STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

October 10, 2018

U.S. Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

ATTN: Mr. Steve Kichefski
NCDOT Coordinator

Subject: **Application for Section 404 Nationwide Permit 14 and Section 401 Water Quality Certification** for the Proposed Replacement of Bridge 21 on NC 18 over Little River in Alleghany County, Division 11, TIP No. B-5388, Debit $570 from WBS 46103.1.1.

Dear Sir:

The North Carolina Department of Transportation (NCDOT) proposes to replace bridge number 21 on NC 18 with a new bridge on the existing alignment. Traffic will be maintained on-site during construction.

As a result of replacing the existing bridge, there will be 159 linear feet of stream bank stabilization and 0.48 acre (202 linear feet) of temporary stream impacts. There will also be <0.01 acre of permanent fill in wetlands, <0.01 acre of temporary fill in wetlands, and <0.01 acre of hand clearing in wetlands.

Please see enclosed copies of the Pre-Construction Notification (PCN), Stormwater Management Plan, Permit Drawings, Roadway Plan Sheets, and northern long-eared bat memos. A State Minimum Criteria Checklist (SMC) was completed in August 2017 and distributed shortly thereafter. Additional copies are available upon request.

This project is located in a trout watershed, therefore comments from the NCWRC will be required prior to authorization by the Corps of Engineers. By copy of this letter and attachment, NCDOT hereby requests NCWRC Review. NCDOT requests that NCWRC forward their comments to the Corps of Engineers and the NCDOT within 30 calendar days of receipt of this application.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
NATURAL ENVIRONMENT SECTION
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

Telephone: (919) 707-6000
Fax: (919) 212-5785
Customer Service: 1-877-368-4968
Website: www.ncdot.gov

Location:
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

This project calls for a letting date of December 18, 2018 and a review date of October 30, 2018.

A copy of this permit application and its distribution list will be posted on the NCDOT Website at: http://connect.ncdot.gov/resources/Environmental. If you have any questions or need additional information, please call Erin Cheely at (919) 707-6108.

Sincerely,

Carla Dagnino

for Philip S. Harris III, P.E., C.P.M.
Environmental Analysis Unit Head

Cc:
NCDOT Permit Application Standard Distribution List

Pre-Construction Notification (PCN) Form

For Nationwide Permits and Regional General Permits

(along with corresponding Water Quality Certifications)

September 29, 2018 Ver 3

*Please note: fields marked with a red asterisk * below are required. You will not be able to submit the form until all mandatory questions are answered.*

Also, if at any point you wish to print a copy of the E-PCN, all you need to do is right-click on the document and you can print a copy of the form.

Below is a link to the online help file.

https://edocs.deq.nc.gov/WaterResources/0/edoc/624704/PCN%20Help%20File%202018-1-30.pdf

A. Processing Information

County (or Counties) where the project is located:*

Alleghany

Is this project a public transportation project?*

(•) Yes ( ) No

This is any publicly funded by municipal,state or federal funds road, rail, airport transportation project.

Is this a NCDOT Project?*

(•) Yes ( ) No

(NCDOT only) T.I.P. or state project number:

B-5388

WBS #*

46103.1.1

(for NCDOT use only)

1a. Type(s) of approval sought from the Corps:*

- [x] Section 404 Permit (wetlands, streams and waters, Clean Water Act)
- [ ] Section 10 Permit (navigable waters, tidal waters, Rivers and Harbors Act)

1b. What type(s) of permit(s) do you wish to seek authorization?*

- [x] Nationwide Permit (NWP)
- [ ] Regional General Permit (RGP)
- [ ] Standard (IP)

1c. Has the NWP or GP number been verified by the Corps?*

( ) Yes (•) No

This form may be used to initiate the standard/individual permit process with the Corps. Please contact your Corps representative concerning submittals for standard permits. All required items that are not provided in the E-PCN can be added to the miscellaneous upload area located at the bottom of this form.

Nationwide Permit (NWP) Number: 14 - Linear transportation

NWP Numbers (for multiple NWPS):

List all NW numbers you are applying for not on the drop dow n list.

1d. Type(s) of approval sought from the DWR:*

check all that apply

- [x] 401 Water Quality Certification - Regular
- [ ] Non-404 Jurisdictional General Permit
- [ ] Individual Permit
- [ ] 401 Water Quality Certification - Express
- [ ] Riparian Buffer Authorization

1e. Is this notification solely for the record because written approval is not required? *

For the record only for DWR 401 Certification: ( ) Yes (•) No

For the record only for Corps Permit: ( ) Yes (•) No

1f. Is this an after-the-fact permit application?*

( ) Yes (•) No

1g. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts?

If so, attach the acceptance letter from mitigation bank or in-lieu fee program.

○ Yes ◉ No

Acceptance Letter Attachment

Click the upload button or drag and drop files here to attach document

FILE TYPE MUST BE PDF

1h. Is the project located in any of NC's twenty coastal counties?*

○ Yes ◉ No

1j. Is the project located in a designated trout watershed?*

◉ Yes ○ No

You must submit a copy of the appropriate Wildlife Resource Commission Office.

Link to trout information: http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/Trout.aspx

B. Applicant Information

1a. Who is the Primary Contact?*

NCDOT

1b. Primary Contact Email:*

ekcheely@ncdot.gov

1c. Primary Contact Phone:*

(xxx)xxx-xxxx

(919)707-6108

1d. Who is applying for the permit?*

☑ Owner ☐ Applicant (other than owner)

(Check all that apply)

Is there an Agent/Consultant for this project?*

○ Yes ◉ No

2. Owner Information

2a. Name(s) on recorded deed:*

NC Department of Transportation

2b. Deed book and page no.:

2c. Responsible party:

(for Corporations)

2d. Address*

Street Address

1598 Mail Service Center

Address Line 2

City

Raleigh

State / Province / Region

NC

Postal / Zip Code

27699

Country

USA

2e. Telephone Number:*

(xxx)xxx-xxxx

(919)707-6108

2f. Fax Number:

(xxx)xxx-xxxx

2g. Email Address:*

pharris@ncdot.gov

C. Project Information and Prior Project History

1. Project Information

1a. Name of project:*

Replacement of Bridge 21 on NC 18 over Little River

1b. Subdivision name:

(if appropriate)

1c. Nearest municipality / town:*

Ennice

2. Project Identification

2a. Property Identification Number:
(tax PIN or parcel ID)

2b. Property size:
(in acres)

2c. Project Address

Street Address

Address Line 2

City

State / Province / Region

Postal / Zip Code

Country

2d. Site coordinates in decimal degrees

Please collect site coordinates in decimal degrees. Use between 4-6 digits (unless you are using a survey-grade GPS device) after the decimal place as appropriate, based on how the location was determined. (For example, most mobile phones with GPS provide locational precision in decimal degrees to map coordinates to 5 or 6 digits after the decimal place.)

Latitude: *

36.542848
ex: 34.208504

Longitude: *

-81.021017
-77.796371

3. Surface Waters

3a. Name of the nearest body of water to proposed project: *

Little River

3b. Water Resources Classification of nearest receiving water: *

C, HQW

Surface Water Lookup

3d. Please provide the 12-digit HUC in which the project is located. *

05050001

3c. What river basin(s) is your project located in? *

New

River Basin Lookup

4. Project Description and History

4a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application: *

Land use within the vicinity of this project consists of about 30% forest land, 55% cultivated land (agricultural fields and pastures), and 15% developed or disturbed lands.

4b. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past? *

○ Yes ◉ No ○ Unknown

4d. Attach an 8 1/2 X 11 excerpt from the most recent version of the USGS topographic map indicating the location of the project site. (for DWR)

Click the upload button or drag and drop files here to attach document

File type must be pdf

4e. Attach an 8 1/2 X 11 excerpt from the most recent version of the published County NRCS Soil Survey map depicting the project site. (for DWR)

Click the upload button or drag and drop files here to attach document

File type must be pdf

4f. List the total estimated acreage of all existing wetlands on the property:

0.05

4g. List the total estimated linear feet of all existing streams on the property:

(intermittent and perennial)

1190

4h. Explain the purpose of the proposed project: *

The purpose of this project is to replace a structurally deficient and functionally obsolete bridge. Bridge No. 21 has a sufficiency rating of 8.57 out of 100, superstructure and substructure condition ratings of 4 or less out of 9, and a structural appraisal of 4 out of 9.

4i. Describe the overall project in detail, including indirect impacts and the type of equipment to be used: *

The proposed project involves replacing a 316-foot seven-span bridge with a 315-foot, three-span bridge on the existing alignment. Traffic will be detoured on-site during construction. Standard road building equipment, such as trucks, dozers, and cranes will be used.

4j. Please upload project drawings for the proposed project.

Click the upload button or drag and drop files here to attach document

B-5388 Roadway Plans - FINAL.pdf	5.63MB
B-5388 Permit Drawings - FINAL 2018 10 02.pdf	9.48MB

File type must be pdf

5. Jurisdictional Determinations

5a. Have the wetlands or streams been delineated on the property or proposed impact areas? *

(•) Yes ( ) No ( ) Unknown

Comments:

Only two perennial streams and one small wetland are present in the project area. No JD visit conducted.

5b. If the Corps made a jurisdictional determination, what type of determination was made? *

( ) Preliminary ( ) Approved (•) Not Verified ( ) Unknown ( ) N/A

Corps AID Number:

Example: SAW-2017-99999

5c. If 5a is yes, who delineated the jurisdictional areas?

Name (if known): Tom Dickinson and John Roberts

Agency/Consultant Company: Three Oaks

Other:

5d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation.

5d1. Jurisdictional determination upload

Click the upload button or drag and drop files here to attach document

File type must be PDF

6. Future Project Plans

6a. Is this a phased project? *

( ) Yes (•) No

Are any other NWP(s), regional general permit(s), or individual permits(s) used, or intended to be used, to authorize any part of the proposed project or related activity? This includes other separate and distant crossing for linear projects that require Department of the Army authorization but don't require pre-construction notification.

D. Proposed Impacts Inventory

1. Impacts Summary

1a. Where are the impacts associated with your project? (check all that apply):

☑ Wetlands ☑ Streams-tributaries ☐ Buffers

☐ Open Waters ☐ Pond Construction

2. Wetland Impacts

If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.

"W." will be used in the table below to represent the word "wetland".

2a. Site # * (?)	2a1 Reason * (?)	2b. Impact type * (?)	2c. Type of W. *	2d. W. name *	2e. Forested *	2f. Type of Jurisdicition * (?)	2g. Impact area *
2	Roadway Fill	P	Headwater Forest	WA	Yes	Corps	0.001 (acres)
2	Roadway Fill	T	Headwater Forest	WA	Yes	Corps	0.006 (acres)
2	Hand Clearing	T	Headwater Forest	WA	Yes	Corps	0.005 (acres)

2g. Total Temporary Wetland Impact

0.011

2g. Total Permanent Wetland Impact

0.001

2g. Total Wetland Impact

0.012

2h. Comments:

There will be an additional <0.01 ac of temporary fill in wetlands in the hand clearing areas for erosion control measures. Due to the size of the impacts from permanent fill (<0.01 ac, 57 square feet), NCDOT does not propose mitigation for this impact. The nearby spring that feeds the wetland hydrology will not be disturbed during construction.

3. Stream Impacts

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

"S." will be used in the table below to represent the word "stream".

	3a. Reason for impact * (?)	3b.Impact type *	3c. Type of impact *	3d. S. name *	3e. Stream Type * (?)	3f. Type of Jurisdiction *	3g. S. width *	3h. Impact length *
S1	Bank Stabilization	Permanent	Bank Stabilization	Little River	Perennial	Both	90 Average (feet)	159 (linear feet)
S2	Bridge construction and demolition	Temporary	Workpad/Causeway	Little River	Perennial	Both	90 Average (feet)	202 (linear feet)

** All Perennial or Intermittent streams must be verified by DWR or delegated local government.

3i. Total jurisdictional ditch impact in square feet:

0

3i. Total permanent stream impacts:

159

3i. Total temporary stream impacts:

202

3i. Total stream and ditch impacts:

361

3j. Comments:

Temporary impact acreage from temporary causeways and workbridge is 0.48 acre. Additionally, the impact area of the proposed piers in the water is 65 square feet (9 lf of channel).

E. Impact Justification and Mitigation

1. Avoidance and Minimization

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing the project: *

The new bridge will be constructed in the same location as the existing bridge, and will have less spans and less bents in the water. The deck drains on the proposed bridge will not discharge directly into the river. Deck drainage is received by rip rap deck drain pads. Runoff leaving the bridge deck is collected by inlets at the west end, and conveyed to rip-rap lined ditch, which diffuses the flow into the floodplain before entering Little River. Roadway drainage from the beginning of the project to the bridge is collected on the left side into a grass-lined ditch, which crosses the road and is discharged into the floodplain before entering Little River. Roadway drainage at the end of the project is collected along the right side of the roadway in a gutter and inlet system, which discharges onto a rip rap lined ditch before draining down the embankment. Construction of the new bridge will take place detour structure maintains traffic. Construction will take place using causeways, as no other practical option exists to minimize disturbance to the river. Site constraints on the eastern end prohibit crane access down the slope. Construction equipment that is clean will be permitted to cross the river at times of low flow in order to construct a workbridge and causeways. Causeways will be constructed and phased such that the channel always has at least 50% unblocked. Bank stabilization rip rap will be installed as necessary to prevent streambank degradation.

Multiple other construction alternatives were investigated and eliminated, including blasting down an access road to install causeways from the east side and using temporary modular bottomless culverts for construction/demolition (like Envirospan). Since the rock line is so high, replacing the crane pad portion of the southwest causeway with a temporary structure would necessitate some sort of drilled footing, which would require causeway to construct, and this is not a location where you could drive piles to allow that as an option.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques: *

Design Standards in Sensitive Watersheds will be utilized during construction to reduce stormwater impacts to the receiving stream due to erosion and runoff. Hand clearing of the small wetland in the northeast quadrant will be used to minimize disturbance to the wetland as well as avoid any impacts to the spring that feeds its hydrology.

2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?

○ Yes ◉ No

2b. If this project DOES NOT require Compensatory Mitigation, explain why:

The NCDOT does not propose mitigation for the 159 linear feet of bank stabilization or the 0.48 ac (202 linear feet) of temporary impacts from the work bridge and causeways. These impacts do not require permanent fill in the stream bed and, therefore, under Section 404 of the Clean Water Act, do not constitute Loss of Waters of the U.S. and are not subject to compensatory mitigation. Additionally, due to the size of the wetland impacts from permanent fill (<0.01 ac, 57 square feet), NCDOT does not propose mitigation for this impact. The nearby spring that feeds the wetland hydrology will not be disturbed during construction.

NC Stream Temperature Classification Maps can be found under the Mitigation Concepts tab on the Wilmington District's RIBITS website.

F. Stormwater Management and Diffuse Flow Plan (required by DWR)

*** Recent changes to the stormwater rules have required updates to this section .***

1. Diffuse Flow Plan

1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?

○ Yes ◉ No

For a list of options to meet the diffuse flow requirements, click here.

If no, explain why:

2. Stormwater Management Plan

2a. Is this a NCDOT project subject to compliance with NCDOT's Individual NPDES permit NCS000250? *

(•) Yes ( ) No

Comments:

G. Supplementary Information

1. Environmental Documentation

1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land? *

(•) Yes ( ) No

1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)? *

(•) Yes ( ) No

1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) *

(•) Yes ( ) No

NEPA or SEPA Final Approval Letter

Click the upload button or drag and drop files here to attach document

FILE TYPE MUST BE PDF

2. Violations (DWR Requirement)

2a. Is the site in violation of DWR Water Quality Certification Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), or DWR Surface Water or Wetland Standards or Riparian Buffer Rules (15A NCAC 2B .0200)? *

( ) Yes (•) No

3. Cumulative Impacts (DWR Requirement)

3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality? *

( ) Yes (•) No

3b. If you answered "no," provide a short narrative description.

Due to the minimal transportation impact resulting from this bridge replacement, this project will neither influence nearby land uses nor stimulate growth. Therefore, a detailed indirect or cumulative effects study will not be necessary.

4. Sewage Disposal (DWR Requirement)

4a. Is sewage disposal required by DWR for this project? *

( ) Yes (•) No ( ) N/A

5. Endangered Species and Designated Critical Habitat (Corps Requirement)

5a. Will this project occur in or near an area with federally protected species or habitat? *

(•) Yes ( ) No

5b. Have you checked with the USFWS concerning Endangered Species Act impacts? *

(•) Yes ( ) No

5c. If yes, indicate the USFWS Field Office you have contacted.

Asheville

5d. Is another Federal agency involved? *

( ) Yes ( ) No (•) Unknown

5e. Is this a DOT project located within Division's 1-8? *

( ) Yes (•) No

5f. Will you cut any trees in order to conduct the work in waters of the U.S.? *

(•) Yes ( ) No

5g. Does this project involve bridge maintenance or removal? *

(•) Yes ( ) No

5g(1). If yes, have you inspected the bridge for signs of bat use such as staining, guano, bats, etc.? Representative photos of signs of bat use can be found in the NLEB SLOPES, Appendix F, pages 3-7.

(•) Yes ( ) No

Link to the NLEB SLOPES document: http://saw-reg.usace.army.mil/NLEB/1-30-17-signed_NLEB-SLOPES&apps.pdf

If you answered "Yes" to 5g(1), did you discover any signs of bat use? *

( ) Yes (•) No ( ) Unknown

*** **If yes, please show the location of the bridge on the permit drawings/project plans.**

5h. Does this project involve the construction/installation of a wind turbine(s)?* *

( ) Yes (•) No

5i. Does this project involve (1) blasting, and/or (2) other percussive activities that will be conducted by machines, such as jackhammers, mechanized pile drivers, etc.? *

(•) Yes ( ) No

If yes, please provide details to include type of percussive activity, purpose, duration, and specific location of this activity on the property.

Click the upload button or drag and drop files here to attach document

File must be PDF

5j. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat? *

As of June 27, 2018 the USFWS lists two federally protected species for Transylvania County. No habitat is present for the bog turtle and documentation is attached with information regarding the northern long-eared bat for SLOPES. This project is 53 miles away from the neared red HUC and a survey of the bridge on June 14, 2018 found no evidence of bat use.

There is a possibility that the hellbender may be formally under conference for listing before construction begins for this project. Extensive discussions with agencies prior to submitting this permit application have occurred and the in-water work for this project has been minimized to the greatest extent practicable considering site constraints. Should this hellbender be under conference any time before or during construction, appropriate coordination will occur to satisfy Section 7.

Consultation Documentation Upload

Click the upload button or drag and drop files here to attach document

B-5388 NLEB Alleghany.pdf	123.37KB
B-5388 NLEB Slopes Alleghany.pdf	95.35KB

File type must be PDF

6. Essential Fish Habitat (Corps Requirement)

6a. Will this project occur in or near an area designated as an Essential Fish Habitat? *

( ) Yes (•) No

6b. What data sources did you use to determine whether your site would impact an Essential Fish Habitat? *

NMFS County Index

7. Historic or Prehistoric Cultural Resources (Corps Requirement)

Link to the State Historic Preservation Office Historic Properties Map (does not include archaeological data: http://gis.ncdcr.gov/hpoweb/

7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)? *

( ) Yes (•) No

7b. What data sources did you use to determine whether your site would impact historic or archeological resources? *

SEPA documentation.

7c. Historic or Prehistoric Information Upload

Click the upload button or drag and drop files here to attach document

File must be PDF

8. Flood Zone Designation (Corps Requirement)

Link to the FEMA Floodplain Maps: https://msc.fema.gov/portal/search

8a. Will this project occur in a FEMA-designated 100-year floodplain? *

(•) Yes ( ) No

8b. If yes, explain how project meets FEMA requirements:

8c. What source(s) did you use to make the floodplain determination? *

NCDOT Hydraulics Unit coordination with FEMA.

Miscellaneous

Comments

There will be 0.15 acre of tree clearing on this project.

Miscellaneous attachments not previously requested.

Click the upload button or drag and drop files here to attach document

B-5388 Cover Letter signed.pdf 37.86KB

File must be PDF or KMZ

Signature

*

☑ By checking the box and signing below, I certify that:

- I have given true, accurate, and complete information on this form;
- I agree that submission of this PCN form is a “transaction” subject to Chapter 66, Article 40 of the NC General Statutes (the “Uniform Electronic Transactions Act”);
- I agree to conduct this transaction by electronic means pursuant to Chapter 66, Article 40 of the NC General Statutes (the “Uniform Electronic Transactions Act”);
- I understand that an electronic signature has the same legal effect and can be enforced in the same way as a written signature; AND
- I intend to electronically sign and submit the PCN form.

