STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

August 22, 2008

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

ATTENTION: Mr. Dave Baker
NCDOT Coordinator

SUBJECT: **Section 404 Nationwide Permits 12, 13, 14 & 401 Water Quality Certifications Application** for the proposed widening of SR 1783 (Upward Road) from US 176 to 1006 (Howard Gap Road) in Henderson County. Federal Project No STP-1783(1), WBS Element No. 34623.1.1, TIP No. R-4430.
Debit $475.00 from WBS Element 34623.1.1.

Dear Sir:

Please find enclosed the Pre-Construction Notification, Approved Jurisdictional Determination Form, EEP Acceptance Letter, Natural Environment Unit (NEU) Memorandum to the North Carolina Division of Water Quality (NCDWQ), permit drawings, utility drawings and half- size plans for the above referenced project. An Environmental Assessment (EA) was completed for the project on March 30, 2004 and Finding of No Significant Impact (FONSI) was signed October 27, 2005. Additional copies are available upon request. The North Carolina Department of Transportation (NCDOT) proposes to widen SR 1783 (Upward Road) to a multi-lane facility. The project extends for 2.7 miles from US 176, crosses over I-26 and ends at SR 1006 (Howard Gap Road). Traffic will be maintained via onsite temporary detours and staged construction.

Impacts to Waters of the United States

The water resources in the project vicinity lie within the French Broad River Basin (HUC 06010105). Eight jurisdictional streams and one jurisdictional pond are located within

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

TELEPHONE: 919-733-3141
FAX: 919-733-9794

WEBSITE: WWW.NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

the project study area including: two unnamed tributaries to King Creek, Bat Fork, three unnamed tributaries to Bat Fork, Dunn Creek, and one unnamed tributary to Dunn Creek which are classified as C by NCDWQ. Bat Fork is listed on the North Carolina Division of Water Quality's (DWQ) 303(d) list (2006) of impaired waters due to impaired biological integrity but is not listed for sedimentation. There are no other 303(d) streams listed within one mile of the project.

Neither High Quality Waters (HQW), Water Supplies (WS-I or WS-II), nor Outstanding Resource Waters (ORW) occur within 1.0 mile of the project area.

Permit Site 1: Perennial stream UT1 to King Creek will be impacted by the replacement of the existing 72" corrugated metal pipe (CMP) with a 7' x 7' reinforced concrete box culvert (RCBC) with the culvert being extended at the inlet and outlet ends and a headwall and bank stabilization at the outlet. Temporary impacts will result from diversion channels for pipe installation.
Total Permanent Impacts, Stream: 126 lf
Non-mitigable bank stabilization impacts: 36 lf
Mitigable impacts, Stream: 90 lf
Temporary Impact, Stream: <0.01 ac

Permit Site 2: UT2 to King Creek is an intermittent stream that will be impacted by relocation into a 30" reinforced concrete pipe (RCP). Temporary impacts will result from diversion channels for pipe installation.
Total Permanent Impacts, Stream: 117 lf
Temporary Impact, Stream: <0.01 ac

Permit Site 3: UT1 to Bat Fork Creek is a perennial stream that will impacted by relocation into a 72" RCP. Temporary impacts will result from diversion channels or check dams for headwall installation.
Total Permanent Impacts, Stream: 114 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 4: UT2 to Bat Fork Creek is a perennial stream that will be impacted by relocation into a 72" RCP. Temporary impacts will result from diversion channels for pipe installation.
Total Permanent Impacts, Stream: 110 lf
Non-mitigable bank stabilization impacts: 25 lf
Mitigable impacts, Stream: 85 lf
Temporary Impacts, Stream: 0.02 ac

Permit Site 5: Bat Fork Creek is a perennial stream that will be impacted by a base ditch tying in to the stream.
Total Permanent Impacts, Stream: 41 lf

Permit Site 6: UT3 to Bat Fork Creek is an intermittent stream that will be impacted by relocation into a 48" RCP. Temporary impacts will result from diversion channels for pipe installation.
Total Permanent Impacts, Stream: 78 lf
Non-mitigable bank stabilization impacts: 9 lf
Mitigable impacts, Stream: 69 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 7: Wetland B is a non-riparian wetland that will be impacted by excavation for a lateral base ditch and construction fill.
Total Permanent Impacts, Non-Riparian Wetland: 0.07 ac

Permit Site 8: Wetland A is a non-riparian wetland that will be impacted by the construction of a detention pond.
Total Permanent Impacts, Non-Riparian Wetland: 0.03 ac

Permit Site 9: UT2 to Bat Fork Creek is an intermittent stream that will be impacted by relocation into a 72" RCP. Temporary impacts will result from diversion channels for pipe installation.
Total Permanent Impacts, Stream: 150 lf
Non-mitigable bank stabilization impacts: 10 lf
Mitigable impacts, Stream: 140 lf
Temporary Impacts, Stream: <0.01 ac

Utilities: There are 24 linear feet of temporary impacts to jurisdictional streams due to utilities for this project. An 8" water line will be installed north of the bridge crossing at Bat Fork Creek and a 10" sanitary sewer line will be installed south of the same crossing. Excavations will be approximately 3 feet wide and 15 feet in length for the water line and approximately 3 feet wide and 9 feet in length for the sanitary sewer line. The Excavated material will be place back in the stream bed upon completion of installation.
Utility drawings are attached.

Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), 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 United States Fish and Wildlife Service lists a total of seven federally protected species for Henderson County (Table 1). The oyster mussel has recently been delisted from Henderson County. A description of each species is provided in the referenced FONSI document. As noted in the FONSI, biological conclusions for all species listed below are "No Effect", due to lack of suitable habitat or no specimens found. The FONSI has bunched arrowhead with the biological conclusion of 'May Effect/Not Likely to Adversely Affect' but USFWS changed the call to No Effect on September 13, 2005 with the stipulation that another survey for bunched arrowhead be conducted prior to construction. On October 18, 2007, NCDOT personnel conducted another survey for Bunched arrowhead and found no specimens. The Natural Heritage database was reviewed on July 23, 2008 and elemental occurrences of bunched

arrowhead and mountain sweet pitcher plant are located 1.7 miles to the west of the project area.

The Bald and Golden Eagle Act requires NCDOT to look for suitable foraging habitat within one mile of the project area for these species. Suitable habitat for bald eagle does not exist in the project study area with no large open water feeding sources located within one mile.

Table 1. Federally-Protected Species for Henderson County

Common Name	Scientific Name	Federal Status	Habitat	Biological Conclusion
Bog turtle	*Clemmys muhlenbergii*	T (S/A)	No Habitat	N/A
Appalachian elktoe	*Alasmidonta raveneliana*	E	No Habitat	No Effect
Bunched arrowhead	*Sagittaria fasciculata*	E	Habitat	No Effect
Mountain sweet pitcher plant	*Sarracenia jonesii*	E	No Habitat	No Effect
Small whorled pogonia	*Isotria medeoloides*	T	No Habitat	No Effect
Swamp pink	*Helonias bullata*	T	No Habitat	No Effect
White irisette	*Sisyrinchium dichotomum*	E	No Habitat	No Effect

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 stages; minimization measures were incorporated as part of the project design. The use of best management practices for construction should reduce impacts to plant communities. The following avoidance and minimization measures will apply to this project:

- The proposed bridge replacement will be built utilizing staged construction; therefore, avoiding additional temporary surface water impacts from an onsite detour.
- Preformed scourholes (Roadway plansheets 7, 8 & 10) will be utilized to control water velocity and provide vegetated treatment for stormwater runoff.
- Design Standards for Sensitive Watersheds will be implemented for this project. Please refer to the attached memo from NEU to NCDWQ for details.

Mitigation

Construction for this project will impose 0.07 acre of temporary impacts 736 linear feet of permanent impacts to jurisdictional streams. NCDOT proposes no mitigation for 80 linear feet of impacts from bank stabilization due to this impact not being a "Loss of Waters". Mitigation has been requested from the Ecosystems Enhancement Program (EEP) for 656 linear feet of mitigable impacts resulting from the proposed construction of this project.

Project Schedule

The project is currently scheduled for review on December 30, 2008 and to Let on February 17, 2009 with construction scheduled to begin shortly thereafter.

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. It is anticipated that bank stabilization installation along UT1 to King Creek, UT2 & UT3 to Bat Fork Creek and UT1 to Dunn Creek will be authorized under Section 404 Nationwide Permit 13. It is anticipated that temporary utility impacts to Bat Fork Creek will be authorized under Section 404 Nationwide Permit 12.

Section 401 Permit: We anticipate 401 General Certification numbers 3699, 3689 and 3704 will apply to this project. We are hereby requesting a water quality certification from DWQ. We are submitting five copies of this application to the North Carolina Department of Environmental and Natural Resources, Division of Water Quality, for their review and approval.

We anticipate that comments from the NCWRC will be requested prior to authorization by the US Army Corps of Engineers (USACE). By copy of this letter and attachment, NCDOT hereby requests NCWRC review. NCDOT requests that NCWRC forward their comments to the USACE and NCDOT within 30 days of receipt of this application.

Thank you for your assistance with this project. A copy of this permit application will be posted on the NCDOT Website at http://207.4.62.65/PDEA/PermApps/. If you have any questions or need additional information, please contact Jeff Hemphill at (919) 715-1458.

Sincerely,

E. L. Thorpe

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

Cc
W/attachment
Mr. Brian Wrenn, NCDWQ **(5 Copies)**
Ms. Marella Buncick, USFWS
Ms. Marla Chambers, NCWRC
Mr. Harold Draper, TVA
W/o attachment (see website for attachments)
Dr. David Chang, P.E., Hydraulics
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. J. B. Setzer, P.E., Division Engineer
Mr. Mark Davis, Division Environmental Officer
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. Stacy Oberhausen, PDEA Project Planning Engineer
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT External Audit Branch

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: NWP's 12, 13 & 14

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: NCDOT – Project Development and Environmental Analysis
   1598 Mail Service Center
   Raleigh, NC 27699-1598

   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address: jhemphill@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: SR 1783 (Upward Road) Widening Project.

2. T.I.P. Project Number or State Project Number (NCDOT Only): R-4430

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

4. Location
   County: Henderson Nearest Town: Hendersonville
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.): Take I-40 west to I-26 East at Exit 1A in Asheville. Proceed south for approximately 22 miles to Exit 53 in East Flat Rock which is Upward Road.

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): _____ °N _____ °W

6. Property size (acres): N/A

7. Name of nearest receiving body of water: French Broad River

8. River Basin: French Broad
   (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: The land uses surrounding and within the project study area are commercial development interspersed with small areas of undeveloped property.

10. Describe the overall project in detail, including the type of equipment to be used: NCDOT proposes to widen SR 1783 (Upward Road) to a multi-lane facility from US 176 to SR 1006 (Howard Gap Road) in Hendersonville. The project will involve seven stream crossings and two wetlands will be impacted. Please refer to Cover Letter for details. Traffic will be maintained onsite via temporary detours and staged construction. Construction equipment will consist of heavy trucks, earth moving equipment, cranes, etc.

11. Explain the purpose of the proposed work: The widening of SR 1783 will provide improved safety and additional capacity to serve existing and planned future development.

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: Permanent stream impacts from bridge piers will occur with this action. Please see cover letter for more details.

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)
Site 7	Fill	Scrub-shrub	No	1400'	0.06
Site 7	Excavation	Scrub-shrub	No	1400'	0.01
Site 8	Fill	Forested/Scrub/shrub	No	1700'	0.03
Total Wetland Impact (acres)					0.10

3. List the total acreage (estimated) of all existing wetlands on the property: 0.010

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	Impact Length (linear feet)	Area of Impact (acres)
Site 1	UT1 to King Creek	Permanent	Perennial	7ft	126	0.02
Site 1	UT1 to King Creek	Temporary	Perennial		20	<0.01
Site 2	UT2 to King Creek	Permanent	Intermittent	1ft	117	0.01
Site 2	UT2 to King Creek	Temporary	Intermittent		16	<0.01
Site 3	UT1 to Bat Fork Creek	Permanent	Perennial	2.5ft	114	0.01
Site 3	UT1 to Bat Fork Creek	Temporary	Perennial		10	<0.01
Site 4	UT2 to Bat Fork Creek	Permanent	Perennial	7ft	110	0.02
Site 4	UT2 to Bat Fork Creek	Temporary	Perennial		76	0.02
Site 5	Bat Fork Creek	Permanent	Perennial	11ft	41	0.01
Site 5	Bat Fork Creek	Temporary	Perennial		0	0
Site 6	UT3 to Bat Fork Creek	Permanent	Intermittent	1ft	78	0.01
Site 6	UT3 to Bat Fork Creek	Temporary	Intermittent		12	<0.01
Site 9	UT1 to Dunn Creek	Permanent	Intermittent	4.5ft	150	0.02
Site 9	UT1 to Dunn Creek	Temporary	Intermittent		21	<0.01
Total Stream Impact (by length and acreage)					891	0.17

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)
No open water				
Total Open Water Impact (acres)				0

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

Stream Impact (acres):	0.17
Wetland Impact (acres):	0.10
Open Water Impact (acres):	0
Total Impact to Waters of the U.S. (acres)	0.20 Permanent / 0.07 Temporary
Total Stream Impact (linear feet):	736 Permanent / 155 Temporary

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.

_____

_____

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. See Permit Application Cover Letter.

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 EEP.

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): 656
   Amount of buffer mitigation requested (square feet): 0
   Amount of Riparian wetland mitigation requested (acres): 0
   Amount of Non-riparian wetland mitigation requested (acres): 0
   Amount of Coastal wetland mitigation requested (acres): 0

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_____)? 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		3 (2 for Catawba)	
2		1.5	
Total			

* 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.
Impervious surface will not significantly increase as a result of this 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).

E. L. Luck 8-22-08

Applicant/Agent's Signature **Date**

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

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION: TIP# R-4430 NCDOT
State: NC County/parish/borough: Henderson City: Hendersonville
Center coordinates of site (lat/long in degree decimal format): Lat. 35° N, Long. 82° W.
Universal Transverse Mercator:
Name of nearest waterbody: Bat Fork Creek/Dunn Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: French Broad River
Name of watershed or Hydrologic Unit Code (HUC): 06010105
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** *"waters of the U.S."* within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☒ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: 1,055 linear feet: width (ft) and/or acres.
      Wetlands: 0.10 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain: .

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) General Area Conditions:
   Watershed size: **Pick List**
   Drainage area: **Pick List**
   Average annual rainfall: inches
   Average annual snowfall: inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☐ Tributary flows through **2** tributaries before entering TNW.

   Project waters are **Pick List** river miles from TNW.
   Project waters are **Pick List** river miles from RPW.
   Project waters are **Pick List** aerial (straight) miles from TNW.
   Project waters are **Pick List** aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

   Identify flow route to TNW[5]: .
   Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain:		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):

☐ clear, natural line impressed on the bank	☐ the presence of litter and debris
☐ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

■ High Tide Line indicated by:	■ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

---

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is: **Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List**.

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **2**

Approximately (0.10) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
No	0.07	No	0.03

Summarize overall biological, chemical and physical functions being performed: .

LOW

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: The Corps in Aug 2003 verified these two wetlands as jurisdictional.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☒ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: DWQ rating form greater than 30.
   - ☒ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: DWQ ratings greater than 19 - These streams were verified as jurisdictional by the Corps in Aug 2003.

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
   - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **87 Corps Manuel Wetland criteria were met in areas adjacent to RPWs.**

   - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☒ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: **0.10** acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

---

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
- ☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
- ☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name:1:24,000 Hendersonville Quad (1978).
- ☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
- ☐ National wetlands inventory map(s). Cite name: .
- ☐ State/Local wetland inventory map(s): .
- ☐ FEMA/FIRM maps: .
- ☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
- ☐ Photographs: ☐ Aerial (Name & Date): .
  - or ☐ Other (Name & Date): .
- ☐ Previous determination(s). File no. and date of response letter: .
- ☐ Applicable/supporting case law: .
- ☐ Applicable/supporting scientific literature: .
- ☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

MITIGATION REQUEST FORM
TRI-PARTY MOA (NCDOT)

Revised 3/24/2008

Fill in requested information, print out the form, sign and date, and either mail to EEP, 1652 Mail Service Center, Raleigh, NC 27699-1652, or fax to 919-715-2219. Attachments are acceptable for clarification purposes.

Electronic submissions are permissable; however, an acceptance letter cannot be sent until the original signed form has been received.

NCDOT CONTACT INFORMATION		REGULATORY CONTACT INFORMATION	
Agency/Division	NCDOT-Highways	**USACE Office**	Regulatory Field Office
Branch	PDEA-NEU	**USACE Contact**	Mr. David Baker
Mailing Address	1598 Mail Service Center	**Mailing Address**	151 Patton Avenue, Room 208
City, State, Zip	Raleigh, NC 27699-1598	**City, State, Zip**	Asheville, NC 28801-5006
Project Manager	Jeff Hemphill	**USACE Fax Number**	(828) 271-7950
Telephone Number	(919) 715-1334	**NCDWQ Contact**	Brian Wrenn
E-Mail Address	jhemphill@dot.state.nc.us	**Mailing Address**	1650 Mail Service Center
Supervisor	Carla Dagnino	**City, State, Zip**	Raleigh, NC 27699-1650
Telephone Number	(919) 715-1334	**NCDWQ Fax Number**	(919) 733-6893

PROJECT LOCATION INFORMATION AND IMPACTS

TIP Number(s)		R-4430		
TIP Description		SR 1783 (UPWARD RD) FROM US 176 TO SR 1006 (HOWARD GAP RD) IN		
Current Let Date		2/17/09		
NCDOT Highway Division		Division 14		
County(ies)		Henderson		
EEP Ecoregion(s)		Southern Mountains		
River Basin(s)		French Broad		
Cataloging Unit(s) (8-digit)		06010105		
Total Stream (feet)	**Warm**	656		
	Cool			
	Cold			
	TOTAL	656		
Total Riparian Wetland Impact (acres)				
Total Non-Riparian Wetland Impact (acres)				
Total Coastal Marsh Impact (acres)				
Total Buffer Impact	**Zone 1 (square feet)**			
	Zone 2 (square feet)			

OTHER INFORMATION

USACE Action ID Number (if known)	
NCDWQ Project Number (if known)	
NCDCM Project Number (if known)	

Comments:

IMPORTANT

Check below if this request is a:

- [X] **New Mitigation Request**
- [ ] **Revision to a current acceptance**

Signature of Applicant or Agent:

Linda Pettyjohn

Date: 7/24/08

Ecosystem Enhancement PROGRAM

July 29, 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-4430, SR 1783 (Upward Road) from US 176 to SR 1006 (Howard Gap Road) in Hendersonville, Henderson County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream mitigation for the subject project. Based on the information supplied by you on July 25, 2008, the impacts are located in CU 06010105 of the French Broad River Basin in the Southern Mountains (SM) Eco-Region, and are as follows:

Cool Stream: 656 feet

EEP commits to implementing sufficient compensatory stream mitigation 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 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,

William D. Gilmore, P.E.
EEP Director

cc: Mr. David Baker, USACE – Asheville Regulatory Field Office
Mr. Brian Wrenn, Division of Water Quality, Wetlands/401 Unit
File: R-4430

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

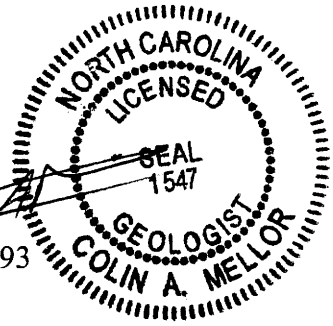
August, 19, 2008

MEMORANDUM

To: Brian Wrenn, Transportation Permitting Unit,
NC Division of WaterQuality

From: Colin Mellor, LG, NCDOT Natural Environment Unit

Subject: TIP R-4430, WBS# 34623, Proposed widening of SR 1793 (Upward Rd.), Henderson County



NCDOT offer the following responses to the April 18, 2008 comments provided by NCDWQ on the ICE Assessment for R-4430:

1. NCDWQ expressed concern for the potential of acid drainage from potential rock cuts both along the proposed roadway corridor and from development that may be stimulated by the proposed project.

   No cuts within rock are proposed along the roadway alignment. Within Henderson County, the geologic formations known by the North Carolina Geologic Survey (NCGS) to contain significant amounts of iron sulfides and therefore pose a high risk of generating acid runoff (Ashe Metamorphic Suite/Tallulah Falls Formation), occur in the north-western third of the county. A literature and mapping search, as well as a field outcrop investigation, confirm that neither of these geologic units underlies either the roadway project or the ICE Growth Impact Study Area.

2. NCDWQ requested that the NCDOT implement Design Standards in Sensitive Watersheds [15A NCAC 04B .0124(a)-(e)] for the portions of the corridor draining to Bat Fork Creek and that NCDOT implement stormwater BMP's that route runoff from the road project through vegetated conveyances with reduced outlet velocities.

   Section (a) of the design standards refers to limiting uncovered areas in High Quality Water Zones to 20 acres or less. Due to the length of the project area that

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

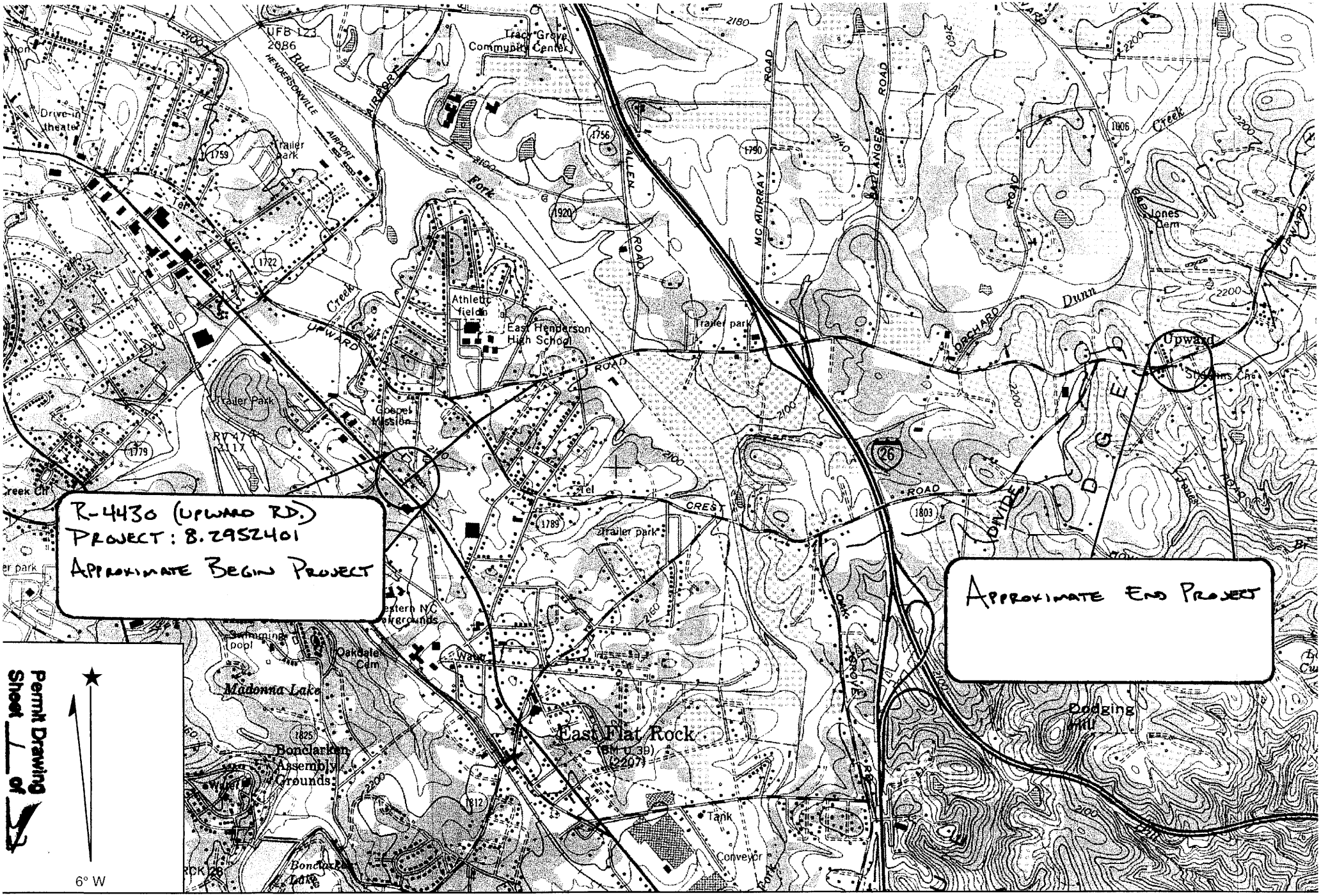
TELEPHONE: 919-715-1335 or 919-715-1334
FAX: 919-715-1501
WEBSITE: WWW.NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

is within the Bat Fork Creek watershed, minimizing clearing to less than 20 acres will severely limit construction schedule. NCDOT has previously been given permission by NCDWQ to waive this provision and we ask for that opportunity on this project. Sections (b) – (d) address stormwater and erosion controls. As part of NCDOT's merger process, stormwater and erosion control issues along the project have been discussed in order to avoid and minimize the direct impacts of the project. Given that this is a widening project, spatial restrictions, and existing conditions (primarily backwater from Bat Fork Ck. in >5yr. storm event) limited the possible options for stormwater BMP's. Options were presented at the 4(c) review meeting on September 26, 2007. In the vicinity of Bat Fork Creek, NCDOT proposes to implement a preformed scour hole and a specially designed, wide bottomed ditch. The ditch will have rock checks to reduce outlet velocities and improve sediment removal. Additionally, a soil mat will be incorporated with the rock checks that could provide some infiltration. Section (e) of the design standards requires groundcover sufficient to restrain erosion to be provided within 15 working days or 60 calendar days (whichever is shorter) after completion of construction. NCDOT agrees to this provision in riparian areas or near creeks that drain into Bat Fork Creek.

We appreciate NCDWQ's input on this project. If there are any questions, please call (919-715-1426) or email (cmellor@ncdot.gov).

cc: Dave Baker, US Army Corps of Engineers, Ashville Field Office
Clarence Coleman, Federal Highway Administration
Roger Bryan, Division 13 Environmental Officer
Chris Militscher, Environmental Protection Agency
Marla Chambers, NC Wildlife Resources Commission
Mike Parker, DWQ Asheville Regional Office
Mark Staley, NCDOT Roadside Environmental
Jeff Hemphill, NCDOT Natural Environment Unit



Name: HENDERSONVILLE
Date: 11/14/2007
Scale: 1 inch equals 2000 feet

Location: 035° 17' 33.9" N 082° 24' 51.4" W
Caption: Project: 8.2952401 (R-4430)
SR 1783 (Upward Rd.) from US 176 (Spartanburg Hwy) to SR 1006 (Howard Gap Rd.)

	OWNER'S NAME	ADDRESS
(6)	Mullinax, Isabel	2204 Old Spartanburg Hwy E. Flat Rock, NC 28726
(8)	Children and Family Resource Center of Henderson County, Inc.	845 Case Street Hendersonville, NC 28792
(31)	Johnson, E. Leland and Betty	P.O. Box 613 Hendersonville, NC 28793
(36)	Taylor, Jo Ann and E. Kendall	684 Duncan Road Flat Rock, NC 28731
(37)	Bryan Easler Ford, Inc.	P.O. Box 728 Hendersonville, NC 28793
(44)	Kuykendall, John	640 Upward Rd. Flat Rock, NC 28731
(76)	The Blue Lake Company, Inc.	P.O. Box 1167 Hendersonville, NC 28793
(77)	Leisure Craft, Inc. C/O Dick Herman	P.O. Box 1700 Hendersonville, NC 28793
(78)	King, Joseph Basil, Jr.	RT. 2 Box 4 Flat Rock, NC 28731

R:\01\036108\Drainage\Wetland Permits\wetland_property_owners.dgn

PROPERTY OWNER NAME AND ADDRESS R-4430

NCDOT
DIVISION OF HIGHWAYS
HENDERSON COUNTY

PROJECT: 8.2952401 (R-4430)
SR 1783 (UPWARD RD) FROM US 176 (SPARTANBURG HWY) TO SR 1006 (HOWARD GAP RD)

Permit Drawing
11/29/2006 **Sheet 2 of 33**

11/2008

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation in Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing in Wetlands (ac)	WETLAND IMPACTS: Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	SURFACE WATER IMPACTS: Temp. SW impacts (ac)	SURFACE WATER IMPACTS: Existing Channel Impacts Permanent (ft)	SURFACE WATER IMPACTS: Existing Channel Impacts Temp. (ft)	SURFACE WATER IMPACTS: Natural Stream Design (ft)
1	-L- 26+18	1 @ 7' X 7' RCBC						0.02	< 0.01	126	20	
2	-L- 26+53	30" RCP						0.01	< 0.01	117	16	
3	-L- 63+17	72" RCP						0.01	< 0.01	114	10	
4	-L- 64+66	72" RCP						0.02	0.02	110	76	
5	-L- 66+19	Base Ditch Outlet						< 0.01		41		
6	-L- 79+73	48" RCP						0.01	< 0.01	78	12.0	
7	-L- 93+98	Base Ditch	0.06		0.01							
8	-L- 97+90	Detention Pond	0.03									
9	-L- 138+27	48" RCP						0.02	< 0.01	150	21	
TOTALS:			0.09		0.01			< 0.10	< 0.07	736	155	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

HENDERSON COUNTY
PROJECT: 8.2952401 (R-4430)

4/2/2008

ATN Revised 3/31/05

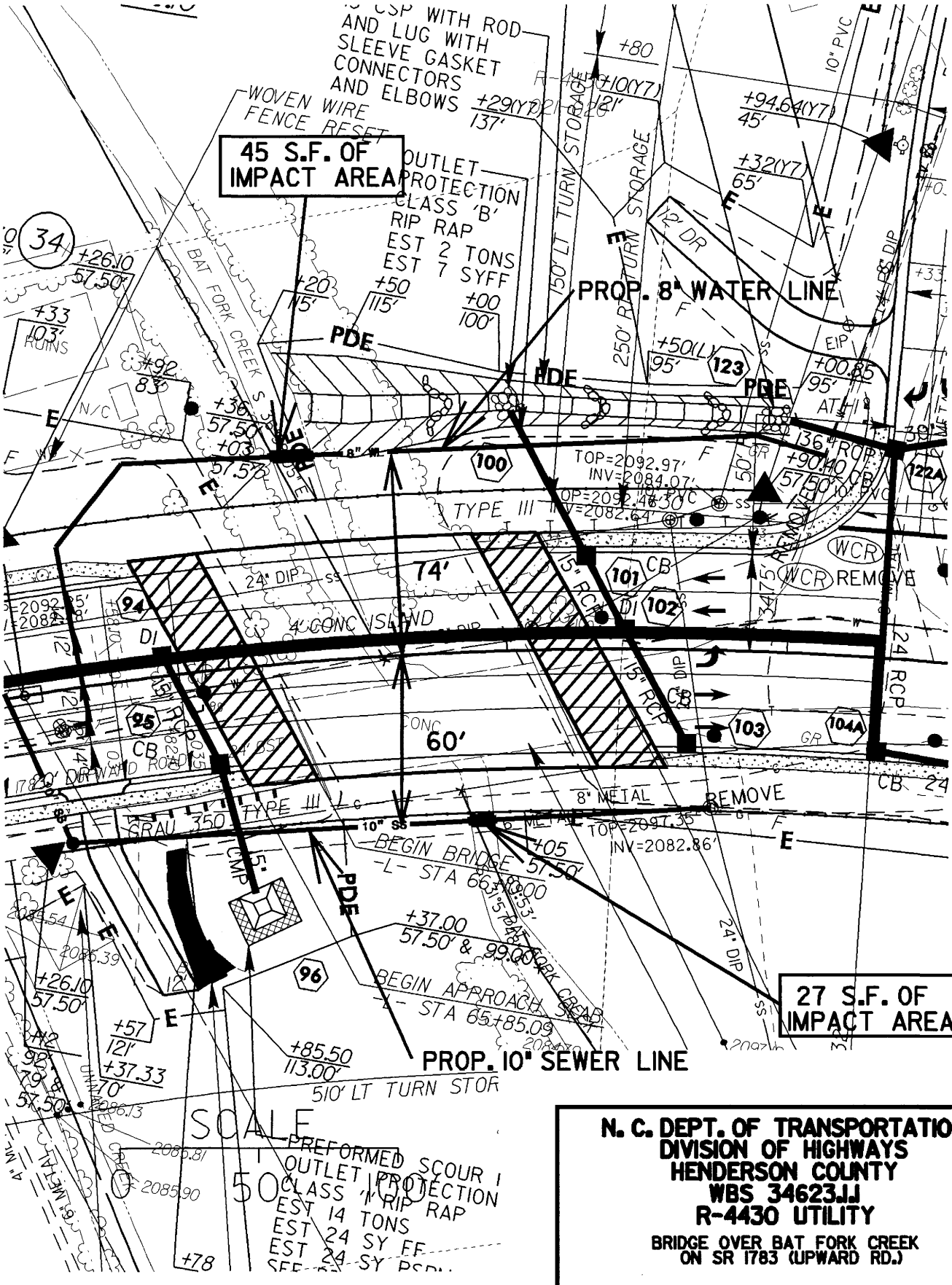
Permit Drawing Sheet 3 of 33

R-4430 Utility Impact Summary

Site	Station Number	Plan View Permit Drawing	Fill in Surface Water (Natural) Acre	Existing Stream Channel Impacted (Feet) Mitigation	Existing Stream Channel Impacted (Feet) No Mitigation	Temporary Channel Impact (Feet)	Relocated Stream Channel (Feet)	Proposed On-Site Stream Mitigation (Feet)	Stream Channel Loss After On-Site Mitigation	Proposed 2:1 Off-Site Compensatory Stream Mitigation (Feet)
	-L-66+60	YES	0.0010	-	15		-	-	-	-
	-L-66+60	YES	0.0006	-	9		-	-	-	-

The stream impact due to water and sewer line installation involves excavation of the bottom of the stream to allow installation of a proposed 8" diameter ductile iron water line and a proposed 10" diameter ductile iron sewer line. Excavation will be approximately three feet wide and fifteen feet in length for the water line and nine feet in length for the sewer line. The excavated material will be placed back in the stream bed after the proposed water line and sewer line has been installed.

UTILITY DRAWINGS

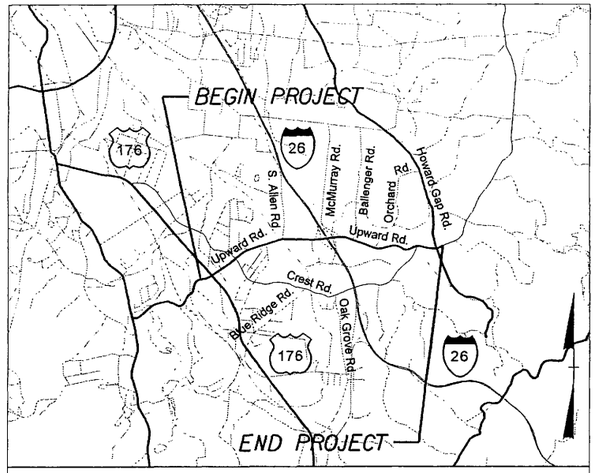


UTILITY DRAWINGS

TIP PROJECT: R-4430

CONTRACT:

SEE SHEET 1-A FOR INDEX OF SHEETS
SEE SHEET 1-B FOR CONVENTIONAL PLAN SHEET SYMBOLS



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

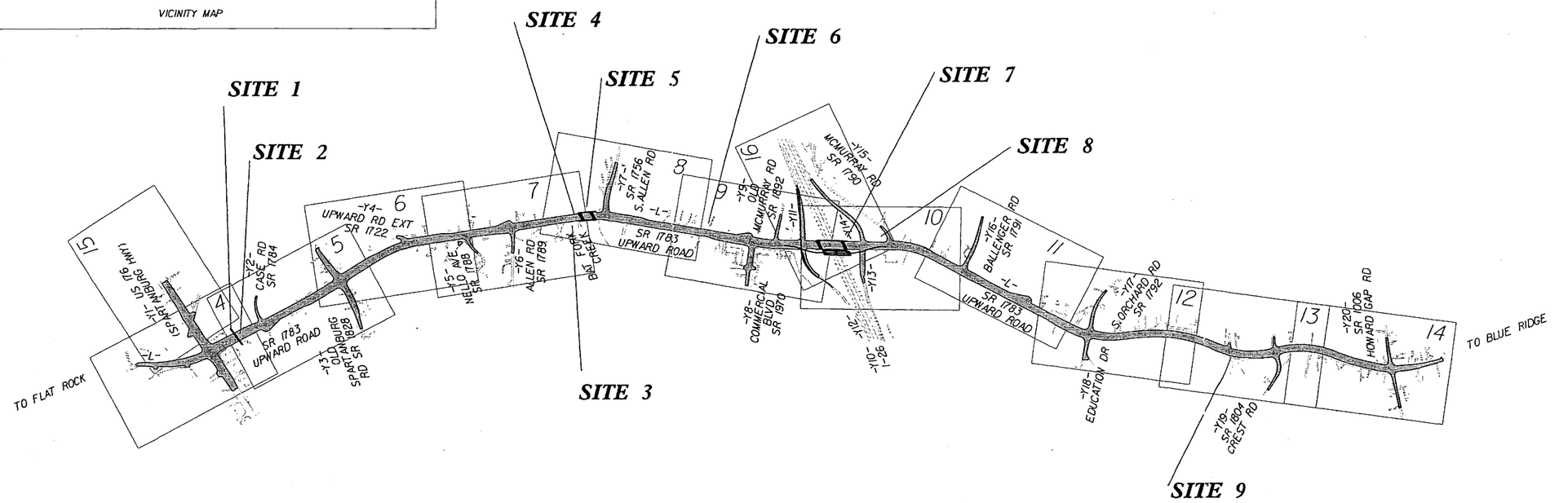
HENDERSON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4430	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34623.1.1	STP-1783 (1)	P.E.
34623.3.1	STP-1783 (1)	R / W

LOCATION: ***SR 1783 (UPWARD ROAD) FROM US 176 (SPARTANBURG HWY) TO SR 1006 (HOWARD GAP ROAD)***

WETLAND /STREAM PERMIT DRAWINGS



NCDOT CONTACT: B.D. TAYLOR, P.E.
PROJECT ENGINEER
ROADWAY DESIGN UNIT

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF EAST FLAT ROCK

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALE

25 0 50
PLANS

25 0 50
PROFILE (HORIZONTAL)

5 0 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2009 = 21,400 VPD
ADT 2030 = 35,800 VPD
DHV = 10%
D = 60%
T = 5% *
V = 50 mph

VERTICAL CURVE DESIGN EXCEPTIONS

FUNCTIONAL CLASSIFICATION: URBAN ARTERIAL

* (TTST 3% + DUAL 2%)

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-4430 = 2.714 MILES

LENGTH OF STRUCTURE TIP PROJECT R-4430 = 0.065 MILES

TOTAL LENGTH OF TIP PROJECT R-4430 = 2.779 MILES

PLANS PREPARED FOR NCDOT BY:

Kimley-Horn and Associates, Inc.

Post Office Box 33068
Raleigh, North Carolina 27636

2006 STANDARD SPECIFICATIONS

RIGHT-OF-WAY DATE:
DECEMBER 29, 2006

LETTING DATE:

JEFFREY W. MOORE, P.E.
PROJECT ENGINEER

J. JASON PACE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN

P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

Permit Drawing

4/2/2008 R:\0II036\08\Drainage\Wetland Permits\wet_r4430_rdy_tsh.dgn

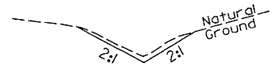
PROJECT REFERENCE NO.	SHEET NO.
R-4430	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

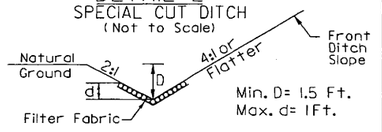
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL 1
DITCH CLEANOUT DETAIL
(Not to Scale)



-L- STA 15+00 (RT)

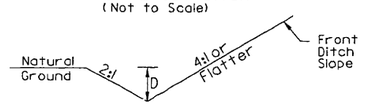
DETAIL 2
SPECIAL CUT DITCH
(Not to Scale)



Min. D= 1.5 Ft.
Max. d= 1Ft.
Type of Liner= Class 'B' Rip-Rap

-Y17- STA 12+94 TO 15+67 (LT)

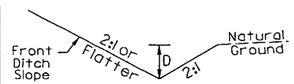
DETAIL 3
SPECIAL CUT DITCH
(Not to Scale)



Min. D = 2 Ft

-Y2- STA 13+00 TO 14+25 (LT)
-Y3- STA 10+07 TO 13+50 (RT)
-Y11- STA 5+40 TO 7+00 (RT)
-Y11- STA 7+27 TO 10+00 (RT)
-Y16- STA 15+00 TO 15+50 (LT)
-Y16- STA 15+00 TO 15+50 (RT)
-Y17- STA 11+50 TO 12+94 (LT)
-Y20- STA 16+25 TO 17+00 (RT)
-Y20- STA 18+00 TO 19+21 (LT)

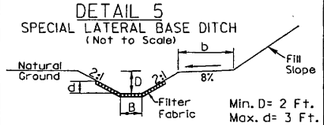
DETAIL 4
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.0'

-L- STA 14+96 TO 16+00 (RT)
-Y1- STA 22+50 TO 23+44 (RT)
-L- STA 46+00 TO 46+30 (LT)
-L- STA 69+07 TO 70+50 (LT)
-Y7- STA 16+40 TO 16+84 (LT)
-L- STA 78+56 TO 79+25 (RT)
-L- STA 79+43 TO 80+30 (RT)
-L- STA 105+50 TO 107+00 (LT)
-L- STA 109+50 TO 110+47 (RT)
-L- STA 126+03 TO 126+16 (LT)
-L- STA 145+00 TO 145+25 (RT)

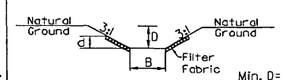
DETAIL 5
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D= 2 Ft.
Max. d= 3 Ft.
B= 6 - 10 Ft.
b= 3 Ft.
•Place Class II Rock Check Dams every 15 ft.
Type of Liner= PSRM

-L- STA 66+30 TO 68+00 (LT)

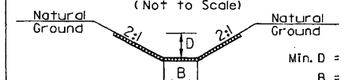
DETAIL 6
TAIL BASE DITCH
(Not to Scale)



Min. D= 3 Ft.
Max. d= 3 Ft.
B= 6 Ft.
Type of Liner:
CLASS 'I' Rip-Rap (BANKS ONLY)

-L- STA 63+88 TO 64+60 (LT)

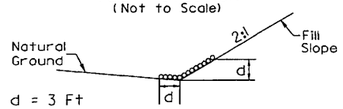
DETAIL 7
TAIL BASE DITCH
(Not to Scale)



Min. D = 3 Ft
B = 2 Ft
Base Tapers From 2' To 0' At Ditch Outlet
Type of Liner: CLASS 'B' Rip-Rap

-Y1- STA 12+05 (LT)

DETAIL 8
TOE PROTECTION
(Not to Scale)

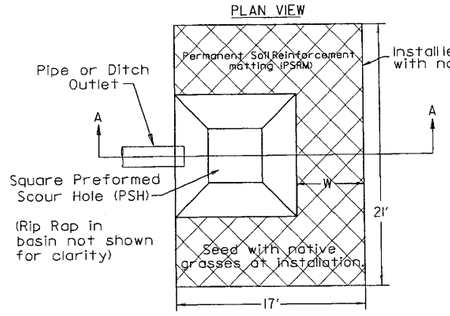


d = 3 Ft
Type of Liner = CLASS 'I' RIP RAP

-Y2- STA 14+25 TO 15+16 (LT)
-L- STA 97+30 TO 98+00 (RT)
-L- STA 124+00 TO 125+00 (RT)

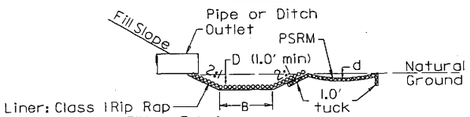
DETAIL 9
PREFORMED SCOUR HOLE
(Not to Scale)

PLAN VIEW



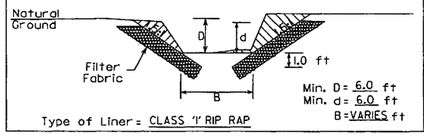
B	5.0'
D	2.0'
W	4.0'
d	0.5'

SECTION A-A



-L- STA 64+55 (RT)
-L- STA 65+99 (RT)
-L- STA 95+00 (RT)

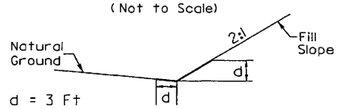
DETAIL 10
TAIL BASE DITCH
(Not to Scale)



Min. D= 6.0 ft
Min. d= 6.0 ft
B=VARIES ft
Type of Liner= CLASS 'I' RIP RAP

-L- STA 26+25 (LT)

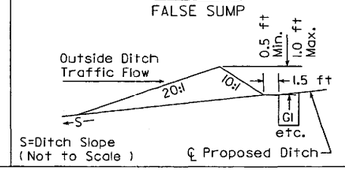
DETAIL 11
TOE PROTECTION
(Not to Scale)



d = 3 Ft
Type of Liner = PSRM

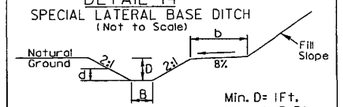
-L- STA 17+00 (LT)
-L- STA 44+50 TO 46+00 (LT)
-Y4- STA 13+00 (LT) TO -L- STA 48+00 (LT)
-L- STA 110+47 TO 113+15 (RT)
-L- STA 113+50 TO 115+40 (RT)
-L- STA 116+00 TO 116+60 (RT)
-Y17- STA 12+80 (RT)

DETAIL 12
FALSE SUMP



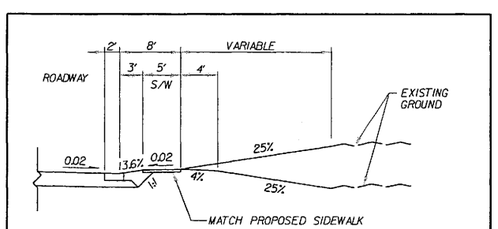
-Y11- STA 7+20 (RT)

DETAIL 14
SPECIAL LATERAL BASE DITCH
(Not to Scale)



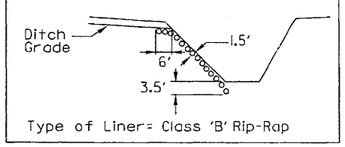
Min. D= 1Ft.
Max. d= 3 Ft.
B= 3 Ft.
b= 4 Ft.

