STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

December 20, 2021

MEMORANDUM TO: Mr. Mark Gibbs, P.E.
Division 13 Engineer

FROM: MAT for Philip S. Harris, III, P.E., Manager
Environmental Analysis Unit

SUBJECT: Environmental Permits for the Improvements to US 221 from US 74 Bypass to North of SR 1366 (Roper Loop Road) Rutherford County, Division 13, **TIP R-2233 BB and BA**

Please find enclosed the following permits for this project:

Agency	Permit Type	Permit Expiration
US Army Corps of Engineers Section 404 Clean Water Act Permit	Individual Permit, dated 12/4/2020, and 12/17/2021	December 31, 2030
NC Division of Water Resources Section 401 Water Quality Certification	Individual Certification No. WQC4229, dated 6/10/2020 and 8/19/2021	expires with above 404.

Please feel free to contact our Unit for any questions.

ec:
NCDOT Permit Website (https://xfer.services.ncdot.gov/pdea/PermIssued/)

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL ANALYSIS UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

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

Location:
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610

PROJECT COMMITMENTS
TIP R-2233BB & R-2233BA
Proposed Rutherfordton Bypass
US 221 North of US 74 Bypass to North of SR 1366 (Roper Loop Road)
Rutherford County
Federal Aid Project No. STBG-0024(083)
WBS 34400.1.S5.

COMMITMENTS FROM PROJECT DEVELOPMENT

Project ManagementUnit/Roadway Design Unit

NCDOT will coordinate with local officials as the proposed project progresses regarding the status of local greenway plans and proposed walking trails.

Coordination has occurred and resulted in portions of Overmountain Victory National Historic Trail to be included in the plans for 4-inch concrete sidewalk installation.

Project Management Unit and Environmental Analysis Unit

The project will be resurveyed for the federally protected dwarf-flowered heartleaf prior to construction.

Dwarf-flowered heartleaf plants that will be impacted by the project will be transplanted to the Tate property conservation area.

No Dwarf-flowered heartleaf plants were found in the R-2233BB section of the project. Surveys of the project were conducted March 20-23, 2019.

Project Management Unit -Historic Architecture Group

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 above commitments have been completed and the MOA for Ruth School is included in the SFEIS.

Project Management Unit -Historic Architecture Group/Rutherford County

The Rutherford County Manager will establish a committee to oversee the development of an adaptive use plan for the campus and buildings of Ruth Elementary School within six months of the filing of the Memorandum of Agreement regarding the project's effects on Ruth School. Members of the committee shall include representatives from the State Historic Preservation Office and the Historic Architecture Group of NCDOT along with municipal staff and local citizens with a demonstrated interest in the school and its potential redevelopment.

The above commitments have been completed.

NCDOT will provide funds not to exceed $10,000 for use by the committee to accomplish the following tasks: identify and analyze the issues associated with reusing the structures and campus, develop alternatives for consideration and produce an adaptive reuse plan for the site. If the Rutherford County Manager chooses not to establish the committee, no funds will be available for this study.

A committee was created and funds were provided for the reuse plan for the Ruth Elementary School site.

Project Management Unit -Traffic Noise and Air Quality Group/Roadway Design Unit Public Involvement and Community Studies Group

For the proposed bypass, five noise barriers were determined to be feasible and reasonable. Property owners and residents of all the noise receptors that would benefit from construction of the five likely noise barriers will be sent ballots to allow them to vote on whether or not they want the noise barrier that would benefit their property or residence. Consideration of the noise barriers will continue unless a simple majority of the distributed points are returned indicating the balloted voters do not want the abatement measure.

A Design Noise Report is underway. Once the report is finalized, balloting for the suggested walls will occur.

Roadway Design Unit

2:1 side slopes will be used at all stream crossings, wetlands and at dwarf-flowered heartleaf sites along the project.

2:1 slopes have been included throughout the entire project at all stream crossings, wetlands and dwarf-flowered heartleaf sites.

A portion of existing SR 1537 (Water Works Road) will be left in place to provide access to a Town of Rutherfordton lift station located northeast of the SR 1536 (Old US 221)/SR 1537 intersection.

A six-foot driveway has been included on the plans at SR 1537 (Water Works Rd) to provide access to the lift station located in this location.

Access will be provided to a Town of Rutherfordton lift station located in the southwest quadrant of the proposed US 74 Business-US 221 Alternate (Charlotte Road) interchange with the bypass.

A driveway has been included on the plans to provide access to the lift station located in this area.

ADA-compliant pedestrian crossings will be provided at the intersection of US 64 with US 74A (Railroad Avenue) and at the Overmountain Victory National Historic Trail crossing of the proposed SR 1520 (Rock Road) realignment.

The above stated locations have ADA compliant pedestrian crossings incorporated into the plans for this project.

A sidewalk will be constructed on the south side of US 64 from the intersection of US 64 with US 74A to the proposed driveway to Ruth and Trinity Schools, in order to accommodate the Overmountain Victory National Historic Trail.

A sidewalk, which address this commitment, has been included in the plans for R-2233BB.

NCDOT will provide access between the proposed sidewalk along US 64 and Southern Street via a pathway from the vicinity of the relocated driveway for Ruth and Trinity schools in order to accommodate pedestrians who wish to follow the historic route of the Overmountain Victory National Historic Trail. NCDOT will design this pathway for pedestrian use and construct it in a manner that is ADA compliant to the greatest extent possible.

A pathway connecting Ruth and Trinity schools to the Overmountain Victory National Historic Trail, has been included in the plans and is sufficient to accommodate pedestrians.

NCDOT will continue to coordinate with the Overmountain Victory National Historic Trail and the SHPO regarding the trail by providing post-hydraulic design plans to the parties with a 30-day review and comment period.

Final design plans were sent to the Historic Architecture Unit for coordination with SHPO and OMVNHT

Structure Design Unit

A sidewalk and 42-inch handrails will be provided on the south side of the proposed bridge carrying US 64 over the bypass, in order to accommodate the Overmountain Victory National Historic Trail.

This commitment has been satisfied as shown on the bridge plans at this location.

Roadway Design Unit/Division Thirteen/Signing and Delineation Unit

NCDOT will install signage provided by the Overmountain Victory National Historic Trail to mark and indicate the status of the pathway as an official portion of the trail. The number of signs and their location will be determined in consultation with the Trail and in accordance with NCDOT policy.

Coordination is ongoing regarding this commitment. Currently there are 10 signs within the project limits that would be applicable to the Overmount Victory National Historic Trail. Based off the original drawings and field investigation, NCDOT should not be affecting the existing sign locations. The Rutherford County sign locations are at the East/West Mountain St interchange with existing US 221 (Main St.) and at the intersection of Charlotte Rd/Maple St and existing US 221 (Main St).

Roadway Design Unit/Structure Design Unit/Transportation Program Management Unit/Town of Rutherfordton

The Town of Rutherfordton has requested decorative murals or etches be provided on some of the structures for the proposed bypass. The Town will provide NCDOT with the location of the suggested treatments and drawings or photographs depicting the etches or murals.

Coordination is ongoing to address this commitment.

NCDOT will evaluate the practicality and cost of the etches or murals and provide the anticipated cost to the Town. If practical, these decorative treatments will be included in the project if the Town will agree in writing to fund the treatments prior to the final design field inspection for R-2233BA.

This commitment applies to the R-2233BA section of this project.

A municipal agreement will be prepared prior to project construction regarding the Town's funding the additional cost for the murals or etches on structures.

Coordination is ongoing to address this commitment.

Roadway Design Unit/Roadside Environmental Unit/Division Thirteen/ Transportation Program Management Unit

The Town of Rutherfordton has requested landscaping as a part of the proposed project. NCDOT will coordinate further with the Town regarding landscaping during the preparation of right of way and construction plans for the project.

No landscaping contracts or commitments were included in this project.

A municipal agreement will be prepared prior to project construction regarding any maintenance responsibilities the Town may have for landscape plantings.

The municipal agreement is being prepared. No landscaping commitments are included within this agreement.

Roadway Design Unit/Transportation Program Management Unit/Town of Rutherfordton

The Town of Rutherfordton has requested decorative traffic signal poles be provided at locations where traffic signals are proposed. NCDOT will coordinate with the Town during preparation of project plans regarding decorative options for signal poles and the locations where the Town would like decorative poles.

This coordination has already taken place.

A municipal agreement will be prepared prior to project construction regarding the Townôs funding the additional cost for decorative traffic signal poles.

The municipal agreement that is being prepared will address this commitment

Hydraulics Unit/Environment Analysis Unit

Prior to the Concurrence Point 4B NEPA/404 merger team meeting, the merger team will review Streams 2UT1C and 1N to determine if additional minimization is feasible.

A junction box drop structure was requested to be added to the 30" pipe to reduce velocity and eliminate the rip rap energy dissipater basin. Rip rap would be required on channel banks only. "

NCDOT implemented this request into the Final Design.

Hydraulics Unit

The Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP) for approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR) for each new crossing of a FEMA regulated stream.

The permit is underway to be submitted to the agencies for final approval. All FEMA stream crossings have been coordinated between the Hydraulics Unit and NCFMP. In addition, all MOAs and CLOMRs have been approved by FMP for this project.

Division 13 Construction

This project involves construction activities on or adjacent to FEMA-regulated stream(s). Therefore, the Division shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying that the drainage structure(s) and roadway embankment located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

This commitment will be completed upon the conclusion of construction activities.

In the event unanticipated archaeological discoveries, such as unmarked cemeteries, are made during construction, the NCDOT Archaeology Group will be notified and consulted immediately for any necessary resolution or coordination with the State Historic Preservation Office, prior to any additional construction work in that area.

This commitment is applicable during the construction period.

Location and Surveys Unit/Roadway Design Unit

Unmarked graves are believed to be located behind the church building on the Mountain View Baptist Church property. The church is located on 2nd Street in Rutherfordton. Efforts will be made to locate these graves and avoid them if practicable during final surveys and design for the project.

The unmarked graves have been identified in the final survey and are displayed on the plans for this project.

Roadside Environmental Unit/Division 13 Construction

NCDOT's native seed mix will be used throughout the project in riparian areas, where possible.

This will be coordinated through the Erosion Control Unit prior to construction.

Division 13 Construction/Environmental Analysis Unit

A Biological Opinion (BO) from the US Fish and Wildlife Service was issued for R-2233B (R-2233BB And R-2233BA) in May 2009 for Dwarf-flowered heartleaf. An Amended BO was issued for R-2233B on August 20, 2021. Conservation Measures from the Amended BO apply to the R-2233BA section (no Dwarf-flowered heartleaf was found on the R-2233BB section). The following conservation recommendations were listed:

A. Install brightly colored fencing (construction fence) where any HENA plants occur and the remainder of the site will be preserved. Fencing is recommended as it can easily be seen by equipment operators and ground crews during clearing activities. The fencing makes an easily-visible marker so any construction and clearing crews know the boundaries in order to keep from causing additional/undocumented impacts to HENA populations.

B. If fencing is needed, conduct a pre-construction meeting with project contractors to ensure site crews understand the reason for the construction fencing and the importance of working within the bounds of the fencing.

C. Construct temporary staging areas offsite, or in an area that would have no impacts to HENA.

The section boundary between R-2233BB and R-2233BA was shifted 1,335' into R-2233BA as a cost saving measure for fill access. No jurisdictional resources or endangered species were affected by this change. As a result of this shift an Amended BO was issued November 2021 reflecting the new boundary. No new measures were offered with this issuance.

COMMITMENTS FROM PERMITTING

No new commitments from permitting.

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

December 4, 2020

Regulatory Division

Action ID SAW-2008-02857, STIP R-2233 B

North Carolina Department of Transportation
Division of Highways
Attn: Mr. Philip S. Harris III, P.E., C.P.M.
Natural Environment Section Head
1598 Mail Service Center
Raleigh, NC 27699-1598

Dear Mr. Harris:

In accordance with your written request of March 13, 2020, additional information submitted after the original request, and the ensuing administrative record, enclosed are two copies of a Department of the Army permit to discharge fill material into streams and wetlands to construct STIP R-2233 B. Construction of STIP R-2233 B will permanently impact 10,149 linear feet (lf) of streams and 0.66 acre of wetlands, and temporarily impact 1,980 lf of streams, along the 8.5-mile project corridor in Rutherford County, North Carolina.

Any deviation in the authorized work will likely require modification of this permit. If a change in the authorized work is necessary, you should promptly submit revised plans to the Corps showing the proposed changes. You may not undertake the proposed changes until the Corps notifies you that your permit has been modified.

Carefully read your permit. The general and special conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant general conditions require that:

a. You must complete construction before December 31, 2030.

b. You must notify this office in advance as to when you intend to commence and complete work.

c. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

You should address all questions regarding this authorization to Ms. Lori Beckwith in the Asheville Regulatory Field Office at loretta.a.beckwith@usace.army.mil or by phone at (828) 271-7980, ext. 4223.

Thank you in advance for completing our Customer Survey Form. This can be accomplished by visiting our web-site at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0 and completing the survey on-line. We value your comments and appreciate your taking the time to complete a survey each time you interact with our office.

Sincerely,

Monte Matthews Date: 2020.12.04 10:00:53 -05'00'

FOR/ Scott McLendon Chief
Regulatory Division
Wilmington District.

Enclosures

Copies Furnished electronically (with special conditions):

Ms. Janet Mizzi
U.S. Fish and Wildlife Service
Asheville Ecological Service Field Office
160 Zillicoa Street
Asheville, North Carolina 28801-1082

Mr. Todd Bowers
Oceans, Wetlands and Streams Protection Branch
Wetlands and Streams Regulatory Section
U.S. Environmental Protection Agency – Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-8931

DEPARTMENT OF THE ARMY PERMIT

Permittee **NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**
ATTN: MR. PHILIP S. HARRIS III, P.E., C.P.M.

Permit No. **SAW-2008-02857, STIP R-2233 B**

Issuing Office **CESAW-RG-A**

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: **The project (STIP R-2233 B) involves the permanent discharge of fill material into 10,149 linear feet (lf) of streams and 0.66 acre of wetlands, and the temporary discharge of fill material into 1,980 lf of streams, along the 8.5-mile project corridor.**

Project Location: **STIP R-2233 B will extend along existing US 221 from north of 74 Bypass to north of US 74 Business (Section BA) and on new location from north of US 74 Business to US 221 just north of SR 1366, (Section BB) in Rutherford County, North Carolina. Center coordinates for the project are N 35.37867, W 81.94998.**

THIS IS A PHASED PERMIT AUTHORIZATION: This permit only authorizes work on Section R-2233 BB (Phase 1 for permitting) of the STIP R-2233 B project. The permittee is authorized to impact regulated waters along the R-2233 BB Section as follows: permanent discharge of fill material into 4,736 lf of streams and 0.11 acre of wetlands. The permittee is also authorized to temporarily impact 382 lf of streams during construction. Construction on the remaining section of STIP R-2233 B (i.e., R-2233 BA/Phase 2) shall not commence until final design has been completed for that section; the permittee has minimized impacts to waters and wetlands to the maximum extent practicable, and; any modifications to the plans, and the compensatory mitigation plans, have been approved by the US Army Corps of Engineers (the Corps).

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2030.** If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination

required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit,

Special Conditions:

SEE ATTACHED SPECIAL CONDITIONS

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit, Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Carla Dagnino — December 3, 2020

(PERMITTEE) **NC DEPARTMENT OF TRANSPORTATION** — *(DATE)*

for **ATTN: MR. PHILIP S. HARRIS III**

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

Monte Matthews — Date: 2020.12.04 10:04:31 -05'00'

FOR (DISTRICT COMMANDER) **BENJAMIN A. BENNETT, COLONEL** — *(DATE)*

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) — *(DATE)*

*U.S. GOVERNMENT PRINTING OFFICE: 1986 - 717-425

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

December 17, 2021

Regulatory Division

Action ID: SAW-2008-02857 (STIP No. R-2233 B)

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

Dear Mr. Harris:

I refer to your permit modification request of July 27, 2021, to change the boundaries of the two phases (BB and BA) of the STIP R-2233 B project by adding 1,335 linear feet (lf) of the unpermitted Section BA to the already permitted section (BB). The entire STIP R-2233B project is approximately 8.5 miles in-length, and is located in Rutherford County, North Carolina.

NCDOT requested this modification in order to take advantage of over 400,000 cubic yards of earthwork that is supposed to occur in this 1,335 lf section of Section BA (which is now proposed to become part of Section BB). R-2233 BB is a borrow fill (fill needed) project and R-2233 BA is a waste (excess material) project. According to NCDOT, this change in boundaries would allow for a more balanced fill budget for R-2233 BB and reduce tax dollar expenditure with an estimated savings of $1.4 million. Grading would be the primary construction activity occurring in the 1,335 lf area.

As background, STIP R-2233 B is a phased project that is divided into two sections for permitting and construction: R-2233 BA (Section BA – Phase 2) and R-2233 BB (Section BB – Phase 1). In 2020, NCDOT applied for authorization for Phase 1 (R-2233 BB) and the USACE issued the permit for impacts to waters of the U.S. on December 4, 2020. NCDOT has not yet applied for authorization for the impacts on Phase 2.

Your permit modification request of July 27 ,2021, was coordinated with the U.S. Fish and Wildlife Service (USFWS), the U.S. Environmental Protection Agency (EPA), the N.C. Division of Water Resources (NCDWR), and the N.C. Wildlife Resources Commission (NCWRC). No objections were raised.

The USACE has also reviewed NCDOT's modification request and has no objections. As such, the permit special conditions for this project have been revised. The revised language is in bold italics and is highlighted in yellow to call attention to the revisions.

As noted in the permit issued on December 4, 2020 for this project, all permit general conditions, as well as all special conditions (now revised by this modification), must be complied with; this includes compliance with the modified 401 Water Quality Certification issued by NCDWR on August 19, 2021. Additionally, the USFWS amended the Biological Opinion (BO) for this project on November 4, 2021; while this 2021 Amended BO does not contain additional requirements to the 2020 BO, this 2021 Amended BO is referenced in the revised special conditions. We have enclosed the revised special conditions, the modified 401 WQC, and the 2021 Amended BO for reference.

If you have any questions, please contact Lori Beckwith, Regulatory Project Manager, Asheville Regulatory Field Office, at Loretta.A.Beckwith@usace.army.mil or at 828-271-7980, ext. 4223.

FOR THE COMMANDER

Monte Matthews

Date: 2021.12.17 13:25:53 -05'00'

Monte Matthews
Lead Project Manager
Wilmington District

Enclosures

Copies furnished by email with enclosures:

USFWS, Ms. Holland Youngman
USEPA, Ms. Amanetta Sommerville
NCDWR, Mr. Kevin Mitchell
NCWRC, Ms. Marla Chambers
NCDOT, Mr. Jeff Hemphill
NCDOT, Mr. Michael Turchy
NCDOT, Mr. Roger Bryan

SPECIAL CONDITIONS
ACTION ID. SAW-2008-02857
NC DEPARTMENT OF TRANSPORTATION
RUTHERFORDTON BYPASS, RUTHERFORD COUNTY
STIP No. R-2233 B

Failure to institute and carry out the details of the following special conditions will result in a directive to cease all ongoing and permitted work within waters of the U.S. associated with the permitted project, or such other remedies and/or fine as the Wilmington District Engineer, or his authorized representatives, may seek.

WORK LIMITS/NOTIFCATION

1) The entire 8.5-mile long project is identified as STIP R-2233 B. This permit only authorizes work on Section R-2233 BB of this project; this section is also known as “Phase 1” for permitting purposes. Construction on the remaining section (i.e., Section R-2233 BA – “Phase 2”) of the STIP R-2233 B project shall not commence until: (a) final design for those sections/phases has been completed and submitted to the U.S. Army Corps of Engineers (Corps); (b) the Permittee has minimized impacts to waters and wetlands to the maximum extent practicable for that section/phase and the Corps concurs with this assessment through standard Merger 4B and 4C meetings; (c) any modification(s) to the plans for that section/phase have been approved by the Corps in writing; and (d) a final compensatory mitigation plan for that section/phase has been submitted by the Permittee and approved by the Corps.

2) Work Limits: All work authorized by this permit shall be performed in strict compliance with the permit plans titled, “Wetland and Surface Water Impacts Permit, R-2233BB”, permit drawing sheets 1-37, dated March 13, 2020,which are now part of this permit. The Permittee shall ensure that the construction design plans for this project do not deviate from the approved permit plans. Any modification to the approved permit plans must be approved by the US Army Corps of Engineers prior to any active construction in waters or wetlands.

3) Unauthorized Dredge or Fill: Except as authorized by this permit or any U.S. Army Corps of Engineers approved modification to this permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands, or shall any activities take place that cause the degradation of waters or wetlands. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of

this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and waste activities connected with this project.

4) Maintain Flows and Circulation Patterns of Waters: Except as specified in the approved permit plans referenced above, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters and/or wetlands.

5) Permit Distribution: The Permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions, drawings and attachments shall be available at the project site during the construction and maintenance of this project.

6) Pre-Construction Meeting: The Permittee shall schedule and attend a preconstruction meeting between its representatives, the contractors representatives, and the U.S. Army Corps of Engineers, Asheville Regulatory Field Office, NCDOT Regulatory Project Manager, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all the terms and conditions contained with this Department of Army Permit. The Permittee shall provide the Corps, Asheville Regulatory Field Office, NCDOT Project Manager, with a copy of the final permit plans at least two weeks prior to the preconstruction meeting along with a description of any changes that have been made to the project's design, construction methodology or construction timeframe. The Permittee shall schedule the preconstruction meeting for a time frame when the Corps and NCDWR Project Managers can attend. The Permittee shall invite the Corps and NCDWR Project Managers a minimum of thirty (30) days in advance of the scheduled meeting in order to provide those individuals with ample opportunity to schedule and participate in the required meeting. The thirty (30) day requirement can be waived with the concurrence of the Corps.

7) Notification of Construction Commencement and Completion: The Permittee shall notify the U.S. Army Corps of Engineers in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.

8) Reporting Address: All reports, documentation, and correspondence required by the conditions of this permit shall be submitted to the following: U.S. Army Corps of Engineers, Wilmington District Asheville Regulatory Field Office, Attn:

Lori Beckwith, 151 Patton Ave., Room 208, Asheville, NC 28801-5006, or loretta.a.beckwith@usace.army.mil . The Permittee shall reference the following permit number, SAW-2008-02857, on all submittals.

9) Reporting Violations: Violation of these permit conditions or violation of Section 404 of the Clean Water Act shall be reported to the Corps by email to loretta.a.beckwith@usace.army.mil and by telephone at: 828-271-7980, ext. 4223, within 24 hours of the Permittee's discovery of the violation.

10) Permit Revocation: The Permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

RELATED LAWS

11) Clean Fill: The Permittee shall use only clean fill material for this project. The fill material shall be free from items such as trash, construction debris, metal and plastic products, and concrete block with exposed reinforcement bars. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source.

12) Water Contamination: All mechanized equipment shall be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the Permittee shall immediately report it to the N.C. Division of Water Resources at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act shall be followed.

13) Federally Listed Species/Biological Opinion: The U.S. Fish and Wildlife Service issued a Biological Opinion (BO) titled, "Amended Biological Opinion, Proposed US 221 Widening and Bypass, Rutherfordton, Rutherford County, NC; STIP R-2233B", dated August 21, 2020, which contains conservation measures for the project's effect on the federally threatened dwarf-flowered heartleaf (DFHL) (*Hexastylis naniflora*). Your authorization under this permit is conditional upon your compliance with the conservation measures in the aforementioned BO, which are incorporated by reference in this permit. Failure to comply with the conservation measures would constitute non-compliance with your permit. The

U.S. Fish and Wildlife Service is the appropriate authority to determine compliance with the conservation measures of its BO, and with the ESA.

14) NCDOT shall abide by all stipulations identified in the Memorandum of Agreement titled, “MEMORANDUM OF AGREEMENT AMONG THE US ARMY CORPS OF ENGINEERS, THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, THE NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICER AND THE OVERMOUNTAIN VICTORY NATIONAL HISTORIC TRAIL FOR US 221 BYPASS OF RUTHERFORDTON, RUTHERFORD COUNTY, NC, TIP PROJECT R-2233B”, executed in 2013. This MOA is incorporated herein by reference.

AQUATIC LIFE/CULVERTS

15) Prohibitions on Concrete: The Permittee shall take measures necessary to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with any water in or entering into waters of the United States. Water inside coffer dams or casings that has been in contact with concrete shall only be returned to waters of the United States when it no longer poses a threat to aquatic organisms (concrete is set and cured).

16) Unless otherwise requested in the application and depicted on the approved permit plans, culverts greater than 48 inches in diameter shall be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter and less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain existing channel slope. The bottom of the culvert shall be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Culverts shall be designed and constructed in a manner that minimizes destabilization and head cutting.

17) Measures shall be included in the construction/installation of culverts that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed opening shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

18) Aquatic Life Movement: Unless otherwise requested in the application and depicted on the approved permit plans, no activity may substantially disrupt the

necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area. All discharges of dredged or fill material within waters of the United States shall be designed and constructed to maintain low flows to sustain the movement of aquatic species.

19) Culverts placed within wetlands must be installed in a manner that does not restrict the flows and circulation patterns of waters of the United States. Culverts placed across wetland fills purely for the purposes of equalizing surface water shall not be buried, but the culverts must be of adequate size and/or number to ensure unrestricted transmission of water.

SEDIMENT AND EROSION CONTROL

20) During the clearing phase of the project, heavy equipment shall not be operated in surface waters or stream channels. Temporary stream crossings will be used to access the opposite sides of stream channels. All temporary diversion channels and stream crossings will be constructed of non-erodible materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

21) No fill or excavation impacts for the purposes of sedimentation and erosion control shall occur within jurisdictional waters, including wetlands, unless the impacts are included on the approved plan drawings and specifically authorized by this permit. This includes, but is not limited to, sediment control fences and other barriers intended to catch sediment losses.

22) The Permittee shall remove all sediment and erosion control measures placed in waters and/or wetlands, and shall restore natural grades on those areas, prior to project completion.

23) The Permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the “North Carolina Sediment and Erosion Control Planning and Design Manual” to ensure compliance with the appropriate turbidity water quality standard. Erosion and sediment control practices shall be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to ensure compliance with the appropriate turbidity water quality standards. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project shall remain in full compliance with all aspects of the Sedimentation Pollution Control

Act of 1973 (North Carolina General Statutes Chapter 113A, Article 4). Adequate sedimentation and erosion control measures shall be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures shall be inspected and maintained regularly, especially following rainfall events. All fill material shall be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

24) The Permittee shall implement all reasonable and practicable measures to ensure that equipment, structures, fill pads, work, and operations associated with this project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or stream bank erosion. The Permittee shall routinely monitor for these effects, cease all work when detected, take initial corrective measures to correct actively eroding areas, and notify this office immediately. Permanent corrective measures may require additional authorization by the U.S. Army Corps of Engineers.

25) Temporary Fills: Within thirty (30) days of the date of completing the authorized work, the Permittee shall remove all temporary fills in waters of the United States and restore the affected areas to pre-construction contours and elevations. The affected areas shall be re-vegetated with native, non-invasive vegetation as necessary to minimize erosion and ensure site stability.

BORROW AND WASTE

26) To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent waters and wetlands, except as authorized by this permit, the Permittee shall require its contractors and/or agents to identify all areas to be used as a borrow and/or waste site(s) associated with this project and provide this information to the U.S. Army Corps of Engineers, along with the following:

a) Borrow Sites: When any portion of an aquatic resource(s) (i.e., a stream, river, wetland, pond, seep, and/or spring) is located within the boundaries of the proposed borrow site(s), or within a distance of 400 feet from the nearest boundary of the proposed borrow site(s), the Permittee shall provide the U.S. Army Corps of Engineers with appropriate maps indicating: the locations of the proposed borrow site(s); boundaries of the proposed borrow site(s), and; delineation(s) of all aquatic resources (as described above) within the site, and out to 400 feet from the boundary of the site, as soon as such information is available.

b) Waste Sites: When any portion of an aquatic resource(s) (i.e., a stream, river, wetland, pond, seep, and/or spring) is located within the boundaries of the proposed waste site(s), the Permittee shall provide the U.S. Army Corps of Engineers with appropriate maps indicating: the locations of the proposed waste site(s); boundaries of the proposed waste site(s), and; delineation(s) of all aquatic resources (as described above) within the site, as soon as such information is available.

For those areas proposed as waste sites that have any aquatic resources within the boundaries, or borrow sites that have any aquatic resources within the boundary or out to 400 feet beyond the boundaries, the Permittee shall not approve those borrow and/or waste sites until the U.S. Army Corps of Engineers issues written confirmation that an area does or does not contain potentially jurisdictional resources. All delineations of aquatic sites on borrow and/or waste sites shall be verified by the U.S. Army Corps of Engineers and shown on the approved reclamation plans. The Permittee shall ensure that all borrow and/or waste sites comply with Special Condition #4 of this permit. Additionally, the Permittee shall produce and maintain documentation of all borrow and waste sites associated with this project. When aquatic resources are located within these designated areas, this documentation will include data regarding soils, vegetation, hydrology, delineation(s) of aquatic sites, and any jurisdictional determinations made by the Corps to clearly demonstrate compliance with Special Condition #4. All information will be available to the U.S. Army Corps of Engineers upon request. The Permittee shall require its contractors to complete and execute reclamation plans for each borrow and/or waste site and provide written documentation that the reclamation plans have been implemented and all work is completed to the Permittee. For areas with aquatic resources that the Corps has determined are potentially jurisdictional (or jurisdictional), this documentation will be provided to the U.S. Army Corps of Engineers within 30 days of the completion of the reclamation work. The permittee shall ensure that (1) waste material placed in a project-related waste site(s) does not migrate into an aquatic resource, even if that resource is located outside the boundaries of the waste site, and (2) that any project-related activities in borrow sites does not adversely impact any off-site waters, to include dewatering (due to project-related excavation/borrow activities in the borrow site) of those off-site waters.

COMPENSATORY MITIGATION

27) In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit.

U.S. ARMY CORPS OF ENGINEERS
Wilmington District
Compensatory Mitigation Responsibility Transfer Form

Permittee: North Carolina Department of Transportation **Action ID: SAW-2008-02857**
Project Name: Phase 1 (R-2233 BB) of STIP No. R-2233 B Project **County:** Rutherford

Instructions to Permittee: The Permittee must provide a copy of this form to the Mitigation Sponsor, either an approved Mitigation Bank or the North Carolina Division of Mitigation Services (NCDMS), who will then sign the form to verify the transfer of the mitigation responsibility. Once the Sponsor has signed this form, it is the Permittee's responsibility to ensure that Wilmington District Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one Mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate Mitigation Sponsors.

Instructions to Sponsor: The Sponsor verifies that the mitigation requirements (credits) shown below have been released and are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether they have received payment from the Permittee. Once the form is signed, the Sponsor must update the bank ledger and provide a copy of the signed form and the updated ledger to the Permittee, the Project Manager who issued the permit, the Bank Project Manager, and the District Mitigation Office (see contact information on page 2). The Sponsor must also comply with all reporting requirements established in their authorizing instrument.

Permitted Impacts and Compensatory Mitigation Requirements

Permitted Impacts Requiring Mitigation*: **8-digit HUC and Basin:** 03050105, Broad River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
	4,621		0.11			

*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

Compensatory Mitigation Requirements: **8-digit HUC and Basin:** 03050105, Broad River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
	9,242		0.22			

Mitigation Site Debited: NCDMS
(List the name of the bank to be debited. For umbrella banks, also list the specific site. For NCDMS, list NCDMS. If the NCDMS acceptance letter identifies a specific site, also list the specific site to be debited).

Section to be completed by the Mitigation Sponsor

Statement of Mitigation Liability Acceptance: I, the undersigned, verify that I am authorized to approve mitigation transactions for the Mitigation Sponsor shown below, and I certify that the Sponsor agrees to accept full responsibility for providing the mitigation identified in this document (see the table above), associated with the USACE Permittee and Action ID number shown. I also verify that released credits (and/or advance credits for NCDMS), as approved by the Wilmington District, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

Mitigation Sponsor Name:_____

Name of Sponsor's Authorized Representative:_____

_____ _____
Signature of Sponsor's Authorized Representative **Date of Signature**

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

Conditions for Transfer of Compensatory Mitigation Credit:

- Once this document has been signed by the Mitigation Sponsor and the District is in receipt of the signed form, the Permittee is no longer responsible for providing the mitigation identified in this form, though the Permittee remains responsible for any other mitigation requirements stated in the permit conditions.
- Construction within jurisdictional areas authorized by the permit identified on page one of this form can begin only after the District is in receipt of a copy of this document signed by the Sponsor, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein. When NCDMS provides mitigation for authorized impacts conducted by the North Carolina Department of Transportation (NCDOT), construction within jurisdictional areas may proceed upon permit issuance; however, a copy of this form signed by NCDMS must be provided to the District within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the District has received this form, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein.
- Signed copies of this document must be retained by the Permittee, Mitigation Sponsor, and in the USACE administrative records for both the permit and the Bank/ILF Instrument. It is the Permittee's responsibility to ensure that the District Project Manager (address below) is provided with a signed copy of this form.
- If changes are proposed to the type, amount, or location of mitigation after this form has been signed and returned to the District, the Sponsor must obtain case-by-case approval from the District Project Manager and/or North Carolina Interagency Review Team (NCIRT). If approved, higher mitigation ratios may be applied, as per current District guidance and a new version of this form must be completed and included in the District administrative records for both the permit and the Bank/ILF Instrument.

Comments/Additional Conditions:

Compensatory mitigation amounts noted on this form reflect only the requirements for Section R-2233 BB, also known as Phase 1 for permitting purposes.

Future phase(s). The R-2233 B project only has one future phase (i.e., R-2233 BA – Phase 2). If a permit modification for Phase 2 is requested and authorized, compensatory mitigation for the future phase/Phase 2 would be required at the time of permit modification; this is the standard process for phased permitting.

This form is not valid unless signed below by the District Project Manager and by the Mitigation Sponsor on Page 1. ***Once signed, the Sponsor should provide copies of this form along with an updated bank ledger to: 1) the Permittee, 2) the District Project Manager at the address below, 3) the Bank Manager listed in RIBITS, and 4) the Wilmington District Mitigation Office, 3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587 (or by email to SAWMIT@usace.army.mil)***. Questions regarding this form or any of the permit conditions may be directed to the District Mitigation Office.

USACE Project Manager: Lori Beckwith
USACE Field Office: Asheville Regulatory Field Office
US Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, NC 28801-5006
Email: loretta.a.beckwith@usace.army.mil

BECKWITH.LORETTA.ANN.1173452264 Digitally signed by BECKWITH.LORETTA.ANN.1173452264 Date: 2020.12.01 15:12:52 -05'00'

Wilmington District Project Manager Signature

December 1, 2020
Date of Signature

Current Wilmington District mitigation guidance, including information on mitigation ratios, functional assessments, and mitigation bank location and availability, and credit classifications (including stream temperature and wetland groupings) is available at http://ribits.usace.army.mil.

U.S. ARMY CORPS OF ENGINEERS
Wilmington District
Compensatory Mitigation Responsibility Transfer Form

Permittee: North Carolina Department of Transportation **Action ID: SAW-2008-02857**
Project Name: Phase 1 (R-2233 BB) of STIP No. R-2233 B Project - *REVISED* **County:** Rutherford

Instructions to Permittee: The Permittee must provide a copy of this form to the Mitigation Sponsor, either an approved Mitigation Bank or the North Carolina Division of Mitigation Services (NCDMS), who will then sign the form to verify the transfer of the mitigation responsibility. Once the Sponsor has signed this form, it is the Permittee's responsibility to ensure that Wilmington District Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one Mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate Mitigation Sponsors.

Instructions to Sponsor: The Sponsor verifies that the mitigation requirements (credits) shown below have been released and are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether they have received payment from the Permittee. Once the form is signed, the Sponsor must update the bank ledger and provide a copy of the signed form and the updated ledger to the Permittee, the Project Manager who issued the permit, the Bank Project Manager, and the District Mitigation Office (see contact information on page 2). The Sponsor must also comply with all reporting requirements established in their authorizing instrument.

Permitted Impacts and Compensatory Mitigation Requirements

Permitted Impacts Requiring Mitigation*: **8-digit HUC and Basin:** 03050105, Broad River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
	5,500		0.11			

*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

Compensatory Mitigation Requirements: **8-digit HUC and Basin:** 03050105, Broad River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
	11,000		0.22			

Mitigation Site Debited: NCDMS
(List the name of the bank to be debited. For umbrella banks, also list the specific site. For NCDMS, list NCDMS. If the NCDMS acceptance letter identifies a specific site, also list the specific site to be debited).

Section to be completed by the Mitigation Sponsor

Statement of Mitigation Liability Acceptance: I, the undersigned, verify that I am authorized to approve mitigation transactions for the Mitigation Sponsor shown below, and I certify that the Sponsor agrees to accept full responsibility for providing the mitigation identified in this document (see the table above), associated with the USACE Permittee and Action ID number shown. I also verify that released credits (and/or advance credits for NCDMS), as approved by the Wilmington District, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

Mitigation Sponsor Name: NCDEQ - DMS

Name of Sponsor's Authorized Representative: Beth Harmon

Elizabeth Harmon — 12/20/2021

Signature of Sponsor's Authorized Representative **Date of Signature**

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

Conditions for Transfer of Compensatory Mitigation Credit:

- Once this document has been signed by the Mitigation Sponsor and the District is in receipt of the signed form, the Permittee is no longer responsible for providing the mitigation identified in this form, though the Permittee remains responsible for any other mitigation requirements stated in the permit conditions.
- Construction within jurisdictional areas authorized by the permit identified on page one of this form can begin only after the District is in receipt of a copy of this document signed by the Sponsor, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein. When NCDMS provides mitigation for authorized impacts conducted by the North Carolina Department of Transportation (NCDOT), construction within jurisdictional areas may proceed upon permit issuance; however, a copy of this form signed by NCDMS must be provided to the District within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the District has received this form, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein.
- Signed copies of this document must be retained by the Permittee, Mitigation Sponsor, and in the USACE administrative records for both the permit and the Bank/ILF Instrument. It is the Permittee's responsibility to ensure that the District Project Manager (address below) is provided with a signed copy of this form.
- If changes are proposed to the type, amount, or location of mitigation after this form has been signed and returned to the District, the Sponsor must obtain case-by-case approval from the District Project Manager and/or North Carolina Interagency Review Team (NCIRT). If approved, higher mitigation ratios may be applied, as per current District guidance and a new version of this form must be completed and included in the District administrative records for both the permit and the Bank/ILF Instrument.

Comments/Additional Conditions:

Compensatory mitigation amounts noted on this form reflect only the requirements for Section R-2233 BB, also known as Phase 1 for permitting purposes. ***Due to a boundary shift between the BB and BA Sections and inclusion of Sites 19 and 20 in the BB Section, the original MRTF has been revised as noted above in bold italics and highlighted in yellow.***

Future phase(s). The R-2233 B project only has one future phase (i.e., R-2233 BA – Phase 2). If a permit modification for Phase 2 is requested and authorized, compensatory mitigation for the future phase/Phase 2 would be required at the time of permit modification; this is the standard process for phased permitting.

This form is not valid unless signed below by the District Project Manager and by the Mitigation Sponsor on Page 1. ***Once signed, the Sponsor should provide copies of this form along with an updated bank ledger to: 1) the Permittee, 2) the District Project Manager at the address below, 3) the Bank Manager listed in RIBITS, and 4) the Wilmington District Mitigation Office, 3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587 (or by email to SAWMIT@usace.army.mil).*** Questions regarding this form or any of the permit conditions may be directed to the District Mitigation Office.

USACE Project Manager: Lori Beckwith
USACE Field Office: Asheville Regulatory Field Office
US Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, NC 28801-5006
Email: loretta.a.beckwith@usace.army.mil

Loretta A. Beckwith

Digitally signed by Loretta A. Beckwith
Date: 2021.12.17 13:48:14 -05'00'

Wilmington District Project Manager Signature

December 17, 2021
Date of Signature

Current Wilmington District mitigation guidance, including information on mitigation ratios, functional assessments, and mitigation bank location and availability, and credit classifications (including stream temperature and wetland groupings) is available at http://ribits.usace.army.mil.

NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
S. DANIEL SMITH
Director

June 10, 2020

Mr. Philip S. Harris, III, P.E., CPM
Natural Environment Section Head
Project Development and Environmental Analysis
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina, 27699-1598

Subject: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for the proposed Rutherfordton Bypass, US 221 North of US 74 Bypass to North of SR 1366 (Roper Loop Road) in Rutherford County, Federal Aid Project No. STBG-0024(083), TIP Nos. R-2233BB & R-2233BA.
NCDWR Project No. 20200362

Dear Mr. Harris:

Attached hereto is a copy of Certification No. WQC004229 issued to The North Carolina Department of Transportation (NCDOT) dated June 10, 2020.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

DocuSigned by:
Amy Chapman
9C98B6312DCD474...
S. Daniel Smith, Director
Division of Water Resources

Attachments

Electronic copy only distribution:
Lori Beckwith, US Army Corps of Engineers, Asheville Field Office
Roger Bryan, Division 13 Environmental Officer
Jeff Hemphill, NC Department of Transportation
Colin Mellor, NC Department of Transportation
Carla Dagnino, NC Department of Transportation
Dr. Cynthia Van Der Wiele, US Environmental Protection Agency
Claire Ellwanger, US Fish and Wildlife Service
Marla Chambers, NC Wildlife Resources Commission
Beth Harmon, Division of Mitigation Services
File Copy

401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500 and 15A NCAC 2B. This certification authorizes the NCDOT to impact 0.11 acres of jurisdictional wetlands and 4,736 linear feet of jurisdictional streams in Rutherford County. The project shall be constructed pursuant to the application dated received March 13, 2020. The authorized impacts are as described below:

Stream Impacts in the Broad River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear feet)	Stream Impacts Requiring Mitigation (linear ft)
1			43	34	77	0
1			24	14	38	0
4			139	18	157	139
4			698		698	698
4	68				68	
4			10	7	17	10
5			10	17	27	0
5			112		112	0
5	28	21			49	0
6			11	9	20	0
6			670		670	670
6			34	18	52	34
7			832		832	832
8			445		445	445
8			32		32	32
8			25	20	45	0
9			14	9	23	0
9			140		140	0
9			55	7	62	0
10			72	19	91	72
10			217		217	217
10			45	51	96	45
11			10	27	37	0
11			151		151	0
13			35	19	54	0
14			10	24	34	0
15			22	14	36	0
15			506		506	506
15			14	19	33	14
16	52	10			62	0
16	38				38	0
16	18	12			30	0
17			143		143	0
18			13	13	26	0
TOTAL:	204	43	4,532	339	5,118	3,714

Total Stream Impact for R-2233BB: 4,736 linear feet

Wetland Impacts in the Broad River Basin (Riverine)

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)	Impacts Requiring Mitigation (ac)
W8	0.11					0.11	0.00

Total Wetland Impact for R-2233BB: 0.11 acres.

The application provides adequate assurance that the discharge of fill material into the waters of the Broad River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your application dated received March 13, 2020. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 300 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Condition(s) of Certification:

Project Specific Conditions

1. The NCDOT Division Environmental Officer or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand the potential issues with stream and pipe alignment at the permitted site. NCDWR staff shall be invited to the pre-construction meeting. [15A NCAC 02H.0506(b)(2) and (b)(3)

2. Compensatory mitigation for 3,714 linear feet of impact to streams is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the North Carolina Division of Mitigation Service (DMS) (formerly NCEEP), and that the DMS has agreed to implement the mitigation for the project. The DMS has indicated in a letter dated March 4, 2020, that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the DMS Mitigation Banking Instrument signed July 28, 2010.

3. When final design plans are completed for R-2233BA, a modification to the 401 Water Quality Certification shall be submitted with five copies and fees to the NC Division of Water Resources. Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, and other surface waters, and buffers. No construction activities that impact any wetlands, streams, surface waters, or buffers located in R-2233BA shall begin until after the permittee applies for, and receives a written modification of the 401 Water Quality Certification from the NC Division of Water Resources.

General Conditions

1. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and downstream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWR. If this condition is unable to be met due to

bedrock or other limiting features encountered during construction, please contact NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required. [15A NCAC 02H.0506(b)(2)]

2. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. [15A NCAC 02B.0200]

3. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers. [15A NCAC 02H.0506(b)(2)]

4. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions. [15A NCAC 02H.0506(b)(2)]

5. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage. [15A NCAC 02H.0506(b)(2)]

6. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

7. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water. [15A NCAC 02H.0506(b)(3) and (c)(3)]

8. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream. [15A NCAC 02H.0506(b)(3)]

9. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. [15A NCAC 02H.0506(b)(3)]

10. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]

11. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]

12. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur. [15A NCAC 02H .0506{b)(3) and (c)(3) and 15A NCAC 02B .0200]

13. Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the North Carolina Sediment and Erosion Control Manual, or for linear transportation projects, the NCDOT Sediment and Erosion Control Manual.

14. All devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) sites, including contractor-owned or leased borrow pits associated with the project. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

15. For borrow pit sites, the erosion and sediment control measures shall be designed, installed, operated, and maintained in accordance with the most recent version of the North Carolina Surface Mining Manual. Reclamation measures and implementation shall comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

16. If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-1, WS-11, High Quality Waters (HQW), or Outstanding Resource Waters (ORW), then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B .0124, Design Standards in Sensitive Watershed. [15A NCAC 02H.0506(b)(3) and (c)(3); GC 4135]

17. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

18. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. [15A NCAC 02H.0506(b)(2)]

19. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

20. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification. [15A NCAC 02H.0501 and .0502]

21. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

22. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

23. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

24. Native riparian vegetation must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction. [15A NCAC 02B. 0506(b)(2)]

25. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities. [15A NCAC 02H.0506(b)(3) and (c)(3)]

26. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards [15A NCAC 02H.0506(b)(3) and (c)(3]):

    a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.

b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

27. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. [15A NCAC 02H.0506(b)(3) and (c)(3)]

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919)-431-3000, Facsimile: (919)-431-3100

A copy of the petition must also be served on DEQ as follows:

Mr. Bill F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center

This the 10th day of June 2020

DIVISION OF WATER RESOURCES

DocuSigned by:
Amy Chapman
9C9886312DCD474...

S. Daniel Smith, Director

WQC No. WQC004229

NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
S. DANIEL SMITH
Director

NCDWR Project No.: _____ **County:** _____

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion
Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401 Transportation Permitting Unit, North Carolina Division of Water Resources, 1617 Mail Service Center, Raleigh, NC, 27699-1617. This form may be returned to NCDWR by the applicant, the applicant's authorized agent, **or** the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Agent's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date:_____

Engineer's Certification

_____ Partial _____ Final

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature _____ Registration No. _____
Date _____

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
S. DANIEL SMITH
Director

NORTH CAROLINA
Environmental Quality

August 19, 2021

Mr. Philip S. Harris, III, P.E., CPM
Natural Environment Section Head
Project Development and Environmental Analysis
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina, 27699-1598

Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water with ADDITIONAL CONDITIONS for proposed improvements to the Rutherfordton Bypass, US 221 South of US 74 Business to North of SR 1366 (Roper Loop Road) in Rutherford County, Federal Aid Project No. STBG-0024(083), TIP Nos. R-2233BB & BA.
NCDWR Project No. 20200362 v. 2

Dear Mr. Harris:

Attached hereto is a modification of Certification No. WQC004229 issued to The North Carolina Department of Transportation (NCDOT) dated June 10, 2020.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

DocuSigned by:
Amy Chapman
9C9886312DCD474...
S. Daniel Smith, Director
Division of Water Resources

Attachments

Electronic copy only distribution:
Lori Beckwith, US Army Corps of Engineers, Asheville Field Office
Roger Bryan, Division 13 Environmental Officer
Colin Mellor, NC Department of Transportation
Carla Dagnino, NC Department of Transportation
Amanetta Somerville, US Environmental Protection Agency
Holland Youngman, US Fish and Wildlife Service
Marla Chambers, NC Wildlife Resources Commission
Beth Harmon, Division of Mitigation Services
File Copy

Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500. This certification authorizes the NCDOT to impact an additional 0.01 acres of jurisdictional wetlands and 879 linear feet of jurisdictional streams in Rutherford County. The project shall be constructed pursuant to the modification dated received July 27, 2021. The authorized impacts are as described below:

Stream Impacts in the Broad River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear feet)	Stream Impacts Requiring Mitigation (linear ft)
Original approved impacts	204	43	4,532	339	5,118	3,714
New additional impacts with this approval at Site 19			879		879	879
TOTAL:	**204**	**43**	**5,411**	**339**	**5,997**	**4,593**

Total Stream Impact for R-2233BB: 5,615 linear feet

Wetland Impacts in the Broad River Basin (Riverine)

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)	Impacts Requiring Mitigation (ac)
Original approved impacts	0.11					0.11	0.11
New additional impacts with this approval at Site 20	0.01					0.01	0.01
Total	**0.12**	**0.00**	**0.00**	**0.00**	**0.00**	**0.12**	**0.12**

Total Wetland Impact for R-2233BB: 0.12 acres.

The application provides adequate assurance that the discharge of fill material into the waters of the Broad River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your modified application dated received July 27, 2021. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated June 10, 2020, still apply except where superseded by this certification. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one tenth of an acre or 300 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Conditions of Certification:

1. This modification is applicable only to the additional proposed activities. All of the authorized activities and conditions of certification associated with the original Water Quality Certification dated June 10, 2021, still apply except where superseded by this certification.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919) 431-3000, Facsimile: (919) 431-3100

A copy of the petition must also be served on DEQ as follows:

Mr. Bill F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center

This the 19th day of August 2021

DIVISION OF WATER RESOURCES

DocuSigned by:
Amy Chapman
9C9886312DCD474...

