The Contractor shall prepare and submit shop drawings, fabrication drawings, catalog cuts, etc. as appropriate for the proposed single hollow core steel door/frame which shall be compatible with the sound wall specified in the Plan and these provisions. The submittal shall include all material specifications and details necessary for general construction, configuration, jointing methods, reinforcement, and anchorage. Sufficient design calculations or directly applicable test data for the proposed door/frame, if available, shall be provided to indicate the door will remain closed and intact during windspeeds equivalent to the design windspeed for the sound wall itself.

The Contractor shall furnish elevations and door locations to the Supplier for development of shop drawings. These drawings will include an elevation view of each single steel door/frame indicating the locations and concrete threshold area elevation directly at the door. The single

steel door shall have a 96" height and 36" width with keyed door entry handles set within 8" to 12" of clearance from the centerline of the door handle to the top of the adjacent 2' – 8" high roadway concrete barrier. The minimum swing arc from a closed position shall be 120 degrees. The door/frame shall be designed so that it cannot be opened in such a way that it will strike directly against the sound wall edge.

The type of jointing/filler material proposed for use such as sealant, caulk, grout, etc. to fill any space between the door frame and the sound wall shall submitted for approval by the Engineer and shall either be a direct match to the proposed color of the sound wall as shown in the Plan or shall be the closest available match subject to review and approval by the Engineer.

Furnish one complete copy of each submittal to the Engineer with 7 complete copies furnished to the Structures Management Unit unless directed otherwise by the Engineer.

4.0 Construction Methods

The Contractor shall install the single steel door/frame according to the manufacturer's recommendations, the Plan, contract documents, and shop drawings or other submittals approved by the Engineer. The sloped concrete threshold area and adjoining slope protection around the sign support shall be constructed in accordance with section 825 of the *2018 NCDOT Standard Specifications for Roads and Structures.*

The finished work shall provide a neat appearance with a uniform wall and door/frame color matching the Federal standard color number provided in the Plan for the sound wall. Door surfaces shall be carefully protected prior to, during, and after installation to avoid scratching or other damage to protective coatings. Such damage to the doors may necessitate replacement based on the Engineer's sole discretion.

The locks for the steel doors shall all be keyed identically and a total of ten (10) keys shall be provided to the Engineer immediately following installation. Each key shall be capable of opening every single steel door on the project.

5.0 Measurement and Payment

Sound Wall Steel Access Door shall be measured and paid as the number of each of these items manufactured and installed as part of the aforementioned, accepted work. Such price and payment will be full compensation for all work and will include, but not be limited to, furnishing all labor, materials, shop drawings, equipment, maintenance during construction prior to project acceptance, and other incidentals necessary to complete this work.

Payment will be made under:

Pay Item	**Pay Unit**
___Sound Wall Steel Access Door	Each

FIELD OFFICE (CONTRACTOR DESIGNED)

PART 1 – GENERAL

1.01 SUMMARY

A. The work consists of designing, furnishing, erecting, equipping, and maintaining a field office facility for the exclusive use of Department Engineers and Inspectors at the location indicated in the attached drawings and as approved by the Engineer. Provide a field office that complies with the 2018 North Carolina Building Codes, ICC/ANSI A117.1, the National Electric Code, the State Construction Office guidelines, other Authorities Having Jurisdiction, and the following requirements.

B. The field office shall be separated from buildings and trailers used by the Contractor. At the final acceptance of the Bypass Project, the field office facility shall be turned over to the North Carolina Department of Transportation.

C. See NCDOT Bypass Project Intermediate Contract Time schedule for scheduling of this Pay Item.

D. The Contractor shall provide all design services, approvals, permits, materials, labor, tools, equipment, and all else required for a complete and operational facility.

1.02 REFERENCES

A. 1994 North Carolina Building Code – Volume VIII Modular Building Regulations, updated July 23, 2020.

B. North Carolina Department of Transportation *Standard Specifications for Roads and Structures*, latest edition.

C. Modular Building Institute: 285 Hydraulic Ridge Road, Suite 6, Charlottesville, Va. 22901; T. 888-811-3288; T. 434-296-3288; Fax 434-296-3361.

1.03 SUBMITTALS

A. Provide the following design documents to the Resident Engineer for approval:

1. Modular Office Shop Drawings: Drawings shall include:
    a. Manufacturer's modular building fabrication drawings sealed by an architect or engineer licensed in the State of North Carolina;
    b. Architectural Drawings for stairs, decks, ramps, and canopies sealed by an architect or engineer licensed in the State of North Carolina.
2. Soil Borings, Geotechnical Report, and Recommendations.
    a. Soils analysis and structural recommendations sealed by engineer licensed in the State of North Carolina.
3. Property Survey by surveyor licensed in the State of North Carolina.
4. Civil/Site Design.
    a. Site Plan sealed by civil engineer licensed in the State of North Carolina indicating the following:
        1. Property metes and bounds;
        2. Wetlands;
        3. Area to be cleared;
        4. Fine grading with spot elevations;
        5. Foundation design;

6. Gravel entry road, gravel parking, concrete pads, stairs, ramps, decks;
7. Security fencing and gate;
8. Drainage structures;
9. Electrical infrastructure, including provision for generator by Owner;
10. Water service infrastructure;
11. Septic system.

b. Concrete Mix Design(s).
c. Potable Water Service Design.
d. Electrical Utility Design.
e. Septic System Shop Drawings and Pender County Health Department Permit.
f. Chain-link Security Fencing and Gate Shop Drawings;
g. Erosion Control Design.

1.04 QUALITY ASSURANCE

A. Modular Office:
1. Manufacturer with not less than 5 years of successful production of modular offices.
2. Manufacturer shall be licensed to produce modular buildings by the North Carolina Department of Insurance Manufactured Building Division.
3. Each modular unit shall display North Carolina Department of Insurance Manufactured Building Certification.

B. Reviews and Comments:
1. NCDOT personnel shall review and comment on initial design documents as required for verification of compliance with Contract.
2. State Construction Office shall review and comment on final design documents to verify compliance with North Carolina Building Codes, Life Safety, Accessibility, State Construction guidelines, etc. as required for Approval for Construction.

C. Inspections:
1. NCDOT personnel shall inspect project progress and quality on a regular basis to verify compliance with Contract documents.
2. The State Construction Office Monitor shall routinely inspect project progress and quality for compliance with all project requirements.
3. The State Electrical Inspector shall inspect and approve electrical work at prescribed intervals. The Contractor shall schedule such inspections by the State Electrical Inspector as the electrical work progresses. Electrical construction shall not proceed, unless the Inspector's comments have been satisfactorily addressed.

PART 2 – PRODUCTS

2.01 MODULAR OFFICE

A. Manufactured Building consisting of four (4) modules each 11'-8" wide by 60'-0" long.
B. Floor plan shall be arranged per the attached preliminary floor plan.
C. Make provisions for Information Technology infrastructure in cooperation with North Carolina Department of Transportation Information Technology Field Services.
D. Foundation as designed consisting of concrete footings and CMU piers.
E. Appropriate connection points for all utilities.
F. Provide double-hung metal windows where shown, each a minimum of seven (7.0) square feet and each having blinds and insect screens.

G. Provide self-sealing exterior doors with standard locks and lever handles.
H. Provide minimum 20 keys for each exterior door.
I. Provide certification that the office is free of asbestos and other hazardous materials.

2.02 MODULAR OFFICE FURNISHINGS

A. Provide the following office furnishings that shall become the property of NCDOT at final acceptance of the Bypass Project:

Number	Item
1	Double-pedestal desk (approximately 60 by 34 inches)
5	Plan and drafting table (approximately 30 by 96 inches) with adjustable stool
5	Plan rack for 24 by 36 inch drawings with 6 plan clamps.
4	4-drawer fire protection file, 15 inch drawer width, minimum UL rating of Class 350
20	Office chairs: adjustable, 5-leg, rolling base.
1	Wastebasket per room
1	Copy / Scanning / Fax machine (11 inch x 17 inch copies)
1	Internet Connection Service (modem for Wi-Fi).
-	2 Data ports in all rooms (with exception of Break Room and Toilet Rooms)
1	70" Class TV mounted in conference room with 20' cord for Laptop Display / Audio connections. Location in conference room to be approved by the Engineer
1	Break Room with refrigerator, microwave oven, plastic laminate counters, floor and wall cabinets, etc.
20	Conference Room chairs: adjustable, 5-leg, rolling base.
1	Wall-mounted white board (8 feet wide x 4 feet high)

2.03 STORAGE BUILDINGS

A. Storage Building for Nuclear Gauge:
   1. Provide separate storage building minimum eight (8) feet square permanently anchored to a minimum 6” thick cast-in-place concrete floor slab. Provide a permanent, sloped, shingled or metal weatherproof roof. Provide minimum 4” thick five (5) foot square cast-in-place exterior concrete pad at door.
   2. Provide a flush metal exterior door and frame with tamperproof lock and lever handle.
   3. Provide electrical light with wall switch.
   4. Building shall be located on site not less than ten (10) feet from all other buildings.

B. Storage Building for Test Equipment:
   1. Provide separate storage building minimum eight (8) feet square permanently anchored to a minimum 6” thick cast-in-place concrete floor slab. Provide a permanent, sloped, shingled or metal weatherproof roof. Provide minimum 4” thick five (5) foot square cast-in-place exterior concrete pad at door.
   2. Provide a flush metal exterior door and frame with tamperproof lock and lever handle.
   3. Provide electrical light with wall switch.
   4. Building shall be located on site not less than ten (10) feet from all other buildings.

2.04 UTILITIES

A. Obtain permits to connect to available utilities.

B. Potable Water Service: Properly size water service for the requirements of the Modular Office. Provide all materials, accessories, labor, tools, equipment, and all else for a complete and fully operational water system.

1. Tapping Sleeve;
2. Water Meter Box;
3. Water Meter Base;
4. Shut off valve(s);
5. Reduced Pressure Zone Backflow Preventer;
6. One (1) wall hydrant;
7. Heat Tape as required;

C. Electrical Power Service:

1. Properly size electrical service for requirements of the Modular Office. The service may enter the site above ground; however, the final service run shall be underground to the location of the generator pad.
2. The Contractor shall make provision for the Department's Generator and Automatic Transfer Switch.
3. Provide concrete foundation/pad sized for Generator.
4. Provide pressure-treated wood rack for all electrical switches and disconnects.

D. Septic System:

1. Properly size septic system for requirements of the Modular Office.
2. Submit septic system design to Pender County Health Department for approval and permitting.
3. Provide all materials, accessories, labor, tools, equipment, and all else for a complete and fully operational septic system.

E. Generator Pad, Electrical Rack, and Bollards:

1. Properly sized and reinforced cast-in-place concrete generator pad for NCDOT's generator.
2. Electrical Rack: Pressure-treated wood post and panel rack of dimension lumber for mounting of electrical meter, switches, disconnects, NCDOT's Automatic Transfer Switch, etc.
3. Protective steel pipe bollards: Concrete-filled Schedule 40 steel pipe bollards extending minimum 48" above grade and placed no more than 48" on center around the perimeter of the generator pad and at the electrical rack.

F. Information Technology

1. Make provision for NCDOT's Information Technology equipment.
2. Provide minimum two (2) data outlets per office/workstation.
3. Provide floor data outlet for each row of computer tables.
4. Provide data outlet for each printer/copier.

2.05 ENTRANCE ROAD

A. Provide entrance road into the Department's property from St. John's Church Road (Route 1592).

B. The road shall be properly graded and compacted and shall comply in all respects with the North Carolina Department of Transportation *Standard Specifications for Roads and Structures*.
C. The road shall have a gravel surface suitable for use. The Contractor shall maintain the road in good condition for the duration of the Bypass Project.
D. Culvert(s):
    1. Provide a 24" RCP culvert at the access road entrance.
    2. Provide a 24" RCP culvert where road crosses Wetlands as required for proper Drainage.
E. Provide permanent protection of roadbed from erosion with rip-rap or other acceptable means.

2.06 SECURITY FENCING AND GATE
A. Provide complete chain-link fencing assembly six (6) feet high with 3 strands of barbed wire where indicated on attached drawings.
B. Provide twelve- (12) foot wide by six- (6) foot high rolling chain-link gate with locking hardware.

2.07 FIRE EXTINGUISHERS
A. Furnish and maintain one fire extinguisher for each exterior exit door.
B. Fire extinguisher may be chemical or dry powder. UL Classification 10-B:C (minimum), suitable for Type A:B:C: fires. Mount and maintain fire extinguishers in accordance with OSHA Safety and Health Standards.

2.08 MISCELLANEOUS ITEMS
A. Provide broom, dust pan, mop and bucket, and general cleaning supplies.

2.09 GRADING & EARTHWORK
A. Clearing and Grubbing: Contractor shall perform clearing and grubbing as described in Article 200 of the 2018 NCDOT Standard Specifications for Roads & Structures Contractor; specific adherence to this article is required. Limits will be defined by the Engineer upon award of this contract. Contractor shall clear and grub 2.5+ acres as indicated for site construction. See the attached site plan. The cost of this work shall be included in the lump sum price bid for *Field Office.*
B. Fine Grading with Spot Elevations: See Site/Civil Design, Page 1.

2.10 EROSION CONTROL
A. Provide and maintain all required erosion control devices and materials throughout the construction period.
B. NCDOT maintains delegated authority to approve and to routinely inspect all erosion control systems. Cooperate with NCDOT Roadside Environmental Unit in the construction and maintenance of erosion control systems.

PART 3 – EXECUTION

3.01 PRE-DESIGN MEETING
A. Upon Contract Award, the Contractor shall conduct a meeting to coordinate the design and construction of the Field Office.

B. At a minimum, this meeting shall include:
   1. The Engineer;
   2. The Department's Architect;
   3. The Contractor's Project Manager;
   4. The Contractor's Project Architect and Engineers;
   5. The Contractor's Project Superintendent;
   6. The Contractor's Major Subcontractors and Suppliers.

C. This meeting shall clarify issues of:
   1. Project scope;
   2. Project schedule;
   3. Project deliverables;
   4. Lines of communication and authority;
   5. Permits and approvals required;
   6. Requirements for payment.

3.02 DESIGN SUBMITTALS

A. The designs and other submittal documentation listed in 1.03A shall be provided to the Engineer for review and comment.

B. Upon completion of corrections/responses to NCDOT comments, the designs and other submittal documentation shall be resubmitted to the Engineer for submittal to the State Construction Office for review and comment. The State Construction Office normally requires a preliminary and a final submittal to achieve approval for construction.

C. Construction of the project shall not proceed, until State Construction approval for construction is received.

D. The Contractor shall submit the Septic System design to Pender County Health Department for approval and permitting.

E. The Contractor shall submit the Erosion Control design to the Engineer for review and comment. Upon revision, the Contractor shall submit the Erosion Control design to NCDOT Roadside Environmental Unit for final approval.

3.03 PRE-CONSTRUCTION MEETING

A. Upon receipt of all permits and approvals, the Contractor shall conduct a meeting to coordinate the construction of the Field Office.

B. At a minimum, this meeting shall include:
   1. The Engineer;
   2. The Department's Architect;
   3. The Contractor's Project Manager;
   4. The Contractor's Project Architect and Engineers;
   5. The Contractor's Project Superintendent;
   6. The Contractor's Major Subcontractors and Suppliers;
   7. The State Construction Monitor.

C. This meeting shall clarify issues of:
   1. Project scope;
   2. Project schedule;
   3. Lines of communication and authority;
   4. Project documentation;
   5. Procedural guidelines.

3.04 CONSTRUCTION

A. Upon receipt of all permits and approvals, the Contractor shall proceed to construct the facility in an orderly and professional fashion under the direct and daily supervision of an experienced project superintendent.

B. The project shall be subject to regular and frequent inspections of authorized NCDOT personnel and by the State Construction Monitor.

C. Project electrical work shall be inspected and approved by the State Electrical Inspector at prescribed phases of the work. Electrical work shall not proceed, until the Electrical Inspector's comments have been satisfactorily resolved. Before the project can receive a preliminary final inspection by the State Construction Monitor, the electrical work shall receive a final certification from the State Electrical Inspector.

D. The Contractor shall establish regular bi-weekly progress meetings to coordinate the work. At a minimum, the meetings shall include:

1. The Engineer or his authorized representative;
2. Project Superintendent;
3. Contractor's Architect or Engineer;
4. Representatives of the Major Subcontractors authorized to make decisions;
5. State Construction Monitor.

E. All project administration documentation shall use State Construction Office forms and shall be made available to the Engineer, the NCDOT Architect, the State Construction Monitor, and the State Electrical Inspector.

3.05 PROJECT CLOSEOUT

A. At completion of this Pay Item, the Contractor's Architect or Engineer shall conduct an inspection and produce a punch list(s) which shall be shared with the State Construction Monitor. When construction is certified by the Contractor's Architect or Engineer as completed, that Architect or Engineer shall collect all required State Construction Office closeout documentation and call for a preliminary State Construction inspection.

B. Upon completion of the preliminary inspection punch list, the Contractor's Architect or Engineer shall schedule a final inspection with the State Construction Monitor. Upon successful completion of final inspection, the Contractor's Architect or Engineer shall present the completed Project Closeout Manual to the State Construction Monitor for signature. The Contractor's Architect or Engineer shall provide Operations and Maintenance Manuals to the NCDOT Resident Engineer.

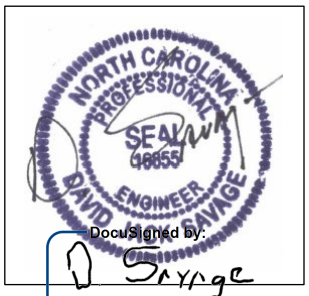
3.06 MEASUREMENT AND PAYMENT

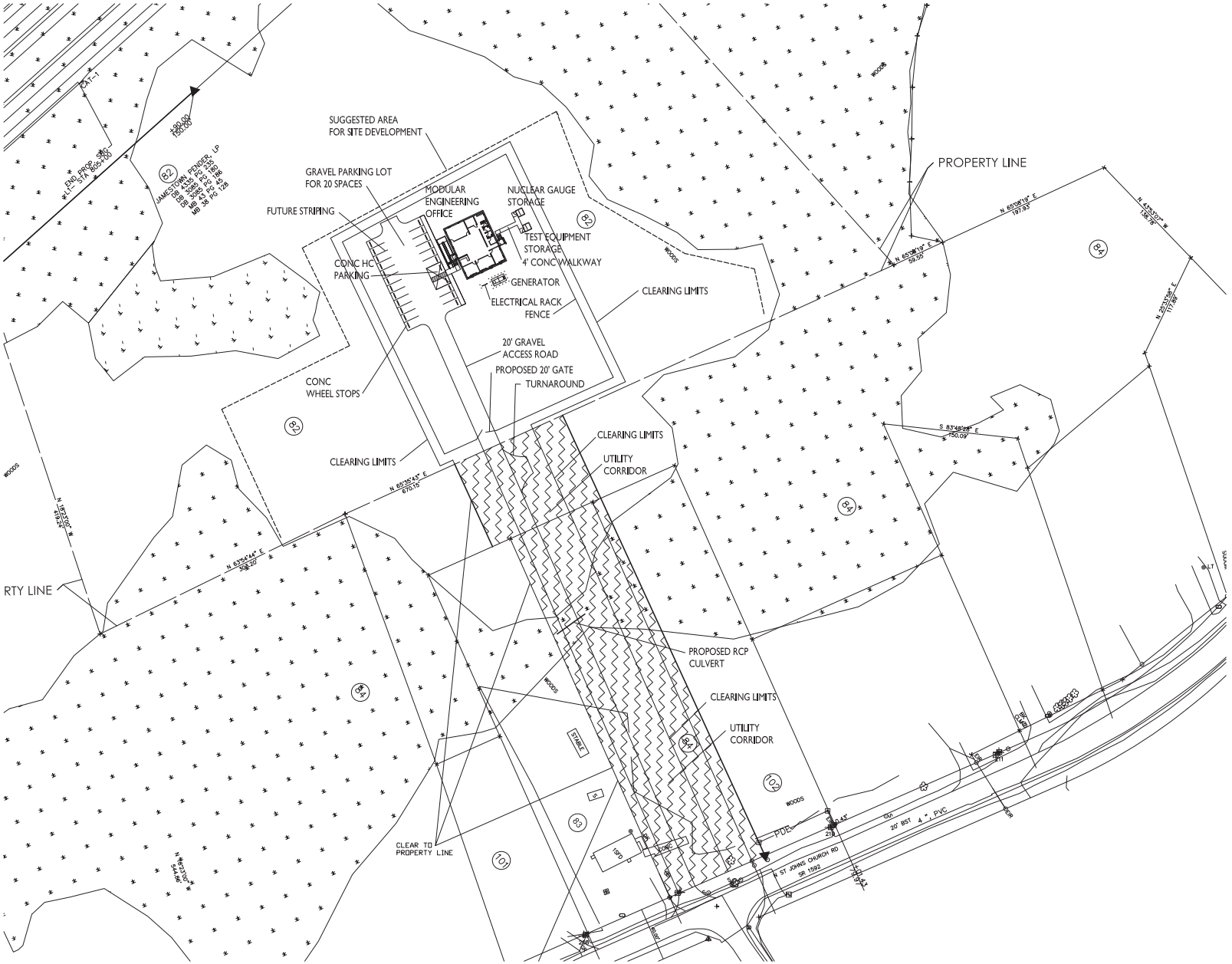
A. Payment at the contract lump sum bid price for *Field Office* will be full compensation for all work covered by this provision including but not limited to clearing, designing, furnishing, erecting, equipping, and maintaining the field office as outlined in this provision.

B. Installation and service fees for the telephone and internet shall be paid for by the Department.

C. Payment will be made under:

Pay Item
Field Office





SCHEMATIC SITE PLAN

SCALE: 1" = 50.0'

NOT FOR CONSTRUCTION

CONSTRUCTION DOCUMENTS

D Savage

NCDOT FACILITIES DESIGN UNIT
ARCHITECT & ENGINEERS

1 SOUTH WILMINGTON STREET
RALEIGH, NORTH CAROLINA 27601
PHONE: 919/707-4540 FAX 919/715-0399

SCHEMATIC SITE PLAN

Modular Office for R-3300 B
R-3300-B Bypass Project
NCDOT Engineering Staff

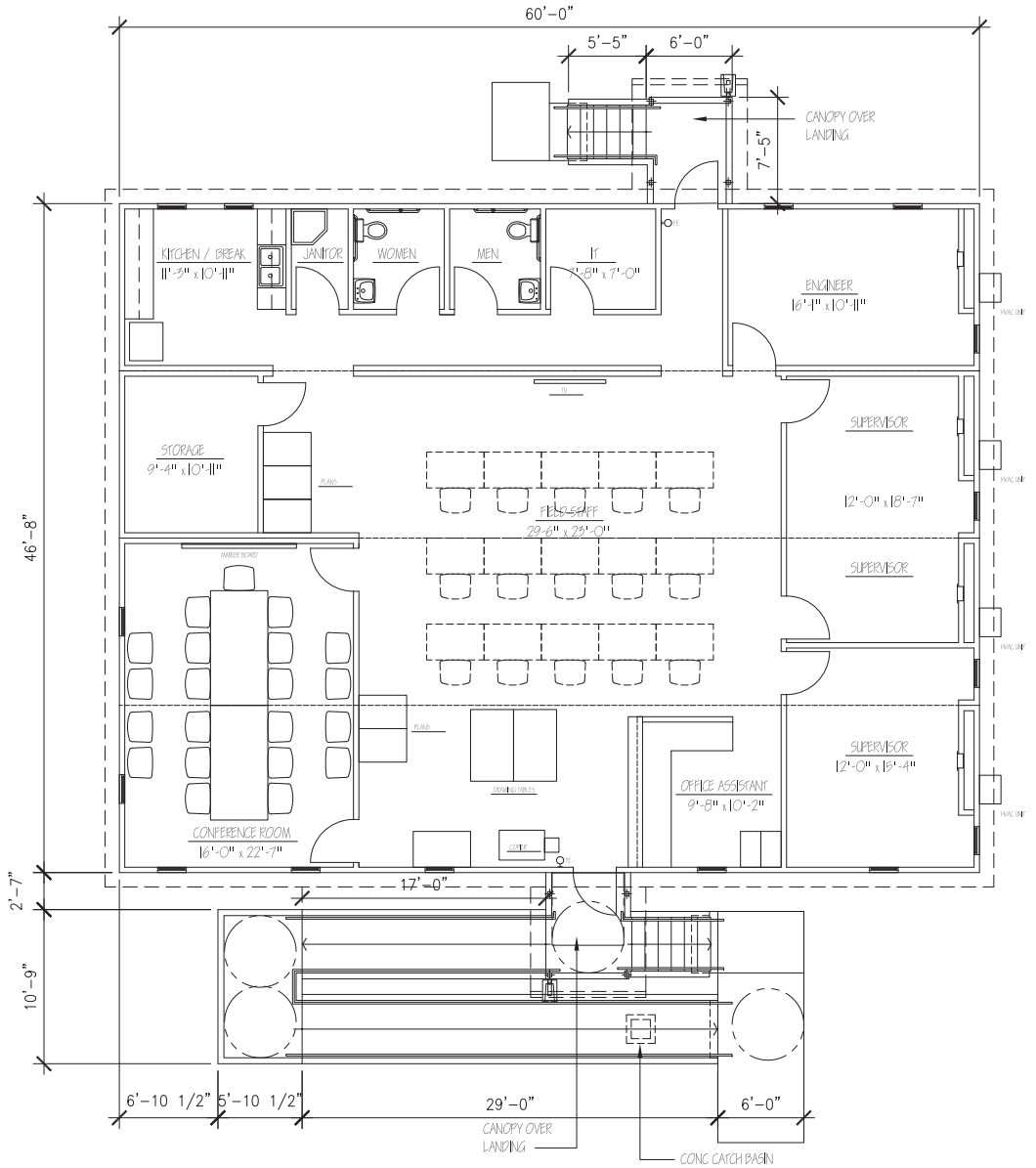
HAMPSTEAD, NORTH CAROLINA

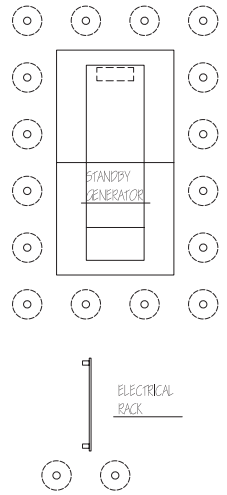
STATE CONSTRUCTION ID.# XX-XXXXX-01A

EQUIPMENT NUMBER:

REVISIONS	
NO.	DATE

DATE ISSUED: 11/10/21
DRAWN BY:
CHECKED BY:
SHEET NO.
C1





LEGEND

- RENEWAL IN CONTRACT
- RENEWAL NOT IN CONTRACT
- TREE TO REMAIN

1 / A1 MODULAR OFFICE FLOOR PLAN
SCALE: 1/4" = 1'-0"

NOT FOR CONSTRUCTION

CONSTRUCTION DOCUMENTS

NORTH CAROLINA PROFESSIONAL SEAL 049550 ENGINEER

Documents Originally Issued and Sealed by: [signature] on 11/10/2021

NCDOT FACILITIES DESIGN UNIT
ARCHITECT & ENGINEERS
1 SOUTH WILMINGTON STREET
RALEIGH, NORTH CAROLINA 27699
PHONE: (919)715-0400 FAX: (919)715-0399

MODULAR OFFICE FLOOR PLAN

Modular Office for R-3300 B
R-3300-B Bypass Project
NCDOT Engineering Staff
HAMPSTEAD, NORTH CAROLINA

STATE CONSTRUCTION ID.# XX-XXXXX-01A

EQUIPMENT NUMBER:

REVISIONS

NO.	DATE

DATE ISSUED: 11/10/21
DRAWN BY:
CHECKED BY:

SHEET NO.
A1

PROJECT SPECIAL PROVISION

(10-18-95) (Rev. 3-21-17) Z-1a

PERMITS

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

PERMIT	AUTHORITY GRANTING THE PERMIT
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, DEQ State of North Carolina

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by * are the responsibility of the Department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-13 of the *2018 Standard Specifications* and the following:

Should the Contractor propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Contractor's responsibility to coordinate with the Engineer to determine what, if any, additional permit action is required. The Contractor shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Contractor shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Contractor's request for approval of construction methods not specifically identified in the permit.

Where construction moratoriums are contained in a permit condition which restricts the Contractor's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the restricted waters, wetlands or buffer zones, provided that activities outside those areas is done in such a manner as to not affect the restricted waters, wetlands or buffer zones.

P-2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

June 29, 2020

MEMO TO: Chad D. Kimes, P.E.
Division 3 Engineer

FROM: Mason Herndon
Division Environmental Program Supervisor

SUBJECT: Section 404 Individual Permit Modification and Section 401 Water Quality Certification Modification for construction of the Hampstead Bypass from South of NC 210 to North of SR 1563 (Sloop Point Loop Road) in Pender County. WBS 40237.1.1, TIP No. R-3300B

Attached are modifications to the U.S. Army Corps of Engineers Section 404 Permit, N.C. Division of Water Resources (NCDWR) 401Water Quality Certification and Division of Coastal Management Federal Consistency Determination for construction of the Hampstead Bypass from South of NC 210 to North of SR 1563 (Sloop Point Loop Road) in Pender County. These modifications only approve construction of Section B. Except as revised by these modifications, all permit conditions in the original U-4751/R-3300 permits remain valid.

If you have any questions or if I can be of any further assistance, please do not hesitate to contact me.

ec:

Katie Hite, P.E. Division Project Development Engineer
David Leonard, P.E. Division Project Lead
Trace Howell, P.E. Division Design Construct
Jonathan Mitchell, Division Contract & Proposals Engineer

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
5501 BARBADOS BOULEVARD
CASTLE HAYNE, NC 28429-5647

Telephone: 910-341-2000
Fax: 910-675-0143
Customer Service: 1-877-368-4968

Website: ncdot.gov

Location:
5501 BARBADOS BOULEVARD
CASTLE HAYNE, NC 28429-5647

P-3

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

June 26, 2020

Regulatory Division

Action ID. SAW-2007-01386

Chad Kimes, PE
Division 3 Engineer
N.C. Department of Transportation
5501 Barbados Blvd.
Castle Hayne, NC 28429

Dear Mr. Kimes:

Reference the Department of the Army (DA) permit issued on August 10, 2017, for the discharge of fill material into waters and wetlands adjacent to various creeks, and their tributaries in order to construct TIP# U-4751 and R-3300 (Military Cut Off Road and Hampstead ByPass), in New Hanover and Pender Counties, North Carolina. This was a phased permit for the entire project with only U-4751 authorized for construction to date. Subsequent permit modifications would authorize construction of additional phases within the limits of the original permit.

Further reference your April 7, 2020 request for modification to the 2017 permit mentioned above. This request is for authorization to construct section B of R-3300 which is a 6.916-mile new location phase starting around NC 210 and extending to Sloop Point Loop Road in Pender County. This phase of the project will permanently impact 55.428 acres of non-riparian wetlands, 16.886 acres of riparian wetlands, and 5,756 linear feet of stream channel. This phase would also temporarily impact 0.354 acre of wetlands and 489 linear feet of stream channel during construction.

I have determined that the proposed project modifications described above are not contrary to the public interest and consistent with the 404 (B) (1) and therefore, the DA permit is hereby modified.

All original conditions in the August 10, 2017 permit remain enforceable with an expiration date of December 31, 2022. New special conditions follow:

1. All work authorized by this permit shall be performed in strict compliance with the permit plans 1-165 of 165 dated 4/1/2020 and 6/9/2020, and Utility Plans 1-23 of

23 dated 4/1/2020 and 6/9/2020 which are a part of this permit. The Permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Any modification to the attached permit plans must be approved by the U.S. Army Corps of Engineers (Corps) prior to any active construction in waters or wetlands.

2. Any rip rap placed in the main flow (thalweg) of any channel along this project must be buried to the natural streambed elevation.

*3. In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Forms. The requirements of these forms, including any special conditions listed on these forms, are hereby incorporated as special conditions of this permit.

This modification approval will be utilized for future compliance of the project. If you have questions, please contact Brad Shaver of the Wilmington Regulatory Field Office, at telephone (910) 251-4611.

FOR THE COMMANDER

Monte Matthews Date: 2020.06.26 13:24:37 -04'00'

Monte Matthews
Lead Project Manager
Wilmington District

Copies Furnished (electronic w/o attachments):

Mr. Mason Herndon, NCDOT
Ms. Joanne Steenhuis, NCDEQ-DWR
Ms. Amanetta Somerville, USEPA
Mr. Gary Jordan, USFWS
Mr, Travis Wilson, NCWRC
Ms. Renee Gledhill-Earley, SHPO
Mr. Monte Matthews, USACE
Ms, Cathy Brittingham, NC DCM

Mr. Stephen Lane, NC DCM
Ms. Beth Harmon, NC DMS (attached mitigation transfer form)
Mr. Christian Preziosi, NE Bank (attached mitigation transfer form)
Mr. Todd Tugwell, USACE (attached both mitigation tra

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403

August 7, 2017

Regulatory Division

Action ID. SAW-SAW-2007-01386: U-4751 and R-3300, New Hanover and Pender Counties, North Carolina

Mr. Phillip S. Harris III, P.E., C.P.M.
North Carolina Department of Transportation
Natural Environment Section Head
1548 Mail Service Center
Raleigh, North Carolina 27699

Dear Mr. Harris:

In accordance with your written request of December 21, 2016, and the ensuing administrative record, enclosed is a copy of a Department of Army (DA) Permit to directly discharge fill material into waters and wetlands along multiple drainages to construct a 5.5 mile six-lane divided roadway (U-4751) on new location from Hwy 17 Business to US 17 By-Pass, New Hanover County, North Carolina.

Any deviation in the authorized work will likely require modification of this permit. If a change in the authorized work is necessary, you should promptly submit revised plans to the Corps showing the proposed changes. You may not undertake the proposed changes until the Corps notifies you that your permit has been modified.

Carefully read your permit. The general and specific conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant general conditions require that:

a. You must complete construction before December 31, 2022.

b. You must notify this office in advance as to when you intend to commence and complete work.

c. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

You should address all questions regarding this authorization to Mickey T. Sugg, at the Wilmington Regulatory Field Office, telephone number 910-251-4811.

Thank you in advance for completing our Customer Survey Form. This can be accomplished by visiting our website at http://per2.nwp.usace.army.mil/survey.html and completing the survey on-line. We value your comments and appreciate your taking the time to complete a survey each time you interact with our office.

Sincerely,

for Robert J. Clark
Colonel, US Army
District Commander

Enclosures

Copies Furnished (w/Special Conditions & Plans):

Chief, Source Data Unit
Attn: Ms. Sharon Tear
NOAA/National Ocean Service
1315 East-West Highway, Room 7316
Silver Spring, Maryland 20910-3282

U.S. Fish and Wildlife Service
Attn: Mr. Pete Benjamin
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726

National Marine Fisheries Service
Attn: Dr. Ken Riley
Habitat Conservation Service
Pivers Island
Beaufort, North Carolina 28516

U.S. Environmental Protection Agency
Attn: Ms. Jennifer Derby, Chief
Wetlands Protection Service – Region IV
Water Management Division
61 Forsyth Street
Atlanta, Georgia 30303

U.S. Environmental Protection Agency
Attn: Mr. Todd A. Bowers
Wetlands and Marine Regulatory Section
61 Forsyth Street, S.W.
Atlanta, Georgia 30303-8931

North Carolina Department of
Environmental Quality
Attn: Mr. Doug Huggett
Division of Coastal Management
400 Commerce Avenue
Morehead City, North Carolina 28557

National Marine Fisheries Service
Attn: Dr. Pace Wilber
Habitat Conservation Service
219 Fort Johnson Road
Charleston, South Carolina 29412-9110

DEPARTMENT OF THE ARMY PERMIT

Permittee: North Carolina Department of Transportation-c/o: Mr. Phillip Harris III, P.E., C.P.M.

Permit No.: SAW-2007-01386

Issuing Office: CESAW-RG-L

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: The overall project purpose is to directly discharge fill material into waters and wetlands (60.51 acres of non-riparian wetlands and 2,122 linear feet of stream channel) along multiple drainages to construct a 5.5 mile six-lane divided roadway (U-4751). The future year project/second phase (R-3300) would be authorized for construction by modification at a future date.

Project Location: (U-4751) on new location from Hwy 17 Business to US 17 By-Pass, New Hanover County, North Carolina.

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2022 If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

SEE ATTACHED SPECIAL CONDITIONS

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

() Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf
of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity
authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit, unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

(PERMITTEE) for PHILIP S. HARRIS III — 07-31-2017 *(DATE)*

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

(DISTRICT ENGINEER) **ROBERT J. CLARK** — 10 Aug 2017 *(DATE)*
FOR **COLONEL, U.S. ARMY**
DISTRICT COMMANDER

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

(TRANSFEREE) *(DATE)*

*U.S. GOVERNMENT PRINTING OFFICE: 1986 - 717-425

SPECIAL CONDITIONS (Action ID 2007-01386)

In accordance with 33 U.S.C. 1341(d), all conditions of the North Carolina Division of Water Resources 401 Water Quality Certification #004116 and the North Carolina Division of Coastal Management Consistency Certification (CD17-018) are incorporated as part of the Department of the Army permit.

NCDOT must adhere to Green Sheet Project Commitments as presented in the September 2014 State Record of Decision incorporated by reference.

1. Phased Permits:

A. This permit only authorizes work on U-4751 of TIP U-4751/R-3300 (Military Cutoff-Hampstead Bypass). Construction of R-3300 of TIP U-4751/R-3300 shall not commence until final design has been completed for those sections, the permittee has minimized impacts to waters and wetlands to the maximum extent practicable, and any modifications to the plans, and a compensatory mitigation plan, have been approved by the US Army Corps of Engineers (USACE).

B. The modification request for future R-3300 will be recirculated under Public Notice to gather relevant comments related to finalized hydraulic structures and other modifications realized during final plan preparation. NCDOT is responsible for providing updated mailing list labels along with the final plans for R-3300 at the time of modification request.

2. Plans:

* A. The permittee will ensure that the construction design plans for this project do not deviate from the permit plans. Written verification shall be provided that the final construction drawings comply with the attached permit drawings prior to any active construction in waters of the United States, including wetlands. Any deviation in the construction design plans will be brought to the attention of the USACE, Wilmington Regulatory Field Office prior to any active construction in waters or wetlands.

B. All work authorized by this permit must be performed in strict compliance with the plans dated 5/9/2017, received on 6/1/2017 entitled U-4751, permit drawings 1-83 of 83, which are a part of this permit. Any modification to these plans must be approved by the USACE prior to implementation.

3. Pre-Construction Meetings:

A. The permittee shall schedule and attend a pre-construction meeting between its representatives, the contractors representatives, and the USACE, Wilmington Field Office, NCDOT Regulatory Project Manager, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all the terms and conditions contained with this Department of the Army Permit. The permittee shall provide the USACE, Wilmington Field Office, NCDOT Project Manager, with a copy of the final permit plans at least two weeks

prior to the pre-construction meeting along with a description of any changes that have been made to the project's design, construction methodology or construction timeframe. The permittee shall schedule the pre-construction meeting for a time frame when the USACE, NCDCM, and NCDWR Project Managers can attend. The permittee shall invite the USACE, NCDCM, and NCDWR Project Managers a minimum of thirty (30) days in advance of the scheduled meeting in order to provide those individuals with ample opportunity to schedule and participate in the required meeting.

4. Threatened and Endangered Species:

A. This USACE permit does not authorize you to take an endangered species, in particular *Picoides borealis* (Red-cockaded woodpecker). In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., a Biological Opinion (BO) under the ESA, Section 7, with "incidental take" provisions with which you must comply). The U.S. Fish and Wildlife Service (USFWS) BO, dated July 21, 2016, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Your authorization under this USACE permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your USACE permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.

B. This USACE permit does not authorize you to take a threatened or species, in particular, the Northern Long-eared Bat (NLEB) (*Myotis septentrionalis*). In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., a Biological Opinion (BO) under the ESA, Section 7, with "incidental take" provisions with which you must comply). The U.S. Fish and Wildlife Service's (USFWS's) Programmatic BO titled "Northern Long-eared Bat (NLEB) Programmatic Biological Opinion for North Carolina Department of Transportation (NCDOT) Activities in Eastern North Carolina (Divisions 1-8)," dated March 25, 2015, and adopted on April 10, 2015, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that are specified in the BO. Your authorization under this USACE permit is conditioned upon your compliance with all the mandatory terms and conditions (incorporated by reference into this permit) associated with incidental take of the BO. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and would also constitute non-compliance with your USACE permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO and with the ESA.

5. Maintain circulation and flow of waters

A. Unless otherwise requested in the applicant's application and depicted on the approved work plans, culverts greater than 48 inches in diameter will be buried at least one foot

below the bed of the stream. Culverts 48 inches in diameter and less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain existing channel slope. The bottom of the culvert must be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Destabilizing the channel and head cutting upstream should be considered in the placement of the culvert.

B. Measures will be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed opening should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

C. Except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters and wetlands.

6. Sediment Erosion Control:

A. During the clearing phase of the project, heavy equipment must not be operated in surface waters or stream channels. Temporary stream crossings will be used to access the opposite sides of stream channels. All temporary diversion channels and stream crossings will be constructed of non-erodible materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

B. No fill or excavation impacts for the purposes of sedimentation and erosion control shall occur within jurisdictional waters, including wetlands, unless the impacts are included on the plan drawings and specifically authorized by this permit.

C. The permittee shall remove all sediment and erosion control measures placed in wetlands or waters, and shall restore natural grades on those areas, prior to project completion.

D. The permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the "North Carolina Sediment and Erosion Control Planning and Design Manual" to ensure compliance with the appropriate turbidity water quality standard. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to ensure compliance with the appropriate turbidity water quality standards. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the

Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4). Adequate sedimentation and erosion control measures must be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures must be inspected and maintained regularly, especially following rainfall events. All fill material must be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

E. Design Standards for Sensitive Watersheds must be implemented during project construction for all tributaries of streams within the study area designated as HQW or ORW due to the classification of their receiving waters

F. The permittee shall install barrier fencing around all wetlands that are not to be disturbed to make them readily visible and prevent construction equipment from inadvertently entering or disturbing these areas.

7. Temporary Fills

A. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

8. Borrow and Waste

A. To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent waters and wetlands, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material or to dispose of dredged, fill or waste material. The permittee shall provide the USACE with appropriate maps indicating the locations of proposed borrow or waste sites as soon as such information is available. The permittee will coordinate with the USACE before approving any borrow or waste sites that are within 400 feet of any stream or wetland. All jurisdictional wetland delineations on borrow and waste areas shall be verified by the USACE and shown on the approved reclamation plans.

B. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act.

9. Project Maintenance

A. The permittee shall advise the USACE in writing prior to beginning work authorized by this permit and again upon completion of the work authorized by this permit.

B. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this

project with a copy of this permit. A copy of this permit, including all conditions, shall be available at the project site during construction and maintenance of this project.

C. The permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

D. The permittee shall take measures to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with any water in or entering into water of the United States. Water inside coffer dams or casings that has been in contact with concrete shall only be returned to water of the United States when it no longer poses a threat to aquatic organisms (i.e. concrete is set and cured).

* 10. Mitigation

A. In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit authorization.

B. The attached transfer forms cover two separate sources for mitigation. The non-riparian wetland mitigation will come from the Northeast Cape Fear Umbrella Mitigation Bank (total need of 121.57 acre credits) and stream credits will come from the North Carolina Division of Mitigation Services (total need of 3,041 linear feet credits).

11. Cultural Resources

* A. NCDOT shall abide by all stipulations identified in the Memorandum of Agreement between the United States Army Corps of Engineers and the North Carolina State Historic Preservation Officer, signed 29 January 2015 and filed by the Advisory Council on April 15, 2016, copy attached.

B. While accomplishing the authorized work, if the permittee discovers any previously unknown cultural resources, the USACE will be immediately notified so that required coordination can be initiated with the North Carolina Division of Cultural Resources.

12. Enforcement

A. All reports, documentation and correspondence required by the conditions of this permit shall be submitted to the following address: U.S. Army Corps of Engineers, Regulatory Division, Wilmington Regulatory Field Office, c/o Mr. Brad Shaver, Field office address, and by telephone at: 910-251-4611. The Permittee shall reference the following permit number, SAW-2007-01386, on all submittals.

B. Violation of these conditions or violation of Section 404 of the Clean Water Act of Section 10 of the Rivers and Harbors Act must be reported in writing to the Wilmington District U.S. Army Corps of Engineers within 24 hours of the permittee's discovery of the violation.

C. A representative of the USACE will periodically and randomly inspect the work for compliance with these conditions. Deviations from these procedures may result in an administrative financial penalty and/or directive to cease work until the problem is resolved to the satisfaction of the USACE.

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
S. DANIEL SMITH
Director

NORTH CAROLINA
Environmental Quality

June 17, 2020

Mason Herndon, Environmental Program Supervisor
NC DOT Division 3
5501 Barbados Blvd.
Castle Hayne, NC 28429

Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for the Proposed Hampstead Bypass on a new alignment in Pender County, State Project No. 40237.1.2, TIP No. R-3300B.
NCDWR Project No. 20161268 v. 3

Dear Mr. Herndon:

Attached hereto is a modification of Certification No. WQ 004116 issued to The North Carolina Department of Transportation (NCDOT) dated June 5, 2017 and modified on March 1, 2019.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

DocuSigned by:
Amy Chapman
[illegible]

S. Daniel Smith, Director
Division of Water Resources

Attachment

Electronic copy only distribution:
Brad Shaver, US Army Corps of Engineers, Wilmington Field Office
Chris Rivenbark, NC Department of Transportation
Gary Jordan, US Fish and Wildlife Service
Travis Wilson, NC Wildlife Resources Commission
Cathy Brittingham, NC Division of Coastal Management
Beth Harmon, Division of Mitigation Services
Joanne Steenhuis, NC Division of Water Resources Wilmington Regional Office

Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500. This certification authorizes the NCDOT to permanently impact an additional 72.314 acres of jurisdictional wetlands, 1.491 acres of open waters and 6212 linear feet of jurisdictional streams (Intermittent : 1552 lf and Perennial 4204 lf) in Pender County. The project shall be constructed pursuant to the modification dated received April 7, 2020 and subsequent information received on June 10, 2020, June 11, 2020, June 15, 2020 and June 17, 2020. The authorized impacts are as described below:

Stream Impacts in the *Cape Fear and White Oak River Basins

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	**Bank Stabiliz-ation (Linear Feet)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
*Site 3 609+50 to 618+70-L1			419	36		455	419
*Site 3 Inlet Bank Stabilization					33		
*Site 3 611+98 to 612+68-L1-LT Outlet ditch bank stabilization					56		
*Outlet Bank Stabilization					38		
*Site 3 53+88 to 54+12-Y30-LT				25		25	
*Site 3 54+51 to 56+42-Y30-LT			91	10		101	91
*Site 3 57+15 to 58+74-Y30DET				125		125	
*Site 3 13+40 to 19+59-Y30RPA			441	55		496	441
*Site 3 15+01 to 15+56-Y30RPA-LT				12	29	12	
*Site 3 26+15 to 26+49-SR6-LT Outlet Channel				14		14	
Site 3 Outlet Bank Stabilization					14		
*Site 3 18+22 to 20+14-Y30RPD			243			243	243
*Site 3 19+69 to 20+05-Y30RPD-LT				25		25	
*Site 3 Inlet Bank Stabilization					25		
*Site 3 Outlet Bank Stabilization					22		

*Site 5 638+99 to 642+01-L1	172		192			364	
*Site 6 641+99 to 643+06-L1			355	31		386	355
*Site 7 645+01 to 666+60-L1			1768	52		1820	1768
Site 7 Outlet Bank Stabilization					34		
*Site 7 18+94 to 20+52-Y38			226			226	
*Site 7 19+57 to 20+40-Y38-RT Flood Plain Bench ****				10	32	10	
*Site 13 709+67 to 715+63-L1			228			228	228
*Site 13 712+83 to 713+95-L1-RT			78	14		92	78
*Site 13 711+78 to 712+35-L1-LT Outlet Channel				12		12	
*Site 13 Flood Plain Bench**** Outlet bank Stabilization					42		
Site 19 769+74 to 854+07-L1	773					773	
Site 19 18+01 to 22+37-Y32	484					484	
Site 21 23+66 to 25+54-Y19	97					97	
Site 21 24+82 to 25+32-Y19 Outlet Channel		33					
*Site 22 10+17 to 12+28-SR5			163			163	
Site 31 LLT 320+33 LT	26					26	
Site 31 LLT 320+33 LT Channel Realignment ***	39***	19				19	
Site 31 LLT 320+33 RT Bank Stabilization -rip rap pad					20		
Site 31 LLT 320+33 RT Channel Realignment***			37***	16		16	
Total	1552	52	4204	437	345	6212	3623

Total Stream Impacts for Project: 6212 linear feet (Intermittent : 1552 lf and Perennial 4204 lf)
****Bank Stabilization does Not count towards Impacts**
***** Channel Realignment impacts not included as impacts**
****** Flood Plain Benches do not impact the thalweg**
Intermittent Streams do not count towards impacts
Permanent Stream impacts in the Cape Fear Basin = 3623 lf requiring mitigation

Wetland Impacts in the *Cape Fear and White Oak River Basins

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	**Hand Clearing (ac)	Total Wetland Impact (ac)
*Site 1 584+18 to 601+51 L1	5.436		0.005	0.699		6.14
*Site 1 5+13 to 5+71-Y30RPB-LT			0.015	0.016		0.031
*Site 1 13+27 to 18+16-Y30RPB	0.883			0.118		1.001
*Site 1 19+30 to 26+02-Y30RPC	1.190		0.025	0.080		1.295
*Site 1 27+65 SR4				0.004		0.004
*Site 1 20+90 to 21+60 SR5	0.008		0.028	0.027		0.063
*Site 1 43+83 to 44+59-Y30DET-LT	0.038			0.003		0.041
*Site 2 41+43 to 43+15- Y30-RT	0.141		0.022			0.163
*Site 3 609+50 to 618+70-L1	1.754		0.002	0.089	0.210	1.845
*Site 3 611+72 to 611+91-L1-RT Inlet Channel			0.004			0.004
*Site 3 611+98 to 612+68-L1-LT				0.005	0.015	0.005
*Site 3 45+87 to 47+20-Y30-LT	0.180		0.035	0.024		0.239
*Site 3 53+88 to 54+12-Y30-LT			0.013	0.009		0.022
*Site 3 54+51 to 56+42 -Y30-LT			0.082			0.082
*Site 3 56+99 to 57+43-Y30-RT	0.008					0.008
*Site 3 57+15 to 58+74-Y30DET		0.149			0.010	0.149
*Site 3 13+40 to 19+59-Y30RPA	1.694		0.045	0.188		1.927
*Site 3 15+01 to 15+56 -Y30RPA-LT			0.020			0.020
*Site 3 26+15 to 26+49-SR6-LT			0.005			0.005
*Site 3 18+22 to 20+14-Y30RPD	0.470			0.064	0.026	0.534
*Site 3 19+69 to 20+05-Y30RPD-LT			0.004			0.004
*Site 3 18+99 to 19+24-Y30RPD-RT			0.012			0.012
*Site 4 623+04 to 632+02-L1	1.812			0.131		1.943
*Site 4 633+70 to 634+01-L1-LT				0.005		0.005
*Site 5 638+99 to 642+01-L1	0.065					0.065
*Site 7 645+01 to 666+60-L1	4.805		0.249	0.380		5.434

*Site 7 Outlet Channel			0.062			0.062
*Site 7 18+94 to 20+52-Y38	0.072		0.033	0.018		0.123
*Site 7 19+83-Y38-RT			0.009			0.009
*Site 7 19+38 to 20+09-Y38-LT				0.007		0.007
*Site 7 19+57 to 20+40Y38-RT			0.062	0.008		0.070
*Site 7 18+94 to 19+38-Y38			0.033	0.018		0.051
*Site 7 11+08 to 12+48-Y38DET		0.110			0.020	0.110
*Site 8 673+01 to 673+68-L1-RT	0.071			0.012		0.083
*Site 9 673+18 to 689+67-L1-LT	0.087			0.041		0.128
*Site 11 695+36 to 695+47-L1-LT				0.001		0.001
*Site 13 709+67 to 715+63-L1	2.160			0.114		2.274
*Site 13 712+83 to 713+95-L1-RT			0.024	0.015		0.039
*Site 13 711+78 to 712+35-L1-LT			0.021	0.010		0.031
*Site 15 730+72 to 743+68-L1	4.898		0.060	0.228		5.186
*Site 15 15+72 to 22+37-SR7	1.059		0.014	0.193		1.266
*Site 15 15+91 to 16+09-SR7-RT			0.012			0.012
*Site 16 18+25 to 21+01-Y31-RT	0.066			0.009		0.075
*Site 16 18+74 to 21+34-Y31DET		0.082			0.024	0.082
*Site 17 18+38 to 19+05-Y31-LT	0.002			0.007		0.009
*Site 17 26+86 to 28+87-SR7	0.190		0.030	0.022		0.242
*Site 18 45+47 to 47+66-SR7	0.252			0.043		0.295
*Site 18 766+70 to 769+26-L1	0.534			0.020		0.554
*Site 19 769+74 to 854+07-L1	23.110		0.073	3.036		26.219
*Site 19 48+38 to 56+57-SR7	1.002			0.188		1.19
*Site 19 14+42 to 19+70-SR8	0.359			0.055		0.414
Site 19 769+74 to 854+07-LT	3.697					3.697
Site 19 7+45 to 16+31-Y32RPB1	2.075			0.156		2.231
Site 19 18+01 to 22+37-Y32	1.094		0.054	0.002		1.15
Site 19 29+50 to 39+40-Y32	4.455		0.110	0.335		4.90
Site 21 23+66 to 25+54-Y19	0.372			0.020		0.392
Site 21 25+09-Y19			0.013			0.013

Site 21 24+82 to 25+32-Y19			0.033	0.010		0.043
*Site 22 10+17 to 12+28-SR5	0.209		0.002	0.009		0.220
*Site 24 16+83 to 18+03-Y30DET-RT		0.013			0.012	0.013
*Site 25 46+69 to 46+76-Y31DET-RT					0.001	
Site 26 Y19 50+00 RT				0.005		0.005
Site 28 L279+29 to 286-56 RT	0.307			0.085		0.392
Site 29 L293+08 to 293+80 RT	0.016			0.003		0.019
Site 30 L 301+00 RT	0.005			0.001		0.006
Site 32 13+45 to 14+89-Y43-LT				0.014		0.014
*Site U3 23+91 to 26+36-SR6-LT					0.171	
*Site U3 19+29 to 22+74-Y30RPD-LT					0.143	
*Site U3 10+57 to 13+41-Y30RPD-LT					0.192	
*Site U3 52+05 to 56+54-Y30-LT					0.257	
*Site U17 19+10 to 19+16-Y31-LT					0.060	
*Site U24 16+77 to 16+97-Y30-RT					0.019	
Site U28 289+27 to 286+83-l-RT					0.322	
Site U29 293+53 to 293+90-l-RT					0.006	
Site U33 219+74 to 220+73-L-RT					0.081	
Site U34 34+21 to 34+86-SR6-LT					0.014	
Site U35 279+95 to 280+81-L-LT					0.080	
Site U35 281+62 to 283+85-L-LT					0.178	
Site U35 284+33 to 286+01-L-LT					0.147	
Total	64.576	0.354	1.211	6.527	**1.988**	72.668

Total Permanent Wetland Impacts for Project : 72.314acres Temp Impacts: 0.354 acre
**** Hand Clearing does not count towards impacts**
Wetland impacts in the CFB: 59.452 ac Temp impacts 0.354 ac
Wetland impacts in the WOB: 12.862 ac Temp impacts 0 ac

Open Water Impacts in the *Cape Fear and White Oak River Basin

Site	Permanent Fill in Open Waters (ac)	Temporary Fill in Open Waters (ac)	Total Fill in Open Waters (ac)
*Site 10 676+64 to 679+37-L1 Pond	0.633		0.633
*Site 12 700+69 to 702+88-L1 Pond	0.416		0.416
*Site 14 724+44 to 725+96-L1	0.100	0.007	0.107
*Site 14 724+48 to 724+73-L1-RT	0.007		0.007
*Site 14 17+51 to 18+26-Y31RPC	0.035	0.006	0.041
*Site 14 17+57 to 17+87-Y31RPC	0.008		0.008
*Site 23 603+49 to 604+94-L1-RT Pond	0.279		0.279
Total	**1.478**	**0.013**	**1.491**

Total Open Water Impact for Project: 1.491acres.

The application provides adequate assurance that the discharge of fill material into the waters of the Cape Fear and White Oak River Basins in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your modified application dated received April 7, 2020 and subsequent information received on June 10, 2020, June 11, 2020, June 15, 2020 and June 17, 2020. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated June 5, 2017 and modified on March 1, 2019 still apply except where superseded by this certification. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 300 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7**)**. For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit (SAW-2007-1386).

Conditions of Certification:

1. This modification is applicable only to the additional proposed activities. All of the authorized activities and conditions of certification associated with the original Water Quality Certification dated June 5, 2017 and subsequent modifications dated March 1, 2019 still apply except where superseded by this certification.
2. The use of rip-rap placed for stream channel stabilization shall be buried to the natural streambed elevation in stream channels in such a manner that it does not impede aquatic life passage or change the dimension, pattern and profile of the stream. [15A NCAC 02H.0506(b)(2)]

3. Erosion control matting in riparian areas shall not contain a nylon mesh grid which can impinge and entrap small animals. Matting should be secured in place by staples, stakes, or wherever possible live stakes of native trees. Riparian areas are defined as a distance 25 feet from top of stream bank. [15A NCAC 02B.0224, .0225]

4. The NCDOT Division Environmental Officer/Supervisor or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand the potential issues with stream and pipe alignment at the permitted site. NCDWR staff shall be invited to the pre-construction meeting. [15A NCAC 02H.0506(b)(2) and (b)(3)

* *5.* Compensatory mitigation for impacts for 72.314 acres wetlands is required. Of this 12.862 acres should be in the White Oak Basin, (3.33 acres Riparian and 9.532 acres Non-Riparian), 59.452 acres in the Cape Fear Basin (13.534 acres Riparian and 45.918 acres Non-Riparian). We understand that you have chosen to perform compensatory mitigation for impacts to wetlands through the North East Cape Fear Umbrella Mitigation Bank (NECFUMB), and that the NECFUMB has agreed to implement the mitigation for the project. NECFUMB has indicated in letters dated December 6, 2016 (wetlands already purchased for the 20161268 V1 section of this project) and May 21, 2020 that they will assume responsibility for satisfying the Federal Clean Water Act compensatory mitigation requirements for the above-referenced project.

* **6.** Compensatory mitigation for 3623 linear feet of impact to streams in the Cape Fear Basin is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the North Carolina Division of Mitigation Service (DMS) (formerly NCEEP), and that the DMS has agreed to implement the mitigation for the project. The DMS has indicated in a letter dated June 17, 2020 that they will assume responsibility for satisfying the Federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the DMS Mitigation Banking Instrument signed July 28, 2010.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919) 431-3000, Facsimile: (919) 431-3100

A copy of the petition must also be served on DEQ as follows:

Mr. Bill F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

This the 17th day of June 2020

DIVISION OF WATER RESOURCES

DocuSigned by:
Amy Chapman
9C9886312DCD474...

S. Daniel Smith, Director

WQC No. WQ 004116

Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

S. JAY ZIMMERMAN
Director

June 5, 2017

Mr. Philip S. Harris, III, P.E., CPM
Natural Environment Section Head
Project Development and Environmental Analysis
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina, 27699-1598

Subject: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for the proposed extension to Military Cutoff (SR 1409) and US 17 Hampstead Bypass in New Hanover and Pender Counties, TIP Nos. U-4751 and R-3300 (respectively). NCDWR Project No.20161268

Dear Mr. Harris:

Attached hereto is a copy of Certification No. WQ004116 issued to The North Carolina Department of Transportation (NCDOT) dated June 5, 2017.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

S. Jay Zimmerman, Director
Division of Water Resources

Electronic copy only distribution:
Brad Shaver, US Army Corps of Engineers, Wilmington Field Office
Mason Herndon, Division 3 Environmental Officer
Rodger Rochelle, NC Department of Transportation
Chris Rivenbark, NC Department of Transportation
Dr. Cynthia Van Der Wiele, US Environmental Protection Agency
Gary Jordan, US Fish and Wildlife Service
Travis Wilson, NC Wildlife Resources Commission
Stephen Lane, NC Division of Coastal Management
Jason Elliott, NCDOT, Natural Environment Section
Beth Harmon, Division of Mitigation Services
Joanne Steenhuis, NC Division of Water Resources Wilmington Regional Office
File Copy

401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500 and 15A NCAC 2B. This certification authorizes the NCDOT to impact 60.52 acres of jurisdictional wetlands, 8.27 acres of open waters and 1,891 linear feet of jurisdictional streams in New Hanover and Pender Counties. The project shall be constructed pursuant to the application dated received December 21, 2016. 2017and subsequent information received on May 30, 2017. **No impacts to R-3300 are being authorized at this time.** The authorized impacts are as described below:

Stream Impacts in the Cape Fear River Basin

Permit Drawing Site Number	Station From/To	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear feet)	Stream Impacts Requiring Mitigation (linear ft)
10	117+49-L-LT & RT			373	201	574	373
15	151+41-L-RT			303	58	361	303
18	166+73-L-LT&RT	231	19			250	0
25	199+05-L-LT&RT			251	16	267	251
27	205+35-211+16-L LT&RT			544	46	590	544
27 Streambank				14		14	14
29	212+90-213+70-L-LT&RT			34	46	80	34
32	214+85-L-RT			36	33	69	36
34	223+72.58-224+45L-RT			32	37	69	32
36	42+74-42+78 Y8RPDB LT&RT			200	56	256	200
36 streambank				41		41	41
38	40+46-Y8-LT			43	10	53	43
40	18+68 Y18-LT			20		20	20
Total for U-4751		231	19	1,891	503	2,644	1,891
R-3300	Preliminary Proposed Impacts	3,167		8,733		11,900	8,733
TOTAL:		3,398	38	10,624	503	14,544	10,624

Total Stream Impact for U-4751: 1,891 linear feet

Wetland Impacts in the Cape Fear River Basin* (Site 1 is in White Oak River Basin)

Permit Drawing Site Number	Station From/To	Wetland Type	Fill (Permanent) (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)
1*	27+77-28+11-L-RT	NR	0.002			0.009		0.01
1a*	11+15-15+20 Y1RPD LT&RT	NR	1.114			0.097		1.21
2	20+16-24+68 Y1RPB LT&RT	NR	0.257		0.054	0.024		0.34
3	52+3-63+29-L-LT&RT	NR	5.02			0.256		5.28
4	63+20-77+3-L-LT&RT	NR	6.02			0.302		6.32
5	84+90-85+68-L-LT	NR				0.0001		0.00
15	15+41-L-RT	NR	0.006		0.062	0.023		0.09
16	151+41-165+59-L-LT&RT	NR	5.715			0.314		6.03
19	165+51-168+79-L-LT&RT	NR	0.506			0.011		0.52
21	169+92-180+39-L-LT&RT	NR	4.087			0.312		4.40
23	177+13-198+17-L-LT&RT	NR	6.425		0.018	0.4		6.84
24	27+55-31+96 SR4-LT	NR	0.028			0.043		0.07
26	15+94-29+38 Y8RPDB	NR	10.827			1.159		11.99
28	208+35-214+86-L-LT&RT	NR	4.604		0.006	0.511		5.12
33	216+46-225+15-L-LT&RT	NR	5.759			0.424		6.18
37	4+04.6-62+90 Y8RPCA LT&RT	NR	4.966		0.051	0.967		5.98
39	112+37-120+65 Y8 LT	NR	0.045			0.082		0.13
41	37+46-39+65 Y8 LT	NR				0.01		0.01
Total for U-4751			55.38	0.00	0.19	4.94	0.00	60.52
R-3300	Preliminary Proposed Impacts		155.86					155.86
Total			**211.24**	**0.00**	**0.19**	**4.94**	**0.00**	**216.38**

Total Wetland Impact for U-4751: 60.52 acres.

Open Water Impacts in the Cape Fear River Basin *(Site 1 is in the White Oak River Basin)

Permit Drawing Site Number	Station Number From/To	Permanent Fill in Open Waters (ac)	Temporary Fill in Open Waters (ac)	Total Fill in Open Waters (ac)
1b*	15+20-15+29 -Y1RPD LT&RT	0.03	0.01	0.03
6	110+42-L LT&RT	0.21	0.03	0.23
6a Streambank		0.01		0.01
7	14+05 Y4- LT&RT	0.16		0.16
8	110+41-117+49-L- LT	0.47		0.47
9	112+57-116+35-L-RT	0.51		0.51
10	117+49-L-LT&RT	0.34	0.19	0.53
11	118+15-217+87-L-LT	0.28		0.28
12	120+35-127+74-L-RT	0.70		0.70
13	126+00-126+50-L-LT	0.01	0.01	0.01
14	124+39-145+48-L-RT	2.05	0.02	2.07
15	151+41-L-RT	0.15	0.02	0.17
17	166+32-L-LT&RT	0.06	0.00	0.06
18	166+73-L-LT&RT	0.07	0.01	0.08
20	163+73-L-LT&RT	0.11		0.11
22	175+00-184+16-L-LT&RT	0.98	0.02	1.00
23	177+13-198+17-L-LT&RT	0.42	0.04	0.46
25	199+05-L-LT&RT	0.12	0.01	0.12
27	205+35-211+16-L-LT&RT	0.25	0.02	0.27
27a Streambank			0.01	0.01
29	212+90-213+70-L-RT	0.00	0.02	0.02
30	26+22-30+19 Y8RPC-LT&RT	0.14	0.01	0.14
30a Streambank		0.01		0.01
31	215+61.5-L-LT&RT	0.08	0.01	0.09
32	214+85-L-RT	0.01	0.02	0.02
34	223+72.58-224+45-L-RT	0.01	0.01	0.03
35	33+79 Y8RPDB-LT	0.19	0.00	0.19
35a Streambank		0.00		0.00
36	40+74-42+78 Y8RPDB LT&RT	0.34	0.04	0.38
36a Streambank		0.02		0.02
38	40+46-Y8-LT	0.01	0.02	0.04
40	18+68-Y18-LT	0.06		0.06
Total for U-4851		**7.76**	**0.51**	**8.27**
R-3300	Proposed impacts	2.56		2.56
TOTAL		**10.32**	**0.51**	**10.83**

Total Open Water Impact for U-4751: 8.27 acres.

The application provides adequate assurance that the discharge of fill material into the waters of the Cape Fear River Basin and the White Oak River Basins in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your application dated received December 21, 2016 and subsequent information received on May 30, 2017. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a

copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Condition(s) of Certification:

Project Specific Conditions

1. The NCDOT Division Environmental Officer or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand the potential issues with stream and pipe alignment at the permitted site. NCDWR staff shall be invited to the pre-construction meeting. [15A NCAC 02H.0506(b)(2) and (b)(3)]

2. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage. [15A NCAC 02H.0506(b)(2)]

3. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed. [15A NCAC 02H.0506(b)(2)]

4. The stream channel shall be excavated no deeper than the natural bed material of the stream, to the maximum extent practicable. Efforts must be made to minimize impacts to the stream banks, as well as to vegetation responsible for maintaining the stream bank stability. Any applicable riparian buffer impact for access to stream channel shall be temporary and be revegetated with native riparian species. [15A NCAC 02H.0506(b)(2)]

5. Pipes and culverts used exclusively to maintain equilibrium in wetlands, where aquatic life passage is not a concern, shall not be buried. These pipes shall be installed at natural ground elevation.) [15A NCAC 02H.0506(b)(2) and (b)(3)]

6. Tall fescue shall not be used in the establishment of temporary or permanent groundcover within riparian areas. For the establishment of permanent herbaceous cover, erosion control matting shall be used in conjunction with an appropriate native seed mix on disturbed soils within the riparian area and on disturbed steep slopes with the following exception. Erosion control matting is not necessary if the area is contained by perimeter erosion control devices such as silt fence, temporary sediment ditches, basins, etc. Matting should be secured in place with staples, stakes, or wherever possible, live stakes of native trees. Erosion control matting placed in riparian areas shall not contain a nylon mesh grid, which can impinge and entrap small animals. For the establishment of temporary groundcover within riparian areas, hydroseeding along with wood or cellulose based hydro mulch applied from a fertilizer- and limestone-free tank is allowable at the appropriate rate in conjunction with the erosion control measures. Discharging hydroseed mixtures and wood or cellulose mulch into surface waters in prohibited. Riparian areas are defined as a distance 25 feet landward from top of stream bank.

7. When final design plans are completed for R-3300, a modification to the 401 Water Quality Certification shall be submitted with five copies and fees to the NC Division of Water Resources. Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, and other surface waters, and buffers. No construction activities that impact any wetlands, streams, surface waters, or buffers located in R-3300 shall begin until after the permittee applies for, and receives a written modification of the 401 Water Quality Certification from the NC Division of Water Resources. [15A NCAC 02H. 0506(b)]

General Conditions

8. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required. [15A NCAC 02H.0506(b)(2)]

9. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. [15A NCAC 02B.0200]

10. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers. [15A NCAC 02H.0506(b)(2)]

11. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions. [15A NCAC 02H.0506(b)(2)]

12. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage. [15A NCAC 02H.0506(b)(2)]

* 13. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

14. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water. [15A NCAC 02H.0506(b)(3) and (c)(3)]

15. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream. [15A NCAC 02H.0506(b)(3)]

16. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. [15A NCAC 02H.0506(b)(3)]

17. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]

18. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]

19. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

20. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. [15A NCAC 02H.0506(b)(2)]

21. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

22. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization, including all non-commercial borrow and waste sites associated with the project, shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification. [15A NCAC 02H.0501 and .0502]

23. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

24. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

* 25. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

26. Native riparian vegetation must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction. [15A NCAC 02H 0506(b)(2)]

27. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities. [15A NCAC 02H.0506(b)(3) and (c)(3)

28. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards [15A NCAC 02H.0506(b)(3) and (c)(3)]

    a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual.*
    b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual.* The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
    c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual.*
    d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

29. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. [15A NCAC 02H.0506(b)(3) and (c)(3)]

* 30. Compensatory mitigation for 1,891 linear feet of impact to streams is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the Division of Mitigation Services (DMS), and that the DMS has agreed to implement the mitigation for the project. The DMS has indicated in a letter dated December 5, 2016 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the DMS Mitigation Banking Instrument signed July 28, 2010.

* 31. Compensatory mitigation for impacts to 60.52 acres of non-riverine wetlands is required. We understand that you have chosen to perform compensatory mitigation for impacts to wetlands through the Northeast Cape Fear Umbrella Mitigation Bank, and that the bank has agreed to implement the mitigation for the project. The Northeast Cape Fear Umbrella Mitigation Bank has indicated in a letter dated December 6,

2016 that they will assume responsibility for satisfying the Federal Clean Water Act compensatory mitigation requirements for the above-referenced project.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919) 431-3000, Facsimile: (919) 431-3100

A copy of the petition must also be served on DEQ as follows:

Mr. Bill F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699

This the 2nd day of June 2017

DIVISION OF WATER RESOURCES

S. Jay Zimmerman, Director

WQC No.WQ004116

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
BRAXTON C. DAVIS
Director

NORTH CAROLINA
Environmental Quality

June 25, 2020

Mr. Mason Herndon, Environmental Program Supervisor
N.C. Department of Transportation, Division 3
5501 Barbados Blvd
Castle Hayne, NC 28429

SUBJECT: **CD 17-018** - Supplemental Consistency Concurrence, SR 1409 (Military Cutoff Road) extension and US 17 Hampstead Bypass in New Hanover and Pender Counties, TIP Nos. U-4751 and R-3300.

Dear Mr. Herndon:

The N.C. Division of Coastal Management (DCM) received a supplemental consistency certification from the N.C. Department of Transportation (NCDOT) dated April 7, 2020 for TIP No. R-3300B, which is approximately 6.9 miles long, and which involves construction of a four-lane divided roadway from South of NC 210 to a point North of SR 1563 (Sloop Point Road) in Pender County. When DCM issued a conditional concurrence on June 16, 2017 for the complete 17.5-mile project which includes TIP No. U-4751 and TIP No. R-3300, final design was only complete for TIP No. U-4751, which is 5.5 miles. TIP No. R-3300 includes an A-Section and a B-Section, and at this time, final design is complete for TIP No. R-3300B. TIP No. R-3300A is still in preliminary design.

The April 7, 2020 submittal included a cover letter, supporting information document, green sheet project commitments, a Memorandum of Agreement (MOA) among the U.S. Army Corps of Engineers, NCDOT, and the N.C. State Historic Preservation Officer, and a mitigation request to the N.C. Division of Mitigation Services (DMS). After the April 7, 2020 submittal, DCM received the following additional revised information: a revised mitigation proposal dated May 20, 2020, a credit reservation letter from the Northeast Cape Fear Umbrella Mitigation Bank dated May 21, 2020, six revised permit drawings and updated wetland impact summary sheets received on June 10, 2020, and a revised DMS Acceptance Letter dated June 17, 2020.

North Carolina's coastal zone management program consists of, but is not limited to, the Coastal Area Management Act, the State's Dredge and Fill Law, Chapter 7 of Title 15A of North Carolina's Administrative Code, and the land use plan(s) of the county and/or local municipalities in which the proposed project is located. It is the objective of DCM to manage the State's coastal resources to ensure that proposed Federal actions would be compatible with safeguarding and perpetuating the biological, social, economic and aesthetic values of the State's coastal resources.

DCM circulated the supplemental consistency certification for TIP No. R-3300B to state agencies that would have a regulatory or resource interest in the proposed development. No comments were received asserting that the proposed project would be inconsistent with North Carolina's coastal management program.

DCM reviewed the information submitted by NCDOT, and the comments received from state agencies, pursuant to the management objectives and enforceable policies of Subchapters 7H and 7M of Chapter 7 in Title 15A of the North Carolina Administrative Code. DCM concurs that the proposed project is consistent, to the maximum extent practicable, with North Carolina's approved coastal management program, with the following conditions:

1. This Conditional Supplemental Consistency Concurrence certifies consistency of TIP R-3300B for the purposes of construction. However, it does not certify consistency of TIP R-3300A for the purposes of construction. In the future, when the final design and a final compensatory mitigation plan for TIP R-3300A are complete, NCDOT shall submit a Supplemental Consistency Determination to DCM in accordance with provisions of Federal Consistency under 15 CFR 930.46, Supplemental Coordination for Proposed Activities. NCDOT shall request that DCM respond with a determination if the project with the proposed changes remains consistent with North Carolina's coastal management program.

2. The project shall be implemented in accordance with the Modification of the 401 Water Quality Certification No. WQ004116 which was issued by the N.C. Division of Water Resources (DWR) on June 17, 2020 (NCDWR Project No. 20161268 v. 3).

3. In accordance with comments received from the N.C. Division of Water Resources Public Water Supply Section on May 4, 2020, plans and specifications for the relocation and/or replacement of water mains must be submitted to the N.C. Division of Water Resources, Public Water Supply Plan Review Section, for approval prior to construction. Final approval must be issued before water mains are placed into service.

Should the proposed action be modified, a revised consistency certification could be necessary. This might take the form of either a supplemental consistency certification pursuant to 15 CFR 930.46, or a new consistency certification pursuant to 15 CFR 930.36. Likewise, if further project assessments reveal environmental effects not previously considered by the proposed development, a supplemental consistency certification may be required.

If you have any questions or concerns, please contact Cathy Brittingham via e-mail at cathy.brittingham@ncdenr.gov or Stephen Lane via e-mail at Stephen.Lane@ncdenr.gov. Thank you for your consideration of the North Carolina coastal management program.

Sincerely,

Daniel Govoni
Federal Consistency Coordinator

cc: Brad Shaver, USACE
Joanne Steenhuis, DWR
Beth Harmon, DMS
Travis Wilson, WRC
Renee Gledhill-Earley, SHPO
Heidi Cox, DWR-PWSS
Tara MacPherson, DCM
Stephen Lane, DCM

North Carolina Department of Environmental Quality | Division of Coastal Management
Morehead City Office | 400 Commerce Avenue | Morehead City, North Carolina 28557
252.808.2808

09/08/99

CONTRACT: TIP PROJECT: R-3300B

$$$$$$SYSTIME$$$$$$
$$$$$$USERNAME$$$$$$
$$$$$$DGNFILE$$$$$$

See Sheet 1A For Index of Sheets See Sheet 1B for Conventional Symbols

VICINITY MAP NOT TO SCALE

FDFI PLANS SUBMITTAL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PENDER COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3300B	1	

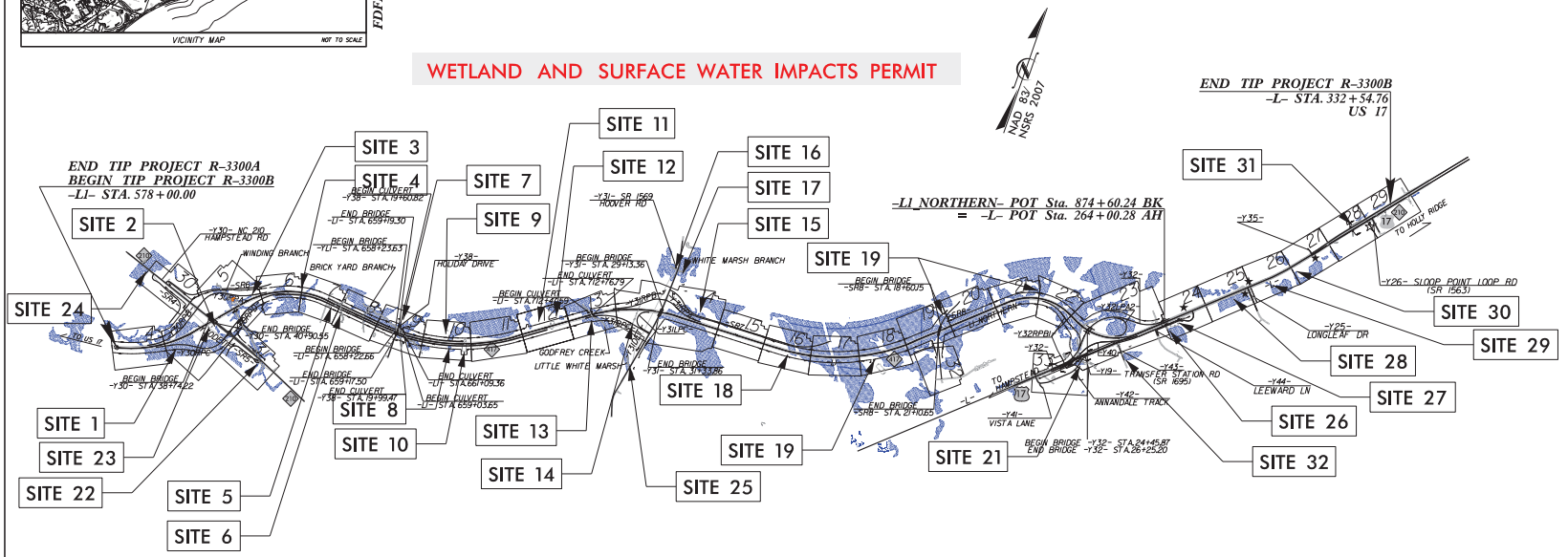
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
40237.1.1	N/A	PE
40237.2.1	N/A	R/W
40237.2.2	N/A	UTIL

PERMIT DRAWING
SHEET 1 OF 165
DATE: 04-01-2020

LOCATION: NC 417 (HAMPSTEAD BYPASS) FROM SOUTH OF NC 210 TO NORTH OF SR 1563 (SLOOP POINT LOOP ROAD).

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, SIGNALS, AND CULVERTS

WETLAND AND SURFACE WATER IMPACTS PERMIT



SUNGATE DESIGN GROUP, P.A.
Dewberry
2610 WYCLIFF ROAD SUITE 400 RALEIGH, NC 27607 PHONE: 919.881.9539 NC COA No.: P-0929

☆ UPDATE EXISTING SIGNAL
★ PROPOSED SIGNAL

-THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
-CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY MODIFIED METHOD III.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2016 = N/A
ADT 2040 = 55,400
DHV = 8 %
D = 60 %
T = 6 % *
V = 70 MPH
*(TTST 2% + DUALS 4%)
FUNC CLASS = FREEWAY
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3300B = 6.893 MILES
LENGTH STRUCTURE TIP PROJECT R-3300B = 0.023 MILES
TOTAL LENGTH TIP PROJECT R-3300B = 6.916 MILES

PREPARED IN THE OFFICE OF:
STANTEC CONSULTING
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 16, 2018

LETTING DATE: JULY 21, 2020

MICHAEL D. LINDGREN, P.E.
PROJECT ENGINEER

TRACE HOWELL, P.E.
NCDOT DIVISION 3 CONTACT

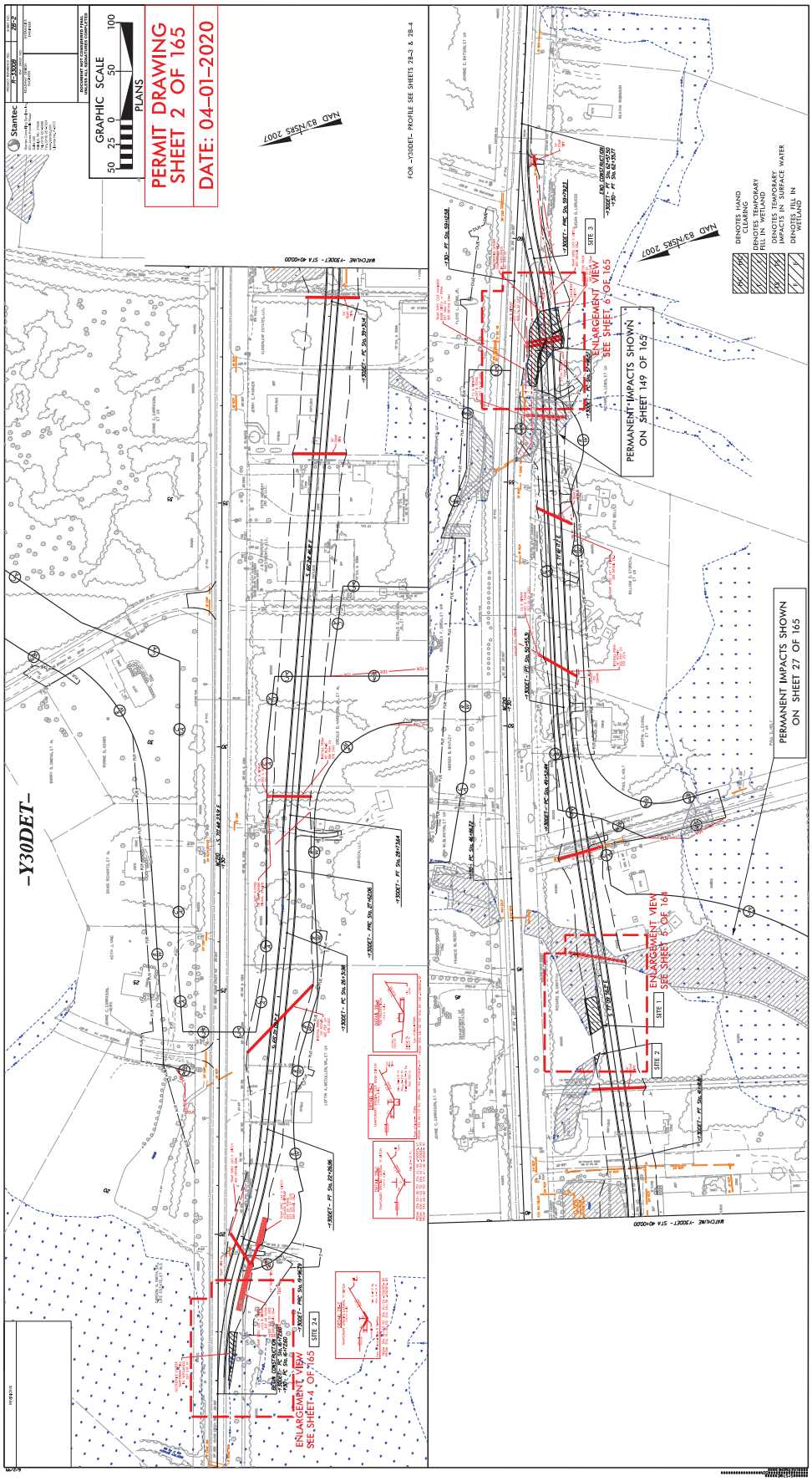
HYDRAULICS ENGINEERS

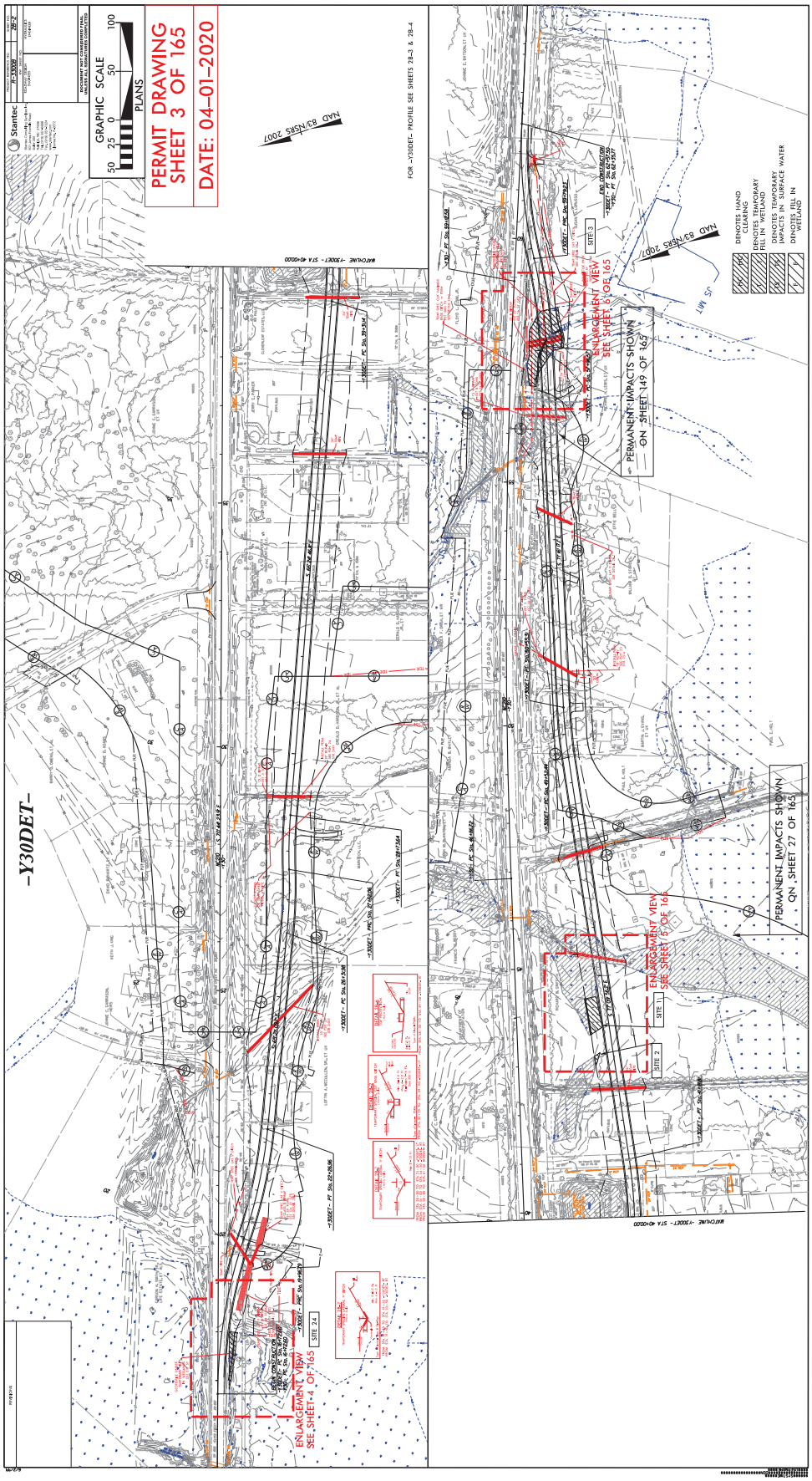
SIGNATURE: P.E.

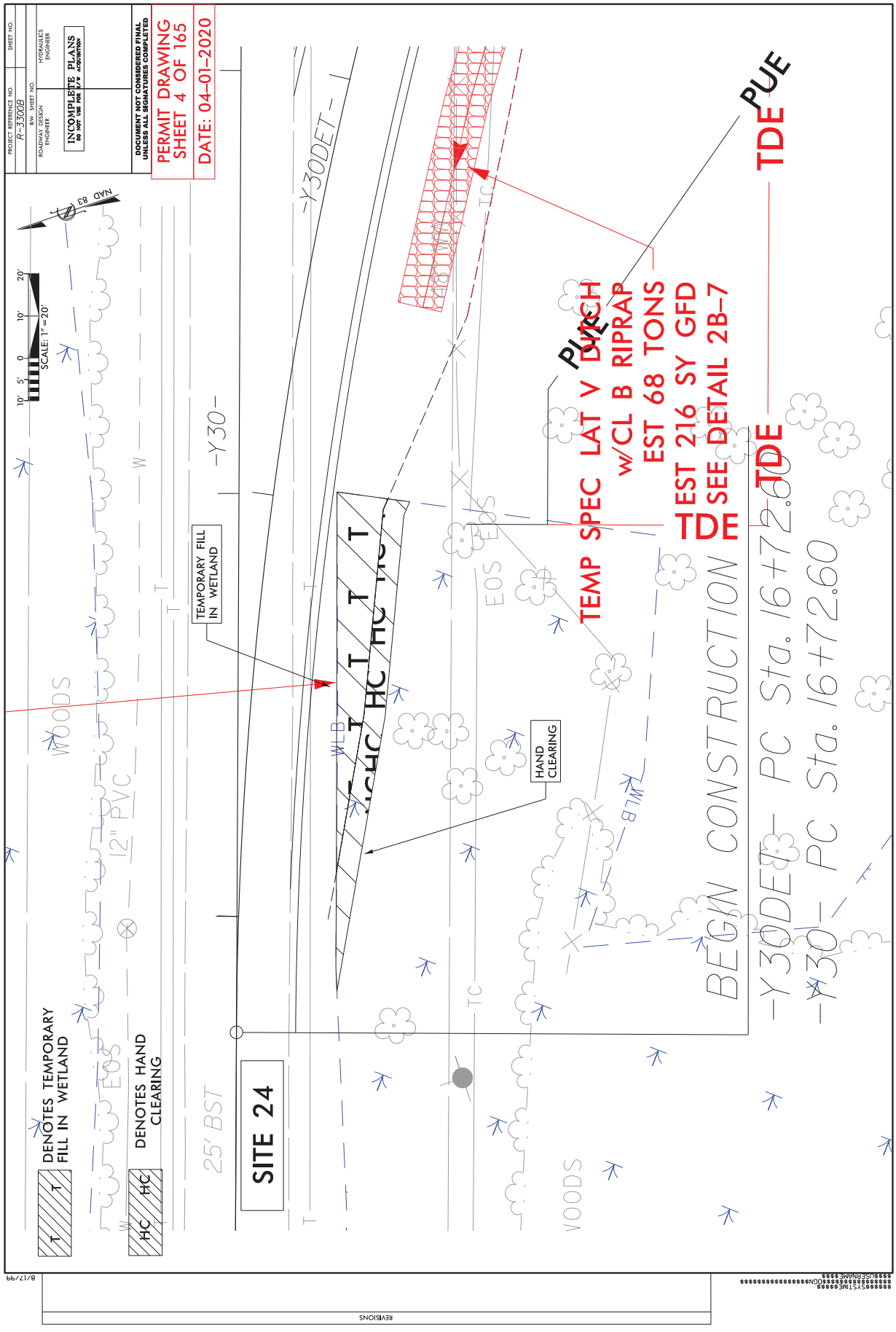
ROADWAY DESIGN ENGINEER

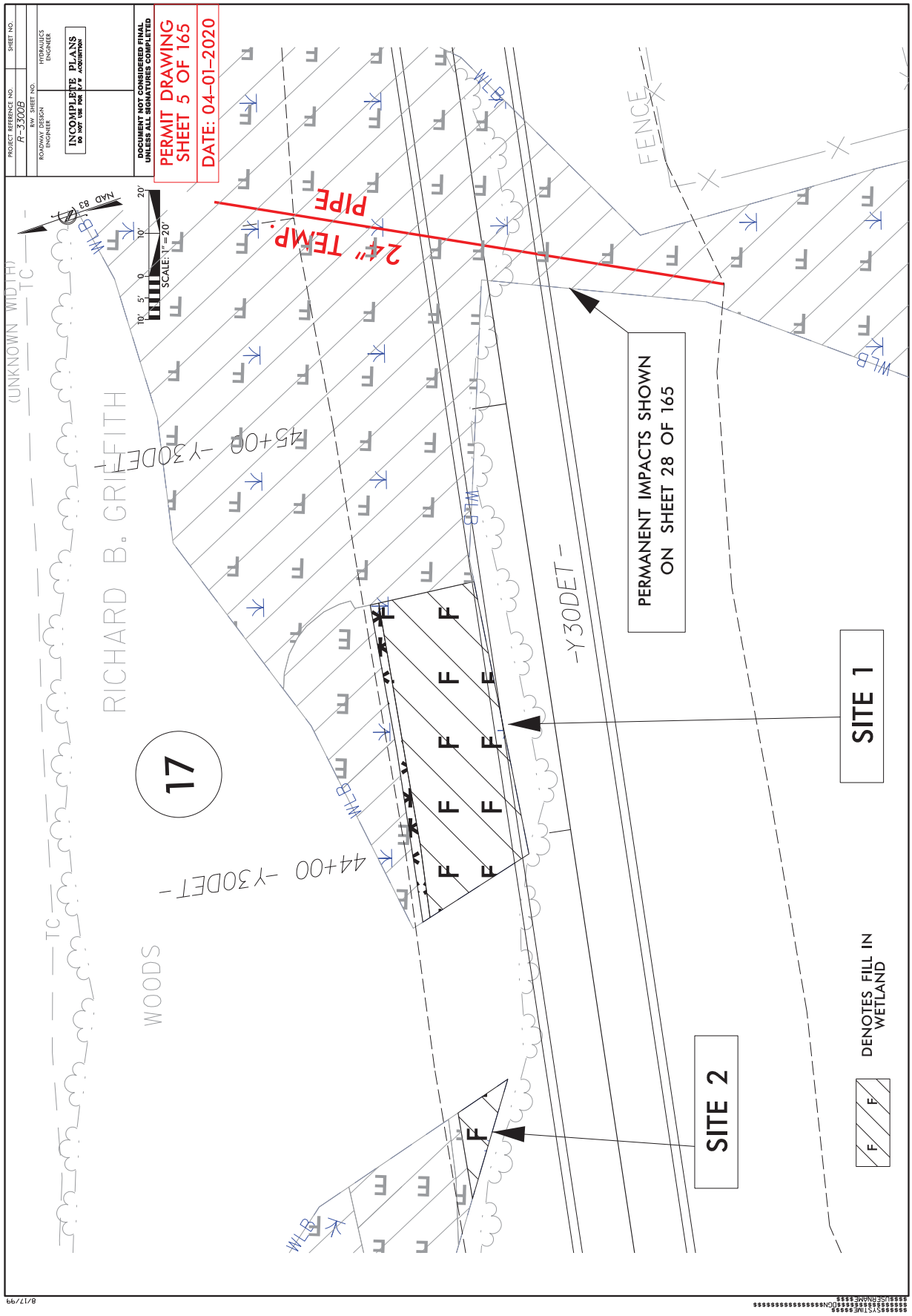
SIGNATURE: P.E.

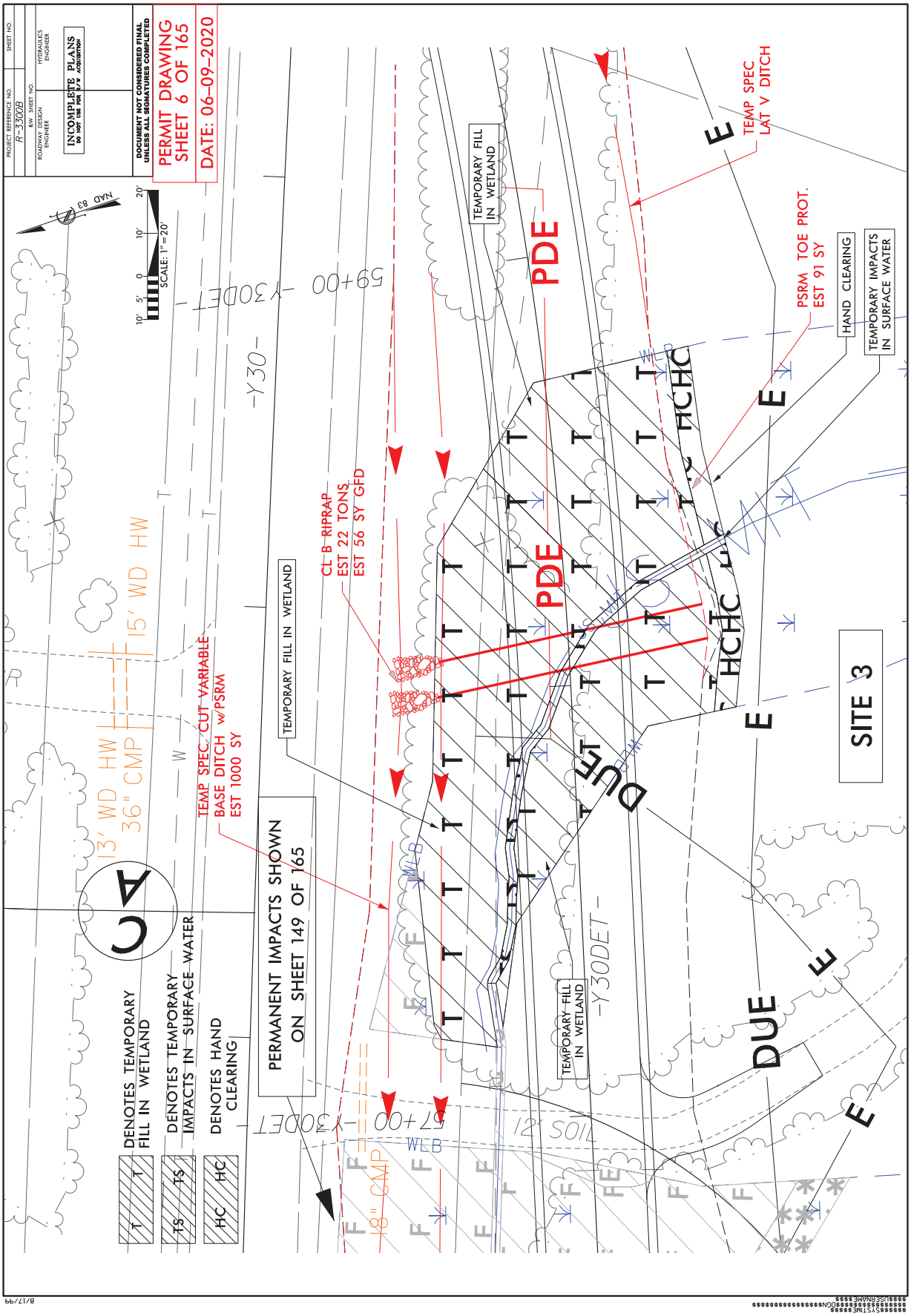
P-39

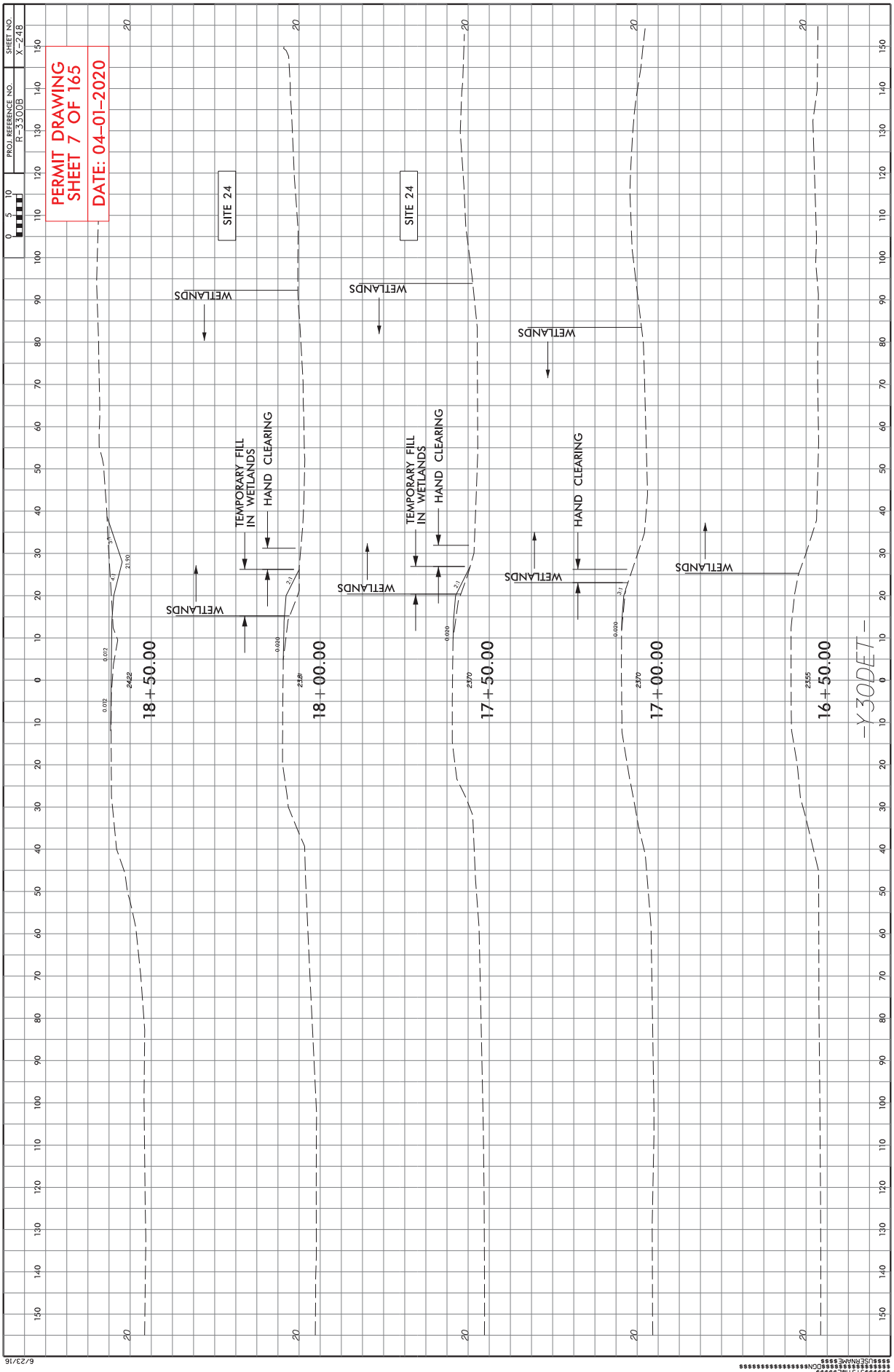

PERMIT DRAWING
SHEET 2 OF 165
DATE: 04-01-2020
GRAPHIC SCALE
PLANS
-Y30DET-
PERMANENT IMPACTS SHOWN ON SHEET 149 OF 165
PERMANENT IMPACTS SHOWN ON SHEET 27 OF 165
ENLARGEMENT VIEW SEE SHEET 6 OF 165
ENLARGEMENT VIEW SEE SHEET 5 OF 164
ENLARGEMENT VIEW SEE SHEET 4 OF 165
SITE 1
SITE 2
SITE 24
DENOTES HAND CLEARING
DENOTES TEMPORARY IMPACTS IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
NAD 83/NSRS 2007

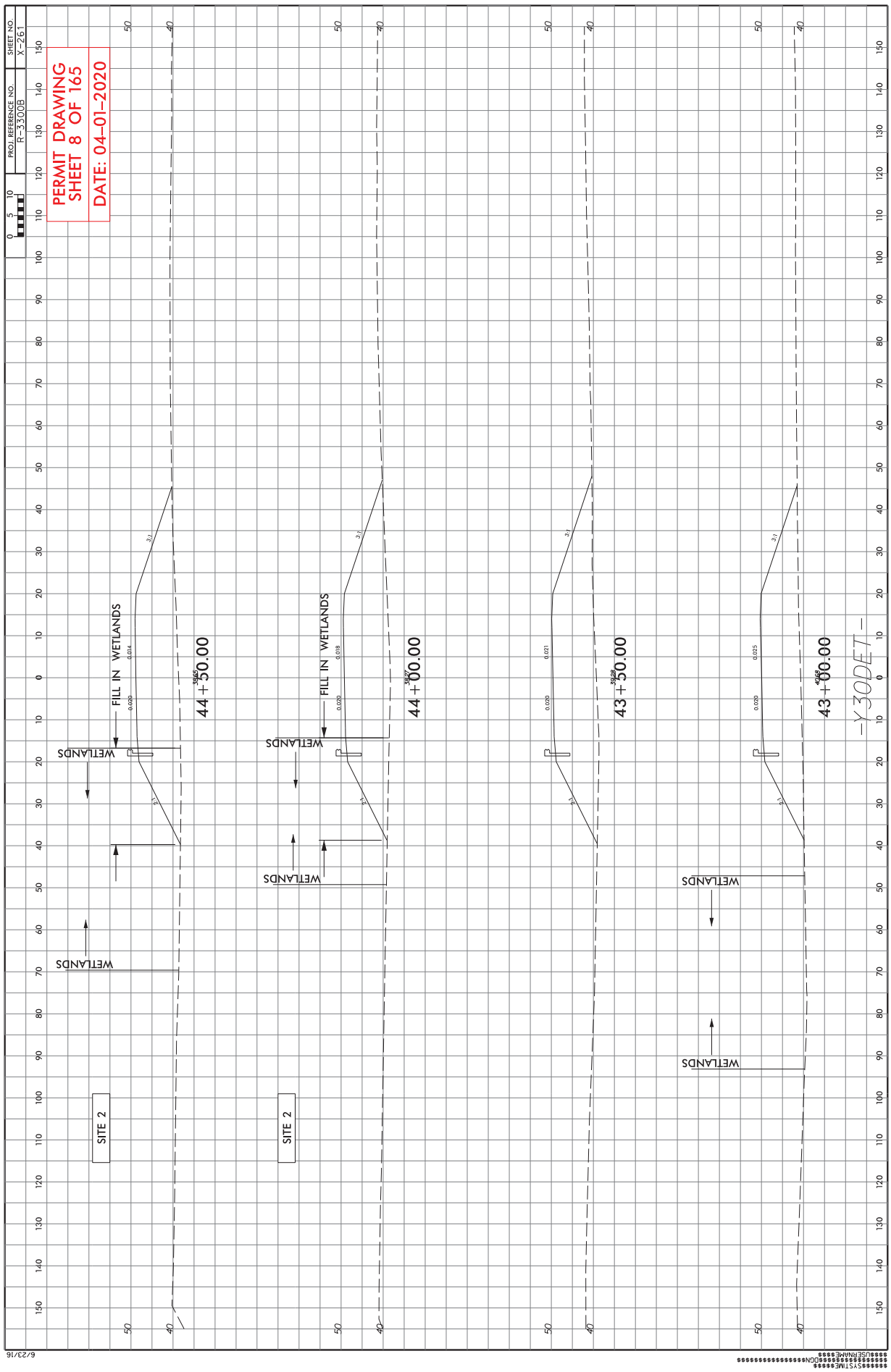

PERMIT DRAWING
SHEET 3 OF 165
DATE: 04-01-2020
GRAPHIC SCALE
PLANS
NAD 83/NSRS 2007
-Y30DET-
ENLARGEMENT VIEW
SEE SHEET 4 OF 165
SITE 24
PERMANENT IMPACTS SHOWN
ON SHEET 149 OF 165
ENLARGEMENT VIEW
SEE SHEET 6 OF 165
SITE 3
ENLARGEMENT VIEW
SEE SHEET 5 OF 165
SITE 1
SITE 2
PERMANENT IMPACTS SHOWN
ON SHEET 27 OF 165
DENOTES HAND CLEARING
DENOTES TEMPORARY FILL IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND

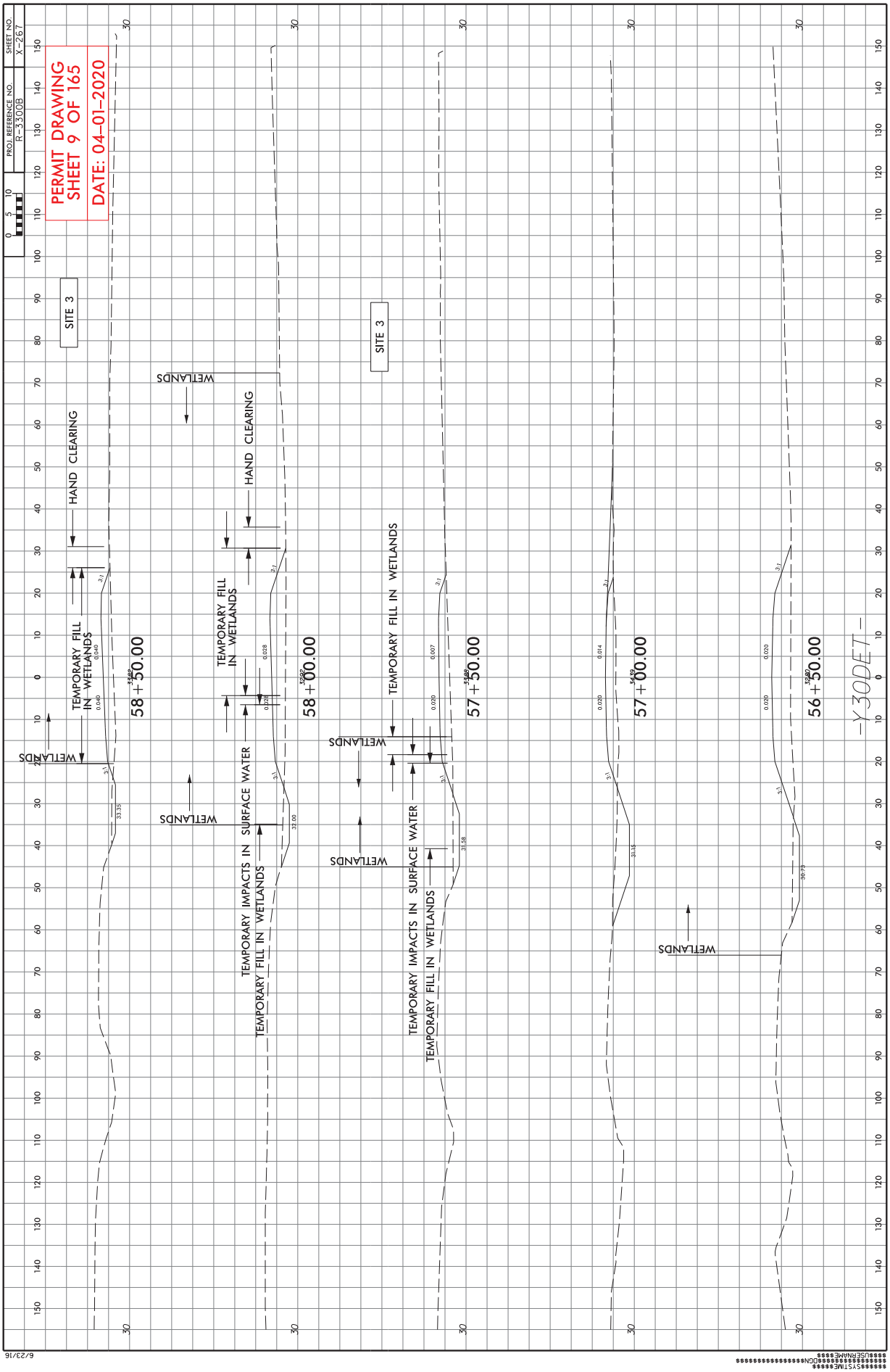

PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 4 OF 165
DATE: 04-01-2020
SCALE: 1" = 20'
NAD 83
DENOTES TEMPORARY FILL IN WETLAND
DENOTES HAND CLEARING
SITE 24
TEMPORARY FILL IN WETLAND
HAND CLEARING
TEMP SPEC LAT V DITCH
w/CL B RIPRAP
EST 68 TONS
EST 216 SY GFD
SEE DETAIL 2B-7
TDE
PUE
BEGIN CONSTRUCTION
-Y30DET- PC Sta. 16+72.60
-Y30- PC Sta. 16+72.60
-Y30-
-Y30DET-
12" PVC
25' BST
WOODS
EOS
TC
WLB
REVISIONS
8/17/99

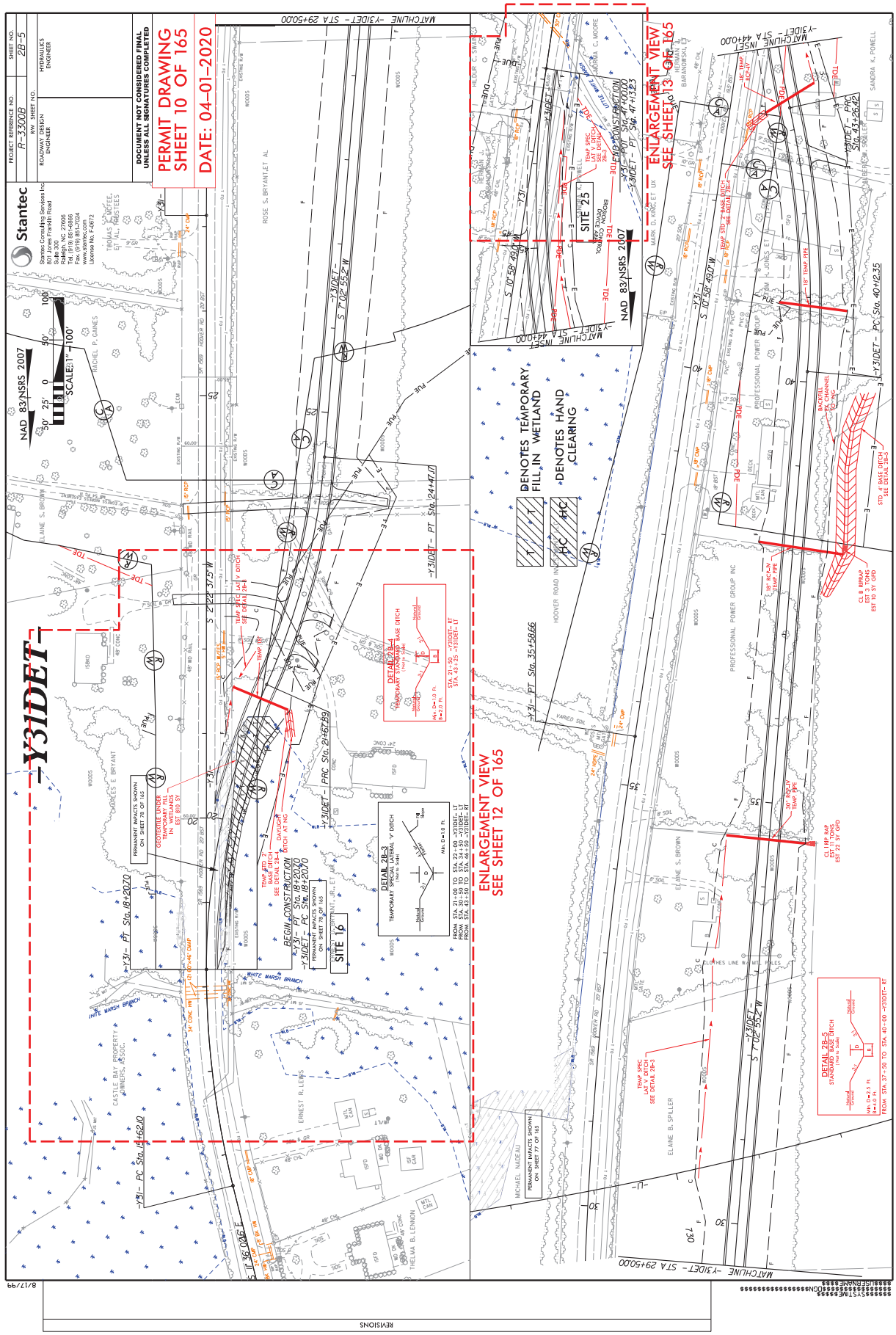

PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 5 OF 165
DATE: 04-01-2020
NAD 83
SCALE: 1"=20'
24" TEMP. PIPE
FENCE
(UNKNOWN WIDTH)
TC
RICHARD B. GRIFFITH
WOODS
17
-Y30DET-
45+00
44+00
WLB
PERMANENT IMPACTS SHOWN ON SHEET 28 OF 165
SITE 1
SITE 2
DENOTES FILL IN WETLAND
F

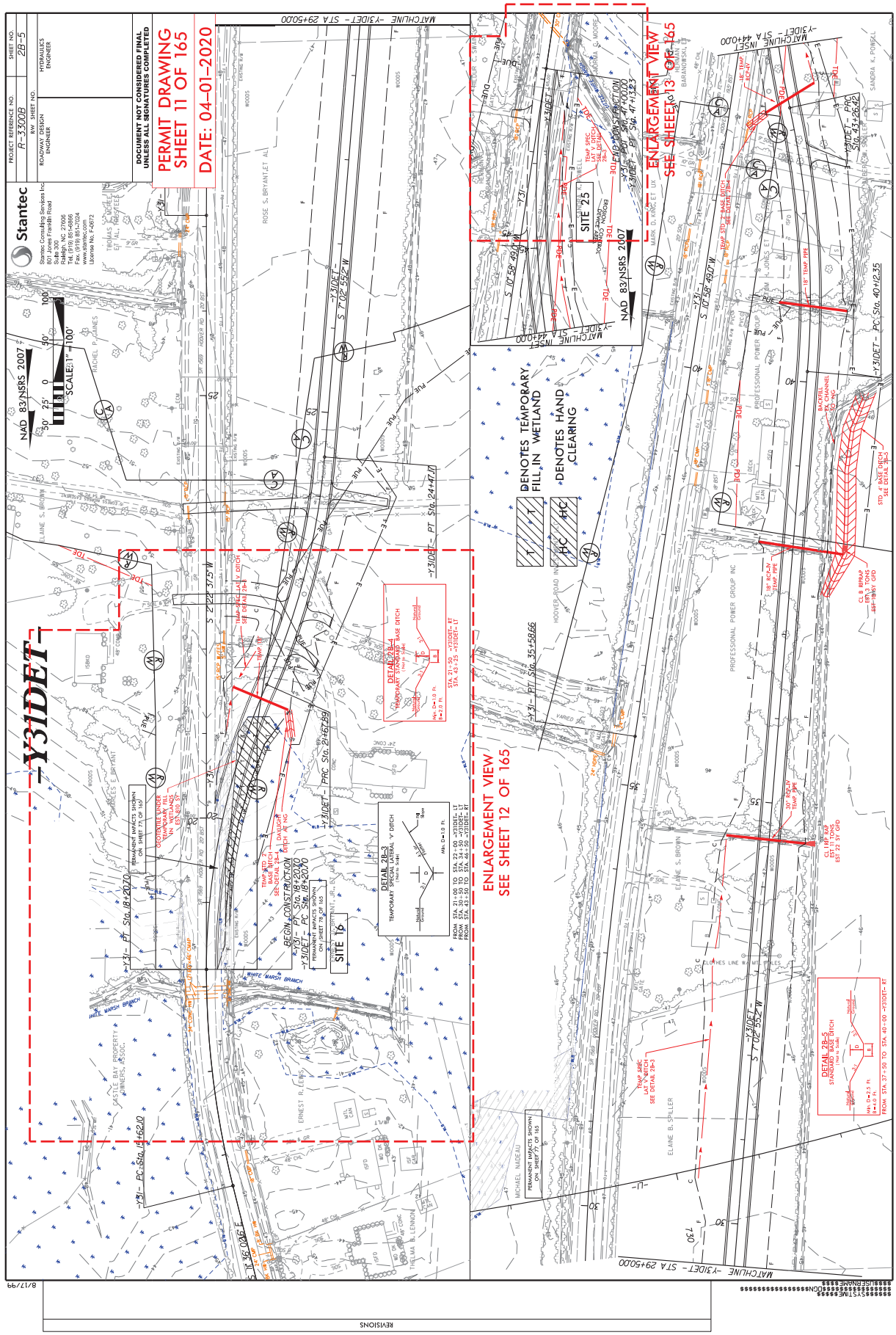

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 6 OF 165
DATE: 06-09-2020
NAD 83
SCALE: 1"= 20'
DENOTES TEMPORARY FILL IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES HAND CLEARING
PERMANENT IMPACTS SHOWN ON SHEET 149 OF 165
TEMPORARY FILL IN WETLAND
TEMP SPEC. CUT VARIABLE
BASE DITCH w/PSRM
EST 1000 SY
CL B RIPRAP
EST 22 TONS
EST 56 SY GFD
13' WD HW
36" CMP
15' WD HW
59+00 -Y30DET-
57+00 -Y30DET-
-Y30-
-Y30DET-
48" CMP
WLB
PDE
TEMPORARY FILL IN WETLAND
TEMP SPEC LAT V DITCH
PSRM TOE PROT.
EST 91 SY
HAND CLEARING
TEMPORARY IMPACTS IN SURFACE WATER
SITE 3
DUE

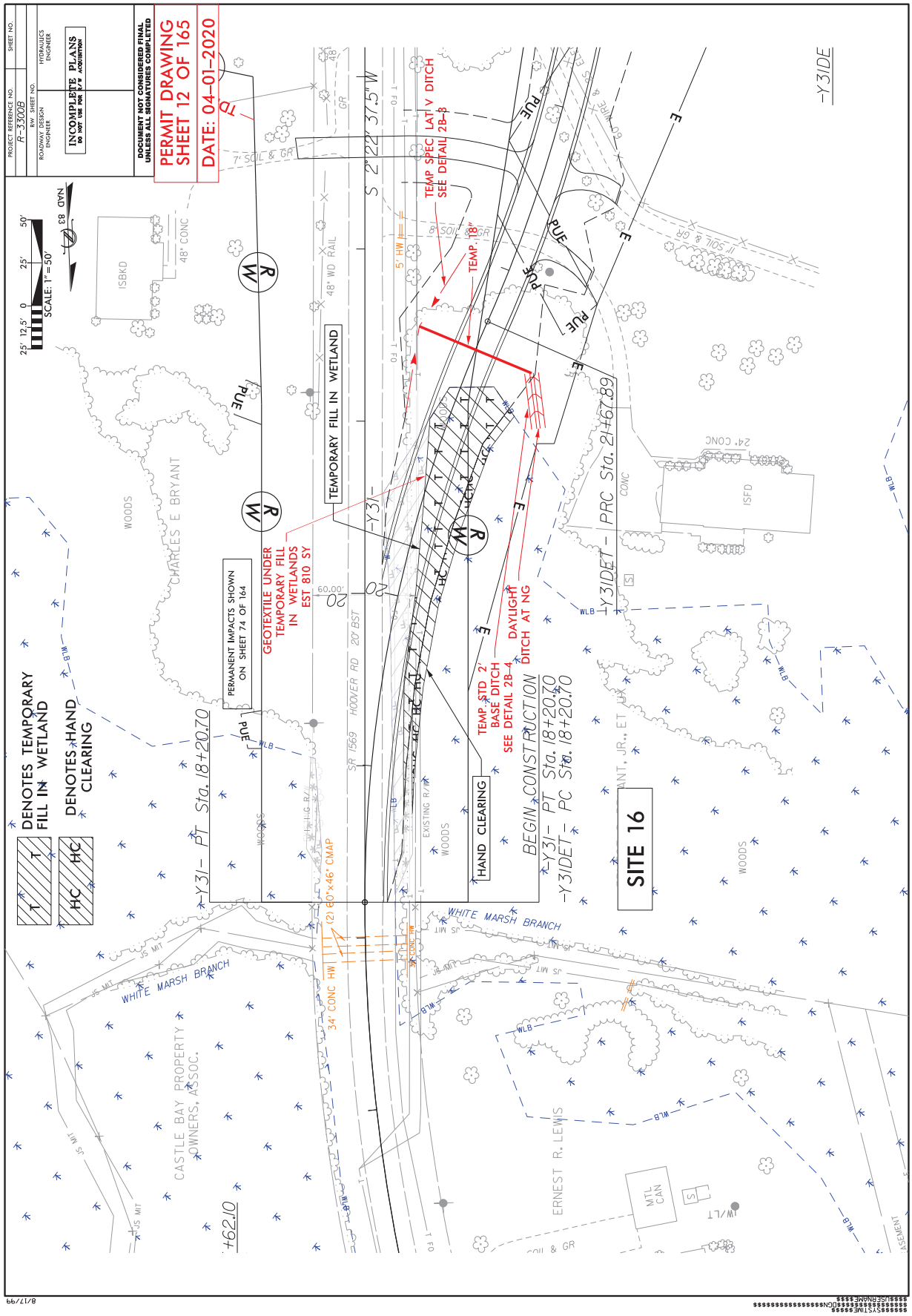

PERMIT DRAWING
SHEET 7 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-248
SITE 24
SITE 24
WETLANDS
WETLANDS
WETLANDS
WETLANDS
WETLANDS
WETLANDS
TEMPORARY FILL IN WETLANDS
HAND CLEARING
TEMPORARY FILL IN WETLANDS
HAND CLEARING
HAND CLEARING
18+50.00
18+00.00
17+50.00
17+00.00
16+50.00
-Y30DET-

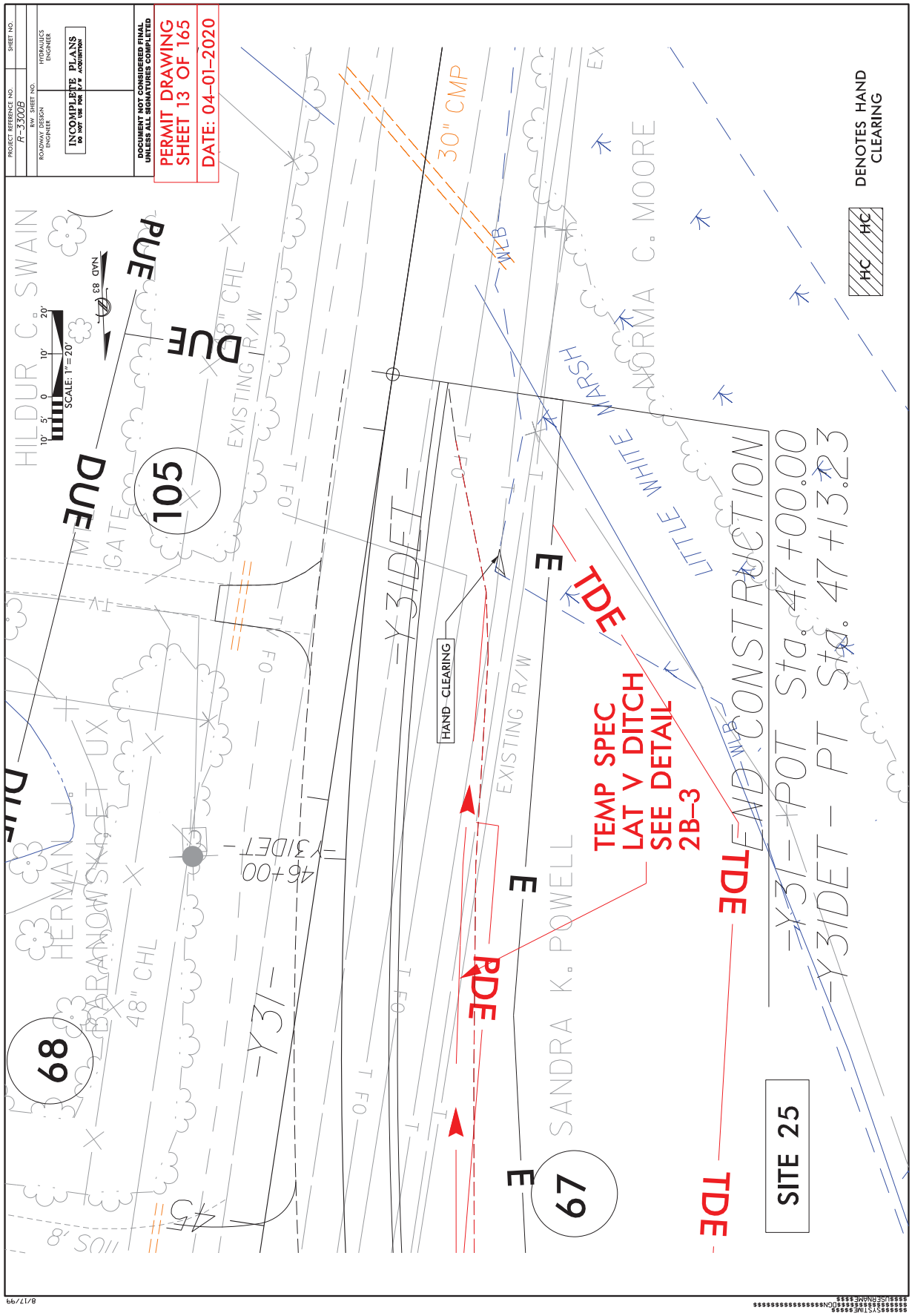

PERMIT DRAWING
SHEET 8 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-261
0 5 10
FILL IN WETLANDS
WETLANDS
SITE 2
44+50.00
44+00.00
43+50.00
43+00.00
3:1
-Y3ODET-
6/23/16

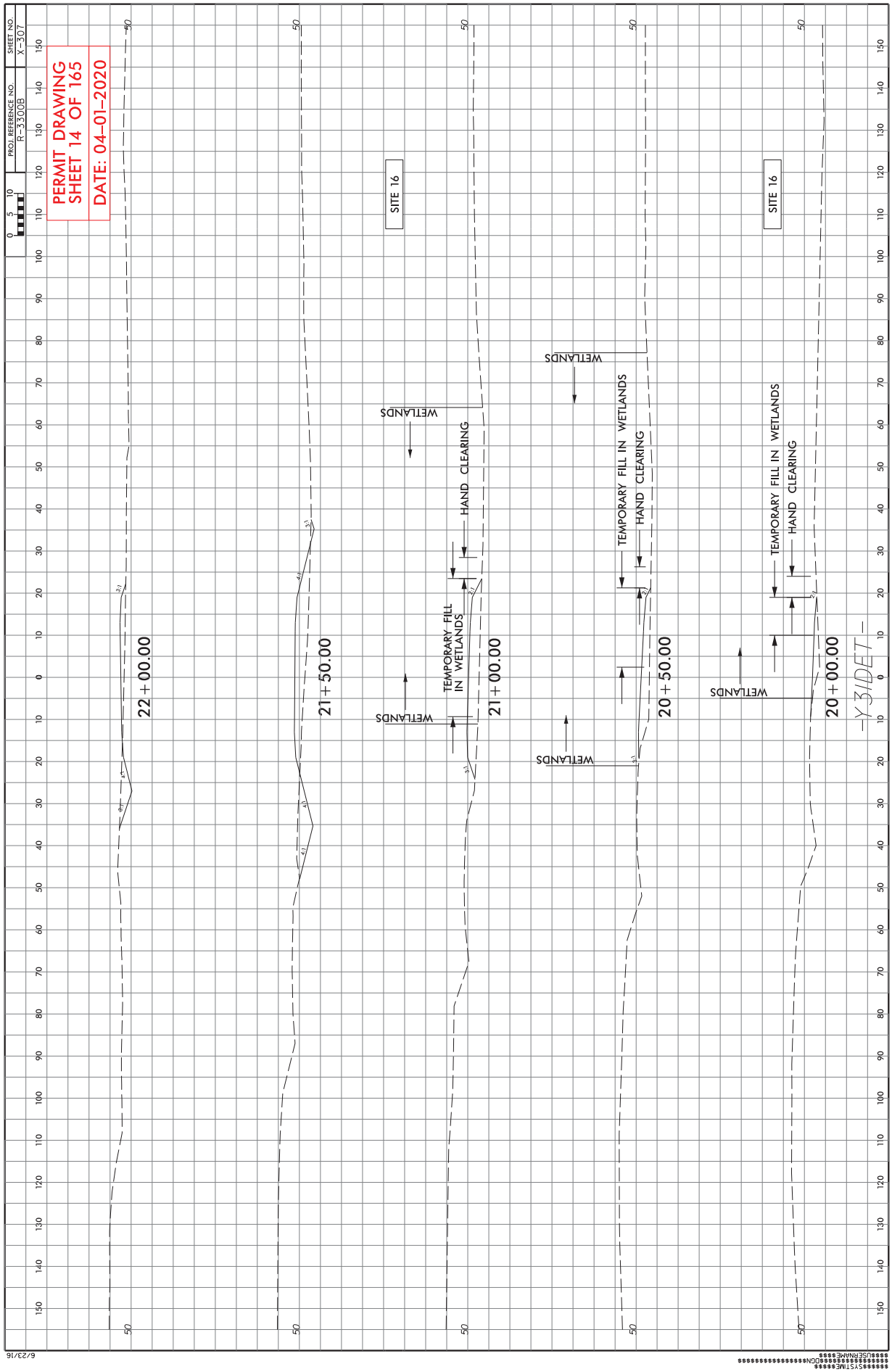

PERMIT DRAWING
SHEET 9 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-267
SITE 3
HAND CLEARING
TEMPORARY FILL IN WETLANDS
WETLANDS
TEMPORARY IMPACTS IN SURFACE WATER
58+50.00
58+00.00
57+50.00
57+00.00
56+50.00

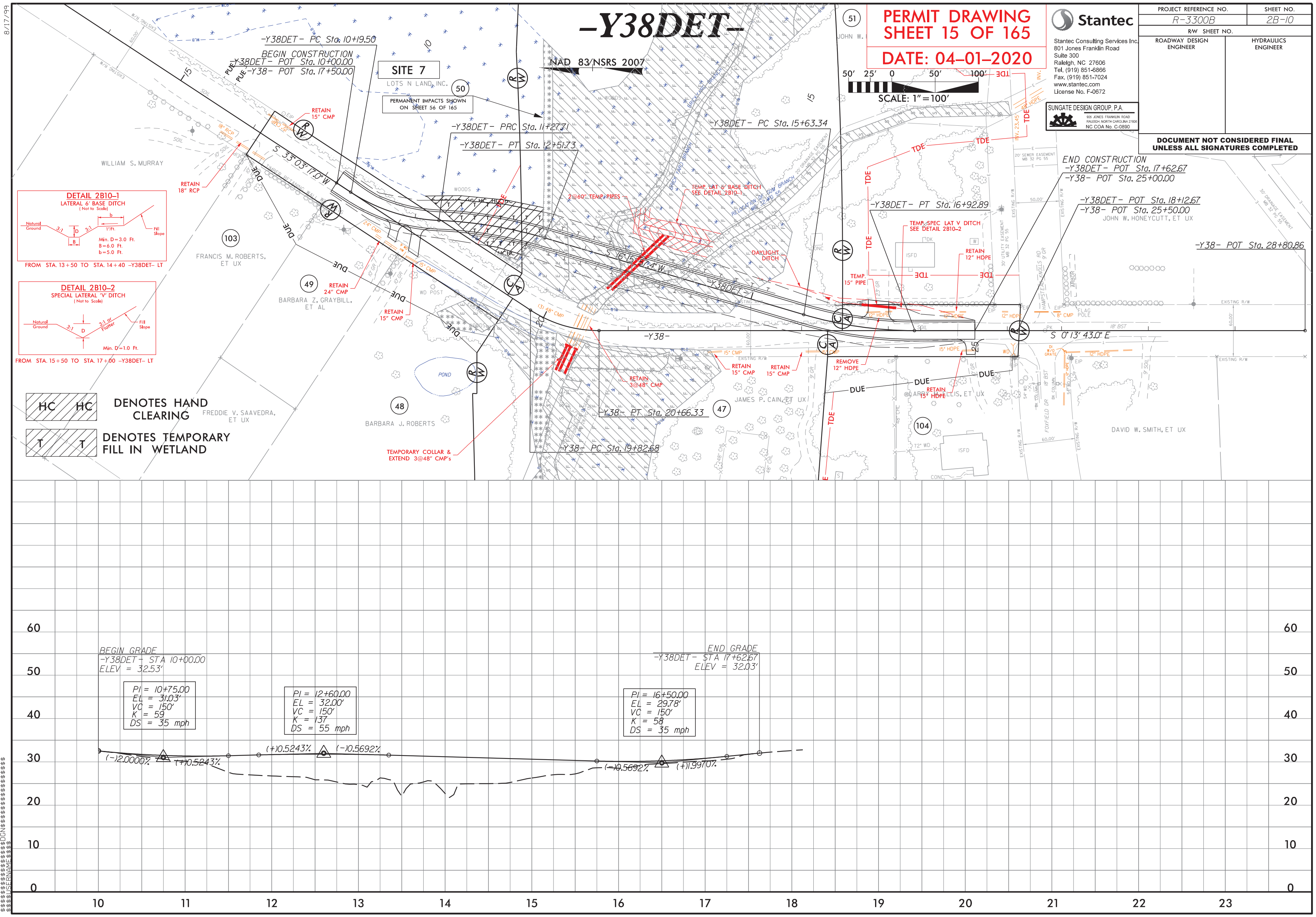

PERMIT DRAWING
SHEET 10 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 2B-5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
NAD 83/NSRS 2007
SCALE: 1" = 100'
-Y31DET-
-Y31- PT Sta. 18+20.20
-Y31- PC Sta. 14+62.20
BEGIN CONSTRUCTION -Y31DET- PT Sta. 18+20.40
-Y31DET- PRC Sta. 21+67.89
-Y31DET- PT Sta. 24+47.10
-Y31- PT Sta. 35+58.66
-Y31DET- PRC Sta. 43+26.42
END CONSTRUCTION -Y31DET- PT Sta. 47+13.23
-Y31DET- S 7°02'55.2" W
S 22°23'37.5" W
S 0°58'49.4" W
S 0°58'49.0" W
MATCHLINE -Y31DET- STA 29+50.00
MATCHLINE -Y31DET- STA 44+00.00
ENLARGEMENT VIEW SEE SHEET 12 OF 165
ENLARGEMENT VIEW SEE SHEET 13 OF 165
DENOTES TEMPORARY FILL IN WETLAND
DENOTES HAND CLEARING
SITE 16
SITE 25
DETAIL 2B-3 TEMPORARY SPECIAL LATERAL 'V' DITCH
DETAIL 2B-4 STANDARD BASE DITCH
DETAIL 2B-5 STANDARD BASE DITCH
TEMP SPEC LAT V DITCH SEE DETAIL 2B-3
TEMP STD 7 BASE DITCH SEE DETAIL 2B-4
STD 7 BASE DITCH SEE DETAIL 2B-5
PERMANENT IMPACTS SHOWN ON SHEET 78 OF 165
PERMANENT IMPACTS SHOWN ON SHEET 77 OF 165
GEOTEXTILE LINER TEMPORARY FILL IN WETLANDS EST 810 SY
CL B RIPRAP EST 9 TONS EST 10 SY GFD
CL I RIP RAP EST 11 TONS EST 22 SY GFD
CASTLE BAY PROPERTY OWNERS ASSOC.
CHARLES E. BRYANT
ELAINE S. BROWN
RACHEL P. GAINES
ROSE S. BRYANT ET AL
PROFESSIONAL POWER GROUP INC
ELAINE B. SPILLER
ERNEST R. LEWIS
THELMA B. LENNON
MICHAEL NADEAU
WHITE MARSH BRANCH
REVISIONS
8/17/99

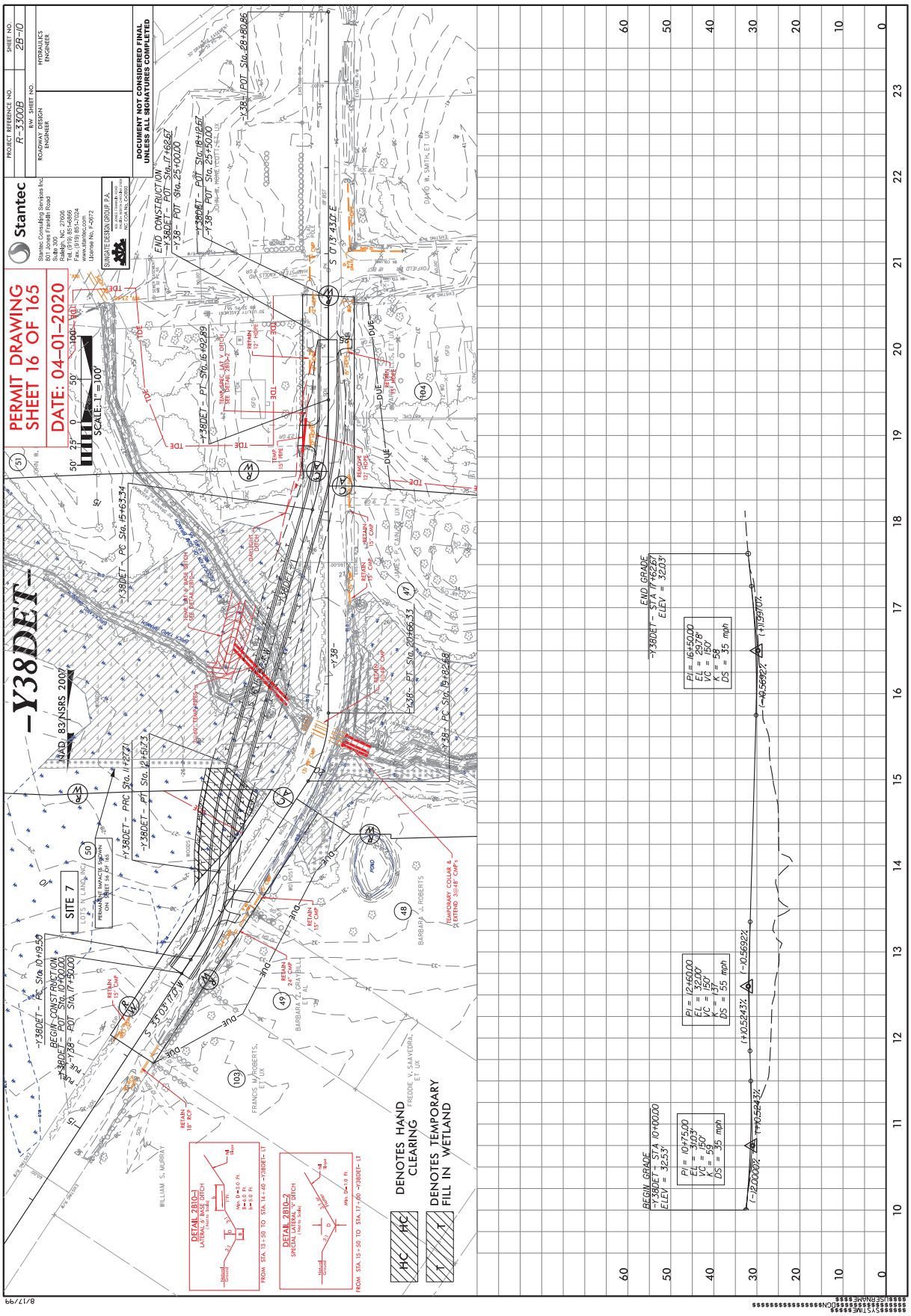

PERMIT DRAWING
SHEET 11 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 2B-5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
NAD 83/NSRS 2007
SCALE: 1" = 100'
-Y31DET-
-Y31- PT Sta. 18+20.70
-Y31- PC Sta. 14+62.10
-Y31DET- PRC Sta. 21+67.29
-Y31DET- PT Sta. 24+47.10
-Y31DET- PC Sta. 40+12.35
-Y31DET- PRC Sta. 43+26.42
-Y31DET- STA 29+50.00
-Y31DET- STA 44+00.00
BEGIN CONSTRUCTION -Y31DET- Sta. 18+20.70
SITE 16
SITE 25
DENOTES TEMPORARY FILL IN WETLAND
DENOTES HAND CLEARING
ENLARGEMENT VIEW SEE SHEET 12 OF 165
ENLARGEMENT VIEW SEE SHEET 13 OF 165
DETAIL 2B-3 TEMPORARY SPECIAL LATERAL 'V' DITCH
DETAIL 2B-4 TEMPORARY SPECIAL BASE DITCH
DETAIL 2B-5 STANDARD BASE DITCH
PERMANENT IMPACTS SHOWN ON SHEET 78 OF 165
PERMANENT IMPACTS SHOWN ON SHEET 77 OF 165
TEMP. SPEC. LAT. DITCH SEE DETAIL 2B-3
TEMP. SPEC. BASE DITCH SEE DETAIL 2B-4
STD. 4' LATE DITCH SEE DETAIL 2B-5
TEMP. STD. 7 BASE DITCH SEE DETAIL 2B-4
TEMP. SSRC LAT. V DITCH SEE DETAIL 2B-3
DESTROYED STRUCTURE TEMPORARY FILL NON-JURISDICTIONAL EES 0.10 AC
DESTROYED STRUCTURE TEMPORARY FILL NON-JURISDICTIONAL EES 0.03 AC
WWE MARSH BRANCH
CASTLE BAY PROPERTY OWNERS ASSOC.
PROFESSIONAL POWER GROUP INC
HOOVER ROAD INVESTMENTS LLC
ROSE S. BRYANT ET AL
ELAINE S. BROWN
ELAINE B. SPILLER
MICHAEL NADEAU
THELMA B. LENNON
ERNEST R. LEWIS
REVISIONS
8/17/99

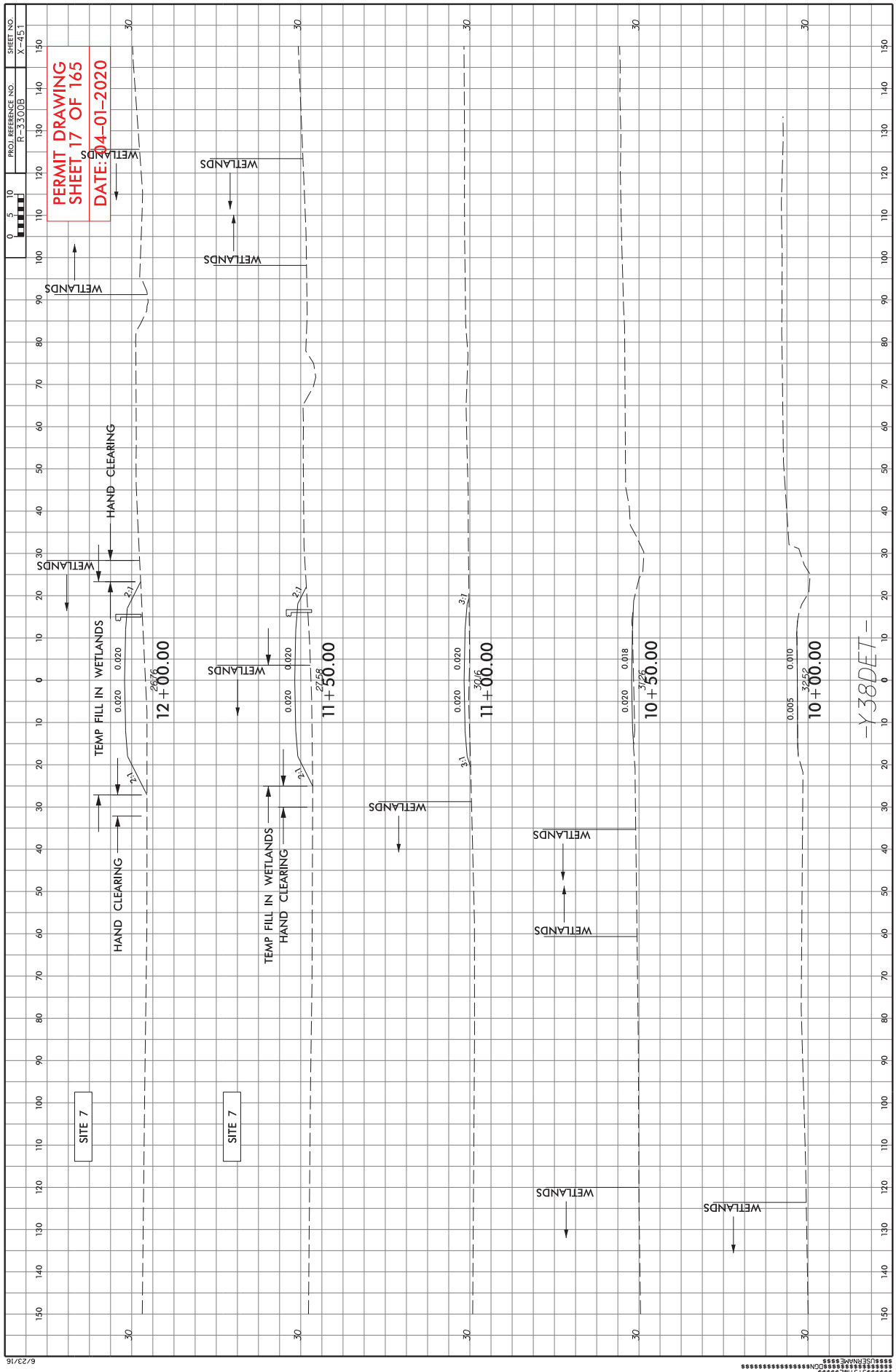

PROJECT REFERENCE NO.
A-3300B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO.
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 12 OF 165
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
DENOTES TEMPORARY FILL IN WETLAND
DENOTES HAND CLEARING
-Y31- PT Sta. 18+20.70
-Y31- PT Sta. 18+20.70
-Y31DET- PC Sta. 18+20.70
-Y31DET- PRC Sta. 21+67.89
-Y31DE
BEGIN CONSTRUCTION
PERMANENT IMPACTS SHOWN ON SHEET 74 OF 164
GEOTEXTILE UNDER TEMPORARY FILL IN WETLANDS EST 810 SY
TEMPORARY FILL IN WETLAND
HAND CLEARING
TEMP SPEC LAT V DITCH SEE DETAIL 2B-3
TEMP. 18"
TEMP STD 2' BASE DITCH SEE DETAIL 2B-4
DAYLIGHT DITCH AT NG
SITE 16
SR 1569 HOOVER RD
20' BST
(2) 60"x46" CMAP
34" CONC HW
WHITE MARSH BRANCH
CHARLES E BRYANT
CASTLE BAY PROPERTY OWNERS, ASSOC.
ERNEST R. LEWIS
WOODS
ISBKD
ISFD
48" CONC
24" CONC
48" WD RAIL
MTL CAN
PUE
WLB
JS MIT
EXISTING R/W

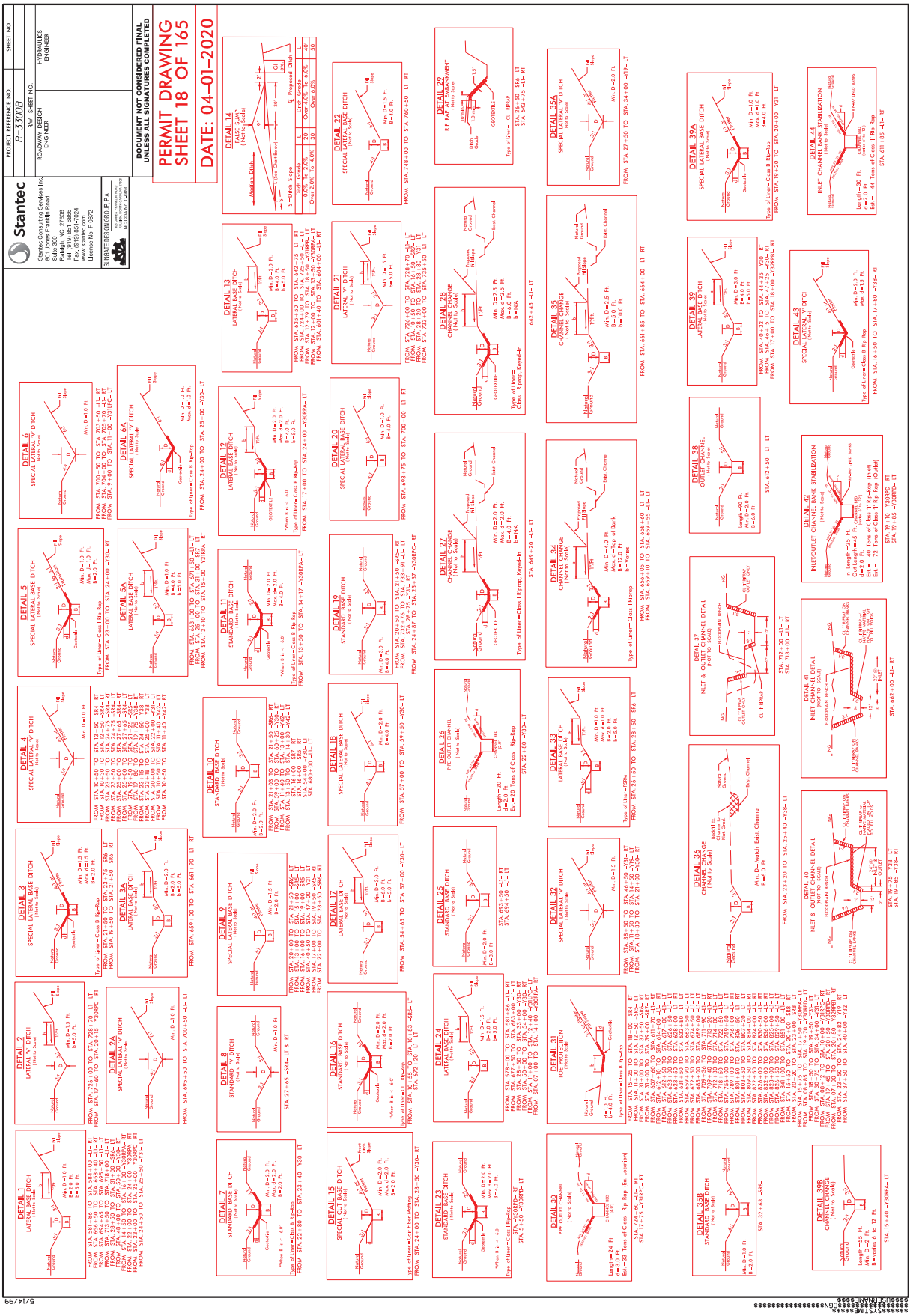

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 13 OF 165
DATE: 04-01-2020
SCALE: 1"=20'
NAD 83
DENOTES HAND CLEARING
HC
HILDUR C. SWAIN
HERMAN J. BRANOWSKI ET UX
SANDRA K. POWELL
NORMA C. MOORE
MARSH
LITTLE WHITE
EXISTING R/W
48" CHL
18" CHL
30" CMP
T FO
BLW
EX
DUE
105
68
67
HAND CLEARING
TDE
PDE
TEMP SPEC
LAT V DITCH
SEE DETAIL
2B-3
-Y3/DET-
-Y3/-
46+00
-Y3/DET- PT Sta. 47+13.23
-Y3/- POT Sta. 47+00.00
END CONSTRUCTION
SITE 25
8/17/99


PERMIT DRAWING
SHEET 14 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-307
0 5 10
22+00.00
21+50.00
21+00.00
20+50.00
20+00.00
SITE 16
SITE 16
WETLANDS
WETLANDS
WETLANDS
WETLANDS
WETLANDS
HAND CLEARING
TEMPORARY FILL IN WETLANDS
TEMPORARY FILL IN WETLANDS
HAND CLEARING
TEMPORARY FILL IN WETLANDS
HAND CLEARING
-Y SIDE T-
6/23/16


-Y38DET-
PERMIT DRAWING
SHEET 15 OF 165
DATE: 04-01-2020
50' 25' 0 50' 100'
SCALE: 1"=100'
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672
SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890
PROJECT REFERENCE NO.
R-3300B
SHEET NO.
2B-10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83/NSRS 2007
-Y38DET- PC Sta. 10+19.50
BEGIN CONSTRUCTION
-Y38DET- POT Sta. 10+00.00
-Y38- POT Sta. 17+50.00
SITE 7
LOTS N LAND, INC.
50
PERMANENT IMPACTS SHOWN ON SHEET 56 OF 165
-Y38DET- PRC Sta. 11+27.71
-Y38DET- PT Sta. 12+51.73
-Y38DET- PC Sta. 15+63.34
-Y38DET- PT Sta. 16+92.89
END CONSTRUCTION
-Y38DET- POT Sta. 17+62.67
-Y38- POT Sta. 25+00.00
-Y38DET- POT Sta. 18+12.67
-Y38- POT Sta. 25+50.00
JOHN W. HONEYCUTT, ET UX
-Y38- POT Sta. 28+80.86
S 33°03'17.0" W
S 16°15'14" W
S 0°13'43.0" E
-Y38-
-Y38DET-
-Y38- PT Sta. 20+66.33
-Y38- PC Sta. 19+82.68
51
JOHN W.
WILLIAM S. MURRAY
103
FRANCIS M. ROBERTS, ET UX
49
BARBARA Z. GRAYBILL, ET AL
48
BARBARA J. ROBERTS
FREDDIE V. SAAVEDRA, ET UX
47
JAMES P. CAIN, ET UX
104
DAVID W. SMITH, ET UX
RETAIN 15" CMP
RETAIN 18" RCP
RETAIN 24" CMP
RETAIN 15" CMP
RETAIN 3@48" CMP
RETAIN 15" CMP
RETAIN 15" CMP
RETAIN 12" HDPE
RETAIN 15" HDPE
REMOVE 12" HDPE
TEMP. 15" PIPE
2@60" TEMP. PIPES
TEMP. LAT 6' BASE DITCH SEE DETAIL 2B10-1
TEMP. SPEC LAT V DITCH SEE DETAIL 2B10-2
DAYLIGHT DITCH
TEMPORARY COLLAR & EXTEND 3@48" CMP's
POND
WOODS
TDE
DUE
PUE
INV. 23.45'
48" HDPE
20' SEWER EASEMENT MB 32 PG 55
30' DRAINAGE EASEMENT MB 32 PG 55
20' DRAINAGE EASEMENT MB 32 PG 55
EXISTING R/W
50.00'
60.00'
DETAIL 2B10-1
LATERAL 6' BASE DITCH
(Not to Scale)
Natural Ground
3:1
D
3:1
b
1"/Ft.
B
Fill Slope
Min. D=3.0 Ft.
B=6.0 Ft.
b=5.0 Ft.
FROM STA. 13+50 TO STA. 14+40 -Y38DET- LT
DETAIL 2B10-2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
3:1
D
3:1 or Flatter
Fill Slope
Min. D=1.0 Ft.
FROM STA. 15+50 TO STA. 17+00 -Y38DET- LT
HC HC
DENOTES HAND CLEARING
T T
DENOTES TEMPORARY FILL IN WETLAND
BEGIN GRADE
-Y38DET- STA 10+00.00
ELEV = 32.53'
PI = 10+75.00
EL = 31.03'
VC = 150'
K = 59
DS = 35 mph
PI = 12+60.00
EL = 32.00'
VC = 150'
K = 137
DS = 55 mph
PI = 16+50.00
EL = 29.78'
VC = 150'
K = 58
DS = 35 mph
END GRADE
-Y38DET- STA 17+62.67
ELEV = 32.03'
(-)2.0000%
(+)0.5243%
(+)0.5243%
(-)0.5692%
(-)0.5692%
(+)1.9970%
60
50
40
30
20
10
0
10
11
12
13
14
15
16
17
18
19
20
21
22
23
8/17/99


-Y38DET-
PERMIT DRAWING
SHEET 16 OF 165
DATE: 04-01-2020
Stantec
PROJECT REFERENCE NO.
R-3300B
SHEET NO.
2B-10
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SUNGATE DESIGN GROUP, P.A.
License No. F-0672
SCALE: 1"=100'
NAD 83/NSRS 2007
-Y38DET- PC Sta. 10+19.59
BEGIN CONSTRUCTION
-Y38DET- POT Sta. 10+00.00
-Y38- POT Sta. 17+30.00
-Y38DET- PRC Sta. 11+27.41
-Y38DET- PT Sta. 12+51.73
-Y38DET- PC Sta. 15+63.34
-Y38DET- PT Sta. 16+92.89
END CONSTRUCTION
-Y38DET- POT Sta. 17+68.67
-Y38- POT Sta. 25+00.00
-Y38DET- POT Sta. 18+11.67
-Y38- POT Sta. 25+45.00
-Y38- POT Sta. 28+30.86
SITE 7
LOTS 1, 2, AND 3
PERMIT DRAWING SHEET 17 OF 165
DETAIL 2B10-1
LATERAL "V" DITCH
DETAIL 2B10-2
SPECIAL LATERAL "V" DITCH
FROM STA. 13+50 TO STA. 14+40 -Y38DET- LT
FROM STA. 15+50 TO STA. 17+60 -Y38DET- LT
DENOTES HAND CLEARING
DENOTES TEMPORARY FILL IN WETLAND
BEGIN GRADE
-Y38DET- STA 10+00.00
ELEV = 32.53'
PI = 10+75.00
EL = 31.03'
VC = 150'
K = 59
DS = 35 mph
PI = 12+60.00
EL = 32.00'
VC = 150'
K = 37
DS = 55 mph
PI = 16+50.00
EL = 29.78'
VC = 150'
K = 59
DS = 35 mph
END GRADE
-Y38DET- STA 17+68.67
ELEV = 32.03'
(-)2.00%
(+)0.52431%
(-)0.56922%
(+)0.56922%
(-)0.56922%
(+)1.99107%
NAD 83/NSRS 2007
8/17/99


PERMIT DRAWING
SHEET 17 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-451
0 5 10
WETLANDS
HAND CLEARING
TEMP FILL IN WETLANDS
SITE 7
12+00.00
11+50.00
11+00.00
10+50.00
10+00.00
2676
2758
3016
3276
3262
0.020
0.018
0.010
0.005
2:1
3:1
-Y38DET-
6/23/16


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
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Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGLETON DESIGN GROUP, P.A.
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 18 OF 165
DATE: 04-01-2020
DETAIL 1
LATERAL BASE DITCH
DETAIL 2
LATERAL "V" DITCH
DETAIL 2A
SPECIAL LATERAL "V" DITCH
DETAIL 3
SPECIAL LATERAL BASE DITCH
DETAIL 3A
LATERAL BASE DITCH
DETAIL 4
SPECIAL LATERAL "V" DITCH
DETAIL 5
SPECIAL LATERAL BASE DITCH
DETAIL 5A
LATERAL BASE DITCH
DETAIL 6
SPECIAL LATERAL BASE DITCH
DETAIL 6A
SPECIAL LATERAL "V" DITCH
DETAIL 7
STANDARD BASE DITCH
DETAIL 8
STANDARD "V" DITCH
DETAIL 9
SPECIAL LATERAL BASE DITCH
DETAIL 10
STANDARD BASE DITCH
DETAIL 11
STANDARD BASE DITCH
DETAIL 12
LATERAL BASE DITCH
DETAIL 13
LATERAL BASE DITCH
DETAIL 14
FALSE SUMP
DETAIL 15
SPECIAL LATERAL BASE DITCH
DETAIL 16
STANDARD BASE DITCH
DETAIL 17
LATERAL BASE DITCH
DETAIL 18
SPECIAL LATERAL BASE DITCH
DETAIL 19
STANDARD BASE DITCH
DETAIL 20
SPECIAL LATERAL BASE DITCH
DETAIL 21
LATERAL "V" DITCH
DETAIL 22
SPECIAL LATERAL BASE DITCH
DETAIL 23
STANDARD BASE DITCH
DETAIL 24
LATERAL BASE DITCH
DETAIL 25
STANDARD BASE DITCH
DETAIL 26
PIPE OUTLET CHANNEL
DETAIL 27
CHANNEL CHANGE
DETAIL 28
CHANNEL CHANGE
DETAIL 29
RIP RAP AT EMBANKMENT
DETAIL 30
PIPE OUTLET CHANNEL
DETAIL 31
TOE PROTECTION
DETAIL 32
SPECIAL LATERAL "V" DITCH
DETAIL 33
LATERAL BASE DITCH
DETAIL 34
CHANNEL CHANGE
DETAIL 35
CHANNEL CHANGE
DETAIL 35A
SPECIAL LATERAL "V" DITCH
DETAIL 35B
STANDARD BASE DITCH
DETAIL 36
CHANNEL CHANGE
DETAIL 37
INLET & OUTLET CHANNEL DETAIL
DETAIL 38
OUTLET CHANNEL
DETAIL 39
LATERAL BASE DITCH
DETAIL 39A
SPECIAL LATERAL BASE DITCH
DETAIL 39B
CHANNEL CHANGE
DETAIL 40
INLET & OUTLET CHANNEL DETAIL
DETAIL 41
INLET CHANNEL DETAIL
DETAIL 42
INLET/OUTLET CHANNEL BANK STABILIZATION
DETAIL 43
SPECIAL LATERAL "V" DITCH
DETAIL 44
INLET CHANNEL BANK STABILIZATION
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-3300B	2D-2

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

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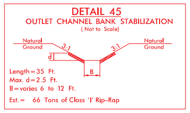
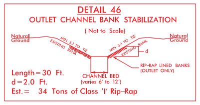
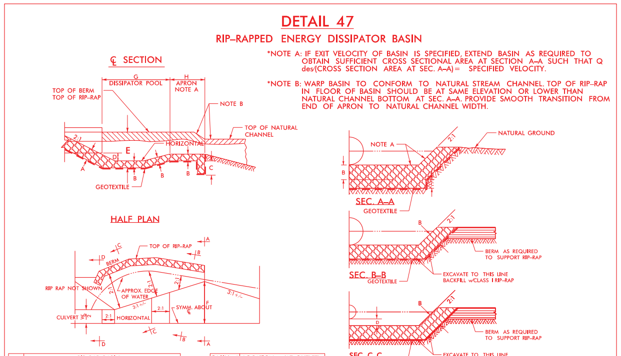

DETAIL 45
OUTLET CHANNEL BANK STABILIZATION
(Not to Scale)

STA. 612 + 40 –L1– LT


DETAIL 46
OUTLET CHANNEL BANK STABILIZATION
(Not to Scale)

STA. 26 + 40 –SR6– LT


DETAIL 47
RIP–RAPPED ENERGY DISSIPATOR BASIN

*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A–A SUCH THAT Q des/(CROSS SECTION AREA AT SEC. A–A) = SPECIFIED VELOCITY.