Full Name: *

Carla Dagnino

Signature

Date

10/10/2018

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 46103.1.1 **TIP No.:** B-5388 **County(ies):** Alleghany

General Project Information

WBS Element:	46103.1.1	**TIP Number:**	B-5388	**Project Type:**	Bridge Replacement	**Date:**	6/26/2018
NCDOT Contact:	Heath Slaughter			**Contractor / Designer:**	MI Engineering, PLLC (Andrew Nottingham)		
	Address:	NCDOT Division 11 801 Statesville Rd North Wilkesboro NC 28659			**Address:**	1011 Schaub Dr Suite 100 Raleigh NC 27606	
	Phone:	336-903-9202			**Phone:**	919-851-6606	
	Email:	hslaughter@ncdot.gov			**Email:**	anottingham@mi-engineers.com	
City/Town:	Ennice, NC			**County(ies):**	Alleghany		
River Basin(s):	New			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	0.22	**Surrounding Land Use:**	Rural farmlands and forest

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	0.8 ac.	0.6 ac.
Typical Cross Section Description:	2 lanes undivided highway with 12ft lanes, normal crown.	2 lanes undivided highway, with varying 10ft to 11.5ft lanes, normal crown.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 2000 Year: 2040	Existing: 1650 Year: 2020

General Project Narrative: (Description of Minimization of Water Quality Impacts)

Existing 7 span (1@45.5',5@45',1@45.5') bridge on NC18 spans Little River. The existing bridge consists of a reinforced deck on I-beams. The existing bridge was constructed in 1948. Various components of the superstructure and substructure have deteriorated to a point where maintenance activities cannot extend the life of the structure. Additionally, the structure is considered structurally deficient due to deck, superstructure, and substructure condition ratings of 4 or less. The bridge is considered functionally obsolete due to substandard geometrics and has a structural appraisal of 4 out of 9 possible points. The bridge is approaching the end of its useful life. Replacement of the bridge will result in safer traffic operations. The proposed bridge is a 3 span (1@100, 1@115, 1@100') prestressed concrete girder bridge with sloping abutments. The proposed bridge requires deck drains but does not discharge any drains directly into the river. Deck drainage is received by rip rap deck drain pads. Runoff leaving the bridge deck is collected by inlets at the west end, and conveyed to rip-rap lined ditch, which diffuses the flow into the floodplain before entering Little River. Roadway drainage from the beginning of the project to the bridge is collected on the left side into a grassed-lined ditch, which crosses the road and is discharged into the floodplain before entering Little River. Roadway drainage at the end of the project is collected along the right side of the roadway in a gutter and inlet system, which discharges onto a rip-rap lined ditch before draining down the embankment. Construction of the new bridge will take place while a on-site detour structure maintains traffic. Construction will take place using causeways, as no other practical option exists to minimize disturbance to the river. Site constrains on the eastern end prohibit crane access down the slope. Construction equipment that is clean will be permitted to cross the river at times of low flow in order to construct a workbridge and causeways. Causeways shall be constructed and phased such that the channel always has at least 50% unblocked. Bank stabilization rip rap will be installed as necessary to prevent streambank degradation.

Waterbody Information

Surface Water Body (1):	Little River		**NCDWR Stream Index No.:**	10-9-(11.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	High Quality Waters (HQW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	N/A			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

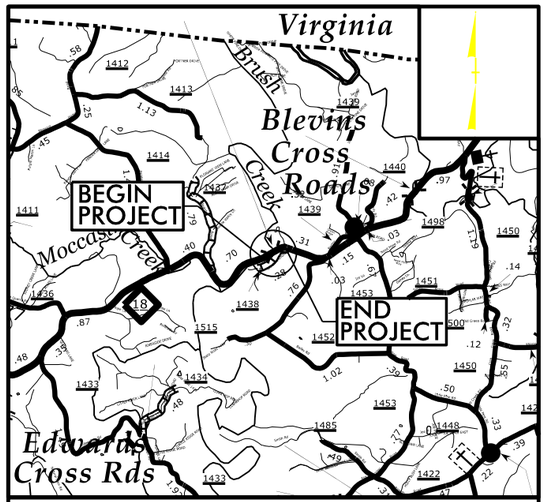
09/08/99

TIP PROJECT: B-5388

CONTRACT: C204255

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

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



VICINITY MAP

N.T.S.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ALLEGHANY COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5388	1	

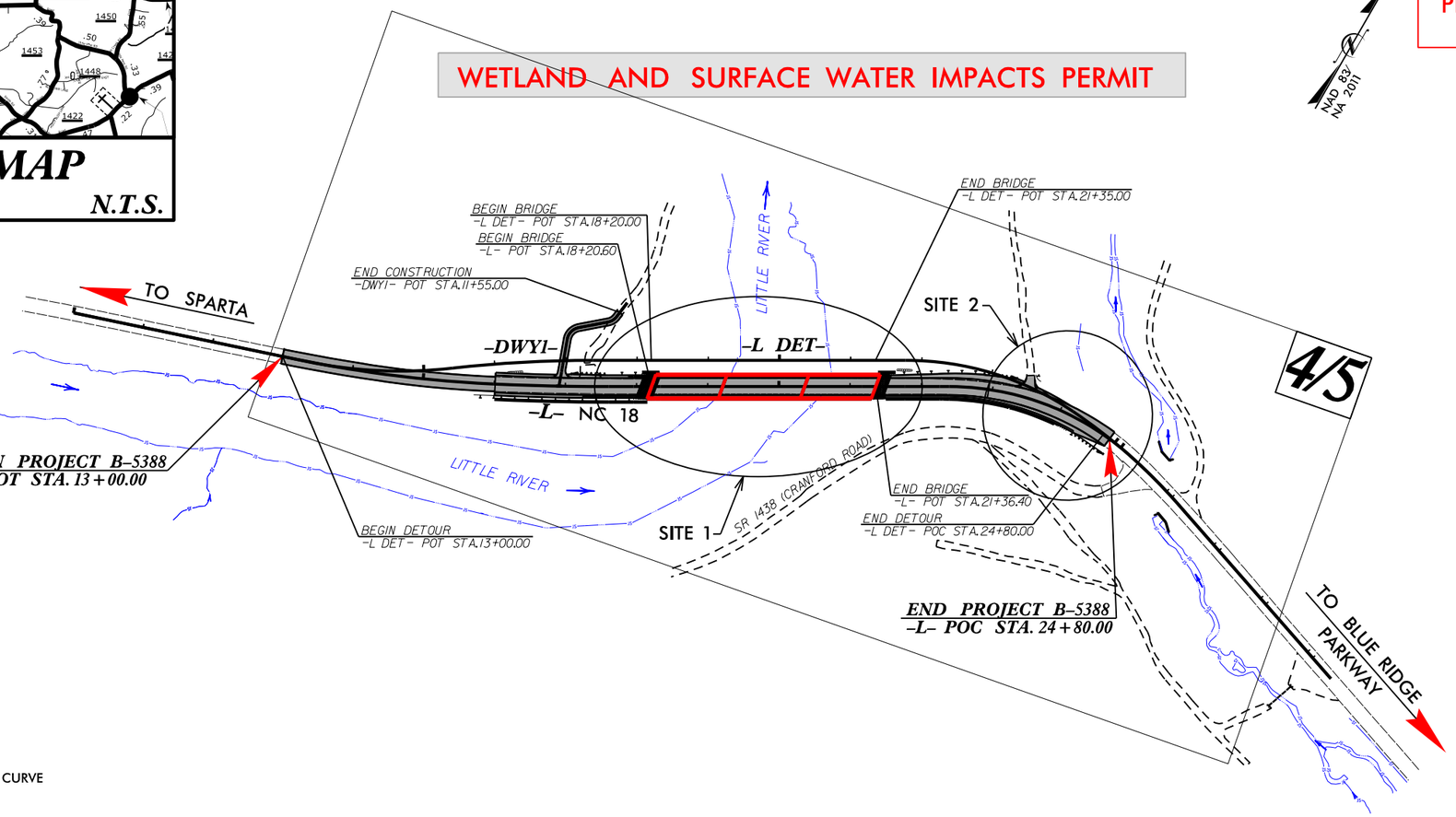
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46103.1.1	N/A	P.E.
46103.2.1	N/A	ROW/UTIL
46103.3.1	N/A	CONST.

LOCATION: REPLACE BRIDGE 21 OVER LITTLE RIVER ON NC 18

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

PERMIT DRAWING
SHEET 1 OF 15

WETLAND AND SURFACE WATER IMPACTS PERMIT



DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVE RADIUS AND STOPPING SIGHT DISTANCE.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2020 = 1650 VPD
ADT 2040 = 2000 VPD
K = 60 %
D = 10 %
T = 6 %
V (-L-) = 50 MPH
V (-L DET-) = 40 MPH
*TTST=1% DUALS=5%
FUNC CLASS =
MAJOR COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5388 = 0.163 MILES
LENGTH BRIDGE TIP PROJECT B-5388 = 0.060 MILES

TOTAL LENGTH TIP PROJECT B-5388 = 0.223 MILES

Prepared In the Office of:
CDM Smith
CDM Smith Inc.
5400 Glenwood Avenue
Suite 400
Raleigh, NC 27612-3228
NC COA No. F-1255
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 20, 2018

LETTING DATE:
DECEMBER 18, 2018

DAVID J. CLODGO, PE
PROJECT ENGINEER

KIT A. PERSIANI, PE
PROJECT DESIGN ENGINEER

DAVID STUTTS, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

8/17/99

REVISIONS

PERMIT DRAWING SHEET 2 OF 15

PROJECT REFERENCE NO.	SHEET NO.
B-5388	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CDM Smith Inc, 5400 Glenwood Avenue, Suite 400, Raleigh, NC 27612-3220, NC CDA No. P-1255

MI Engineering, PLLC, 1011 Schaub Drive, Suite 101, Raleigh, NC 27606, NC CDA No. P-4071

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NAD 83 /NA 2011

SITE 1

SITE 2

CONSTRUCTION CAUSEWAY #5

TEMP. WORK BRIDGE

DEMOLITION CAUSEWAY #3

DEMOLITION CAUSEWAY #2

CONSTRUCTION AND DEMOLITION CAUSEWAY #1

CONSTRUCTION AND DEMOLITION CAUSEWAY #4

ALICE EDWARDS

DOROTHY O. BAILEY, ET AL

PATRICIA E. BAILEY

WETLAND "WA"

LITTLE RIVER

GRAPHIC SCALE 100' 0' 100'

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES HAND CLEARING

DETAIL A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

FROM STA. 13+00 TO STA. 17+00 -L- LT.

DETAIL B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Type of Liner= CL I Rip-Rap
Min. D= 1.5 Ft.
Max. d= 1.0 Ft.

FROM STA. 17+00 TO STA 18+00 -L- LT.
59 TONS CL I Rip Rap/110 SY GEOTEXTILE
FROM STA. 21+40 TO STA. 22+50 -L- LT.
65 TONS CL I Rip Rap/121 SY GEOTEXTILE

DETAIL C
TOE PROTECTION
(Not to Scale)

d= 1.0 Ft.
Type of Liner= CL I Rip-Rap

FROM STA. 18+00 TO 18+40 -L- LT.
13 TONS CL I Rip Rap/30 SY GEOTEXTILE

DETAIL G
DECK DRAIN DISSIPATOR PAD
(Not to Scale)

*NOTE: CENTER PAD DIRECTLY BELOW DECK DRAINS

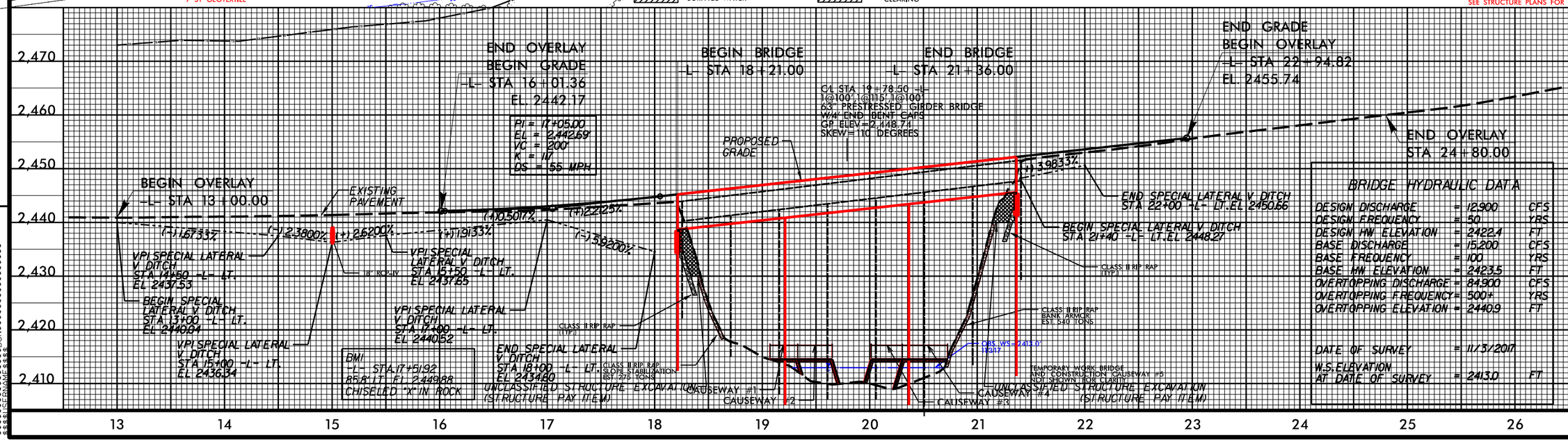
Type of Liner= CL B Rip-Rap
Geotextile= 23 sy

FROM STA. 18+27 TO STA. 18+86 -L- LT/RT
FROM STA. 20+83 – 21+35 -L- LT/RT
QUANTITIES SHOWN FOR EACH PAD

DETAIL H
RIP RAP AT EMBANKMENT
(Not to Scale)

Type of Liner= 105 TONS,CL II Rip-Rap
Geotextile= 150sy

SEE STRUCTURE PLANS FOR EAST BANK



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 12,900	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 2422.4	FT
BASE DISCHARGE	= 15,200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2423.5	FT
OVERTOPPING DISCHARGE	= 84,900	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 2440.9	FT
DATE OF SURVEY	= 11/3/2017	
W.S. ELEVATION AT DATE OF SURVEY	= 2413.0	FT

$$$$$SYSTIME$$$$$
$$$$$USERNAME$$$$$
$$$$$FILENAME$$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-5388	4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CDM Smith Inc. 5400 Glenwood Avenue Suite 400 Raleigh, NC 27612-3228 NC COA No. F-1255	MI Engineering, PLLC 1011 Schaub Drive Suite 100 Raleigh, NC 27606 NC COA No. P-0671

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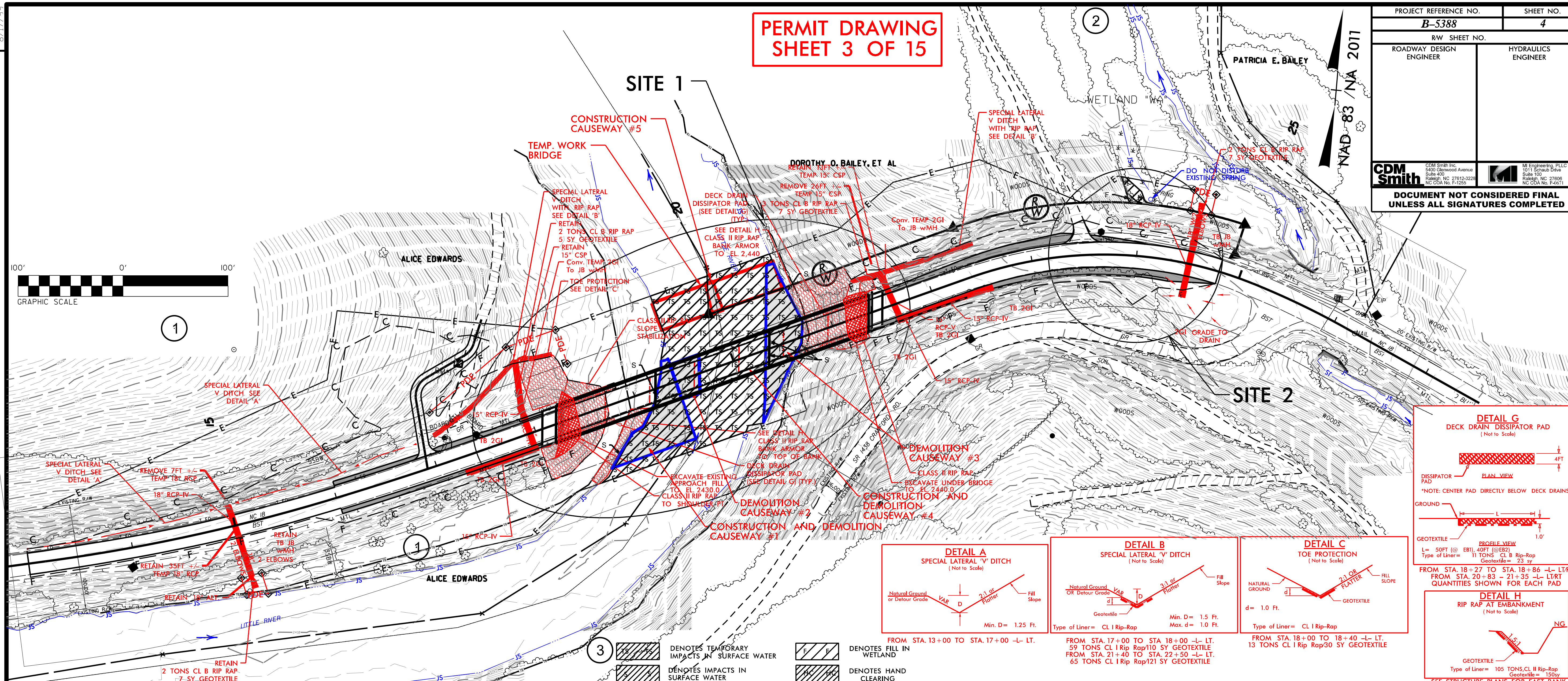
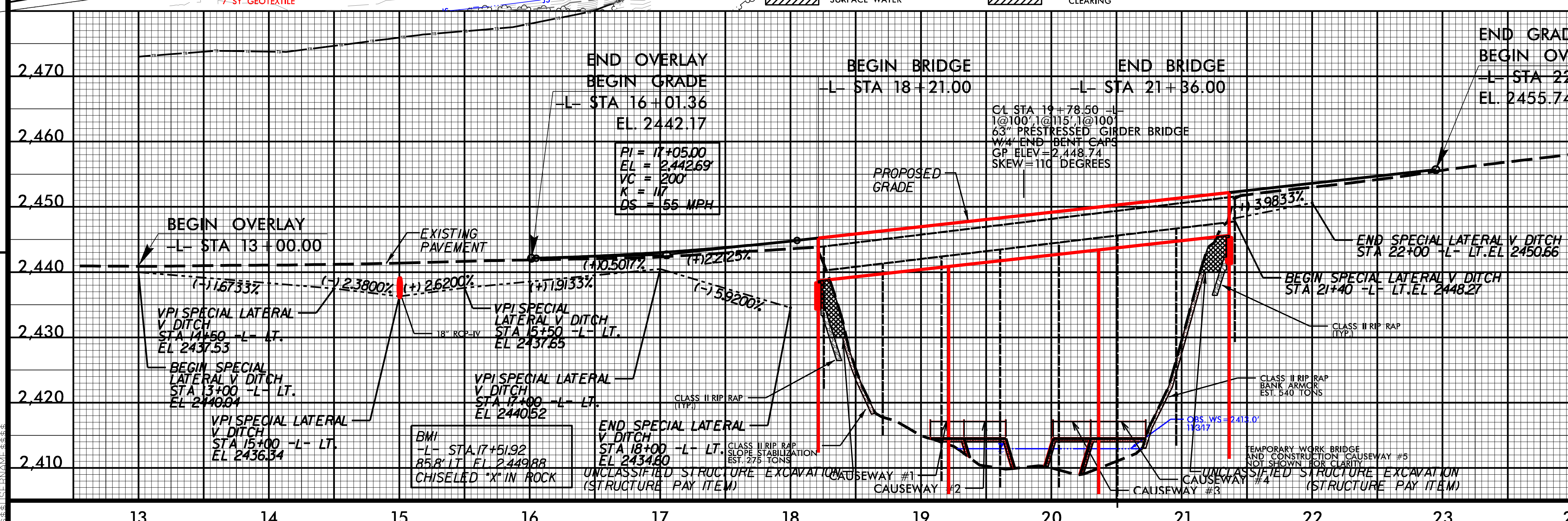
PERMIT DRAWING SHEET 3 OF 15





BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	12,900	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	2422.4	FT
BASE DISCHARGE	=	15,200	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2423.5	FT
OVERTOPPING DISCHARGE	=	84,900	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	2440.9	FT
DATE OF SURVEY	=	11/3/2017	
W.S.ELEVATION AT DATE OF SURVEY	=	2413.0	FT

8/17/99

REVISIONS

40′ 0′ 40′ 80′ 120′

GRAPHIC SCALE

SITE 1

PROJECT REFERENCE NO.	SHEET NO.
B-5388	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NAD 83 /NA 2011

CDM Smith Inc. 5400 Glenwood Avenue, Suite 400, Raleigh, NC 27612-3220, NC CDA No. F-1255

MI Engineering, PLLC 1011 Schaub Drive Suite 101, Raleigh, NC 27606, NC CDA No. P-4671