S. Daniel Smith, Director

WQC No. 004229

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
S. DANIEL SMITH
Director

NORTH CAROLINA
Environmental Quality

NCDWR Project No.: _____ **County:** _____

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion
Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401 Transportation Permitting Unit, North Carolina Division of Water Resources, 1617 Mail Service Center, Raleigh, NC, 27699-1617. This form may be returned to NCDWR by the applicant, the applicant's authorized agent, **or** the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Agent's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date:_____

Engineer's Certification

_____ Partial _____ Final

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature _____ Registration No. _____
Date _____

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

General Project Information

WBS Element:	34400.1.S5	**TIP Number:**	R-2233BB	**Project Type:**	New Location	**Date:**	5/27/2021
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)					

Additional Waterbody Information

Surface Water Body (2):	Cleghorn Creek Trib 12	**NCDWR Stream Index No.:**			
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)						

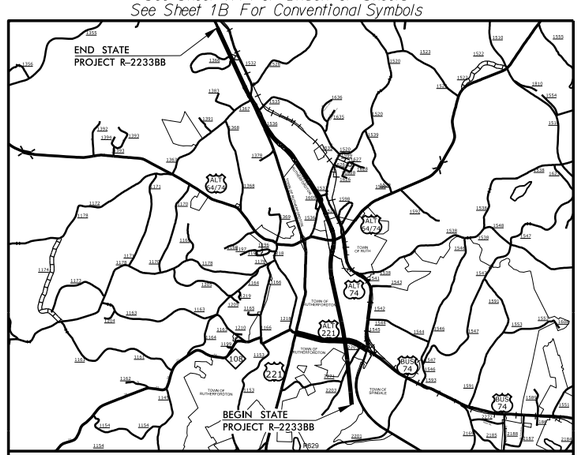
Surface Water Body (4):	Hollands Creek		**NCDWR Stream Index No.:**	9-41-13-7-(1)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply V (WS-V)			
		Supplemental Classification:				
Other Stream Classification:						
Impairments:						
Aquatic T&E Species?		Comments:				
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

CONTRACT: C204397

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RUTHERFORD COUNTY

PERMIT DRAWING
SHEET 1 OF 37

Revised
7/1/2021

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

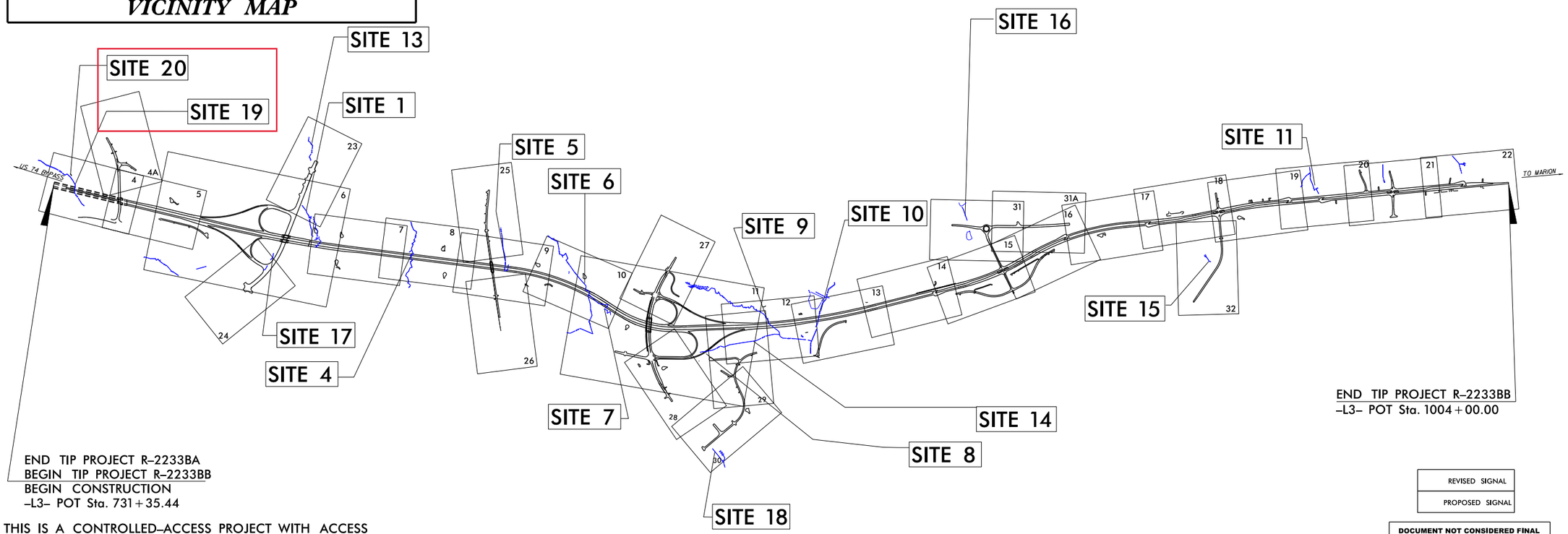
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34400.1.S5		PE
34400.2.5		R/W
34400.2.7		UTIL.
34400.3.4		CONST.

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

TYPE OF WORK: GRADING, DRAINAGE, PAVING, RETAININ AND STRUCTURES

WETLAND AND SURFACE WATER IMPACTS PERMIT

NAD 83/NA 2011



END TIP PROJECT R-2233BA
BEGIN TIP PROJECT R-2233BB
BEGIN CONSTRUCTION
–L3– POT Sta. 731+35.44

END TIP PROJECT R-2233BB
–L3– POT Sta. 1004+00.00

REVISED SIGNAL
PROPOSED SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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.

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 = 5.140 MILES
LENGTH STRUCTURE TIP PROJECT R-2233BB = 0.026 MILES
TOTAL LENGTH TIP PROJECT R-2233BB = 5.166 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

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 28, 2017

LETTING DATE:
DECEMBER 21, 2021

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

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

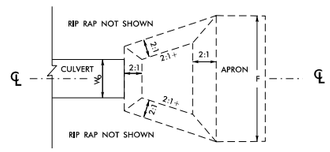
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2D-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 2 OF 37

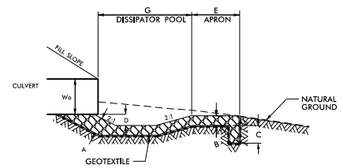
DETAIL 1
RIP-RAP ENERGY DISSIPATOR BASIN

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



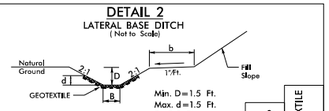
PLAN



℄ 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

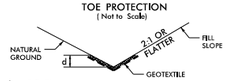
DETAIL 2
LATERAL BASE DITCH
(Not to Scale)



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

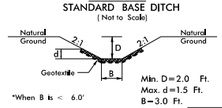
DETAIL 3
TOE PROTECTION
(Not to Scale)



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

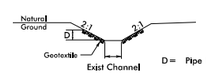
DETAIL 4
STANDARD BASE DITCH
(Not to Scale)



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

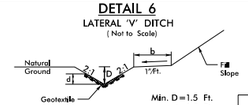
DETAIL 5
RIRPAP PAD AT JURISDICTIONAL STREAM
(Not to Scale)



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

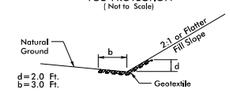
DETAIL 6
LATERAL 'V' DITCH
(Not to Scale)



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

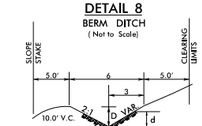
DETAIL 7
TOE PROTECTION
(Not to Scale)



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

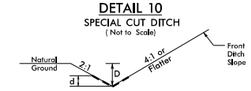
LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y2 STA. 31+00 TO 33+00 LT	6	178	92	260
FROM L3 STA. 782+00 TO 782+50 RT	7	44	23	70
FROM L3 STA. 811+45 TO 812+20 RT	9	67	35	100
FROM L3 STA. 815+87 TO 824+15 RT	9, 10	264	381	1080
FROM L3 STA. 824+15 TO 826+00 RT	10	65	85	240
FROM Y2 STA.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

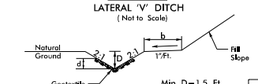
DETAIL 10
SPECIAL CUT DITCH
(Not to Scale)



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

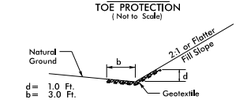
DETAIL 11
LATERAL 'V' DITCH
(Not to Scale)



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

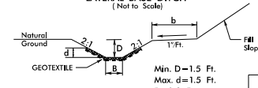
DETAIL 12
TOE PROTECTION
(Not to Scale)



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

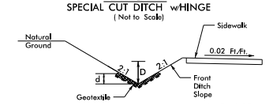
DETAIL 13
LATERAL BASE DITCH
(Not to Scale)



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

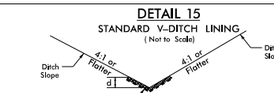
DETAIL 14
SPECIAL CUT DITCH wHINGE
(Not to Scale)



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

5/14/99

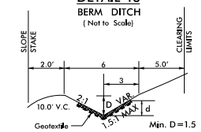
10/25/2017
DWilkins
R2233BB_Permit Drawings_20171025.pdf

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)

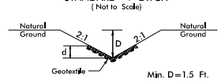


Min. D=1.5 Ft.
Max. d=1.5 Ft.

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)

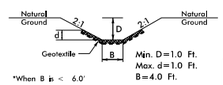


Min. D=1.5 Ft.
Max. d=1.5 Ft.

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)



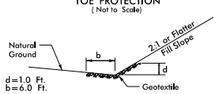
Min. D=1.0 Ft.
Max. d=1.0 Ft.
B=4.0 Ft.

*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)

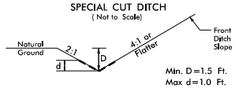


d=1.0 Ft.
b=6.0 Ft.

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)

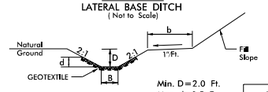


Min. D=1.5 Ft.
Max d=1.0 Ft.

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)



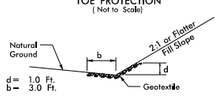
Min. D=2.0 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.
b=5.0 Ft.

*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)

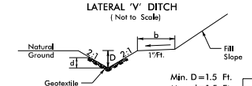


d= 1.0 Ft.
b= 3.0 Ft.

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)

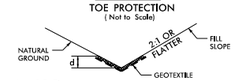


Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.

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)

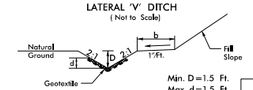


d= 1.5 Ft.

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)

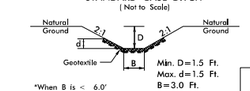


Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.

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)



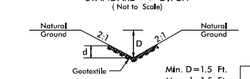
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.

*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

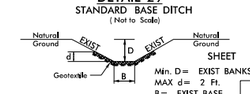
LOCATION	SHEET	DDE CY	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 797+67 TO 798+00 RT	8	18	15	70

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)



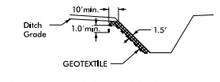
SHEET
Min. D= EXIST BANKS
MAX d= 2 Ft.
B= EXIST BASE

*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

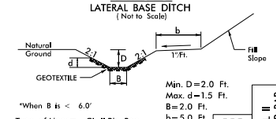
DETAIL 30
RIP RAP AT EMBANKMENT
(Not to Scale)



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

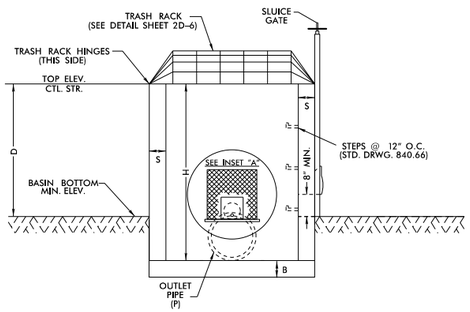
Dewberry
7610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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

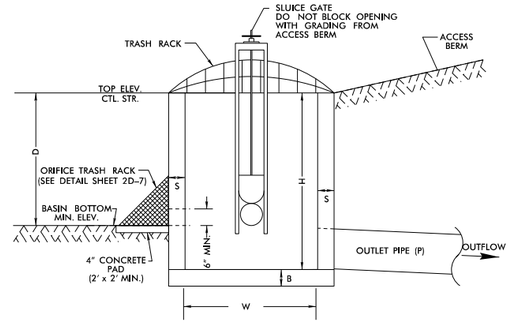
DETAIL K

DRY DETENTION BASIN DRAWDOWN STRUCTURE

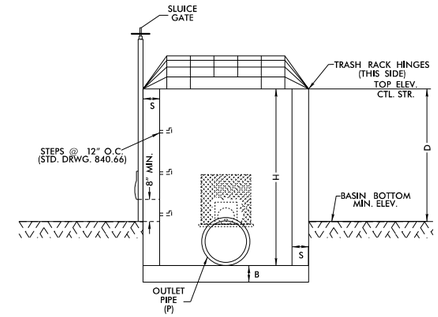
NOT TO SCALE



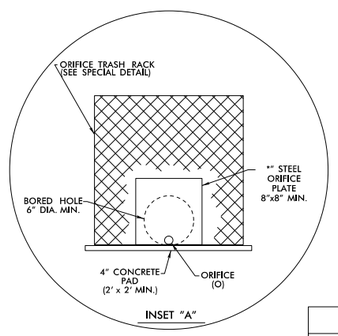
SIDE 1



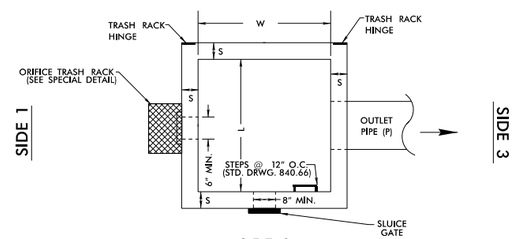
SIDE 2



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

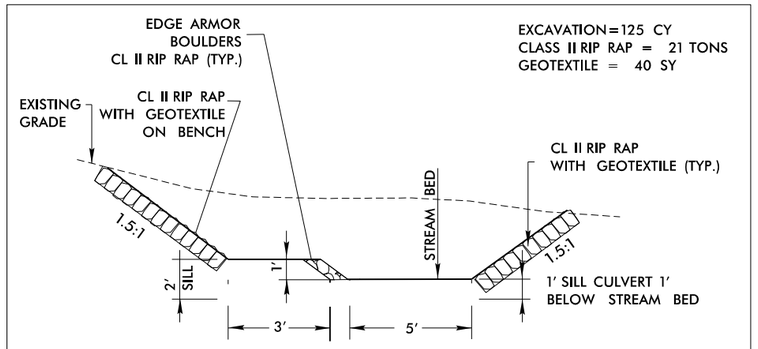
STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
LPB 17+50 RT	655	8	12	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

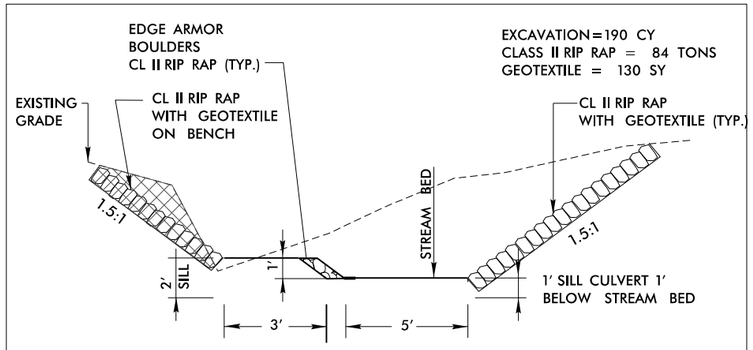
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 5 OF 37



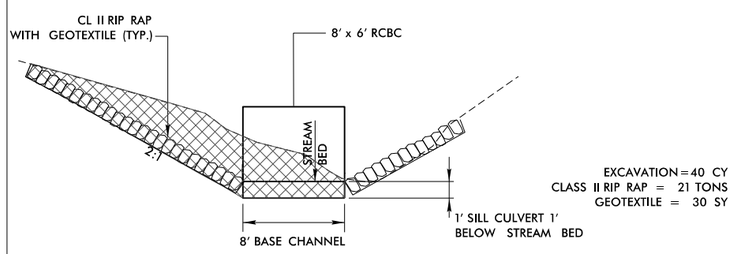
DETAIL G1 – FLOODPLAIN BENCH INLET CHANNEL DETAIL
STA 797+66 (LOOKING DOWNSTREAM)

DETAIL G1
CULVERT 797+66



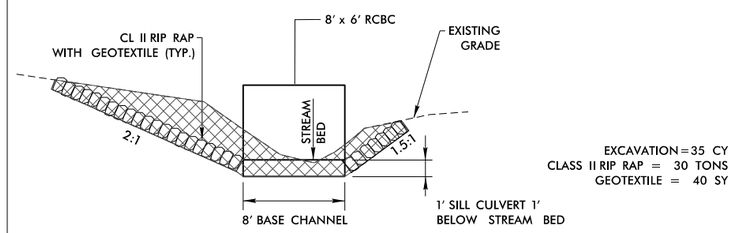
DETAIL G2 – FLOODPLAIN BENCH OUTLET CHANNEL DETAIL
STA 797+66 (LOOKING DOWNSTREAM)

DETAIL G2
CULVERT 797+66



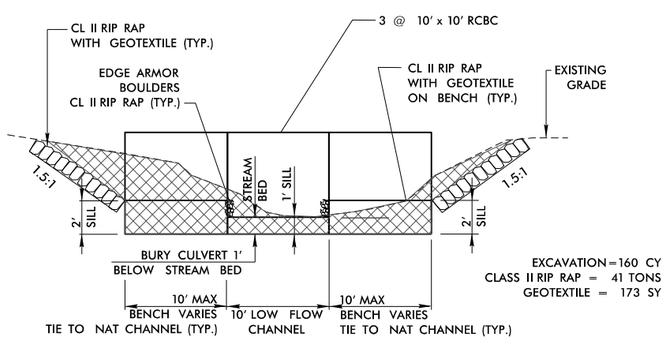
INLET CHANNEL DETAIL
STA 830+03 (LOOKING DOWNSTREAM)

DETAIL H1
CULVERT 830+02



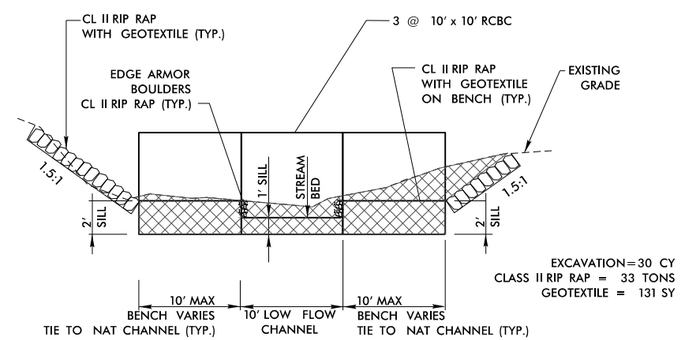
OUTLET CHANNEL DETAIL
STA 830+03 (LOOKING DOWNSTREAM)

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

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

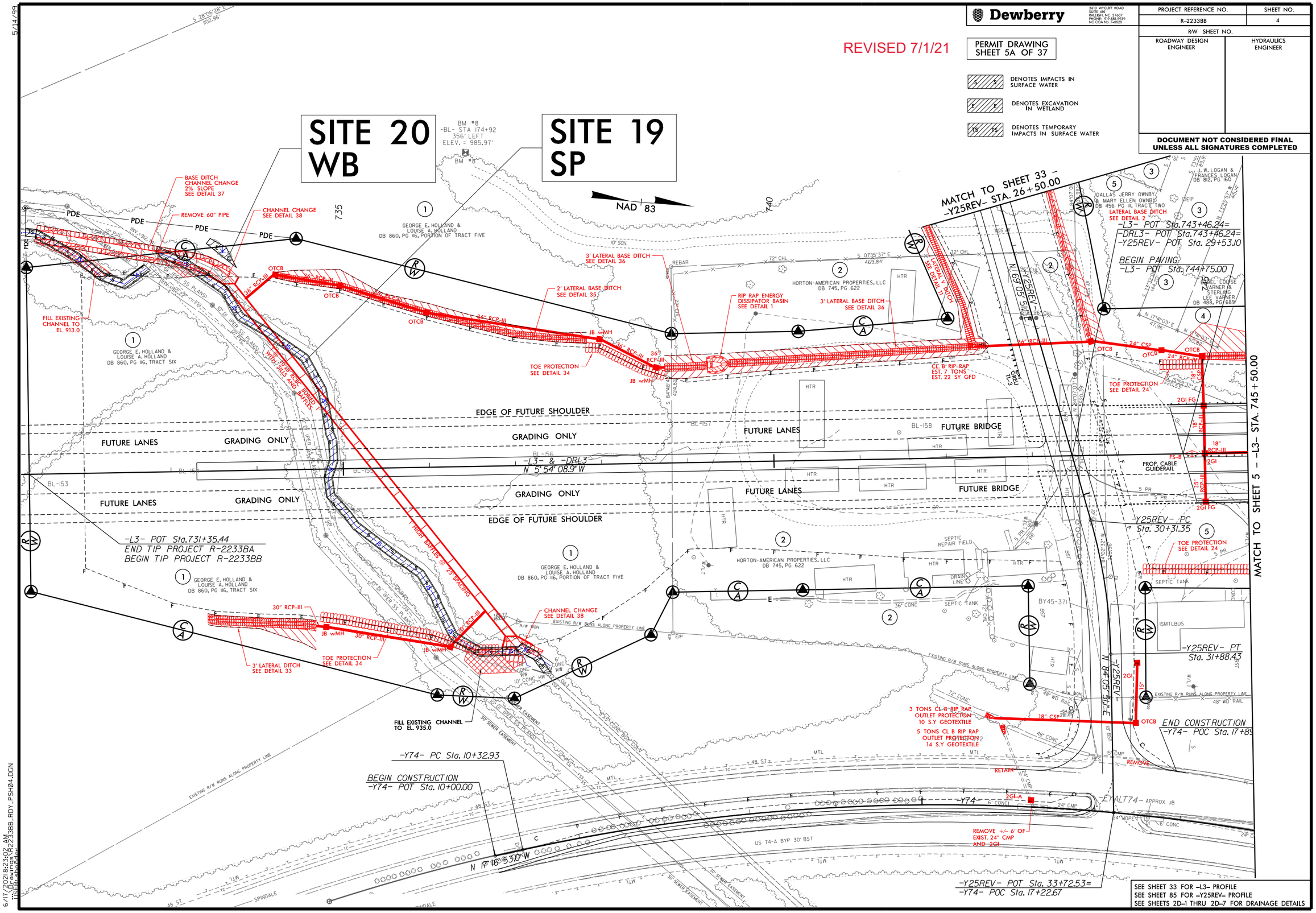
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISED 7/1/21

PERMIT DRAWING
SHEET 5A OF 37

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



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
6/17/2021 8:23:02 AM
R-2233BB_RDY_PSH04.DGN

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

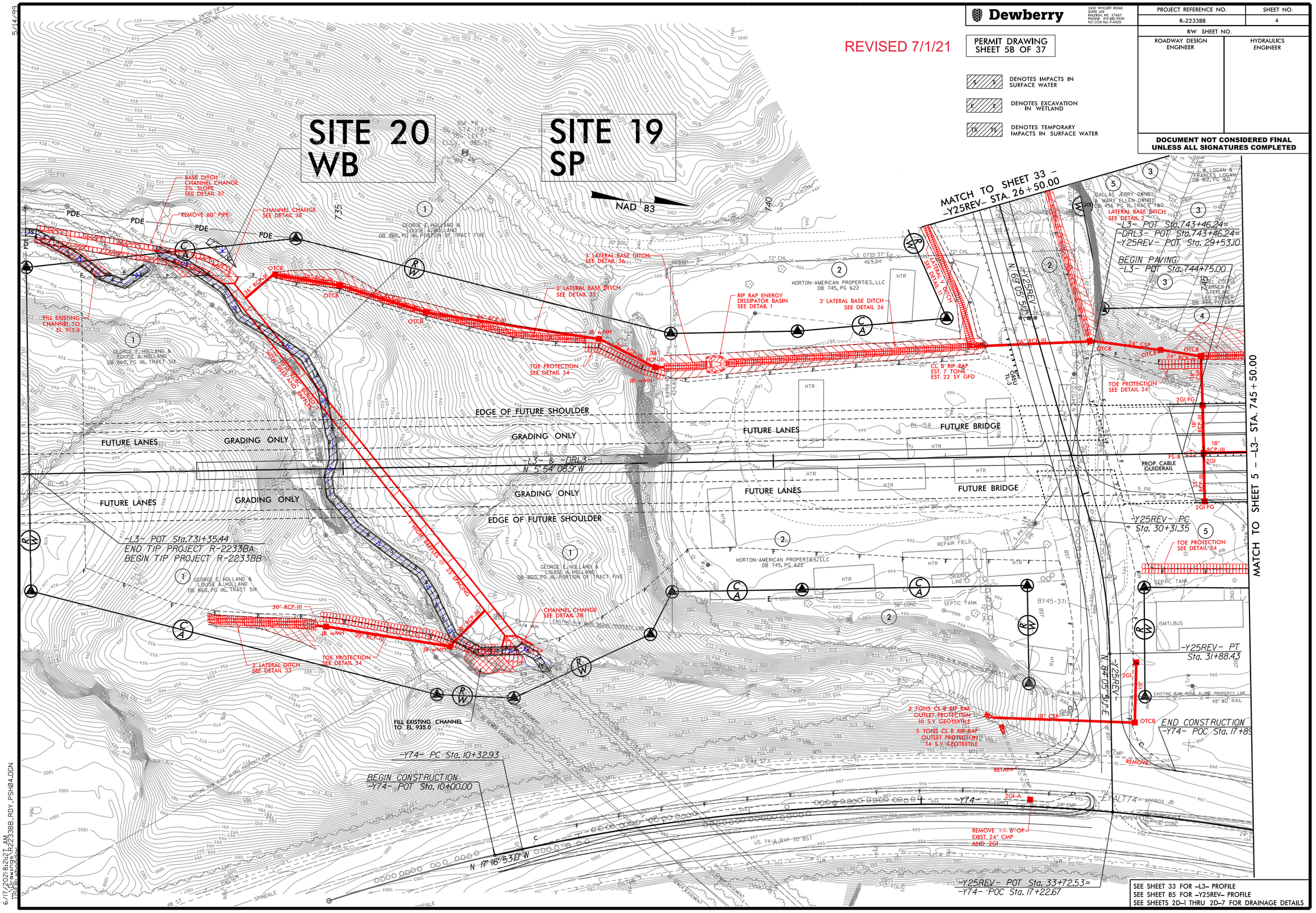
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISED 7/1/21

PERMIT DRAWING
SHEET 5B OF 37

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



5/14/99

6/17/2021 8:26:27 AM
R2233BB_RDY_PSH04.DGN
USER: swinegar

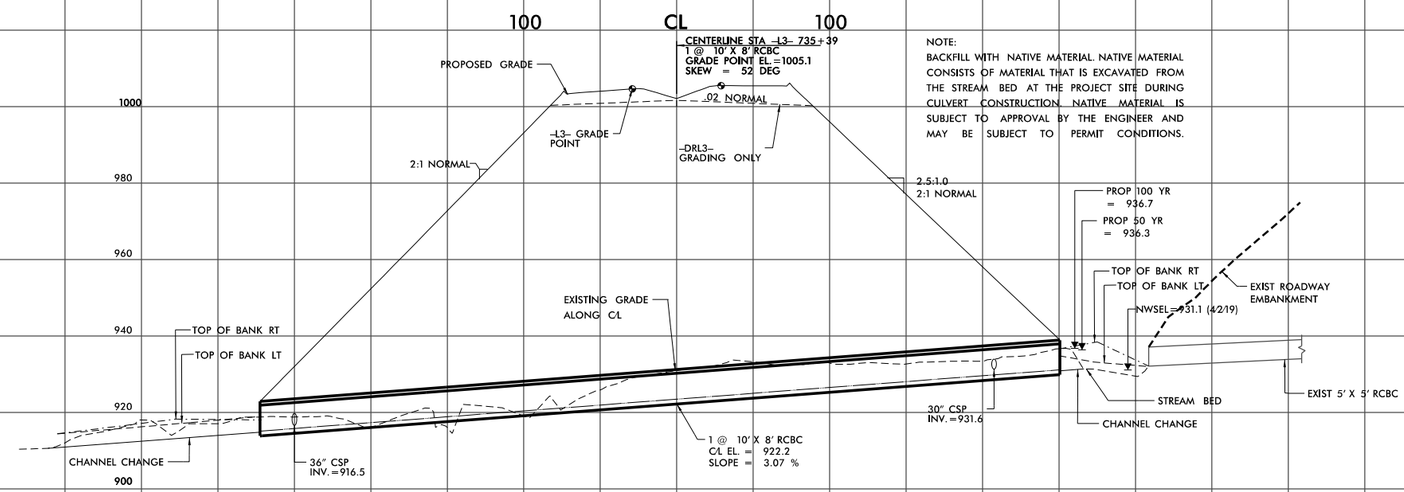
5/14/99

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

PERMIT DRAWING SHEET 5C OF 37

REVISED 7/1/21

SITE 19 SP



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.

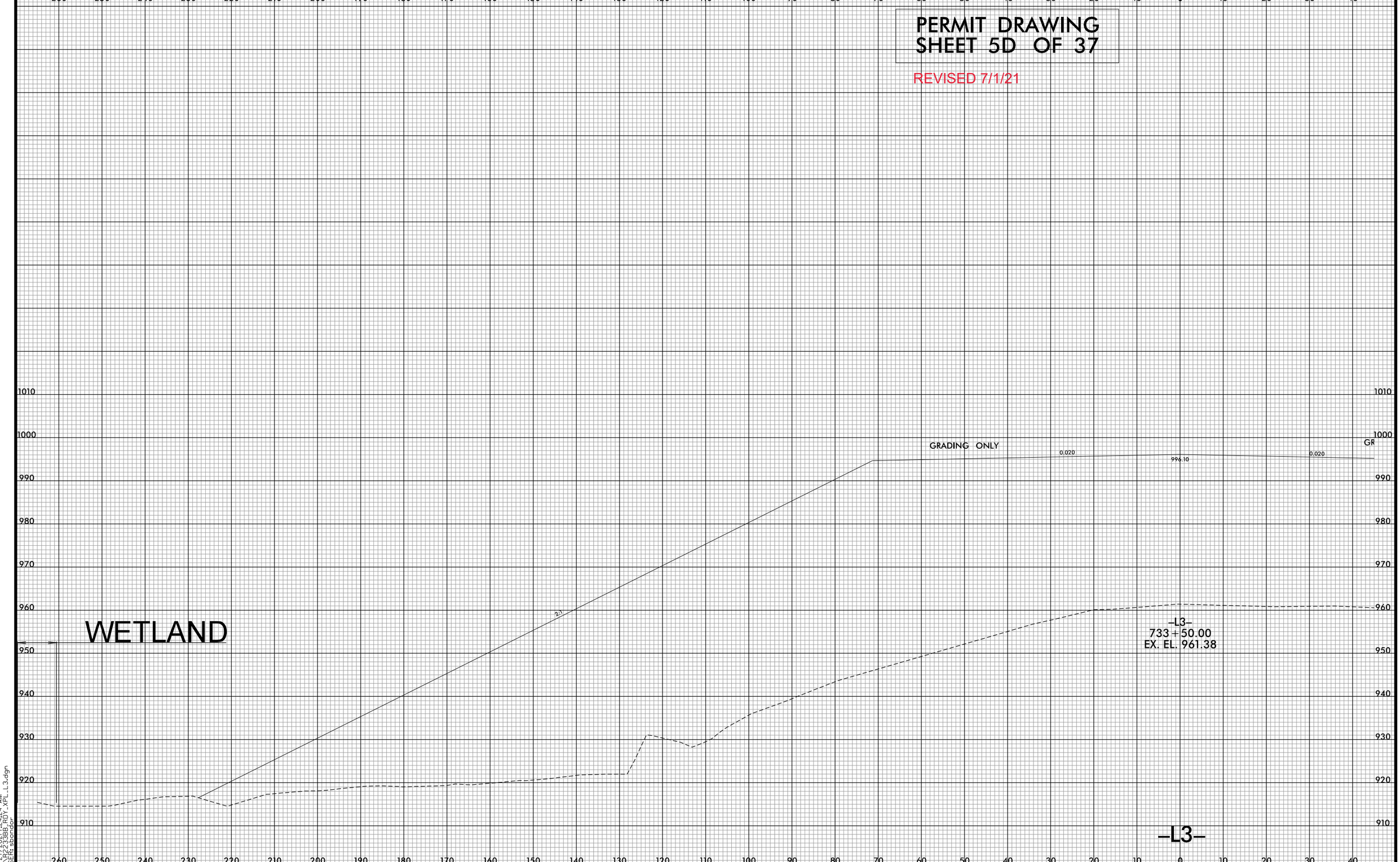
6/23/16

PROJ. REFERENCE NO.	SHEET NO.
R-2233BB	X-4B

0 5 10

PERMIT DRAWING
SHEET 5D OF 37

REVISED 7/1/21



5/27/2021 7:24:24 AM
USER: ASCOTT
DGN: 2388_RD1_XPL_L3.dgn

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

B

C

NAD 83

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
CHARLOTTE RD. US 74 BUSINESS
65/88 US 221 BYPASS 128/145
C 71/97 D 94/112
192/255 206/260 *VPD IN 100s

SEE SHEETS 33 & 36 FOR -L3- PROFILE
SEE SHEETS 34 & 35 FOR -Y25- PROFILE
SEE SHEETS 18&19 FOR -RPB- PROFILE
SEE SHEETS 19&20 FOR -RPC- PROFILE
SEE SHEET 20 FOR -RPD- PROFILE
SEE SHEET 20 FOR -RPE- PROFILE
SEE SHEET 36-A FOR INTERSECTION DETAILS
SEE SHEET 36-B FOR INTERCHANGE DETAILS
SEE SHEETS 20-1 THRU 20-7 FOR DRAINAGE DETAILS

PROPOSED SIGNAL

GRAPHIC SCALE
50 25 0 50 100
PLANS

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

REVISIONS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 1 SN

SITE 1 SN

SITE 17

SITE 17 SO

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
10/15		12/15
65/88 US 221 BYPASS		128/145
C	71/57	D
192/255		94/112
		206/206

CHARLOTTE RD. US 74 BUSINESS

*TPD IN KDH

SEE SHEETS 35 & 36 FOR <L3> PROFILE
SEE SHEETS 44 & 45 FOR <Y2> PROFILE
SEE SHEETS 58 & 59 FOR <PL> PROFILE
SEE SHEETS 59 & 60 FOR <PR> PROFILE
SEE SHEET 58 FOR <RPB> PROFILE
SEE SHEET 59 FOR <RPC> PROFILE
SEE SHEET 38-A FOR INTERSECTION DETAILS
SEE SHEET 38-B FOR <L3> DETAILS
SEE SHEETS 20-1 THRU 20-3 FOR DRAINAGE DETAILS

PROPOSED SIGNAL

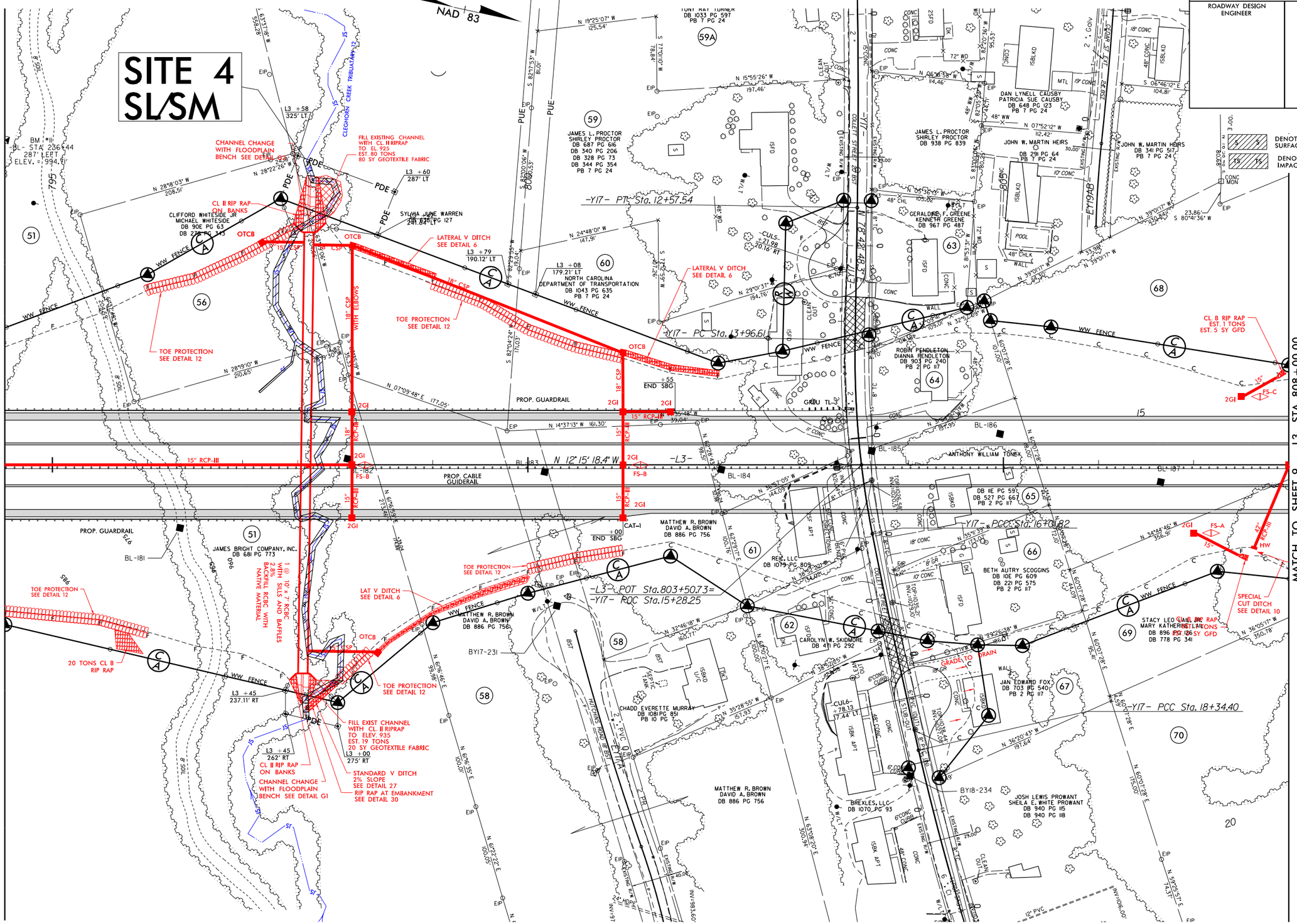
GRAPHIC SCALE
50 25 0 50 100
PLANS

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



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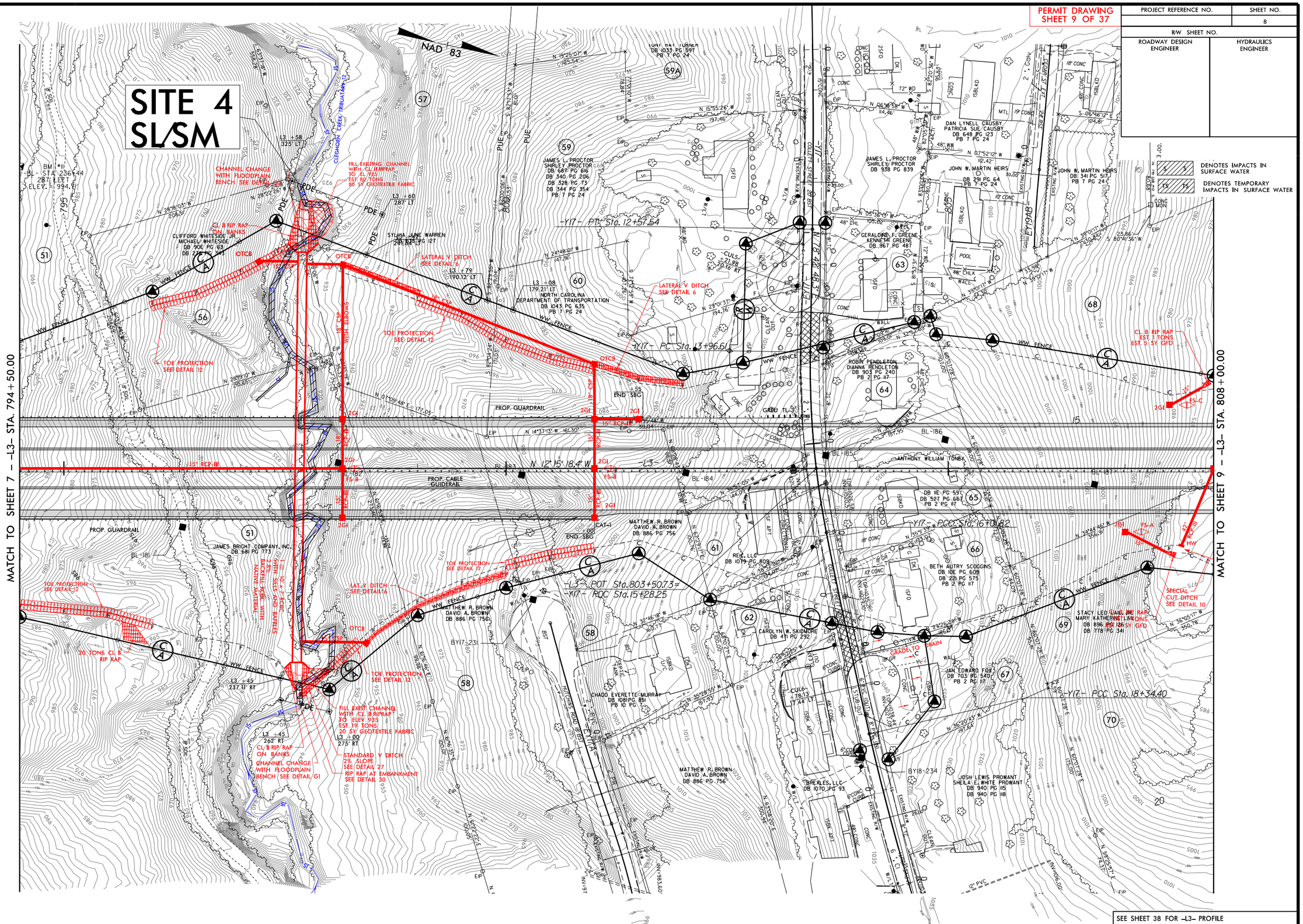
5/14/99

PERMIT DRAWING
SHEET 9 OF 37

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

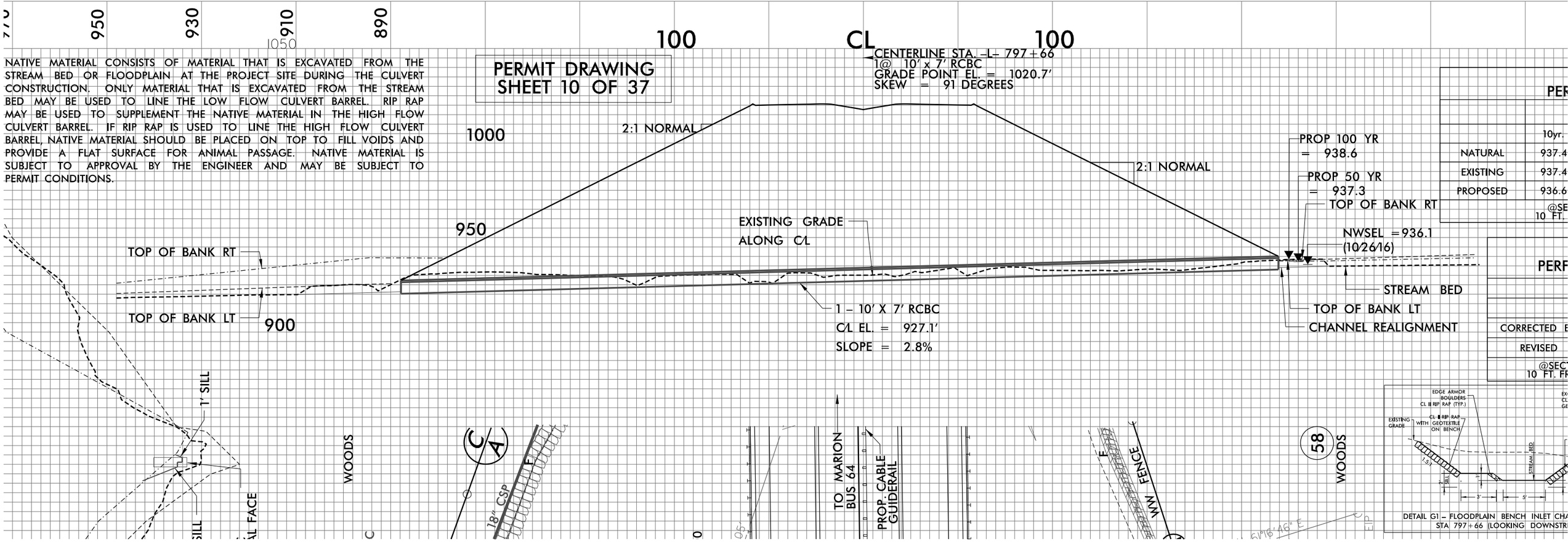


SEE SHEET 38 FOR –L3– PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

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

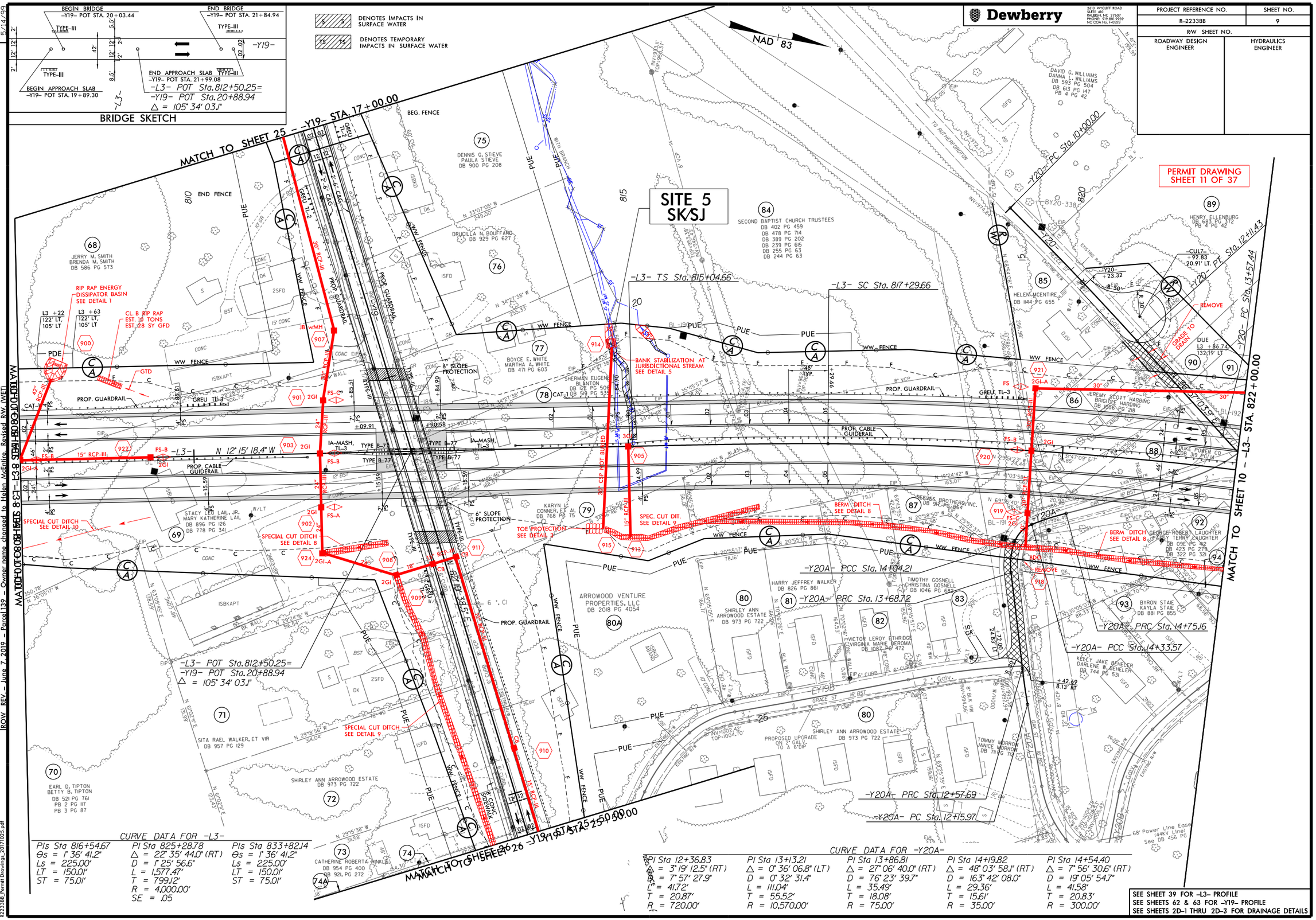
NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING THE CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE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



PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	9
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 -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 -Y20A-

PI Sta 12+36.83	PI Sta 13+13.21	PI Sta 13+86.81	PI Sta 14+19.82	PI Sta 14+54.40
Δ = 3° 19' 12.5" (RT)	Δ = 0° 36' 06.8" (LT)	Δ = 27° 06' 40.0" (RT)	Δ = 48° 03' 58.1" (RT)	Δ = 7° 56' 30.6" (RT)
D = 7° 57' 27.9"	D = 0° 32' 31.4"	D = 76° 23' 39.7"	D = 163° 42' 08.0"	D = 19° 05' 54.7"
L = 41.72'	L = 111.04'	L = 35.49'	L = 29.36'	L = 41.58'
T = 20.87'	T = 55.52'	T = 18.08'	T = 15.61'	T = 20.83'
R = 720.00'	R = 10,570.00'	R = 75.00'	R = 35.00'	R = 300.00'