*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP–RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A–A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

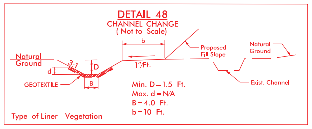
DIM.	RIP RAP BASIN # 1	2	3	4	5	6	7	8
A	2.5	2.5						
B	1.7	1.7						
C	1.7	1.7						
D	0.7	0.3						
E	6.1	4.7						
F	8.3	7.3						
G	13.5	12.0						
H	4.5	4.0						

*ALL DIMENSIONS APPROXIMATE IN FEET (FT)

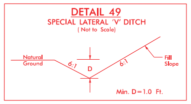
BASIN #	LOCATION (AT OUTLET)
1	–Y30– 46 + 88 LT
2	–L1– 677 + 37 RT
3	
4	
5	
6	
7	
8	

NOTE:
W_o = DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE–ARCH CULVERTS

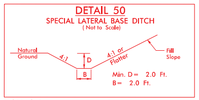
5/05


DETAIL 48
CHANNEL CHANGE
(Not to Scale)

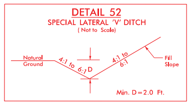
FROM STA. 787 + 50 TO STA. 788 + 50 –L1– RT


DETAIL 49
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

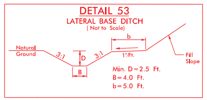
FROM STA. 231 + 00 TO STA. 232 + 00 –Y40– RT


DETAIL 50
SPECIAL LATERAL BASE DITCH
(Not to Scale)

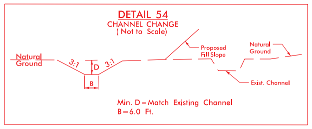
FROM STA. 235 + 00 TO STA. 237 + 20 –Y40– RT


DETAIL 52
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

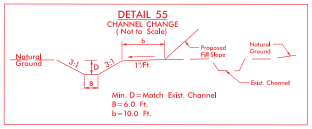
FROM STA. 12 + 00 TO STA. 15 + 00 –Y32– LT


DETAIL 53
LATERAL BASE DITCH
(Not to Scale)

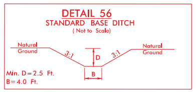
FROM STA. 15 + 00 TO STA. 18 + 30 –Y32– LT


DETAIL 54
CHANNEL CHANGE
(Not to Scale)

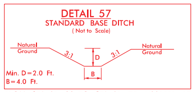
FROM STA. 18 + 30 TO STA. 21 + 90 –Y32– LT


DETAIL 55
CHANNEL CHANGE
(Not to Scale)

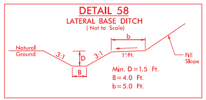
FROM STA. 26 + 00 TO STA. 31 + 65 –Y32– LT


DETAIL 56
STANDARD BASE DITCH
(Not to Scale)

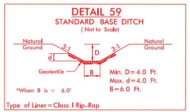
STA. 677 + 00 –L1– RT


DETAIL 57
STANDARD BASE DITCH
(Not to Scale)

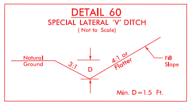
FROM STA. 21 + 00 TO STA. 21 + 75 –Y32RPB1– RT


DETAIL 58
LATERAL BASE DITCH
(Not to Scale)

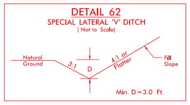
FROM STA. 646 + 50 TO STA. 654 + 50 –L1– RT


DETAIL 59
STANDARD BASE DITCH
(Not to Scale)

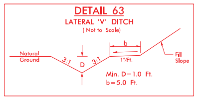
STA. 50 + 35 –Y19– RT


DETAIL 60
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

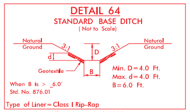
FROM STA. 17 + 00 TO STA. 23 + 50 –Y19– LT


DETAIL 62
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

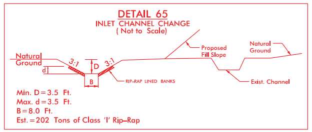
FROM STA. 41 + 00 TO STA. 48 + 12 –Y32– LT


DETAIL 63
LATERAL 'V' DITCH
(Not to Scale)

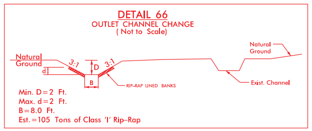
FROM STA. 655 + 00 TO STA. 656 + 00 –L1– RT


DETAIL 64
STANDARD BASE DITCH
(Not to Scale)

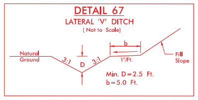
STA. 18 + 10 –Y32RPB1–


DETAIL 65
INLET CHANNEL CHANGE
(Not to Scale)

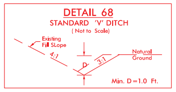
STA. 18 + 40 –Y32– LT


DETAIL 66
OUTLET CHANNEL CHANGE
(Not to Scale)

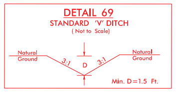
STA. 25 + 00 –Y19– RT


DETAIL 67
LATERAL 'V' DITCH
(Not to Scale)

FROM STA. 52 + 15 TO STA. 56 + 40 –SR7– RT


DETAIL 68
STANDARD 'V' DITCH
(Not to Scale)

FROM STA. 12 + 50 TO STA. 13 + 00 –Y43– LT


DETAIL 69
STANDARD 'V' DITCH
(Not to Scale)

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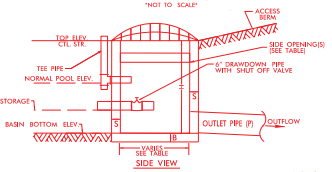
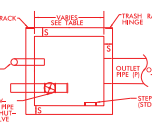
DETAIL P–1
WET DETENTION OUTLET CONTROL STRUCTURE
"NOT TO SCALE"



SIDE OPENING DIMENSIONS				
STRUCTURE NUMBER	# OF SIDES w/ OPENING	INVERT ELEV. (FEET)	OPENING WIDTH (INCHES)	OPENING HEIGHT (INCHES)
2356	2	42.5'	60"	6"

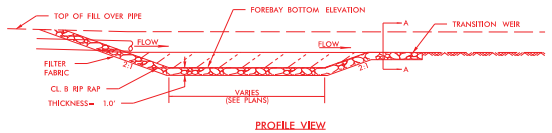


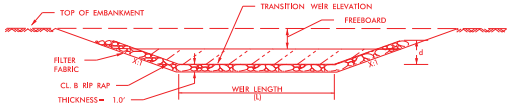
NOTES
1) NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
2) ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE.
3) SHUT OFF VALVE MAY BE A GATE VALVE, BALL VALVE, SHEAR GATE, ETC. SHUT OFF VALVE IS TO REMAIN CLOSED DURING NORMAL OPERATION.

MINIMUM DIMENSIONS FOR WET DETENTION BASIN DRAWDOWN STRUCTURE

STATION	STRUCTURE NUMBER	SIDE WALLS (INCHES)	BASE B (INCHES)	CTL STR. DIMENSIONS W	L	H	TOP ELEVATION CONTROL STRUCTURE	BASIN BOTTOM ELEV.	TEE PIPE DIAMETER INCHES	TEE PIPE INV. ELEV. (NORMAL POOL)	DRAWDOWN PIPE INVERT	OUTLET PIPE INVERT	OUTLET PIPE DIAMETER(P) INCHES	OUTLET PIPE MATERIAL
L1_N 869+04 LT	2356	6"	18"	5.0'	5.0'	4.0'	43.5'	38.5'	3.0"	41.5'	39.5'	39.5'	42"	RCP–IV

DETAIL P–2
FOREBAY
(Not to Scale)





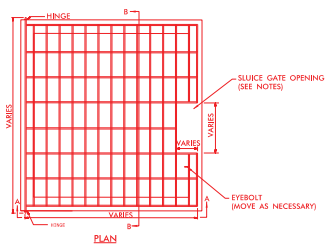
SECTION A–A
"TRANSITION BERM CROSS-SECTION"

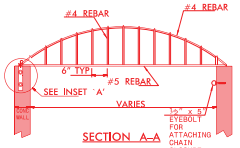
MINIMUM DIMENSIONS FOR FOREBAY

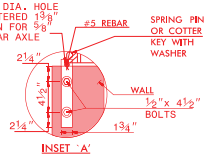
LOCATION	FOREBAY BOTTOM ELEV.	TRANSITION WEIR ELEV.	TRANSITION WEIR LENGTH (L)	WEIR SIDE SLOPES (X:1)	d
L1_N 866+50 LT	39.0'	42.0'	38'	3	1.0'
Y32 39+75 RT	39.0'	42.0'	56'	3	1.0'
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?

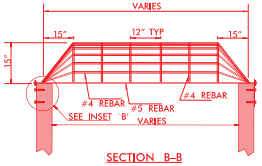
DETAIL P–3
REBAR & ORIFICE TRASH RACKS
(N.T.S.)

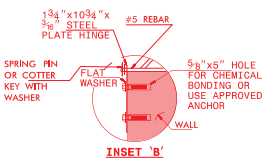
RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A "" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A–153.
5. PROVIDE OPENING IN TRASH RACK TO ACCOMODATE SLUICE GATE, IF APPLICABLE, ON THE OUTLET PIPE. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATES.



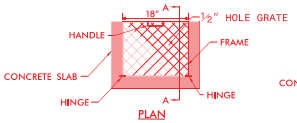


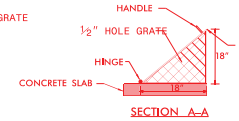






REBAR TRASH RACK
NOT TO SCALE





ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A "" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A–153.

ORIFICE TRASH RACK
NOT TO SCALE

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SUNGATE DESIGN GROUP, P.A.
801 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 NC COA No. C-0850

PROJECT REFERENCE NO.	SHEET NO.
R-3300B	2D-3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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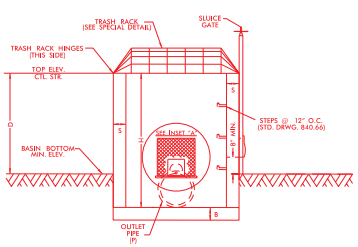
~~DATE: 04-01-2020~~

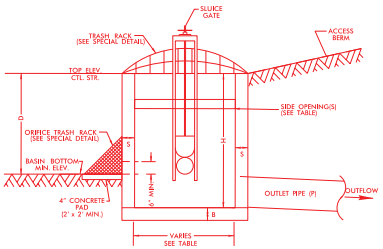
DETAIL P-4

DRY DETENTION DRAWDOWN STRUCTURE w/SLUICE GATE

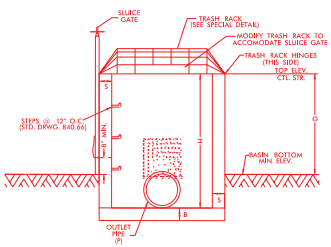
NOT TO SCALE



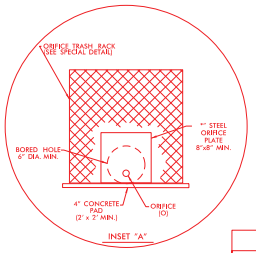
SIDE 1

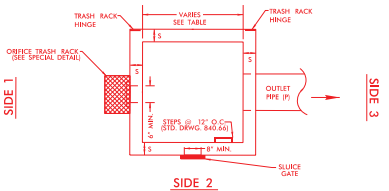


SIDE 2



SIDE 3





SIDE 2

PLAN VIEW

TRASH RACK NOT SHOWN FOR CLARITY

NOTES:
1. 15" MINIMUM DIAMETER FOR OUTLET PIPE.
2. 2" MINIMUM DIAMETER ORIFICE. IF ORIFICE IS GREATER THAN 6", A STEEL PLATE IS NOT REQUIRED.
3. NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
4. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION. A GATE VALVE MAY BE USED IN LIEU OF THE 8" SLUICE GATE.
5. SLUICE GATE SHALL PROVIDE WATERTIGHT SEAL. PROVIDE ADEQUATE CLEARANCE FOR GATE OPERATION.
6. SELECT BOX STANDARD AS REQUIRED TO ACCOMMODATE SLUICE GATE AND ORIFICE TRASH RACK WIDTH.
7. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATE.
8. ADJUST FOOTER DIMENSIONS AS NEEDED FOR ANTI-FLOTATION.

SIDE OPENING DIMENSIONS

STRUCTURE NUMBER	# OF SIDES w/ OPENING	INVERT ELEV. (FEET)	OPENING WIDTH (INCHES)	OPENING HEIGHT (INCHES)
2333	1	43.5'	60"	6"

MINIMUM DIMENSIONS FOR DRY DETENTION/HAZARDOUS SPILL BASIN DRAWDOWN STRUCTURE

STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
-Y32- 29+23 RT	2333	6.0	18.0	43.0	45.0	2.0	40.0	5' x 5' x 5'	4.0	43.0	48"

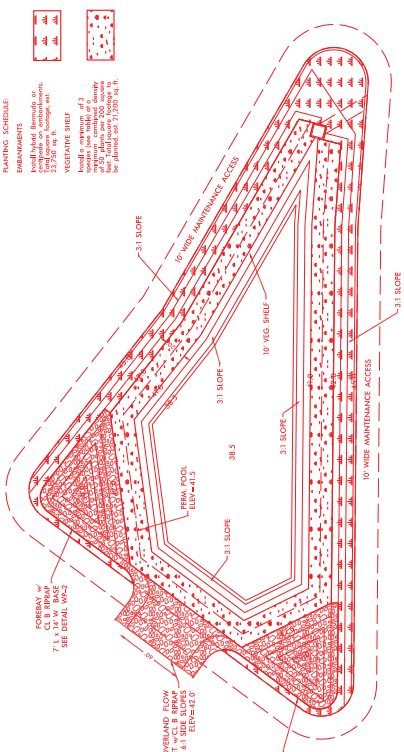
P-59

WET DET. BASIN DETAILS

OPERATION AND MAINTENANCE PROVISIONS

BMP element:	Potential problems:	How to remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The perimeter of the wet pond	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until established. Provide lime and a one-time fertilizer application.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.
The inlet device: pipe or swale	The pipe is clogged.	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged.	Replace the pipe.
	Erosion is occurring in the swale.	Regrade the swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or rip-rap to avoid future problems with erosion.
The forebay	Sediment has accumulated to a depth greater than the original design depth for sediment storage.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Erosion has occurred.	Provide additional erosion control devices or stabilize if needed to prevent future erosion problems.
	Weeds are present	Remove the weeds, preferably by pulling by hand, and dispose of off site. Apply herbicide as a spot treatment only if necessary, and wipe it on the plants rather than spraying.
The vegetated shelf	Best professional practices show that pruning is needed to maintain optimal plant health.	Prune according to best professional practices
	Plants are dead, diseased or dying.	Determine the source of the problem: soils, hydrology, disease, etc. Remedy the problem if possible and replace plants. Do not replace plants until the problem has been remedied. If necessary, have new plants installed by a professional.
	Weeds are present.	Remove the weeds, preferably by pulling by hand, and dispose of off site. Apply herbicide as a spot treatment only if necessary, and wipe it on the plants rather than spraying.
The main treatment area	Sediment has accumulated to a depth greater than the original design sediment storage depth.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Algal growth covers over 50% of the area	Consult a professional to remove and control the algal growth.
	Cattails, phragmites or other undesirable plants cover 10% of the basin surface.	Remove the plants by wicking the herbicide onto the plant (no spray).
The embankment	Shrubs have started to grow on the embankment	Remove shrubs immediately
	Evidence of muskrat or beaver activity is present	Use traps to remove muskrats and consult a professional to remove beavers.
	A tree has started to grow on the embankment.	Consult a dam safety specialist to remove the tree.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	Make all needed repairs.
The outlet device: The receiving swale	Clogging has occurred.	Clean out the outlet device. Dispose of the sediment off-site.
	The outlet device is damaged	Repair or replace the outlet device
	Erosion or other signs of deterioration occurred at the outlet.	Contact the local NC Division of Water Resources Regional Office, or the 401 Oversight Unit at 919-733-1760.
Floating wetland island (if applicable)	Weeds or volunteer trees are growing on the mat	Remove the weeds or trees.
	The anchor cable is damaged, disconnected or missing	Reattach the anchor cable to its design state.

WET DET. BASIN –L1_NORTH– 868+00 LT – PLANTING PLAN



PLANTING SCHEDULE

EMBANKMENTS

Install hybrid Bermuda or centipede sod throughout, including top of berm, toe of slope, and all disturbed areas.

VEGETATIVE SHELF

Install a minimum of 3 species (see table) at a minimum density of 50 plants per 200 square feet (average spacing of 3' on center). Plants should be planted over 21,000 sq. ft.

Landscape Plan:

1. Embankment slopes of the pond shall be vegetated with non-clumping turf grass, perennial grasses, such as hybrid Bermuda or centipede are recommended; trees and woody shrubs shall not be allowed; and

2. The vegetated shelf shall be planted with a minimum of three diverse species of herbaceous, native vegetation at a minimum density of 50 plants per 200 square feet of shelf area. Species shall be selected from the Plants for Submerged and Partially Submerged Vegetative Shelves table shown below. Wetland seed mixes shall not be used.

3. Trees and woody shrubs shall not be planted on the embankment slopes and any volunteers should be removed as part of regular maintenance activities.

PLANTS FOR SUBMERGED AND PARTIALLY SUBMERGED VEGETATIVE SHELVES

Botanical Name	Common Name
Andropbo tricornata	Swamp Milkweed
Carex spp.	Sedges
Carex tenera	Quill sedge
Eupatoriadelphus dubius	Dwarf Joe Pye Weed
Eupatoriadelphus fistulosus	Joe Pye Weed
Eupatoriadelphus maculatus	Spotted Trumpetweed
Hibiscus coccineus	Scarlet rose mallow
Hibiscus laevis	Halberdleaf rosemallow
Juncus effusus	Rush
Kosteletzkya virginica	Seashore Mallow
Lobelia cardinalis	Cardinal flower
Pontederia cordata	Pickerelweed
Rhynchospora spp.	Beaksrush
Saccharum baldwinii	Narrow plumegrass
Sagittaria latifolia	Duck Potato
Saururus cernuus	Lizardtail
Scirpus cyperinus	Woolgrass
Scirpus spp.	Bulrush

Maintenance Plan:

1. Immediately after the wet pond is established, the plants on the vegetated shelf and perimeter of the basin should be watered twice weekly if needed, until the plants become established (commonly six weeks).

2. No portion of the wet pond should be fertilized after the first initial fertilization that is required to establish the plants on the vegetated shelf.

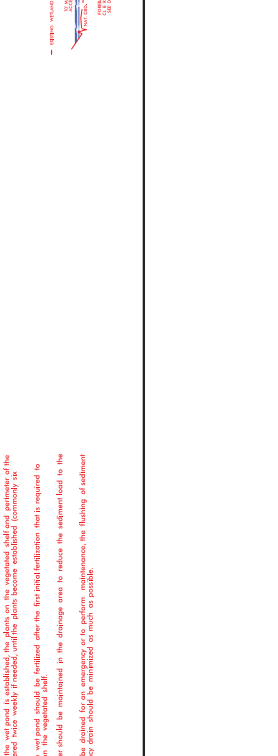
3. Stable groundcover should be maintained in the drainage area to reduce the sediment load to the wet pond.

4. If the pond must be drained for an emergency or to perform maintenance, the flushing of sediment through the emergency drain should be minimized as much as possible.

PLAN VIEW

WET DET. BASIN –L1 NORTH– 868+00 LT – PLAN & PROFILE

SECTION B–B



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SHEET 22 OF 165

DATE: 04–01–2020

PROJECT REFERENCE NO.	SHEET NO.
R-33008	2D-5

ROADWAY DESIGN ENGINEER	RW SHEET NO.	HYDRAULICS ENGINEER

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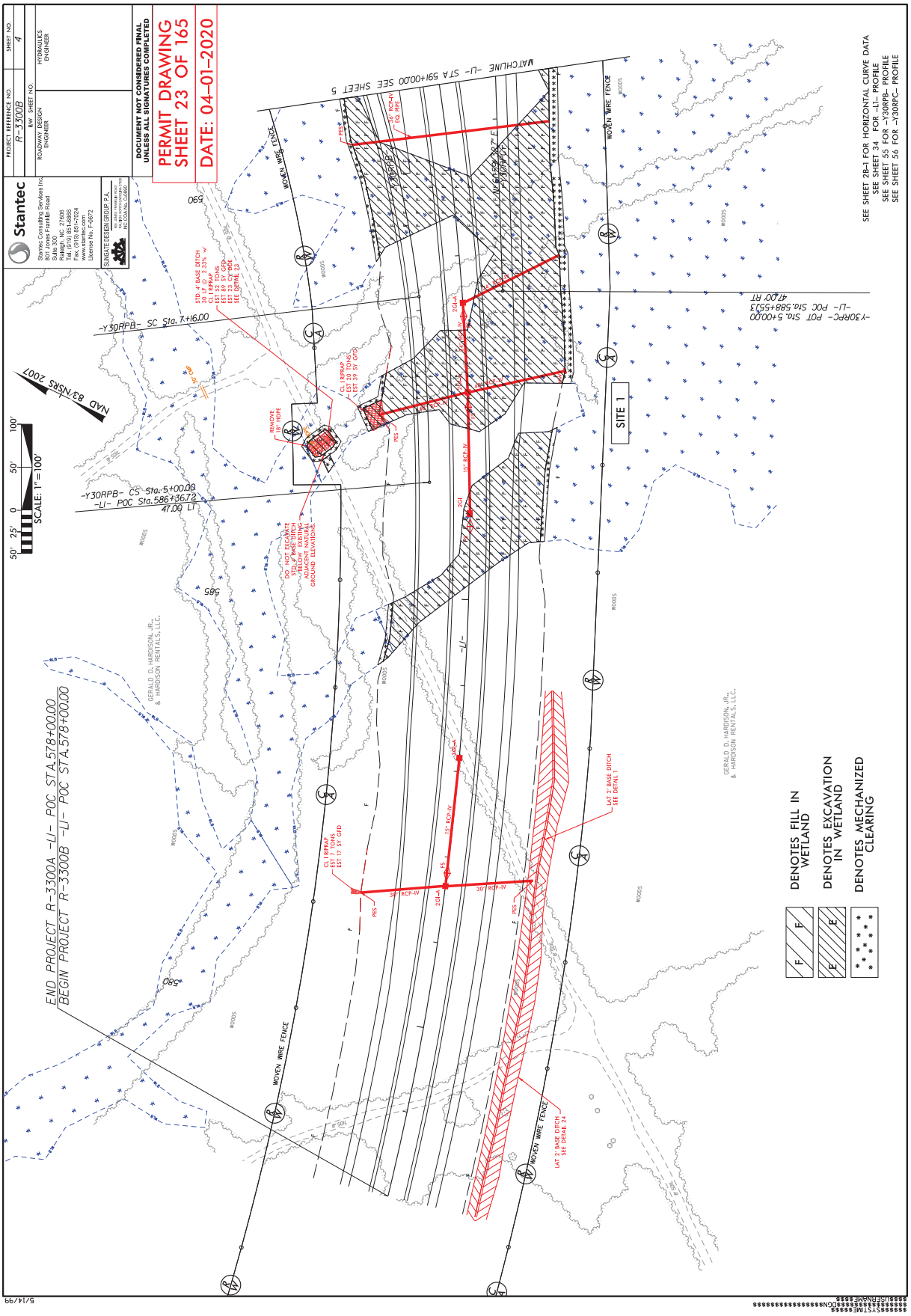
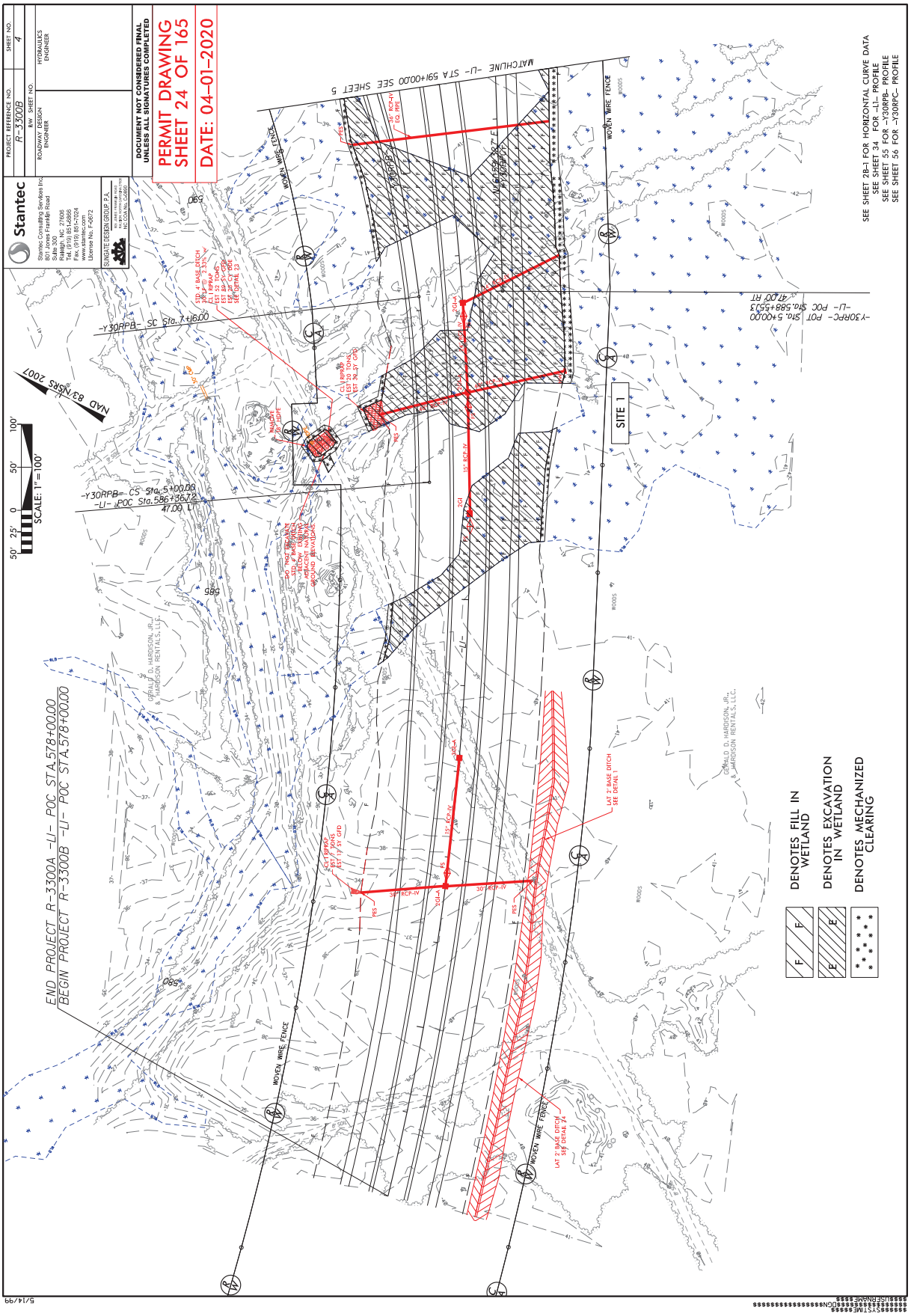
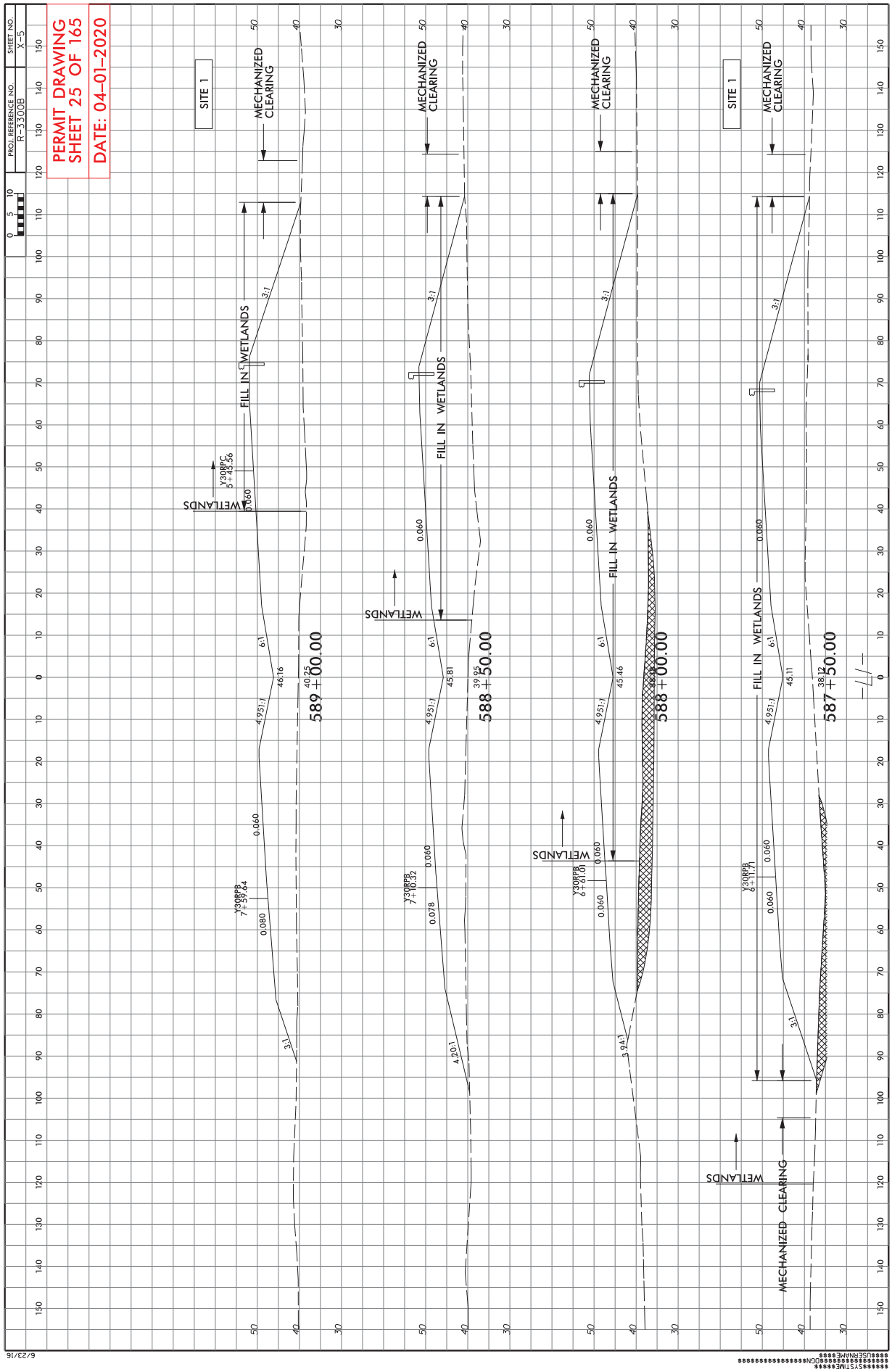
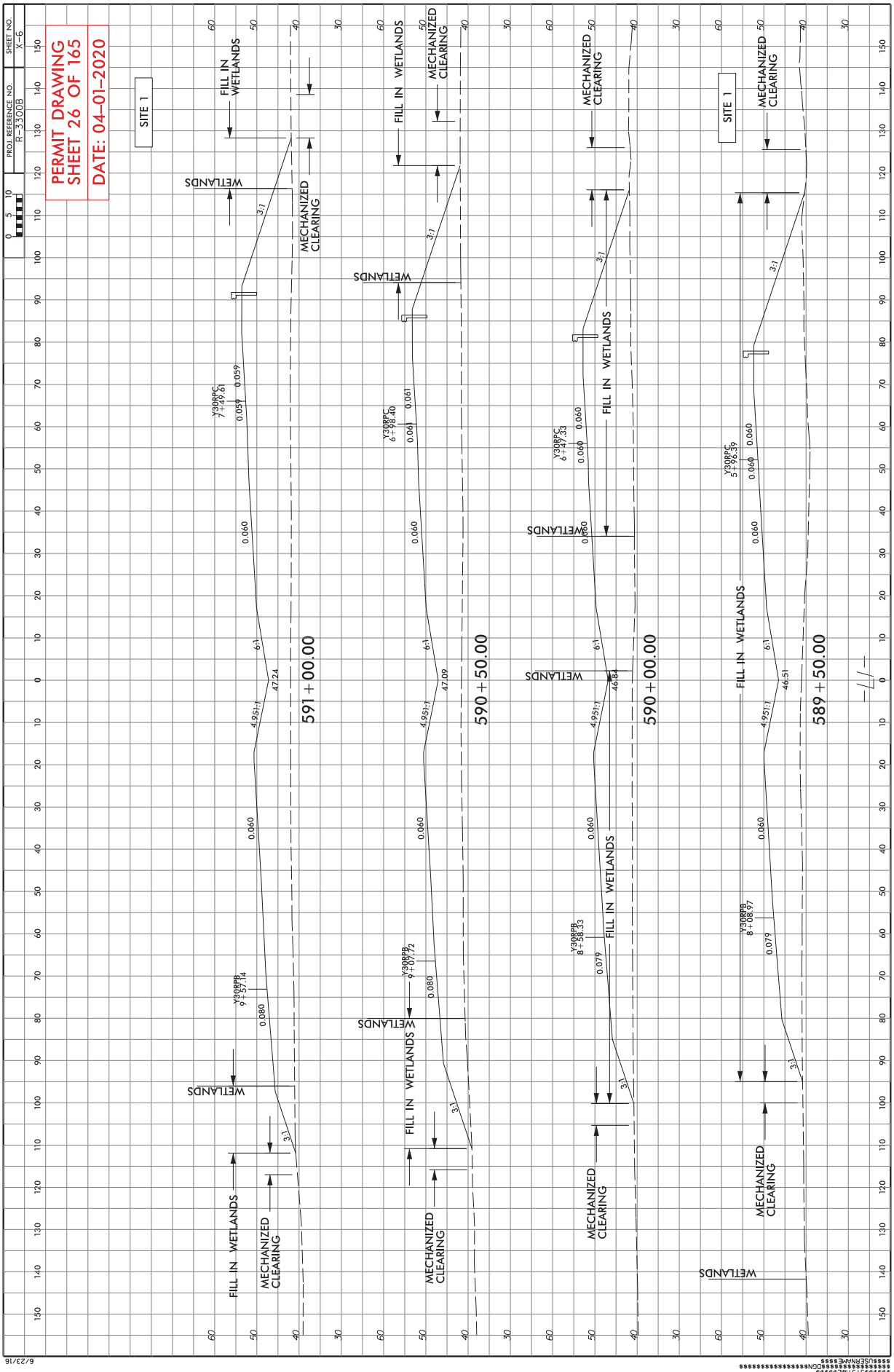
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$$$


PROJECT REFERENCE NO. R-3300B
SHEET NO. 4
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 23 OF 165
DATE: 04-01-2020
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 34 FOR -L1- PROFILE
SEE SHEET 55 FOR -Y30RPB- PROFILE
SEE SHEET 56 FOR -Y30RPC- PROFILE
MATCHLINE -L1- STA 591+00.00 SEE SHEET 5
-Y30RPC- POT Sta. 5+00.00
-L1- POC Sta. 588+55.3
47.00' RT
-Y30RPB- SC Sta. 7+16.00
-Y30RPB- CS Sta. 5+00.00
-L1- POC Sta. 586+36.72
47.00' LT
NAD 83/NSRS 2007
SCALE: 1" = 100'
50' 25' 0 50' 100'
END PROJECT R-3300A -L1- POC STA. 578+00.00
BEGIN PROJECT R-3300B -L1- POC STA. 578+00.00
SITE 1
GERALD D. HARDISON, JR. & HARDISON RENTALS, LLC.
WOVEN WIRE FENCE
REMOVE 18" HDPE
CL I RIPRAP EST 39 SY GRD
CL I RIPRAP EST 7 TONS EST 17 SY GRD
STD. 4' BASE DITCH 30 LF @ 2.33% = S EST 32 TONS EST 29 CY CORE EST 23 SY GEOTEX SEE DETAIL 33
LAT 2' BASE DITCH SEE DETAIL 1
LAT 2' BASE DITCH SEE DETAIL 24
15" RCP-IV
30" RCP-IV
54" RCP-IV
PES
2GI
2GI-A
-L1-
-Y1-
WOODS
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
5/14/99


PROJECT REFERENCE NO. R-3300B
SHEET NO. 4
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 24 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
License No. F-0672
END PROJECT R-3300A -L1- POC STA.578+00.00
BEGIN PROJECT R-3300B -L1- POC STA.578+00.00
-Y30RPB- SC Sta.x+1600
-Y30RPB- CS Sta.5+00.00
-L1- POC Sta.586+36.72
47.00 LT
-Y30RPC- POT Sta.5+00.00
-L1- POC Sta.588+55.13
47.00' RT
MATCHLINE -L1- STA 591+00.00 SEE SHEET 5
SITE 1
WOVEN WIRE FENCE
SCALE: 1"=100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 34 FOR -L1- PROFILE
SEE SHEET 55 FOR -Y30RPB- PROFILE
SEE SHEET 56 FOR -Y30RPC- PROFILE
GERALD D. HARDISON, JR. & HARDISON RENTALS, LLC.
5/14/99


PERMIT DRAWING
SHEET 25 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-5
0 5 10
SITE 1
MECHANIZED CLEARING
FILL IN WETLANDS
WETLANDS
589+00.00
588+50.00
588+00.00
587+50.00
3:1
6:1
4.95:1
4.20:1
3.94:1
0.060
0.080
0.078
Y30RPB 7+59.64
Y30RPB 7+10.32
Y30RPB 6+61.01
Y30RPB 6+11.71
Y30RPC 5+43.56
40.25
46.16
39.95
45.81
45.46
38.12
45.11


PERMIT DRAWING
SHEET 26 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-6
SITE 1
FILL IN WETLANDS
MECHANIZED CLEARING
WETLANDS
591+00.00
590+50.00
590+00.00
589+50.00
Y308PC 7+49.61
Y308PB 9+57.14
Y308PB 9+07.72
Y308PC 6+98.40
Y308PC 6+49.33
Y308PB 8+58.33
Y308PB 8+08.97
Y308PC 5+96.39
0.059
0.060
0.061
0.079
0.080
6:1
4.95:1
3:1
47.24
47.09
46.81
46.51

09/08/99

CONTRACT: TIP PROJECT: R-3300B

$$$$$$SYSTIME$$$$$$
$$$$$$USERNAME$$$$$$
$$$$$$DGNFILE$$$$$$

See Sheet 1A For Index of Sheets See Sheet 1B for Conventional Symbols

VICINITY MAP NOT TO SCALE

FDFI PLANS SUBMITTAL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PENDER COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3300B	1	

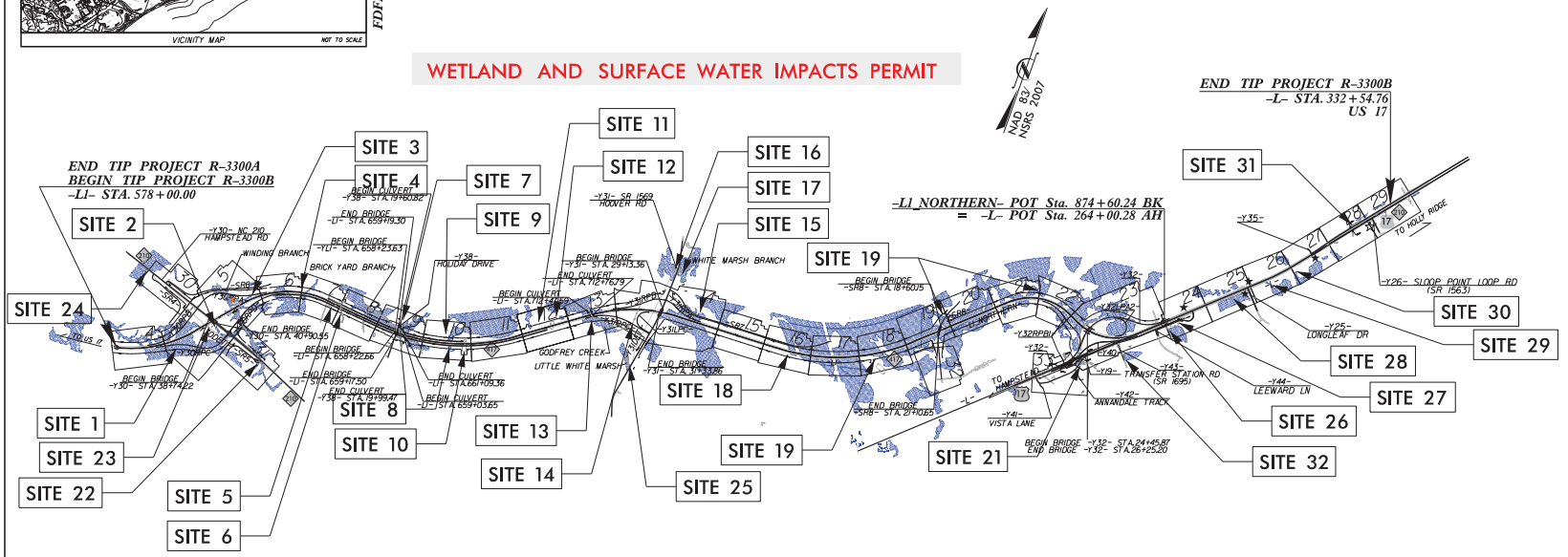
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
40237.1.1	N/A	PE
40237.2.1	N/A	R/W
40237.2.2	N/A	UTIL

PERMIT DRAWING
SHEET 1 OF 165
DATE: 04-01-2020

LOCATION: NC 417 (HAMPSTEAD BYPASS) FROM SOUTH OF NC 210 TO NORTH OF SR 1563 (SLOOP POINT LOOP ROAD).

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, SIGNALS, AND CULVERTS

WETLAND AND SURFACE WATER IMPACTS PERMIT



SUNGATE DESIGN GROUP, P.A.
Dewberry
2610 WYCLIFF ROAD SUITE 400 RALEIGH, NC 27607 PHONE: 919.881.9539 NC COA No.: P-0929

☆ UPDATE EXISTING SIGNAL
★ PROPOSED SIGNAL

-THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
-CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY MODIFIED METHOD III.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2016 = N/A
ADT 2040 = 55,400
DHV = 8 %
D = 60 %
T = 6 % *
V = 70 MPH
*(TTST 2% + DUALS 4%)
FUNC CLASS = FREEWAY
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3300B = 6.893 MILES
LENGTH STRUCTURE TIP PROJECT R-3300B = 0.023 MILES
TOTAL LENGTH TIP PROJECT R-3300B = 6.916 MILES

PREPARED IN THE OFFICE OF:
STANTEC CONSULTING
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 16, 2018

LETTING DATE: JULY 21, 2020

MICHAEL D. LINDGREN, P.E.
PROJECT ENGINEER

TRACE HOWELL, P.E.
NCDOT DIVISION 3 CONTACT

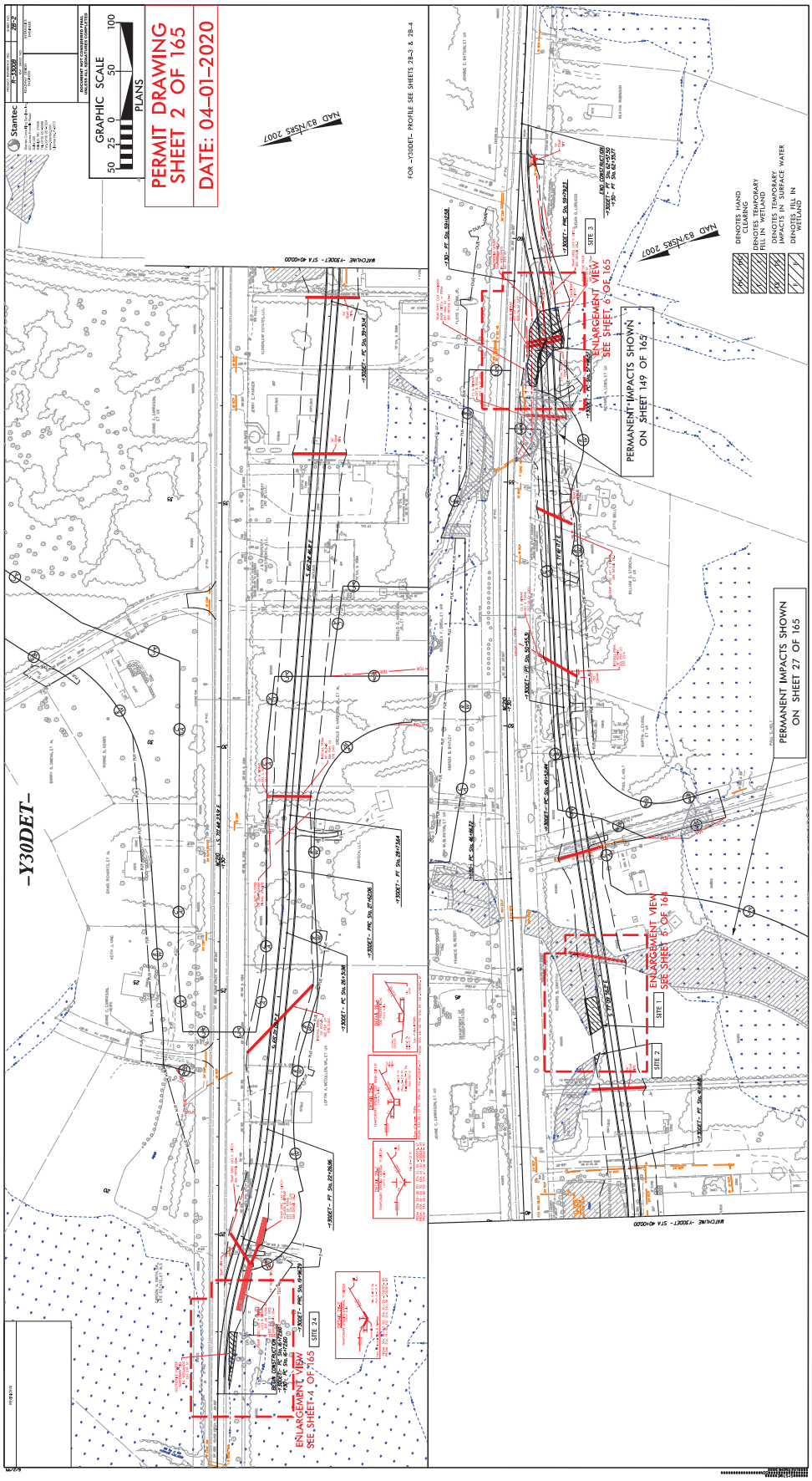
HYDRAULICS ENGINEERS

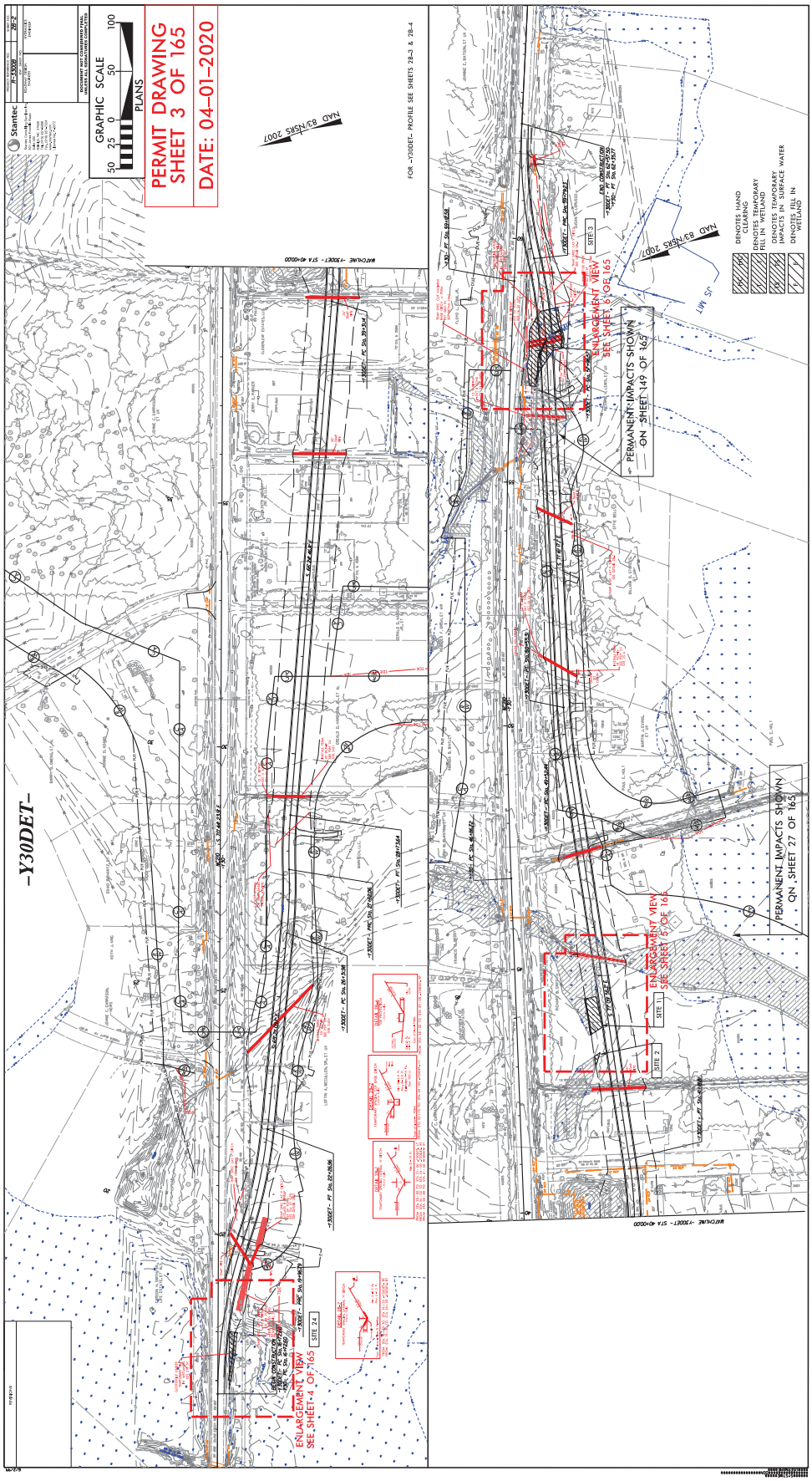
SIGNATURE: P.E.

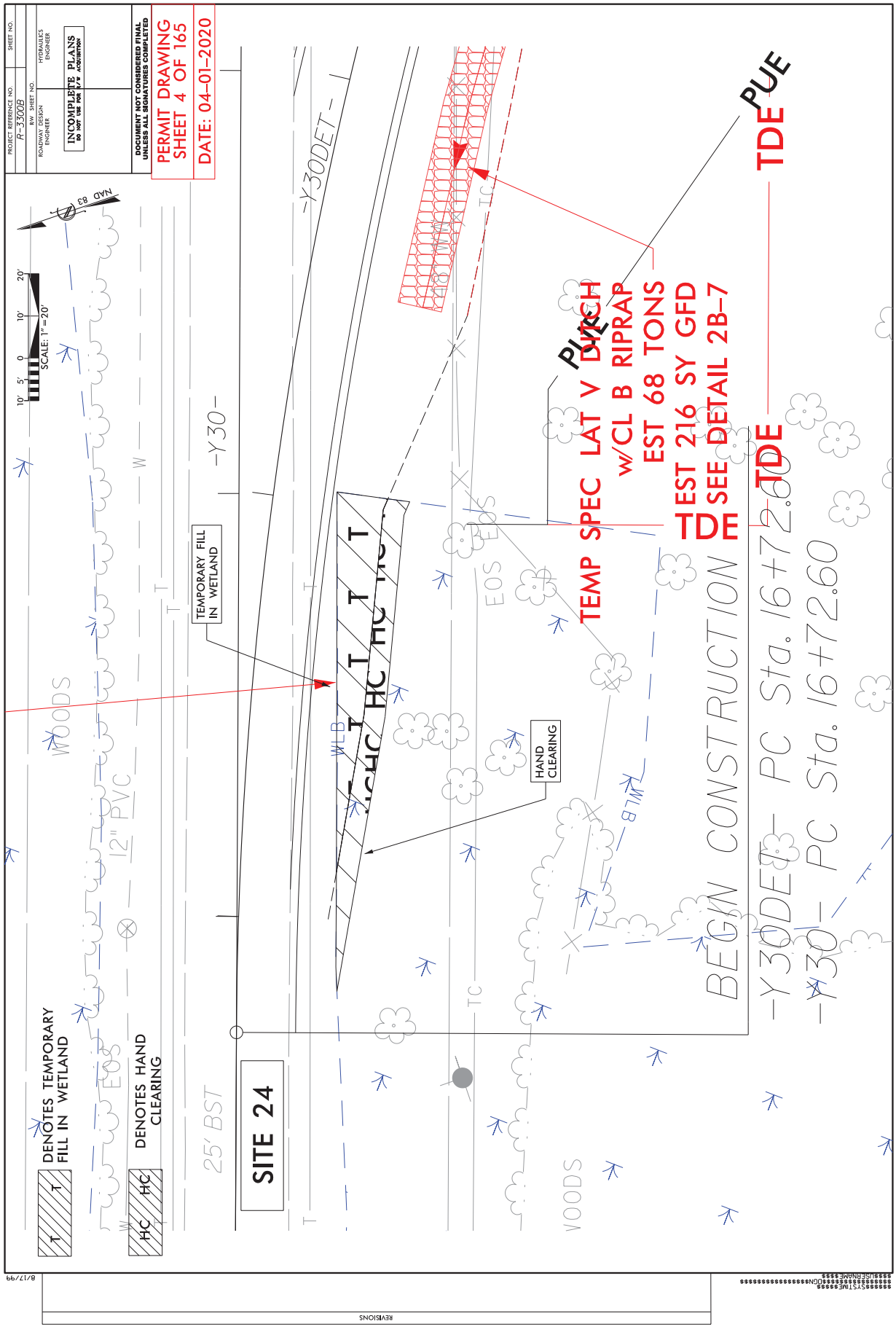
ROADWAY DESIGN ENGINEER

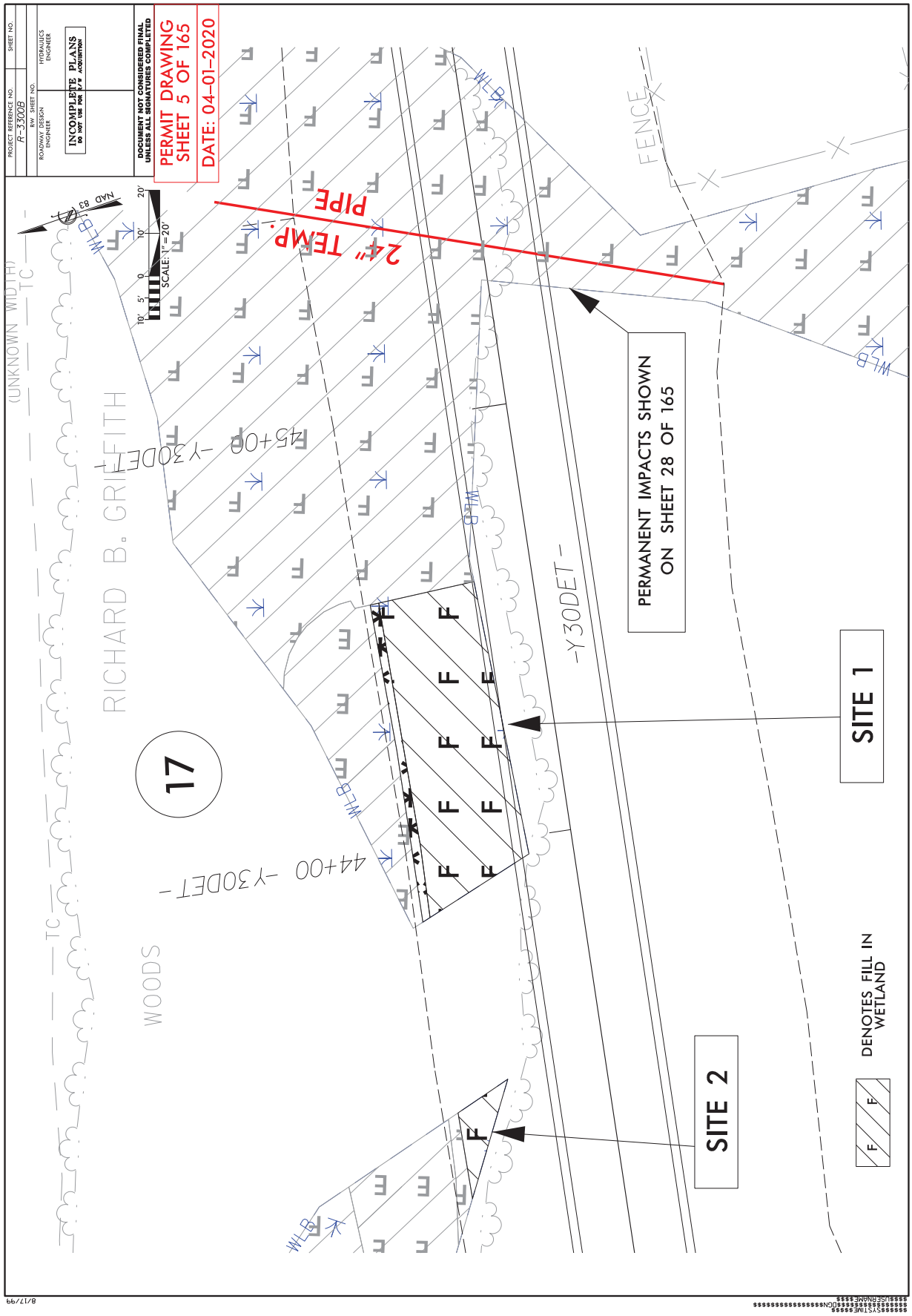
SIGNATURE: P.E.

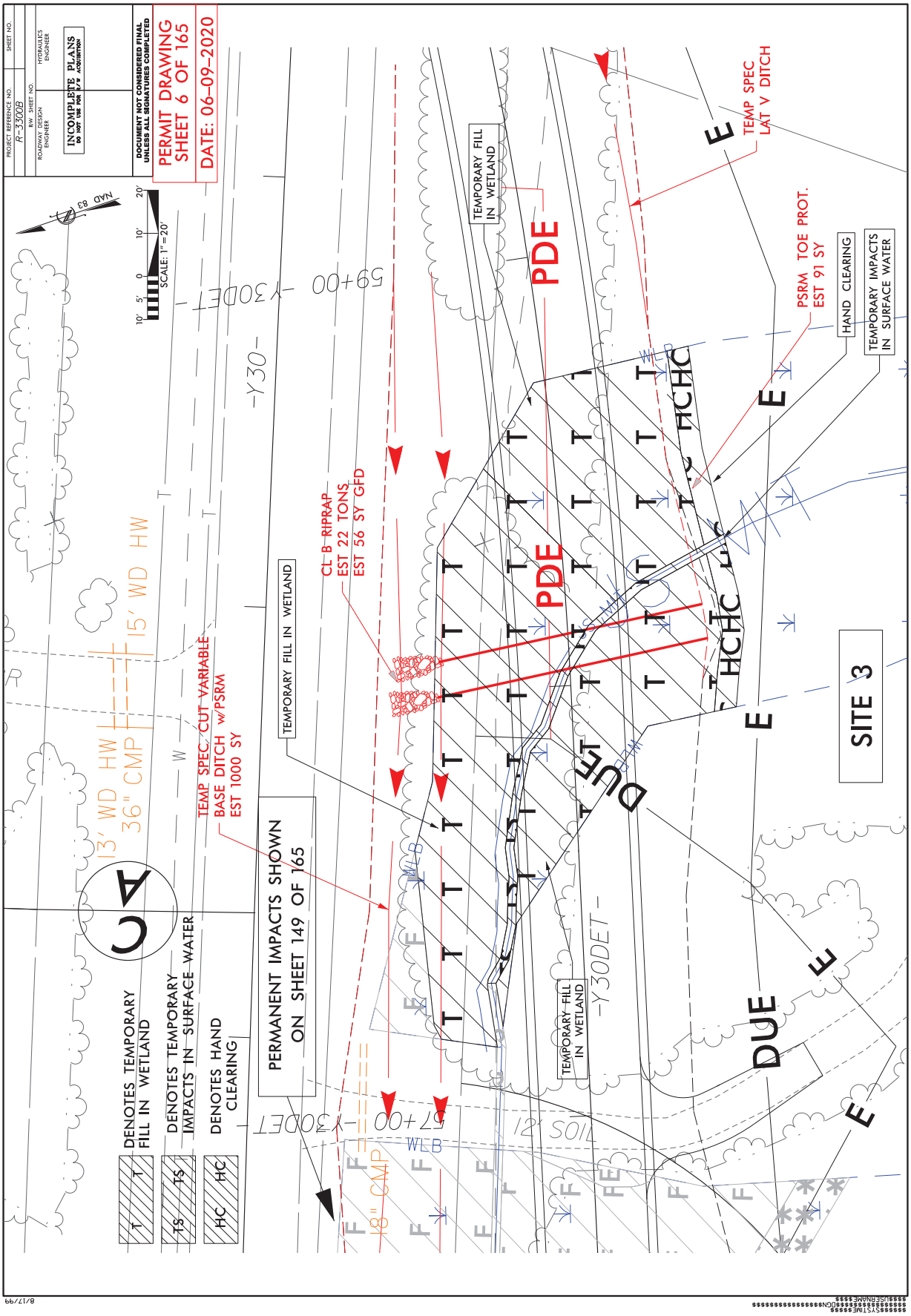
P-39

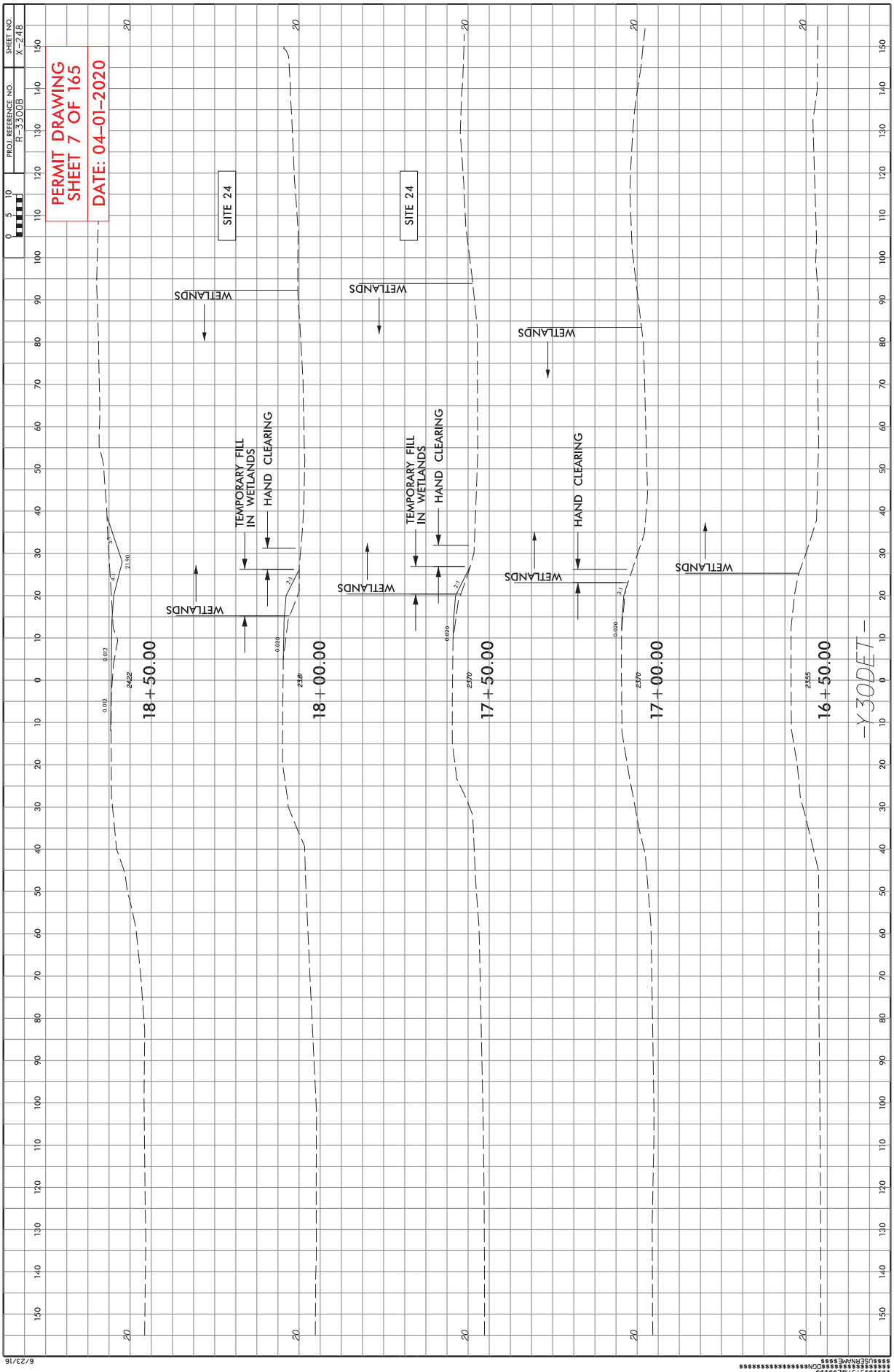

PERMIT DRAWING
SHEET 2 OF 165
DATE: 04-01-2020
GRAPHIC SCALE
PLANS
-Y30DET-
PERMANENT IMPACTS SHOWN ON SHEET 149 OF 165
PERMANENT IMPACTS SHOWN ON SHEET 27 OF 165
ENLARGEMENT VIEW SEE SHEET 6 OF 165
ENLARGEMENT VIEW SEE SHEET 5 OF 164
ENLARGEMENT VIEW SEE SHEET 4 OF 165
SITE 1
SITE 2
SITE 24
DENOTES HAND CLEARING
DENOTES TEMPORARY IMPACTS IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
NAD 83/NSRS 2007

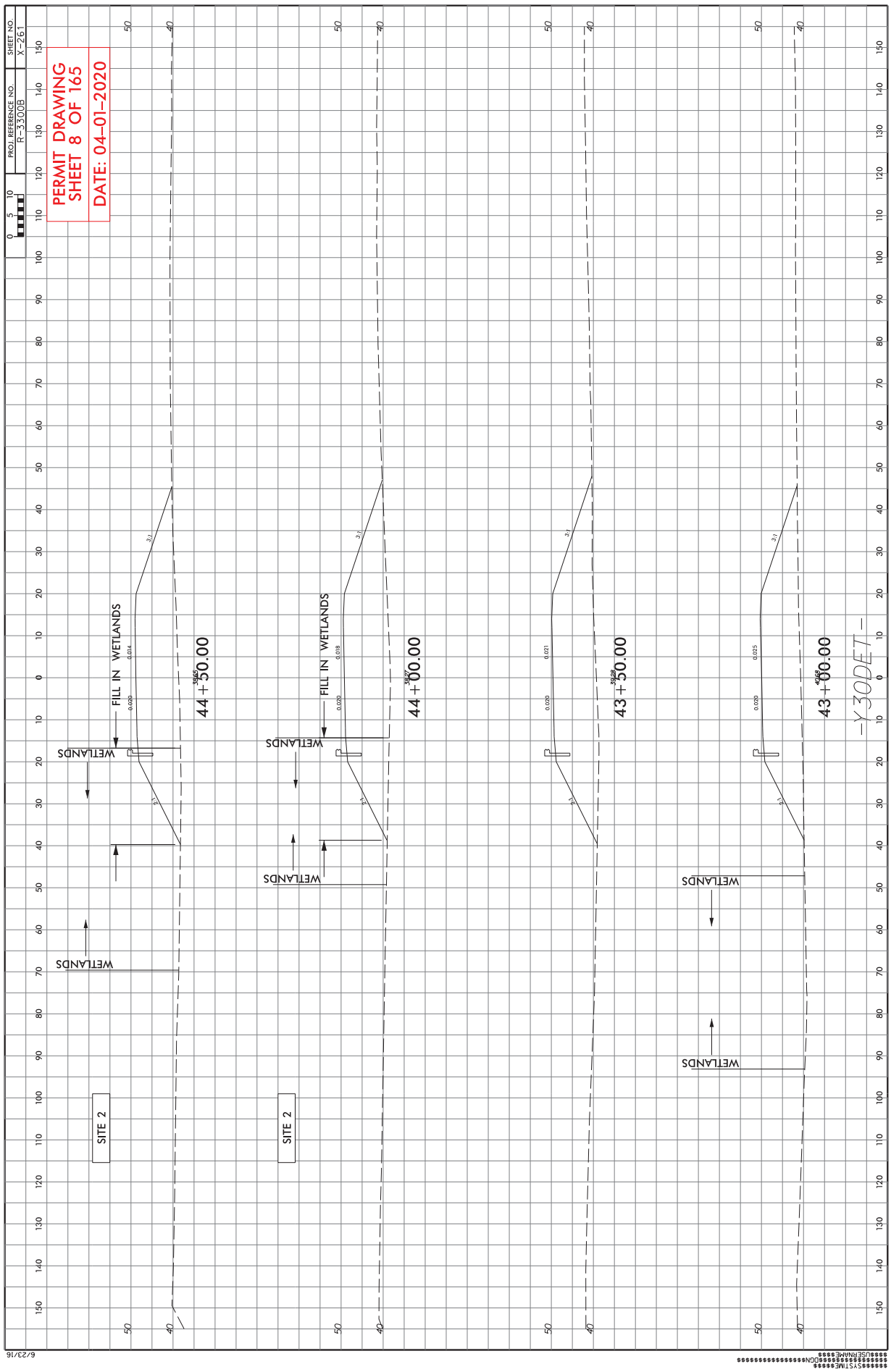

PERMIT DRAWING
SHEET 3 OF 165
DATE: 04-01-2020
GRAPHIC SCALE
PLANS
NAD 83/NSRS 2007
-Y30DET-
ENLARGEMENT VIEW
SEE SHEET 4 OF 165
SITE 24
PERMANENT IMPACTS SHOWN
ON SHEET 149 OF 165
ENLARGEMENT VIEW
SEE SHEET 6 OF 165
SITE 3
ENLARGEMENT VIEW
SEE SHEET 5 OF 165
SITE 1
SITE 2
PERMANENT IMPACTS SHOWN
ON SHEET 27 OF 165
DENOTES HAND CLEARING
DENOTES TEMPORARY FILL IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND

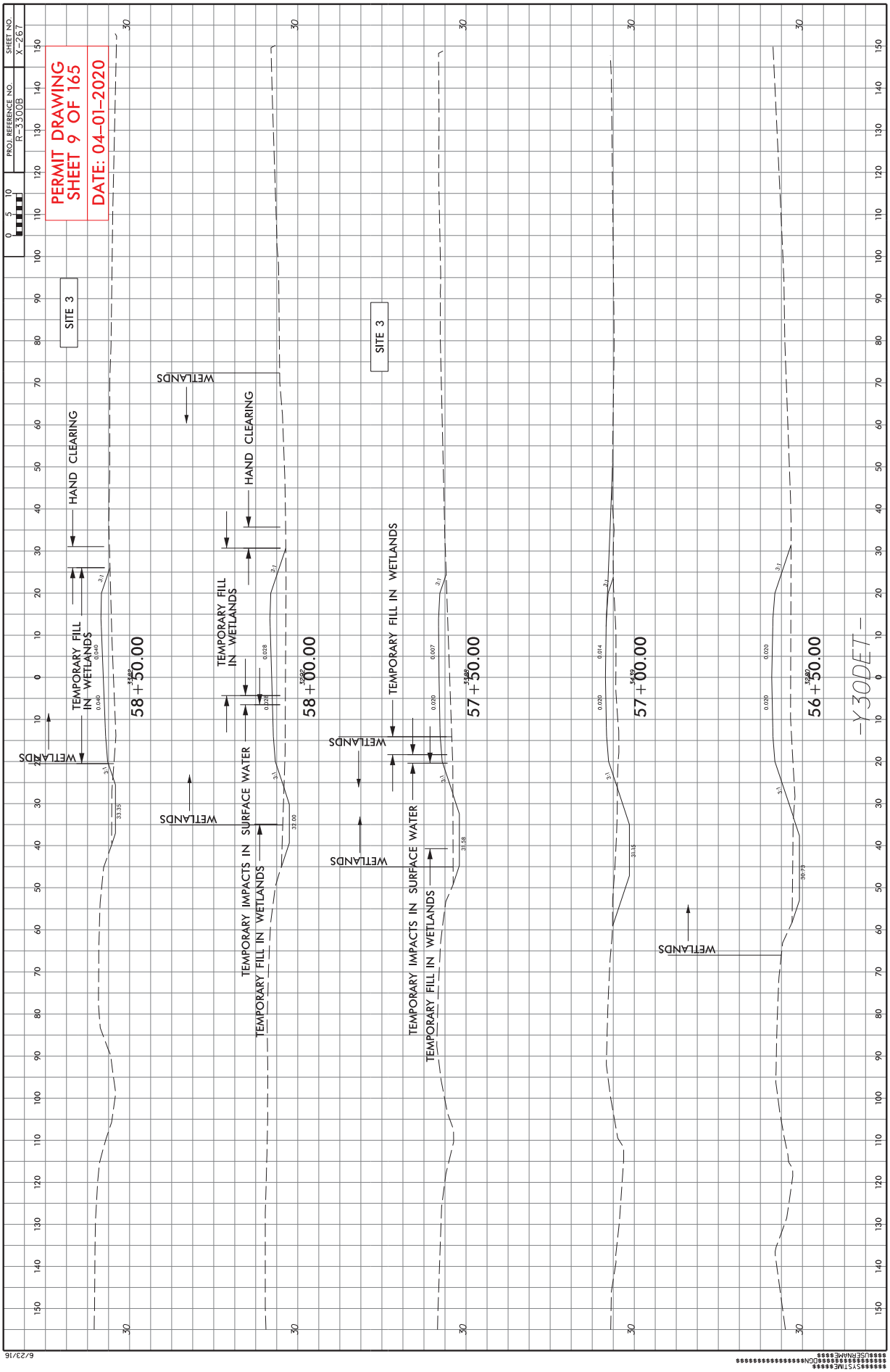

PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 4 OF 165
DATE: 04-01-2020
SCALE: 1" = 20'
NAD 83
DENOTES TEMPORARY FILL IN WETLAND
DENOTES HAND CLEARING
SITE 24
TEMPORARY FILL IN WETLAND
HAND CLEARING
TEMP SPEC LAT V DITCH
w/CL B RIPRAP
EST 68 TONS
EST 216 SY GFD
SEE DETAIL 2B-7
TDE
PUE
BEGIN CONSTRUCTION
-Y30DET- PC Sta. 16+72.60
-Y30- PC Sta. 16+72.60
-Y30-
-Y30DET-
12" PVC
25' BST
WOODS
EOS
TC
WLB
REVISIONS
8/17/99

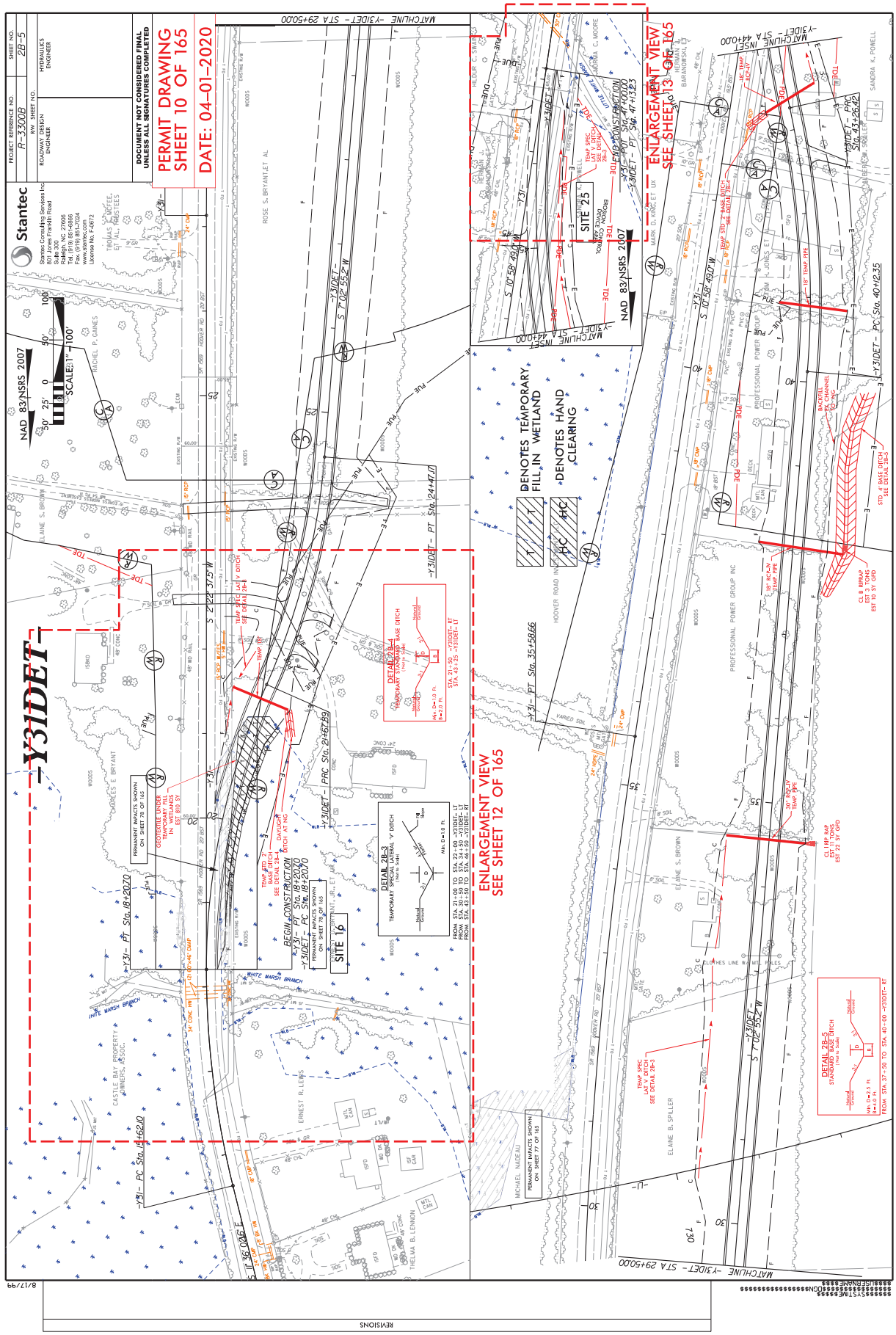

PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 5 OF 165
DATE: 04-01-2020
NAD 83
SCALE: 1"=20'
24" TEMP. PIPE
FENCE
(UNKNOWN WIDTH)
TC
RICHARD B. GRIFFITH
WOODS
17
-Y30DET-
45+00
44+00
WLB
PERMANENT IMPACTS SHOWN ON SHEET 28 OF 165
SITE 1
SITE 2
DENOTES FILL IN WETLAND
F

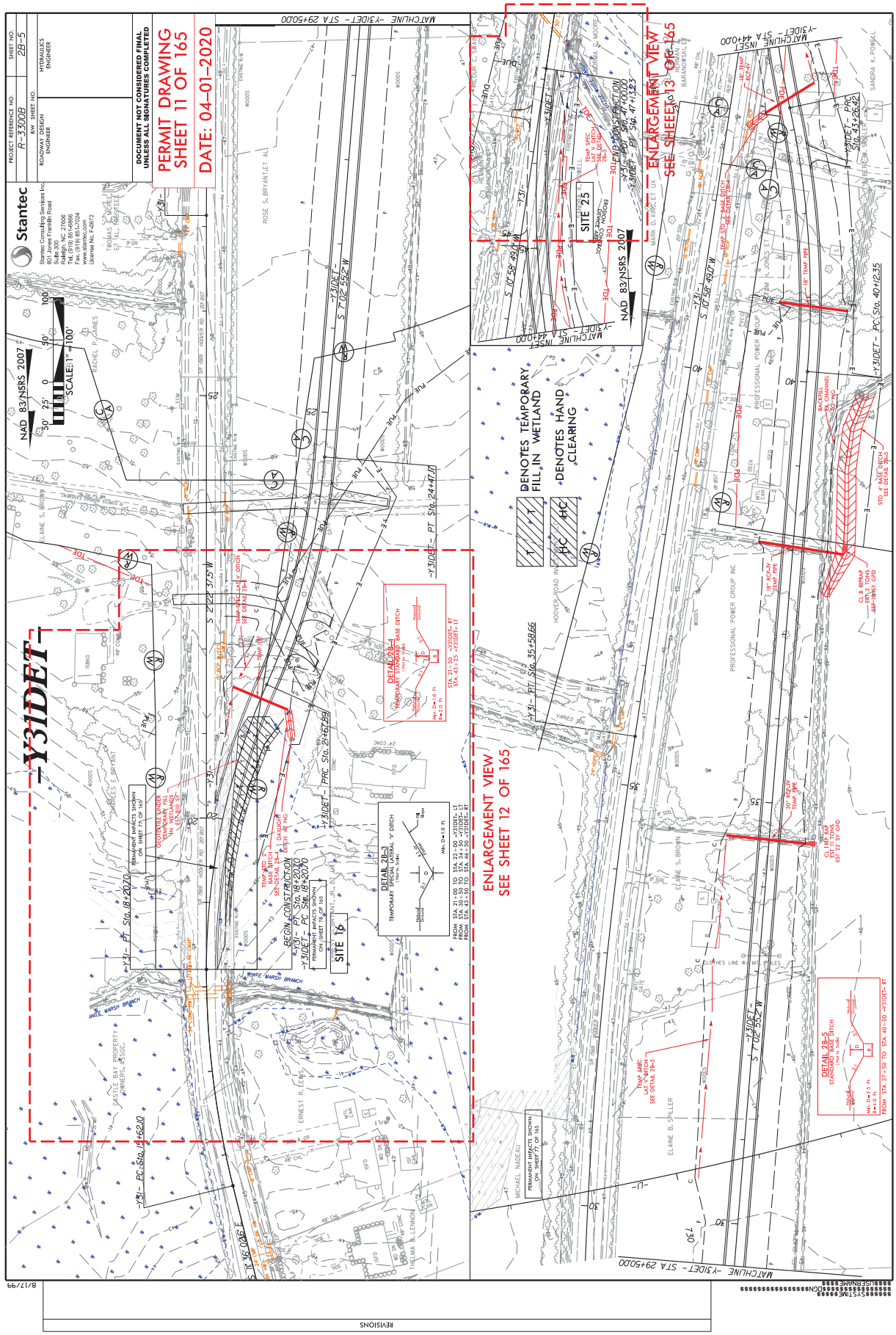

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 6 OF 165
DATE: 06-09-2020
NAD 83
SCALE: 1"= 20'
DENOTES TEMPORARY FILL IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES HAND CLEARING
PERMANENT IMPACTS SHOWN ON SHEET 149 OF 165
TEMPORARY FILL IN WETLAND
TEMP SPEC. CUT VARIABLE
BASE DITCH w/PSRM
EST 1000 SY
CL B RIPRAP
EST 22 TONS
EST 56 SY GFD
13' WD HW
36" CMP
15' WD HW
59+00 -Y30DET-
57+00 -Y30DET-
-Y30-
-Y30DET-
48" CMP
WLB
PDE
TEMPORARY FILL IN WETLAND
TEMP SPEC LAT V DITCH
PSRM TOE PROT.
EST 91 SY
HAND CLEARING
TEMPORARY IMPACTS IN SURFACE WATER
SITE 3
DUE

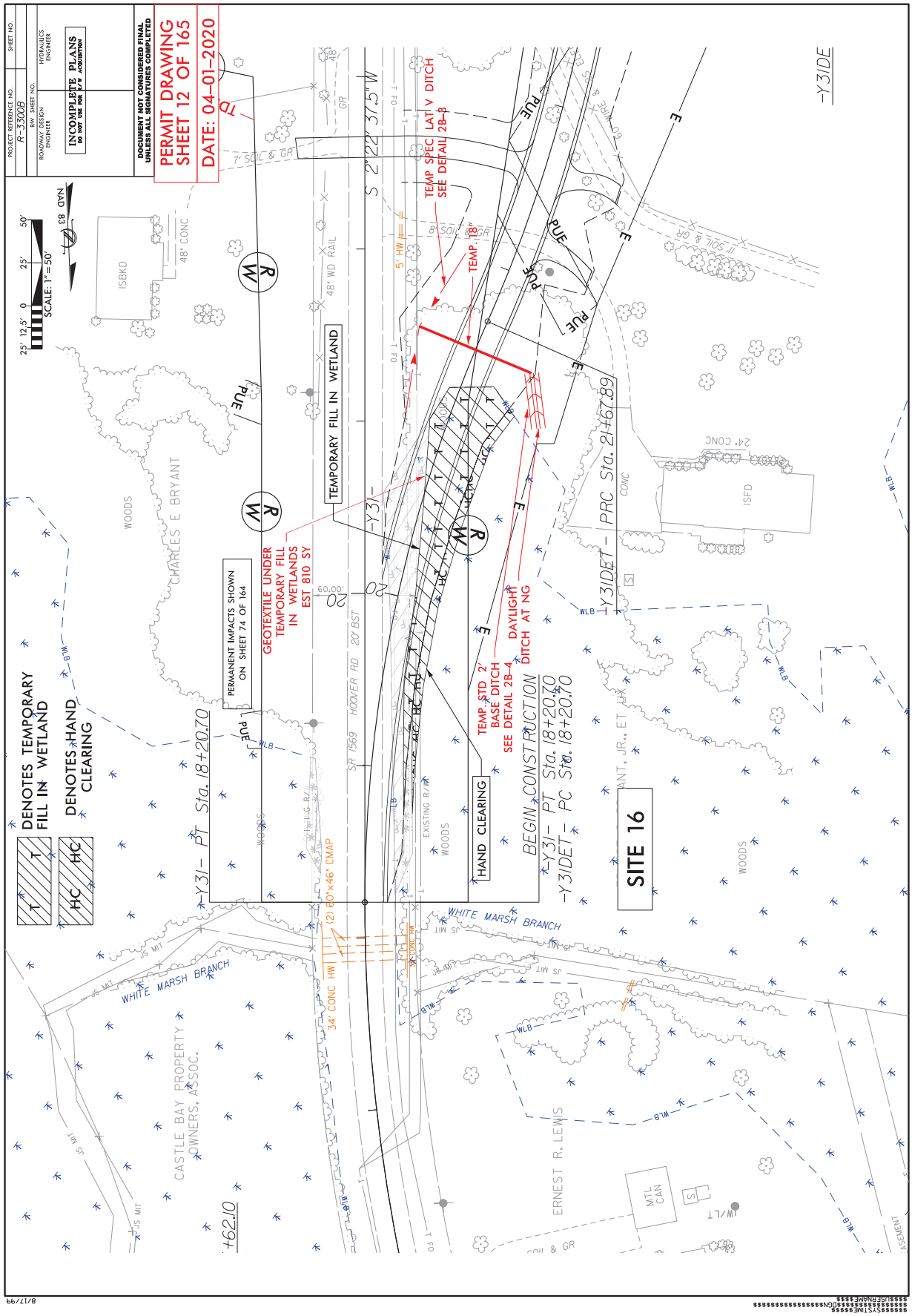

PERMIT DRAWING
SHEET 7 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-248
SITE 24
SITE 24
WETLANDS
WETLANDS
WETLANDS
WETLANDS
WETLANDS
WETLANDS
TEMPORARY FILL IN WETLANDS
HAND CLEARING
TEMPORARY FILL IN WETLANDS
HAND CLEARING
HAND CLEARING
18+50.00
18+00.00
17+50.00
17+00.00
16+50.00
-Y30DET-

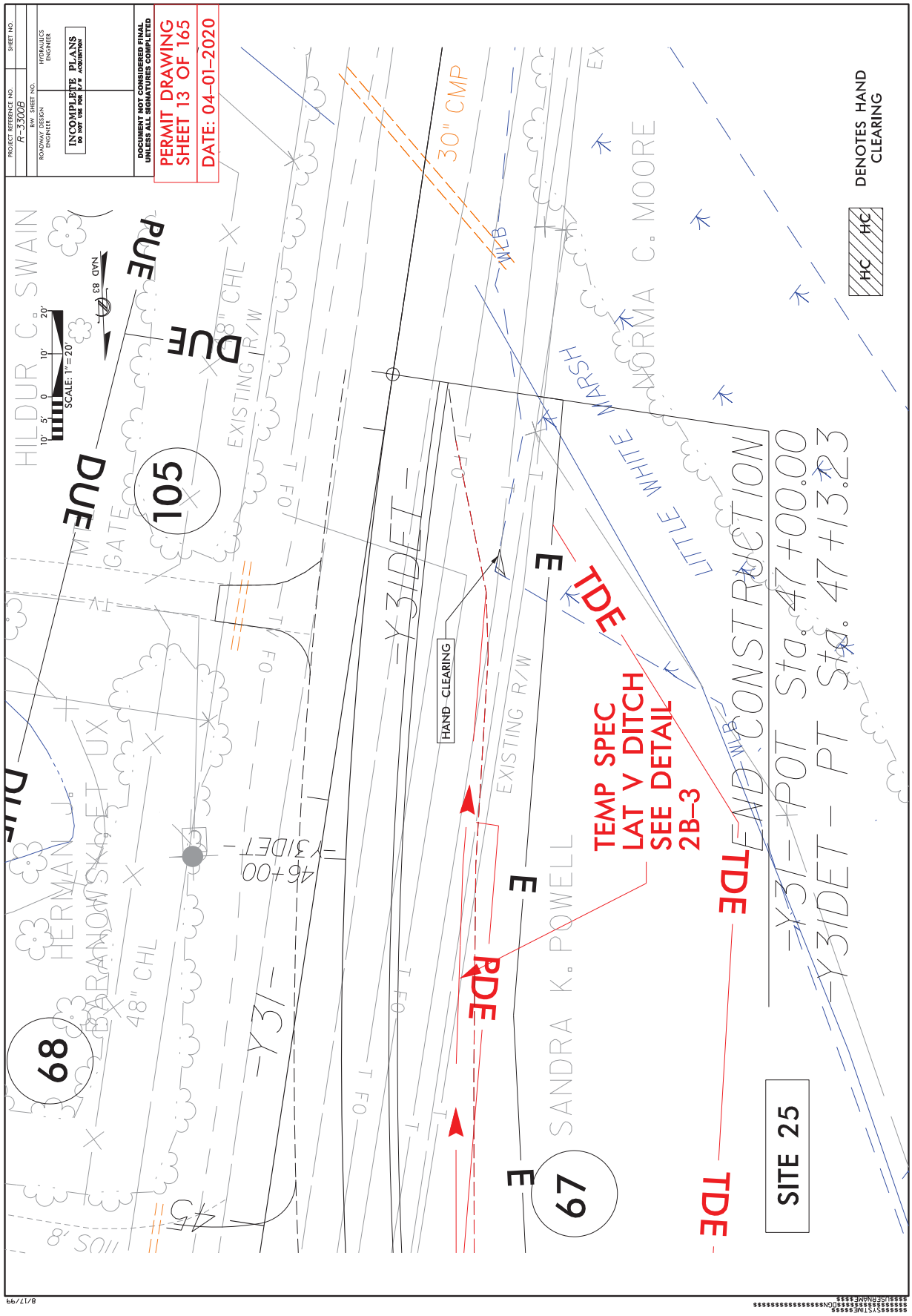

PERMIT DRAWING
SHEET 8 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-261
0 5 10
FILL IN WETLANDS
WETLANDS
SITE 2
44+50.00
44+00.00
43+50.00
43+00.00
3:1
-Y3ODET-
6/23/16


PERMIT DRAWING
SHEET 9 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-267
SITE 3
HAND CLEARING
TEMPORARY FILL IN WETLANDS
WETLANDS
TEMPORARY IMPACTS IN SURFACE WATER
58+50.00
58+00.00
57+50.00
57+00.00
56+50.00


PERMIT DRAWING
SHEET 10 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 2B-5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
NAD 83/NSRS 2007
SCALE: 1" = 100'
-Y31DET-
-Y31- PT Sta. 18+20.20
-Y31- PC Sta. 14+62.20
BEGIN CONSTRUCTION -Y31DET- PT Sta. 18+20.40
-Y31DET- PRC Sta. 21+67.89
-Y31DET- PT Sta. 24+47.10
-Y31- PT Sta. 35+58.66
-Y31DET- PRC Sta. 43+26.42
END CONSTRUCTION -Y31DET- PT Sta. 47+13.23
-Y31DET- S 7°02'55.2" W
S 22°23'37.5" W
S 0°58'49.4" W
S 0°58'49.0" W
MATCHLINE -Y31DET- STA 29+50.00
MATCHLINE -Y31DET- STA 44+00.00
ENLARGEMENT VIEW SEE SHEET 12 OF 165
ENLARGEMENT VIEW SEE SHEET 13 OF 165
DENOTES TEMPORARY FILL IN WETLAND
DENOTES HAND CLEARING
SITE 16
SITE 25
DETAIL 2B-3 TEMPORARY SPECIAL LATERAL 'V' DITCH
DETAIL 2B-4 STANDARD BASE DITCH
DETAIL 2B-5 STANDARD BASE DITCH
TEMP SPEC LAT V DITCH SEE DETAIL 2B-3
TEMP STD 7 BASE DITCH SEE DETAIL 2B-4
STD 7 BASE DITCH SEE DETAIL 2B-5
PERMANENT IMPACTS SHOWN ON SHEET 78 OF 165
PERMANENT IMPACTS SHOWN ON SHEET 77 OF 165
GEOTEXTILE LINER TEMPORARY FILL IN WETLANDS EST 810 SY
CL B RIPRAP EST 9 TONS EST 10 SY GFD
CL I RIP RAP EST 11 TONS EST 22 SY GFD
CASTLE BAY PROPERTY OWNERS ASSOC.
CHARLES E. BRYANT
ELAINE S. BROWN
RACHEL P. GAINES
ROSE S. BRYANT ET AL
PROFESSIONAL POWER GROUP INC
ELAINE B. SPILLER
ERNEST R. LEWIS
THELMA B. LENNON
MICHAEL NADEAU
WHITE MARSH BRANCH
REVISIONS
8/17/99


PERMIT DRAWING
SHEET 11 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 2B-5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
NAD 83/NSRS 2007
SCALE: 1" = 100'
-Y31DET-
-Y31- PT Sta. 18+20.70
-Y31- PC Sta. 14+62.10
-Y31DET- PRC Sta. 21+67.29
-Y31DET- PT Sta. 24+47.10
-Y31DET- PC Sta. 40+12.35
-Y31DET- PRC Sta. 43+26.42
-Y31DET- STA 29+50.00
-Y31DET- STA 44+00.00
BEGIN CONSTRUCTION -Y31DET- Sta. 18+20.70
SITE 16
SITE 25
DENOTES TEMPORARY FILL IN WETLAND
DENOTES HAND CLEARING
ENLARGEMENT VIEW SEE SHEET 12 OF 165
ENLARGEMENT VIEW SEE SHEET 13 OF 165
DETAIL 2B-3 TEMPORARY SPECIAL LATERAL 'V' DITCH
DETAIL 2B-4 TEMPORARY SPECIAL BASE DITCH
DETAIL 2B-5 STANDARD BASE DITCH
PERMANENT IMPACTS SHOWN ON SHEET 78 OF 165
PERMANENT IMPACTS SHOWN ON SHEET 77 OF 165
TEMP. SPEC. LAT. DITCH SEE DETAIL 2B-3
TEMP. SPEC. BASE DITCH SEE DETAIL 2B-4
STD. 4' LATE DITCH SEE DETAIL 2B-5
TEMP. STD. 7 BASE DITCH SEE DETAIL 2B-4
TEMP. SSRC LAT. V DITCH SEE DETAIL 2B-3
DESTROYED STRUCTURE TEMPORARY FILL NON-JURISDICTIONAL EES 0.10 AC
DESTROYED STRUCTURE TEMPORARY FILL NON-JURISDICTIONAL EES 0.03 AC
WWE MARSH BRANCH
CASTLE BAY PROPERTY OWNERS ASSOC.
PROFESSIONAL POWER GROUP INC
HOOVER ROAD INVESTMENTS LLC
ROSE S. BRYANT ET AL
ELAINE S. BROWN
ELAINE B. SPILLER
MICHAEL NADEAU
THELMA B. LENNON
ERNEST R. LEWIS
REVISIONS
8/17/99


PROJECT REFERENCE NO.
A-3300B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO.
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 12 OF 165
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
DENOTES TEMPORARY FILL IN WETLAND
DENOTES HAND CLEARING
-Y31- PT Sta. 18+20.70
-Y31- PT Sta. 18+20.70
-Y31DET- PC Sta. 18+20.70
-Y31DET- PRC Sta. 21+67.89
-Y31DE
BEGIN CONSTRUCTION
PERMANENT IMPACTS SHOWN ON SHEET 74 OF 164
GEOTEXTILE UNDER TEMPORARY FILL IN WETLANDS EST 810 SY
TEMPORARY FILL IN WETLAND
HAND CLEARING
TEMP SPEC LAT V DITCH SEE DETAIL 2B-3
TEMP. 18"
TEMP STD 2' BASE DITCH SEE DETAIL 2B-4
DAYLIGHT DITCH AT NG
SITE 16
SR 1569 HOOVER RD
20' BST
(2) 60"x46" CMAP
34" CONC HW
WHITE MARSH BRANCH
CHARLES E BRYANT
CASTLE BAY PROPERTY OWNERS, ASSOC.
ERNEST R. LEWIS
WOODS
ISBKD
ISFD
48" CONC
24" CONC
48" WD RAIL
MTL CAN
PUE
WLB
JS MIT
EXISTING R/W


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
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INCOMPLETE PLANS
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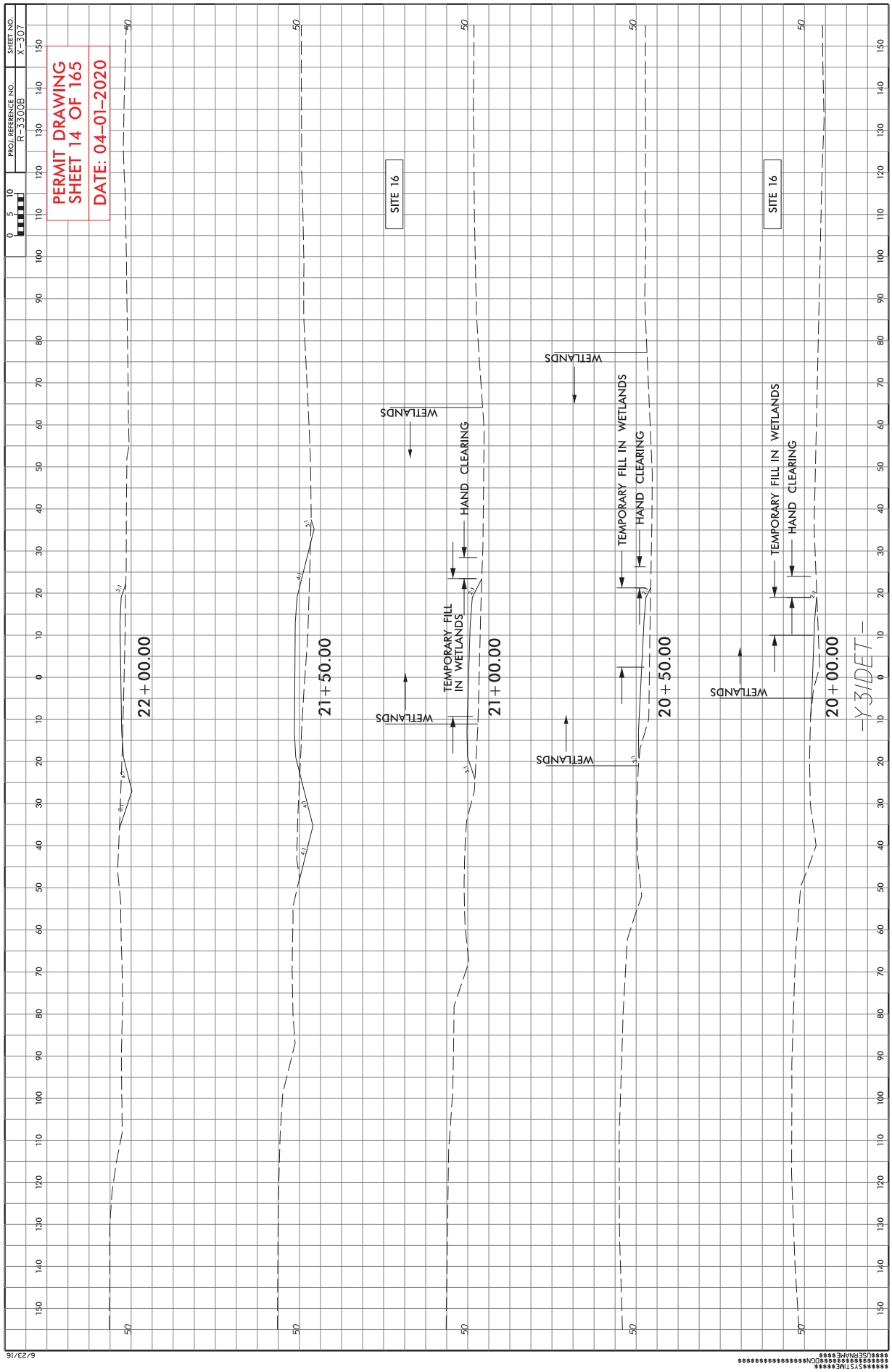
SHEET 13 OF 165
DATE: 04-01-2020
SCALE: 1"=20'
NAD 83
DENOTES HAND CLEARING
HC
HILDUR C. SWAIN
HERMAN J. BRANOWSKI ET UX
SANDRA K. POWELL
NORMA C. MOORE
MARSH
LITTLE WHITE
EXISTING R/W
48" CHL
18" CHL
30" CMP
T FO
BLW
EX
DUE
105
68
67
HAND CLEARING
TDE
PDE
TEMP SPEC
LAT V DITCH
SEE DETAIL
2B-3
-Y3/DET-
-Y3/-
46+00
-Y3/DET- PT Sta. 47+13.23
-Y3/- POT Sta. 47+00.00
END CONSTRUCTION
SITE 25
8/17/99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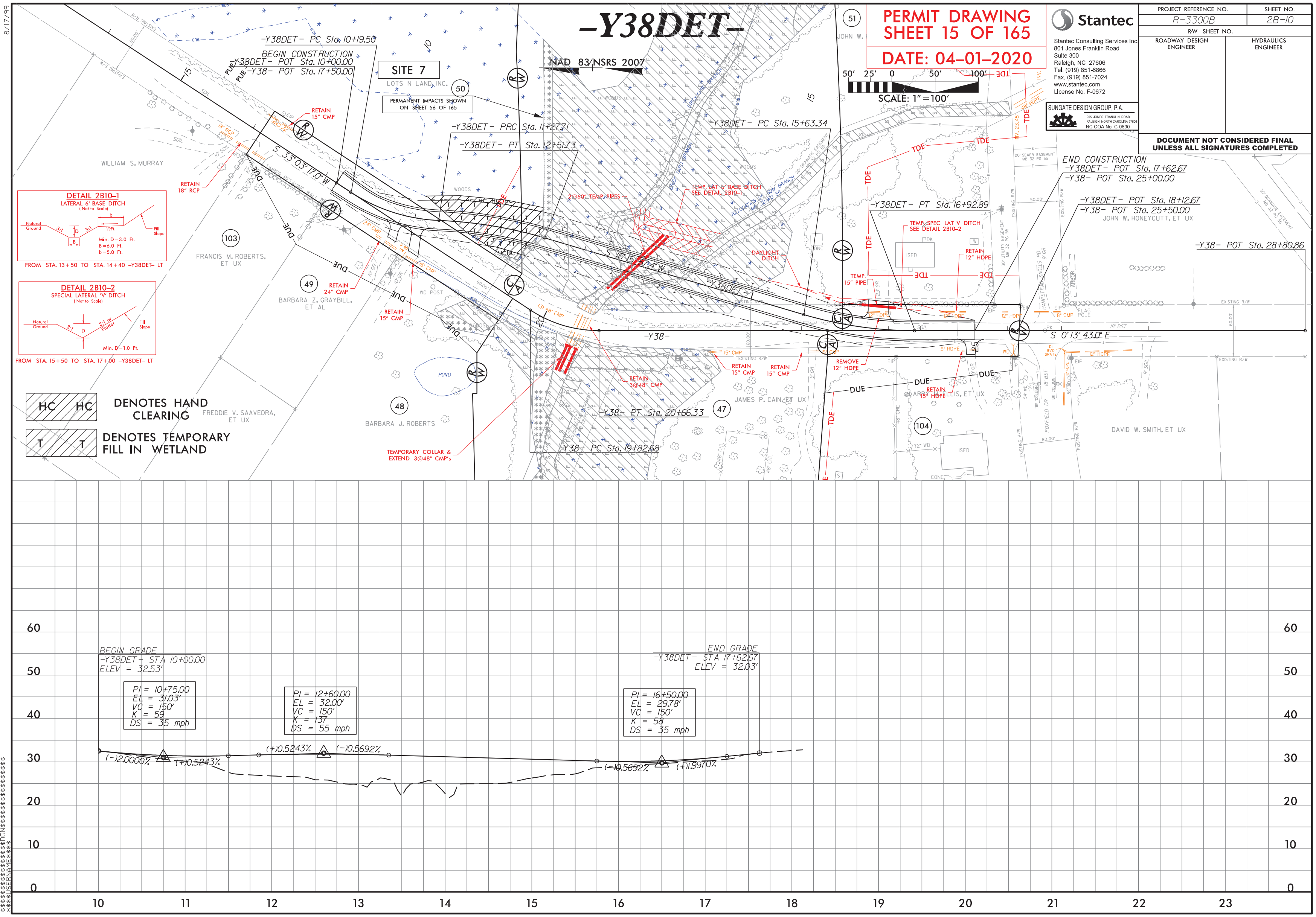
SHEET 14 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-307
0 5 10
22+00.00
21+50.00
21+00.00
20+50.00
20+00.00
SITE 16
SITE 16
WETLANDS
WETLANDS
WETLANDS
WETLANDS
WETLANDS
HAND CLEARING
TEMPORARY FILL IN WETLANDS
TEMPORARY FILL IN WETLANDS
HAND CLEARING
TEMPORARY FILL IN WETLANDS
HAND CLEARING
-Y SIDE T-
6/23/16

P-53



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SHEET 15 OF 165

DATE: 04-01-2020

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www.stantec.com
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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

PROJECT REFERENCE NO.	SHEET NO.
R-3300B	2B-10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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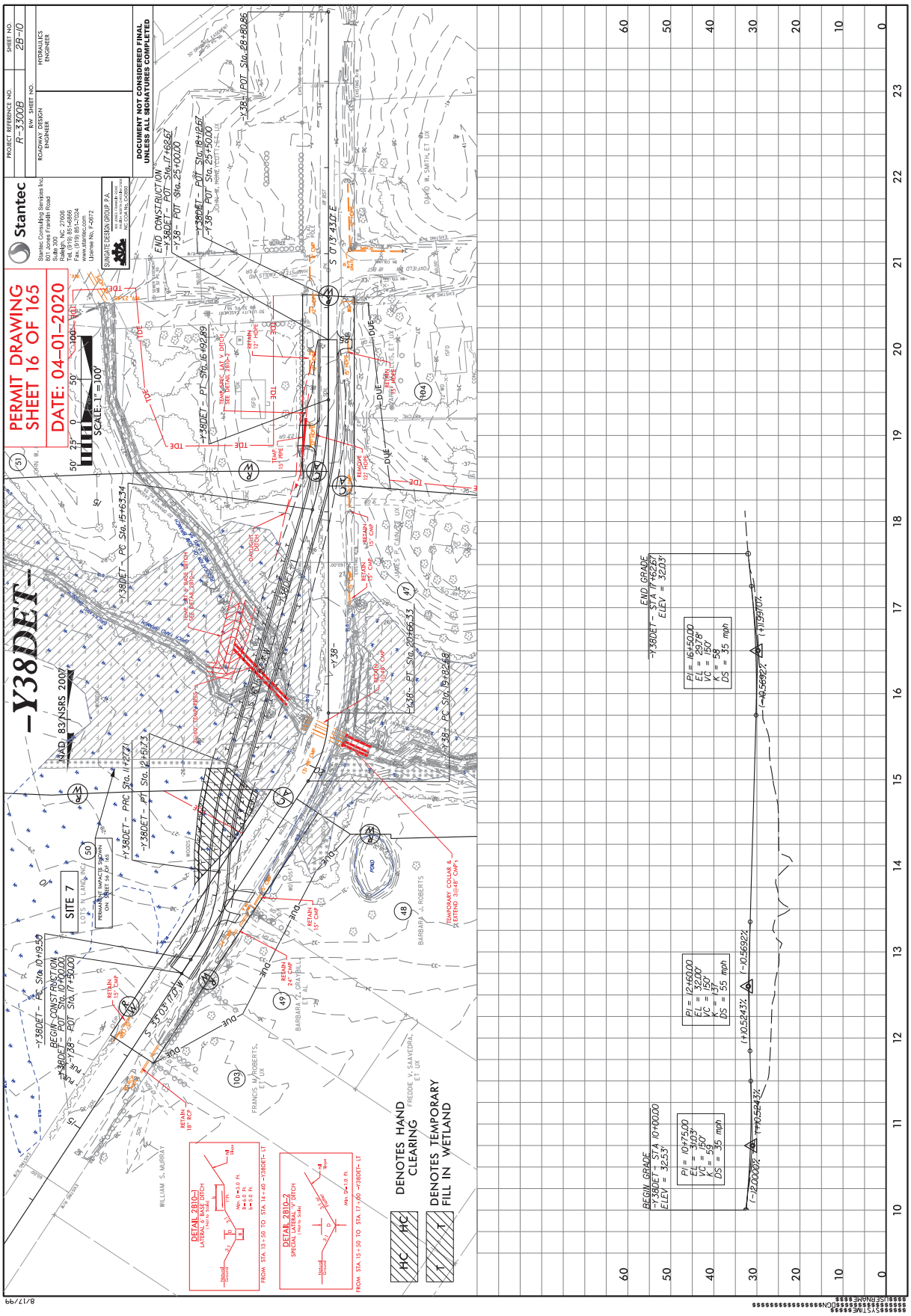
-Y38DET-
PERMIT DRAWING
SHEET 16 OF 165
DATE: 04-01-2020
Stantec
PROJECT REFERENCE NO.
R-3300B
SHEET NO.
2B-10
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
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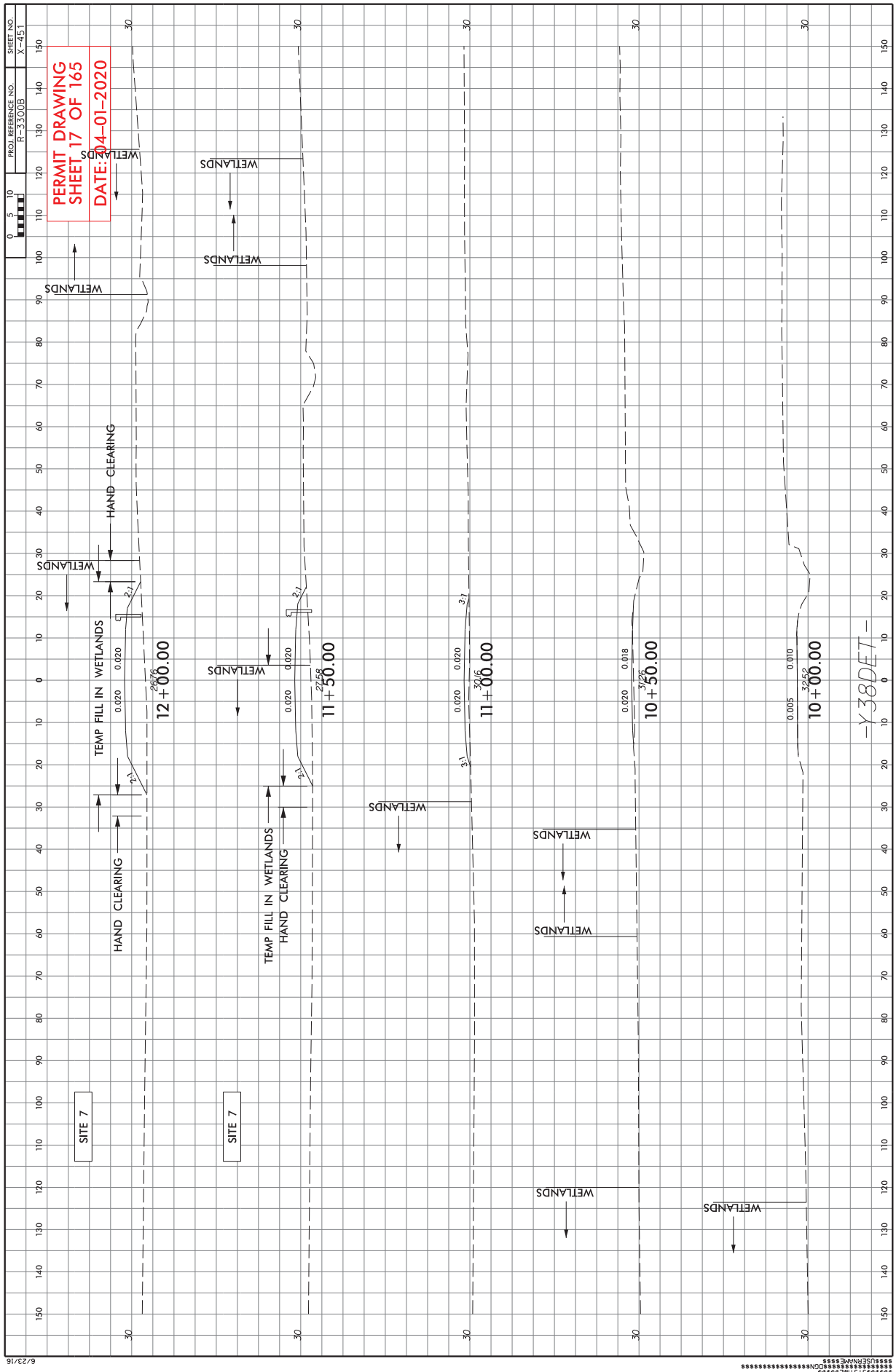
SUNGATE DESIGN GROUP, P.A.
License No. F-0672
SCALE: 1"=100'
NAD 83/NSRS 2007
-Y38DET- PC Sta. 10+19.59
BEGIN CONSTRUCTION
-Y38DET- POT Sta. 10+00.00
-Y38- POT Sta. 17+30.00
-Y38DET- PRC Sta. 11+27.41
-Y38DET- PT Sta. 12+51.73
-Y38DET- PC Sta. 15+63.34
-Y38DET- PT Sta. 16+92.89
END CONSTRUCTION
-Y38DET- POT Sta. 17+68.67
-Y38- POT Sta. 25+00.00
-Y38DET- POT Sta. 18+11.67
-Y38- POT Sta. 25+45.00
-Y38- POT Sta. 28+30.86
SITE 7
LOTS 1, 2, AND 3
PERMIT DRAWING SHEET 17 OF 165
DETAIL 2B10-1
LATERAL "V" DITCH
DETAIL 2B10-2
SPECIAL LATERAL "V" DITCH
FROM STA. 13+50 TO STA. 14+40 -Y38DET- LT
FROM STA. 15+50 TO STA. 17+60 -Y38DET- LT
DENOTES HAND CLEARING
DENOTES TEMPORARY FILL IN WETLAND
BEGIN GRADE
-Y38DET- STA 10+00.00
ELEV = 32.53'
PI = 10+75.00
EL = 31.03'
VC = 150'
K = 59
DS = 35 mph
PI = 12+60.00
EL = 32.00'
VC = 150'
K = 37
DS = 55 mph
PI = 16+50.00
EL = 29.78'
VC = 150'
K = 59
DS = 35 mph
END GRADE
-Y38DET- STA 17+68.67
ELEV = 32.03'
(-)2.00%
(+)0.52431%
(-)0.56922%
(+)0.56922%
(-)0.56922%
(+)1.99107%
NAD 83/NSRS 2007
8/17/99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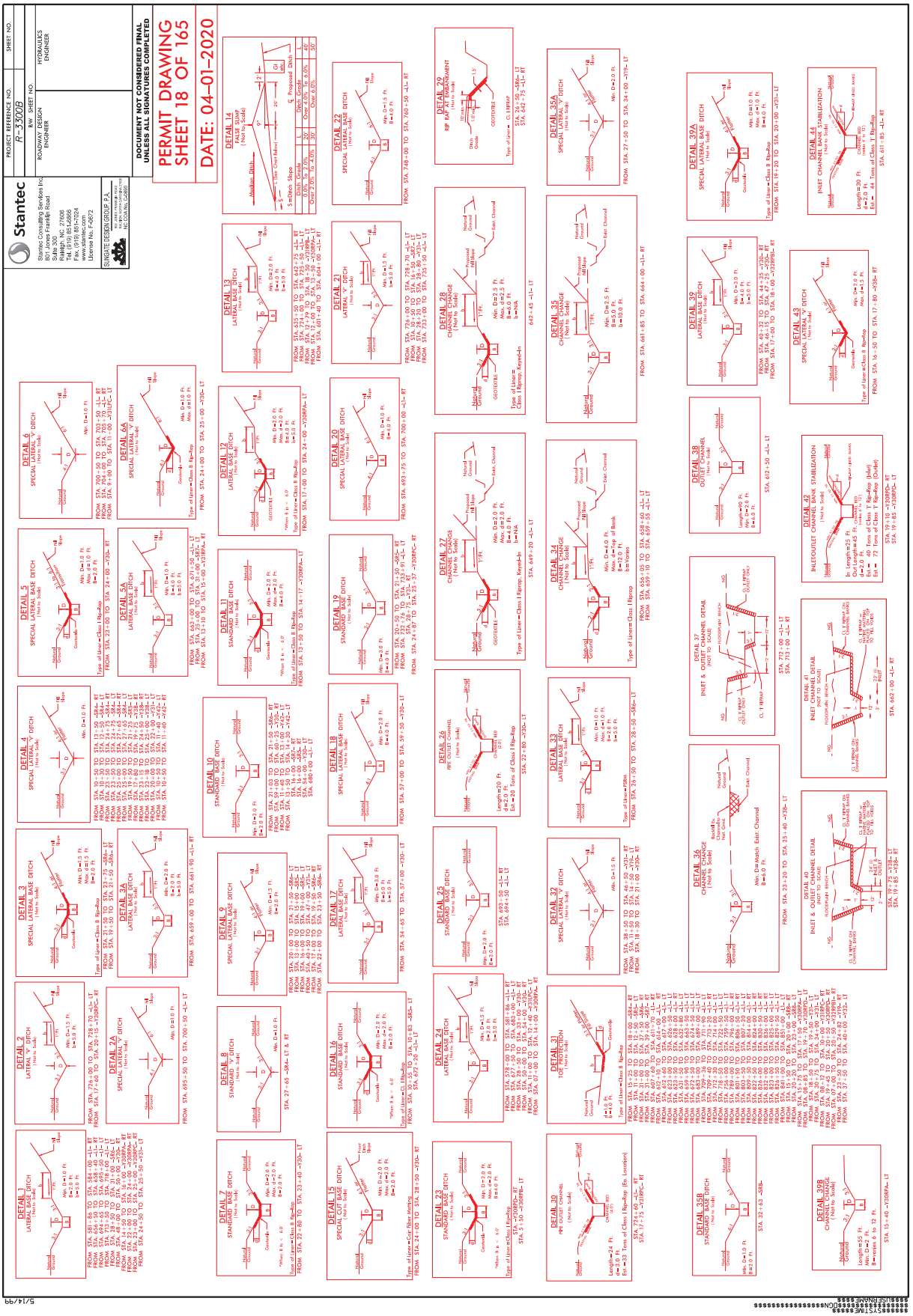
SHEET 17 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-451
0 5 10
WETLANDS
HAND CLEARING
TEMP FILL IN WETLANDS
SITE 7
12+00.00
11+50.00
11+00.00
10+50.00
10+00.00
2676
2758
3016
3276
3262
0.020
0.018
0.010
0.005
2:1
3:1
-Y38DET-
6/23/16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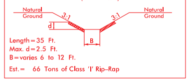
SHEET 18 OF 165
DATE: 04-01-2020
DETAIL 1
LATERAL BASE DITCH
DETAIL 2
LATERAL "V" DITCH
DETAIL 2A
SPECIAL LATERAL "V" DITCH
DETAIL 3
SPECIAL LATERAL BASE DITCH
DETAIL 3A
LATERAL BASE DITCH
DETAIL 4
SPECIAL LATERAL "V" DITCH
DETAIL 5
SPECIAL LATERAL BASE DITCH
DETAIL 5A
LATERAL BASE DITCH
DETAIL 6
SPECIAL LATERAL BASE DITCH
DETAIL 6A
SPECIAL LATERAL "V" DITCH
DETAIL 7
STANDARD BASE DITCH
DETAIL 8
STANDARD "V" DITCH
DETAIL 9
SPECIAL LATERAL BASE DITCH
DETAIL 10
STANDARD BASE DITCH
DETAIL 11
STANDARD BASE DITCH
DETAIL 12
LATERAL BASE DITCH
DETAIL 13
LATERAL BASE DITCH
DETAIL 14
FALSE SUMP
DETAIL 15
SPECIAL LATERAL BASE DITCH
DETAIL 16
STANDARD BASE DITCH
DETAIL 17
LATERAL BASE DITCH
DETAIL 18
SPECIAL LATERAL BASE DITCH
DETAIL 19
STANDARD BASE DITCH
DETAIL 20
SPECIAL LATERAL BASE DITCH
DETAIL 21
LATERAL "V" DITCH
DETAIL 22
SPECIAL LATERAL BASE DITCH
DETAIL 23
STANDARD BASE DITCH
DETAIL 24
LATERAL BASE DITCH
DETAIL 25
STANDARD BASE DITCH
DETAIL 26
PIPE OUTLET CHANNEL
DETAIL 27
CHANNEL CHANGE
DETAIL 28
CHANNEL CHANGE
DETAIL 29
RIP RAP AT EMBANKMENT
DETAIL 30
PIPE OUTLET CHANNEL
DETAIL 31
TOE PROTECTION
DETAIL 32
SPECIAL LATERAL "V" DITCH
DETAIL 33
LATERAL BASE DITCH
DETAIL 34
CHANNEL CHANGE
DETAIL 35
CHANNEL CHANGE
DETAIL 35A
SPECIAL LATERAL "V" DITCH
DETAIL 35B
STANDARD BASE DITCH
DETAIL 36
CHANNEL CHANGE
DETAIL 37
INLET & OUTLET CHANNEL DETAIL
DETAIL 38
OUTLET CHANNEL
DETAIL 39
LATERAL BASE DITCH
DETAIL 39A
SPECIAL LATERAL BASE DITCH
DETAIL 39B
CHANNEL CHANGE
DETAIL 40
INLET & OUTLET CHANNEL DETAIL
DETAIL 41
INLET CHANNEL DETAIL
DETAIL 42
INLET/OUTLET CHANNEL BANK STABILIZATION
DETAIL 43
SPECIAL LATERAL "V" DITCH
DETAIL 44
INLET CHANNEL BANK STABILIZATION
5/14/99

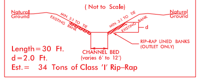
DETAIL 45
OUTLET CHANNEL BANK STABILIZATION
(Not to Scale)



Length=35 Ft.
Max. d=2.5 Ft.
B=varies 6 to 12 Ft.
Est.= 66 Tons of Class 'I' Rip–Rap

STA. 612+40 –L1– LT

DETAIL 46
OUTLET CHANNEL BANK STABILIZATION
(Not to Scale)



Length=30 Ft.
d=2.0 Ft.
Est.= 34 Tons of Class 'I' Rip–Rap

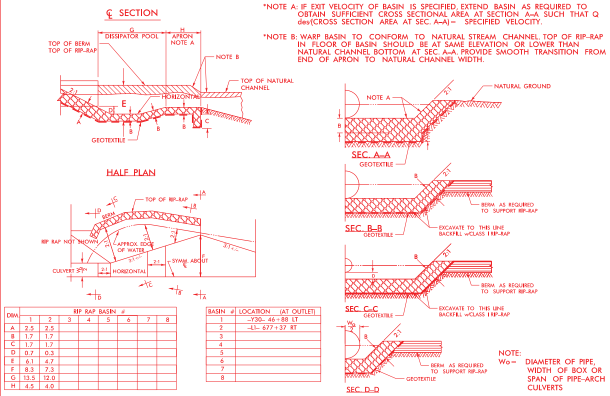
STA. 26+40 –SR6– LT

DETAIL 47

RIP–RAPPED ENERGY DISSIPATOR BASIN

*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A–A SUCH THAT Q des/(CROSS SECTION AREA AT SEC. A–A)= SPECIFIED VELOCITY.

*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP–RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A–A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.



DIM.	RIP RAP BASIN #							
	1	2	3	4	5	6	7	8
A	2.5	2.5						
B	1.7	1.7						
C	1.7	1.7						
D	0.7	0.3						
E	6.1	4.7						
F	8.3	7.3						
G	13.5	12.0						
H	4.5	4.0						

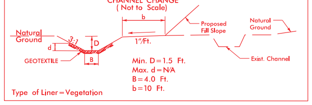
*ALL DIMENSIONS APPROXIMATE IN FEET (FT)

BASIN #	LOCATION (AT OUTLET)
1	–Y30– 46+88 LT
2	–L1– 677+37 RT
3	
4	
5	
6	
7	
8	

NOTE:
Wo= DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE–ARCH CULVERTS

5/05

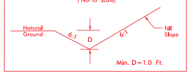
DETAIL 48
CHANNEL CHANGE
(Not to Scale)



Min. D=1.5 Ft.
Max. d=N/A
B=4.0 Ft.
b=10 Ft.
Type of Liner=Vegetation

FROM STA. 787+50 TO STA. 788+50 –L1– RT

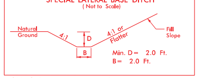
DETAIL 49
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.0 Ft.

FROM STA. 231+00 TO STA. 232+00 –Y40– RT

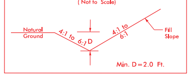
DETAIL 50
SPECIAL LATERAL BASE DITCH
(Not to Scale)



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

FROM STA. 235+00 TO STA. 237+20 –Y40– RT

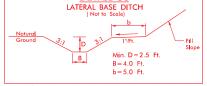
DETAIL 52
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D=2.0 Ft.

FROM STA. 12+00 TO STA. 15+00 –Y32– LT

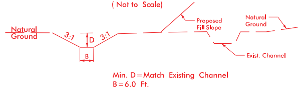
DETAIL 53
LATERAL BASE DITCH
(Not to Scale)



Min. D=2.5 Ft.
B=4.0 Ft.
b=5.0 Ft.

FROM STA. 15+00 TO STA. 18+30 –Y32– LT

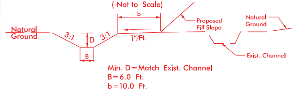
DETAIL 54
CHANNEL CHANGE
(Not to Scale)



Min. D=Match Existing Channel
B=6.0 Ft.

FROM STA. 18+30 TO STA.21+90 –Y32– LT

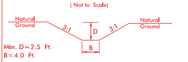
DETAIL 55
CHANNEL CHANGE
(Not to Scale)



Min. D=Match Exist. Channel
B=6.0 Ft.
b=10.0 Ft.

FROM STA. 26+00 TO STA. 31+65 –Y32– LT

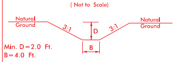
DETAIL 56
STANDARD BASE DITCH
(Not to Scale)



Min. D=2.5 Ft.
B=4.0 Ft.

STA. 677+00 –L1– RT

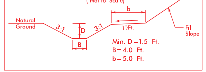
DETAIL 57
STANDARD BASE DITCH
(Not to Scale)



Min. D=2.0 Ft.
B=4.0 Ft.

FROM STA. 21+00 TO STA. 21+75 –Y32RPB1– RT

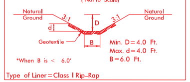
DETAIL 58
LATERAL BASE DITCH
(Not to Scale)



Min. D=1.5 Ft.
B=4.0 Ft.
b=5.0 Ft.

FROM STA. 646+50 TO STA. 654+50 –L1– RT

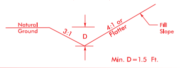
DETAIL 59
STANDARD BASE DITCH
(Not to Scale)



Min. D=4.0 Ft.
Max. d=4.0 Ft.
B=6.0 Ft.
*When B is < 6.0'
Type of Liner=Class I Rip–Rap

STA. 50+35 –Y19– RT

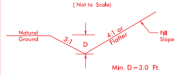
DETAIL 60
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.

FROM STA. 17+00 TO STA. 23+50 –Y19– LT

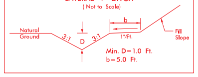
DETAIL 62
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D=3.0 Ft.

FROM STA. 41+00 TO STA. 48+12 –Y32– LT

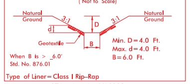
DETAIL 63
LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.0 Ft.
b=5.0 Ft.

FROM STA. 655+00 TO STA. 656+00 –L1– RT

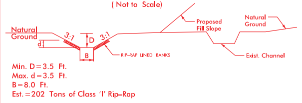
DETAIL 64
STANDARD BASE DITCH
(Not to Scale)



Min. D=4.0 Ft.
Max. d=4.0 Ft.
B=6.0 Ft.
When B is > 6.0'
Std. No. 876.01
Type of Liner=Class I Rip–Rap

STA. 18+10 –Y32RPB1–

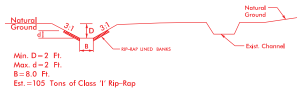
DETAIL 65
INLET CHANNEL CHANGE
(Not to Scale)



Min. D=3.5 Ft.
Max. d=3.5 Ft.
B=8.0 Ft.
Est.=202 Tons of Class 'I' Rip–Rap

STA. 18+40 –Y32– LT

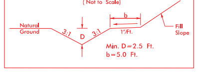
DETAIL 66
OUTLET CHANNEL CHANGE
(Not to Scale)



Min. D=2 Ft.
Max. d=2 Ft.
B=8.0 Ft.
Est.=105 Tons of Class 'I' Rip–Rap

STA. 25+00 –Y19– RT

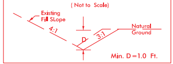
DETAIL 67
LATERAL 'V' DITCH
(Not to Scale)



Min. D=2.5 Ft.
b=5.0 Ft.

FROM STA. 52+15 TO STA. 56+40 –SR7– RT

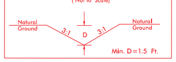
DETAIL 68
STANDARD 'V' DITCH
(Not to Scale)



Min. D=1.0 Ft.

FROM STA. 12+50 TO STA. 13+00 –Y43– LT

DETAIL 69
STANDARD 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.

BRICKYARD RD. CUL–DE–SAC

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RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

PROJECT REFERENCE NO.	SHEET NO.
R-3300B	2D-2

R/W SHEET NO.

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING
SHEET 19 OF 165

DATE: 04–01–2020

5/14/99

$$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$
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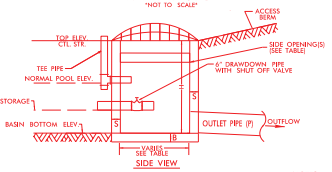
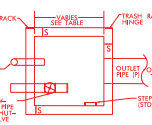
5/14/99

DETAIL P–1
WET DETENTION OUTLET CONTROL STRUCTURE
"NOT TO SCALE"



SIDE OPENING DIMENSIONS				
STRUCTURE NUMBER	# OF SIDES w/ OPENING	INVERT ELEV. (FEET)	OPENING WIDTH (INCHES)	OPENING HEIGHT (INCHES)
2356	2	42.5'	60"	6"

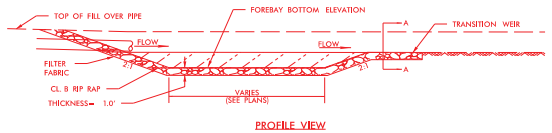


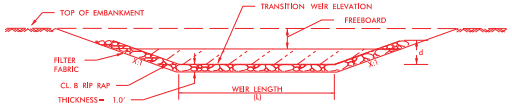
NOTES
1) NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
2) ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE.
3) SHUT OFF VALVE MAY BE A GATE VALVE, BALL VALVE, SHEAR GATE, ETC. SHUT OFF VALVE IS TO REMAIN CLOSED DURING NORMAL OPERATION.

MINIMUM DIMENSIONS FOR WET DETENTION BASIN DRAWDOWN STRUCTURE

STATION	STRUCTURE NUMBER	SIDE WALLS (INCHES)	BASE B (INCHES)	CTL STR. DIMENSIONS W	L	H	TOP ELEVATION CONTROL STRUCTURE	BASIN BOTTOM ELEV.	TEE PIPE DIAMETER INCHES	TEE PIPE INV. ELEV. (NORMAL POOL)	DRAWDOWN PIPE INVERT	OUTLET PIPE INVERT	OUTLET PIPE DIAMETER(P) INCHES	OUTLET PIPE MATERIAL
L1_N 869+04 LT	2356	6"	18"	5.0'	5.0'	4.0'	43.5'	38.5'	3.0"	41.5'	39.5'	39.5'	42"	RCP–IV

DETAIL P–2
FOREBAY
(Not to Scale)





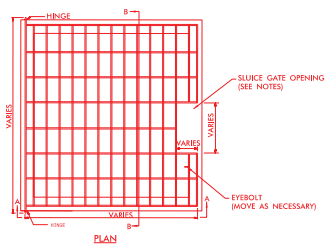
SECTION A–A
"TRANSITION BERM CROSS-SECTION"

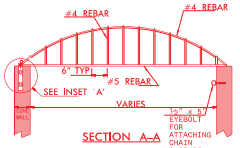
MINIMUM DIMENSIONS FOR FOREBAY

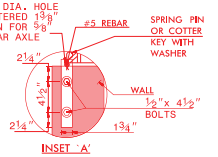
LOCATION	FOREBAY BOTTOM ELEV.	TRANSITION WEIR ELEV.	TRANSITION WEIR LENGTH (L)	WEIR SIDE SLOPES (X:1)	d
L1_N 866+50 LT	39.0'	42.0'	38'	3	1.0'
Y32 39+75 RT	39.0'	42.0'	56'	3	1.0'
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?

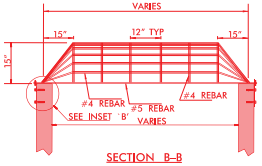
DETAIL P–3
REBAR & ORIFICE TRASH RACKS
(N.T.S.)

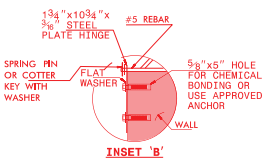
RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A "" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A–153.
5. PROVIDE OPENING IN TRASH RACK TO ACCOMODATE SLUICE GATE, IF APPLICABLE, ON THE OUTLET PIPE. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATES.



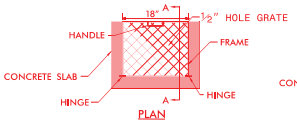


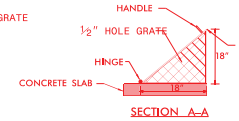






REBAR TRASH RACK
NOT TO SCALE





ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A "" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A–153.

ORIFICE TRASH RACK
NOT TO SCALE

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License No. F-0672

SUNGATE DESIGN GROUP, P.A.
801 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 NC COA No. C-0850

PROJECT REFERENCE NO.	SHEET NO.
R-3300B	2D-3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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DATE: 04–01–2020

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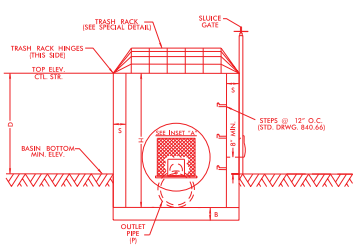
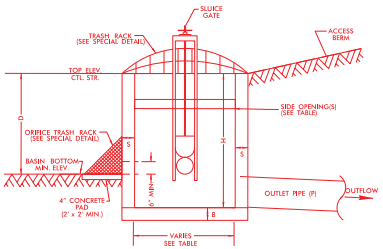
DETAIL P-4

DRY DETENTION DRAWDOWN STRUCTURE w/SLUICE GATE

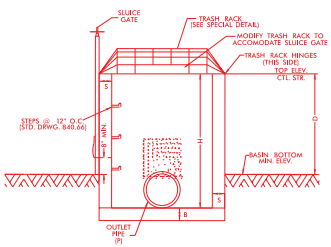
NOT TO SCALE



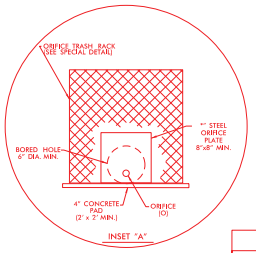
SIDE 1

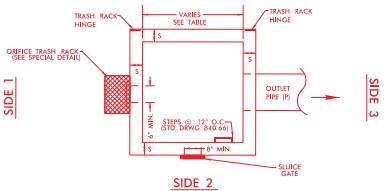


SIDE 2



SIDE 3





SIDE 2

PLAN VIEW

TRASH RACK NOT SHOWN FOR CLARITY

NOTES:
1. 15" MINIMUM DIAMETER FOR OUTLET PIPE.
2. 2" MINIMUM DIAMETER ORIFICE. IF ORIFICE IS GREATER THAN 6", A STEEL PLATE IS NOT REQUIRED.
3. NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
4. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION. A GATE VALVE MAY BE USED IN LIEU OF THE 8" SLUICE GATE.
5. SLUICE GATE SHALL PROVIDE WATERTIGHT SEAL. PROVIDE ADEQUATE CLEARANCE FOR GATE OPERATION.
6. SELECT BOX STANDARD AS REQUIRED TO ACCOMMODATE SLUICE GATE AND ORIFICE TRASH RACK WIDTH.
7. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATE.
8. ADJUST FOOTER DIMENSIONS AS NEEDED FOR ANTI-FLOTATION.

SIDE OPENING DIMENSIONS

STRUCTURE NUMBER	# OF SIDES w/ OPENING	INVERT ELEV. (FEET)	OPENING WIDTH (INCHES)	OPENING HEIGHT (INCHES)
2333	1	43.5'	60"	6"

MINIMUM DIMENSIONS FOR DRY DETENTION/HAZARDOUS SPILL BASIN DRAWDOWN STRUCTURE

STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
-Y32- 29+23 RT	2333	6.0	18.0	43.0	45.0	2.0	40.0	5' x 5' x 5'	4.0	43.0	48"

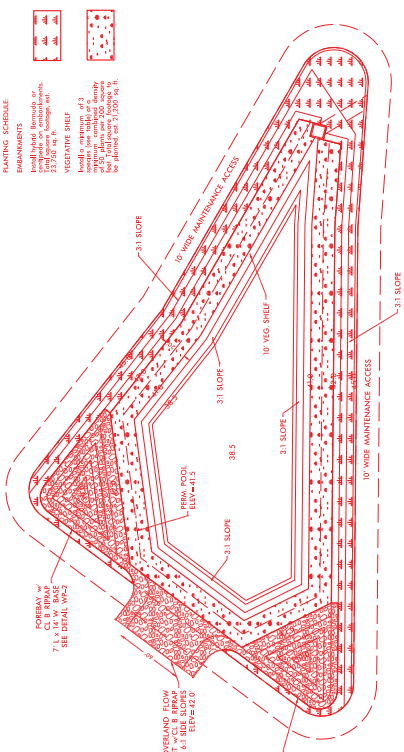
P-59

WET DET. BASIN DETAILS

OPERATION AND MAINTENANCE PROVISIONS

BMP element:	Potential problems:	How to remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The perimeter of the wet pond	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until established. Provide lime and a one-time fertilizer application.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.
The inlet device: pipe or swale	The pipe is clogged.	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged.	Replace the pipe.
	Erosion is occurring in the swale.	Regrade the swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or rip-rap to avoid future problems with erosion.
The forebay	Sediment has accumulated to a depth greater than the original design depth for sediment storage.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Erosion has occurred.	Provide additional erosion control devices or stabilize if needed to prevent future erosion problems.
	Weeds are present	Remove the weeds, preferably by pulling by hand, and dispose of off site. Apply herbicide as a spot treatment only if necessary, and wipe it on the plants rather than spraying.
The vegetated shelf	Best professional practices show that pruning is needed to maintain optimal plant health.	Prune according to best professional practices
	Plants are dead, diseased or dying.	Determine the source of the problem: soils, hydrology, disease, etc. Remedy the problem if possible and replace plants. Do not replace plants until the problem has been remedied. If necessary, have new plants installed by a professional.
	Weeds are present.	Remove the weeds, preferably by pulling by hand, and dispose of off site. Apply herbicide as a spot treatment only if necessary, and wipe it on the plants rather than spraying.
The main treatment area	Sediment has accumulated to a depth greater than the original design sediment storage depth.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Algal growth covers over 50% of the area	Consult a professional to remove and control the algal growth.
	Cattails, phragmites or other undesirable plants cover 10% of the basin surface.	Remove the plants by wicking the herbicide onto the plant (no spray).
The embankment	Shrubs have started to grow on the embankment	Remove shrubs immediately
	Evidence of muskrat or beaver activity is present	Use traps to remove muskrats and consult a professional to remove beavers.
	A tree has started to grow on the embankment.	Consult a dam safety specialist to remove the tree.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	Make all needed repairs.
The outlet device: The receiving swale	Clogging has occurred.	Clean out the outlet device. Dispose of the sediment off-site.
	The outlet device is damaged	Repair or replace the outlet device
	Erosion or other signs of deterioration occurred at the outlet.	Contact the local NC Division of Water Resources Regional Office, or the 401 Oversight Unit at 919-733-1760.
Floating wetland island (if applicable)	Weeds or volunteer trees are growing on the mat	Remove the weeds or trees.
	The anchor cable is damaged, disconnected or missing	Reattach the anchor cable to its design state.