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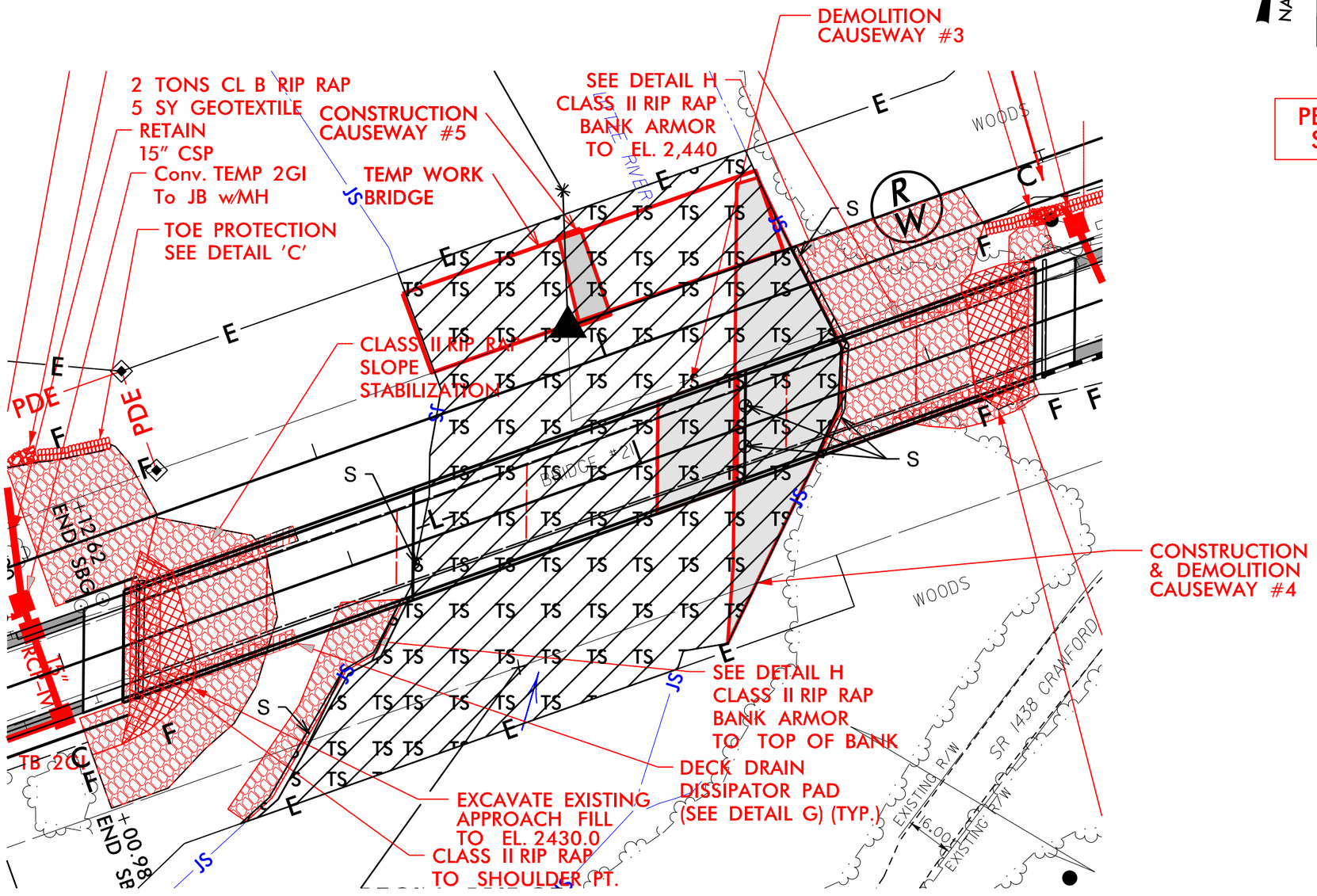
PERMIT DRAWING
SHEET 4 OF 15



CAUSEWAY PLACEMENT
PHASE I

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES CONSTRUCTION AND/OR DEMOLITION CAUSEWAY

PROJECT REFERENCE NO.	SHEET NO.
B-5388	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CDM Smith — CDM Smith Inc. 5400 Glenwood Avenue Suite 400 Raleigh, NC 27612-3228 NC COA No. F-1255

MI Engineering, PLLC 1011 Schaub Drive Suite 100 Raleigh, NC 27606 NC COA No. P-0671

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PERMIT DRAWING
SHEET 5 OF 15

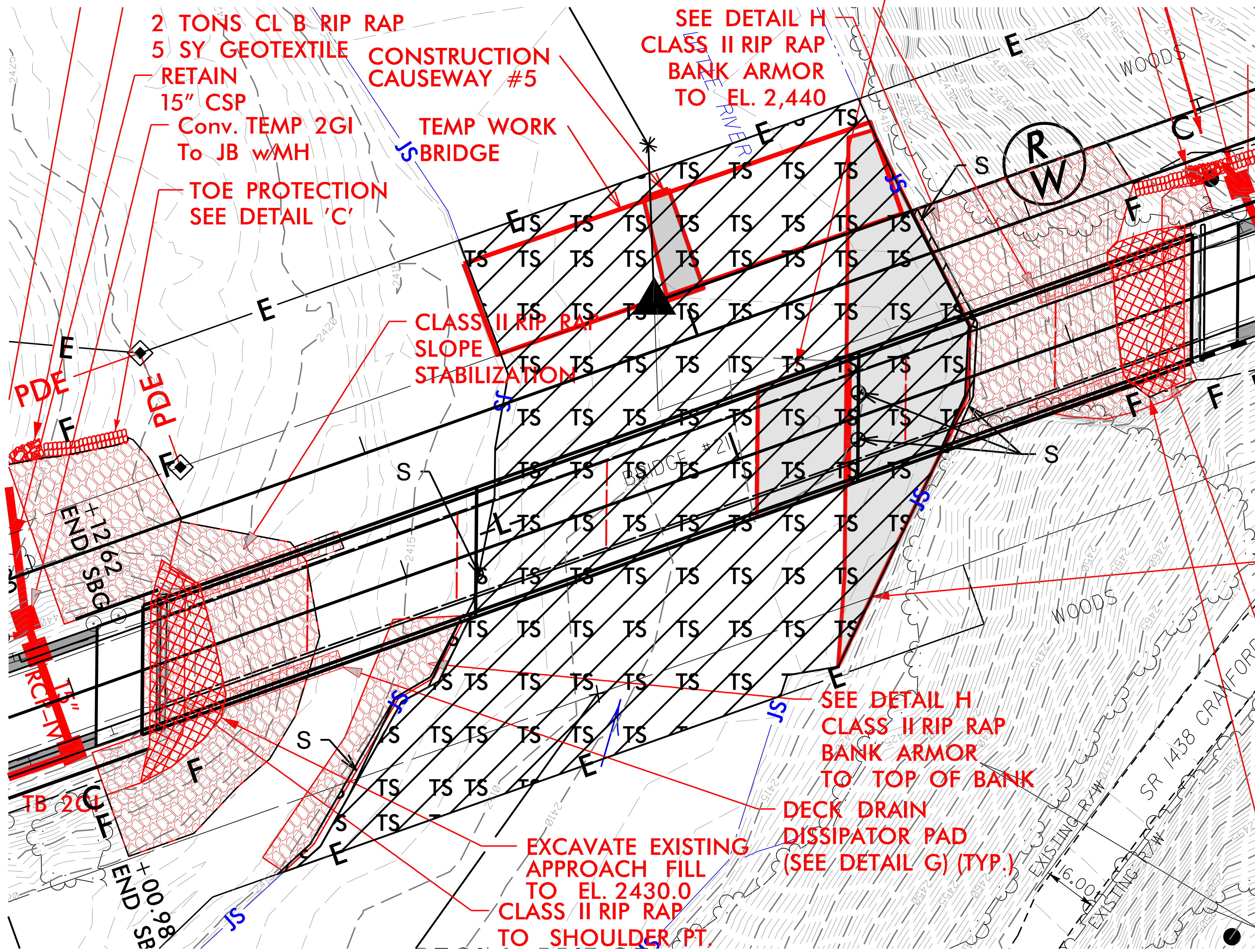
NAD 83 /NA 2011

8/17/99

REVISIONS

40′ 0′ 40′ 80′ 120′
GRAPHIC SCALE

SITE 1

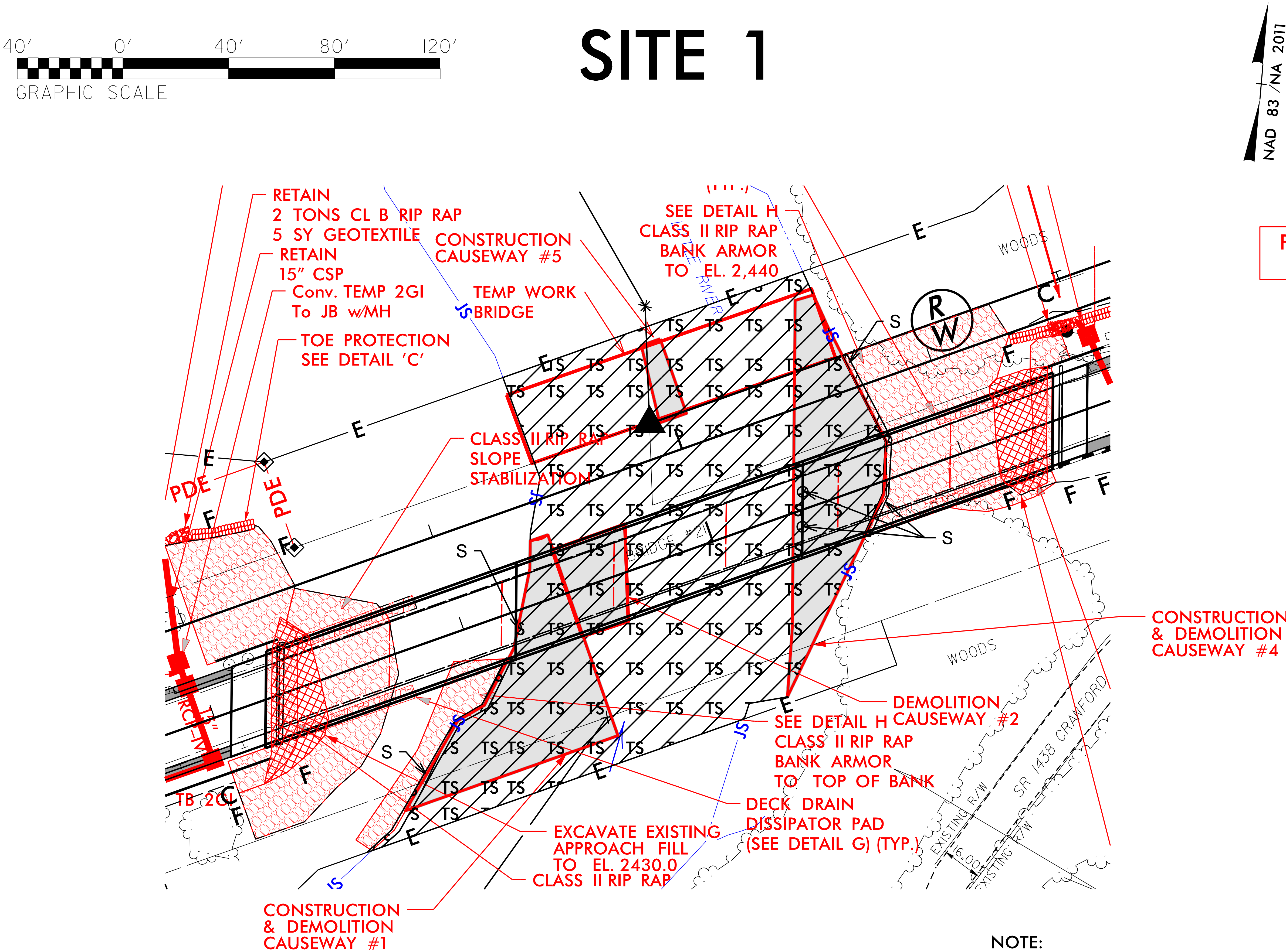


CAUSEWAY PLACEMENT
PHASE I

S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
(grey box)	DENOTES CONSTRUCTION AND/OR DEMOLITION CAUSEWAY

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

SITE 1



PROJECT REFERENCE NO.	SHEET NO.
B-5388	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 6 OF 15

CAUSEWAY PLACEMENT PHASE II

NOTE:
DEMOLITION CAUSEWAY #3 MUST BE COMPLETELY REMOVED BEFORE PLACEMENT OF CAUSEWAY #1 & #2 CAN BEGIN.

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES CONSTRUCTION AND/OR DEMOLITION CAUSEWAY

8/17/99

REVISIONS

40′ 0′ 40′ 80′ 120′

GRAPHIC SCALE

SITE 1

PROJECT REFERENCE NO.	SHEET NO.
B-5388	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CDM Smith Inc
5400 Glenwood Avenue
Suite 400
Raleigh, NC 27612-3220
NC CDA No. F-1255

MI Engineering, PLLC
1011 Schaub Drive
Suite 101
Raleigh, NC 27606
NC CDA No. P-0671

NAD 83 /NA 2011

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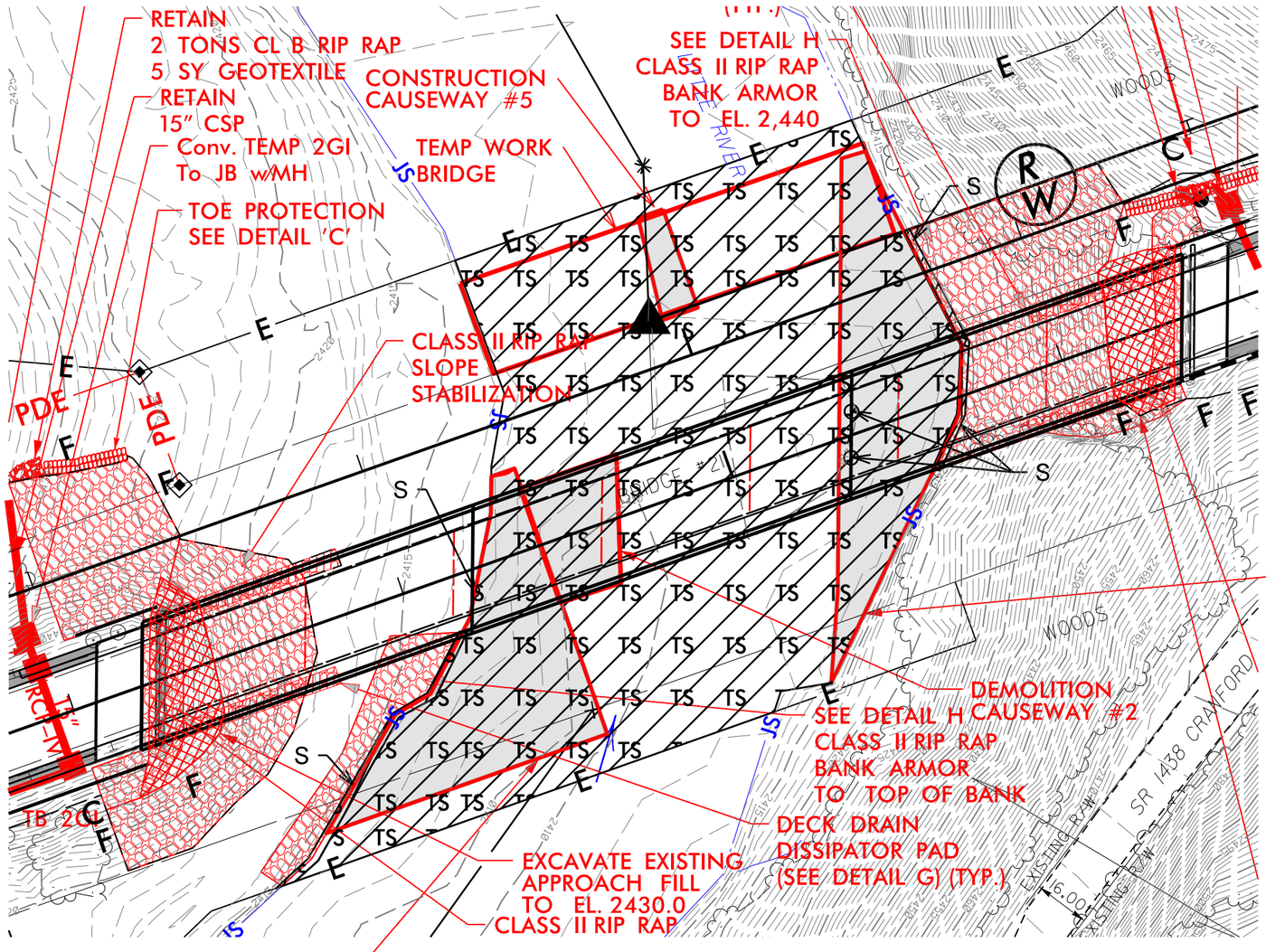
PERMIT DRAWING
SHEET 7 OF 15



CAUSEWAY PLACEMENT
PHASE II

NOTE:
DEMOLITION CAUSEWAY #3 MUST BE COMPLETELY REMOVED BEFORE PLACEMENT OF CAUSEWAY #1 & #2 CAN BEGIN.

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES CONSTRUCTION AND/OR DEMOLITION CAUSEWAY

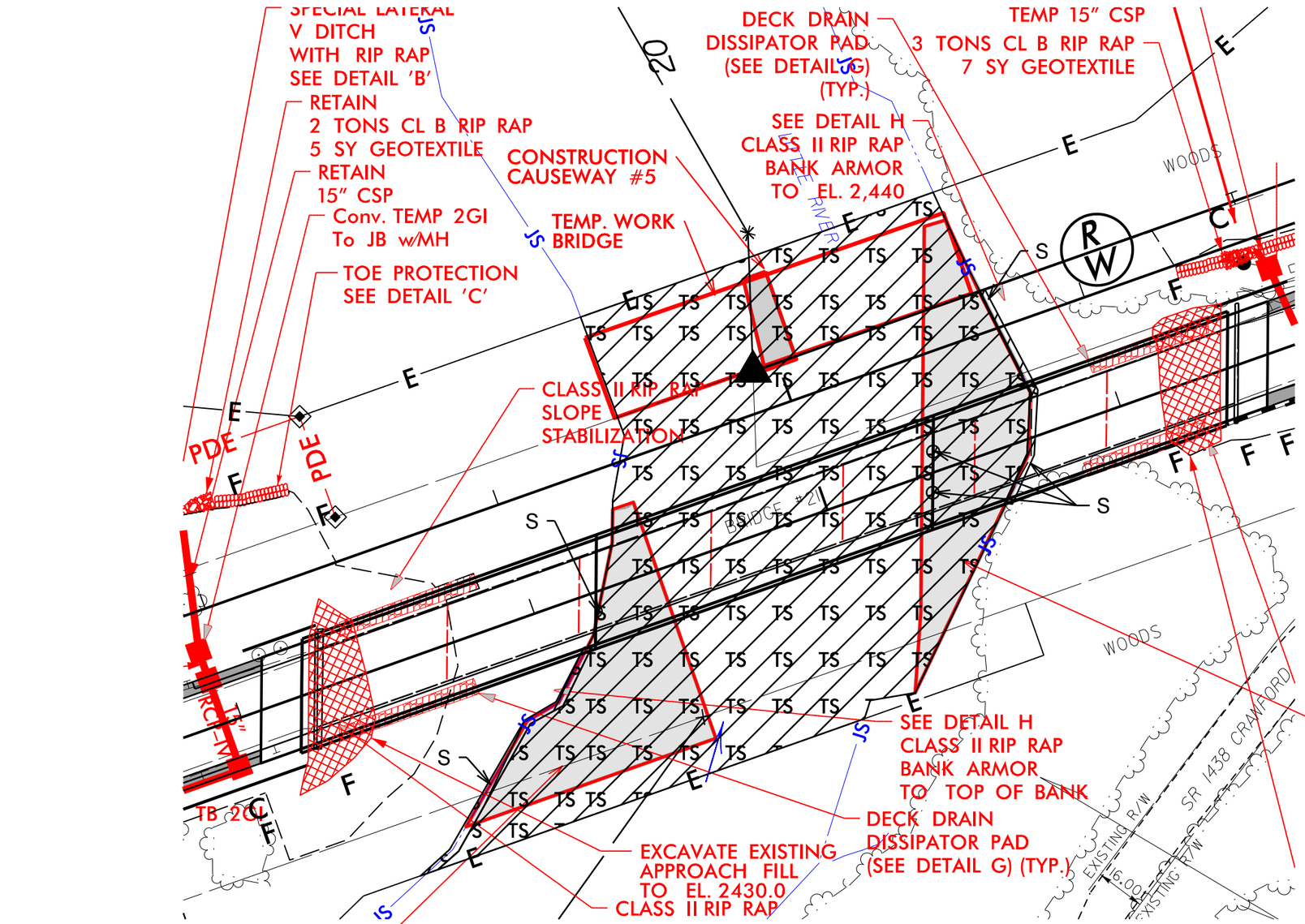
8/17/99

REVISIONS

40' 0' 40' 80' 120'

GRAPHIC SCALE

SITE 1



CONSTRUCTION AND DEMOLITION CAUSEWAY PHASE III

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES CONSTRUCTION AND/OR DEMOLITION CAUSEWAY

NAD 83 /NA 2011

PROJECT REFERENCE NO.	SHEET NO.
B-5388	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CDM Smith — CDM Smith Inc. 5400 Glenwood Avenue Suite 400 Raleigh, NC 27612-3226 NC COA No. F-1255

MI Engineering, PLLC 1011 Schaub Drive Suite 100 Raleigh, NC 27606 NC COA No. P-0671

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PERMIT DRAWING SHEET 8 OF 15

$$$$$$SYSTIME$$$$$$
$$$$$$USERNAME$$$$$$

40′ 0′ 40′ 80′ 120′

GRAPHIC SCALE

SITE 1

PROJECT REFERENCE NO.	SHEET NO.
B-5388	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CDM Smith
CDM Smith Inc.
5400 Glenwood Avenue
Suite 400
Raleigh, NC 27612-3228
NC COA No. F-1255

MI Engineering, PLLC
1011 Schaub Drive
Suite 100
Raleigh, NC 27606
NC COA No. P-0671

