STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 11, 2008

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

ATTENTION: Mr. Steve Lund
NCDOT Coordinator

Dear Sir:

SUBJECT: **Nationwide Permit 13, 14, 33, Section 401 Certification and Catawba Buffer Authorization Application** for the widening of Brawley School Road and new interchange with I-77 from SR 1109 (Centre Church Road) to just east of I-77 in Iredell County. TIP No. R-3833 B; State Project No. 8.1823301; Federal Project No. STP-150(1). Debit Work Order 34554.1.1 in the amount of $570.00 for the Processing Fee for the Section 401 Certification.

Please see the enclosed Pre-Construction Notification form, Ecosystem Enhancement Program (EEP) mitigation acceptance letter, permit drawings, design plans, and Meeting Minutes from the Concurrence Point 4 B & C meetings. An Environmental Assessment (EA) (approved 12/31/2003) and Finding of No Significant Impact (FONSI) (approved 4/26/2005) have been completed and distributed for this project. Additional copies are available upon request. The North Carolina Department of Transportation (NCDOT) proposes to widen the existing 2 lane facility to a 4 lane curb and gutter facility using a "best-fit" alignment. This project will also create a new single point urban interchange (SPUI) with Interstate 77. The purpose of this facility is to improve safety, access and reduce congestion. The project will permanently impact 889 liner feet of streams, 0.06 acre of stream temporarily, and impact 39,652 square feet of the Catawba Buffers. There are no wetlands located in the project area.

IMPACTS TO WATERS OF THE UNITED STATES

General Description:
The water resources impacted from this project include multiple unnamed tributaries (UTs) to the Catawba River. The study area lies entirely within the Catawba River Basin. The Division of Water Quality (DWQ) best usage classifications for the Catawba River (and it's UTs) are WS-IV, B, and CA.

No High Quality Waters (HQW), Water Supplies (WS-I or WSII), Outstanding Resource Waters (ORW), or 303(d) streams occur within one mile of the project study area.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-715-1334
FAX: 919-715-5501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
PARKER LINCOLN BUILDING,
2728 CAPITAL BLVD.
RALEIGH NC 27604

Stream Impacts:

Each impact is described in detail below. Site and station numbers correspond with the permit (hydraulic) drawings included in this application.

Site 1 (11+40 -Y1-)
A triple 60" corrugated metal pipe carrying a UT to the Catawba River will be extended to accommodate a wider roadway required due to its proximity to the intersection. This activity will result in <0.01 acre of temporary impact, and 140 linear feet of permanent stream impact broken down as follows:

20 feet of impact for the pipe extensions,
70 feet of impact on the inlet side for the creation of a high flow bench, and
50 feet on the outlet side for bank stabilization. (See Details 11 & 12 on Permit Drawing Sheet 5 of 23).

Site 2 (265+08 -L-)
The 40-foot bridge crossing a UT to Catawba River will be replaced with a triple barrel 12' x 8' reinforced concrete box culvert. This activity will result in 0.02 acre of temporary stream impacts, and 252 linear feet of permanent stream impacts broken down as follows:

135 feet of impact for the box culvert,
117 feet of on the outlet side of the culvert bank stabilization.

Also at Site 2, a UT coming in from the northwest (the same UT impacted at Site 1) will have to be relocated in a 6-foot base ditch, as its current confluence will be occupied by the new culvert. This relocation will result in 65 feet of permanent stream impact.

Site 3 (15+00 –Y6-)
A 54" corrugated metal pipe carrying a UT to Catawba River will be extended to accommodate the new deceleration lanes from I-77 to the new interchange with Brawley School Road. This activity will result in 65 linear feet of permanent stream impact and <0.01 acre of temporary stream impact.

Site 4 (40+22 -Y- 6)
A 6' x 6' reinforced concrete box culvert will be extended to accommodate the new acceleration and deceleration lanes from I-77 to the new interchange with Brawley School Road. This activity will result in 78 linear feet of permanent stream impact and 0.02 acre of temporary stream impact.

Site 5 (24+00 -Y4-)
Due to the relocation of the current Gibbs Road (resulting from the new interchange with I-77) the new alignment of Gibbs Road will cross the UT to Catawba River South (downstream) of the Brawley School Road crossing. The UT to Catawba River will be traversed with a 210 foot, 5 span bridge. This activity results in 25 linear feet of bank stabilization to the UT to Catawba River from a base ditch created to handle storm water from the project.

Site 6 (27+09 -Y4-)
Due to the relocation of the current Gibbs Road (resulting from the new interchange with I-77), the new alignment of Gibbs Road will cross a UT to a UT to Catawba River using a 36" Reinforced Concrete Pipe. This activity results in 174 feet of permanent stream impacts.

Site 7 (287+30 –L- LT)
Due to the wider roadway, a UT to the Catawba River will be relocated in a 4-foot wide base ditch. This will result in 90 feet of permanent stream impacts.

Buffer Impacts
Sites 2 and 5 are subject to the Catawba Buffer Regulations.
At Site 2, there will be 16,921 square feet of impacts to Zone 1 and 9,143 square feet of impacts to Zone 2 for this "mitigable" impact to the Catawba River Buffers.
At Site 5 there will be 8,137 square feet of impacts to Zone 1 and 5,451 square feet of impacts to Zone 2 for this "allowable" impact to the Catawba River Buffers.

Total Impacts
The project will impact 889 linear feet of stream permanently, 0.06 acre of streams temporarily, and 39,652 square feet of impact to the Catawba Buffers.

Utility Impacts:
Though multiple utilities including power, telephone, gas, water, and sewer lines will require relocation within the project area, there will be no impacts to Waters of the United States due to their relocation.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended.

As of January 31, 2008, the U.S. Fish and Wildlife Service (FWS) lists two protected species for Iredell County (Table 1). Dwarf-flowered heartleaf (*Hexastylis naniflora)* has been added to the list since the completion of the right of way consultation. NCDOT biologists surveyed the project on March, 28, 2008. During a 6 person hour survey, habitat was identified, but no individuals were found, resulting in a biological conclusion of "No Effect."

Table 1. Federally Protected Species for Iredell County.

Common Name	Scientific name	Federal Status	Habitat Present	Biological Conclusion
Bog turtle	*Clemmys muhlenbergii*	Threatened for similarity of appearance	No	N/A
Dwarf-flowered heartleaf	*Hexastylis naniflora*	Threatened	Yes	No Effect

The bald eagle has been delisted from the Endangered Species Act as of August 8, 2007. It is still protected under the Bald and Golden Eagle Protection Act. During a survey on March 28, 2008, NCDOT biologists determined that no nests (or nesting habitat) exists within, or 660 feet outside of the project area.

A review of the North Carolina Natural Heritage Program (NCNHP) database on April 1, 2008 indicated that there are no known occurrences of any federally protected species within 1 mile of the project study area.

AVOIDANCE, MINIMIZATION AND MITIGATION

Avoidance and Minimization:
Avoidance examines all appropriate and practicable possibilities of averting impacts to "Waters of the United States." The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impact. In addition, Best Management Practices will be followed as outlined in "NCDOT's Best Management Practices for Construction and Maintenance Activities".

- A Single Point Urban Interchange (SPUI) will be used with the intersection of Brawley School Road and Interstate 77. A SPUI has a compact layout, requiring less right of way, and reduced impacts to the human and natural environment.

- A bridge will be used on the new location of Gibbs Road at the UT to the Catawba River. This 210-foot bridge will span the stream as well as the Buffers associated with the Catawba River.

- The culvert at Site 2 will contain 2' sills to accommodate natural stream width during low flow.

- Two Hazardous spill basins will be located along this project near the UT to Catawba River to protect the nearby water supply.

Compensatory Mitigation:
NCDOT proposes mitigation for the 627 feet of stream and 26,024 square feet (16,921 in Zone 1 and 9,143 in Zone 2) of impacts to the Catawba River Buffers.
This amount does not include the 120 feet at Site 1, 117 feet at Site 2, and 25 feet at Site 3. NCDOT proposes no mitigation for bank stabilization impacts as it is not considered a "Loss of Waters of the US".

A letter dated May 27, 2008 from the NC EEP confirming they will provide mitigation for the above mentioned impacts.

PROJECT SCEHDULE

The project schedule calls for a February 17, 2009 let date, and a review date of December 30, 2008. As a Federal Energy Regulatory Commission (FERC) permit is required, the acquisition of all state and federal permits are required for its application. We appreciate your expeditious review.

REGULATORY APPROVALS

Section 404 Permit:
It is anticipated that the permanent impacts to streams and wetlands associated with this linear transportation project will be authorized under Section 404 Nationwide Permit 14, the temporary impacts with a Nationwide 33, and the bank stabilization with a Nationwide 13. We are, therefore, requesting the issuance of a Nationwide Permit 13, 14, and 33.

Section 401 and Buffer Certification:
We anticipate 401 General Certification numbers 3689, 3704 and 3688 will apply to this project. In compliance with Section 143-215.3D(e) of the NCAC, we will provide $570.00 to act as payment for processing the Section 401, and Catawba Buffer certification application (debit WBS element 34948.1.1). We are providing five copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality for their approval.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Michael Turchy at maturchy@dot.state.nc.us or (919) 715-1468.

Sincerely,

for Gregory J. Thorpe, Ph.D., Environmental Management Director
Project Development and Environmental Analysis Branch

W/attachment
Mr. Brian Wrenn, NCDWQ (5 Copies)
Ms. Marella Buncick, USFWS
Ms. Marla Chambers, NCWRC

W/o attachment (see website for attachments)
Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Mark Staley, Roadside Environmental
Mr. M.L. Holder, P.E, Division 12
Ms. Trish Simon, Division 12 DEO
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE, Wilmington
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT External Audit Branch
Ms. Kristina Solberg, Project Planning Engineer

Office Use Only: Form Version March 05

USACE Action ID No. _____ **DWQ No.** _____

(If any particular item is not applicable to this project, please enter "Not Applicable" or "N/A".)

I. Processing

1. Check all of the approval(s) requested for this project:
   - ☒ Section 404 Permit
   - ☐ Section 10 Permit
   - ☒ 401 Water Quality Certification
   - ☒ Riparian or Watershed Buffer Rules
   - ☐ Isolated Wetland Permit from DWQ
   - ☐ Express 401 Water Quality Certification

2. Nationwide, Regional or General Permit Number(s) Requested: NW 13, 14 and 33

3. If this notification is solely a courtesy copy because written approval for the 401 Certification is not required, check here: ☐

4. If payment into the North Carolina Ecosystem Enhancement Program (NCEEP) is proposed for mitigation of impacts, attach the acceptance letter from NCEEP, complete section VIII, and check here: ☒

5. If your project is located in any of North Carolina's twenty coastal counties (listed on page 4), and the project is within a North Carolina Division of Coastal Management Area of Environmental Concern (see the top of page 2 for further details), check here: ☐

II. Applicant Information

1. Owner/Applicant Information
   Name: Gregory J. Thorpe, Ph.D., Environmental Management Director
   Mailing Address: 1598 Mail Service Center
   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address: maturchy@dot.state.nc.us

2. Agent/Consultant Information (A signed and dated copy of the Agent Authorization letter must be attached if the Agent has signatory authority for the owner/applicant.)
   Name:
   Company Affiliation:
   Mailing Address:
   Telephone Number: Fax Number:
   E-mail Address:

III. Project Information

Attach a **vicinity map** clearly showing the location of the property with respect to local landmarks such as towns, rivers, and roads. Also provide a detailed **site plan** showing property boundaries and development plans in relation to surrounding properties. Both the vicinity map and site plan must include a scale and north arrow. The specific footprints of all buildings, impervious surfaces, or other facilities must be included. If possible, the maps and plans should include the appropriate USGS Topographic Quad Map and NRCS Soil Survey with the property boundaries outlined. Plan drawings, or other maps may be included at the applicant's discretion, so long as the property is clearly defined. For administrative and distribution purposes, the USACE requires information to be submitted on sheets no larger than 11 by 17-inch format; however, DWQ may accept paperwork of any size. DWQ prefers full-size construction drawings rather than a sequential sheet version of the full-size plans. If full-size plans are reduced to a small scale such that the final version is illegible, the applicant will be informed that the project has been placed on hold until decipherable maps are provided.

1. Name of project: R-3833B, The widening of Brawley School Road from Centre Church Road, to just east of I-77.

2. T.I.P. Project Number or State Project Number (NCDOT Only): R-3833 B

3. Property Identification Number (Tax PIN): N/A

4. Location
   County: Iredell Nearest Town: Mooresville
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.):

5. Site coordinates (For linear projects, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)
   Decimal Degrees (6 digits minimum): 35.57954 °N 80.85627 °W

6. Property size (acres): N/A

7. Name of nearest receiving body of water: Catawba River (Lake Norman)

8. River Basin: Catawba
   (Note – this must be one of North Carolina's seventeen designated major river basins. The River Basin map is available at http://h2o.enr.state.nc.us/admin/maps/.)

9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: Residential & Commercial

10. Describe the overall project in detail, including the type of equipment to be used: Brawley School Road will be widened from a 2 lane, to a 4 lane curb and gutter facility. Equpment may include, but not limited to, earth moving equipment including graders, pavers, bull dozers, backhoes, etc.

11. Explain the purpose of the proposed work: To improve safety, access and capacity of Brawley School Road.

IV. Prior Project History

If jurisdictional determinations and/or permits have been requested and/or obtained for this project (including all prior phases of the same subdivision) in the past, please explain. Include the USACE Action ID Number, DWQ Project Number, application date, and date permits and certifications were issued or withdrawn. Provide photocopies of previously issued permits, certifications or other useful information. Describe previously approved wetland, stream and buffer impacts, along with associated mitigation (where applicable). If this is a NCDOT project, list and describe permits issued for prior segments of the same T.I.P. project, along with construction schedules. N/A

V. Future Project Plans

Are any future permit requests anticipated for this project? If so, describe the anticipated work, and provide justification for the exclusion of this work from the current application.
N/A

VI. Proposed Impacts to Waters of the United States/Waters of the State

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. Each impact must be listed separately in the tables below (e.g., culvert installation should be listed separately from riprap dissipater pads). Be sure to indicate if an impact is temporary. All proposed impacts, permanent and temporary, must be listed, and must be labeled and clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) should be shown on a delineation map, whether or not impacts are proposed to these systems. Wetland and stream evaluation and delineation forms should be included as appropriate. Photographs may be included at the applicant's discretion. If this proposed impact is strictly for wetland or stream mitigation, list and describe the impact in Section VIII below. If additional space is needed for listing or description, please attach a separate sheet.

1. Provide a written description of the proposed impacts: Proposed impacts include pipe, culvert and a bridge on new location. Specific descriptions and reasons for replacement can be found on the attached coversheet.
2. Individually list wetland impacts. Types of impacts include, but are not limited to mechanized clearing, grading, fill, excavation, flooding, ditching/drainage, etc. For dams, separately list impacts due to both structure and flooding.

Wetland Impact Site Number (indicate on map)	Type of Impact	Type of Wetland (e.g., forested, marsh, herbaceous, bog, etc.)	Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Area of Impact (acres)
No	Wetland	Impacts			
Total Wetland Impact (acres)					

3. List the total acreage (estimated) of all existing wetlands on the property: N/A

4. Individually list all intermittent and perennial stream impacts. Be sure to identify temporary impacts. Stream impacts include, but are not limited to placement of fill or culverts, dam construction, flooding, relocation, stabilization activities (e.g., cement walls, rip-rap, crib walls, gabions, etc.), excavation, ditching/straightening, etc. If stream relocation is proposed, plans and profiles showing the linear footprint for both the original and relocated streams must be included. To calculate acreage, multiply length X width, then divide by 43,560.

Stream Impact Number (indicate on map)	Stream Name	Type of Impact	Perennial or Intermittent?	Average Stream Width Before Impact (linear feet)	Impact Length (linear feet)	Area of Impact (acres)
1	UT to Catawba River	Permanent	Perennial	4	140	0.02
1	UT to Catawba River	Temporary	Perennial	4	14	<0.01
2	UT to Catawba River	Permanent	Perennial	8	252	0.07
2	UT to Catawba River	Temporary	Perennial	8	85	0.02
2	UT to UT to Catawba River	Permanent	Perennial	4	65	<0.01
3	UT to Catawba River	Permanent	Perennial	5	65	0.01
3	UT to Catawba River	Temporary	Perennial	5	30	<0.01
4	UT to Catawba River	Permanent	Perennial	5	78	0.02
4	UT to Catawba River	Temporary	Perennial	5	75	0.02
5	UT to Catawba River	Permanent	Perennial	8	25	<0.01
6	UT to Catawba River	Permanent	Perennial	2	174	<0.01
7	UT to Catawba River	Permanent	Perennial	2	90	<0.01
Total Stream Impact (Linear feet)				Permanent Temporary	889 204	0.16 0.06

5. Individually list all open water impacts (including lakes, ponds, estuaries, sounds, Atlantic Ocean and any other water of the U.S.). Open water impacts include, but are not limited to fill, excavation, dredging, flooding, drainage, bulkheads, etc.

Open Water Impact Site Number (indicate on map)	Name of Waterbody (if applicable)	Type of Impact	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)	Area of Impact (acres)
NONE				
Total Open Water Impact (acres)				

6. List the cumulative impact to all Waters of the U.S. resulting from the project:

Stream Impact (acres):	0.16 (permanent) 0.06 (temp)
Wetland Impact (acres):	None
Open Water Impact (acres):	None
Total Impact to Waters of the U.S. (acres)	0.06 (temp) 0.16 (permanent)
Total Stream Impact (linear feet):	889 (permanent) 204 (temp)

7. Isolated Waters
   Do any isolated waters exist on the property? ☐ Yes ☒ No
   Describe all impacts to isolated waters, and include the type of water (wetland or stream) and the size of the proposed impact (acres or linear feet). Please note that this section only applies to waters that have specifically been determined to be isolated by the USACE.
   N/A

8. Pond Creation
   If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
   Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
   Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.):_____
   Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.):_____
   Current land use in the vicinity of the pond:_____
   Size of watershed draining to pond:_____ Expected pond surface area:_____

VII. Impact Justification (Avoidance and Minimization)

Specifically describe measures taken to avoid the proposed impacts. It may be useful to provide information related to site constraints such as topography, building ordinances, accessibility, and financial viability of the project. The applicant may attach drawings of alternative, lower-impact site layouts, and explain why these design options were not feasible. Also discuss how impacts were minimized once the desired site plan was developed. If applicable, discuss construction techniques to be followed during construction to reduce impacts. Jurisdictional impacts for this project are limited to extensions of current structures, with the exception of a new bridge used for the relocation of Gibbs Road. Widening occurs asymmetrically throughout the project to minimize impacts to jurisdictional resources.

VIII. Mitigation

DWQ - In accordance with 15A NCAC 2H .0500, mitigation may be required by the NC Division of Water Quality for projects involving greater than or equal to one acre of impacts to freshwater wetlands or greater than or equal to 150 linear feet of total impacts to perennial streams.

USACE – In accordance with the Final Notice of Issuance and Modification of Nationwide Permits, published in the Federal Register on January 15, 2002, mitigation will be required when necessary to ensure that adverse effects to the aquatic environment are minimal. Factors including size and type of proposed impact and function and relative value of the impacted aquatic resource will be considered in determining acceptability of appropriate and practicable mitigation as proposed. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland and/or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferable in the same watershed.

If mitigation is required for this project, a copy of the mitigation plan must be attached in order for USACE or DWQ to consider the application complete for processing. Any application lacking a required mitigation plan or NCEEP concurrence shall be placed on hold as incomplete. An applicant may also choose to review the current guidelines for stream restoration in DWQ's Draft Technical Guide for Stream Work in North Carolina, available at http://h2o.enr.state.nc.us/ncwetlands/strmgide.html.

1. Provide a brief description of the proposed mitigation plan. The description should provide as much information as possible, including, but not limited to: site location (attach directions and/or map, if offsite), affected stream and river basin, type and amount (acreage/linear feet) of mitigation proposed (restoration, enhancement, creation, or preservation), a plan view, preservation mechanism (e.g., deed restrictions, conservation easement, etc.), and a description of the current site conditions and proposed method of construction. Please attach a separate sheet if more space is needed.
   Mitigation will be provided by the EEP for this project.

2. Mitigation may also be made by payment into the North Carolina Ecosystem Enhancement Program (NCEEP). Please note it is the applicant's responsibility to contact the NCEEP at (919) 715-0476 to determine availability, and written approval from the NCEEP indicating that they are will to accept payment for the mitigation must be attached to this form. For additional information regarding the application process for the NCEEP, check the NCEEP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCEEP is proposed, please check the appropriate box on page five and provide the following information:

   Amount of stream mitigation requested (linear feet): 627
   Amount of buffer mitigation requested (square feet): Zone 1-16,921 Zone 2-9,143
   Amount of Riparian wetland mitigation requested (acres): n/a
   Amount of Non-riparian wetland mitigation requested (acres): n/a
   Amount of Coastal wetland mitigation requested (acres): n/a

IX. Environmental Documentation (required by DWQ)

1. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land? Yes ☒ No ☐

2. If yes, does the project require preparation of an environmental document pursuant to the requirements of the National or North Carolina Environmental Policy Act (NEPA/SEPA)? Note: If you are not sure whether a NEPA/SEPA document is required, call the SEPA coordinator at (919) 733-5083 to review current thresholds for environmental documentation. Yes ☒ No ☐

3. If yes, has the document review been finalized by the State Clearinghouse? If so, please attach a copy of the NEPA or SEPA final approval letter. Yes ☒ No ☐

X. Proposed Impacts on Riparian and Watershed Buffers (required by DWQ)

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to required state and local buffers associated with the project. The applicant must also provide justification for these impacts in Section VII above. All proposed impacts must be listed herein, and must be clearly identifiable on the accompanying site plan. All buffers must be shown on a map, whether or not impacts are proposed to the buffers. Correspondence from the DWQ Regional Office may be included as appropriate. Photographs may also be included at the applicant's discretion.

1. Will the project impact protected riparian buffers identified within 15A NCAC 2B .0233 (Neuse), 15A NCAC 2B .0259 (Tar-Pamlico), 15A NCAC 02B .0243 (Catawba) 15A NCAC 2B .0250 (Randleman Rules and Water Supply Buffer Requirements), or other (please identify Catawba)? Yes ☒ No ☐

2. If "yes", identify the square feet and acreage of impact to each zone of the riparian buffers. If buffer mitigation is required calculate the required amount of mitigation by applying the buffer multipliers.

Zone*	Impact (square feet)	Multiplier	Required Mitigation
1	16,921	3 (2 for Catawba)	33,842
2	9,143	1.5	13,714.5
Total	26,064		47556.5

* Zone 1 extends out 30 feet perpendicular from the top of the near bank of channel; Zone 2 extends an additional 20 feet from the edge of Zone 1.

3. If buffer mitigation is required, please discuss what type of mitigation is proposed (i.e., Donation of Property, Riparian Buffer Restoration / Enhancement, or Payment into the Riparian Buffer Restoration Fund). Please attach all appropriate information as identified within 15A NCAC 2B .0242 or .0244, or .0260. _____

XI. Stormwater (required by DWQ)

Describe impervious acreage (existing and proposed) versus total acreage on the site. Discuss stormwater controls proposed in order to protect surface waters and wetlands downstream from the property. If percent impervious surface exceeds 20%, please provide calculations demonstrating total proposed impervious level. NCDOT's Best Management Practices will be followed throughout the construction of the project.

XII. Sewage Disposal (required by DWQ)

Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility.
N/A

XIII. Violations (required by DWQ)

Is this site in violation of DWQ Wetland Rules (15A NCAC 2H .0500) or any Buffer Rules?
Yes ☐ No ☒

Is this an after-the-fact permit application? Yes ☐ No ☒

XIV. Cumulative Impacts (required by DWQ)

Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality? Yes ☐ No ☒
If yes, please submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent North Carolina Division of Water Quality policy posted on our website at http://h2o.enr.state.nc.us/ncwetlands. If no, please provide a short narrative description:

XV. Other Circumstances (Optional):

It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g., draw-down schedules for lakes, dates associated with Endangered and Threatened Species, accessibility problems, or other issues outside of the applicant's control).

N/A

E. L. Lues 6·11·08

Applicant/Agent's Signature **Date**

(Agent's signature is valid only if an authorization letter from the applicant is provided.)

Ecosystem Enhancement PROGRAM

May 27, 2008

Mr. Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-3833B, SR 1101 (Brawley School Road) Widening from SR 1109 (Centre Church Road) to I-77 and New Interchange with I-77, Iredell County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream mitigation and buffer mitigation for the subject project. Based on the information supplied by you on May 21, 2008, the impacts are located in CU 03050101 of the Catawba River Basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Warm Stream:	627 feet
Buffer – Zone 1:	16,921 square feet
Buffer – Zone 2:	9,143 square feet

All buffer mitigation requests and approvals are administrated through the Riparian Restoration Buffer Fund. The NCDOT will be responsible to ensure that appropriate compensation for the buffer mitigation will be provided in the agreed upon method of fund transfer. Upon receipt of the NCDWQ's Buffer Authorization Certification, EEP will transfer funds from Tri-Party MOA Fund into the Riparian Restoration Buffer Fund. Upon completion of transfer payment, NCDOT will have completed its riparian buffer mitigation responsibility for TIP R-3833B. Subsequently, EEP will conduct a review of current MOA mitigation projects in the river basin to

determine if available buffer mitigation credits exist. If there are buffer mitigation credits available, then the Riparian Restoration Buffer Fund will purchase the appropriate amount of buffer mitigation credits from Tri-Party MOA Fund.

EEP commits to implementing sufficient stream mitigation credits to offset the impacts associated with this project by the end of the MOA Year in which this project is permitted, in accordance with Section X of the Amendment No. 2 to the Memorandum of Agreement between the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, fully executed on March 8, 2007. If the above referenced stream or buffer impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

Jame B. Stanfill for

William D. Gilmore, P.E.
EEP Director

cc: Mr. Steve Lund, USACE – Asheville Regulatory Field Office
Mr. Brian Wrenn, Division of Water Quality, Wetlands/401 Unit
File: R-3833B

Subject: Draft Minutes from Interagency 4C Permit Review Meeting on September 26, 2007 for R-3833B in Iredell County

Team Members:

Steve Lund -USACE	(absent)*
Dave Baker-USACE*	
Polly Lespinasse-NCDWQ	(present)
Marla Chambers-NCWRC	(present)
Marella Burnick-USFWS	(present)
Kathy Mathews-EPA	(present)
Donnie Brew-FHWA	(present)
Drew Joyner-NCDOT PDEA	(present)
Michael Turchy, NCDOT NEU	(present)

*Mr. Baker was present on Mr. Lund's behalf

Participants:
Galen Cail, NCDOT Hydraulics
Frank Fleming, Sungate Design Group
Jenny Fleming, Sungate Design Group
Roy Girolami, NCDOT Structures
David Anderson, NCDOT Structures
Mark Staley, NCDOT REU
Jeremy Goodwin, NCDOT REU
Doug Taylor, NCDOT Roadway
K. Zak Hamidi, NCDOT Roadway
Dan Grissom, NCDOT DCE
Michelle Long, NCDOT Const. Unit

After introductions, Frank Fleming proceeded with review.

Site #1 & #2 (Streams/Wetlands permit)

- F Fleming explained proposed structures. Site #1 is the extension of existing 3@60"CSPs and Site #2 is the bridge replacement with 3@12'x8' RCBC
- Kathy Mathews asked for reasoning for replacing the bridge w/ culvert.
  - G Cail explained the site only requires a box culvert.
  - F Fleming stated the downstream structure would be a bridge and upstream is fast approaching a built out condition.
- P Lespinasse asked for an explanation for the location of the Harzardous Spill Basins
  - F Fleming explained that the majority of the roadway stormwater is approaching the site from the West and the only area suited for a basin, based on topography, is left of 262+00-L-. The remainder of the roadway stormwater is approaching from the East. The volume of runoff is much less. This location is due to the topography and close proximity to existing apartments and existing detention basin.
  - There were further discussions about the buffers at this location. See Below under Site #1(Buffer Permit)
- D Baker relayed Steve Lund's request to attempt to limit the permanent surface water impacts at Site# 2 to less than 300'. It was discussed and agreed upon to call the inlet channel work of benching the channel as temporary surface water impacts. The permanent impacts will begin at the proposed inlet wing walls of the box culvert.

Site #1(Buffer permit)

- F Fleming explained the limit of the Buffers at the inlet of the proposed culvert as dictated by Lake Norman's full pool elevation of 760'.
- F Fleming explained that the earthen berm of the Hazardous Spill Basin right of 265+50-L- was in the buffer. There is no practical alternative giving the topography and proximity of existing dwellings.
- P Lepinasse explained that mitigation can be avoided for the Hazardous Spill Basin(HSB) right of 265+50 –L- as long as the HSB impact to the buffer is less than 1/3 ac. and since there is no alternative available. F Fleming responded that this reduction may throw the entire site into allowable without mitigation. P Lepinasse agreed.

Site #3 (Streams/Wetlands Permit)

- F Fleming described the existing 54" CSP crossing I-77 is proposed to be extended with use of a junction box as a drop structure. There was discussion by WRC, USFWS, DWQ, and EPA concerning fish passage. P Lepinasse asked to consider a sloped pipe or fish ladder. J Fleming expressed concern that the structure or the outlet dissipater would not be able to remain in place because of the increased velocities with a sloping pipe to the stream bed. Because there is virtually no habitat upstream and very little base flow due to development it was concluded to leave as designed.
    - The outlet rip rap will be on the banks only. This will be revised.

Site #4 (Streams/Wetlands Permit)

- F Fleming described the existing 6X6 RCBC will be extended on the inlet and outlet. The existing inlet is at bed level and the outlet has a large scour hole and a drop in the stream bed from the box culvert. It is proposed to drop both the inlet and outlet 2.0' to minimize undermining of the culvert at the inlet and dissipate some energy at the outlet. P Lepinasse asked to consider fish ladder or scour hole w/ ladder. Again the velocities of the structure raised concern with J Fleming that a rock structure will not be stable with the high velocities. The high velocities are a product of an undersized structure and increased impervious area upstream. M Burnick responded that the limited base flow and potential of failure of the fish ladder because of velocities makes it not worth the effort.
    - P Lepinasse expressed concerns about the amount of time the inlet drop would fill up with sediment. It was agreed by D Grissom that bed material excavated for the extension can be stockpiled and placed in the inlet. A note will be provided on the roadway plans, permit, and structure plans.

Site #5 (Streams/Wetland Permit) Site#2 (Buffer Permit)

- G Cail commented to show proposed piers on the plan view of permit drawings and roadway plans.
- D Grissom commented no causeway or work pads will be necessary.
- G Cail commented a profile sheet for the site is needed with impacts
- F Fleming described the proposed drainage system that outlets into a proposed 3' base ditch on the right side of –L-. Concerns of ditching in the buffers were expressed. F

Fleming expressed the ditch could discharge into a rip rap energy dissipater outside the buffer zones. F Fleming also expressed that there will be sheet flow out of the dissipater but could not guarantee the water would not converge and cut a new channel in the buffer. G Cail also express the dissipater would not spread the water enough to prevent concentration. P Lepinasse commented that the dissipator could work if the receiving buffer would not be cleared. D Grissom expressed concern about constructing the bridge without this area cleared. It was concluded that P Lepinasse and D Grissom would visit the site and make a determination.

- P Lepinasse requested to rip rap along banks about the water line under bridge.

Meeting adjourned.

Subject: Draft Minutes from Interagency Hydraulic Design Review Meeting on January 25, 2006 for R-3833B in Iredell County, 3:30pm to 4:30 pm

Team Members:

Steve Lund-USACE	(present)
Polly Lespinasse -NCDWQ	(present)
Marella Buncick-USFWS	(present)
Carla Dagnino-NCDOT-NEU	(present)
Michael Turchy-NCDOT-NEU	(present)

Participants:
Marshall Clawson, NCDOT Hydraulics
Galen Cail, NCDOT Hydraulics
Frank Fleming, Sungate Design Group
Miranda Alexander, Sungate Design Group
Trent Huffman, Moffatt and Nichol
Roy Girolami, NCDOT Structure Design

GENERAL NOTES

NCDOT and SDG are working together to develop construction plans to widen Brawley School Road (SR 1100) from East of SR 1109 to East of Windhaven Court. The project will widen the existing two-lane facility to a four-lane divided curb and gutter section.

- Location of Hazardous Spill Basin near –L- STA 252+20 Non-Jurisdictional Stream
  - F. Fleming discussed the pond online for retention, and the location choice for the hazardous spill basin (HSB). F. Fleming suggested locating the HSB as shown because it's the shortest distance between R/W and water's edge of the pond.
  - M. Clawson suggests moving the HSB to the edge of the tract in order to avoid property getting split up. F. Fleming was unaware if it was just a tract line and property on both sides of tract was owned by same person or not.
- Pipe crossing at –L- STA 265+10 Jurisdictional Stream UT to Lake Norman
  - USACE asked about sills within the culvert and at outlet, M. Clawson suggested there would be a bench at the outlet and committed to placing sills in the culvert.
  - F. Fleming estimated the impacts on the stream to be around +/- 200 ft.
  - The extension of the 3@60" CMP's was discussed.
- -Y6- and –L- Interchange
  - Questions were asked about whether there would be any problems with the retaining walls under I-77. F. Fleming said there would not be any.
- Pipe crossing at –Y6- STA 40+20 (Existing 6'x6' RCBC) Jurisdictional Stream UT3 to Lake Norman
  - Lund wants to make sure all crossings were permitted.

- M. Turchy discussed heading out to the site after an upcoming nearby field inspection. *Per field visit on 1/26/06, the crossing at Sta 40+20 –Y6- is jurisdictional.*
- M. Buncick was concerned with the orientation of the box culvert and that it is undersized.
- F. Fleming discussed extending the inlet end by about 30 feet, and extending the outlet end and dropping the bottom down approximately 1-2 ft to decrease velocities and skewing the inlet and outlet to line up with the channel.

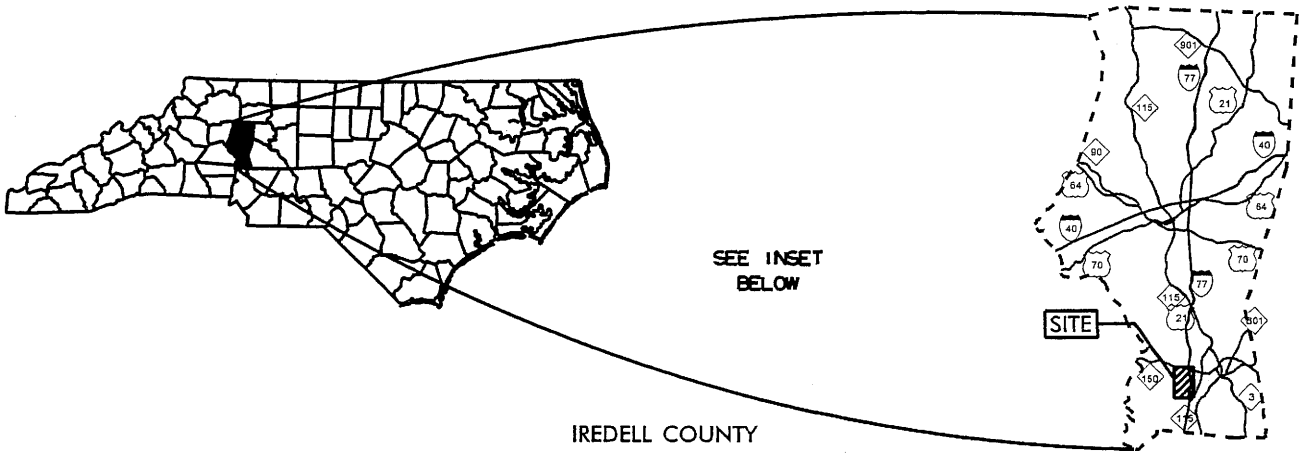
➢ Pipe crossing at –Y6- STA 15+00 (Existing 48" CMP)

- F. Fleming discussed extending the existing pipe on both sides, and adding a junction box with a larger pipe to attempt to decrease velocities.
- M. Turchy will be checking on jurisdiction for the streams crossing –Y6- STA 15+00, 45+80 and 66+40. *Per field visit on 1/26/06, the crossing at Sta 15+00 –Y6- is jurisdictional. The crossings at Sta 45+80 and 66+40 –Y6- are NOT jurisdictional.*

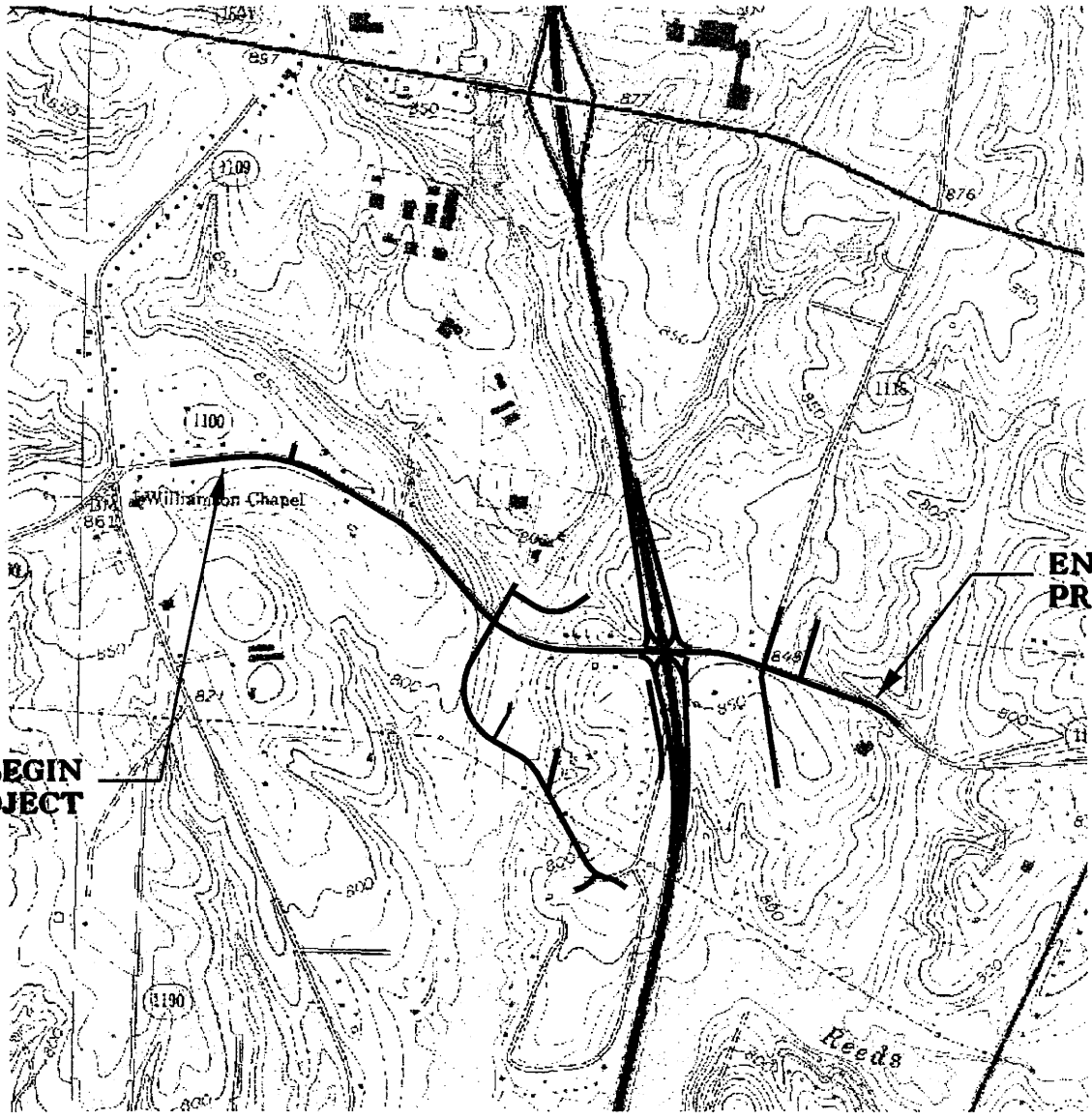
➢ Crossing at –Y4- STA 24+00 (New location) Jurisdictional Stream UT to Lake Norman

- Discussion on why there is not a proposed bridge, full pond elevation for buffer, and if the site was subject to a 50 ft buffer in Catawba.
- P. Lespinasse said the full pond elevation was 760 ft and was going to look into buffer rules with regard to mitigation.
- M. Clawson will determine whether NCDOT has committed to bridging buffers in the Catawba Basin.
- Everyone agreed that a cost estimate should be worked up regarding a culvert vs. a bridge over the new location (Y4) and if the bridge was not much more expensive then a bridge should be built.
- F. Fleming will get G. Cail a preliminary bridge size for a cost estimate by NCDOT for the bridge versus culvert at this crossing.

MEETING ADJOURNED



IREDELL COUNTY



WETLAND/STREAM IMPACTS
VICINITY MAP

Permit Drawing
Sheet 1 of 2

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
IREDELL COUNTY

PROJECT: 34554.1.1 (R-3833B)
SR 1100 (BRAWLEY SCHOOL ROAD)
EAST OF SR 1109 (WILLIAMSON
ROAD) TO EAST OF WINGHAVEN COURT

SHEET ___ OF ___ 5/8/08

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	11+40-Y1-	Extend 3@60"CMP						0.02	<0.01	140	14	
2	265+08-L-	3@12X8 RCBC						0.07	0.02	252	85	
2	265+08 -L- LT	6' Base Ditch						<0.01		65		
3	15+00 -Y6-	Extend 54"CMP						0.01	<0.01	65	30	
4	40+22 -Y6-	Extend 6X6 RCBC						0.02	0.02	78	75	
5	24+00 -Y4-	2@40', 1@50', 2@40' Bridge						<0.01		25		
6	27+09 -Y4-	36" RCP						<0.01		174		
TOTALS:								0.15	0.06	799	204	

Site #2: Sills in outer barrels. Culvert buried 1'.
Site#5: No peirs in surface waters. No causeway.

Permit Drawing
Sheet 2 of 23

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

IREDELL COUNTY
PROJECT: 34554.1.1 (R-3833B)

SHEET

Revised 5/27/2008

ATN Revised 3/31/05

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
258	GOLDSTAR USA, LLC (FORMERLY J&K'S EXCELLENT ADVENTURE LLC)	584 PENELOPE PLACE NE CONCORD NC, 28025
154	ROE LTD	121 ROLLING HILL RD. SUITE 200 MOORESVILLE NC, 28117
153	TOWN OF MOORESVILLE	215 N. MAIN STREET MOORESVILLE NC, 28115
155A	SUNRIDGE TOWNHOMES, LLC	175 DAVIDSON HIGHWAY CONCORD NC, 28027
279	SUNRIDGE TOWNHOMES LLC (FORMERLY BUFFALO MOORESVILLE, LLC)	175 DAVIDSON HIGHWAY CONCORD NC, 28027
278	SUNCHASE AMERICAN LTD (FORMERLY CGRWFS REAL PROPERTY, LLC)	1700 ABBEY PL. SUITE 111 CHARLOTTE NC, 28209
155B	SUNCHASE AMERICAN LTD	1700 ABBEY PL. SUITE 111 CHARLOTTE NC, 28209

WETLAND/ STREAM IMPACTS

Permit Drawing
Sheet 3 of 23

NCDOT

DIVISION OF HIGHWAYS

IREDELL COUNTY

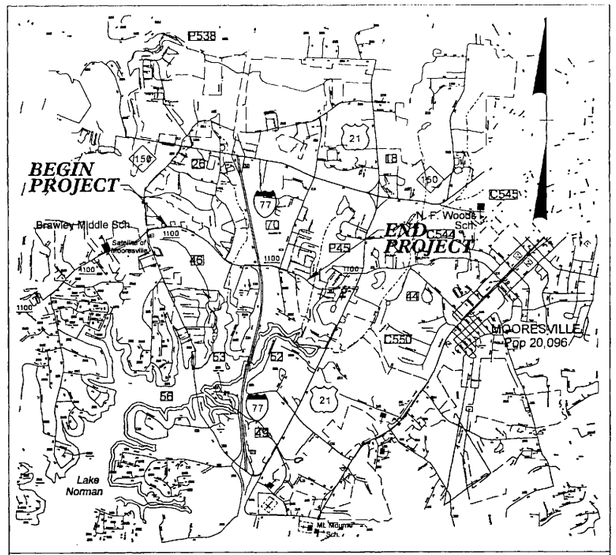
PROJECT: 34554.1.1 (R3833B)
SR 1100 (BRAWLEY SCHOOL ROAD)
EAST OF SR 1109 (WILLIAMSON
ROAD) TO EAST OF WINGHAVEN COURT

SHEET OF 05/30/08

09/28/99

CONTRACT: C202068 TIP PROJECT: R-3833B

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3833B	1	

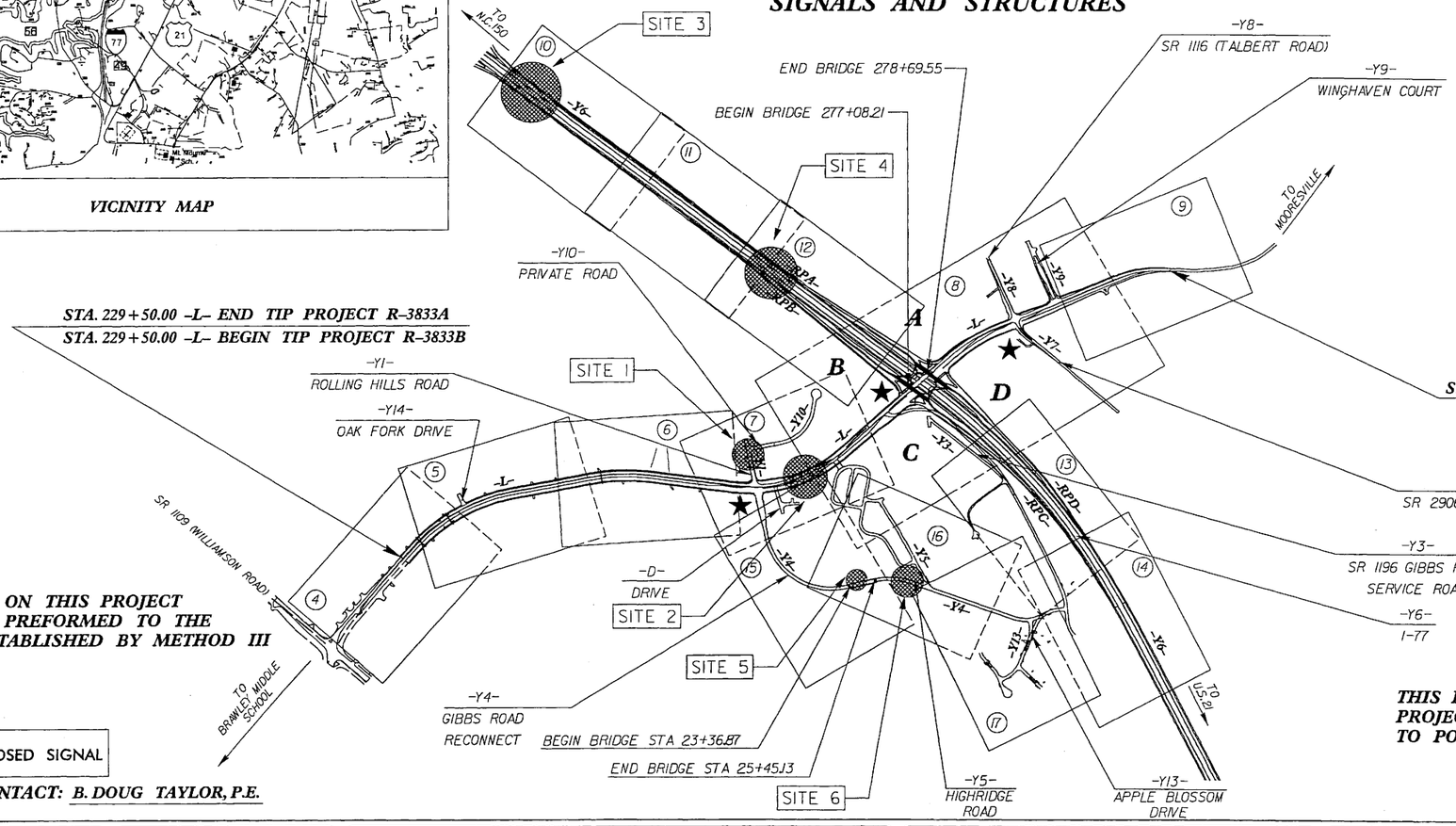
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34554.1.1	STP-150(11)	P.E.
34554.2.3	STP-1100(20)	R/W, UTL
34554.3.2	STP-1100(20)	CONST.

