STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

March 13, 2020

U.S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, North Carolina 28801

ATTN: Ms. Lori Beckwith
NCDOT Coordinator

Subject: **Application for Section 404 Individual Permit and 401 Water Quality Certification** for the proposed Rutherfordton Bypass, US 221 North of US 74 Bypass to North of SR 1366 (Roper Loop Road), Federal Aid Project No. STBG-0024(083), Division 13, TIP Nos. R-2233BB, & R-2233BA. Debit $570 from WBS 34400.1.S5.

Dear Madam:

The proposed action involves constructing the US 221 Bypass of Rutherfordton, in Rutherford County. The proposed Rutherfordton Bypass extends along existing US 221 from north of 74 Bypass to north of US 74 Business (R-2233BA) and new location from north of US 74 Business to rejoining US 221 just north of SR 1366, (R-2233BB). The proposed bypass will be constructed as a four-lane roadway with a 46-foot median and will be approximately 8.5 miles long.

Please see the enclosed ENG form, Division of Mitigation Services (DMS) mitigation acceptance letters, permit drawing review minutes (4B and 4C), State Stormwater Management Plan (SMP), Final R-2233BB permit drawings, R-2233BB design plans, and R-2233BA preliminary permit drawings for the above referenced project.

Purpose and Need

The purpose of the proposed project is to reduce congestion, improve safety, and improve travel time for traffic using the US 221 corridor in the vicinity of Rutherfordton.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
ENVIRONMENT ANALYSIS UNIT
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:
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610

MERGER INFORMATION

In compliance with the NEPA/404 Merger Process, the following Concurrence Meetings were held for R-2233 BB: 4B: March 16, 2017, and 4C: May 16, 2018.

PROJECT SCHEDULE

This project will be permitted in phases. R-2233BB is currently scheduled to let to construction on July 21, 2020. R-2233BA is currently scheduled to let on June 20, 2023.

The impacts reported in this Individual Phased Permit Application for Section R-2233BB are based on final design. The proposed impacts for Section R-2233BA are based on preliminary design. A phased permit modification will be requested for R-2233BA prior to that section's construction letting.

RESOURCE STATUS

Waters within the project area are located in the Broad River Basin (HUC 03050105), within Sub basins 03-07-08, 03-07-10, and 03-07-15). There are no Outstanding Resource Waters (ORW) or High-Quality Waters (HQW) within the project area. No Water Supply Waters (WS-I or WS-II) waters occur within 1.0 mile of the project area.

Wetland and stream determinations within R-2233BB and R-2233BA were conducted using the field delineation method outlined in the 1987 Corps of Engineers Wetland Delineation Manual. These determinations were initially verified in 2004 and 2010. Lori Beckwith from USACE and David Wainwright of DWR, field reverified the wetlands and streams on August 29, 2017.

<u>303(d) Impaired Waters</u>:
No streams in the project footprint or within 1 mile of the project area are currently listed on the North Carolina 2018 Final 303(d) list of impaired waters.

IMPACTS TO WATERS OF THE U.S.

Tables 1 and 2 summarize the impacts to jurisdictional water resources for R-2233BB (impacts for R-2233BA are only preliminary design and are listed in Table 4). Site numbers correspond with the permit (hydraulic) drawings included in this application. The stream and wetland numbers correspond to the 2017 PJD package.

Table 1 – R-2233BB Wetland Impacts (acres)

Permit Site	NRTR Site	NC WAM Classification	Wetland Size	Permanent Fill in Wetlands	Excavation in Wetlands	Mechanized Clearing	Hand Clearing	Impact Description
8	WA	Headwater Forest	0.11	0.11	--	--	--	Roadway fill/Utility excavation
Total Wetland Impacts:				**0.11**	--	--	--	
Total Wetland Impacts Requested from DMS:				**0.11**				

Table 2 – R-2233BB Stream Impacts (linear feet)

Permit Site	Stream Name/ NRTR ID	Status/ Class	Permanent		Temp. Channel Impacts	ACOE Required Mitigation	DWR Required Mitigation	Impacts Description
			Channel Impacts	Bank Stabilization				
1	UT to Cleghorn Creek / SN	Perennial C	43	--	34	43	--	Stream SN will be relocated into a 15” CSP with impacts from roadway fill to the original streambed.
1	UT to Cleghorn Creek / SN	Perennial C	24	--	14	24	--	Stream SN will be impacted by the extension of a 48” RCP.
4	UT to Cleghorn Creek / SL	Perennial C	139	--	18	139	139	Stream SL will be impacted by a channel realignment up and downstream of a new RCBC.
4	UT to Cleghorn Creek / SL-SM	Perennial C	766	--	--	766	766	Stream SL and an intermittent UT (SM) will be impacted by their relocation into a 10’ x 7’ RCBC.
4	UT to Cleghorn Creek /SL	Perennial C	10	--	7	10	10	Stream SL will be impacted by the installation of a lateral V ditch above the inlet of the 10’ x 7’ RCBC.
5	UT to Cleghorn Creek/SK	Perennial C	--	10	17	--	--	Stream SK will be impacted by the installation of Bank Stabilization at the inlet of a 7’x 7’ RCBC (26’).
5	UT to Cleghorn Creek/SK	Perennial C	112	--	--	112	--	Stream SK will be impacted by its relocation into a 30” CSP.
5	UT to Cleghorn Creek / SJ	Intermittent C	28	--	21	28	--	Stream SJ will be impacted by roadway fill.
6	Cleghorn Creek / SI	Perennial C	--	11	9	--	--	Stream SI will be impacted by the installation of bank stabilization at the outlet of an 8’x8’ RCBC.

Permit Site	Stream Name/ NRTR ID	Status/ Class	Perm. Channel Impacts	Bank Stabilization	Temp. Channel Impacts	ACOE Required Mitigation	DWR Required Mitigation	Impacts Description
6	Cleghorn Creek / SI	Perennial C	670	--	--	670	670	Stream SI will be impacted by its relocation into an 8’ x 6’ RCBC.
6	Cleghorn Creek / SI	Perennial C	34	--	18	34	34	Stream SI will be impacted by a channel change at the inlet of the 8’ x 6’ RCBC.
7	UT to Cleghorn Creek / SH	Perennial C	832	--	--	832	832	Stream SH will be covered by roadway fill. A spring box or subsurface drain will be installed to handle any remaining flow.
8	UT to Hollands Creek / SG	Perennial WS-V	445	--	--	445	445	Stream SG will be covered by roadway fill with the flow diverted to a standard V ditch.
8	UT to Hollands Creek / SG	Perennial WS-V	32	--	--	32	32	Stream SG will be relocated into a 36” CSP with impacts from roadway fill to the original streambed.
8	UT to Hollands Creek / SG	Perennial WS-V	--	25	20	--	--	Stream SG will be impacted by the installation of bank stabilization at the outlet of a 36” CSP.
9	UT to Hollands Creek / SF	Perennial WS-V	--	14	9	--	--	Stream SF will be impacted by the installation of bank stabilization at the inlet of a 54” RCP.
9	UT to Hollands Creek / SF	Perennial WS-V	140	--	--	140	--	Stream SF will be relocated into a 54” RCP with impacts from roadway fill to the original streambed.
9	UT to Hollands Creek / SF	Perennial WS-V	55		7	55	--	Stream SF will be impacted by an energy dissipater placed at the outlet of the 54” RCP.
10	Hollands Creek / SE	Perennial WS-V	72	--	19	72	72	Stream SE will be impacted by a channel change from the installation of a floodplain bench.
10	Hollands Creek / SE	Perennial WS-V	217	--	--	217	217	Stream SE will be impacted by its relocation into a triple barrel 10’ x 10’ RCBC.
10	Hollands Creek / SE	Perennial WS-V	45	--	51	45	45	Stream SE will be impacted by a channel change from the installation of a floodplain bench and temporary impacts from the removal of a double barrel 6’ x 6’ box culvert.
11	UT to Mountain Creek / SB	Perennial C	--	10	27	--	--	Stream SB will be impacted by the installation of bank stabilization at the outlet of a 36” CSP.
11	UT to Mountain Creek / SB	Perennial C	151	--	--	151	--	Stream SB will be relocated into a 36” CSP with impacts from roadway fill to the original streambed.
13	UT to Cleghorn Creek / SO	Perennial C	35	--	19	35	--	Stream SO will be impacted by an energy dissipater placed at the outlet of a 72” RCP.

Permit Site	Stream Name/ NRTR ID	Status/ Class	Perm. Channel Impacts	Bank Stabilization	Temp. Channel Impacts	ACOE Required Mitigation	DWR Required Mitigation	Impacts Description
14	UT to Hollands Creek / SG	Perennial WS-V	--	10	24	--	--	Stream SG will be impacted by the installation of bank stabilization at the outlet of a standard base ditch.
15	UT to Catheys Creek / SC	Perennial WS-V	--	22	14	--	--	Stream SC will be impacted by the installation of bank stabilization at the outlet of a standard base ditch.
15	UT to Catheys Creek / SC	Perennial WS-V	506	--	--	506	506	Stream SC will be relocated into a 42” CSP with impacts from roadway fill to the original streambed.
15	UT to Catheys Creek / SC	Perennial WS-V	14	--	19	14	14	Stream SC will be impacted by a standard V ditch.
16	UT to Hollands Creek / SD	Intermittent WS-V	52	--	10	52	--	Stream SD will be impacted by an energy dissipater placed at the outlet of a 60” RCP.
16	UT to Hollands River / SD	Intermittent WS-V	38	--	--	38	--	Stream SD will be relocated into a 60” RCP with impacts from roadway fill to the original streambed.
16	UT to Hollands River / SD	Intermittent WS-V	18	--	12	18	--	Stream SD will be impacted by a lateral V ditch as part of the energy dissipater at the outlet of the 60” RCP
17	UT to Cleghorn Creek / SO	Perennial C	143	--	--	143	--	Stream SO will be impacted by its relocation into a 42” RCP with impacts from roadway fill to the original streambed.
18	UT to Hollands Creek *	Perennial WS-V	--	13	13	--	--	An UT to Hollands Creek will be impacted by the installation of bank stabilization at the outlet of a 30” RCP.
Total Stream Impacts:			**4,621**	**115**	**382**	**4,621**	**3,782**	
Total Permanent Impacts			**4,736**					
Total Stream Impact Requested from DMS:						**4,621**		

***** Stream identified after PJD reverification.

R-2233BB has 115 linear feet of permanent impacts from bank stabilization. As these impacts are not considered a loss of Waters of the US, mitigation is not proposed. 115 linear feet has been subtracted from total permanent impacts for R-2233BB: 4,736’ – 115’ = 4,621’.

Utility Impacts

There will be no Utility impacts to jurisdictional resources on for R-2233BB.
Utility impacts for R-2233BA will be determined when that section reaches final design.

FEDERALLY PROTECTED SPECIES

Plants and animals with Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of November 13, 2019, the USFWS lists seven federally protected species for Rutherford County.

Dwarf-flowered heartleaf is present in the project footprint. A Biological Opinion for dwarf-flowered heartleaf was developed for the project on May 12, 2009 but is currently being updated/ prepared for the USACE's submittal to the USFWS (as the USACE is the Lead Federal Agency) for this project. It is anticipated the biological conclusion for this species will be May Affect, Likely to Adversely Affect.

Table 3 – Federally protected species listed for Rutherford County

Scientific Name	Common Name	Federal Status	Habitat	Proposed Biological Conclusion	Last Survey Date
Glyptemys muhlenbergii	Bog turtle	T (S/A)	No	Not Subject	n/a
Hexastylis naniflora	Dwarf-flowered heartleaf	T	Yes	MALTAA	5/23/2019 – Currently Updating
Isotria medeoloids	Small whorled pogonia	T	Yes	No Effect	5/22/2016 Currently Updating
Sisyrinchium dichotomum	White irisette	E	No	No Effect	n/a
Gymnoderma lineare	Rock gnome lichen	E	No	No Effect	n/a
Myotis sodalis	Indiana bat	E	Yes	MANLTAA	6/24/2019
Myotis septentrionalis	Northern long-eared bat	T	Yes	MANLTAA	6/24/2019

T (S/A): Threatened for Similarity of Appearance **T**: Threatened **E**: Endangered
MALTAA: May Affect; Likely to Adversely Affect
MANLTAA: May Affect; Not Likely to Adversely Affect

INDIRECT CUMULATIVE IMPACT ANALYSIS

NCDOT completed an Indirect Screening and Land Use Scenario Assessment for R-2233B in January 2010. The findings of this report state that residential, commercial, industrial, and mixed-use development is expected to continue (at a slow pace) in the Future Land Use Study Area (FLUSA) with or without the project. R-2233B will have little to no effect of future stormwater runoff or water quality in the watersheds encompassed by the project. Given the minimal indirect effects of the project, the contribution of the project to cumulative effects resulting from current and planned development patters should be minimal. For these reasons, potential indirect and cumulative effects to downstream water quality should be minimal.

CULTURAL RESOURCES

Archaeological Resources:

An intensive archaeological survey was conducted within the study corridor for the selected alternative during 2010. The archaeological Area of Potential Effect is considered the proposed construction limits of the project. The intensive archaeological survey covered all of the 3-13 proposed construction limits. Subsurface shovel testing was conducted in areas of high probability within the proposed construction limits. As a result of the Phase I archaeological survey along US 221 conducted in 2010, seven new archaeological sites were recorded within the project APE. These cultural resources are one multi-component (prehistoric and historic) artifact scatter (31RF196/196), five isolated finds of prehistoric lithic material (31RF197-31RF201) and one sparse prehistoric lithic scatter (31RF202). These archaeological

resources are recommended as not eligible for listing on the National Register of Historic Places. The final archaeological report has been forwarded to the US Army Corps of Engineers and the HPO for review. Under Section 106, no significant archaeological resources were identified.

Historic Architectural Resources:

The proposed project is subject to North Carolina General Statute 121-12(a). Although no federal funds will be used for the construction of the proposed project, the project will require a permit from the US Army Corps of Engineers. Section 106 of the National Historic Preservation Act of 1966, as amended, applies to federal permit areas along the project. Surveys for historic architectural resources were conducted in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. A preliminary survey for Historic Architectural Resources was conducted by NCDOT in 1999. The survey consisted of a cursory field survey and limited historical background research. USGS maps were used as guides in the field to identify historic resources and evaluate their potential for National Register of Historic Places eligibility. During the survey, a total of 145 resources at least 50 years old were identified within the Area of Potential Effects (APE). Of these resources, three are listed on the National Register and eight were evaluated and determined to be eligible for the National Register. The State Historic Preservation Office (HPO) concurred with these findings in a letter dated April 25, 2003.

Prior to the initiation of construction, NCDOT will record the existing condition of **Ruth Elementary School** in accordance with the Historic Structures and Landscape Recordation Plan. Copies of the documentation will be deposited in the files of the State Historic Preservation Office and the files of the Historic Architecture Group of NCDOT. NCDOT will compile a historic context documenting the history of Consolidation-Era public schools within Rutherford, Polk and Cleveland counties. The context will compile documentary materials, bibliographical sources, National Register eligibility considerations and digital images. The final report will be in a digital format and will be provided on a CD-ROM to the State Historic Preservation Office. Another copy of the report will be deposited in the files of the Historic Architecture Group of NCDOT. The final digital product will be completed and distributed within three years of the execution of the Memorandum of Agreement regarding the project's adverse effects on Ruth School.

The proposed bypass will cross the portion of US 64 which is designated a part of the commemorative motor route for the **Overmountain Victory National Historic Trail** (OMVNHT). Although there is no trail currently in place along Cleghorn Creek, the primary historic route of the OMVNHT crosses US 64 near US 74A (Railroad Avenue) and follows Cleghorn Creek toward Rutherfordton. NCDOT has coordinated with the National Park Service and local agencies regarding how the proposed bypass can accommodate the OMVNHT. The selected alternative will carry US 64 over the proposed bypass on a bridge. A sidewalk and 42-inch handrails will be provided on the south side of this bridge to allow pedestrians using the OMVNHT to cross the proposed bypass. NCDOT will continue to coordinate with the Park Service and local agencies regarding the OMVNHT.

Community Studies:

The Community Impact Assessment (CIA) Update was completed in February 2011. While this project is expected to result in residential and business displacements, the project is not expected to have notable community impacts, and the impacts to Environmental Justice communities are not expected to be disproportionately high and adverse.

The Indirect Screening and Land Use Scenario Assessment (ICE-LUSA) was completed in January 2010. It concluded that, "Given the minimal indirect effects of the project, the contribution of the project to cumulative effects resulting from current and planned development patterns should be minimal. For these reasons, potential indirect and cumulative effects to downstream water quality should be minimal. No additional ICE study is recommended."

Both the CIA Update and the ICE-LUSA remain valid, unless there are new alternatives that extend beyond the 2011 Direct Community Impact Area and the 2010 Future Land Use Study Area.

FEMA COMPLIANCE

The project has been coordinated with appropriate state and local officials and the Federal Emergency Management Agency (FEMA) to assure compliance with FEMA, state, and local floodway regulations.

WILD AND SCENIC RIVER SYSTEM

The project will not impact any designated Wild and Scenic Rivers or any rivers included in the list of study rivers (Public Law 90-542, as amended).

MITIGATION OPTIONS

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages, and minimization measures were incorporated as part of the project design.

Avoidance and Minimization

- BMPs were used throughout the project for stormwater treatment and to minimize erosion.
- The design of the proposed interchange with existing US 221 south of Rutherfordton was changed from a diamond interchange to a half-cloverleaf interchange. No ramps are proposed in the northern quadrants of the interchange, which will reduce stream impacts.
- 2:1 side slopes are proposed in jurisdictional areas and in areas containing the federally protected dwarf-flowered heartleaf.
- The design of the ramp in the northeast quadrant of the proposed US 64 interchange was changed. The ramp will more closely follow the alignment of the proposed which will reduce stream impacts.
- Roadway runoff flows to grass shoulders in fill sections and is collected in median and grass side ditches in cut sections to pipe systems. Pipe systems include riprap pads or energy dissipator basins at outfalls.
- Two dry detention ponds will be installed to reduce post construction runoff to the levels of preconstruction discharge.
- Ditches include riprap lining where shear stress exceeds allowable for grass.

Compensation:
The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. Table 4 summarizes the wetland and stream impacts for each section and summarizes the mitigation requirements for the project.

Table 4 – R-2233BB/BA Mitigation Summary

HUC	Project Section/ Design Level	ACOE Required Mitigation (lf)	DWR Required Mitigation (lf)	Wetland Mitigation (ac)
03050105	R-2233BB (Final Design)	4,621	3,782	0.11
03050105	R-2233BA (Preliminary Design*)	5,664	--	0.61
R-2233BB Total Mitigation:		**10,285**	**3,782**	**0.72**

*Preliminary design impacts are based on slope stakes plus 25 feet – please see preliminary impact table and preliminary permit drawings for R-2233BA (attached).

R-2233BB has 115 linear feet of permanent impacts from bank stabilization. As these impacts are not considered a loss of Waters of the US, mitigation is not proposed. 115 linear feet has been subtracted from total permanent impacts for R-2233BB: 4,736' – 115' = 4,621'.

Although R-2233BA is in preliminary design, because the project is scheduled to let within 5 years, mitigation for the proposed 5,664 linear feet of stream impacts and 0.61 acre of wetland impacts has also been secured for this project.

Permanent stream and wetland impacts are proposed to be mitigated at a ratio of 2:1 with credits acquired from DMS.

REGULATORY APPROVALS

Section 404 and Section 10: Application is hereby made for a USACE Individual 404 and Section 10 Permit as required for the above-described activities.

Section 401: We are hereby requesting a 401 Water Quality Certification from the N. C. Division of Water Resources. In compliance with Section 143 215.3D(e) of the NCAC, we will provide $570.00 to act as payment for processing the Section 401 permit application previously noted in this application (see Subject line).

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Jeff Hemphill at jhemphill@ncdot.gov or (919) 707-6126. A copy of this application and distribution list will also be posted on the NCDOT website at: https://xfer.services.ncdot.gov/pdea/PermApps/.

Sincerely,

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

cc:
NCDOT Permit Application Standard Distribution List.

U.S. ARMY CORPS OF ENGINEERS

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

33 CFR 325. The proponent agency is CECW-CO-R.

Form Approved - OMB No. 0710-0003 Expires: 30-SEPTEMBER-2015

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Phil Middle - S Last - Harris	First - Middle - Last -
Company - NCDOT	Company -
E-mail Address - pharris@ncdot.gov	E-mail Address -
6. APPLICANT'S ADDRESS:	9. AGENT'S ADDRESS:
Address- 1598 Mail Service Center	Address-
City - Raleigh State - NC Zip - 27699 Country - USA	City - State - Zip - Country -
7. APPLICANT'S PHONE NOs. w/AREA CODE	10. AGENTS PHONE NOs. w/AREA CODE
a. Residence b. Business 919-707-6001 c. Fax	a. Residence b. Business c. Fax

STATEMENT OF AUTHORIZATION

11. I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____ SIGNATURE OF APPLICANT _____ DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

R-2233BB

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Broad River	Address
15. LOCATION OF PROJECT	City - State- Zip-
Latitude: ◦N 35.37867 Longitude: ◦W 81.94998	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID Municipality

Section - Township - Range -

17. DIRECTIONS TO THE SITE

Please see attached Vicinity Map and Cover Letter.

18. Nature of Activity (Description of project, include all features)

The proposed action involves constructing the US 221 Bypass of Rutherfordton, in Rutherford County. The proposed bypass will be constructed as a four-lane roadway with a 46-foot median. Portions of the bypass will be constructed on new location. Full control of access will be obtained for new location sections of the bypass. Partial control of access (one access per parcel with no other access) will be obtained for sections of the project along existing roadways. The proposed project is approximately 8.5 miles long.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The purpose of the project is to reduce congestion, improve safety, and improve travel time for traffic using the US 221 corridor in the vicinity of Rutherfordton.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

New location road construction and widening of existing will lead to roadway fill need to be placed in jurisdictional feature in the project footprint.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
see attached Cover Letter.		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres

or

Linear Feet see attached Cover Letter.

23. Description of Avoidance, Minimization, and Compensation (see instructions)

see attached Cover Letter.

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- see attached Permit Drawings.

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Michael [illegible] 3/13/2020

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
TIM BAUMGARTNER
Director

NORTH CAROLINA
Environmental Quality

March 4, 2020

Mr. Philip S. Harris, III, P.E.
Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Subject: Mitigation Acceptance Letter:

TIP Number R-2233BB – US 221 South of US 74 Business (Charlotte Road) to North of SR 1366 (Roper Loop Road), Rutherford County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the compensatory stream and wetland mitigation for the subject project. Based on the information received on March 4, 2020, the impacts are located in CU 03050105 of the Broad River basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

Broad 03050105 SP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	4,623.0	0	0.11	0	0	0	0

DMS commits to implementing sufficient compensatory wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from DMS.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-707-8420.

Sincerely,

Beth Harmon

for James B. Stanfill
DMS Asset Management Supervisor

cc: Mr. Monte Matthews, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, NCDWR
File: R-2233BB

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
TIM BAUMGARTNER
Director

NORTH CAROLINA
Environmental Quality

March 4, 2020

Mr. Philip S. Harris, III, P.E.
Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Subject: Mitigation Acceptance Letter:

R-2233BA, US 221 North of US 74 Bypass to Just North of US 74 Business, Rutherford County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the compensatory stream and wetland mitigation for the subject project. Based on the information supplied by you on March 4, 2020, the impacts are located in CU 03050105 of the Broad River basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

Broad 03050105 SP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	5,664.0	0	0.72	0	0	0	0

*Some of the stream and/or wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

The impacts and associated mitigation needs were under projected by the NCDOT in the 2020 impact data. DMS will commit to implement sufficient compensatory stream and wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies using the delivery timeline listed in Section F.3.c.iii of the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from DMS.

If you have any questions or need additional information, please contact Beth Harmon at 919-707-8420.

Sincerely,

Beth Harmon

James B. Stanfill
for DMS Asset Management Supervisor

cc: Mr. Monte Matthews, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, NCDWR
File: R-2233BA

Dewberry

R-2233BB HYDRAULIC DESIGN 4B CONCEPTUAL HYDRAULIC DESIGN REVIEW

Date: March 16, 2017

Time: 10:00-12:00 PM

Location: NCDOT Structure Design Conference Room

Purpose: R-2233BB

US 221 Proposed Rutherfordton Bypass
Rutherford County
4B Conceptual Hydraulic Design Review Meeting

In Attendance

Name	Organization	Phone	Email
Bill Zerman	NCDOT Hydraulics Unit	919-707-6755	bzerman@ncdot.gov
Matthew York	NCDOT Hydraulics Unit	919-707-6765	mjyork@ncdot.gov
Cynthia Van Der Wiele	USEPA	919-450-6811	vanderwiele.cynthia@epa.gov
Monte Matthews	USACE		Monte.K.Matthews@usace.army.mil
Marella Buncick	USFWS	828-258-3939(237)	marella_buncick@fws.gov
Marla Chambers	NCWRC	704-982-9181	marla.chambers@ncwildlife.org
Kevin Barnett (By Phone)	NCDWR	828-296-4657	Kevin.Barnette@ncdenr.gov
Jim Mason	NCDOT NES	919-707-6136	jsmason@ncdot.gov
Mark Staley	NCDOT REU	919-707-2948	mstaley@ncdot.gov
Amelia Coley	NCDOT Roadway		alcoley1@ncdot.gov
Allison White	NCDOT Roadway	919-707-6341	akwhite@ncdot.gov
Ali Koucheki	NCDOT Utilities	919-707-6699	akoucheki@ncdot.gov
Carla Dagnino	NCDOT NES	919-707-6110	cdagnino@ncdot.gov
Jay McInnis	NCDOT PDEA	919-707-6029	jmcinnis@ncdot.gov
Ricky Tipton (By Phone)	NCDOT Division 13	828-251-6171	rtipton@ncdot.gov
Crystal Moore	Dewberry	919-424-3745	comoore@dewberry.com
Steve Bondor	Dewberry	919-636-6334	sbondor@dewberry.com

Summary of Discussion

The R-2233BB project is new alignment approximately 5 miles long and includes two interchanges. Typical section is divided highway with paved shoulders and median ditches.

Purpose of the meeting is to review the potential impact the hydraulic design may have on jurisdictional stream and wetlands. 17 impact sites were identified and shown in the plans.

The jurisdictional stream survey was prepared over 10 years ago and will be updated with a current review. The final survey file will be revised to include the current stream delineation.

Plan Sheet 6

Site 1 – stream located along Y2 sta 34+00 RT, will be entirely covered by proposed roadway embankment.

- No comments.

Site 2 – stream located along Y2 sta 23+00 LT, section of stream will be enclosed in extension of 48" pipe due to proposed roadway embankment.

- No comments.

Site 3 – wetland located near L sta 780+00 Lt, will be partially filled by proposed roadway embankment. Section of stream located near L sta 779+00 LT will be filled with rip rap energy dissipater basin due to velocity of 16 ft/sec at outfall of 36" pipe.

- No comments.

Site 16 – stream located in cul-de-sac 16, near L Sta 780+00 LY, portion of stream will be diverted into roadway ditch along the cul-de-sac.

- No comments.

Plan Sheet 8

Site 4 – stream located near L sta 797+60, section of stream will be enclosed in box culvert. Preliminary culvert size is 2 @ 7' x 6' approximately 460' long at 2.7% slope. Existing stream is approximately 6' wide. Therefore one barrel will be used as low flow and the other as floodplain bench. Sills and baffles will be included due to the slope.

- Comment expressed about the possibility of reducing the length of proposed culvert. The roadway profile shows approximately 80' of fill and includes side slopes of 2:1, therefore no practical way to reduce length.
- Comment expressed about proposed roadway drainage discharged to stream. Roadway discharge to stream required however to maintain existing drainage pattern.
- Comment suggested that invert of proposed pipe outfalls located in side of box culvert be placed at lowest invert elevation as possible to limit erosion of bed material inside the culvert.
- Comment suggested that rip rap be used in the floodplain bench barrel of the box culvert to limit erosion of material from the barrel.
- Comment noted that burial of low flow barrel may not be required due to length of culvert and would be confirmed at the 4C meeting.

Plan Sheet 9

Site 5 - stream located near L sta 815+00 LT, upstream section of stream will be filled by roadway embankment, 36" pipe will be used.

- Comment expressed about the need for spring box to drain potential groundwater below embankment. Springbox not shown in plans but can be added in field during construction if groundwater is present.

Plan Sheet 10

Site 6 - stream located near L sta 830+00, section of stream will be enclosed in box culvert. Preliminary culvert size is single barrel 7' x 6' approximately 530' long at 2.6% slope. Existing stream is approximately 5' wide. Therefore a low flow channel with a sill 5' wide will be used. Baffles will be included due to the slope.

- Comment expressed possible need for outlet protection at discharge end of box culvert. Plans currently show rip rap on banks only. Velocity at the outlet will be confirmed and rip rap energy dissipater basin added if velocity is greater than 15 ft/sec.

Site 7 – stream located near L sta 832+00 RT, stream is small trib that will be entirely filled by the proposed roadway embankment.

- No comments.

Plan Sheet 11

Site 8 – stream located near RPD sta 20+00 LT, upstream section of stream will be filled by proposed roadway embankment and will be enclosed in 36" pipe. Rip rap on banks only will be placed at pipe outfall.

- Comment requested the addition of bank stabilization at end of v-ditch at RPD sta 18+50 LT.

Plan Sheet 12

Site 9 - stream located near L sta 866+00, section of stream will be enclosed in proposed 54" pipe. Section of stream at outfall will be filled with rip rap energy dissipater basin due to velocity of 16 ft/sec at outfall of 54" pipe. Proposed roadway drainage system will also discharge to the same rip rap energy dissipater basin.

- Comment requested that a separate rip rap energy dissipater basin be used for the roadway drainage system at outfall #1209 at approximate sta L 866+50 RT. This would avoid direct discharge of roadway drainage to the stream.
- Comment requested possible reduction of size of the rip rap energy dissipater basin at outfall of 54" pipe if the roadway pipe outfall 1209 is relocated. Rip rap will be added to end of basin to provide transition to existing channel width.

Plan Sheet 13

Site 10 - stream located near L sta 874+50, section of stream will be enclosed in box culvert. Preliminary culvert size is 3 @ 10' x 10' approximately 200' long at 0.3% slope. Existing stream is approximately 10' wide. Therefore center barrel will be used as low flow and the outside barrels as floodplain benches. Sills will be included to establish the floodplain bench. The center barrel will be buried 1' below the streambed.

- No comments.

Plan Sheet 20

Site 11 - stream located near L sta 969+00 LT, upstream section of stream will be enclosed in proposed 30" pipe. Section of stream at outfall will be filled with rip rap energy dissipater basin due to velocity of 20 ft/sec at outfall of 30" pipe. Proposed roadway drainage system will also discharge to the same rip rap energy dissipater basin.

- This site was noted in the Record of Decision (site 1N) for consideration of additional mitigation
- Comment suggested addition of junction box drop structure to the 30" pipe to reduce velocity and eliminate the rip rap energy dissipater basin. Rip rap would be required on channel banks only.
- Comment suggested connection of the 18" roadway drainage outfall #2006 to the drop structure.
- Comment noted that additional group field visit not required. Site photographs adequate for review. Additional mitigation will be provided by addition of drop structure as noted above

Plan Sheet 21

Not a current impact site – current stream delineation shows limit of jurisdictional stream downstream of project, L sta 981+50 LT. New delineation may extend stream limit to project footprint however. Proposed drainage design consists of 36" pipe with an outfall that includes a rip rap energy dissipater basin due to velocity of 21 ft/sec at outfall. Proposed roadway drainage system will also discharge to the same rip rap energy dissipater basin.

- Comment suggested addition of junction box drop structure to the 36" pipe to reduce velocity and eliminate the rip rap energy dissipater basin. Rip rap would be required on channel banks only.
- Comment suggested connection of the 15" roadway drainage outfall #2116 to the drop structure.

Plan Sheet 22

Site 12 - stream located near L sta 996+00 LT, section of stream at outfall of 30" pipe will be filled with rip rap energy dissipater basin due to velocity of 16 ft/sec at outfall. Proposed roadway drainage system will also discharge to the same rip rap energy dissipater basin.

- Comment suggested addition of junction box drop structure to the 30" pipe to reduce velocity and eliminate the rip rap energy dissipater basin. Rip rap would be required on channel banks only.

- Comment suggested connection of the 24” roadway drainage outfall #2207 to the drop structure.
- Comment suggested that possibility of relocation of U-turn bulb be investigated. Relocation would reduce length of embankment and would avoid impact to the stream.

Plan Sheet 23

Site 13 – limit of jurisdictional stream located at Y2 sta 15+00 RT at the outfall of existing 72” pipe. Proposed 72” pipe outfall #2303 and endwall will be placed in same location. Stream will be filled with rip rap lining at pipe outfall to prevent enlargement of existing scour hole.

- No comment

Plan Sheet 31

Site 14 - stream located near Y10 sta 15+00 LT and is enclosed in 60” pipe. Existing 60” pipe will remain if pipe structural condition is adequate. If pipe is replaced location will be moved slightly. Section of stream at 60” pipe outfall will be filled with rip rap energy dissipater basin due to velocity of 19 ft/sec.

- Comment suggested addition of junction box drop structure to the 60” pipe to reduce velocity and eliminate the rip rap energy dissipater basin. However the Division noted that the drop structure for the 60” pipe would be large and would trap debris and therefore would not be a practical solution. Therefore the rip rap energy dissipater basin will remain as proposed.

Plan Sheet 32

Site 15 - stream located near Y11 sta 21+00, section of stream will be enclosed in proposed 42” pipe approximately 440’ long with rip rap on banks only at the outfall.

- Comment expressed concern of the length of pipe and if there is possibility to reduce length. The roadway profile shows approximately 90’ of fill and includes side slopes of 2:1. The profile is restricted due to connection to the existing roadway at sta 28+00 and the existing greenway trail at sta 15+00, therefore no practical way to reduce length.

Plan Sheet 29

Site 17- Stream is located near Y6 sta 10+50 RT. An outfall of a proposed 30” pipe outfall will be located at top of banks of existing stream channel. No proposed fill would be located in the channel.

- Comment suggested that because no fill is proposed in the channel, there is no impact at the site and it could be removed as an impact site.
- Subsequent to the meeting however, a revision to the hydraulic design was discussed to replace the 30” pipe with a ditch that would tie to the top of banks of the channel

and would require bank stabilization. The bank stabilization would be considered an impact therefore the site will remain as an impact location.

Plan Sheet 30

Additional survey work on Plan Sheet 30 may involve impacts to jurisdictional stream. This site will be discussed during the upcoming 4C Meeting after field surveys have been obtained.

Dewberry

R-2233BB HYDRAULIC DESIGN 4C MERGER MEETING

Date: May 16, 2018

Time: 8:00-10:00 AM

Location: NCDOT Structure Design Conference Room

Purpose: R-2233BB

US 221 Proposed Rutherfordton Bypass
Rutherford County
4C Merger Meeting

In Attendance

Name	Organization	Phone	Email
Bill Zerman	NCDOT Hydraulics Unit	919-707-6755	bzerman@ncdot.gov
Nathan Adima	NCDOT PMU	919-707-6755	nadima@ncdot.gov
Lori Beckwith (On Phone)	USACE	828-271-7980 (42230	Loretta.a.beckwith@usace.army.mil
Matthew York	NCDOT Hydraulics Unit	919-707-6765	mjyork@ncdot.gov
Marla Chambers	NCWRC	704-244-8907	marla.chambers@ncwildlife.org
Marella Buncick	USFWS	828-258-3939 (237)	Marella_buncick@fws.gov
Jeff Hemphill	NCDOT EAU	919-707-6126	jhemphill@ncdot.gov
Carla Dagnino	NCDOT EAU	919-707-6110	cdagnino@ncdot.gov
Mark Staley (On Phone)	NCDOT	919-707-2948	mstaley@ncdot.gov
Kevin Barnett (On Phone)	DENR	828-296-4657	Kevin.barnett@ncdenr.gov
Crystal Moore	Dewberry	919-424-3745	comoore@dewberry.com
Steve Bondor	Dewberry	919-636-6334	sbondor@dewberry.com

Summary of Discussion

The R-2233BB project is new alignment approximately 5 miles long and includes two interchanges. Typical section is divided highway with paved shoulders and median ditches.

Purpose of the meeting is to review the potential impact the hydraulic design may have on jurisdictional stream and wetlands. 18 impact sites were identified and shown in the plans.

The jurisdictional stream survey was prepared over 10 years ago and will be updated with a current review. The final survey file will be revised to include the current stream delineation.

Site 2, 3, and 12 are no longer impact sites. See the site comments below for more information.

General Comments

- Sites 2, 3, and 12 will be removed from the permit package. Based on the current wet file, these are no longer classified as jurisdictional streams nor wetlands.
- The JD wetland/stream name will be added to the impact table in addition to the site names. Jeff Hemphill has edited the excel table. He also annotated plan sheets so Dewberry can add names to plans.
- The impact table will be revised to include more detailed description of the type of impact. For example: culvert, stream relocation, ditches, and bank stabilization. Footnotes will also be added to the table to help with clarification on the impact type.

Site 1

- No additional comments other than the general comments.

Site 2

- Lori Beckwith requested NCDOT confirmation that wetland is not jurisdictional. If the wetland is jurisdictional, confirm if it will be a total take and the amount of impact. Jeff Hemphill verified that stream and wetland are not jurisdictional, therefore, will be removed from project impacts.

Site 3

- Impact will be removed. The stream is not jurisdictional.

Site 4

- Address General Comments
- Update the culvert size on the profile and wetland impact table.

Site 5

- JS MIT at –L- Sta. 815+00 will be removed. This "J" feature is not jurisdictional. The impact table will be revised to remove this length of impact.
- Address General comment for the impact table.

Site 6

- Address general comments for the impact table.
- Confirm the impact table quantity for existing channel impact permanent.

Site 7

- Address General comment.

Site 8

- Address general comment
- Stop the temporary impact at the ROW.

Site 9

- Address general comment

- Confirm the slope of the existing 30" CMP (2.6%) and the proposed 54" RCP (3.1%). It was recommended that the slope be less than 3% to allow passage through the pipe. Current design indicates inlet is buried 1' and outlet flows into a dissipator basin.

  Additional Data Verified
  - Existing 30" CMP Pipe Slope is 2.6%
  - Proposed 54" RCP Pipe Slope is 3.1%.
  - Pending agency review comments, pipe will remain as shown on plans.

Site 10

- Address general comment
- Turn off impervious dikes from permit drawings
- Add temporary impact from the existing culvert to the DUE.

Site 11

- No additional comments other than the general comments

Site 12

- Impact will be removed. The stream is not jurisdictional.

Site 13

- The jurisdiction stream is not in the current jurisdictional wet file, however, it will be added.

Site 14

- Move Site 14 note to allow riprap note to appear on the drawing.

Site 15

- Extend the jurisdictional stream needs to the ROW on the downstream end.
- Address general comment

Site 16

- General comments – remove bank stabilization text at dissipator. Retain bank stabilization upstream. Add temporary stream impact to PDE downstream.

Site 17

- No additional comments other than the general comments

Site 18

- Jurisdictional stream is missing from the JD file. It was agreed upon to keep the impact. No revision necessary.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element:	34400.1.S5	TIP No.:	R-2233BB	County(ies):	Rutherford	Page	1	of	4

General Project Information

WBS Element:	34400.1.S5	**TIP Number:**	R-2233BB	**Project Type:**	New Location	**Date:**	3/4/2019
NCDOT Contact:	Matthew York, PE Hydraulics Unit			**Contractor / Designer:**	Steven Bondor, PE Dewberry Engineers Inc		
Address:	NCDOT Hydraulics Unit 1020 Birch Ridge Road Raleigh, NC 27610			**Address:**	Dewberry Engineers Inc. 2610 Wycliff Road, Suite 410 Raleigh, NC 27607		
Phone:	919-707-6765			**Phone:**	919-636-6334		
Email:	mjyork@ncdot.gov			**Email:**	sbondor@deqwberry.com		
City/Town:	Rutherfordton			**County(ies):**	Rutherford		
River Basin(s):	Broad			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	5.01 miles	**Surrounding Land Use:**	Residential, light industrial, rural undeveloped

	Proposed Project	Existing Site
Project Built-Upon Area (ac.)	139 (proposed pavement) ac.	60.0 ac.
Typical Cross Section Description:	The R-2233BB project is new alignment approximately 5 miles long and includes two interchanges. Typical section is four lane divided highway with 46' grass median, paved shoulders and median ditches.	Two lane shoulder section along existing alignment that will be widened.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 13,300 / 14,500 Year: 2020/2040	Existing: 7000 Year: 2016

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

Roadway runoff flows to grass shouders in fill sections and is collected in median and grass side ditches in cut sections to pipe systems. Pipe systems include riprap pads or energy dissipator basins at outfalls. Two locations include dry detention ponds to reduce post construction runoff to the preconstruction discharge. Ditches include riprap lining where sheat stress exceeds allowable for grass.

Waterbody Information

Surface Water Body (1):	Cleghorn Creek Trib 11	**NCDWR Stream Index No.:**	n/a		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?	Comments:				
NRTR Stream ID:			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(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)					

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element:	34400.1.S5	**TIP No.:**	R-2233BB	**County(ies):**	Rutherford	**Page**	**2**	**of**	**4**

Additional Waterbody Information

Surface Water Body (2):	Cleghorn Creek Trib 12		**NCDWR Stream Index No.:**	n/a		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:				
Other Stream Classification:						
Impairments:						
Aquatic T&E Species?		Comments:				
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(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)						

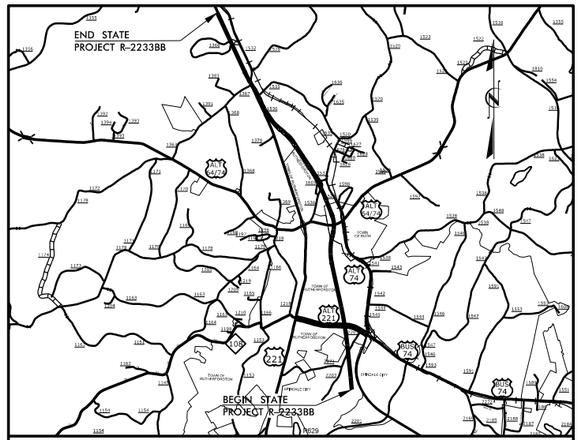
Surface Water Body (3):	Cleghorn Creek		**NCDWR Stream Index No.:**	9-26-(0.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:				
Other Stream Classification:						
Impairments:						
Aquatic T&E Species?		Comments:				
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(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)						

Surface Water Body (4):	Hollands Creek		**NCDWR Stream Index No.:**	9-41-13-7-(1)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply V (WS-V)			
		Supplemental Classification:				
Other Stream Classification:						
Impairments:						
Aquatic T&E Species?		Comments:				
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(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: R-2233BB

See Sheet 1A For Index of Sheets



VICINITY MAP

FINAL R/W PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PERMIT DRAWING
SHEET 1 OF 37

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2233BB	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34400.1.S5		PE
34400.2.S5		R/W & UTIL

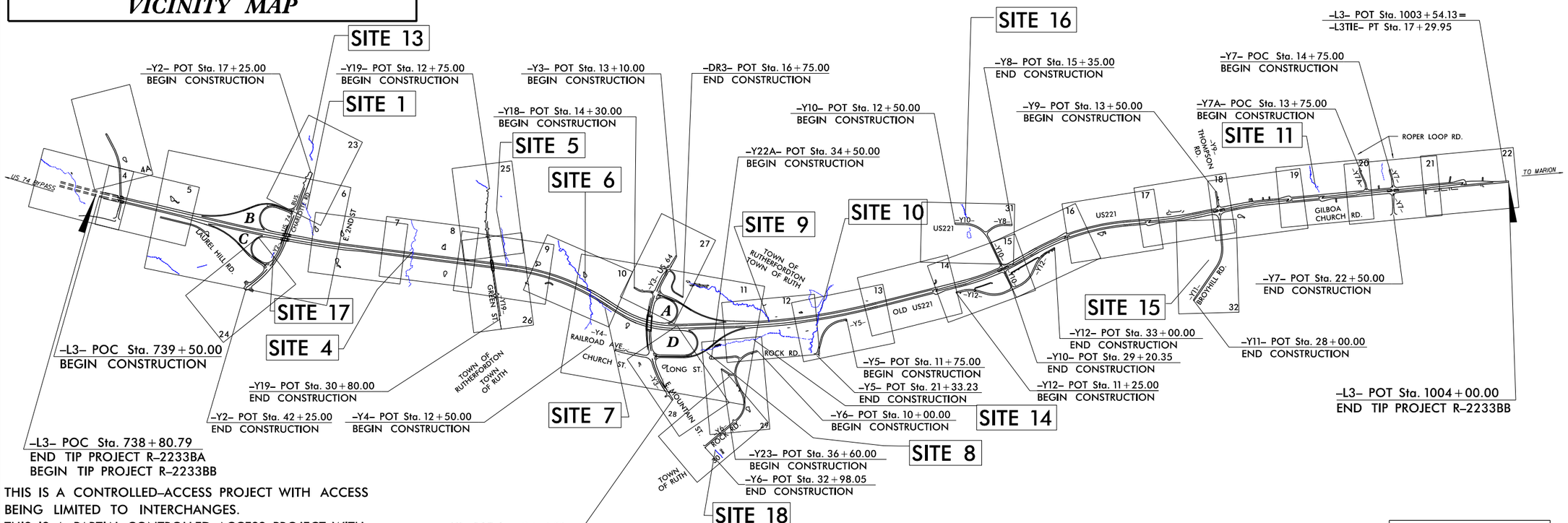
RUTHERFORD COUNTY

LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES

WETLAND AND SURFACE WATER IMPACTS PERMIT

NAD 83/NA 2011



THIS IS A CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
THIS IS A PARTIAL CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWNS OF RUTHERFORDTON, RUTH, AND SPINDALE CITY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NCDOT CONTACT: DERRICK WEAVER, P.E.

CONTRACT:

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 = 13300
ADT 2040 = 14500
K = 9 %
D = 60 %
T = 9 % *
V = 70 MPH
* TTST 5% DUAL 4%
FUNC CLASS =
ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2233BB = 4.991 MILES
LENGTH STRUCTURE TIP PROJECT R-2233BB = 0.019 MILES
TOTAL LENGTH TIP PROJECT R-2233BB = 5.010 MILES

STRUCTURE LENGTH BASED ON –L3– NB STATIONING.

PLANS PREPARED FOR NCDOT BY:

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 28, 2017

LETTING DATE:
JANUARY 21, 2020

DENNIS J. MORY, P.E.
PROJECT ENGINEER

WILLIAM E. TILLITT, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919 881-9939
NC CO.A No. F-0929

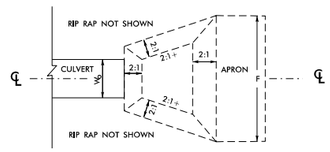
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2D-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 2 OF 37

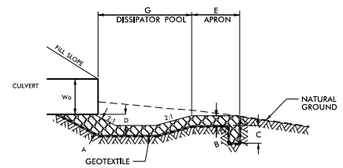
DETAIL 1
RIP-RAP ENERGY DISSIPATOR BASIN

DIM. (ft)	RIP RAP BASIN TYPE A	B	C	D	E	
A	2.0	2.0	2.5	2.5	2.0	
B	1.5	1.5	2.0	2.5	1.5	
C	2.0	2.0	2.0	3.0	2.0	
D	1.5	3.0	2.0	1.5	1.0	
E	7.5	10	10	7.5	5.0	
F	20	25	25	20	15	
G	15	25	20	15	10	
DDE (CY)	370	105	244	50	15	
GEOTEXTILE (SY)	370	70	185	40	20	
CL B RIP RAP (TONS)	125	45	55	45	N/A	
CL I RIP RAP (TONS)	105	N/A	N/A	N/A	15	
CL II RIP RAP (TONS)	25	50	115	N/A	N/A	

ALL DIMENSIONS APPROXIMATE



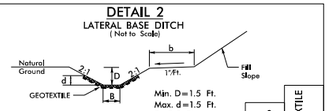
PLAN



℄ SECTION

BASIN #	LOCATION (AT OUTLET)	TYPE	SHEET
1	L3 STA 739+50 LT (CL I)	A	4
2	LPB STA. 17+50 RT (CL B)	B	6
3	L3 STA 778+91 LT (CL II)	A	6
4	L3 STA. 786+61 LT (CL B)	A	7
5	L3 STA. 808+38 LT (CL I)	A	9
6	L3 STA. 824+15 LT (CL B)	A	10
7	RPD STA. 20+15 RT (CL B)	A	11
8	L3 STA. 866+75 RT (CL I)	E	12
9	L3 STA. 867+10 RT (CL I)	A	12
10	L3 STA. 947+50 RT (CL B)	A	18
11	Y11 STA. 13+50 RT (CL B)	A	18
12	L3 STA. 965+10 LT (CL II)	C	20
13	L3 STA. 990+58 LT (CL B)	C	22
14	Y3 STA. 41+55 RT (CL B)	D	28
15	Y10 STA. 14+70 LT (CL II)	B	31
16	Y10 STA. 16+25 RT (CL II)	C	31
17	Y11 STA. 22+00 LT (CL I)	A	32

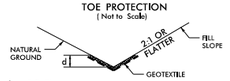
DETAIL 2
LATERAL BASE DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
*When B is < 6.0'
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 745+00 TO STA. 747+80 LT	5	1429	157	430
FROM Y25REV STA. 26+30 TO STA. 28+31 LT	5,33	70	113	305

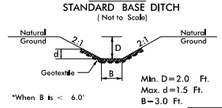
DETAIL 3
TOE PROTECTION
(Not to Scale)



d= 1.5 Ft.
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM LPD STA. 16+22 TO 18+08 RT	11	86	250
FROM LPD STA. 18+70 TO 20+41 RT	11	79	230
FROM RPD STA. 16+71 TO 19+00 RT	11	105	300
FROM RPD STA. 19+92 TO 20+50 RT	11	27	80
FROM L STA. 814+50 TO 814+68 RT	9	5	12

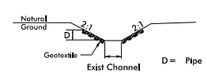
DETAIL 4
STANDARD BASE DITCH
(Not to Scale)



Min. D=2.0 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.
*When B is < 6.0'
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM RPD STA. 19+04 TO 19+86 RT	11	225	59	140
FROM Y5 STA. 11+75 TO 11+77 RT	13	256	1	10

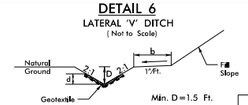
DETAIL 5
RIRPAP PAD AT JURISDICTIONAL STREAM
(Not to Scale)



D= Pipe Dia.
Type of Liner= CL II Rip-Rap

LOCATION	SHEET	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 814+83 LT	9	15	100
FROM RPD STA. 18+09 LT	11	29	100
FROM L3 STA. 995+71 LT	22	15	100
FROM L3 STA. 981+50 LT	21	27	100
FROM L3 STA. 968+80 LT	20	23	100
FROM Y6 STA. 10+25 RT	29	29	100
FROM Y11 STA. 22+33 LT	32	15	100
FROM Y6 STA. 32+05 LT	30	15	100

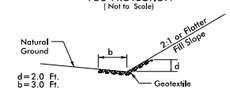
DETAIL 6
LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.
Type of Liner= CL II Rip-Rap

LOCATION	SHEET	DDE CY	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 798+16 TO 799+00 LT	8	49	103	160
FROM L3 STA. 801+00 TO 802+01 LT	8	51	124	190
FROM L3 STA. 798+42 TO 800+00 RT	8	110	193	300
FROM RPD STA. 18+11 TO 26+22 LT	11	970	993	1500
FROM L3 STA. 831+47 TO 838+00 LT	10, 11	2048	799	1210
FROM Y18 STA. 16+00 TO 17+51 LT	11	104	185	280
FROM Y11 STA. 11+00 TO 13+50 LT	18	529	245	470
FROM L3 STA. 963+56 TO 966+53 RT	19, 20	206	360	550
FROM L3 STA. 961+50 TO 965+05 LT	19, 20	317	435	660
FROM L3 STA. 966+54 TO 968+52 RT	20	121	186	290
FROM L3 STA. 968+55 TO 971+50 RT	20	408	361	550
FROM L3 STA. 989+50 TO 989+87 RT	21	14	45	70
FROM L3 STA. 995+00 TO 996+62 RT	22	113	207	320
FROM Y6 STA. 20+74 TO 21+41 RT	30	24	82	130
FROM Y11 STA. 20+56 TO 24+13 RT	32	160	106	660

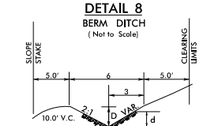
DETAIL 7
TOE PROTECTION
(Not to Scale)



d=2.0 Ft.
b=3.0 Ft.
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y12 STA. 16+50 TO 18+00 LT	15	53	130
FROM Y11 STA. 12+42 TO 12+73 RT	18	11	30
FROM Y11 STA. 13+50 TO 14+50 LT	18, 32	36	90
FROM L3 STA. 981+57 TO 982+00 LT	21	15	40
FROM L3 STA. 980+25 TO 980+62 RT	21	13	40
FROM Y10 STA. 12+50 TO 13+50 RT	31	36	90
FROM L3 STA. 888+00 TO 894+50 RT	14	228	685
FROM Y25REV STA. 25+00 TO 25+85 LT	33	65	167

DETAIL 8
BERM DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.
Type of Liner= CL B RIPRAP

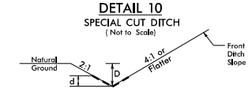
LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y2 STA. 31+00 TO 33+00 LT	6	178	92	260
FROM L3 STA. 782+00 TO 782+50 RT	7	44	23	70
FROM L3 STA. 811+45 TO 812+20 RT	9	67	35	100
FROM L3 STA. 815+87 TO 824+15 RT	9, 10	264	381	1080
FROM L3 STA. 824+15 TO 826+00 RT	10	65	85	240
FROM Y2 STA. 19+08 TO 21+00 LT	23	171	88	250

DETAIL 9
SPECIAL CUT DITCH
(Not to Scale)

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

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y2 STA. 26+21 TO 27+67 RT	6	67	190
FROM L3 STA. 814+71 TO 816+50 RT	9	82	240
FROM Y19 STA. 22+20 TO 27+00 RT	9, 26	358	1010
FROM LPD STA. 18+08 TO 18+70 RT	11	29	90
FROM L3 STA. 883+96 TO 885+50 LT	13	71	200
FROM L3 STA. 890+50 TO 892+00 LT	14	69	200
FROM Y6 STA. 10+00 TO 10+90 LT	29	41	120
FROM Y6 STA. 11+40 TO 13+56 LT	29	99	280
FROM Y22A STA. 35+60 TO 37+00 RT	11, 29	64	190
FROM Y10 STA. 20+00 TO 22+00 LT	31	92	260
FROM Y10 STA. 31+00 TO 33+02 LT	33	92	260

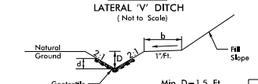
DETAIL 10
SPECIAL CUT DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max d=1.5 Ft.
Type of Liner= PSRM

LOCATION	SHEET	PSRM SY
FROM L3 STA. 807+64 TO 809+50 RT	8, 9	70
FROM Y7 STA. 14+75 TO 17+75 LT	21	330
FROM L3 STA. 776+50 TO 779+50 RT	6	200

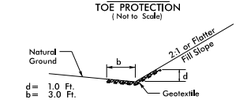
DETAIL 11
LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 765+00 TO 767+15 RT	6	2276	99	170
FROM Y5 STA. 17+50 TO 20+50 LT	13	134	138	230
FROM L3 STA. 885+50 TO 890+50 LT	13, 14	176	230	380
FROM Y22A STA. 37+50 TO 40+00 RT	29	199	115	190
FROM Y10 STA. 13+50 TO 14+25 LT	31	96	35	60
FROM Y25REV STA. 26+00 TO 28+00 RT	5	130	92	259

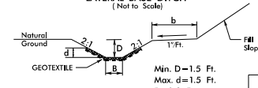
DETAIL 12
TOE PROTECTION
(Not to Scale)



d= 1.0 Ft.
b= 3.0 Ft.
Type of Liner= CL II Rip-Rap

LOCATION	SHEET	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 794+00 TO 796+00 RT	7, 8	225	320
FROM L3 STA. 795+98 TO 797+57 LT	8	179	260
FROM L3 STA. 798+00 TO 798+33 RT	8	37	60
FROM L3 STA. 799+00 TO 801+00 LT	8	225	320
FROM L3 STA. 800+00 TO 801+00 RT	8	112	160
FROM L3 STA. 828+72 TO 830+50 LT	10	200	290
FROM Y18 STA. 15+27 TO 15+76 LT	11	55	80
FROM L3 STA. 963+00 TO 963+54 RT	19	61	90
FROM L3 STA. 980+75 TO 981+50 LT	21	84	120
FROM L3 STA. 989+50 TO 990+50 LT	21	113	160
FROM Y6 STA. 26+25 TO 28+50 LT	30	275	360
FROM Y6 STA. 29+00 TO 30+45 RT	30	177	240

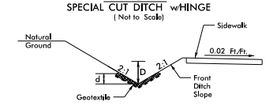
DETAIL 13
LATERAL BASE DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.
b=5.0 Ft.
*When B is < 6.0'
Type of Liner= CL II Rip-Rap

LOCATION	SHEET	DDE CY	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 832+55 TO 838+00 RT	10, 11	1954	332	1190
FROM Y10 STA. 17+80 TO 18+04 LT	31	21	15	60
FROM Y10 STA. 15+50 TO 15+70 RT	31	18	13	50

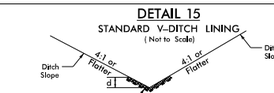
DETAIL 14
SPECIAL CUT DITCH wHINGE
(Not to Scale)



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

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y2 STA. 33+50 TO 40+00 LT	6	299	850

DETAIL 15
STANDARD V-DITCH LINING
(Not to Scale)



Max. d= 1.5 Ft.
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM RPD STA. 14+14 TO 16+71 RT	11	118	340
FROM RPD STA. 20+50 TO 23+40 RT	11	133	380
FROM L3 STA. 927+50 LT	17	15	50
FROM L3 STA. 944+50 LT	18	15	50
FROM L3 STA. 871+00 TO 872+00 LT	12	32	70

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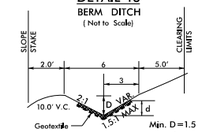
10/25/2017
DWilkins
R2233BB_Permit Drawings_20171025.pdf

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919 881-9939
NC CO.A No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2D-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 3 OF 37

DETAIL 16
BERM DITCH
(Not to Scale)

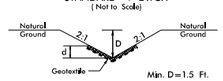


Min. D=1.5 Ft.
Max. d=1.5 Ft.

Type of Liner= CL B RIPRAP

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 951+32 TO 954+20 RT	18, 19	160	120	320

DETAIL 17
STANDARD 'V' DITCH
(Not to Scale)

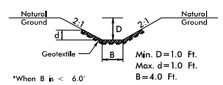


Min. D=1.5 Ft.
Max. d=1.5 Ft.

Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y3 STA. 31+05 TO 31+67 RT	11	24	29	90
FROM Y12 STA. 28+72 TO 29+20 LT	16	20	25	44
FROM Y12 STA. 10+43 TO 11+25 RT	15	40	38	110
FROM Y11 STA. 19+90 TO 20+25 RT	32	33	16	50

DETAIL 18
STANDARD BASE DITCH
(Not to Scale)



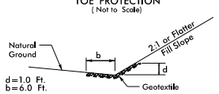
Min. D=1.0 Ft.
Max. d=1.0 Ft.
B=4.0 Ft.

*When B is < 6.0'

Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
Y6 STA. 10+31 RT	29	16	30	90

DETAIL 19
TOE PROTECTION
(Not to Scale)

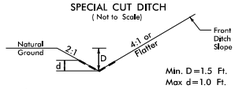


d=1.0 Ft.
b=6.0 Ft.

Type of Liner= CLASS II Rip-Rap

LOCATION	SHEET	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 921+00 TO 922+50 RT	16	148	240
FROM L3 STA. 996+00 TO 998+58 LT	22	292	475
FROM L3 STA. 997+00 TO 998+50 RT	22	195	315

DETAIL 20
SPECIAL CUT DITCH
(Not to Scale)

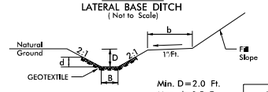


Min. D=1.5 Ft.
Max d=1.0 Ft.

Type of Liner= PSRM

LOCATION	SHEET	PSRM SY
FROM Y12 STA. 20+60 TO 22+50 RT	15	210
FROM Y12 STA. 24+00 TO 26+00 RT	15, 16	225
FROM Y12 STA. 28+50 TO 29+20 RT	16	80
FROM Y12 STA. 29+20 TO 31+00 RT	16	200
FROM Y11 STA. 26+00 TO 27+00 RT	32	110

DETAIL 21
LATERAL BASE DITCH
(Not to Scale)



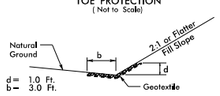
Min. D=2.0 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.
b=5.0 Ft.

*When B is < 6.0'

Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y8 STA. 10+66 TO 12+90 RT	31	176	120	320
FROM L3 STA. 739+50 TO 742+66 LT	4, 5	784	245	655

DETAIL 22
TOE PROTECTION
(Not to Scale)

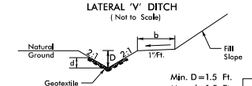


d= 1.0 Ft.
b= 3.0 Ft.

Type of Liner= CL 1 Rip-Rap

LOCATION	SHEET	CL I RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 865+00 TO 866+49 LT	12	112	200
FROM L3 STA. 969+00 TO 971+00 LT	20	151	270

DETAIL 23
LATERAL 'V' DITCH
(Not to Scale)

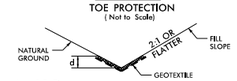


Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.

Type of Liner= CL I Rip-Rap

LOCATION	SHEET	DDE CY	CL I RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 828+00 TO 831+80 RT	10	692	175	600
FROM Y11 STA. 12+42 TO 12+73 RT	18	62	14	50
FROM Y10 STA. 19+19 TO 20+00 LT	31	128	37	130
FROM Y11 STA. 15+50 TO 17+09 LT	32	137	73	250
FROM Y11 STA. 17+09 TO 18+00 LT	32	81	42	150
FROM Y11 STA. 18+00 TO 18+64 LT	32	15	29	110
FROM Y11 STA. 18+64 TO 19+45 LT	32	25	37	130
FROM Y11 STA. 19+45 TO 21+51 LT	32	186	95	330
FROM Y11 STA. 21+51 TO 22+03 LT	32	15	24	90

DETAIL 24
TOE PROTECTION
(Not to Scale)

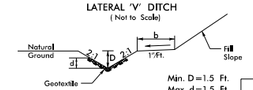


d= 1.5 Ft.

Type of Liner= CL 1 Rip-Rap

LOCATION	SHEET	CL I RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 743+84 TO 745+00 LT	5	133	160
FROM DR3 STA. 12+00 TO 14+50 RT	11, 27	287	340
FROM Y10 STA. 16+50 TO 17+76 LT	31	145	170
FROM Y8 STA. 10+61 TO 11+73 LT	31	129	150
FROM L STA. 744+15 TO 747+50 RT	31	129	150

DETAIL 25
LATERAL 'V' DITCH
(Not to Scale)

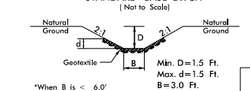


Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.

Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y3 STA. 18+85 TO 20+44 RT	11, 27	38	73	210

DETAIL 26
STANDARD BASE DITCH
(Not to Scale)



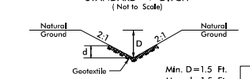
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.

*When B is < 6.0'

Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 767+26 TO 768+28 LT	6	596	71	190

DETAIL 27
STANDARD 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.

Type of Liner= CL II Rip-Rap

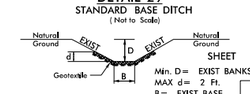
LOCATION	SHEET	DDE CY	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 797+67 TO 798+00 RT	8	18	15	70

DETAIL 28
SPECIAL CUT DITCH
(Not to Scale)

Min. D=1.5 Ft.

LOCATION	SHEET
FROM L3 STA. 779+47 TO 799+60 LT (-CUL16-)	6

DETAIL 29
STANDARD BASE DITCH
(Not to Scale)



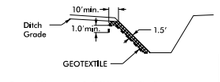
SHEET
Min. D= EXIST BANKS
MAX d= 2 Ft.
B= EXIST BASE

*When B is < 6.0'

Type of RIPRAP = SEE BELOW

LOCATION	SHEET	CL I RIP-RAP TON	GEOTEXTILE FABRIC SY
L3 STA. 867+12 RT (CL I)	12	20	110

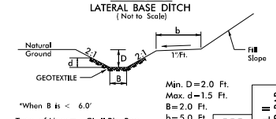
DETAIL 30
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 5 TONS,CL B Rip-Rap
Geotextile= 6 sy

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 797+65 RT	8	35	70
FROM L3 STA. 864+92 LT	12	35	70
FROM L3 STA. 882+80 RT	13	35	70
FROM Y11 STA. 22+27 LT	32	35	70

DETAIL 31
LATERAL BASE DITCH
(Not to Scale)



Min. D=2.0 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.

*When B is < 6.0'

Type of Liner= CL II Rip-Rap

LOCATION	SHEET	DDE CY	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y10 STA. 26+25 TO 28+00 LT	15	55	107	390
FROM L3 STA. 910+00 TO 910+50 RT	15	25	83	115

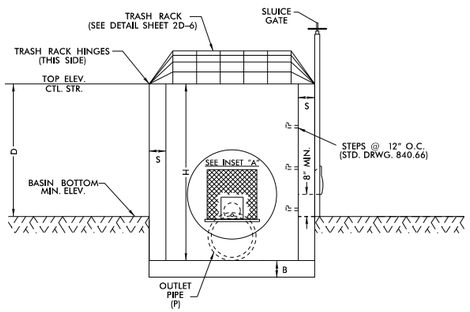
Dewberry
7610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2D-3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

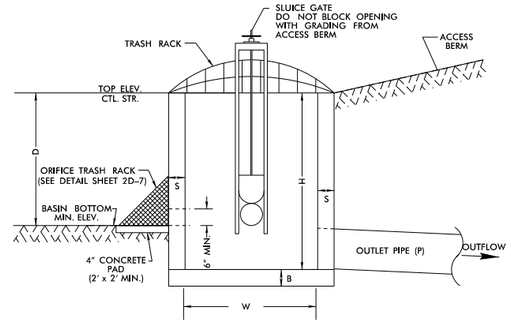
DETAIL K

DRY DETENTION BASIN DRAWDOWN STRUCTURE

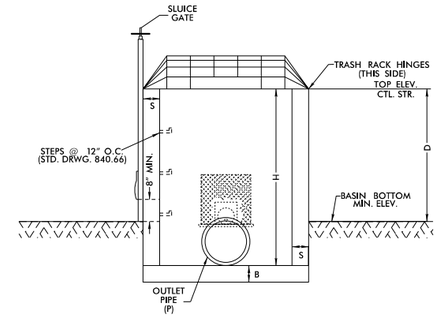
NOT TO SCALE



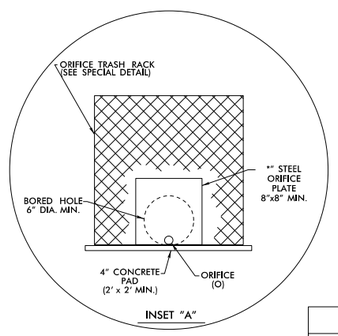
SIDE 1



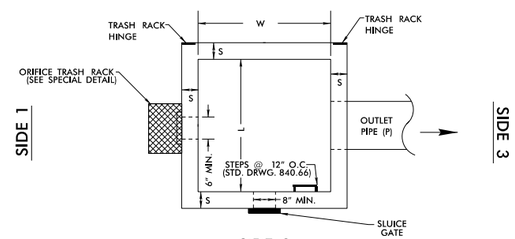
SIDE 2



SIDE 3



INSET "A"



SIDE 2

PLAN VIEW

TRASH RACK NOT SHOWN FOR CLARITY

NOTES:

1. TOP ELEVATION OF CONTROL STRUCTURE (WEIR ELEVATION) SHOULD BE SET AT THE WQv ELEVATION.
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. 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 AND FOR PROPER SEATING OF GATE OVER PIPE.
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.