-L- STA 93+94 TO 95+00 (LT)



DRIVEWAY GRADE DETAIL A

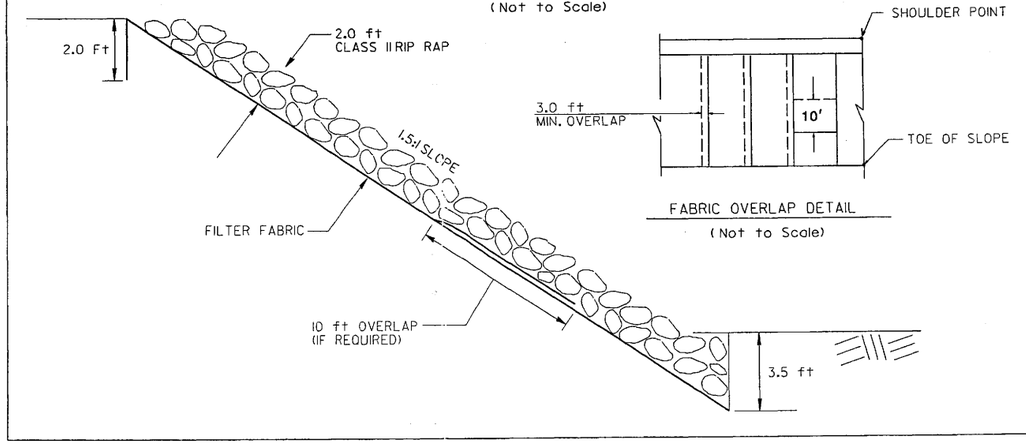
DETAIL 15
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

-L- STA 64+80 (LT)

DETAIL 13
ROCK PLATING DETAIL
(Not to Scale)



-Y13- STA 7+50 TO 10+05 (RT)
-Y14- STA 12+00 TO 13+75 (LT)

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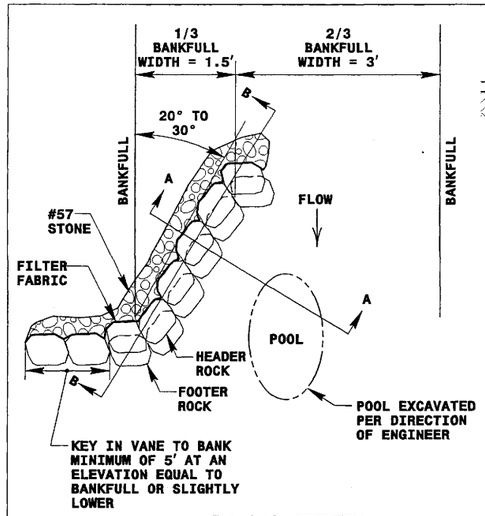
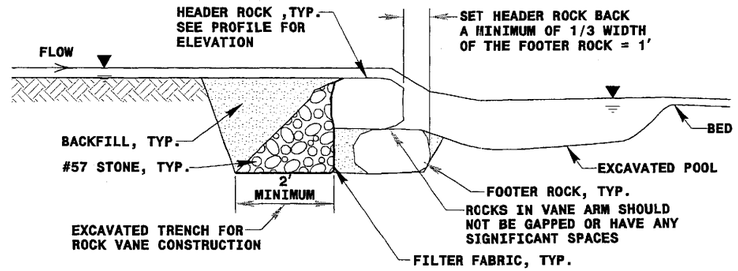
3/27/2008

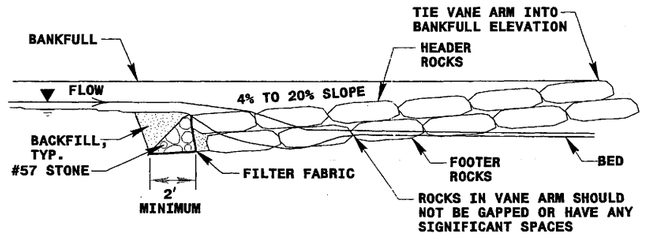
Permit Drawing
Sheet 5 of 33



PLAN VIEW



SECTION A-A



SECTION B-B

	BOULDER DIMENSIONS (FT)		
STATION	HEIGHT	LENGTH	WIDTH
64+16 -L-	2'	2'	3'

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BACKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

DETAIL 15

ROCK VANE DETAIL

(Not to Scale)

-L- STA 64+16 (LT)

Kimley-Horn
and Associates, Inc.

P.O. BOX 33068
RALEIGH, N.C. 27636-3068

PROJECT REFERENCE NO.	SHEET NO.
R-4430	2-E
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

RIGHT-OF-WAY REV.

CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

R:\01\036\08\Roadway\Proj\r4430_rdy_typdgn

3/27/2008

Permit Drawing
Sheet 1 of 22

REVISIONS
R/W REVISIONS PARCELS 1, 3, 4, 6, 6A, 6B, 103 - / /07

PROJECT REFERENCE NO.	SHEET NO.
R-4430	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCH LINE -Y1- STA 14+50 (SHEET 15)

15+00

REMOVE EXIST CB AND CONSTRUCT TBJB W/ MH COVER

BOYD MASSAGEE
DB 1067 PG 427

GEORGE'S STOR-MOR REALTY, LLC
DB 1084 PG 511

RITCHARD A. MATTEIS
DB 1128 PG 391
PB 1 PG 92

DAVID WARD
DB 1123 PG 138

JAMES C. KIRKPATRICK
DB 1239 PG 142
DB 1320 PG 709
PLAT SLIDE #6590

CHILDREN & FAMILY RESOURCE CENTER OF HENDERSON COUNTY, INC.
DB 1186 PG 033
PLAT SLIDE #6590

CHARLES W. McGRADY, TRUSTEE OF THE KATHLEEN M. McGRADY TRUST
DB 1313 PG 375
PLAT SLIDE #6590

MEADOW GARDEN ASSOCIATES
DB 652 PG 157

-L- PCSta. 13+59.53

-L- PRCSta. 15+98.70

20+00

25+00

ADJUSTMENT OF EXIST CB

TOE PROTECTION SEE DETAIL II SHEET 2-D

REMOVE EXIST CB AND CONSTRUCT TBJB W/ MH COVER
REMOVE EXIST 18" RCP

REMOVE 18" CMP

OUTLET PROTECTION CLASS 'I' RIP RAP
EST 2 TONS
EST 7 SY FF

TAIL BASE DITCH SEE DETAIL 10 SHEET 2-D

SITE 1

SITE 2

OUTLET PROTECTION CLASS 'I' RIP RAP
EST 8 TONS
EST 21SY FF

REMOVE EXIST CB AND CONSTRUCT TBJB W/ MH COVER

CVS 75236 NC
DB 1301 PG 458
PLAT SLIDE 6402

JSD, INC
DB 1267 BK 535
DB 1307 PG 238

-L- PTSta. 23+49.36

OUTLET PROTECTION CLASS 'B' RIP RAP
EST 8 TONS
EST 21SY FF

TIE SLOPE TO BASE OF EXIST DITCH

RETAIN AND CLEAN OUT PIPE

JB W/ MH COVER

CONVERT DITO JB W/ MH COVER

REMOVE

RETAIN EXIST 12" CMP OUTLET MAINTAIN POSITIVE DRAINAGE

LYNDON HILL
DB 676 PG 663
PB 4 PG 76

REMOVE EXIST 72" CMP
PROP. 7'X7' RCBC
W/ HEADWALLS

LATERAL 'V' DITCH SEE DETAIL 4 SHEET 2-D

CLEAN OUT EXIST DITCH
EST DDE = 15 CY
SEE DETAIL 1SHEET 2-D

-L- POC Sta. 14+96.00
BEGIN STATE PROJECT R-4430
BEGIN CONSTRUCTION

NAD 83

-L- POC Sta. 23+16.34 =
-Y1- POT Sta. 19+37.31
Δ = 82°33'09.8"

INGLES MARKETS, INC.
DB 861 PG 253

MORRIS AND TIMOTHY MULLINAX
DB 1238 PG 42

WILLIAM AND CAROL MULLINAX
DB 1234 PG 548

LINDA AND SAMUEL LAUGHTER
DB 1235 PG 435

STATE OF NORTH CAROLINA
DB 392 PG 153

LATERAL 'V' DITCH SEE DETAIL 4 SHEET 2-D

ADJUST EXISTING CATCH BASIN

REMOVE EXIST DI AND 15" RCP

RETAIN EXIST 24" RCP OUTLET UNKNOWN

CONVERT EXIST CB TO TBJB W/ MH COVER

-Y1- POT Sta. 24+20.00
END CONSTRUCTION

MATCH LINE -L- STA 28+00 (SHEET 5)

50 0 100

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY SURFACE WATER IMPACTS

PIPE HYDRAULIC DATA
(35) 7' X 7' RCBC (BURIED 1')

DRAINAGE AREA	=	126.3 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	370 CFS
DESIGN HW ELEVATION	=	2120.58 FT
100 YEAR DISCHARGE	=	420 CFS
100 YEAR HW ELEVATION	=	2121.49 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

** VERTICAL CURVE DESIGN EXCEPTION

SEE SHEET NO.17 FOR -L- PROFILE
SEE SHEET NO.23 FOR -Y1- PROFILE

Permit Drawing
Sheet 3 of 33

R:\01\036108\Drainage\Wetland Permits\R4430_wet_pst04.dgn
4/9/2008

R/W REVISIONS PARCELS 1, 3, 4, 6, 6A, 6B, 103 - / /07

PROJECT REFERENCE NO.	SHEET NO.
R-4430	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCH LINE -Y1- STA 14+50 (SHEET 1 5)

MATCH LINE -L- STA 28+00 (SHEET 5)

-L- PCSta. 13+59.53

-L- PRCSta. 15+98.70

-L- PTSta. 23+49.36

-L- POC Sta. 14+96.00
BEGIN STATE PROJECT R-4430
BEGIN CONSTRUCTION

-L- POC Sta. 23+16.34 =
-Y1- POT Sta. 19+37.31
Δ = 82°33'09.8"

-Y1- POT Sta. 24+20.00
END CONSTRUCTION

NAD 83

1 MEADOW GARDEN ASSOCIATES
DB 652 PG 157

2 INGLES MARKETS, INC.
DB 861 PG 253

3 CVS 75236 NC
DB 1301 PG 458
PLAT SLIDE 6402

4 JSD, INC.
DB 1267 PG 536
DB 1307 PG 238

5 LYNDON HILL
DB 676 PG 663
PB 4 PG 76

6 MORRIS AND TIMOTHY MULLINAX
DB 1238 PG 42

6A WILLIAM AND CAROL MULLINAX
DB 1234 PG 548

6B LINDA AND SAMUEL LAUGHTER
DB 1235 PG 435

8 CHILDREN & FAMILY RESOURCE CENTER OF HENDERSON COUNTY, INC.
DB 1186 PG 033
PLAT SLIDE #6590

101 BOYD MASSAGEE
DB 1067 PG 427

102 RITCHARD A. MATTEIS
DB 1128 PG 391
PB 1 PG 92

103 JAMES C. KIRKPATRICK
DB 1239 PG 142
DB 1320 PG 109
PLAT SLIDE #6590

104 GEORGE'S STOR-MOR REALTY, LLC
DB 1084 PG 511

DAVID WARD
DB 1123 PG 138

ADJUSTMENT OF EXIST CB

TOE PROTECTION
SEE DETAIL II
SHEET 2-D

REMOVE EXIST CB AND CONSTRUCT TBJB W/ MH COVER

REMOVE EXIST CB AND CONSTRUCT TBJB W/ MH COVER

REMOVE EXIST CB AND CONSTRUCT TBJB W/ MH COVER
REMOVE EXIST 18" RCP

REMOVE 18" CMP

OUTLET PROTECTION CLASS 'I' RIP RAP
EST 2 TONS
EST 7 SY FF

OUTLET PROTECTION CLASS 'I' RIP RAP
EST 8 TONS
EST 21 SY FF

OUTLET PROTECTION CLASS 'B' RIP RAP
EST 8 TONS
EST 21 SY FF

TIE SLOPE TO BASE OF EXIST DITCH

TAIL BASE DITCH
SEE DETAIL 10
SHEET 2-D

RETAIN AND CLEAN OUT PIPE

JB W/ MH COVER

CONVERT DI TO JB W/ MH COVER

LATERAL 'V' DITCH
SEE DETAIL 4
SHEET 2-D

CLEAN OUT EXIST DITCH
EST DDE = 15 CY
SEE DETAIL 1 SHEET 2-D

LATERAL 'V' DITCH
SEE DETAIL 4
SHEET 2-D

STATE OF NORTH CAROLINA
DB 392 PG 153

ADJUST EXISTING CATCH BASIN

REMOVE EXIST DI AND 15" RCP

RETAIN EXIST 24" RCP OUTLET UNKNOWN

CONVERT EXIST CB TO TBJB W/ MH COVER

RETAIN EXIST 12' CMP OUTLET MAINTAIN POSITIVE DRAINAGE

REMOVE EXIST 72" CMP
PROP 7' X 7' RCBC
W/ HEADWALLS

SITE 1

SITE 2

RETAIN

REMOVE

PDE

TDE

50 0 100

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY SURFACE WATER IMPACTS

PIPE HYDRAULIC DATA
(35) 7' X 7' RCBC (BURIED 1')

DRAINAGE AREA	=	126.3 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	370 CFS
DESIGN HW ELEVATION	=	2120.58 FT
100 YEAR DISCHARGE	=	420 CFS
100 YEAR HW ELEVATION	=	2121.49 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

** VERTICAL CURVE DESIGN EXCEPTION

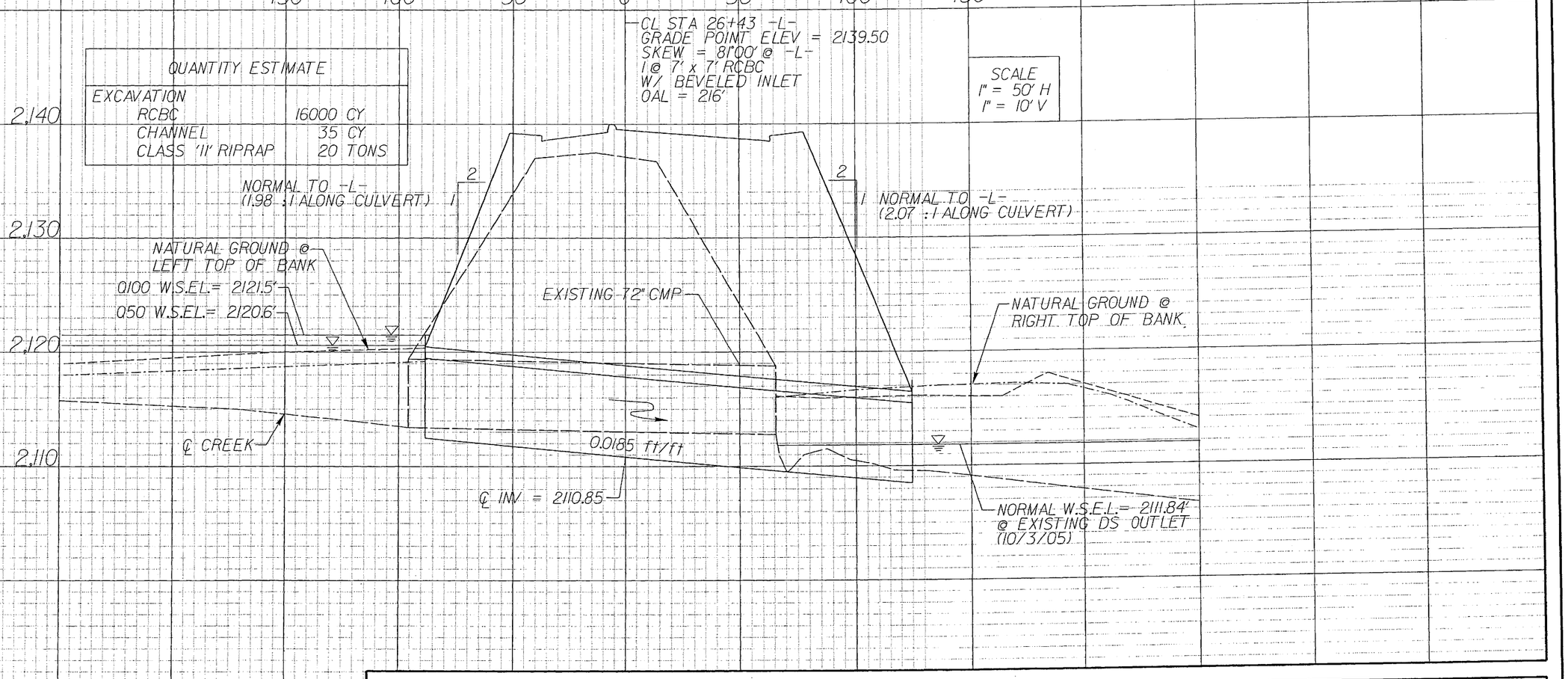
SEE SHEET NO.17 FOR -L- PROFILE
SEE SHEET NO.23 FOR -Y1- PROFILE

Permit Drawing
Sheet 8 of 23

4/2/2008 R:\Dll\036\08\Drainage\Wetland Permits\R4430_wet_dsh04.dgn

QUANTITY ESTIMATE	
EXCAVATION	
RCBC	16000 CY
CHANNEL	35 CY
CLASS 'II' RIPRAP	20 TONS

SCALE
1" = 50' H
1" = 10' V



WETLAND PERMIT DRAWING
SITE 1
CSR PROFILE at 26+43 -L-
R-4430

NCDOT
DIVISION OF HIGHWAYS
HENDERSON COUNTY

PROJECT: 8.2952401 (R-4430)

SR 1783 (UPWARD RD) FROM US 176 (SPARTANBURG HWY) TO SR 1006 (HOWARD GAP RD)

4/2/2008

Permit Drawing
Sheet 9 of 23

R:\011036108\DrainageWetland Permits\wetland_26+43_profile.dgn
4/27/2008

REVISIONS
R/W REVISIONS PARCELS 24, 25, 29, 30, 30A, 31, 32, 118 - / /07

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY SURFACE WATER IMPACTS

Kimley-Horn and Associates, Inc.

P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.

CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
R-4430	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L- POT Sta. 53+61.00 =
-Y5- POT Sta. 10+00.00
Δ = 90°

-L- POT Sta. 58+61.87 =
-Y6- POT Sta. 10+00.00
Δ = 99°49'24.4"

MATCH LINE -L- STA 53+00 (SHEET 6)

MATCH LINE -L- STA 65+00 (SHEET 8)

JOHN BIANUCCI AND JENNIE CAMPBELL DB 1276 PG 785

JAMES H. MOORE DB 1096 PG 109

DORIS LEE McCRAIN DB 888 PG 635

THELMA E. ANDERS DB 254 PG 147

CARROLL AND CLARA CLARK DB 769 PG 583

WILD HARE INVESTMENTS, LTD. DB 1247 PG 83

JERRY AND CHERYL WHITTED DB 713 PG 269 PB 4 PG 28

CHRIS KEIFER DB 1280 PG 651 PB 4 PG 28

WALTER J. MAKI DB 1041 PG 752 PB 4 PG 28

E. LELAND JOHNSON DB 668 PG 300 DB 408 PG 477

ROBERT CALLOWAY DB 376 PG 381 PB 4 PG 28

JAMES AND NANCY OSTERGARD DB 2556 PG 177 DB 898 PG 28 PB 4 PG 28

LAWRENCE AND SUZANNE RUSSELL DB 1155 PG 653 PB 4 PG 28

FRANK AND JOYCE SWAIN DB 540 PG 139 PB 4 PG 28

L.E. McGLASSON DB 129 PG 559 DB 416 PG 567 PB 4 PG 28

SPURGEON JUSTICE DB 384 PG 517 PB 4 PG 28

DUKE ENERGY CORPORATION DB 988 PG 26

-Y5- PCSta. 10+37.64
-Y5- PTSta. 11+72.28
-Y5- POTSta. 12+65.00
END CONSTRUCTION
-Y5- PCSta. 13+00.96
-Y5- PTSta. 13+95.33
-Y5- POTSta. 15+00.00
-Y6- POTSta. 12+78.00
END CONSTRUCTION
-Y6- POTSta. 15+60.00

S 16° 50' 27.6" E
S 28° 09' 32.4" W
N 3° 09' 32.4" E
S 7° 01' 03.3" E
S 35° 38' 26.3" W

ROCK CROSS VANE
FLOW ROCK EL=2085.7 FT
TIE ARMS IN TO EL=2087.2 FT
SEE DETAIL 5&15 SHEET 2-D&2-E
EST 26 TONS BOULDERS
EST 5.5 TONS CLASS B
EST 5.5 TONS CLASS I
EST 175 SY FF

6' TAIL BASE DITCH
SEE DETAIL 6 SHEET 2-D

RIP RAP AT EMBANKMENT
CLASS 'B' RIP RAP
EST 13 TONS
EST 29 SYFF
SEE DETAIL 15 SHEET 2-D

-L- SAG
STA = 63+82.08
EL = 2100.47

JURISDICTIONAL STREAM UT2 TO BAT FORK

OUTLET PROTECTION (STREAM BANKS ONLY)
CLASS 'I' RIP RAP
EST 60 TONS
EST 90 SY FF

JURISDICTIONAL STREAM UT1 TO BAT FORK

PREFORMED SCOUR HOLE
OUTLET PROTECTION
SEE DETAIL 9 SHEET 2-D
CLASS 'I' RIP RAP
EST 14 TONS
EST 24 SY FF
EST 24 SY PSRM

SITE 4

SITE 3

NAD 83

50 0 100

PIPE HYDRAULIC DATA

(92) 72" RCP
(INLET BURIED 6', OUTLET BURIED 1')

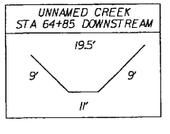
DRAINAGE AREA	=	52 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	138.8 CFS
DESIGN HW ELEVATION	=	2090.31 FT
100 YEAR DISCHARGE	=	161.3 CFS
100 YEAR HW ELEVATION	=	2090.80 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

PIPE HYDRAULIC DATA

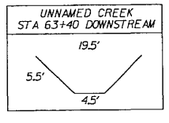
(84) 72" RCP
BURIED 1'

DRAINAGE AREA	=	79 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	203.5 CFS
DESIGN HW ELEVATION	=	2095.46 FT
100 YEAR DISCHARGE	=	236.5 CFS
100 YEAR HW ELEVATION	=	2096.13 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

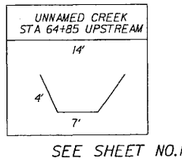
UNNAMED CREEK STA 64+85 DOWNSTREAM



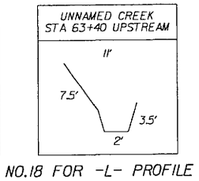
UNNAMED CREEK STA 63+40 DOWNSTREAM



UNNAMED CREEK STA 64+85 UPSTREAM



UNNAMED CREEK STA 63+40 UPSTREAM



SEE SHEET NO.18 FOR -L- PROFILE
SEE SHEET NO.24 FOR -Y5- PROFILE
SEE SHEET NO. 25 FOR -Y6-PROFILE

Permit Drawing
Sheet 10 of 32

4/9/2008 R:\011036\108\Drainage\Wetland Permits\R4430_wet_pst07.dgn

R/W REVISIONS PARCELS 24, 25, 29, 30, 30A, 31, 32, 118 - / /07

DENOTES FILL IN SURFACE WATER

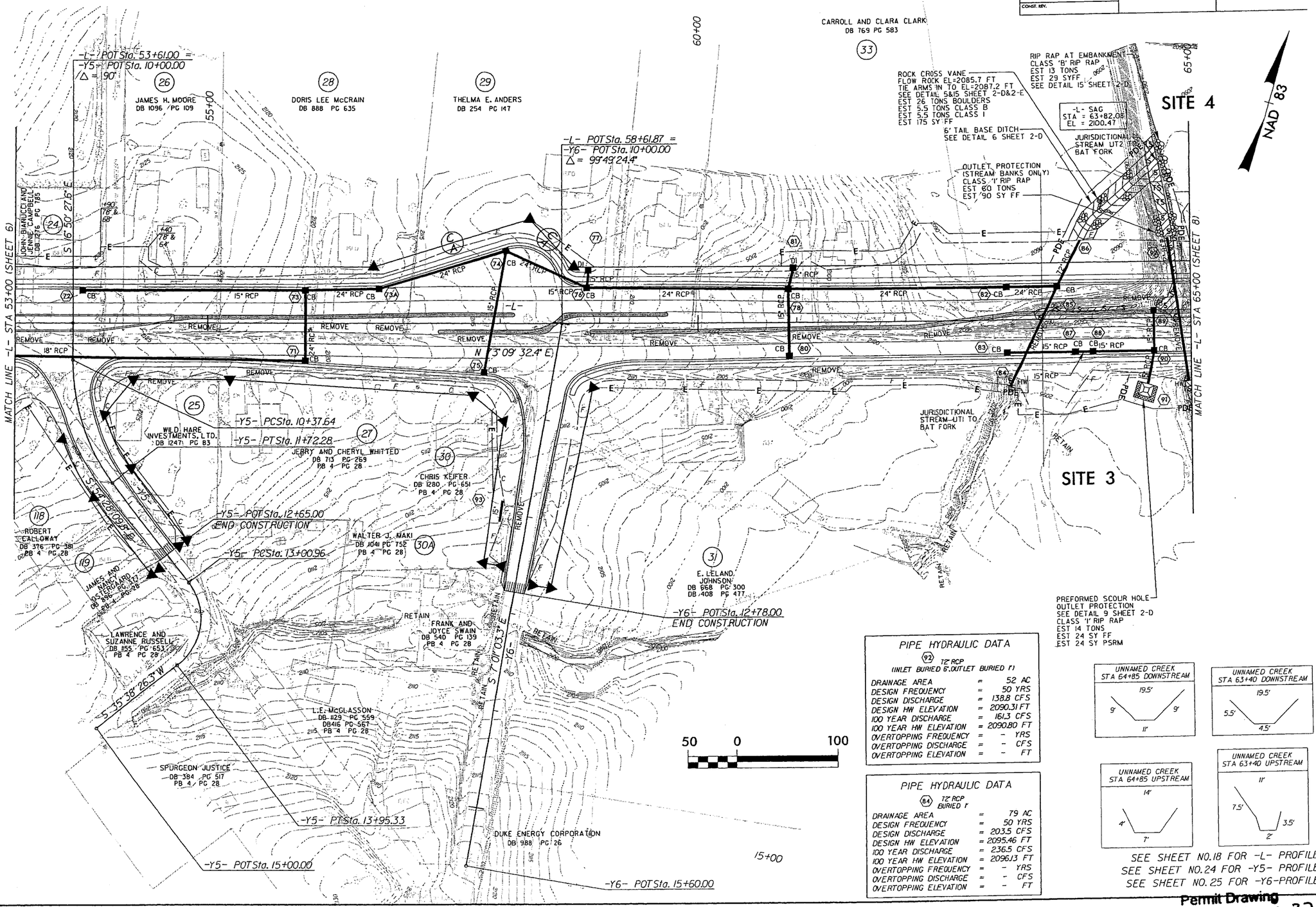
DENOTES TEMPORARY SURFACE WATER IMPACTS

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
R-4430	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PIPE HYDRAULIC DATA

(92) 12" RCP
(INLET BURIED 6", OUTLET BURIED 1')

DRAINAGE AREA	=	52 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	138.8 CFS
DESIGN HW ELEVATION	=	2090.31 FT
100 YEAR DISCHARGE	=	161.3 CFS
100 YEAR HW ELEVATION	=	2090.80 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

PIPE HYDRAULIC DATA

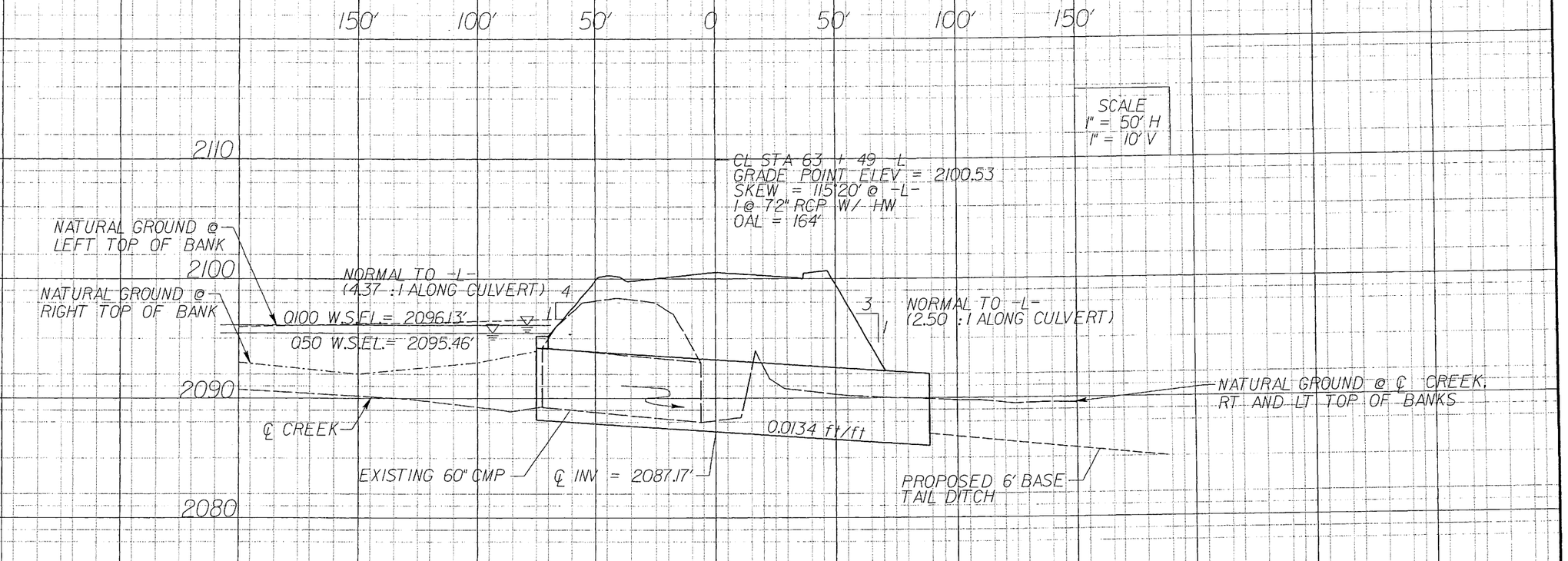
(84) 12" RCP
BURIED 1'

DRAINAGE AREA	=	79 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	203.5 CFS
DESIGN HW ELEVATION	=	2095.46 FT
100 YEAR DISCHARGE	=	236.5 CFS
100 YEAR HW ELEVATION	=	2096.13 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

SEE SHEET NO.18 FOR -L- PROFILE
SEE SHEET NO.24 FOR -Y5- PROFILE
SEE SHEET NO. 25 FOR -Y6-PROFILE

Permit Drawing
Sheet 11 of 32

4/2/2008 R:\01036108\Drainage\Wetland Permits\R4430_wet_pstNOT.dgn



WETLAND PERMIT DRAWING
SITE 3
72" RCP PROFILE at 63+49 –L–
R–4430

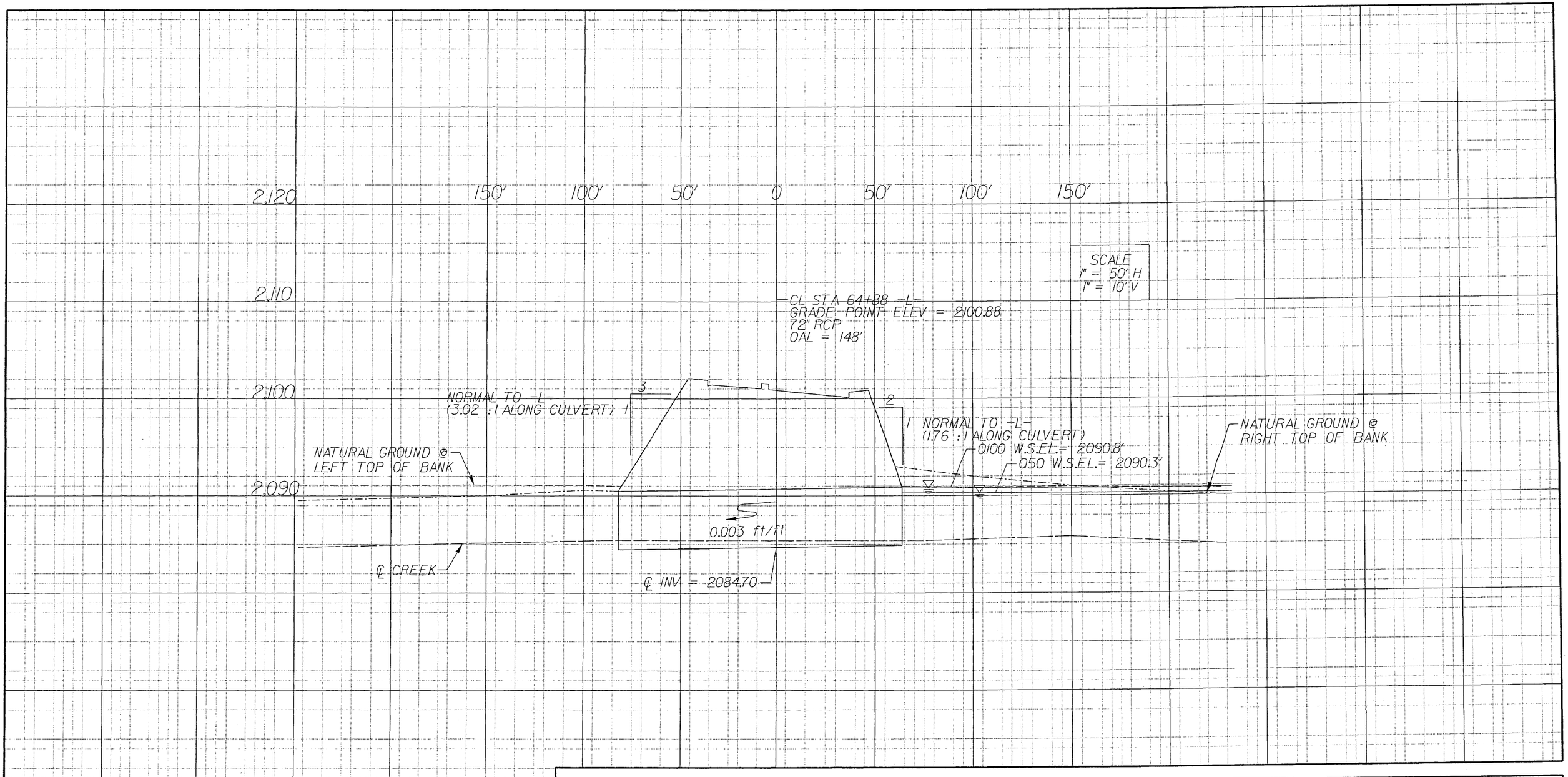
NCDOT
DIVISION OF HIGHWAYS
HENDERSON COUNTY

PROJECT: 8.2952401 (R–4430)

SR 1783 (UPWARD RD) FROM US 176 (SPARTANBURG HWY) TO SR 1006 (HOWARD GAP RD)

4/2/2008

Permit Drawing



WETLAND PERMIT DRAWING
SITE 4
PROFILE of 72" RCP at 64+88 -L-
R-4430

NCDOT
DIVISION OF HIGHWAYS
HENDERSON COUNTY

PROJECT: 8.2952401 (R-4430)

SR 1783 (UPWARD RD) FROM US 176 (SPARTANBURG HWY) TO SR 1006 (HOWARD GAP RD)

4/2/2008

REVISIONS
R/W REVISIONS PARCELS 34, 35, 36, 38, 39, 121 – / /07

PROJECT REFERENCE NO.	SHEET NO.
R-4430	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

SITE 5

SITE 4

-Y7- POT Sta. 11+80.00
BEGIN CONSTRUCTION
-Y7- PC Sta. 11+83.93

-Y7- PRC Sta. 14+45.82

-Y7- PT Sta. 16+43.99

-L- POC Sta. 68+62.00 =
-Y7- POT Sta. 17+75.00
Δ = 90°

-L- PT Sta. 69+80.75

-L- PC Sta. 65+26.10

-L- SAG
STA = 78+47.18
EL = 2114.78

70+00

75+00

15+00

MATCH LINE -L- STA 65+00 (SHEET 7)

MATCH LINE -L- STA 78+50 (SHEET 9)

ANITA AND JAMES HEATHERLY
DB 721 PG 715
(121)

JO ANN AND E. KENDALL TAYLOR
DB 721 PG 713
DB 356 PG 507
(36)

JUSTUS BUSINESS CENTER, LLC
DB 1085 PG 200
(122)

JUSTUS BUSINESS CENTER, LLC
DB 626 PG 408
(38)

E. LELAND AND BETTY JOHNSON
DB 561 PG 659
(40)

C LEMUEL AND SANDRA OATES
DB 1049 PG 270
(41)

SCOTT AND MARSHA KING
DB 693 PG 21
(42)

JO ANN AND ANITA HEATHERLY
DB 761 PG 148
(34)

BRYAN EASLER FORD, INC.
DB 1124 PG 115
(37)

GLOVER McMURRAY
DB 820 PG 164
(39)

JO ANN AND ERNEST TAYLOR
DB 565 PG 872
(35)

CONVERT EXIST DI TO JB W/ MH COVER

EXTEND EXIST 24" CMP W/ CONC PIPE COLLAR AND 12'-24" RCP

OUTLET PROTECTION CLASS 'B' RIP RAP
EST 11 TONS
EST 28 SYFF

SPECIAL LATERAL
6'-10' BASE DITCH
W/ CLASS II RIP RAP
ROCK CHECK DAMS
PLACED EVERY 15'
EST 30 TONS
SEE DETAIL 5
SHEET 2-D

JURISDICTIONAL CREEK BAT FORK CREEK

15" CSP WITH ROD AND LUG WITH SLEEVE GASKET CONNECTORS AND ELBOWS

OUTLET PROTECTION CLASS 'B' RIP RAP
EST 2 TONS
EST 7 SYFF

SPECIAL LATERAL
V DITCH
SEE DETAIL 4
SHEET 2-D

SPECIAL LATERAL V DITCH
SEE DETAIL 4
SHEET 2-D

REMOVE 42 LF OF EXISTING 12" HDPE

PREFORMED SCOUR HOLE
OUTLET PROTECTION
CLASS 'I' RIP RAP
EST 14 TONS
EST 24 SY FF
EST 24 SY PSRM
SEE DETAIL 9 SHEET 2-D

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY SURFACE WATER IMPACTS

50 0 100

SEE SHEET NO.19 FOR -L- PROFILE
SEE SHEET NO.25 FOR -Y7- PROFILE
SEE SHEET NOS.? FOR STRUCTURE PLANS

Permit Drawing

R:\01103610B\Drainage\Wetland Permits\R4430_wet_pshOB.dgn
4/9/2008

REVISIONS
R/W REVISIONS PARCELS 34, 35, 36, 38, 39, 121 – / /07

PROJECT REFERENCE NO.	SHEET NO.
R-4430	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

SITE 5

SITE 4

-Y7- POT Sta. 11+80.00
BEGIN CONSTRUCTION
-Y7- PCSta. 11+83.93

-Y7- PRCSta. 14+45.82

-Y7- PT Sta. 16+43.99

-L- POCSta. 68+62.00 =
-Y7- POT Sta. 17+75.00
Δ = 90°

-L- PT Sta. 69+80.75

-L- PCSta. 65+26.10

-L- SAG
STA = 78+47.18
EL = 2114.78

ANITA AND JAMES HEATHERLY
DB 721 PG 715
(121)

