STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

November 28, 2011

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

ATTN: Ms. Sarah Elizabeth Hair
NCDOT Coordinator

Dear Madam:

Subject: **Application for an Individual Section 404 and Section 401 Water Quality Certification** for the I-40 & I-77 interchange in Statesville including I-40 from west of SR 2003 (Radio Road) to SR 2158 (Old Mocksville Road) and I-77 from south of SR 2321 (East Broad Street) to south of SR 2171 (Jane Sower Road) in Iredell County. Federal Aid Project No. IMS-40-2, Division 12, TIP No. I-3819A. Debit $570 from WBS 34192.1.2.

The North Carolina Department of Transportation (NCDOT) proposes to replace two of the four existing loops with directional ramps, widen portions of the interstate in the vicinity of the interchange and include additional improvements along I-40 and its intersecting roads including a diverging diamond interchange (DDI) at US 21. The I-3189 A section has independent utility which will improve the intersection of I-40 and I-77 in Statesville. The I-3819 B section is the final build-out of the interchange improvement and will let post-year. The final build-out will widen I-40 and I-77 to eight lanes (in the vicinity of the interchange) and, as a result, ultimately improve the I-40/I-77 interchange from the current two-level full cloverleaf interchange to a four-level offset interchange by replacing three of the four existing ramps with directional ramps.

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

TELEPHONE: 919-717-6100
FAX: 919-212-5785

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
1020 BIRCH RIDGE DRIVE
RALEIGH NC, 27610-4328

Please see the enclosed ENG 4345, stream and wetland mitigation plan, permit drawing review minutes (4B and 4C), Effects Form for historic properties, State Stormwater Management Plan (SMP), Rapanos jurisdictional determination forms, permit drawings, utility drawings and design plans for the above referenced project.

Purpose and Need:
The proposed project has two primary purposes. The first is to improve traffic flow along the I-40 and I-77 corridors within the study area. The I-40/I-77 interchange is at the center of a transportation system that includes four additional interchanges serving Iredell County. The four adjacent interchanges serve Statesville and Iredell County by providing access points to I-40 and I-77, as well as access to the City of Statesville. Existing and projected operational deficiencies in the I-40/I-77 interchange contributes to operational deficiencies in the other interchanges within the system, thus impeding the efficiency of the overall transportation system in the immediate area.

The second purpose of the proposed project is to improve regional connectivity between Iredell County and points east, west, north and south within North Carolina and across the Interstate System. The existing and projected traffic volumes and land use conditions within the study area diminish the interchange's ability to function as a regional exchange point, as a connector between two designated North Carolina Strategic Highway Corridors, and as a high-speed interstate freeway serving the southeastern United States.

Summary of Jurisdictional Impacts:
The project will permanently impact 1.36 acres of wetlands, 2,326 linear feet of streams, and temporarily impact 135 linear feet (0.04 acre) of streams. Additional minor impacts from utility relocations are discussed below. Due to rounding, utility impacts do not change impact totals in this section.

Summary of Utility Impacts:
Utility relocations for this project will result in <0.01 acre of wetland excavation impacts, <0.01 acre (44 linear feet) of temporary stream impacts and 0.13 acre of hand clearing in wetlands.

Summary of Mitigation:
The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the National Environmental Policy Act (NEPA) and design processes. However, project impacts will necessitate compensatory mitigation for the unavoidable impacts. Detailed descriptions of these actions are presented in the mitigation portion of this application. All of the stream and wetland impacts requiring mitigation for this project will be compensated through on-site stream restoration, stream enhancement and wetland preservation.

NEPA DOCUMENT STATUS

An Environmental Assessment (EA) was prepared for this project in November 2006. A Finding of No Significant Impact (FONSI) was prepared in July 2008. In addition a

Construction Consultation was completed in January 2011. Additional copies will be provided upon request.

In compliance with the NEPA/404 Merger Process, Concurrence Points 4B and 4C were reached for I-3819A on September 23, 2009 and January 13, 2010, respectively.

INDEPENDENT UTILITY

The subject project is in compliance with 23 CFR Part 771.111(f) which lists the Federal Highway Administration (FHWA) characteristics of independent utility of a project:

(1) The project connects logical termini and is of sufficient length to address environmental matters on a broad scope,
(2) The project is usable and a reasonable expenditure, even if no additional transportation improvements are made in the area;
(3) The project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

RESOURCE STATUS

Waters within the project area are located in the South Yadkin River Drainage Basin (HUC 03040102 of the Yadkin-Pee Dee River Basin within subbasin 03-07-06). No designated Outstanding Resource Waters (ORW), High Quality Waters (HQW) or Water Supply (WS-I or WS-II) waters occur within 1.0 mile of the project area.

<u>303(d) Impaired Waters</u>:
Fourth Creek is currently listed on the North Carolina 2010 Draft and 2008 Final 303(d) list of impaired waters for having impaired ecological/biological integrity. The portion of Fourth Creek from its source to Morrison Creek (near the intersection of US 21 and I-40) is the only section on the 2010 Draft list located within the project area. On previous 303(d) lists (including the 2008 Final) the entire stretch of Fourth Creek within the project area was considered 303(d).

Wetland and stream determinations within I-3819A were conducted using the field delineation method outlined in the 1987 Corps of Engineers Wetland Delineation Manual. Mr. Steven Lund of the U.S. Army Corps of Engineers field verified the wetlands and surface waters on November 21, 2005. As this verification will expire before the current let date for this project, Rapanos jurisdictional determination forms have been included with this application for the relevant water resources impacted by I-3819A in order to obtain an updated approved jurisdictional determination for this project.

IMPACTS TO WATERS OF THE U.S.

Tables 1A and 1B summarize the impacts to jurisdictional water resources. Table 2 summarizes the additional minor impacts to jurisdictional water resources from utility relocations. Site numbers correspond with the permit (hydraulic) and utility drawings included in this application. The stream and wetland numbers correspond to the FONSI. A brief description of each impact site will follow the tables.

Table 1A – I-3819A Wetland Impacts*

Site	FONSI Wetland Number	Wetland Size (ac)	Permanent Fill in Wetlands (ac)	Mechanized Clearing (ac)	Temporary Fill (ac)	Impacts Requiring Mitigation (ac)
6	W15	14.72	1.00	0.09	0	1.09
8	W20	0.09	0.09	0	0	0.09
9	W12	3.74	0.13	0.03	0	0.16
12	W8	3.87	0	0.02	0	0.02
		Total Impacts	**1.22**	**0.14**	**0**	**1.36**

* All wetlands impacted are riparian

Table 1B – I-3819A Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P)	FONSI Stream Number	Permanent Impacts (feet)	Impacts Requiring Mitigation (feet)	Temporary Impacts (acres)	DWQ Index number	DWQ Class
1	UT to Gregory Creek (P)	S28	77	77	0	12-108-20-3-1	C
1A	UT to Gregory Creek (I)	S29	12***	0	0	12-108-20-3-1	C
2	UT to Morrison Creek (P)	S26	71	71	0	12-108-20-3	C
			46*	0	0		
3	Fourth Creek (P)	S1	23*	0	<0.01	12-108-20	C
4	UT to Fourth Creek (I)	S16	594	594	0	12-108-20	C
5	Fourth Creek (P)	S1	409**	0	0	12-108-20	C
			93*	0	0		
6	N/A (wetland only)	--	--	--	--	--	--
7	UT to Fourth Creek (P)	S12	70	70	0	12-108-20	C
			45*	0	0		
8	UT to Fourth Creek (P)	S17	494	494	0	12-108-20	C
9	UT to Fourth Creek (P)	S2	37*	0	0	12-108-20	C
10	UT to Fourth Creek (P)	S6	15*	0	0	12-108-20	C
11	UT to Fourth Creek (P)	S6	10	10	<0.01	12-108-20	C
12	UT to Fourth Creek (I)	S9	175	175	0.03	12-108-20	C
13	UT to Fourth Creek (P)	S24	175	175	0	12-108-20	C
		Total Impacts	**2,326**	**1,666**	**0.04†**		

* Bank stabilization impacts

** Shoring up under bridges with rip rap (there is 20 feet of overlap between the 409 lf of shoring and the 93 lf of stabilization for a total of 482 lf of impacts at Site 5)

*** S29 is jurisdictional, but considered unimportant for mitigation purposes

† Values are based on rounding, due to some of the individual impacts being <0.01 acre.

Table 2 – I-3819A Utility Impacts

Site	Wetland or Stream Number	Wetland Size (ac)	Excavation in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Temporary Stream Impacts (ac)
U1	W6	0.60	<0.01	--	--
U2	S2	--	--	--	<0.01
U3	S6	--	--	--	<0.01
U4	W12	3.74	--	0.05	--
U5	W14	1.44	--	0.08	--
		Total Impacts	**<0.01**	**0.13**	**<0.01**

* Due to rounding, utility impacts do not change impact totals in Table 1A.

Permit Site 1: The existing 60" CMP is being replaced with a new, 72" smooth wall steel pipe (SWS) that will be installed to the east of the existing site. A portion of S28 will be relocated to flow into the new pipe location resulting in 77 linear feet of permanent stream impacts. The relocated channel will be constructed with floodplain benches with coir fiber matting.

Permit Site 1A: S29 is a short intermittent, unimportant stream that is weakly channelized. All 12 feet of this stream will be permanently impacts as a result of the relocation of S28 at Site 1.

Permit Site 2: The existing 36" RCP under I-40 is being extended on the south side of the interstate resulting in 71 linear feet of permanent impacts to S26. Additionally, there will be 46 linear feet of bank stabilization impacts to S26 at the north (outlet) end of the 36" RCP for a total of 117 linear feet of impacts at this site.

Permit Site 3: A temporary work bridge will be used over S1 (Fourth Creek) at this site to install a new bridge. The work bridge will temporarily impact <0.01 acre (45 linear feet) of S1. There will also be 23 linear feet of bank stabilization impacts to S1 at this site at the outlet end of a standard 'v' ditch. (Site 3 is on page 20, permit sheet 41 of 68.)

In addition to the work bridge, a separate temporary bent will be necessary to "support" the proposed steel beams during construction. The temporary bent is located under the proposed bridge and is necessary for a field splice of the steel beams. The temporary surface water impacts to S1 from this bent will be <0.01 acre.

Permit Site 4: As a result of road widening in this section, intermittent stream S16 will be filled in for a total of 594 linear feet of permanent impacts to this stream. The flow to this stream will be conveyed through the new pipes installed on the south side of the interstate.

Permit Site 5: Because of the extensive width of the new I-40 bridges over S1 (Fourth Creek), the banks of this creek will be stabilized with rip rap to reduce erosion. This shoring up under the bridge will result in 409 linear feet of bank stabilization impacts. Additionally, there will be 93 linear feet of bank stabilization impacts to S1 at three outlets associated with the two adjacent wet detention basins. There is 20 feet of overlap between the impacts under the bridge and the outlet protection, resulting in a total of 482 linear feet of bank stabilization impacts at this site.

Permit Site 6: As a result of the new roadway slopes associated with widening the interstate in this area, there will be 1.0 acre of permanent fill and 0.09 acre of mechanized clearing in Wetland 15 (W15) for a total of 1.09 acre of wetland impacts at this site. The existing 72" RCP at the eastern end of the impact area will be extended into the area of wetland fill. At the end of the 72" pipe extension, there are two 48" CMPs running under a gravel road that will be removed, opening up a small portion of W15.

Permit Site 7: The existing 54" RCP will be extended to accommodate new roadway slopes resulting in 70 linear feet of permanent impacts to S12. Additionally, there will be 45 linear feet of bank stabilization impacts to S12 at the outlet of the pipe extension for a total of 115 linear feet of stream impacts at this site. Immediately downstream of the bank stabilization impacts, a 24" CMP running under a gravel road will be removed, day-lighting a small portion of S12.

Permit Site 8: The new roadway slopes in this area will fill in the day-lighted portion of S17 on the north side of the ramp, resulting in 494 linear feet of permanent impacts to this stream. Wetland 20 (W20) will also be entirely filled in as a result of the new slopes, resulting in 0.09 acre of permanent wetland fill. The flow from S17 will be diverted to a lateral base ditch on the south side of the ramp. The rock in the rip rapped portion of the ditch/channel will be flush with the bed to allow for aquatic life passage.

Permit Site 9: Due to a new ramp and bridge being constructed in this area, there will be 0.13 acre of permanent fill and 0.03 acre of mechanized clearing in the northern end of Wetland 12 (W12) for a total of 0.16 acre of wetland impacts at this site. Additionally, there will be a total of 37 linear feet of bank stabilization impacts to S2 at the outlet ends of two base tail ditches.

Permit Site 10: The impact area at this site is in a transition area from roadway fill to retaining wall. Because of the cross pipe and fill height, it was decided to stop the wall short and to address this area with a rock fill for stabilization and avoid a cross pipe conflict. There will be 15 linear feet of bank stabilization impacts to S6 as a result of the rock fill.

Permit Site 11: The existing oversized section of 60" CMP is being removed and replaced with a 48" CMP to match the existing pipe under the road. As a result, there will be 10 linear feet of permanent impacts to S6 and <0.01 acre (10 linear feet) of temporary impacts to S6 associated with installation of the new section of pipe.

Permit Site 12: A new two-barrel RCBC will be constructed where S9 and Wetland 7 (W7) intersect the proposed new road in this area. There will be 175 linear feet of permanent impacts to S9 and 0.03 acre (80 linear feet) of temporary impacts to S9 associated with the installation of the new crossing and the temporary drainage easement. In addition, there will be 0.02 acre of mechanized clearing in W8 associated with the temporary drainage easement at this site.

Permit Site 13: A new 66" RCP will be installed where S24 intersects the proposed new road in this area. The new road is required to provide parcel access that is removed at its current

access point. There will be 175 linear feet of permanent impacts to S24 associated with this installation of this new crossing.

Utility Site U1: The relocation of a 24" ductile water line will result in an open cut in wetland W6 that will be 4' wide and 26' long to lay the new pipe. This will result in <0.01 acre of excavation in wetlands. Once the pipe has been installed, the trench will be filled back in.

Utility Site U2: The relocation of a 24" ductile water line will result in an open cut in stream S2 that will be 4" wide and 10' long to lay the new pipe. Once installed, the trench will be filled back in. This will result in <0.01 acre (10 linear feet) of temporary impacts to S2.

Utility Site U3: The relocation of a 24" ductile water line will result in an open cut in stream S6 that will be 4" wide and 8' long to lay the new pipe. Once installed, the trench will be filled back in. This will result in <0.01 acre (8 linear feet) of temporary impacts to S6.

Utility Site 3 is located within the proposed onsite mitigation as described in the UT to Fourth Creek Stream and Wetland Mitigation Plan, dated April 2011. This utility line is proposed to cross the enhancement section of the site approximately 550 feet downstream from the culvert under I-77. Other options were reviewed, including running the utility line along the existing roadway. However new parallel utility lines are not allowed. Directional bore was also considered but would create a larger impact due to the large bore pit required for the steep slopes.

Access to the line would be required in the event that emergency repairs are necessary. However, routine maintenance of the line is not required unless a valve or blow-off assembly is installed in the main line. No valves or blow-offs will be installed in the above referenced environmentally sensitive areas.

Potential effects due to construction of the utility line have been minimized to the maximum extent practicable. Long term effects should be minimal also since there will be no utility easement on the line within the onsite mitigation area and access will only be allowed for emergency repair after approval by the District Engineer.

Utility Site U4: Power line relocation will result in the need for hand clearing within wetland W12. The power line poles will be installed outside the wetland boundaries and the plans indicate no trucks in the wetlands. This utility relocation will result in 0.05 acre of hand clearing in W12.

Utility Site U5: Power line relocation will result in the need for hand clearing within wetland W14. The power line poles will be installed outside the wetland boundaries and the plans indicate no trucks in the wetlands. This utility relocation will result in 0.08 acre of hand clearing in W14.

MORATORIUM

No moratoriums are required by the U.S. Fish and Wildlife Service (USFWS) or were proposed in a letter from the North Carolina Wildlife Resources Commission (NCWRC) dated February 12, 2007.

FEDERALLY PROTECTED SPECIES

Plants and animals with Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of September 22, 2010, the USFWS lists two federally protected species for Iredell County (Table 3).

The entire project area was surveyed for suitable dwarf-flowered heartleaf habitat. All potential habitat was surveyed in the spring of 2008 by walking visual plant-by-plant surveys. No dwarf-flowered heartleaf plants were found, therefore this project will have "No Effect" on this species. The bog turtle is listed due to similarity of appearance and does not require a biological conclusion. However, per communication with Dennis Herman (NCDOT Biological Surveys Group) the wetlands located within the project area are not considered bogs and likely would not provide suitable habitat for bog turtles.

Table 3 – Federally protected species listed for Iredell County.

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
Clemmys muhlenbergii	Bog turtle	T (S/A)	No	Not Required
Hexastylis naniflora	Dwarf-flowered heartleaf	T	Yes	No Effect

T(S/A) - Threatened due to similarity of appearance
T – Threatened

INDIRECT CUMULATIVE IMPACT ANALYSIS

Existing rules for the 401 Water Quality Certification Program (15A NCAC 2H .0506(b)(4) require that the DWQ determine that a project "does not result in cumulative impacts, based on past or reasonably anticipated future impacts, that cause or will cause a violation of downstream water quality standards."

An Indirect and Cumulative Effects Assessment (ICE) was completed for this project in 2005. Copies of this report are available upon request. This report concluded the following:

Indirect and Cumulative Effects to the Human Environment

Land Use/Development

While it is apparent that further study area development and eventual build-out is likely, project induced growth in the study area is expected to be minimal due to the lack of new access provided by the project. The project is likely to have the greatest impact on location

decisions made by industry, specifically warehousing and distribution related industries. Some of these industries may locate within the study area.

Commerce
Ultimately, the project is likely to facilitate intrastate and interstate commerce by increasing the efficiency of the I-40/I-77 interchange.

Travel Patterns
The reconfiguration of the I-40/I-77 interchange will improve traffic flow, reduce congestion, and decrease travel time along the corridor. This will improve access and traffic flow at this interchange and the surrounding access points in and near Statesville.

Indirect and Cumulative Effects to the Natural Environment

Encroachment-alteration and induced growth effects to natural resources associated with the project are anticipated to be low. Specific impacts to natural resources in the study area are discussed below.

Water Resources
Since the proposed project consists primarily of improvements within existing right of way and development has already occurred in many of the areas adjoining the project; indirect and cumulative impacts are expected to be minimal. The future land use assessment shows continued development in the area with or without the project.

Future development impacts to Fourth Creek include water quality degradation as a result of more impervious surfaces that block or redirect discharge and more storm drains that divert precipitation into streams instead of aquifers, which could increase erosion rates over time. The Iredell County Draft Stormwater Ordinance** has been proposed to protect surface water quality in the study area. This ordinance would be put in place to regulate the discharge of stormwater runoff to limit the amount of silts and pollutants entering surface waters. The impaired status of Fourth Creek indicates that existing programs and regulations in place have not prevented degradation and may not properly protect sensitive species. However, the potential positive impacts from the soon-to-be implemented Iredell County Stormwater Ordinance have not yet been realized.

Wetlands
Unavoidable wetland impacts will be mitigated and efforts will be made to replace wetlands in-kind within the same watershed as the impacted site. Increased development expected because of current development trends is likely to result in negative impacts to study area wetlands. Minimal impacts to wetlands are likely because of development induced by the project."

**named the *Soil Erosion and Sedimentation Control Ordinance*
Adopted: December 05, 2006
Amended: June 06, 2009
Effective: July 01, 2009

CULTURAL RESOURCES

Historical Structures:
This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800. Section 106 requires Federal agencies to take into account the effect of their undertakings (federally-funded, licensed, or permitted) on properties included in or eligible for inclusion in the National Register of Historic Places (NRHP) and to afford the Advisory Council a reasonable opportunity to comment on such undertakings. There are three NRHP-eligible properties within the project area, the Ramsey Farm Barn, the Ramsey Farm, and the McKee House. In a meeting between NCDOT, FHWA and the North Carolina State Historic Preservation Office (NC-HPO) on September 15, 2010 it was determined that the project would have no effect on the Ramsey Farm Barn. The plans shown at the meeting also resulted in a no adverse effect call for the Ramsey Farm provided that no noise wall was constructed along the historic boundary and a landscape buffer could be planted by NCDOT at the owner's request during right of way negotiations. Lastly, the design plans confirmed that there was no adverse effect on the McKee House because there are no construction activities planned within or adjacent to the historic boundary. A copy of the concurrence form signed by NCDOT, FHWA, and NC-HPO during the meeting is attached.

Archaeology:
Per a memo sent from the North Carolina Department of Cultural Resources (dated March 5, 2004 and included in the EA), they conducted a review of the proposed undertaking and are aware of no historic resources which would be affected by the project.

In the course of construction, all construction inspectors will have the responsibility to monitor the project area for potential archaeological remains throughout the construction process. If potential archaeological remains (such as foundations, fireplaces, bones, stone tools, pottery, etc.) are identified, the inspector will immediately notify the Construction Supervisor (CS) who will immediately halt work in the vicinity of the potential find. At this point, the CS will notify the NCDOT and the North Carolina Office of State Archaeology (NCOSA) to determine the appropriate course of action, as per the requirements of Section 106 of the National Historic Preservation Act.

SECTION 4(f)

Three potential Section 4(f) resources were identified in the project study area and were subsequently evaluated for Section 4(f) applicability. These resources include Pressly Elementary School, Northview Elementary School, and a greenway owned by the City of Statesville that traverses the project area. It was concluded that Section 4(f) did not apply to the elementary schools and that the project had no effects on the use of the greenway. Thus, the proposed project will have no effect on Section 4(f) resources.

FEMA COMPLIANCE

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

WILD AND SCENIC RIVER SYSTEM

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

MITIGATION OPTIONS

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

Avoidance and Minimization:
NCDOT has avoided impacting many wetlands and streams and reduced impacts to wetlands and streams to the greatest extent practicable. Wetland impacts have been kept to a minimum by avoiding ditching and channelization through wetlands. Existing drainage patterns to the wetlands have been kept to maintain the hydrology feeding the wetlands. Other specific examples of avoidance and minimization measures include:

- Three dry detention basins will be utilized to control and reduce peak flow rates into receiving water bodies.
- Two wet detention basins will be utilized to control and reduce peak flow rates into receiving water bodies.
- Two preformed scour holes (PSH) with level spreader will be utilized to diffuse the concentrated flow from storm drain outlet pipes into non-erosive sheet flow to surrounding wetlands.
- Pavement runoffs will be treated through roadside grass swales, median swales, lateral swales, tail swales or existing natural swale before entering wetlands with non erosive sheet flow (see attached SMP for specific locations) .
- Grass swales will also be utilized in multiple locations (see SMP) to reduce water velocity, promote infiltration and provide treatment for discharge before runoff enters streams.
- No deck drains will carry water directly to jurisdictional waters on the proposed bridges. Deck pavement runoff for the proposed bridges will be treated via wet detention basin, tail ditches or preformed scour holes before entering jurisdictional water resources.
- Several culvert extensions will utilize junction boxes to dissipate energy and provide a non-erosive outlet velocity to the stream bed and bank.