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

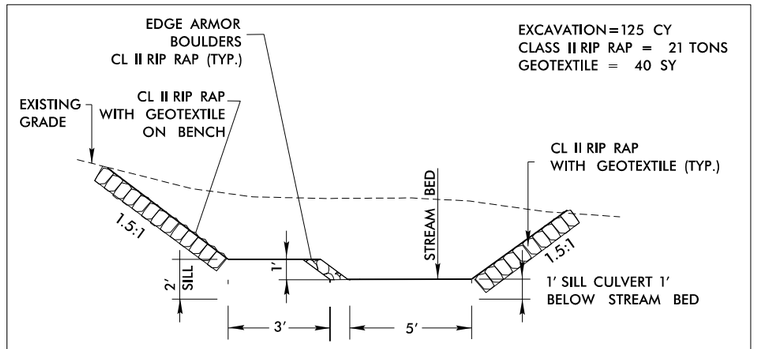
STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
LPB 17+50 RT	655	8	12	957.50	960.50	3.0	956.00	4 X 4 X 4.5	2	957.50	30
L 907+00 RT	1514	8	12	1036.50	1039.00	2.5	1034.00	4 X 4 X 5	2	1036.50	30

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0029

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2D-5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

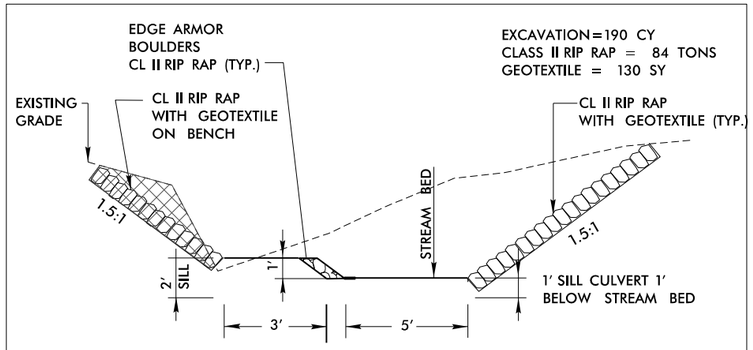
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 5 OF 37



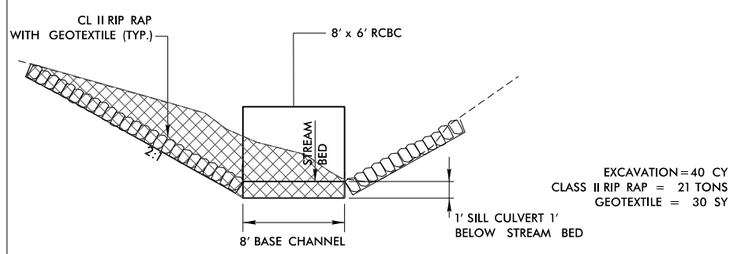
DETAIL G1 – FLOODPLAIN BENCH INLET CHANNEL DETAIL
STA 797+66 (LOOKING DOWNSTREAM)

DETAIL G1
CULVERT 797+66



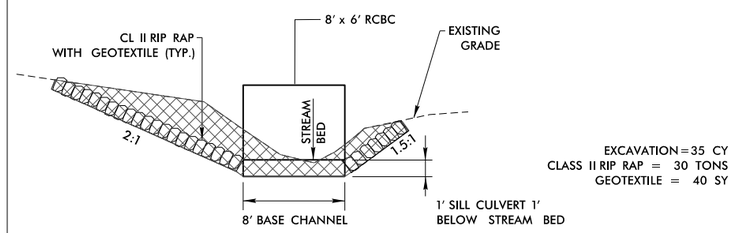
DETAIL G2 – FLOODPLAIN BENCH OUTLET CHANNEL DETAIL
STA 797+66 (LOOKING DOWNSTREAM)

DETAIL G2
CULVERT 797+66



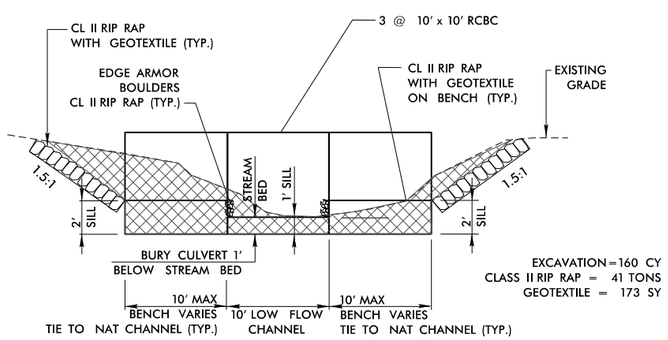
INLET CHANNEL DETAIL
STA 830+03 (LOOKING DOWNSTREAM)

DETAIL H1
CULVERT 830+02



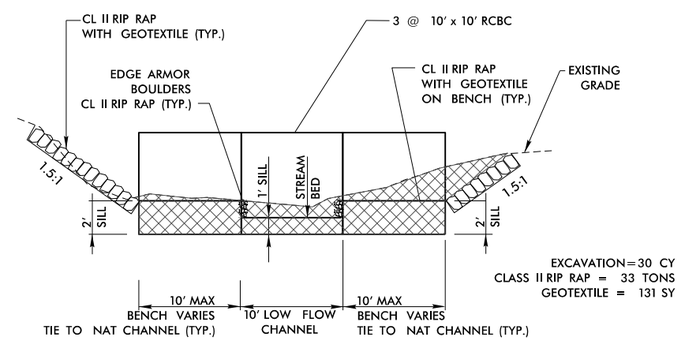
OUTLET CHANNEL DETAIL
STA 830+03 (LOOKING DOWNSTREAM)

DETAIL H2
CULVERT 830+02



FLOODPLAIN BENCH INLET CHANNEL DETAIL
STA 874+45 (LOOKING DOWNSTREAM)

DETAIL J1
CULVERT 874+45



FLOODPLAIN BENCH OUTLET CHANNEL DETAIL
STA 874+45 (LOOKING DOWNSTREAM)

DETAIL J2
CULVERT 874+45

5/14/99
10/25/2017
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REVISIONS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 1 SN

SITE 17 SO

SITE 17

MATCH TO SHEET 23 -Y2- STA. 23+00.00

MATCH TO SHEET 5 -L3- STA. 756+00.00

MATCH TO SHEET 7 -L3- STA. 782+00.00

MATCH TO SHEET 24 -Y25- STA. 32+00.00

MATCH TO SHEET 24 -Y2- STA. 37+50.00

Dewberry

PERMIT DRAWING SHEET 6 OF 37

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TRAFFIC DATA

B 87/114 A 12/15
10/15 128/145
65/88 US 221 BYPASS
C 71/97 D 94/112
192/255 206/260 *VPD IN 100s

PROPOSED SIGNAL

GRAPHIC SCALE
50 25 0 50 100
PLANS

SEE SHEETS 33 & 36 FOR -L3- PROFILE
SEE SHEETS 34 & 35 FOR -Y2- PROFILE
SEE SHEETS 18&19 FOR -RPB- PROFILE
SEE SHEETS 14&15 FOR -RPC- PROFILE
SEE SHEET 20 FOR -LPB- PROFILE
SEE SHEET 20 FOR -LPC- PROFILE
SEE SHEET 26-A FOR INTERSECTION DETAILS
SEE SHEETS 26-B, 26-C FOR SIGNING DETAILS
SEE SHEETS 20-1 THRU 20-7 FOR DRAINAGE DETAILS

LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TIP NO.:	COUNTY:
R-2233BB	RUTHERFORD
DESIGNED BY: RES	DATE: 6/1/2018
CHECKED BY: DJM	DATE: 6/1/2018

REVISIONS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 1 SN

SITE 1 SN

SITE 17 SO

SITE 17

B

C

MATCH TO SHEET 23 -Y2- STA. 23+00.00

MATCH TO SHEET 5 -L3- STA. 756+00.00

MATCH TO SHEET 7 -L3- STA. 782+00.00

MATCH TO SHEET 24 -Y25- STA. 32+00.00

MATCH TO SHEET 24 -Y2- STA. 37+50.00

Dewberry

PERMIT DRAWING SHEET 7 OF 37

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TRAFFIC DATA

B 87/114 A 12/15 CHARLOTTE RD. US 74 BUSINESS 10/13 65/88 US 221 BYPASS 128/145 C 71/97 D 94/112 192/255 206/300 *VPD IN 100s

PROPOSED SIGNAL

GRAPHIC SCALE 50 25 0 50 100 PLANS

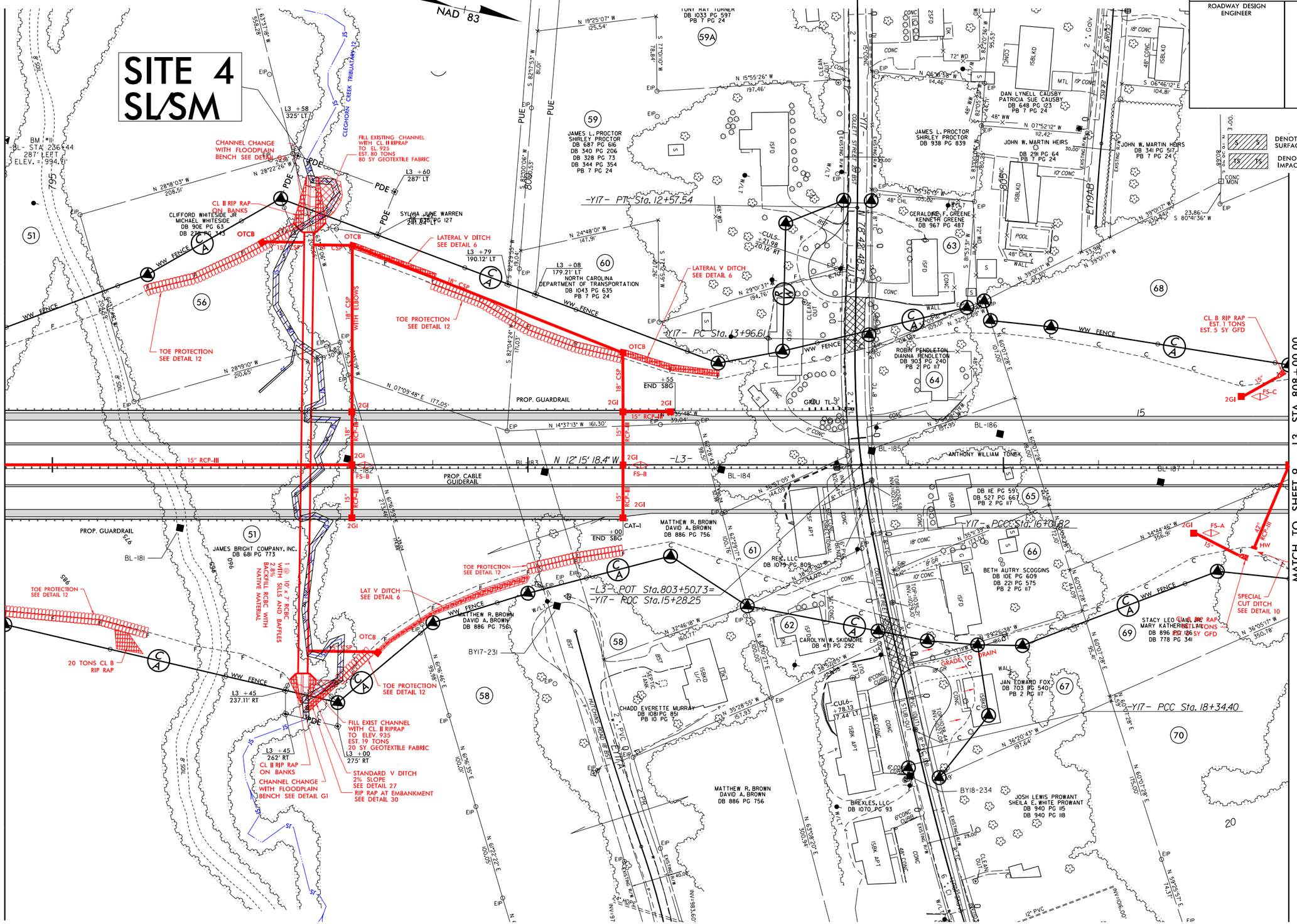
SEE SHEETS 35 & 36 FOR -L3- PROFILE
SEE SHEETS 44 & 45 FOR -Y25- PROFILE
SEE SHEETS 58 & 61 FOR -RPC- PROFILE
SEE SHEETS 59 & 61 FOR -RPB- PROFILE
SEE SHEET 59 FOR -ARPB- PROFILE
SEE SHEET 59 FOR -ARPC- PROFILE
SEE SHEET 36-A FOR INTERCHANGE DETAILS
SEE SHEET 36-B FOR INTERCHANGE DETAILS
SEE SHEETS 20-1 THRU 20-7 FOR DRAINAGE DETAILS

LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TIP NO.	COUNTY:
R-2233BB	RUTHERFORD
DESIGNED BY: RES	6/1/2018
CHECKED BY: DJM	DATE: 6/1/2018

PERMIT DRAWING
SHEET 8 OF 37

PROJECT REFERENCE NO.	SHEET NO.
	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



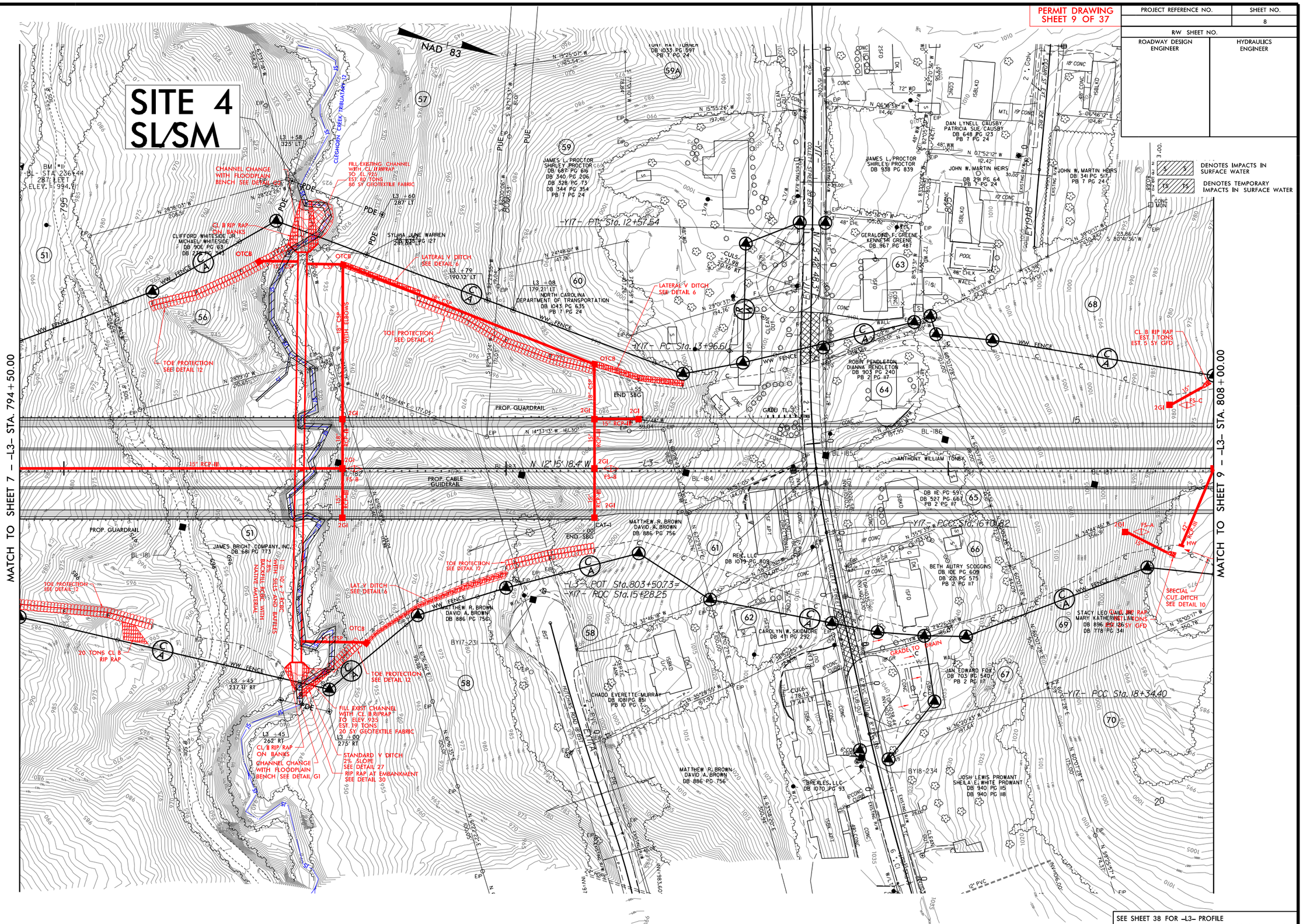
5/14/99

10252017
DSWEBKRY
R2223198_Permit Drawings_20171025.pdf

5/14/99

PERMIT DRAWING
SHEET 9 OF 37

PROJECT REFERENCE NO.	SHEET NO.
	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

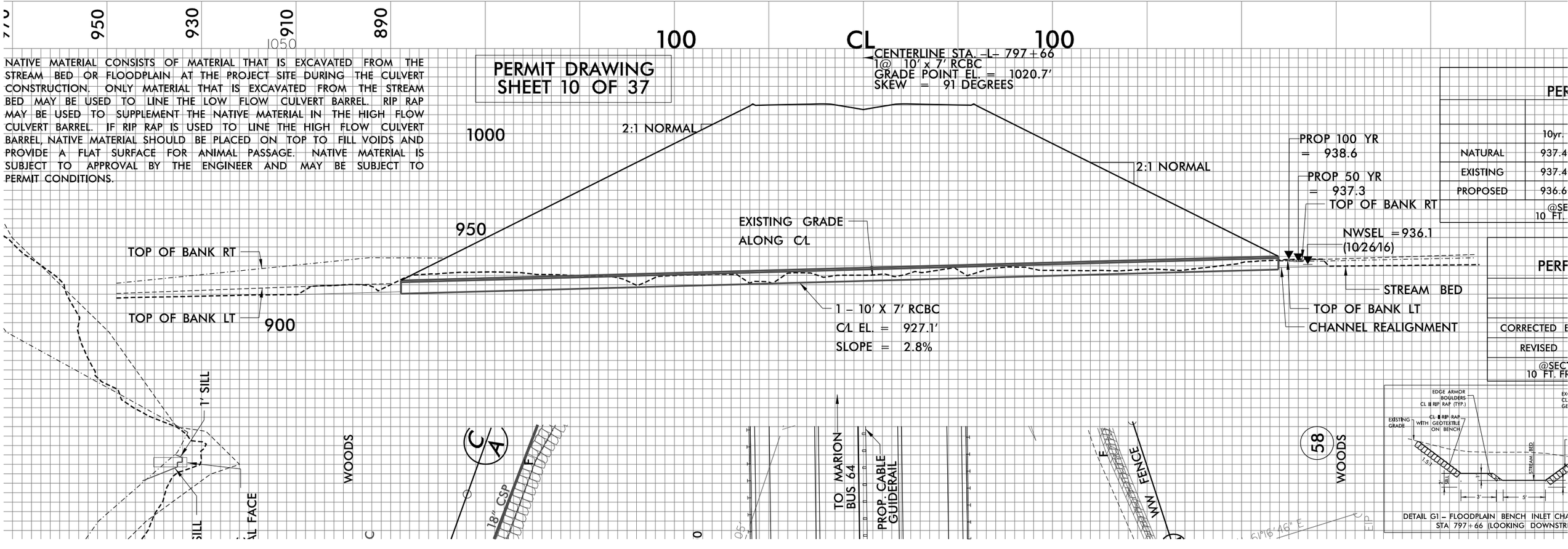


SEE SHEET 38 FOR –L3– PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

10/25/2017
DEWBERRY
R2123-38_Permit Drawings_20171025.pdf

NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING THE CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL. IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL, 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.

PERMIT DRAWING
SHEET 10 OF 37

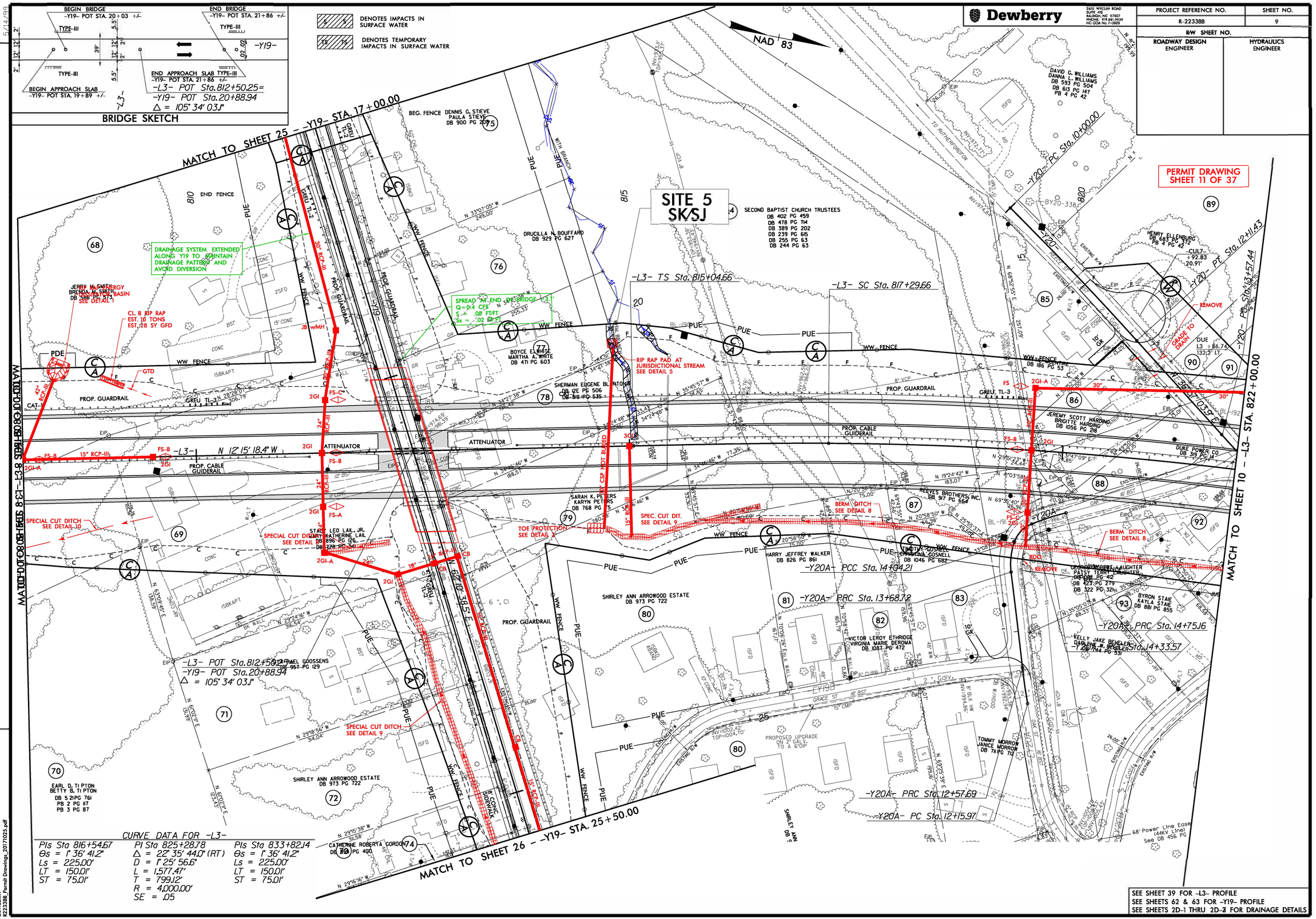


	PER	
	10yr	
NATURAL	937.4	
EXISTING	937.4	
PROPOSED	936.6	
	@SE 10 FT.	

	PERF
CORRECTED E	
REVISED	
	@SECT 10 FT. FR

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929



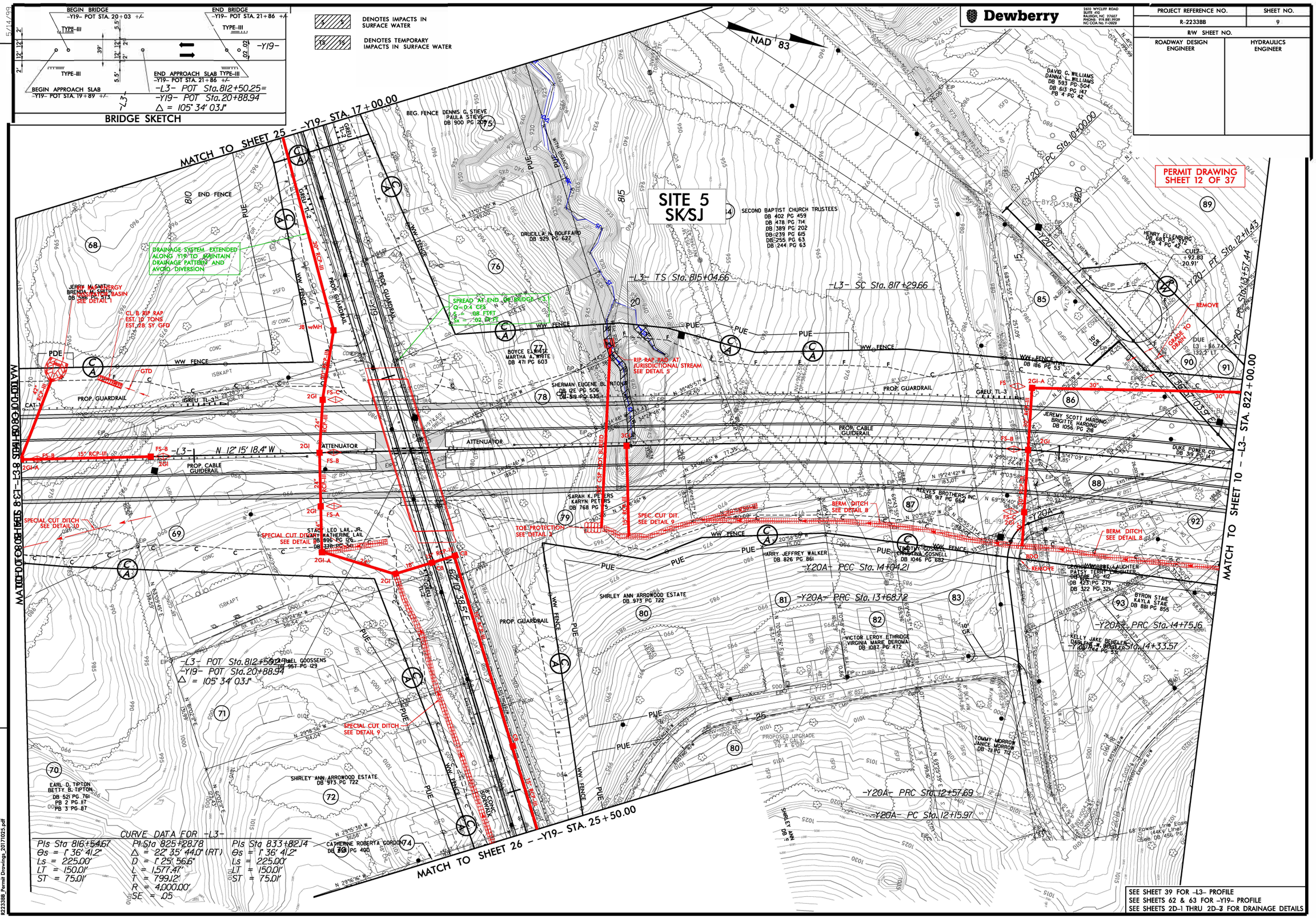
CURVE DATA FOR -L3-

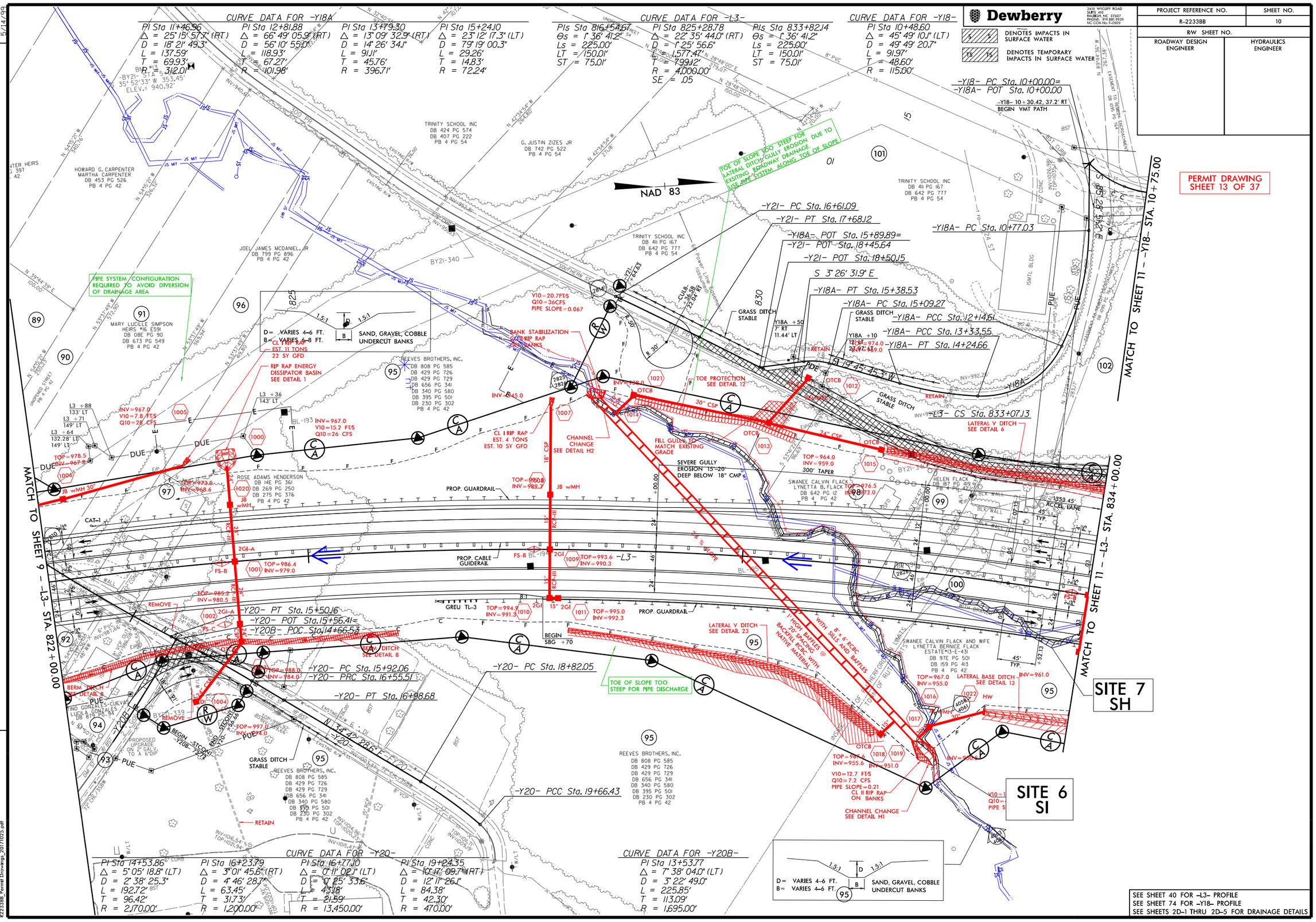
PIs Sta 816+54.67	PI Sta 825+28.78	PIs Sta 833+82.14
Θs = 1° 36' 41.2"	Δ = 22° 35' 44.0" (RT)	Θs = 1° 36' 41.2"
Ls = 225.00'	D = 1° 25' 56.6"	Ls = 225.00'
LT = 150.01'	L = 1,577.47'	LT = 150.01'
ST = 75.01'	T = 799.12'	ST = 75.01'
	R = 4,000.00'	
	SE = .05	

REVISIONS
ROW REV. - December 21, 2017 - Parcel 93 - Revised tie at Y20A +60 to Y20A +68.88EX. R/W (WET)
ROW REV. - December 21, 2017 - Parcel 85 - Property owner name changed to Earl McEntire (WET)

5/14/99

10252017
DEWBERRY
R2233BB_Permit Drawings_20171023.pdf


BEGIN BRIDGE
-Y19- POT STA. 20+03 +/-
END BRIDGE
-Y19- POT STA. 21+86 +/-
TYPE-III
-Y19-
END APPROACH SLAB TYPE-III
-Y19- POT STA. 21+86 +/-
BEGIN APPROACH SLAB
-Y19- POT STA. 19+89 +/-
-L3-
-L3- POT Sta.812+50.25=
-Y19- POT Sta.20+88.94
Δ = 105° 34' 03.1"
BRIDGE SKETCH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC CON NO. F-0929
PROJECT REFERENCE NO.
R-2233BB
SHEET NO.
9
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NAD 83
MATCH TO SHEET 25 – -Y19- STA. 17+00.00
MATCH TO SHEET 10 – -L3- STA. 822+00.00
MATCH TO SHEET 26 – -Y19- STA. 25+50.00
PERMIT DRAWING
SHEET 12 OF 37
SITE 5
SK/SJ
-L3- TS Sta. 815+04.66
-L3- SC Sta. 817+29.66
-Y20- PC Sta. 10+00.00
-Y20- PT Sta. 12+11.43
-Y20A- PCC Sta. 14+04.21
-Y20A- PRC Sta. 13+68.72
-Y20A- PRC Sta. 14+75.16
-Y20A- PT Sta. 14+33.57
-Y20A- PRC Sta. 12+57.69
-Y20A- PC Sta. 12+15.97
-L3- POT Sta.812+50.25=
-Y19- POT Sta.20+88.94
Δ = 105° 34' 03.1"
DRAINAGE SYSTEM EXTENDED ALONG -Y19- TO MAINTAIN DRAINAGE PATTERN AND AVOID DIVERSION
SPREAD AT END OF BRIDGE = 3.1'
Q = 0.4 CFS
S = .08 FT/FT
Csx = .02 FT/FT
CL B RIP RAP
EST. 10 TONS
EST. 28 SY GFD
RIP-RAP PAD AT JURISDICTIONAL STREAM SEE DETAIL 5
SPECIAL CUT DITCH SEE DETAIL 10
SPECIAL CUT DITCH SEE DETAIL 9
TOE PROTECTION SEE DETAIL
SPEC. CUT DIT. SEE DETAIL 9
BERM DITCH SEE DETAIL 8
REMOVE
GRADE TO DRAIN
PROP. GUARDRAIL
ATTENUATOR
PROP. CABLE GUIDERAIL
WW FENCE
PUE
N 12° 15' 18.4" W
N 62° 10' 38.5" E
N 35° 45' 57.1" W
N 35° 31' 03.5" E
CURVE DATA FOR -L3-
PIs Sta 816+54.67
Θs = 1° 36' 41.2"
Ls = 225.00'
LT = 150.01'
ST = 75.01'
PIs Sta 825+28.78
Δ = 22° 35' 44.0" (RT)
D = 1° 25' 56.6"
L = 1,577.47'
T = 799.12'
R = 4,000.00'
SE = .05
PIs Sta 833+82.14
Θs = 1° 36' 41.2"
Ls = 225.00'
LT = 150.01'
ST = 75.01'
SEE SHEET 39 FOR -L3- PROFILE
SEE SHEETS 62 & 63 FOR -Y19- PROFILE
SEE SHEETS 2D-1 THRU 2D-3 FOR DRAINAGE DETAILS
REVISIONS
ROW REV. - December 21, 2017 - Parcel 93 - Revised tie at Y20A +60 to Y20A +68.88/EX. R/W (WET)
ROW REV. - December 21, 2017 - Parcel 85 - Property owner name changed to Earl McEntire (WET)
10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf


Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PROJECT REFERENCE NO.
R-2233BB
SHEET NO.
10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PERMIT DRAWING
SHEET 13 OF 37
CURVE DATA FOR -Y18A
PI Sta 11+46.96
△ = 25° 15' 57.7" (RT)
D = 18° 21' 49.3"
L = 137.59'
T = 69.93'
R = 312.01'
PI Sta 12+81.88
△ = 66° 49' 05.9" (RT)
D = 56° 10' 55.0"
L = 118.93'
T = 67.27'
R = 101.98'
PI Sta 13+79.30
△ = 13° 09' 32.9" (RT)
D = 14° 26' 34.1"
L = 91.11'
T = 45.76'
R = 396.71'
PI Sta 15+24.10
△ = 23° 12' 17.3" (LT)
D = 79° 19' 00.3"
L = 29.26'
T = 14.83'
R = 72.24'
CURVE DATA FOR -L3-
PIs Sta 816+54.67
Θs = 1° 36' 41.2"
Ls = 225.00'
LT = 150.01'
ST = 75.01'
PI Sta 825+28.78
△ = 22° 35' 44.0" (RT)
D = 1° 25' 56.6"
L = 1,577.47'
T = 799.12'
R = 4,000.00'
SE = .05
PIs Sta 833+82.14
Θs = 1° 36' 41.2"
Ls = 225.00'
LT = 150.01'
ST = 75.01'
CURVE DATA FOR -Y18-
PI Sta 10+48.60
△ = 45° 49' 10.1" (LT)
D = 49° 49' 20.7"
L = 91.97'
T = 48.60'
R = 115.00'
-Y18- PC Sta. 10+00.00=
-Y18A- POT Sta. 10+00.00
-Y18- 10+30.42, 37.2' RT
BEGIN VMT PATH
NAD 83
TOE OF SLOPE TOO STEEP FOR LATERAL DITCH/GULLY EROSION DUE TO EXISTING ROADWAY DRAINAGE. USE PIPE SYSTEM ALONG TOE OF SLOPE
PIPE SYSTEM CONFIGURATION REQUIRED TO AVOID DIVERSION OF DRAINAGE AREA
-Y21- PC Sta. 16+61.09
-Y21- PT Sta. 17+68.12
-Y18A- POT Sta. 15+89.89=
-Y21- POT Sta. 18+45.64
-Y21- POT Sta. 18+50.15
S 3° 26' 31.9" E
-Y18A- PT Sta. 15+38.53
-Y18A- PC Sta. 15+09.27
-Y18A- PC Sta. 10+77.03
-Y18A- PCC Sta. 12+14.61
-Y18A- PCC Sta. 13+33.55
-Y18A- PT Sta. 14+24.66
-L3- CS Sta. 833+07.13
MATCH TO SHEET 11 - -Y18- STA. 10+75.00
MATCH TO SHEET 11 - -L3- STA. 834+00.00
MATCH TO SHEET 9 - -L3- STA. 822+00.00
SITE 7
SH
SITE 6
SI
D = VARIES 4-6 FT.
B = VARIES 4-6 FT.
SAND, GRAVEL, COBBLE UNDERCUT BANKS
BANK STABILIZATION CL II RIP RAP ON BANKS
CL I RIP RAP EST. 11 TONS 22 SY GFD
RIP RAP ENERGY DISSIPATOR BASIN SEE DETAIL 1
V10=20.7FTS Q10=36CFS PIPE SLOPE=0.067
TOE PROTECTION SEE DETAIL 12
CHANNEL CHANGE SEE DETAIL H2
CL I RIP RAP EST. 4 TONS EST. 10 SY GFD
FILL GULLY TO MATCH EXISTING GRADE
SEVERE GULLY EROSION 15-20' DEEP BELOW 18" CMP
LATERAL V DITCH SEE DETAIL 6
LATERAL V DITCH SEE DETAIL 23
LATERAL BASE DITCH SEE DETAIL 13
BERM DITCH SEE DETAIL 8
TOE OF SLOPE TOO STEEP FOR PIPE DISCHARGE
CHANNEL CHANGE SEE DETAIL H1
-Y20- PT Sta. 15+50.16
-Y20- POT Sta. 15+56.41=
-Y20B- POC Sta. 14+66.53
-Y20- PC Sta. 15+92.06
-Y20- PRC Sta. 16+55.51
-Y20- PC Sta. 18+82.05
-Y20- PT Sta. 16+98.68
-Y20- PCC Sta. 19+66.43
CURVE DATA FOR -Y20-
PI Sta 14+53.86
△ = 5° 05' 18.8" (LT)
D = 2° 38' 25.3"
L = 192.72'
T = 96.42'
R = 2,170.00'
PI Sta 16+23.79
△ = 3° 01' 45.6" (RT)
D = 4° 46' 28.7"
L = 63.45'
T = 31.73'
R = 1,200.00'
PI Sta 16+77.10
△ = 0° 11' 02.1" (LT)
D = 0° 25' 33.6"
L = 43.18'
T = 21.59'
R = 13,450.00'
PI Sta 19+24.35
△ = 10° 17' 09.7" (RT)
D = 12° 11' 26.1"
L = 84.38'
T = 42.30'
R = 470.00'
CURVE DATA FOR -Y20B-
PI Sta 13+53.77
△ = 7° 38' 04.0" (LT)
D = 3° 22' 49.0"
L = 225.85'
T = 113.09'
R = 1,695.00'
SEE SHEET 40 FOR -L3- PROFILE
SEE SHEET 74 FOR -Y18- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS
REVISIONS
5/14/99
J0252017
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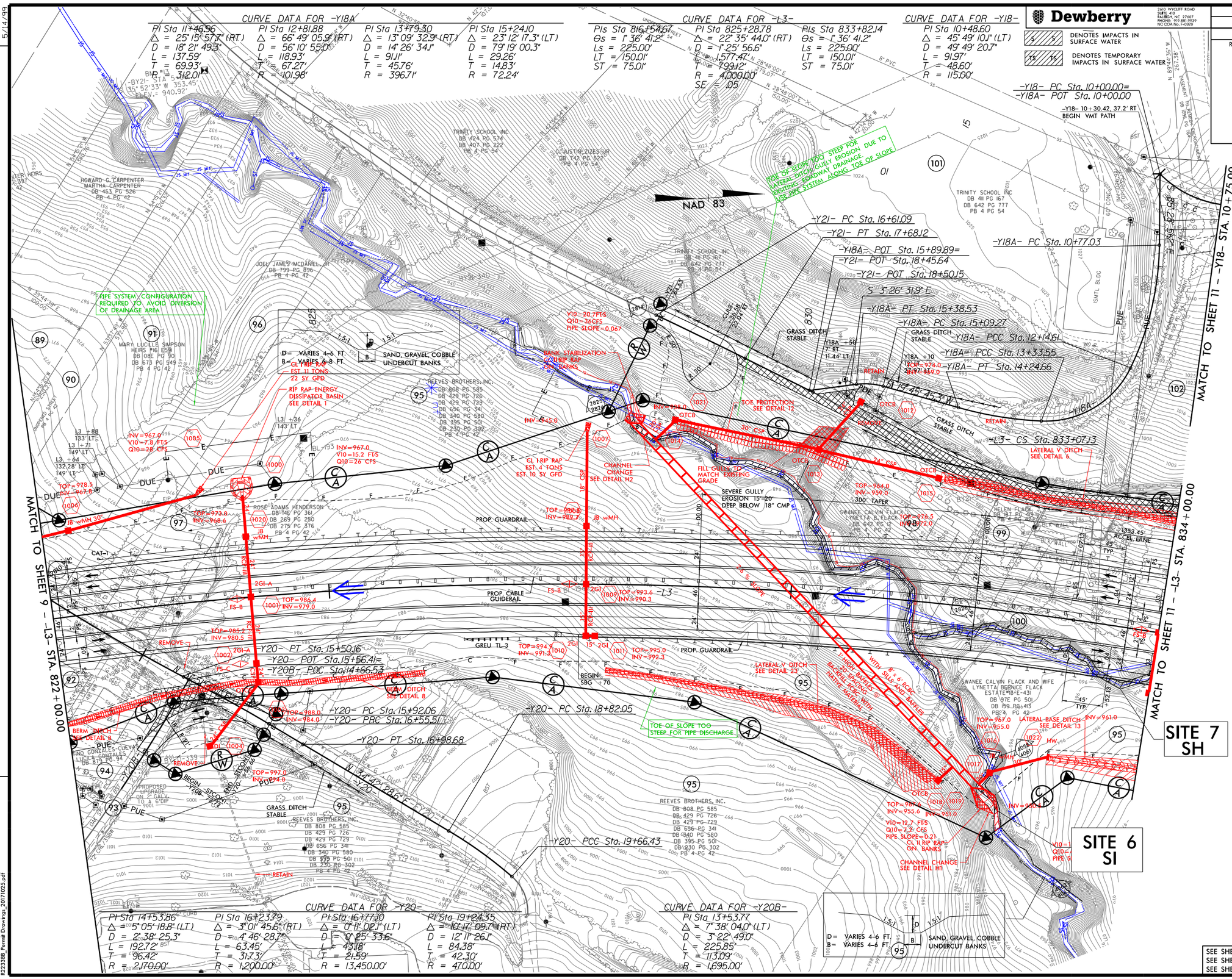
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 14 OF 37



CURVE DATA FOR -Y18A-

PI Sta 11+46.96	PI Sta 12+81.88	PI Sta 13+79.30	PI Sta 15+24.10
Δ = 25° 15' 57.7" (RT)	Δ = 66° 49' 05.9" (RT)	Δ = 13° 09' 32.9" (RT)	Δ = 23° 12' 17.3" (LT)
D = 18° 21' 49.3"	D = 56° 10' 55.0"	D = 14° 26' 34.1"	D = 79° 19' 00.3"
L = 137.59'	L = 118.93'	L = 91.11'	L = 29.26'
T = 69.93'	T = 67.27'	T = 45.76'	T = 14.83'
R = 312.01'	R = 101.98'	R = 396.71'	R = 72.24'

CURVE DATA FOR -L3-

PIs Sta 816+54.67	PI Sta 825+28.78	PIs Sta 833+82.14
Θs = 1° 36' 41.2"	Δ = 22° 35' 44.0" (RT)	Θs = 1° 36' 41.2"
Ls = 225.00'	D = 1° 25' 56.6"	Ls = 225.00'
LT = 150.01'	L = 1,577.47'	LT = 150.01'
ST = 75.01'	T = 799.12'	ST = 75.01'
	R = 4,000.00'	
	SE = .05'	

CURVE DATA FOR -Y18-

PI Sta 10+48.60
Δ = 45° 49' 10.1" (LT)
D = 49° 49' 20.7"
L = 91.97'
T = 48.60'
R = 115.00'

CURVE DATA FOR -Y20-

PI Sta 14+53.86	PI Sta 16+23.79	PI Sta 16+77.10	PI Sta 19+24.35
Δ = 5° 05' 18.8" (LT)	Δ = 3° 01' 45.6" (RT)	Δ = 0° 11' 02.1" (LT)	Δ = 10° 17' 09.7" (RT)
D = 2° 38' 25.3"	D = 4° 46' 28.7"	D = 0° 25' 33.6"	D = 12° 11' 26.1"
L = 192.72'	L = 63.45'	L = 43.18'	L = 84.38'
T = 96.42'	T = 31.73'	T = 21.59'	T = 42.30'
R = 2,170.00'	R = 1,200.00'	R = 13,450.00'	R = 470.00'

CURVE DATA FOR -Y20B-

PI Sta 13+53.77
Δ = 7° 38' 04.0" (LT)
D = 3° 22' 49.0"
L = 225.85'
T = 113.09'
R = 1,695.00'

SEE SHEET 40 FOR -L3- PROFILE
SEE SHEET 74 FOR -Y18- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

J0252017
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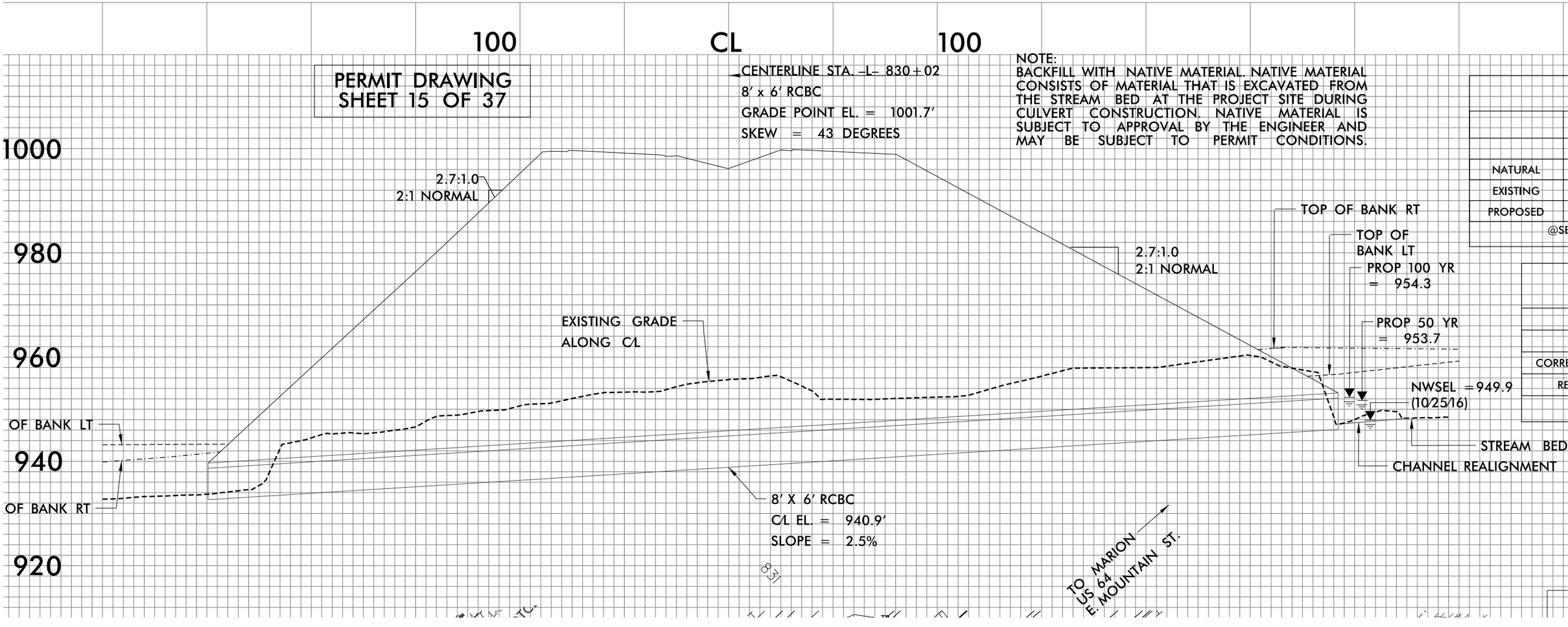

100
CL
100
PERMIT DRAWING
SHEET 15 OF 37
CENTERLINE STA. –L– 830+02
8' x 6' RCBC
GRADE POINT EL. = 1001.7'
SKEW = 43 DEGREES
NOTE:
BACKFILL WITH NATIVE MATERIAL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
1000
980
960
940
920
2.7:1.0
2:1 NORMAL
EXISTING GRADE
ALONG C/L
TOP OF BANK RT
TOP OF
BANK LT
PROP 100 YR
= 954.3
2.7:1.0
2:1 NORMAL
PROP 50 YR
= 953.7
NWSEL = 949.9
(10/25/16)
STREAM BED
CHANNEL REALIGNMENT
OF BANK LT
OF BANK RT
8' X 6' RCBC
C/L EL. = 940.9'
SLOPE = 2.5%
TO MARION
US 64
E. MOUNTAIN ST.
NATURAL
EXISTING
PROPOSED

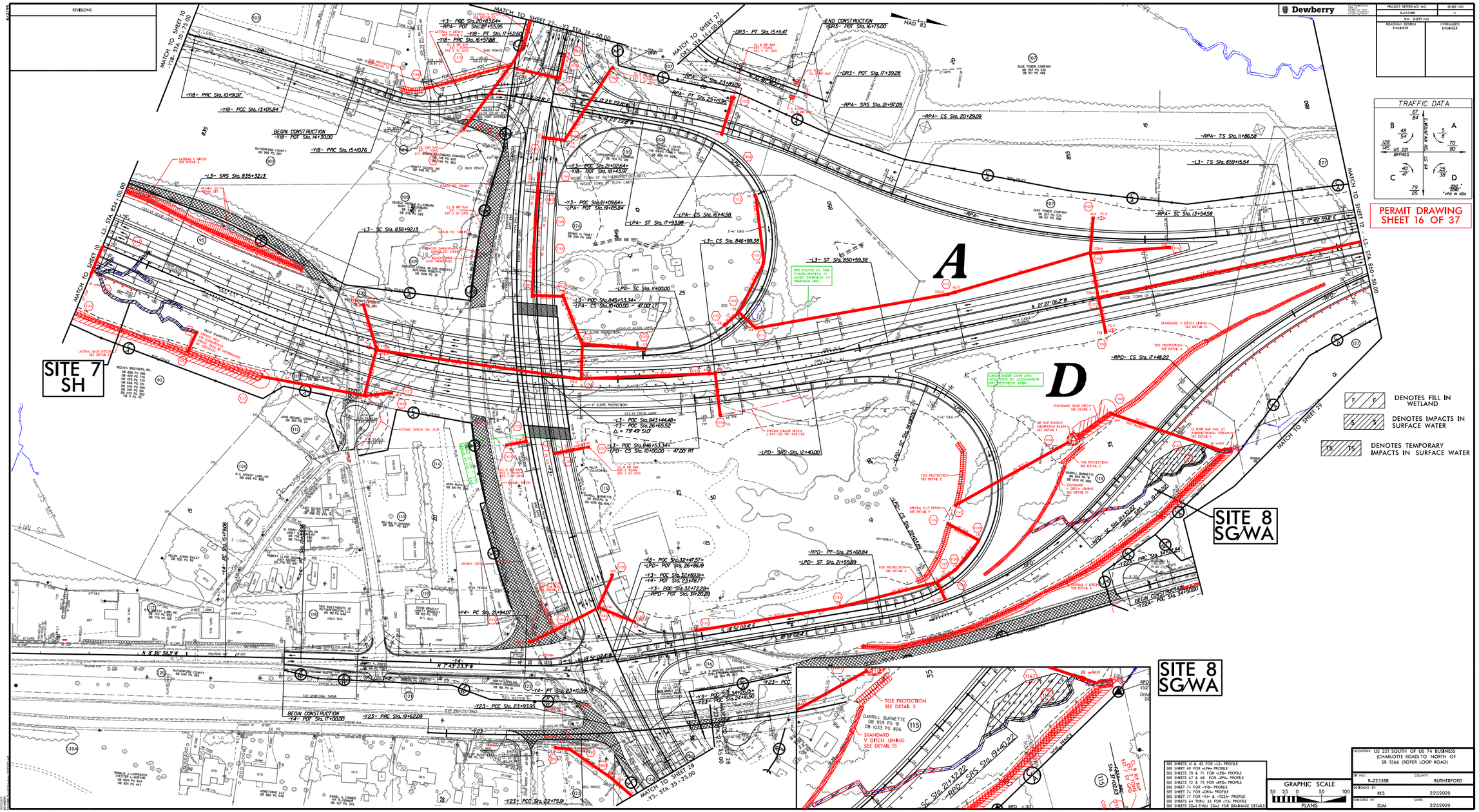
REVISIONS

Dewberry

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TRAFFIC DATA

PERMIT DRAWING
SHEET 16 OF 37



SEE SHEETS 41 & 42 FOR -L3- PROFILE
SEE SHEET 69 FOR -LPA- PROFILE
SEE SHEETS 70 & 71 FOR -LPD- PROFILE
SEE SHEETS 67 & 68 FOR -RPA- PROFILE
SEE SHEETS 72 & 73 FOR -RPD- PROFILE
SEE SHEET 74 FOR -Y18- PROFILE
SEE SHEET 74 FOR -DR3- PROFILE
SEE SHEET 77 FOR -Y4- & -Y22A- PROFILE
SEE SHEETS 64 THRU 66 FOR -Y3- PROFILE
SEE SHEETS 20-1 THRU 20-5 FOR DRAINAGE DETAILS

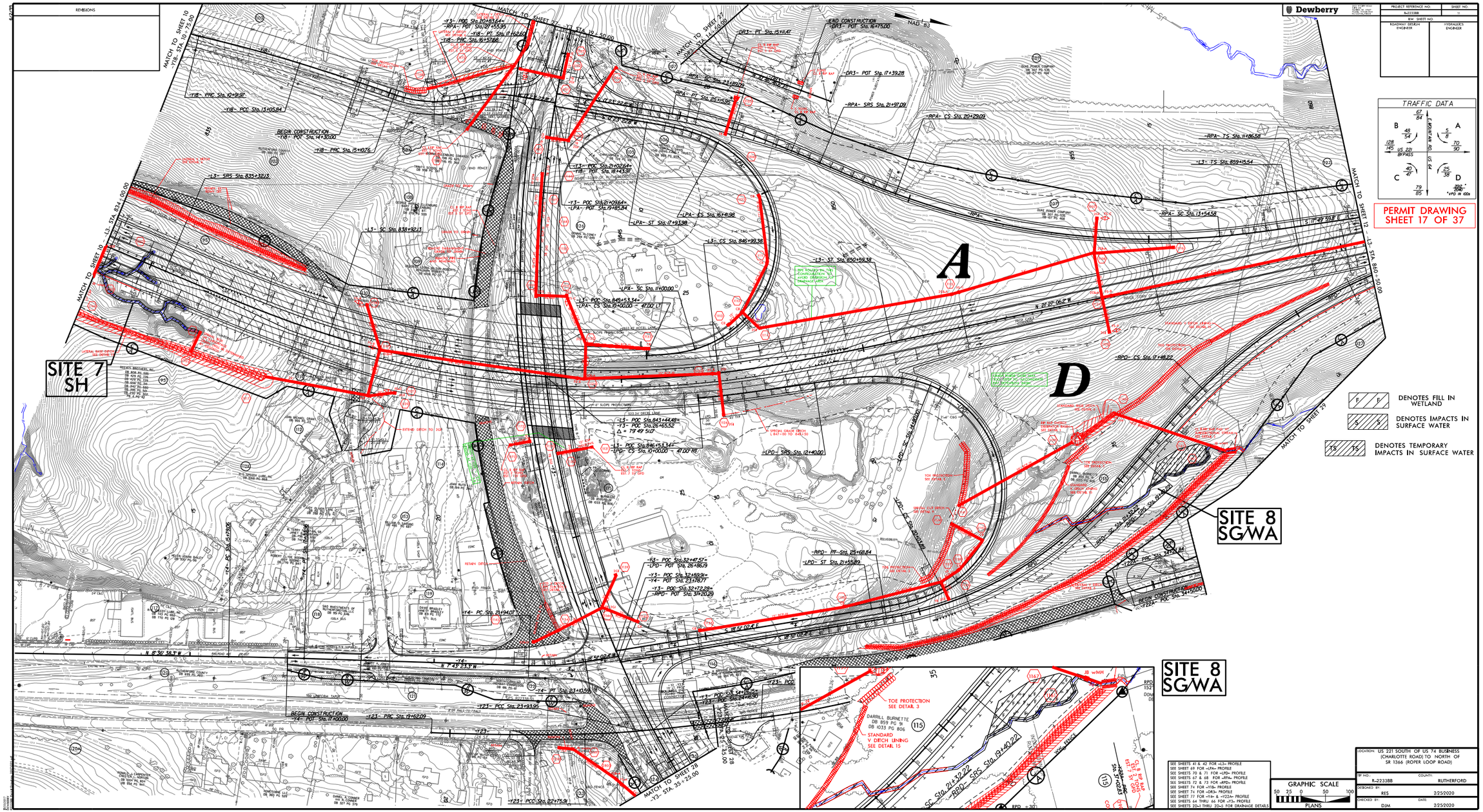
LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TIP NO. R-2233BB	COUNTY: RUTHERFORD
DESIGNED BY: RES	2/25/2020
CHECKED BY: DJM	DATE: 2/25/2020

REVISIONS

Dewberry

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

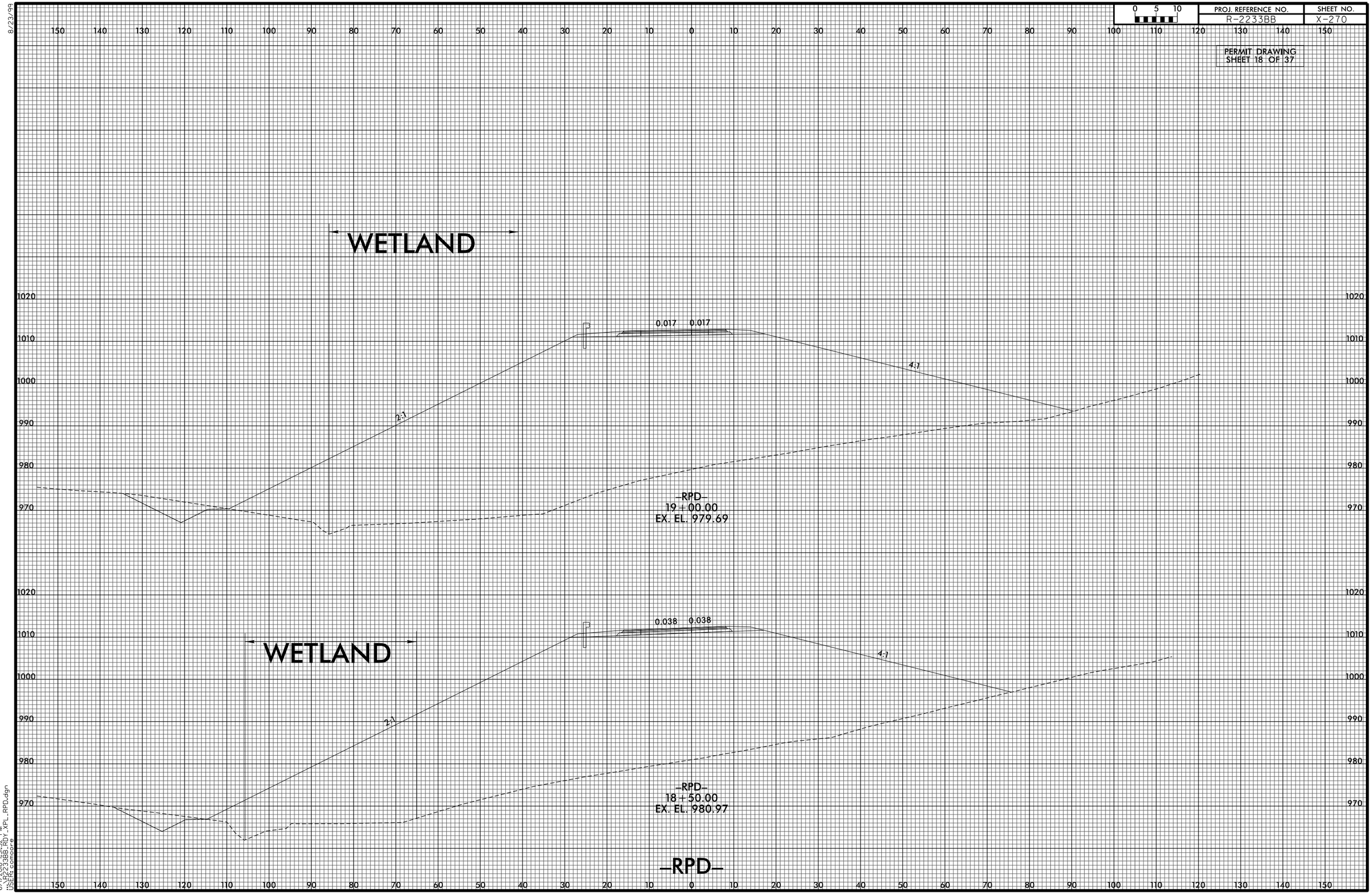


LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TIP NO.: R-2233BB	COUNTY: RUTHERFORD
DESIGNED BY: RES	2/25/2020
CHECKED BY: DJM	DATE: 2/25/2020

PROJ. REFERENCE NO.	SHEET NO.
R-2233BB	X-270

PERMIT DRAWING
SHEET 18 OF 37



8/23/99

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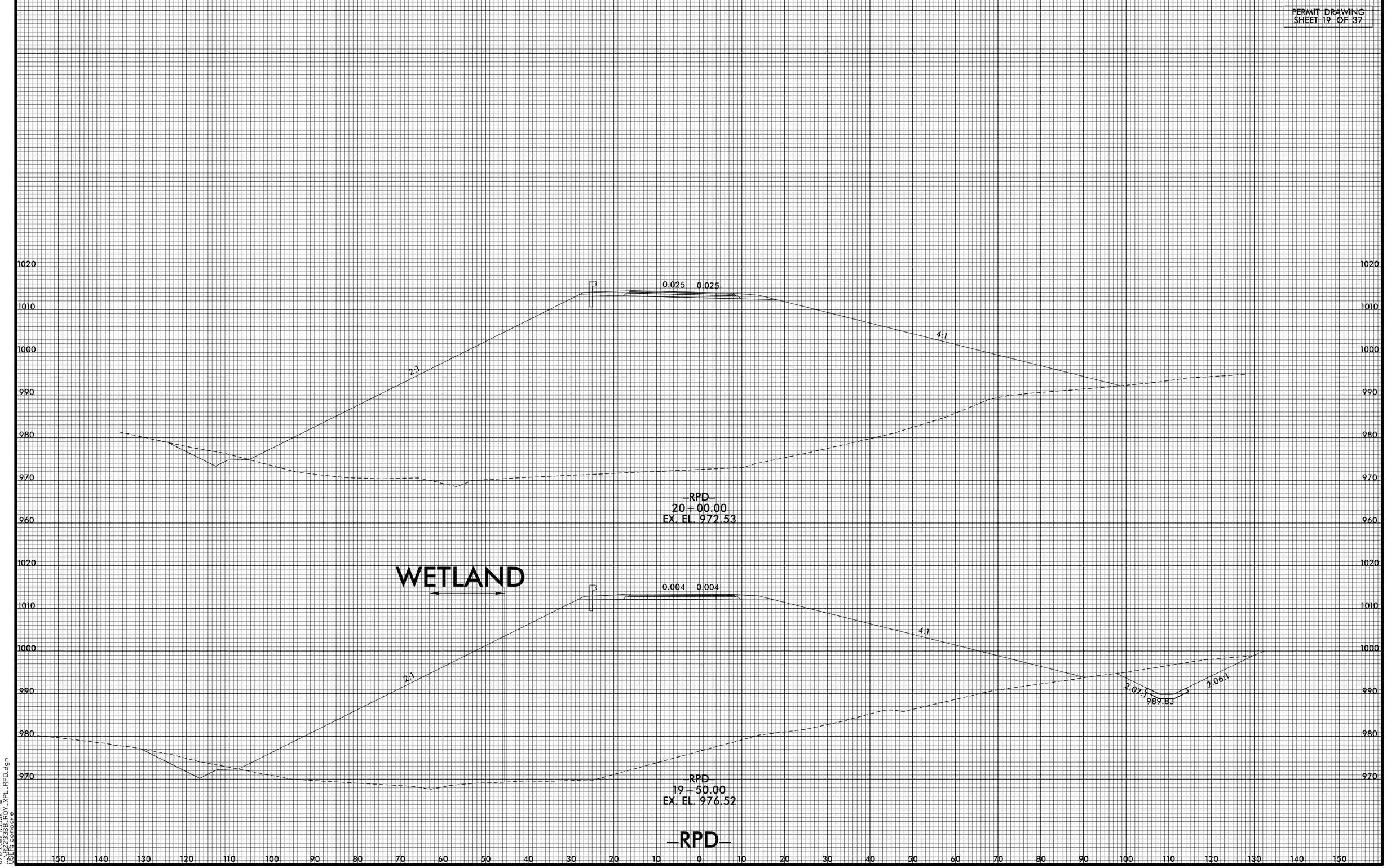
USER: comoore

PROJ. REFERENCE NO.	SHEET NO.
R-2233BB	X-271

0 5 10

PERMIT DRAWING
SHEET 19 OF 37



8/23/99

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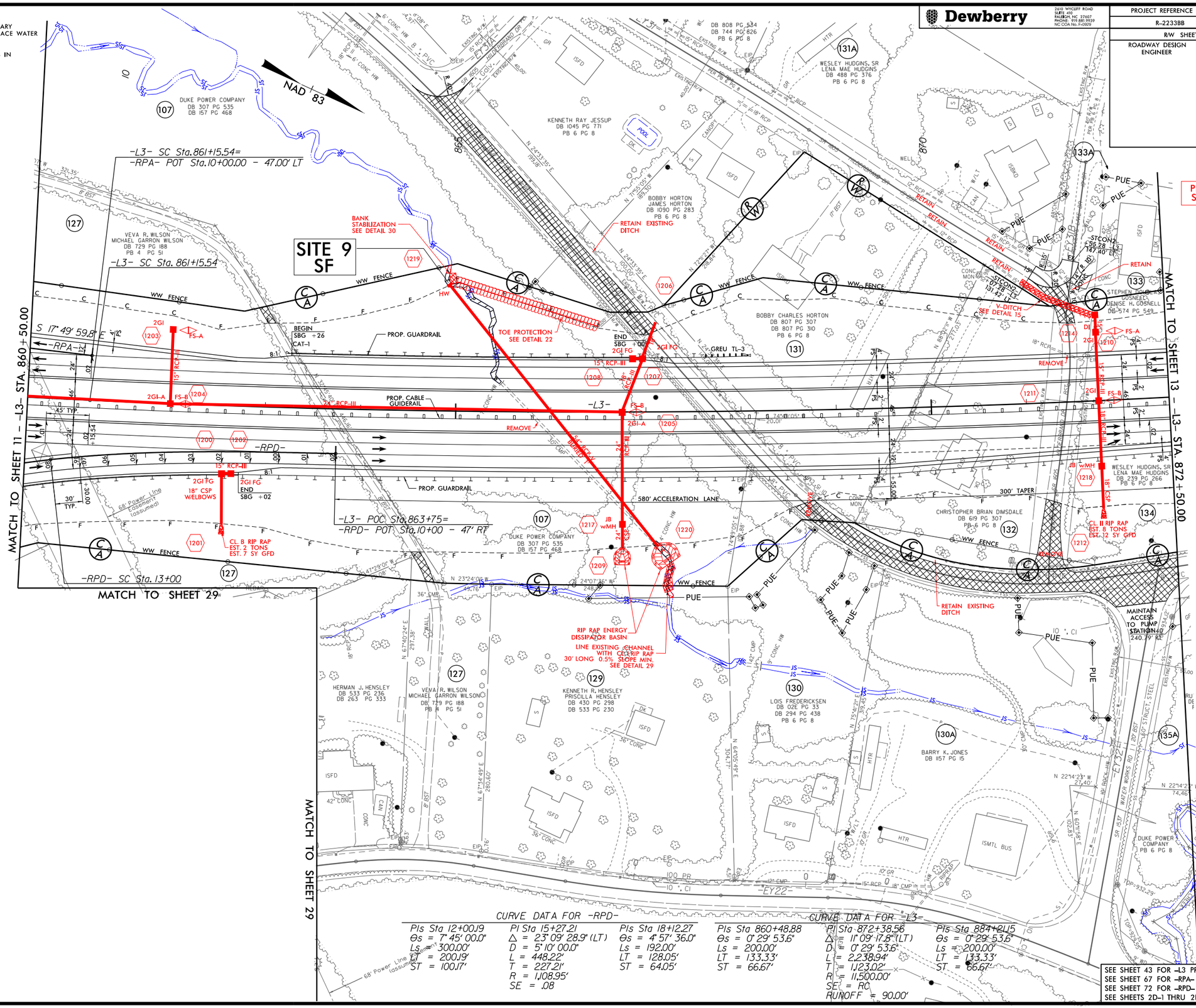
5/14/99

REVISIONS

TS / TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S / S DENOTES IMPACTS IN SURFACE WATER



PERMIT DRAWING
SHEET 20 OF 37

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CURVE DATA FOR -RPD-

PIs Sta 12+00.19	PI Sta 15+27.21	PIs Sta 18+12.27	PIs Sta 860+48.88
Θs = 7° 45' 00.0"	Δ = 23° 09' 28.9" (LT)	Θs = 4° 57' 36.0"	Θs = 0° 29' 53.6"
Ls = 300.00'	D = 5° 10' 00.0"	Ls = 192.00'	Ls = 200.00'
LT = 200.19'	L = 448.22'	LT = 128.05'	LT = 133.33'
ST = 100.17'	T = 227.21'	ST = 64.05'	ST = 66.67'
	R = 1,108.95'		
	SE = .08		

CURVE DATA FOR -L3-

PI Sta 872+38.56	PIs Sta 884+21.15
Δ = 11° 09' 17.8" (LT)	Θs = 0° 29' 53.6"
D = 0° 29' 53.6"	Ls = 200.00'
L = 2,238.94'	LT = 133.33'
T = 1,123.02'	ST = 66.67'
R = 11,500.00'	
SE = RC	
RUNOFF = 90.00'	

SEE SHEET 43 FOR -L3 PROFILE
SEE SHEET 67 FOR -RPA- PROFILE
SEE SHEET 72 FOR -RPD- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

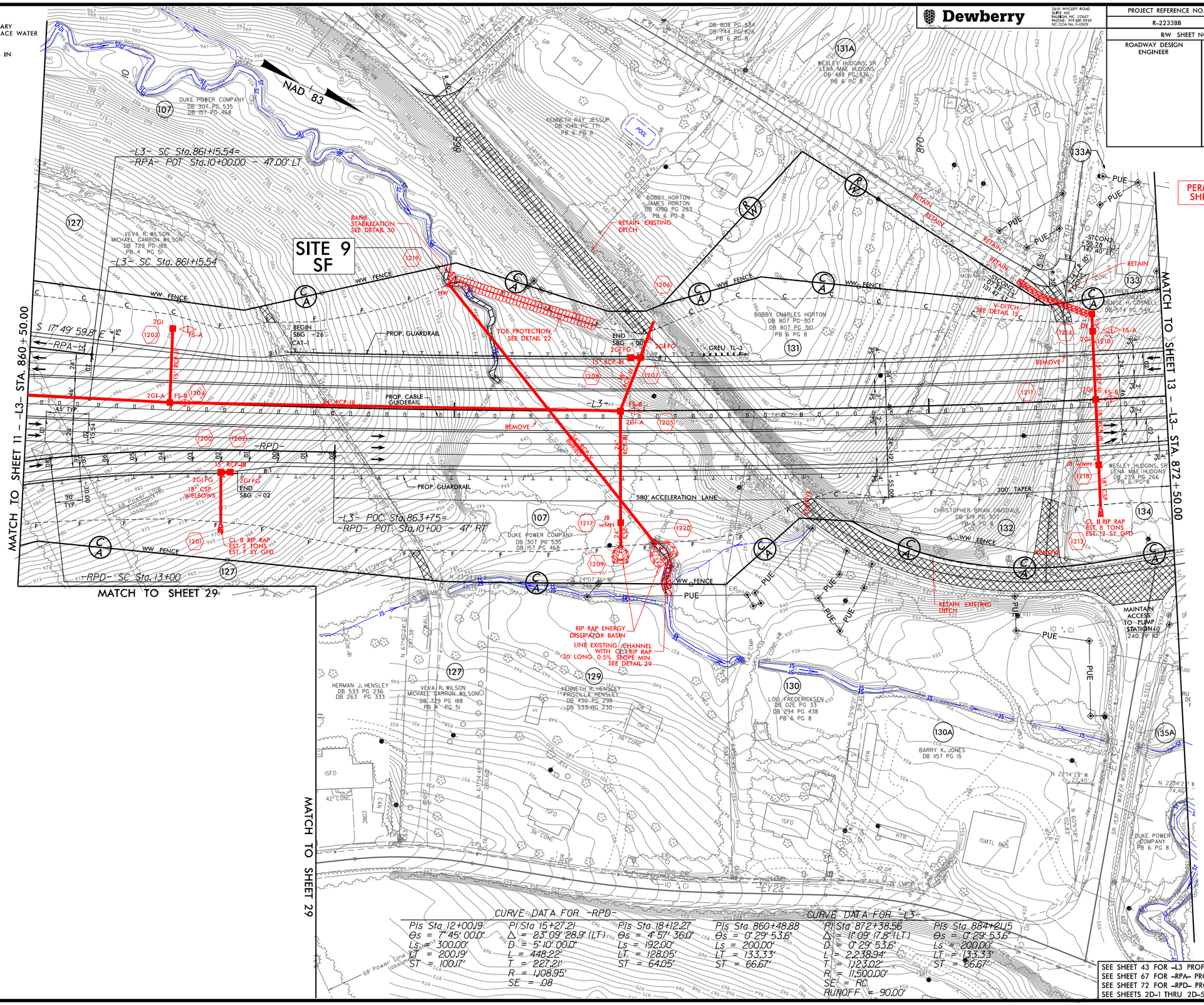
10/25/2017
DEVBERRY
R2233BB_Permit Drawings_20171025.pdf

5/14/99

REVISIONS

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S DENOTES IMPACTS IN SURFACE WATER



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CURVE DATA FOR -RPD-

PIs Sta 12+00.19	PI Sta 15+27.21	PIs Sta 18+12.27
Θs = 7° 45' 00.0"	Δ = 23° 09' 28.9" (LT)	Θs = 4° 57' 36.0"
Ls = 300.00'	D = 5° 10' 00.0"	Ls = 192.00'
LT = 200.19'	L = 448.22'	LT = 128.05'
ST = 100.17'	T = 227.21'	ST = 64.05'
	R = 1,108.95'	
	SE = .08	

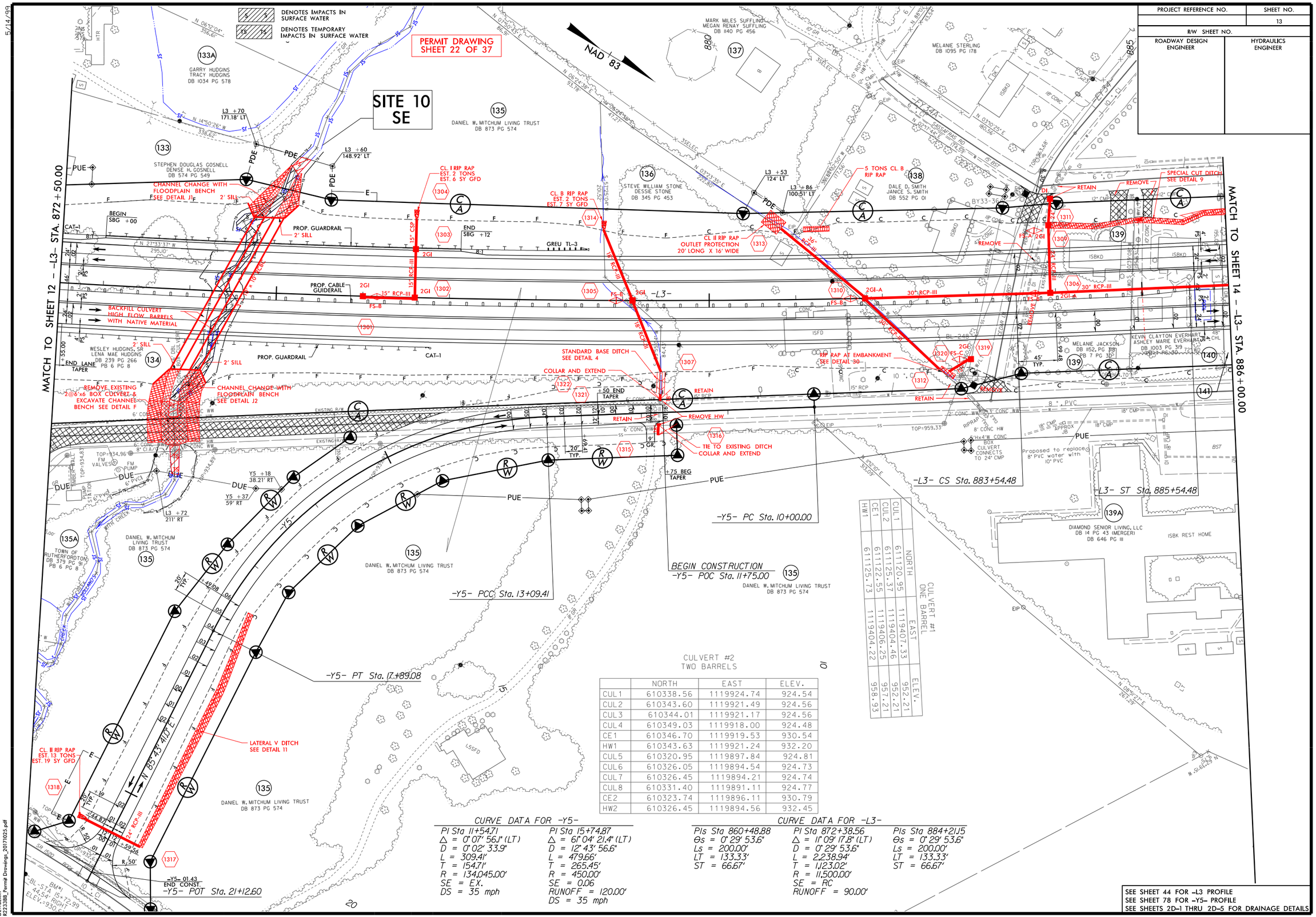
CURVE DATA FOR -L3-

PIs Sta 860+48.88	PI Sta 872+38.56	PIs Sta 884+21.15
Θs = 0° 29' 53.6"	Δ = 11° 09' 17.8" (LT)	Θs = 0° 29' 53.6"
Ls = 200.00'	D = 0° 29' 53.6"	Ls = 200.00'
LT = 133.33'	L = 2,238.94'	LT = 133.33'
ST = 66.67'	T = 1,123.02'	ST = 66.67'
	R = 11,500.00'	
	SE = RC	
	RUNOFF = 90.00'	

SEE SHEET 43 FOR -L3 PROFILE
SEE SHEET 67 FOR -RPA- PROFILE
SEE SHEET 72 FOR -RPD- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

10/25/2017
DEVBERRY
R2233BB_Permit Drawings_20171025.pdf

PROJECT REFERENCE NO.	SHEET NO.
	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



	NORTH	EAST	ELEV.
CUL1	611120.95	1119407.33	952.21
CUL2	611125.37	1119404.46	952.21
CE1	611122.55	1119406.25	957.21
HW1	611125.73	1119404.22	958.93