JUSTUS BUSINESS CENTER, LLC
DB 1085 PG 200
(122)

JUSTUS BUSINESS CENTER, LLC
DB 626 PG 408
(38)

E. LELAND AND BETTY JOHNSON
DB 561 PG 659
(40)

C LEMUEL AND SANDRA OATES
DB 1049 PG 270
(41)

SCOT AND MARSHA KING
DB 693, PG 21
(42)

JO ANN AND E. KENDALL TAYLOR
DB 721 PG 713
DB 356 PG 507
(36)

JO ANN AND ANITA HEATHERLY
DB 281 PG 146
(34)

JO ANN AND ERNEST TAYLOR
DB 565 PG 872
(35)

BRYAN EASLER FORD, INC.
DB 1124 PG 115
(37)

GLOVER McMURRAY
DB 820 PG 164
(39)

CONVERT EXIST DI TO JB W/ MH COVER

EXTEND EXIST 24" CMP W/ CONC PIPE COLLAR AND 12' - 24" RCP

OUTLET PROTECTION
CLASS 'B' RIP RAP
EST 11 TONS
EST 28 SYFF

SPECIAL LATERAL
6' - 10' BASE DITCH
W/ CLASS II RIP RAP
ROCK CHECK DAMS
PLACED EVERY 15'
EST 30 TONS
SEE DETAIL 5
SHEET 2-D

JURISDICTIONAL
CREEK BAT
FORK CREEK

15" CSP WITH ROD AND LUG WITH SLEEVE GASKET CONNECTORS AND ELBOWS

OUTLET PROTECTION
CLASS 'B'
RIP RAP
EST 2 TONS
EST 7 SYFF

SPECIAL LATERAL
V DITCH
SEE DETAIL 4
SHEET 2-D

SPECIAL LATERAL V DITCH
SEE DETAIL 4
SHEET 2-D

REMOVE 42 L.F. OF EXISTING 12" HDPE

PREFORMED SCOUR HOLE
OUTLET PROTECTION
CLASS 'I' RIP RAP
EST 14 TONS
EST 24 SY FF
EST 24 SY PSRM
SEE DETAIL 9 SHEET 2-D

MATCH LINE -L- STA 65+00 (SHEET 7)

MATCH LINE -L- STA 78+50 (SHEET 9)

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY SURFACE WATER IMPACTS

50 0 100

SEE SHEET NO.19 FOR -L- PROFILE
SEE SHEET NO.25 FOR -Y7- PROFILE
SEE SHEET NOS.? FOR STRUCTURE PLANS

Permit Drawing

R:\Dll036\08\Drainage\Wetland Permits\R4430_wet_psh08.dgn
4/9/2008

63+00 64+00 65+00 66+00 67+00 68+00 69+00

2130
2120
2110
2100
2090
2080
2070

SCALE
1" = 50' H
1" = 10' V

-L-
PI = 62+06.00
EL = 2,099.47'
VC = 450'
K = 98
CL LOW PT STA 63+82.08
CL LOW PT ELEV = 2100.47'

CL STA 66+60 -L-
1@ 100' - 40" STEEL PLATE GIRDER
CL ELEV = 2101.76
65° SKEW

NATURAL GROUND @ ℄ BRIDGE
(+)0.5000%
NATURAL GROUND UPSTREAM
EXISTING BRIDGE AND ROADWAY
LOW STEEL OF BRIDGE
050 W.S.EL.= 2095.4'
HIGH WATER MARK HURRICANE JEANNE (SEPT. 2004) W.S.EL.= 2095.9'
(+)0.5000%
2' (TYP.)
1.5:1 (TYP.)
CLASS II RIP RAP (TYP.)
3.5' (TYP.)
100-YR TOTAL THEORETICAL SCOUR
500-YR TOTAL THEORETICAL SCOUR
NORMAL W.S.EL.= 2086.0' (MARCH 7, 2005)
NATURAL GROUND DOWNSTREAM
EXCAVATION = 250 CY (BRIDGE AREA, EMBANKMENT AND REVISED BERM) (ROADWAY ITEM)

WETLAND PERMIT DRAWING
SITE 5
BSR PROFILE at 66+60 -L-
R-4430

NCDOT
DIVISION OF HIGHWAYS
HENDERSON COUNTY

PROJECT: 8.2952401 (R-4430)

SR 1783 (UPWARD RD) FROM US 176 (SPARTANBURG HWY) TO SR 1006 (HOWARD GAP RD)

4/2/2008

Permit Drawing
Sheet 16 of 33

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REVISIONS

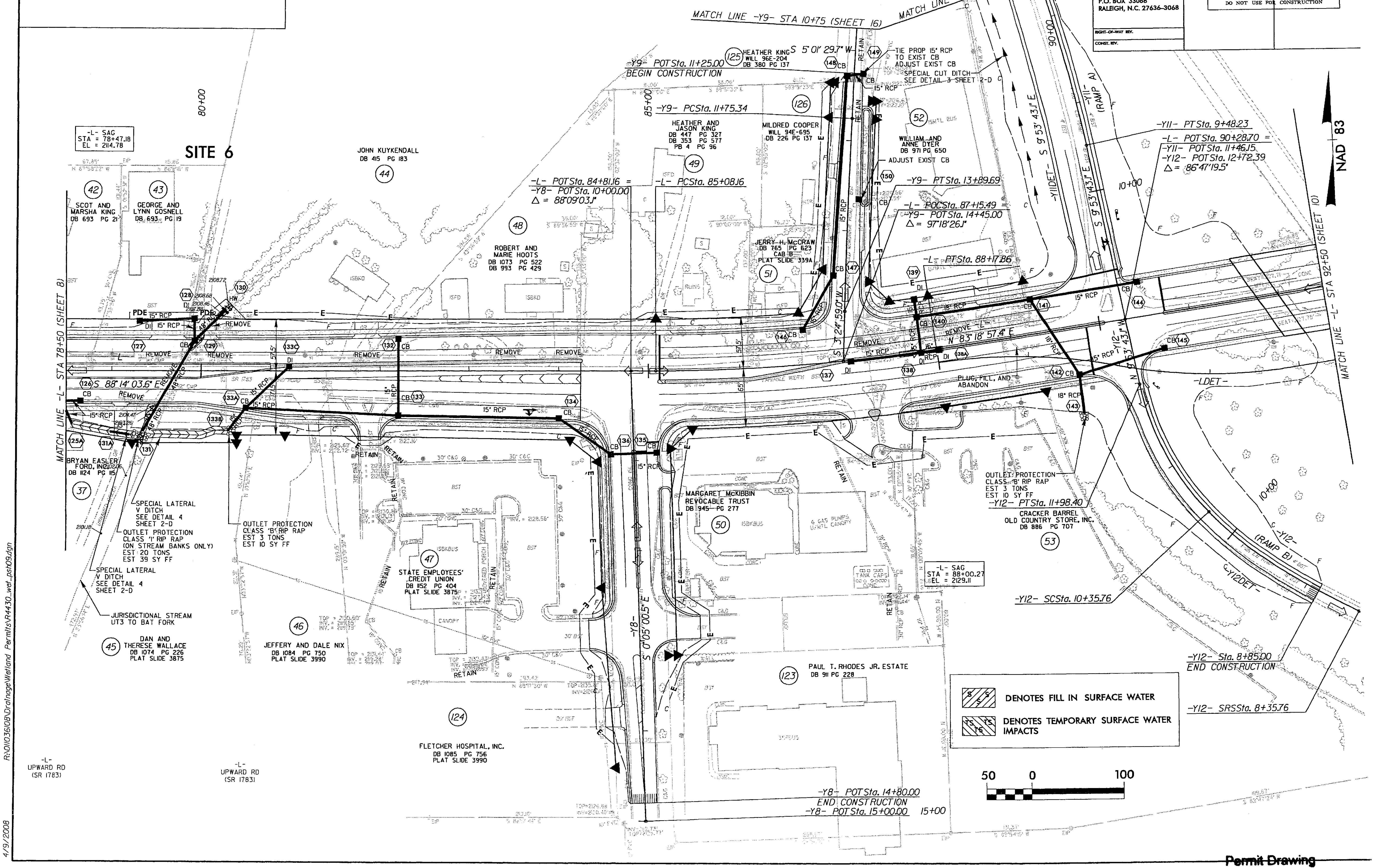
R/W REVISIONS PARCELS 48 & 49 - 03/ /08

PROJECT REFERENCE NO.	SHEET NO.
R-4430	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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4/9/2008

Permit Drawing
Sheet 17 of 33

REVISIONS

R/W REVISIONS PARCELS 48 & 49 - 03/ /08

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
R-4430	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

SITE 6

MATCH LINE -Y9- STA 10+75 (SHEET 16)

MATCH LINE -Y11- STA 7+50 (SHEET 16)

MATCH LINE -L- STA 78+50 (SHEET 8)

MATCH LINE -L- STA 92+50 (SHEET 10)

-L- SAG
STA = 78+47.18
EL = 2114.78

-Y9- POT Sta. 11+25.00
BEGIN CONSTRUCTION

-Y9- POT Sta. 11+75.34

-L- POT Sta. 84+81.16 =
-Y8- POT Sta. 10+00.00
Δ = 88°09'03.1"

-L- PCSta. 85+08.16

-Y9- PT Sta. 13+89.69

-L- POC Sta. 87+15.49
-Y9- POT Sta. 14+45.00
Δ = 97°18'26.1"

-L- PT Sta. 88+17.86

-Y11- PT Sta. 9+48.23
-L- POT Sta. 90+28.70 =
-Y11- POT Sta. 11+46.15
-Y12- POT Sta. 12+72.39
Δ = 86°47'19.5"

-Y12- PT Sta. 11+98.40

-Y12- SC Sta. 10+35.76

-Y12- Sta. 8+85.00
END CONSTRUCTION

-Y12- SRS Sta. 8+35.76

-Y8- POT Sta. 14+80.00
END CONSTRUCTION
-Y8- POT Sta. 15+00.00

-L- SAG
STA = 88+00.27
EL = 2129.11

S 5° 01' 29.7" W

S 3° 24' 59.0" W

S 9° 53' 43.1" E

S 88° 14' 03.6" E

N 83° 18' 57.4" E

S 6° 05' 00.5" E

N 3° 43' 7.2" W

-L- RET. A (RAMP A)

-L- RET. B (RAMP B)

-LDET-

-Y11DET-

-Y12DET-

-Y8-

-Y11-

-Y12-

-L-

-Y9-

-Y11-

-Y12-

80+00

85+00

90+00

10+00

10+50

15+00

42 SCOT AND MARSHA KING DB 693 PG 21

43 GEORGE AND LYNN GOSNELL DB 693 PG 19

44 JOHN KUYKENDALL DB 415 PG 183

45 DAN AND THERESE WALLACE DB 1074 PG 226 PLAT SLIDE 3875

46 JEFFERY AND DALE NIX DB 1084 PG 750 PLAT SLIDE 3990

47 STATE EMPLOYEES' CREDIT UNION DB 852 PG 404 PLAT SLIDE 3875

48 ROBERT AND MARIE HOOTS DB 1073 PG 522 DB 993 PG 429

49 HEATHER AND JASON KING DB 447 PG 327 DB 353 PG 577 PB 4 PG 96

50 MARGARET MCKIBBIN REVOCABLE TRUST DB 1945 PG 277

51 JERRY H. MCCRAW DB 765 PG 623 CAB 18 PLAT SLIDE 339A

52 WILLIAM AND ANNE DYER DB 971 PG 650

53 CRACKER BARREL OLD COUNTRY STORE, INC. DB 886 PG 707

123 PAUL T. RHODES JR. ESTATE DB 911 PG 228

124 FLETCHER HOSPITAL, INC. DB 1085 PG 756 PLAT SLIDE 3990

125 HEATHER KING WILL 96E-204 DB 380 PG 137

126 MILDRED COOPER WILL 94E-695 DB 226 PG 137

BRYAN EASLER FORD, INC. DB 1124 PG 115

JURISDICTIONAL STREAM UT3 TO BAT FORK

SPECIAL LATERAL V DITCH SEE DETAIL 4 SHEET 2-D

SPECIAL LATERAL V DITCH SEE DETAIL 3 SHEET 2-D

OUTLET PROTECTION CLASS 'I' RIP RAP (ON STREAM BANKS ONLY) EST 20 TONS EST 39 SY FF

OUTLET PROTECTION CLASS 'B' RIP RAP EST 3 TONS EST 10 SY FF

OUTLET PROTECTION CLASS 'B' RIP RAP EST 3 TONS EST 10 SY FF

-L- UPWARD RD (SR 1783)

-L- UPWARD RD (SR 1783)

TIE PROP 15" RCP TO EXIST CB ADJUST EXIST CB

ADJUST EXIST CB

PLUG, FILL, AND ABANDON

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY SURFACE WATER IMPACTS

50 0 100

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4/2/2008

Permit Drawing
Sheet 17 of 33

R/W REVISIONS PARCELS 54 & 58 - / /07
R/W REVISIONS PARCEL 59 - 03/ /08

PROJECT REFERENCE NO.	SHEET NO.
R-4430	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

ROCK PLATING
CLASS "II" RIP RAP
W/ FILTER FABRIC
1.5:1 (VARIES) SLOPES
EST 625 TONS
EST 715 SY FF
-Y14- STA 12+00 TO 13+75 LT
SEE DETAIL 13 SHEET 2-D

-L- POT Sta. 93+31.40 =
-Y10- POT Sta. 22+90.02
Δ = 63°56'08.5"

TIE PROP TBJB W/ MH COVER TO EXIST PIPE AND REMOVE REMAINING 28' OF 30" CMP

OUTLET PROTECTION CLASS 'B' RIP RAP
EST. 8 TONS
EST 21 SY FF

SPECIAL LATERAL BASE DITCH
SEE DETAIL 14 SHEET 2-D

SITE 7

SITE 8

DRY DETENTION POND (SEE SHEETS 2G & 2H)

-Y14- PT Sta. 13+85.65

REMOVE 19 LF OF 36" CMP

-Y14- SC Sta. 12+05.36

-Y15- PC Sta. 11+70.80
-Y15- Sta. 12+57.00
BEGIN CONSTRUCTION

-Y15- PCC Sta. 13+14.24

-Y15- PT Sta. 14+73.57
-L- PC Sta. 99+82.20

ADJUST EXIST CB

-L- SAG
STA = 100+38.30
EL = 2121.49

-L- PT Sta. 104+16.97

TIE INTO EXIST DI
ADJUST EXIST DI

SPECIAL LATERAL 'V' DITCH
SEE DETAIL 4 SHEET 2-D
TIE DITCH TO EXIST PIPE

TOE PROTECTION
SEE DETAIL 8 SHEET 2-D

-L- POT Sta. 99+39.00 =
-Y15- POT Sta. 15+02.00
Δ = 90°

-L- POT Sta. 96+41.94 =
-Y13- POT Sta. 10+63.24
-Y14- POT Sta. 14+29.70
Δ = 87°50'00.8"

-Y13- PT Sta. 8+70.02

ROCK PLATING
CLASS "II" RIP RAP W/ FILTER FABRIC
1.5:1 (VARIES) SLOPES
EST 700 TONS
EST 1000 SY FF
-Y13- STA 7+00 TO 10+00 RT
SEE DETAIL 13 SHEET 2-D

OUTLET PROTECTION
CLASS 'B' RIP RAP
EST 2 TONS
EST 7 SY FF

-Y13- POC Sta. 6+62.00
BEGIN CONSTRUCTION

-Y12- CS Sta. 6+85.76

-Y13- SC Sta. 4+52.57

JURISDICTIONAL CREEK
DUNN CREEK

PREFORMED SCOUR HOLE
OUTLET PROTECTION
CLASS 'I' RIP RAP
EST 14 TONS
EST 24 SY FF
EST 24 SY PSRM
SEE DETAIL 9 SHEET 2-D

MATCH LINE -L- STA 92+50 (SHEET 9)
MATCH LINE -Y15- STA 10+75 (SHEET 16)
MATCH LINE -Y14- STA 12+00 (SHEET 16)
MATCH LINE -L- STA 106+00 (SHEET 11)

N 83° 18' 57.4" E
S 6° 41' 02.6" E
S 6° 41' 01.8" E
S 37° 44' 54.1" E
S 69° 53' 55.5" E
N 8° 51' 01.8" W

-L- -LDET- -Y10- -Y12- -Y13- -Y14- -Y15-

RAMP B RAMP C RAMP D

RETAIN REMOVE

CAROLINA MOUNTAIN CONCEPTS, LLC
DB 1164 PG 646

(54) J. HALL WADDELL
DB 1124 PG 267

(55) CAROLINA MOUNTAIN CONCEPTS, LLC
DB 1164 PG 646

(56) WH CAPITAL, LLC
DB 1123 PG 542

(57) OUATTLEBAUM PROPERTIES F, LLC
DB 878 PG 326

(58) E. LEMUEL AND SANDRA OATES
DB 717 PG 105

(59) JAMES S. ERWIN JR. ET UX
RUTH G. ERWIN
DB 717 PG 217

(60) RICHARD AND IMOGENE POWELL
DB 716 PG 857
DB 489 PG 337

(61) GREGORY SCOTT SHERMAN
DB 1178 PG 151

DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND

50 0 100

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4/9/2008

Permit Drawing
Sheet 19 of 37

R/W REVISIONS PARCELS 54 & 58 - / /07
R/W REVISIONS PARCEL 59 - 03/ /08

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

R-4430	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ROCK PLATING
CLASS 'II' RIP RAP
W/ FILTER FABRIC
1.5:1(VARIES) SLOPES
EST 625 TONS
EST 775 SY FF
-Y14- STA 12+00 TO 13+75 LT
SEE DETAIL 13 SHEET 2-D

-L- POT Sta. 93+31.40 =
-Y10- POT Sta. 22+90.02
Δ = 63°56'08.5"

TIE PROP TBJB W/ MH COVER TO EXIST PIPE AND REMOVE REMAINING 28' OF 30" CMP

OUTLET PROTECTION
CLASS 'B' RIP RAP
EST 8 TONS
EST 215 SY FF

SPECIAL LATERAL BASE DITCH
SEE DETAIL 14 SHEET 2-D

SITE 7

MATCH LINE -L- STA 92+50 (SHEET 9)

MATCH LINE -Y14- STA 12+00 (SHEET 16)

MATCH LINE -Y15- STA 10+75 (SHEET 16)

-Y14- PT Sta. 13+85.65

-Y15- PCS Sta. 11+70.80
-Y15- Sta. 12+57.00
BEGIN CONSTRUCTION

-Y15- PCC Sta. 13+14.24

S 61°29'12" E

-Y14- SCS Sta. 12+05.36

DRY DETENTION POND
(SEE SHEETS 20 & 21)

SITE 8

-Y15- PT Sta. 14+73.57
-L- PCS Sta. 99+82.20

ADJUST EXIST CB

-L- PT Sta. 104+16.97

-L- SAG
STA 100+38.30
EL = 2121.49

N 83°18'57.4" E

S 6°41'02.6" E

N 8°51'01.8" W

-L- POT Sta. 99+39.00 =
-Y15- POT Sta. 15+02.00
Δ = 90°

-L- POT Sta. 96+41.94 =
-Y13- POT Sta. 10+63.24
-Y14- POT Sta. 14+29.70
Δ = 87°50'00.8"

-Y13- PT Sta. 8+70.02

S 37°44'54.1" E

-Y12- CS Sta. 6+85.76

-Y13- POC Sta. 6+62.00
BEGIN CONSTRUCTION

-Y13- SCS Sta. 4+52.57

S 69°53'55.5" E

MATCH LINE -L- STA 106+00 (SHEET 11)

PREFORMED SCOUR HOLE
OUTLET PROTECTION
CLASS 'I' RIP RAP
EST 14 TONS
EST 24 SY FF
EST 24 SY PSRM
SEE DETAIL 9 SHEET 2-D

TOE PROTECTION
SEE DETAIL 8' SHEET 2-D

ROCK PLATING
CLASS 'II' RIP RAP W/ FILTER FABRIC
1.5:1 (VARIES) SLOPES
EST 100 TONS
EST 1000 SY FF
-Y13- STA 7+00 TO 10+00 RT
SEE DETAIL 13 SHEET 2-D

OUTLET PROTECTION
CLASS 'B' RIP RAP
EST 2 TONS
EST 7 SY FF

JURISDICTIONAL CREEK
DUNN CREEK

TIE INTO EXIST DI
ADJUST EXIST DI
SPECIAL LATERAL 'V' DITCH
SEE DETAIL 4 SHEET 2-D
TIE DITCH TO EXIST PIPE

CAROLINA MOUNTAIN CONCEPTS, LLC
DB 1164 PG 646

WH CAPITAL, LLC
DB 823 PG 542

E. LEMUEL AND SANDRA OATES
DB 717 PG 105

JAMES S. ERWIN JR. ET UX
RUTH G. ERWIN
DB 717 PG 217

RICHARD AND IMOGENE POWELL
DB 716 PG 857
DB 489 PG 337

GREGORY SCOTT SHERMAN
DB 1178 PG 85

J. HALL WADDELL
DB 824 PG 267

OUATTLEBAUM PROPERTIES F, LLC
DB 1178 PG 326

DENOTES FILL IN WETLAND

DENOTES EXCAVATION IN WETLAND

50 0 100

NAD 83

4/2/2008 R:\011036108\Drainage\Wetland Permits\R4430_wet_psh02.dgn

Permit Drawing
Sheet 2A of 37

PROJECT REFERENCE NO.	SHEET NO.
R-4430	X-48

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5 0 10

SITE 7

WETLAND IMPACTS

95+00.00

94+50.00

94+00.00

93+50.00

-L- (SR 1783) UPWARD RD

2132.59 2133.51 2132.59

2134.5 2135.10

2136.66

2137.93

2102.35 2102.63 2102.88

0.020B 0.020B

2:1

2125 2120 2115 2110 2105 2100 2095

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

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4/2/2008

Permit Drawing
Sheet 21 of

PROJECT REFERENCE NO.	SHEET NO.
R-4430	X-49

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5 0 10

GRADING FOR PROPOSED DRY DETENTION POND
SEE GRADING ON PLAN SHEET 10
AND SHEETS 2-G AND 2-H

97+00.00

2126.34 2127.33 2126.37

0.020ft 0.020ft

3:1 2:1 2:1

96+50.00

2129.48 2130.44 2129.48

0.020ft 0.020ft

2:1 2:1

96+00.00

2130.4 2131.99 2130.4

0.020ft 0.020ft

2:1 2:1

95+50.00

-L- (SR 1783) UPWARD RD

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

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4/2/2008

Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-4430	X-50

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5 0 10

SITE 8

WETLAND IMPACTS

99+00.00

2122.48 | 2122.58 | 0.0095 | 0.0208 | 2:1

GRADING FOR PROPOSED DRY DETENTION POND
SEE GRADING ON PLAN SHEET 10 AND SHEETS 2-G AND 2-H

2123.32 | 2123.21 | 2122.42 | 0.0059 | 0.0208 | 2:1 | 2:1

98+50.00

2124.42 | 2123.89 | 2123.52 | 0.0113 | 0.0208 | 2:1 | 2:1

GRADING FOR PROPOSED DRY DETENTION POND
SEE GRADING ON PLAN SHEET 10 AND SHEETS 2-G AND 2-H

VARIES

98+00.00

2125.78 | 2124.85 | 2124.85 | 0.0208 | 0.0208 | 2:1 | 3:1

GRADING FOR PROPOSED DRY DETENTION POND
SEE GRADING ON PLAN SHEET 10 AND SHEETS 2-G AND 2-H

97+50.00

-L- (SR 1783) UPWARD RD

2135 2130 2125 2120 2115 2110 2105 2100 2095

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

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4/2/2008

Permit Drawing

R-4430	2-G
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.

CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

UPWARD ROAD DRY DETENTION POND
-L- STA 97+65 LT

SCALE: 5 0 10

NAD 83

BERM SOIL TO BE AS SPECIFIED IN NCDOT STANDARD SPEC. MANUAL SECTION 1016 -- SELECT MATERIAL CLASS I. SEE BORING LOCATIONS AND GEOTECHNICAL REPORT FOR EXISTING CONDITIONS.

RIP RAP DISSIPATOR (18'W x 12'L x 22'D) CLASS B STONE ON FILTER FABRIC

B-1

2109.00

2102.5

2102.8 2102.8 2102.8

END OF FILTER FABRIC TO BE BURIED 12" MIN

30' WIDE SPILLWAY WITH CLASS I ARMOR ON FILTER FABRIC

B-2

2103.0 2103.0 2103.0 2103.0 2103.0

RIP RAP BERM TOP ELEV = 2105.0 MIN. SIDESLOPES 2:1

FOREBAY

213

RIP RAP DISSIPATOR (25'W x 16'L x 24'D) CLASS I STONE ON FILTER FABRIC

36" RCP

ADJUST MANHOLE TOP TO 2' ABOVE PROPOSED GROUND ELEVATION

2110.00

TOP=2107.17'
INV=2095.33'

TOP=2109.03'
INV=2097.23'

B-3

2109.8 2109.2 2109.2 2109.8 2109.8

CONTRACTOR TO USE CARE WHILE GRADING AROUND EXISTING SEWER LINE

10" PVC

8" D

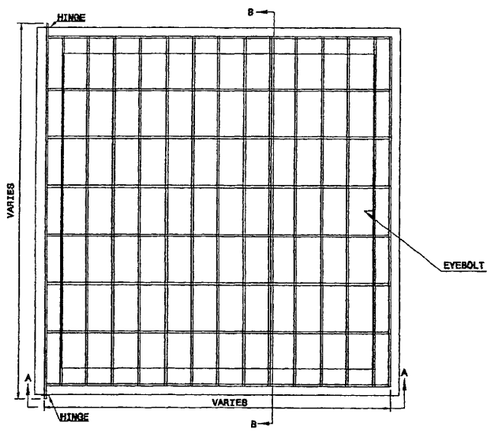
2105 2110 2115 2120

$FILE$

$DATE$

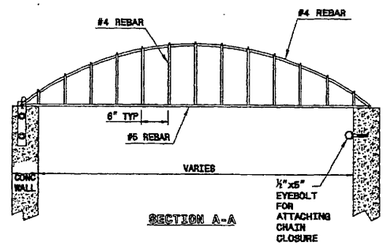
Permit Drawing
Sheet 24 of 2

REBAR TRASH RACK

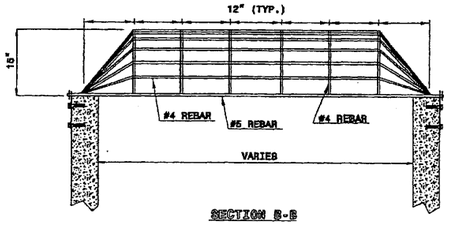


PLAN

REBAR TRASH RACKNOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM 153.

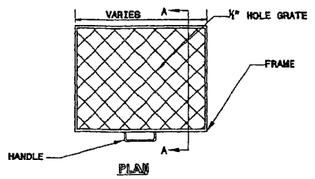


SECTION A-A

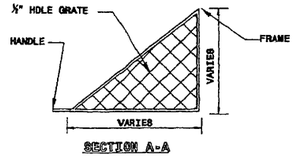


SECTION B-B

REMOVEABLE ORFICE TRASH RACK



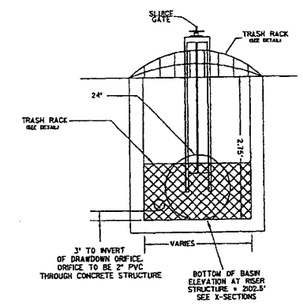
PLAN



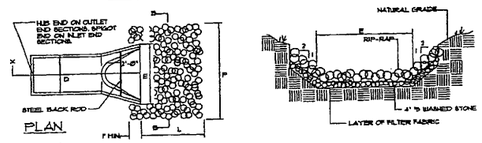
SECTION A-A

ORFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM 153.

STRUCTURE FRONT VIEW



RIP RAP DISSIPATOR DETAIL



NOTES
END OF THE PIPE OR CULVERT AT THE DISCHARGE OUTLET AT A MAXIMUM SLOPE OF 2:1 AND A HEIGHT NOT LESS THAN TWO THIRDS THE PIPE DIAMETER OR CULVERT HEIGHT.

THERE SHALL BE NO OVERFLOW FROM THE END OF THE APRON TO THE SURFACE OF THE RECEIVING CHANNEL. THE AREA TO BE PAVED OR RIP-RAPPED SHALL BE UNDERCUT SO THAT THE INVERT OF THE APRON SHALL BE AT THE BARE GRADE (FLUSH) WITH THE SURFACE OF THE RECEIVING CHANNEL. THE APRON SHALL HAVE A CUTOFF OR TOE WALL AT THE DOWNSTREAM END.

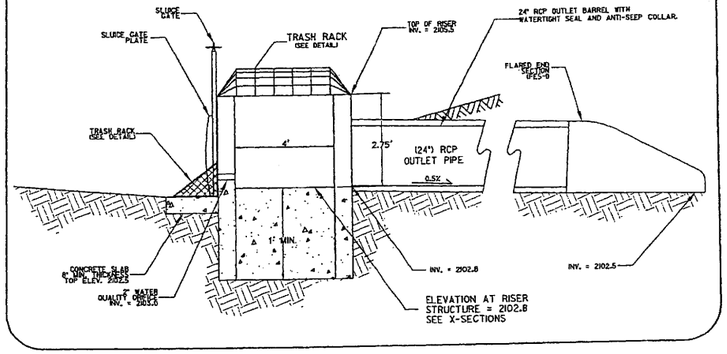
THE WIDTH OF THE END OF THE APRON SHALL BE EQUAL TO THE BOTTOM WIDTH OF THE RECEIVING CHANNEL. MAXIMUM TAPER TO RECEIVING CHANNEL 5:1.

ALL SUBGRADE STRUCTURE TO BE COMPACTED TO 95% OR GREATER. THE PLACING OF FILL, EITHER LOOSE OR COMPACTED IN THE RECEIVING CHANNEL SHALL NOT BE ALLOWED.

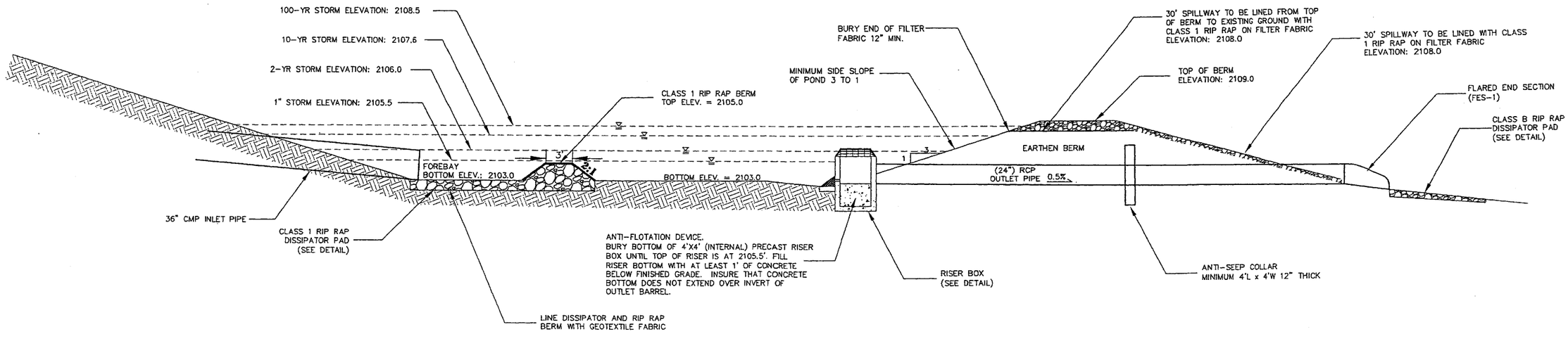
NO BENDS OR CURVES IN THE HORIZONTAL ALIGNMENT OF THE APRON WILL BE PERMITTED.

STRUCTURE	VEL. (FPS)	S (%)	L (ft.)	P (ft.)	STONE THICKNESS (in.)	STONE	METHOD	ZONE
36" INLET	16.83	9	16	25	24	CLASS I	NY DISSIPATER	ZONE 3
FES-1	7.20	6	12	16	22	CLASS B	NY DISSIPATER	ZONE 2

STRUCTURE PROFILE VIEW



DRY DETENTION POND PROFILE



REV. No:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

PREPARED IN THE OFFICE OF:
Kimley-Horn and Associates, Inc.
P.O. BOX 33068 - RALEIGH, NORTH CAROLINA 27636-3068
PHONE: (919) 677-2000 FAX: (919) 677-2050

CLIENT: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

TITLE: UPWARD ROAD DRY DETENTION POND

SEAL:

DATE: 08/08/06
HORIZONTAL SCALE: NTS
VERTICAL SCALE: NTS
DRAWN BY: JGM
DESIGNED BY: JGM
CHECKED BY:

PROJECT: UPWARD ROAD DETENTION POND
HENDERSON COUNTY, NORTH CAROLINA

ATTACHED REFERENCE FILES:
JOB NUMBER: 011036108
SHEET NUMBER: 2-H

Permit Drawing

R/W REVISIONS PARCELS 75, 78, 79, 80, 83, 84 – / /07

⟨287⟩ 48" RCP	
DRAINAGE AREA	21.0 AC
DESIGN FREQUENCY	50 YRS
DESIGN DISCHARGE	62.9 CFS
DESIGN HW ELEVATION	2175.67 FT
100 YEAR DISCHARGE	73.10 CFS
100 YEAR HW ELEVATION	2176.13 FT
OVERTOPPING FREQUENCY	– YRS
OVERTOPPING DISCHARGE	– CFS
OVERTOPPING ELEVATION	– FT

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY SURFACE WATER IMPACTS

NAD 83

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.

CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
R-4430	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SITE 9

-L- SAG
STA = 138+61.97
EL = 2183.10

-L- PRCSta. 136+65.24

-L- PCSta. 144+02.48

-Y19- POTSta. 10+00.00
-Y19- POTSta. 10+25.00
BEGIN CONSTRUCTION

-L- POTSta. 143+45.00 =
-Y19- POTSta. 11+83.21
Δ = 90°

-L- PTSta. 142+74.48

-Y19- PTSta. 11+12.13

-Y19- PCSta. 10+57.71

-Y19- PCSta. 13+10.57

-Y19- PTSta. 14+71.21

-Y19- PCSta. 15+34.12

-Y19- PTSta. 17+17.00

UTITO DUNN CREEK TRANSITION POINT FROM INTERMITTENT TO PERENNIAL STREAM

OUTLET PROTECTION CLASS 'I' RIP RAP (BANKS ONLY) EST 5 TONS EST 14 SY FF

OUTLET PROTECTION CLASS 'B' RIP RAP EST 2 TONS EST 7 SY FF

OUTLET PROTECTION CLASS 'B' RIP RAP EST 3 TONS EST 10 SY FF

SPECIAL LATERAL 'V' DITCH SEE DETAIL 4 SHEET 2-D

TIE PROP DI TO EXIST PIPE

TIE TO EXISTING DITCH

TIE TO EXISTING DITCH

-Y19- POTSta. 16+35.00
END CONSTRUCTION

MATCH LINE -L- STA 134+00 (SHEET 12)

MATCH LINE -L- STA 148+00 (SHEET 14)

135+00

140+00

145+00

15+00

N 69° 45' 48.2" E

S 7° 45' 54.8" E

S 20° 14' 11.8" E

S 24° 39' 41.2" W

DWM INVESTMENTS, LLC.
DB 1198 PG 662
(75)

THE BLUE LAKE COMPANY, INC.
DB 132 PG 570
PLAT SLIDE 448

JOSEPH BASIL KING JR.
DB 872 PG 435
(78)

HELEN J. KING
DB 729 PG 779
(80)

CAROLINA CONFERENCE OF SEVENTH DAY ADVENTISTS
DB 543 PG 699
(81)

DOUGLAS AND BRENDA TATE
DB 1052 PG 184
(82)

GARY K. AND KATHY C. KING
DB 1225 PG 38
(84)

HENDERSONVILLE PENTECOSTAL HOLINESS CHURCH
DB 1018 PG 542
(85)

HENDERSON CO. BOARD OF EDUCATION
DB 824 PG 216
(68)

LEISURE CRAFT, INC.
DB 716 PG 813
(77)

THOMAS AND MARJORIE JONES
DB 797 PG 169
(79)

JOE D. SPEARMAN JR.
DB 1165 PG 3
(83)

ISBK SCH (APPROXIMATE)

IS MTL BUS

ORCHARD

VARIABLE WIDTH

REMOVE

RETAIN

50 0 100

4/9/2008 R:\0110360\08\Drainage\Wetland Permits\R4430_wet_pshl3.dgn

Permit Drawing
Sheet 1 of 37

R/W REVISIONS PARCELS 75, 78, 79, 80, 83, 84 - / /07

DRAINAGE AREA	=	21.0 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	62.9 CFS
DESIGN HW ELEVATION	=	2175.67 FT
100 YEAR DISCHARGE	=	73.0 CFS
100 YEAR HW ELEVATION	=	2176.13 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY SURFACE WATER IMPACTS

NAD 83

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
R-4430	13

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SITE 9

DWM INVESTMENTS, LLC
DB 1198 PG 662
(75)

THE BLUE LAKE COMPANY, INC.
DB 132 PG 570
PLAT SLIDE 4487
(76)

JOSEPH BASIL KING JR.
DB 872 PG 435
(78)

HELEN J. KING
DB 729 PG 779
(80)

CAROLINA CONFERENCE OF SEVENTH DAY ADVENTISTS
DB 543 PG 699
(81)

DOUGLAS AND BRENDA TATE
DB 1052 PG 184
(82)

GARY K. AND KATHY C. KING
DB 1225 PG 38
(84)

HENDERSONVILLE PENTECOSTAL HOLINESS CHURCH
DB 1018 PG 542
(85)

HENDERSON CO. BOARD OF EDUCATION
DB 824 PG 216
(68)

LEISURE CRAFT, INC.
DB 716 PG 813
(77)

THOMAS AND MARJORIE JONES
DB 797 / PG 169
(79)

JOE D. SPEARMAN JR.
DB 1165 PG 3
(83)

-L- SAG
STA = 138+61.97
EL = 2183.10

-L- PRCSta. 136+65.24

-L- PCSta. 144+02.48

-Y19- POT Sta. 10+00.00

-Y19- POT Sta. 10+25.00
BEGIN CONSTRUCTION

-L- POT Sta. 143+45.00 =
-Y19- POT Sta. 11+83.21
Δ = 90°

-L- PT Sta. 142+74.48

-Y19- PCSta. 10+57.71

-Y19- PT Sta. 11+12.13

-Y19- POT Sta. 16+35.00
END CONSTRUCTION

-Y19- PCSta. 13+10.57

-Y19- PT Sta. 14+71.21

-Y19- PCSta. 15+34.12

-Y19- PT Sta. 17+17.00

-Y19- S 77° 45' 54.8" E

N 69° 45' 48.2" E

S 20° 14' 11.8" E

S 54° 33' 41.2" W

135+00

140+00

145+00

15+00

MATCH LINE -L- STA 134+00 (SHEET 12)

MATCH LINE -L- STA 148+00 (SHEET 14)

TIE TO DUNN CREEK TRANSITION POINT FROM INTERMITTENT TO PERENNIAL STREAM

OUTLET PROTECTION CLASS 'I' RIP RAP (BANKS ONLY)
EST. 5 TONS
EST. 14 SY FF

OUTLET PROTECTION CLASS 'B' RIP RAP
EST. 2 TONS
EST. 7 SY FF

SPECIAL LATERAL 'V' DITCH SEE DETAIL 4 SHEET 21D

OUTLET PROTECTION CLASS 'B' RIP RAP
EST. 3 TONS
EST. 10 SY FF

TIE PROP DI TO EXIST. PIPE

TIE TO EXISTING DITCH

TIE TO EXISTING DITCH

RETAIN

REMOVE

15" RCP

18" RCP

48" RCP

CB

DI

PDE

50 0 100

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4/2/2008

Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-4430	17
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

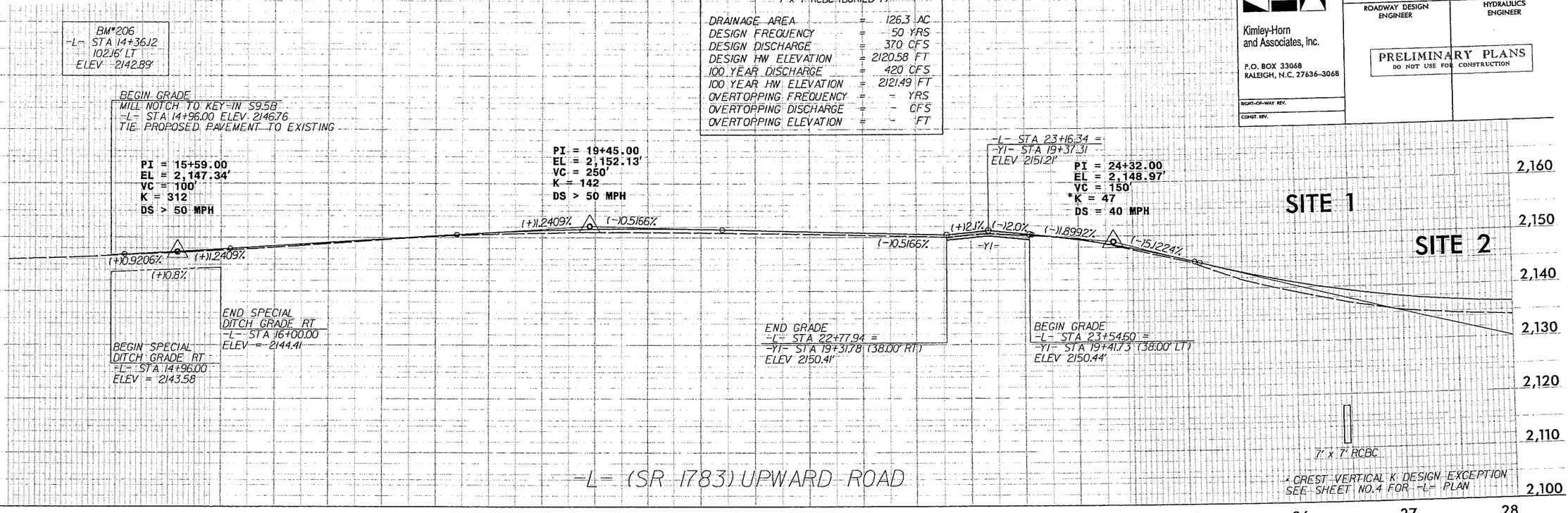
Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