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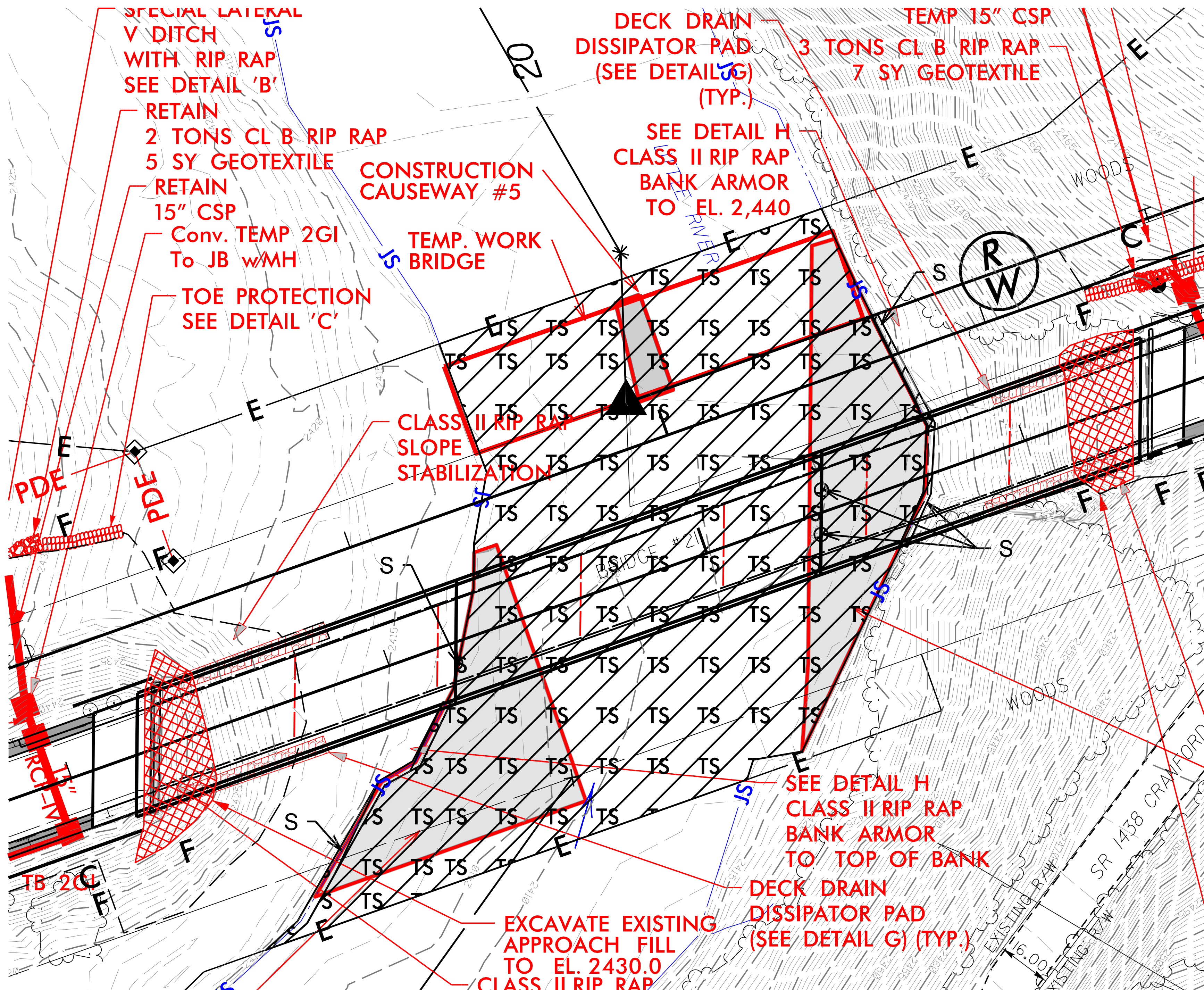
UNLESS ALL SIGNATURES COMPLETED

NAD 83 /NA 2011

PERMIT DRAWING
SHEET 9 OF 15



CONSTRUCTION AND DEMOLITION
CAUSEWAY #4

CONSTRUCTION AND DEMOLITION
CAUSEWAY #1

CONSTRUCTION AND DEMOLITION CAUSEWAY
PHASE III

Symbol	Meaning
S S (hatched)	DENOTES IMPACTS IN SURFACE WATER
TS TS (hatched)	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
(grey box, red outline)	DENOTES CONSTRUCTION AND/OR DEMOLITION CAUSEWAY

REVISIONS

8/17/99

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

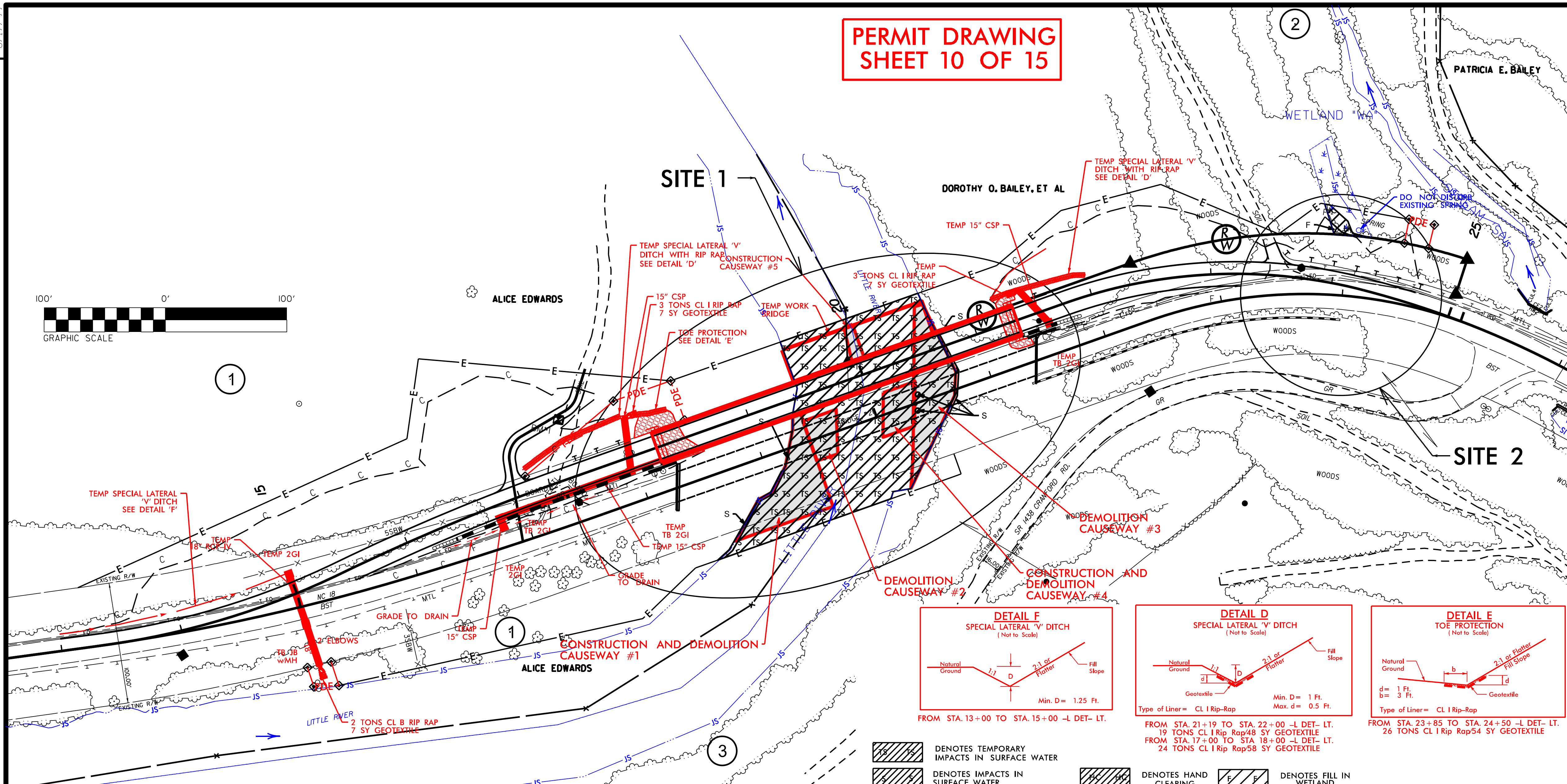
PROJECT REFERENCE NO.	SHEET NO.
B-5388	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

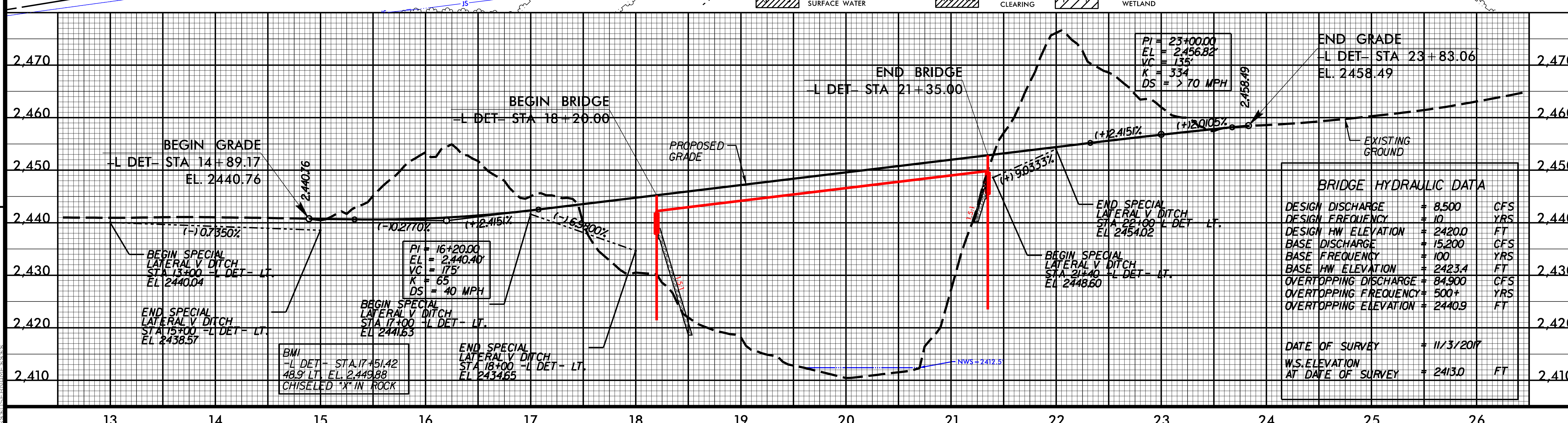
CDM Smith

MI Engineering, PLLC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 10 OF 15





BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 8,500	CFS
DESIGN FREQUENCY	= 10	YRS
DESIGN HW ELEVATION	= 2420.0	FT
BASE DISCHARGE	= 15,200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2423.4	FT
OVERTOPPING DISCHARGE	= 84,900	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 2440.9	FT
DATE OF SURVEY	= 11/3/2017	
W.S. ELEVATION AT DATE OF SURVEY	= 2413.0	FT

REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-5388	5

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

CDM Smith

MI Engineering, PLLC

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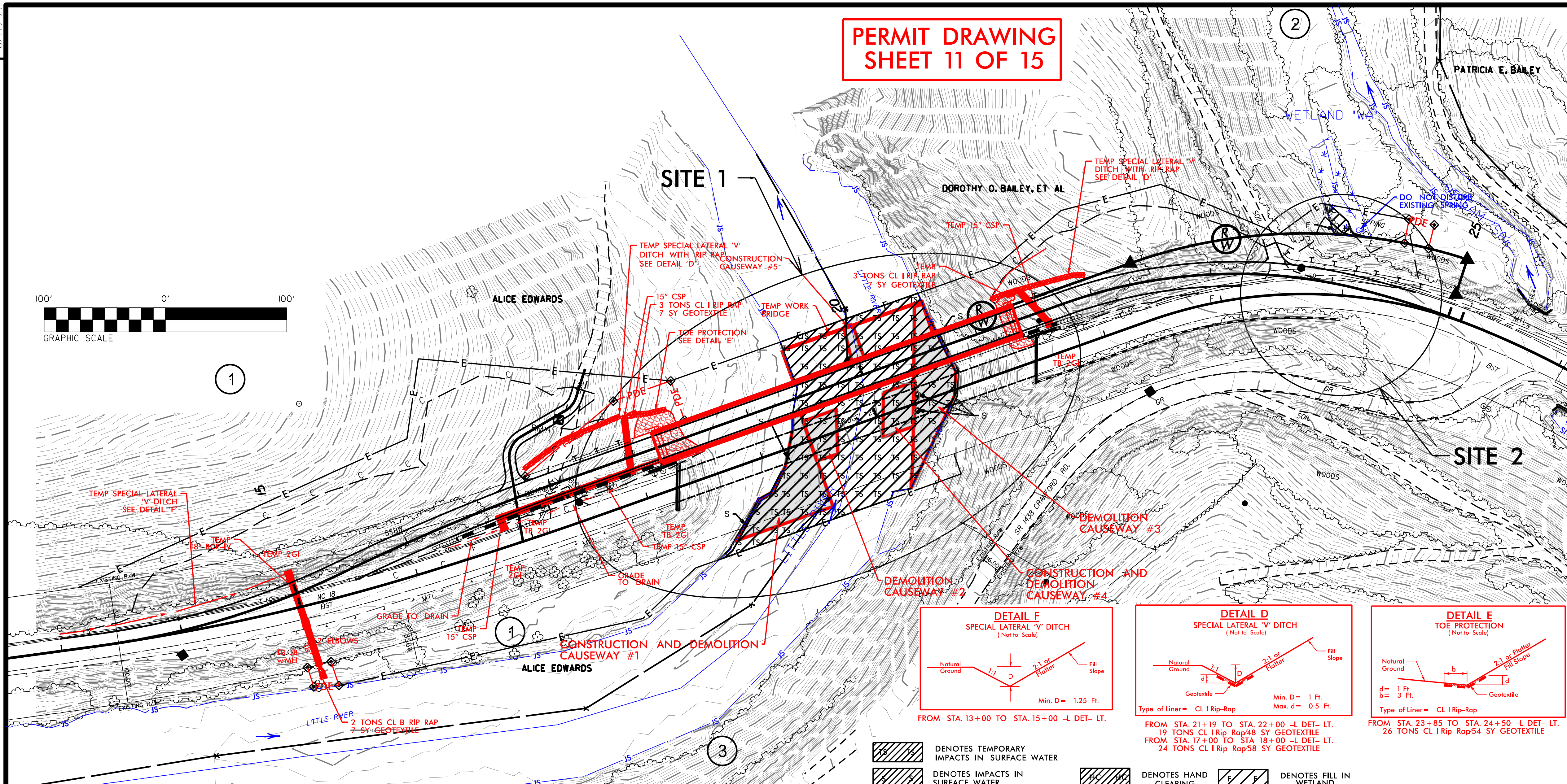
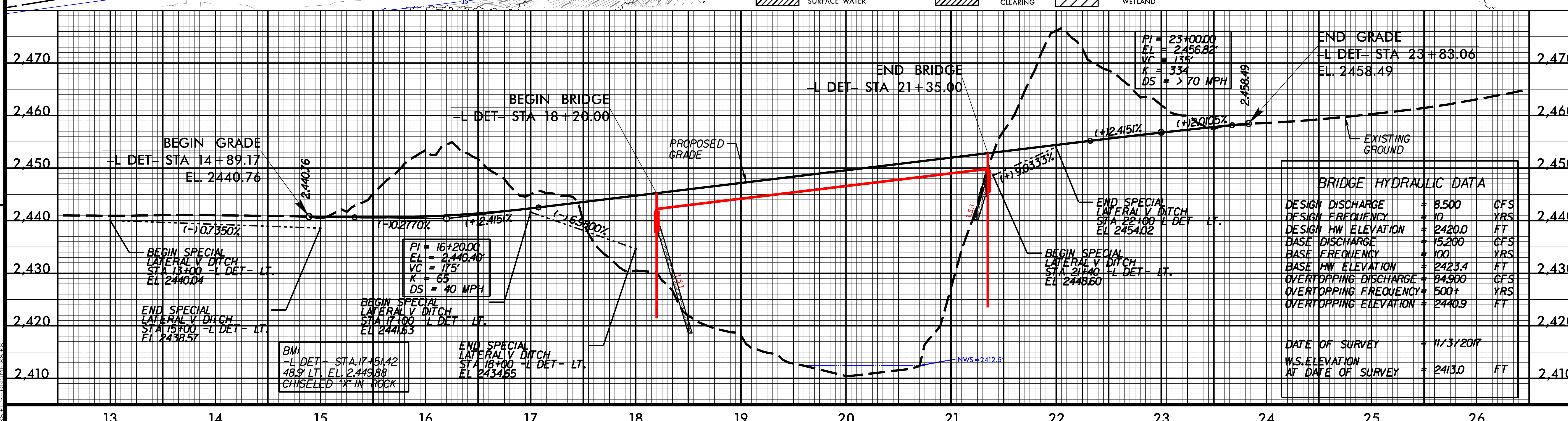
PERMIT DRAWING SHEET 11 OF 15



SITE 1
SITE 2
GRAPHIC SCALE
100' 0' 100'
ALICE EDWARDS
DOROTHY O. BAILEY, ET AL
PATRICIA E. BAILEY
WETLAND "WA"
DO NOT DISTURB EXISTING SPRING
TEMP SPECIAL LATERAL 'V' DITCH WITH RIP RAP SEE DETAIL 'D'
CONSTRUCTION CAUSEWAY #5
TEMP SPECIAL LATERAL 'V' DITCH SEE DETAIL 'F'
TOE PROTECTION SEE DETAIL 'E'
TEMP WORK BRIDGE
3 TONS CL I RIP RAP 3 SY GEOTEXTILE
15" CSP 3 TONS CL I RIP RAP 7 SY GEOTEXTILE
DEMOLITION CAUSEWAY #2
DEMOLITION CAUSEWAY #3
CONSTRUCTION AND DEMOLITION CAUSEWAY #4
CONSTRUCTION AND DEMOLITION CAUSEWAY #1
2 TONS CL B RIP RAP 7 SY GEOTEXTILE
LITTLE RIVER
GRADE TO DRAIN
NC 18
NAD 83/ NA 2011
DETAIL F
SPECIAL LATERAL 'V' DITCH (Not to Scale)
FROM STA. 13+00 TO STA. 15+00 -L DET- LT.
DETAIL D
SPECIAL LATERAL 'V' DITCH (Not to Scale)
FROM STA. 21+19 TO STA. 22+00 -L DET- LT. 19 TONS CL I Rip Rap/48 SY GEOTEXTILE
FROM STA. 17+00 TO STA. 18+00 -L DET- LT. 24 TONS CL I Rip Rap58 SY GEOTEXTILE
DETAIL E
TOE PROTECTION (Not to Scale)
FROM STA. 23+85 TO STA. 24+50 -L DET- LT. 26 TONS CL I Rip Rap54 SY GEOTEXTILE
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES HAND CLEARING
DENOTES FILL IN WETLAND



BEGIN GRADE -L DET- STA 14+89.17 EL. 2440.76
BEGIN BRIDGE -L DET- STA 18+20.00
END BRIDGE -L DET- STA 21+35.00
END GRADE -L DET- STA 23+83.06 EL. 2458.49
PI = 16+20.00 EL = 2,440.40' VC = 175' K = 65 DS = 40 MPH
PI = 23+00.00 EL = 2,456.82' VC = 135' K = 334 DS = > 70 MPH
PROPOSED GRADE
EXISTING GROUND
BM1 -L DET- STA.17+51.42 48.9' LT. EL. 2,449.88 CHISELED "X" IN ROCK
NWS=2412.5

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 8,500	CFS
DESIGN FREQUENCY	= 10	YRS
DESIGN HW ELEVATION	= 2420.0	FT
BASE DISCHARGE	= 15,200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2423.4	FT
OVERTOPPING DISCHARGE	= 84,900	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 2440.9	FT
DATE OF SURVEY	= 11/3/2017	
W.S. ELEVATION AT DATE OF SURVEY	= 2413.0	FT

REVISIONS

8/17/99

REVISIONS

40′ 0′ 40′ 80′ 120′

GRAPHIC SCALE

SITE 2

PROJECT REFERENCE NO.	SHEET NO.
B-5388	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NAD 83 /NA 2011

CDM Smith Inc
5400 Glenwood Avenue
Suite 400
Raleigh, NC 27612-3209
NC CDA No. F-1255

MI Engineering, PLLC
1011 Schaub Drive
Suite 101
Raleigh, NC 27606
NC CDA No. P-4671