	NORTH	EAST	ELEV.
CUL1	610338.56	1119924.74	924.54
CUL2	610343.60	1119921.49	924.56
CUL3	610344.01	1119921.17	924.56
CUL4	610349.03	1119918.00	924.48
CE1	610346.70	1119919.53	930.54
HW1	610343.63	1119921.24	932.20
CUL5	610320.95	1119897.84	924.81
CUL6	610326.05	1119894.54	924.73
CUL7	610326.45	1119894.21	924.74
CUL8	610331.40	1119891.11	924.77
CE2	610323.74	1119896.11	930.79
HW2	610326.45	1119894.56	932.45

CURVE DATA FOR -Y5-

PI Sta 11+54.71
Δ = 0° 07' 56.1" (LT)
D = 0° 02' 33.9"
L = 309.41'
T = 154.71'
R = 134,045.00'
SE = EX.
DS = 35 mph

PI Sta 15+74.87
Δ = 61° 04' 21.4" (LT)
D = 12° 43' 56.6"
L = 479.66'
T = 265.45'
R = 450.00'
SE = 0.06
RUNOFF = 120.00'
DS = 35 mph

CURVE DATA FOR -L3-

PIs Sta 860+48.88
θs = 0° 29' 53.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 872+38.56
Δ = 11° 09' 17.8" (LT)
D = 0° 29' 53.6"
L = 2,238.94'
T = 1,123.02'
R = 11,500.00'
SE = RC
RUNOFF = 90.00'

PIs Sta 884+21.15
θs = 0° 29' 53.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

SEE SHEET 44 FOR -L3 PROFILE
SEE SHEET 78 FOR -Y5- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

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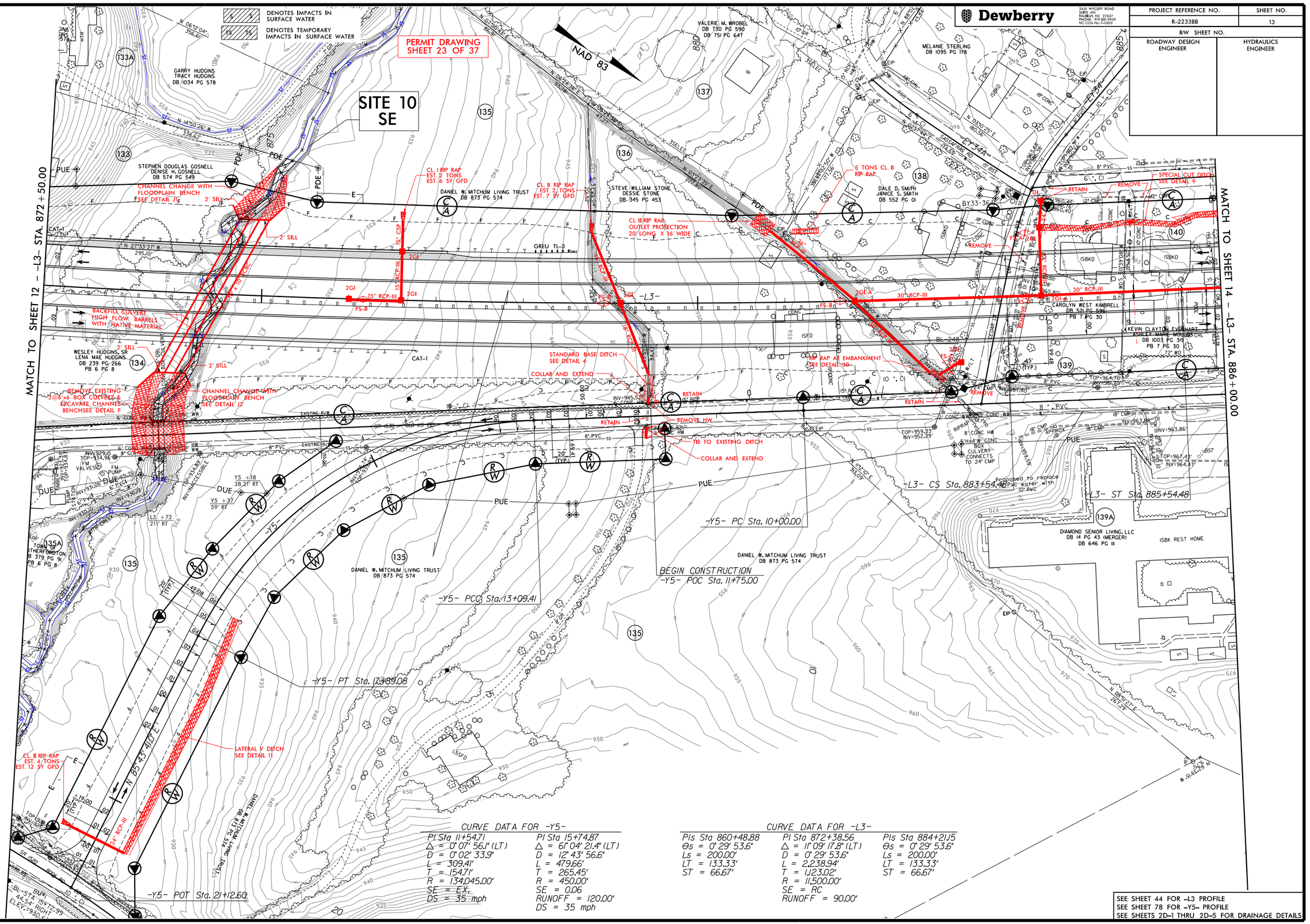
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929



CURVE DATA FOR -Y5-

PI Sta 11+54.71	PI Sta 15+74.87
Δ = 0° 07' 56.1" (LT)	Δ = 61° 04' 21.4" (LT)
D = 0° 02' 33.9"	D = 12° 43' 56.6"
L = 309.41'	L = 479.66'
T = 154.71'	T = 265.45'
R = 134,045.00'	R = 450.00'
SE = EX.	SE = 0.06
DS = 35 mph	RUNOFF = 120.00'
	DS = 35 mph

CURVE DATA FOR -L3-

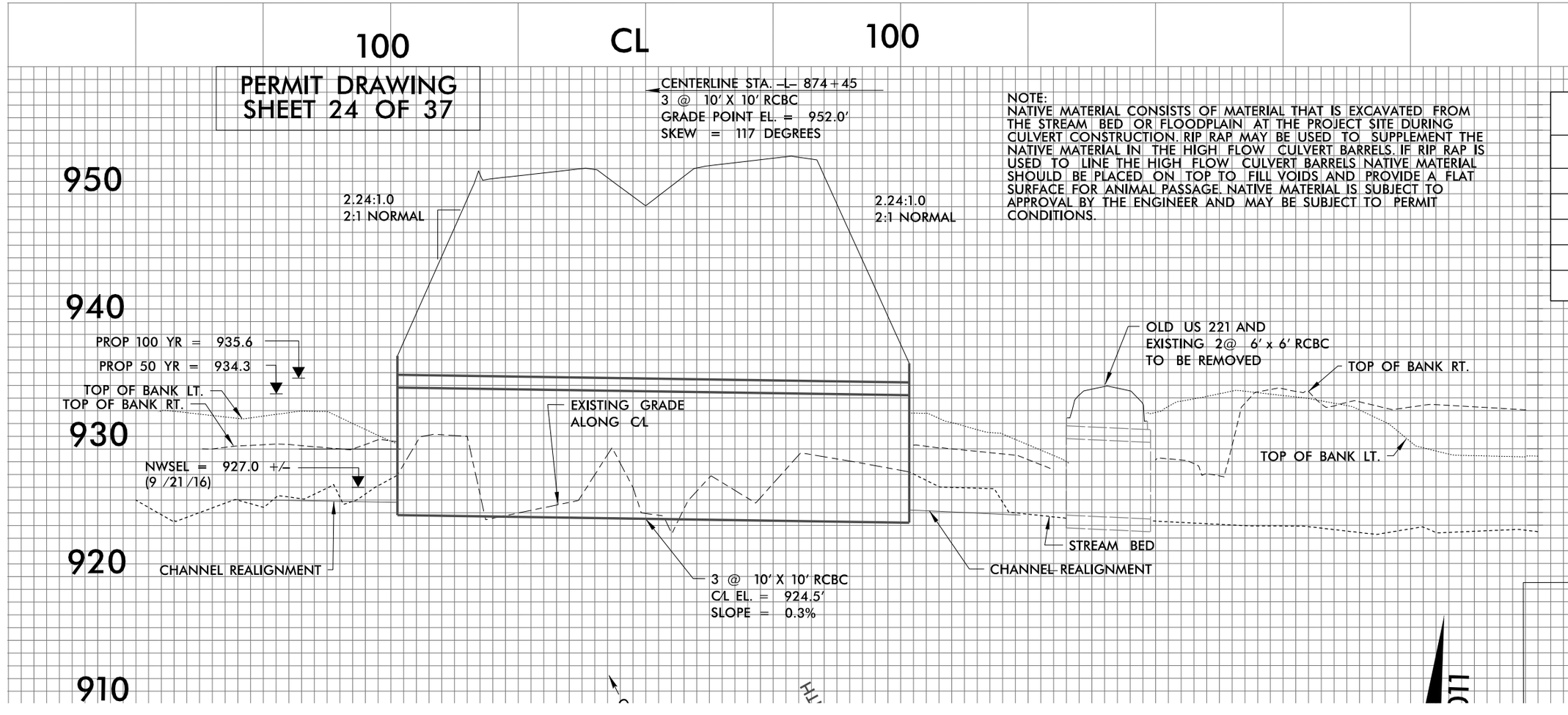
PIs Sta 860+48.88	PI Sta 872+38.56	PIs Sta 884+21.15
Θs = 0° 29' 53.6"	Δ = 11° 09' 17.8" (LT)	Θs = 0° 29' 53.6"
Ls = 200.00'	D = 0° 29' 53.6"	Ls = 200.00'
LT = 133.33'	L = 2,238.94'	LT = 133.33'
ST = 66.67'	T = 1,123.02'	ST = 66.67'
	R = 11,500.00'	
	SE = RC	
	RUNOFF = 90.00'	

SEE SHEET 44 FOR -L3 PROFILE
SEE SHEET 78 FOR -Y5- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf


100
CL
100
PERMIT DRAWING
SHEET 24 OF 37
CENTERLINE STA. –L– 874+45
3 @ 10' X 10' RCBC
GRADE POINT EL. = 952.0'
SKEW = 117 DEGREES
NOTE:
NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARRELS. IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARRELS 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.
950
940
930
920
910
2.24:1.0
2:1 NORMAL
2.24:1.0
2:1 NORMAL
PROP 100 YR = 935.6
PROP 50 YR = 934.3
TOP OF BANK LT.
TOP OF BANK RT.
NWSEL = 927.0 +/–
(9 /21 /16)
EXISTING GRADE
ALONG C/L
OLD US 221 AND
EXISTING 2@ 6' x 6' RCBC
TO BE REMOVED
TOP OF BANK RT.
TOP OF BANK LT.
STREAM BED
CHANNEL REALIGNMENT
CHANNEL REALIGNMENT
3 @ 10' X 10' RCBC
C/L EL. = 924.5'
SLOPE = 0.3%

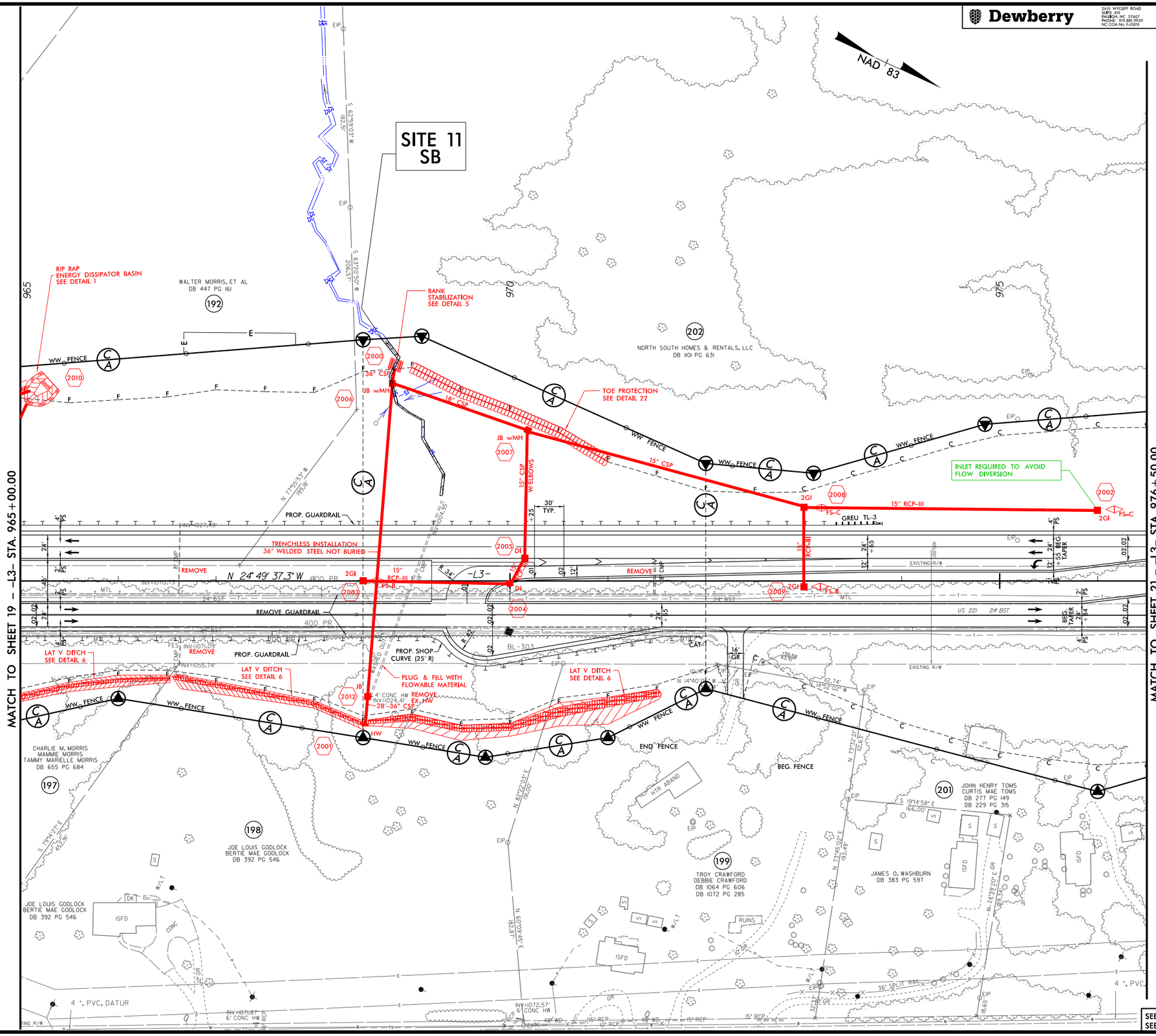
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 25 OF 37

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SEE SHEET 51 FOR –L3– PROFILE
SEE SHEETS 2D-1 THRU 2D-3 FOR DRAINAGE DETAILS

REVISIONS

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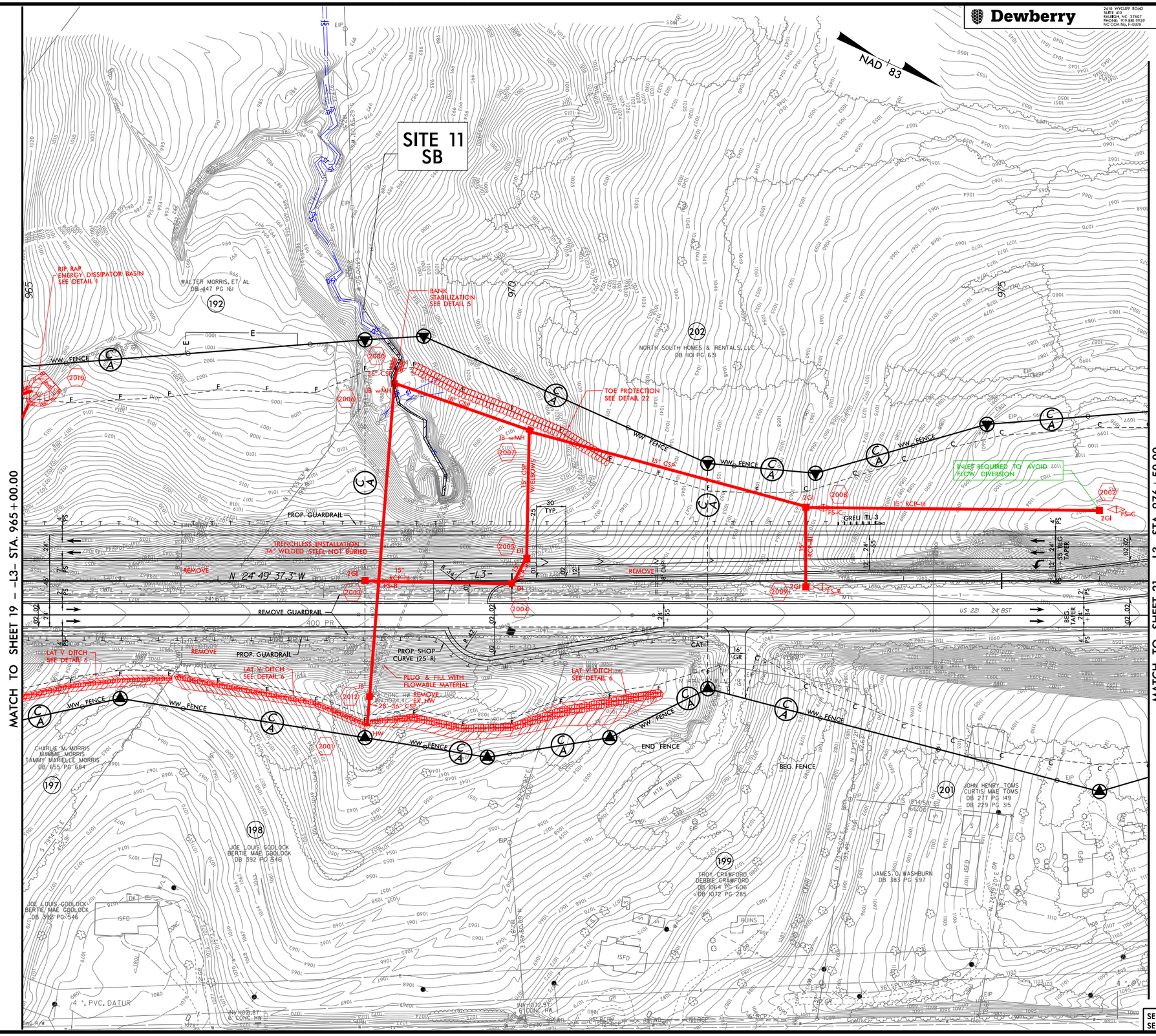
REVISIONS



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 26 OF 37

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SEE SHEET 51 FOR –L3– PROFILE
SEE SHEETS 2D-1 THRU 2D-3 FOR DRAINAGE DETAILS

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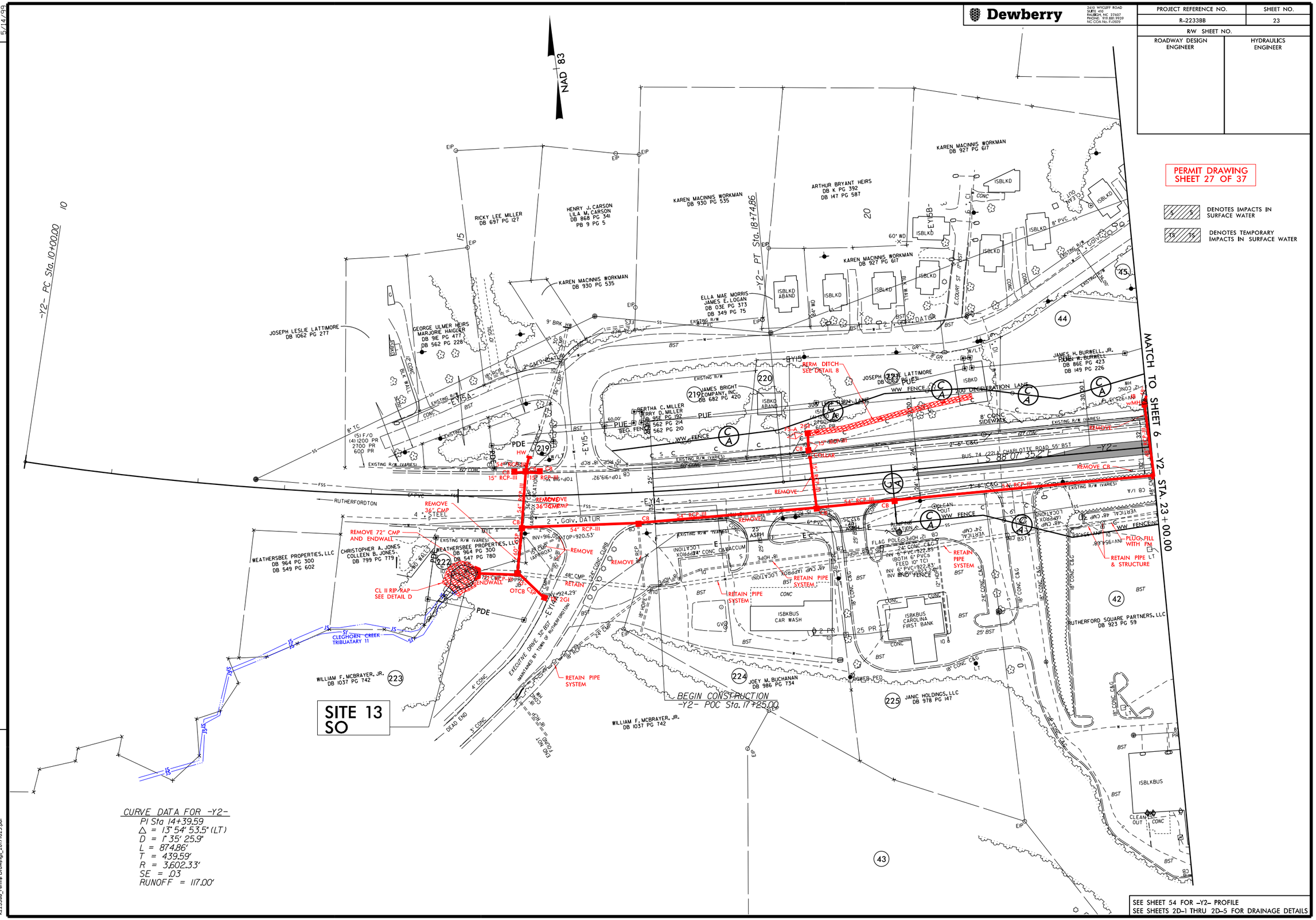
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 27 OF 37

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER



CURVE DATA FOR -Y2-
PI Sta 14+39.59
Δ = 13° 54' 53.5" (LT)
D = 1° 35' 25.9"
L = 874.86'
T = 439.59'
R = 3,602.33'
SE = .03
RUNOFF = 117.00'

REVISIONS

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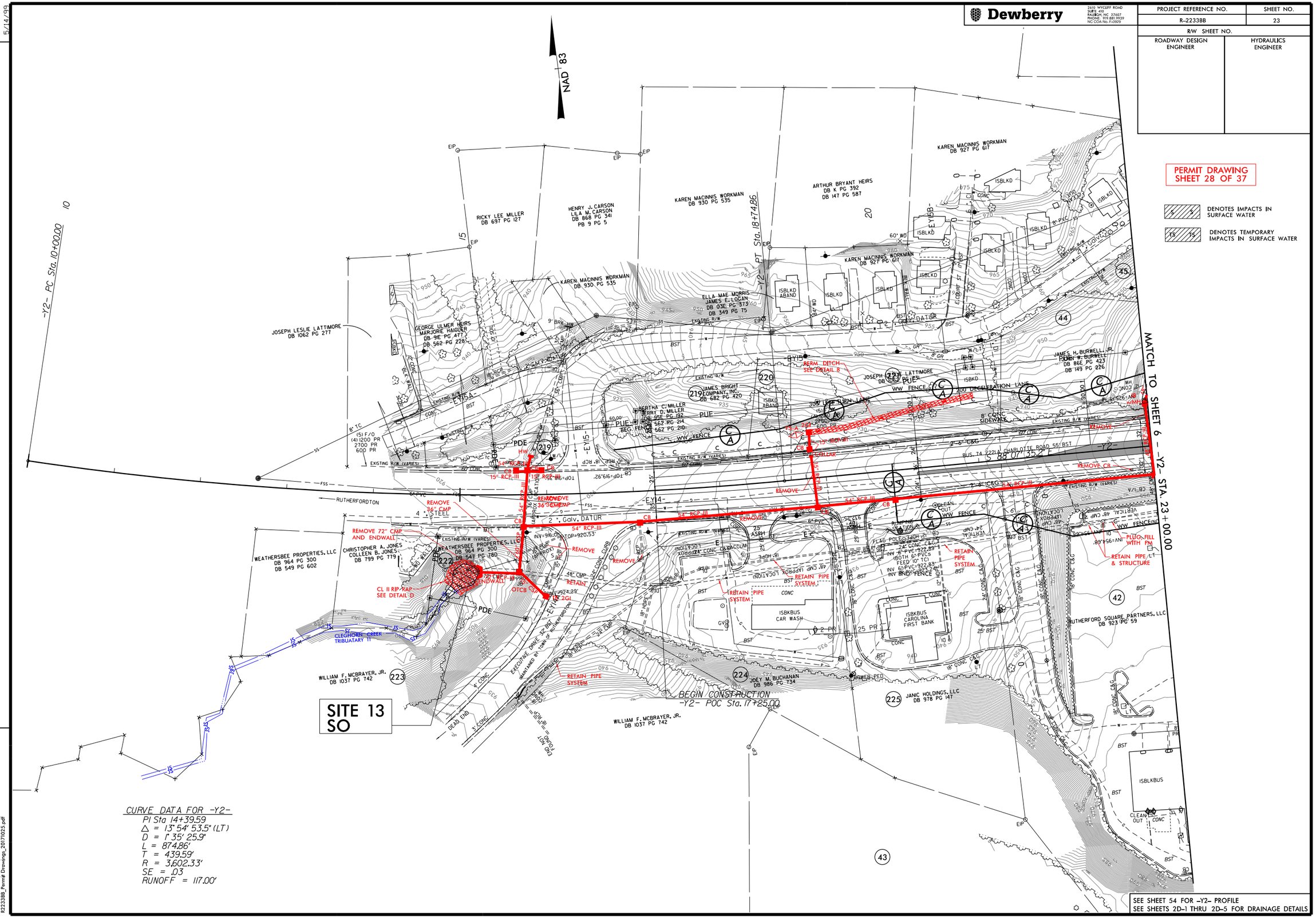
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 28 OF 37

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



CURVE DATA FOR -Y2-
PI Sta 14+39.59
△ = 13° 54' 53.5" (LT)
D = 1° 35' 25.9"
L = 874.86'
T = 439.59'
R = 3,602.33'
SE = .03
RUNOFF = 117.00'

SEE SHEET 54 FOR -Y2- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

5/14/99

REVISIONS

ROW REV. - October 22, 2018 - Parcel 153 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 158 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 265 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 266 - Revised R/W take for roundabout (WET)

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 29 OF 37

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

SITE 16
SD

CURVE DATA FOR -Y8-

PI Sta 16+37.55	PI Sta 22+89.77	PI Sta 24+86.43	PI Sta 28+64.40
Δ = 5° 49' 31.0" (RT)	Δ = 18° 14' 44.9" (RT)	Δ = 0° 26' 26.8" (LT)	Δ = 3° 01' 15.1" (LT)
D = 2° 17' 30.6"	D = 11° 27' 33.0"	D = 0° 11' 14.0"	D = 0° 34' 49.8"
L = 254.18'	L = 159.22'	L = 235.44'	L = 520.39'
T = 127.20'	T = 80.29'	T = 117.72'	T = 260.25'
R = 2,500.00'	R = 500.00'	R = 30,605.00'	R = 9,870.00'

BEGIN CONSTRUCTION
-Y8- POT Sta. 15+00

-Y8- PC Sta. 15+10.35

-Y8- PT Sta. 17+68.71

-Y8- PRC Sta. 23+68.71

-Y8- PI Sta. 21+32.13=
-Y10- POC Sta. 17+55.52
-Y8- PI Sta. 21+89.13 =
-RAB- POC Sta. 1+40.93
-Y8- PC Sta. 22+09.48

-RAB- PC 0+00.00=
-RAB- PT 3+58.14

-Y8- POT Sta. 20+75.13 =
-RAB- POC 3+44.39

-Y10- POC Sta. 18+12.55 =
-RAB- POC Sta. 2+45.81

-Y10- PT Sta. 19+90.43

LINE EXISTING CHANNEL WITH CL B RIP RAP 20' LONG. SEE DETAIL 29

RIP RAP ENERGY DISSIPATOR BASIN SEE DETAIL 1

CL B RIP RAP 3 TONS 10 SY GEOTEXTILE

REMOVE 60" PIPE THAT INTERFERES WITH INSTALLTION OF 60"

REMOVE

TRENCHLESS INSTALLATION AND OBLITERATE HARDPAN

18" CSP WELDBOWS

15" CSP WELDBOWS

36" RCP-III

TOE PROTECTION SEE DETAIL 7

PLUG AND ABANDON 60" THAT DOES NOT INTERFER WITH INSTALLATION OF 60"

REMOVE HEADWALL

JB w/MH

LATERAL BASE DITCH SEE DETAIL 21

LATERAL 'V' DITCH SEE DETAIL 23

SPECIAL CUT DITCH SEE DETAIL 9

CL B RIP RAP 1 TON 5 SY GEOTEXTILE

H. GREGORY HODGE
H. STEPHEN HODGE
DB 06E PG 129
DB 343 PG 200

LEE ANNA EDGERTON
DB 834 PG 691

EVELYN FRANCES MOORE HEFFIN
DB 07E PG 49
DB 473 PG 260

DARRELL AND JANE WHITESIDE
FAMILY LIVING TRUST
DB 1100 PG 546
PB 35 PG 106

DAVID EDGERTON
CAROLYN EDGERTON
DB 1090 PG 396
PB 35 PG 106

MATCH TO SHEET 31A -Y8- STA. 14+00.00

MATCH TO SHEET 15 -Y10- STA. 22+00.00

CURVE DATA FOR -Y10-

PI Sta 18+75.18
Δ = 26° 55' 04.1" (LT)
D = 11° 27' 32.9"
L = 234.90'
T = 119.66'
R = 500.00'

CURVE DATA FOR -RAB-

PI Sta 1+63.96	PI Sta 3+04.88
Δ = 141° 39' 34.3" (RT)	Δ = 218° 20' 25.7" (RT)
D = 100° 31' 08.1"	D = 100° 31' 08.1"
L = 140.93'	L = 217.21'
T = 163.96'	T = 163.96'
R = 57.00'	R = 57.00'

SEE SHEET 78 FOR -Y8- PROFILE
SEE SHEET 79 FOR -Y10- PROFILE
SEE SHEET 79 FOR -RAB- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

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PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PERMIT DRAWING
SHEET 30 OF 37

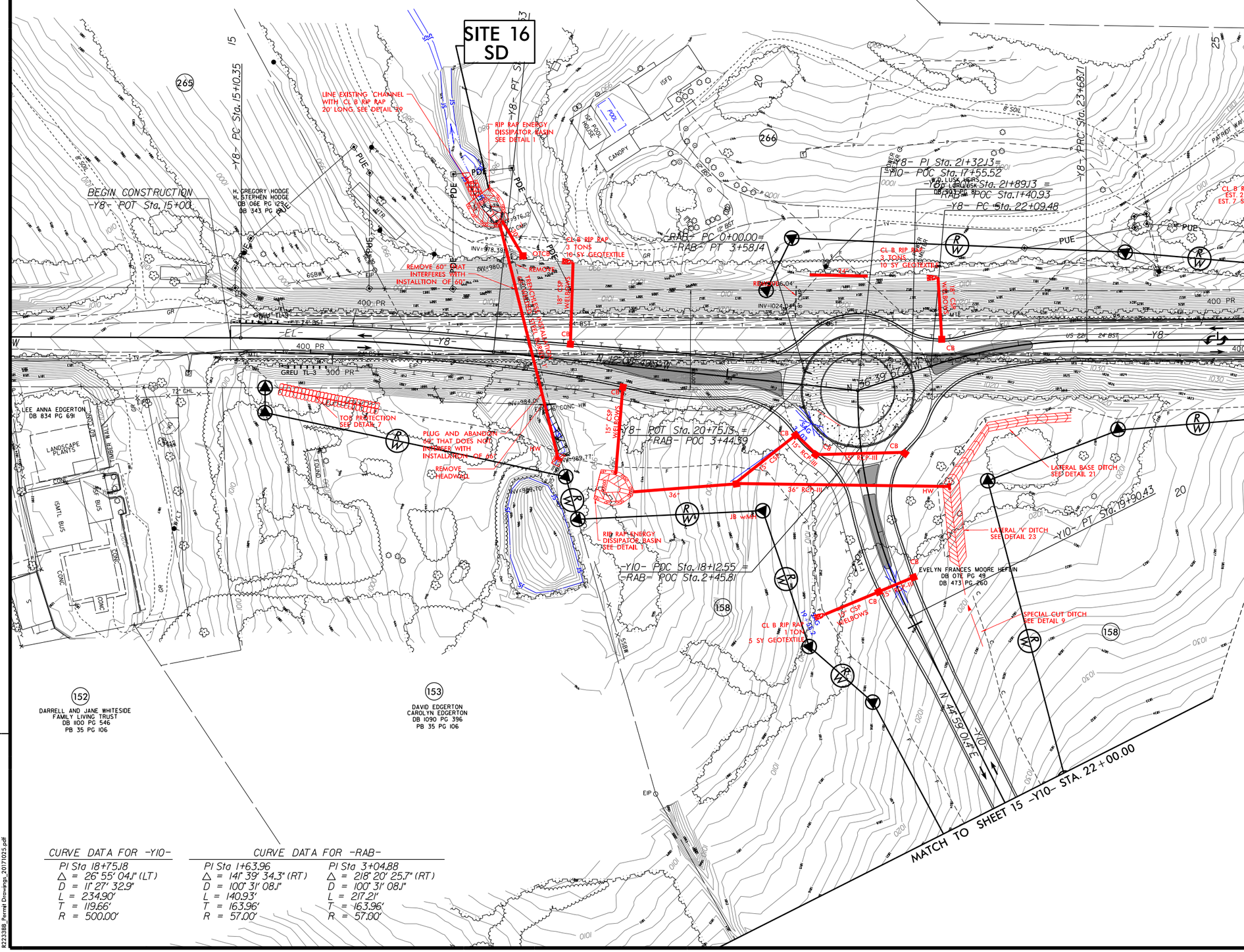
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

CURVE DATA FOR -Y8-

PI Sta 16+37.55	PI Sta 22+89.77	PI Sta 24+86.43	PI Sta 28+64.40
Δ = 5° 49' 31.0" (RT)	Δ = 18° 14' 44.9" (RT)	Δ = 0° 26' 26.8" (LT)	Δ = 3° 01' 15.1" (LT)
D = 2° 17' 30.6"	D = 11° 27' 33.0"	D = 0° 11' 14.0"	D = 0° 34' 49.8"
L = 254.18'	L = 159.22'	L = 235.44'	L = 520.39'
T = 127.20'	T = 80.29'	T = 117.72'	T = 260.25'
R = 2,500.00'	R = 500.00'	R = 30,605.00'	R = 9,870.00'



CURVE DATA FOR -Y10-

PI Sta 18+75.18
Δ = 26° 55' 04.1" (LT)
D = 11° 27' 32.9"
L = 234.90'
T = 119.66'
R = 500.00'

CURVE DATA FOR -RAB-

PI Sta 1+63.96	PI Sta 3+04.88
Δ = 141° 39' 34.3" (RT)	Δ = 218° 20' 25.7" (RT)
D = 100° 31' 08.1"	D = 100° 31' 08.1"
L = 140.93'	L = 217.21'
T = 163.96'	T = 163.96'
R = 57.00'	R = 57.00'

SEE SHEET 78 FOR -Y8- PROFILE
SEE SHEET 79 FOR -Y10- PROFILE
SEE SHEET 79 FOR -RAB- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

REVISIONS

ROW REV. - October 22, 2018 - Parcel 153 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 158 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 265 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 266 - Revised R/W take for roundabout (WET)

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Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

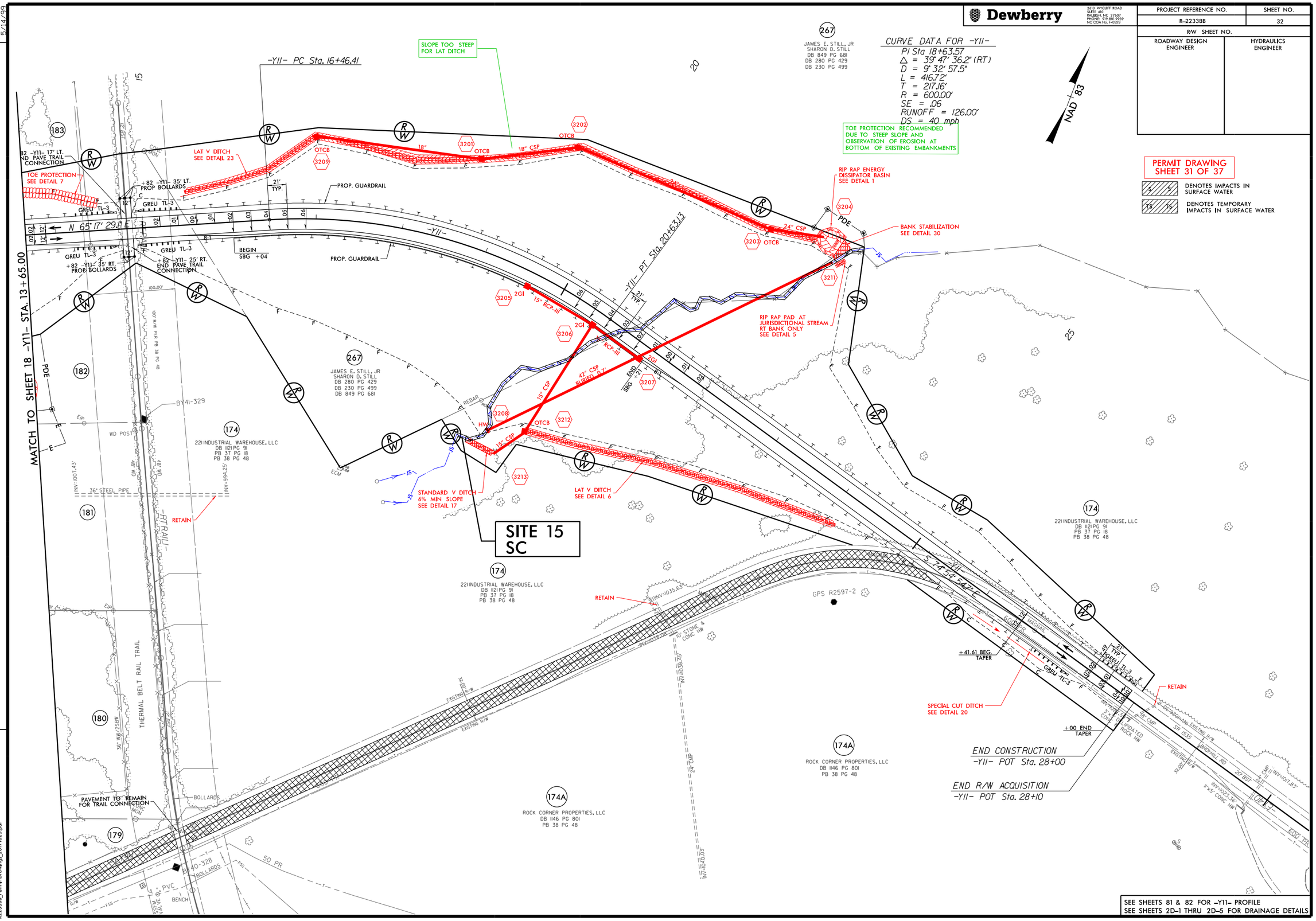
PERMIT DRAWING
SHEET 31 OF 37

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

CURVE DATA FOR -Y11-
PI Sta 18+63.57
Δ = 39° 47' 36.2" (RT)
D = 9° 32' 57.5"
L = 416.72'
T = 217.16'
R = 600.00'
SE = .06
RUNOFF = 126.00'
DS = 40 mph

NAD 83



REVISIONS

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10/25/2017
DEWBERRY
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Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 32 OF 37

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

CURVE DATA FOR -Y11-
PI Sta 18+63.57
Δ = 39° 47' 36.2" (RT)
D = 9° 32' 57.5"
L = 416.72'
T = 217.16'
R = 600.00'
SE = .06
RUNOFF = 126.00'
DS = 40 mph

SLOPE TOO STEEP FOR LAT DITCH

TOE PROTECTION RECOMMENDED DUE TO STEEP SLOPE AND OBSERVATION OF EROSION AT BOTTOM OF EXISTING EMBANKMENTS

RIP RAP ENERGY DISSIPATOR BASIN SEE DETAIL 1

BANK STABILIZATION SEE DETAIL 30

RIP RAP PAD AT JURISDICTIONAL STREAM RT BANK ONLY SEE DETAIL 3

LAT V DITCH SEE DETAIL 23

TOE PROTECTION SEE DETAIL 23

STANDARD V DITCH 6% MIN SLOPE SEE DETAIL 17

LAT V DITCH SEE DETAIL 6

SPECIAL CUT DITCH SEE DETAIL 20

SITE 15 SC

MATCH TO SHEET 18 -Y11- STA. 13+65.00

-Y11- PC Sta. 16+46.41

-Y11- PT Sta. 20+63.57

END CONSTRUCTION -Y11- POT Sta. 28+00

END R/W ACQUISITION -Y11- POT Sta. 28+10

+41.61 BEG TAPER

+00 END TAPER

JAMES E. STILL, JR
SHARON D. STILL
DB 849 PG 681
DB 280 PG 429
DB 230 PG 499

220 INDUSTRIAL WAREHOUSE, LLC
DB 1121 PG 91
PB 37 PG 18
PB 38 PG 48

ROCK CORNER PROPERTIES, LLC
DB 1146 PG 801
PB 38 PG 48

SEE SHEETS 81 & 82 FOR -Y11- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

10/25/2017
DEWBERRY
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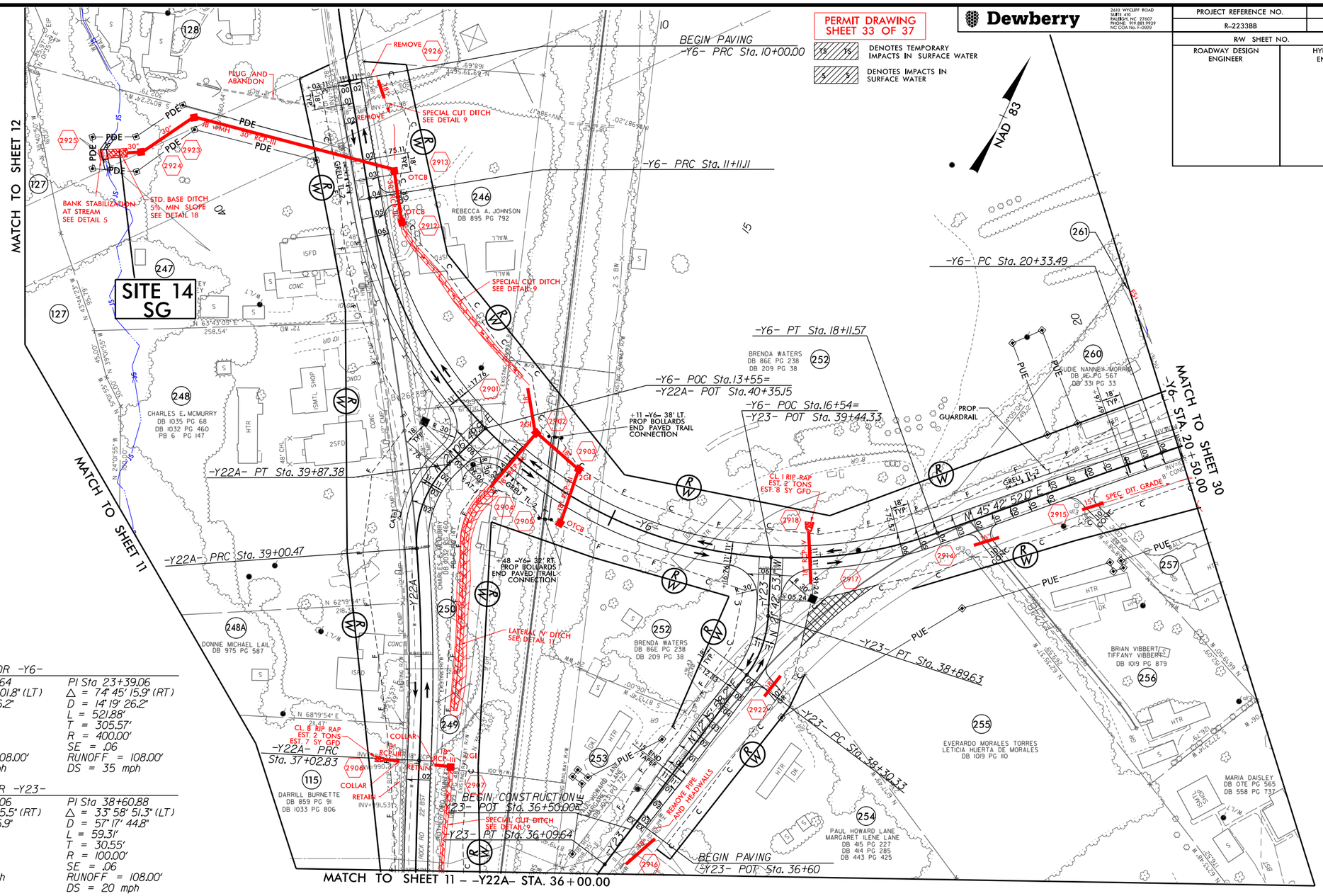
PERMIT DRAWING
SHEET 33 OF 37

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER



CURVE DATA FOR –Y6–

PI Sta 10+55.56	PI Sta 15+90.64	PI Sta 23+39.06
Δ = 0° 45' 51.3" (RT)	Δ = 100° 20' 01.8" (LT)	Δ = 74° 45' 15.9" (RT)
D = 0° 41' 16.2"	D = 14° 19' 26.2"	D = 14° 19' 26.2"
L = 111.11'	L = 700.46'	L = 521.88'
T = 55.56'	T = 479.53'	T = 305.57'
R = 8,330.00'	R = 400.00'	R = 400.00'
SE = EX.	SE = .06	SE = .06
DS = 35 mph	RUNOFF = 108.00'	RUNOFF = 108.00'
	DS = 35 mph	DS = 35 mph

CURVE DATA FOR –Y23–

PI Sta 32+45.69	PI Sta 35+18.06	PI Sta 38+60.88
Δ = 4° 29' 38.6" (RT)	Δ = 30° 01' 05.5" (RT)	Δ = 33° 58' 51.3" (LT)
D = 1° 16' 23.7"	D = 16° 00' 15.9"	D = 57° 17' 44.8"
L = 352.96'	L = 187.56'	L = 59.31'
T = 176.57'	T = 95.99'	T = 30.55'
R = 4,500.00'	R = 358.00'	R = 100.00'
SE = EX.	SE = EX.	SE = .06
DS = 35 mph	DS = 20 mph	RUNOFF = 108.00'
		DS = 20 mph

CURVE DATA FOR –Y22A–

PI Sta 32+70.82	PI Sta 35+65.41	PI Sta 38+01.76	PI Sta 39+46.88
Δ = 0° 56' 34.2" (LT)	Δ = 4° 35' 36.2" (RT)	Δ = 6° 44' 25.9" (LT)	Δ = 49° 47' 48.1" (RT)
D = 0° 18' 00.8"	D = 1° 40' 13.6"	D = 3° 24' 37.7"	D = 57° 17' 44.8"
L = 314.05'	L = 274.98'	L = 197.64'	L = 86.91'
T = 157.03'	T = 137.56'	T = 98.94'	T = 46.41'
R = 19,085.00'	R = 3,430.00'	R = 1,680.00'	R = 100.00'
SE = EX.	SE = EX.	SE = EX.	SE = .04
DS = 35 mph	DS = 35 mph	DS = 35 mph	RUNOFF = 72.00'
			DS = 15 mph

CURVE DATA FOR –Y23A–

PI Sta 44+55.25	PI Sta 45+75.10	PI Sta 46+84.50	PI Sta 48+15.42
Δ = 1° 32' 38.7" (RT)	Δ = 6° 33' 34.4" (RT)	Δ = 19° 55' 51.0" (RT)	Δ = 35° 04' 00.6" (RT)
D = 1° 09' 35.4"	D = 6° 09' 39.0"	D = 17° 54' 17.8"	D = 23° 52' 23.7"
L = 133.13'	L = 106.47'	L = 111.31'	L = 146.89'
T = 66.57'	T = 53.29'	T = 56.23'	T = 75.83'
R = 4,940.00'	R = 930.00'	R = 320.00'	R = 240.00'
SE = EX.	SE = EX.	SE = EX.	SE = EX.

SEE SHEETS 75 & 76 FOR –Y6– PROFILE
SEE SHEET 77 FOR –Y22A– PROFILE
SEE SHEET 77 FOR –Y23– PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

10/23/2017
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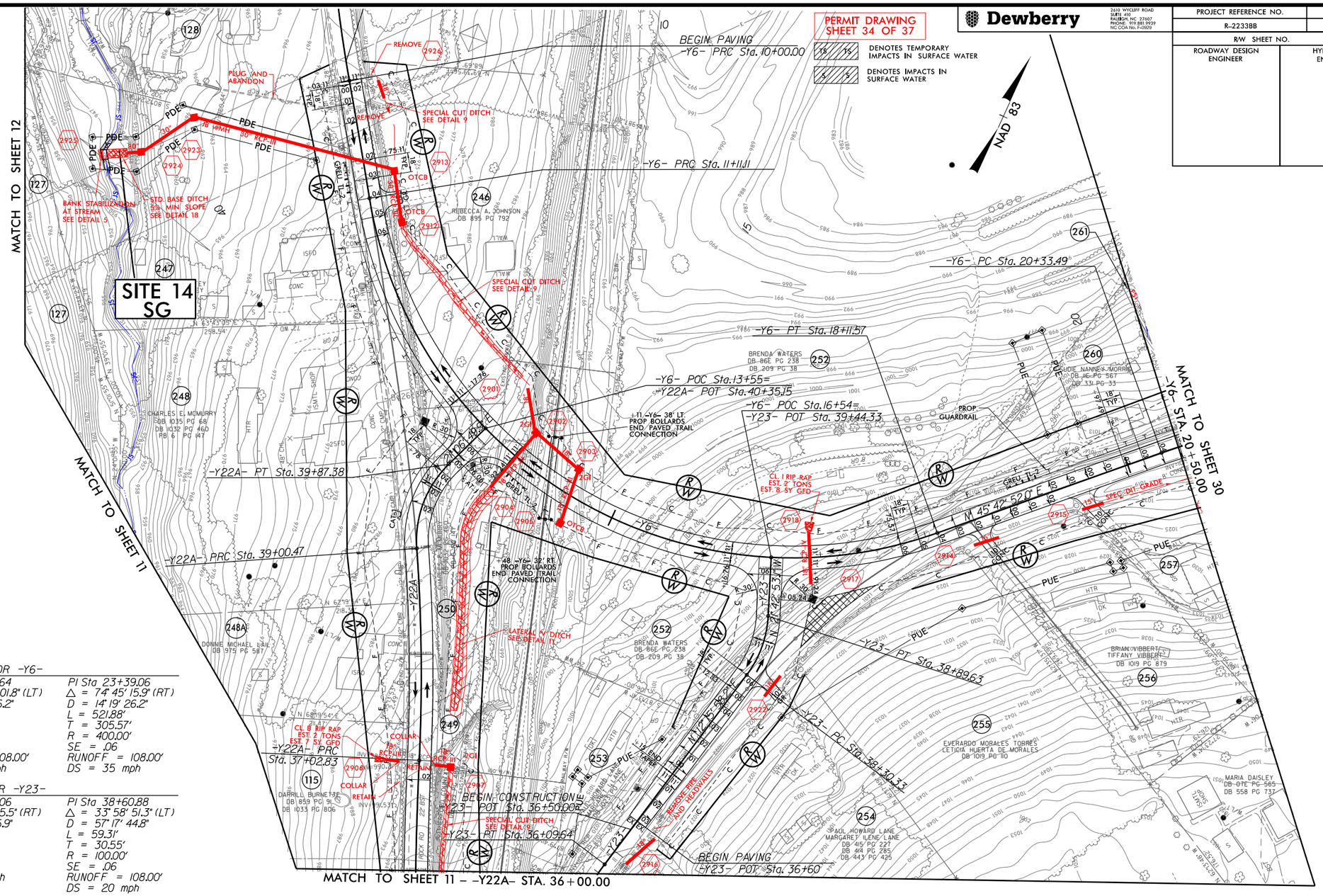
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 34 OF 37

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER



CURVE DATA FOR -Y6-

PI Sta 10+55.56	PI Sta 15+90.64	PI Sta 23+39.06
Δ = 0° 45' 51.3" (RT)	Δ = 100° 20' 01.8" (LT)	Δ = 74° 45' 15.9" (RT)
D = 0° 41' 16.2"	D = 14° 19' 26.2"	D = 14° 19' 26.2"
L = 111.11'	L = 700.46'	L = 521.88'
T = 55.56'	T = 479.53'	T = 305.57'
R = 8,330.00'	R = 400.00'	R = 400.00'
SE = EX.	SE = .06	SE = .06
DS = 35 mph	RUNOFF = 108.00'	RUNOFF = 108.00'
	DS = 35 mph	DS = 35 mph

CURVE DATA FOR -Y23-

PI Sta 32+45.69	PI Sta 35+18.06	PI Sta 38+60.88
Δ = 4° 29' 38.6" (RT)	Δ = 30° 01' 05.5" (RT)	Δ = 33° 58' 51.3" (LT)
D = 1° 16' 23.7"	D = 16° 00' 15.9"	D = 57° 17' 44.8"
L = 352.96'	L = 187.56'	L = 59.31'
T = 176.57'	T = 95.99'	T = 30.55'
R = 4,500.00'	R = 358.00'	R = 100.00'
SE = EX.	SE = EX.	SE = .06
DS = 35 mph	DS = 20 mph	RUNOFF = 108.00'
		DS = 20 mph

CURVE DATA FOR -Y22A-

PI Sta 32+70.82	PI Sta 35+65.41	PI Sta 38+01.76	PI Sta 39+46.88
Δ = 0° 56' 34.2" (LT)	Δ = 4° 35' 36.2" (RT)	Δ = 6° 44' 25.9" (LT)	Δ = 49° 47' 48.1" (RT)
D = 0° 18' 00.8"	D = 1° 40' 13.6"	D = 3° 24' 37.7"	D = 57° 17' 44.8"
L = 314.05'	L = 274.98'	L = 197.64'	L = 86.91'
T = 157.03'	T = 137.56'	T = 98.94'	T = 46.41'
R = 19,085.00'	R = 3,430.00'	R = 1,680.00'	R = 100.00'
SE = EX.	SE = EX.	SE = EX.	SE = .04
DS = 35 mph	DS = 35 mph	DS = 35 mph	RUNOFF = 72.00'
			DS = 15 mph

CURVE DATA FOR -Y23A-

PI Sta 44+55.25	PI Sta 45+75.10	PI Sta 46+84.50	PI Sta 48+15.42
Δ = 1° 32' 38.7" (RT)	Δ = 6° 33' 34.4" (RT)	Δ = 19° 55' 51.0" (RT)	Δ = 35° 04' 00.6" (RT)
D = 1° 09' 35.4"	D = 6° 09' 39.0"	D = 17° 54' 17.8"	D = 23° 52' 23.7"
L = 133.13'	L = 106.47'	L = 111.31'	L = 146.89'
T = 66.57'	T = 53.29'	T = 56.23'	T = 75.83'
R = 4,940.00'	R = 930.00'	R = 320.00'	R = 240.00'
SE = EX.	SE = EX.	SE = EX.	SE = EX.

SEE SHEETS 75 & 76 FOR -Y6- PROFILE
SEE SHEET 77 FOR -Y22A- PROFILE
SEE SHEET 77 FOR -Y23- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS 5/14/99

10/23/2017
DEWBERRY
R2233BB_Permit Drawings_20171023.pdf

SITE 18

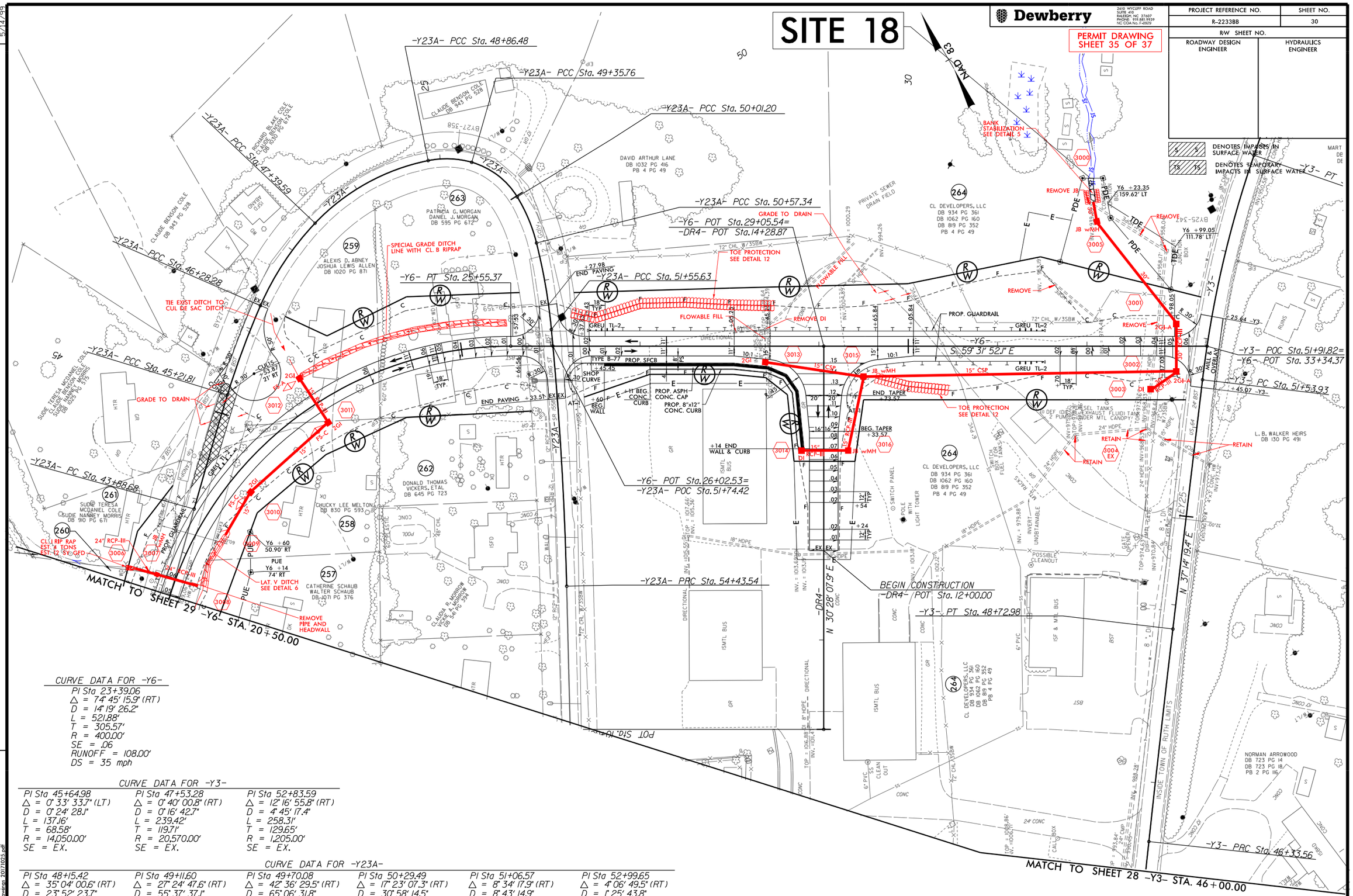
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PERMIT DRAWING
SHEET 35 OF 37

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS
5/14/99



CURVE DATA FOR -Y6-

PI Sta 23+39.06
Δ = 74° 45' 15.9" (RT)
D = 14° 19' 26.2"
L = 521.88'
T = 305.57'
R = 400.00'
SE = .06
RUNOFF = 108.00'
DS = 35 mph

CURVE DATA FOR -Y3-

PI Sta 45+64.98	PI Sta 47+53.28	PI Sta 52+83.59
Δ = 0° 33' 33.7" (LT)	Δ = 0° 40' 00.8" (RT)	Δ = 12° 16' 55.8" (RT)
D = 0° 24' 28.1"	D = 0° 16' 42.7"	D = 4° 45' 17.4"
L = 137.16'	L = 239.42'	L = 258.31'
T = 68.58'	T = 119.71'	T = 129.65'
R = 14,050.00'	R = 20,570.00'	R = 1,205.00'
SE = EX.	SE = EX.	SE = EX.

CURVE DATA FOR -Y23A-

PI Sta 48+15.42	PI Sta 49+11.60	PI Sta 49+70.08	PI Sta 50+29.49	PI Sta 51+06.57	PI Sta 52+99.65
Δ = 35° 04' 00.6" (RT)	Δ = 27° 24' 47.6" (RT)	Δ = 42° 36' 29.5" (RT)	Δ = 17° 23' 07.3" (RT)	Δ = 8° 34' 17.9" (RT)	Δ = 4° 06' 49.5" (RT)
D = 23° 52' 23.7"	D = 55° 37' 37.1"	D = 65° 06' 31.8"	D = 30° 58' 14.5"	D = 8° 43' 14.9"	D = 1° 25' 43.8"
L = 146.89'	L = 49.28'	L = 65.44'	L = 56.13'	L = 98.29'	L = 287.91'
T = 75.83'	T = 25.12'	T = 34.32'	T = 28.28'	T = 49.24'	T = 144.02'
R = 240.00'	R = 103.00'	R = 88.00'	R = 185.00'	R = 657.00'	R = 4,010.00'
SE = EX.	SE = EX.	SE = EX.	SE = EX.	SE = EX.	SE = EX.

SEE SHEETS 75 & 76 FOR -Y6- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

11/8/2017
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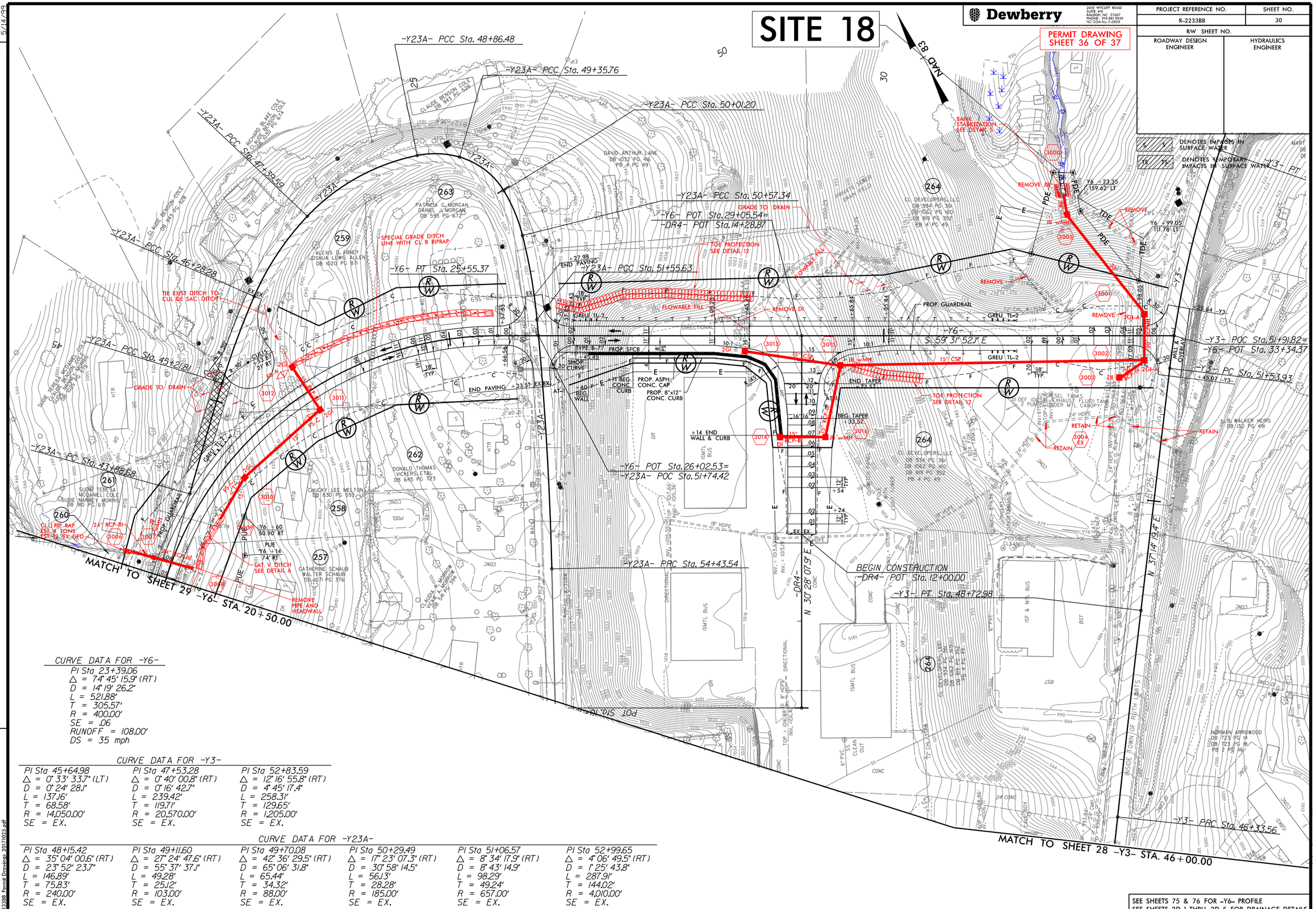
SITE 18

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PERMIT DRAWING
SHEET 36 OF 37

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER



CURVE DATA FOR -Y6-

PI Sta 23+39.06
△ = 74° 45' 15.9" (RT)
D = 14° 19' 26.2"
L = 521.88'
T = 305.57'
R = 400.00'
SE = .06
RUNOFF = 108.00'
DS = 35 mph

CURVE DATA FOR -Y3-

PI Sta 45+64.98	PI Sta 47+53.28	PI Sta 52+83.59
△ = 0° 33' 33.7" (LT)	△ = 0° 40' 00.8" (RT)	△ = 12° 16' 55.8" (RT)
D = 0° 24' 28.1"	D = 0° 16' 42.7"	D = 4° 45' 17.4"
L = 137.16'	L = 239.42'	L = 258.31'
T = 68.58'	T = 119.71'	T = 129.65'
R = 14,050.00'	R = 20,570.00'	R = 1,205.00'
SE = EX.	SE = EX.	SE = EX.

CURVE DATA FOR -Y23A-

PI Sta 48+15.42	PI Sta 49+11.60	PI Sta 49+70.08	PI Sta 50+29.49	PI Sta 51+06.57	PI Sta 52+99.65
△ = 35° 04' 00.6" (RT)	△ = 27° 24' 47.6" (RT)	△ = 42° 36' 29.5" (RT)	△ = 17° 23' 07.3" (RT)	△ = 8° 34' 17.9" (RT)	△ = 4° 06' 49.5" (RT)
D = 23° 52' 23.7"	D = 55° 37' 37.1"	D = 65° 06' 31.8"	D = 30° 58' 14.5"	D = 8° 43' 14.9"	D = 1° 25' 43.8"
L = 146.89'	L = 49.28'	L = 65.44'	L = 56.13'	L = 98.29'	L = 287.91'
T = 75.83'	T = 25.12'	T = 34.32'	T = 28.28'	T = 49.24'	T = 144.02'
R = 240.00'	R = 103.00'	R = 88.00'	R = 185.00'	R = 657.00'	R = 4,010.00'
SE = EX.	SE = EX.	SE = EX.	SE = EX.	SE = EX.	SE = EX.

SEE SHEETS 75 & 76 FOR -Y6- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

1/18/2017
DEWBERRY
R2233BB Permit Drawings 20171025.pdf

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	JD ID	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	SN	L3 778+97 TO 779+40 LT	ROADWAY FILL						< 0.01	< 0.01	43	34	
1	SN	Y2 22+05 LT	48" Pipe						< 0.01	< 0.01	24	14	
4	SL	L3 797+64 TO 798+03 LT	CHANNEL REALIGNMENT						0.01	< 0.01	96	18	
4	SL/SM	L3 797+66	10' X 7' RCBC						0.09		766		
4	SL	L 797+63 TO 798+0 RT	CHANNEL REALIGNMENT						< 0.01		43		
4	SL	L3 797+63 TO 797+70 RT	V DITCH						< 0.01	< 0.01	10	7	
5	SK	L3 814+76 LT TO 814+87 LT	BANK STABILIZATION						< 0.01	< 0.01	10	17	
5	SK	L3 814+76 LT TO 815+43 RT	ROADWAY FILL/30" CSP						0.02		112		
5	SJ	L3 815+11 TO 815+46LT	ROADWAY FILL						< 0.01	< 0.01	28	21	
6	SI	L3 828+19 TO 828+28 LT	BANK STABILIZATION						< 0.01	< 0.01	11	9	
6	SI	L3 830+00	8' X 6' RCBC						0.06		670		
6	SI	L3 832+25 TO 832+56 RT	CL. II RIPRAP ON BANKS						< 0.01	< 0.01	34	18	
7	SH	L3 831+35 TO 836+42 RT	ROADWAY FILL						0.11		832		
8	SG	RPD 22+04 RT TO 18+22 LT	ROADWAY FILL						0.05		445		
8	WA	RPD 17+38 TO 22+04 LT	ROADWAY FILL	0.11									
8	SG	RPD 18+26 TO 18+08 LT	36" PIPE						< 0.01		32		
8	SG	RPD 18+08 TO 17+76 LT	CL. II RIPRAP ON BANKS						< 0.01	< 0.01	25	20	
9	SF	L3 864+92 LT	BANK STABILIZATION						< 0.01	< 0.01	14	9	
9	SF	L3 866+00	54" RCP-V						0.01		140		
9	SF	L3 867+00 TO 867+28 RT	RIIP RAP ENERGY DISSIPATOR BASIN/CL. I RIP RAP IN CHANNEL						< 0.01	< 0.01	55	7	
10	SE	L3 875+24 LT	FLOODPLAIN BENCH						0.01	< 0.01	72	19	
10	SE	L3 874+42	3 - 10' X 10' RCBC						0.05		217		
10	SE	L3 874+16 RT	FLOODPLAIN BENCH						0.01		45		
10	SE	L3 873+90 RT	REMOVAL OF EXISTING CULVERT							0.01		51	
11	SB	L3 968+69 TO 968+88 LT	BANK STABILIZATION						< 0.01	< 0.01	10	27	
11	SB	L3 968+64	36" STEEL PIPE						< 0.01		151		
13	SO	Y2 15+24 RT	CL. II RIPRAP						0.02	< 0.01	35	19	
14	SG	Y6 10+23 RT	BANK STABILIZATION						< 0.01	< 0.01	10	24	
15	SC	Y11 22+50 LT	BANK STABILIZATION						< 0.01	< 0.01	22	14	
15	SC	Y11 22+80	42" CSP						0.05		506		
15	SC	Y11 19+88 RT	LATERAL V DITCH						< 0.01	< 0.01	14	19	
16	SD	Y8 17+18 LT	RIP RAP ENEGY DISSIPATOR/CL. B RIPRAP LINING CHANNEL						< 0.01	< 0.01	52	10	
16	SD	Y8 18+04	60" PIPE						< 0.01		38		
16	SD	Y10 15+63 RT	LATERAL V DITCH						< 0.01	< 0.01	18	12	
17	SO	Y2 33+41 TO 34+50 RT	ROADWAY FILL						0.01		143		
18	N/A	Y6 32+02 TO 32+09 LT	BANK STABILIZATION						< 0.01	< 0.01	13	13	
TOTALS*:				0.11					0.58	0.05	4736	382	0

*Rounded totals are sum of actual impacts

NOTES:
Site 4 SL/SM is comprised of both the main jurisdictional stream and a trib to the left of the main stem.
Site 7 begin on sheet 16 of 37. The stream is completely covered by roadway. The drainage that would have gone to the stream is being picked up in the proposed lateral V ditch to the right of L3.
Site 17 is a small area between piped streams that has been covered up by the roadway.
Site 2,3, and 12 have been removed due to those sites not being jurisdictional.
Site 18 was not in the original JD file, therefore it never received a JD ID. During the 4C meeting, it was agreed upon to keep the impact site.

Revised 2016 09 09

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
3/4/2019
RUTHERFORD
R-2233BB
ENTER WBS # HERE

09/08/99

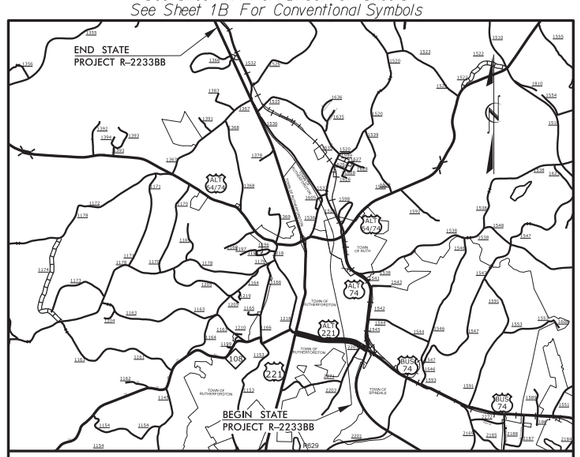
TIP PROJECT: R-2233BB

CONTRACT: C204397

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2233BB	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34400.1.S5		PE
34400.2.5		R/W & UTIL
34400.3.4		CONST.