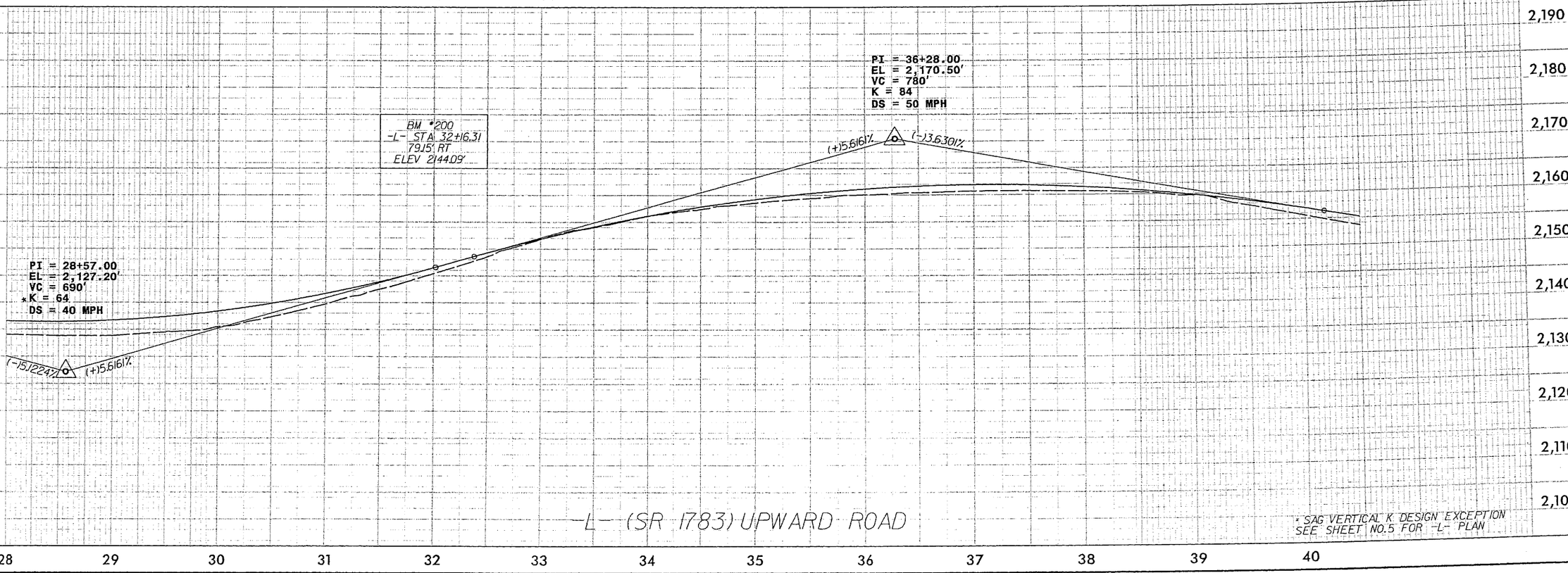
RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

7' X 7' RCBC (BURIED 1')

DRAINAGE AREA	=	126.3 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	370 CFS
DESIGN HW ELEVATION	=	2120.58 FT
100 YEAR DISCHARGE	=	420 CFS
100 YEAR HW ELEVATION	=	2121.49 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT





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4/2/2008

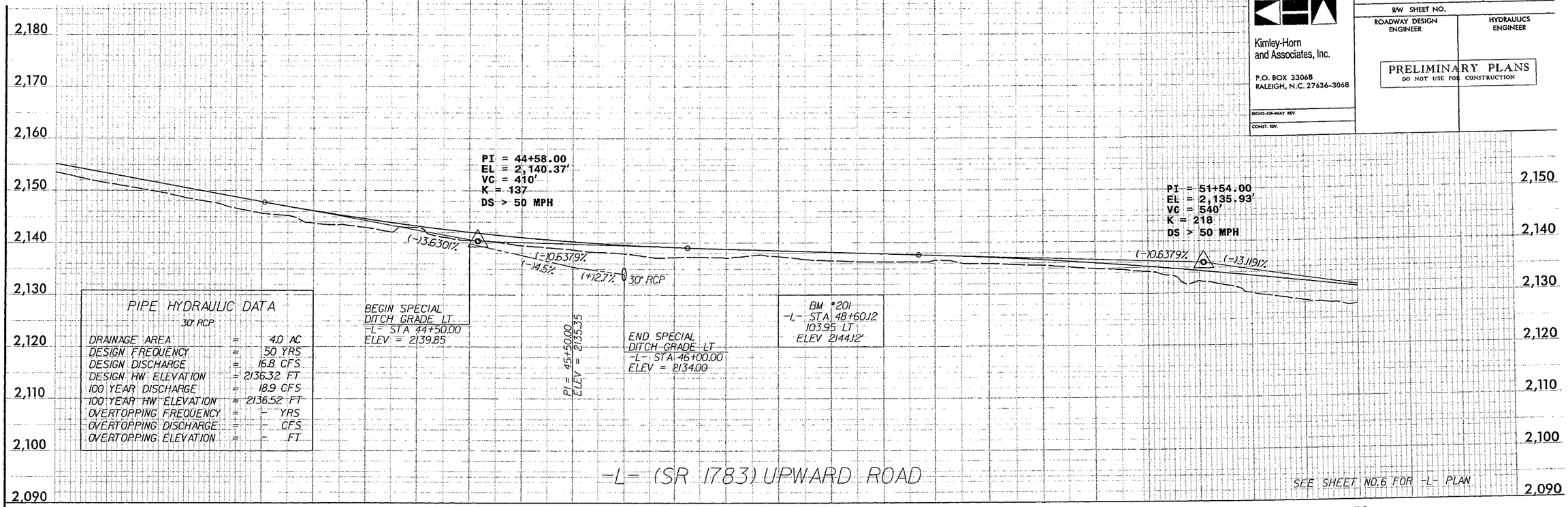
Permit Drawing

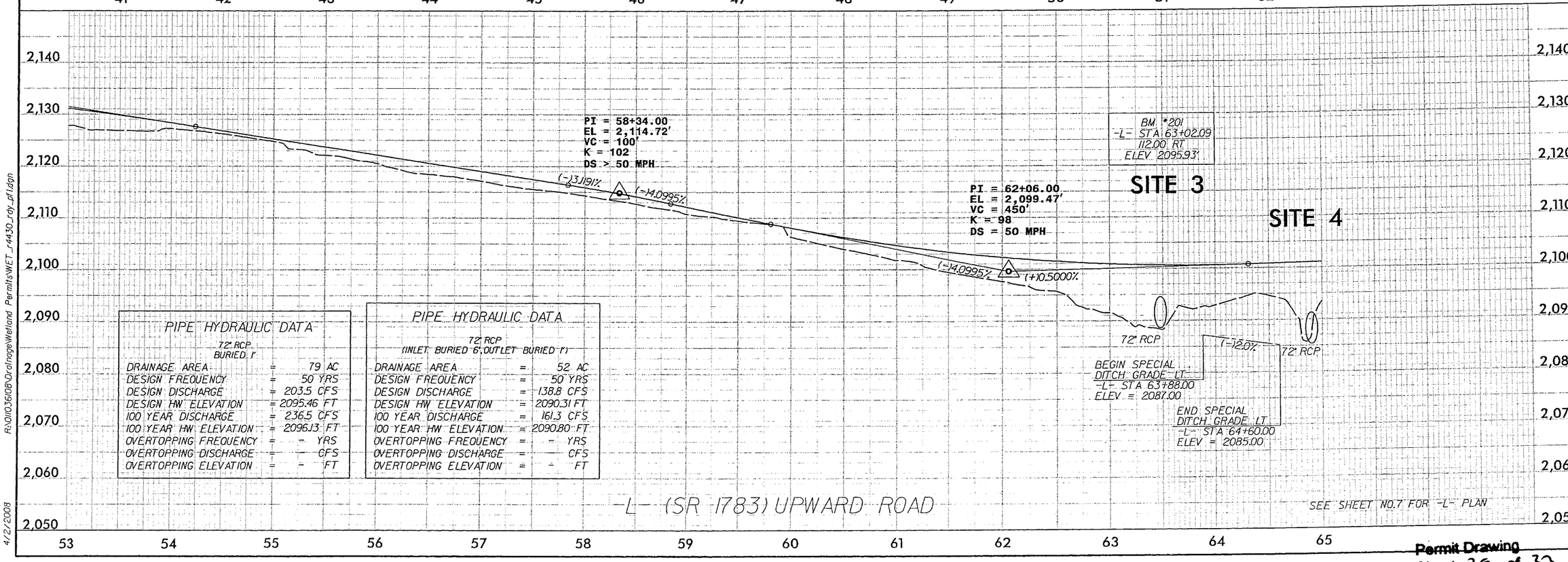
PROJECT REFERENCE NO.	SHEET NO.
R-4430	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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4/2/2008

Permit Drawing
Sheet 29 of 32

PROJECT REFERENCE NO.	SHEET NO.
R-4430	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SITE 5

CL STA 66+60.11
1 @ 100' - 40" STEEL PLATE GIRDER
CL ELEV = 2101.76
SKEW = 65°00'00"

BEGIN BRIDGE
-L- STA 66+10.10
ELEV = 2101.49

END BRIDGE
-L- STA 67+10.12
ELEV = 2101.99

EXIST LOW STEEL
2096.58'

1.5:1

1.5:1

(+)6.5%

(+)3.8%

BEGIN SPECIAL DITCH GRADE LT
-L- STA 66+30.00
ELEV = 2085.00

PI = 66+50.00
ELEV = 2086.30

BEGIN SPECIAL DITCH GRADE LT
-L- STA 69+07.00
ELEV = 2099.22

END SPECIAL DITCH GRADE LT
-L- STA 68+00.00
ELEV = 2092.00

PI = 70+96.00
EL = 2,103.92'
VC = 140'
K = 97
DS = 50 MPH

(+)0.5000%

(+)1.9396%

(+)3.19%

END SPECIAL DITCH GRADE LT
-L- STA 70+50.00
ELEV = 2103.78

(+)1.9396%

(-)0.5035%

PI = 76+92.00
EL = 2,115.48'
VC = 210'
K = 86
DS = 50 MPH

BM #202
-L- STA 66+32.66
47.19' RT
ELEV 2097.40'

BRIDGE HYDRAULIC DATA
100' BRIDGE

DRAINAGE AREA	=	5.52 SQMI
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	1890 CFS
DESIGN HW ELEVATION	=	2095.4 FT
100 YEAR DISCHARGE	=	2150 CFS
100 YEAR HW ELEVATION	=	2095.8 FT
OVERTOPPING FREQUENCY	=	500 YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	2100.6 FT

-L- (SR 1783) UPWARD ROAD

SEE SHEET NO.8 FOR -L- PLAN

SITE 6

PI = 79+80.00
EL = 2,114.03'
VC = 330'
* K = 64
DS = 40 MPH

(-)10.5035%

(+)4.6597%

PI = 84+56.00
EL = 2,136.21'
VC = 330'
* K = 44
DS = 40 MPH

(+)4.6597%

(-)2.7897%

PI = 88+46.00
EL = 2,125.33'
VC = 450'
* K = 64
DS = 40 MPH

(-)2.7897%

(+)4.2128%

PI = 92+36.00
EL = 2,141.76'
VC = 330'
* K = 45
DS = 40 MPH

BEGIN BRIDGE
-L- STA 91+99.40
ELEV = 2138.39

(+)4.2128%

1.5:1

(-)11.17%

48" RCP

(-)10.56%

END SPECIAL DITCH GRADE RT
-L- STA 80+30.00
ELEV = 2110.49

BEGIN SPECIAL DITCH GRADE RT
-L- STA 79+43.00
ELEV = 2110.00

END SPECIAL DITCH GRADE RT
-L- STA 79+25.00
ELEV = 2109.00

BEGIN SPECIAL DITCH GRADE RT
-L- STA 78+56.00
ELEV = 2109.81

BM #203
-L- STA 80+59.78
59.52' RT
ELEV 2097.40'

PIPE HYDRAULIC DATA
48" RCP

DRAINAGE AREA	=	27.5 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	79.6 CFS
DESIGN HW ELEVATION	=	2113.22 FT
100 YEAR DISCHARGE	=	92.5 CFS
100 YEAR HW ELEVATION	=	2113.91 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

-L- (SR 1783) UPWARD ROAD

* CREST VERTICAL K DESIGN EXCEPTION
* SAG VERTICAL K DESIGN EXCEPTION
SEE SHEET NO.9 FOR -L- PLAN

R:\01\036\08\Drainage\Wetland Permits\WET_r4430_rdy_pr1.dgn
4/2/2008

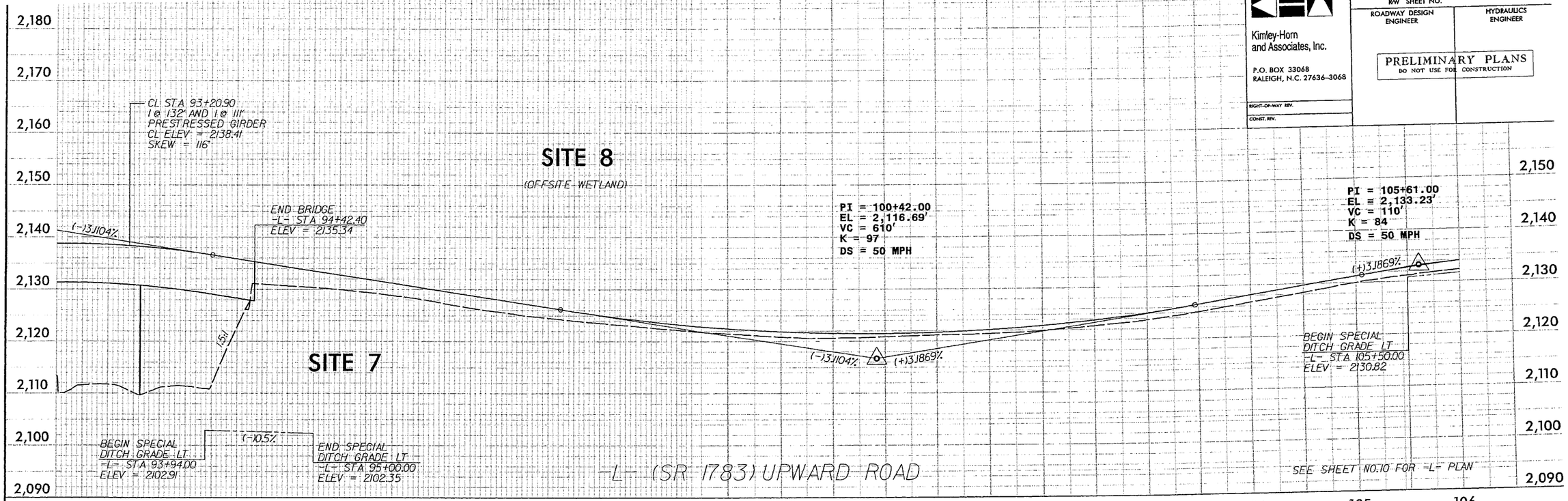
Permit Drawing
Sheet 20 of 33

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

PROJECT REFERENCE NO.	SHEET NO.
R-4430	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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4/2/2008

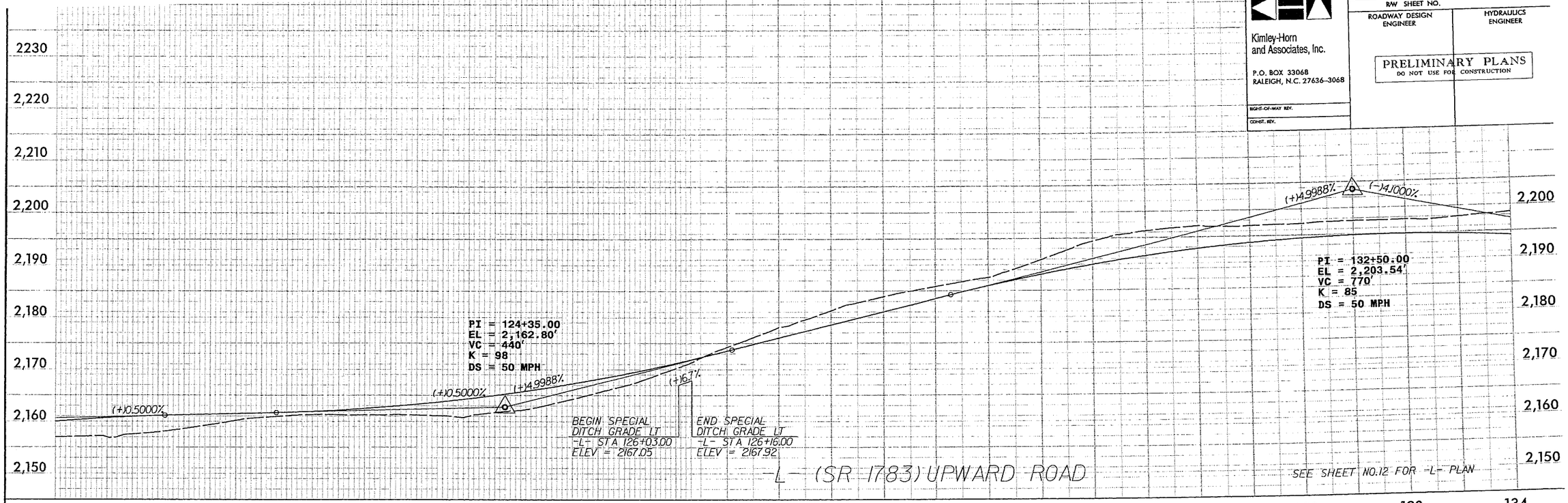
Permit Drawing
Sheet 31 of 33

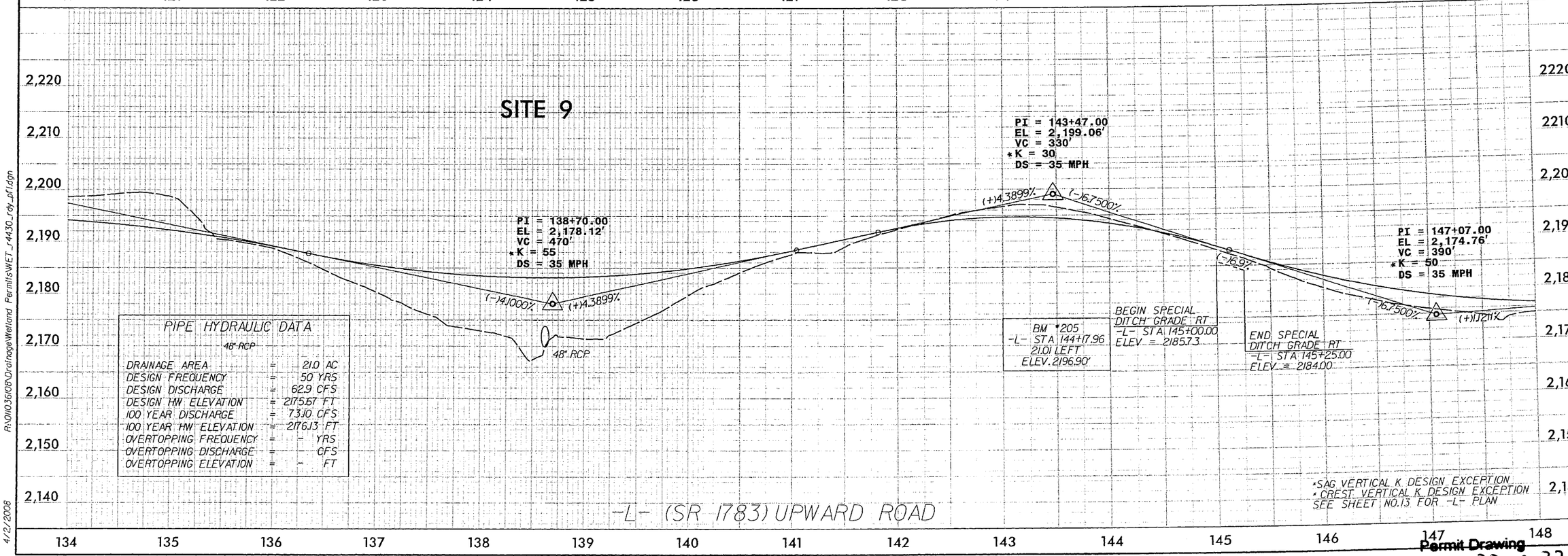
PROJECT REFERENCE NO.	SHEET NO.
R-4430	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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4/2/2006

Permit Drawing
Sheet 32 of 33

PROJECT REFERENCE NO.	SHEET NO.
R-4430	22
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

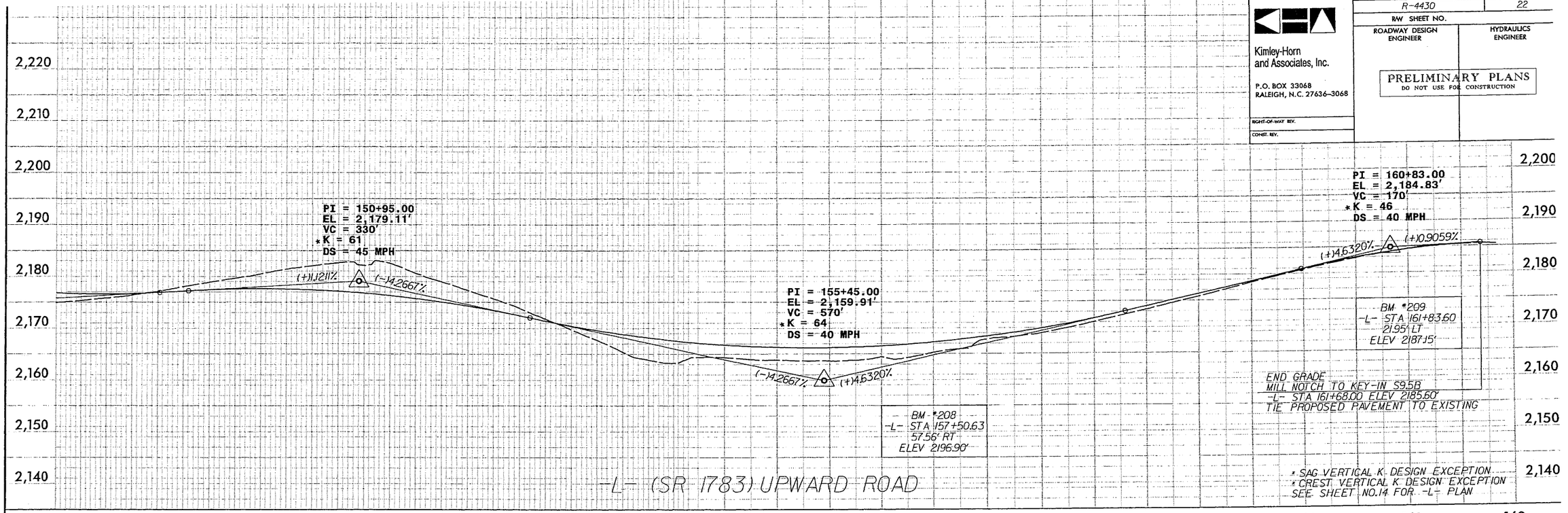
Kimley-Horn and Associates, Inc.

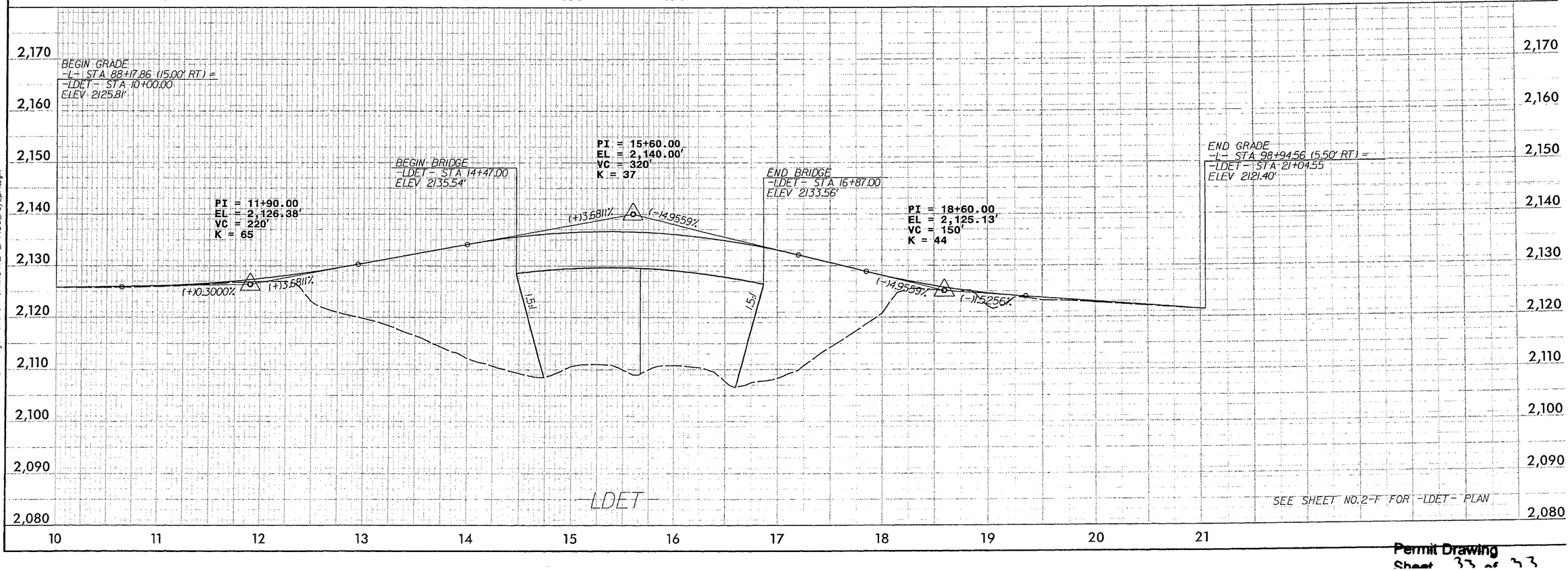
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.

CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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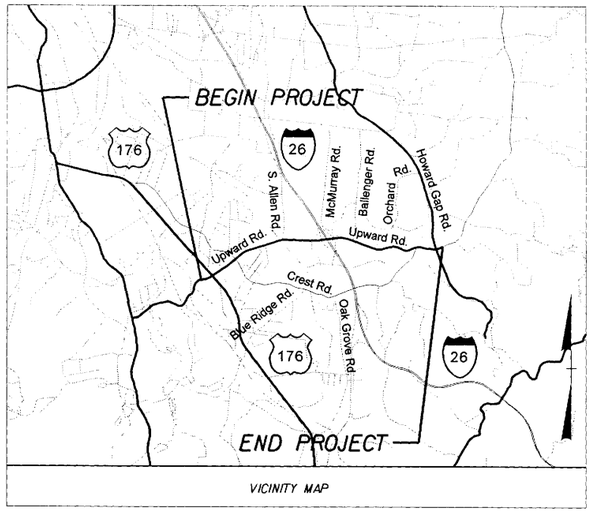
4/2/2008

Permit Drawing
Sheet 33 of 33

TIP PROJECT: R-4430

CONTRACT:

SEE SHEET 1-A FOR INDEX OF SHEETS
SEE SHEET 1-B FOR CONVENTIONAL PLAN SHEET SYMBOLS



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

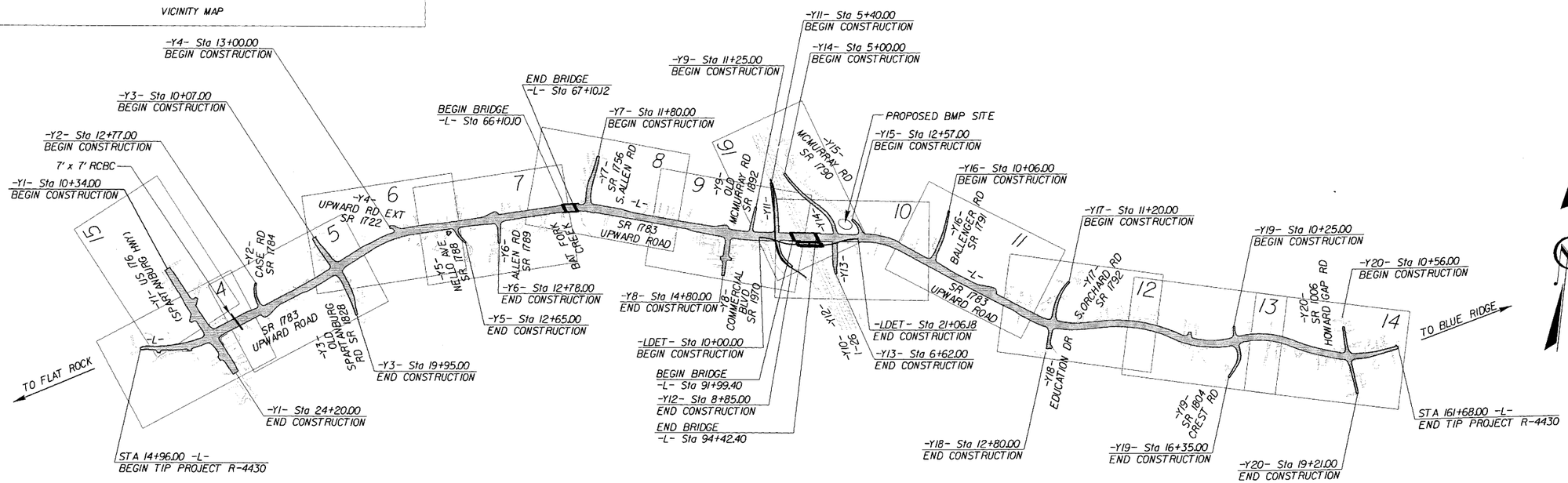
HENDERSON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4430	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34623.1.1	STP-1783 (1)	P.E.
34623.3.1	STP-1783 (1)	R / W

LOCATION: ***SR 1783 (UPWARD ROAD) FROM US 176 (SPARTANBURG HWY) TO SR 1006 (HOWARD GAP ROAD)***

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



NCDOT CONTACT: B.D. TAYLOR, P.E.
PROJECT ENGINEER
ROADWAY DESIGN UNIT

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF EAST FLAT ROCK

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALE

25 0 50
PLANS

25 0 50
PROFILE (HORIZONTAL)

5 0 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2009 = 21,400 VPD
ADT 2030 = 35,800 VPD
DHV = 10%
D = 60%
T = 5% *
V = 50 mph

VERTICAL CURVE
DESIGN EXCEPTIONS

FUNCTIONAL CLASSIFICATION:
URBAN ARTERIAL

* (TTST 3% + DUAL 2%)

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-4430 = 2.714 MILES

LENGTH OF STRUCTURE TIP PROJECT R-4430 = 0.065 MILES

TOTAL LENGTH OF TIP PROJECT R-4430 = 2.779 MILES

PLANS PREPARED FOR NCDOT BY:

Kimley-Horn and Associates, Inc.

Post Office Box 33068
Raleigh, North Carolina 27636

2006 STANDARD SPECIFICATIONS

RIGHT-OF-WAY DATE:
DECEMBER 29, 2006

LETTING DATE:

JEFFREY W. MOORE, P.E.
PROJECT ENGINEER

J. JASON PACE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED DATE
DIVISION ADMINISTRATOR

r:\01036108\Roadway\Proj\r-4430_rdy_lshdgn
3/27/2008

PROJECT REFERENCE NO.	SHEET NO.
R-4430	1-B

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing High Quality Wetland Boundary — HQ WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- River Basin Buffer — RBB
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

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

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Curb Cut for Future Wheel Chair Ramp — ECFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equaility Symbol
- Pavement Removal

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

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

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole — SS
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

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

r:\01\036\08\Roadway\Pro\r-4430_rdy_1shdgn

3/27/2008

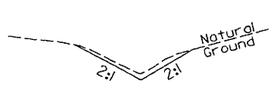
PROJECT REFERENCE NO.	SHEET NO.
R-4430	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

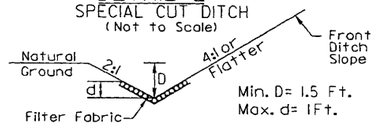
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL 1
DITCH CLEANOUT DETAIL
(Not to Scale)



-L- STA 15+00 (RT)

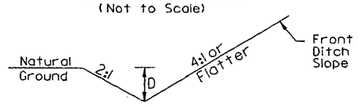
DETAIL 2
SPECIAL CUT DITCH
(Not to Scale)



Min. D= 1.5 Ft.
Max. d= 1Ft.
Type of Liner= Class 'B' Rip-Rap

-Y17- STA 12+94 TO 15+67 (LT)

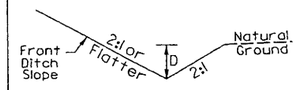
DETAIL 3
SPECIAL CUT DITCH
(Not to Scale)



Min. D = 2 Ft

-Y2- STA 13+00 TO 14+25 (LT)
-Y3- STA 10+07 TO 13+50 (RT)
-Y11- STA 5+40 TO 7+00 (RT)
-Y11- STA 7+27 TO 10+00 (RT)
-Y16- STA 15+00 TO 15+50 (LT)
-Y16- STA 15+00 TO 15+50 (RT)
-Y17- STA 11+50 TO 12+94 (LT)
-Y20- STA 16+25 TO 17+00 (RT)
-Y20- STA 18+00 TO 19+21 (LT)

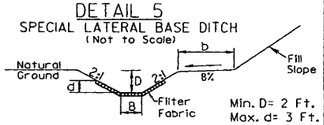
DETAIL 4
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.0'

-L- STA 14+96 TO 16+00 (RT)
-Y1- STA 22+50 TO 23+44 (RT)
-L- STA 46+00 TO 46+30 (LT)
-L- STA 69+07 TO 70+50 (LT)
-Y7- STA 16+40 TO 16+84 (LT)
-L- STA 78+56 TO 79+25 (RT)
-L- STA 79+43 TO 80+30 (RT)
-L- STA 105+50 TO 107+00 (LT)
-L- STA 109+50 TO 110+47 (RT)
-L- STA 126+03 TO 126+16 (LT)
-L- STA 145+00 TO 145+25 (RT)

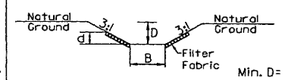
DETAIL 5
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D= 2 Ft.
Max. d= 3 Ft.
B= 6 - 10 Ft.
b= 3 Ft.
•Place Class II Rock Check Dams every 15 ft.
Type of Liner= PSRM

-L- STA 66+30 TO 68+00 (LT)

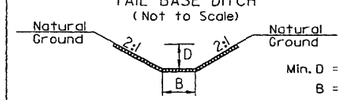
DETAIL 6
TAIL BASE DITCH
(Not to Scale)



Min. D= 3 Ft.
Max. d= 3 Ft.
B= 6 Ft.
Type of Liner:
CLASS 'I' Rip-Rap (BANKS ONLY)

-L- STA 63+88 TO 64+60 (LT)

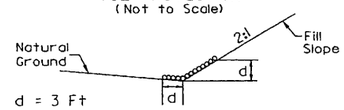
DETAIL 7
TAIL BASE DITCH
(Not to Scale)



Min. D = 3 Ft
B = 2 Ft
Base Tapers From 2' To 0' At Ditch Outlet
Type of Liner: CLASS 'B' Rip-Rap

-Y1- STA 12+05 (LT)

DETAIL 8
TOE PROTECTION
(Not to Scale)

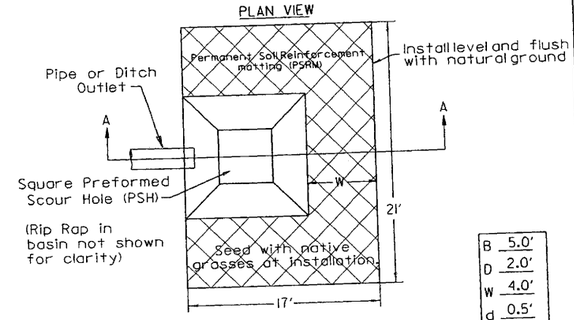


d = 3 Ft
Type of Liner = CLASS 'I' RIP RAP

-Y2- STA 14+25 TO 15+16 (LT)
-L- STA 97+30 TO 98+00 (RT)
-L- STA 124+00 TO 125+00 (RT)

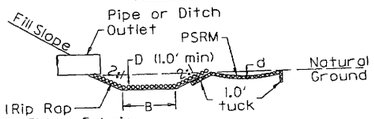
DETAIL 9
PREFORMED SCOUR HOLE
(Not to Scale)

PLAN VIEW



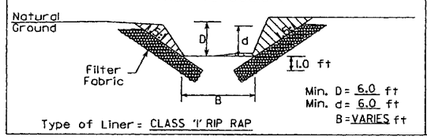
B	5.0'
D	2.0'
W	4.0'
d	0.5'

SECTION A-A



-L- STA 64+55 (RT)
-L- STA 65+99 (RT)
-L- STA 95+00 (RT)

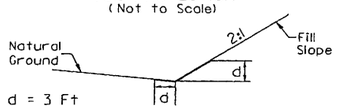
DETAIL 10
TAIL BASE DITCH
(Not to Scale)



Min. D= 6.0 ft
Min. d= 6.0 ft
B=VARIES ft
Type of Liner= CLASS 'I' RIP RAP

-L- STA 26+25 (LT)

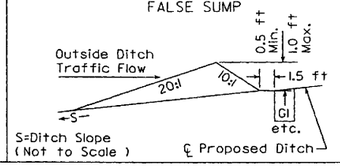
DETAIL 11
TOE PROTECTION
(Not to Scale)



d = 3 Ft
Type of Liner = PSRM

-L- STA 17+00 (LT)
-L- STA 44+50 TO 46+00 (LT)
-Y4- STA 13+00 (LT) TO -L- STA 48+00 (LT)
-L- STA 110+47 TO 113+15 (RT)
-L- STA 113+50 TO 115+40 (RT)
-L- STA 116+00 TO 116+60 (RT)
-Y17- STA 12+80 (RT)

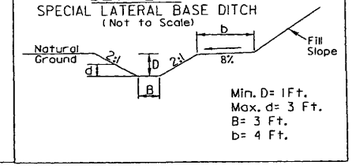
DETAIL 12
FALSE SUMP



S=Ditch Slope (Not to Scale)
℄ Proposed Ditch

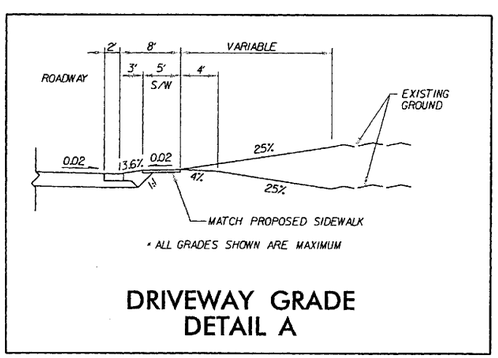
-Y11- STA 7+20 (RT)

DETAIL 14
SPECIAL LATERAL BASE DITCH
(Not to Scale)



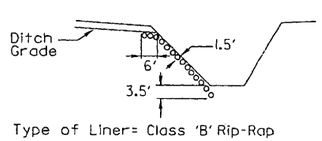
Min. D= 1Ft.
Max. d= 3 Ft.
B= 3 Ft.
b= 4 Ft.