WET DET. BASIN –L1_NORTH– 868+00 LT – PLANTING PLAN



PLANTING SCHEDULE

EMBANKMENTS

Install hybrid Bermuda or centipede sod throughout, including top of berm, toe of slope, and all disturbed areas.

VEGETATIVE SHELF

Install a minimum of 3 species (see table) at a minimum density of 50 plants per 200 square feet (average spacing of 3' on center). Plants should be planted over 21,000 sq. ft.

Landscape Plan:

1. Embankment slopes of the pond shall be vegetated with non-clumping turf grass, perennial grasses, such as hybrid Bermuda or centipede are recommended; trees and woody shrubs shall not be allowed; and

2. The vegetated shelf shall be planted with a minimum of three diverse species of herbaceous, native vegetation at a minimum density of 50 plants per 200 square feet of shelf area. Species shall be selected from the Plants for Submerged and Partially Submerged Vegetative Shelves table shown below. Wetland seed mixes shall not be used.

3. Trees and woody shrubs shall not be planted on the embankment slopes and any volunteers should be removed as part of regular maintenance activities.

PLANTS FOR SUBMERGED AND PARTIALLY SUBMERGED VEGETATIVE SHELVES

Botanical Name	Common Name
Andropbo tricornata	Swamp Milkweed
Carex spp.	Sedges
Carex tenera	Quill sedge
Eupatoriadelphus dubius	Dwarf Joe Pye Weed
Eupatoriadelphus fistulosus	Joe Pye Weed
Eupatoriadelphus maculatus	Spotted Trumpetweed
Hibiscus coccineus	Scarlet rose mallow
Hibiscus laevis	Halberdleaf rosemallow
Juncus effusus	Rush
Kosteletzkya virginica	Seashore Mallow
Lobelia cardinalis	Cardinal flower
Pontederia cordata	Pickerelweed
Rhynchospora spp.	Beaksrush
Saccharum baldwinii	Narrow plumegrass
Sagittaria latifolia	Duck Potato
Saururus cernuus	Lizardtail
Scirpus cyperinus	Woolgrass
Scirpus spp.	Bulrush

Maintenance Plan:

1. Immediately after the wet pond is established, the plants on the vegetated shelf and perimeter of the basin should be watered twice weekly if needed, until the plants become established (commonly six weeks).

2. No portion of the wet pond should be fertilized after the first initial fertilization that is required to establish the plants on the vegetated shelf.

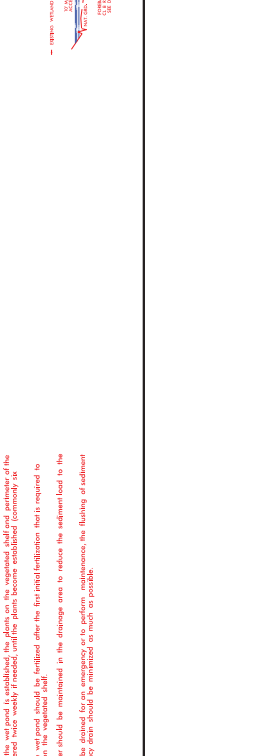
3. Stable groundcover should be maintained in the drainage area to reduce the sediment load to the wet pond.

4. If the pond must be drained for an emergency or to perform maintenance, the flushing of sediment through the emergency drain should be minimized as much as possible.

PLAN VIEW

WET DET. BASIN –L1 NORTH– 868+00 LT – PLAN & PROFILE

SECTION B–B



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R-33008	2D-5

ROADWAY DESIGN ENGINEER	RW SHEET NO.	HYDRAULICS ENGINEER

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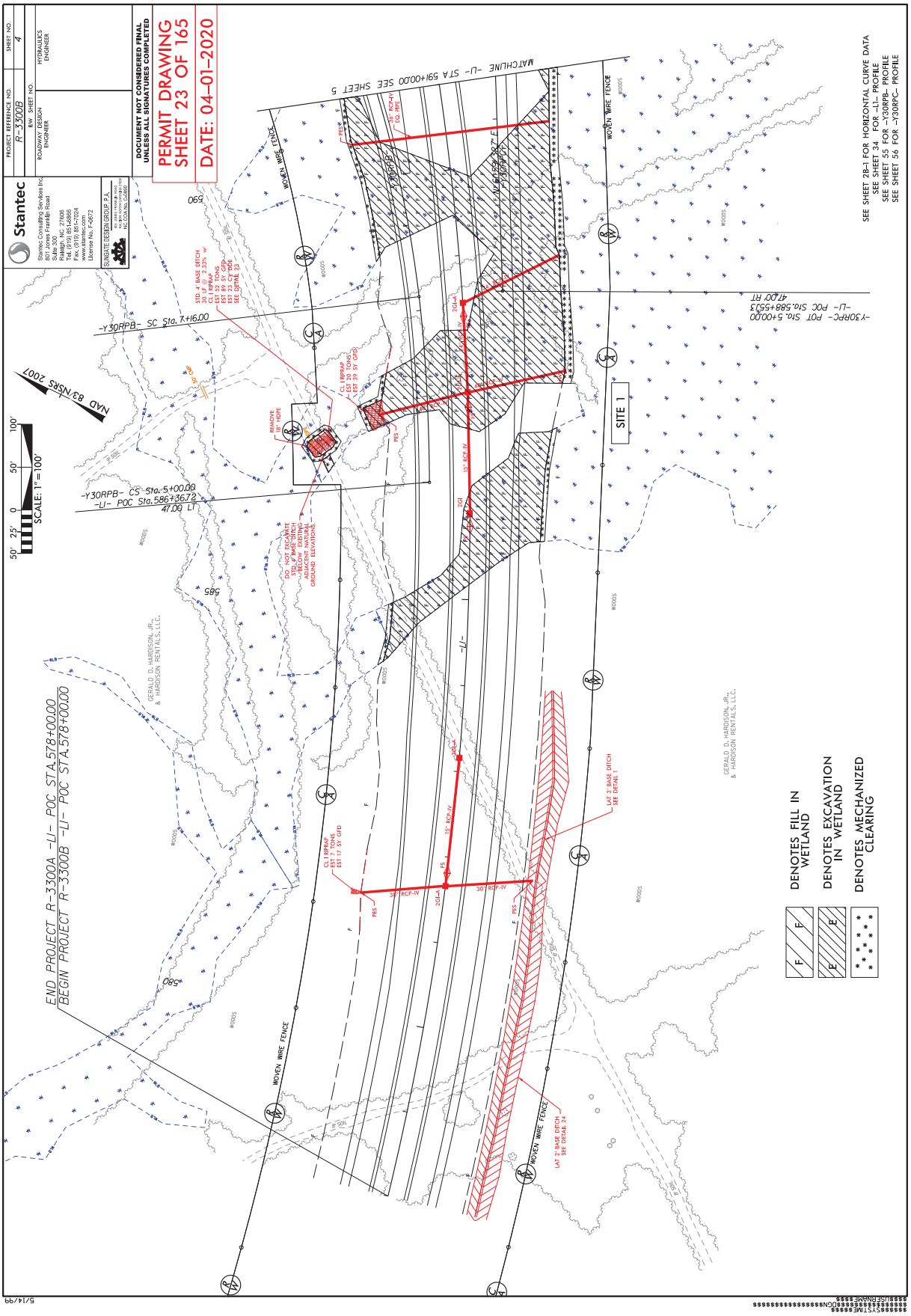
$$$$$$USERNAME$$$$$$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RW SHEET NO.
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HYDRAULICS ENGINEER
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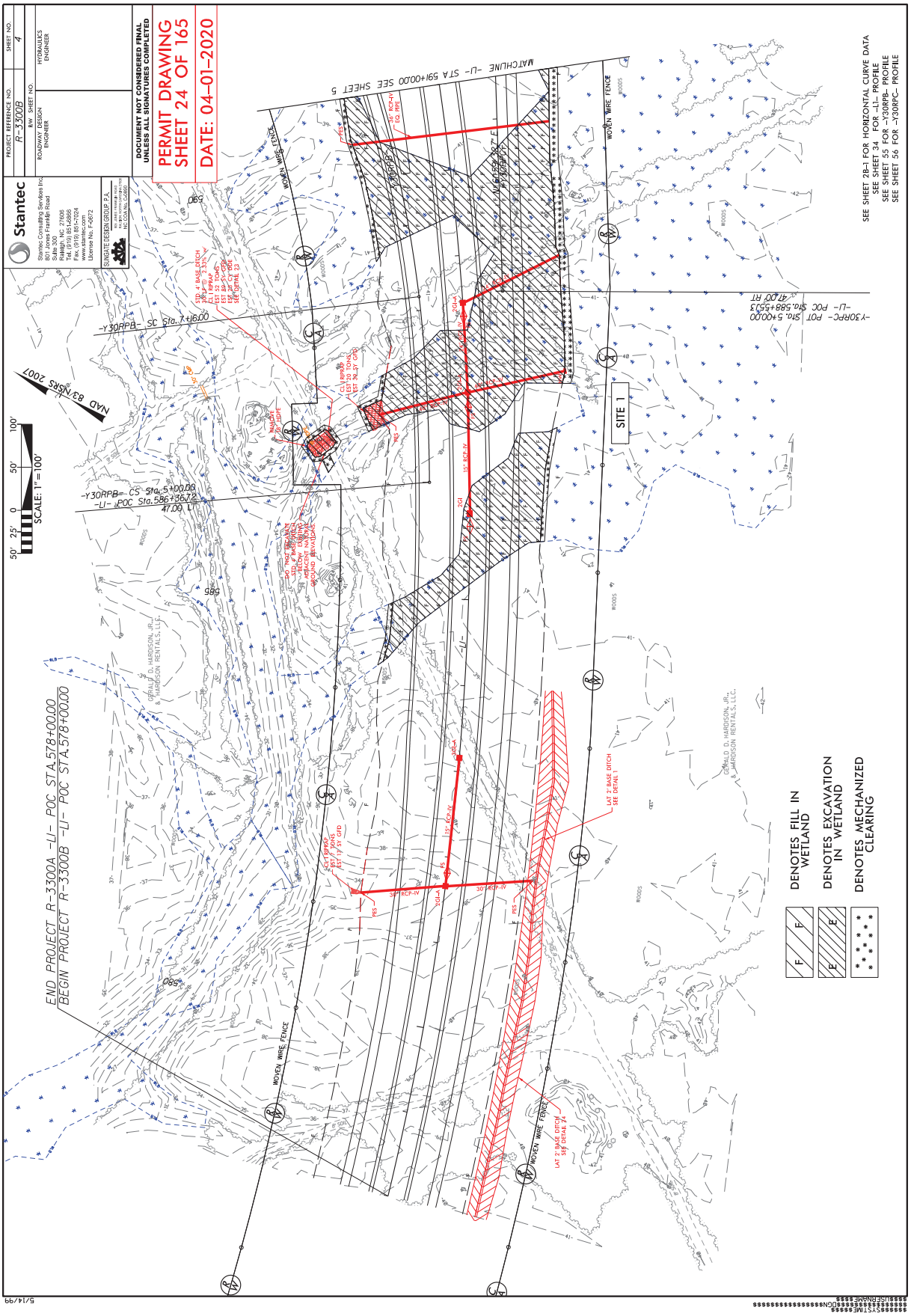
DATE: 04-01-2020
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 34 FOR -L1- PROFILE
SEE SHEET 55 FOR -Y30RPB- PROFILE
SEE SHEET 56 FOR -Y30RPC- PROFILE
MATCHLINE -L1- STA 591+00.00 SEE SHEET 5
-Y30RPC- POT Sta. 5+00.00
-L1- POC Sta. 588+55.3
47.00' RT
-Y30RPB- SC Sta. 7+16.00
-Y30RPB- CS Sta. 5+00.00
-L1- POC Sta. 586+36.72
47.00' LT
NAD 83/NSRS 2007
SCALE: 1" = 100'
50' 25' 0 50' 100'
END PROJECT R-3300A -L1- POC STA. 578+00.00
BEGIN PROJECT R-3300B -L1- POC STA. 578+00.00
SITE 1
GERALD D. HARDISON, JR. & HARDISON RENTALS, LLC.
WOVEN WIRE FENCE
REMOVE 18" HDPE
CL I RIPRAP EST 39 SY GRD
CL I RIPRAP EST 7 TONS EST 17 SY GRD
STD. 4' BASE DITCH 30 LF @ 2.33% = S EST 32 TONS EST 29 CY CORE EST 23 SY GEOTEX SEE DETAIL 33
LAT 2' BASE DITCH SEE DETAIL 1
LAT 2' BASE DITCH SEE DETAIL 24
15" RCP-IV
30" RCP-IV
54" RCP-IV
PES
2GI
2GI-A
-L1-
-Y1-
WOODS
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
5/14/99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SINGATE DESIGN GROUP, P.A.
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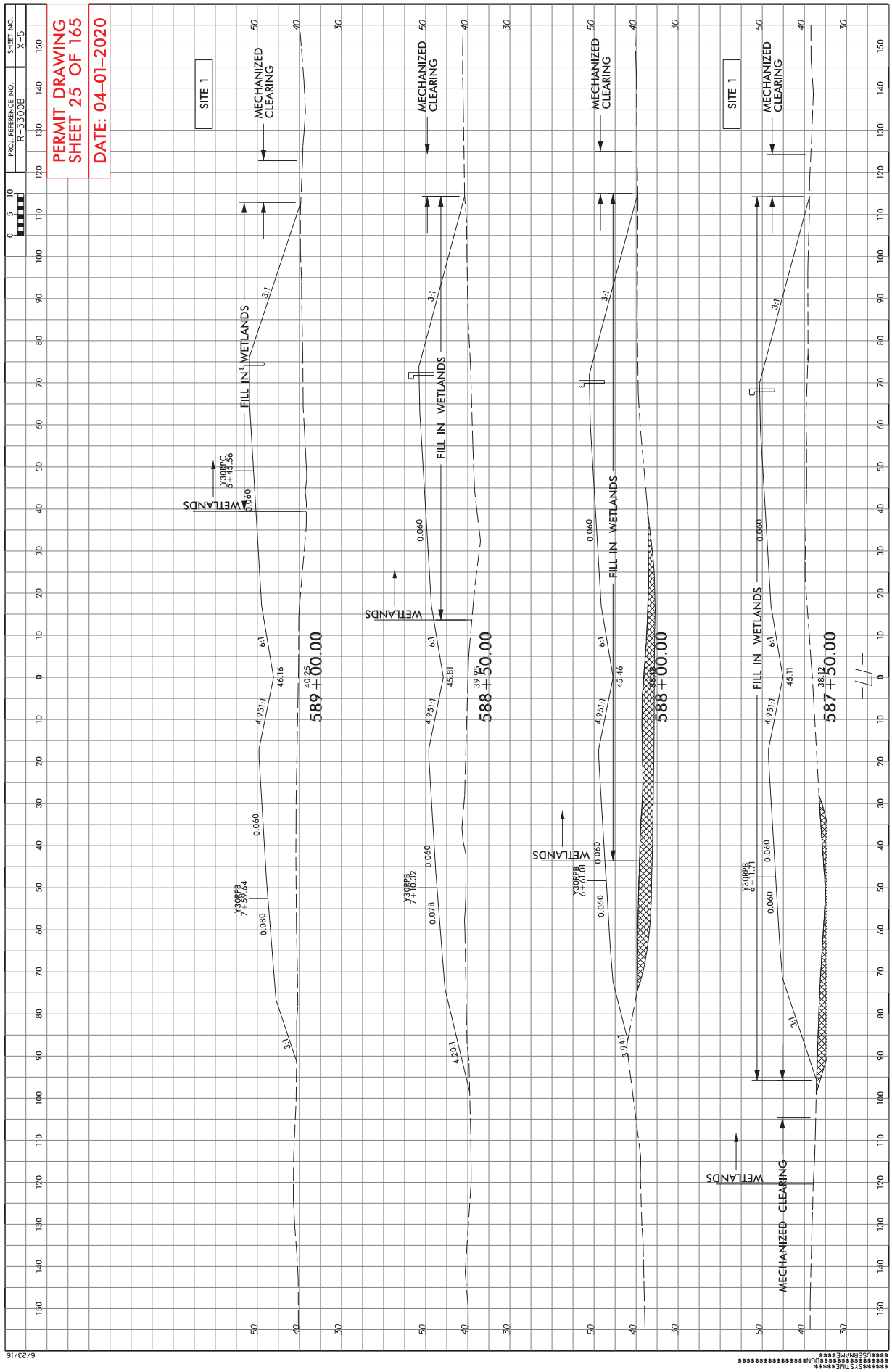
END PROJECT R-3300A -L1- POC STA.578+00.00
BEGIN PROJECT R-3300B -L1- POC STA.578+00.00
-Y30RPB- SC Sta.x+1600
-Y30RPB- CS Sta.5+00.00
-L1- POC Sta.586+36.72
47.00 LT
-Y30RPC- POT Sta.5+00.00
-L1- POC Sta.588+55.13
47.00' RT
MATCHLINE -L1- STA 591+00.00 SEE SHEET 5
SITE 1
WOVEN WIRE FENCE
SCALE: 1"=100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 34 FOR -L1- PROFILE
SEE SHEET 55 FOR -Y30RPB- PROFILE
SEE SHEET 56 FOR -Y30RPC- PROFILE
GERALD D. HARDISON, JR. & HARDISON RENTALS, LLC.
5/14/99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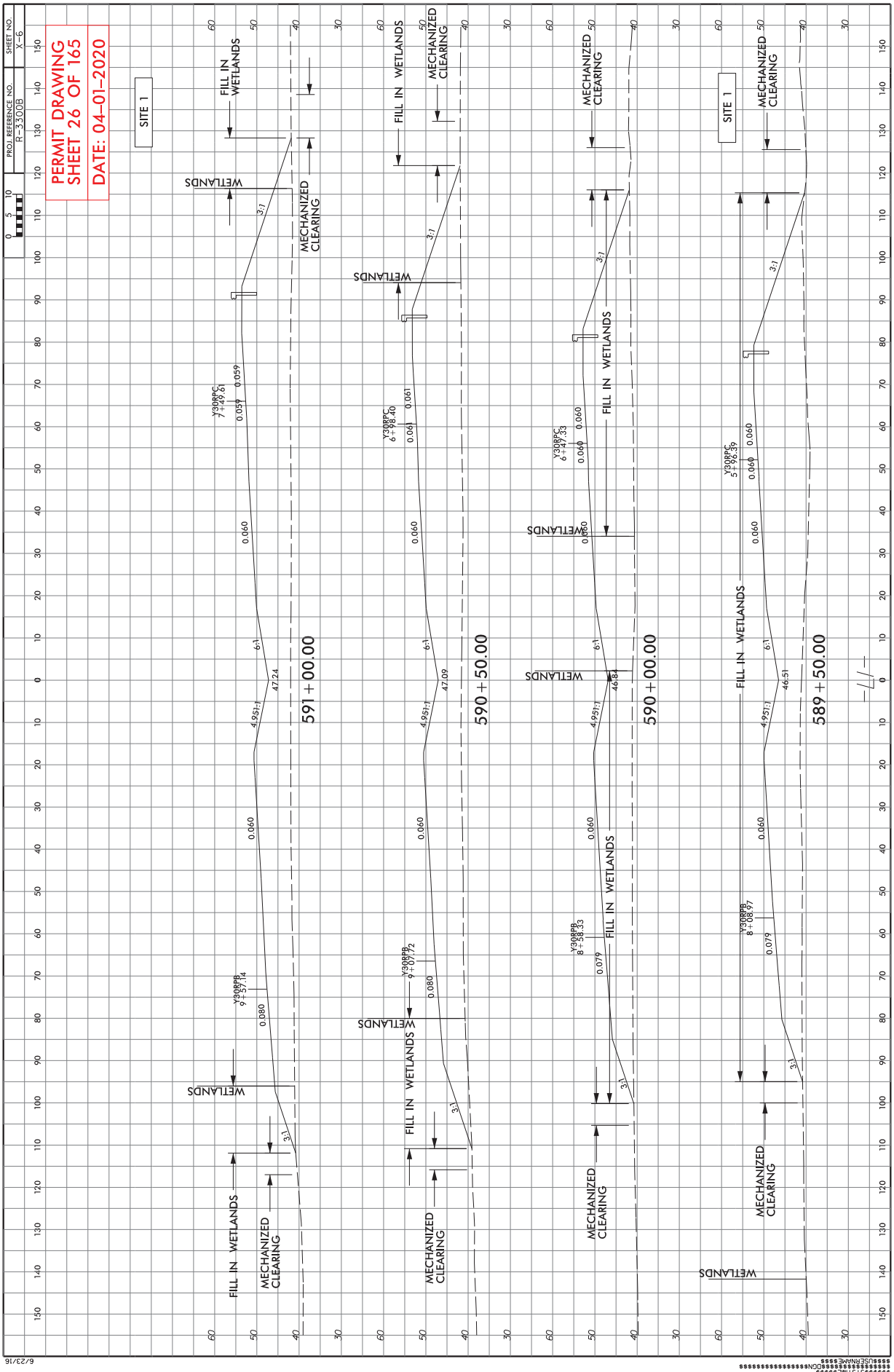
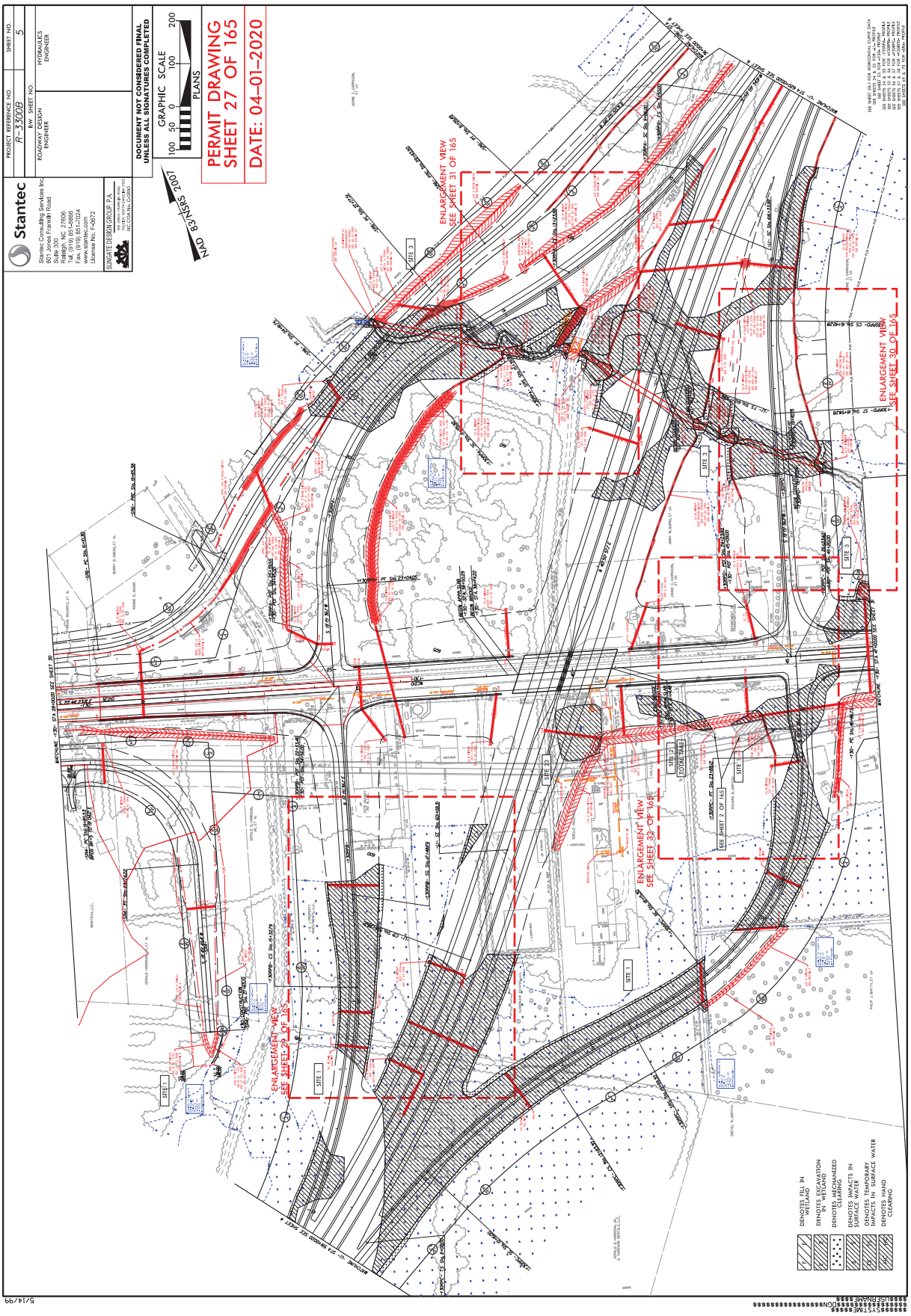
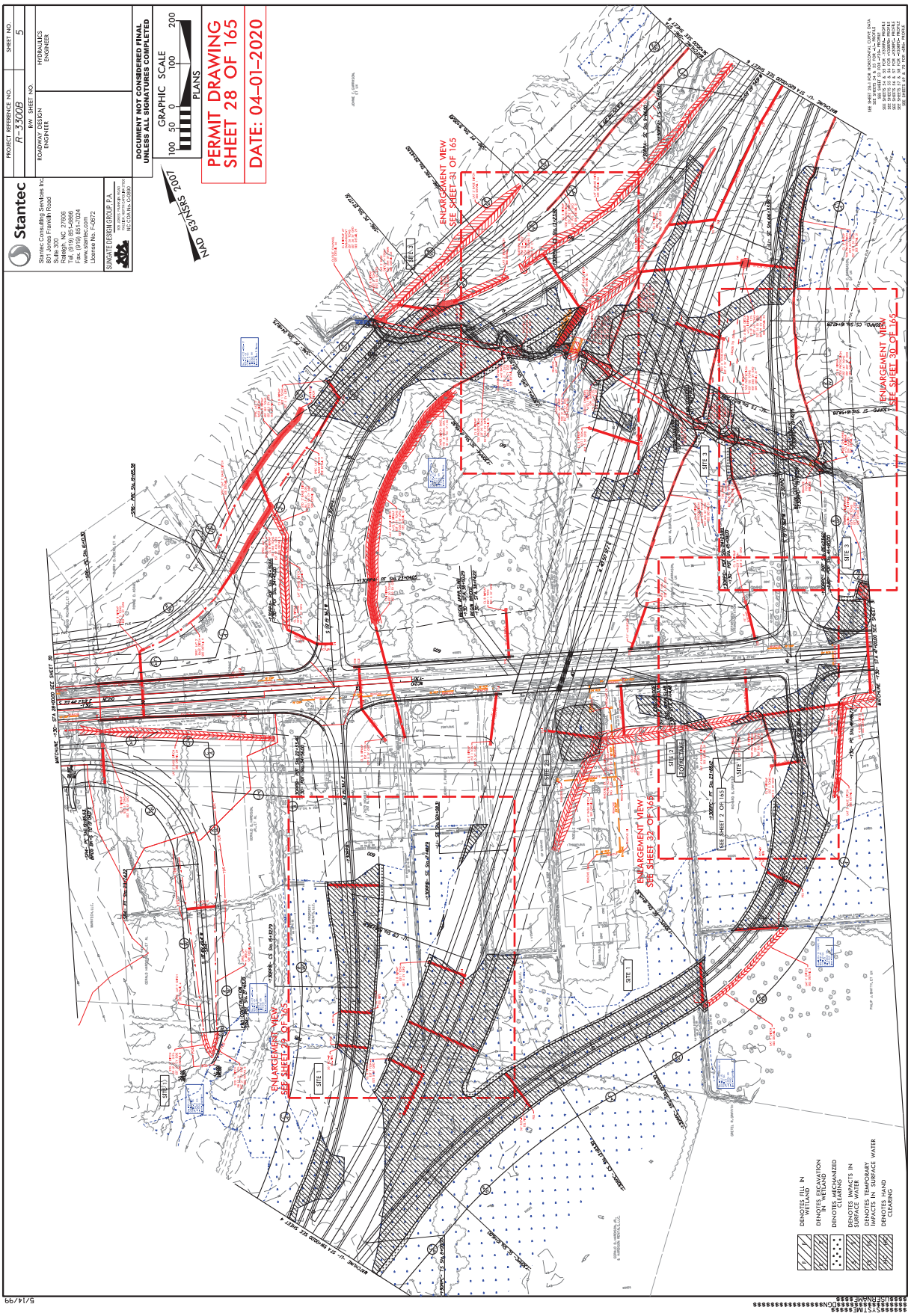
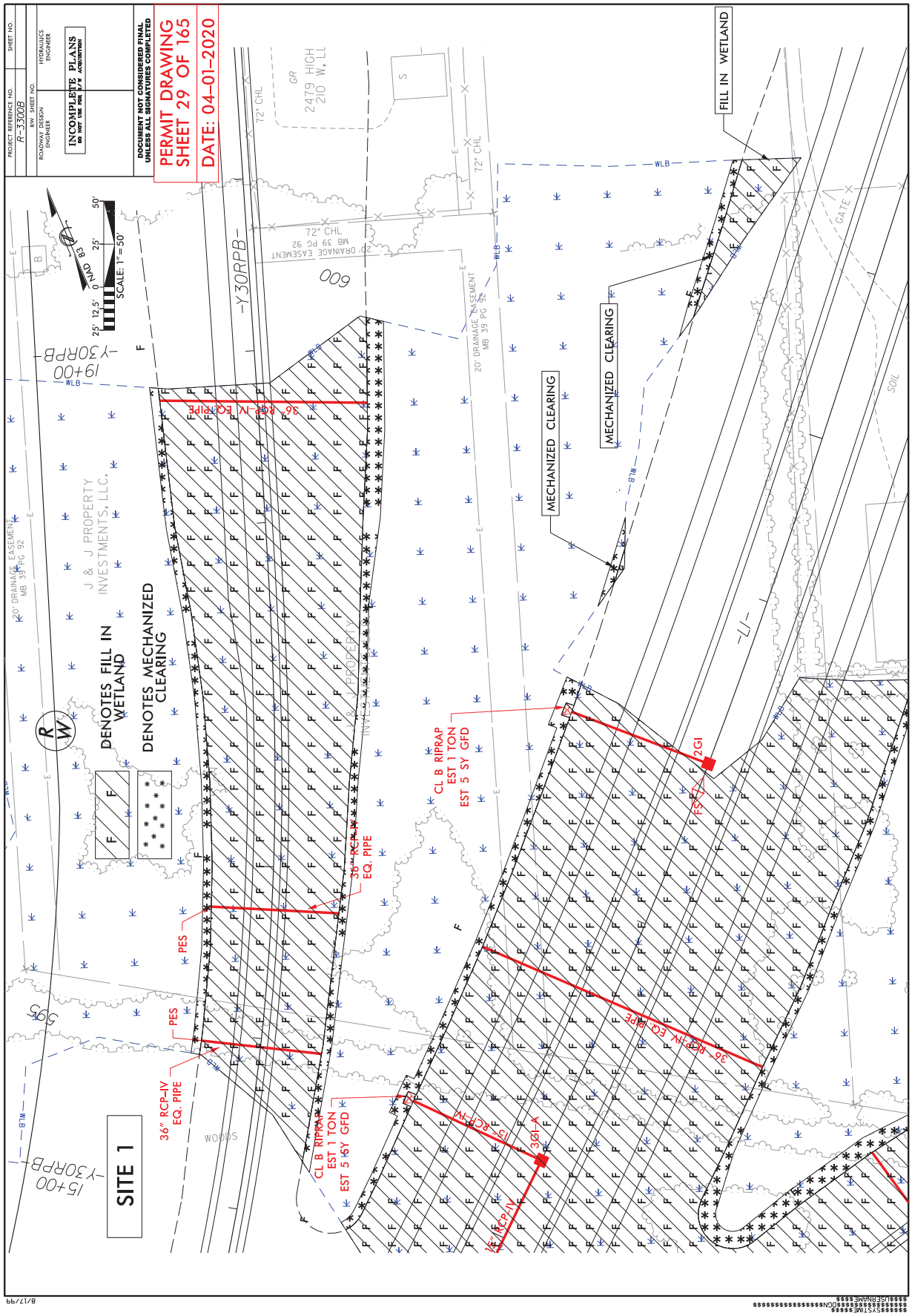
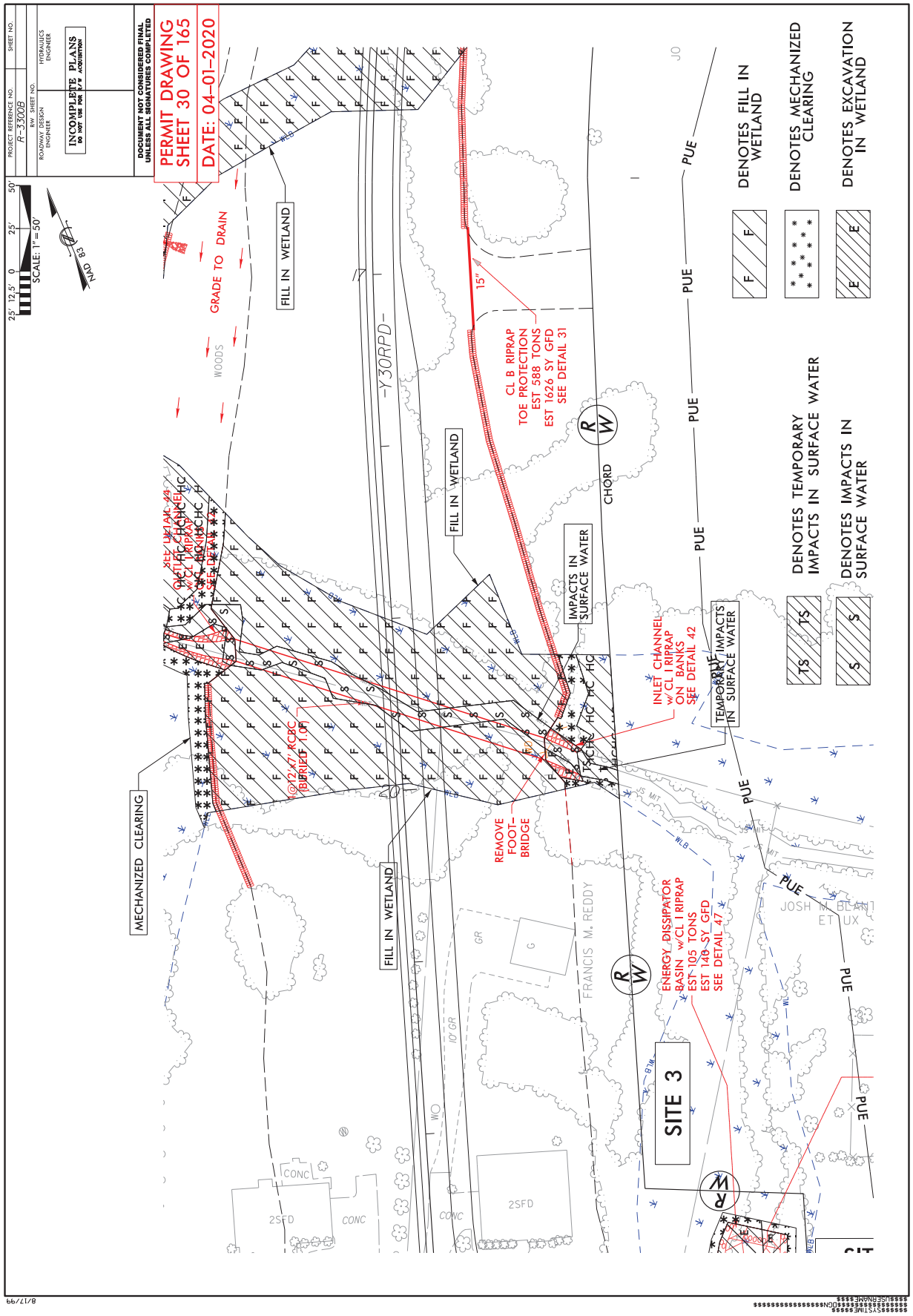
SHEET 25 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-5
0 5 10
SITE 1
MECHANIZED CLEARING
FILL IN WETLANDS
WETLANDS
589+00.00
588+50.00
588+00.00
587+50.00
3:1
6:1
4.95:1
4.20:1
3.94:1
0.060
0.080
0.078
Y30RPB 7+59.64
Y30RPB 7+10.32
Y30RPB 6+61.01
Y30RPB 6+11.71
Y30RPC 5+43.56
40.25
46.16
39.95
45.81
45.46
38.12
45.11

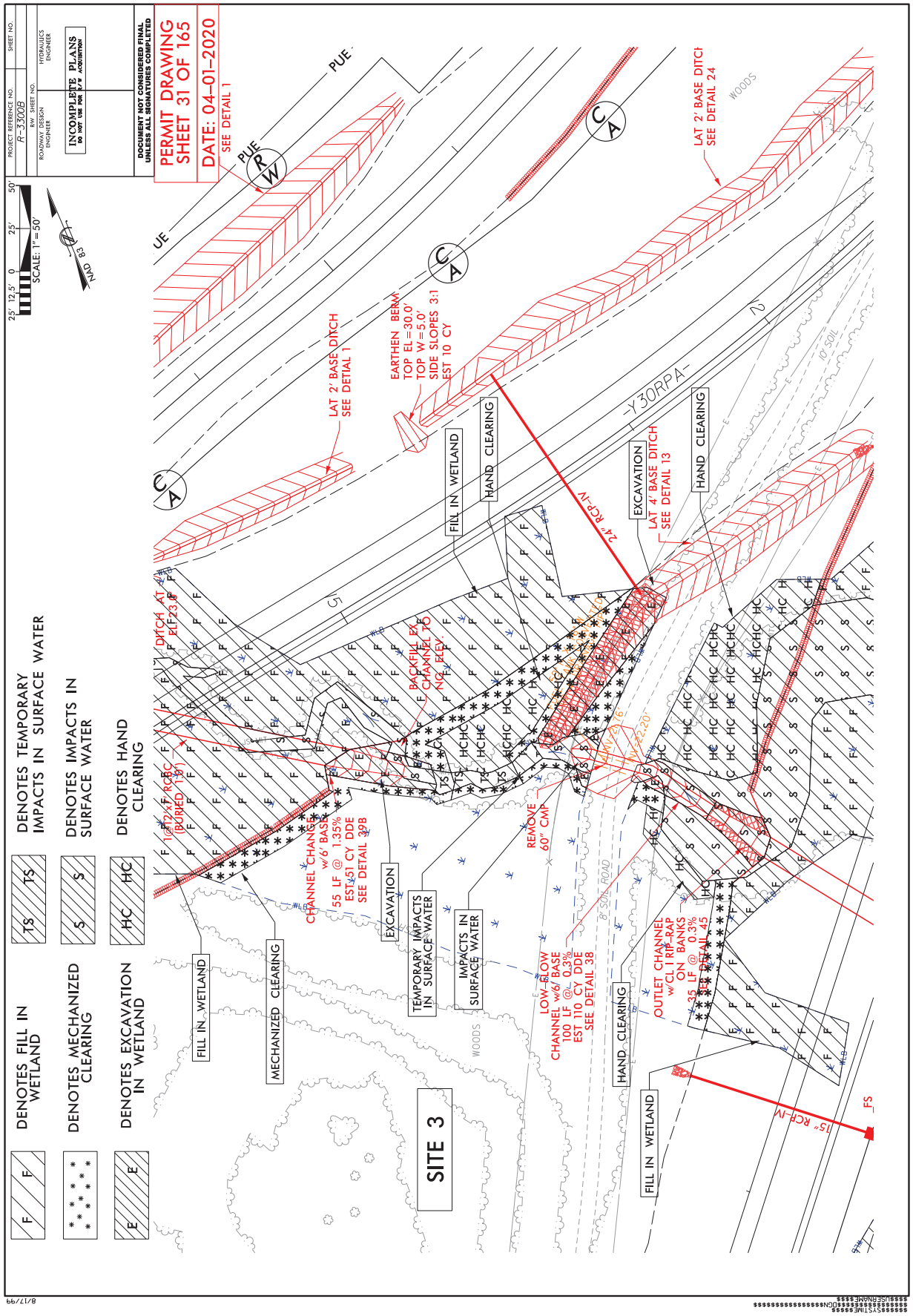

PERMIT DRAWING
SHEET 26 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-6
SITE 1
FILL IN WETLANDS
MECHANIZED CLEARING
WETLANDS
591+00.00
590+50.00
590+00.00
589+50.00
Y308PC 7+49.61
Y308PB 9+57.14
Y308PB 9+07.72
Y308PC 6+98.40
Y308PC 6+49.33
Y308PB 8+58.33
Y308PB 8+08.97
Y308PC 5+96.39
0.059
0.060
0.061
0.079
0.080
6:1
4.95:1
3:1
47.24
47.09
46.81
46.51

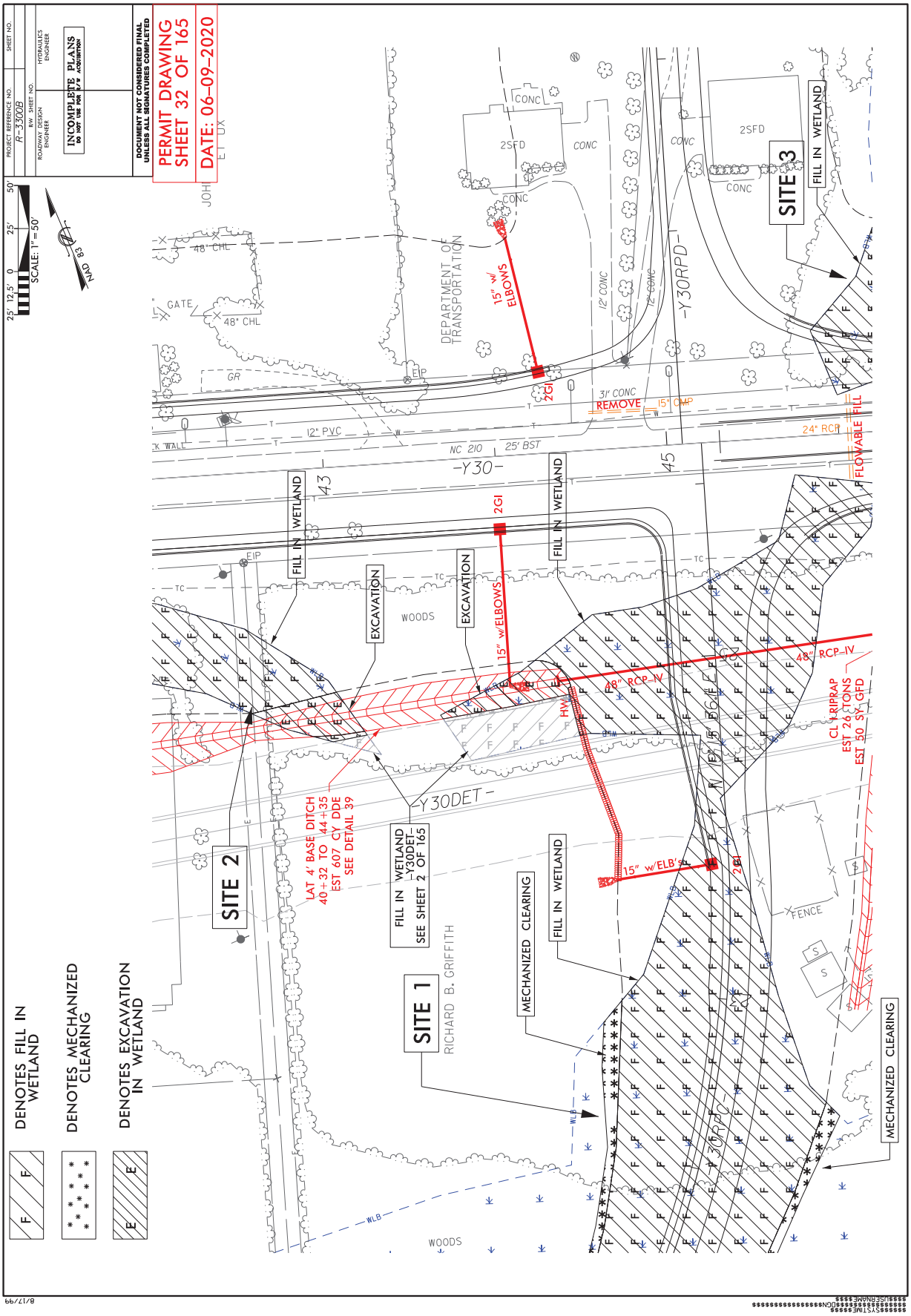

PERMIT DRAWING
SHEET 27 OF 165
DATE: 04-01-2020
ENLARGEMENT VIEW
SEE SHEET 31 OF 165
ENLARGEMENT VIEW
SEE SHEET 30 OF 165
ENLARGEMENT VIEW
SEE SHEET 32 OF 165
ENLARGEMENT VIEW
SEE SHEET 29 OF 165
SITE 1
SITE 2
SITE 3
SITE 5
SITE 9
Stantec
SANGATE DESIGN GROUP, P.A.
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
GRAPHIC SCALE
PLANS
NAD 83/NSRS 2007

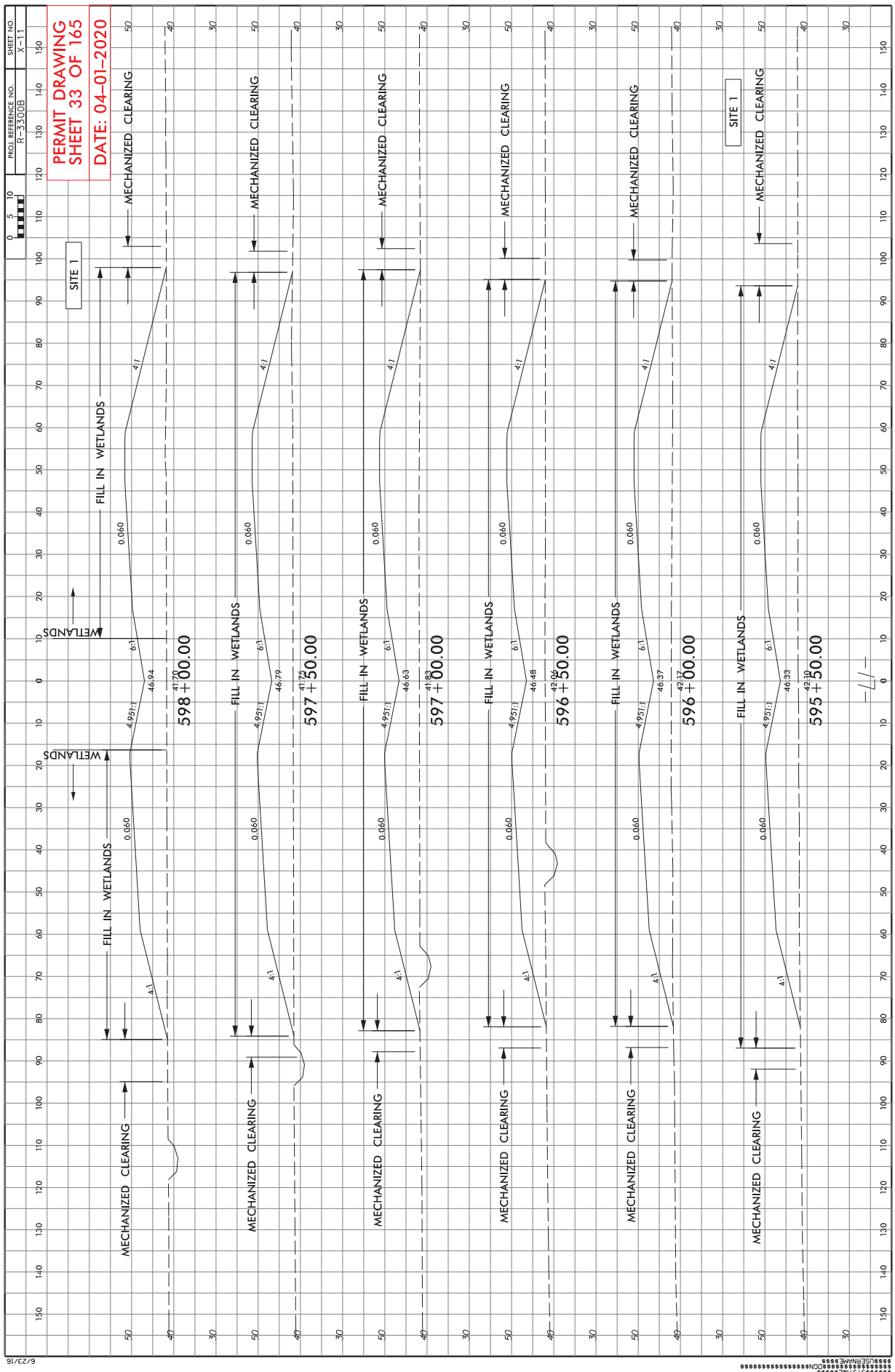

PERMIT DRAWING
SHEET 28 OF 165
DATE: 04-01-2020
PROJECT REFERENCE NO. R-3300B
SHEET NO. 5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
GRAPHIC SCALE
PLANS
NAD 83/NSRS 2007
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SANGATE DESIGN GROUP, P.A.
ENLARGEMENT VIEW SEE SHEET 29 OF 165
ENLARGEMENT VIEW SEE SHEET 30 OF 165
ENLARGEMENT VIEW SEE SHEET 31 OF 165
ENLARGEMENT VIEW SEE SHEET 32 OF 165
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES HAND CLEARING

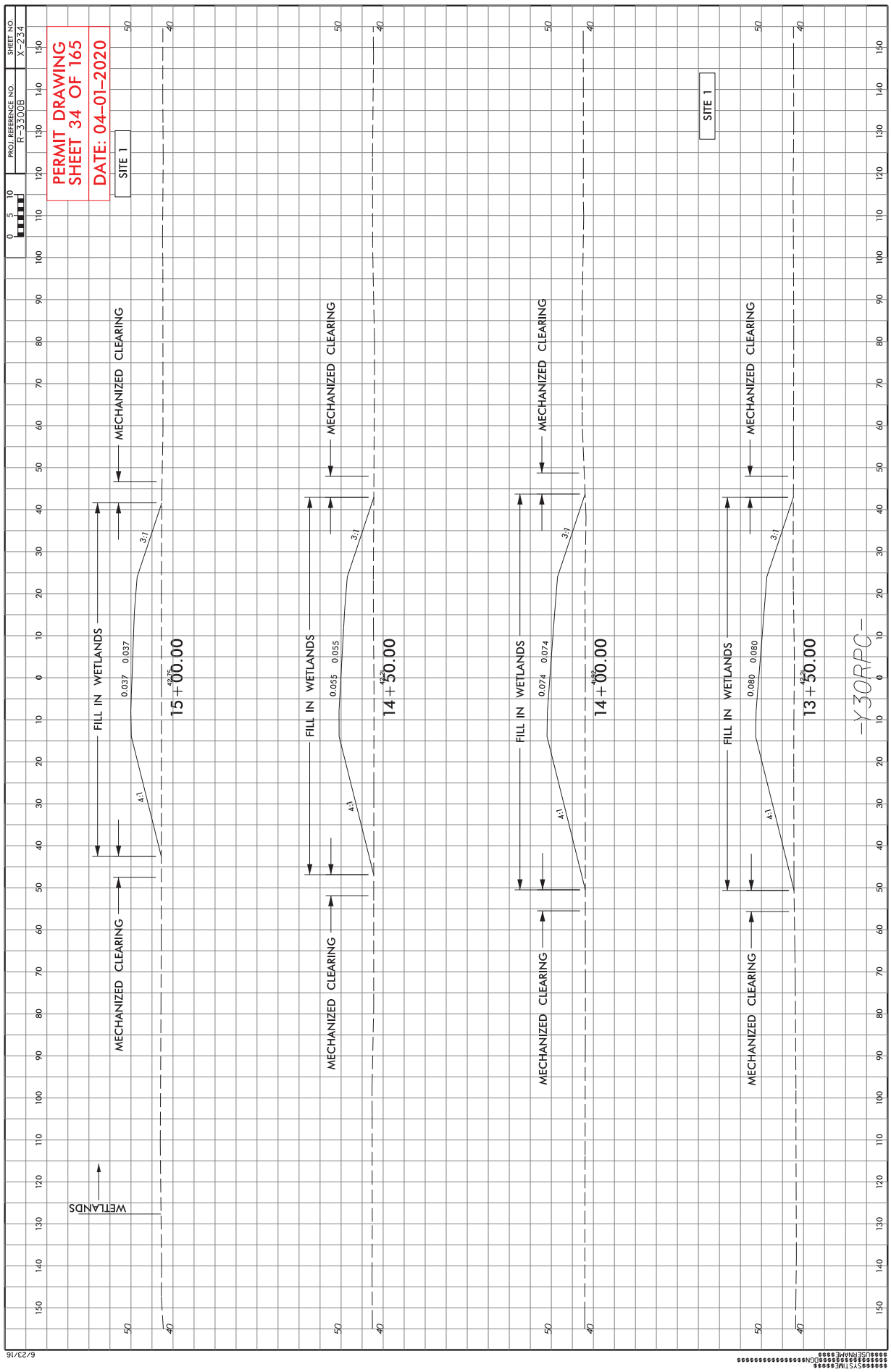

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 29 OF 165
DATE: 04-01-2020
SCALE: 1"=50'
QUAD 83
FILL IN WETLAND
MECHANIZED CLEARING
MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
J & J PROPERTY INVESTMENTS, LLC.
20' DRAINAGE EASEMENT MB 39 PG 92
20' DRAINAGE EASEMENT MB 39 PG 92
72" CHL
GR 2479 HIGH 210 W. LL
-Y30RPB-
19+00
15+00
WLB
GATE
SOIL
WOODS
SITE 1
PES
PES
36" RCP-IV EQ. PIPE
36" RCP-IV EQ. PIPE
CL B RIPRAP EST 1 TON EST 5 SY GFD
CL B RIPRAP EST 1 TON EST 5 SY GFD
36" RCP-IV EQ. PIPE
36" RCP-IV EQ. PIPE
36" RCP-IV EQ. PIPE
36" RCP-IV EQ. PIPE
36I-A
2GI
FES
8/17/99

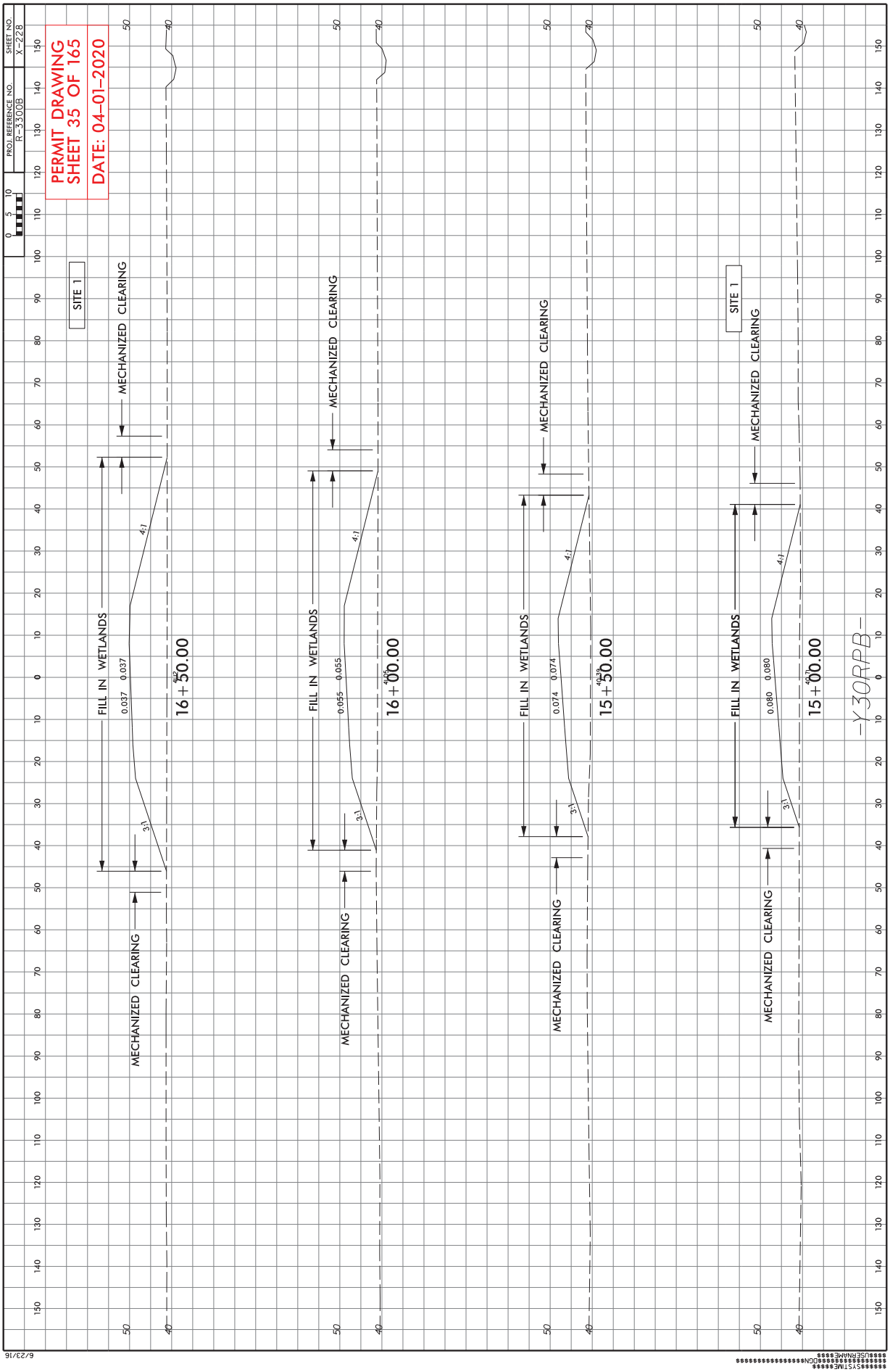

PROJECT REFERENCE NO.
R-3300B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO.
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 30 OF 165
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
GRADE TO DRAIN
FILL IN WETLAND
WOODS
-Y30RPD-
15"
CL B RIPRAP TOE PROTECTION EST 588 TONS EST 1626 SY GFD SEE DETAIL 31
CHORD
IMPACTS IN SURFACE WATER
PUE
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
MECHANIZED CLEARING
SEE DETAIL 44
PATH HC CHANNEL w/CL I RIPRAP SEE DETAIL 44
HC
12"X7" RCBC @12.47' BURIED 1.0'
INLET CHANNEL w/CL I RIPRAP ON BANKS SEE DETAIL 42
TEMPORARY IMPACTS IN SURFACE WATER
REMOVE FOOT-BRIDGE
ENERGY DISSIPATOR BASIN w/CL I RIPRAP EST 105 TONS EST 140 SY GFD SEE DETAIL 47
SITE 3
FRANCIS M. REDDY
JOSH W. BLANT ET UX
CONC
2SFD
GR
WO
RW
WLB
MIT

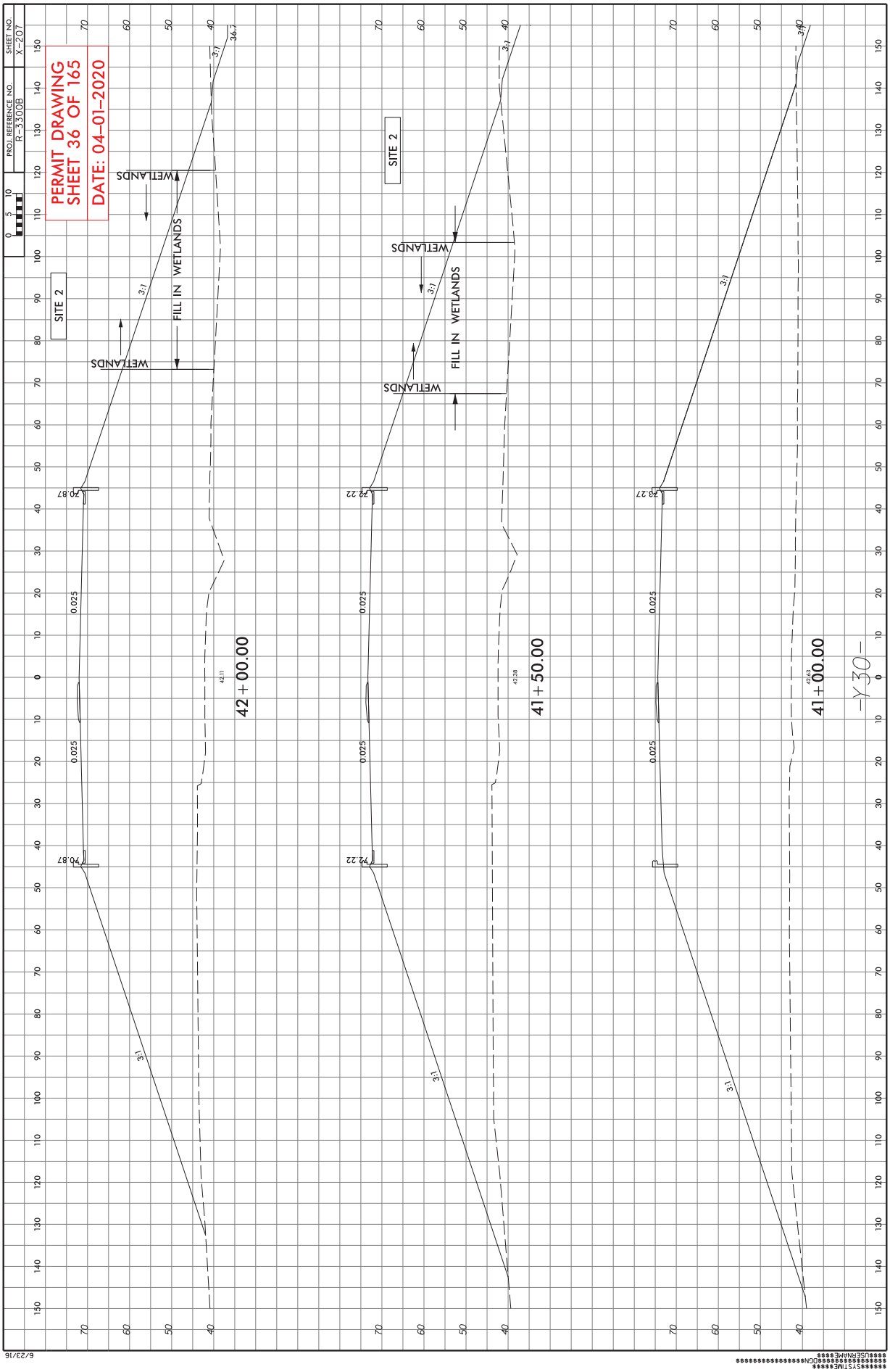

DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES HAND CLEARING
PROJECT REFERENCE NO. A-3300B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO.
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 31 OF 165
DATE: 04-01-2020
SEE DETAIL 1
SCALE: 1"=50'
NAD 83
SITE 3
FILL IN WETLAND
MECHANIZED CLEARING
CHANNEL CHANGE w/6' BASE 55 LF @ 1.35% EST 51 CY DDE SEE DETAIL 39B
EXCAVATION
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
REMOVE 60" CMP
LOW-FLOW CHANNEL w/6' BASE 100 LF @ 0.3% EST 110 CY DDE SEE DETAIL 38
HAND CLEARING
OUTLET CHANNEL w/CL I RIP-RAP ON BANKS 35 LF @ 0.3% SEE DETAIL 45
FILL IN WETLAND
15" RCP-IV
24" RCP-IV
LAT 2' BASE DITCH SEE DETAIL 1
EARTHEN BERM TOP EL=30.0' TOP W=5.0' SIDE SLOPES 3:1 EST 10 CY
FILL IN WETLAND
HAND CLEARING
EXCAVATION
LAT 4' BASE DITCH SEE DETAIL 13
HAND CLEARING
LAT 2' BASE DITCH SEE DETAIL 24
-Y30RPA-
PUE
R/W
UE
WOODS
8' SOIL ROAD
10' SOIL
FS
8/17/99

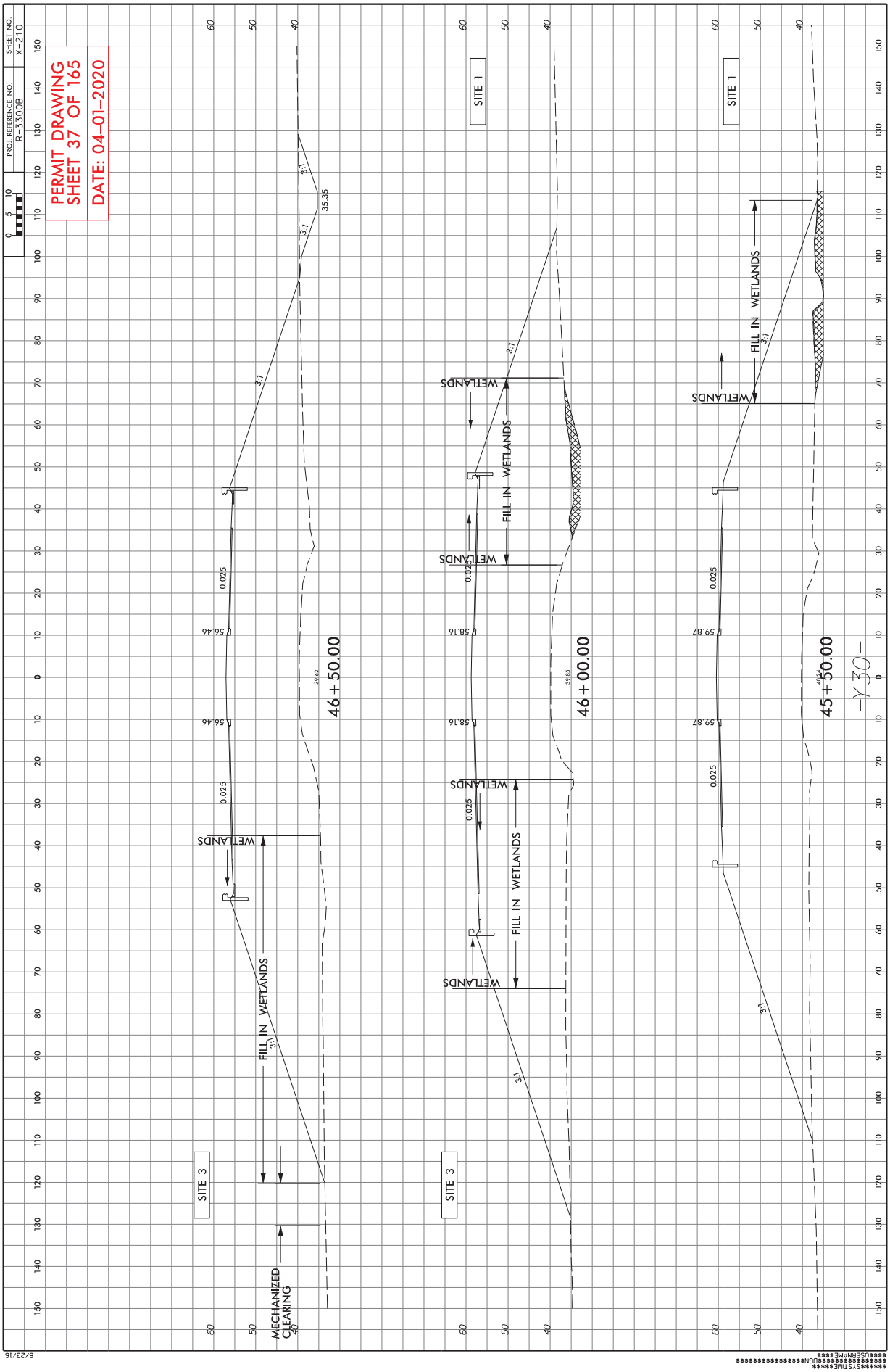

PERMIT DRAWING
SHEET 32 OF 165
DATE: 06-09-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PROJECT REFERENCE NO.
R-3300B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO.
SCALE: 1"=50'
NAD 83
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
SITE 1
SITE 2
SITE 3
RICHARD B. GRIFFITH
DEPARTMENT OF TRANSPORTATION
FILL IN WETLAND
EXCAVATION
MECHANIZED CLEARING
WOODS
FENCE
2SFD
CONC
12" PVC
24" RCP
48" RCP-IV
15" w/ELBOWS
15" w/ELB's
31" CONC REMOVE
15" CMP
-Y30-
-Y30RPD-
-Y30DET-
FLOWABLE FILL
CL B RIPRAP
EST 26 TONS
EST 50 SY GFD
LAT 4' BASE DITCH
40+32 TO 44+35
EST 607 CY DDE
SEE DETAIL 39
FILL IN WETLAND
Y30DET
SEE SHEET 2 OF 165
WLB
48" CHL
GATE
GR
EIP
TC
2GI
2GI

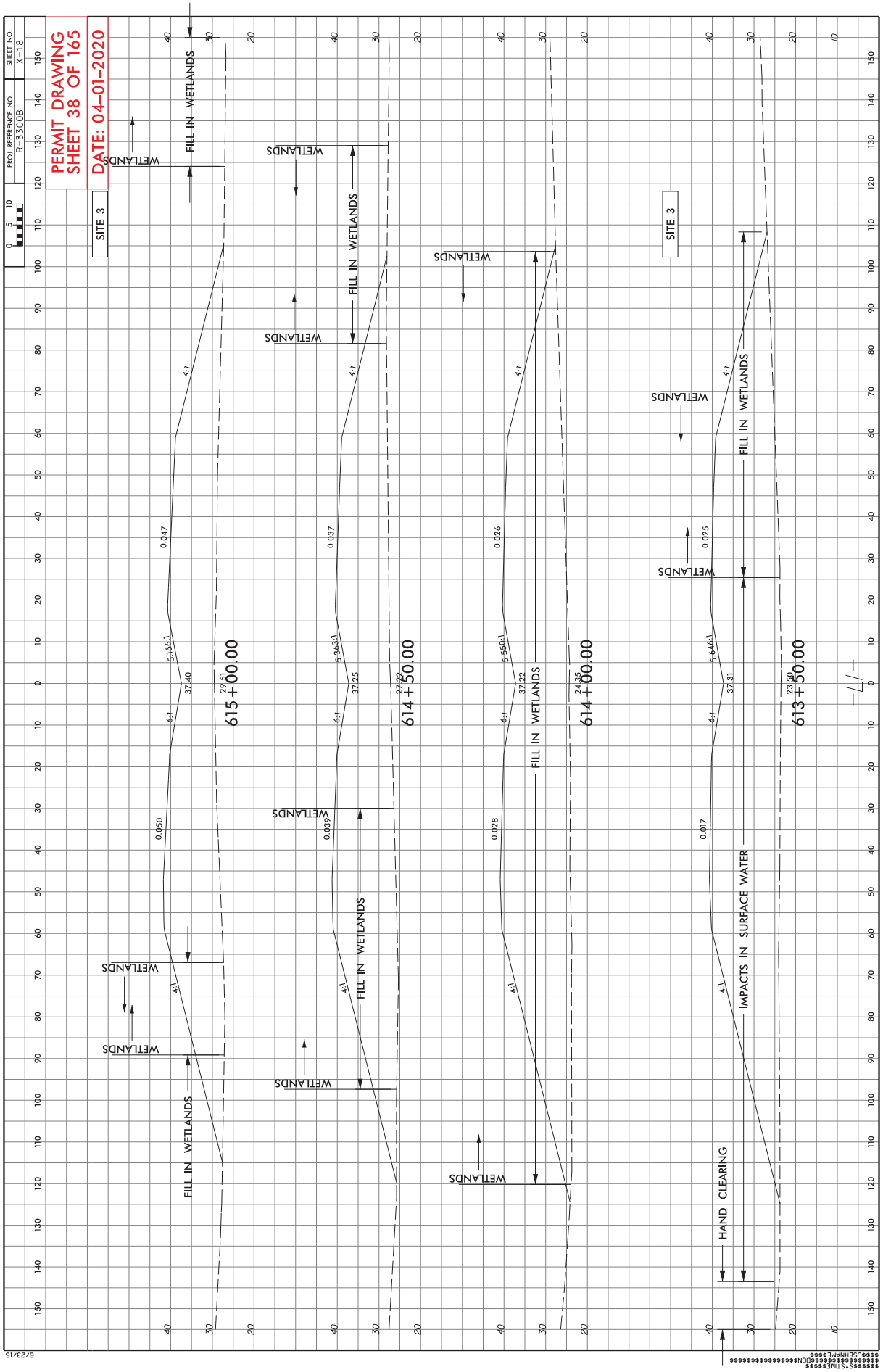

PERMIT DRAWING
SHEET 33 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-11
SITE 1
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
598+00.00
597+50.00
597+00.00
596+50.00
596+00.00
595+50.00
0.060
4:1
6:1
4.95:1
41.70
46.94
41.75
46.79
41.83
46.63
42.06
46.48
42.17
46.37
42.10
46.33

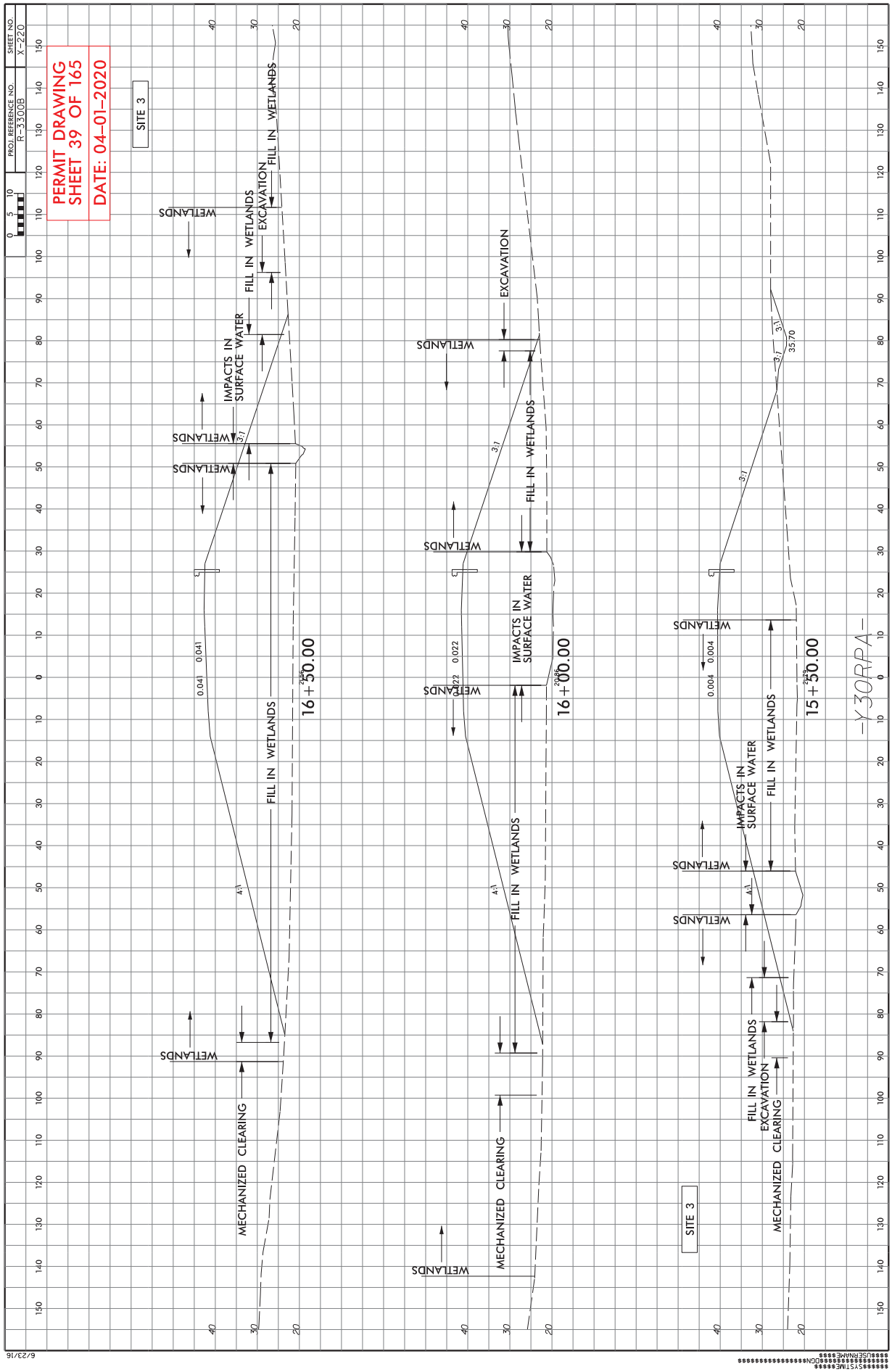

PERMIT DRAWING
SHEET 34 OF 165
DATE: 04-01-2020
SHEET NO. X-234
PROJ. REFERENCE NO. R-3300B
SITE 1
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
0.037
0.055
0.074
0.080
3:1
4:1
15+00.00
14+50.00
14+00.00
13+50.00
-Y30RPC-

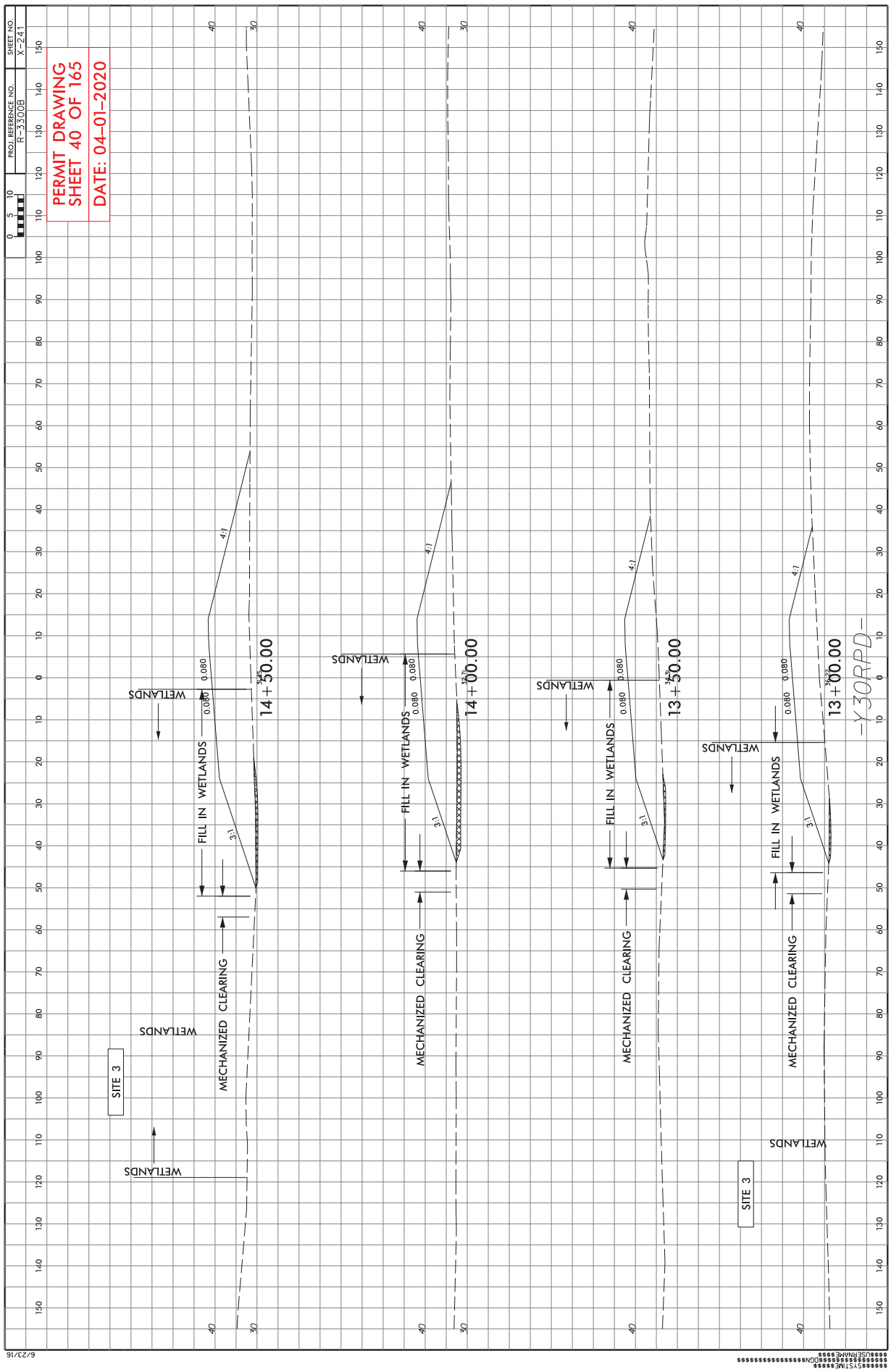

SHEET NO. X-228
PROJ. REFERENCE NO. R-3300B
0 5 10
PERMIT DRAWING
SHEET 35 OF 165
DATE: 04-01-2020
SITE 1
MECHANIZED CLEARING
FILL IN WETLANDS
MECHANIZED CLEARING
0.037
0.037
4:1
3:1
16+50.00
MECHANIZED CLEARING
FILL IN WETLANDS
MECHANIZED CLEARING
0.055
0.055
4:1
3:1
16+00.00
MECHANIZED CLEARING
FILL IN WETLANDS
MECHANIZED CLEARING
0.074
0.074
4:1
3:1
15+50.00
SITE 1
MECHANIZED CLEARING
FILL IN WETLANDS
MECHANIZED CLEARING
0.080
0.080
4:1
3:1
15+00.00
-Y30RPB-
6/23/16

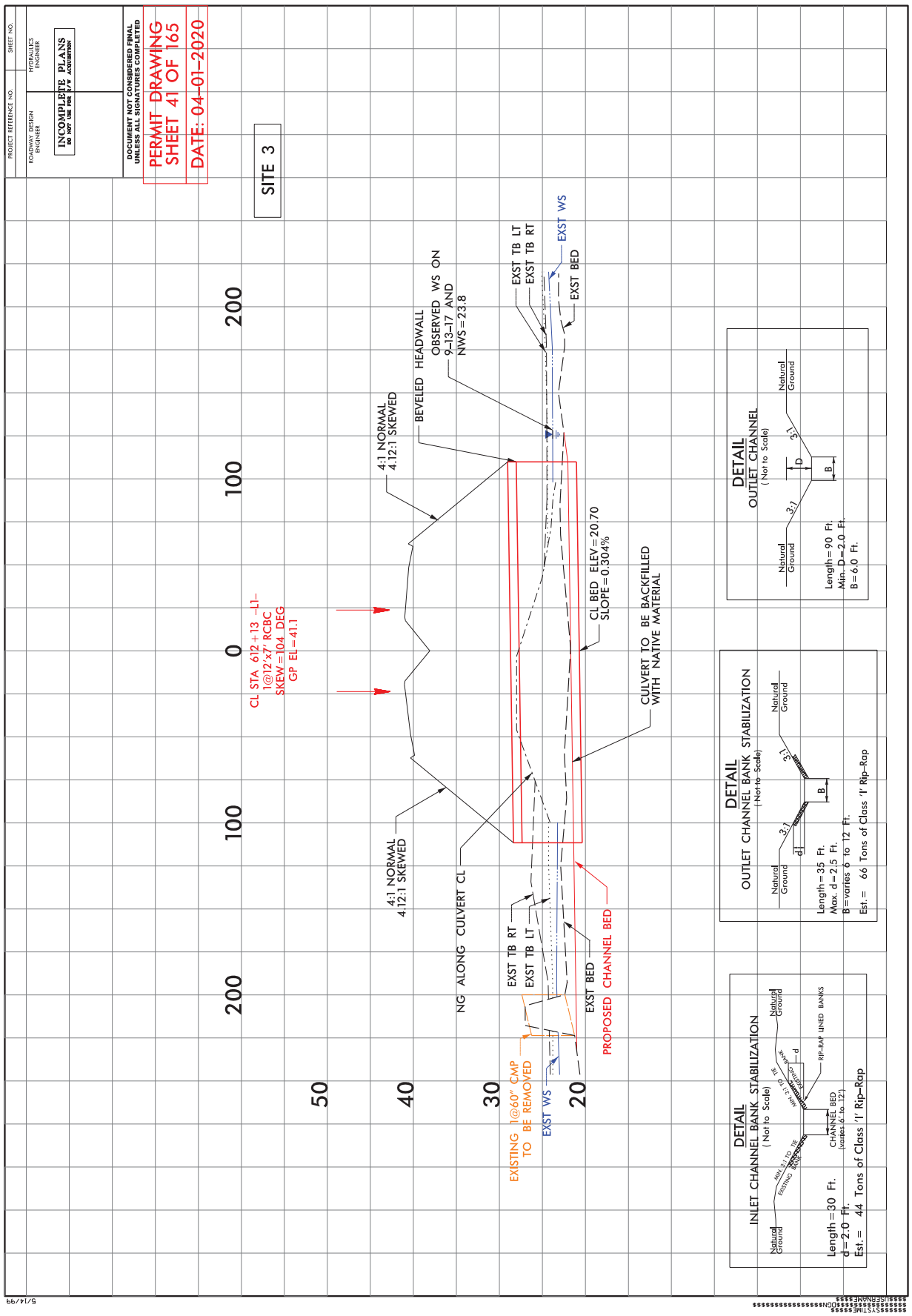

PERMIT DRAWING
SHEET 36 OF 165
DATE: 04-01-2020
SHEET NO. X-207
PROJ. REFERENCE NO. R-3300B
0 5 10
SITE 2
WETLANDS
FILL IN WETLANDS
WETLANDS
3:1
0.025
70.87
70.87
42+00.00
SITE 2
WETLANDS
FILL IN WETLANDS
WETLANDS
3:1
0.025
72.22
72.22
41+50.00
3:1
0.025
72.27
41+00.00
-Y30-
6/23/16

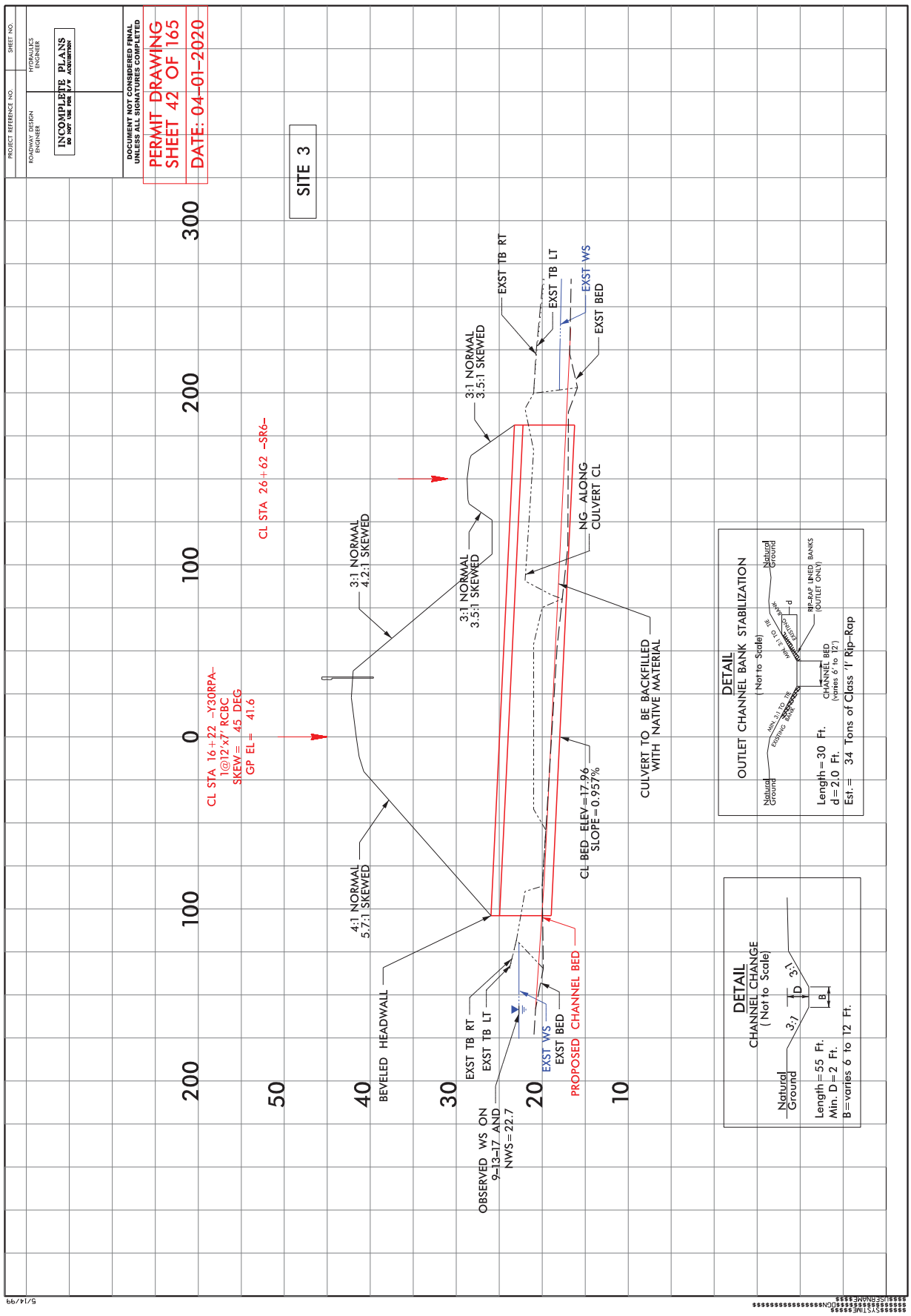

PERMIT DRAWING
SHEET 37 OF 165
DATE: 04-01-2020
SHEET NO. X-210
PROJ. REFERENCE NO. R-3300B
0 5 10
SITE 3
SITE 1
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
3:1
0.025
35.35
56.46
39.62
46+50.00
58.16
39.85
46+00.00
59.87
45+50.00
-Y 30-
6/23/16

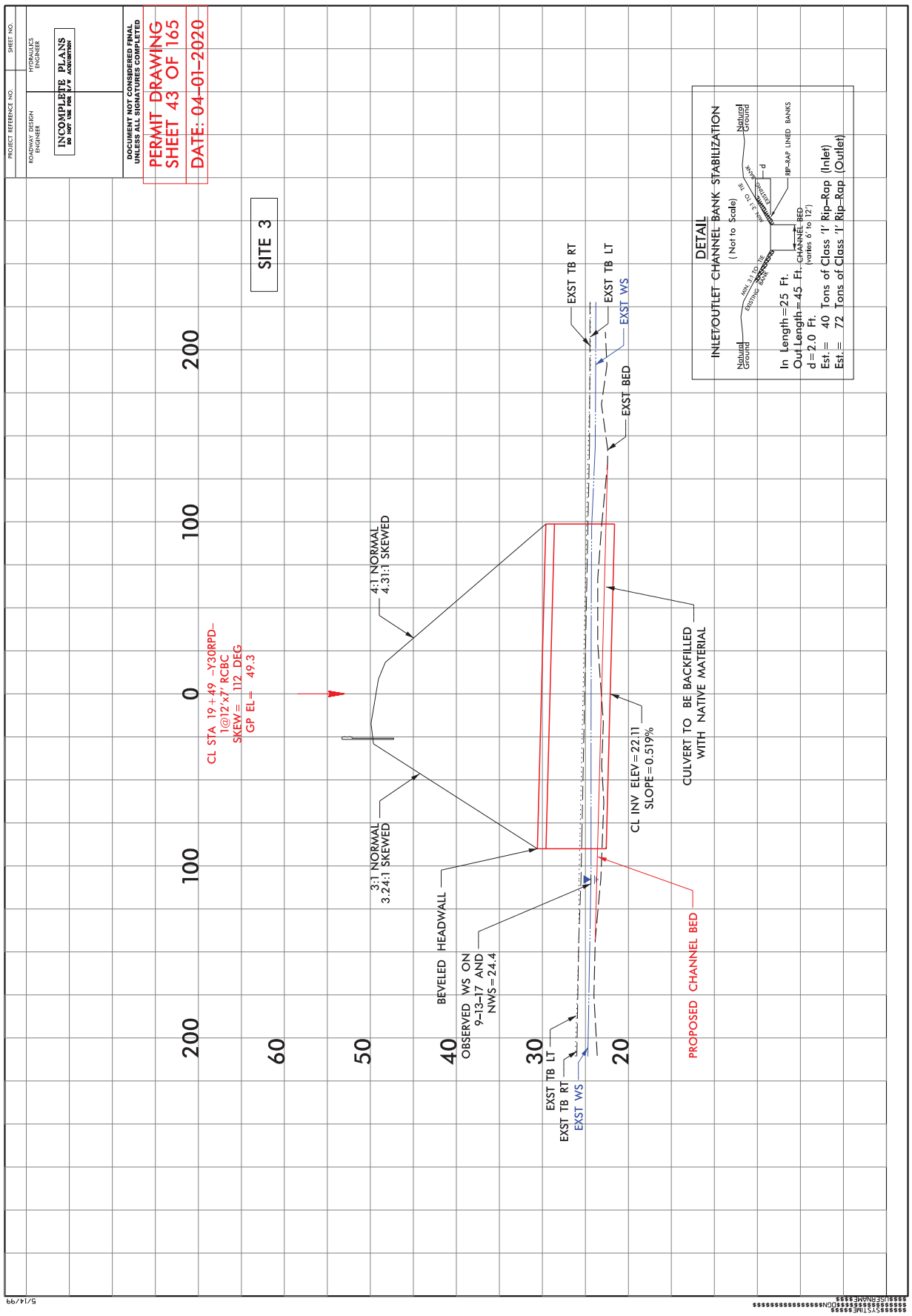

PERMIT DRAWING
SHEET 38 OF 165
DATE: 04-01-2020
SITE 3
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-18
615 + 00.00
614 + 50.00
614 + 00.00
613 + 50.00
WETLANDS
FILL IN WETLANDS
IMPACTS IN SURFACE WATER
HAND CLEARING
0.047
0.050
0.037
0.039
0.026
0.028
0.025
0.017
5.156:1
5.363:1
5.550:1
5.646:1
6:1
4:1
37.40
29.51
37.25
27.22
37.22
24.35
37.31
23.50
6/23/16

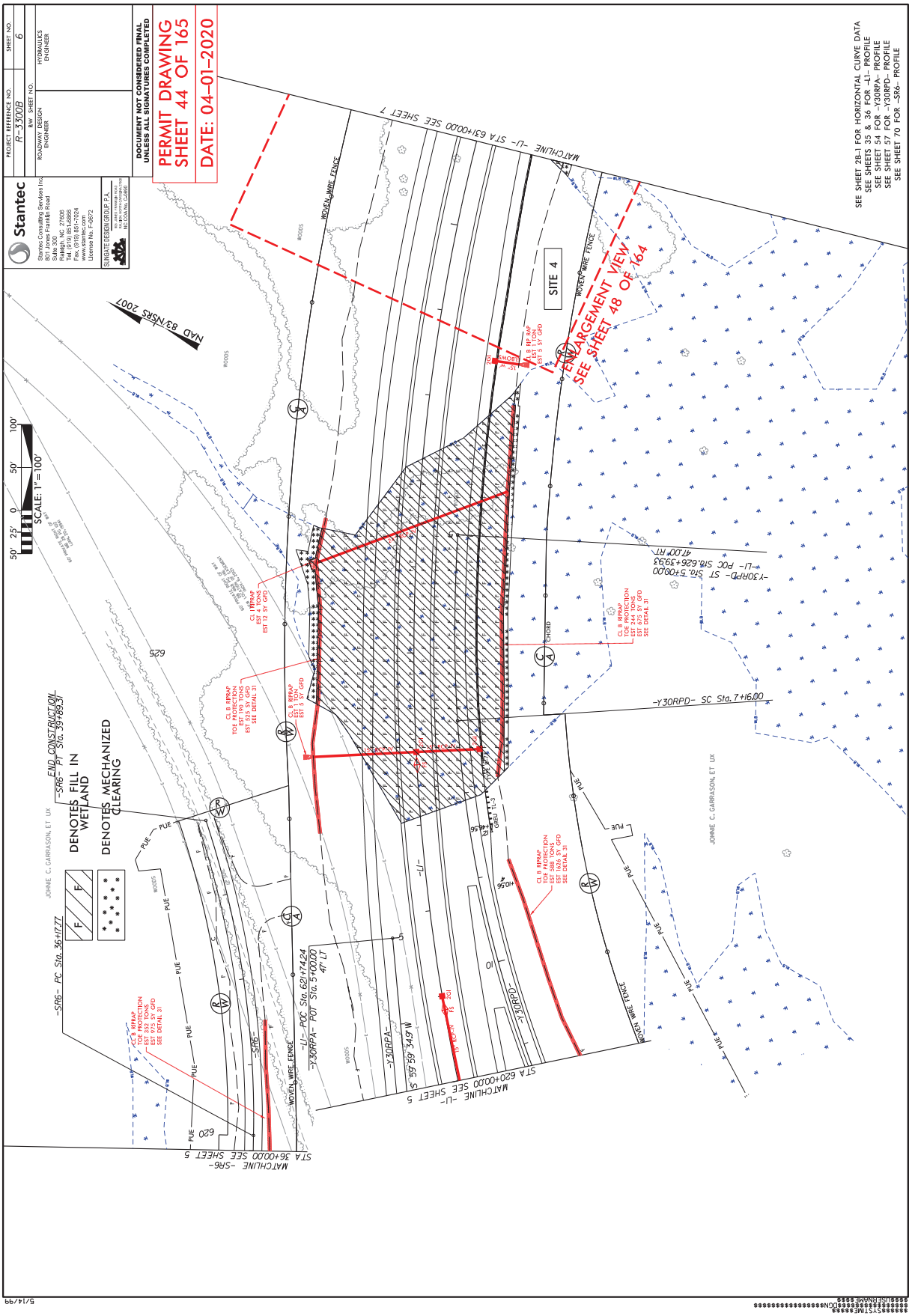

SHEET NO. X-220
PROJ. REFERENCE NO. R-3300B
0 5 10
PERMIT DRAWING
SHEET 39 OF 165
DATE: 04-01-2020
SITE 3
WETLANDS
FILL IN WETLANDS
EXCAVATION
IMPACTS IN SURFACE WATER
MECHANIZED CLEARING
16+50.00
16+00.00
15+50.00
0.041
0.022
0.004
3:1
4:1
35:70
-Y30RPA-
6/23/16


PERMIT DRAWING
SHEET 40 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-241
0 5 10
14+50.00
14+00.00
13+50.00
13+00.00
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
SITE 3
4:1
3:1
0.080
-Y3ORPD-

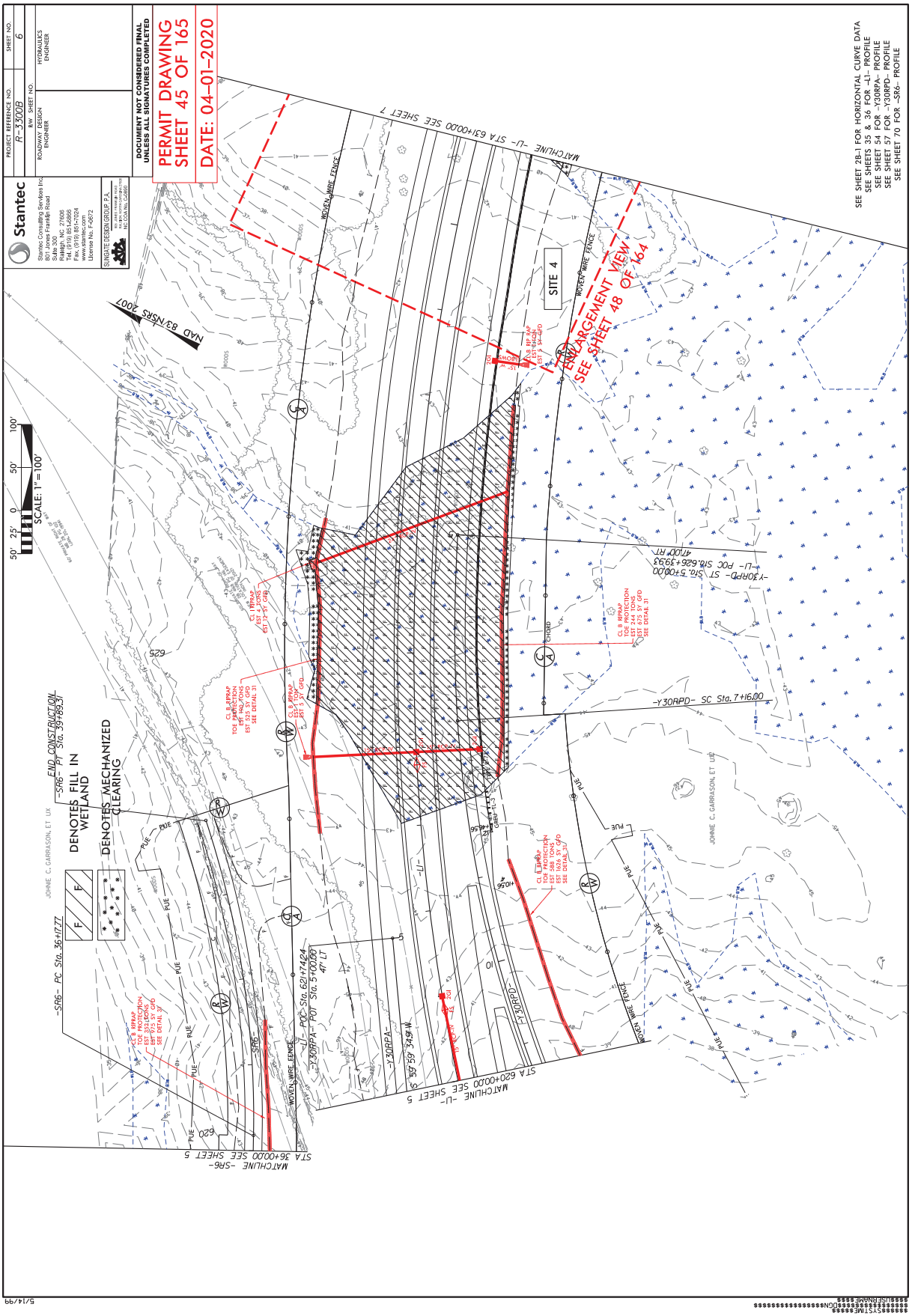

PROJECT REFERENCE NO.
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 41 OF 165
DATE: 04-01-2020
SITE 3
CL STA 612+13 -L1-
1@12'x7' RCBC
SKEW=104 DEG
GP EL=41.1
4:1 NORMAL
4:12:1 SKEWED
BEVELED HEADWALL
OBSERVED WS ON
9-13-17 AND
NWS=23.8
EXST TB LT
EXST TB RT
EXST WS
EXST BED
CL BED ELEV=20.70
SLOPE=0.304%
CULVERT TO BE BACKFILLED
WITH NATIVE MATERIAL
NG ALONG CULVERT CL
EXST TB RT
EXST TB LT
EXISTING 1@60" CMP
TO BE REMOVED
EXST WS
EXST BED
PROPOSED CHANNEL BED
0
100
200
100
200
50
40
30
20
DETAIL
INLET CHANNEL BANK STABILIZATION
(Not to Scale)
Natural Ground
Natural Ground
RIP-RAP LINED BANKS
CHANNEL BED
(varies 6' to 12')
Length=30 Ft.
d=2.0 Ft.
Est.= 44 Tons of Class 'I' Rip-Rap
DETAIL
OUTLET CHANNEL BANK STABILIZATION
(Not to Scale)
Natural Ground
Natural Ground
Length=35 Ft.
Max. d=2.5 Ft.
B=varies 6 to 12 Ft.
Est.= 66 Tons of Class 'I' Rip-Rap
DETAIL
OUTLET CHANNEL
(Not to Scale)
Natural Ground
Natural Ground
Length=90 Ft.
Min. D=2.0 Ft.
B=6.0 Ft.

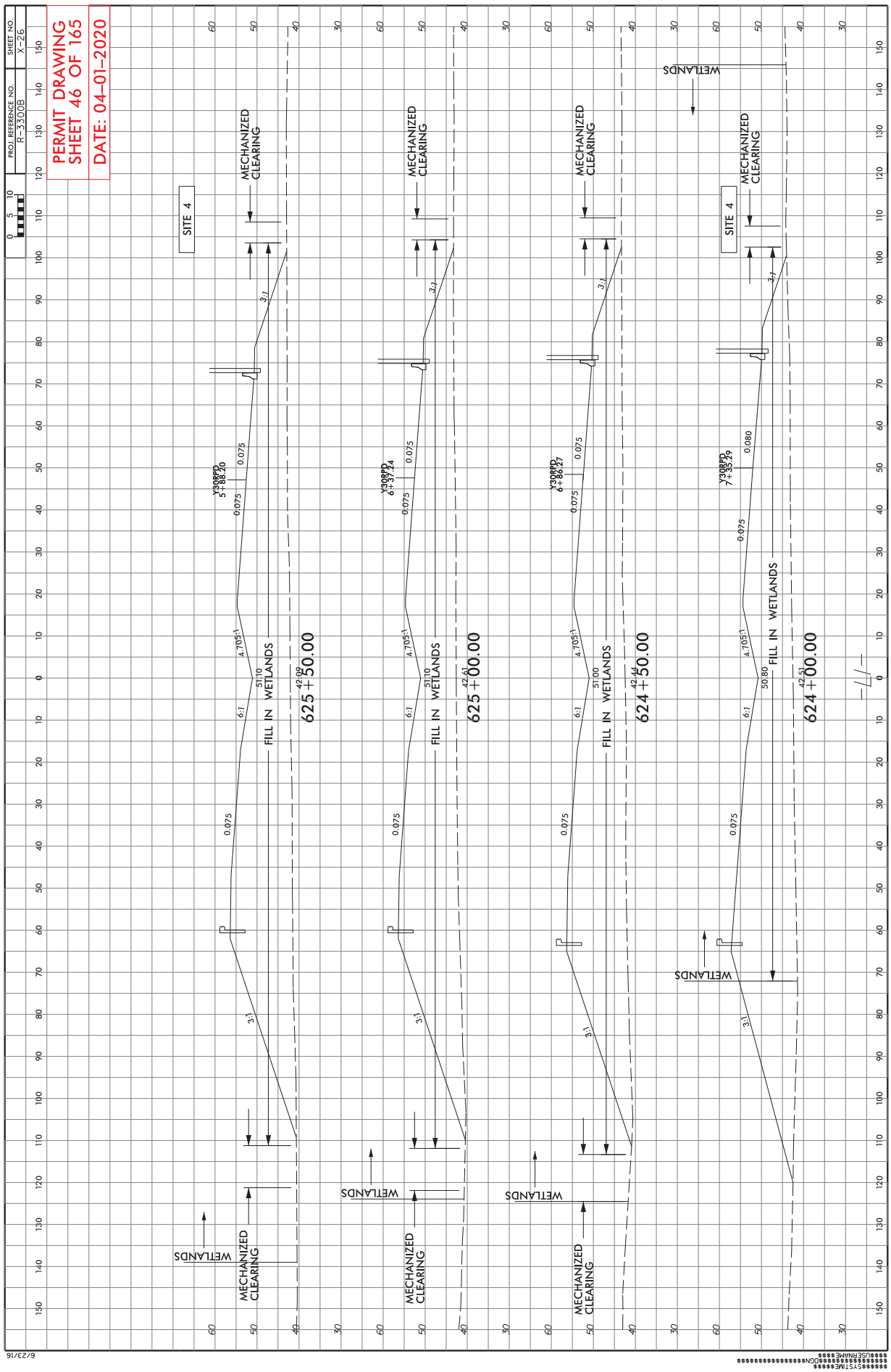

PROJECT REFERENCE NO.
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 42 OF 165
DATE: 04-01-2020
SITE 3
CL STA 16+22 -Y30RPA-
1@12'x7' RCBC
SKEW= 45 DEG
GP EL= 41.6
CL STA 26+62 -SR6-
3:1 NORMAL
4.2:1 SKEWED
3:1 NORMAL
3.5:1 SKEWED
4:1 NORMAL
5.7:1 SKEWED
EXST TB RT
EXST TB LT
EXST WS
EXST BED
NG ALONG
CULVERT CL
BEVELED HEADWALL
PROPOSED CHANNEL BED
CL BED ELEV=17.96
SLOPE=0.957%
CULVERT TO BE BACKFILLED
WITH NATIVE MATERIAL
OBSERVED WS ON
9-13-17 AND
NWS=22.7
0
50
100
200
300
10
20
30
40
DETAIL
CHANNEL CHANGE
(Not to Scale)
Natural Ground
3:1
D
B
Length=55 Ft.
Min. D=2 Ft.
B=varies 6 to 12 Ft.
DETAIL
OUTLET CHANNEL BANK STABILIZATION
(Not to Scale)
Natural Ground
MIN. 3:1 TO TIE EXISTING BANKS
MIN. 3:1 TO TIE EXISTING BANK
d
RIP-RAP LINED BANKS (OUTLET ONLY)
CHANNEL BED (varies 6' to 12')
Length=30 Ft.
d=2.0 Ft.
Est.= 34 Tons of Class 'I' Rip-Rap

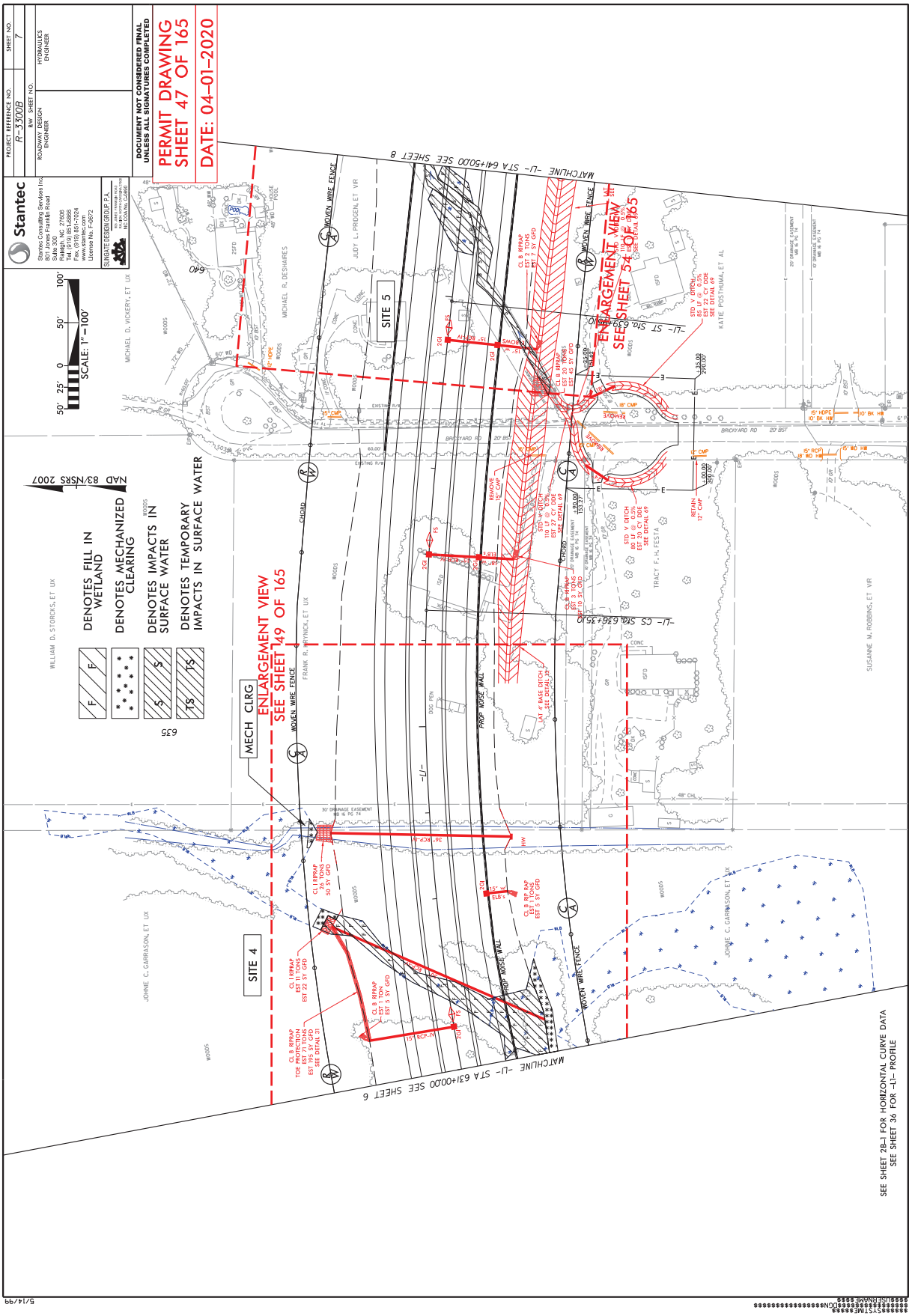

PROJECT REFERENCE NO.
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 43 OF 165
DATE: 04-01-2020
SITE 3
CL STA 19+49 -Y30RPD-
1@12'x7' RCBC
SKEW= 112 DEG
GP EL= 49.3
4:1 NORMAL
4.31:1 SKEWED
3:1 NORMAL
3.24:1 SKEWED
BEVELED HEADWALL
OBSERVED WS ON
9-13-17 AND
NWS=24.4
EXST TB LT
EXST TB RT
EXST WS
CL INV ELEV=22.11
SLOPE=0.519%
CULVERT TO BE BACKFILLED
WITH NATIVE MATERIAL
PROPOSED CHANNEL BED
EXST TB RT
EXST TB LT
EXST WS
EXST BED
DETAIL
INLET/OUTLET CHANNEL BANK STABILIZATION
(Not to Scale)
Natural Ground
MIN 3:1 TO THE EXISTING SIDE SLOPE
MIN 3:1 TO THE PROPOSED CHANNEL BANK
d
RIP-RAP LINED BANKS
In Length=25 Ft.
Out Length=45 Ft.
d=2.0 Ft.
Est.= 40 Tons of Class 1' Rip-Rap (Inlet)
Est.= 72 Tons of Class 1' Rip-Rap (Outlet)
(CHANNEL BED
(varies 6' to 12')
0
100
200
20
30
40
50
60
5/14/99

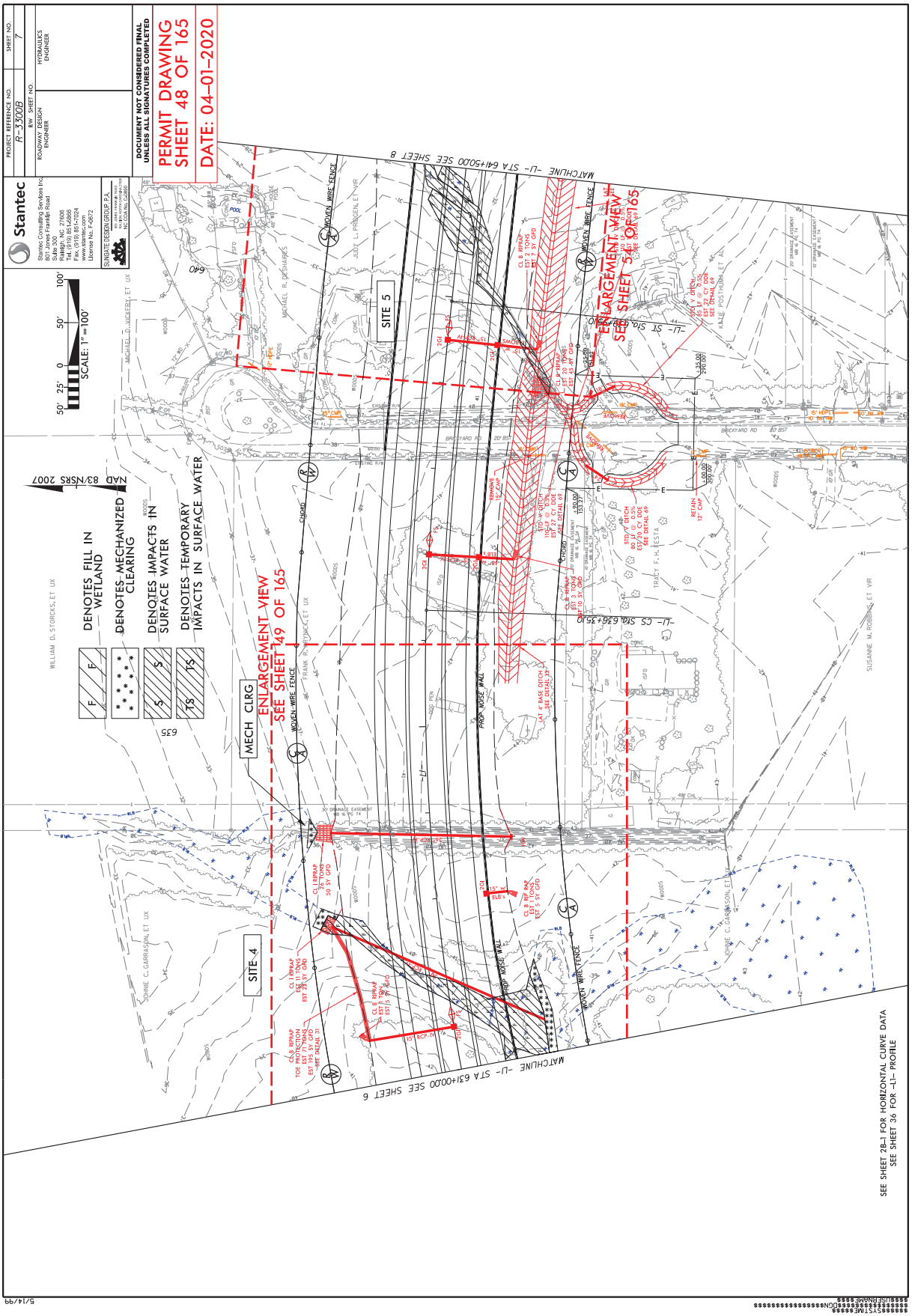

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
6
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 44 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 35 & 36 FOR -L1- PROFILE
SEE SHEET 54 FOR -Y30RPA- PROFILE
SEE SHEET 57 FOR -Y30RPD- PROFILE
SEE SHEET 70 FOR -SR6- PROFILE
NAD 83/NSRS 2007
SCALE: 1"=100'
ENLARGEMENT VIEW
SEE SHEET 48 OF 164
SITE 4
WOVEN WIRE FENCE
MATCHLINE -L1- STA 631+00.00 SEE SHEET 7
MATCHLINE -SR6- STA 36+00.00 SEE SHEET 5
MATCHLINE -L1- STA 620+00.00 SEE SHEET 5
-Y30RPD- SC Sta. 7+16.00
-Y30RPD- ST Sta. 5+09.00
-L1- POC Sta. 626+39.93
47.00' RT
-SR6- PC Sta. 36+17.77
END CONSTRUCTION
-SR6- PT Sta. 39+89.31
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
-L1- POC Sta. 621+74.24
-Y30RPA- POT Sta. 5+00.00
47' LT
-Y30RPA-
S 59° 59' 34.9" W
JOHNIE C. GARRASON, ET UX
CL B RIPRAP
EST 4 TONS
EST 72 SY GFD
CL B RIPRAP
TOE PROTECTION
EST 1190 TONS
EST 325 SY GFD
SEE DETAIL 31
CL B RIPRAP
TOE PROTECTION
EST 388 TONS
EST 425 SY GFD
SEE DETAIL 31
CL B RIPRAP
TOE PROTECTION
EST 1010 TONS
EST 875 SY GFD
SEE DETAIL 31
CL B RIPRAP
EST 5 SY GFD
5/14/99

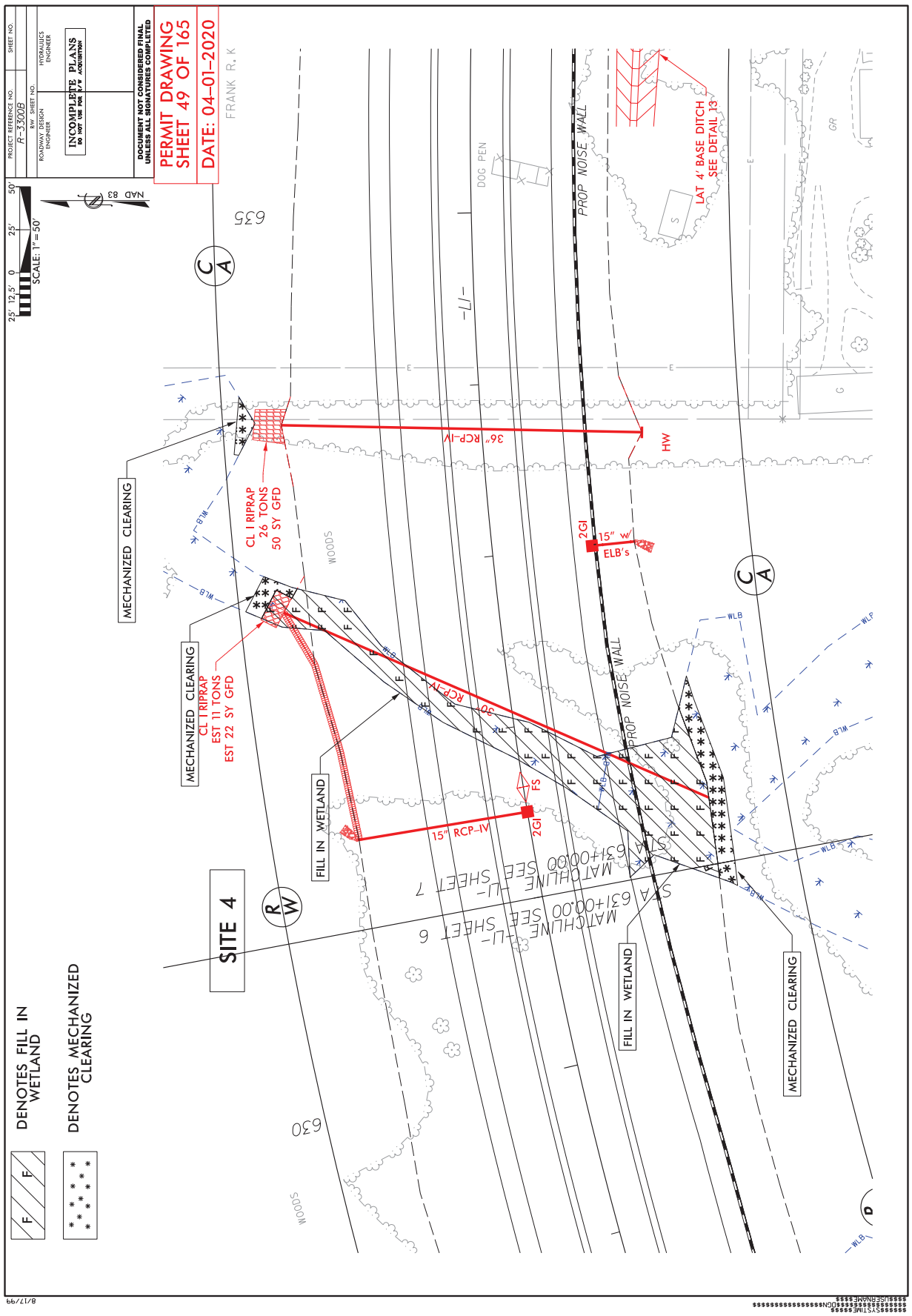
P-83

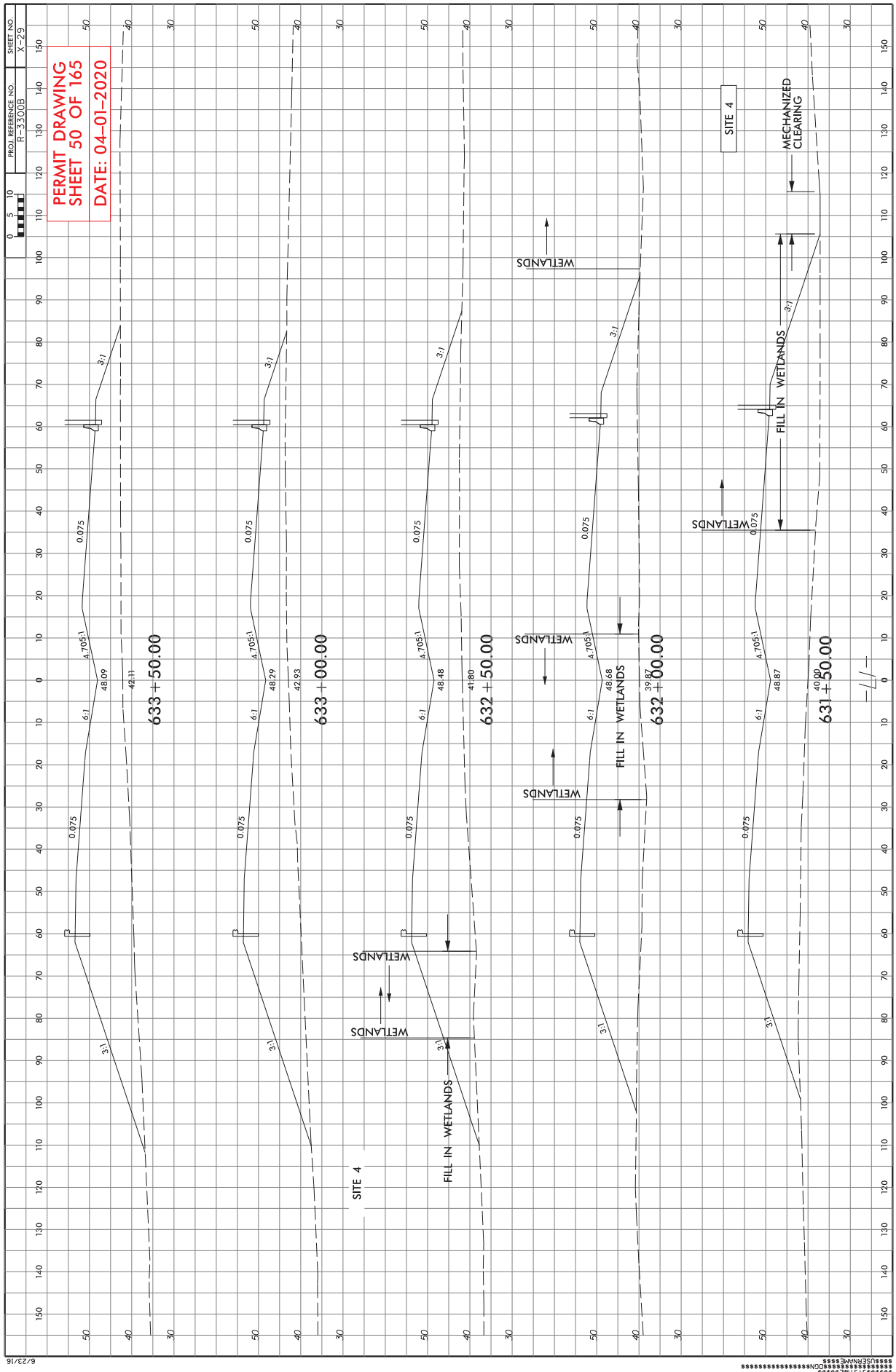

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672
SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 45 OF 165
DATE: 04-01-2020
NAD 83/NSRS 2007
SCALE: 1" = 100'
50' 25' 0 50' 100'
MATCHLINE -L1- STA 631+00.00 SEE SHEET 7
MATCHLINE -L1- STA 620+00.00 SEE SHEET 5
MATCHLINE -SR6- STA 36+00.00 SEE SHEET 5
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 35 & 36 FOR -L1- PROFILE
SEE SHEET 54 FOR -Y30RPA- PROFILE
SEE SHEET 57 FOR -Y30RPD- PROFILE
SEE SHEET 70 FOR -SR6- PROFILE
SITE 4
ENLARGEMENT VIEW
SEE SHEET 48 OF 164
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
END CONSTRUCTION
-SR6- PT Sta. 39+89.31
-SR6- PC Sta. 36+17.77
-L1- POC Sta. 621+74.24
-Y30RPA- POT Sta. 5+00.00
47' LT
-Y30RPD- ST Sta. 5+00.00
-L1- POC Sta. 626+39.93
47.00' RT
-Y30RPD- SC Sta. 7+16.00
-Y30RPA-
-Y30RPD-
-L1-
-SR6-
S 59° 59' 34.9" W
CHORD
WOVEN WIRE FENCE
WOODS
JOHNIE C. GARRASON, ET UX
PUE
CL B RIPRAP TOE PROTECTION EST 352 TONS EST 975 SY GFD SEE DETAIL 31
CL B RIPRAP TOE PROTECTION EST 190 TONS EST 525 SY GFD SEE DETAIL 31
CL B RIPRAP EST 4 TONS EST 12 SY GFD
CL B RIPRAP EST 1 TON EST 5 SY GFD
CL B RIPRAP TOE PROTECTION EST 244 TONS EST 675 SY GFD SEE DETAIL 31
CL B RIPRAP TOE PROTECTION EST 588 TONS EST 1626 SY GFD SEE DETAIL 31
CL B RIP RAP EST 1 TON EST 5 SY GFD
2GI
15" RCP
ELBOWS
620
625
5/14/99

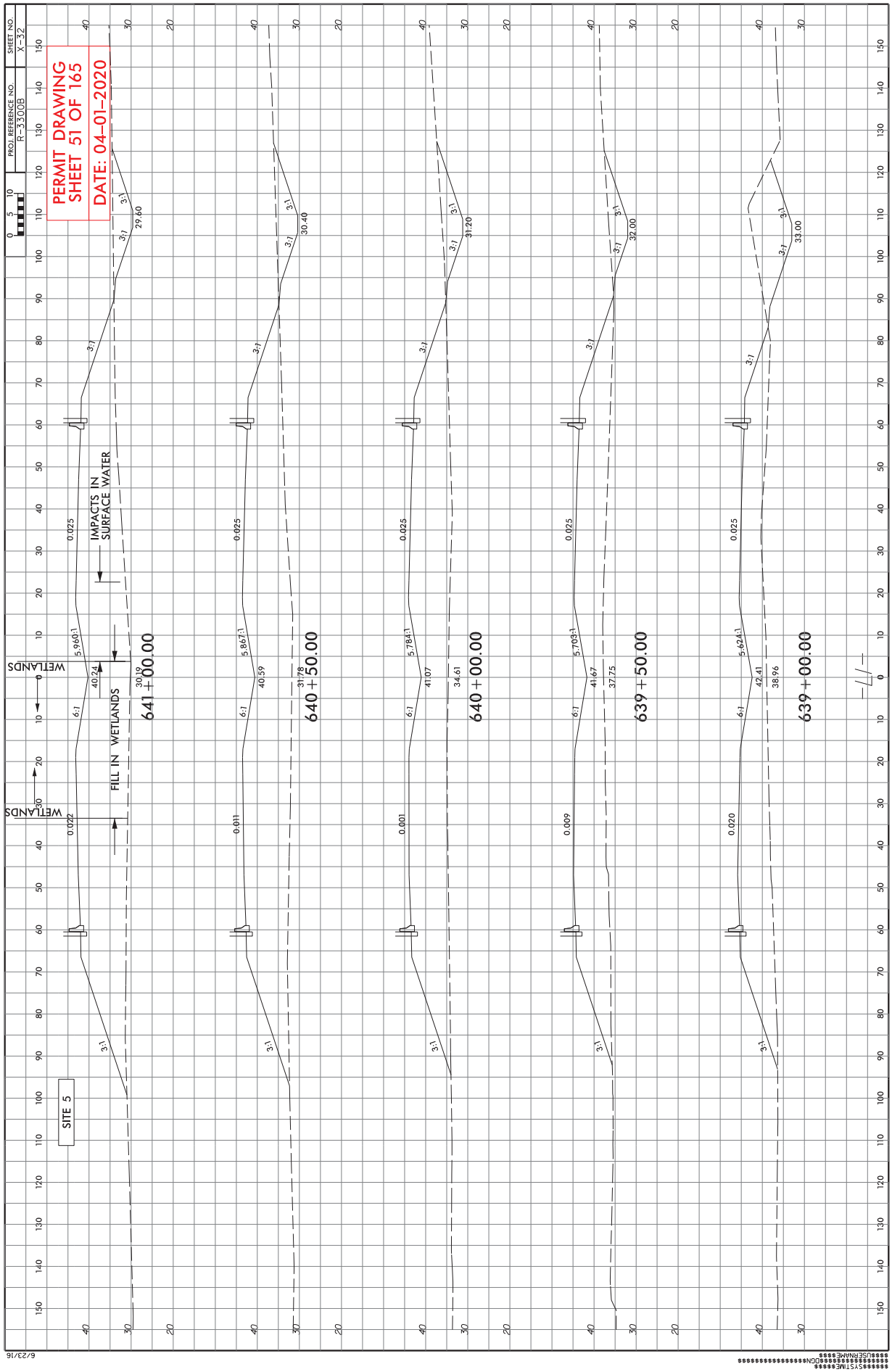

PERMIT DRAWING
SHEET 46 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-26
SITE 4
MECHANIZED CLEARING
FILL IN WETLANDS
WETLANDS
625+50.00
625+00.00
624+50.00
624+00.00
Y308PD
5+88.20
Y308PD
6+37.24
Y308PD
6+86.27
Y308PD
7+35.29
0.075
0.080
3:1
4.705:1
6:1
51.10
51.00
50.80
42.09
42.61
42.44
42.51

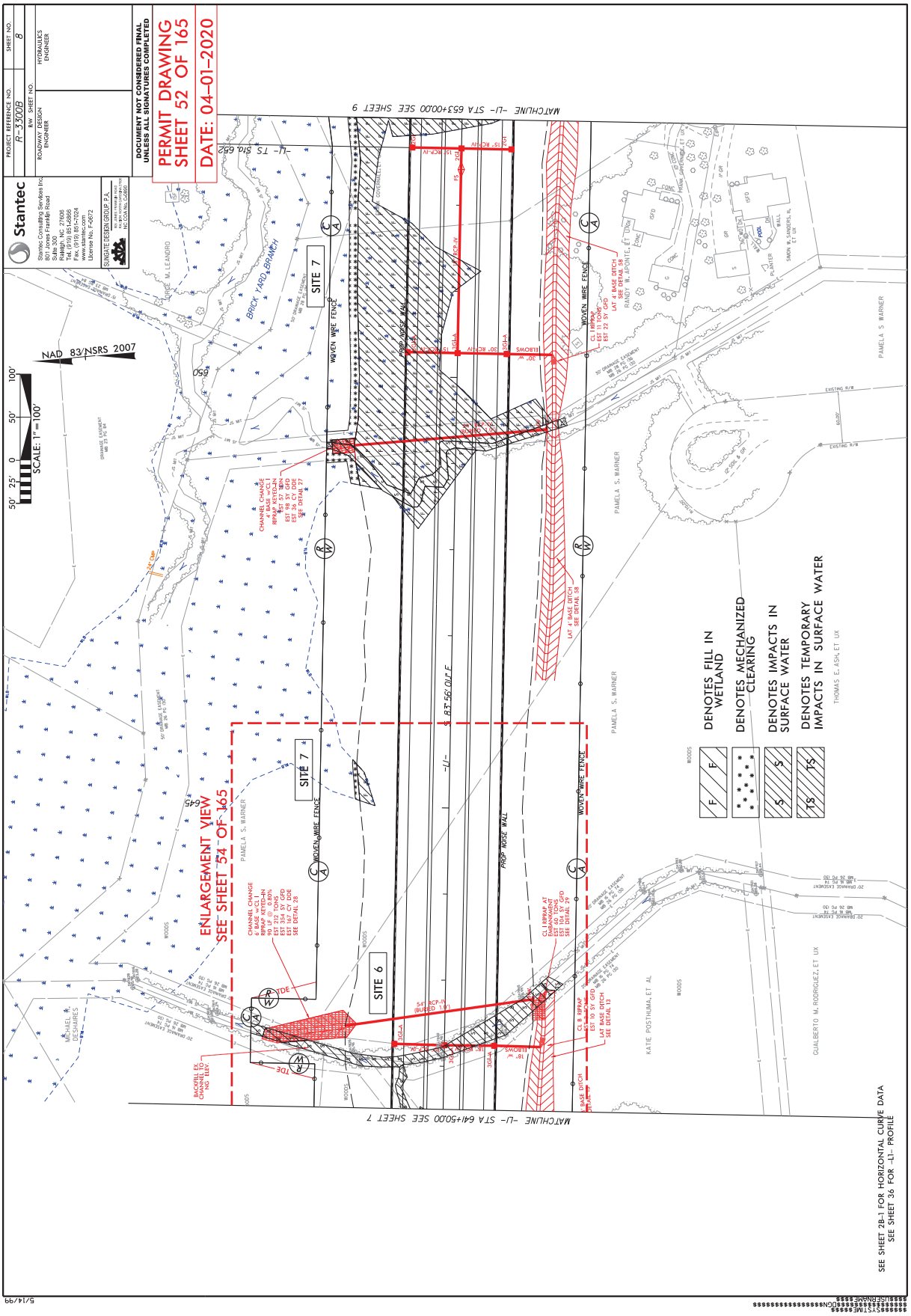

PERMIT DRAWING
SHEET 47 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 7
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SITE 4
SITE 5
MECH CLRG
ENLARGEMENT VIEW SEE SHEET 49 OF 165
ENLARGEMENT VIEW SEE SHEET 54 OF 165
MATCHLINE -L- STA 631+00.00 SEE SHEET 6
MATCHLINE -L- STA 641+50.00 SEE SHEET 8
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 36 FOR -L1- PROFILE
WOVEN WIRE FENCE
PROP NOISE WALL
BRICKYARD RD
MICHAEL D. VICKERY, ET UX
JUDY L. PRIDGEN, ET VIR
MICHAEL R. DESHAZES
WILLIAM D. STORCKS, ET UX
FRANK R. MITNICK, ET UX
TRACY F. H. FESTA
KATIE POSTHUMA, ET AL
SUSANNE M. ROBBINS, ET VIR
JOHNNIE C. GARRASON, ET UX

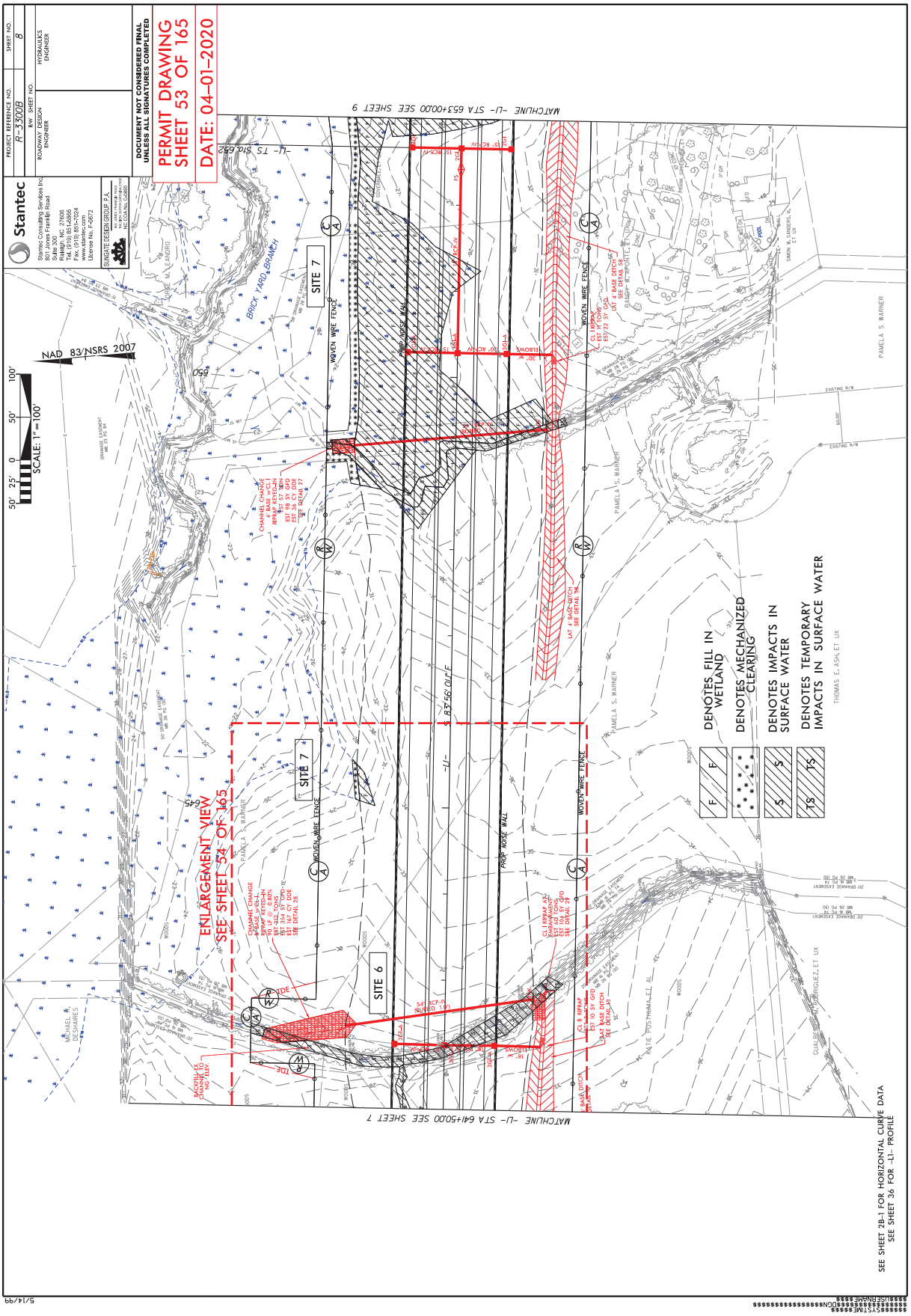

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
7
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 48 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
MECH CLRG
ENLARGEMENT VIEW SEE SHEET 49 OF 165
ENLARGEMENT VIEW SEE SHEET 54 OF 165
SITE 4
SITE 5
MATCHLINE -L1- STA 631+00.00 SEE SHEET 6
MATCHLINE -L1- STA 641+50.00 SEE SHEET 8
-L1- CS Sta 636+35.10
-L1- ST Sta 640+00.00
WOVEN WIRE FENCE
PRIVACY FENCE
BRICKYARD RD
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 36 FOR -L1- PROFILE
5/14/99

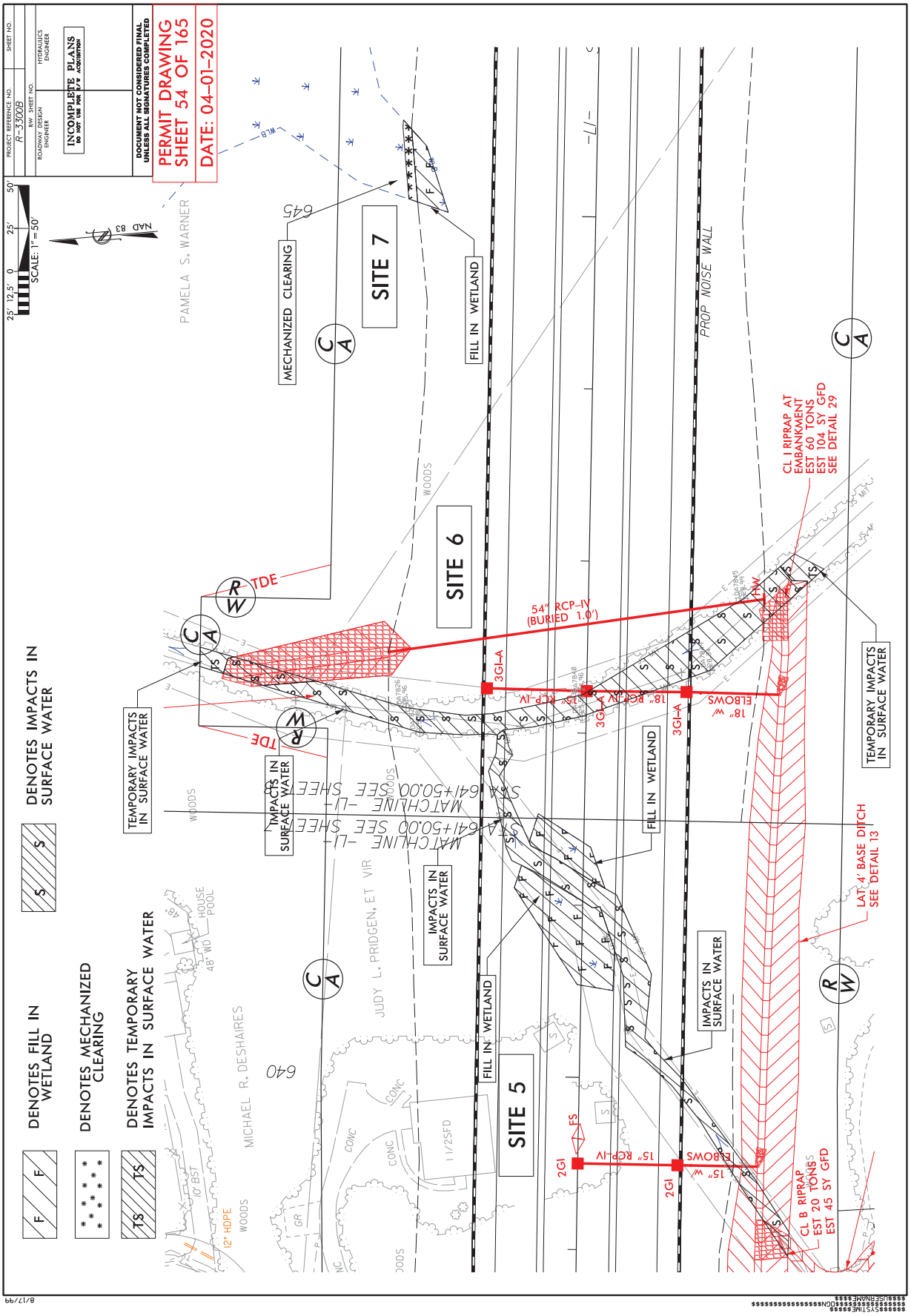

PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 49 OF 165
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 4
MECHANIZED CLEARING
CL I RIPRAP
26 TONS
50 SY GFD
CL I RIPRAP
EST 11 TONS
EST 22 SY GFD
FILL IN WETLAND
36" RCP-IV
30" RCP-IV
15" RCP-IV
HW
2GI
15" w
ELB's
FS
PROP NOISE WALL
LAT 4' BASE DITCH
SEE DETAIL 13
DOG PEN
FRANK R. K
WOODS
635
630
-L1-
STA 631+00.00 SEE -L1- SHEET 6
STA 631+00.00 SEE -L1- SHEET 7

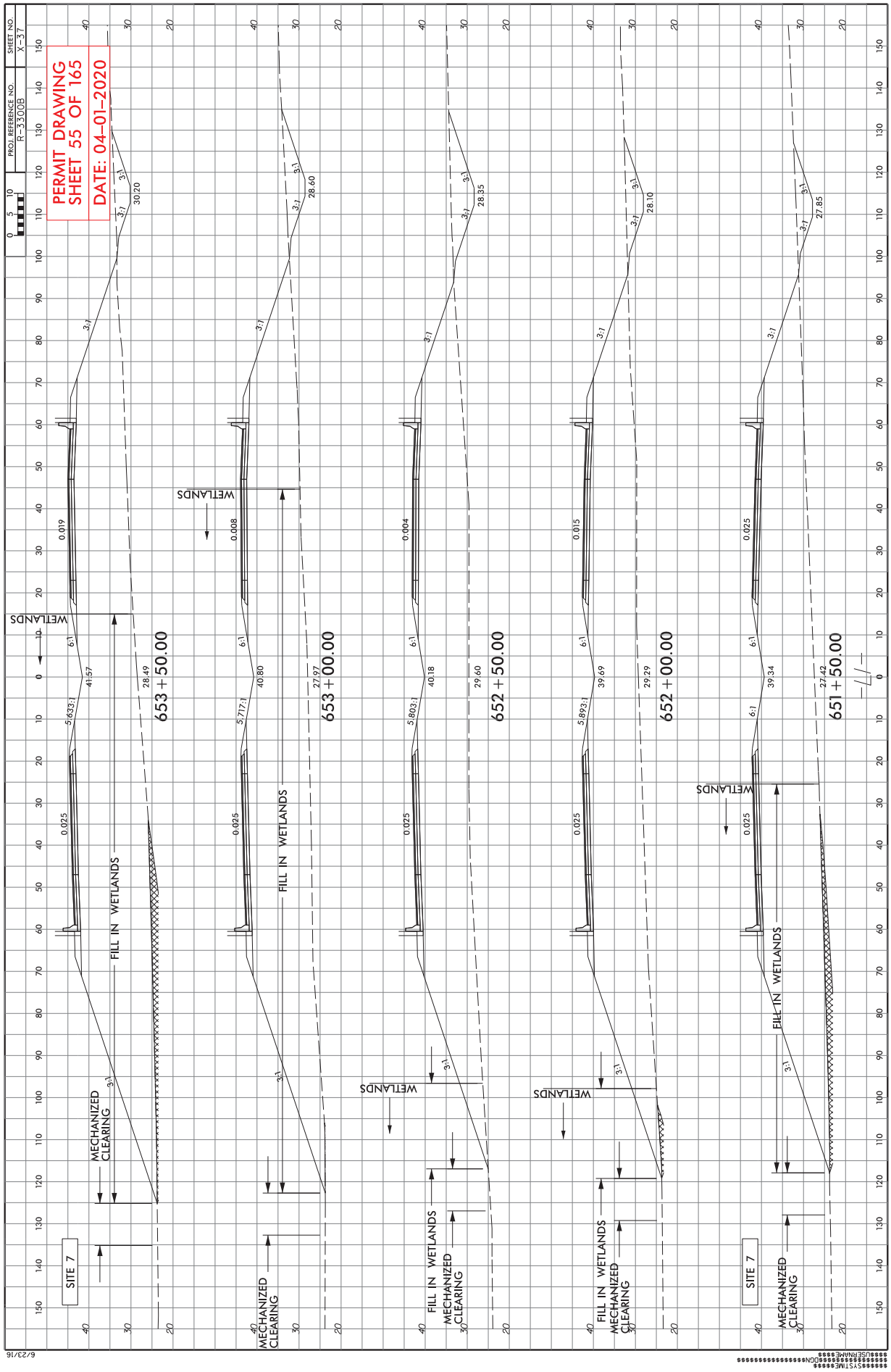

PERMIT DRAWING
SHEET 50 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-29
0 5 10
633+50.00
633+00.00
632+50.00
632+00.00
631+50.00
SITE 4
FILL IN WETLANDS
WETLANDS
MECHANIZED CLEARING
3:1
4:1
6:1
0.075
48.09
42.11
48.29
42.93
48.48
41.80
48.68
39.87
48.87
40.80