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



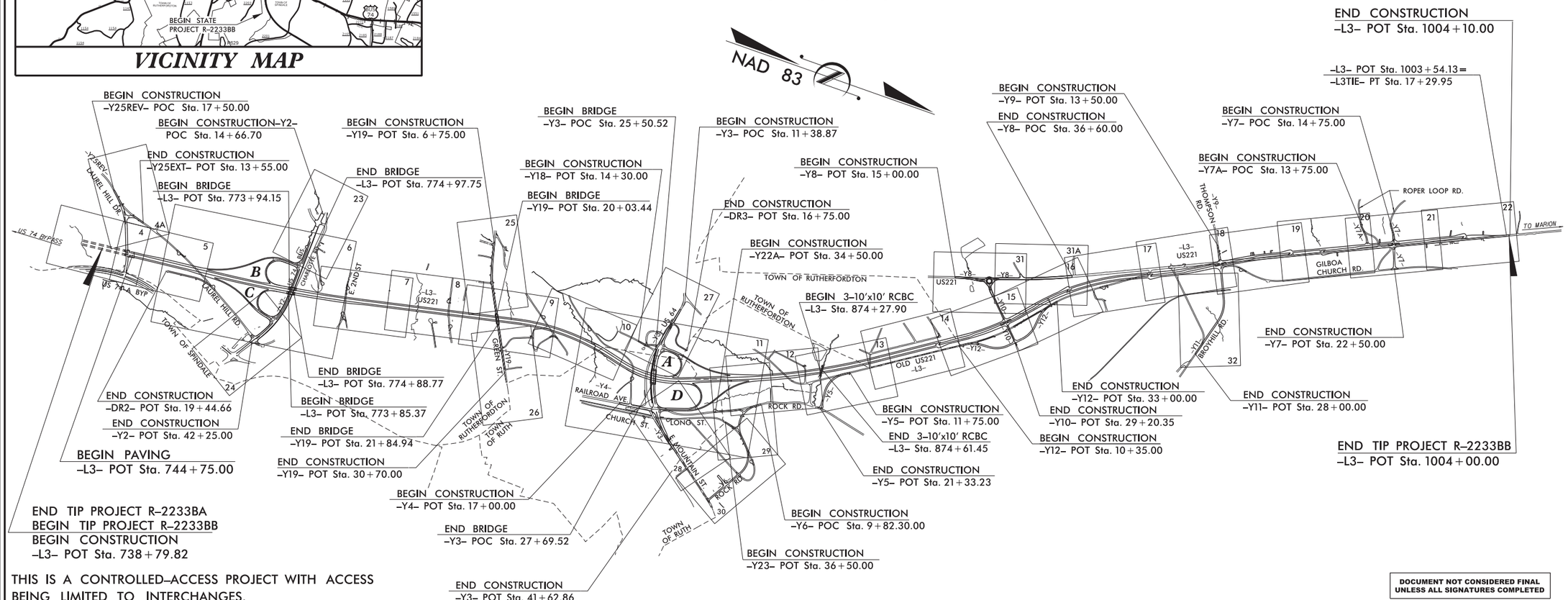
VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RUTHERFORD COUNTY

LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, RETAINING WALL AND STRUCTURES



THIS IS A CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
THIS IS A PARTIAL CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NCDOT CONTACT: NATHAN ADIMA, P.E.

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 = 13300
ADT 2040 = 14500
K = 9 %
D = 60 %
T = 9 % *
V = 70 MPH
* TTST 5% DUAL 4%
FUNC CLASS =
ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R–2233BB = 4.999 MILES
LENGTH STRUCTURE TIP PROJECT R–2233BB = 0.026 MILES
TOTAL LENGTH TIP PROJECT R–2233BB = 5.025 MILES

STRUCTURE LENGTH BASED ON –L3– NB STATIONING.

PLANS PREPARED FOR NCDOT BY:

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F–0929

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 28, 2017

LETTING DATE:
JULY 21, 2020

DENNIS J. MORY, P.E.
PROJECT ENGINEER

ANNE MARIE PRIETO, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BONDOR P.E.

SIGNATURE:

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORY P.E.

SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2/18/2020 3:30:14 PM
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USER: aprietto

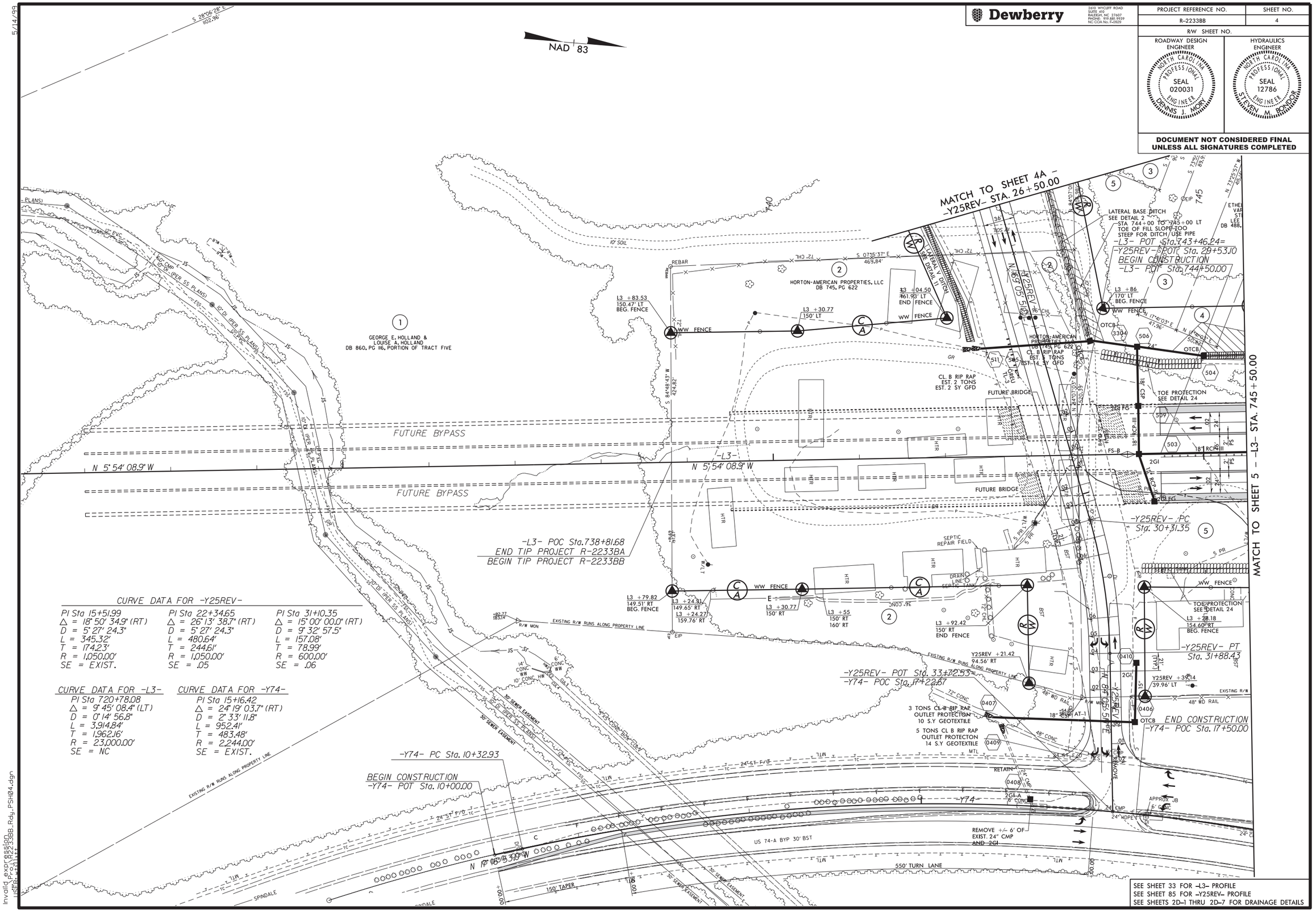
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND JR.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 33 FOR –L3– PROFILE
SEE SHEET 85 FOR –Y25REV– PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

5/14/99
Invalid expression
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5/14/99

Dewberry

2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	4A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND JR.

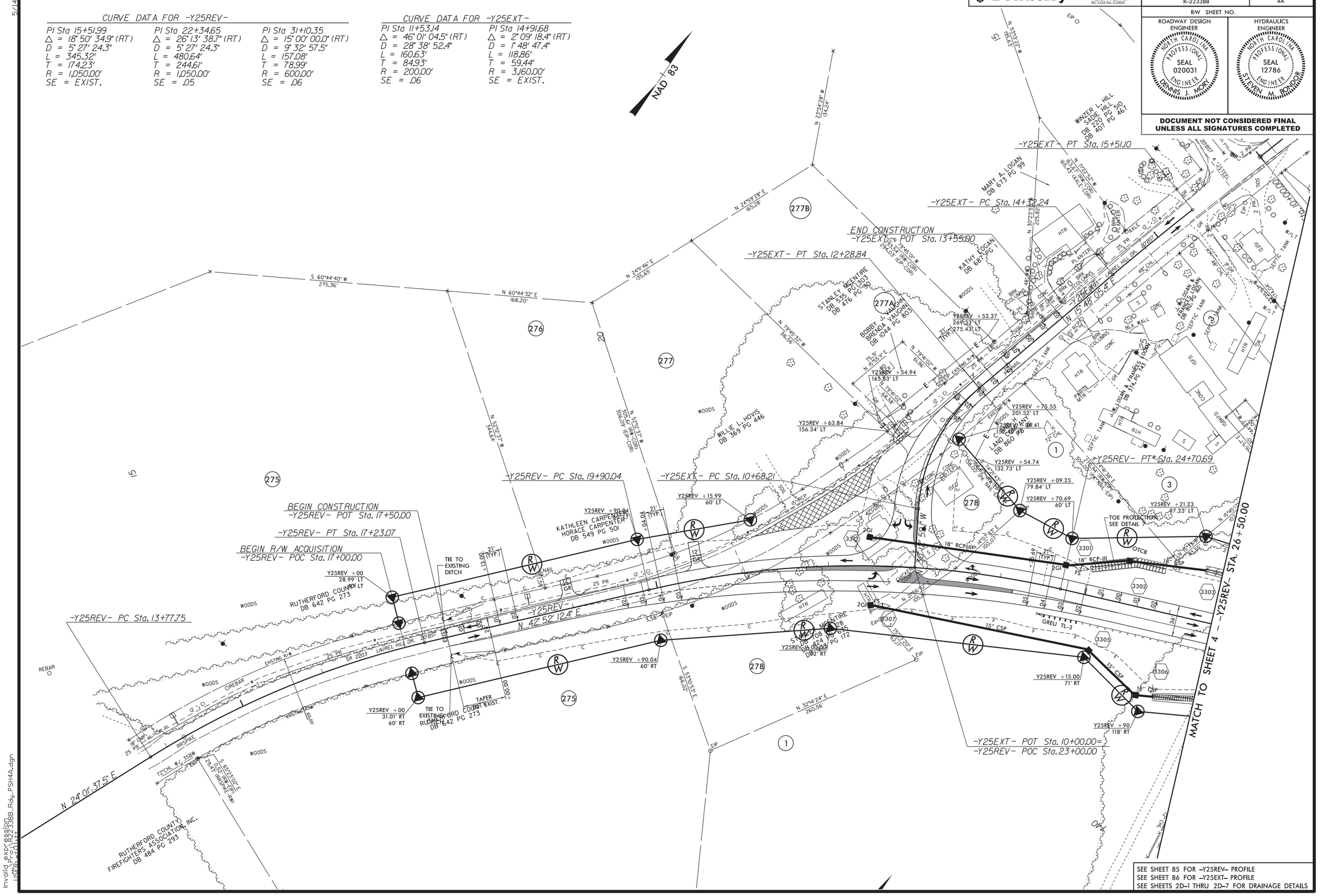
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CURVE DATA FOR -Y25REV-

PI Sta 15+51.99	PI Sta 22+34.65	PI Sta 31+10.35
△ = 18° 50' 34.9" (RT)	△ = 26° 13' 38.7" (RT)	△ = 15° 00' 00.0" (RT)
D = 5° 27' 24.3"	D = 5° 27' 24.3"	D = 9° 32' 57.5"
L = 345.32'	L = 480.64'	L = 157.08'
T = 174.23'	T = 244.61'	T = 78.99'
R = 1,050.00'	R = 1,050.00'	R = 600.00'
SE = EXIST.	SE = .05	SE = .06

CURVE DATA FOR -Y25EXT-

PI Sta 11+53.14	PI Sta 14+91.68
△ = 46° 01' 04.5" (RT)	△ = 2° 09' 18.4" (RT)
D = 28° 38' 52.4"	D = 1° 48' 47.4"
L = 160.63'	L = 118.86'
T = 84.93'	T = 59.44'
R = 200.00'	R = 3,160.00'
SE = .06	SE = EXIST.



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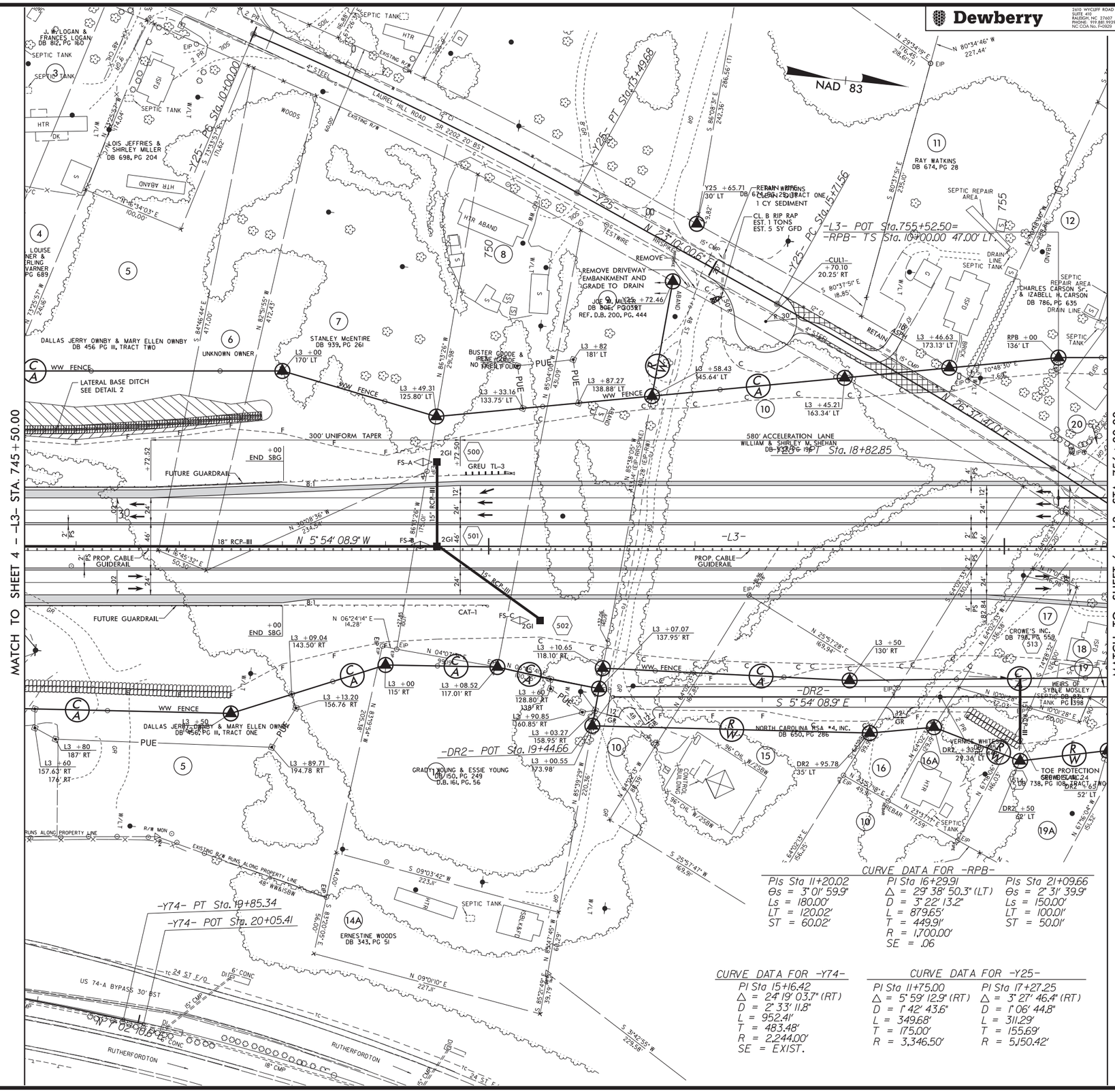
5/14/99



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919-881-9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORK

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BONDS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEE SHEET 34 FOR –L3– PROFILE
SEE SHEET 56 FOR –RPB– PROFILE
SEE SHEET 85 FOR –Y25REV– PROFILE
SEE SHEET 86 FOR –DR2– PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

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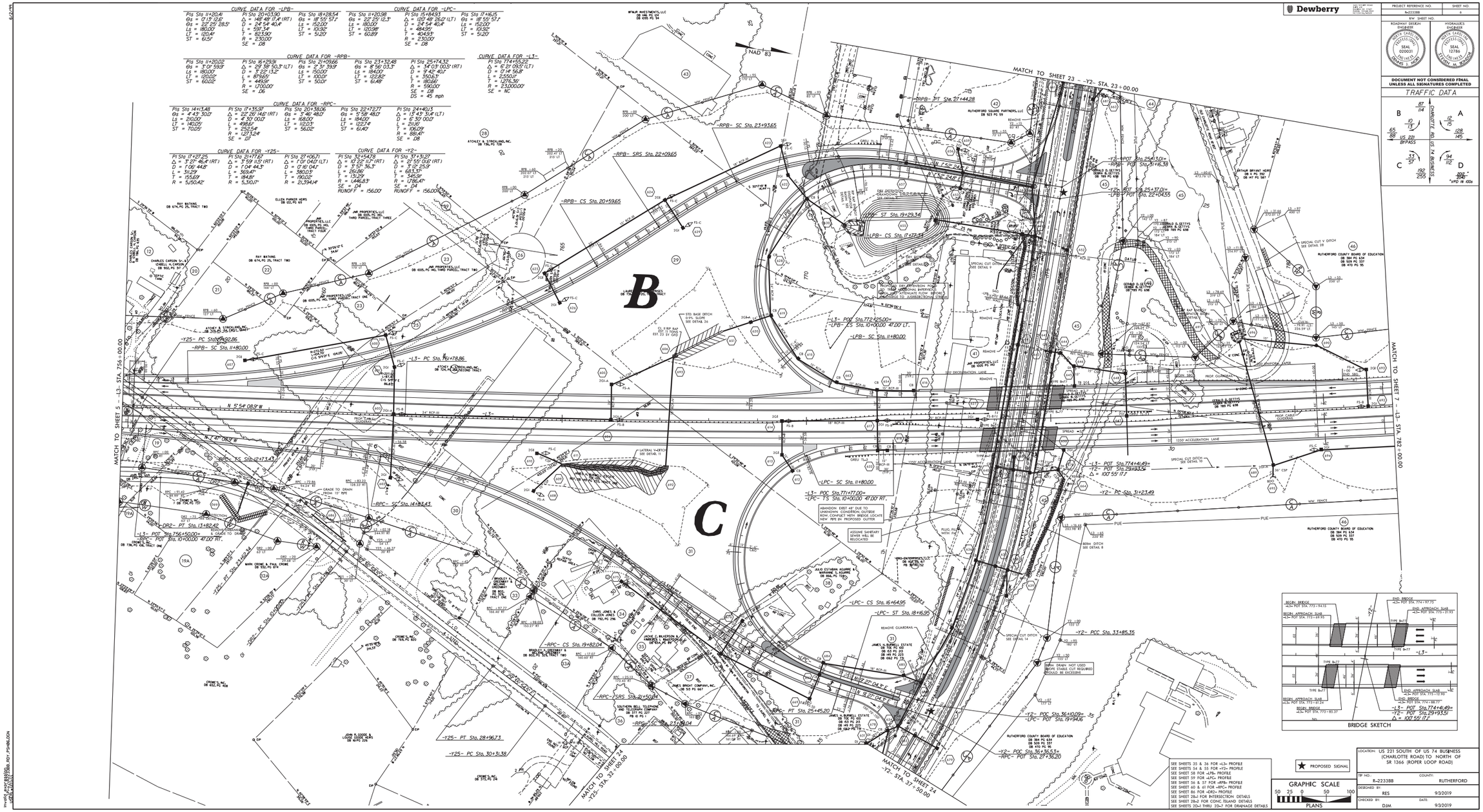

Dewberry
PROJECT REFERENCE NO.
8-2233BB
SHEET NO.
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS DESIGN ENGINEER
SEAL 020031
SEAL 12786
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TRAFFIC DATA
CHARLOTTE RD. US 74 BUSINESS
US 221 BYPASS
B
C
MATCH TO SHEET 23 - -Y2- STA. 23+00.00
MATCH TO SHEET 5 - -L3- STA. 756+00.00
MATCH TO SHEET 7 - -L3- STA. 782+00.00
MATCH TO SHEET 24 -Y2- STA. 32+00.00
MATCH TO SHEET 24 -Y2- STA. 37+50.00
NAD 83
-RPB- SC Sta. 23+93.65
-RPB- SRS Sta. 22+09.65
-RPB- CS Sta. 20+59.65
-RPB- ST Sta. 19+29.34
-LPB- CS Sta. 17+77.34
-LPB- SC Sta. 11+80.00
-L3- POT Sta. 772+25.00=
-LPB- CS Sta. 10+00.00 47.00 LT.
-Y2- POT Sta. 25+37.01=
-RPB- POT Sta. 5+16.38
-Y2- BOT Sta. 25+37.01=
-LPB- POT Sta. 22+04.55
-Y25- PC Sta. 9+92.86
-RPB- SC Sta. 11+80.00
-L3- PC Sta. 761+78.86
-L3- POT Sta. 756+50.00=
-RPC- POT Sta. 10+00.00 47.00 RT.
-RPC- SC Sta. 14+83.43
-RPC- CS Sta. 19+82.04
-RPC- SRS Sta. 21+50.04
-RPC- PT Sta. 25+45.20
-LPC- SC Sta. 11+80.00
-L3- POC Sta. 771+77.00=
-LPC- TS Sta. 10+00.00 47.00 RT.
-LPC- CS Sta. 16+64.95
-LPC- ST Sta. 18+16.95
-L3- POT Sta. 774+14.49=
-Y2- POT Sta. 29+93.52
Δ = 100°55'17.1"
-Y2- PC Sta. 31+23.49
-Y2- POC Sta. 33+85.35
-Y2- POC Sta. 36+10.09= -35
-LPC- POT Sta. 19+19.46
-Y2- POC Sta. 36+56.53=
-RPC- POT Sta. 27+36.20
-Y25- PT Sta. 28+96.73
-Y25- PC Sta. 30+51.38
-DR2- PT Sta. 13+82.42
-DR2- PC Sta. 21+60.44
-DR2- PT Sta. 21+60.44
-DR2- PC Sta. 21+60.44
ABANDON EXIST 48" DUE TO UNKNOWN CONDITION, OUTSIDE ROW, CONFLICT WITH BRIDGE LOCATE NEW PIPE IN PROPOSED GUTTER
ASSUME SANITARY SEWER WILL BE RELOCATED
NEW DRAIN NOT USED BECAUSE STABLE CUT REQUIRED WOULD BE EXCESSIVE
REMOVE GUARDRAIL
SEE SHEETS 35 & 36 FOR -L3- PROFILE
SEE SHEETS 54 & 55 FOR -Y2- PROFILE
SEE SHEET 58 FOR -LPB- PROFILE
SEE SHEET 59 FOR -LPC- PROFILE
SEE SHEET 56 & 57 FOR -RPB- PROFILE
SEE SHEET 60 & 61 FOR -RPC- PROFILE
SEE SHEET 86 FOR -DR2- PROFILE
SEE SHEET 28-J FOR INTERSECTION DETAILS
SEE SHEET 28-J FOR CONC. ISLAND DETAILS
SEE SHEETS 2D-J THRU 2D-7 FOR DRAINAGE DETAILS
PROPOSED SIGNAL
GRAPHIC SCALE
50 25 0 50 100
PLANS
BRIDGE SKETCH
LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)
TIP NO.: B-2233BB
COUNTY: RUTHERFORD
DESIGNED BY: RES
DATE: 9/3/2019
CHECKED BY: DJM
DATE: 9/3/2019

5/14/99

Dewberry

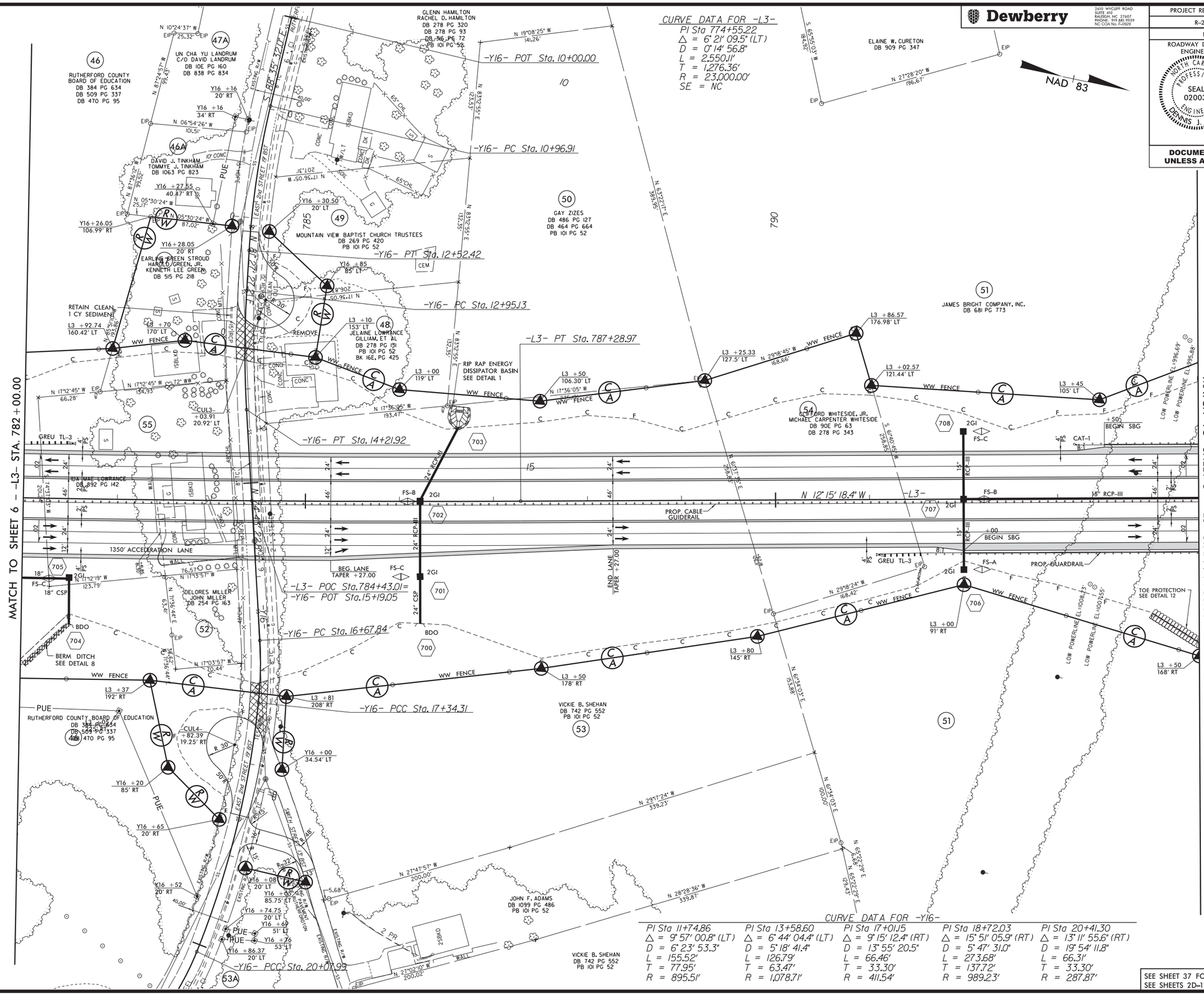
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORR

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BONDS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



CURVE DATA FOR -L3-

PI Sta 774+55.22
Δ = 6° 21' 09.5" (LT)
D = 0° 14' 56.8"
L = 2,550.11'
T = 1,276.36'
R = 23,000.00'
SE = NC

CURVE DATA FOR -Y16-

PI Sta 11+74.86	PI Sta 13+58.60	PI Sta 17+01.15	PI Sta 18+72.03	PI Sta 20+41.30
Δ = 9° 57' 00.8" (LT)	Δ = 6° 44' 04.4" (LT)	Δ = 9° 15' 12.4" (RT)	Δ = 15° 51' 05.9" (RT)	Δ = 13° 11' 55.6" (RT)
D = 6° 23' 53.3"	D = 5° 18' 41.4"	D = 13° 55' 20.5"	D = 5° 47' 31.0"	D = 19° 54' 11.8"
L = 155.52'	L = 126.79'	L = 66.46'	L = 273.68'	L = 66.31'
T = 77.95'	T = 63.47'	T = 33.30'	T = 137.72'	T = 33.30'
R = 895.51'	R = 1,078.71'	R = 411.54'	R = 989.23'	R = 287.87'

SEE SHEET 37 FOR –L3– PROFILE
SEE SHEETS 2D–1 THRU 2D–7 FOR DRAINAGE DETAILS

5/14/99

Dewberry

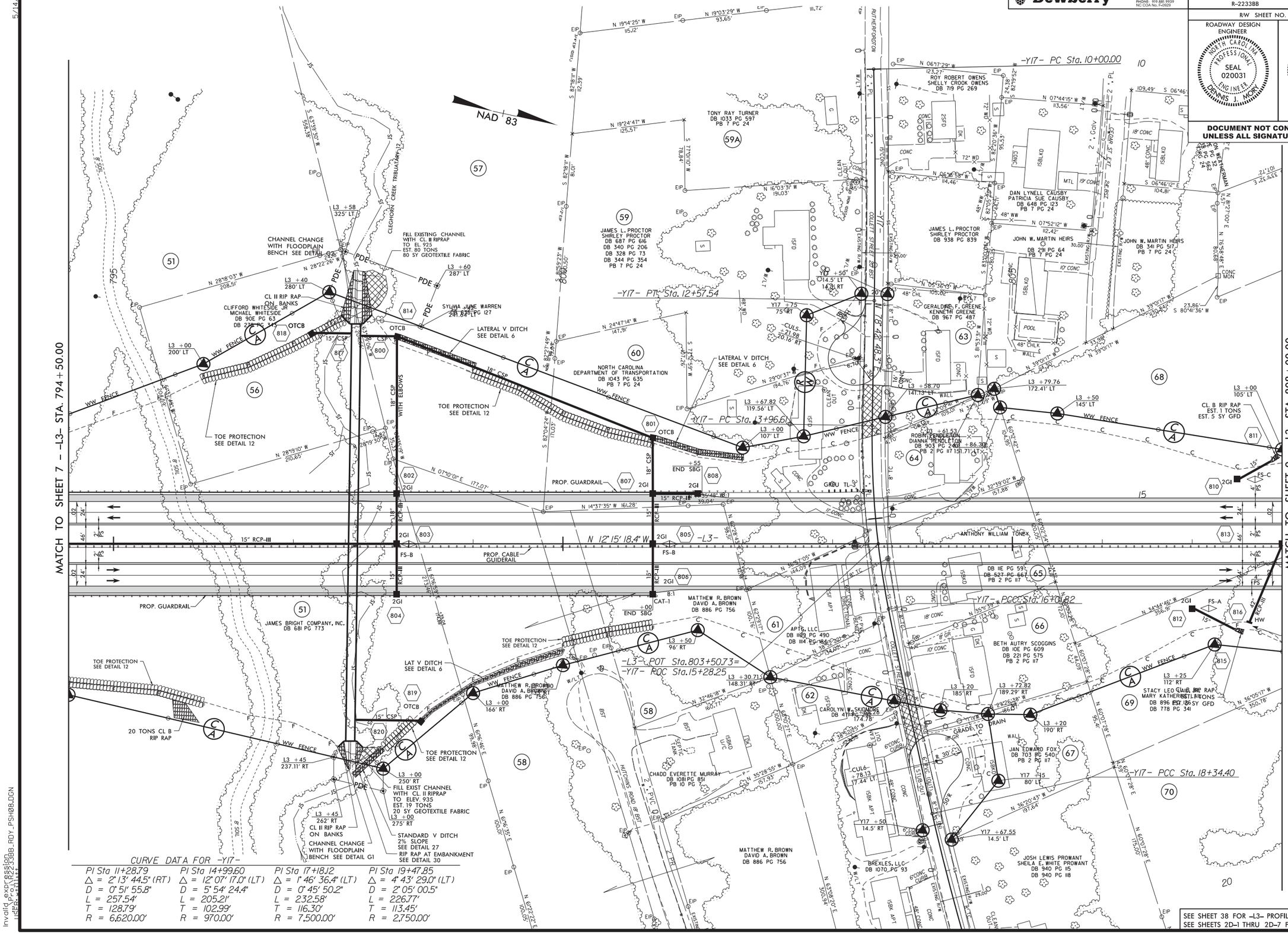
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORR

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 38 FOR -L3- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

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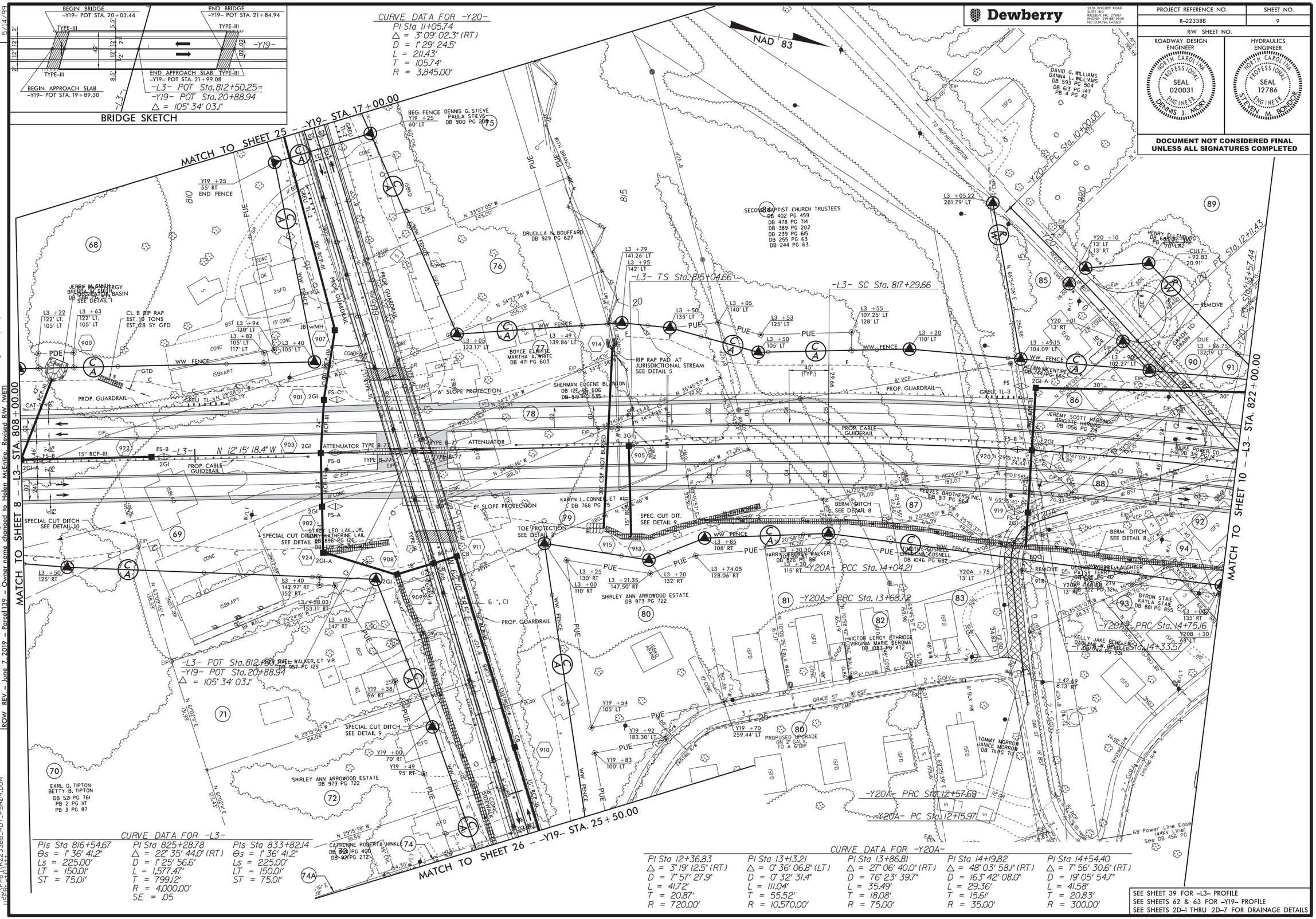
FILE: R-2233BB_RDY_PSH08.DGN


BEGIN BRIDGE
-Y19- POT STA. 20+03.44
END BRIDGE
-Y19- POT STA. 21+84.94
TYPE-III
-Y19-
END APPROACH SLAB TYPE-III
-Y19- POT STA. 21+99.08
BEGIN APPROACH SLAB
-Y19- POT STA. 19+89.30
-L3- POT Sta.812+50.25=
-Y19- POT Sta.20+88.94
△ = 105° 34' 03.1"
BRIDGE SKETCH
CURVE DATA FOR -Y20-
PI Sta 11+05.74
△ = 3° 09' 02.3" (RT)
D = 1° 29' 24.5"
L = 211.43'
T = 105.74'
R = 3,845.00'
NAD 83
MATCH TO SHEET 25 - -Y19- STA. 17+00.00
MATCH TO SHEET 8 - -L3- STA. 808+00.00
MATCH TO SHEET 10 - -L3- STA. 822+00.00
MATCH TO SHEET 26 - -Y19- STA. 25+50.00
-L3- TS Sta. 815+04.66
-L3- SC Sta. 817+29.66
-Y20- PC Sta. 10+00.00
-Y20- PT Sta. 12+11.43
-Y20- PC Sta. 13+41+57.44
-Y20A- PCC Sta. 14+04.21
-Y20A- PRC Sta. 13+68.72
-Y20A- PRC Sta. 14+75.16
-Y20A- PRC Sta. 14+33.57
-Y20A- PRC Sta. 12+57.69
-Y20A- PC Sta. 12+15.97
-L3- POT Sta.812+50.25=
-Y19- POT Sta.20+88.94
△ = 105° 34' 03.1"
CURVE DATA FOR -L3-
PIs Sta 816+54.67
Θs = 1° 36' 41.2"
Ls = 225.00'
LT = 150.01'
ST = 75.01'
PIs Sta 825+28.78
△ = 22° 35' 44.0" (RT)
D = 1° 25' 56.6"
L = 1,577.47'
T = 799.12'
R = 4,000.00'
SE = .05
PIs Sta 833+82.14
Θs = 1° 36' 41.2"
Ls = 225.00'
LT = 150.01'
ST = 75.01'
CURVE DATA FOR -Y20A-
PI Sta 12+36.83
△ = 3° 19' 12.5" (RT)
D = 7° 57' 27.9"
L = 41.72'
T = 20.87'
R = 720.00'
PI Sta 13+13.21
△ = 0° 36' 06.8" (LT)
D = 0° 32' 31.4"
L = 111.04'
T = 55.52'
R = 10,570.00'
PI Sta 13+86.81
△ = 27° 06' 40.0" (RT)
D = 76° 23' 39.7"
L = 35.49'
T = 18.08'
R = 75.00'
PI Sta 14+19.82
△ = 48° 03' 58.1" (RT)
D = 163° 42' 08.0"
L = 29.36'
T = 15.61'
R = 35.00'
PI Sta 14+54.40
△ = 7° 56' 30.6" (RT)
D = 19° 05' 54.7"
L = 41.58'
T = 20.83'
R = 300.00'
SEE SHEET 39 FOR -L3- PROFILE
SEE SHEETS 62 & 63 FOR -Y19- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929
PROJECT REFERENCE NO.
R-2233BB
SHEET NO.
9
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORR
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
REVISIONS
ROW REV - December 21, 2017 - Parcel 93 - Revised He at Y20A +60 to Y20A +68.88-EX. R/W (WET)
ROW REV - December 21, 2017 - Parcel 85 - Property owner name changed to Earl McEntire (WET)
ROW REV - June 19, 2018 - Parcel 85 - Added "DB 1144 PG 655" (AMP)
ROW REV - October 22, 2018 - Parcel 71 - Changed name to Sita Rael Walker, et vir and DB 957 PG 129 (WET)
ROW REV - October 22, 2018 - Parcel 79 - Changed name to Karyn L. Conner, et al (WET)
ROW REV - February 14, 2019 - Parcel 74/74A - Property boundary change. Parcel 74 name change to Lois Grobes DB 809, Pg 498 & DB 995, Pg 594 (WET)
ROW REV - February 14, 2019 - Parcel 74/74A - Added new parcel - 74A, Owner: Jeanette Weber Trust, DB 1131, Pg 114 (WET)
ROW REV - June 7, 2019 - Parcel 91 - Owner name changed to Mary Lucille Simpson Heirs; Added #16 E591. (WET)
ROW REV - June 7, 2019 - Parcel 74/74A - Added DB 921, Pg 272. (WET)
ROW REV - June 7, 2019 - Parcel 73 - Owner name changed to Catherine Roberta Hinkle; Added DB 921, Pg 272. (WET)
ROW REV - June 7, 2019 - Parcel 139 - Owner name changed to Helen McEntire. Revised R/W. (WET)
Invalid expression
USER: dmorr
FILE: R-2233BB_RDY_PSH09.DGN

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

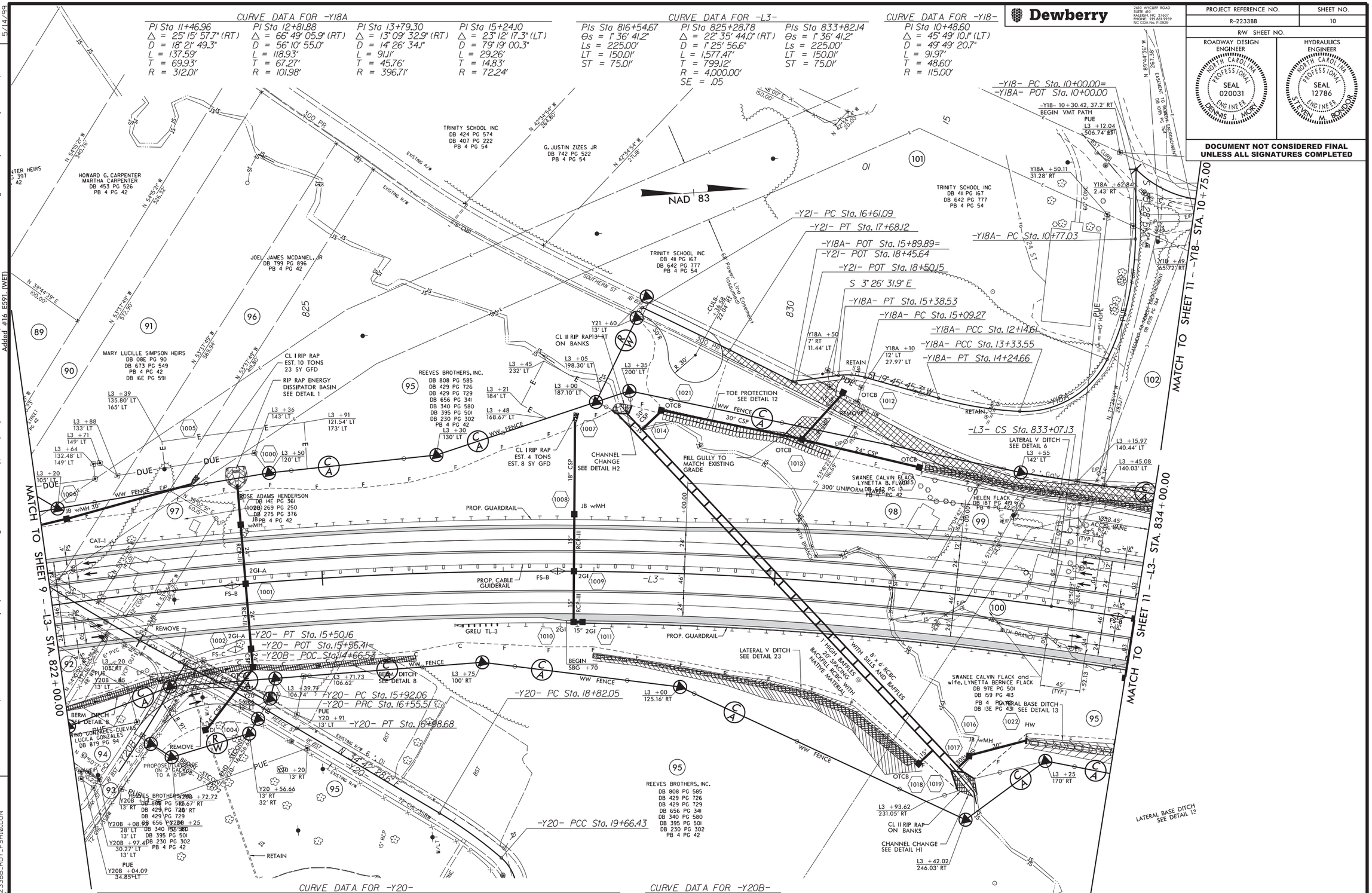
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOWDEN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

ROW REV. – June 19, 2018 – Parcel 103 – Property owner name changed to Parton Family, LLC (AMP)
ROW REV. – June 19, 2018 – Parcel 103, 239 – Adjusted boundary between parcels (AMP)
ROW REV. – June 7, 2019 – Parcel 100 – Owner name changed to Swanee Calvin Flack and wife, Lynetta Bernice Flack, Added Estate#13-E-431. (WET)
ROW REV. – June 7, 2019 – Parcel 91 – Owner name changed to Mary Lucille Simpson Heirs; Added #16 E591. (WET)
ROW REV. – June 19, 2018 – Parcel 102 – Property owner name changed to Parton Family, LLC (AMP)
ROW REV. – June 19, 2018 – Parcel 103 – Adjust boundary line & removed existing easement line (AMP)
ROW REV. – June 19, 2018 – Parcel 102 – Adjust boundary line & removed existing easement line (AMP)
ROW REV. – December 21, 2017 – Parcel 95 – Revised PUE line to R/W line (WET)

5/14/99



SEE SHEET 40 FOR –L3– PROFILE
SEE SHEET 74 FOR –Y18– PROFILE
SEE SHEETS 2D–1 THRU 2D–7 FOR DRAINAGE DETAILS

Invalid expression
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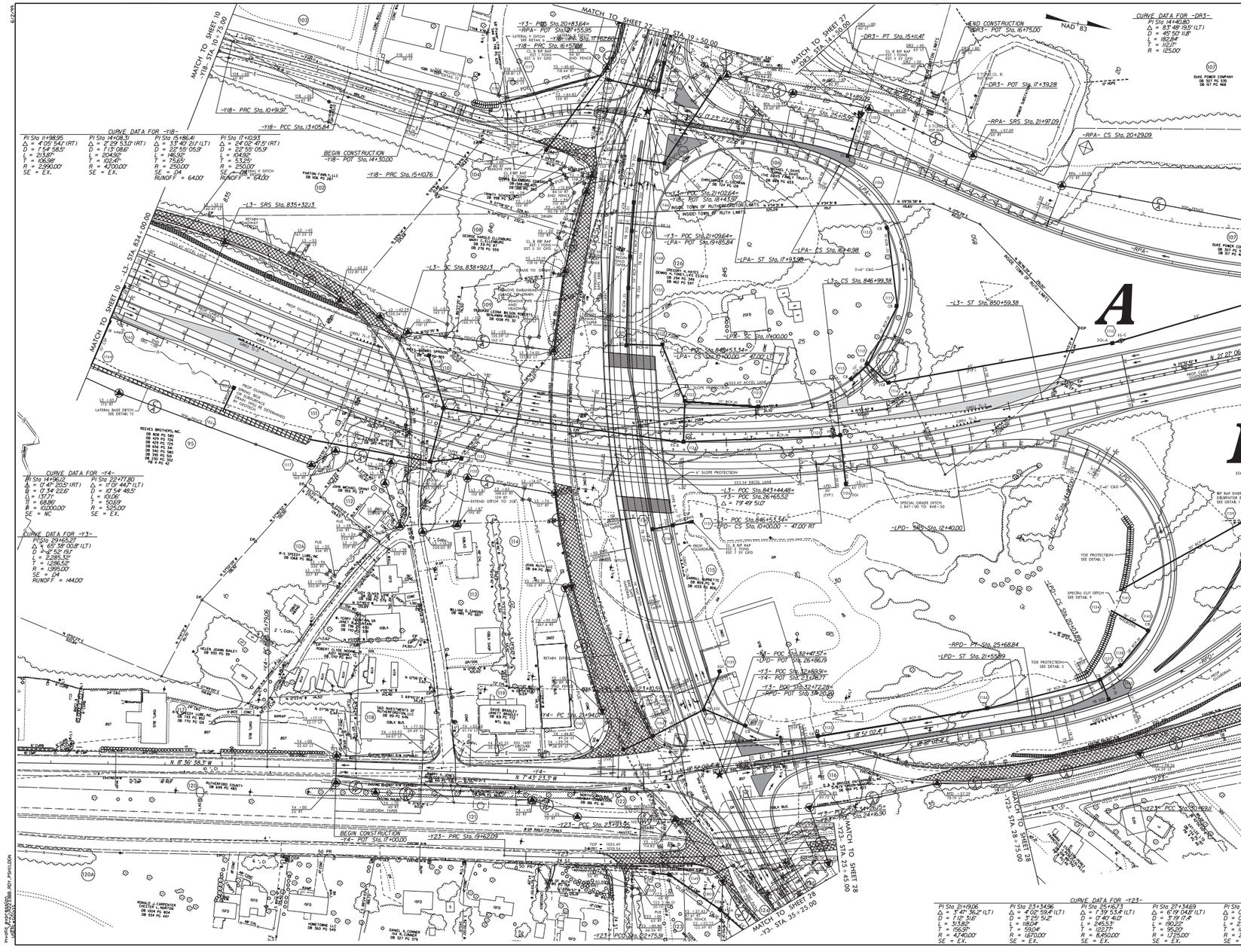


Dewberry

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	11

R/W SHEET NO.

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEERING

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEERING

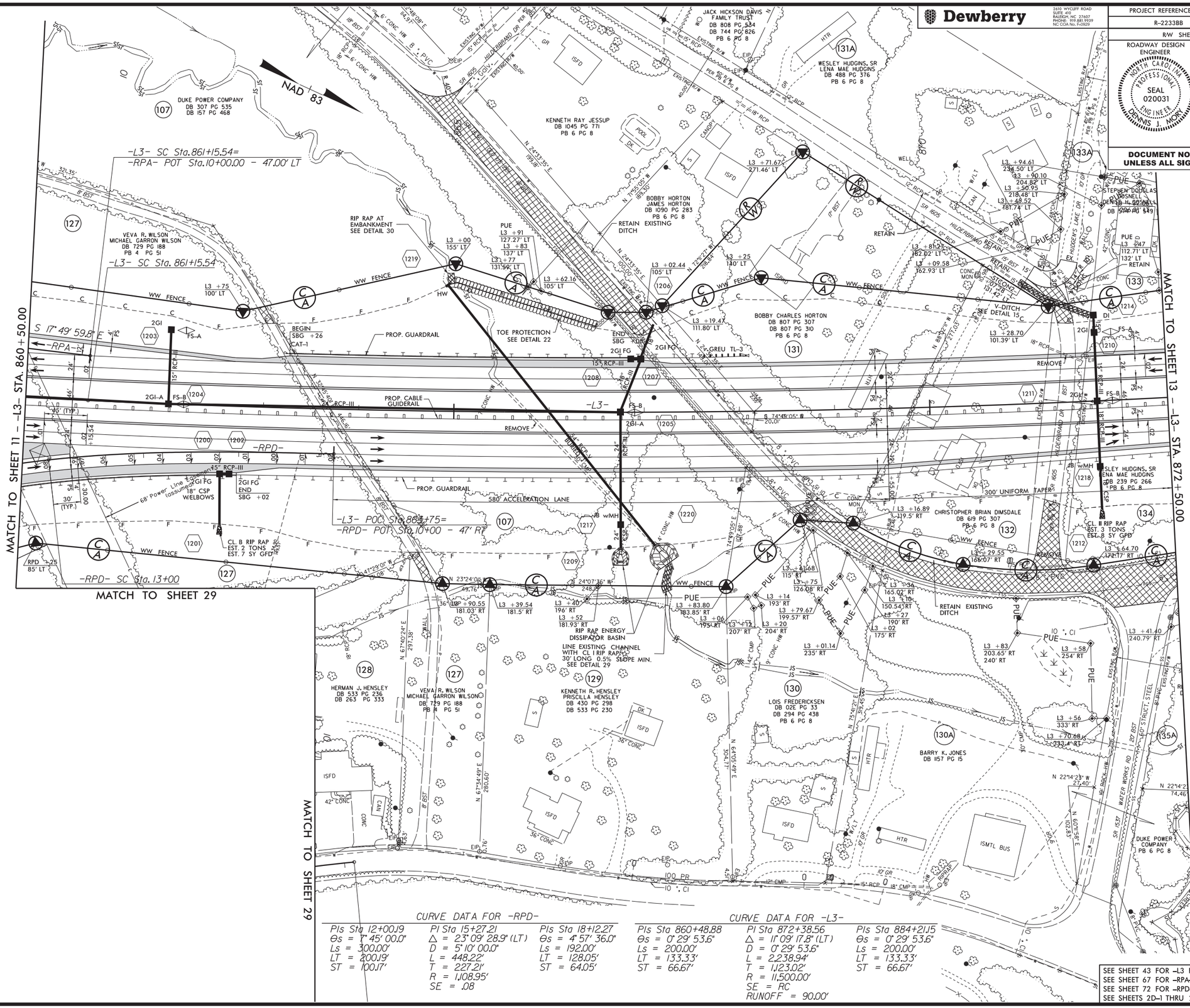
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TIP NO.: R-2233BB	COUNTY: RUTHERFORD
DESIGNED BY: RES	DATE: 9/3/2019
CHECKED BY: DJM	DATE: 9/3/2019

SEE SHEETS 41 & 42 FOR -L3- PROFILE
SEE SHEET 69 FOR -LPA- PROFILE
SEE SHEETS 70 & 71 FOR -LPD- PROFILE
SEE SHEETS 67 & 68 FOR -RPA- PROFILE
SEE SHEETS 72 & 73 FOR -RPD- PROFILE
SEE SHEET 74 FOR -Y18- & -Y23- PROFILES
SEE SHEET 77 FOR -Y4- & -Y23A- PROFILES
SEE SHEETS 64 THRU 66 FOR -Y3- PROFILE
SEE SHEET 28-J1 FOR INTERSECTION DETAILS
SEE SHEET 28-J4 FOR CONC. ISLAND DETAILS
SEE SHEETS 20-J1 THRU 20-J7 FOR DRAINAGE DETAILS

5/14/99



Dewberry

2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORR

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOLDEN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CURVE DATA FOR -RPD-

PIs Sta 12+00.19	PI Sta 15+27.21	PIs Sta 18+12.27
Θs = 1° 45' 00.0"	Δ = 23° 09' 28.9" (LT)	Θs = 4° 57' 36.0"
Ls = 300.00'	D = 5° 10' 00.0"	Ls = 192.00'
LT = 200.19'	L = 448.22'	LT = 128.05'
ST = 100.17'	T = 227.21'	ST = 64.05'
	R = 1,108.95'	
	SE = .08	

CURVE DATA FOR -L3-

PIs Sta 860+48.88	PI Sta 872+38.56	PIs Sta 884+21.15
Θs = 0° 29' 53.6"	Δ = 11° 09' 17.8" (LT)	Θs = 0° 29' 53.6"
Ls = 200.00'	D = 0° 29' 53.6"	Ls = 200.00'
LT = 133.33'	L = 2,238.94'	LT = 133.33'
ST = 66.67'	T = 1,123.02'	ST = 66.67'
	R = 11,500.00'	
	SE = RC	
	RUNOFF = 90.00'	

SEE SHEET 43 FOR -L3 PROFILE
SEE SHEET 67 FOR -RPA- PROFILE
SEE SHEET 72 FOR -RPD- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

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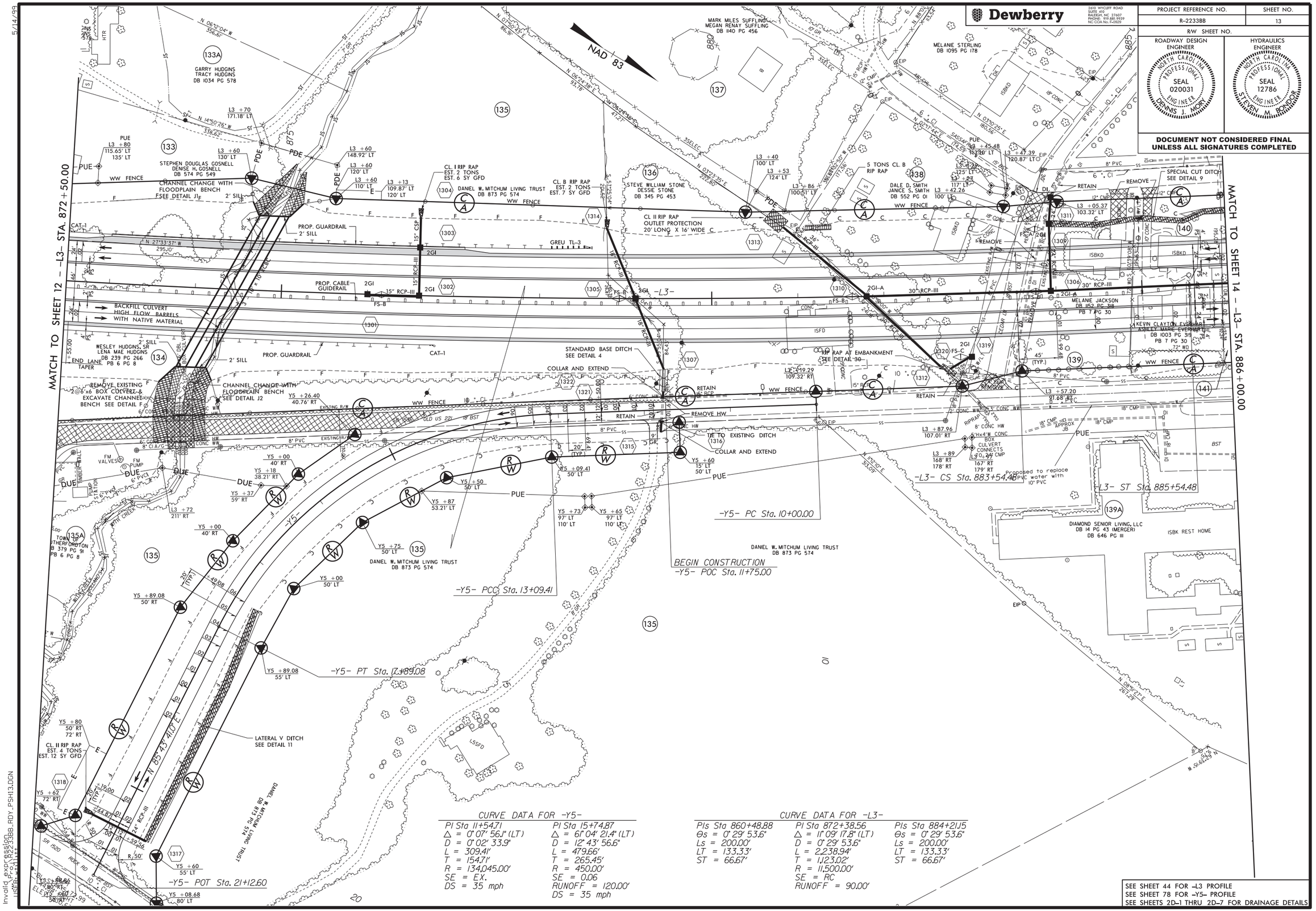
USER: 4211

5/14/99



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORRIS

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOWDEN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CURVE DATA FOR -Y5-

PI Sta 11+54.71	PI Sta 15+74.87
△ = 0° 07' 56.1" (LT)	△ = 61° 04' 21.4" (LT)
D = 0° 02' 33.9"	D = 12° 43' 56.6"
L = 309.41'	L = 479.66'
T = 154.71'	T = 265.45'
R = 134,045.00'	R = 450.00'
SE = EX.	SE = 0.06
DS = 35 mph	RUNOFF = 120.00'
	DS = 35 mph

CURVE DATA FOR -L3-

PIs Sta 860+48.88	PI Sta 872+38.56	PIs Sta 884+21.15
Θs = 0° 29' 53.6"	△ = 11° 09' 17.8" (LT)	Θs = 0° 29' 53.6"
Ls = 200.00'	D = 0° 29' 53.6"	Ls = 200.00'
LT = 133.33'	L = 2,238.94'	LT = 133.33'
ST = 66.67'	T = 1,123.02'	ST = 66.67'
	R = 11,500.00'	
	SE = RC	
	RUNOFF = 90.00'	

SEE SHEET 44 FOR -L3 PROFILE
SEE SHEET 78 FOR -Y5- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

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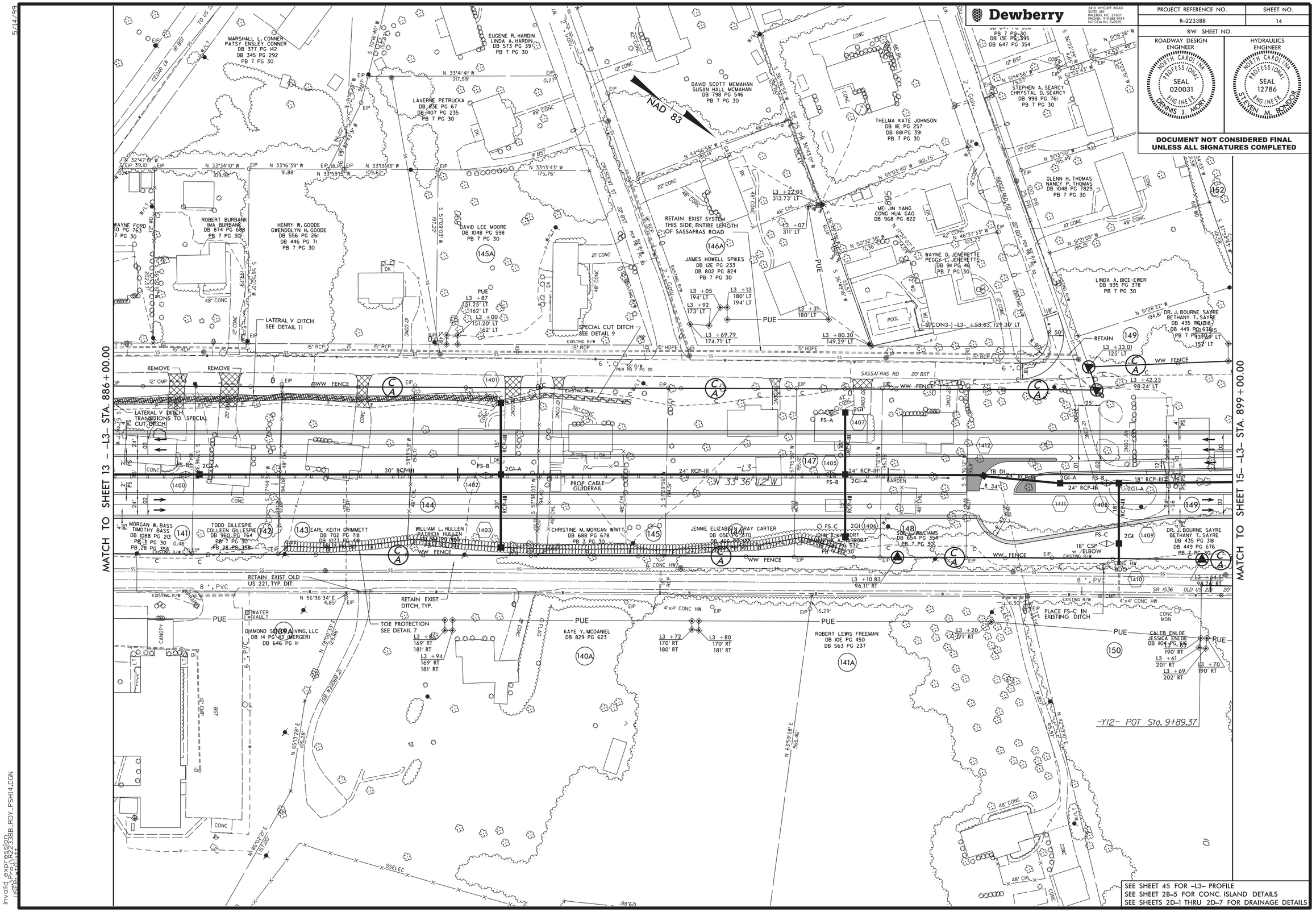

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929
PROJECT REFERENCE NO.
R-2233BB
SHEET NO.
14
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORE
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOWDEN
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
MATCH TO SHEET 13 - -L3- STA. 886+00.00
MATCH TO SHEET 15 - -L3- STA. 899+00.00
NAD 83
-L3-
W 33° 36' 11.2" W
-Y12- POT Sta. 9+89.37
SEE SHEET 45 FOR -L3- PROFILE
SEE SHEET 2B-5 FOR CONC. ISLAND DETAILS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS
5/14/99
Invalid expression
USER: P0117

5/14/99

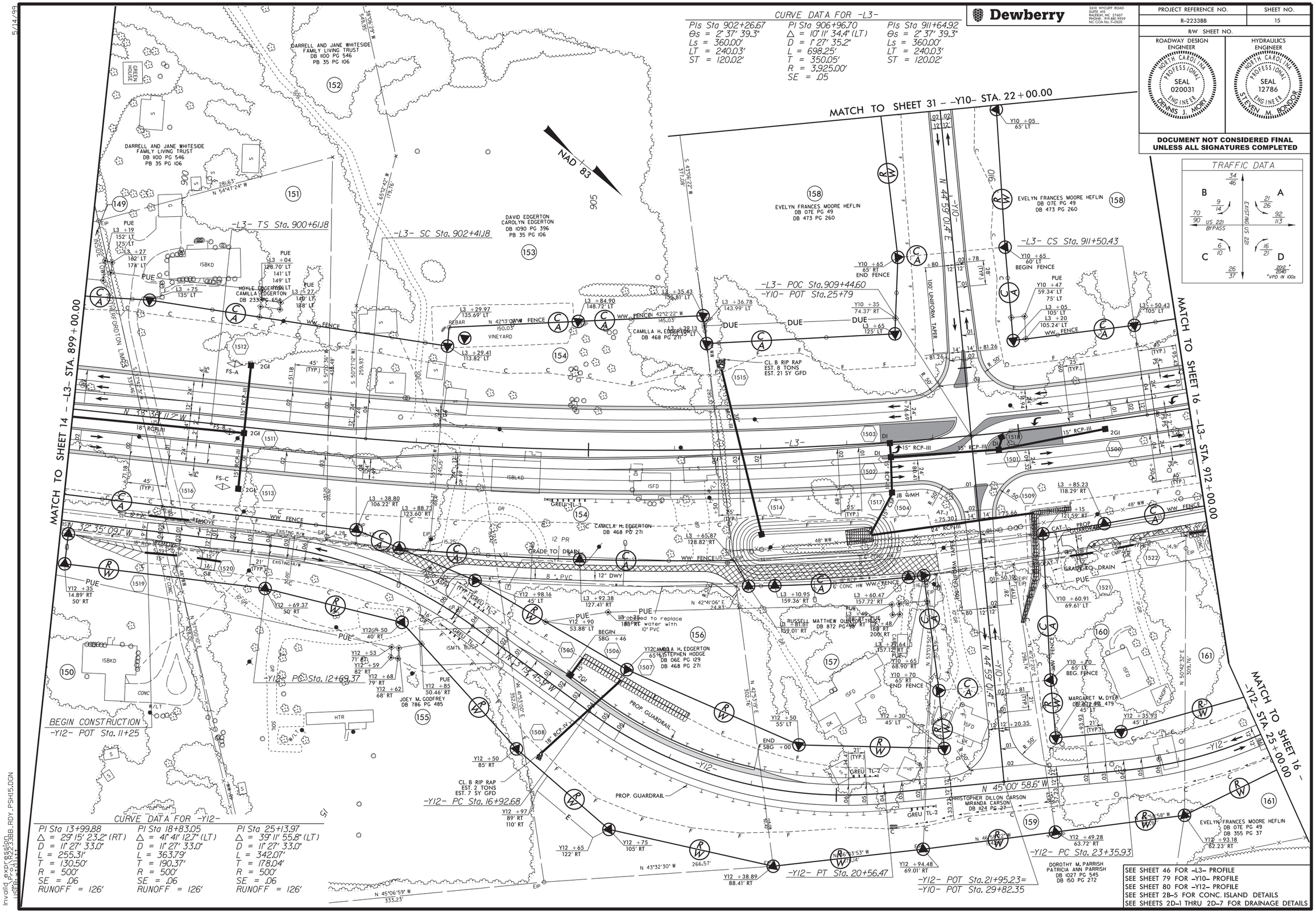
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	15
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORR

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 46 FOR -L3- PROFILE
SEE SHEET 79 FOR -Y10- PROFILE
SEE SHEET 80 FOR -Y12- PROFILE
SEE SHEET 2B-5 FOR CONC. ISLAND DETAILS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

Invalid expression
USER: 4211 PE
SER: R2233BB_RDY_PSH15.DGN

5/14/99

Dewberry

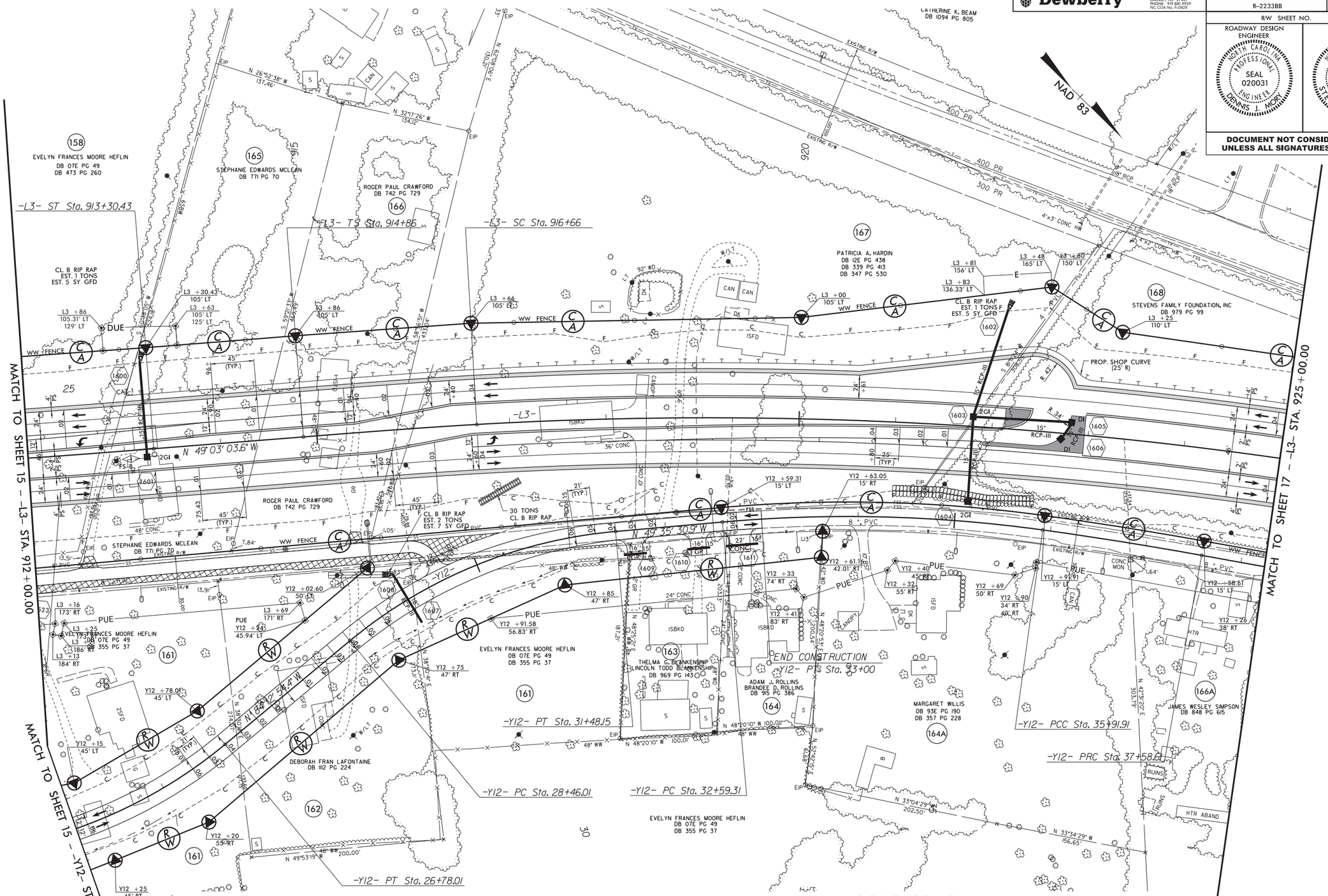
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	16
R/W SHEET NO.	