- Culverts will be buried 20% of the pipe diameter below the natural streambed up to 1 foot.
- Riprap used for outlet protection will be placed on banks only and will not be placed in the streambed.

Compensation:
The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. This project will permanently impact 1.36 acres of wetlands, 2,326 linear feet of streams, and temporarily impact 135 linear feet (0.04 acre) of streams. Impacts from utility relocations will result in <0.01 acre of wetland excavation impacts, <0.01 acre (44 linear feet) of temporary stream impacts and 0.13 acre of hand clearing in wetlands. These utility impacts do not increase the total permanent impacts requiring mitigation for this project.

Of the 2,326 linear feet of stream impacts, 12 linear feet are impacts to an intermittent and unimportant stream and 648 linear feet are impacts from bank stabilization on several streams. The NCDOT does not propose mitigation for stream bank stabilization impacts as stabilizing the banks does not require fill in the stream bed and does not constitute Loss of Waters of the US. No individual stream with bank stabilization has impacts totaling ≥150 linear feet with the exception of Fourth Creek, where there are 409 linear feet of bank stabilization for shoring up under the new bridges.

- Total stream impacts = 2,326 linear feet
- Non-mitigable stream impacts = 12 linear feet
- Bank stabilization impacts = 648 linear feet

Therefore, the total impacts requiring mitigation are 1,666 linear feet of stream and 1.36 acres of wetlands.

The NCDOT will perform on-site mitigation for the 1,666 linear feet of stream impacts and 1.36 acres of wetland impacts in the form of stream restoration, stream enhancement and wetland preservation (Table 4). These impacts will be mitigated for at a 1:1 ratio. The on-site mitigation for this project will leave leftover stream and wetland mitigation credits for the debit ledger. Both the wetland and stream preservation sites will be monitored by NCDOT as described in the attached mitigation plan.

Table 4 – Summary of On-Site Mitigation for I-3819A

Mitigation Source	Stream Length Proposed (lf)	Wetland Area Proposed (ac)	Credit Ratio	Stream Credits Proposed (lf)	Wetland Credits Proposed (ac)
On-Site Stream Restoration	1,050	N/A	1:1	1,050	N/A
On-Site Stream Enhancement	1,305	N/A	2:1	652	N/A
On-Site Wetland Preservation	N/A	26.69	10:1	N/A	2.67
Total				**1,702 lf**	**2.67 ac**

PROJECT SCHEDULE

I-3819A calls for a March 20, 2012 let date, and a review date of January 31, 2012. This application provides final design and impacts for the project.

REGULATORY APPROVALS

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

Section 401: We are hereby requesting a 401 Water Quality Certification from the N. C. Division of Water Quality. In compliance with Section 143 215.3D(e) of the NCAC, we will provide $570.00 to act as payment for processing the Section 401 permit application previously noted in this application (see Subject line). We are providing five (5) copies of this application to the NCDWQ for their review and approval.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Erin Cheely at ekcheely@ncdot.gov or (919) 707-6108. A copy of this application and distribution list will also be posted on the NCDOT website at: http://www.ncdot.org/doh/preconstruct/pe/neu/permit.html.

Sincerely,

E. L. Lusk

for Gregory J. Thorpe, Ph.D., Manager
Project Development and Environmental Analysis Unit

cc:

NCDOT Permit Application Standard Distribution List.

U.S. ARMY CORPS OF ENGINEERS

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

(33 CFR 325)

OMB APPROVAL NO. 0710-0003
EXPIRES: 31 AUGUST 2012

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

PRIVACY ACT STATEMENT

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

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

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

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME
First - Middle - Last -
Company - North Carolina Department of Transportation - PDEA
E-mail Address -

8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Middle - Last -
Company -
E-mail Address -

6. APPLICANT'S ADDRESS:
Address- 1548 Mail Service Center
City - Raleigh State - NC Zip - 27699 Country - USA

9. AGENT'S ADDRESS:
Address-
City - State - Zip - Country -

7. APPLICANT'S PHONE NOs. w/AREA CODE
a. Residence b. Business 919-707-6100 c. Fax 919-212-5785

10. AGENTS PHONE NOs. w/AREA CODE
a. Residence b. Business c. Fax

STATEMENT OF AUTHORIZATION

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

_____ SIGNATURE OF APPLICANT _____ DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
I-3819A

13. NAME OF WATERBODY, IF KNOWN (if applicable)
Fourth Creek, Morrison Creek, Gregory Creek & UTs

14. PROJECT STREET ADDRESS (if applicable)
Address
City - State- Zip-

15. LOCATION OF PROJECT
Latitude: °N 35.80978 Longitude: °W -80.86115

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)
State Tax Parcel ID Municipality
Section - Township - Range -

17. DIRECTIONS TO THE SITE

Please see attached vicinity map and cover letter,

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

I-3819A section improves the I-40/I-77 interchange including replacing 2 loops with directional ramps, interstate widening in the vicinity of the interchange, construction of a diverging diamond interchange at US 21 and additional improvements along I-40 and its intersecting roads.

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

The purpose of this project is to improve traffic flow along the I-40 & I-77 corridors within the study area and to improve regional connectivity between Iredell County and points east, west, north and south within North Carolina and across the Interstate System.

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

20. Reason(s) for Discharge

Impacts will result from widening the roadway and shoulders, constructing new directional ramps and lengthening/replacing hydraulic structures around the interchange of I-40/I-77.

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

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
See attached cover letter		

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

Acres See attached cover letter

or

Linear Feet See attached cover letter

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

See attached cover letter

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

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

a. Address- Please see adjacent property landowners page in the permit drawing package.

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

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

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

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

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

E. L. Luck for Gregory J. Thorpe, PhD Nov 22, 2011

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

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

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

Stream and Wetland Mitigation Plan
New Interchange at I-40 and I-77 in Statesville
Iredell County

TIP I-3819A
WBS No. 34192.1.2

April 15, 2011

1.0 BASELINE INFORMATION

The I-40/I-77 Interchange Area Improvement Project (TIP No. I-3819) is located northeast of the City of Statesville in Iredell County, North Carolina. The proposed 1550 acre project study area encompasses the I-40/I-77 interchange and five adjacent interchanges. The topography of the project study area is characterized as gently rolling hills with some steep areas. Gently rolling topography is found within inter-stream areas, with steeper slopes found along the edges of some stream floodplains. Land use within the project vicinity includes a mixture of commercial, residential, agriculture, industrial, forested, and public/institutional land uses.

Perennial streams in the project study area include: 17 UT's to Fourth Creek and 2 UT's to Morrison Creek. No water supply watersheds, Outstanding Water Resources (OWR), High Quality Waters (HQW), or Critical Areas (CA) were identified in the project study area. All UT's to Fourth Creek have been assigned a stream Index of 12-108-20 with a classification C which are fresh waters protected for secondary recreation, fishing, aquatic life including propagation and survival and wildlife.

Jurisdictional wetlands in the project study area are primarily palustrine in nature, as defined in Cowardin et al. (1979). Some wetland systems are defined as palustrine but are hydrologically influenced by surface waters. Wetlands that are located adjacent to streams and receive the majority of hydrology from the adjacent waterways were identified as riverine for this project.

2.0 SITE SELECTION

An unnamed tributary to Fourth Creek enters the Northeast quadrant of the interchange through a 48 inch pipe under I-77. The stream then runs parallel to I-77 for approximately 2355 feet within the potential stream mitigation area. The primary degrading factors along this stream are cattle access and lack of a riparian buffer.

Within this potential mitigation area, the upstream section of the Ut flows approximately 1050 feet in an incised channel through a steep U-shaped valley. The channel has several near vertical banks and areas of exposed bedrock. Cattle gain access to the stream at several locations along the banks, causing localized erosion. Along this section of the stream, the riparian area along the

right bank is densely wooded. The riparian area along the left bank is sparsely wooded with pines and hardwoods.

Along the downstream section of the potential mitigation area, the valley flattens as the stream flows approximately 1305 feet in the channel at floodplain elevation. Cattle have full access to the stream through this section. The banks of the channel have been severely degraded by hoof shear but the riffle-pool structure is still largely intact. The far downstream end is so severely impacted by cattle that the channel is difficult to distinguish as it flows through a wetland dominated by herbaceous vegetation. The channel reforms as it exits the wetland and the stream mitigation area.

A proposed 26.69 acre wetland preservation site in the southwestern quadrant of the interchange is made up of several small wetland systems. The site is part of a 53.4 acre tract that NCDOT will be purchasing for FEMA flood plain issues. These riverine wetlands are in the floodplain of Fourth Creek that runs parallel to the south side of the tract. The largest wetland system within the preservation site is influenced by beavers, creating a mosaic of open water, forested wetland and herbaceous wetland. The other wetland systems are small forested wetlands. The wetland preservation site is dominated by American sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), and river birch (*Betula nigra*). These wetlands help treat overland flow from impervious surfaces upslope of this tract and also receive overbank flow from Fourth Creek during heavy rain events.

3.0 SITE PROTECTION INSTRUMENT

The mitigation areas are presently located within or will be located within the NCDOT Right-of-Way for the project. They will be managed to prohibit all use inconsistent with its use as mitigation property, including any activity that would materially alter the biological integrity or functional and educational value of the site, consistent with the mitigation plan.

The site will be placed on the NEU mitigation geo-database. After closeout, the site will placed in the NCDOT Stewardship Program for long term management and protection.

4.0 OBJECTIVES

The goal of the projects is to restore 1050 linear feet stream, enhance 1305 linear feet of stream and preserve 26.69 acres of wetlands. The functional restoration of the stream site will be accomplished through replanting a minimum 50 foot buffer along both sides of the streams. NCDOT also purchased a 53.4 acre tract needed for FEMA flood plain issues that contains 26.69 acres of smaller individual wetland systems within the tract.

5.0 MITIGATION WORK PLAN

The mitigation areas will be constructed in conjunction with TIP I-3819A. Construction activities involve fencing the mitigation area and replanting the appropriate tree species in the buffer zone.

The buffer of the stream restoration and enhancement area will be planted with the following bare root seedlings at a density of 680 trees per acre on 8 foot centers: northern red oak, American sycamore, white oak, and yellow poplar depending on availability.

The banks of the stream restoration area will be planted with live stakes on 4 foot centers with silky dogwood (*Cornus amomum*) and buttonbush (*Cephalanthus occidentalis*) depending on availability.

The proposed wetland preservation consists of purchasing the 53.4 acre tract fee simple, placing the 26.69 acres of wetlands within the tract on the NCDOT GeoDatabase and protecting them in perpetuity.

6.0 PERFORMANCE STANDARDS

NCDOT shall monitor the stream mitigation areas by visual observation, photo points, and monitoring vegetation survival as well as channel stability through permanent cross sections. NCDOT will monitor the site for a minimum of five years or until the site is deemed successful.

Benthic macro-invertebrate surveys will be conducted pre and post restoration. Macro-invertebrate surveys will be conducted annually for five years. NCDWQ Qual 4 methods of collection will be used per their Standard Operating Procedures Manual (NCDENR 2006).

All monitoring activities will be initiated upon completion of site planning.

7.0 MONITORING REQUIREMENTS

Upon successful completion of construction, NCDOT will perform visual inspection and photo points yearly for five years and document these monitoring activities on the site in an annual report distributed to the regulatory agencies.

8.0 OTHER INFORMATION

NCDOT will conduct a benthic macro-invertebrate survey within the stream mitigation area prior to construction to document the baseline conditions of the site. Benthic surveys will also be conducted each year of the monitoring period. NCDWQ Qual 4 methods of collection will be used as per their Standard Operating Procedures manual. All data collection methods are derived

from techniques used by the NC Department of Environment and Natural Resources - Division of Water Quality. http://h2o.enr.state.nc.us/esb/BAU.html.

Site information forms including habitat characterization will be completed at each sampling location. Locations will be recorded with a Trimble GPS unit to indicate the extent of the sample area and locations of existing habitat. Digital photographs will be taken at each sampling location. Physical/Chemical parameters will also be recorded at each site; water temperature, dissolved oxygen (DO), conductivity, and ph.

Samples will be "field picked" – the macro invertebrates will be removed from respective collections and placed in vials of alcohol for transport to a laboratory where they will be identified to species level, where appropriate.

9.0 DETERMINATION OF CREDITS

Per the NCDOT plans and 401/404 permit application for I-3819A; NCDOT proposes to preserve 26.69 acres of riverine wetlands, 1305ft. of stream enhancement and 1050ft. of stream restoration to mitigate for permanent impacts associated with the TIP at the following ratios: 10:1 for wetland preservation, 1:1 ratio for stream restoration and 2:1 for stream enhancement. An as-built report will be submitted within 60 days of completion of the project to verify actual acreage. The success of the mitigation areas and determination of final credits will be based upon successful completion of the monitoring.

All restoration, enhancement and preservation mitigation used for I-3819A will be used within the (HUC) 03040103. All unused stream and wetland mitigation assets will be added to NCDOT's debit ledger for use in adjacent HUC's in the future.

9.1 CREDIT RELEASE SCHEDULE

NCDOT proposes immediate, full release of the stream restoration and enhancement and the wetland preservation as on-site mitigation for the associated riverine wetland impacts of 1.36 acres and the 1666 linear feet of stream impacts for I-3819A.

10.0 GEOGRAPHIC SERVICE AREA

The proposed Geographic Service Area (GSA) for the mitigation area is composed of the Hydrologic Cataloging Unit (HUC) 03040103 in the Yadkin River Basin. 1.36 acres of the wetland preservation

will be used for on-site mitigation affiliated with the TIP project I-3819A. 1666 feet of stream mitigation will be used to offset unavoidable impacts associated with the TIP project I-3819A.

11.0 MAINTENANCE PLAN

The site will be held by NCDOT and placed on the NEU mitigation geodatabase. Once monitoring is completed and the site is closed out, it will be placed in the NCDOT Stewardship Program for long term maintenance and protection.

If an appropriate third party recipient is identified in the future, then the transfer of the property will include a conservation easement or other measure to protect the natural features and mitigation value of the site in perpetuity.

12.0 LONG TERM ADAPTIVE MANAGEMENT PLAN

The site will be managed by the NCDOT according to the mitigation plan. In the event that unforeseen issues arise that affect the management of the site, any remediation will be addressed by NCDOT in coordination with the Interagency Review Team.

13.0 FINANCIAL ASSURANCES

The site will be managed by NCDOT with its own distinct cost center number within the NCDOT budgeting and financial tracking system. Therefore, all accounting for revenues, contract encumbrances, fund transfers, and expenses will be performed and reported independent from other capital budget or operating budget accounting.

Subject: Minutes from Interagency 4B Hydraulics Design Review Meeting on September 23, 2009 for I-3819A in Iredell County

Team Members:

Steve Lund-USACE	(present)
Marella Buncick-USFWS	(present)
Marla Chambers-NCWRC	(present)
Polly Lespinasse-NCDWQ	(present)
Kathy Matthews-EPA	(present)
Donnie Brew-FHWA	(present)
Bryan D. Taylor-Roadway	(absent)
Mack Bailey-Structures	(absent)
James F. Bridges-PDEA	(absent)
Carla S. Dagnino-NEU	(present)
David Harris-REU	(absent)
Dan Grisson-Division 12	(present)

Participants:
Marshall Clawson, NCDOT Hydraulics
Dan Duffield, NCDOT Hydraulics
Clayton Walston, NCDOT Roadway
Undrea Major, NCDOT-PDEA
LeiLani Paugh, NCDOT-NEU
Brad Chilton, NCDOT-NEU
Jeff Reck, Mulkey Engineering
Herb Turner, Ko/Florence & Hutcheson
David Fuh, Ko/Florence & Hutcheson

plan sheet 4, -L- 22+80, stream not labled, existing crossing: 60" CMP:

1. Replace existing pipe with a 72" pipe. Rip rap will be placed at the outlet on banks only to protect the stream banks.
2. Since this location is outside Natural Resource Study Area, it is not labeled as a jurisdictional stream in Environmental Assessment or NEU wetland/stream digital file. It is a blue line in USGS Quad and shown as "JS" in Location and Survey plan file. JS status may need confirmation with updated NEU wetland file.

plan sheet 6, -L- 53+00, stream S26, existing crossing: 36" RCP:

1. The existing pipe will be retained with an extension on the inlet end. The stream at the outlet end will not be disturbed.

plan sheet 7, no streams or wetlands:

1. Dry detention basin at -Y3A- 38+00 LT to collect onsite pavement runoffs for treatment with outlet to an existing ditch.

plan sheet 8, -L- 92+00, stream S1 (Fourth Creek), existing crossing: 3-span dual bridges:

1. The existing dual bridges will be replaced by a very wide 3-span bridge. New 3-span bridges on -Y4RPA- and -Y4RPD- will be constructed immediately up and downstream of the existing crossing, respectively.
2. Onsite pavement runoffs prior to begin of the -L- bridge will be drained to a wet pond at -L- 91+00 RT in SW quadrant for treatment before entering the stream. The wet pond will be utilized due to the seasonal high water table.

3. Bridge deck pavement runoffs and onsite pavement runoffs after the end of -L-bridge will be drained to a dry detention basin at -L- 95+50 RT in SE quadrant for treatment before entering the stream.

plan sheet 9
-L-104+00 to 120+00:

1. The stream parallel to I-40 and on just south side of I-40 will be filled. Fourth Creek is not being filled but its floodplain is encroached with roadway fill. The flood conveyance will be reduced. The new bridges on -Y4RPA- and -Y4RPD- (sheet 8) will also have impacts to floodplain conveyance. Extra measure is needed to produce no rise in the 100 year water surface elevation. To achieve this goal, it is proposed to clear and grub approximately 6.5 acres of land from -L- 103+00 RT to 113+00 RT to reduce the flow resistance in the floodplain area. The land will be maintained as a grass field by NCDOT.

2. This stream with a well defined channel and water depth within wetland area (W15) is not labeled as a stream in Environment Assessment or NEU wetland/stream digital file, but it is shown as "JS" lines in Location & Surveys plan file. If considered as a stream, NEU digital file may need to be updated.

3. Storm Water Diversion BMP will be used in this area. The offsite runoffs will be drained directly to the stream and onsite pavement runoffs will be drained by three outfalls to wetland (W15) with non-erosive sheet flows.

4. Stormwater treatment by Jurisdictional Wetland is not allowed; therefore, the phrase "Stormwater Drain to Wetland for Treatment" in Storm Water Management Plan should be revised to indicate that onsite pavement runoffs have been treated through roadside grass swales, median swales, lateral swales, tail swales, and existing natural swale prior to entering the wetland (W15).

Dry Detention Basin at -L-123+00 RT:

1. Onsite pavement runoffs will be collected in this basin for treatment before entering the stream (S12). The existing 54" pipe under ramp C will be retained and used as the outlet pipe for the basin. This pipe will be extended with junction box to dissipate energy to provide a non-erosive outlet flow to the stream (S12). Rip rap will be placed at the outlet on banks only to protect the stream banks.

-Y5- 50+00 to 55+00:

1. The stream (S17) and wetland (W20) will be impacted totally due to interchange construction.

Plan sheet 10:
-L- 149+00, Fourth Creek Tributary 3:

1. The existing 2@7'x7' box culvert along stream S2 will be retained. Therefore, there are no stream impacts up or downstream of the crossing.

Dry Detention Basin at -L-144+00 RT:

1. This basin will collect onsite pavement runoffs from interchange area for treatment and will be drained to stream S2. For the basin outlet pipe, a junction box to dissipate energy and a wide base ditch with rip rap to diffuse outlet flow to the stream S2 will be used. Instead of 90 degree, the angle of the base ditch to the stream should be revised to provide a better tie to S2.

-YRPD- 16+62, Fourth Creek Tribtutary 3:

1. A new 3-span bridge will be constructed on the ramp over stream S2. Wetland W12 will be impacted because of the bridge end bent fill.

2. Bridge deck runoff will be drained to a preformed scour hole to provide a non-erosive sheet flow to wetland W12. Team discussed if bridge deck runoff can cross the ramp and drain to the dry detention basin. Since only a small amount of runoff will be collected through bridge deck, draining to the preformed scour hole should be fine.

3. On SE quadrant of the new bridge, onsite pavement runoff will be treated through roadside grass swales before entering the stream S2. For the grass swale outlet pipe, a junction box to dissipate energy and a wide base ditch with rip rap to diffuse outlet flow to the stream S2 will be used. The angle of the base ditch to the stream should be revised to provide a better tie to S2.

-YRPAB- 15+00 to 18+00 RT, UT to Fourth Creek Tributary 3:

1. A retaining wall is proposed to avoid impacts to stream S6 and wetland W7. Team discussed if retaining wall can be eliminated to save some construction cost. If the wall is eliminated, approximately 200 feet of stream impact and 0.15 Ac of wetland impact are anticipated. The stream S6 can either be enclosed with a culvert or relocated. After meeting, NCDOT will compare cost for all alternatives and make decision.

Plan sheet 14:

1. No construction is proposed along I-77 south bound lane; therefore, there are no impacts on wetland W15 on west side of I-77. I-77 north bound lane construction begins just north of existing bridge over stream S1 (Fourth Creek). Therefore, no stream impacts to S1.

2. The wetland W14 on east side of I-77 is outside proposed right of way. Therefore, no wetland impacts to W14. All onsite pavement runoffs will be treated through median grass swales, roadside grass swales and existing natural swale before entering the wetland W14 with a non-erosive sheet flow.

plan sheet 15, UT to Fourth Creek Tributary 3:

1. The proposed right of way includes the stream S6 on east side of -YRPA-. This area is reserved for stream enhancement program to provide stream buffer, plant, and fence. The surrounding area is pasture in nature.