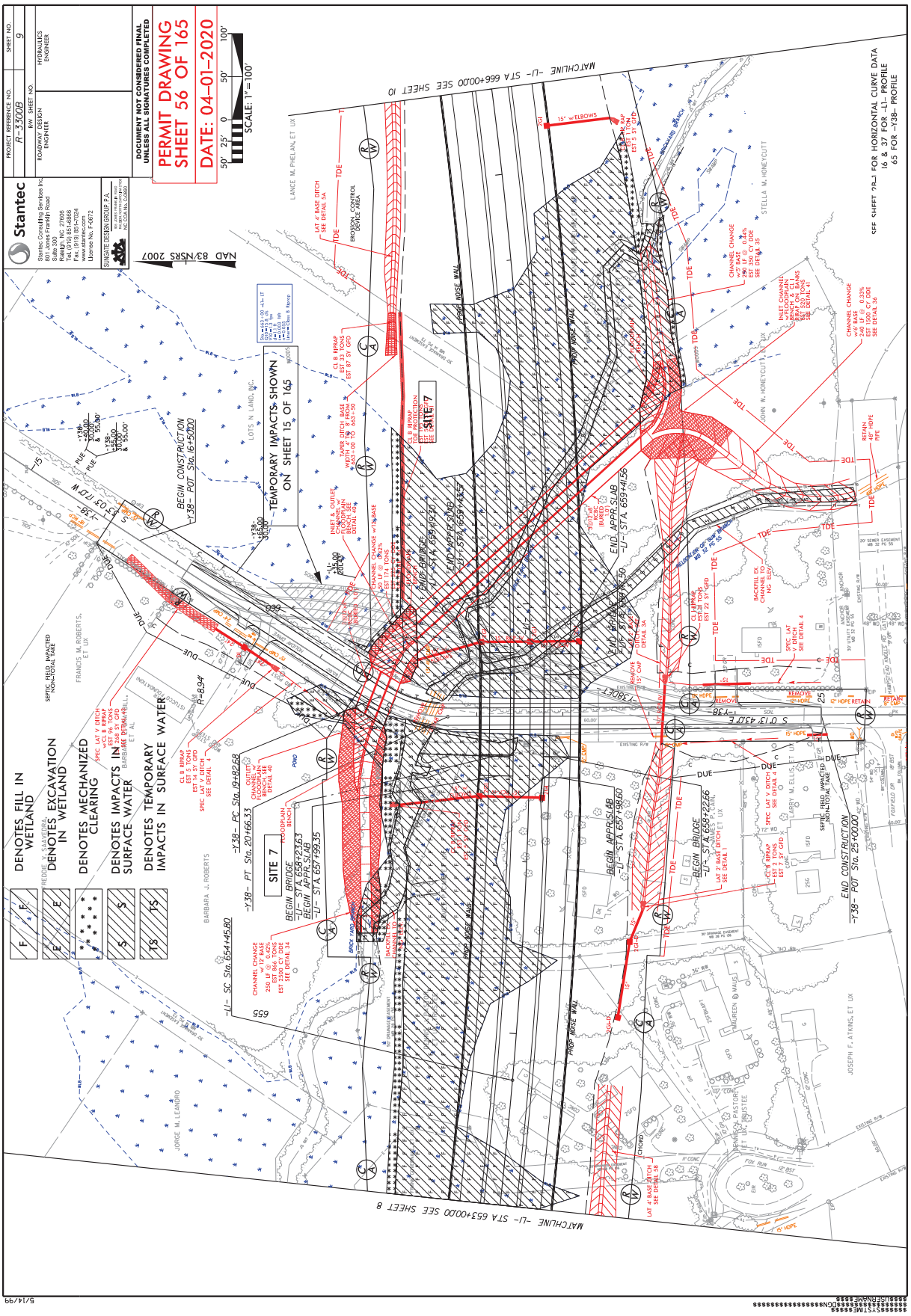

PERMIT DRAWING
SHEET 51 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-32
SITE 5
WETLANDS
WETLANDS
FILL IN WETLANDS
IMPACTS IN SURFACE WATER
641+00.00
640+50.00
640+00.00
639+50.00
639+00.00


PERMIT DRAWING
SHEET 52 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 8
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SUNGATE DESIGN GROUP, P.A.
License No. C-2672
NAD 83/NSRS 2007
SCALE: 1"=100'
50' 25' 0 50' 100'
MATCHLINE -L1- STA 653+00.00 SEE SHEET 9
MATCHLINE -L1- STA 641+50.00 SEE SHEET 7
-L1- TS Sta. 652
-L1- 645
-L1- S 83°56'00" E
ENLARGEMENT VIEW
SEE SHEET 54 OF 165
SITE 7
SITE 6
WOVEN WIRE FENCE
PROP NOISE WALL
BRICK YARD BRANCH
PAMELA S. WARNER
KATIE POSTHUMA, ET AL
GUALBERTO M. RODRIGUEZ, ET UX
THOMAS E. ASH, ET UX
MICHAEL K. DAVIS, ET UX
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 36 FOR -L1- PROFILE

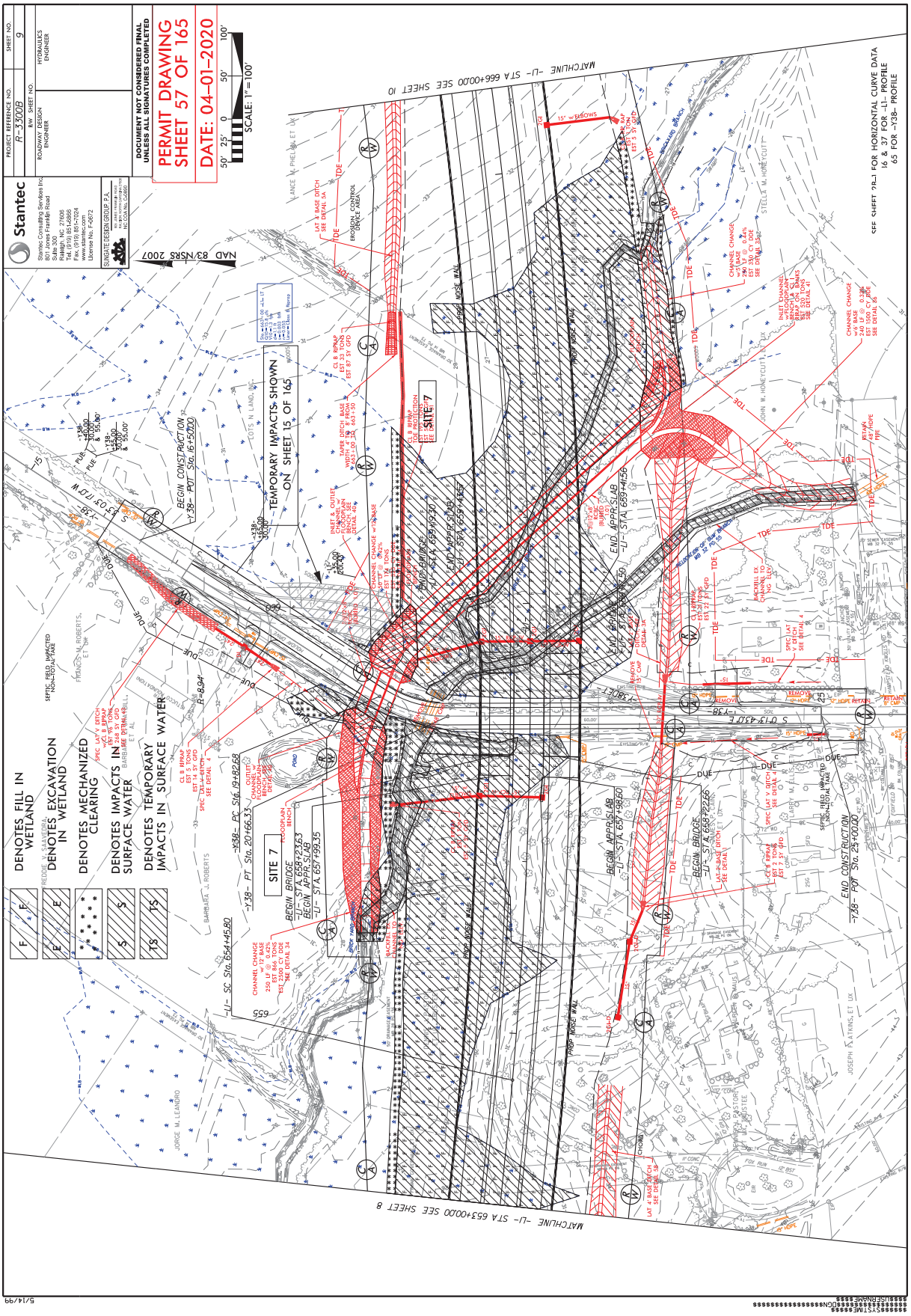

PERMIT DRAWING
SHEET 53 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 8
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
SINGATE DESIGN GROUP, P.A.
NAD 83/NSRS 2007
SCALE: 1"=100'
ENLARGEMENT VIEW
SEE SHEET 54 OF 165
MATCHLINE -L1- STA 653+00.00 SEE SHEET 9
MATCHLINE -L1- STA 641+50.00 SEE SHEET 7
SITE 7
SITE 6
WOVEN WIRE FENCE
PROP NOISE WALL
BRICK YARD BRANCH
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 36 FOR -L1- PROFILE

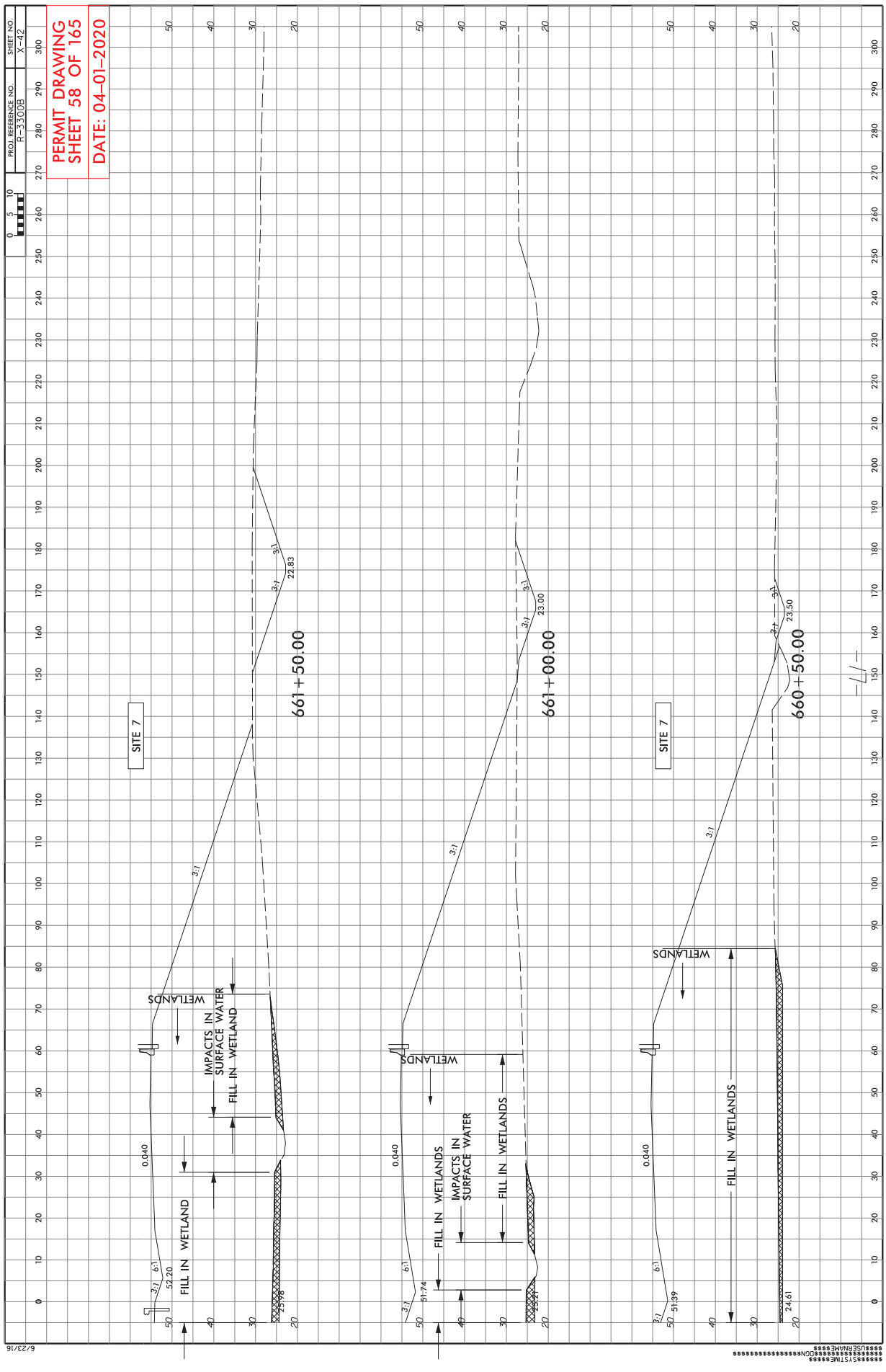

PROJECT REFERENCE NO.
R-3300B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO.
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 54 OF 165
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
PAMELA S. WARNER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
SITE 5
SITE 6
SITE 7
MECHANIZED CLEARING
FILL IN WETLAND
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
54" RCP-IV (BURIED 1.0')
18" RCP-IV
15" RCP-IV
18" W ELBOWS
15" W ELBOWS
3GI-A
2GI
FS
TDE
PROP NOISE WALL
CL I RIPRAP AT EMBANKMENT EST 60 TONS EST 104 SY GFD SEE DETAIL 29
CL B RIPRAP EST 20 TONS EST 45 SY GFD
LAT. 4' BASE DITCH SEE DETAIL 13
MATCHLINE -L- STA 641+50.00 SEE SHEET
JUDY L. PRIDGEN, ET VIR
MICHAEL R. DESHAIRES
WOODS
HOUSE
POOL
12" HDPE
645
640

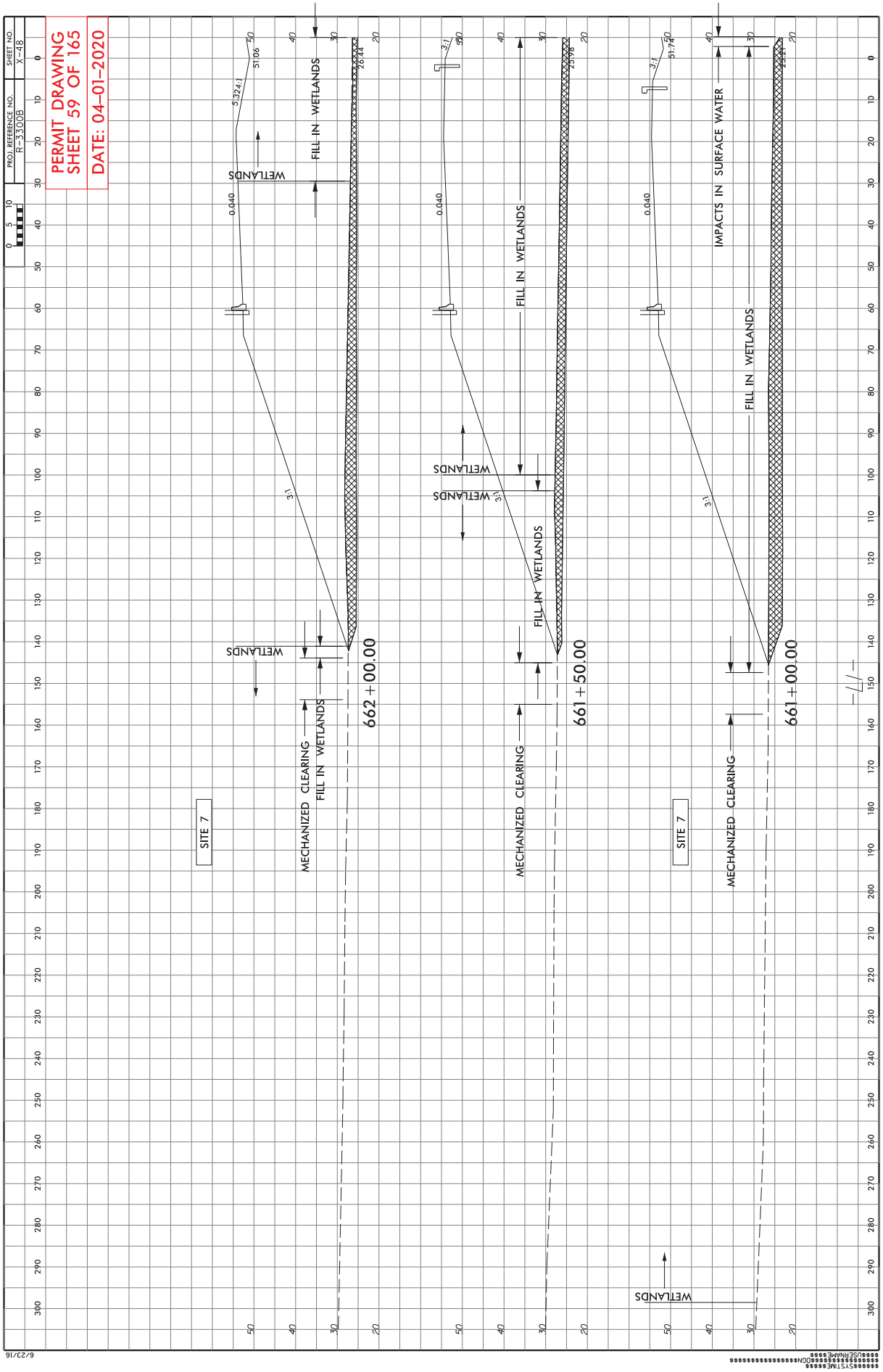

PERMIT DRAWING
SHEET 55 OF 165
DATE: 04-01-2020
SHEET NO. X-37
PROJ. REFERENCE NO. R-3300B
653+50.00
653+00.00
652+50.00
652+00.00
651+50.00
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
SITE 7
0.019
0.008
0.004
0.015
0.025
0.026
6:1
3:1
5.633:1
5.717:1
5.803:1
5.893:1
41.57
28.49
40.80
27.97
40.18
29.60
39.69
29.29
39.34
27.42
30.20
28.60
28.35
28.10
27.85

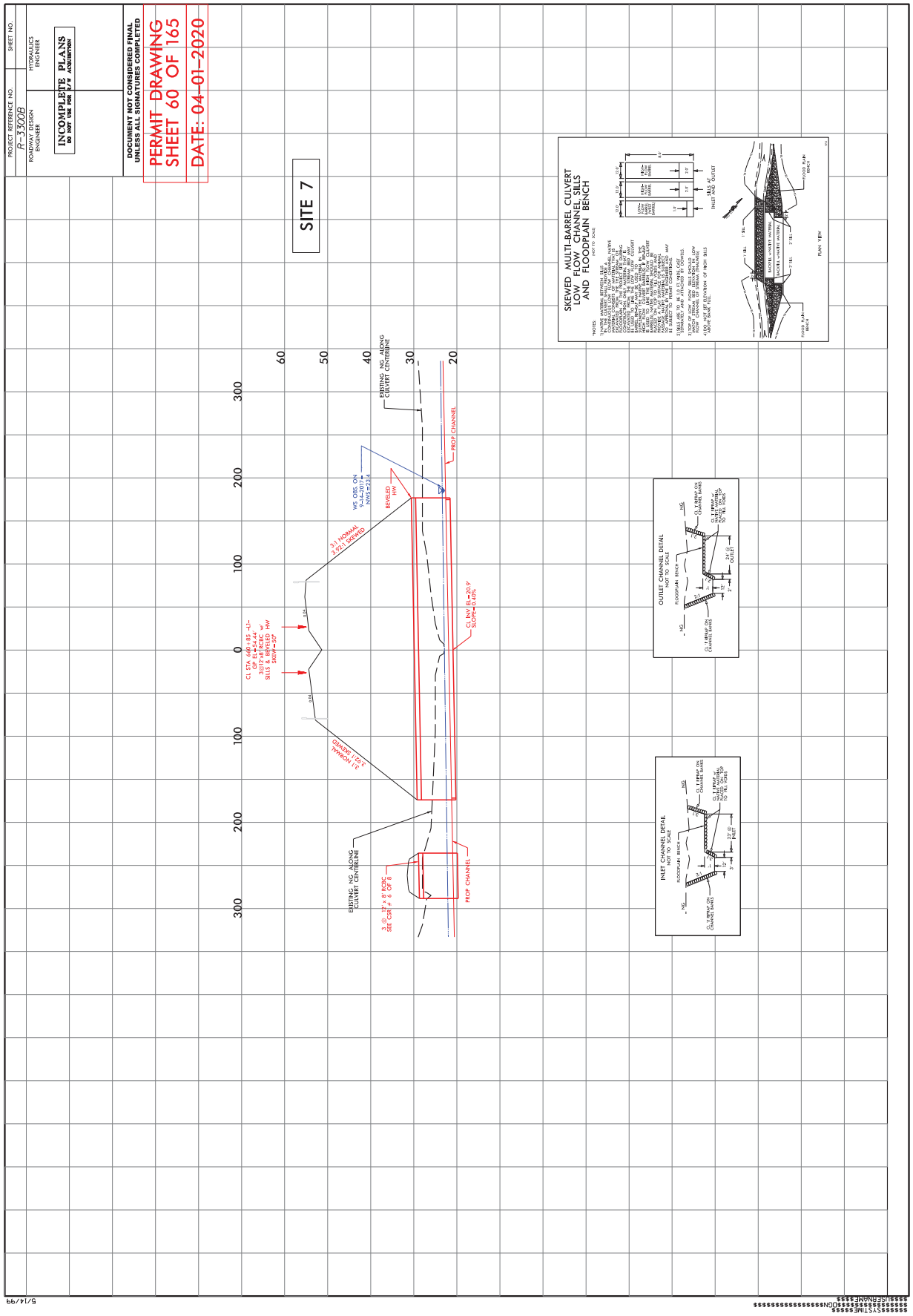

PERMIT DRAWING
SHEET 56 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 9
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
SINGATE DESIGN GROUP, P.A.
NAD 83/NSRS 2007
SCALE: 1"=100'
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
-L- STA 654+45.80
-L- STA 657+99.35
-L- STA 658+22.83
-L- STA 658+42.48
-L- STA 658+89.31
-L- STA 659+44.55
-L- STA 659+41.56
-L- STA 687+98.60
-L- STA 688+22.66
-L- STA 688+42.31
-Y38- PC Sta. 0+98.68
-Y38- PT Sta. 2+66.33
-Y38- POT Sta. 16+50.00
-L- POT Sta. 25+00.00
SITE 7
SITE 17
TEMPORARY IMPACTS SHOWN ON SHEET 15 OF 165
MATCHLINE -L- STA 666+00.00 SEE SHEET 10
MATCHLINE -L- STA 653+00.00 SEE SHEET 8
S 07°03'17"W
S 01°37'38"E
S 01°34'30"E
PROP MSE WALL
END APPR SLAB
BEGIN APPR SLAB
END BRIDGE
BEGIN BRIDGE
BEGIN CONSTRUCTION
END CONSTRUCTION
SEPTIC FIELD IMPACTED AREA
5/14/99

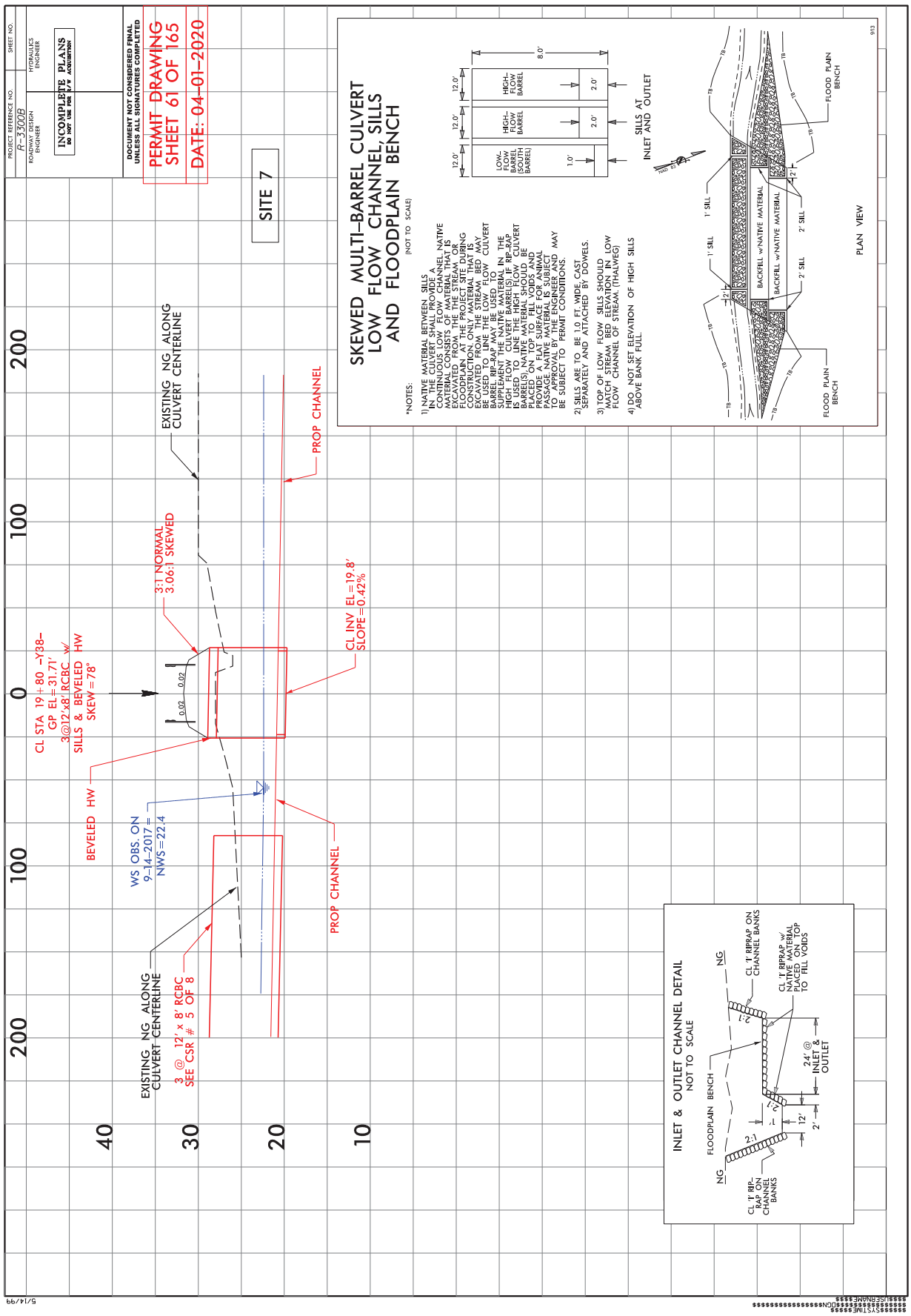
P-95


PERMIT DRAWING
SHEET 57 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 9
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1"=100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SITE 7
SITE 17
BEGIN BRIDGE -L1- STA 658+22.83
END BRIDGE -L1- STA 658+72.66
BEGIN APPR SLAB -L1- STA 657+98.60
END APPR SLAB -L1- STA 659+44.56
BEGIN CONSTRUCTION -Y38- POT Sta. 16+50.00
END CONSTRUCTION -Y38- POT Sta. 25+00.00
TEMPORARY IMPACTS SHOWN ON SHEET 15 OF 165
SEE SHEET 79-1 FOR HORIZONTAL CURVE DATA
16 & 37 FOR -L1- PROFILE
65 FOR -Y38- PROFILE
MATCHLINE -L1- STA 666+00.00 SEE SHEET 10
MATCHLINE -L1- STA 653+00.00 SEE SHEET 8

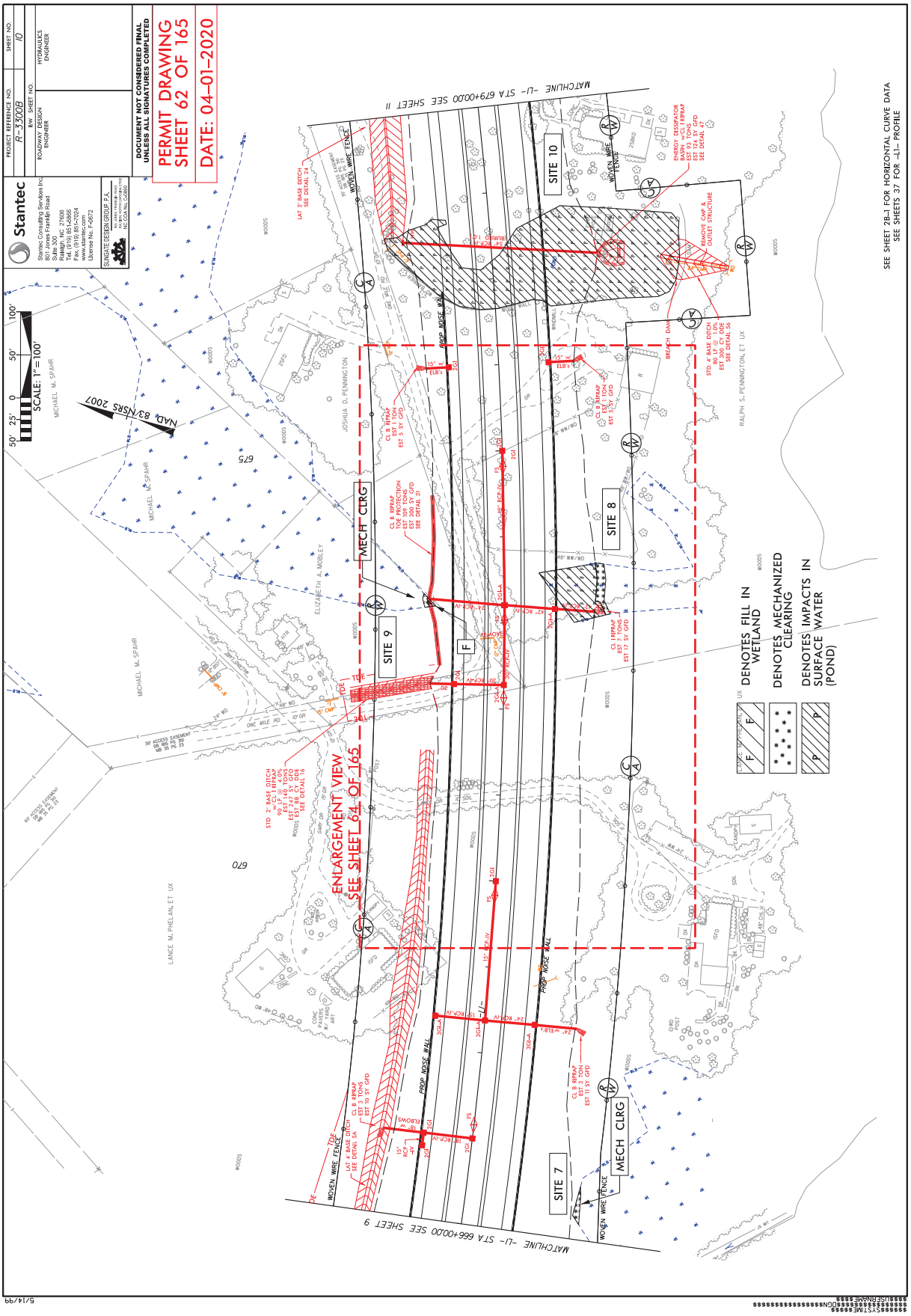

PERMIT DRAWING
SHEET 58 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-42
SITE 7
661+50.00
WETLANDS
IMPACTS IN SURFACE WATER
FILL IN WETLAND
FILL IN WETLANDS
661+00.00
660+50.00


PERMIT DRAWING
SHEET 59 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-48
0 5 10
SITE 7
MECHANIZED CLEARING
FILL IN WETLANDS
WETLANDS
662+00.00
661+50.00
661+00.00
FILL IN WETLANDS
IMPACTS IN SURFACE WATER
5.324:1
3:1
0.040
51.06
26.44
25.98
51.74
25.41
6/23/16

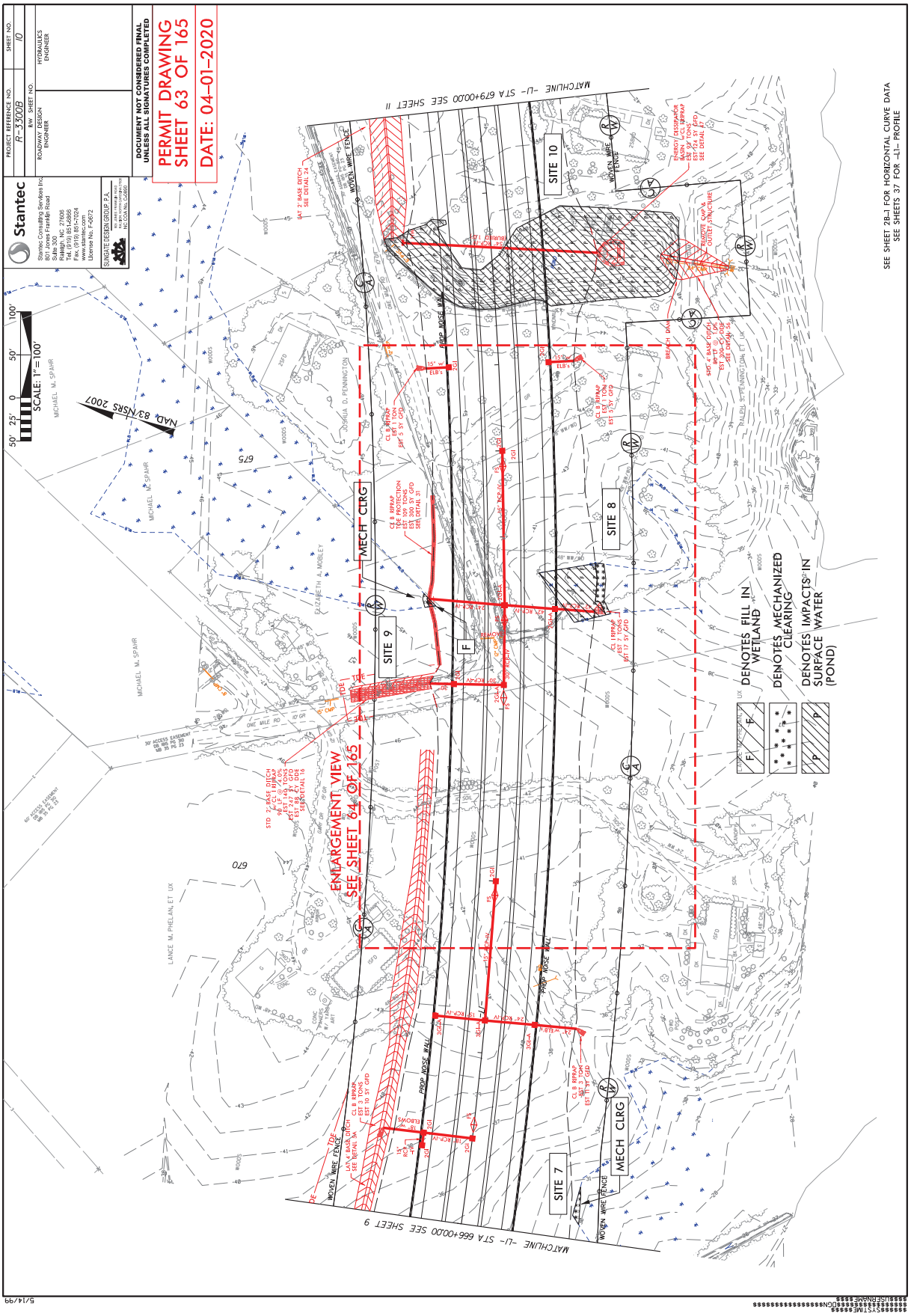

PROJECT REFERENCE NO.
A-33008
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 60 OF 165
DATE: 04-01-2020
SITE 7
SKEWED MULTI-BARREL CULVERT
LOW FLOW CHANNEL SILLS
AND FLOODPLAIN BENCH
(NOT TO SCALE)
PLAN VIEW
INLET AND OUTLET
FLOOD PLAIN BENCH
EXISTING NG ALONG CULVERT CENTERLINE
PROP CHANNEL
BEVELED HW
WS OBS ON 4-4-2019 WS=527.14
3-7 NORMAL 3-7.1 SKEWED
GRADING 1:4 C 1:3 FOR 5'-0"
CL STA 6+80.48 -L- 60.00' LT. & RT. 4:1 SIDES 3@12'x8' RCBC w/ SILLS & BEVELED HW SKEW =50°
CL HW EL=20.9' SLOPE=0.40%
3 @ 144" x 8' RCPC SEE CSP-1 & CSP-16
OUTLET CHANNEL DETAIL
NOT TO SCALE
INLET CHANNEL DETAIL
NOT TO SCALE
FLOODPLAIN BENCH
NG
CL 1 REPAV ON CHANNEL SIDES
CL 1 REPAV OUTSIDE WIDENING TO TAIL WATER
24'-0" (MIN.)
25'-0" (MIN.)
5/14/99


PROJECT REFERENCE NO.
A-33008
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 61 OF 165
DATE: 04-01-2020
SITE 7
SKEWED MULTI-BARREL CULVERT
LOW FLOW CHANNEL, SILLS
AND FLOODPLAIN BENCH
(NOT TO SCALE)
*NOTES:
1) NATIVE MATERIAL BETWEEN SILLS WITHIN THE CULVERT BARRELS AND CONTINUOUS LOW FLOW CHANNEL NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL RIP-RAP. IMPORTED MATERIAL TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL(S) IF RIP-RAP IS USED, OR IN THE LOW FLOW CULVERT BARREL(S) IF NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. ANY IMPORTED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
2) SILLS ARE TO BE 1.0 FT. WIDE CAST SEPARATELY AND ATTACHED BY DOWELS.
3) TOP OF LOW FLOW SILLS SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)
4) DO NOT SET ELEVATION OF HIGH SILLS ABOVE BANK FULL.
SILLS AT INLET AND OUTLET
LOW-FLOW BARREL (SOUTH BARREL)
HIGH-FLOW BARREL
12.0'
1.0'
2.0'
8.0'
PLAN VIEW
1' SILL
2' SILL
BACKFILL w/NATIVE MATERIAL
FLOOD PLAIN BENCH
INLET & OUTLET CHANNEL DETAIL
NOT TO SCALE
FLOODPLAIN BENCH
NG
CL 1' RIP-RAP ON CHANNEL BANKS
CL 1' RIPRAP w/ NATIVE MATERIAL PLACED ON TOP TO FILL VOIDS
2:1
12'
2'
24' @ INLET & OUTLET
CL STA 19+80 -Y38-
GP EL=31.71'
3@12'x8' RCBC w/
SILLS & BEVELED HW
SKEW=78°
BEVELED HW
3:1 NORMAL
3.06:1 SKEWED
EXISTING NG ALONG CULVERT CENTERLINE
WS OBS. ON 9-14-2017 = NWS=22.4
3 @ 12' x 8' RCBC SEE CSR # 5 OF 8
PROP CHANNEL
CL INV EL=19.8'
SLOPE=0.42%
0.02
0.02
0
100
200
10
20
30
40

P-100


PROJECT REFERENCE NO. R-3300B
SHEET NO. 10
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 62 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1"=100'
NAD 83/NSRS 2007
ENLARGEMENT VIEW SEE SHEET 64 OF 165
SITE 10
SITE 9
SITE 8
SITE 7
MECH CLRG
PROP HOSE WALL
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER (POND)
SEE SHEET 28-J FOR HORIZONTAL CURVE DATA
SEE SHEETS 37 FOR -L1- PROFILE
MATCHLINE -L1- STA 679+00.00 SEE SHEET 11
MATCHLINE -L1- STA 666+00.00 SEE SHEET 9

P-101


PROJECT REFERENCE NO. R-3300B
SHEET NO. 10
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 63 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1"=100'
NAD 83/NSRS 2007
MATCHLINE -L1- STA 679+00.00 SEE SHEET 11
MATCHLINE -L1- STA 666+00.00 SEE SHEET 9
ENLARGEMENT VIEW SEE SHEET 64 OF 165
SITE 10
SITE 9
SITE 8
SITE 7
MECH CLRG
PROP WOVEN WIRE FENCE
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER (POND)
SEE SHEET 28-J FOR HORIZONTAL CURVE DATA
SEE SHEETS 37 FOR -L1- PROFILE

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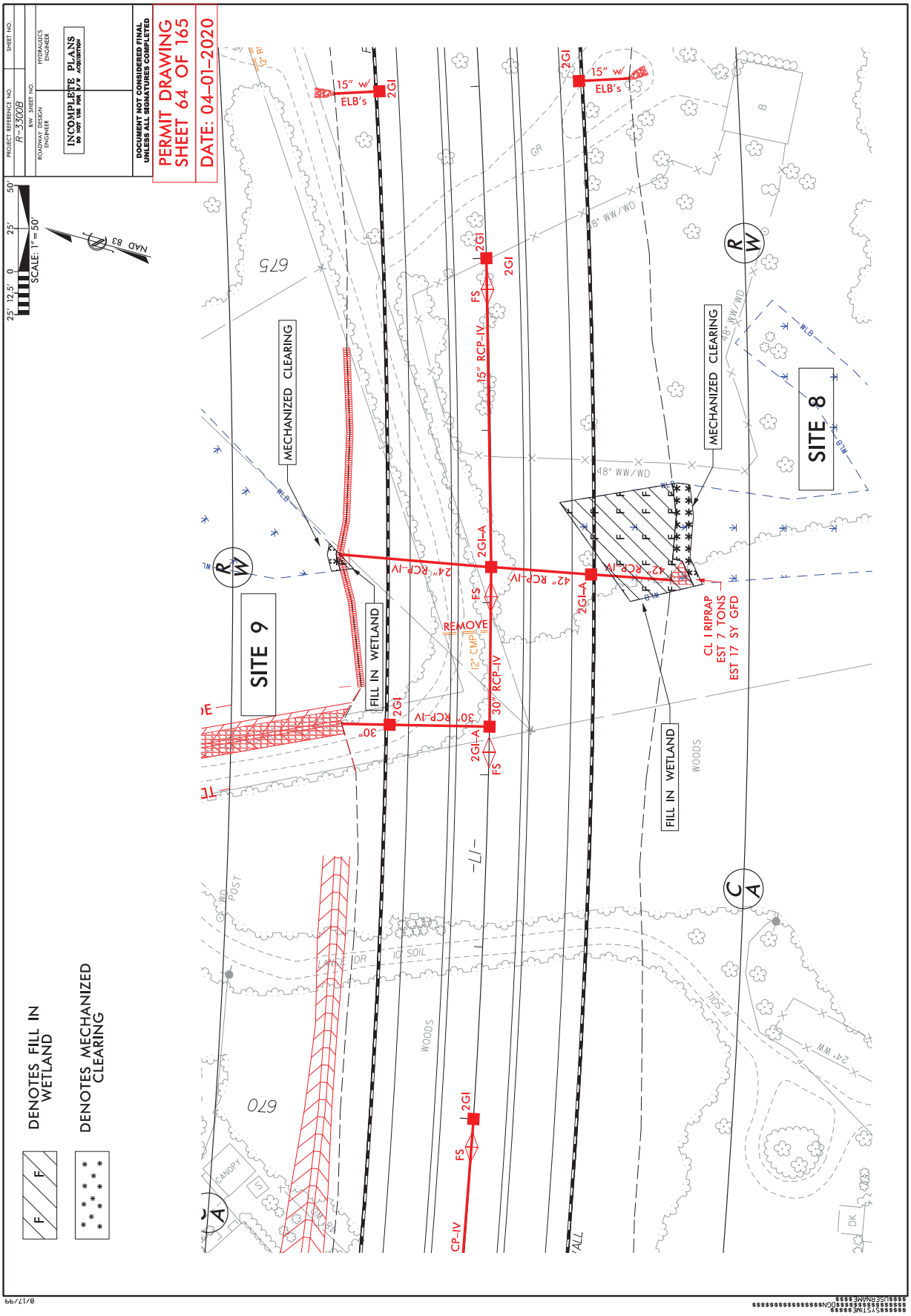
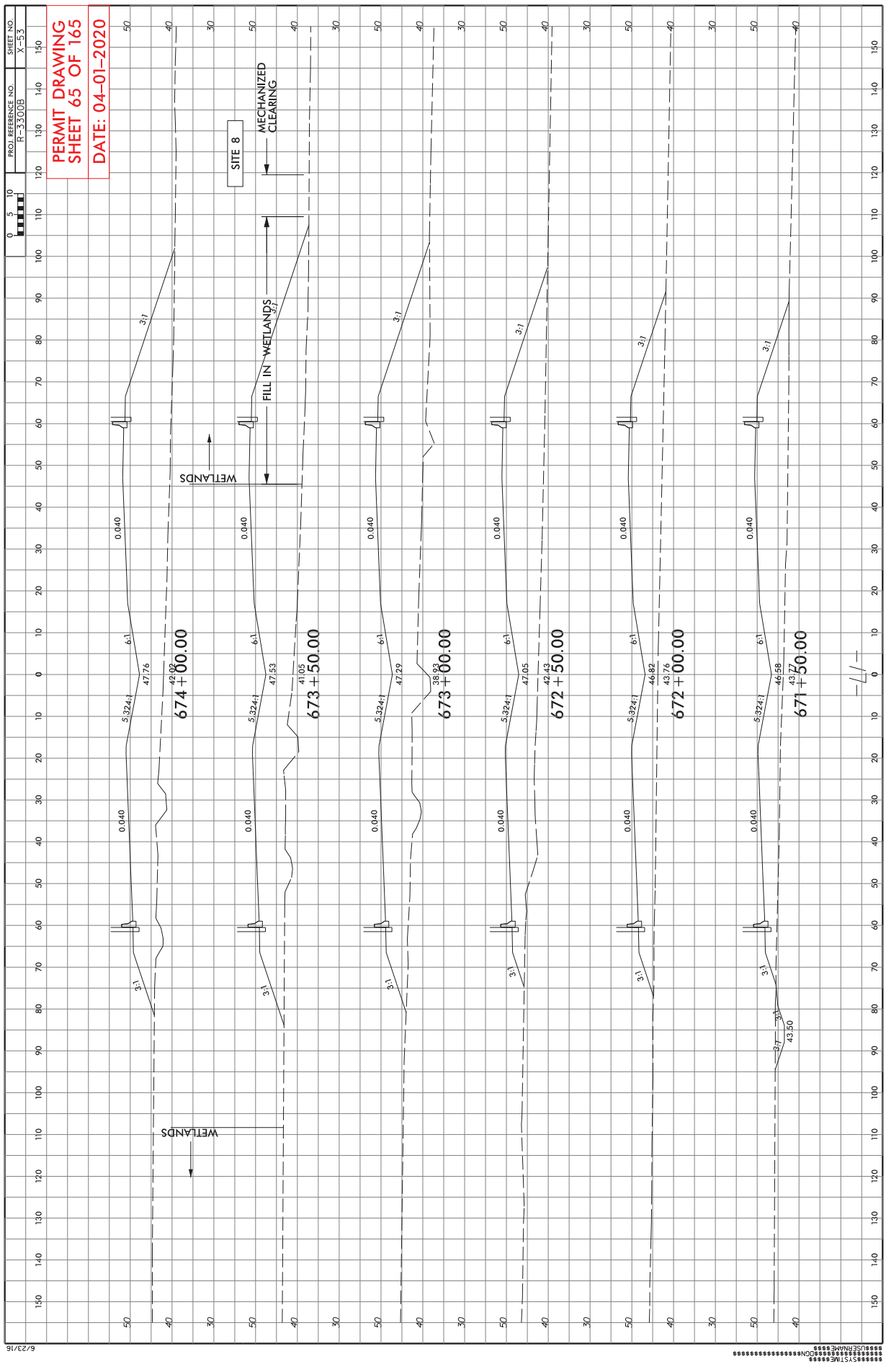
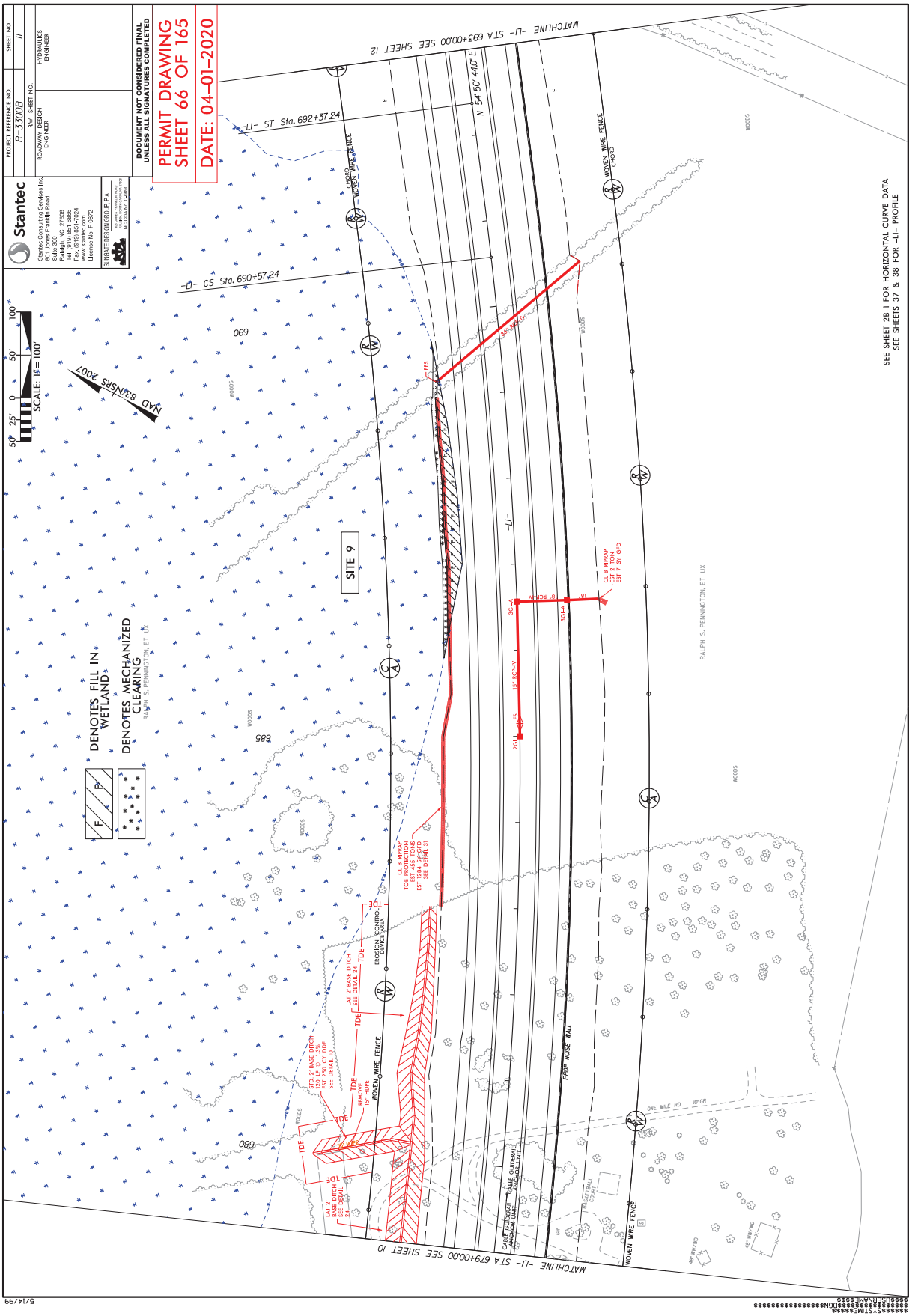

PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 64 OF 165
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 9
SITE 8
MECHANIZED CLEARING
FILL IN WETLAND
REMOVE
15" w/ ELB's
30" RCP-IV
24" RCP-IV
42" RCP-IV
15" RCP-IV
12" CMP
2GI
2GI-A
FS
CP-IV
CL I RIPRAP
EST 7 TONS
EST 17 SY GFD
48" WW/WD
WOODS
675
670

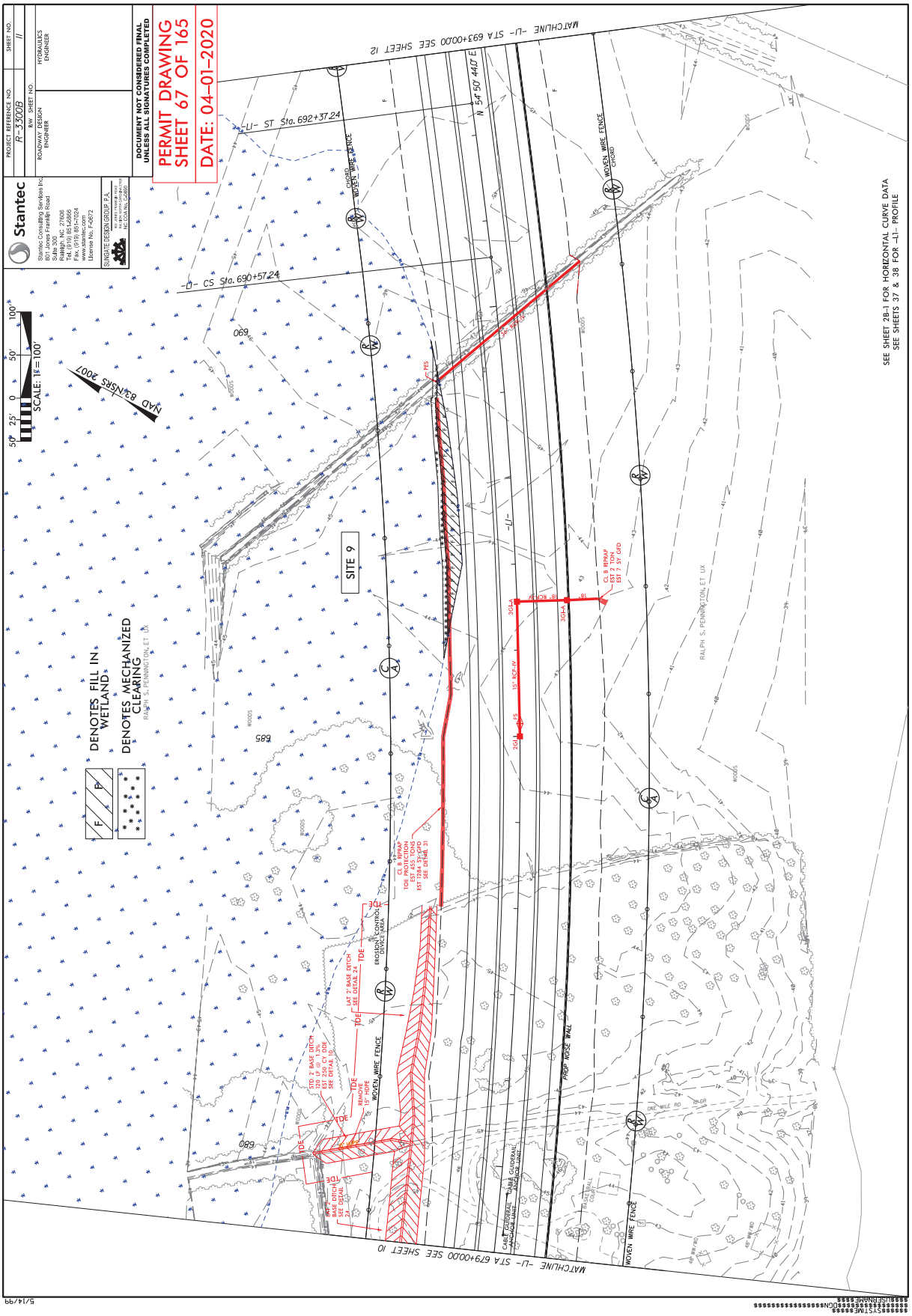
P-103


PERMIT DRAWING
SHEET 65 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-53
SITE 8
MECHANIZED CLEARING
FILL IN WETLANDS
WETLANDS
WETLANDS
674+00.00
673+50.00
673+00.00
672+50.00
672+00.00
671+50.00
3:1
6:1
5.324:1
0.040
47.76
42.82
47.53
41.05
47.29
38.93
47.05
42.43
46.82
43.76
46.58
43.77
43.50

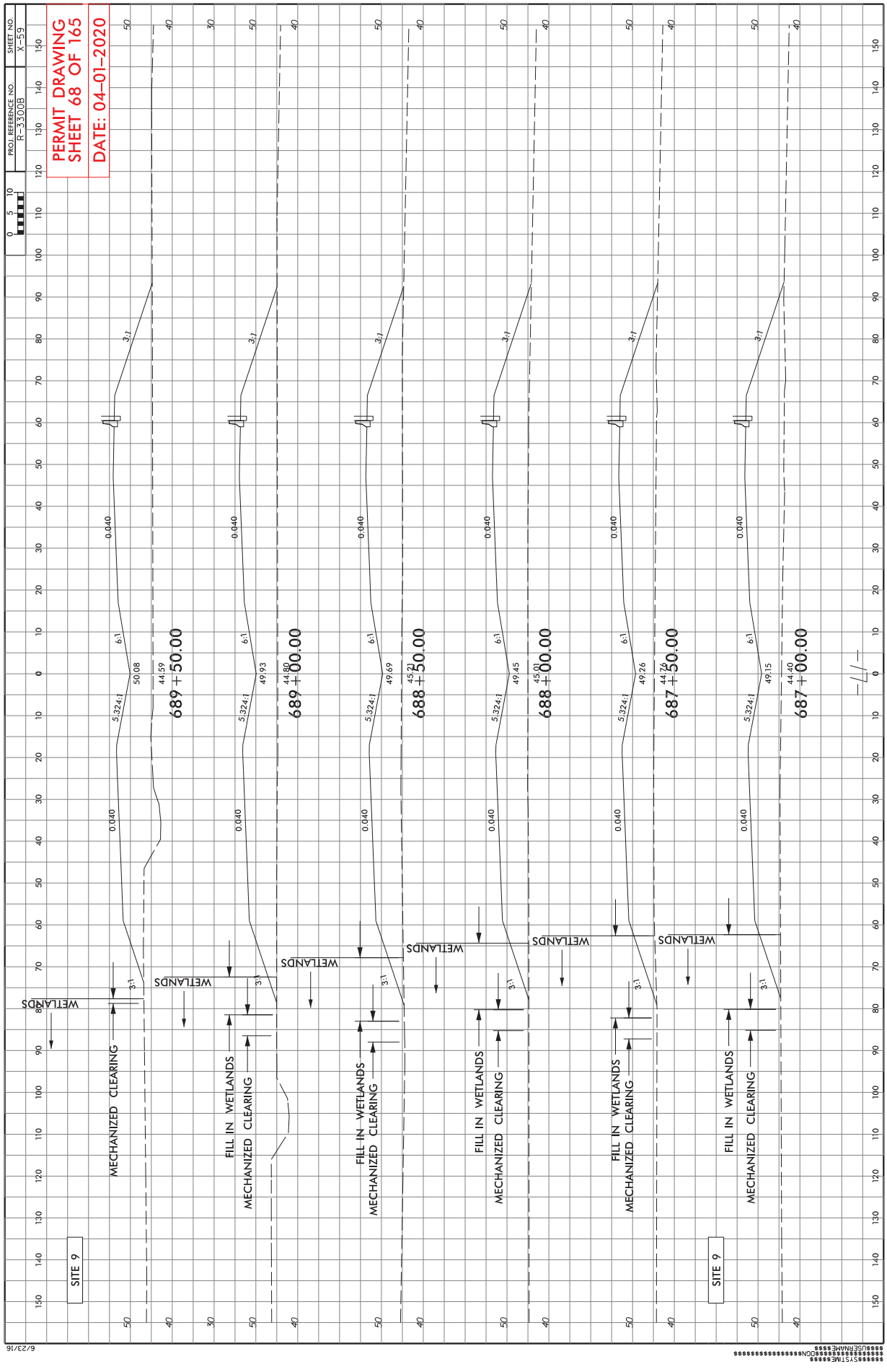
P-104

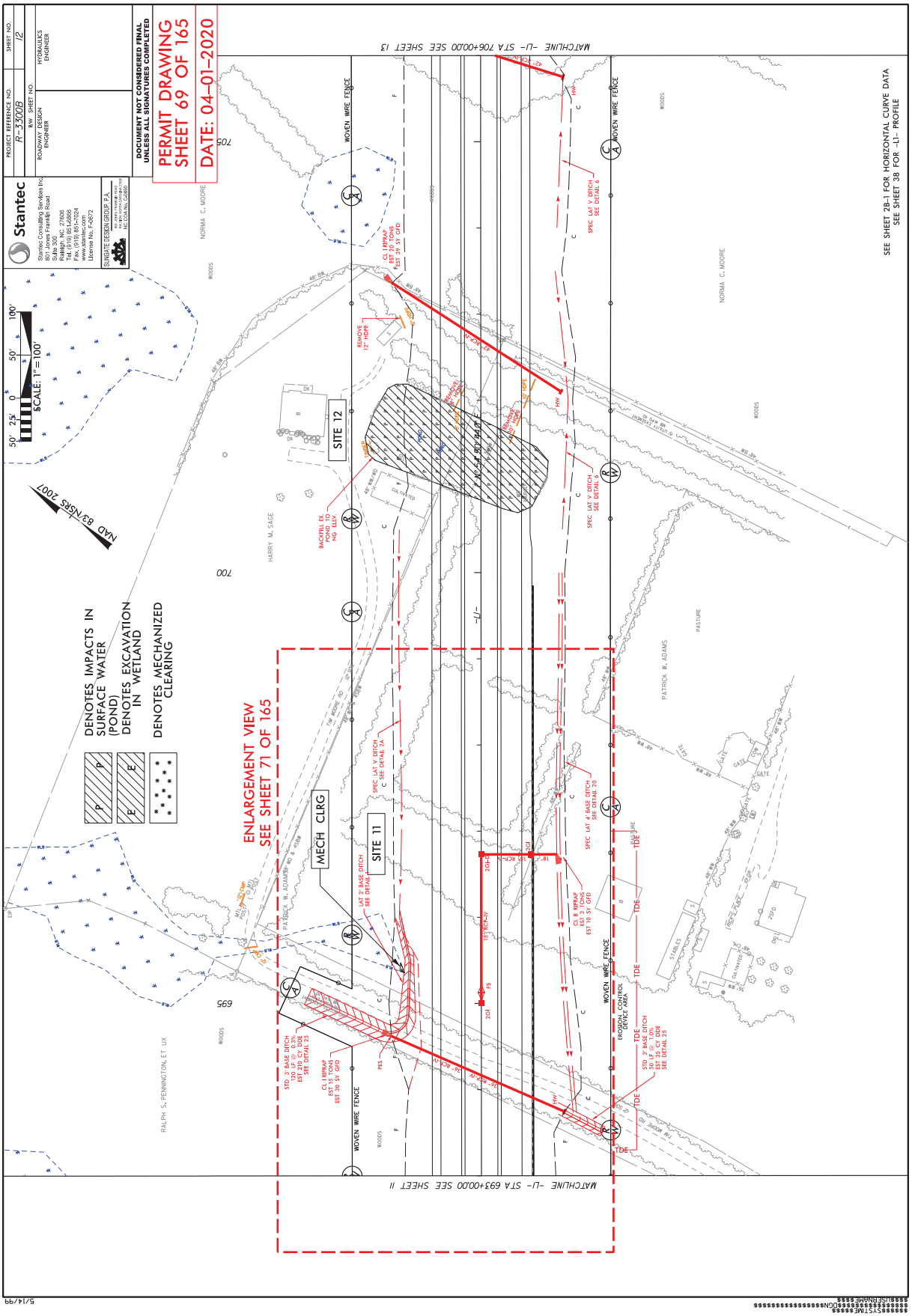

PROJECT REFERENCE NO. R-3300B
SHEET NO. 11
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 66 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 9
-L- ST Sta. 692+37.24
-D- CS Sta. 690+57.24
MATCHLINE -L- STA 693+00.00 SEE SHEET 12
MATCHLINE -L- STA 679+00.00 SEE SHEET 10
N 54° 50' 44.0" E
WOVEN WIRE FENCE
CHORD
RALPH S. PENNINGTON, ET UX
WOODS
EROSION CONTROL DEVICE AREA
CL B RIPRAP TOE PROTECTION EST 1284 SY GFD SEE DETAIL 31
CL B RIPRAP EST 7 SY FES EST 7 SY GFD
15" RCP-W
STD 2' BASE DITCH 135 LF EST 250 CY DIR SEE DETAIL 10
LAT 2' BASE DITCH SEE DETAIL 24
LAT 2' BASE DITCH SEE DETAIL 24
RIP-RAP 15" HDPE
PROP NOISE WALL
CABLE GUIDERAIL ANCHOR UNIT
ONE MILE RD
10' GR
BASKETBALL COURT
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 37 & 38 FOR -L- PROFILE
5/14/99

P-105

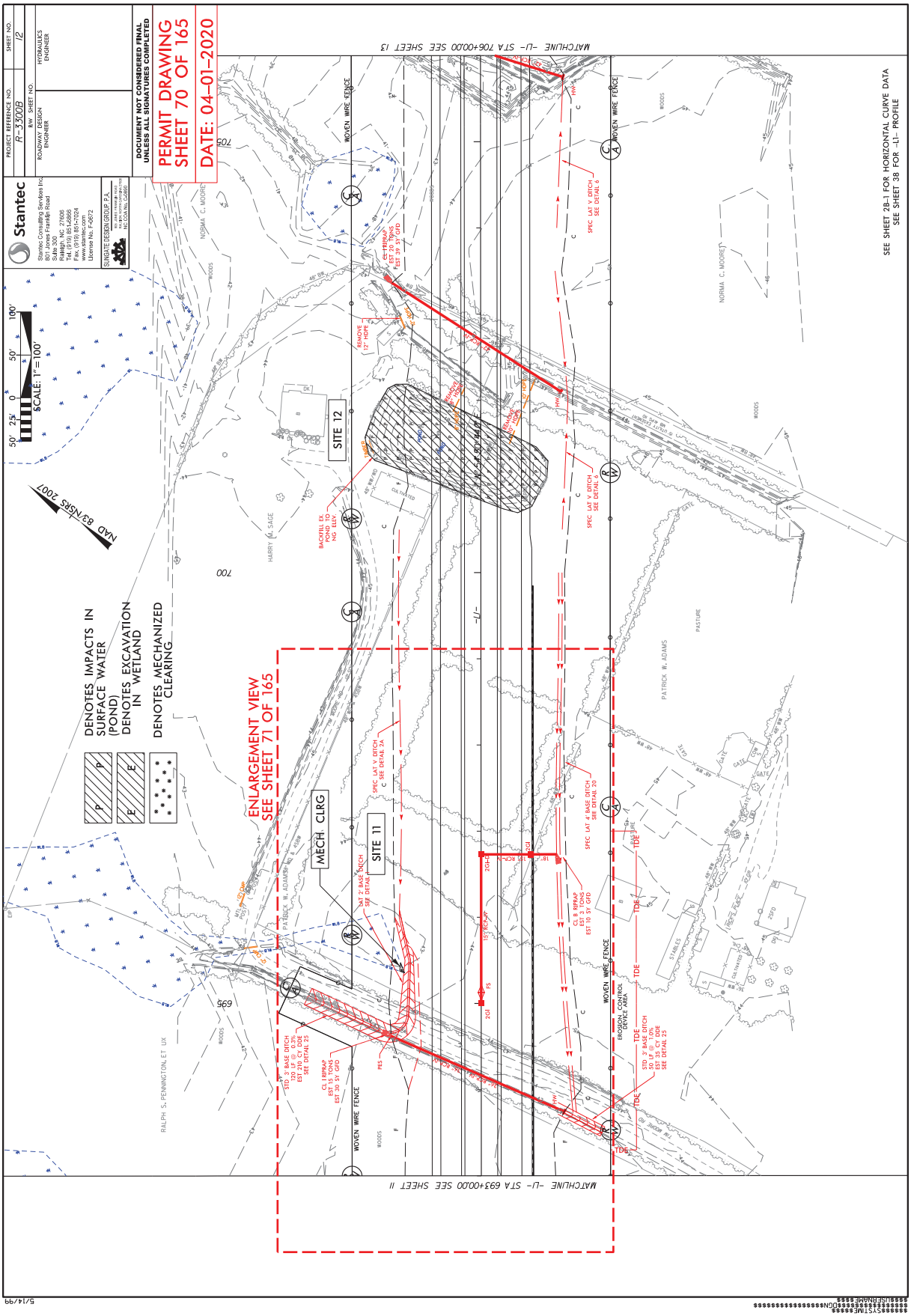

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
11
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 67 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
License No. C-2820
SCALE: 1" = 100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 9
-L- ST Sta. 692+37.24
-D- CS Sta. 690+57.24
MATCHLINE -L- STA 693+00.00 SEE SHEET 12
MATCHLINE -L- STA 679+00.00 SEE SHEET 10
N 54° 50' 44.0" E
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 37 & 38 FOR -L- PROFILE
WOVEN WIRE FENCE
CHORD
PROP MOWE WALL
EROSION CONTROL DEVICE AREA
CABLE GUIDERAIL ANCHOR UNIT
RALPH S. PENNINGTON, ET UX
WOODS
ONE MILE RD
5/14/99

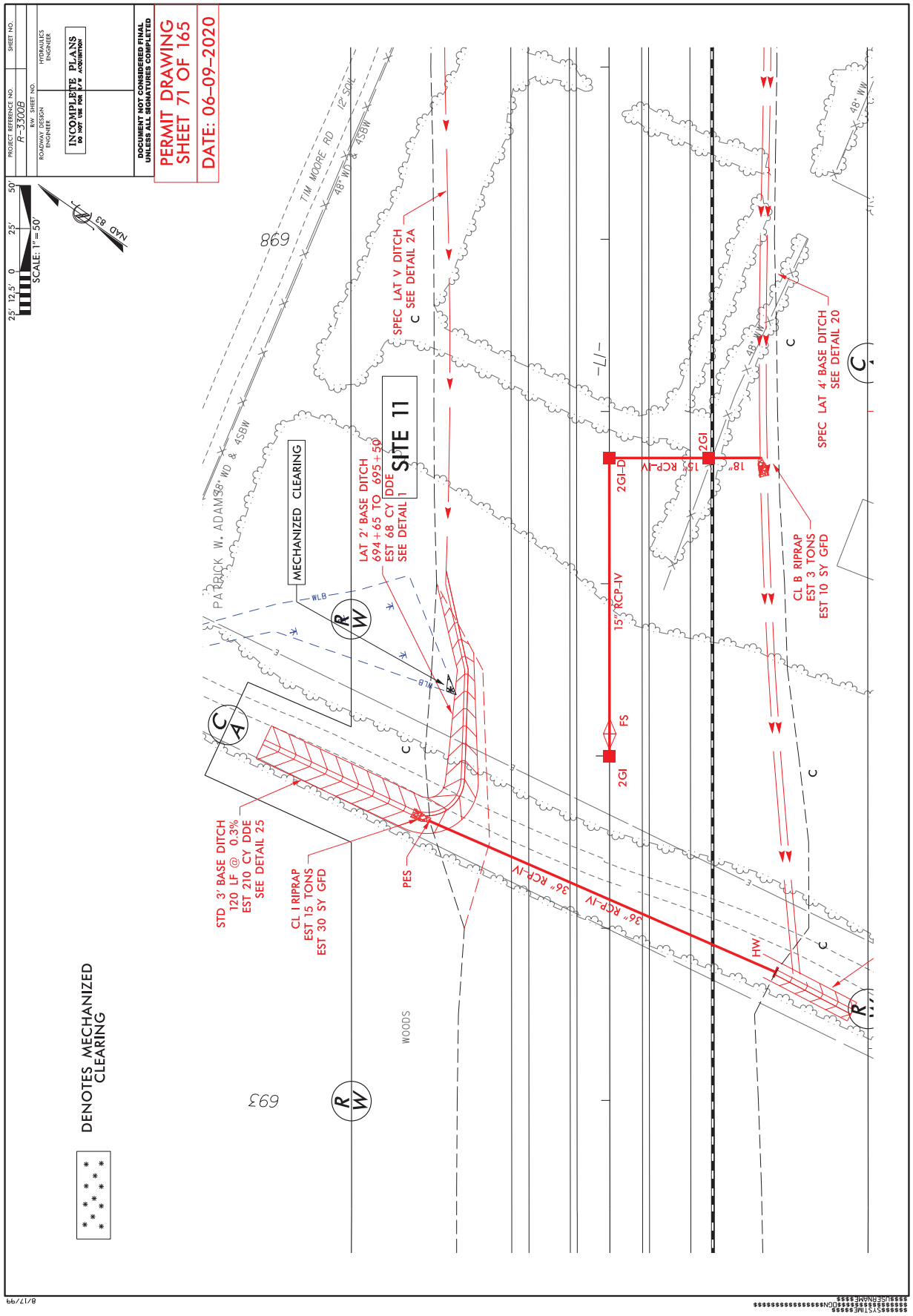
P-106


PERMIT DRAWING
SHEET 68 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-59
0 5 10
SITE 9
WETLANDS
MECHANIZED CLEARING
FILL IN WETLANDS
689+50.00
689+00.00
688+50.00
688+00.00
687+50.00
687+00.00
3:1
6:1
5,324:1
0.040
50.08
44.59
49.93
44.80
49.69
45.21
49.45
45.01
49.26
44.76
49.15
44.40
6/23/16

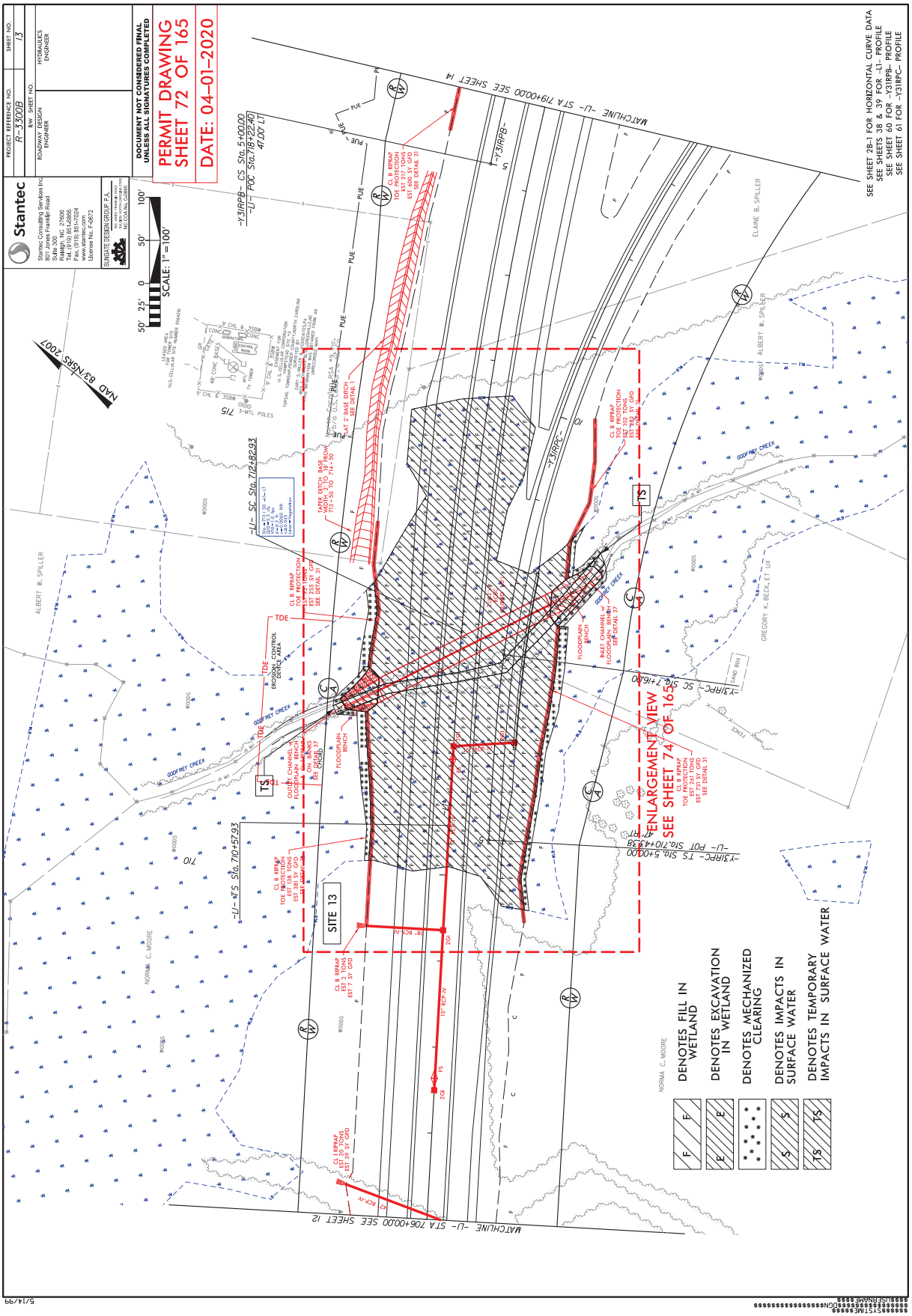

PROJECT REFERENCE NO. R-3300B
SHEET NO. 12
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 69 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
License No. C-2820
SCALE: 1"=100'
NAD 83/NSRS 2007
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
ENLARGEMENT VIEW SEE SHEET 71 OF 165
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 38 FOR -L1- PROFILE
MATCHLINE -L1- STA 706+00.00 SEE SHEET 13
MATCHLINE -L1- STA 693+00.00 SEE SHEET 11
SITE 12
SITE 11
MECH CLRG
WOVEN WIRE FENCE
NORMA C. MOORE
HARRY M. SAGE
PATRICK W. ADAMS
RALPH S. PENNINGTON, ET UX
EROSION CONTROL DEVICE AREA
STABLES
PASTURE
WOODS
705
700
695

P-108

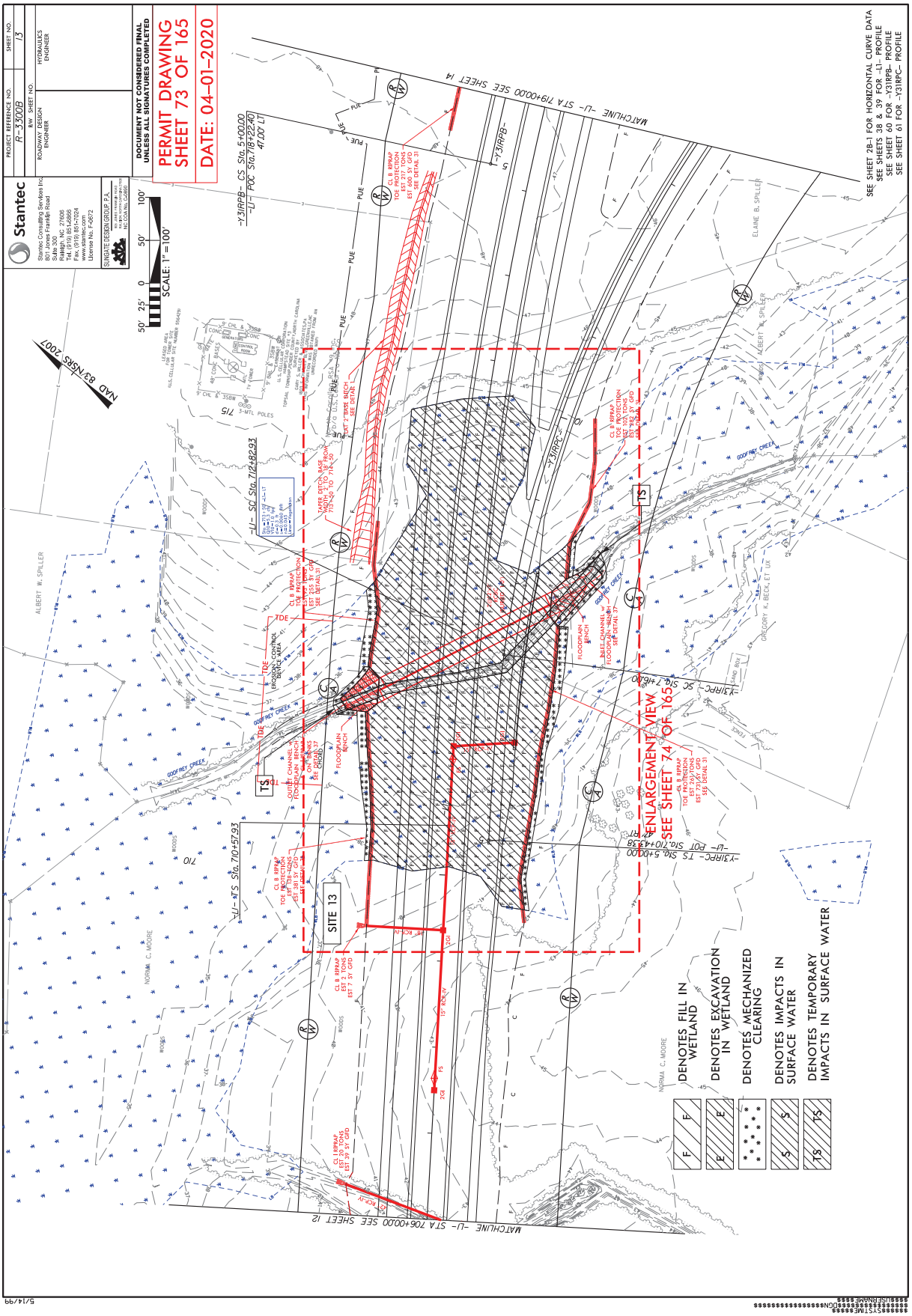

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
12
ROADWAY DESIGN ENGINEER
RW
SHEET NO.
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 70 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
License No. C-2672
SCALE: 1"=100'
NAD 83/NSRS 2007
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
ENLARGEMENT VIEW SEE SHEET 71 OF 165
SITE 12
SITE 11
MECH CLRG
MATCHLINE -L1- STA 706+00.00 SEE SHEET 13
MATCHLINE -L1- STA 693+00.00 SEE SHEET 11
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 38 FOR -L1- PROFILE
WOVEN WIRE FENCE
EROSION CONTROL DEVICE AREA
NORMA C. MOORE
HARRY M. SAGE
PATRICK W. ADAMS
RALPH S. PENNINGTON, ET UX
PASTURE
WOODS
STABLES
5/14/99


PERMIT DRAWING
SHEET 71 OF 165
DATE: 06-09-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PROJECT REFERENCE NO. R-3300B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO.
SCALE: 1"=50'
NAD 83
DENOTES MECHANIZED CLEARING
SITE 11
MECHANIZED CLEARING
PATRICK W. ADAMS
TIM MOORE RD
48" WD & 45BW
48" WW
12' SOW
LAT 2' BASE DITCH
694+65 TO 695+50
EST 68 CY DDE
SEE DETAIL 1
SPEC LAT V DITCH
SEE DETAIL 2A
SPEC LAT 4' BASE DITCH
SEE DETAIL 20
STD 3' BASE DITCH
120 LF @ 0.3%
EST 210 CY DDE
SEE DETAIL 25
CL I RIPRAP
EST 15 TONS
EST 30 SY GFD
CL B RIPRAP
EST 3 TONS
EST 10 SY GFD
15" RCP-IV
18" RCP-IV
36" RCP-IV
2GI-D
2GI
FS
PES
HW
WOODS
WLB
869
693
-L1-

P-110


PROJECT REFERENCE NO. R-3300B
SHEET NO. 13
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 72 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
SEE SHEET 28-L1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 38 & 39 FOR -L1- PROFILE
SEE SHEET 60 FOR -Y3IRPB- PROFILE
SEE SHEET 61 FOR -Y3IRPC- PROFILE
SITE 13
ENLARGEMENT VIEW SEE SHEET 74 OF 165
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
MATCHLINE -L- STA 706+00.00 SEE SHEET 12
MATCHLINE -L- STA 719+00.00 SEE SHEET 14
-L- SC Sta.712+82.93
-Y3IRPB- CS Sta. 5+00.00
-L- POC Sta.718+22.40
47.00 LT
-Y3IRPC- TS Sta. 5+00.00
-L- POT Sta.710+43.38
47.00 RT
-L- ST Sta. 710+57.93
-Y3IRPC- SC Sta. 7+16.00
CL B RIPRAP TOE PROTECTION EST 138 TONS EST 35 SY GRD SEE DETAIL 31
CL B RIPRAP TOE PROTECTION EST 7 TONS EST 3 SY GRD
CL B RIPRAP TOE PROTECTION EST 230 TONS EST 82 SY GRD
CL B RIPRAP TOE PROTECTION EST 102 TONS EST 36 SY GRD SEE DETAIL 31
CL B RIPRAP TOE PROTECTION EST 261 TONS EST 93 SY GRD SEE DETAIL 31
CL B RIPRAP TOE PROTECTION EST 255 SY GRD SEE DETAIL 31
CL B RIPRAP TOE PROTECTION EST 27 TONS EST 10 SY GRD SEE DETAIL 31
SAT 2 BASE DITCH SEE DETAIL 1
SAT 3 BASE DITCH SEE DETAIL 1
SAT 4 BASE DITCH SEE DETAIL 1
TABER DITCH BASE -L- STA 713+50 TO 714+50
OUTER CHANNEL W/ FLOODPLAIN BENCH SEE DETAIL 37
INLET CHANNEL W/ FLOODPLAIN BENCH SEE DETAIL 37
FLOODPLAIN BENCH
EROSION CONTROL DEVICE AREA
GOOFREY CREEK
WOODS
ALBERT W. SPILLER
ELAINE B. SPILLER
NORMA C. MOORE
GREGORY K. BECK, ET UX
TDE
TS
SC
CA
RW
F
E
S
C
15" RCP-FW
18" RCP-FW
24" RCP-FW
5/14/99

P-111


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 73 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672
SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890
50' 25' 0 50' 100'
SCALE: 1"=100'
NAD 83/NSRS 2007
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 38 & 39 FOR -L1- PROFILE
SEE SHEET 60 FOR -Y31RPB- PROFILE
SEE SHEET 61 FOR -Y31RPC- PROFILE
MATCHLINE -L1- STA 719+00.00 SEE SHEET 14
MATCHLINE -L1- STA 706+00.00 SEE SHEET 12
-Y31RPB- CS Sta. 5+00.00
-L1- POC Sta. 718+22.40
47.00' LT
-L1- SC Sta. 712+82.93
-L1- TS Sta. 710+57.93
-Y31RPC- SC Sta. 7+16.00
-L1- POT Sta. 710+43.38
47' RT
-Y31RPC- TS Sta. 5+00.00
-Y31RPB-
-Y31RPC-
-L1-
CL B RIPRAP TOE PROTECTION EST 77 TONS EST 600 SY GFD SEE DETAIL 31
CL B RIPRAP TOE PROTECTION EST 102 TONS EST 282 SY GFD SEE DETAIL 31
CL B RIPRAP TOE PROTECTION EST 261 TONS EST 731 SY GFD SEE DETAIL 31
CL B RIPRAP TOE PROTECTION EST 138 TONS EST 381 SY GFD SEE DETAIL 31
CL B RIPRAP TOE PROTECTION EST 72 TONS EST 253 SY GFD SEE DETAIL 31
CL B RIPRAP EST 2 TONS EST 7 SY GFD
CL I RIPRAP EST 20 TONS EST 39 SY GFD
FLAT 2' BASE DITCH SEE DETAIL
TAPER DITCH BASE WIDTH 2' TO 18' FROM 715+50 TO 714+50
EROSION CONTROL DEVICE AREA
OUTLET CHANNEL w/ FLOODPLAIN BENCH
FLOODPLAIN BENCH
INLET CHANNEL w/ FLOODPLAIN BENCH SEE DETAIL 37
ENLARGEMENT VIEW SEE SHEET 74 OF 165
SITE 13
GODFREY CREEK
TDE
TS
PUE
WOODS
ALBERT W. SPILLER
ELAINE B. SPILLER
GREGORY K. BECK, ET UX
NORMA C. MOORE
LEASED AREA FOR TOWER SITE (U.S. CELLULAR SITE NUMBER 556429)
3-MTL POLES
715
710
15" RCP-IV
18" RCP-IV
2GI
FS
F F
DENOTES FILL IN WETLAND
E E
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
S S
DENOTES IMPACTS IN SURFACE WATER
TS TS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
5/14/99

PROJECT REFERENCE NO. R-3300B	SHEET NO.
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

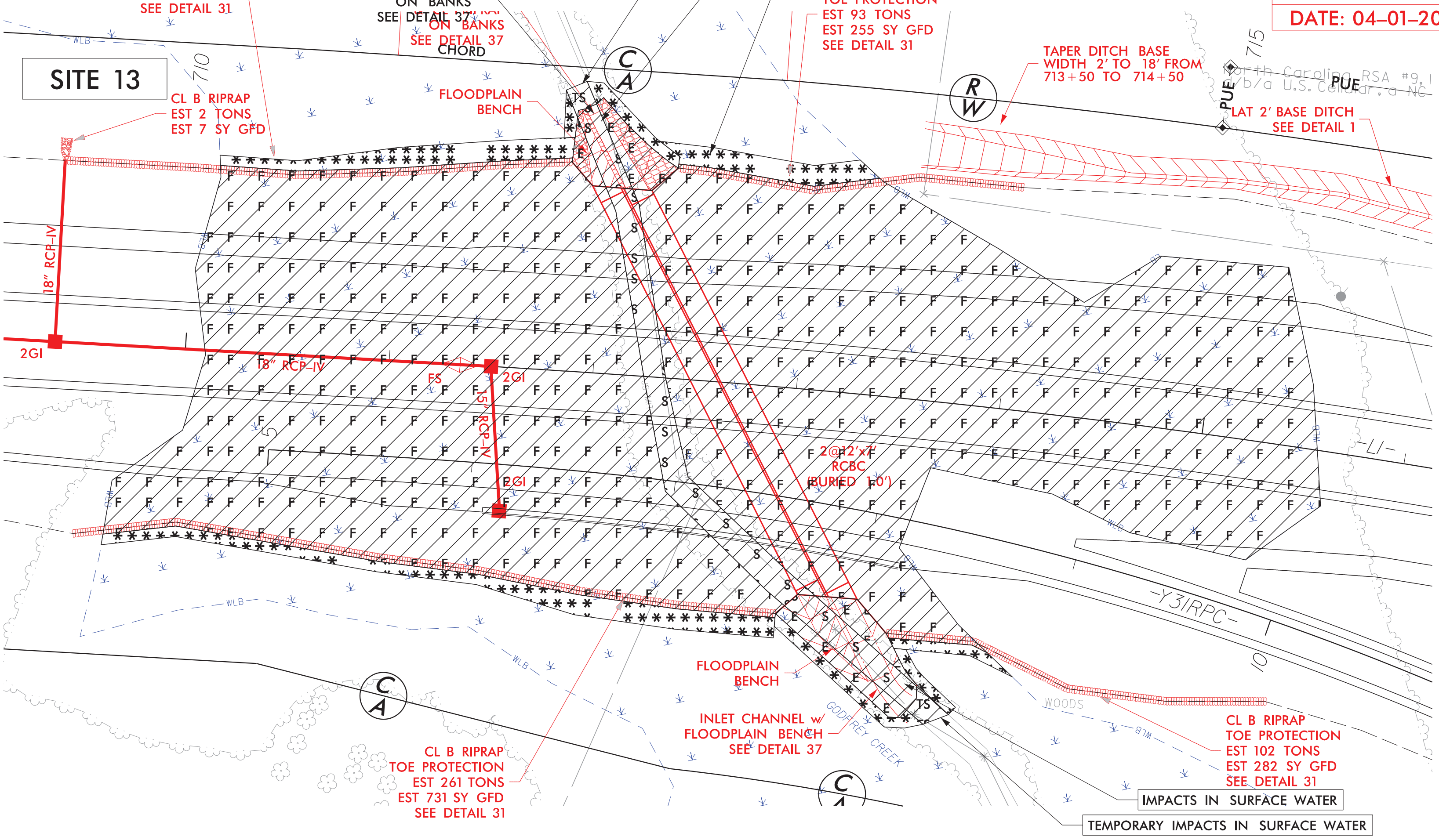
PERMIT DRAWING
SHEET 74 OF 165

DATE: 04-01-2020

E E	DENOTES EXCAVATION IN WETLAND
* * *	DENOTES MECHANIZED CLEARING
S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F	DENOTES FILL IN WETLAND

25' 12.5' 0 25' 50'
SCALE: 1"=50'

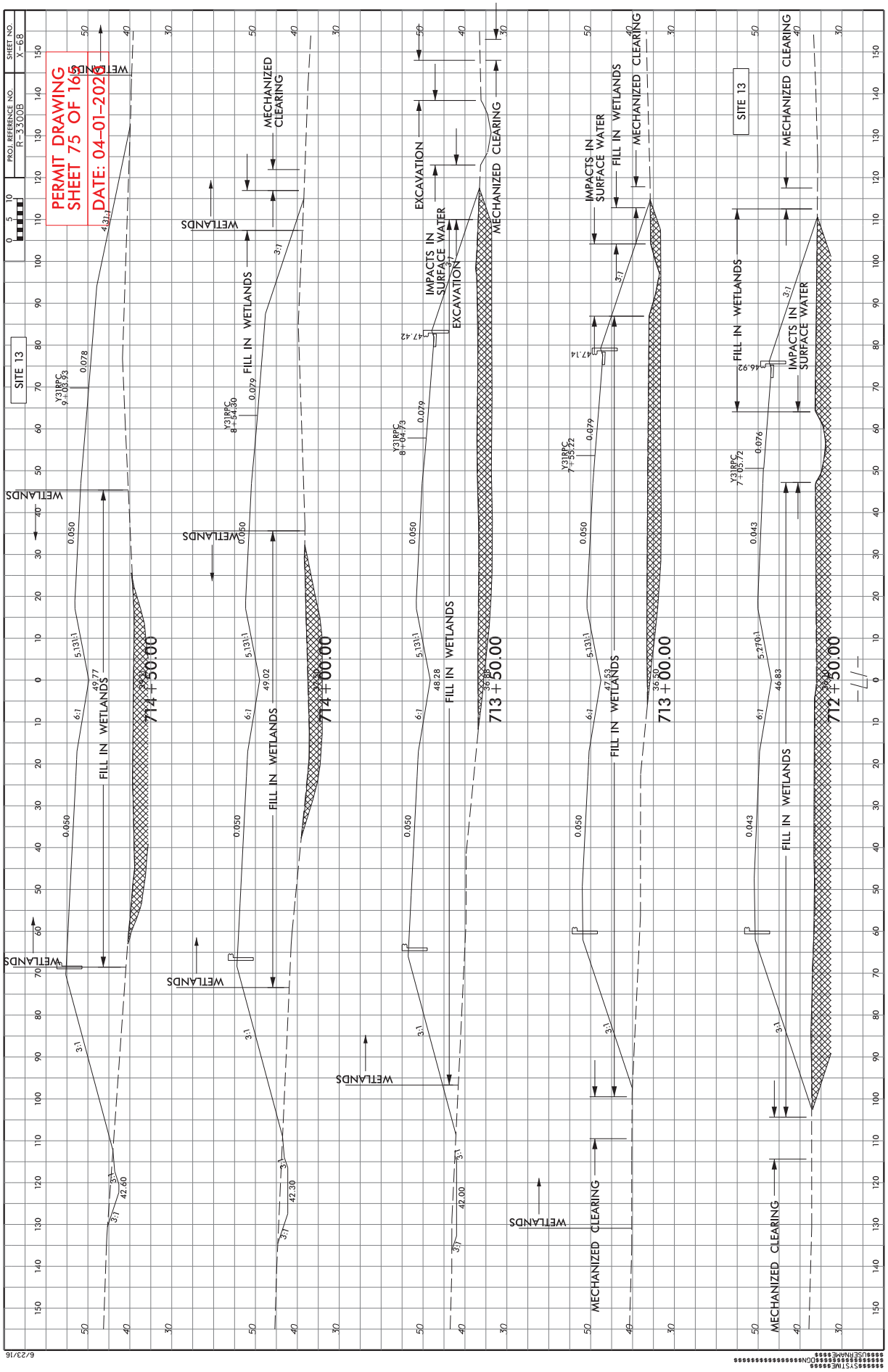
NAD 83

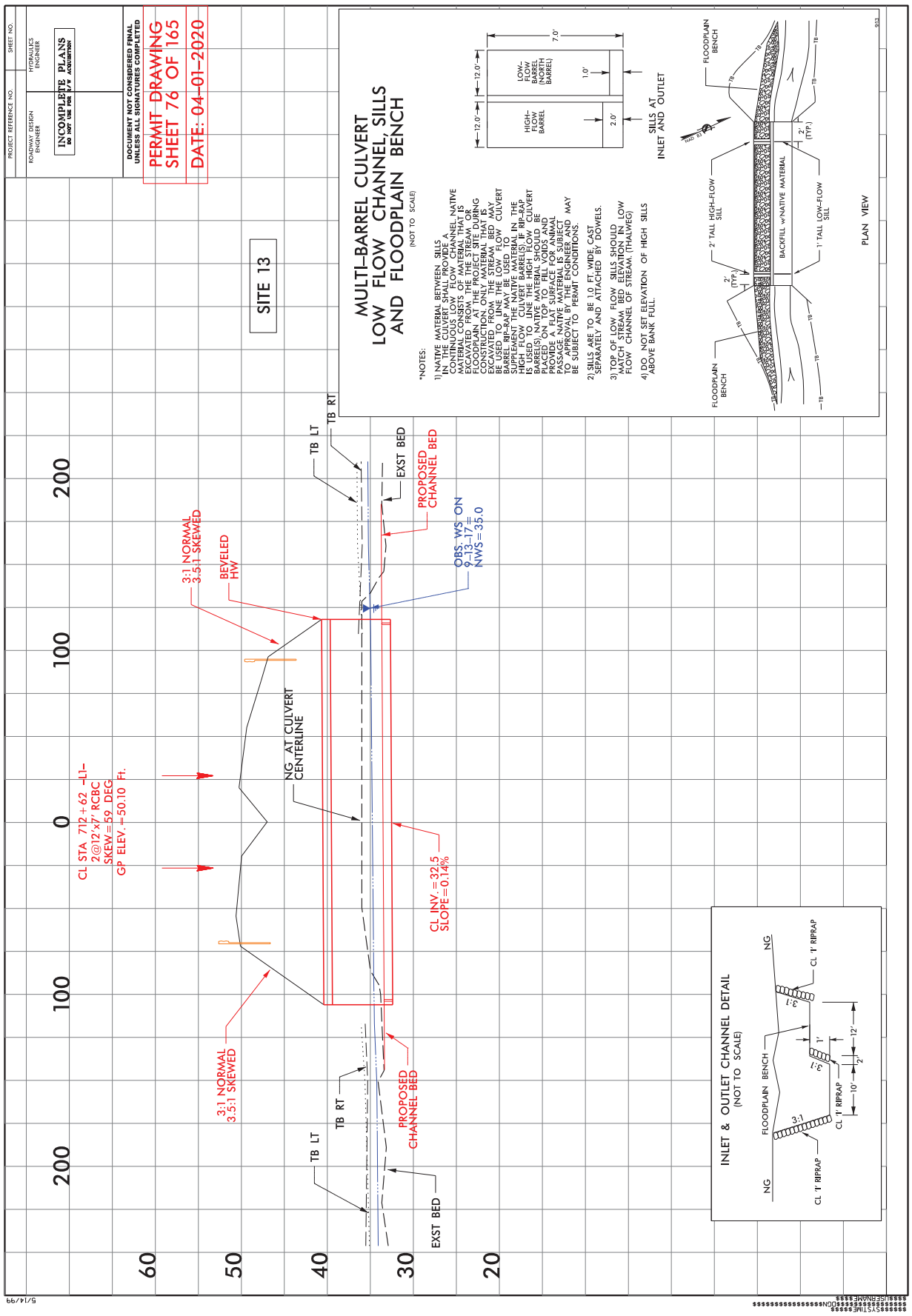


8/17/99

$$$$SYSTIME$$$$
$$$$USERNAME$$$$

P-113


PERMIT DRAWING
SHEET 75 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-68
SITE 13
WETLANDS
MECHANIZED CLEARING
FILL IN WETLANDS
EXCAVATION
IMPACTS IN SURFACE WATER
714+50.00
714+00.00
713+50.00
713+00.00
712+50.00


PROJECT REFERENCE NO.
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
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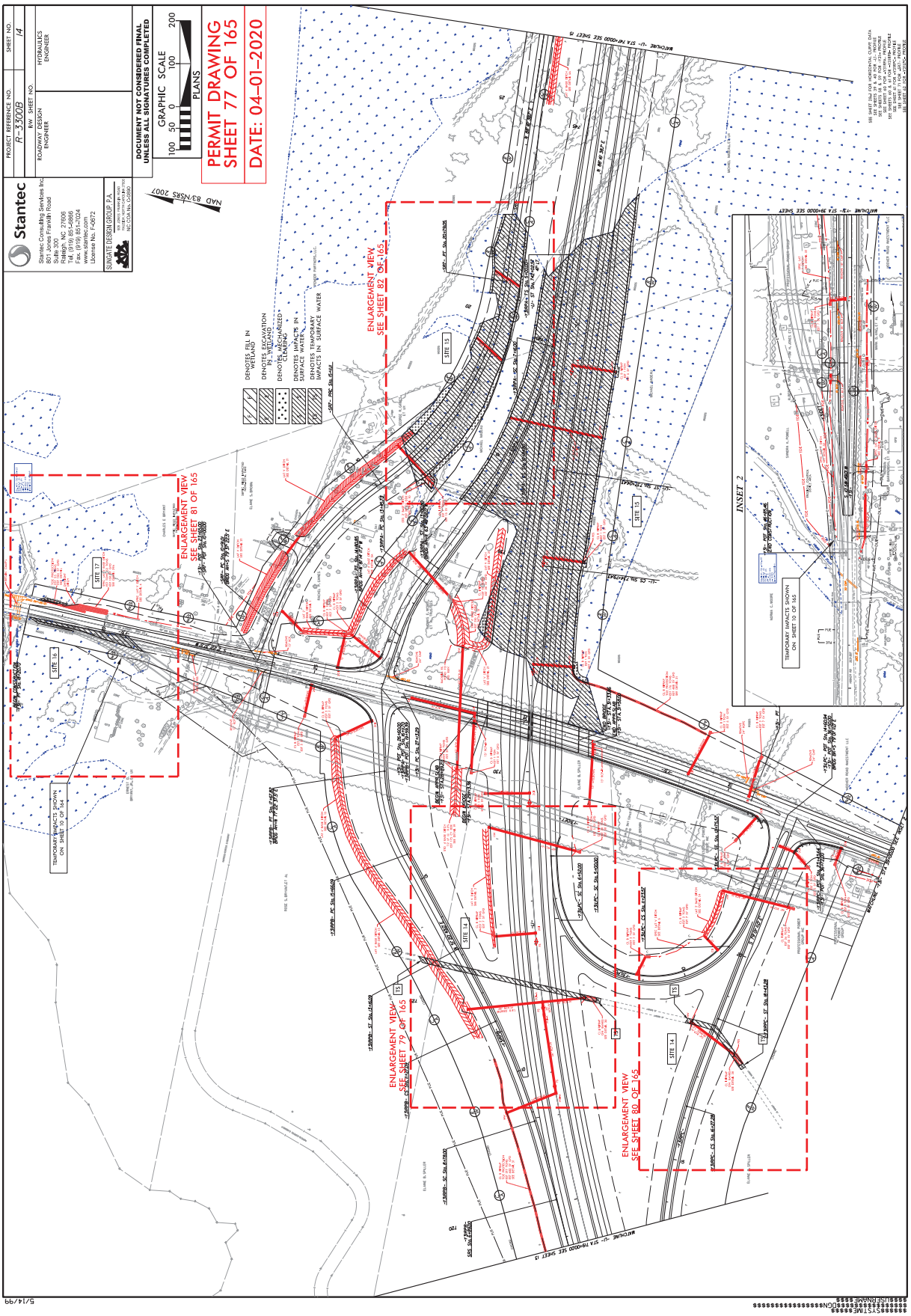
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 76 OF 165
DATE: 04-01-2020
SITE 13
MULTI-BARREL CULVERT
LOW FLOW CHANNEL, SILLS
AND FLOODPLAIN BENCH
(NOT TO SCALE)
*NOTES:
1) NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM, OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. IMPORTED MATERIAL TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL(S) IF RIP-RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL(S). NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
2) SILLS ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.
3) TOP OF LOW FLOW SILLS SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (TYP.ALL)
4) DO NOT SET ELEVATION OF HIGH SILLS ABOVE BANK FULL.
SILLS AT INLET AND OUTLET
12.0'
HIGH-FLOW BARREL
2.0'
12.0'
LOW-FLOW BARREL (NORTH BARREL)
1.0'
7.0'
PLAN VIEW
FLOODPLAIN BENCH
2' TALL HIGH-FLOW SILL
2' (TYP.)
BACKFILL w/NATIVE MATERIAL
1' TALL LOW-FLOW SILL
2' (TYP.)
FLOODPLAIN BENCH
NAD 83
TB
INLET & OUTLET CHANNEL DETAIL
(NOT TO SCALE)
NG
FLOODPLAIN BENCH
3:1
CL 1' RIPRAP
CL 1' RIPRAP
NG
3:1
1'
2'
12'
10'
CL 1' RIPRAP
CL STA 712+62 -L1-
2@12'x7' RCBC
SKEW=59 DEG
GP ELEV.=50.10 Ft.
3:1 NORMAL
3.5:1 SKEWED
BEVELED HW
NG AT CULVERT CENTERLINE
TB LT
TB RT
EXST BED
PROPOSED CHANNEL BED
OBS. WS ON 9-13-17 = NWS=35.0
CL INV.=32.5
SLOPE=0.14%
3:1 NORMAL
3.5:1 SKEWED
TB LT
TB RT
PROPOSED CHANNEL BED
EXST BED
0
100
200
100
200
60
50
40
30
20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NC CoA No. C-2989
PROJECT REFERENCE NO.
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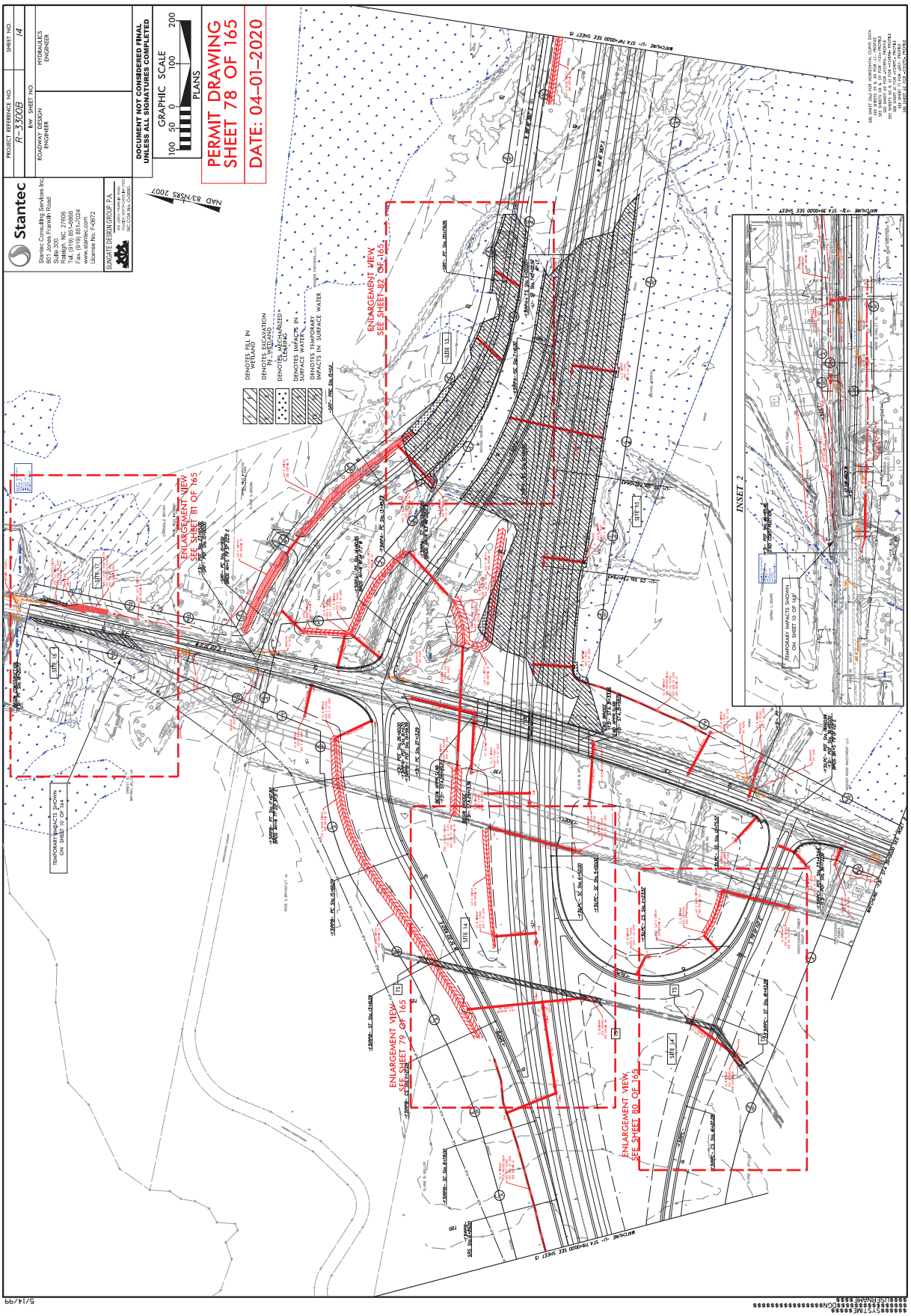
SHEET NO.
14
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
GRAPHIC SCALE
100 50 0 100 200
PLANS
NAD 83/NSRS 2007
PERMIT DRAWING
SHEET 77 OF 165
DATE: 04-01-2020
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
ENLARGEMENT VIEW SEE SHEET 82 OF 165
ENLARGEMENT VIEW SEE SHEET 81 OF 165
ENLARGEMENT VIEW SEE SHEET 79 OF 165
ENLARGEMENT VIEW SEE SHEET 80 OF 165
INSET 2
TEMPORARY IMPACTS SHOWN ON SHEET 10 OF 165
TEMPORARY IMPACTS SHOWN ON SHEET 10 OF 164
SITE 14
SITE 15
SITE 16
SITE 17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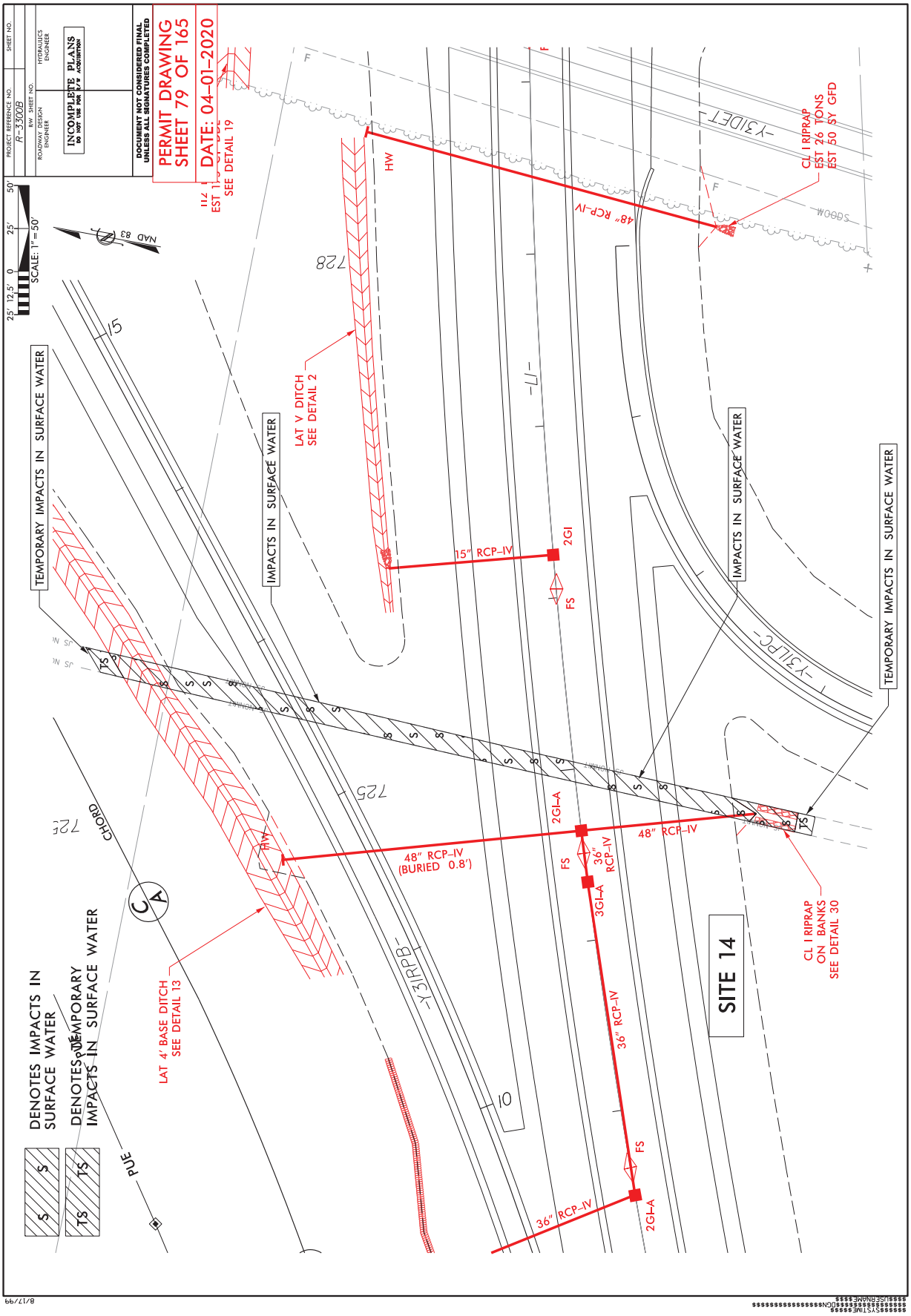
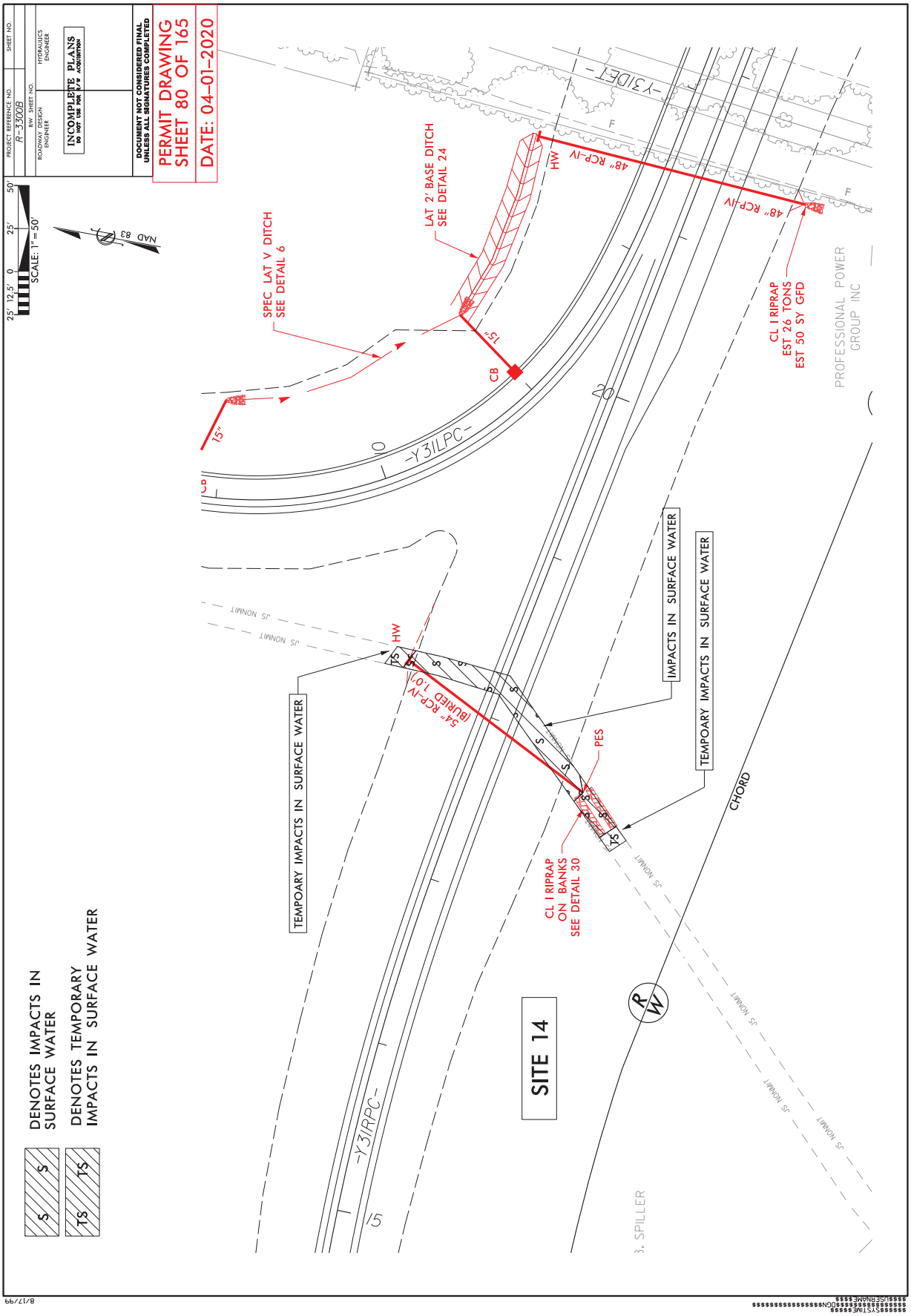
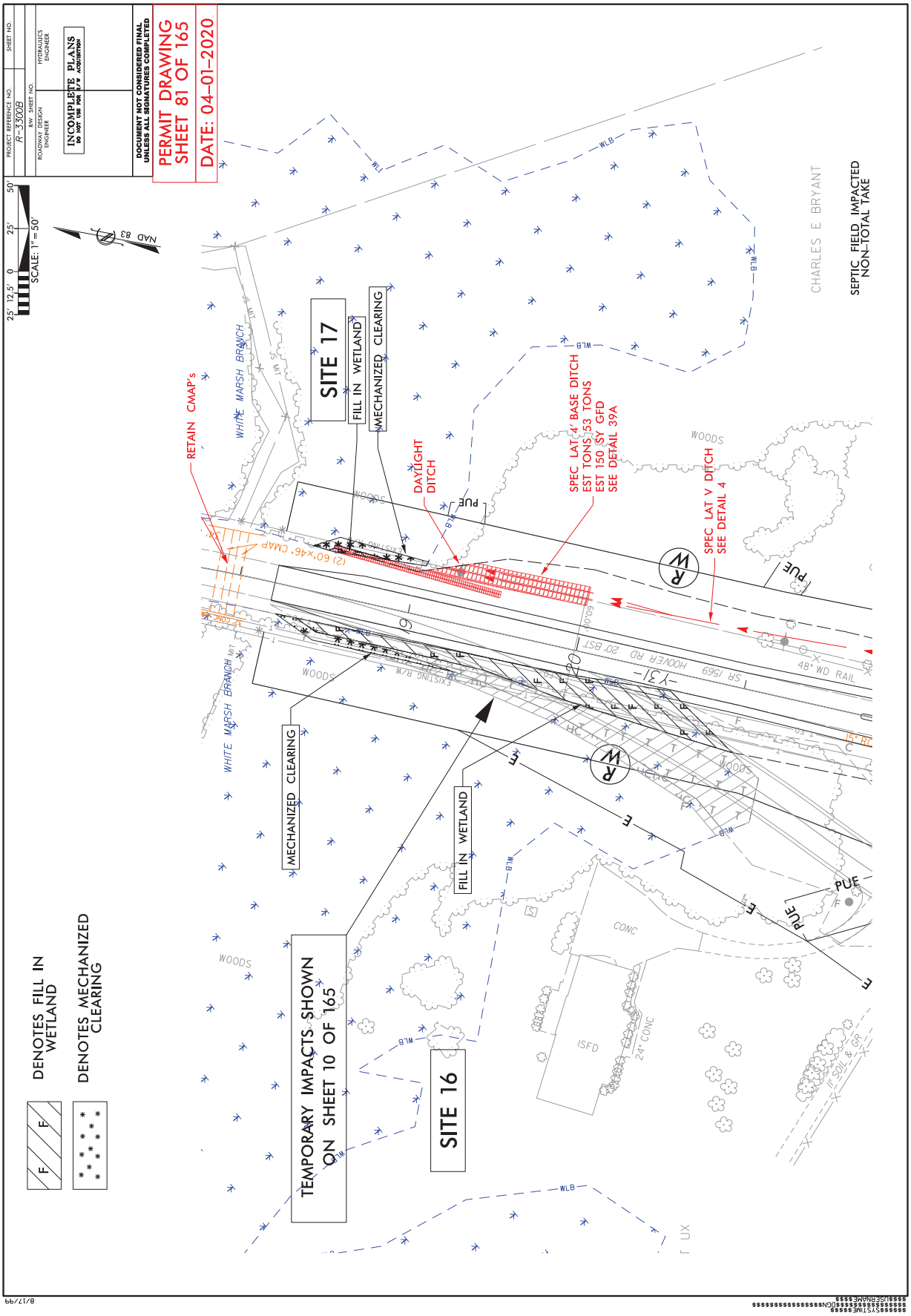
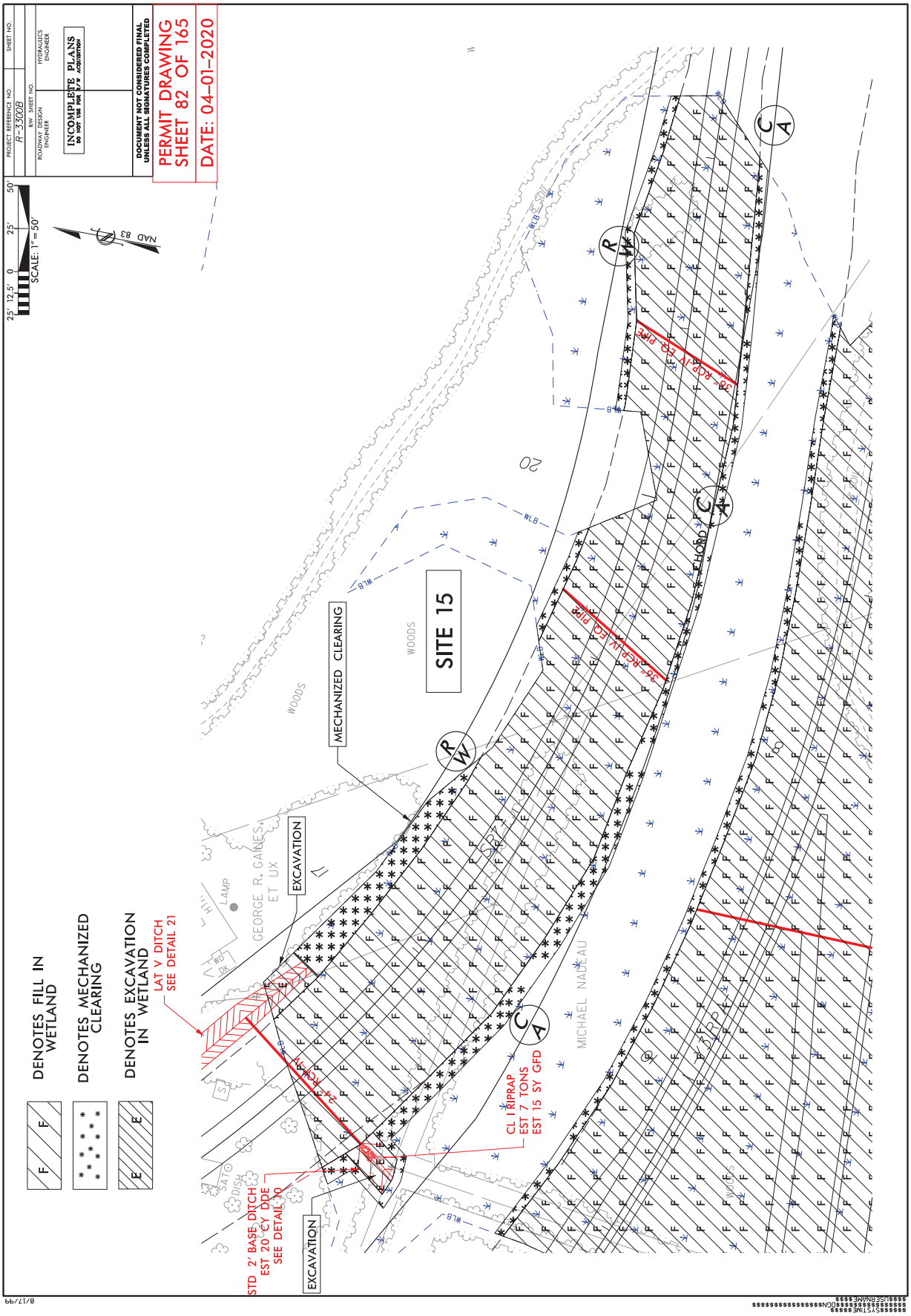
SHEET NO.
14
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
GRAPHIC SCALE
100 50 0 100 200
PLANS
NAD 83/NSRS 2007
PERMIT DRAWING
SHEET 78 OF 165
DATE: 04-01-2020
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
ENLARGEMENT VIEW SEE SHEET 82 OF 165
ENLARGEMENT VIEW SEE SHEET 81 OF 165
ENLARGEMENT VIEW SEE SHEET 79 OF 165
ENLARGEMENT VIEW SEE SHEET 80 OF 165
INSET 2
TEMPORARY IMPACTS SHOWN ON SHEET 10 OF 165
SITE 16
SITE 15
SITE 14
SITE 13
5/14/99


PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 79 OF 165
DATE: 04-01-2020
SEE DETAIL 19
SCALE: 1"=50'
NAD 83
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
LAT V DITCH
SEE DETAIL 2
LAT 4' BASE DITCH
SEE DETAIL 13
CL I RIPRAP
EST 26 TONS
EST 50 SY GFD
CL I RIPRAP
ON BANKS
SEE DETAIL 30
48" RCP-IV
15" RCP-IV
36" RCP-IV
48" RCP-IV (BURIED 0.8')
2GI
2GI-A
3GI-A
FS
HW
SITE 14
-Y3IDET-
-Y3ILFC-
-Y3IRPB-
-17-
CHORD
PUE
728
725
10
8/17/99

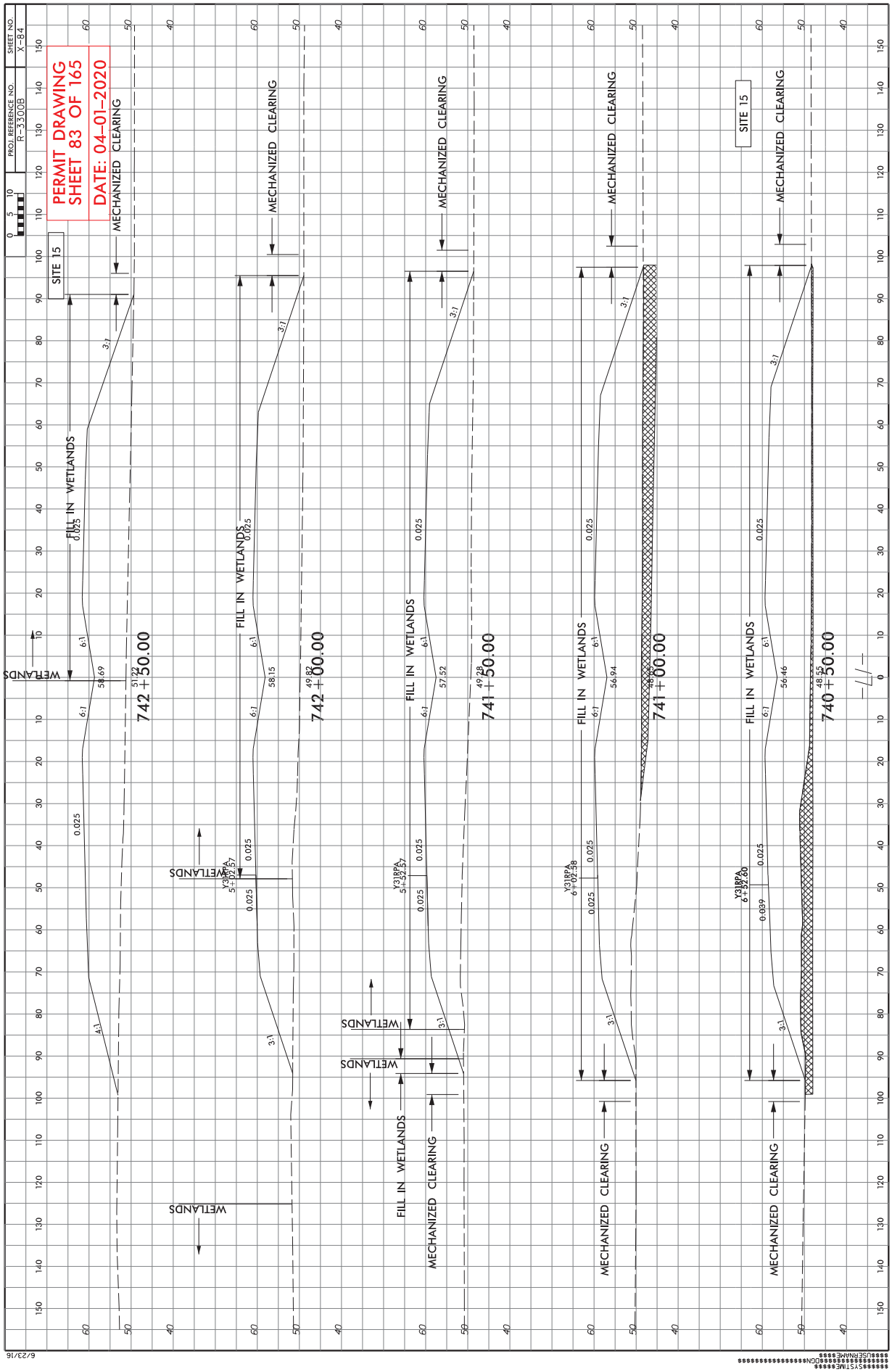

PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 80 OF 165
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SITE 14
TEMPOARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
SPEC LAT V DITCH SEE DETAIL 6
LAT 2' BASE DITCH SEE DETAIL 24
54" RCP-IV (BURIED 1.0')
48" RCP-IV
CL I RIPRAP EST 26 TONS EST 50 SY GFD
CL I RIPRAP ON BANKS SEE DETAIL 30
PES
CB
HW
CHORD
-Y3ILPC-
-Y3IRPC-
-Y3IDET-
JS NONMT
PROFESSIONAL POWER GROUP INC
B. SPILLER


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 81 OF 165
DATE: 04-01-2020
SCALE: 1" = 50'
NAD 83
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
TEMPORARY IMPACTS SHOWN ON SHEET 10 OF 165
SITE 16
SITE 17
FILL IN WETLAND
MECHANIZED CLEARING
RETAIN CMAP's
(2) 60'x46' CMAP
DAYLIGHT DITCH
SPEC LAT 4' BASE DITCH
EST TONS 53 TONS
EST 150 SY GFD
SEE DETAIL 39A
SPEC LAT V DITCH
SEE DETAIL 4
SEPTIC FIELD IMPACTED
NON-TOTAL TAKE
CHARLES E BRYANT
WHITE MARSH BRANCH
WOODS
CONC
ISFD
24" CONC
48" WD RAIL
SR 1569 HOOVER RD
PUE
WLB
8/17/99

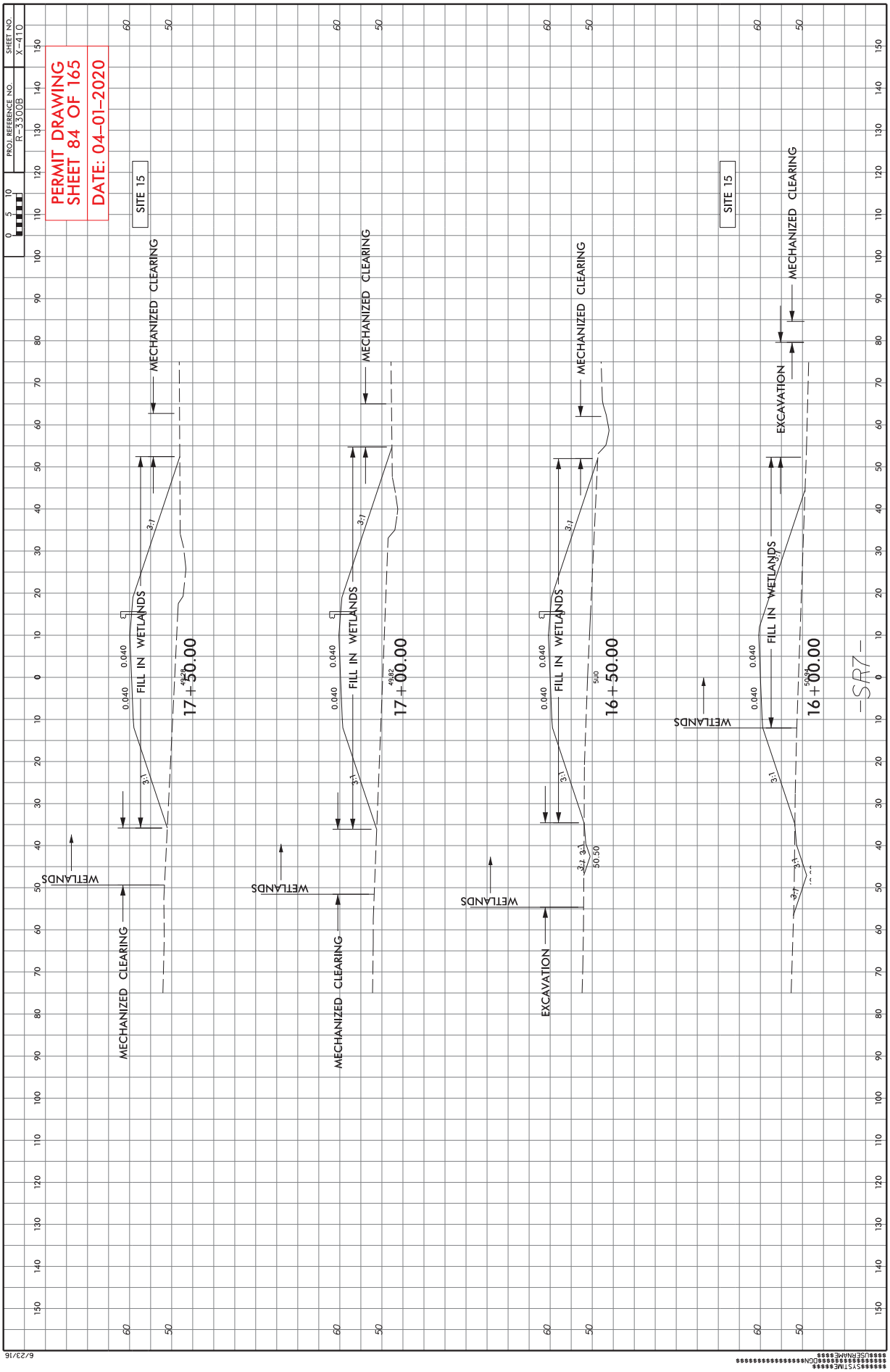
P-120


PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 82 OF 165
DATE: 04-01-2020
SCALE: 1" = 50'
NAD 83
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
LAT V DITCH
SEE DETAIL 21
SITE 15
MECHANIZED CLEARING
EXCAVATION
STD 2' BASE DITCH
EST 20 CY DDE
SEE DETAIL 20
CL I RIPRAP
EST 7 TONS
EST 15 SY GFD
WOODS
GEORGE R. CAINES ET UX
MICHAEL NADEAU
ECHO FARM ROAD
WLB
LAMP
DISH

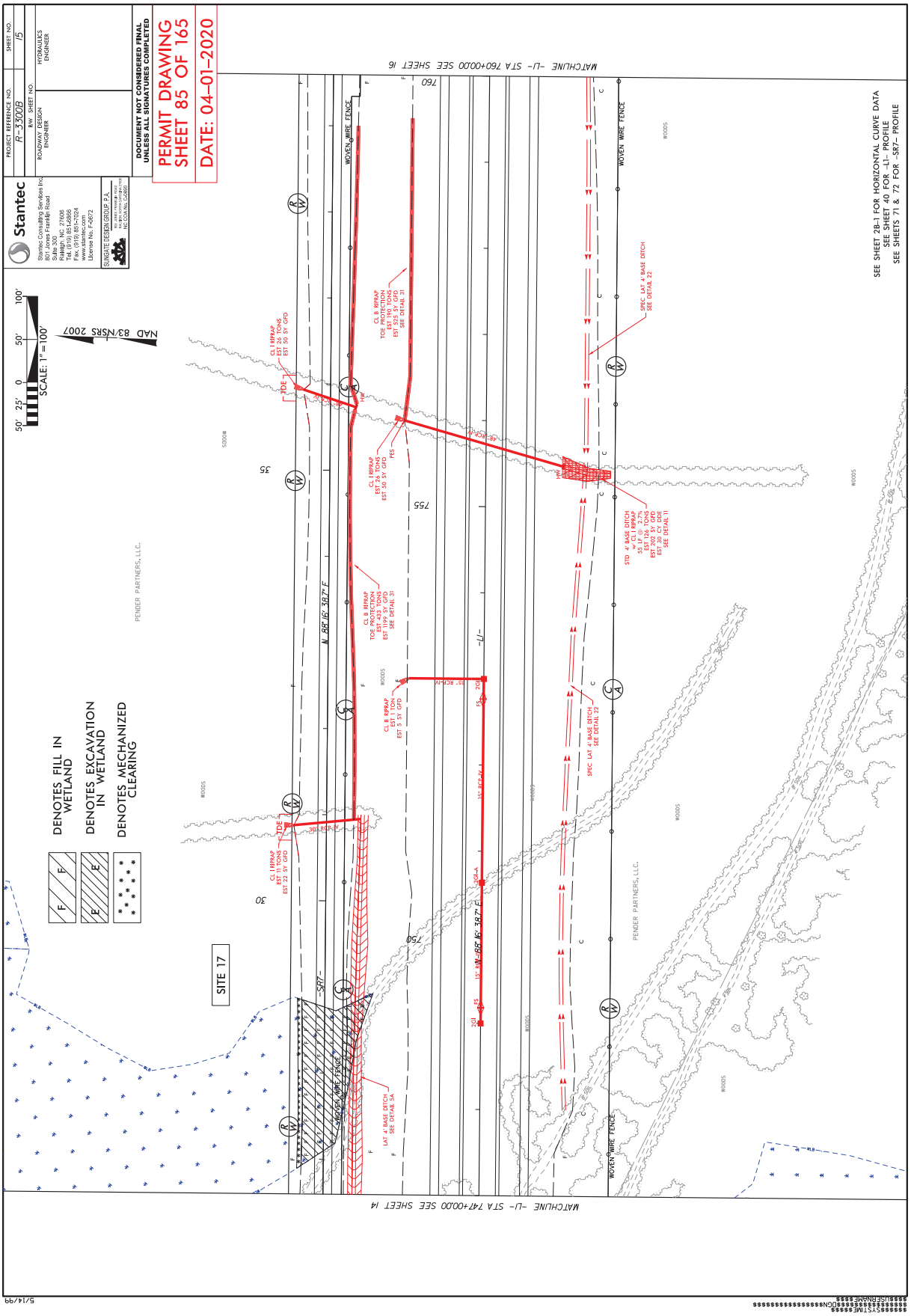
P-121


PERMIT DRAWING
SHEET 83 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-84
SITE 15
MECHANIZED CLEARING
FILL IN WETLANDS
WETLANDS
742+50.00
742+00.00
741+50.00
741+00.00
740+50.00
6/23/16

P-122


PERMIT DRAWING
SHEET 84 OF 165
DATE: 04-01-2020
SHEET NO. X-410
PROJ. REFERENCE NO. R-3300B
0 5 10
SITE 15
MECHANIZED CLEARING
FILL IN WETLANDS
EXCAVATION
WETLANDS
17+50.00
17+00.00
16+50.00
16+00.00
3:1
0.040
-SR7-
6/23/16

P-123


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
15
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
RW
SHEET NO.
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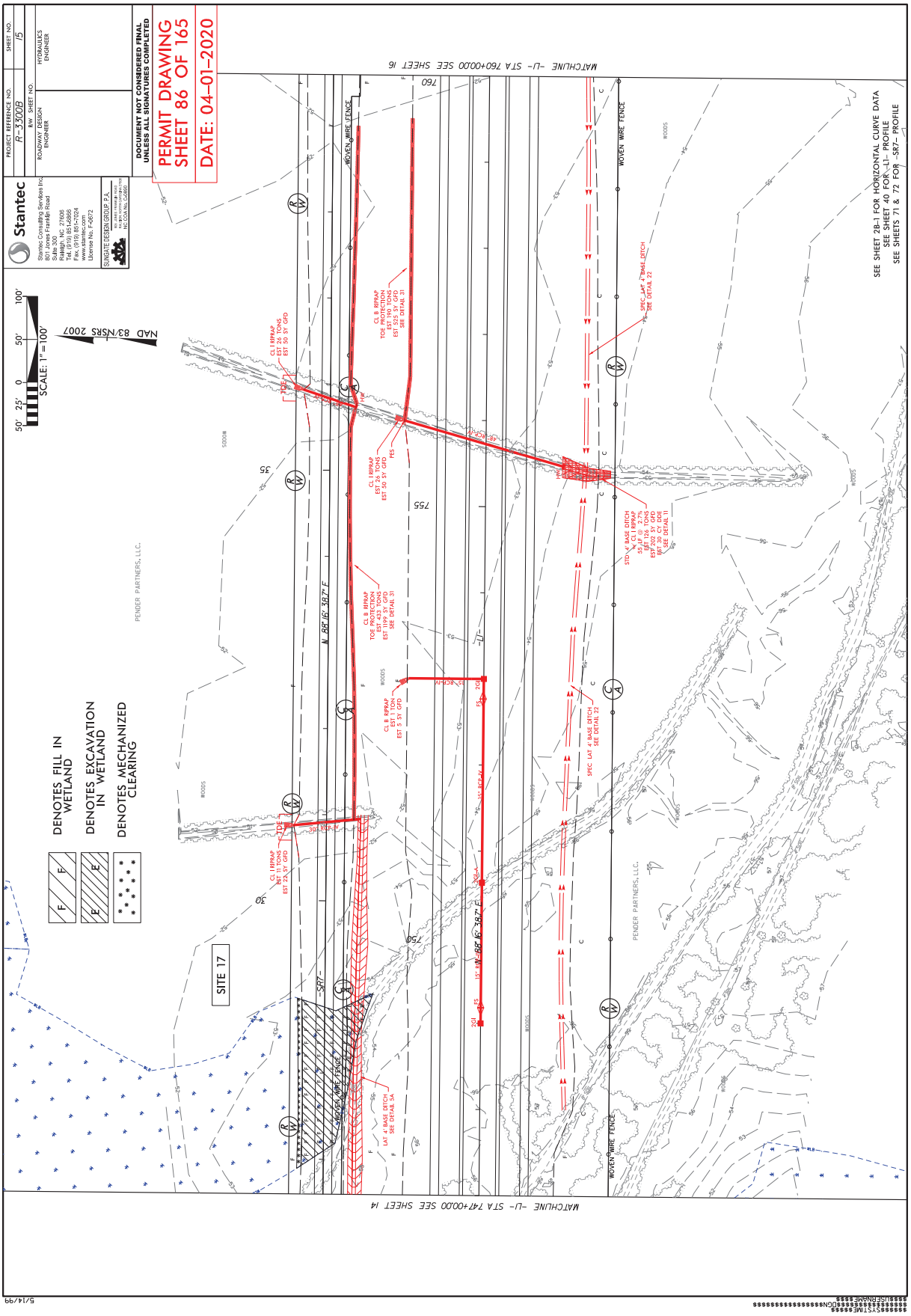
PERMIT DRAWING
SHEET 85 OF 165
DATE: 04-01-2020
SCALE: 1"=100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 17
MATCHLINE -L1- STA 760+00.00 SEE SHEET 16
MATCHLINE -L1- STA 747+00.00 SEE SHEET 14
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 40 FOR -L1- PROFILE
SEE SHEETS 71 & 72 FOR -SR7- PROFILE
PENDER PARTNERS, LLC.
WOVEN WIRE FENCE
WOODS
CL B RIPRAP TOE PROTECTION
CL I RIPRAP
LAT 4' BASE DITCH SEE DETAIL 5A
SPEC LAT 4' BASE DITCH SEE DETAIL 22
STD 4' BASE DITCH W/ CL I RIPRAP SEE DETAIL 22
N 88°16'38.7" E
N 88°16'38.7" E
-L1-
-SR7-
5/14/99

P-124


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
15
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 86 OF 165
DATE: 04-01-2020
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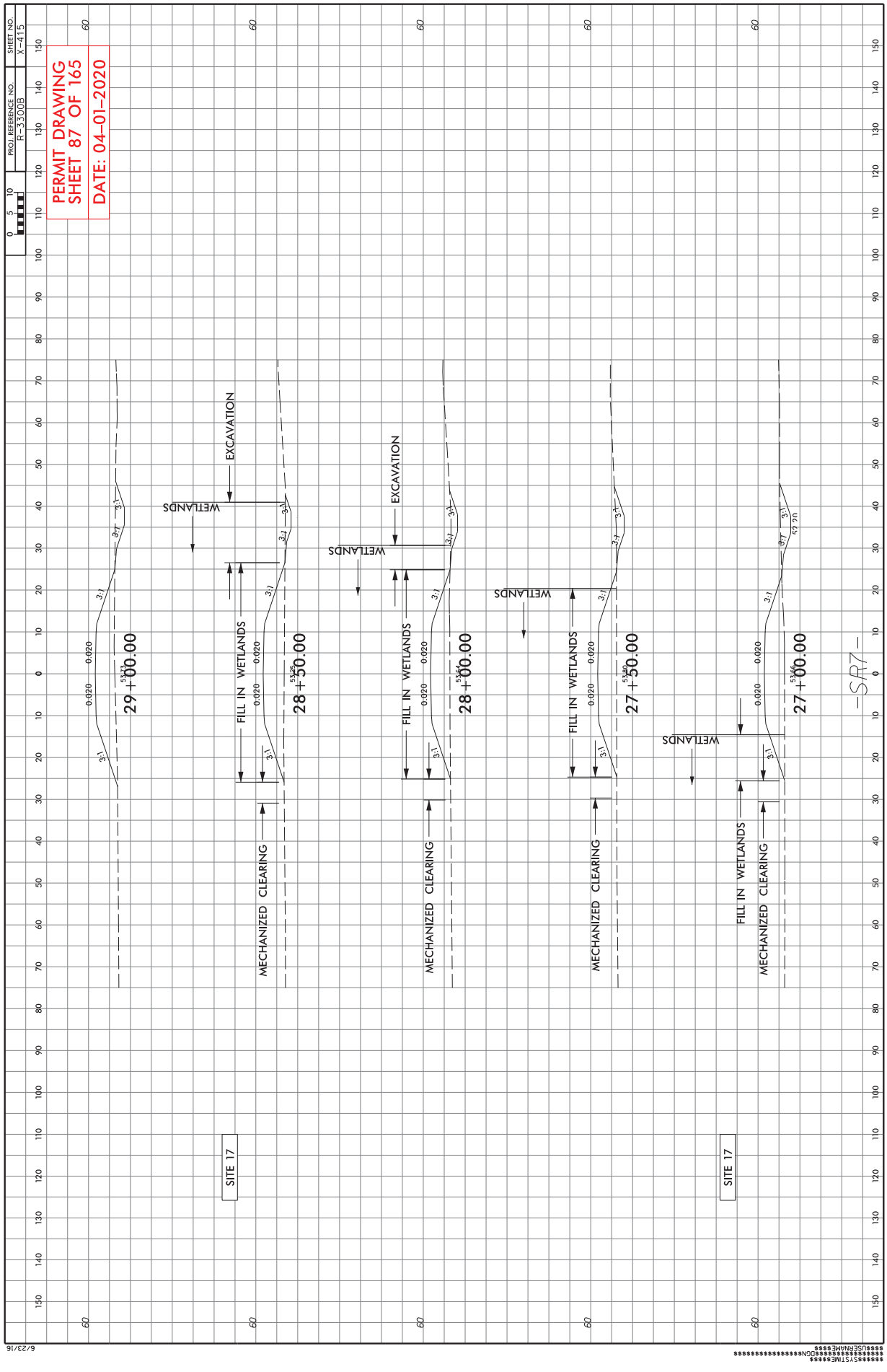
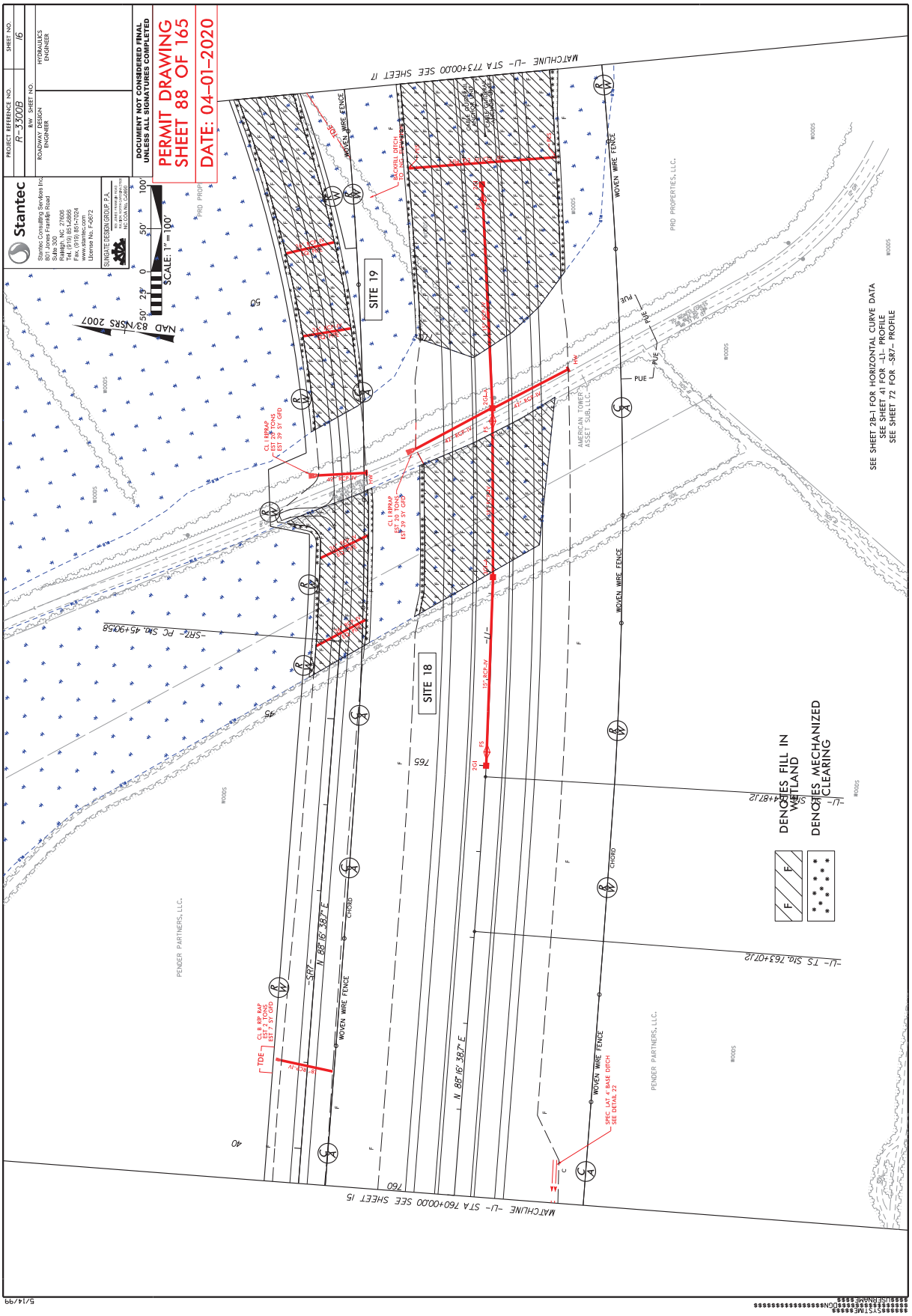
License No. F-0672
SINGLETON DESIGN GROUP, P.A.
License No. F-0672
SCALE: 1"=100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 17
MATCHLINE -L1- STA 760+00.00 SEE SHEET 16
MATCHLINE -L1- STA 747+00.00 SEE SHEET 14
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 40 FOR -L1- PROFILE
SEE SHEETS 71 & 72 FOR -SR7- PROFILE
WOVEN WIRE FENCE
PENDER PARTNERS, LLC.
WOODS
CL B RIPRAP TOE PROTECTION EST 525 TONS EST 525 SY GFD SEE DETAIL 31
CL I RIPRAP EST 26 TONS EST 50 SY GFD
CL B RIPRAP TOE PROTECTION EST 1165 TONS EST 1199 SY GFD SEE DETAIL 31
CL B RIPRAP EST 1 TON EST 5 SY GFD
CL I RIPRAP EST 11 TONS EST 72 SY GFD
LAT A BASE DITCH SEE DETAIL 5A
SPEC LAT A BASE DITCH SEE DETAIL 22
STD "A" BASE DITCH CL I RIPRAP SEE DETAIL 22 EST 126 TONS EST 175 GFD EST 30 CY DDE SEE DETAIL 11
N 88° 16' 38.7" E
N 88° 16' 38.7" E
-L1-
-SR7-
755
760
750
35
30

P-125


PERMIT DRAWING
SHEET 87 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-415
0 5 10
29+00.00
28+50.00
28+00.00
27+50.00
27+00.00
EXCAVATION
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
SITE 17
-SR7-
3:1
0.020