-L- STA 93+94 TO 95+00 (LT)



DRIVEWAY GRADE DETAIL A

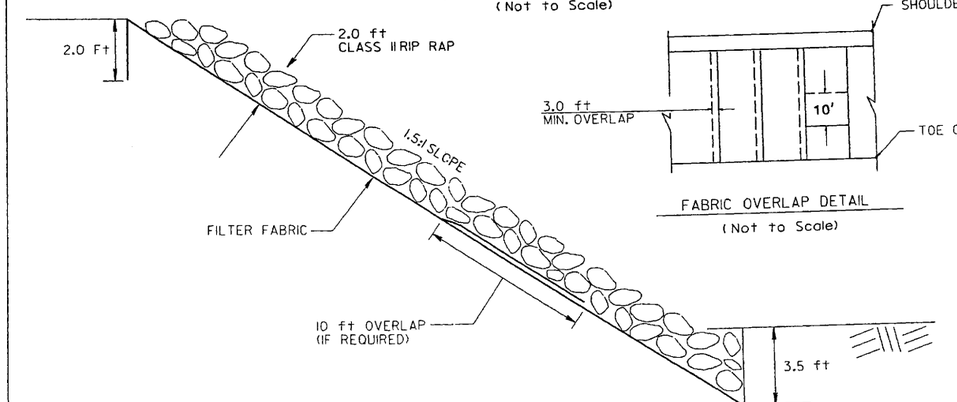
DETAIL 15
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

-L- STA 64+80 (LT)

DETAIL 13
ROCK PLATING DETAIL
(Not to Scale)



-Y13- STA 7+50 TO 10+05 (RT)
-Y14- STA 12+00 TO 13+75 (LT)

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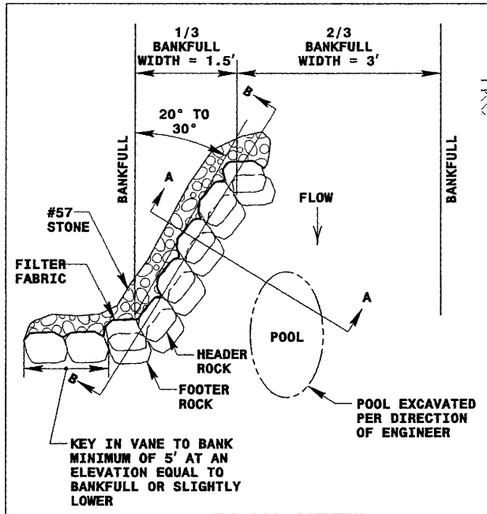
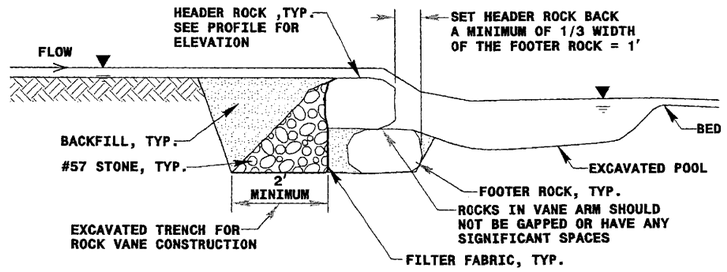
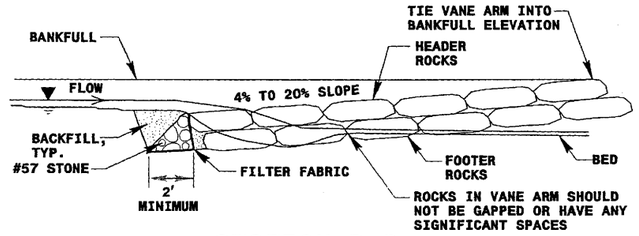
3/27/2006



PLAN VIEW



SECTION A-A



SECTION B-B

	BOULDER DIMENSIONS (FT)		
STATION	HEIGHT	LENGTH	WIDTH
64+16 -L-	2'	2'	3'

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BACKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

DETAIL 15

ROCK VANE DETAIL

(Not to Scale)

-L- STA 64+16 (LT)

Kimley-Horn
and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

PROJECT REFERENCE NO.	SHEET NO.
R-4430	2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

3/27/2008
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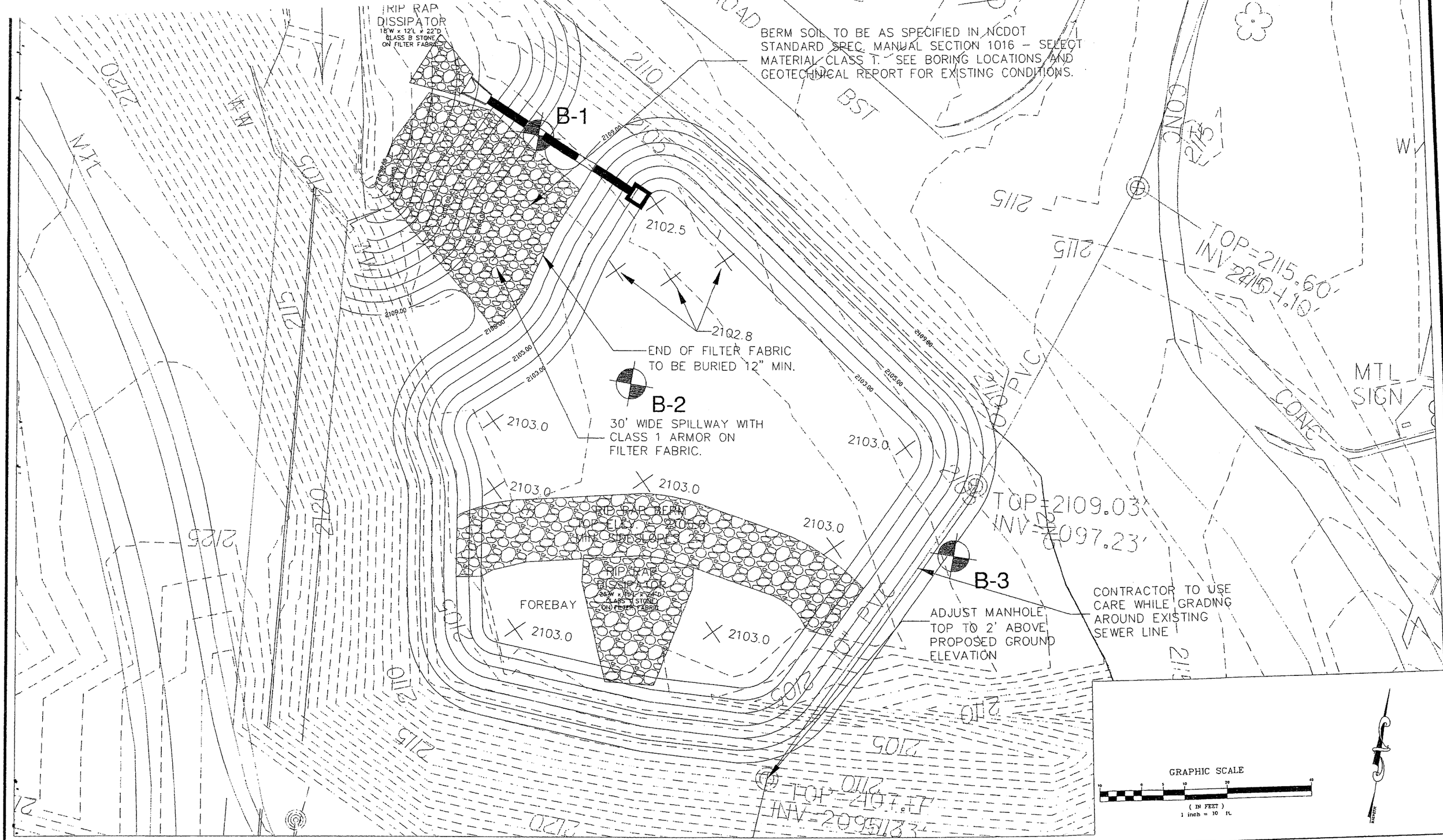


REV No.	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

PREPARED IN THE OFFICE OF:
Kimley-Horn and Associates, Inc.
P.O. BOX 33068 - RALEIGH, NORTH CAROLINA 27636-3068
PHONE: (919) 677-2000 FAX: (919) 677-2050

CLIENT:
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

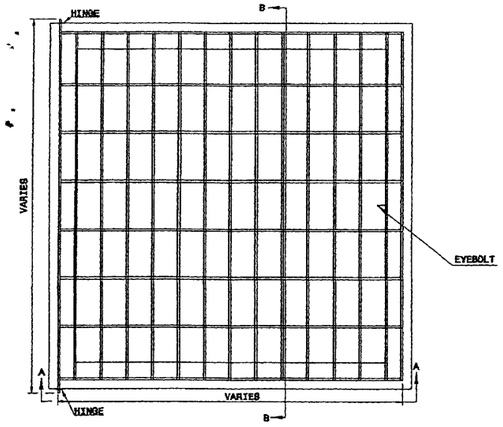
TITLE:
UPWARD ROAD DRY DETENTION POND
- L - STA 97+65 LT

SEAL:

DATE: 08/08/06
HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'
DRAWN BY: JGM
DESIGNED BY: JGM
CHECKED BY:

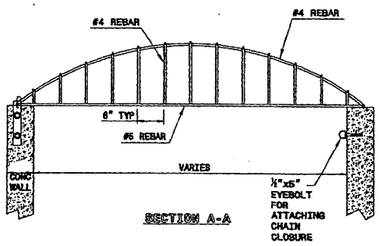
PROJECT:
UPWARD ROAD DETENTION POND
HENDERSON COUNTY, NORTH CAROLINA

ATTACHED REFERENCE FILES:
JOB NUMBER: 011036108
SHEET NUMBER: 2-G

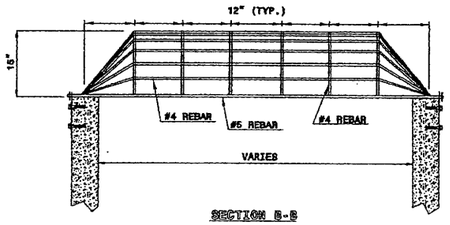


PLAN

REBAR TRASH RACKNOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ⅛" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM 153.

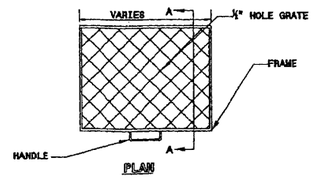


SECTION A-A

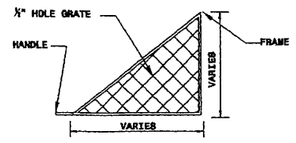


SECTION B-B

REMOVEABLE ORIFICE TRASH RACK



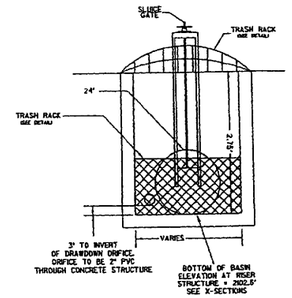
PLAN



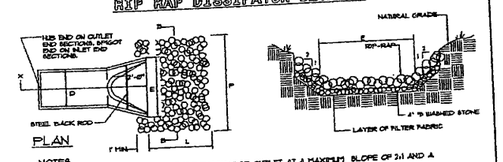
SECTION A-A

ORFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ⅛" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM 153.

STRUCTURE FRONT VIEW



RIP RAP DISSIPATOR DETAIL



NOTES
END OF THE PIPE OR CULVERT AT THE DISCHARGE OUTLET AT A MAXIMUM SLOPE OF 2:1 AND A HEIGHT NOT LESS THAN TWO TIMES THE PIPE DIAMETER OR CULVERT HEIGHT.

THERE SHALL BE NO OVERFLOW FROM THE END OF THE APRON TO THE SURFACE OF THE RECEIVING CHANNEL. THE AREA TO BE PAVED OR RIP-RAPPED SHALL BE UNDERCUT SO THAT THE INVERT OF THE APRON SHALL BE AT THE BASE GRADE (FLUSH) WITH THE SURFACE OF THE RECEIVING CHANNEL. THE APRON SHALL HAVE A CUTOFF OR TOE WALL AT THE DOWNSTREAM END.

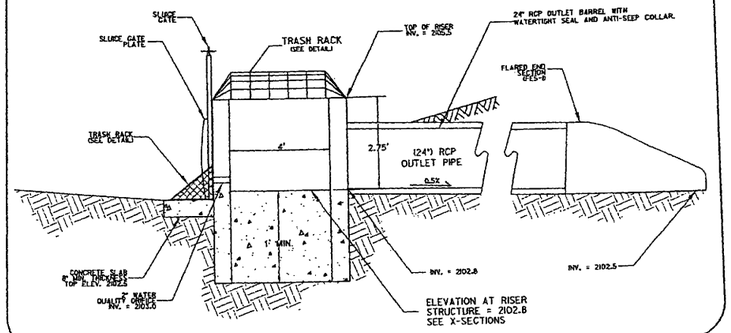
THE WIDTH OF THE END OF THE APRON SHALL BE EQUAL TO THE BOTTOM WIDTH OF THE RECEIVING CHANNEL. MAXIMUM TAPER TO RECEIVING CHANNEL 5:1

ALL SUBGRADE STRUCTURE TO BE COMPACTED TO 95% OR GREATER. THE PLACING OF FILL EITHER LOOSE OR COMPACTED IN THE RECEIVING CHANNEL SHALL NOT BE ALLOWED.

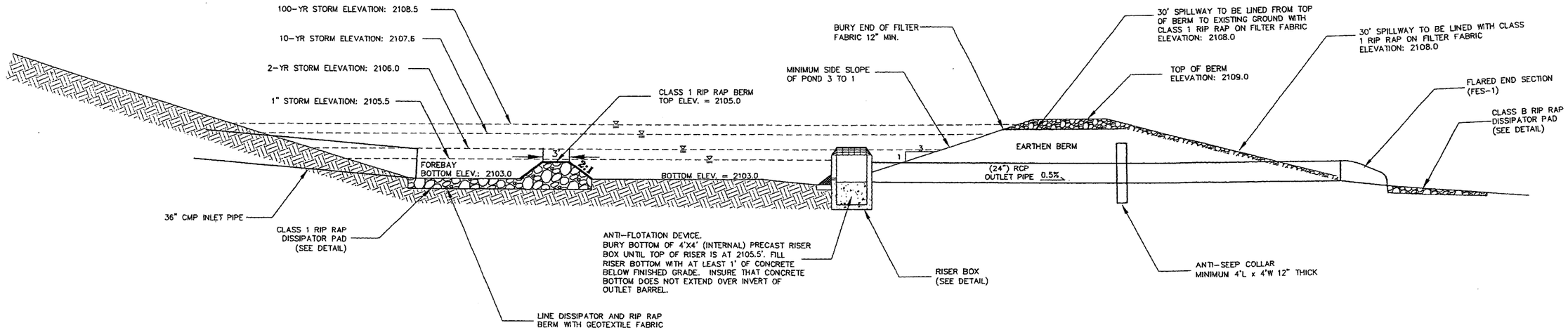
NO BENDS OR CURVES IN THE HORIZONTAL ALIGNMENT OF THE APRON WILL BE PERMITTED.

STRUCTURE	VEL. (FPS)	E (ft.)	L (ft.)	W (ft.)	STONE THICKNESS (in.)	STONE	METHOD	ZONE
36" INLET	16.83	8	16	25	24	CLASS 1	NY DISSIPATER	ZONE 3
FES-1	7.20	6	12	16	22	CLASS B	NY DISSIPATER	ZONE 2

STRUCTURE PROFILE VIEW



DRY DETENTION POND PROFILE



V. No:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

PREPARED IN THE OFFICE OF:
Kimley-Horn and Associates, Inc.
P.O. BOX 33068 - RALEIGH, NORTH CAROLINA 27636-3068
PHONE: (919) 677-2000 FAX: (919) 677-2050

CLIENT: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

TITLE: UPWARD ROAD DRY DETENTION POND

SEAL:

DATE: 08/08/06
HORIZONTAL SCALE: NTS
VERTICAL SCALE: NTS
DRAWN BY: JGM
DESIGNED BY: JGM
CHECKED BY:

PROJECT: UPWARD ROAD DETENTION POND
HENDERSON COUNTY, NORTH CAROLINA

ATTACHED REFERENCE FILES:
JOB NUMBER: 011036108
SHEET NUMBER: 2-H

R/W REVISIONS PARCELS 1, 3, 4, 6, 6A, 6B, 103 - / /07

PROJECT REFERENCE NO.	SHEET NO.
R-4430	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

RIGHT-OF-WAY REV.
CONST. REV.

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

MATCH LINE -Y1- STA 14+50 (SHEET 15)

MATCH LINE -L- STA 28+00 (SHEET 5)

NAD 83

-L- PCSta. 13+59.53

-BL- 1
-L- STA 13+78.67
OFF 20.74' LT

N 34° 49' 24.4" E

-L- PRCSta. 15+98.70

-L- PTSta. 23+49.36

-L- N 54° 26' 38.1" E

-L- POC Sta. 14+96.00
BEGIN STATE PROJECT R-4430
BEGIN CONSTRUCTION

-L- POC Sta. 23+16.34 =
-Y1- POT Sta. 19+37.31
Δ = 82°33'09.8"

-Y1- POT Sta. 24+20.00
END CONSTRUCTION

-BL- 2
-L- STA 18+01.38
OFF 8.57' LT

-BL- 3 = -BY-
-L- STA 22+54.01
OFF 23.92' LT

-BL- 4 = -TI-
-L- STA 27+63.61
OFF 3.83' LT

-BY- =
-Y1- STA 16+24.07
OFF 39.81' RT

-BY- 80
-Y1- STA 17+62.30
OFF 207.29' RT

-BY- 31
-Y1- STA 17+67.32
OFF 39.77' RT

-BYA- 79
-Y1- STA 15+46.93
OFF 53.66' LT

-TI- 61
-L- STA 26+25.67
OFF 276.38' LT

-TI- 62
-L- STA 26+38.05
OFF 161.21' LT

-TI- 64
-L- STA 26+63.14
OFF 59.73' RT

-TI- 65
-L- STA 27+28.20
OFF 172.65' RT

-TI- 66
-L- STA 27+15.76
OFF 247.33 RT

1 MEADOW GARDEN ASSOCIATES
DB 652 PG 157

2 INGLES MARKETS, INC.
DB 861 PG 253

3 CVS 75236 NC
DB 1301 PG 458
PLAT SLIDE 6402

4 JSD INC
DB 1267 BK 535
DB 1307 PG 238

5 LYNDON HILL
DB 676 PG 663
PB 4 PG 76

6 MORRIS AND TIMOTHY MULLINAX
DB 1238 PG 42

6A WILLIAM AND CAROL MULLINAX
DB 1234 PG 548

6B LINDA AND SAMUEL LAUGHTER
DB 1235 PG 435

8 CHILDREN & FAMILY RESOURCE CENTER OF HENDERSON COUNTY, INC.
DB 1186 PG 033
PLAT SLIDE #6590

101 BOYD MASSAGEE
DB 1067 PG 427

102 RITCHARD A. MATTEIS
DB 1128 PG 391
PB 1 PG 92

103 JAMES C. KIRKPATRICK
DB 1239 PG 142
DB 1320 PG 709
PLAT SLIDE #6590

104 DAVID WARD
DB 1123 PG 138

GEORGE'S STOR-MOR REALTY, LLC
DB 1084 PG 511

CHARLES W. McGRADY, TRUSTEE OF THE KATHLEEN M. McGRADY TRUST
DB 1313 PG 375
PLAT SLIDE #6590

STATE OF NORTH CAROLINA
DB 392 PG 153

REMOVE EXIST CB AND CONSTRUCT TBJB W/ MH COVER

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO CONSTRUCT CUT SLOPE

ADJUSTMENT OF EXIST CB

RELOCATE CHAIN LINK FENCE TO PROP R/W LINE

TOE PROTECTION SEE DETAIL 11 SHEET 2-D

SEE SITE PLAN

REMOVE EXIST CB AND CONSTRUCT TBJB W/ MH COVER

REMOVE EXIST CB AND CONSTRUCT TBJB W/ MH COVER REMOVE EXIST 18" RCP

REMOVE 18" CMP

OUTLET PROTECTION CLASS 'I' RIP RAP EST 2 TONS EST 7 SY FF

TAIL BASE DITCH SEE DETAIL 10 SHEET 2-D

OUTLET PROTECTION CLASS 'I' RIP RAP EST 8 TONS EST 21 SY FF

OUTLET PROTECTION CLASS 'B' RIP RAP EST 8 TONS EST 21 SY FF

TIE SLOPE TO BASE OF EXIST DITCH

RETAIN AND CLEAN OUT PIPE

END EXPRESSWAY GUTTER BEGIN 2'-6" C&G FLARE Sta 16+47

BEGIN EXPRESSWAY GUTTER Sta 15+20

LATERAL 'V' DITCH SEE DETAIL 4 SHEET 2-D

CLEAN OUT EXIST DITCH EST DDE = 15 CY SEE DETAIL 1SHEET 2-D

CONVERT DI TO JB W/ MH COVER

SAWCUT AND REMOVE EXIST ASPHALT - CONSTRUCT 8'x12" CONC CURB AT EXIST ELEV

BEGIN 2'-6" C&G END 8'X12" CONC CURB

RELOCATE EXIST SIGN

REMOVE EXIST CONC ISLANDS

ADJUST EXISTING CATCH BASIN

END C&G Sta 23+79 RT.

LATERAL 'V' DITCH SEE DETAIL 4 SHEET 2-D

SAWCUT AND REMOVE EXIST ASPHALT - CONSTRUCT 8'x12" CONC CURB AT EXIST ELEV

REMOVE EXIST 72" CMP PROP 7'X7' RCBC W/ HEADWALLS

RETAIN EXIST 12" CMP OUTLET MAINTAIN POSITIVE DRAINAGE

REMOVE EXIST DI AND 15" RCP

RETAIN EXIST 52.62' 24" RCP OUTLET & 65' UNKNOWN

CONVERT EXIST CB TO TBJB W/ MH COVER

RELOCATE CHAIN LINK FENCE TO PROP R/W

NOTE: RADII DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED

OBLITERATION OF EXISTING ASPHALT PAVEMENT

** VERTICAL CURVE DESIGN EXCEPTION

SEE SHEET NO.17 FOR -L- PROFILE
SEE SHEET NO.23 FOR -Y1- PROFILE

-Y1- (US 176) SPARTANBURG HWY

2004 ADT / 2025 ADT			25500 / 48000	
DHV = 9% DIR = 55% TTST = 2% DUAL = 3%				
	9000 / 15200	2600 / 4600	8300 / 14000	15800 / 26600
-L- UPWARD RD (SR 1783)		500 / 1200	1600 / 3200	-L- UPWARD RD (SR 1783)
DHV = 9% DIR = 55% TTST = 2% DUAL = 3%			16600 / 33800	

-Y1- (US 176) SPARTANBURG HWY

-L-

PI Sta 14+88.33	PI Sta 19+84.82
Δ = 52° 42' 17.4" (RT)	Δ = 3° 05' 03.6" (LT)
D = 22° 02' 12.6"	D = 4° 24' 26.5"
L = 239.17'	L = 750.66'
T = 128.80'	T = 386.12'
R = 260.00'	R = 1,300.00'
SE = 0.03	SE = 0.03
RO = 72'	RO = 135'

3/27/2008

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PROJECT REFERENCE NO.	SHEET NO.
R-4430	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

MATCH LINE -L- STA 28+00 (SHEET 4)

MATCH LINE -L- STA 40+50 (SHEET 6)

CHILDREN & FAMILY RESOURCE CENTER OF HENDERSON COUNTY, INC. DB 1186 PG 033 PLAT SLIDE #6590 — (8)

RETAIN EXIST CURB

CHILDREN & FAMILY RESOURCE CENTER OF HENDERSON COUNTY, INC. DB 1186 PG 033 PLAT SLIDE #6590

-L- SAG STA = 28+41.14 EL = 2136.44

ADJUST EXIST JB

BELLSOUTH TELECOMMUNICATIONS, INC DB 1214 PG 011 DB 1214 PG 014 DB 1214 PG 140 — (9)

200' BAY TAPER

TIE INTO EXIST SYSTEM — (8A)

-BY1- 33
-Y2- STA 12+93.10
OFF 11.50' RT

-Y2- POT Sta. 12+77.00
BEGIN CONSTRUCTION
-Y2- PC Sta. 12+90.63

SPECIAL CUT DITCH SEE DETAIL 3 SHEET 2-D

TOE PROTECTION SEE DETAIL 8 SHEET 2-D

-Y2- PT Sta. 14+96.12

-BY1- 34
-Y2- STA 15+28.65
OFF 13.96' RT

-L- POT Sta. 29+53.53 =
-Y2- POT Sta. 16+00.00
Δ = 90°

ELZIE AND SOPHRONIA PORTER DB 222 PG 231 — (10)

-L- PC Sta. 32+99.09

-BL- 5
-L- STA 33+19.57
OFF 3.16' LT

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE TO SLOPE

TIE CUT SLOPE TO BASE OF EXIST SLOPE

GLENDA AND WILLIAM GLOVER DB 430 PG 437 DB 694 PG 163 — (11)

CHARLES D. II AND PEGGY HUNNICUTT DB 612 PG 389 — (14)

C.M. JONES AND LORENE JONES DB 370 PG 507 — (110)

330' LT TURN STORAGE

-Y3- POT Sta. 10+00.00
-Y3- POT Sta. 10+07.00
BEGIN CONSTRUCTION

TIE PROPOSED SPECIAL CUT DITCH INTO EXIST SWALE

CHARLES GREGORY PORTER WILL 98-E-62 — (107)

-BY2- 35
-Y3- STA 10+79.42
OFF 31.83' RT

100' BAY TAPER

REMOVE -Y3-

S 45°07'57.0" E

180' TAPER (20')

SPECIAL CUT DITCH SEE DETAIL 3 SHEET 2-D

LAUREL E. IVEY DB 936 PG 481 DB 1002 PG 367 — (109)

250' RT TURN STORAGE

C.M. AND WILMA JONES DB 956 PG 320

CHARLES D. AND BETTY J. HUNNICUTT DB 721 PG 915 DB 407 PG 557 — (15)

330' RT TURN STORAGE

-Y3- PC Sta. 13+25.24
-L- PT Sta. 37+93.85

C.M. JONES AND LORENE JONES DB 721 PG 917 — (16)

N 49°33'23.1" E

GLORIA CRISP FREEMAN DB 694 PG 165 DB 501 PG 39 — (13)

-BL- 6 = -BY2-
-L- STA 38+65.79
OFF 5.89' LT

-L- POT Sta. 39+07.52 =
-Y3- POC Sta. 14+30.85
Δ = 89°05'34.7"

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN DRIVEWAYS

RETAIN

OUTLET PROTECTION CLASS 'B' RIPRAP EST 3 TONS EST 10 SY FF

180' TAPER

137.5' MEDIAN TAPER (50')

330' LT TURN STORAGE

100' BAY TAPER

ELZIE AND SOPHRONIA PORTER DB 222 PG 231 — (7)

-BL- = -BY1-
-L- STA 29+18.42
OFF 3.66' LT

SPEVINES AND DEITRA JONES DB 1176 PG 246 PLAT SLIDE 3176 — (12)

SPEVINES AND MARY JONES DB 991 PG 443 PLAT SLIDE 3176

SPEVINES AND DEITRA JONES DB 1176 PG 246 PLAT SLIDE 3176 — (112)

SPEVINES AND MARY JONES DB 829 PG 133 — (114)

-BY2- 36
-Y3- 17+02.94
OFF 18.58' LT

TIE CUT DITCH TO EXIST OUTFALL SWALE AND GRADE TO DRAIN

-Y3- PT Sta. 18+89.20

SAWCUT EXIST CONCRETE AND TIE PAVED SHOULDER TO EXIST DRIVEWAY

KAREN PACE DAVIS DB 643 PG 115 — (115)

-Y3- POT Sta. 19+95.00
END CONSTRUCTION

WILLIAM AND JEANNE PACE DB 377 PG 175

CHAIN LINK FENCE RESET

WILLIAM AND ANNIE JONES DB 356 PG 267 — (116)

S 24°56'14.6" E

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN DRIVEWAY

REMOVE EXIST WALL TO END OF DRIVEWAY - TIE FILL SLOPES TO TOP OF EXIST WALL

REMOVE EXIST WALL TO END OF DRIVEWAY - TIE FILL SLOPES TO TOP OF EXIST WALL

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN DRIVEWAY

SPEVINES R. AND MARY JONES DB 956 PG 325 DB 343 PG 209 DB 263 PG 28 — (113)

CHARLES D. AND BETTY J. HUNNICUTT DB 721 PG 915 DB 407 PG 557 — (111)

FLORENA DENISE HENSLEY DB 1299 PG 135

300' RT TURN STORAGE

200' LT TURN STORAGE

300' TAPER (200')

100' BAY TAPER

N 54°26'38.1" E

-L-

4' CONC ISLAND

2'-6" C&G

5' SIDEWALK

REMOVE

-Y3- (SR 1828) OLD SPARTANBURG RD

2004 ADT / 2025 ADT			2400 / 4800	
DHV = 9% DIR = 55% TTST = 2% DUAL = 3%				
-L- UPWARD RD (SR 1783)	15800 / 26600	1500 / 2600	700 / 1200	14700 / 24600
		1700 / 3000	1500 / 2400	-L- UPWARD RD (SR 1783)
DHV = 9% DIR = 51% TTST = 1% DUAL = 5%			3500 / 6400	

-Y3- (SR 1828) OLD SPARTANBURG RD

-L-	-Y2-	-Y3-
PI Sta 35+46.62	PI Sta 13+97.59	PI Sta 16+10.18
Δ = 4°53'15.0" (LT)	Δ = 39°14'47.8" (LT)	Δ = 20°11'42.3" (RT)
D = 0°59'16.3"	D = 19°05'54.9"	D = 3°34'51.6"
L = 494.76'	L = 205.49'	L = 563.95'
T = 247.53'	T = 106.96'	T = 284.93'
R = 5,800.00'	R = 300.00'	R = 1,600.00'
SE = NC	SE = NC	SE = 0.03
RO = NONE	RO = NONE	RO = 96'

OBLITERATION OF EXISTING ASPHALT PAVEMENT

** VERTICAL CURVE DESIGN EXCEPTION

SEE SHEET NO.17 FOR -L- PROFILE
SEE SHEET NO. 23 FOR -Y2- PROFILE
SEE SHEET NO.24 FOR -Y3 PROFILE

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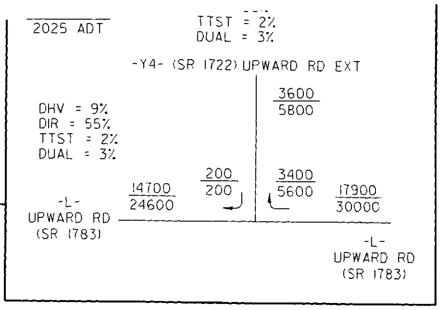
3/27/2008



-L-

PI Sta 46+16.54
Δ = 23° 36' 09.3" (RT)
D = 4° 46' 28.7"
L = 494.33'
T = 250.72'
R = 1,200.00'
SE = 0.04
RO = 192'

-Y4-

PI Sta 13+84.87
Δ = 64° 19' 09.04" (RT)
D = 45° 50' 11.8"
L = 140.32'
T = 78.59'
R = 125.00'
SE = NC
RO = NONE

Kimley-Horn
and Associates, Inc.

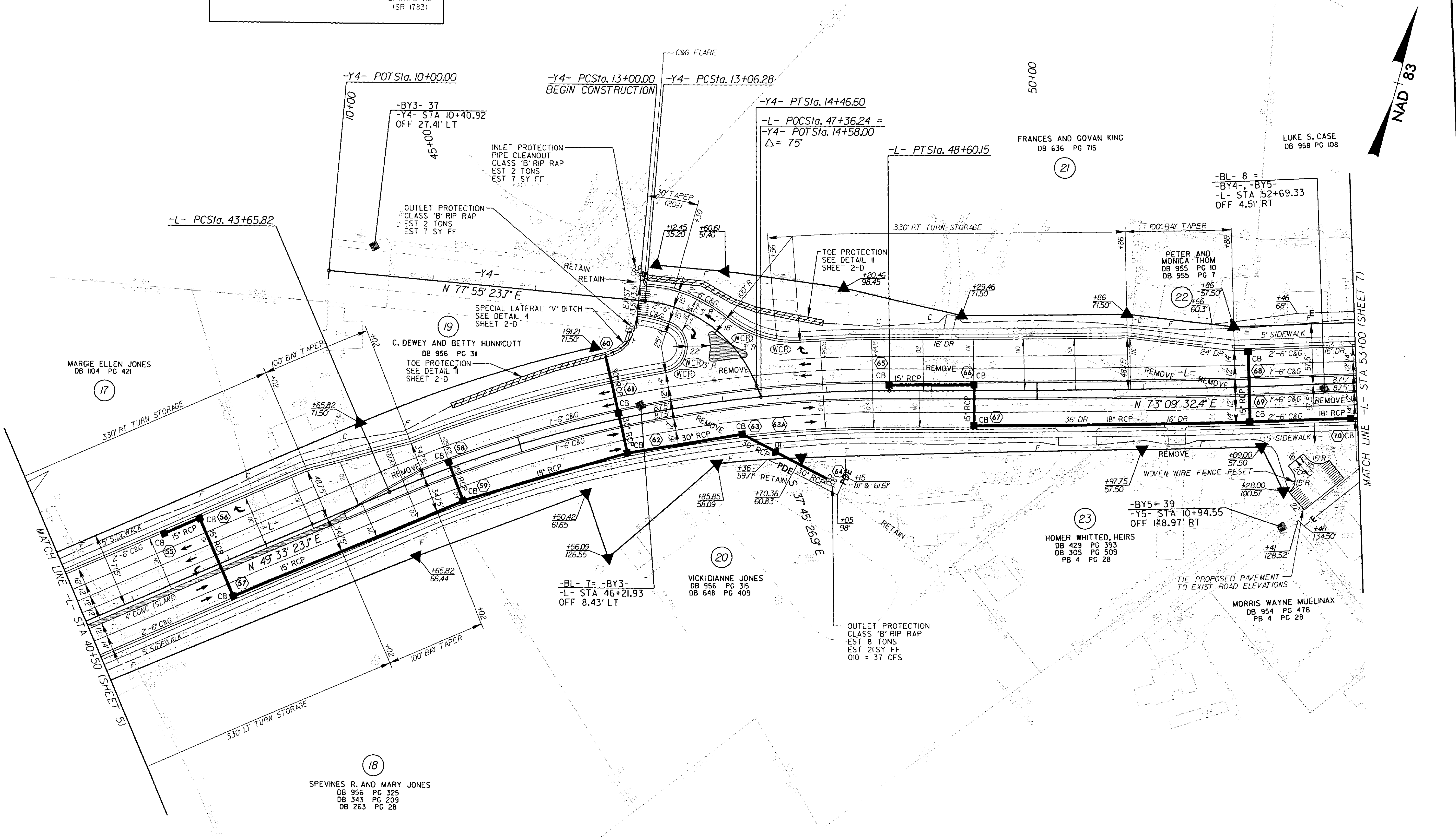
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

PROJECT REFERENCE NO.	SHEET NO.
R-4430	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

RIGHT-OF-WAY REV.

CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



** VERTICAL CURVE DESIGN EXCEPTION

SEE SHEET NO.18 FOR -L- PROFILE
SEE SHEET NO.24 FOR -Y4- PROFILE

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3/27/2008

R/W REVISIONS PARCELS 24, 25, 29, 30, 30A, 31, 32, 118 – / /07

2025 ADT

-L- UPWARD RD (SR 1783)
17900 / 30000
DHV = 9%
DIR = 55%
TTST = 2%
DUAL = 3%
800 / 1800
2300 / 4200
19400 / 32400
-L- UPWARD RD (SR 1783)
3100 / 6000
-Y6- (SR 1789) ALLEN RD
DHV = 10%
DIR = 60%
TTST = 2%
DUAL = 3%

-Y5-
PI Sta 11+07.49
Δ = 37° 37' 42.2" (LT)
D = 27° 56' 57.0"
L = 134.63'
T = 69.84'
R = 205.00'
SE = RC
RO = SEE PLANS

PI Sta 13+61.08
Δ = 90° 06' 36.1" (RT)
D = 95° 29' 34.7"
L = 94.36'
T = 60.12'
R = 60.00'
SE = EXISTING
RO = EXISTING

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068
RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO. R-4430 | SHEET NO. 7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

LUKE S. CASE
DB 958 PG 108

-L- POT Sta. 53+61.00 =
-Y5- POT Sta. 10+00.00
Δ = 90°

(26) JAMES H. MOORE
DB 1096 PG 109

(28) DORIS LEE McCRAIN
DB 888 PG 635

(29) THELMA E. ANDERS
DB 254 PG 147

(32) DIANA S. HOUSTON
DB 801 PG 569

CARROLL AND CLARA CLARK
DB 769 PG 583
(33)

55+00

60+00

65+00

-BL- 9 = -BY6-
-L- STA 58+35.22
OFF 16.23' RT

-L- POT Sta. 58+61.87 =
-Y6- POT Sta. 10+00.00
Δ = 99°49'24.4"

JOHN BIANUCCIANO
JENNIE CAMPBELL
DB 1276 PG 785
(24)

S 16° 50' 27.6" E

100' BAY TAPER
330' LT TURN STORAGE
140' TAPER
137.5' MEDIAN TAPER (50:1)
BEGIN C/A +70.00 57.50'
END C/A +74.00 57.50'
137.5' MEDIAN TAPER (50:1)

ROCK CROSS VANE
FLOW ROCK EL=2085.7 FT
TIE ARMS IN TO EL=2087.2 FT
SEE DETAIL 5&15 SHEET 2-D&2-E
EST 26 TONS BOULDERS
EST 5.5 TONS CLASS B
EST 5.5 TONS CLASS I
EST 175 SY FF
6' TAIL BASE DITCH
SEE DETAIL 6 SHEET 2-D

RIP RAP AT EMBANKMENT
CLASS 'B' RIP RAP
EST 13 TONS
EST 29 SYFF
SEE DETAIL 15 SHEET 2-D

-L- SAG
STA = 63+82.08
EL = 2100.47

JURISDICTIONAL STREAM UT2 TO BAT FORK

OUTLET PROTECTION (STREAM BANKS ONLY)
CLASS 'I' RIP RAP
EST 60 TONS
EST 90 SY FF

5' SIDEWALK
2'-6" C&G
15" RCP
18" RCP
16" RCP
24" RCP
4' CONC ISLAND
REMOVE
WCR
RC
DI
CB
HW
PDE
RETAIN
EXIST

MATCH LINE -L- STA 53+00 (SHEET 6)
MATCH LINE -L- STA 65+00 (SHEET 8)

N 3° 09' 32.4" E

WOVEN WIRE FENCE RESET
-Y5- PCSta. 10+37.64
-Y5- PTSta. 11+72.28

WILD HARE INVESTMENTS, LTD.
DB 1247 PG 83
(25)

JERRY AND CHERYL WHITTED
DB 713 PG 269
PB 4 PG 28
(27)

265' BAY TAPER

CHRIS KEIFER
DB 1280 PG 651
PB 4 PG 28
(30)

-Y5- POT Sta. 12+65.00
END CONSTRUCTION

-Y5- PCSta. 13+00.96

-BY4- 38
-Y5- STA 13+36.94
OFF 13.66' LT

ROBERT CALLOWAY
DB 376 PG 381
PB 4 PG 28
(118)

JAMES AND NANCY FERGUSON
DB 1196 PG 377
DB 896 PG 38
PB 4 PG 28
(119)

MILL AND RESURFACE
TIE PROP 2'-6" C&G TO
EXIST ASPHALT CURB

LAWRENCE AND SUZANNE RUSSELL
DB 1155 PG 653
PB 4 PG 28

WALTER J. MAKI
DB 1041 PG 752
PB 4 PG 28
(30A)

FRANK AND JOYCE SWAIN
DB 540 PG 139
PB 4 PG 28

L.E. McGLASSON
DB 1129 PG 559
DB416 PG 567
PB 4 PG 28

SPURGEON JUSTICE
DB 384 PG 517
PB 4 PG 28

S 35° 38' 26.3" W

-Y5- PTSta. 13+95.33

-Y5- POT Sta. 15+00.00

-Y6- POT Sta. 12+78.00
END CONSTRUCTION

10' PAVED SHOULDER TAPER (LT & RT)

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN DRIVEWAY

200' TAPER (40:1)

E. LELAND JOHNSON
DB 668 PG 300
DB 408 PG 477
(31)

-Y6- S 7° 01' 03.3" E

-BY6- 40
-Y6- STA 13+71.58
OFF 16.53' LT

DUKE ENERGY CORPORATION
DB 988 PG 26

15+00

-Y6- POT Sta. 15+60.00

-T2- T4
-L- STA 62+64.83
OFF 210.65' RT

-BL- 10 =
-T2- = -T3-
ELEV=2097.11
-L- STA 64+23.34
OFF 50.19' RT

PREFORMED SCOUR HOLE OUTLET PROTECTION
SEE DETAIL 9 SHEET 2-D
CLASS 'I' RIP RAP
EST 14 TONS
EST 24 SY FF
EST 24 SY PSRM

OBLITERATION OF EXISTING ASPHALT PAVEMENT

SEE SHEET NO.18 FOR -L- PROFILE
SEE SHEET NO.24 FOR -Y5- PROFILE
SEE SHEET NO. 25 FOR -Y6-PROFILE

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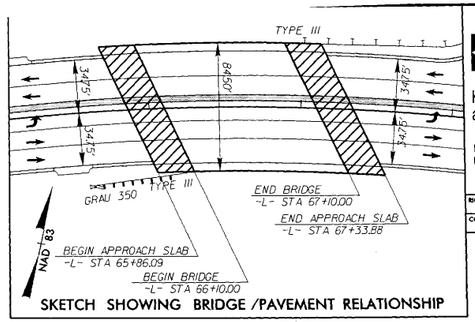
3/27/2008

PROJECT REFERENCE NO.	SHEET NO.
R-4430	8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP

NAD 83

2004 ADT
2025 ADT
DHV = 10%
DIR = 60%
TTST = 2%
DUAL = 3%
-Y7- (SR 1756) SOUTH ALLEN RD
5000 / 9400
DHV = 9%
DIR = 55%
TTST = 2%
DUAL = 3%
-L- UPWARD RD (SR 1783)
19400 / 32400
2600 / 4800
2400 / 4600
19200 / 32200
-L- UPWARD RD (SR 1783)

ANITA AND JAMES HEATHERLY
DB 721 PG 715
(121)

JUSTUS BUSINESS CENTER, LLC
DB 1085 PG 200
(122)

JUSTUS BUSINESS CENTER, LLC
DB 626 PG 408
(38)

E. LELAND AND BETTY JOHNSON
DB 561 PG 659
(40)

C LEMUEL AND SANDRA OATES
DB 1049 PG 270
(41)

SCOTT AND MARSHA KING
DB 693 PG 21
(42)

JO ANN AND E. KENDALL TAYLOR
DB 721 PG 715
DB 356 PG 507
(36)

JO ANN AND ERNEST TAYLOR
DB 565 PG 872
(35)

BRYAN EASLER FORD, INC.
DB 1124 PG 115
(37)

GLOVER McMURRAY
DB 820 PG 164
(39)

-Y7- POT Sta. 11+80.00
BEGIN CONSTRUCTION
-Y7- PCSta. 11+83.93

TIE PROPOSED PAVEMENT TO EXISTING DRIVEWAY

CHAIN LINK FENCE RESET

-BY7- 41
-Y7- STA 12+40.90
OFF 15.72' LT

REMOVE EXIST ASPHALT FLUME
REPLACE W/ 6' OF 6" ASPHALT CURB

CONVERT EXIST DI TO JB W/ MH COVER

EXTEND EXIST 24" CMP W/ CONC PIPE COLLAR AND 12' - 24" RCP

-Y7- PRCSta. 14+45.82

-Y7- PT Sta. 16+43.99

SPECIAL LATERAL V DITCH SEE DETAIL 4 SHEET 2-D

-L- POCSta. 68+62.00 =
-Y7- POT Sta. 17+75.00
Δ = 90°

-L- PTSta. 69+80.75

-T4- 71
-L- STA 66+47.79
OFF 231.79' LT

JURISDICTIONAL CREEK BAT FORK CREEK

SPECIAL LATERAL 6' - 10' BASE DITCH W/ CLASS II RIP RAP ROCK CHECK DAMS PLACED EVERY 15' EST 30 TONS SEE DETAIL 5 SHEET 2-D

OUTLET PROTECTION CLASS 'B' RIP RAP EST 11 TONS EST 28 SYFF

15" CSP WITH ROD AND LUG WITH SLEEVE GASKET CONNECTORS AND ELBOWS

-L- PCSta. 65+26.10
-T2- 67
-L- STA 65+28.55
OFF 180.82' LT

WOVEN WIRE FENCE RESET

-T2- 68
-L- STA 65+44.12
OFF 74.81' LT

OUTLET PROTECTION CLASS 'B' RIP RAP EST 2 TONS EST 7 SYFF

JO ANN AND E. KENDALL TAYLOR DB 721 PG 715 / ANITA HEATHERLY DB 721 PG 716

MATCH LINE -L- STA 65+00 (SHEET 7)

MATCH LINE -L- STA 78+50 (SHEET 9)

BEGIN BRIDGE 57.50'
-L- STA 66+10.00

BEGIN APPROACH SLAB
-L- STA 65+85.09

510' LT TURN STORAGE

PREFORMED SCOUR HOLE
OUTLET PROTECTION CLASS 'I' RIP RAP
EST 14 TONS
EST 24 SY FF
EST 24 SY PSRM
SEE DETAIL 9 SHEET 2-D

REMOVE EXISTING BRIDGE (STRUCTURE ITEM)

END BRIDGE
-L- STA 67+10.00

END APPROACH SLAB
-L- STA 67+33.88

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN DRIVEWAY

TIE PROP FILL SLOPE INSIDE OF UTILITY TOWER BASE

-T3- 70
-L- STA 65+15.47
OFF 294.09' RT

-BL- 11
-BY7-, -T4-
ELEV=2097.48
-L- STA 68+50.75
OFF 30.30' RT

-T4- 73
ELEV=2095.59
REBAR SET
-L- STA 69+57.72
OFF 318.08' RT

330' RT TURN STORAGE

100' BAY TAPER

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN DRIVEWAY

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN CUT SLOPE

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN DRIVEWAYS

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN FILL SLOPE

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN DRIVEWAY

SPECIAL LATERAL V DITCH SEE DETAIL 4 SHEET 2-D

REMOVE 42 LF OF EXISTING 12" HDPE

S 88° 14' 03.6" E

330' LT TURN STORAGE

100' BAY TAPER

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN DRIVEWAY

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE FILL SLOPE

-BL- 12
-L- STA 75+25.76
OFF 23.61' RT

-L- SAG
STA = 78+47.18
EL = 2114.78

-L-	-Y7-	
PI Sta 67+55.45	PI Sta 13+14.91	PI Sta 15+45.28
Δ = 18° 36' 24.1" (RT)	Δ = 3° 26' 58.1" (RT)	Δ = 12° 12' 33.1" (LT)
D = 4° 05' 33.2"	D = 1° 19' 01.7"	D = 6° 09' 39.0"
L = 454.65'	L = 261.89'	L = 198.17'
T = 229.34'	T = 130.99'	T = 99.46'
R = 1,400.00'	R = 4,350.00'	R = 930.00'
SE = 0.035	SE = NC	SE = 0.04
RO = 168'	RO = NONE	RO = 120'