WETLAND/ STREAM IMPACTS

Permit Drawing Sheet 4 of 23

LOCATION: ***SR 1100 (BRAWLEY SCHOOL ROAD) FROM EAST OF SR 1109 (WILLIAMSON ROAD) TO EAST OF WINGHAVEN COURT***

TYPE OF WORK: ***GRADING, DRAINAGE, PAVING, SIGNING, SIGNALS AND STRUCTURES***



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

★ PROPOSED SIGNAL

NCDOT CONTACT: *B. DOUG TAYLOR, P.E.*

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH THE ACCESS BEING LIMITED TO POINTS SHOWN ON PLANS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/95 NC GRID

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 2009 = 24,880
ADT 2029 = 33,790
DHV = 9 %
D ≐ 60 %
T = 9 % *
V = 50 MPH

* (TTST 3% + DUAL 6%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3833B = *1.32 MI*

LENGTH STRUCTURES TIP PROJECT R-3833B = *0.03 MI*

TOTAL LENGTH OF TIP PROJECT R-3833B = *1.35 MI*

Prepared for NCDOT In the Office of:
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MAY 19, 2006

LETTING DATE: FEBRUARY 17, 2009

TIM R. REID, P.E.
PROJECT ENGINEER

TRENT E. HUFFMAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SDG Sungate Design Group, P.A.
Engineering - Landscape Architecture - Environmental
915-A Jones Franklin Rd.
Raleigh, N.C. 27606
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER WHITNEY WELLS IV
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID
P.E.
SIGNATURE:

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA
STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION
P.E.
STATE HIGHWAY DESIGN ENGINEER

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

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL — SDG Sungate Design Group, P.A.

8/17/99

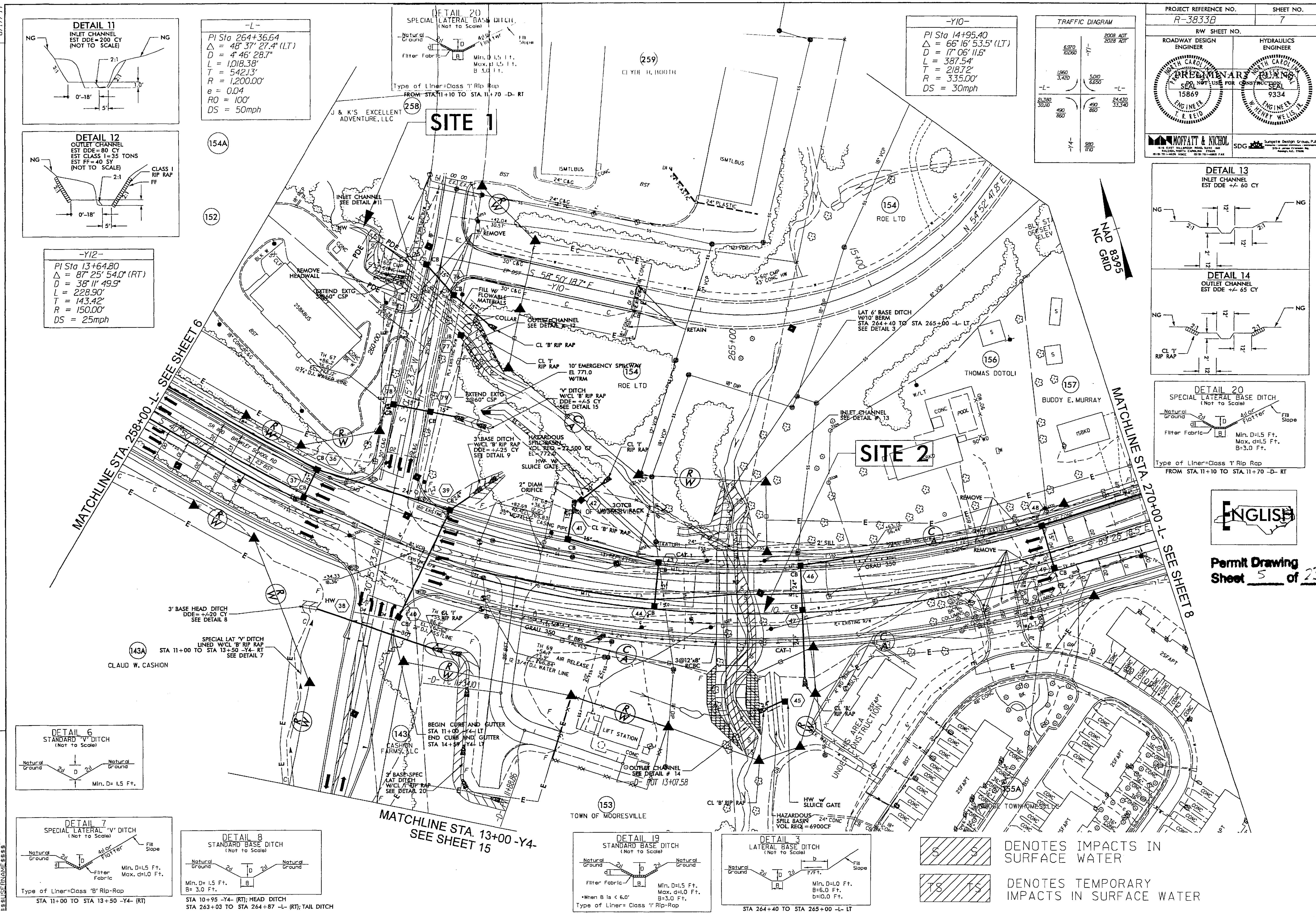
REVISIONS

DATE: 01/26/2007 -REVISED R/W FOR PARCELS 153 & 155
DATE: 02/21/2008 -ADDED PARCEL 143, REVISED PARCEL 143 TO 143A, UPDATED DEED BOOK AND PAGE

-L-
PI Sta 264+36.64
Δ = 48° 37' 27.4" (LT)
D = 4° 46' 28.7"
L = 1,018.38'
T = 542.13'
R = 1,200.00'
e = 0.04
RO = 100'
DS = 50mph

-Y10-
PI Sta 14+95.40
Δ = 66° 16' 53.5" (LT)
D = 17° 06' 11.6"
L = 387.54'
T = 218.72'
R = 335.00'
DS = 30mph

-Y12-
PI Sta 13+64.80
Δ = 87° 25' 54.0" (RT)
D = 38° 11' 49.9"
L = 228.90'
T = 143.42'
R = 150.00'
DS = 25mph



SITE 1
SITE 2
MATCHLINE STA. 258+00 -L- SEE SHEET 6
MATCHLINE STA. 270+00 -L- SEE SHEET 8
MATCHLINE STA. 13+00 -Y4- SEE SHEET 15
NAD 83/95 NC GRID
TRAFFIC DIAGRAM
DETAIL 11 INLET CHANNEL EST DDE=200 CY (NOT TO SCALE)
DETAIL 12 OUTLET CHANNEL EST DDE=80 CY EST CLASS I=35 TONS EST FF=40 SY (NOT TO SCALE)
DETAIL 13 INLET CHANNEL EST DDE +/- 60 CY
DETAIL 14 OUTLET CHANNEL EST DDE +/- 65 CY
DETAIL 20 SPECIAL LATERAL BASE DITCH (Not to Scale)
Type of Liner=Class 'I' Rip Rap
FROM STA 11+10 TO STA 11+70 -D- RT
DETAIL 6 STANDARD 'V' DITCH (Not to Scale)
Min. D= 1.5 Ft.
DETAIL 7 SPECIAL LATERAL 'V' DITCH (Not to Scale)
Type of Liner=Class 'B' Rip-Rap
STA 11+00 TO STA 13+50 -Y4- (RT)
DETAIL 8 STANDARD BASE DITCH (Not to Scale)
STA 10+95 -Y4- (RT); HEAD DITCH
STA 263+03 TO STA 264+87 -L- (RT); TAIL DITCH
DETAIL 19 STANDARD BASE DITCH (Not to Scale)
Type of Liner= Class 'I' Rip-Rap
DETAIL 3 LATERAL BASE DITCH (Not to Scale)
STA 264+40 TO STA 265+00 -L- LT
J & K'S EXCELLENT ADVENTURE, LLC
CLYDE H. BOOTH
ROE LTD
THOMAS DOTOLI
BUDDY E. MURRAY
CLAUD W. CASHION
CASHION FARMS, LLC
TOWN OF MOORESVILLE
HAZARDOUS SPILL BASIN VOL. REQ.=22,500 CF
HAZARDOUS SPILL BASIN VOL. REQ.=6900CF
10' EMERGENCY SPILLWAY EL 771.0 W/TRM
LIFT STATION

ENGLISH

Permit Drawing Sheet 5 of 23

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL — 1616 EAST MILLBROOK ROAD, SUITE 160, RALEIGH, NORTH CAROLINA 27609, (919) 781-4626 VOICE, (919) 781-4865 FAX

SDG Surveying & Design Group, P.A. — 515-A Jones Franklin Rd., Raleigh, N.C. 27606

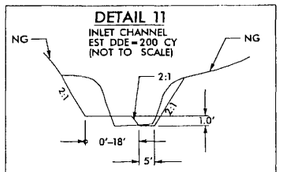
REVISIONS

DATE: 01/26/2007 -REVISED R/W FOR PARCELS 153 & 155
DATE: 02/21/2008 -ADDED PARCEL 143, REVISED PARCEL 143 TO 143A, UPDATED DEED BOOK AND PAGE

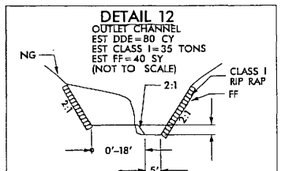
8/17/99

\$\$\$\$\$\$SYSTIME\$\$\$\$\$\$
\$\$\$\$\$\$USERNAME\$\$\$\$\$\$
\$\$\$\$\$\$DGNFILE\$\$\$\$\$\$

DETAIL 11
INLET CHANNEL
EST DDE = 200 CY
(NOT TO SCALE)



DETAIL 12
OUTLET CHANNEL
EST DDE = 80 CY
EST CLASS I = 35 TONS
EST FF = 40 SY
(NOT TO SCALE)



-Y12-
PI Sta 13+64.80
Δ = 87° 25' 54.0" (RT)
D = 38° 11' 49.9"
L = 228.90'
T = 143.42'
R = 150.00'
DS = 25mph

-L-
PI Sta 264+36.64
Δ = 48° 37' 27.4" (LT)
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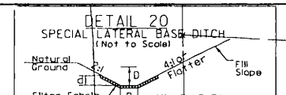
L = 1,018.38'
T = 542.13'
R = 1,200.00'
e = 0.04
RO = 100'
DS = 50mph

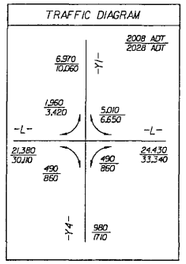
DETAIL 20
SPECIAL LATERAL BASE DITCH
(Not to Scale)



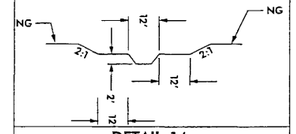
Type of Liner=Class 'I' Rip Rap
FROM STA. 11+10 TO STA. 11+70 -D- RT

-Y10-
PI Sta 14+95.40
Δ = 66° 16' 53.5" (LT)
D = 17° 06' 11.6"
L = 387.54'
T = 218.72'
R = 335.00'
DS = 30mph

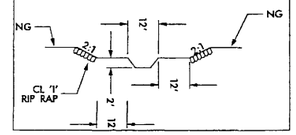
TRAFFIC DIAGRAM



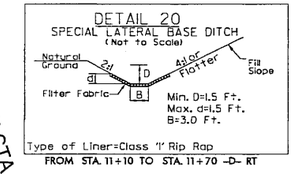
DETAIL 13
INLET CHANNEL
EST DDE +/- 60 CY



DETAIL 14
OUTLET CHANNEL
EST DDE +/- 65 CY



DETAIL 20
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Type of Liner=Class 'I' Rip Rap
FROM STA. 11+10 TO STA. 11+70 -D- RT

ENGLISH

Permit Drawing Sheet 6 of 23

SITE 1

SITE 2

J & K'S EXCELLENT ADVENTURE, LLC

CLYDE H. BOOTH

ROE LTD

THOMAS DOTOLI

BUDDY E. MURRAY

CLAUD W. CASHION

CASHION FARMS, LLC

TOWN OF MOORESVILLE

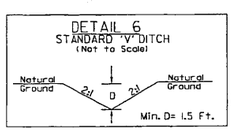
MATCHLINE STA. 258+00 -L- SEE SHEET 6

MATCHLINE STA. 270+00 -L- SEE SHEET 8

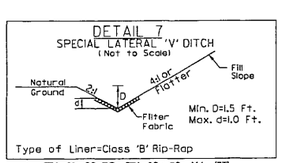
MATCHLINE STA. 13+00 -Y4- SEE SHEET 15

NAD 83/95 NC GRID

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

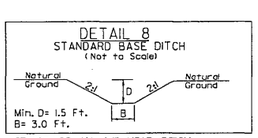


DETAIL 7
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



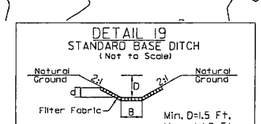
Type of Liner=Class 'B' Rip-Rap
STA 11+00 TO STA 13+50 -Y4- (RT)

DETAIL 8
STANDARD BASE DITCH
(Not to Scale)



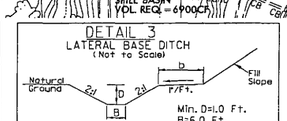
STA 10+95 -Y4- (RT); HEAD DITCH
STA 263+03 TO STA 264+87 -L- (RT); TAIL DITCH

DETAIL 19
STANDARD BASE DITCH
(Not to Scale)



*When B is < 6.0'
Type of Liner= Class 'I' Rip-Rap

DETAIL 3
LATERAL BASE DITCH
(Not to Scale)



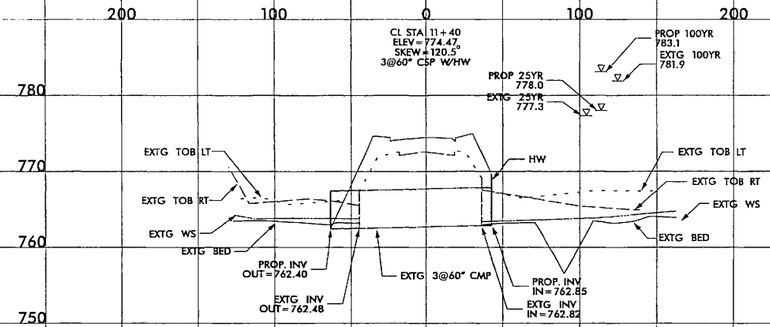
STA 264+40 TO STA 265+00 -L- LT

DENOTES IMPACTS IN SURFACE WATER

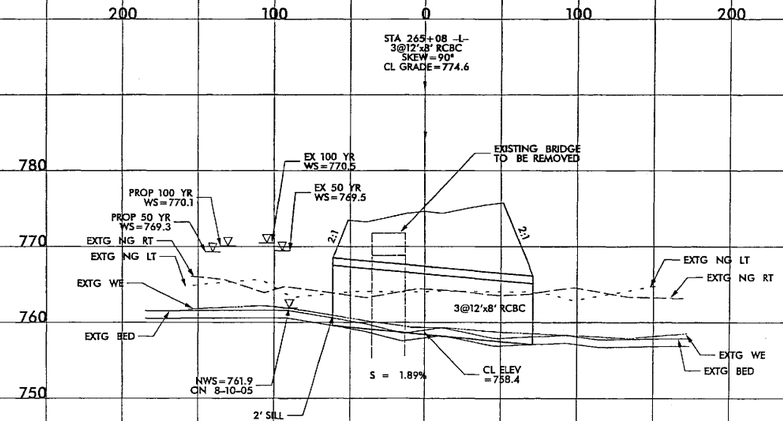
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJ. REFERENCE NO.	SHEET NO.

Permit Drawing
Sheet 7 **of** 23



SITE 1
UT–LAKE NORMAN



SITE 2
UT–LAKE NORMAN

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833B	X-34

Permit Drawing
Sheet 8 **of** 23

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

5/28/99

–L– (SR 1100)
BRAWLEY SCHOOL ROAD

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	19

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19884 ENGINEER T. R. REID

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22334 ENGINEER HENRY WELLS, IV

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL
SDG Synoptic Design Group, P.A.

Permit Drawing
Sheet 9 of 23

PROPOSED GRADE

EXISTING GRADE

PI = 250+95.00
EL = 821.24'
VC = 290'
k = 111
DS = 50 mph

PI = 256+58.00
EL = 813.92'
VC = 513'
k = 84
DS = 50 mph

(-)13.9282%
(-)11.2990%
(-)11.2990%
(-)17.3949%

FOR –L– PLAN SEE SHEET 6

–L– (SR 1100)
BRAWLEY SCHOOL ROAD

SITE 2

BM12 – RR SPIKE IN THE BASE OF A 48" TWIN BEECH TREE
N 671495.8155 E 1447311.0509
–BL– STA. 268+87 OFFSET 363.72' LT
ELEV 785.67

S S DENOTES IMPACTS IN SURFACE WATER

–L– STA. 261+03.08 =
–Y1– STA 14+20 =
–Y4– STA 10+00

DESIGN EXCEPTION

PI = 264+96.00
EL = 763.46'
VC = 643'
k = 50
DS = 35 mph

PI = 260+31.00
EL = 786.34'
VC = 233'
k = 94
DS = 50 mph

(-)17.3949%
(-)14.9207%
(-)14.9207%
(+)17.9228%

PROPOSED GRADE

EXISTING GRADE

EXIST STRUCTURE

2' SILL

3@ 12' x 8' RCBC

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1,700	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 769.3	FT
BASE DISCHARGE	= 1,900	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 770.1	FT
OVERTOPPING DISCHARGE	= 1,900	CFS
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING ELEVATION	= 770.3	FT

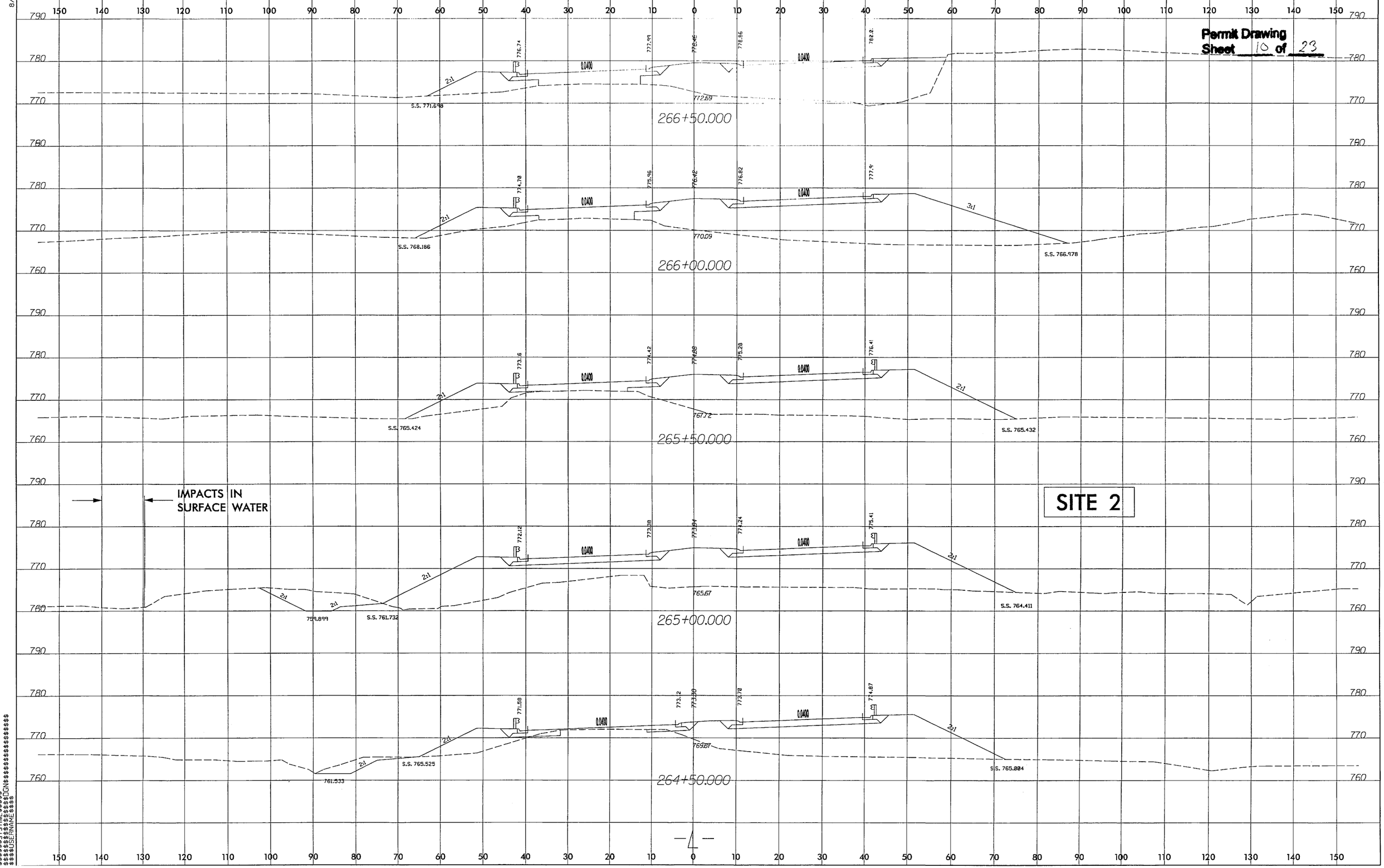
FOR –L– PLAN SEE SHEET 7

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

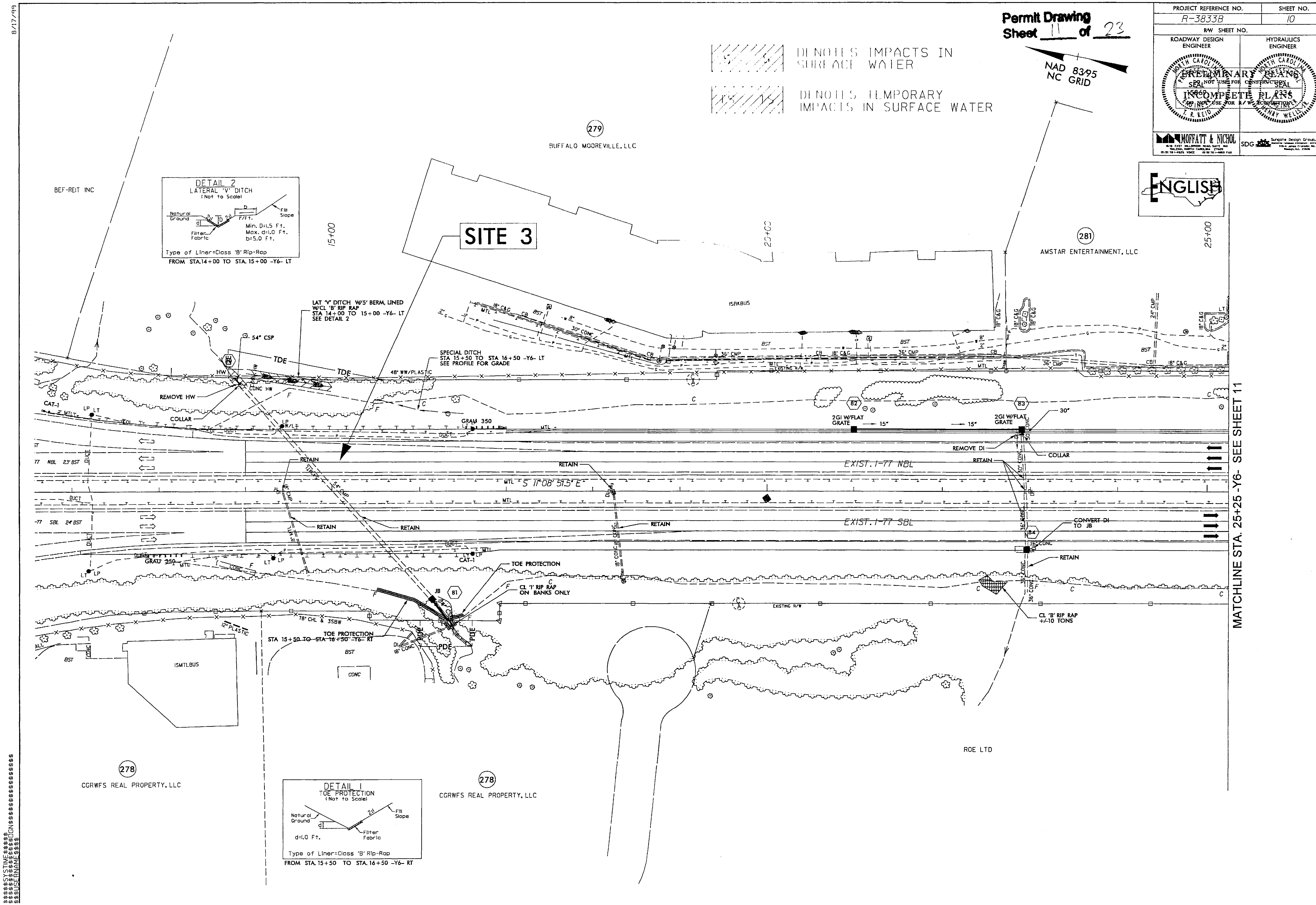
8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833B	X-15

Permit Drawing
Sheet 10 **of** 23



SITE 2



Permit Drawing
Sheet 11 of 23
PROJECT REFERENCE NO. R-3833B
SHEET NO. 10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
MOFFATT & NICHOL
SDG Sungate Design Group, P.A.
ENGLISH
NAD 83/95
NC GRID
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
279
BUFFALO MOOREVILLE, LLC
BEF-REIT INC
DETAIL 2
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Filter Fabric
Fill Slope
Min. D=1.5 Ft.
Max. d=1.0 Ft.
b=5.0 Ft.
Type of Liner=Class 'B' Rip-Rap
FROM STA.14+00 TO STA. 15+00 -Y6- LT
SITE 3
15+00
25+00
281
AMSTAR ENTERTAINMENT, LLC
LAT 'V' DITCH W/5' BERM, LINED W/CL 'B' RIP RAP
STA 14+00 TO 15+00 -Y6- LT
SEE DETAIL 2
SPECIAL DITCH
STA 15+50 TO STA 16+50 -Y6- LT
SEE PROFILE FOR GRADE
54" CSP
TDE
48" WW/PLASTIC
REMOVE HW
COLLAR
CONC HW
GRAU 350
2GI W/FLAT GRATE
REMOVE DI
RETAIN
COLLAR
EXIST. I-77 NBL
S 11°08' 51.5" E
EXIST. I-77 SBL
CONVERT DI TO JB
TOE PROTECTION
CL 'I' RIP RAP ON BANKS ONLY
CL 'B' RIP RAP +/-10 TONS
STA 15+50 TO STA 16+50 -Y6- RT
PDE
EXISTING R/W
ISMTLBUS
MATCHLINE STA. 25+25 -Y6- SEE SHEET 11
278
CGRWFS REAL PROPERTY, LLC
ROE LTD
DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground
Fill Slope
Filter Fabric
d=1.0 Ft.
Type of Liner=Class 'B' Rip-Rap
FROM STA. 15+50 TO STA. 16+50 -Y6- RT
8/17/99

8/17/99

Permit Drawing
Sheet 12 of 23

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	10

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

MOFFATT & NICHOL

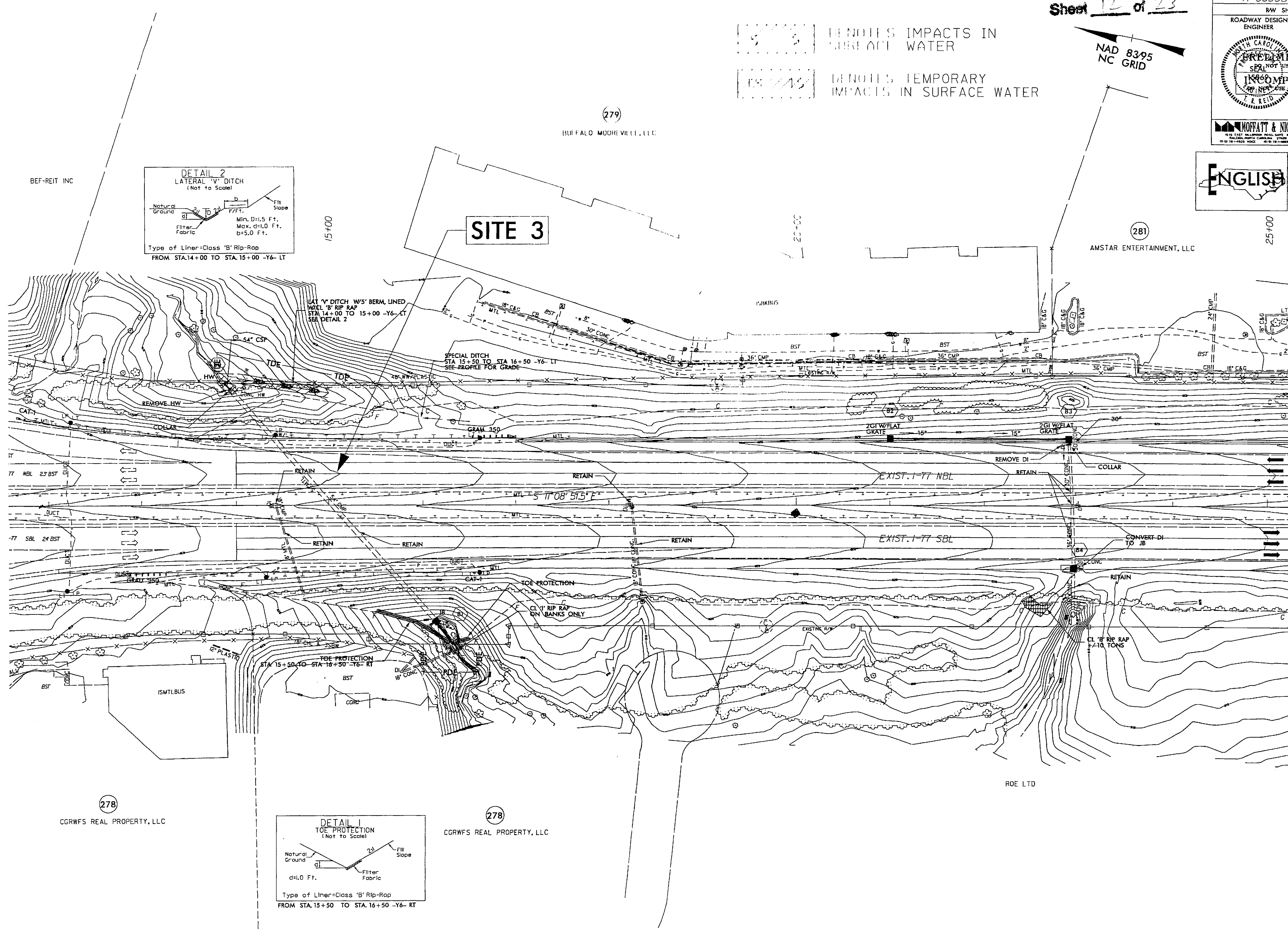
SDG Sungate Design Group, P.A.

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

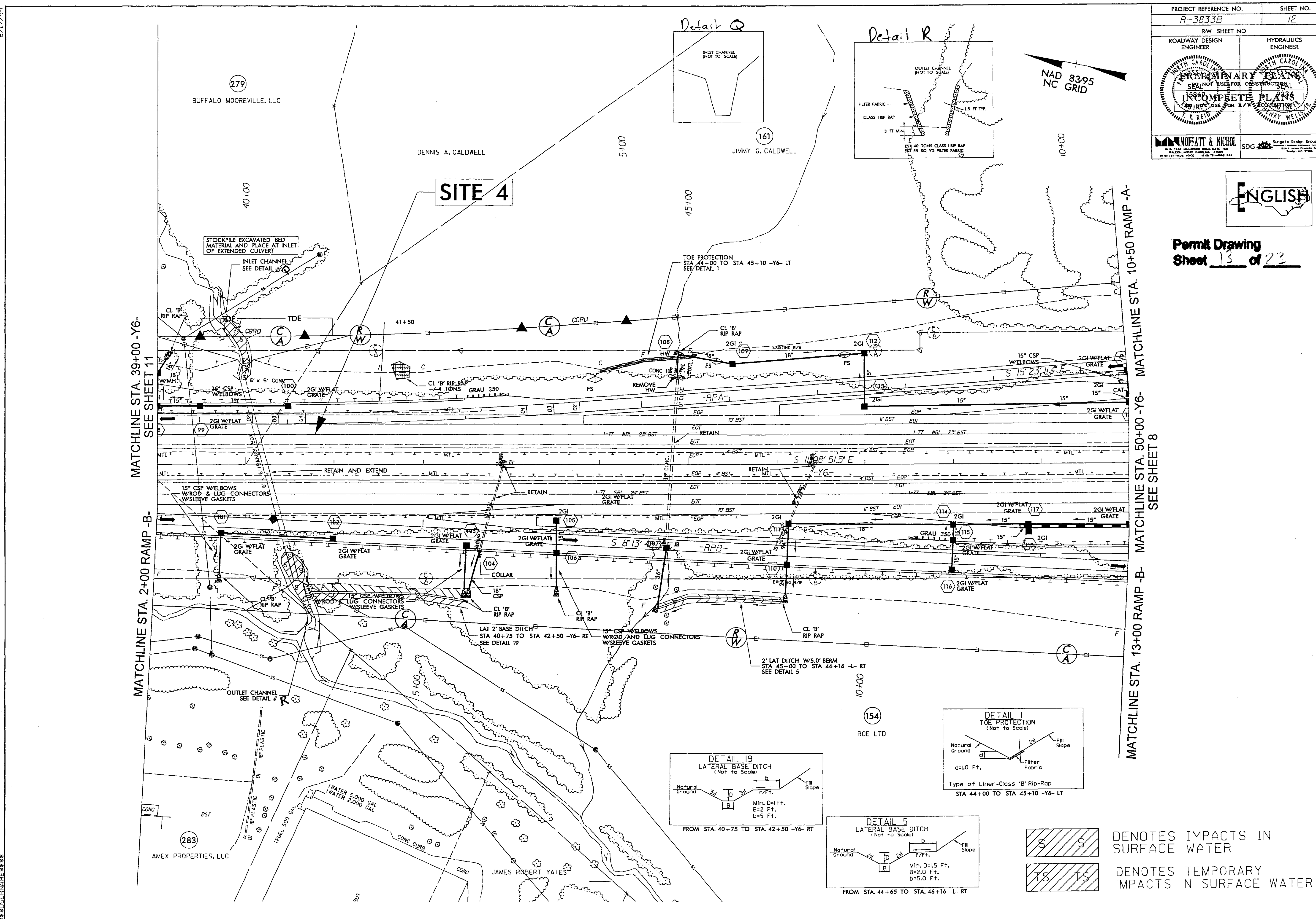
NAD 83/95
NC GRID

ENGLISH



SITE 3
(279)
BUFFALO MOORESVILLE, LLC
BEF-REIT INC
(281)
AMSTAR ENTERTAINMENT, LLC
(278)
CGRWFS REAL PROPERTY, LLC
ROE LTD
DETAIL 2
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Filter Fabric
Fill Slope
Min. D=1.5 Ft.
Max. d=1.0 Ft.
b=5.0 Ft.
Type of Liner=Class 'B' Rip-Rap
FROM STA.14+00 TO STA. 15+00 -Y6- LT
DETAIL 1
TOE PROTECTION
(Not to Scale)
d=1.0 Ft.
Type of Liner=Class 'B' Rip-Rap
FROM STA. 15+50 TO STA. 16+50 -Y6- RT
LAT 'V' DITCH W/5' BERM, LINED W/CL 'B' RIP RAP
STA 14+00 TO 15+00 -Y6- LT
SEE DETAIL 2
SPECIAL DITCH
STA 15+50 TO STA 16+50 -Y6- LT
SEE PROFILE FOR GRADE
REMOVE HW
COLLAR
RETAIN
EXIST. I-77 NBL
EXIST. I-77 SBL
S 11°08'51.5" E
TOE PROTECTION
CL 'I' RIP RAP ON BANKS ONLY
TOE PROTECTION
STA 15+50 TO STA 16+50 -Y6- RT
2GI W/FLAT GRATE
REMOVE DI
CONVERT DI TO JB
CL 'B' RIP RAP
+/-10 TONS
15+00
25+00
MATCHLINE STA. 25+25 -Y6- SEE SHEET 11

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



PROJECT REFERENCE NO.
R-3833B
SHEET NO.
12
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
MOFFATT & NICHOL
SDG Sungate Design Group, P.A.
ENGLISH
Permit Drawing
Sheet 13 of 23
NAD 83/95
NC GRID
Detail Q
INLET CHANNEL (NOT TO SCALE)
Detail R
OUTLET CHANNEL (NOT TO SCALE)
FILTER FABRIC
CLASS I RIP RAP
3 FT MIN
1.5 FT TYP.
EST. 40 TONS CLASS I RIP RAP
EST. 55 SQ. YD. FILTER FABRIC
SITE 4
279 BUFFALO MOOREVILLE, LLC
DENNIS A. CALDWELL
161 JIMMY G. CALDWELL
154 ROE LTD
283 AMEX PROPERTIES, LLC
JAMES ROBERT YATES
STOCKPILE EXCAVATED BED MATERIAL AND PLACE AT INLET OF EXTENDED CULVERT
INLET CHANNEL SEE DETAIL Q
OUTLET CHANNEL SEE DETAIL R
TOE PROTECTION STA 44+00 TO STA 45+10 -Y6- LT SEE DETAIL 1
CL 'B' RIP RAP
CL 'B' RIP RAP +/-4 TONS
6' x 6' CONC
RETAIN AND EXTEND
REMOVE HW
15" CSP W/ELBOWS W/ROD & LUG CONNECTORS W/SLEEVE GASKETS
LAT 2' BASE DITCH STA 40+75 TO STA 42+50 -Y6- RT SEE DETAIL 19
2' LAT DITCH W/5.0' BERM STA 45+00 TO STA 46+16 -L- RT SEE DETAIL 5
S 8° 13' 49.7" E
S 11° 08' 51.5" E
S 15° 23' 11.4" E
-RPA-
-RPB-
-Y6-
MATCHLINE STA. 39+00 -Y6- SEE SHEET 11
MATCHLINE STA. 2+00 RAMP -B-
MATCHLINE STA. 10+50 RAMP -A-
MATCHLINE STA. 50+00 -Y6- SEE SHEET 8
MATCHLINE STA. 13+00 RAMP -B-
DETAIL 1
TOE PROTECTION (Not to Scale)
Natural Ground
Fill Slope
Filter Fabric
d=1.0 Ft.
Type of Liner=Class 'B' Rip-Rap
STA 44+00 TO STA 45+10 -Y6- LT
DETAIL 19
LATERAL BASE DITCH (Not to Scale)
Min. D=1 Ft.
B=2 Ft.
b=5 Ft.
FROM STA. 40+75 TO STA. 42+50 -Y6- RT
DETAIL 5
LATERAL BASE DITCH (Not to Scale)
Min. D=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
FROM STA. 44+65 TO STA. 46+16 -L- RT
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 15868 T. R. REID	SEAL 9334 HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

SDG Sungate Design Group, P.A.
515-1 Jones Franklin Rd.
Raleigh, N.C. 27606

ENGLISH

Permit Drawing
Sheet 11 of 23

DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground
d
Fill Slope
Filter Fabric
d=1.0 Ft.
Type of Liner=Class 'B' Rip-Rap
STA 44+00 TO STA 45+10 -Y6- LT

DETAIL 19
LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Fill Slope
Min. D=1 Ft.
B=2 Ft.
b=5 Ft.
FROM STA. 40+75 TO STA. 42+50 -Y6- RT

DETAIL 5
LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Fill Slope
Min. D=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
FROM STA. 44+65 TO STA. 46+16 -L- RT

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

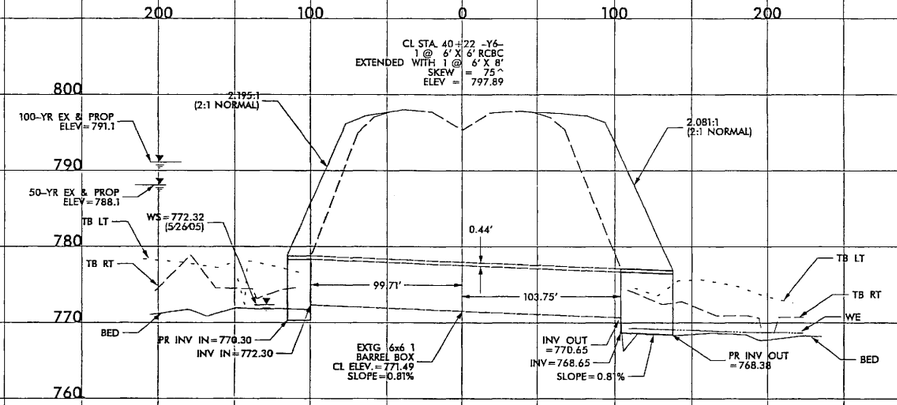
$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$
$$$USERNAME$$$$

8/23/99

0 25 50	PROJ. REFERENCE NO.	SHEET NO.

Permit Drawing
Sheet 15 of 23

SITE 4
UT–LAKE NORMAN



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

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-3833B	X-74

Permit Drawing
Sheet 16 of 23

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	16

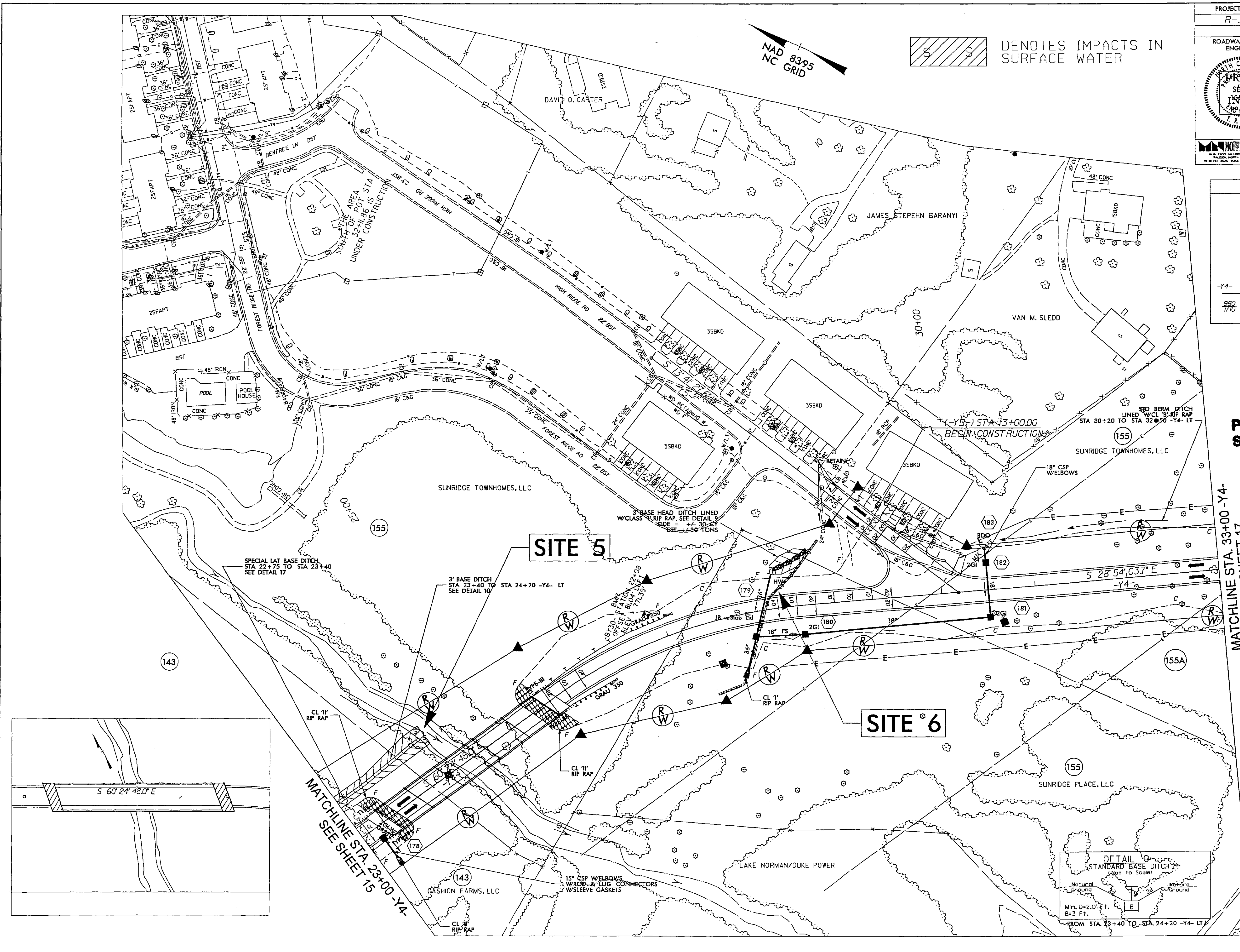
RW SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS — DO NOT USE FOR R/W ACQUISITION

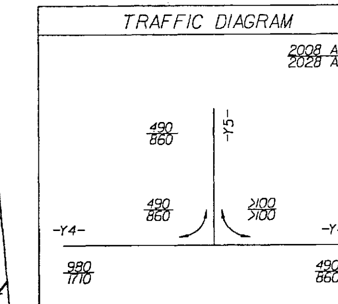
MOFFATT & NICHOL — SDG Sungate Design Group, P.A.