2. The existing outfall at -YRPA- 22+00 RT will be maintained. All onsite pavement runoffs will be treated through medial grass swales, roadside swales, and existing natural swale before entering the stream. Because of steep natural ground slope, a pipe to prevent erosion and a junction box to dissipate energy will be used. Also, a wide base ditch with rip rap to diffuse flow to the steam S6 will be provided. The angle of the base ditch to the stream should be revised to provide a better tie to S6.

plans sheet 16, -Y- 169+00, existing cross pipe: 48" RCP

1. The stream S6 begins at outlet of the existing cross pipe. All onsite pavement runoffs will be treated through median grass swales and roadside grass swales before entering the stream S6. A junction box will be used to connect the grass swale outlet pipe (24") and the cross pipe (48") to dissipate energy to provide a non-erosive outlet flow to the stream S6. Rip rap will be placed at the outlet on banks only to protect the stream banks.

plan sheet 19, -Y4- 18+70, Free Nancy Branch, existing: 2@9'x11' box culvert

1. The existing box culvert along stream S15 will be retained. Only the headwall at inlet will be raised to accommodate the proposed roadway. Therefore, no stream impacts to S15. The existing box culvert extends downstream with 2@188"x117" corrugated metal arch pipe for approximately 1000'. The surrounding area is highly commercialized urban area. Proposed project's increase in impervious area is insignificant. Therefore, treatment for onsite runoffs is not practical. Existing drainage patterns will be maintained.

Plan sheet 20

-Y4- 36+00, existing: 3-span bridge over Fourth Creek:

1. The existing bridge over S1 will be retained and no construction activity for the bridge. Therefore, no stream impacts to the stream S1. The surrounding area is highly commercialized urban area. Because of this restriction and the project limits of proposed roadway construction, treatment for onsite runoffs is not feasible. Existing drainage patterns will be maintained.

-Y8- 15+90, proposed 2-span bridge over Fourth Creek:

1. The new bridge is over stream S1. All onsite pavement runoffs will be treated through roadside grass swales and tail grass swale before entering the stream S1. The grass swale outlet to the stream from north end of the bridge will be protected by rip rap at embankment to prevent erosion to stream bank.

plan sheet 21:

-SR1- 6+69: proposed 2@9'x 7' box culvert along Fourth Creek Tributary 3:

1. The stream S9 will be impacted for this new crossing. The culvert will be buried 1' to provide a natural stream bed. The culvert west cell with a sill at inlet end provides conveyance for overflow (larger storms or major floods). The culvert east cell maintains normal or low flow. The east cell width matches the channel width to provide a continuum of water depth and width without substantial modifications of

velocity. The riprap for outlet protection will be placed on banks only and will not be placed in streambed. The normal functioning of sediment transport during bankful discharge can be maintained and the stream will not degrade or aggrade.

2. The wetland W8 will be impacted because of temporary diversion channel and stilling basin during construction. Mechanized clearing within the temporary drainage easement is expected.

3. All onsite pavement runoffs will be treated through roadside grass swales before entering the wetland W8 and the stream S9.

-SR1- 15+00: proposed 66" RCP

1. The stream S24 will be impacted for this new crossing. The culvert will be buried 1'to provide a natural stream bed. Rip rap will be placed at the outlet on banks only to protect the stream banks.
2. All onsite pavement runoffs will be treated through roadside grass swales before entering the stream S24. Rip rap on banks only will also be placed at cross pipe inlet end to protect banks for the grass swale outlet pipe.

Subject: Minutes from Interagency 4C Permit Drawings Review Meeting on January 13, 2010 for I-3819A in Iredell County

Team Members:

Liz Hare-USACE	(present)
David Baker-USACE	(present)
Marella Buncick-USFWS	(present)
Marla Chambers-NCWRC	(absent)
Polly Lespinasse-NCDWQ	(absent)
Chris Militscher-EPA	(absent)
Donnie Brew-FHWA	(absent)
Bryan D. Taylor-Roadway	(absent)
Mack Bailey-Structures	(absent)
James F. Bridges-PDEA	(present)
Carla S. Dagnino-NEU	(present)
David Harris-REU	(absent)
Dan Grissom-Division 12	(present)

Participants:
Marshall Clawson, NCDOT Hydraulics
Dan Duffield, NCDOT Hydraulics
Clayton Walston, NCDOT Roadway
Karen McCauley, NCDOT Roadway
Undrea Major, NCDOT-PDEA
Erin Cheely, NCDOT-NEU
Brad Chilton, NCDOT-NEU
Randy Griffin, NCDOT-NEU
Mark Staley, NCDOT-REU
Kevin Alford, Mulkey Engineers
Matt Harvey, Mulkey Engineers
Herb Turner, Ko/Florence & Hutcheson
David Fuh, Ko/Florence & Hutcheson

The following is a brief summary of the discussions on the project:

General

- General introduction was initiated by Marshall Clawson. Introductions were made by all in attendance.
- Polly Lespinasse was not in attendance, but her questions/comments were sent via email and discussed.
- At the wetlands, change the Hand Clearing Impacts to Mechanized Clearing Impacts.
- Break out bank stabilization impacts on the impact summary sheet.
- To be consistent with other sheets, show sheet number and R/W sheet number at right upper corner for sheets 8, 9 and 10.

Plan Sheet 4

- Proposed 72" Cross Pipe installed by Trenchless Construction Methods at –L- 22+80 (Permit Site 1)
    - NEU is confirming if Tributary entering the channel downstream of the outlet is JS or not.
    - The permanent impacts are needed to the R/W line so that adequate area is given for the Trenchless Construction.

Plan Sheet 6

- Retain Existing 36" RCP Cross Pipe at –L- 52+60 (Permit Sites 2 & 3)
    - Change the site name to make this location one site.

- The permanent surface water impacts at Site 3 are due to placing bank stabilization along the channel. Break out bank stabilization impacts on the impact summary sheet. These impacts will still be permanent impacts.

Plan Sheet 8

- Filling in Existing Stream Between Stations –L- 86+25 RT. to –L- 92+20 RT. (Permit Site 5)
  - There were concerns regarding where the water in stream goes since the channel was being filled in. It was stated that the water in the stream will be picked up in the storm drainage system and discharged into Fourth Creek.
  - This stream is intermittent.
- Rip Rap Impacts From Outlet Pipes Along Fourth Creek at Station –L- 93+50 RT. +/- (Permit Site 6)
  - Rip Rap out the outlets needs to be Class I Rip Rap with a median stone size ranging between 10 inches and 17 inches in size.
  - Break out bank stabilization impacts on the impact summary sheet. These impacts will still be permanent impacts.
  - The banks under the bridge need to be armored and the impacts added to the Site 6 impacts. Herb Turner will make the changes and send the revised BSR to structures to have incorporated into the plans.

Plan Sheet 8 & 9

- Fill in Wetlands Between Stations –L- 99+70 RT. to –L- 114+25 RT. (Permit Site 7)
  - The JS stream lines do not need to be shown on the plans. Location and Surveys needs to update their files so that the stream lines do not show up as JS.
  - There will be an extension placed on the 72" RCP and ditch work completed at the outlet. Since the JS line is shown incorrectly at this location, these impacts will wetland impacts as shown.

Plan Sheet 9

- Proposed 54" RCP at –YRPC- 20+50 RT. +/- (Permit Site 8)
  - The impacts from the from the end of the rip rap at the pipe outlet of the proposed 54" RCP to the existing 24" CMP that is being removed should be shown as temporary surface water impacts rather than permanent surface water impacts
  - When the 24" CMP is removed, the channel section that is constructed will daylight the stream.
  - Coir Fiber matting should be added to the ditch detail where the 24" CMP is removed and a channel section is constructed.

Plan Sheet 9 & 15

- Filling in Existing Stream between Stations –Y5- 50+40 to –Y5- 54+80 (Permit Site 9)

- There were concerns regarding where the water in stream goes since the channel was being filled in. It was stated that the water in the stream will be picked up in the storm drainage system.
- Rip rap will be placed between the 24" RCP and 54"RCP as a dissipater for the 24" RCP.
- This area will need to be built with sheet pilings in order to maintain traffic and flow of the stream. Dan Grissom will coordinate this with the traffic engineer.

Plan Sheet 10

- Fill in wetlands at Stations –L- 147+00 Rt. +/- (Permit Site 10)
  - Show Clearing Limits of Wetlands to the R/W line
- Rip Rap Impacts From Ditch Outlets at Station –L- 148+00 RT. +/- (Permit Site 10)
  - No rip rap shall be placed in the stream.
- Ditch Outlets into Wetlands at Stations –L- 146+30 LT. and 149+00 Lt.
  - Show impacts to wetlands for construction purposes.

Plan Sheet 16

- Proposed 48" RCP at –YRPA- 33+40 RT. (Permit Site 11)
  - Rip Rap out the outlets needs to be Class I Rip Rap with a median stone size ranging between 10 inches and 17 inches in size.

Plan Sheet 20

- Proposed Outfall Channel at –Y8- 17+50 RT. (Permit Site 4)
  - There are concerns with the outfall channel entering the stream at a 90 degree angle. It was stated that the velocities are too low to cause impacts to the stream. Rip Rap out the outlets needs to be Class I Rip Rap with a median stone size ranging between 10 inches and 17 inches in size.
  - The 23' of permanent impacts shown on the impact summary sheet are needed to construct this channel.

Plan Sheet 21

- Proposed 2@9'X7' RCBC at –SR1- 6+70 (Permit Site 12)
  - At the outlet of the culvert the permanent surface water impacts should end at the PDE and temporary surface water impacts should be shown from PDE to the TDE.
  - At the inlet of the culvert the permanent surface water impacts should end at the channel improvements and temporary surface water impacts should be shown from the end of the permanent surface water impacts to the TDE.
  - The proposed channel bench should be protected with Class I Rip Rap with a median stone size ranging between 10 inches and 17 inches in size.
  - The floodplain bench length should be shown separate on the impact summary sheet because the length along the floodplain bench is not mitigable.

- The location of the JS stream line is incorrect. Location and Surveys needs to fix the location in their files.
- Only one JS is going thru the culvert since the JS stream lines are shown incorrectly on the plans. The impacts for this have been accounted for.

Federal Aid #: **IMS-40-2** *TIP#:* **I-3819** *County*: **Iredell**

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: Improvements to I-40/I-77 Interchange in Statesville

On September 15, 2010, representatives of the

- [x] North Carolina Department of Transportation (NCDOT)
- [x] Federal Highway Administration (FHWA)
- [x] North Carolina State Historic Preservation Office (HPO)
- [ ] Other

Reviewed the subject project and agreed on the effects findings listed within the table on the reverse of this signature page.

Signed:

Mary Pope Furr 9/15/2010

Representative, NCDOT Date

Donald W Brown 9-15-10

FHWA, for the Division Administrator, or other Federal Agency Date

Representative, HPO Date

Renee Gledhill-Earley 9-15-10

State Historic Preservation Officer Date

Federal Aid #: **IMS-40-2** *TIP#:* **I-3819** *County*: **Iredell**

Property and Status	Effect Finding	Alternative	Reasons
Ramsey Farm (DE)	No Adverse Effect	all alternatives	no noise wall along property boundary - retaining wall will require soil nails - access to property from south - landscape buffer available @ owner's request
McKee House (DE)	No Effect	all alternatives	no constuction activities within or adjacent to historic boundary
Ramsey Farm Barn (DE)	No Adverse Effect	all alternatives	no constuction activities within or adjacent to historic boundary.

Initialed: NCDOT MPJ FHWA DB HPO Rye

☑ FHWA intends to use HPO's call of "No Adverse Effect" as the basis of a "de minimis" finding for the following properties, pursuant to Section 4(f): FHWA initials DB

Ramsey Farm

STORMWATER MANAGEMENT PLAN

TIP No. I-3819A
Project: 34192.1.2
Iredell County

ROADWAY DESCRIPTION

The project proposes to improve the I-40/I-77 interchange area including I-40 from west of SR 2003 to west of SR 2158 and I-77 from south of I-40 to south of SR 2171 in Statesville, Iredell County. The overall length of the project is approximately 3.2 miles. The proposed improvement would be a Four-Level Offset interchange. The major stream crossings that require conveyances 72" pipe or larger in diameter are shown in Table 1 below. The project drainage design consists of cross pipes, grated inlets with associated pipe systems, tail ditches, lateral stormwater ditches, grass swales, wet detention basins and dry detention basins.

Table 1 - Major Stream Crossings

Location	Stream Name	Drainage Area	Proposed Structure	Bury Depth
-L- 92+04	Fourth Creek	27.7 Sq Mi	3-Span Bridge	N/A
-Y4RPA- 19+31.5	Fourth Creek	27.7 Sq Mi	3-Span Bridge	N/A
-Y4RPD- 17+48	Fourth Creek	27.7 Sq Mi	3-Span Bridge	N/A
-Y8- 15+90	Fourth Creek	26.6 Sq Mi	2-Span Bridge	N/A
-YRPD- 16+62	Fourth Creek Tributary 3	1.53 Sq Mi	3-Span Bridge	N/A
-SR1- 6+69	Fourth Creek Tributary 3	0.51 Sq Mi	2 @ 9'x 7' RCBC	1'

ENVIROMENTAL DESCRIPTION

The project is located in the Yadkin-Pee Dee River Basin. The streams listed in Table 1 have been classified as jurisdictional streams. In addition to the major crossings in Table 1, six minor stream crossings are subject to the stream impacts. Surface waters in the project area are classified C, which is the minimum classification. According to the NCDWQ's 303(d) Impaired Waters List, the majority of Fourth Creek is classified as "Impaired" due to fecal coliform, turbidity, and biological impairment. The section of Fourth Creek that flows through the project area is identified as impaired.

There are five wetland sites that will be impacted by the proposed project. Wetland impacts have been kept to a minimum by avoiding ditching and channelization through wetlands. Existing drainage patterns to the wetlands have been kept to maintain the hydrology feeding the wetlands.

BEST MANAGEMENT PRACTICES (BMP's)

The primary goal of Best Management Practices (BMP) is to prevent degradation of the state's surface waters through the location, construction and operation of the highway system. BMP's are activities, practices and procedures undertaken to prevent or reduce stormwater pollution.

The BMP's and measures that have been used on this project for the roadside drainage are as follows:

STORM WATER DIVERSION

-L- 104+00 to 120+00: The off-site flows will be separated from the on-site roadway pavement runoffs. The on-site pavement runoffs will be collected through grated inlets and storm systems and be drained to the wetland. Using separated storm systems and berm ditch, the off-site runoffs will be drained directly to the stream. This will maintain the existing drainage pattern feeding the wetland. All onsite pavement runoffs will be treated through roadside grass swales, median swales, lateral swales, tail swales, and existing natural swale before entering the wetland.

DRY DETENTION BASIN

The primary objective of the dry detention basin is controlling and reducing peak flow rates into receiving water bodies. Because storm water is detained in the basin, the settling of particles and particulate-bound pollutants is the primary pollutant removal mechanism. They are at the following locations:

-L- 73+00 LT -L- 123+00 RT -L- 144+00 RT

WET DETENTION BASIN

The primary objective of the wet detention basin is controlling and reducing peak flow rates into receiving water bodies. The basin has a permanent pool of water for removing pollutants and additional capacity above the permanent pool for detaining stormwater runoff. Because storm water is detained in the basin, the settling of particles and particulate-bound pollutants is the primary pollutant removal mechanism. They are at the following locations:

-L- 91+00 RT -L- 95+50 RT

PREFORMED SCOUR HOLES with LEVEL SPREADER

Preformed scour holes with level spreader have been provided at the following locations:

-YRPD- 19+00 LT -SR1- 7+15 RT

A preformed scour hole with level spreader is utilized at these locations in an effort to diffuse the concentrated flow from the storm drain outlet pipe into non-erosive sheet flow to the surrounding wetlands.

TREATED STORMWATER DRAIN TO WETLAND

All onsite pavement runoffs will be treated through roadside grass swales, median swales, lateral swales, tail swales, or existing natural swale before entering the wetland with non-erosive sheet flow at the following locations:

-L- 109+00 RT -L- 115+00 RT -L- 119+00 RT -Y- 127+00 RT
-YRPAB- 18+00 RT

GRASS SWALES

A Grass swale is a type of biofilter because the vegetation on the swale takes up some pollutants and helps filter sediment and other solid particles out of the runoff. They convey stormwater and provide stormwater management by retarding peak flow rates, lowering velocities of runoff and by infiltrating runoff water into the soil. The grass swale provides treatment for the discharge before entering the stream. They have been utilized at the following locations:

-L- 26+50 to 28+00 LT	-L- 26+50 to 36+50 RT	-L- 36+00 to 41+50 LT
-L- 26+00 to 84+50 Med	-Y3- 12+50 to 16+00 RT	-L- 40+00 to 48+75 RT
-L- 49+00 to 57+00 RT	-L- 43+00 to 49+50 LT	-L- 58+00 to 70+50 RT
-L- 72+00 to 84+50 RT	-Y8- 10+50 to 14+00 RT	-Y8- 10+50 to 12+75 LT
-Y8- 19+00 to 22+00 LT	-L- 94+00 to 97+00 RT	-Y4RPB -17+30 to 19+90 RT
-L- 100+00 to 109+00 RT	-L- 94+00 to 126+00 Med	-L- 136+00 to 170+00 Med
-L- 159+00 to 170+00 RT	-L- 154+00 to 170+00 LT	-Y- 157+50 to 180+00 RT
-Y- 159+00 to 180+00 LT	-Y- 122+00 to 180+00 Med	
-YPRA-: 10+00 to 21+00 RT, 10+00 to 21+50 LT, 23+00 to 31+00 LT		
-YRPB- 16+00 to 21+00 RT	-YRPC- 16+00 to 20+00 LT	-YRPD- 6+00 to 15+50 LT
-YRPD- 21+50 to 29+00 LT	-YRPAB- 20+00 to 21+40 LT&RT	
-YRPBD-: 15+00 to 20+00 RT, 21+00 to 24+50 RT, 26+00 to 57+50 RT, 28+50 to 58+50 LT		
-SR1-: 8+00 to 13+00 RT&LT, 16+00 to 36+50 RT, 16+00 to 22+00 LT, 28+00 to 36+50 LT		
PSRM was used in lieu of rip rap for the base ditch -L- 50+00 to 53+50 LT and -L- 54+00 to 59+50 LT		

NON-EROSIVE OUTLET FLOW TO STREAM

Junction box with manhole and wide tail base ditch with rip rap for treated stormwater will be used to dissipate energy and provide a non-erosive outlet velocity to the stream bed and bank at the followings locations:

-YRPD- 16+60 LT -YRPD- 17+80 LT -YRPA- 22+00 RT

The BMP's and measures that have been used on this project for the major stream crossings are as follows:

Bridges on -L- 92+04, -Y4RPA- 19+31.5, -Y4RPD- 17+48

The bridges on -Y4RPA- and -Y4RPD- are located immediately up and downstream of the bridge on -L-. Deck drains are not required for all bridges. All deck pavement

runoffs for the three bridges will be collected in one storm system and will be drained to the wet detention basin located at -L- 95+50 RT for treatment before entering the stream. A minimum of 5' setback from bridge bents to stream banks is provided.

Bridge on -Y8- 15+90
No Deck drains are allowed to directly discharge into the water or main channel. Deck drains outside top of banks are provided to promote filtration of runoff through floodplain vegetation. All deck pavement runoff bypassed from deck drains will be drained to a tail ditch for treatment before entering the stream. A minimum of 10' setback from end bent fills to stream banks is provided.

Bridge on -YRPD- 16+62
Deck drains are not required. All deck pavement runoffs will be drained to a preformed scour hole to provide a non-erosive sheet flow to wetland. A minimum of 10' setback from bridge bents to stream banks is provided.

-SR1- 6+69, 2@9'x7' RCBC
The culvert will be buried 1' to provide a natural stream bed. The culvert west cell with a sill at inlet end provides conveyance for overflow (larger storms or major floods). The culvert east cell maintains normal or low flow. The east cell width matches the channel width to provide a continuum of water depth and width without substantial modifications of velocity. The riprap for outlet protection will be placed on banks only and will not be placed in streambed. The normal functioning of sediment transport during bankfull discharge can be maintained and the stream will not degrade or aggrade. The crossing will accommodate the natural stream channel with minimum disruption to the ecosystem and values unique to the floodplain.

The BMP's and measures for the minor stream crossings have been used in this project are as follows:

1. The culvert will be buried 20% of the pipe diameter below the natural streambed up to a maximum of 1 foot.
2. The riprap for outlet protection will be placed on banks only and will not be placed in streambed.
3. The crossings will accommodate the natural stream channel with minimum disruption to the ecosystem and values unique to the floodplain.

They are at the followings locations:

-L- 22+80 LT: Replace the existing 60" CMP with a 72" smooth wall steel pipe and collar to 72" RCP at the outfall. Rip rap will be placed at the outlet on banks only to protect the stream banks from erosion.

-L- 53+00 LT: The existing 36" RCP will be utilized along with an extension on the inlet end. The stream at the outlet of the existing 36" RCP will not be disturbed for this

project. Rip rap will be placed at the outlet on banks only to protect the stream banks from erosion.

-L- 113+00: Extend 72" RCP with a junction box. The junction box with a flat extension pipe slope will dissipate energy and provide a non-erosive outlet velocity to the stream bed and bank.

-YRPA- 33+50: Extend 48" RCP with a drop junction box. The drop junction box with a flat (0.3%) extension pipe slope will dissipate energy and provide a non-erosive outlet velocity to the stream bed and bank.

-YRPC- 20+00: Extend 54" RCP with a drop junction box. The drop junction box with a flat (0.3%) extension pipe slope will dissipate energy and provide a non-erosive outlet velocity to the stream bed and bank.

-SR1- 15+00: Provide proposed 66" RCP. Rip rap (on banks only) will also be placed at inlet end to protect banks for the storm drain outlet from roadside drainage.

Reference Reach #1

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:

State: North Carolina County/parish/borough: Iredell City: Statesville
Center coordinates of site (lat/long in degree decimal format): Lat. 35.80986° N, Long. -80.86118° W.
Universal Transverse Mercator:
Name of nearest waterbody: Fourth Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: South Yadkin River
Name of watershed or Hydrologic Unit Code (HUC): 03040102

- [x] 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
   - [x] Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - [ ] Non-RPWs that flow directly or indirectly into TNWs
   - [x] 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: 11,631 linear feet: 2 to 35 width (ft) and/or acres.
   Wetlands: 14.81 acres.

   c. **Limits (boundaries) of jurisdiction** based on: Established by OHWM.
   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: .

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[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.

#1

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: i nches
   Average annual snowfall: inches

   (ii) **Physical Characteristics:**
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☐ Tributary flows through Pick List 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.

#1

(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
☐ changes in the character of soil
☐ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☐ sediment deposition
☐ water staining
☐ other (list):
☐ the presence of litter and debris
☐ destruction of terrestrial vegetation
☐ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community
☐ 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:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):
☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(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.

#1

(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: Pick List

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

#1

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

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

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: .

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: li near 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: Streams S28, S26, S1, S16, S12 and S17 all scored 30 or greater on the NCDWQ stream ID form.
   - ☒ 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: S29 (12 linear feet) and S16 (594 linear feet) scored between 19-29 on the NCDWQ stream ID form. S29 is being considered "unimportant" (scored 19) and S16 is being considered "important" (scored 28) for mitigation purposes.