P-126


PROJECT REFERENCE NO.
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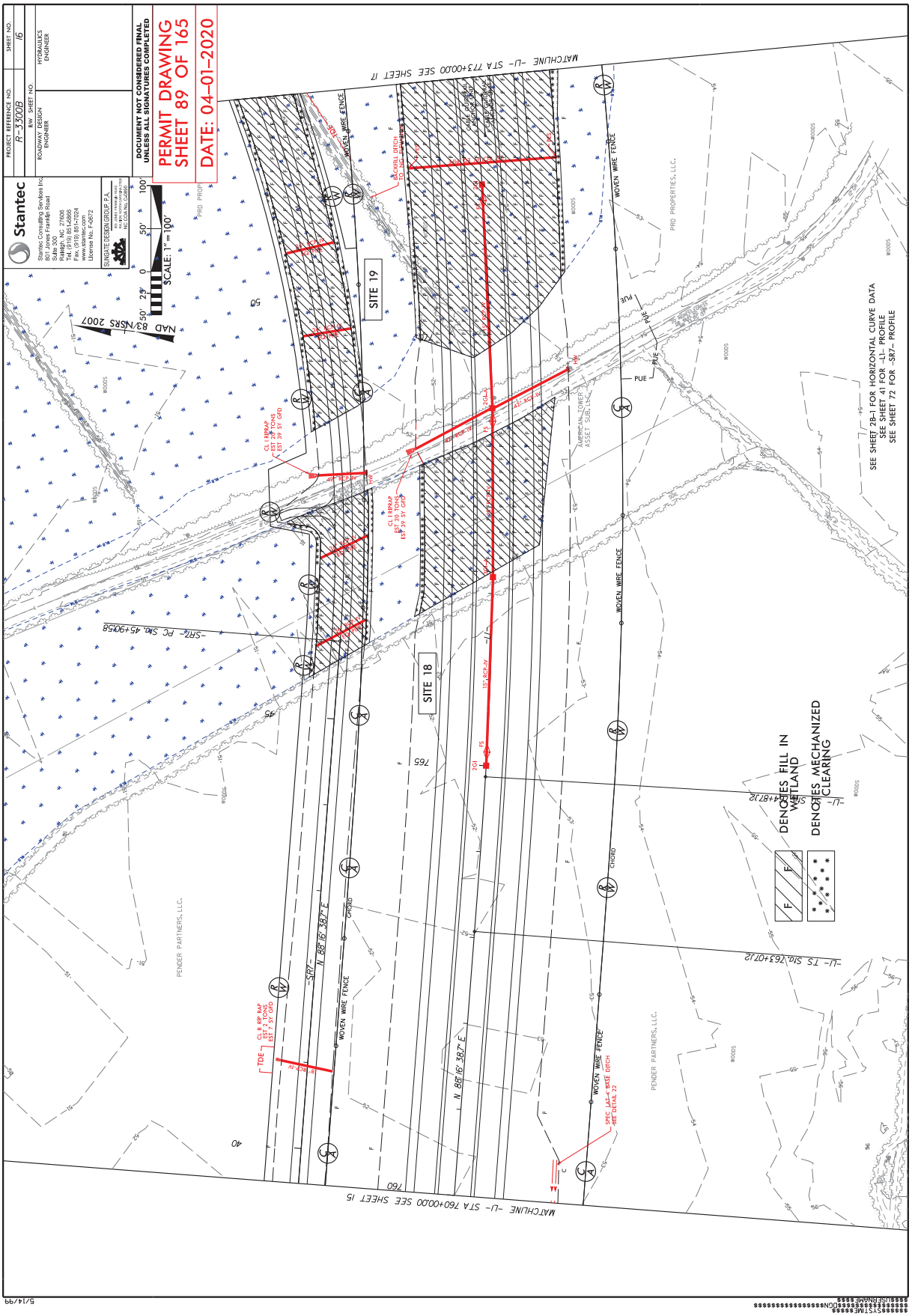
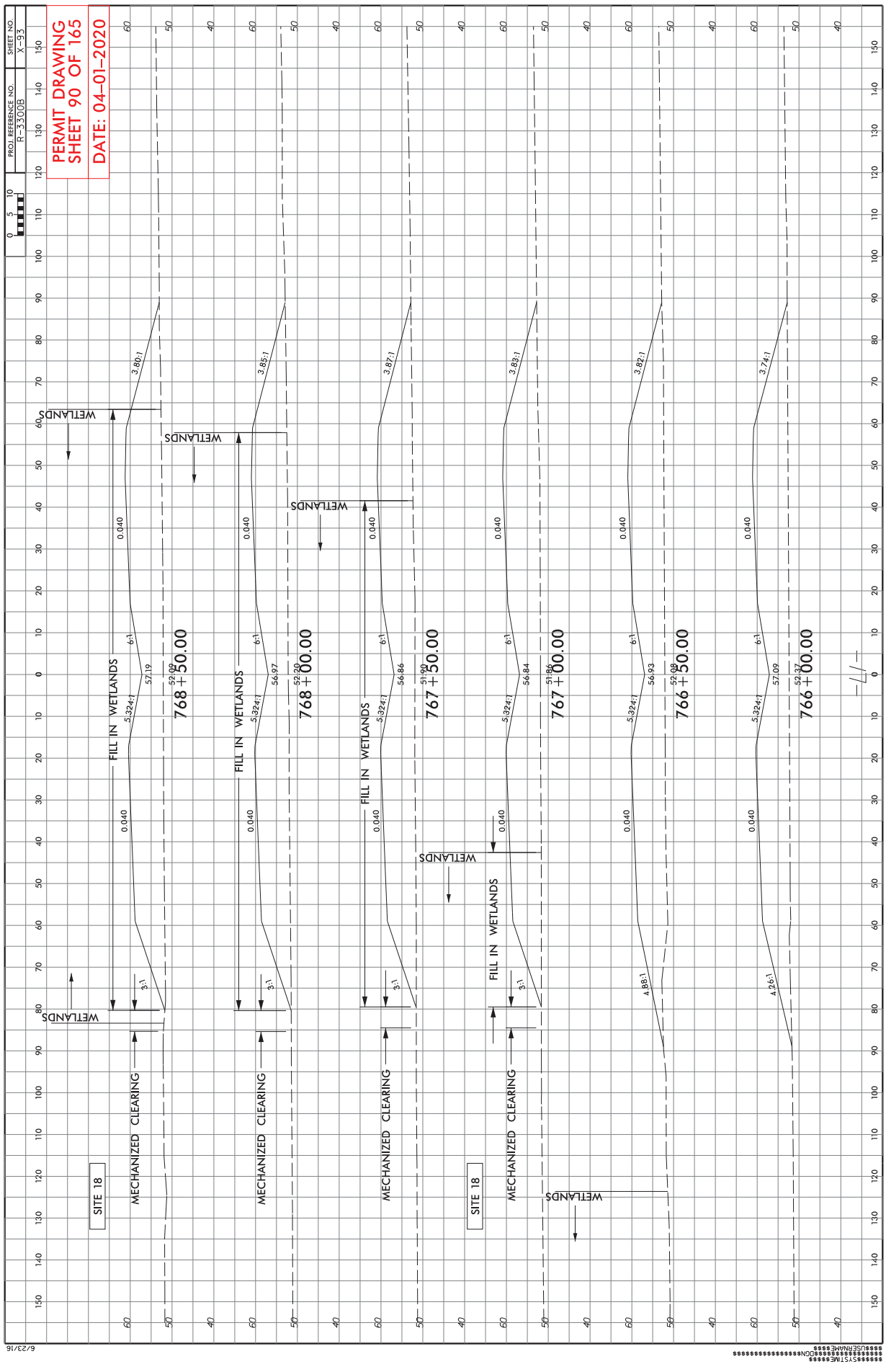
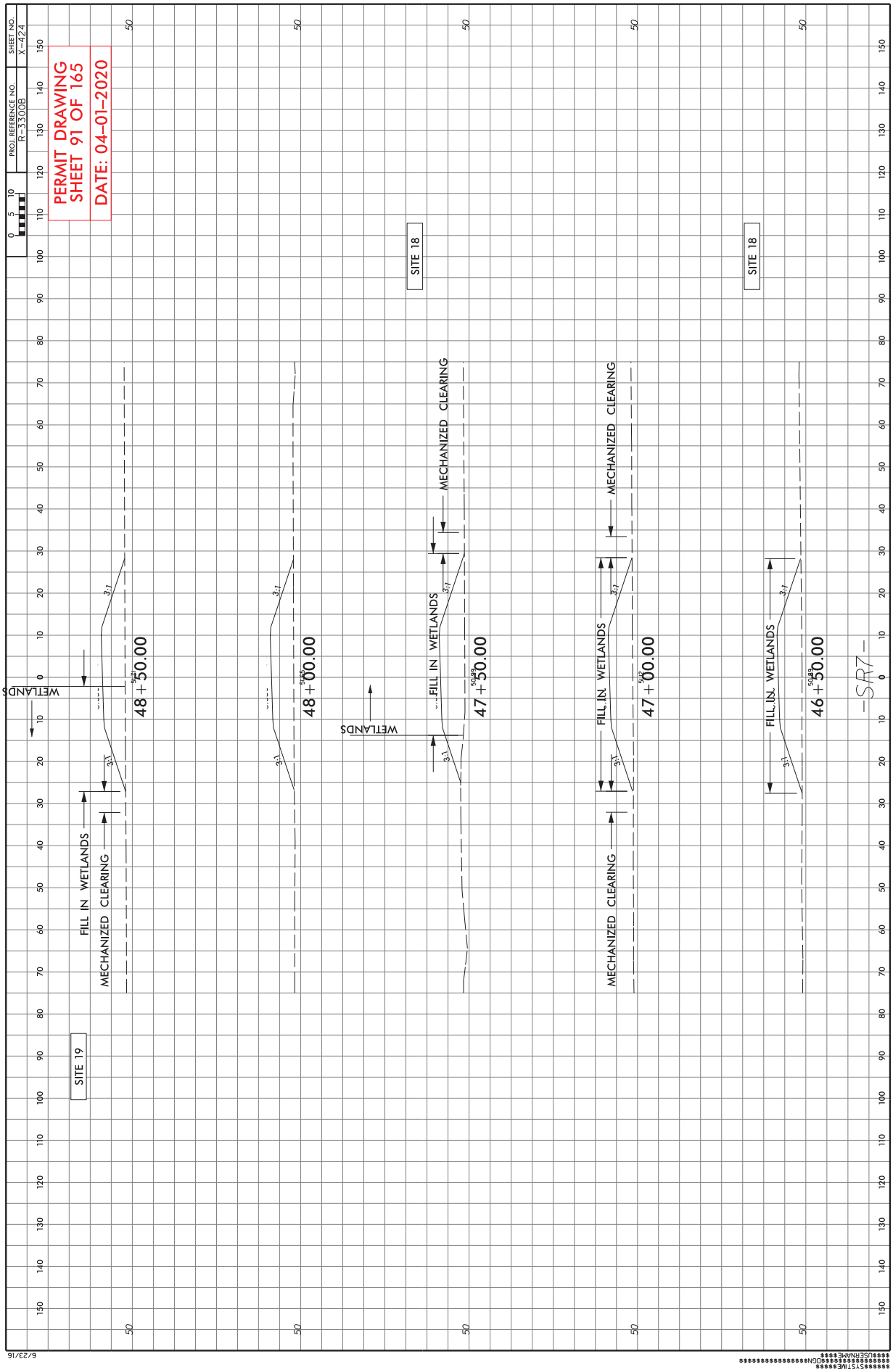
SHEET NO.
16
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 88 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
SITE 19
SITE 18
WOVEN WIRE FENCE
PUE
PENDER PARTNERS, LLC.
PRD PROPERTIES, LLC.
AMERICAN TOWER ASSET SUB, LLC
WOODS
CHORD
N 88° 16' 38.7" E
MATCHLINE -L1- STA 773+00.00 SEE SHEET 17
MATCHLINE -L1- STA 760+00.00 SEE SHEET 15
-L1- Sta 763+07.12
-L1- Sta 744+87.12
-SR7- PC Sta 45+90.58
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 41 FOR -L1- PROFILE
SEE SHEET 72 FOR -SR7- PROFILE
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
TOE
SPEC. LAT. 4 BASE DITCH
SEE DETAIL 22
5/14/99

P-127

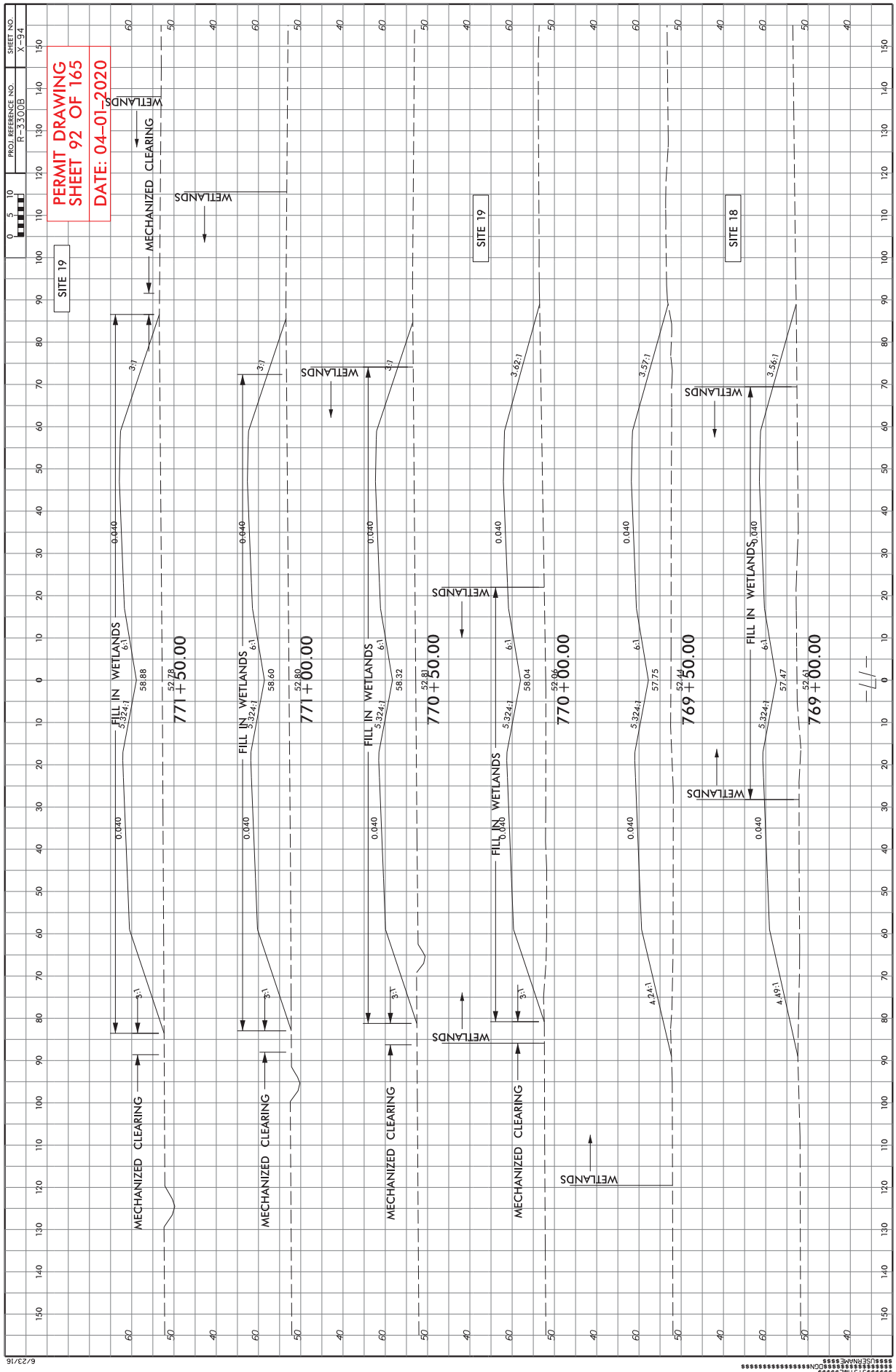

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
16
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 89 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
SITE 19
SITE 18
WOVEN WIRE FENCE
PENDER PARTNERS, LLC.
PRD PROPERTIES, LLC.
PUE
CHORD
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 41 FOR -L1- PROFILE
SEE SHEET 72 FOR -SR7- PROFILE
MATCHLINE -L1- STA 773+00.00 SEE SHEET 17
MATCHLINE -L1- STA 760+00.00 SEE SHEET 15
-SR7- PC Sta 45+90.58
-L1- PI Sta 448+87.12
-L1- TS Sta 763+07.12
N 88° 16' 38.7" E
765
760


PERMIT DRAWING
SHEET 90 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-93
0 5 10
768+50.00
768+00.00
767+50.00
767+00.00
766+50.00
766+00.00
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
SITE 18
3.80:1
3.85:1
3.87:1
3.88:1
3.82:1
3.74:1
5.32:1
4.88:1
4.26:1
6:1
3:1
0.040
52.00
57.19
52.20
56.97
51.90
56.86
51.86
56.84
52.08
56.93
52.37
57.09

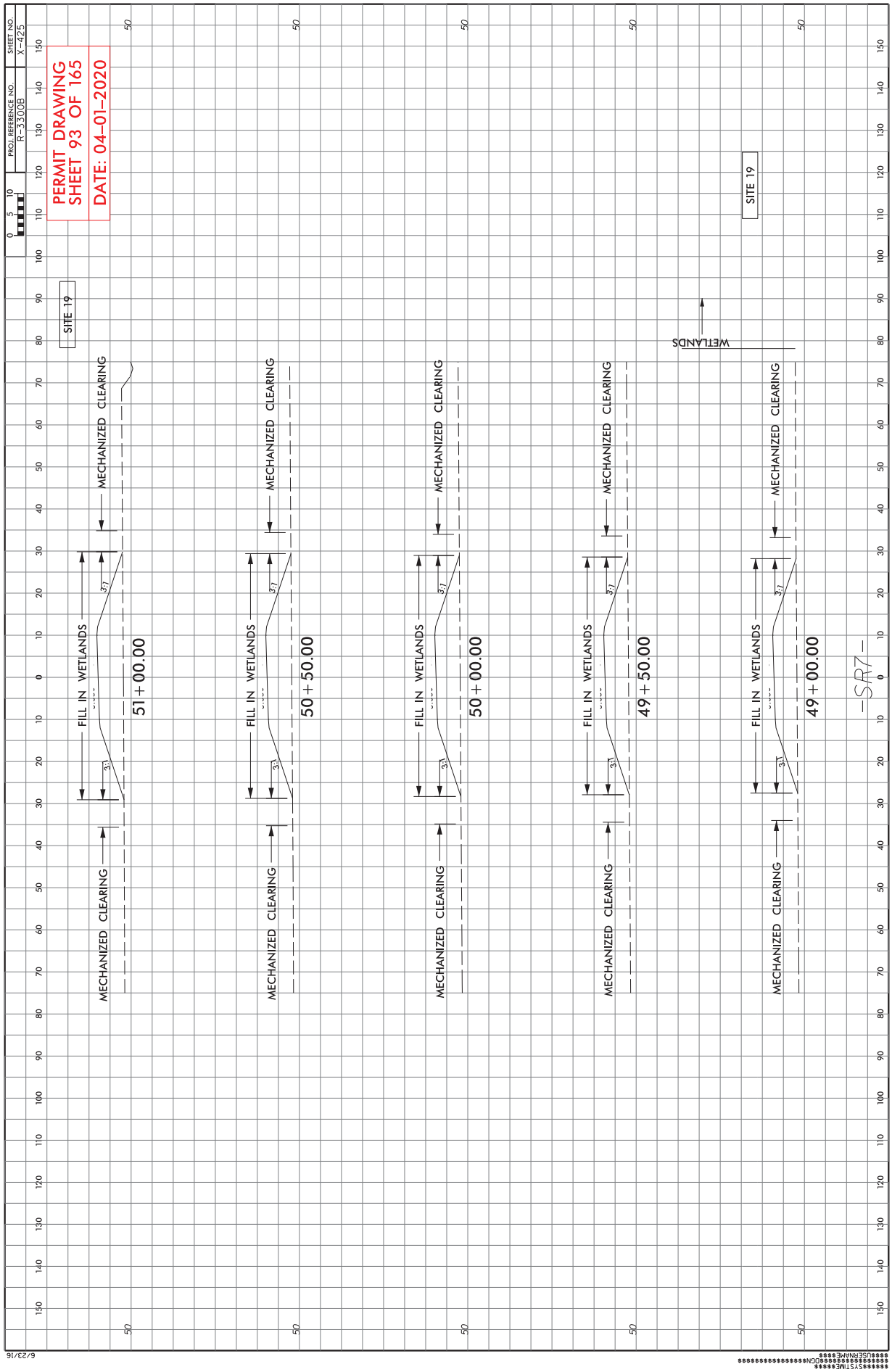
P-129

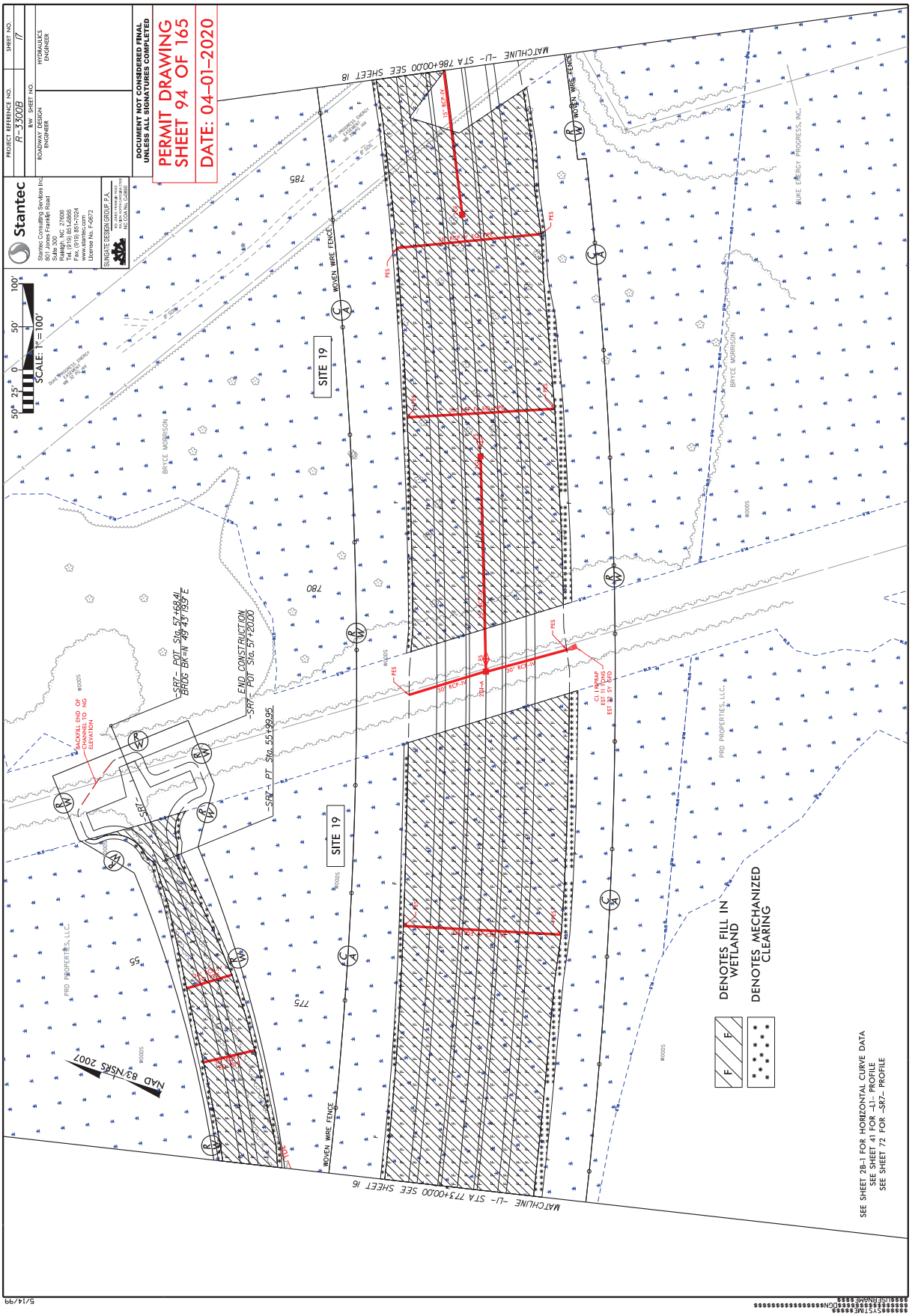

PERMIT DRAWING
SHEET 91 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-424
0 5 10
SITE 19
SITE 18
SITE 18
WETLANDS
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
FILL IN WETLANDS
MECHANIZED CLEARING
FILL IN WETLANDS
MECHANIZED CLEARING
FILL IN WETLANDS
MECHANIZED CLEARING
48+50.00
48+00.00
47+50.00
47+00.00
46+50.00
-SR7-
3:1
50
6/23/16

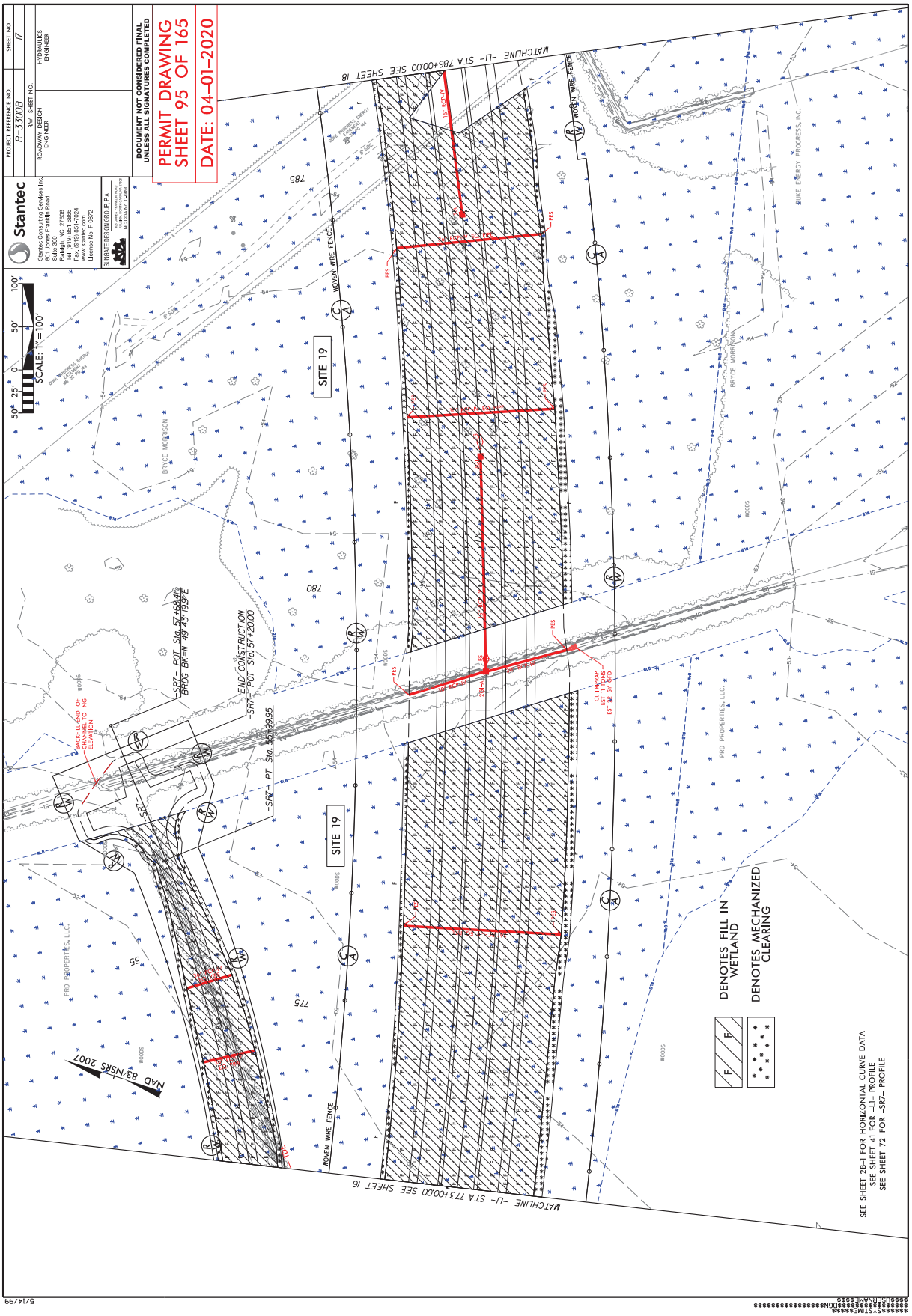
P-130

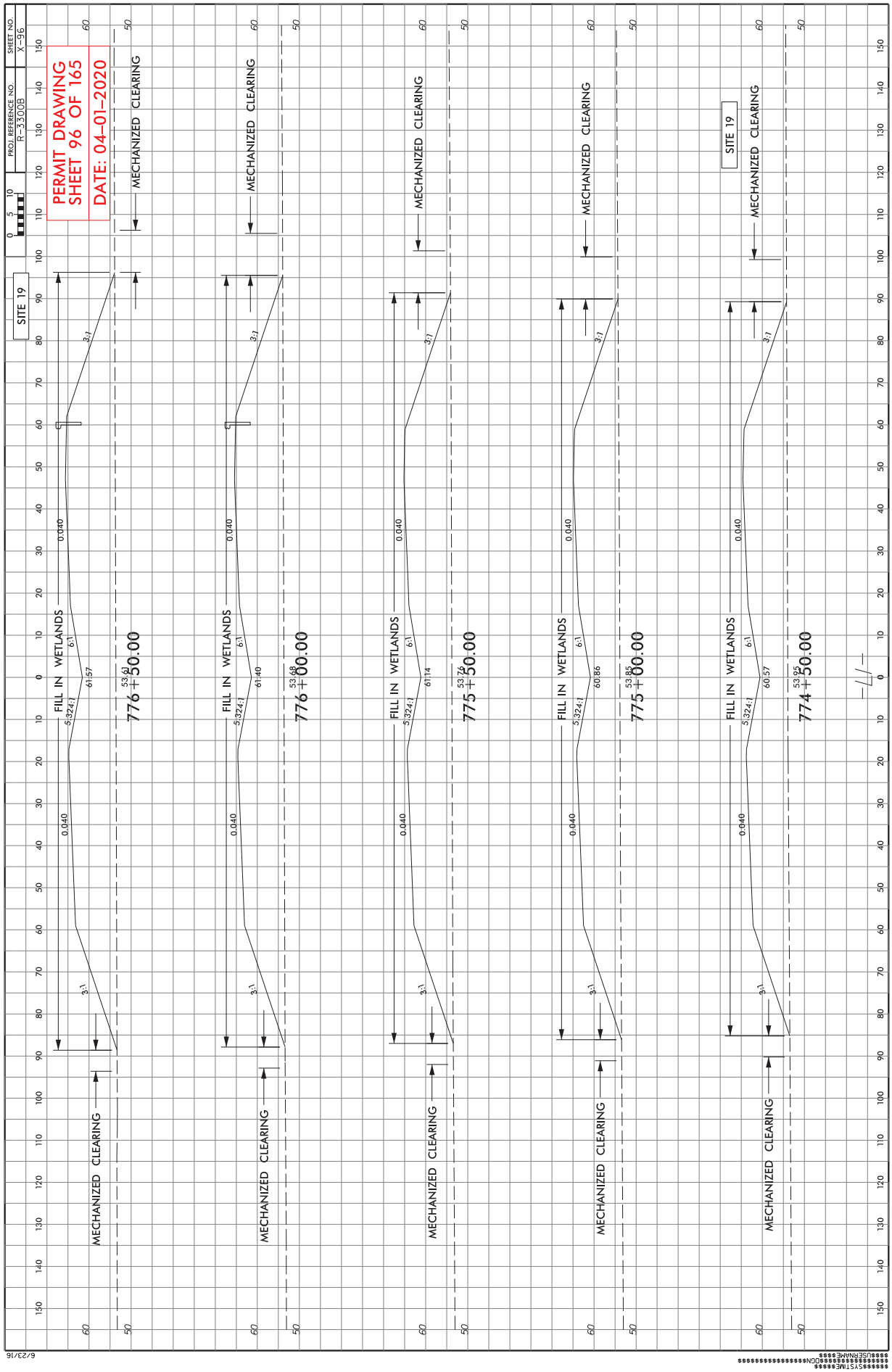

PERMIT DRAWING
SHEET 92 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-94
SITE 19
SITE 18
MECHANIZED CLEARING
WETLANDS
FILL IN WETLANDS
771+50.00
771+00.00
770+50.00
770+00.00
769+50.00
769+00.00
6/23/16

P-131

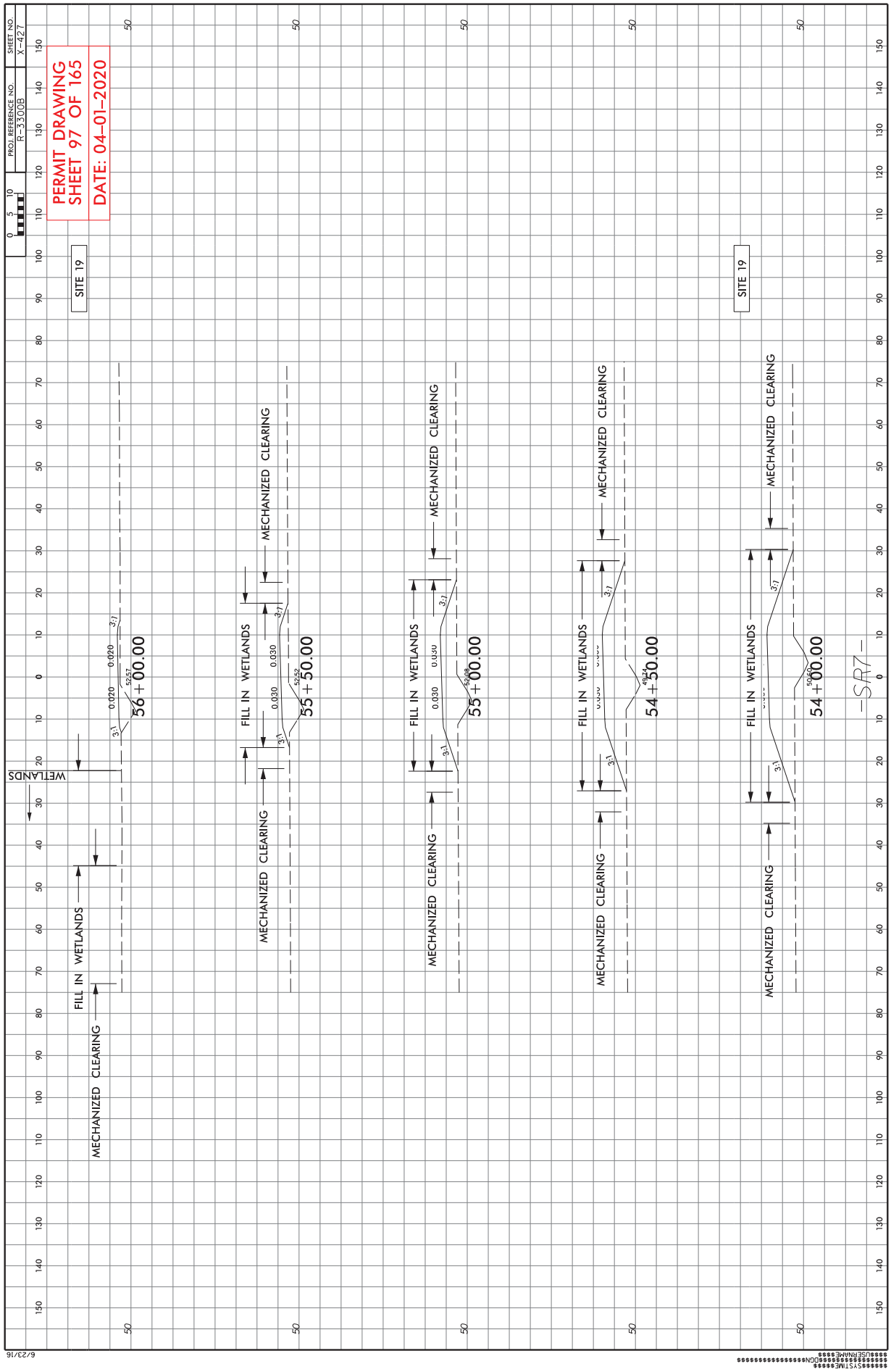

PERMIT DRAWING
SHEET 93 OF 165
DATE: 04-01-2020
SHEET NO. X-425
PROJ. REFERENCE NO. R-3300B
0 5 10
SITE 19
SITE 19
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
MECHANIZED CLEARING
3:1
51+00.00
50+50.00
50+00.00
49+50.00
49+00.00
-SR7-
6/23/16

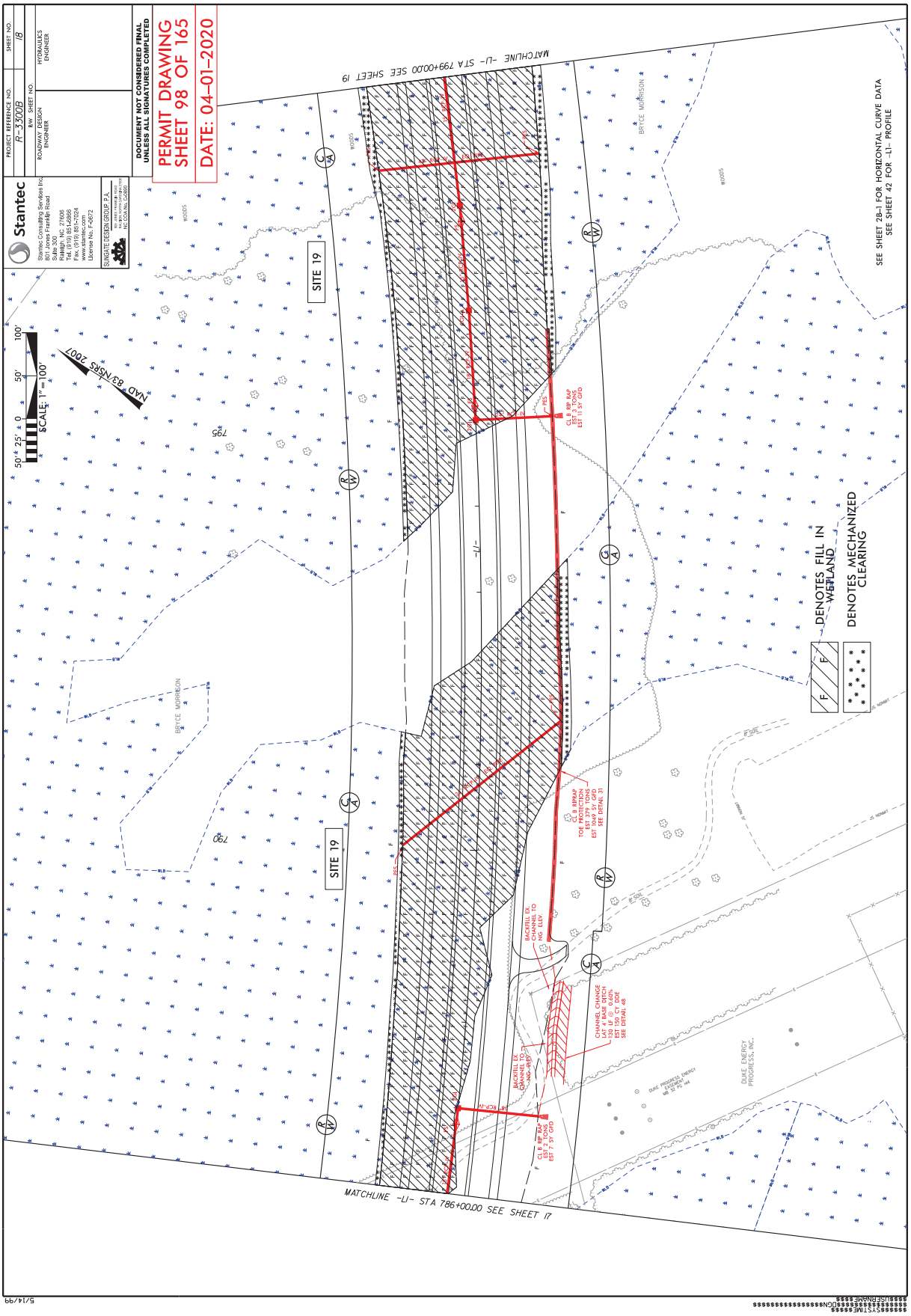

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
17
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 94 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
SCALE: 1"=100'
MATCHLINE -L- STA 786+00.00 SEE SHEET 18
MATCHLINE -L- STA 773+00.00 SEE SHEET 16
WOVEN WIRE FENCE
SITE 19
-SR7- POT Sta. 57+68.41
BRDG BK=N 49°43'19"E
END CONSTRUCTION
-SR7- POT Sta. 57+20.00
-SR7- PT Sta. 55+99.95
-SR7-
BRYCE MORRISON
PRD PROPERTIES, LLC.
DUKE ENERGY PROGRESS, INC.
WOODS
785
780
775
55
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 41 FOR -L1- PROFILE
SEE SHEET 72 FOR -SR7- PROFILE
5/14/99

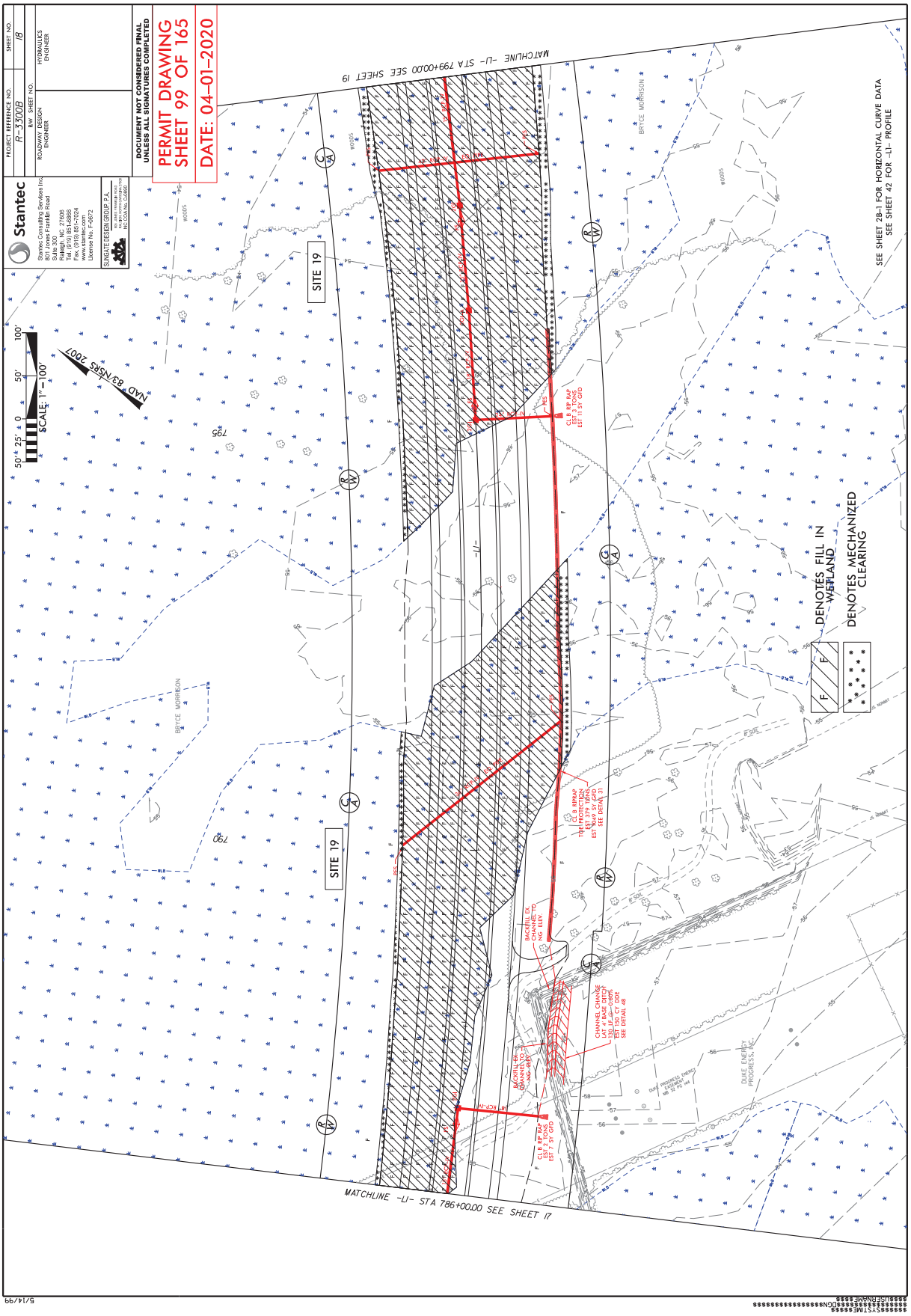

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
17
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 95 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
License No. C-2672
SCALE: 1"=100'
MATCHLINE -L- STA 786+00.00 SEE SHEET 18
MATCHLINE -L- STA 773+00.00 SEE SHEET 16
WOVEN WIRE FENCE
SITE 19
-SR7- POT Sta. 57+69.44
BRDG BK=N 49°43'19.9"E
-SR7- END CONSTRUCTION
-SR7- PT Sta. 57+20.00
-SR7- PT Sta. 57+39.95
RIP-RAP CL II
EST 11 TONS
EST @ 3' DEEP
PRD PROPERTIES, LLC.
BRYCE MORRISON
DUKE ENERGY PROGRESS, INC.
WOODS
780
785
775
55
54
53
52
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 41 FOR -L1- PROFILE
SEE SHEET 72 FOR -SR7- PROFILE
5/14/99


SITE 19
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-96
PERMIT DRAWING
SHEET 96 OF 165
DATE: 04-01-2020
MECHANIZED CLEARING
FILL IN WETLANDS
0.040
3:1
5:324:1
6:1
776+50.00
776+00.00
775+50.00
775+00.00
774+50.00
SITE 19
6/23/16

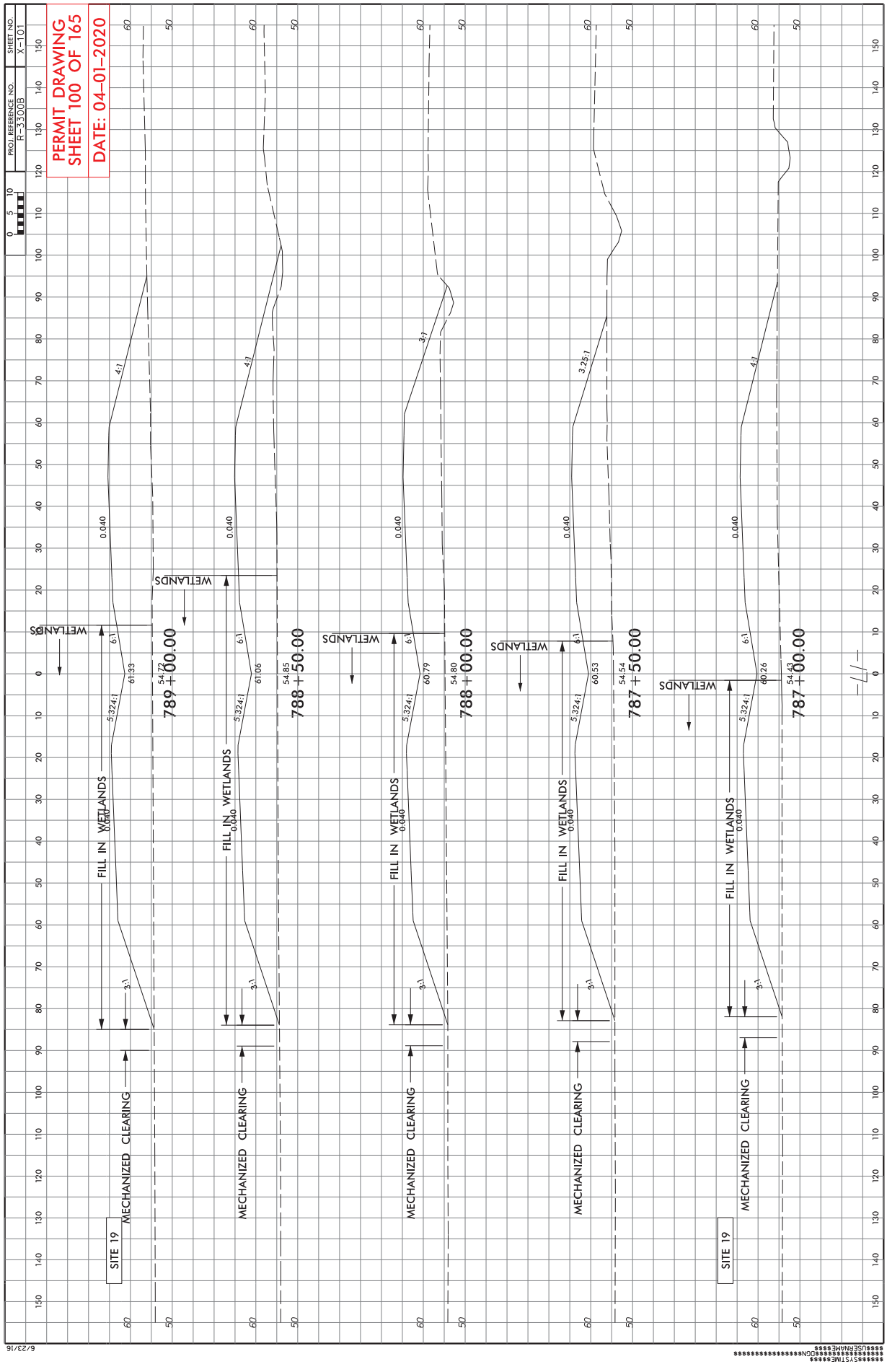
P-135


PERMIT DRAWING
SHEET 97 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-427
SITE 19
WETLANDS
MECHANIZED CLEARING
FILL IN WETLANDS
56+00.00
55+50.00
55+00.00
54+50.00
54+00.00
-SR7-

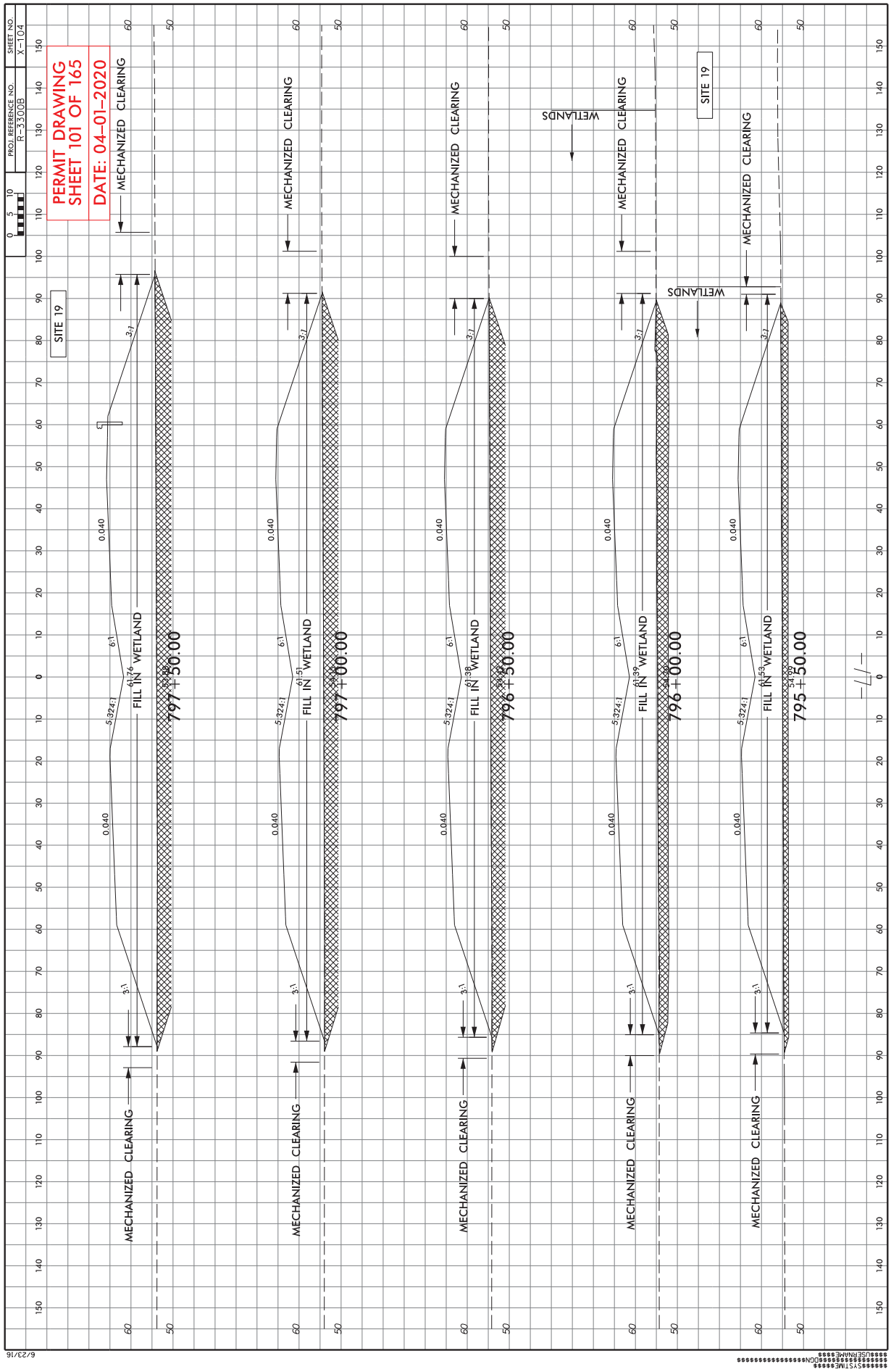

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
18
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 98 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
MATCHLINE -L1- STA 799+00.00 SEE SHEET 19
MATCHLINE -L1- STA 786+00.00 SEE SHEET 17
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 42 FOR -L1- PROFILE
SITE 19
SITE 19
BRYCE MORRISON
BRYCE MORRISON
WOODS
WOODS
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
CL B RIP RAP EST 3 TONS EST 11 SY GFD
CL B RIPRAP TOE PROTECTION EST 105 TONS EST 1049 SY GFD SEE DETAIL 31
BACKFILL EX CHANNEL TO NG ELEV
CHANNEL CHANGE LAT 4' BASE DITCH 30' TOP WIDTH EST 150 CY DIG SEE DETAIL 48
BACKFILL EX CHANNEL TO NG ELEV
CL B RIP RAP EST 7 SY GFD
DUKE ENERGY PROGRESS, INC.
DUKE PROGRESS ENERGY EASEMENT MB 19 PG 44
795
790
5/14/99


PERMIT DRAWING
SHEET 99 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 18
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
SCALE: 1"=100'
NAD 83/NSRS 2007
MATCHLINE -LI- STA 799+00.00 SEE SHEET 19
MATCHLINE -LI- STA 786+00.00 SEE SHEET 17
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 42 FOR -LI- PROFILE
SITE 19
SITE 19
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
BRYCE MORRISON
DUKE ENERGY PROGRESS, INC.
CL B RIP RAP EST 3 TONS EST 11 SY GRD
CL B RIPRAP TOE PROTECTION EST 3 TONS EST 149 SY GRD SEE DETAIL (1 3)
BACKFILL EX CHANNEL TO NG ELEV
CHANNEL CHANGE LAT 4' BASE DITCH 33' TOP WIDTH EST 150 CY DIG SEE DETAIL 48
CL B RIP RAP EST 7 SY GRD
5/14/99

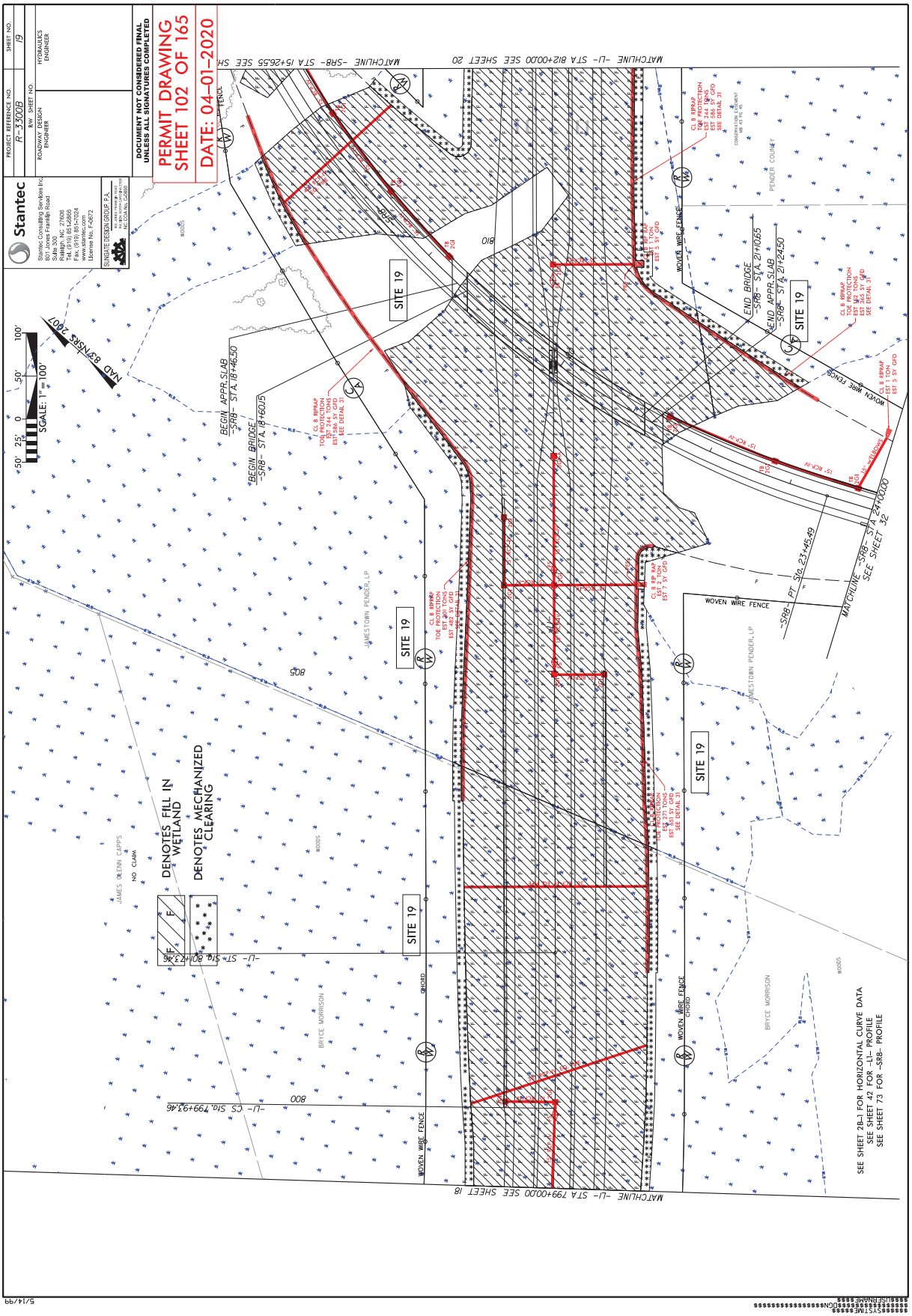
P-138

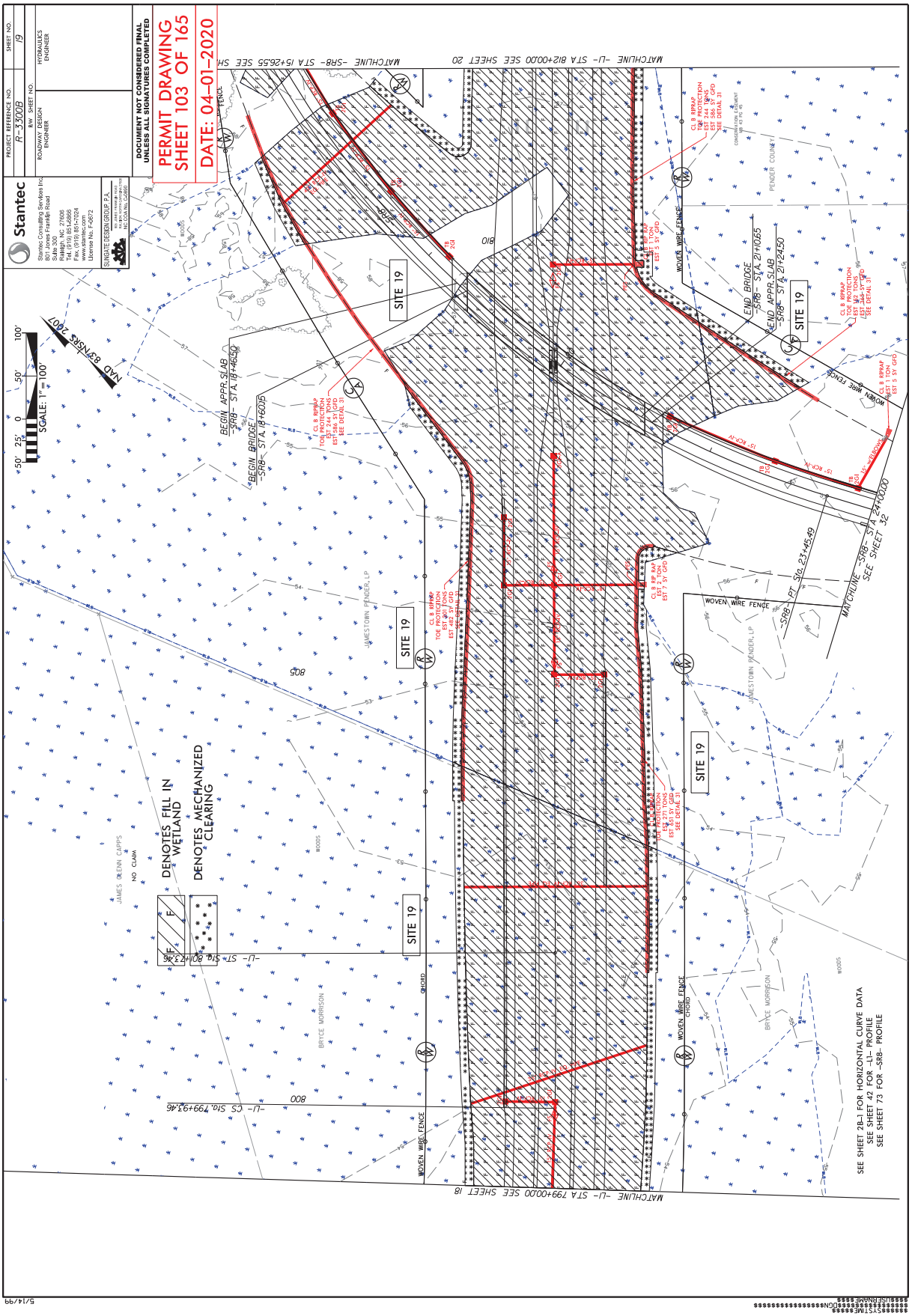

PERMIT DRAWING
SHEET 100 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-101
0 5 10
SITE 19
MECHANIZED CLEARING
FILL IN WETLANDS
0.040
WETLANDS
789+00.00
788+50.00
788+00.00
787+50.00
787+00.00
4:1
3:1
5.324:1
3.25:1
6:1
54.72
61.33
54.85
61.06
54.80
60.79
54.54
60.53
54.43
60.26

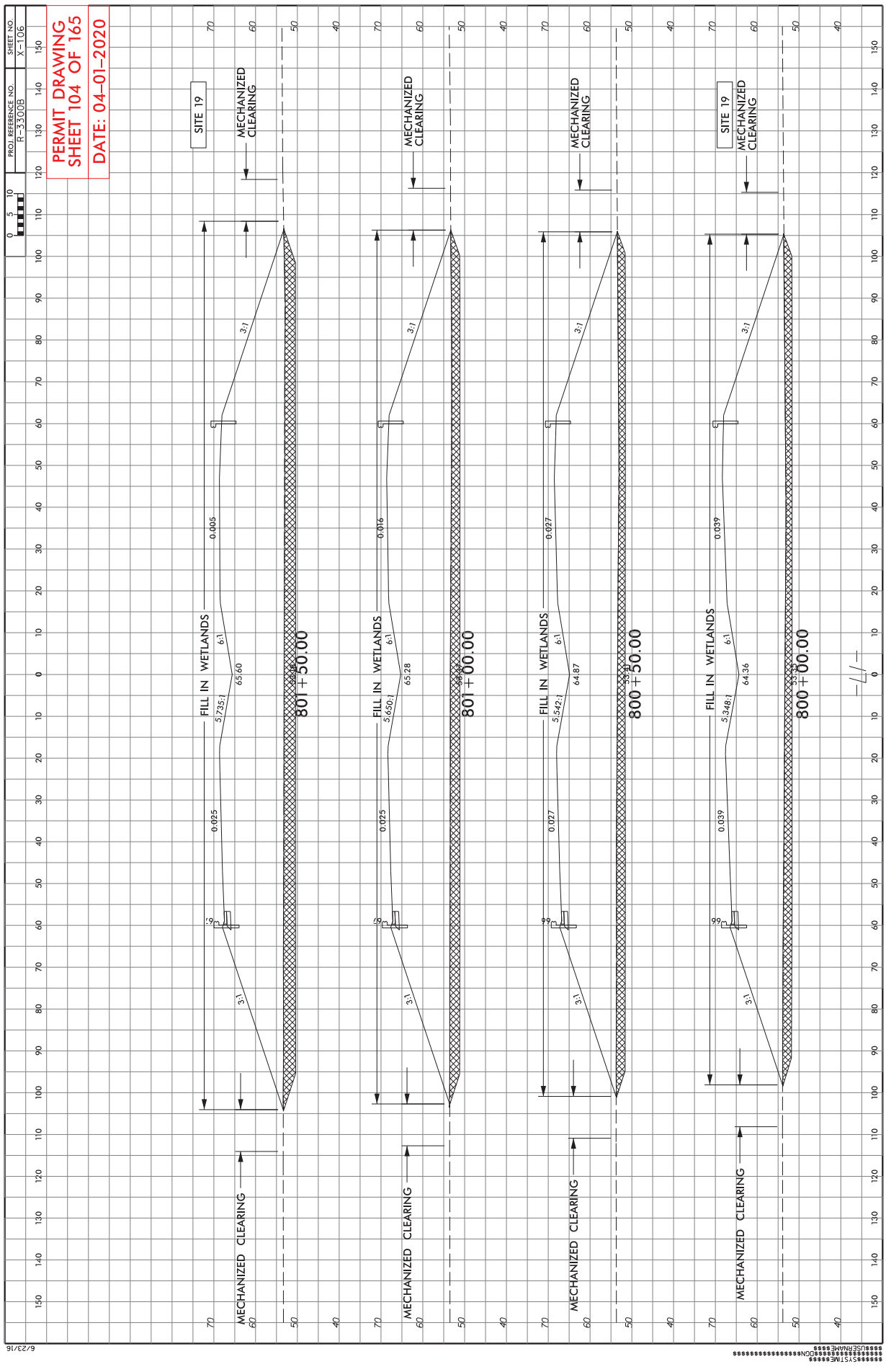
P-139


PERMIT DRAWING
SHEET 101 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-104
SITE 19
MECHANIZED CLEARING
FILL IN WETLAND
WETLANDS
797+50.00
797+00.00
796+50.00
796+00.00
795+50.00
0.040
3:1
6:1
5.324:1

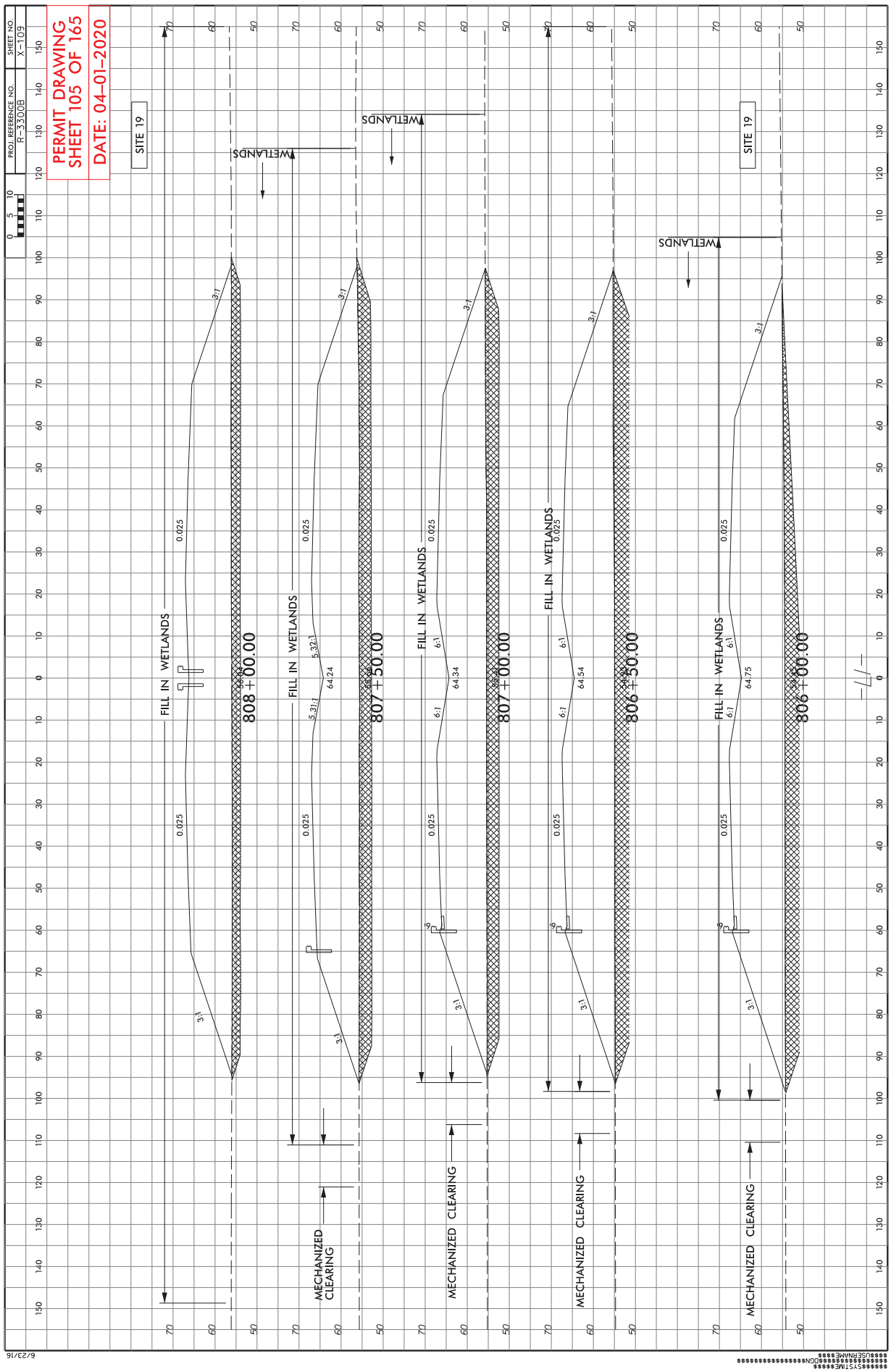
P-140

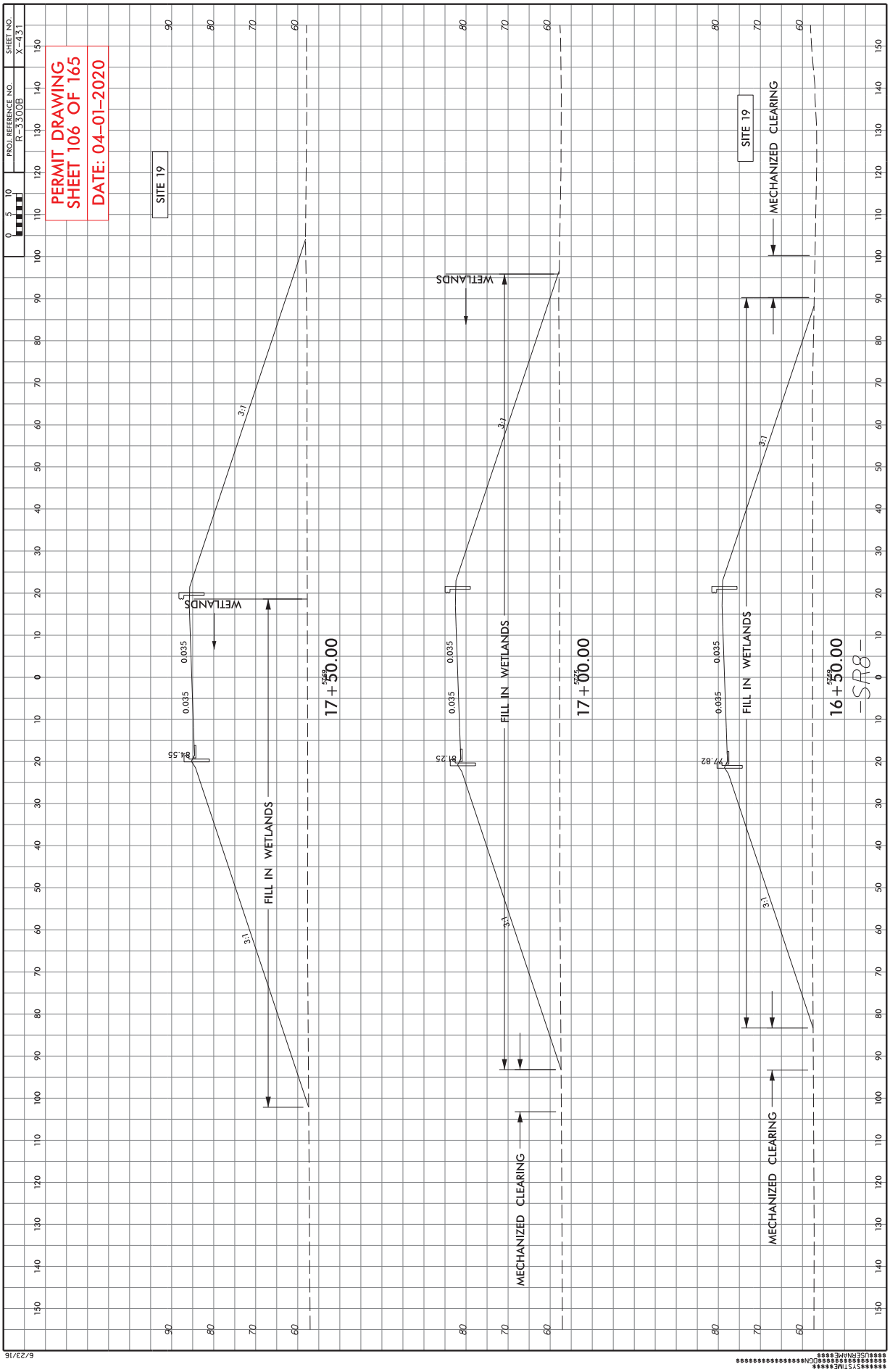

PERMIT DRAWING
SHEET 102 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 19
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 19
BEGIN APPR SLAB -SR8- STA 18+46.50
BEGIN BRIDGE -SR8- STA 18+60.15
END BRIDGE -SR8- STA 21+10.65
END APPR SLAB -SR8- STA 21+24.50
MATCHLINE -SR8- STA 23+45.49 SEE SHEET 32
MATCHLINE -L1- STA 812+00.00 SEE SHEET 20
MATCHLINE -L1- STA 799+00.00 SEE SHEET 18
MATCHLINE -SR8- STA 15+26.55 SEE SHEET 17
WOVEN WIRE FENCE
JAMESTOWN PENDER, LP
BRYCE MORRISON
JAMES OLEAN CAPPS
PENDER COUNTY
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 42 FOR -L1- PROFILE
SEE SHEET 73 FOR -SR8- PROFILE

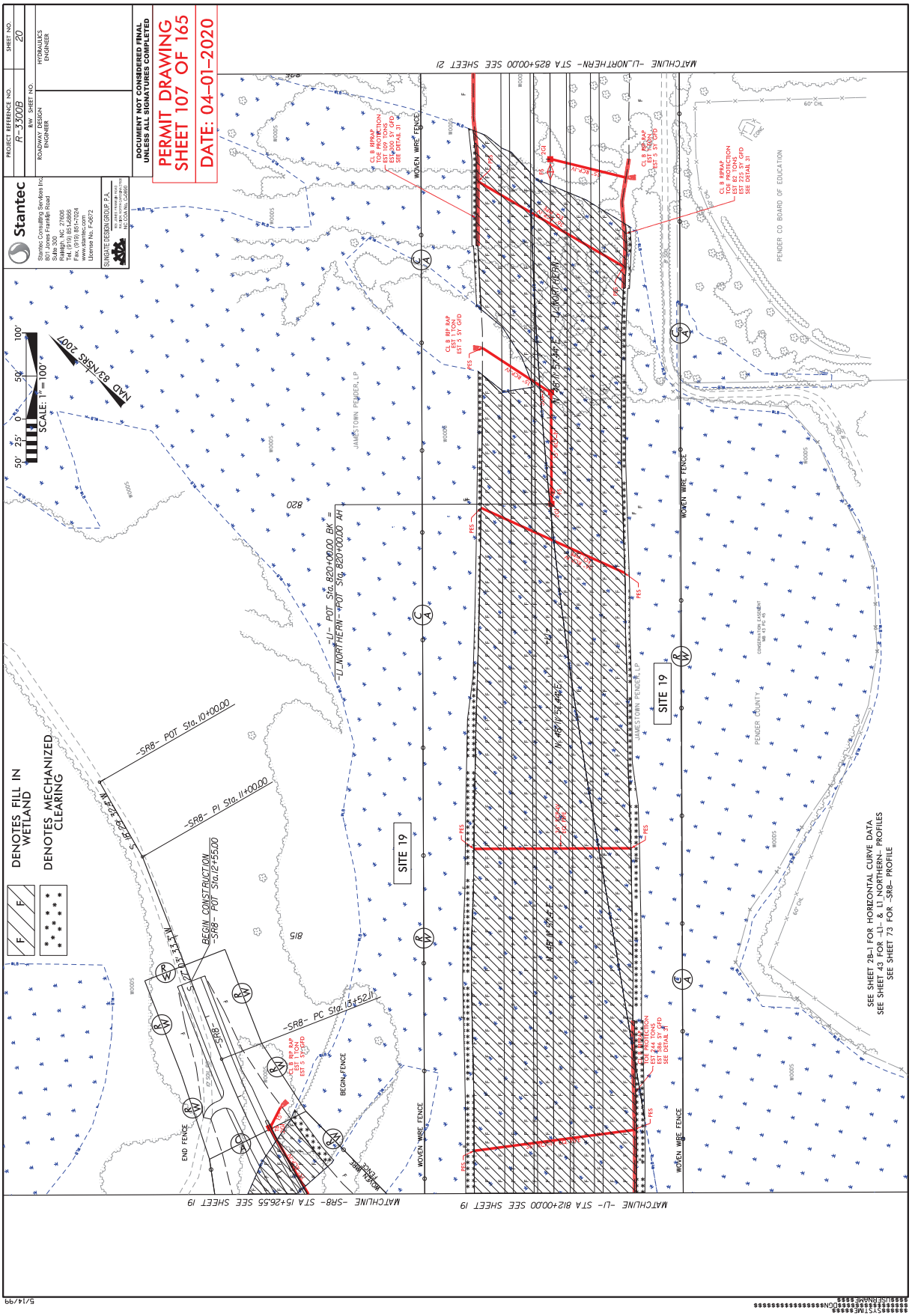

PERMIT DRAWING
SHEET 103 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 19
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 19
BEGIN APPR SLAB -SR8- STA 18+60.15
BEGIN BRIDGE -SR8- STA 18+46.50
END BRIDGE -SR8- STA 21+10.65
END APPR SLAB -SR8- STA 21+24.50
MATCHLINE -SR8- STA 24+00.00 SEE SHEET 32
MATCHLINE -L1- STA 799+00.00 SEE SHEET 18
MATCHLINE -L1- STA 812+00.00 SEE SHEET 20
MATCHLINE -SR8- STA 15+26.55 SEE SHEET 17
WOVEN WIRE FENCE
CHORD
JAMESTOWN PENDER, LP
BRYCE MORRISON
JAMES OLIVIA CAPPS
PENDER COUNTY
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 42 FOR -L1- PROFILE
SEE SHEET 73 FOR -SR8- PROFILE

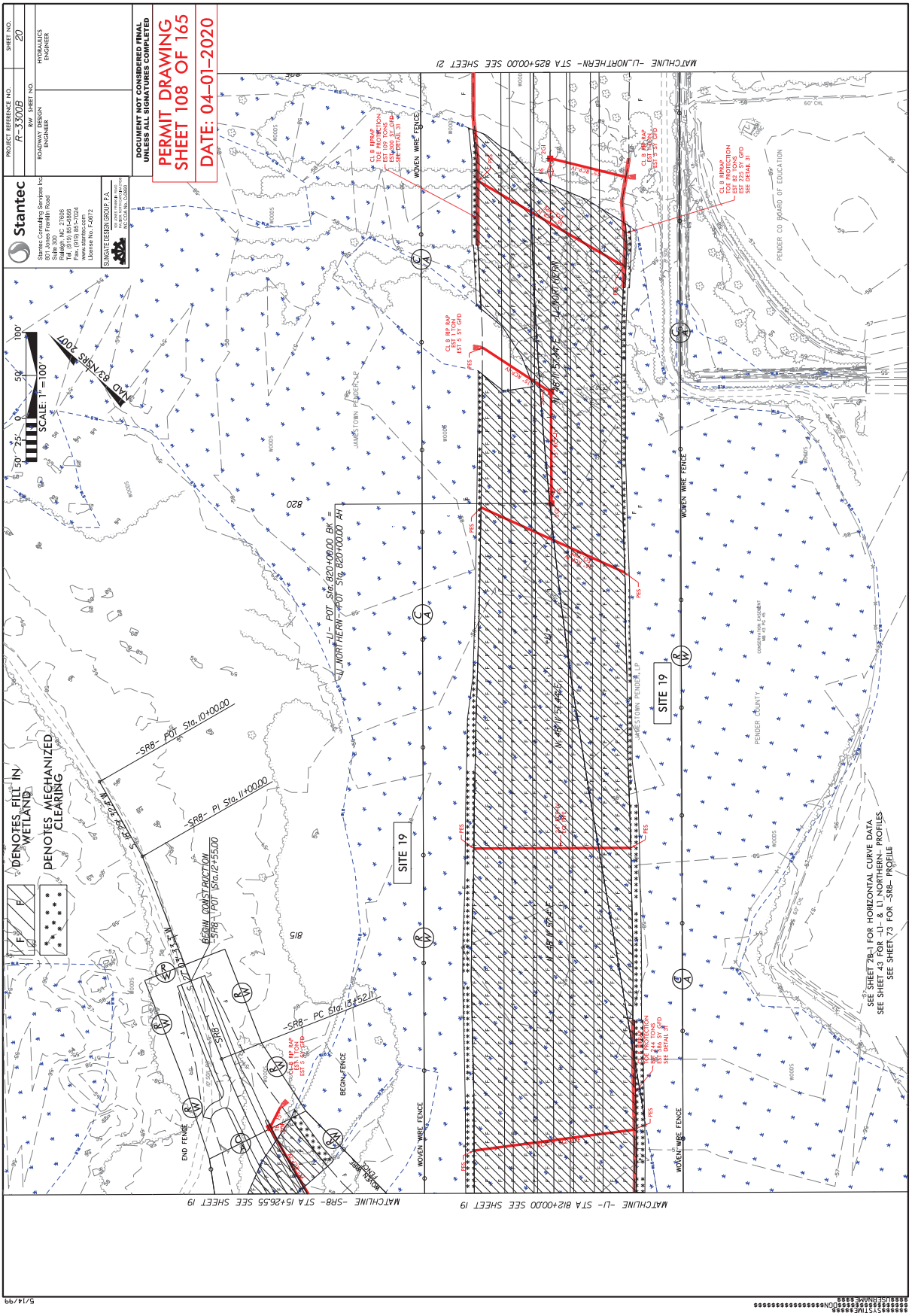

PERMIT DRAWING
SHEET 104 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-106
SITE 19
MECHANIZED CLEARING
FILL IN WETLANDS
801+50.00
801+00.00
800+50.00
800+00.00
0.005
0.025
0.016
0.027
0.039
6:1
3:1
5,735:1
5,650:1
5,542:1
5,348:1
65.60
65.28
64.87
64.36

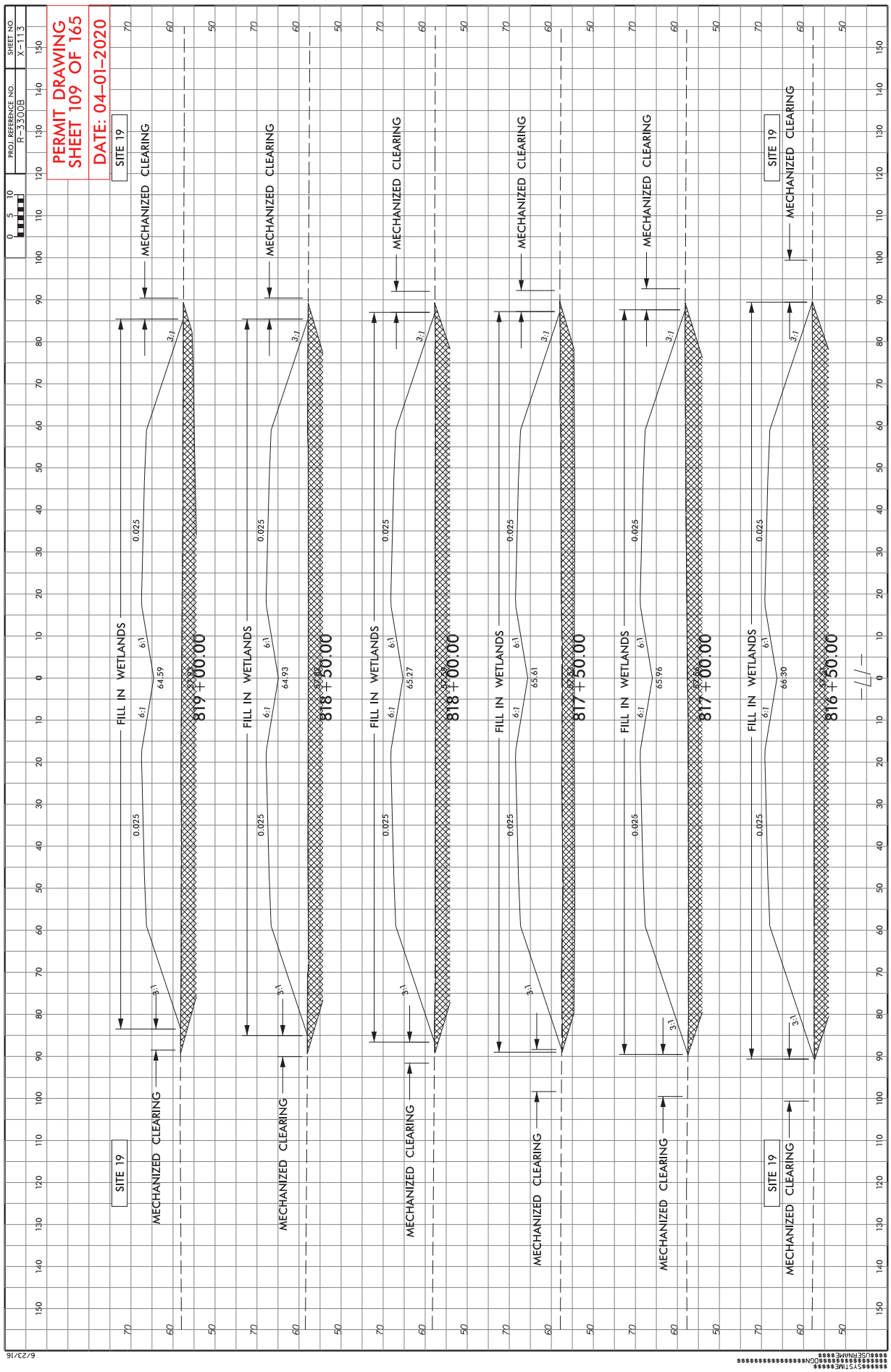
P-143


PERMIT DRAWING
SHEET 105 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-109
SITE 19
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
808+00.00
807+50.00
807+00.00
806+50.00
806+00.00
0.025
3:1
6:1
5.32:1
64.24
64.34
64.54
64.75

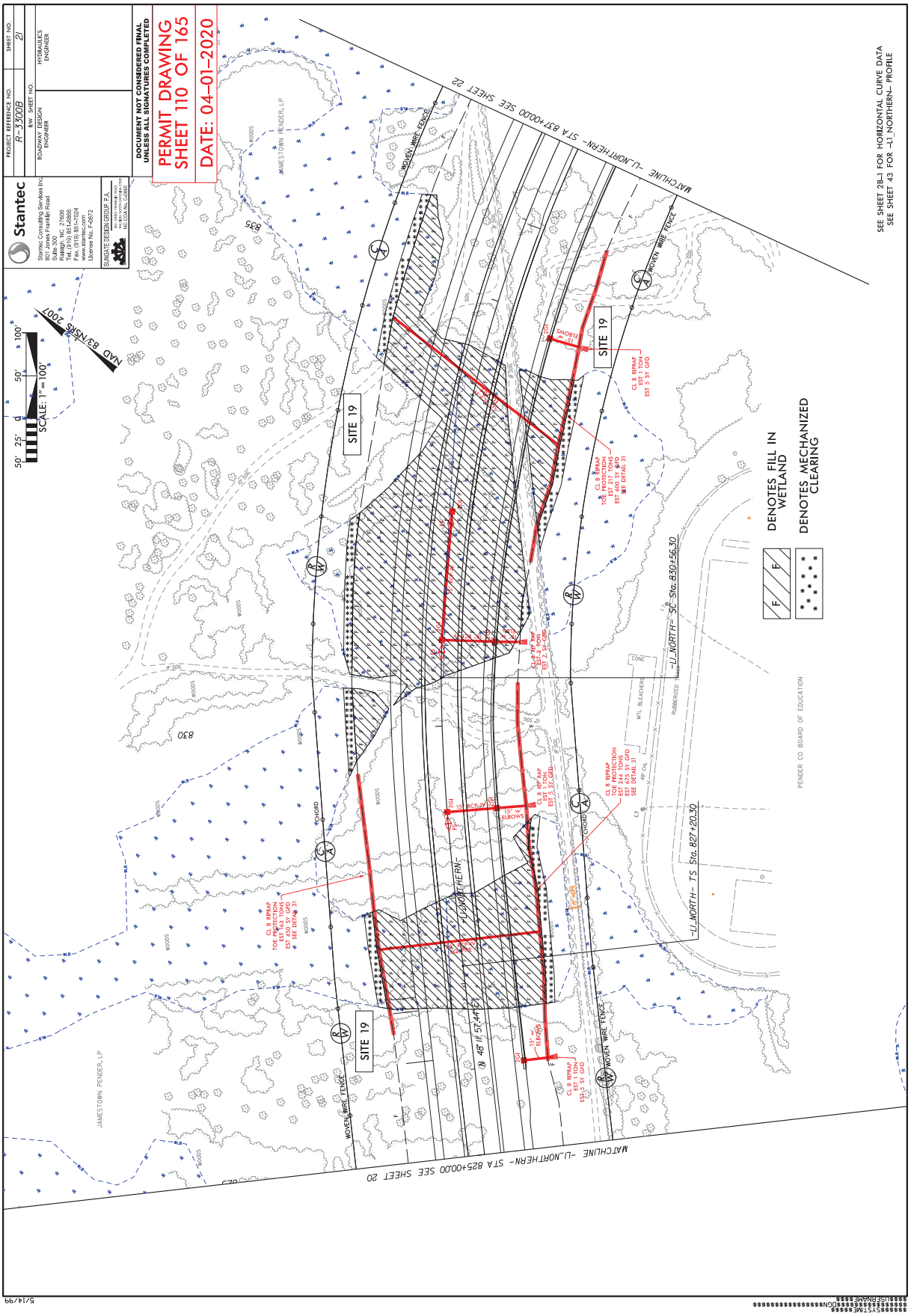

PERMIT DRAWING
SHEET 106 OF 165
DATE: 04-01-2020
SHEET NO. X-431
PROJ. REFERENCE NO. R-3300B
0 5 10
SITE 19
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
3:1
0.035
84.55
81.25
79.82
17+50.00
17+00.00
16+50.00
-SP8-
6/23/16

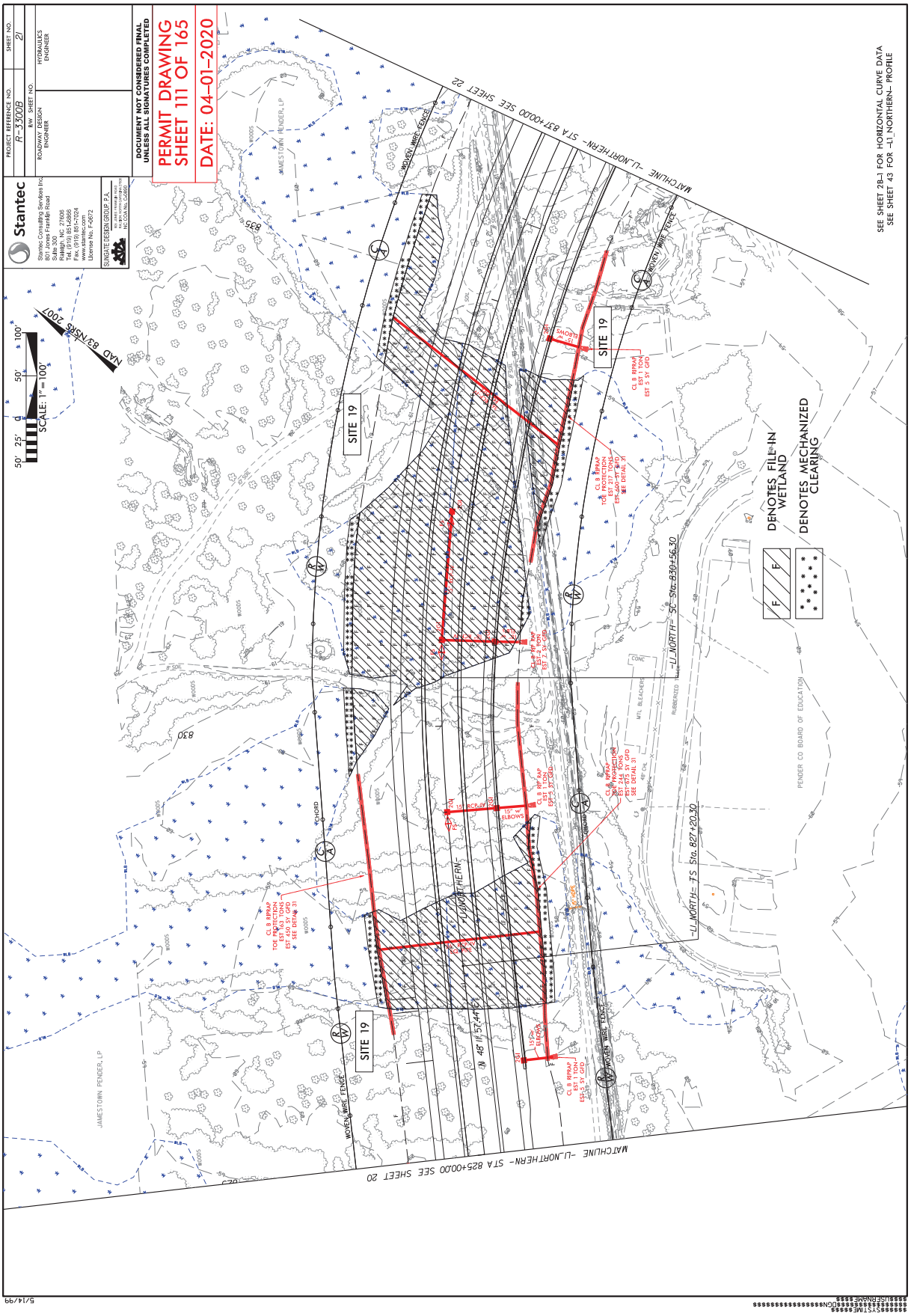

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
20
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 107 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGLETON DESIGN GROUP, P.A.
License No. F-0672
SCALE: 1" = 100'
NAD 83 NSRS 2007
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
-L- NORTHERN- POT Sta. 820+00.00 BK
-L- NORTHERN- POT Sta. 820+00.00 AH
-SR8- POT Sta. 10+00.00
-SR8- PI Sta. 11+00.00
BEGIN CONSTRUCTION -SR8- POT Sta. 12+55.00
-SR8- PC Sta. 15+52.11
SITE 19
JAMESTOWN PENDER, LP
PENDER COUNTY
PENDER CO BOARD OF EDUCATION
WOVEN WIRE FENCE
END FENCE
BEGIN FENCE
CL B RIPRAP TOE PROTECTION EST 109 TONS EST 75 SY GFD SEE DETAIL 31
CL B RIPRAP EST 5 SY GFD
CL B RIPRAP TOE PROTECTION EST 225 SY GFD SEE DETAIL 31
CL B RIP RAP EST 5 SY GFD
CL B RIPRAP TOE PROTECTION EST 44 TONS EST 48s SY GFD SEE DETAIL 31
SEE SHEET 2B-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 43 FOR -L1- & L1 NORTHERN- PROFILES
SEE SHEET 73 FOR -SR8- PROFILE
MATCHLINE -L- STA 825+00.00 SEE SHEET 21
MATCHLINE -L- STA 812+00.00 SEE SHEET 19
MATCHLINE -SR8- STA 15+26.55 SEE SHEET 19
5/14/99


PERMIT DRAWING
SHEET 108 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
R/W SHEET NO.
SHEET NO. 20
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
SIGNATURE DESIGN GROUP, P.A.
License No. F-0672
SCALE: 1" = 100'
NAD 83 NSRS 2007
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
-L1- POT Sta. 820+06.00 BK
-L1- NORTHERN- POT Sta. 820+00.00 AH
-SR8- POT Sta. 10+00.00
-SR8- PI Sta. 11+00.00
-SR8- PC Sta. 15+52.11
BEGIN CONSTRUCTION -SR8- POT Sta. 12+55.00
SITE 19
WOVEN WIRE FENCE
END FENCE
BEGIN FENCE
JAMESTOWN PENDER LP
PENDER CO BOARD OF EDUCATION
PENDER COUNTY
CONSERVATION EASEMENT
MATCHLINE -L1- STA 812+00.00 SEE SHEET 19
MATCHLINE -SR8- STA 15+26.55 SEE SHEET 19
MATCHLINE -L1_NORTHERN- STA 825+00.00 SEE SHEET 21
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 43 FOR -L1- & L1_NORTHERN- PROFILES
SEE SHEET 73 FOR -SR8- PROFILE

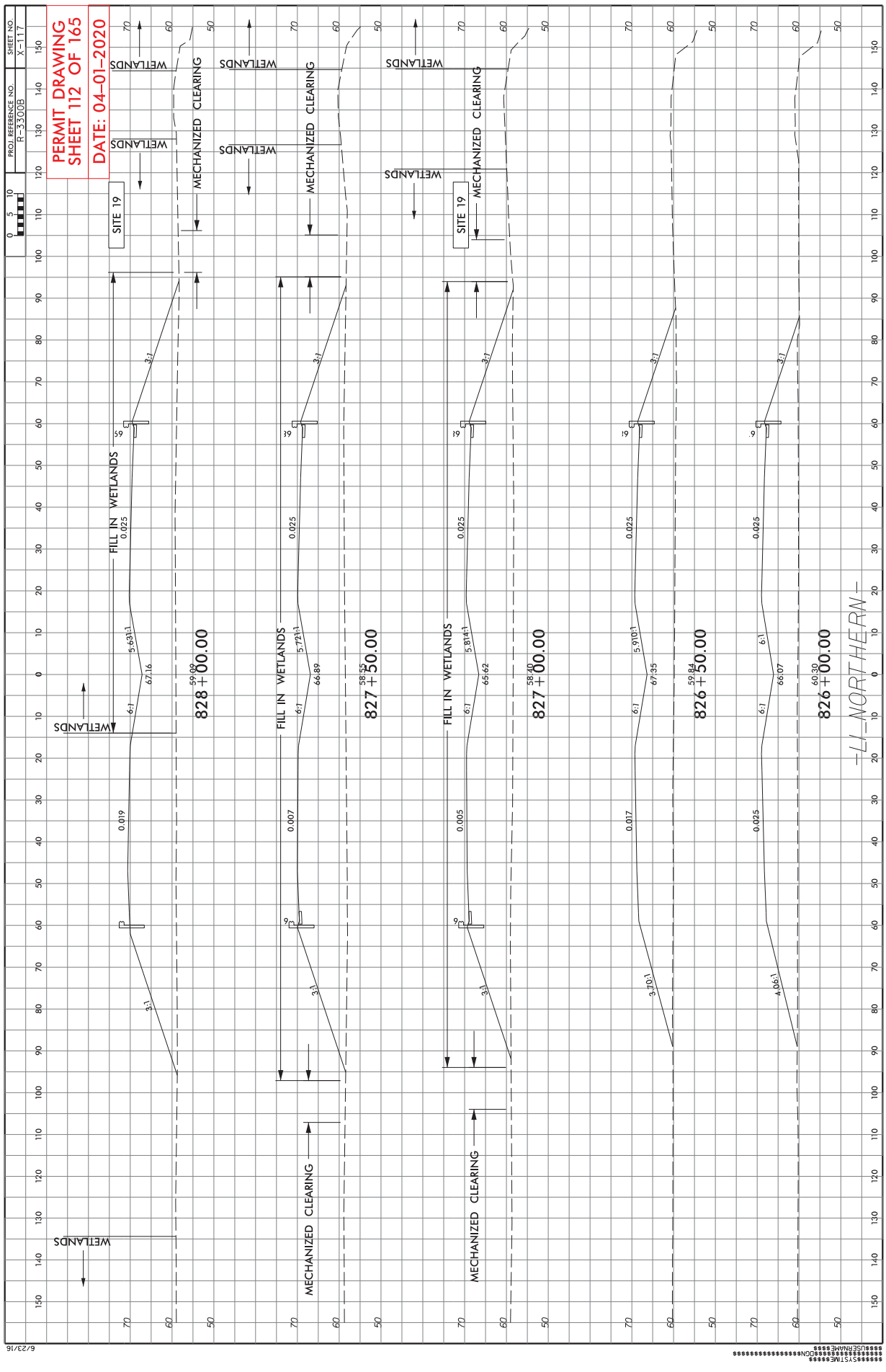

PERMIT DRAWING
SHEET 109 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-113
SITE 19
MECHANIZED CLEARING
FILL IN WETLANDS
0.025
6:1
3:1
64.59
819+00.00
64.93
818+50.00
65.27
818+00.00
65.61
817+50.00
65.96
817+00.00
66.30
816+50.00

P-148

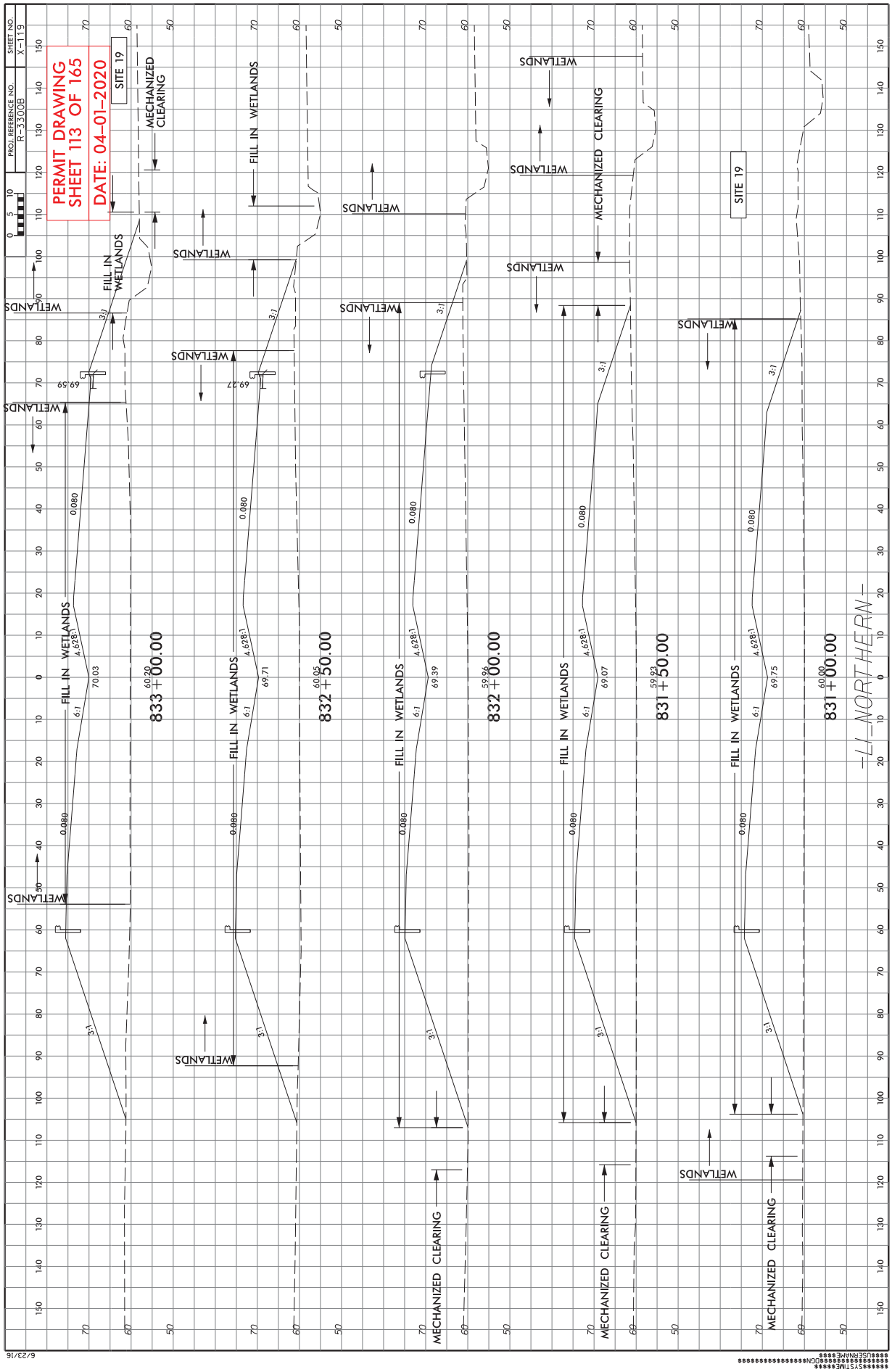

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
21
ROADWAY DESIGN ENGINEER
RW
SHEET NO.
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 110 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
License No. F-0672
SCALE: 1"=100'
NAD 83/NSRS 2007
SEE SHEET 28-L1 FOR HORIZONTAL CURVE DATA
SEE SHEET 43 FOR -L1_NORTHERN- PROFILE
MATCHLINE -L_NORTHERN- STA 837+00.00 SEE SHEET 22
MATCHLINE -L_NORTHERN- STA 825+00.00 SEE SHEET 20
-L1_NORTHERN- STA 827+20.30
-L1_NORTH- TS Sta. 827+20.30
-L1_NORTH- SC Sta. 830+56.30
SITE 19
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
JAMESTOWN PENDER, LP
PENDER CO BOARD OF EDUCATION
WOVEN WIRE FENCE
WOODS
5/14/99

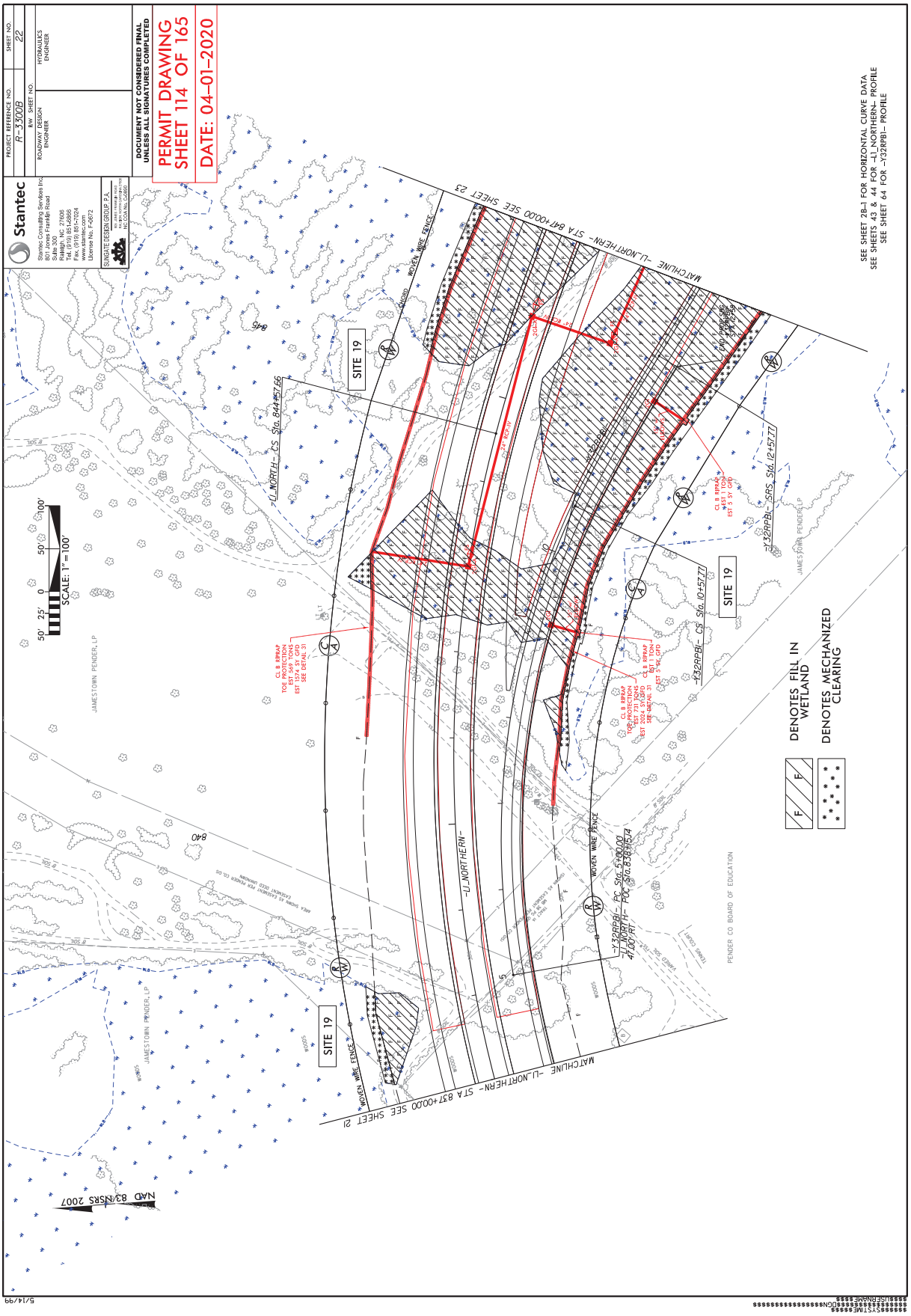

PROJECT REFERENCE NO. R-3300B
SHEET NO. 21
ROADWAY DESIGN ENGINEER RW
SHEET NO.
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 111 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
License No. C-2672
SCALE: 1"=100'
NAD 83/NSRS 2007
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 43 FOR -L1_NORTHERN- PROFILE
MATCHLINE -L_NORTHERN- STA 837+00.00 SEE SHEET 22
MATCHLINE -L_NORTHERN- STA 825+00.00 SEE SHEET 20
-L1_NORTH- SC Sta. 830+56.30
-L1_NORTH- TS Sta. 827+20.30
-L1_NORTHERN-
N 48° 11' 57.44" E
SITE 19
SITE 19
SITE 19
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
JAMESTOWN PENDER, LP
PENDER CO BOARD OF EDUCATION
WOVEN WIRE FENCE
WOODS
CONC
RUBBERIZED
MTL BLEACHERS
CL B RIPRAP TOE PROTECTION EST 143 TONS EST 1430 SY GFD SEE DETAIL 31
CL B RIPRAP EST 1 TON EST 5 SY GFD
CL B RIPRAP TOE PROTECTION EST 5 TONS EST 50 SY GFD SEE DETAIL 31
CL B RIPRAP EST 2 TONS EST 20 SY GFD
CL B RIPRAP TOE PROTECTION EST 3 TONS EST 30 SY GFD SEE DETAIL 31
CL B RIPRAP EST 3 TONS EST 30 SY GFD
CL B RIPRAP TOE PROTECTION EST 75 TONS EST 375 SY GFD SEE DETAIL 31
CL B RIPRAP EST 1 TON EST 5 SY GFD
15" RCP-FW
15" RCP
15" ELBOWS
5/14/99

P-150

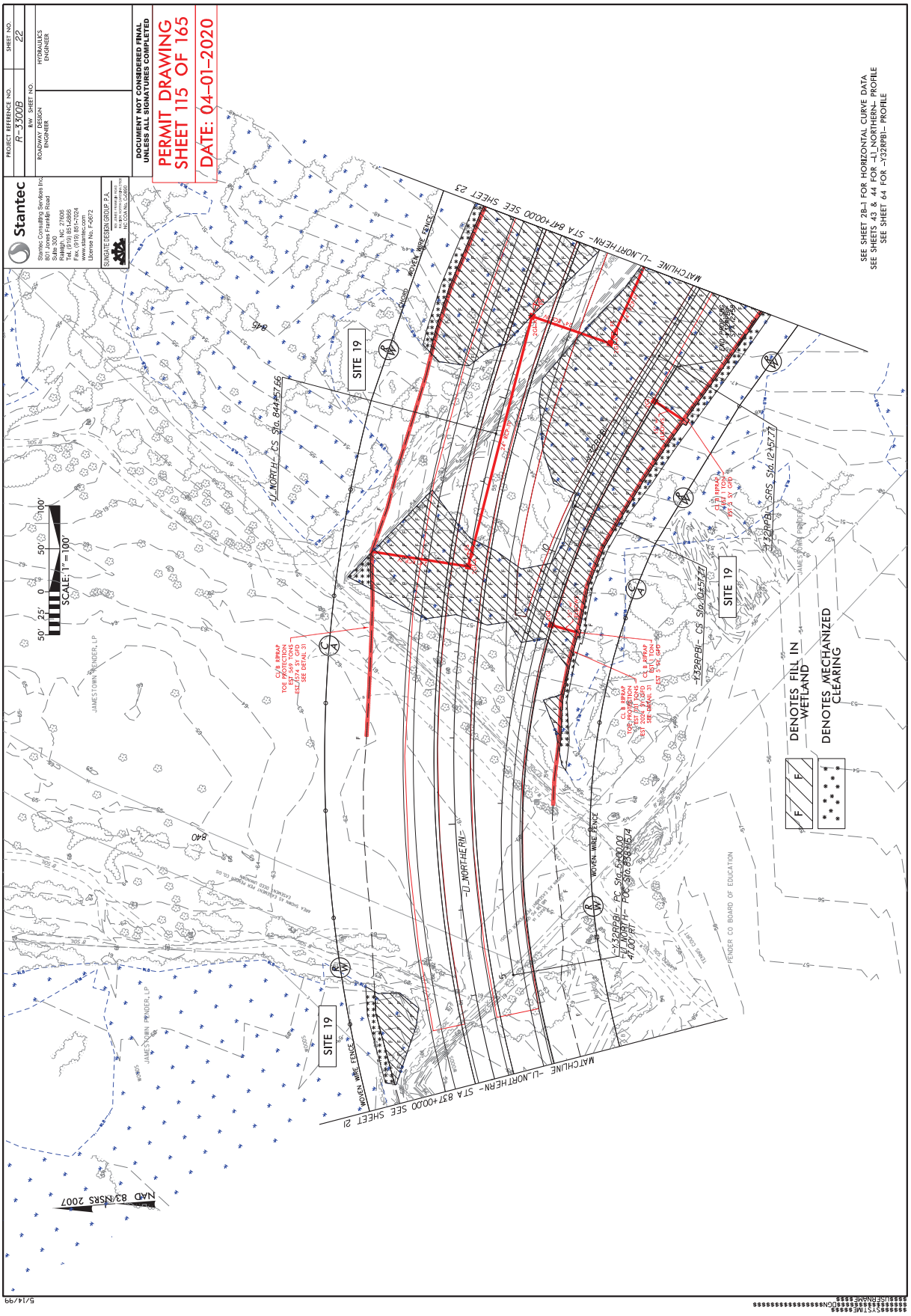

PERMIT DRAWING
SHEET 112 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-117
0 5 10
SITE 19
WETLANDS
MECHANIZED CLEARING
FILL IN WETLANDS
828+00.00
827+50.00
827+00.00
826+50.00
826+00.00
-L1- NORTHERN
6/23/16

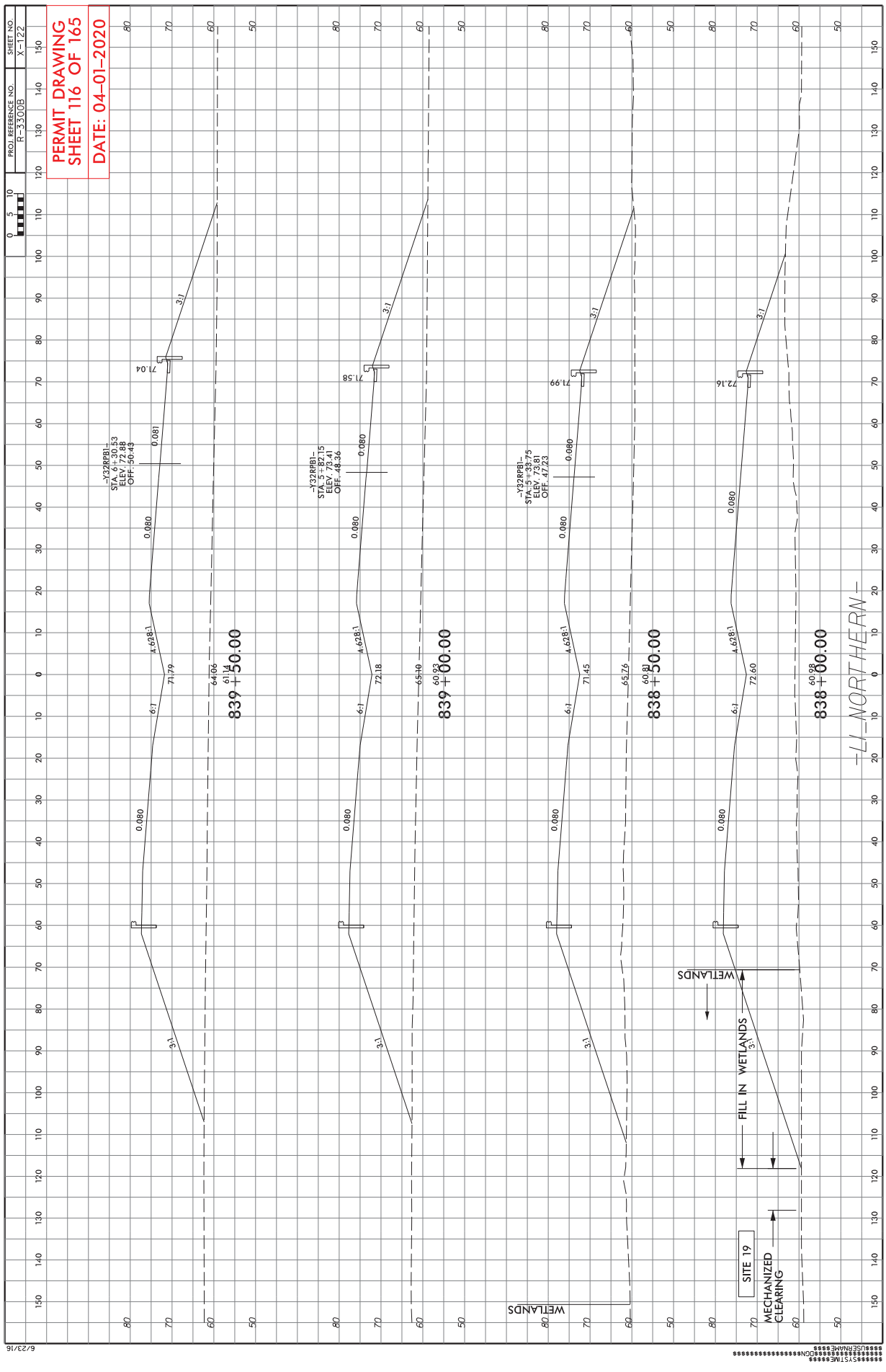
P-151


PERMIT DRAWING
SHEET 113 OF 165
DATE: 04-01-2020
SITE 19
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-119
MECHANIZED CLEARING
FILL IN WETLANDS
WETLANDS
833+00.00
832+50.00
832+00.00
831+50.00
831+00.00
SITE 19
-L1-NORTHERN-
6/23/16

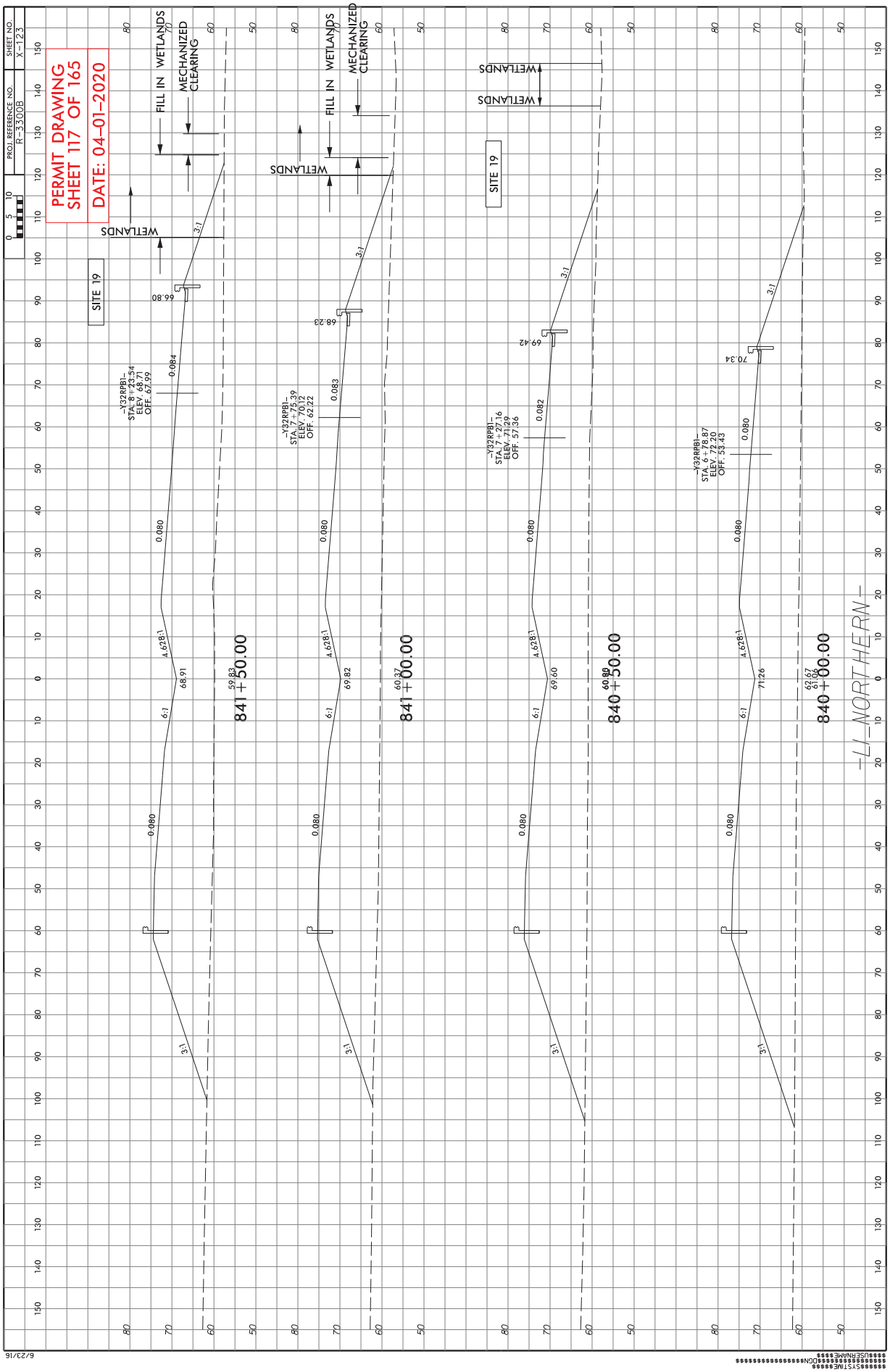

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
22
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 114 OF 165
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SINGATE DESIGN GROUP, P.A.
License No. C-2672
SCALE: 1"= 100'
50' 25' 0 50' 100'
NAD 83/NSRS 2007
SEE SHEET 21-1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 43 & 44 FOR -L1_NORTHERN- PROFILE
SEE SHEET 64 FOR -Y32PBI- PROFILE
MATCHLINE -L1_NORTHERN- STA 847+00.00 SEE SHEET 23
MATCHLINE -L1_NORTHERN- STA 837+00.00 SEE SHEET 21
-L1_NORTH- CS Sta. 844+57.66
-L1_NORTH- PC Sta. 5+00.00
-L1_NORTH- POC Sta. 8386+74
47.00 RT
-Y32PBI- CS Sta. 0+57.77
-Y32PBI- SRS Sta. 12+57.77
SITE 19
WOVEN WIRE FENCE
JAMESTOWN PENDER, LP
PENDER CO BOARD OF EDUCATION
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
CL B RIPRAP
TOE PROTECTION
EST 569 TONS
EST 7.5 CY/LF
SEE DETAIL 31
CL B RIPRAP
TOE PROTECTION
EST 731 TONS
EST 7.5 CY/LF
SEE DETAIL 31
CL B RIPRAP
WEIR PROTECTION
EST 5 SY
EST 5 SY GPD
END PROTECTION
EST 5 SY GPD
5/14/99

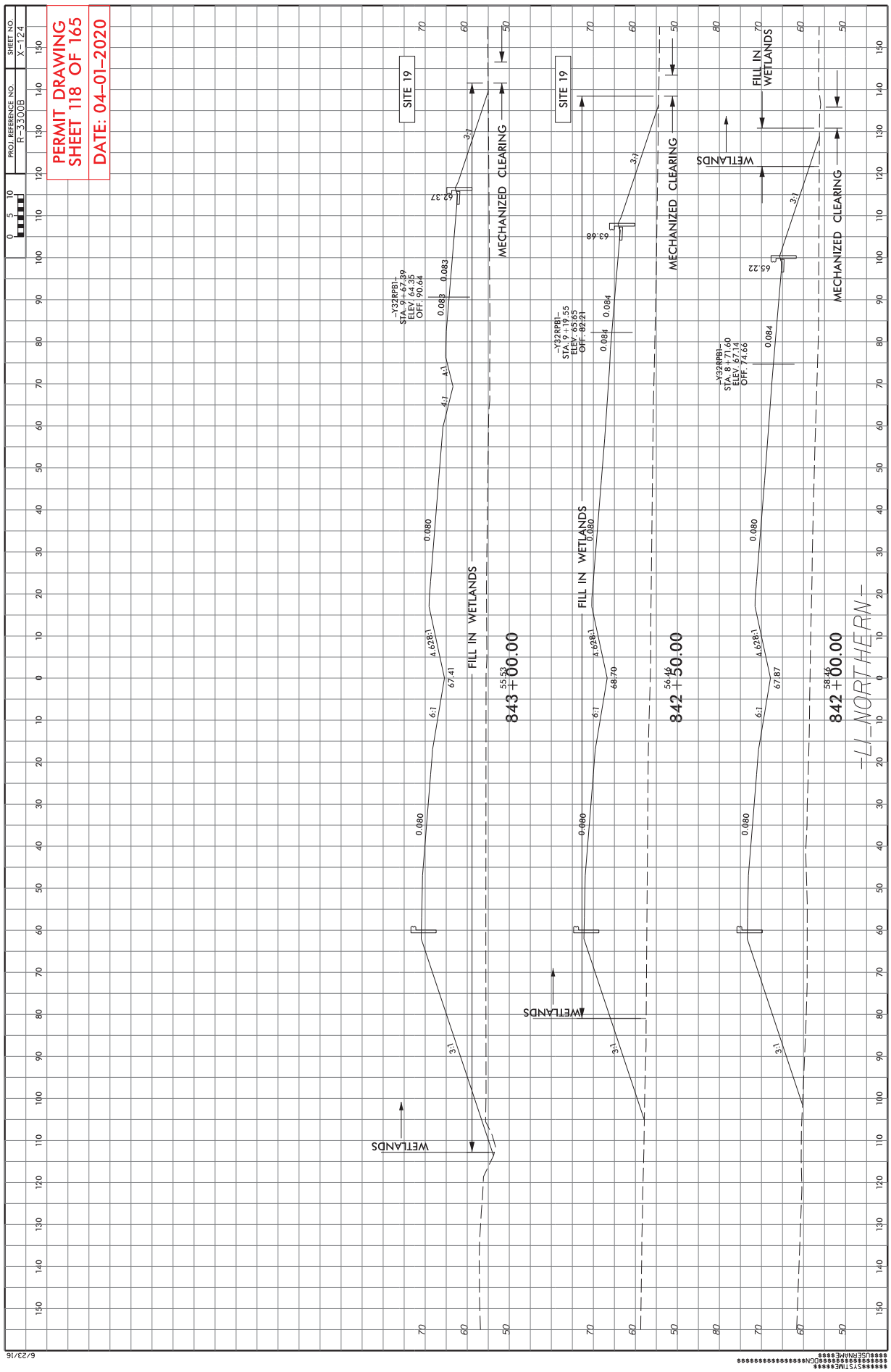
P-153


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
22
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 115 OF 165
DATE: 04-01-2020
Stantec
SUNGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
SITE 19
SITE 19
SITE 19
-L1 NORTH- CS Sta 844+57.66
-L1 NORTHERN- PC Sta 5+00.00
-L1 NORTH- POT Sta 8+86.74
-L1 NORTHERN- STA 837+00.00 SEE SHEET 21
-L1 NORTHERN- STA 847+00.00 SEE SHEET 23
-Y32RPBI- CS Sta 10+57.77
-Y32RPBI- SRS Sta 12+57.77
JAMESTOWN PENDER, LP
PENDER CO BOARD OF EDUCATION
WOVEN WIRE FENCE
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SEE SHEET 21B-1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 43 & 44 FOR -L1 NORTHERN- PROFILE
SEE SHEET 64 FOR -Y32RPBI- PROFILE

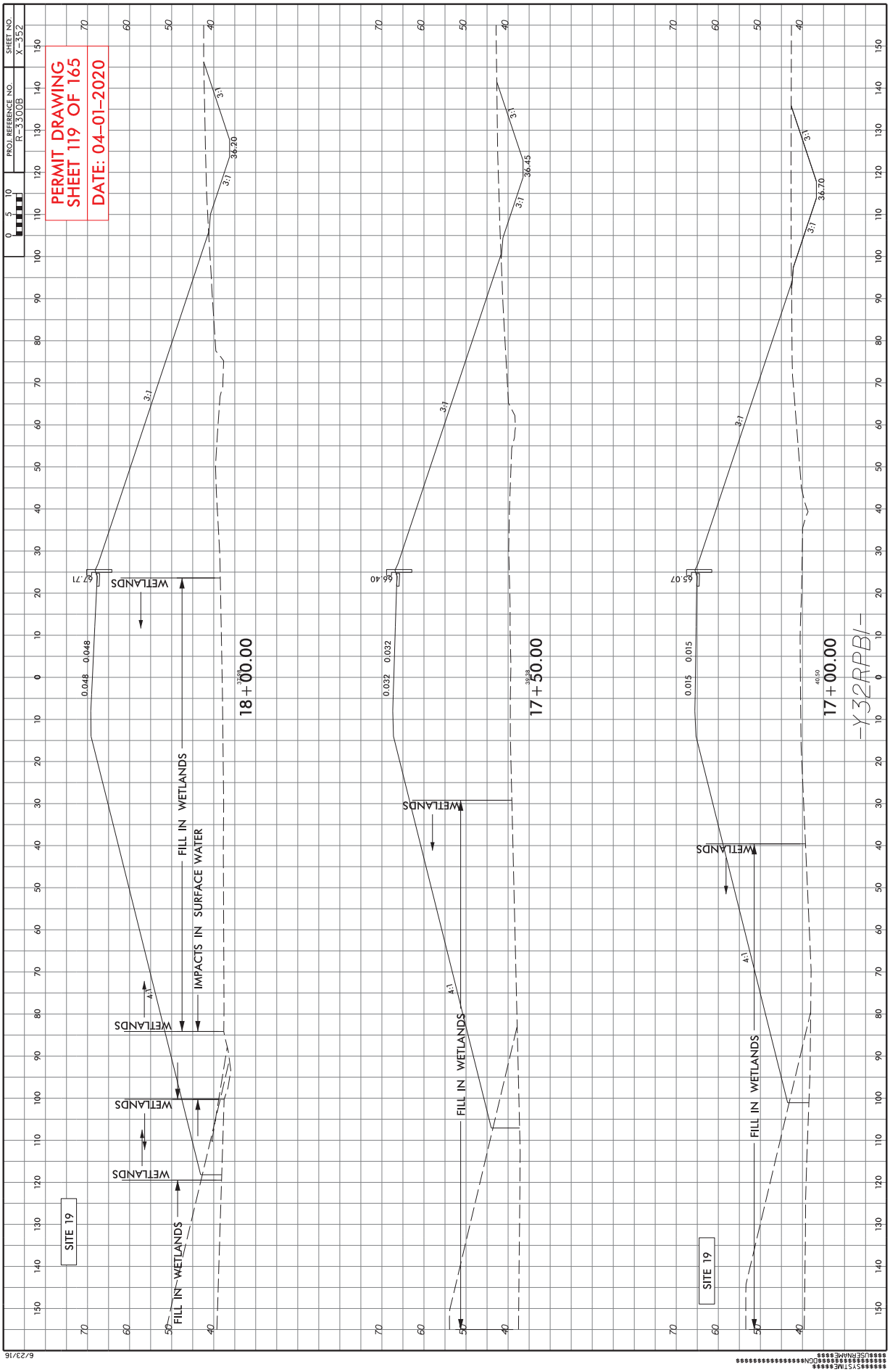

PERMIT DRAWING
SHEET 116 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-122
0 5 10
839+50.00
839+00.00
838+50.00
838+00.00
-Y32RPB1-
STA. 6+30.53
ELEV. 72.88
OFF. 50.43
-Y32RPB1-
STA. 5+82.15
ELEV. 73.41
OFF. 48.36
-Y32RPB1-
STA. 5+33.75
ELEV. 73.81
OFF. 47.23
71.04
71.58
71.99
72.16
64.06
61.14
65.10
60.93
65.76
60.81
72.18
71.79
71.45
72.60
60.98
0.080
0.081
4.628:1
6:1
3:1
WETLANDS
FILL IN WETLANDS
SITE 19
MECHANIZED CLEARING
-L1-NORTHERN-

P-155

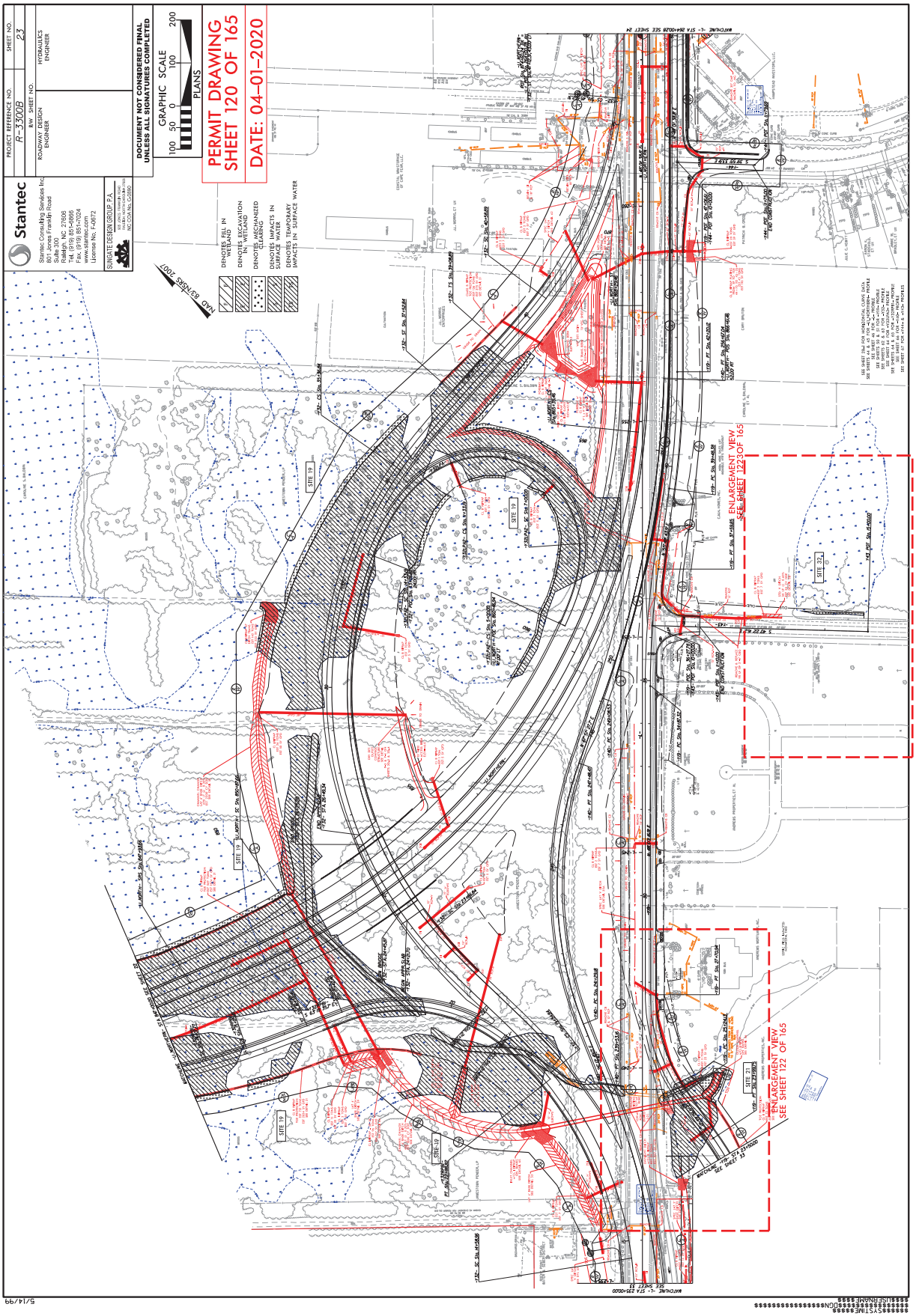

PERMIT DRAWING
SHEET 117 OF 165
DATE: 04-01-2020
SHEET NO. X-123
PROJ. REFERENCE NO. R-3300B
0 5 10
SITE 19
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
841+50.00
841+00.00
840+50.00
840+00.00
-Y32RPB1-
STA: 8+23.54
ELEV: 68.71
OFF: 67.99
-Y32RPB1-
STA: 7+75.39
ELEV: 70.12
OFF: 62.22
-Y32RPB1-
STA: 7+27.16
ELEV: 71.29
OFF: 57.36
-Y32RPB1-
STA: 6+78.87
ELEV: 72.20
OFF: 53.43
0.080
0.084
0.083
0.082
4.628:1
6:1
3:1
66.80
68.23
69.42
70.34
68.91
69.82
69.60
71.26
59.83
60.37
60.88
61.06
61.07
61.06
+11 NORTHERN


PERMIT DRAWING
SHEET 118 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-124
SITE 19
MECHANIZED CLEARING
FILL IN WETLANDS
WETLANDS
843+00.00
842+50.00
842+00.00
-L1-NORTHERN-
Y32RPB1-
STA. 842+19.55
ELEV. 63.55
OFF. 82.21
Y32RPB1-
STA. 842+77.60
ELEV. 67.14
OFF. 74.66
Y32RPB1-
STA. 843+27.39
ELEV. 64.35
OFF. 90.64

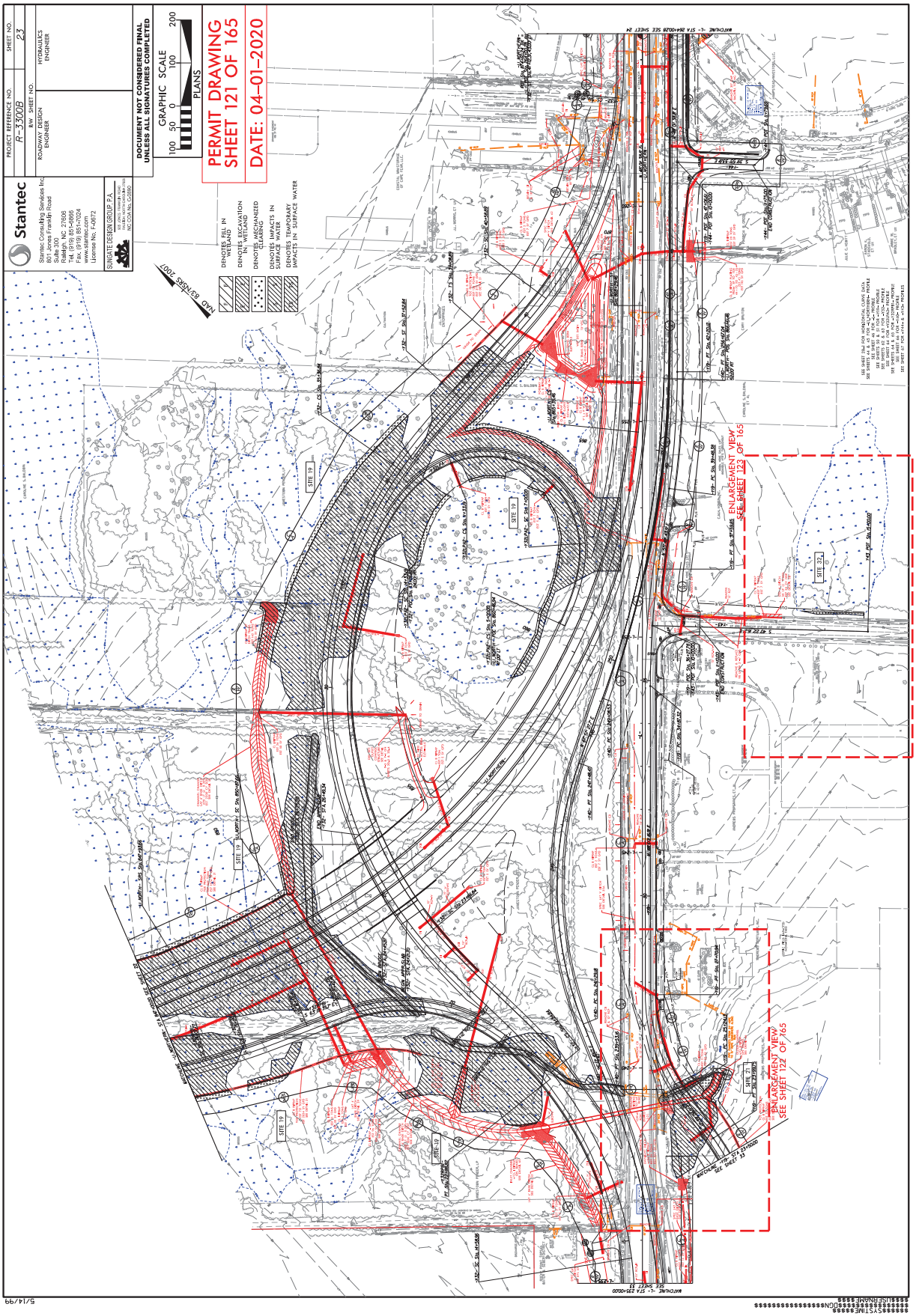
P-157


PERMIT DRAWING
SHEET 119 OF 165
DATE: 04-01-2020
SHEET NO. X-352
PROJ. REFERENCE NO. R-3300B
0 5 10
SITE 19
FILL IN WETLANDS
WETLANDS
WETLANDS
WETLANDS
IMPACTS IN SURFACE WATER
FILL IN WETLANDS
18+00.00
17+50.00
17+00.00
3:1
4:1
0.048
0.032
0.015
36.20
36.45
36.70
-Y32RPBI-

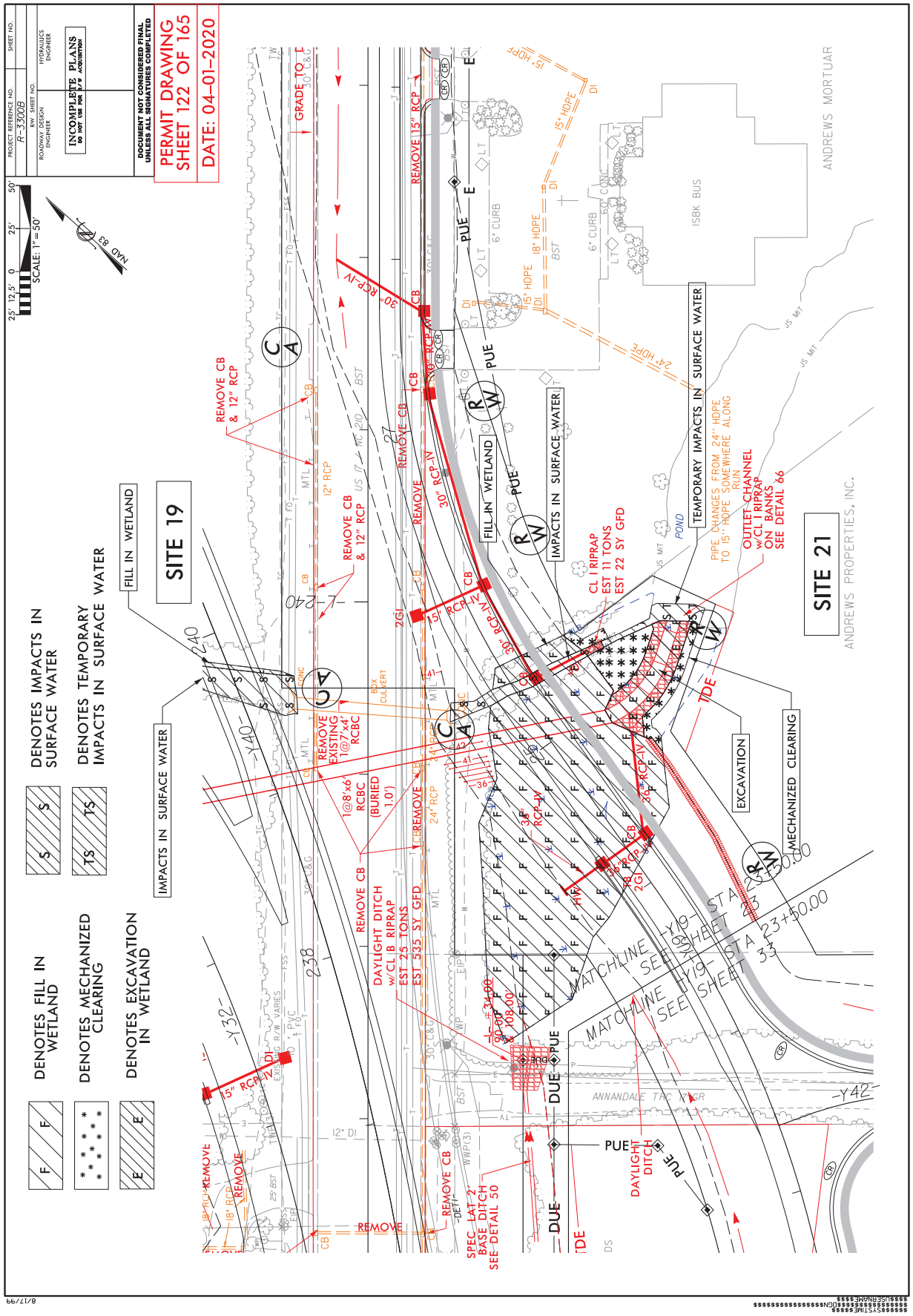
P-158

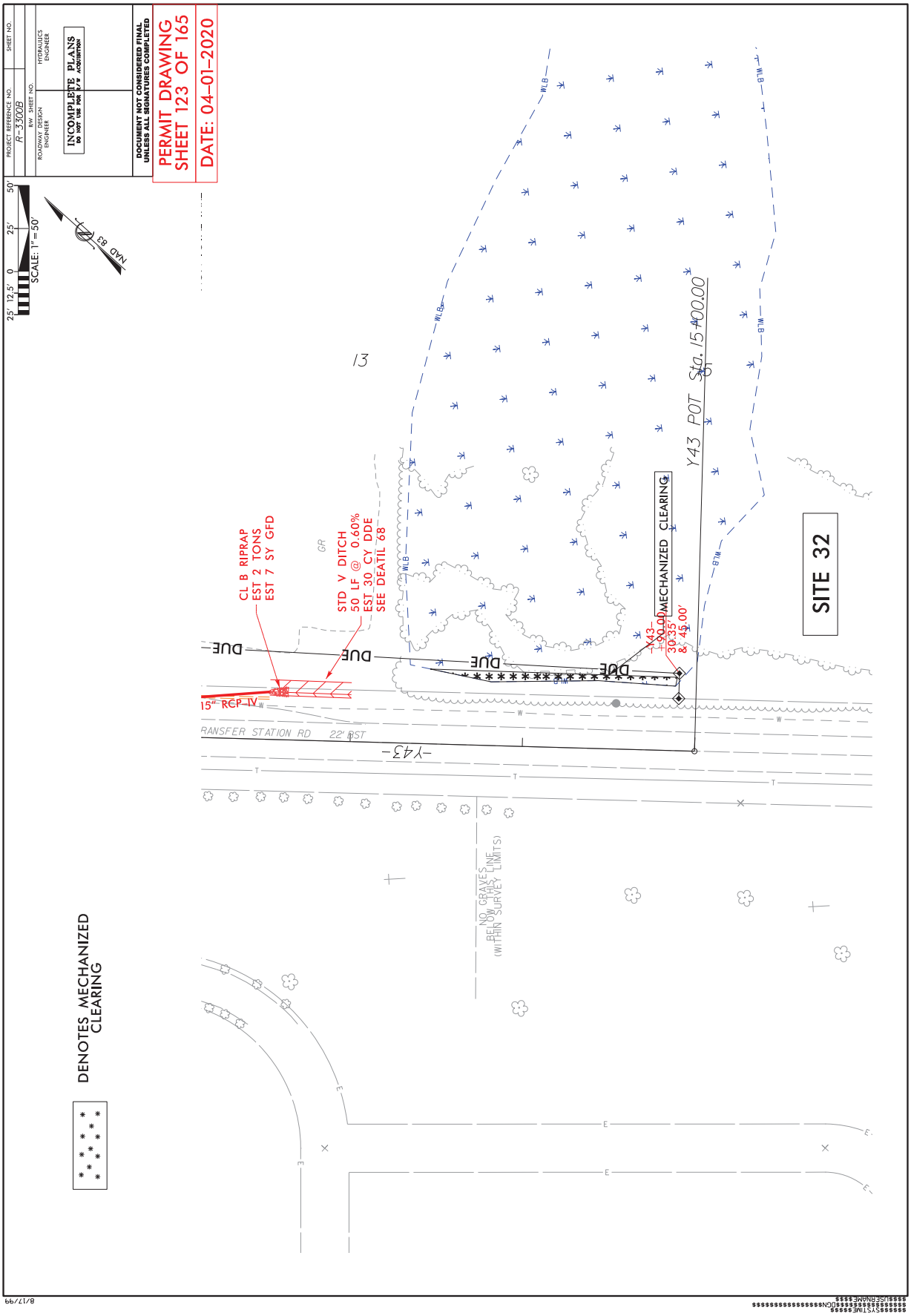

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
23
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax (919) 851-7024
www.stantec.com
License No. F-0672
SUNCITE DESIGN GROUP, P.A.
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
GRAPHIC SCALE
100 50 0 100 200
PLANS
PERMIT DRAWING
SHEET 120 OF 165
DATE: 04-01-2020
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83/NSRS 2007
ENLARGEMENT VIEW
SEE SHEET 123 OF 165
ENLARGEMENT VIEW
SEE SHEET 122 OF 165
SITE 19
SITE 32
SITE 23
SITE 13
5/14/99