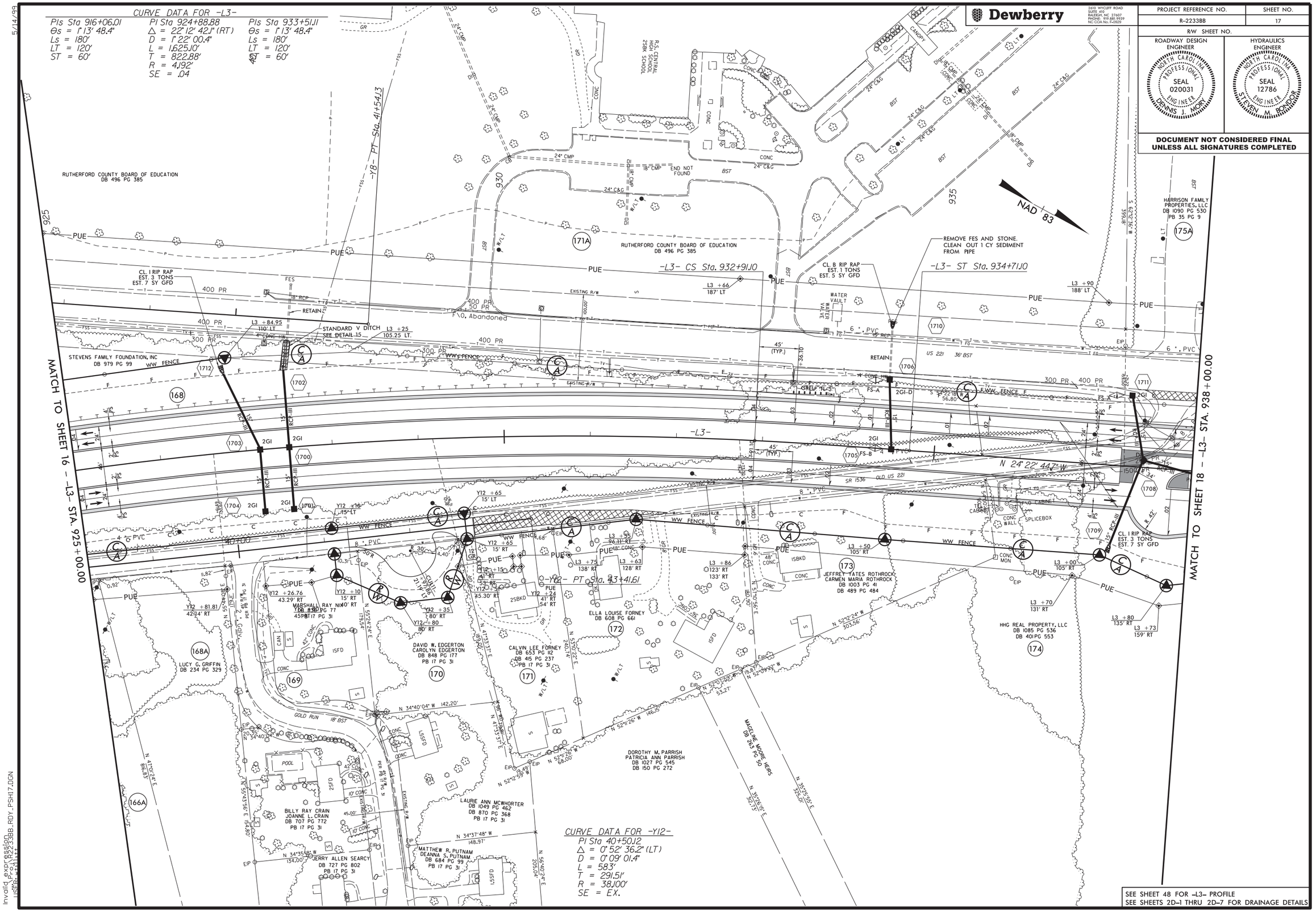
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BONDS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED


NAD 83
MATCH TO SHEET 15 – -L3- STA. 912+00.00
MATCH TO SHEET 17 – -L3- STA. 925+00.00
MATCH TO SHEET 15 – -Y12- STA. 25+00.00
-L3- ST Sta. 913+30.43
-L3- TS Sta. 914+86
-L3- SC Sta. 916+66
-Y12- PT Sta. 26+78.01
-Y12- PC Sta. 28+46.01
-Y12- PT Sta. 31+48.15
-Y12- PC Sta. 32+59.31
-Y12- PT Sta. 33+00
END CONSTRUCTION
-Y12- PCC Sta. 35+91.91
-Y12- PRC Sta. 37+58.61
EVELYN FRANCES MOORE HEFLIN
DB 07E PG 49
DB 473 PG 260
STEPHANIE EDWARDS MCLEAN
DB 771 PG 70
ROGER PAUL CRAWFORD
DB 742 PG 729
PATRICIA A. HARDIN
DB 12E PG 438
DB 339 PG 413
DB 347 PG 530
STEVENS FAMILY FOUNDATION, INC
DB 979 PG 99
CATHERINE K. BEAM
DB 1094 PG 805
THELMA G. BLANKENSHIP
LINCOLN TODD BLANKENSHIP
DB 969 PG 143
ADAM J. ROLLINS
BRANDEE D. ROLLINS
DB 915 PG 386
MARGARET WILLIS
DB 93E PG 190
DB 357 PG 228
JAMES WESLEY SIMPSON
DB 848 PG 615
DEBORAH FRAN LAFONTAINE
DB 112 PG 224
CL. B RIP RAP
EST. 1 TONS
EST. 5 SY GFD
30 TONS
CL. B RIP RAP
PROP. SHOP CURVE
(25' R)
WW FENCE
EXISTING R/W
400 PR
300 PR
4'x3' CONC HW
4'x2' CONC HW
18" RCP
16" RCP
15" RCP-III
16" RCP-III
36" CONC
48" CONC
24" CONC
ISBKD
ISFD
HTR
HTR ABAND
RUINS
N 49°03'03.6" W
N 49°35'30.9" W
N 48°12'54.4" W
N 33°04'29" W
202.50'
N 33°34'29" W
156.65'
N 49°53'19" W
200.00'
N 48°20'10" W
100.01'
N 42°31'20" E
303.19'
N 26°52'38" W
137.46'
N 32°17'26" W
134.32'
N 38°20'41" E
273.11'
N 38°20'41" E
274.27'
N 48°20'53" E
200.01'
N 48°20'53" E
187.12'
N 48°20'53" E
3°51'24.25" N
88.19'
N 48°20'53" E
3°51'24.25" N
88.19'
N 48°20'53" E
3°50'06.29" N
100.21'
N 48°20'53" E
3°50'06.29" N
100.21'
N 48°20'53" E
3°50'06.29" N
100.21

5/14/99



Invalid expression
R-2233BB_RDY_PSH17.DGN
USER: KAYLEE

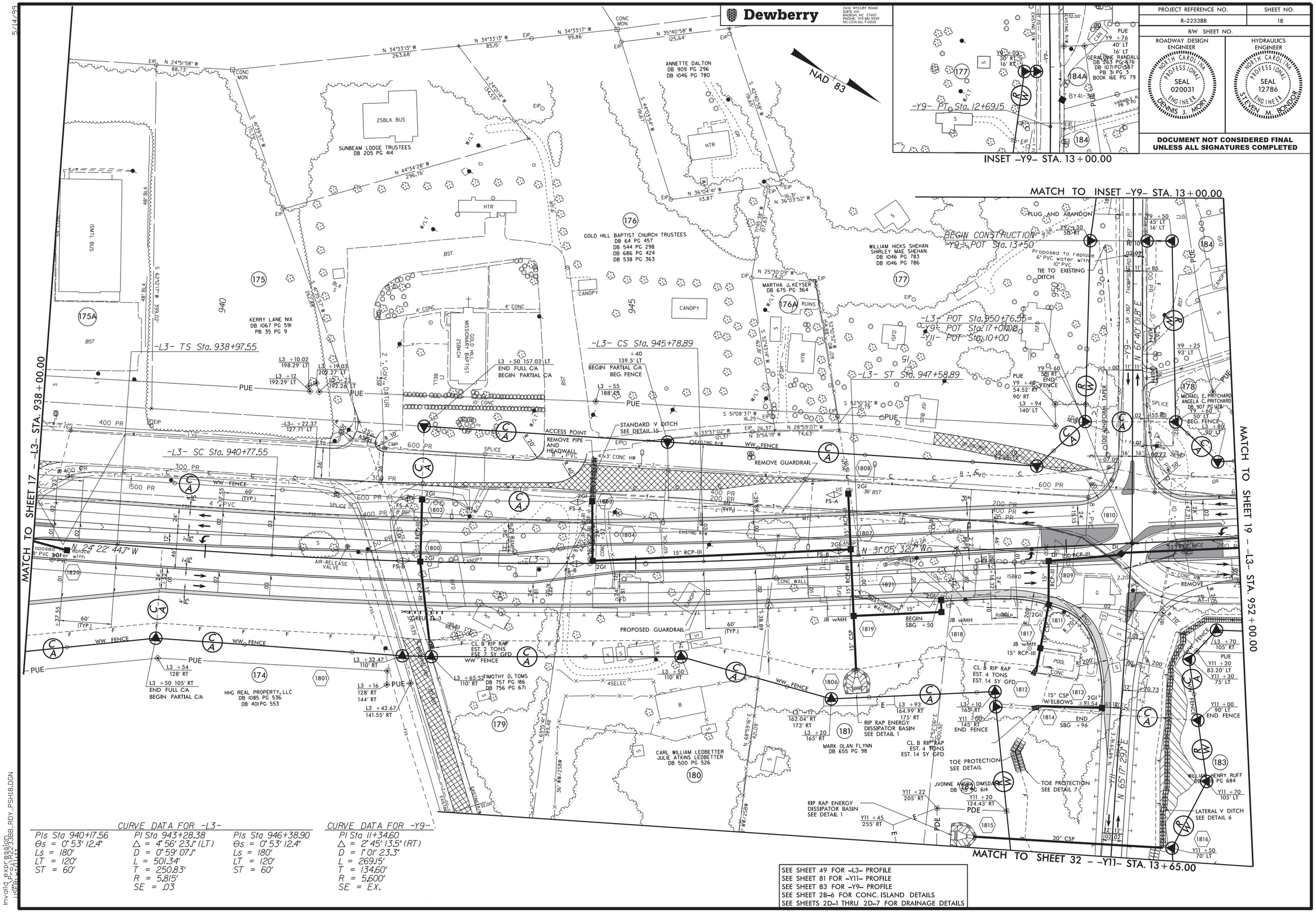
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	18
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORR

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BONDS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



CURVE DATA FOR –L3–

PIs Sta 940+17.56	PI Sta 943+28.38	PIs Sta 946+38.90
Θs = 0° 53' 12.4"	Δ = 4° 56' 23.1" (LT)	Θs = 0° 53' 12.4"
Ls = 180'	D = 0° 59' 07.1"	Ls = 180'
LT = 120'	L = 501.34'	LT = 120'
ST = 60'	T = 250.83'	ST = 60'
	R = 5,815'	
	SE = .03	

CURVE DATA FOR –Y9–

PI Sta 11+34.60
Δ = 2° 45' 13.5" (RT)
D = 1° 01' 23.3"
L = 269.15'
T = 134.60'
R = 5,600'
SE = EX.

SEE SHEET 49 FOR –L3– PROFILE
SEE SHEET 81 FOR –Y11– PROFILE
SEE SHEET 83 FOR –Y9– PROFILE
SEE SHEET 2B–6 FOR CONC. ISLAND DETAILS
SEE SHEETS 2D–1 THRU 2D–7 FOR DRAINAGE DETAILS

5/14/99
Invalid expression
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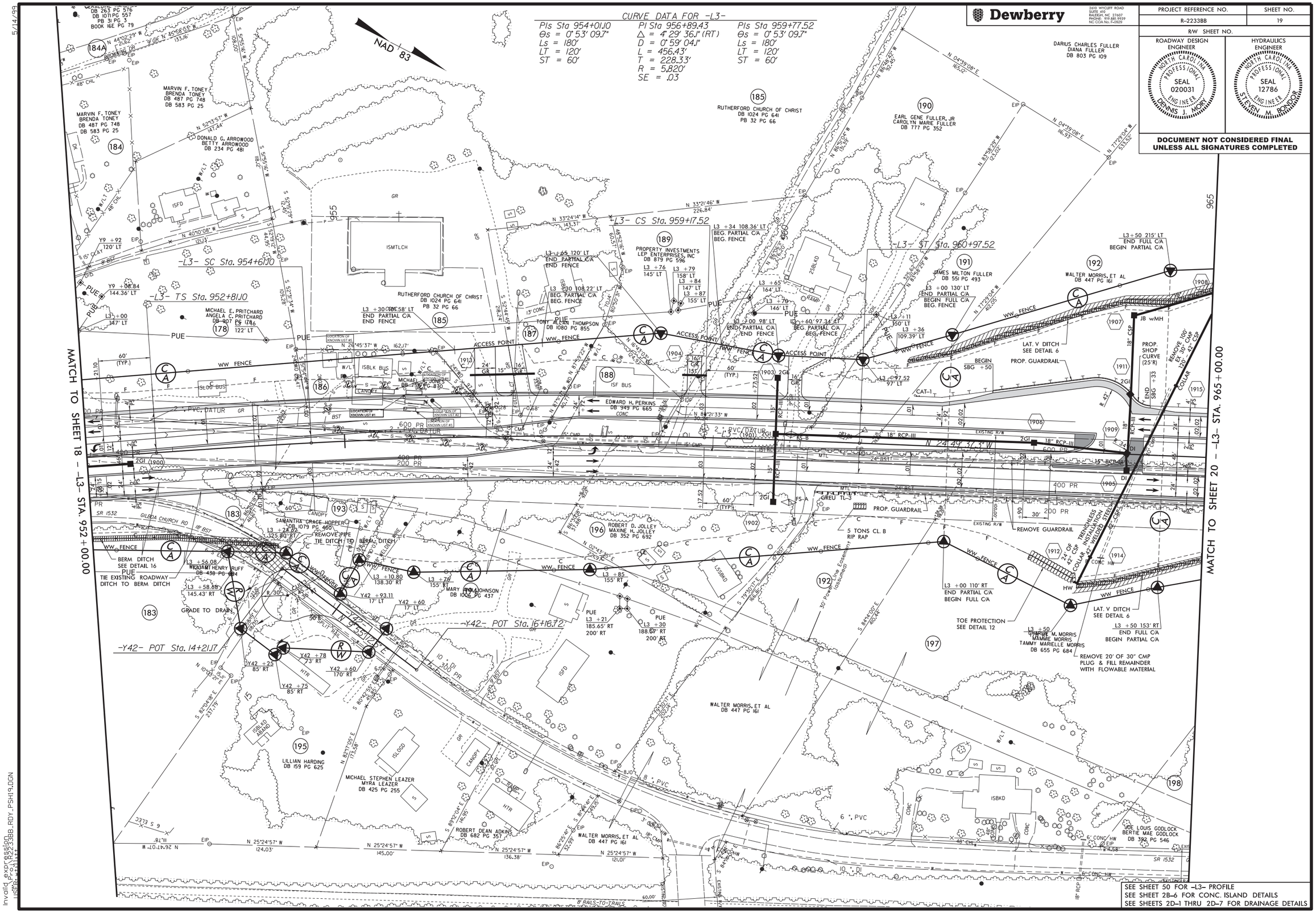
FILE: R2233BB_RDY_PSH19.DGN


Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929
PROJECT REFERENCE NO.
R-2233BB
SHEET NO.
19
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORR
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BONDUR
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
CURVE DATA FOR -L3-
PIs Sta 954+01.10
Θs = 0° 53' 09.7"
Ls = 180'
LT = 120'
ST = 60'
PI Sta 956+89.43
Δ = 4° 29' 36.1" (RT)
D = 0° 59' 04.1"
L = 456.43'
T = 228.33'
R = 5,820'
SE = .03
PIs Sta 959+77.52
Θs = 0° 53' 09.7"
Ls = 180'
LT = 120'
ST = 60'
NAD 83
-L3- SC Sta. 954+61.10
-L3- TS Sta. 952+81.10
-L3- CS Sta. 959+17.52
-L3- ST Sta. 960+97.52
-Y42- POT Sta. 14+21.17
-Y42- POT Sta. 16+16.72
MATCH TO SHEET 18 – -L3- STA. 952+00.00
MATCH TO SHEET 20 – -L3- STA. 965+00.00
SEE SHEET 50 FOR -L3- PROFILE
SEE SHEET 2B-6 FOR CONC. ISLAND DETAILS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

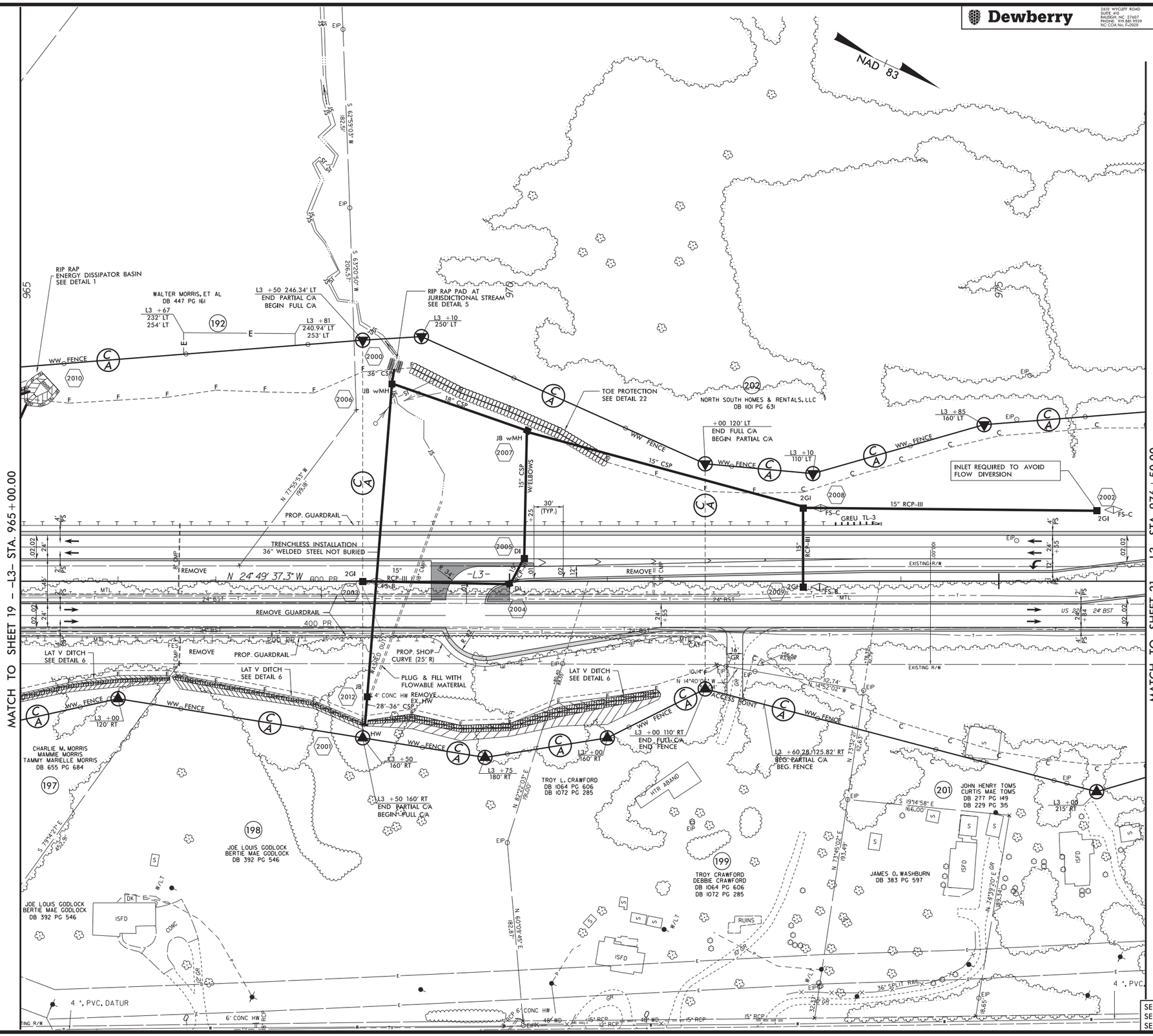
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	20
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORR

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOLDOR

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 51 FOR –L3– PROFILE
SEE SHEET 2B-7 FOR CONC. ISLAND DETAILS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

5/14/99

Invalid expression
USER: SMBOLDOR
FILE: R2233BB_RDY_PSH20.DGN

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	21
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORRIS

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND JR.

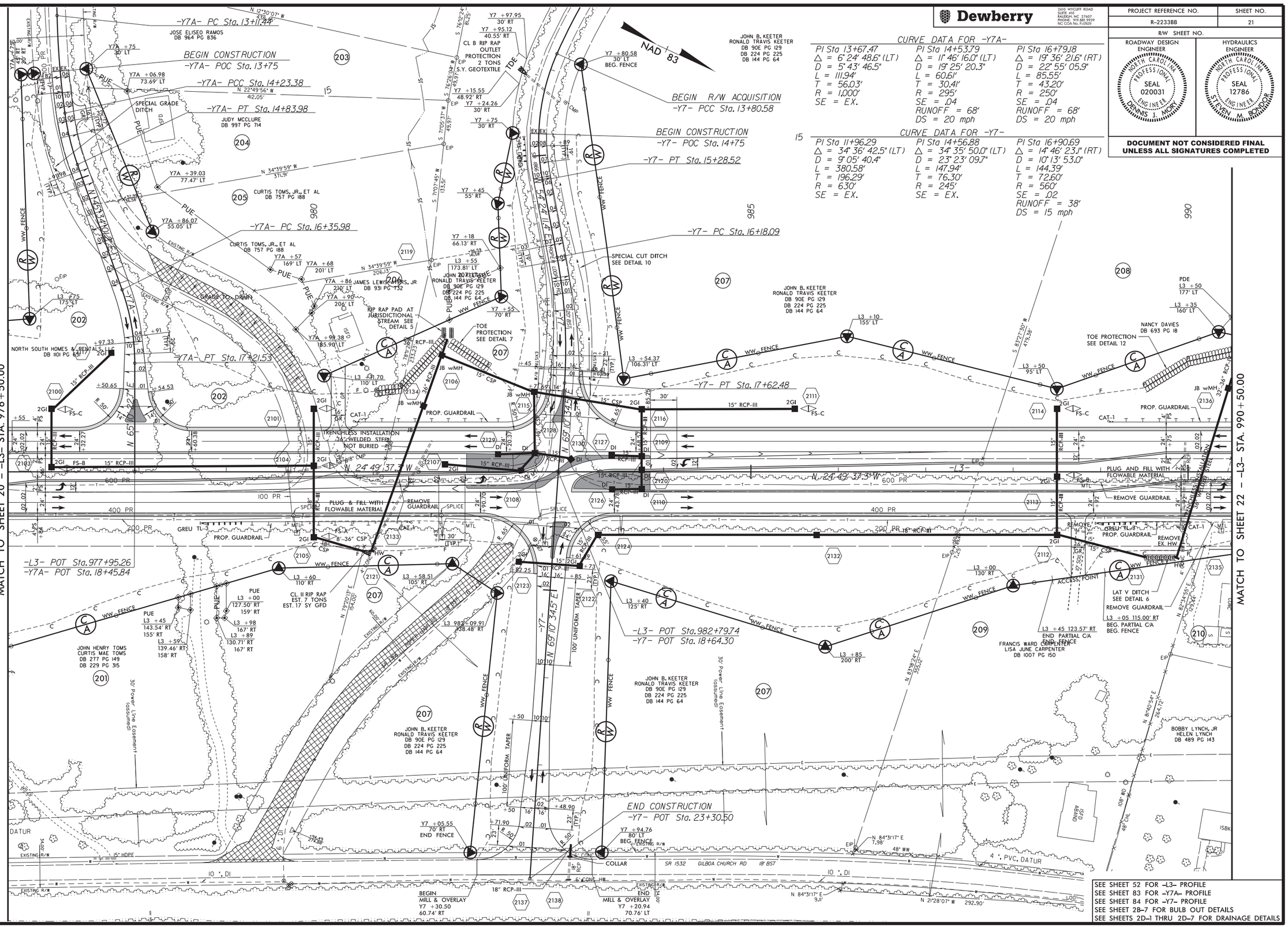
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CURVE DATA FOR -Y7A-

PI Sta 13+67.47	PI Sta 14+53.79	PI Sta 16+79.18
△ = 6° 24' 48.6" (LT)	△ = 11° 46' 16.0" (LT)	△ = 19° 36' 21.6" (RT)
D = 5° 43' 46.5"	D = 19° 25' 20.3"	D = 22° 55' 05.9"
L = 111.94'	L = 60.61'	L = 85.55'
T = 56.03'	T = 30.41'	T = 43.20'
R = 1,000'	R = 295'	R = 250'
SE = EX.	SE = .04	SE = .04
	RUNOFF = 68'	RUNOFF = 68'
	DS = 20 mph	DS = 20 mph

CURVE DATA FOR -Y7-

PI Sta 11+96.29	PI Sta 14+56.88	PI Sta 16+90.69
△ = 34° 36' 42.5" (LT)	△ = 34° 35' 50.0" (LT)	△ = 14° 46' 23.1" (RT)
D = 9° 05' 40.4"	D = 23° 23' 09.7"	D = 10° 13' 53.0"
L = 380.58'	L = 147.94'	L = 144.39'
T = 196.29'	T = 76.30'	T = 72.60'
R = 630'	R = 245'	R = 560'
SE = EX.	SE = EX.	SE = .02
		RUNOFF = 38'
		DS = 15 mph



5/14/99

Invalid expression
USER: p_ctl1_rz
R-2233BB_RDY_PSH21.DGN

5/14/99

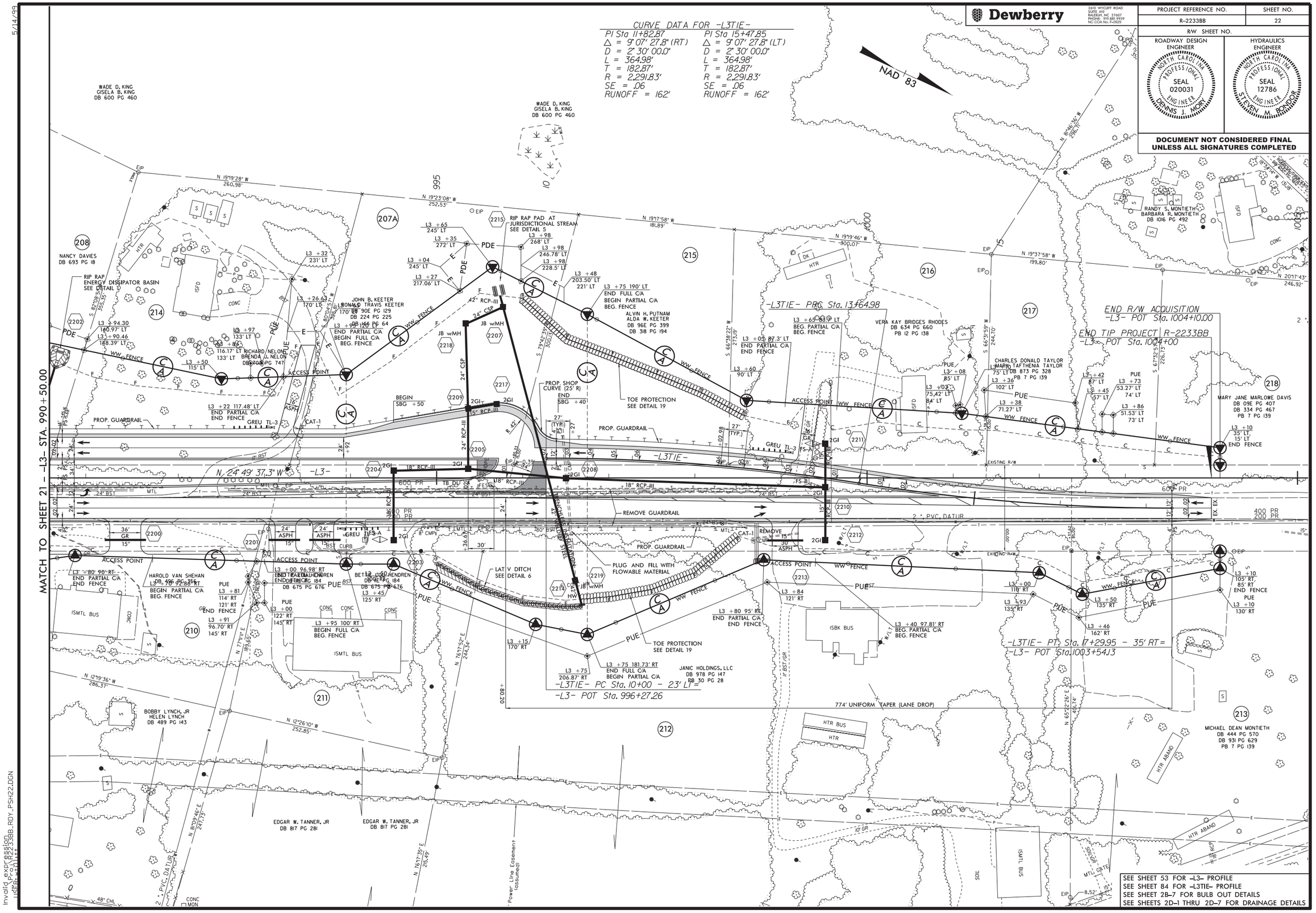
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	22
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOLDOR

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 53 FOR -L3- PROFILE
SEE SHEET 84 FOR -L3TIE- PROFILE
SEE SHEET 2B-7 FOR BULB OUT DETAILS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

Invalid exp(85810)
USER: 0211
R2233BB_RDY_PSH22.DGN

5/14/99

Dewberry

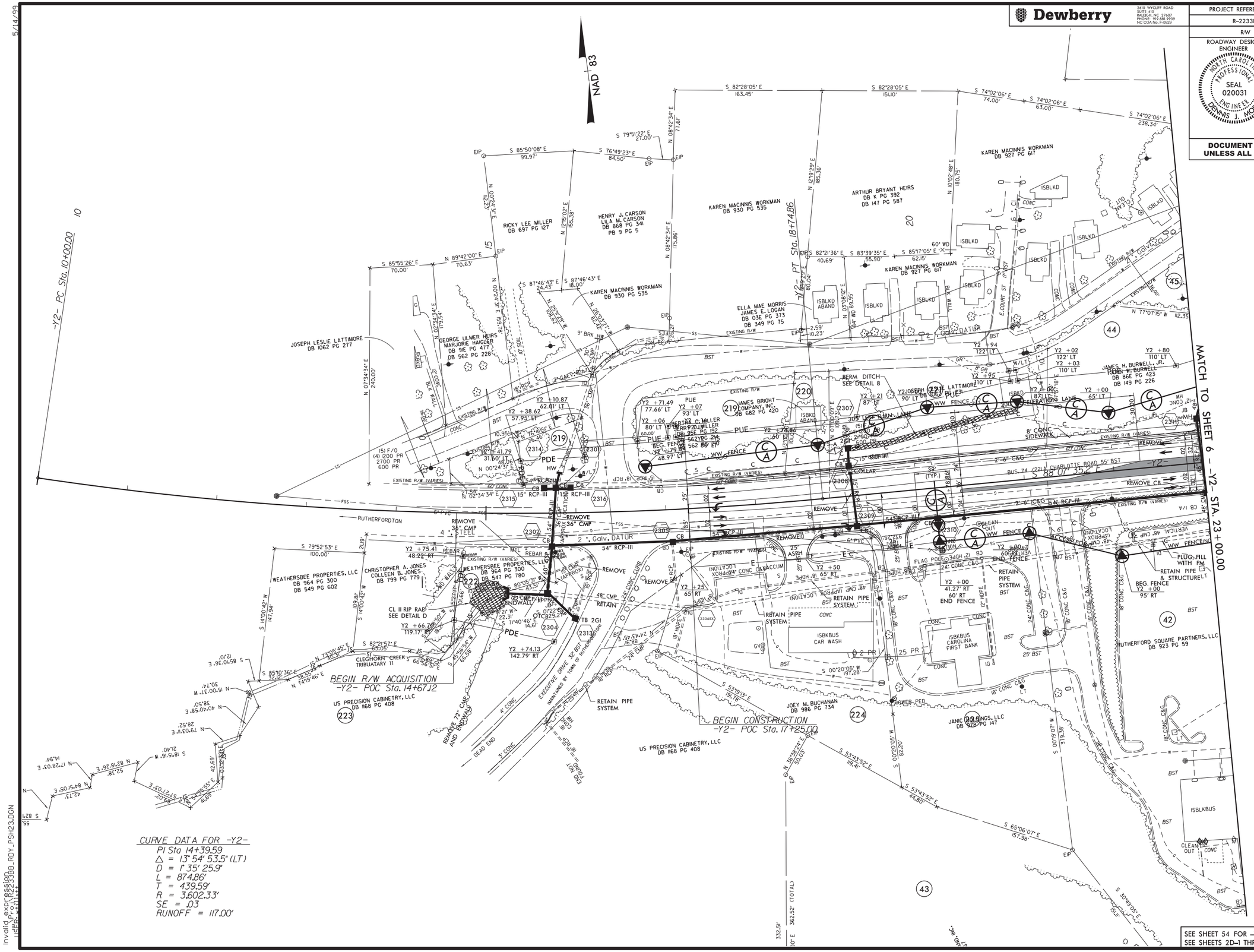
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	23
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORR

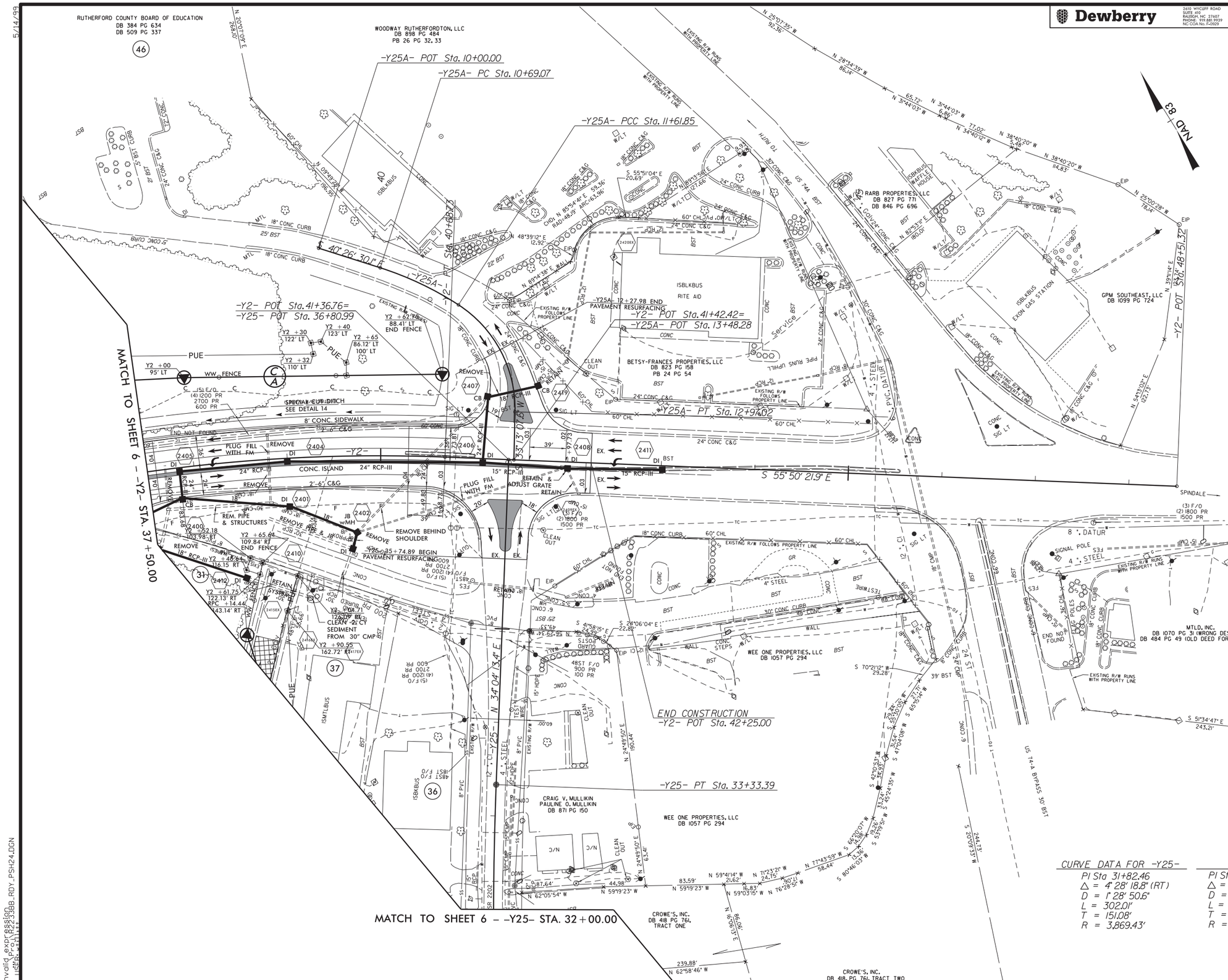
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 54 FOR -Y2- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

Invalid expression
USER: SMILLER
FILE: R2233BB_RDY_PSH23.DGN



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	24
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CURVE DATA FOR -Y2-
PI Sta 37+31.27
△ = 21° 55' 01.6" (RT)
D = 3° 12' 25.9"
L = 683.37'
T = 345.91'
R = 1,786.47'
SE = .04
RUNOFF = 156.00'

CURVE DATA FOR -Y25-
PI Sta 31+82.46
△ = 4° 28' 18.8" (RT)
D = 1° 28' 50.6"
L = 302.01'
T = 151.08'
R = 3,869.43'

CURVE DATA FOR -Y25A-
PI Sta 11+15.74
△ = 15° 18' 49.9" (RT)
D = 16° 30' 22.9"
L = 92.78'
T = 46.67'
R = 347.11'

PI Sta 12+35.95
△ = 58° 20' 47.8" (RT)
D = 43° 09' 49.7"
L = 135.17'
T = 74.10'
R = 132.74'

SEE SHEET 55 FOR -Y2- PROFILE
SEE SHEET 2B-2 FOR CONC. ISLAND DETAILS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

5/14/99
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R2233BB_RDY_PSH24.DGN
USER: P.NITTA

5/14/99

Dewberry

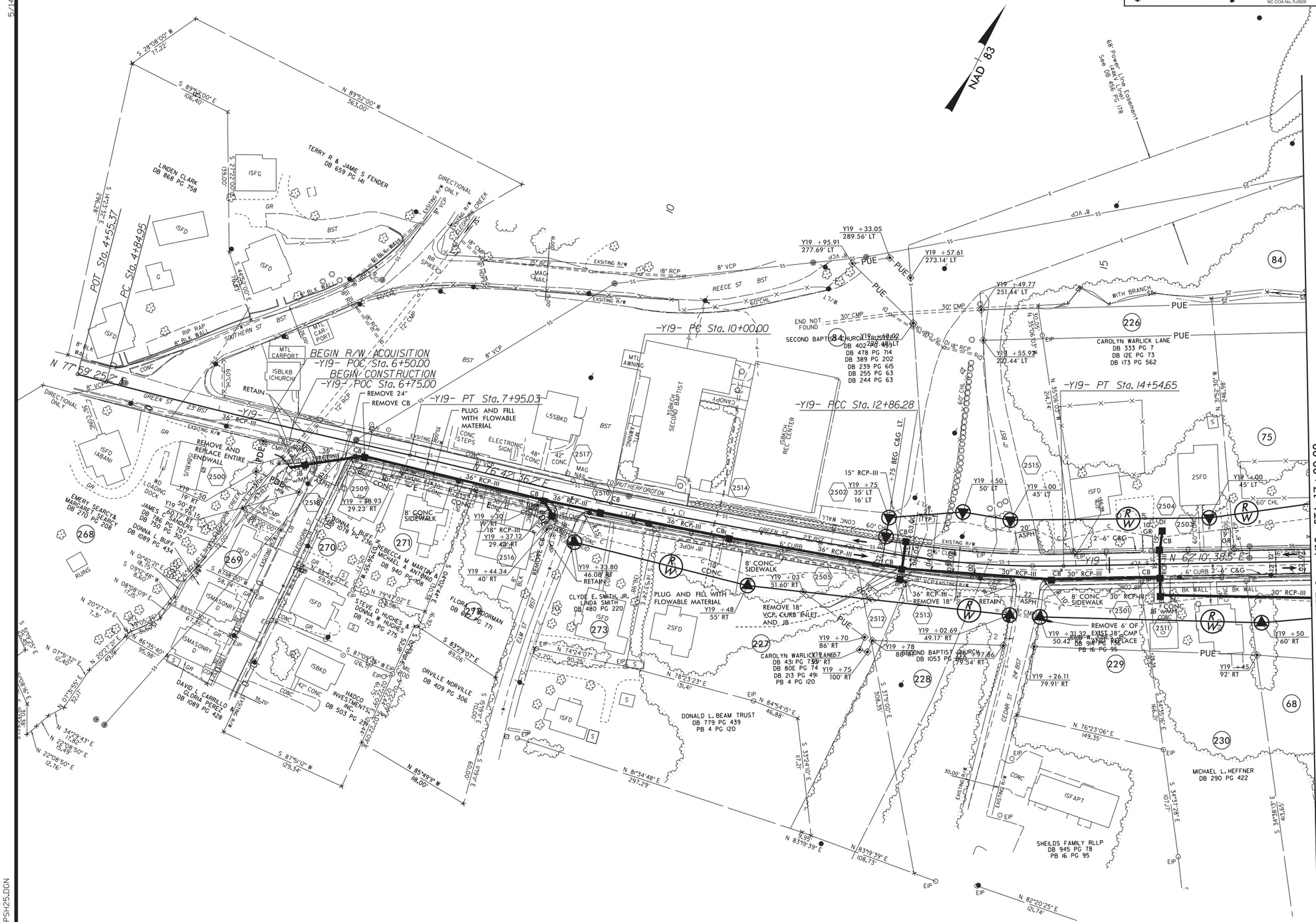
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	25
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND JR.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



CURVE DATA FOR -Y19-

PI Sta 11+43.16	PI Sta 13+70.68
Δ = 2° 20' 35.7" (LT)	Δ = 10° 06' 04.4" (LT)
D = 0° 49' 06.6"	D = 5° 59' 58.4"
L = 286.28'	L = 168.37'
T = 143.16'	T = 84.40'
R = 7,000.00'	R = 955.00'
	SE = EX

SEE SHEET 62 FOR -Y19- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

Invalid expr (.$SIGN)
USER: SCHLEE
FILE: R-2233BB_RDY_PSH25.DGN

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	26
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS
ROW REV. – January 23, 2019 – Parcel 74/74A – Property boundary change. Parcel 74 name change to Lois Grobes DB 809, Pg 498 & DB 995, Pg 594 (WET)
ROW REV. – February 14, 2019 – Parcel 74/74A – Added new parcel – 74A, Owner: Jeanette Weber Trust, DB 1131, Pg 114 (WET)

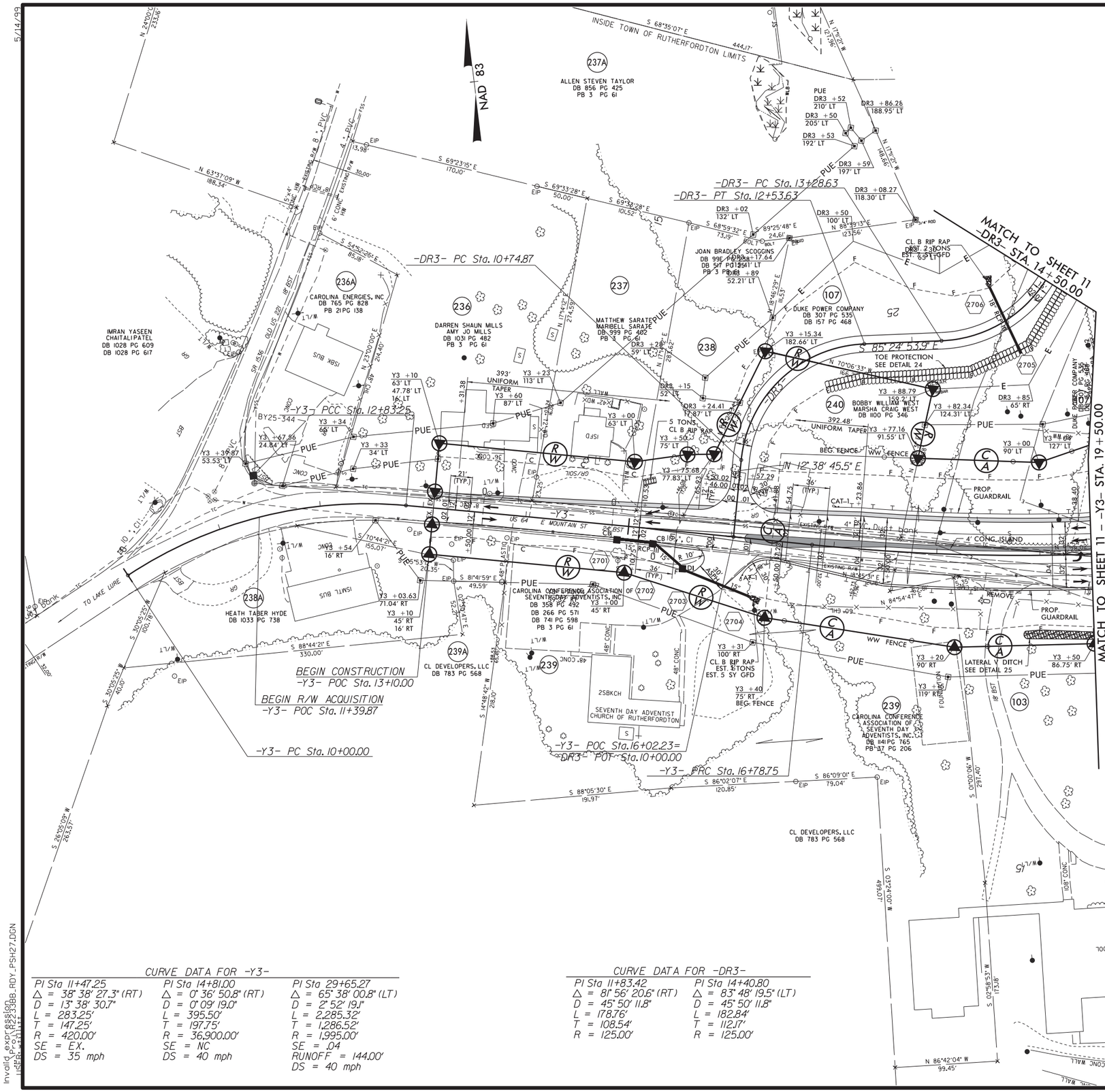
5/14/99

CURVE DATA FOR –Y19–
PI Sta 31+55.16
Δ = 1° 05' 41.6" (LT)
D = 0° 28' 38.9"
L = 229.31'
T = 114.66'
R = 12,000.00'
SE = NC

SEE SHEET 63 FOR –Y19– PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

Invalid expression
R-2233BB_RDY_PSH26.DGN

5/14/99



CURVE DATA FOR -Y3-

PI Sta 11+47.25	PI Sta 14+81.00	PI Sta 29+65.27
Δ = 38° 38' 27.3" (RT)	Δ = 0° 36' 50.8" (RT)	Δ = 65° 38' 00.8" (LT)
D = 13° 38' 30.7"	D = 0° 09' 19.0"	D = 2° 52' 19.1"
L = 283.25'	L = 395.50'	L = 2,285.32'
T = 147.25'	T = 197.75'	T = 1,286.52'
R = 420.00'	R = 36,900.00'	R = 1,995.00'
SE = EX.	SE = NC	SE = .04
DS = 35 mph	DS = 40 mph	RUNOFF = 144.00'
		DS = 40 mph

CURVE DATA FOR -DR3-

PI Sta 11+83.42	PI Sta 14+40.80
Δ = 81° 56' 20.6" (RT)	Δ = 83° 48' 19.5" (LT)
D = 45° 50' 11.8"	D = 45° 50' 11.8"
L = 178.76'	L = 182.84'
T = 108.54'	T = 112.17'
R = 125.00'	R = 125.00'

SEE SHEET 64 FOR -Y3- PROFILE
SEE SHEET 74 FOR -DR3- PROFILE
SEE SHEET 2B-4 FOR CONC. ISLAND DETAILS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	27
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORR

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BONDS

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Invalid expression
R2233BB_RDY_PSH27.DGN
USER: P0117E

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	28
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND

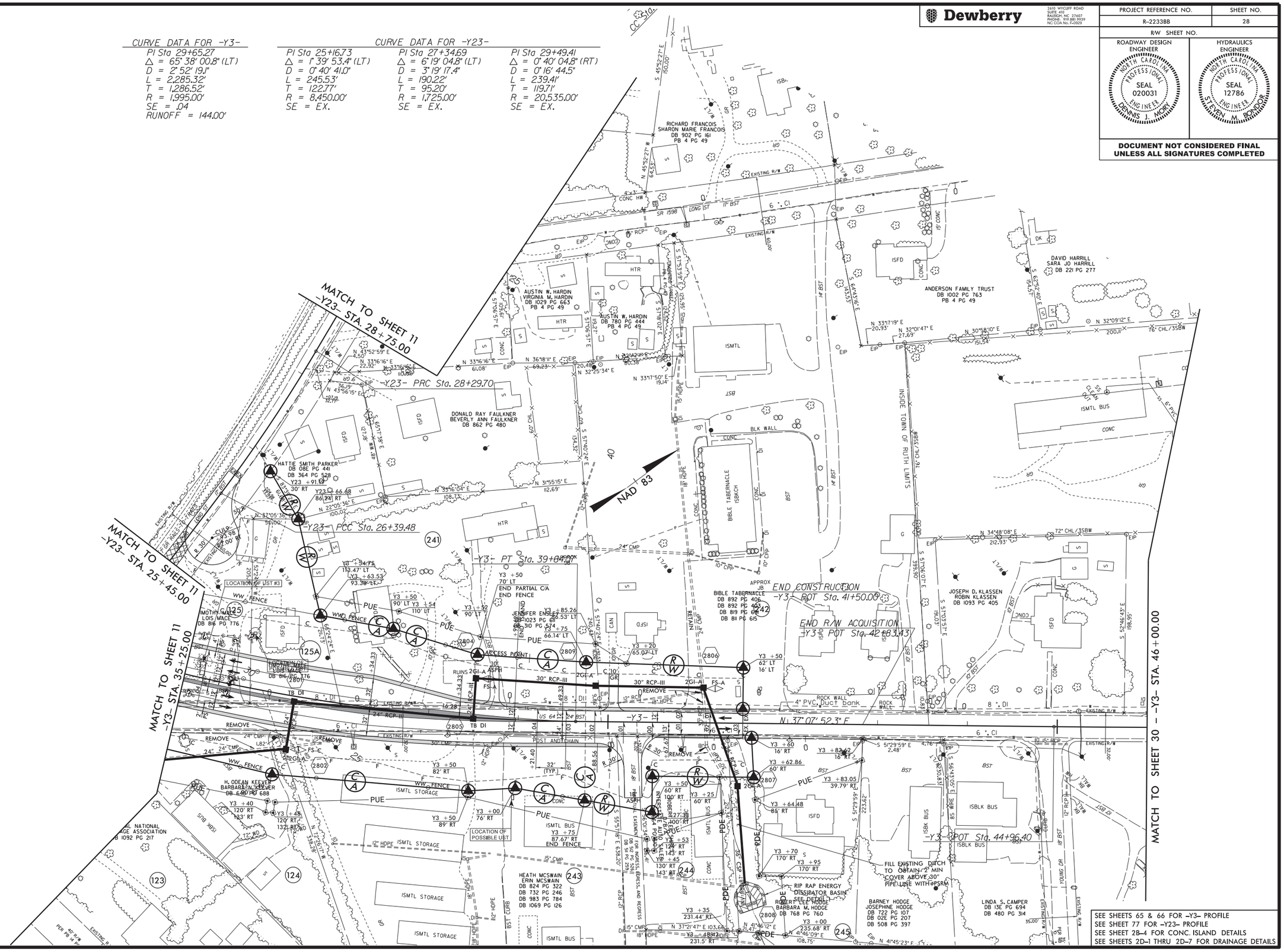
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CURVE DATA FOR -Y3-
PI Sta 29+65.27
△ = 65° 38' 00.8" (LT)
D = 2° 52' 19.1"
L = 2,285.32'
T = 1,286.52'
R = 1,995.00'
SE = .04
RUNOFF = 144.00'

CURVE DATA FOR -Y23-
PI Sta 25+16.73
△ = 1° 39' 53.4" (LT)
D = 0° 40' 41.0"
L = 245.53'
T = 122.77'
R = 8,450.00'
SE = EX.

PI Sta 27+34.69
△ = 6° 19' 04.8" (LT)
D = 3° 19' 17.4"
L = 190.22'
T = 95.20'
R = 1,725.00'
SE = EX.

PI Sta 29+49.41
△ = 0° 40' 04.8" (RT)
D = 0° 16' 44.5"
L = 239.41'
T = 119.71'
R = 20,535.00'
SE = EX.



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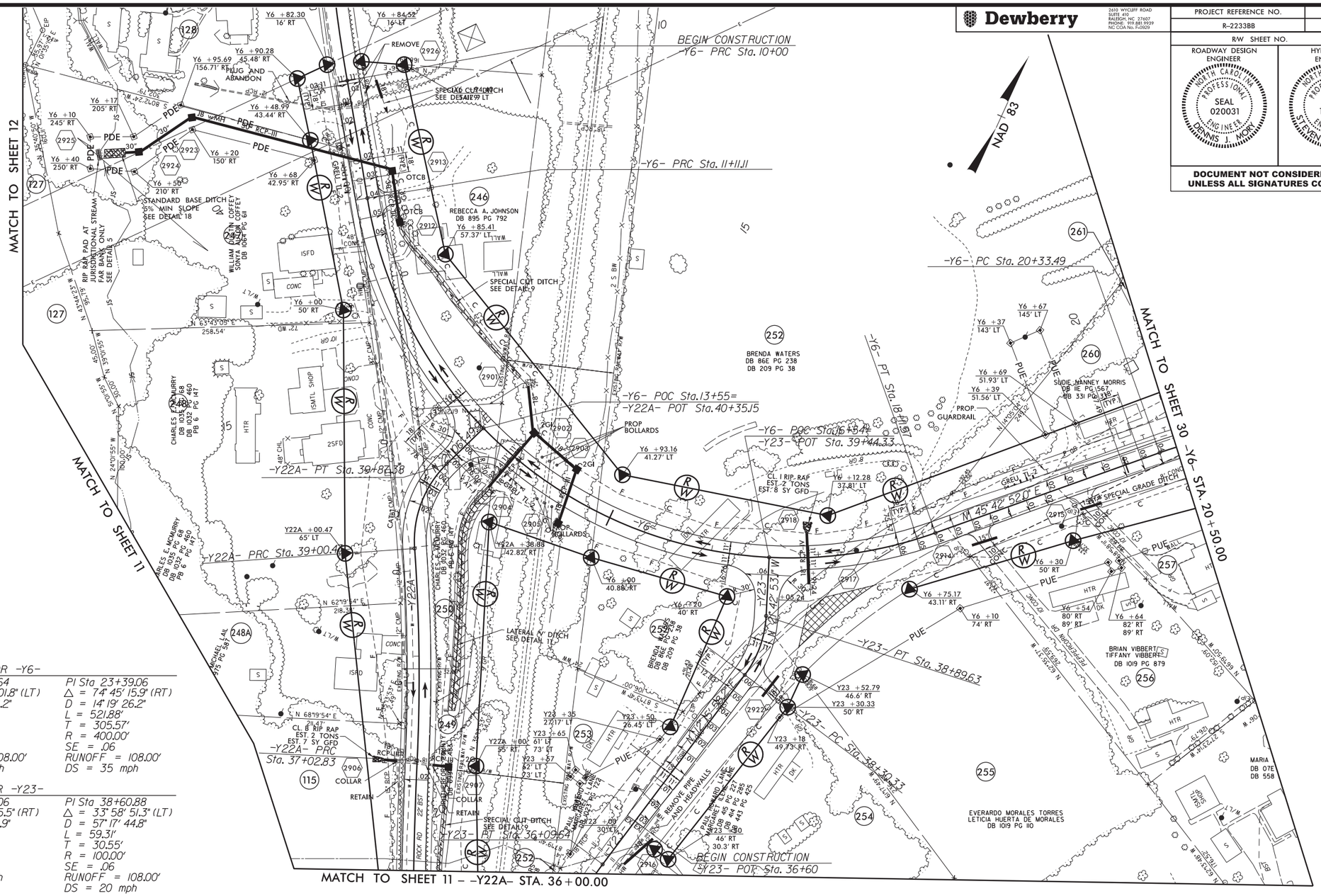
5/14/99



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	29
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORK

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOWDEN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CURVE DATA FOR -Y6-

PI Sta 10+55.56	PI Sta 15+90.64	PI Sta 23+39.06
Δ = 0° 45' 51.3" (RT)	Δ = 100° 20' 01.8" (LT)	Δ = 74° 45' 15.9" (RT)
D = 0° 41' 16.2"	D = 14° 19' 26.2"	D = 14° 19' 26.2"
L = 111.11'	L = 700.46'	L = 521.88'
T = 55.56'	T = 479.53'	T = 305.57'
R = 8,330.00'	R = 400.00'	R = 400.00'
SE = EX.	SE = .06	SE = .06
DS = 35 mph	RUNOFF = 108.00'	RUNOFF = 108.00'
	DS = 35 mph	DS = 35 mph

CURVE DATA FOR -Y23-

PI Sta 32+45.69	PI Sta 35+18.06	PI Sta 38+60.88
Δ = 4° 29' 38.6" (RT)	Δ = 30° 01' 05.5" (RT)	Δ = 33° 58' 51.3" (LT)
D = 1° 16' 23.7"	D = 16° 00' 15.9"	D = 57° 17' 44.8"
L = 352.96'	L = 187.56'	L = 59.31'
T = 176.57'	T = 95.99'	T = 30.55'
R = 4,500.00'	R = 358.00'	R = 100.00'
SE = EX.	SE = EX.	SE = .06
DS = 35 mph	DS = 20 mph	RUNOFF = 108.00'
		DS = 20 mph

CURVE DATA FOR -Y22A-

PI Sta 32+70.82	PI Sta 35+65.41	PI Sta 38+01.76	PI Sta 39+46.88
Δ = 0° 56' 34.2" (LT)	Δ = 4° 35' 36.2" (RT)	Δ = 6° 44' 25.9" (LT)	Δ = 49° 47' 48.1" (RT)
D = 0° 18' 00.8"	D = 1° 40' 13.6"	D = 3° 24' 37.7"	D = 57° 17' 44.8"
L = 314.05'	L = 274.98'	L = 197.64'	L = 86.91'
T = 157.03'	T = 137.56'	T = 98.94'	T = 46.41'
R = 19,085.00'	R = 3,430.00'	R = 1,680.00'	R = 100.00'
SE = EX.	SE = EX.	SE = EX.	SE = .04
DS = 35 mph	DS = 35 mph	DS = 35 mph	RUNOFF = 72.00'
			DS = 15 mph

CURVE DATA FOR -Y23A-

PI Sta 44+55.25	PI Sta 45+75.10	PI Sta 46+84.50	PI Sta 48+15.42
Δ = 1° 32' 38.7" (RT)	Δ = 6° 33' 34.4" (RT)	Δ = 19° 55' 51.0" (RT)	Δ = 35° 04' 00.6" (RT)
D = 1° 09' 35.4"	D = 6° 09' 39.0"	D = 17° 54' 17.8"	D = 23° 52' 23.7"
L = 133.13'	L = 106.47'	L = 111.31'	L = 146.89'
T = 66.57'	T = 53.29'	T = 56.23'	T = 75.83'
R = 4,940.00'	R = 930.00'	R = 320.00'	R = 240.00'
SE = EX.	SE = EX.	SE = EX.	SE = EX.

SEE SHEETS 75 & 76 FOR -Y6- PROFILE
SEE SHEET 77 FOR -Y22A- PROFILE
SEE SHEET 77 FOR -Y23- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

Invalid expression
pw:\\pwinter:2233BB_RDY_PSH29.DGN
USER: pwinter

5/14/99

Dewberry

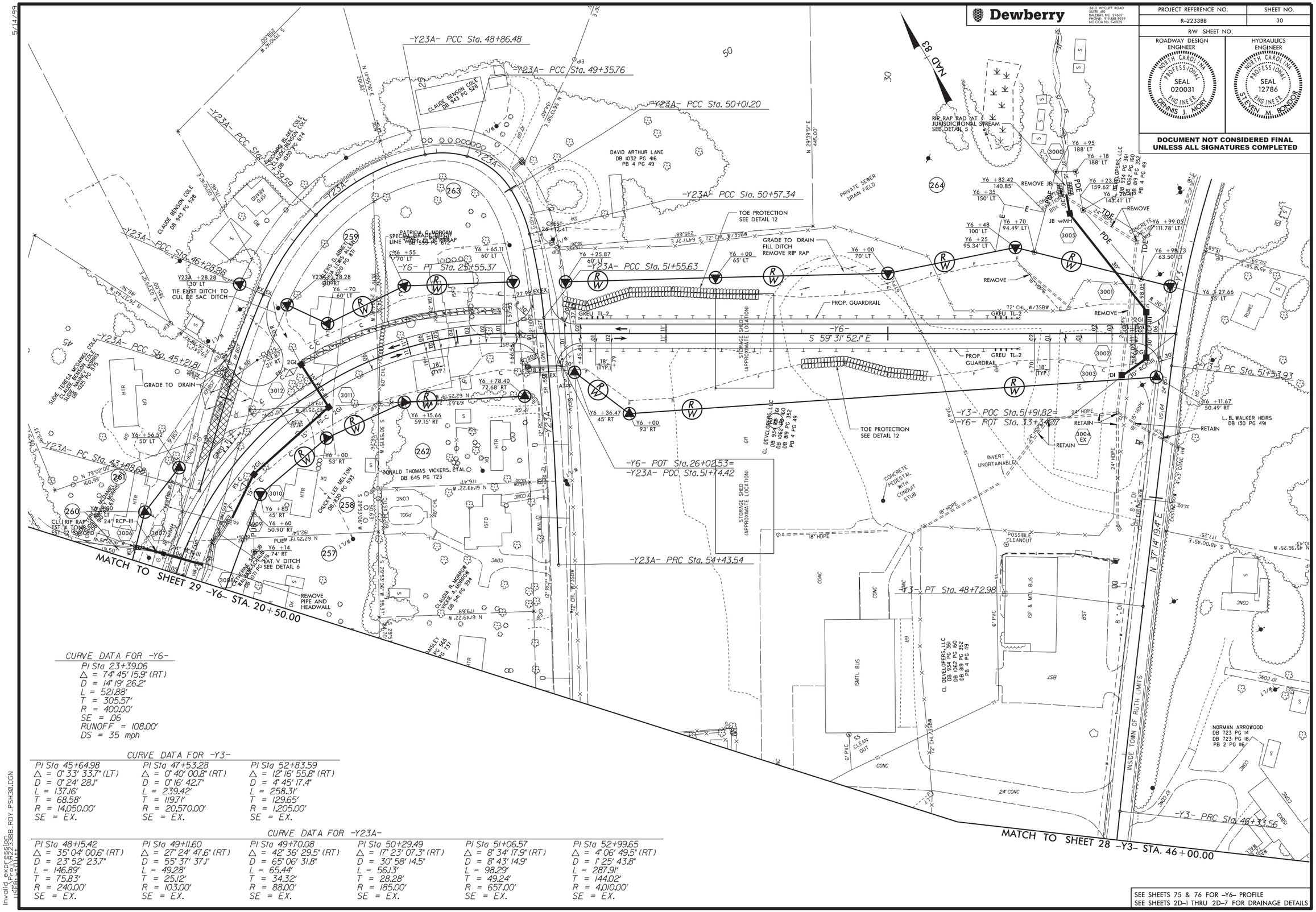
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	30
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORRIS

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND JR.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



CURVE DATA FOR -Y6-

PI Sta 23+39.06
Δ = 74° 45' 15.9" (RT)
D = 14° 19' 26.2"
L = 521.88'
T = 305.57'
R = 400.00'
SE = .06
RUNOFF = 108.00'
DS = 35 mph

CURVE DATA FOR -Y3-

PI Sta 45+64.98	PI Sta 47+53.28	PI Sta 52+83.59
Δ = 0° 33' 33.7" (LT)	Δ = 0° 40' 00.8" (RT)	Δ = 12° 16' 55.8" (RT)
D = 0° 24' 28.1"	D = 0° 16' 42.7"	D = 4° 45' 17.4"
L = 137.16'	L = 239.42'	L = 258.31'
T = 68.58'	T = 119.71'	T = 129.65'
R = 14,050.00'	R = 20,570.00'	R = 1,205.00'
SE = EX.	SE = EX.	SE = EX.

CURVE DATA FOR -Y23A-

PI Sta 48+15.42	PI Sta 49+11.60	PI Sta 49+70.08	PI Sta 50+29.49	PI Sta 51+06.57	PI Sta 52+99.65
Δ = 35° 04' 00.6" (RT)	Δ = 27° 24' 47.6" (RT)	Δ = 42° 36' 29.5" (RT)	Δ = 17° 23' 07.3" (RT)	Δ = 8° 34' 17.9" (RT)	Δ = 4° 06' 49.5" (RT)
D = 23° 52' 23.7"	D = 55° 37' 37.1"	D = 65° 06' 31.8"	D = 30° 58' 14.5"	D = 8° 43' 14.9"	D = 1° 25' 43.8"
L = 146.89'	L = 49.28'	L = 65.44'	L = 56.13'	L = 98.29'	L = 287.91'
T = 75.83'	T = 25.12'	T = 34.32'	T = 28.28'	T = 49.24'	T = 144.02'
R = 240.00'	R = 103.00'	R = 88.00'	R = 185.00'	R = 657.00'	R = 4,010.00'
SE = EX.	SE = EX.	SE = EX.	SE = EX.	SE = EX.	SE = EX.

SEE SHEETS 75 & 76 FOR -Y6- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

Invalid expression
R2233BB_RDY_PSH30.DGN
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Dewberry

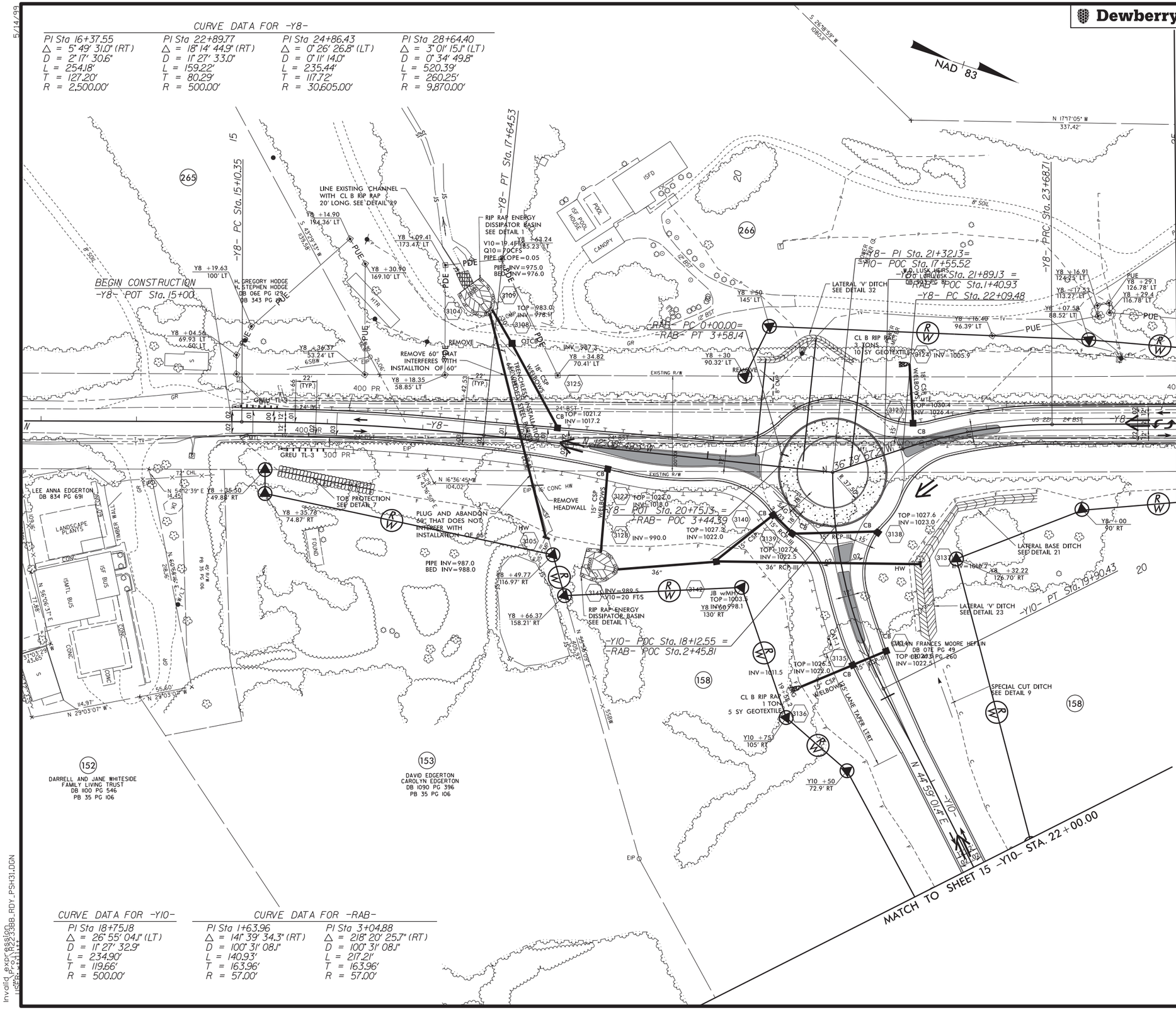
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	31
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORRIS

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOLDOR

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 78 & 79 FOR -Y8- PROFILE
SEE SHEET 79 FOR -Y10- PROFILE
SEE SHEET 79 FOR -RAB- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

Invalid expression
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FILE: R-2233BB_RDY_PSH31.DGN

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2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	31A
R/W SHEET NO.	

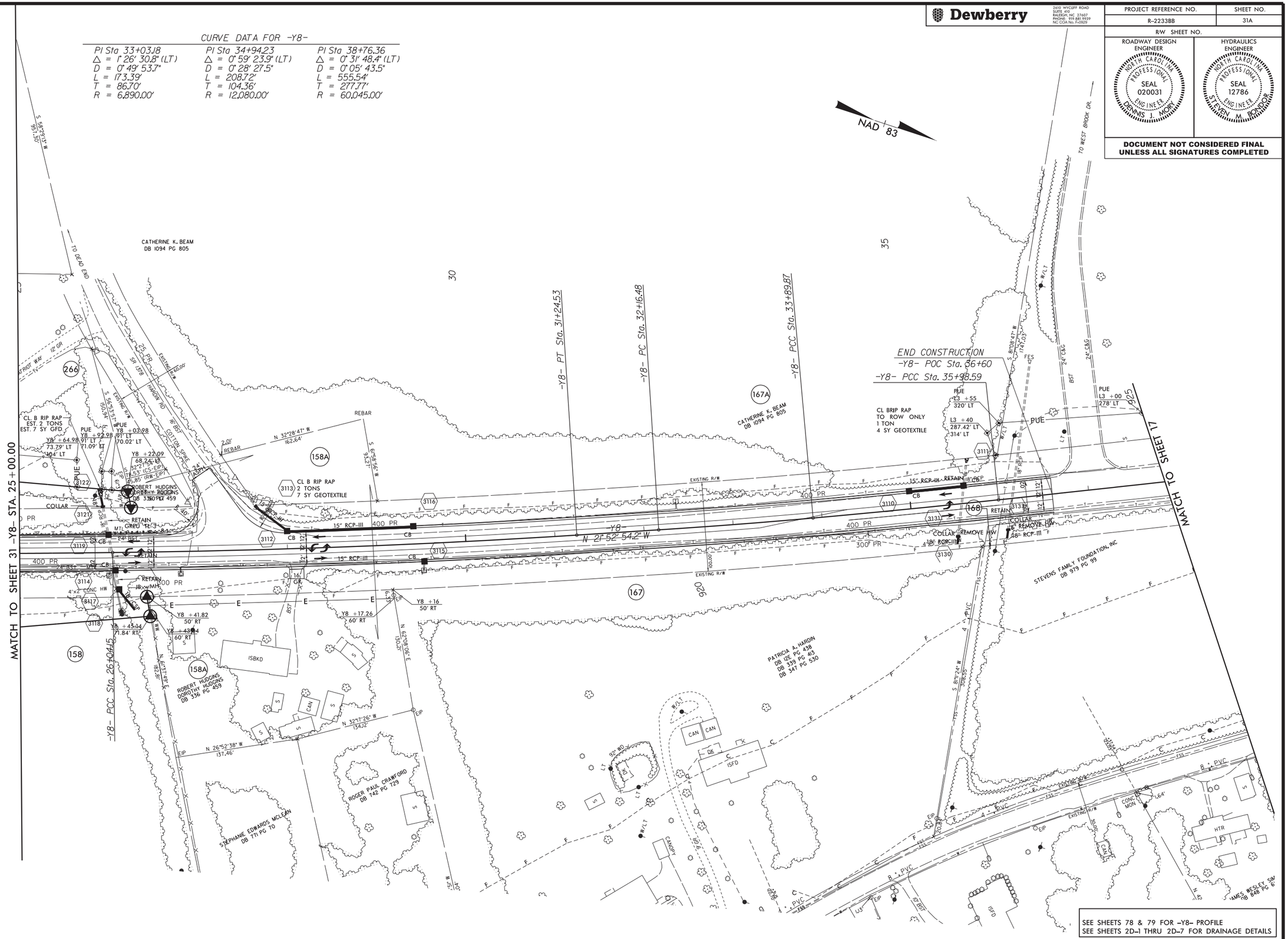
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOLDOR

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CURVE DATA FOR -Y8-

PI Sta 33+03.18	PI Sta 34+94.23	PI Sta 38+76.36
Δ = 1° 26' 30.8" (LT)	Δ = 0° 59' 23.9" (LT)	Δ = 0° 31' 48.4" (LT)
D = 0° 49' 53.7"	D = 0° 28' 27.5"	D = 0° 05' 43.5"
L = 173.39'	L = 208.72'	L = 555.54'
T = 86.70'	T = 104.36'	T = 277.77'
R = 6,890.00'	R = 12,080.00'	R = 60,045.00'



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USER: 0111

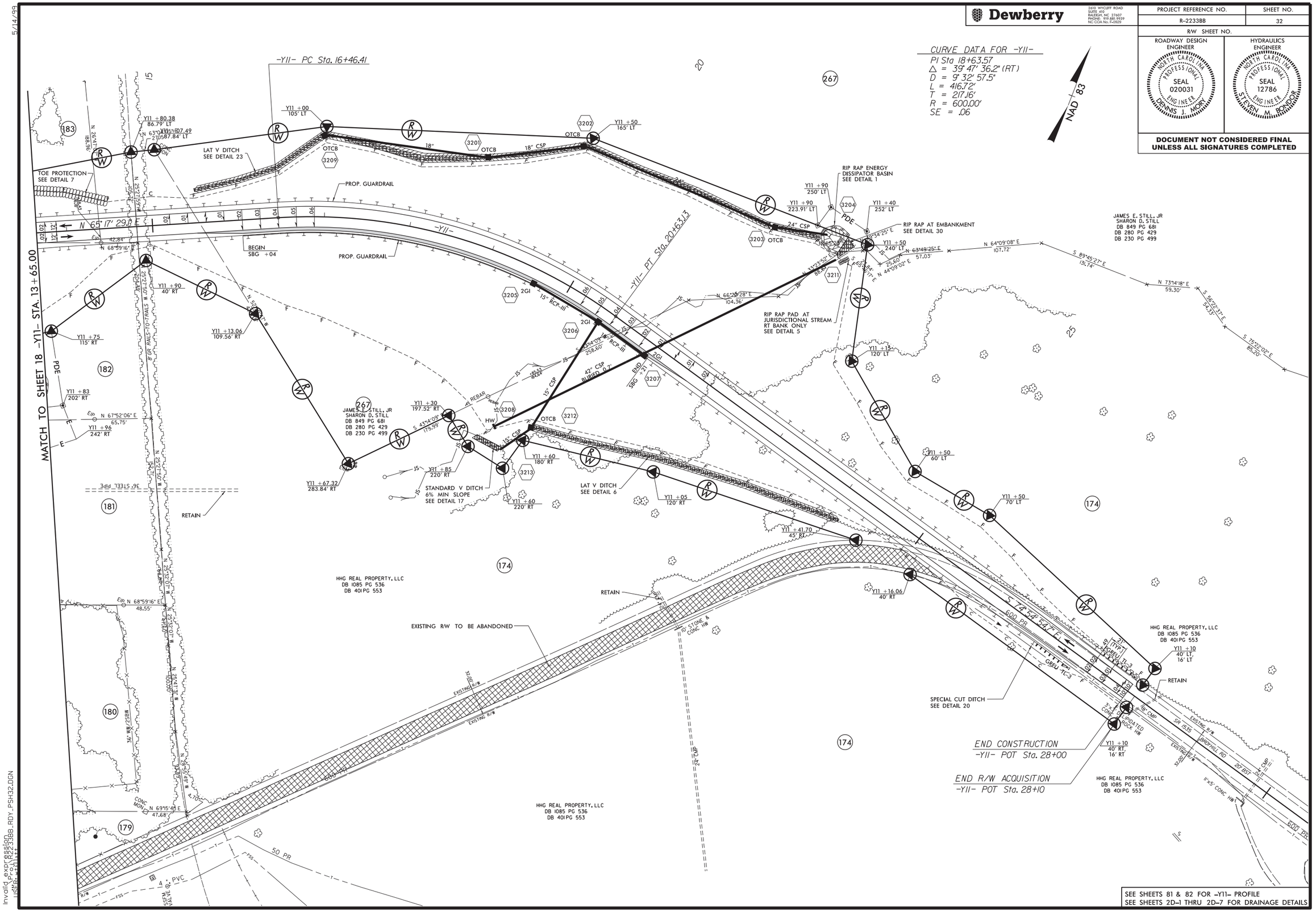
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	32
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORA

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BOND JR.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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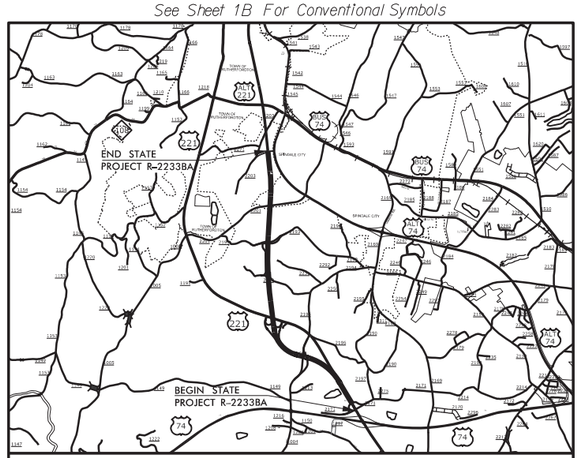
USER: *****

09/08/99

TIP PROJECT: R-2233BA

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



VICINITY MAP

FDFI PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PERMIT DRAWING
SHEET 1 OF 50

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2233BA	1	

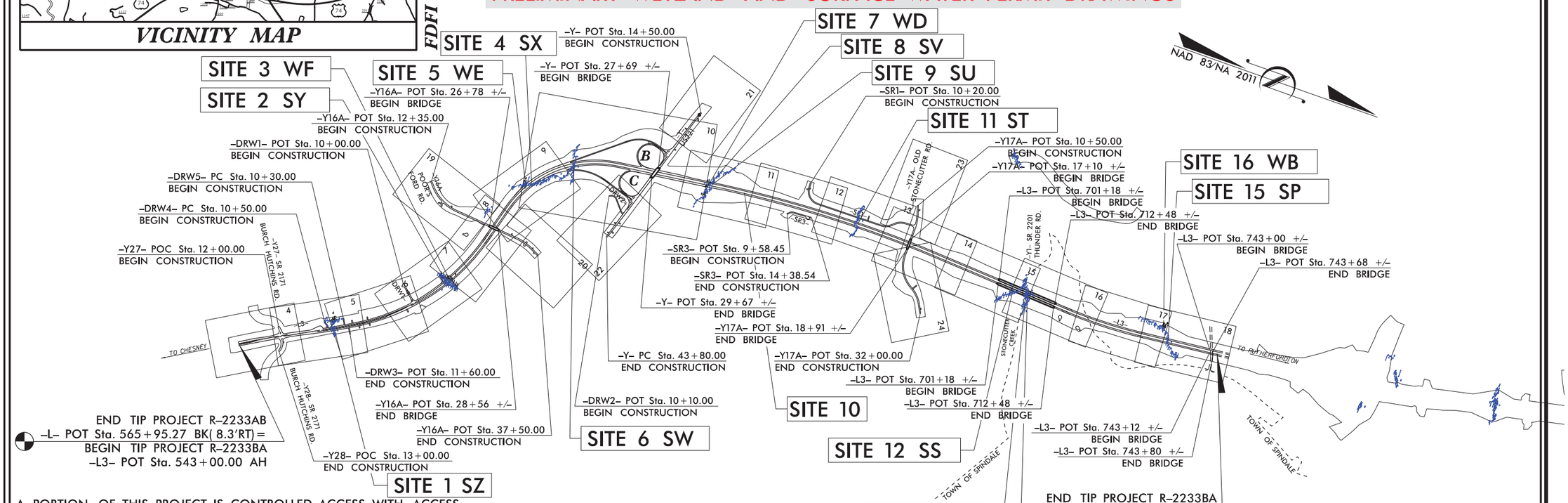
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34400.1.S5		PE
34400.2.S5		R/W & UTIL

RUTHERFORD COUNTY

LOCATION: RUTHERFORDTON BYPASS FROM US 74 BYPASS TO US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES

PRELIMINARY WETLAND AND SURFACE WATER PERMIT DRAWINGS



A PORTION OF THIS PROJECT IS CONTROLLED–ACCESS WITH ACCESS BEING LIMITED TO INTERCHANGES.
A PORTION OF THIS PROJECT IS PARTIAL CONTROLLED–ACCESS WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD XX.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF SPINDALE.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NCDOT CONTACT: NATHAN ADIMA, P.E.