DENOTES IMPACTS IN SURFACE WATER
NAD 83/95 NC GRID
SITE 5
SITE 6
MATCHLINE STA. 33+00 -Y4- SEE SHEET 17
MATCHLINE STA 23+00 -Y4- SEE SHEET 15
SUNRIDGE TOWNHOMES, LLC
SUNRIDGE PLACE, LLC
LAKE NORMAN/DUKE POWER
CASHION FARMS, LLC
JAMES STEPEHN BARANYI
VAN M. SLEDD
DAVID O. CARTER
FOREST RIDGE RD
HIGH RIDGE RD
BENTREE LN
S 28° 54' 03.7" E
S 60° 24' 48.0" E
(-Y5-) STA 13+00.00 BEGIN CONSTRUCTION
THE AREA SOUTH OF POT STA 32+11.86 IS UNDER CONSTRUCTION
SPECIAL LAT BASE DITCH STA 22+75 TO STA 23+40 SEE DETAIL 17
3' BASE DITCH STA 23+40 TO STA 24+20 -Y4- LT SEE DETAIL 10
3' BASE HEAD DITCH LINED W/CLASS 'I' RIP RAP, SEE DETAIL 9 DDE = +/- 30 CY EST. +/- 30 TONS
3' BD BERM DITCH LINED W/CL 'B' RIP RAP STA 30+20 TO STA 32+50 -Y4- LT
18" CSP W/ELBOWS
15" CSP W/ELBOWS W/ROD & LUG CONNECTORS W/SLEEVE GASKETS
CL 'II' RIP RAP
CL 'I' RIP RAP
DETAIL 10 STANDARD BASE DITCH (Not to Scale)
Natural Ground
Min. D=2.0 Ft. B=3 Ft.
FROM STA. 23+40 TO STA 24+20 -Y4- LT

TRAFFIC DIAGRAM

2008 ADT / 2028 ADT



ENGLISH

Permit Drawing Sheet 17 of 23

REVISIONS

DATE: 1/08/2008 -REVISED PARCEL'S 155A & 155B

DATE: 2/21/2008 -REVISED PARCEL 143 OWNER NAME AND UPDATED DEED BOOK AND PAGE

8/17/99

8/17/99

REVISIONS

DATE: 1/08/2008 -REVISED PARCEL'S 155A & 155B
DATE: 2/21/2008 -REVISED PARCEL 143 OWNER NAME AND UPDATED DEED BOOK AND PAGE

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

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	16

R/W SHEET NO.

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 15860 T. R. REID	SEAL 8334 HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

SDG Sungate Design Group, P.A.
915-A Jones Franklin Rd.
Raleigh, N.C. 27606

DENOTES IMPACTS IN SURFACE WATER

ENGLISH

Permit Drawing
Sheet 18 of 23

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	27

ROADWAY DESIGN ENGINEER — T. R. REID, SEAL 15887

HYDRAULICS ENGINEER — W. HENRY WELLS, JR., SEAL 9334

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

SDG Sungate Design Group, P.A.
915-J Jones Franklin Rd.
Raleigh, N.C. 27606

Permit Drawing
Sheet 19 **of** 21

-Y4-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO._
DRAINAGE AREA = 5.3 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 25 CFS
DESIGN HW ELEVATION = 777.06 FT
100 YEAR DISCHARGE = 26.4 CFS
100 YEAR HW ELEVATION = 777.24 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 46+ CFS
OVERTOPPING ELEVATION = *782.40 FT

-Y4-

STRUCTURE HYDRAULIC DATA
DESIGN DISCHARGE = 1600 CFS
DESIGN FREQUENCY = 25 YRS
DESIGN HW ELEVATION = 763.3 FT
BASE DISCHARGE = 2000 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 763.8 FT
OVERTOPPING DISCHARGE = 2400 CFS
OVERTOPPING FREQUENCY = 100+ YRS
OVERTOPPING ELEVATION = 764.64 FT

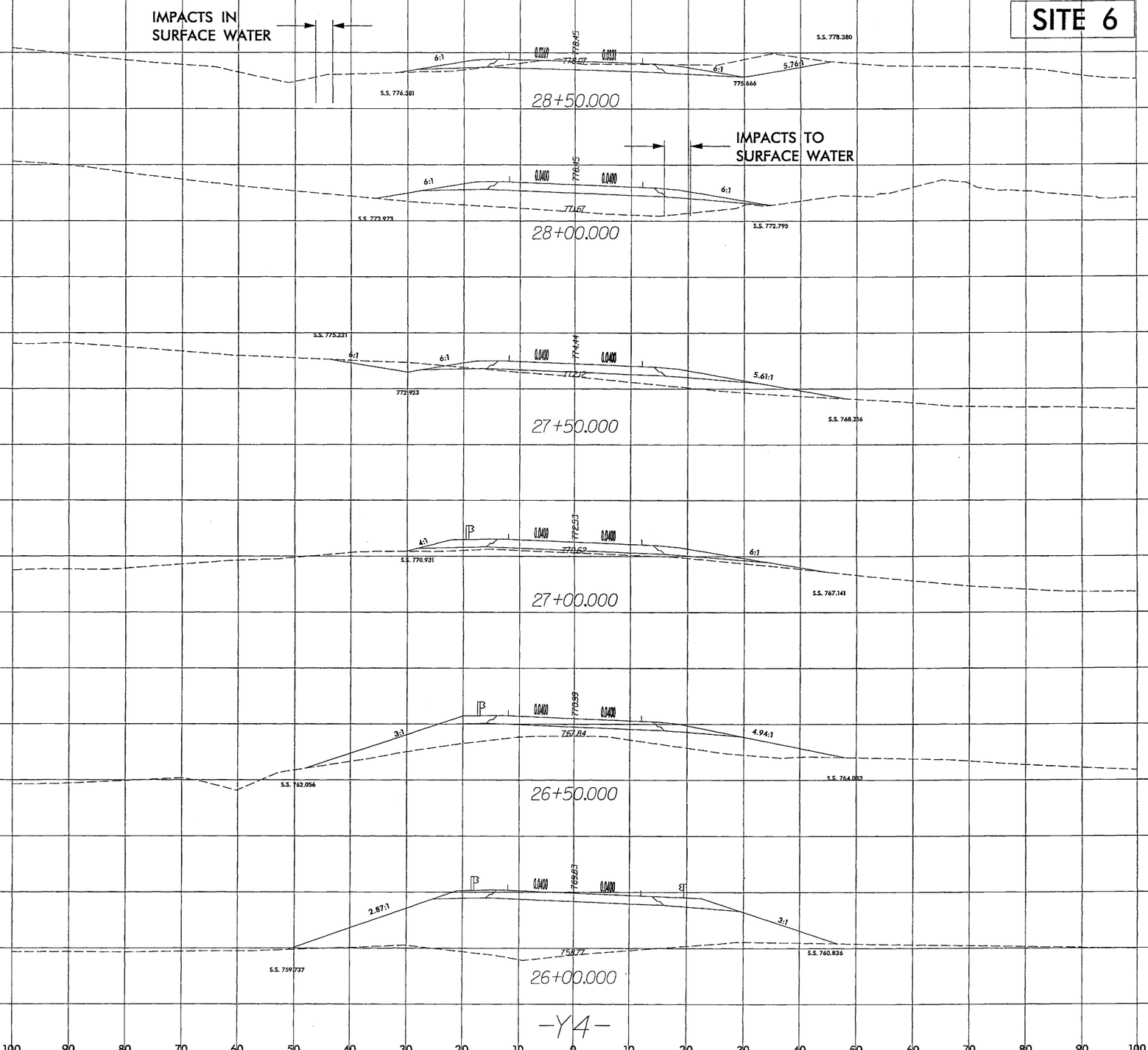
▨ DENOTES IMPACTS IN SURFACE WATER

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO._
DRAINAGE AREA = 15 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 39 CFS
DESIGN HW ELEVATION = 775.75 FT
100 YEAR DISCHARGE = 46 CFS
100 YEAR HW ELEVATION = 776.20 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 81+ CFS
OVERTOPPING ELEVATION = 778.00 FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO._
DRAINAGE AREA = 9.0 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 35 CFS
DESIGN HW ELEVATION = 797.40 FT
100 YEAR DISCHARGE = 38 CFS
100 YEAR HW ELEVATION = 797.55 FT
OVERTOPPING FREQUENCY = 100+ YRS
OVERTOPPING DISCHARGE = 38+ CFS
OVERTOPPING ELEVATION = *798.00 FT

RIGHT DITCH ------------
LEFT DITCH ············

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



8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-3833B	X-46

Permit Drawing
Sheet 20 of 23

SITE 6

8/17/99

REVISIONS

DATE: 01/26/2007 -REVISED TEMPORARY CONSTRUCTION EASEMENT ACROSS PARCEL'S 171 THRU 174 -L- (RT)
DATE: 05/02/2008 -REVISED OWNERS FOR PARCEL'S 171,173,175 AND 177

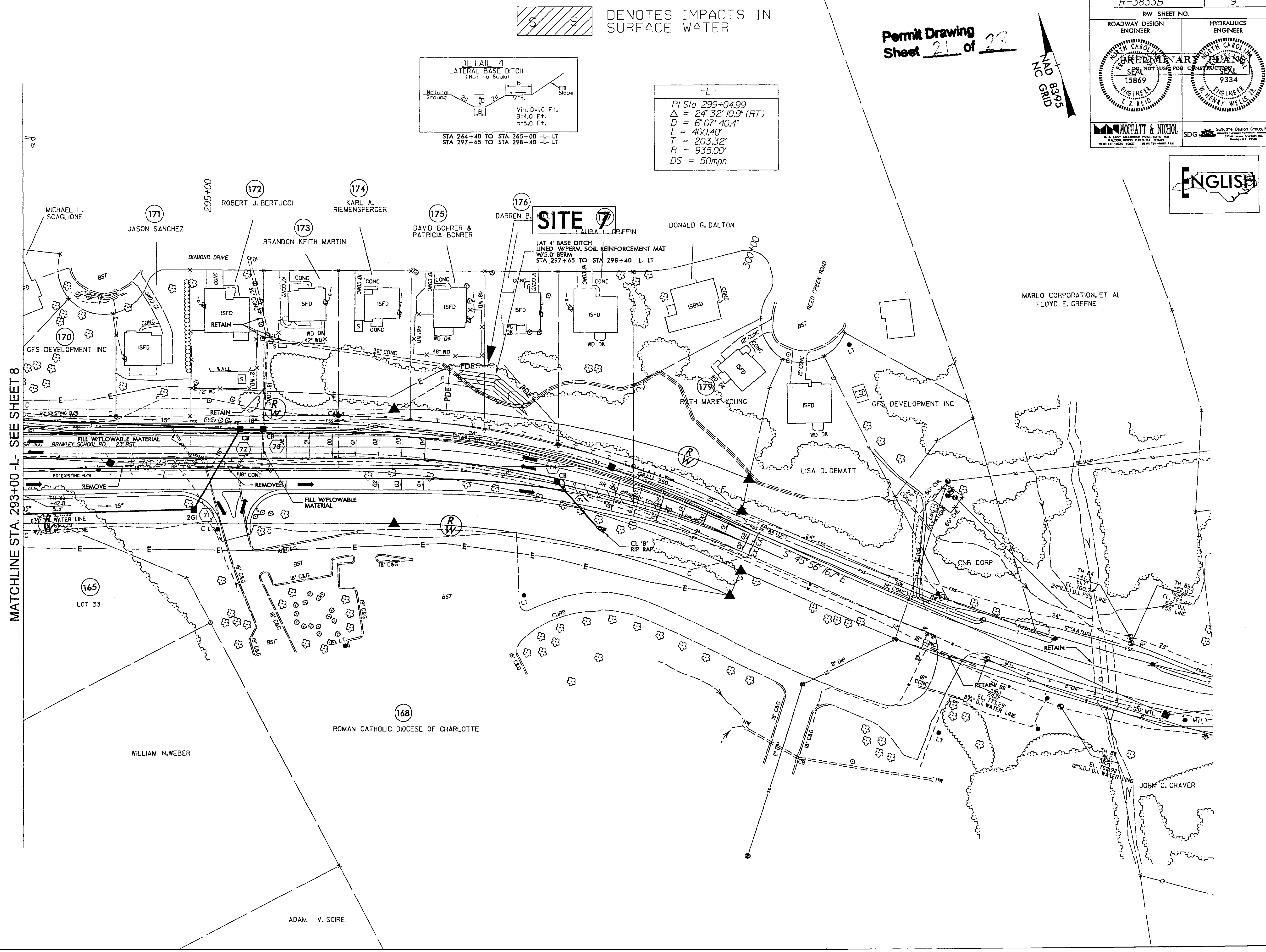
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.

Permit Drawing Sheet 21 of 22



DENOTES IMPACTS IN SURFACE WATER
DETAIL 4
LATERAL BASE DITCH (Not to Scale)
Natural Ground
Fill Slope
Min. D=1.0 Ft. B=4.0 Ft. b=5.0 Ft.
STA 264+40 TO STA 265+00 -L- LT
STA 297+65 TO STA 298+40 -L- LT
-L-
PI Sta 299+04.99
Δ = 24° 32' 10.9" (RT)
D = 6° 07' 40.4"
L = 400.40'
T = 203.32'
R = 935.00'
DS = 50mph
NAD 83/95 NC GRID
ENGLISH
SITE 7
LAT 4' BASE DITCH LINED W/PERM. SOIL REINFORCEMENT MAT W/5.0' BERM STA 297+65 TO STA 298+40 -L- LT
MATCHLINE STA. 293+00 -L- SEE SHEET 8
MICHAEL L. SCAGLIONE
JASON SANCHEZ
ROBERT J. BERTUCCI
BRANDON KEITH MARTIN
KARL A. RIEMENSPERGER
DAVID BOHRER & PATRICIA BONRER
DARREN B. J
LAURA L. GRIFFIN
DONALD G. DALTON
GFS DEVELOPMENT INC
RUTH MARIE YOUNG
LISA D. DEMATT
MARLO CORPORATION, ET AL FLOYD E. GREENE
CNB CORP
LOT 33
ROMAN CATHOLIC DIOCESE OF CHARLOTTE
WILLIAM N.WEBER
ADAM V. SCIRE
JOHN C. CRAVER
DIAMOND DRIVE
REED CREEK ROAD
BRAWLEY SCHOOL RD
FILL W/FLOWABLE MATERIAL
REMOVE
RETAIN
CL 'B' RIP RAP
S 45°56'16.7" E
295+00
300+00

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 15869 T. R. REID	SEAL 9334 W. HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

SDG Sungate Design Group, P.A.
915-A Jones Franklin Rd.
Raleigh, N.C. 27606

ENGLISH

Permit Drawing
Sheet 22 of 22

NAD 83/95
NC GRID

▨ S S DENOTES IMPACTS IN SURFACE WATER

STA 264+40 TO STA 265+00 -L- LT
STA 297+65 TO STA 298+40 -L- LT

-L-
PI Sta 299+04.99
Δ = 24° 32′ 10.9″ (RT)
D = 6° 07′ 40.4″
L = 400.40′
T = 203.32′
R = 935.00′
DS = 50mph

REVISIONS

DATE: 01/26/2007 -REVISED TEMPORARY CONSTRUCTION EASEMENT ACROSS PARCEL'S 171 THRU 174 -L- (RT)
DATE: 05/02/2008 -REVISED OWNERS FOR PARCEL'S 171,173,175 AND 177

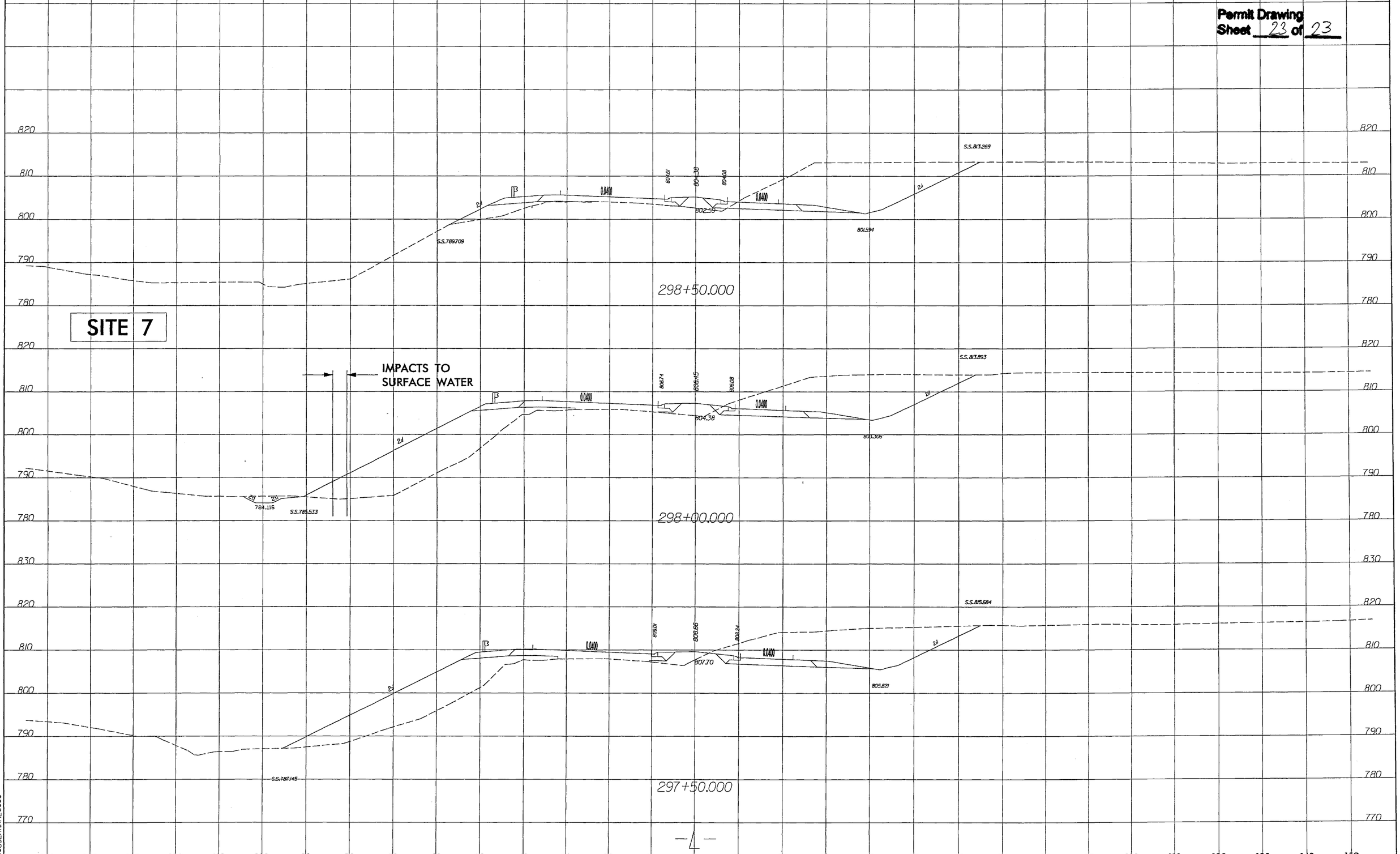
$$$$SYSTIME$$$$
$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

8/23/99

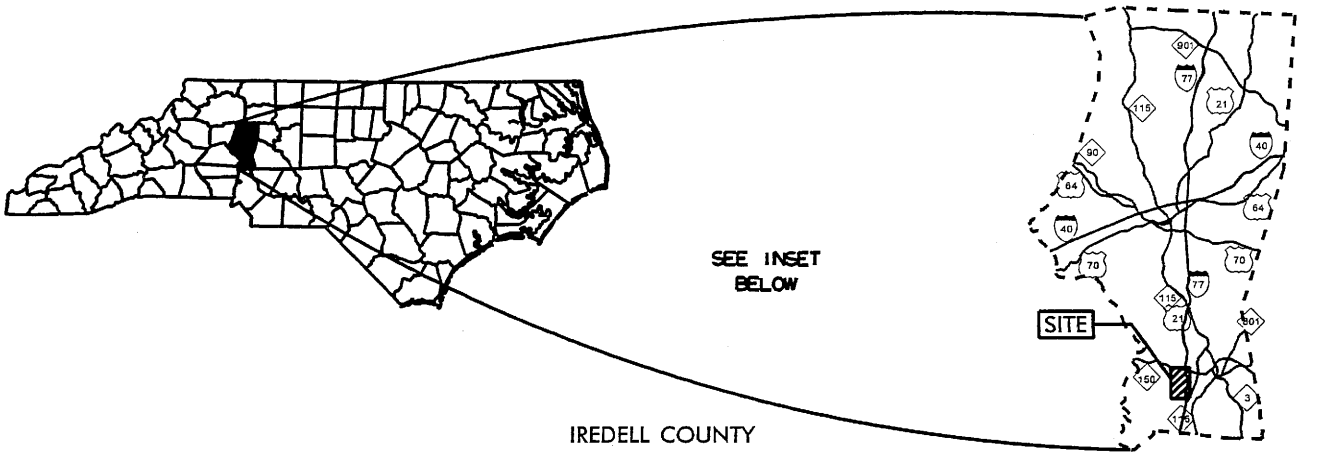
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833B	X-31

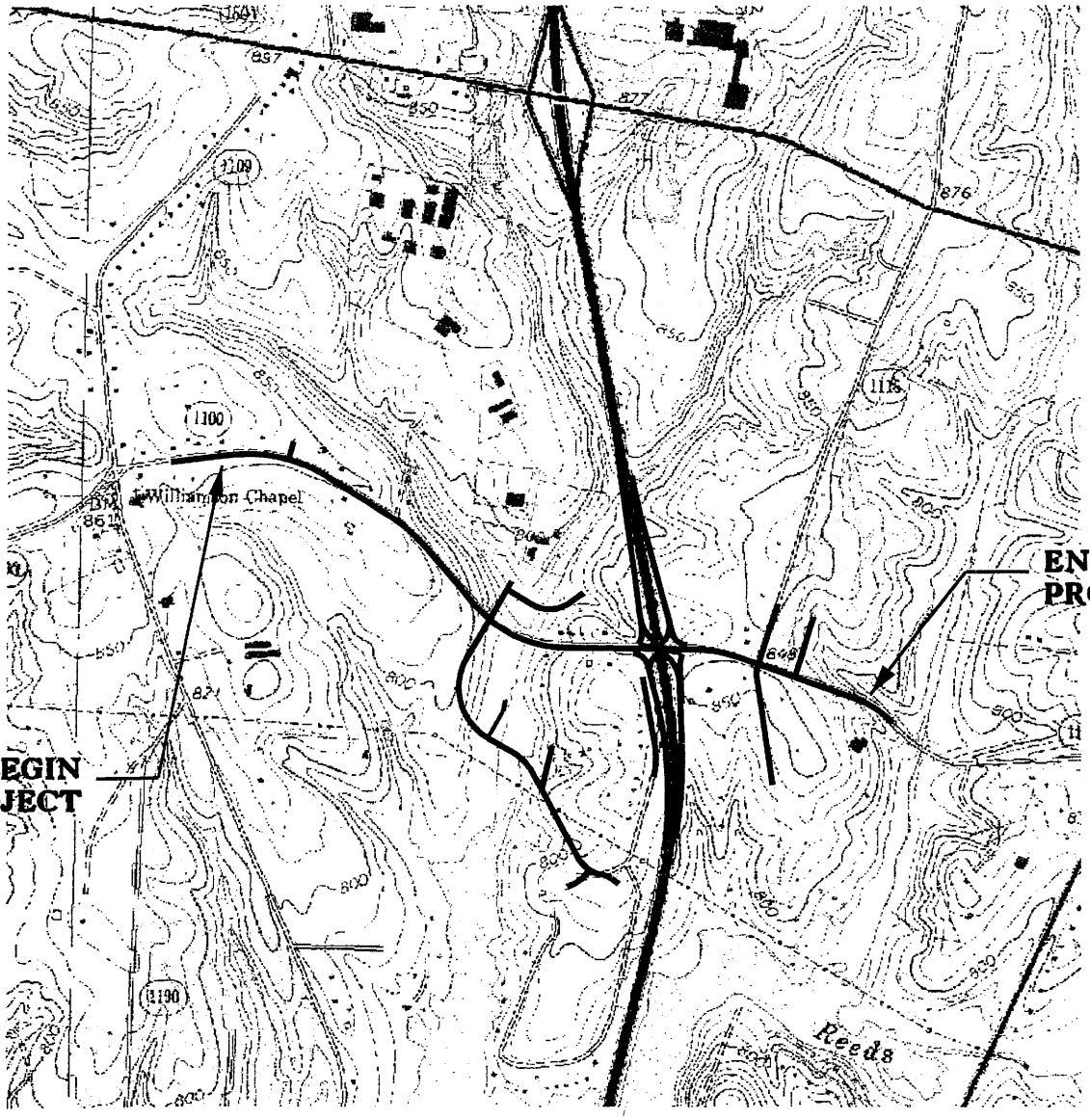
Permit Drawing
Sheet 23 of 23

SITE 7



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





BUFFER IMPACTS
VICINITY MAP

Buffer Drawing
Sheet 1 of 11

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
IREDELL COUNTY

PROJECT: 34554.1.1 (R-3833B)
SR 1100 (BRAWLEY SCHOOL ROAD)
EAST OF SR 1109 (WILLIAMSON
ROAD) TO EAST OF WINGHAVEN COURT

SHEET ___ OF ___ 5/8/08

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	3 @12'x8' RCBC*	265+08 -L-	X						16997	9283	26280		
2	2@40,1@50,2@40' BRIDGE	24+00 -Y4-		X		8137	5451	13588					
TOTAL:						8137	5451	13588	16997	9283	26280		

*SITE #1: 2' SILLS WILL BE INSTALLED IN THE OUTER TWO BARRELS.
THE LENGTH OF IMPACT IS 220'

SITE #2 BUFFERS WILL BE SPANNED.
THE LENGTH OF IMPACT IS 135'

Buffer Drawing Sheet 2 of

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

IREDELL COUNTY
PROJECT: 34554.1.1 (R-3833B)

REV 5/27/2008
SHEET OF

Rev. May 2006

BUFFER IMPACTS SUMMARY

		WETLANDS IN BUFFER	
Site	Station	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	265+08 -L-	0.0	0.0
2	24+00 -Y4-	0.0	0.0
	TOTAL	0.0	0.0

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

IREDELL COUNTY

PROJECT:34554.1.1 (R-3833B)

5/8/2008

Buffer Drawing Sheet 3 of 11

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
154	ROE LTD.	121 ROLLING HILL RD. SUITE 200 MOORESVILLE NC. 28117
153	TOWN OF MOORESVILLE	215 N. MAIN STREET MOORESVILLE NC. 28115
155A	SUNRIDGE TOWNHOMES. LLC	175 DAVIDSON HIGHWAY CONCORD NC. 28027

BUFFER IMPACTS

Buffer Drawing
Sheet 4 of 11

NCDOT

DIVISION OF HIGHWAYS

IREDELL COUNTY

PROJECT: 34554.1.1 (R3833B)
SR 1100 (BRAWLEY SCHOOL ROAD)
EAST OF SR 1109 (WILLIAMSON
ROAD) TO EAST OF WINGHAVEN COURT

SHEET OF 5/30/08

09/08/99

TIP PROJECT: R-3833B

CONTRACT: C202068

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

See Sheet 1-A For Index of Sheets

VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

LOCATION: SR 1100 (BRAWLEY SCHOOL ROAD) FROM EAST OF SR 1109 (WILLIAMSON ROAD) TO EAST OF WINGHAVEN COURT

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING, SIGNALS AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3833B	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34554.1.1	STP-150(11)	P.E.
34554.2.3	STP-1100(20)	R/W, UTL
34554.3.2	STP-1100(20)	CONST.

BUFFER IMPACTS

Buffer Drawing Sheet 5 of 11

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

★ PROPOSED SIGNAL

NCDOT CONTACT: B. DOUG TAYLOR, P.E.

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH THE ACCESS BEING LIMITED TO POINTS SHOWN ON PLANS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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 2009 = 24,880
ADT 2029 = 33,790
DHV = 9 %
D ≐ 60 %
T = 9 % *
V = 50 MPH

* (TTST 3% + DUAL 6%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3833B	=	1.32 MI
LENGTH STRUCTURES TIP PROJECT R-3833B	=	0.03 MI
TOTAL LENGTH OF TIP PROJECT R-3833B	=	1.35 MI

Prepared for NCDOT In the Office of:
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 19, 2006

LETTING DATE:
FEBRUARY 17, 2009

TIM R. REID, P.E.
PROJECT ENGINEER

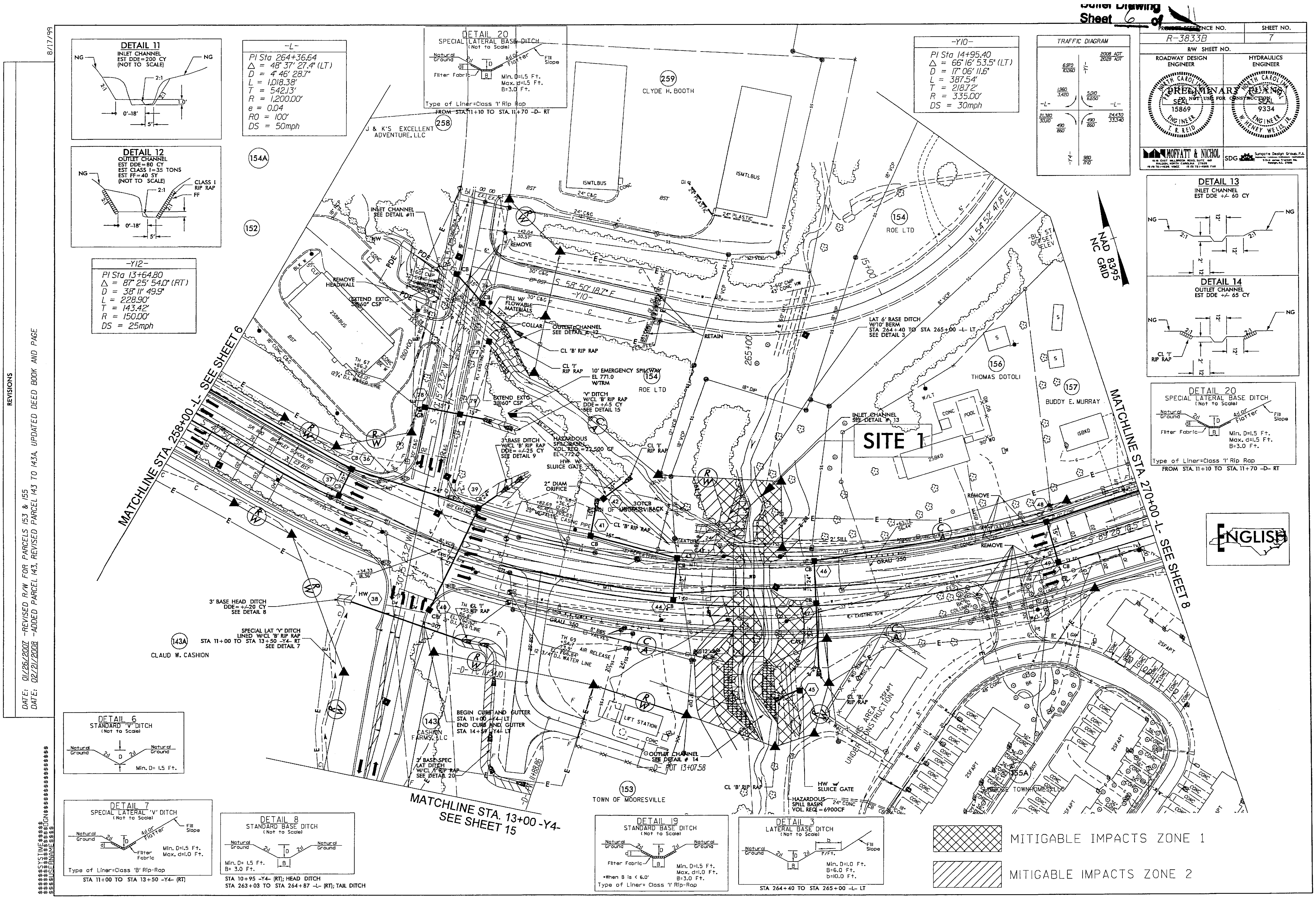
TRENT E. HUFFMAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SDG
Sungate Design Group, P.A.
Engineering - Landscape Architecture - Environmental
915-A Jones Franklin Rd.
Raleigh, N.C. 27606
SEAL 9334 W. HENRY WELLS, JR.
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
SEAL 15869 T. R. REID
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER



Buffer Drawing Sheet 6 of
PROJECT REFERENCE NO. R-3833B
SHEET NO. 7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SEAL 15869
T. R. REID
SEAL 9334
W. HENRY WELLS JR.
MOFFATT & NICHOL
SDG Sungate Design Group, P.A.
TRAFFIC DIAGRAM
REVISIONS
DATE: 01/26/2007 -REVISED R/W FOR PARCELS 153 & 155
DATE: 02/21/2008 -ADDED PARCEL 143, REVISED PARCEL 143 TO 143A UPDATED DEED BOOK AND PAGE
8/17/99
DETAIL 11
INLET CHANNEL
EST DDE=200 CY
(NOT TO SCALE)
DETAIL 12
OUTLET CHANNEL
EST DDE=80 CY
EST CLASS I=35 TONS
EST FF=40 SY
(NOT TO SCALE)
-L-
PI Sta 264+36.64
Δ = 48° 37' 27.4" (LT)
D = 4° 46' 28.7"
L = 1,018.38'
T = 542.13'
R = 1,200.00'
e = 0.04
RO = 100'
DS = 50mph
-Y12-
PI Sta 13+64.80
Δ = 87° 25' 54.0" (RT)
D = 38° 11' 49.9"
L = 228.90'
T = 143.42'
R = 150.00'
DS = 25mph
-Y10-
PI Sta 14+95.40
Δ = 66° 16' 53.5" (LT)
D = 17° 06' 11.6"
L = 387.54'
T = 218.72'
R = 335.00'
DS = 30mph
DETAIL 20
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.
Type of Liner=Class 'I' Rip Rap
FROM STA. 11+10 TO STA. 11+70 -D- RT
DETAIL 13
INLET CHANNEL
EST DDE +/- 60 CY
DETAIL 14
OUTLET CHANNEL
EST DDE +/- 65 CY
NAD 83/95 NC GRID
CLYDE H. BOOTH
J & K'S EXCELLENT ADVENTURE, LLC
ROE LTD
THOMAS DOTOLI
BUDDY E. MURRAY
CLAUD W. CASHION
CASHION FARMS, LLC
TOWN OF MOORESVILLE
SITE 1
MATCHLINE STA. 258+00 -L- SEE SHEET 6
MATCHLINE STA. 270+00 -L- SEE SHEET 8
MATCHLINE STA. 13+00 -Y4- SEE SHEET 15
ENGLISH
10' EMERGENCY SPILLWAY EL 771.0 W/TRM
HAZARDOUS SPILL BASIN VOL. REQ.=22,500 CF EL=772.0
HW W/ SLUICE GATE
LIFT STATION
BEGIN CURB AND GUTTER STA 11+00 -Y4- LT
END CURB AND GUTTER STA 14+55 -Y4- LT
HAZARDOUS SPILL BASIN VOL. REQ.=6900CF
DETAIL 6
STANDARD 'V' DITCH
(Not to Scale)
Min. D= 1.5 Ft.
DETAIL 7
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.0 Ft.
Type of Liner=Class 'B' Rip-Rap
STA 11+00 TO STA 13+50 -Y4- (RT)
DETAIL 8
STANDARD BASE DITCH
(Not to Scale)
Min. D= 1.5 Ft.
B= 3.0 Ft.
STA 10+95 -Y4- (RT); HEAD DITCH
STA 263+03 TO STA 264+87 -L- (RT); TAIL DITCH
DETAIL 19
STANDARD BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.0 Ft.
B=3.0 Ft.
Type of Liner= Class 'I' Rip-Rap
DETAIL 3
LATERAL BASE DITCH
(Not to Scale)
Min. D=1.0 Ft.
B=6.0 Ft.
b=10.0 Ft.
STA 264+40 TO STA 265+00 -L- LT
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2

Other Drawing
Sheet 7 of 11

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	7

R/W SHEET NO.

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 15869 T. R. REID	SEAL 9334 W. HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

SDG Sungate Design Group, P.A.
915-A Jones Franklin Rd.
Raleigh, N.C. 27606

REVISIONS

DATE: 01/26/2007 -REVISED R/W FOR PARCELS 153 & 155
DATE: 02/21/2008 -ADDED PARCEL 143, REVISED PARCEL 143 TO 143A, UPDATED DEED BOOK AND PAGE

8/17/99

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

-L-
PI Sta 264+36.64
Δ = 48° 37' 27.4" (LT)
D = 4° 46' 28.7"
L = 1,018.38'
T = 542.13'
R = 1,200.00'
e = 0.04
RO = 100'
DS = 50mph

-Y10-
PI Sta 14+95.40
Δ = 66° 16' 53.5" (LT)
D = 17° 06' 11.6"
L = 387.54'
T = 218.72'
R = 335.00'
DS = 30mph

-Y12-
PI Sta 13+64.80
Δ = 87° 25' 54.0" (RT)
D = 38° 11' 49.9"
L = 228.90'
T = 143.42'
R = 150.00'
DS = 25mph

▨ MITIGABLE IMPACTS ZONE 1
▨ MITIGABLE IMPACTS ZONE 2

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	16

R/W SHEET NO.

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
T. R. REID SEAL 15860	HENRY WELLS, JR. SEAL 8334

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4865 FAX

SDG Sungate Design Group, P.A.

ENGLISH

REVISIONS

DATE: 1/08/2008 -REVISED PARCEL'S 155A & 155B
DATE: 2/21/2008 -REVISED PARCEL 143 OWNER NAME AND UPDATED DEED BOOK AND PAGE

8/17/99

8/17/99

REVISIONS

DATE: 1/08/2008 -REVISED PARCEL'S 155A & 155B
DATE: 2/21/2008 -REVISED PARCEL 143 OWNER NAME AND UPDATED DEED BOOK AND PAGE

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15860 T. R. REID

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9334 HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

SDG Sungate Design Group, P.A.

▨ ALLOWABLE IMPACTS ZONE 1

▨ ALLOWABLE IMPACTS ZONE 2

Buffer Drawing
Sheet 9 of 11

TRAFFIC DIAGRAM

ENGLISH

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

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	19

ROADWAY DESIGN ENGINEER
SEAL 15889
T. R. REID

HYDRAULICS ENGINEER
SEAL 9334
W. HENRY WELLS, JR.

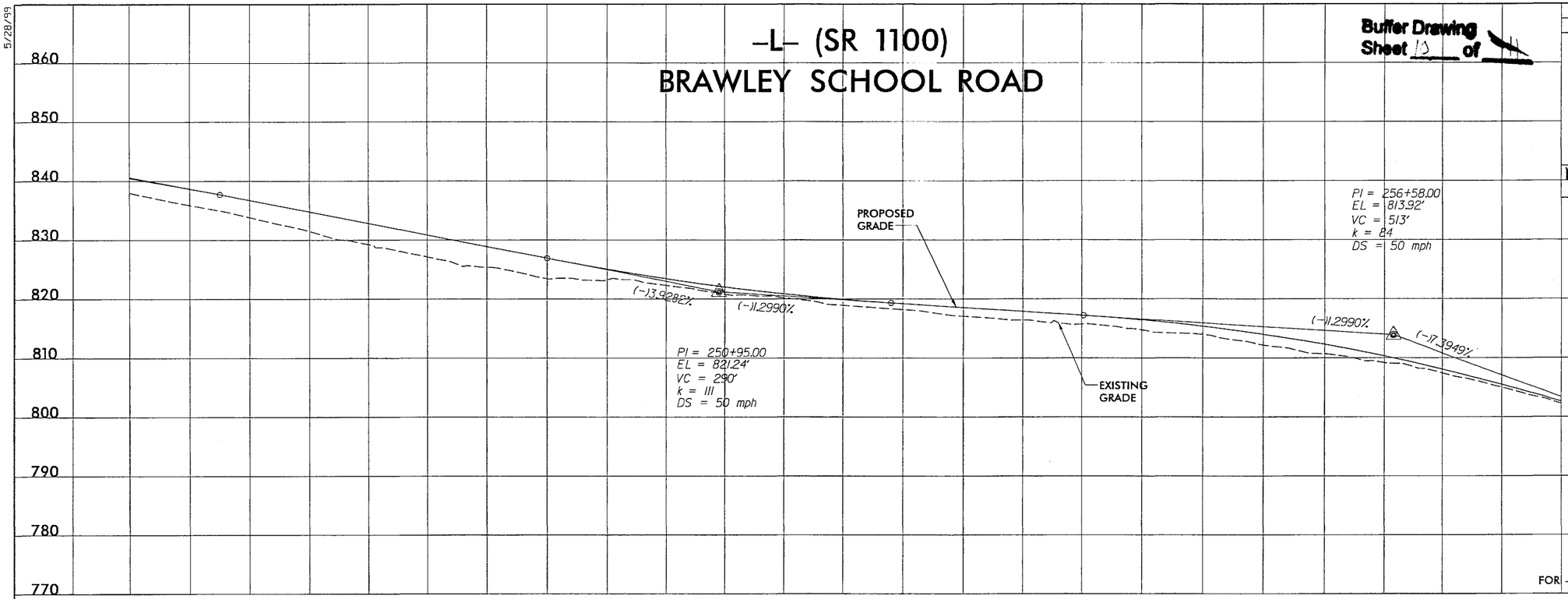
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE | (919) 781-4869 FAX

SDG Sungate Design Group, P.A.