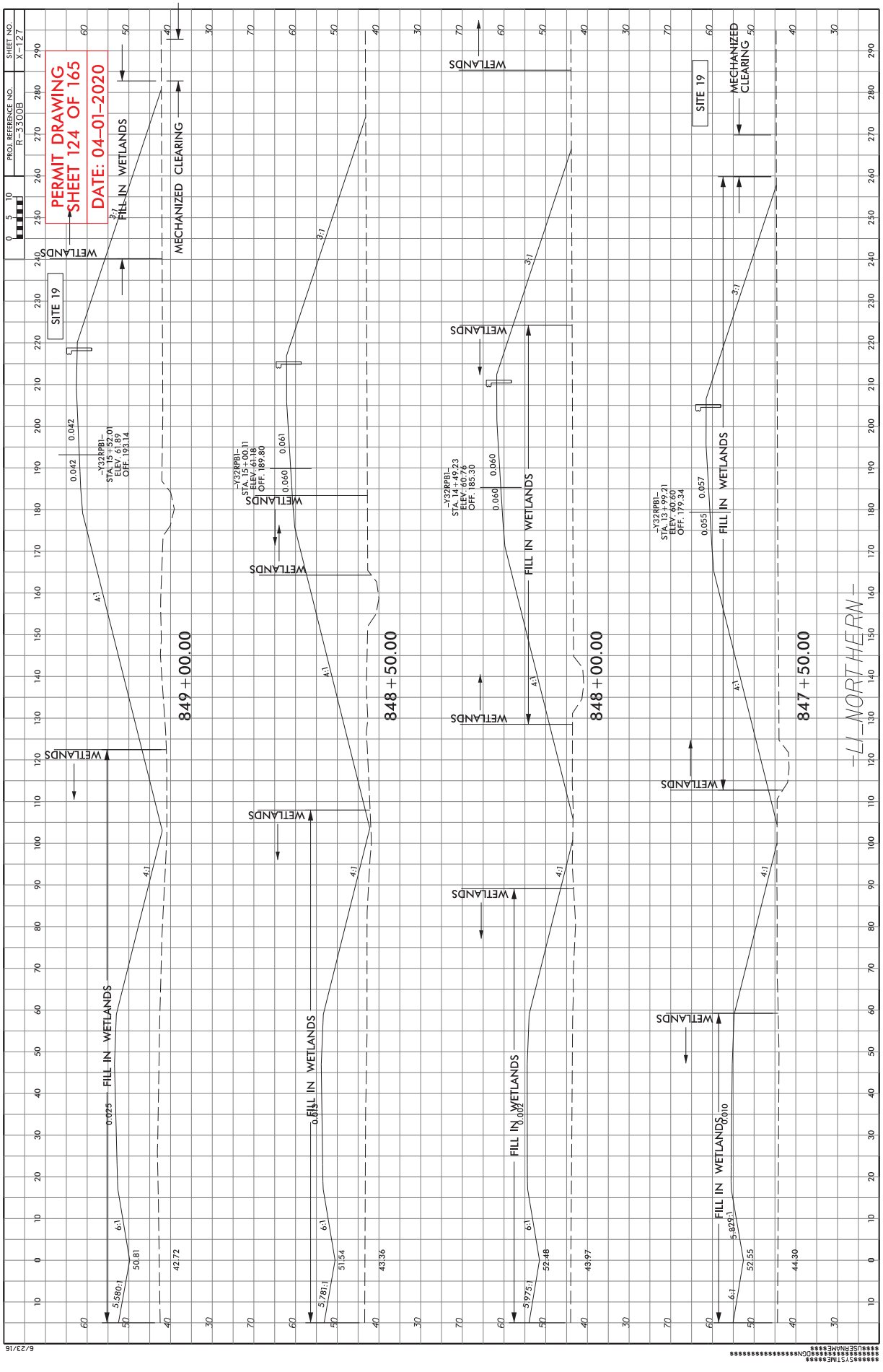
P-159


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
23
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax (919) 851-7004
www.stantec.com
License No. F-0672
SUMMITE DESIGN GROUP, P.A.
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
GRAPHIC SCALE
100 50 0 100 200
PLANS
PERMIT DRAWING
SHEET 121 OF 165
DATE: 04-01-2020
NAD 83/NSRS 2007
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
ENLARGEMENT VIEW
SEE SHEET 123 OF 165
ENLARGEMENT VIEW
SEE SHEET 122 OF 165
SITE 19
SITE 32
SITE 2
SITE 13

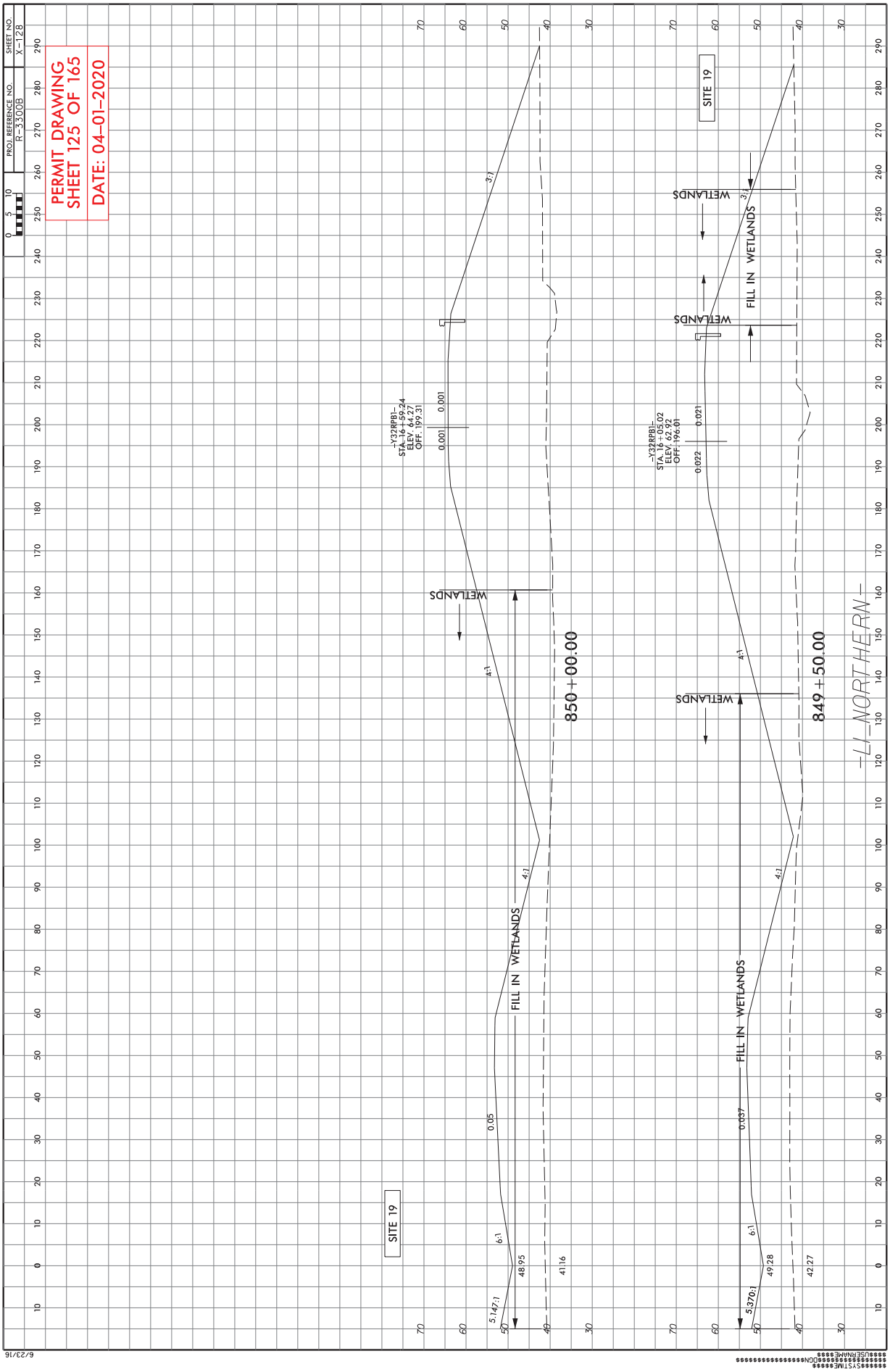
P-160


PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 122 OF 165
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
SITE 19
SITE 21
FILL IN WETLAND
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
EXCAVATION
MECHANIZED CLEARING
REMOVE CB & 12" RCP
REMOVE EXISTING 1@7'x4' RCBC
1@8'x6' RCBC (BURIED 1.0')
DAYLIGHT DITCH w/CL B RIPRAP EST 25 TONS EST 535 SY GFD
CL I RIPRAP EST 11 TONS EST 22 SY GFD
OUTLET CHANNEL w/CL I RIPRAP ON BANKS SEE DETAIL 66
PIPE CHANGES FROM 24" HDPE TO 15" HDPE SOMEWHERE ALONG RUN
SPEC LAT 2' BASE DITCH SEE DETAIL 50
MATCHLINE -LY19- STA 23+50.00 SEE SHEET 33
MATCHLINE -LY19- STA 23+50.00 SEE SHEET 33
ANDREWS PROPERTIES, INC.
ANDREWS MORTUAR
ISBK BUS
ANNANDALE TWP MGR
POND
GRADE TO
REMOVE 15" RCP
30" RCP-IV
24" RCP
18" RCP
15" RCP-IV
12" RCP
12" DI
6' CURB
60' CONC
15" HDPE
18" HDPE
24" HDPE
PUE
DUE
TDE
JS MIT

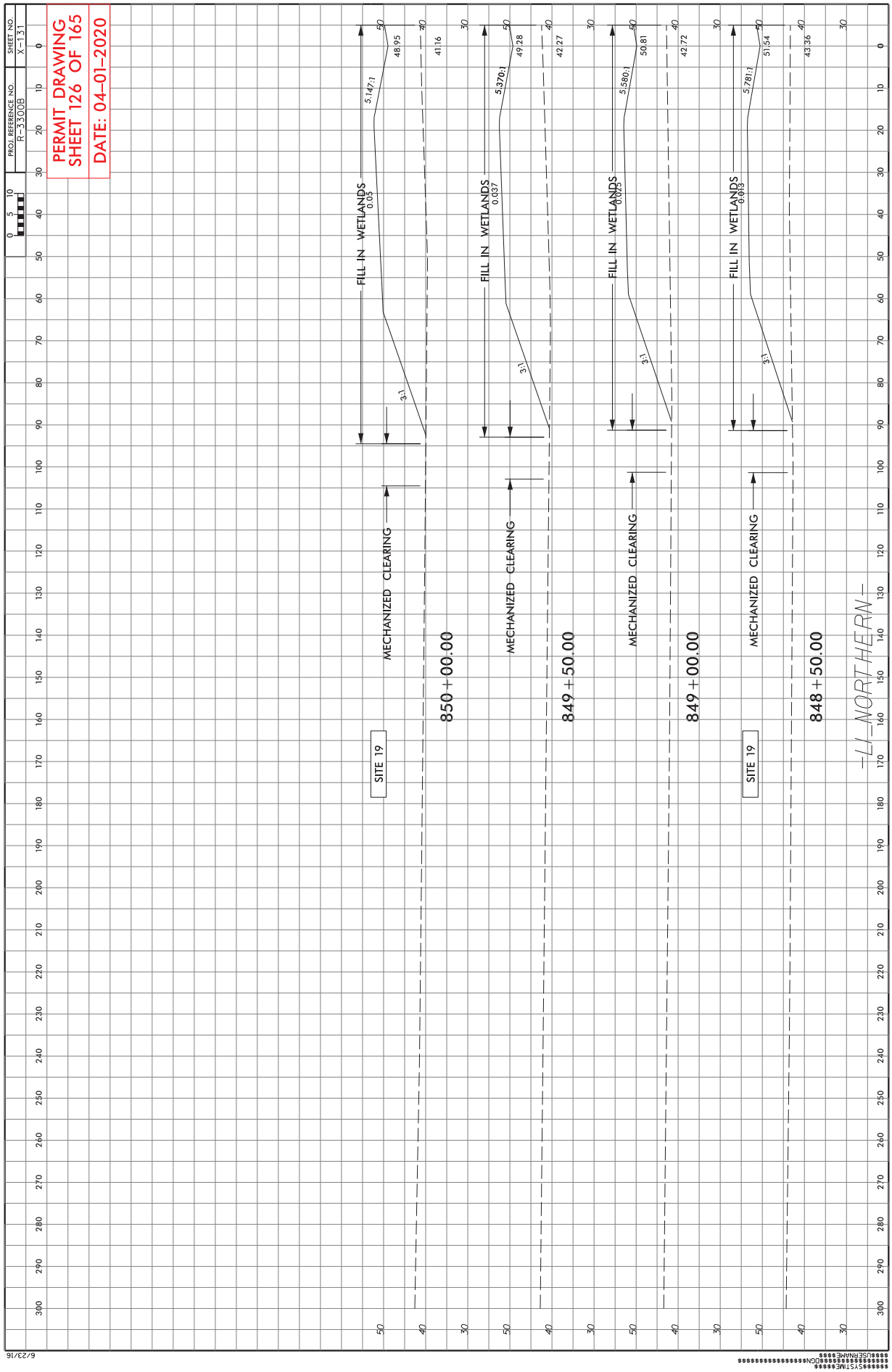

PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 123 OF 165
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
CL B RIPRAP
EST 2 TONS
EST 7 SY GFD
STD V DITCH
50 LF @ 0.60%
EST 30 CY DDE
SEE DEATIL 68
15" RCP-IV
TRANSFER STATION RD 22' PST
-Y43-
Y43 POT Sta. 15+00.00
MECHANIZED CLEARING
SITE 32
NO GRAVES BELOW SURVEY LINE (WITHIN SURVEY LIMITS)
DENOTES MECHANIZED CLEARING


PERMIT DRAWING
SHEET 124 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-33008
SHEET NO.
X-127
SITE 19
MECHANIZED CLEARING
FILL IN WETLANDS
WETLANDS
849+00.00
848+50.00
848+00.00
847+50.00
-Y32RPB1-
STA. 15+52.01
ELEV. 61.89
OFF. 193.14
-Y32RPB1-
STA. 15+00.11
ELEV. 61.18
OFF. 189.80
-Y32RPB1-
STA. 14+49.23
ELEV. 60.76
OFF. 185.30
-Y32RPB1-
STA. 13+99.21
ELEV. 60.60
OFF. 179.34
-LI-NORTHERN-

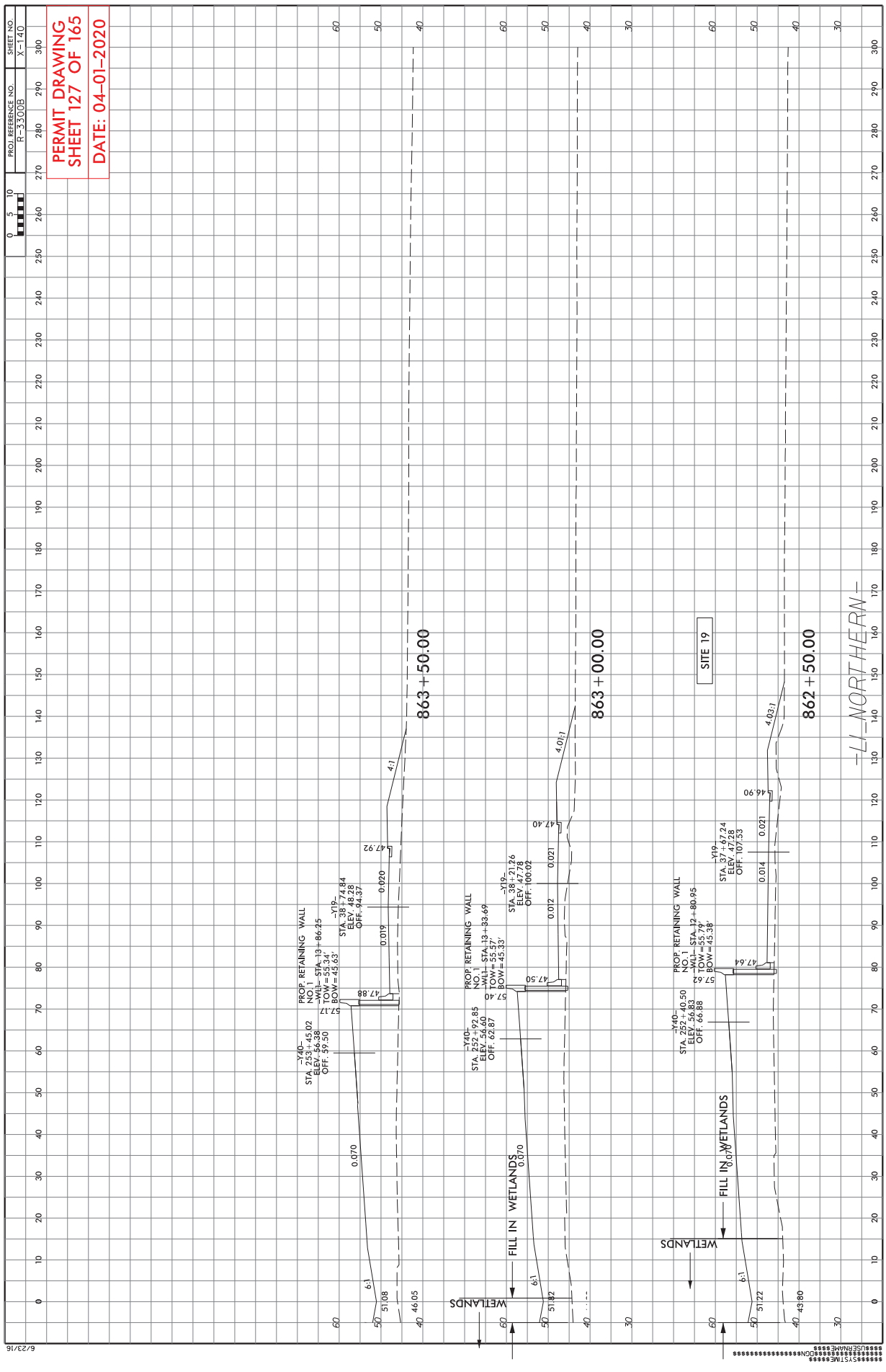
P-163

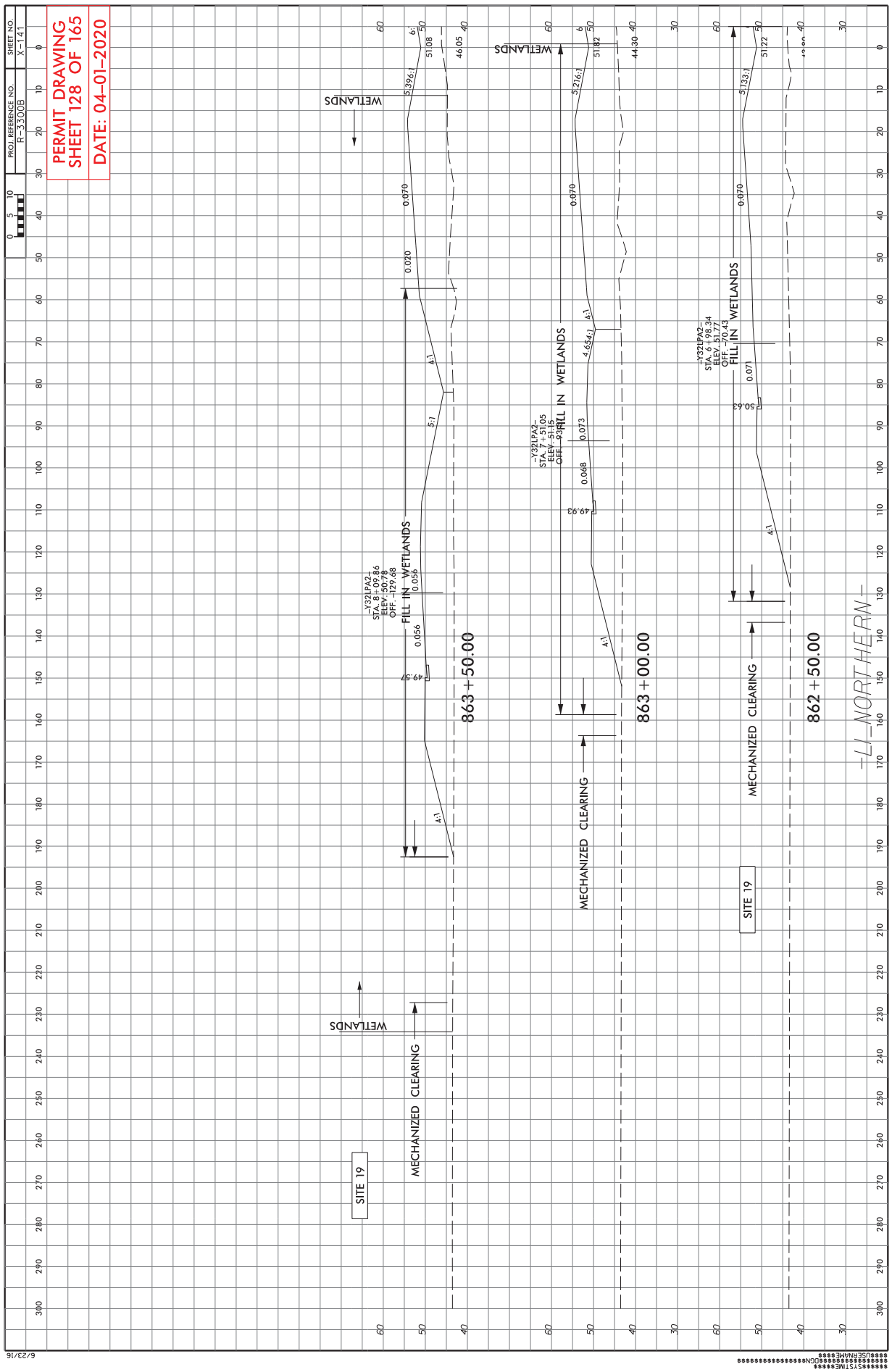

PERMIT DRAWING
SHEET 125 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-128
SITE 19
WETLANDS
FILL IN WETLANDS
850+00.00
849+50.00
NORTHERN
SITE 19
WETLANDS
FILL IN WETLANDS
6/23/16

P-164

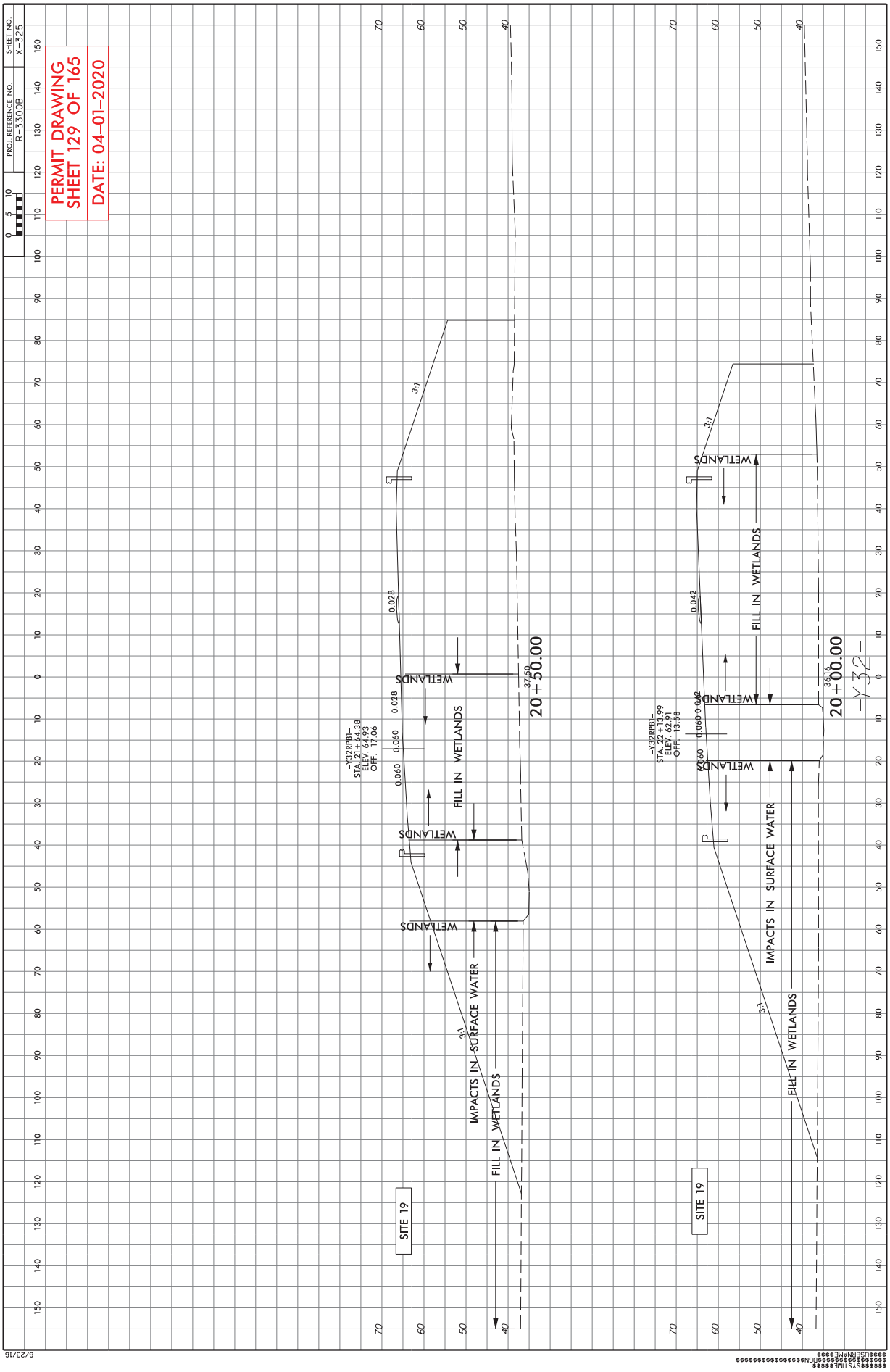

PERMIT DRAWING
SHEET 126 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-131
0 5 10
FILL IN WETLANDS
0.05
5,147:1
48.95
41.16
3:1
MECHANIZED CLEARING
SITE 19
850+00.00
FILL IN WETLANDS
0.037
5,370:1
49.28
42.27
3:1
MECHANIZED CLEARING
849+50.00
FILL IN WETLANDS
0.025
5,580:1
50.81
42.72
3:1
MECHANIZED CLEARING
849+00.00
FILL IN WETLANDS
0.013
5,781:1
51.54
43.36
3:1
MECHANIZED CLEARING
SITE 19
848+50.00
NORTHERN

P-165

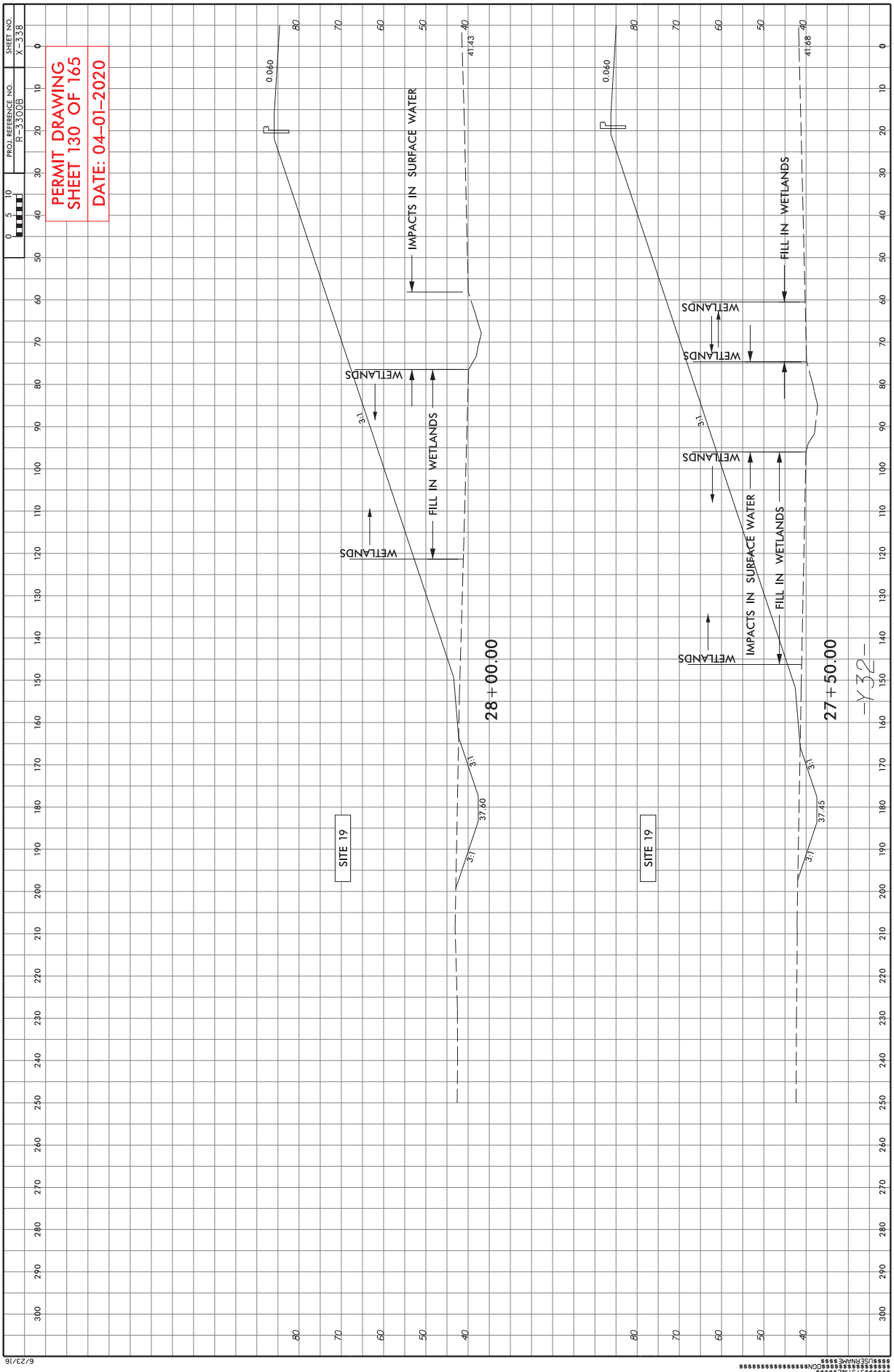

PERMIT DRAWING
SHEET 127 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-140
0 5 10
863+50.00
863+00.00
862+50.00
SITE 19
NORTHERN
PROP. RETAINING WALL NO. 1
-WL1- STA. 13+86.25
TOW=55.34'
BOW=45.63'
-Y40-
STA. 253+45.02
ELEV. 56.38
OFF. 59.50
-Y19-
STA. 38+74.84
ELEV. 48.28
OFF. 94.37
PROP. RETAINING WALL NO. 1
-WL1- STA. 13+33.69
TOW=55.57'
BOW=45.33'
-Y40-
STA. 252+92.85
ELEV. 58.60
OFF. 62.87
-Y19-
STA. 38+21.26
ELEV. 47.78
OFF. 100.02
PROP. RETAINING WALL NO. 1
-WL1- STA. 12+80.95
TOW=55.79'
BOW=45.38'
-Y40-
STA. 252+40.50
ELEV. 56.83
OFF. 66.88
-Y19-
STA. 37+47.24
ELEV. 47.28
OFF. 107.53
FILL IN WETLANDS
WETLANDS
4:1
6:1
4.01:1
4.03:1
0.070
0.020
0.019
0.012
0.021
0.014
57.17
47.88
47.92
57.40
47.50
47.40
57.62
47.64
46.90
51.08
46.05
51.82
51.22
43.80


PERMIT DRAWING
SHEET 128 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-141
0 5 10
WETLANDS
MECHANIZED CLEARING
SITE 19
FILL IN WETLANDS
-Y32LPA2-
STA. 8+09.86
ELEV. 50.78
OFF. -129.68
-Y32LPA2-
STA. 7+51.05
ELEV. 51.15
OFF. 93.71
-Y32LPA2-
STA. 6+98.34
ELEV. 51.77
OFF. -70.43
863+50.00
863+00.00
862+50.00
NORTHERN

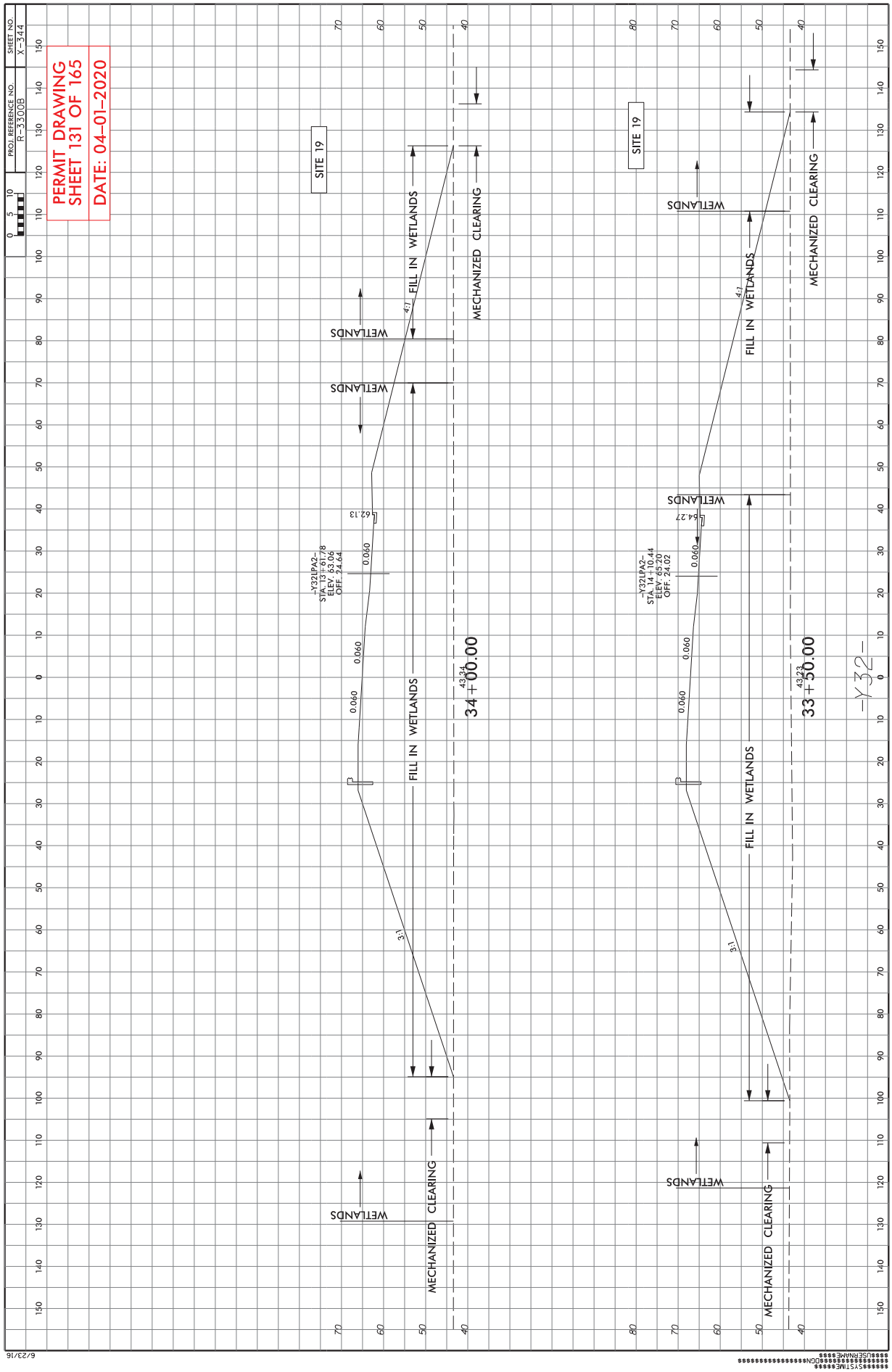
P-167


PERMIT DRAWING
SHEET 129 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO. R-3300B
SHEET NO. X-325
0 5 10
20+50.00
20+00.00
WETLANDS
FILL IN WETLANDS
IMPACTS IN SURFACE WATER
FILL IN WETLANDS
SITE 19
3:1
0.028
0.060
0.042
37.50
36.16
-Y32RPB1-
STA. 21+64.38
ELEV. 64.93
OFF. -17.06
-Y32RPB1-
STA. 22+13.99
ELEV. 62.91
OFF. -13.58
-Y32-
6/23/16

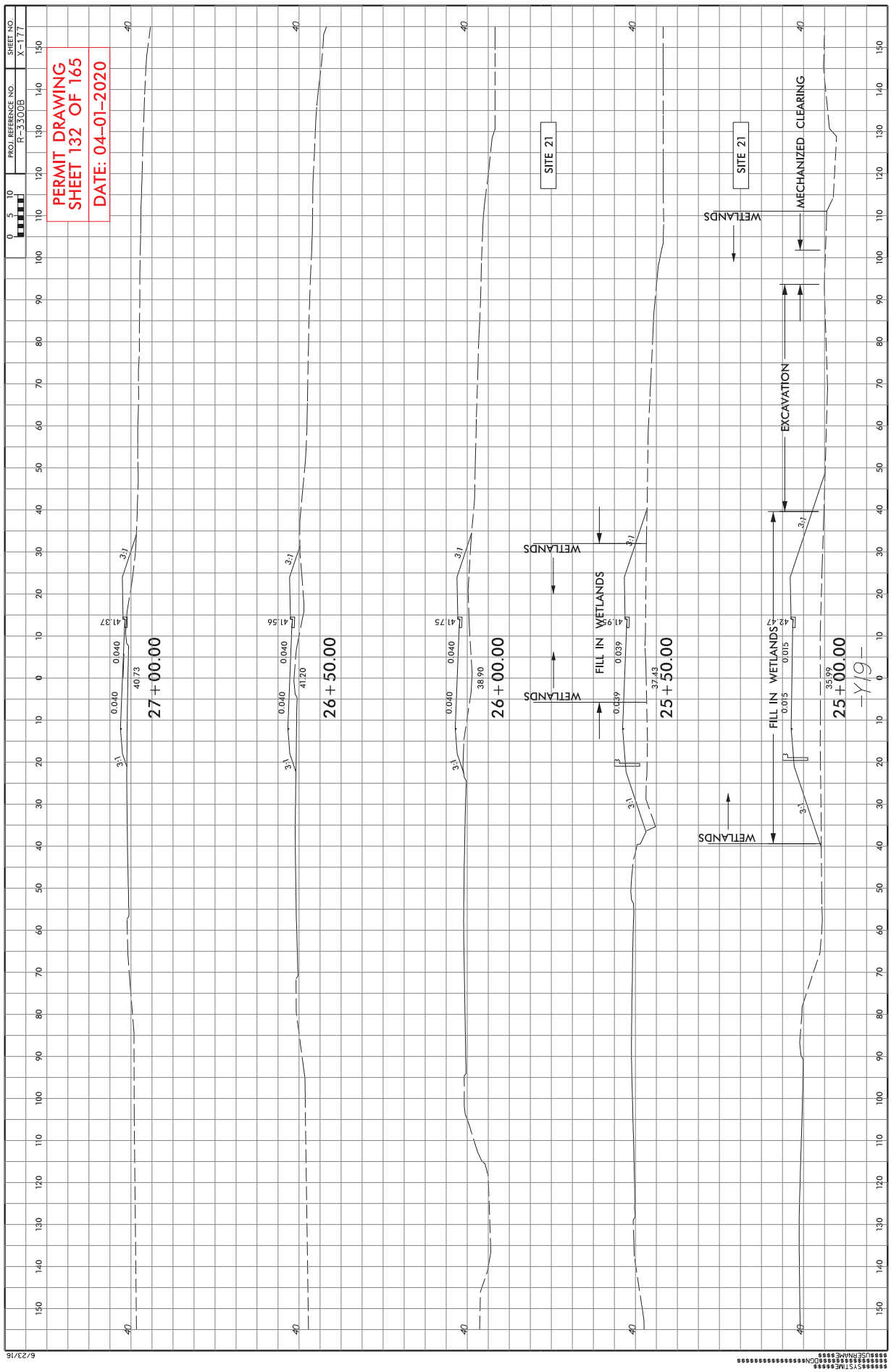
P-168

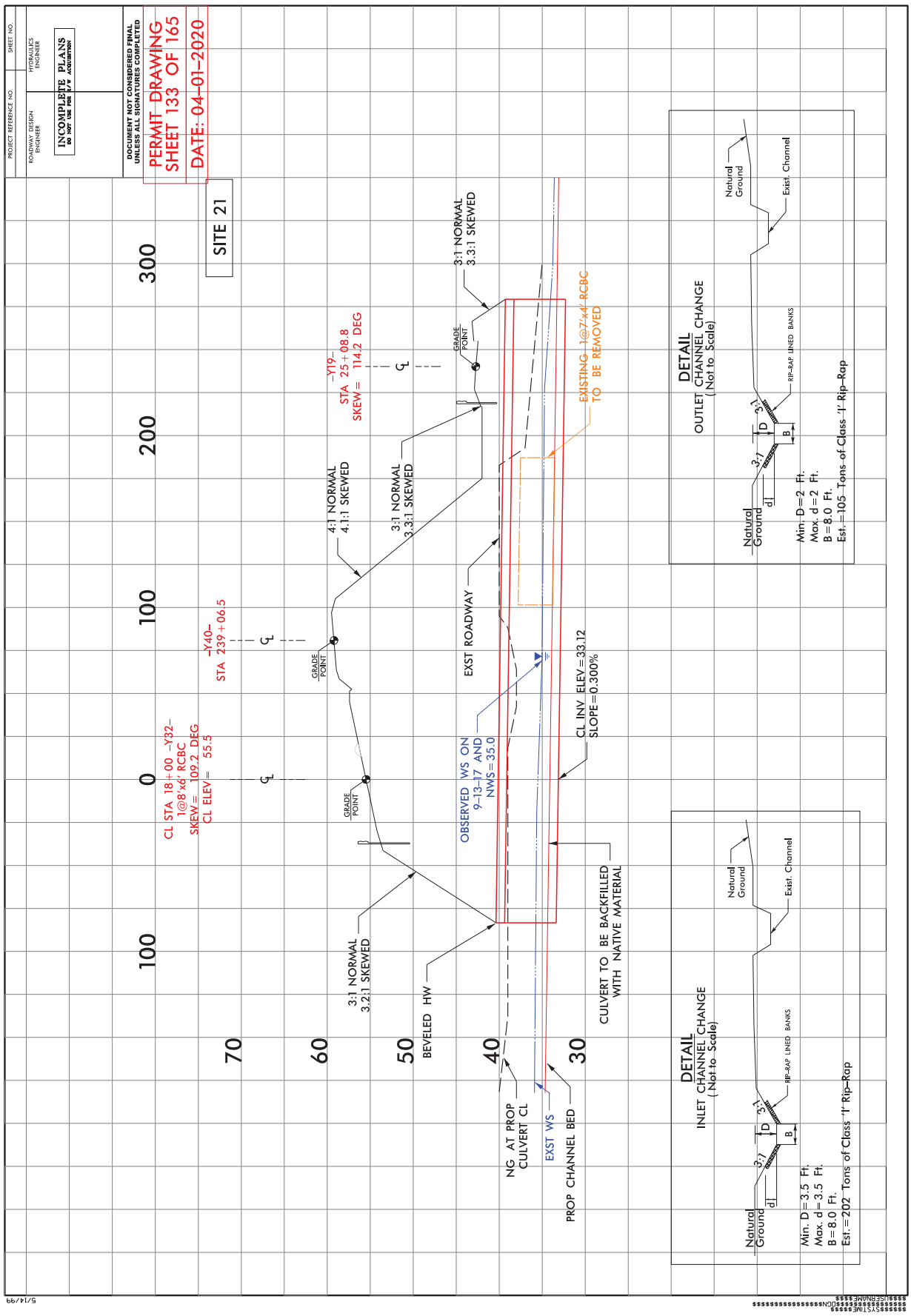

SHEET NO. X-338
PROJ. REFERENCE NO. R-3300B
0 5 10
PERMIT DRAWING
SHEET 130 OF 165
DATE: 04-01-2020
0.060
41.43
IMPACTS IN SURFACE WATER
WETLANDS
3:1
FILL IN WETLANDS
WETLANDS
28+00.00
SITE 19
37.60
3:1
0.060
41.68
FILL IN WETLANDS
WETLANDS
WETLANDS
3:1
WETLANDS
IMPACTS IN SURFACE WATER
FILL IN WETLANDS
WETLANDS
27+50.00
SITE 19
37.45
3:1
-Y32-
6/23/16

P-169

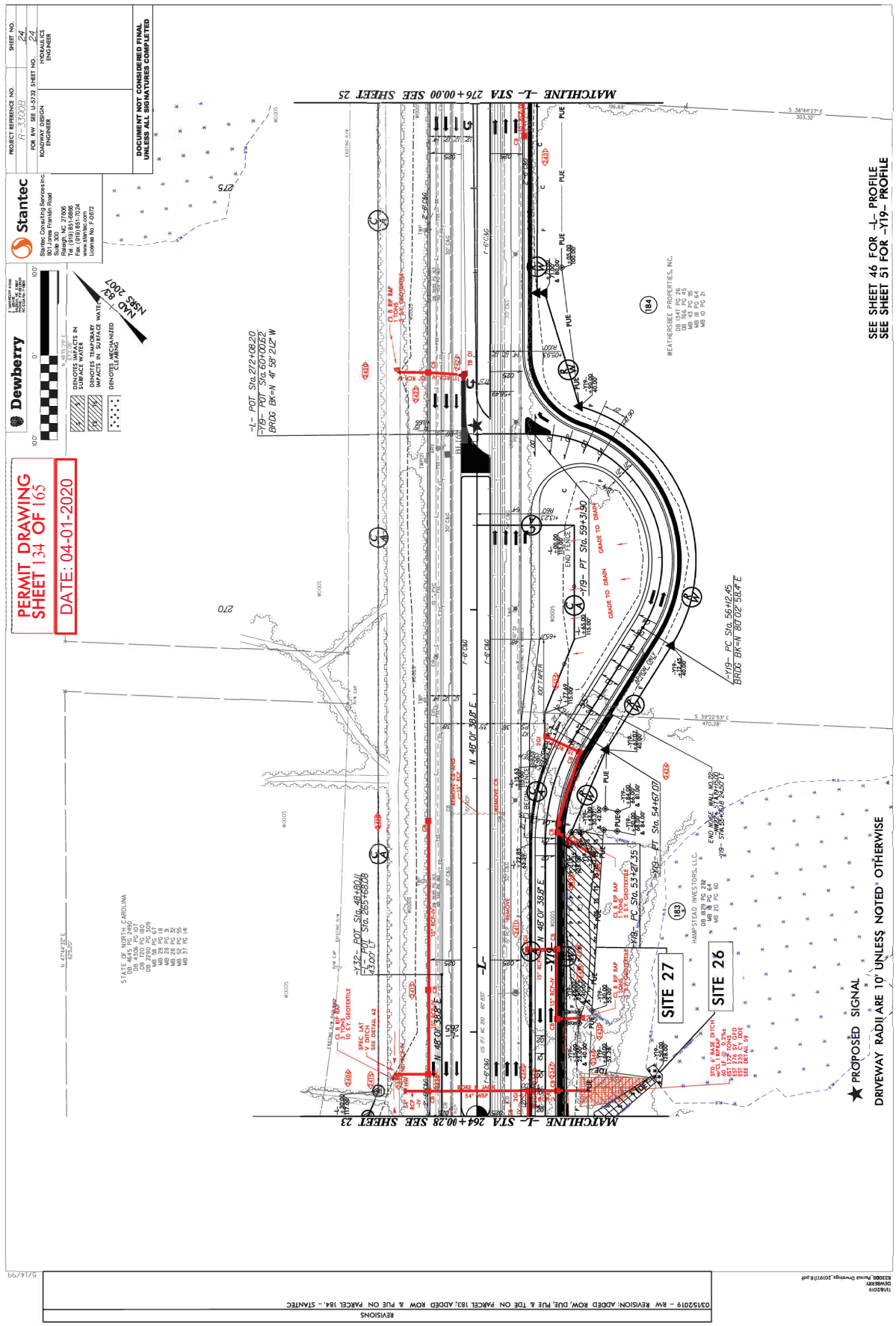

PERMIT DRAWING
SHEET 131 OF 165
DATE: 04-01-2020
SHEET NO. X-344
PROJ. REFERENCE NO. R-3300B
0 5 10
SITE 19
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
4:1
3:1
34+00.00
33+50.00
-Y32LIPA2-
STA. 13+87.78
ELEV. 63.06
OFF. 24.64
-Y32LIPA2-
STA. 14+10.44
ELEV. 65.20
OFF. 24.02
0.060
62.13
64.27
43.34
43.23
-Y32-
6/23/16

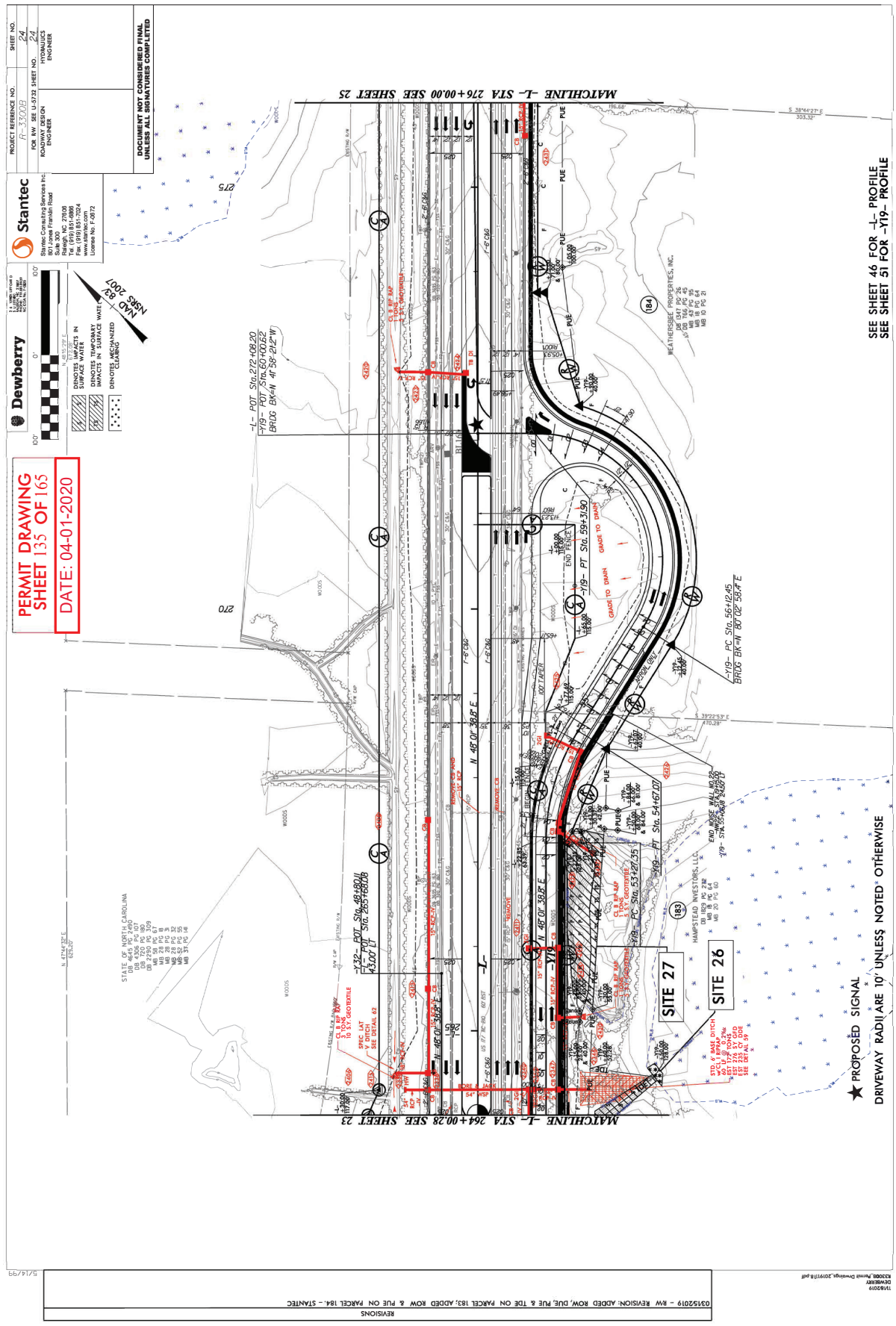
P-170

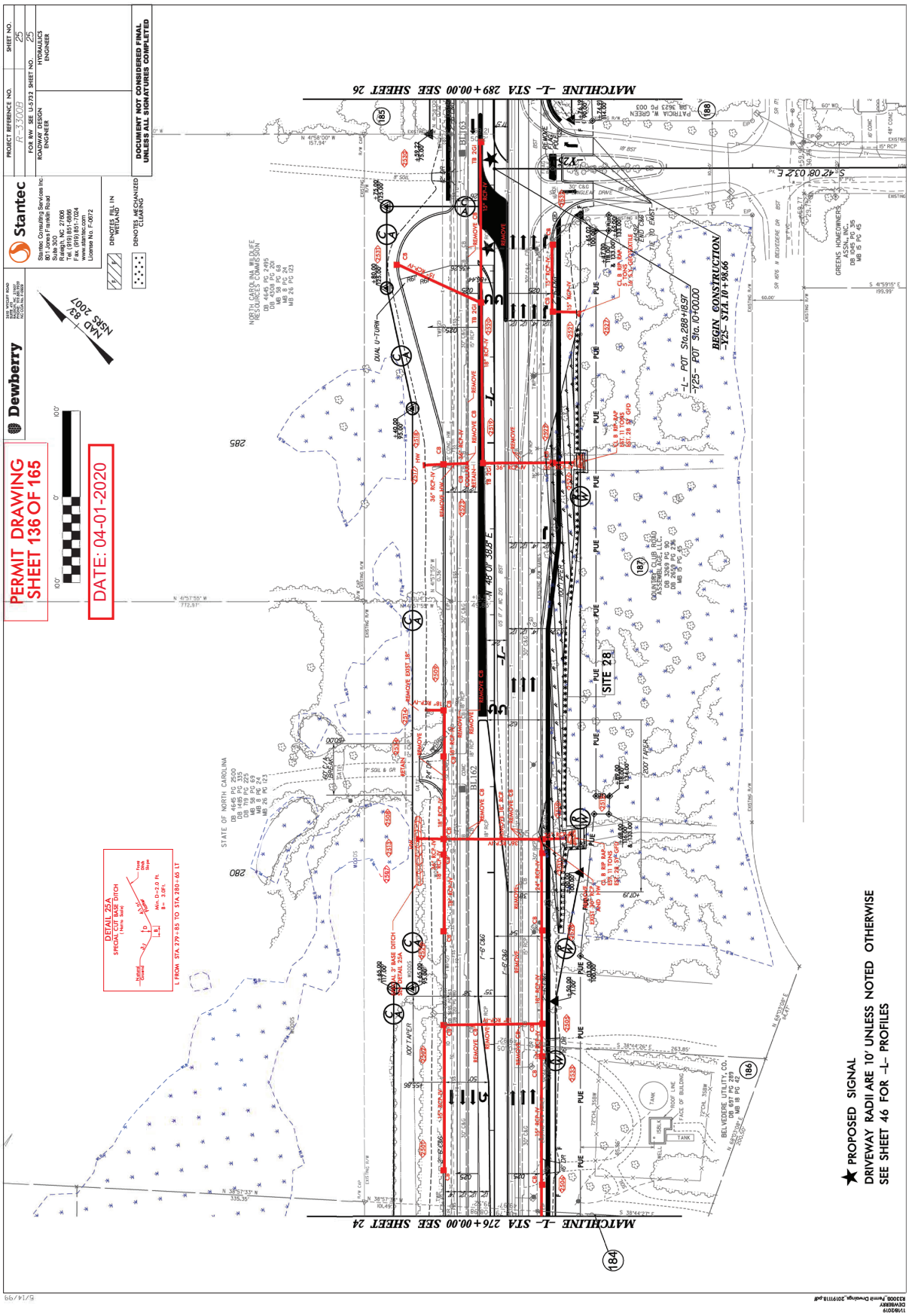

PERMIT DRAWING
SHEET 132 OF 165
DATE: 04-01-2020
SHEET NO. X-177
PROJ. REFERENCE NO. R-3300B
0 5 10
27+00.00
26+50.00
26+00.00
25+50.00
25+00.00
SITE 21
SITE 21
WETLANDS
WETLANDS
WETLANDS
WETLANDS
FILL IN WETLANDS
FILL IN WETLANDS
EXCAVATION
MECHANIZED CLEARING
3:1
0.040
0.039
0.015
41.37
40.73
41.56
41.20
41.75
38.90
41.95
37.43
42.47
35.99
-Y19-
6/23/16

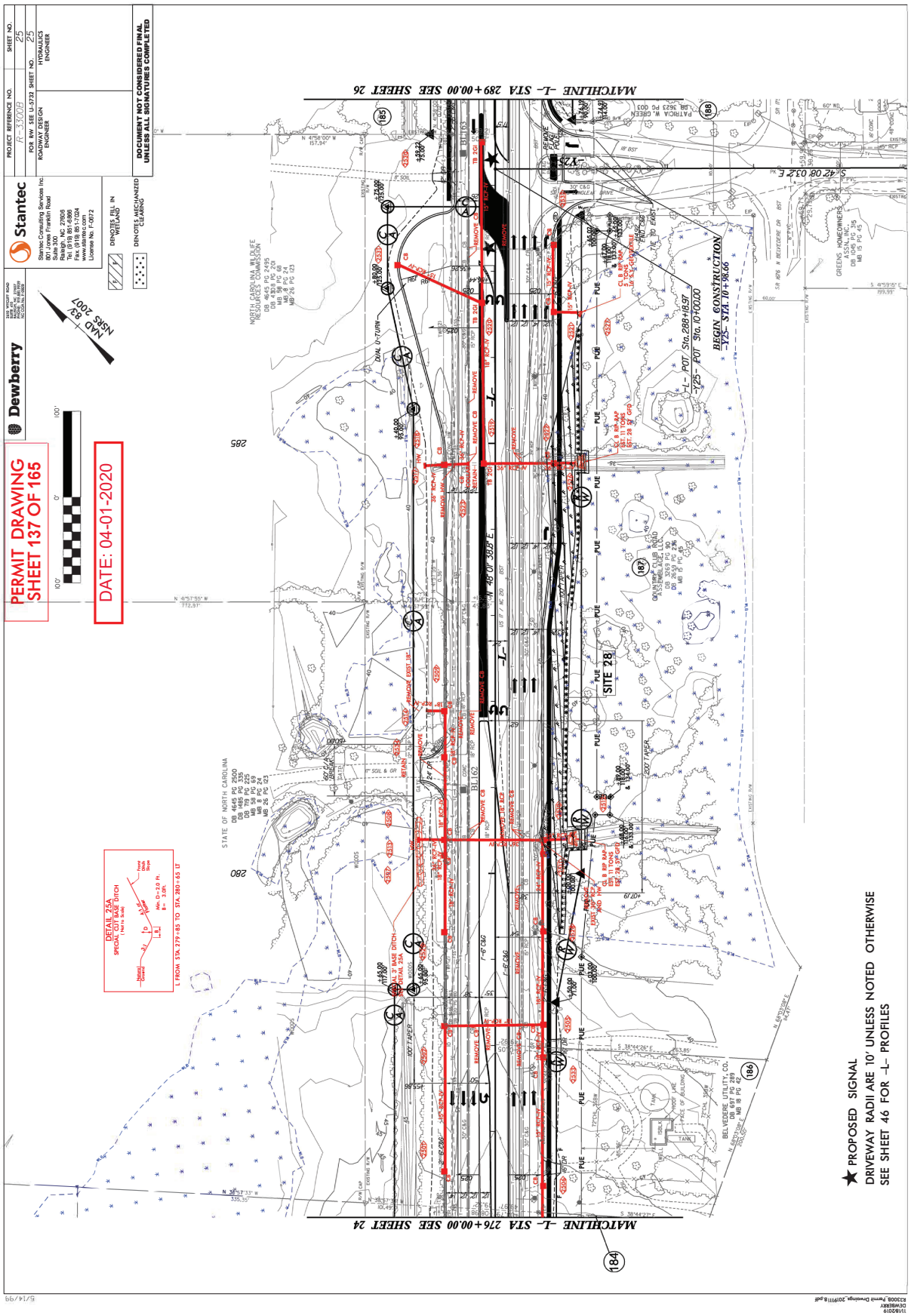

PROJECT REFERENCE NO.
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 133 OF 165
DATE: 04-01-2020
SITE 21
CL STA 18+00 –Y32–
1@8'x6' RCBC
SKEW = 109.2 DEG
CL ELEV = 55.5
–Y40–
STA 239+06.5
–Y19–
STA 25+08.8
SKEW = 114.2 DEG
GRADE POINT
4:1 NORMAL
4.1:1 SKEWED
3:1 NORMAL
3.3:1 SKEWED
EXST ROADWAY
EXISTING 1@7'x4' RCBC
TO BE REMOVED
OBSERVED WS ON
9-13-17 AND
NWS=35.0
CL INV ELEV=33.12
SLOPE=0.300%
3:1 NORMAL
3.2:1 SKEWED
BEVELED HW
NG AT PROP
CULVERT CL
EXST WS
PROP CHANNEL BED
CULVERT TO BE BACKFILLED
WITH NATIVE MATERIAL
DETAIL
INLET CHANNEL CHANGE
(Not to Scale)
Natural Ground
Exist. Channel
RIP-RAP LINED BANKS
Min. D=3.5 Ft.
Max. d=3.5 Ft.
B=8.0 Ft.
Est.=202 Tons of Class 'I' Rip-Rap
DETAIL
OUTLET CHANNEL CHANGE
(Not to Scale)
Min. D=2 Ft.
Max. d=2 Ft.
B=8.0 Ft.
Est.=105 Tons of Class 'I' Rip-Rap

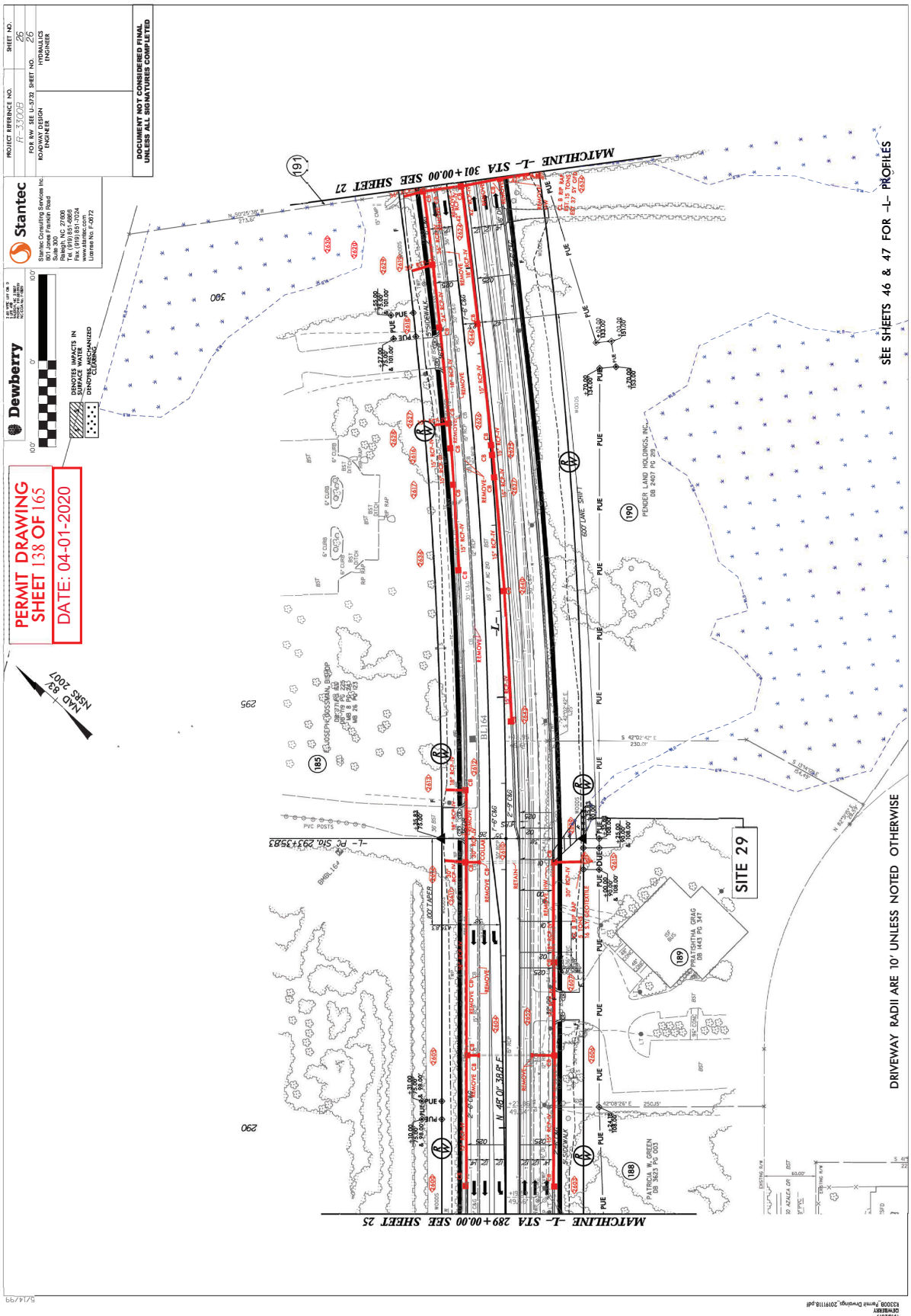
P-172


PERMIT DRAWING
SHEET 134 OF 165
DATE: 04-01-2020
Dewberry
Stantec
PROJECT REFERENCE NO.
R-3306
SHEET NO.
24
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
DENOTES MECHANIZED CLEARING
NWD 632 NSRS 2007
MATCHLINE -L- STA 276+00.00 SEE SHEET 25
MATCHLINE -L- STA 264+00.28 SEE SHEET 23
-L- POT Sta.272+08.20
-Y9- POT Sta.60+00.62
BRDG BK=N 4° 58' 21.2" W
-Y32- POT Sta.48+80.41
-Y32- PT Sta.265+68.08
-Y9- PC Sta.53+27.35
-Y9- PT Sta.54+67.07
-Y19- PT Sta.59+31.50
-Y19- PC Sta.56+42.45
BRDG BK=N 80° 02' 58.4" E
SITE 27
SITE 26
SEE SHEET 46 FOR -L- PROFILE
SEE SHEET 51 FOR -Y19- PROFILE
PROPOSED SIGNAL
DRIVEWAY RADII ARE 10' UNLESS NOTED OTHERWISE
REVISIONS
03/5/2019 - RW REVISION: ADDED ROW, DUE, PUE & TDE ON PARCEL 183; ADDED ROW & PUE ON PARCEL 184 - STANTEC


PERMIT DRAWING
SHEET 135 OF 165
DATE: 04-01-2020
Dewberry
Stantec
PROJECT REFERENCE NO. R-3300
SHEET NO. 24
FOR R/W SEE U-5732 SHEET NO. 24
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
NAD 83 NSRS 2007
MATCHLINE -L- STA 276+00.00 SEE SHEET 25
MATCHLINE -L- STA 264+00.28 SEE SHEET 23
SEE SHEET 46 FOR -L- PROFILE
SEE SHEET 51 FOR -Y19- PROFILE
SITE 27
SITE 26
PROPOSED SIGNAL
DRIVEWAY RADII ARE 10' UNLESS NOTED OTHERWISE
REVISIONS
03/15/2019 – RW REVISION: ADDED ROW, DUE, PUE & TDE ON PARCEL 183; ADDED ROW & PUE ON PARCEL 184. – STANTEC


Dewberry
Stantec
PROJECT REFERENCE NO. R-3300B
SHEET NO. 25
FOR NW SEE U-3373 SHEET NO. 25
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
NAD 83/2007 NSRS
PERMIT DRAWING SHEET 136 OF 165
DATE: 04-01-2020
MATCHLINE -L- STA 289+00.00 SEE SHEET 26
MATCHLINE -L- STA 276+00.00 SEE SHEET 24
-L- POT Sta.288+18.97
-125- POT Sta.10+00.00
BEGIN CONSTRUCTION -125- STA.10+36.66
N 48°01'38"E
SITE 28
DETAIL 25A
SPECIAL CUT BASE DITCH
PROPOSED SIGNAL
DRIVEWAY RADII ARE 10' UNLESS NOTED OTHERWISE
SEE SHEET 46 FOR -L- PROFILES


PERMIT DRAWING
SHEET 137 OF 165
DATE: 04-01-2020
Dewberry
Stantec
PROJECT REFERENCE NO. R-5301
SHEET NO. 25
FOR R/W SEE U-5732 SHEET NO. 25
ROADWAY DESIGN ENGINEER
STRUCTURES ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DENOTES FILL IN WETLAND
DENOTES VEGETATION CLEARING
NAD 83/2007
MATCHLINE -L- STA 289+00.00 SEE SHEET 26
MATCHLINE -L- STA 276+00.00 SEE SHEET 24
BEGIN CONSTRUCTION -L- STA. 10+98.66
-L- POT Sta.288+48.97
-L- POT Sta.10+00.00
SITE 28
DETAIL 25A
SPOIL CUT BASE DITCH
L FROM STA 279+65 TO STA 280+65 LT
★ PROPOSED SIGNAL
DRIVEWAY RADII ARE 10' UNLESS NOTED OTHERWISE
SEE SHEET 46 FOR -L- PROFILES


PERMIT DRAWING
SHEET 138 OF 165
DATE: 04-01-2020
Dewberry
Stantec
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO.
R-3308
SHEET NO.
26
FOR R/W SEE U-5732
SHEET NO.
26
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DENOTES IMPACTS IN STREAMS, MECHANIZED CLEARING
DENOTES IMPACTS IN WETLANDS, MECHANIZED CLEARING
NAD 83 NSRS 2007
MATCHLINE -L- STA 301+00.00 SEE SHEET 27
MATCHLINE -L- STA 289+00.00 SEE SHEET 25
SEE SHEETS 46 & 47 FOR -L- PROFILES
DRIVEWAY RADII ARE 10' UNLESS NOTED OTHERWISE
SITE 29
PENDER LAND HOLDINGS, INC.
DB 2407 PG 2019
PRATISHTHA GRAG
DB 1443 PG 347
PATRICIA W. GREEN
DB 3823 PG 003
-L- PC Sta. 293+73.83
N 46°01'38.8" E
S 42°02'42" E
230.0'
S 42°08'26" E
250.0'
60' LANE SHIFT
-L-
-T-
-Y1-
-Y2-
-Y3-
-Y4-
-Y5-
-Y6-
-Y7-
-Y8-
-Y9-
-Y10-
-Y11-
-Y12-
-Y13-
-Y14-
-Y15-
-Y16-
-Y17-
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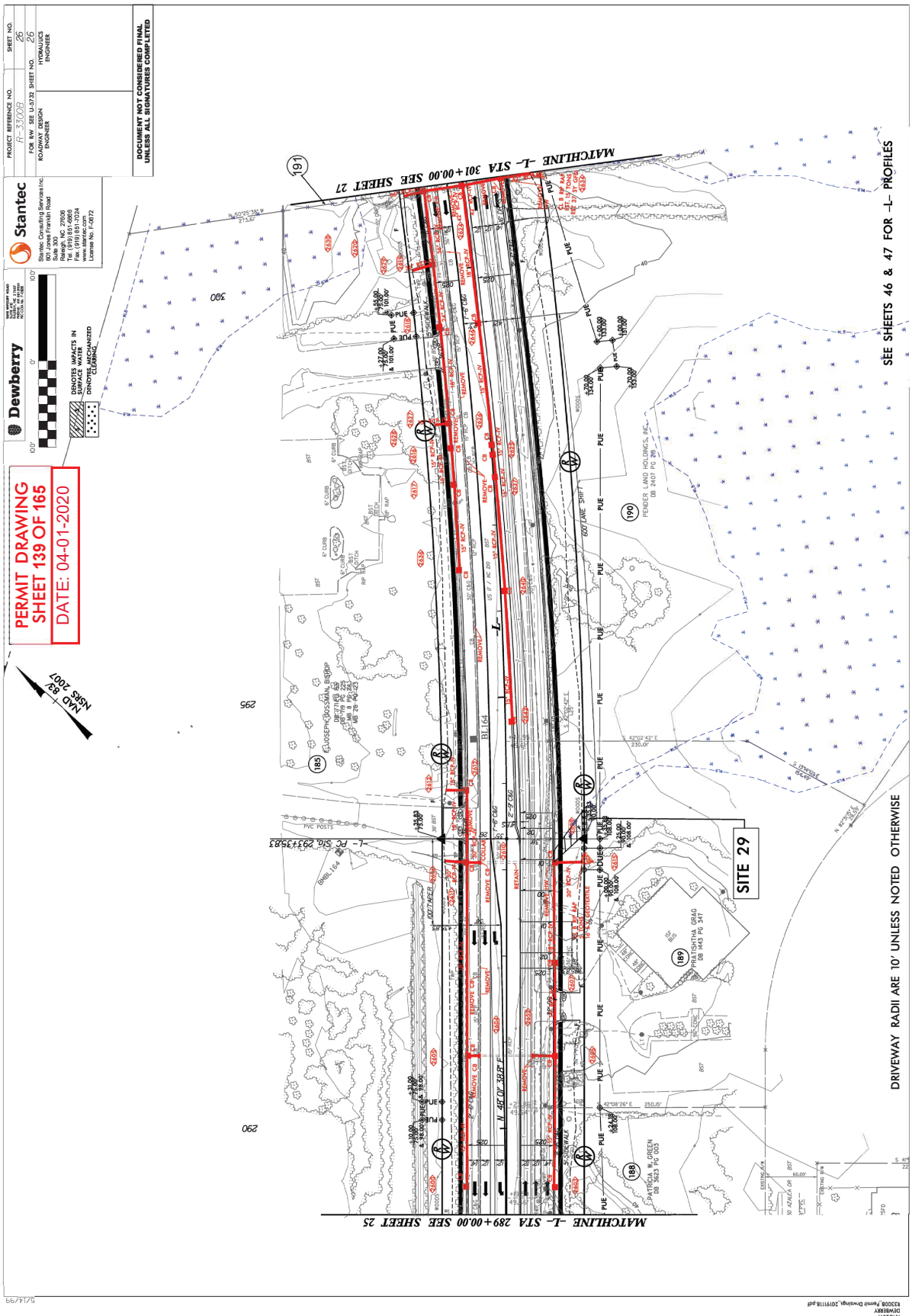
PERMIT DRAWING
SHEET 139 OF 165
DATE: 04-01-2020
Dewberry
Stantec
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3308
SHEET NO. 26
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DENOTES IMPACTS IN DENOTES MECHANIZED CLEARING
NAD 83 NSRS 2007
MATCHLINE -L- STA 301+00.00 SEE SHEET 27
MATCHLINE -L- STA 289+00.00 SEE SHEET 25
SEE SHEETS 46 & 47 FOR -L- PROFILES
DRIVEWAY RADII ARE 10' UNLESS NOTED OTHERWISE
SITE 29
-L-
-Y1-
-Y2-
-Y3-
-Y4-
-Y5-
-Y6-
-Y7-
-Y8-
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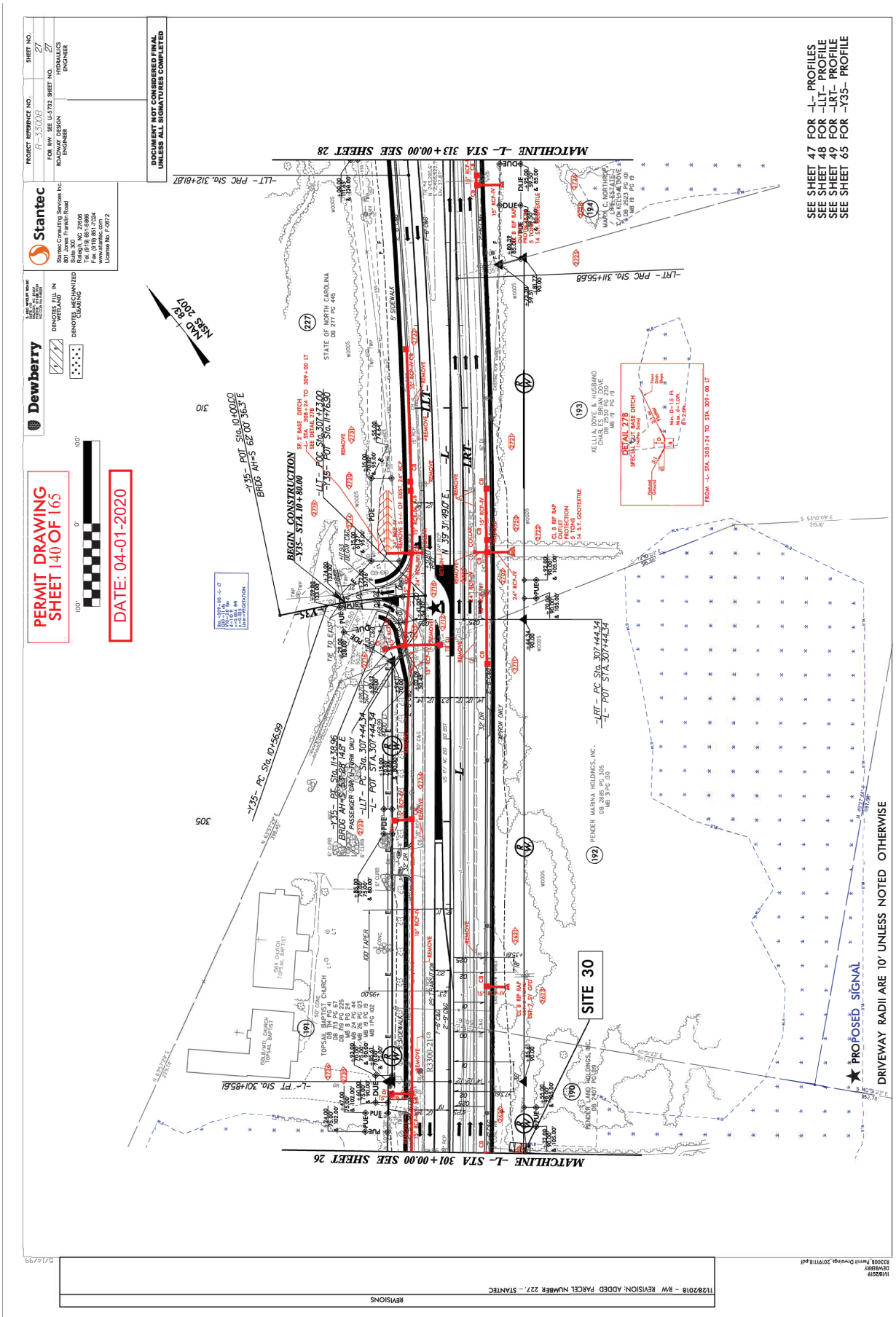
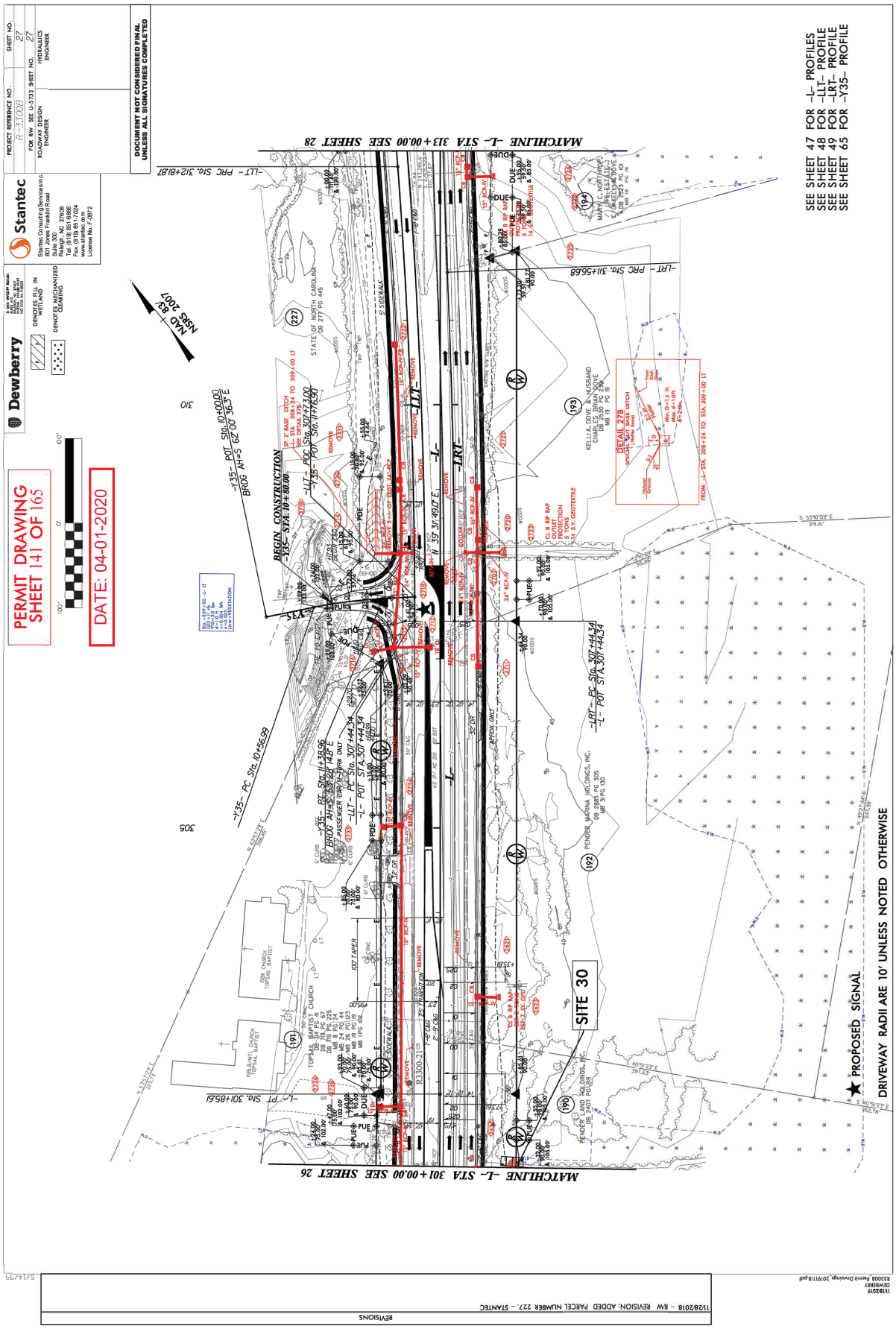
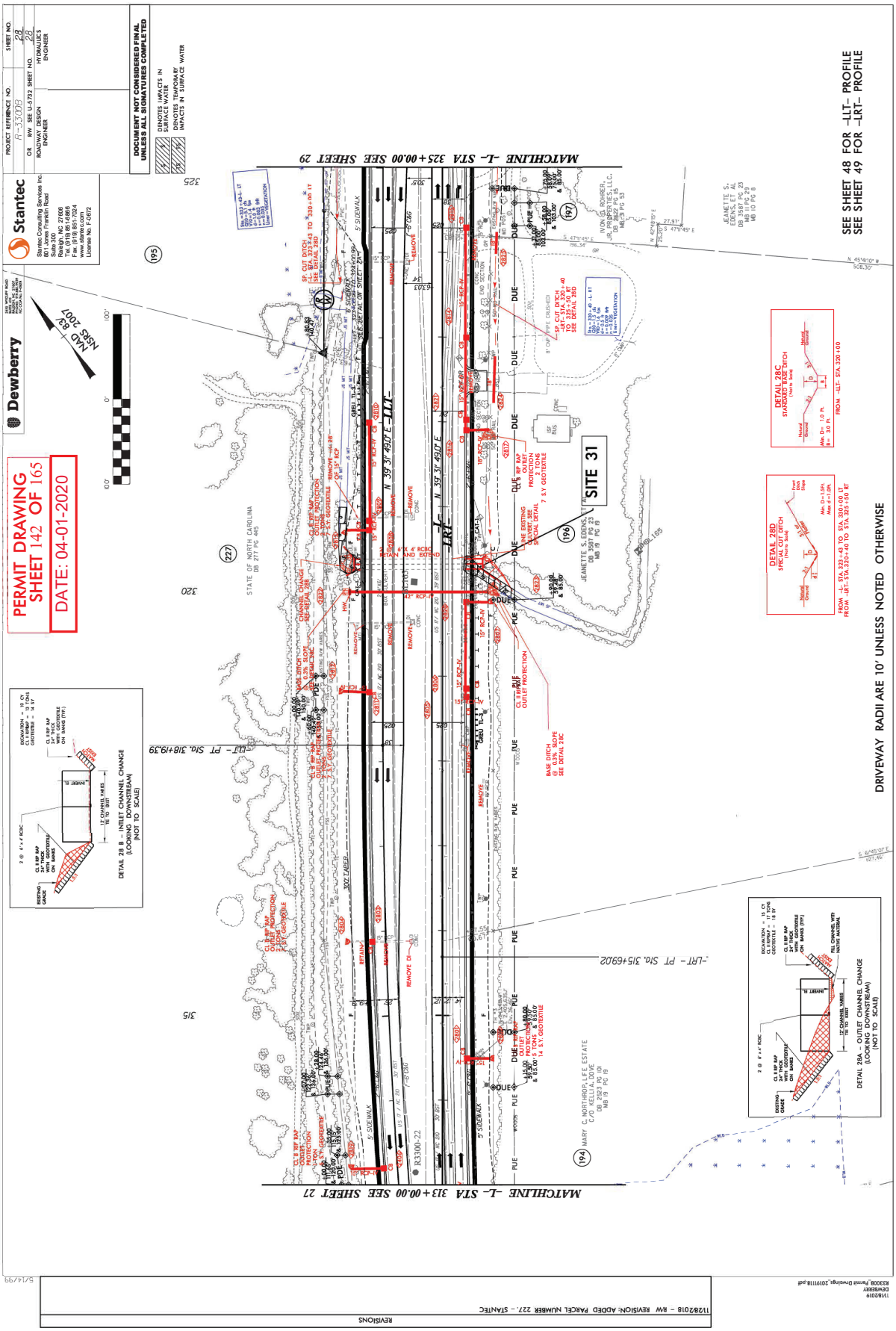
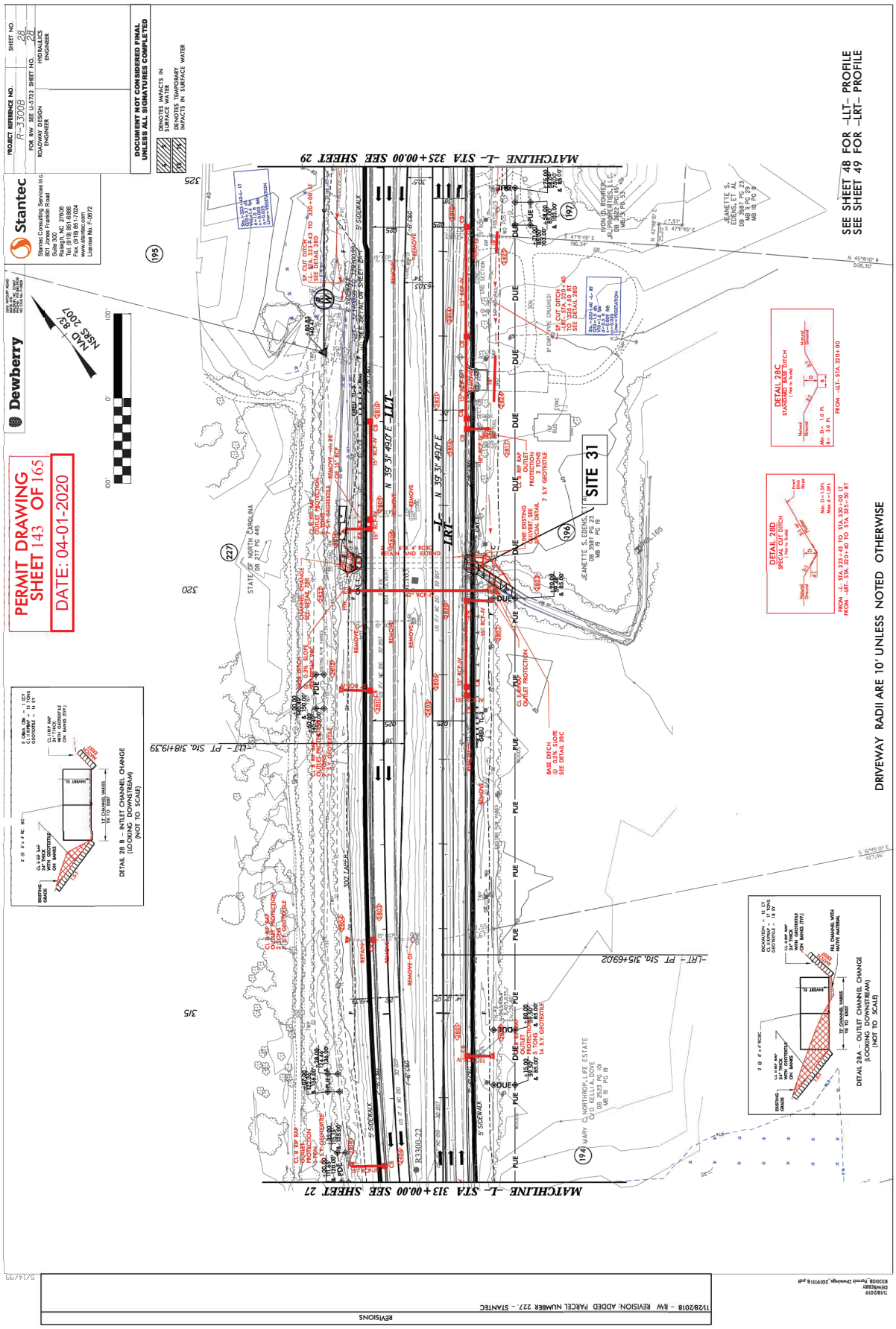
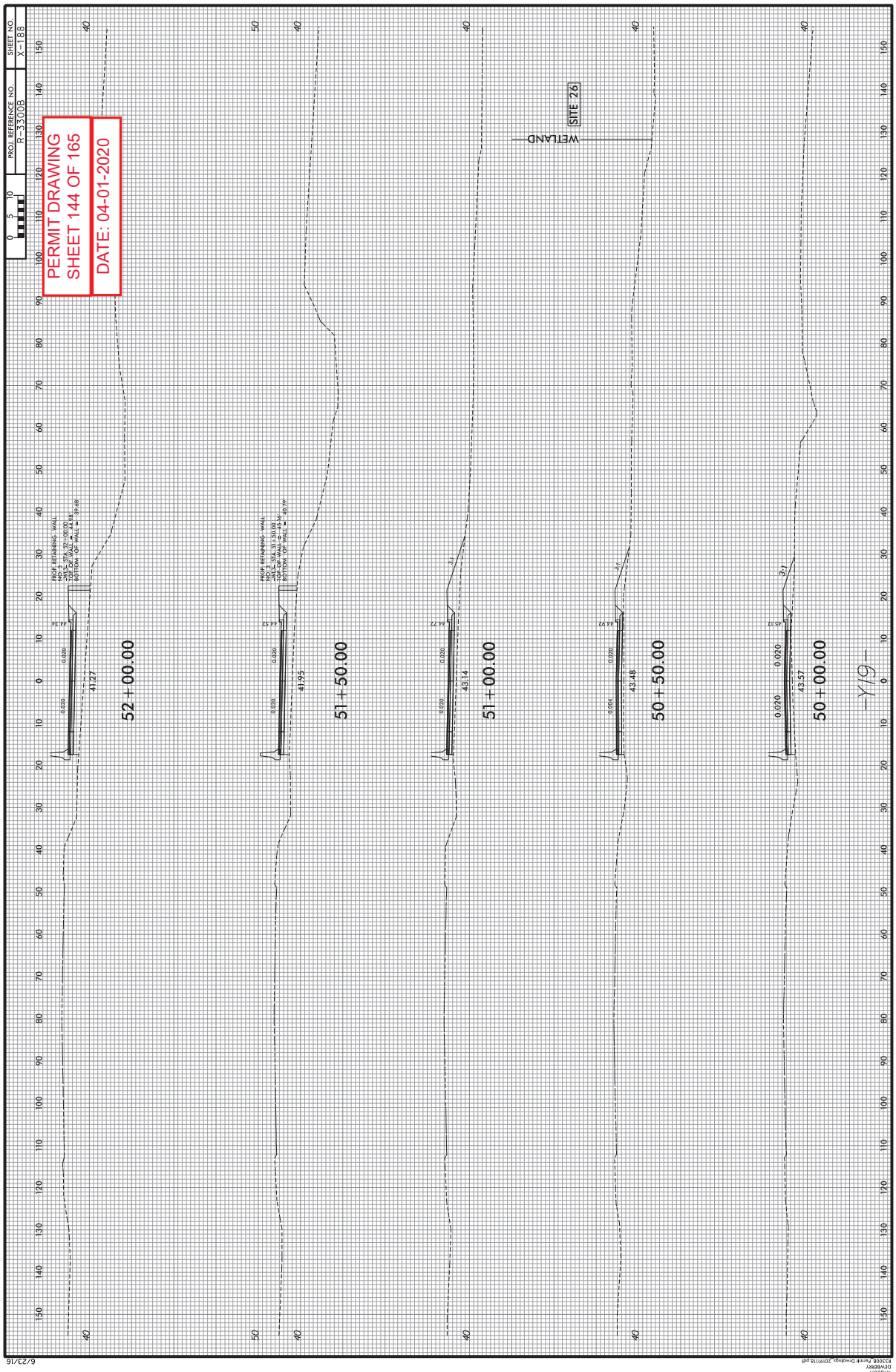

PERMIT DRAWING
SHEET 140 OF 165
DATE: 04-01-2020
Dewberry
Stantec
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3306
SHEET NO. 27
FOR R/W SEE U-5732 SHEET NO. 27
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
NAD 83/ NSRS 2007
SEE SHEET 47 FOR -L- PROFILES
SEE SHEET 48 FOR -LLT- PROFILE
SEE SHEET 49 FOR -LRT- PROFILE
SEE SHEET 65 FOR -Y35- PROFILE
MATCHLINE -L- STA 313+00.00 SEE SHEET 28
MATCHLINE -L- STA 301+00.00 SEE SHEET 26
BEGIN CONSTRUCTION -Y35- STA. 10+80.00
-Y35- PC Sta. 10+56.99
-Y35- PT Sta. 11+38.96
-L- PC Sta. 307+44.34
-L- POT STA. 307+44.34
-LLT- PC Sta. 307+44.34
-L- PT Sta. 301+85.61
-LLT- PRC Sta. 312+81.87
-LRT- PRC Sta. 311+56.68
-L- STA. 309+00.00
-Y35- POT Sta. 10+00.00
-Y35- POT Sta. 11+72.90
DETAIL 27B
SPECIAL CUT EDGE DITCH
FROM -L- STA. 308+24 TO STA. 309+00 LT
SITE 30
PROPOSED SIGNAL
DRIVEWAY RADII ARE 10' UNLESS NOTED OTHERWISE
TOPSAIL BAPTIST
TOPSAIL CHURCH
PENDER MARINA HOLDINGS, INC.
STATE OF NORTH CAROLINA
REVISIONS
11/28/2018 - RW REVISION: ADDED PARCEL NUMBER 227 - STANTEC

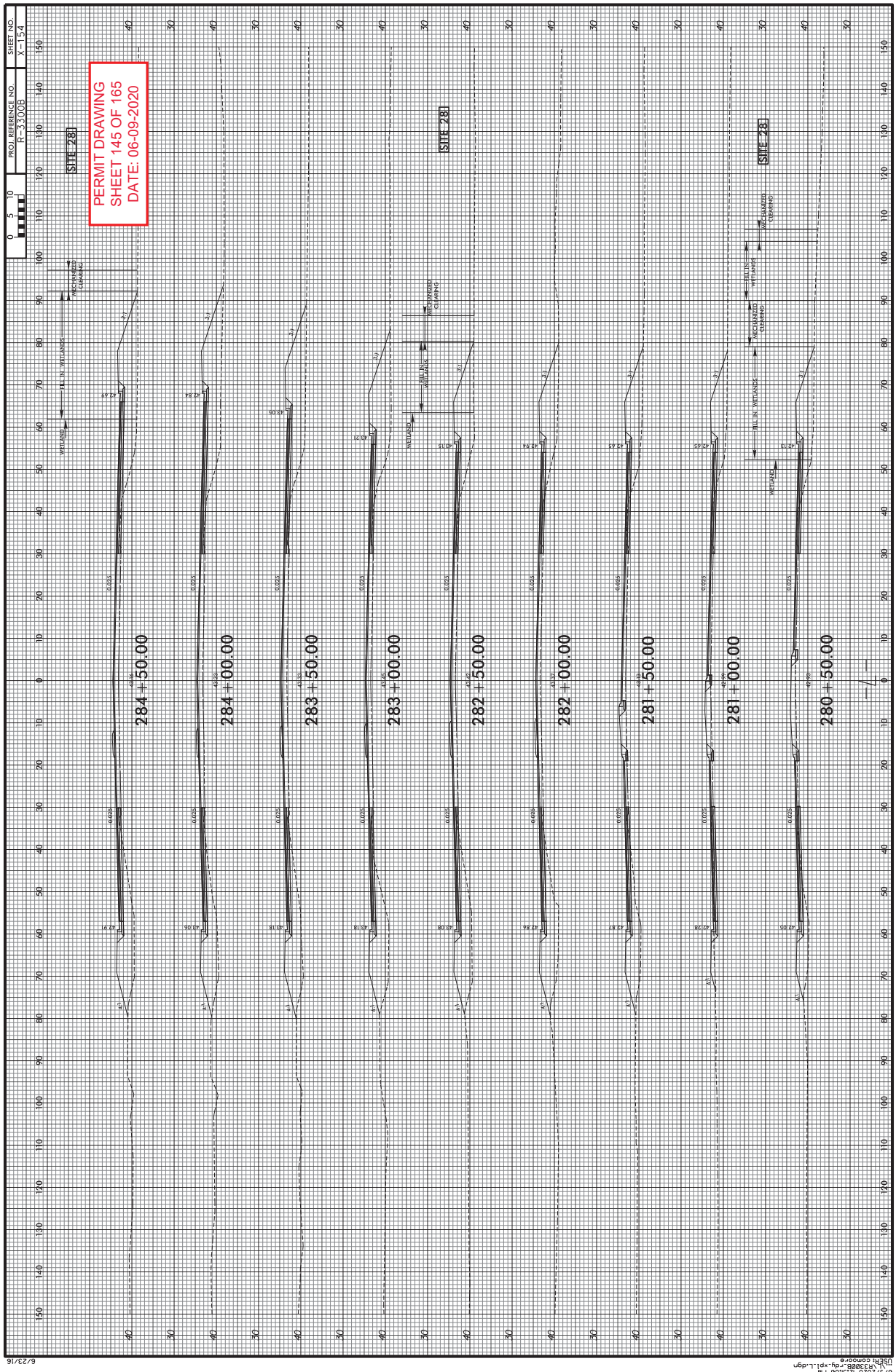

PERMIT DRAWING
SHEET 141 OF 165
DATE: 04-01-2020
SITE 30
PROPOSED SIGNAL
DRIVEWAY RADII ARE 10' UNLESS NOTED OTHERWISE
SEE SHEET 47 FOR -L- PROFILES
SEE SHEET 48 FOR -LLT- PROFILE
SEE SHEET 49 FOR -LRT- PROFILE
SEE SHEET 65 FOR -Y35- PROFILE
MATCHLINE -L- STA 313+00.00 SEE SHEET 28
MATCHLINE -L- STA 301+00.00 SEE SHEET 26
BEGIN CONSTRUCTION -Y35- STA 10+80.00
-Y35- POT Sta 10+00.00
BRDG AH=5' 62° 00' 36.3" E
-LLT- POC Sta 307+47.00
-Y35- POT Sta 11+76.90
N 39°31'49.0" E
-Y35- PC Sta 10+56.99
-Y35- PT Sta 11+39.95
BRDG AH=5' 53° 32' 14.5" E
-LLT- PC Sta 307+44.34
-L- POT STA 307+44.34
-LRT- PC Sta 307+44.34
-L- POT STA 307+44.34
-L- PT Sta 301+85.61
-LLT- PRC Sta 312+81.87
-LRT- PRC Sta 311+56.68
DETAIL 27B
DETAIL 27D
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
NAD 83 NSRS 2007
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3306
FOR RW SEE U-5732 SHEET NO. 27
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO. 27
Dewberry
Stantec
Stantec Consulting Services Inc.
801 Corporate Center Drive
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6666
Fax: (919) 851-7024
www.stantec.com
License No. C-0672
REVISIONS
11/28/2018 – R/W REVISION: ADDED PARCEL NUMBER 227. – STANTEC
5414799
11/18/2019
DECEMBER
R3306 Permit Drawings 20191118.pdf


PERMIT DRAWING
SHEET 142 OF 165
DATE: 04-01-2020
Dewberry
Stantec
PROJECT REFERENCE NO. R-3300B
SHEET NO. 28
O.R. R/W SEE U-5732 SHEET NO. 28
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
MATCHLINE -L- STA 325+00.00 SEE SHEET 29
MATCHLINE -L- STA 313+00.00 SEE SHEET 27
-LRT- PT Sta. 318+19.39
-LRT- PT Sta. 315+69.02
N 39° 31' 49.0" E -LLT-
N 39° 31' 49.0" E -LRT-
SITE 31
SEE SHEET 48 FOR -LLT- PROFILE
SEE SHEET 49 FOR -LRT- PROFILE
DRIVEWAY RADII ARE 10' UNLESS NOTED OTHERWISE
DETAIL 28B – INTLET CHANNEL CHANGE (LOOKING DOWNSTREAM) (NOT TO SCALE)
DETAIL 28A – OUTLET CHANNEL CHANGE (LOOKING DOWNSTREAM) (NOT TO SCALE)
DETAIL 28C STANDARD BASE DITCH
DETAIL 28D SPECIAL CUT DITCH
STATE OF NORTH CAROLINA DB 277 PG 445
JEANETTE S. EDENS, ET AL DB 3587 PG 23 MB 10 PG 8
MARY C. NORTHROP, LIFE ESTATE C/O KELLIA DOVE DB 3232 PG 826 MB 19 PG 19
WONJIN ROHRER, JR. PROPERTIES, LLC. DB 3622 PG 18 MB 39 PG 53
REVISIONS
11/28/2018 – RW REVISION: ADDED PARCEL NUMBER 227. – STANTEC
5/14/99
11/8/2019
DEWBERRY
R3300B_Permit Drawings_20191118.pdf


PERMIT DRAWING
SHEET 143 OF 165
DATE: 04-01-2020
Dewberry
Stantec
PROJECT REFERENCE NO.
R-3300B
FOR R/W SEE U-5732
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO.
28
29
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SEE SHEET 48 FOR -LLT- PROFILE
SEE SHEET 49 FOR -LRT- PROFILE
MATCHLINE -L- STA 325+00.00 SEE SHEET 29
MATCHLINE -L- STA 313+00.00 SEE SHEET 27
-LLT- PT Sta. 318+19.39
-LRT- PT Sta. 315+69.02
N 39° 31' 49.07" E -LLT-
N 39° 31' 49.0" E -LRT-
SITE 31
DETAIL 28 B - INTLET CHANNEL CHANGE (LOOKING DOWNSTREAM) (NOT TO SCALE)
DETAIL 28A - OUTLET CHANNEL CHANGE (LOOKING DOWNSTREAM) (NOT TO SCALE)
DETAIL 28C STANDARD BASE DITCH
DETAIL 28D SPECIAL CUT DITCH
DRIVEWAY RADII ARE 10' UNLESS NOTED OTHERWISE
REVISIONS
11/28/2018 - R/W REVISION: ADDED PARCEL NUMBER 227. - STANTEC


PERMIT DRAWING
SHEET 144 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-188
WETLAND
SITE 26
52+00.00
51+50.00
51+00.00
50+50.00
50+00.00
-Y19-

P-183


PERMIT DRAWING
SHEET 145 OF 165
DATE: 06-09-2020
SHEET NO.
X-154
PROJ. REFERENCE NO.
R-3300B
0 5 10
SITE 28
SITE 28
SITE 28
MECHANIZED CLEARING
FILL IN WETLANDS
WETLANDS
284+50.00
284+00.00
283+50.00
283+00.00
282+50.00
282+00.00
281+50.00
281+00.00
280+50.00
6/23/16
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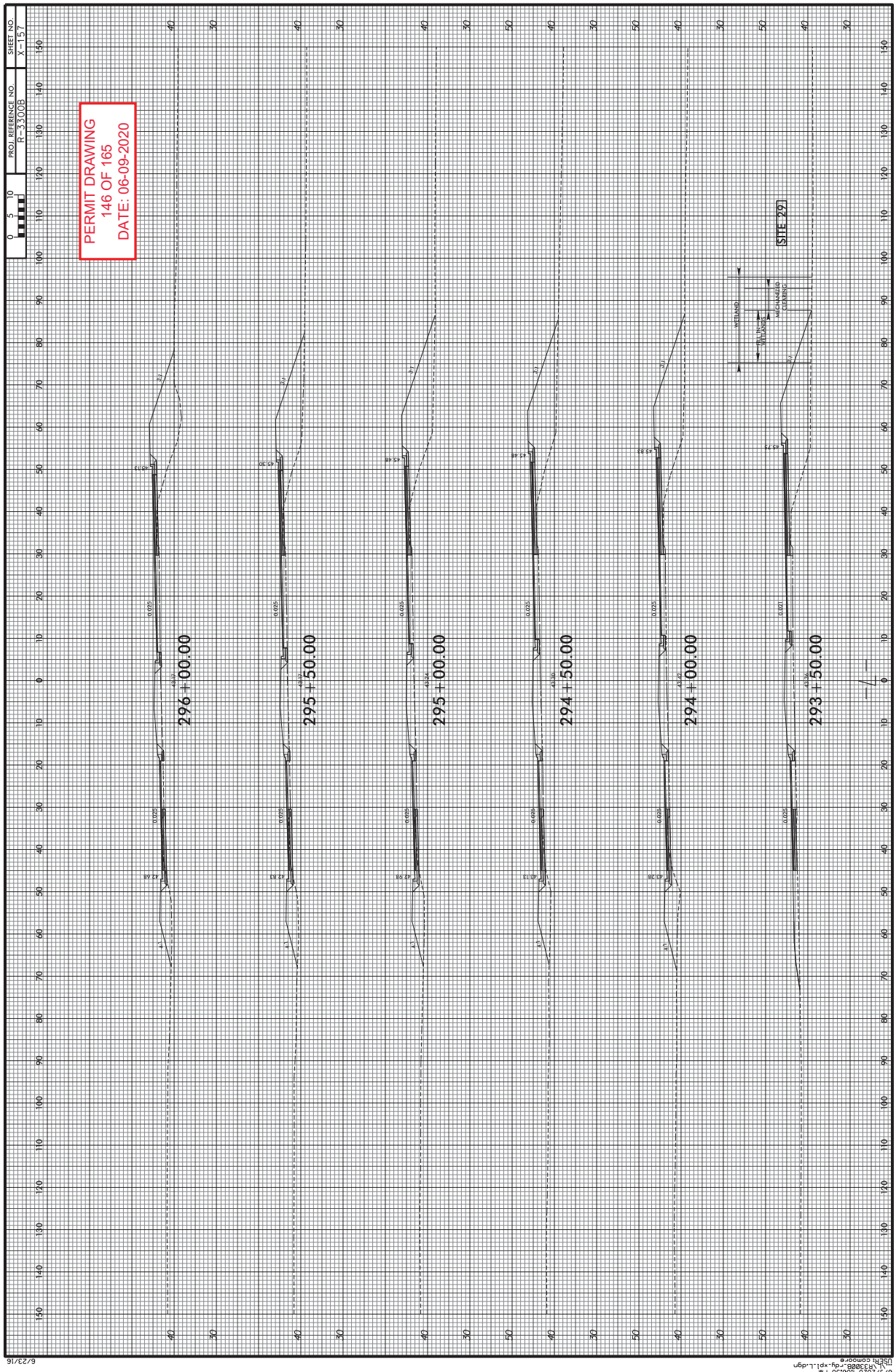
P-184


PERMIT DRAWING
146 OF 165
DATE: 06-09-2020
0 5 10
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-157
296+00.00
295+50.00
295+00.00
294+50.00
294+00.00
293+50.00
[SITE 29]
WETLAND
UTILIZING WETLAND
MECHANIZED CLEARING
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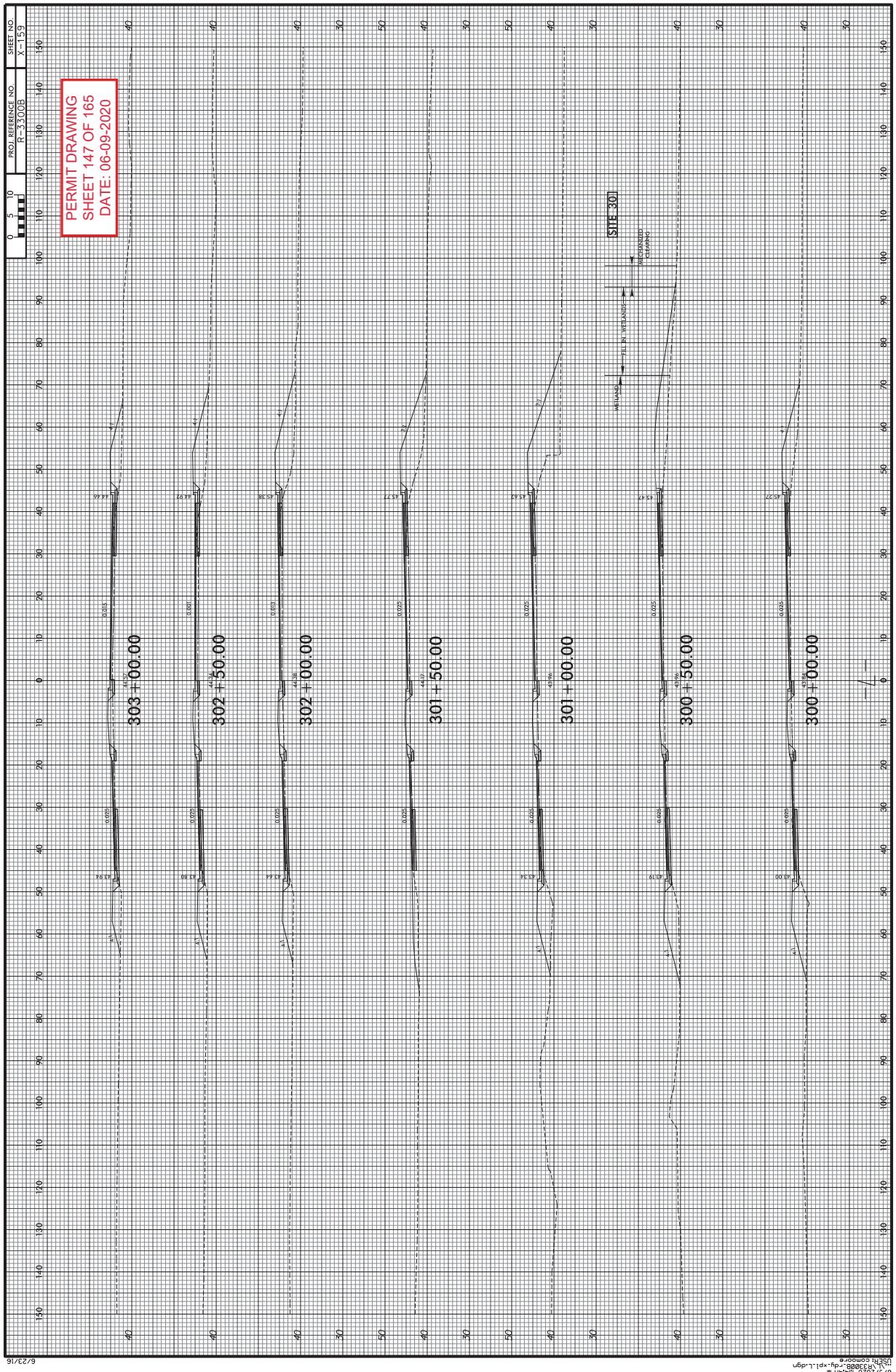
P-185


PERMIT DRAWING
SHEET 147 OF 165
DATE: 06-09-2020
SHEET NO.
X-159
PROJ. REFERENCE NO.
R-3300B
0 5 10
SITE 301
WETLAND
FILL IN WETLANDS
MECHANICALLY STRAINED
303 + 00.00
302 + 50.00
302 + 00.00
301 + 50.00
301 + 00.00
300 + 50.00
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6/23/16
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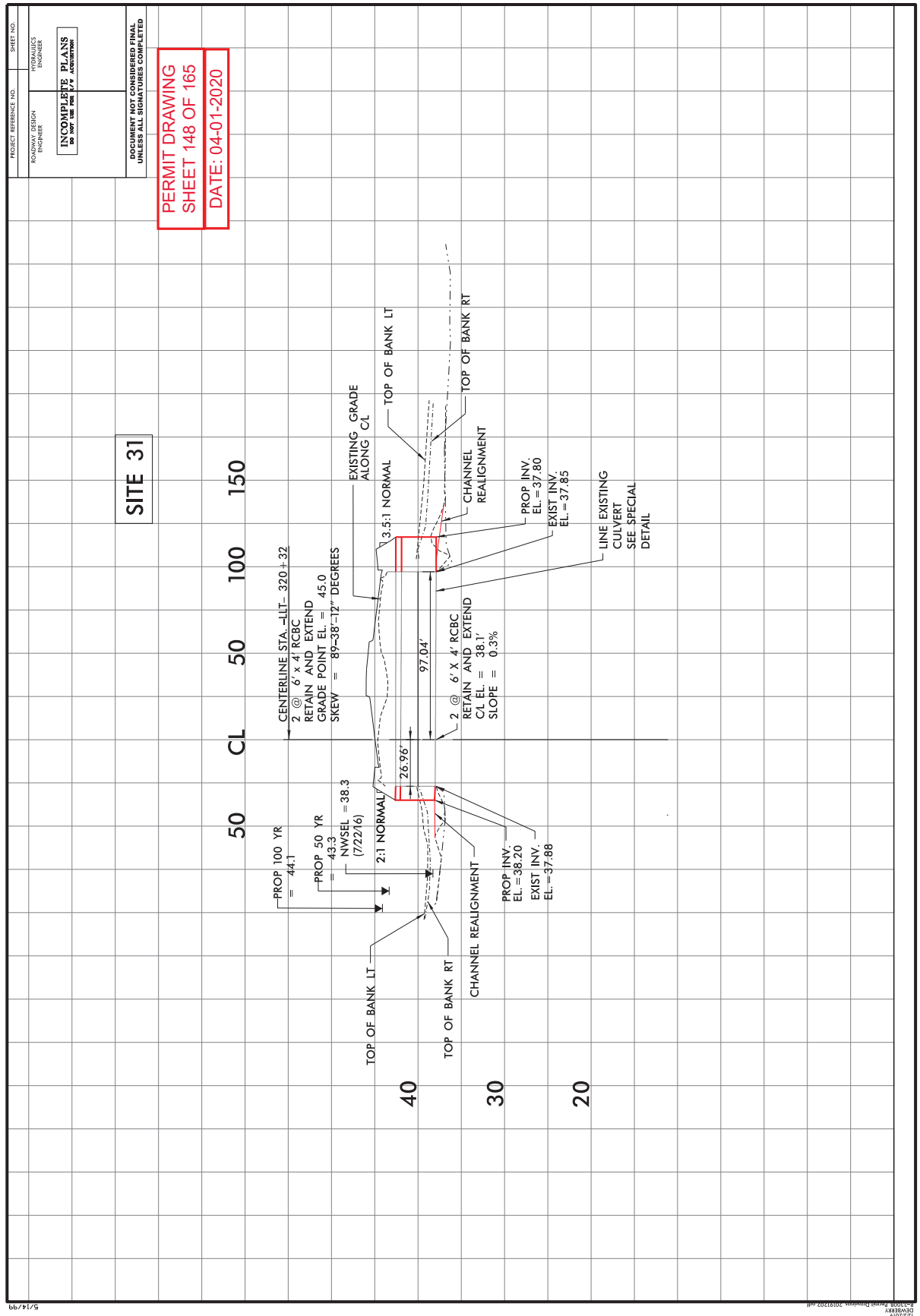
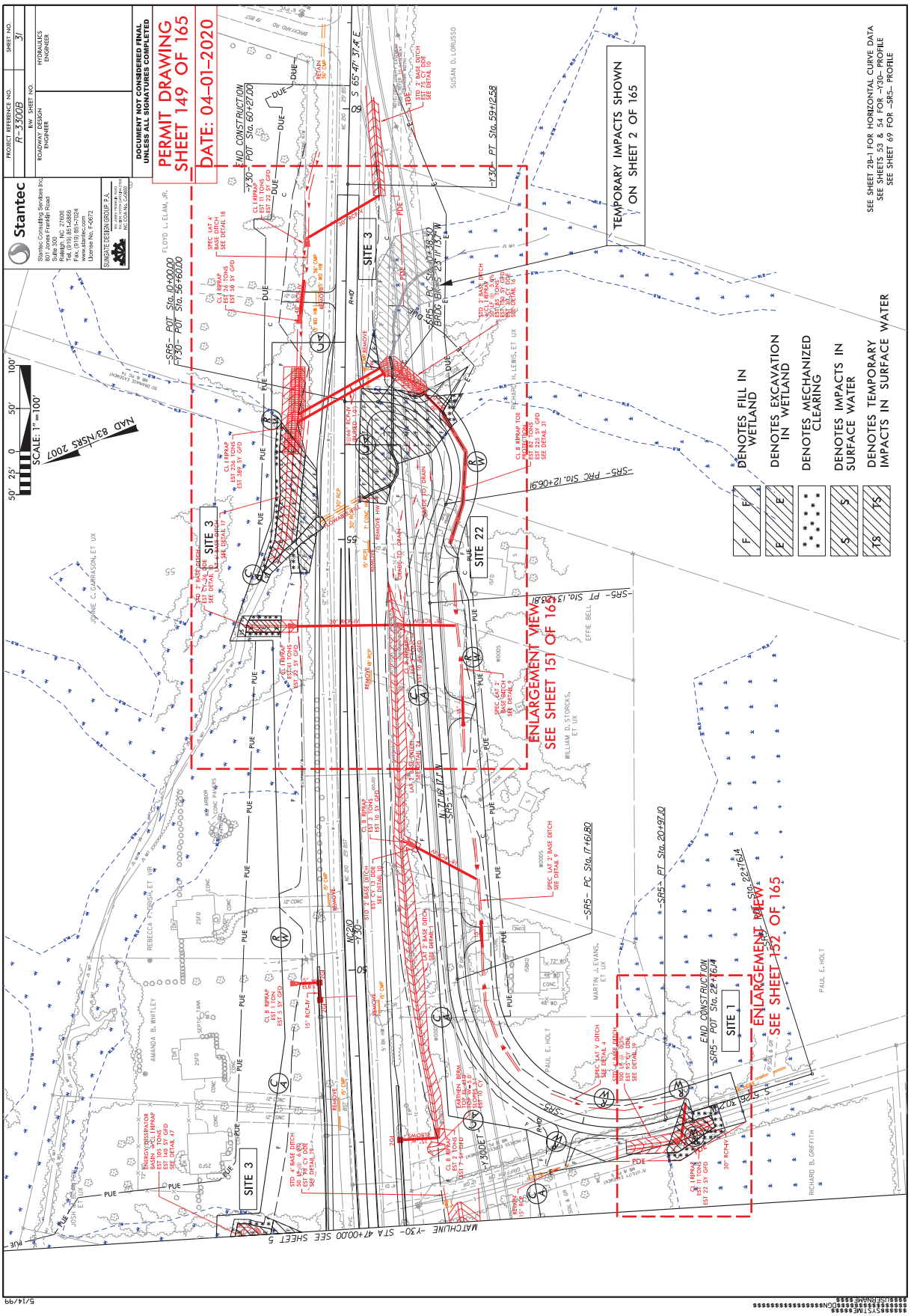
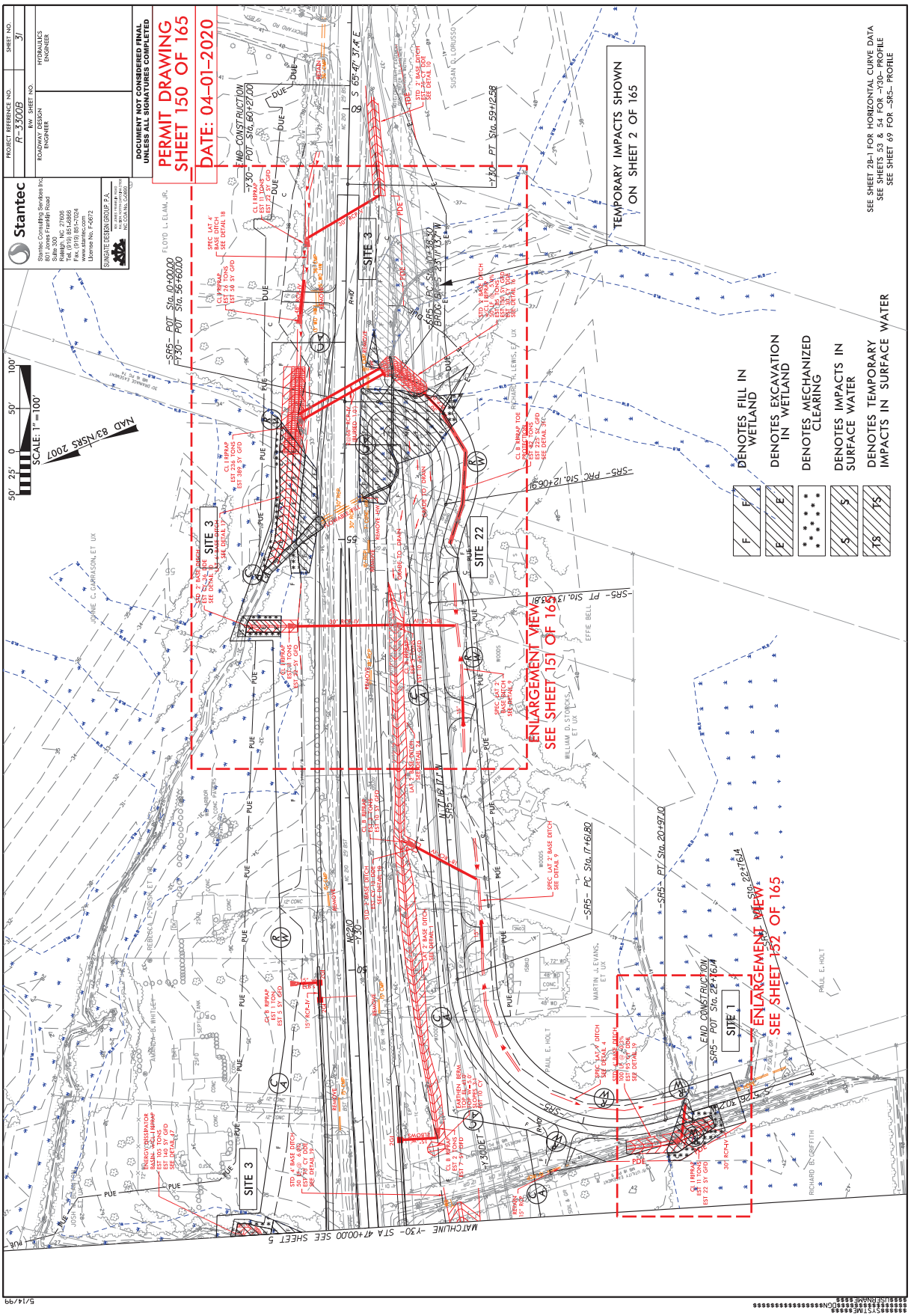

PROJECT REFERENCE NO.
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R / W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 148 OF 165
DATE: 04-01-2020
SITE 31
50
CL
50
100
150
CENTERLINE STA. –LIT– 320+32
2 @ 6' x 4' RCBC
RETAIN AND EXTEND
GRADE POINT EL. = 45.0
SKEW = 89-38'-12" DEGREES
EXISTING GRADE ALONG C/L
TOP OF BANK LT
TOP OF BANK RT
3.5:1 NORMAL
CHANNEL REALIGNMENT
PROP INV. EL. = 37.80
EXIST INV. EL. = 37.85
LINE EXISTING CULVERT SEE SPECIAL DETAIL
PROP 100 YR = 44.1
PROP 50 YR = 43.3
NWSEL = 38.3 (7/22/16)
2:1 NORMAL
26.96'
97.04'
2 @ 6' X 4' RCBC
RETAIN AND EXTEND
C/L EL. = 38.1'
SLOPE = 0.3%
TOP OF BANK LT
TOP OF BANK RT
CHANNEL REALIGNMENT
PROP INV. EL. = 38.20
EXIST INV. EL. = 37.88
40
30
20
5/14/99


PERMIT DRAWING
SHEET 149 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 31
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
END CONSTRUCTION -Y30- POT Sta. 60+27.00
-SR5- POT Sta. 1040.00
-Y30- POT Sta. 56+60.00
-Y30- PT Sta. 59+12.58
-SR5- PC Sta. 23+13.30
-SR5- PRC Sta. 12+06.91
-SR5- PT Sta. 13+38.53
-SR5- PC Sta. 17+61.80
-SR5- PT Sta. 20+97.10
-SR5- POT Sta. 22+16.14
-Y30DET-
-SR5-
SITE 1
SITE 3
SITE 22
TEMPORARY IMPACTS SHOWN ON SHEET 2 OF 165
ENLARGEMENT VIEW SEE SHEET 151 OF 165
ENLARGEMENT VIEW SEE SHEET 152 OF 165
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 53 & 54 FOR -Y30- PROFILE
SEE SHEET 69 FOR -SR5- PROFILE
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
MATCHLINE -Y30- STA 47+00.00 SEE SHEET 5


PROJECT REFERENCE NO. R-3300B
SHEET NO. 31
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 150 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
TEMPORARY IMPACTS SHOWN ON SHEET 2 OF 165
ENLARGEMENT VIEW SEE SHEET 151 OF 165
ENLARGEMENT VIEW SEE SHEET 152 OF 165
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 53 & 54 FOR -Y30- PROFILE
SEE SHEET 69 FOR -SR5- PROFILE
SITE 1
SITE 3
SITE 22
-SR5- POT Sta. 1040.00
-Y30- POT Sta. 56+60.00
-Y30- END CONSTRUCTION POT Sta. 60+27.00
-Y30- PT Sta. 59+12.58
-SR5- PRC Sta. 12+06.91
-SR5- PI Sta. 13+38.00
-SR5- PC Sta. 17+61.80
-SR5- PT Sta. 20+97.10
-SR5- END CONSTRUCTION POT Sta. 22+16.14
MATCHLINE -Y30- STA 47+00.00 SEE SHEET 5

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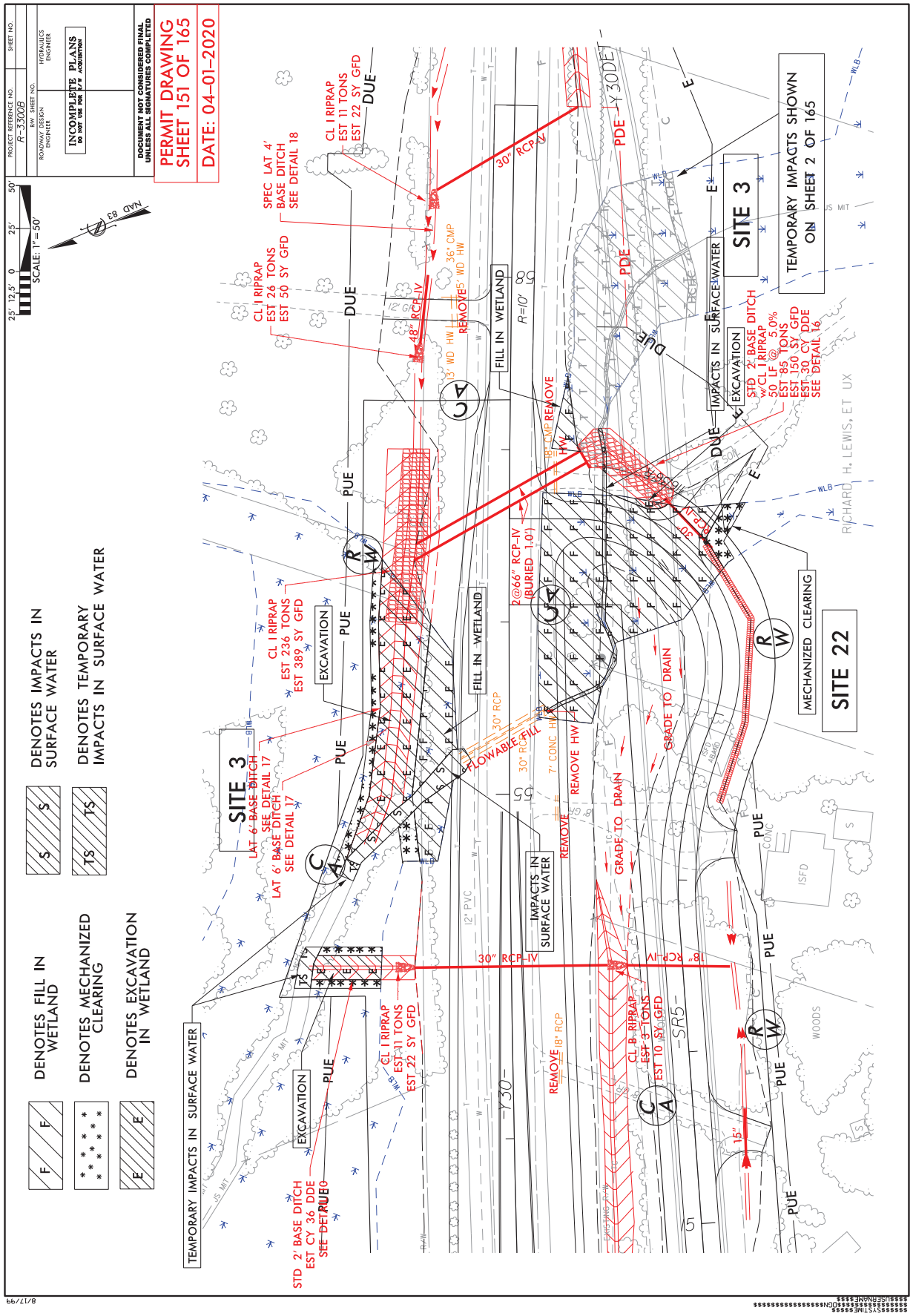
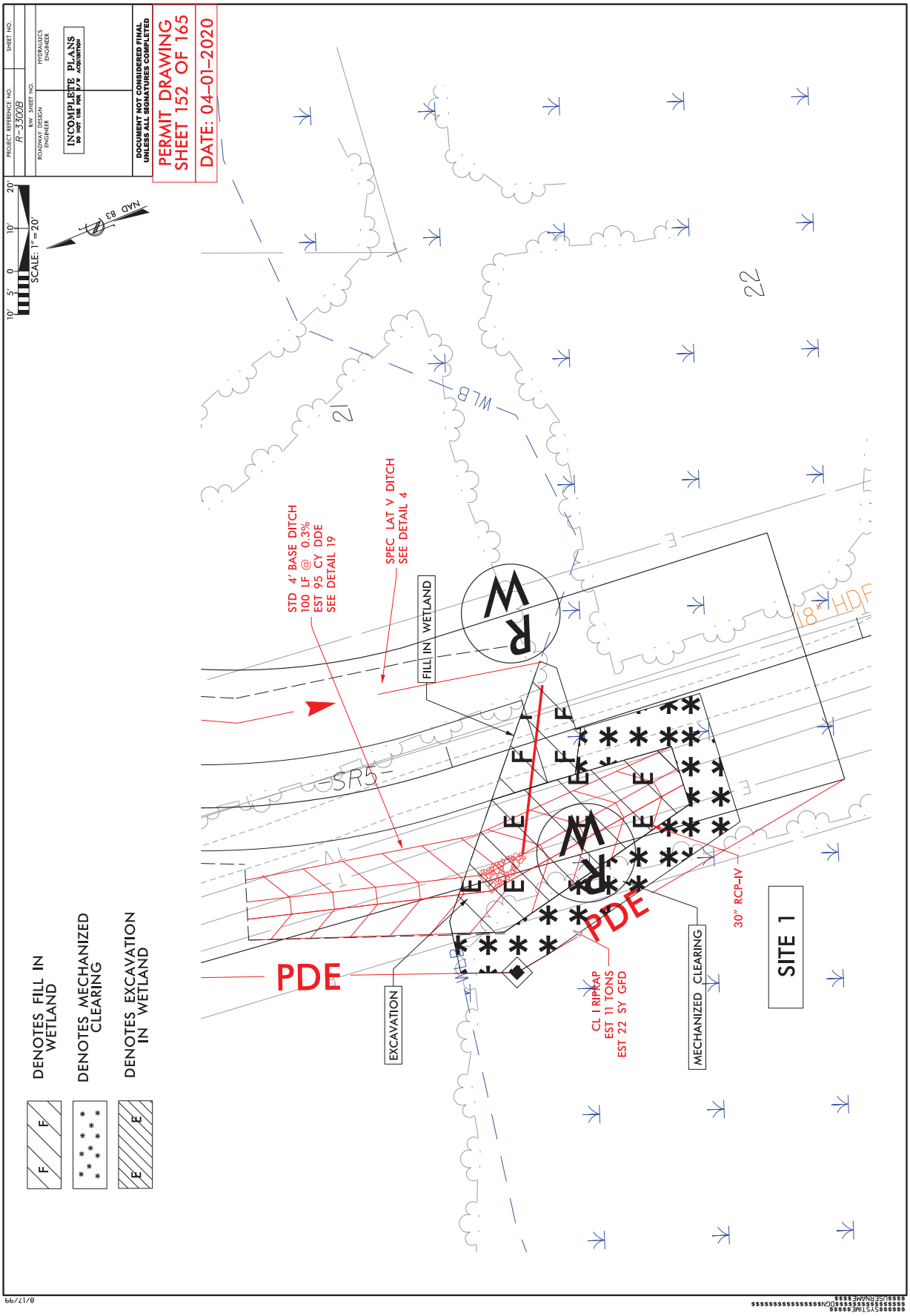
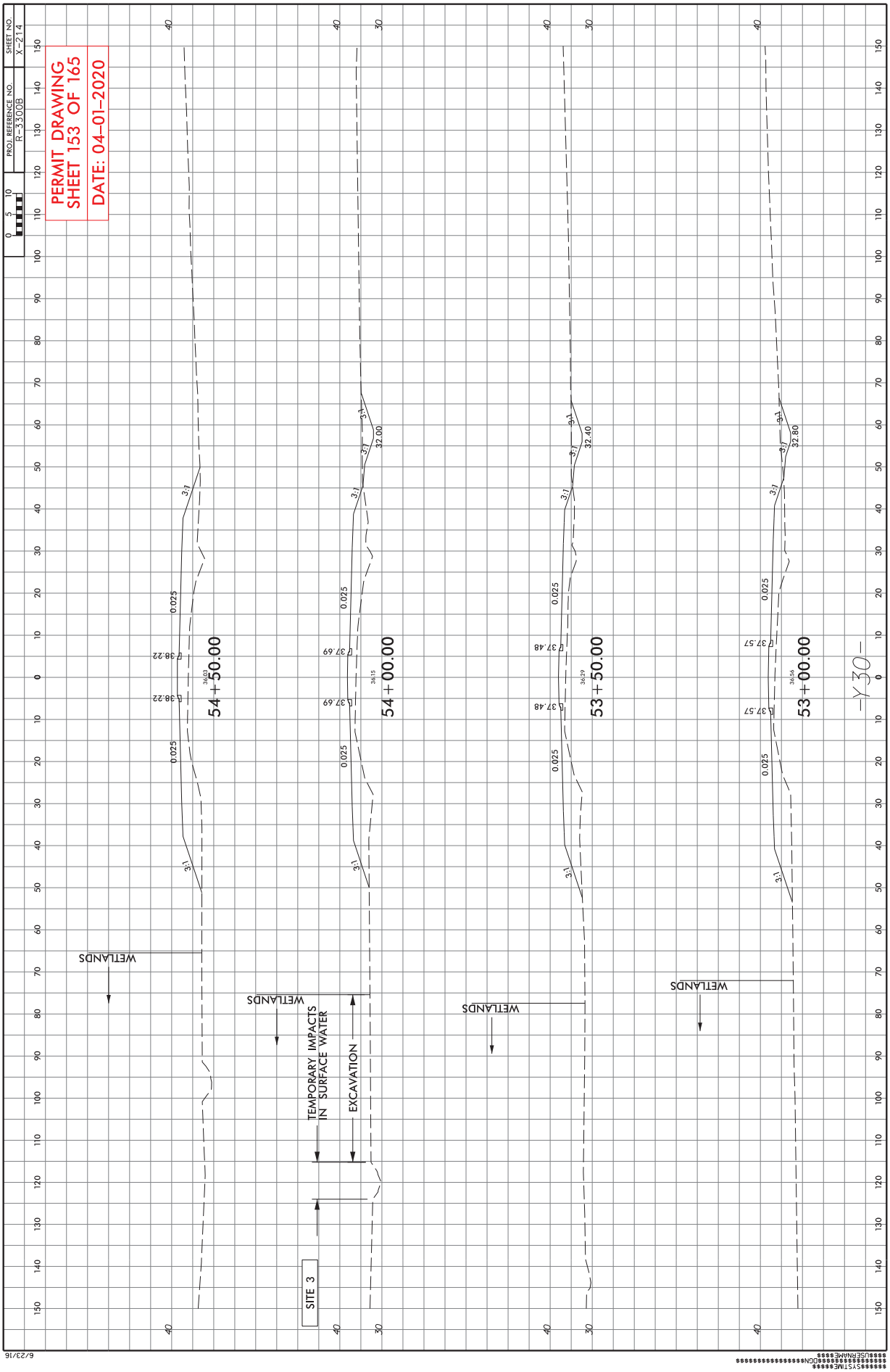
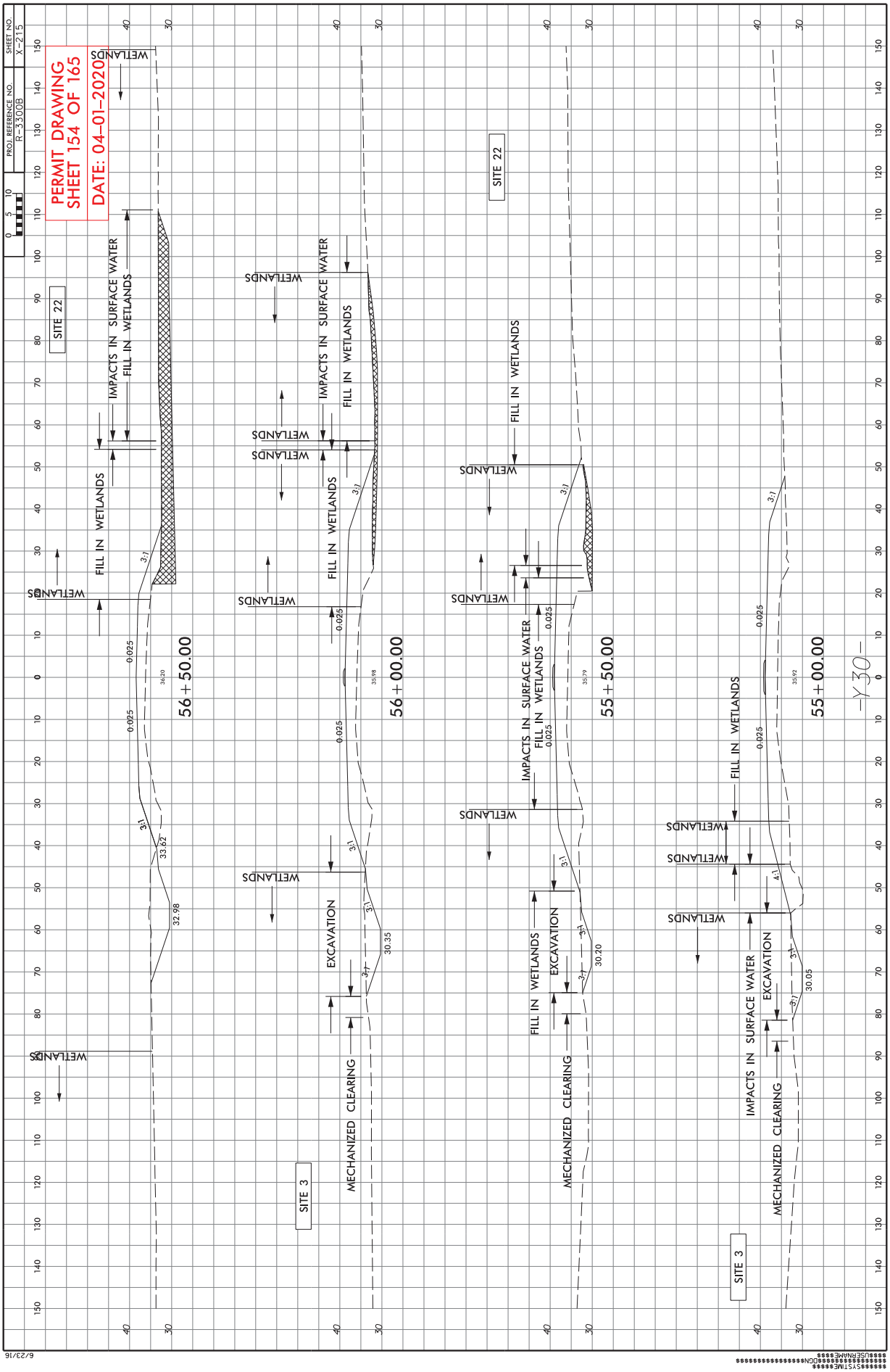

PROJECT REFERENCE NO.
A-3300B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SHEET NO.
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 151 OF 165
DATE: 04-01-2020
SCALE: 1" = 50'
NAD 83
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
SITE 3
SITE 22
SITE 3
TEMPORARY IMPACTS SHOWN ON SHEET 2 OF 165
MECHANIZED CLEARING
EXCAVATION
IMPACTS IN SURFACE WATER
FILL IN WETLAND
FLOWABLE FILL
GRADE TO DRAIN
REMOVE
REMOVE HW
STD 2' BASE DITCH
EST CY 36 DDE
SEE DETAIL 10
CL I RIPRAP
EST 11 TONS
EST 22 SY GFD
CL I RIPRAP
EST 236 TONS
EST 389 SY GFD
LAT 6' BASE DITCH
SEE DETAIL 17
CL I RIPRAP
EST 26 TONS
EST 50 SY GFD
SPEC LAT 4' BASE DITCH
SEE DETAIL 18
CL I RIPRAP
EST 11 TONS
EST 22 SY GFD
CL B RIPRAP
EST 3 TONS
EST 10 SY GFD
STD 2' BASE DITCH
w/CL I RIPRAP
50 LF @ 5.0%
EST 85 TONS
EST 150 SY GFD
EST 30 CY DDE
SEE DETAIL 16
30" RCP-IV
48" RCP-IV
36" CMP
5' WD HW
3' WD HW
30" RCP
12" PVC
8" RCP
15"
PUE
DUE
PDE
Y30DE
Y30
SR5
ISFD
WOODS
RICHARD H. LEWIS, ET UX


PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 152 OF 165
DATE: 04-01-2020
SCALE: 1"=20'
NAD 83
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
STD 4' BASE DITCH
100 LF @ 0.3%
EST 95 CY DDE
SEE DETAIL 19
SPEC LAT V DITCH
SEE DETAIL 4
FILL IN WETLAND
18" HDPE
30" RCP-IV
PDE
PDE
EXCAVATION
CL I RIPRAP
EST 11 TONS
EST 22 SY GFD
MECHANIZED CLEARING
SITE 1
SR5
WLB
22
21


PERMIT DRAWING
SHEET 153 OF 165
DATE: 04-01-2020
SHEET NO. X-214
PROJ. REFERENCE NO. R-3300B
0 5 10
54+50.00
54+00.00
53+50.00
53+00.00
WETLANDS
TEMPORARY IMPACTS IN SURFACE WATER
EXCAVATION
SITE 3
3:1
0.025
32.00
32.40
32.80
-Y30-


PERMIT DRAWING
SHEET 154 OF 165
DATE: 04-01-2020
SHEET NO. X-215
PROJ. REFERENCE NO. R-3300B
0 5 10
SITE 22
SITE 3
IMPACTS IN SURFACE WATER
FILL IN WETLANDS
WETLANDS
EXCAVATION
MECHANIZED CLEARING
56+50.00
56+00.00
55+50.00
55+00.00
3:1
4:1
0.025
36.20
33.62
32.98
35.98
35.79
35.92
30.35
30.20
30.05
-Y30-
6/23/16

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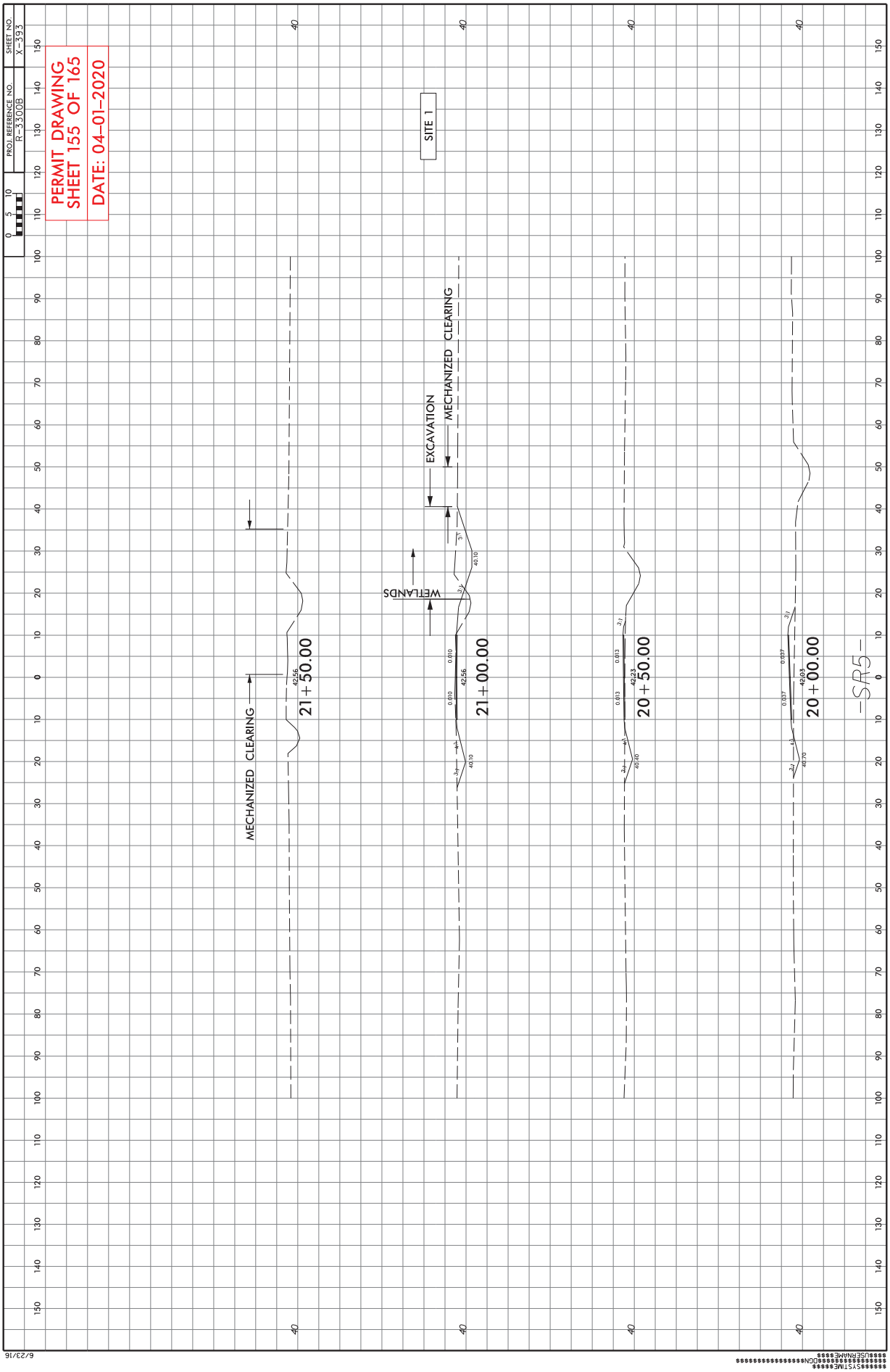
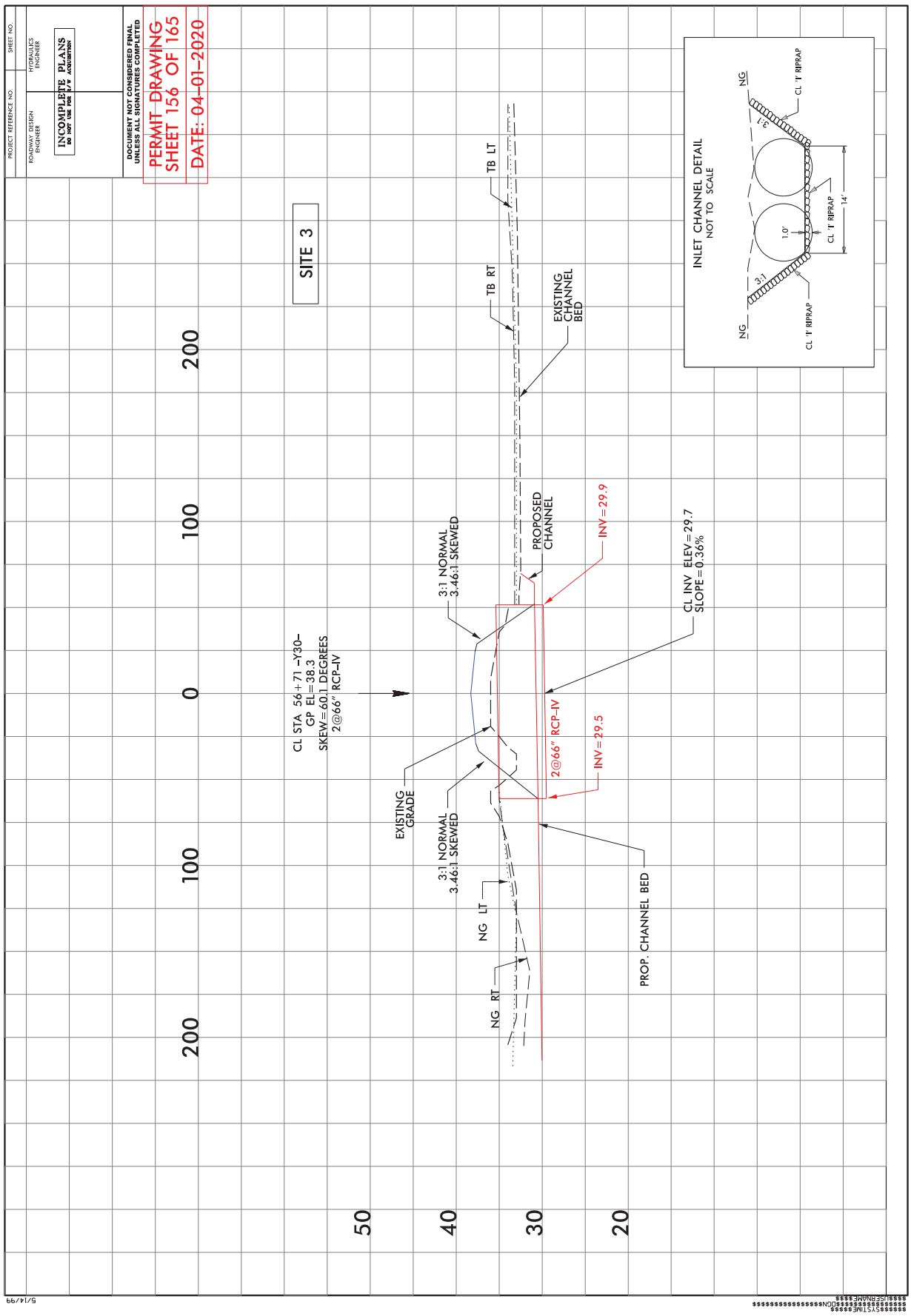
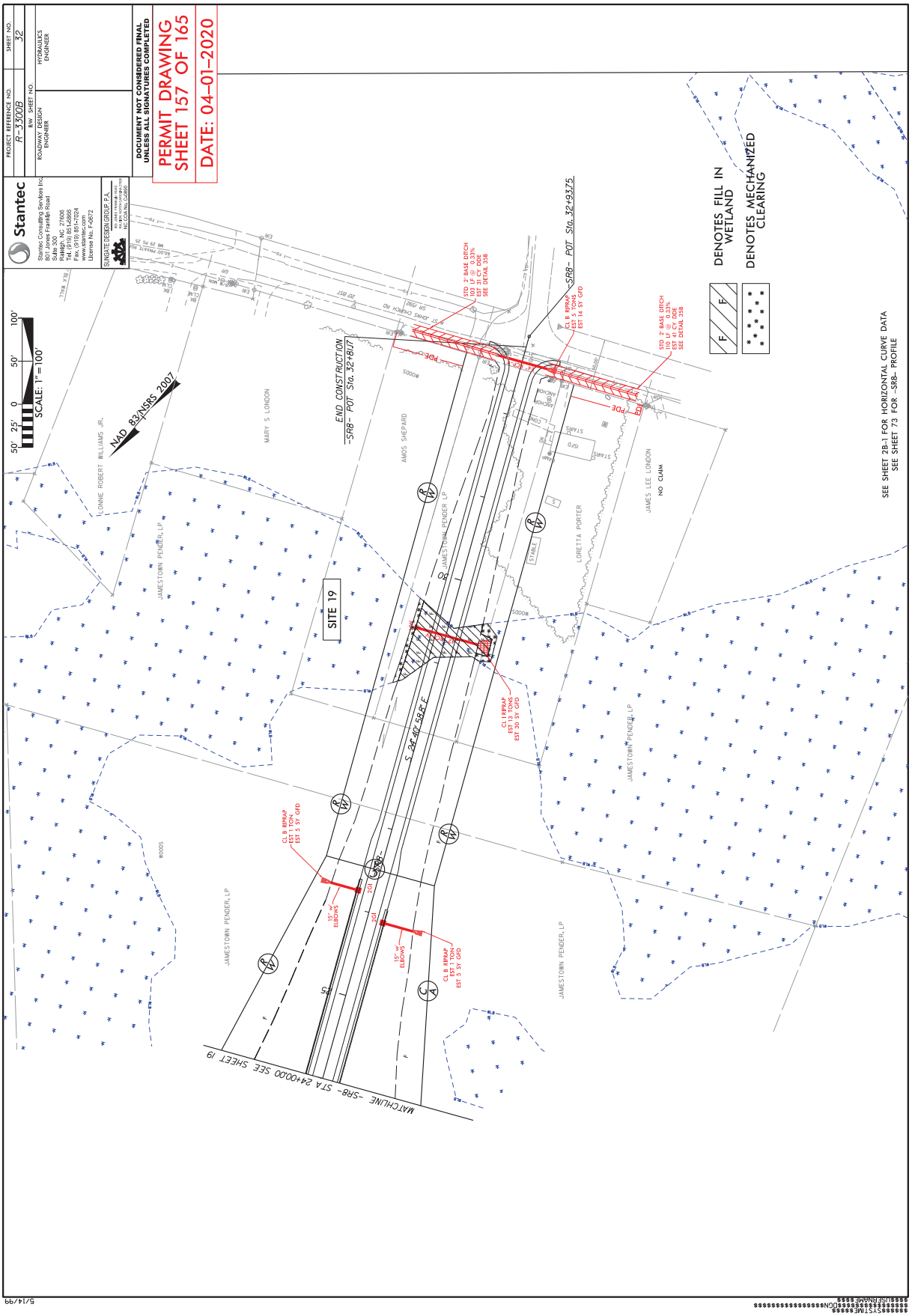
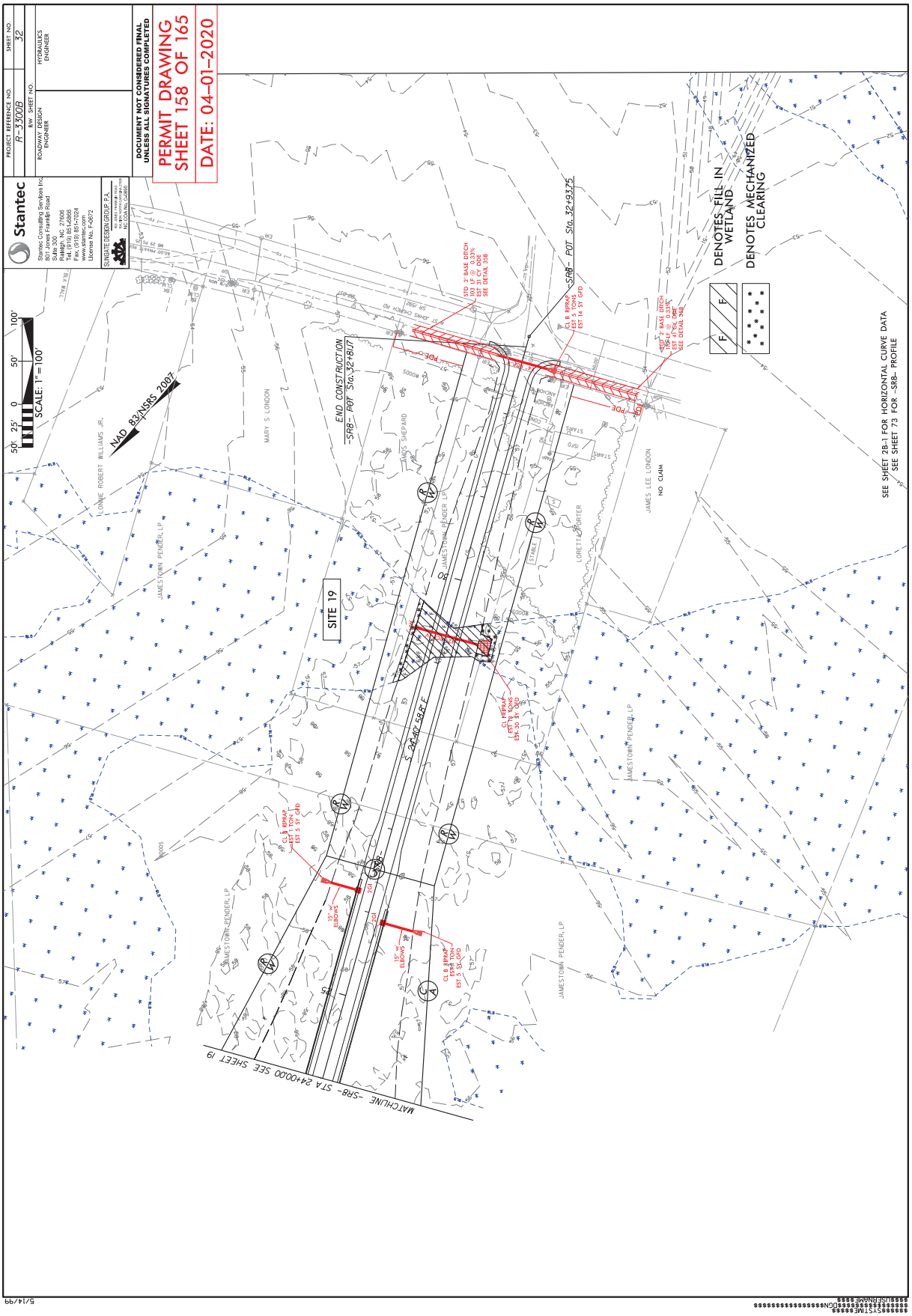
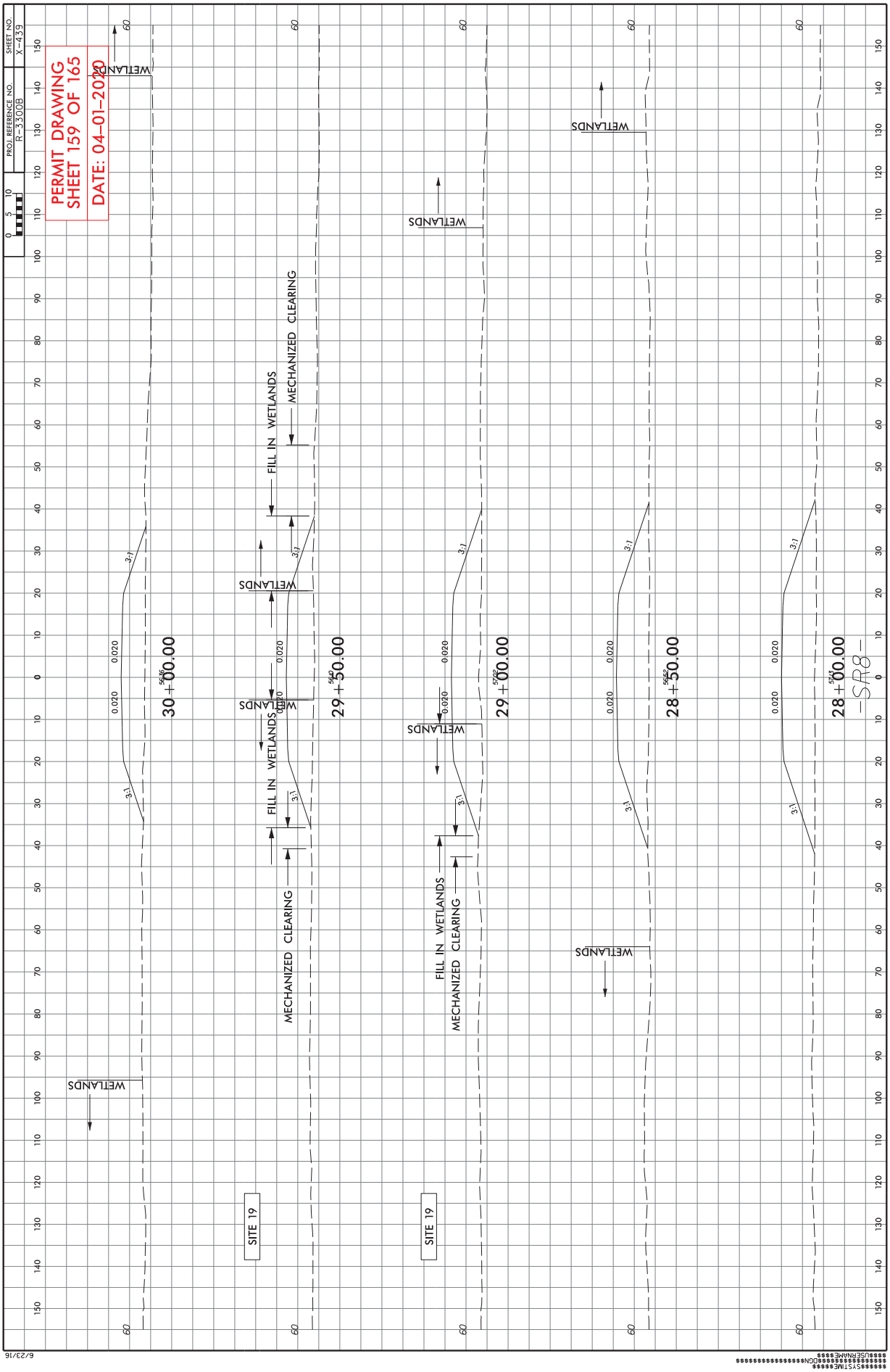

PERMIT DRAWING
SHEET 155 OF 165
DATE: 04-01-2020
PROJ. REFERENCE NO.
R-3300B
SHEET NO.
X-393
SITE 1
MECHANIZED CLEARING
EXCAVATION
MECHANIZED CLEARING
WETLANDS
21+50.00
21+00.00
20+50.00
20+00.00
-SD5-


PROJECT REFERENCE NO.
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 156 OF 165
DATE: 04-01-2020
SITE 3
CL STA 56+71 -Y30-
GP EL=38.3
SKEW=60.1 DEGREES
2@66" RCP-IV
EXISTING GRADE
3:1 NORMAL
3.46:1 SKEWED
NG LT
NG RT
TB LT
TB RT
EXISTING CHANNEL BED
PROPOSED CHANNEL
INV=29.9
2@66" RCP-IV
INV=29.5
CL INV ELEV=29.7
SLOPE=0.36%
PROP. CHANNEL BED
INLET CHANNEL DETAIL
NOT TO SCALE
NG
CL 1' RIPRAP
3:1
1.0'
14'
0
100
200
100
200
50
40
30
20


PROJECT REFERENCE NO. R-3300B
SHEET NO. 32
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 157 OF 165
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
END CONSTRUCTION -SR8- POT Sta. 32+81.17
-SR8- POT Sta. 32+93.75
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SITE 19
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 73 FOR -SR8- PROFILE
MARY S LONDON
LONNIE ROBERT WILLIAMS JR.
AMOS SHEPARD
JAMESTOWN PENDER, LP
LORETTA PORTER
JAMES LEE LONDON
NO CLAIM
WOODS
STABLE
MATCHLINE -SR8- STA 24+00.00 SEE SHEET 19


PERMIT DRAWING
SHEET 158 OF 165
DATE: 04-01-2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 32
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1" = 100'
NAD 83/NSRS 2007
END CONSTRUCTION -SR8- POT Sta.32+18.17
-SR8- POT Sta.32+93.75
SITE 19
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 73 FOR -SR8- PROFILE
MARY S LONDON
LONNIE ROBERT WILLIAMS JR.
JAMES SHEPARD
JAMESTOWN PENDER, LP
LORETTA PORTER
JAMES LEE LONDON
NO CLAIM
WOODS
STABLE
MATCHLINE -SR8- STA 24+00.00 SEE SHEET 19


PERMIT DRAWING
SHEET 159 OF 165
DATE: 04-01-2020
SHEET NO. X-439
PROJ. REFERENCE NO. R-3300B
0 5 10
WETLANDS
FILL IN WETLANDS
MECHANIZED CLEARING
SITE 19
30+00.00
29+50.00
29+00.00
28+50.00
28+00.00
3:1
0.020
-SP8-

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	584+18 to 601+51-L1-	ROADWAY FILL	5.436		0.005	0.699						
	5+13 to 5+71-Y30RPB-LT				0.015	0.016						
	13+27 to 18+16-Y30RPB-		0.883			0.118						
	19+30 to 26+02-Y30RPC-		1.190		0.025	0.080						
	27+65-SR4-					0.004						
	20+90 to 21+60-SR5-		0.008		0.028	0.027						
	43+83 to 44+59-Y30DET-LT		0.038			0.003						
2	41+43 to 43+15-Y30-RT	ROADWAY FILL	0.141		0.022							
	43+21 to 44+49-Y30DET-LT *											
3	609+50 to 618+70-L1-	ROADWAY FILL	1.754		0.002	0.089	0.210	0.526	0.010	419	36	
	611+72 to 611+91-L1-RT	1 at 12'x7' RCBC										
		INLET CHANNEL			0.004							
		INLET BANK STABILIZATION								33		
	611+98 to 612+68-L1-LT	OUTLET CHANNEL				0.005	0.015	0.014		56		
		OUTLET BANK STABILIZATION								38		
	45+87 to 47+20-Y30-LT	ROADWAY FILL	0.180		0.035	0.024						
	53+88 to 54+12-Y30-LT	30" RCP OUTLET DITCH			0.013	0.009			0.005		25	
	54+51 to 56+42-Y30-LT	2 at 66" RCP OUTLET DITCH			0.082			0.019	0.002	91	10	
	56+99 to 57+43-Y30-RT	ROADWAY FILL	0.008									
	57+15 to 58+74-Y30DET-			0.149			0.010		0.006		125	
	13+40 to 19+59-Y30RPA-		1.694		0.045	0.188		0.094	0.011	441	55	
TOTALS:			**11.332**	**0.149**	**0.276**	**1.262**	**0.235**	**0.653**	**0.034**	**1078**	**251**	**0**

NOTES:
* Site 2 detour impacts included in roadway fill impacts (Total Take).