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2022 = 10400
ADT 2040 = 12900
K = 8 %
D = 55 %
T = 7 % *
V = 70 MPH
* TTST 2% DUAL 5%
FUNC CLASS =
ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2233BA = 3.589 MILES
LENGTH STRUCTURE TIP PROJECT R-2233BA = 0.227 MILES
TOTAL LENGTH TIP PROJECT R-2233BA = 3.816 MILES

STRUCTURE LENGTH BASED ON –L3– NB STATIONING.

PLANS PREPARED FOR NCDOT BY:

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 19, 2020

LETTING DATE:
JUNE 20, 2023

DENNIS J. MORY, P.E.
PROJECT ENGINEER

BRYAN LAMBETH, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	5
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 2 OF 50

NAD 83

5 5 DENOTES IMPACTS IN SURFACE WATER

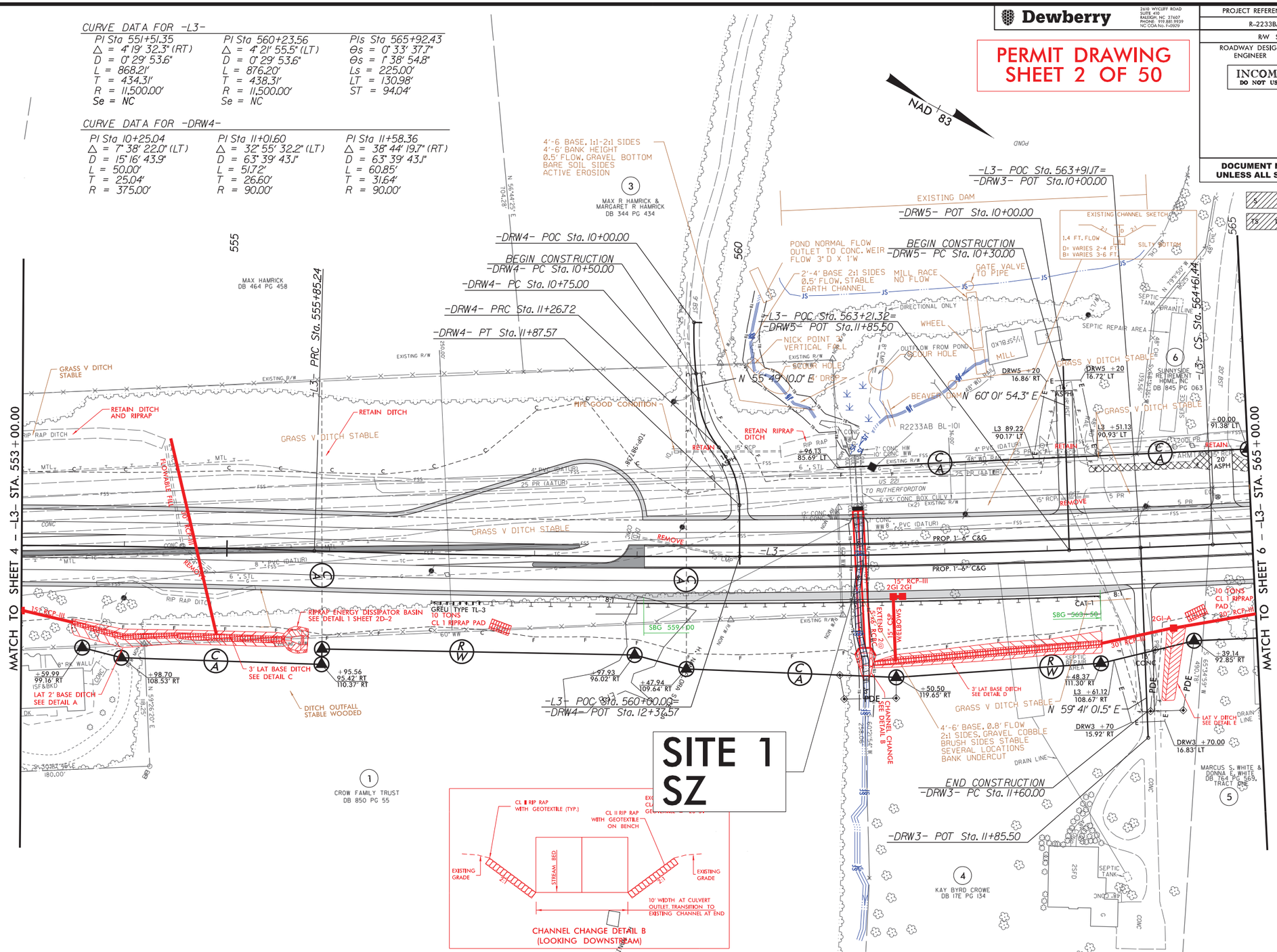
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

CURVE DATA FOR -L3-

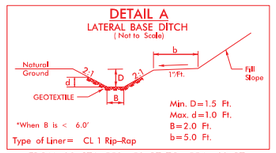
PI Sta 551+51.35	PI Sta 560+23.56	PIs Sta 565+92.43
Δ = 4° 19' 32.3" (RT)	Δ = 4° 21' 55.5" (LT)	Θs = 0° 33' 37.7"
D = 0° 29' 53.6"	D = 0° 29' 53.6"	Θs = 1° 38' 54.8"
L = 868.21'	L = 876.20'	Ls = 225.00'
T = 434.31'	T = 438.31'	LT = 130.98'
R = 11,500.00'	R = 11,500.00'	ST = 94.04'
Se = NC	Se = NC	

CURVE DATA FOR -DRW4-

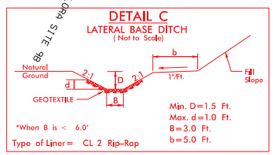
PI Sta 10+25.04	PI Sta 11+01.60	PI Sta 11+58.36
Δ = 7° 38' 22.0" (LT)	Δ = 32° 55' 32.2" (LT)	Δ = 38° 44' 19.7" (RT)
D = 15° 16' 43.9"	D = 63° 39' 43.1"	D = 63° 39' 43.1"
L = 50.00'	L = 51.72'	L = 60.85'
T = 25.04'	T = 26.60'	T = 31.64'
R = 375.00'	R = 90.00'	R = 90.00'



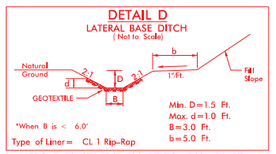
CHANNEL CHANGE DETAIL B
(LOOKING DOWNSTREAM)



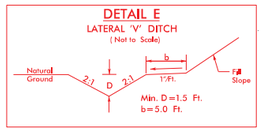
DETAIL A
LATERAL BASE DITCH
(Not to Scale)
FROM L3 STA. 553+50 RT TO 554+60 RT



DETAIL C
LATERAL BASE DITCH
(Not to Scale)
FROM L3 STA. 554+60 RT TO 555+60 RT



DETAIL D
LATERAL BASE DITCH
(Not to Scale)
FROM L3 STA. 561+30 RT TO 563+50 RT



DETAIL E
LATERAL 'V' DITCH
(Not to Scale)
FROM DRW3 STA. 10+80 LT TO 11+50 LT

SEE SHEET 26 FOR -L3- PROFILE
SEE SHEET 51 FOR -DRW3- PROFILE
SEE SHEET 52 FOR -DRW4- PROFILE
SEE SHEET 52 FOR -DRW5- PROFILE
SEE SHEET 2B-2 FOR INTERSECTION DETAILS

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	5
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 3 OF 50

NAD 83

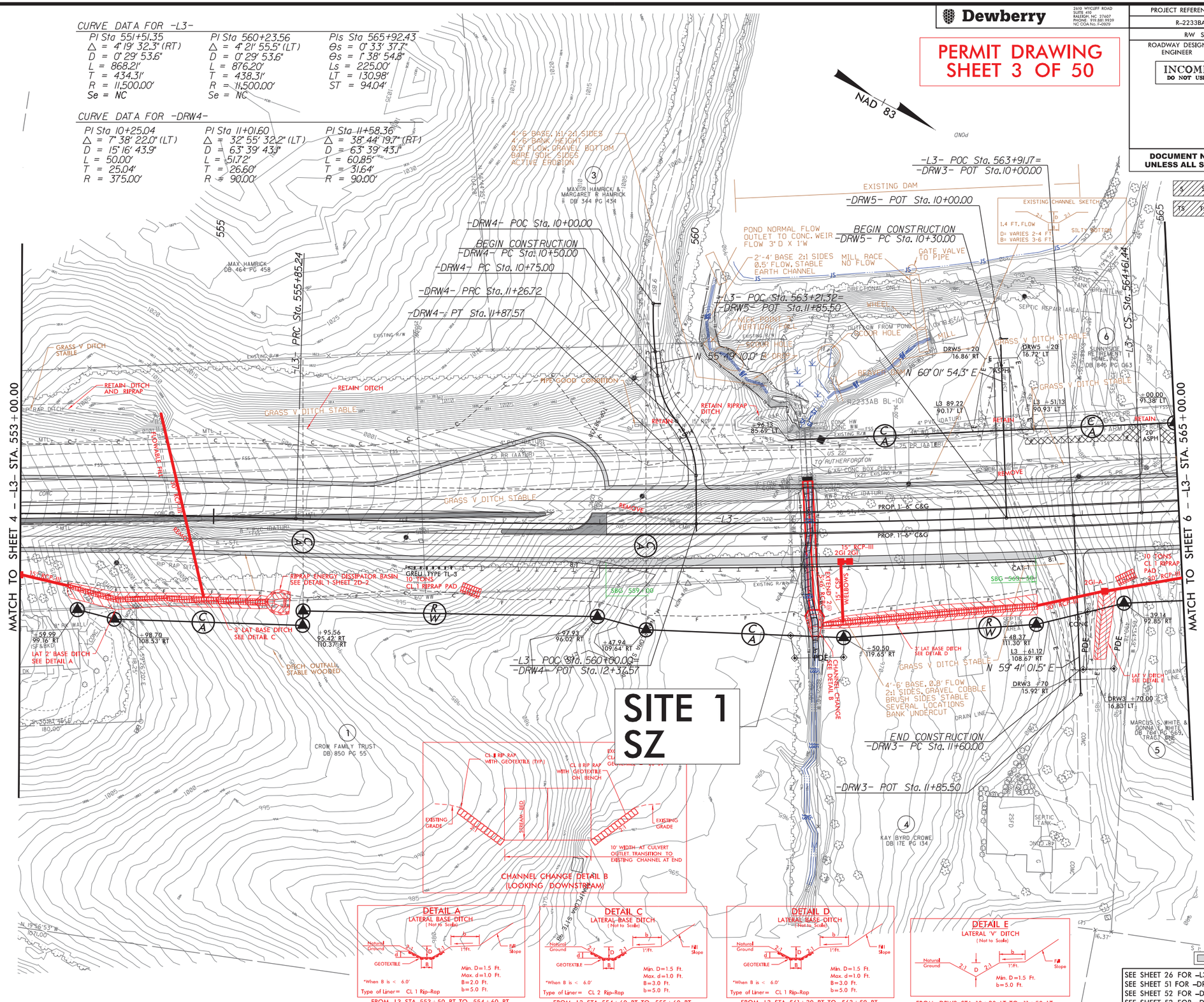
5 / 5 — DENOTES IMPACTS IN SURFACE WATER
TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

CURVE DATA FOR -L3-

PI Sta 551+51.35	PI Sta 560+23.56	PIs Sta 565+92.43
Δ = 4° 19' 32.3" (RT)	Δ = 4° 21' 55.5" (LT)	Θs = 0° 33' 37.7"
D = 0° 29' 53.6"	D = 0° 29' 53.6"	Θs = 1° 38' 54.8"
L = 868.21'	L = 876.20'	Ls = 225.00'
T = 434.31'	T = 438.31'	LT = 130.98'
R = 11,500.00'	R = 11,500.00'	ST = 94.04'
Se = NC	Se = NC	

CURVE DATA FOR -DRW4-

PI Sta 10+25.04	PI Sta 11+01.60	PI Sta 11+58.36
Δ = 7° 38' 22.0" (LT)	Δ = 32° 55' 32.2" (LT)	Δ = 38° 44' 19.7" (RT)
D = 15° 16' 43.9"	D = 63° 39' 43.3"	D = 63° 39' 43.3"
L = 50.00'	L = 51.72'	L = 60.85'
T = 25.04'	T = 26.60'	T = 31.64'
R = 375.00'	R = 90.00'	R = 90.00'



SEE SHEET 26 FOR –L3– PROFILE
SEE SHEET 51 FOR –DRW3– PROFILE
SEE SHEET 52 FOR –DRW4– PROFILE
SEE SHEET 52 FOR –DRW5– PROFILE
SEE SHEET 2B-2 FOR INTERSECTION DETAILS

12/6/2019
DEWBERRY
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5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

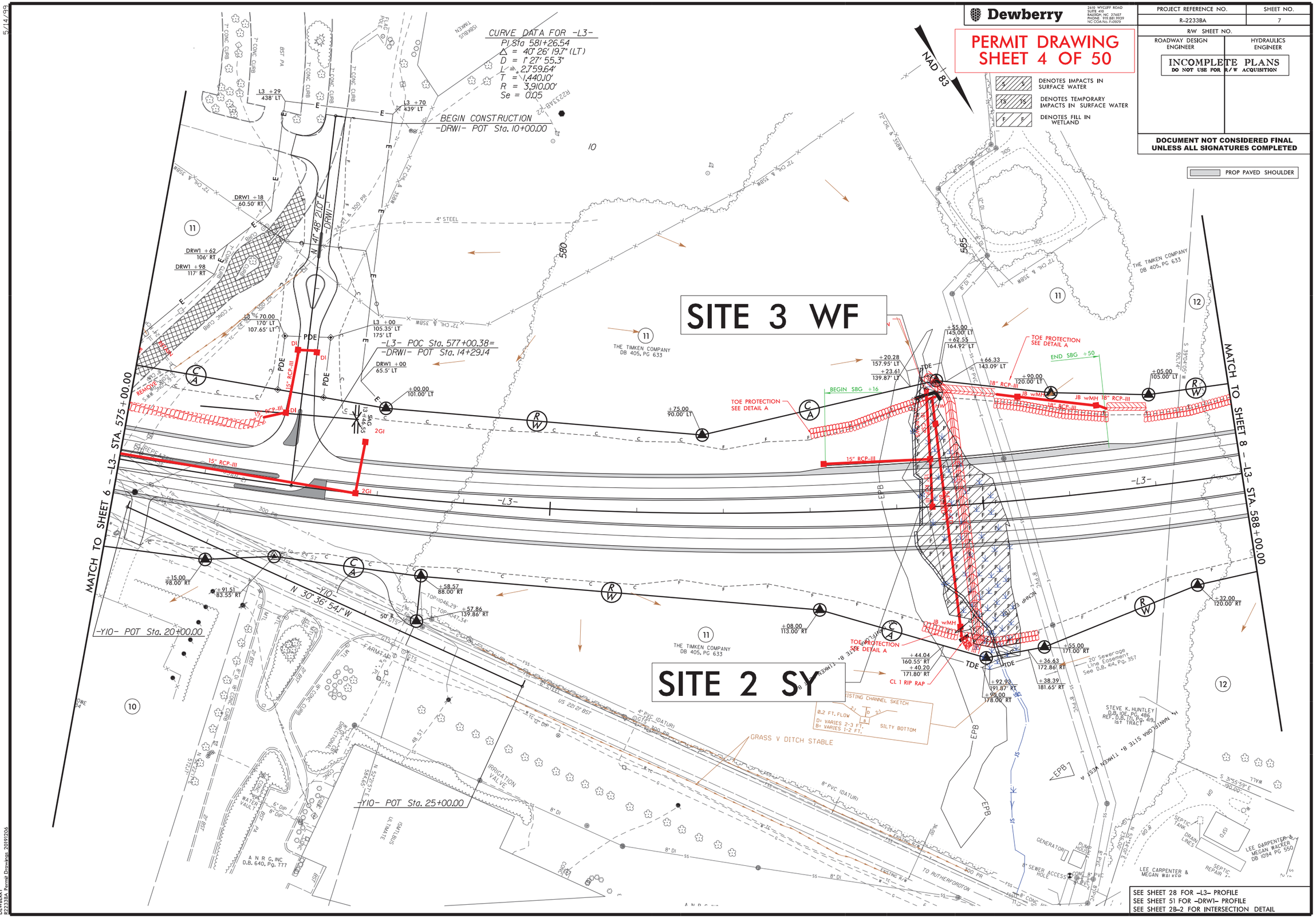
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 4 OF 50

S S — DENOTES IMPACTS IN SURFACE WATER
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F — DENOTES FILL IN WETLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROP PAVED SHOULDER



SEE SHEET 28 FOR -L3- PROFILE
SEE SHEET 51 FOR -DRW1- PROFILE
SEE SHEET 28-2 FOR INTERSECTION DETAIL

12/6/2019
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R2233BA_Permit Drawings_20191206

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2610 WYCLIFF ROAD
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RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

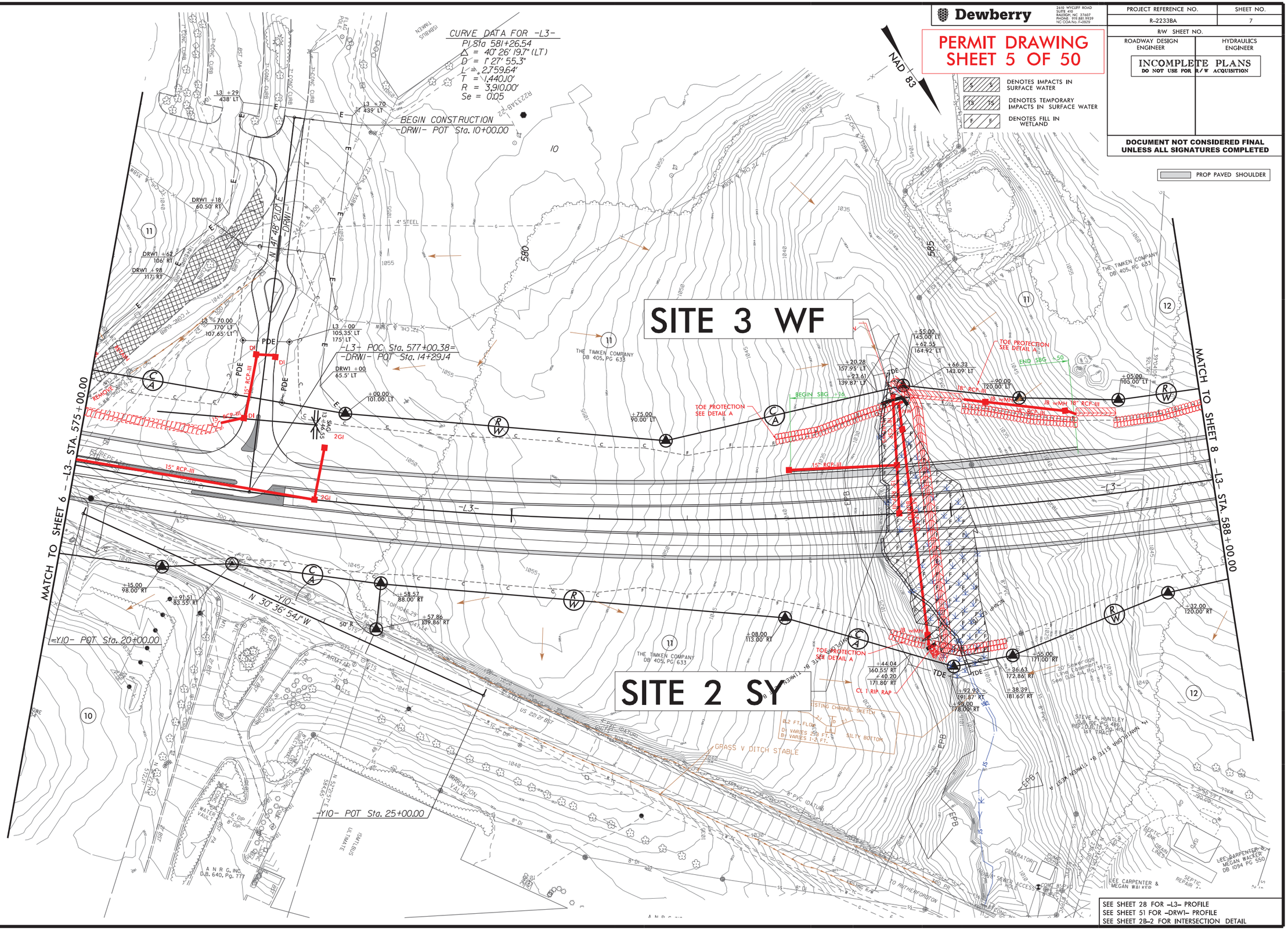
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 5 OF 50

S S — DENOTES IMPACTS IN SURFACE WATER
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F — DENOTES FILL IN WETLAND

PROP PAVED SHOULDER



12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

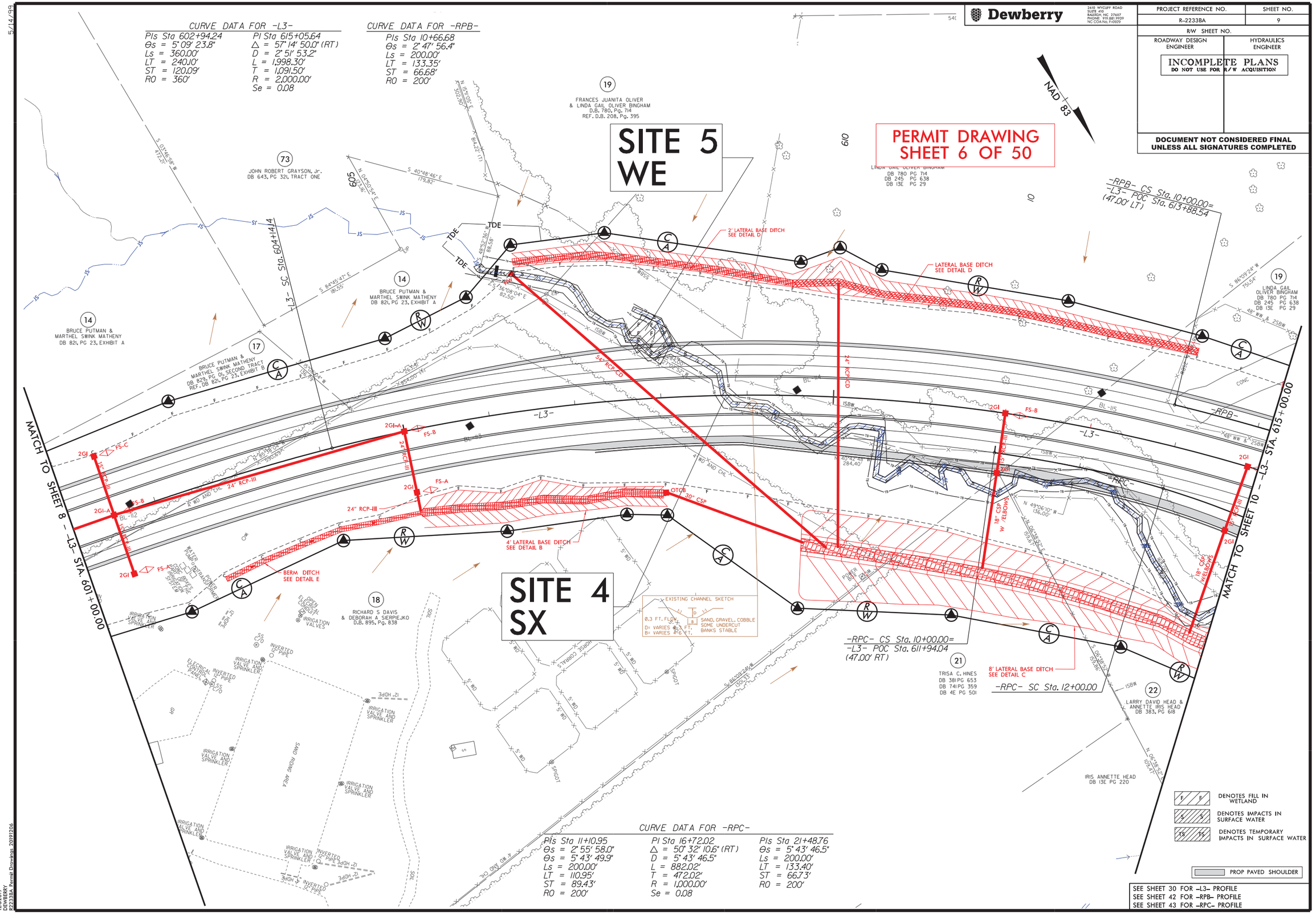
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	9
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 50



CURVE DATA FOR -L3-

PIs Sta 602+94.24	PI Sta 615+05.64
Θs = 5° 09' 23.8"	Δ = 57° 14' 50.0" (RT)
Ls = 360.00'	D = 2° 51' 53.2"
LT = 240.10'	L = 1,998.30'
ST = 120.09'	T = 1,091.50'
RO = 360'	R = 2,000.00'
	Se = 0.08

CURVE DATA FOR -RPB-

PIs Sta 10+66.68
Θs = 2° 47' 56.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'
RO = 200'

CURVE DATA FOR -RPC-

PIs Sta 11+10.95	PI Sta 16+72.02	PIs Sta 21+48.76
Θs = 2° 55' 58.0"	Δ = 50° 32' 10.6" (RT)	Θs = 5° 43' 46.5"
Θs = 5° 43' 49.9"	D = 5° 43' 46.5"	Ls = 200.00'
Ls = 200.00'	L = 882.02'	LT = 133.40'
LT = 110.95'	T = 472.02'	ST = 66.73'
ST = 89.43'	R = 1,000.00'	RO = 200'
RO = 200'	Se = 0.08	

SEE SHEET 30 FOR -L3- PROFILE
SEE SHEET 42 FOR -RPB- PROFILE
SEE SHEET 43 FOR -RPC- PROFILE

5/14/99

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	9
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 7 OF 50

NAD 83

SITE 5
WE

SITE 4
SX

CURVE DATA FOR -L3-

PIs Sta 602+94.24
Θs = 5° 09' 23.8"
Ls = 360.00'
LT = 240.10'
ST = 120.09'
RO = 360'

PI Sta 615+05.64
Δ = 57° 14' 50.0" (RT)
D = 2° 51' 53.2"
L = 1,998.30'
T = 1,091.50'
R = 2,000.00'
Se = 0.08

CURVE DATA FOR -RPB-

PIs Sta 10+66.68
Θs = 2° 47' 56.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'
RO = 200'

CURVE DATA FOR -RPC-

PIs Sta 11+10.95
Θs = 2° 55' 58.0"
Θs = 5° 43' 49.9"
Ls = 200.00'
LT = 110.95'
ST = 89.43'
RO = 200'

PI Sta 16+72.02
Δ = 50° 32' 10.6" (RT)
D = 5° 43' 46.5"
L = 882.02'
T = 472.02'
R = 1,000.00'
Se = 0.08

PIs Sta 21+48.76
Θs = 5° 43' 46.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'
RO = 200'

-RPB- CS Sta. 10+00.00=
-L3- POC Sta. 613+88.54
(47.00' LT)

-RPC- CS Sta. 10+00.00=
-L3- POC Sta. 611+94.04
(47.00' RT)

-RPC- SC Sta. 12+00.00

MATCH TO SHEET 8 – -L3- STA. 601+00.00

MATCH TO SHEET 10 – -L3- STA. 615+00.00

19 FRANCES JUANITA OLIVER & LINDA GAIL OLIVER BINGHAM D.B. 780, PG. 714 REF. D.B. 208, PG. 395

73 JOHN ROBERT CRAYSON, JR. DB 643, PG 321, TRACT ONE

14 BRUCE PUTMAN & MARTHEL SWINK MATHENY DB 821, PG 23, EXHIBIT A

17 BRUCE PUTMAN & MARTHEL SWINK MATHENY DB 821, PG 23, SECOND TRACT REF. DB 821, PG 23, EXHIBIT A

18 RICHARD S. DAVIS & DEBORAH A. SIERPIEJKO D.B. 895, PG. 838

21 TRISA C. HINES DB 381 PG 653 DB 741 PG 359 DB 1E PG 501

22 LARRY DAVID HEAD & ANNETTE IRIS HEAD DB 383, PG 618

IRIS ANNETTE HEAD DB 1E PG 220

LINDA GAIL OLIVER BINGHAM DB 780 PG 714 DB 245 PG 638 DB 13E PG 29

2' LATERAL BASE DITCH SEE DETAIL D

LATERAL BASE DITCH SEE DETAIL D

4' LATERAL BASE DITCH SEE DETAIL B

BERM DITCH SEE DETAIL E

8' LATERAL BASE DITCH SEE DETAIL C

24" RCP-III

30" CSP

18" CSP W/ FLOW DIVERTER

EXISTING CHANNEL SKETCH
0.3 FT. FLOW
D= VARIES 4.5 FT.
B= VARIES 4.5 FT.
SAND, GRAVEL, COBBLE
SOME UNDERCUT
BANKS STABLE

F/F DENOTES FILL IN WETLAND

S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROP PAVED SHOULDER

SEE SHEET 30 FOR -L3- PROFILE
SEE SHEET 42 FOR -RPB- PROFILE
SEE SHEET 43 FOR -RPC- PROFILE

12/6/2019
DEWBERRY
R2233BA_Permit Drawings 20191206

REVISIONS

Dewberry

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	70
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 8 OF 50

NAD 83

PROP PAVED SHOULDER

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 4 SX

SITE 6 SW

MATCH TO SHEET 21 - Y STA. 21+00.00

MATCH TO SHEET 11 - L3- STA. 641+50.00

MATCH TO SHEET 22 - Y STA. 35+50.00

MATCH TO SHEET 9 - L3- STA. 615+50.00

-RPB- SC Sta. 25+92.92

-RPB- TS Sta. 23+92.92

-RPB- ST Sta. 21+00.00

-RPB- POT Sta. 33+41.77=
-Y- POT Sta. 24+33.05

-LPB- POT Sta. 21+86.27=
-Y- POT Sta. 24+15.05

-LPB- ST Sta. 10+00.00=
-L3- POT Sta. 632+39.40
(47.00 LT)

-LPB- SC Sta. 11+80.00

-L3- POT Sta. 633+19.66=
-Y- POT Sta. 28+68.37

-L3- ST Sta. 627+72.44

-L3- ST Sta. 624+62.24

-RPB- ST Sta. 12+00.00

-LPC- SC Sta. 11+80.00

-LPC- ST Sta. 10+00.00=
-L3- POT Sta. 630+12.87
(47.00 RT)

-LPC- CS Sta. 16+15.74

-LPC- ST Sta. 17+17.74

-RPC- CS Sta. 20+82.03

-RPC- ST Sta. 22+82.03

-RPC- POT Sta. 28+39.46=
-Y- POT Sta. 35+42.43

-LPC- POT Sta. 19+15.74=
-Y- POT Sta. 35+24.43

N 17° 29' 50.0" W

N 17° 29' 50.0" W

N 17° 29' 50.0" W

N 17° 29' 50.0" W

N 7° 24' 08.3" W

B

C

CURVE DATA FOR -RPB-

PIs Sta 10+66.68	PI Sta 25+26.45	PI Sta 28+54.49
Gs = 2° 47' 56.4"	Gs = 9° 32' 57.5"	Δ = 41° 06' 36.1" (RT)
Ls = 200.00'	Ls = 200.00'	D = 9° 52' 57.5"
LT = 133.35'	LT = 133.53'	L = 493.33'
ST = 66.68'	ST = 66.84'	T = 261.57'
RO = 200'	RO = 200'	R = 580.00'
		Se = 0.08

CURVE DATA FOR -L3-

PI Sta 615+05.64	PI Sta 625+32.53
Δ = 53° 14' 50.0" (RT)	Gs = 9° 09' 23.8"
D = 2° 54' 53.2"	Ls = 360.00'
L = 1,998.50'	LT = 240.00'
T = 1,129.50'	ST = 120.19'
R = 2,000.00'	RO = 360'
Se = 0.08	

CURVE DATA FOR -LPB-

PIs Sta 11+20.98	PI Sta 17+97.59	PIs Sta 18+93.06
Gs = 22° 25' 12.3"	Δ = 167° 36' 08.4" (RT)	Gs = 14° 56' 48.2"
Ls = 180.00'	D = 24° 54' 40.4"	Ls = 120.00'
LT = 120.98'	L = 672.87'	LT = 80.29'
ST = 60.89'	T = 2,117.59'	ST = 40.26'
RO = 180'	R = 230.00'	RO = 120'
	Se = 0.08	

CURVE DATA FOR -RPC-

PIs Sta 11+20.95	PI Sta 16+72.00	PIs Sta 21+48.76
Gs = 2° 55' 58.0"	Δ = 50° 32' 10.2" (RT)	Gs = 5° 43' 46.5"
Gs = 5° 43' 49.9"	D = 5° 43' 46.5"	Ls = 200.00'
Ls = 200.00'	L = 882.12'	LT = 133.40'
LT = 110.95'	T = 472.22'	ST = 66.73'
ST = 89.43'	R = 1,000.00'	RO = 200'
RO = 200'	Se = 0.08	

CURVE DATA FOR -LPC-

PIs Sta 11+20.98	PI Sta 15+61.01	PIs Sta 16+93.00
Gs = 22° 25' 12.3"	Δ = 107° 49' 55.0" (LT)	Gs = 14° 56' 48.2"
Ls = 180.00'	D = 24° 54' 40.4"	Ls = 120.00'
LT = 120.98'	L = 412.74'	LT = 80.29'
ST = 60.89'	T = 318.01'	ST = 40.26'
RO = 180'	R = 230.00'	RO = 120'
	Se = 0.08	

TRAFFIC DATA

US 221 BYPASS

	AADT	DHV	%DHV	%D	%T	TTST	K	D	V
A	44/55	7/9	16	55	2	1	9	60	55
B	33/41	7.3/8.8	16	55	2	1	9	60	55
C	102/124	6/7	6	55	2	1	9	60	55
D	12/15	2/3	16	55	2	1	9	60	55

2020 / 2040
*VPD IN 100s

SEE SHEETS 31 & 32 FOR -L3- PROFILE
SEE SHEET 41 FOR -LPB- PROFILE
SEE SHEET 41 FOR -LPC- PROFILE
SEE SHEET 42 & 43 FOR -RPB- PROFILE
SEE SHEET 44 & 45 FOR -RPC- PROFILE
SEE SHEETS 45 & 46 FOR -X- PROFILE
SEE SHEET 28-1 FOR INTERSECTION DETAILS
SEE SHEET 1 FOR CONC. BLAND DETAILS

LOCATION:
RUTHERFORDTON BYPASS FROM US 74 BYPASS TO NORTH OF RELOCATED LAUREL HILL ROAD

TIP NO.: R-2233BA	COUNTY:	RUTHERFORD
DESIGNED BY:	AMP	3/5/2020
CHECKED BY:	DJM	3/5/2020

GRAPHIC SCALE
50 25 0 50 100
PLANS

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

REVISIONS

CURVE DATA FOR -RPB-

PIs Sta 10+66.68	PI Sta 25+26.45	PI Sta 28+54.49
Gs = 2° 47' 56.4"	Gs = 9° 32' 57.5"	Δ = 41° 06' 36.1" (RT)
Ls = 200.00'	Ls = 200.00'	D = 9° 32' 57.5"
LT = 133.35'	LT = 133.33'	L = 493.33'
ST = 66.68'	ST = 66.84'	T = 261.57'
RO = 200'	RO = 200'	R = 600.00'
		Se = 0.08

CURVE DATA FOR -LS-

PI Sta 6+50+50.64	PIs Sta 6+25+32.53
Δ = 53° 14' 50.0" (RT)	Gs = 5° 09' 23.8"
D = 2° 54' 53.2"	Ls = 560.00'
L = 1,998.50'	LT = 240.00'
T = 1,129.50'	ST = 120.19'
R = 2,000.00'	RO = 360'
Se = 0.08	

CURVE DATA FOR -LPB-

PIs Sta 11+20.98	PIs Sta 18+93.06
Gs = 22° 25' 12.3"	Gs = 14° 56' 48.2"
Ls = 180.00'	Ls = 120.00'
LT = 120.98'	LT = 80.25'
ST = 60.89'	ST = 40.26'
RO = 180'	RO = 120'

Dewberry

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

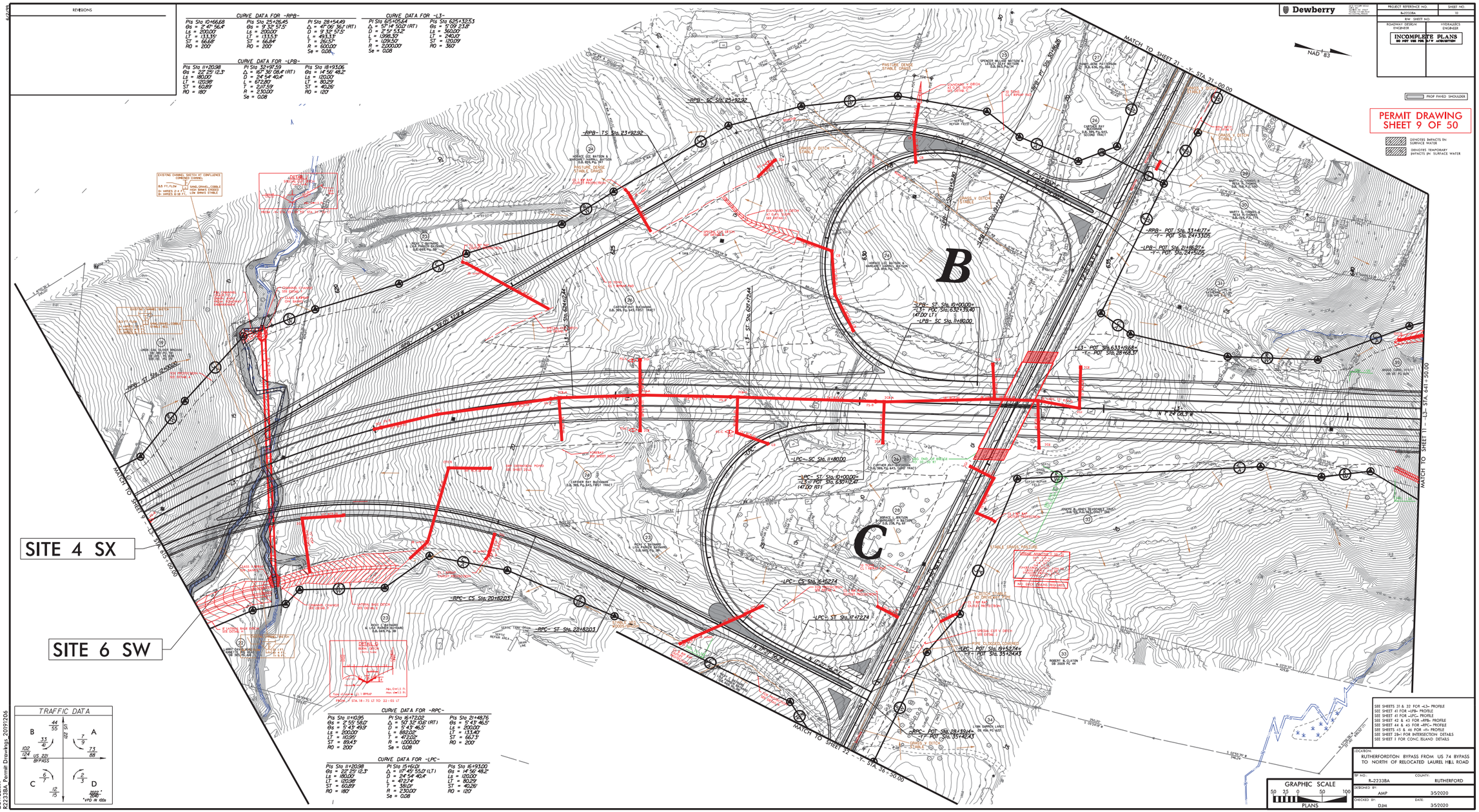
NAD 83

PROP PAVED SHOULDER

PERMIT DRAWING
SHEET 9 OF 50

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER


MATCH TO SHEET 21 - Y- STA. 21+00.00
MATCH TO SHEET 11 - L3- STA. 641+50.00
MATCH TO SHEET 9 - L3- STA. 615+00.00
MATCH TO SHEET 22 - Y- STA. 36+50.00
SITE 4 SX
SITE 6 SW
B
C
-RPB- SC Sta. 25+92.92
-RPB- TS Sta. 23+92.92
-RPB- POT Sta. 33+67.77=
-Y- POT Sta. 24+33.05
-LPB- POT Sta. 21+86.87=
-Y- POT Sta. 24+53.05
-LPB- ST Sta. 8+00.00=
-L3- POT Sta. 632+39.40
(47.00' LT)
-LPB- SC Sta. 11+80.00
-L3- POT Sta. 633+09.64=
-Y- POT Sta. 28+68.37
-LPC- SC Sta. 11+80.00
-LPC- ST Sta. 10+00.00=
-L3- POT Sta. 630+12.47
(47.00' RT)
-LPC- CS Sta. 16+52.74
-LPC- ST Sta. 17+72.74
-RPC- CS Sta. 20+82.03
-RPC- ST Sta. 22+82.03
-RPC- POT Sta. 19+52.74=
-Y- POT Sta. 35+42.43
-RPC- POT Sta. 28+89.46=
-Y- POT Sta. 35+42.43
N 17°24'00.3"W
N 17°24'00.3"E
N 17°24'00.3"W
N 17°24'00.3"E
EXISTING CHANNEL SKETCH AT CONFLUENCE COMBINED CHANNEL
DETAIL G
NTS
DETAIL H
NTS
PROP. 1" DTA. 18+75 LT TO 22+85 LT
Vert. Clr = 2 ft.
Horz. Clr = 5 ft.
Top of Pipe = 2 ft. BRAP
PROP. 1" DTA. 18+75 LT TO 22+85 LT
PROP. 1" DTA. 18+75 LT TO 22+85 LT
PROP. 1" DTA. 18+75 LT TO 22+85 LT

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

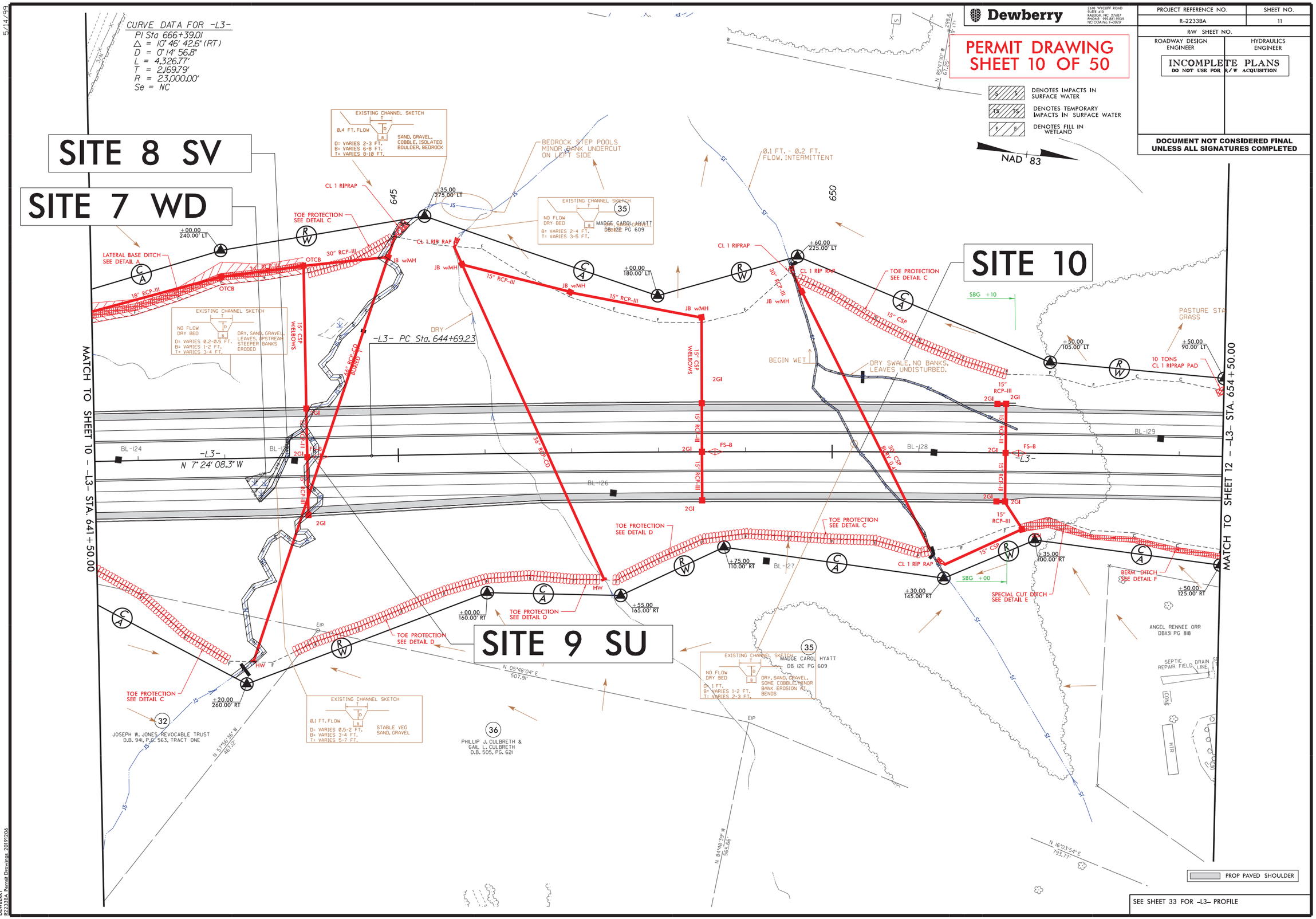
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 10 OF 50

S/S DENOTES IMPACTS IN SURFACE WATER
TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F/F DENOTES FILL IN WETLAND

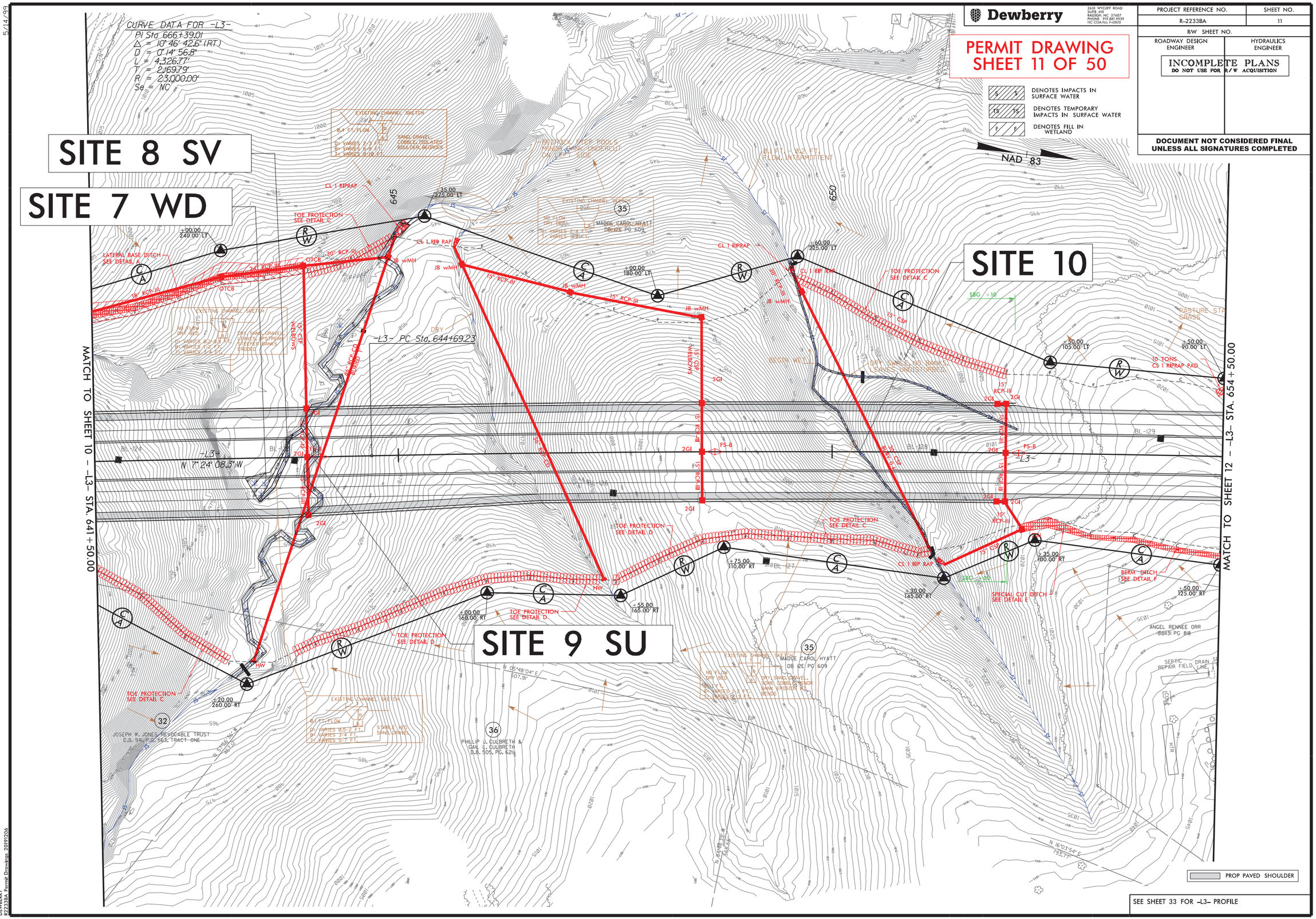
NAD 83



SEE SHEET 33 FOR -L3- PROFILE

12/6/2019
DEWBERRY
R2233BA Permit Drawings 20191206

5/14/99



12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

PERMIT DRAWING
SHEET 12 OF 50

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	13
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

PROP PAVED SHOULDER
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

CURVE DATA FOR -L3-
PI Sta 666+39.01
△ = 10° 46' 42.6" (RT)
D = 0° 14' 56.8"
L = 4,326.77'
T = 2,169.79'
R = 23,000.00'
Se = NC

CURVE DATA FOR -SR1-
PI Sta 28+77.65
△ = 46° 17' 48.5" (LT)
D = 19° 05' 54.9"
L = 242.41'
T = 128.26'
R = 300.00'
Se = 0.06
RO = 108'

PI Sta 31+17.50
△ = 45° 28' 11.4" (RT)
D = 19° 05' 54.9"
L = 238.08'
T = 125.71'
R = 300.00'
Se = 0.06
RO = 108'

NAD 83

MATCH TO SHEET 12 - -L3- STA. 667+50.00

MATCH TO SHEET 14 - -L3- STA. 680+50.00

MATCH TO SHEET 23 -SR1- STA. 32+00.00

-SR1- PC Sta. 27+49.39

-SR1- PRC Sta. 29+91.79

EXISTING CHANNEL SKETCH
43 KATHY PATE MORGAN
Ø.8 FT. FLOW
D= VARIES 2 VIEW PATE
B= VARIES 0.6-1.5 FT. COBBLE, GRAVEL, SOME
T= VARIES 8-10 FT. COBBLE, STABLE VEG ON BANKS

39 DOUGLAS W. ARROWOOD
D.B. 866, PG. 358
PORTION OF P.B. 6, PG. 152

44 LOYD C. PATE
D.B. 1067, PG. 785
D.B. 1067, PG. 884

46 LOYD C. PATE
PASTURE STABLE GRASS

45 KEVIN MARTIN PATE
D.B. 697, PG. 371

47 ROGER MCCLUNEY & ALMAY GAIL McCLUNEY HAMMETT
DB 1077 PG 879

43 KATHY PATE MORGAN
LYNN PATE
DB 1167 PG 785

CHANNEL CHANGE SEE DETAIL E

CL B RIP RAP OUTLET PROTECTION

PASTURE STABLE GRASS

TOE PROTECTION SEE DETAIL D

BERM DITCH SEE DETAIL C

TOE PROTECTION SEE DETAIL A

TOE PROTECTION SEE DETAIL B

FILL EXISTING CHANNEL TO EL 945

24" RCP-III
18" RCP-III
15" RCP-III
2GI
FS-A
FS-B
FS-C
JB w/MH
SBG +75
SBG +00
SBG +50
-L3-
-SR-
N 0°42'07.1" W

SITE 11 ST

SEE SHEET 35 FOR -L3- PROFILE
SEE SHEETS 49 & 50 FOR -SR1- PROFILE

12/6/2019
DEWBERRY
R2233BA Permit Drawings 20191206

5/14/99

PERMIT DRAWING
SHEET 13 OF 50

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	13
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

PROP PAVED SHOULDER

S S — DENOTES IMPACTS IN SURFACE WATER

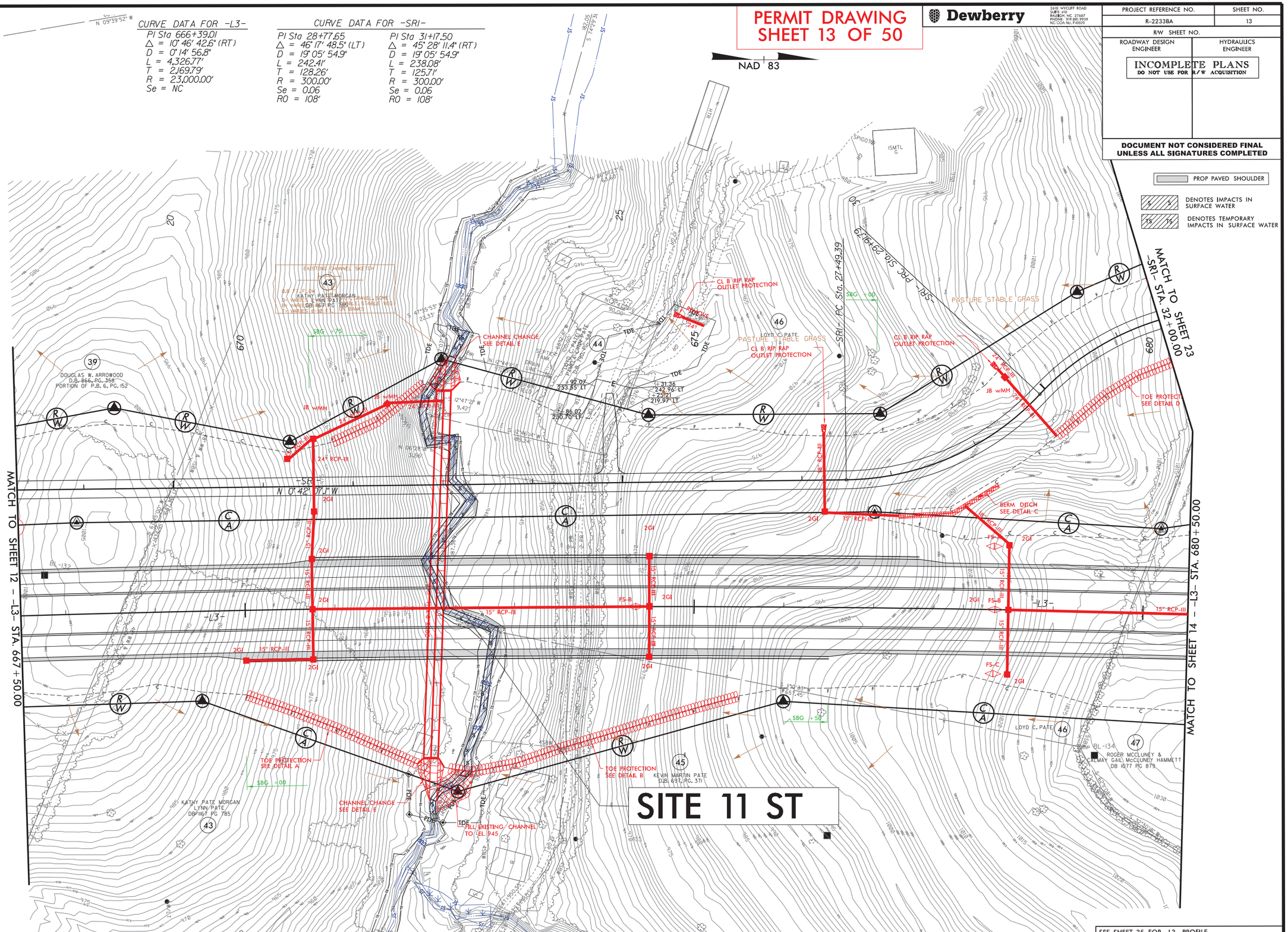
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

CURVE DATA FOR -L3-
PI Sta 666+39.01
△ = 10° 46' 42.6" (RT)
D = 0° 14' 56.8"
L = 4,326.77'
T = 2,169.79'
R = 23,000.00'
Se = NC

CURVE DATA FOR -SR1-
PI Sta 28+77.65
△ = 46° 17' 48.5" (LT)
D = 19° 05' 54.9"
L = 242.41'
T = 128.26'
R = 300.00'
Se = 0.06
RO = 108'

PI Sta 31+17.50
△ = 45° 28' 11.4" (RT)
D = 19° 05' 54.9"
L = 238.08'
T = 125.71'
R = 300.00'
Se = 0.06
RO = 108'



SEE SHEET 35 FOR -L3- PROFILE
SEE SHEETS 49 & 50 FOR -SR1- PROFILE

12/6/2019
DEWBERRY
R2233BA Permit Drawings 20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC CGA No. F-0259

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	15
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

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 14 OF 50

NAD 83

SITE 12 SS

SPREAD ANALYSIS L3 700+80LT
DA= 1.19 ac
I= 4.0 in/hr
C= 0.9
Q= 4.3 cfs
LONGITUDINAL SLOPE= 0.004 ft/ft
CROSS SLOPE= .025 ft/ft
SHOULDER WIDTH= 12.0 FT.
SPREAD= 12.6 FT.

NO DECK DRAINS REQUIRED

SBG +60 TO END OF BRIDGE LT AND RT

47
ROGER MCCLUNEY &
CALMAY GAIL McCLUNEY HAMMETT
DB 1077 PG 879

48
A. L. COSTNER HEIRS
D.B. 156, P.G. 468

STONECUTTER CREEK

MATCH TO SHEET 14 – –L3– STA. 693+50.00

MATCH TO SHEET 16 – –L3– STA. 706+50.00

695 700 705

+65.00 184.00' LT
+00.00 140.00' LT
+45.00 100.00' LT
+75.00 100.00' RT
+58.00 146.00' RT
+87.00 100.00' RT 142.00' RT
+88.08 100.00' RT 142.00' RT
+18.02 100.00' RT 122.04' RT
+78.02 100.00' RT 120.00' RT
+55.60 134.95' RT

BM #6

BL-137
BL-138
BL-139
BL-140
BL-141

2GI FS-C 15" RCP-III
2GI FS-B 18" RCP-III
2GI FS-A 15" RCP-III
2GI 15" RCP-III
2GI 15" RCP-III
2GI 15" RCP-III
2GI 18" RCP-III
2GI 24" RCP-III
2GI-A 30" RCP-III JB w/MH
30" RCP-III
JB w/MH 30" RCP-III JB w/MH
30" RCP-III PDE

–L3–
N 3° 22' 34.3" E

CL II RIPRAP
845 TONS

RIPRAP ENERGY DISSIPATOR BASIN
SEE DETAIL 1 SHEET 2D-2

PIPE REQUIRED DOWN SLOPE TO AVOID EROSION OF STEEP SLOPES

47
ROGER MCCLUNEY &
CALMAY GAIL McCLUNEY HAMMETT
DB 1077 PG 879

SPREAD ANALYSIS L3 700+80RT
DA= 1.19 ac
I= 4.0 in/hr
C= 0.9
Q= 4.3 cfs
LONGITUDINAL SLOPE= 0.004 ft/ft
CROSS SLOPE= .025 ft/ft
SHOULDER WIDTH= 12.0 FT.
SPREAD= 12.6 FT.