#1

Provide estimates for jurisdictional waters in the review area (check all that apply):
☒ Tributary waters: **11,631** linear feet **ranging from 2 to 35** 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: li near 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: **S15 flows directly into Wetland 15 (W15) and S11 (not impacted by I-3819A, but is perennial) flows directly out of it and into Fourth Creek (S1). Wetland 20 (W20) is adjacent to S17.**

☐ 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: **14.81** 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: 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: .

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[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.***

#1

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet widt h (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): li near 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): li near 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: .
- ☐ 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: Action ID 200531626 issued 11/21/05.
- ☐ Applicable/supporting case law: .
- ☐ Applicable/supporting scientific literature: .
- ☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

Reference Reach #2

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:

State: North Carolina County/parish/borough: Iredell City: Statesville
Center coordinates of site (lat/long in degree decimal format): Lat. 35.80986° N, Long. -80.86118° W.
Universal Transverse Mercator:
Name of nearest waterbody: Fourth Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: South Yadkin River
Name of watershed or Hydrologic Unit Code (HUC): 03040102

- [x] 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
   - [x] Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - [ ] Non-RPWs that flow directly or indirectly into TNWs
   - [x] 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: 9,534 linear feet: 4 to 5 width (ft) and/or acres.
   Wetlands: 7.7 acres.

   c. **Limits (boundaries) of jurisdiction** based on: Established by OHWM.
   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: .

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[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.

#2

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: i nches
   Average annual snowfall: inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☐ Tributary flows through Pick List 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: .

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[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.

#2

(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
  - ☐ changes in the character of soil
  - ☐ shelving
  - ☐ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☐ sediment deposition
  - ☐ water staining
  - ☐ other (list):
  - ☐ the presence of litter and debris
  - ☐ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community
- ☐ 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:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (list):
- ☒ Mean High Water Mark indicated by:
  - ☐ survey to available datum;
  - ☐ physical markings;
  - ☐ vegetation lines/changes in vegetation types.

(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: .

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[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.

#2

(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: Pick List

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

#2

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

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

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: .

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: li near 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: Streams S24, S6 and S2 all scored 30 or greater on the NCDWQ stream ID form.
   - ☒ 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: S9 (1,692 linear feet) scored 27.5 on the NCDWQ stream ID form. S9 is being considered "important" for mitigation purposes.

#2

Provide estimates for jurisdictional waters in the review area (check all that apply):
☒ Tributary waters: **9,534** linear feet **ranging from 4 to 5** 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: li near 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: **Wetland 8 (W8) is adjacent to S9 and S24 (both flow into it). Wetland 9 (W9) is adjacent to S9 which connects it to W8. Wetland 12 (W12) is adjacent to S2.**

☐ 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: **7.7** 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: 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: .

---

[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.***

#2

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet widt h (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): .

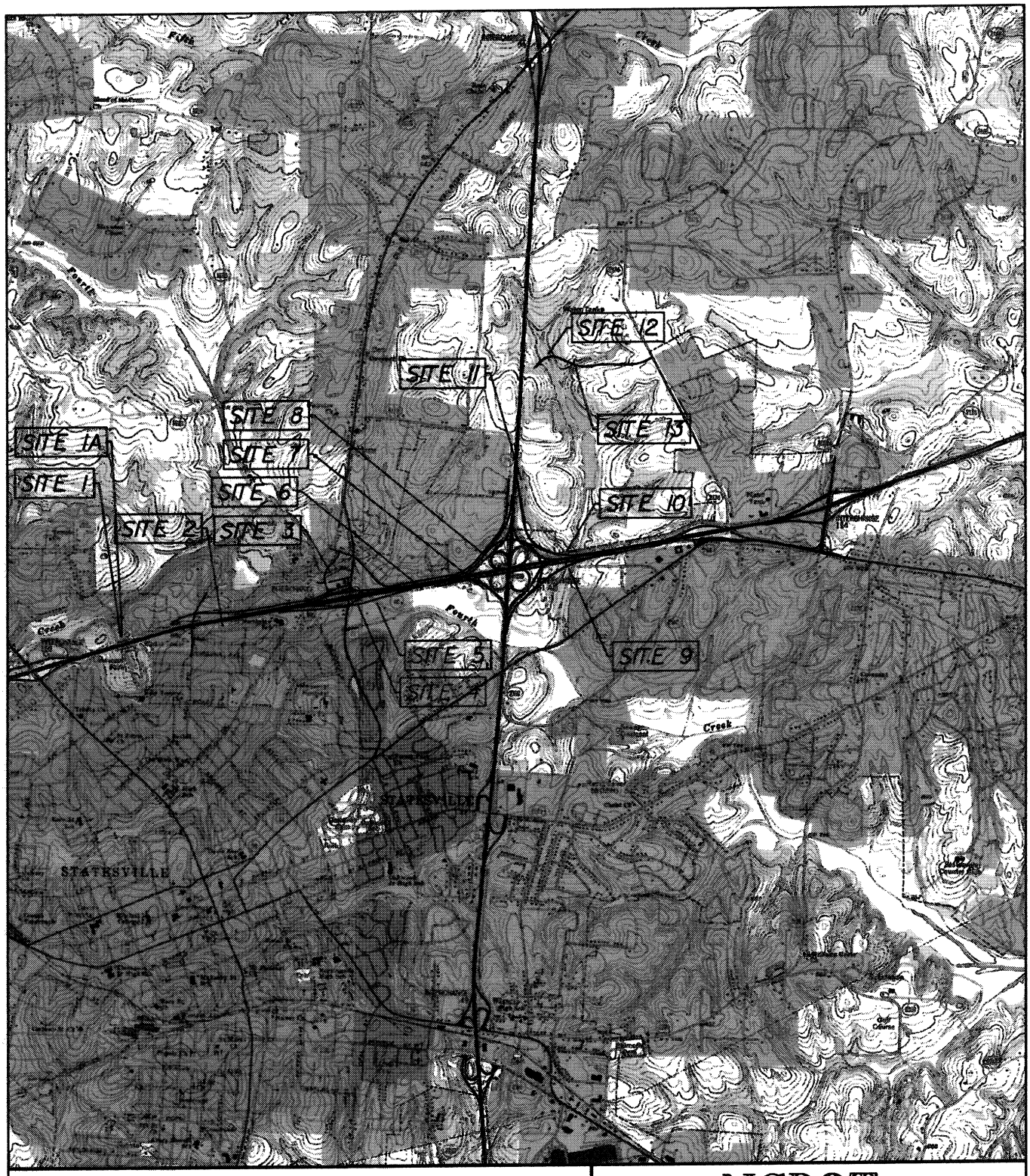
Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): li near 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): li near 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: .
- ☐ 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: Action ID 200531626 issued 11/21/05.
- ☐ Applicable/supporting case law: .
- ☐ Applicable/supporting scientific literature: .
- ☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .



TOPO MAP

SCALE: 1" = 4000'

Permit Drawing
Sheet 1 of 68

NCDOT

DIVISION OF HIGHWAYS
IREDELL COUNTY
PROJECT: I-3819A

I-40 / I-77 INTERCHANGE INCLUDING I-40 FROM WEST OF SR 2003 TO WEST OF SR 2158 & I-77 FROM SOUTH OF I-40 TO SOUTH OF SR 2171

SHEET OF 07 / 06 / 10

PROPERTY OWNERS

NAMES AND ADDRESSES

REFERENCE NO.	NAMES	ADDRESSES
1	ARTS AND SCIENCE MUSEUM, INC.	1335 MUSEUM ROAD STATESVILLE, NC 28625
16A	KEITH M. NORRIS	PO DRAWER 1068 STATESVILLE, NC 28687
37A	CITY OF STATEVILLE	PO BOX 1111 STATESVILLE, NC 28677
60	THE ARNESON PARK ASSOCIATES PARTNERSHIP	1180 FREE NANCY AVE. STATESVILLE, NC 28677
61	RAHAB LAND COMPANY INC.	5005 LBJ FWY #1130 DALLAS, TX 75011
78	MEWA MUNDI	715 SULLIVAN ROAD STATESVILLE, NC 28677
79	THE W.H. CHAMBERS ESTATE	150 LITTLE JOHN ROAD STATESVILLE, NC 28625
81	LLOYD D. HINSON	846 MOCK MILL ROAD STATESVILLE, NC 28677
83A	JAME LIMITED PARTNERSHIP	2529 AMITY HILL ROAD STATESVILLE, NC 28677
95	DOOSAN INTERNATIONAL USA, INC.	1293 GLENWAY DRIVE STATESVILLE, NC 28625

Permit Drawing
Sheet 2 of 68

NCDOT

DIVISION OF HIGHWAYS
IREDELL COUNTY
PROJECT: I-3819A

I-40 / I-77 INTERCHANGE INCLUDING
I-40 FROM WEST OF SR 2003 TO
WEST OF SR 2158
& I-77 FROM SOUTH OF I-40
TO SOUTH OF SR 2171

SHEET OF 07 / 06 / 10

PROPERTY OWNERS

NAMES AND ADDRESSES

REFERENCE NO.	NAMES	ADDRESSES
96	JAMES FARM, INC.	PO BOX 1042 STATESVILLE, NC 28687
97A	SPEK INVESTMENT CO., LLC	611B SULLIVAN ROAD STATESVILLE, NC 28677
100	JUDITH M. STUTTS	7404 SHERRILLS FORD ROAD SHERRILLS FORD, NC 28673
178	GOFORTH FAMILY REVOCABLE TRUST	PO BOX 712 STATESVILLE, NC 28687
179	PEPPERCORN MANAGEMENT, LLC	245 FORT CHISWELL ROAD MAX MEADOW, VA 24360

Permit Drawing
Sheet 3 of 68

NCDOT

DIVISION OF HIGHWAYS
IREDELL COUNTY
PROJECT: I-3819A

I-40 / I-77 INTERCHANGE INCLUDING
I-40 FROM WEST OF SR 2003 TO
WEST OF SR 2158
& I-77 FROM SOUTH OF I-40
TO SOUTH OF SR 2171

SHEET OF 07 / 06 / 10

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 22+74 to 22+95 Lt	72" SWS						<0.01		77		
1A	-L- 22+93 to 23+00 Lt							<0.01		12		
2	-L- 50+39 to 55+89	36" RCP/48" CMP						<0.01		71		
	Bank Stabilization	48" CMP						<0.01		46		
3	-Y8- 15+16 to 15+73 Rt	**Work Bridge							<0.01		45	
	Bank Stabilization							<0.01		23		
4	-L- 86+29 to 92+26 Rt	Roadway Fill						0.04		594		
5	-L- 91+21 to 94+14 Rt	Bridge										
	Bank Stabilization	Bridge						0.10		482		
6	-L- 99+74 to 114+26 Rt	Roadway Fill	1.00			0.09						
7	-INT_YRPC- 19+98 to 20+60 Rt	54" RCP						0.01		70		
	Bank Stabilization							0.01		45		
8	-Y5- 50+43 to 54+80 Lt	24" RCP	0.09					0.02		494		
9	-INT_YRPD- 17+23 to 18+69	Bridge	0.13			0.03						
	Bank Stabilization	Bridge						<0.01		37		
10	-INT_YRPAB- 14+85 RT / 17+85 RT	Roadway Fill										
	Bank Stabilization							<0.01		15		
11	-Y- 167+13 to 167+28	48" RCP						<0.01	<0.01	10	10	
12	-SR-1- 6+69	Culvert				0.02		0.07	0.03	175	80	
13	-SR-1- 15+00	66" RCP						0.01		175		
TOTALS:			1.22			0.14		0.28*	0.04*	2,326	135	

No additional impacts for 2@48" CMP removal at the outlet of Site 6
No additional impacts for 24" CMP removal at the outlet of Site 7

* Values are based on rounding, due to some of the individual impacts being <0.01 acre.
** in addition to the work bridge, a separate temporary bent will be necessary to "support" the proposed steel beams during construction. The temporary bent is located under the proposed bridge and is necessary for a field splice of the steel beams. The temporary surface water impacts are 36 sq ft., less than 0.01 ac

ATN Revised 3/31/05

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

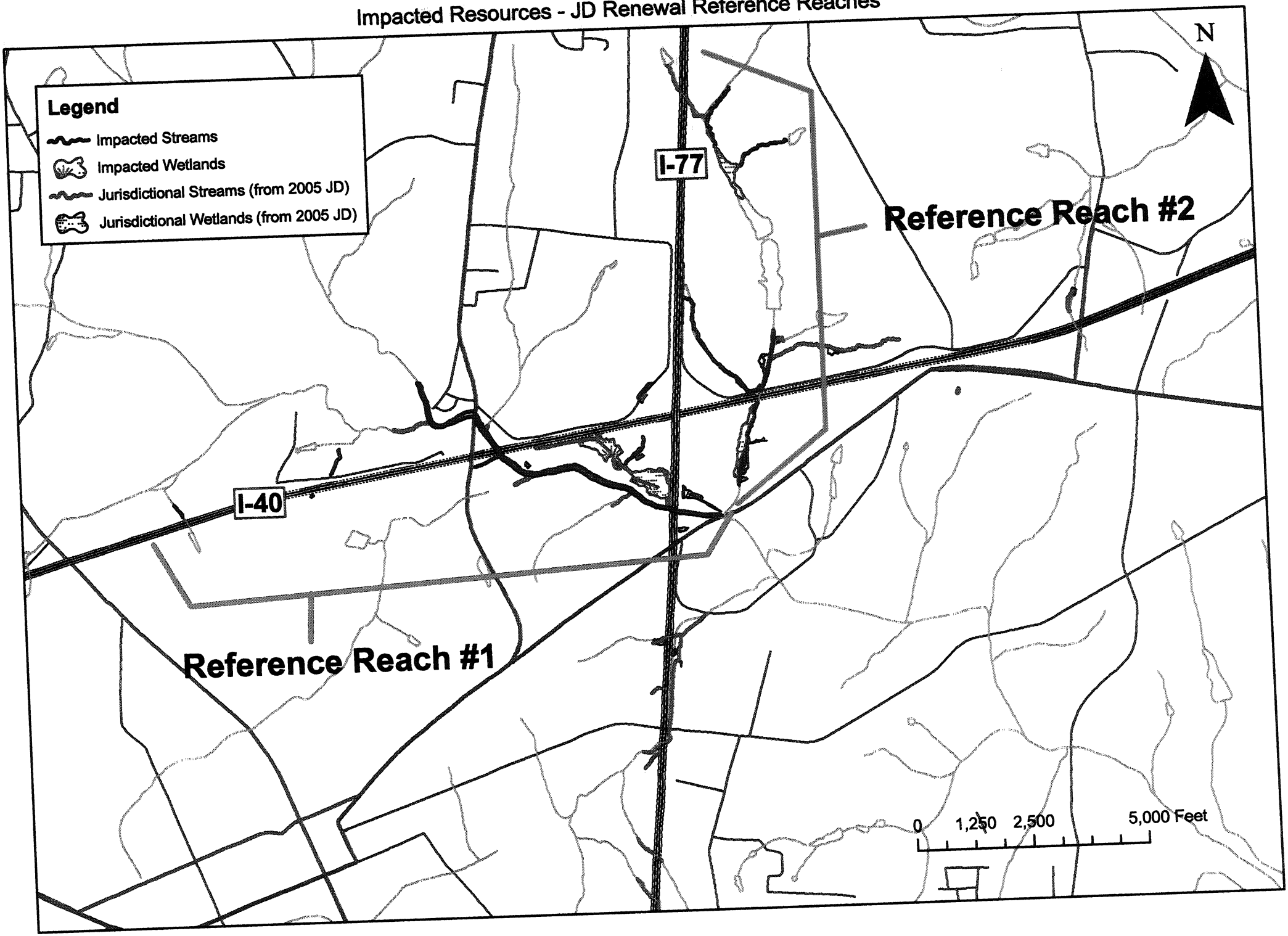
IREDELL COUNTY
WBS -34192.1.2 (I-3819A)

SHEET 7/20/2010

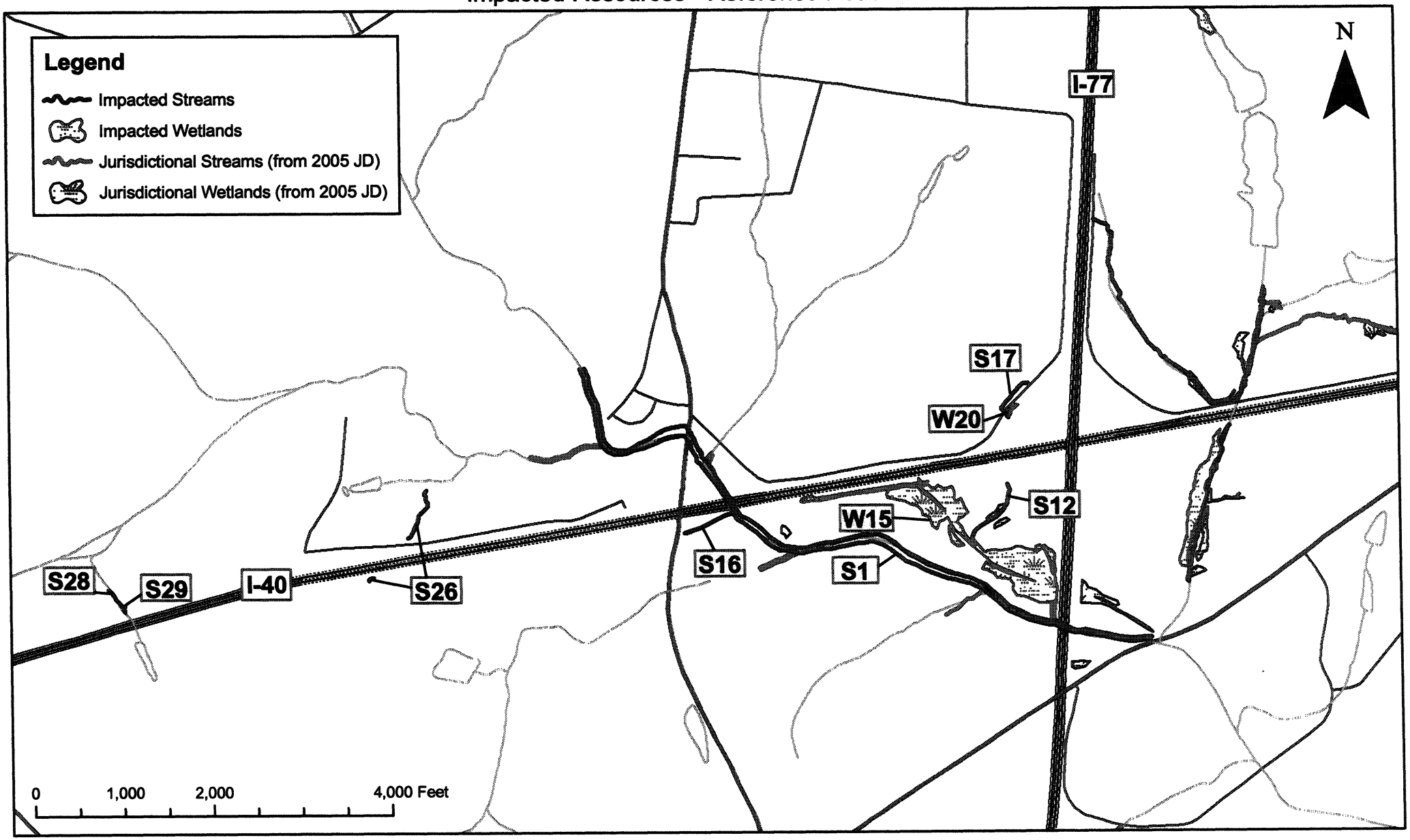
Permit Drawing
Sheet 4 of 68

I-3819A

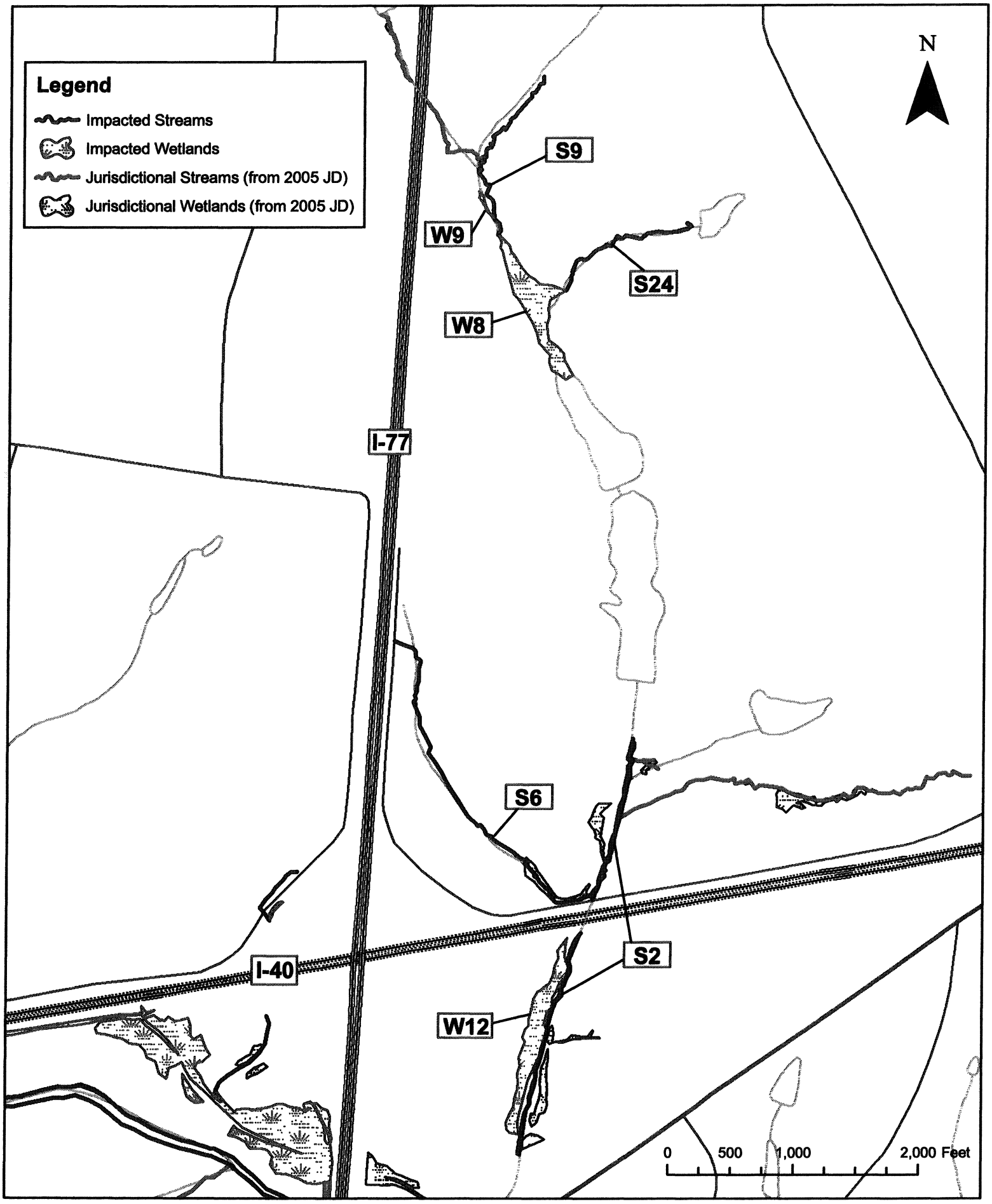
Impacted Resources - JD Renewal Reference Reaches



I-3819A - Iredell County
Impacted Resources - Reference Reach #1



I-3819A - Iredell County
Impacted Resources - Reference Reach #2



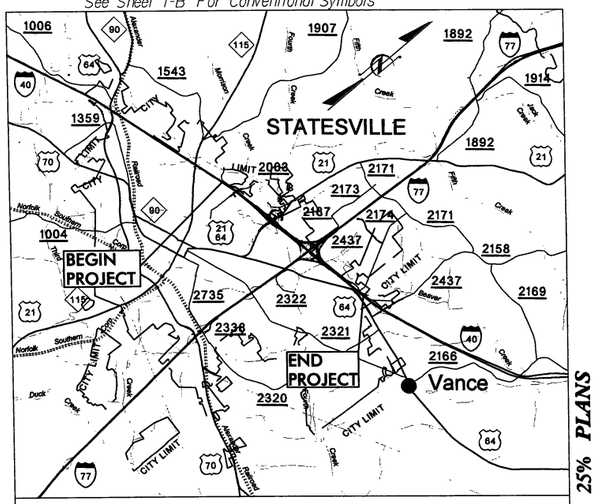
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-3819A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34192.1.2	IMS-40-2(124)	P.E.