OBLITERATION OF EXISTING ASPHALT PAVEMENT

SEE SHEET NO.19 FOR -L- PROFILE
SEE SHEET NO.25 FOR -Y7- PROFILE
SEE SHEET NOS.? FOR STRUCTURE PLANS

3/27/2008 r:\01036108\Roadway\Proj\R4430_rdy_pst08.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-4430	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

-L- UPWARD RD (SR 1783) — 19200/32200 — 19600/32800
DHV = 10%, DIR = 60%, TTST = 6%, DUAL = 12%
1700/3300 | 2000/3900
-Y8- COMMERCIAL BLVD
3600/7200
DHV = 10%, DIR = 60%, TTST = 3%, DUAL = 2%

PI Sta 86+63.29
Δ = 8° 26' 59.0" (LT)
D = 2° 43' 42.1"
L = 309.70'
T = 155.13'
R = 2,100.00'
SE = 0.03
RO = 162'

PI Sta 12+82.52
Δ = 1° 36' 30.7" (LT)
D = 0° 45' 01.6"
L = 214.35'
T = 107.18'
R = 7,635.00'
SE = NC
RO = NONE

PI Sta 7+05.49
Δ = 17° 31' 23.7"
D = 3° 34' 51.6"
L = 489.34'
T = 246.59'
R = 1600.00'
SE = 0.06
RO = SEE PLANS

PI Sta 11+19.13
Δ = 31° 03' 46.5" (RT)
D = 19° 05' 54.9"
L = 162.64'
T = 83.37'
R = 300.00'
SE = RC
RO = SEE PLANS

PIs Sta 9+69.88
θs = 19° 05' 54.9" (RT)
Ls = 200.00'
LT = 134.12'
ST = 67.38'

MATCH LINE -Y9- STA 10+75 (SHEET 16)
MATCH LINE -Y11- STA 7+50 (SHEET 16)
-Y12-
-Y9- POTSta. 11+25.00
BEGIN CONSTRUCTION
-Y9- PCSta. 11+75.34
-L- POTSta. 84+81.16 =
-Y8- POTSta. 10+00.00
Δ = 88°09'03.1"
-L- PCSta. 85+08.16
-L- SAG
STA = 78+47.18
EL = 2114.78
-T5- 75
-L- STA 81+68.67
OFF 169.49' LT
-BY8A- 81
-Y9- STA 11+07.74
OFF 9.42' RT
-Y9- PTSta. 13+89.69
-L- POCSta. 87+15.49 =
-Y9- POTSta. 14+45.00
Δ = 97°18'26.1"
-BY8A- 82
-Y9- STA 14+14.16
OFF 20.76' LT
-L- PTSta. 88+17.86
-Y11- PTSta. 9+48.23
-L- POTSta. 90+28.70 =
-Y11- POTSta. 11+46.15
-Y12- POTSta. 12+72.39
Δ = 86°41'19.5"
-L- PTSta. 91+99.40
-BL- 15 =
-L- STA 91+59.78
OFF 24.77' RT
-BL- 14 = -BY8-
-L- STA 84+43.64
OFF 54.51' RT
-BL- 13 = -T5-
ELEV=2113.28
-L- STA 80+01.22
OFF 28.02' RT
-T5- 77
-L- STA 79+80.52
OFF 206.02' RT
-BL- 42
-Y8- STA 13+42.79
OFF 17.27' LT
-BL- = -BY8A-
POINT NOT SET
-L- STA 87+37.37
OFF 24.50' RT
-Y12- PTSta. 11+98.40
-Y12- SCSta. 10+35.76
-Y12- Sta. 8+85.00
END CONSTRUCTION
-Y12- SRSSta. 8+35.76
-Y8- POTSta. 14+80.00
END CONSTRUCTION
-Y8- POTSta. 15+00.00
-L- SAG
STA = 88+00.27
EL = 2129.11

HEATHER KING WILL 96E-204 DB 380 PG 137 — S 5° 01' 29.7" W
MILDRED COOPER WILL 94E-695 DB 226 PG 137
HEATHER AND JASON KING DB 447 PG 327, DB 353 PG 577, PB 4 PG 96
WILLIAM AND ANNE DYER DB 971 PG 650
JOHN KUYKENDALL DB 415 PG 183
JERRY H. McCRAW DB 765 PG 623, CAB B PLAT SLIDE 339A
ROBERT AND MARIE HOOTS DB 1073 PG 522, DB 993 PG 429
SCOT AND MARSHA KING DB 693 PG 21
GEORGE AND LYNN GOSNELL DB 693 PG 19
BRYAN EASLER FORD, INC. DB 1124 PG 115
DAN AND THERESE WALLACE DB 1074 PG 226 PLAT SLIDE 3875
JEFFERY AND DALE NIX DB 1084 PG 750 PLAT SLIDE 3990
STATE EMPLOYEES' CREDIT UNION DB 1152 PG 404 PLAT SLIDE 3875
MARGARET McKIBBIN REVOCABLE TRUST DB 945 PG 277
CRACKER BARREL OLD COUNTRY STORE, INC. DB 886 PG 707
PAUL T. RHODES JR. ESTATE DB 911 PG 228
FLETCHER HOSPITAL, INC. DB 1085 PG 756 PLAT SLIDE 3990

-Y9- (SR 1892) OLD McMURRAY RD
2004 ADT 2025 ADT
DHV = 10%, DIR = 60%, TTST = 6%, DUAL = 12%
-L- UPWARD RD (SR 1783)
19600/32800 | 700/1400 | 700/1400 | 19700/32800
1300/2800
1000/1400 | 1100/1400
2200/2800
DRIVEWAY

-Y10- (I-26)
2004 ADT 2025 ADT
DHV = 9%, DIR = 60%, TTST = 2%, DUAL = 3%
-L- UPWARD RD (SR 1783)
19700/32800 | 9600/14200 | 2000/3600 | 9400/17400
49700/75800
4100/7600 | 1500/2800
DHV = 10%, DIR = 55%, TTST = 12%, DUAL = 6%
43700/68400
-Y10- (I-26)

** VERTICAL CURVE DESIGN EXCEPTION

SEE SHEET NO. 19 FOR -L- PROFILE
SEE SHEET NO. 25 FOR -Y8- AND -Y9- PROFILES
SEE SHEET NO. 26 FOR -Y11- AND -Y12- PROFILES
SEE SHEET NO. S- FOR STRUCTURE PLANS

3/27/2008
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R/W REVISIONS PARCELS 54 & 58 - / /07
R/W REVISIONS PARCEL 59 - 03/ /08

PROJECT REFERENCE NO.	SHEET NO.
R-4430	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

RIGHT-OF-WAY REV.
CONST. REV.

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

-Y15- (SR 1790) MCMURRAY RD

2004 ADT
2025 ADT
DHV = 9%
DIR = 60%
TTST = 2%
DUAL = 3%

-L- UPWARD RD (SR 1783)

9400 / 17400	1000 / 2800	1700 / 4600	
		500 / 1600	8900 / 16200
	500 / 1000	500 / 1000	

DHV = 10%
DIR = 60%
TTST = 3%
DUAL = 2%

1300 / 2200

GAS STATION

MATCH LINE -Y15- STA 10+75 (SHEET 16)
MATCH LINE -Y14- STA 12+00 (SHEET 16)
MATCH LINE -L- STA 92+50 (SHEET 9)
MATCH LINE -L- STA 106+00 (SHEET 11)

-L- POT Sta. 93+31.40 =
-Y10- POT Sta. 22+90.02
Δ = 63°56'08.5"

TIE PROP TBJB W/ MH COVER TO EXIST PIPE AND REMOVE REMAINING 28' OF 30" CMP

OUTLET PROTECTION CLASS 'B' RIP RAP EST. 8 TONS EST. 21 SY FF

SPECIAL LATERAL BASE DITCH SEE DETAIL 14 SHEET 2-D

ROCK PLATING CLASS "II" RIP RAP W/ FILTER FABRIC 1.5:1 (VARIES) SLOPES EST 625 TONS EST 775 SY FF -Y14- STA 12+00 TO 13+75 LT SEE DETAIL 13 SHEET 2-D

-Y15- PCSta. 11+70.80
-Y15- Sta. 12+57.00
BEGIN CONSTRUCTION

-Y15- PCCSta. 13+14.24

TIE PROPOSED SIDEWALK AND C&G TO EXISTING

-BY10- 45
-Y15- STA 13+08.95
OFF 15.59' LT

-L- SAG
STA = 100+38.30
EL = 2121.49

DRY DETENTION POND (SEE SHEETS 2G & 2H)

-Y15- PTSta. 14+73.57
-L- PCSta. 99+82.20

-BL- 1-4400-T4-
STA 97+07.08
1.28' LT

-L- STA 97+59.55
OFF 25.69' LT PLUG

-Y14- PTSta. 13+85.65

-BL- / -BY10-
-L- STA 100+02.17
OFF 8.72' RT

-BL- -BY9-
POINT NOT SET
-L- STA 93+42.22
OFF 11.55' RT

-BY9- 14400-13
-Y10- STA 25+31.06
OFF 7.34' LT

PREFORMED SCOUR HOLE OUTLET PROTECTION CLASS 'I' RIP RAP EST 14 TONS EST 24 SY FF EST 24 SY PSRM SEE DETAIL 9 SHEET 2-D

-L- POT Sta. 96+41.94 =
-Y13- POT Sta. 10+63.24
-Y14- POT Sta. 14+29.70
Δ = 87°50'00.8"

-L- POT Sta. 99+39.00 =
-Y15- POT Sta. 15+02.00
Δ = 90°

14400-T4-116
-Y13- STA 8+59.06
OFF 97.38' RT

-Y13- PT Sta. 8+70.02

-Y13- POCSta. 6+62.00
BEGIN CONSTRUCTION

-Y12- CSSta. 6+85.76

JURISDICTIONAL CREEK
DUNN CREEK

14400-T4-115
ELEV. = 2107.75'
12" SPIKE SET
-Y13- STA 5+50.98
OFF 27.38' RT

-Y13- SCSta. 4+52.57

TOE PROTECTION SEE DETAIL 8 SHEET 2-D

ROCK PLATING CLASS "II" RIP RAP W/ FILTER FABRIC 1.5:1 (VARIES) SLOPES EST 700 TONS EST 1000 SY FF -Y13- STA 7+00 TO 10+00 RT SEE DETAIL 13 SHEET 2-D

-L- PTSta. 104+16.97

TIE INTO EXIST DI ADJUST EXIST DI

SPECIAL LATERAL 'V' DITCH SEE DETAIL 4 SHEET 2-D TIE DITCH TO EXIST PIPE

-BL- 17
-L- STA 101+57.85
OFF 14.38' RT

N 83°18'57.4" E
S 6°41'02.6" W
N 8°50'08.4" W
S 32°44'54.1" E
S 69°53'55.5" E

265' LT TURN STORAGE
250' LT TURN STORAGE
100' BAY TAPER
330' LT TURN STORAGE
137.5' MEDIAN TAPER
RAMP B
RAMP C
RAMP D
-L- DET
-Y10-
-Y12-
-Y13-

56 WH CAPITAL, LLC DB 1123 PG 542
58 E. LEMUEL AND SANDRA OATES DB 717 PG 105
59 JAMES S. ERWIN JR. ET UX RUTH G. ERWIN DB 717 PG 217
60 RICHARD AND IMOGENE POWELL DB 716 PG 857 DB 489 PG 337
61 GREGORY SCOTT SHERMAN DB 978 PG 151
55 CAROLINA MOUNTAIN CONCEPTS, LLC DB 1164 PG 646
54 J. HALL WADDELL DB 1124 PG 267
57 OUATTLEBAUM PROPERTIES F, LLC DB 1178 PG 326

NAD 83

-Y12-

PI Sta 4+48.32	PIs Sta 7+35.77
Δ = 20°22'19.3"	Θs = 3°10'59.2"
D = 4°14'38.9"	Ls = 150.00'
L = 480.00'	LT = 100.02'
T = 242.56'	ST = 50.01'
R = 1350.00'	
SE = EXISTING	
RO = EXISTING	

-Y13-

PIs Sta 4+02.58	PI Sta 6+62.78
Θs = 3°00'00"	Δ = 16°41'53.3"
Ls = 150.00'	D = 4°00'00.0"
LT = 100.01'	L = 417.45'
ST = 50.01'	T = 210.22'
	R = 1432.39'
	SE = 0.06
	RO = 216'

-L-

PI Sta 102+03.63	
Δ = 26°47'07.1" (RT)	
D = 6°09'39.0"	
L = 434.77'	
T = 221.43'	
R = 930.00'	
SE = 0.04	
RO = 192'	

-Y14-

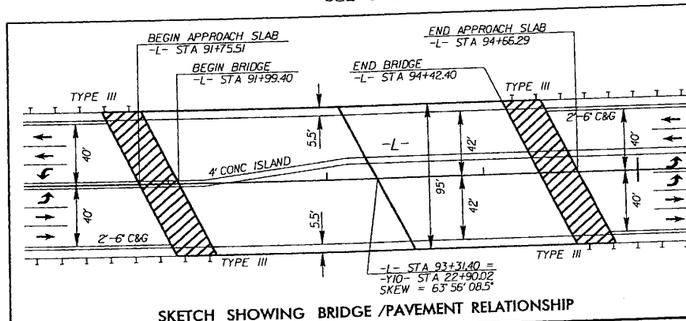
PIs Sta 11+39.40	PI Sta 12+98.05
Θs = 18°11'20.9"	Δ = 32°47'36.7"
Ls = 200.00'	D = 18°11'20.9"
LT = 134.04'	L = 180.29'
ST = 67.31'	T = 92.69'
	R = 315.00'
	SE = RC
	RO = SEE PLANS

-Y15-

PI Sta 12+42.72	PI Sta 13+98.17
Δ = 10°16'22.7" (RT)	Δ = 44°31'51.9" (RT)
D = 1°09'43.1"	D = 27°56'57.0"
L = 143.44'	L = 159.33'
T = 71.91'	T = 83.93'
R = 800.00'	R = 205.00'
SE = RC	SE = RC
RO = NONE	RO = NONE

** VERTICAL CURVE DESIGN EXCEPTION

SEE SHEET NO. 20 FOR -L- PROFILE
SEE SHEET NO. 27 FOR -Y13- AND -Y14- PROFILES
SEE SHEET NO. 28 FOR -Y15- PROFILE
SEE SHEET NOS. ? FOR STRUCTURE PLANS



SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP

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4/3/2008

2004 ADT
2025 ADT

DHV = 10%
DIR = 60%
TTST = 2%
DUAL = 3%

-Y16- (SR 1791) BALLENGER RD

1200 / 3200

DHV = 9%
DIR = 60%
TTST = 2%
DUAL = 3%

-L- UPWARD RD (SR 1783)

8900 / 16200 | 900 / 2400 | 300 / 800 | 8200 / 14600

REVISIONS

R/W REVISIONS PARCELS 62 & 128 - / /07

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
R-4430	11

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

-Y16- Sta. 10+06.00
BEGIN CONSTRUCTION

TIE PROP SHOULDER TO EXIST GRADE PRIOR TO PIPE INLET

TIE PROP DITCH TO EXIST AND GRADE TO DRAIN

-BYII- 86
-Y16- STA 10+45.26
OFF 13.72' RT

-Y16- PCSta. 11+68.83

MOUNTAIN INN AND SUITES, LLC
DB 1306 PG 480
PLAT SLIDE 6501

(128)

GREGORY SCOTT SHERMAN
DB 1178 PG 151

(61)

405' TAPER 145.11

S 5° 23' 45.0" W

110+00

115+00

CHURCH OF THE NAZARENE
DB 378 PG 391
PB 5 PG 13

(64)

ELIZABETH HENDERSON
DB 584 PG 69

(62)

(63)

FREDERICK AND LINDA JENSEN
DB 468 PG 507
DB 447 PG 550

-BL- 19
-L- STA 114+42.94
OFF 1.49' LT

-BYII- 46
-Y16- STA 14+41.68
OFF 11.39' LT

-Y16- PTSta. 14+82.04

SPECIAL CUT DITCH SEE DETAIL 3 SHEET 2-D

265' BAY TAPER

S 19° 45' 08.3" W

15+00

SPECIAL LATERAL 'V' DITCH SEE DETAIL 4 SHEET 2-D

150' RT & LT TURN STORAGE

200' R

40' R

50' R

180' TAPER

BEGIN C/A
+47
57.50'

END C/A
213
57.50'

15" RCP

18" RCP

24" RCP

S 69° 53' 55.5" E

S 70° 32' 33.4" E

MATCH LINE -L- STA 106+00 (SHEET 10)

MATCH LINE -L- STA 120+00 (SHEET 12)

-BL- / -BYII-
-L- STA 108+33.77
OFF 2.82' LT

-L- PTSta. 108+22.27

-L- POCSta. 107+75.94 =
-Y16- POTSta. 16+38.00
Δ = 90°

-L- PCSta. 107+21.13

SPECIAL LATERAL 'V' DITCH SEE DETAIL 4 SHEET 2-D

TOE PROTECTION SEE DETAIL II SHEET 2-D INSTALL PSRM TO BACK OF SIDEWALK

100' BAY TAPER

330' LT TURN STORAGE

137.5' MEDIAN TAPER (50:1)

330' LT & RT TURN STORAGE

REMOVE

REMOVE 20' DR

REMOVE 16' DR

16' DR

-BL- 18
-L- STA 106+25.55
OFF 1.64' LT

QUATTLEBAUM PROPERTIES F, LLC
DB 1178 PG 326

(57)

BOYD L. HYDER
DB 1157 PG 751

(65)

-BL- 20
-BYI2-, -BYI2A-
-L- STA 119+33.35
OFF 4.69' RT

-L-

PI Sta 107+71.70
Δ = 0° 38' 37.9" (LT)
D = 0° 38' 11.8"
L = 101.14'
T = 50.57'
R = 9,000.00'
SE = NC
RO = NONE

-Y16-

PI Sta 13+26.26
Δ = 14° 21' 23.3" (RT)
D = 4° 35' 01.2"
L = 313.21'
T = 157.43'
R = 1,250.00'
SE = 0.04
RO = 96'

** VERTICAL CURVE DESIGN EXCEPTION

SEE SHEET NO. 20 FOR -L- PROFILE
SEE SHEET NO. 28 FOR -Y16- PROFILE

3/27/2008
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-Y17- (SR 1792) SOUTH ORCHARD RD

2004 ADT
2025 ADT
DHV = 9%
DIR = 60%
TTST = 2%
DUAL = 3%

-L- UPWARD RD (SR 1783)

8200 / 14600	700 / 2200	DHV = 10% DIR = 60% TTST = 2% DUAL = 3%
600 / 1600	100 / 600	6500 / 12200
1700 / 2200	400 / 800	
DHV = 14% DIR = 53% TTST = 2% DUAL = 3%	2100 / 3000	

-Y18- EDUCATION DR

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
R-4430	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

-BY12- 47
-Y17- STA 10+00.00
OFF 14.43' RT

-Y17- PCSta. 10+00.00
-Y17- PTSta. 10+96.17
-Y17- POTSta. 11+20.00
BEGIN CONSTRUCTION
-Y17- PCSta. 11+40.07

-L- PCSta. 120+77.51

-BY12- 48
-Y17- STA 10+42.73
OFF 108.38' RT

-L- PCSta. 128+54.94

-L- PTSta. 126+14.94

-Y17- PTSta. 14+45.21

-L- POCSta. 122+87.17 =
-Y17- POTSta. 16+33.77
-Y18- POTSta. 10+00.00
Δ = 87°13'57.5"

-Y18- POTSta. 12+80.00
END CONSTRUCTION

-Y18- POTSta. 15+00.00

-Y18- PTSta. 13+95.86

-Y18- PCSta. 12+83.95

-BY12A- 52
-Y18- STA 13+25.35
OFF 22.94' LT

-BL- 21
-L- STA 124+85.25
OFF 4.28' LT

-BL- 22
-L- STA 130+23.83
OFF 6.90' LT

MATCH LINE -L- STA 120+00 (SHEET 11)

MATCH LINE -L- STA 134+00 (SHEET 13)

SCOTT D. MILLER
DB 819 PG 731

STEVE EDWARD McCLURE
DB 819 PG 829

CHURCH OF THE NAZARENE
DB 378 PG 391
PB 5 PG 13

ANNETTE JOHNSON
DB 454 PG 585
PB 5 PG 13

BENJAMIN AND MARTHA EATON
DB 454 PG 21

CHARLES AND DOROTHY HOOTS
DB 405 PG 107

JAMES K. MILLER, JR AND SCOTT D. MILLER
DB 1312 PG 553

MILLER BROTHERS, INC.
DB 1049 PG 338

UPWARD BAPTIST CHURCH
DB 374 PG 389
DB 381 PG 633

RICHARD D. HATCH
DB 1197 PG 595

BOYD L. HYDER
DB 1157 PG 751

HENDERSON CO. BOARD OF EDUCATION
DB 824 PG 216

OUTLET PROTECTION
CLASS 'I' RIP RAP
EST 5 TONS
EST 14 SY FF

TOE PROTECTION
SEE DETAIL 11
SHEET 2-D
INSTALL PSRM

SPECIAL CUT DITCH
SEE DETAIL 3
SHEET 2-D

SPECIAL CUT DITCH
SEE DETAIL 2
SHEET 2-D

GRADE OUTFALL DITCH TO DRAIN TO PROP CUT DITCH

GRADE EXIST DITCH TO TIE TO PROP AT DRIVE PIPE

SPECIAL LATERAL 'V' DITCH
SEE DETAIL 4 SHEET 2-D

SAWCUT AND REMOVE EXIST ASPHALT PAVEMENT TO TIE-IN DRIVEWAY

BARBED WIRE FENCE RESET

TOE PROTECTION
SEE DETAIL 8 SHEET 2-D

TIE CUT DITCH TO EXIST DI

RETAIN EXIST CURB

330' LT & RT TURN STORAGE
330' LT TURN STORAGE
265' BAY TAPER
200' R
100' LT TURN STORAGE
100' BAY TAPER
120' TAPER (20H)
40' R
35' R
45' R
70' R
2' R
15' R
25' R

-Y18-
PI Sta 13+55.93
Δ = 91° 36' 09.1" (RT)
D = 81° 51' 04.0"
L = 111.91'
T = 71.99'
R = 70.00'
SE = EXISTING
RO = EXISTING

-L-

PI Sta 123+53.96	PI Sta 132+70.24
Δ = 33° 06' 37.3" (LT)	Δ = 30° 57' 03.8" (RT)
D = 6° 09' 39.0"	D = 3° 49' 11.0"
L = 537.43'	L = 810.30'
T = 276.45'	T = 415.30'
R = 930.00'	R = 1,500.00'
SE = 0.04	SE = 0.035
RO = 192'	RO = 168'

-Y17-

PI Sta 10+48.23	PI Sta 12+96.46
Δ = 10° 51' 39.7" (LT)	Δ = 30° 56' 38.5" (LT)
D = 11° 17' 38.1"	D = 10° 08' 27.0"
L = 96.17'	L = 305.14'
T = 48.23'	T = 156.39'
R = 507.32'	R = 565.00'
SE = EXISTING	SE = 0.04
RO = EXISTING	RO = 108'

OBLITERATION OF EXISTING ASPHALT PAVEMENT

** VERTICAL CURVE DESIGN EXCEPTION

SEE SHEET NO. 21 FOR -L- PROFILE
SEE SHEET NO. 28 FOR -Y17- AND -Y18- PROFILES

3/27/2008

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PROJECT REFERENCE NO.	SHEET NO.
R-4430	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

...70, 76, 77, 80, 83, 84 - / /07

DWM INVESTMENTS, LLC.
DB 1198 PG 662
75

THE BLUE LAKE COMPANY, INC.
DB 132, PG 270
PLAT SLIDE 4487

JOSEPH BASIL KING JR.
DB 872 PG 435
78

76

-L- SAG
STA = 138+61.97
EL = 2183.10

UT1 TO DUNN CREEK
TRANSITION POINT
FROM INTERMITTENT
TO PERENNIAL
STREAM

OUTLET PROTECTION
CLASS 'I' RIP RAP
(BANKS ONLY)
EST 5 TONS
EST 14 SY FF

135+00

140+00

-BL- 23
-L- STA 134+57.26
OFF 10.92' LT

-L- PRCSta. 136+65.24

SAWCUT AND REMOVE
EXIST ASPHALT PAVEMENT
TO TIE-IN DRIVEWAY

MATCH LINE -L- STA 134+00 (SHEET 12)

5' SIDEWALK
1'-6" C&G
2'-6" C&G
4' CONC ISLAND
15" RCP
48" RCP
18" RCP
CB
DI
PDE
RETAIN
REMOVE
30' DR
52' DR
45' R
10' R
2' R
100' BAY TAPER
137.5' TAPER (50:1)
200' LT TURN STORAGE
CHORD

68
HENDERSON CO. BOARD OF EDUCATION
DB 824 PG 216

-BL- 24
-L- STA 138+82.82
OFF 110.07' RT

LEISURE CRAFT, INC.
DB 716 PG 813
77

THOMAS AND MARJORIE JONES
DB 797 PG 169
79

-BL- 25
-L- STA 142+76.07
OFF 24.45' RT

265' BAY TAPER
150' R
S 24° 39' 41.2" W

TIE PROP DI
TO EXIST PIPE

TIE TO EXISTING DITCH
-Y19- POTSta. 16+35.00
END CONSTRUCTION

TIE TO EXISTING DITCH
-Y19- PTSta. 17+17.00

-BL- 26 / -BY13-
-L- STA 146+98.92
OFF 14.25' LT

GARY K. AND
KATHY C. KING
DB 1225 PG 38
84

HENDERSONVILLE
PENTECOSTAL
HOLINESS CHURCH
DB 1018 PG 542
85

DOUGLAS AND BRENDA TATE
DB 1052 PG 184
82

81
CAROLINA CONFERENCE OF
SEVENTH DAY
ADVENTISTS
DB 543 PG 699

80
HELEN J. KING
DB 729 PG 779

145+00

MATCH LINE -L- STA 148+00 (SHEET 14)

-Y19- POTSta. 10+00.00
-Y19- POTSta. 10+25.00
BEGIN CONSTRUCTION
BEGIN 2'-6" CURB & GUTTER (SPILL)
AND ASPHALT PARKING AREA
-Y19- STA 10+43.00
-L- POTSta. 143+45.00 =
-Y19- POTSta. 11+83.21
Δ = 90°
-L- PTSta. 142+74.48
-Y19- PTSta. 11+12.13
-L- PCSta. 144+02.48
BEGIN 2'-6" C&G
TRANSITION CURB
-Y19- PCSta. 10+57.71
-Y19- S 7° 45' 54.8" E
N 69° 45' 48.2" E
330' LT TURN STORAGE
100' BAY TAPER
75' TAPER (25:1)
137.5' TAPER (50:1)
270' LT TURN STORAGE
90' LANE TAPER (30:1)
REMOVE
4' CONC ISLAND
2'-6" C&G
5' SIDEWALK
20' DR
36' DR
18" RCP 2'-6" C&G
OUTLET PROTECTION
CLASS 'B' RIP RAP
EST 2 TONS
EST 7 SY FF
SPECIAL LATERAL 'V' DITCH
SEE DETAIL 4 SHEET 2-D
OUTLET PROTECTION
CLASS 'B' RIP RAP
EST 3 TONS
EST 10 SY FF

83
JOE D. SPEARMAN JR.
DB 1165 PG 3

-BY13- 49
-Y19- STA 13+33.27
OFF 84.97' LT

-Y19- PCSta. 13+10.57
-Y19- PTSta. 14+71.21
-Y19- PCSta. 15+34.12
15+00

-BY13- 87
-Y19- STA 16+12.84
OFF 19.29' LT

CHURCH
2004 ADT
2025 ADT
DHV = 9%
DIR = 60%
TTST = 2%
DUAL = 3%
-L- (SR 1783) UPWARD RD
6500 / 12200
200 / 200
300 / 400
50 / 100
5500 / 10600
1300 / 2400
400 / 900
1800 / 3400
DHV = 10%
DIR = 60%
TTST = 2%
DUAL = 3%
-Y19- (SR 1804) CREST RD

-L-		
PI Sta 132+70.24	PI Sta 139+81.24	PI Sta 146+96.96
Δ = 30° 57' 03.8" (RT)	Δ = 37° 32' 04.9" (LT)	Δ = 35° 08' 23.4" (RT)
D = 3° 49' 11.0"	D = 6° 09' 39.0"	D = 6° 09' 39.0"
L = 810.30'	L = 609.25'	L = 570.37'
T = 415.30'	T = 316.01'	T = 294.48'
R = 1,500.00'	R = 930.00'	R = 930.00'
SE = 0.035	SE = 0.04	SE = 0.04
RO = 112'	RO = 128'	RO = 128'

-Y19-		
PI Sta 10+85.03	PI Sta 13+95.27	PI Sta 16+25.59
Δ = 12° 28' 17.0" (LT)	Δ = 44° 53' 53.0" (RT)	Δ = 3° 36' 57.7" (RT)
D = 22° 55' 05.9"	D = 27° 56' 57.0"	D = 1° 58' 38.2"
L = 54.42'	L = 160.64'	L = 182.88'
T = 27.32'	T = 84.70'	T = 91.47'
R = 250.00'	R = 205.00'	R = 2,897.70'
SE = SEE PLANS	SE = 0.04	SE = SEE PLANS
RO = SEE PLANS	RO = 84'	RO = SEE PLANS

OBLITERATION OF EXISTING ASPHALT PAVEMENT

** VERTICAL CURVE DESIGN EXCEPTION

SEE SHEET NO.21 FOR -L- PROFILE
SEE SHEET NO.29 FOR -Y19- PROFILE

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3/27/2008

90, 92, 93, 94, 95, 130, 133 - / /07

PROJECT REFERENCE NO.	SHEET NO.
R-4430	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn
and Associates, Inc.

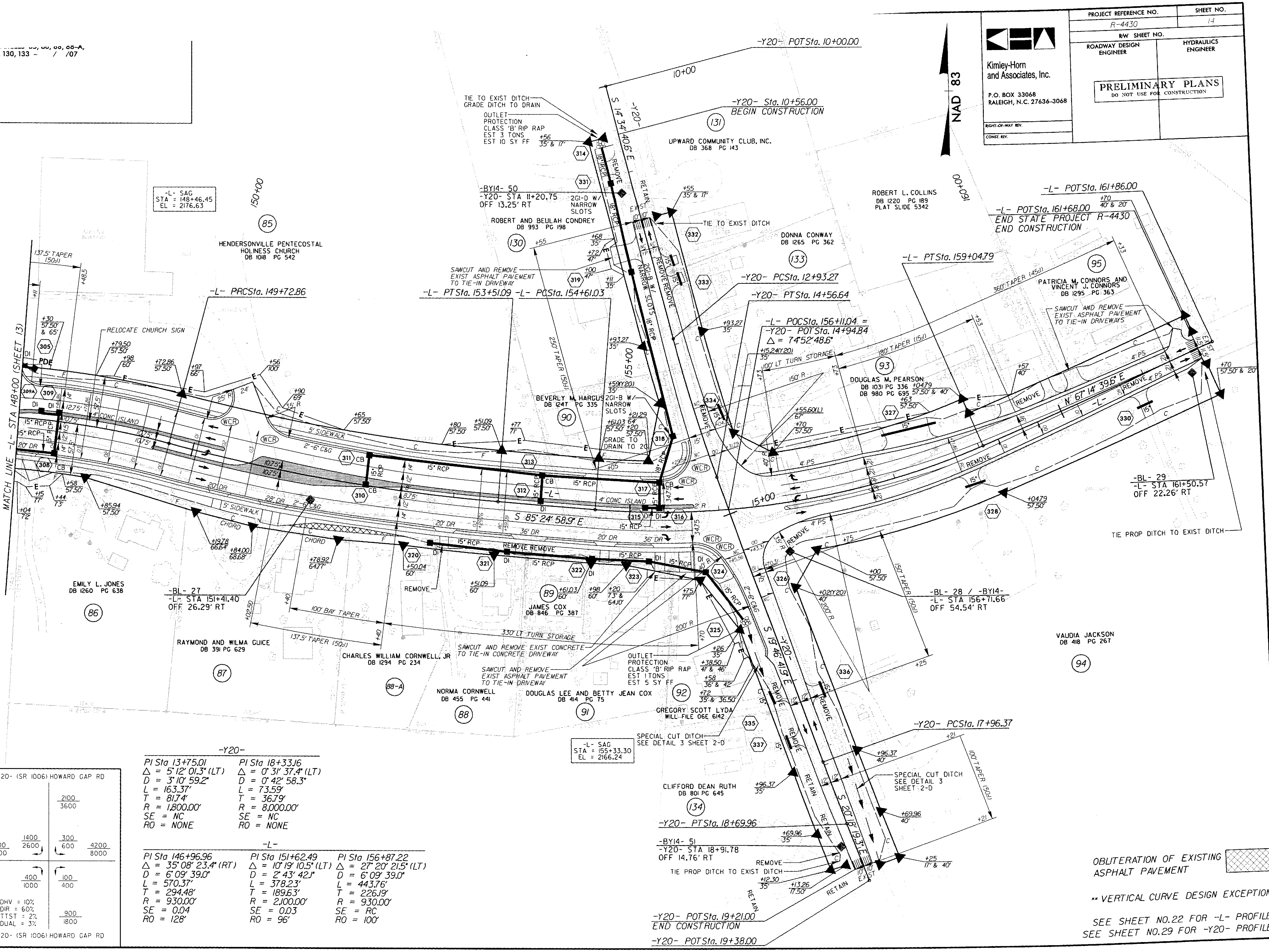
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.

CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83



-Y20- (SR 1006) HOWARD GAP RD

2002 ADT / 2025 ADT

DHV = 9%
DIR = 60%
TTST = 2%
DUAL = 3%

2100 / 3600

1400 / 2600

300 / 600

5500 / 10600

4200 / 8000

-L-
(SR 1783)
UPWARD RD

400 / 1000

100 / 400

DHV = 10%
DIR = 60%
TTST = 2%
DUAL = 3%

900 / 1800

-Y20- (SR 1006) HOWARD GAP RD

-Y20-

PI Sta 13+75.01	PI Sta 18+33.16
△ = 5° 12' 01.3" (LT)	△ = 0° 31' 37.4" (LT)
D = 3° 10' 59.2"	D = 0° 42' 58.3"
L = 163.37'	L = 73.59'
T = 81.74'	T = 36.79'
R = 1,800.00'	R = 8,000.00'
SE = NC	SE = NC
RO = NONE	RO = NONE

-L-

PI Sta 146+96.96	PI Sta 151+62.49	PI Sta 156+87.22
△ = 35° 08' 23.4" (RT)	△ = 10° 19' 10.5" (LT)	△ = 27° 20' 21.5" (LT)
D = 6° 09' 39.0"	D = 2° 43' 42.1"	D = 6° 09' 39.0"
L = 570.37'	L = 378.23'	L = 443.76'
T = 294.48'	T = 189.63'	T = 226.19'
R = 930.00'	R = 2,100.00'	R = 930.00'
SE = 0.04	SE = 0.03	SE = RC
RO = 128'	RO = 96'	RO = 100'

OBLITERATION OF EXISTING ASPHALT PAVEMENT ▨

** VERTICAL CURVE DESIGN EXCEPTION

SEE SHEET NO.22 FOR -L- PROFIL

SEE SHEET NO.29 FOR -Y20- PROFIL

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3/27/2008

PROJECT REFERENCE NO.	SHEET NO.
R-4430	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.

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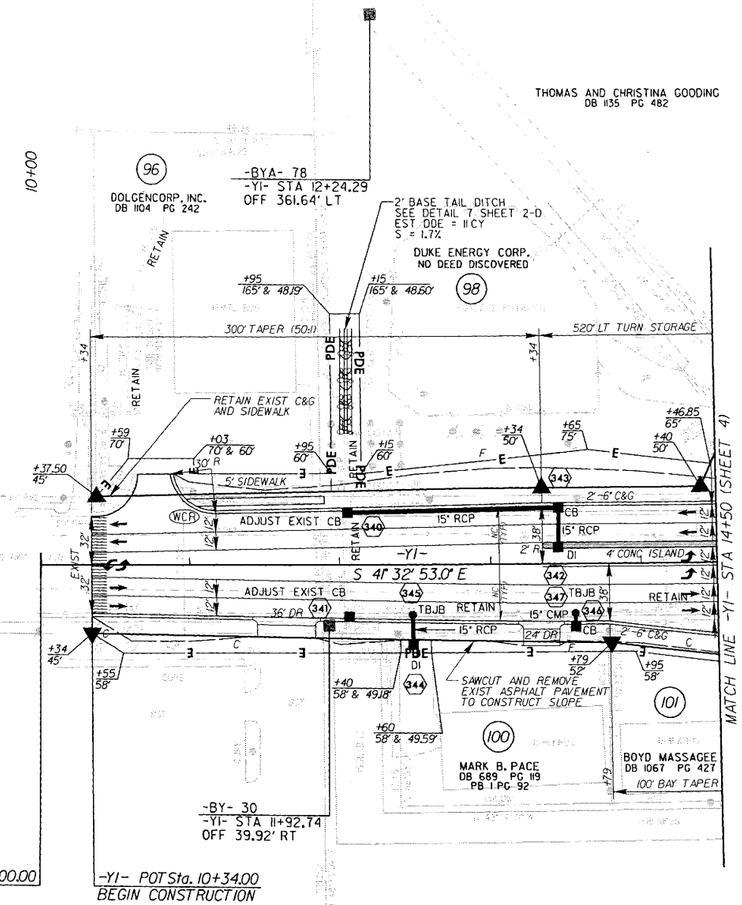
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.

CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83



SEE SHEET NO.23 FOR -Y1- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-4430	16
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
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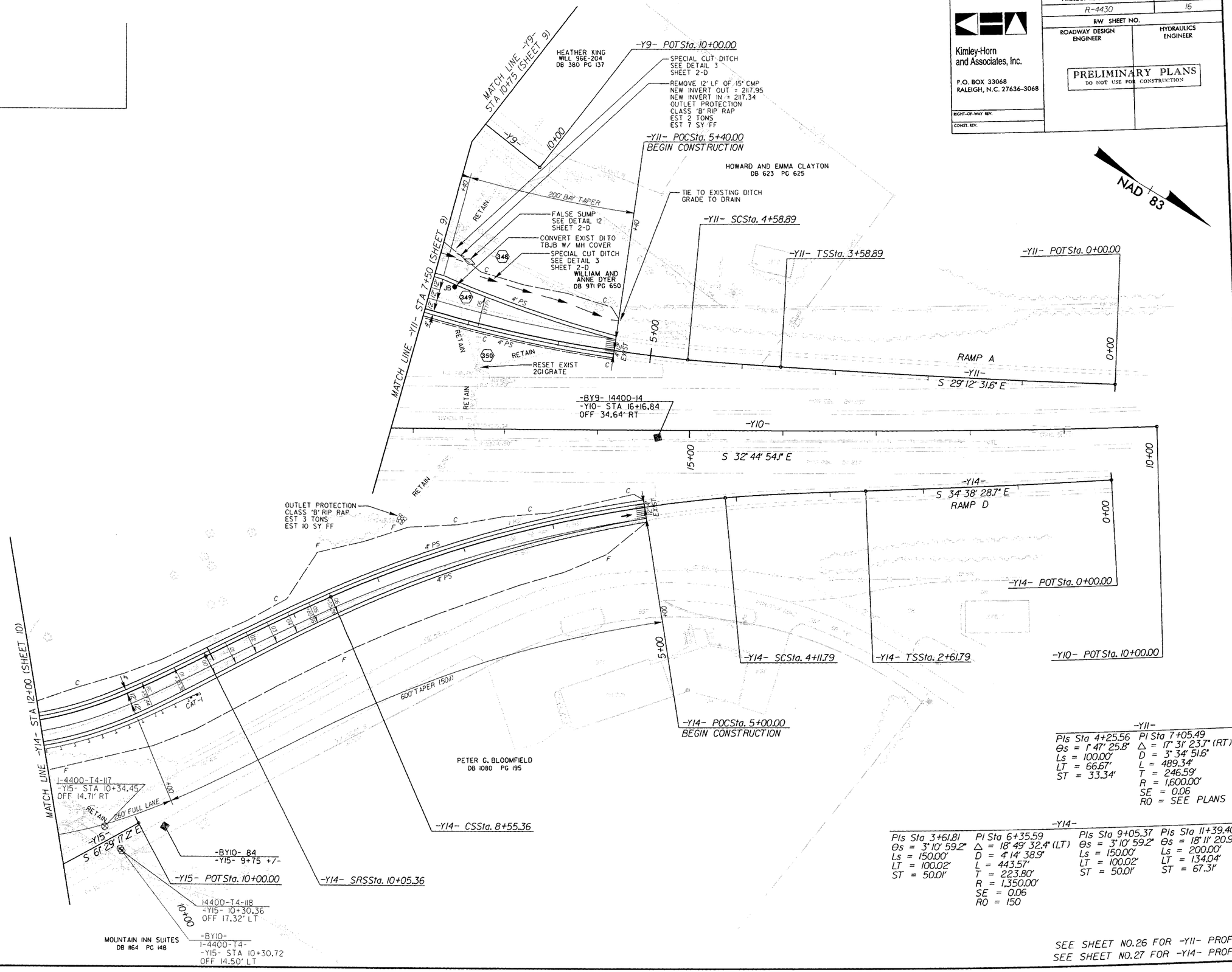
RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83



-Y11-

PIs Sta 4+25.56		PI Sta 7+05.49	
Θs = 1° 47' 25.8"		Δ = 17° 31' 23.7" (RT)	
Ls = 100.00'		D = 3° 34' 51.6"	
LT = 66.67'		L = 489.34'	
ST = 33.34'		T = 246.59'	
		R = 1,600.00'	
		SE = 0.06	
		RO = SEE PLANS	

-Y14-

PIs Sta 3+61.81	PI Sta 6+35.59	PIs Sta 9+05.37	PIs Sta 11+39.40
Θs = 3° 10' 59.2"	Δ = 18° 49' 32.4" (LT)	Θs = 3° 10' 59.2"	Θs = 18° 11' 20.9"
Ls = 150.00'	D = 4° 14' 38.9"	Ls = 150.00'	Ls = 200.00'
LT = 100.02'	L = 443.57'	LT = 100.02'	LT = 134.04'
ST = 50.01'	T = 223.80'	ST = 50.01'	ST = 67.31'
	R = 1,350.00'		
	SE = 0.06		
	RO = 150		

SEE SHEET NO.26 FOR -Y11- PROFILE
SEE SHEET NO.27 FOR -Y14- PROFILE

3/27/2008 r:\01036106\Roadway\Proj\R4430_rdy_pshf6.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-4430	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.