NO DECK DRAINS REQUIRED

S 13°49'30" E
619.12'

STEVEN HOWARD ROSS &
ALLISON B. ROSS
D.B. 982, PG. 698

EXISTING CHANNEL SKETCH
D= VARIES 1-3 FT.
B= VARIES 3-5 FT.
T= VARIES 5-7 FT.
SAND, GRAVEL, COBBLE, STABLE VEG

EIP

1225.63'
N 14°22'04" W

1210.43'
S 56°28' E

PROP PAVED SHOULDER

SEE SHEET 37 FOR –L3– PROFILE

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC CGA No. F-0260

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	15
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 50

NAD 83

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 12 SS

MATCH TO SHEET 14 – -L3- STA. 693+50.00

MATCH TO SHEET 16 – -L3- STA. 706+50.00

SPREAD ANALYSIS L3 700 +80LT
DA= 1.19 ac
I= 4.0 in/hr
C= 0.9
Q= 4.8 cfs
LONGITUDINAL SLOPE= 0.004 ft/ft
CROSS SLOPE= .025 ft/ft
SHOULDER WIDTH= 12.0 FT
SPREAD= 12.6 FT

NO DECK DRAINS REQUIRED

SBG - MOVTO END OF BRIDGE LT AND RT

ROGER MCCLUNEY & CALMAY GAIL MCCLUNEY HAMMETT DB 1077 PG 879

+65.00 184.00' LT

+00.00 140.00' LT

+45.00 100.00' LT

15" RCP-III

18" RCP-III

2GI

FS-C

FS-B

FS-A

18" RCP-III

N 5° 22' 34.3" E

30" RCP-III

JB w/MH

50" RCP-III

+75.00 100.00' RT

+58.00 146.00' RT

+87.00 100.00' RT 142.00' RT

+88.09 100.00' RT 142.00' RT

+18.02 100.00' RT 122.04' RT

+78.02 100.00' RT 120.00' RT

+55.60 134.95' RT

PDE

CL II RIPRAP 843 TONS

RIPRAP ENERGY DISSIPATOR BASIN SEE DETAIL 1 SHEET 25-2

RIP REQUIRED DOWN SLOPE TO AVOID EROSION OF STEEP SLOPES

STONECUTTER CREEK

A.L. COSTNER HEIRS D.B. 861, P.G. 488

ROGER MCCLUNEY & CALMAY GAIL McCLUNEY HAMMETT DB 1077 PG 879

SPREAD ANALYSIS L3 700 +80RT
DA= 1.19 ac
I= 4.0 in/hr
C= 0.9
Q= 4.8 cfs
LONGITUDINAL SLOPE= 0.004 ft/ft
CROSS SLOPE= .025 ft/ft
SHOULDER WIDTH= 12.0 FT
SPREAD= 12.6 FT

NO DECK DRAINS REQUIRED

EXISTING CHANNEL SKETCH

D= VARIES 1-3 FT
B= VARIES 3-5 FT
Z= VARIES 2-3 FT

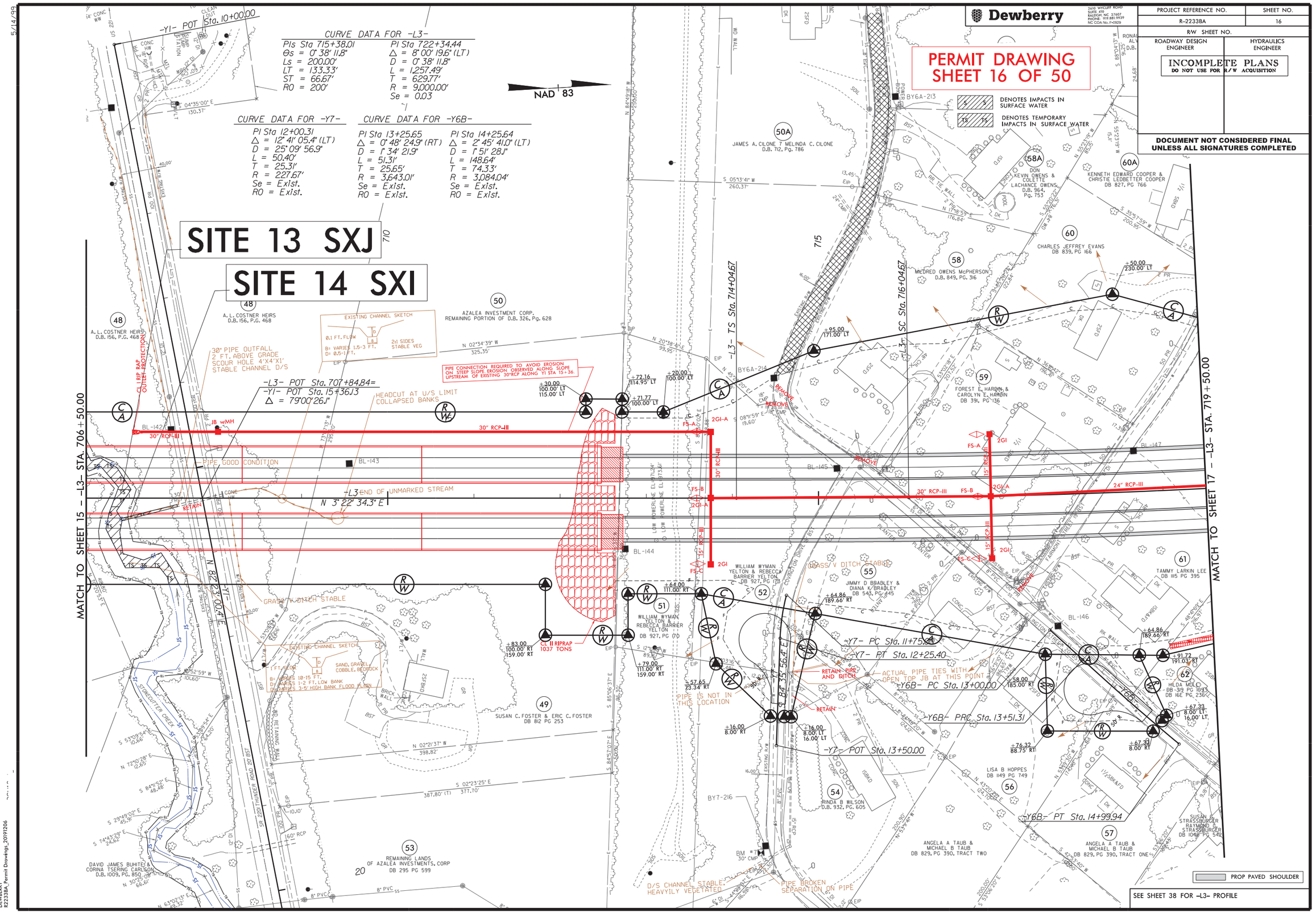
SAND, GRAVEL, COBBLE, STABLE VEG

STEVEN HOWARD ROSS & ALLISON B. ROSS D.B. 987, PG. 888

PROP PAVED SHOULDER

SEE SHEET 37 FOR -L3- PROFILE

12/6/2019
DEWBERRY
R2233BA Permit Drawings_20191206


Dewberry
2610 WYCLIFF ROAD SUITE 410 RALEIGH, NC 27607 PHONE: 919.881.9939 NC COA No. F-0929
PROJECT REFERENCE NO.
R-2233BA
SHEET NO.
16
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 16 OF 50
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83
CURVE DATA FOR -L3-
PIs Sta 715+38.01
Θs = 0° 38' 11.8"
Ls = 200.00'
LT = 133.33'
ST = 66.67'
RO = 200'
PI Sta 722+34.44
Δ = 8° 00' 19.6" (LT)
D = 0° 38' 11.8"
L = 1,257.49'
T = 629.77'
R = 9,000.00'
Se = 0.03
CURVE DATA FOR -Y7-
PI Sta 12+00.31
Δ = 12° 41' 05.4" (LT)
D = 25° 09' 56.9"
L = 50.40'
T = 25.31'
R = 227.67'
Se = Exist.
RO = Exist.
CURVE DATA FOR -Y6B-
PI Sta 13+25.65
Δ = 0° 48' 24.9" (RT)
D = 1° 34' 21.9"
L = 51.31'
T = 25.65'
R = 3,643.01'
Se = Exist.
RO = Exist.
PI Sta 14+25.64
Δ = 2° 45' 41.0" (LT)
D = 1° 51' 28.1"
L = 148.64'
T = 74.33'
R = 3,084.04'
Se = Exist.
RO = Exist.
SITE 13 SXJ
SITE 14 SXI
MATCH TO SHEET 15 – -L3- STA. 706+50.00
MATCH TO SHEET 17 – -L3- STA. 719+50.00
-L3- TS Sta. 714+04.67
SC Sta. 716+04.67
-L3- POT Sta. 707+84.84=
-Y1- POT Sta. 15+36.13
Δ = 79°00'26.1"
-Y1- POT Sta. 10+00.00
-L3- END OF UNMARKED STREAM
N 3° 22' 34.3" E
N 82° 33' 00.4" E
30" RCP-III
24" RCP-III
15" RCP-III
PIPE GOOD CONDITION
HEADCUT AT U/S LIMIT COLLAPSED BANKS
30" PIPE OUTFALL 2 FT. ABOVE GRADE SCOUR HOLE 4'X4'X1' STABLE CHANNEL D/S
PIPE CONNECTION REQUIRED TO AVOID EROSION ON STEEP SLOPE. EROSION OBSERVED ALONG SLOPE UPSTREAM OF EXISTING 30"RCP ALONG Y1 STA 15+36.
EXISTING CHANNEL SKETCH
CL II RIPRAP 1037 TONS
PIPE IS NOT IN THIS LOCATION
-Y7- PC Sta. 11+75.41
-Y7- PT Sta. 12+25.40
-Y6B- PC Sta. 13+00.00
-Y6B- PRC Sta. 13+51.31
-Y7- POT Sta. 13+50.00
-Y6B- PT Sta. 14+99.94
ACTUAL PIPE TIES WITH OPEN TOP JB AT THIS POINT
RETAIN PIPE AND BITCH
RETAIN
REMOVE
GRASS/ V DITCH STABLE
D/S CHANNEL STABLE, HEAVYILY VEGETATED
PIPE BROKEN SEPARATION ON PIPE
JAMES A. CILONE & MELINDA C. CILONE D.B. 712, Pg. 786
KENNETH EDWARD COOPER & CHRISTIE LEDBETTER COOPER DB 827, PG 766
CHARLES JEFFREY EVANS DB 839, PG 166
MILDRED OWENS McPHERSON D.B. 849, PG. 316
FOREST E. HARDIN & CAROLYN E. HARDIN DB 391, PG 136
A. L. COSTNER HEIRS D.B. 156, P.G. 468
AZALEA INVESTMENT CORP. REMAINING PORTION OF D.B. 326, Pg. 628
WILLIAM WYMAN YELTON & REBECCA BARRIER YELTON DB 927, PG 170
JIMMY D BRADLEY & DIANA K BRADLEY DB 540, PG 445
TAMMY LARKIN LEE DB 1115 PG 395
HILDA MULL DB-319 PG 1033 DB 16E PG 236
SUSAN C. FOSTER & ERIC C. FOSTER DB 812 PG 253
REMAINING LANDS OF AZALEA INVESTMENTS, CORP DB 295 PG 599
DAVID JAMES BUHITE & CORINA TSERING CARLSON D.B. 1009, PG. 850
RINDA B WILSON D.B. 932, PG. 605
LISA B HOPPES DB 1149 PG 749
ANGELA A TAUB & MICHAEL B TAUB DB 829, PG 390, TRACT TWO
ANGELA A TAUB & MICHAEL B TAUB DB 829, PG 390, TRACT ONE
SUSAN & STRASSBURGER RAYMOND A. STRASSBURGER DB 1048 PG 542
PROP PAVED SHOULDER
SEE SHEET 38 FOR -L3- PROFILE
12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

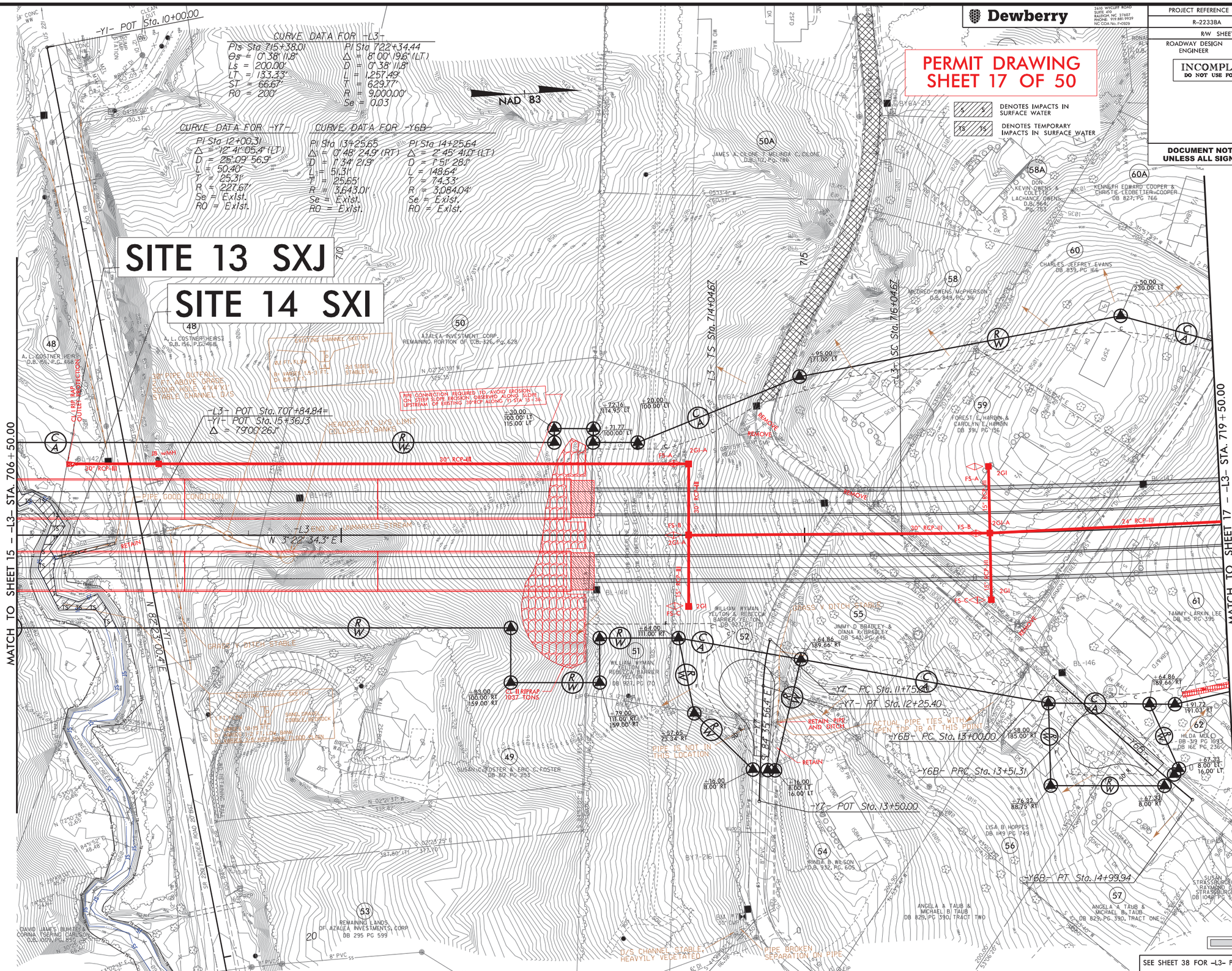
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 17 OF 50

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SEE SHEET 38 FOR -L3- PROFILE

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	17
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

S S — DENOTES IMPACTS IN SURFACE WATER
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 18 OF 50

SITE 15 SP

NAD 83

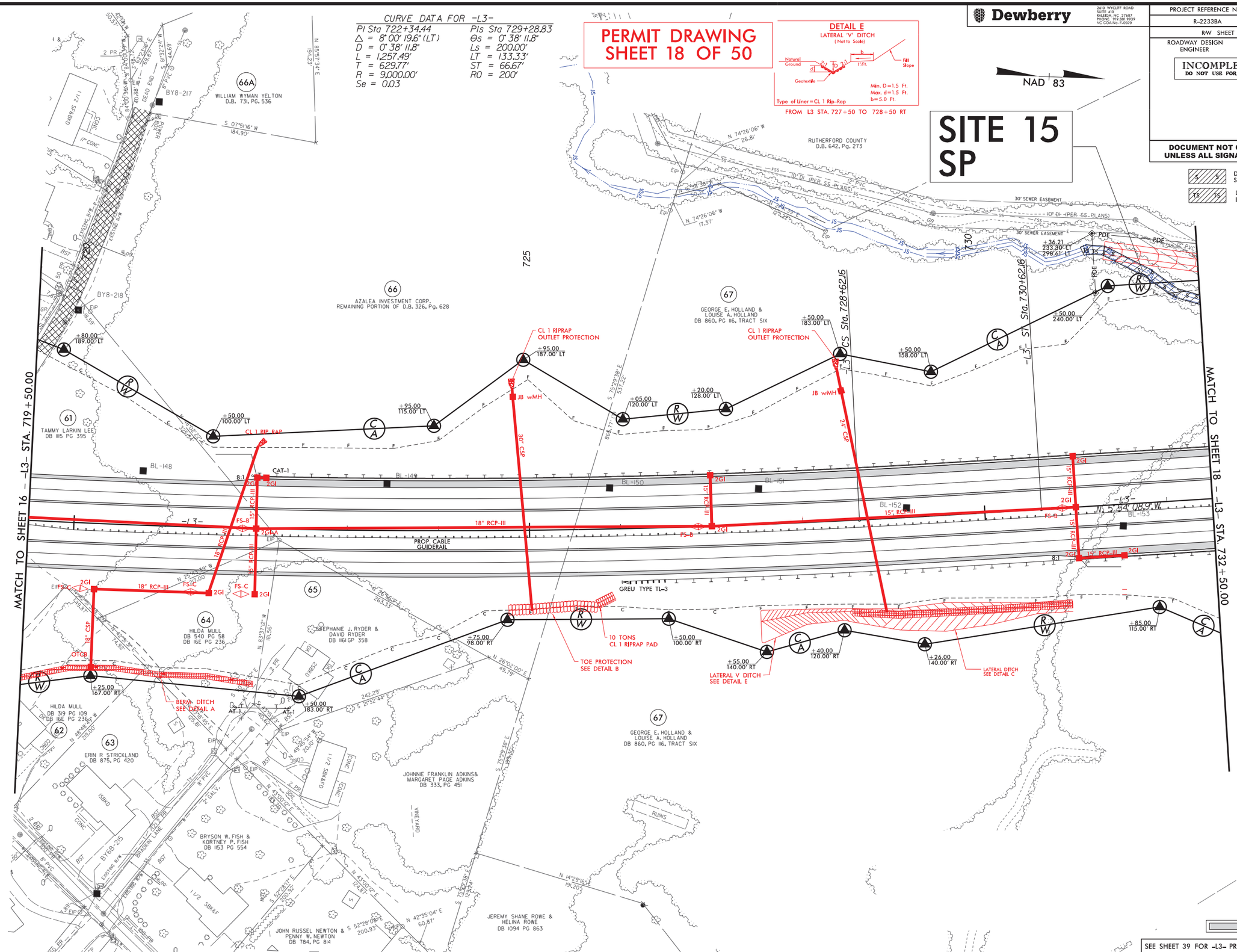
CURVE DATA FOR -L3-

PI Sta 722+34.44
Δ = 8° 00' 19.6" (LT)
D = 0° 38' 11.8"
L = 1,257.49'
T = 629.77'
R = 9,000.00'
Se = 0.03

PIs Sta 729+28.83
Θs = 0° 38' 11.8"
Ls = 200.00'
LT = 133.33'
ST = 66.67'
R0 = 200'

DETAIL E
LATERAL 'V' DITCH
(Not to Scale)

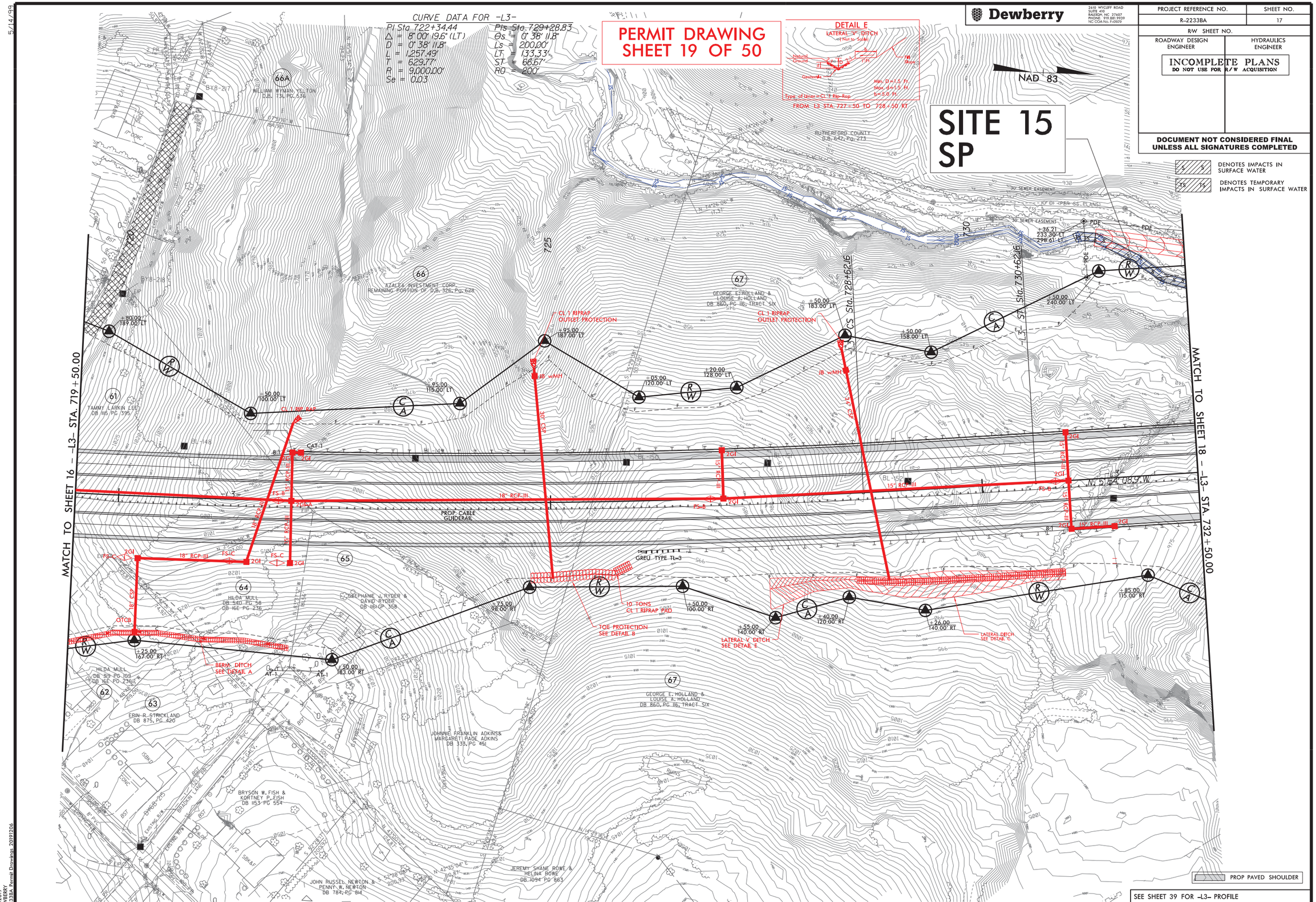
Type of Liner=CL 1 Rip-Rap
FROM L3 STA. 727+50 TO 728+50 RT



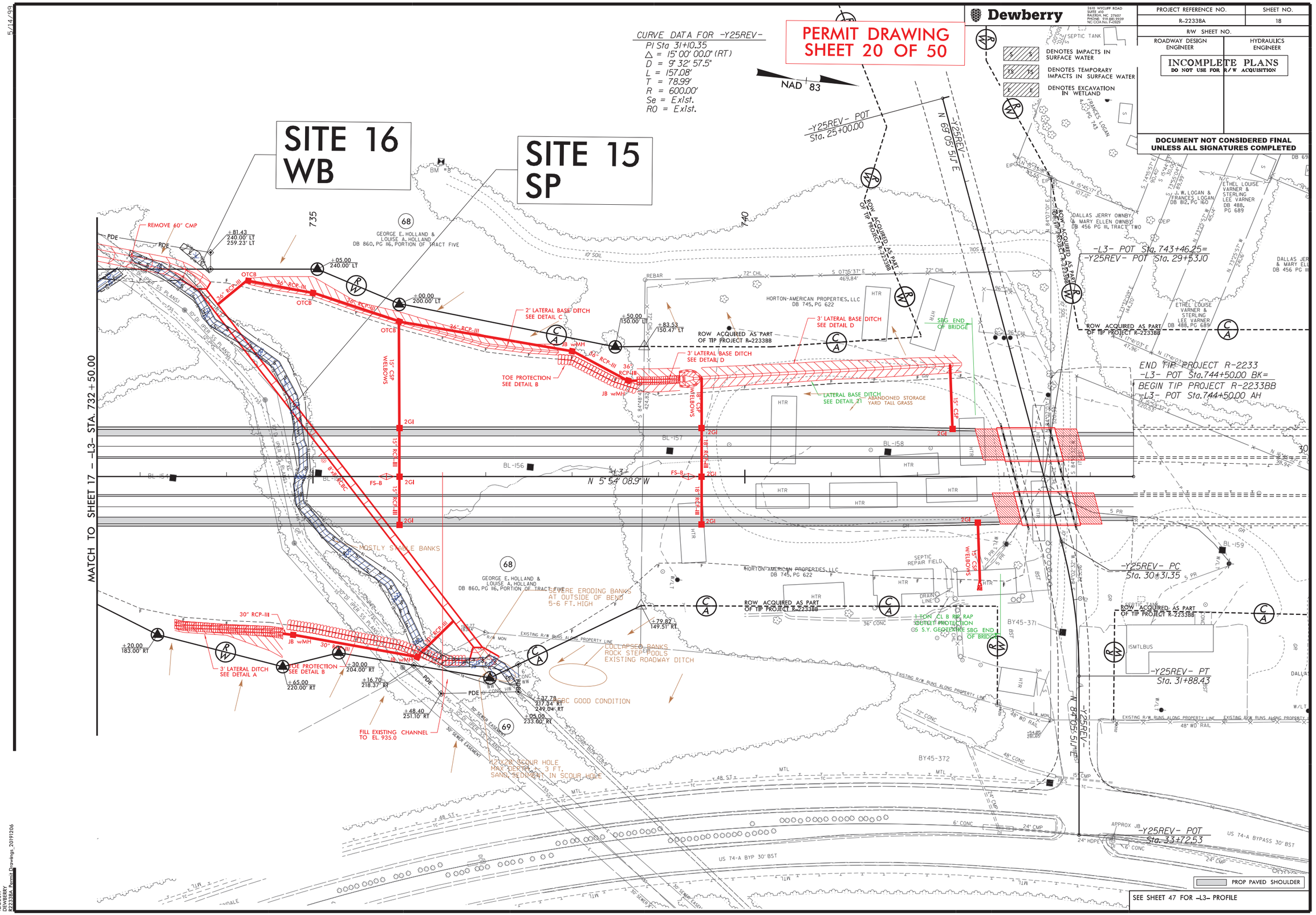
SEE SHEET 39 FOR -L3- PROFILE

12/6/2019
DEWBERRY
R2233BA_Permit Drawings 20191206

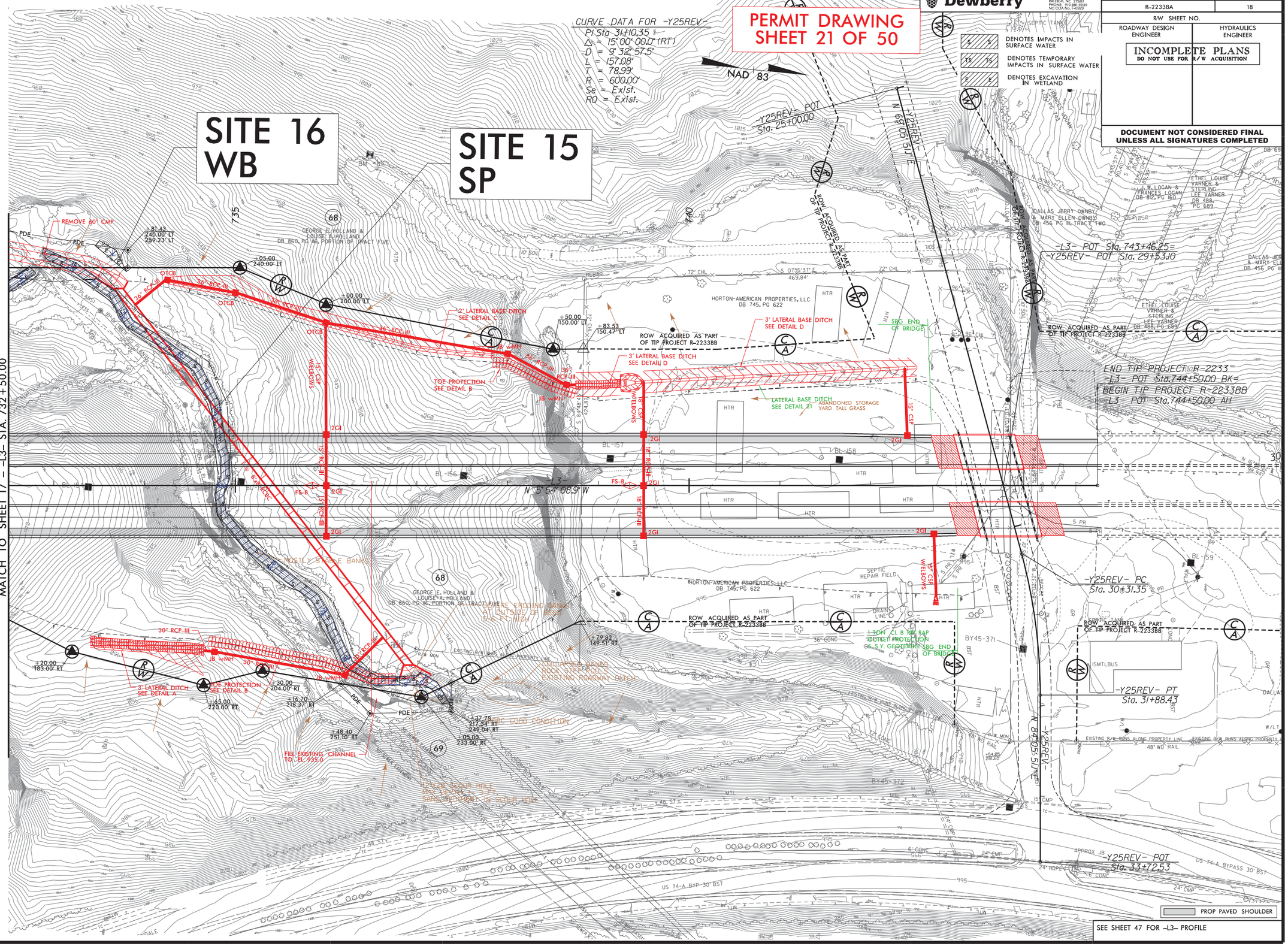
5/14/99



12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206


Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929
PROJECT REFERENCE NO.
R-2233BA
SHEET NO.
18
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 50
CURVE DATA FOR -Y25REV-
PI Sta 31+10.35
△ = 15° 00' 00.0" (RT)
D = 9° 32' 57.5"
L = 157.08'
T = 78.99'
R = 600.00'
Se = Exist.
RO = Exist.
NAD 83
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
SITE 16
WB
SITE 15
SP
MATCH TO SHEET 17 – -L3- STA. 732+50.00
REMOVE 60" CMP
GEORGE E. HOLLAND & LOUISE A. HOLLAND DB 860, PG 116, PORTION OF TRACT FIVE
HORTON-AMERICAN PROPERTIES, LLC DB 745, PG 622
ROW ACQUIRED AS PART OF TIP PROJECT R-2233BB
2' LATERAL BASE DITCH SEE DETAIL C
3' LATERAL BASE DITCH SEE DETAIL D
TOE PROTECTION SEE DETAIL B
LATERAL BASE DITCH SEE DETAIL 21
ABANDONED STORAGE YARD TALL GRASS
SBG END OF BRIDGE
15" CSP WELDOWS
18" CSP WELDOWS
15" RCP-III
18" RCP-III
36" RCP-III
30" RCP-III
MOSTLY STABLE BANKS
SEVERE ERODING BANKS AT OUTSIDE OF BEND 5-6 FT. HIGH
COLLAPSED BANKS ROCK STEPS POOLS EXISTING ROADWAY DITCH
1 TON CL B RIP RAP SUPPLY PROTECTION 65 S.Y. GEOTEXTILE SBG END OF BRIDGE
3' LATERAL DITCH SEE DETAIL A
FILL EXISTING CHANNEL TO EL. 935.0
CSX GOOD CONDITION
SCOUR HOLE MAX DEPTH = 3 FT. SAND SEDIMENT IN SCOUR HOLE
SEPTIC REPAIR FIELD
DRAIN LINE
ISMTLBUS
-L3- POT Sta. 743+46.25=
-Y25REV- POT Sta. 29+53.10
END TIP PROJECT R-2233
-L3- POT Sta. 744+50.00 BK=
BEGIN TIP PROJECT R-2233BB
-L3- POT Sta. 744+50.00 AH
-Y25REV- POT Sta. 25+00.00
-Y25REV- PC Sta. 30+31.35
-Y25REV- PT Sta. 31+88.43
-Y25REV- POT Sta. 33+72.53
N 69° 05' 51.1" E
N 84° 05' 51.1" E
N 5° 54' 08.9" W
US 74-A BYP 30' BST
US 74-A BYPASS 30' BST
PROP PAVED SHOULDER
SEE SHEET 47 FOR -L3- PROFILE
5/14/99
12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

S / S — DENOTES IMPACTS IN SURFACE WATER
TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
E / E — DENOTES EXCAVATION IN WETLAND

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

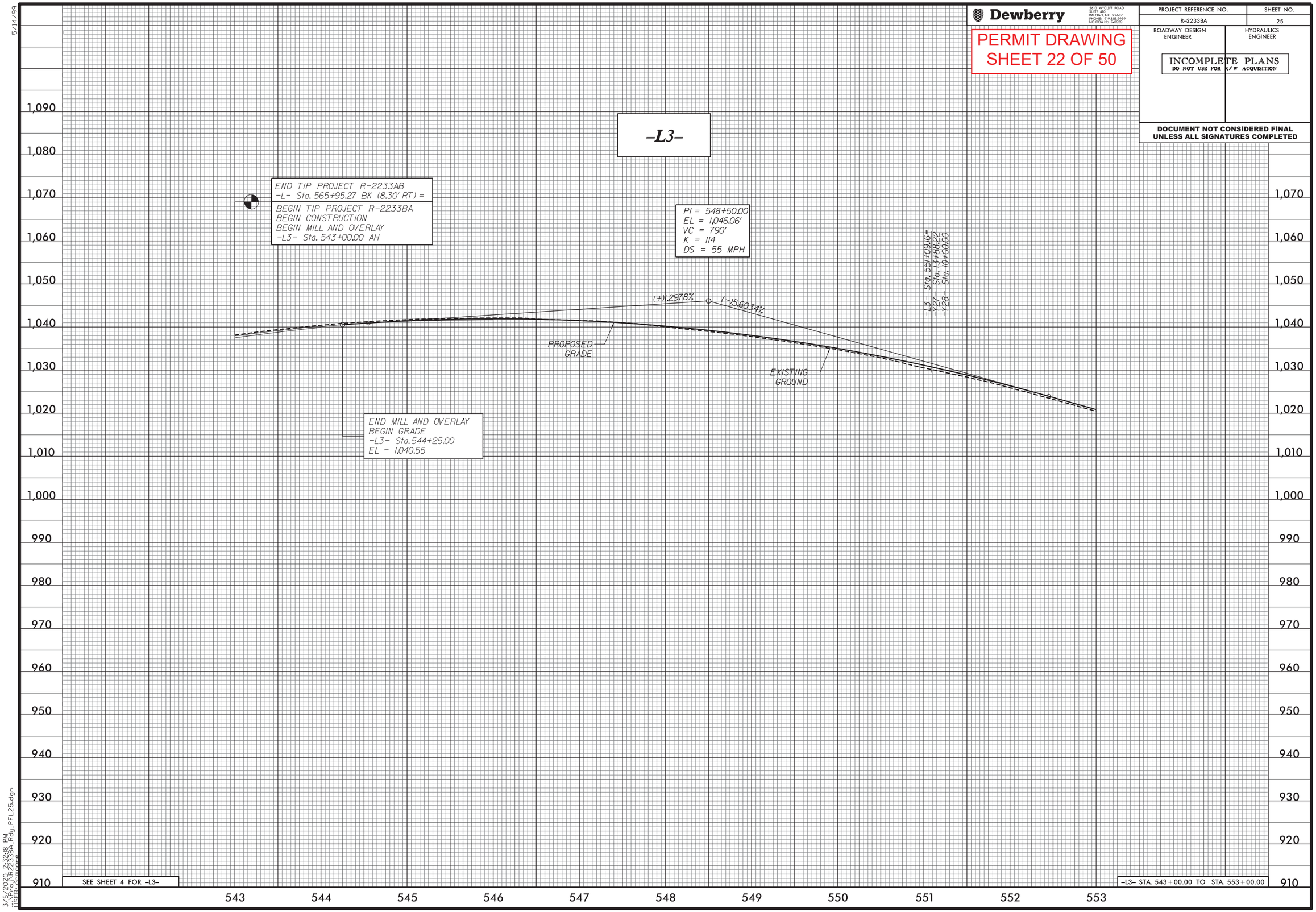
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PERMIT DRAWING
SHEET 22 OF 50

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



5/14/99

3/5/2020 2:33:18 PM
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USER: Jamoore

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	26

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

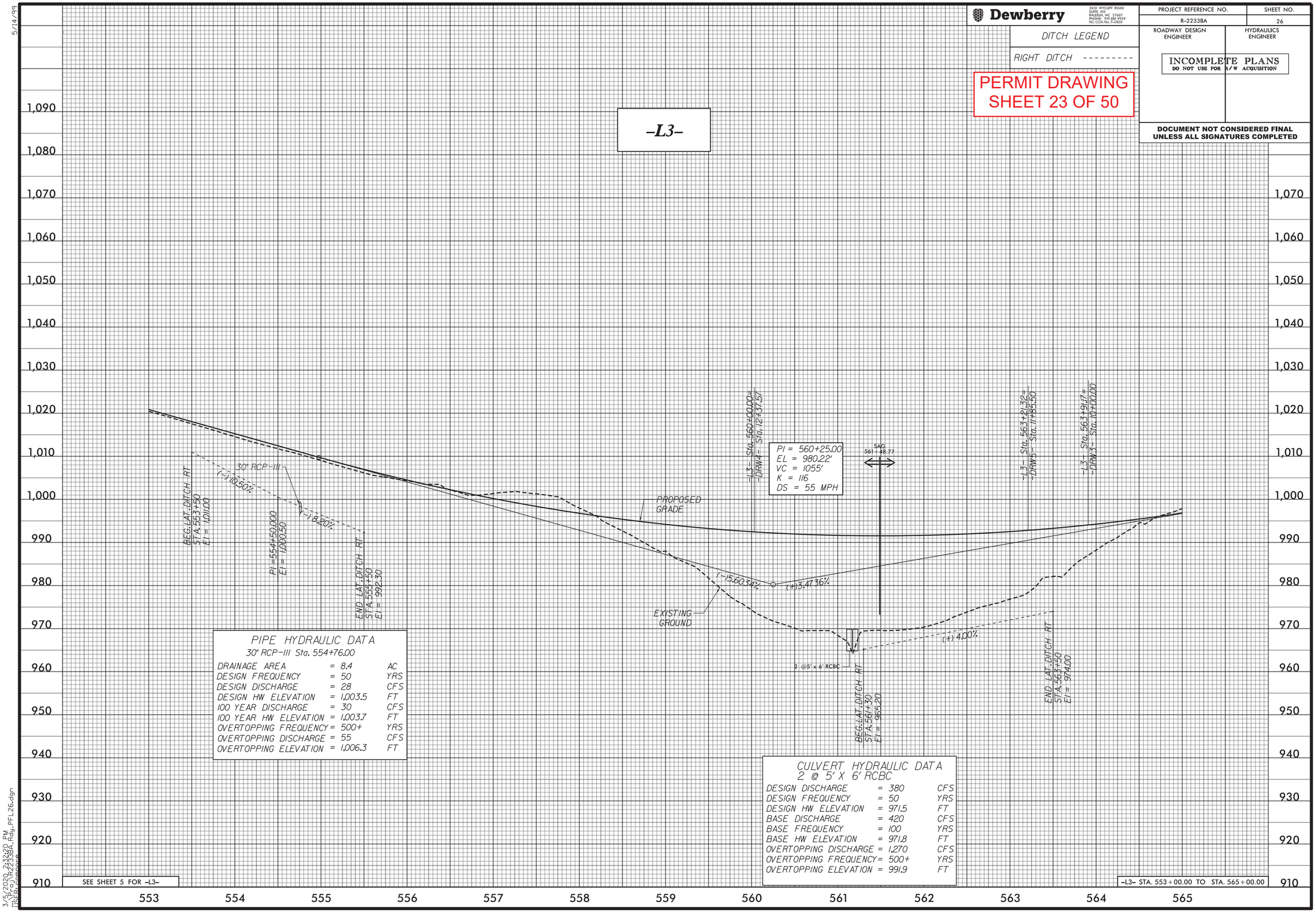
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

RIGHT DITCH ---------

PERMIT DRAWING
SHEET 23 OF 50



PIPE HYDRAULIC DATA
30" RCP-III Sta. 554+76.00

DRAINAGE AREA	=	8.4	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	28	CFS
DESIGN HW ELEVATION	=	1,003.5	FT
100 YEAR DISCHARGE	=	30	CFS
100 YEAR HW ELEVATION	=	1,003.7	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	55	CFS
OVERTOPPING ELEVATION	=	1,006.3	FT

CULVERT HYDRAULIC DATA
2 @ 5' X 6' RCBC

DESIGN DISCHARGE	=	380	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	971.5	FT
BASE DISCHARGE	=	420	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	971.8	FT
OVERTOPPING DISCHARGE	=	1,270	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	991.9	FT

3/5/2020 2:33:20 PM
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USER: Jamoore

5/14/99

Dewberry

2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PERMIT DRAWING
SHEET 24 OF 50

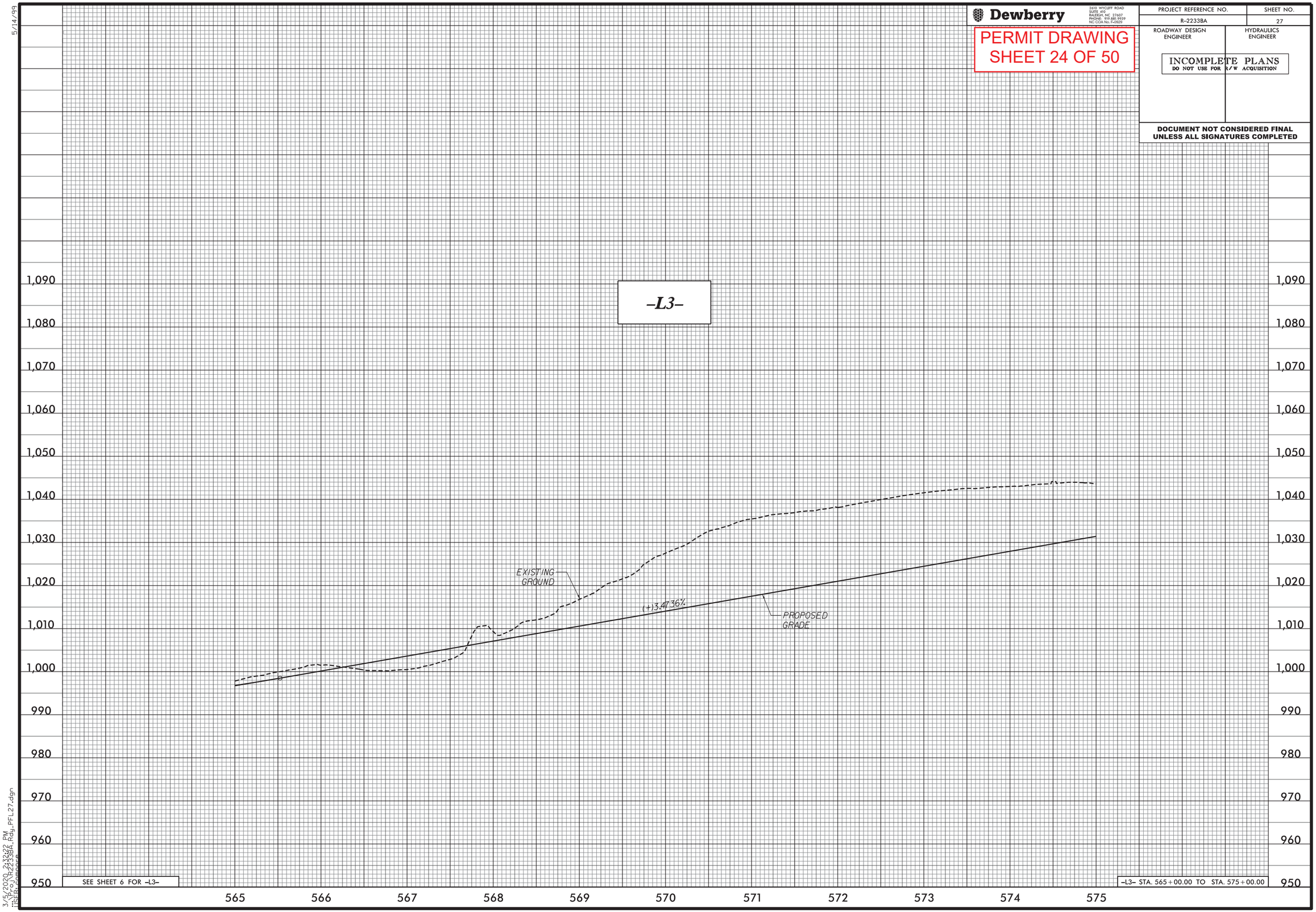
PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	27

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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USER: J.Jamison

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	28

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

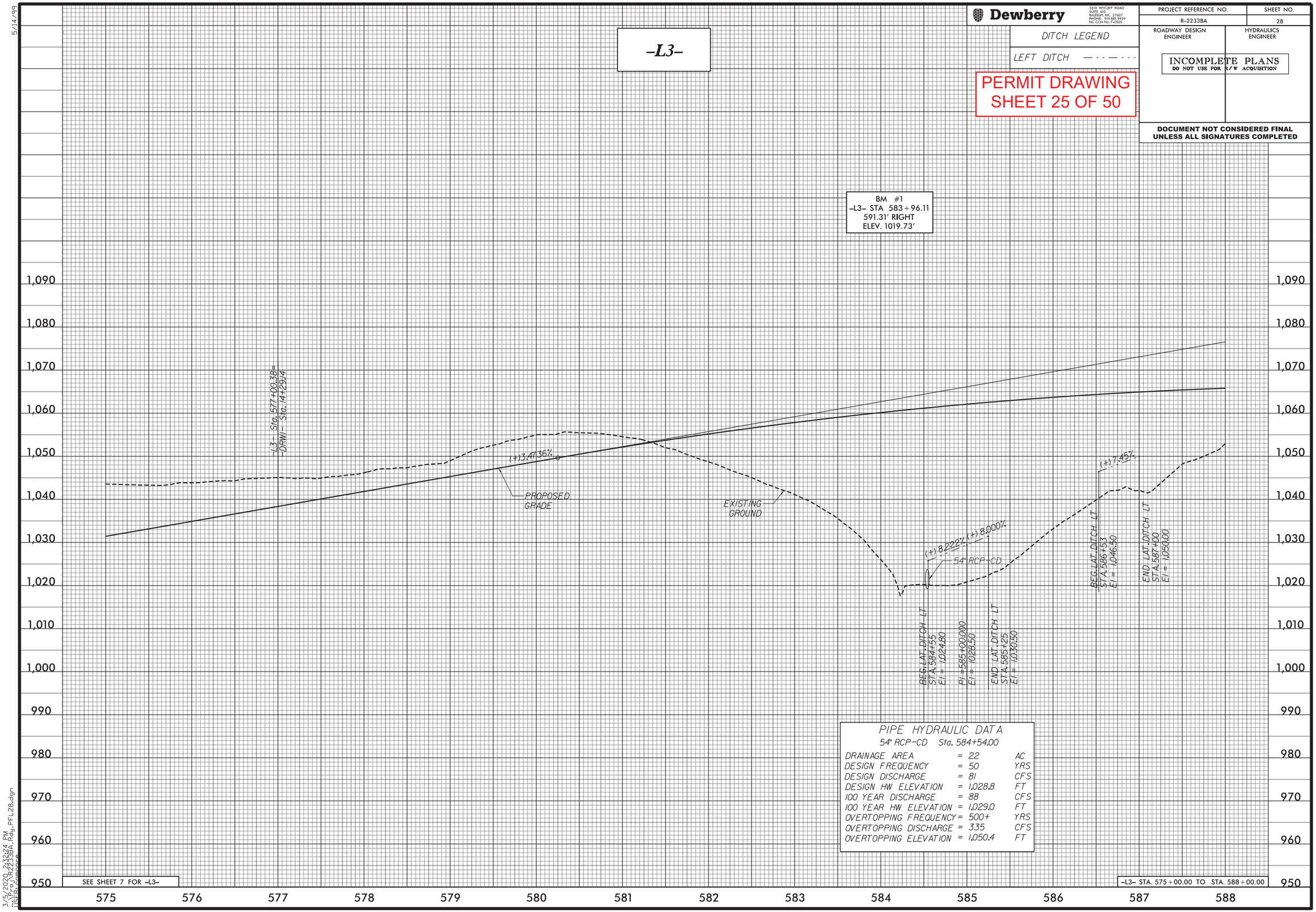
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

LEFT DITCH — - - — - - -

PERMIT DRAWING
SHEET 25 OF 50

–L3–



PIPE HYDRAULIC DATA
54" RCP-CD Sta. 584+54.00

DRAINAGE AREA	=	22	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	81	CFS
DESIGN HW ELEVATION	=	1,028.8	FT
100 YEAR DISCHARGE	=	88	CFS
100 YEAR HW ELEVATION	=	1,029.0	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	335	CFS
OVERTOPPING ELEVATION	=	1,050.4	FT

SEE SHEET 7 FOR –L3–

–L3– STA. 575+00.00 TO STA. 588+00.00

3/5/2020 2:32:24 PM
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USER: Compaq

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	29

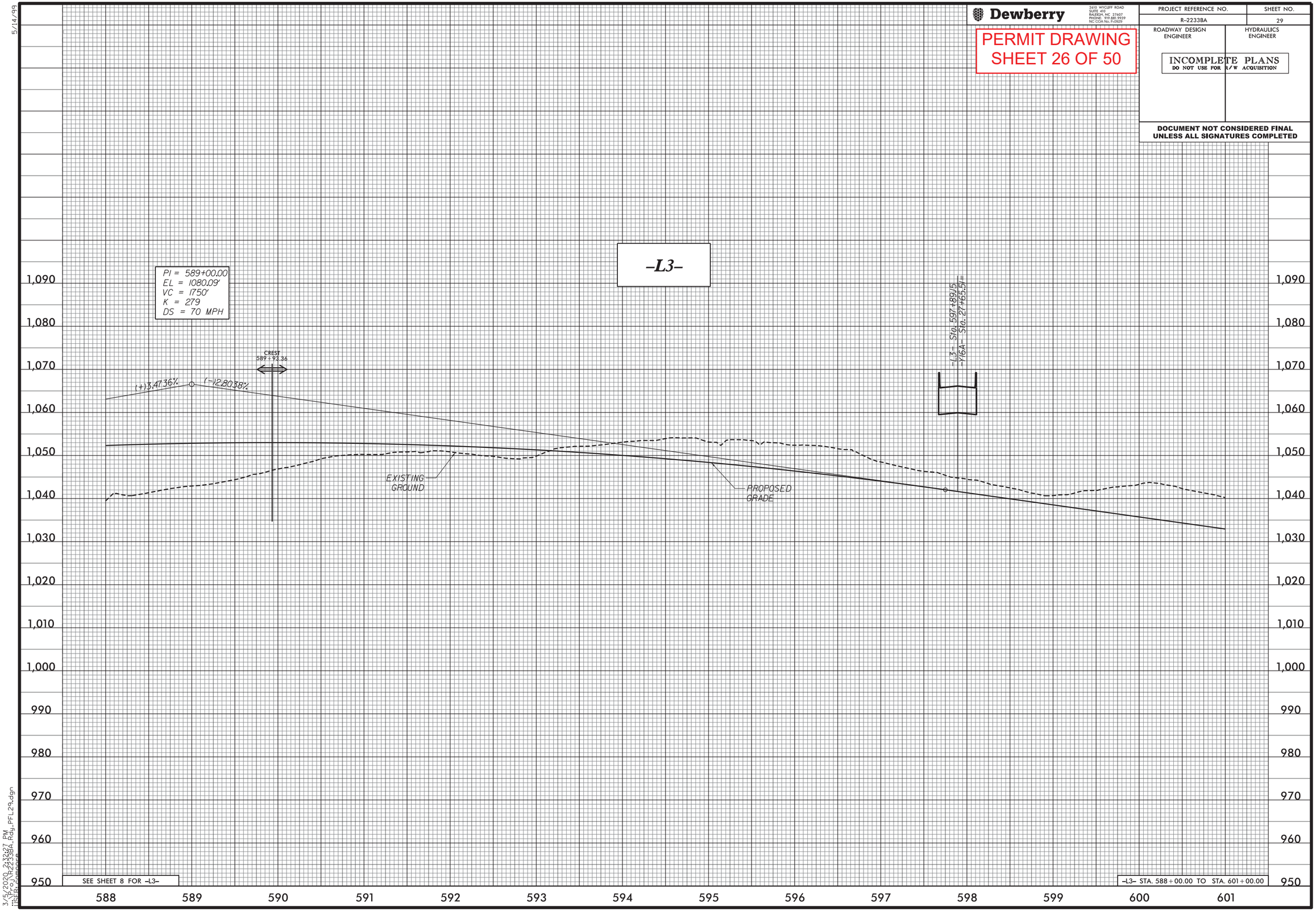
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 26 OF 50



5/14/99

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USER: Jamaya

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	30

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

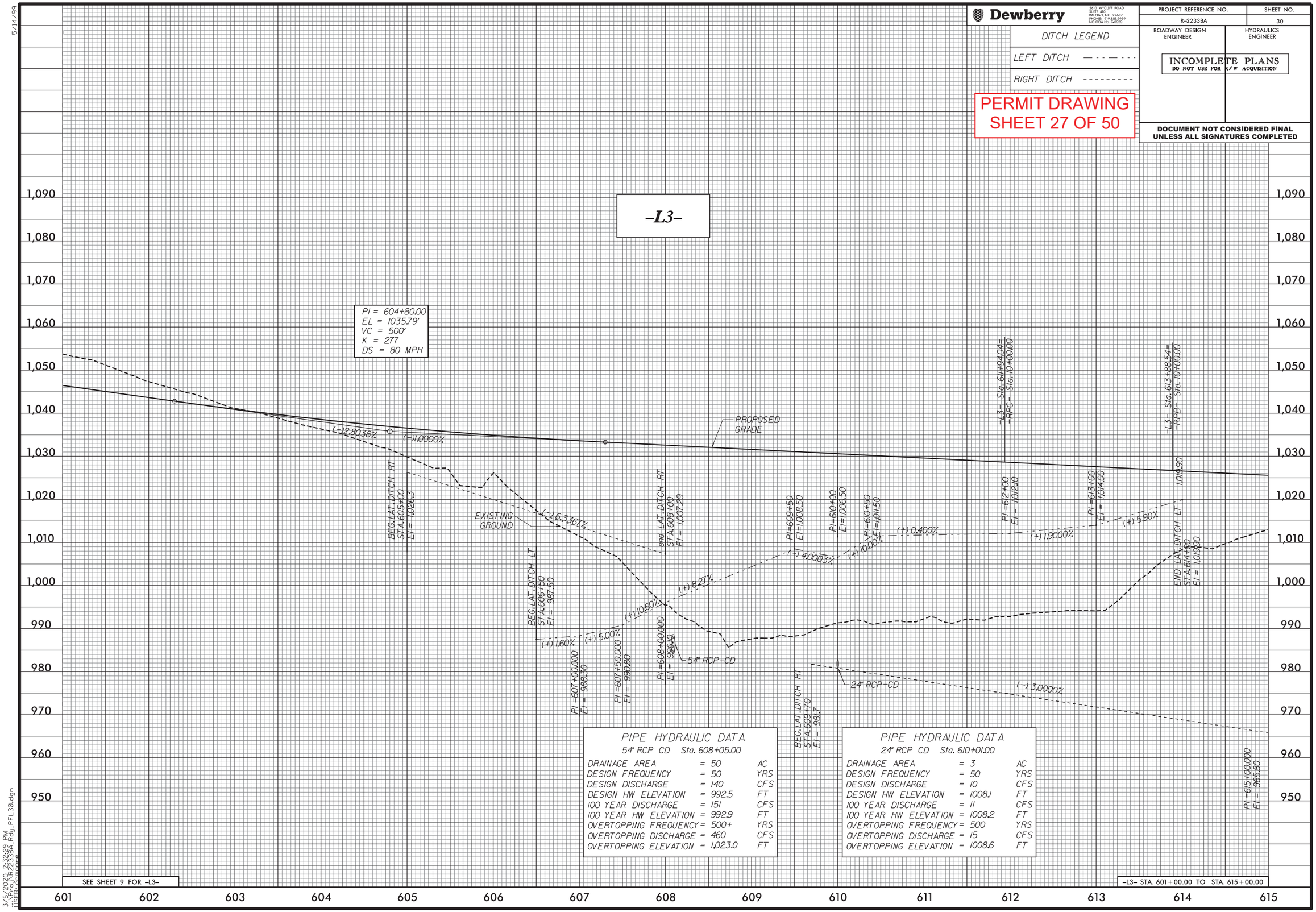
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

LEFT DITCH — · · — · · —

RIGHT DITCH - - - - - - - - -

PERMIT DRAWING
SHEET 27 OF 50



PIPE HYDRAULIC DATA
54" RCP CD Sta. 608+05.00

DRAINAGE AREA	= 50	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 140	CFS
DESIGN HW ELEVATION	= 992.5	FT
100 YEAR DISCHARGE	= 151	CFS
100 YEAR HW ELEVATION	= 992.9	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 460	CFS
OVERTOPPING ELEVATION	= 1,023.0	FT

PIPE HYDRAULIC DATA
24" RCP CD Sta. 610+01.00

DRAINAGE AREA	= 3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 10	CFS
DESIGN HW ELEVATION	= 1008.1	FT
100 YEAR DISCHARGE	= 11	CFS
100 YEAR HW ELEVATION	= 1008.2	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 15	CFS
OVERTOPPING ELEVATION	= 1008.6	FT

SEE SHEET 9 FOR -L3-

-L3- STA. 601+00.00 TO STA. 615+00.00

5/14/99
3/5/2020 2:32:23 PM
-L3-PL-R2233BA_Rdy_PFL30.dgn
USER: Jamacre

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	31

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

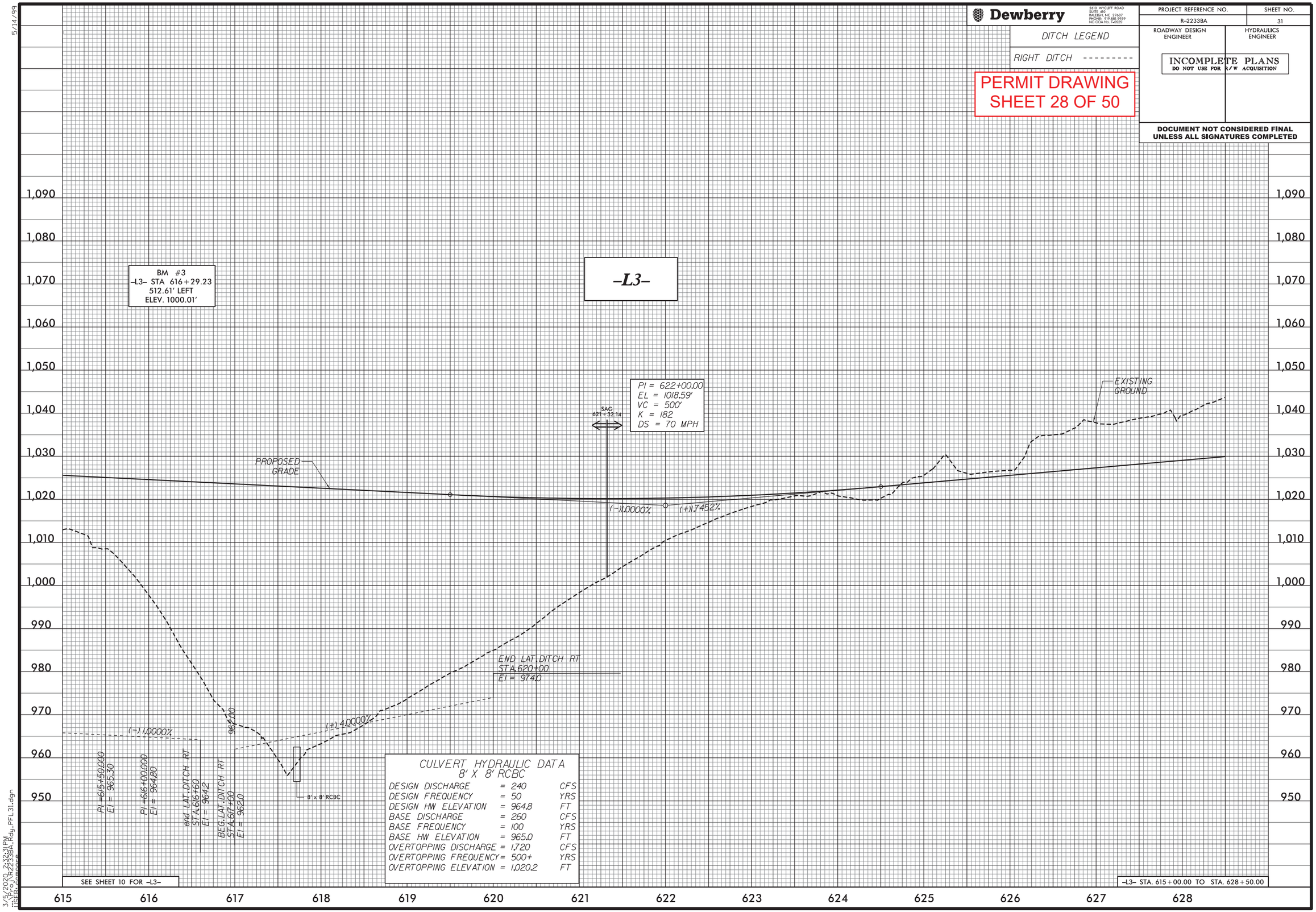
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

RIGHT DITCH ---------

PERMIT DRAWING
SHEET 28 OF 50



CULVERT HYDRAULIC DATA
8' X 8' RCBC

DESIGN DISCHARGE	=	240	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	964.8	FT
BASE DISCHARGE	=	260	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	965.0	FT
OVERTOPPING DISCHARGE	=	1,720	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	1,020.2	FT

SEE SHEET 10 FOR -L3-

-L3- STA. 615+00.00 TO STA. 628+50.00

3/5/2020 2:37:31 PM
R:\2233BA_Hydro\Hydro_Models\Hydro_PFL31.dgn
USER: Jamesca

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	32

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

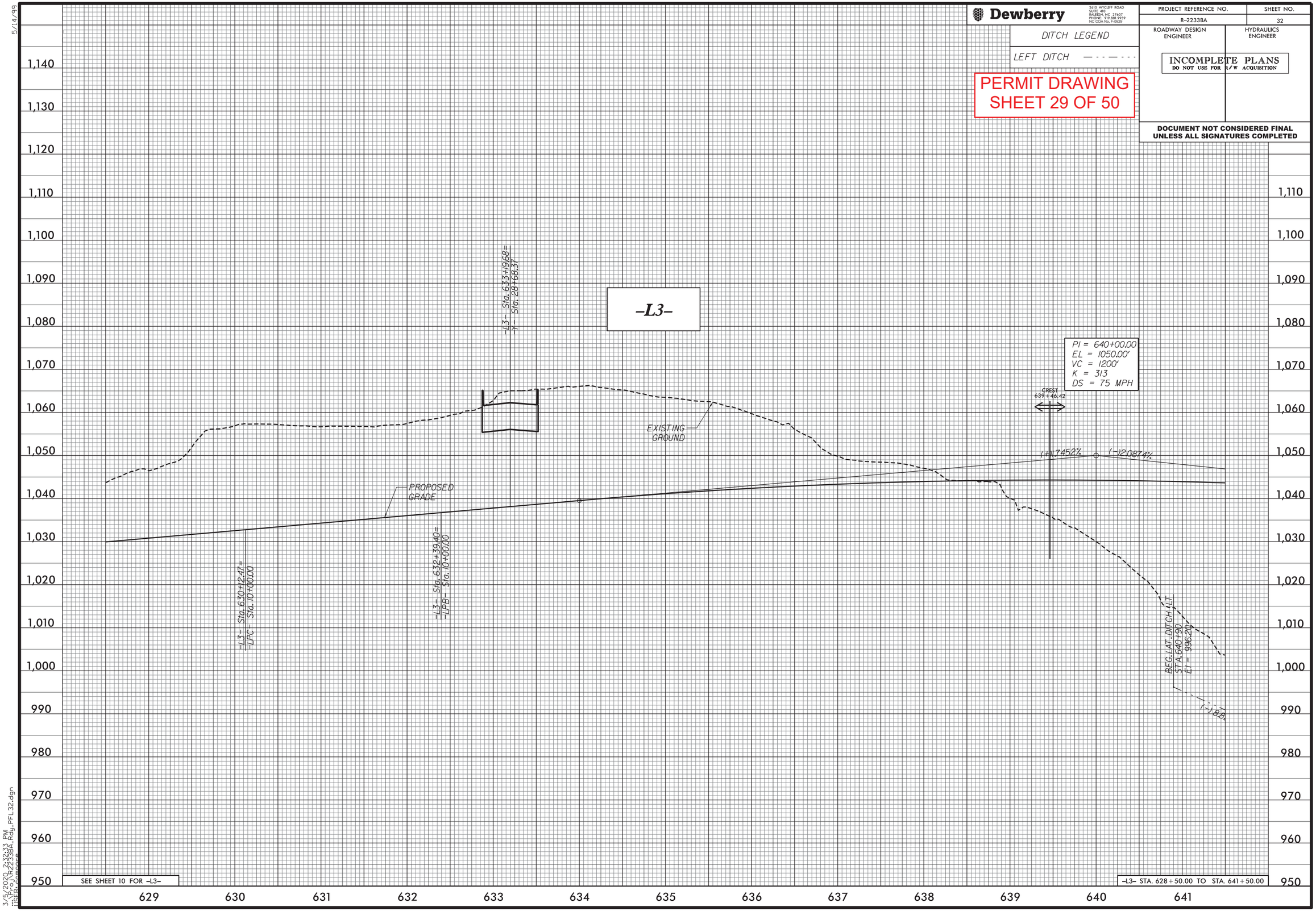
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

LEFT DITCH — - - — - - -

PERMIT DRAWING
SHEET 29 OF 50



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USER: cgonzales

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

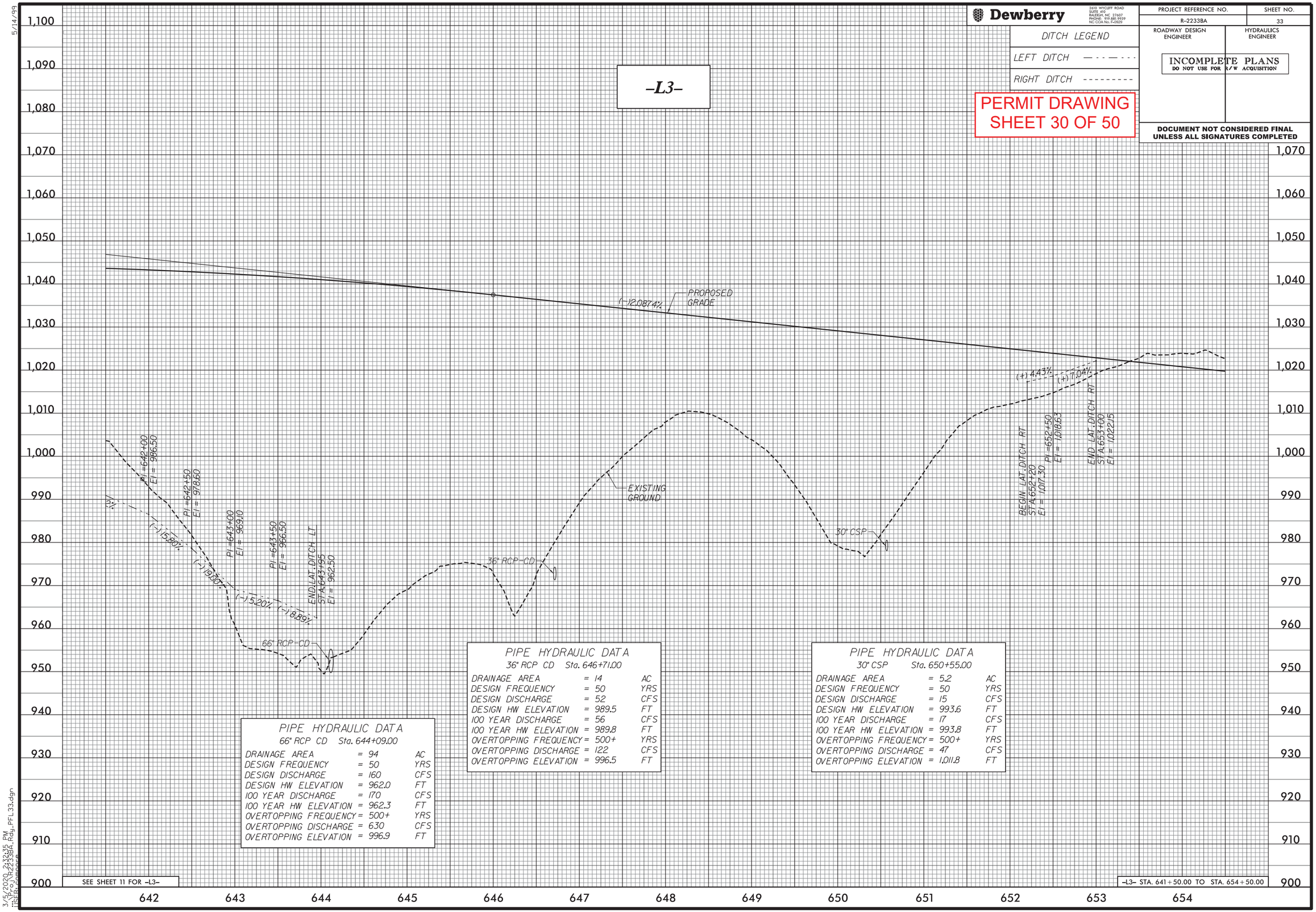
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND
LEFT DITCH — · · — · · —
RIGHT DITCH - - - - - - - - -

PERMIT DRAWING
SHEET 30 OF 50

–L3–



PIPE HYDRAULIC DATA
66" RCP CD Sta. 644+09.00

DRAINAGE AREA	= 94	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 160	CFS
DESIGN HW ELEVATION	= 962.0	FT
100 YEAR DISCHARGE	= 170	CFS
100 YEAR HW ELEVATION	= 962.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 630	CFS
OVERTOPPING ELEVATION	= 996.9	FT

PIPE HYDRAULIC DATA
36" RCP CD Sta. 646+71.00

DRAINAGE AREA	= 14	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 52	CFS
DESIGN HW ELEVATION	= 989.5	FT
100 YEAR DISCHARGE	= 56	CFS
100 YEAR HW ELEVATION	= 989.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 122	CFS
OVERTOPPING ELEVATION	= 996.5	FT

PIPE HYDRAULIC DATA
30" CSP Sta. 650+55.00

DRAINAGE AREA	= 5.2	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 15	CFS
DESIGN HW ELEVATION	= 993.6	FT
100 YEAR DISCHARGE	= 17	CFS
100 YEAR HW ELEVATION	= 993.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 47	CFS
OVERTOPPING ELEVATION	= 1,011.8	FT

SEE SHEET 11 FOR –L3–

–L3– STA. 641+50.00 TO STA. 654+50.00

3/5/2020 2:32:35 PM
R-2233BA_Rdy_PFL33.dgn
USER: Jpowell

5/14/99

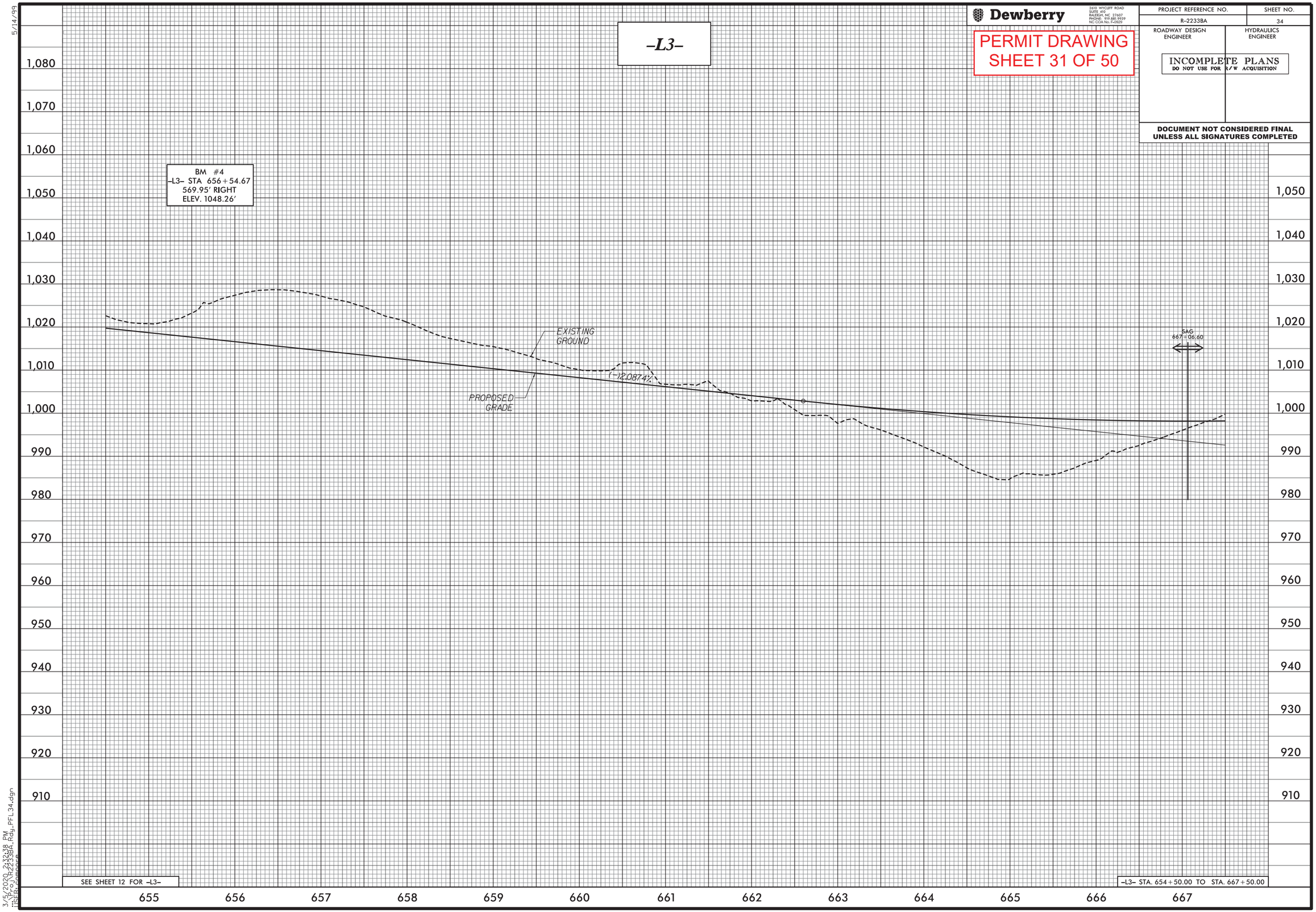
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 31 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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USER: Jamoore

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

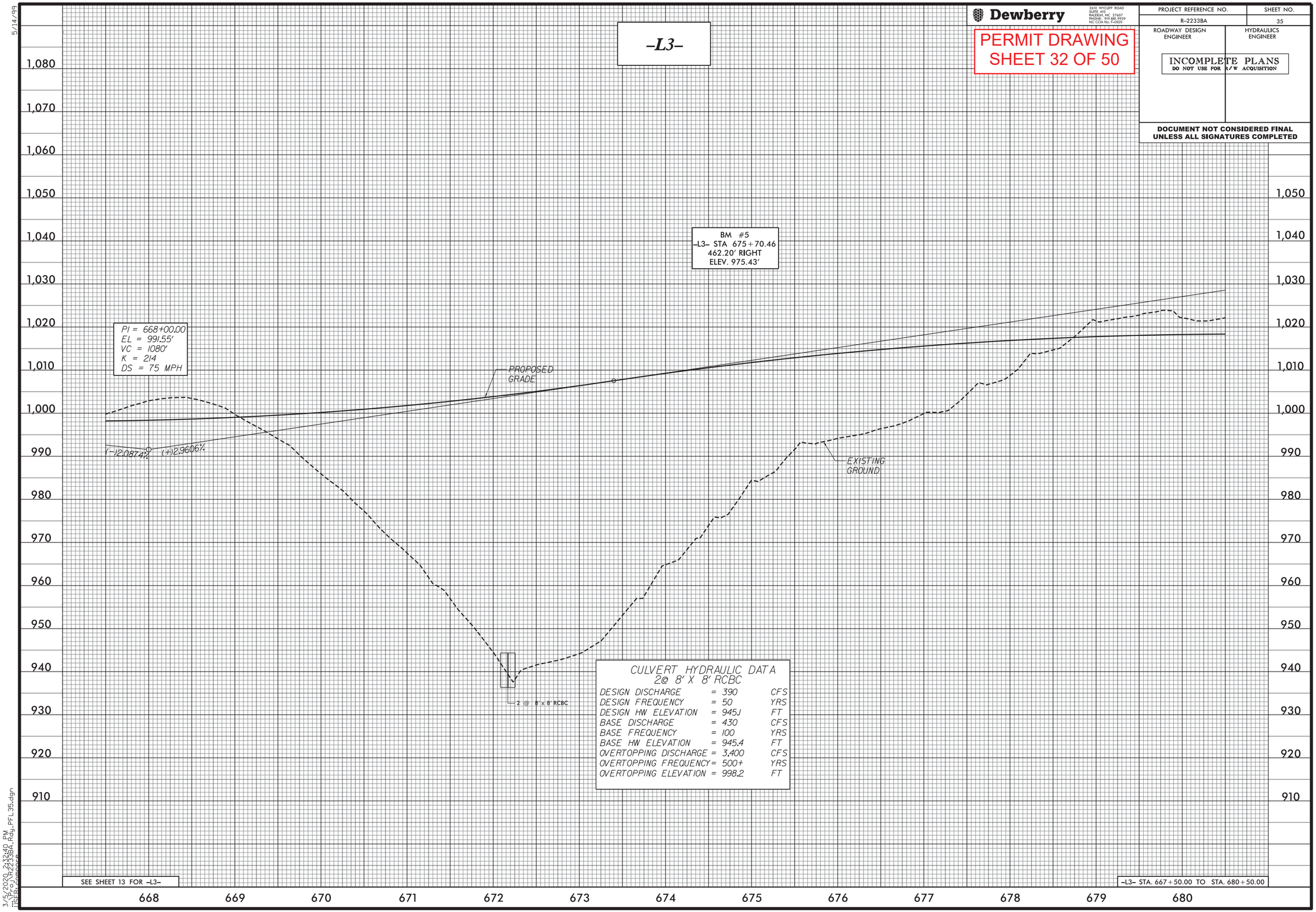
PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 32 OF 50

-L3-



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USER: Jamoore

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

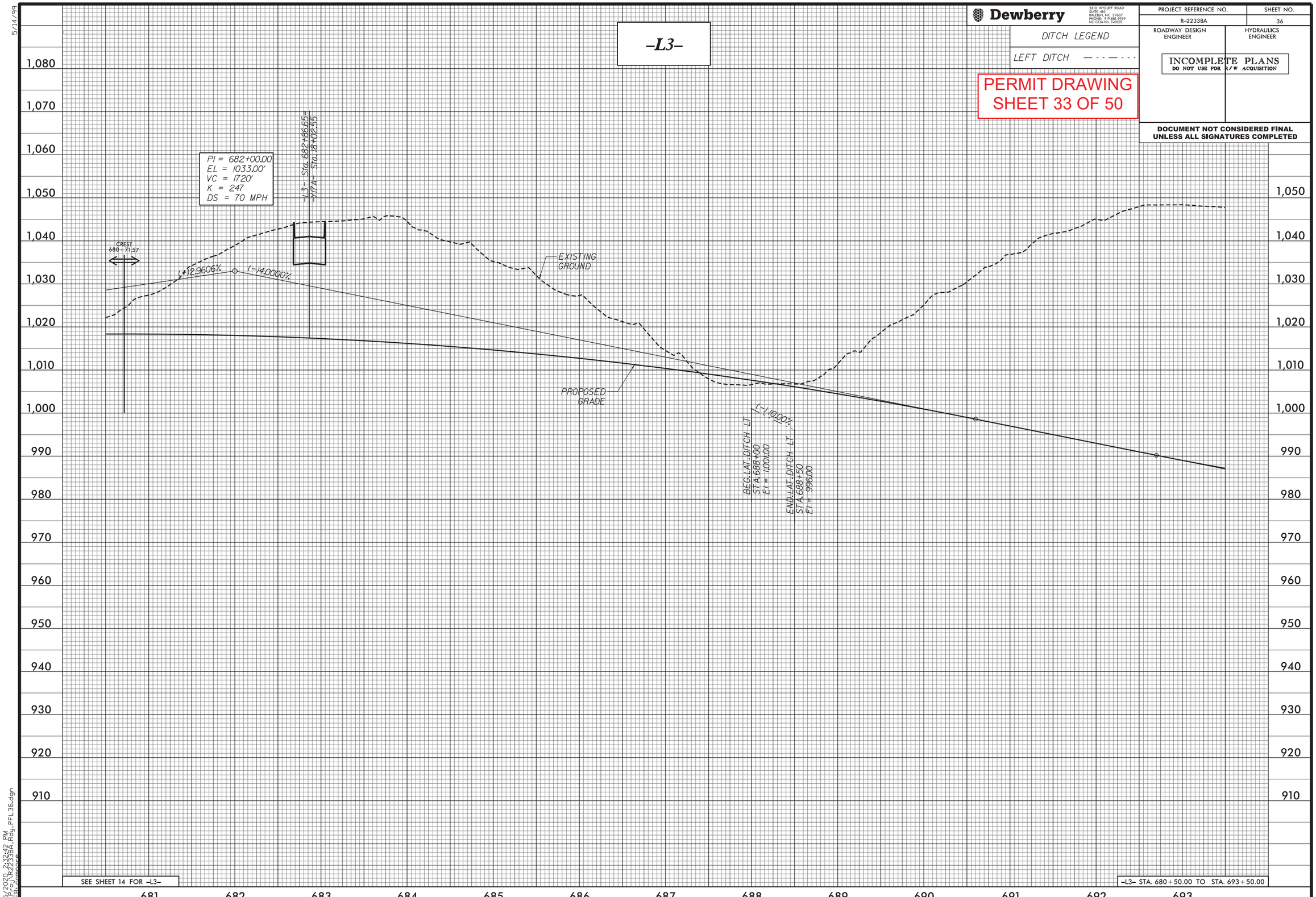
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