Buffer Drawing
Sheet 13 **of**

-L- (SR 1100)
BRAWLEY SCHOOL ROAD

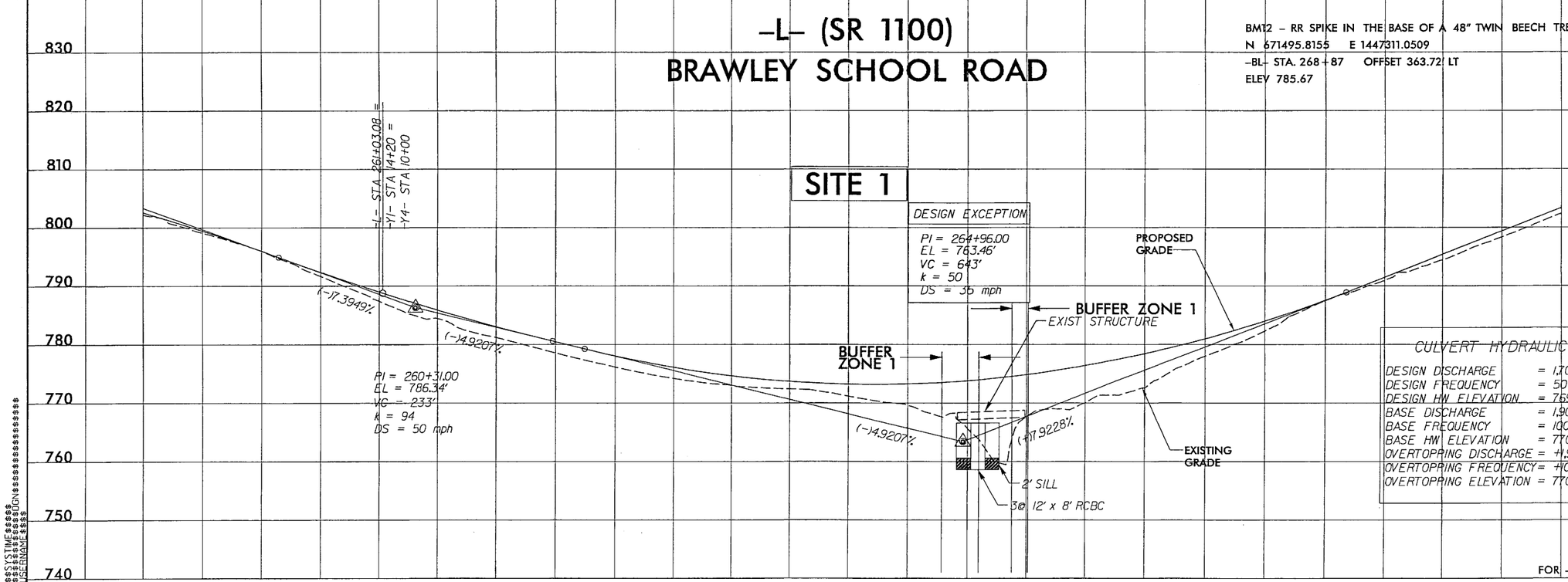


FOR -L- PLAN SEE SHEET 6

-L- (SR 1100)
BRAWLEY SCHOOL ROAD

SITE 1

BM12 - RR SPIKE IN THE BASE OF A 48" TWIN BEECH TREE
N 671495.8155 E 1447311.0509
-BL- STA. 268+87 OFFSET 363.72' LT
ELEV 785.67



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	1,700	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	769.3	FT
BASE DISCHARGE	=	1,900	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	770.1	FT
OVERTOPPING DISCHARGE	=	+1,900	CFS
OVERTOPPING FREQUENCY	=	+100	YRS
OVERTOPPING ELEVATION	=	770.3	FT

FOR -L- PLAN SEE SHEET 7

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

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	27

ROADWAY DESIGN ENGINEER
SEAL 15669 T. R. REID

HYDRAULICS ENGINEER
SEAL 9334 W. HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

SDG Sungate Design Group, P.A.
915-A Jones Franklin Rd.
Raleigh, N.C. 27606

Buffer Drawing Sheet 11 of 11

-Y4-

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	5.3	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	25	CFS
DESIGN HW ELEVATION	=	777.06	FT
100 YEAR DISCHARGE	=	26.4	CFS
100 YEAR HW ELEVATION	=	777.24	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	46+	CFS
OVERTOPPING ELEVATION	=	*782.40	FT

-Y4-

SITE 2

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	=	1600	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	763.3	FT
BASE DISCHARGE	=	2000	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	763.8	FT
OVERTOPPING DISCHARGE	=	2400	CFS
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING ELEVATION	=	764.64	FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	15	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	39	CFS
DESIGN HW ELEVATION	=	775.75	FT
100 YEAR DISCHARGE	=	46	CFS
100 YEAR HW ELEVATION	=	776.20	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	81+	CFS
OVERTOPPING ELEVATION	=	778.00	FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	9.0	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	35	CFS
DESIGN HW ELEVATION	=	797.40	FT
100 YEAR DISCHARGE	=	38	CFS
100 YEAR HW ELEVATION	=	797.55	FT
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING DISCHARGE	=	38+	CFS
OVERTOPPING ELEVATION	=	*798.00	FT

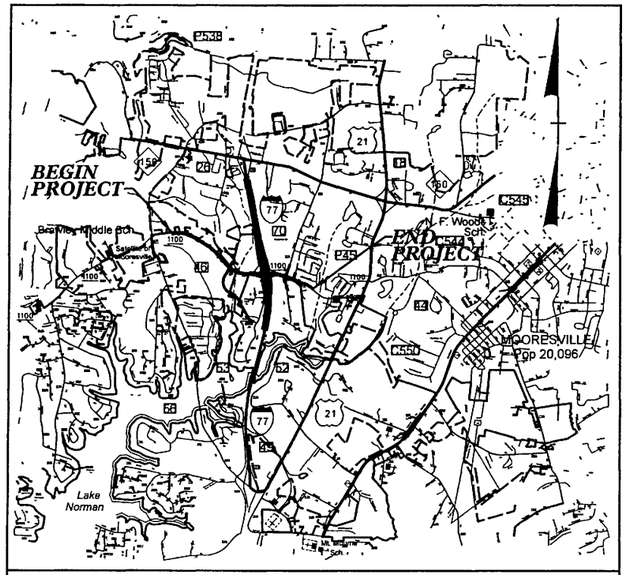
$$$$$$SYSTIME$$$$
$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

09/08/99

TIP PROJECT: R-3833B

CONTRACT: C202068

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

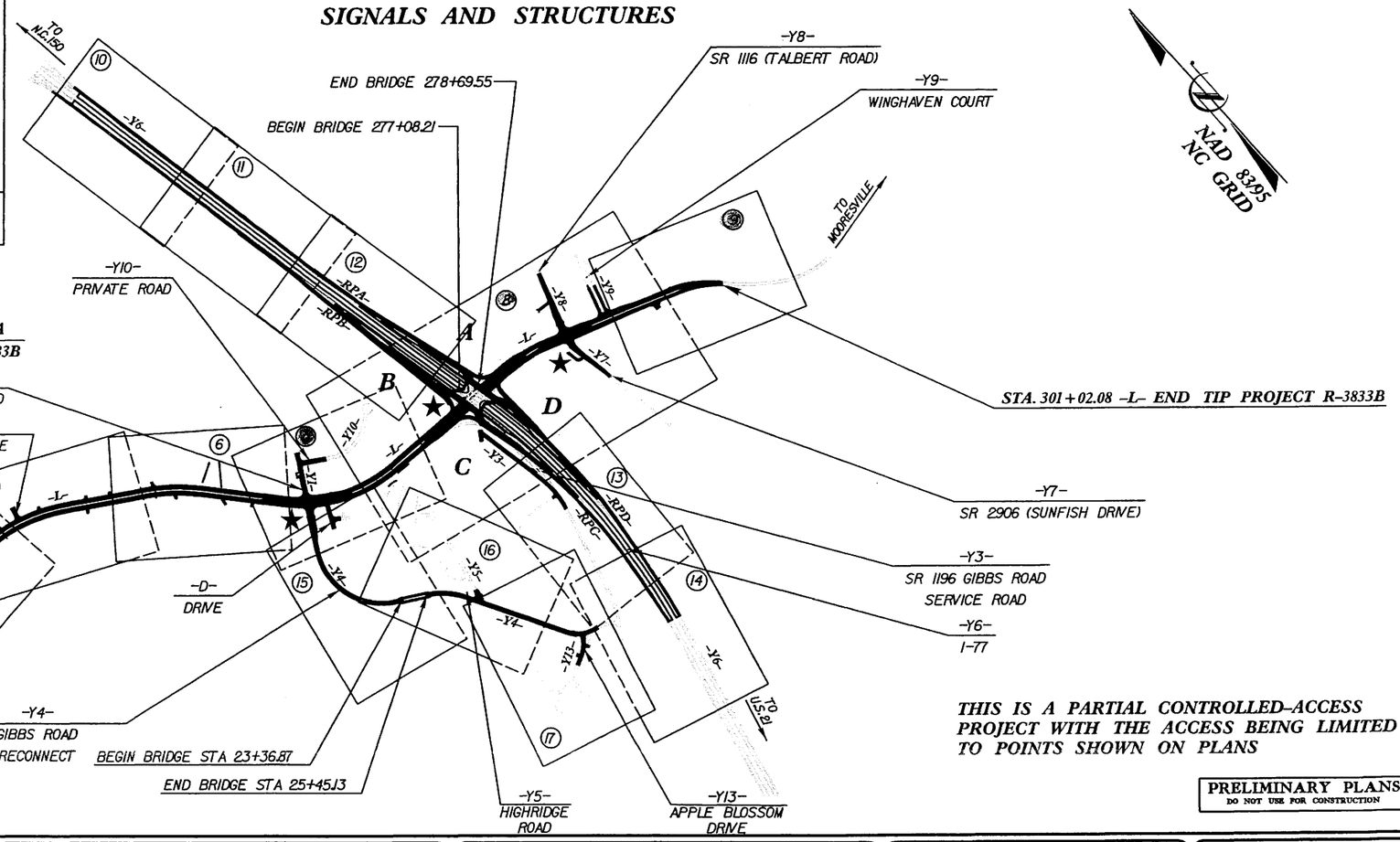
IREDELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3833B	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34554.1.1	STP-150(11)	P.E.
34554.2.3	STP-1100(20)	R/W, UTL
34554.3.2	STP-1100(20)	CONST.

LOCATION: ***SR 1100 (BRAWLEY SCHOOL ROAD) FROM EAST OF SR 1109 (WILLIAMSON ROAD) TO EAST OF WINGHAVEN COURT***

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING, SIGNALS AND STRUCTURES



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

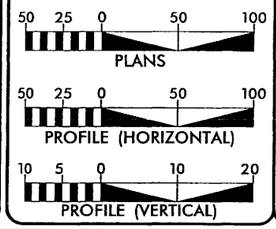
★ PROPOSED SIGNAL

NCDOT CONTACT: B. DOUG TAYLOR, P.E.

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH THE ACCESS BEING LIMITED TO POINTS SHOWN ON PLANS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES



DESIGN DATA

ADT 2009	=	24,880
ADT 2029	=	33,790
DHV	=	9 %
D	=	60 %
T	=	9 % *
V	=	50 MPH

* (TTST 3% + DUAL 6%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3833B	=	*1.32 MI*
LENGTH STRUCTURES TIP PROJECT R-3833B	=	*0.03 MI*
TOTAL LENGTH OF TIP PROJECT R-3833B	=	*1.35 MI*

Prepared for NCDOT In the Office of:
MOFFATT & NICHOL
16 16 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MAY 19, 2006

LETTING DATE: FEBRUARY 17, 2009

TIM R. REID, P.E.
PROJECT ENGINEER

TRENT E. HUFFMAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SDG
Sungate Design Group, P.A.
Engineering - Landscape Architecture - Environmental
915-A Jones Franklin Rd.
Raleigh, N.C. 27606

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS IV

P.E.

SIGNATURE:

ROADWAY DESIGN ENGINEER

MOFFATT & NICHOL
16 16 EAST MILLBROOK ROAD, SUITE 160
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(919) 781-4626 VOICE (919) 781-4869 FAX

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. E. REID

P.E.

SIGNATURE:

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · ROLLA

P.E.

STATE HIGHWAY DESIGN ENGINEER

5/6/2008
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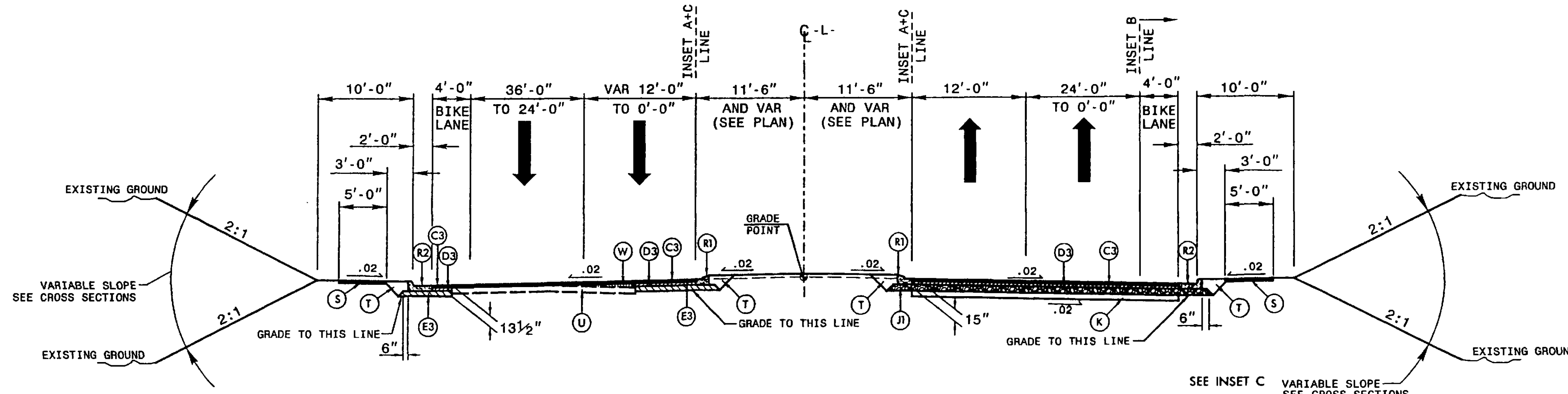
thuffman

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

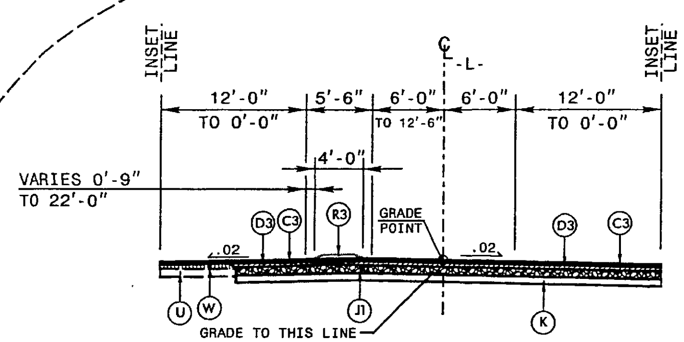
SEAL 15869 ENGINEER T. R. REID

MOFFATT & NICHOL



TYPICAL No. 1 (SEE INSETS A, B & C)

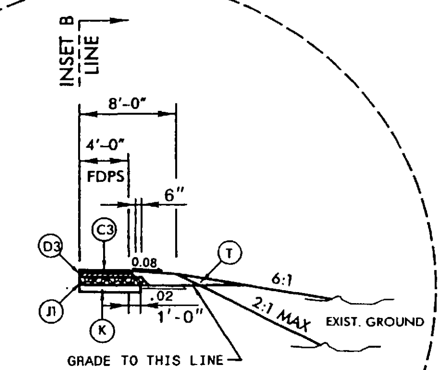
(-L-) STA 229+50.00 TO STA 277+08.21 (BEGIN BRIDGE)
(-L-) STA 278+69.55 (END BRIDGE) TO (-L-) STA 296+86.50



USE INSET 'A' IN CONJUNCTION WITH TYPICAL No. 1

(-L-) STA 273+65.00 TO STA 276+15.00
(-L-) STA 276+15.00 TO STA 277+08.21 (BEGIN BRIDGE) (W/O R3)
(-L-) STA 278+69.55 (END BRIDGE) TO STA 279+95.00 (W/O R3)
* (-L-) STA 279+95.00 TO STA 281+95.00
* REVERSE INSET AT THIS LOCATION

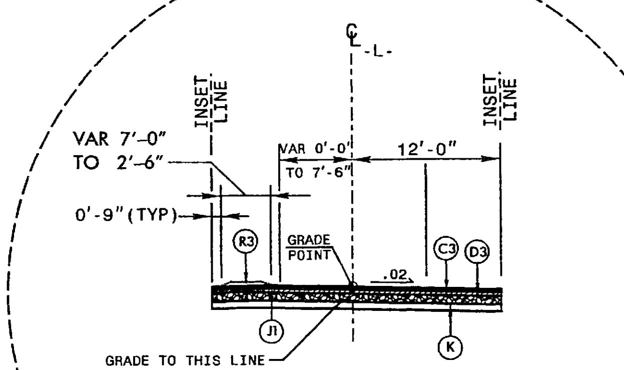
-L-
INSET 'A'



USE INSET 'B' IN CONJUNCTION WITH TYPICAL No. 1

(-L-) STA 287+35.80 TO STA 296+86.50

-L-
INSET 'B'



USE INSET 'C' IN CONJUNCTION WITH TYPICAL No. 1

(-L-) STA 260+00.00 TO STA 260+50.00
* (-L-) STA 260+50.00 TO STA 261+60.00
**(-L-) STA 261+60.00 TO STA 262+10.00
(-L-) STA 286+40.60 TO STA 286+90.60
* (-L-) STA 286+90.60 TO STA 287+80.23
**(-L-) STA 287+80.23 TO STA 288+31.70
* WITHOUT 'R3' AT THIS LOCATION (SEE PLANS)
** REVERSE INSET AT THIS LOCATION

-L-
INSET 'C'

PAVEMENT SCHEDULE

CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	DESCRIPTION
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	E2	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	R2	2'-6" CONCRETE CURB AND GUTTER.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E3	PROP. APPROX. 6.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 370.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS	R3	5" MONOLITHIC CONCRETE ISLAND
C3	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E4	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0X, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.	R4	SHOULDER BERM GUTTER
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5X, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.	J1	PROP. 8" AGGREGATE BASE COURSE.	S	4" SIDEWALK
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	J2	PROP. VAR. DEPTH AGGREGATE BASE COURSE.	T	EARTH MATERIAL
D2	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	K	BASE TO BE TREATED WITH LIME TO A DEPTH OF 8", AT A RATE OF 20 LBS. PER SQ. YD. AS DIRECTED BY THE ENGINEER OR BASE TO BE TREATED WITH CEMENT TO A DEPTH OF 7", AT A RATE OF 55 LBS. PER SQ. YD. AS DIRECTED BY THE ENGINEER	U	EXISTING PAVEMENT
D3	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.			W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET 2-D)
D4	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0X, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2¼" IN DEPTH OR GREATER THAN 4" IN DEPTH.	P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.	Z	MILLING (SEE MILLING DETAIL, SHEET 2-D)
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R1	1'-6" CONCRETE CURB AND GUTTER.		

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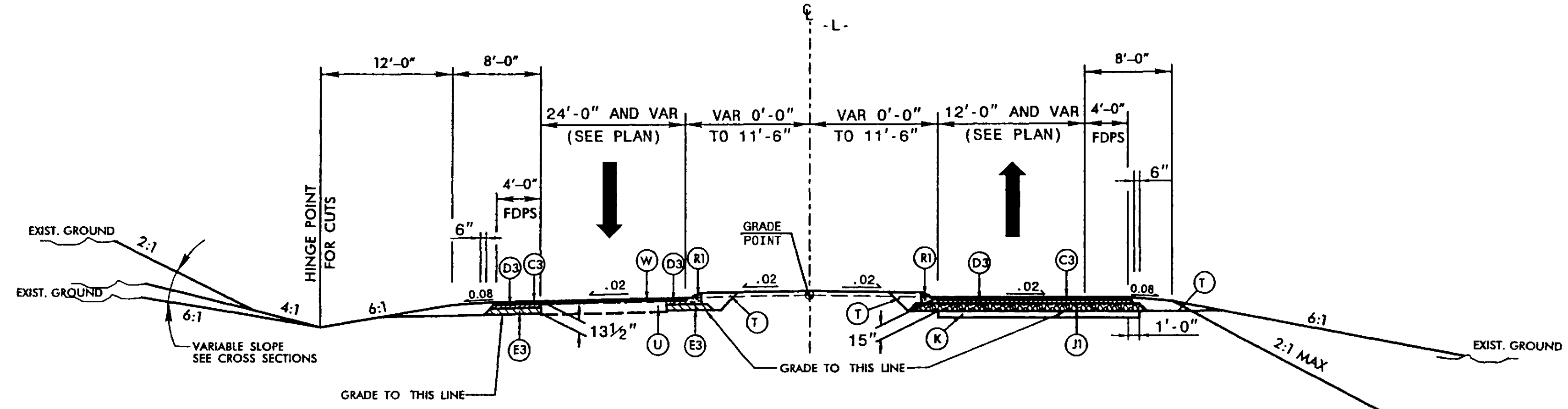
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

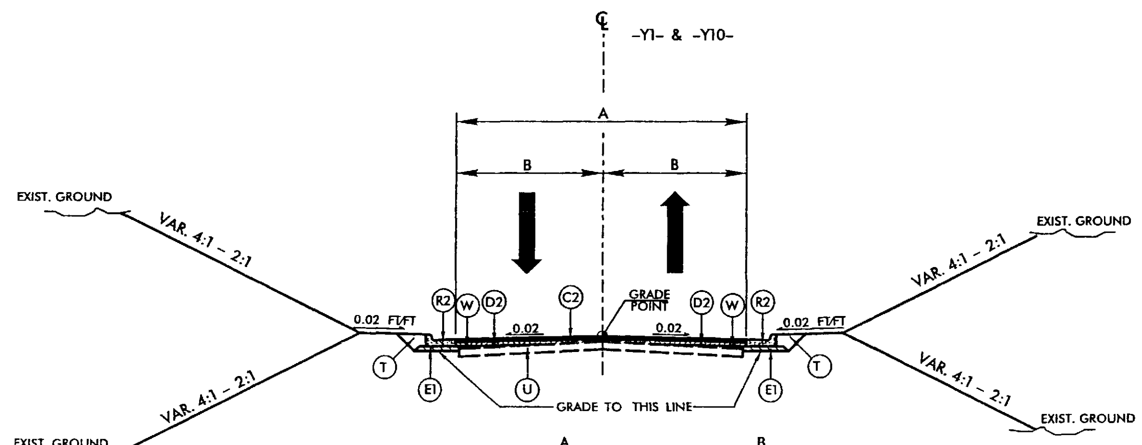
NORTH CAROLINA SEAL 15869 ENGINEER T. R. REID

MOFFATT & NICHOL



TYPICAL No. 2

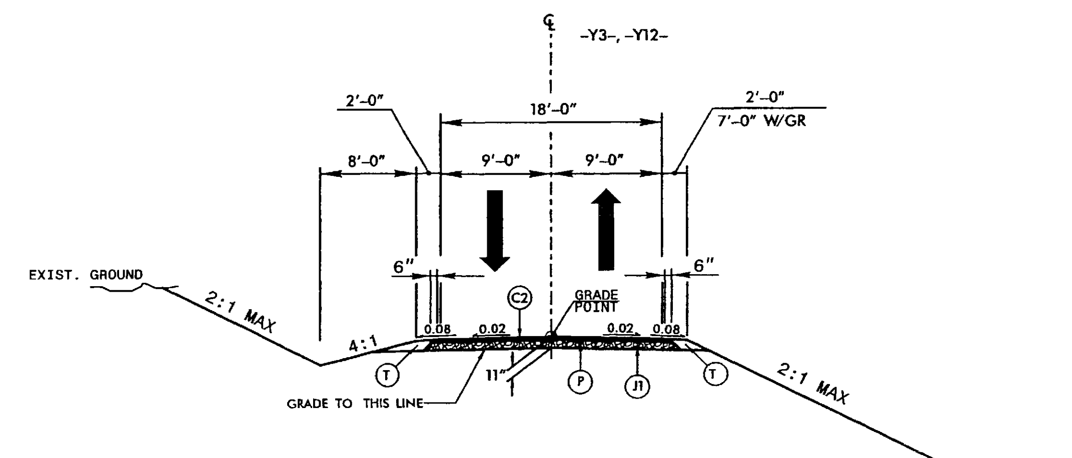
(-L-) STA 296+86.50 TO STA 301+02.08



	A	B
-Y1-	VAR. 24'-0" TO 36'-0"	VAR. 11'-2" TO 19'-0"
-Y10-	VAR. 27'-0" TO 30'-0"	VAR. 13'-6" TO 15'-0"

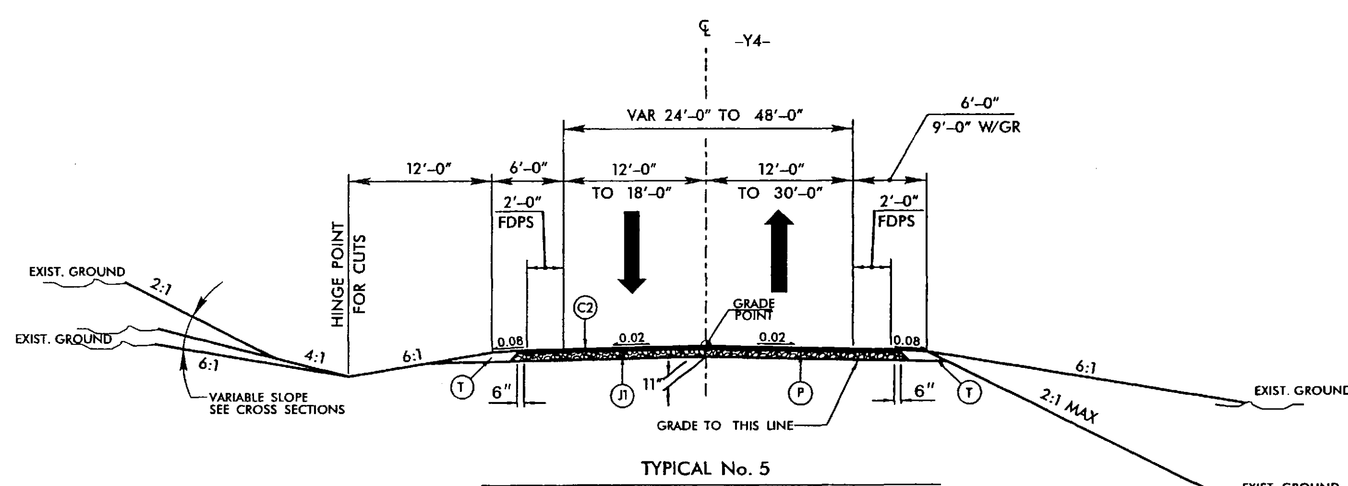
TYPICAL No. 3

(-Y1-) STA 10+00.00 TO STA 13+84.05
(-Y10-) STA 10+16.06 TO STA 12+25.00



TYPICAL No. 4

(-Y3-) STA 14+48.91 TO STA 24+09.03
(-Y12-) STA 11+30.00 TO STA 14+80.69



TYPICAL No. 5

(-Y4-) STA 10+35.92 TO STA 23+36.87 (BEGIN BRIDGE)
(-Y4-) STA 25+45.13 (END BRIDGE) TO STA 38+35.07 LT, STA 38+53.42 RT

PAVEMENT SCHEDULE

CODE	DESCRIPTION
C1	1.5" S9.5C
C2	3" S9.5B
C3	3" S9.5C
C4	VARIABLE DEPTH S9.5X
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
D4	VARIABLE DEPTH I19.0X
E1	4" B25.0B
E2	3" B25.0C
E3	6.5" B25.0C
E4	VARIABLE DEPTH B25.0X
J1	8" ABC
J2	VARIABLE DEPTH ABC
K	8" LIME SUBBASE OR 7" CEMENT SUBBASE
P	PRIME COAT
R1	1'-6" CURB & GUTTER
R2	2'-6" CURB & GUTTER
R3	5" MONOLITHIC ISLAND
R4	SHLDR BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Z	MILLING

6/2/99

5/6/2008
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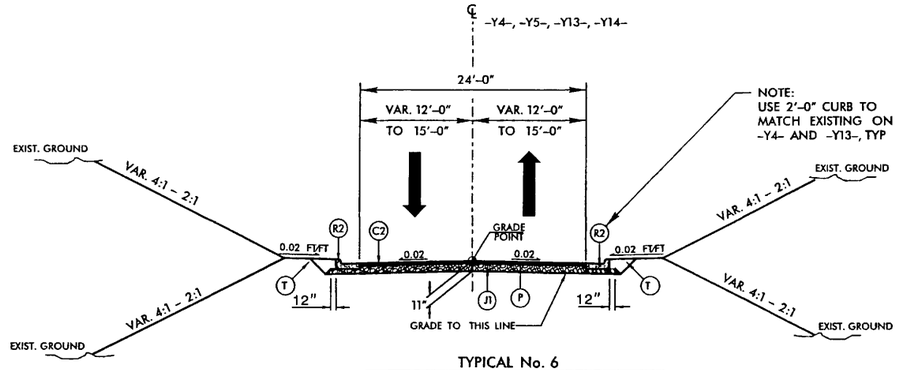
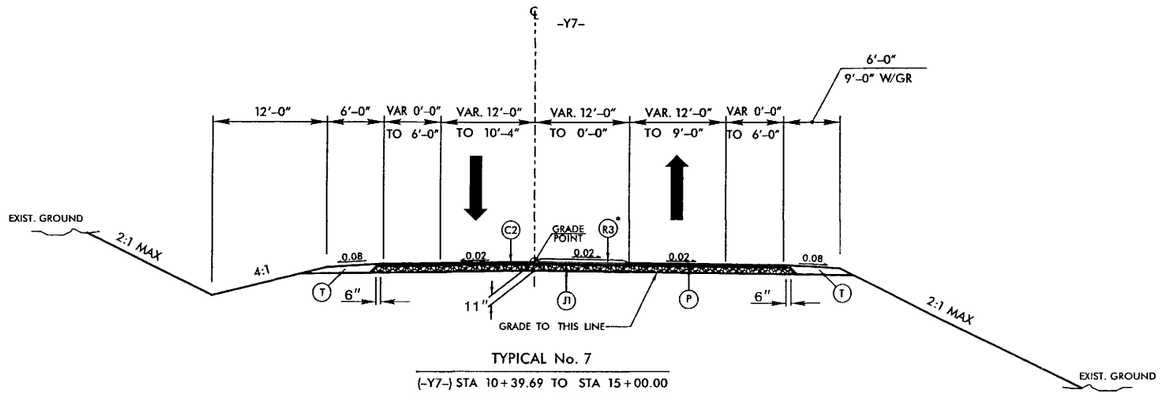
thuffman



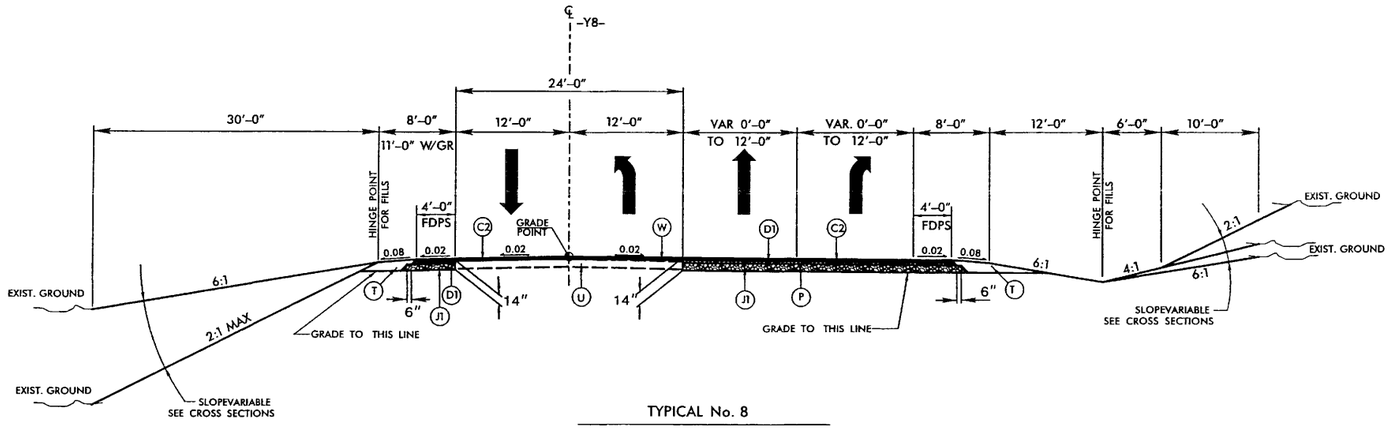
TYPICAL No. 6

(-Y4-) STA. 38+35.07 LT, STA 38+53.42 RT TO STA 40+43.88 (SEE NOTE)
(-Y5-) STA 11+20.00 TO STA 13+86.45
(-Y13-) STA. 10+12.00 TO STA 12+68.60 (SEE NOTE)
(-Y14-) STA. 10+35.00 TO STA 11+37.69



TYPICAL No. 7

(-Y7-) STA 10+39.69 TO STA 15+00.00
* SEE SHEET 2-K FOR ISLAND LOCATION



TYPICAL No. 8

(-Y8-) STA 10+25.00 TO STA 15+59.28

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	2-B

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

PAVEMENT SCHEDULE

CODE	DESCRIPTION
C1	1.5" S9.5C
C2	3" S9.5B
C3	3" S9.5C
C4	VARIABLE DEPTH S9.5X
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
D4	VARIABLE DEPTH I19.0X
E1	4" B25.0B
E2	3" B25.0C
E3	6.5" B25.0C
E4	VARIABLE DEPTH B25.0X
J1	8" ABC
J2	VARIABLE DEPTH ABC
K	8" LIME SUBBASE OR 7" CEMENT SUBBASE
P	PRIME COAT
R1	1'-6" CURB & GUTTER
R2	2'-6" CURB & GUTTER
R3	5" MONOLITHIC ISLAND
R4	SHLDR BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Z	MILLING

6/2/9

5/6/2008
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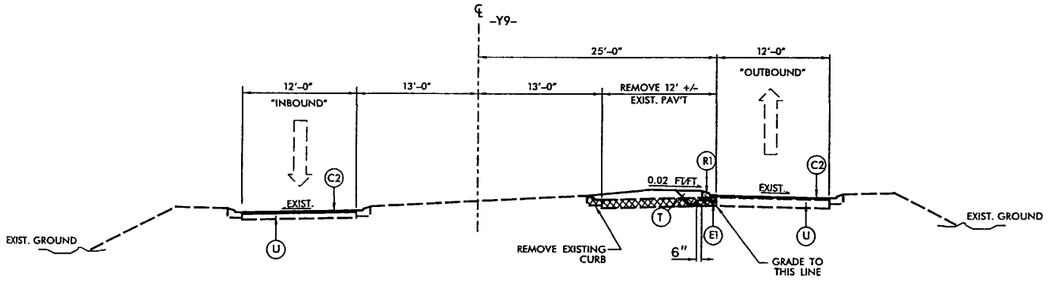
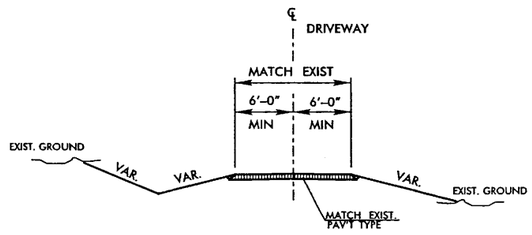
phillman



TYPICAL No. 9

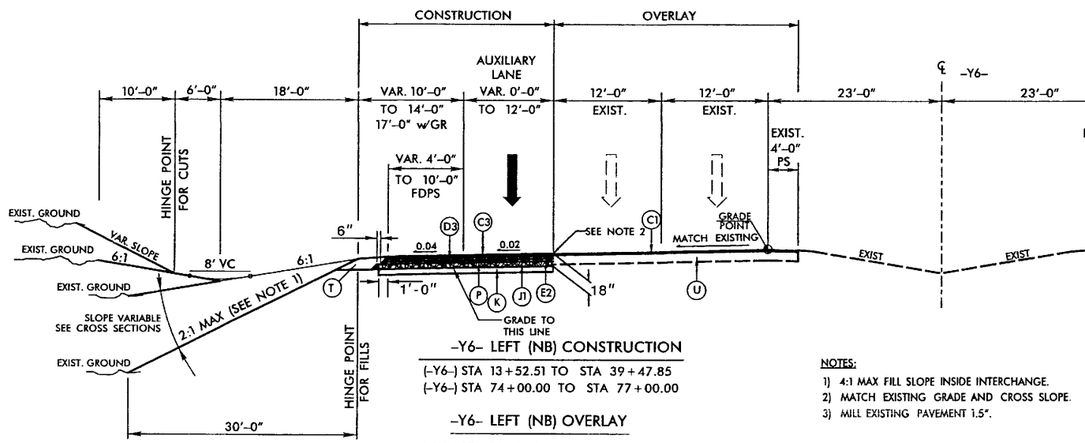
(-Y9-) STA 13+00.00 TO STA 15+58.28



PROPOSED DRIVEWAY TYPICAL

(-Y7-) PARCEL No. 163 SHEET 8

(-Y8-) PARCEL No. 162 SHEET 8



-Y6- LEFT (NB) CONSTRUCTION

(-Y6-) STA 13+52.51 TO STA 39+47.85

(-Y6-) STA 74+00.00 TO STA 77+00.00

-Y6- LEFT (NB) OVERLAY

(-Y6-) STA 14+00.00 TO STA 81+30.00

NOTES:

1) 4:1 MAX FILL SLOPE INSIDE INTERCHANGE.
2) MATCH EXISTING GRADE AND CROSS SLOPE.
3) MILL EXISTING PAVEMENT 1.5".

TYPICAL No. 10

(-Y6-) STA 12+29.06 TO STA 81+30.00 (AS NOTED)

-Y6- RIGHT (SB) CONSTRUCTION

(-Y6-) STA 12+29.06 TO STA 37+02.34

(-Y6-) STA 75+23.31 TO STA 81+30.00

-Y6- RIGHT (SB) OVERLAY

(-Y6-) STA 14+00.00 TO STA 81+30.00

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	2-C

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA SEAL 15869 ENGINEER T. R. REID

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

PAVEMENT SCHEDULE

CODE	DESCRIPTION
C1	1.5" S9.5C
C2	3" S9.5B
C3	3" S9.5C
C4	VARIABLE DEPTH S9.5X
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
D4	VARIABLE DEPTH I19.0X
E1	4" B25.0B
E2	3" B25.0C
E3	6.5" B25.0C
E4	VARIABLE DEPTH B25.0X
J1	8" ABC
J2	VARIABLE DEPTH ABC
K	8" LIME SUBBASE OR 7" CEMENT SUBBASE
P	PRIME COAT
R1	1'-6" CURB & GUTTER
R2	2'-6" CURB & GUTTER
R3	5" MONOLITHIC ISLAND
R4	SHLDR BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Z	MILLING

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thurman

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	2-D

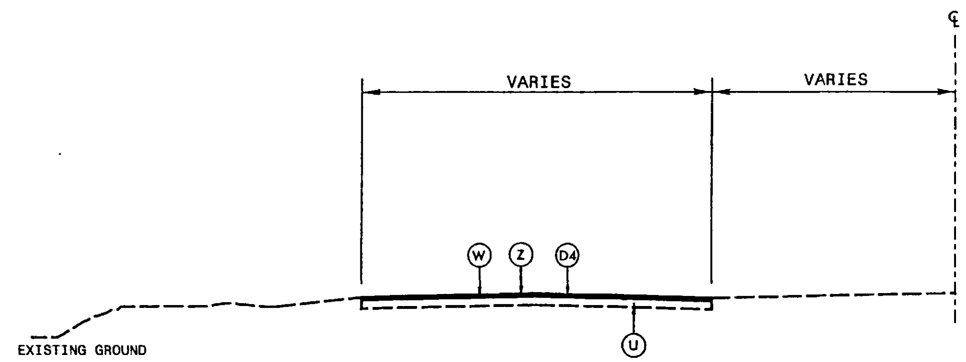
ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

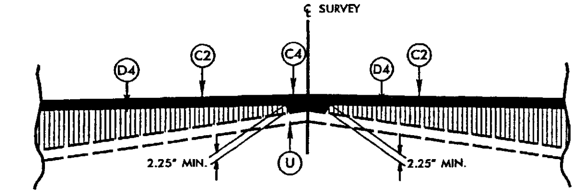
NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

MOFFATT & NICHOL

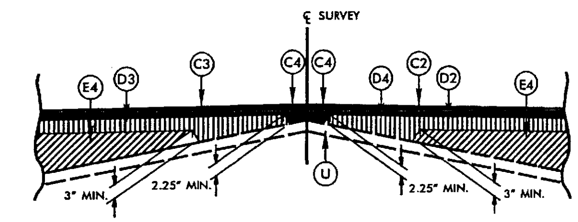


DETAIL FOR MILLING EXISTING PAVEMENT

MILL EXISTING PAVEMENT 2.5" AND REPLACE WITH I19.5C AT THE FOLLOWING LOCATIONS:
-L- STA 229+50.00 TO STA 301+02.08 LT (EXISTING)

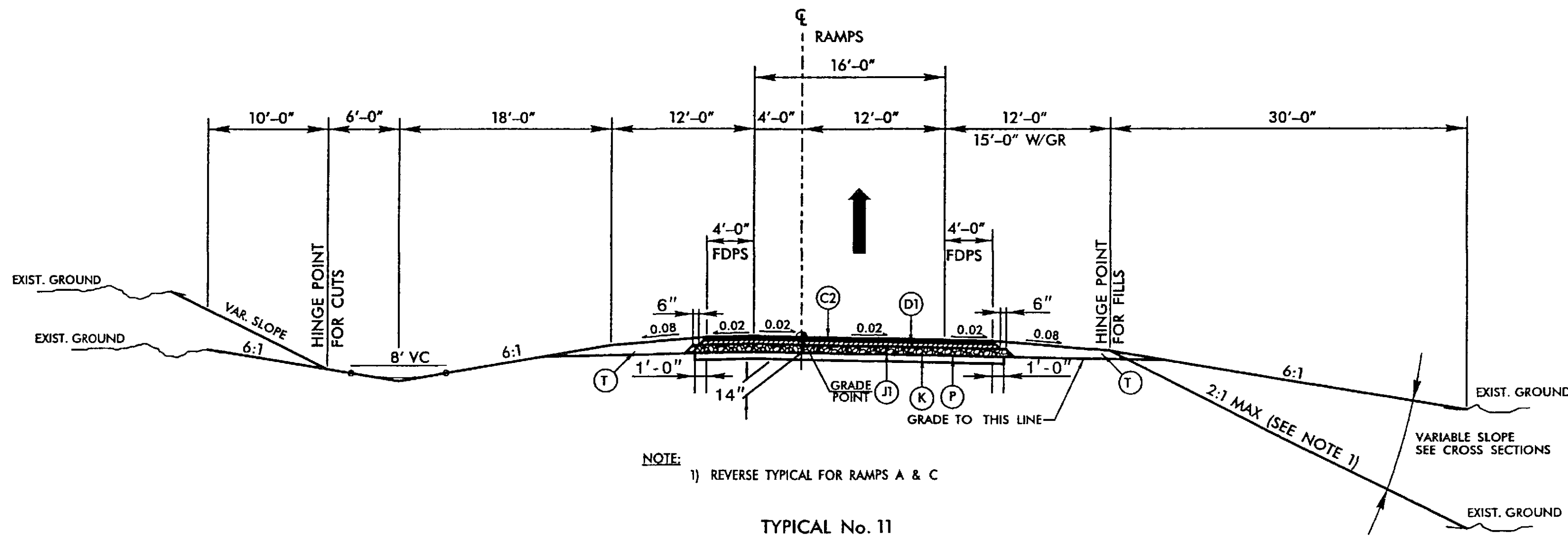


Detail Showing Method of Wedging For -Y8-



*Detail Showing Method of Wedging For -L-, -Y1- and -Y10-

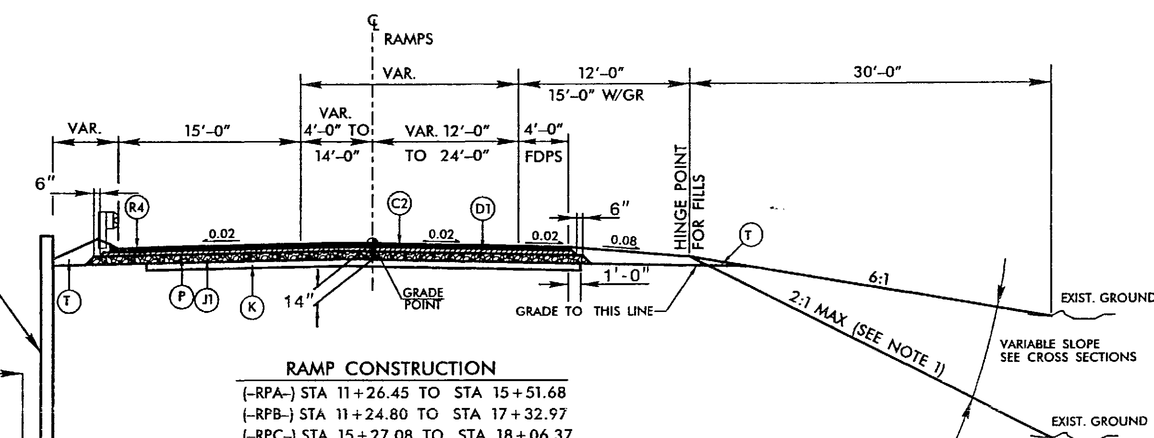
*NOTE: ITEMS USED ON -L- LEFT OF ℄
ITEMS USED ON -Y1-, AND -Y10- RIGHT OF ℄



NOTE:
1) REVERSE TYPICAL FOR RAMPS A & C

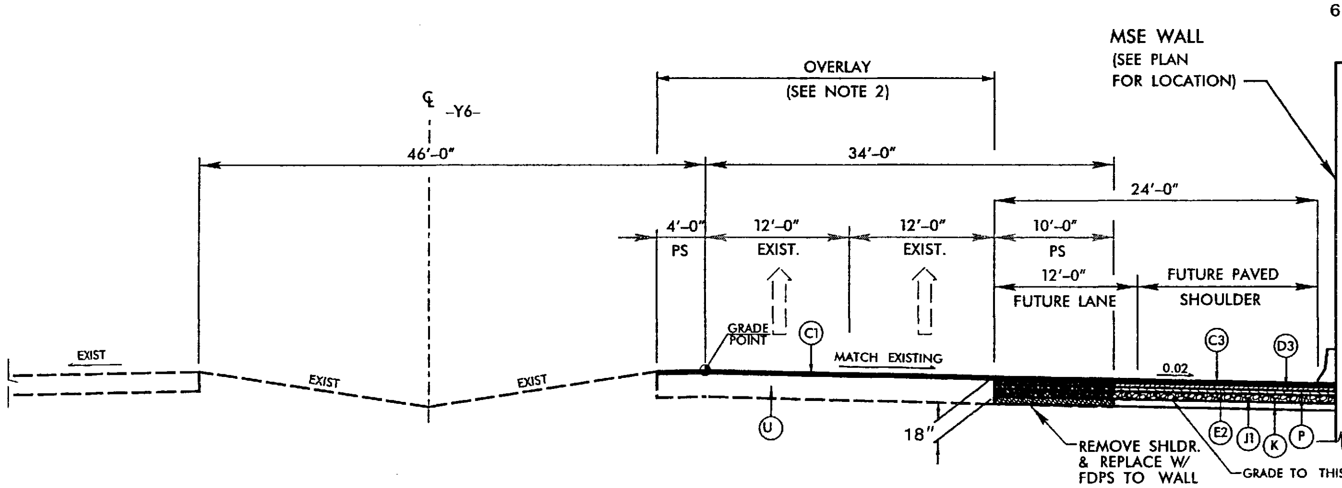
TYPICAL No. 11

(-RPA-) STA 0+00.00 TO STA 11+26.45
(-RPB-) STA 0+00.00 TO STA 11+24.80
(-RPC-) STA 0+00.00 TO STA 15+27.08
(-RPD-) STA 0+00.00 TO STA 10+63.15
(-RPA1-) STA 13+53.86 TO STA 17+35.36
(-RPB1-) STA 14+93.92 TO STA 18+50.58
(-RPC1-) STA 16+12.80 TO STA 19+58.80
(-RPD1-) STA 12+70.00 TO STA 17+48.62



RAMP CONSTRUCTION

(-RPA-) STA 11+26.45 TO STA 15+51.68
(-RPB-) STA 11+24.80 TO STA 17+32.97
(-RPC-) STA 15+27.08 TO STA 18+06.37
(-RPD-) STA 10+63.15 TO STA 16+59.31



SHOULDER CONSTRUCTION

-Y6- STA 50+75.00 TO STA 63+50.00 (LT)
-Y6- STA 48+25.00 TO STA 59+75.00 (RT)

TYPICAL No. 12

RAMPS (SEE PLANS)

NOTES:
1) MIRROR IMAGE FOR RAMPS A & C
2) SEE TYPICAL NO. 10 FOR -Y6- OVERLAY DETAILS.