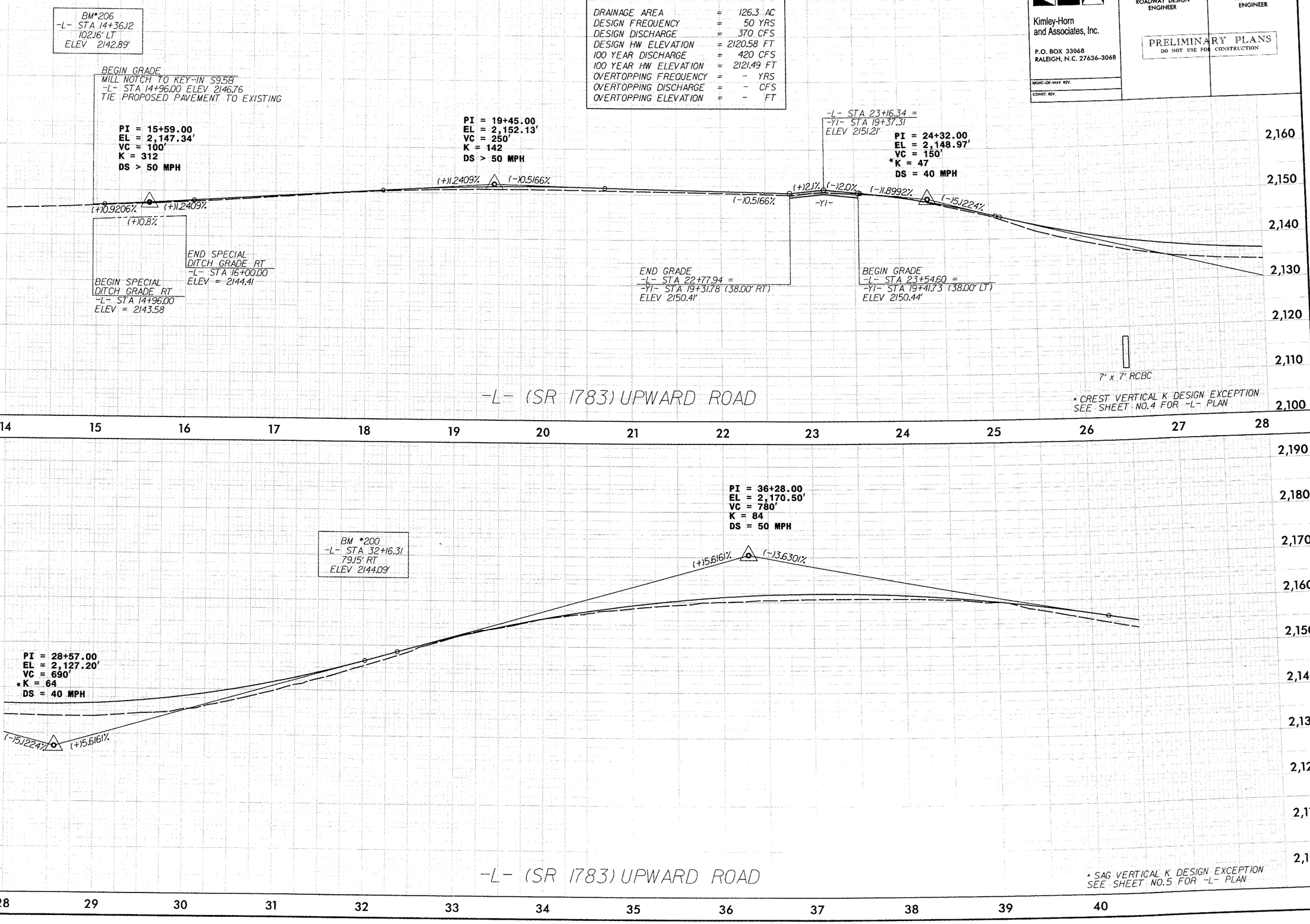
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FIRE HYDRAULIC DATA

7' X 7' RCBC (BURIED 1')

DRAINAGE AREA	=	126.3 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	370 CFS
DESIGN HW ELEVATION	=	2120.58 FT
100 YEAR DISCHARGE	=	420 CFS
100 YEAR HW ELEVATION	=	2121.49 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT



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3/27/2008

PROJECT REFERENCE NO.	SHEET NO.
R-4430	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
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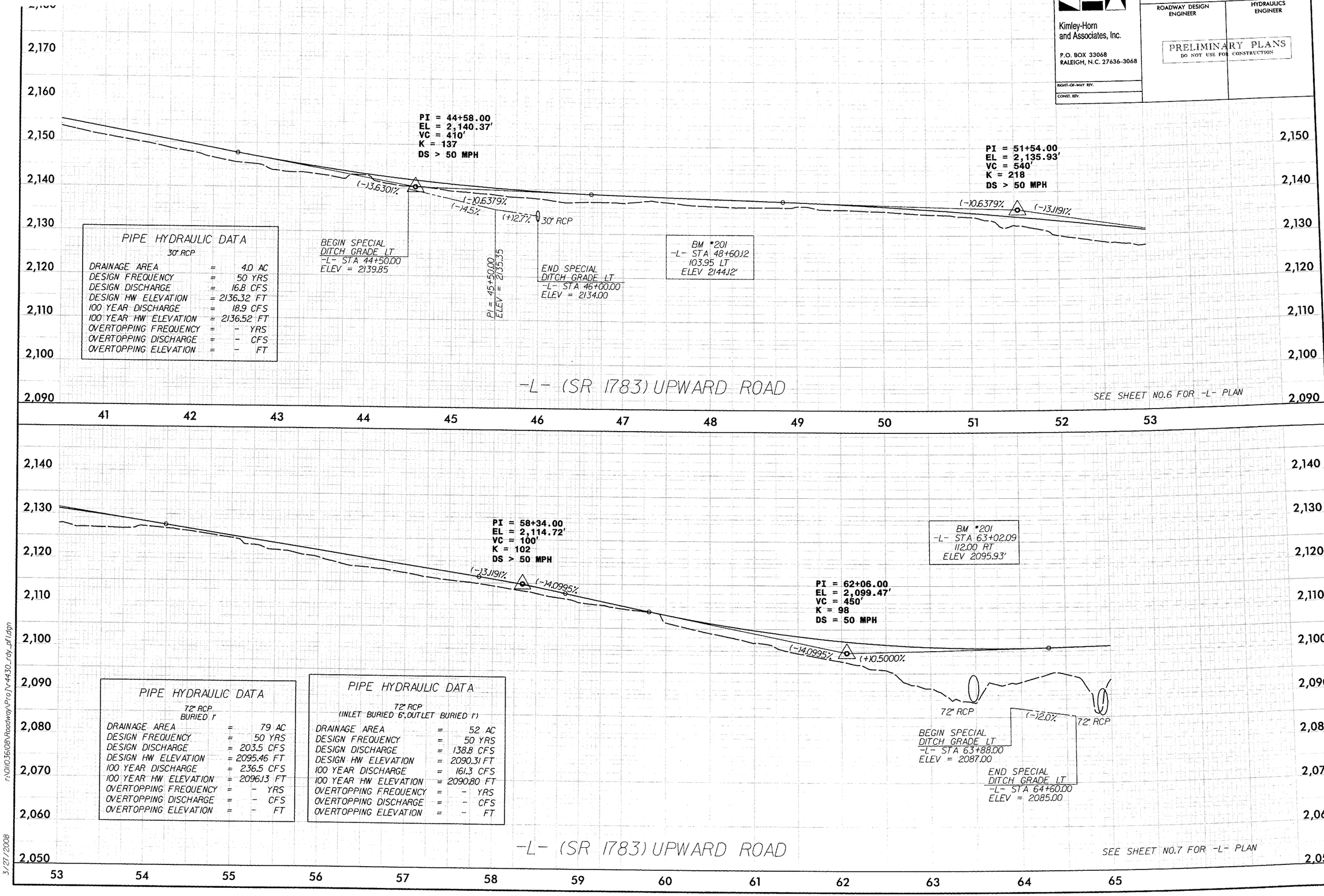
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PIPE HYDRAULIC DATA
30" RCP

DRAINAGE AREA	=	4.0 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	16.8 CFS
DESIGN HW ELEVATION	=	2136.32 FT
100 YEAR DISCHARGE	=	18.9 CFS
100 YEAR HW ELEVATION	=	2136.52 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

-L- (SR 1783) UPWARD ROAD

SEE SHEET NO.6 FOR -L- PLAN

PIPE HYDRAULIC DATA
72" RCP
BURIED 1'

DRAINAGE AREA	=	79 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	203.5 CFS
DESIGN HW ELEVATION	=	2095.46 FT
100 YEAR DISCHARGE	=	236.5 CFS
100 YEAR HW ELEVATION	=	2096.13 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

PIPE HYDRAULIC DATA
72" RCP
(INLET BURIED 6', OUTLET BURIED 1')

DRAINAGE AREA	=	52 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	138.8 CFS
DESIGN HW ELEVATION	=	2090.31 FT
100 YEAR DISCHARGE	=	161.3 CFS
100 YEAR HW ELEVATION	=	2090.80 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

-L- (SR 1783) UPWARD ROAD

SEE SHEET NO.7 FOR -L- PLAN

PROJECT REFERENCE NO.	SHEET NO.
R-4430	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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RIGHT-OF-WAY REV.

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PRELIMINARY PLANS
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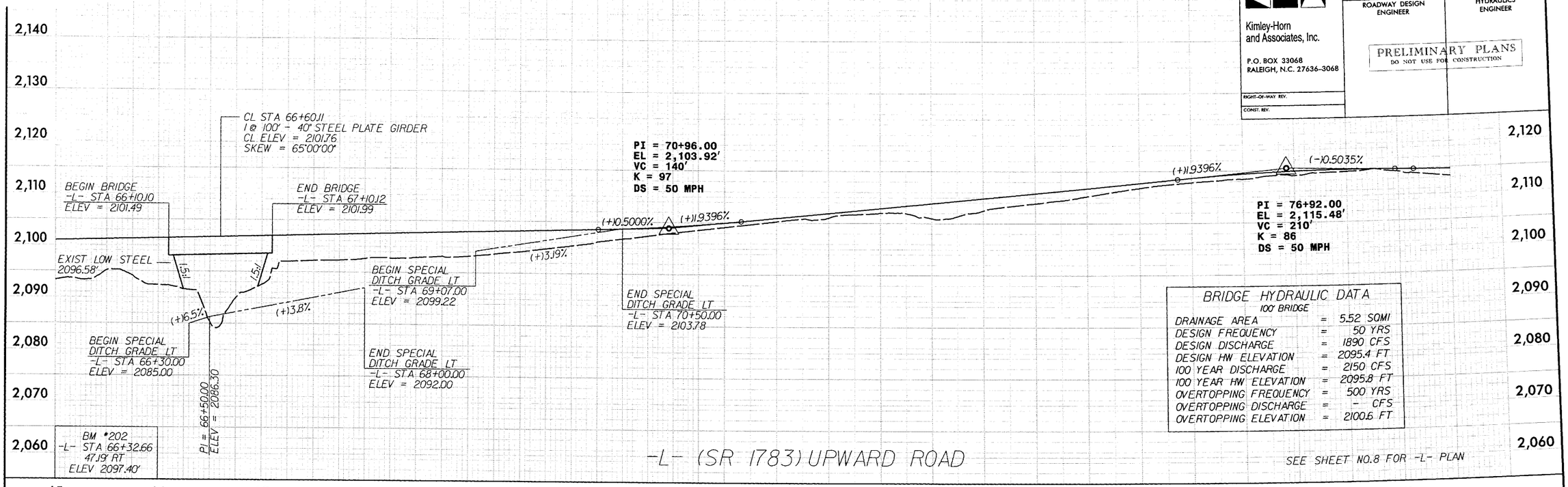
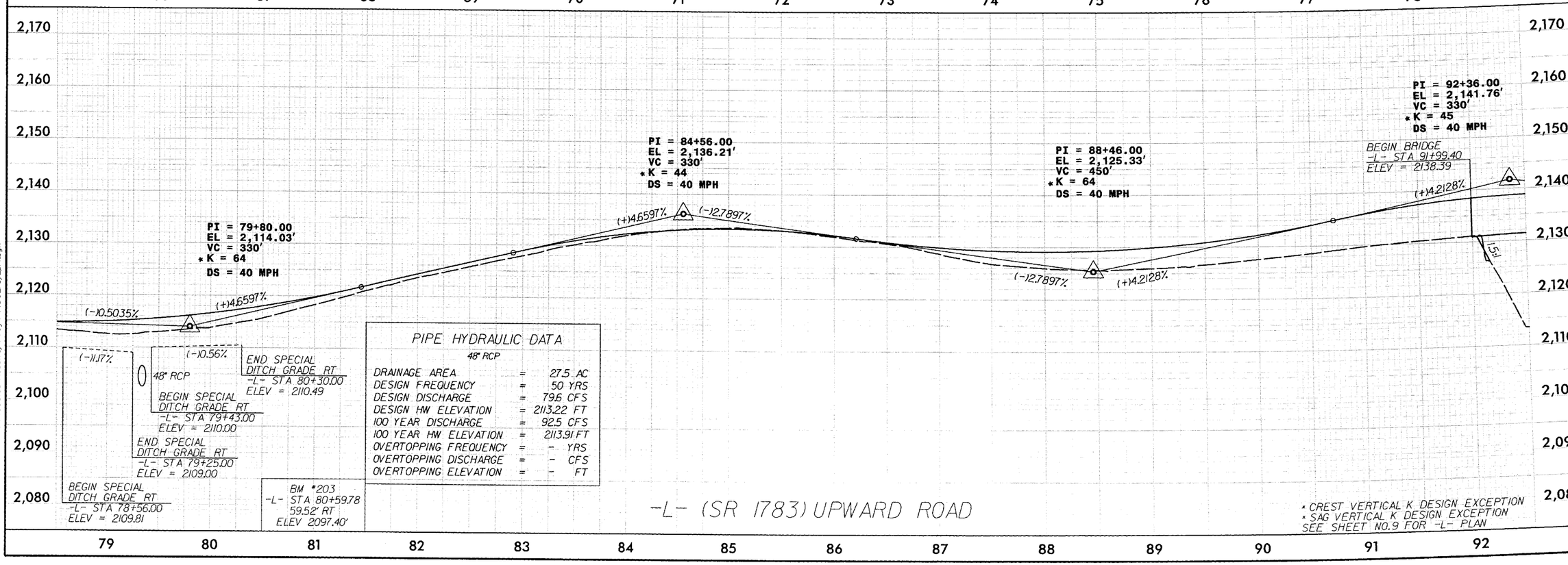


BRIDGE HYDRAULIC DATA
100' BRIDGE

DRAINAGE AREA	=	5.52 SQMI
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	1890 CFS
DESIGN HW ELEVATION	=	2095.4 FT
100 YEAR DISCHARGE	=	2150 CFS
100 YEAR HW ELEVATION	=	2095.8 FT
OVERTOPPING FREQUENCY	=	500 YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	2100.6 FT



PIPE HYDRAULIC DATA
48" RCP

DRAINAGE AREA	=	27.5 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	79.6 CFS
DESIGN HW ELEVATION	=	2113.22 FT
100 YEAR DISCHARGE	=	92.5 CFS
100 YEAR HW ELEVATION	=	2113.91 FT
OVERTOPPING FREQUENCY	=	- YRS
OVERTOPPING DISCHARGE	=	- CFS
OVERTOPPING ELEVATION	=	- FT

* CREST VERTICAL K DESIGN EXCEPTION
* SAG VERTICAL K DESIGN EXCEPTION
SEE SHEET NO.9 FOR -L- PLAN

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3/27/2008

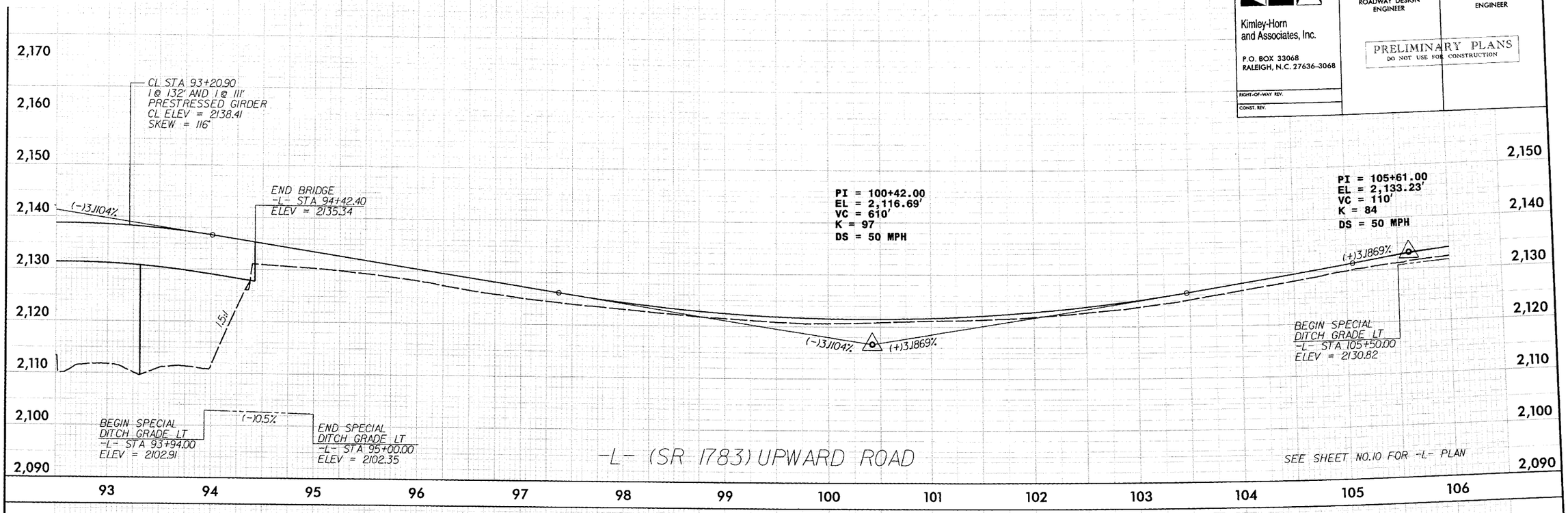
PROJECT REFERENCE NO.	SHEET NO.
R-4430	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

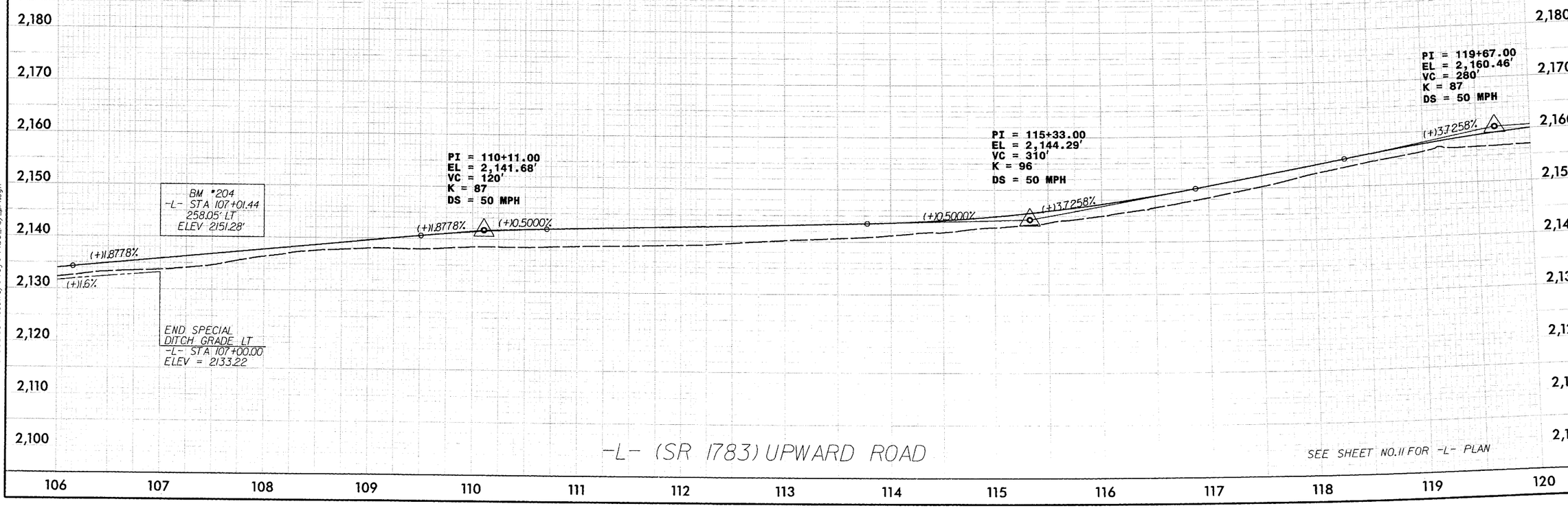
Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.

CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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3/27/2008

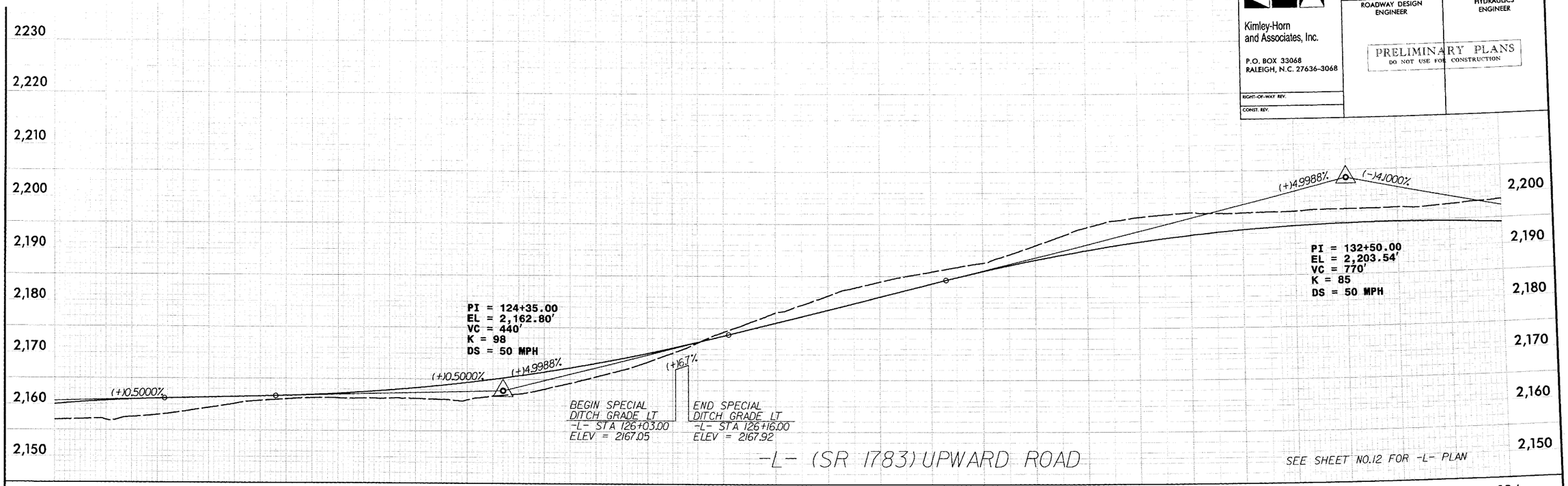
PROJECT REFERENCE NO.	SHEET NO.
R-4430	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

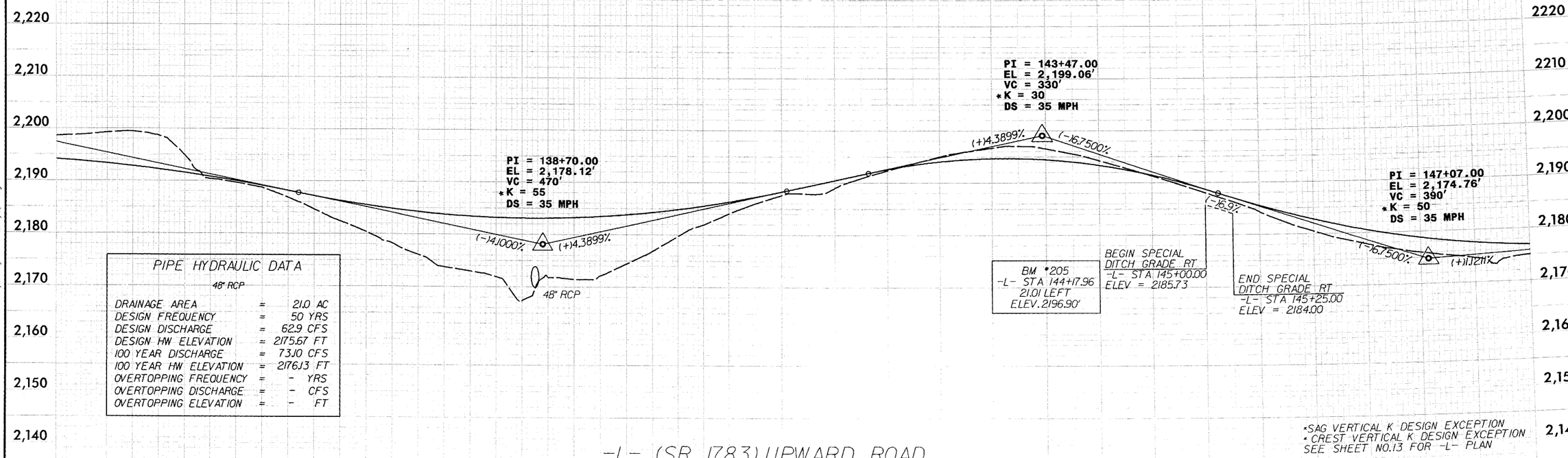
Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.

CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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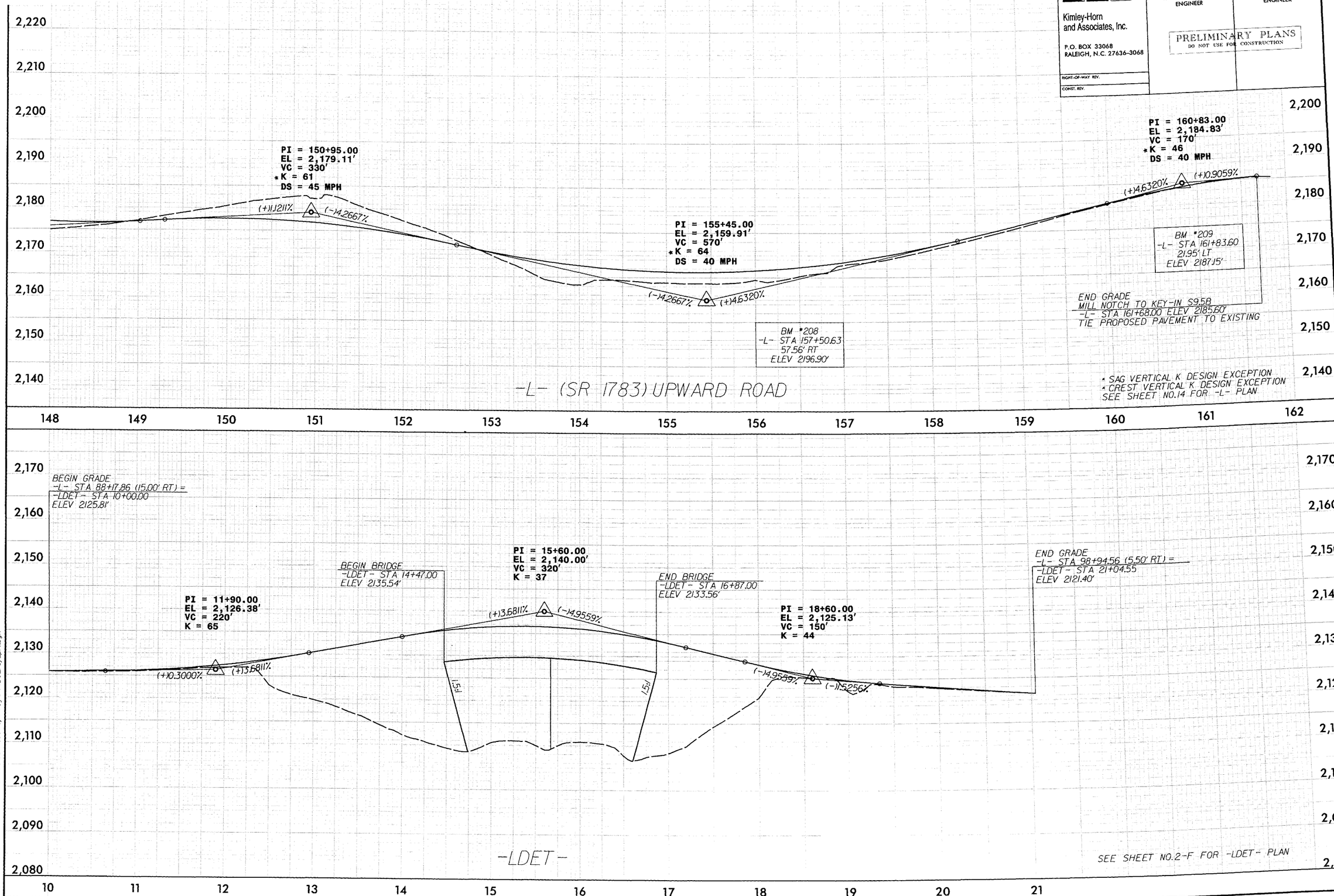
3/27/2008

PROJECT REFERENCE NO.	SHEET NO.
R-4430	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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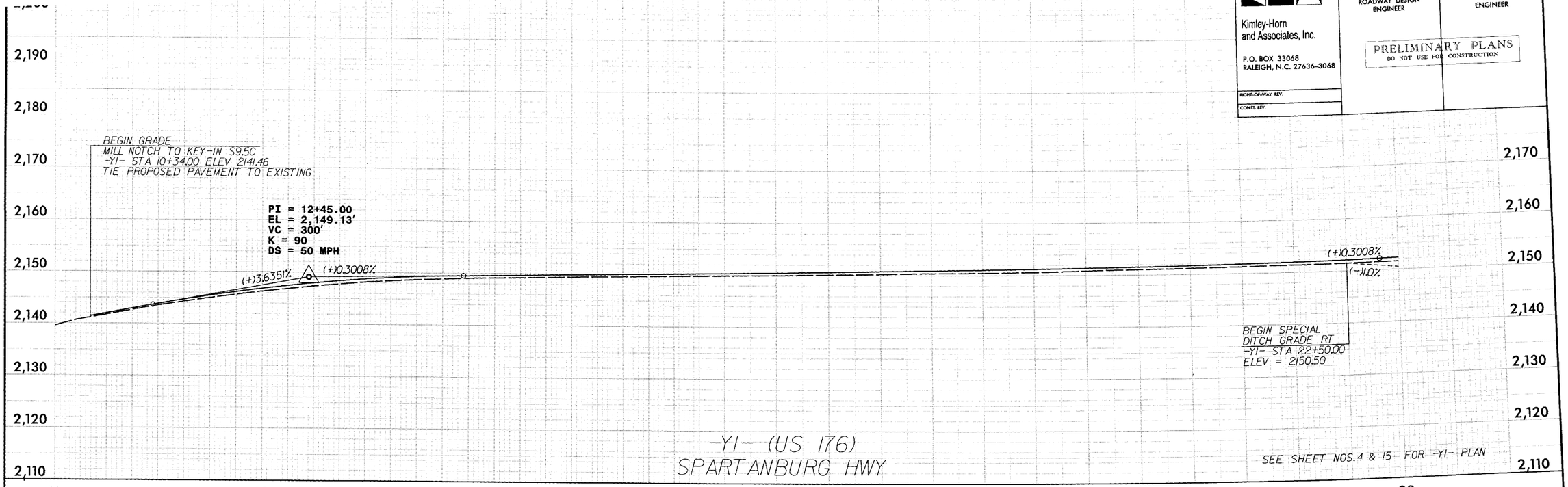
3/27/2008

PROJECT REFERENCE NO.	SHEET NO.
R-4430	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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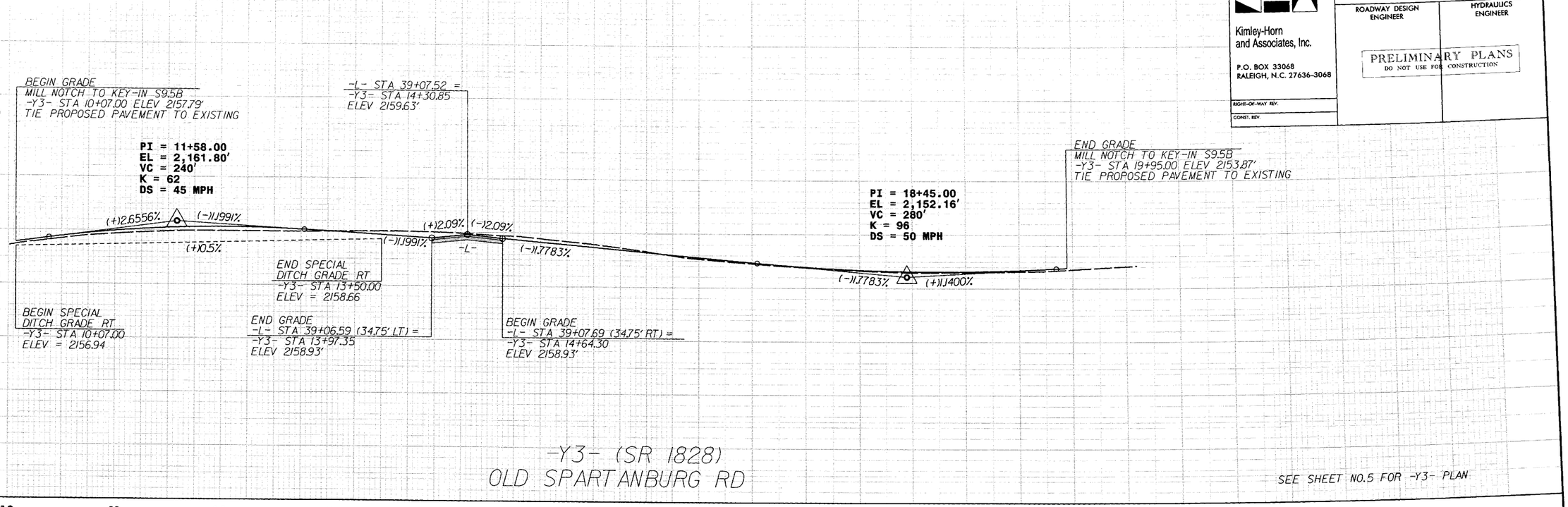
3/27/2008

PROJECT REFERENCE NO.	SHEET NO.
R-4430	24
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

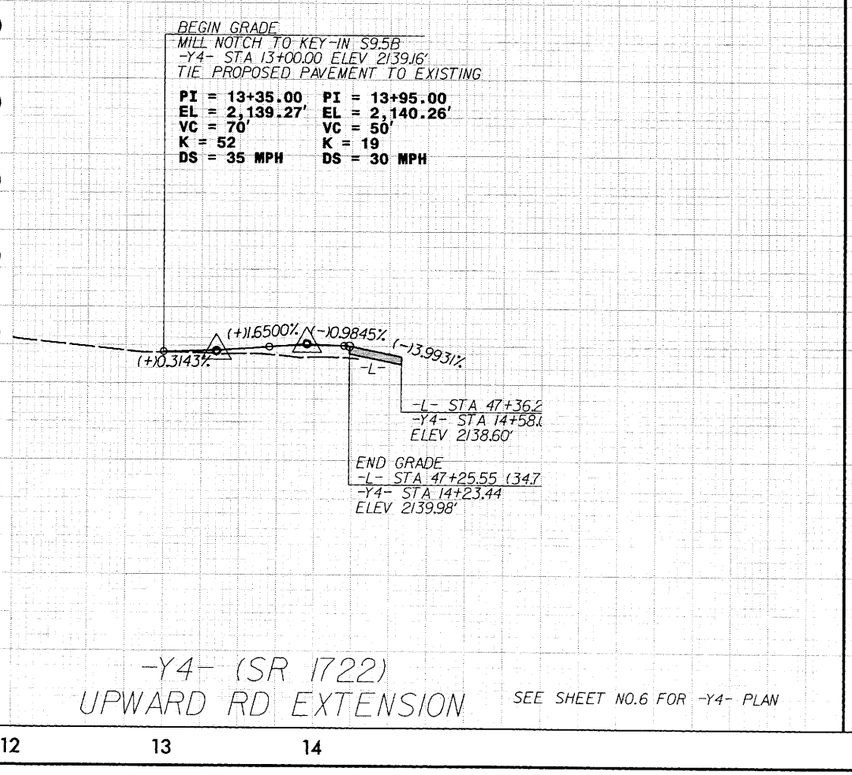
RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



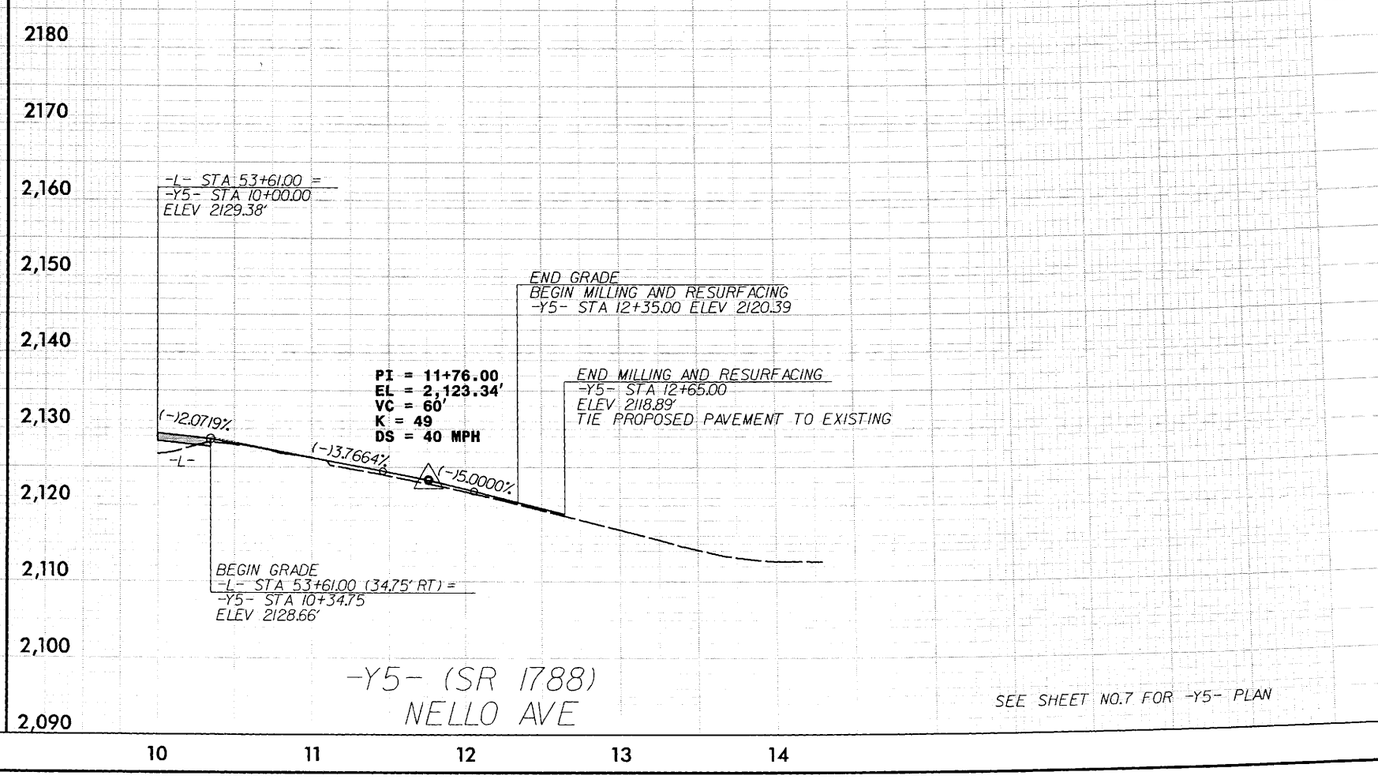
-Y3- (SR 1828)
OLD SPARTANBURG RD

SEE SHEET NO.5 FOR -Y3- PLAN



-Y4- (SR 1722)
UPWARD RD EXTENSION

SEE SHEET NO.6 FOR -Y4- PLAN



-Y5- (SR 1788)
NELLO AVE

SEE SHEET NO.7 FOR -Y5- PLAN

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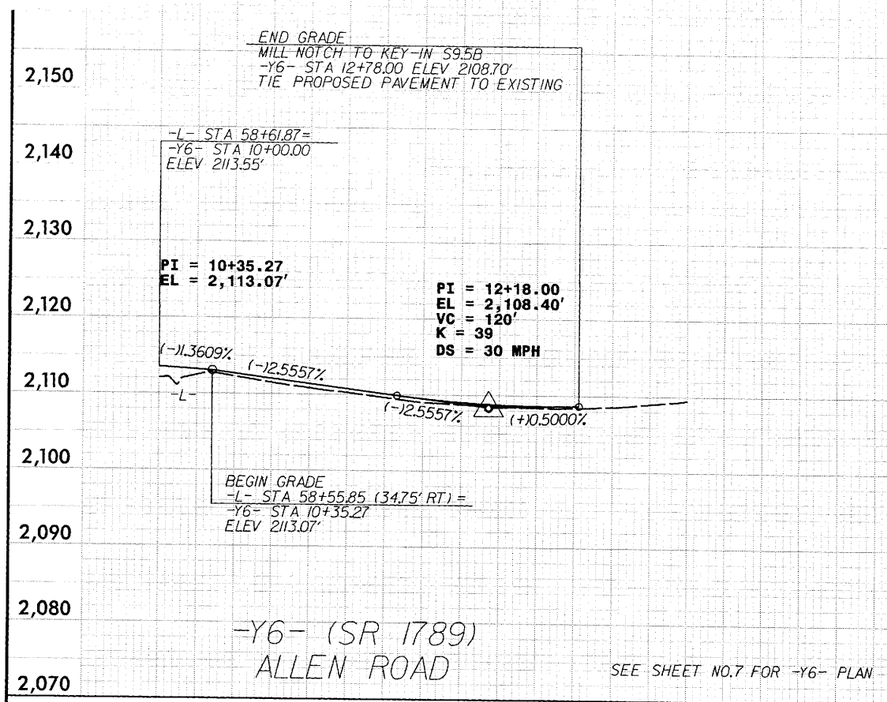
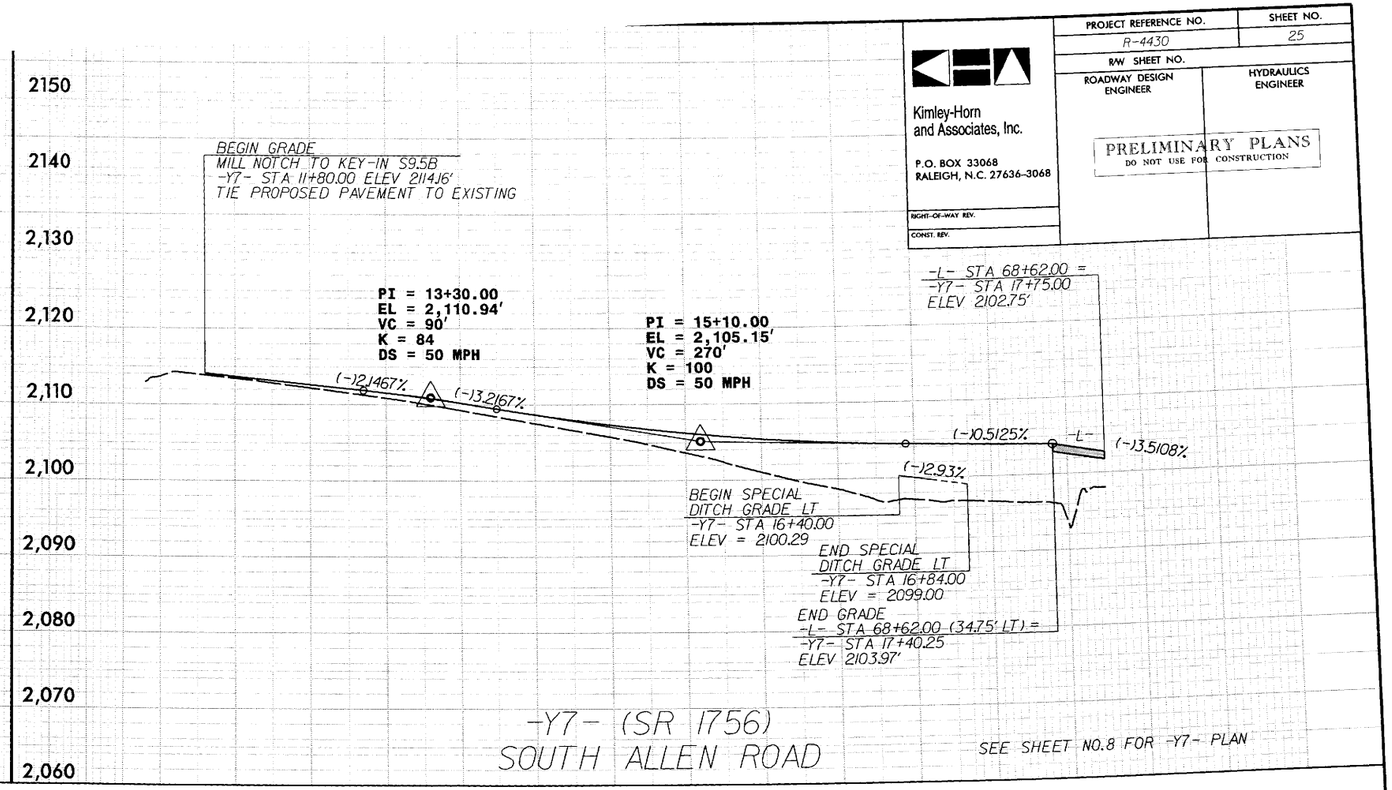
3/27/2008