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NC DEPARTMENT OF TRANSPORTATION
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06-09-2020
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R-3300B
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SHEET 160 OF 165

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
3	15+01 to 15+56-Y30RPA-LT	1 at 12'x7' RCBC INLET CHANNEL			0.020			0.005	0.003	29	12	
	26+15 to 26+49-SR6-LT	OUTLET CHANNEL			0.005				0.004		14	
		OUTLET BANK STABILIZATION								14		
	18+22 to 20+14-Y30RPD-	ROADWAY FILL	0.470			0.064	0.026	0.060		243		
	19+69 to 20+05-Y30RPD-LT	1 at 12'x7' RCBC INLET CHANNEL			0.004				0.005		25	
		INLET BANK STABILIZATION								25		
	18+99 to 19+24-Y30RPD-RT	OUTLET CHANNEL			0.012							
		OUTLET BANK STABILIZATION								22		
4	623+04 to 632+02-L1-	ROADWAY FILL	1.812			0.131						
	633+70 to 634+01-L1-LT	30" RCP PIPE OUTLET				0.005						
5	638+99 to 642+01-L1-	ROADWAY FILL	0.065					0.085		364		
6	641+99 to 643+06-L1-	ROADWAY FILL						0.121	0.010	355	31	
7	645+01 to 666+60-L1-	ROADWAY FILL	4.805		0.249	0.380		0.606	0.012	1768	52	
		OUTLET CHANNEL			0.062							
		OUTLET BANK STABILIZATION								34		
	18+94 to 20+52-Y38-	ROADWAY FILL	0.072		0.033	0.018		0.112		226		
	19+83-Y38-RT	3 AT 12'x8' RCBC			0.009							
	19+38 to 20+09-Y38-LT	INLET CHANNEL				0.007						
	19+57 to 20+40Y38-RT	OUTLET CHANNEL			0.062	0.008		0.013	0.003	32	10	
TOTALS:			**7.224**	**0.000**	**0.456**	**0.613**	**0.026**	**1.002**	**0.037**	**3112**	**144**	**0**

NOTES:

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NC DEPARTMENT OF TRANSPORTATION
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06-09-2020
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R-3300B
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SHEET 161 OF 165

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
7	18+94 to 19+38-Y38-	ROADWAY FILL			0.033	0.018						
	11+08 to 12+48-Y38DET-			0.110			0.020					
8	673+01 to 673+68-L1-RT	ROADWAY FILL	0.071			0.012						
9	673+18 to 689+67-L1-LT	ROADWAY FILL	0.087			0.041						
10	676+64 to 679+37-L1-	DRAIN POND						0.633				
11	695+36 to 695+47-L1-LT	ROADWAY FILL				0.001						
12	700+69 to 702+88-L1-	DRAIN POND						0.416				
13	709+67 to 715+63-L1-	ROADWAY FILL	2.160			0.114		0.063		228		
	712+83 to 713+95-L1-RT	2 at 12'x7' RCBC INLET CHANNEL			0.024	0.015		0.022	0.004	78	14	
	711+78 to 712+35-L1-LT	OUTLET CHANNEL			0.021	0.010			0.003		12	
		OUTLET STABILIZATION								42		
14	724+44 to 725+96-L1-	ROADWAY FILL						0.100	0.007			
	724+48 to 724+73-L1-RT	48" RCP OUTLET STABILIZATION						0.007				
	17+51 to 18+26-Y31RPC-	ROADWAY FILL						0.035	0.006			
	17+57 to 17+87-Y31RPC-	54" RCP OUTLET STABILIZATION						0.008				
TOTALS:			**2.318**	**0.110**	**0.078**	**0.211**	**0.020**	**1.284**	**0.020**	**348**	**26**	**0**

NOTES:
Site 14: JS Non-Mitigable

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WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation in Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing in Wetlands (ac)	WETLAND IMPACTS: Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	SURFACE WATER IMPACTS: Temp. SW impacts (ac)	SURFACE WATER IMPACTS: Existing Channel Impacts Permanent (ft)	SURFACE WATER IMPACTS: Existing Channel Impacts Temp. (ft)	SURFACE WATER IMPACTS: Natural Stream Design (ft)
15	730+72 to 743+68-L1-	ROADWAY FILL	4.898		0.060	0.228						
	15+72 to 22+37-SR7-		1.059		0.014	0.193						
	15+91 to 16+09-SR7-RT	24" RCP OUTLET CHANNEL			0.012							
16	18+25 to 21+01 -Y31-RT	ROADWAY FILL	0.066			0.009						
	18+74 to 21+34-Y31DET-			0.082			0.024					
17	18+38 to 19+05-Y31-LT	ROADWAY FILL	0.002			0.007						
	26+86 to 28+87-SR7-		0.190		0.030	0.022						
18	45+47 to 47+66-SR7-	ROADWAY FILL	0.252			0.043						
	766+70 to 769+26-L1-		0.534			0.020						
19	769+74 to 854+07-L1-	ROADWAY FILL	26.807		0.073	3.036		0.254		773		
	48+38 to 56+57-SR7-		1.002			0.188						
	14+42 to 29+70-SR8-		0.359			0.055						
	7+45 to 16+31-Y32RPB1-		2.075			0.156						
	18+01 to 22+37-Y32-		1.094		0.054	0.002		0.144		484		
	29+50 to 39+40-Y32-		4.455		0.110	0.335						
TOTALS:			**42.793**	**0.082**	**0.353**	**4.294**	**0.024**	**0.398**	**0.000**	**1257**	**0**	**0**

NOTES:
Site 20 Combined with Site 19.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
06-09-2020
PENDER COUNTY
R-3300B
40237.2.1
SHEET 163 OF 165

Revised 2018 Feb

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WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
21	23+66 to 25+54-Y19-	ROADWAY FILL	0.372			0.020		0.014		97		
	25+09-Y19-	1 AT 8'x6' RCBC			0.013							
	24+82 to 25+32-Y19-	OUTLET CHANNEL			0.033	0.010			0.009		33	
22	10+17 to 12+28-SR5-	ROADWAY FILL	0.209		0.002	0.009		0.007		163		
23	603+49 to 604+94-L1-RT	POND						0.279				
24	16+83 to 18+03-Y30DET-RT	ROADWAY FILL		0.013			0.012					
25	46+69 to 46+76-Y31DET-RT	ROADWAY FILL					0.001					
26	Y19 50+00 RT	Channel Realignment				0.005		0.028				
27	Y19 51+27 to 53+44	Roadway Fill						0.117	0.046			
28	L 279+29 to 286+56 RT	Roadway Fill	0.307			0.085						
29	L 293+08 to 293+80 RT	Roadway Fill	0.016			0.003						
30	L 301+00 RT	Roadway Fill	0.005			0.001						
TOTALS:			**0.909**	**0.013**	**0.048**	**0.133**	**0.013**	**0.445**	**0.055**	**260**	**33**	**0**

NOTES:
Site 26: JS Non-Mitigable

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
06-09-2020
PENDER COUNTY
R-3300B
40237.2.1
SHEET 164 OF 165

Revised 2018 Feb

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WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
31	LLT 320+33 LT	6' X 4' RCBC Extension						0.009		26		
	LLT 320+33 LT	Channel Realignment (LT)						0.012	0.004	39	19	
	LLT 320+33 RT	CL. B Rip Rap Pad						0.004		20		
	LLT 320+33 RT	Channel Realignment (RT)						0.008	0.004	37	16	
32	13+45 to 14+89-Y43-LT	DITCH				0.014						
	TOTALS THIS SHEET		**0.000**	**0.000**	**0.000**	**0.014**	**0.000**	**0.033**	**0.008**	**122**	**35**	**0**
	TOTAL SHEET 160		11.332	0.149	0.276	1.262	0.235	0.653	0.034	1078	251	0
	TOTAL SHEET 161		7.224	0.000	0.456	0.613	0.026	1.002	0.037	3112	144	0
	TOTAL SHEET 162		2.318	0.110	0.078	0.211	0.020	1.284	0.020	348	26	0
	TOTAL SHEET 163		42.793	0.082	0.353	4.294	0.024	0.398	0.000	1257	0	0
	TOTAL SHEET 164		0.909	0.013	0.048	0.133	0.013	0.445	0.055	260	33	0
TOTALS:			**64.576**	**0.354**	**1.211**	**6.527**	**0.318**	**3.815**	**0.154**	**6177**	**489**	**0**

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
06-09-2020
PENDER COUNTY
R-3300B
40237.2.1
SHEET 165 OF 165

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TIP PROJECT: R-3300B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

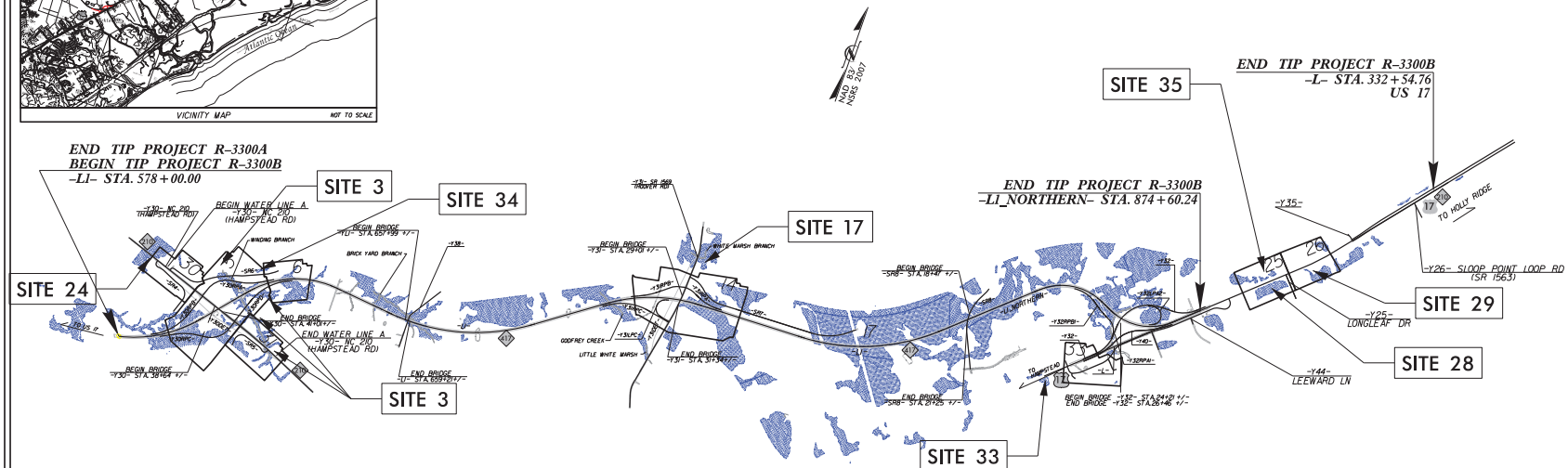
PENDER COUNTY

T.I.P. NO.	SHEET NO.
R-3300B	UC-01

PERMIT DRAWING
SHEET 1 OF 23
DATE: 04-01-2020

LOCATION: NC 417 (HAMPSTEAD BYPASS) FROM SOUTH OF NC 210 TO US-17 NORTH OF HAMPSTEAD

TYPE OF WORK: UTILITY RELOCATES



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED

GRAPHIC SCALES

PLANS: 50 0 50 100

PROFILE (HORIZONTAL): 50 0 50 100

PROFILE (VERTICAL): 10 0 10 20

PREPARED IN THE OFFICE OF

Stantec

STANTEC CONSULTING SERVICES INC.
801 JONES FRANKLIN ROAD, SUITE 300
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FAX: (919) 851-7024
www.stantec.com
License No.: F-0672

RICKY GREENE, PE — CONSULTANT CONTACT #1
LINDA PASS, PE — CONSULTANT CONTACT #2
ROBIN ROCK — CONSULTANT CONTACT #3

SEAL

DIVISION OF HIGHWAYS
UTILITIES UNIT
1555 MAIL SERVICES CENTER
RALEIGH NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

UTILITIES REGIONAL ENGINEER
UTILITIES ENGINEER
UTILITIES AREA COORDINATOR
UTILITIES COORDINATOR

$$$$$$$$SYSTIME$$$$$
$$$$$$$$USERNAME$$$$

P-204

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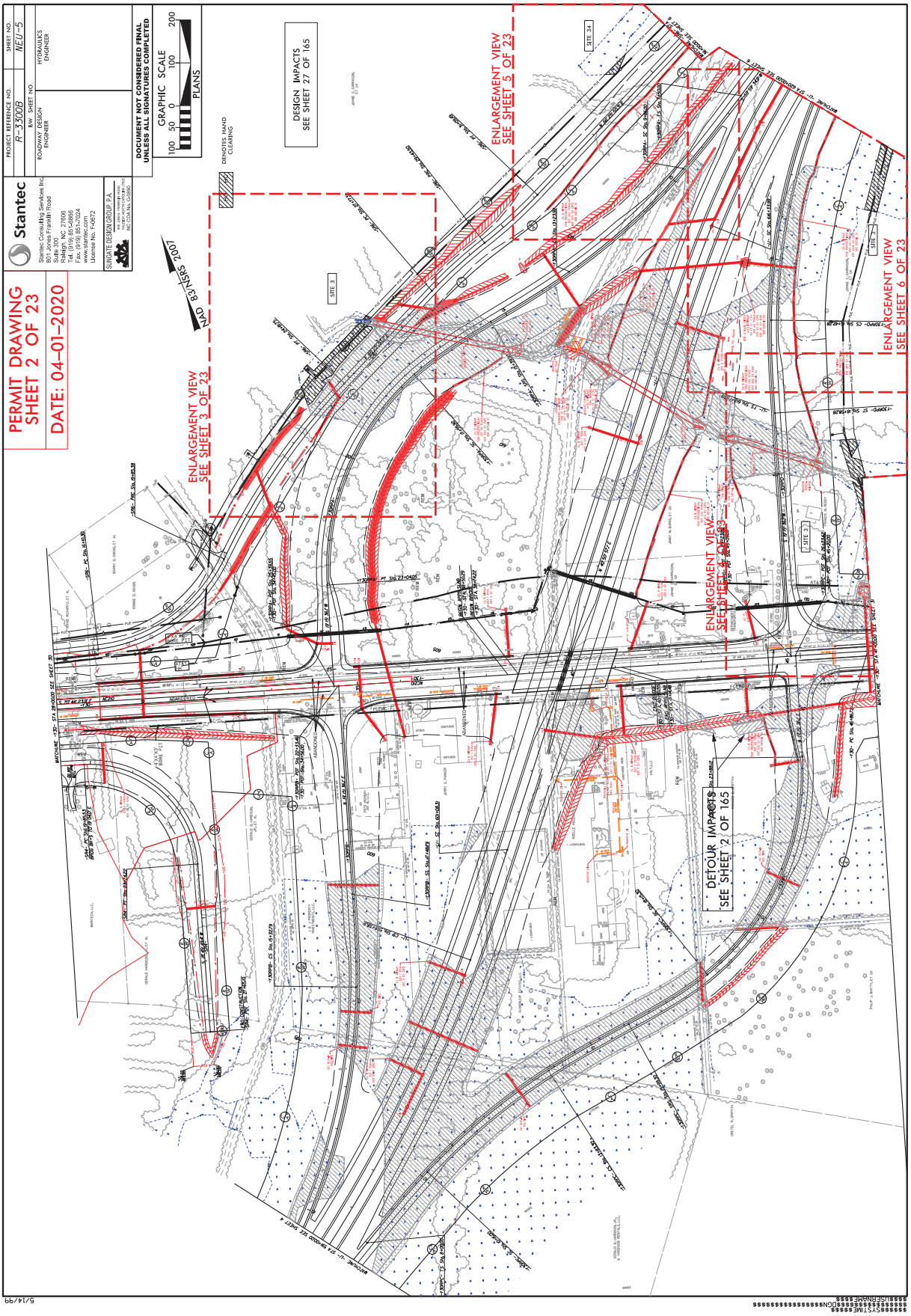
PERMIT DRAWING
SHEET 2 OF 23
DATE: 04-01-2020
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SANGATE DESIGN GROUP, P.A.
NC CERTIFICATE OF AUTHORIZATION
NO. C04176
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UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO.
R-3300B
RW SHEET NO.
SHEET NO.
NEU-5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
GRAPHIC SCALE
100 50 0 100 200
PLANS
NAD 83/NSRS 2007
DENOTES HAND CLEARING
DESIGN IMPACTS
SEE SHEET 27 OF 165
ENLARGEMENT VIEW
SEE SHEET 3 OF 23
ENLARGEMENT VIEW
SEE SHEET 5 OF 23
ENLARGEMENT VIEW
SEE SHEET 6 OF 23
ENLARGEMENT VIEW
SEE SHEET 4 OF 23
DETOUR IMPACTS
SEE SHEET 2 OF 165
SITE 3
SITE 24
5/14/99

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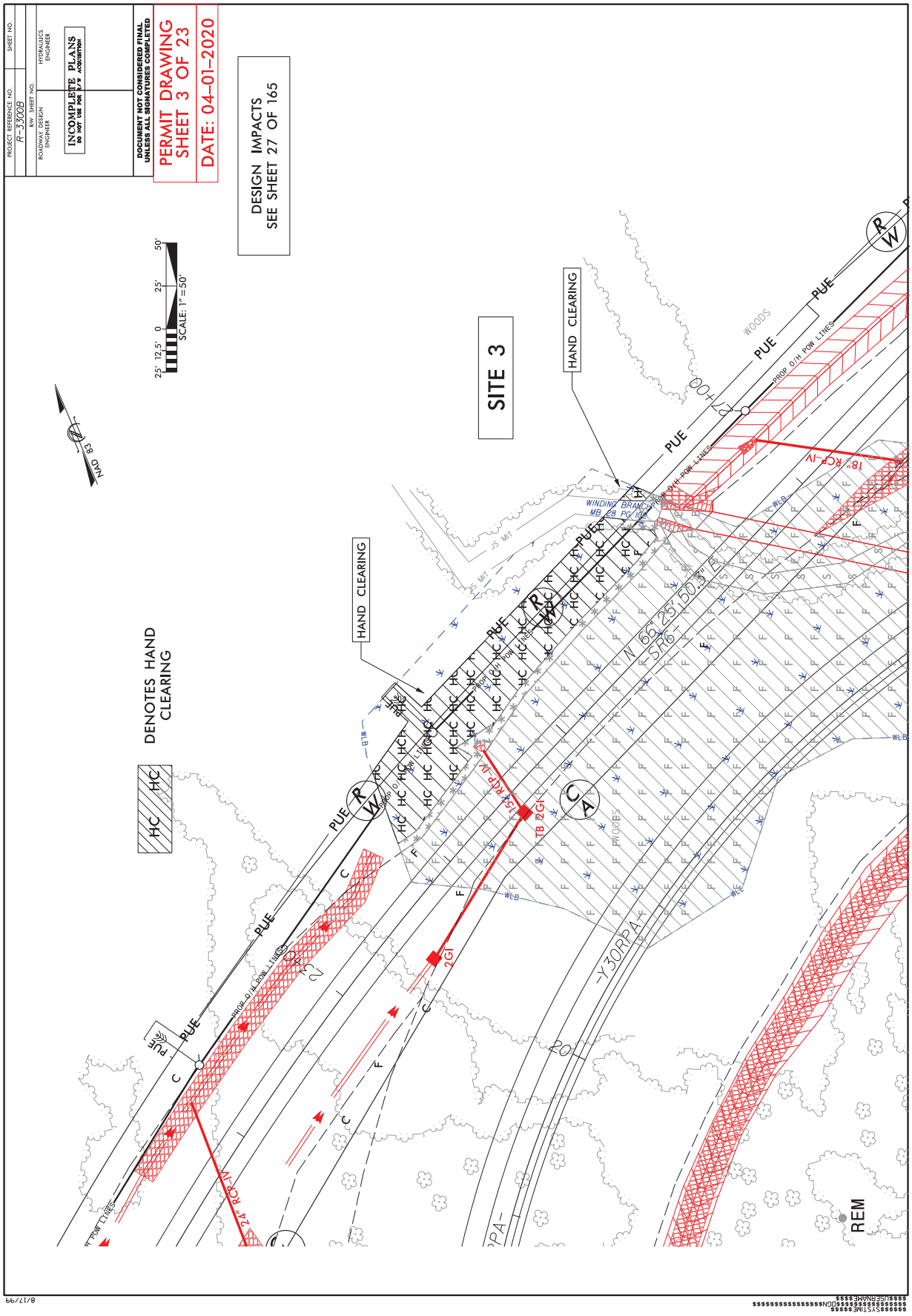
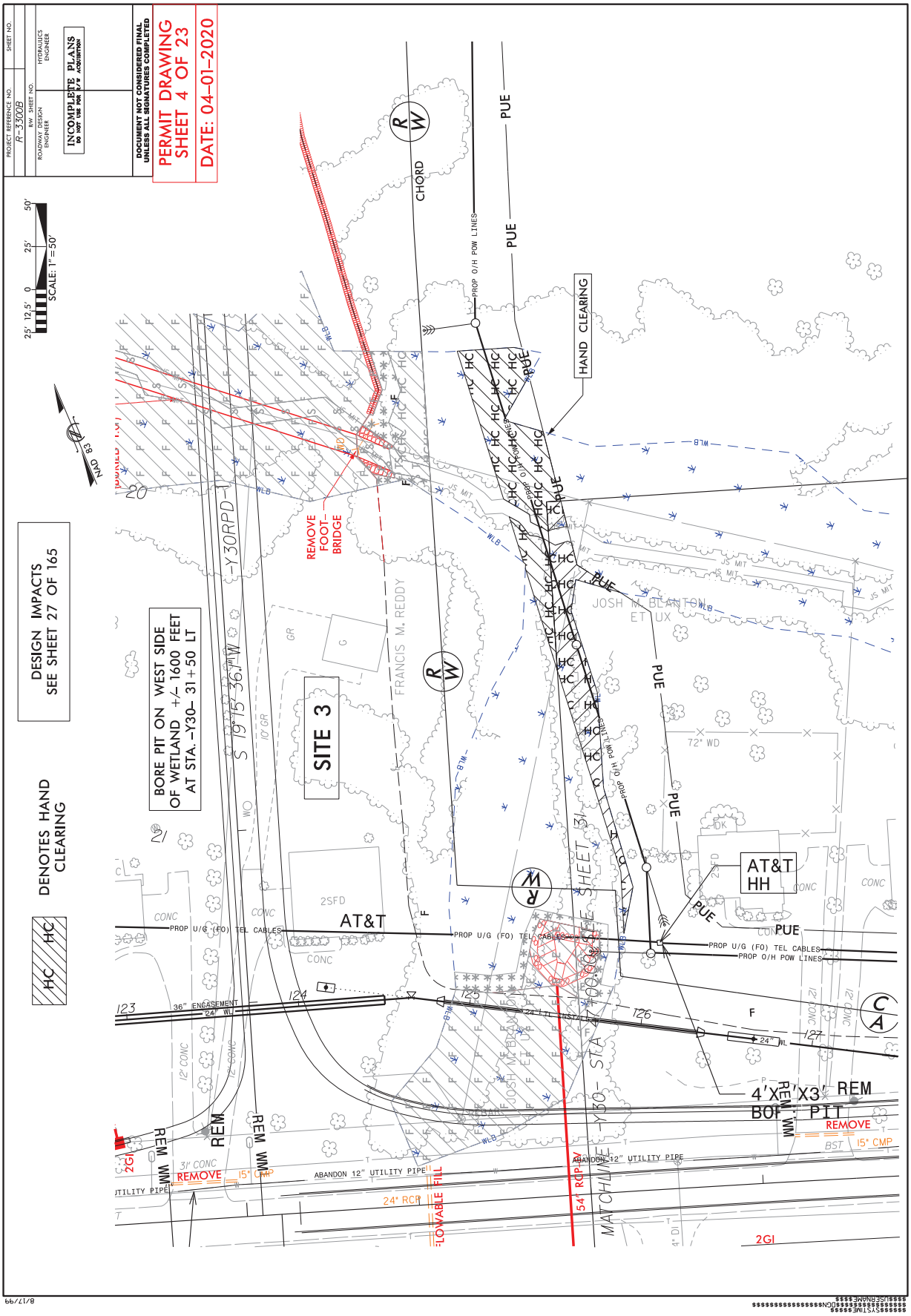

PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W OR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 3 OF 23
DATE: 04-01-2020
DESIGN IMPACTS
SEE SHEET 27 OF 165
SCALE: 1"=50'
NAD 83
SITE 3
HAND CLEARING
DENOTES HAND CLEARING
PROP O/H POW LINES
PUE
WOODS
REM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A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 4 OF 23
DATE: 04-01-2020
SCALE: 1" = 50'
NAD 83
DESIGN IMPACTS
SEE SHEET 27 OF 165
DENOTES HAND CLEARING
HC
BORE PIT ON WEST SIDE OF WETLAND +/- 1600 FEET AT STA. -Y30- 31+50 LT
SITE 3
HAND CLEARING
REMOVE FOOT-BRIDGE
PROP O/H POW LINES
PUE
CHORD
JOSH M BLANTON ET UX
FRANCIS M. REDDY
72" WD
AT&T HH
AT&T
2SFD
PROP U/G (FO) TEL CABLES
PROP O/H POW LINES
36" ENGASEMENT
24" WL
MATCHLINE -Y30- STA 40+00
SHEET 31
4'X4'X3' REM BOP PIT
REMOVE
15" CMP
ABANDON 12" UTILITY PIPE
24" RCP
54" RCP
FLOWABLE FILL
REM WM
2GI
CONC
BST
DK
WLB
JS MIT

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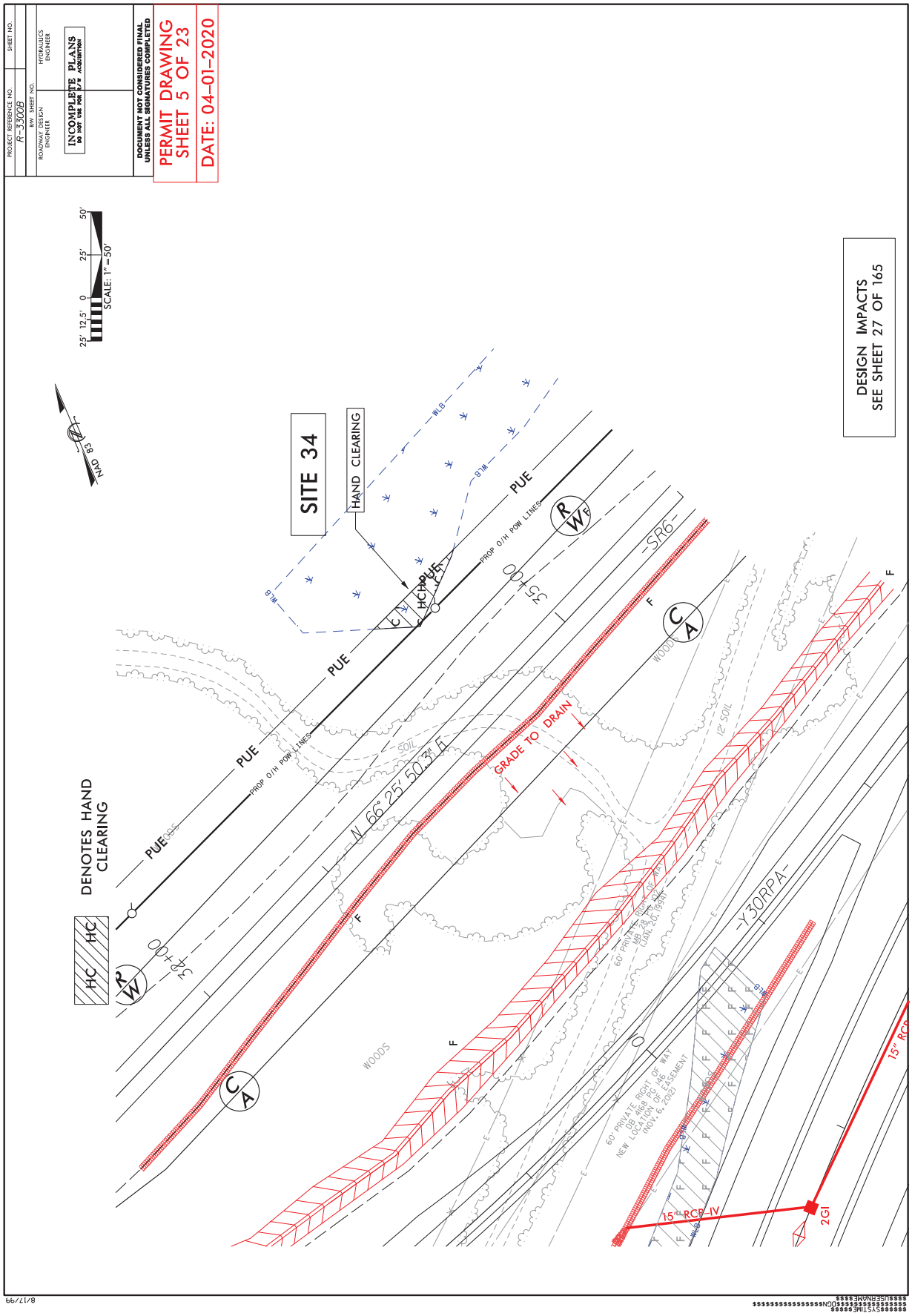
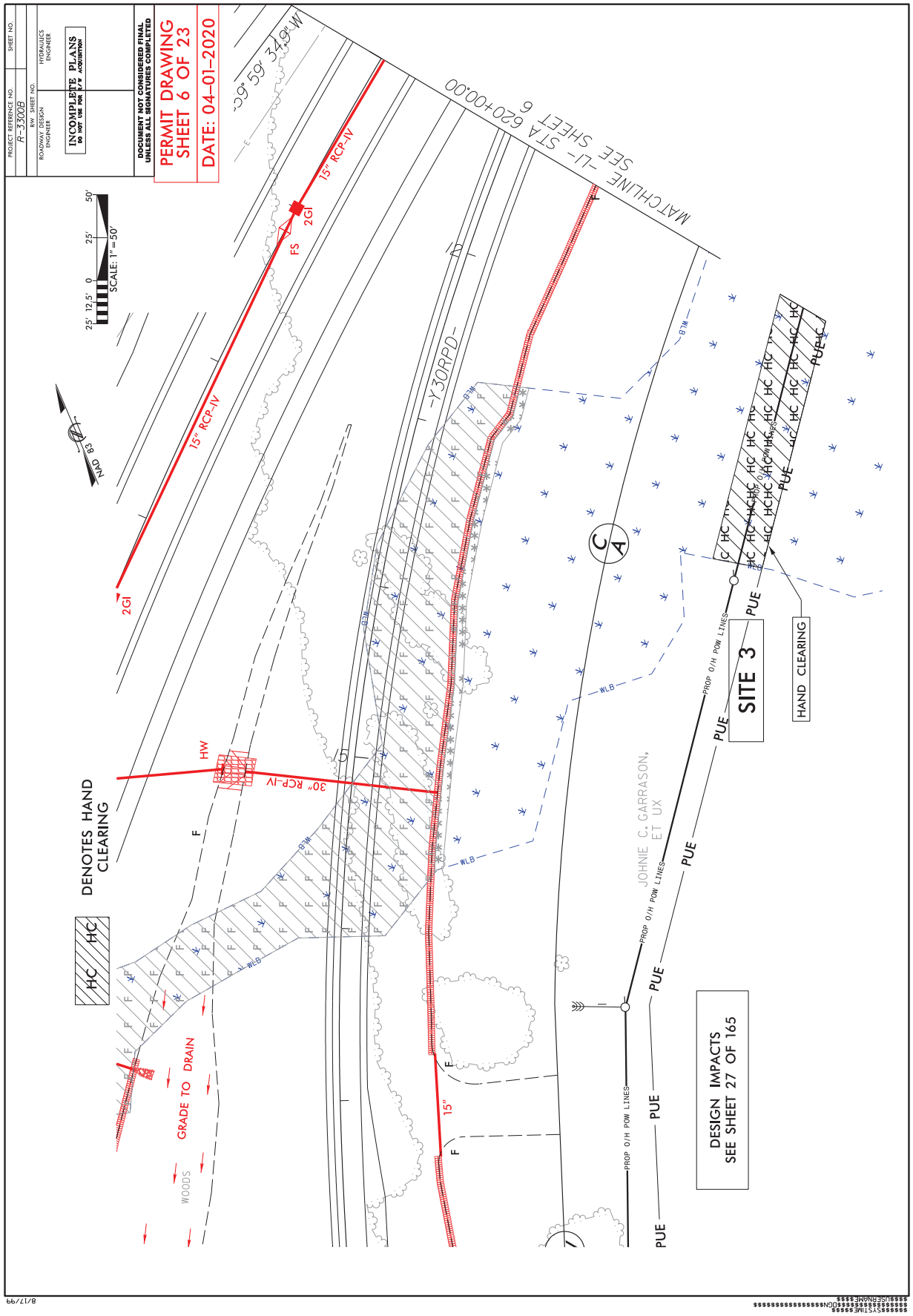

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 5 OF 23
DATE: 04-01-2020
SCALE: 1" = 50'
NAD 83
SITE 34
HAND CLEARING
DENOTES HAND CLEARING
DESIGN IMPACTS
SEE SHEET 27 OF 165
PUE
PROP O/H POW LINES
HC
HC PUE
WLB
BTM
SR6
Y30RPA
N 66° 25' 50.3" E
GRADE TO DRAIN
WOODS
SOIL
60' PRIVATE RIGHT OF WAY
MB 78, PG 96
CAP. 20.183'
60' PRIVATE RIGHT OF WAY
DB 1668 PG 146
NEW LOCATION OF EASEMENT
(NOV. 6, 2020)
15" RCP-IV
2GI
15" RCP
35+00
34+00

P-209


PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 6 OF 23
DATE: 04-01-2020
SCALE: 1"=50'
MATCHLINE -L- STA 620+00.00 SEE SHEET 6
S 69° 59' 34.9" W
15" RCP-IV
2GI
FS
-Y30RPD-
-L-
NAD83
DENOTES HAND CLEARING
HC
HW
30" RCP-IV
WLB
GRADE TO DRAIN
WOODS
15"
JOHNIE C. GARRASON, ET UX
PROP O/H POW LINES
PUE
SITE 3
HAND CLEARING
DESIGN IMPACTS
SEE SHEET 27 OF 165
8/17/99

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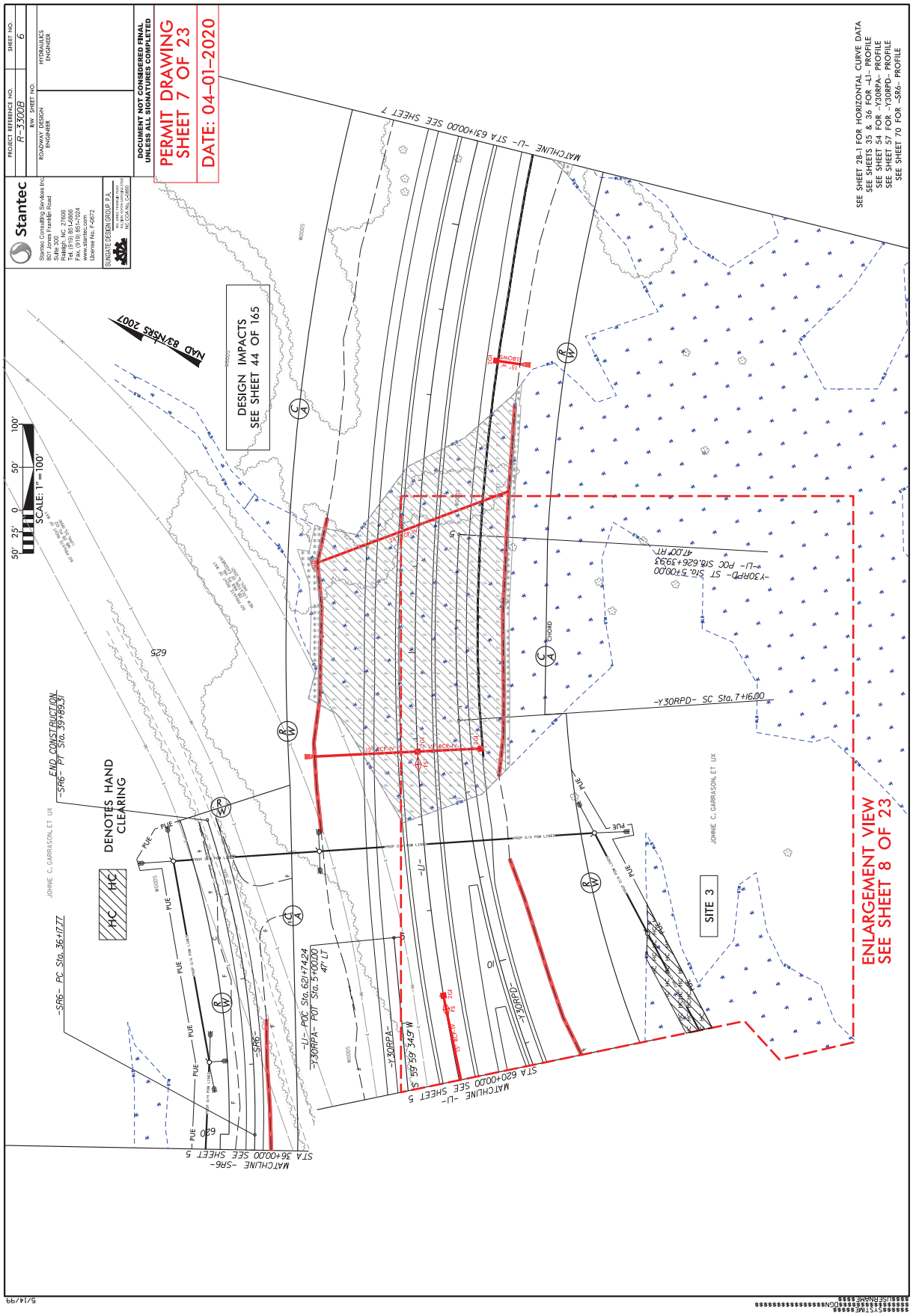
PROJECT REFERENCE NO. R-3300B
SHEET NO. 6
ROADWAY DESIGN ENGINEER RW
HYDRAULICS ENGINEER
SHEET NO.
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 7 OF 23
DATE: 04-01-2020
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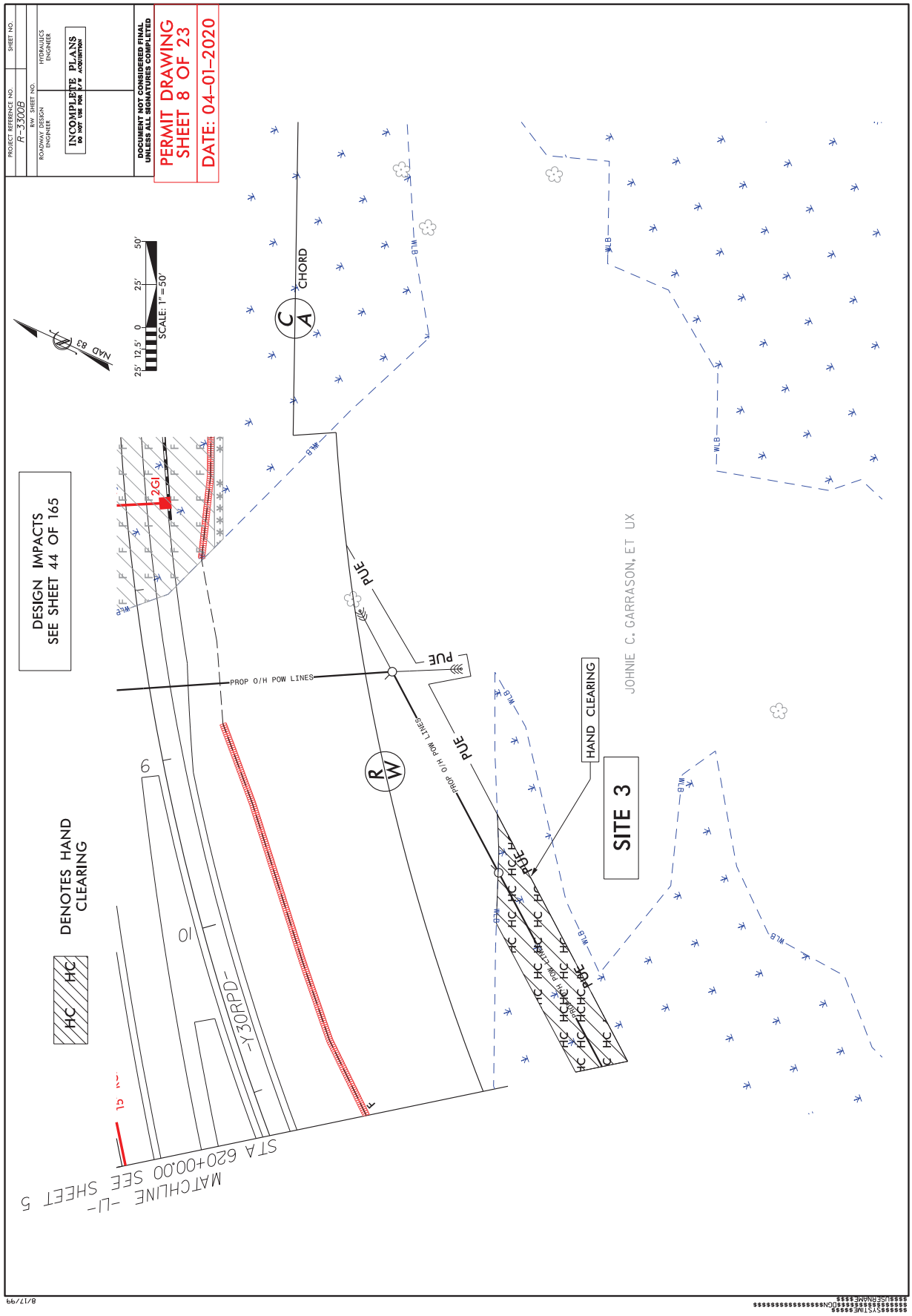
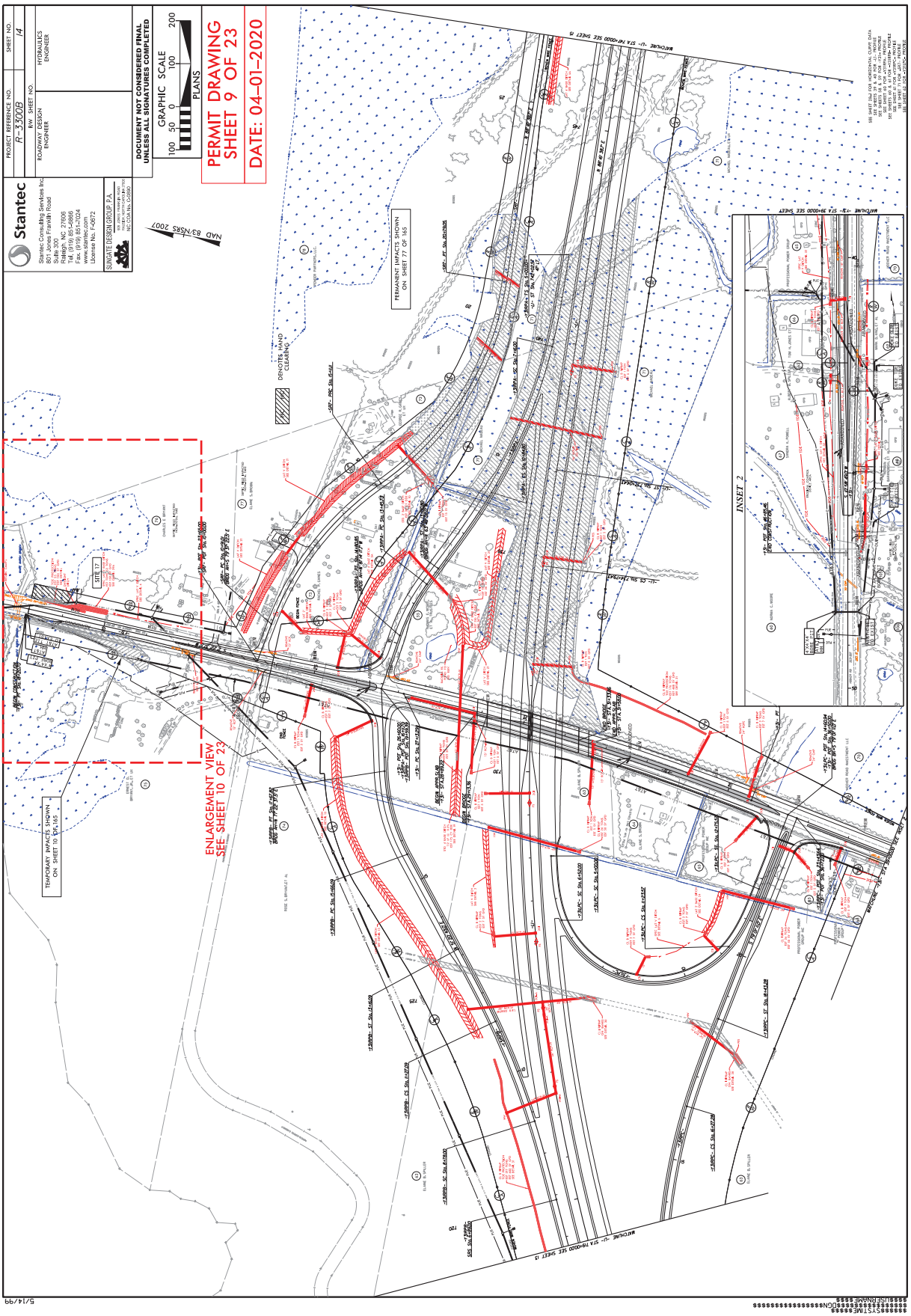
License No. F-0672
SINGATE DESIGN GROUP, P.A.
License No. F-0672
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEETS 35 & 36 FOR -L1- PROFILE
SEE SHEET 54 FOR -Y30RPA- PROFILE
SEE SHEET 57 FOR -Y30RPD- PROFILE
SEE SHEET 70 FOR -SR6- PROFILE
MATCHLINE -L1- STA 631+00.00 SEE SHEET 7
NAD 83/NSRS 2007
SCALE: 1" = 100'
DESIGN IMPACTS SEE SHEET 44 OF 165
DENOTES HAND CLEARING
END CONSTRUCTION -SR6- PT Sta. 39+89.31
-SR6- PC Sta. 36+11.77
MATCHLINE -SR6- STA 36+00.00 SEE SHEET 5
-L1- POC Sta. 621+74.24
-Y30RPA- POT Sta. 5+00.00
47' LT
S 55° 59' 34.9" W
-Y30RPA-
-Y30RPD-
-L1-
MATCHLINE -L1- STA 620+00.00 SEE SHEET 5
-Y30RPD- SC Sta. 7+16.00
-Y30RPD- ST Sta. 5+00.00
-L1- POC Sta. 626+39.93
47.00' RT
SITE 3
ENLARGEMENT VIEW SEE SHEET 8 OF 23
JOHNIE C. GARRASON, ET UX
625
620
WOODS
HC
PUE
PUE
PROP O/H POW LINES
5/14/99


PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 8 OF 23
DATE: 04-01-2020
NAD 83
SCALE: 1"=50'
25' 12.5' 0 25' 50'
DESIGN IMPACTS
SEE SHEET 44 OF 165
DENOTES HAND CLEARING
HC
SITE 3
HAND CLEARING
JOHNIE C. GARRASON, ET UX
PROP O/H POW LINES
PUE
CHORD
MATCHLINE -L- SEE SHEET 5
STA 620+00.00
-Y30RPD-
2GI
WLB
R/W

P-212


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
14
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
Stantec Consulting Services Inc.
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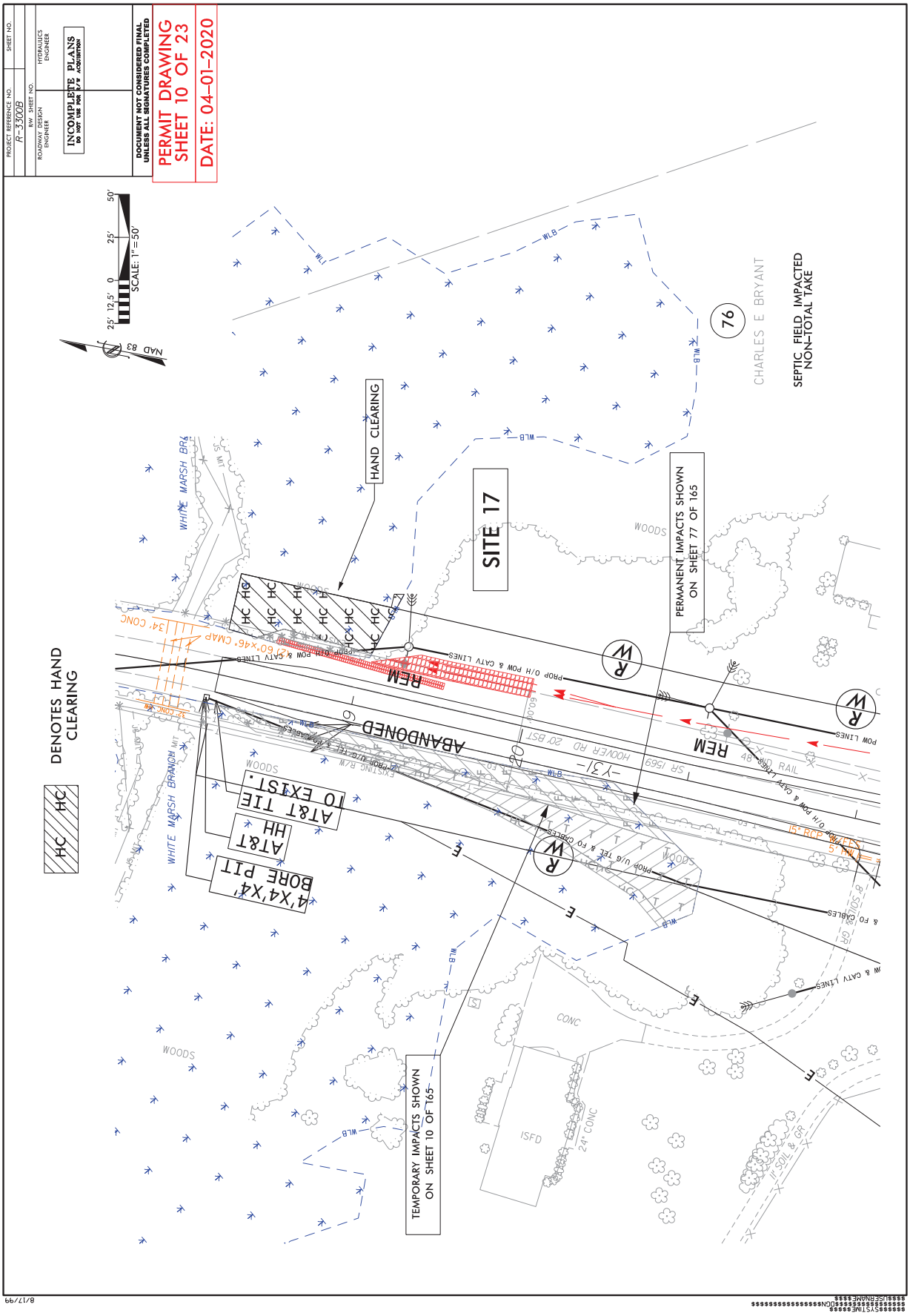
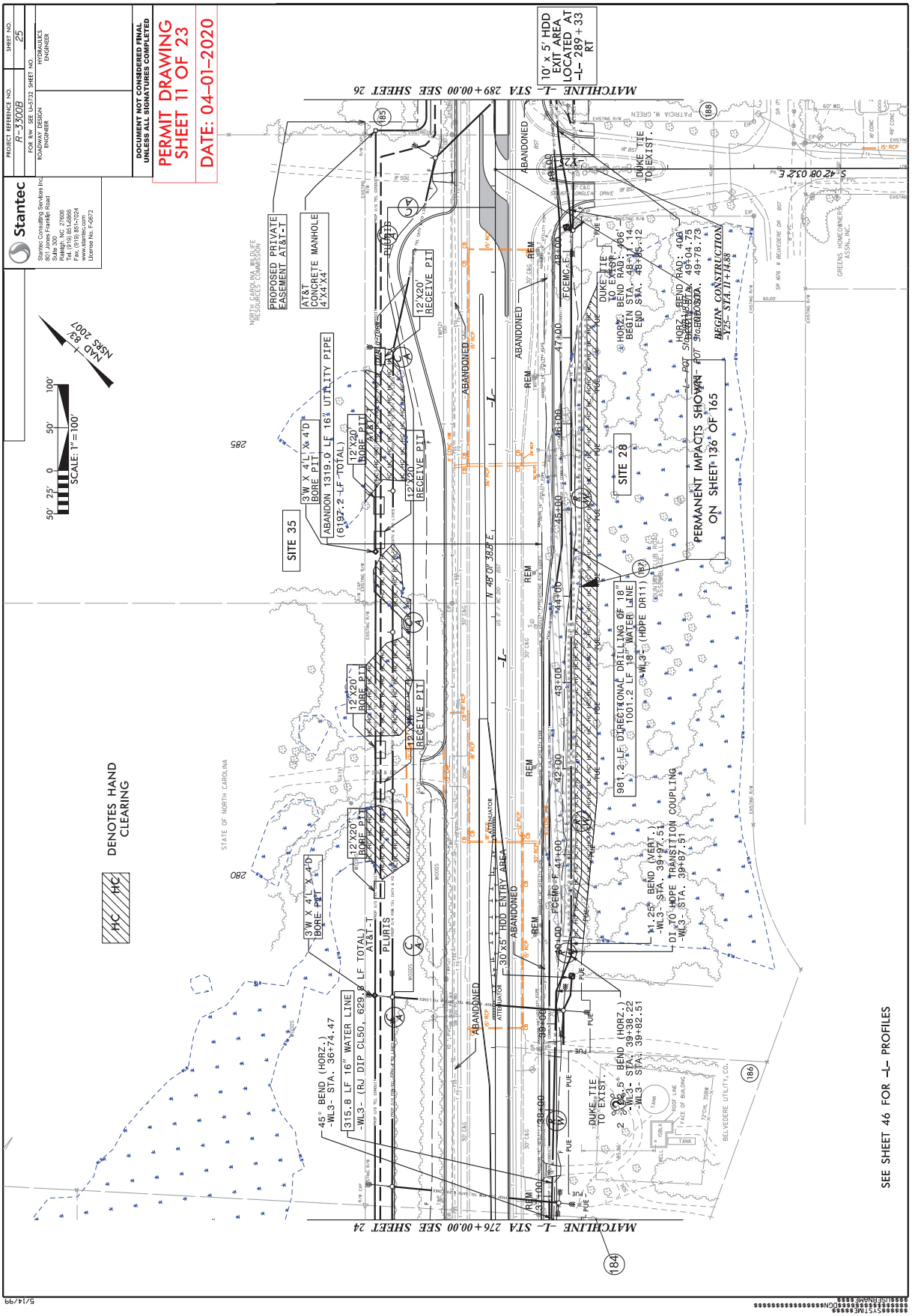
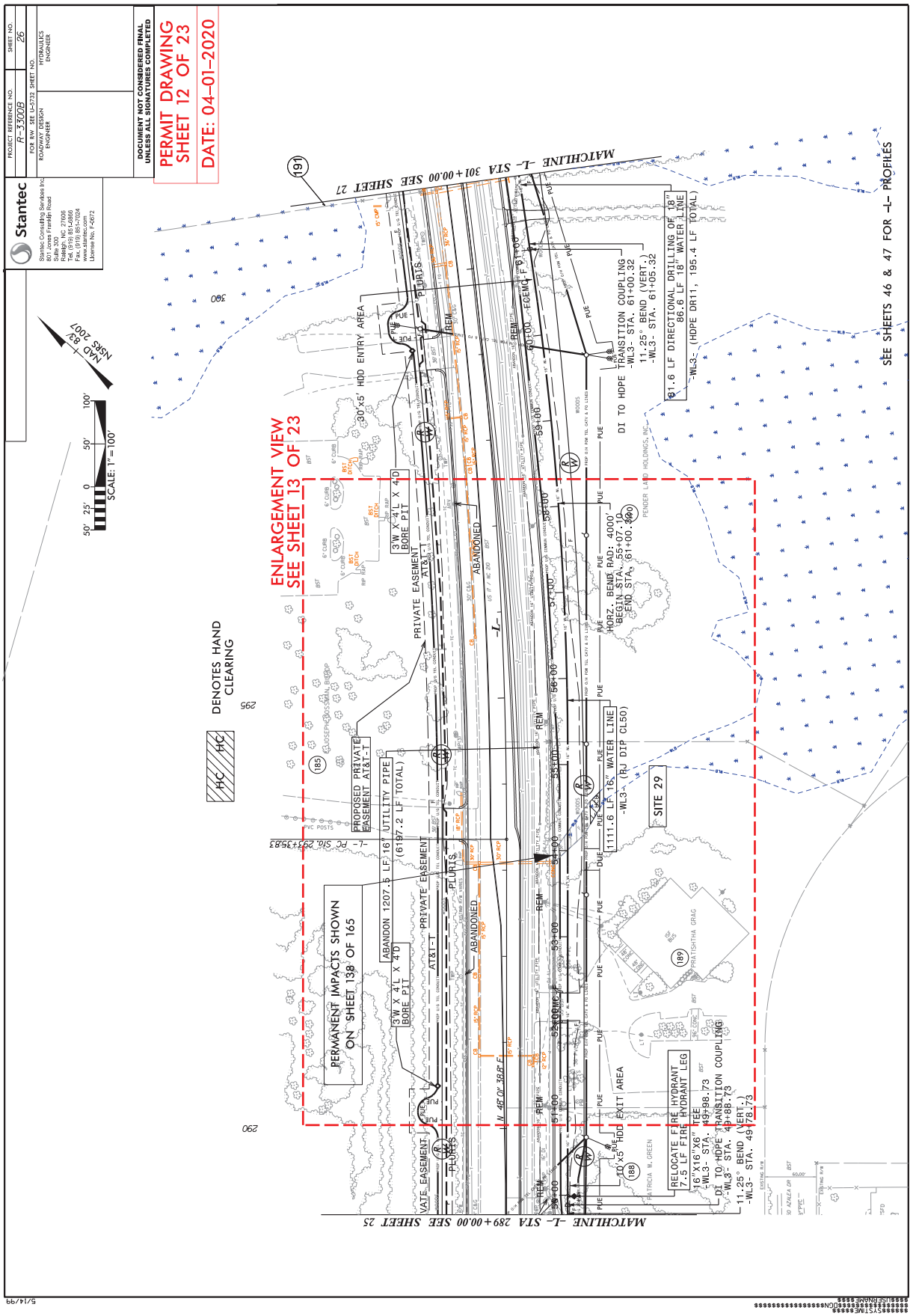
Fax. (919) 851-7024
www.stantec.com
License No. F-0672
SIGNATURE DESIGN GROUP, P.A.
NC CORA No. C-2699
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
GRAPHIC SCALE
100 50 0 100 200
PLANS
NAD 83/NSRS 2007
PERMIT DRAWING
SHEET 9 OF 23
DATE: 04-01-2020
PERMANENT IMPACTS SHOWN ON SHEET 77 OF 165
DENOTES HAND CLEARING
ENLARGEMENT VIEW SEE SHEET 10 OF 23
TEMPORARY IMPACTS SHOWN ON SHEET 10 OF 165
INSET 2
5/14/99


PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 10 OF 23
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
DENOTES HAND CLEARING
HC
HAND CLEARING
SITE 17
PERMANENT IMPACTS SHOWN ON SHEET 77 OF 165
TEMPORARY IMPACTS SHOWN ON SHEET 10 OF 165
SEPTIC FIELD IMPACTED NON-TOTAL TAKE
CHARLES E BRYANT
76
WHITE MARSH BRANCH MIT
WOODS
REM
ABANDONED
AT&T TIE TO EXIST.
AT&T HH
A'XA'XA' BORE PIT
HOOVER RD
SR 1569
RAIL ROAD
CONC
ISFD
24" CONC
PROP O/H POW & CATV LINES
PROP U/G TEL & FO CABLES
POW & CATV LINES
FO CABLES
15" RCP
34" CONC
WLB
TW
SHL
SHR
E
R/W

P-214


PROJECT REFERENCE NO. R-3300B
SHEET NO. 25
FOR R/W SEE U-3732
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 11 OF 23
DATE: 04-01-2020
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SCALE: 1"=100'
NAD 83/NSRS 2007
DENOTES HAND CLEARING
HC
MATCHLINE -L- STA 289+00.00 SEE SHEET 26
MATCHLINE -L- STA 276+00.00 SEE SHEET 24
SEE SHEET 46 FOR -L- PROFILES
SITE 35
SITE 28
PROPOSED PRIVATE EASEMENT AT&T-T
AT&T CONCRETE MANHOLE 4'X4'X4'
3W X 4'L X 4'D BORE PIT
ABANDON 1319.0 LF 16" UTILITY PIPE (6197.2 LF TOTAL)
12'X20' BORE PIT
12'X20' RECEIVE PIT
AT&T-T
PLURIS
45° BEND (HORZ.) -WL3- STA. 36+74.47
315.8 LF 16" WATER LINE -WL3- (RJ DIP CL50, 629.8 LF TOTAL)
30'x5' HDD ENTRY AREA
ABANDONED
981.2 LF DIRECTIONAL DRILLING OF 18" 1001.2 LF 18" WATER LINE -WL3- (HDPE DR11)
11.25° BEND (VERT.) -WL3- STA. 39+97.51
DI TO HDPE TRANSITION COUPLING -WL3- STA. 39+87.51
22.5° BEND (HORZ.) -WL3- STA. 39+38.22
22.5° BEND (VERT.) -WL3- STA. 39+82.51
DUKE TIE TO EXIST.
10' x 5' HDD EXIT AREA LOCATED AT -L- 289+33 RT
DUKE TIE TO EXIST.
HORZ. BEND RAD: 406' BEGIN STA. 48+17.14 END STA. 48+85.12
HORZ. BEND RAD: 406' BEGIN STA. 49+04.75 END STA. 49+78.73
BEGIN CONSTRUCTION -L- STA. 11+14.38
PERMANENT IMPACTS SHOWN ON SHEET 136 OF 165
REM
ABANDONED
PUE
WOODS
STATE OF NORTH CAROLINA
NORTH CAROLINA WILDLIFE RESOURCES COMMISSION
GREENS HOMEOWNERS ASSN., INC.
BELVEDERE UTILITY, CO.
5/14/99

P-215


PROJECT REFERENCE NO. R-3300B
SHEET NO. 26
FOR R/W SEE U-3732
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
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Stantec Consulting Services Inc.
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Suite 300
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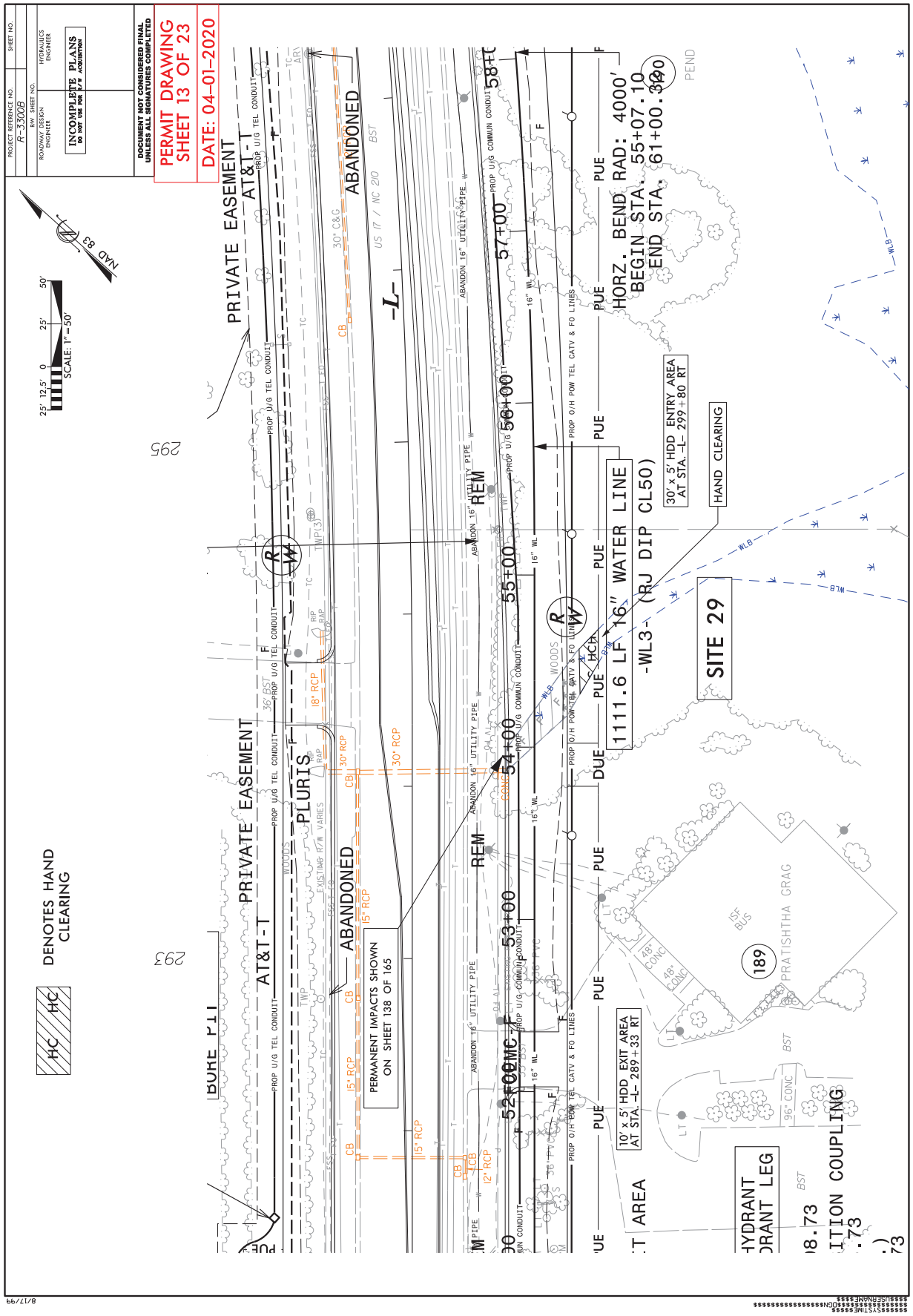
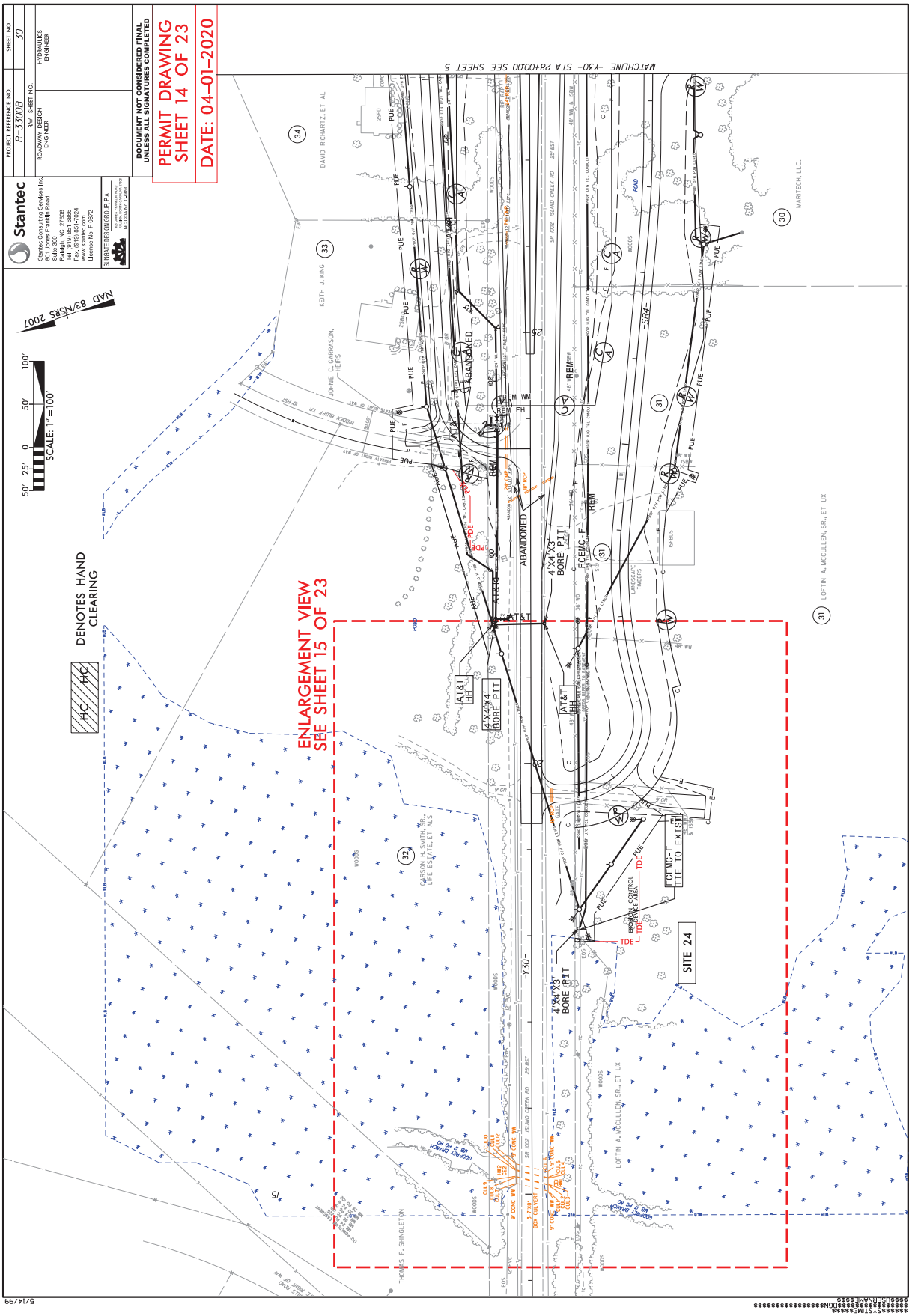
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
PERMIT DRAWING
SHEET 12 OF 23
DATE: 04-01-2020
NAD 83
NSRS 2007
SCALE: 1" = 100'
ENLARGEMENT VIEW
SEE SHEET 13 OF 23
DENOTES HAND CLEARING
MATCHLINE -L- STA 301+00.00 SEE SHEET 27
MATCHLINE -L- STA 289+00.00 SEE SHEET 25
SEE SHEETS 46 & 47 FOR -L- PROFILES
PERMANENT IMPACTS SHOWN ON SHEET 138 OF 165
ABANDON 1207.5 LF 16" UTILITY PIPE (6197.2 LF TOTAL)
PROPOSED PRIVATE EASEMENT AT&T-T
PRIVATE EASEMENT AT&T-T
3'W X 4'L X 4'D BORE PIT
ABANDONED
PLURIS
SITE 29
-WL3- RJ DIP CL50) 1111.6 LF 16" WATER LINE
HORZ. BEND RAD: 4000' BEGIN STA. 55+07.10 END STA. 61+00.3900
DI TO HDPE TRANSITION COUPLING -WL3- STA. 61+00.32
11.25° BEND (VERT.) -WL3- STA. 61+05.32
81.6 LF DIRECTIONAL DRILLING OF 18" 86.6 LF 18" WATER LINE -WL3- (HDPE DR11, 195.4 LF TOTAL)
RELOCATE FIRE HYDRANT 5 LF FIRE HYDRANT LEG
16"X16"X6" TEE -WL3- STA. 49+98.73
DI TO HDPE TRANSITION COUPLING -WL3- STA. 49+98.73
11.25° BEND (VERT.) -WL3- STA. 49+78.73
HDD EXIT AREA
30'X5' HDD ENTRY AREA
PENDER LAND HOLDINGS, INC.
PATRICIA W. GREEN
PATRICIA THOMPSON GRAG
WOODS
5/14/99


PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 13 OF 23
DATE: 04-01-2020
SCALE: 1"=50'
NAD 83
HC HC DENOTES HAND CLEARING
PRIVATE EASEMENT AT&T
AT&T-T
PLURIS
ABANDONED
PERMANENT IMPACTS SHOWN ON SHEET 138 OF 165
SITE 29
HAND CLEARING
30' x 5' HDD ENTRY AREA AT STA. -L- 299+80 RT
10' x 5' HDD EXIT AREA AT STA. -L- 289+33 RT
1111.6 LF 16" WATER LINE
-WL3- (RJ DIP CL50)
HORZ. BEND RAD: 4000'
BEGIN STA. 55+07.10
END STA. 61+00.30
PRATISHTHA GRAG
189
ISF BUS
HYDRANT
ANT LEG
ITION COUPLING
8.73
.73
73
293
295
8/17/99


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
30
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
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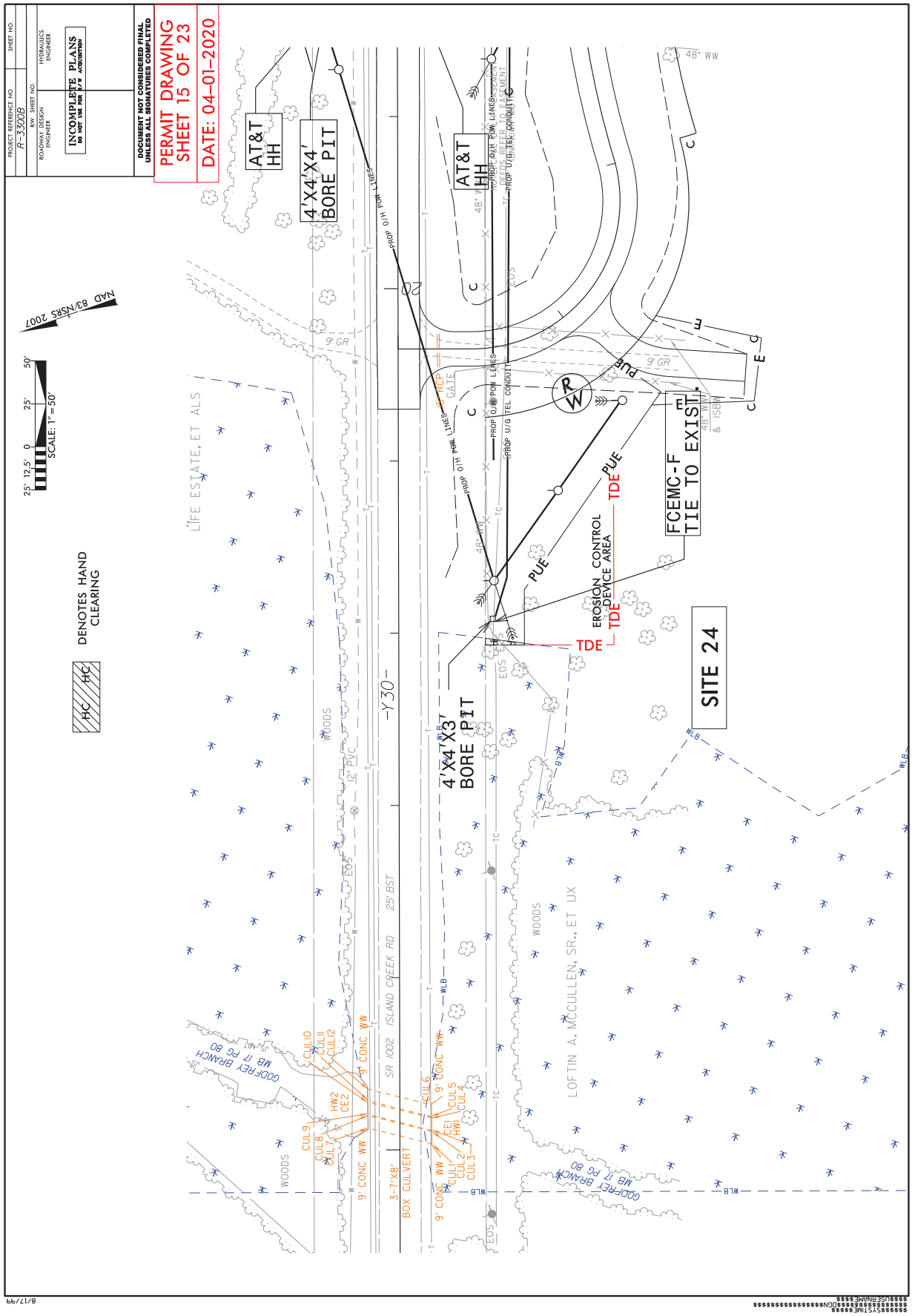
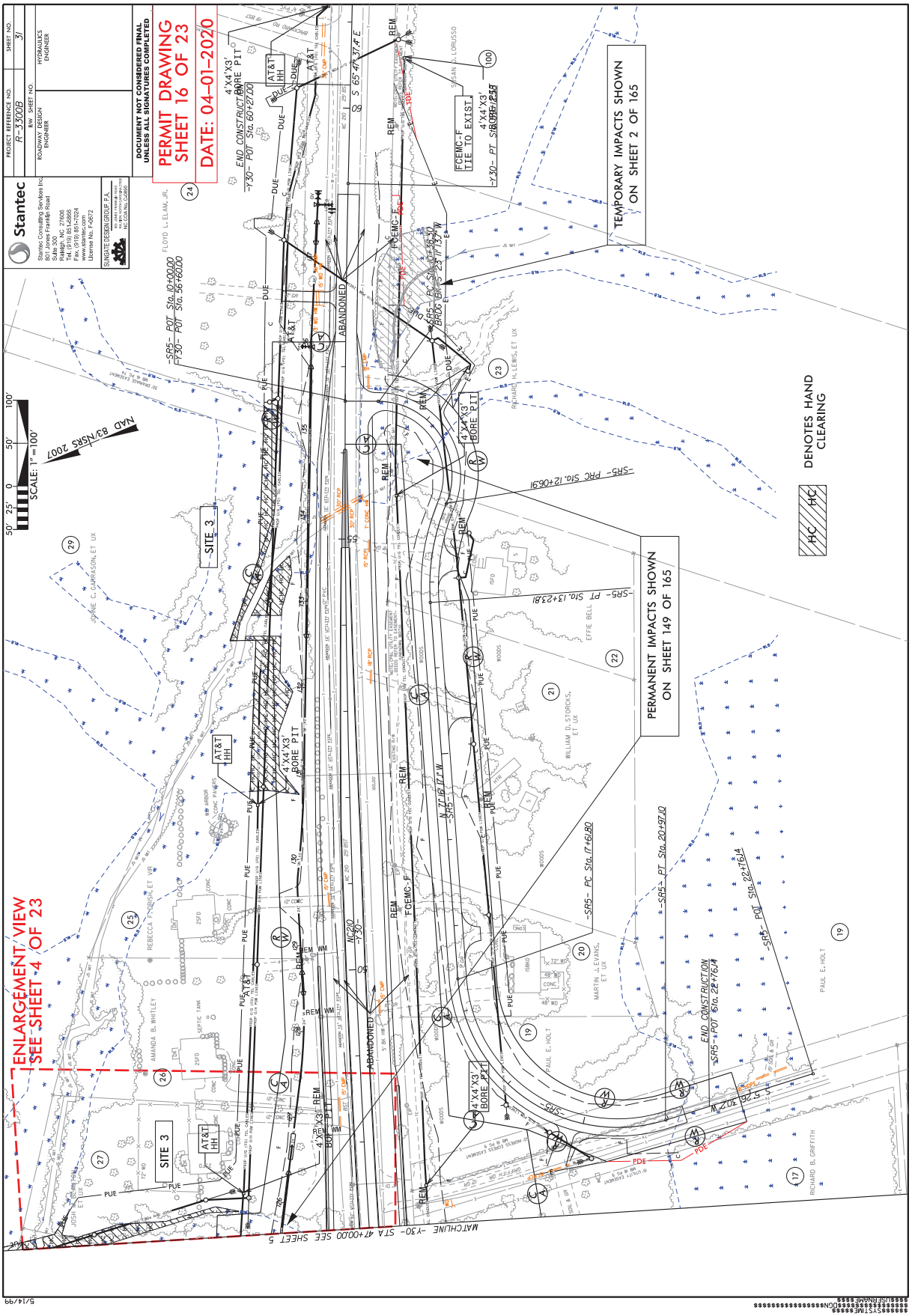
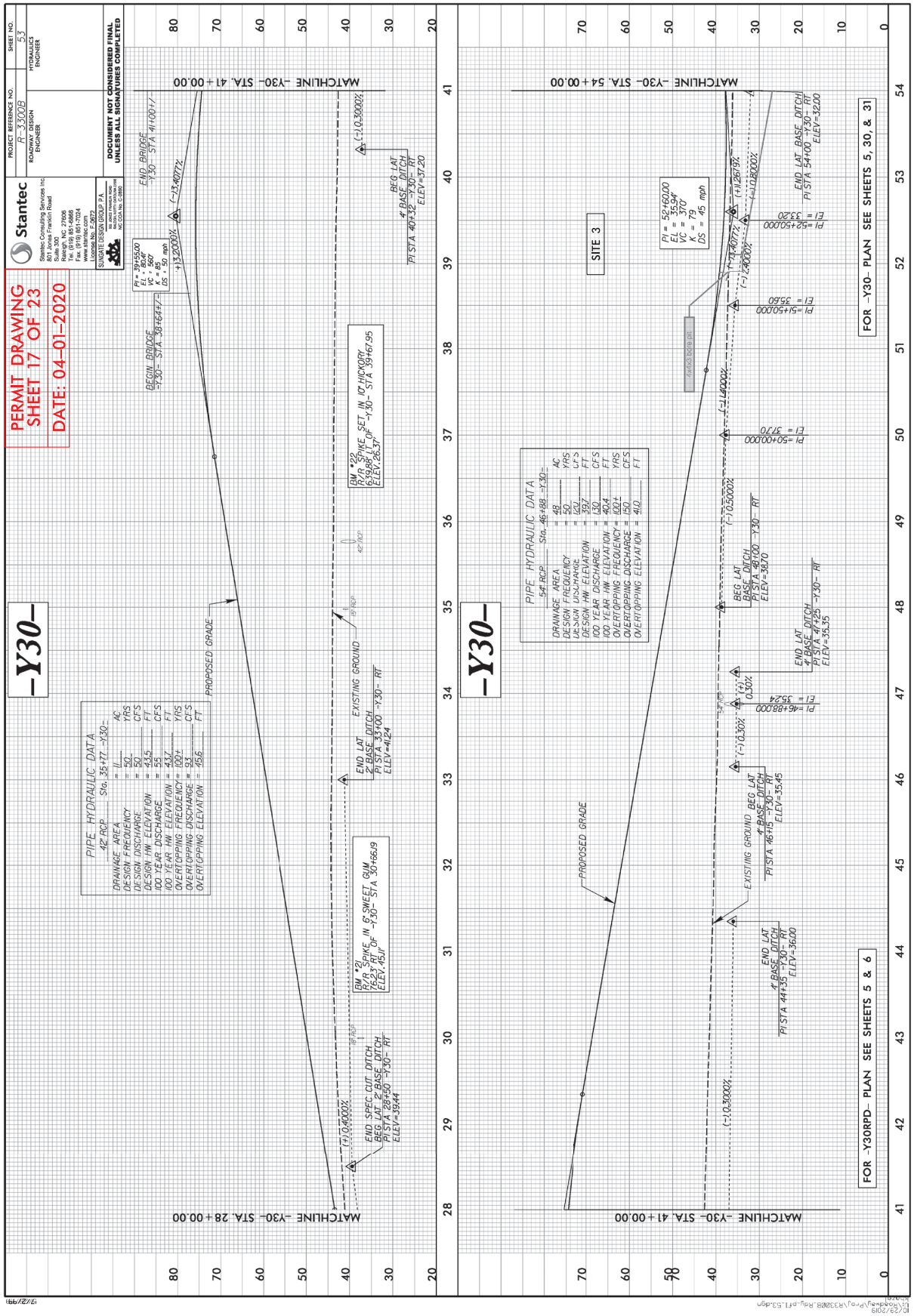
Raleigh, NC 27606
Tel: (919) 851-6866
Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SUNGATE DESIGN GROUP, P.A.
License No. F-0672
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 14 OF 23
DATE: 04-01-2020
NAD 83/NSRS 2007
SCALE: 1" = 100'
DENOTES HAND CLEARING
HC
ENLARGEMENT VIEW
SEE SHEET 15 OF 23
SITE 24
ABANDONED
4'X4' X3' BORE PIT
4'X4'X4' BORE PIT
FCEMC-F TIE TO EXIST
EROSION CONTROL FENCE AREA
DAVID RICHARTZ, ET AL
KEITH J. KING
JOHNIE C. GARRASON, HEIRS
CARSON A. SMITH, SR. LIFE ESTATE ET ALS
LOFTIN A. MCCULLEN, SR., ET UX
MARTECH, LLC.
THOMAS F. SHINGLETON
MATCHLINE -Y30- STA 284000 SEE SHEET 5
MATCHLINE -Y30- STA 284000 SEE SHEET 15

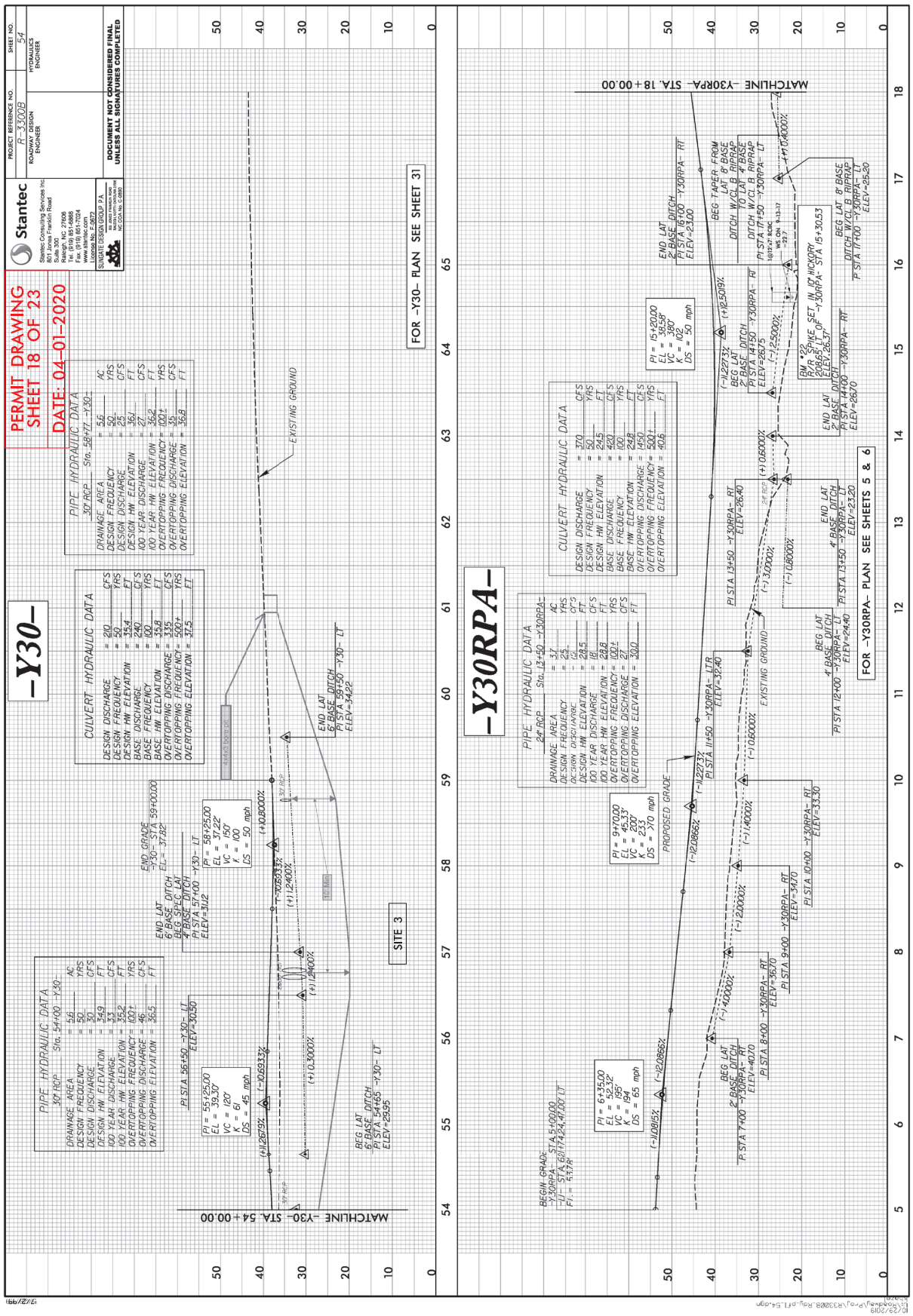

PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 15 OF 23
DATE: 04-01-2020
NAD 83/NSRS 2007
SCALE: 1"=50'
DENOTES HAND CLEARING
HC
AT&T HH
4'X4'X4' BORE PIT
4'X4'X3' BORE PIT
FCEMC-F TIE TO EXIST.
SITE 24
EROSION CONTROL DEVICE AREA
TDE
PUE
PROP O/H POW LINES
PROP U/G TEL CONDUIT
LIFE ESTATE, ET ALS
LOFTIN A. MCCULLEN, SR., ET UX
ISLAND CREEK RD
SR 1002
25' BST
12" PVC
3-7'X8' BOX CULVERT
GODFREY BRANCH
WOODS
9' CONC WW
9' GR
48" WW
-Y30-

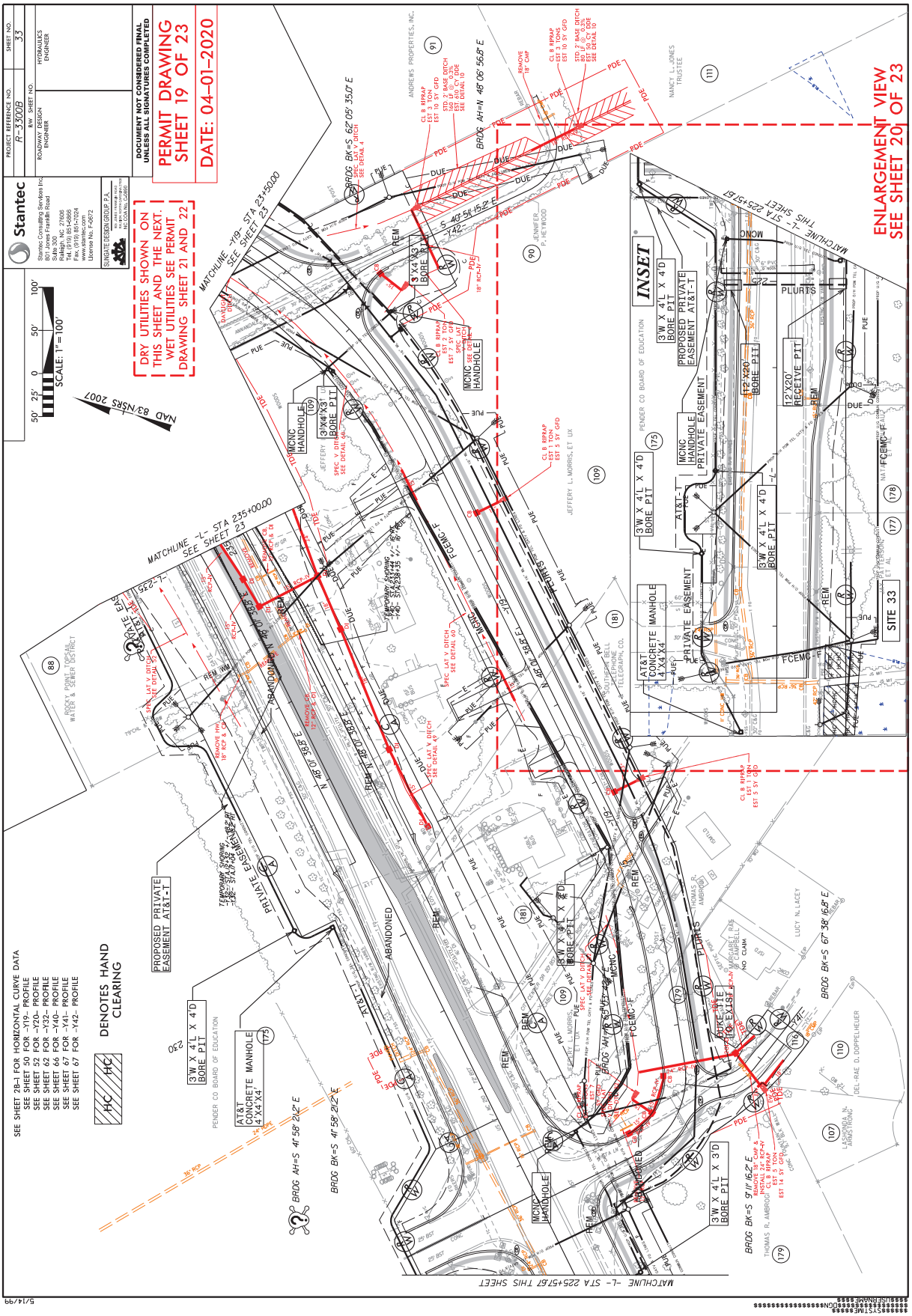
P-219


PROJECT REFERENCE NO.
R-3300B
SHEET NO.
31
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 16 OF 23
DATE: 04-01-2020
Stantec
SINGATE DESIGN GROUP, P.A.
SCALE: 1"=100'
NAD 83/NSRS 2007
ENLARGEMENT VIEW SEE SHEET 4 OF 23
TEMPORARY IMPACTS SHOWN ON SHEET 2 OF 165
PERMANENT IMPACTS SHOWN ON SHEET 149 OF 165
DENOTES HAND CLEARING
HC
SITE 3
4'X4'X3' BORE PIT
AT&T HH
ABANDONED
FCEMC-F
REM
PUE
PDE
-SR5- PC Sta. 17+61.80
-SR5- PT Sta. 20+97.10
-SR5- POT Sta. 22+76.14
END CONSTRUCTION
-SR5- POT Sta. 22+76.14
-SR5- PRC Sta. 12+06.91
-SR5- PT Sta. 13+23.81
-Y30- POT Sta. 60+27.00
END CONSTRUCTION
-SR5- POT Sta. 10+00.00
-Y30- POT Sta. 56+16.00
MATCHLINE -Y30- STA 47+00.00 SEE SHEET 5
FCEMC-F TIE TO EXIST 4'X4'X3'
S 65° 49' 37" E
N 71° 16' 17" W
S 26° 10' 30" W
S 23° 17' 13" W
S 26° 10' 30" W
JOANNE C. CLAPRASON, ET UX
REBECCA P. DIGH, ET VIR
AMANDA B. WHITLEY
JOSH ET UX
FLOYD L. ELAM, JR.
RICHARD H. LEWIS, ET UX
EFFIE BELL
WILLIAM D. STORCKS, ET UX
MARTIN J. EVANS, ET UX
PAUL E. HOLT
RICHARD B. GRIFFITH
SUSAN L. CORUSSO
WOODS
CONC
SEPTIC TANK
WELL
SHED
25FD
72" MD
48" MD
45" RCP
30" RCP
18" RCP
7' CONC. FLUME
5' DIA. MH
5' CMP
6' WIDE DITCH
6' WIDE GRASS EASEMENT
30' WIDE GRASS EASEMENT
5/14/99

P-220


PERMIT DRAWING
SHEET 17 OF 23
DATE: 04-01-2020
Stantec
PROJECT REFERENCE NO.
P-3308
SHEET NO.
53
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
-Y30-
PIPE HYDRAULIC DATA
42" RCP Sta. 35+17 -Y30-
DRAINAGE AREA = 11 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 54.5 CFS
DESIGN HW ELEVATION = 54.5 FT
100 YEAR DISCHARGE = 54.5 CFS
100 YEAR HW ELEVATION = 43.2 FT
OVERTOPPING FREQUENCY = 100+ YRS
OVERTOPPING DISCHARGE = 93 CFS
OVERTOPPING ELEVATION = 45.6 FT
PROPOSED GRADE
EXISTING GROUND
END LAT 2' BASE DITCH
PI STA 33+00 -Y30- RT
ELEV=41.24
BM #21
R/R SPIKE IN 6" SWEET GUM
76.23' RT OF -Y30- STA 30+66.09
ELEV.=45.11'
END SPEC CUT DITCH
BEG LAT 2' BASE DITCH
PI STA 28+50 -Y30- RT
ELEV=39.44
MATCHLINE -Y30- STA. 28+00.00
MATCHLINE -Y30- STA. 41+00.00
BEGIN BRIDGE
-Y30- STA 38+54.44
END BRIDGE
-Y30- STA 41+00.44
PI = 39+55.00
EL = 80.64'
VC = 560'
K = 69
DS = 50 mph
(-)3.20000%
(-)13.40772%
BM #22
R/R SPIKE SET IN 12" HICKORY
69.98' LT OF -Y30- STA 39+67.95
ELEV.=26.37'
(+)0.36000%
BEG LAT
4' BASE DITCH
PI STA 40+32 -Y30- RT
ELEV=37.20
(+)0.40000%
MATCHLINE -Y30- STA. 41+00.00
MATCHLINE -Y30- STA. 54+00.00
-Y30-
PIPE HYDRAULIC DATA
54" RCP Sta. 46+88 -Y30-
DRAINAGE AREA = 48 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 140 CFS
DESIGN HW ELEVATION = 39.7 FT
100 YEAR DISCHARGE = 130 CFS
100 YEAR HW ELEVATION = 40.4 FT
OVERTOPPING FREQUENCY = 100+ YRS
OVERTOPPING DISCHARGE = 150 CFS
OVERTOPPING ELEVATION = 41.0 FT
PROPOSED GRADE
EXISTING GROUND
SITE 3
PI = 52+60.00
EL = 35.94'
VC = 370'
K = 79
DS = 45 mph
(-)14.40772%
(+)1.26792%
(-)1.24000%
(+)1.08000%
(-)1.14000%
(-)1.05000%
(-)0.36000%
(+)0.30000%
PI =52+50.00
EL = 33.20
PI =51+50.00
EL = 35.60
PI =50+00.00
EL = 37.70
PI =46+88.00
EL = 35.24
BEG LAT
BASE DITCH
PI STA 48+00 -Y30- RT
ELEV=38.70
END LAT
4' BASE DITCH
PI STA 44+25 -Y30- RT
ELEV=35.35
END LAT
4' BASE DITCH
PI STA 54+00 -Y30- RT
ELEV=32.00
EXISTING GROUND BEG LAT
4' BASE DITCH
PI STA 46+15 -Y30- RT
ELEV=35.45
END LAT
4' BASE DITCH
PI STA 44+35 -Y30- RT
ELEV=36.00
FOR -Y30RPD- PLAN SEE SHEETS 5 & 6
FOR -Y30- PLAN SEE SHEETS 5, 30, & 31


PERMIT DRAWING
SHEET 18 OF 23
DATE: 04-01-2020
Stantec
PROJECT REFERENCE NO.
P-3300B
SHEET NO.
54
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
-Y30-
-Y30RPA-
EXISTING GROUND
PROPOSED GRADE
MATCHLINE -Y30- STA. 54+00.00
MATCHLINE -Y30RPA- STA. 18+00.00
SITE 3
FOR -Y30- PLAN SEE SHEET 31
FOR -Y30RPA- PLAN SEE SHEETS 5 & 6


PROJECT REFERENCE NO. R-3300B
SHEET NO. 33
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
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Fax: (919) 851-7024
www.stantec.com
License No. F-0672
SUNGATE DESIGN GROUP, P.A.
License No. F-0672
PERMIT DRAWING
SHEET 19 OF 23
DATE: 04-01-2020
DRY UTILITIES SHOWN ON THIS SHEET AND THE NEXT
WET UTILITIES SEE PERMIT DRAWING SHEET 21 AND 22
SCALE: 1"=100'
NAD 83/NSRS 2007
ENLARGEMENT VIEW SEE SHEET 20 OF 23
INSET
SITE 33
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 50 FOR -Y19- PROFILE
SEE SHEET 52 FOR -Y20- PROFILE
SEE SHEET 62 FOR -Y32- PROFILE
SEE SHEET 65 FOR -Y40- PROFILE
SEE SHEET 66 FOR -Y41- PROFILE
SEE SHEET 67 FOR -Y42- PROFILE
DENOTES HAND CLEARING
PROPOSED PRIVATE EASEMENT AT&T-T
3'W X 4'L X 4'D BORE PIT
AT&T CONCRETE MANHOLE 4'X4'X4'
MCNC HANDHOLE
PRIVATE EASEMENT
ABANDONED
REM
PLURTS
PENDER CO BOARD OF EDUCATION
MATCHLINE -L- STA 225+57.67 THIS SHEET
MATCHLINE -L- STA 235+00.00 SEE SHEET 23
MATCHLINE -Y9- STA 23+50.00 SEE SHEET 23
BRDG BK=S 62° 05' 35.0" E
BRDG AH=N 48° 06' 56.8" E
BRDG AH=S 41° 58' 21.2" E
BRDG BK=S 41° 58' 21.2" E
BRDG BK=S 67° 38' 6.8" E
BRDG BK=S 9° 11' 16.2" E
S 40° 54' 15.2" E
N 48° 06' 56.8" E
N 48° 10' 48" E 458.8'
S 41° 49' 00" W 458.8'
S 41° 58' 21.2" E
S 67° 38' 6.8" E
S 9° 11' 16.2" E
TEMPORARY SHORING -Y2- STA 2+33.35 -Y2A- STA 2+33.35
TEMPORARY SHORING -L- STA 233+35 -L- STA 233+85
SPEC LAT V DITCH SEE DETAIL 4A
SPEC LAT V DITCH SEE DETAIL 4B
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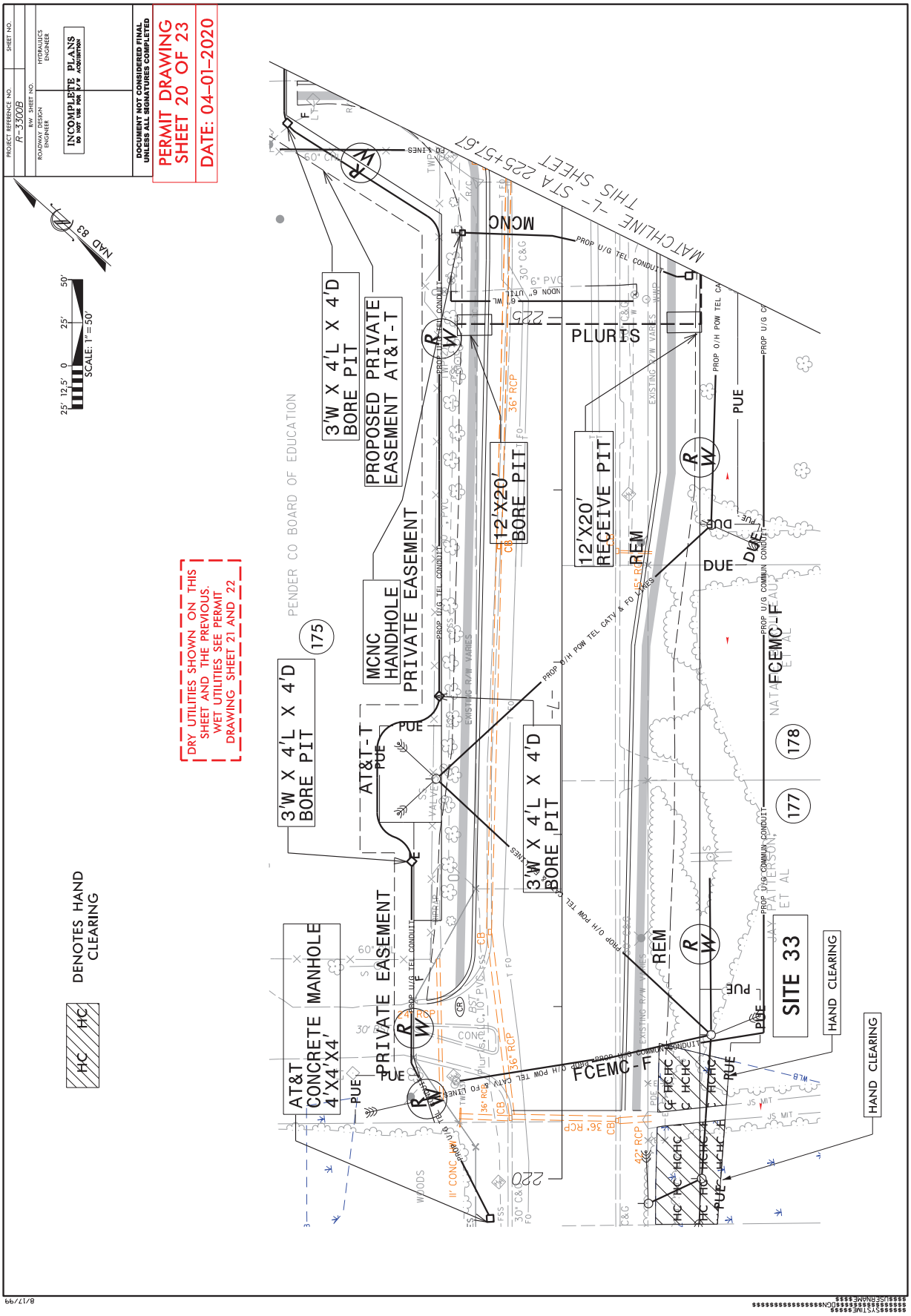
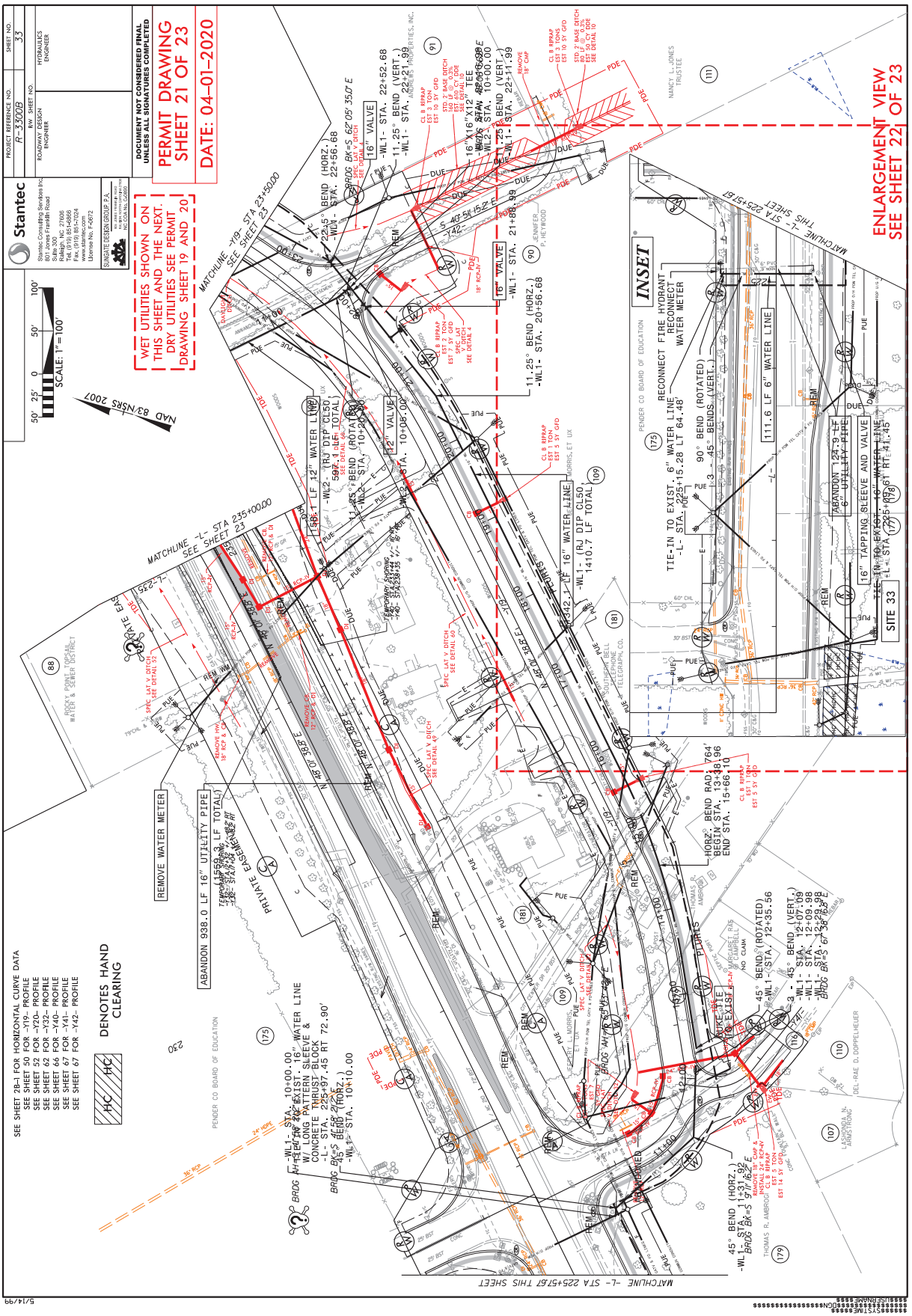
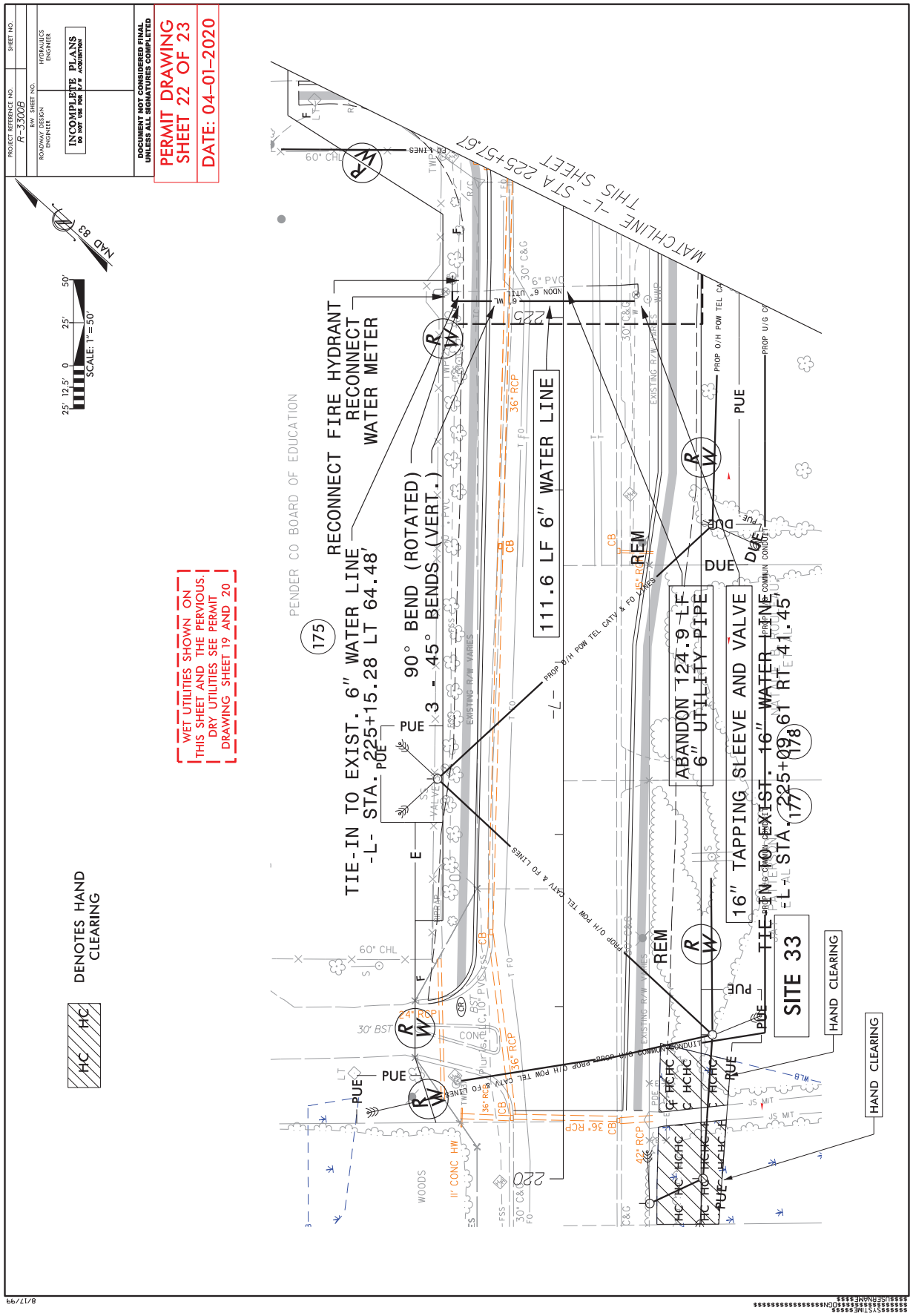

PROJECT REFERENCE NO.
R-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 20 OF 23
DATE: 04-01-2020
NAD 83
SCALE: 1"=50'
DENOTES HAND CLEARING
HC
DRY UTILITIES SHOWN ON THIS SHEET AND THE PREVIOUS. WET UTILITIES SEE PERMIT DRAWING SHEET 21 AND 22
MATCHLINE -L- STA 225+57.67 SHEET
PENDER CO BOARD OF EDUCATION
MCNC
PROP U/G TEL CONDUIT
3'W X 4'L X 4'D BORE PIT
PROPOSED PRIVATE EASEMENT AT&T-T
MCNC HANDHOLE PRIVATE EASEMENT
12'X20' BORE PIT
12'X20' RECEIVE PIT
PLURIS
PROP O/H POW TEL CATV & FO LINES
PROP U/G COMMUN CONDUIT
FCEMC-F
REM
PUE
DUE
AT&T-T
AT&T CONCRETE MANHOLE 4'X4'X4'
PRIVATE EASEMENT
SITE 33
HAND CLEARING
NATHANIEL JAY PATTERSON, ET AL
175
177
178
220
EXISTING R/W VARIES
36" RCP
42" RCP
30" C&G
WOODS
CONC
FENCE
8/17/99

P-224


PERMIT DRAWING
SHEET 21 OF 23
DATE: 04-01-2020
WET UTILITIES SHOWN ON THIS SHEET AND THE NEXT.
DRY UTILITIES SEE PERMIT DRAWING SHEET 19 AND 20
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. R-3300B
SHEET NO. 33
Stantec
SCALE: 1"=100'
NAD 83/NSRS 2007
ENLARGEMENT VIEW
SEE SHEET 22, OF 23
INSET
DENOTES HAND CLEARING
ABANDON 938.0 LF 16" UTILITY PIPE
REMOVE WATER METER
PRIVATE EASEMENT
TIE-IN TO EXIST. 6" WATER LINE -L- STA. 225+15.28 LT 64.48'
90° BEND (ROTATED) -WL3- STA. 12+07.98
45° BEND (ROTATED) -WL1- STA. 12+35.56
45° BEND (VERT.) -WL1- STA. 12+28.98
ABANDON 124.9 LF 6" UTILITY PIPE
111.6 LF 6" WATER LINE
16" TAPPING SLEEVE AND VALVE
TIE-IN TO EXIST. 16" WATER LINE -L- STA. 225+10.61 RT 41.45
SITE 33
HORZ. BEND RAD. 764' BEGIN STA. 13+38.96 END STA. 15+66.10
16" VALVE -WL1- STA. 22+52.68
11.25° BEND (VERT.) -WL1- STA. 22+21.99
16"X16"X12" TEE -WL2- STA. 10+00.00
11.25° BEND (VERT.) -WL1- STA. 22+11.99
16" VALVE -WL1- STA. 21+88.99
11.25° BEND (HORZ.) -WL1- STA. 20+56.68
12" VALVE -WL2- STA. 10+08.00
11.25° BEND (ROTATED) -WL2- STA. 10+20.00
538.1 LF 12" WATER LINE -WL2- (RJ DIP CL50) 597.1 LF TOTAL
1342.1 LF 16" WATER LINE -WL1- (RJ DIP CL50) 1410.7 LF TOTAL
MATCHLINE -L- STA 235+00.00 SEE SHEET 23
MATCHLINE -L- STA 225+57.67 THIS SHEET
MATCHLINE -Y9- STA 23+50.00 SEE SHEET 23
SEE SHEET 28-1 FOR HORIZONTAL CURVE DATA
SEE SHEET 50 FOR -Y19- PROFILE
SEE SHEET 52 FOR -Y20- PROFILE
SEE SHEET 62 FOR -Y32- PROFILE
SEE SHEET 65 FOR -Y40- PROFILE
SEE SHEET 66 FOR -Y41- PROFILE
SEE SHEET 67 FOR -Y42- PROFILE
PENDER CO BOARD OF EDUCATION
ROCKY POINT REGIONAL WATER & SEWER DISTRICT
SOUTHERN BELL TELEPHONE & TELEGRAPH CO.
DUKE POWER CO.
NANCY L. JONES TRUSTEE
THOMAS R. AMBROSE
DEL-RAE D. DOPPELHEUER
LASHONDA N. ARMSTRONG
JENNIFER P. HEYWOOD
MORRIS, ET UX
5/14/99


PROJECT REFERENCE NO.
A-3300B
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 22 OF 23
DATE: 04-01-2020
NAD 83
SCALE: 1"=50'
25' 12.5' 0 25' 50'
WET UTILITIES SHOWN ON THIS SHEET AND THE PERVIOUS. DRY UTILITIES SEE PERMIT DRAWING SHEET 19 AND 20
DENOTES HAND CLEARING
HC
MATCHLINE -L- STA 225+57.67
PENDER CO BOARD OF EDUCATION
TIE-IN TO EXIST. 6" WATER LINE -L- STA. 225+15.28 LT 64.48'
RECONNECT FIRE HYDRANT
RECONNECT WATER METER
90° BEND (ROTATED)
3 - 45° BENDS (VERT.)
111.6 LF 6" WATER LINE
ABANDON 124.9 LF 6" UTILITY PIPE
16" TAPPING SLEEVE AND VALVE
TIE-IN TO EXIST. 16" WATER LINE -L- STA. 225+09.61 RT 41.45'
SITE 33
HAND CLEARING
HAND CLEARING
PROP O/H POW TEL CATV & FO LINES
PROP U/G POW TEL CATV & FO LINES
PROP U/G COMMUN CONDUIT
EXISTING R/W VARIES
REM
PUE
DUE
WOODS
11' CONC HW
30" BST CONC
60" CHL
36" RCP
42" RCP
30" C&G
6" PVC
8" DIP
12" DIP
16" DIP
175
176
177
178
220
225

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
3	23+91 to 26+36-SR6-LT	UTILITY					0.171					
	19+29 to 22+74-Y30RPD-LT						0.143					
	10+57 to 13+41-Y30RPD-LT						0.192					
	52+05 to 56+54-Y30-LT						0.257					
17	19+10 to 19+16-Y31-LT	UTILITY					0.060					
24	17+93 to 17+97-Y30-RT	UTILITY					0.019					
28	279+27 to 286+83-L-RT	UTILITY					0.322					
29	293+53 to 293+90-L-RT	UTILITY					0.006					
33	219+74 to 220+73-L-RT	UTILITY					0.081					
34	34+21 to 34+86-SR6-LT	UTILITY					0.014					
35	279+95 to 280+81-L-LT	UTILITY					0.080					
	281+62 to 283+85-L-LT						0.178					
	284+33 to 286+01-L-LT						0.147					
TOTALS:			**0.000**	**0.000**	**0.000**	**0.000**	**1.669**	**0.000**	**0.000**	**0**	**0**	**0**

NOTES:
Converting a mature forested area to a maintained corridor= 1.51 AC

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
06-09-2020
PENDER COUNTY
R-3300B
40237.2.1
SHEET 23 OF 23

Revised 2018 Feb

P-226

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
			ROADWAY ITEMS			
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0003	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM FIELD OFFICE	Lump Sum	L.S.	
0004	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum	L.S.	
0005	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUB-BING	5 ACR		
0006	0015000000-N	205	SEALING ABANDONED WELLS	5 EA		
0007	0022000000-E	225	UNCLASSIFIED EXCAVATION	104,500 CY		
0008	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (30+17.11 -Y31-)	Lump Sum	L.S.	
0009	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (658+69.17 -L1- LT)	Lump Sum	L.S.	
0010	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (658+69.17 -L1- RT)	Lump Sum	L.S.	
0011	0030000000-N	SP	TYPE II MODIFIED APPROACH FILL, STATION ******* (39+82.39 -Y30-)	Lump Sum	L.S.	
0012	0036000000-E	225	UNDERCUT EXCAVATION	168,000 CY		
0013	0084000000-E	SP	WICK DRAINS	743,000 LF		
0014	0106000000-E	230	BORROW EXCAVATION	4,405,300 CY		
0015	0127000000-N	235	EMBANKMENT SETTLEMENT GAUGES	26 EA		
0016	0134000000-E	240	DRAINAGE DITCH EXCAVATION	37,600 CY		
0017	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	80,460 SY		
0018	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	12,700 SY		

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0019	0192000000-N	260	PROOF ROLLING	90 HR		
0020	0194000000-E	265	SELECT GRANULAR MATERIAL, CLASS III	56,800 CY		
0021	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	68,800 SY		
0022	0199000000-E	SP	TEMPORARY SHORING	13,210 SF		
0023	0223000000-E	275	ROCK PLATING	2,400 SY		
0024	0248000000-N	SP	GENERIC GRADING ITEM MODIFIED TYPE A BRIDGE APPROACH FILL, STATION 25+28.04 -Y32-	Lump Sum	L.S.	
0025	0248000000-N	SP	GENERIC GRADING ITEM PLACEMENT OF NATIVE MATERIAL	Lump Sum	L.S.	
0026	0255000000-E	SP	GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETROLEUM CONTAMINATED SOIL	50 TON		
0027	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	4,910 TON		
0028	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	15,440 SY		
0029	0335000000-E	305	**" DRAINAGE PIPE (60")	184 LF		
0030	0335200000-E	305	15" DRAINAGE PIPE	3,416 LF		
0031	0335300000-E	305	18" DRAINAGE PIPE	992 LF		
0032	0335400000-E	305	24" DRAINAGE PIPE	612 LF		
0033	0335500000-E	305	30" DRAINAGE PIPE	432 LF		
0034	0335600000-E	305	36" DRAINAGE PIPE	324 LF		
0035	0335700000-E	305	42" DRAINAGE PIPE	60 LF		
0036	0335800000-E	305	48" DRAINAGE PIPE	108 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0037	0335850000-E	305	**" DRAINAGE PIPE ELBOWS (15")	82 EA		
0038	0335850000-E	305	**" DRAINAGE PIPE ELBOWS (18")	8 EA		
0039	0335850000-E	305	**" DRAINAGE PIPE ELBOWS (24")	2 EA		
0040	0335850000-E	305	**" DRAINAGE PIPE ELBOWS (30")	2 EA		
0041	0343000000-E	310	15" SIDE DRAIN PIPE	392 LF		
0042	0344000000-E	310	18" SIDE DRAIN PIPE	96 LF		
0043	0345000000-E	310	24" SIDE DRAIN PIPE	136 LF		
0044	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (18", V)	48 LF		
0045	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (30", V)	96 LF		
0046	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (36", V)	320 LF		
0047	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (42", V)	464 LF		
0048	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	7,752 LF		
0049	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	2,588 LF		
0050	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	1,960 LF		
0051	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	1,164 LF		
0052	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	4,644 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0053	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	800 LF		
0054	0402000000-E	310	48" RC PIPE CULVERTS, CLASS III	1,200 LF		
0055	0408000000-E	310	54" RC PIPE CULVERTS, CLASS III	1,128 LF		
0056	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (48")	112 LF		
0057	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (66")	232 LF		
0058	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (78")	428 LF		
0059	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	8,424 LF		
0060	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	1,954 LF		
0061	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	564 LF		
0062	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	876 LF		
0063	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	3,352 LF		
0064	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	1,000 LF		
0065	0546000000-E	310	**" CAA PIPE CULVERTS, *****" THICK (48", 0.109")	340 LF		
0066	0973100000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (54", 0.750")	60 LF		
0067	0973300000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (54", 0.750")	60 LF		
0068	0992000000-E	SP	GENERIC PIPE ITEM 30" PIPE ENDWALL WITH LOAD-CARRYING GRATE	5 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0069	0992000000-E	SP	GENERIC PIPE ITEM 36" PIPE ENDWALL WITH LOAD-CARRYING GRATE	28 EA		
0070	0992000000-E	SP	GENERIC PIPE ITEM 42" PIPE ENDWALL WITH LOAD-CARRYING GRATE	2 EA		
0071	0992000000-E	SP	GENERIC PIPE ITEM 48" PIPE ENDWALL WITH LOAD-CARRYING GRATE	2 EA		
0072	0992000000-E	SP	GENERIC PIPE ITEM 54" PIPE ENDWALL WITH LOAD-CARRYING GRATE	1 EA		
0073	0992000000-E	SP	GENERIC PIPE ITEM 6" VALVE	1 EA		
0074	0995000000-E	340	PIPE REMOVAL	13,207 LF		
0075	1000000000-E	462	6" SLOPE PROTECTION	675 SY		
0076	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0077	1099500000-E	505	SHALLOW UNDERCUT	1,100 CY		
0078	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	2,050 TON		
0079	1111000000-E	SP	CLASS IV AGGREGATE STABILIZATION	12,170 TON		
0080	1121000000-E	520	AGGREGATE BASE COURSE	157,800 TON		
0081	1220000000-E	545	INCIDENTAL STONE BASE	10,000 TON		
0082	1275000000-E	600	PRIME COAT	19,109 GAL		
0083	1297000000-E	607	MILLING ASPHALT PAVEMENT, ***" DEPTH (1-1/2")	1,590 SY		
0084	1330000000-E	607	INCIDENTAL MILLING	2,000 SY		
0085	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	101,660 TON		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0086	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	92,280 TON		
0087	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	18,990 TON		
0088	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	73,460 TON		
0089	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	14,685 TON		
0090	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	800 TON		
0091	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	118,100 LF		
0092	2022000000-E	815	SUBDRAIN EXCAVATION	3,159 CY		
0093	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	9,400 SY		
0094	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	1,580 CY		
0095	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	9,400 LF		
0096	2070000000-N	815	SUBDRAIN PIPE OUTLET	19 EA		
0097	2077000000-E	815	6" OUTLET PIPE	114 LF		
0098	2209000000-E	838	ENDWALLS	115.6 CY		
0099	2220000000-E	838	REINFORCED ENDWALLS	52.7 CY		
0100	2253000000-E	840	PIPE COLLARS	7.44 CY		
0101	2275000000-E	SP	FLOWABLE FILL	26 CY		
0102	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	352 EA		
0103	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	8.3 CY		
0104	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	171 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0105	2352000000-N	840	FRAME WITH GRATE, STD 840.**** (840.20)	8 EA		
0106	2354000000-N	840	FRAME WITH GRATE, STD 840.22	21 EA		
0107	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	30 EA		
0108	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	84 EA		
0109	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	85 EA		
0110	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	4 EA		
0111	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	5 EA		
0112	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	24 EA		
0113	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	59 EA		
0114	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	54 EA		
0115	2396000000-N	840	FRAME WITH COVER, STD 840.54	4 EA		
0116	2407000000-N	840	STEEL FRAME WITH TWO GRATES, STD 840.37	5 EA		
0117	2440000000-N	852	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	1 EA		
0118	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	23 EA		
0119	2462000000-E	836	**" SLUICE GATE (8")	1 EA		
0120	2538000000-E	846	**'-**" CONCRETE CURB & GUTTER (2'-9")	1,010 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0121	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	13,770 LF		
0122	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	21,560 LF		
0123	2556000000-E	846	SHOULDER BERM GUTTER	9,580 LF		
0124	2591000000-E	848	4" CONCRETE SIDEWALK	2,620 SY		
0125	2605000000-N	848	CONCRETE CURB RAMPS	22 EA		
0126	2612000000-E	848	6" CONCRETE DRIVEWAY	400 SY		
0127	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	7,950 SY		
0128	2717000000-E	854	VARIABLE HEIGHT CONCRETE BARRIER, TYPE ********** (II)	1,110 LF		
0129	2717000000-E	854	VARIABLE HEIGHT CONCRETE BARRIER, TYPE ********** (III)	59 LF		
0130	2717000000-E	854	VARIABLE HEIGHT CONCRETE BARRIER, TYPE ********** (T2)	59 LF		
0131	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	14,020 LF		
0132	2905000000-N	859	CONVERT EXISTING DROP INLET TO JUNCTION BOX	2 EA		
0133	2995000000-N	SP	GENERIC DRAINAGE ITEM CONVERT EXISTING CATCH BASIN TO TRAFFIC BEARING JUNCTION BOX	4 EA		
0134	3001000000-N	SP	IMPACT ATTENUATOR UNITS, TYPE TL-3	14 EA		
0135	3030000000-E	862	STEEL BEAM GUARDRAIL	27,837.5 LF		
0136	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	1,112.5 LF		
0137	3140000000-E	862	25' CLEAR SPAN GUARDRAIL SECTIONS	1 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0138	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	30 EA		
0139	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	3 EA		
0140	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	27 EA		
0141	3215000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE III	4 EA		
0142	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	34 EA		
0143	3288000000-N	SP	GUARDRAIL END UNITS, TYPE TL-2	12 EA		
0144	3317000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE B-77	31 EA		
0145	3360000000-E	863	REMOVE EXISTING GUARDRAIL	1,106 LF		
0146	3380000000-E	862	TEMPORARY STEEL BEAM GUARDRAIL	1,750 LF		
0147	3389150000-N	SP	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-2)	4 EA		
0148	3389150000-N	SP	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)	8 EA		
0149	3389200000-E	865	CABLE GUIDERAIL	26,900 LF		
0150	3389500000-N	865	ADDITIONAL GUIDERAIL POSTS	10 EA		
0151	3389600000-N	865	CABLE GUIDERAIL ANCHOR UNITS	34 EA		
0152	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	66,750 LF		
0153	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	4,319 EA		
0154	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	832 EA		
0155	3557000000-E	866	ADDITIONAL BARBED WIRE	1,000 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0156	3564000000-E	866	SINGLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 12', 12')	7 EA		
0157	3565000000-E	866	DOUBLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 10', 20')	2 EA		
0158	3628000000-E	876	RIP RAP, CLASS I	5,656 TON		
0159	3649000000-E	876	RIP RAP, CLASS B	11,250 TON		
0160	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	42,700 SY		
0161	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	13 CY		
0162	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDATIONS	2 CY		
0163	4057000000-E	SP	OVERHEAD FOOTING	24 CY		
0164	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	14,099 LB		
0165	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	971 LB		
0166	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	6,829 LF		
0167	4082000000-E	903	SUPPORTS, WOOD	117 LF		
0168	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (233+44 -L-)	Lump Sum	L.S.	
0169	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (279+50 -L-)	Lump Sum	L.S.	
0170	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (651+15 -L1-)	Lump Sum	L.S.	
0171	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (654+20 -L1-)	Lump Sum	L.S.	

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0172	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (680+60 -L1-)	Lump Sum	L.S.	
0173	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (838+15 -L1 NORTHERN-)	Lump Sum	L.S.	
0174	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (874+60 -L1 NORTHERN-)	Lump Sum	L.S.	
0175	4096000000-N	904	SIGN ERECTION, TYPE D	9 EA		
0176	4102000000-N	904	SIGN ERECTION, TYPE E	240 EA		
0177	4108000000-N	904	SIGN ERECTION, TYPE F	63 EA		
0178	4109000000-N	904	SIGN ERECTION, TYPE *** (OVERHEAD) (A)	11 EA		
0179	4109000000-N	904	SIGN ERECTION, TYPE *** (OVERHEAD) (B)	7 EA		
0180	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	17 EA		
0181	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	10 EA		
0182	4114000000-N	904	SIGN ERECTION, MILEMARKERS	20 EA		
0183	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (D)	10 EA		
0184	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)	3 EA		
0185	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	33 EA		
0186	4192000000-N	907	DISPOSAL OF SUPPORT, U-CHANNEL	13 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0187	4360000000-N	SP	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER – OM3-C	6 EA		
0188	4360000000-N	SP	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER – OM3-L	19 EA		
0189	4360000000-N	SP	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER – OM3-R	1 EA		
0190	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	917 SF		
0191	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	343 SF		
0192	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	498 SF		
0193	4415000000-N	1115	FLASHING ARROW BOARD	4 EA		
0194	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	7 EA		
0195	4423000000-N	SP	WORK ZONE DIGITAL SPEED LIMIT SIGNS	2 EA		
0196	4430000000-N	1130	DRUMS	1,301 EA		
0197	4445000000-E	1145	BARRICADES (TYPE III)	1,360 LF		
0198	4455000000-N	1150	FLAGGER	440 DAY		
0199	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	4 EA		
0200	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	3 EA		
0201	4480000000-N	1165	TMA	4 EA		
0202	4485000000-E	1170	PORTABLE CONCRETE BARRIER	2,200 LF		
0203	4490000000-E	1170	PORTABLE CONCRETE BARRIER (ANCHORED)	2,120 LF		
0204	4500000000-E	1170	REMOVE AND RESET PORTABLE CONCRETE BARRIER	2,420 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0205	4520000000-N	1266	TUBULAR MARKERS (FIXED)	50 EA		
0206	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	1,800 EA		
0207	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	72,950 LF		
0208	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	152,618 LF		
0209	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	5,353 LF		
0210	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	12,680 LF		
0211	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	64 EA		
0212	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	208 EA		
0213	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	2,590 LF		
0214	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	426,805 LF		
0215	4815000000-E	1205	PAINT PAVEMENT MARKING LINES (6")	10,450 LF		
0216	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	11,875 LF		
0217	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	4,380 LF		
0218	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	1,240 LF		
0219	4840000000-N	1205	PAINT PAVEMENT MARKING CHARAC-TER	64 EA		
0220	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	138 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0221	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 4", 20 MILS (STANDARD GLASS BEADS)	3,223 LF		
0222	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 6", 20 MILS (STANDARD GLASS BEADS)	1,630 LF		
0223	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	1,340 LF		
0224	4895000000-N	SP	GENERIC PAVEMENT MARKING ITEM NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKER	1,520 EA		
0225	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	55 EA		
0226	4935000000-N	1267	FLEXIBLE DELINEATORS (CRYSTAL)	70 EA		
0227	4940000000-N	1267	FLEXIBLE DELINEATORS (YELLOW)	70 EA		
0228	4945000000-N	1267	FLEXIBLE DELINEATORS (CRYSTAL & RED)	16 EA		
0229	4950000000-N	1267	FLEXIBLE DELINEATORS (YELLOW & RED)	12 EA		
0230	5255000000-N	1413	PORTABLE LIGHTING	Lump Sum	L.S.	
0231	5325000000-E	1510	**" WATER LINE (18")	4,874 LF		
0232	5325400000-E	1510	4" WATER LINE	15 LF		
0233	5325600000-E	1510	6" WATER LINE	297.4 LF		
0234	5326200000-E	1510	12" WATER LINE	3,912.3 LF		
0235	5326600000-E	1510	16" WATER LINE	5,657.1 LF		
0236	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	35,855 LB		
0237	5540000000-E	1515	6" VALVE	4 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0238	5552000000-E	1515	10" VALVE	7 EA		
0239	5558000000-E	1515	12" VALVE	1 EA		
0240	5558600000-E	1515	16" VALVE	7 EA		
0241	5572200000-E	1515	12" TAPPING SLEEVE & VALVE	2 EA		
0242	5589100000-E	1515	1" AIR RELEASE VALVE	6 EA		
0243	5648000000-N	1515	RELOCATE WATER METER	1 EA		
0244	5649000000-N	1515	RECONNECT WATER METER	2 EA		
0245	5666000000-N	1515	FIRE HYDRANT	5 EA		
0246	5672000000-N	1515	RELOCATE FIRE HYDRANT	5 EA		
0247	5673000000-E	1515	FIRE HYDRANT LEG	80 LF		
0248	5678800000-E	1515	10" LINE STOP	4 EA		
0249	5679000000-E	1515	12" LINE STOP	3 EA		
0250	5679200000-E	1515	16" LINE STOP	4 EA		
0251	5686500000-E	1515	WATER SERVICE LINE	33.3 LF		
0252	5709200000-E	1520	4" FORCE MAIN SEWER	64 LF		
0253	5709500000-E	1520	10" FORCE MAIN SEWER	7,289.1 LF		
0254	5709600000-E	1520	12" FORCE MAIN SEWER	2,503.4 LF		
0255	5769000000-E	1520	DUCTILE IRON SEWER PIPE FITTINGS	8,835 LB		
0256	5798000000-E	1530	ABANDON **" UTILITY PIPE (4")	140.5 LF		
0257	5800000000-E	1530	ABANDON 6" UTILITY PIPE	935 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0258	5804000000-E	1530	ABANDON 12" UTILITY PIPE	4,281.7 LF		
0259	5810000000-E	1530	ABANDON 16" UTILITY PIPE	9,544 LF		
0260	5815000000-N	1530	REMOVE WATER METER	12 EA		
0261	5815500000-N	1530	REMOVE FIRE HYDRANT	3 EA		
0262	5835700000-E	1540	16" ENCASEMENT PIPE	207.2 LF		
0263	5835900000-E	1540	20" ENCASEMENT PIPE	243.6 LF		
0264	5836000000-E	1540	24" ENCASEMENT PIPE	942.1 LF		
0265	5872500000-E	1550	BORE AND JACK OF **" (16")	171.6 LF		
0266	5872500000-E	1550	BORE AND JACK OF **" (20")	219.2 LF		
0267	5872500000-E	1550	BORE AND JACK OF **" (24")	238.5 LF		
0268	5872600000-E	1550	DIRECTIONAL DRILLING OF **" (12")	2,304.4 LF		
0269	5872600000-E	1550	DIRECTIONAL DRILLING OF **" (16")	516 LF		
0270	5872600000-E	1550	DIRECTIONAL DRILLING OF **" (18")	4,200.6 LF		
0271	6000000000-E	1605	TEMPORARY SILT FENCE	251,850 LF		
0272	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	3,850 TON		
0273	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	28,110 TON		
0274	6012000000-E	1610	SEDIMENT CONTROL STONE	13,640 TON		
0275	6015000000-E	1615	TEMPORARY MULCHING	245 ACR		
0276	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	14,500 LB		

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0277	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED-ING	74 TON		
0278	6024000000-E	1622	TEMPORARY SLOPE DRAINS	39,650 LF		
0279	6029000000-E	SP	SAFETY FENCE	39,920 LF		
0280	6030000000-E	1630	SILT EXCAVATION	134,940 CY		
0281	6036000000-E	1631	MATTING FOR EROSION CONTROL	400,000 SY		
0282	6037000000-E	SP	COIR FIBER MAT	37,285 SY		
0283	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	1,400 SY		
0284	6042000000-E	1632	1/4" HARDWARE CLOTH	22,900 LF		
0285	6043000000-E	SP	LOW PERMEABILITY GEOTEXTILE	10,040 SY		
0286	6045000000-E	SP	**" TEMPORARY PIPE (36")	185 LF		
0287	6045000000-E	SP	**" TEMPORARY PIPE (42")	80 LF		
0288	6070000000-N	1639	SPECIAL STILLING BASINS	14 EA		
0289	6071012000-E	SP	COIR FIBER WATTLE	24,100 LF		
0290	6071020000-E	SP	POLYACRYLAMIDE (PAM)	9,030 LB		
0291	6071030000-E	1640	COIR FIBER BAFFLE	26,000 LF		
0292	6071050000-E	SP	**" SKIMMER (1-1/2")	21 EA		
0293	6071050000-E	SP	**" SKIMMER (2")	21 EA		
0294	6071050000-E	SP	**" SKIMMER (2-1/2")	9 EA		
0295	6071050000-E	SP	**" SKIMMER (3")	4 EA		

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0296	6071050000-E	SP	**" SKIMMER (5")	2 EA		
0297	6084000000-E	1660	SEEDING & MULCHING	245 ACR		
0298	6087000000-E	1660	MOWING	124 ACR		
0299	6090000000-E	1661	SEED FOR REPAIR SEEDING	3,000 LB		
0300	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	13.5 TON		
0301	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	8,225 LB		
0302	6108000000-E	1665	FERTILIZER TOPDRESSING	246 TON		
0303	6111000000-E	SP	IMPERVIOUS DIKE	1,142 LF		
0304	6114500000-N	1667	SPECIALIZED HAND MOWING	230 MHR		
0305	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	108 EA		
0306	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	12 EA		
0307	6120000000-E	SP	CULVERT DIVERSION CHANNEL	4,100 CY		
0308	6123000000-E	1670	REFORESTATION	5 ACR		
0309	6676000000-E	SP	GENERIC PLANTING ITEM VEGETATIVE SHELF PLANTING	5,100 SF		
0310	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	2 EA		
0311	7060000000-E	1705	SIGNAL CABLE	24,380 LF		
0312	7108000000-E	1705	VEHICLE SIGNAL HEAD (12", 1 SECTION)	14 EA		
0313	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	53 EA		
0314	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	18 EA		

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0315	7264000000-E	1710	MESSENGER CABLE (3/8")	930 LF		
0316	7279000000-E	1715	TRACER WIRE	10,670 LF		
0317	7300000000-E	1715	UNPAVED TRENCHING (**********) (2, 2")	10,010 LF		
0318	7300000000-E	1715	UNPAVED TRENCHING (**********) (3, 2")	3,240 LF		
0319	7300000000-E	1715	UNPAVED TRENCHING (**********) (4, 2")	470 LF		
0320	7300100000-E	1715	UNPAVED TRENCHING FOR TEMP-ORARY LEAD-IN	1,050 LF		
0321	7301000000-E	1715	DIRECTIONAL DRILL (**********) (1, 2")	160 LF		
0322	7301000000-E	1715	DIRECTIONAL DRILL (**********) (2, 1-1/2")	120 LF		
0323	7301000000-E	1715	DIRECTIONAL DRILL (**********) (2, 2")	1,680 LF		
0324	7301000000-E	1715	DIRECTIONAL DRILL (**********) (3, 2")	660 LF		
0325	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 2")	440 LF		
0326	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	67 EA		
0327	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEA-VY DUTY)	28 EA		
0328	7360000000-N	1720	WOOD POLE	7 EA		
0329	7372000000-N	1721	GUY ASSEMBLY	14 EA		
0330	7408000000-E	1722	1" RISER WITH WEATHERHEAD	2 EA		
0331	7420000000-E	1722	2" RISER WITH WEATHERHEAD	7 EA		
0332	7456000000-E	1726	LEAD-IN CABLE (**********) (14-2)	580 LF		

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0333	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER) (48)	11,225 LF		
0334	7528000000-E	1730	DROP CABLE	600 LF		
0335	7540000000-N	1731	SPLICE ENCLOSURE	6 EA		
0336	7552000000-N	1731	INTERCONNECT CENTER	7 EA		
0337	7566000000-N	1733	DELINEATOR MARKER	27 EA		
0338	7588000000-N	SP	METAL POLE WITH SINGLE MAST ARM	8 EA		
0339	7590000000-N	SP	METAL POLE WITH DUAL MAST ARM	1 EA		
0340	7613000000-N	SP	SOIL TEST	9 EA		
0341	7614100000-E	SP	DRILLED PIER FOUNDATION	54 CY		
0342	7631000000-N	SP	MAST ARM WITH METAL POLE DE-SIGN	9 EA		
0343	7636000000-N	1745	SIGN FOR SIGNALS	48 EA		
0344	7642200000-N	1743	TYPE II PEDESTAL WITH FOUND-ATION	2 EA		
0345	7642300000-N	1743	TYPE III PEDESTAL WITH FOUND-ATION	16 EA		
0346	7648000000-N	1746	RELOCATE EXISTING SIGN	2 EA		
0347	7684000000-N	1750	SIGNAL CABINET FOUNDATION	6 EA		
0348	7696000000-N	1751	CONTROLLERS WITH CABINET (**********) (TYPE 2070E - BASE MOUNTED)	6 EA		
0349	7901000000-N	1753	CABINET BASE EXTENDER	6 EA		
0350	7948000000-N	1757	TRAFFIC SIGNAL REMOVAL	1 EA		
0351	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV CAMERA EXTENSION POLE	1 EA		

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0352	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV ELECTRICAL SERVICE	3 EA		
0353	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV METAL POLE (40')	3 EA		
0354	7980000000-N	SP	GENERIC SIGNAL ITEM DIGITAL CCTV CAMERA ASSEMBLY	4 EA		
0355	7980000000-N	SP	GENERIC SIGNAL ITEM DISPOSAL OF EXISTING DMS	1 EA		
0356	7980000000-N	SP	GENERIC SIGNAL ITEM DISPOSAL OF EXISTING DMS ELECTRICAL SERVICE	1 EA		
0357	7980000000-N	SP	GENERIC SIGNAL ITEM DISPOSAL OF EXISTING DMS STRUCTURE & FOUNDATION	1 EA		
0358	7980000000-N	SP	GENERIC SIGNAL ITEM DMS	6 EA		
0359	7980000000-N	SP	GENERIC SIGNAL ITEM DMS ELECTRICAL SERVICE	3 EA		
0360	7980000000-N	SP	GENERIC SIGNAL ITEM DMS STRUCTURE	3 EA		
0361	7980000000-N	SP	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	7 EA		
0362	7980000000-N	SP	GENERIC SIGNAL ITEM FIELD EQUIPMENT CABINET	3 EA		
0363	7980000000-N	SP	GENERIC SIGNAL ITEM MICROWAVE VEHICLE DETECTION SYSTEM - MULTIPLE ZONES	18 EA		
0364	7980000000-N	SP	GENERIC SIGNAL ITEM SOIL TEST FOR CCTV POLE	3 EA		
0365	7980000000-N	SP	GENERIC SIGNAL ITEM SOIL TEST FOR DMS FOUNDATION	3 EA		
0366	7992000000-E	SP	GENERIC SIGNAL ITEM DRILLED PIER FOUNDATION FOR CCTV POLE	18 CY		
0424	5802000000-E	1530	ABANDON 10" UTILITY PIPE	9,136.5 LF		

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0425	6102000000-E	1664	SODDING	10,000 SY		
0426	6105000000-E	1664	WATER	20 M/G		
0429	7960000000-N	SP	METAL POLE FOUNDATION REMOVAL	4 EA		
0430	7972000000-N	SP	METAL POLE REMOVAL	4 EA		
			CULVERT ITEMS			
0367	0320000000-E	300	FOUNDATION CONDITIONING GEO-TEXTILE	9,769 SY		
0368	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ********** (19+49.00 -Y30RPD-)	Lump Sum	L.S.	
0369	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ********** (18+00.00 -Y32-)	Lump Sum	L.S.	
0370	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ********** (320+01.00 -L-)	Lump Sum	L.S.	
0371	8065000000-N	SP	ASBESTOS ASSESSMENT	Lump Sum	L.S.	
0372	8126000000-N	414	CULVERT EXCAVATION, STA ****** (16+22.00 -Y30RPA-)	Lump Sum	L.S.	
0373	8126000000-N	414	CULVERT EXCAVATION, STA ****** (18+00.00 -Y32-)	Lump Sum	L.S.	
0374	8126000000-N	414	CULVERT EXCAVATION, STA ****** (19+49.00 -Y30RPD-)	Lump Sum	L.S.	
0375	8126000000-N	414	CULVERT EXCAVATION, STA ****** (19+80.00 -Y38-)	Lump Sum	L.S.	
0376	8126000000-N	414	CULVERT EXCAVATION, STA ****** (320+01.00 -L-)	Lump Sum	L.S.	
0377	8126000000-N	414	CULVERT EXCAVATION, STA ****** (612+13.00 -L1-)	Lump Sum	L.S.	