PAVEMENT SCHEDULE

CODE	DESCRIPTION
C1	1.5" S9.5C
C2	3" S9.5B
C3	3" S9.5C
C4	VARIABLE DEPTH S9.5X
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
D4	VARIABLE DEPTH I19.0X
E1	4" B25.0B
E2	3" B25.0C
E3	6.5" B25.0C
E4	VARIABLE DEPTH B25.0X
J1	8" ABC
J2	VARIABLE DEPTH ABC
K	8" LIME SUBBASE OR 7" CEMENT SUBBASE
P	PRIME COAT
R1	1'-6" CURB & GUTTER
R2	2'-6" CURB & GUTTER
R3	5" MONOLITHIC ISLAND
R4	SHLDR BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING
Z	MILLING

6/2/99

5/6/2008
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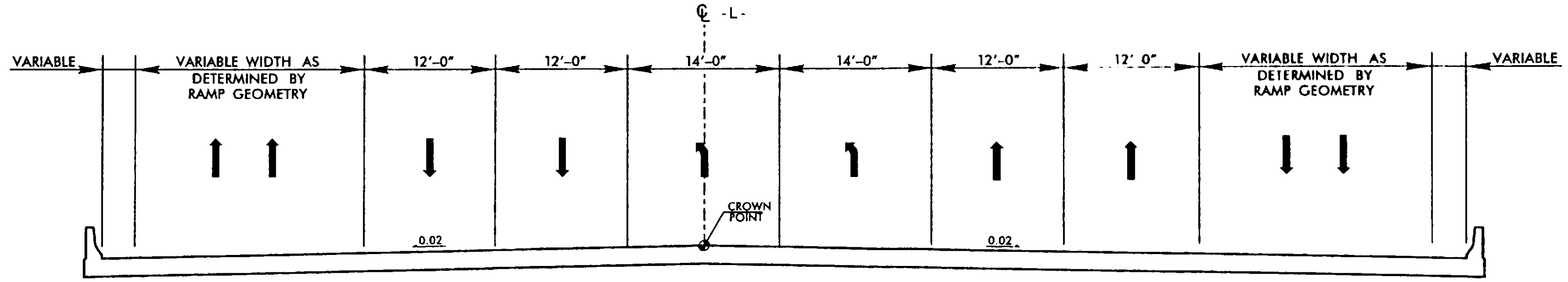
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	2-E
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

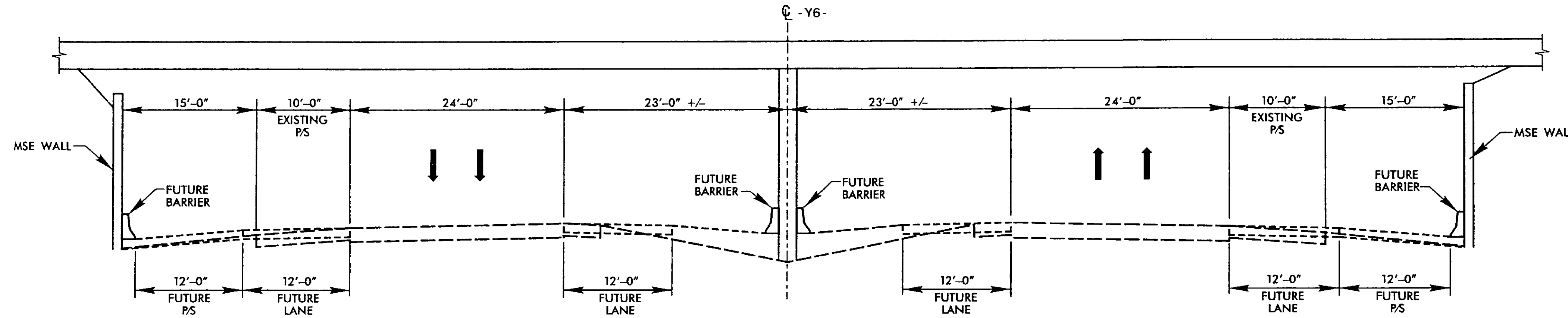
NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

MOFFATT & NICHOL



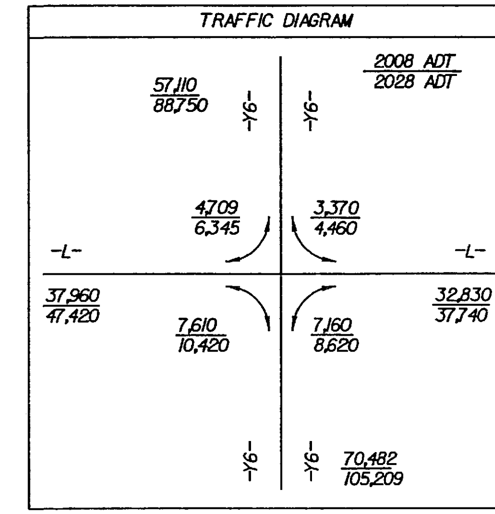
TYPICAL SECTION ON STRUCTURE

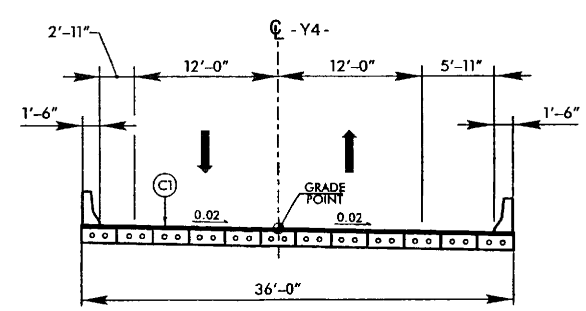
FUNCTIONAL CLASSIFICATION: COLLECTOR



FUNCTIONAL CLASSIFICATION = INTERSTATE

TYPICAL SECTION ON ROADWAY UNDER STRUCTURE





FUNCTIONAL CLASSIFICATION = RURAL LOCAL

NOTE: BRIDGE TO BE CORD SLAB

TYPICAL SECTION ON STRUCTURE

GIBBS ROAD RECONNECT

2008 ADT / 2028 ADT	6,973 ADT / 10,064 ADT	TTST= 2% DUALS= 4% DHV= 11% DIR= 60%

6/2/99

5/6/2008
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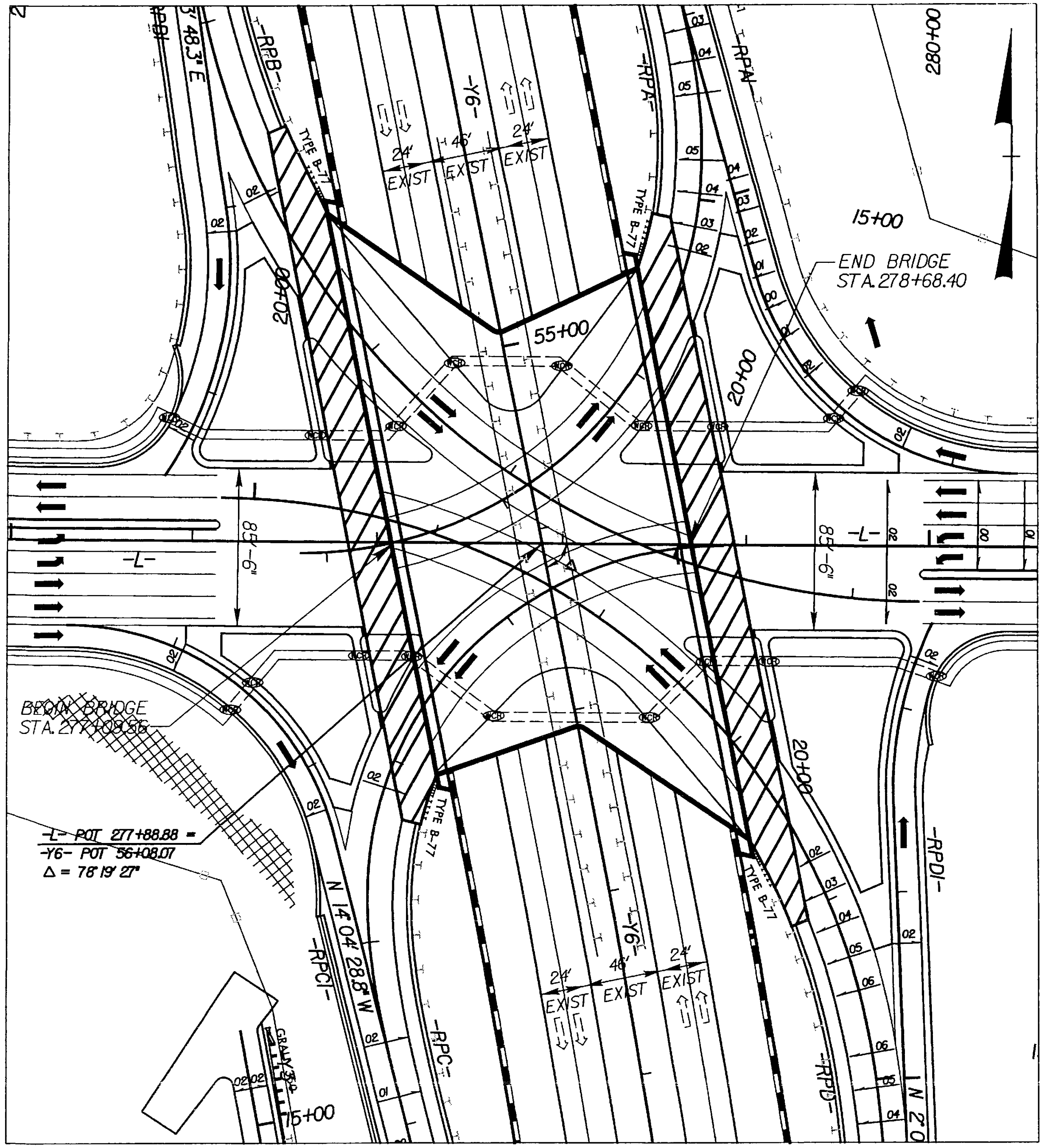
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	2-F
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

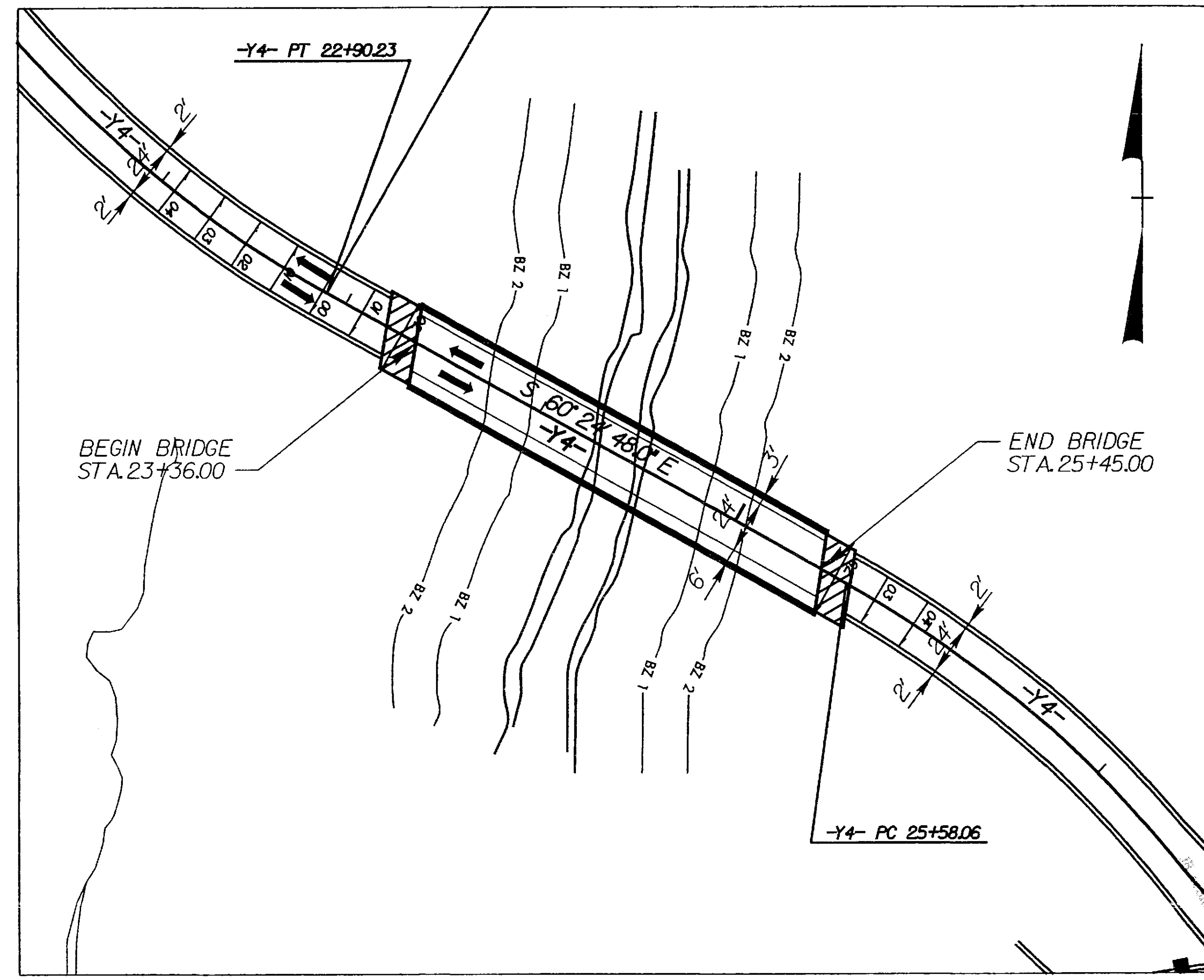
NORTH CAROLINA
SEAL
15869
ENGINEER
T. R. REID

MOFFATT & NICHOL

6/2/99



DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -L- OVER -Y6-



DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -Y4- OVER STREAM

5/6/2008
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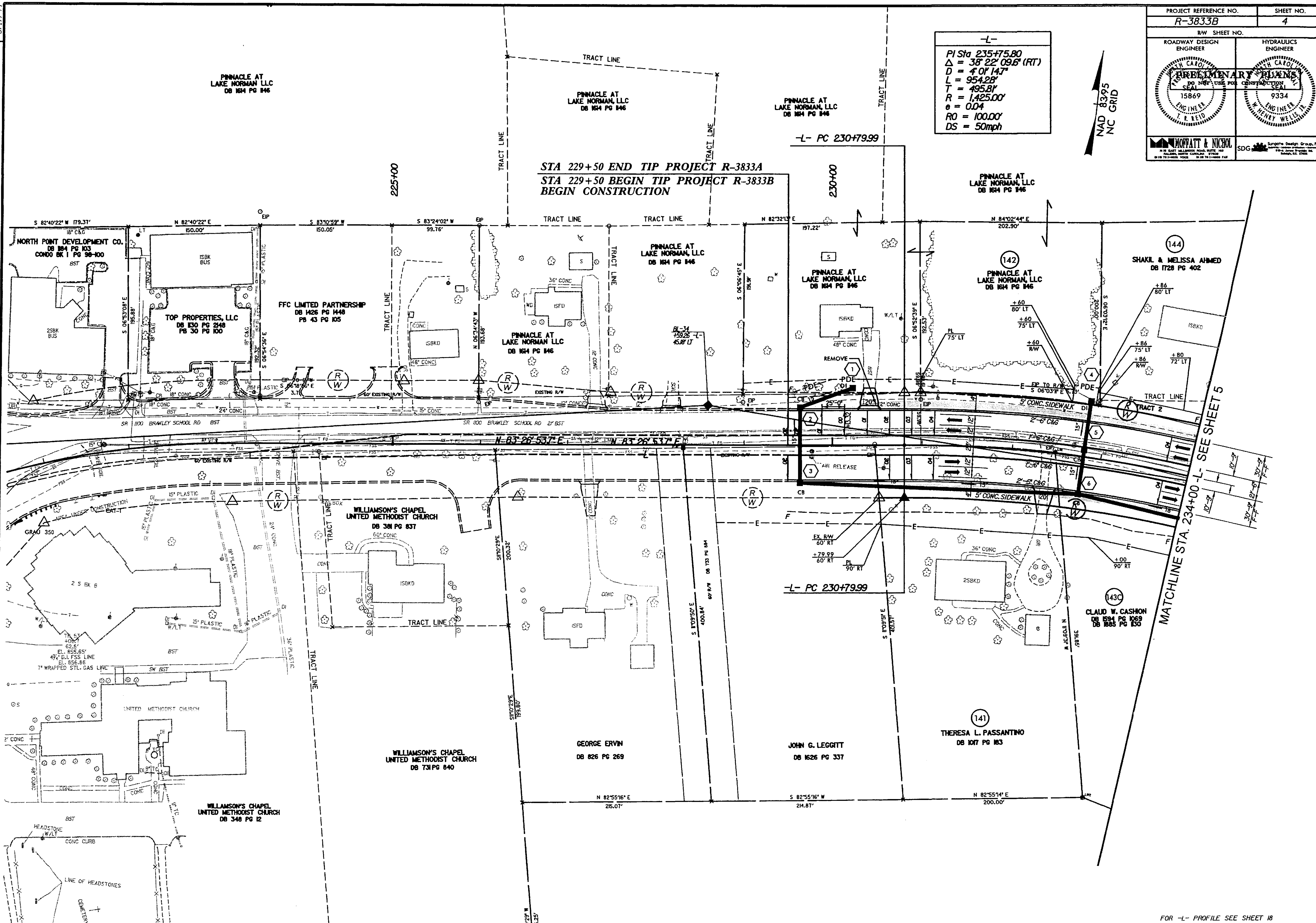
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 15869 T. R. REID	SEAL 9334 W. HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL
Sungate Design Group, P.A.

REVISIONS
DATE: 02/21/2008 -REVISED PARCEL 143, UPDATED DEED BOOK AND PAGE AND CHANGED NUMBER TO 143C

8/17/99



-L-
PI Sta 235+75.80
Δ = 38° 22' 09.6" (RT)
D = 4° 01' 14.7"
L = 954.28'
T = 495.81'
R = 1,425.00'
e = 0.04
RO = 100.00'
DS = 50mph
NAD 83/95 NC GRID
STA 229+50 END TIP PROJECT R-3833A
STA 229+50 BEGIN TIP PROJECT R-3833B
BEGIN CONSTRUCTION
-L- PC 230+79.99
225+00
230+00
PINNACLE AT LAKE NORMAN, LLC DB 1614 PG 1146
NORTH POINT DEVELOPMENT CO. DB 1184 PG 103 CONDO BK 1 PG 98-100
TOP PROPERTIES, LLC DB 1130 PG 2148 PB 30 PG 100
FFC LIMITED PARTNERSHIP DB 1426 PG 1448 PB 43 PG 105
SHAKIL & MELISSA AHMED DB 1728 PG 402
WILLIAMSON'S CHAPEL UNITED METHODIST CHURCH DB 381 PG 837
WILLIAMSON'S CHAPEL UNITED METHODIST CHURCH DB 731 PG 840
WILLAMSON'S CHAPEL UNITED METHODIST CHURCH DB 348 PG 12
GEORGE ERVIN DB 826 PG 269
JOHN G. LEGGITT DB 1626 PG 337
THERESA L. PASSANTINO DB 1017 PG 183
CLAUD W. CASHION DB 1594 PG 1069 DB 1885 PG 1130
UNITED METHODIST CHURCH
142
144
141
143C
TRACT LINE
SR 1100 BRAWLEY SCHOOL RD
N 83° 26' 53.7" E
5' CONC. SIDEWALK
2'-6" C&G
AIR RELEASE
REMOVE
PDE
LINE OF HEADSTONES
CEMETERY
MATCHLINE STA. 234+00 -L- SEE SHEET 5
FOR -L- PROFILE SEE SHEET 18

5/6/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833B	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

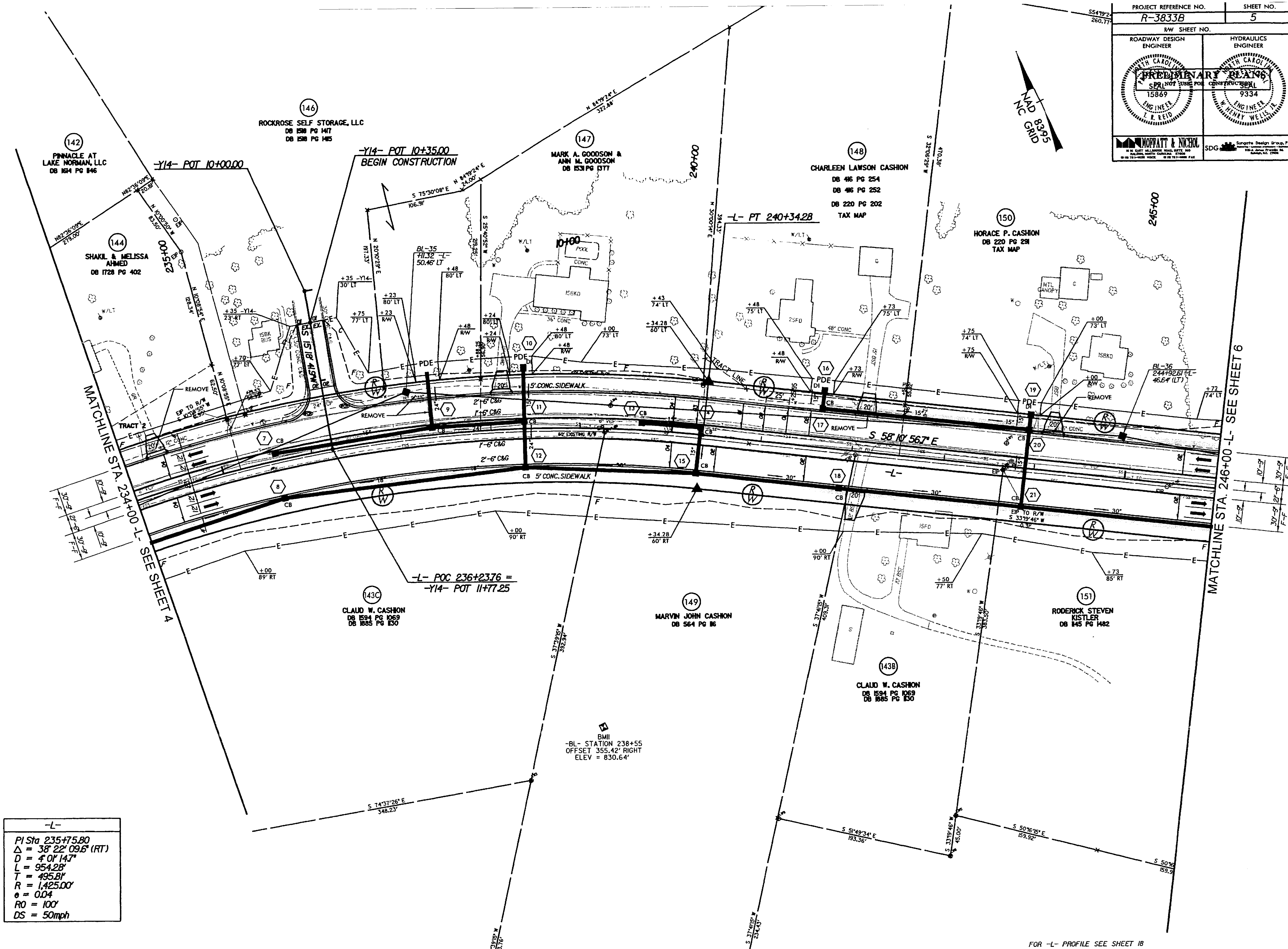
PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL — SDG Sungate Design Group, P.A.

REVISIONS

DATE: 01/26/2007 -ADDED TEMPORARY CONSTRUCTION EASEMENT TO PARCEL 145 DUE TO OAK FORK DRIVE (-Y14-) BEING ADDED WITH THE LATEST TOPO UPDATE

DATE: 02/21/2008 -REVISED PARCEL 143, UPDATED DEED BOOK AND PAGE, CHANGED NUMBER TO 143C AND ADDED PARCEL 143B



MATCHLINE STA. 234+00 -L- SEE SHEET 4
MATCHLINE STA. 246+00 -L- SEE SHEET 6
NAD 83/95 NC GRID
142 PINNACLE AT LAKE NORMAN, LLC DB 1614 PG 1146
144 SHAKIL & MELISSA AHMED DB 1728 PG 402
146 ROCKROSE SELF STORAGE, LLC DB 1518 PG 1417 DB 1518 PG 1415
147 MARK A. GOODSON & ANN M. GOODSON DB 1531 PG 1377
148 CHARLEEN LAWSON CASHION DB 416 PG 254 DB 416 PG 252 DB 220 PG 202 TAX MAP
150 HORACE P. CASHION DB 220 PG 291 TAX MAP
143C CLAUD W. CASHION DB 1594 PG 1069 DB 1885 PG 1130
149 MARVIN JOHN CASHION DB 564 PG 116
143B CLAUD W. CASHION DB 1594 PG 1069 DB 1885 PG 1130
151 RODERICK STEVEN KISTLER DB 1145 PG 1482
-Y14- POT 10+00.00
-Y14- POT 10+35.00 BEGIN CONSTRUCTION
-L- PT 240+34.28
-L- POC 236+23.76 = -Y14- POT 11+77.25
S 58°10' 56.7" E
5' CONC. SIDEWALK
BMII -BL- STATION 238+55 OFFSET 355.42' RIGHT ELEV = 830.64'
FOR -L- PROFILE SEE SHEET 18

-L-
PI Sta 235+75.80
Δ = 38° 22' 09.6" (RT)
D = 4° 01' 14.7"
L = 954.28'
T = 495.81'
R = 1,425.00'
e = 0.04
RO = 100'
DS = 50mph

5/6/2008 r:\roadway\proj\r3833b_rdy_psh05.dgn

8/17/99

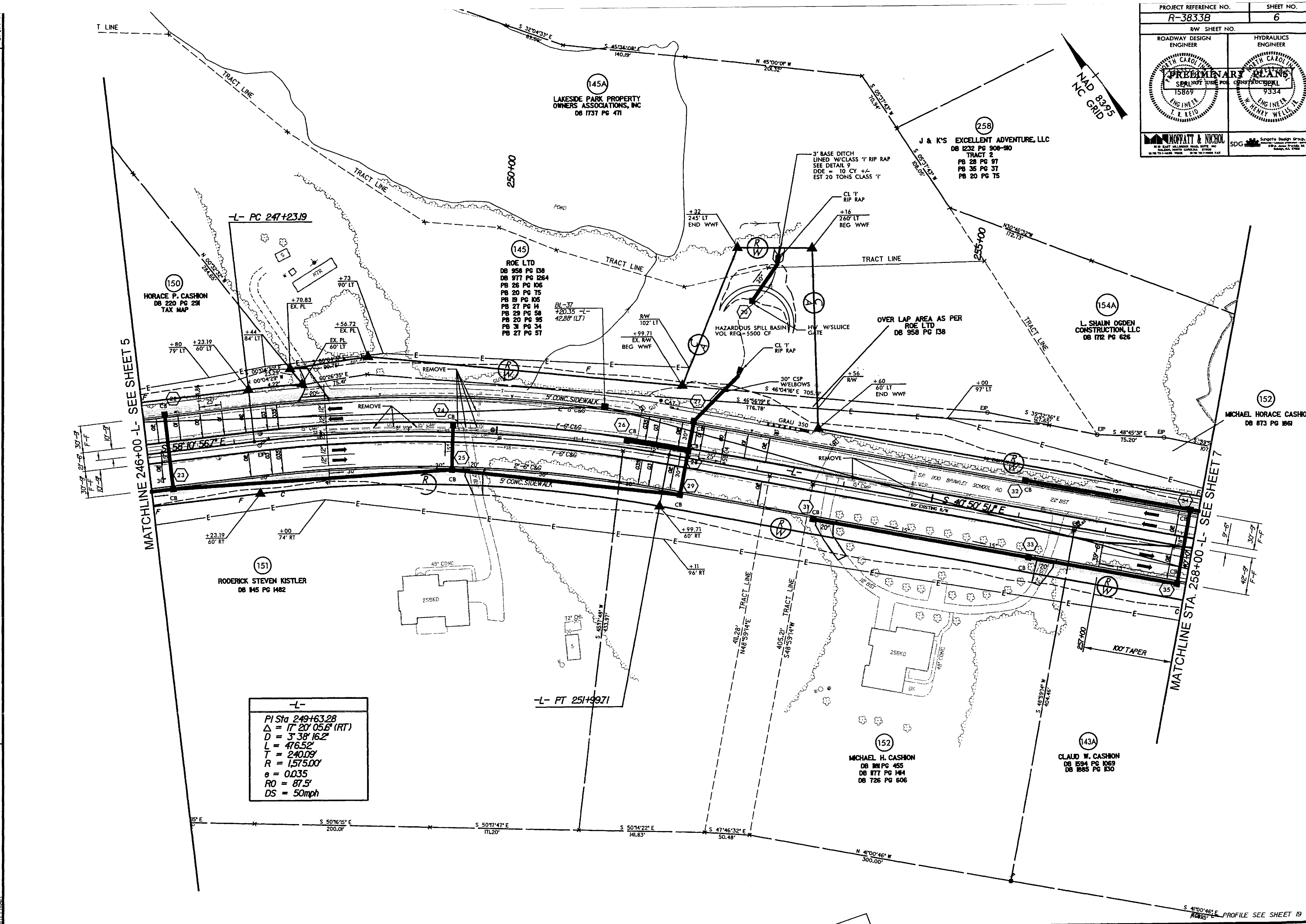
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	6

RW SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL — SDG Sungate Design Group, P.A.



NAD 83/95 NC GRID
145A
LAKESIDE PARK PROPERTY OWNERS ASSOCIATIONS, INC
DB 1737 PG 471
258
J & K'S EXCELLENT ADVENTURE, LLC
DB 1232 PG 908-910
TRACT 2
PB 28 PG 97
PB 35 PG 37
PB 20 PG 75
145
ROE LTD
DB 958 PG 138
DB 977 PG 1264
PB 26 PG 106
PB 20 PG 75
PB 19 PG 105
PB 27 PG 14
PB 29 PG 58
PB 20 PG 95
PB 31 PG 34
PB 27 PG 57
150
HORACE P. CASHION
DB 220 PG 291
TAX MAP
154A
L. SHAUN OGDEN CONSTRUCTION, LLC
DB 1712 PG 626
152
MICHAEL HORACE CASHION
DB 873 PG 1861
151
RODERICK STEVEN KISTLER
DB 1145 PG 1482
152
MICHAEL H. CASHION
DB 1161 PG 455
DB 1177 PG 1414
DB 726 PG 606
143A
CLAUD W. CASHION
DB 1594 PG 1069
DB 1685 PG 1130
3' BASE DITCH
LINED W/CLASS 'I' RIP RAP
SEE DETAIL 9
DDE = 10 CY +/-
EST 20 TONS CLASS 'I'
CL 'I' RIP RAP
HAZARDOUS SPILL BASIN
VOL REQ=5500 CF
HW W/SLUICE GATE
OVER LAP AREA AS PER ROE LTD
DB 958 PG 138
-L- PC 247+23.19
-L- PT 251+99.71
BL-37 +20.35 -L- 42.88' (LT)
MATCHLINE 246+00 -L- SEE SHEET 5
MATCHLINE STA. 258+00 -L- SEE SHEET 7
250+00
255+00
257+00
100' TAPER
TRACT LINE
T LINE
REMOVE
5' CONC. SIDEWALK
1'-6" C&G
2'-6" C&G
S 58°10'56.7" E
S 40°50'51.1" E
SR 1100 BRAWLEY SCHOOL RD
22' BST
60' EXISTING R/W
30" CSP W/ELBOWS
PROFILE SEE SHEET 19

-L-
PI Sta 249+63.28
Δ = 17° 20' 05.6" (RT)
D = 3° 38' 16.2"
L = 476.52'
T = 240.09'
R = 1,575.00'
e = 0.035
RO = 87.5'
DS = 50mph

REVISIONS

DATE: 02/21/2008 -ADDED PARCEL NUMBER 143A
DATE: 05/02/2008 -PLACED WOVEN WIRE FENCE ALONG HAZARDOUS SPILL BASIN,ADDED LABELS TO MONUMENTS

5/6/2008
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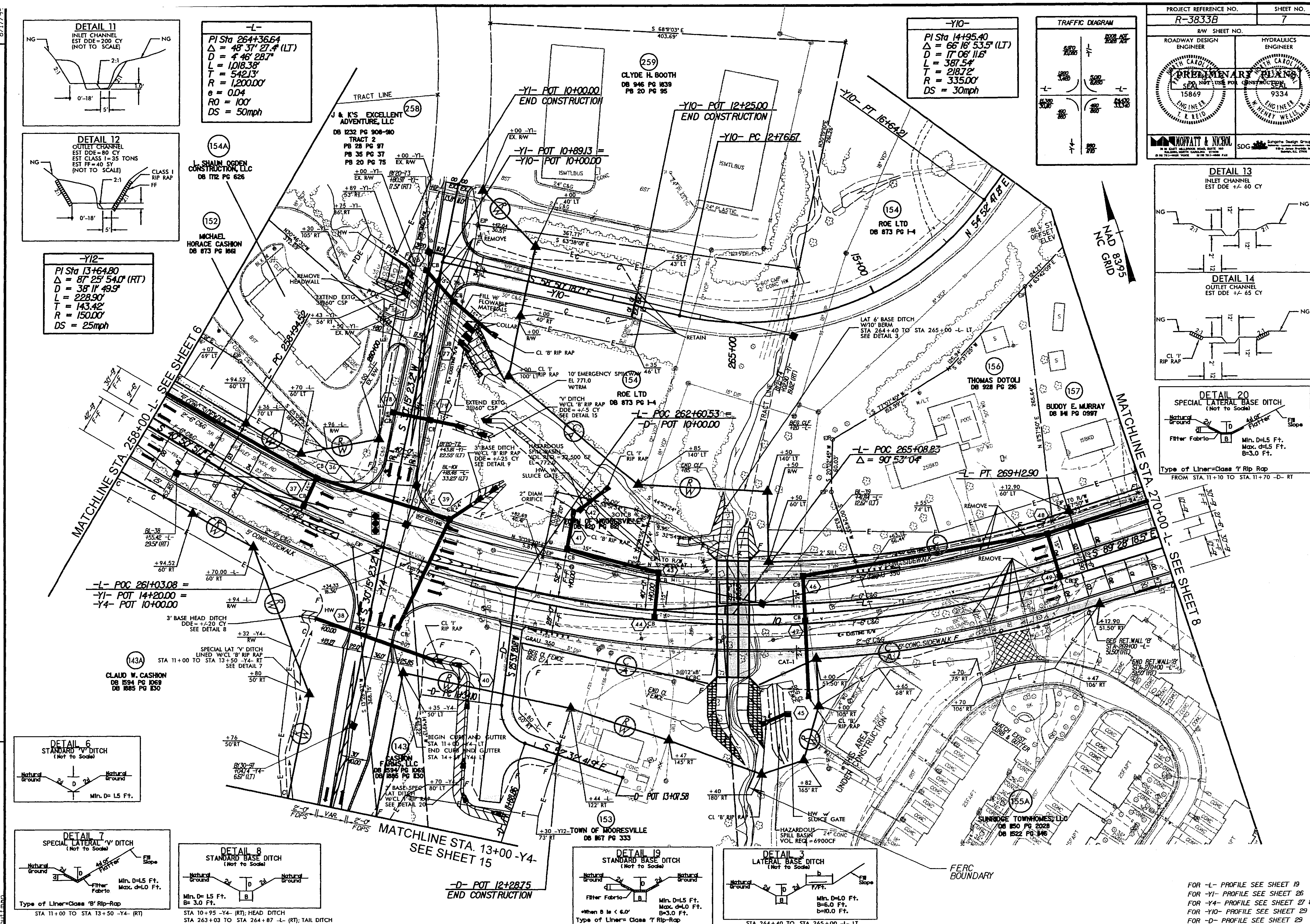
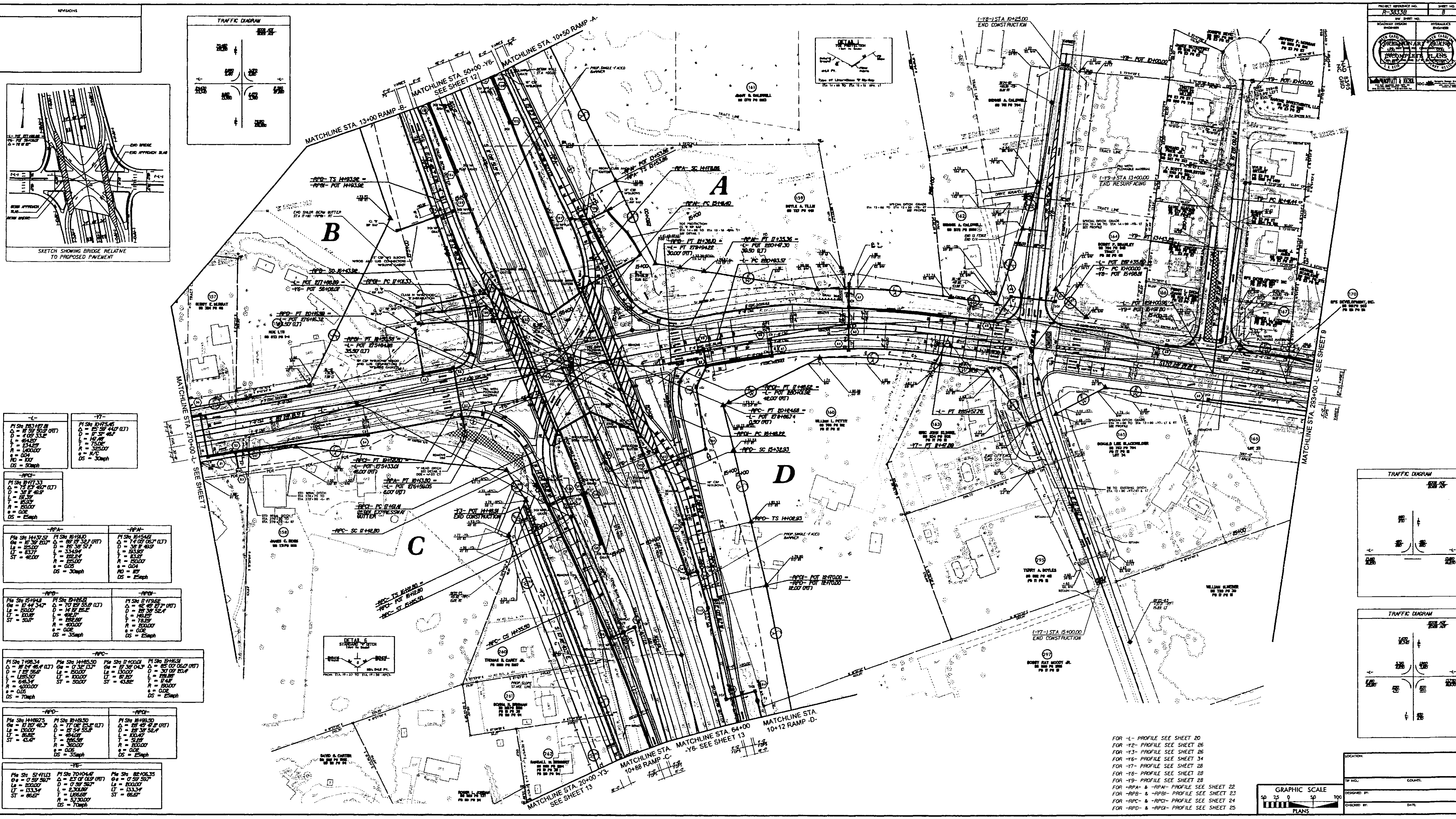
8/17/99


PROJECT REFERENCE NO. R-3833B
SHEET NO. 7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
MOFFATT & NICHOL
SDG Sungate Design Group, P.A.
-L-
PI Sta 264+36.64
Δ = 48° 37' 27.4" (LT)
D = 4° 46' 28.7"
L = 1,018.38'
T = 542.13'
R = 1,200.00'
e = 0.04
RO = 100'
DS = 50mph
-Y10-
PI Sta 14+95.40
Δ = 66° 16' 53.5" (LT)
D = 17° 06' 11.6"
L = 387.54'
T = 218.72'
R = 335.00'
DS = 30mph
-Y12-
PI Sta 13+64.80
Δ = 87° 25' 54.0" (RT)
D = 38° 11' 49.9"
L = 228.90'
T = 143.42'
R = 150.00'
DS = 25mph
TRAFFIC DIAGRAM
DETAIL 11
INLET CHANNEL
EST DDE=200 CY
(NOT TO SCALE)
DETAIL 12
OUTLET CHANNEL
EST DDE=80 CY
EST CLASS I=35 TONS
EST FF=40 SY
(NOT TO SCALE)
DETAIL 13
INLET CHANNEL
EST DDE +/- 60 CY
DETAIL 14
OUTLET CHANNEL
EST DDE +/- 65 CY
DETAIL 20
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.
Type of Liner=Class 'I' Rip Rap
FROM STA. 11+10 TO STA. 11+70 -D- RT
DETAIL 6
STANDARD 'V' DITCH
(Not to Scale)
Min. D= 1.5 Ft.
DETAIL 7
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.0 Ft.
Type of Liner=Class 'B' Rip-Rap
STA 11+00 TO STA 13+50 -Y4- (RT)
DETAIL 8
STANDARD BASE DITCH
(Not to Scale)
Min. D= 1.5 Ft.
B= 3.0 Ft.
STA 10+95 -Y4- (RT); HEAD DITCH
STA 263+03 TO STA 264+87 -L- (RT); TAIL DITCH
DETAIL 19
STANDARD BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.0 Ft.
B=3.0 Ft.
Type of Liner= Class 'I' Rip-Rap
DETAIL 3
LATERAL BASE DITCH
(Not to Scale)
Min. D=1.0 Ft.
B=6.0 Ft.
b=10.0 Ft.
STA 264+40 TO STA 265+00 -L- LT
MATCHLINE STA. 258+00 -L- SEE SHEET 6
MATCHLINE STA. 270+00 -L- SEE SHEET 8
MATCHLINE STA. 13+00 -Y4- SEE SHEET 15
-Y1- POT 10+00.00 END CONSTRUCTION
-Y10- POT 12+25.00 END CONSTRUCTION
-Y1- POT 10+89.13 = -Y10- POT 10+00.00
-L- POC 262+60.53 = -D- POT 10+00.00
-L- POC 261+03.08 = -Y1- POT 14+20.00 = -Y4- POT 10+00.00
-L- POC 265+08.83
Δ = 90° 53' 04"
-L- PT 269+12.90
-D- POT 13+07.58
-D- POT 12+28.75 END CONSTRUCTION
CLYDE H. BOOTH DB 946 PG 1639 PB 20 PG 95
J & K'S EXCELLENT ADVENTURE, LLC DB 1232 PG 908-910 TRACT 2 PB 28 PG 97 PB 35 PG 37 PB 20 PG 75
L. SHAUN OGDEN CONSTRUCTION, LLC DB 1712 PG 626
MICHAEL HORACE CASHION DB 873 PG 1861
ROE LTD DB 873 PG 1-4
THOMAS DOTOLI DB 928 PG 216
BUDDY E. MURRAY DB 1141 PG 0997
CLAUD W. CASHION DB 1594 PG 1069 DB 1885 PG 1130
CASHION FARMS, LLC DB 1594 PG 1069 DB 1885 PG 1130
TOWN OF MOORESVILLE DB 1167 PG 333
SUNRIDGE TOWNHOMES, LLC DB 1150 PG 2028 DB 1522 PG 146
NAD 83/95 NC GRID
HAZARDOUS SPILL BASIN VOL REQ =6900CF
FERC BOUNDARY
FOR -L- PROFILE SEE SHEET 19
FOR -Y1- PROFILE SEE SHEET 26
FOR -Y4- PROFILE SEE SHEET 27 & 28
FOR -Y10- PROFILE SEE SHEET 29
FOR -D- PROFILE SEE SHEET 29

REVISIONS

DATE: 01/26/2007 -REVISED R/W FOR PARCELS 153 & 155
DATE: 02/21/2008 -ADDED PARCEL 143, REVISED PARCEL 143 TO 143A, UPDATED DEED BOOK AND PAGE

5/6/2008 r:\roadway\proj\r-3833b_rdy_psh07.dgn



-L-
PI Sta 283+27.81
Δ = 18° 59' 50.9" (RT)
D = 4° 05' 33.2"
L = 464.20'
T = 234.29'
R = 1,400.00'
e = 0.04
RO = 100'
DS = 50mph

-Y7-
PI Sta 10+75.46
Δ = 25° 59' 44.0" (LT)
D = 17° 37' 46.2"
L = 147.46'
T = 75.02'
R = 325.00'
e = N/C
DS = 30mph

-RPCI-
PI Sta 18+77.33
Δ = 75° 23' 49.7" (LT)
D = 38° 11' 49.9"
L = 197.39'
T = 115.93'
R = 150.00'
e = 0.02
DS = 25mph

-RPA-		-RPAI-
PIe Sta 14+37.57	PI Sta 16+91.10	PI Sta 16+54.61
θe = 16° 39' 20.7"	Δ = 89° 15' 32.1" (RT)	Δ = 74° 05' 06.7" (LT)
Ls = 125.00'	D = 26° 38' 57.1"	D = 38° 11' 49.9"
LT = 83.71'	L = 334.94'	L = 193.95'
ST = 42.00'	T = 212.24'	T = 113.21'
	R = 215.00'	R = 150.00'
	e = 0.05	e = 0.04
	DS = 30mph	RO = 115'
		DS = 25mph

-RPB-		-RPBI-
PIe Sta 15+94.11	PI Sta 19+26.13	PI Sta 17+79.62
θe = 10° 44' 34.7"	Δ = 70° 29' 55.6" (LT)	Δ = 42° 45' 27.7" (RT)
Ls = 150.00'	D = 14° 19' 26.2"	D = 28° 38' 52.4"
LT = 100.16'	L = 492.17'	L = 149.25'
ST = 50.17'	T = 282.68'	T = 78.29'
	R = 400.00'	R = 200.00'
	e = 0.02	e = 0.02
	DS = 35mph	DS = 25mph

-RPC-			
PI Sta 7+98.34	PIe Sta 14+85.50	PIe Sta 17+00.01	PI Sta 19+16.91
Δ = 18° 24' 48.4" (LT)	θe = 0° 32' 13.7"	θe = 19° 36' 04.3"	Δ = 85° 00' 06.0" (RT)
D = 1° 25' 56.6"	Ls = 150.00'	Ls = 130.00'	D = 30° 09' 20.4"
L = 1,285.50'	LT = 100.00'	LT = 87.20'	L = 281.86'
T = 648.34'	ST = 50.00'	ST = 43.82'	T = 174.11'
R = 4,000.00'			R = 190.00'
e = 0.05			e = 0.02
DS = 70mph			DS = 25mph

-RPD-		-RPDI-
PIe Sta 14+89.75	PI Sta 18+19.50	PI Sta 16+99.50
θe = 10° 30' 42.3"	Δ = 77° 02' 25.2" (LT)	Δ = 28° 45' 47.8" (RT)
Ls = 130.00'	D = 15° 54' 55.8"	D = 28° 38' 52.4"
LT = 86.82'	L = 484.08'	L = 100.40'
ST = 43.47'	T = 286.58'	T = 51.28'
	R = 360.00'	R = 200.00'
	e = 0.06	e = 0.02
	DS = 35mph	DS = 25mph

-Y6-		
PIe Sta 57+71.13	PI Sta 70+04.47	PIe Sta 82+06.35
θs = 0° 59' 59.7"	Δ = 23° 01' 01.9" (RT)	θs = 0° 59' 59.7"
Ls = 200.00'	D = 0° 59' 59.7"	Ls = 200.00'
LT = 133.34'	L = 2,301.89'	LT = 133.34'
ST = 66.67'	T = 1,166.68'	ST = 66.67'
	R = 5,730.00'	
	DS = 70mph	

FOR -L- PROFILE SEE SHEET 20
FOR -Y2- PROFILE SEE SHEET 26
FOR -Y3- PROFILE SEE SHEET 26
FOR -Y6- PROFILE SEE SHEET 34
FOR -Y7- PROFILE SEE SHEET 28
FOR -Y8- PROFILE SEE SHEET 28
FOR -Y9- PROFILE SEE SHEET 28
FOR -RPA- & -RPAI- PROFILE SEE SHEET 22
FOR -RPB- & -RPBI- PROFILE SEE SHEET 23
FOR -RPC- & -RPCI- PROFILE SEE SHEET 24
FOR -RPD- & -RPDI- PROFILE SEE SHEET 25

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

5/6/2008

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION — SEAL 15869 T. R. REID

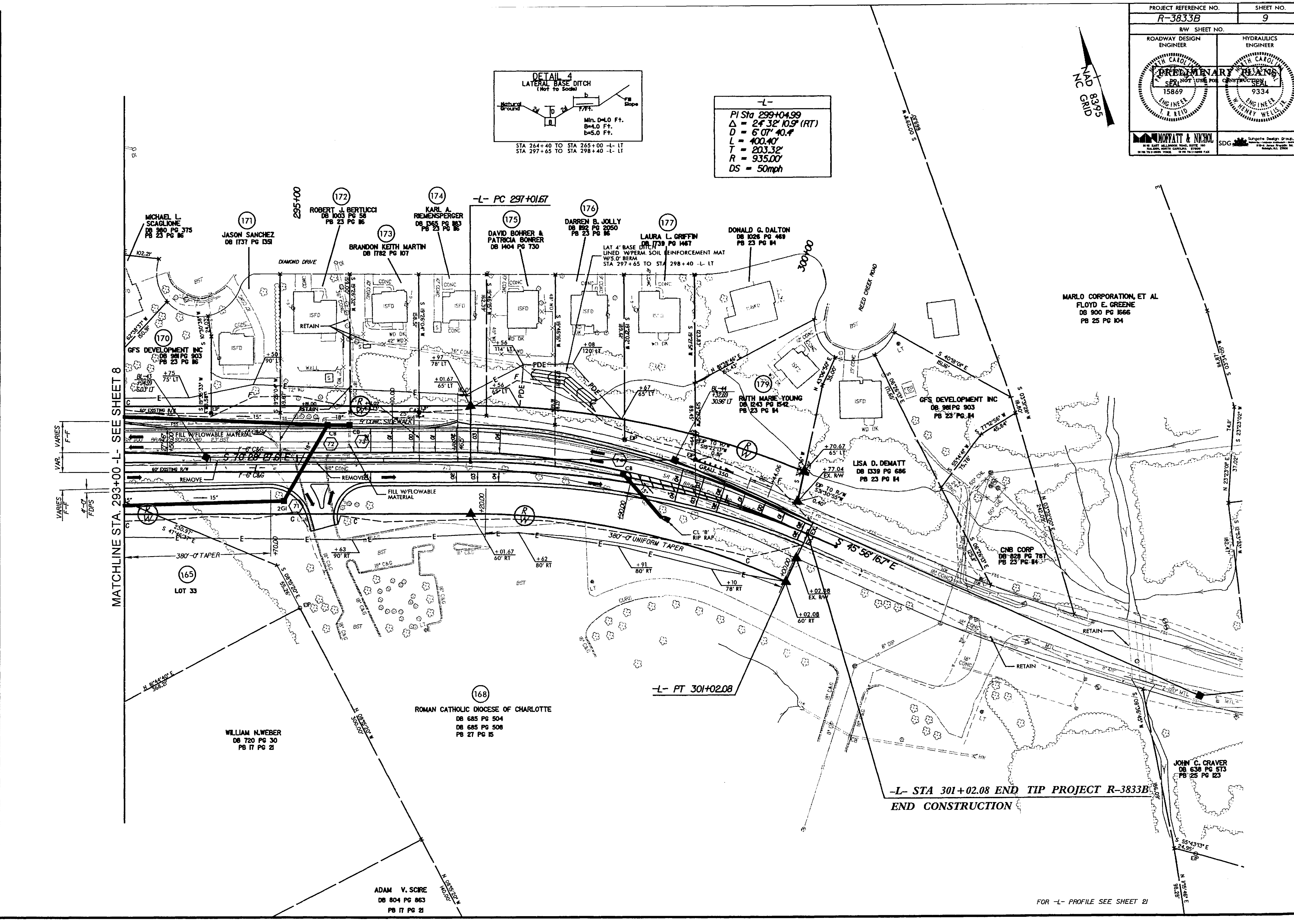
HYDRAULICS ENGINEER — SEAL 9334 W. HENRY WELLS JR.