TIP PROJECT: I-3819A

PROJECT: 34192.1.2

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



VICINITY MAP

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF STATESVILLE

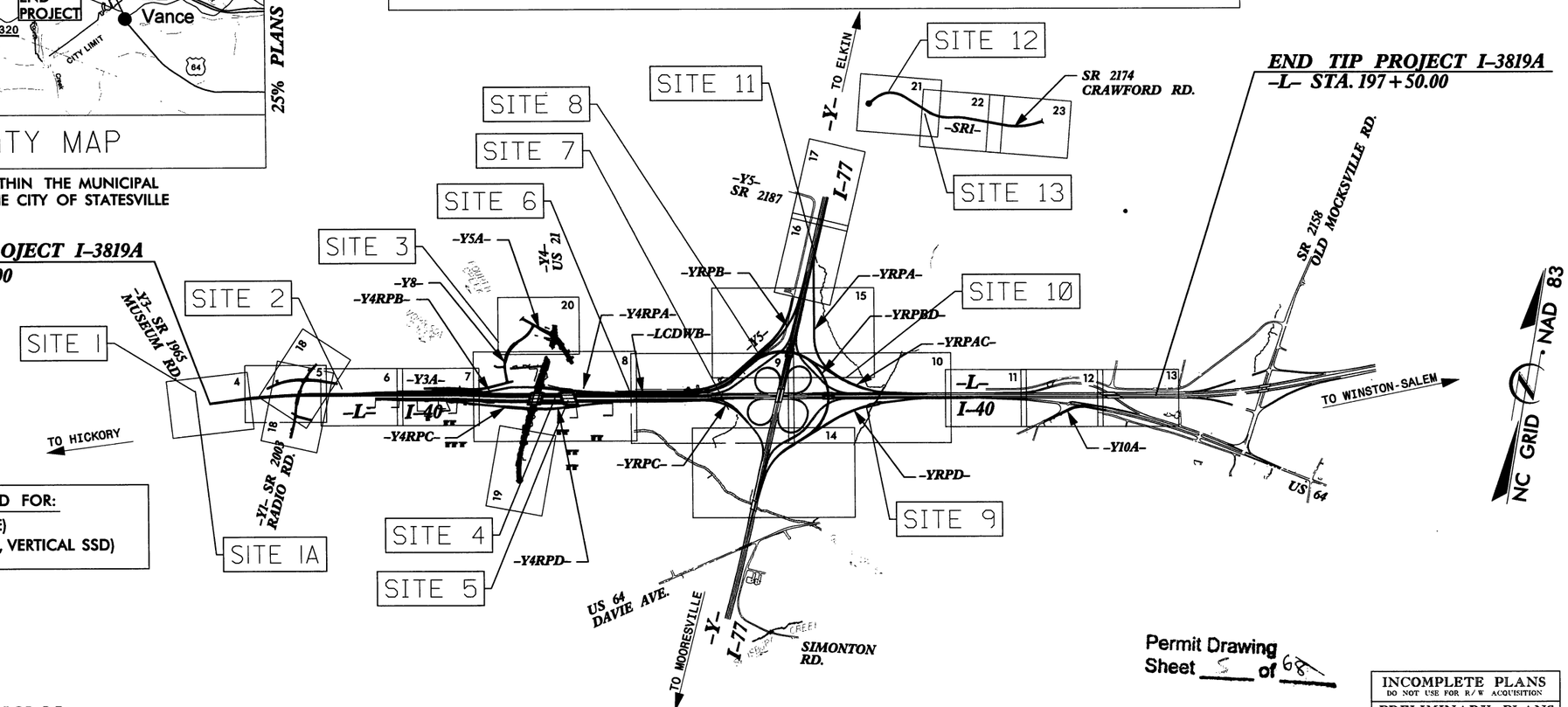
25% PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

LOCATION: I-40/I-77 INTERCHANGE INCLUDING I-40 FROM WEST OF SR 2003 (Radio Rd.) TO WEST OF SR 2158 (Old Mocksville Rd.) & I-77 FROM SOUTH OF I-40 TO SOUTH OF SR 2171 (Jane Sower Rd.)

WETLAND & STREAM IMPACTS



DESIGN EXCEPTIONS REQUIRED FOR:
- -Y4RPC- (MAXIMUM GRADE)
- -Y5A- (CREST V.C. K VALUE, VERTICAL SSD)

Permit Drawing Sheet 5 of 68

NCDOT CONTACT: DOUG TAYLOR, P.E.
ROADWAY DESIGN - ENGINEERING COORDINATION

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

	I-40	I-77
ADT 2010 =	71,100	73,200
ADT 2030 =	99,420	109,040
DHV =	10 %	9 %
D =	60 %	55 %
T =	19 % *	20 % **
V =	60 MPH	60 MPH

* TTST 14 + DUAL 5 (I-40)
** TTST 15 + DUAL 5 (I-77)
CLASSIFICATION: INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT	I-3819A	=	3.138
LENGTH STRUCTURES TIP PROJECT	I-3819A	=	0.110
TOTAL LENGTH OF TIP PROJECT	I-3819A	=	3.248

Prepared In the Office of:
KO & ASSOCIATES, P.C.
Consulting Engineers
A Figrence & Hutcheson, Inc. Company
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 19, 2008

LETTING DATE:
MAY 10, 2011

DAVID C. WALLER, P.E.
PROJECT ENGINEER

MICHAEL A. YOUNG, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

Florence & Hutcheson CONSULTING ENGINEERS 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No: F-0258	PROJECT REFERENCE NO.	SHEET NO.
	1-3819A	2-AG
	R/W SHEET NO.	
	HYDRAULICS ENGINEER	

DRY DETENTION BASIN NOTES @ -L- 123+00 RT.

SEQUENCE OF CONSTRUCTION FOR DRY DETENTION BASIN

1. INSTALL ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
3. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR DRY DETENTION BASIN

1. APPLY SEEDING OVER THE SIDE SLOPES AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.

2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   -INVERTS IN THE PIPE AND THE BOXES.

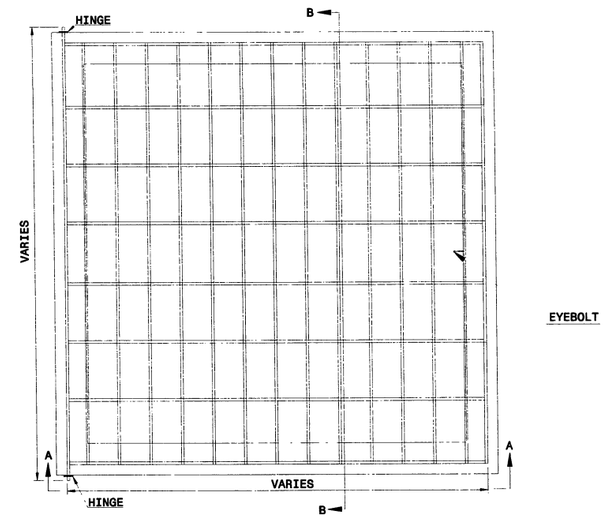
3. THE BERM SHALL BE CONSTRUCTED WITH SUITABLE FILL MATERIAL PER THE ENGINEER.

4. ANY FILL MATERIAL SHALL BE COMPACTED.

MAINTENANCE RECOMMENDATIONS

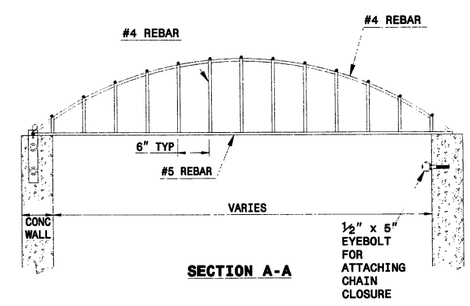
1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.
2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.
3. CHECK INLETS AND OUTLETS FOR STRUCTURAL REPAIR TO CONFIRM THAT THEY ARE OPERATIONAL.
4. MOW AS NECESSARY TO LIMIT UNWANTED VEGETATION AND REMOVE CLIPPINGS AS PRACTICAL.
5. NO PORTION OF THE DRY DETENTION POND SHOULD BE FERTILIZED AFTER THE FIRST INITIAL FERTILIZATION THAT IS REQUIRED TO ESTABLISH VEGETATION.
6. STABLE GROUNDCOVER SHOULD BE MAINTAINED IN THE DRAINAGE AREA TO REDUCE THE SEDIMENT LOAD TO THE DRY DETENTION POND.
7. ONCE A YEAR, A DAM SAFETY EXPERT SHOULD INSPECT THE EMBANKMENT (IF APPLICABLE).
8. RECORDS OF OPERATION AND MAINTENANCE SHOULD BE KEPT IN A KNOWN SET LOCATION AND MUST BE AVAILABLE UPON REQUEST.

TRASH RACKS FOR OUTLET STRUCTURES

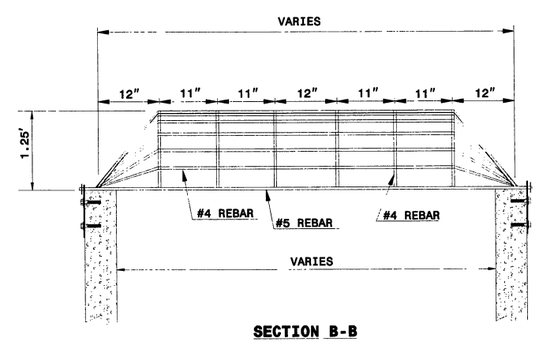


PLAN

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 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 REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.



SECTION A-A



SECTION B-B

* NOT TO SCALE

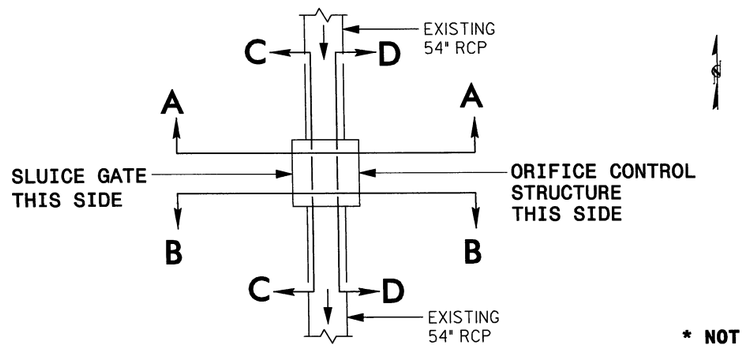
Permit Drawing
Sheet 6 of 68

7-16-2010
F&H Design Page 1-3819a_hwd_F&H_basin_details.dgn
08:23:33 AM

Florence & Hutcheson CONSULTING ENGINEERS 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No: P-0258	PROJECT REFERENCE NO.	SHEET NO.
	I-3819A	2-AH
	R/W SHEET NO.	
	HYDRAULICS ENGINEER	

-L- STA. 123+00 RT.
CONVERT EXISTING OTCB TO DRY DETENTION BASIN OUTLET CONTROL STRUCTURE

SECTION VIEW SCHEMATIC OF OUTLET STRUCTURE



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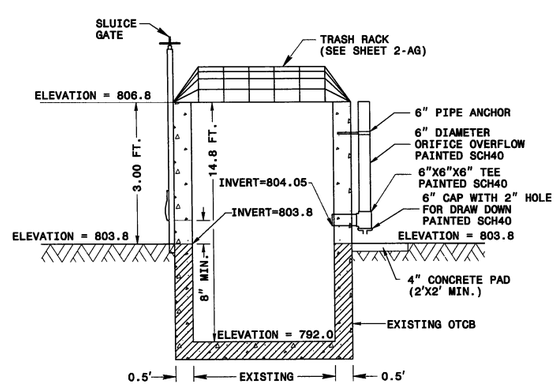
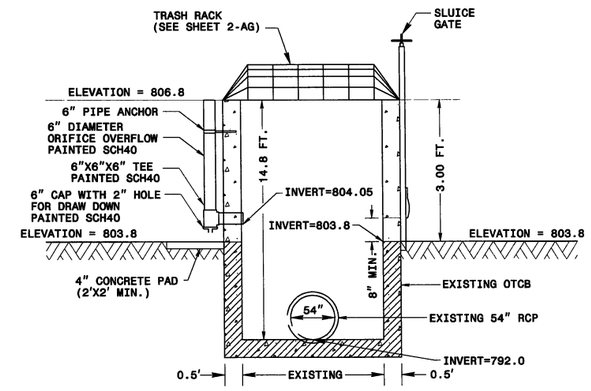
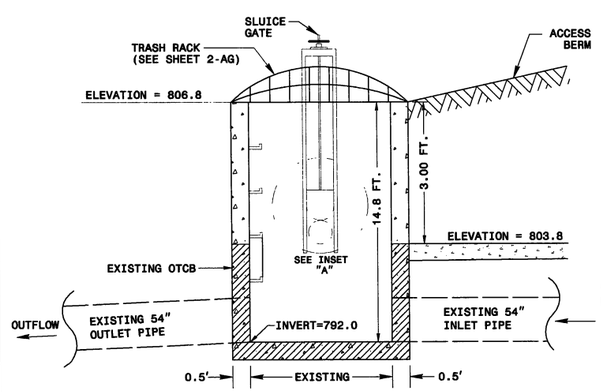


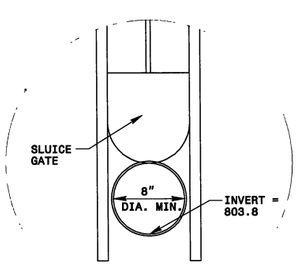
SECTION A-A

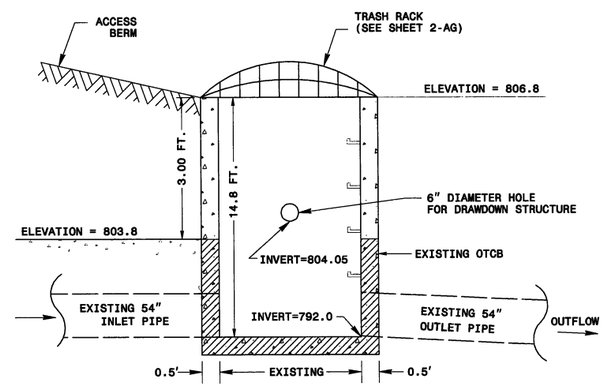


SECTION B-B



SECTION C-C





SECTION D-D

NOTES

1. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.

* NOT TO SCALE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

Permit Drawing
Sheet 7 of 68

Florence & Hutcheson CONSULTING ENGINEERS 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No: F-0258	PROJECT REFERENCE NO.	SHEET NO.
	1-3819A	2-A1
	R/W SHEET NO.	
	HYDRAULICS ENGINEER	

DRY DETENTION BASIN NOTES @ -L- 144+00 RT.

SEQUENCE OF CONSTRUCTION FOR DRY DETENTION BASIN

1. INSTALL ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. EXCAVATE FOR THE BASIN PER CROSS SECTIONS FOR -L-, -YRPD-, & -YRPBD-. PREPARE THE BASIN FLOOR PER DITCH PROFILE.
3. CONSTRUCT MAIN POND.
4. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
5. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR DRY DETENTION BASIN

1. APPLY SEEDING OVER THE SIDE SLOPES AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.

2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   -INVERTS IN THE PIPE AND THE BOXES.

3. THE BERM SHALL BE CONSTRUCTED WITH SUITABLE FILL MATERIAL PER THE ENGINEER.

4. ANY FILL MATERIAL SHALL BE COMPACTED.

MAINTENANCE RECOMMENDATIONS

1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.
2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.
3. CHECK INLETS AND OUTLETS FOR STRUCTURAL REPAIR TO CONFIRM THAT THEY ARE OPERATIONAL.
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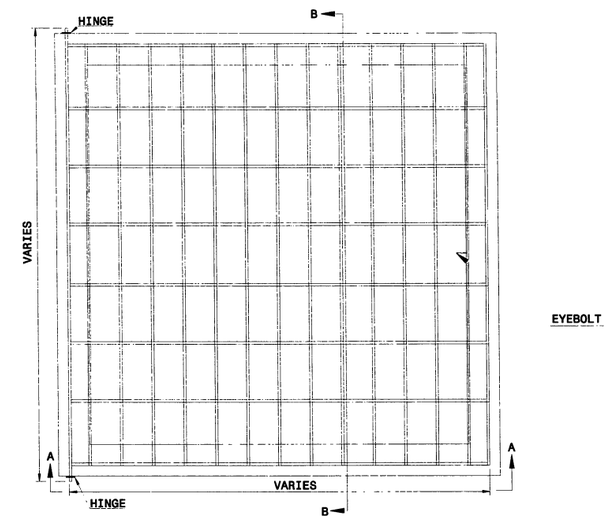
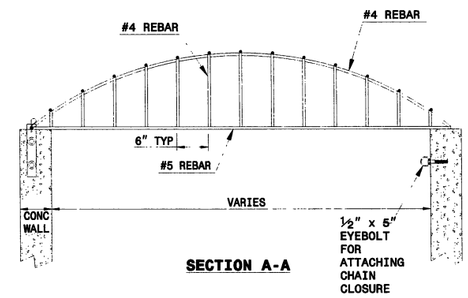
8. RECORDS OF OPERATION AND MAINTENANCE SHOULD BE KEPT IN A KNOWN SET LOCATION AND MUST BE AVAILABLE UPON REQUEST.

TRASH RACKS FOR OUTLET STRUCTURES

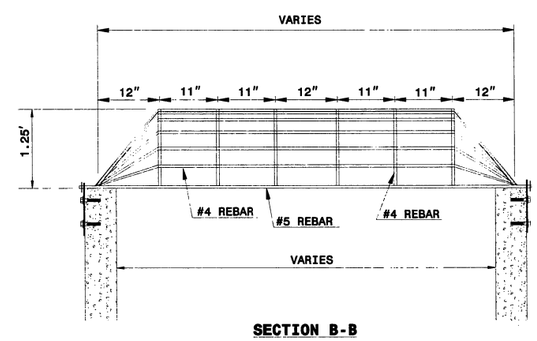


PLAN

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 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 REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.



SECTION A-A



SECTION B-B

Permit Drawing
Sheet 8 of 68

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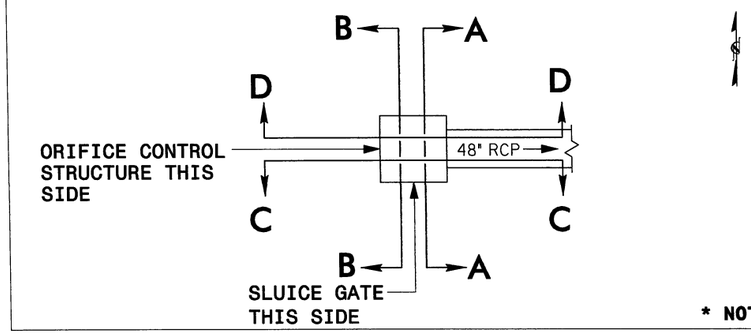
Florence & Hutcheson CONSULTING ENGINEERS 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No: F-0268	PROJECT REFERENCE NO.	SHEET NO.
	1-3819A	2-AJ
	R/W SHEET NO.	
	HYDRAULICS ENGINEER	

-L- STA. 144+00 RT.
DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

SECTION VIEW SCHEMATIC OF OUTLET STRUCTURE



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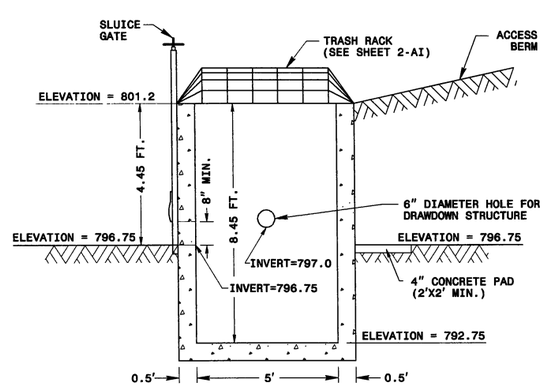

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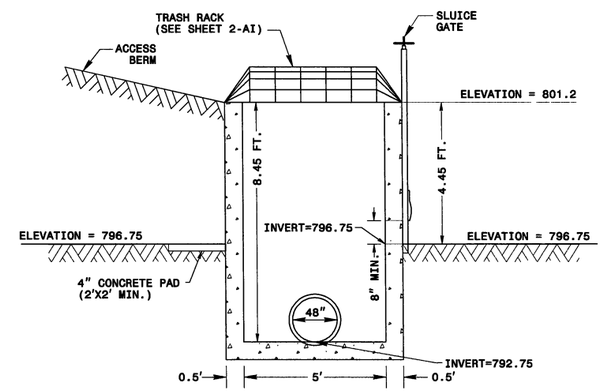

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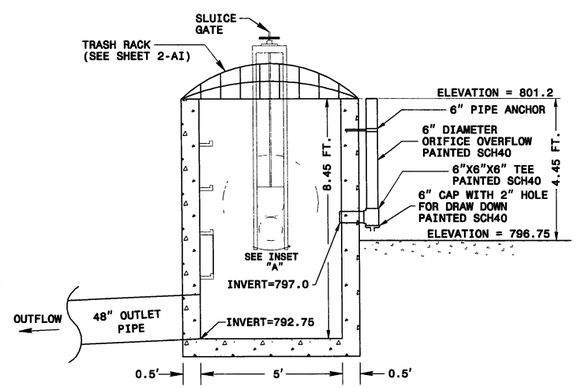

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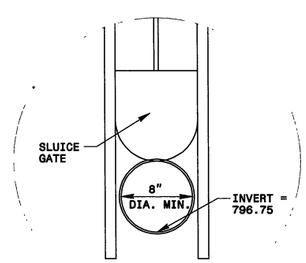

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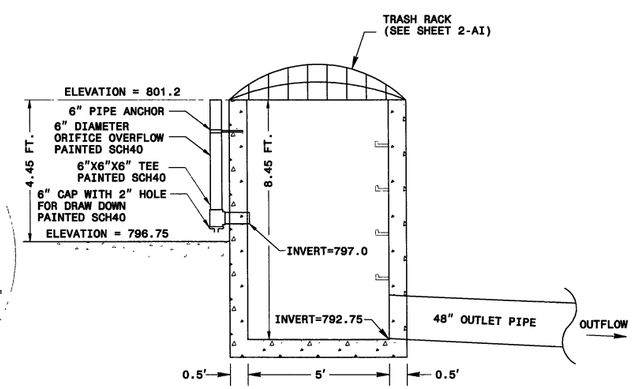

SECTION D-D

NOTES

1. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.