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 +68.88EX. 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 Rae 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 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)

10/25/2017
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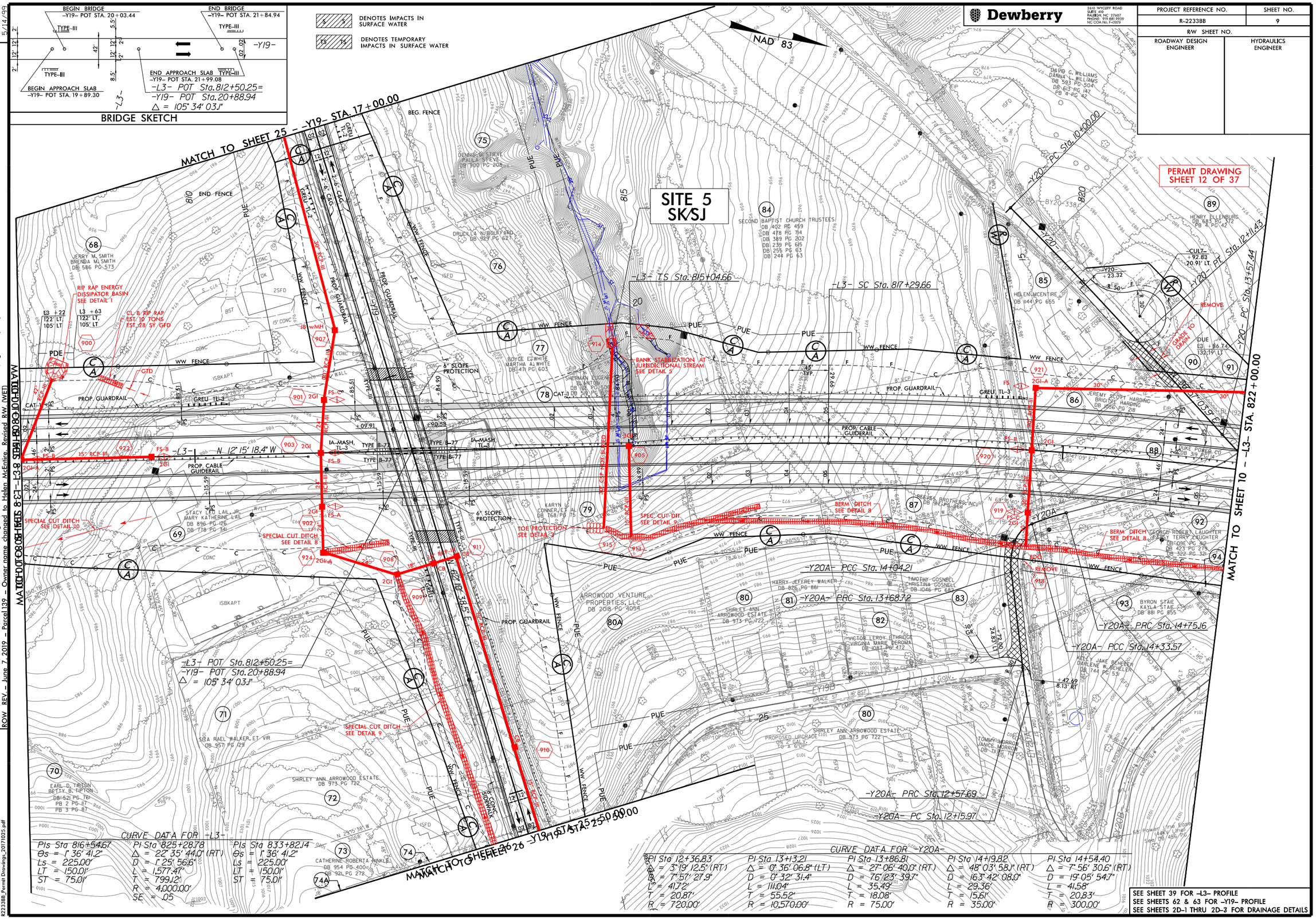
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



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)
ROW REV - June 19, 2018 - Parcel 85 - Added "DB 1144 PG 655" (AMP)
ROW REV - October 22, 2018 - Parcel 71 - Changed name to Stra Raet 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 - 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 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)

MATCH TO SHEET 10 - -L3- STA. 822+00.00

MATCH TO SHEET 26 -Y19- STA. 25+50.00

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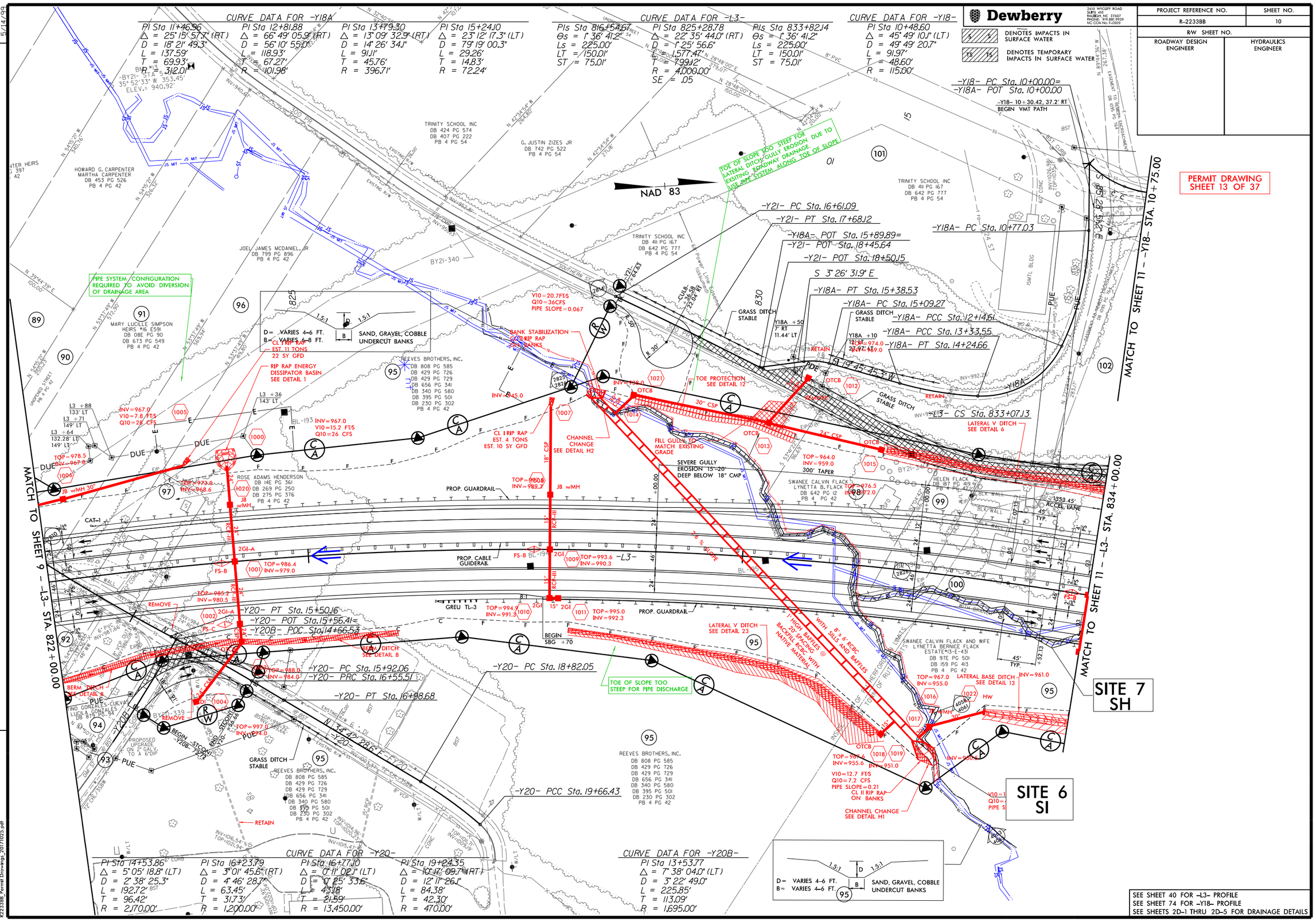
CURVE DATA FOR -Y18A
PI Sta 11+46.96
Δ = 25° 15' 57.7" (RT)
D = 18° 21' 49.3"
L = 137.59'
T = 69.93'
R = 312.01'
PI Sta 12+81.88
Δ = 66° 49' 05.9" (RT)
D = 56° 10' 55.0"
L = 118.93'
T = 67.27'
R = 101.98'
PI Sta 13+79.30
Δ = 13° 09' 32.9" (RT)
D = 14° 26' 34.1"
L = 91.11'
T = 45.76'
R = 396.71'
PI Sta 15+24.10
Δ = 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
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'
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'
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
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
NAD 83
-Y18- PC Sta. 10+00.00=
-Y18A- POT Sta. 10+00.00
-Y18- 10+30.42, 37.2' RT
BEGIN VMT PATH
-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
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
TOE OF SLOPE TOO STEEP FOR PIPE DISCHARGE
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
D = VARIES 4-6 FT.
B = VARIES 4-8 FT.
SAND, GRAVEL, COBBLE UNDERCUT BANKS
V10=20.7FTS
Q10=36CFS
PIPE SLOPE=0.067
INV=967.0
V10=7.8 FTS
Q10=28 CFS
INV=967.0
V10=15.2 FTS
Q10=26 CFS
CL I RIP RAP
EST. 4 TONS
EST. 10 SY GFD
CHANNEL CHANGE
SEE DETAIL H2
TOE PROTECTION
SEE DETAIL 12
FILL GULLY TO MATCH EXISTING GRADE
SEVERE GULLY EROSION 15-20' DEEP BELOW 18" CMP
300' TAPER
LATERAL V DITCH
SEE DETAIL 6
PROP. GUARDRAIL
PROP. CABLE GUIDERAIL
-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
BEGIN SBG +70
BERM DITCH
SEE DETAIL 8
LATERAL V DITCH
SEE DETAIL 23
LATERAL BASE DITCH
SEE DETAIL 13
8' x 6' RCBC WITH SILLS AND BAFFLES
1' HIGH BAFFLES @ 2.0' SPACING
BACKFILL RCBC WITH NATIVE MATERIAL
V10=12.7 FTS
Q10=7.2 CFS
PIPE SLOPE=0.21
CL II RIP RAP ON BANKS
CHANNEL CHANGE
SEE DETAIL H1
GRASS DITCH STABLE
REEVES BROTHERS, INC.
DB 808 PG 585
DB 429 PG 726
DB 429 PG 729
DB 656 PG 341
DB 340 PG 580
DB 395 PG 501
DB 230 PG 302
PB 4 PG 42
TRINITY SCHOOL INC
DB 424 PG 574
DB 407 PG 222
PB 4 PG 54
G. JUSTIN ZIZES JR
DB 742 PG 522
PB 4 PG 54
HOWARD C. CARPENTER
MARTHA CARPENTER
DB 453 PG 526
PB 4 PG 42
JOEL JAMES MCDANIEL, JR
DB 799 PG 896
PB 4 PG 42
MARY LUCILLE SIMPSON
HEIRS #16 E591
DB 086 PG 90
DB 673 PG 549
PB 4 PG 42
ROSE ADAMS HENDERSON
DB 14E PG 361
DB 269 PG 250
DB 275 PG 376
PB 4 PG 42
SWANEE CALVIN FLACK
LYNETTA B. FLACK
DB 642 PG 12
PB 4 PG 42
HELEN FLACK
DB 187 PG 419
PB 4 PG 42
SWANEE CALVIN FLACK AND WIFE
LYNETTA BERNICE FLACK
ESTATE#13-E-431
DB 97E PG 501
DB 159 PG 413
PB 4 PG 42
CURVE DATA FOR -Y20-
PI Sta 14+53.86
Δ = 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
Δ = 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
Δ = 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
Δ = 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
Δ = 7° 38' 04.0" (LT)
D = 3° 22' 49.0"
L = 225.85'
T = 113.09'
R = 1,695.00'
D = VARIES 4-6 FT.
B = VARIES 4-6 FT.
SAND, GRAVEL, COBBLE UNDERCUT BANKS
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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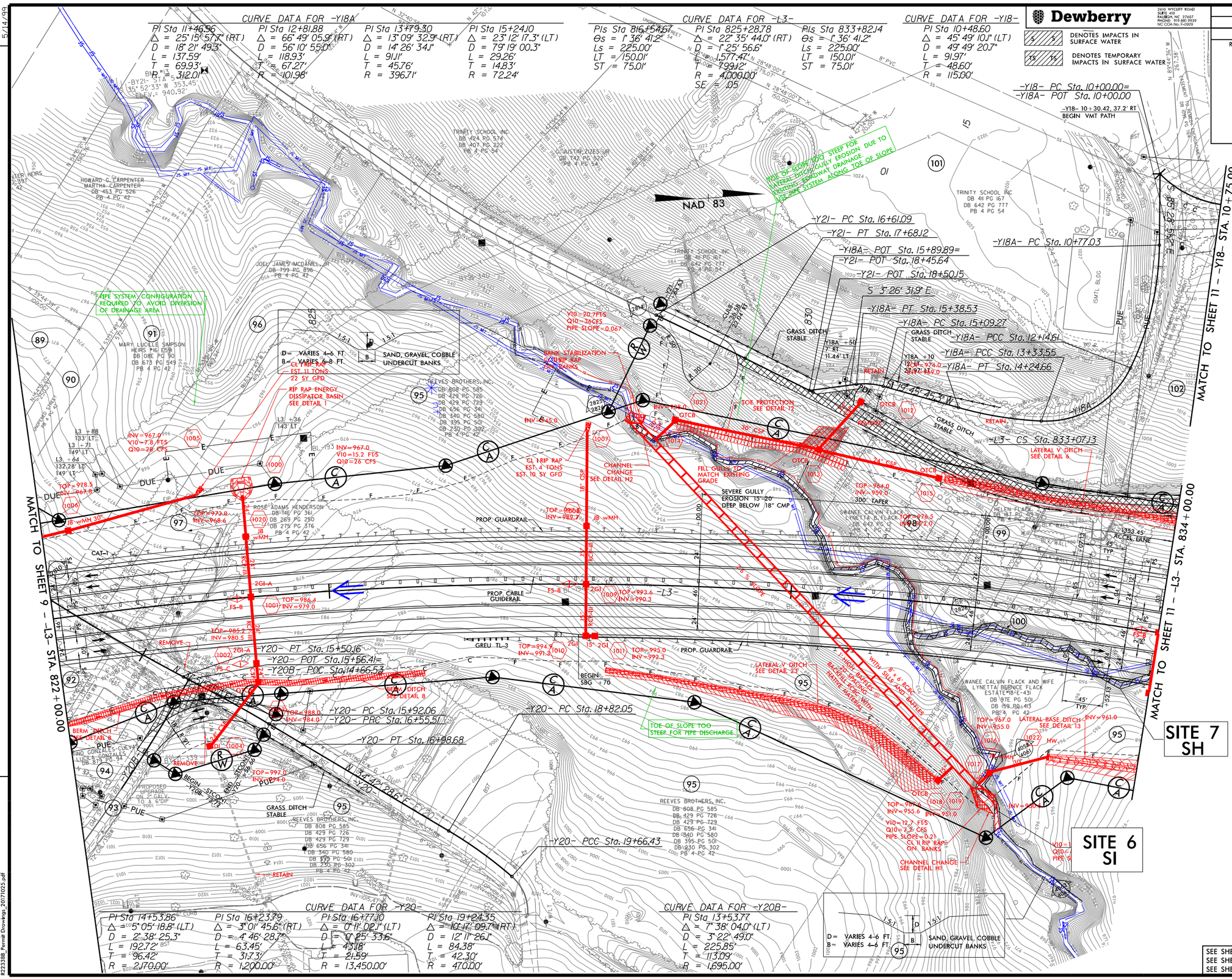
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



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

10/25/2017
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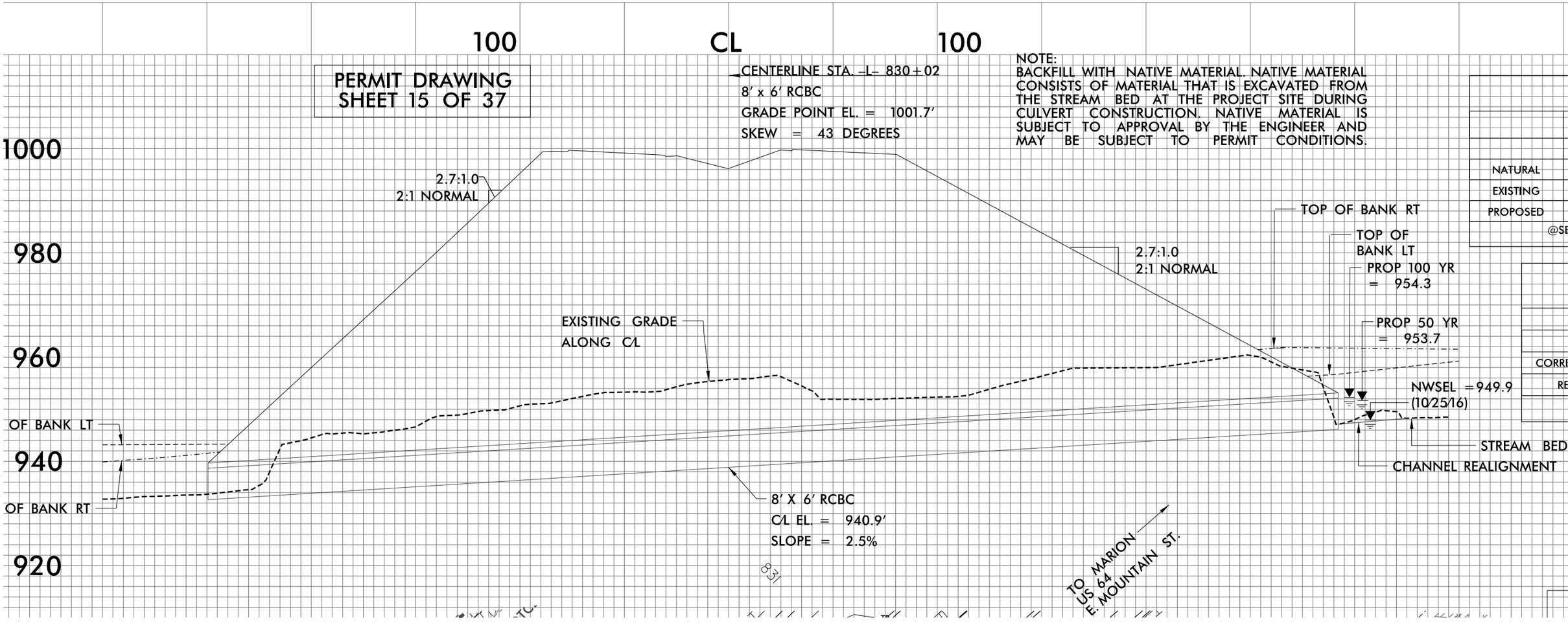

100
CL
100
PERMIT DRAWING
SHEET 15 OF 37
CENTERLINE STA. –L– 830+02
8' x 6' RCBC
GRADE POINT EL. = 1001.7'
SKEW = 43 DEGREES
NOTE:
BACKFILL WITH NATIVE MATERIAL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. NATIVE MATERIAL 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

SITE 7
SH

SITE 8
SG/WA

SITE 8
SG/WA

A

D

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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 -Y3- PROFILE
SEE SHEET 74 FOR -DR3- PROFILE
SEE SHEET 77 FOR -Y4- & -Y23- PROFILE
SEE SHEETS 64 THRU 66 FOR -Y3- PROFILE
SEE SHEETS 20-I THRU 20-J FOR DRAINAGE DETAILS

GRAPHIC SCALE
50 25 0 50 100
PLANS

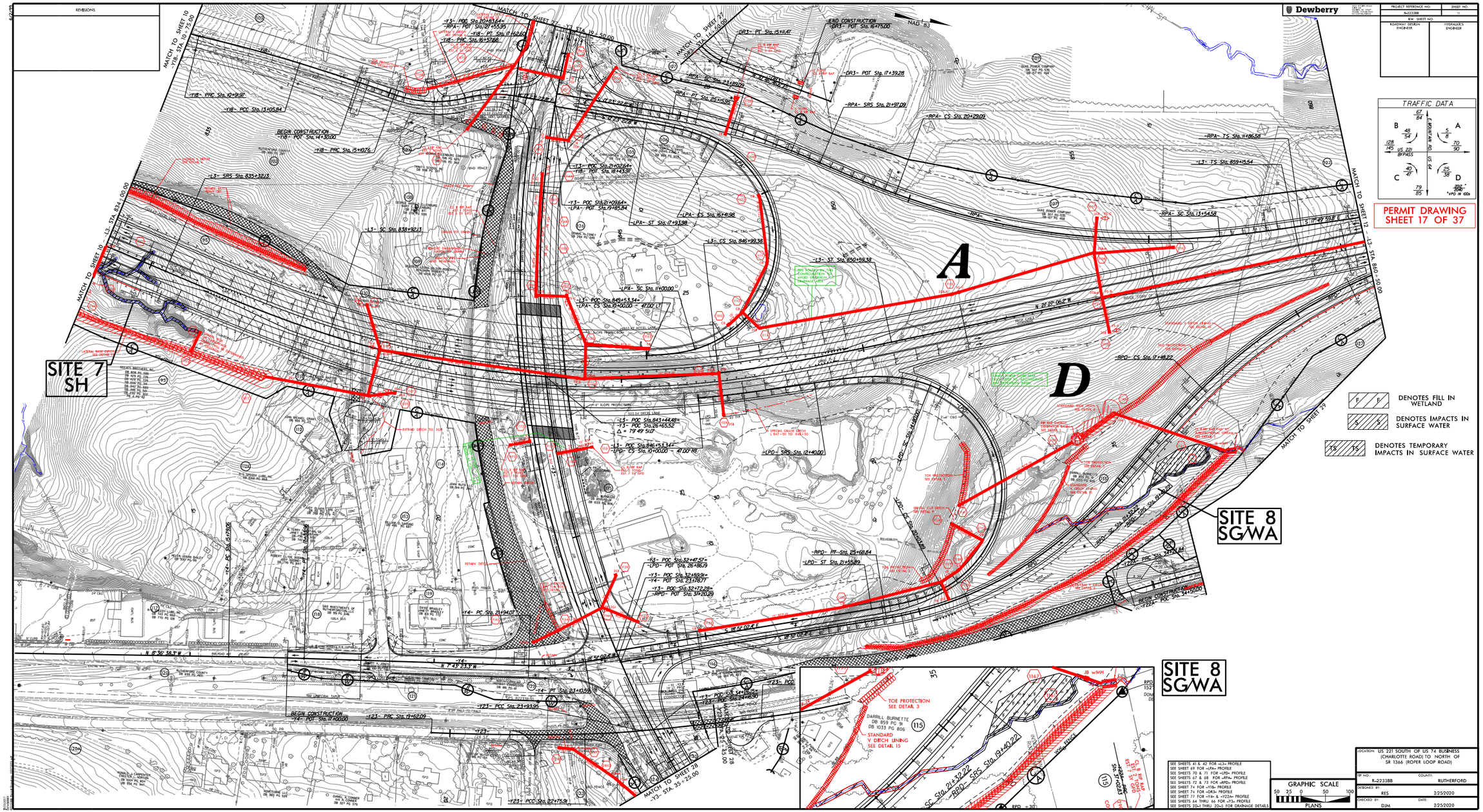
LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TIP NO.	COUNTY:
R-2233BB	RUTHERFORD
DESIGNED BY: RES	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



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 20-3 FOR DRAINAGE DETAILS

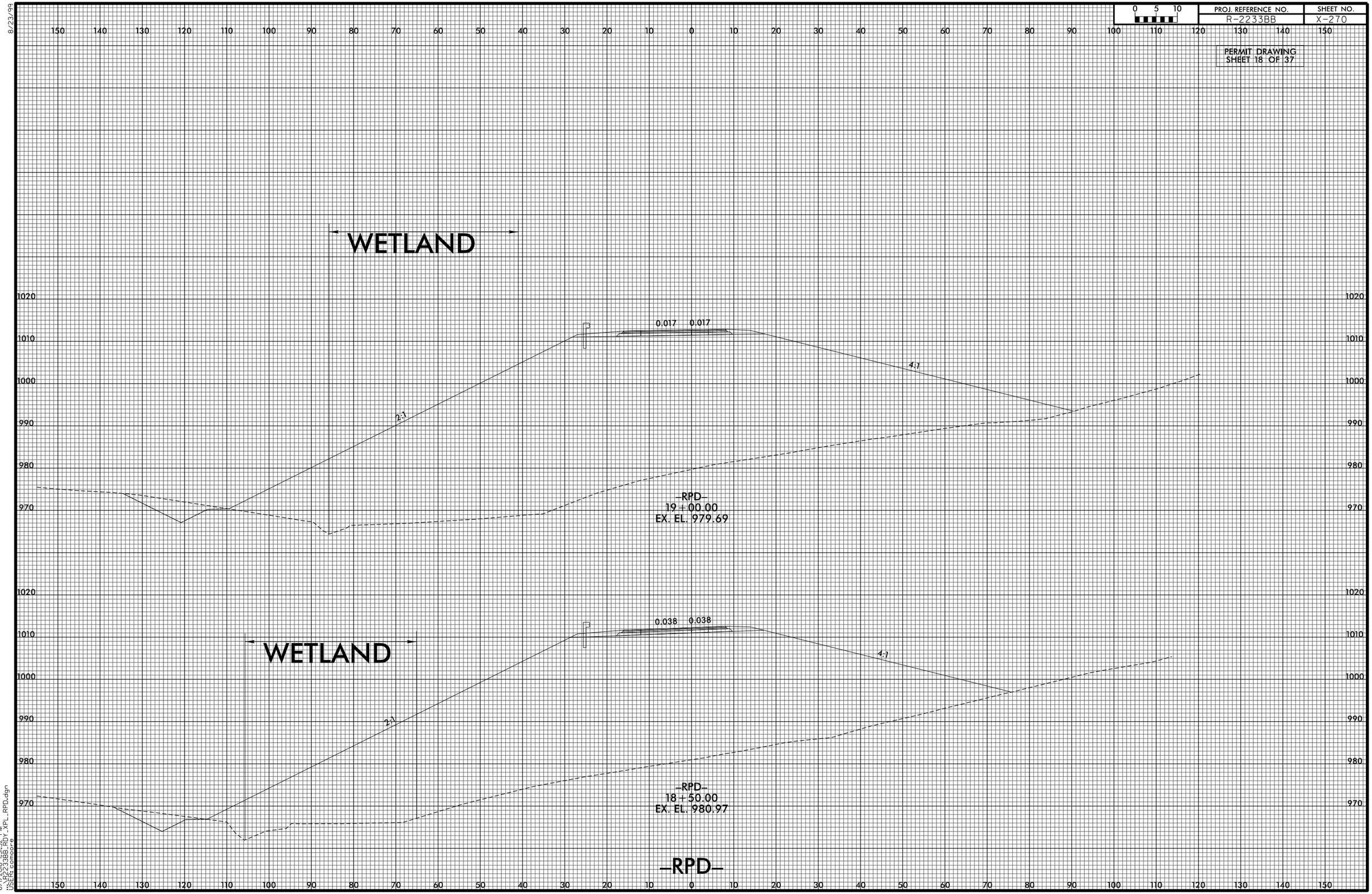
GRAPHIC SCALE
50 25 0 50 100
PLANS

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



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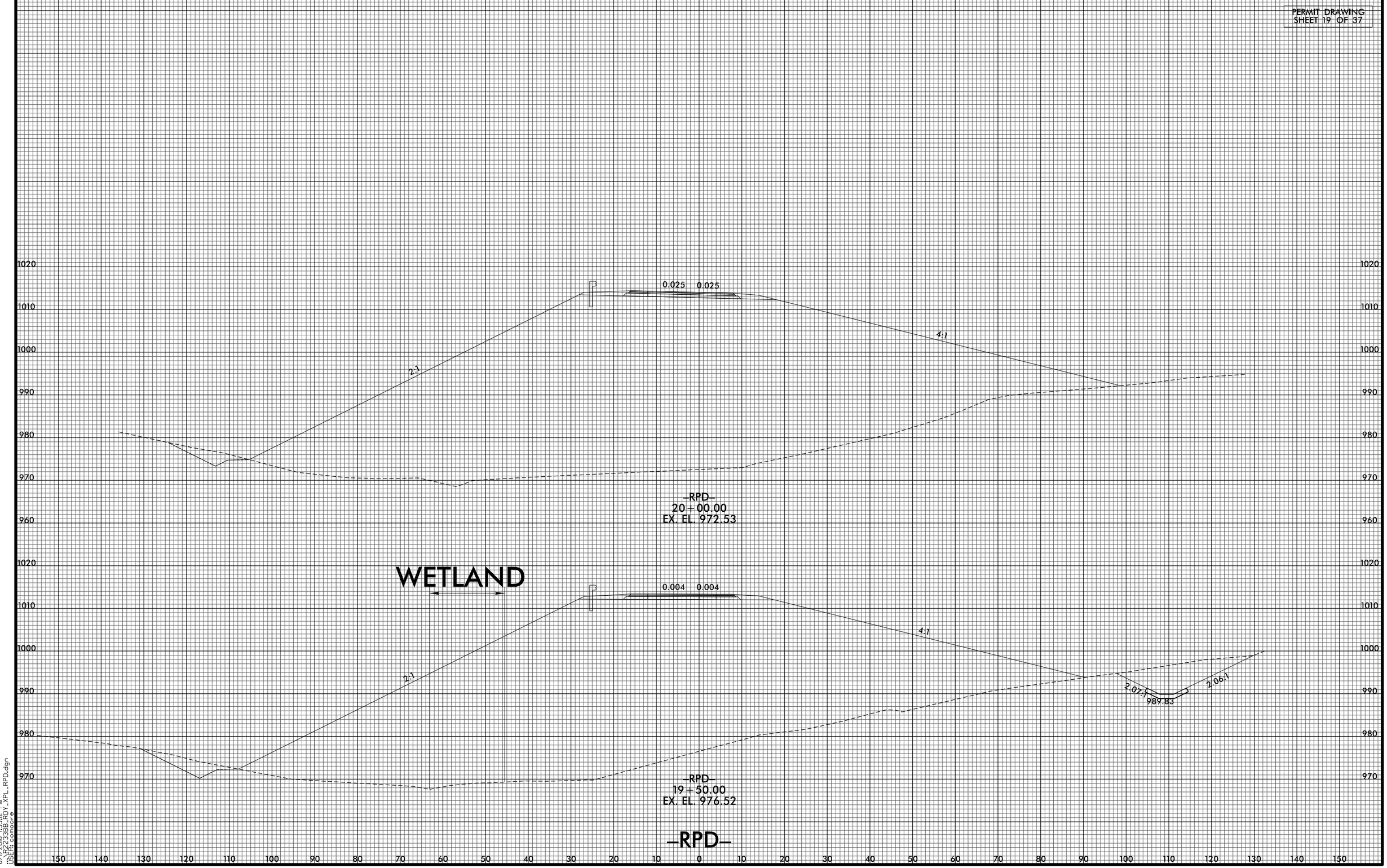
USER: comoore

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

0 5 10

PERMIT DRAWING
SHEET 19 OF 37



8/23/99

6/1/2018 1:53:12 PM
R2233BB_HDY_XPL_RPD.dgn
USER: rcamoore

5/14/99

REVISIONS

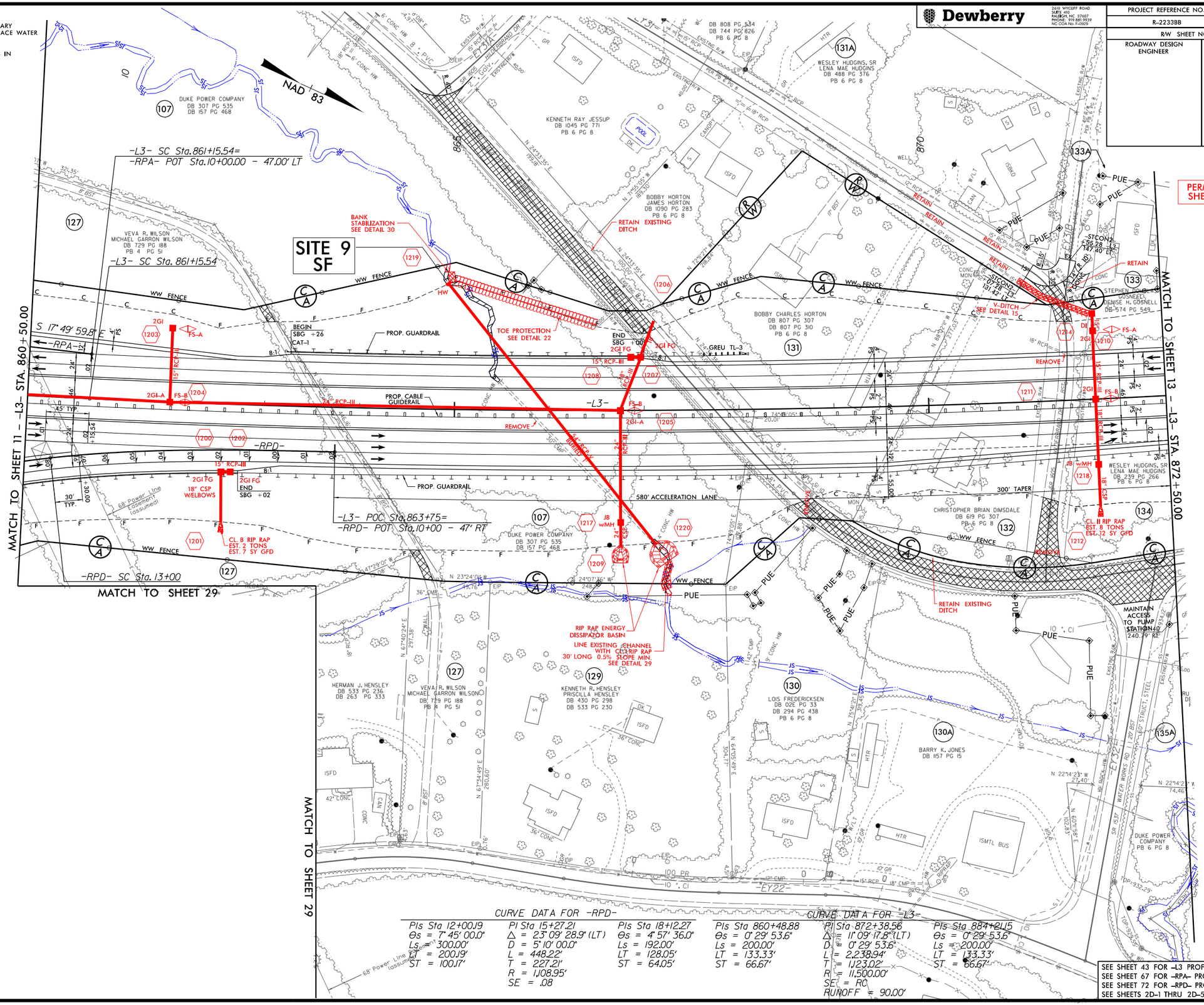
TS / TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S / 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

PERMIT DRAWING
SHEET 20 OF 37



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
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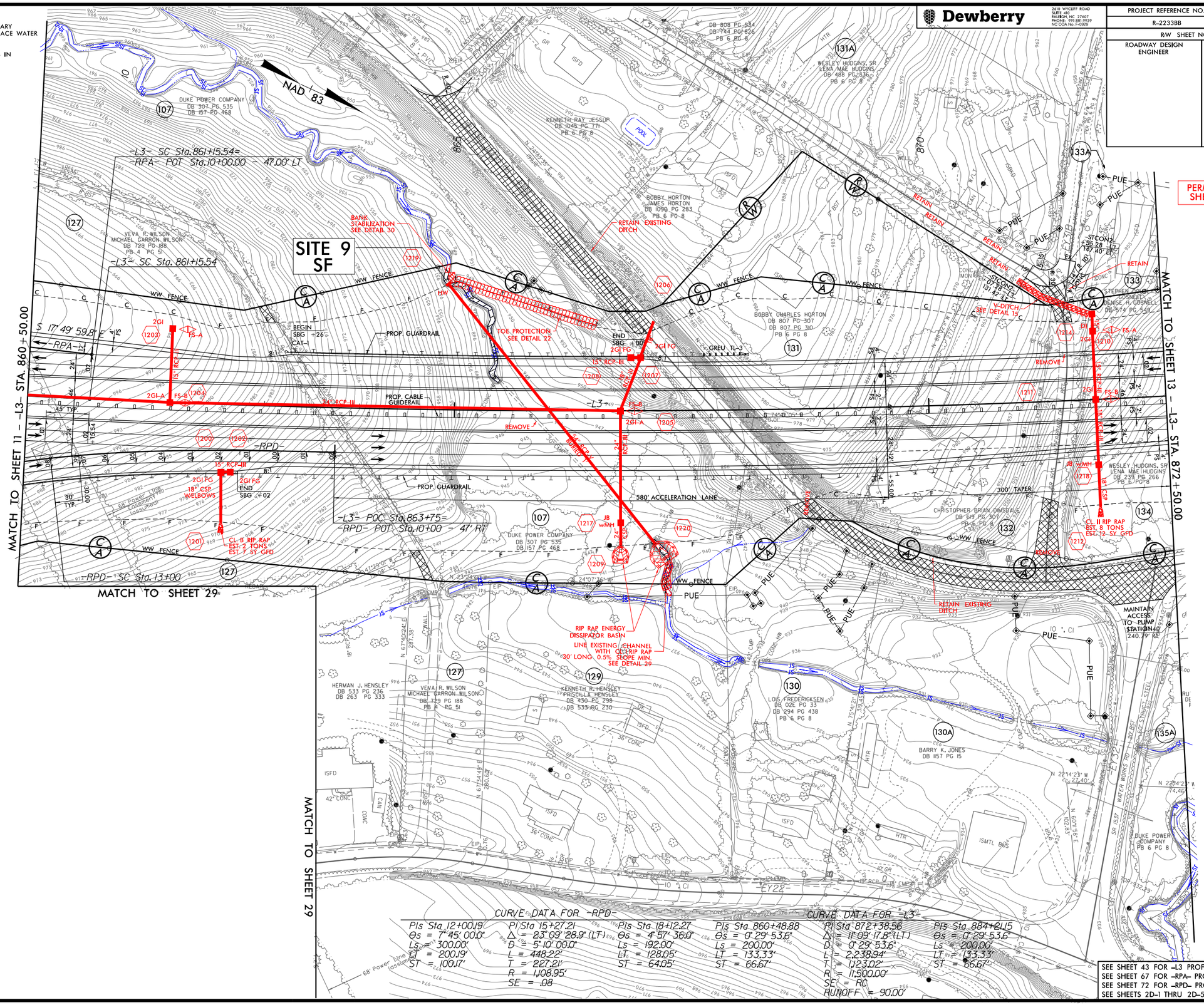
5/14/99

REVISIONS

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S DENOTES IMPACTS IN SURFACE WATER



PERMIT DRAWING
SHEET 21 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
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
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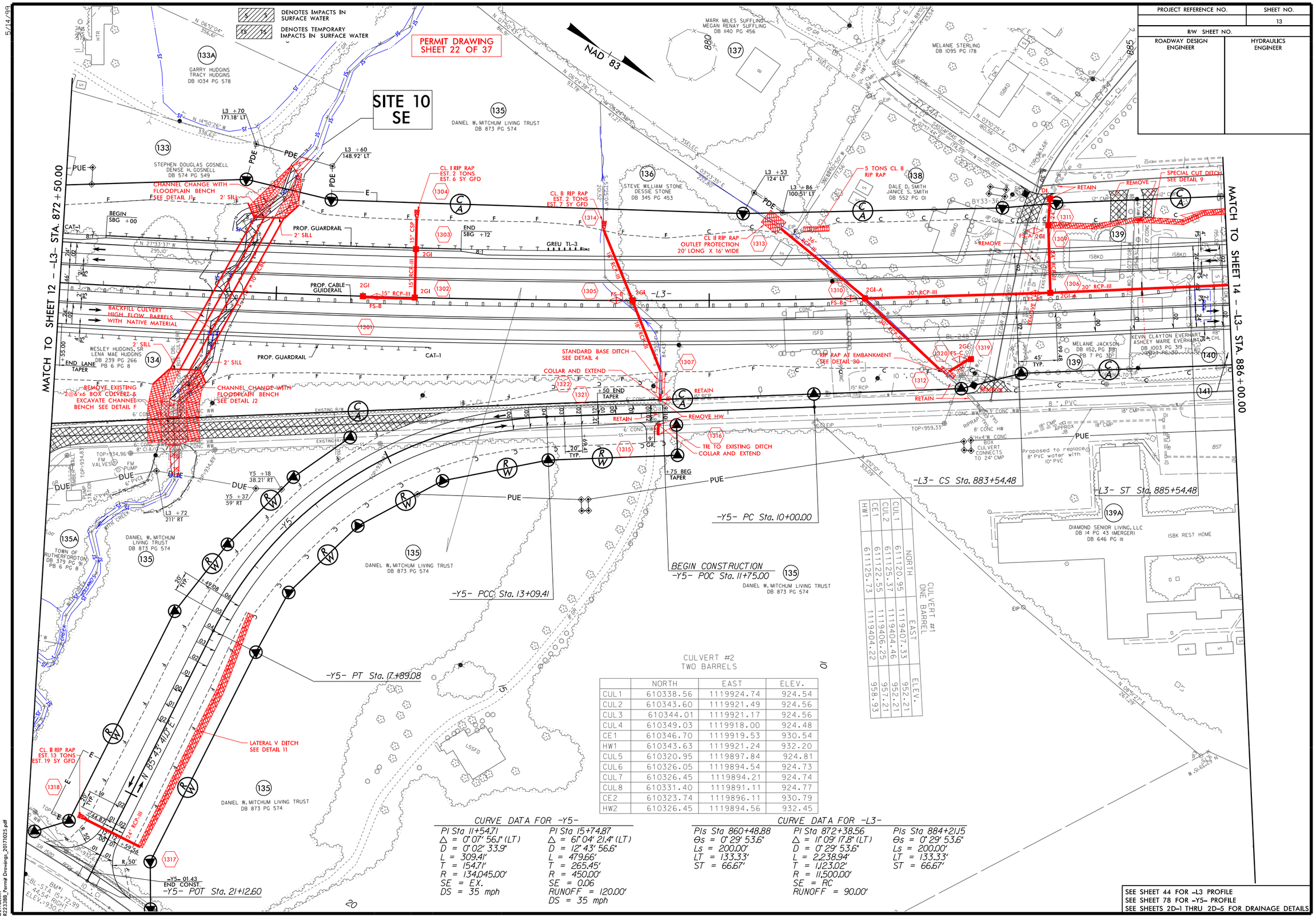
PROJECT REFERENCE NO.	SHEET NO.
	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



CULVERT #1
ONE BARREL

	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

CULVERT #2
TWO BARRELS

	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
△ = 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
△ = 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'

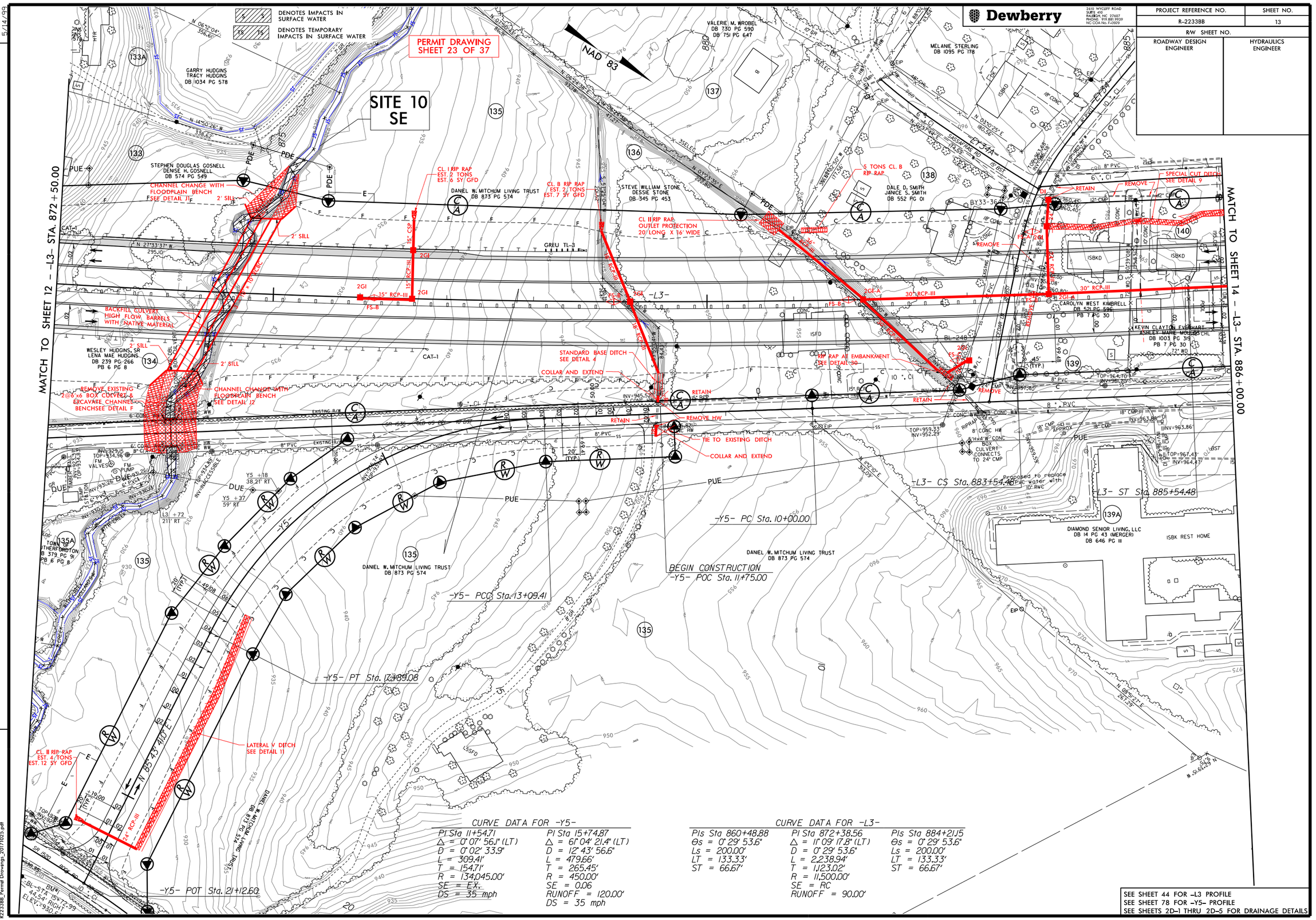
PI Sta 872+38.56
△ = 11° 09' 17.8" (LT)
D = 0° 29' 53.6"
L = 2,238.94'
T = 1,123.02'
R = 11,500.00'
SE = RC
RUNOFF = 90.00'

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

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

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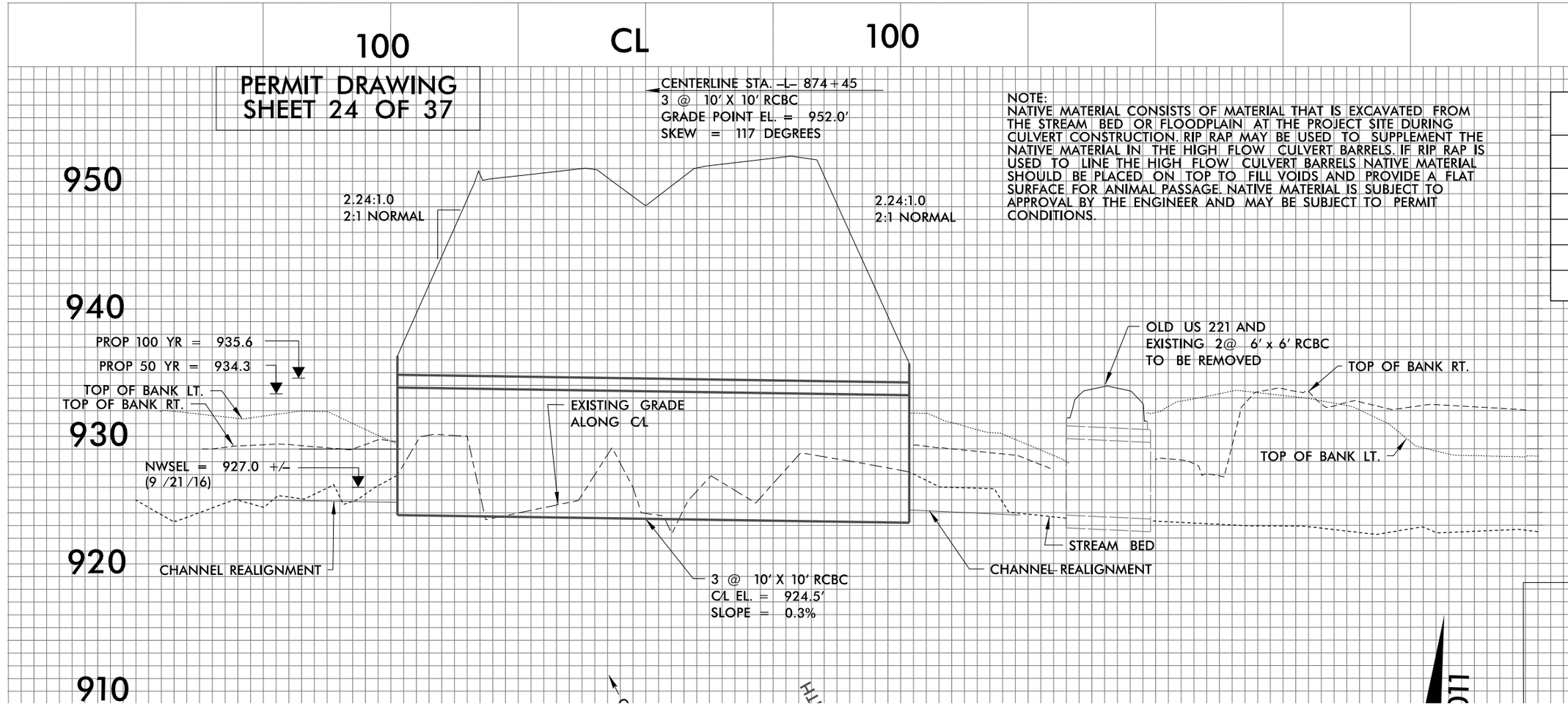