MOFFATT & NICHOL — SDG Sungate Design Group, P.A.

REVISIONS

DATE: 01/26/2007 -REVISED TEMPORARY CONSTRUCTION EASEMENT ACROSS PARCEL'S 171 THRU 174 -L- (RT)

DATE: 05/02/2008 -REVISED OWNERS FOR PARCEL'S 171,173,175 AND 177



DETAIL 4
LATERAL BASE DITCH
(Not to Scale)
Min. D=1.0 Ft.
B=4.0 Ft.
b=5.0 Ft.
STA 264+40 TO STA 265+00 -L- LT
STA 297+65 TO STA 298+40 -L- LT
-L-
PI Sta 299+04.99
Δ = 24° 32' 10.9" (RT)
D = 6° 07' 40.4"
L = 400.40'
T = 203.32'
R = 935.00'
DS = 50mph
NAD 83/95
NC GRID
MATCHLINE STA. 293+00 -L- SEE SHEET 8
-L- PC 297+01.67
-L- PT 301+02.08
S 78° 28' 27.8" E
S 45° 56' 16.7" E
MICHAEL L. SCAGLIONE
DB 980 PG 375
PB 23 PG 116
JASON SANCHEZ
DB 1737 PG 1351
ROBERT J. BERTUCCI
DB 1003 PG 58
PB 23 PG 116
BRANDON KEITH MARTIN
DB 1782 PG 107
KARL A. RIEMENSPERGER
DB 1365 PG 183
PB 23 PG 116
DAVID BOHRER & PATRICIA BOHRER
DB 1404 PG 730
DARREN B. JOLLY
DB 1192 PG 2050
PB 23 PG 116
LAURA L. GRIFFIN
DB 1739 PG 1467
DONALD G. DALTON
DB 1026 PG 469
PB 23 PG 114
MARLO CORPORATION, ET AL
FLOYD E. GREENE
DB 900 PG 1666
PB 25 PG 104
GFS DEVELOPMENT INC
DB 981 PG 903
PB 23 PG 116
RUTH MARIE YOUNG
DB 1243 PG 1542
PB 23 PG 114
GFS DEVELOPMENT INC
DB 981 PG 903
PB 23 PG 114
LISA D. DEMATT
DB 1339 PG 686
PB 23 PG 114
CNB CORP
DB 828 PG 787
PB 23 PG 114
LOT 33
ROMAN CATHOLIC DIOCESE OF CHARLOTTE
DB 685 PG 504
DB 685 PG 508
PB 27 PG 15
WILLIAM N. WEBER
DB 720 PG 30
PB 17 PG 21
ADAM V. SCIRE
DB 804 PG 863
PB 17 PG 21
JOHN C. CRAVER
DB 638 PG 573
PB 25 PG 123
DIAMOND DRIVE
REED CREEK ROAD
LAT 4' BASE DITCH LINED W/PERM. SOIL REINFORCEMENT MAT W/5.0' BERM STA 297+65 TO STA 298+40 -L- LT
FILL W/FLOWABLE MATERIAL
380'-0" TAPER
380'-0" UNIFORM TAPER
CL 'B' RIP RAP
-L- STA 301+02.08 END TIP PROJECT R-3833B
END CONSTRUCTION
FOR -L- PROFILE SEE SHEET 21

8/17/99

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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS — INCOMPLETE PLANS — NOT TO BE USED FOR CONSTRUCTION

MOFFATT & NICHOL — SDG Sungate Design Group, P.A.

NAD 83/95 NC GRID

279
BUFFALO MOOREVILLE, LLC
DB 1388 PG 1191
PB 33 PG 12
PB 33 PG 45

281
AMSTAR ENTERTAINMENT, LLC
DB 1142 PG 1016
PB 33 PG 12

BEF-REIT INC
DB 1197 PG 1518
PB 35 PG 57

278
CGRWFS REAL PROPERTY, LLC
DB 1235 PG 1217
PB 24 PG 118

ROE LTD
DB 763 PG 75
PB 29 PG 58

DETAIL 2
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, d, 2' To 24', b, F/Ft., Fill Slope, Filter Fabric
Min. D=1.5 Ft.
Max. d=1.0 Ft.
b=5.0 Ft.
Type of Liner=Class 'B' Rip-Rap
FROM STA. 14+00 TO STA. 15+00 -Y6- LT

DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground, d, 2:1, Fill Slope, Filter Fabric
d=1.0 Ft.
Type of Liner=Class 'B' Rip-Rap
FROM STA. 15+50 TO STA. 16+50 -Y6- RT

15+00
20+00
25+00

(-Y6-) STA. 13+52.51
BEGIN CONSTRUCTION
NORTH BOUND

LAT 'V' DITCH W/S' BERM, LINED
W/CL 'B' RIP RAP
STA 14+00 TO 15+00 -Y6- LT
SEE DETAIL 2

SPECIAL DITCH
STA 15+50 TO STA 16+50 -Y6- LT
SEE PROFILE FOR GRADE

(-Y6-) STA. 12+29.06
BEGIN CONSTRUCTION
SOUTH BOUND

(-Y6-) STA. 14+00.00
BEGIN OVERLAY
NORTH BOUND AND
SOUTH BOUND

BEGIN EXPRESSWAY
GUTTER STA 17+00

EXIST. I-77 NBL

EXIST. I-77 SBL

(-Y6-)
I-77

S 11°08'51.5" E

N 83°01'57" W
44.60'

S 83°01'58" E
182.54'

N 78°59'58" E
137.60'

S 84°09'27" E
66.39'

+80
165' LT

+80
EX. R/W

+60
EX. R/W

+00
180' RT

+60
180' RT

+00
EX. R/W

+60
EX. R/W

54" CSP

TDE

PDE

REMOVE HW

REMOVE EXIST. GUARDRAIL

REMOVE DI

CONVERT DI TO JB

COLLAR

RETAIN

TOE PROTECTION

CL 'I' RIP RAP ON BANKS ONLY

CL 'B' RIP RAP +/-10 TONS

2GI W/FLAT GRATE

15" EXPRESSWAY GUTTER 15"

30"

GRAU 350

CAT-1

JB 81

82 83 84

BEG CL FENCE

EXISTING R/W

TRACT LINE

MATCHLINE STA. 25+25 -Y6- SEE SHEET 11

FOR -Y6- PROFILE SEE SHEET 31

5/13/2008
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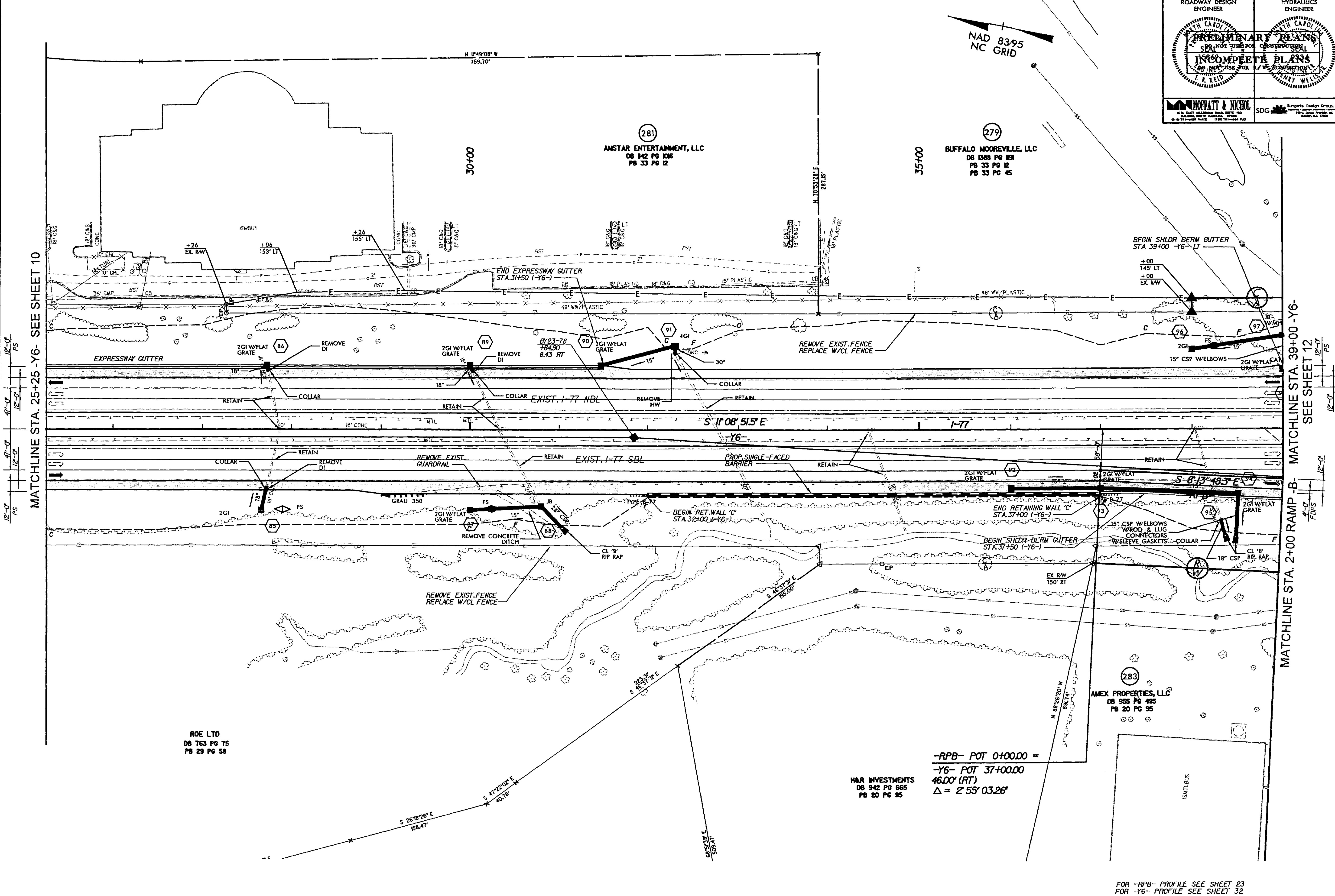
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

MOFFATT & NICHOL
SDG Sungate Design Group, P.A.



NAD 83/95
NC GRID
N 8°49'08" W
759.70'
281
AMSTAR ENTERTAINMENT, LLC
DB 1142 PG 1016
PB 33 PG 12
279
BUFFALO MOOREVILLE, LLC
DB 1388 PG 1191
PB 33 PG 12
PB 33 PG 45
30+00
35+00
MATCHLINE STA. 25+25 -Y6- SEE SHEET 10
MATCHLINE STA. 39+00 -Y6- SEE SHEET 12
MATCHLINE STA. 2+00 RAMP -B-
END EXPRESSWAY GUTTER
STA.31+50 (-Y6-)
BEGIN SHLDR BERM GUTTER
STA 39+00 -Y6- LT
EXPRESSWAY GUTTER
REMOVE EXIST. FENCE
REPLACE W/CL FENCE
EXIST. I-77 NBL
EXIST. I-77 SBL
S 11°08' 51.5" E
-Y6-
I-77
REMOVE EXIST. GUARDRAIL
PROP. SINGLE-FACED BARRIER
BEGIN RET. WALL 'C'
STA 32+00 (-Y6-)
END RETAINING WALL 'C'
STA.37+00 (-Y6-)
BEGIN SHLDR BERM GUTTER
STA.37+50 (-Y6-)
REMOVE CONCRETE DITCH
CL 'B' RIP RAP
S 8°13' 48.3" E
283
AMEX PROPERTIES, LLC
DB 955 PG 495
PB 20 PG 95
ROE LTD
DB 763 PG 75
PB 29 PG 58
H&R INVESTMENTS
DB 942 PG 665
PB 20 PG 95
-RPB- POT 0+00.00 =
-Y6- POT 37+00.00
46.00' (RT)
Δ = 2° 55' 03.26"

FOR -RPB- PROFILE SEE SHEET 23
FOR -Y6- PROFILE SEE SHEET 32

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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION — INCOMPLETE PLANS — DO NOT USE FOR R/W ACQUISITION

MOFFATT & NICHOL — SDG Sungate Design Group, P.A.

NAD 83/95 NC GRID

-RPA-

PIs Sta 0+80.00	PI Sta 2+44.98	PIs Sta 4+09.91
Θs = 0° 4' 15.2"	Δ = 2° 51' 49.5" (LT)	Θs = 0° 4' 15.2"
Ls = 120.00'	D = 1° 08' 45.3"	Ls = 120.00'
LT = 80.00'	L = 249.91'	LT = 80.00'
ST = 40.00'	T = 124.98'	ST = 40.00'
	R = 5,000.00'	
	e = 0.04	
	DS = 70mph	

279 BUFFALO MOORERVILLE, LLC
DB 1388 PG 891
PB 33 PG 12
PB 33 PG 45

-RPA- ST 0+00.00 = -Y6- POT 39+47.85 46.00' (LT)

-RPA- SC 1+20.00

-RPA- CS 3+69.91

-RPA- ST 4+89.91

DENNIS A. CALDWELL
DB 1372 PG 1680

161 JIMMY G. CALDWELL
DB 1372 PG 1683

40+00 | 45+00 | 5+00 | 10+00

STOCKPILE EXCAVATED BED MATERIAL AND PLACE AT INLET OF EXTENDED CULVERT

TOE PROTECTION STA 44+00 TO STA 45+10 -Y6- LT SEE DETAIL 1

END SHLDR BERM GUTTER STA 42+50 -Y6- LT

CL 'B' RIP RAP +/-4 TONS GRAU 350

REMOVE EXIST. GUARDRAIL

RETAIN AND EXTEND

RETAIN

REMOVE HW

BEGIN WALL STA 11+00

PROP. SINGLE-FACED BARRIER

MSE WALL

2' LAT DITCH W/5.0' BERM STA 45+00 TO STA 46+16 -L- RT SEE DETAIL 5

LAT 2' BASE DITCH STA 40+75 TO STA 42+50 -Y6- RT SEE DETAIL 19

15" CSP W/ELBOWS W/ROD & LUG CONNECTORS W/SLEEVE GASKETS

18" CSP

15" CSP W/ELBOWS

2GI W/FLAT GRATE

CL 'B' RIP RAP

COLLAR

JB W/MH

CL OF RIP/RAP

BEG CL FENCE

END CL FENCE

CORD

EXISTING R/W

S 15°23'11.4" E

S 11°08'51.5" E

S 8°13'49.7" E

-Y6-

-RPB-

-RPA-

I-77

MATCHLINE STA. 39+00 -Y6- SEE SHEET 11

MATCHLINE STA. 2+00 RAMP -B-

MATCHLINE STA. 13+00 RAMP -B-

MATCHLINE STA. 50+00 -Y6- SEE SHEET 8

MATCHLINE STA. 10+50 RAMP -A-

283 AMEX PROPERTIES, LLC
DB 955 PG 495
PB 20 PG 95

JAMES ROBERT YATES
DB 1273 PG 2291
PB 20 PG 95

154 ROE LTD
DB 873 PG 1-4

DETAIL 19
LATERAL BASE DITCH
(Not to Scale)
FROM STA. 40+75 TO STA. 42+50 -Y6- RT
Min. D=1 Ft.
B=2 Ft.
b=5 Ft.

DETAIL 5
LATERAL BASE DITCH
(Not to Scale)
FROM STA. 44+65 TO STA. 46+16 -L- RT
Min. D=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.

DETAIL 1
TOE PROTECTION
(Not to Scale)
d=1.0 Ft.
Type of Liner=Class 'B' Rip-Rap
STA 44+00 TO STA 45+10 -Y6- LT

FOR -Y6- PROFILE SEE SHEET 33
FOR -RPA- PROFILE SEE SHEET 22
FOR -RPB- PROFILE SEE SHEET 23

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thuffman

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	13
R/W SHEET NO.	

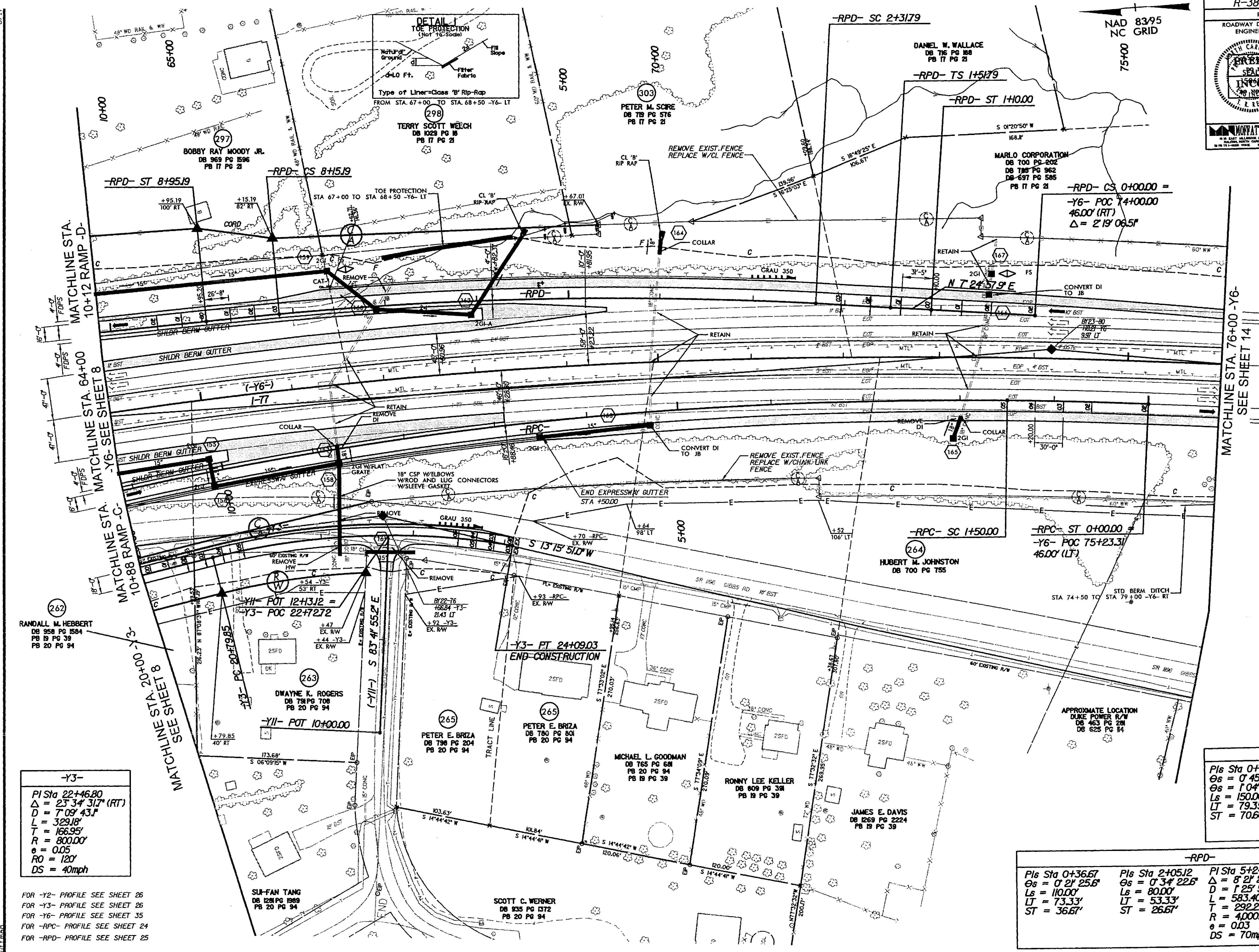
ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609

SDG Sungate Design Group, P.A.



NAD 83/95
NC GRID
DETAIL 1
TOE PROTECTION
(Not to Scale)
Type of Liner=Class 'B' Rip-Rap
FROM STA. 67+00 TO STA. 68+50 -Y6- LT
-RPD- ST 8+95.19
-RPD- CS 8+15.19
-RPD- SC 2+31.79
-RPD- TS 1+51.79
-RPD- ST 1+10.00
-RPD- CS 0+00.00 =
-Y6- POC 74+00.00
46.00' (RT)
Δ = 2° 19' 06.5"
N 7° 24' 57.9" E
S 13° 15' 51.0" W
-RPC- SC 1+50.00
-RPC- ST 0+00.00 =
-Y6- POC 75+23.31
46.00' (LT)
-Y11- POT 12+13.12 =
-Y3- POC 22+72.72
-Y3- PC 20+79.85
-Y3- PT 24+09.03
END CONSTRUCTION
-Y11- POT 10+00.00
(-Y11-) S 83° 41' 55.2" E
BOBBY RAY MOODY JR.
TERRY SCOTT WELCH
PETER M. SCIRE
DANIEL W. WALLACE
MARLO CORPORATION
HUBERT M. JOHNSTON
RANDALL M. HEBBERT
DWAYNE K. ROGERS
PETER E. BRIZA
MICHAEL L. GOODMAN
RONNY LEE KELLER
JAMES E. DAVIS
SU-FAN TANG
SCOTT C. WERNER
APPROXIMATE LOCATION DUKE POWER R/W
MATCHLINE STA. 10+12 RAMP -D-
MATCHLINE STA. 64+00 -Y6- SEE SHEET 8
MATCHLINE STA. 10+88 RAMP -C-
MATCHLINE STA. 20+00 -Y3- SEE SHEET 8
MATCHLINE STA. 76+00 -Y6- SEE SHEET 14
REMOVE EXIST. FENCE REPLACE W/CL FENCE
REMOVE EXIST. FENCE REPLACE W/CHAIN LINK FENCE
END EXPRESSWAY GUTTER
SHLDR BERM GUTTER
EXPRESSWAY GUTTER
STD BERM DITCH
SR 1196 GIBBS RD
I-77

-Y3-
PI Sta 22+46.80
Δ = 23° 34' 31.7" (RT)
D = 7° 09' 43.1"
L = 329.18'
T = 166.95'
R = 800.00'
e = 0.05
RO = 120'
DS = 40mph

-Y6-
PI Sta 70+04.47
Δ = 23° 01' 01.9" (RT)
D = 0° 59' 59.7"
L = 2,301.89'
T = 1,166.68'
R = 5,730.00'
DS = 70mph

-RPC-	
PIs Sta 0+79.35	PI Sta 7+98.34
Θs = 0° 45' 21.6"	Δ = 18° 24' 48.4" (LT)
Θs = 1° 04' 27.5"	D = 1° 25' 56.6"
Ls = 150.00'	L = 1,285.50'
LT = 79.35'	T = 648.34'
ST = 70.66'	R = 4,000.00'
	e = 0.05
	DS = 70mph

-RPD-			
PIs Sta 0+36.67	PIs Sta 2+05.12	PI Sta 5+24.01	PIs Sta 8+41.86
Θs = 0° 21' 25.6"	Θs = 0° 34' 22.6"	Δ = 8° 21' 23.7" (LT)	Θs = 0° 34' 22.6"
Ls = 110.00'	Ls = 80.00'	D = 1° 25' 56.6"	Ls = 80.00'
LT = 73.33'	LT = 53.33'	L = 583.40'	LT = 53.33'
ST = 36.67'	ST = 26.67'	T = 292.22'	ST = 26.67'
		R = 4,000.00'	
		e = 0.03	
		DS = 70mph	

FOR -Y2- PROFILE SEE SHEET 26
FOR -Y3- PROFILE SEE SHEET 26
FOR -Y6- PROFILE SEE SHEET 35
FOR -RPC- PROFILE SEE SHEET 24
FOR -RPD- PROFILE SEE SHEET 25

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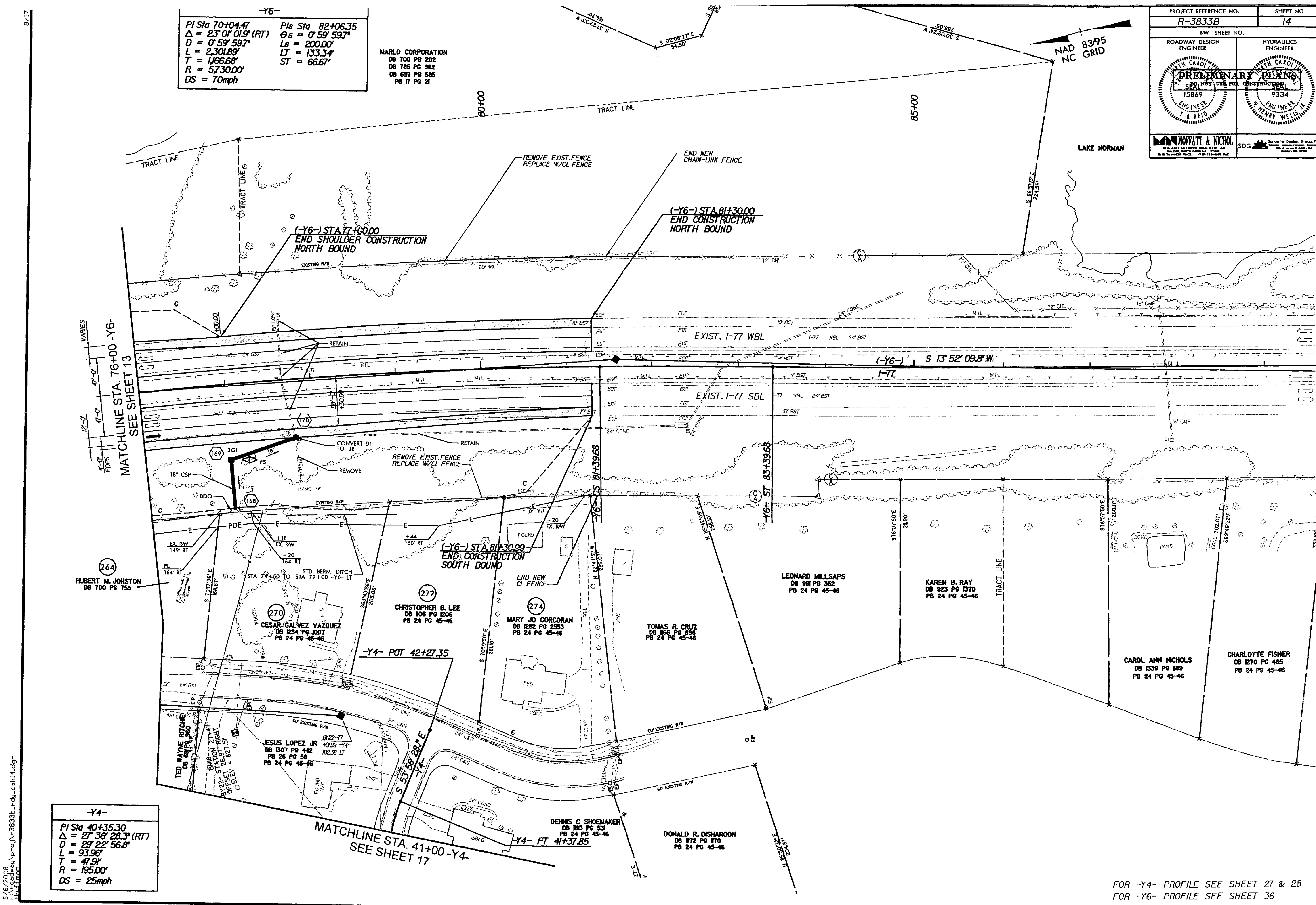

PROJECT REFERENCE NO.
R-3833B
SHEET NO.
14
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
NORTH CAROLINA SEAL 15869 ENGINEER T. R. REID
NORTH CAROLINA SEAL 9334 ENGINEER W. HENRY WELLS, JR.
MOFFATT & NICHOL
SDG Sungate Design Group, P.A.
-Y6-
PI Sta 70+04.47
Δ = 23° 01' 01.9" (RT)
D = 0° 59' 59.7"
L = 2,301.89'
T = 1,166.68'
R = 5,730.00'
DS = 70mph
PIs Sta 82+06.35
θs = 0° 59' 59.7"
Ls = 200.00'
LT = 133.34'
ST = 66.67'
MARLO CORPORATION
DB 700 PG 202
DB 785 PG 962
DB 697 PG 585
PB 17 PG 21
NAD 83/95
NC GRID
TRACT LINE
80+00
85+00
LAKE NORMAN
REMOVE EXIST. FENCE
REPLACE W/CL FENCE
END NEW
CHAIN-LINK FENCE
(-Y6-) STA. 81+30.00
END CONSTRUCTION
NORTH BOUND
(-Y6-) STA. 77+00.00
END SHOULDER CONSTRUCTION
NORTH BOUND
EXIST. I-77 WBL
(-Y6-) S 13° 52' 09.8" W
I-77
EXIST. I-77 SBL
RETAIN
CONVERT DI TO JB
REMOVE
18" CSP
BDO
PDE
MATCHLINE STA. 76+00 -Y6-
SEE SHEET 13
(-Y6-) STA. 81+30.00
END CONSTRUCTION
SOUTH BOUND
END NEW
CL FENCE
-Y6- CS 81+39.68
-Y6- ST 83+39.68
STD BERM DITCH
STA 74+50 TO STA 79+00 -Y6- LT
HUBERT M. JOHSTON
DB 700 PG 755
CESAR GALVEZ VAZQUEZ
DB 1234 PG 1007
PB 24 PG 45-46
CHRISTOPHER B. LEE
DB 1106 PG 1206
PB 24 PG 45-46
MARY JO CORCORAN
DB 1282 PG 2553
PB 24 PG 45-46
TOMAS R. CRUZ
DB 1166 PG 898
PB 24 PG 45-46
LEONARD MILLSAPS
DB 991 PG 352
PB 24 PG 45-46
KAREN B. RAY
DB 923 PG 1370
PB 24 PG 45-46
CAROL ANN NICHOLS
DB 1339 PG 889
PB 24 PG 45-46
CHARLOTTE FISHER
DB 1270 PG 465
PB 24 PG 45-46
-Y4- POT 42+27.35
TED WAYNE RITCHIE
DB 69 PG 960
JESUS LOPEZ JR
DB 1307 PG 442
PB 26 PG 58
PB 24 PG 45-46
DENNIS C SHOEMAKER
DB 1193 PG 531
PB 24 PG 45-46
DONALD R. DISHAROON
DB 1172 PG 1170
PB 24 PG 45-46
-Y4- PT 41+37.85
MATCHLINE STA. 41+00 -Y4-
SEE SHEET 17
-Y4-
PI Sta 40+35.30
Δ = 27° 36' 28.3" (RT)
D = 29° 22' 56.8"
L = 93.96'
T = 47.91'
R = 195.00'
DS = 25mph
FOR -Y4- PROFILE SEE SHEET 27 & 28
FOR -Y6- PROFILE SEE SHEET 36
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PROJECT REFERENCE NO.	SHEET NO.
R-3833B	15
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — SEAL 15869 — ENGINEER J. R. REID

HYDRAULICS ENGINEER — SEAL 9334 — ENGINEER W. HENRY WELLS, IV

PRELIMINARY PLANS — NOT TO BE USED FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.

NAD 83/95
NC GRID

REVISIONS

DATE: 01/26/2007 -REVISED R/W FOR PARCELS 153 & 143
DATE: 02/21/2008 -REVISED PARCEL 143 AND ADDED PARCEL 143A

155A
SUNRIDGE TOWNHOMES, LLC
DB 1522 PG 146
PB 49 PG 85

153
TOWN OF MOORESVILLE
DB 1167 PG 333

143
CASHION FARMS, LLC
DB 1594 PG 1069
DB 1885 PG 130

143A
CLAUD W. CASHION
DB 1594 PG 1069
DB 1885 PG 130

TED WAYNE RITCHIE AND WIFE, NORMA T. RITCHIE
DB T30 PG 503

LAKE NORMAN / DUKE POWER
NO DEED REFERENCE

FERC BOUNDARY

-Y4- PT 22+90.23

MATCHLINE STA. 23+00 -Y4- SEE SHEET 16

MATCHLINE STA. 13+00 -Y4- SEE SHEET 7

-Y4- PC 14+49.86

15+00

SPECIAL LAT BASE DITCH STA 22+75 TO STA 23+40 SEE DETAIL 17

SPECIAL LAT BASE DITCH STA 20+50 TO STA 22+75 -Y4- LT SEE DETAIL 16

END CURB AND GUTTER STA 14+59 -Y4- LT

SPECIAL LAT 'V' DITCH LINED W/CL 'B' RIP RAP STA 11+00 TO STA 13+50 -Y4- RT SEE DETAIL 7

24" CSP W/ELBOWS

PROP. SLOPE STAKE LINE

STD. BERM DITCH LINED W/CL 'B' RIP RAP STA 14+73 TO STA 19+00 -Y4- RT

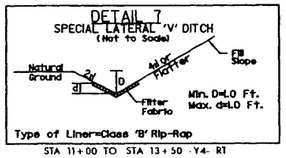
24" CSP W/ELBOWS W/ROD & LUG CONNECTORS AND SLEEVE GASKETS

CL 'B' RIP -RAP

CL 'I' RIP RAP 76.56 LT R/W

-Y4-	-Y12-
PI Sta 19+76.33	PI Sta 13+64.80
Δ = 90° 40' 11.2" (LT)	Δ = 87° 25' 54.0" (RT)
D = 10° 25' 02.7"	D = 38° 11' 49.9"
L = 870.37'	L = 228.30'
T = 556.47'	T = 143.42'
R = 550.00'	R = 150.00'
e = 0.04	DS = 25mph
RO = 120'	e = 0.03
DS = 40mph	

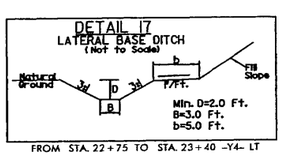
DETAIL 7
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Type of Liner=Class 'B' Rip-Rap

STA 11+00 TO STA 13+50 -Y4- RT

DETAIL 17
LATERAL BASE DITCH
(Not to Scale)



FROM STA. 22+75 TO STA. 23+40 -Y4- LT

FOR -Y4- PROFILE SEE SHEET 27 & 28
FOR -Y12- PROFILE SEE SHEET 29

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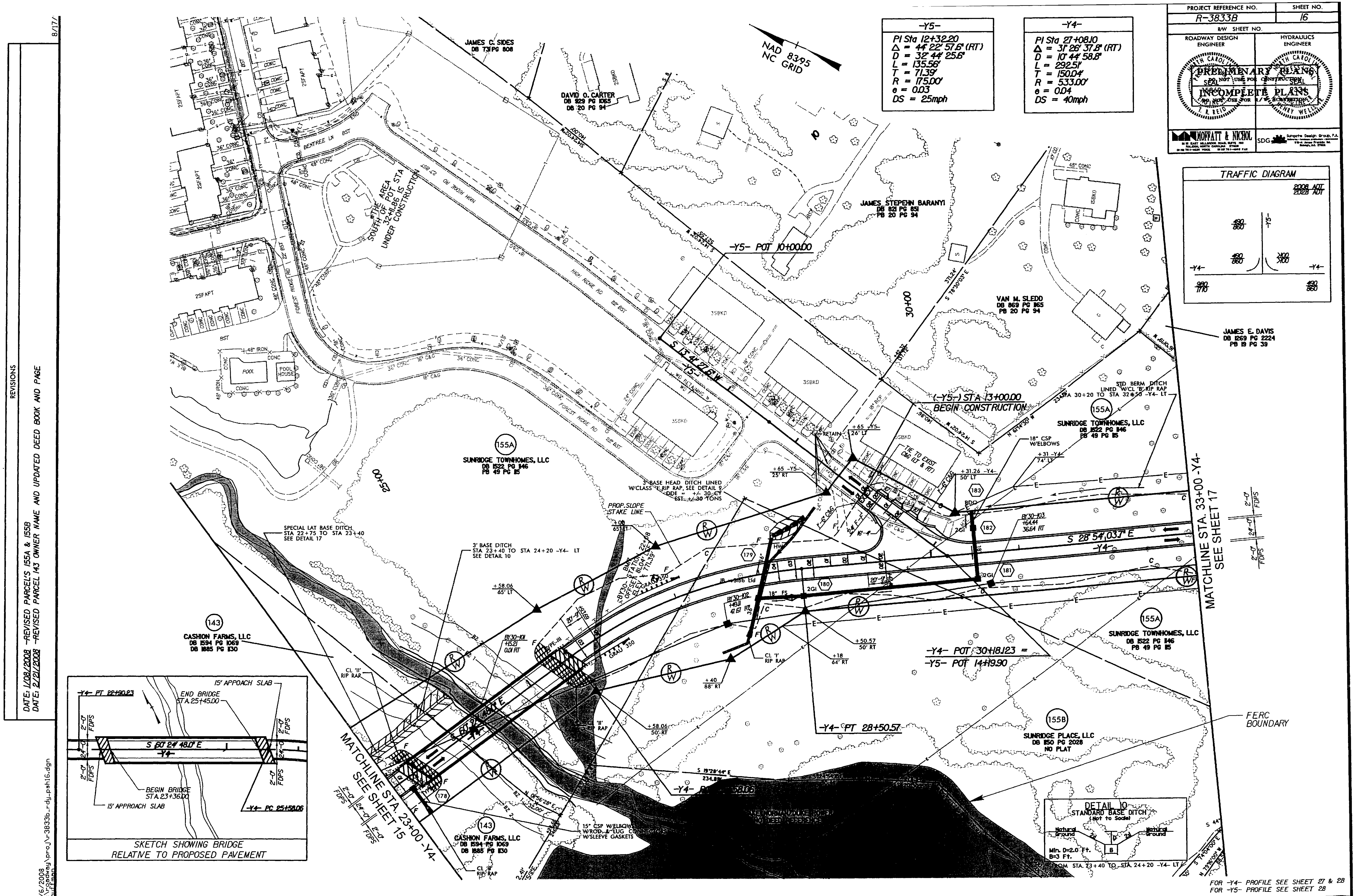
thuffman



PROJECT REFERENCE NO. R-3833B
SHEET NO. 16
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
MOFFATT & NICHOL
SDG
-Y5-
PI Sta 12+32.20
Δ = 44° 22' 57.6" (RT)
D = 32° 44' 25.6"
L = 135.56'
T = 71.39'
R = 175.00'
e = 0.03
DS = 25mph
-Y4-
PI Sta 27+08.10
Δ = 31° 26' 37.8" (RT)
D = 10° 44' 58.8"
L = 292.51'
T = 150.04'
R = 533.00'
e = 0.04
DS = 40mph
NAD 83/95 NC GRID
TRAFFIC DIAGRAM
2008 ADT
2028 ADT
REVISIONS
DATE: 1/08/2008 -REVISED PARCEL'S 155A & 155B
DATE: 2/21/2008 -REVISED PARCEL 143 OWNER NAME AND UPDATED DEED BOOK AND PAGE
JAMES C. SIDES
DB 731 PG 808
DAVID O. CARTER
DB 929 PG 1065
DB 20 PG 94
JAMES STEPEHN BARANYI
DB 821 PG 651
PB 20 PG 94
VAN M. SLEDD
DB 869 PG 165
PB 20 PG 94
JAMES E. DAVIS
DB 1269 PG 2224
PB 19 PG 39
THE AREA SOUTH OF POT STA 32+11.86 IS UNDER CONSTRUCTION
-Y5- POT 10+00.00
(-Y5-) STA 13+00.00
BEGIN CONSTRUCTION
TIE TO EXIST C&G (LT & RT)
STD BERM DITCH LINED W/CL 'B' RIP RAP
STA 30+20 TO STA 32+50 -Y4- LT
155A
SUNRIDGE TOWNHOMES, LLC
DB 1522 PG 1146
PB 49 PG 115
18" CSP W/ELBOWS
3' BASE HEAD DITCH LINED W/CLASS 'I' RIP RAP, SEE DETAIL 9
PROP. SLOPE STAKE LINE
SPECIAL LAT BASE DITCH
STA 22+75 TO STA 23+40
SEE DETAIL 17
3' BASE DITCH
STA 23+40 TO STA 24+20 -Y4- LT
SEE DETAIL 10
S 28° 54' 03.7" E
-Y4-
MATCHLINE STA. 33+00 -Y4-
SEE SHEET 17
143
CASHION FARMS, LLC
DB 1594 PG 1069
DB 1885 PG 1130
CL 'II' RIP RAP
CL 'I' RIP RAP
-Y4- POT 30+18.123 =
-Y5- POT 14+19.90
-Y4- PT 28+50.57
155B
SUNRIDGE PLACE, LLC
DB 1150 PG 2028
NO PLAT
FERC BOUNDARY
15" CSP W/ELBOWS W/ROD & LUG CONNECTORS W/SLEEVE GASKETS
MATCHLINE STA. 23+00 -Y4-
SEE SHEET 15
15' APPROACH SLAB
-Y4- PT 22+50.23
END BRIDGE STA. 25+45.00
S 60° 24' 48.0" E
BEGIN BRIDGE STA. 23+36.00
-Y4- PC 25+58.06
SKETCH SHOWING BRIDGE RELATIVE TO PROPOSED PAVEMENT
DETAIL 10
STANDARD BASE DITCH
(Not to Scale)
Natural Ground
Min. D=2.0 Ft.
B=3 Ft.
FROM STA. 23+40 TO STA. 24+20 -Y4- LT
FOR -Y4- PROFILE SEE SHEET 27 & 28
FOR -Y5- PROFILE SEE SHEET 28
5/6/2008

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SOUTH CAROLINA SEAL 15869 ENGINEER T. K. REID	SOUTH CAROLINA SEAL 9334 ENGINEER W. HENRY WELLS, II
PRELIMINARY PLANS NOT TO BE USED FOR CONSTRUCTION	
MOFFATT & NICHOL	SDG Singleton Design Group, P.A.

REVISIONS

8/17/09

DATE: 01/08/2008 - REVISED PARCELS 155A & 155B
DATE: 05/02/2008 -REVISED OWNERS FOR PARCELS 350,351,353 AND ADDED PARCEL 269A

MATCHLINE STA. 41+00 -Y4- SEE SHEET 14

-Y4- STA 40+43.88
END CONSTRUCTION

NAD 83/95
NC GRID

JESUS LOPEZ JR
DB 1307 PG 442
PB 26 PG 58
PB 24 PG 45-46

TED WAYNE RITCHIE
DB 723 PG 989

-Y4- PC 40+14.46
TIE INTO EXISTING C&G

AREA UNDER CONSTRUCTION

-Y13- PC 10+42.14

DENNIS C SHOEMAKER
DB 1193 PG 531
PB 24 PG 45-46

DONALD R. DISHAROON
DB 972 PG 170
PB 24 PG 45-46

15" CSP W/ELBOWS W/ROD & LUG CONNECTORS W/SLEEVE GASKETS

341

JOHN ANTHONY JULIAN
DB 1176 PG 1879
PB 26 PG 58
PB 24 PG 45-46

352

CURTIS C. LEWIS
DB 1539 PG 2238
PB 42 PG 34

-Y4- PC 37+65.26

APPROXIMATE LOCATION
DUKE POWER R/W
DB 463 PG 281
DB 625 PG 114

SCOTT C. WERNER
DB 935 PG 1372
PB 20 PG 94

269

TED WAYNE RITCHIE
DB 691 PG 960

VELCO DEVELOPMENT, LLC
DB 1531 PG 409
PB 42 PG 34

-Y13- PT 11+98.72

-Y13- POT 12+68.60
END CONSTRUCTION

269A

JAMES E. DAVIS
DB 1269 PG 2224
PB 19 PG 39

LAT 'V' DITCH W/5.0' BERM LINED W/CL 'B' RIP RAP
STA 35+25 TO STA 38+00 -Y4- LT
SEE DETAIL 2

CUT DITCH
STA 34+50 TO STA 35+25 -Y4- LT
SEE DETAIL 18

353

JUDITH JOSEPH,
DB 1642 PG 1032
PB 42 PG 34

350

SCOTT D. LIPPARD &
KELLY M. LIPPARD
DB 1641 PG 1247

VAN M. SLEDD
DB 869 PG 865
PB 20 PG 94

155A

SUNRIDGE TOWNHOMES, LLC
DB 1522 PG 1146
PB 49 PG 185

-Y4- PC 39+09.70 =
-Y13- POT 10+00.00

JAMES MICHAEL RAY, JR.
DB 1577 PG 731
PB 42 PG 34

GLENN R. CULLY AND
WANDA M. CULLY
DB 1579 PG 308
PB 42 PG 34

351

DOMINICK DEPALO
DB 1735 PG 413

155B

SUNRIDGE PLACE, LLC
DB 1150 PG 2028
NO PLAT

MATCHLINE STA. 33+00 -Y4- SEE SHEET 16

-Y13-

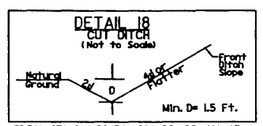
PI Sta	11+50.00
Δ	= 29° 54' 16.6" (LT)
D	= 19° 05' 54.9"
L	= 156.58'
T	= 80.12'
R	= 300.00'
e	= 0.02
DS	= 30mph

-Y4-

PI Sta	39+15.50
Δ	= 52° 26' 56.4" (LT)
D	= 18° 47' 07.8"
L	= 279.20'
T	= 150.24'
R	= 305.00'
e	= 0.04
RO	= 36'
DS	= 30mph

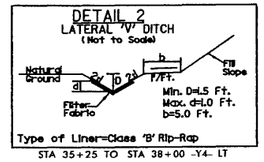
PI Sta	40+92.07
Δ	= 27° 25' 06.8" (RT)
D	= 29° 21' 34.5"
L	= 93.39'
T	= 47.61'
R	= 195.15'

DETAIL 18
CUT DITCH
(Not to Scale)



FROM STA. 34+50 TO STA. 35+25 -Y4- LT.