* NOT TO SCALE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

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Permit Drawing
Sheet 9 of 68

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AN
R/W SHEET NO.	
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MATERIALS

A	GEOTEXTILE FABRIC
B	POLYPROPYLENE WOVEN MONOFILAMENT GEOTEXTILE FABRIC
C	18" INLET PIPE
D	18" OUTLET PIPE
E	TWO LINES OF 6" PERFORATED HDPE (UNDERDRAIN PIPE)(SEE SHEET 2-AR)
F	PRECAST DI BOX
G	6" THICKNESS OF ENGINEERED SOIL (80%-85% SAND, 8%-12% FINES (SILT & CLAY), 3%-5% ORGANICS) (FILTER BED)
H	PERMANENT SOIL REINFORCEMENT MAT TO BE USED ON ALL 2:1 SLOPES THAT ARE NOT RIP RAPPED EST 700 SY FF
I	IMPERVIOUS LINER

DIMENSIONS FOR UNDERDRAIN PIPE & FILTER BED (TABLE A)

BASIN	UNDERDRAIN PIPE DIM.	FILTER BED DIMENSIONS AT EL. 829.0	
	LENGTH	WIDTH	LENGTH
-L- 73+00 LT.	60.0 FT.	4.0 FT.	62.0'

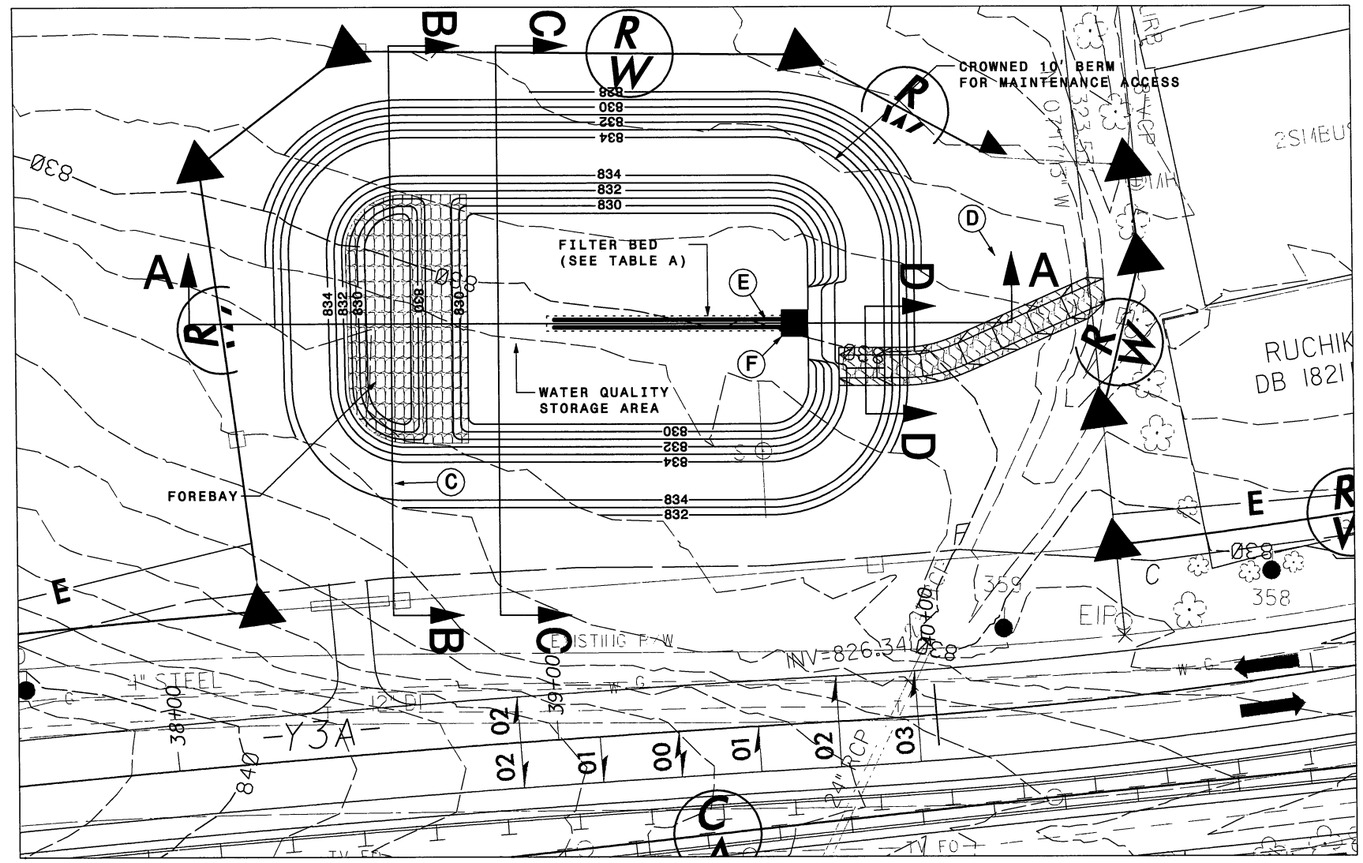
NOTE:

ENGINEERED SOIL SURFACE AREA
AT ELEV. 829.0 = 248.0 SF.
BOTTOM OF TOTAL BASIN SURFACE AREA
AT ELEV. 829.0 = 6380 SF.
BOTTOM OF FOREBAY SURFACE AREA
AT ELEV. 829.0 = 606 SF.

DRY DETENTION BASIN DETAIL (-L- 73+00 LT.)

SCALE:
1" = 20'

NC GRID NAD 83



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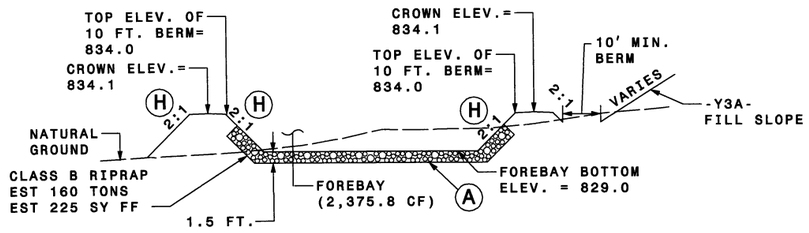

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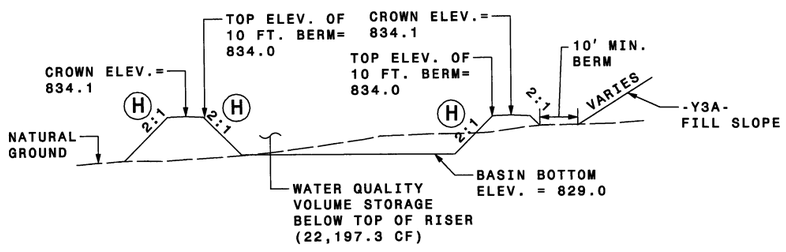
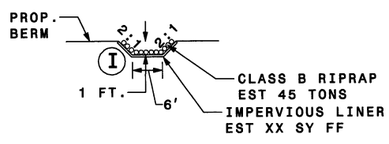
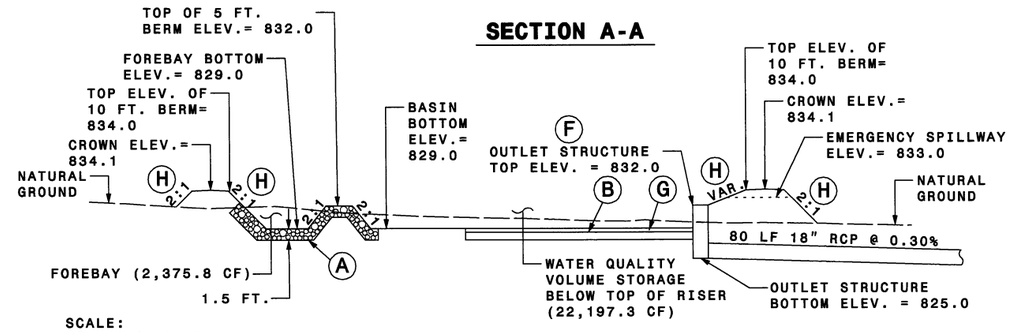


SECTION D-D



SECTION A-A



SCALE:
1" = 20' HORIZ
1" = 10' VERT

REVISIONS

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Sheet 10 of 68

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I-3819A	2-A0
R/W SHEET NO.	

HYDRAULICS ENGINEER

DRY DETENTION BASIN NOTES

SEQUENCE OF CONSTRUCTION FOR DRY DETENTION BASIN

1. INSTALL ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. EXCAVATE FOR THE BASIN AND FOREBAY. PREPARE THE BASIN FLOOR AT THE GIVEN GRADE.
3. CONSTRUCT FOREBAY.
4. CONSTRUCT MAIN POND.
5. CONSTRUCT UNDERDRAIN SYSTEM (SEE DETAIL SHEET 2-AR)
6. SEE SHEET 2-AR FOR DETAILS OF SOIL LAYERING SEQUENCE. LAY GEOTEXTILE FABRIC, PLACE & GRADE 6" OF ENGINEERED SOIL, PLACE SOD OR NATIVE GRASSES IN BASIN.
7. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
8. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR DRY DETENTION BASIN

1. APPLY SEEDING OVER THE SIDE SLOPES AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.

2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   -INVERTS IN THE PIPE AND THE BOXES.

3. THE BERM SHALL BE CONSTRUCTED WITH SUITABLE FILL MATERIAL PER THE ENGINEER.

4. ANY FILL MATERIAL SHALL BE COMPACTED.

MAINTENANCE RECOMMENDATIONS

1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.
2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.
3. CHECK INLETS AND OUTLETS FOR STRUCTURAL REPAIR TO CONFIRM THAT THEY ARE OPERATIONAL.
4. MOW AS NECESSARY TO LIMIT UNWANTED VEGETATION AND REMOVE CLIPPINGS AS PRACTICAL.
5. NO PORTION OF THE DRY DETENTION POND SHOULD BE FERTILIZED AFTER THE FIRST INITIAL FERTILIZATION THAT IS REQUIRED TO ESTABLISH VEGETATION.
6. STABLE GROUNDCOVER SHOULD BE MAINTAINED IN THE DRAINAGE AREA TO REDUCE THE SEDIMENT LOAD TO THE DRY DETENTION POND.
7. ONCE A YEAR, A DAM SAFETY EXPERT SHOULD INSPECT THE EMBANKMENT (IF APPLICABLE).
8. RECORDS OF OPERATION AND MAINTENANCE SHOULD BE KEPT IN A KNOWN SET LOCATION AND MUST BE AVAILABLE UPON REQUEST.

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Bassett, Jeff

PROJECT REFERENCE NO.	SHEET NO.
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R/W SHEET NO.	

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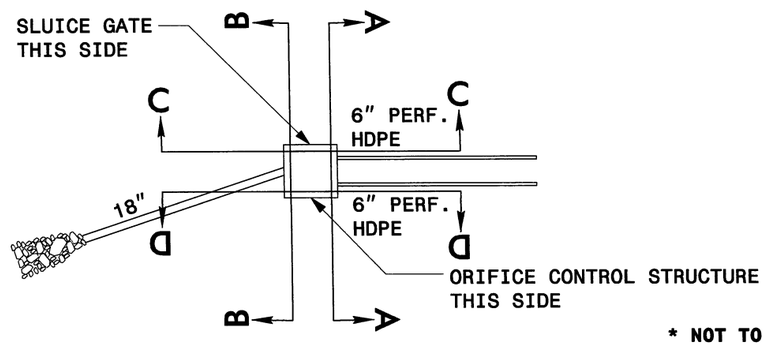
HYDRAULICS ENGINEER

SECTION VIEW SCHEMATIC OF OUTLET STRUCTURE



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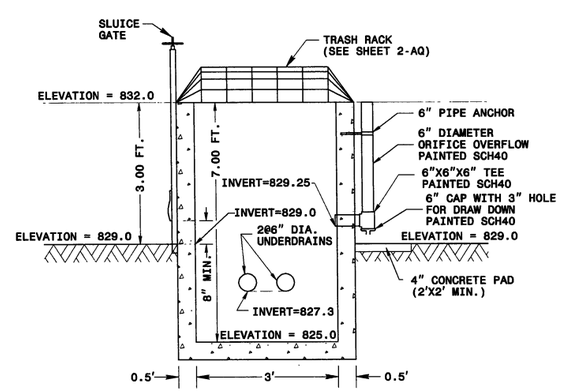
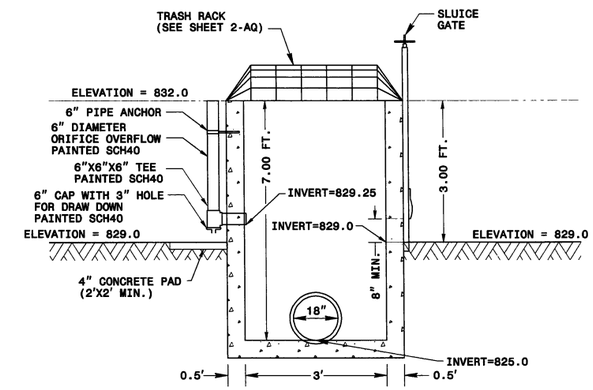


SECTION A-A



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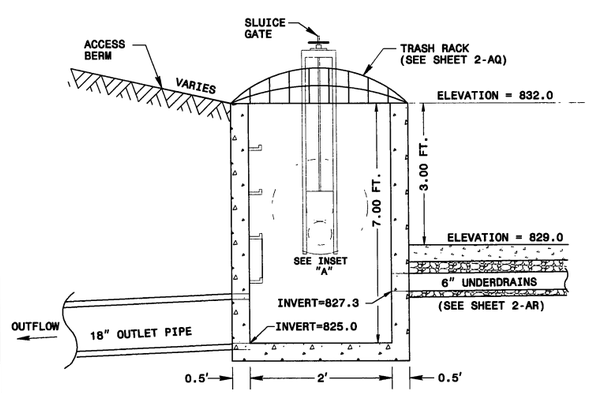
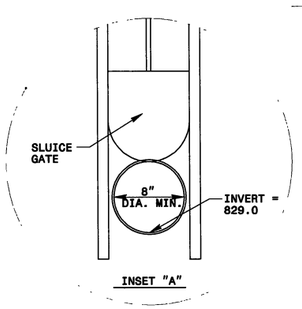
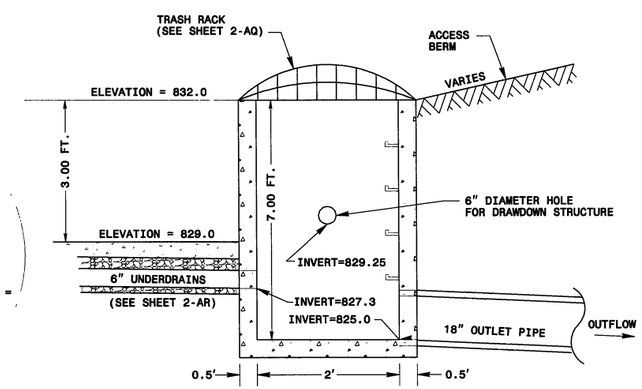


SECTION C-C





SECTION D-D

NOTES

1. 6" UNDERDRAINS ARE SECONDARY DRAWDOWN DEVICES AND ARE NOT INTENDED TO BE PRIMARY DRAWDOWN DEVICES.
2. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.

* NOT TO SCALE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

Permit Drawing
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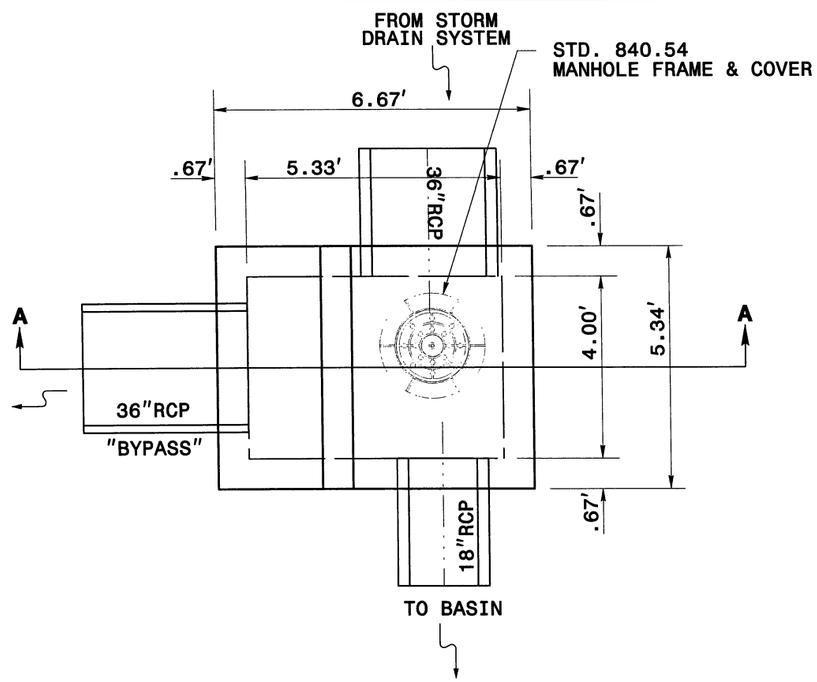
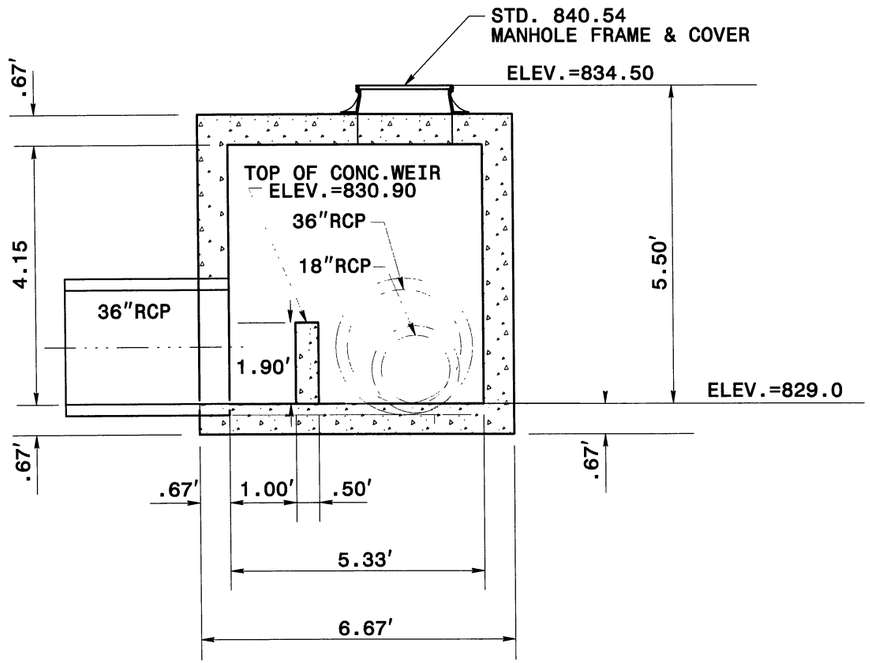
SPLITTER JUNCTION BOX



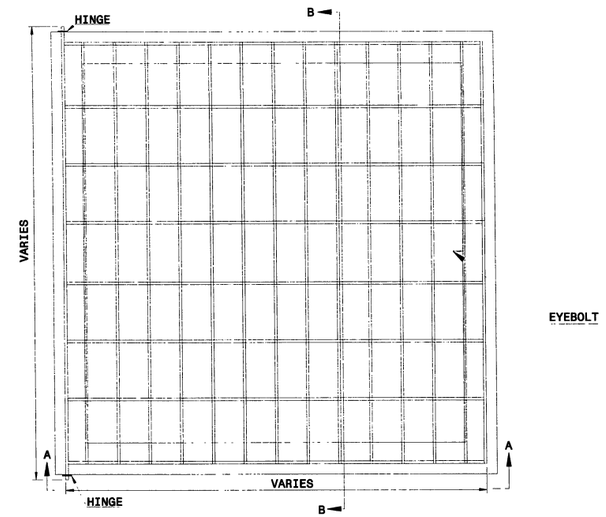
PLAN



SECTION A-A

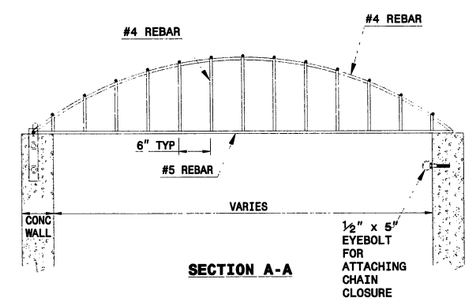
* NOT TO SCALE

TRASH RACKS FOR OUTLET STRUCTURES



PLAN

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 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 REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.