LEFT DITCH — - - — - - -

PERMIT DRAWING
SHEET 33 OF 50



SEE SHEET 14 FOR -L3-

-L3- STA. 680+50.00 TO STA. 693+50.00

3/5/2020 2:37:42 PM
R-2233BA_Rdy_PFL36.dgn
USER: Samaras

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

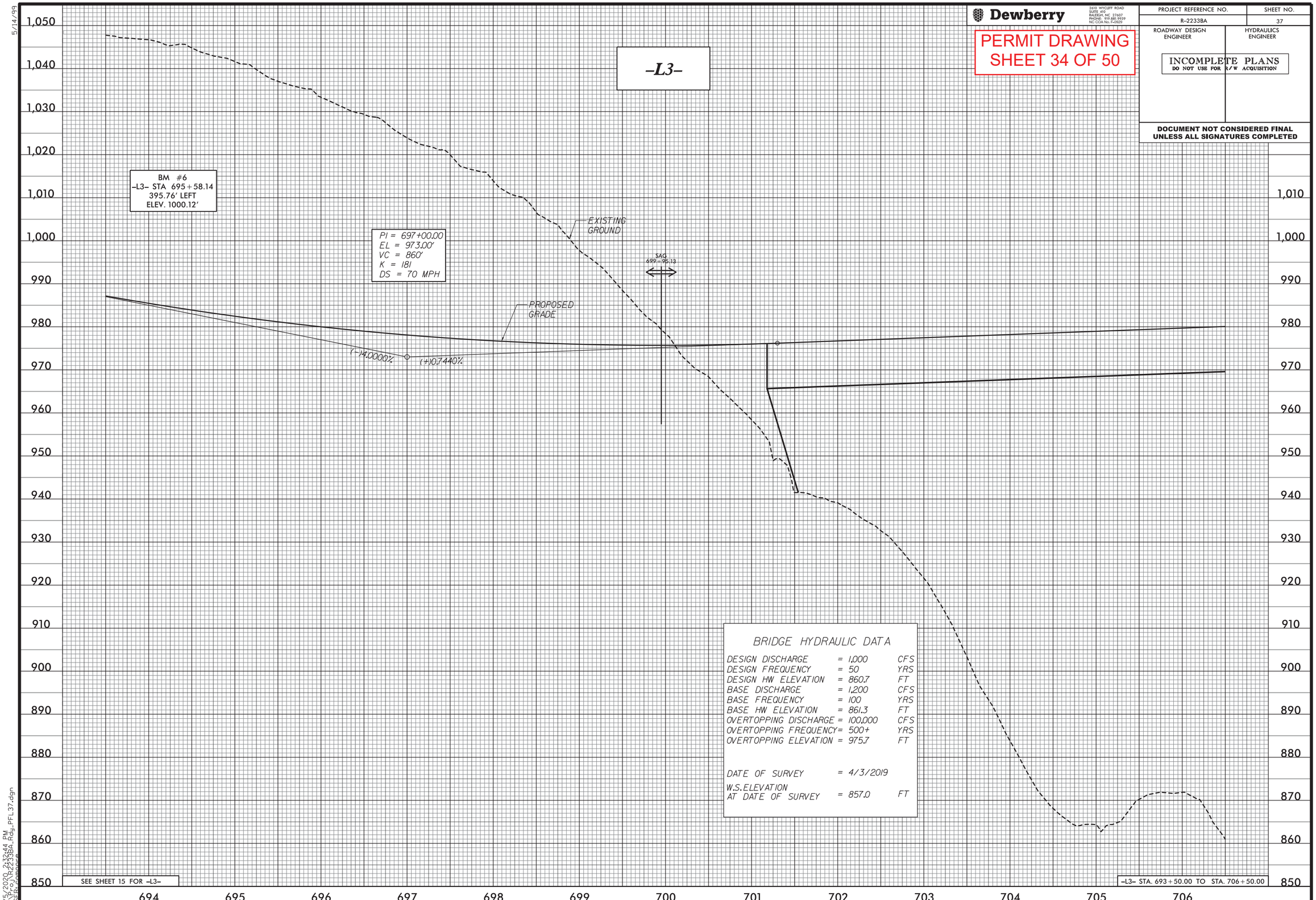
PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	37
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 34 OF 50

-L3-



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1,000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 860.7	FT
BASE DISCHARGE	= 1,200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 861.3	FT
OVERTOPPING DISCHARGE	= 100,000	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 975.7	FT
DATE OF SURVEY	= 4/3/2019	
W.S. ELEVATION AT DATE OF SURVEY	= 857.0	FT

SEE SHEET 15 FOR -L3-

-L3- STA. 693+50.00 TO STA. 706+50.00

3/5/2020 2:32:44 PM
-L3-PFL 37 R-2233BA_Rdy_PFL 37.dgn
USER: Jcamacho

5/14/99

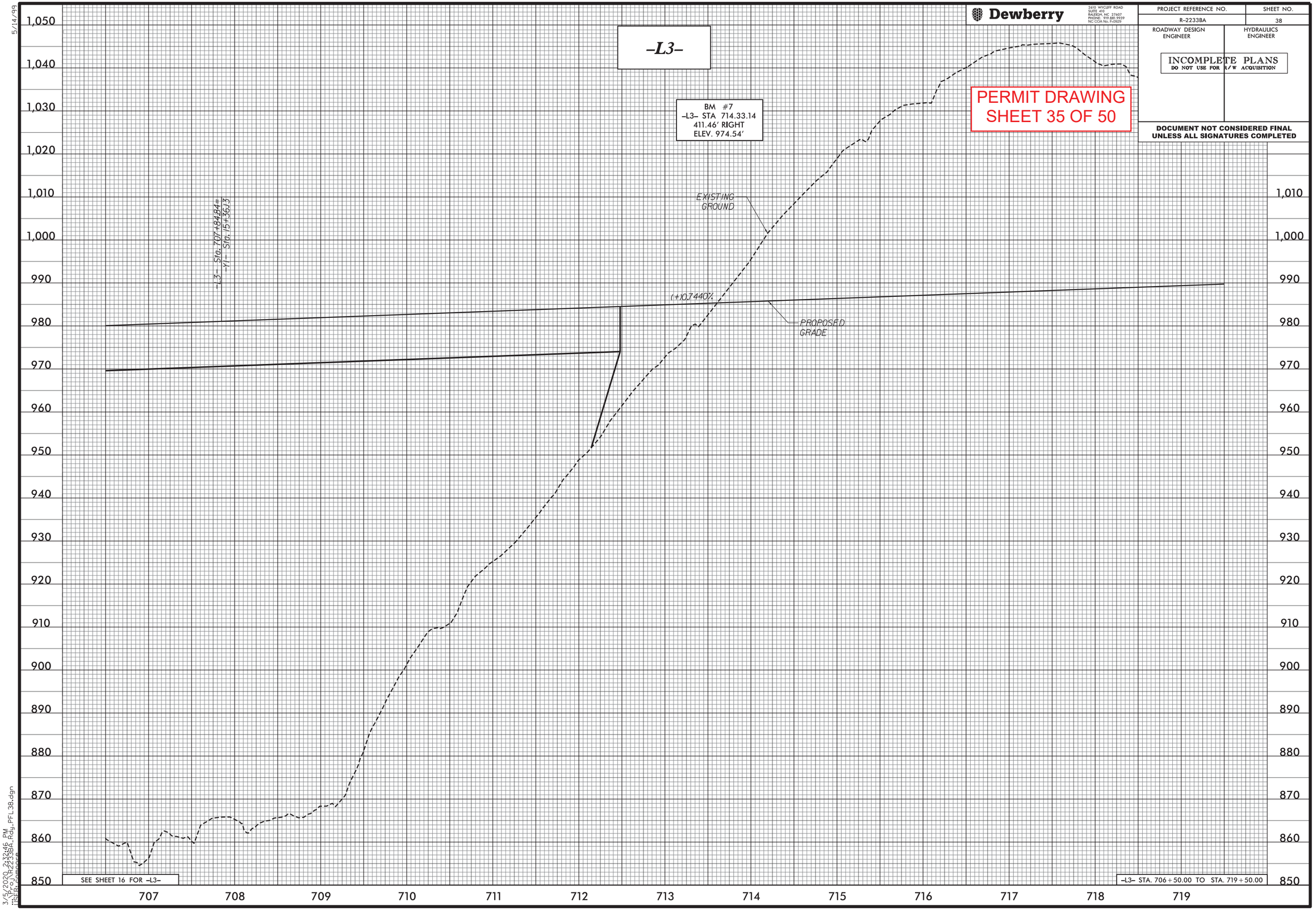
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	38
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 35 OF 50



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USER: Jamoore

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919-881-9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	39

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

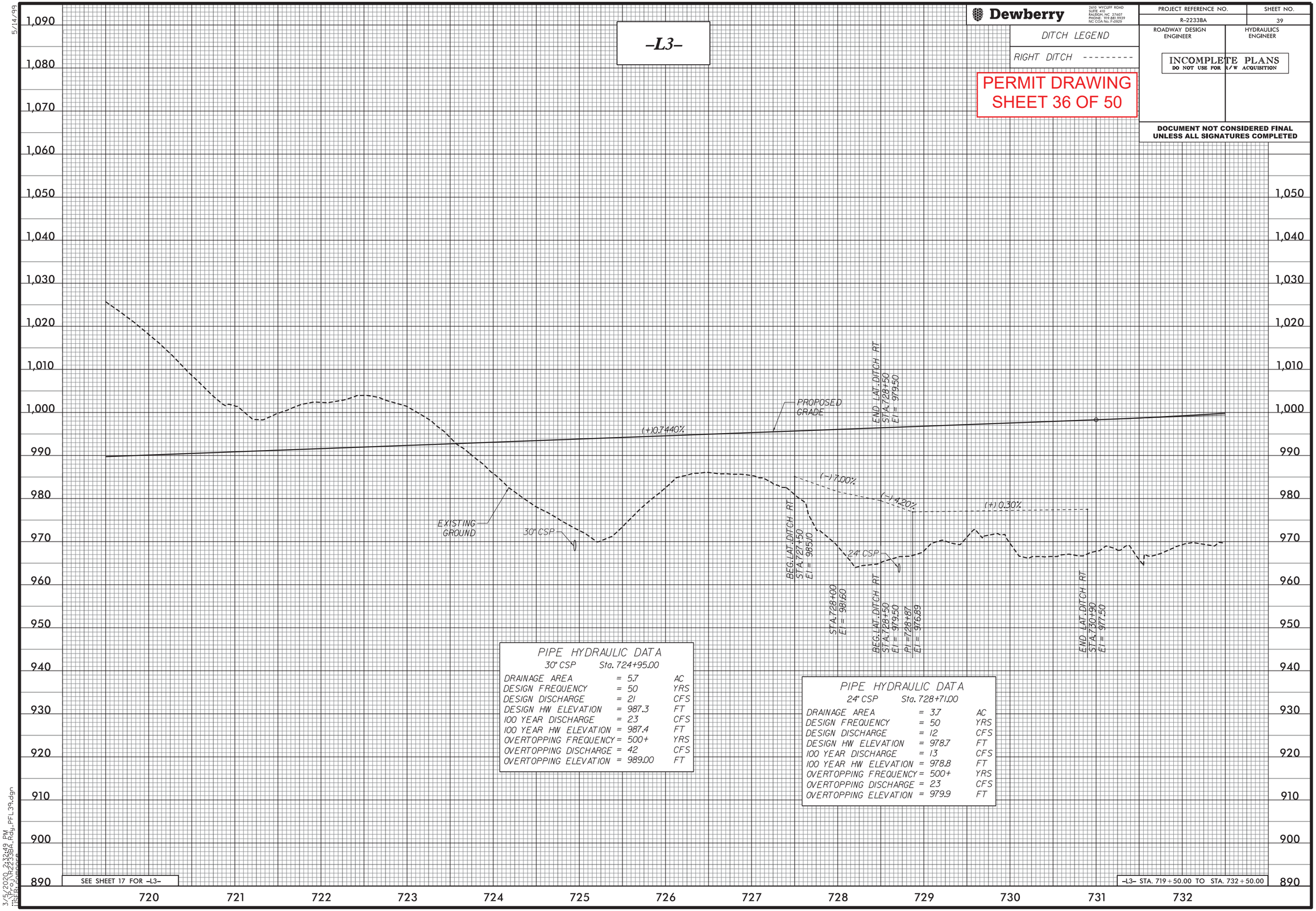
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

RIGHT DITCH ---------

PERMIT DRAWING
SHEET 36 OF 50



PIPE HYDRAULIC DATA
30" CSP Sta. 724+95.00

DRAINAGE AREA	= 5.7	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 21	CFS
DESIGN HW ELEVATION	= 987.3	FT
100 YEAR DISCHARGE	= 23	CFS
100 YEAR HW ELEVATION	= 987.4	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 42	CFS
OVERTOPPING ELEVATION	= 989.00	FT

PIPE HYDRAULIC DATA
24" CSP Sta. 728+71.00

DRAINAGE AREA	= 3.7	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 12	CFS
DESIGN HW ELEVATION	= 978.7	FT
100 YEAR DISCHARGE	= 13	CFS
100 YEAR HW ELEVATION	= 978.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 23	CFS
OVERTOPPING ELEVATION	= 979.9	FT

3/5/2020 2:33:48 PM
USER: Jamoore

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	40

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

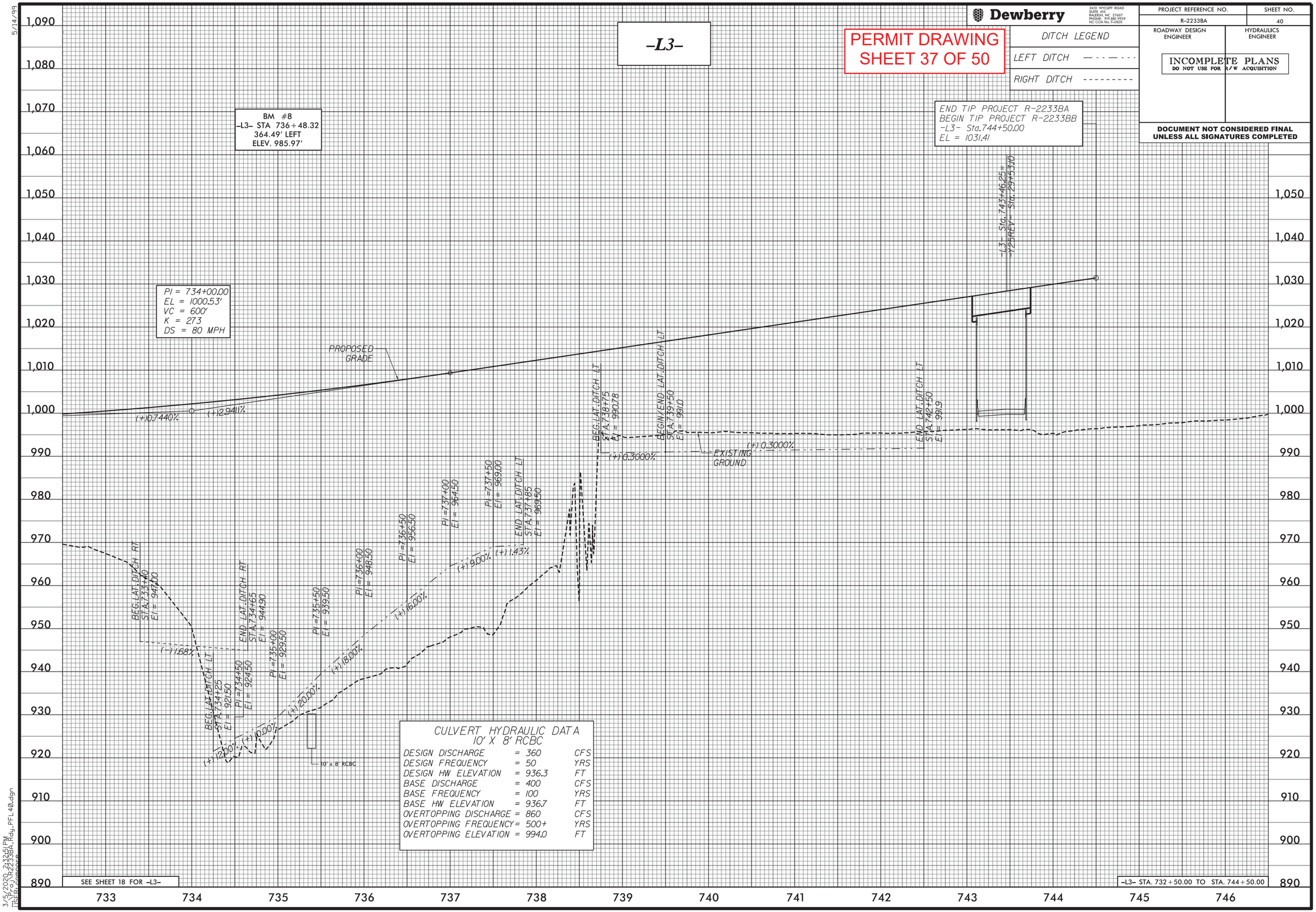
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 37 OF 50

DITCH LEGEND

LEFT DITCH — · · — · · —

RIGHT DITCH - - - - - - - - -



CULVERT HYDRAULIC DATA
10' X 8' RCBC

DESIGN DISCHARGE	=	360	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	936.3	FT
BASE DISCHARGE	=	400	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	936.7	FT
OVERTOPPING DISCHARGE	=	860	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	994.0	FT

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USER: Jcampos

5/28/99

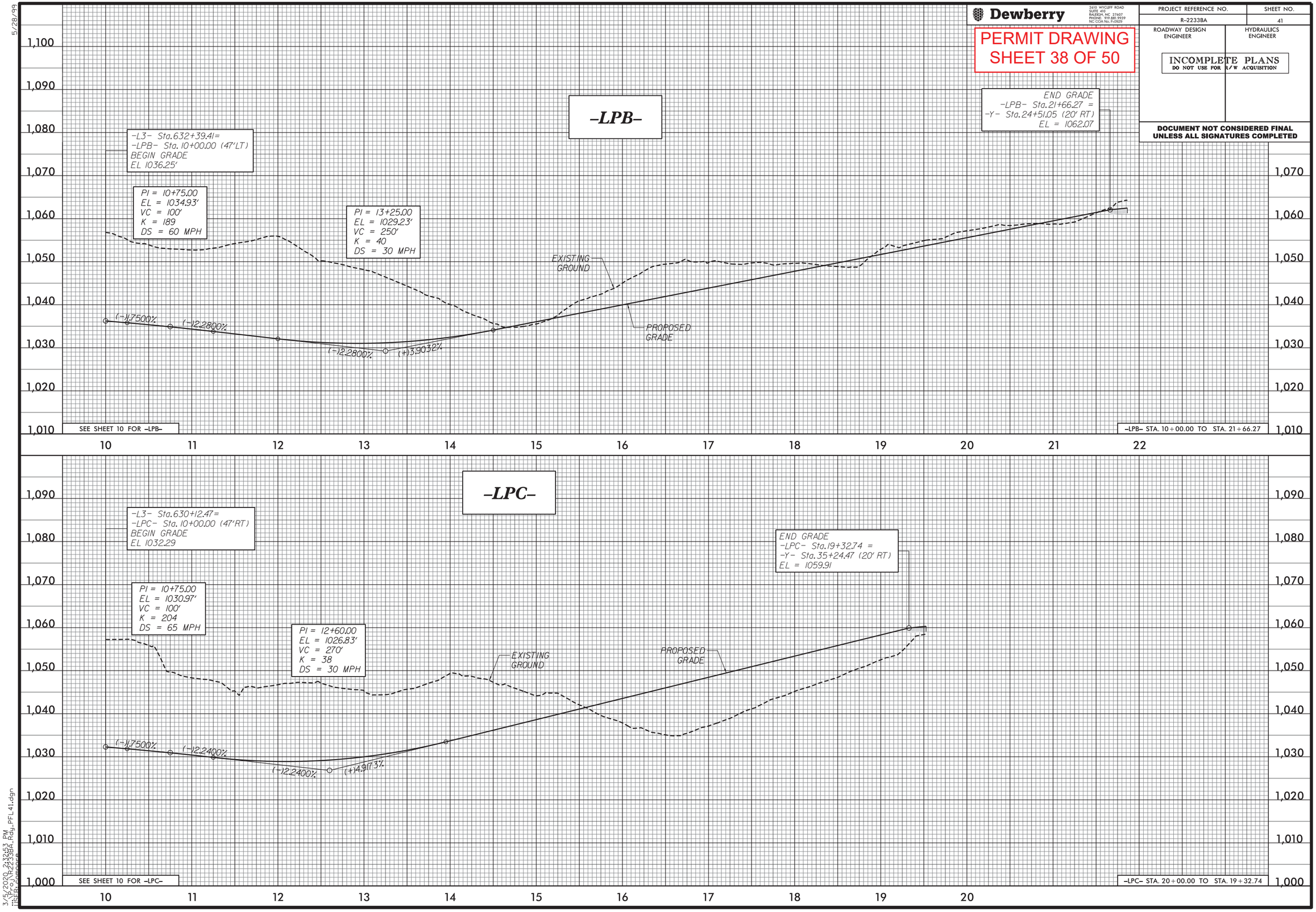
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	41
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 38 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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USER: Jongrace

5/14/99

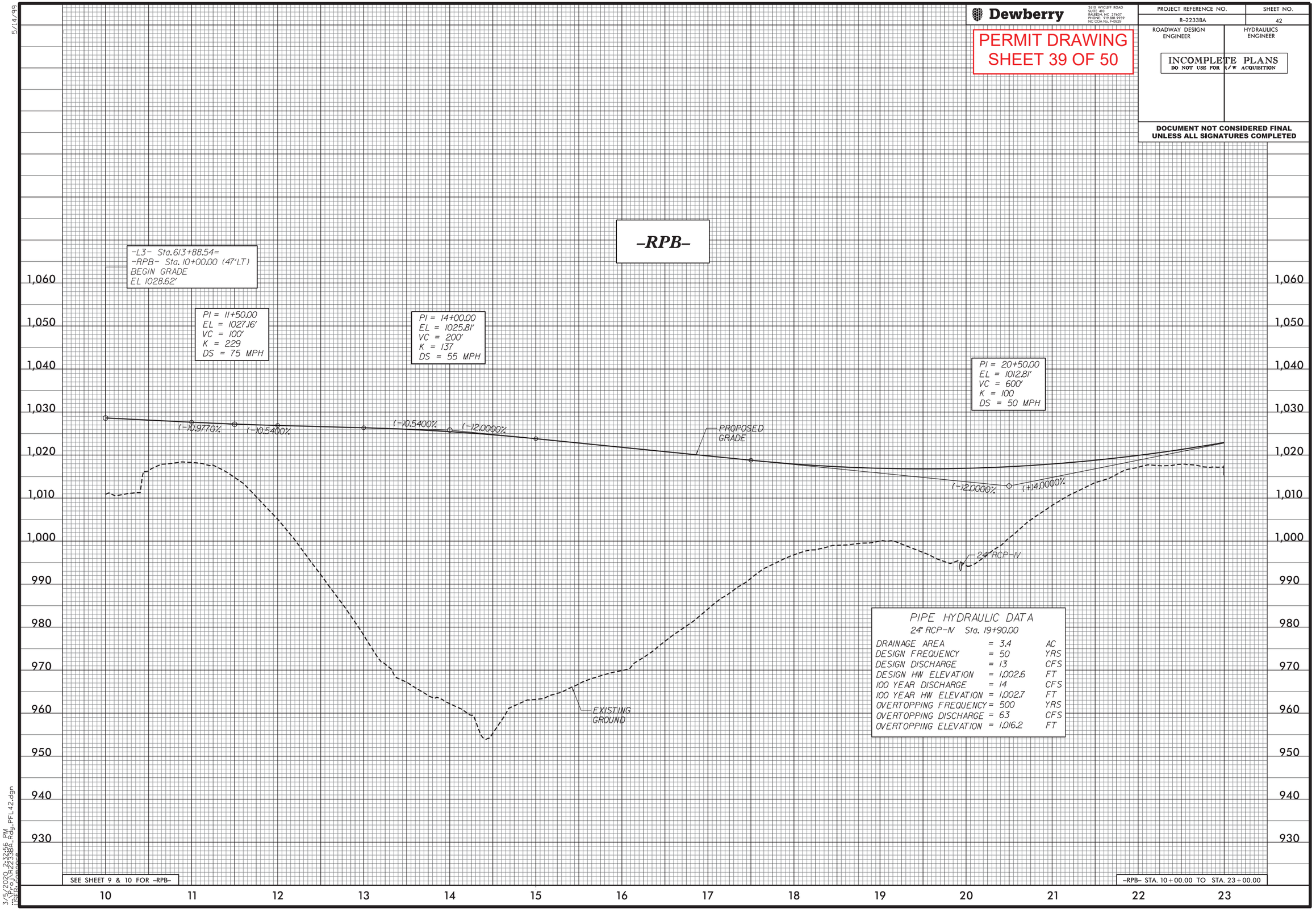
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PERMIT DRAWING
SHEET 39 OF 50

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	42
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PIPE HYDRAULIC DATA
24" RCP-IV Sta. 19+90.00

DRAINAGE AREA	=	3.4	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	13	CFS
DESIGN HW ELEVATION	=	1,002.6	FT
100 YEAR DISCHARGE	=	14	CFS
100 YEAR HW ELEVATION	=	1,002.7	FT
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING DISCHARGE	=	63	CFS
OVERTOPPING ELEVATION	=	1,016.2	FT

SEE SHEET 9 & 10 FOR -RPB-

-RPB- STA. 10+00.00 TO STA. 23+00.00

3/5/2020 2:32:55 PM
R:\Roadway\Proj\2233BA_Rdy_PFL42.dgn
USER: jamacce

5/14/99

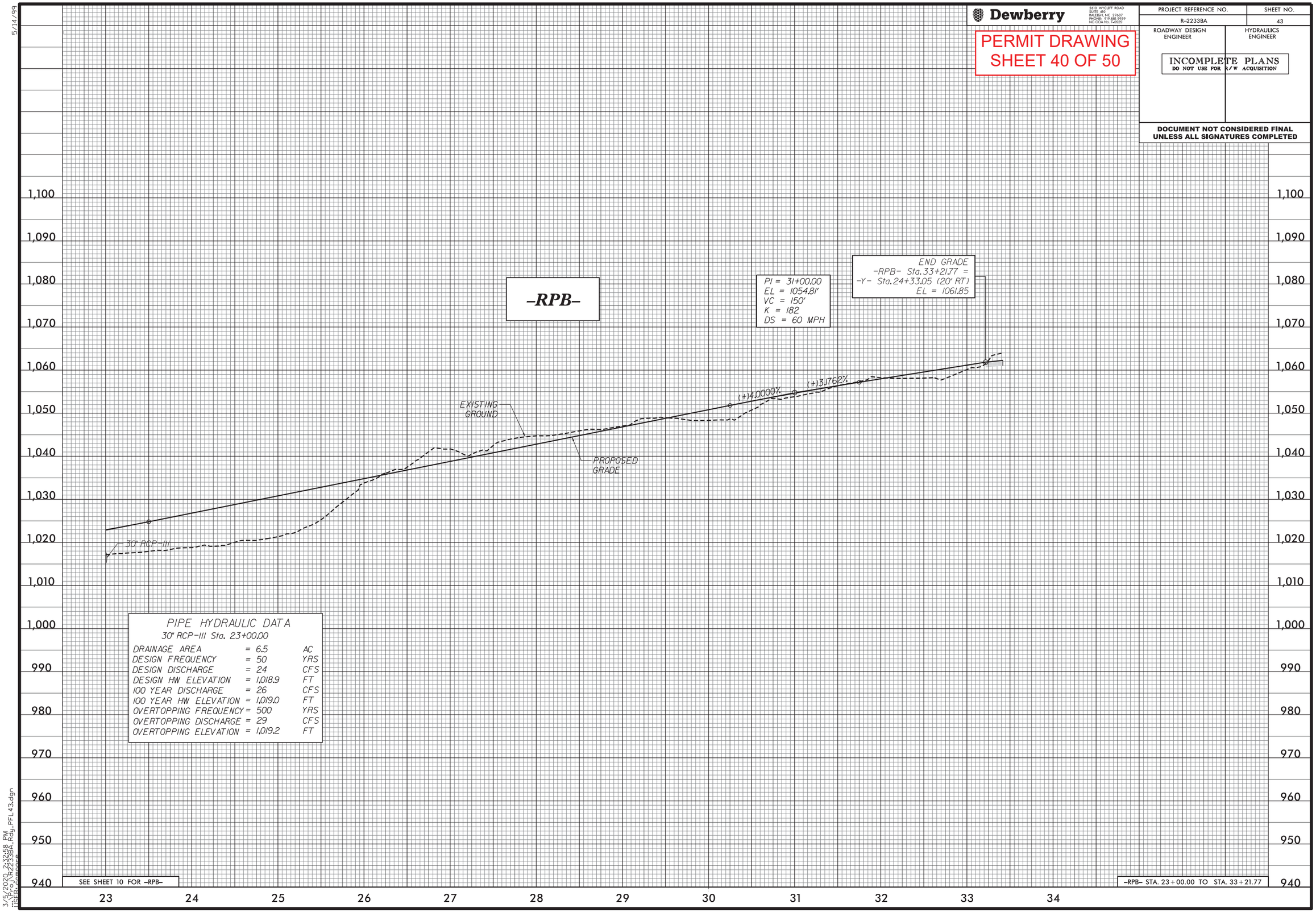
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 40 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



PIPE HYDRAULIC DATA
30" RCP-III Sta. 23+00.00

DRAINAGE AREA	=	6.5	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	24	CFS
DESIGN HW ELEVATION	=	1,018.9	FT
100 YEAR DISCHARGE	=	26	CFS
100 YEAR HW ELEVATION	=	1,019.0	FT
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING DISCHARGE	=	29	CFS
OVERTOPPING ELEVATION	=	1,019.2	FT

SEE SHEET 10 FOR -RPB-

-RPB- STA. 23+00.00 TO STA. 33+21.77

3/5/2020 2:32:58 PM
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USER: Jamoore

5/14/99

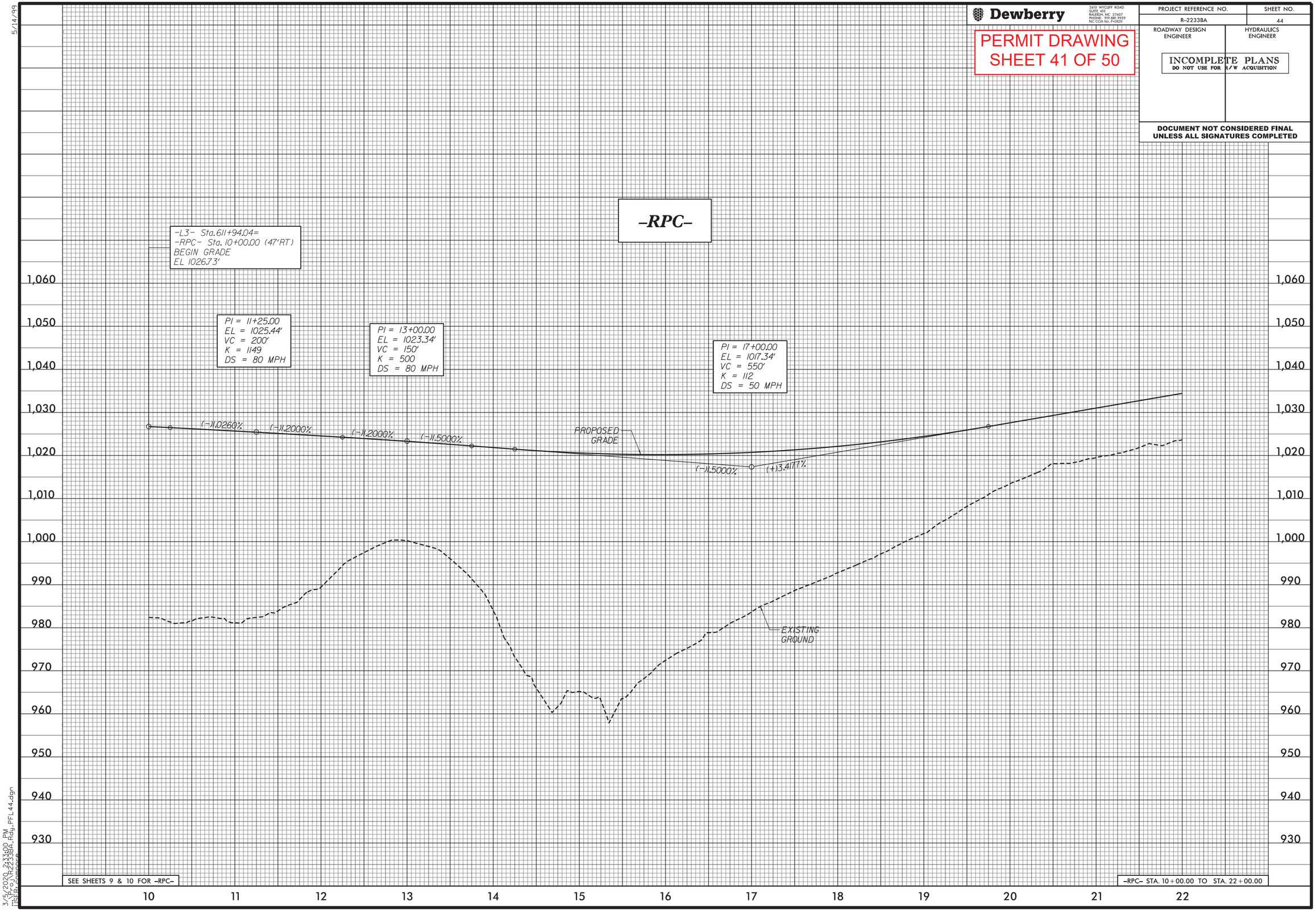
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 41 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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USER: Jamoore

5/28/99

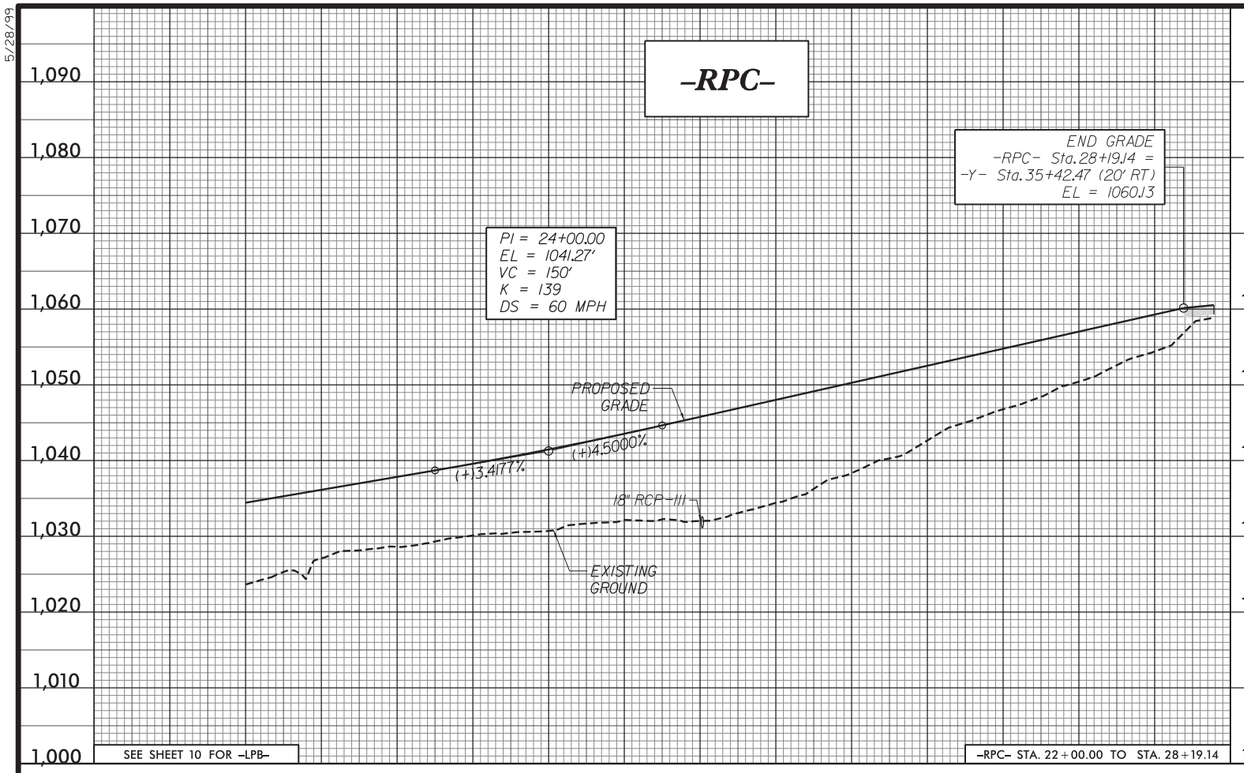
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0029

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	45
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

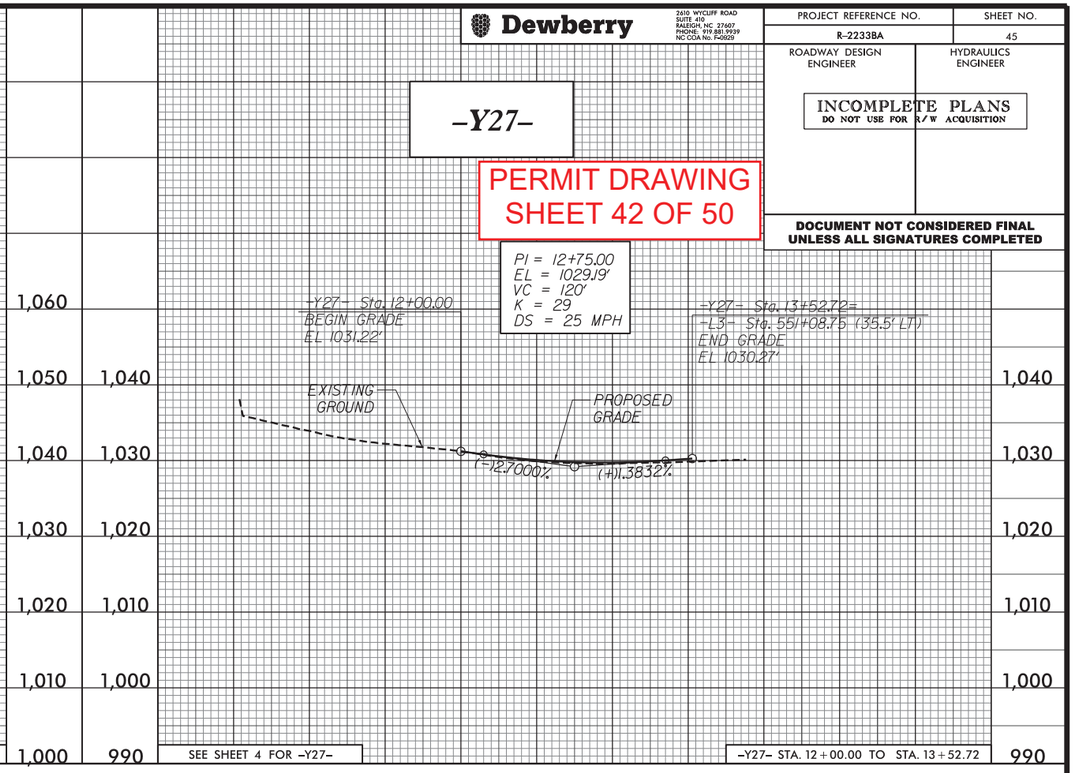
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 42 OF 50



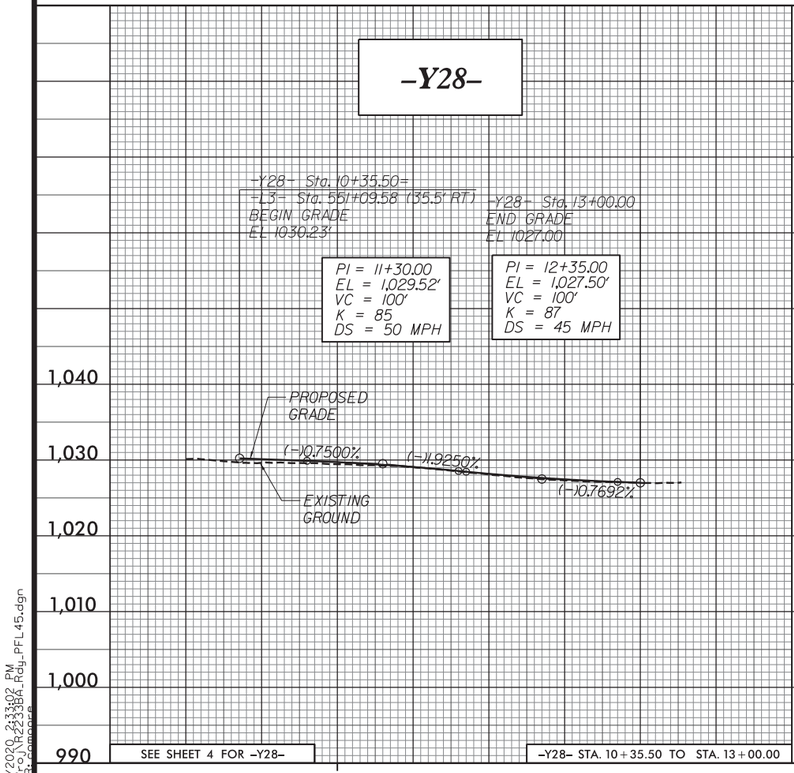
SEE SHEET 10 FOR -LPB-

-RPC- STA. 22+00.00 TO STA. 28+19.14



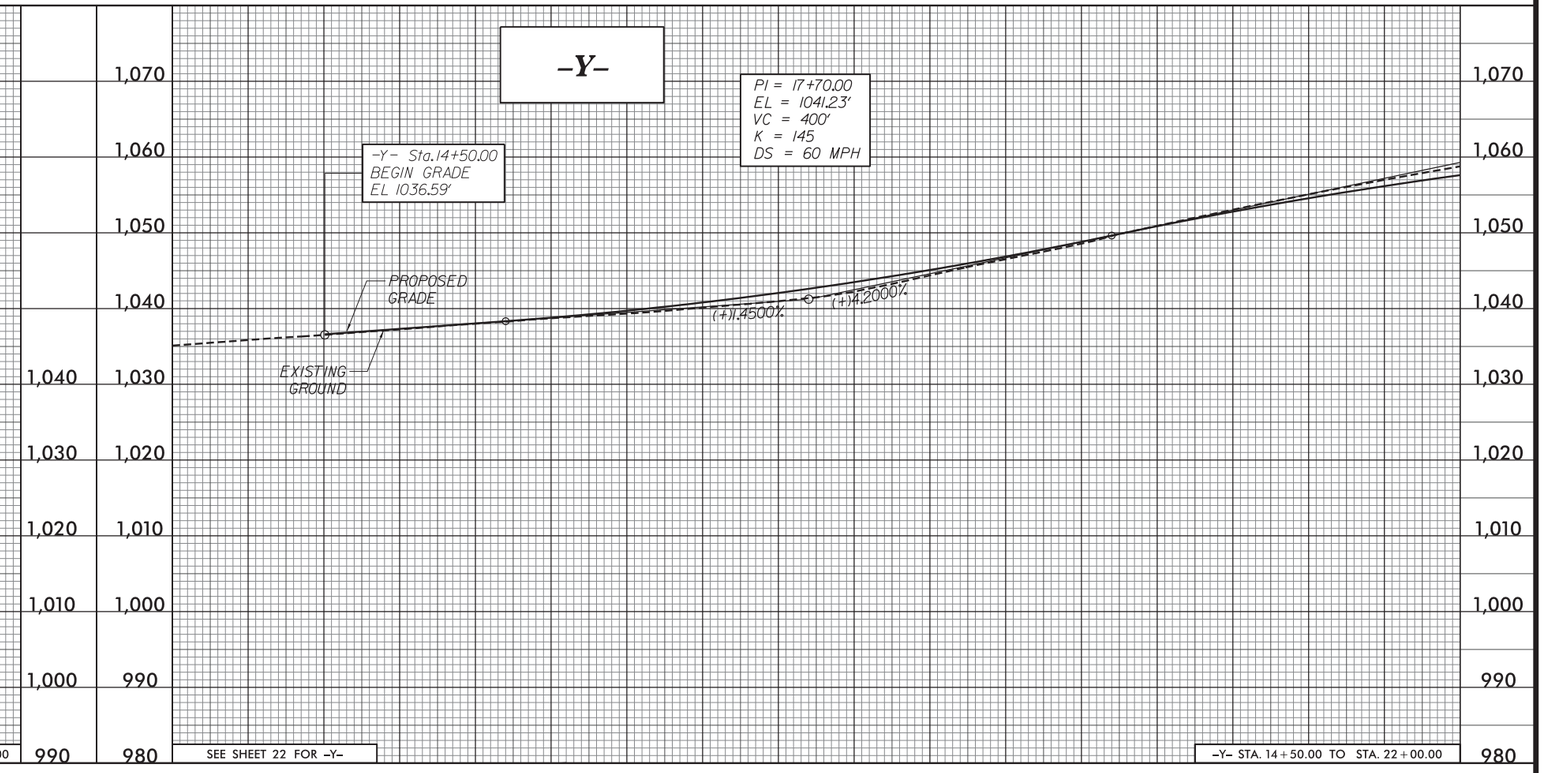
SEE SHEET 4 FOR -Y27-

-Y27- STA. 12+00.00 TO STA. 13+52.72



SEE SHEET 4 FOR -Y28-

-Y28- STA. 10+35.50 TO STA. 13+00.00



SEE SHEET 22 FOR -Y-

-Y- STA. 14+50.00 TO STA. 22+00.00

3/5/2020 2:33:02 PM
R-2233BA_Rdy_PFL45.dgn
USER: jcordero

5/28/99

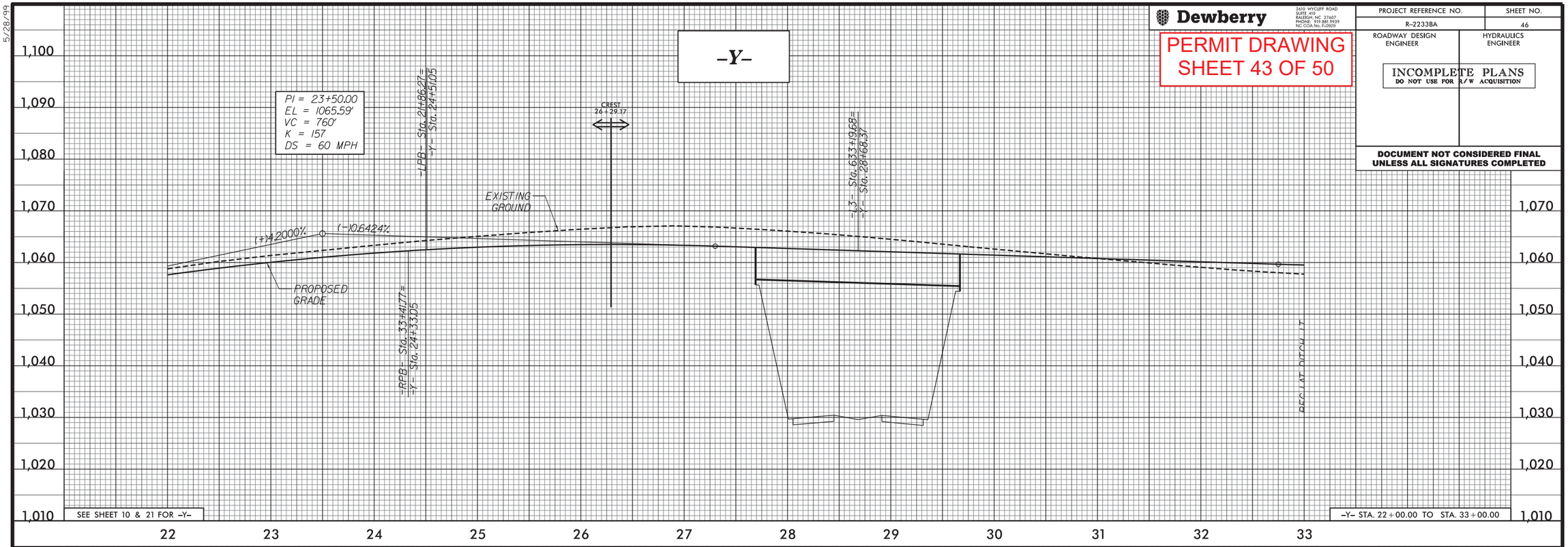
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

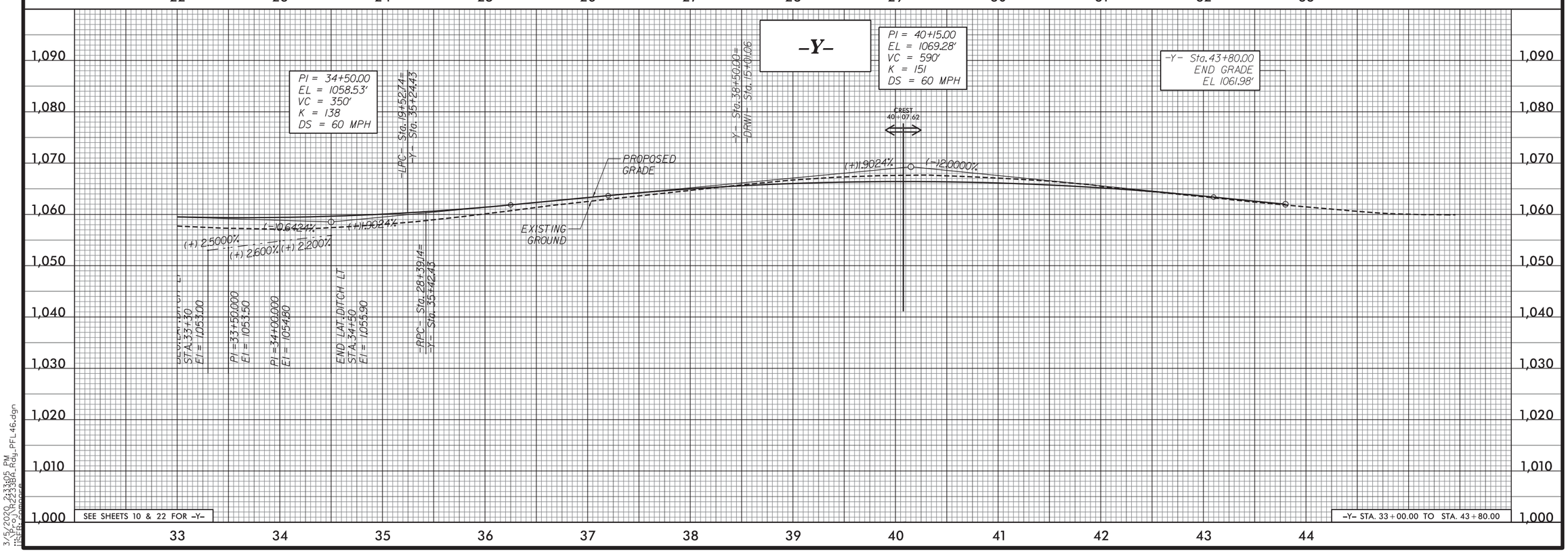
PERMIT DRAWING
SHEET 43 OF 50

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	46
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





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USER: Jonnace

5/28/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	47

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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PERMIT DRAWING
SHEET 44 OF 50

DITCH LEGEND

LEFT DITCH — · · — · · —

RIGHT DITCH - - - - - - - - -

-Y16A-

PI = 15+40.00
EL = 107.3.28'
VC = 200'
K = 720
DS = 80 MPH

-Y16A- Sta. 12+35.00
BEGIN GRADE
EL 1070.85'

(+)0.7976%

(+)0.5200%

PROPOSED GRADE

EXISTING GROUND

BEG. LAT. DITCH LT
STA. 22+40
EI = 1.05.00

BEG. LAT. DITCH RT
STA. 22+00
EI = 1.038.00

END LAT. DITCH RT
STA. 22+40
EI = 1.034.50

(-) 1.03%

PI = 23+00.000
EI = 1.046.50

END LAT. DITCH LT
STA. 23+50
EI = 1.045.50

(-) 2.00000%

(-) 8.75%

PI = 22+50.000
EI = 1.047.50

(-) 3.33%

(-) 0.35%

PI=STA. 23+00
EI = 1.032.50

SEE SHEETS 19 & 8 FOR -Y16A-

-Y16A- STA. 12+35.00 TO STA. 24+50.00

1,110 1,100 1,090 1,080 1,070 1,060 1,050 1,040 1,030 1,020

11 12 13 14 15 16 17 18 19 20 21 22 23 24

-Y16A-

PI = 33+30.00
EL = 1082.59'
VC = 500'
K = 608
DS = 80 MPH

-Y16A- Sta. 35+75.00
END GRADE
EL 1081.85'

-Y16A- Sta. 37+50.00
END MILL AND OVERLAY
EL 1081.32'

-Y16A- Sta. 27+65.51=
-L3- Sta. 5.97+89.15

PROPOSED GRADE

(+)0.5200%

(-)0.3020%

(+) 0.30%

(+) 2.20%

EXISTING GROUND

BEG. SP. DITCH RT
STA. 30+00
EI = 1.076.30

PI = 30+50
EI = 1.077.40

END SP. DITCH RT
STA. 33+50
EI = 1.078.30

END LAT. DITCH RT
STA. 24+70
EI = 1.031.90

36" RCP-CD

END LAT. DITCH LT
STA. 25+50
EI = 1.021.4

(+) 4.67%

BEGIN LAT. DITCH LT
STA. 25+20
EI = 1.020.0

PIPE HYDRAULIC DATA
36" RCP-CD Sta. 24+97.00

DRAINAGE AREA	=	11	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	41	CFS
DESIGN HW ELEVATION	=	1,033.2	FT
100 YEAR DISCHARGE	=	44	CFS
100 YEAR HW ELEVATION	=	1,033.4	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	155	CFS
OVERTOPPING ELEVATION	=	1,046.9	FT

SEE SHEETS 8 & 20 FOR -Y16A-

-Y16A- STA. 24+50.00 TO STA. 37+50.00

1,100 1,090 1,080 1,070 1,060 1,050 1,040 1,030 1,020 1,010

25 26 27 28 29 30 31 32 33 34 35 36 37 38

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Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	48
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 45 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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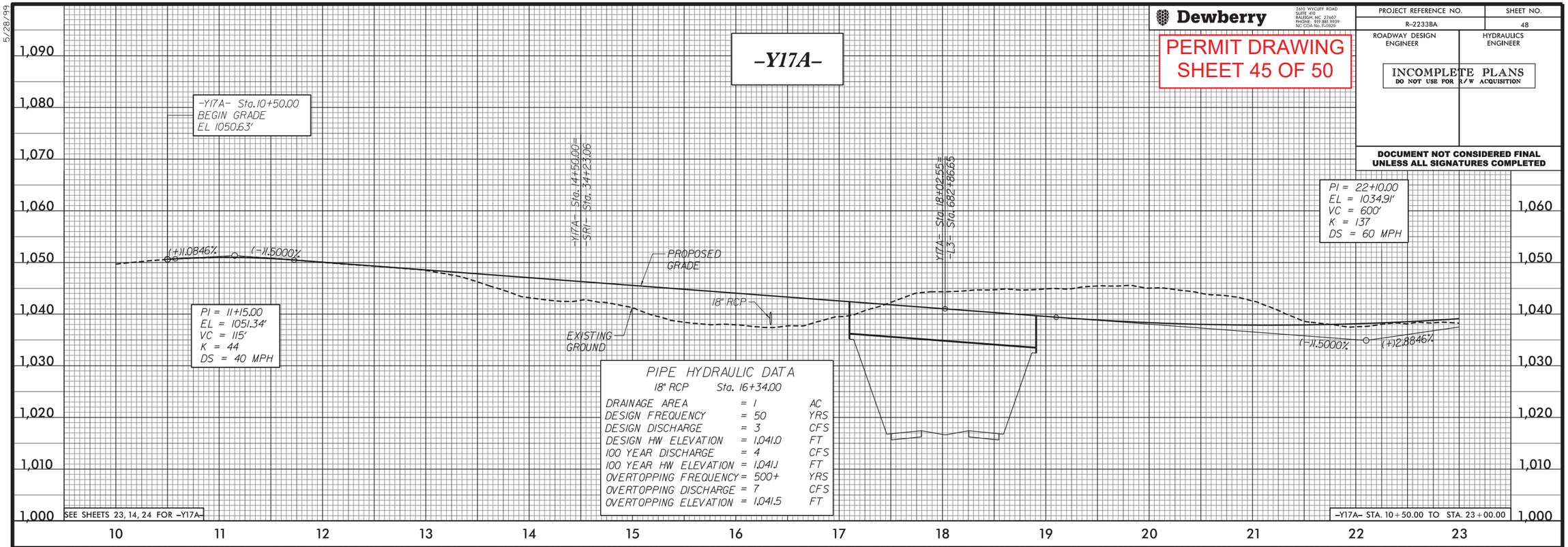
-Y17A-



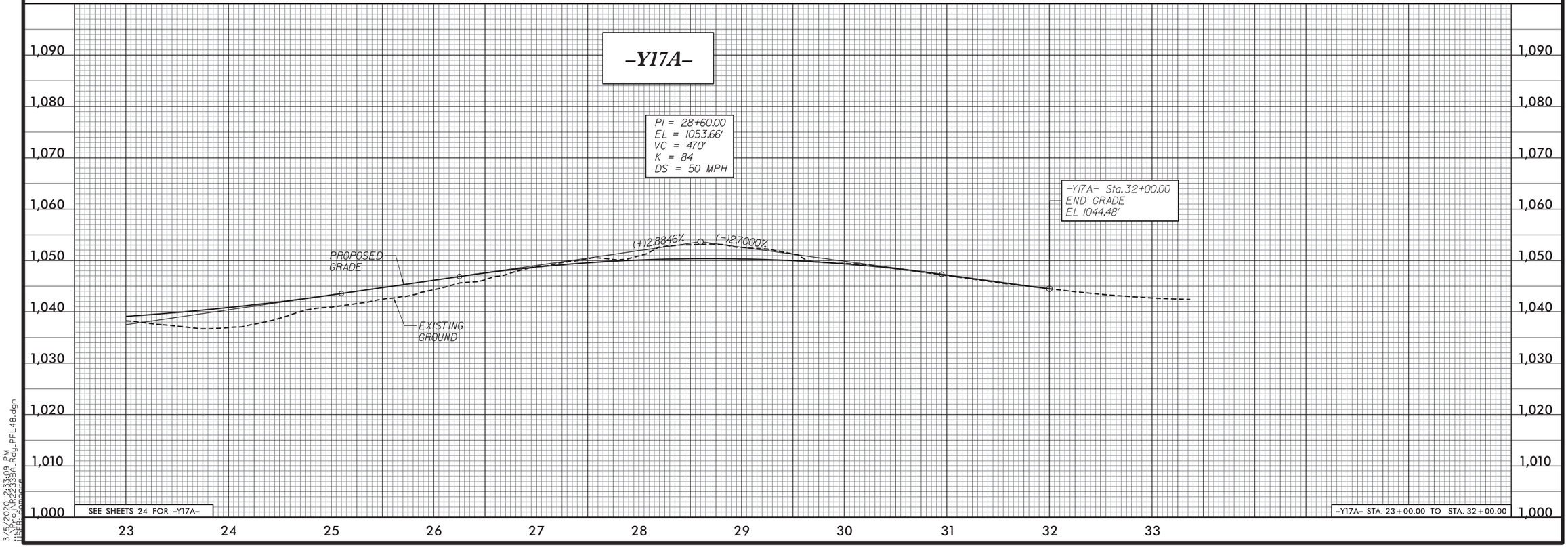
PIPE HYDRAULIC DATA
18" RCP Sta. 16+34.00

DRAINAGE AREA	=	1	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	3	CFS
DESIGN HW ELEVATION	=	1,041.0	FT
100 YEAR DISCHARGE	=	4	CFS
100 YEAR HW ELEVATION	=	1,041.1	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	7	CFS
OVERTOPPING ELEVATION	=	1,041.5	FT

SEE SHEETS 23, 14, 24 FOR -Y17A-

-Y17A- STA. 10+50.00 TO STA. 23+00.00

-Y17A-



SEE SHEETS 24 FOR -Y17A-

-Y17A- STA. 23+00.00 TO STA. 32+00.00

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Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	49
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 46 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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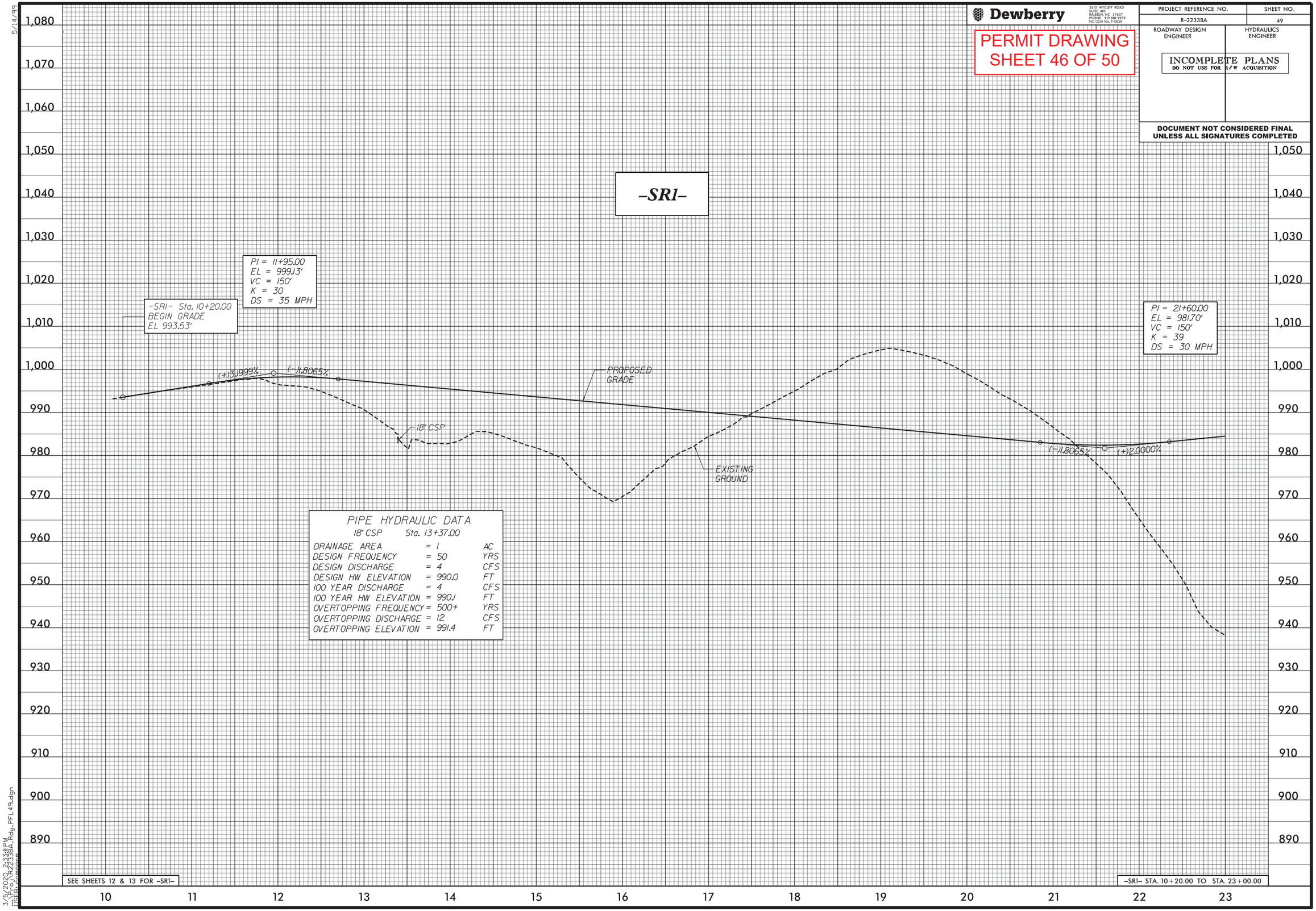

PIPE HYDRAULIC DATA

18" CSP Sta. 13+37.00

DRAINAGE AREA	= 1	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 4	CFS
DESIGN HW ELEVATION	= 990.0	FT
100 YEAR DISCHARGE	= 4	CFS
100 YEAR HW ELEVATION	= 990.1	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 12	CFS
OVERTOPPING ELEVATION	= 991.4	FT

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Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	50
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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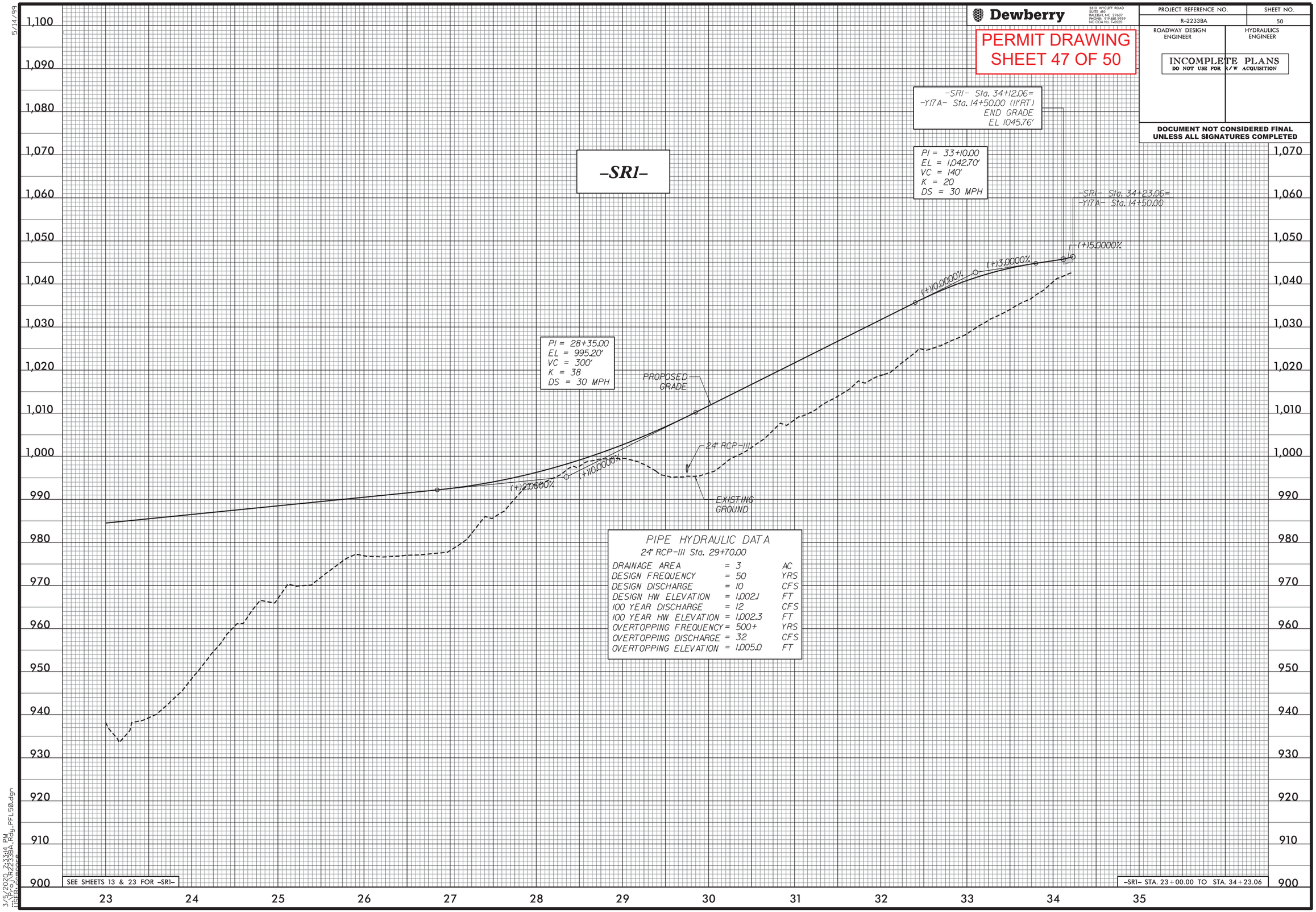
PERMIT DRAWING
SHEET 47 OF 50



PIPE HYDRAULIC DATA
24" RCP-111 Sta. 29+70.00

DRAINAGE AREA	=	3	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	10	CFS
DESIGN HW ELEVATION	=	1,002.1	FT
100 YEAR DISCHARGE	=	12	CFS
100 YEAR HW ELEVATION	=	1,002.3	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	32	CFS
OVERTOPPING ELEVATION	=	1,005.0	FT

SEE SHEETS 13 & 23 FOR -SR1-

-SR1- STA. 23+00.00 TO STA. 34+23.06

5/14/99

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Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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PERMIT DRAWING
SHEET 48 OF 50

DITCH LEGEND

LEFT DITCH — - - — - - -

-SR3-

-SR3- Sta. 9+58.45
BEGIN GRADE
EL 1026.73'

PI = 13+75.00
EL = 999.45'
VC = 100'
K = 39
DS = 30 MPH

-SR3- Sta. 14+38.54
END GRADE
EL 996.91'

(-)6.5481%

(-)4.0000%

SEE SHEET 12 FOR -SR3-

-SR3- STA. 9+58.45 TO STA. 14+38.54

-DRW1-

-DRW1- Sta. 10+00.00
BEGIN GRADE
EL 1052.24'

PI = 10+90.00
EL = 1049.63'
VC = 100'
K = 32
DS = 35 MPH

PI = 13+10.00
EL = 1,036.43'
VC = 100'
K = 14
DS = 15 MPH

-DRW1- Sta. 13+93.64=
-L3- Sta. 577+00.09 (35.5' LT)
END GRADE
EL = 1037.21'

EXISTING GROUND

PROPOSED GRADE

(-)2.9000%

(-)6.0000%

(-)6.0000%

(+)0.9326%

SEE SHEET 7 FOR -DRW1-

-DRW1- STA. 10+00.00 TO STA. 13+93.64

-DRW2-

-DRW2- Sta. 10+10.00
BEGIN GRADE
EL 1026.79'

PI = 10+80.00
EL = 1030.68'
VC = 100'
K = 24
DS = 20 MPH

PI = 14+00.00
EL = 1061.79'
VC = 100'
K = 18
DS = 25 MPH

-DRW2- Sta. 14+77.06=
-Y- Sta. 38+50.00 (24'RT)
END GRADE
EL 1065.10'

~~-DRW2- Sta. 15+01.06=~~
~~-Y- Sta. 38+50.00~~

(+)5.5500%

(+)7.2225%

(+)7.2225%

(+)4.2992%

(+)2.0000%

SEE SHEET 22 FOR -DRW2-

-DRW2- STA. 10+10.00 TO STA. 14+77.06

-DRW3-

-DRW3- Sta. 10+35.50=
-L3- Sta. 563+91.17 (35.5' RT)
BEGIN GRADE
EL = 993.58'

PI = 10+52.00
EL = 993.25'
VC = 25'
K = 3
DS = 15 MPH

PI = 11+30.00
EL = 984.52'
VC = 50'
K = 5
DS = 15 MPH

-DRW3- Sta. 11+60.00
END GRADE
EL = 984.43'

PROPOSED GRADE

EXISTING GROUND

(-)2.0000%

(-)11.9046%

(-)0.3000%

(+) 0.43%

BEG. LAT. DITCH LT
STA. 10+80
El = 982.10

END. LAT. DITCH LT
STA. 11+50
El = 982.40

SEE SHEET 5 FOR -DRW3-

-DRW3- STA. 10+35.50 TO STA. 11+60.00

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Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	52
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

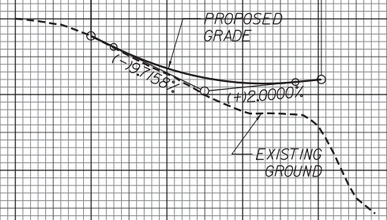
PERMIT DRAWING
SHEET 49 OF 50

-DRW4-

-DRW4- Sta. 10+50.00
BEGIN GRADE
EL = 997.75'

PI = 11+25.00
EL = 990.46'
VC = 120'
K = 10
DS = 15 MPH

-DRW4- Sta. 12+02.07=
-L3- Sta. 560+00.00 (35.5' LT)
END GRADE
EL = 992.00'



SEE SHEET 4 FOR -DRW4-

-DRW4- STA. 10+50.00 TO STA. 12+02.07

-DRW5-

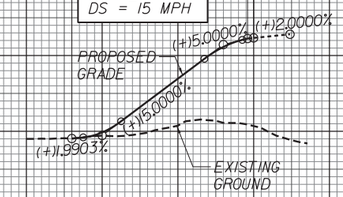
-DRW5- Sta. 10+30.00
BEGIN GRADE
EL = 979.05'

PI = 11+30.00
EL = 991.45'
VC = 25'
K = 3
DS = 15 MPH

PI = 11+46.00
EL = 992.25'

-DRW5- Sta. 11+50.00=
-L3- Sta. 563+21.32 (35.5' LT)
END GRADE
EL = 992.33'

PI = 10+50.00
EL = 979.45'
VC = 25'
K = 2
DS = 15 MPH



SEE SHEET 5 FOR -DRW5-

-DRW5- STA. 10+30.00 TO STA. 11+50.00

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WETLAND AND SURACE WATER IMPACTS SUMMARY

				WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	JD ID	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	SZ	L3 561+11 TO 561+24 RT	2 -5' x 6' RCBC						0.02		136		
1	SZ	L3 561+11 TO 561+24 RT	CHANNEL REALIGNMENT						< 0.01	< 0.01	24	18	
2	SY	L3 584+19 TO 585+04	54" RCP	0.03					0.02	< 0.01	323	60	
3	WF	L3 584+16 TO 585+35	ROADWAY FILL	0.47			0.02						
3	WF	L3 584+16 TO 585+35	TEMPORARY BYPASS CHANNEL			0.01							
4	SX	L3 606+50 TO 617+50	54" RCP						0.21	< 0.01	1509	43	
5	WE	L3 607+66 TO 608+22 LT	ROADWAY FILL	0.04									
6	SW	L3 616+76 TO 618+60	8' X 6' RCBC						0.09		583		
6	SW	L3 617+00 RT	CHANNEL REALIGNMENT						< 0.01	< 0.01	21	5	
6	SW	L3 618+58 LT	CHANNEL REALIGNMENT						0.01	< 0.01	75	18	
7	WD	L3 643+23 TO 643+80 RT	ROADWAY FILL	0.01									
8	SV	L3 643+38 RT TO 643+91 LT	ROADWAY FILL						< 0.01		102		
9	SU	L3 643+13 RT TO 645+10 LT	66" RCP						0.10	< 0.01	702	29	
9	SU	L3 645+10 LT	CL II RIPRAP ON BANKS						< 0.01	< 0.01	20	10	
10		L3 649+55 LT TO 651+18 RT	30" RCP						0.03	< 0.01	620	29	
10		L3 649+55 LT	CL II RIPRAP ON BANKS						< 0.01	< 0.01	8	10	
11	ST	L3 671+97 LT TO 672+82 RT	9' x 8' RCBC						0.10		582		
11	ST	L3 672+08 RT	CHANNEL REALIGNMENT						< 0.01	< 0.01	44	23	
11	ST	L3 672+34 LT	CHANNEL REALIGNMENT						< 0.01	< 0.01	36	35	
12	SS	L3 705+00 RT TO 705+10 LT	TEMPORARY WORK BRIDGE							0.03		272	
13	SR	L3 706+79 RT TO 707+02 LT	TEMPORARY WORK BRIDGE							0.08		290	
14	SQ	L3 706+90 RT TO 707+54 RT	TEMPORARY STREAM CROSSING							< 0.01		67	
15	SP	L3 733+34 LT TO 736+81 RT	8' X 8' RCBC						0.14		605		
15	SP	L3 731+47 TO 732+16 LT	CHANNEL REALIGNMENT						0.02		92		
15	SP	L3 732+16 TO 732+71 LT	ROADWAY FILL						0.01		60		
15	SP	L3 732+71 TO 733+34 LT	CHANNEL REALIGNMENT						0.02		76		
15	SP	L3 731+22 TO 731+47 LT	CHANNEL REALIGNMENT							< 0.01		24	
15	SP	L3 736+81 TO 737+26 RT	CHANNEL REALIGNMENT						0.01		46		
15	SP	L3 737+26 TO 737+36 RT	CHANNEL REALIGNMENT							< 0.01		18	
16	WB	L3 733+46 LT TO 733+80 LT	CHANNEL REALIGNMENT			< 0.01							
TOTALS*:				0.56		0.02	0.02		0.81	0.15	5664	951	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
2/20/2020
RUTHERFORD
R-2233BA
34400.1.S5

Revised 2016 09 09