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0378	8126000000-N	414	CULVERT EXCAVATION, STA ****** (660+85.00 -L1-)	Lump Sum	L.S.	
0379	8126000000-N	414	CULVERT EXCAVATION, STA ****** (712+62.00 -L1-)	Lump Sum	L.S.	
0380	8133000000-E	414	FOUNDATION CONDITIONING MATERIAL, BOX CULVERT	7,053 TON		
0381	8196000000-E	420	CLASS A CONCRETE (CULVERT)	5,269.1 CY		
0382	8245000000-E	425	REINFORCING STEEL (CULVERT)	838,896 LB		
			WALL ITEMS			
0383	8504000000-E	460	CONCRETE BARRIER RAIL WITH MOMENT SLAB	630 LF		
0384	8801000000-E	SP	MSE RETAINING WALL NO **** (1)	5,990 SF		
0385	8801000000-E	SP	MSE RETAINING WALL NO **** (2)	1,290 SF		
0386	8801000000-E	SP	MSE RETAINING WALL NO **** (3)	6,560 SF		
0387	8801000000-E	SP	MSE RETAINING WALL NO **** (4)	3,530 SF		
0388	8839000000-E	SP	GENERIC RETAINING WALL ITEM CUSTOM BARRIER RAIL	80 LF		
0389	8847000000-E	SP	GENERIC RETAINING WALL ITEM ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	516,691 SF		
0390	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND ABSORPTIVE BARRIER WALL NO -SW10-	91,231 SF		
0391	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND ABSORPTIVE BARRIER WALL NO -SW9&11-	93,961 SF		

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0392	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NO -SW10-	91,231 SF		
0393	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NO -SW22-	10,055 SF		
0394	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NO -SW9&11-	178,826 SF		
0395	8847000000-E	SP	GENERIC RETAINING WALL ITEM TEMPORARY SURCHARGE WALL NO 3	520 SF		
0396	8847000000-E	SP	GENERIC RETAINING WALL ITEM TEMPORARY SURCHARGE WALL NO 4	500 SF		
0427	8834000000-N	SP	GENERIC RETAINING WALL ITEM NO -SW9&11- SOUND WALL STEEL ACCESS DOOR	2 EA		
0428	8834000000-N	SP	GENERIC RETAINING WALL ITEM NO -SW10- SOUND WALL STEEL ACCESS DOOR	1 EA		
			STRUCTURE ITEMS			
0397	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 25+28.04 -Y32-)	Lump Sum	L.S.	
0398	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 30+17.11 -Y31-)	Lump Sum	L.S.	
0399	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 39+82.39 -Y30-)	Lump Sum	L.S.	
0400	8112730000-N	450	PDA TESTING	8 EA		
0401	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	52,701 SF		
0402	8161000000-E	420	GROOVING BRIDGE FLOORS	56,601 SF		
0403	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	992.7 CY		

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0404	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (25+28.04 -Y32-)	Lump Sum	L.S.	
0405	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (30+17.11 -Y31-)	Lump Sum	L.S.	
0406	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (39+82.39 -Y30-)	Lump Sum	L.S.	
0407	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (658+69.17 -L1- LT)	Lump Sum	L.S.	
0408	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (658+69.17 -L1- RT)	Lump Sum	L.S.	
0409	8217000000-E	425	REINFORCING STEEL (BRIDGE)	154,013 LB		
0410	8238000000-E	425	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	5,405 LB		
0411	8277000000-E	430	MODIFIED 72" PRESTRESSED CONC GIRDERS	1,298.06 LF		
0412	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 12 X 53)	180 EA		
0413	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 14 X 73)	24 EA		
0414	8364000000-E	450	HP12X53 STEEL PILES	13,500 LF		
0415	8384000000-E	450	HP14X73 STEEL PILES	2,280 LF		
0416	8391000000-N	450	STEEL PILE POINTS	176 EA		
0417	8393000000-N	450	PILE REDRIVES	103 EA		
0418	8503000000-E	460	CONCRETE BARRIER RAIL	1,736.94 LF		
0419	8531000000-E	462	4" SLOPE PROTECTION	3,878 SY		

County : Pender

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0420	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum	L.S.	
0421	8706000000-N	SP	EXPANSION JOINT SEALS	Lump Sum	L.S.	
0422	8860000000-N	SP	GENERIC STRUCTURE ITEM SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)	Lump Sum	L.S.	
0423	8867000000-E	SP	GENERIC STRUCTURE ITEM MODIFIED 54" PRESTRESSED CONCRETE GIRDERS	4,176.15 LF		

1601/Jan11/Q10852229.99/D1971367842000/E430 **Total Amount Of Bid For Entire Project :**

Vendor 1 of 2: CONTI CIVIL, LLC (19390)
Call Order 001 (Proposal: C204553)

Bid Information

Proposal County: PENDER
Vendor Address: 2045 LINCOLN HIGHWAY
EDISON , NJ , 08817
Signature Check: Gerard Maurer
Time Bid Received: January 18, 2022 01:49 PM
Amendment Count: 2

Bid Checksum: FD27F4F574
Bid Total: $185,680,442.00
Items Total: $185,680,442.00
Time Total: $0.00

Bidding Errors:
None.

Advertised DBE Goal: 8.0%
DBE Participation Submitted: 8.13%

Vendor 1 of 2: CONTI CIVIL, LLC (19390)
Call Order 001 (Proposal: C204553)

Bid Bond Information

Projects:		**Bond Maximum:**	
Counties:		**State of Incorporation:**	CT
Bond ID:	79BR-DTJW-GS4R-RT36	**Agency Execution Date:**	1/18/2022
Paid by Check:	No	**Surety Name:**	SuretyWave
Bond Percent:	5%	**Bond Agency Name:**	Travelers Casualty and Surety Company of America

DBE Load Information

Letting ID: L220118
Letting Date: 01/18/2022
Call Order: 001
Contract ID: C204553
Project: STATE FUNDEDSTATE FUNDEDSTATE FUNDEDSTATE FUNDED
Bid Total: $185,680,442.00
DBE Goal: 8.00% ($14,854,435.36)

Vendor ID: 19390
Vendor Name: Conti Civil, LLC
DBE Entered: 8.13% ($15,102,541.63)

Vendor ID	DBE Name	Is Supplier?	City/State	Goods/Service	Amount
4247	SEAL BROTHERS CONTRACTING LLC	False	131 W. CLEVE STREET , MOUNT AIRY, NC 27030	SubContractor	1,510,330.00
4720	MILITARY & FEDERAL CONSTRUCTION CO	False	317-C CENTER STREET , JACKSONVILLE, NC 28546	SubContractor	8,826,986.44
4761	TRAFFIC CONTROL SAFETY SERVICES, INC.	False	POST OFFICE BOX 24511 , WINSTON-SALEM, NC 27114	SubContractor	1,417,167.00
15521	4 D CONSTRUCTION	False	P.O. BOX 806 , MAXTON, NC 28364	SubContractor	973,431.04
3376	REYNOLDS FENCE & GUARDRAIL INC	False	9320 MACHADO DRIVE , INDIAN TRAIL, NC 28079	SubContractor	1,909,605.25
16776	PROFESSIONAL MAINTENANCE SYSTEMS INC	False	2400 BOSTON ST UNIT 102 , BALTIMORE, MD 21224	SubContractor	465,021.90

BondID: 79BR-DTJW-GS4R-RT36
Surety Registry Agency: SuretyWave
Verified?: 1
Surety Agency: Travelers Casualty and Surety Company of America
Bond Execution Date: 1/18/2022

Line Number	Item Number	Quantity	Unit	Unit Price	Extension Price
Section 0001 ROADWAY ITEMS					
0001	0000100000-N MOBILIZATION	1.000	LS	$9,410,000.0000	$9,410,000.00
0002	0000400000-N CONSTRUCTION SURVEYING	1.000	LS	$3,200,000.0000	$3,200,000.00
0003	0000900000-N GENERIC MISCELLANEOUS ITEM FIELD OFFICE	1.000	LS	$800,000.0000	$800,000.00
0004	0001000000-E CLEARING & GRUBBING .. ACRE(S)	1.000	LS	$30,474,974.2700	$30,474,974.27
0005	0008000000-E SUPPLEMENTARY CLEARING & GRUB-BING	5.000	ACR	$7,000.0000	$35,000.00
0006	0015000000-N SEALING ABANDONED WELLS	5.000	EA	$2,200.0000	$11,000.00
0007	0022000000-E UNCLASSIFIED EXCAVATION	104500.000	CY	$9.0000	$940,500.00
0008	0028000000-N TYPE I STANDARD APPROACH FILL STATION ********** (30+17.11 -Y31-)	1.000	LS	$110,000.0000	$110,000.00
0009	0028000000-N TYPE I STANDARD APPROACH FILL STATION ********** (658+69.17 -L1- LT)	1.000	LS	$64,700.0000	$64,700.00
0010	0028000000-N TYPE I STANDARD APPROACH FILL STATION ********** (658+69.17 -L1- RT)	1.000	LS	$68,000.0000	$68,000.00
0011	0030000000-N TYPE II MODIFIED APPROACH FILL, STATION ******* (39+82.39 -Y30-)	1.000	LS	$65,600.0000	$65,600.00
0012	0036000000-E UNDERCUT EXCAVATION	168000.000	CY	$24.0000	$4,032,000.00
0013	0084000000-E WICK DRAINS	743000.000	LF	$0.5500	$408,650.00
0014	0106000000-E BORROW EXCAVATION	4405300.000	CY	$3.0000	$13,215,900.00
0015	0127000000-N EMBANKMENT SETTLEMENT GAUGES	26.000	EA	$725.0000	$18,850.00
0016	0134000000-E DRAINAGE DITCH EXCAVATION	37600.000	CY	$12.0000	$451,200.00
0017	0156000000-E REMOVAL OF EXISTING ASPHALT PAVEMENT	80460.000	SY	$7.0000	$563,220.00
0018	0177000000-E BREAKING OF EXISTING ASPHALT PAVEMENT	12700.000	SY	$4.5000	$57,150.00
0019	0192000000-N PROOF ROLLING	90.000	HR	$105.0000	$9,450.00
0020	0194000000-E SELECT GRANULAR MATERIAL, CLASS III	56800.000	CY	$3.0000	$170,400.00
0021	0196000000-E GEOTEXTILE FOR SOIL STABILIZA-TION	68800.000	SY	$1.0000	$68,800.00
0022	0199000000-E TEMPORARY SHORING	13210.000	SF	$16.0000	$211,360.00
0023	0223000000-E	2400.000	SY	$95.0000	$228,000.00

	ROCK PLATING				
0024	0248000000-N	1.000	LS	$117,000.0000	$117,000.00
	GENERIC GRADING ITEM MODIFIED TYPE A BRIDGE AP- PROACH FILL, STATION 25+28.04 - Y32-				
0025	0248000000-N	1.000	LS	$31,000.0000	$31,000.00
	GENERIC GRADING ITEM PLACEMENT OF NATIVE MATERIAL				
0026	0255000000-E	50.000	TON	$360.0000	$18,000.00
	GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETRO- LEUM CONTAMINATED SOIL				
0027	0318000000-E	4910.000	TON	$55.0000	$270,050.00
	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES				
0028	0320000000-E	15440.000	SY	$1.5000	$23,160.00
	FOUNDATION CONDITIONING GEO- TEXTILE				
0029	0335000000-E	184.000	LF	$520.0000	$95,680.00
	**" DRAINAGE PIPE (60")				
0030	0335200000-E	3416.000	LF	$85.0000	$290,360.00
	15" DRAINAGE PIPE				
0031	0335300000-E	992.000	LF	$98.0000	$97,216.00
	18" DRAINAGE PIPE				
0032	0335400000-E	612.000	LF	$135.0000	$82,620.00
	24" DRAINAGE PIPE				
0033	0335500000-E	432.000	LF	$170.0000	$73,440.00
	30" DRAINAGE PIPE				
0034	0335600000-E	324.000	LF	$250.0000	$81,000.00
	36" DRAINAGE PIPE				
0035	0335700000-E	60.000	LF	$360.0000	$21,600.00
	42" DRAINAGE PIPE				
0036	0335800000-E	108.000	LF	$380.0000	$41,040.00
	48" DRAINAGE PIPE				
0037	0335850000-E	82.000	EA	$380.0000	$31,160.00
	**" DRAINAGE PIPE ELBOWS (15")				
0038	0335850000-E	8.000	EA	$580.0000	$4,640.00
	**" DRAINAGE PIPE ELBOWS (18")				
0039	0335850000-E	2.000	EA	$735.0000	$1,470.00
	**" DRAINAGE PIPE ELBOWS (24")				
0040	0335850000-E	2.000	EA	$1,750.0000	$3,500.00
	**" DRAINAGE PIPE ELBOWS (30")				
0041	0343000000-E	392.000	LF	$80.0000	$31,360.00
	15" SIDE DRAIN PIPE				
0042	0344000000-E	96.000	LF	$95.0000	$9,120.00
	18" SIDE DRAIN PIPE				
0043	0345000000-E	136.000	LF	$120.0000	$16,320.00
	24" SIDE DRAIN PIPE				
0044	0354000000-E	48.000	LF	$140.0000	$6,720.00
	" RC PIPE CULVERTS, CLASS ** (18", V)				
0045	0354000000-E	96.000	LF	$190.0000	$18,240.00
	" RC PIPE CULVERTS, CLASS ** (30", V)				
0046	0354000000-E	320.000	LF	$200.0000	$64,000.00
	" RC PIPE CULVERTS, CLASS ** (36", V)				
0047	0354000000-E	464.000	LF	$280.0000	$129,920.00

		" RC PIPE CULVERTS, CLASS ** (42", V)			
0048	0366000000-E	7752.000	LF	$50.0000	$387,600.00
	15" RC PIPE CULVERTS, CLASS III				
0049	0372000000-E	2588.000	LF	$65.0000	$168,220.00
	18" RC PIPE CULVERTS, CLASS III				
0050	0378000000-E	1960.000	LF	$80.0000	$156,800.00
	24" RC PIPE CULVERTS, CLASS III				
0051	0384000000-E	1164.000	LF	$105.0000	$122,220.00
	30" RC PIPE CULVERTS, CLASS III				
0052	0390000000-E	4644.000	LF	$135.0000	$626,940.00
	36" RC PIPE CULVERTS, CLASS III				
0053	0396000000-E	800.000	LF	$165.0000	$132,000.00
	42" RC PIPE CULVERTS, CLASS III				
0054	0402000000-E	1200.000	LF	$300.0000	$360,000.00
	48" RC PIPE CULVERTS, CLASS III				
0055	0408000000-E	1128.000	LF	$360.0000	$406,080.00
	54" RC PIPE CULVERTS, CLASS III				
0056	0448000000-E	112.000	LF	$315.0000	$35,280.00
	****" RC PIPE CULVERTS, CLASS IV (48")				
0057	0448000000-E	232.000	LF	$600.0000	$139,200.00
	****" RC PIPE CULVERTS, CLASS IV (66")				
0058	0448000000-E	428.000	LF	$800.0000	$342,400.00
	****" RC PIPE CULVERTS, CLASS IV (78")				
0059	0448200000-E	8424.000	LF	$50.0000	$421,200.00
	15" RC PIPE CULVERTS, CLASS IV				
0060	0448300000-E	1954.000	LF	$55.0000	$107,470.00
	18" RC PIPE CULVERTS, CLASS IV				
0061	0448400000-E	564.000	LF	$75.0000	$42,300.00
	24" RC PIPE CULVERTS, CLASS IV				
0062	0448500000-E	876.000	LF	$130.0000	$113,880.00
	30" RC PIPE CULVERTS, CLASS IV				
0063	0448600000-E	3352.000	LF	$170.0000	$569,840.00
	36" RC PIPE CULVERTS, CLASS IV				
0064	0448700000-E	1000.000	LF	$330.0000	$330,000.00
	42" RC PIPE CULVERTS, CLASS IV				
0065	0546000000-E	340.000	LF	$460.0000	$156,400.00
	" CAA PIPE CULVERTS, ***" THICK (48", 0.109")				
0066	0973100000-E	60.000	LF	$1,300.0000	$78,000.00
	" WELDED STEEL PIPE, **" THICK, GRADE B IN SOIL (54", 0.750")				
0067	0973300000-E	60.000	LF	$4,500.0000	$270,000.00
	" WELDED STEEL PIPE, **" THICK, GRADE B NOT IN SOIL (54", 0.750")				
0068	0992000000-E	5.000	EA	$11,000.0000	$55,000.00
	GENERIC PIPE ITEM 30" PIPE ENDWALL WITH LOAD- CARRYING GRATE				
0069	0992000000-E	28.000	EA	$13,000.0000	$364,000.00
	GENERIC PIPE ITEM 36" PIPE ENDWALL WITH LOAD- CARRYING GRATE				
0070	0992000000-E	2.000	EA	$19,500.0000	$39,000.00
	GENERIC PIPE ITEM 42" PIPE ENDWALL WITH LOAD- CARRYING GRATE				
0071	0992000000-E	2.000	EA	$24,000.0000	$48,000.00
	GENERIC PIPE ITEM 48" PIPE ENDWALL WITH LOAD- CARRYING GRATE				

0072	0992000000-E	1.000	EA	$27,000.0000	$27,000.00
	GENERIC PIPE ITEM 54" PIPE ENDWALL WITH LOAD- CARRYING GRATE				
0073	0992000000-E	1.000	EA	$11,000.0000	$11,000.00
	GENERIC PIPE ITEM 6" VALVE				
0074	0995000000-E	13207.000	LF	$50.0000	$660,350.00
	PIPE REMOVAL				
0075	1000000000-E	675.000	SY	$120.0000	$81,000.00
	6" SLOPE PROTECTION				
0076	1011000000-N	1.000	LS	$12,500,000.0000	$12,500,000.00
	FINE GRADING				
0077	1099500000-E	1100.000	CY	$26.0000	$28,600.00
	SHALLOW UNDERCUT				
0078	1099700000-E	2050.000	TON	$50.0000	$102,500.00
	CLASS IV SUBGRADE STABILIZA- TION				
0079	1111000000-E	12170.000	TON	$55.0000	$669,350.00
	CLASS IV AGGREGATE STABILIZA- TION				
0080	1121000000-E	157800.000	TON	$45.0000	$7,101,000.00
	AGGREGATE BASE COURSE				
0081	1220000000-E	10000.000	TON	$50.0000	$500,000.00
	INCIDENTAL STONE BASE				
0082	1275000000-E	19109.000	GAL	$6.0000	$114,654.00
	PRIME COAT				
0083	1297000000-E	1590.000	SY	$17.0000	$27,030.00
	MILLING ASPHALT PAVEMENT, ***"DEPTH (1-1/2")				
0084	1330000000-E	2000.000	SY	$17.0000	$34,000.00
	INCIDENTAL MILLING				
0085	1491000000-E	101660.000	TON	$80.0000	$8,132,800.00
	ASPHALT CONC BASE COURSE, TYPE B25.0C				
0086	1503000000-E	92280.000	TON	$80.0000	$7,382,400.00
	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C				
0087	1519000000-E	18990.000	TON	$84.0000	$1,595,160.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5B				
0088	1523000000-E	73460.000	TON	$86.0000	$6,317,560.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5C				
0089	1575000000-E	14685.000	TON	$394.0000	$5,785,890.00
	ASPHALT BINDER FOR PLANT MIX				
0090	1693000000-E	800.000	TON	$185.0000	$148,000.00
	ASPHALT PLANT MIX, PAVEMENT REPAIR				
0091	1840000000-E	118100.000	LF	$0.3100	$36,611.00
	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)				
0092	2022000000-E	3159.000	CY	$43.0000	$135,837.00
	SUBDRAIN EXCAVATION				
0093	2026000000-E	9400.000	SY	$0.8500	$7,990.00
	GEOTEXTILE FOR SUBSURFACE DRAINS				
0094	2036000000-E	1580.000	CY	$18.0000	$28,440.00
	SUBDRAIN COARSE AGGREGATE				
0095	2044000000-E	9400.000	LF	$5.2500	$49,350.00
	6" PERFORATED SUBDRAIN PIPE				

0096	2070000000-N SUBDRAIN PIPE OUTLET	19.000	EA	$310.0000	$5,890.00
0097	2077000000-E 6" OUTLET PIPE	114.000	LF	$14.0000	$1,596.00
0098	2209000000-E ENDWALLS	115.600	CY	$1,450.0000	$167,620.00
0099	2220000000-E REINFORCED ENDWALLS	52.700	CY	$2,650.0000	$139,655.00
0100	2253000000-E PIPE COLLARS	7.440	CY	$2,300.0000	$17,112.00
0101	2275000000-E FLOWABLE FILL	26.000	CY	$4,700.0000	$122,200.00
0102	2286000000-N MASONRY DRAINAGE STRUCTURES	352.000	EA	$2,460.0000	$865,920.00
0103	2297000000-E MASONRY DRAINAGE STRUCTURES	8.300	CY	$4,000.0000	$33,200.00
0104	2308000000-E MASONRY DRAINAGE STRUCTURES	171.000	LF	$540.0000	$92,340.00
0105	2352000000-N FRAME WITH GRATE, STD 840.**** (840.20)	8.000	EA	$870.0000	$6,960.00
0106	2354000000-N FRAME WITH GRATE, STD 840.22	21.000	EA	$870.0000	$18,270.00
0107	2364000000-N FRAME WITH TWO GRATES, STD 840.16	30.000	EA	$820.0000	$24,600.00
0108	2364200000-N FRAME WITH TWO GRATES, STD 840.20	84.000	EA	$1,080.0000	$90,720.00
0109	2365000000-N FRAME WITH TWO GRATES, STD 840.22	85.000	EA	$795.0000	$67,575.00
0110	2366000000-N FRAME WITH TWO GRATES, STD 840.24	4.000	EA	$1,065.0000	$4,260.00
0111	2367000000-N FRAME WITH TWO GRATES, STD 840.29	5.000	EA	$1,075.0000	$5,375.00
0112	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	24.000	EA	$1,300.0000	$31,200.00
0113	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	59.000	EA	$1,375.0000	$81,125.00
0114	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	54.000	EA	$1,375.0000	$74,250.00
0115	2396000000-N FRAME WITH COVER, STD 840.54	4.000	EA	$930.0000	$3,720.00
0116	2407000000-N STEEL FRAME WITH TWO GRATES, STD 840.37	5.000	EA	$2,960.0000	$14,800.00
0117	2440000000-N CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	1.000	EA	$1,220.0000	$1,220.00
0118	2451000000-N CONCRETE TRANSITIONAL SECTION FOR DROP INLET	23.000	EA	$1,050.0000	$24,150.00
0119	2462000000-E **" SLUICE GATE (8")	1.000	EA	$4,300.0000	$4,300.00
0120	2538000000-E	1010.000	LF	$30.0000	$30,300.00

		'-" CONCRETE CURB & GUTTER (2'-9")			
0121	2542000000-E	13770.000	LF	$26.0000	$358,020.00
	1'-6" CONCRETE CURB & GUTTER				
0122	2549000000-E	21560.000	LF	$30.0000	$646,800.00
	2'-6" CONCRETE CURB & GUTTER				
0123	2556000000-E	9580.000	LF	$30.0000	$287,400.00
	SHOULDER BERM GUTTER				
0124	2591000000-E	2620.000	SY	$45.0000	$117,900.00
	4" CONCRETE SIDEWALK				
0125	2605000000-N	22.000	EA	$4,600.0000	$101,200.00
	CONCRETE CURB RAMPS				
0126	2612000000-E	400.000	SY	$68.0000	$27,200.00
	6" CONCRETE DRIVEWAY				
0127	2655000000-E	7950.000	SY	$68.0000	$540,600.00
	5" MONOLITHIC CONCRETE ISLANDS(KEYED IN)				
0128	2717000000-E	1110.000	LF	$155.0000	$172,050.00
	VARIABLE HEIGHT CONCRETE BAR- RIER, TYPE ********** (II)				
0129	2717000000-E	59.000	LF	$295.0000	$17,405.00
	VARIABLE HEIGHT CONCRETE BAR- RIER, TYPE ********** (III)				
0130	2717000000-E	59.000	LF	$600.0000	$35,400.00
	VARIABLE HEIGHT CONCRETE BAR- RIER, TYPE ********** (T2)				
0131	2724000000-E	14020.000	LF	$120.0000	$1,682,400.00
	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED				
0132	2905000000-N	2.000	EA	$9,000.0000	$18,000.00
	CONVERT EXISTING DROP INLET TOJUNCTION BOX				
0133	2995000000-N	4.000	EA	$9,000.0000	$36,000.00
	GENERIC DRAINAGE ITEM CONVERT EXISTING CATCH BASIN TO TRAFFIC BEARING JUNCTION BOX				
0134	3001000000-N	14.000	EA	$25,000.0000	$350,000.00
	IMPACT ATTENUATOR UNITS, TYPE TL-3				
0135	3030000000-E	27837.500	LF	$28.0000	$779,450.00
	STEEL BEAM GUARDRAIL				
0136	3045000000-E	1112.500	LF	$30.0000	$33,375.00
	STEEL BEAM GUARDRAIL, SHOP CURVED				
0137	3140000000-E	1.000	EA	$2,100.0000	$2,100.00
	25' CLEAR SPAN GUARDRAIL SEC- TIONS				
0138	3150000000-N	30.000	EA	$60.0000	$1,800.00
	ADDITIONAL GUARDRAIL POSTS				
0139	3195000000-N	3.000	EA	$920.0000	$2,760.00
	GUARDRAIL END UNITS, TYPE AT-1				
0140	3210000000-N	27.000	EA	$1,150.0000	$31,050.00
	GUARDRAIL END UNITS, TYPE CAT-1				
0141	3215000000-N	4.000	EA	$2,500.0000	$10,000.00
	GUARDRAIL ANCHOR UNITS, TYPE III				
0142	3287000000-N	34.000	EA	$3,600.0000	$122,400.00
	GUARDRAIL END UNITS, TYPE TL-3				
0143	3288000000-N	12.000	EA	$3,500.0000	$42,000.00
	GUARDRAIL END UNITS, TYPE TL-2				
0144	3317000000-N	31.000	EA	$3,600.0000	$111,600.00

		GUARDRAIL ANCHOR UNITS, TYPE B-77			
0145	3360000000-E	1106.000	LF	$1.6000	$1,769.60
	REMOVE EXISTING GUARDRAIL				
0146	3380000000-E	1750.000	LF	$9.5000	$16,625.00
	TEMPORARY STEEL BEAM GUARDRAIL				
0147	3389150000-N	4.000	EA	$2,700.0000	$10,800.00
	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-2)				
0148	3389150000-N	8.000	EA	$2,900.0000	$23,200.00
	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)				
0149	3389200000-E	26900.000	LF	$13.0000	$349,700.00
	CABLE GUIDERAIL				
0150	3389500000-N	10.000	EA	$63.0000	$630.00
	ADDITIONAL GUIDERAIL POSTS				
0151	3389600000-N	34.000	EA	$4,100.0000	$139,400.00
	CABLE GUIDERAIL ANCHOR UNITS				
0152	3503000000-E	66750.000	LF	$3.3000	$220,275.00
	WOVEN WIRE FENCE, 47" FABRIC				
0153	3509000000-E	4319.000	EA	$19.0000	$82,061.00
	4" TIMBER FENCE POSTS, 7'-6" LONG				
0154	3515000000-E	832.000	EA	$27.0000	$22,464.00
	5" TIMBER FENCE POSTS, 8'-0" LONG				
0155	3557000000-E	1000.000	LF	$1.0500	$1,050.00
	ADDITIONAL BARBED WIRE				
0156	3564000000-E	7.000	EA	$1,300.0000	$9,100.00
	SINGLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 12', 12')				
0157	3565000000-E	2.000	EA	$2,200.0000	$4,400.00
	DOUBLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 10', 20')				
0158	3628000000-E	5656.000	TON	$95.0000	$537,320.00
	RIP RAP, CLASS I				
0159	3649000000-E	11250.000	TON	$90.0000	$1,012,500.00
	RIP RAP, CLASS B				
0160	3656000000-E	42700.000	SY	$1.5000	$64,050.00
	GEOTEXTILE FOR DRAINAGE				
0161	4048000000-E	13.000	CY	$1,050.0000	$13,650.00
	REINFORCED CONCRETE SIGN FOUN-DATIONS				
0162	4054000000-E	2.000	CY	$10.5000	$21.00
	PLAIN CONCRETE SIGN FOUNDA- TIONS				
0163	4057000000-E	24.000	CY	$3,700.0000	$88,800.00
	OVERHEAD FOOTING				
0164	4060000000-E	14099.000	LB	$6.3000	$88,823.70
	SUPPORTS, BREAKAWAY STEEL BEAM				
0165	4066000000-E	971.000	LB	$6.3000	$6,117.30
	SUPPORTS, SIMPLE STEEL BEAM				
0166	4072000000-E	6829.000	LF	$8.4000	$57,363.60
	SUPPORTS, 3-LB STEEL U-CHANNEL				
0167	4082000000-E	117.000	LF	$21.0000	$2,457.00
	SUPPORTS, WOOD				
0168	4082100000-N	1.000	LS	$420,000.0000	$420,000.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (233+44 -L-)				

0169	4082100000-N	1.000	LS	$200,000.0000	$200,000.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (279+50 -L-)				
0170	4082100000-N	1.000	LS	$76,000.0000	$76,000.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (651+15 -L1-)				
0171	4082100000-N	1.000	LS	$82,000.0000	$82,000.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (654+20 -L1-)				
0172	4082100000-N	1.000	LS	$82,000.0000	$82,000.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (680+60 -L1-)				
0173	4082100000-N	1.000	LS	$170,000.0000	$170,000.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (838+15 -L1 NORTHERN-)				
0174	4082100000-N	1.000	LS	$202,000.0000	$202,000.00
	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (874+60 -L1 NORTHERN-)				
0175	4096000000-N	9.000	EA	$210.0000	$1,890.00
	SIGN ERECTION, TYPE D				
0176	4102000000-N	240.000	EA	$80.0000	$19,200.00
	SIGN ERECTION, TYPE E				
0177	4108000000-N	63.000	EA	$210.0000	$13,230.00
	SIGN ERECTION, TYPE F				
0178	4109000000-N	11.000	EA	$1.0000	$11.00
	SIGN ERECTION, TYPE *** (OVER-HEAD) (A)				
0179	4109000000-N	7.000	EA	$1.0000	$7.00
	SIGN ERECTION, TYPE *** (OVER-HEAD) (B)				
0180	4110000000-N	17.000	EA	$770.0000	$13,090.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)				
0181	4110000000-N	10.000	EA	$330.0000	$3,300.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)				
0182	4114000000-N	20.000	EA	$110.0000	$2,200.00
	SIGN ERECTION, MILEMARKERS				
0183	4116100000-N	10.000	EA	$330.0000	$3,300.00
	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (D)				
0184	4116100000-N	3.000	EA	$220.0000	$660.00
	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)				
0185	4155000000-N	33.000	EA	$2.1000	$69.30
	DISPOSAL OF SIGN SYSTEM, U- CHANNEL				
0186	4192000000-N	13.000	EA	$2.1000	$27.30
	DISPOSAL OF SUPPORT, U-CHANNEL				
0187	4360000000-N	6.000	EA	$160.0000	$960.00
	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER ◆ OM3-C				
0188	4360000000-N	19.000	EA	$160.0000	$3,040.00
	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER ◆ OM3-L				
0189	4360000000-N	1.000	EA	$160.0000	$160.00
	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER ◆ OM3-R				
0190	4400000000-E	917.000	SF	$8.0000	$7,336.00
	WORK ZONE SIGNS (STATIONARY)				
0191	4405000000-E	343.000	SF	$9.5000	$3,258.50
	WORK ZONE SIGNS (PORTABLE)				
0192	4410000000-E	498.000	SF	$7.7000	$3,834.60
	WORK ZONE SIGNS (BARRICADE MOUNTED)				
0193	4415000000-N	4.000	EA	$3,800.0000	$15,200.00

		FLASHING ARROW BOARD			
0194	4420000000-N	7.000	EA	$11,000.0000	$77,000.00
	PORTABLE CHANGEABLE MESSAGE SIGN				
0195	4423000000-N	2.000	EA	$7,400.0000	$14,800.00
	WORK ZONE DIGITAL SPEED LIMIT SIGNS				
0196	4430000000-N	1301.000	EA	$60.0000	$78,060.00
	DRUMS				
0197	4445000000-E	1360.000	LF	$29.0000	$39,440.00
	BARRICADES (TYPE III)				
0198	4455000000-N	440.000	DAY	$360.0000	$158,400.00
	FLAGGER				
0199	4465000000-N	4.000	EA	$10,800.0000	$43,200.00
	TEMPORARY CRASH CUSHIONS				
0200	4470000000-N	3.000	EA	$3,100.0000	$9,300.00
	REMOVE & RESET TEMPORARY CRASH CUSHION				
0201	4480000000-N	4.000	EA	$32,000.0000	$128,000.00
	TMA				
0202	4485000000-E	2200.000	LF	$55.0000	$121,000.00
	PORTABLE CONCRETE BARRIER				
0203	4490000000-E	2120.000	LF	$80.0000	$169,600.00
	PORTABLE CONCRETE BARRIER (ANCHORED)				
0204	4500000000-E	2420.000	LF	$10.0000	$24,200.00
	REMOVE AND RESET PORTABLE CON-CRETE BARRIER				
0205	4520000000-N	50.000	EA	$130.0000	$6,500.00
	TUBULAR MARKERS (FIXED)				
0206	4650000000-N	1800.000	EA	$7.3500	$13,230.00
	TEMPORARY RAISED PAVEMENT MARKERS				
0207	4685000000-E	72950.000	LF	$0.8500	$62,007.50
	THERMOPLASTIC PAVEMENT MARKINGLINES (4", 90 MILS)				
0208	4688000000-E	152618.000	LF	$1.0000	$152,618.00
	THERMOPLASTIC PAVEMENT MARKINGLINES (6", 90 MILS)				
0209	4695000000-E	5353.000	LF	$1.6000	$8,564.80
	THERMOPLASTIC PAVEMENT MARKINGLINES (8", 90 MILS)				
0210	4700000000-E	12680.000	LF	$2.0000	$25,360.00
	THERMOPLASTIC PAVEMENT MARKINGLINES (12", 90 MILS)				
0211	4720000000-E	64.000	EA	$135.0000	$8,640.00
	THERMOPLASTIC PAVEMENT MARKINGCHARACTER (90 MILS)				
0212	4725000000-E	208.000	EA	$165.0000	$34,320.00
	THERMOPLASTIC PAVEMENT MARKINGSYMBOL (90 MILS)				
0213	4770000000-E	2590.000	LF	$3.1500	$8,158.50
	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)				
0214	4810000000-E	426805.000	LF	$0.2100	$89,629.05
	PAINT PAVEMENT MARKING LINES (4")				
0215	4815000000-E	10450.000	LF	$0.3200	$3,344.00
	PAINT PAVEMENT MARKING LINES (6")				
0216	4820000000-E	11875.000	LF	$0.5500	$6,531.25
	PAINT PAVEMENT MARKING LINES (8")				
0217	4825000000-E	4380.000	LF	$0.6500	$2,847.00
	PAINT PAVEMENT MARKING LINES (12")				

0218	4835000000-E	1240.000	LF	$5.8100	$7,204.40
	PAINT PAVEMENT MARKING LINES (24")				
0219	4840000000-N	64.000	EA	$42.0000	$2,688.00
	PAINT PAVEMENT MARKING CHARAC-TER				
0220	4845000000-N	138.000	EA	$42.0000	$5,796.00
	PAINT PAVEMENT MARKING SYMBOL				
0221	4890000000-E	3223.000	LF	$3.6000	$11,602.80
	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 4", 20 MILS (STANDARD GLASS BEADS)				
0222	4890000000-E	1630.000	LF	$4.1000	$6,683.00
	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 6", 20 MILS (STANDARD GLASS BEADS)				
0223	4891000000-E	1340.000	LF	$11.0000	$14,740.00
	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)				
0224	4895000000-N	1520.000	EA	$42.0000	$63,840.00
	GENERIC PAVEMENT MARKING ITEM NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKER				
0225	4900000000-N	55.000	EA	$7.3500	$404.25
	PERMANENT RAISED PAVEMENT MARKERS				
0226	4935000000-N	70.000	EA	$70.0000	$4,900.00
	FLEXIBLE DELINEATORS (CRYSTAL)				
0227	4940000000-N	70.000	EA	$70.0000	$4,900.00
	FLEXIBLE DELINEATORS (YELLOW)				
0228	4945000000-N	16.000	EA	$70.0000	$1,120.00
	FLEXIBLE DELINEATORS (CRYSTAL & RED)				
0229	4950000000-N	12.000	EA	$70.0000	$840.00
	FLEXIBLE DELINEATORS (YELLOW &RED)				
0230	5255000000-N	1.000	LS	$151,000.0000	$151,000.00
	PORTABLE LIGHTING				
0231	5325000000-E	4874.000	LF	$120.0000	$584,880.00
	**" WATER LINE (18")				
0232	5325400000-E	15.000	LF	$105.0000	$1,575.00
	4" WATER LINE				
0233	5325600000-E	297.400	LF	$265.0000	$78,811.00
	6" WATER LINE				
0234	5326200000-E	3912.300	LF	$105.0000	$410,791.50
	12" WATER LINE				
0235	5326600000-E	5657.100	LF	$170.0000	$961,707.00
	16" WATER LINE				
0236	5329000000-E	35855.000	LB	$16.7500	$600,571.25
	DUCTILE IRON WATER PIPE FITTINGS				
0237	5540000000-E	4.000	EA	$1,880.0000	$7,520.00
	6" VALVE				
0238	5552000000-E	7.000	EA	$9,700.0000	$67,900.00
	10" VALVE				
0239	5558000000-E	1.000	EA	$5,265.0000	$5,265.00
	12" VALVE				
0240	5558600000-E	7.000	EA	$14,865.0000	$104,055.00
	16" VALVE				
0241	5572200000-E	2.000	EA	$10,000.0000	$20,000.00

	12" TAPPING SLEEVE & VALVE				
0242	5589100000-E 1" AIR RELEASE VALVE	6.000	EA	$8,165.0000	$48,990.00
0243	5648000000-N RELOCATE WATER METER	1.000	EA	$2,660.0000	$2,660.00
0244	5649000000-N RECONNECT WATER METER	2.000	EA	$2,660.0000	$5,320.00
0245	5666000000-N FIRE HYDRANT	5.000	EA	$8,300.0000	$41,500.00
0246	5672000000-N RELOCATE FIRE HYDRANT	5.000	EA	$8,000.0000	$40,000.00
0247	5673000000-E FIRE HYDRANT LEG	80.000	LF	$54.0000	$4,320.00
0248	5678800000-E 10" LINE STOP	4.000	EA	$10,600.0000	$42,400.00
0249	5679000000-E 12" LINE STOP	3.000	EA	$12,700.0000	$38,100.00
0250	5679200000-E 16" LINE STOP	4.000	EA	$19,700.0000	$78,800.00
0251	5686500000-E WATER SERVICE LINE	33.300	LF	$27.0000	$899.10
0252	5709200000-E 4" FORCE MAIN SEWER	64.000	LF	$70.0000	$4,480.00
0253	5709500000-E 10" FORCE MAIN SEWER	7289.100	LF	$65.0000	$473,791.50
0254	5709600000-E 12" FORCE MAIN SEWER	2503.400	LF	$63.0000	$157,714.20
0255	5769000000-E DUCTILE IRON SEWER PIPE FITTINGS	8835.000	LB	$21.0000	$185,535.00
0256	5798000000-E ABANDON **" UTILITY PIPE (4")	140.500	LF	$11.0000	$1,545.50
0257	5800000000-E ABANDON 6" UTILITY PIPE	935.000	LF	$11.0000	$10,285.00
0258	5804000000-E ABANDON 12" UTILITY PIPE	4281.700	LF	$7.0000	$29,971.90
0259	5810000000-E ABANDON 16" UTILITY PIPE	9544.000	LF	$32.0000	$305,408.00
0260	5815000000-N REMOVE WATER METER	12.000	EA	$530.0000	$6,360.00
0261	5815500000-N REMOVE FIRE HYDRANT	3.000	EA	$1,065.0000	$3,195.00
0262	5835700000-E 16" ENCASEMENT PIPE	207.200	LF	$135.0000	$27,972.00
0263	5835900000-E 20" ENCASEMENT PIPE	243.600	LF	$175.0000	$42,630.00
0264	5836000000-E 24" ENCASEMENT PIPE	942.100	LF	$220.0000	$207,262.00
0265	5872500000-E BORE AND JACK OF **" (16")	171.600	LF	$395.0000	$67,782.00

0266	5872500000-E BORE AND JACK OF ** (20")	219.200	LF	$415.0000	$90,968.00
0267	5872500000-E BORE AND JACK OF ** (24")	238.500	LF	$450.0000	$107,325.00
0268	5872600000-E DIRECTIONAL DRILLING OF ** (12")	2304.400	LF	$97.0000	$223,526.80
0269	5872600000-E DIRECTIONAL DRILLING OF ** (16")	516.000	LF	$102.0000	$52,632.00
0270	5872600000-E DIRECTIONAL DRILLING OF ** (18")	4200.600	LF	$118.0000	$495,670.80
0271	6000000000-E TEMPORARY SILT FENCE	251850.000	LF	$2.5000	$629,625.00
0272	6006000000-E STONE FOR EROSION CONTROL, CLASS A	3850.000	TON	$90.0000	$346,500.00
0273	6009000000-E STONE FOR EROSION CONTROL, CLASS B	28110.000	TON	$90.0000	$2,529,900.00
0274	6012000000-E SEDIMENT CONTROL STONE	13640.000	TON	$70.0000	$954,800.00
0275	6015000000-E TEMPORARY MULCHING	245.000	ACR	$1,050.0000	$257,250.00
0276	6018000000-E SEED FOR TEMPORARY SEEDING	14500.000	LB	$5.2500	$76,125.00
0277	6021000000-E FERTILIZER FOR TEMPORARY SEED-ING	74.000	TON	$1,050.0000	$77,700.00
0278	6024000000-E TEMPORARY SLOPE DRAINS	39650.000	LF	$22.0000	$872,300.00
0279	6029000000-E SAFETY FENCE	39920.000	LF	$2.2000	$87,824.00
0280	6030000000-E SILT EXCAVATION	134940.000	CY	$7.0000	$944,580.00
0281	6036000000-E MATTING FOR EROSION CONTROL	400000.000	SY	$1.7000	$680,000.00
0282	6037000000-E COIR FIBER MAT	37285.000	SY	$3.5000	$130,497.50
0283	6038000000-E PERMANENT SOIL REINFORCEMENT MAT	1400.000	SY	$7.3500	$10,290.00
0284	6042000000-E 1/4" HARDWARE CLOTH	22900.000	LF	$6.0000	$137,400.00
0285	6043000000-E LOW PERMEABILITY GEOTEXTILE	10040.000	SY	$6.3000	$63,252.00
0286	6045000000-E ** TEMPORARY PIPE (36")	185.000	LF	$185.0000	$34,225.00
0287	6045000000-E ** TEMPORARY PIPE (42")	80.000	LF	$105.0000	$8,400.00
0288	6070000000-N SPECIAL STILLING BASINS	14.000	EA	$315.0000	$4,410.00
0289	6071012000-E COIR FIBER WATTLE	24100.000	LF	$10.5000	$253,050.00
0290	6071020000-E	9030.000	LB	$6.3000	$56,889.00

	POLYACRYLAMIDE (PAM)				
0291	6071030000-E COIR FIBER BAFFLE	26000.000	LF	$9.4500	$245,700.00
0292	6071050000-E **" SKIMMER (1-1/2")	21.000	EA	$600.0000	$12,600.00
0293	6071050000-E **" SKIMMER (2")	21.000	EA	$725.0000	$15,225.00
0294	6071050000-E **" SKIMMER (2-1/2")	9.000	EA	$900.0000	$8,100.00
0295	6071050000-E **" SKIMMER (3")	4.000	EA	$1,150.0000	$4,600.00
0296	6071050000-E **" SKIMMER (5")	2.000	EA	$2,500.0000	$5,000.00
0297	6084000000-E SEEDING & MULCHING	245.000	ACR	$2,450.0000	$600,250.00
0298	6087000000-E MOWING	124.000	ACR	$170.0000	$21,080.00
0299	6090000000-E SEED FOR REPAIR SEEDING	3000.000	LB	$15.7500	$47,250.00
0300	6093000000-E FERTILIZER FOR REPAIR SEEDING	13.500	TON	$1,300.0000	$17,550.00
0301	6096000000-E SEED FOR SUPPLEMENTAL SEEDING	8225.000	LB	$11.0000	$90,475.00
0302	6108000000-E FERTILIZER TOPDRESSING	246.000	TON	$945.0000	$232,470.00
0303	6111000000-E IMPERVIOUS DIKE	1142.000	LF	$400.0000	$456,800.00
0304	6114500000-N SPECIALIZED HAND MOWING	230.000	MHR	$68.0000	$15,640.00
0305	6117000000-N RESPONSE FOR EROSION CONTROL	108.000	EA	$325.0000	$35,100.00
0306	6117500000-N CONCRETE WASHOUT STRUCTURE	12.000	EA	$880.0000	$10,560.00
0307	6120000000-E CULVERT DIVERSION CHANNEL	4100.000	CY	$33.0000	$135,300.00
0308	6123000000-E REFORESTATION	5.000	ACR	$3,800.0000	$19,000.00
0309	6676000000-E GENERIC PLANTING ITEM VEGETATIVE SHELF PLANTING	5100.000	SF	$4.2000	$21,420.00
0310	7048500000-E PEDESTRIAN SIGNAL HEAD (16", 1SECTION W/COUNTDOWN)	2.000	EA	$1,100.0000	$2,200.00
0311	7060000000-E SIGNAL CABLE	24380.000	LF	$4.2500	$103,615.00
0312	7108000000-E VEHICLE SIGNAL HEAD (12", 1 SECTION)	14.000	EA	$550.0000	$7,700.00
0313	7120000000-E VEHICLE SIGNAL HEAD (12", 3 SECTION)	53.000	EA	$870.0000	$46,110.00
0314	7132000000-E VEHICLE SIGNAL HEAD (12", 4 SECTION)	18.000	EA	$1,150.0000	$20,700.00

0315	7264000000-E MESSENGER CABLE (3/8")	930.000	LF	$5.5000	$5,115.00
0316	7279000000-E TRACER WIRE	10670.000	LF	$1.0500	$11,203.50
0317	7300000000-E UNPAVED TRENCHING (**********) (2, 2")	10010.000	LF	$12.0000	$120,120.00
0318	7300000000-E UNPAVED TRENCHING (**********) (3, 2")	3240.000	LF	$13.5000	$43,740.00
0319	7300000000-E UNPAVED TRENCHING (**********) (4, 2")	470.000	LF	$19.0000	$8,930.00
0320	7300100000-E UNPAVED TRENCHING FOR TEMP- ORARY LEAD-IN	1050.000	LF	$6.3000	$6,615.00
0321	7301000000-E DIRECTIONAL DRILL (**********) (1, 2")	160.000	LF	$21.0000	$3,360.00
0322	7301000000-E DIRECTIONAL DRILL (**********) (2, 1-1/2")	120.000	LF	$25.5000	$3,060.00
0323	7301000000-E DIRECTIONAL DRILL (**********) (2, 2")	1680.000	LF	$23.0000	$38,640.00
0324	7301000000-E DIRECTIONAL DRILL (**********) (3, 2")	660.000	LF	$25.0000	$16,500.00
0325	7301000000-E DIRECTIONAL DRILL (**********) (4, 2")	440.000	LF	$34.0000	$14,960.00
0326	7324000000-N JUNCTION BOX (STANDARD SIZE)	67.000	EA	$340.0000	$22,780.00
0327	7348000000-N JUNCTION BOX (OVER-SIZED, HEA-VY DUTY)	28.000	EA	$735.0000	$20,580.00
0328	7360000000-N WOOD POLE	7.000	EA	$1,550.0000	$10,850.00
0329	7372000000-N GUY ASSEMBLY	14.000	EA	$700.0000	$9,800.00
0330	7408000000-E 1" RISER WITH WEATHERHEAD	2.000	EA	$560.0000	$1,120.00
0331	7420000000-E 2" RISER WITH WEATHERHEAD	7.000	EA	$770.0000	$5,390.00
0332	7456000000-E LEAD-IN CABLE (**********) (14-2)	580.000	LF	$2.1000	$1,218.00
0333	7516000000-E COMMUNICATIONS CABLE (**FIBER) (48)	11225.000	LF	$3.5000	$39,287.50
0334	7528000000-E DROP CABLE	600.000	LF	$3.2500	$1,950.00
0335	7540000000-N SPLICE ENCLOSURE	6.000	EA	$1,700.0000	$10,200.00
0336	7552000000-N INTERCONNECT CENTER	7.000	EA	$1,800.0000	$12,600.00
0337	7566000000-N DELINEATOR MARKER	27.000	EA	$160.0000	$4,320.00
0338	7588000000-N METAL POLE WITH SINGLE MAST ARM	8.000	EA	$35,000.0000	$280,000.00
0339	7590000000-N	1.000	EA	$46,000.0000	$46,000.00

		METAL POLE WITH DUAL MAST ARM			
0340	7613000000-N	9.000	EA	$1,900.0000	$17,100.00
	SOIL TEST				
0341	7614100000-E	54.000	CY	$2,300.0000	$124,200.00
	DRILLED PIER FOUNDATION				
0342	7631000000-N	9.000	EA	$420.0000	$3,780.00
	MAST ARM WITH METAL POLE DE- SIGN				
0343	7636000000-N	48.000	EA	$390.0000	$18,720.00
	SIGN FOR SIGNALS				
0344	7642200000-N	2.000	EA	$3,050.0000	$6,100.00
	TYPE II PEDESTAL WITH FOUND- ATION				
0345	7642300000-N	16.000	EA	$7,200.0000	$115,200.00
	TYPE III PEDESTAL WITH FOUND- ATION				
0346	7648000000-N	2.000	EA	$300.0000	$600.00
	RELOCATE EXISTING SIGN				
0347	7684000000-N	6.000	EA	$2,100.0000	$12,600.00
	SIGNAL CABINET FOUNDATION				
0348	7696000000-N	6.000	EA	$17,000.0000	$102,000.00
	CONTROLLERS WITH CABINET (**********) (TYPE 2070E - BASE MOUNTED)				
0349	7901000000-N	6.000	EA	$525.0000	$3,150.00
	CABINET BASE EXTENDER				
0350	7948000000-N	1.000	EA	$6,800.0000	$6,800.00
	TRAFFIC SIGNAL REMOVAL				
0351	7980000000-N	1.000	EA	$4,000.0000	$4,000.00
	GENERIC SIGNAL ITEM CCTV CAMERA EXTENSION POLE				
0352	7980000000-N	3.000	EA	$2,300.0000	$6,900.00
	GENERIC SIGNAL ITEM CCTV ELECTRICAL SERVICE				
0353	7980000000-N	3.000	EA	$10,000.0000	$30,000.00
	GENERIC SIGNAL ITEM CCTV METAL POLE (40')				
0354	7980000000-N	4.000	EA	$5,750.0000	$23,000.00
	GENERIC SIGNAL ITEM DIGITAL CCTV CAMERA ASSEMBLY				
0355	7980000000-N	1.000	EA	$7,000.0000	$7,000.00
	GENERIC SIGNAL ITEM DISPOSAL OF EXISTING DMS				
0356	7980000000-N	1.000	EA	$525.0000	$525.00
	GENERIC SIGNAL ITEM DISPOSAL OF EXISTING DMS ELECTRICAL SERVICE				
0357	7980000000-N	1.000	EA	$13,500.0000	$13,500.00
	GENERIC SIGNAL ITEM DISPOSAL OF EXISTING DMS STRUCTURE & FOUNDATION				
0358	7980000000-N	6.000	EA	$125.0000	$750.00
	GENERIC SIGNAL ITEM DMS				
0359	7980000000-N	3.000	EA	$3,100.0000	$9,300.00
	GENERIC SIGNAL ITEM DMS ELECTRICAL SERVICE				
0360	7980000000-N	3.000	EA	$59,750.0000	$179,250.00
	GENERIC SIGNAL ITEM DMS STRUCTURE				
0361	7980000000-N	7.000	EA	$4,400.0000	$30,800.00
	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH				
0362	7980000000-N	3.000	EA	$1,700.0000	$5,100.00
	GENERIC SIGNAL ITEM FIELD EQUIPMENT CABINET				
0363	7980000000-N	18.000	EA	$16,500.0000	$297,000.00

		GENERIC SIGNAL ITEM MICROWAVE VEHICLE DETECTION SYSTEM - MULTIPLE ZONES			
0364	7980000000-N	3.000	EA	$2,100.0000	$6,300.00
	GENERIC SIGNAL ITEM SOIL TEST FOR CCTV POLE				
0365	7980000000-N	3.000	EA	$2,100.0000	$6,300.00
	GENERIC SIGNAL ITEM SOIL TEST FOR DMS FOUNDATION				
0366	7992000000-E	18.000	CY	$2,500.0000	$45,000.00
	GENERIC SIGNAL ITEM DRILLED PIER FOUNDATION FOR CCTV POLE				
0424	5802000000-E	9136.500	LF	$14.0000	$127,911.00
	ABANDON 10" UTILITY PIPE				
0425	6102000000-E	10000.000	SY	$6.5000	$65,000.00
	SODDING				
0426	6105000000-E	20.000	M/G	$160.0000	$3,200.00
	WATER				
0429	7960000000-N	4.000	EA	$4,100.0000	$16,400.00
	METAL POLE FOUNDATION REMOVAL				
0430	7972000000-N	4.000	EA	$3,800.0000	$15,200.00
	METAL POLE REMOVAL				
Section 0001 Total					$154,223,416.77

Section 0002
CULVERT ITEMS

0367	0320000000-E	9769.000	SY	$0.6000	$5,861.40
	FOUNDATION CONDITIONING GEO- TEXTILE				
0368	8035000000-N	1.000	LS	$100.0000	$100.00
	REMOVAL OF EXISTING STRUCTURE AT STATION ********** (19+49.00 -Y30RPD-)				
0369	8056000000-N	1.000	LS	$10,000.0000	$10,000.00
	REMOVAL OF EXISTING STRUCTURE AT STATION ********** (18+00.00 -Y32-)				
0370	8056000000-N	1.000	LS	$35,000.0000	$35,000.00
	REMOVAL OF EXISTING STRUCTURE AT STATION ********** (320+01.00 -L-)				
0371	8065000000-N	1.000	LS	$2,400.0000	$2,400.00
	ASBESTOS ASSESSMENT				
0372	8126000000-N	1.000	LS	$52,000.0000	$52,000.00
	CULVERT EXCAVATION, STA ****** (16+22.00 -Y30RPA-)				
0373	8126000000-N	1.000	LS	$57,000.0000	$57,000.00
	CULVERT EXCAVATION, STA ****** (18+00.00 -Y32-)				
0374	8126000000-N	1.000	LS	$42,000.0000	$42,000.00
	CULVERT EXCAVATION, STA ****** (19+49.00 -Y30RPD-)				
0375	8126000000-N	1.000	LS	$54,500.0000	$54,500.00
	CULVERT EXCAVATION, STA ****** (19+80.00 -Y38-)				
0376	8126000000-N	1.000	LS	$54,500.0000	$54,500.00
	CULVERT EXCAVATION, STA ****** (320+01.00 -L-)				
0377	8126000000-N	1.000	LS	$46,500.0000	$46,500.00
	CULVERT EXCAVATION, STA ****** (612+13.00 -L1-)				
0378	8126000000-N	1.000	LS	$140,500.0000	$140,500.00
	CULVERT EXCAVATION, STA ****** (660+85.00 -L1-)				
0379	8126000000-N	1.000	LS	$81,200.0000	$81,200.00
	CULVERT EXCAVATION, STA ****** (712+62.00 -L1-)				

0380	8133000000-E	7053.000	TON	$75.0000	$528,975.00
	FOUNDATION CONDITIONING MATER-IAL, BOX CULVERT				
0381	8196000000-E	5269.100	CY	$650.0000	$3,424,915.00
	CLASS A CONCRETE (CULVERT)				
0382	8245000000-E	838896.000	LB	$1.3000	$1,090,564.80
	REINFORCING STEEL (CULVERT)				
Section 0002 Total					$5,626,016.20

Section 0003
WALL ITEMS

0383	8504000000-E	630.000	LF	$370.0000	$233,100.00
	CONCRETE BARRIER RAIL WITH MOMENT SLAB				
0384	8801000000-E	5990.000	SF	$70.0000	$419,300.00
	MSE RETAINING WALL NO **** (1)				
0385	8801000000-E	1290.000	SF	$80.0000	$103,200.00
	MSE RETAINING WALL NO **** (2)				
0386	8801000000-E	6560.000	SF	$151.0000	$990,560.00
	MSE RETAINING WALL NO **** (3)				
0387	8801000000-E	3530.000	SF	$151.0000	$533,030.00
	MSE RETAINING WALL NO **** (4)				
0388	8839000000-E	80.000	LF	$116.0000	$9,280.00
	GENERIC RETAINING WALL ITEM CUSTOM BARRIER RAIL				
0389	8847000000-E	516691.000	SF	$1.3000	$671,698.30
	GENERIC RETAINING WALL ITEM ARCHITECTURAL SURFACE TREAT- MENT (SOUND BARRIER WALL)				
0390	8847000000-E	91231.000	SF	$5.0000	$456,155.00
	GENERIC RETAINING WALL ITEM SOUND ABSORPTIVE BARRIER WALL NO -SW10-				
0391	8847000000-E	93961.000	SF	$5.0000	$469,805.00
	GENERIC RETAINING WALL ITEM SOUND ABSORPTIVE BARRIER WALL NO -SW9&11-				
0392	8847000000-E	91231.000	SF	$47.0000	$4,287,857.00
	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NO -SW10-				
0393	8847000000-E	10055.000	SF	$54.0000	$542,970.00
	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NO -SW22-				
0394	8847000000-E	178826.000	SF	$48.0000	$8,583,648.00
	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NO -SW9&11-				
0395	8847000000-E	520.000	SF	$19.3500	$10,062.00
	GENERIC RETAINING WALL ITEM TEMPORARY SURCHARGE WALL NO 3				
0396	8847000000-E	500.000	SF	$19.3500	$9,675.00
	GENERIC RETAINING WALL ITEM TEMPORARY SURCHARGE WALL NO 4				
0427	8834000000-N	2.000	EA	$23,000.0000	$46,000.00
	GENERIC RETAINING WALL ITEM NO -SW9&11- SOUND WALL STEEL ACCESS DOOR				
0428	8834000000-N	1.000	EA	$23,000.0000	$23,000.00
	GENERIC RETAINING WALL ITEM NO -SW10- SOUND WALL STEEL ACCESS DOOR				
Section 0003 Total					$17,389,340.30

Section 0004

STRUCTURE ITEMS

0397	8091000000-N	1.000	LS	$1,600.0000	$1,600.00
	FOUNDATION EXCAVATION FOR BENT** AT STATION ********** (1, 25+28.04 -Y32-)				
0398	8091000000-N	1.000	LS	$1,600.0000	$1,600.00
	FOUNDATION EXCAVATION FOR BENT** AT STATION ********** (1, 30+17.11 -Y31-)				
0399	8091000000-N	1.000	LS	$1,600.0000	$1,600.00
	FOUNDATION EXCAVATION FOR BENT** AT STATION ********** (1, 39+82.39 -Y30-)				
0400	8112730000-N	8.000	EA	$2,200.0000	$17,600.00
	PDA TESTING				
0401	8147000000-E	52701.000	SF	$43.0000	$2,266,143.00
	REINFORCED CONCRETE DECK SLAB				
0402	8161000000-E	56601.000	SF	$0.7000	$39,620.70
	GROOVING BRIDGE FLOORS				
0403	8182000000-E	992.700	CY	$804.0000	$798,130.80
	CLASS A CONCRETE (BRIDGE)				
0404	8210000000-N	1.000	LS	$103,000.0000	$103,000.00
	BRIDGE APPROACH SLABS, STATION********** (25+28.04 -Y32-)				
0405	8210000000-N	1.000	LS	$98,000.0000	$98,000.00
	BRIDGE APPROACH SLABS, STATION********** (30+17.11 -Y31-)				
0406	8210000000-N	1.000	LS	$135,000.0000	$135,000.00
	BRIDGE APPROACH SLABS, STATION********** (39+82.39 -Y30-)				
0407	8210000000-N	1.000	LS	$67,000.0000	$67,000.00
	BRIDGE APPROACH SLABS, STATION********** (658+69.17 -L1- LT)				
0408	8210000000-N	1.000	LS	$67,000.0000	$67,000.00
	BRIDGE APPROACH SLABS, STATION********** (658+69.17 -L1- RT)				
0409	8217000000-E	154013.000	LB	$1.4500	$223,318.85
	REINFORCING STEEL (BRIDGE)				
0410	8238000000-E	5405.000	LB	$2.9500	$15,944.75
	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)				
0411	8277000000-E	1298.060	LF	$415.0000	$538,694.90
	MODIFIED 72" PRESTRESSED CONC GIRDERS				
0412	8328200000-E	180.000	EA	$2,250.0000	$405,000.00
	PILE DRIVING EQUIPMENT SETUP (HP 12 X 53)				
0413	8328200000-E	24.000	EA	$4,700.0000	$112,800.00
	PILE DRIVING EQUIPMENT SETUP (HP 14 X 73)				
0414	8364000000-E	13500.000	LF	$55.0000	$742,500.00
	HP12X53 STEEL PILES				
0415	8384000000-E	2280.000	LF	$75.0000	$171,000.00
	HP14X73 STEEL PILES				
0416	8391000000-N	176.000	EA	$150.0000	$26,400.00
	STEEL PILE POINTS				
0417	8393000000-N	103.000	EA	$250.0000	$25,750.00
	PILE REDRIVES				
0418	8503000000-E	1736.940	LF	$142.0000	$246,645.48
	CONCRETE BARRIER RAIL				
0419	8531000000-E	3878.000	SY	$88.0000	$341,264.00
	4" SLOPE PROTECTION				
0420	8657000000-N	1.000	LS	$135,000.0000	$135,000.00
	ELASTOMERIC BEARINGS				

0421	8706000000-N	1.000	LS	$135,000.0000	$135,000.00
	EXPANSION JOINT SEALS				
0422	8860000000-N	1.000	LS	$160,000.0000	$160,000.00
	GENERIC STRUCTURE ITEM SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)				
0423	8867000000-E	4176.150	LF	$375.0000	$1,566,056.25
	GENERIC STRUCTURE ITEM MODIFIED 54" PRESTRESSED CON- CRETE GIRDERS				
Section 0004 Total					$8,441,668.73
Item Total					$185,680,442.00

ELECTRONIC BID SUBMISSION

By submitting this bid electronically, I hereby acknowledge that all requirements included in the hard copy proposal, addendum, amendments, plans, standard specifications, supplemental specifications and special provisions are part of the bid and contract. Further, I acknowledge that I have read, understand, accept, acknowledge and agree to comply with all statements in this electronic bid.

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NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

The prequalified bidder declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. §133-24 within the last three years, and that the prequalified bidder intends to do the work with his own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. §133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

DEBARMENT CERTIFICATION OF PREQUALIFIED BIDDER

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation that is file with the Department, or has become erroneous because of changed circumstances.

2. The terms covered transaction, debarred, suspended, ineligible, lower tier

covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal- Aid Provision titled Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or

commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion and debarment certification will result in the prequalified bidder’s bid being considered non-responsive.

EXPLANATION:

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Award Limits on Multiple Projects

By answering YES to this statement, the bidder acknowleges that they are using the award limits on multiple projects? **Yes** ○**No** ◉

A bidder who desires to bid on more than one project on which bids are to be opened on the same date, and who also desires to avoid receiving an award of more projects than he is equipped to handle, may bid on any number of projects but may limit the total amount of work awarded to him on selected projects by completing the AWARD LIMITS ON MULTIPLE PROJECTS.

The Award Limits on Multiple Projects must be filled in on each project bid for which the Bidder desires protection.

It is the desire of the Bidder to be awarded contracts, the value of which

will not exceed a total of for those

projects indicated herein, for which bids will be opened on (MM/DD/YY)

The Award Limits shall apply to the following projects:

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

It is agreed that if I am (we are) the low Bidder(s) on indicated projects, the total value of which is more than the above stipulated award limits, the Board of Transportation will award me (us) projects from among those indicated

that have a total value not to exceed the award limit and will result in the lowest total bids to the Department of Transportation.

DBE List Summary

Project: STATE FUNDED
Bid Total: 185,680,442.00
Goal: 8.00% (14,854,435.36)
Total Entered: 8.13% (15,102,541.63)

Bidder ID: 19390
Business Name: Conti Civil, LLC

ID	Name	Is Supplier?	Item Count	Amount	Is Complete?
4247	SEAL BROTHERS CONTRACTING LLC	False	12	1,510,330.00	True
4720	MILITARY & FEDERAL CONSTRUCTION CO	False	75	8,826,986.44	True
4761	TRAFFIC CONTROL SAFETY SERVICES, INC.	False	35	1,417,167.00	True
15521	4 D CONSTRUCTION	False	9	973,431.04	True
3376	REYNOLDS FENCE & GUARDRAIL INC	False	18	1,909,605.25	True
16776	PROFESSIONAL MAINTENANCE SYSTEMS INC	False	1	465,021.90	True

Name: SEAL BROTHERS CONTRACTING LLC ID: 4247

Address: 131 W. CLEVE STREET , MOUNT AIRY, NC 27030

Used As: SubContractor DBE Items Total:$1,510,330.00

Items for SEAL BROTHERS CONTRACTING LLC

0001 ROADWAY ITEMS					
0152	3503000000-E WOVEN WIRE FENCE, 47" FABRIC	66750.000	LF	$3.1500	$210,262.50
0153	3509000000-E 4" TIMBER FENCE POSTS, 7'-6" LONG	4319.000	EA	$18.0000	$77,742.00
0154	3515000000-E 5" TIMBER FENCE POSTS, 8'-0" LONG	832.000	EA	$25.0000	$20,800.00
0155	3557000000-E ADDITIONAL BARBED WIRE	1000.000	LF	$1.0000	$1,000.00
0156	3564000000-E SINGLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 12', 12')	7.000	EA	$1,200.0000	$8,400.00
0157	3565000000-E DOUBLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 10', 20')	2.000	EA	$2,000.0000	$4,000.00
0271	6000000000-E TEMPORARY SILT FENCE	251850.000	LF	$2.2500	$566,662.50
0279	6029000000-E SAFETY FENCE	39920.000	LF	$2.1500	$85,828.00
0284	6042000000-E 1/4" HARDWARE CLOTH	22900.000	LF	$5.6500	$129,385.00
0289	6071012000-E COIR FIBER WATTLE	24100.000	LF	$8.5000	$204,850.00
0291	6071030000-E COIR FIBER BAFFLE	26000.000	LF	$6.5000	$169,000.00
0305	6117000000-N RESPONSE FOR EROSION CONTROL	108.000	EA	$300.0000	$32,400.00
Section 0001 Total					$1,510,330.00
Item Total					$1,510,330.00

Name: MILITARY & FEDERAL CONSTRUCTION CO ID: 4720

Address: 317-C CENTER STREET , JACKSONVILLE, NC 28546

Used As: SubContractor DBE Items Total:$8,826,986.44

Items for MILITARY & FEDERAL CONSTRUCTION CO

0001 ROADWAY ITEMS					
0001	0000100000-N MOBILIZATION	1.000	LS	$129,576.0000	$129,576.00
0027	0318000000-E FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	4910.000	TON	$48.0000	$235,680.00
0028	0320000000-E FOUNDATION CONDITIONING GEO- TEXTILE	15440.000	SY	$1.4000	$21,616.00
0029	0335000000-E **" DRAINAGE PIPE (60")	184.000	LF	$465.0000	$85,560.00
0030	0335200000-E 15" DRAINAGE PIPE	3416.000	LF	$75.0000	$256,200.00
0031	0335300000-E 18" DRAINAGE PIPE	992.000	LF	$87.0000	$86,304.00
0032	0335400000-E 24" DRAINAGE PIPE	612.000	LF	$113.0000	$69,156.00
0033	0335500000-E 30" DRAINAGE PIPE	432.000	LF	$151.0000	$65,232.00
0034	0335600000-E 36" DRAINAGE PIPE	324.000	LF	$217.0000	$70,308.00
0035	0335700000-E 42" DRAINAGE PIPE	60.000	LF	$318.0000	$19,080.00
0036	0335800000-E 48" DRAINAGE PIPE	108.000	LF	$346.0000	$37,368.00
0037	0335850000-E **" DRAINAGE PIPE ELBOWS (15")	82.000	EA	$347.0000	$28,454.00
0038	0335850000-E **" DRAINAGE PIPE ELBOWS (18")	8.000	EA	$539.0000	$4,312.00
0039	0335850000-E **" DRAINAGE PIPE ELBOWS (24")	2.000	EA	$680.0000	$1,360.00
0040	0335850000-E **" DRAINAGE PIPE ELBOWS (30")	2.000	EA	$1,635.0000	$3,270.00
0041	0343000000-E 15" SIDE DRAIN PIPE	392.000	LF	$72.0000	$28,224.00
0042	0344000000-E 18" SIDE DRAIN PIPE	96.000	LF	$81.0000	$7,776.00
0043	0345000000-E 24" SIDE DRAIN PIPE	136.000	LF	$105.0000	$14,280.00

0044	0354000000-E	48.000	LF	$130.0000	$6,240.00
	" RC PIPE CULVERTS, CLASS ** (18", V)				
0045	0354000000-E	96.000	LF	$168.0000	$16,128.00
	" RC PIPE CULVERTS, CLASS ** (30", V)				
0046	0354000000-E	320.000	LF	$175.0000	$56,000.00
	" RC PIPE CULVERTS, CLASS ** (36", V)				
0047	0354000000-E	464.000	LF	$251.0000	$116,464.00
	" RC PIPE CULVERTS, CLASS ** (42", V)				
0048	0366000000-E	7752.000	LF	$42.0000	$325,584.00
	15" RC PIPE CULVERTS, CLASS III				
0049	0372000000-E	2588.000	LF	$56.0000	$144,928.00
	18" RC PIPE CULVERTS, CLASS III				
0050	0378000000-E	1960.000	LF	$71.0000	$139,160.00
	24" RC PIPE CULVERTS, CLASS III				
0051	0384000000-E	1164.000	LF	$91.0000	$105,924.00
	30" RC PIPE CULVERTS, CLASS III				
0052	0390000000-E	4644.000	LF	$119.0000	$552,636.00
	36" RC PIPE CULVERTS, CLASS III				
0053	0396000000-E	800.000	LF	$151.0000	$120,800.00
	42" RC PIPE CULVERTS, CLASS III				
0054	0402000000-E	1200.000	LF	$268.0000	$321,600.00
	48" RC PIPE CULVERTS, CLASS III				
0055	0408000000-E	1128.000	LF	$328.0000	$369,984.00
	54" RC PIPE CULVERTS, CLASS III				
0056	0448000000-E	112.000	LF	$292.0000	$32,704.00
	****" RC PIPE CULVERTS, CLASS IV (48")				
0057	0448000000-E	232.000	LF	$531.0000	$123,192.00
	****" RC PIPE CULVERTS, CLASS IV (66")				
0058	0448000000-E	428.000	LF	$755.0000	$323,140.00
	****" RC PIPE CULVERTS, CLASS IV (78")				
0059	0448200000-E	8424.000	LF	$41.0000	$345,384.00
	15" RC PIPE CULVERTS, CLASS IV				
0060	0448300000-E	1954.000	LF	$47.0000	$91,838.00
	18" RC PIPE CULVERTS, CLASS IV				
0061	0448400000-E	564.000	LF	$66.0000	$37,224.00
	24" RC PIPE CULVERTS, CLASS IV				
0062	0448500000-E	876.000	LF	$117.0000	$102,492.00
	30" RC PIPE CULVERTS, CLASS IV				
0063	0448600000-E	3352.000	LF	$146.0000	$489,392.00
	36" RC PIPE CULVERTS, CLASS IV				
0064	0448700000-E	1000.000	LF	$282.0000	$282,000.00
	42" RC PIPE CULVERTS, CLASS IV				
0065	0546000000-E	340.000	LF	$436.0000	$148,240.00
	" CAA PIPE CULVERTS, ***" THICK (48", 0.109")				
0066	0973100000-E	60.000	LF	$1,109.0000	$66,540.00
	" WELDED STEEL PIPE, **" THICK, GRADE B IN SOIL (54", 0.750")				
0067	0973300000-E	60.000	LF	$4,261.0000	$255,660.00
	" WELDED STEEL PIPE, **" THICK, GRADE B NOT IN SOIL (54", 0.750")				
0068	0992000000-E	5.000	EA	$10,596.0000	$52,980.00

		GENERIC PIPE ITEM 30" PIPE ENDWALL WITH LOAD- CARRYING GRATE			
0069	0992000000-E	28.000	EA	$11,902.0000	$333,256.00
	GENERIC PIPE ITEM 36" PIPE ENDWALL WITH LOAD- CARRYING GRATE				
0070	0992000000-E	2.000	EA	$17,946.0000	$35,892.00
	GENERIC PIPE ITEM 42" PIPE ENDWALL WITH LOAD- CARRYING GRATE				
0071	0992000000-E	2.000	EA	$21,440.0000	$42,880.00
	GENERIC PIPE ITEM 48" PIPE ENDWALL WITH LOAD- CARRYING GRATE				
0072	0992000000-E	1.000	EA	$25,237.0000	$25,237.00
	GENERIC PIPE ITEM 54" PIPE ENDWALL WITH LOAD- CARRYING GRATE				
0074	0995000000-E	13207.000	LF	$45.0000	$594,315.00
	PIPE REMOVAL				
0092	2022000000-E	3159.000	CY	$41.0000	$129,519.00
	SUBDRAIN EXCAVATION				
0093	2026000000-E	9400.000	SY	$0.7500	$7,050.00
	GEOTEXTILE FOR SUBSURFACE DRAINS				
0094	2036000000-E	1580.000	CY	$17.0000	$26,860.00
	SUBDRAIN COARSE AGGREGATE				
0095	2044000000-E	9400.000	LF	$5.0000	$47,000.00
	6" PERFORATED SUBDRAIN PIPE				
0096	2070000000-N	19.000	EA	$287.0000	$5,453.00
	SUBDRAIN PIPE OUTLET				
0097	2077000000-E	114.000	LF	$13.0000	$1,482.00
	6" OUTLET PIPE				
0098	2209000000-E	115.600	CY	$1,389.0000	$160,568.40
	ENDWALLS				
0099	2220000000-E	52.700	CY	$2,484.0000	$130,906.80
	REINFORCED ENDWALLS				
0100	2253000000-E	7.440	CY	$2,096.0000	$15,594.24
	PIPE COLLARS				
0101	2275000000-E	26.000	CY	$4,413.0000	$114,738.00
	FLOWABLE FILL				
0102	2286000000-N	352.000	EA	$2,291.0000	$806,432.00
	MASONRY DRAINAGE STRUCTURES				
0103	2297000000-E	8.300	CY	$3,730.0000	$30,959.00
	MASONRY DRAINAGE STRUCTURES				
0104	2308000000-E	171.000	LF	$500.0000	$85,500.00
	MASONRY DRAINAGE STRUCTURES				
0105	2352000000-N	8.000	EA	$812.0000	$6,496.00
	FRAME WITH GRATE, STD 840.**** (840.20)				
0106	2354000000-N	21.000	EA	$812.0000	$17,052.00
	FRAME WITH GRATE, STD 840.22				
0107	2364000000-N	30.000	EA	$762.0000	$22,860.00
	FRAME WITH TWO GRATES, STD 840.16				
0108	2364200000-N	84.000	EA	$1,003.0000	$84,252.00
	FRAME WITH TWO GRATES, STD 840.20				
0109	2365000000-N	85.000	EA	$740.0000	$62,900.00
	FRAME WITH TWO GRATES, STD 840.22				
0110	2366000000-N	4.000	EA	$992.0000	$3,968.00
	FRAME WITH TWO GRATES, STD 840.24				

0111	2367000000-N	5.000	EA	$1,003.0000	$5,015.00
	FRAME WITH TWO GRATES, STD 840.29				
0112	2374000000-N	24.000	EA	$1,210.0000	$29,040.00
	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)				
0113	2374000000-N	59.000	EA	$1,273.0000	$75,107.00
	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)				
0114	2374000000-N	54.000	EA	$1,273.0000	$68,742.00
	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)				
0115	2396000000-N	4.000	EA	$867.0000	$3,468.00
	FRAME WITH COVER, STD 840.54				
0116	2407000000-N	5.000	EA	$2,758.0000	$13,790.00
	STEEL FRAME WITH TWO GRATES, STD 840.37				
0132	2905000000-N	2.000	EA	$8,444.0000	$16,888.00
	CONVERT EXISTING DROP INLET TOJUNCTION BOX				
0133	2995000000-N	4.000	EA	$8,444.0000	$33,776.00
	GENERIC DRAINAGE ITEM CONVERT EXISTING CATCH BASIN TO TRAFFIC BEARING JUNCTION BOX				
Section 0001 Total					$8,826,986.44
Item Total					$8,826,986.44

Name: TRAFFIC CONTROL SAFETY SERVICES, INC. ID: 4761

Address: POST OFFICE BOX 24511 , WINSTON-SALEM, NC 27114

Used As: SubContractor DBE Items Total:$1,417,167.00

Items for TRAFFIC CONTROL SAFETY SERVICES, INC.

0001 ROADWAY ITEMS					
0001	0000100000-N MOBILIZATION	1.000	LS	$100,000.0000	$100,000.00
0161	4048000000-E REINFORCED CONCRETE SIGN FOUN-DATIONS	13.000	CY	$975.0000	$12,675.00
0162	4054000000-E PLAIN CONCRETE SIGN FOUNDA- TIONS	2.000	CY	$10.0000	$20.00
0163	4057000000-E OVERHEAD FOOTING	24.000	CY	$3,500.0000	$84,000.00
0164	4060000000-E SUPPORTS, BREAKAWAY STEEL BEAM	14099.000	LB	$6.0000	$84,594.00
0165	4066000000-E SUPPORTS, SIMPLE STEEL BEAM	971.000	LB	$6.0000	$5,826.00
0166	4072000000-E SUPPORTS, 3-LB STEEL U-CHANNEL	6829.000	LF	$8.0000	$54,632.00
0167	4082000000-E SUPPORTS, WOOD	117.000	LF	$20.0000	$2,340.00
0168	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (233+44 -L-)	1.000	LS	$340,000.0000	$340,000.00
0169	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (279+50 -L-)	1.000	LS	$160,000.0000	$160,000.00
0170	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (651+15 -L1-)	1.000	LS	$62,000.0000	$62,000.00
0171	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (654+20 -L1-)	1.000	LS	$67,000.0000	$67,000.00
0172	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (680+60 -L1-)	1.000	LS	$67,000.0000	$67,000.00
0173	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (838+15 -L1 NORTHERN-)	1.000	LS	$138,000.0000	$138,000.00
0174	4082100000-N SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (874+60 -L1 NORTHERN-)	1.000	LS	$165,000.0000	$165,000.00
0175	4096000000-N SIGN ERECTION, TYPE D	9.000	EA	$200.0000	$1,800.00
0176	4102000000-N SIGN ERECTION, TYPE E	240.000	EA	$75.0000	$18,000.00
0177	4108000000-N SIGN ERECTION, TYPE F	63.000	EA	$200.0000	$12,600.00

0178	4109000000-N	11.000	EA	$1.0000	$11.00
	SIGN ERECTION, TYPE *** (OVER-HEAD) (A)				
0179	4109000000-N	7.000	EA	$1.0000	$7.00
	SIGN ERECTION, TYPE *** (OVER-HEAD) (B)				
0180	4110000000-N	17.000	EA	$700.0000	$11,900.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)				
0181	4110000000-N	10.000	EA	$300.0000	$3,000.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)				
0182	4114000000-N	20.000	EA	$100.0000	$2,000.00
	SIGN ERECTION, MILEMARKERS				
0183	4116100000-N	10.000	EA	$300.0000	$3,000.00
	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (D)				
0184	4116100000-N	3.000	EA	$200.0000	$600.00
	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)				
0185	4155000000-N	33.000	EA	$2.0000	$66.00
	DISPOSAL OF SIGN SYSTEM, U- CHANNEL				
0186	4192000000-N	13.000	EA	$2.0000	$26.00
	DISPOSAL OF SUPPORT, U-CHANNEL				
0187	4360000000-N	6.000	EA	$150.0000	$900.00
	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER OM3-C				
0188	4360000000-N	19.000	EA	$150.0000	$2,850.00
	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER OM3-L				
0189	4360000000-N	1.000	EA	$150.0000	$150.00
	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER OM3-R				
0205	4520000000-N	50.000	EA	$125.0000	$6,250.00
	TUBULAR MARKERS (FIXED)				
0226	4935000000-N	70.000	EA	$65.0000	$4,550.00
	FLEXIBLE DELINEATORS (CRYSTAL)				
0227	4940000000-N	70.000	EA	$65.0000	$4,550.00
	FLEXIBLE DELINEATORS (YELLOW)				
0228	4945000000-N	16.000	EA	$65.0000	$1,040.00
	FLEXIBLE DELINEATORS (CRYSTAL & RED)				
0229	4950000000-N	12.000	EA	$65.0000	$780.00
	FLEXIBLE DELINEATORS (YELLOW &RED)				
Section 0001 Total					$1,417,167.00
Item Total					$1,417,167.00

Name: 4 D CONSTRUCTION ID: 15521

Address: P.O. BOX 806 , MAXTON, NC 28364

Used As: SubContractor DBE Items Total:$973,431.04

Items for 4 D CONSTRUCTION

0004 STRUCTURE ITEMS					
0401	8147000000-E	52701.000	SF	$13.0610	$688,327.76
	REINFORCED CONCRETE DECK SLAB				
0404	8210000000-N	1.000	LS	$23,234.0000	$23,234.00
	BRIDGE APPROACH SLABS, STATION********** (25+28.04 -Y32-)				
0405	8210000000-N	1.000	LS	$21,508.0000	$21,508.00
	BRIDGE APPROACH SLABS, STATION********** (30+17.11 -Y31-)				
0406	8210000000-N	1.000	LS	$31,738.0000	$31,738.00
	BRIDGE APPROACH SLABS, STATION********** (39+82.39 -Y30-)				
0407	8210000000-N	1.000	LS	$13,785.0000	$13,785.00
	BRIDGE APPROACH SLABS, STATION********** (658+69.17 -L1- LT)				
0408	8210000000-N	1.000	LS	$14,692.0000	$14,692.00
	BRIDGE APPROACH SLABS, STATION********** (658+69.17 -L1- RT)				
0409	8217000000-E	154013.000	LB	$1.0220	$157,401.29
	REINFORCING STEEL (BRIDGE)				
0410	8238000000-E	5405.000	LB	$2.2350	$12,080.18
	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)				
0418	8503000000-E	1736.940	LF	$6.1400	$10,664.81
	CONCRETE BARRIER RAIL				
Section 0004 Total					$973,431.04
Item Total					$973,431.04

Name: REYNOLDS FENCE & GUARDRAIL INC ID: 3376

Address: 9320 MACHADO DRIVE , INDIAN TRAIL, NC 28079

Used As: SubContractor DBE Items Total:$1,909,605.25

Items for REYNOLDS FENCE & GUARDRAIL INC

0001 ROADWAY ITEMS					
0134	3001000000-N	14.000	EA	$24,000.0000	$336,000.00
	IMPACT ATTENUATOR UNITS, TYPE TL-3				
0135	3030000000-E	27837.500	LF	$26.5000	$737,693.75
	STEEL BEAM GUARDRAIL				
0136	3045000000-E	1112.500	LF	$29.0000	$32,262.50
	STEEL BEAM GUARDRAIL, SHOP CURVED				
0137	3140000000-E	1.000	EA	$2,000.0000	$2,000.00
	25' CLEAR SPAN GUARDRAIL SEC- TIONS				
0138	3150000000-N	30.000	EA	$58.0000	$1,740.00
	ADDITIONAL GUARDRAIL POSTS				
0139	3195000000-N	3.000	EA	$900.0000	$2,700.00
	GUARDRAIL END UNITS, TYPE AT-1				
0140	3210000000-N	27.000	EA	$1,100.0000	$29,700.00
	GUARDRAIL END UNITS, TYPE CAT-1				
0141	3215000000-N	4.000	EA	$2,400.0000	$9,600.00
	GUARDRAIL ANCHOR UNITS, TYPE III				
0142	3287000000-N	34.000	EA	$3,300.0000	$112,200.00
	GUARDRAIL END UNITS, TYPE TL-3				
0143	3288000000-N	12.000	EA	$3,200.0000	$38,400.00
	GUARDRAIL END UNITS, TYPE TL-2				
0144	3317000000-N	31.000	EA	$3,300.0000	$102,300.00
	GUARDRAIL ANCHOR UNITS, TYPE B-77				
0145	3360000000-E	1106.000	LF	$1.5000	$1,659.00
	REMOVE EXISTING GUARDRAIL				
0146	3380000000-E	1750.000	LF	$9.0000	$15,750.00
	TEMPORARY STEEL BEAM GUARDRAIL				
0147	3389150000-N	4.000	EA	$2,500.0000	$10,000.00
	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-2)				
0148	3389150000-N	8.000	EA	$2,700.0000	$21,600.00
	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)				
0149	3389200000-E	26900.000	LF	$12.0000	$322,800.00
	CABLE GUIDERAIL				
0150	3389500000-N	10.000	EA	$60.0000	$600.00
	ADDITIONAL GUIDERAIL POSTS				
0151	3389600000-N	34.000	EA	$3,900.0000	$132,600.00
	CABLE GUIDERAIL ANCHOR UNITS				

Section 0001 Total	$1,909,605.25

Item Total	$1,909,605.25

Name: PROFESSIONAL MAINTENANCE SYSTEMS INC ID: 16776

Address: 2400 BOSTON ST UNIT 102 , BALTIMORE, MD 21224

Used As: SubContractor DBE Items Total:$465,021.90

Items for PROFESSIONAL MAINTENANCE SYSTEMS INC

0003 WALL ITEMS					
0389	8847000000-E	516691.000	SF	$0.9000	$465,021.90
	GENERIC RETAINING WALL ITEM ARCHITECTURAL SURFACE TREAT- MENT (SOUND BARRIER WALL)				
Section 0003 Total					$465,021.90
Item Total					$465,021.90

THIS PROPOSAL CONTAINS THE FOLLOWING ERRORS/WARNINGS (IF ANY)

This Bid contains 2 amendment files

000001 01/06/2022 ADD ITEMS
000002 01/12/2022 ADD ITEMS

Electronic Bid Submission

By submitting this bid electronically, I hereby acknowledge that all requirements included in the hard copy proposal, addendum, amendments, plans, standard specifications, supplemental specifications and special provisions are part of the bid and contract. Further, I acknowledge that I have read, understand, accept, acknowledge and agree to comply with all statements in this electronic bid.

I hereby certify that I have the authority to submit this bid.

Signature _____

Agency _____

Date _____

Signature _____

Agency _____

Date _____

Signature _____

Agency _____

Date _____

Attachments

Failure to complete and attach the Fuel Usage Factor Adjustment Form will result in using 2.90 gallons per ton as the Fuel Usage Factor for Diesel for the asphalt items included on the form. The contractor will not be permitted to change the option after the bids are submitted.

NOTE: The maximum upload limit is 5 MB. ☐ Verify

Contract Item Sheets For C204553

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
			ROADWAY ITEMS			
0001	0000100000-N	800	MOBILIZATION	Lump Sum LS	9,410,000.00	9,410,000.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum LS	3,200,000.00	3,200,000.00
0003	0000900000-N	SP	GENERIC MISCELLANEOUS ITEM FIELD OFFICE	Lump Sum LS	800,000.00	800,000.00
0004	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum LS	30,474,974.27	30,474,974.27
0005	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUB-BING	5 ACR	7,000.00	35,000.00
0006	0015000000-N	205	SEALING ABANDONED WELLS	5 EA	2,200.00	11,000.00
0007	0022000000-E	225	UNCLASSIFIED EXCAVATION	104,500 CY	9.00	940,500.00
0008	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (30+17.11 -Y31-)	Lump Sum LS	110,000.00	110,000.00
0009	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (658+69.17 -L1- LT)	Lump Sum LS	64,700.00	64,700.00
0010	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (658+69.17 -L1- RT)	Lump Sum LS	68,000.00	68,000.00
0011	0030000000-N	SP	TYPE II MODIFIED APPROACH FILL, STATION ******* (39+82.39 -Y30-)	Lump Sum LS	65,600.00	65,600.00
0012	0036000000-E	225	UNDERCUT EXCAVATION	168,000 CY	24.00	4,032,000.00
0013	0084000000-E	SP	WICK DRAINS	743,000 LF	0.55	408,650.00
0014	0106000000-E	230	BORROW EXCAVATION	4,405,300 CY	3.00	13,215,900.00
0015	0127000000-N	235	EMBANKMENT SETTLEMENT GAUGES	26 EA	725.00	18,850.00
0016	0134000000-E	240	DRAINAGE DITCH EXCAVATION	37,600 CY	12.00	451,200.00
0017	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	80,460 SY	7.00	563,220.00
0018	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	12,700 SY	4.50	57,150.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0019	0192000000-N	260	PROOF ROLLING	90 HR	105.00	9,450.00
0020	0194000000-E	265	SELECT GRANULAR MATERIAL, CLASS III	56,800 CY	3.00	170,400.00
0021	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZA-TION	68,800 SY	1.00	68,800.00
0022	0199000000-E	SP	TEMPORARY SHORING	13,210 SF	16.00	211,360.00
0023	0223000000-E	275	ROCK PLATING	2,400 SY	95.00	228,000.00
0024	0248000000-N	SP	GENERIC GRADING ITEM MODIFIED TYPE A BRIDGE AP-PROACH FILL, STATION 25+28.04 -Y32-	Lump Sum LS	117,000.00	117,000.00
0025	0248000000-N	SP	GENERIC GRADING ITEM PLACEMENT OF NATIVE MATERIAL	Lump Sum LS	31,000.00	31,000.00
0026	0255000000-E	SP	GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETRO-LEUM CONTAMINATED SOIL	50 TON	360.00	18,000.00
0027	0318000000-E	300	FOUNDATION CONDITIONING MATE-RIAL, MINOR STRUCTURES	4,910 TON	55.00	270,050.00
0028	0320000000-E	300	FOUNDATION CONDITIONING GEO-TEXTILE	15,440 SY	1.50	23,160.00
0029	0335000000-E	305	**" DRAINAGE PIPE (60")	184 LF	520.00	95,680.00
0030	0335200000-E	305	15" DRAINAGE PIPE	3,416 LF	85.00	290,360.00
0031	0335300000-E	305	18" DRAINAGE PIPE	992 LF	98.00	97,216.00
0032	0335400000-E	305	24" DRAINAGE PIPE	612 LF	135.00	82,620.00
0033	0335500000-E	305	30" DRAINAGE PIPE	432 LF	170.00	73,440.00
0034	0335600000-E	305	36" DRAINAGE PIPE	324 LF	250.00	81,000.00
0035	0335700000-E	305	42" DRAINAGE PIPE	60 LF	360.00	21,600.00
0036	0335800000-E	305	48" DRAINAGE PIPE	108 LF	380.00	41,040.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0037	0335850000-E	305	**" DRAINAGE PIPE ELBOWS (15")	82 EA	380.00	31,160.00
0038	0335850000-E	305	**" DRAINAGE PIPE ELBOWS (18")	8 EA	580.00	4,640.00
0039	0335850000-E	305	**" DRAINAGE PIPE ELBOWS (24")	2 EA	735.00	1,470.00
0040	0335850000-E	305	**" DRAINAGE PIPE ELBOWS (30")	2 EA	1,750.00	3,500.00
0041	0343000000-E	310	15" SIDE DRAIN PIPE	392 LF	80.00	31,360.00
0042	0344000000-E	310	18" SIDE DRAIN PIPE	96 LF	95.00	9,120.00
0043	0345000000-E	310	24" SIDE DRAIN PIPE	136 LF	120.00	16,320.00
0044	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (18", V)	48 LF	140.00	6,720.00
0045	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (30", V)	96 LF	190.00	18,240.00
0046	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (36", V)	320 LF	200.00	64,000.00
0047	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (42", V)	464 LF	280.00	129,920.00
0048	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	7,752 LF	50.00	387,600.00
0049	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	2,588 LF	65.00	168,220.00
0050	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	1,960 LF	80.00	156,800.00
0051	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	1,164 LF	105.00	122,220.00
0052	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	4,644 LF	135.00	626,940.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0053	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	800 LF	165.00	132,000.00
0054	0402000000-E	310	48" RC PIPE CULVERTS, CLASS III	1,200 LF	300.00	360,000.00
0055	0408000000-E	310	54" RC PIPE CULVERTS, CLASS III	1,128 LF	360.00	406,080.00
0056	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (48")	112 LF	315.00	35,280.00
0057	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (66")	232 LF	600.00	139,200.00
0058	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (78")	428 LF	800.00	342,400.00
0059	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	8,424 LF	50.00	421,200.00
0060	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	1,954 LF	55.00	107,470.00
0061	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	564 LF	75.00	42,300.00
0062	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	876 LF	130.00	113,880.00
0063	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	3,352 LF	170.00	569,840.00
0064	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	1,000 LF	330.00	330,000.00
0065	0546000000-E	310	**" CAA PIPE CULVERTS, *****" THICK (48", 0.109")	340 LF	460.00	156,400.00
0066	0973100000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (54", 0.750")	60 LF	1,300.00	78,000.00
0067	0973300000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (54", 0.750")	60 LF	4,500.00	270,000.00
0068	0992000000-E	SP	GENERIC PIPE ITEM 30" PIPE ENDWALL WITH LOAD-CARRYING GRATE	5 EA	11,000.00	55,000.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0069	0992000000-E	SP	GENERIC PIPE ITEM 36" PIPE ENDWALL WITH LOAD-CARRYING GRATE	28 EA	13,000.00	364,000.00
0070	0992000000-E	SP	GENERIC PIPE ITEM 42" PIPE ENDWALL WITH LOAD-CARRYING GRATE	2 EA	19,500.00	39,000.00
0071	0992000000-E	SP	GENERIC PIPE ITEM 48" PIPE ENDWALL WITH LOAD-CARRYING GRATE	2 EA	24,000.00	48,000.00
0072	0992000000-E	SP	GENERIC PIPE ITEM 54" PIPE ENDWALL WITH LOAD-CARRYING GRATE	1 EA	27,000.00	27,000.00
0073	0992000000-E	SP	GENERIC PIPE ITEM 6" VALVE	1 EA	11,000.00	11,000.00
0074	0995000000-E	340	PIPE REMOVAL	13,207 LF	50.00	660,350.00
0075	1000000000-E	462	6" SLOPE PROTECTION	675 SY	120.00	81,000.00
0076	1011000000-N	500	FINE GRADING	Lump Sum LS	12,500,000.00	12,500,000.00
0077	1099500000-E	505	SHALLOW UNDERCUT	1,100 CY	26.00	28,600.00
0078	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	2,050 TON	50.00	102,500.00
0079	1111000000-E	SP	CLASS IV AGGREGATE STABILIZATION	12,170 TON	55.00	669,350.00
0080	1121000000-E	520	AGGREGATE BASE COURSE	157,800 TON	45.00	7,101,000.00
0081	1220000000-E	545	INCIDENTAL STONE BASE	10,000 TON	50.00	500,000.00
0082	1275000000-E	600	PRIME COAT	19,109 GAL	6.00	114,654.00
0083	1297000000-E	607	MILLING ASPHALT PAVEMENT, **** DEPTH (1-1/2")	1,590 SY	17.00	27,030.00
0084	1330000000-E	607	INCIDENTAL MILLING	2,000 SY	17.00	34,000.00
0085	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	101,660 TON	80.00	8,132,800.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0086	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	92,280 TON	80.00	7,382,400.00
0087	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	18,990 TON	84.00	1,595,160.00
0088	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	73,460 TON	86.00	6,317,560.00
0089	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	14,685 TON	394.00	5,785,890.00
0090	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	800 TON	185.00	148,000.00
0091	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	118,100 LF	0.31	36,611.00
0092	2022000000-E	815	SUBDRAIN EXCAVATION	3,159 CY	43.00	135,837.00
0093	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	9,400 SY	0.85	7,990.00
0094	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	1,580 CY	18.00	28,440.00
0095	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	9,400 LF	5.25	49,350.00
0096	2070000000-N	815	SUBDRAIN PIPE OUTLET	19 EA	310.00	5,890.00
0097	2077000000-E	815	6" OUTLET PIPE	114 LF	14.00	1,596.00
0098	2209000000-E	838	ENDWALLS	115.6 CY	1,450.00	167,620.00
0099	2220000000-E	838	REINFORCED ENDWALLS	52.7 CY	2,650.00	139,655.00
0100	2253000000-E	840	PIPE COLLARS	7.44 CY	2,300.00	17,112.00
0101	2275000000-E	SP	FLOWABLE FILL	26 CY	4,700.00	122,200.00
0102	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	352 EA	2,460.00	865,920.00
0103	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	8.3 CY	4,000.00	33,200.00
0104	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	171 LF	540.00	92,340.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0105	2352000000-N	840	FRAME WITH GRATE, STD 840.**** (840.20)	8 EA	870.00	6,960.00
0106	2354000000-N	840	FRAME WITH GRATE, STD 840.22	21 EA	870.00	18,270.00
0107	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	30 EA	820.00	24,600.00
0108	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	84 EA	1,080.00	90,720.00
0109	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	85 EA	795.00	67,575.00
0110	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	4 EA	1,065.00	4,260.00
0111	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	5 EA	1,075.00	5,375.00
0112	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	24 EA	1,300.00	31,200.00
0113	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	59 EA	1,375.00	81,125.00
0114	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	54 EA	1,375.00	74,250.00
0115	2396000000-N	840	FRAME WITH COVER, STD 840.54	4 EA	930.00	3,720.00
0116	2407000000-N	840	STEEL FRAME WITH TWO GRATES, STD 840.37	5 EA	2,960.00	14,800.00
0117	2440000000-N	852	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	1 EA	1,220.00	1,220.00
0118	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	23 EA	1,050.00	24,150.00
0119	2462000000-E	836	**" SLUICE GATE (8")	1 EA	4,300.00	4,300.00
0120	2538000000-E	846	**'-**" CONCRETE CURB & GUTTER (2'-9")	1,010 LF	30.00	30,300.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0121	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	13,770 LF	26.00	358,020.00
0122	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	21,560 LF	30.00	646,800.00
0123	2556000000-E	846	SHOULDER BERM GUTTER	9,580 LF	30.00	287,400.00
0124	2591000000-E	848	4" CONCRETE SIDEWALK	2,620 SY	45.00	117,900.00
0125	2605000000-N	848	CONCRETE CURB RAMPS	22 EA	4,600.00	101,200.00
0126	2612000000-E	848	6" CONCRETE DRIVEWAY	400 SY	68.00	27,200.00
0127	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	7,950 SY	68.00	540,600.00
0128	2717000000-E	854	VARIABLE HEIGHT CONCRETE BARRIER, TYPE ********** (II)	1,110 LF	155.00	172,050.00
0129	2717000000-E	854	VARIABLE HEIGHT CONCRETE BARRIER, TYPE ********** (III)	59 LF	295.00	17,405.00
0130	2717000000-E	854	VARIABLE HEIGHT CONCRETE BARRIER, TYPE ********** (T2)	59 LF	600.00	35,400.00
0131	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	14,020 LF	120.00	1,682,400.00
0132	2905000000-N	859	CONVERT EXISTING DROP INLET TO JUNCTION BOX	2 EA	9,000.00	18,000.00
0133	2995000000-N	SP	GENERIC DRAINAGE ITEM CONVERT EXISTING CATCH BASIN TO TRAFFIC BEARING JUNCTION BOX	4 EA	9,000.00	36,000.00
0134	3001000000-N	SP	IMPACT ATTENUATOR UNITS, TYPE TL-3	14 EA	25,000.00	350,000.00
0135	3030000000-E	862	STEEL BEAM GUARDRAIL	27,837.5 LF	28.00	779,450.00
0136	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	1,112.5 LF	30.00	33,375.00
0137	3140000000-E	862	25' CLEAR SPAN GUARDRAIL SECTIONS	1 EA	2,100.00	2,100.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0138	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	30 EA	60.00	1,800.00
0139	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	3 EA	920.00	2,760.00
0140	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	27 EA	1,150.00	31,050.00
0141	3215000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE III	4 EA	2,500.00	10,000.00
0142	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	34 EA	3,600.00	122,400.00
0143	3288000000-N	SP	GUARDRAIL END UNITS, TYPE TL-2	12 EA	3,500.00	42,000.00
0144	3317000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE B-77	31 EA	3,600.00	111,600.00
0145	3360000000-E	863	REMOVE EXISTING GUARDRAIL	1,106 LF	1.60	1,769.60
0146	3380000000-E	862	TEMPORARY STEEL BEAM GUARDRAIL	1,750 LF	9.50	16,625.00
0147	3389150000-N	SP	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-2)	4 EA	2,700.00	10,800.00
0148	3389150000-N	SP	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)	8 EA	2,900.00	23,200.00
0149	3389200000-E	865	CABLE GUIDERAIL	26,900 LF	13.00	349,700.00
0150	3389500000-N	865	ADDITIONAL GUIDERAIL POSTS	10 EA	63.00	630.00
0151	3389600000-N	865	CABLE GUIDERAIL ANCHOR UNITS	34 EA	4,100.00	139,400.00
0152	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	66,750 LF	3.30	220,275.00
0153	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	4,319 EA	19.00	82,061.00
0154	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	832 EA	27.00	22,464.00
0155	3557000000-E	866	ADDITIONAL BARBED WIRE	1,000 LF	1.05	1,050.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0156	3564000000-E	866	SINGLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 12', 12')	7 EA	1,300.00	9,100.00
0157	3565000000-E	866	DOUBLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 10', 20')	2 EA	2,200.00	4,400.00
0158	3628000000-E	876	RIP RAP, CLASS I	5,656 TON	95.00	537,320.00
0159	3649000000-E	876	RIP RAP, CLASS B	11,250 TON	90.00	1,012,500.00
0160	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	42,700 SY	1.50	64,050.00
0161	4048000000-E	902	REINFORCED CONCRETE SIGN FOUN-DATIONS	13 CY	1,050.00	13,650.00
0162	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDA-TIONS	2 CY	10.50	21.00
0163	4057000000-E	SP	OVERHEAD FOOTING	24 CY	3,700.00	88,800.00
0164	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	14,099 LB	6.30	88,823.70
0165	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	971 LB	6.30	6,117.30
0166	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	6,829 LF	8.40	57,363.60
0167	4082000000-E	903	SUPPORTS, WOOD	117 LF	21.00	2,457.00
0168	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (233+44 -L-)	Lump Sum LS	420,000.00	420,000.00
0169	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (279+50 -L-)	Lump Sum LS	200,000.00	200,000.00
0170	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (651+15 -L1-)	Lump Sum LS	76,000.00	76,000.00
0171	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (654+20 -L1-)	Lump Sum LS	82,000.00	82,000.00
0172	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUC-TURE AT STA ****** (680+60 -L1-)	Lump Sum LS	82,000.00	82,000.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0173	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (838+15 -L1 NORTHERN-)	Lump Sum LS	170,000.00	170,000.00
0174	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (874+60 -L1 NORTHERN-)	Lump Sum LS	202,000.00	202,000.00
0175	4096000000-N	904	SIGN ERECTION, TYPE D	9 EA	210.00	1,890.00
0176	4102000000-N	904	SIGN ERECTION, TYPE E	240 EA	80.00	19,200.00
0177	4108000000-N	904	SIGN ERECTION, TYPE F	63 EA	210.00	13,230.00
0178	4109000000-N	904	SIGN ERECTION, TYPE *** (OVERHEAD) (A)	11 EA	1.00	11.00
0179	4109000000-N	904	SIGN ERECTION, TYPE *** (OVERHEAD) (B)	7 EA	1.00	7.00
0180	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	17 EA	770.00	13,090.00
0181	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	10 EA	330.00	3,300.00
0182	4114000000-N	904	SIGN ERECTION, MILEMARKERS	20 EA	110.00	2,200.00
0183	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (D)	10 EA	330.00	3,300.00
0184	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)	3 EA	220.00	660.00
0185	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	33 EA	2.10	69.30
0186	4192000000-N	907	DISPOSAL OF SUPPORT, U-CHANNEL	13 EA	2.10	27.30
0187	4360000000-N	SP	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER – OM3-C	6 EA	160.00	960.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0188	4360000000-N	SP	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER – OM3-L	19 EA	160.00	3,040.00
0189	4360000000-N	SP	GENERIC SIGNING ITEM VERTICAL PANEL TYPE 3 OBJECT MARKER – OM3-R	1 EA	160.00	160.00
0190	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	917 SF	8.00	7,336.00
0191	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	343 SF	9.50	3,258.50
0192	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	498 SF	7.70	3,834.60
0193	4415000000-N	1115	FLASHING ARROW BOARD	4 EA	3,800.00	15,200.00
0194	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	7 EA	11,000.00	77,000.00
0195	4423000000-N	SP	WORK ZONE DIGITAL SPEED LIMIT SIGNS	2 EA	7,400.00	14,800.00
0196	4430000000-N	1130	DRUMS	1,301 EA	60.00	78,060.00
0197	4445000000-E	1145	BARRICADES (TYPE III)	1,360 LF	29.00	39,440.00
0198	4455000000-N	1150	FLAGGER	440 DAY	360.00	158,400.00
0199	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	4 EA	10,800.00	43,200.00
0200	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	3 EA	3,100.00	9,300.00
0201	4480000000-N	1165	TMA	4 EA	32,000.00	128,000.00
0202	4485000000-E	1170	PORTABLE CONCRETE BARRIER	2,200 LF	55.00	121,000.00
0203	4490000000-E	1170	PORTABLE CONCRETE BARRIER (ANCHORED)	2,120 LF	80.00	169,600.00
0204	4500000000-E	1170	REMOVE AND RESET PORTABLE CONCRETE BARRIER	2,420 LF	10.00	24,200.00
0205	4520000000-N	1266	TUBULAR MARKERS (FIXED)	50 EA	130.00	6,500.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0206	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	1,800 EA	7.35	13,230.00
0207	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	72,950 LF	0.85	62,007.50
0208	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	152,618 LF	1.00	152,618.00
0209	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	5,353 LF	1.60	8,564.80
0210	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	12,680 LF	2.00	25,360.00
0211	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	64 EA	135.00	8,640.00
0212	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	208 EA	165.00	34,320.00
0213	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	2,590 LF	3.15	8,158.50
0214	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	426,805 LF	0.21	89,629.05
0215	4815000000-E	1205	PAINT PAVEMENT MARKING LINES (6")	10,450 LF	0.32	3,344.00
0216	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	11,875 LF	0.55	6,531.25
0217	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	4,380 LF	0.65	2,847.00
0218	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	1,240 LF	5.81	7,204.40
0219	4840000000-N	1205	PAINT PAVEMENT MARKING CHARAC-TER	64 EA	42.00	2,688.00
0220	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	138 EA	42.00	5,796.00
0221	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 4", 20 MILS (STANDARD GLASS BEADS)	3,223 LF	3.60	11,602.80

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0222	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 6", 20 MILS (STANDARD GLASS BEADS)	1,630 LF	4.10	6,683.00
0223	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	1,340 LF	11.00	14,740.00
0224	4895000000-N	SP	GENERIC PAVEMENT MARKING ITEM NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKER	1,520 EA	42.00	63,840.00
0225	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	55 EA	7.35	404.25
0226	4935000000-N	1267	FLEXIBLE DELINEATORS (CRYSTAL)	70 EA	70.00	4,900.00
0227	4940000000-N	1267	FLEXIBLE DELINEATORS (YELLOW)	70 EA	70.00	4,900.00
0228	4945000000-N	1267	FLEXIBLE DELINEATORS (CRYSTAL & RED)	16 EA	70.00	1,120.00
0229	4950000000-N	1267	FLEXIBLE DELINEATORS (YELLOW & RED)	12 EA	70.00	840.00
0230	5255000000-N	1413	PORTABLE LIGHTING	Lump Sum LS	151,000.00	151,000.00
0231	5325000000-E	1510	**" WATER LINE (18")	4,874 LF	120.00	584,880.00
0232	5325400000-E	1510	4" WATER LINE	15 LF	105.00	1,575.00
0233	5325600000-E	1510	6" WATER LINE	297.4 LF	265.00	78,811.00
0234	5326200000-E	1510	12" WATER LINE	3,912.3 LF	105.00	410,791.50
0235	5326600000-E	1510	16" WATER LINE	5,657.1 LF	170.00	961,707.00
0236	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	35,855 LB	16.75	600,571.25
0237	5540000000-E	1515	6" VALVE	4 EA	1,880.00	7,520.00
0238	5552000000-E	1515	10" VALVE	7 EA	9,700.00	67,900.00
0239	5558000000-E	1515	12" VALVE	1 EA	5,265.00	5,265.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0240	5558600000-E	1515	16" VALVE	7 EA	14,865.00	104,055.00
0241	5572200000-E	1515	12" TAPPING SLEEVE & VALVE	2 EA	10,000.00	20,000.00
0242	5589100000-E	1515	1" AIR RELEASE VALVE	6 EA	8,165.00	48,990.00
0243	5648000000-N	1515	RELOCATE WATER METER	1 EA	2,660.00	2,660.00
0244	5649000000-N	1515	RECONNECT WATER METER	2 EA	2,660.00	5,320.00
0245	5666000000-N	1515	FIRE HYDRANT	5 EA	8,300.00	41,500.00
0246	5672000000-N	1515	RELOCATE FIRE HYDRANT	5 EA	8,000.00	40,000.00
0247	5673000000-E	1515	FIRE HYDRANT LEG	80 LF	54.00	4,320.00
0248	5678800000-E	1515	10" LINE STOP	4 EA	10,600.00	42,400.00
0249	5679000000-E	1515	12" LINE STOP	3 EA	12,700.00	38,100.00
0250	5679200000-E	1515	16" LINE STOP	4 EA	19,700.00	78,800.00
0251	5686500000-E	1515	WATER SERVICE LINE	33.3 LF	27.00	899.10
0252	5709200000-E	1520	4" FORCE MAIN SEWER	64 LF	70.00	4,480.00
0253	5709500000-E	1520	10" FORCE MAIN SEWER	7,289.1 LF	65.00	473,791.50
0254	5709600000-E	1520	12" FORCE MAIN SEWER	2,503.4 LF	63.00	157,714.20
0255	5769000000-E	1520	DUCTILE IRON SEWER PIPE FITTINGS	8,835 LB	21.00	185,535.00
0256	5798000000-E	1530	ABANDON **" UTILITY PIPE (4")	140.5 LF	11.00	1,545.50
0257	5800000000-E	1530	ABANDON 6" UTILITY PIPE	935 LF	11.00	10,285.00
0258	5804000000-E	1530	ABANDON 12" UTILITY PIPE	4,281.7 LF	7.00	29,971.90
0259	5810000000-E	1530	ABANDON 16" UTILITY PIPE	9,544 LF	32.00	305,408.00
0260	5815000000-N	1530	REMOVE WATER METER	12 EA	530.00	6,360.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0261	5815500000-N	1530	REMOVE FIRE HYDRANT	3 EA	1,065.00	3,195.00
0262	5835700000-E	1540	16" ENCASEMENT PIPE	207.2 LF	135.00	27,972.00
0263	5835900000-E	1540	20" ENCASEMENT PIPE	243.6 LF	175.00	42,630.00
0264	5836000000-E	1540	24" ENCASEMENT PIPE	942.1 LF	220.00	207,262.00
0265	5872500000-E	1550	BORE AND JACK OF **" (16")	171.6 LF	395.00	67,782.00
0266	5872500000-E	1550	BORE AND JACK OF **" (20")	219.2 LF	415.00	90,968.00
0267	5872500000-E	1550	BORE AND JACK OF **" (24")	238.5 LF	450.00	107,325.00
0268	5872600000-E	1550	DIRECTIONAL DRILLING OF **" (12")	2,304.4 LF	97.00	223,526.80
0269	5872600000-E	1550	DIRECTIONAL DRILLING OF **" (16")	516 LF	102.00	52,632.00
0270	5872600000-E	1550	DIRECTIONAL DRILLING OF **" (18")	4,200.6 LF	118.00	495,670.80
0271	6000000000-E	1605	TEMPORARY SILT FENCE	251,850 LF	2.50	629,625.00
0272	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	3,850 TON	90.00	346,500.00
0273	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	28,110 TON	90.00	2,529,900.00
0274	6012000000-E	1610	SEDIMENT CONTROL STONE	13,640 TON	70.00	954,800.00
0275	6015000000-E	1615	TEMPORARY MULCHING	245 ACR	1,050.00	257,250.00
0276	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	14,500 LB	5.25	76,125.00
0277	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED-ING	74 TON	1,050.00	77,700.00
0278	6024000000-E	1622	TEMPORARY SLOPE DRAINS	39,650 LF	22.00	872,300.00
0279	6029000000-E	SP	SAFETY FENCE	39,920 LF	2.20	87,824.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0280	6030000000-E	1630	SILT EXCAVATION	134,940 CY	7.00	944,580.00
0281	6036000000-E	1631	MATTING FOR EROSION CONTROL	400,000 SY	1.70	680,000.00
0282	6037000000-E	SP	COIR FIBER MAT	37,285 SY	3.50	130,497.50
0283	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	1,400 SY	7.35	10,290.00
0284	6042000000-E	1632	1/4" HARDWARE CLOTH	22,900 LF	6.00	137,400.00
0285	6043000000-E	SP	LOW PERMEABILITY GEOTEXTILE	10,040 SY	6.30	63,252.00
0286	6045000000-E	SP	**" TEMPORARY PIPE (36")	185 LF	185.00	34,225.00
0287	6045000000-E	SP	**" TEMPORARY PIPE (42")	80 LF	105.00	8,400.00
0288	6070000000-N	1639	SPECIAL STILLING BASINS	14 EA	315.00	4,410.00
0289	6071012000-E	SP	COIR FIBER WATTLE	24,100 LF	10.50	253,050.00
0290	6071020000-E	SP	POLYACRYLAMIDE (PAM)	9,030 LB	6.30	56,889.00
0291	6071030000-E	1640	COIR FIBER BAFFLE	26,000 LF	9.45	245,700.00
0292	6071050000-E	SP	**" SKIMMER (1-1/2")	21 EA	600.00	12,600.00
0293	6071050000-E	SP	**" SKIMMER (2")	21 EA	725.00	15,225.00
0294	6071050000-E	SP	**" SKIMMER (2-1/2")	9 EA	900.00	8,100.00
0295	6071050000-E	SP	**" SKIMMER (3")	4 EA	1,150.00	4,600.00
0296	6071050000-E	SP	**" SKIMMER (5")	2 EA	2,500.00	5,000.00
0297	6084000000-E	1660	SEEDING & MULCHING	245 ACR	2,450.00	600,250.00
0298	6087000000-E	1660	MOWING	124 ACR	170.00	21,080.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0299	6090000000-E	1661	SEED FOR REPAIR SEEDING	3,000 LB	15.75	47,250.00
0300	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	13.5 TON	1,300.00	17,550.00
0301	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	8,225 LB	11.00	90,475.00
0302	6108000000-E	1665	FERTILIZER TOPDRESSING	246 TON	945.00	232,470.00
0303	6111000000-E	SP	IMPERVIOUS DIKE	1,142 LF	400.00	456,800.00
0304	6114500000-N	1667	SPECIALIZED HAND MOWING	230 MHR	68.00	15,640.00
0305	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	108 EA	325.00	35,100.00
0306	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	12 EA	880.00	10,560.00
0307	6120000000-E	SP	CULVERT DIVERSION CHANNEL	4,100 CY	33.00	135,300.00
0308	6123000000-E	1670	REFORESTATION	5 ACR	3,800.00	19,000.00
0309	6676000000-E	SP	GENERIC PLANTING ITEM VEGETATIVE SHELF PLANTING	5,100 SF	4.20	21,420.00
0310	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	2 EA	1,100.00	2,200.00
0311	7060000000-E	1705	SIGNAL CABLE	24,380 LF	4.25	103,615.00
0312	7108000000-E	1705	VEHICLE SIGNAL HEAD (12", 1 SECTION)	14 EA	550.00	7,700.00
0313	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	53 EA	870.00	46,110.00
0314	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	18 EA	1,150.00	20,700.00
0315	7264000000-E	1710	MESSENGER CABLE (3/8")	930 LF	5.50	5,115.00
0316	7279000000-E	1715	TRACER WIRE	10,670 LF	1.05	11,203.50
0317	7300000000-E	1715	UNPAVED TRENCHING (**********) (2, 2")	10,010 LF	12.00	120,120.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0318	7300000000-E	1715	UNPAVED TRENCHING (**********) (3, 2")	3,240 LF	13.50	43,740.00
0319	7300000000-E	1715	UNPAVED TRENCHING (**********) (4, 2")	470 LF	19.00	8,930.00
0320	7300100000-E	1715	UNPAVED TRENCHING FOR TEMP-ORARY LEAD-IN	1,050 LF	6.30	6,615.00
0321	7301000000-E	1715	DIRECTIONAL DRILL (**********) (1, 2")	160 LF	21.00	3,360.00
0322	7301000000-E	1715	DIRECTIONAL DRILL (**********) (2, 1-1/2")	120 LF	25.50	3,060.00
0323	7301000000-E	1715	DIRECTIONAL DRILL (**********) (2, 2")	1,680 LF	23.00	38,640.00
0324	7301000000-E	1715	DIRECTIONAL DRILL (**********) (3, 2")	660 LF	25.00	16,500.00
0325	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 2")	440 LF	34.00	14,960.00
0326	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	67 EA	340.00	22,780.00
0327	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEA-VY DUTY)	28 EA	735.00	20,580.00
0328	7360000000-N	1720	WOOD POLE	7 EA	1,550.00	10,850.00
0329	7372000000-N	1721	GUY ASSEMBLY	14 EA	700.00	9,800.00
0330	7408000000-E	1722	1" RISER WITH WEATHERHEAD	2 EA	560.00	1,120.00
0331	7420000000-E	1722	2" RISER WITH WEATHERHEAD	7 EA	770.00	5,390.00
0332	7456000000-E	1726	LEAD-IN CABLE (**********) (14-2)	580 LF	2.10	1,218.00
0333	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER) (48)	11,225 LF	3.50	39,287.50
0334	7528000000-E	1730	DROP CABLE	600 LF	3.25	1,950.00
0335	7540000000-N	1731	SPLICE ENCLOSURE	6 EA	1,700.00	10,200.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0336	7552000000-N	1731	INTERCONNECT CENTER	7 EA	1,800.00	12,600.00
0337	7566000000-N	1733	DELINEATOR MARKER	27 EA	160.00	4,320.00
0338	7588000000-N	SP	METAL POLE WITH SINGLE MAST ARM	8 EA	35,000.00	280,000.00
0339	7590000000-N	SP	METAL POLE WITH DUAL MAST ARM	1 EA	46,000.00	46,000.00
0340	7613000000-N	SP	SOIL TEST	9 EA	1,900.00	17,100.00
0341	7614100000-E	SP	DRILLED PIER FOUNDATION	54 CY	2,300.00	124,200.00
0342	7631000000-N	SP	MAST ARM WITH METAL POLE DE-SIGN	9 EA	420.00	3,780.00
0343	7636000000-N	1745	SIGN FOR SIGNALS	48 EA	390.00	18,720.00
0344	7642200000-N	1743	TYPE II PEDESTAL WITH FOUND-ATION	2 EA	3,050.00	6,100.00
0345	7642300000-N	1743	TYPE III PEDESTAL WITH FOUND-ATION	16 EA	7,200.00	115,200.00
0346	7648000000-N	1746	RELOCATE EXISTING SIGN	2 EA	300.00	600.00
0347	7684000000-N	1750	SIGNAL CABINET FOUNDATION	6 EA	2,100.00	12,600.00
0348	7696000000-N	1751	CONTROLLERS WITH CABINET (**********) (TYPE 2070E - BASE MOUNTED)	6 EA	17,000.00	102,000.00
0349	7901000000-N	1753	CABINET BASE EXTENDER	6 EA	525.00	3,150.00
0350	7948000000-N	1757	TRAFFIC SIGNAL REMOVAL	1 EA	6,800.00	6,800.00
0351	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV CAMERA EXTENSION POLE	1 EA	4,000.00	4,000.00
0352	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV ELECTRICAL SERVICE	3 EA	2,300.00	6,900.00
0353	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV METAL POLE (40')	3 EA	10,000.00	30,000.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0354	7980000000-N	SP	GENERIC SIGNAL ITEM DIGITAL CCTV CAMERA ASSEMBLY	4 EA	5,750.00	23,000.00
0355	7980000000-N	SP	GENERIC SIGNAL ITEM DISPOSAL OF EXISTING DMS	1 EA	7,000.00	7,000.00
0356	7980000000-N	SP	GENERIC SIGNAL ITEM DISPOSAL OF EXISTING DMS ELECTRICAL SERVICE	1 EA	525.00	525.00
0357	7980000000-N	SP	GENERIC SIGNAL ITEM DISPOSAL OF EXISTING DMS STRUCTURE & FOUNDATION	1 EA	13,500.00	13,500.00
0358	7980000000-N	SP	GENERIC SIGNAL ITEM DMS	6 EA	125.00	750.00
0359	7980000000-N	SP	GENERIC SIGNAL ITEM DMS ELECTRICAL SERVICE	3 EA	3,100.00	9,300.00
0360	7980000000-N	SP	GENERIC SIGNAL ITEM DMS STRUCTURE	3 EA	59,750.00	179,250.00
0361	7980000000-N	SP	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	7 EA	4,400.00	30,800.00
0362	7980000000-N	SP	GENERIC SIGNAL ITEM FIELD EQUIPMENT CABINET	3 EA	1,700.00	5,100.00
0363	7980000000-N	SP	GENERIC SIGNAL ITEM MICROWAVE VEHICLE DETECTION SYSTEM - MULTIPLE ZONES	18 EA	16,500.00	297,000.00
0364	7980000000-N	SP	GENERIC SIGNAL ITEM SOIL TEST FOR CCTV POLE	3 EA	2,100.00	6,300.00
0365	7980000000-N	SP	GENERIC SIGNAL ITEM SOIL TEST FOR DMS FOUNDATION	3 EA	2,100.00	6,300.00
0366	7992000000-E	SP	GENERIC SIGNAL ITEM DRILLED PIER FOUNDATION FOR CCTV POLE	18 CY	2,500.00	45,000.00
0424	5802000000-E	1530	ABANDON 10" UTILITY PIPE	9,136.5 LF	14.00	127,911.00
0425	6102000000-E	1664	SODDING	10,000 SY	6.50	65,000.00
0426	6105000000-E	1664	WATER	20 M/G	160.00	3,200.00

Contract Item Sheets For C204553

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0429	7960000000-N	SP	METAL POLE FOUNDATION REMOVAL	4 EA	4,100.00	16,400.00
0430	7972000000-N	SP	METAL POLE REMOVAL	4 EA	3,800.00	15,200.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0367	0320000000-E	300	FOUNDATION CONDITIONING GEO-TEXTILE	9,769 SY	0.60	5,861.40
0368	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ********** (19+49.00 -Y30RPD-)	Lump Sum LS	100.00	100.00
0369	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ********** (18+00.00 -Y32-)	Lump Sum LS	10,000.00	10,000.00
0370	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ********** (320+01.00 -L-)	Lump Sum LS	35,000.00	35,000.00
0371	8065000000-N	SP	ASBESTOS ASSESSMENT	Lump Sum LS	2,400.00	2,400.00
0372	8126000000-N	414	CULVERT EXCAVATION, STA ****** (16+22.00 -Y30RPA-)	Lump Sum LS	52,000.00	52,000.00
0373	8126000000-N	414	CULVERT EXCAVATION, STA ****** (18+00.00 -Y32-)	Lump Sum LS	57,000.00	57,000.00
0374	8126000000-N	414	CULVERT EXCAVATION, STA ****** (19+49.00 -Y30RPD-)	Lump Sum LS	42,000.00	42,000.00
0375	8126000000-N	414	CULVERT EXCAVATION, STA ****** (19+80.00 -Y38-)	Lump Sum LS	54,500.00	54,500.00
0376	8126000000-N	414	CULVERT EXCAVATION, STA ****** (320+01.00 -L-)	Lump Sum LS	54,500.00	54,500.00
0377	8126000000-N	414	CULVERT EXCAVATION, STA ****** (612+13.00 -L1-)	Lump Sum LS	46,500.00	46,500.00
0378	8126000000-N	414	CULVERT EXCAVATION, STA ****** (660+85.00 -L1-)	Lump Sum LS	140,500.00	140,500.00
0379	8126000000-N	414	CULVERT EXCAVATION, STA ****** (712+62.00 -L1-)	Lump Sum LS	81,200.00	81,200.00
0380	8133000000-E	414	FOUNDATION CONDITIONING MATER-IAL, BOX CULVERT	7,053 TON	75.00	528,975.00
0381	8196000000-E	420	CLASS A CONCRETE (CULVERT)	5,269.1 CY	650.00	3,424,915.00
0382	8245000000-E	425	REINFORCING STEEL (CULVERT)	838,896 LB	1.30	1,090,564.80

Contract Item Sheets For C204553

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0383	8504000000-E	460	CONCRETE BARRIER RAIL WITH MOMENT SLAB	630 LF	370.00	233,100.00
0384	8801000000-E	SP	MSE RETAINING WALL NO **** (1)	5,990 SF	70.00	419,300.00
0385	8801000000-E	SP	MSE RETAINING WALL NO **** (2)	1,290 SF	80.00	103,200.00
0386	8801000000-E	SP	MSE RETAINING WALL NO **** (3)	6,560 SF	151.00	990,560.00
0387	8801000000-E	SP	MSE RETAINING WALL NO **** (4)	3,530 SF	151.00	533,030.00
0388	8839000000-E	SP	GENERIC RETAINING WALL ITEM CUSTOM BARRIER RAIL	80 LF	116.00	9,280.00
0389	8847000000-E	SP	GENERIC RETAINING WALL ITEM ARCHITECTURAL SURFACE TREAT-MENT (SOUND BARRIER WALL)	516,691 SF	1.30	671,698.30
0390	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND ABSORPTIVE BARRIER WALL NO -SW10-	91,231 SF	5.00	456,155.00
0391	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND ABSORPTIVE BARRIER WALL NO -SW9&11-	93,961 SF	5.00	469,805.00
0392	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NO -SW10-	91,231 SF	47.00	4,287,857.00
0393	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NO -SW22-	10,055 SF	54.00	542,970.00
0394	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NO -SW9&11-	178,826 SF	48.00	8,583,648.00
0395	8847000000-E	SP	GENERIC RETAINING WALL ITEM TEMPORARY SURCHARGE WALL NO 3	520 SF	19.35	10,062.00
0396	8847000000-E	SP	GENERIC RETAINING WALL ITEM TEMPORARY SURCHARGE WALL NO 4	500 SF	19.35	9,675.00
0427	8834000000-N	SP	GENERIC RETAINING WALL ITEM NO -SW9&11- SOUND WALL STEEL ACCESS DOOR	2 EA	23,000.00	46,000.00

Contract Item Sheets For C204553

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0428	8834000000-N	SP	GENERIC RETAINING WALL ITEM NO -SW10- SOUND WALL STEEL ACCESS DOOR	1 EA	23,000.00	23,000.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0397	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 25+28.04 -Y32-)	Lump Sum LS	1,600.00	1,600.00
0398	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 30+17.11 -Y31-)	Lump Sum LS	1,600.00	1,600.00
0399	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 39+82.39 -Y30-)	Lump Sum LS	1,600.00	1,600.00
0400	8112730000-N	450	PDA TESTING	8 EA	2,200.00	17,600.00
0401	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	52,701 SF	43.00	2,266,143.00
0402	8161000000-E	420	GROOVING BRIDGE FLOORS	56,601 SF	0.70	39,620.70
0403	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	992.7 CY	804.00	798,130.80
0404	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (25+28.04 -Y32-)	Lump Sum LS	103,000.00	103,000.00
0405	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (30+17.11 -Y31-)	Lump Sum LS	98,000.00	98,000.00
0406	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (39+82.39 -Y30-)	Lump Sum LS	135,000.00	135,000.00
0407	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (658+69.17 -L1- LT)	Lump Sum LS	67,000.00	67,000.00
0408	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (658+69.17 -L1- RT)	Lump Sum LS	67,000.00	67,000.00
0409	8217000000-E	425	REINFORCING STEEL (BRIDGE)	154,013 LB	1.45	223,318.85
0410	8238000000-E	425	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	5,405 LB	2.95	15,944.75
0411	8277000000-E	430	MODIFIED 72" PRESTRESSED CONC GIRDERS	1,298.06 LF	415.00	538,694.90
0412	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 12 X 53)	180 EA	2,250.00	405,000.00

Contract Item Sheets For C204553

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0413	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 14 X 73)	24 EA	4,700.00	112,800.00
0414	8364000000-E	450	HP12X53 STEEL PILES	13,500 LF	55.00	742,500.00
0415	8384000000-E	450	HP14X73 STEEL PILES	2,280 LF	75.00	171,000.00
0416	8391000000-N	450	STEEL PILE POINTS	176 EA	150.00	26,400.00
0417	8393000000-N	450	PILE REDRIVES	103 EA	250.00	25,750.00
0418	8503000000-E	460	CONCRETE BARRIER RAIL	1,736.94 LF	142.00	246,645.48
0419	8531000000-E	462	4" SLOPE PROTECTION	3,878 SY	88.00	341,264.00
0420	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum LS	135,000.00	135,000.00
0421	8706000000-N	SP	EXPANSION JOINT SEALS	Lump Sum LS	135,000.00	135,000.00
0422	8860000000-N	SP	GENERIC STRUCTURE ITEM SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)	Lump Sum LS	160,000.00	160,000.00
0423	8867000000-E	SP	GENERIC STRUCTURE ITEM MODIFIED 54" PRESTRESSED CONCRETE GIRDERS	4,176.15 LF	375.00	1,566,056.25

TOTAL AMOUNT OF BID FOR ENTIRE PROJECT **$185,680,442.00**

1343/Jan31/Q10852229.99/D1971367842000/E430

Contract No. C204553
County Bender

Rev. 1-16-18

EXECUTION OF CONTRACT
NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

LIMITED LIABILITY COMPANY

The Contractor declares (or certifies, verifies, or states) under penalty of perjuryunder the laws of the United States that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Contract, that the Contractor has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Contractor intends to do the work with its own bonafide employees or subcontractors and did not bid for the benefit of another contractor.
By submitting this Execution of Contract, Non-Collusion and Debarment Certification, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Cont Civil LLC
Full Name of Firm

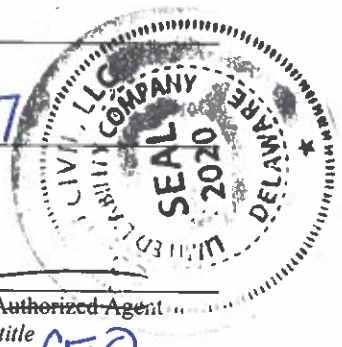
2045 Lincoln Highway, Edison NJ. 08817
Address as Prequalified

E. Peter Guerrero
Signature of Witness

E. PETER GUERRERO
Print or type Signer's name

Gerard Maurer
Signature of ~~Member~~/Manager/~~Authorized Agent~~
Select appropriate title CEO

Gerard Maurer
Print or type Signer's Name



Contract No. C204553
County Pender

Rev. 1-16-18

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.

2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal,* and *voluntarily excluded,* as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR* 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

Contract No. C204553
County Pender

Rev. 1-16-18

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

Contract No. **C204553**

County (ies): **Pender**

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

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

02/07/2022
Date

Execution of Contract and Bonds
Approved as to Form:

DocuSigned by:
Scott Beaver
55FE7B40AA93401...
Attorney General

02/07/2022
Date

Contract No. C204553
County Pender

Rev 5-17-11

Bond No. 107563191

CONTRACT PAYMENT BOND

Date of Payment Bond Execution	January 28, 2022
Name of Principal Contractor	Conti Civil, LLC
Name of Surety:	Travelers Casualty and Surety Company of America
Name of Contracting Body:	**North Carolina Department of Transportation**
	Raleigh, North Carolina
Amount of Bond:	One Hundred Eighty Five Million Six Hundred Eighty Thousand Four Hundred Forty Two and No/100 ($185,680,442.00)
Contract ID No.:	C204553
County Name:	Pender

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

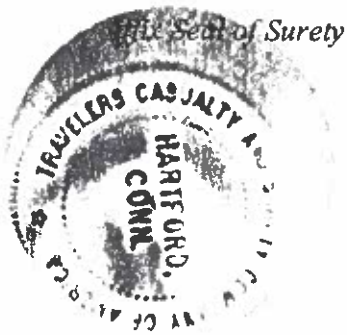
IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No. C204553
County Pender

Rev 5-17-11

CONTRACT PAYMENT BOND

The Seal of Surety Company



Travelers Casualty and Surety Company of America
Print or type Surety Company Name

By Kathleen M. Coen
Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Holly Tallone
Signature of Witness

Holly Tallone
Print or type Signer's name

751 Arbor Way, Suite 250
Blue Bell, PA 19422
Address of Attorney-in-Fact

Contract No. C204553
County Pender

Rev 5-17-11

CONTRACT PAYMENT BOND

LIMITED LIABILITY COMPANY

SIGNATURE OF CONTRACTOR (Principal)

Name of Contractor: Conti Civil, LLC

Full name of Firm

2045 Lincoln Highway
Edison, NJ 08817

Address as prequalified

By: _____

Signature of ~~Member~~, Manager, ~~Authorized Agent~~

Select appropriate title CEO

CONTI CIVIL, LLC LIMITED LIABILITY COMPANY SEAL 2020

Gerard Maurer

Print or type Signer's name

Contract No. C204553
County Pender

Rev 5-17-11

Bond No. 107563191

CONTRACT PERFORMANCE BOND

Date of Performance Bond Execution:	January 28, 2022
Name of Principal Contractor:	Conti Civil, LLC
Name of Surety:	Travelers Casualty and Surety Company of America
Name of Contracting Body:	**North Carolina Department of Transportation**
	Raleigh, North Carolina
Amount of Bond:	One Hundred Eighty Five Million Six Hundred Eighty Thousand Four Hundred Forty Two and No/100 ($185,680,442 00)
Contract ID No.:	C204553
County Name:	Pender

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No. C204553
County Pender

Rev 5-17-11

CONTRACT PERFORMANCE BOND

Affix Seal of Surety Company

Travelers Casualty and Surety Company of America
Print or type Surety Company Name

By Kathleen M. Coen
Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Holly Tallone
Signature of Witness

Holly Tallone
Print or type Signer's name

751 Arbor Way, Suite 250
Blue Bell, PA 19422
Address of Attorney-in-Fact

Contract No. C204553
County Pender

Rev 5-17-11

CONTRACT PERFORMANCE BOND

LIMITED LIABILITY COMPANY

SIGNATURE OF CONTRACTOR (Principal)

Name of Contractor: Conti Civil, LLC

Full name of Firm

2045 Lincoln Highway
Edison, NJ 08817

Address as prequalified

By: Gerard Maurer

Signature ~~of Member~~, Manager, ~~Authorized Agent~~

Select appropriate title CEO

LIMITED LIABILITY COMPANY SEAL 2020 DELAWARE

Gerard Maurer

Print or type Signer's name

TRAVELERS

Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **KATHLEEN M COEN** of **FARMINGTON**, **Connecticut**, their true and lawful Attorney(s)-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **21st** day of **April, 2021**.

State of Connecticut

City of Hartford ss

By _____
Robert L. Raney, Senior Vice President

On this the **21st** day of **April, 2021**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of each of the Companies, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of said Companies by himself as a duly authorized officer.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June, 2026**

_____
Anna P. Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of each of the Companies, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of each of the Companies, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this **28th** day of **January**, **2022**.

HARTFORD, CONN.

_____
Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney(s)-in-Fact and the details of the bond to which this Power of Attorney is attached.

DocuSign

Certificate Of Completion

Envelope Id: C0D02F3B0C00466F845061C83D38DEC3
Status: Completed
Subject: Please DocuSign: Pender, c204553
Source Envelope:
Document Pages: 780
Signatures: 2
Certificate Pages: 5
Initials: 0
AutoNav: Enabled
EnvelopeId Stamping: Disabled
Time Zone: (UTC-05:00) Eastern Time (US & Canada)

Envelope Originator:
Michelle Taylor
1020 Birch Ridge Dr
Raleigh, NC 27610-4328
mataylor@ncdot.gov
IP Address: 199.90.35.12

Record Tracking

Status: Original
2/7/2022 12:45:23 PM
Holder: Michelle Taylor
mataylor@ncdot.gov
Location: DocuSign

Security Appliance Status: Connected
Pool: StateLocal

Storage Appliance Status: Connected
Pool: North Carolina Department of Transportation
Location: DocuSign

Signer Events	Signature	Timestamp
Scott Beaver skbeaver@ncdoj.gov Security Level: Email, Account Authentication (None)	DocuSigned by: Scott Beaver 55FE7B40AA93401... Signature Adoption: Pre-selected Style Using IP Address: 75.183.198.188	Sent: 2/7/2022 1:17:27 PM Viewed: 2/7/2022 2:16:33 PM Signed: 2/7/2022 2:18:28 PM
Electronic Record and Signature Disclosure: Accepted: 2/7/2022 2:16:33 PM ID: 1cef1389-16f9-4b36-8f88-82f03763ca10		
Ronald E. Davenport, Jr. rondavenport@ncdot.gov Contract Officer North Carolina Department of Transportation Security Level: Email, Account Authentication (None)	DocuSigned by: Ronald E. Davenport, Jr. F81B6038A47A442... Signature Adoption: Pre-selected Style Using IP Address: 199.90.35.12	Sent: 2/7/2022 2:19:48 PM Viewed: 2/7/2022 2:22:30 PM Signed: 2/7/2022 2:23:08 PM
Electronic Record and Signature Disclosure: Not Offered via DocuSign		

In Person Signer Events	Signature	Timestamp

Editor Delivery Events	Status	Timestamp

Agent Delivery Events	Status	Timestamp

Intermediary Delivery Events	Status	Timestamp

Certified Delivery Events	Status	Timestamp

Carbon Copy Events	Status	Timestamp
Beth Mckay agodotcontractreview@ncdoj.gov North Carolina Department of Transportation Security Level: Email, Account Authentication (None)	COPIED	Sent: 2/7/2022 1:17:28 PM
Electronic Record and Signature Disclosure: Not Offered via DocuSign		

Carbon Copy Events	Status	Timestamp
Lori Strickland lastrickland@ncdot.gov Administrative Specialist I North Carolina Department of Transportation Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via DocuSign	COPIED	Sent: 2/7/2022 2:24:25 PM Viewed: 2/7/2022 2:25:16 PM
Michelle Taylor mataylor@ncdot.gov North Carolina Department of Transportation Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via DocuSign	COPIED	Sent: 2/7/2022 2:24:26 PM Resent: 2/7/2022 2:24:30 PM Viewed: 2/8/2022 6:49:43 AM
Malcolm J Bell mjbell1@ncdot.gov Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via DocuSign	COPIED	Sent: 2/7/2022 2:24:27 PM
Nancy L. Gay nlgay@ncdot.gov CC+Contract Standards and Development Unit Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via DocuSign	COPIED	Sent: 2/7/2022 2:24:27 PM
Mike Gwyn wmgwyn@ncdot.gov Administration Officer I North Carolina Department of Transportation Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via DocuSign	COPIED	Sent: 2/7/2022 2:24:28 PM Viewed: 2/8/2022 7:11:08 AM

Witness Events	Signature	Timestamp

Notary Events	Signature	Timestamp

Envelope Summary Events	Status	Timestamps
Envelope Sent	Hashed/Encrypted	2/7/2022 1:02:17 PM
Certified Delivered	Security Checked	2/7/2022 2:22:30 PM
Signing Complete	Security Checked	2/7/2022 2:23:08 PM
Completed	Security Checked	2/7/2022 2:24:28 PM

Payment Events	Status	Timestamps

Electronic Record and Signature Disclosure

CONSUMER DISCLOSURE

From time to time, North Carolina Department of Transportation (we, us or Company) may be required by law to provide to you certain written notices or disclosures. Described below are the terms and conditions for providing to you such notices and disclosures electronically through your DocuSign, Inc. (DocuSign) Express user account. Please read the information below carefully and thoroughly, and if you can access this information electronically to your satisfaction and agree to these terms and conditions, please confirm your agreement by clicking the æI agreeÆ button at the bottom of this document.

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Withdrawing your consent

If you decide to receive notices and disclosures from us electronically, you may at any time change your mind and tell us that thereafter you want to receive required notices and disclosures only in paper format. How you must inform us of your decision to receive future notices and disclosure in paper format and withdraw your consent to receive notices and disclosures electronically is described below.

Consequences of changing your mind

If you elect to receive required notices and disclosures only in paper format, it will slow the speed at which we can complete certain steps in transactions with you and delivering services to you because we will need first to send the required notices or disclosures to you in paper format, and then wait until we receive back from you your acknowledgment of your receipt of such paper notices or disclosures. To indicate to us that you are changing your mind, you must withdraw your consent using the DocuSign ôWithdraw Consentö form on the signing page of your DocuSign account. This will indicate to us that you have withdrawn your consent to receive required notices and disclosures electronically from us and you will no longer be able to use your DocuSign Express user account to receive required notices and consents electronically from us or to sign electronically documents from us.

All notices and disclosures will be sent to you electronically

Unless you tell us otherwise in accordance with the procedures described herein, we will provide electronically to you through your DocuSign user account all required notices, disclosures, authorizations, acknowledgements, and other documents that are required to be provided or made available to you during the course of our relationship with you. To reduce the chance of you inadvertently not receiving any notice or disclosure, we prefer to provide all of the required notices and disclosures to you by the same method and to the same address that you have given us. Thus, you can receive all the disclosures and notices electronically or in paper format through the paper mail delivery system. If you do not agree with this process, please let us know as described below. Please also see the paragraph immediately above that describes the consequences of your electing not to receive delivery of the notices and disclosures electronically from us.

How to contact North Carolina Department of Transportation:
You may contact us to let us know of your changes as to how we may contact you electronically, to request paper copies of certain information from us, and to withdraw your prior consent to receive notices and disclosures electronically as follows:
To contact us by email send messages to: bledwards1@ncdot.gov

To advise North Carolina Department of Transportation of your new e-mail address
To let us know of a change in your e-mail address where we should send notices and disclosures electronically to you, you must send an email message to us at bledwards1@ncdot.gov and in the body of such request you must state: your previous e-mail address, your new e-mail address. We do not require any other information from you to change your email address..
In addition, you must notify DocuSign, Inc to arrange for your new email address to be reflected in your DocuSign account by following the process for changing e-mail in DocuSign.
To request paper copies from North Carolina Department of Transportation
To request delivery from us of paper copies of the notices and disclosures previously provided by us to you electronically, you must send us an e-mail to bledwards1@ncdot.gov and in the body of such request you must state your e-mail address, full name, US Postal address, and telephone number. We will bill you for any fees at that time, if any.
To withdraw your consent with North Carolina Department of Transportation
To inform us that you no longer want to receive future notices and disclosures in electronic format you may:

i. decline to sign a document from within your DocuSign account, and on the subsequent page, select the check-box indicating you wish to withdraw your consent, or you may;
ii. send us an e-mail to bledwards1@ncdot.gov and in the body of such request you must state your e-mail, full name, IS Postal Address, telephone number, and account number. We do not need any other information from you to withdraw consent.. The consequences of your withdrawing consent for online documents will be that transactions may take a longer time to process..

Required hardware and software

Operating Systems:	Windows2000¬ or WindowsXP¬
Browsers (for SENDERS):	Internet Explorer 6.0¬ or above
Browsers (for SIGNERS):	Internet Explorer 6.0¬, Mozilla FireFox 1.0, NetScape 7.2 (or above)
Email:	Access to a valid email account
Screen Resolution:	800 x 600 minimum
Enabled Security Settings:	ò Allow per session cookies ò Users accessing the internet behind a Proxy Server must enable HTTP 1.1 settings via proxy connection

** These minimum requirements are subject to change. If these requirements change, we will provide you with an email message at the email address we have on file for you at that time providing you with the revised hardware and software requirements, at which time you will have the right to withdraw your consent.
Acknowledging your access and consent to receive materials electronically
To confirm to us that you can access this information electronically, which will be similar to

other electronic notices and disclosures that we will provide to you, please verify that you were able to read this electronic disclosure and that you also were able to print on paper or electronically save this page for your future reference and access or that you were able to e-mail this disclosure and consent to an address where you will be able to print on paper or save it for your future reference and access. Further, if you consent to receiving notices and disclosures exclusively in electronic format on the terms and conditions described above, please let us know by clicking the æI agreeÆ button below.
By checking the æI AgreeÆ box, I confirm that:

- I can access and read this Electronic CONSENT TO ELECTRONIC RECEIPT OF ELECTRONIC CONSUMER DISCLOSURES document; and

- I can print on paper the disclosure or save or send the disclosure to a place where I can print it, for future reference and access; and

- Until or unless I notify North Carolina Department of Transportation as described above, I consent to receive from exclusively through electronic means all notices, disclosures, authorizations, acknowledgements, and other documents that are required to be provided or made available to me by North Carolina Department of Transportation during the course of my relationship with you.