100
CL
100
PERMIT DRAWING
SHEET 24 OF 37
CENTERLINE STA. –L– 874+45
3 @ 10' X 10' RCBC
GRADE POINT EL. = 952.0'
SKEW = 117 DEGREES
NOTE:
NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT 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%

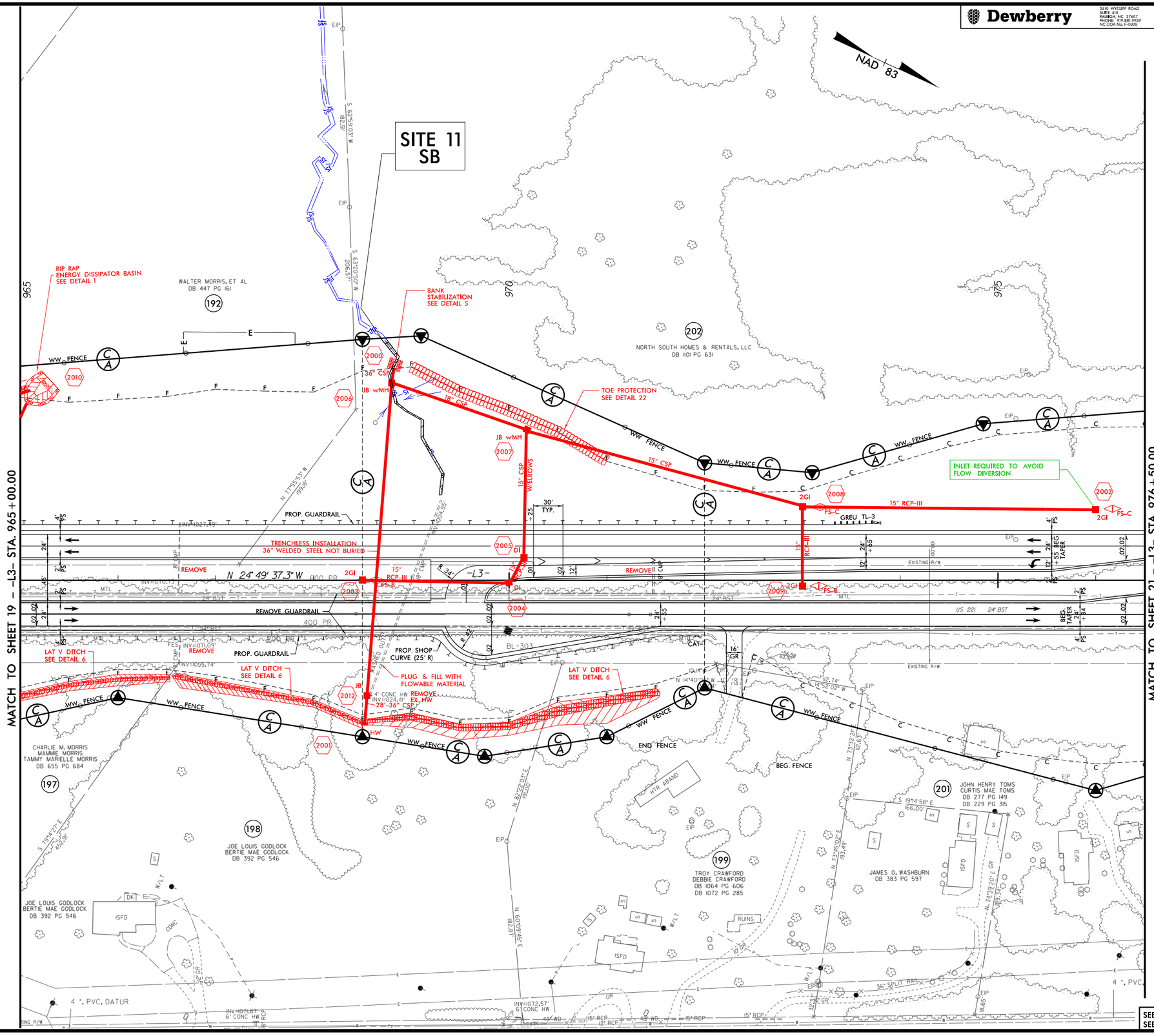
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

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

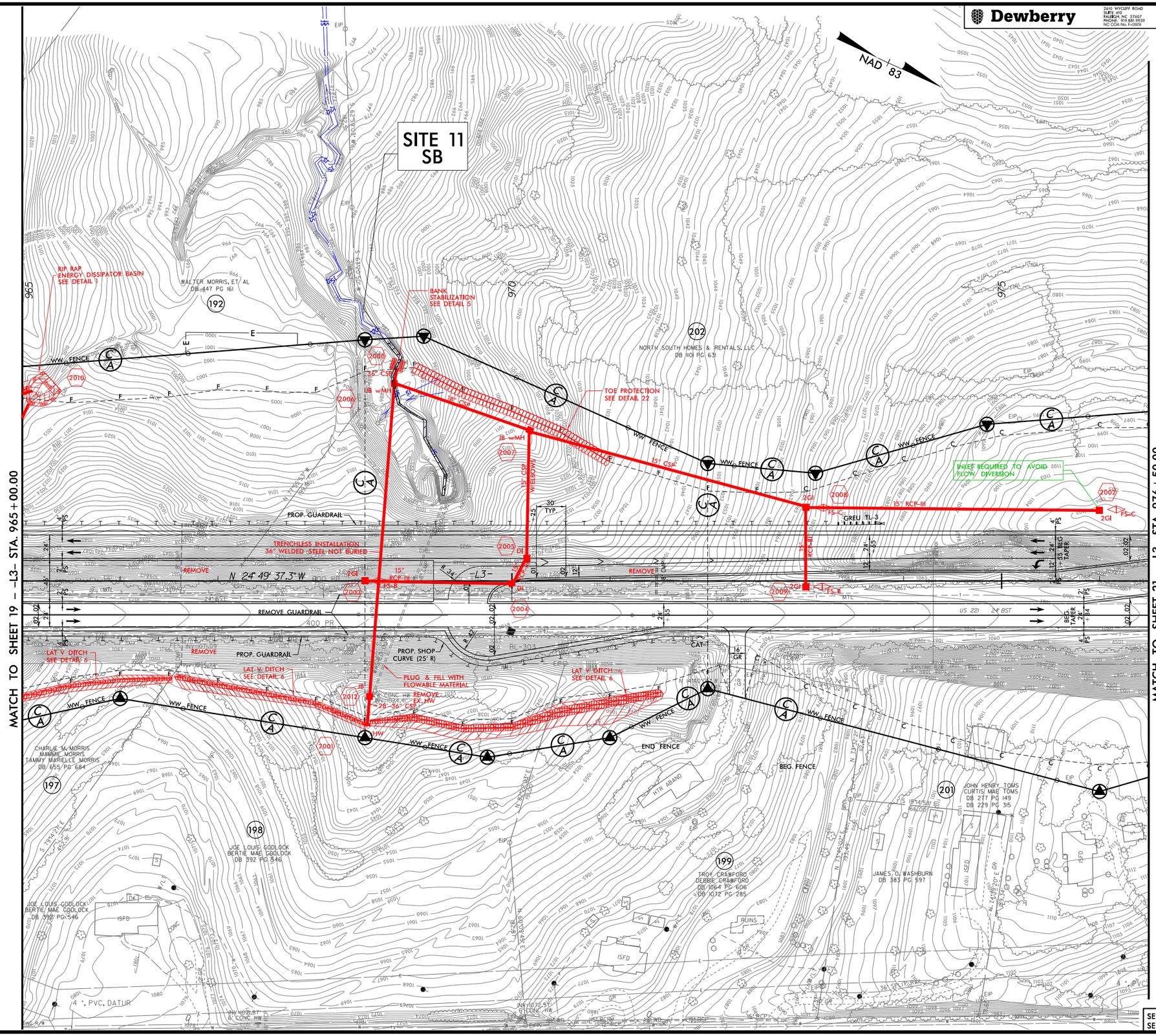
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

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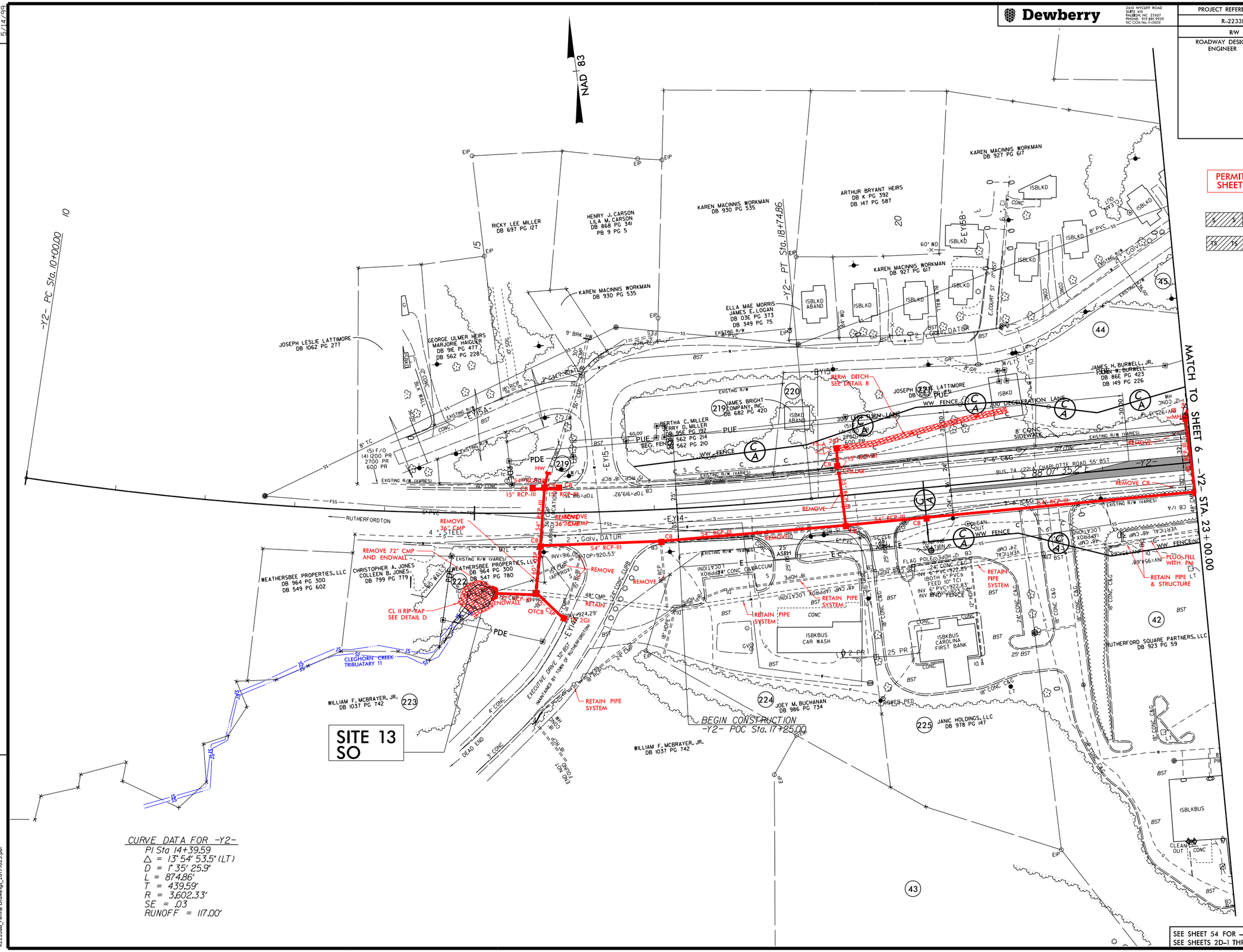
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

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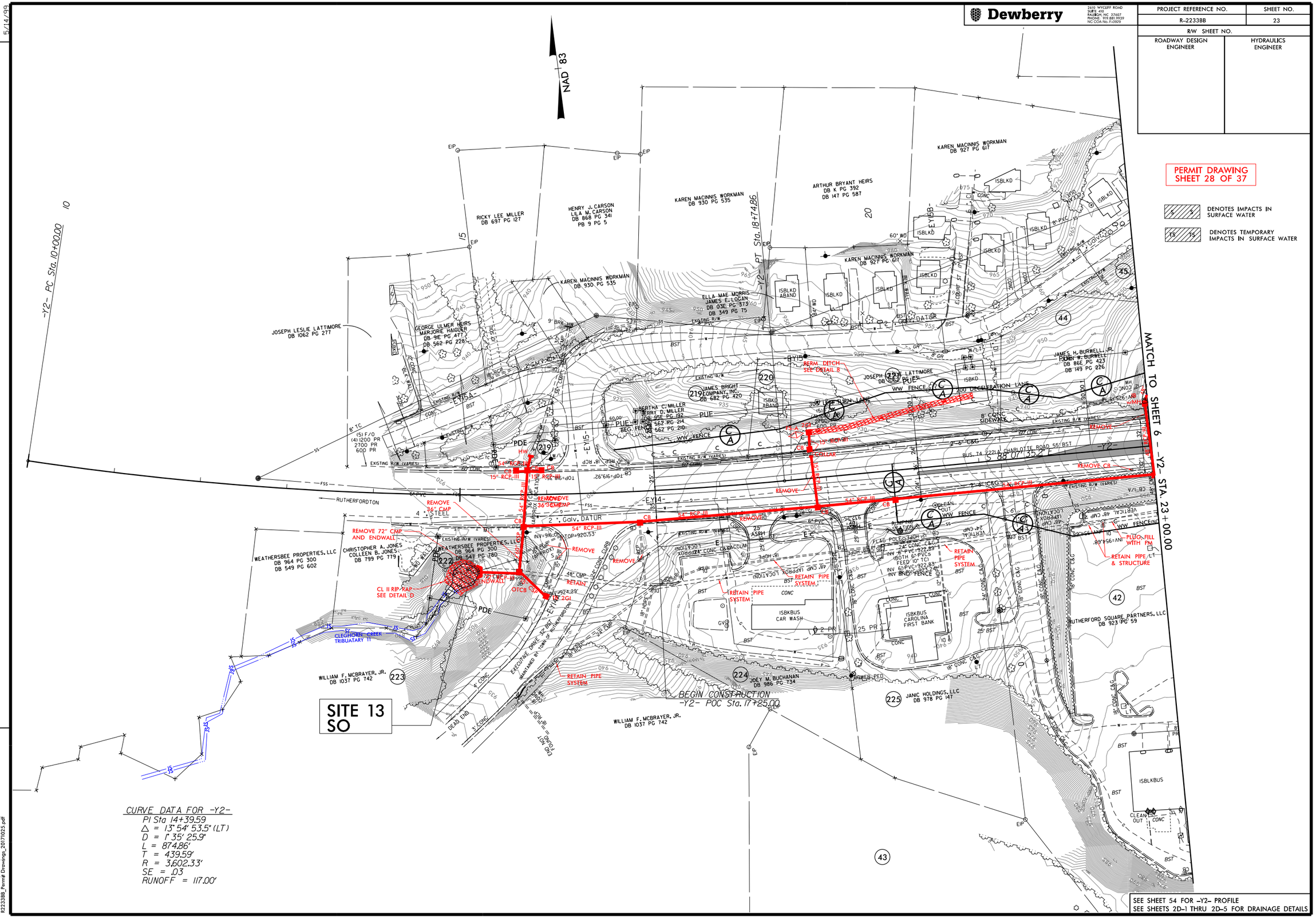
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

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

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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

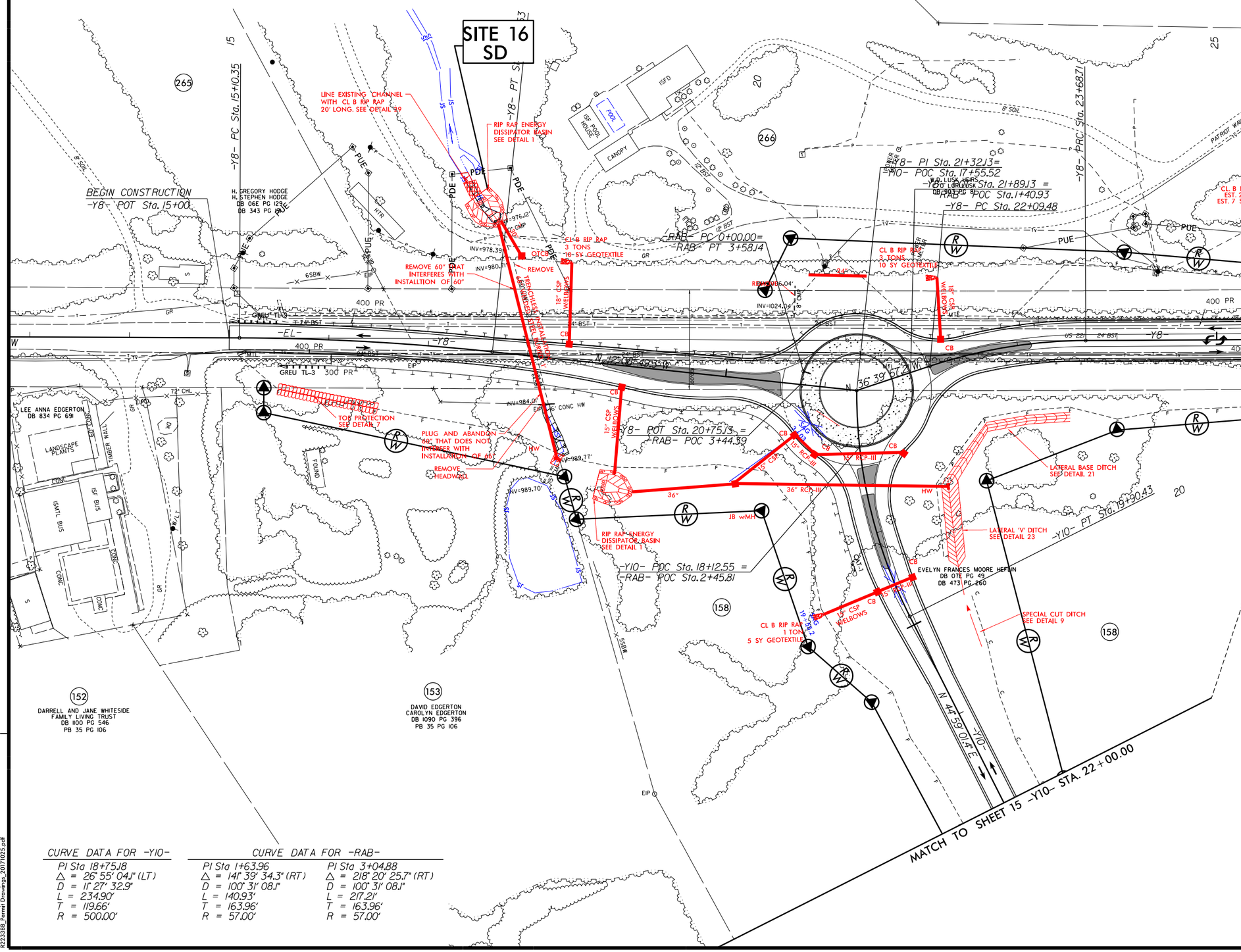
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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'



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

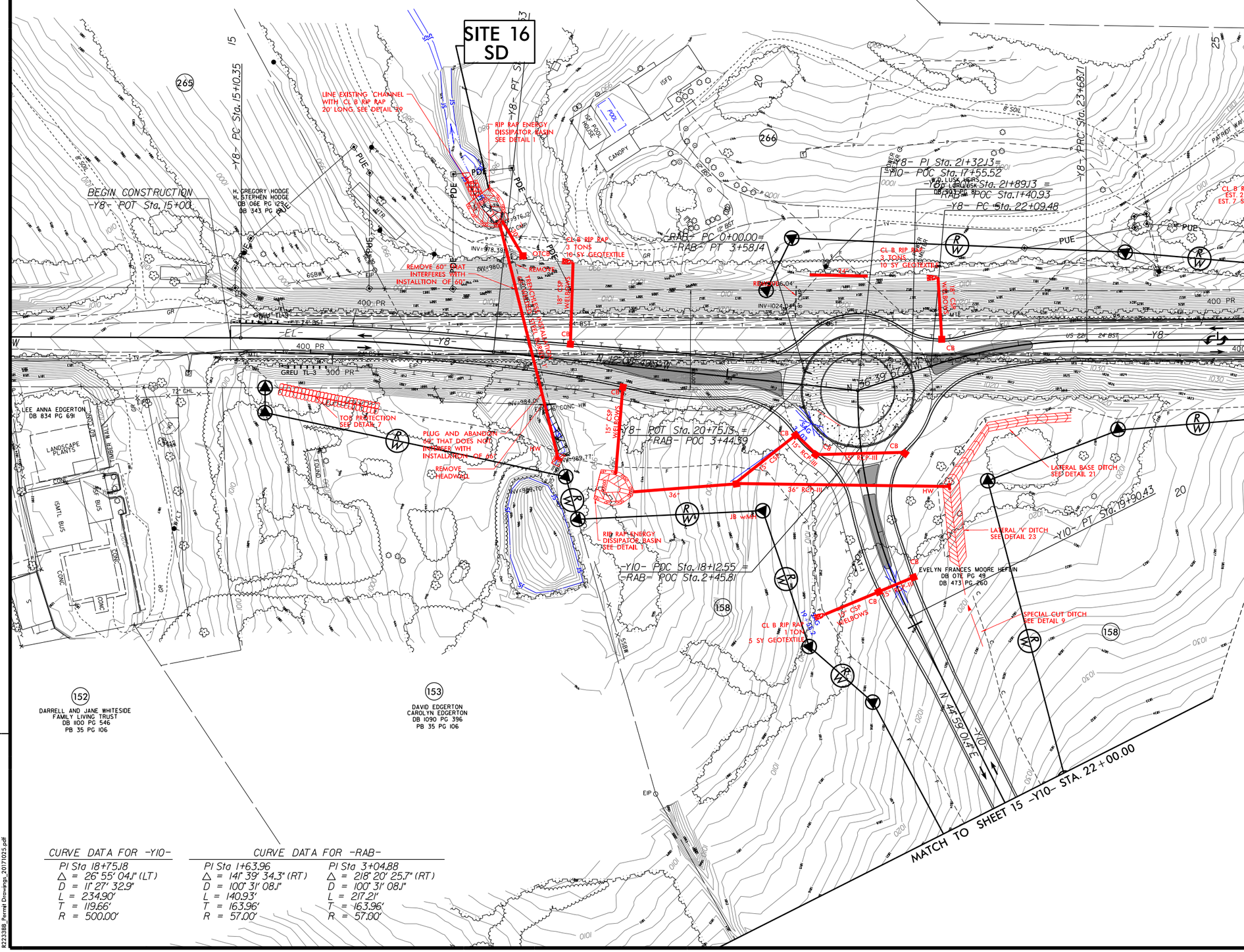
DENOTES IMPACTS IN SURFACE WATER

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

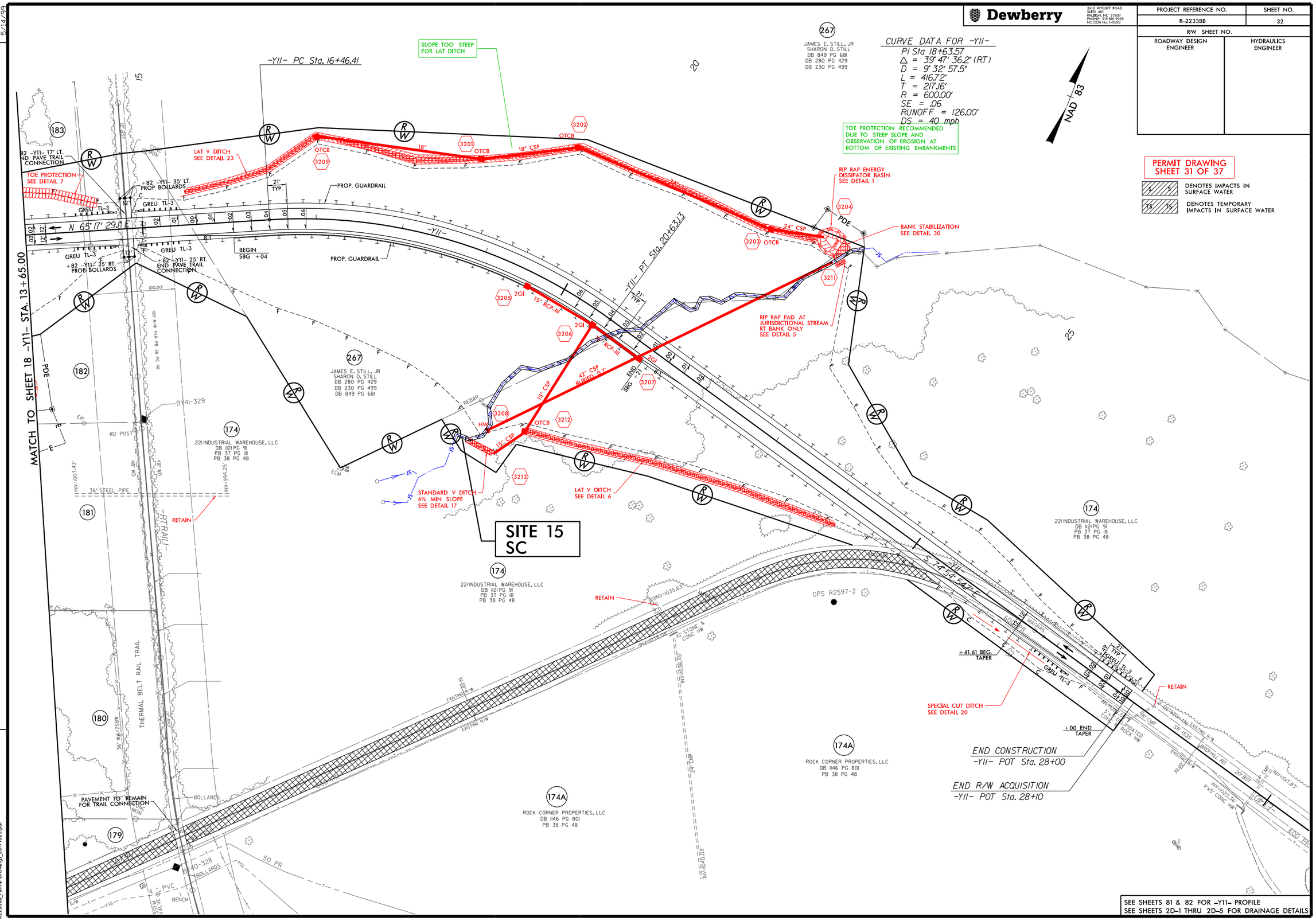
PERMIT DRAWING
SHEET 31 OF 37

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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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
R2233BB_Permit Drawings_20171025.pdf

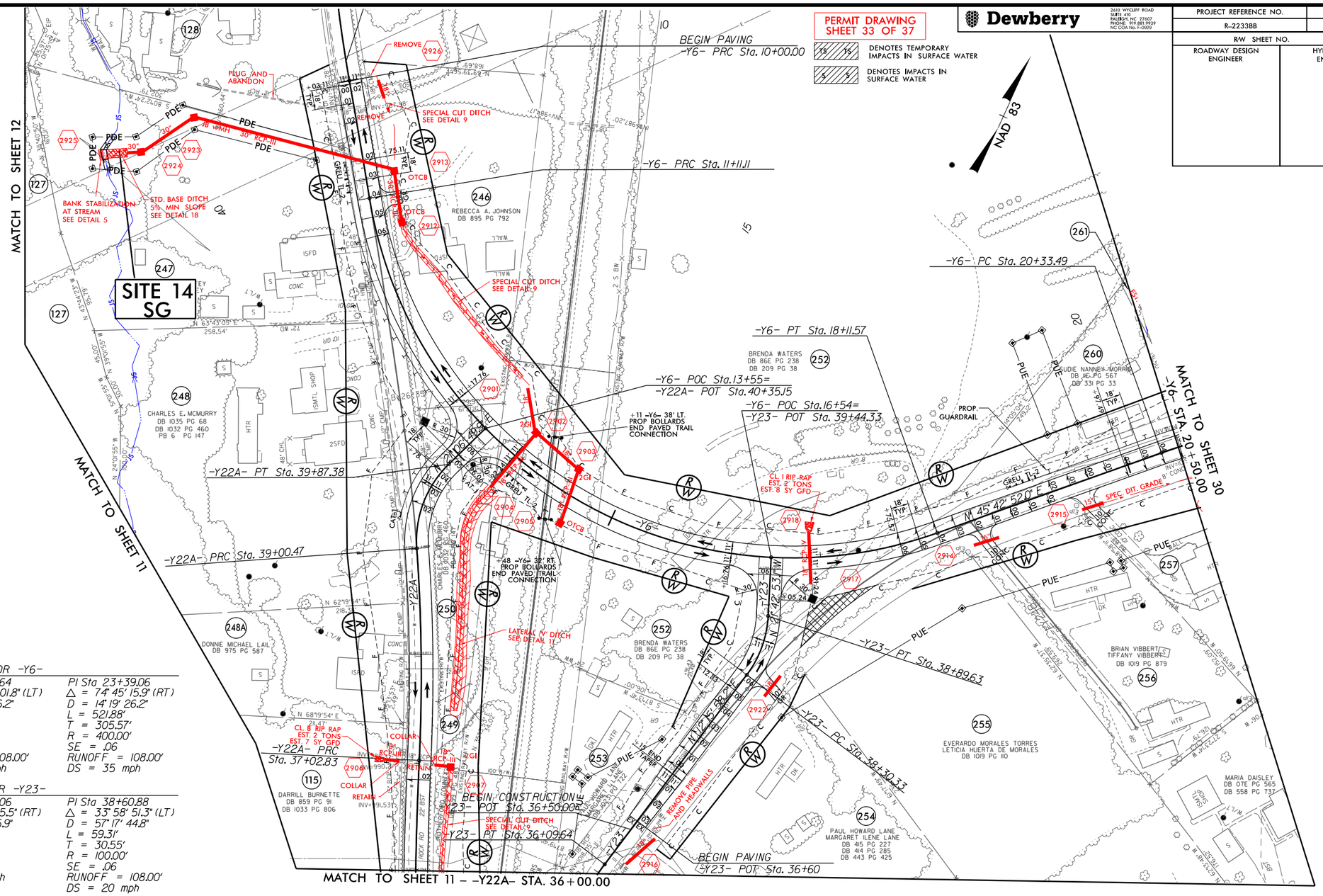
PERMIT DRAWING
SHEET 33 OF 37

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

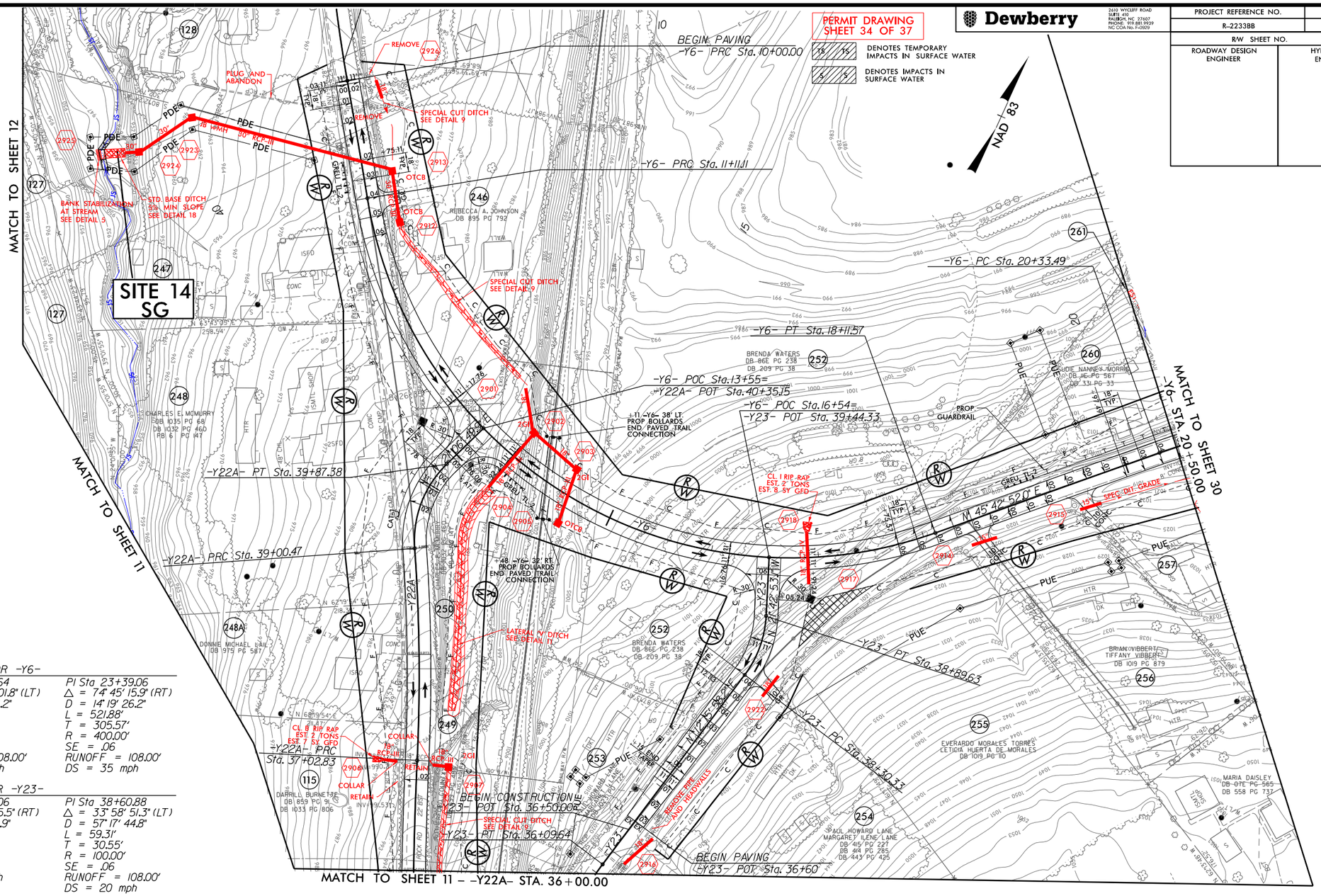
10/23/2017
DEWBERRY
R2233BB_Permit Drawings_20171023.pdf

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

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SITE 18

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

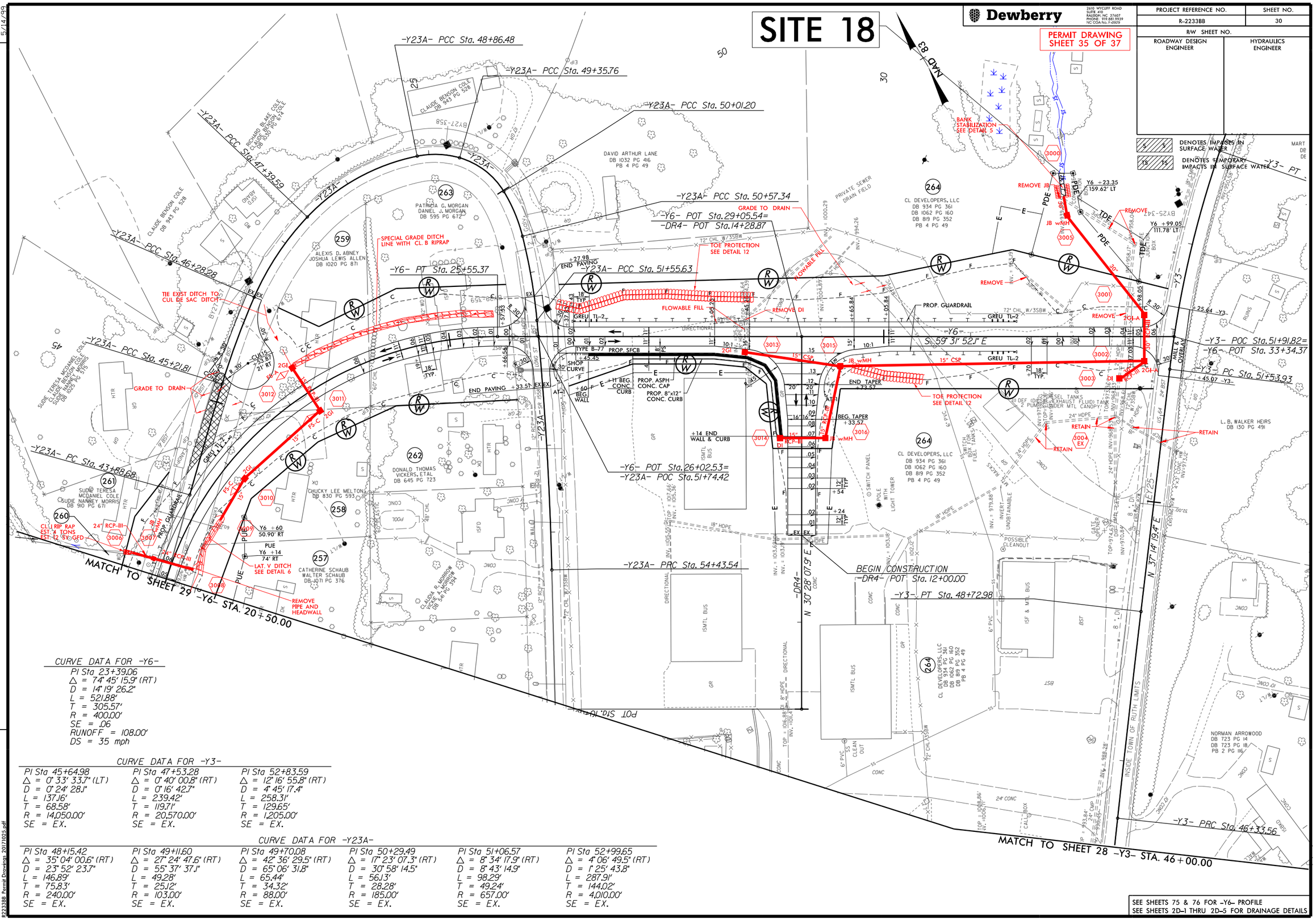
PERMIT DRAWING
SHEET 35 OF 37

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
△ = 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

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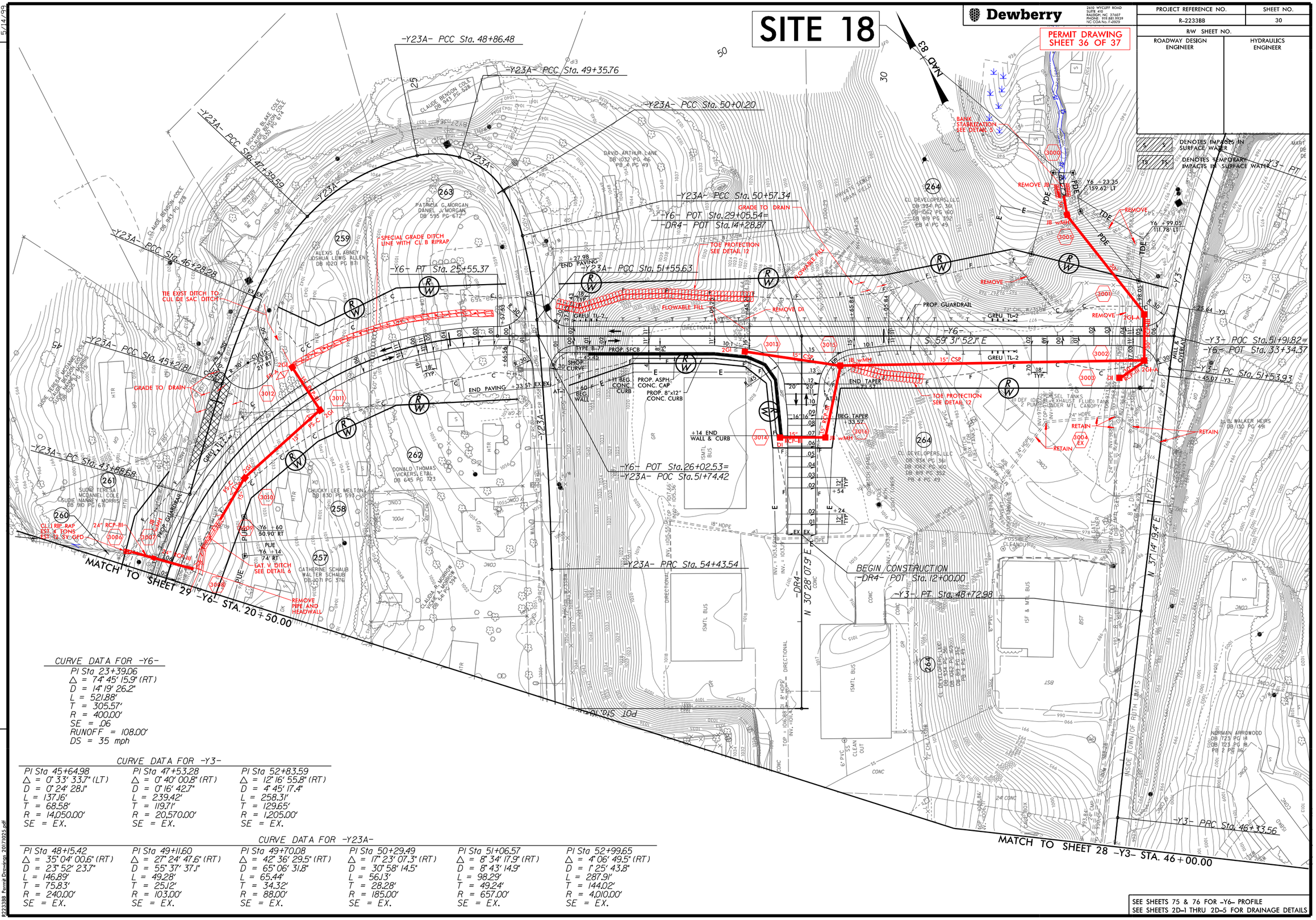
SITE 18

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
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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	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	8	
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	12	
19	SP	L3 733+34 LT TO 736+81 RT	10' X 8' RCBC						0.14		605		
19	SP	L3 731+47 TO 732+16 LT	CHANNEL REALIGNMENT						0.02		92		
19	SP	L3 732+16 TO 732+71 LT	ROADWAY FILL						0.01		60		
19	SP	L3 732+71 TO 733+34 LT	CHANNEL REALIGNMENT						0.02		76		
19	SP	L3 731+22 TO 731+47 LT	CHANNEL REALIGNMENT							< 0.01		12.0	
19	SP	L3 736+81 TO 737+26 RT	CHANNEL REALIGNMENT						0.01		46		
19	SP	L3 737+26 TO 737+36 RT	CHANNEL REALIGNMENT							< 0.01		18.0	
20	WB	L3 733+46 LT TO 733+80 LT	CHANNEL REALIGNMENT			< 0.01							
TOTALS*:				0.11		< 0.01			0.77	0.06	5615	411	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
6/25/2021
RUTHERFORD
R-2233BB

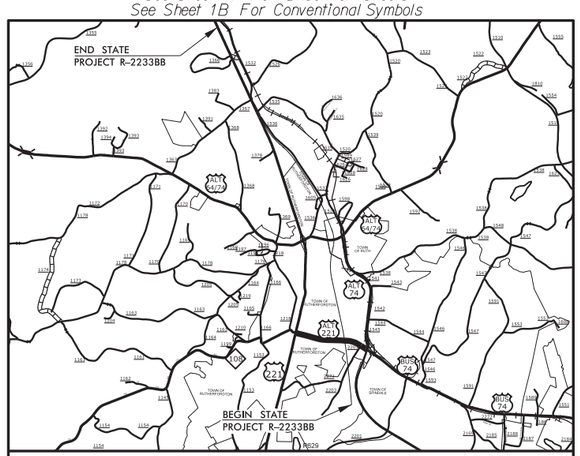
REVISED 7/1/21

09/08/99

TIP PROJECT: R-2233BB

CONTRACT: C204397

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RUTHERFORD COUNTY

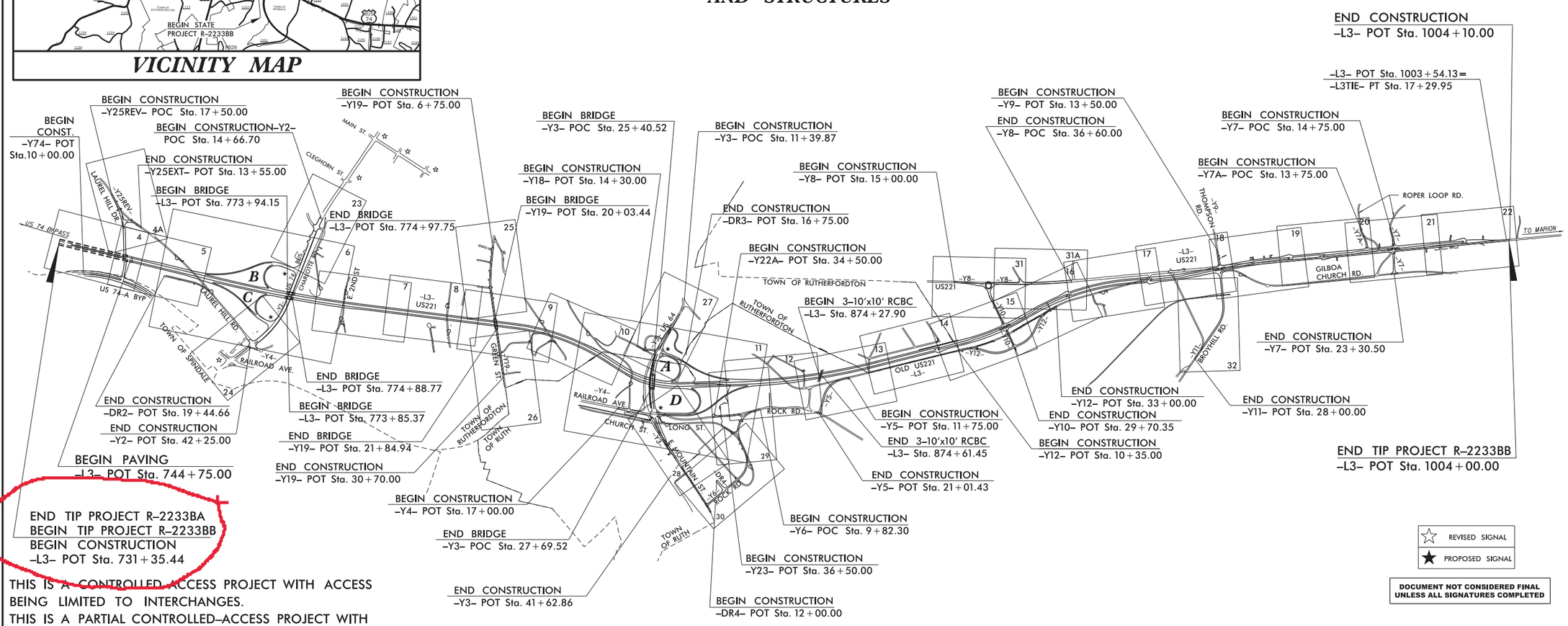
LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

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

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
34400.2.7		UTIL.
34400.3.4		CONST.