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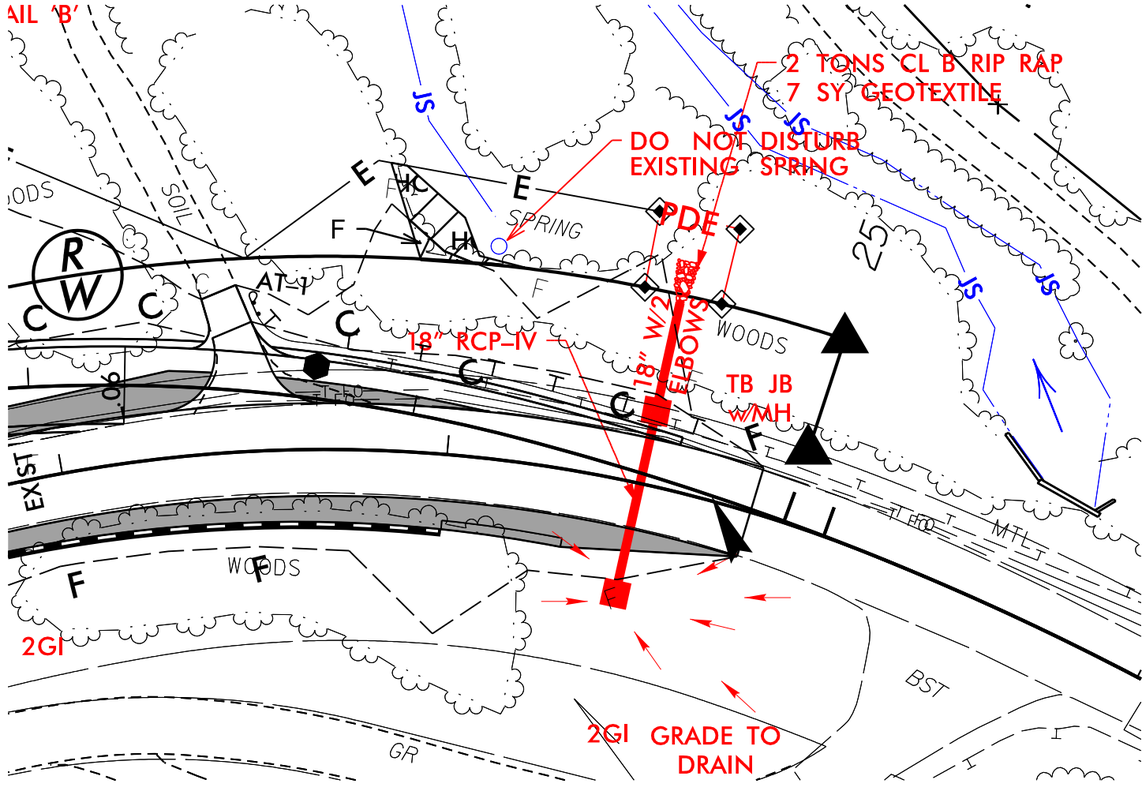
PERMIT DRAWING
SHEET 12 OF 15



HC HC DENOTES HAND CLEARING

F F DENOTES FILL IN WETLAND

PROJECT REFERENCE NO.	SHEET NO.
B-5388	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

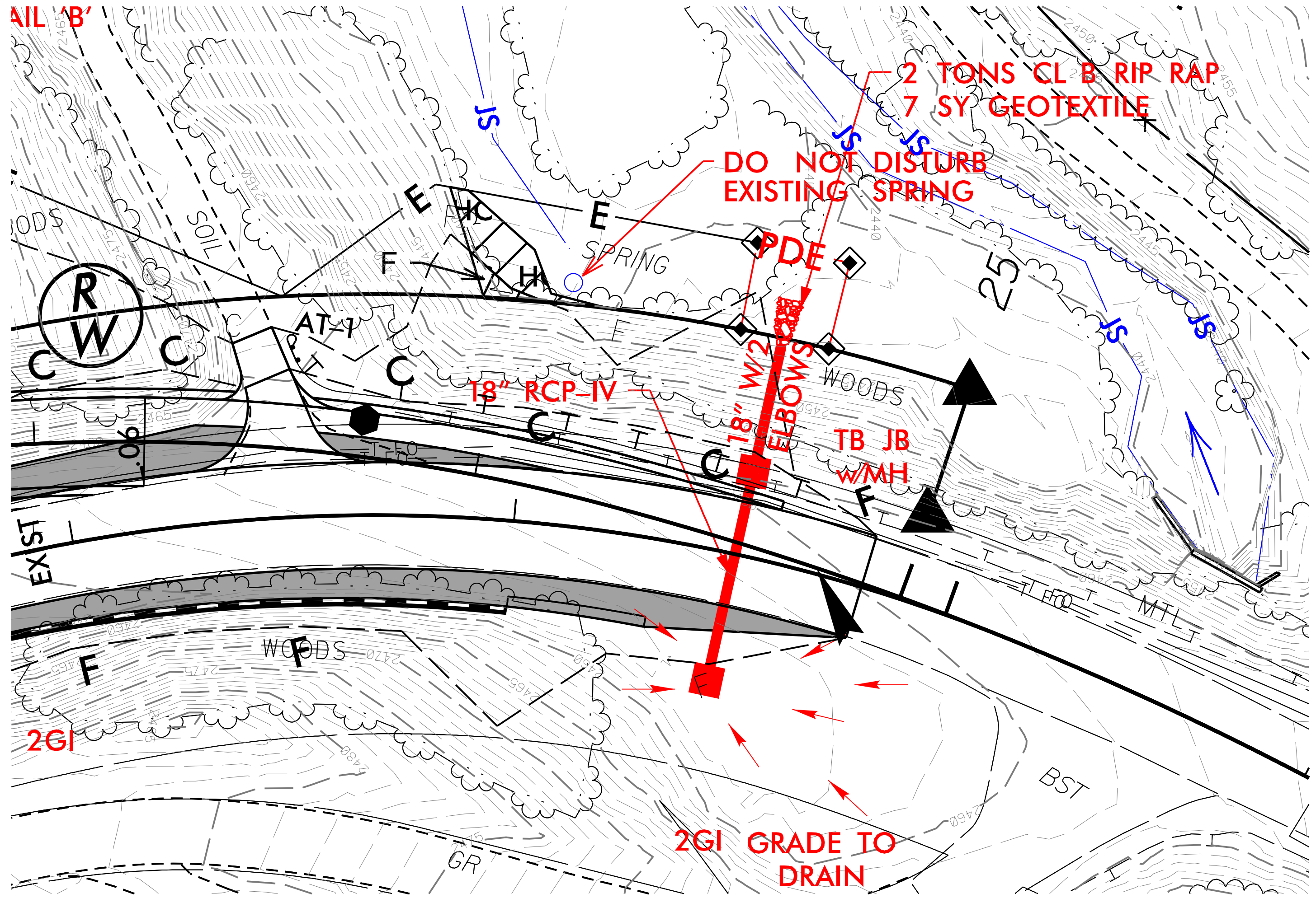
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SITE 2

40' 0' 40' 80' 120'
GRAPHIC SCALE

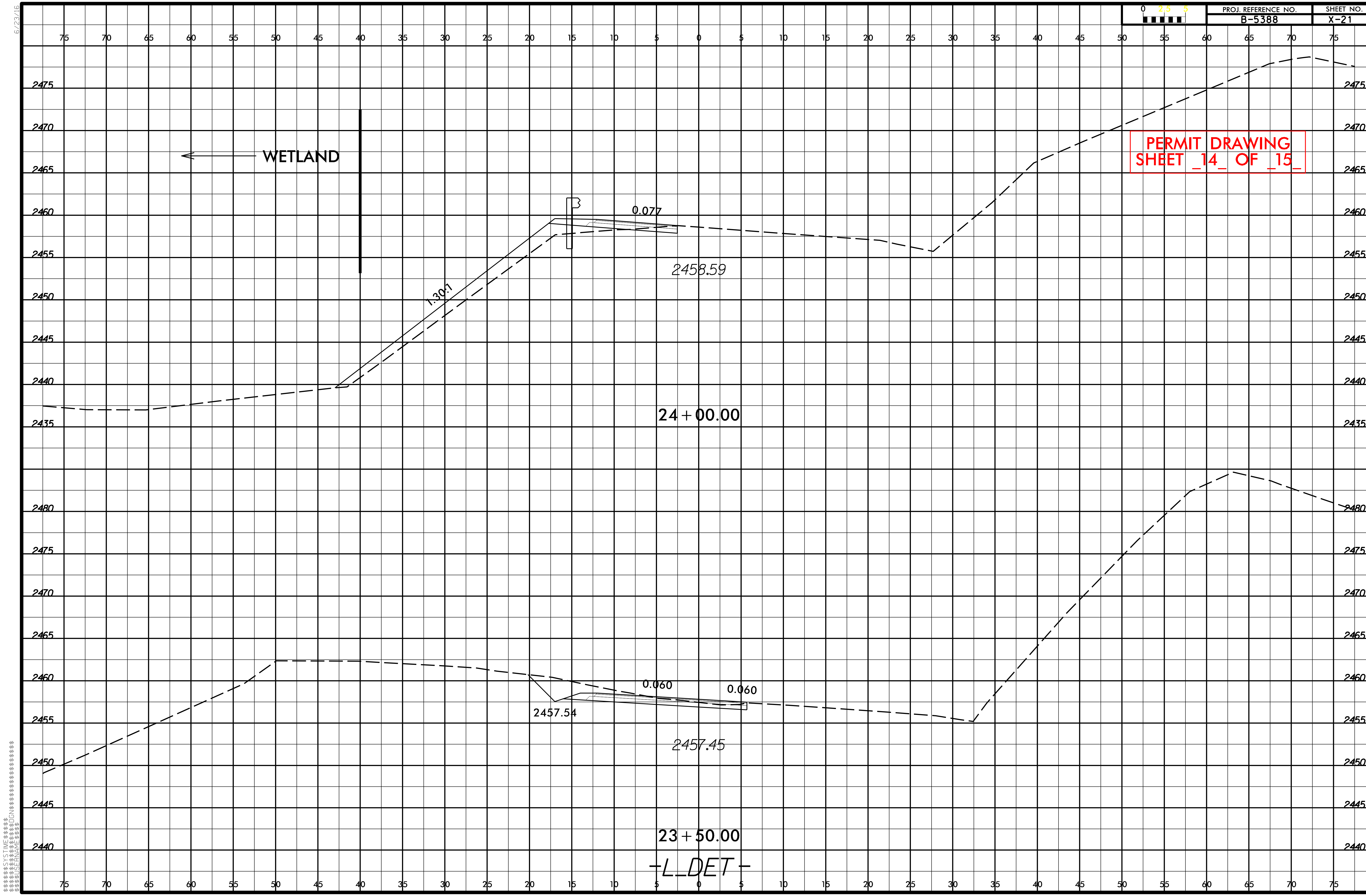
NAD 83 /NA 2011

PERMIT DRAWING
SHEET 13 OF 15



HC HC DENOTES HAND CLEARING

F F DENOTES FILL IN WETLAND


PROJ. REFERENCE NO.
B-5388
SHEET NO.
X-21
0 2.5 5
PERMIT DRAWING
SHEET _14_ OF _15_
WETLAND
1.30:1
0.077
2458.59
24+00.00
0.060
0.060
2457.54
2457.45
23+50.00
-L_DET-
6/23/16
$$$$$$SYSTIME$$$$$
$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

WETLAND AND SURACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	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)
1	18+37/19+13 -L- 20+55/20+77 -L-	Bank Stabilization						< 0.01		159		
1	18+43/20+74 -L-	Bridge Construction and Demolition (1)							0.48		202	
2	23+82/24+21 -L- DET	Roadway Fill	< 0.01	< 0.01			< 0.01					
TOTALS*:			< 0.01	< 0.01			< 0.01	< 0.01	0.48	159	202	0

*Rounded totals are sum of actual impacts

NOTES:

(1) - Proposed pier area = 65 SF, 9LF of channel
(2) - Tree clearing = 0.15ac
(3) - <0.01ac of Temporary Fill in Wetlands in the Hand Clearing areas for erosion control measures.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
6/28/2018
ALLEGHANY COUNTY
B-5388
46103.1.1

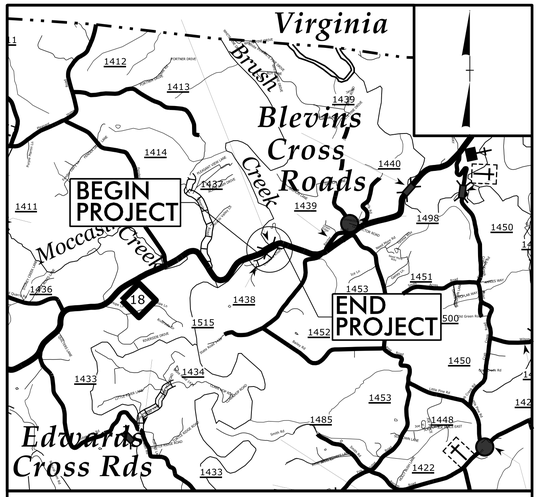
Revised 2016 09 09

09/08/99

TIP PROJECT: B–5388

CONTRACT: C204255

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



VICINITY MAP

N.T.S.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

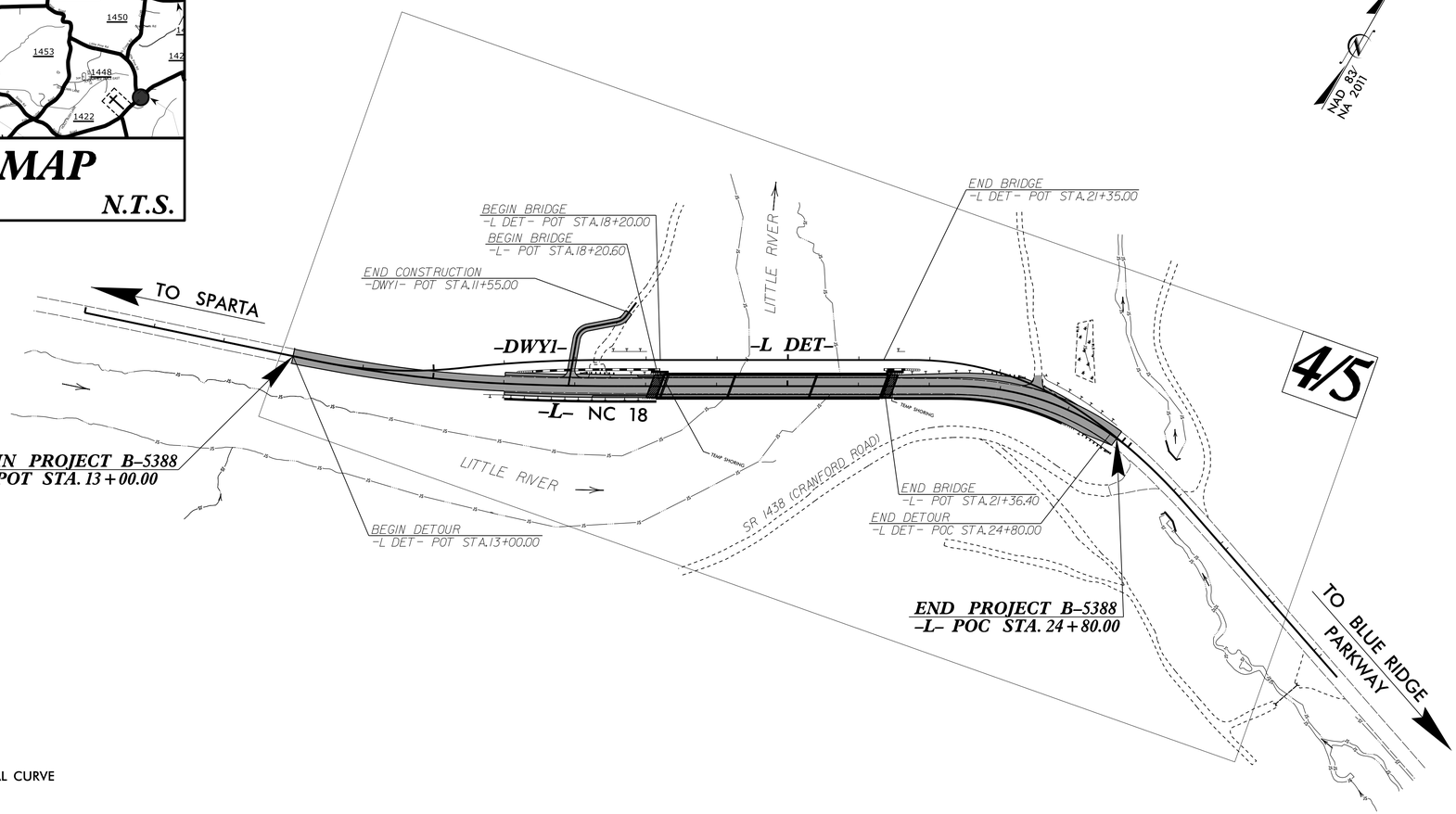
ALLEGHANY COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B–5388	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46103.1.1	N/A	P.E.
46103.2.1	N/A	ROW/UTIL
46103.3.1	N/A	CONST.

LOCATION: REPLACE BRIDGE 21 OVER LITTLE RIVER ON NC 18

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE



DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVE RADIUS AND STOPPING SIGHT DISTANCE.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2020	=	1650 VPD
ADT 2040	=	2000 VPD
K	=	60 %
D	=	10 %
T	=	6 %
V (–L–)	=	50 MPH
V (–L DET–)	=	40 MPH

*TTST = 1% DUALS = 5%
FUNC CLASS =
MAJOR COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B–5388	=	*0.163 MILES*
LENGTH BRIDGE TIP PROJECT B–5388	=	*0.060 MILES*
TOTAL LENGTH TIP PROJECT B–5388	=	*0.223 MILES*

Prepared in the Office of:

CDM Smith

CDM Smith Inc.
5400 Glenwood Avenue
Suite 400
Raleigh, NC 27612-3228
NC COA No. F-1255

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 20, 2018

LETTING DATE:
DECEMBER 18, 2018

DAVID J. CLODGO, PE
PROJECT ENGINEER

KIT A. PERSIANI, PE
PROJECT DESIGN ENGINEER

DAVID STUTTS, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18533 ENGINEER A. T. NOTTINGHAM P.E.

SIGNATURE:

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 035683 ENGINEER DAVID J. CLODGO P.E.

SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

-SYSTIME-
-:\Roadway\Proj\B5388_Rdy_tsh.dgn
USER: PERSIANIK

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 035683 ENGINEER DAVID J. CLODGO

CDM Smith — CDM Smith Inc. 5400 Glenwood Avenue Suite 400 Raleigh, NC 27612-3228 NC COA No. F-1255

INDEX OF SHEETS

EFF. 01-16-2018
REV.

2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
	DIVISION 2 - EARTHWORK
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
	DIVISION 3 - PIPE CULVERTS
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
	DIVISION 4 - MAJOR STRUCTURES
422.01	Bridge Approach Fills - Type I Standard Approach Fill
	DIVISION 5 - SUBGRADE, BASES AND SHOULDERS
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
	DIVISION 6 - ASPHALT BASES AND PAVEMENTS
654.01	Pavement Repairs
	DIVISION 8 - INCIDENTALS
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.22	Frames and Wide Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
850.01	Concrete Paved Ditches
857.01	Precast Reinforced Concrete Barrier - 41" Single Faced
862.01	Guardrail Placement
862.02	Guardrail Installation (Special Detail for Sheet 6 of 8)
862.03	Structure Anchor Units (Special Detail for Type III Anchor Units Sheets 1 of 7 and 2 of 7)
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
866.04	Barbed Wire Fence with Wood Posts (2 - 7 Strands)
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets

GENERAL NOTES

EFF. 01-16-2018
REV.

2018 ROADWAY ENGLISH STANDARD DRAWINGS

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. N. 560.01.

SIDE ROADS:

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

SUBSURFACE DRAINS:

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

GUARDRAIL:

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

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE SKY LINE/SKY BEST COMMUNICATIONS.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS (NCDOT).

ROCK:

ROCK IS ANTICIPATED BETWEEN -L- 13+00 TO 24+80, -LDET- 13+00 TO 24+80 AND -DWY1- 10+00 TO 11+55. BLASTING MAY BE REQUIRED FOR EXCAVATION ON THE PROJECT. SEE SECTION 220 OF THE STANDARD SPECIFICATIONS AND IF APPLICABLE, ROCK BLASTING PROVISION.