DETAIL 2
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner=Class 'B' Rip-Rap
STA 35+25 TO STA 38+00 -Y4- LT

TRAFFIC DIAGRAM

2008 ADT
2028 ADT

-Y4-		-Y4-
430 / 860	250 / 430	300 / 500 — 250 / 430
	-Y13- 250 / 430	

FOR -Y4- PROFILE SEE SHEET 27 & 28
FOR -Y13- PROFILE SEE SHEET 29

5/6/2008
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thuffman

5/28/9

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	18

ROADWAY DESIGN ENGINEER

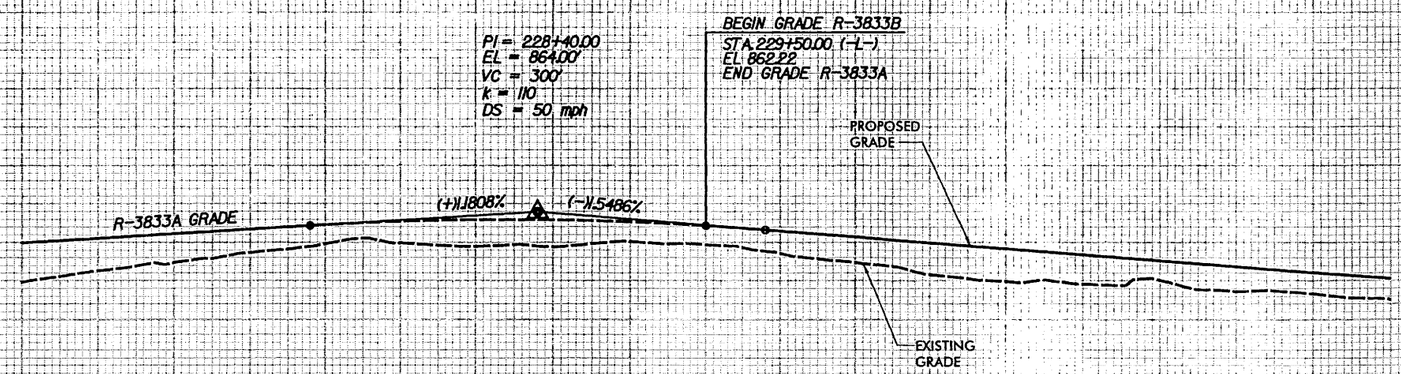
HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Singapore Design Group, P.A.

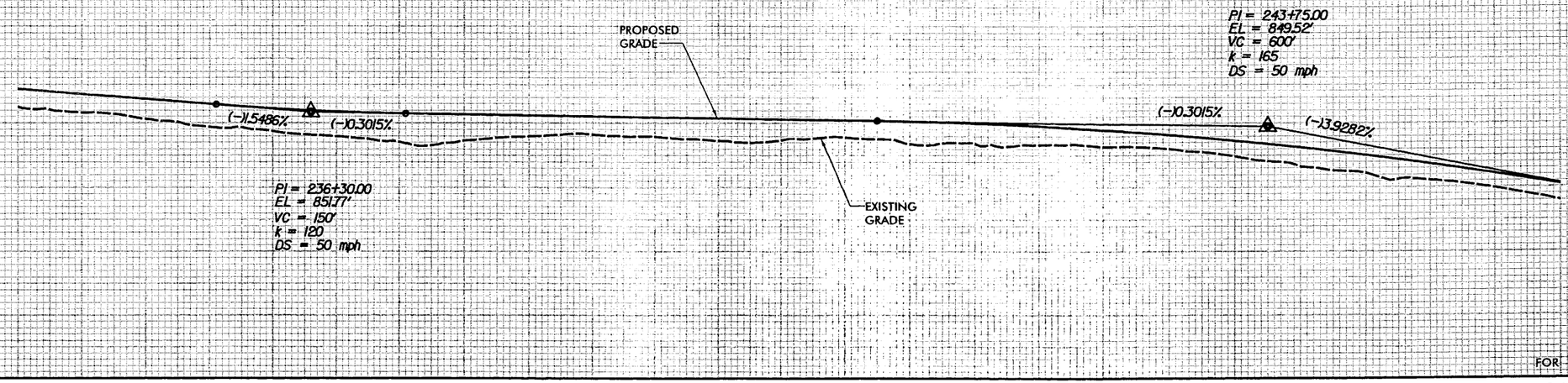
-L- (SR 1100)
BRAWLEY SCHOOL ROAD



FOR -L- PLAN SEE SHEET 4

BM11 - RR SPIKE IN THE ROOT OF 72" OAK TREE
N 672466.8112 E 1444681.3741
-BL- STA. 238+55 OFFSET 355.42' RT
ELEV 830.64

-L- (SR 1100)
BRAWLEY SCHOOL ROAD



FOR -L- PLAN SEE SHEET 5

5/6/2008
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thuffman

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	19

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15669 T. R. REID

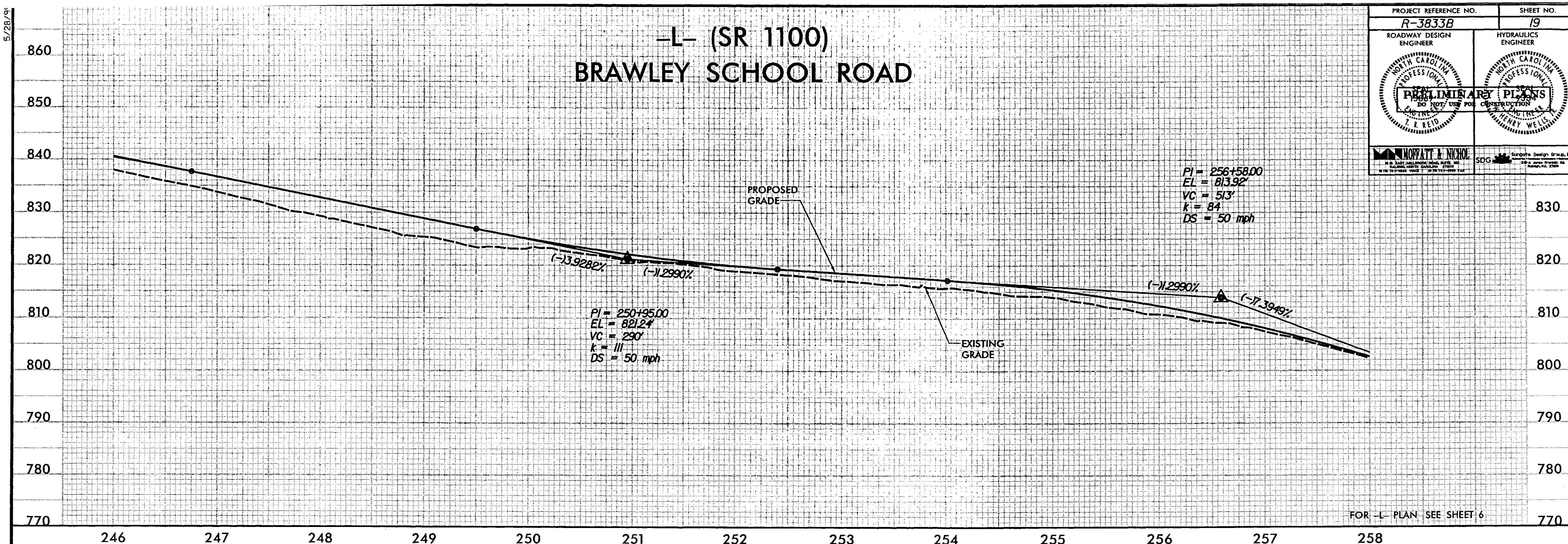
HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9334 HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

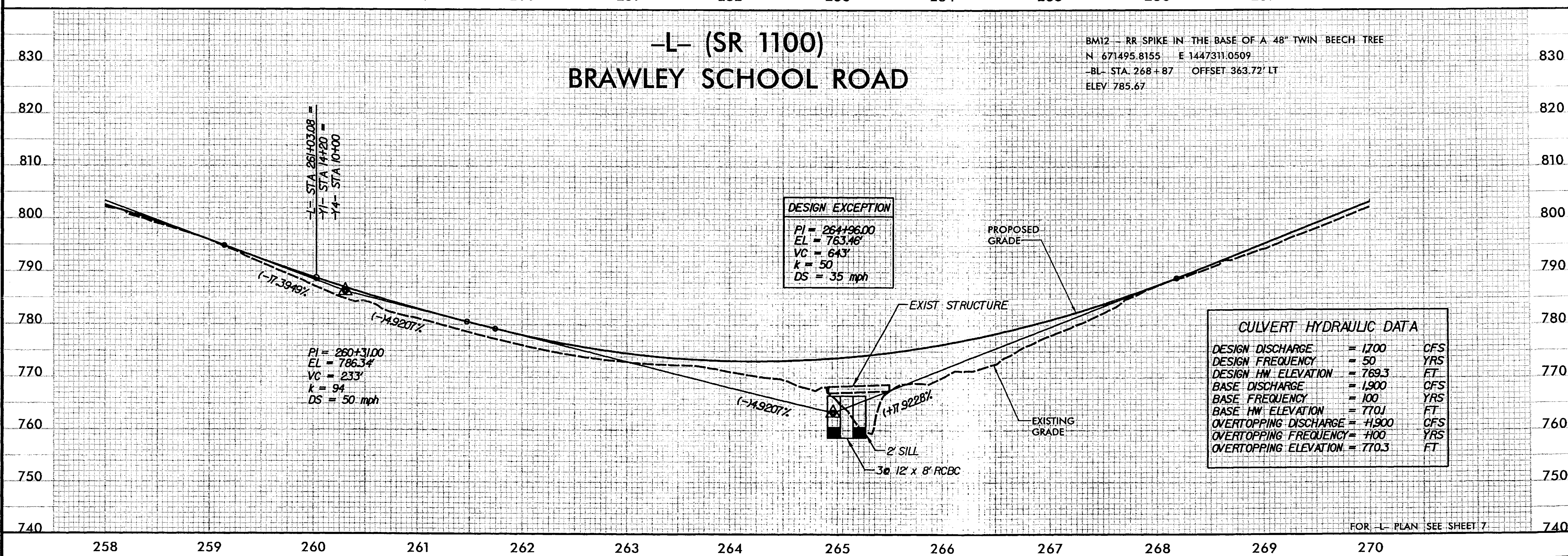
SDG Sungate Design Group, P.A.

-L- (SR 1100)
BRAWLEY SCHOOL ROAD



-L- (SR 1100)
BRAWLEY SCHOOL ROAD

BM12 – RR SPIKE IN THE BASE OF A 48" TWIN BEECH TREE
N 671495.8155 E 1447311.0509
-BL- STA. 268+87 OFFSET 363.72' LT
ELEV 785.67



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1,700	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 769.3	FT
BASE DISCHARGE	= 1,900	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 770.1	FT
OVERTOPPING DISCHARGE	= +1,900	CFS
OVERTOPPING FREQUENCY	= +100	YRS
OVERTOPPING ELEVATION	= 770.3	FT

5/6/2008
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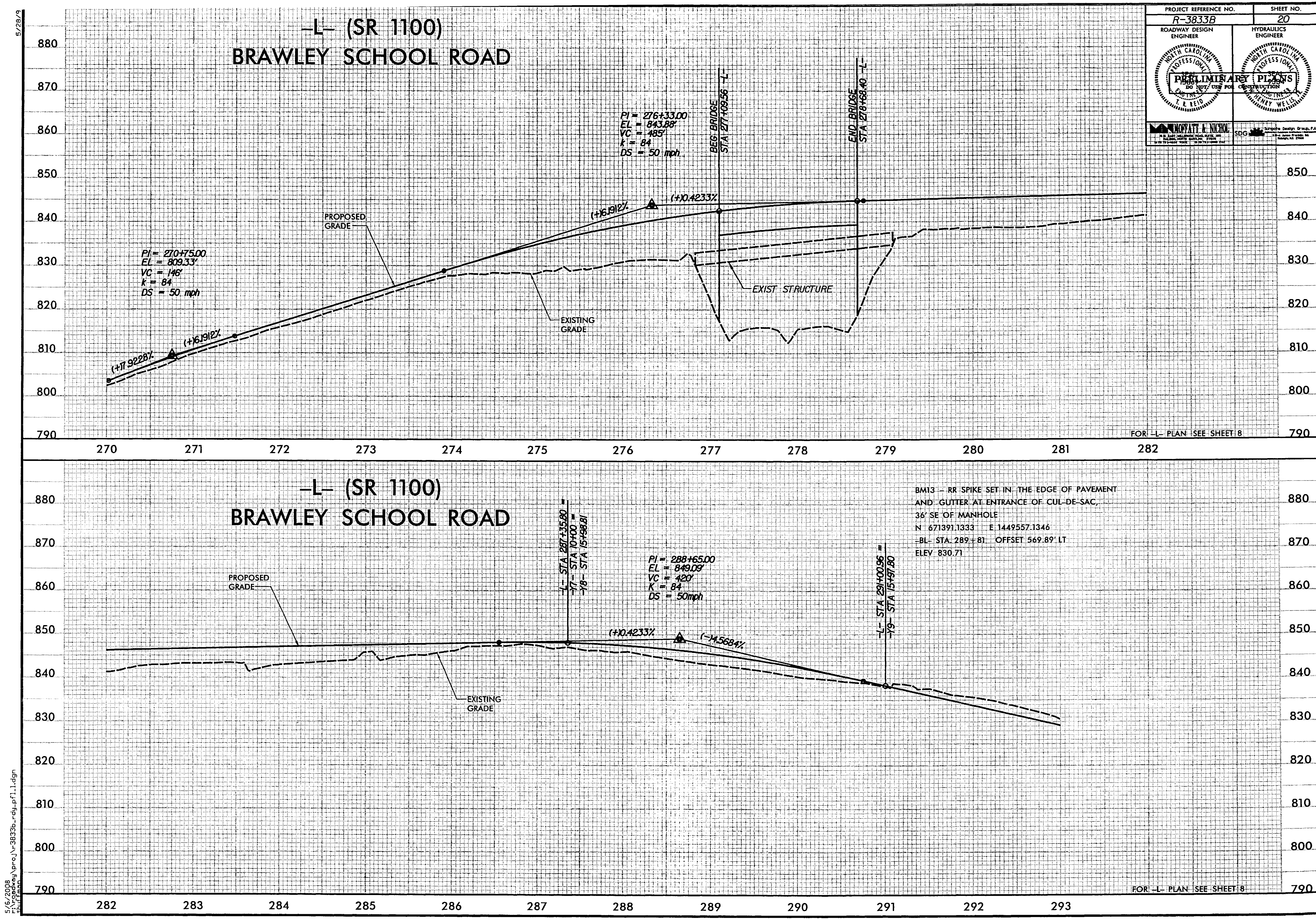
PROJECT REFERENCE NO.
R-3833B
SHEET NO.
20
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
T. R. REID
HENRY WELLS
MOFFATT & NICHOL
SDG
-L- (SR 1100)
BRAWLEY SCHOOL ROAD
PI = 270+75.00
EL = 809.33'
VC = 146'
k = 84
DS = 50 mph
PI = 276+33.00
EL = 843.88'
VC = 485'
k = 84
DS = 50 mph
BEG. BRIDGE STA 277+09.56 -L-
END BRIDGE STA 278+68.40 -L-
(+)17.9228%
(+)6.1912%
(+)6.1912%
(+)0.4233%
PROPOSED GRADE
EXISTING GRADE
EXIST STRUCTURE
FOR -L- PLAN SEE SHEET 8
-L- (SR 1100)
BRAWLEY SCHOOL ROAD
-L- STA 287+35.80 = -Y7- STA 10+00 = -Y8- STA 15+98.81
PI = 288+65.00
EL = 849.09'
VC = 420'
K = 84
DS = 50mph
-L- STA 291+00.96 = -Y9- STA 15+97.80
(+)0.4233%
(-)4.5684%
BM13 – RR SPIKE SET IN THE EDGE OF PAVEMENT
AND GUTTER AT ENTRANCE OF CUL-DE-SAC,
36' SE OF MANHOLE
N 671391.1333 E 1449557.1346
-BL- STA. 289+81 OFFSET 569.89' LT
ELEV 830.71
PROPOSED GRADE
EXISTING GRADE
FOR -L- PLAN SEE SHEET 8
5/6/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833B	21

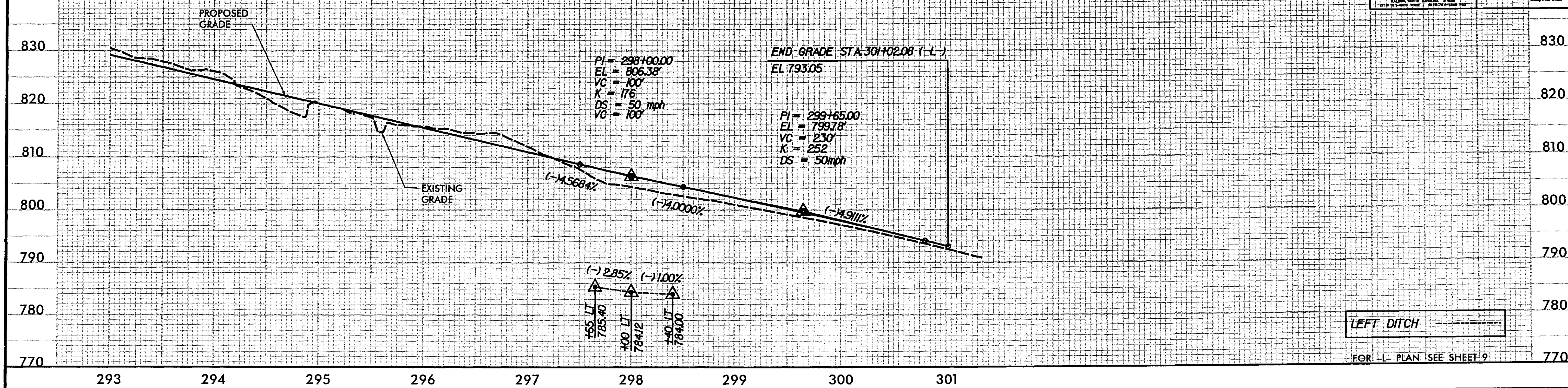
ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.

-L- (SR 1100)
BRAWLEY SCHOOL ROAD



FOR -L- PLAN SEE SHEET 9

5/6/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833B	22

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 15881 ENGINEER T. R. REID

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 23961 ENGINEER HENRY WELLS, JR.

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

MORFATT & NICHOL

SDG Singapore Design Group, P.A.

RAMP A (–RPA–)

BEGIN GRADE (–RPA–) STA 0+00.00 = (–Y6–) STA 39+47.85; O/S 46.00' (LT)
EL = 797.80

PI = 0+85.00
EL = 797.86'
VC = 60'
K = 196
DS = 70 mph

PI = 2+25.00
EL = 798.35'
VC = 50'
K = 196
DS = 70 mph

PI = 8+45.00
EL = 802.46'
VC = 428'
K = 80
DS = 45 mph

(+)0.0624%
(+)0.3561%
(+)0.6626%
(+)0.6626%
(+)5.9982%

EXISTING GRADE
PROPOSED GRADE

FOR RAMP A PLAN SEE SHEET 8 & 12

RAMP A (–RPA–)

END GRADE (–RPA–) STA 15+42.56 = (–L–) STA 278+63.86; O/S 143.58' (LT)
EL = 841.98
(BEGIN APPROACH SLAB)

FILL FACE OF THE STRUCTURE
(–RPA–) STA 15+83.70; EL = 842.626 = (–L–) STA 278+47.68; O/S 105.82' (LT)

PI = 14+90.00
EL = 841.15'
VC = 100'
K = 23
DS = 30 mph

(+)1.5751%
(+)5.9982%

PROPOSED GRADE
EXISTING GRADE

FOR –RPA– PLAN SEE SHEET 8 & 12

RAMP A1 (–RPA1–)

END GRADE (–RPA1–) STA 17+35.36 = (–L–) STA 280+47.30; O/S: 39'-6" (LT)
EL = 844.84

PI = 16+20.00
EL = 844.19'
VC = 100'
K = 55
DS = 40 MPH

PROPOSED GRADE
(+)2.3940%
(+)0.5660%
EXISTING GRADE

BEGIN GRADE (–RPA1–) STA 14+86.25 = (–RPA–) STA 14+83.21; O/S: 14'-0" (LT)
EL = 840.99

FOR –RPA1– PLAN SEE SHEET 8

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PROJECT REFERENCE NO.	SHEET NO.
R-3833B	23

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.

RAMP B (-RPB-)

BEGIN GRADE (-RPB-) STA 0+00.00 = (-Y6-) STA 37+02.34, 0/S 46.00' (RT)
EL = 798.66

PI = 2+30.00
EL = 797.32'
VC = 135'
K = 186
DS = 70 mph

PROPOSED GRADE

(-)0.5798%

(+)0.1456%

PI = 8+64.00
EL = 798.24'
VC = 460'
K = 98
DS = 50 mph

(+)0.1456%

(+)4.8449%

EXISTING GRADE

FOR -RPB- PLAN SEE SHEET 8, 11 & 12

RAMP B (-RPB-)

END GRADE (-RPB-) STA 17+21.20 = (-L-) STA 276+49.81, 0/S 166.56' (LT)
EL = 837.59
(BEGIN APPROACH SLAB)

FILL FACE OF STRUCTURE
(-RPB-) STA 17+80.93, EL=839.56 = (-L-) STA 276+83.91, 0/S 117.59' (LT)

PI = 15+80.00
EL = 832.93'
VC = 100'
K = 65
DS = 45 mph

(+)4.8449%

(+)3.2980%

PROPOSED GRADE

EXISTING GRADE

FOR -RPB- PLAN SEE SHEET 8, 11 & 12

RAMP B1 (-RPB1-)

BEGIN GRADE
(-RPB1-) STA 14+93.92 = (-RPB-) STA 14+93.92
EL = 828.76

END GRADE
(-RPB1-) STA 18+50.58 = (-L-) STA 275+84.88, 0/S 35'-6" (LT)
EL = 837.94

(+)4.9380%

(+)2.5486%

(+)0.4808%

PI = 16+15.00
EL = 834.74'
VC = 65'
K = 27
DS = 30 MPH

PI = 17+15.00
EL = 837.29'
VC = 95'
K = 46
DS = 40 MPH

PROPOSED GRADE

EXISTING GRADE

FOR -RPB1- PLAN SEE SHEET 8

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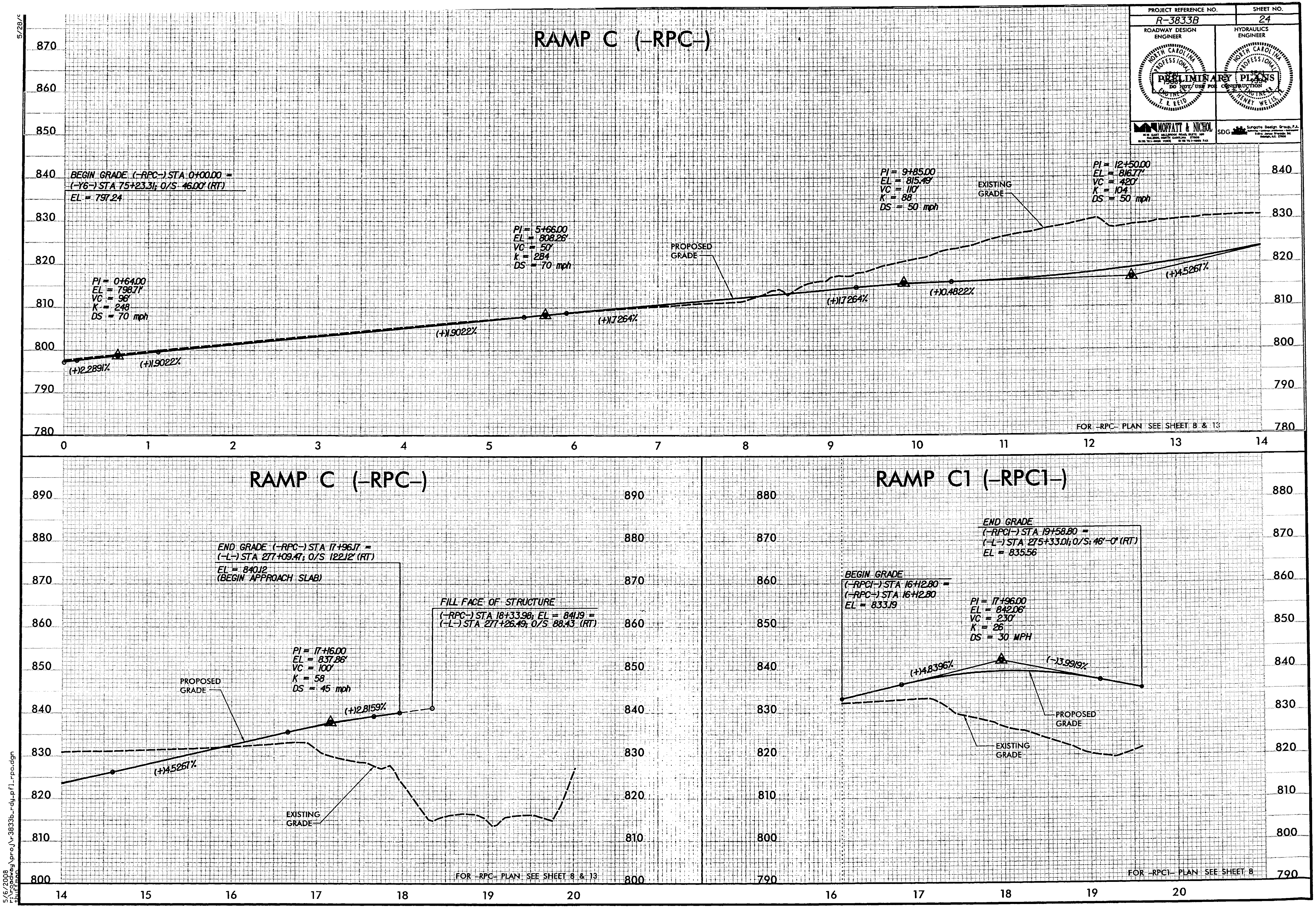

PROJECT REFERENCE NO.
R-3833B
SHEET NO.
24
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
T. R. REID
HENRY WELLS
MOFFATT & NICHOL
SDG
RAMP C (-RPC-)
BEGIN GRADE (-RPC-) STA 0+00.00 = (-Y6-) STA 75+23.31; 0/S 46.00' (RT)
EL = 797.24
PI = 0+64.00
EL = 798.71'
VC = 96'
K = 248
DS = 70 mph
(+)2.2891%
(+)1.9022%
PI = 5+66.00
EL = 808.26'
VC = 50'
k = 284
DS = 70 mph
(+)1.9022%
(+)1.7264%
PROPOSED GRADE
PI = 9+85.00
EL = 815.49'
VC = 110'
K = 88
DS = 50 mph
(+)1.7264%
(+)0.4822%
EXISTING GRADE
PI = 12+50.00
EL = 816.77'
VC = 420'
K = 104
DS = 50 mph
(+)4.5267%
FOR -RPC- PLAN SEE SHEET 8 & 13
RAMP C (-RPC-)
END GRADE (-RPC-) STA 17+96.17 = (-L-) STA 277+09.47; 0/S 122.12' (RT)
EL = 840.12
(BEGIN APPROACH SLAB)
FILL FACE OF STRUCTURE
(-RPC-) STA 18+33.98; EL = 841.19 = (-L-) STA 277+26.49; 0/S 88.43 (RT)
PI = 17+16.00
EL = 837.86'
VC = 100'
K = 58
DS = 45 mph
(+)2.8159%
PROPOSED GRADE
(+)4.5267%
EXISTING GRADE
FOR -RPC- PLAN SEE SHEET 8 & 13
RAMP C1 (-RPC1-)
END GRADE
(-RPC1-) STA 19+58.80 =
(-L-) STA 275+33.01; 0/S: 46'-0" (RT)
EL = 835.56
BEGIN GRADE
(-RPC1-) STA 16+12.80 =
(-RPC-) STA 16+12.80
EL = 833.19
PI = 17+96.00
EL = 842.06'
VC = 230'
K = 26
DS = 30 MPH
(+)4.8396%
(-)3.9919%
PROPOSED GRADE
EXISTING GRADE
FOR -RPC1- PLAN SEE SHEET 8
5/6/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833B	25

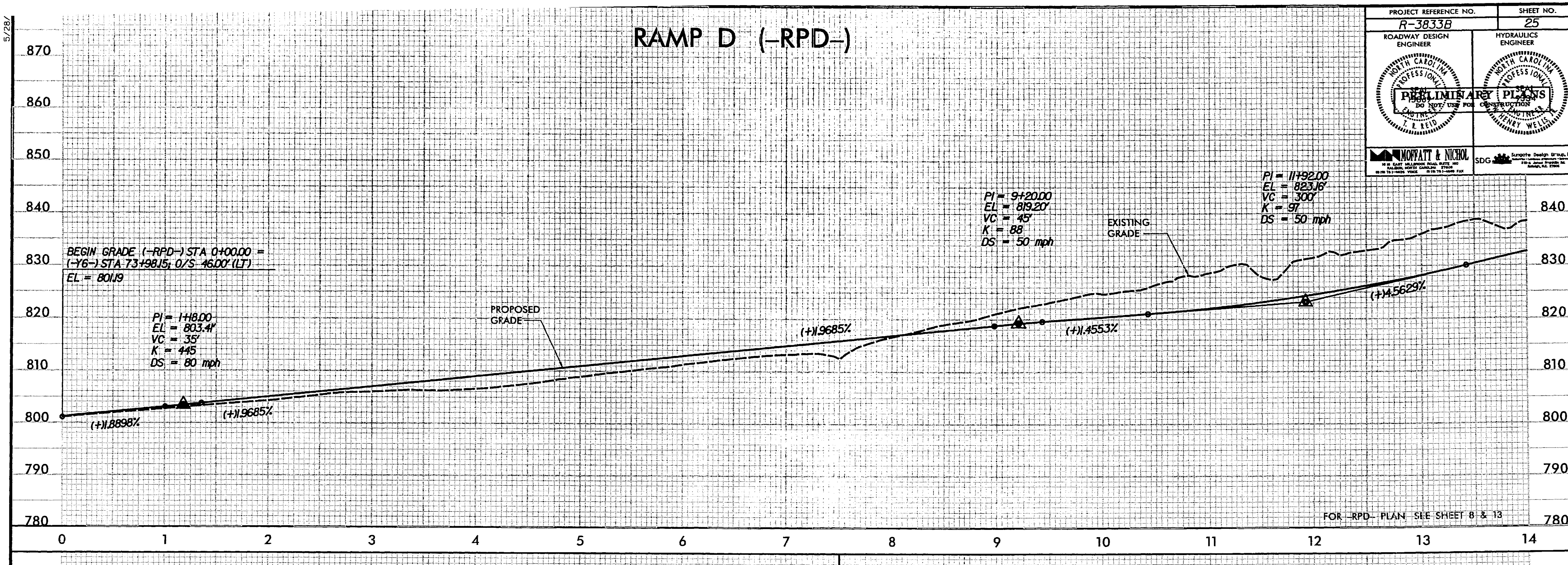
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15869 T. R. REID

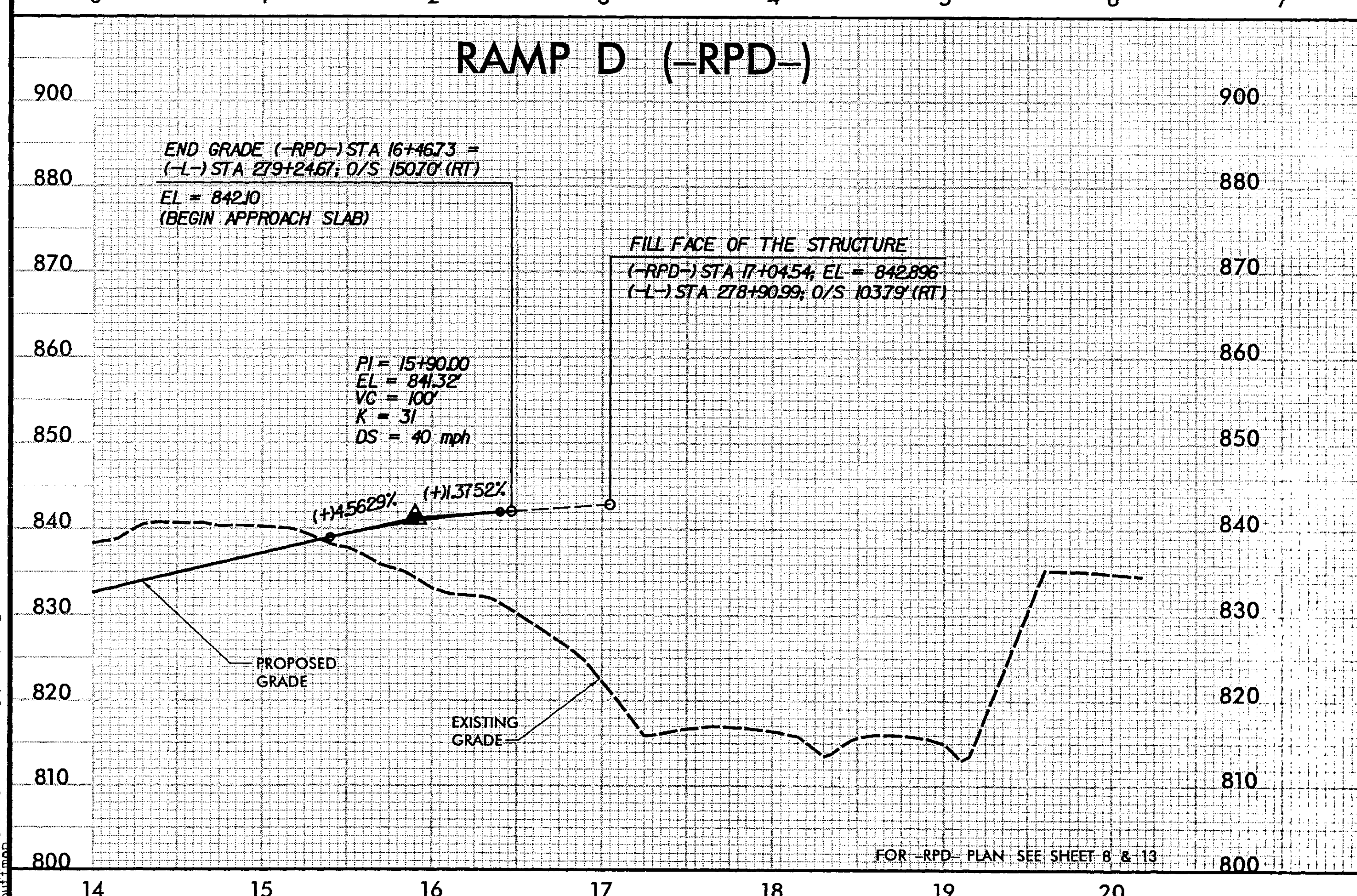
HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 7334 W. HENRY WELLS JR.

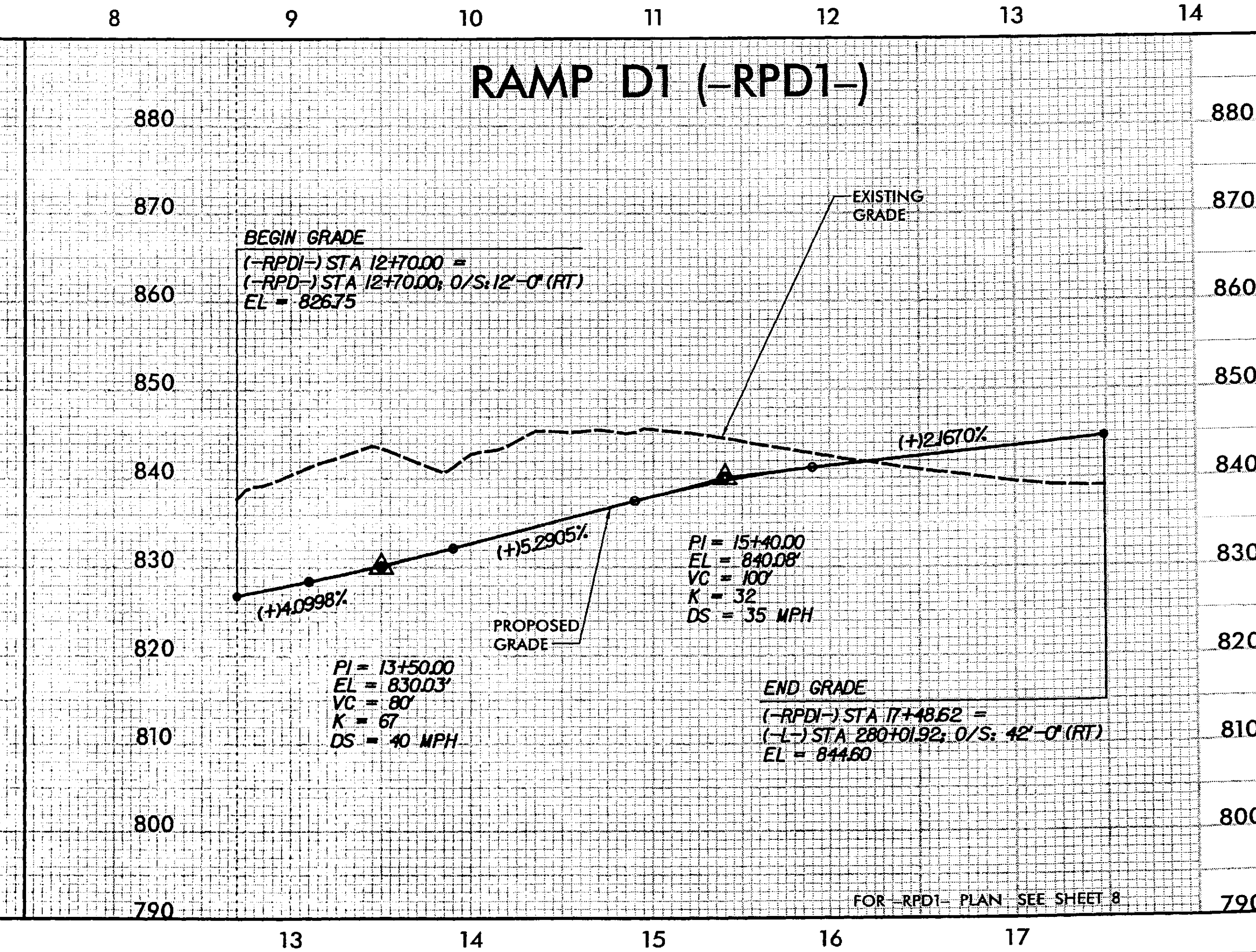
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.







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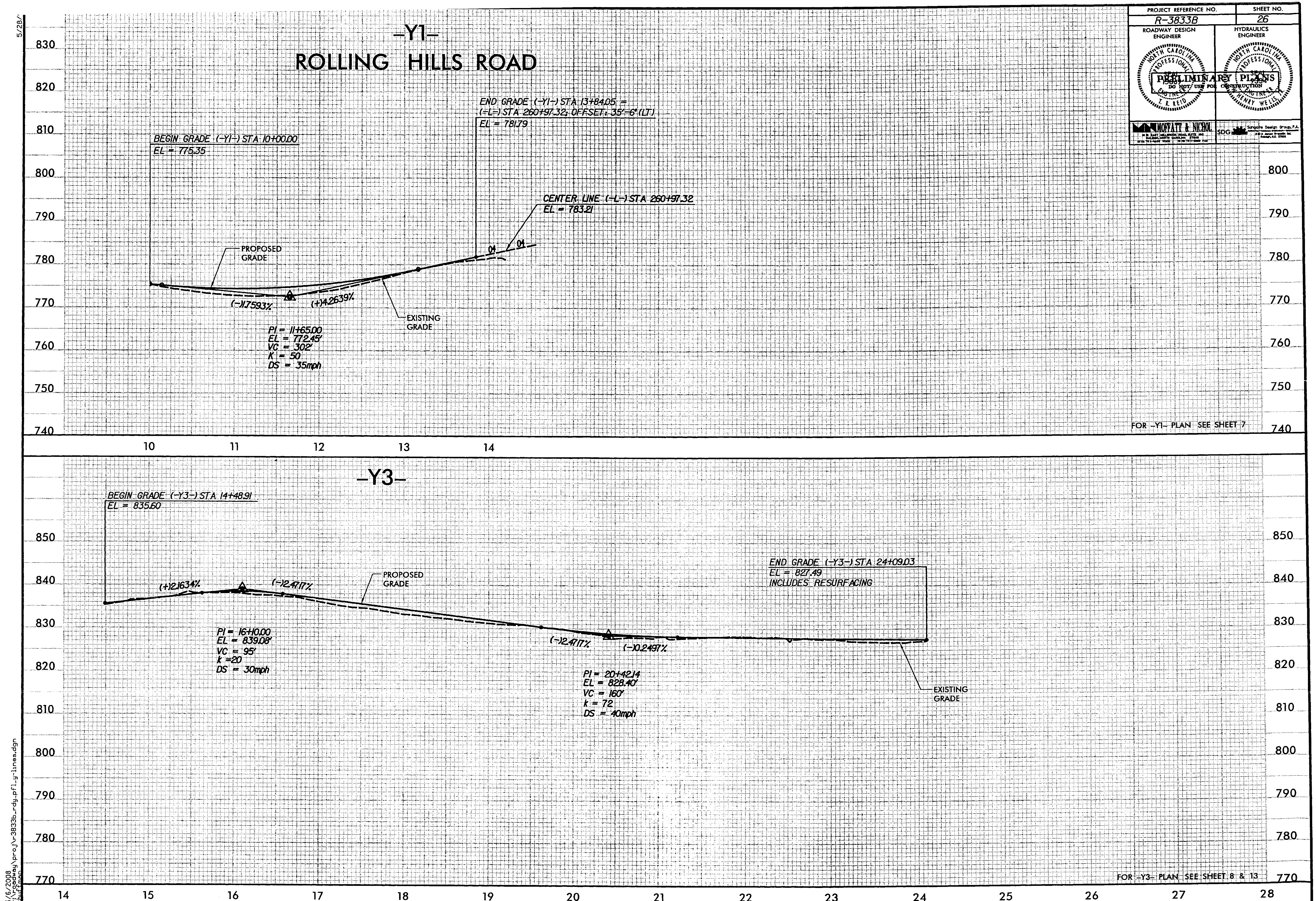
PROJECT REFERENCE NO.
R-3833B
SHEET NO.
26
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
MOFFATT & NICHOL
SDG
-Y1-
ROLLING HILLS ROAD
END GRADE (-Y1-) STA 13+84.05 =
(-L-) STA 260+97.32; OFFSET: 35'-6" (LT)
EL = 781.79
BEGIN GRADE (-Y1-) STA 10+00.00
EL = 775.35
CENTER LINE (-L-) STA 260+97.32
EL = 783.21
PROPOSED GRADE
(-)1.7593%
(+)4.2639%
EXISTING GRADE
PI = 11+65.00
EL = 772.45'
VC = 302'
K = 50
DS = 35mph
FOR -Y1- PLAN SEE SHEET 7
-Y3-
BEGIN GRADE (-Y3-) STA 14+48.91
EL = 835.60
(+)2.1634%
(-)2.4717%
PROPOSED GRADE
END GRADE (-Y3-) STA 24+09.03
EL = 827.49
INCLUDES RESURFACING
PI = 16+10.00
EL = 839.08'
VC = 95'
k = 20
DS = 30mph
(-)2.4717%
(-)0.2497%
PI = 20+42.14
EL = 828.40'
VC = 160'
k = 72
DS = 40mph
EXISTING GRADE
FOR -Y3- PLAN SEE SHEET 8 & 13
5/6/2008
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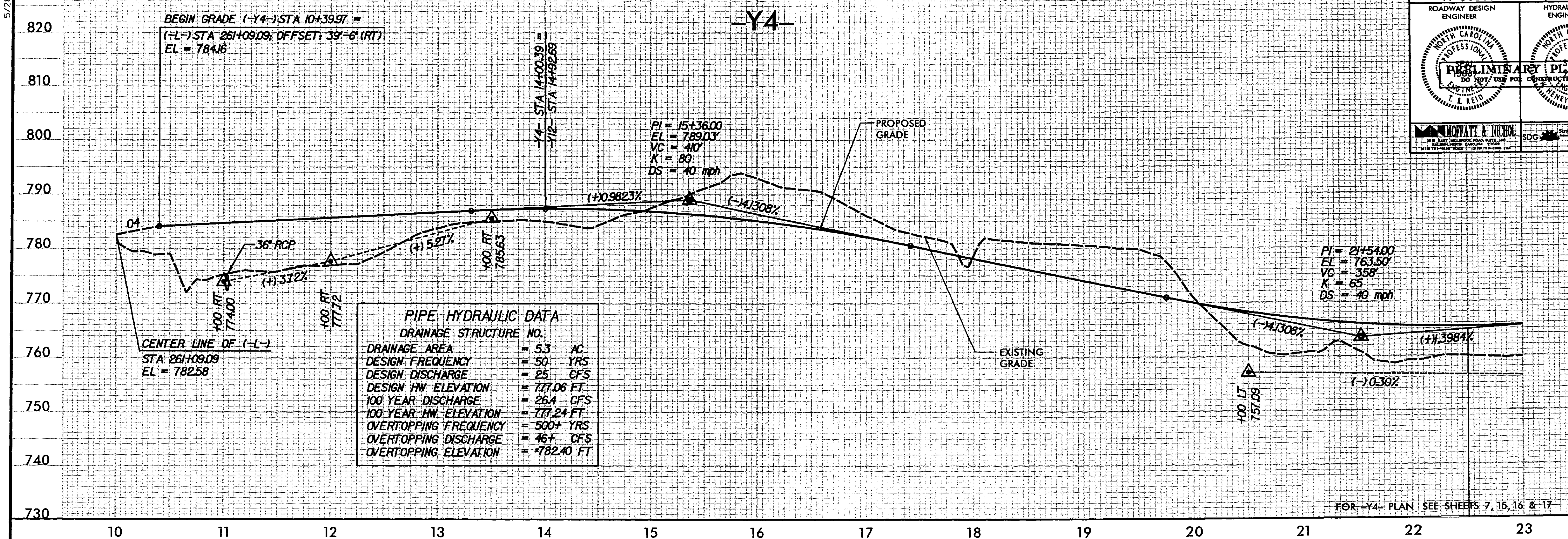
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	27

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL — SDG Sungate Design Group, P.A.