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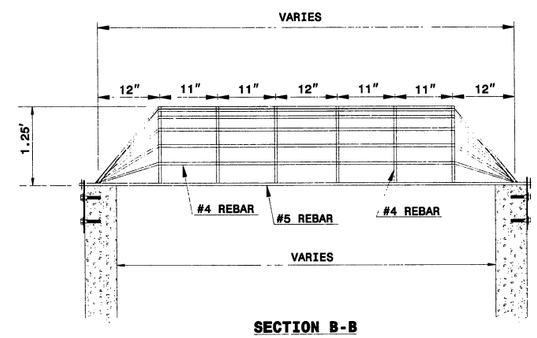

SECTION B-B

* NOT TO SCALE

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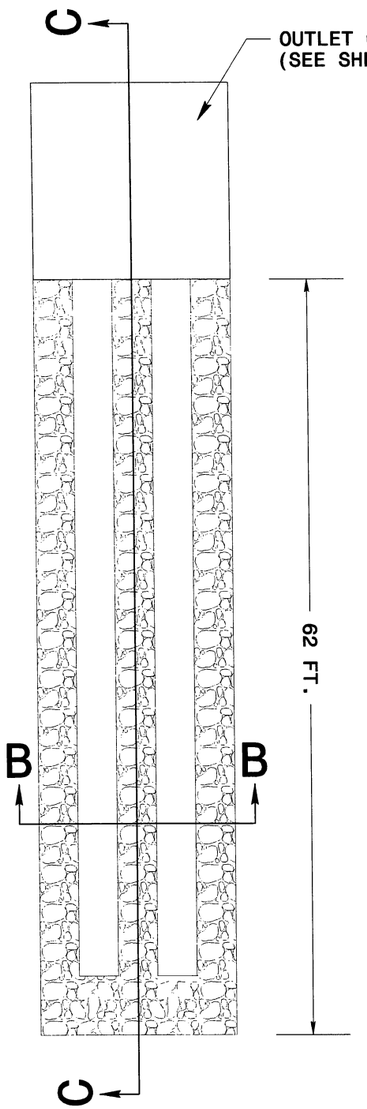
I-3819A	2-AR
R/W SHEET NO.	
HYDRAULICS ENGINEER	

DRY DETENTION BASIN

"UNDERDRAIN SYSTEM"

* NOT TO SCALE



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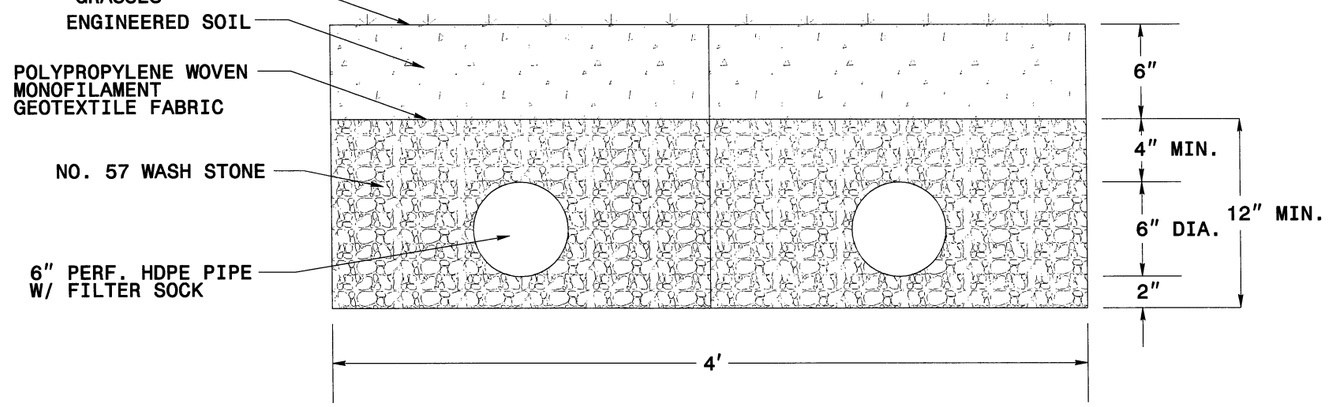
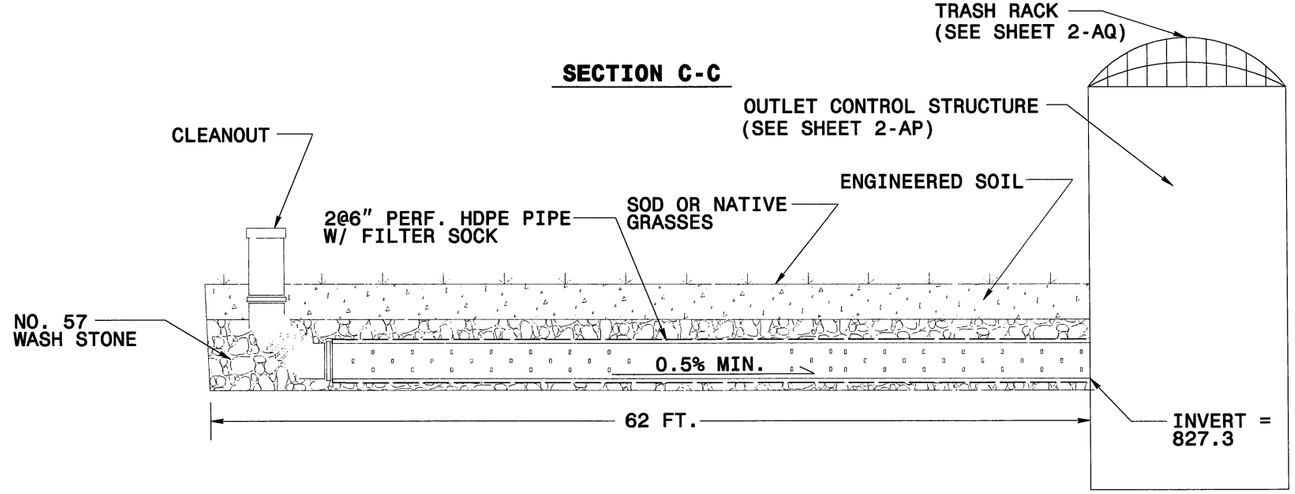


SECTION C-C



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Sheet 14 of 68

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WET DETENTION BASIN DETAIL (-L- 91+00 RT.)

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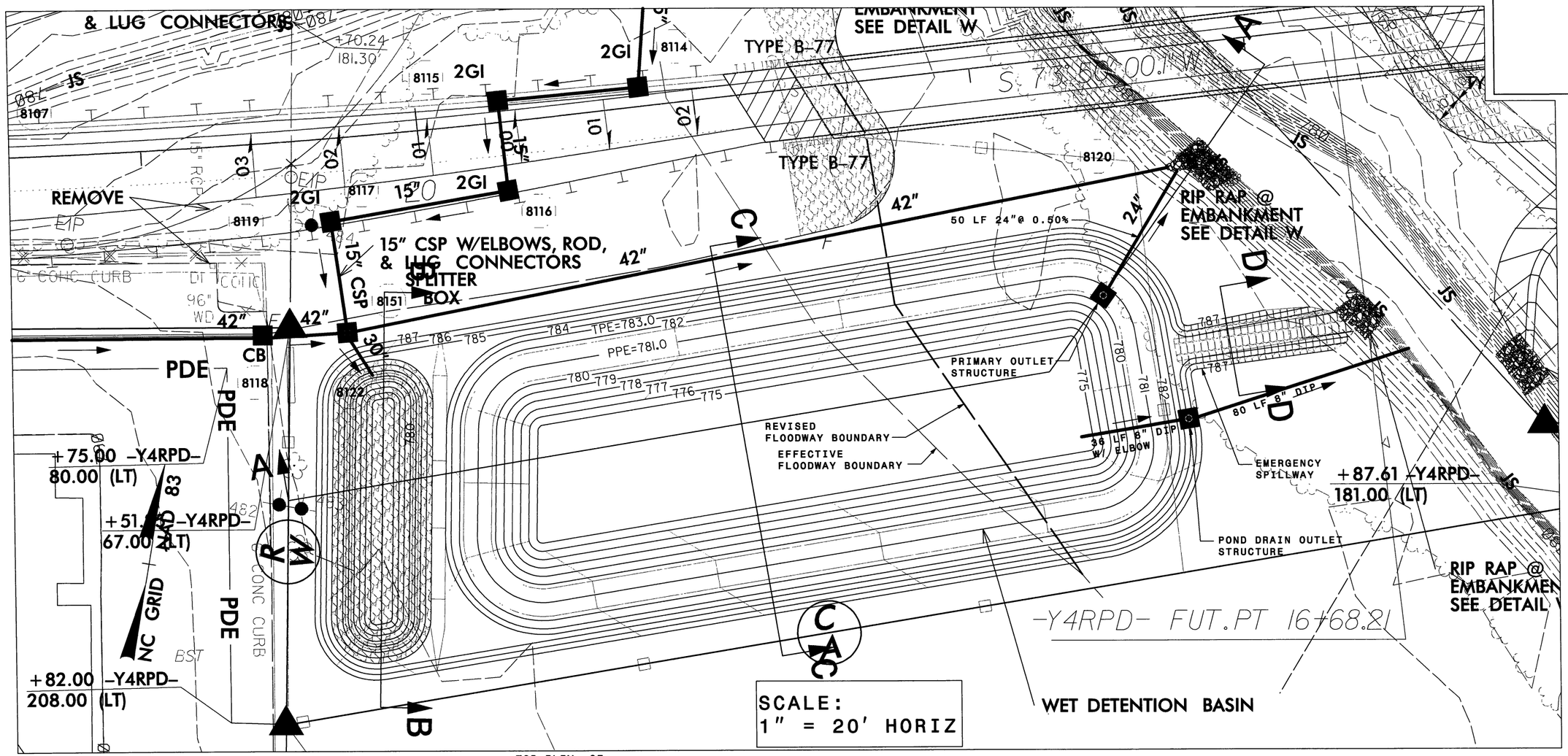

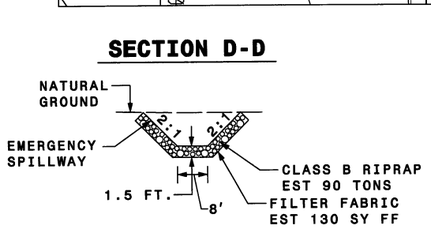

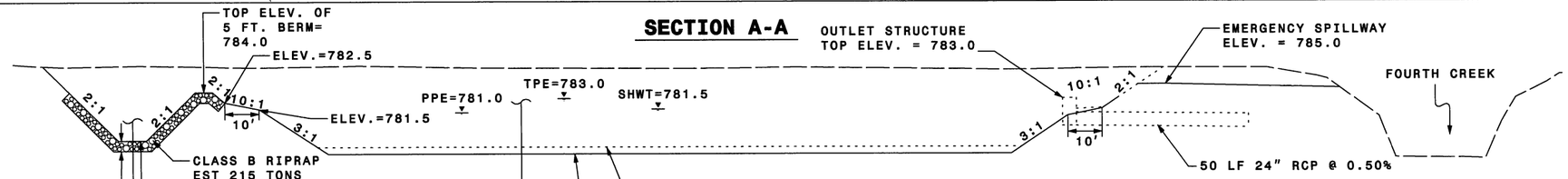

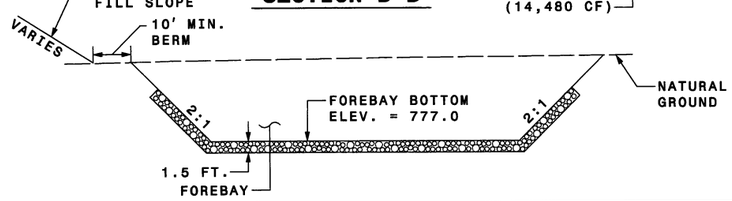

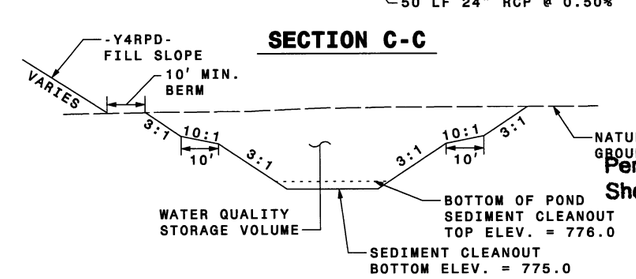

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WET DETENTION BASIN NOTES

SEQUENCE OF CONSTRUCTION FOR WET DETENTION BASIN

1. INSTALL ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. EXCAVATE FOR THE BASIN AND FOREBAY. PREPARE THE BASIN FLOOR AT THE GIVEN GRADE.
3. CONSTRUCT FOREBAY.
4. CONSTRUCT MAIN POND.
5. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
6. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR WET DETENTION BASIN

1. APPLY SEEDING ABOVE VEGETATED SHELF AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.

2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   - -INVERTS IN THE PIPE AND THE BOXES
   - -ELEVATION OF EMERGENCY SPILLWAY INVERT

VEGETATION NOTES FOR WET DETENTION BASIN

1. NO TREES OR SHRUBS SHOULD BE PLANTED WITHIN 10 FEET OF INLET OR OUTLET PIPES, OR MANMADE DRAINAGE STRUCTURES SUCH AS SPILLWAYS OR FLOW SPREADERS. SPECIES WITH ROOTS THAT SEEK WATER (E.G. WILLOW OR POPLAR), SHOULD BE AVOIDED WITHIN 50 FEET OF PIPES OR MANMADE STRUCTURES.

2. ALL LANDSCAPE MATERIAL, INCLUDING GRASS, SHOULD BE PLANTED IN GOOD TOPSOIL. NATIVE UNDERLYING SOILS MAY BE SUITABLE FOR PLANTING IF AMENDED WITH 4 INCHES OF WELL-AGED COMPOST TILLED INTO THE SUBGRADE COMPOST USED SHOULD MEET SPECIFICATIONS FOR GRADE A COMPOST QUALITY.

3. SOIL IN WHICH TREE OR SHRUBS ARE PLANTED MAY NEED ADDITIONAL ENRICHMENT OR ADDITIONAL COMPOST TOP-DRESSING DEPENDING ON THE RESULTS OF THE SOIL ANALYSIS. CONSULT A NURSERYMAN, LANDSCAPE PROFESSIONAL, OR ARBORIST FOR SITE-SPECIFIC RECOMMENDATIONS.

4. RECOMMENDED PLANTS TO BE USED ON VEGETATED SHELF (ABOVE SHWT):
   LINDERA BENZOIN - SPICEBRUSH
   ITEA VIRGINICA - VIRGINIA SWEETSPIRE
   VIBURNUM NUDUM - POSSUMHAW
   CORNUS AMOMUM - SILKY DOGWOOD
   CEPHALANTHUS OCCIDENTALIS - BOTTONBUS
   HIBISCUS MOSCHENUTOS - ROSE MALLOW
   SAMBUCUS CANADENSIS - ELDERBERRY

5. RECOMMENDED PLANTS TO BE USED ON VEGETATED SHELF (BELOW SHWT):
   PONTEDERIA CORDATA - PICKERELWEED
   PELTANDRA VIRGINICA - ARROW ARUM
   JUNCUS EFFUSUS - SOFT RUSH
   ITEA VIRGINICA - VIRGINIA SWEETSPIRE
   OSMUNDA REGALIS - ROYAL FERN

MAINTENANCE RECOMMENDATIONS

1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.

2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.

3. CHECK INLETS AND OUTLETS FOR STRUCTURAL REPAIR TO CONFIRM THAT THEY ARE OPERATIONAL.

4. IMMEDIATELY AFTER THE WET DETENTION BASIN IS ESTABLISHED, THE PLANTS ON THE VEGETATED SHELF AND PERIMETER OF THE BASIN SHOULD BE WATERED TWICE WEEKLY IF NEEDED, UNTIL THE PLANTS BECOME ESTABLISHED (COMMONLY SIX WEEKS).

5. NO PORTION OF THE WET DETENTION POND SHOULD BE FERTILIZED AFTER THE FIRST INITIAL FERTILIZATION THAT IS REQUIRED TO ESTABLISH THE PLANTS ON THE VEGETATED SHELF.

6. STABLE GROUNDCOVER SHOULD BE MAINTAINED IN THE DRAINAGE AREA TO REDUCE THE SEDIMENT LOAD TO THE WET DETENTION POND.

7. IF THE BASIN MUST BE DRAINED FOR AN EMERGENCY OR TO PERFORM MAINTENANCE, THE FLUSHING OF SEDIMENT THROUGH THE EMERGENCY DRAIN SHOULD BE MINIMIZED TO THE MAXIMUM EXTENT POSSIBLE.

8. ONCE A YEAR, A DAM SAFETY EXPERT SHOULD INSPECT THE EMBANKMENT (IF APPLICABLE).

9. WATER CLARITY & ALGAE GROWTH SHOULD BE MONITORED REGULARLY.

10. AFTER THE WET DETENTION POND IS ESTABLISHED, IT SHOULD BE INSPECTED ONCE A MONTH AND WITHIN 24 HOURS AFTER EVERY STORM EVENT GREATER THAN 1.0 INCHES.

11. RECORDS OF OPERATION AND MAINTENANCE SHOULD BE KEPT IN A KNOWN SET LOCATION AND MUST BE AVAILABLE UPON REQUEST.

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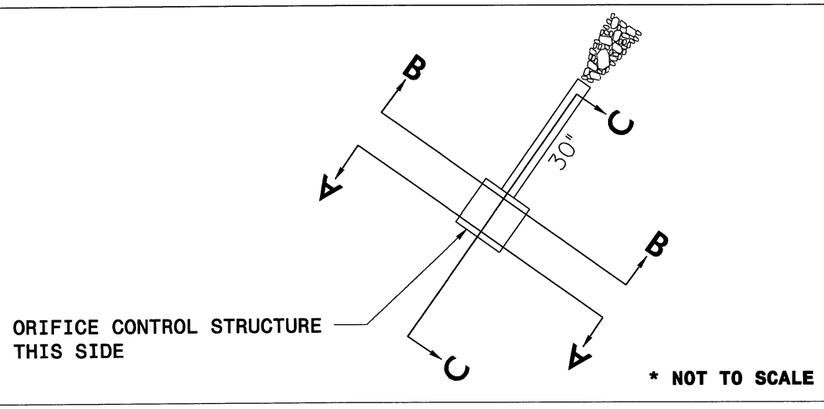
	R/W SHEET NO.	
	HYDRAULICS ENGINEER	

SECTION VIEW SCHEMATIC OF PRIMARY OUTLET STRUCTURE



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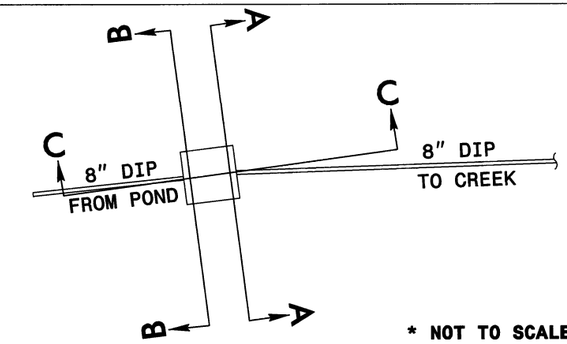
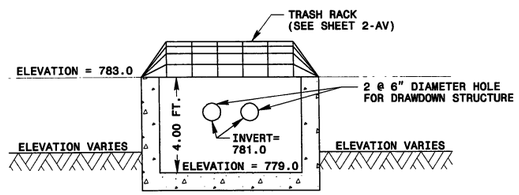
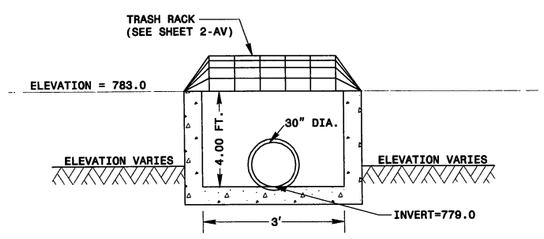
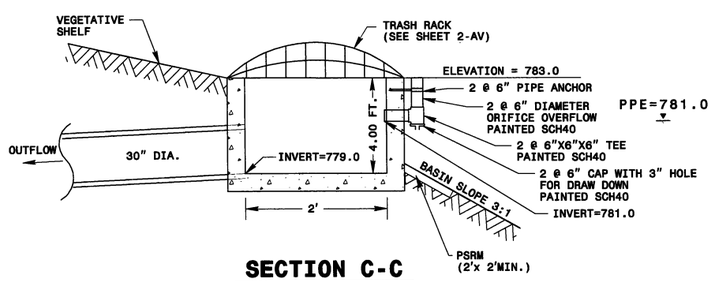




SECTION A-A



SECTION B-B



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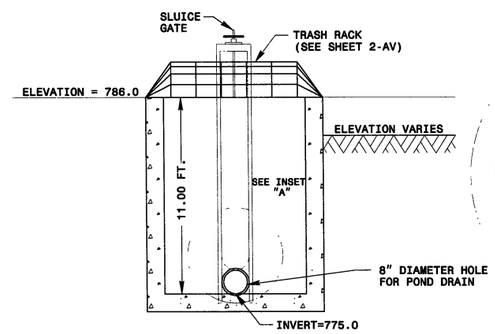

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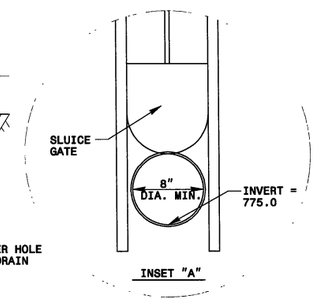

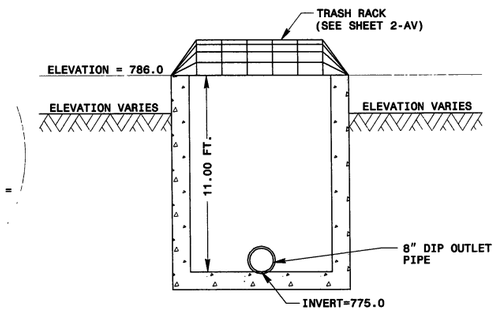

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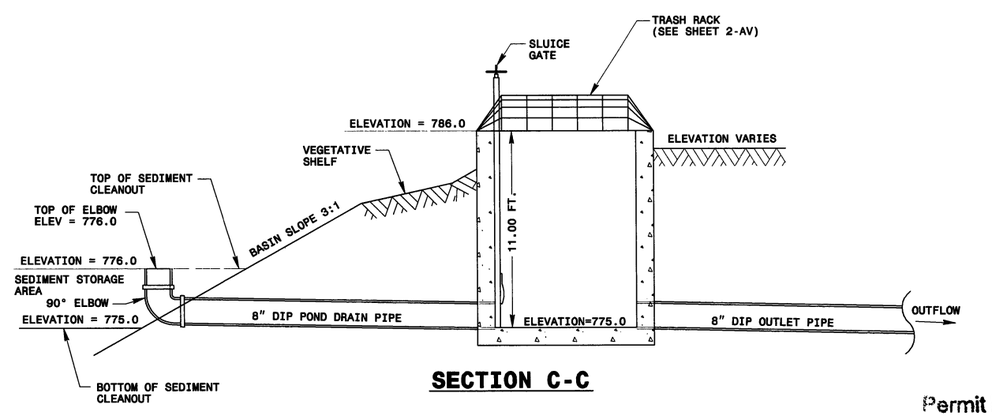

SECTION C-C

Permit Drawing
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NOTES

1. 8" DIP POND DRAIN IS A POND DRAIN DEVICE AND IS NOT INTENDED TO BE A SECONDARY DRAWDOWN DEVICE.
2. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.