8/17/99
$$SYSTIME$$
...\B5388_Rdy_psh_1A.dgn
$$USER$$

12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
B-5388	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

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

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
B-5388	2A-1

ROADWAY DESIGN ENGINEER — SEAL 035683 — DAVID J. CLODGO

PAVEMENT DESIGN ENGINEER — SEAL 022896 — CLARK S. MORRISON

CDM Smith — CDM Smith Inc., 5400 Glenwood Avenue, Suite 400, Raleigh, NC 27612-3228, NC COA No. F-1255

NC DEPARTMENT OF TRANSPORTATION, PAVEMENT MANAGEMENT UNIT, 1593 MAIL SERVICE CENTER, RALEIGH, NC 27699-1593

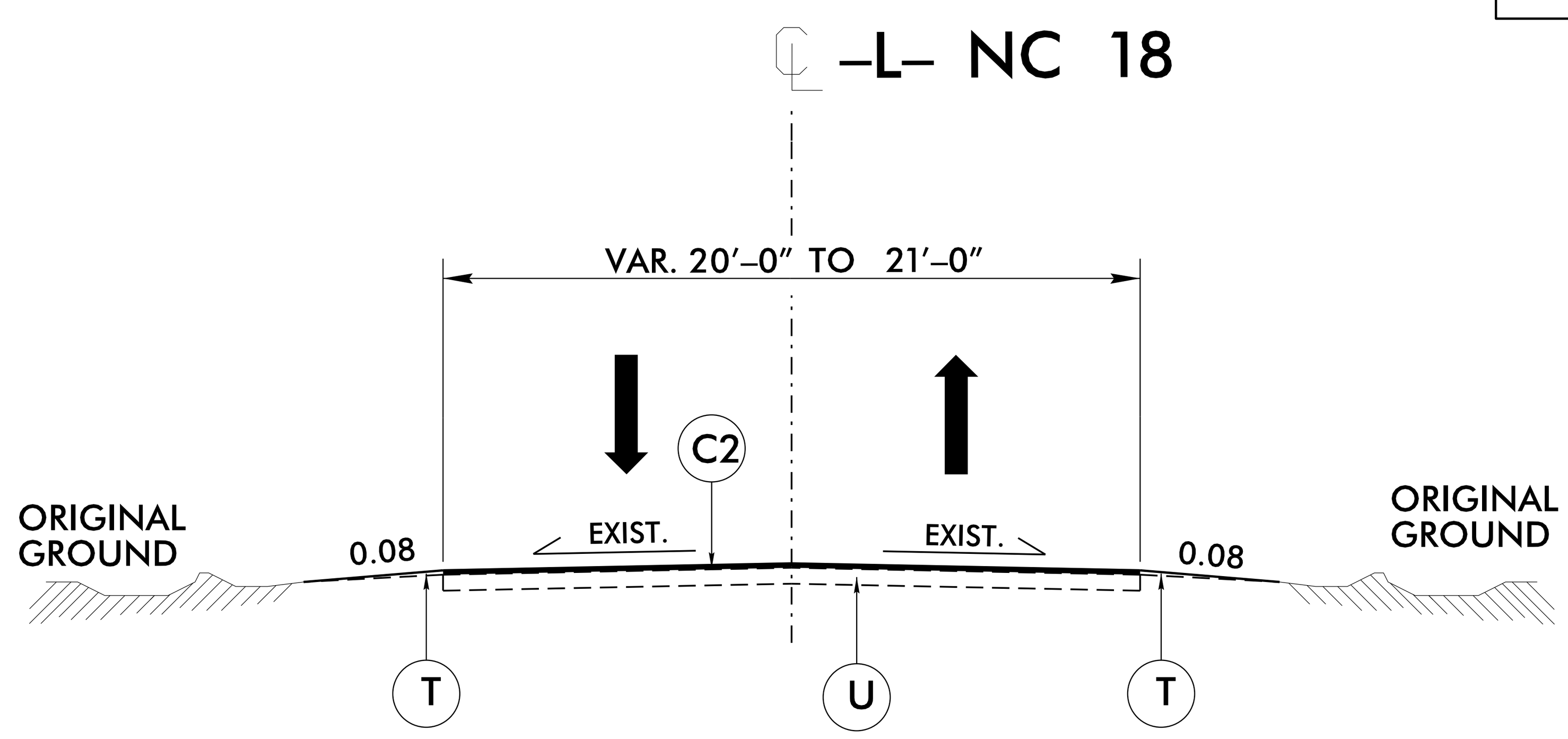
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	J1	6" AGGREGATE BASE COURSE
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.	P1	PRIME COAT AT A RATE OF 0.35 GAL./ SQ. YD.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R1	SHOULDER BERM GUTTER
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.	T	EARTH MATERIAL
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	U	EXISTING PAVEMENT
		W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE -L- WEDGING DETAIL)

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

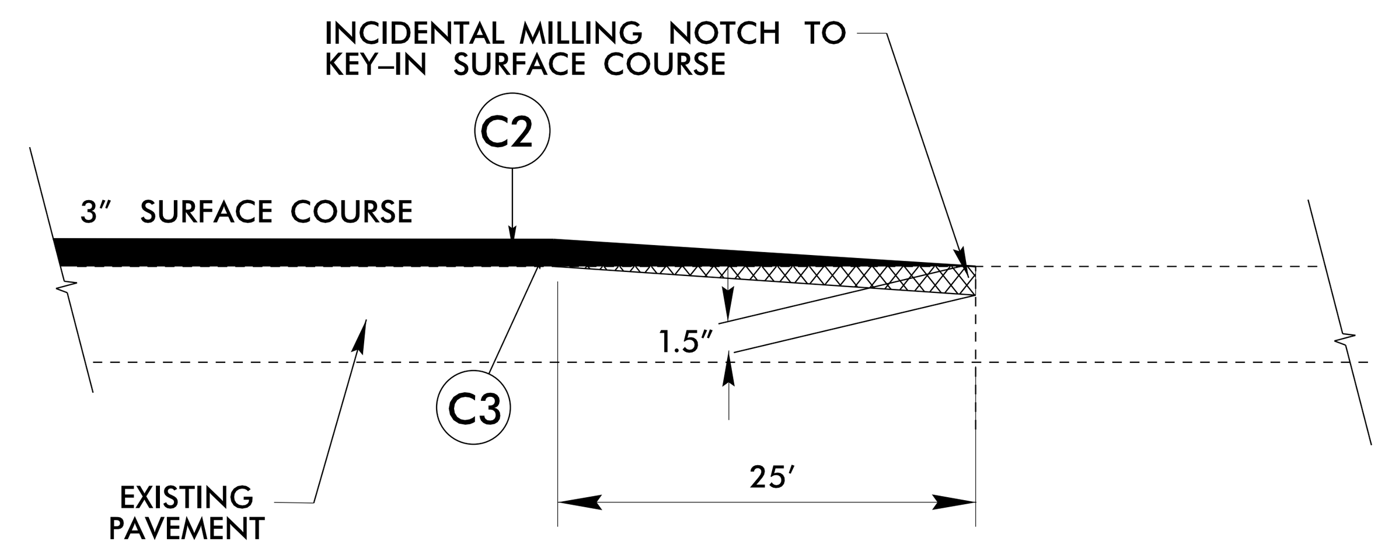


TYPICAL SECTION NO. 1

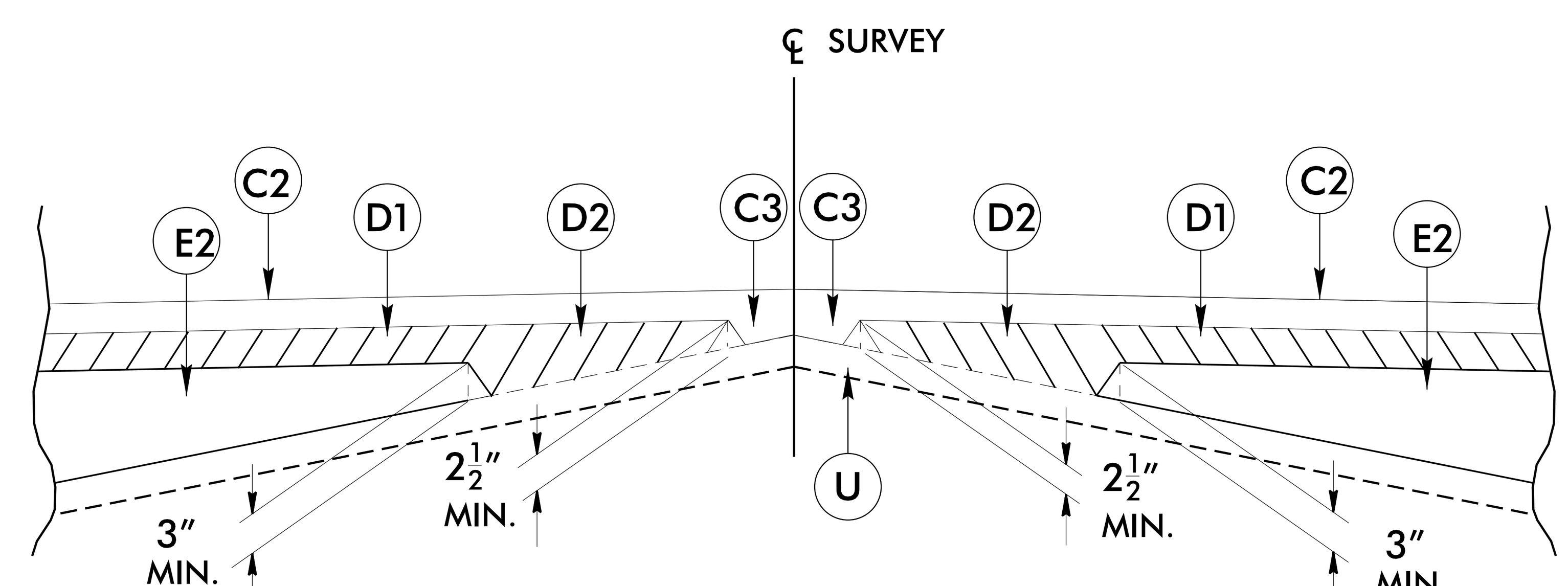
USE TYPICAL SECTION NO. 1

-L- STA. 13+00.00 TO 16+01.36
-L- STA. 24+10.00 TO 24+80.00

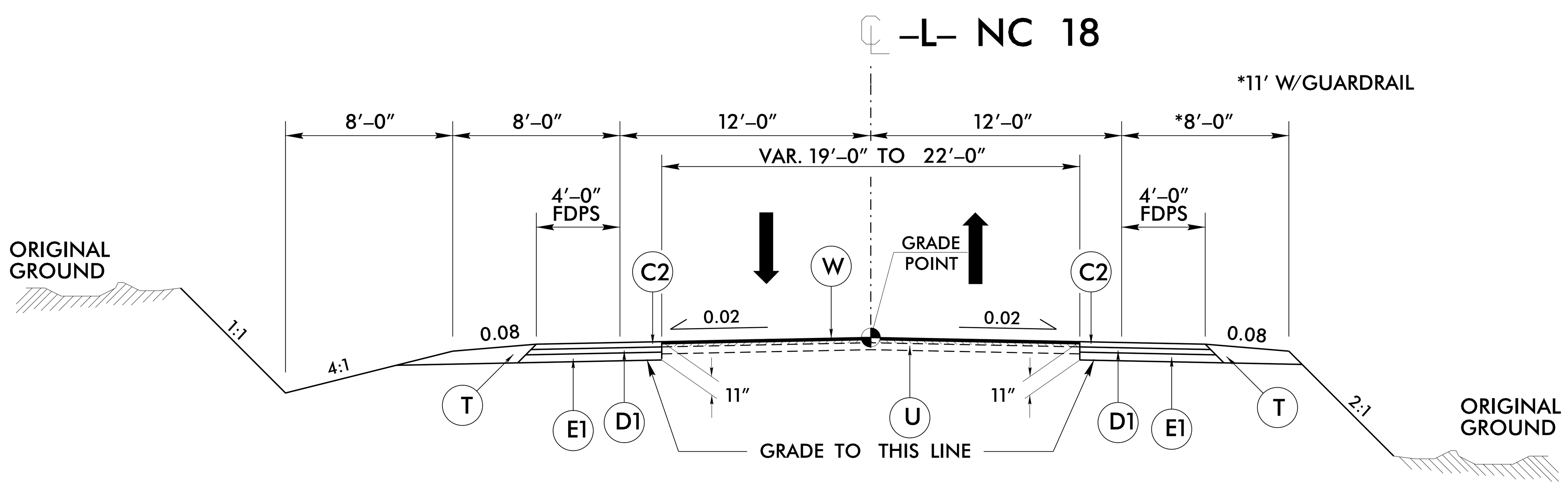
MILLING DETAIL
INCIDENTAL MILLING AT BEGIN/END FOR TIE-INS



-L- STA. 13+00.00 AND STA. 13+25.00
-L- STA. 24+55.00 AND STA. 24+80.00



Detail Showing Method of Wedging – W
-L-



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

-L- STA. 16+01.36 TO 17+20.60
-L- STA. 22+36.40 TO 24+10.00

NOTE: PAVE TO FACE OF GUARDRAIL.
USE L PAVEMENT DESIGN FOR ALL WIDENING

PROJECT REFERENCE NO.	SHEET NO.
B-5388	2A-2

ROADWAY DESIGN ENGINEER — SEAL 035683, DAVID J. CLODGO

PAVEMENT DESIGN ENGINEER — SEAL 022896, CLARK S. MORRISON

CDM Smith — CDM Smith Inc. 5400 Glenwood Avenue Suite 400 Raleigh, NC 27612-3226 NC COA No. F-1255

NC DEPARTMENT OF TRANSPORTATION PAVEMENT MANAGEMENT UNIT 1593 MAIL SERVICE CENTER RALEIGH, NC 27699-1593

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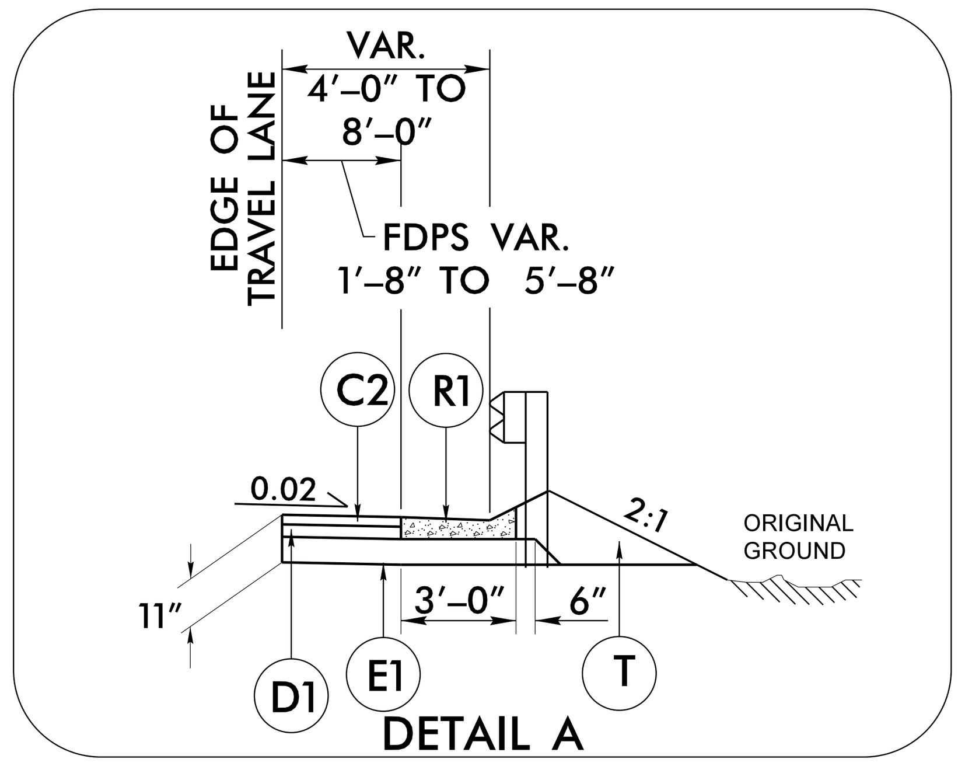
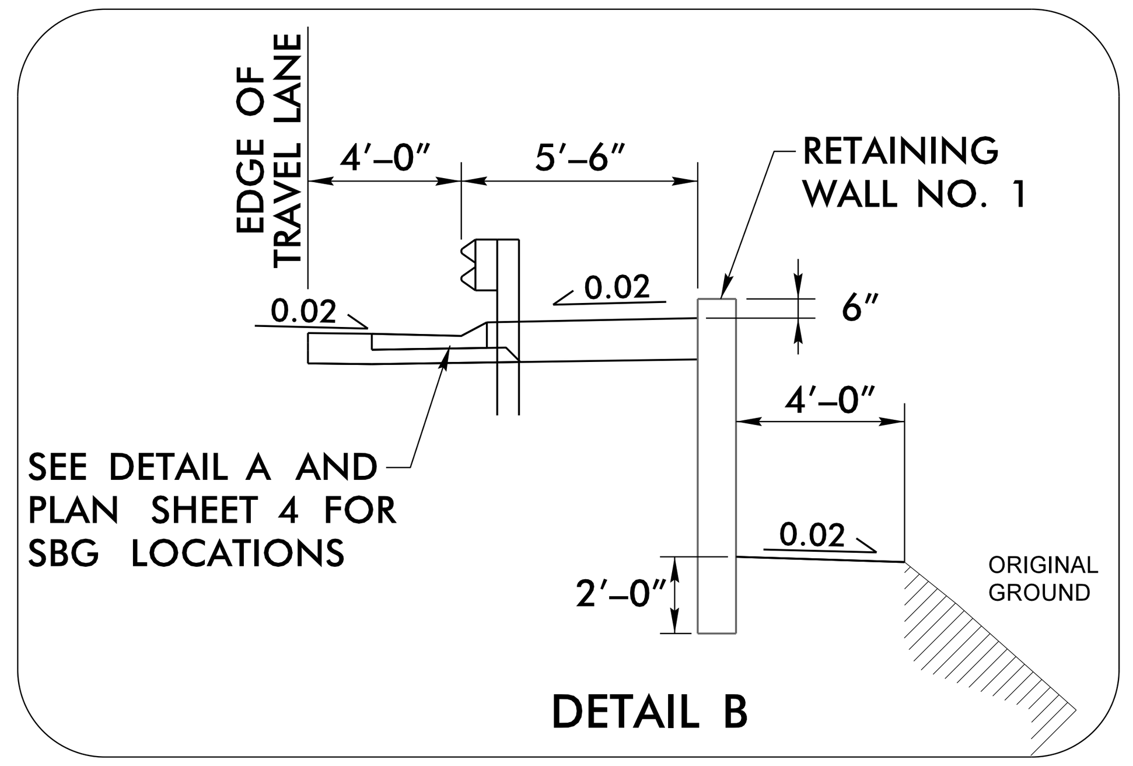


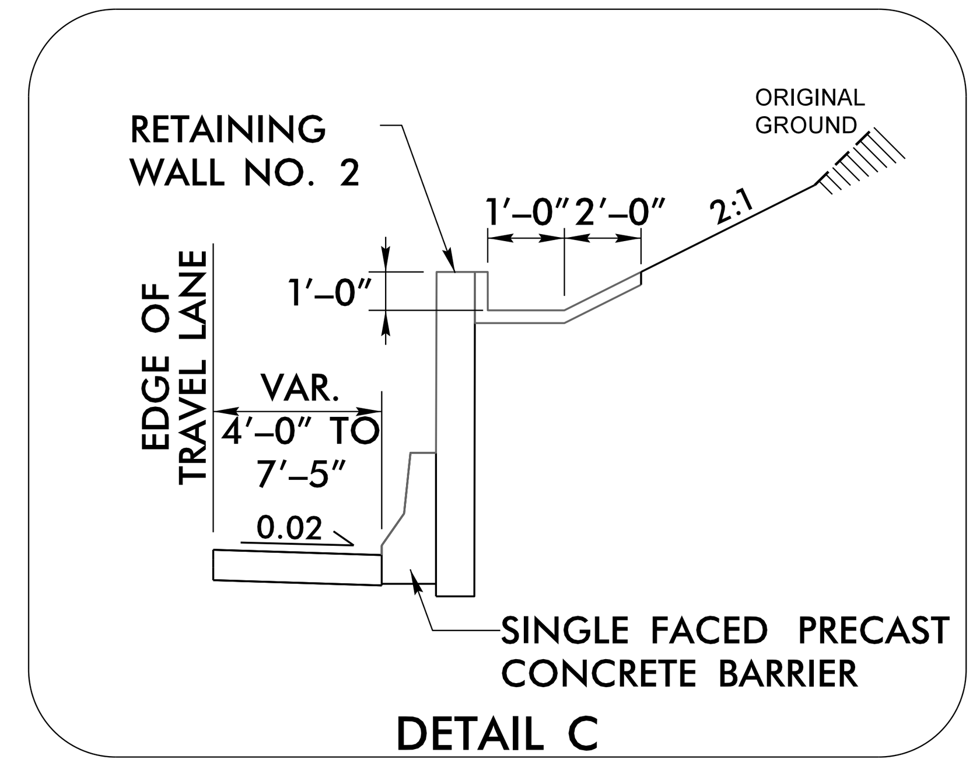
USE DETAIL A IN CONJUNCTION WITH TYPICAL SECTION NO. 3

-L- STA. 17+25.00 TO 18+00.98 (RT)
-L- STA. 17+89.00 TO 18+12.62 (LT)



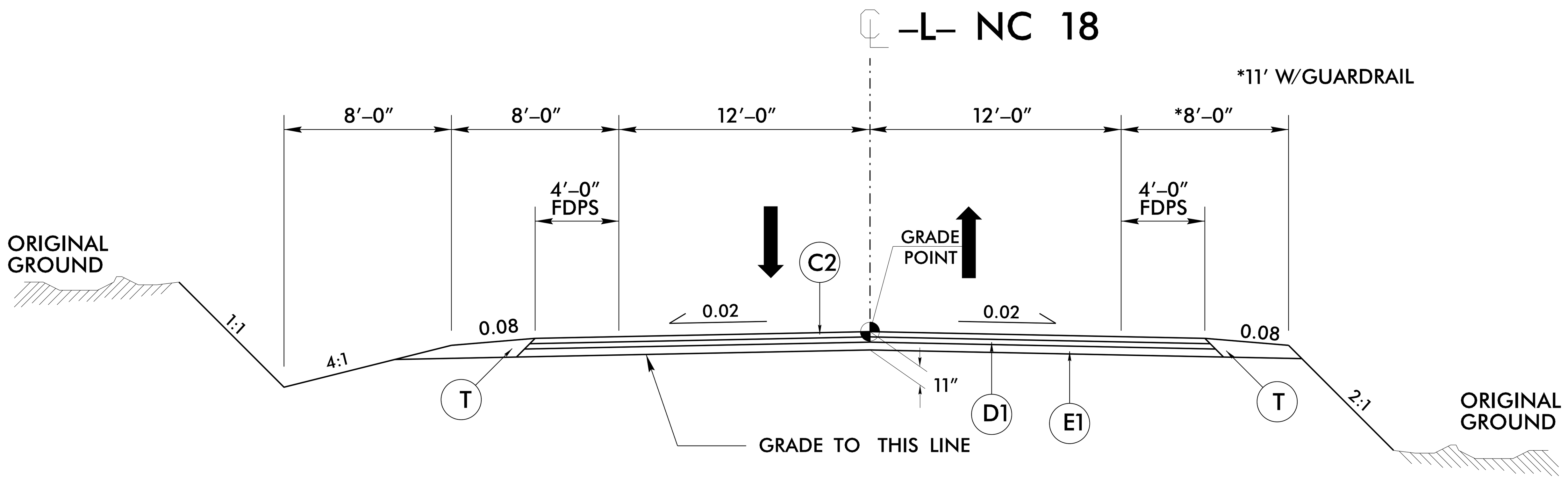
USE DETAIL B IN CONJUNCTION WITH TYPICAL SECTION NO. 2 & 3

-L- STA. 16+01.36 TO 18+15.18 (RT)