REVISED 7/21/2021



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 = 5.140 MILES
LENGTH STRUCTURE TIP PROJECT R-2233BB = 0.026 MILES
TOTAL LENGTH TIP PROJECT R-2233BB = 5.166 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

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 28, 2017

LETTING DATE:
DECEMBER 21, 2021

DENNIS J. MORY, P.E.
PROJECT ENGINEER

BRYAN LAMBETH, 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

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USER: dmory

12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

**S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

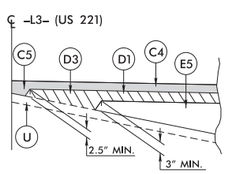
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

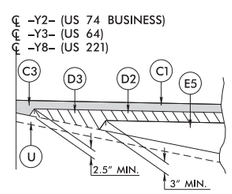
PAVEMENT SCHEDULE (FINAL)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
A1	7″ CONCRETE TRUCK APRON	E4	PROP. APPROX. 5.0″ ASPHALT CONCRETE BASE COURSE,TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YARD.	R4	PROPOSED 2′-0″ MODIFIED VALLEY GUTTER
C1	PROP. APPROX. 1.5″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YARD.	E5	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER 1″ DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3″ OR GREATER THAN 5.5″ IN DEPTH.	R5	PROPOSED 8″ x 12″ CONCRETE CURB
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.	J1	PROP. 6″ AGGREGATE BASE COURSE	R6	PROPOSED CONCRETE EXPRESSWAY GUTTER
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YARD PER 1″ IN DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1.5″ IN DEPTH.	J2	PROP. 8″ AGGREGATE BASE COURSE	S	4″ CONCRETE SIDEWALK
C4	PROP. APPROX. 3.0″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.	K1	PROP. CHEMICAL STABILIZATION (SOIL-CEMENT BASE/LIME-TREATED SOIL). BASE TREATED WITH CEMENT AT A RATE OF 56 LBS. PER SQ. YARD @ 7″ DEPTH OR SOIL TREATED WITH LIME AT A RATE OF 24 LBS. PER SQ. YARD @ 8″ DEPTH.	T	EARTH
C5	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YARD PER 1″ IN DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 2″ IN DEPTH.	K2	PROP. 8″ CLASS IV SUBGRADE STABILIZATION	U	EXISTING PAVEMENT
D1	PROP. APPROX. 2.5″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YARD.	N1	GEOTEXTILE FOR SOIL STABILIZATION	V1	INCIDENTAL MILLING (SEE MILLING DETAIL V1)
D2	PROP. APPROX. 4.0″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.	N2	GEOTEXTILE FOR PAVEMENT STABILIZATION	V2	INCIDENTAL MILLING (SEE MILLING DETAIL V2)
D3	PROP. VAR. DEPTH ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER 1″ DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2.5″ OR GREATER THAN 4″ IN DEPTH.	P	PRIME COAT AT THE NORMAL APPLICATION RATE OF 0.35 GAL. PER SQ. YARD	V3	1.5 ″ PAVEMENT MILLING
E1	PROP. APPROX. 3.0″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YARD.	R1	2′-6″ CONCRETE CURB AND GUTTER	V4	0″ TO 3″ PAVEMENT MILLING
E2	PROP. APPROX. 4.0″ ASPHALT CONCRETE BASE COURSE,TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.	R2	SHOULDER BERM GUTTER (SBG)	Z	MILLED RUMBLE STRIP
E3	PROP. APPROX. 4.5″ ASPHALT CONCRETE BASE COURSE,TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YARD.	R3	5″ MONOLITHIC CONCRETE ISLAND (KEYED IN)	W1 / W2 / W3	VARIABLE DEPTH ASPHALT (SEE WEDGING DETAILS ON THIS SHEET)



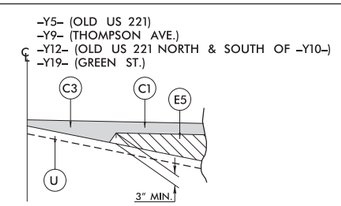
WEDGING DETAIL – W1

USE IN CONJUNCTION WITH TS Nos. 5 & 5A



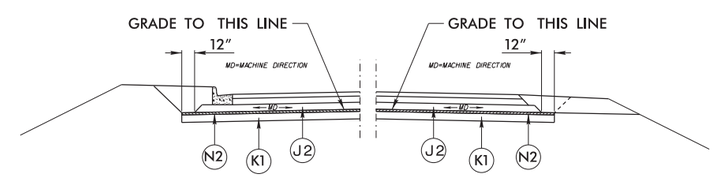
WEDGING DETAIL – W2

USE IN CONJUNCTION WITH TS Nos. 6, 7A, & 19A



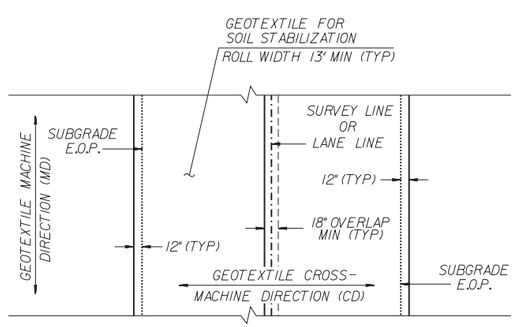
WEDGING DETAIL – W3

USE IN CONJUNCTION WITH TS No. 8A, 15 & 20



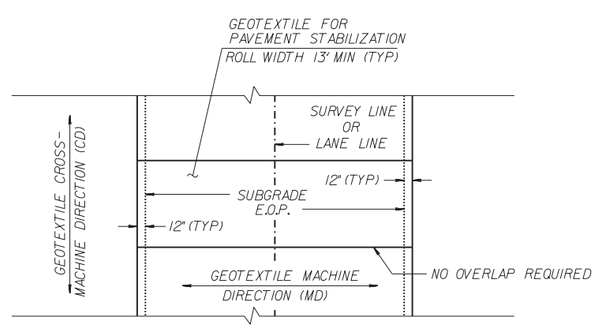
DETAIL FOR CHEMICAL STABILIZATION–GEOTEXTILE FOR PAVEMENT STABLIZATION WITH ABC

USE IN CONJUNCTION WITH TYPICAL SECTIONS No.1, 5, 13, & 14 WHERE GEOTEXTILE IS REQUIRED. FOR LOCATIONS SEE SHEET 3G–1.



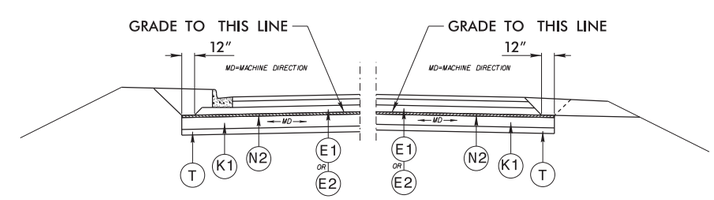
GEOTEXTILE FOR SOIL STABILIZATION PLACEMENT (PLAN VIEW)

(100% COVERAGE REQUIRED)



GEOTEXTILE FOR PAVEMENT STABILIZATION PLACEMENT (PLAN VIEW)

(100% COVERAGE REQUIRED)



DETAIL FOR CHEMICAL STABILIZATION–GEOTEXTILE FOR PAVEMENT STABLIZATION WITH ASPHALT BASE

USE IN CONJUNCTION WITH TYPICAL SECTIONS No. 7, 7A, 8, 9, 9A, 9B, 10, 12, 15, 16, 17, 18 19, 19A, 21, 22 & 23 WHERE GEOTEXTILE IS REQUIRED. FOR LOCATIONS SEE SHEET 3G–1.

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2A–1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORY

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T. HOLLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

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

NOTES:

1. ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.
2. USE 4:1 MAX SLOPES ON THE INSIDE OF INTERCHANGE AREAS.
3. SEE PLANS FOR LOCATION OF ACCELERATION AND DECELERATION LANES.
4. SEE PLANS FOR LOCATION OF TURN LANE AND INTERSECTION TURNOUTS.
5. SEE PLANS FOR LOCATION OF ALL PAVEMENT TAPERS.
6. ALL DRIVEWAY RADII ARE 10′ UNLESS SHOWN OTHERWISE ON PLANS.

6/2/99
8/17/2021 4:23:03 PM
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USER: smorris

6/2/99

PAVEMENT SCHEDULE (FINAL)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
A1	7" CONCRETE	C4	3" S9.5C	D3	VAR DEPTH I19.0C	E4	5" B25.0C	K1	CHEMICAL STABILIZATION: 7" SOIL-CEMENT BASE OR 8"LIME-TREATED SOIL	R1	2'-6" CONCRETE CURB & GUTTER	R5	8"x12" CONCRETE CURB	U	EXIST. PAVEMENT
C1	1.5" S9.5B	C5	VAR DEPTH S9.5C	E1	3" B25.0C	E5	VAR DEPTH B25.0C	K2	8" CLASS IV SUBGRADE STABILIZATION	R2	SHOULDER BERM GUTTER	R6	CONCRETE EXPRESSWAY GUTTER	Z	MILLED RUMBLE STRIP
C2	3" S9.5B	D1	2.5" I19.0C	E2	4" B25.0C	J1	6" ABC	N1	GEOTEXTILE FOR SOIL STABILIZATION	R3	5" CONC. ISLAND	S	4" CONC. SIDEWALK	V1	V2	V3	V4	PAVEMENT MILLING
C3	VAR DEPTH S9.5B	D2	4" I19.0C	E3	4.5" B25.0C	J2	8" ABC	N2	GEOTEXTILE FOR PAVEMENT STABILIZATION	P	PRIME COAT	R4	2' MODIFIED VALLEY GUTTER	T	EARTH	W1	W2	W3	VARIABLE DEPTH PAVEMENT WEDGING

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2A-2

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

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T. HOLLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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2610 WYCLIFF ROAD
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PAVEMENT MANAGEMENT UNIT
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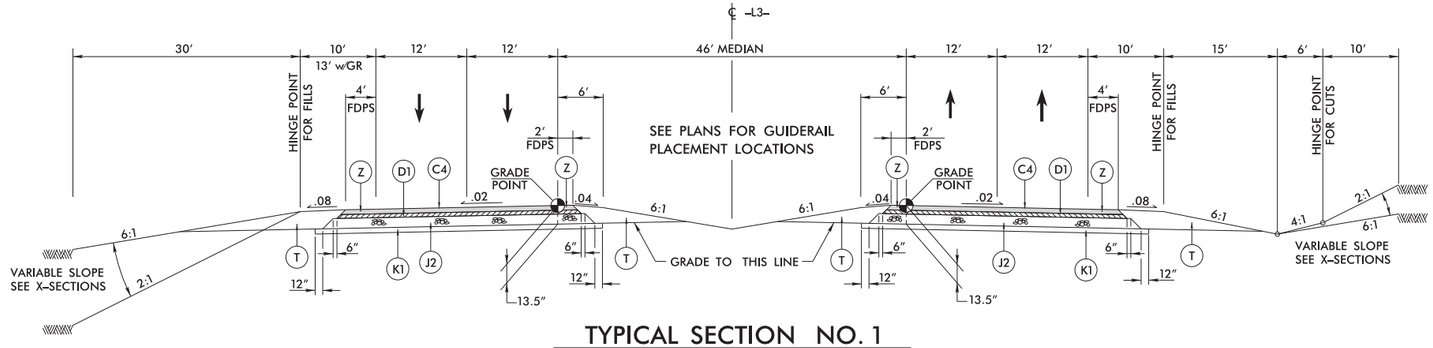
RALEIGH, NC 27699-1593



TYPICAL SECTION NO. 1

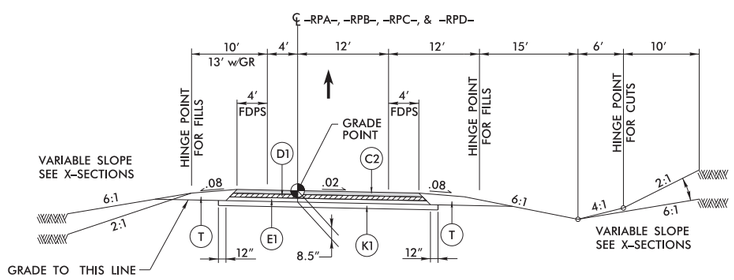
NOTE: SEE SHEET 2A-9 FOR THE GRADING ONLY
TYPICAL SECTION FROM -L3- 732+00.00 TO -L3- 743+00

SOUTHBOUND LANES

-L3- 744+75.00 TO -L3- 773+94.15 (BRIDGE)
-L3- 774+97.75 (BRIDGE) TO -L3- 948+00.00

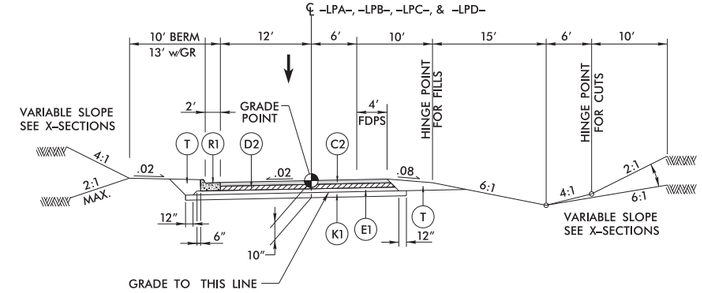
NORTHBOUND LANES

-L3- 744+75.00 TO -L3- 773+85.37 (BRIDGE)
-L3- 774+88.77 (BRIDGE) TO -L3- 955+00.00



TYPICAL SECTION NO. 2

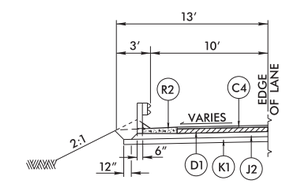
-RPA- 14+53.78 TO -RPA- 23+94.24 -RPB- 13+70.55 TO -RPB- 25+50.13
-RPC- 14+56.68 TO -RPC- 23+71.04 -RPD- 13+36.43 TO -RPD- 24+00.00



NOTE: USE -L3- PAVEMENT DESIGN IN ALL GORE AREAS

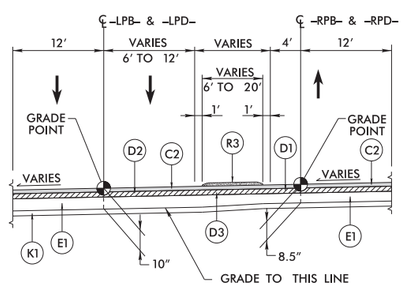
TYPICAL SECTION NO. 3

-LPA- 11+61.84 TO -LPA- 16+31.16 -LPB- 12+89.84 TO -LPB- 17+01.04
-LPC- 11+83.18 TO -LPC- 16+33.37 -LPD- 15+12.97 TO -LPD- 19+71.53



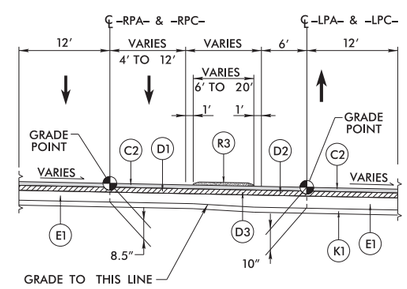
DETAIL FOR SHOULDER BERM GUTTER

USE IN CONJUNCTION WITH -L3- TYPICAL SECTION No.1



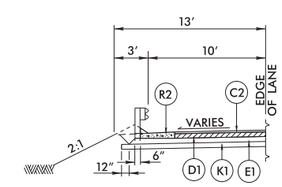
TYPICAL SECTION NO. 4

-LPB- 17+01.04 TO -LPB- 21+72.55 -LPD- 19+71.53 TO -LPD- 26+53.27
-RPB- 25+50.13 TO -RPB- 30+40.47 -RPD- 24+00.00 TO -RPD- 30+87.27



TYPICAL SECTION NO. 4A

-LPC- 16+33.37 TO -LPC- 19+61.65 -LPA- 16+31.16 TO -LPA- 19+53.84
-RPC- 23+71.04 TO -RPC- 27+03.60 -RPA- 23+94.24 TO -RPA- 27+23.95



DETAIL FOR SHOULDER BERM GUTTER

USE IN CONJUNCTION WITH -RPD- TYPICAL SECTION No. 2

8/17/2016 4:23:05 PM
USER: jdoggett

6/2/99

PAVEMENT SCHEDULE (FINAL)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
A1	7" CONCRETE	C4	3" S9.5C	D3	VAR DEPTH I19.0C	E4	5" B25.0C	K1	CHEMICAL STABILIZATION: 7" SOIL-CEMENT BASE OR 8"LIME-TREATED SOIL	R1	2'-6" CONCRETE CURB & GUTTER	R5	8"x12" CONCRETE CURB	U	EXIST. PAVEMENT
C1	1.5" S9.5B	C5	VAR DEPTH S9.5C	E1	3" B25.0C	E5	VAR DEPTH B25.0C	K2	8" CLASS IV SUBGRADE STABILIZATION	R2	SHOULDER BERM GUTTER	R6	CONCRETE EXPRESSWAY GUTTER	Z	MILLED RUMBLE STRIP
C2	3" S9.5B	D1	2.5" I19.0C	E2	4" B25.0C	J1	6" ABC	N1	GEOTEXTILE FOR SOIL STABILIZATION	R3	5" CONC. ISLAND	S	4" CONC. SIDEWALK	V1	PAVEMENT MILLING
C3	VAR DEPTH S9.5B	D2	4" I19.0C	E3	4.5" B25.0C	J2	8" ABC	N2	GEOTEXTILE FOR PAVEMENT STABILIZATION	P	PRIME COAT	R4	2' MODIFIED VALLEY GUTTER	T	EARTH
														V2	
														V3	
														V4	
														W1	
														W2	
														W3	

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2A-3

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORY

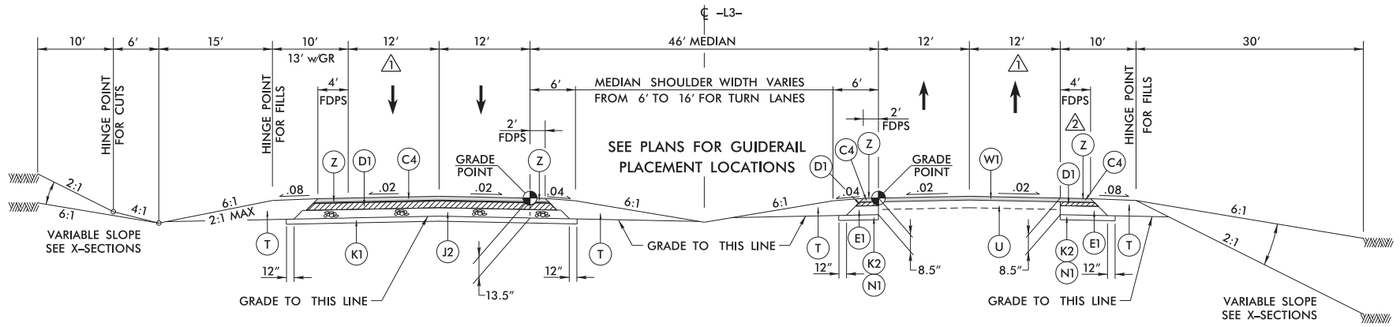
PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T. HOLLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

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



1 PAVEMENT WIDTH VARIES FROM 12′ TO 30′ FOR SUPERSTREET BULB-OUTS.

2 PAVEMENT WIDENING WIDTH VARIES FROM 4′ TO 22′ FOR SUPERSTREET BULB-OUTS.

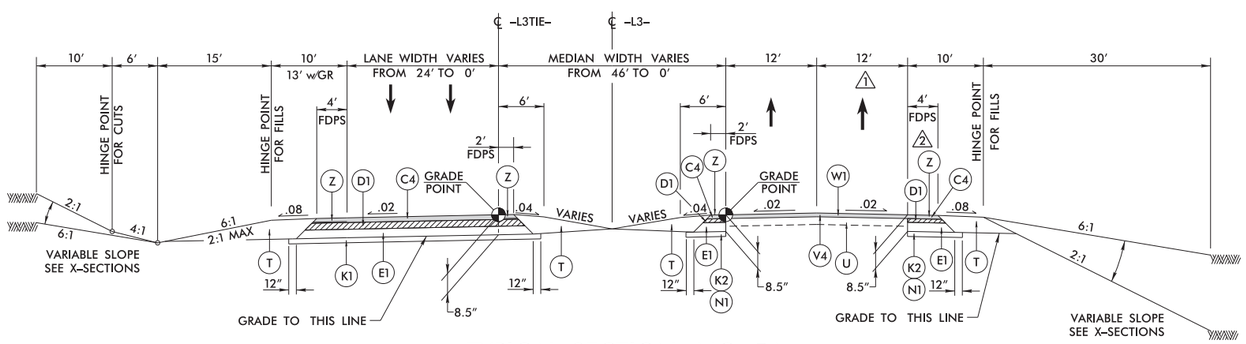
TYPICAL SECTION NO. 5

SOUTHBOUND LANES

-L3- 948+00.00 TO -L3- 952+00.00
(PAVEMENT WEDGING FROM 0′ TO 24′)
-L3- 952+00.00 TO -L3- 996+27.26
(FULL DEPTH PAVEMENT)

NORTHBOUND LANES

-L3- 955+00.00 TO -L3- 996+27.26



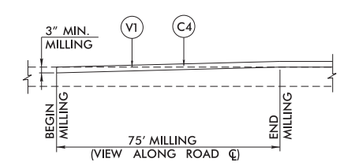
TYPICAL SECTION NO. 5A

SOUTHBOUND LANES

-L3TIE- 10+00.00 TO -L3TIE- 17+29.95

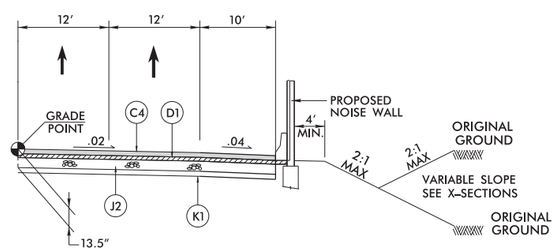
NORTHBOUND LANES

-L3- 996+27.26 TO -L3- 1004+00.00



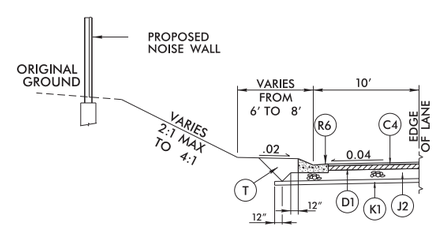
INCIDENTAL MILLING DETAIL – V1

USE IN CONJUNCTION WITH TYPICAL SECTION No. 5A
-L3- 1003+25.00 TO -L3- 1004+00.00



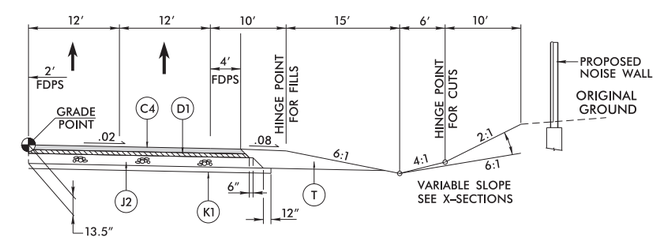
DETAIL NO. 1 FOR NOISE WALLS

USE IN CONJUNCTION WITH -L3- TYPICAL SECTION No.1



DETAIL NO. 2 FOR NOISE WALLS

USE IN CONJUNCTION WITH -L3- TYPICAL SECTION No.1



DETAIL NO. 3 FOR NOISE WALLS

USE IN CONJUNCTION WITH -L3- TYPICAL SECTION No.1

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USER: dmory

6/2/99

PAVEMENT SCHEDULE (FINAL)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
A1	7" CONCRETE	C4	3" S9.5C	D3	VAR DEPTH I19.0C	E4	5" B25.0C	K1	CHEMICAL STABILIZATION: 7" SOIL-CEMENT BASE OR 8"LIME-TREATED SOIL	R1	2'-6" CONCRETE CURB & GUTTER	R5	8"x12" CONCRETE CURB	U	EXIST. PAVEMENT
C1	1.5" S9.5B	C5	VAR DEPTH S9.5C	E1	3" B25.0C	E5	VAR DEPTH B25.0C	K2	8" CLASS IV SUBGRADE STABILIZATION	R2	SHOULDER BERM GUTTER	R6	CONCRETE EXPRESSWAY GUTTER	Z	MILLED RUMBLE STRIP
C2	3" S9.5B	D1	2.5" I19.0C	E2	4" B25.0C	J1	6" ABC	N1	GEOTEXTILE FOR SOIL STABILIZATION	R3	5" CONC. ISLAND	S	4" CONC. SIDEWALK	V1	PAVEMENT MILLING
C3	VAR DEPTH S9.5B	D2	4" I19.0C	E3	4.5" B25.0C	J2	8" ABC	N2	GEOTEXTILE FOR PAVEMENT STABILIZATION	P	PRIME COAT	R4	2' MODIFIED VALLEY GUTTER	T	EARTH

ITEM	DESCRIPTION
V2	PAVEMENT MILLING
V3	VARIABLE DEPTH PAVEMENT WEDGING
W1	
W2	
W3	

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2A-4

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORY

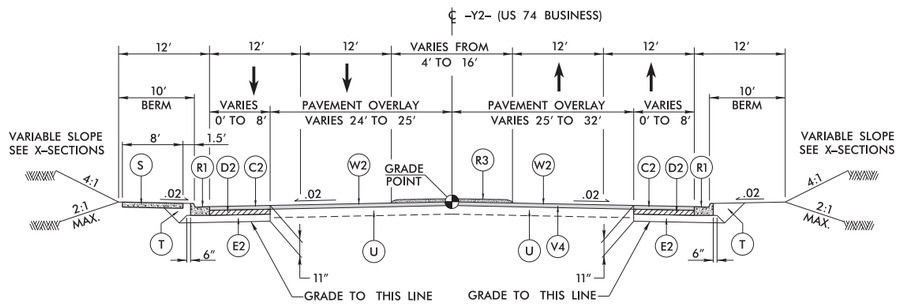
PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T. HOLLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

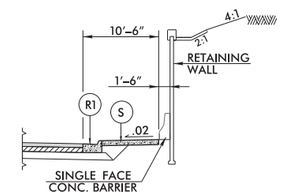
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. P-0929

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



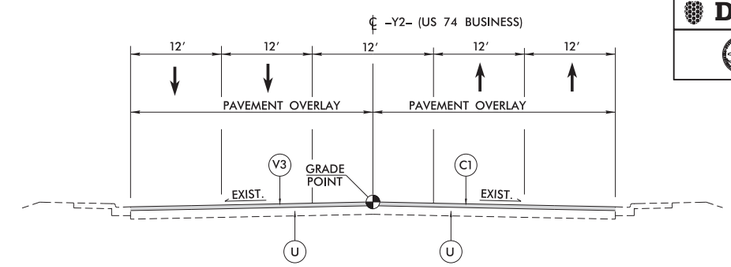
TYPICAL SECTION NO. 6

-Y2- 17+25.00 TO -Y2- 42+25.00



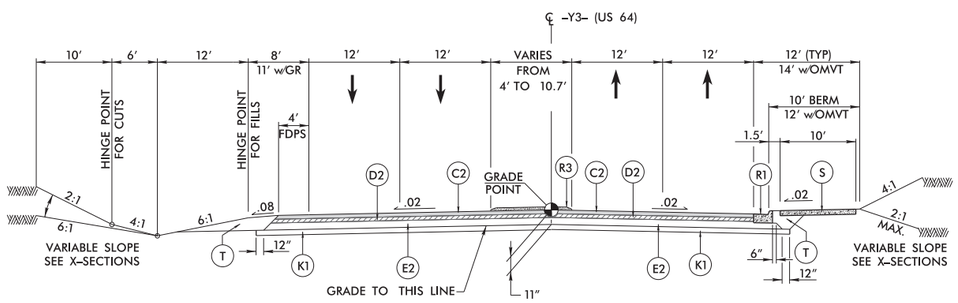
PROPOSED RETAINING WALL

-Y2- 27+67+/- TO -Y2- 31+45+/- - EASTBOUND
-Y2- 28+41+/- TO -Y2- 30+91+/- - WESTBOUND
NOTE: SIDEWALK ON WESTBOUND SIDE ONLY.
SEE BRIDGE PLANS FOR WALL LOCATION & DETAILS



TYPICAL SECTION NO. 6A

-Y2- 14+66.70 TO -Y2- 17+25.00
-Y2- 40+49.83 TO -Y2- 42+25.00



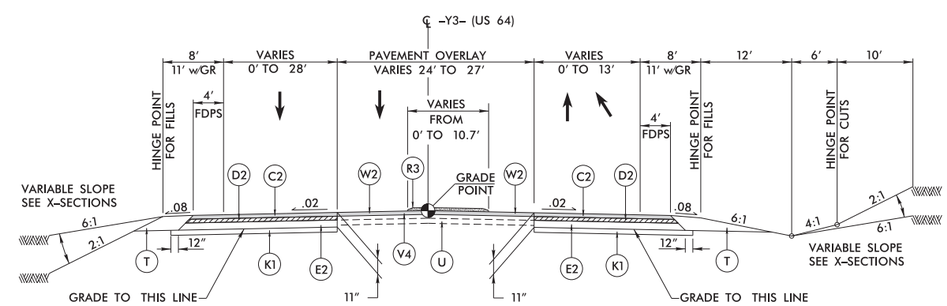
TYPICAL SECTION NO. 7

WESTBOUND LANES

-Y3- 14+75.00 TO -Y3- 25+40.52 BRIDGE
-Y3- 27+69.52 BRIDGE TO -Y3- 37+25.00

EASTBOUND LANES

-Y3- 14+75.00 TO -Y3- 25+40.52 BRIDGE
-Y3- 27+69.52 BRIDGE TO -Y3- 32+05.00
(SEE DETAIL FOR OMVT THIS SHEET)



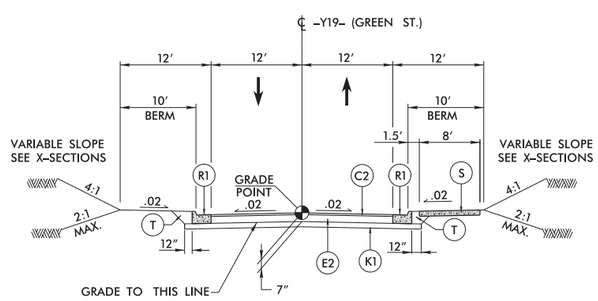
TYPICAL SECTION NO. 7A

WESTBOUND LANES

-Y3- 13+10.00 TO -Y3- 14+75.00
-Y3- 37+25.00 TO -Y3- 41+50.00

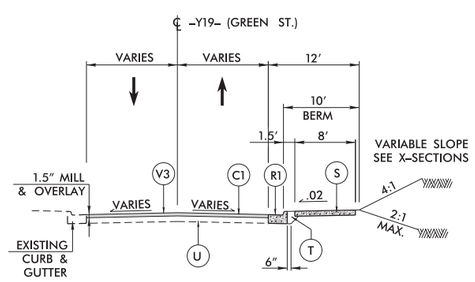
EASTBOUND LANES

-Y3- 13+10.00 TO -Y3- 14+75.00
-Y3- 33+96.00 TO -Y3- 39+88.56
-Y3- 40+67.67 TO -Y3- 41+50.00



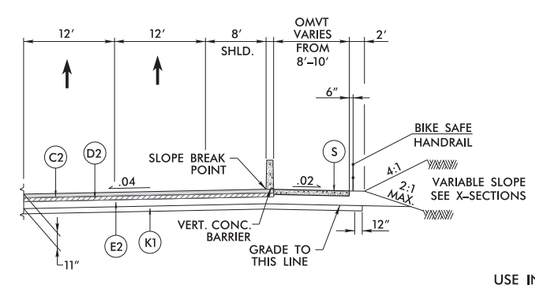
TYPICAL SECTION NO. 8

-Y19- 12+75.00 TO -Y19- 20+03.44 (BRIDGE)
-Y19- 21+84.94 (BRIDGE) TO -Y19- 28+50.00



TYPICAL SECTION NO. 8A

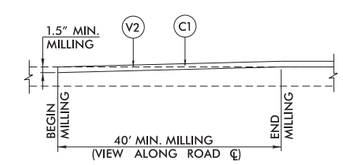
-Y19- 6+75.00 TO -Y19- 12+75.00 SIDEWALK - RIGHT
-Y19- 28+50.00 TO -Y19- 30+20.73 CURB & GUTTER /NO SIDEWALK - LEFT



OVER MOUNTAIN VICTORY TRAIL (OMVT)

-Y3- EASTBOUND LANES

-Y3- 21+60.55 TO -Y3- 25+40.52 BRIDGE
-Y3- 27+69.52 BRIDGE TO -Y3- 32+05.00



INCIDENTAL MILLING DETAIL - V2

USE INCONJUNCTION WITH ALL -Y- LINE TIE-INS
-Y3- 13+10.00 TO -Y3- 13+50.00
-Y3- 41+10.00 TO -Y3- 41+50.00

USE INCONJUNCTION WITH TS No. 7
-Y3- 21+53.59 TO -Y3- 31+35.00 (CONCRETE VERTICAL BARRIER)
-Y3- 22+00.00 TO -Y3- 25+40.52 BRIDGE (BIKE SAFE HANDRAIL-RIGHT)
-Y3- 27+69.52 BRIDGE TO -Y3- 31+35.00 (BIKE SAFE HANDRAIL-RIGHT)
-Y3- 24+50.00 TO -Y3- 25+00.00 WIDTH VARIES FROM 10' TO 8'
-Y3- 28+00.00 TO -Y3- 28+50.00 WIDTH VARIES FROM 8' TO 10'
SIDEWALK WIDTH IS 8' ON THE PROPOSED BRIDGE.
SEE CROSS SECTIONS & BRIDGE PLANS.

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USER: JDOBIE

6/2/99

PAVEMENT SCHEDULE (FINAL)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
A1	7" CONCRETE	C4	3" S9.5C	D3	VAR DEPTH I19.0C	E4	5" B25.0C	K1	CHEMICAL STABILIZATION: 7" SOIL-CEMENT BASE OR 8"LIME-TREATED SOIL	R1	2'-6" CONCRETE CURB & GUTTER	R5	8"x12" CONCRETE CURB	U	EXIST. PAVEMENT
C1	1.5" S9.5B	C5	VAR DEPTH S9.5C	E1	3" B25.0C	E5	VAR DEPTH B25.0C	K2	8" CLASS IV SUBGRADE STABILIZATION	R2	SHOULDER BERM GUTTER	R6	CONCRETE EXPRESSWAY GUTTER	Z	MILLED RUMBLE STRIP
C2	3" S9.5B	D1	2.5" I19.0C	E2	4" B25.0C	J1	6" ABC	N1	GEOTEXTILE FOR SOIL STABILIZATION	R3	5" CONC. ISLAND	S	4" CONC. SIDEWALK	V1	PAVEMENT MILLING
C3	VAR DEPTH S9.5B	D2	4" I19.0C	E3	4.5" B25.0C	J2	8" ABC	N2	GEOTEXTILE FOR PAVEMENT STABILIZATION	P	PRIME COAT	R4	2' MODIFIED VALLEY GUTTER	T	EARTH

ITEM	DESCRIPTION
V2	VARIABLE DEPTH PAVEMENT WEDGING
W1	
W2	
W3	

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2A-5

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORY

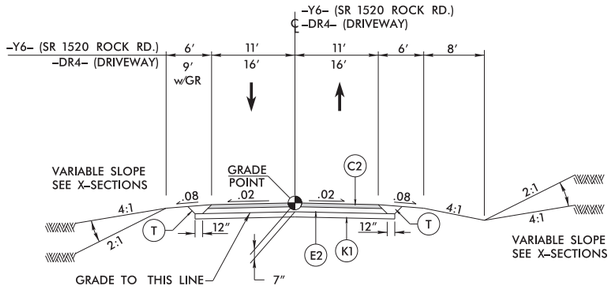
PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T. HOLLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

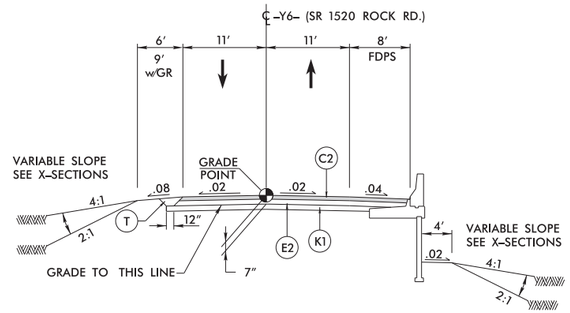
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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



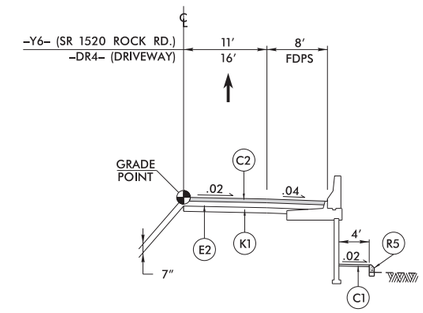
TYPICAL SECTION NO. 9

-Y6- 10+00.00 TO -Y6- 25+92.57
-Y6- 26+12.41 TO -Y6- 33+21.90
-DR4- 12+00.00 TO -DR4- 14+17.87
NOTE - STABILIZATION NOT REQUIRED FOR DRIVEWAY -DR4-



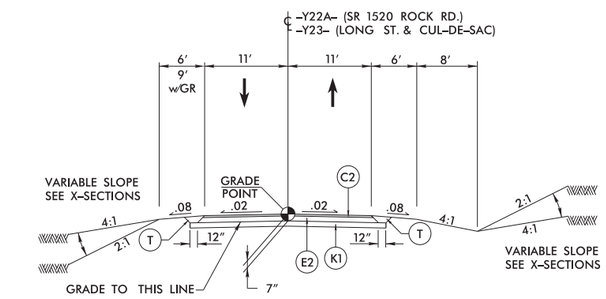
TYPICAL SECTION NO. 9A

-Y6- 26+60.00 TO -Y6- 27+11.00 - RIGHT
-Y6- 26+25.06 TO -Y6- 26+64.31 (FDPS - RIGHT)



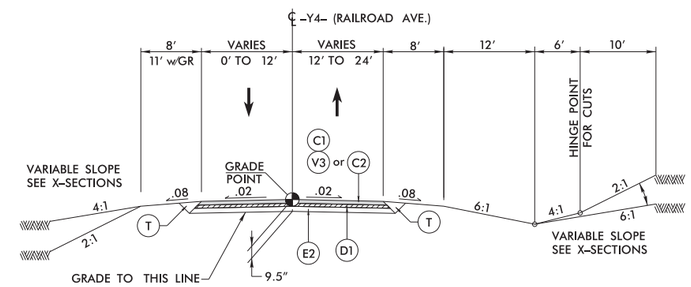
TYPICAL SECTION NO. 9B

-Y6- 27+11.00 TO -Y6- 26+60.00 - RIGHT
-DR4 13+14.00 TO 13+97.10 - LEFT
NOTE - STABILIZATION NOT REQUIRED FOR DRIVEWAY -DR4-



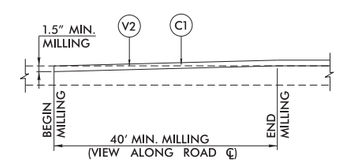
TYPICAL SECTION NO. 10

-Y22A- 34+50.00 TO -Y22A- 40+24.15
-Y23- 36+60.00 TO -Y23- 39+33.33



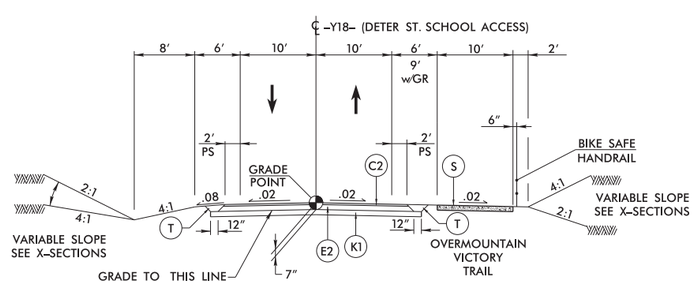
TYPICAL SECTION NO. 11

-Y4- 17+00.00 TO -Y4- 18+50.00 - LEFT (MILL & OVERLAY)
-Y4- 18+50.00 TO -Y4- 23+45.84



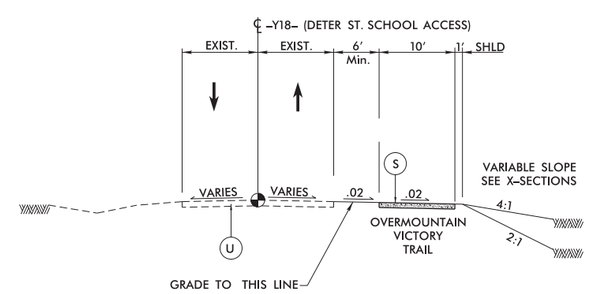
INCIDENTAL MILLING DETAIL - V2

USE INCONJUNCTION WITH ALL -Y- LINE TIE-INS
-Y23- 36+60.00 TO -Y23- 37+00.00



TYPICAL SECTION NO. 12

-Y18- 14+30.00 TO -Y18- 18+11.97
-Y18- 15+50.00 TO -Y18- 16+50.00 - RIGHT w/HANDRAIL



TYPICAL SECTION NO. 12A

-Y18- 10+30.42 TO -Y18- 14+30.00

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USER: JJONES

6/2/99

PAVEMENT SCHEDULE (FINAL)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
A1	7" CONCRETE	C4	3" S9.5C	D3	VAR DEPTH I19.0C	E4	5" B25.0C	K1	CHEMICAL STABILIZATION: 7" SOIL-CEMENT BASE OR 8"LIME-TREATED SOIL	R1	2'-6" CONCRETE CURB & GUTTER	R5	8"x12" CONCRETE CURB	U	EXIST. PAVEMENT
C1	1.5" S9.5B	C5	VAR DEPTH S9.5C	E1	3" B25.0C	E5	VAR DEPTH B25.0C	K2	8" CLASS IV SUBGRADE STABILIZATION	R2	SHOULDER BERM GUTTER	R6	CONCRETE EXPRESSWAY GUTTER	Z	MILLED RUMBLE STRIP
C2	3" S9.5B	D1	2.5" I19.0C	E2	4" B25.0C	J1	6" ABC	N1	GEOTEXTILE FOR SOIL STABILIZATION	R3	5" CONC. ISLAND	S	4" CONC. SIDEWALK	V1	V2
C3	VAR DEPTH S9.5B	D2	4" I19.0C	E3	4.5" B25.0C	J2	8" ABC	N2	GEOTEXTILE FOR PAVEMENT STABILIZATION	P	PRIME COAT	R4	2' MODIFIED VALLEY GUTTER	T	EARTH

ITEM				DESCRIPTION
			U	EXIST. PAVEMENT
			Z	MILLED RUMBLE STRIP
V3	V4			PAVEMENT MILLING
	W1	W2	W3	VARIABLE DEPTH PAVEMENT WEDGING

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2A-6

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORY

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T. HOLLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
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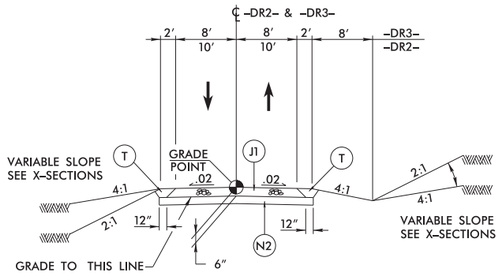
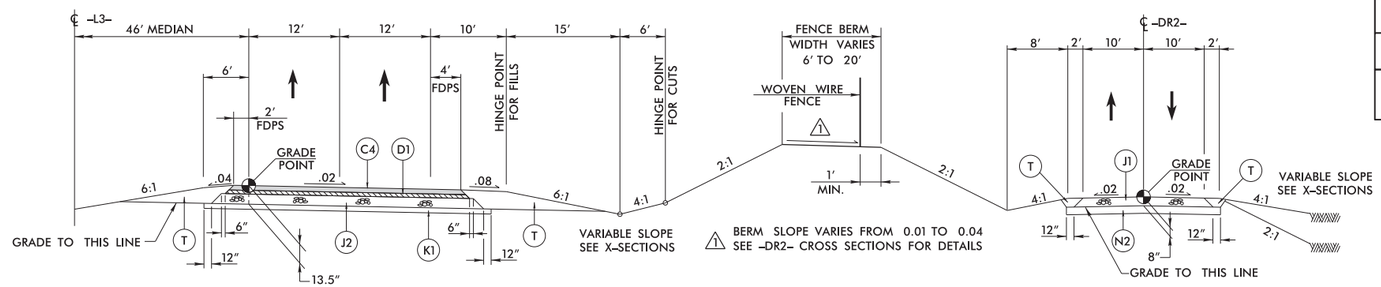
NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1593 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593



TYPICAL SECTION NO. 13

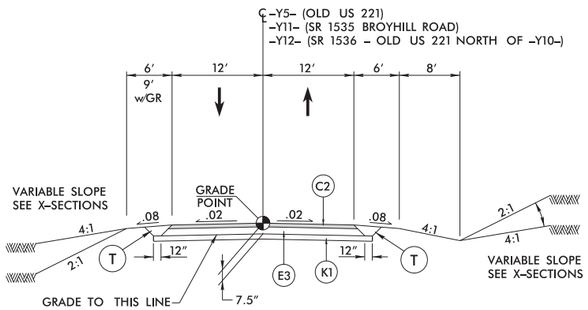
-DR2- 9+67.72 TO -DR2- 19+44.66
-DR3- 10+25.16 TO -DR3- 16+75.00



TYPICAL SECTION 14

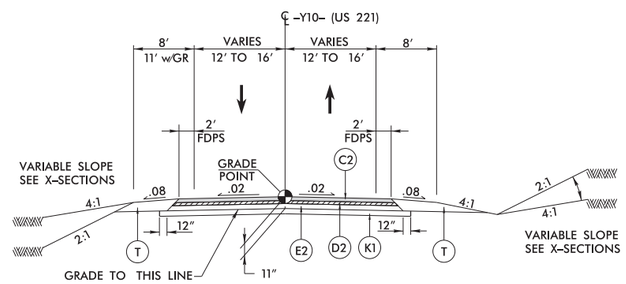
WOVEN WIRE FENCE BERM DETAIL

-L3- 751+20.89 TO -L3- 759+00.00 NORTHBOUND LANES
-DR2- 11+80.00 TO -DR2- 19+44.00



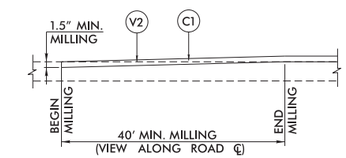
TYPICAL SECTION NO. 15

-Y5- 11+75.00 TO -Y5- 21+01.44
-Y11- 10+47.29 TO -Y11- 28+00.00
-Y12- 11+25.00 TO -Y12- 33+00.00



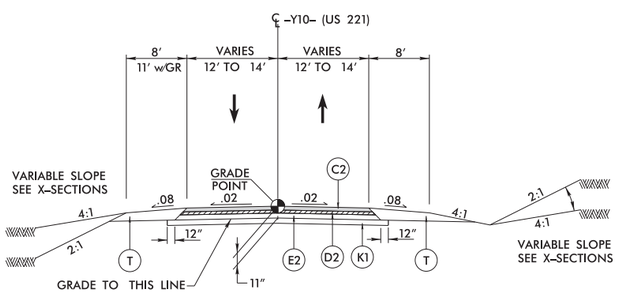
TYPICAL SECTION NO. 16

-Y10- 20+58.96 TO -Y10- 24+81.26 - LEFT
-Y10- 20+58.96 TO -Y10- 24+81.26 - RIGHT



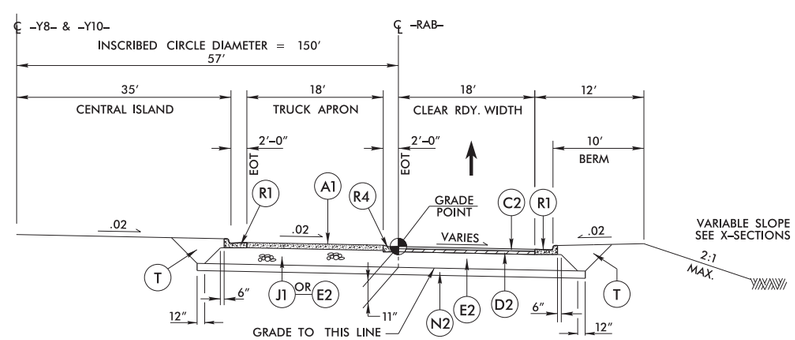
INCIDENTAL MILLING DETAIL - V2

USE INCONJUNCTION WITH ALL -Y- LINE TIE-INS
-Y5- 11+75.00 TO -Y5- 12+15.00
-Y12- 11+25.00 TO -Y12- 11+65.00
-Y12- 32+60.00 TO -Y12- 33+00.00



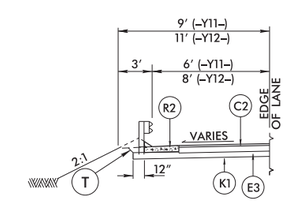
TYPICAL SECTION NO. 17

-Y10- 26+75.30 TO -Y10- 29+70.35 - RIGHT
-Y10- 26+75.66 TO -Y10- 29+70.35 - LEFT



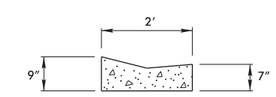
TYPICAL SECTION NO. 18

ROUNDABOUT -RAB-
-RAB- STA 0+00.00 TO -RAB- STA 3+58.14



DETAIL FOR SHOULDER BERM GUTTER

USE IN CONJUNCTION WITH TYPICAL SECTION No. 15



DETAIL FOR MODIFIED VALLEY GUTTER

USE IN CONJUNCTION WITH TYPICAL SECTION No. 18
FOR ROUNDABOUT TRUCK APRON

8/17/2021 4:23:17 PM
R-2233BB_RDY_TYP_2A-6.DGN
USER: gmorris

6/2/99

PAVEMENT SCHEDULE (FINAL)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
A1	7" CONCRETE	C4	3" S9.5C	D3	VAR DEPTH I19.0C	E4	5" B25.0C	K1	CHEMICAL STABILIZATION: 7" SOIL-CEMENT BASE OR 8"LIME-TREATED SOIL	R1	2'-6" CONCRETE CURB & GUTTER	R5	8"x12" CONCRETE CURB	U	EXIST. PAVEMENT
C1	1.5" S9.5B	C5	VAR DEPTH S9.5C	E1	3" B25.0C	E5	VAR DEPTH B25.0C	K2	8" CLASS IV SUBGRADE STABILIZATION	R2	SHOULDER BERM GUTTER	R6	CONCRETE EXPRESSWAY GUTTER	Z	MILLED RUMBLE STRIP
C2	3" S9.5B	D1	2.5" I19.0C	E2	4" B25.0C	J1	6" ABC	N1	GEOTEXTILE FOR SOIL STABILIZATION	R3	5" CONC. ISLAND	S	4" CONC. SIDEWALK	V1	PAVEMENT MILLING
C3	VAR DEPTH S9.5B	D2	4" I19.0C	E3	4.5" B25.0C	J2	8" ABC	N2	GEOTEXTILE FOR PAVEMENT STABILIZATION	P	PRIME COAT	R4	2' MODIFIED VALLEY GUTTER	T	EARTH

ITEM	DESCRIPTION
V2	VARIABLE DEPTH PAVEMENT WEDGING
W1	
W2	
W3	

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2A-7

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORY

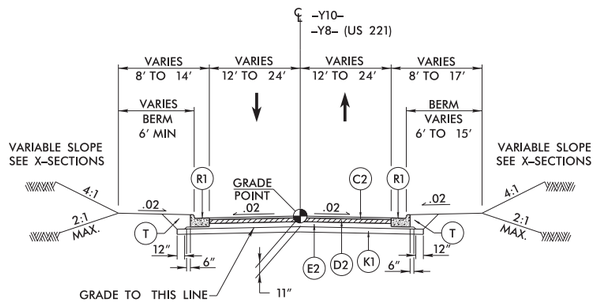
PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T. HOLLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