-Y4-

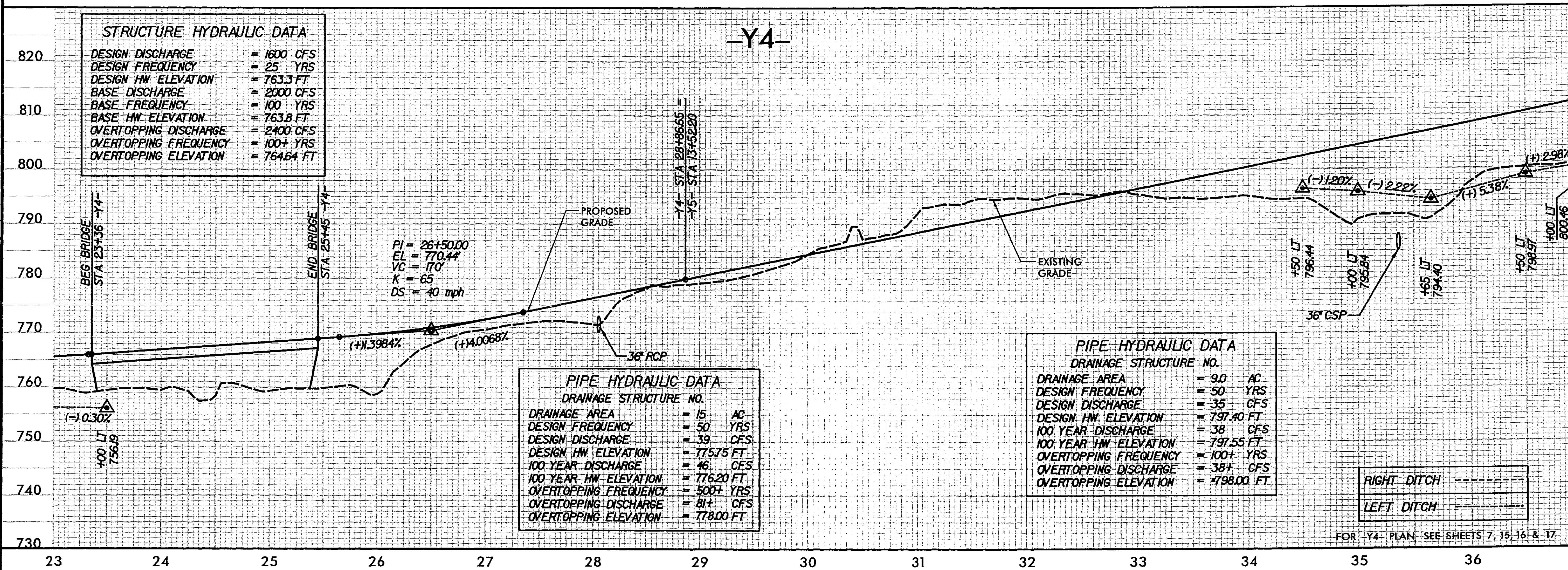


PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 5.3 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 25 CFS
DESIGN HW ELEVATION	= 777.06 FT
100 YEAR DISCHARGE	= 26.4 CFS
100 YEAR HW ELEVATION	= 777.24 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 46+ CFS
OVERTOPPING ELEVATION	= ±782.40 FT

-Y4-



STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 1600 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 763.3 FT
BASE DISCHARGE	= 2000 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 763.8 FT
OVERTOPPING DISCHARGE	= 2400 CFS
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING ELEVATION	= 764.64 FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 15 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 39 CFS
DESIGN HW ELEVATION	= 775.75 FT
100 YEAR DISCHARGE	= 46 CFS
100 YEAR HW ELEVATION	= 776.20 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 81+ CFS
OVERTOPPING ELEVATION	= 778.00 FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 9.0 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 35 CFS
DESIGN HW ELEVATION	= 797.40 FT
100 YEAR DISCHARGE	= 38 CFS
100 YEAR HW ELEVATION	= 797.55 FT
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING DISCHARGE	= 38+ CFS
OVERTOPPING ELEVATION	= ±798.00 FT

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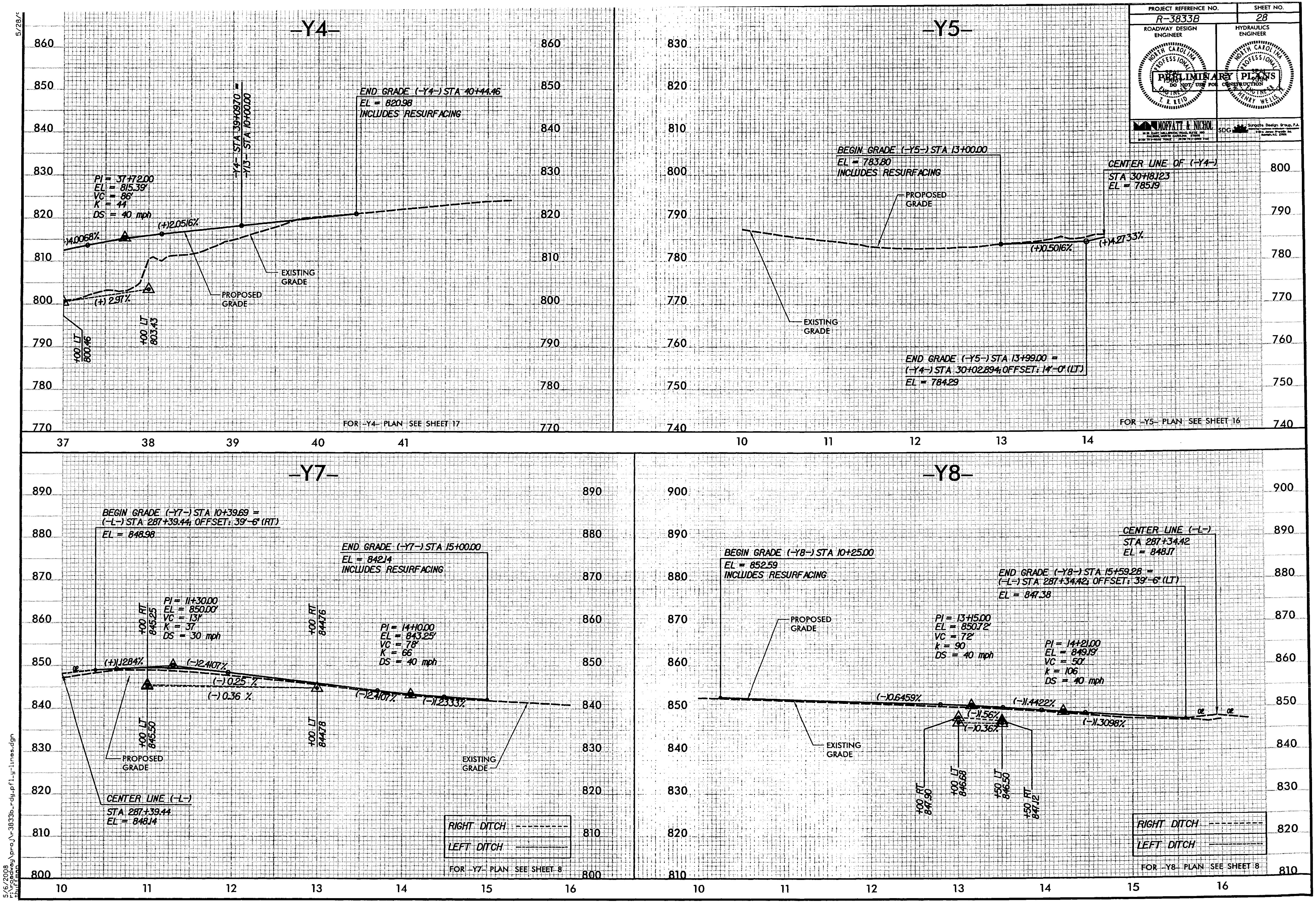

PROJECT REFERENCE NO. R-3833B
SHEET NO. 28
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
T. R. REID
HENRY WELLS
MOFFATT & NICHOL
Sungate Design Group, P.A.
-Y4-
END GRADE (-Y4-) STA 40+44.46
EL = 820.98
INCLUDES RESURFACING
-Y4- STA 39+09.70 =
-Y13- STA 10+00.00
PI = 37+72.00
EL = 815.39'
VC = 86'
K = 44
DS = 40 mph
(+)4.0068%
(+)2.0516%
(+) 2.97%
EXISTING GRADE
PROPOSED GRADE
+00 LT 800.46
+00 LT 803.43
FOR -Y4- PLAN SEE SHEET 17
-Y5-
BEGIN GRADE (-Y5-) STA 13+00.00
EL = 783.80
INCLUDES RESURFACING
PROPOSED GRADE
CENTER LINE OF (-Y4-)
STA 30+18.123
EL = 785.19
(+)0.5016%
(+)4.2733%
EXISTING GRADE
END GRADE (-Y5-) STA 13+99.00 =
(-Y4-) STA 30+02.894; OFFSET: 14'-0" (LT)
EL = 784.29
FOR -Y5- PLAN SEE SHEET 16
-Y7-
BEGIN GRADE (-Y7-) STA 10+39.69 =
(-L-) STA 287+39.44; OFFSET: 39'-6" (RT)
EL = 848.98
END GRADE (-Y7-) STA 15+00.00
EL = 842.14
INCLUDES RESURFACING
+00 RT 845.25
PI = 11+30.00
EL = 850.00'
VC = 131'
K = 37
DS = 30 mph
+00 RT 844.76
PI = 14+10.00
EL = 843.25'
VC = 78'
K = 66
DS = 40 mph
(+)1.1284%
(-)2.4107%
(-) 0.25 %
(-) 0.36 %
(-)2.4107%
(-)1.2333%
+00 LT 845.50
+00 LT 844.78
PROPOSED GRADE
EXISTING GRADE
CENTER LINE (-L-)
STA 287+39.44
EL = 848.14
RIGHT DITCH
LEFT DITCH
FOR -Y7- PLAN SEE SHEET 8
-Y8-
CENTER LINE (-L-)
STA 287+34.42
EL = 848.17
BEGIN GRADE (-Y8-) STA 10+25.00
EL = 852.59
INCLUDES RESURFACING
END GRADE (-Y8-) STA 15+59.28 =
(-L-) STA 287+34.42; OFFSET: 39'-6" (LT)
EL = 847.38
PROPOSED GRADE
PI = 13+15.00
EL = 850.72'
VC = 72'
k = 90
DS = 40 mph
PI = 14+21.00
EL = 849.19'
VC = 50'
k = 106
DS = 40 mph
(-)0.6459%
(-)1.4422%
(-)1.56%
(-)0.36%
(-)1.3098%
EXISTING GRADE
+00 RT 847.90
+00 LT 846.68
+50 LT 846.50
+50 RT 847.12
RIGHT DITCH
LEFT DITCH
FOR -Y8- PLAN SEE SHEET 8
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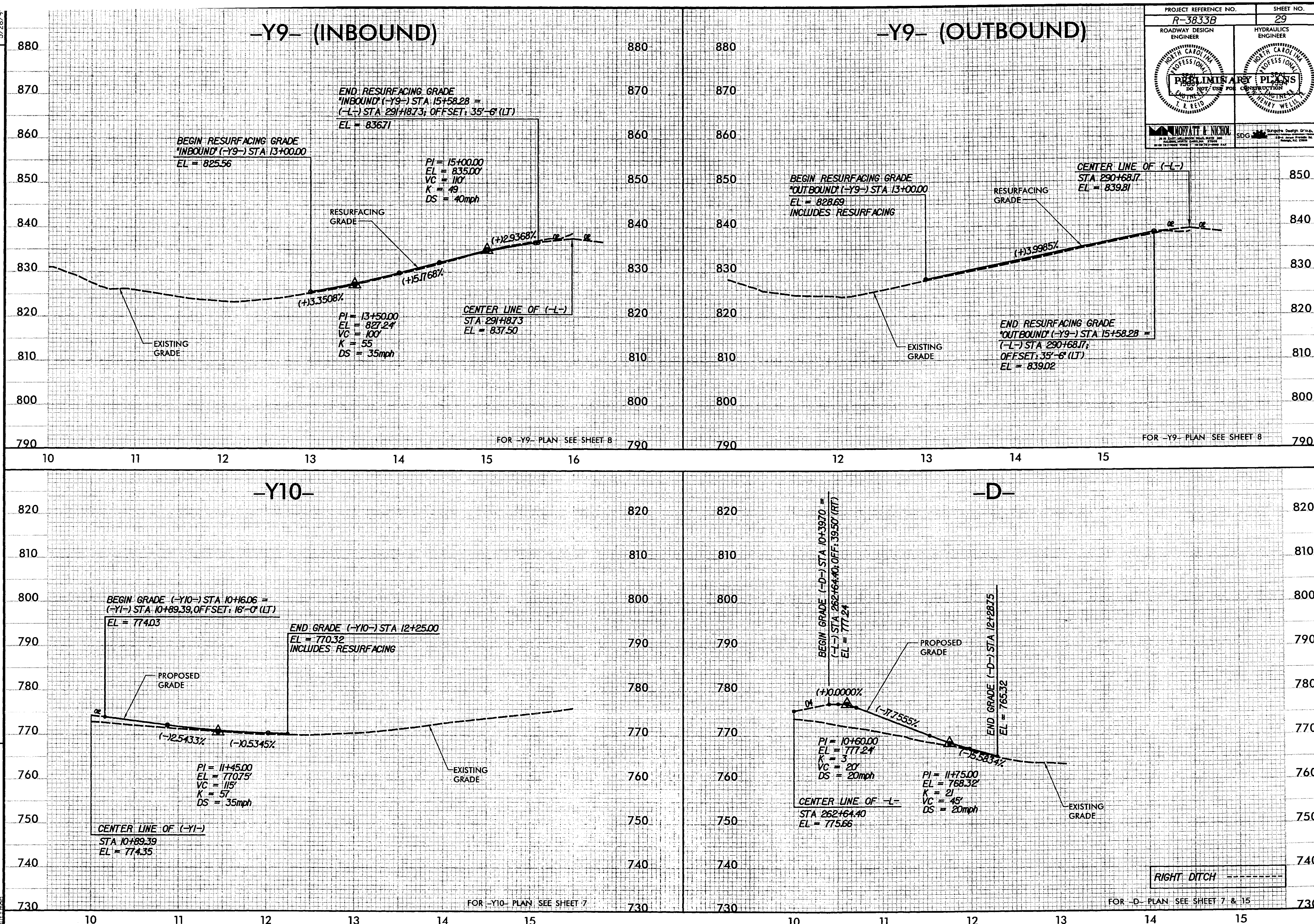
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	29

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL — SDG Sungate Design Group, P.A.



-Y9- (INBOUND)
BEGIN RESURFACING GRADE "INBOUND" (-Y9-) STA 13+00.00
EL = 825.56
END RESURFACING GRADE "INBOUND" (-Y9-) STA 15+58.28 = (-L-) STA 291+18.73; OFFSET: 35'-6" (LT)
EL = 836.71
PI = 15+00.00 EL = 835.00' VC = 110' K = 49 DS = 40mph
RESURFACING GRADE
(+)2.9368%
(+)5.1768%
(+)3.3508%
PI = 13+50.00 EL = 827.24' VC = 100' K = 55 DS = 35mph
CENTER LINE OF (-L-) STA 291+18.73 EL = 837.50
EXISTING GRADE
FOR -Y9- PLAN SEE SHEET 8
-Y9- (OUTBOUND)
BEGIN RESURFACING GRADE "OUTBOUND" (-Y9-) STA 13+00.00
EL = 828.69
INCLUDES RESURFACING
CENTER LINE OF (-L-) STA 290+68.17 EL = 839.81
RESURFACING GRADE
(+)3.9985%
END RESURFACING GRADE "OUTBOUND" (-Y9-) STA 15+58.28 = (-L-) STA 290+68.17; OFFSET: 35'-6" (LT)
EL = 839.02
EXISTING GRADE
FOR -Y9- PLAN SEE SHEET 8
-Y10-
BEGIN GRADE (-Y10-) STA 10+16.06 = (-Y1-) STA 10+89.39, OFFSET: 16'-0" (LT)
EL = 774.03
END GRADE (-Y10-) STA 12+25.00
EL = 770.32
INCLUDES RESURFACING
PROPOSED GRADE
(-)2.5433%
(-)0.5345%
PI = 11+45.00 EL = 770.75' VC = 115' K = 57 DS = 35mph
EXISTING GRADE
CENTER LINE OF (-Y1-) STA 10+89.39 EL = 774.35
FOR -Y10- PLAN SEE SHEET 7
-D-
BEGIN GRADE (-D-) STA 10+39.70 = (-L-) STA 262+64.40; OFF: 39.50' (RT)
EL = 777.24
END GRADE (-D-) STA 12+28.75
EL = 765.32
PROPOSED GRADE
(+)0.0000%
(-)17.7555%
(-)5.5834%
PI = 10+60.00 EL = 777.24' K = 3 VC = 20' DS = 20mph
PI = 11+75.00 EL = 768.32' K = 21 VC = 45' DS = 20mph
CENTER LINE OF -L- STA 262+64.40 EL = 775.66
EXISTING GRADE
RIGHT DITCH
FOR -D- PLAN SEE SHEET 7 & 15

REVISIONS

DATE: 01/26/2007 -REVISED PROFILE FOR -D-

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PROJECT REFERENCE NO.	SHEET NO.
R-3833B	30

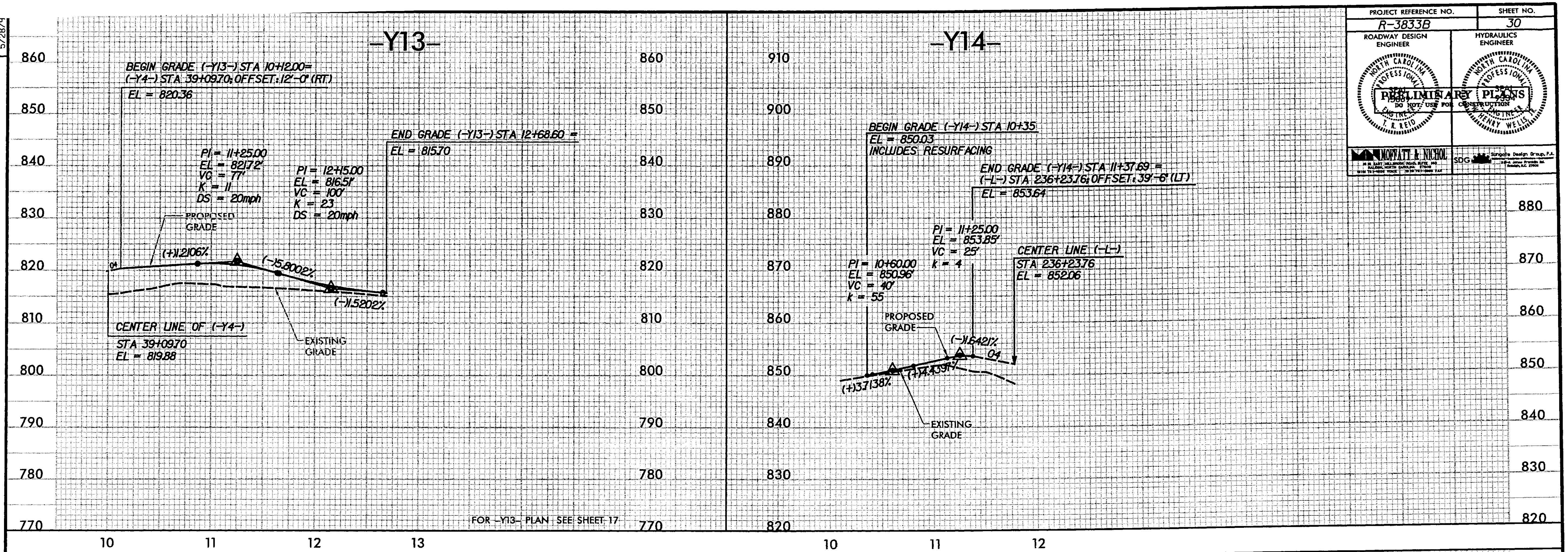
ROADWAY DESIGN ENGINEER — T. R. REID (North Carolina Professional Engineer seal)

HYDRAULICS ENGINEER — HENRY WELLS, JR. (North Carolina Professional Engineer seal)

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.



-Y13-
BEGIN GRADE (-Y13-) STA 10+12.00=
(-Y4-) STA 39+09.70; OFFSET: 12'-0" (RT.)
EL = 820.36
END GRADE (-Y13-) STA 12+68.60 =
EL = 815.70
PI = 11+25.00
EL = 821.72'
VC = 77'
K = 11
DS = 20mph
PI = 12+15.00
EL = 816.51'
VC = 100'
K = 23
DS = 20mph
PROPOSED GRADE
(+)1.2106%
(-)5.8002%
(-)1.5202%
EXISTING GRADE
CENTER LINE OF (-Y4-)
STA 39+09.70
EL = 819.88
FOR -Y13- PLAN SEE SHEET 17
-Y14-
BEGIN GRADE (-Y14-) STA 10+35
EL = 850.03
INCLUDES RESURFACING
END GRADE (-Y14-) STA 11+37.69 =
(-L-) STA 236+23.76; OFFSET: 39'-6" (LT)
EL = 853.64
PI = 11+25.00
EL = 853.85'
VC = 25'
k = 4
CENTER LINE (-L-)
STA 236+23.76
EL = 852.06
PI = 10+60.00
EL = 850.96'
VC = 40'
k = 55
PROPOSED GRADE
(-)1.6421%
(+)3.7138%
(+)4.4391%
EXISTING GRADE

REVISIONS

DATE: 01/26/2007 -ADDED PROFILE FOR -Y14- (OAK FORK DRIVE)

5/6/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-3833B	31

ROADWAY DESIGN ENGINEER — T. R. REID

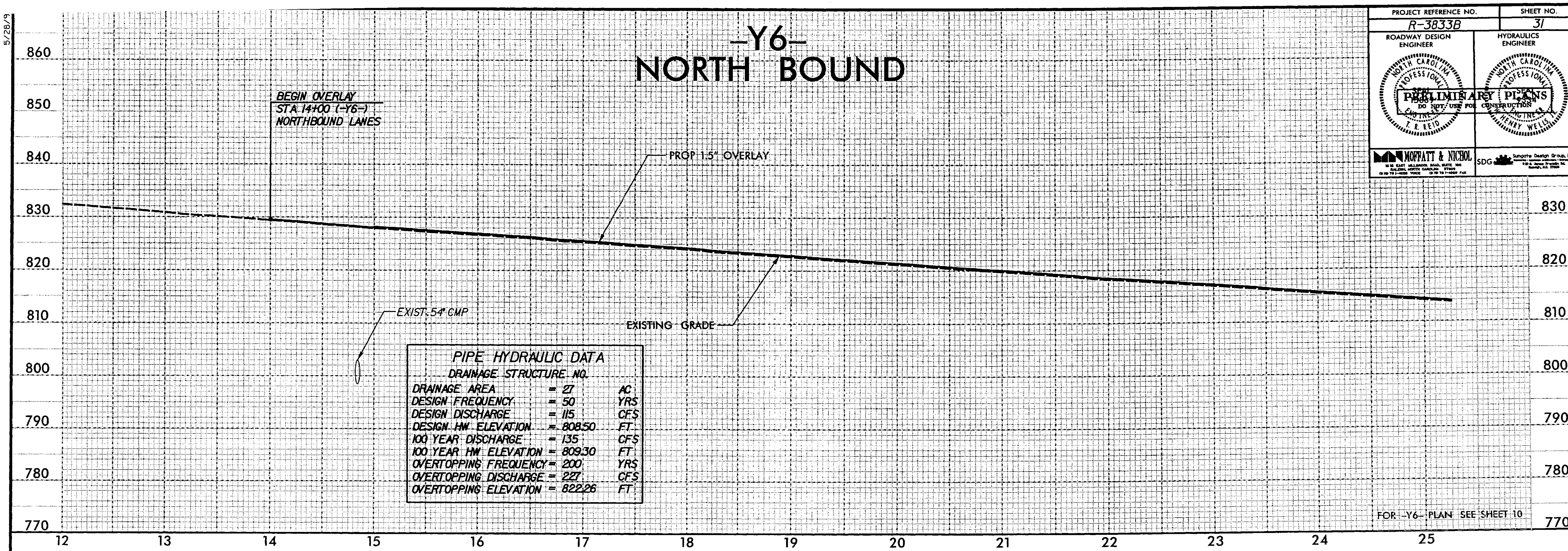
HYDRAULICS ENGINEER — HENRY WELLS, JR.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Sungate Design Group, P.A.

-Y6- NORTH BOUND



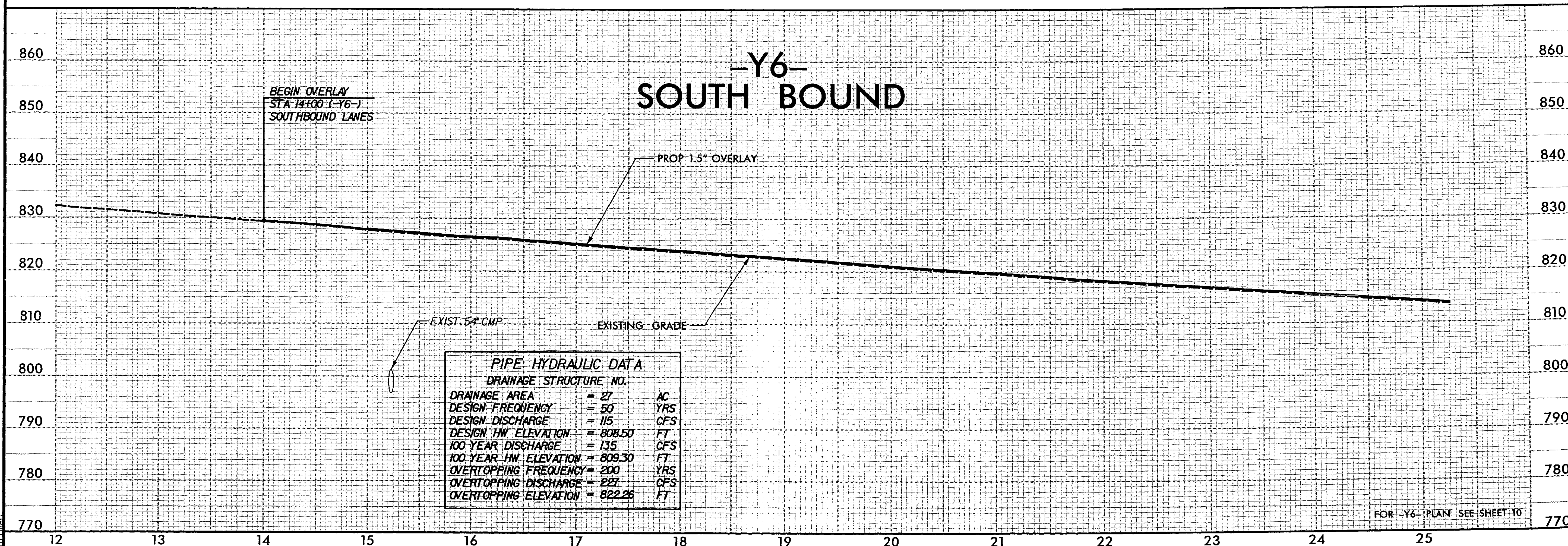
PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 27	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 115	CFS
DESIGN HW ELEVATION	= 808.50	FT
100 YEAR DISCHARGE	= 135	CFS
100 YEAR HW ELEVATION	= 809.30	FT
OVERTOPPING FREQUENCY	= 200	YRS
OVERTOPPING DISCHARGE	= 227	CFS
OVERTOPPING ELEVATION	= 822.26	FT

FOR -Y6- PLAN SEE SHEET 10

-Y6- SOUTH BOUND



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 27	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 115	CFS
DESIGN HW ELEVATION	= 808.50	FT
100 YEAR DISCHARGE	= 135	CFS
100 YEAR HW ELEVATION	= 809.30	FT
OVERTOPPING FREQUENCY	= 200	YRS
OVERTOPPING DISCHARGE	= 227	CFS
OVERTOPPING ELEVATION	= 822.26	FT

FOR -Y6- PLAN SEE SHEET 10

5/28/9

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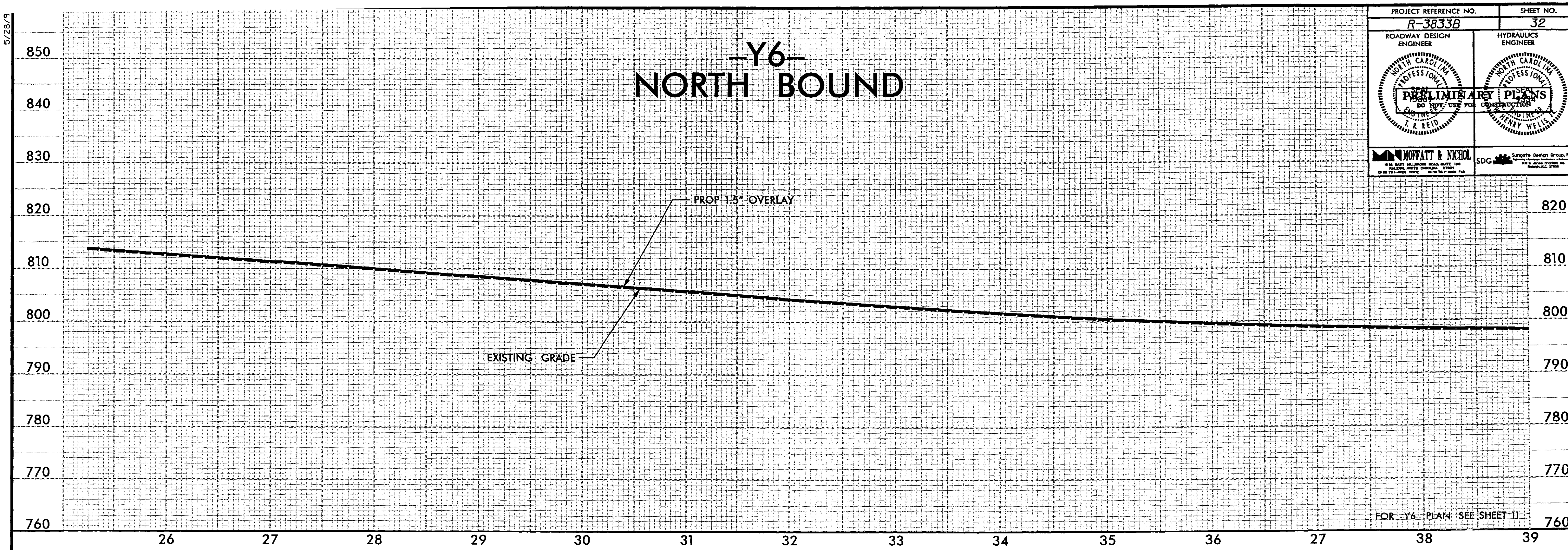
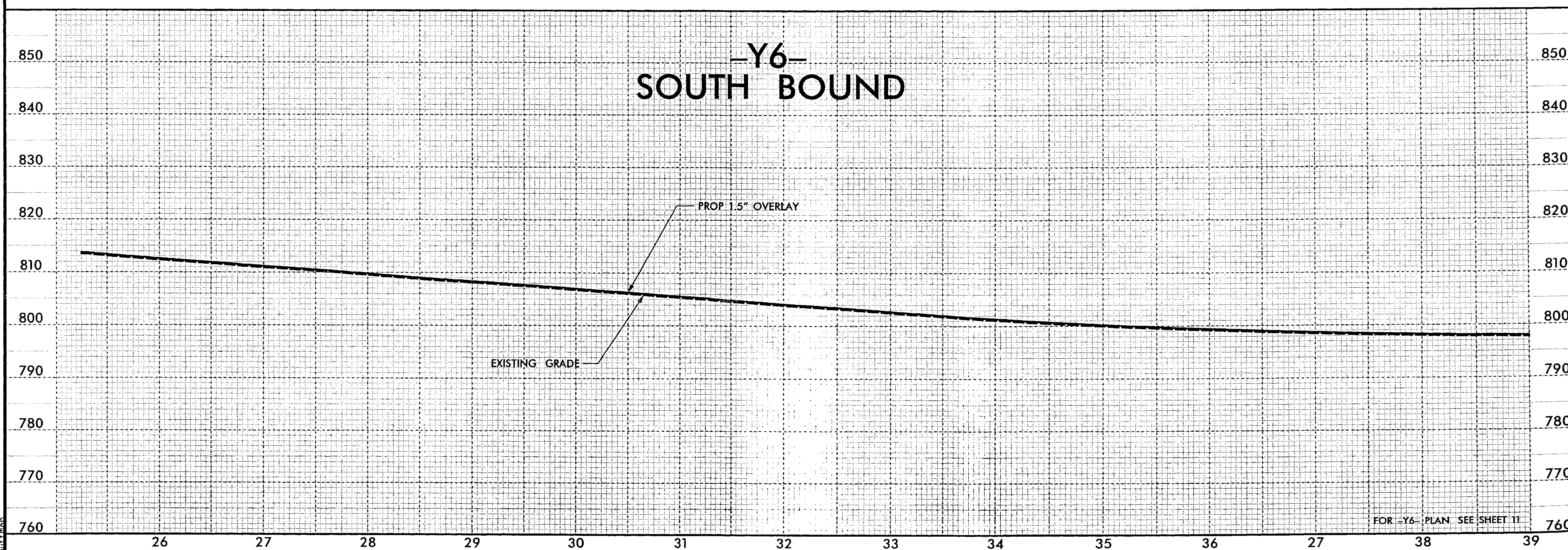
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	32

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL — SDG Sungate Design Group, P.A.





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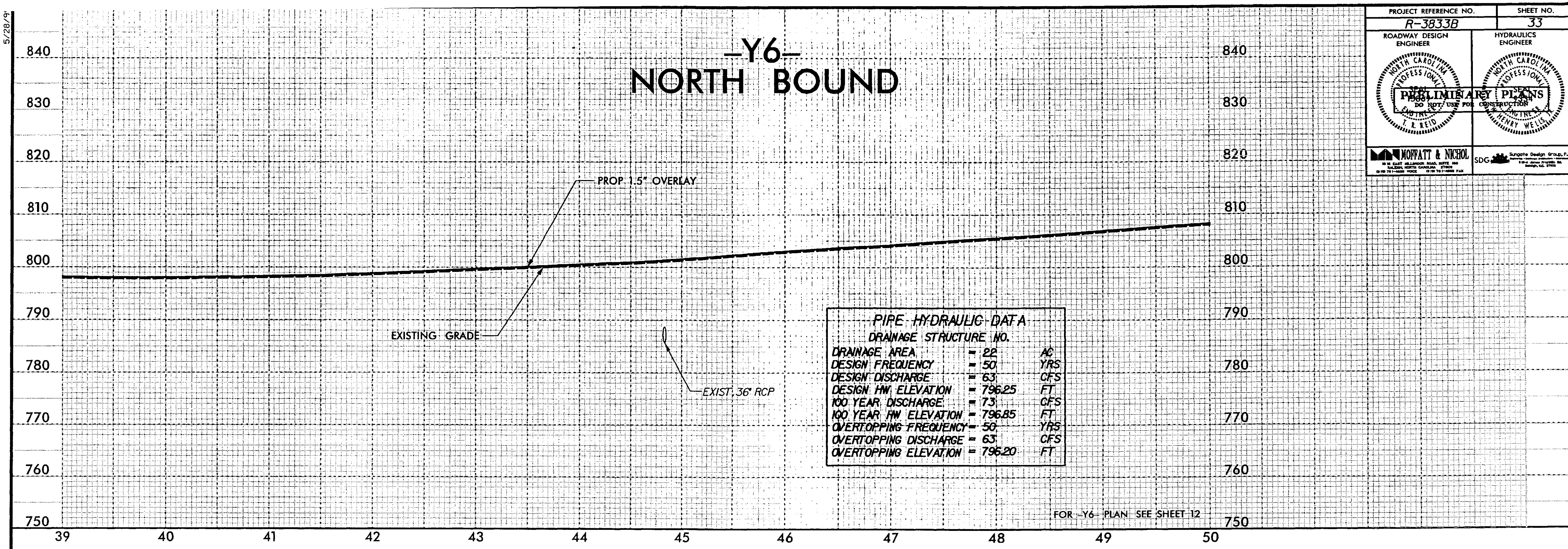
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	33

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL
SDG Sungate Design Group, P.A.

-Y6- NORTH BOUND

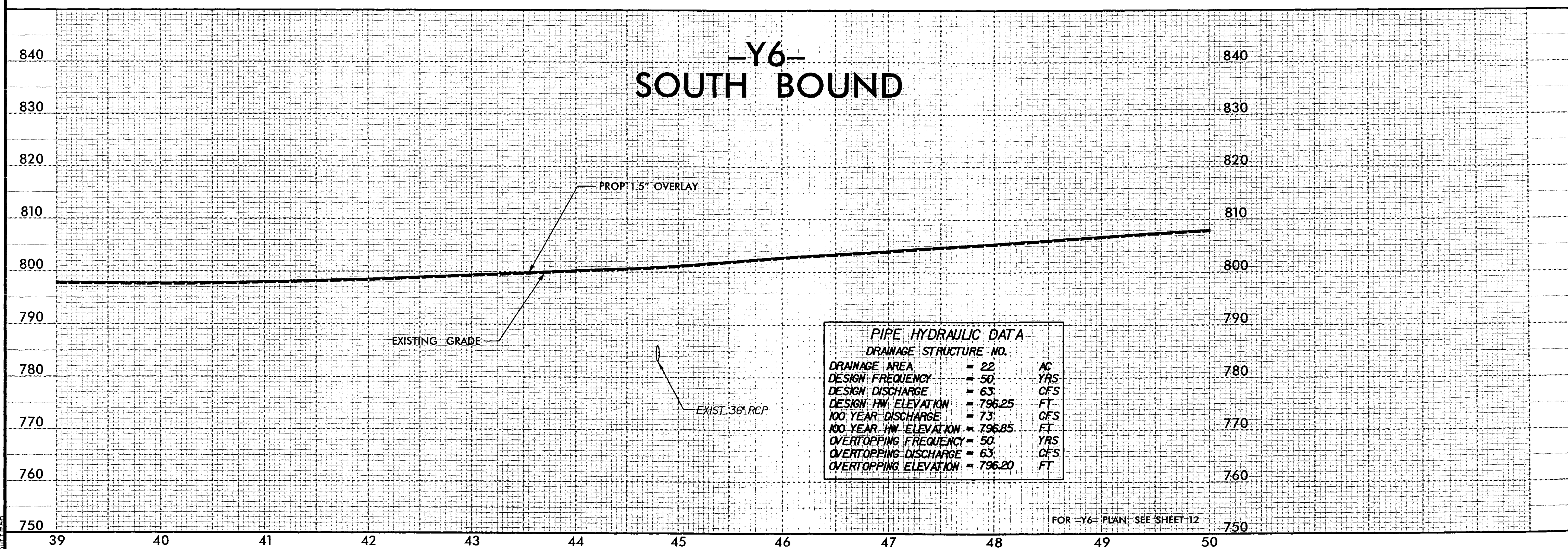


PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 22	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 63	CFS
DESIGN HW ELEVATION	= 796.25	FT
100 YEAR DISCHARGE	= 73	CFS
100 YEAR HW ELEVATION	= 796.85	FT
OVERTOPPING FREQUENCY	= 50	YRS
OVERTOPPING DISCHARGE	= 63	CFS
OVERTOPPING ELEVATION	= 796.20	FT

-Y6- SOUTH BOUND



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 22	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 63	CFS
DESIGN HW ELEVATION	= 796.25	FT
100 YEAR DISCHARGE	= 73	CFS
100 YEAR HW ELEVATION	= 796.85	FT
OVERTOPPING FREQUENCY	= 50	YRS
OVERTOPPING DISCHARGE	= 63	CFS
OVERTOPPING ELEVATION	= 796.20	FT

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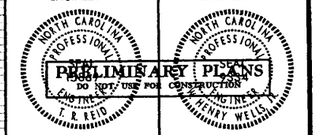
PROJECT REFERENCE NO.	SHEET NO.
R-3833B	35

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL

SDG Singapore Design Group, P.A.

-Y6-
NORTH BOUND

PROP 1.5" OVERLAY

EXISTING GRADE

FOR -Y6- PLAN SEE SHEET 13

850 840 830 820 810 800 790 780 770 760

64 65 66 67 68 69 70 71 72 73 74 75 76

-Y6-
SOUTH BOUND

PROP 1.5" OVERLAY

EXISTING GRADE

FOR -Y6- PLAN SEE SHEET 13

840 830 820 810 800 790 780 770 760 750

64 65 66 67 68 69 70 71 72 73 74 75 76

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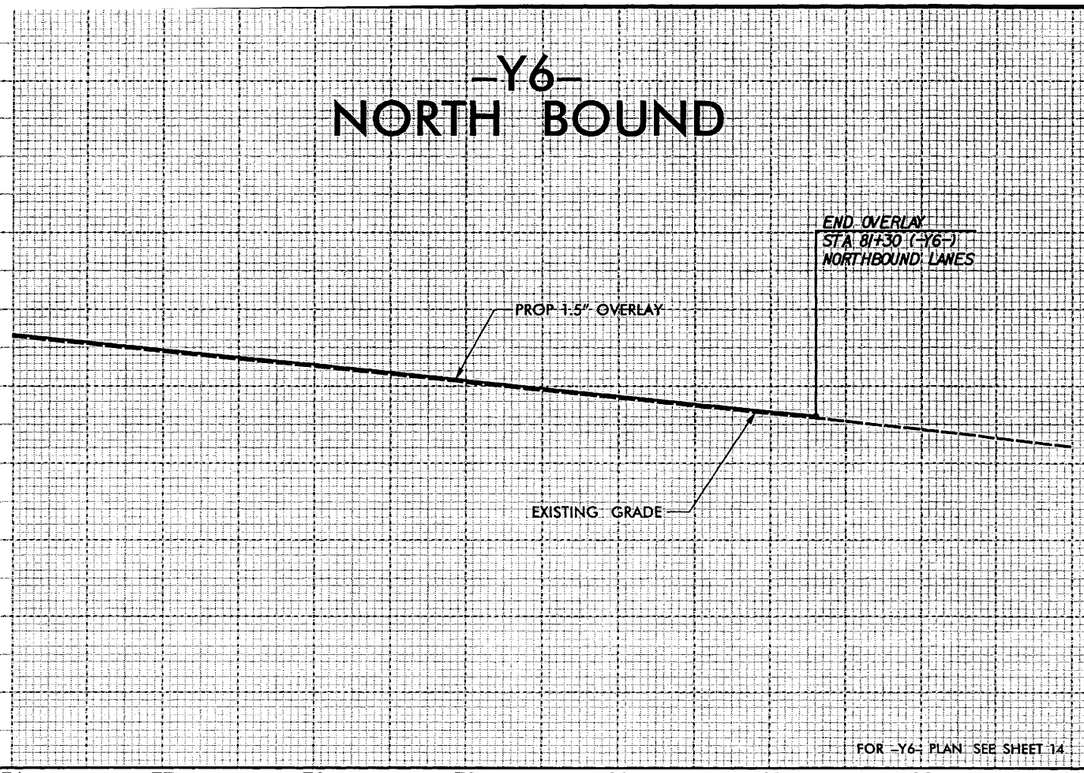
thuffman

5/28/9

-Y6-
NORTH BOUND



FOR -Y6- PLAN SEE SHEET 14

PROJECT REFERENCE NO.	SHEET NO.
R-3833B	36

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

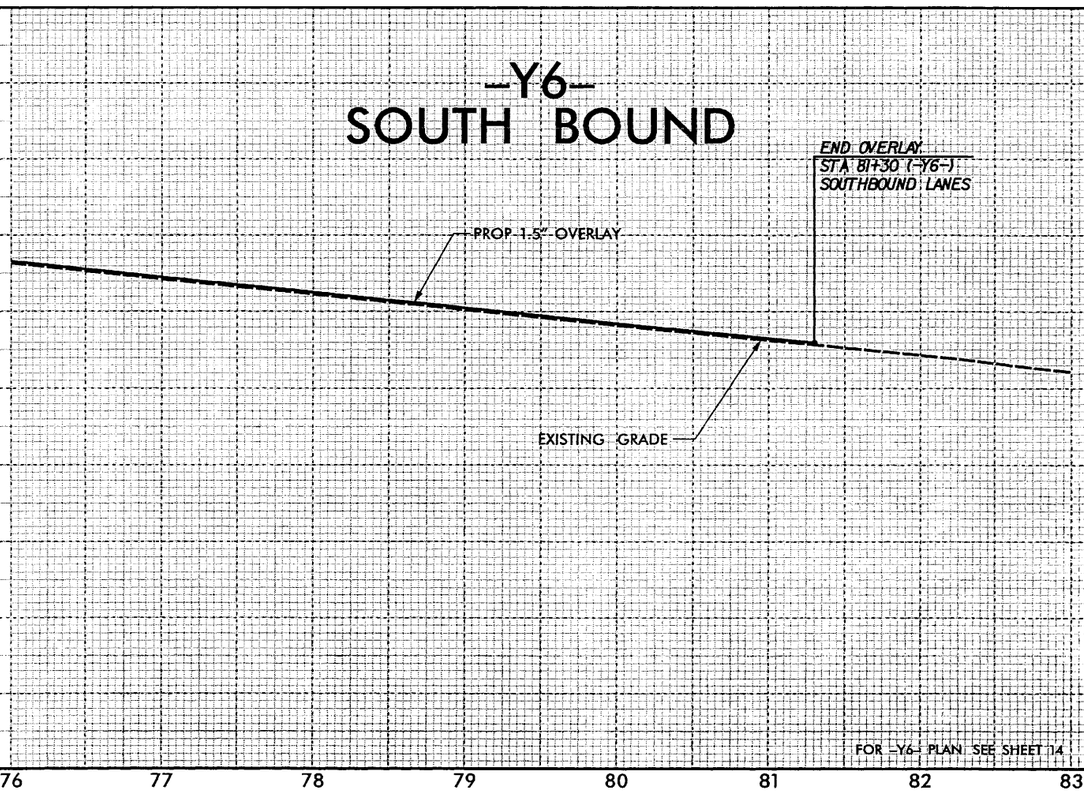
NORTH CAROLINA PROFESSIONAL ENGINEER T. A. REID

NORTH CAROLINA PROFESSIONAL ENGINEER HENRY WELLS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL
SDG Sungate Design Group, P.A.

-Y6-
SOUTH BOUND



FOR -Y6- PLAN SEE SHEET 14

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