USE DETAIL C IN CONJUNCTION WITH TYPICAL SECTION NO. 2 & 3

-L- STA. 21+50.00 TO 24+00.00 (RT)



TYPICAL SECTION NO. 3

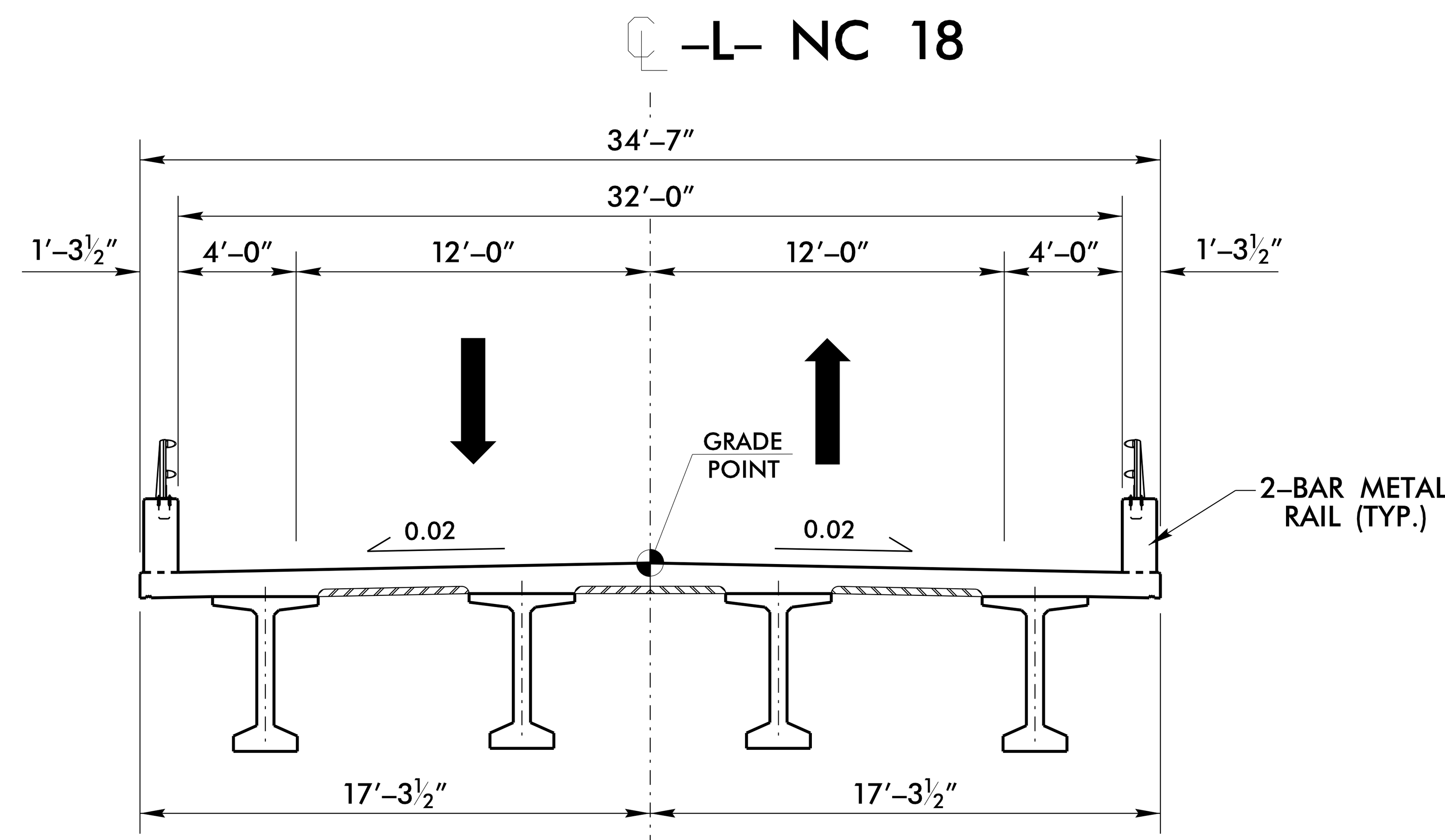
USE TYPICAL SECTION NO. 3

-L- STA. 17+20.60 TO 18+20.60 (BEGIN BRIDGE)
-L- STA. 21+36.40 (END BRIDGE) TO 22+36.40

NOTE: PAVE TO FACE OF GUARDRAIL.

PAVEMENT SCHEDULE	
C1	$2\frac{1}{2}$" S9.5B
C2	3" S9.5B
C3	VAR. S9.5B
D1	4" I19.0C
D2	VAR. I19.0C
E1	4" B25.0C
E2	VAR. B25.0C
J1	6" ABC
P1	PRIME COAT
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

PAVEMENT EDGESLOPES 1:1 UNLESS NOTED OTHERWISE



TYPICAL BRIDGE SECTION

USE TYPICAL BRIDGE SECTION

-L- STA. 18+20.60 TO 21+36.40

NOTE: NC 18 AND BRIDGE NO. 21 IS INCLUDED ON A PROPOSED RE-ROUTE OF STATE BICYCLE ROUTE NC-4 (NORTH LINE TRACE).

PROJECT REFERENCE NO.	SHEET NO.
B-5388	2A-3

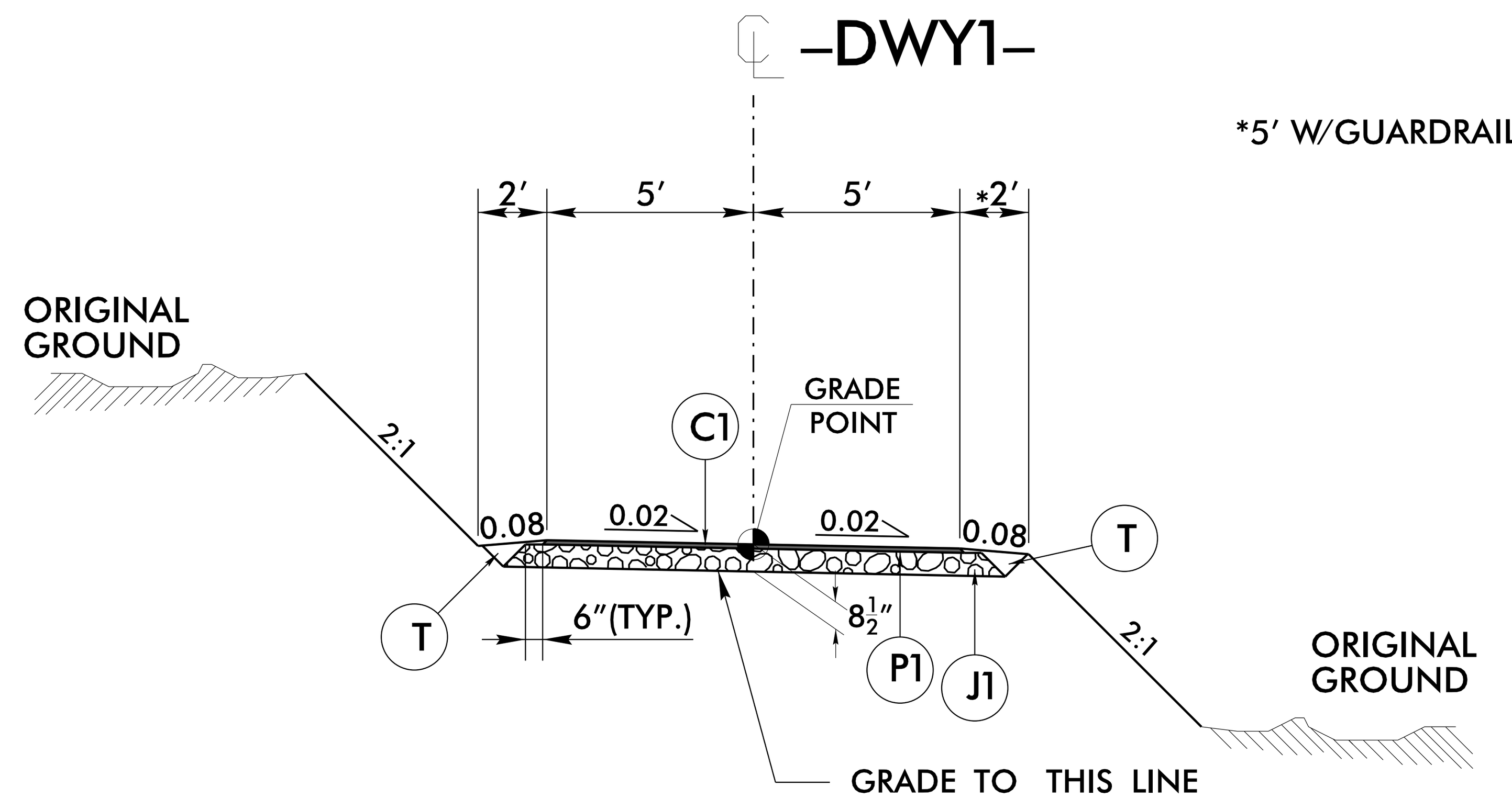
ROADWAY DESIGN ENGINEER — SEAL 035683 — DAVID J. CLODGO

PAVEMENT DESIGN ENGINEER — SEAL 022896 — CLARK S. MORRISON

CDM Smith

NC DEPARTMENT OF TRANSPORTATION PAVEMENT MANAGEMENT UNIT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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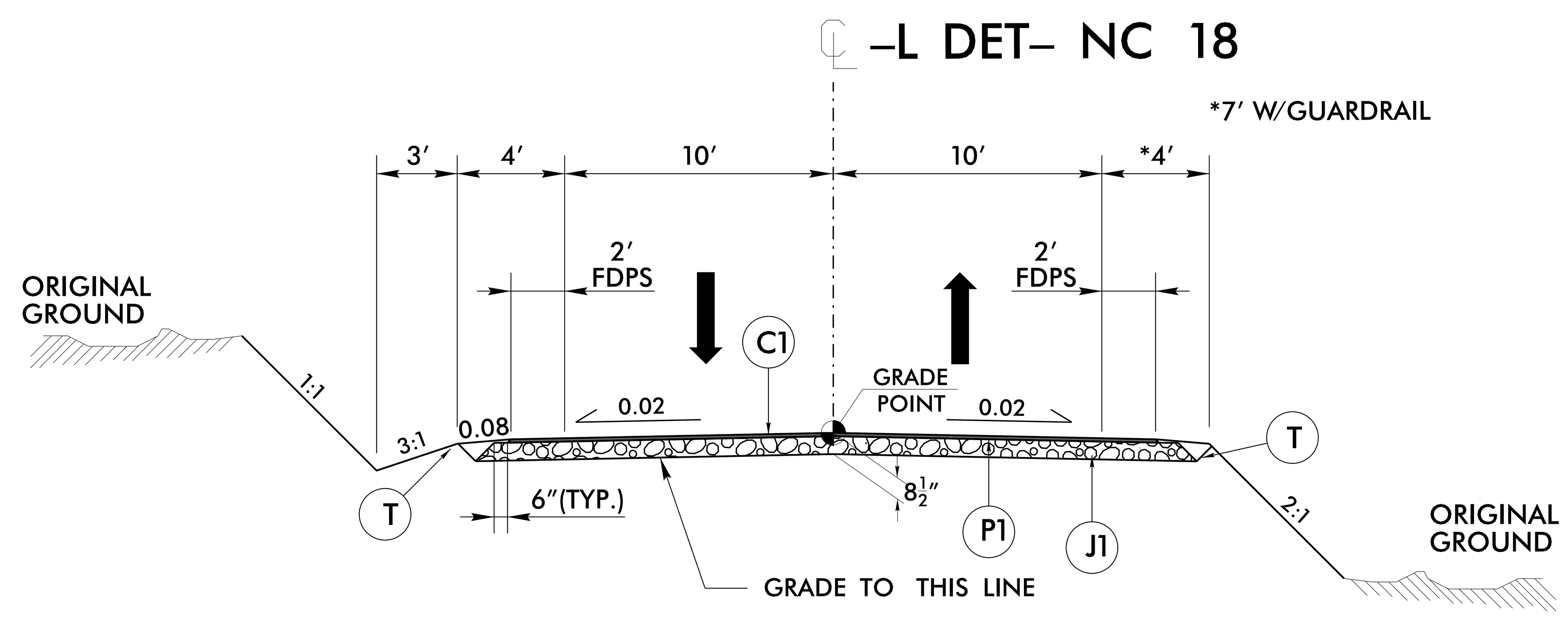
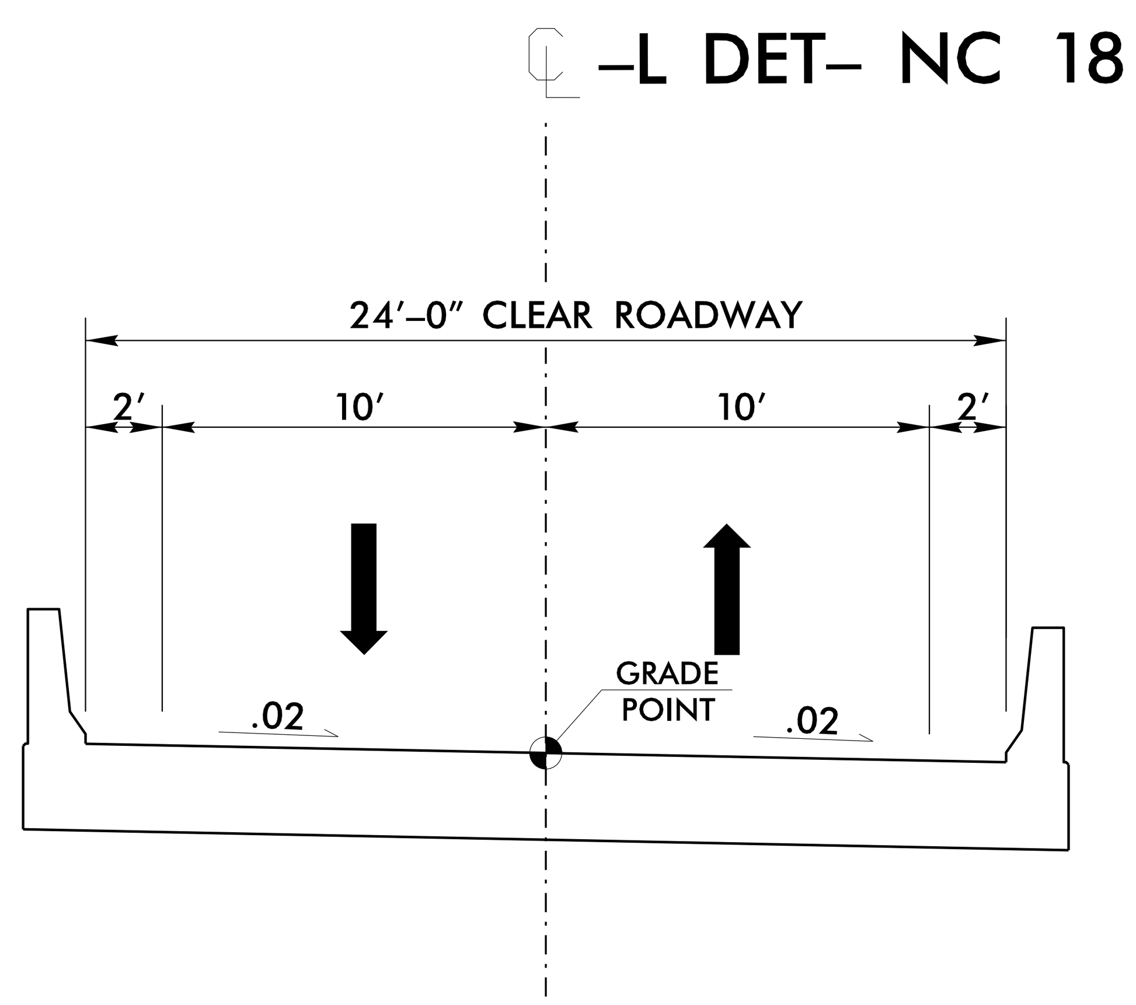


TYPICAL SECTION NO. 5



TYPICAL DETOUR BRIDGE SECTION

USE TYPICAL SECTION NO. 4

-DWY1- STA. 10+12.15 TO 11+55.00

USE TYPICAL SECTION NO. 5

-L DET- STA. 13+00.00 TO 18+20.00 (BEGIN BRIDGE)
-L DET- STA. 21+35.00 (END BRIDGE) TO 24+80.00

USE TYPICAL DETOUR BRIDGE SECTION

-L DET- STA. 18+20.00 TO 21+35.00

NOTE: DETOUR BRIDGE SHALL BE DESIGNED BY THE CONTRACTOR (SEE SPECIAL PROVISIONS) AND SHALL PROVIDE THE CLEAR ROADWAY WIDTH SHOWN IN THE TYPICAL SECTION.

PAVEMENT SCHEDULE	
C1	2½" S9.5B
C2	3" S9.5B
C3	VAR. S9.5B
D1	4" I19.0C
D2	VAR. I19.0C
E1	4" B25.0C
E2	VAR. B25.0C
J1	6" ABC
P1	PRIME COAT
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

PAVEMENT EDGESLOPES 1:1 UNLESS NOTED OTHERWISE

PROJECT REFERENCE NO.	SHEET NO.
B-5388	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

DocuSigned by: Scott A. Hidden 9/21/2018
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ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

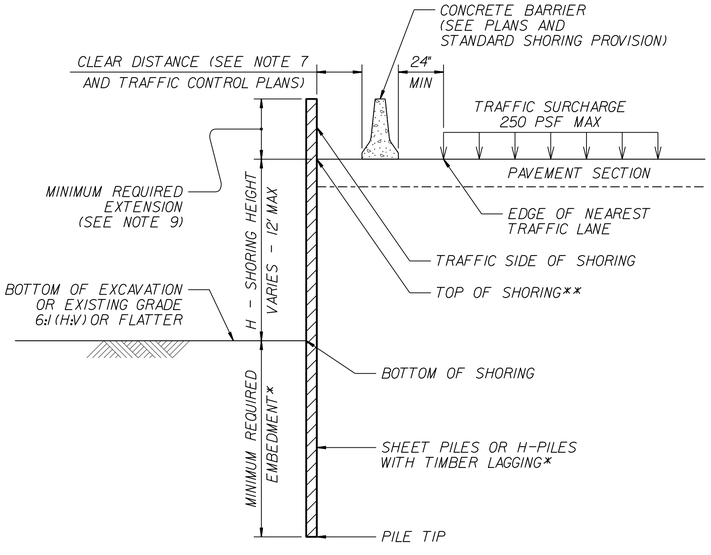
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

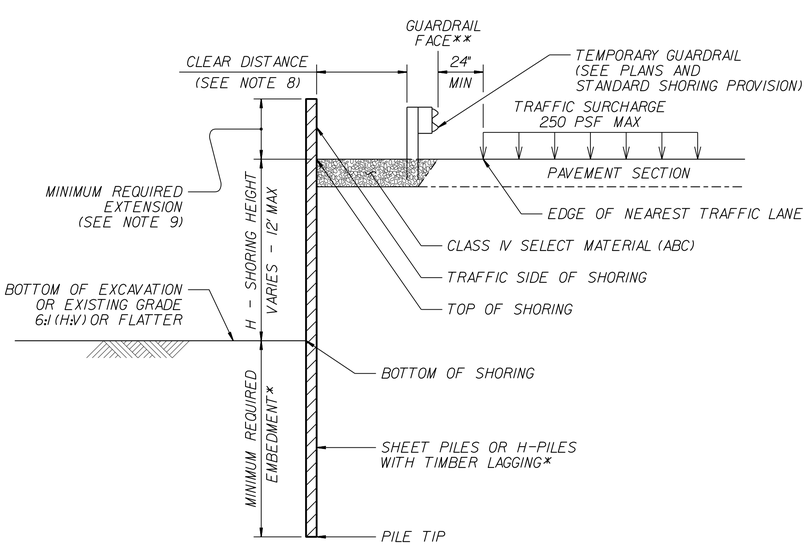
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



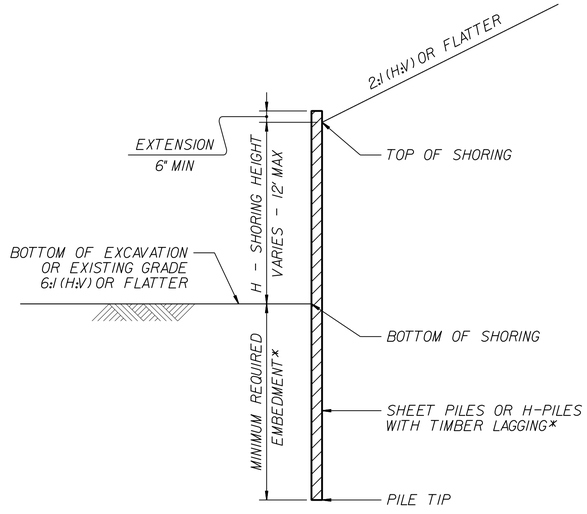
CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING

(SLOPE CASE)
*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
B-5388	4
RW SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 035683 DAVID J. CLODGO	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18533 A.T. NOTTINGHAM

CDM Smith — CDM Smith Inc. 5400 Glenwood Avenue Suite 400 Raleigh, NC 27612-3228 NC COA No. F-1255

MI Engineering, PLLC 1011 Schaub Drive Suite 100 Raleigh, NC 27606 NC COA No.