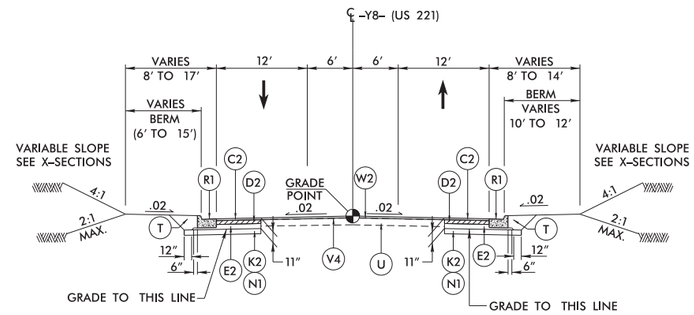
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. P-0929

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



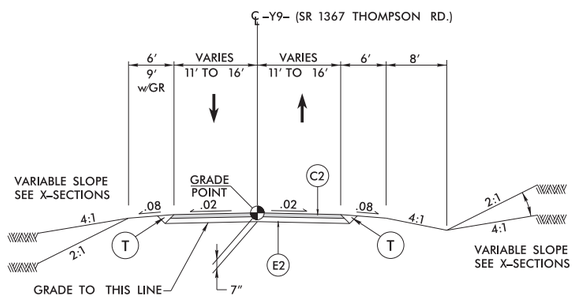
TYPICAL SECTION NO. 19

-Y8- 15+00.00 TO -Y8- 20+57.13
-Y10- 18+30.59 TO -Y10- 20+58.16



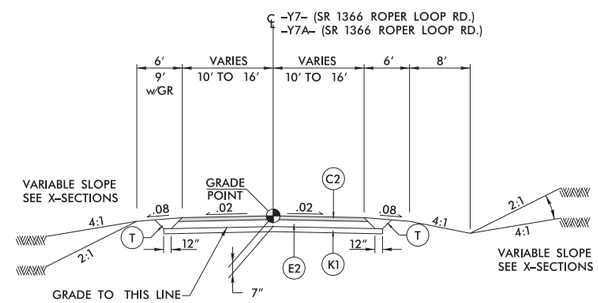
TYPICAL SECTION NO. 19A

-Y8- 22+07.13 TO -Y8- 36+60.00



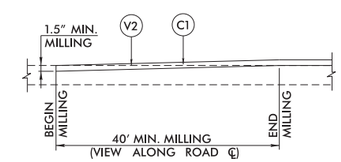
TYPICAL SECTION NO. 20

-Y9- 13+50.00 TO -Y9- 16+53.96



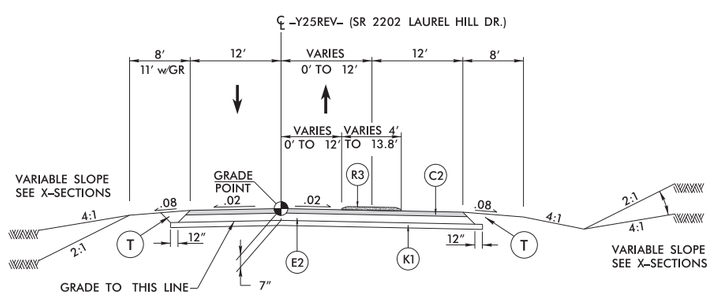
TYPICAL SECTION NO. 21

-Y7- 14+75.00 TO -Y7- 23+08.78
-Y7A- 13+75.00 TO -Y7A- 17+98.84



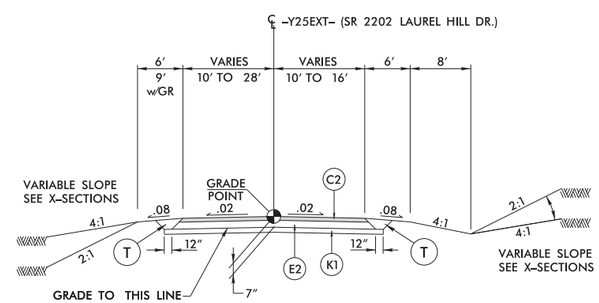
INCIDENTAL MILLING DETAIL – V2

USE INCONJUNCTION WITH ALL -Y- LINE TIE-INS
-Y7- 14+75.00 TO -Y7- 15+15.00
-Y7A- 13+75.00 TO -Y7A- 14+15.00
-Y8- 15+00.00 TO -Y8- 15+40.00
-Y8- 36+20.00 TO -Y8- 36+60.00
-Y9- 13+50.00 TO -Y9- 13+90.00
-Y25EXT- 13+00.00 TO -Y25EXT- 13+55.00



TYPICAL SECTION NO. 22

-Y25REV- 17+50.00 TO -Y25REV- 33+28.28



TYPICAL SECTION NO. 23

-Y25EXT- 10+12.00 TO -Y25EXT- 13+00.00

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USER: dmory
R-2233BB_RDY_TYP_2A-7.DGN

6/2/99

PAVEMENT SCHEDULE (FINAL)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM				DESCRIPTION
A1	7" CONCRETE	C4	3" S9.5C	D3	VAR DEPTH I19.0C	E4	5" B25.0C	K1	CHEMICAL STABILIZATION: 7" SOIL-CEMENT BASE OR 8"LIME-TREATED SOIL	R1	2'-6" CONCRETE CURB & GUTTER	R5	8"x12" CONCRETE CURB				U	EXIST. PAVEMENT
C1	1.5" S9.5B	C5	VAR DEPTH S9.5C	E1	3" B25.0C	E5	VAR DEPTH B25.0C	K2	8" CLASS IV SUBGRADE STABILIZATION	R2	SHOULDER BERM GUTTER	R6	CONCRETE EXPRESSWAY GUTTER				Z	MILLED RUMBLE STRIP
C2	3" S9.5B	D1	2.5" I19.0C	E2	4" B25.0C	J1	6" ABC	N1	GEOTEXTILE FOR SOIL STABILIZATION	R3	5" CONC. ISLAND	S	4" CONC. SIDEWALK	V1	V2	V3	V4	PAVEMENT MILLING
C3	VAR DEPTH S9.5B	D2	4" I19.0C	E3	4.5" B25.0C	J2	8" ABC	N2	GEOTEXTILE FOR PAVEMENT STABILIZATION	P	PRIME COAT	R4	2' MODIFIED VALLEY GUTTER	T	EARTH	W1	W2	W3	VARIABLE DEPTH PAVEMENT WEDGING

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2A-8

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORY

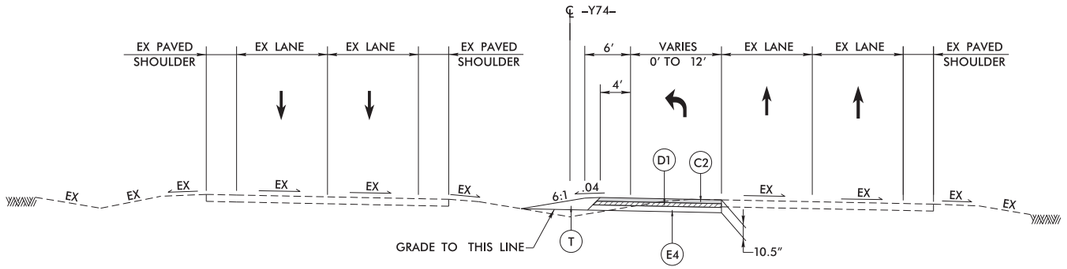
PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T. HOLLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

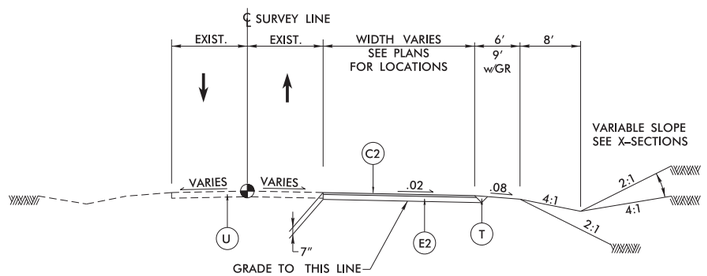
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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



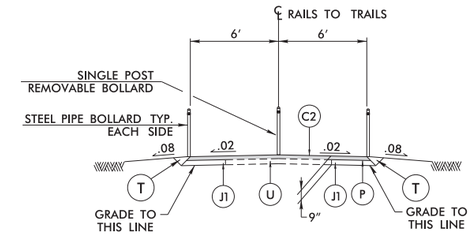
TYPICAL SECTION NO. 24

-Y74- 10+00.00 TO -Y74- 17+89.51

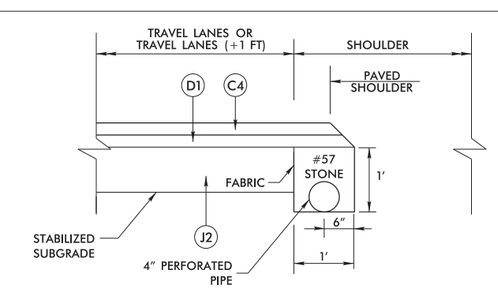


TYPICAL SECTION NO. 25

CUL-DE-SACS & STREET CONNECTIONS

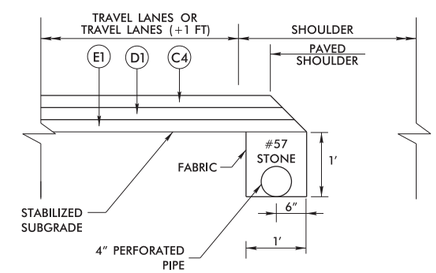


RAILS TO TRAILS PAVEMENT CONNECTIONS			
LOCATION	DESCRIPTION	PAVING LENGTH	BOLLARD LOCATIONS
-Y6- 14+11 LT.	EXISTING TRAIL IS 7' GRAVEL	LENGTH = 30'	PLACE 38' LT.
-Y6- 14+48 RT.	EXISTING TRAIL IS 7' GRAVEL	LENGTH = 24'	PLACE 32' RT.
-Y11- 14+82 RT.	EXISTING TRAIL IS 12' PAVED	LENGTH = 21'	PLACE 35' RT.
-Y11- 14+82 LT.	EXISTING TRAIL IS 12' PAVED	LENGTH = 21'	PLACE 35' LT.
-TR1-	EXISTING TRAIL IS 12' PAVED	LENGTH = 176'	SEE SHEET 11
-TR2-	EXISTING TRAIL IS 7' GRAVEL	LENGTH = 150'	SEE SHEET 11



SHOULDER DRAIN DETAIL WITH ABC

NOT TO SCALE



SHOULDER DRAIN DETAIL B25.0C

NOT TO SCALE

NOTE: SEE SHEET 3B-4 FOR STATION LOCATIONS AND QUANTITY SUMMARY.

CUL-DE-SACS			
LABEL	STREET	CENTER	PAVING LIMITS
-CUL1-	LAUREL HILL RD.	-Y25- 15+70.10 (20.25' RT.)	-Y25- 15+00.65
-CUL2-	LAUREL HILL RD.	-DR2- 10+34.38 (23.69' RT.)	-Y25- 25+16.69
-CUL3-	EAST 2ND ST.	-Y16- 13+03.91 (20.92' LT.)	-Y16- 12+32.17
-CUL4-	EAST 2ND ST.	-Y16- 17+82.39 (19.25' RT.)	-Y16- 18+55.84
-CUL5-	COLLETT ST.	-Y17- 13+21.98 (20.16' RT.)	-Y17- 12+52.47
-CUL6-	COLLETT ST.	-Y17- 17+78.13 (17.44' LT)	-Y17- 18+50.00
-CUL7-	REESE ST.	-Y20- 11+92.83 (20.91' LT.)	-Y20- 11+23.32
-CUL8-	SOUTHERN ST.	-Y21- 17+36.58 (22.04' RT.)	-Y21- 16+64.63
-CUL9-	LONG ST.	-Y23- 25+93.98 (22.00' RT.)	-Y23- 26+64.82
-CUL10-	ROCK RD.	-Y22A- 34+80.00 (19.00' LT.)	-Y22A- 39+96.06
-CUL13-	GILBOA CHURCH RD.	-Y42- 14+45.32 (21.36' RT.)	-Y42- 15+46.08
-CUL14-	SOUTHERN ST.	-L3- 839+94.99 (150.79' RT.)	-L3- 840+01.33 (211.66' RT)
-CUL11-	OLD US 221	-Y12- 41+97.56 (21.19' LT)	-Y12- 41+28.01
-CUL15-	LONG ST.	-Y23A- 45+53.87 (21.00' RT.)	-Y23A- 46+28.28
-CUL16-	OLD CHARLOTTE RD.	-L3- 779+79.91 (226.59' LT.)	-L3- 779+38.74 (289.42' LT.)

STREET CONNECTIONS		
LABEL	DESCRIPTION	LOCATION
-STCON1-	OAK ST. TO REECE ST.	-Y20- 13+72.71 TO -Y20- 16+56.66
-STCON2-	HILDERBRAND DR. TO HUDGEN'S LAKE DR.	-L3- 871+07.28 (131.42' LT.) TO -L3- 871+55.28 (147.40' LT.)
-STCON3-	SASAFFRAS DR. TO RIDGELAND DR.	-L3- 896+53.63 (129.30' LT.) TO -L3- 896+89.24 (185.15' LT.)
-STCON4-	CHURCH ST. TO SANDY WOODS LN.	-Y23- 21+23.17 TO -Y23- 21+52.30 (43.68' RT.)
-STCON5-	US 221 TO GOLD HILL MISSIONARY BAPTIST CHURCH	-L3- 941+22.37 (127.71' LT.) TO -L3- 944+44.60 (129.15' LT.)

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USER: cjones

6/2/99

PAVEMENT SCHEDULE (FINAL)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
A1	7″ CONCRETE	C4	3″ S9.5C	D3	VAR DEPTH I19.0C	E4	5″ B25.0C	K1	CHEMICAL STABILIZATION: 7″ SOIL-CEMENT BASE OR 8″LIME-TREATED SOIL	R1	2′-6″ CONCRETE CURB & GUTTER	R5	8″x12″ CONCRETE CURB	U	EXIST. PAVEMENT
C1	1.5″ S9.5B	C5	VAR DEPTH S9.5C	E1	3″ B25.0C	E5	VAR DEPTH B25.0C	K2	8″ CLASS IV SUBGRADE STABILIZATION	R2	SHOULDER BERM GUTTER	R6	CONCRETE EXPRESSWAY GUTTER	Z	MILLED RUMBLE STRIP
C2	3″ S9.5B	D1	2.5″ I19.0C	E2	4″ B25.0C	J1	6″ ABC	N1	GEOTEXTILE FOR SOIL STABILIZATION	R3	5″ CONC. ISLAND	S	4″ CONC. SIDEWALK	V1	PAVEMENT MILLING
C3	VAR DEPTH S9.5B	D2	4″ I19.0C	E3	4.5″ B25.0C	J2	8″ ABC	N2	GEOTEXTILE FOR PAVEMENT STABILIZATION	P	PRIME COAT	R4	2′ MODIFIED VALLEY GUTTER	T	EARTH

ITEM	DESCRIPTION
V2	VARIABLE DEPTH PAVEMENT WEDGING
V3	
V4	
W1	
W2	
W3	

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2A-9

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 020031 ENGINEER DENNIS J. MORY

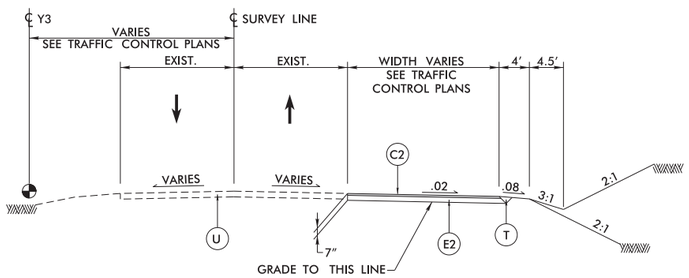
PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024964 ENGINEER JOSEPH T. HOLLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

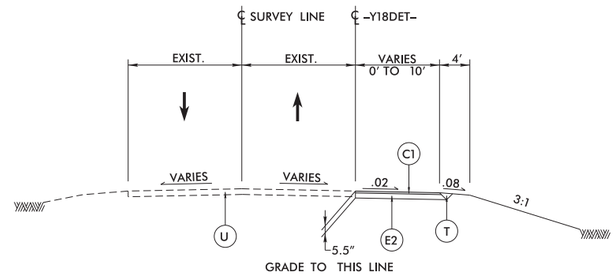
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. P-0929

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



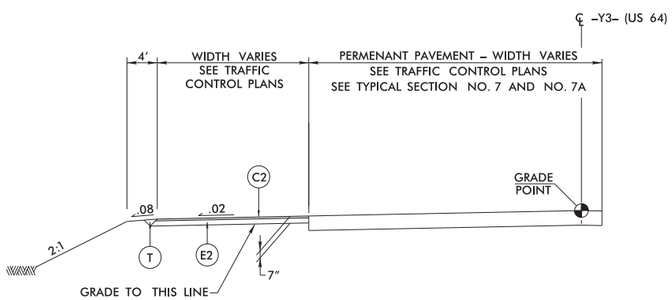
TYPICAL SECTION NO. 26

TEMPORARY PAVEMENT FROM
–Y3– 13+75.00 TO 23+00.00 RT



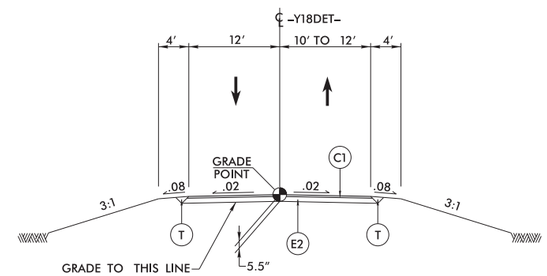
TYPICAL SECTION NO. 28

TEMPORARY PAVEMENT FROM
–Y18DET– 10+00.00 TO 10.76.97



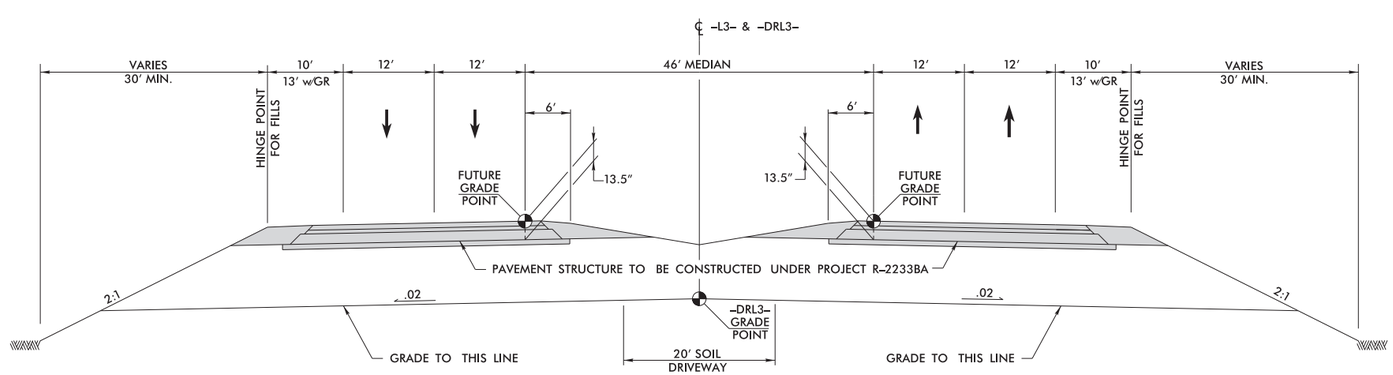
TYPICAL SECTION NO. 27

TEMPORARY PAVEMENT FROM
–Y3– 12+50.00 TO 19+50.00



TYPICAL SECTION NO. 29

TEMPORARY PAVEMENT FROM
–Y18DET– 10+76.97 TO 13+80.03



TYPICAL SECTION NO. 30

GRADING ONLY

SOUTHBOUND LANES

–L3– 733+30.00 TO –L3– 743+21.39

NORTHBOUND LANES

–L3– 733+30.00 TO –L3– 743+21.39

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USER: dmorry
FILE: R-2233BB_PDY_TYP_2A-9.DGN

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

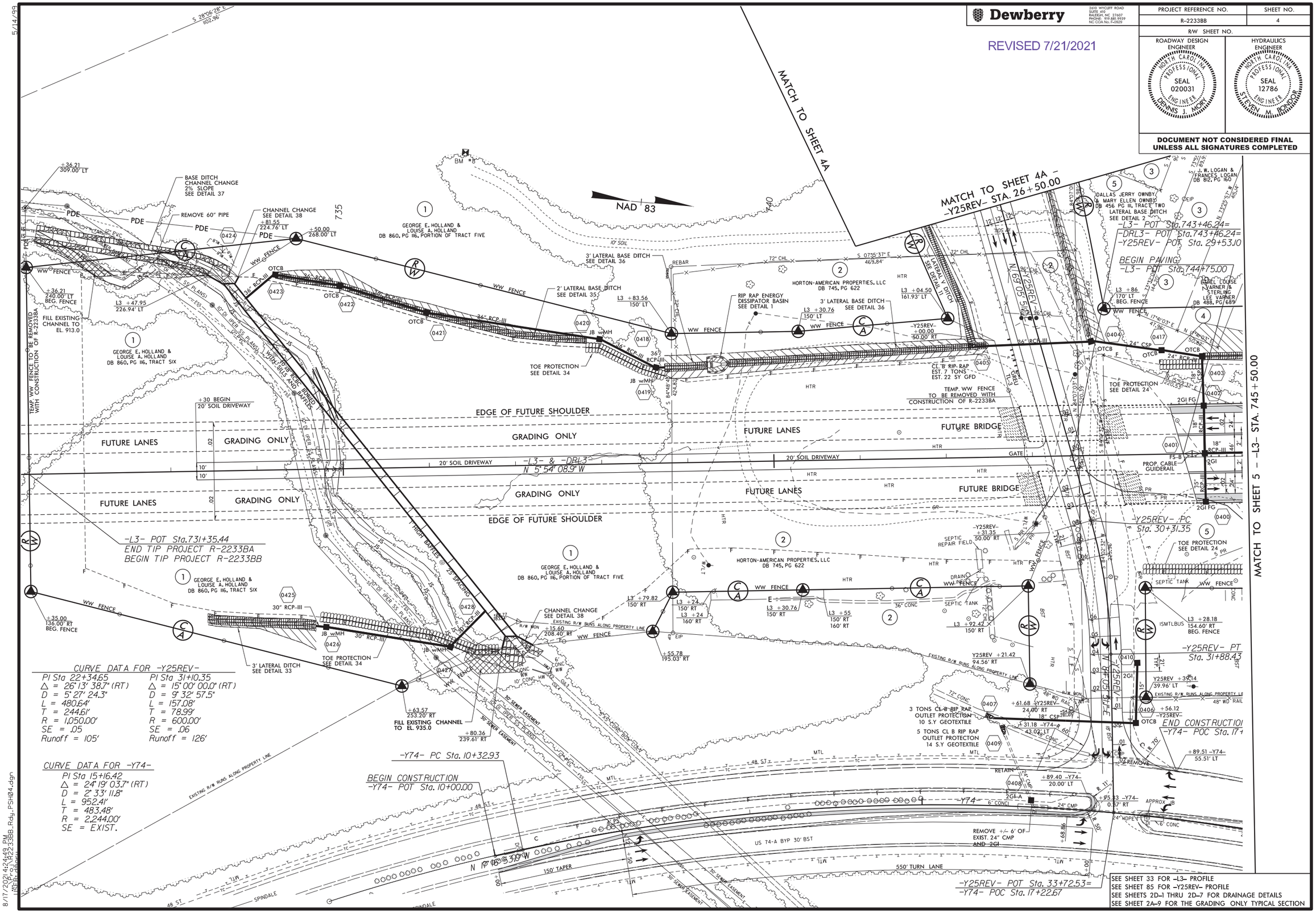
REVISED 7/21/2021

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

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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5/14/99

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. MORY

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

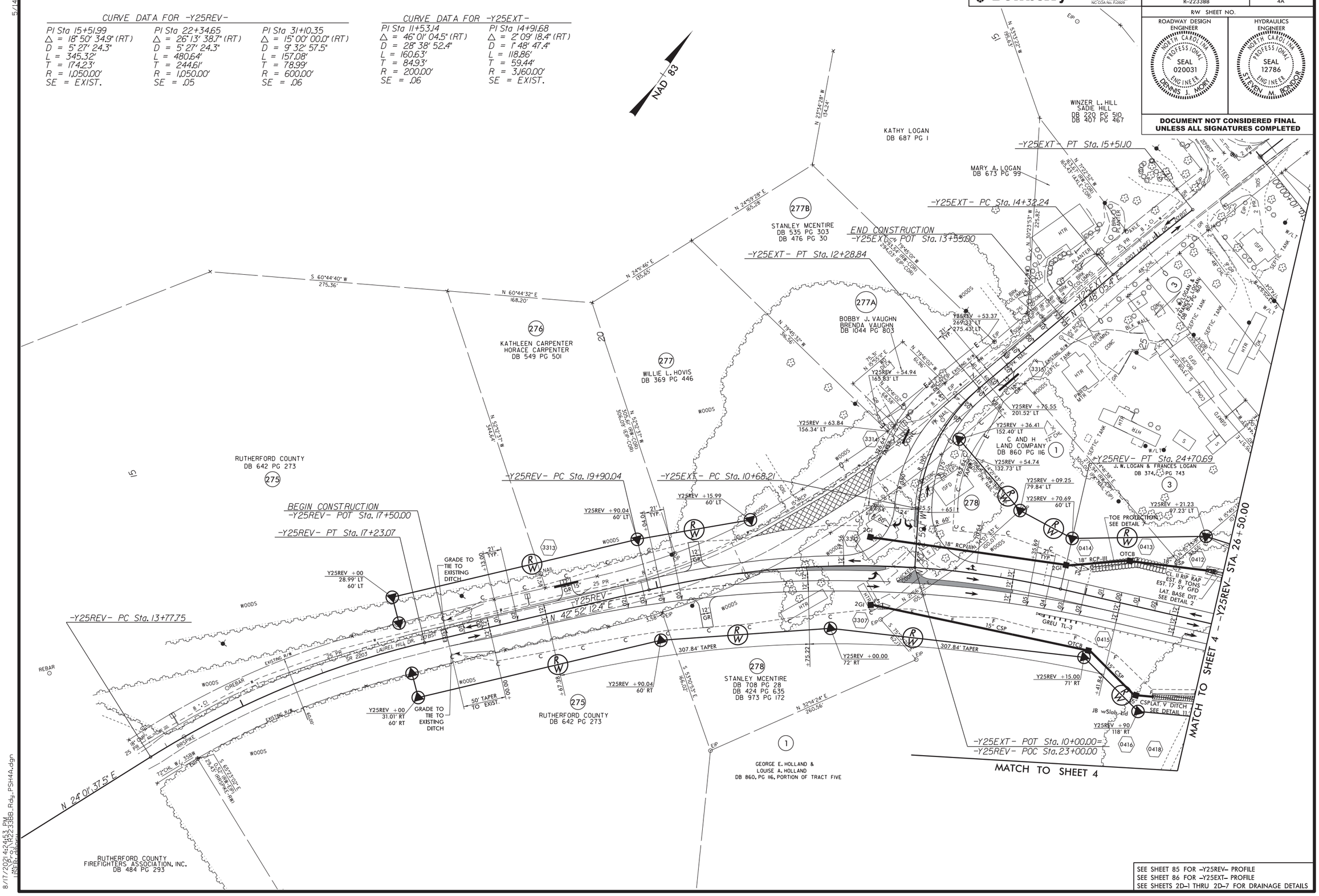
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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-

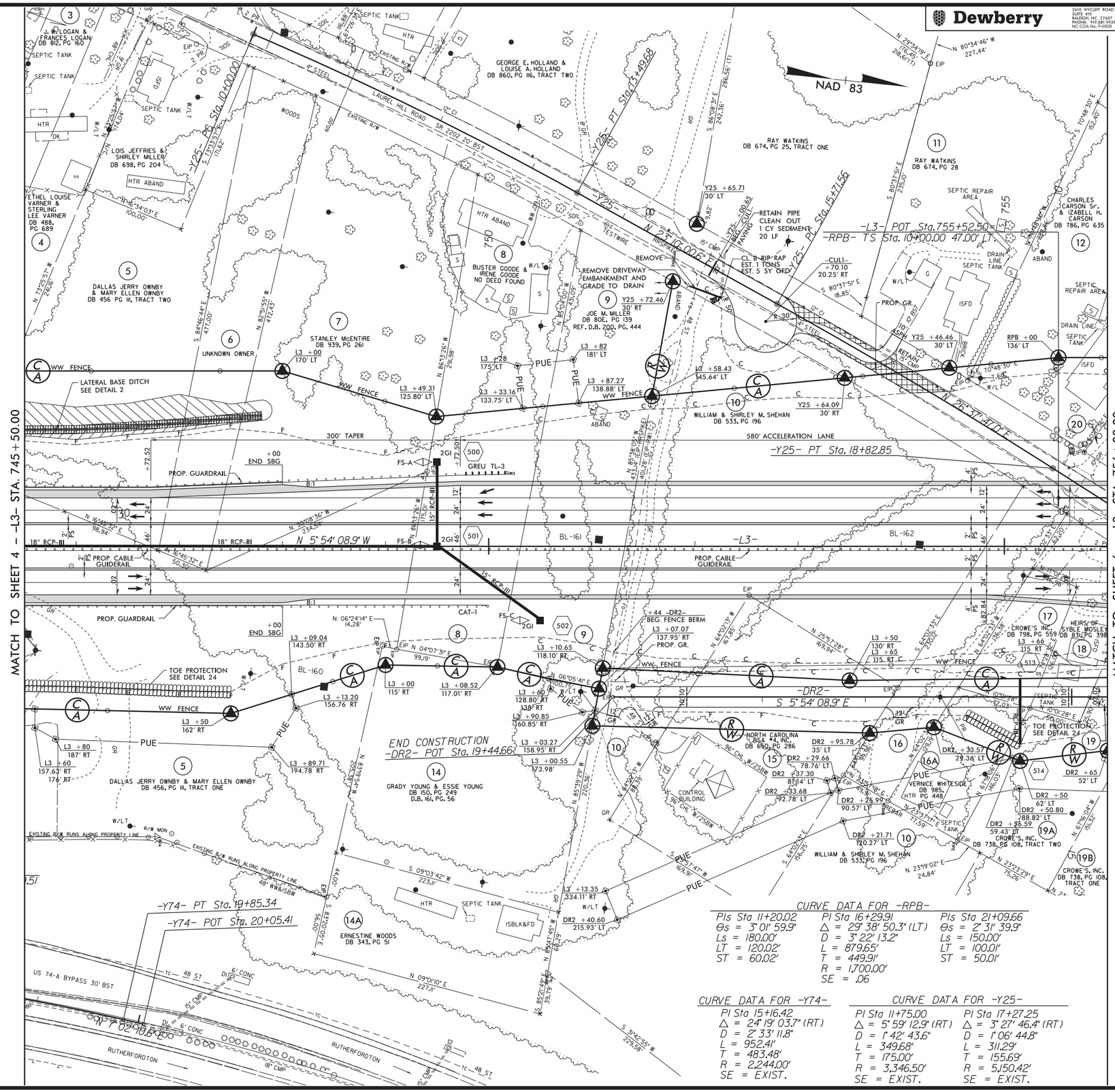
PI Sta 11+53.14	PI Sta 14+91.68
△ = 46° 01' 04.5" (RT)	△ = 2° 09' 18.4" (RT)
D = 28° 38' 52.4"	D = 1° 48' 47.4"
L = 160.63'	L = 118.86'
T = 84.93'	T = 59.44'
R = 200.00'	R = 3,160.00'
SE = .06	SE = EXIST.



SEE SHEET 85 FOR -Y25REV- PROFILE
SEE SHEET 86 FOR -Y25EXT- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

8/17/2021 4:24:53 PM
USER: cmorris
R-2233BB_Rdy_PSH4A.dgn

5/14/99



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

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

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

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CURVE DATA FOR -RPB-

PI Sta 11+20.02	PI Sta 16+29.91	PI Sta 21+09.66
Θs = 3° 01' 59.9"	Δ = 29° 38' 50.3" (LT)	Θs = 2° 31' 39.9"
Ls = 180.00'	D = 3° 22' 13.2"	Ls = 150.00'
LT = 120.02'	L = 879.65'	LT = 100.01'
ST = 60.02'	T = 449.91'	ST = 50.01'
	R = 1,700.00'	
	SE = .06	

CURVE DATA FOR -Y74-

PI Sta 15+16.42
Δ = 24° 19' 03.7" (RT)
D = 2° 33' 11.8"
L = 952.41'
T = 483.48'
R = 2,244.00'
SE = EXIST.

CURVE DATA FOR -Y25-

PI Sta 11+75.00	PI Sta 17+27.25
Δ = 5° 59' 12.9" (RT)	Δ = 3° 27' 46.4" (RT)
D = 1° 42' 43.6"	D = 1° 06' 44.8"
L = 349.68'	L = 311.29'
T = 175.00'	T = 155.69'
R = 3,346.50'	R = 5,150.42'
SE = EXIST.	SE = EXIST.

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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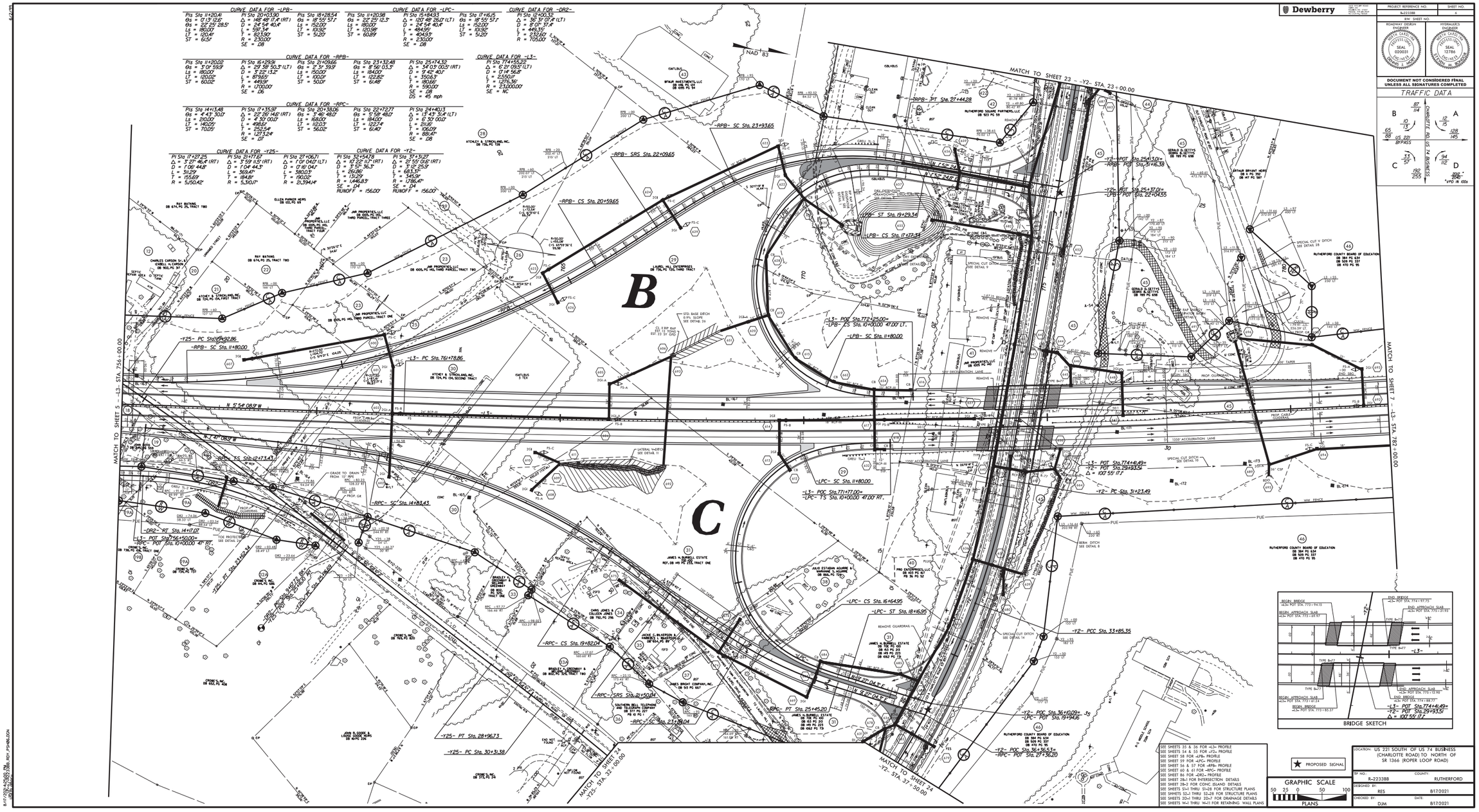
ISER: ...
ISFP: ...2233BB_RDY_PSH05.DGN


Dewberry
PROJECT REFERENCE NO.
R-2233BB
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SEAL 020031
SEAL 12786
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TRAFFIC DATA
CHARLOTTE RD. US 74 BUSINESS
US 221 BYPASS
*VPD IN 100s
CURVE DATA FOR -LPB-
CURVE DATA FOR -LPC-
CURVE DATA FOR -DR2-
CURVE DATA FOR -RPB-
CURVE DATA FOR -L3-
CURVE DATA FOR -RPC-
CURVE DATA FOR -Y25-
CURVE DATA FOR -Y2-
MATCH TO SHEET 23 -Y2- STA. 23+00.00
MATCH TO SHEET 7 -L3- STA. 782+00.00
MATCH TO SHEET 5 -L3- STA. 756+00.00
MATCH TO SHEET 24 -Y25- STA. 32+00.00
MATCH TO SHEET 24 -Y2- STA. 37+50.00
NAD 83
B
C
-RPB- SC Sta. 23+93.65
-RPB- SRS Sta. 22+09.65
-RPB- CS Sta. 20+59.65
-Y25- PC Sta. 29+92.86
-RPB- SC Sta. 11+80.00
-L3- PC Sta. 761+78.86
-L3- SC Sta. 756+00.00
-RPC- SC Sta. 14+83.43
-DR2- RT Sta. 14+17.17
-L3- POT Sta. 756+50.00= -RPC- POT Sta. 10+00.00 47.17 RT.
-Y25- PT Sta. 21+19.34
-Y25- PC Sta. 21+67.34
-Y25- PT Sta. 28+96.73
-Y25- PC Sta. 30+31.38
-RPC- CS Sta. 19+82.04
-RPC- SRS Sta. 21+50.04
-RPC- SC Sta. 21+79.04
-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- POC Sta. 772+25.00= -LPB- CS Sta. 10+00.00 47.00 LT.
-LPB- SC Sta. 11+80.00
-LPB- ST Sta. 19+29.54
-LPB- CS Sta. 17+77.54
-RPB- PT Sta. 27+44.28
-Y2- POT Sta. 25+13.01= -RPB- POT Sta. 51+16.38
-Y2- POT Sta. 25+37.01= -LPB- POT Sta. 22+04.55
-L3- POT Sta. 774+41.49= -Y2- POT Sta. 29+93.51 Δ = 100°55'17"
-Y2- PC Sta. 31+23.49
-Y2- PCC Sta. 33+85.35
-Y2- POC Sta. 36+10.05= -LPC- POT Sta. 19+34.16
-Y2- POC Sta. 36+36.53= -RPC- POT Sta. 27+36.20
BRIDGE SKETCH
SEE SHEETS 35 & 35 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 28-1 FOR INTERSECTION DETAILS
SEE SHEET 28-2 FOR CONC. ISLAND DETAILS
SEE SHEETS 51-1 THRU 51-28 FOR STRUCTURE PLANS
SEE SHEETS 52-1 THRU 52-28 FOR STRUCTURE PLANS
SEE SHEETS 20-1 THRU 20-7 FOR DRAINAGE DETAILS
SEE SHEETS W4-1 THRU W4-11 FOR RETAINING WALL PLANS
PROPOSED SIGNAL
GRAPHIC SCALE
50 25 0 50 100
PLANS
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
8/17/2021
CHECKED BY: DJM
DATE: 8/17/2021

5/14/99

Dewberry

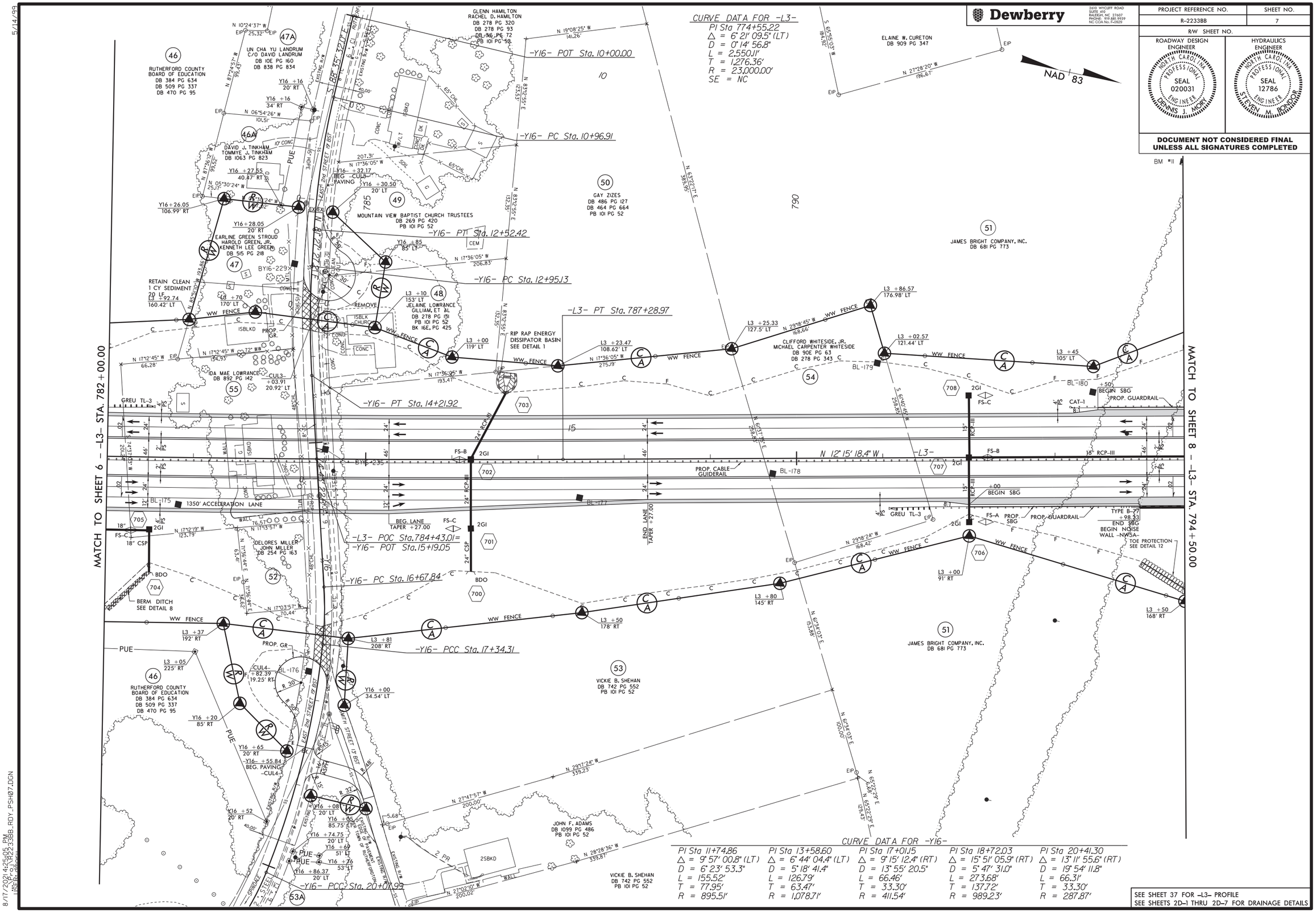
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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

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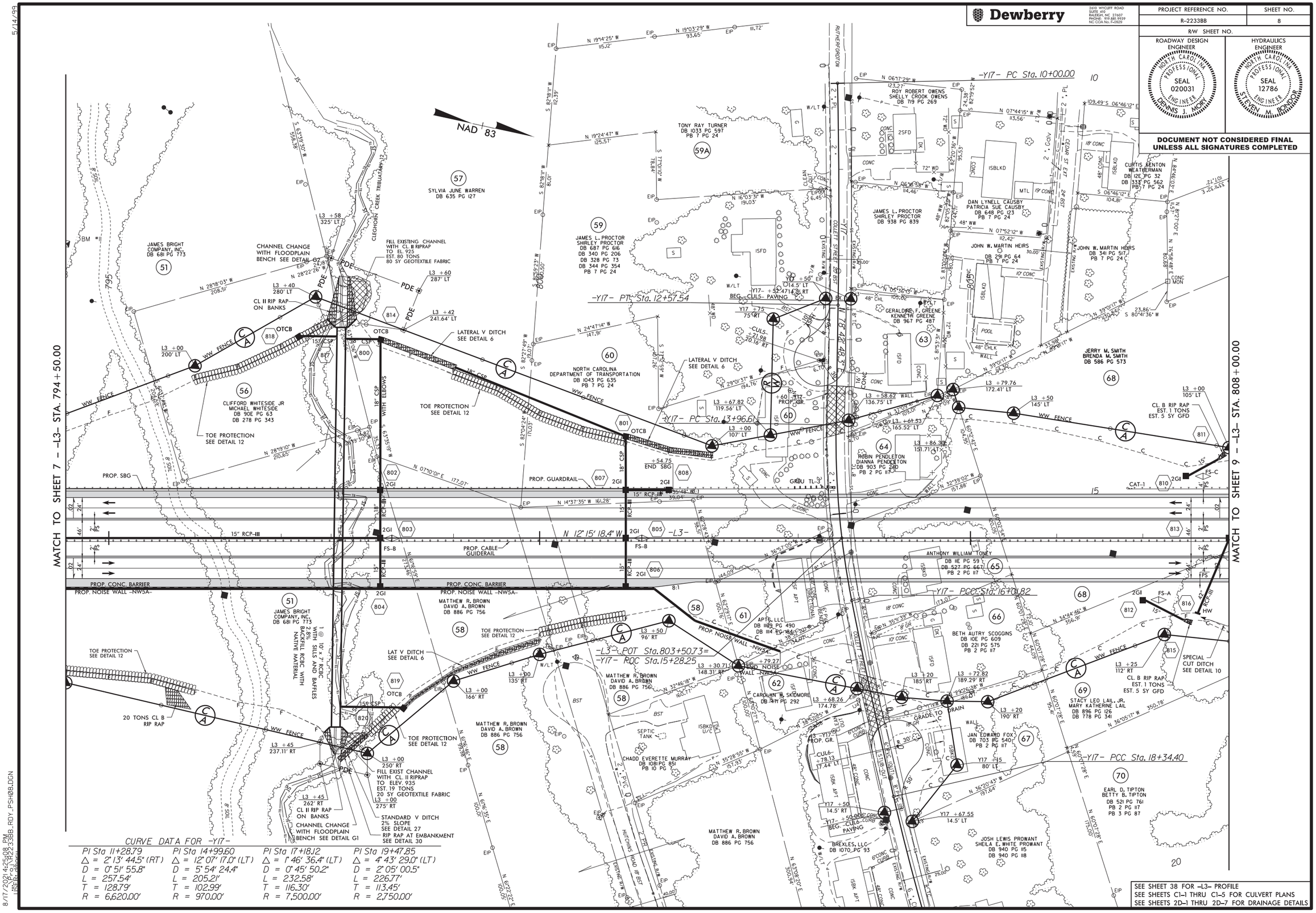
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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

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

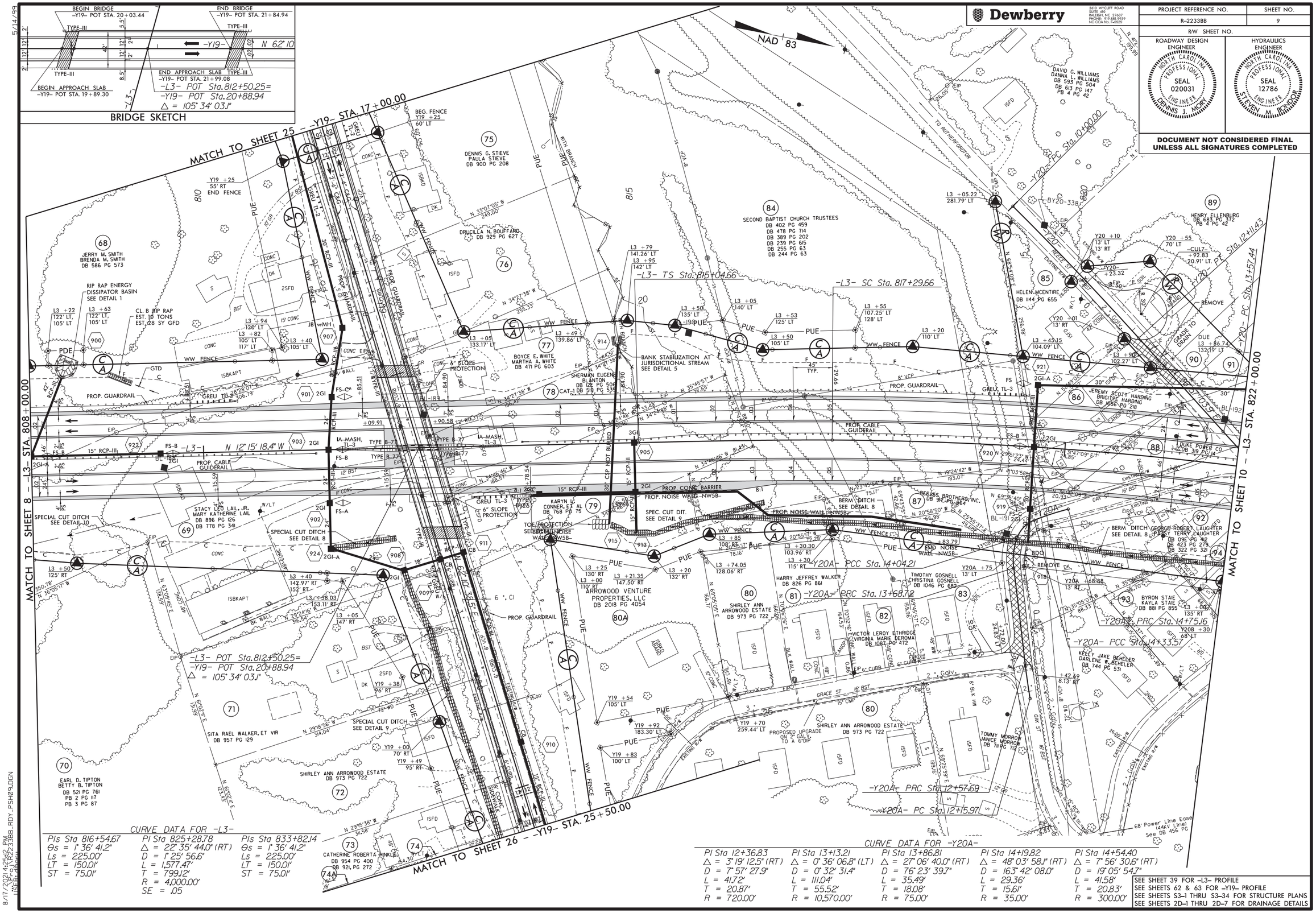
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BONDOR

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 38 FOR –L3– PROFILE
SEE SHEETS C1–1 THRU C1–5 FOR CULVERT PLANS
SEE SHEETS 2D–1 THRU 2D–7 FOR DRAINAGE DETAILS

8/17/2021 4:56:08 PM
R-2233BB_RDY_PSH08.DGN
USER: cbrown



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	9
R/W SHEET NO.	