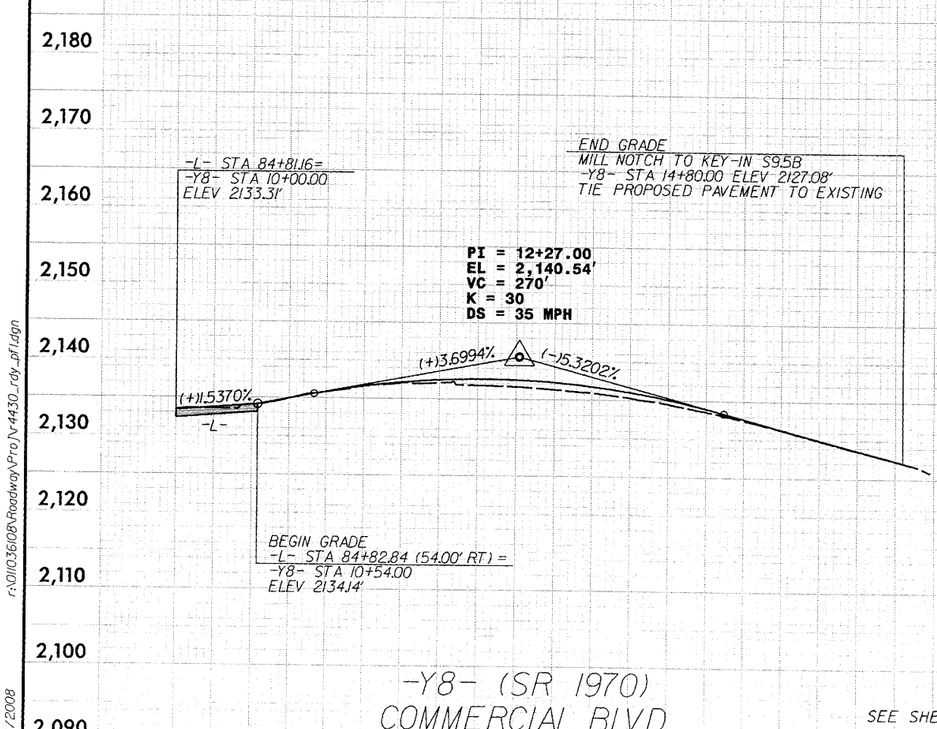
-Y6- (SR 1789)
ALLEN ROAD

SEE SHEET NO.7 FOR -Y6- PLAN



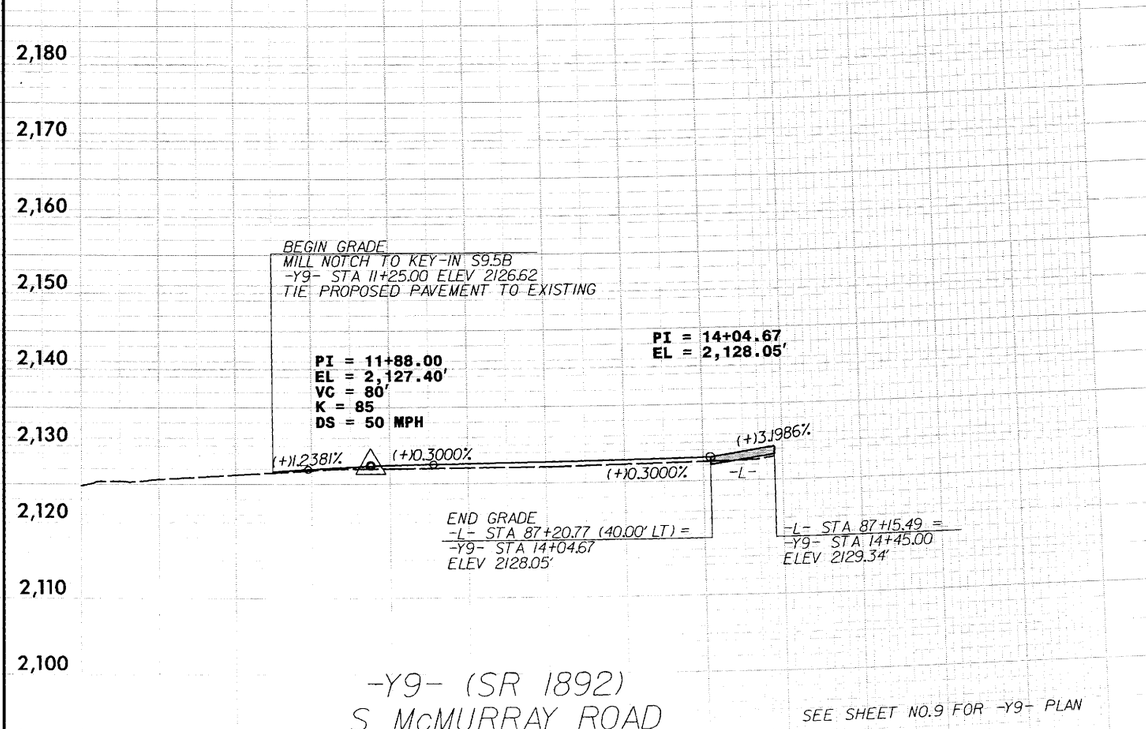
-Y7- (SR 1756)
SOUTH ALLEN ROAD

SEE SHEET NO.8 FOR -Y7- PLAN



-Y8- (SR 1970)
COMMERCIAL BLVD

SEE SHEET NO.9 FOR -Y8- PLAN



-Y9- (SR 1892)
S McMURRAY ROAD

SEE SHEET NO.9 FOR -Y9- PLAN

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

PROJECT REFERENCE NO.	SHEET NO.
R-4430	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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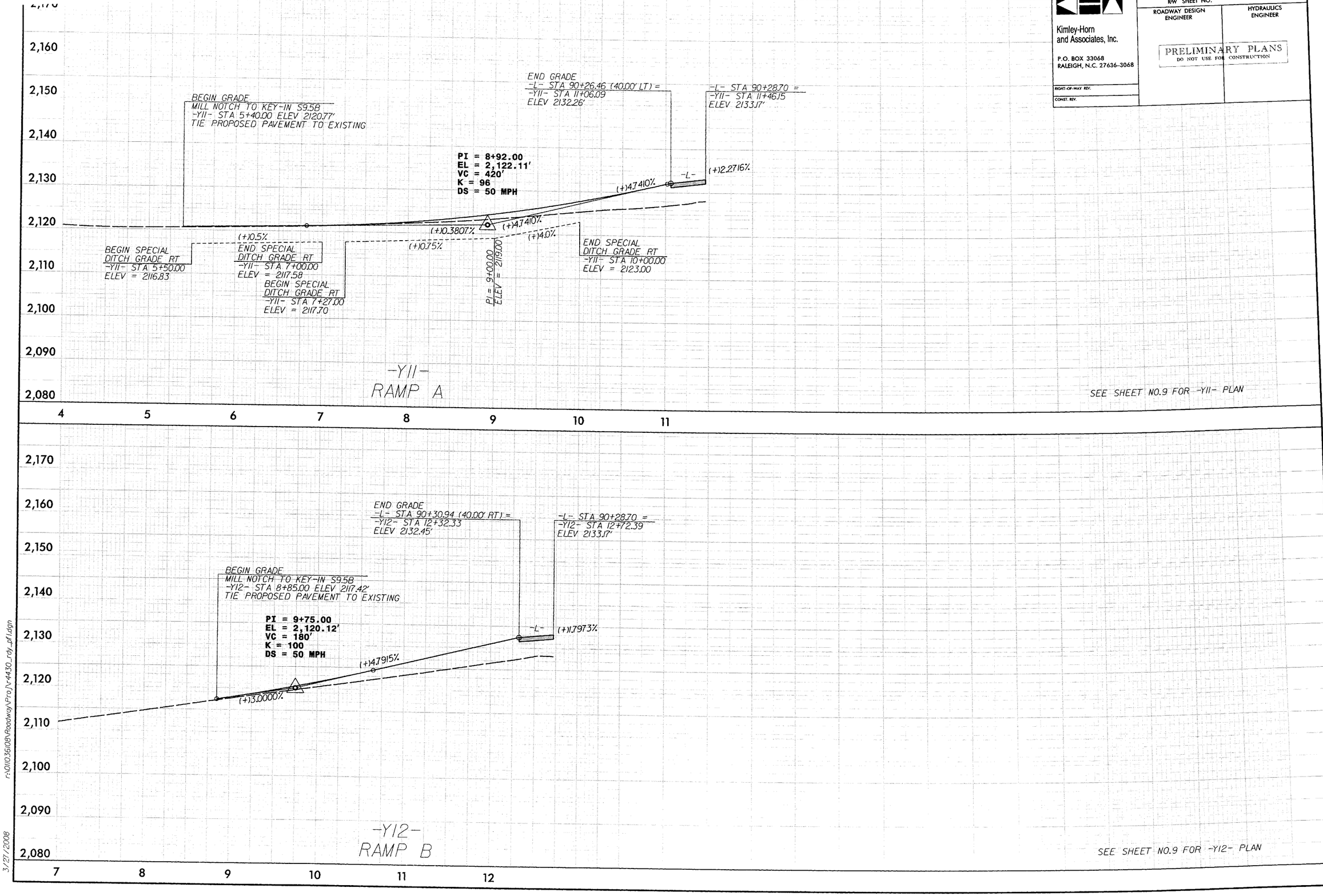
3/27/2008

PROJECT REFERENCE NO.	SHEET NO.
R-4430	26
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SEE SHEET NO.9 FOR -Y11- PLAN

SEE SHEET NO.9 FOR -Y12- PLAN

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3/27/2008

Kimley-Horn
and Associates, Inc.

P.O. BOX 33068
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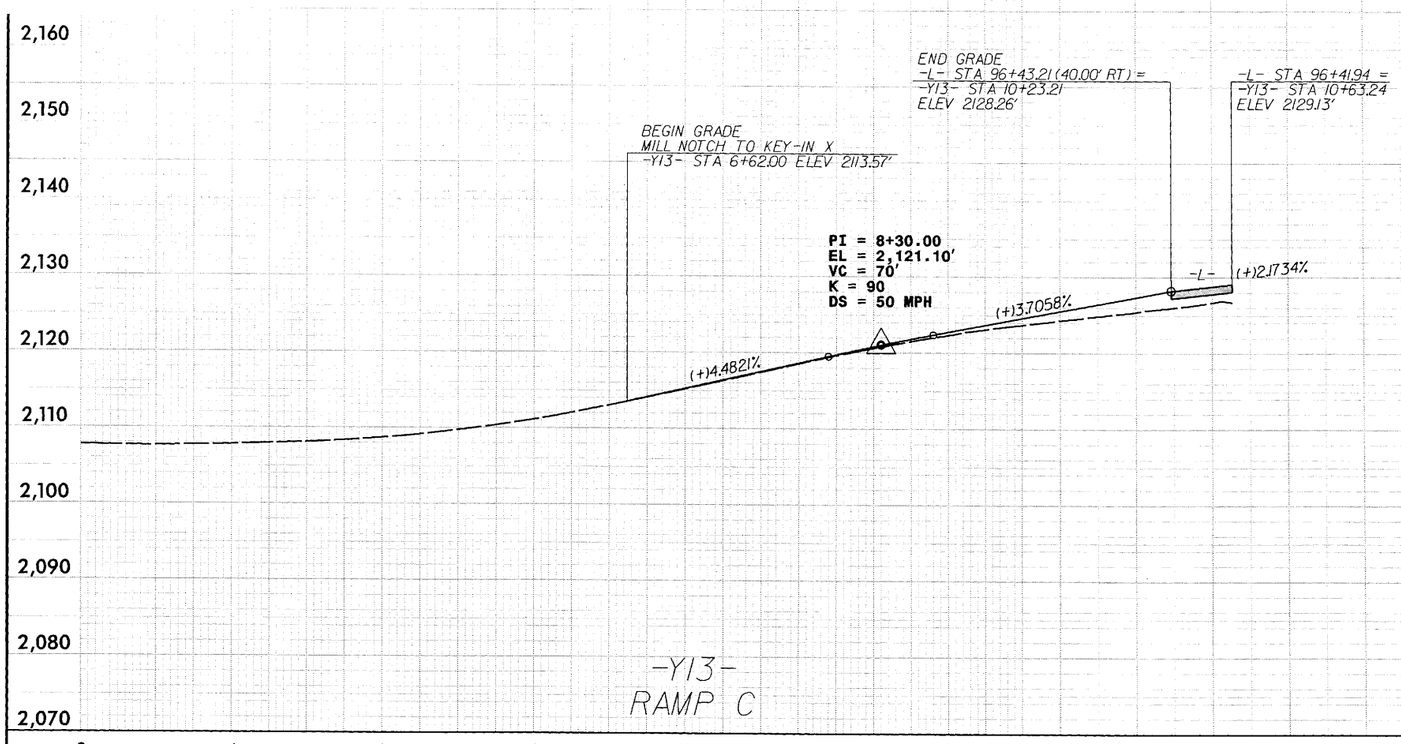
PROJECT REFERENCE NO.	SHEET NO.
R-4430	27
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

RIGHT-OF-WAY REV.

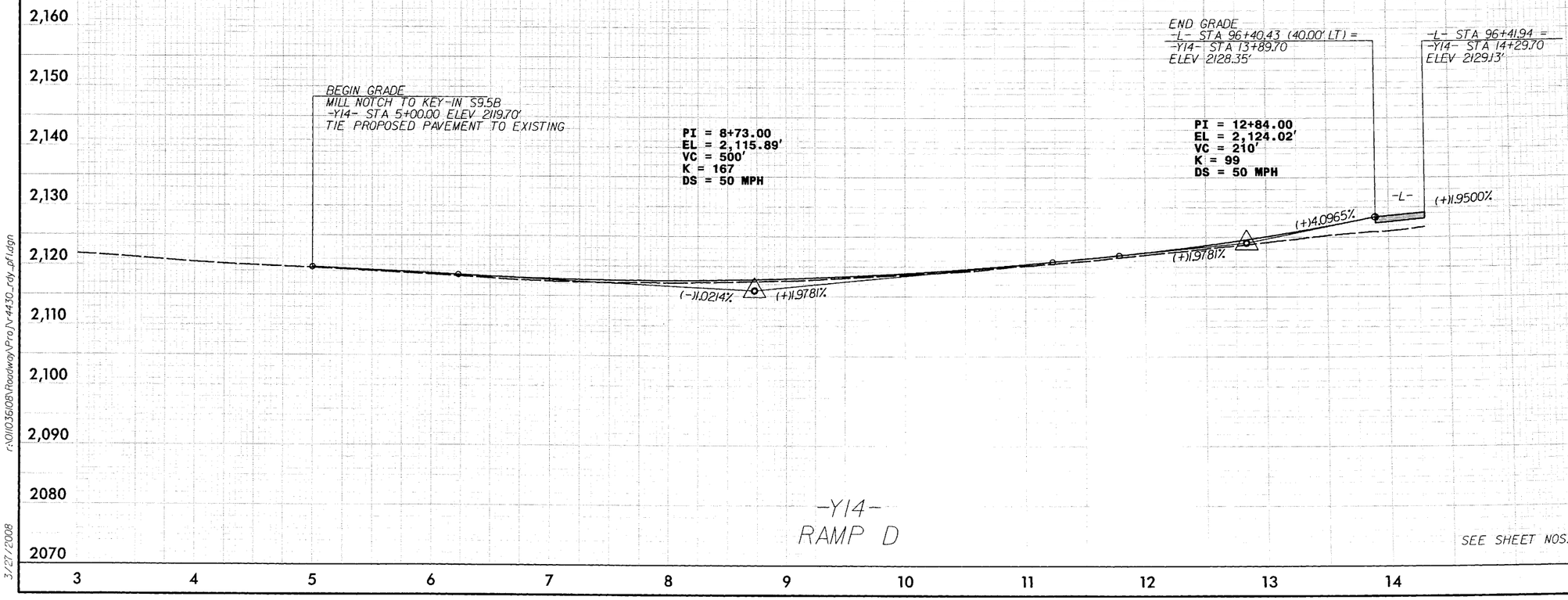
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-Y13-
RAMP C

SEE SHEET NO.10 FOR -Y13- PLAN



-Y14-
RAMP D

SEE SHEET NOS.10 & 16 FOR -Y14- PLAN

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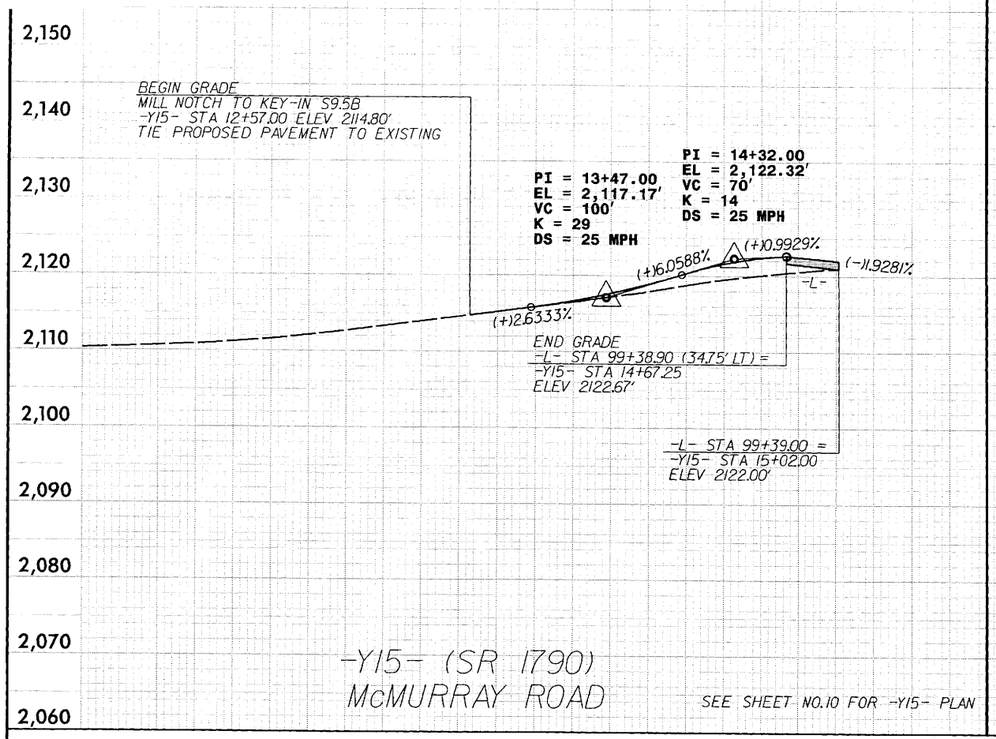
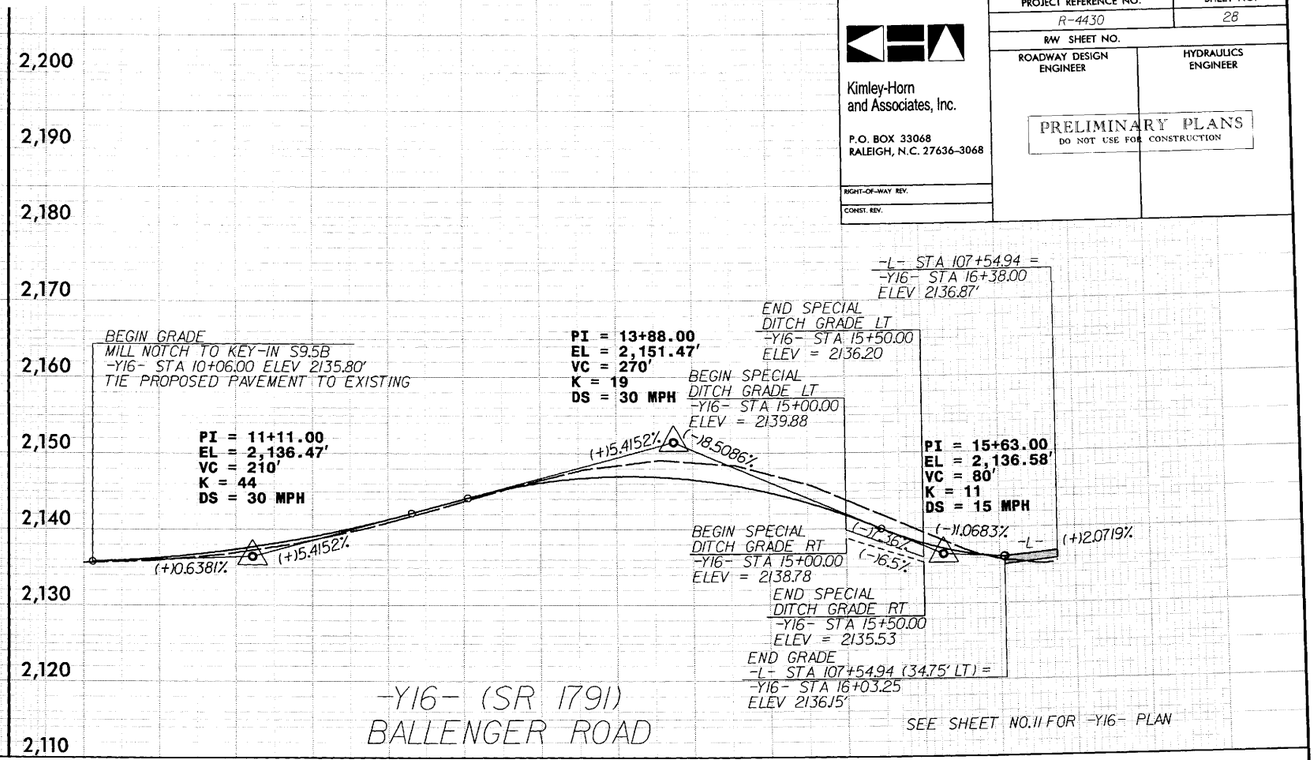
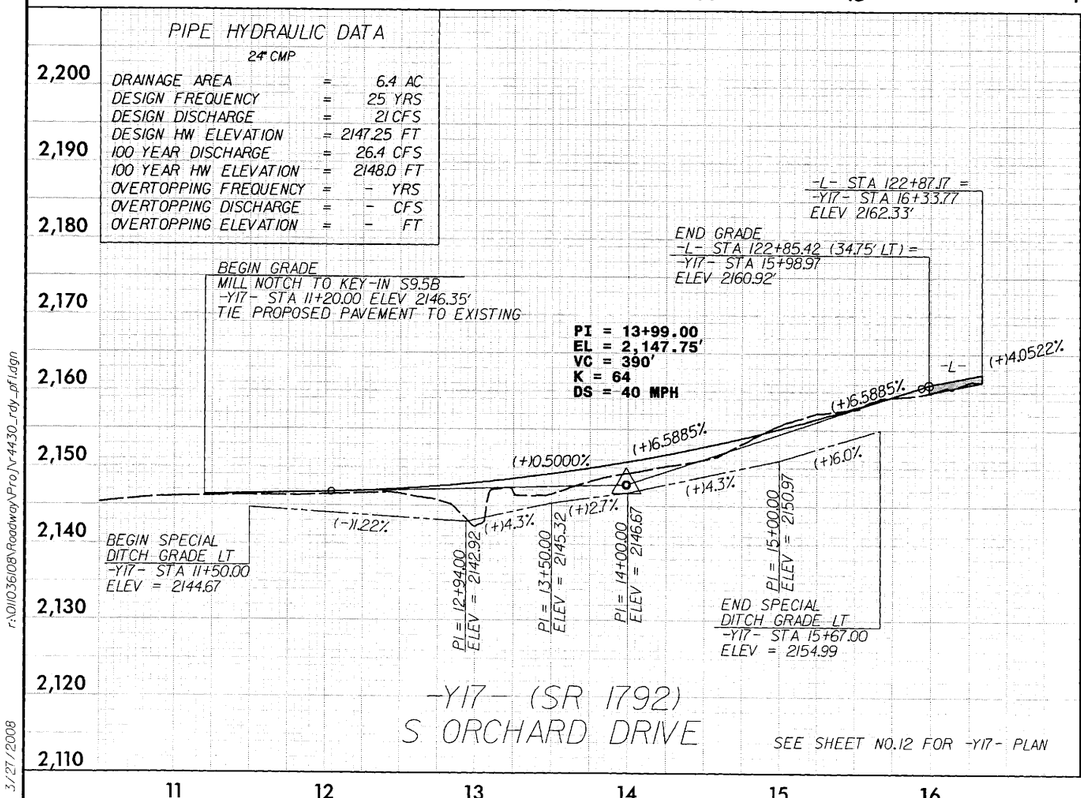
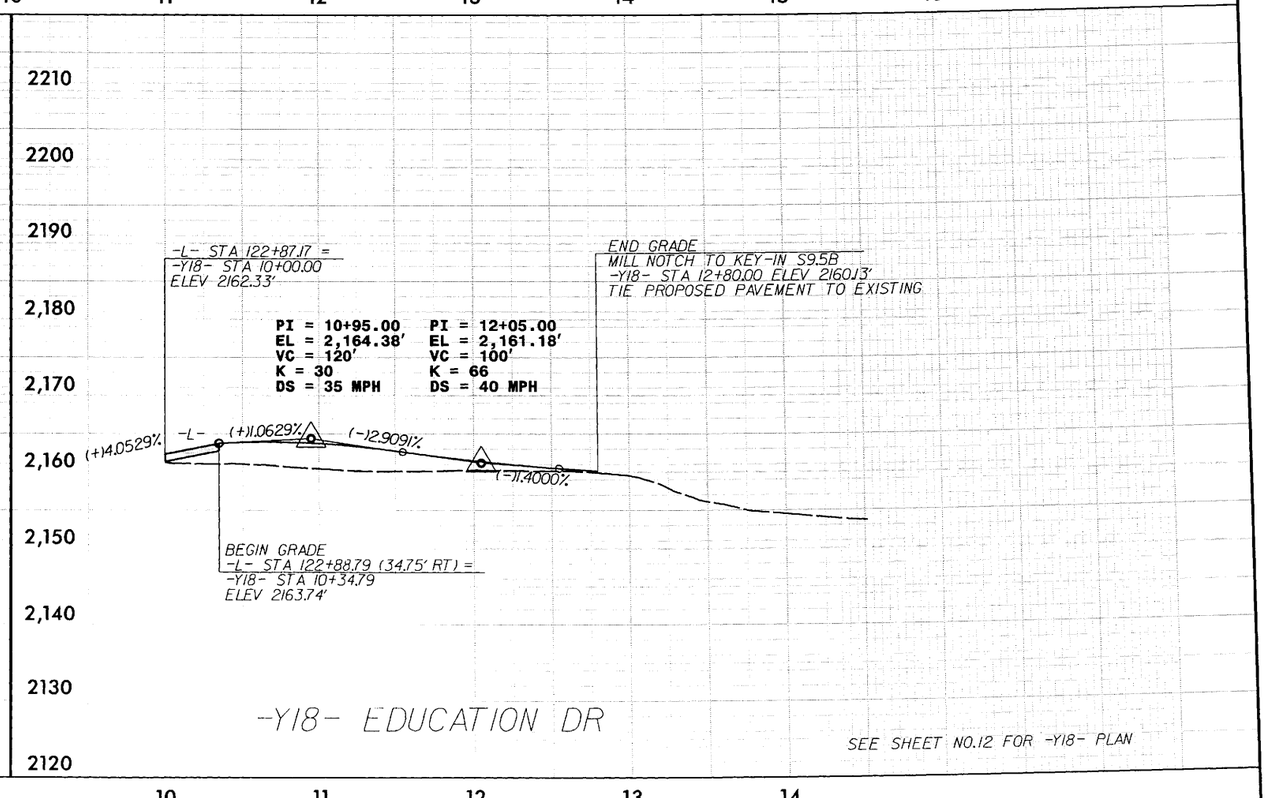
3/27/2008









Kimley-Horn and Associates, Inc.
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PROJECT REFERENCE NO.	SHEET NO.
R-4430	28
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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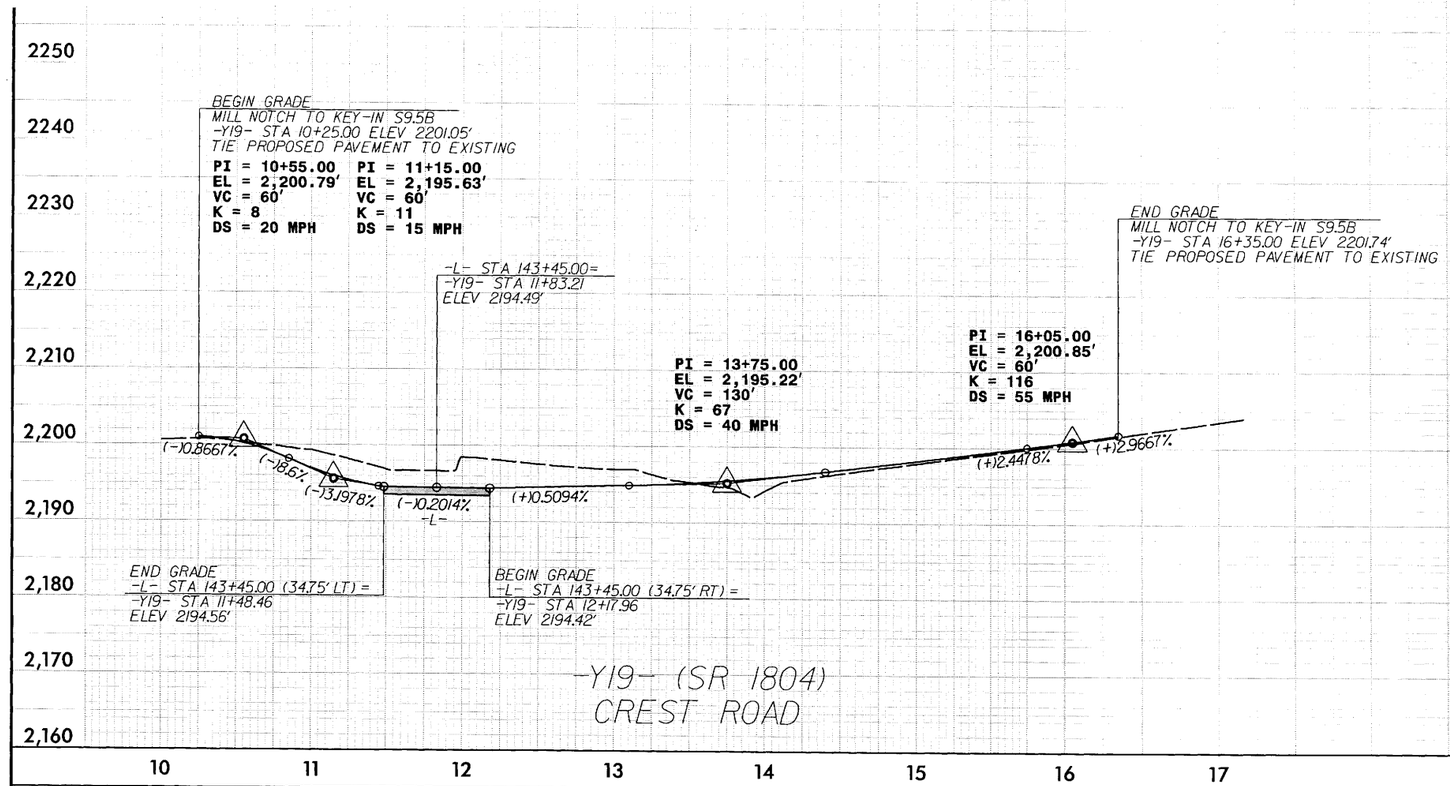
3/27/2008

PROJECT REFERENCE NO.	SHEET NO.
R-4430	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

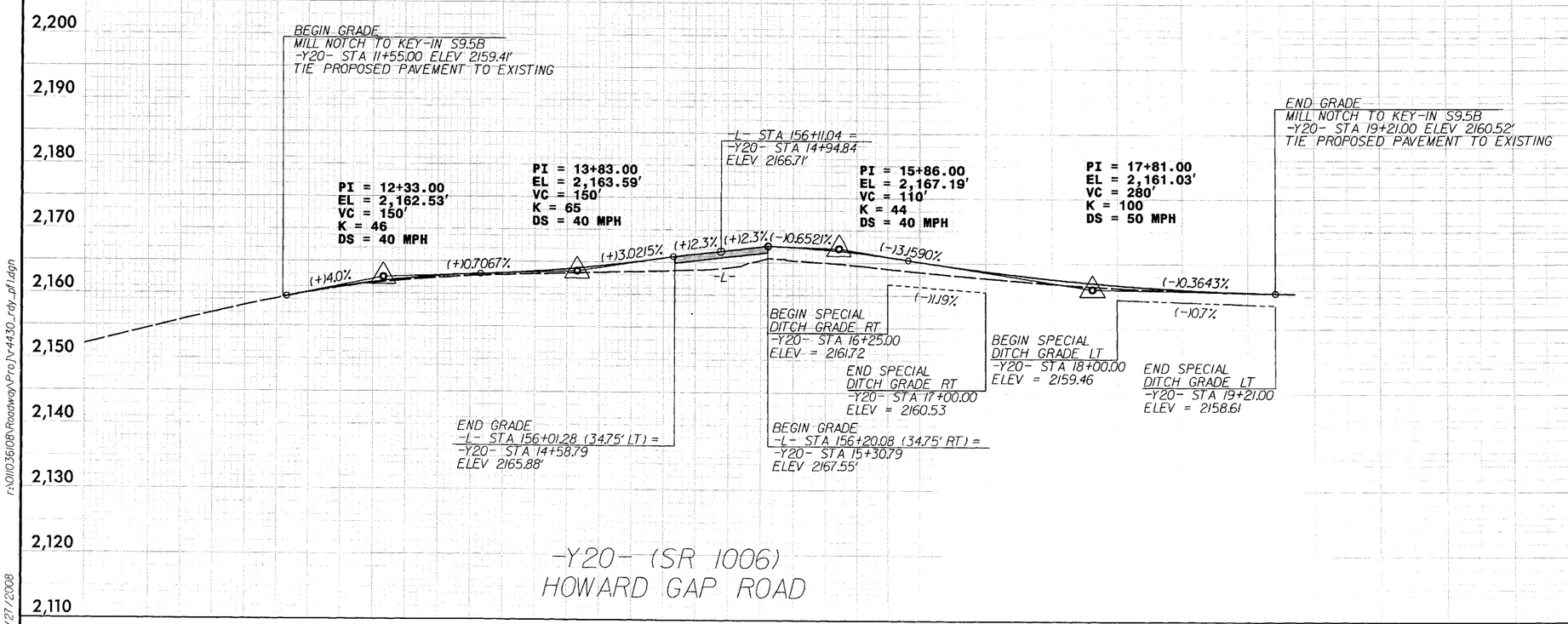
Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SEE SHEET NO.13 FOR -Y19- PLAN



SEE SHEET NO.14 FOR -Y20- PLAN

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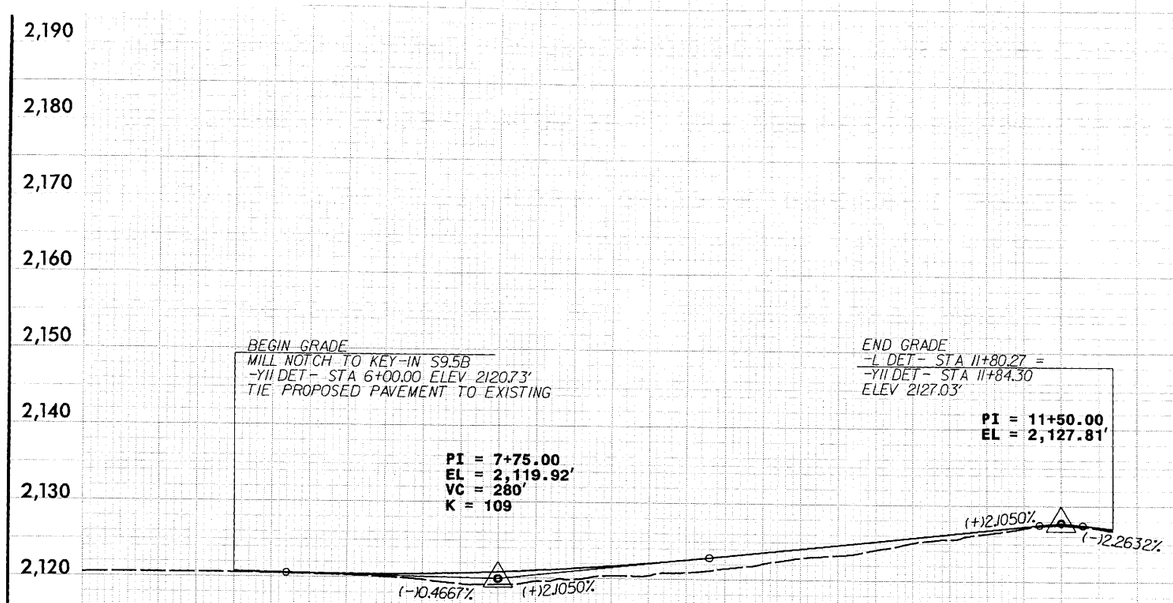
3/27/2008

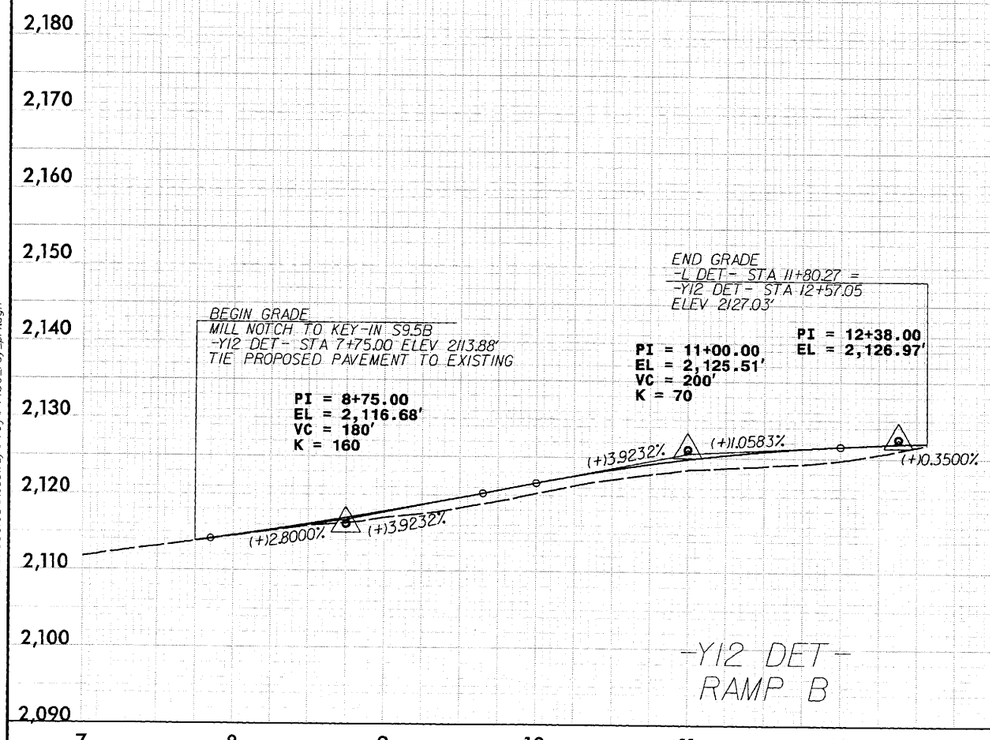
Kimley-Horn and Associates, Inc. P.O. BOX 33068 RALEIGH, N.C. 27636-3068	PROJECT REFERENCE NO. R-4430 R/W SHEET NO.	SHEET NO. 30
RIGHT-OF-WAY REV. CONST. REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-Y11 DET-
RAMP A

SEE SHEET NO.2-F FOR -Y11 DET- PLAN



-Y12 DET-
RAMP B

SEE SHEET NO.2-F FOR -Y12 DET- PLAN

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3/27/2008