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NAD 83 /NA 2011

REVISIONS

-L-

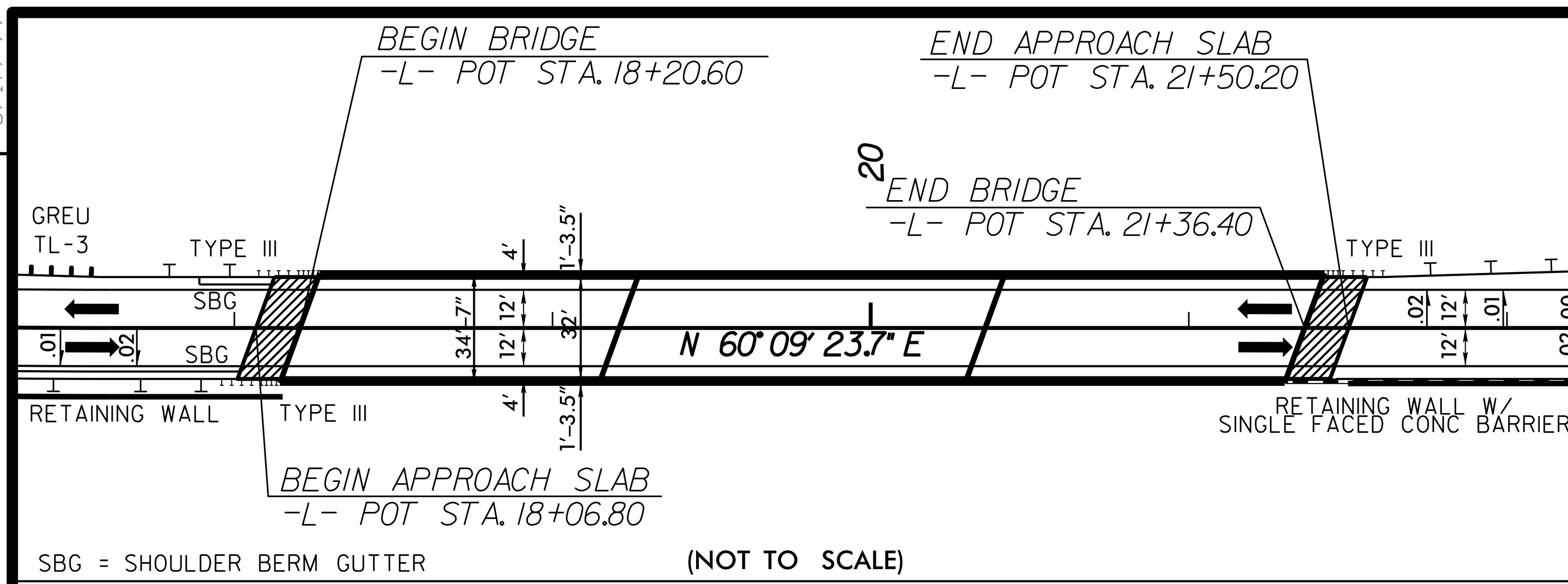
PI Sta 14+57.50	PI Sta 16+79.73	PI Sta 23+83.06	PI Sta 25+63.16
△ = 9° 08' 26.8" (LT)	△ = 2° 37' 56.8" (LT)	△ = 41° 26' 12.8" (RT)	△ = 7° 22' 47.8" (RT)
D = 3° 14' 13.4"	D = 1° 37' 06.7"	D = 15° 04' 40.2"	D = 7° 32' 20.1"
L = 282.38'	L = 162.65'	L = 274.82'	L = 97.89'
T = 141.49'	T = 81.34'	T = 143.73'	T = 49.01'
R = 1,770.00'	R = 3,540.00'	*R = 380.00'	R = 760.00'
e = Exist.	e = 0.04	e = Exist.	e = Exist.
RO = N/A	RO = 96'	RO = N/A	RO = N/A
DS = 50mph	DS = 50mph	*DS = 35mph	DS = 50mph

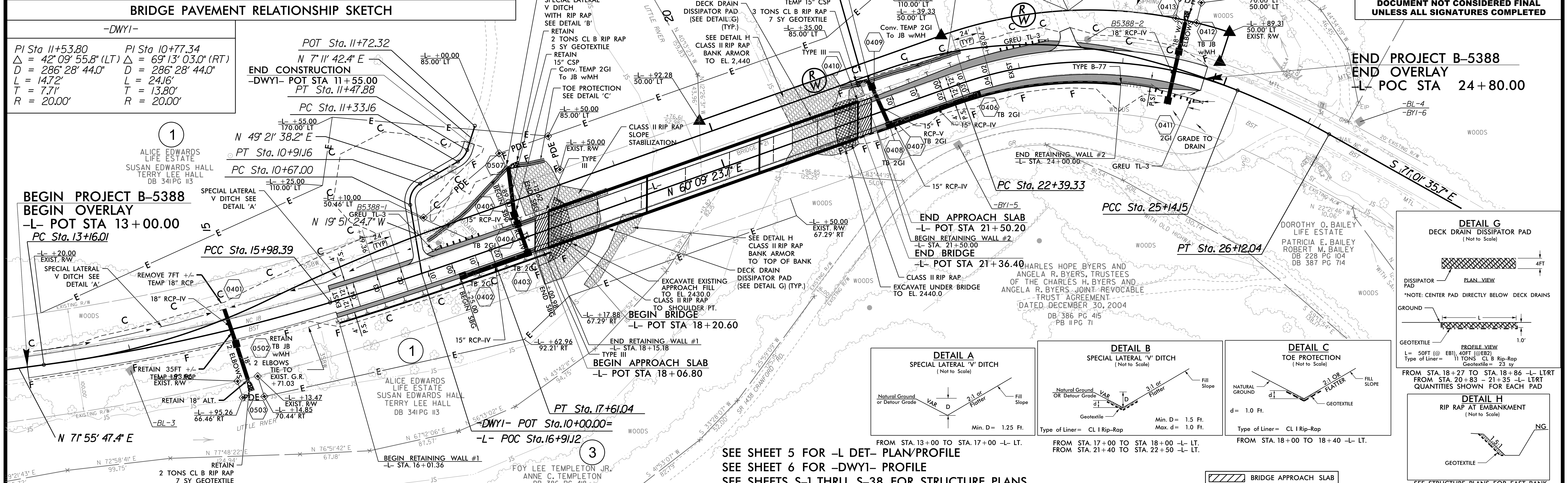
*DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVE RADIUS AND STOPPING SIGHT DISTANCE

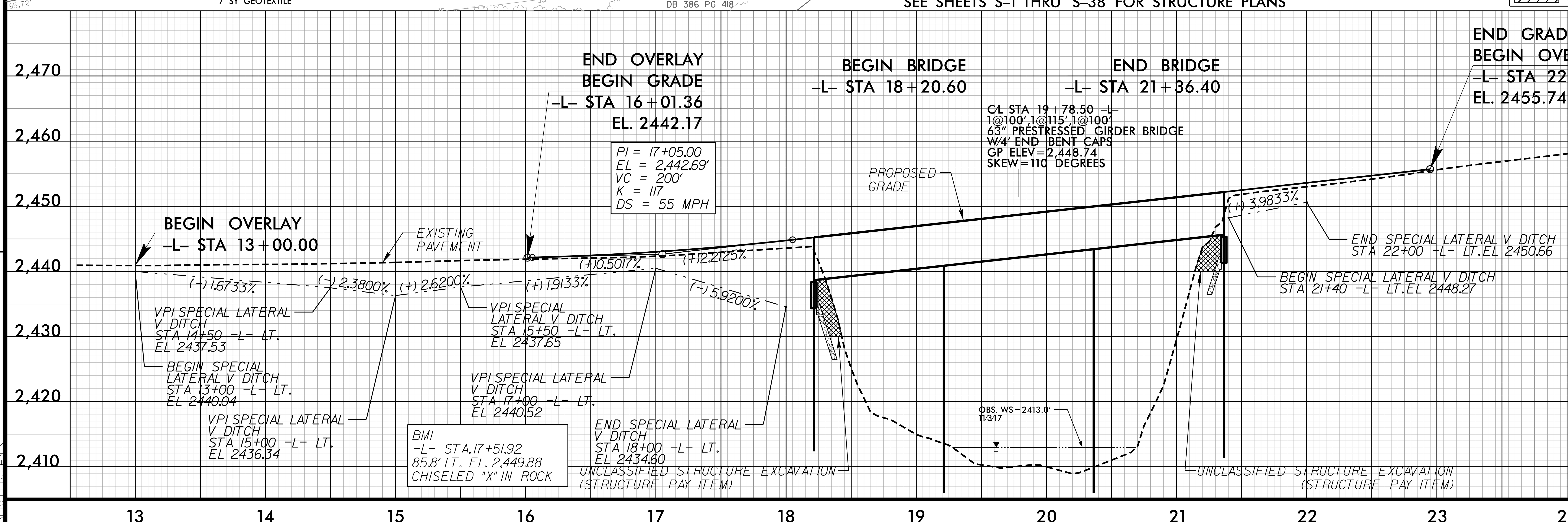
-DWY1-

PI Sta 11+53.80	PI Sta 10+77.34
△ = 42° 09' 55.8" (LT)	△ = 69° 13' 03.0" (RT)
D = 286° 28' 44.0"	D = 286° 28' 44.0"
L = 14.72'	L = 24.16'
T = 7.71'	T = 13.80'
R = 20.00'	R = 20.00'

BRIDGE PAVEMENT RELATIONSHIP SKETCH







BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 12,900	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 2422.4	FT
BASE DISCHARGE	= 15,200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2423.5	FT
OVERTOPPING DISCHARGE	= 84,900	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 2440.9	FT
DATE OF SURVEY	= 11/3/2017	
W.S. ELEVATION AT DATE OF SURVEY	= 2413.0	FT

8/17/99
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PROJECT REFERENCE NO.	SHEET NO.
B-5388	5

RW SHEET NO.

ROADWAY DESIGN ENGINEER — SEAL 035683, NORTH CAROLINA PROFESSIONAL ENGINEER, DAVID J. CLODGO

HYDRAULICS ENGINEER — SEAL 18533, NORTH CAROLINA PROFESSIONAL ENGINEER, A.T. NOTTINGHAM

CDM Smith — CDM Smith Inc., 5400 Glenwood Avenue, Suite 400, Raleigh, NC 27612-3228, NC COA No. F-1255

MI Engineering, PLLC, 1011 Schaub Drive, Suite 100, Raleigh, NC 27606, NC COA No.

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BRIDGE PAVEMENT RELATIONSHIP SKETCH

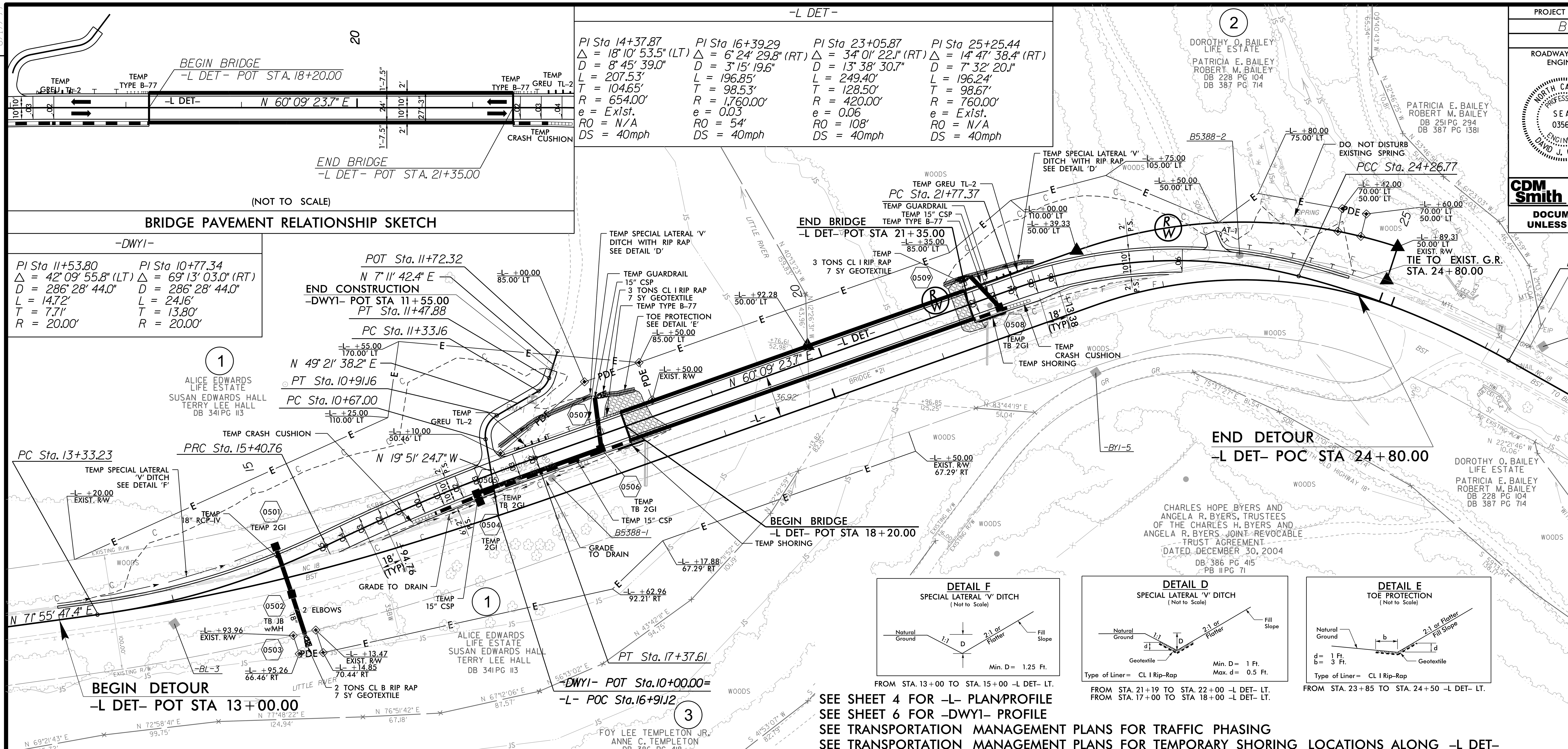
(NOT TO SCALE)

-L DET-

PI Sta 14+37.87	PI Sta 16+39.29	PI Sta 23+05.87	PI Sta 25+25.44
Δ = 18° 10' 53.5" (LT)	Δ = 6° 24' 29.8" (RT)	Δ = 34° 01' 22.1" (RT)	Δ = 14° 47' 38.4" (RT)
D = 8° 45' 39.0"	D = 3° 15' 19.6"	D = 13° 38' 30.7"	D = 7° 32' 20.1"
L = 207.53'	L = 196.85'	L = 249.40'	L = 196.24'
T = 104.65'	T = 98.53'	T = 128.50'	T = 98.67'
R = 654.00'	R = 1,760.00'	R = 420.00'	R = 760.00'
e = Exist.	e = 0.03	e = 0.06	e = Exist.
RO = N/A	RO = 54'	RO = 108'	RO = N/A
DS = 40mph	DS = 40mph	DS = 40mph	DS = 40mph

-DWY1-

PI Sta 11+53.80	PI Sta 10+77.34
Δ = 42° 09' 55.8" (LT)	Δ = 69° 13' 03.0" (RT)
D = 286° 28' 44.0"	D = 286° 28' 44.0"
L = 14.72'	L = 24.16'
T = 7.71'	T = 13.80'
R = 20.00'	R = 20.00'

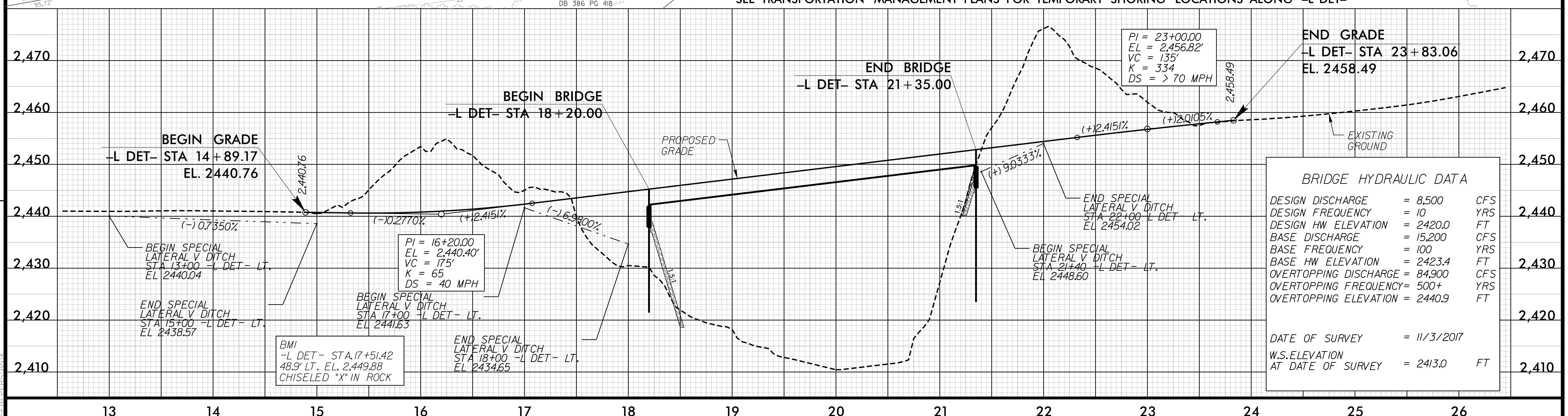


SEE SHEET 4 FOR -L- PLAN/PROFILE

SEE SHEET 6 FOR -DWY1- PROFILE

SEE TRANSPORTATION MANAGEMENT PLANS FOR TRAFFIC PHASING

SEE TRANSPORTATION MANAGEMENT PLANS FOR TEMPORARY SHORING LOCATIONS ALONG -L DET-



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 8,500	CFS
DESIGN FREQUENCY	= 10	YRS
DESIGN HW ELEVATION	= 2420.0	FT
BASE DISCHARGE	= 15,200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2423.4	FT
OVERTOPPING DISCHARGE	= 84,900	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 2440.9	FT
DATE OF SURVEY	= 11/3/2017	
W.S. ELEVATION AT DATE OF SURVEY	= 2413.0	FT

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-5388	6

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 035683 ENGINEER DAVID J. CLODGO

HYDRAULICS ENGINEER

CDM Smith Inc.
5400 Glenwood Avenue
Suite 400
Raleigh, NC 27612-3228
NC COA No. F-1255

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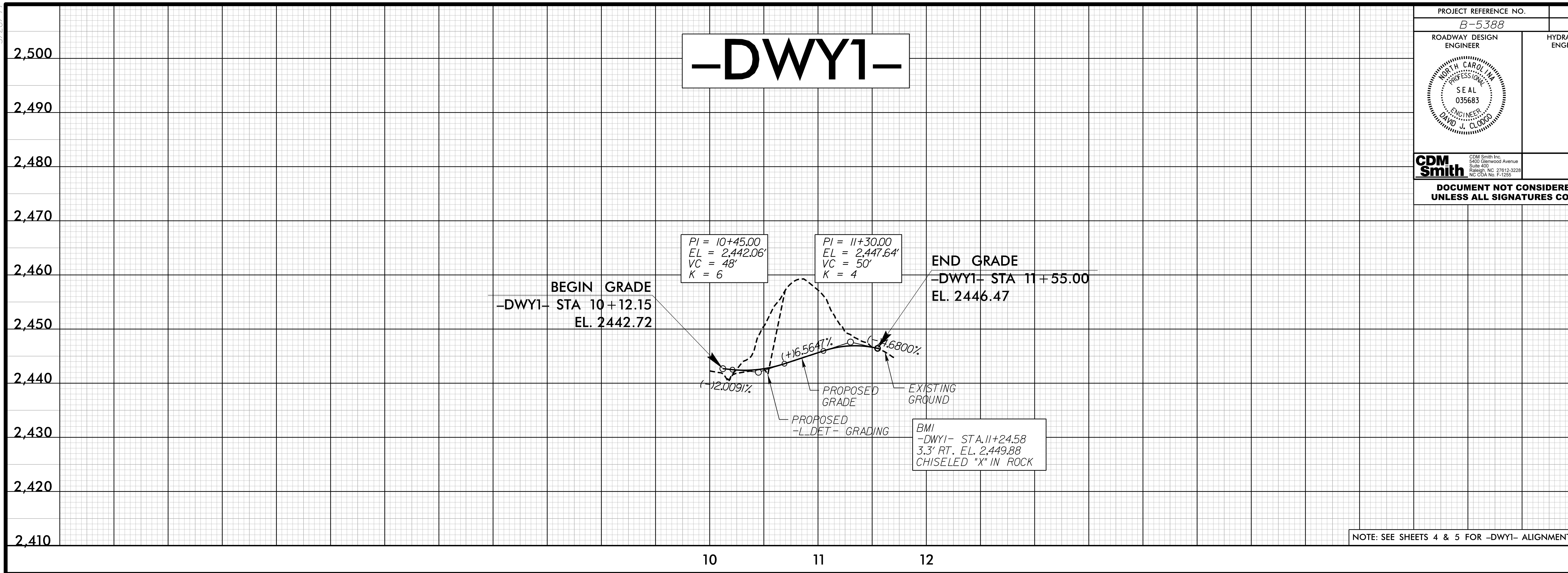
-DWY1-



NOTE: SEE SHEETS 4 & 5 FOR -DWY1- ALIGNMENT

5/28/99

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