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEE SHEET 39 FOR -L3- PROFILE
SEE SHEETS 62 & 63 FOR -Y19- PROFILE
SEE SHEETS S3-1 THRU S3-34 FOR STRUCTURE PLANS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

5/14/99

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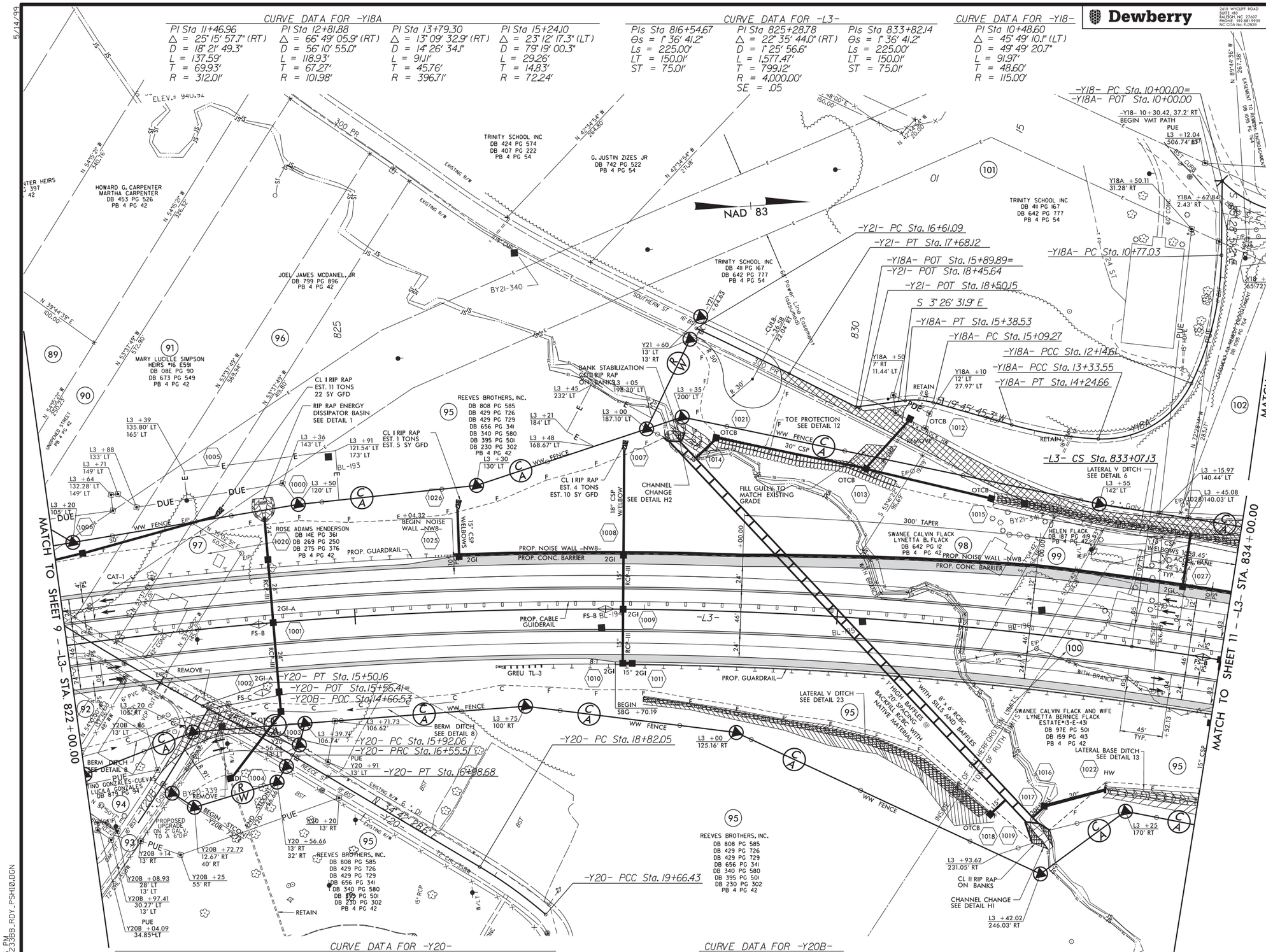
ISER: dgnuser
FILE: R-2233BB_RDY_PSH09.DGN

5/14/99



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'

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. MORY

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEE SHEET 40 FOR –L3– PROFILE
SEE SHEET 74 FOR –Y18– PROFILE
SEE SHEETS C2-1 THRU C2-5 FOR CULVERT PLANS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

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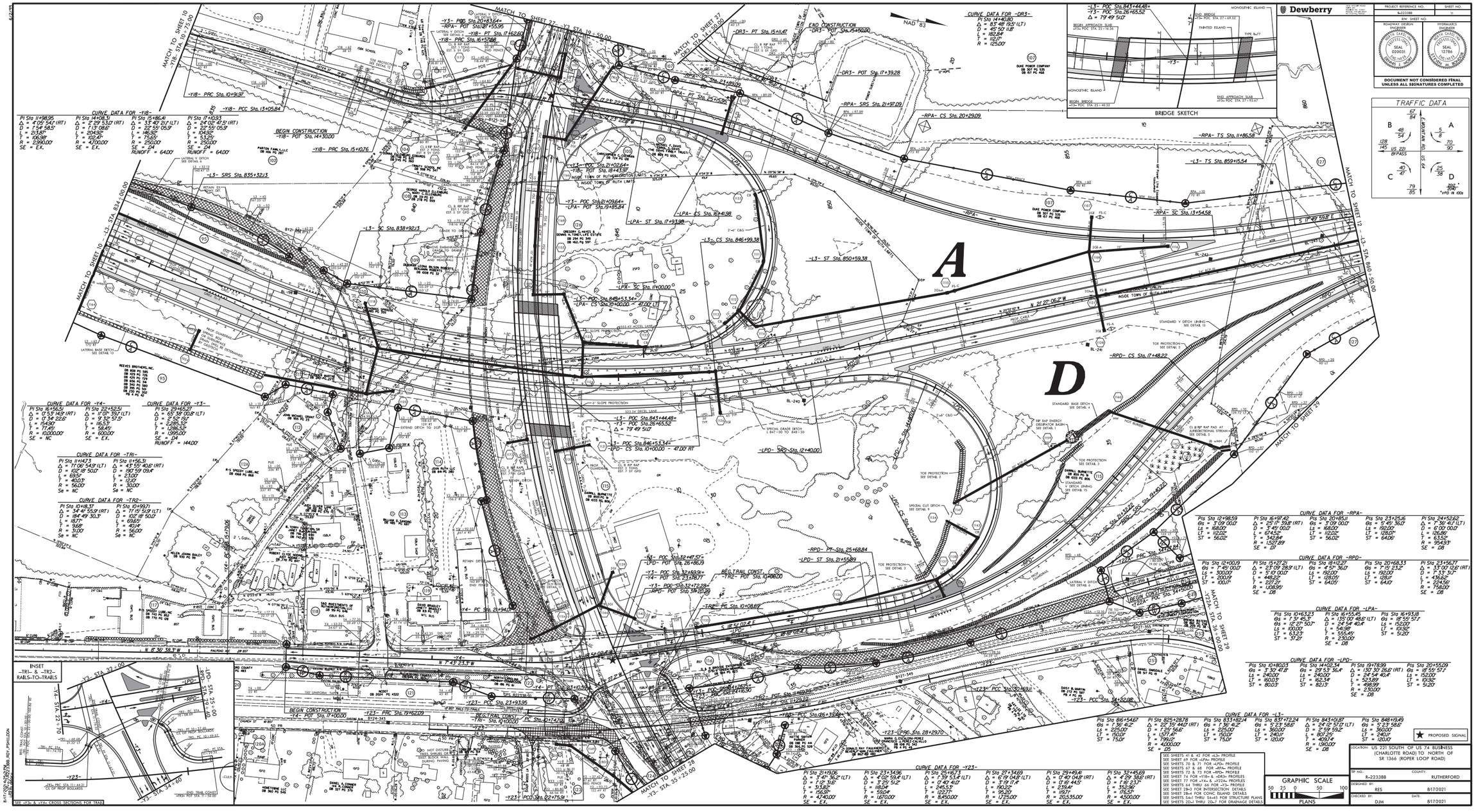
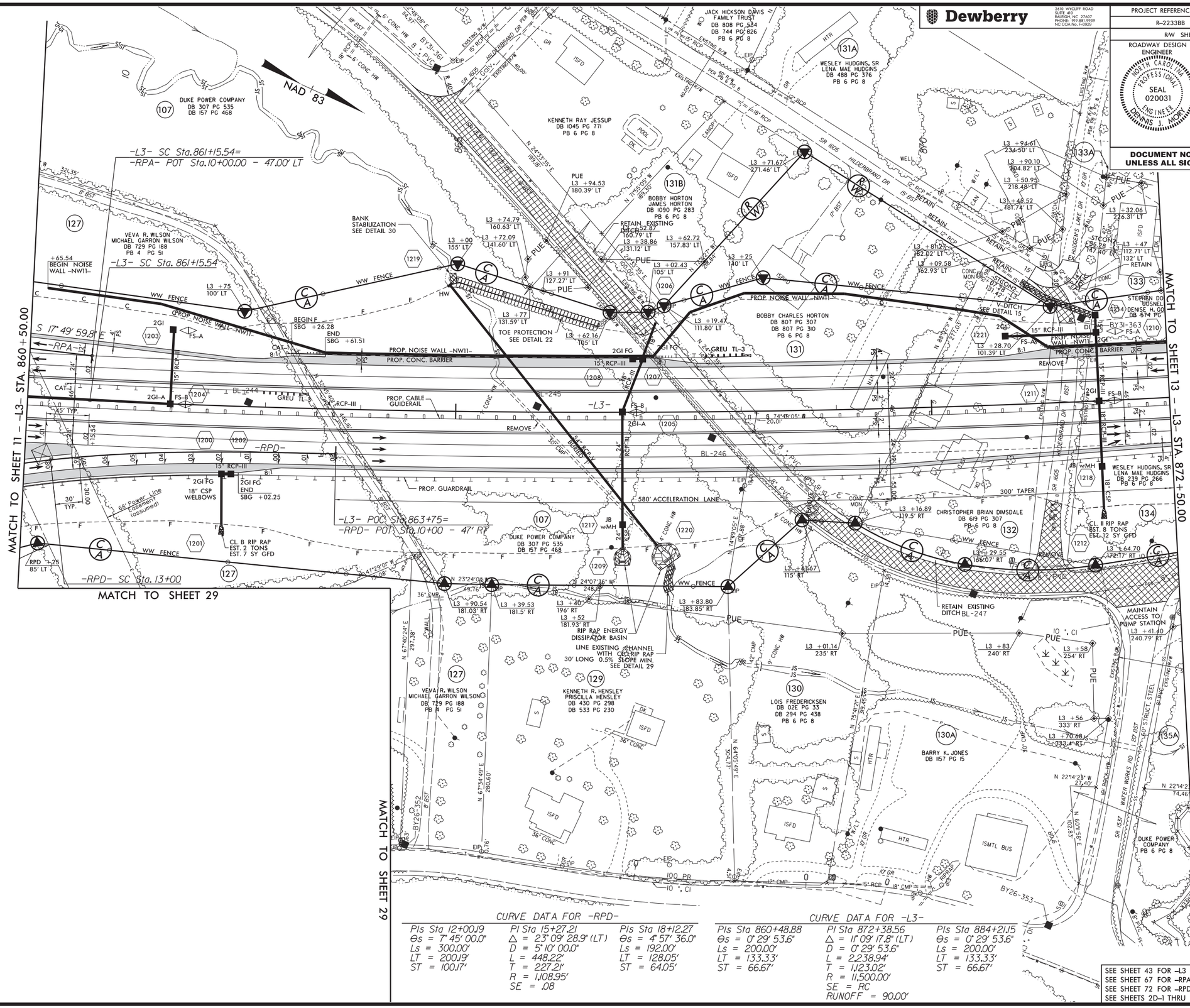

MATCH TO SHEET 10
MATCH TO SHEET 27
MATCH TO SHEET 12
MATCH TO SHEET 29
MATCH TO SHEET 28
MATCH TO SHEET 23
NAD 83
A
D
BEGIN CONSTRUCTION
END CONSTRUCTION
BEG TRAIL CONST.
BRIDGE SKETCH
TRAFFIC DATA
INSET
-TR1- & -TR2-
RAILS-TO-TRAILS
CURVE DATA FOR -Y8-
CURVE DATA FOR -Y4-
CURVE DATA FOR -Y3-
CURVE DATA FOR -TR1-
CURVE DATA FOR -TR2-
CURVE DATA FOR -RPA-
CURVE DATA FOR -RPD-
CURVE DATA FOR -LPA-
CURVE DATA FOR -LPD-
CURVE DATA FOR -L3-
CURVE DATA FOR -DR3-
DUKE POWER COMPANY
DB 307 PG 535
DB 67 PG 468
SEE <Y3> & <Y4> CROSS SECTIONS FOR TRAIL
PROPOSED SIGNAL
GRAPHIC SCALE
PLANS
Dewberry
PROJECT REFERENCE NO.
SHEET NO.
R-2233BB
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SEAL 020031
SEAL 12786
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 8/17/2021
CHECKED BY: DJM
DATE: 8/17/2021

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. MORY

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

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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R2233BB_RDY_PSH12.DGN

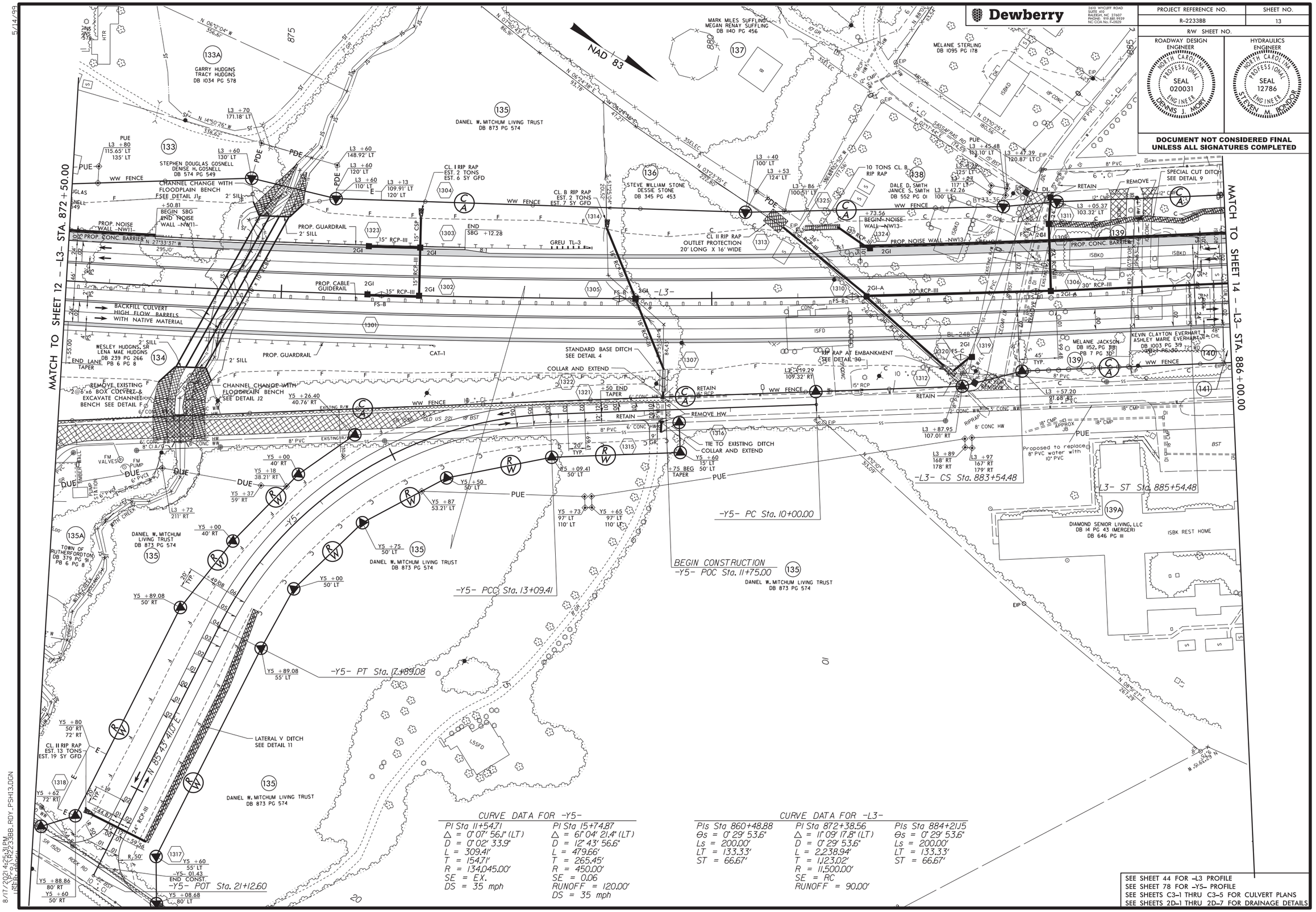
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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 C3-1 THRU C3-5 FOR CULVERT PLANS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

5/14/99

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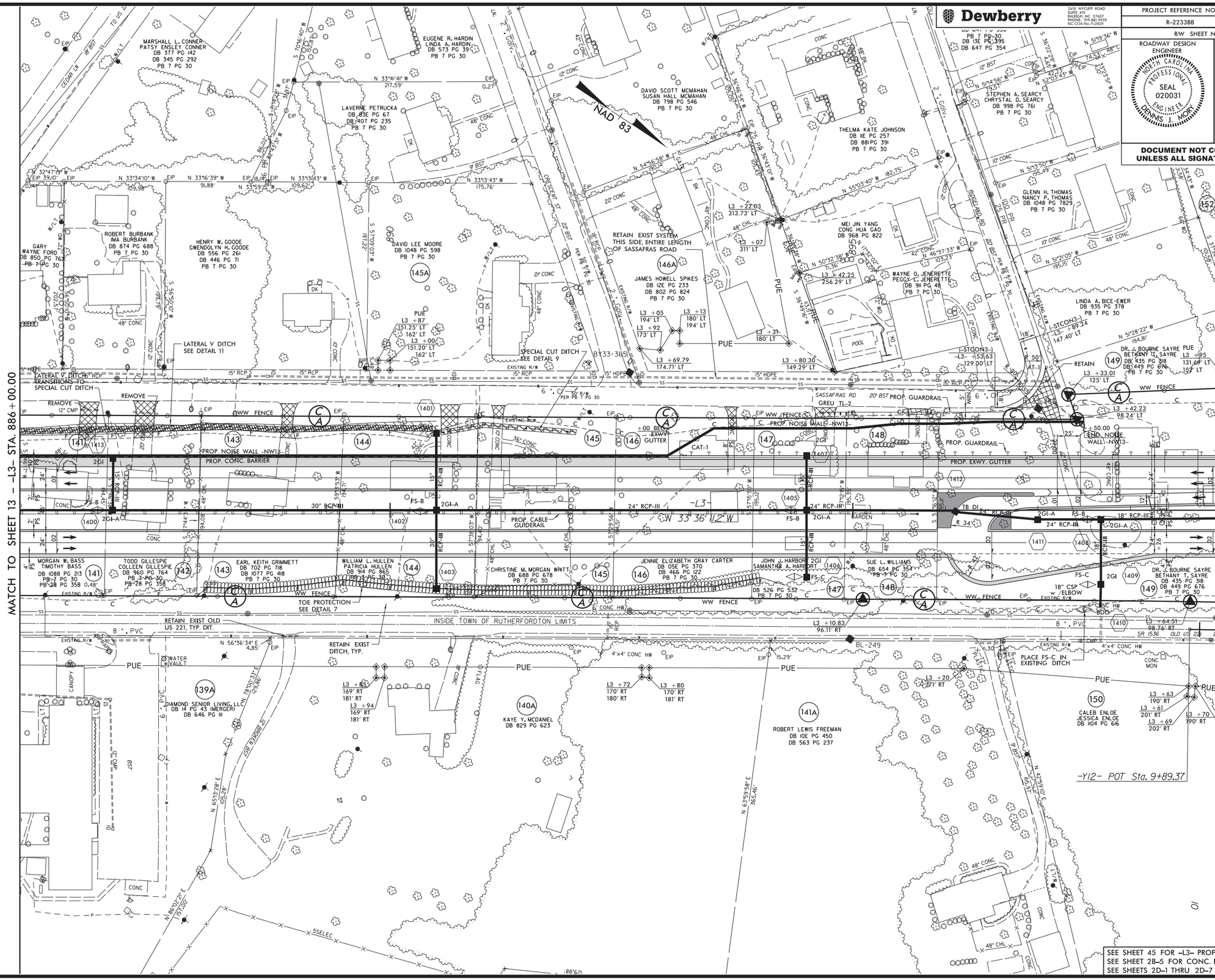
USER: gbowden

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	14
R/W SHEET NO.	

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

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

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USER: cdavis
R-2233BB_RDY_PSH14.DGN

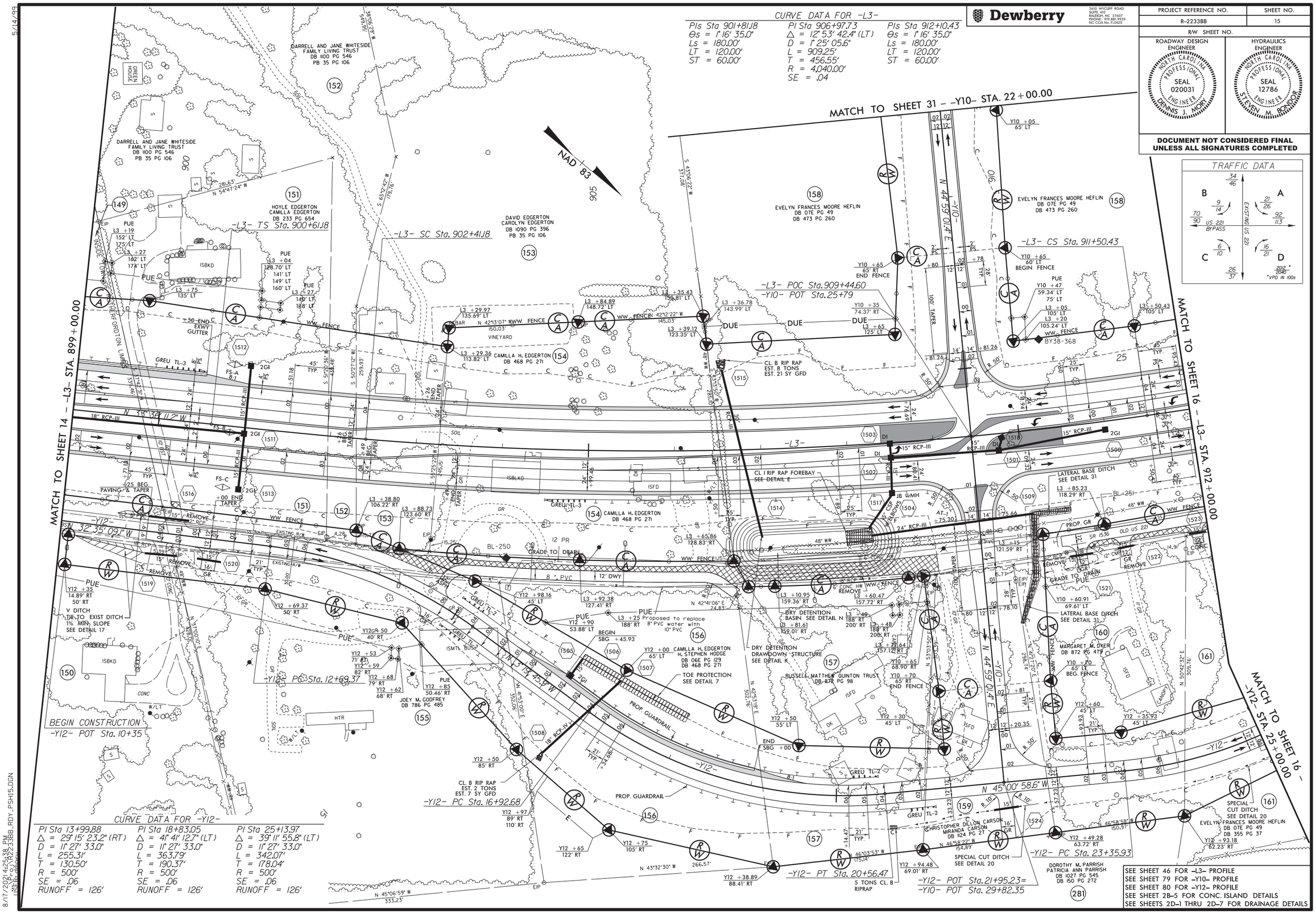
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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

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

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 901+81.18	PI Sta 906+97.73	PIs Sta 912+10.43
Θs = 1° 16' 35.0"	Δ = 12° 53' 42.4" (LT)	Θs = 1° 16' 35.0"
Ls = 180.00'	D = 1° 25' 05.6"	Ls = 180.00'
LT = 120.00'	L = 909.25'	LT = 120.00'
ST = 60.00'	T = 456.55'	ST = 60.00'
	R = 4,040.00'	
	SE = .04	

CURVE DATA FOR -Y12-

PI Sta 13+99.88	PI Sta 18+83.05	PI Sta 25+13.97
Δ = 29° 15' 23.2" (RT)	Δ = 41° 41' 12.7" (LT)	Δ = 39° 11' 55.8" (LT)
D = 11° 27' 33.0"	D = 11° 27' 33.0"	D = 11° 27' 33.0"
L = 255.31'	L = 363.79'	L = 342.07'
T = 130.50'	T = 190.37'	T = 178.04'
R = 500'	R = 500'	R = 500'
SE = .06	SE = .06	SE = .06
RUNOFF = 126'	RUNOFF = 126'	RUNOFF = 126'

5/14/99

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USER: cbrock
FILE: R-2233BB_RDY_PSH15.DGN

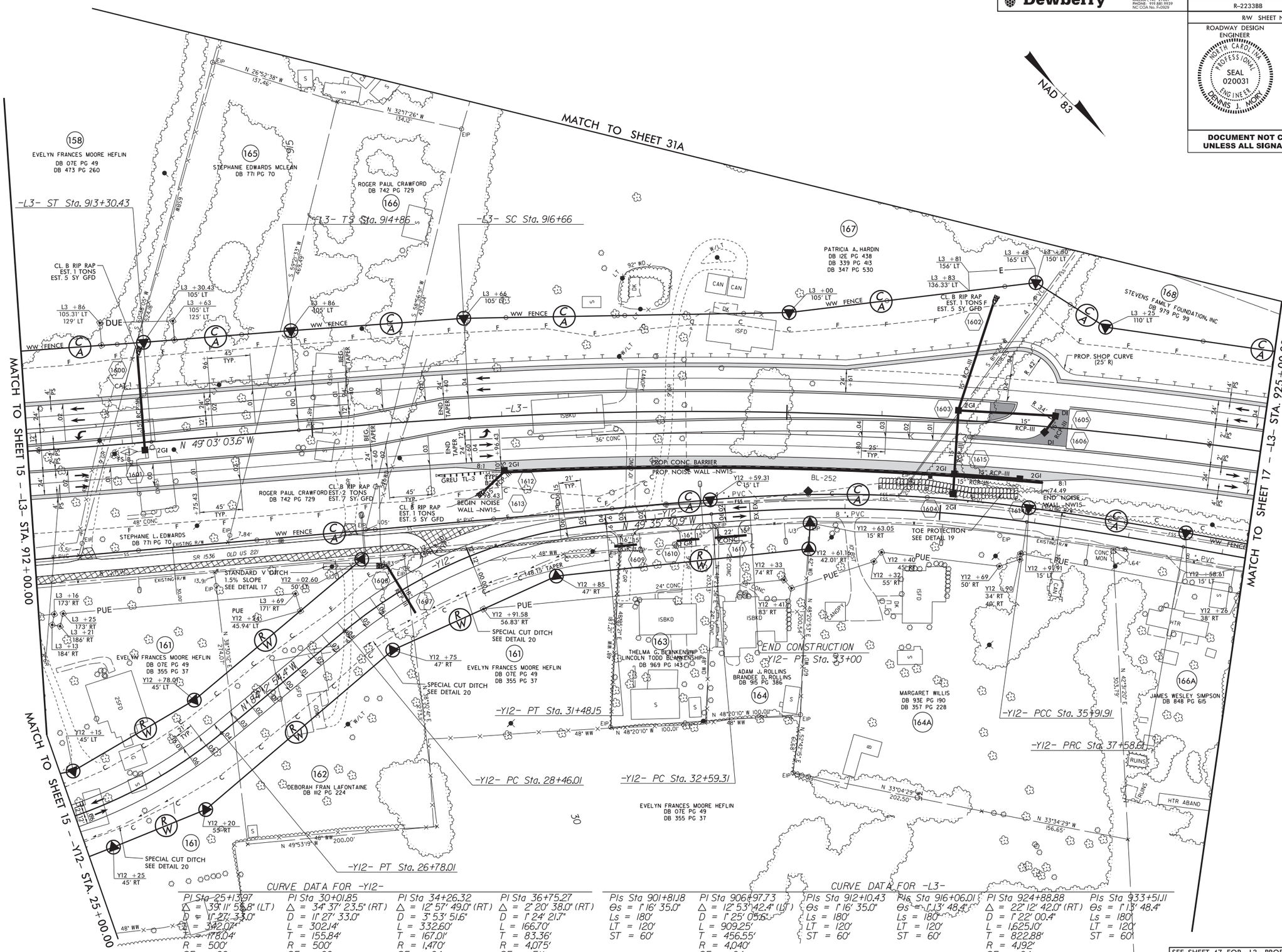
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



CURVE DATA FOR -Y12-

PI Sta 25+13.97	PI Sta 30+01.85	PI Sta 34+26.32	PI Sta 36+75.27
Δ = 39° 11' 58.8" (LT)	Δ = 34° 37' 23.5" (RT)	Δ = 12° 57' 49.0" (RT)	Δ = 2° 20' 38.0" (RT)
D = 11° 27' 33.0"	D = 11° 27' 33.0"	D = 3° 53' 51.6"	D = 1° 24' 21.7"
L = 342.07'	L = 302.14'	L = 332.60'	L = 166.70'
T = 178.04'	T = 155.84'	T = 167.01'	T = 83.36'
R = 500'	R = 500'	R = 1,470'	R = 4,075'
SE = .06	SE = .06	SE = .04	SE = EX.
RUNOFF = 126'	RUNOFF = 126'	RUNOFF = 84'	

CURVE DATA FOR -L3-

PIs Sta 901+81.18	PI Sta 906+97.73	PIs Sta 912+10.43	PIs Sta 916+06.01	PI Sta 924+88.88	PIs Sta 933+51.11
θs = 1° 16' 35.0"	Δ = 12° 53' 42.4" (LT)	θs = 1° 16' 35.0"	θs = 1° 13' 48.4"	Δ = 22° 12' 42.0" (RT)	θs = 1° 13' 48.4"
Ls = 180'	D = 1° 25' 05.6"	Ls = 180'	Ls = 180'	D = 1° 22' 00.4"	Ls = 180'
LT = 120'	L = 909.25'	LT = 120'	LT = 120'	L = 1,625.10'	LT = 120'
ST = 60'	T = 456.55'	ST = 60'	ST = 60'	T = 822.88'	ST = 60'
	R = 4,040'			R = 4,192'	
	SE = .04			SE = .04	

SEE SHEET 47 FOR -L3- 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

8/17/2021 4:25:42 PM
USER: dbondor
FILE: R-2233BB_RDY_PSH16.DGN

5/14/99

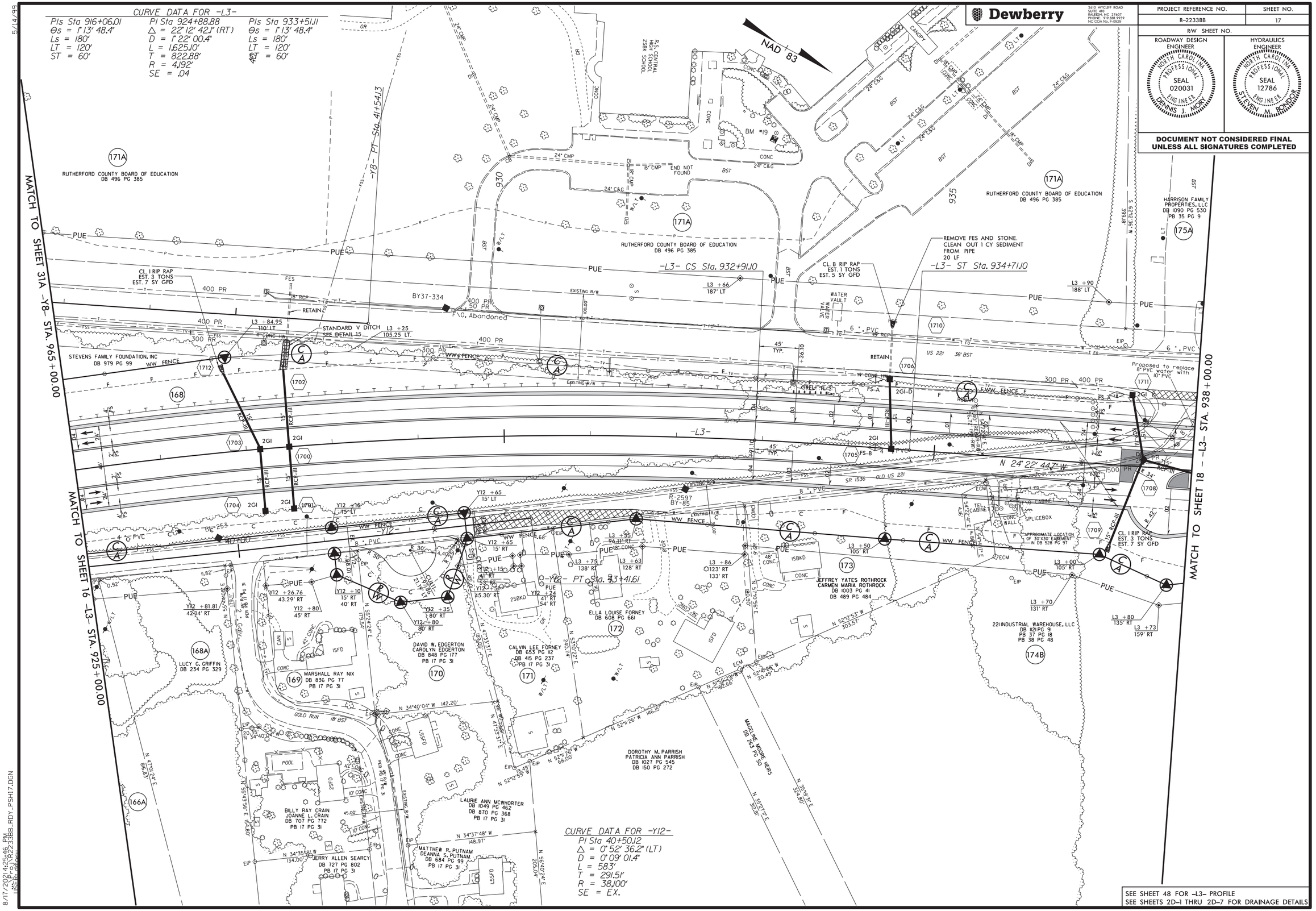
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	17
R/W SHEET NO.	

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

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 48 FOR -L3- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

8/17/2021 4:25:46 PM
USER: CWILLIAMS
R-2233BB_RDY_PSH17.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	18
R/W SHEET NO.	

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

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

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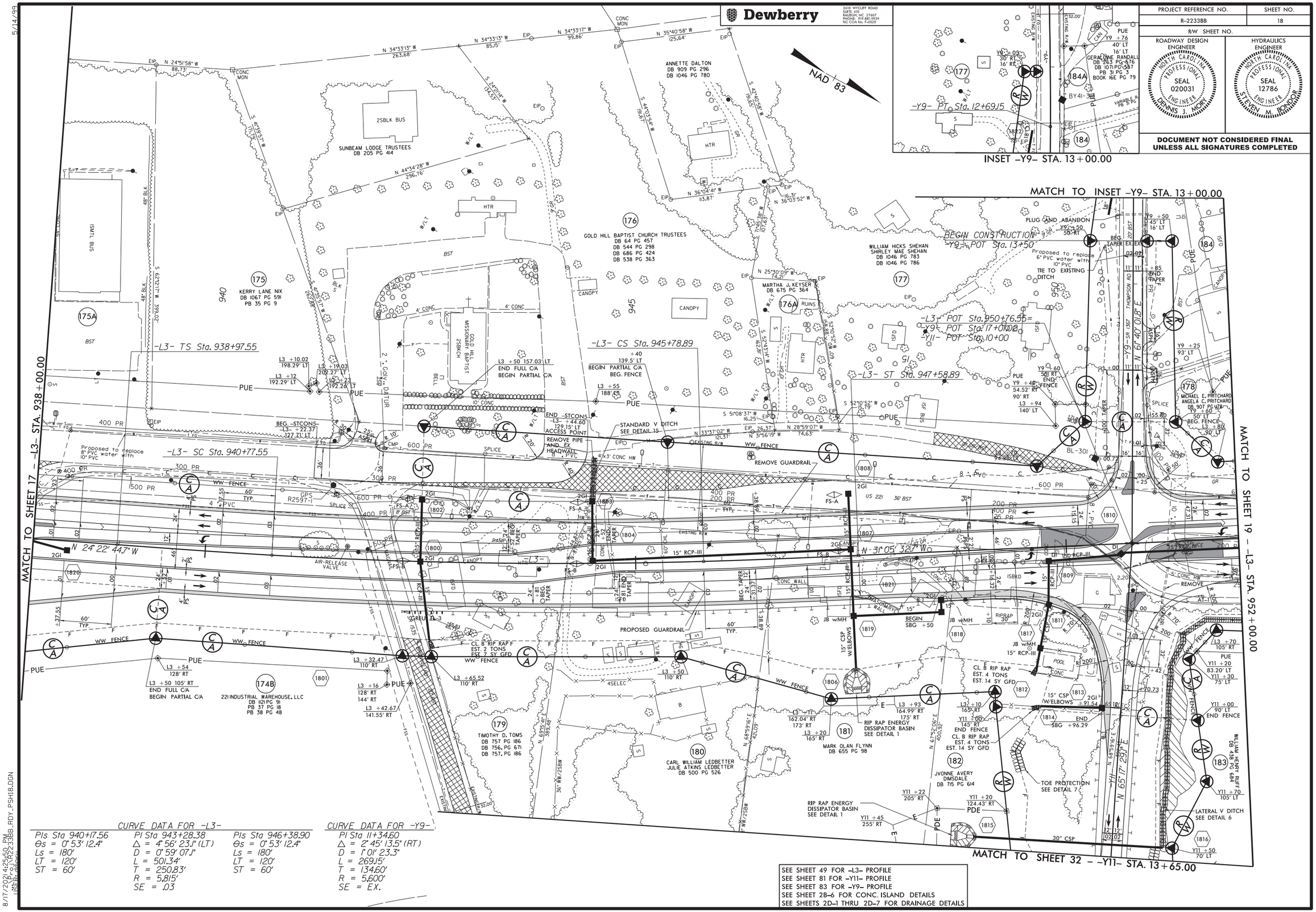

CURVE DATA FOR –L3–

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 SHEETS 2B–6 FOR CONC. ISLAND DETAILS
SEE SHEETS 2D–1 THRU 2D–7 FOR DRAINAGE DETAILS

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8/17/2021 4:25:50 PM
USER: dmorry
R-2233BB_RDY_PSH18.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	19
R/W SHEET NO.	

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

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

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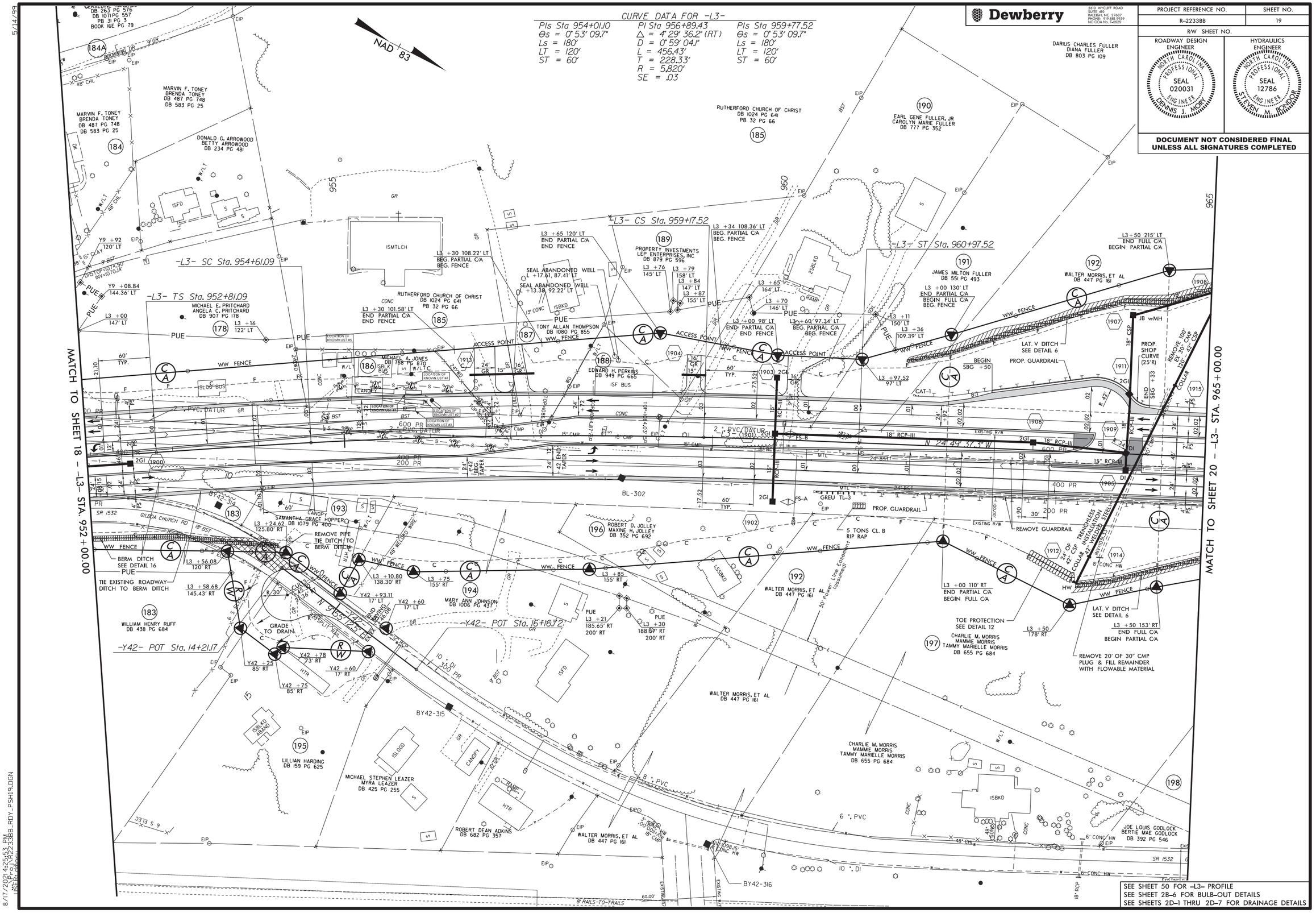
CURVE DATA FOR -L3-

PIs Sta 954+01.10	PI Sta 956+89.43	PIs Sta 959+77.52
Θs = 0° 53' 09.7"	Δ = 4° 29' 36.2" (RT)	Θs = 0° 53' 09.7"
Ls = 180'	D = 0° 59' 04.1"	Ls = 180'
LT = 120'	L = 456.43'	LT = 120'
ST = 60'	T = 228.33'	ST = 60'
	R = 5,820'	
	SE = .03	



SEE SHEET 50 FOR -L3- PROFILE
SEE SHEET 2B-6 FOR BULB-OUT DETAILS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

8/17/2021 4:25:53 PM
USER: dpm
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.	SHEET NO.
R-2233BB	20
R/W SHEET NO.	

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

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

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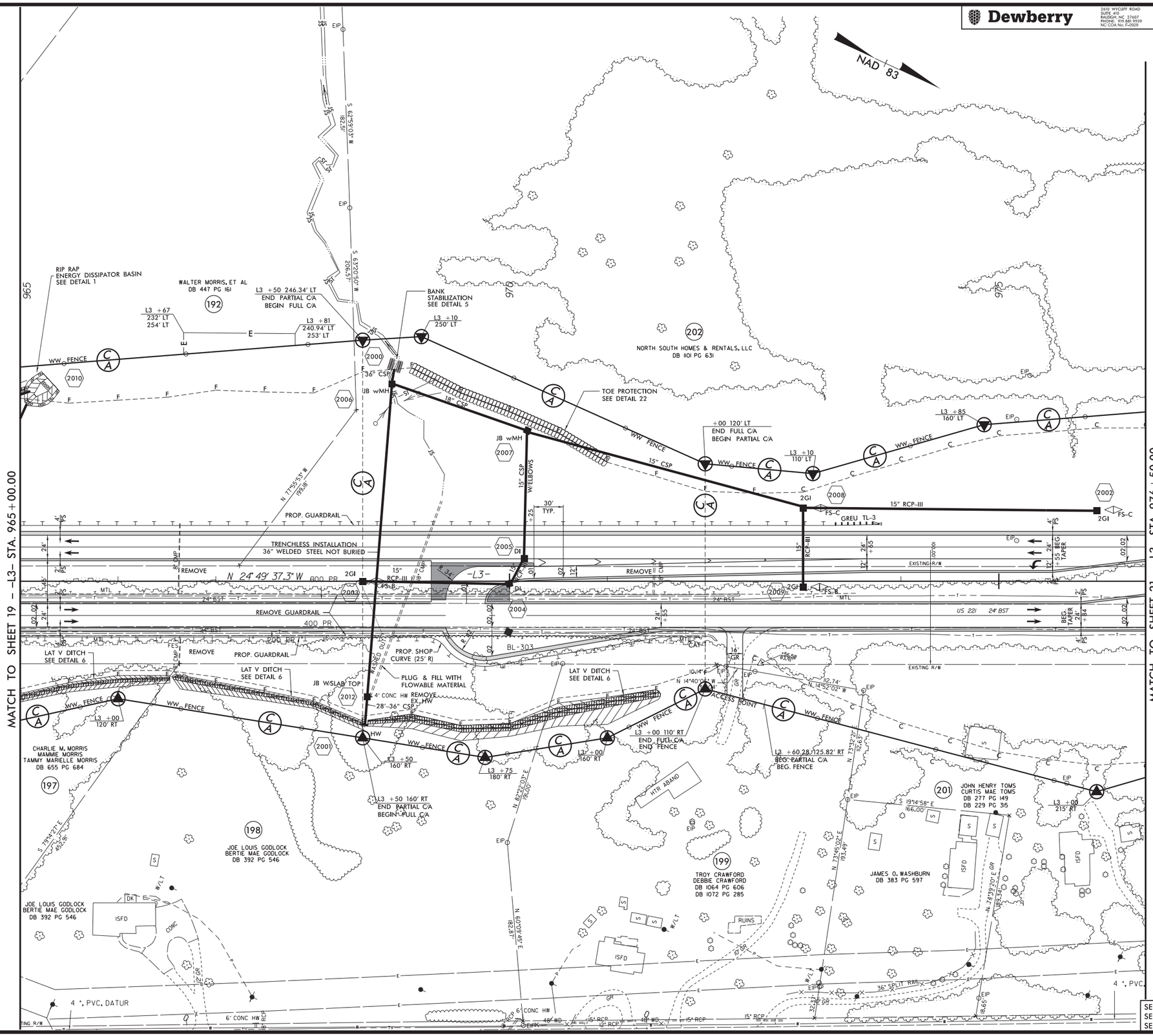

SEE SHEET 51 FOR –L3– PROFILE
SEE SHEET 2B-7 FOR BULB-OUT DETAILS
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

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8/17/2021 4:25:57 PM
C:\PW_WORK\dot\r2233bb_rdy_psh20.dgn
USER: cpoole

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. MORRY

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

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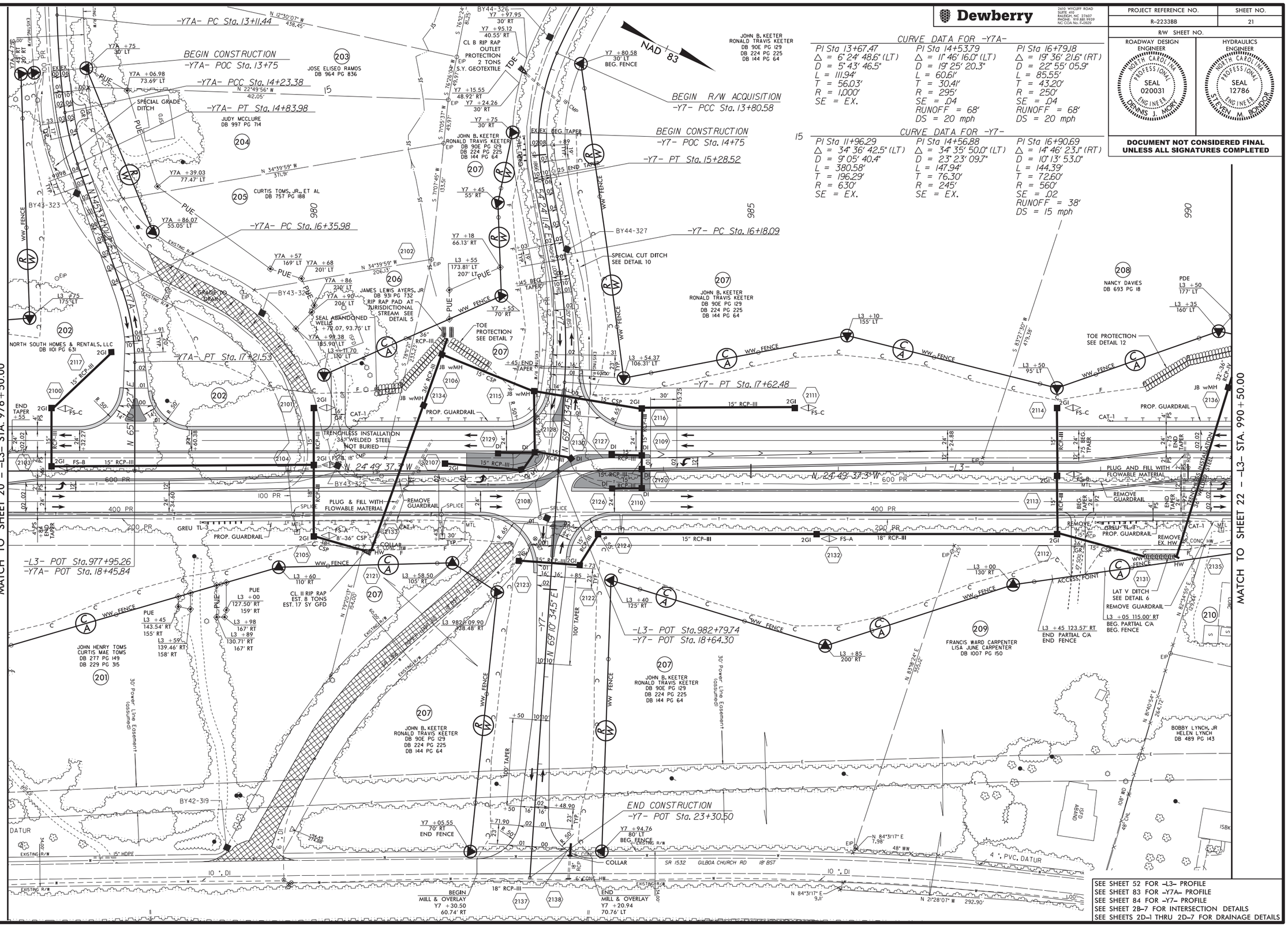
CURVE DATA FOR -Y7A-

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



8/17/2021 4:26:00 PM
R-2233BB_RDY_PSH21.DGN
USER: gbondor

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. MORY

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

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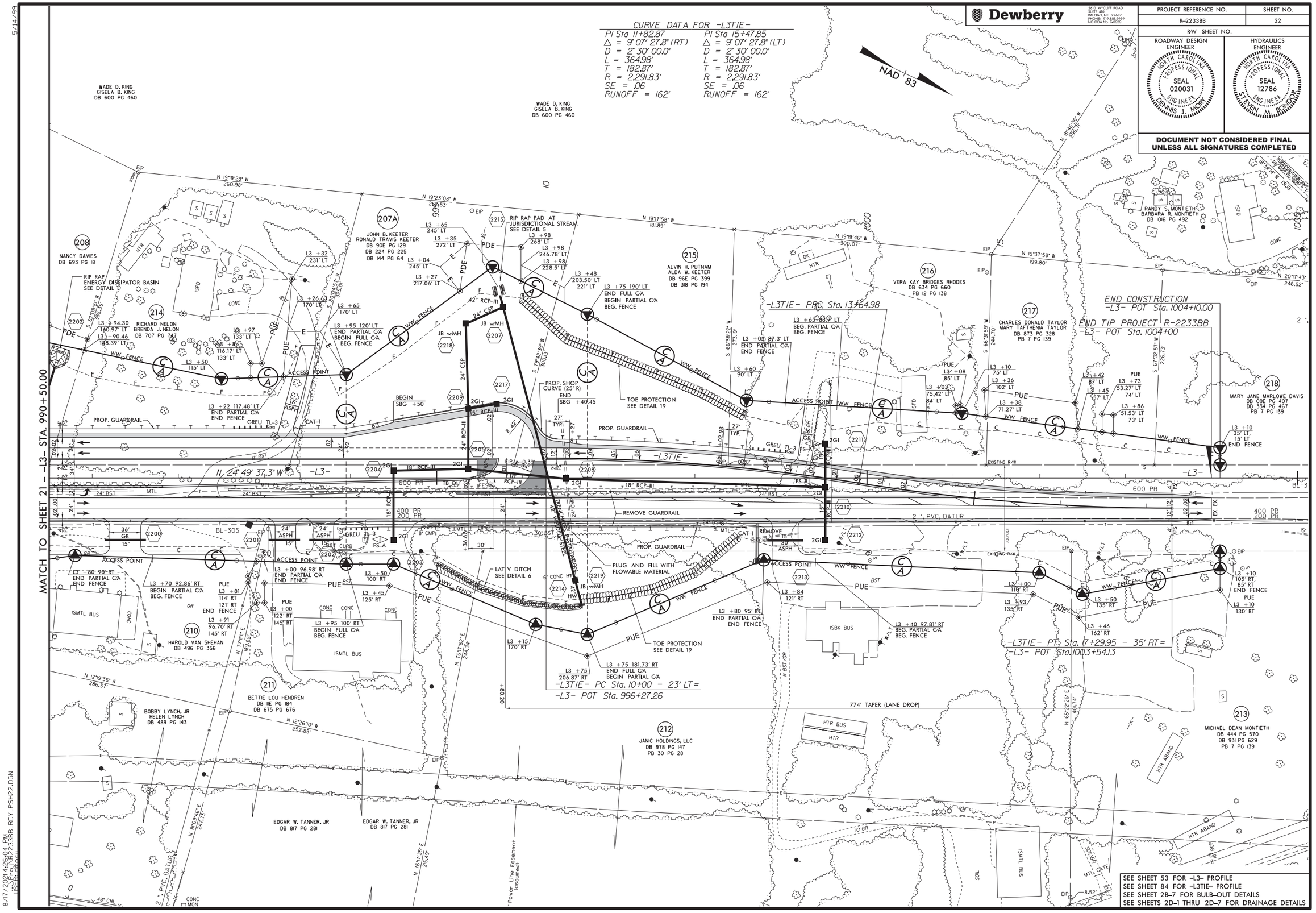

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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

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

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

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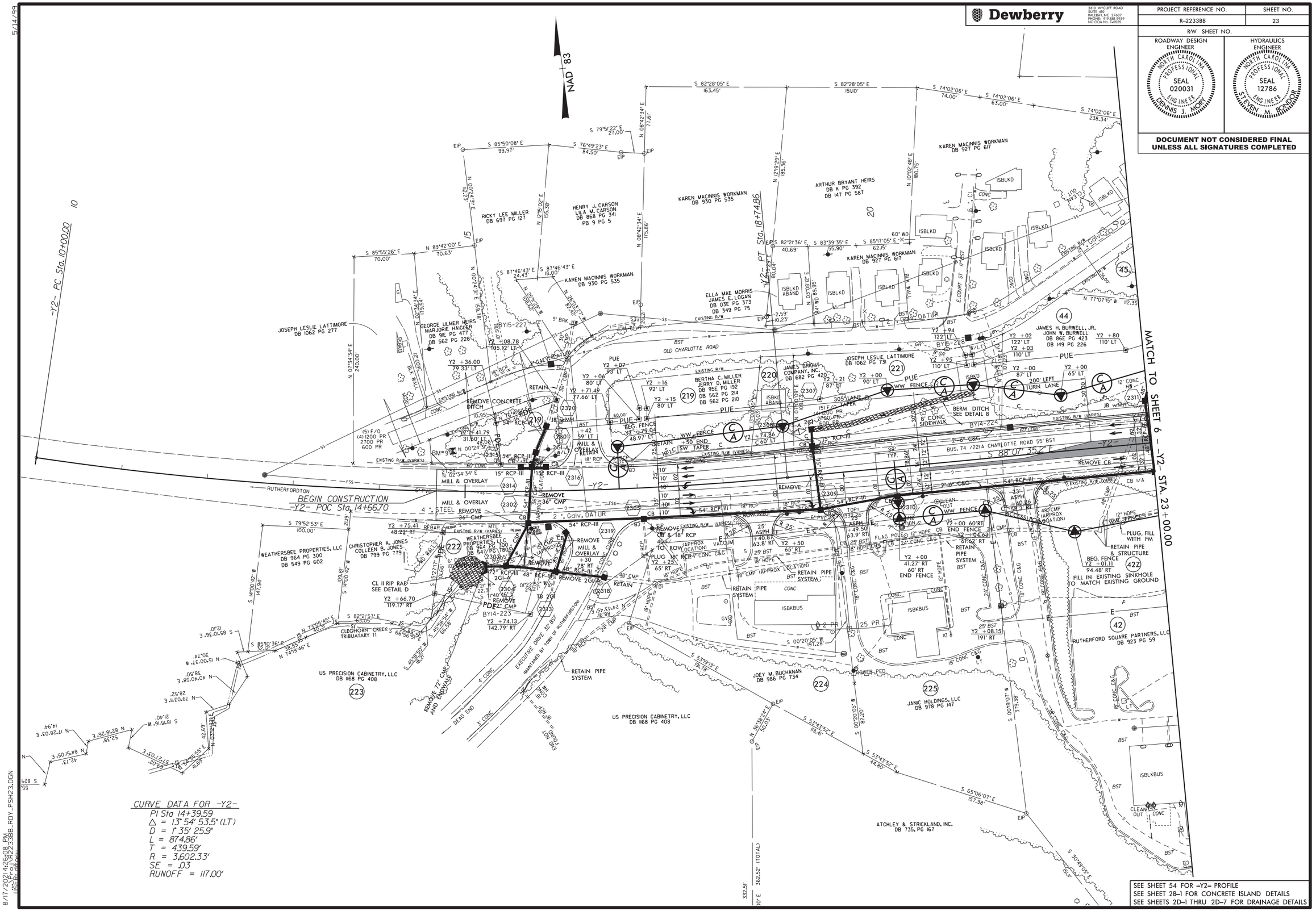

5/14/99

8/17/2021 4:26:08 PM
USER: cbondor
FILE: R-2233BB_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. MORY

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

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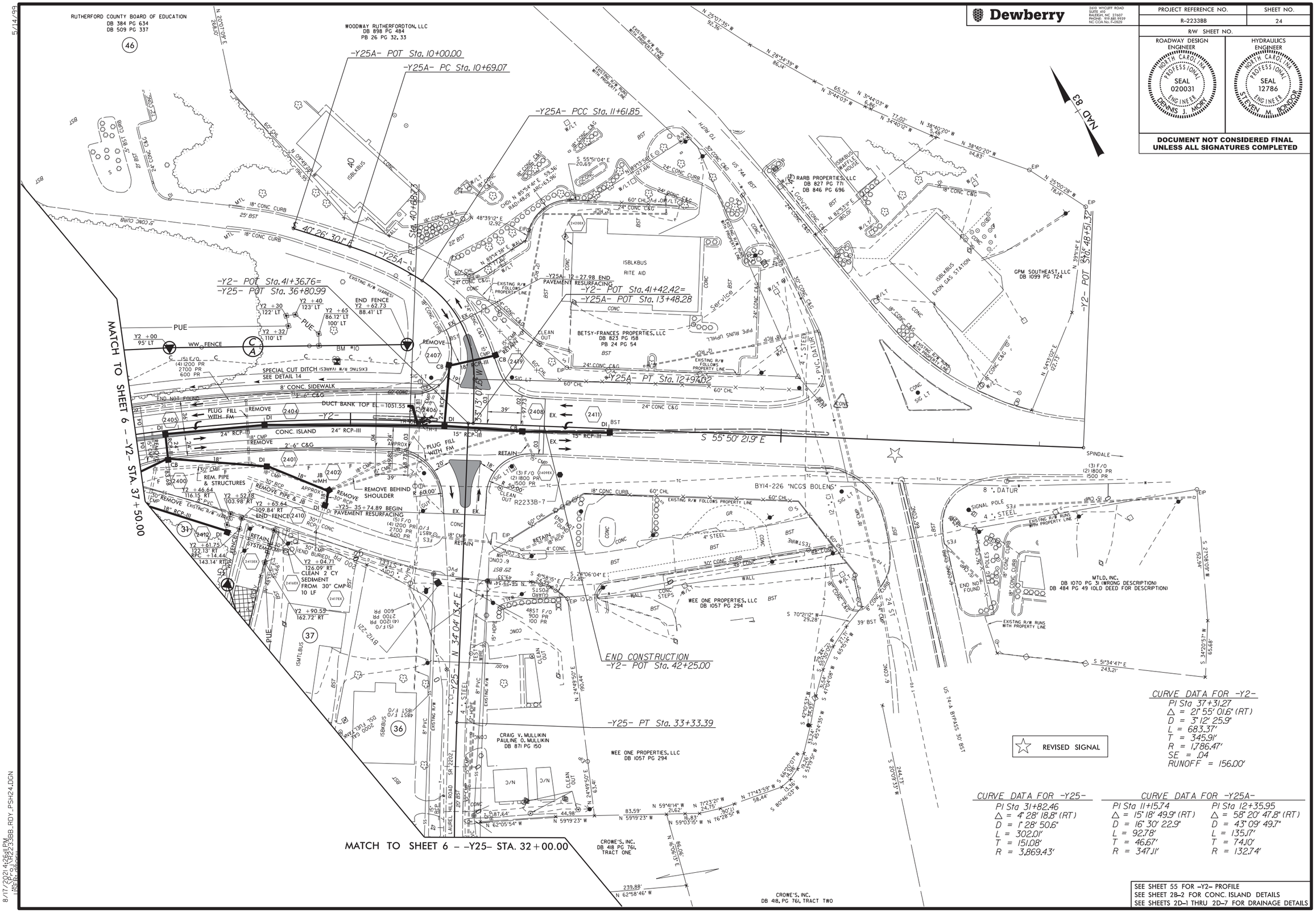

REVISED SIGNAL

CURVE DATA FOR -Y2-
PI Sta 37+31.27
Δ = 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
Δ = 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	PI Sta 12+35.95
Δ = 15° 18' 49.9" (RT)	Δ = 58° 20' 47.8" (RT)
D = 16° 30' 22.9"	D = 43° 09' 49.7"
L = 92.78'	L = 135.17'
T = 46.67'	T = 74.10'
R = 347.11'	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
8/17/2021 4:26:11 PM
R-2233BB_RDY_PSH24.DGN
USER: gbondor

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. MORY

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

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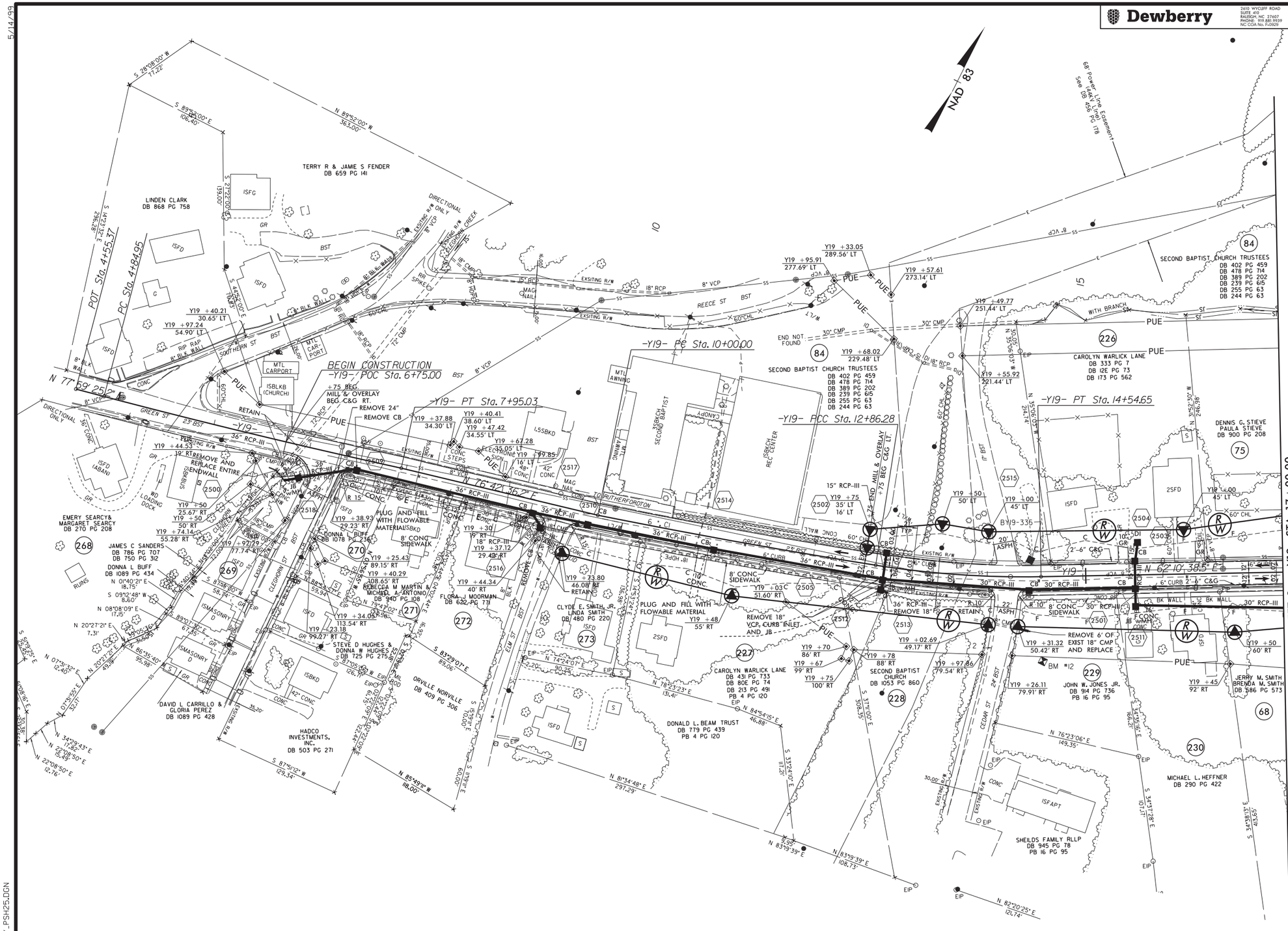

CURVE DATA FOR -Y19-

PI Sta 6+40.01	PI Sta 11+43.16	PI Sta 13+70.68
Δ = 2° 22' 07.7" (LT)	Δ = 2° 20' 35.7" (LT)	Δ = 10° 06' 04.4" (LT)
D = 0° 45' 50.2"	D = 0° 49' 06.6"	D = 5° 59' 58.4"
L = 310.08'	L = 286.28'	L = 168.37'
T = 155.06'	T = 143.16'	T = 84.40'
R = 7,500.00'	R = 7,000.00'	R = 955.00'
SE = EX.	SE = EX.	SE = EX.

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

8/17/2021 4:26:25 PM
R2233BB_RDY_PSH25.DGN
USER: cbondor

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. MORY

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

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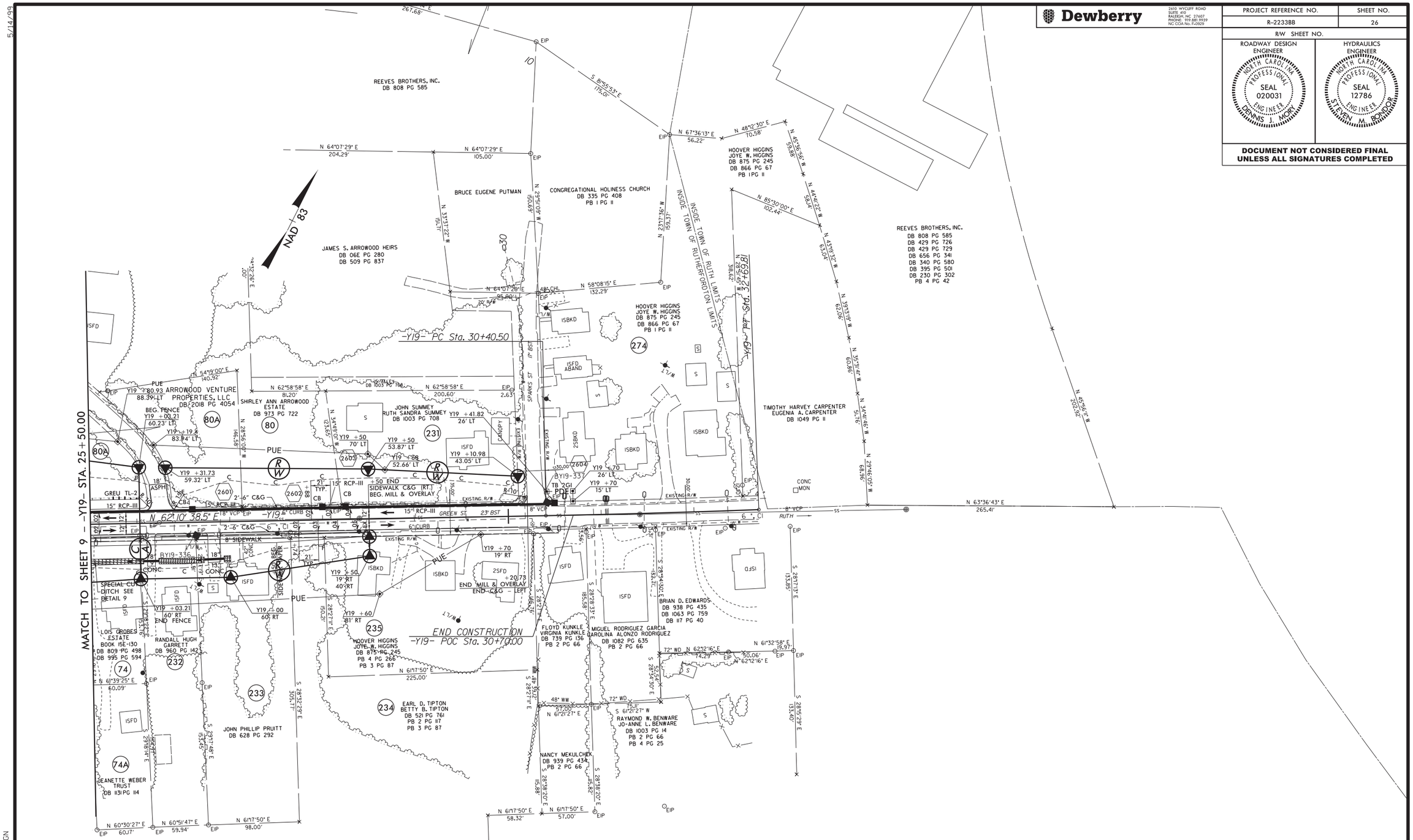

CURVE DATA FOR -Y19-
PI Sta 31+55.16
Δ = 1° 05' 41.6" (LT)
D = 0° 28' 38.9"
L = 229.31'
T = 114.66'
R = 12,000.00'
SE = NC

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

5/14/99

8/17/2021 4:26:08 PM
R-2233BB_RDY_PSH26.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	27
R/W SHEET NO.	

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

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

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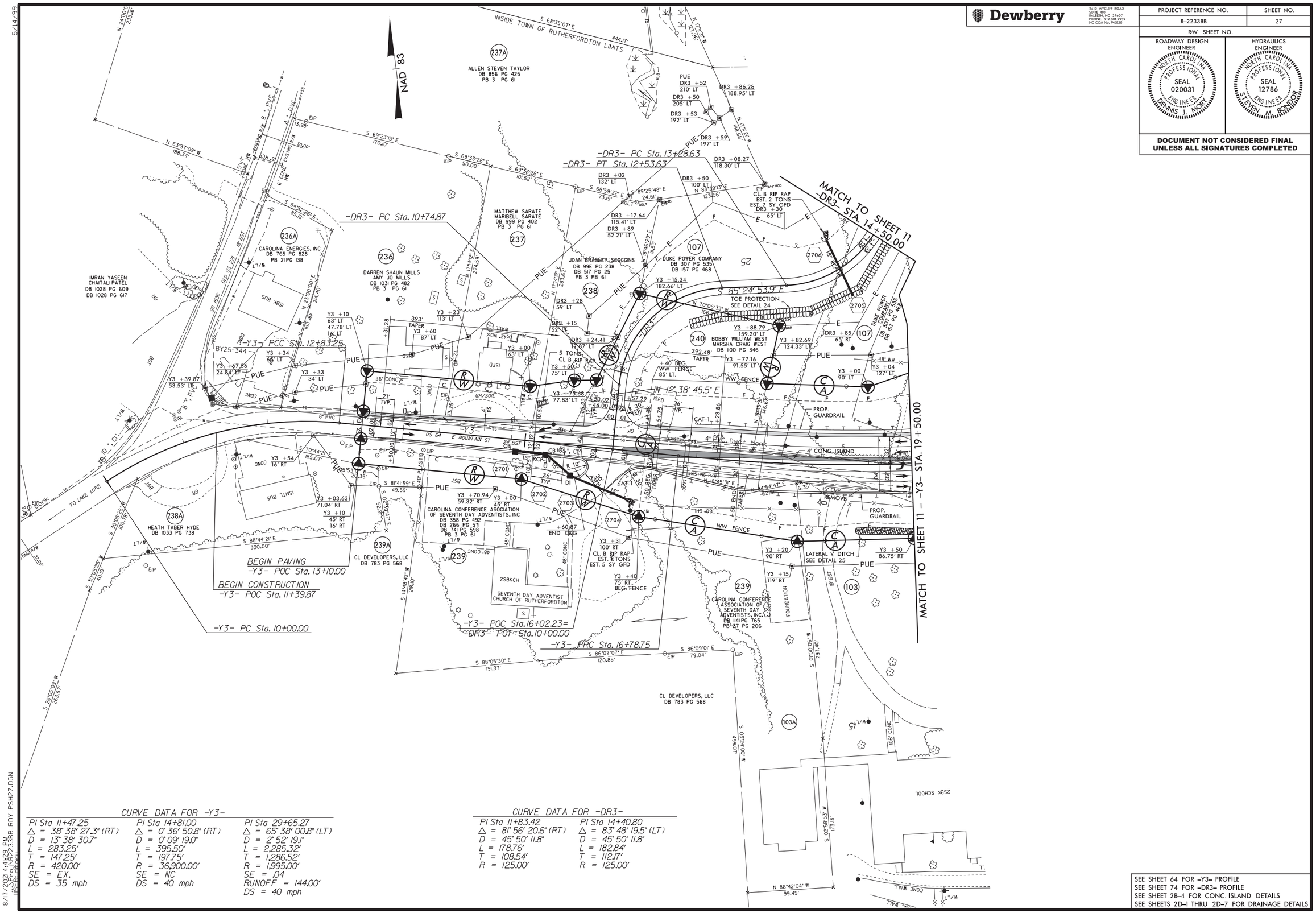

CURVE DATA FOR -Y3-

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

5/14/99
8/17/2021 4:41:22 PM
R2233BB_RDY_PSH27.DGN
USER: cbarnes

5/14/99

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'

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. MORAN

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

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8/17/2021 4:26:25 PM
R2233BB_PROJ_2-33BB_RDY_PSH28.DGN
USER: dpowell

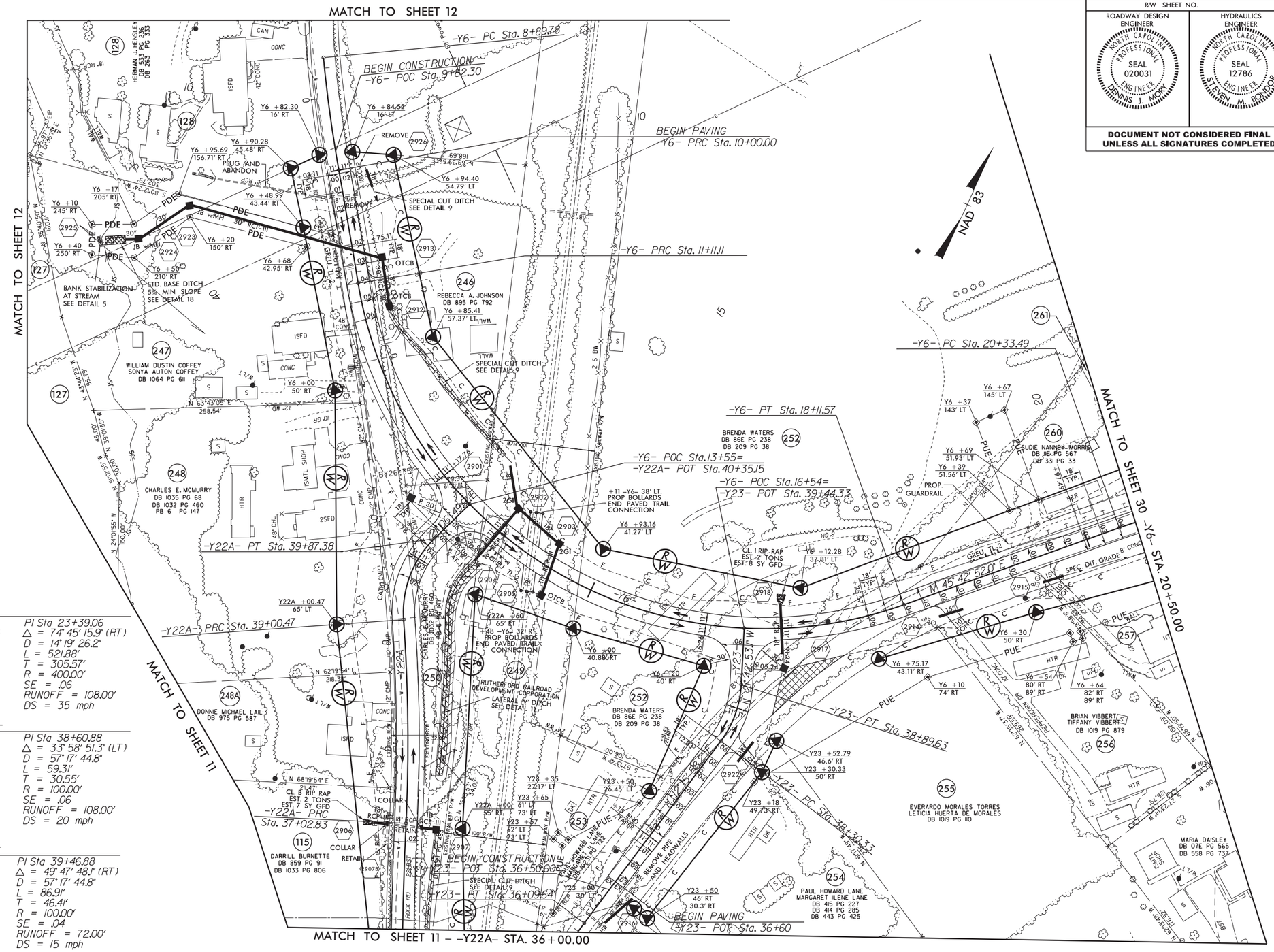
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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

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

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

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
△ = 0° 45' 51.3" (RT)	△ = 100° 20' 01.8" (LT)	△ = 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
△ = 4° 29' 38.6" (RT)	△ = 30° 01' 05.5" (RT)	△ = 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 35+65.41	PI Sta 38+01.76	PI Sta 39+46.88
△ = 4° 35' 36.2" (RT)	△ = 6° 44' 25.9" (LT)	△ = 49° 47' 48.1" (RT)
D = 1° 40' 13.6"	D = 3° 24' 37.7"	D = 57° 17' 44.8"
L = 274.98'	L = 197.64'	L = 86.91'
T = 137.56'	T = 98.94'	T = 46.41'
R = 3,430.00'	R = 1,680.00'	R = 100.00'
SE = EX.	SE = EX.	SE = .04
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
△ = 1° 32' 38.7" (RT)	△ = 6° 33' 34.4" (RT)	△ = 19° 55' 51.0" (RT)	△ = 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

5/14/99

8/17/2021 4:26:28 PM
R2233BB_RDY_PSH29.DGN
USER: cwolf

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. MORRY

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

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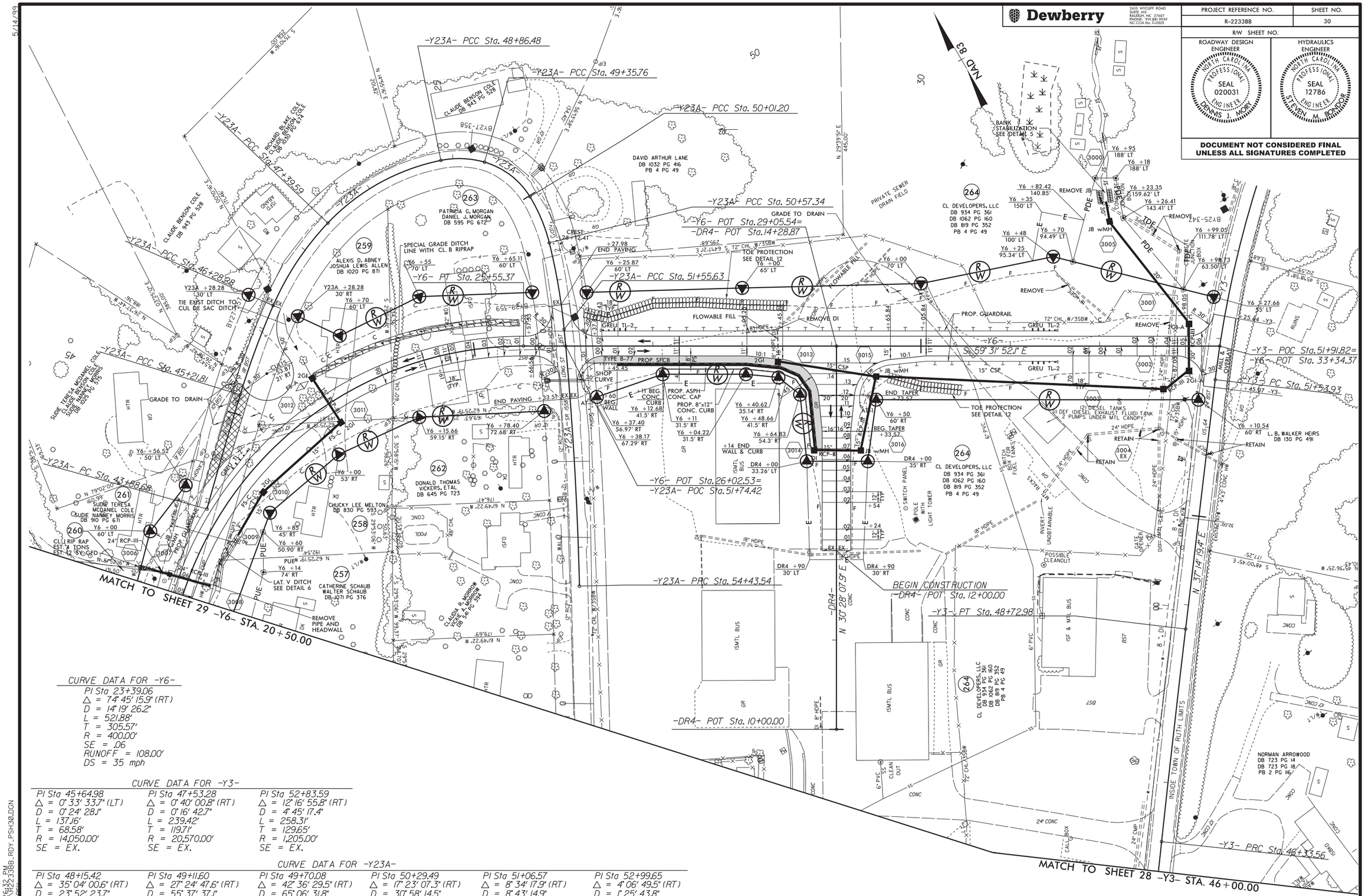

CURVE DATA FOR -Y6-

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 SHEET 76 FOR -DR4- PROFILE
SEE SHEETS 75 & 76 FOR -Y6- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS
SEE SHEETS W-1 THRU W-11 FOR RETAINING WALL PLANS

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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. MORY

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

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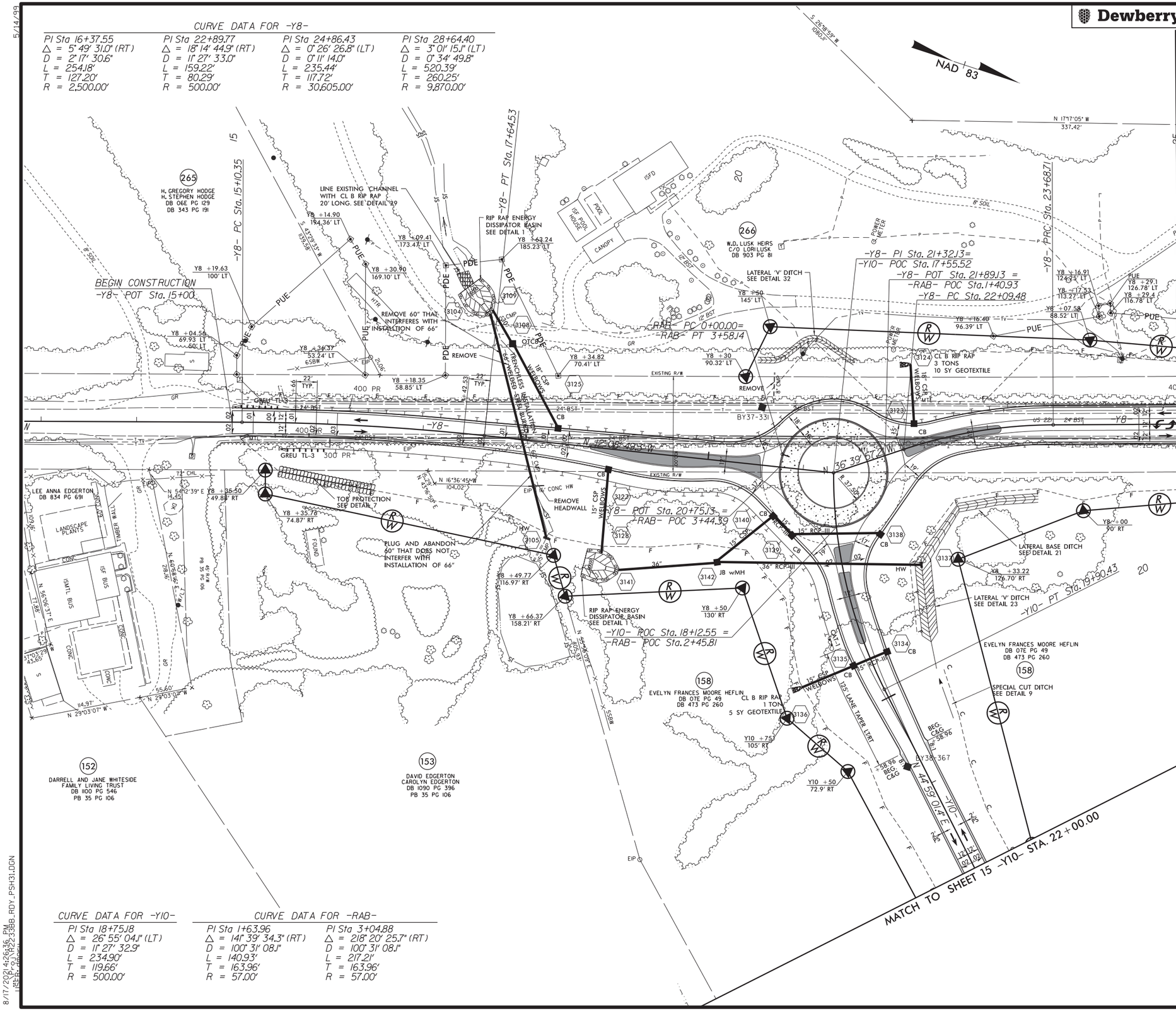

CURVE DATA FOR -Y8-

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 & 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

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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	31A
R/W SHEET NO.	

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

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NORTH CAROLINA PROFESSIONAL SEAL 12786 ENGINEER STEVEN M. BONDOR

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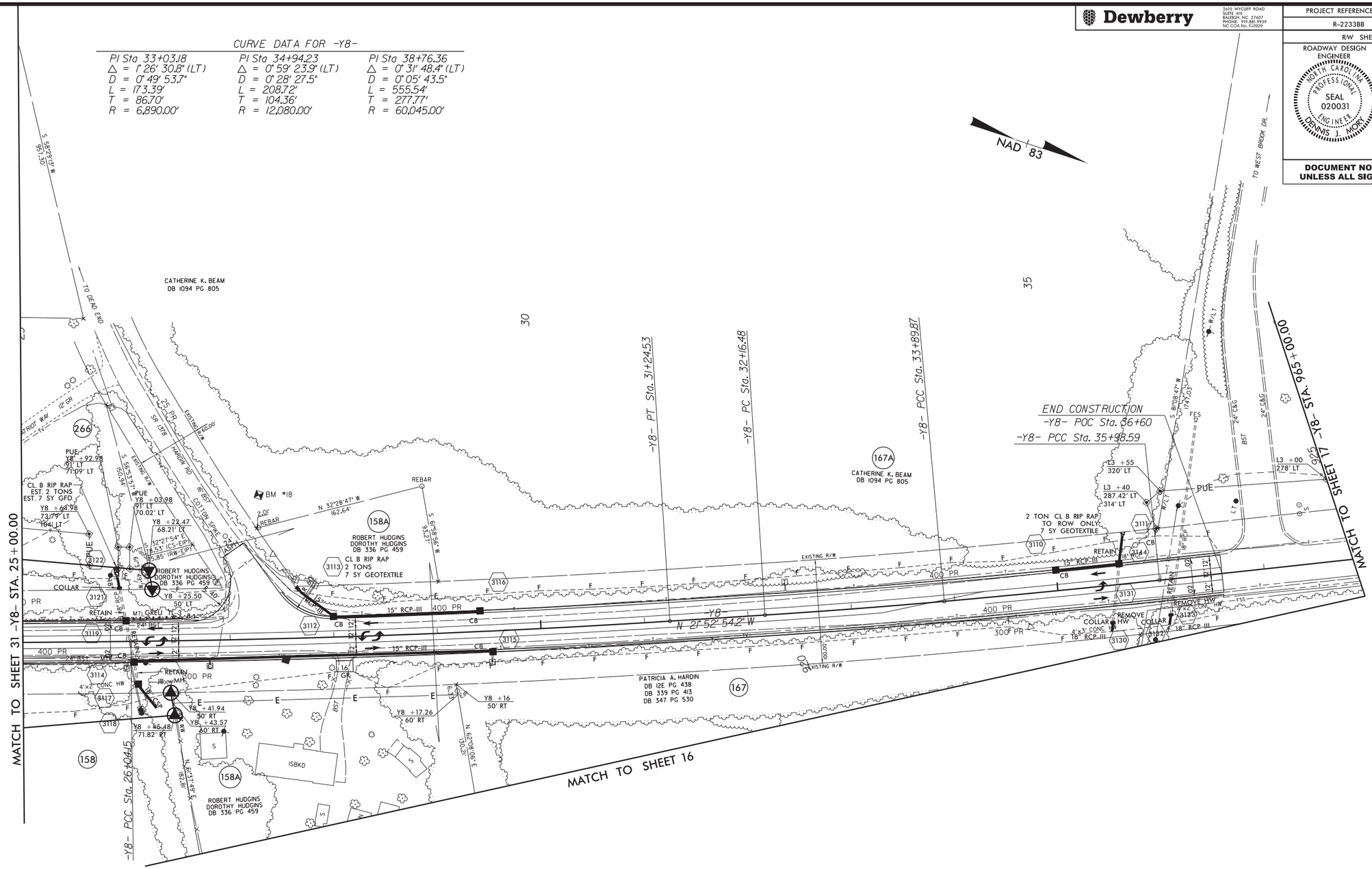
CURVE DATA FOR -Y8-

PI Sta 33+03.18	PI Sta 34+94.23	PI Sta 38+76.36
△ = 1° 26' 30.8" (LT)	△ = 0° 59' 23.9" (LT)	△ = 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'



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

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USER: cjones

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. MORRY

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

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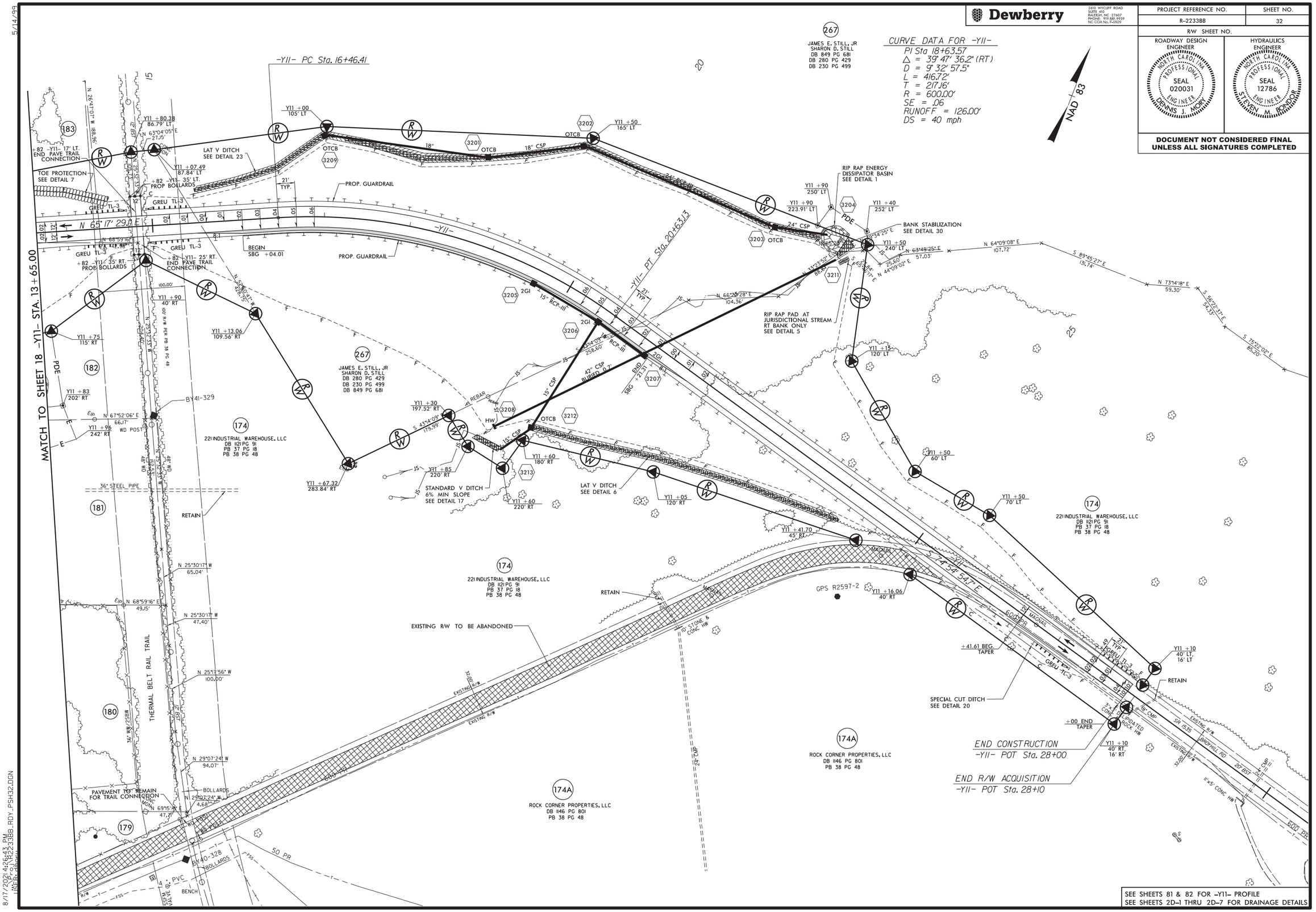

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