* NOT TO SCALE

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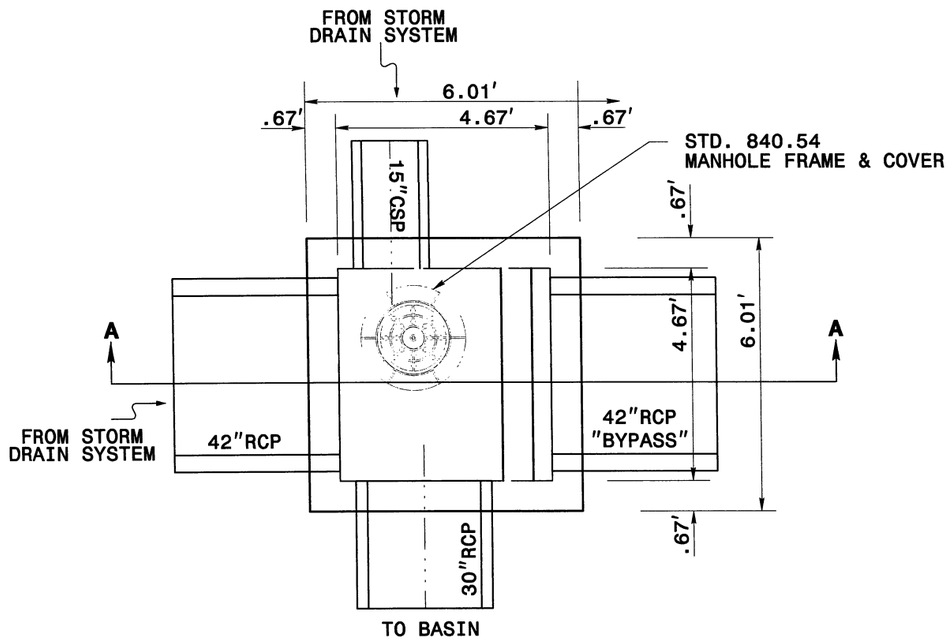
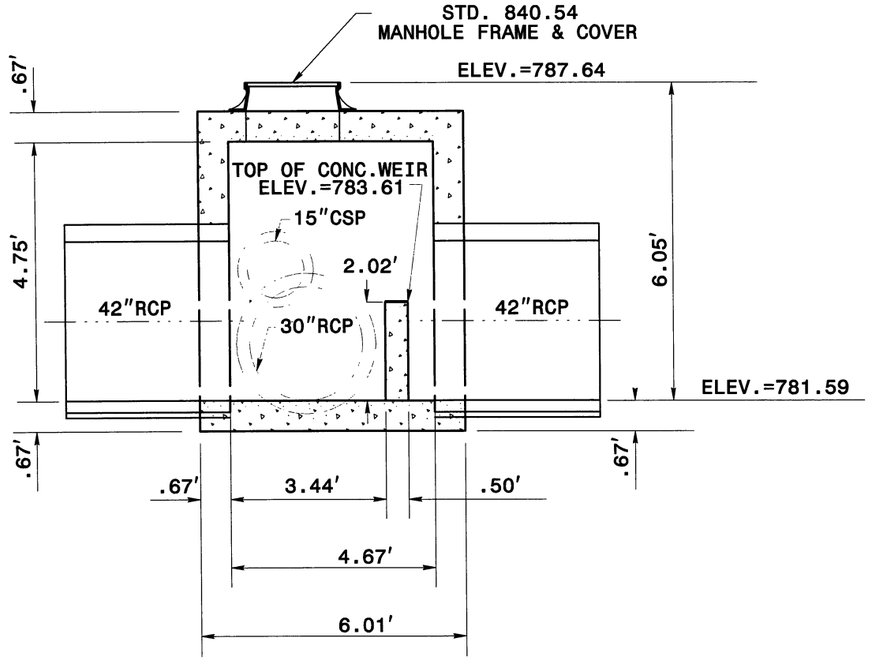
JUNCTION BOX SPLITTER BOX



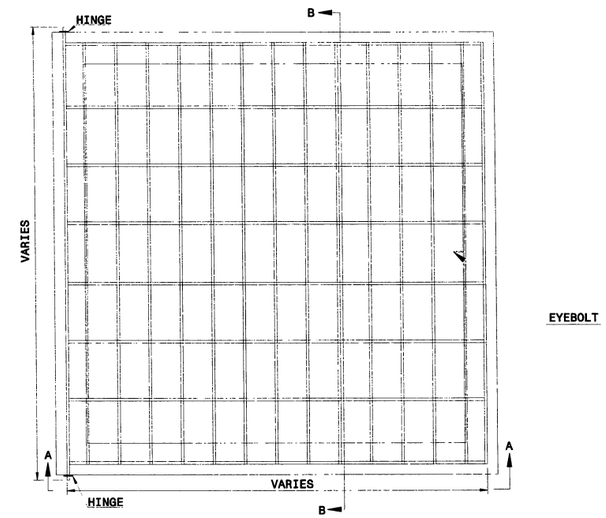
PLAN



SECTION A-A

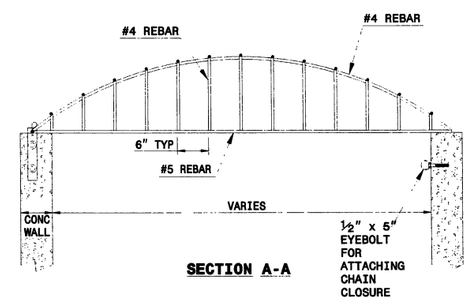
* NOT TO SCALE

TRASH RACKS FOR OUTLET STRUCTURES

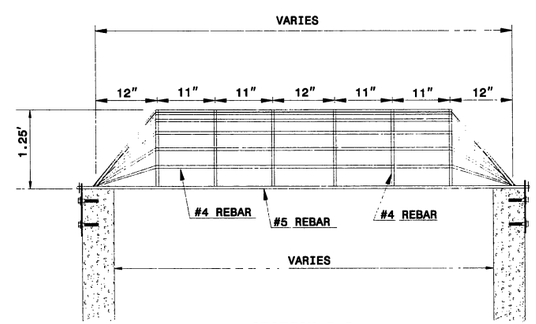


PLAN

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 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 REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.



SECTION A-A



SECTION B-B

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Permit Drawing
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WET DETENTION BASIN DETAIL (-L- 95+50 RT.)

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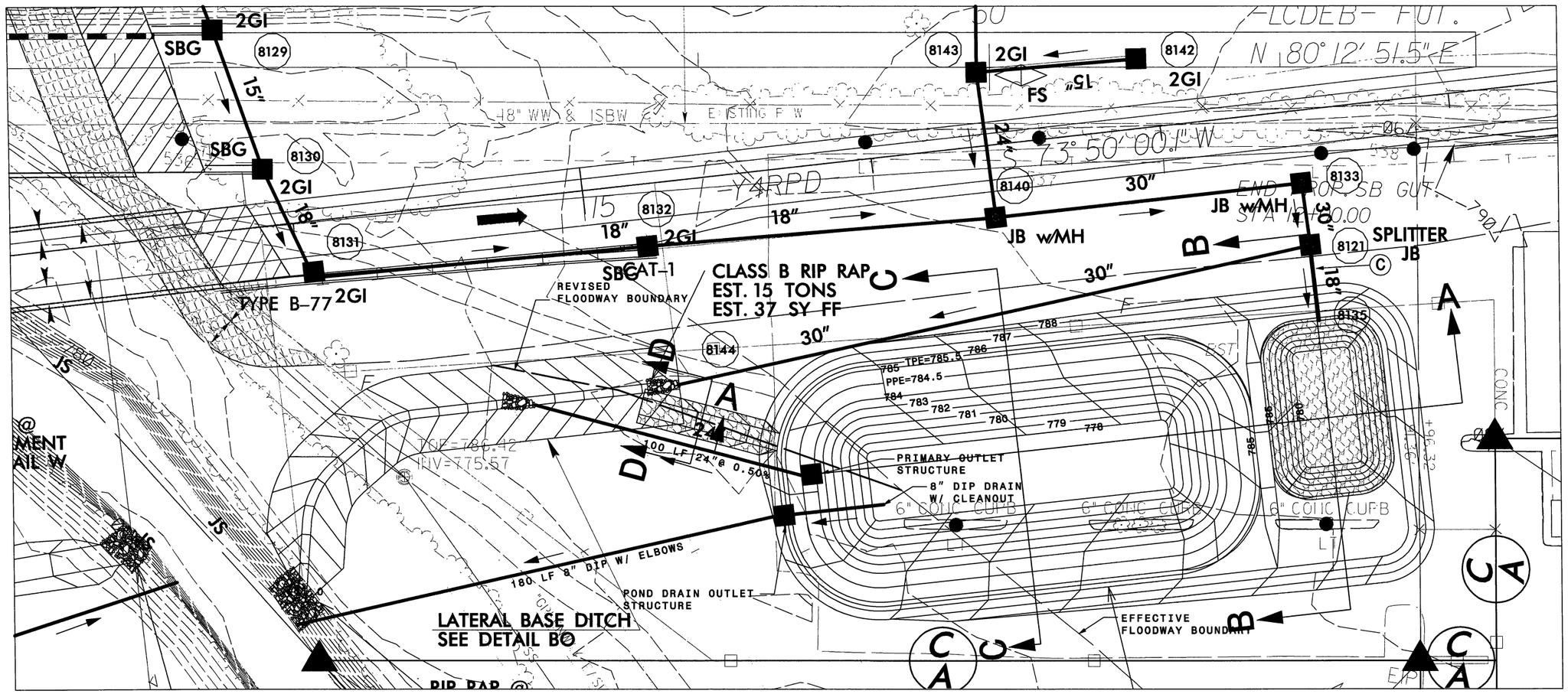

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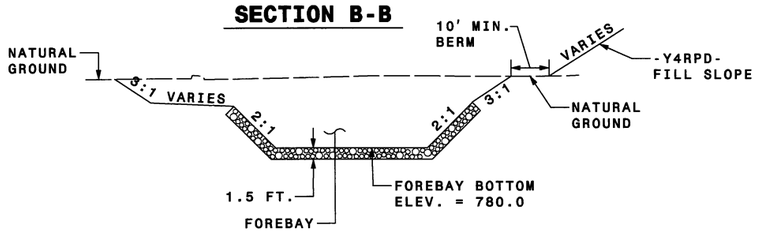

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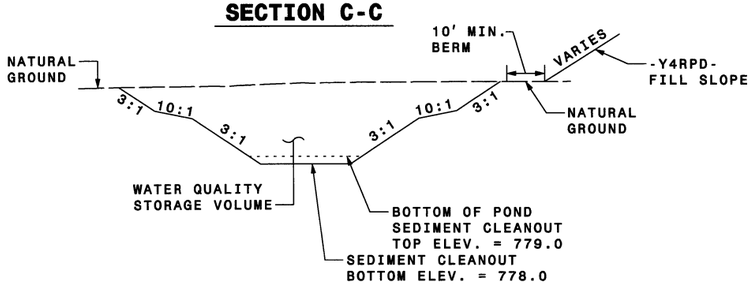

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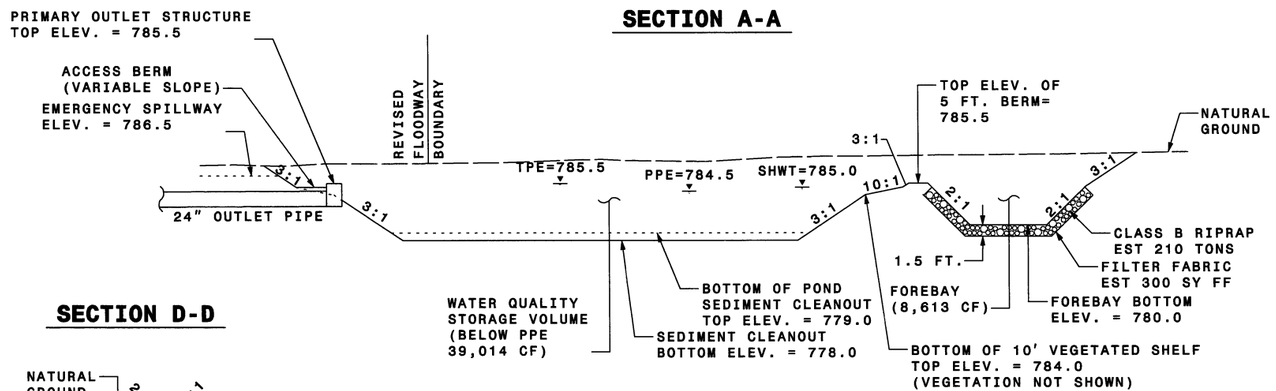

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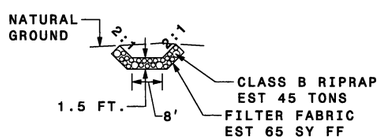

Permit Drawing
Sheet 19 of 68

REVISIONS

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WET DETENTION BASIN NOTES

SEQUENCE OF CONSTRUCTION FOR WET DETENTION BASIN

1. INSTALL ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. EXCAVATE FOR THE BASIN AND FOREBAY. PREPARE THE BASIN FLOOR AT THE GIVEN GRADE.
3. CONSTRUCT FOREBAY.
4. CONSTRUCT MAIN POND.
5. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
6. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR WET DETENTION BASIN

1. APPLY SEEDING ABOVE VEGETATED SHELF AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.

2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   -INVERTS IN THE PIPE AND THE BOXES

VEGETATION NOTES FOR WET DETENTION BASIN

1. NO TREES OR SHRUBS SHOULD BE PLANTED WITHIN 10 FEET OF INLET OR OUTLET PIPES, OR MANMADE DRAINAGE STRUCTURES SUCH AS SPILLWAYS OR FLOW SPREADERS. SPECIES WITH ROOTS THAT SEEK WATER (E.G. WILLOW OR POPLAR), SHOULD BE AVOIDED WITHIN 50 FEET OF PIPES OR MANMADE STRUCTURES.

2. ALL LANDSCAPE MATERIAL, INCLUDING GRASS, SHOULD BE PLANTED IN GOOD TOPSOIL. NATIVE UNDERLYING SOILS MAY BE SUITABLE FOR PLANTING IF AMENDED WITH 4 INCHES OF WELL-AGED COMPOST TILLED INTO THE SUBGRADE COMPOST USED SHOULD MEET SPECIFICATIONS FOR GRADE A COMPOST QUALITY.

3. SOIL IN WHICH TREE OR SHRUBS ARE PLANTED MAY NEED ADDITIONAL ENRICHMENT OR ADDITIONAL COMPOST TOP-DRESSING DEPENDING ON THE RESULTS OF THE SOIL ANALYSIS. CONSULT A NURSERYMAN, LANDSCAPE PROFESSIONAL, OR ARBORIST FOR SITE-SPECIFIC RECOMMENDATIONS.

4. RECOMMENDED PLANTS TO BE USED ON VEGETATED SHELF (ABOVE SHWT):
   LINDERA BENZOIN - SPICEBRUSH
   ITEA VIRGINICA - VIRGINIA SWEETSPIRE
   VIBURNUM NUDUM - POSSUMHAW
   CORNUS AMOMUM - SILKY DOGWOOD
   CEPHALANTHUS OCCIDENTALIS - BOTTONBUS
   HIBISCUS MOSCHENUTOS - ROSE MALLOW
   SAMBUCUS CANADENSIS - ELDERBERRY

5. RECOMMENDED PLANTS TO BE USED ON VEGETATED SHELF (BELOW SHWT):
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   PELTANDRA VIRGINICA - ARROW ARUM
   JUNCUS EFFUSUS - SOFT RUSH
   ITEA VIRGINICA - VIRGINIA SWEETSPIRE
   OSMUNDA REGALIS - ROYAL FERN

MAINTENANCE RECOMMENDATIONS

1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.

2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.

3. CHECK INLETS AND OUTLETS FOR STRUCTURAL REPAIR TO CONFIRM THAT THEY ARE OPERATIONAL.

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5. NO PORTION OF THE WET DETENTION POND SHOULD BE FERTILIZED AFTER THE FIRST INITIAL FERTILIZATION THAT IS REQUIRED TO ESTABLISH THE PLANTS ON THE VEGETATED SHELF.

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jbarnett

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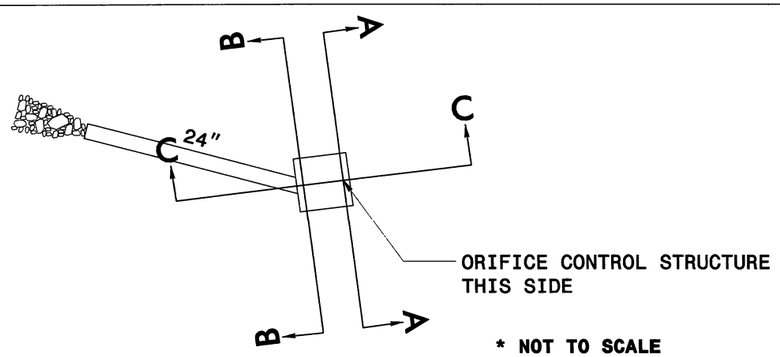
SECTION VIEW SCHEMATIC OF PRIMARY OUTLET STRUCTURE



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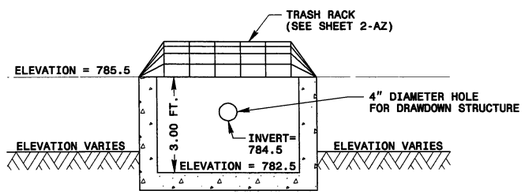

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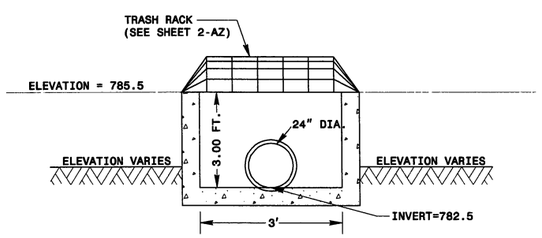

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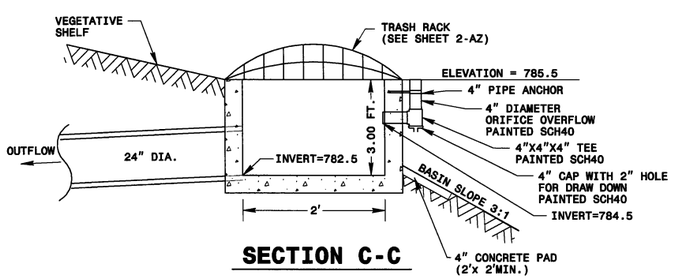

SECTION C-C

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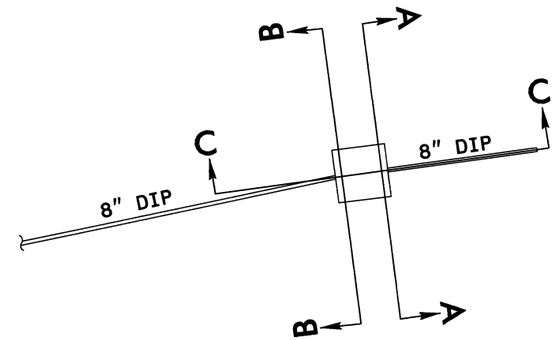
SECTION VIEW SCHEMATIC OF POND DRAIN OUTLET STRUCTURE



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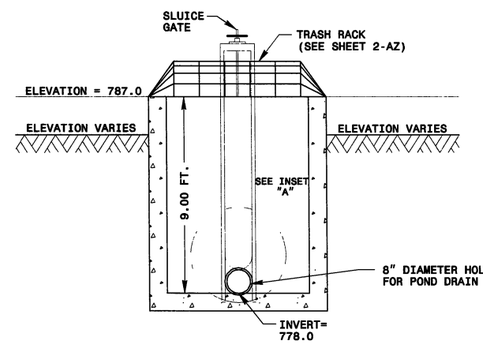

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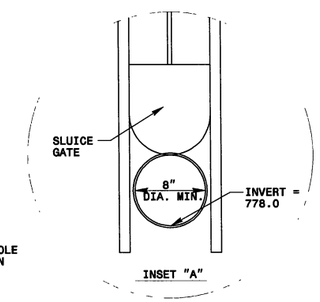

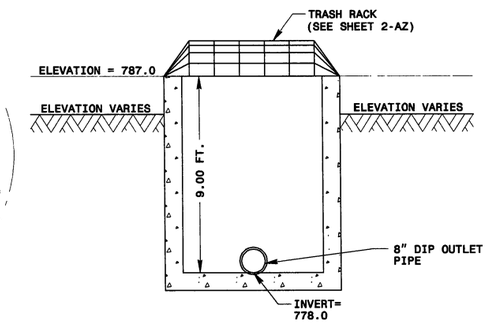

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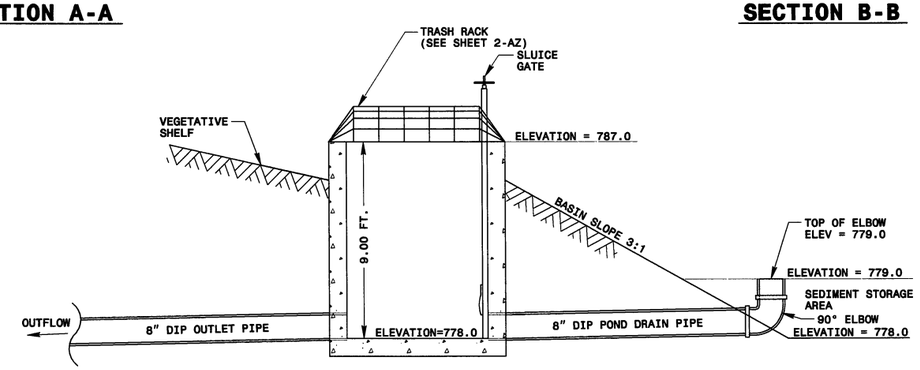

SECTION C-C

Permit Drawing
Sheet 21 of 68

NOTES

1. 8" DIP POND DRAIN IS A POND DRAIN DEVICE AND IS NOT INTENDED TO BE A SECONDARY DRAWDOWN DEVICE.
2. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.

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	R/W SHEET NO.	
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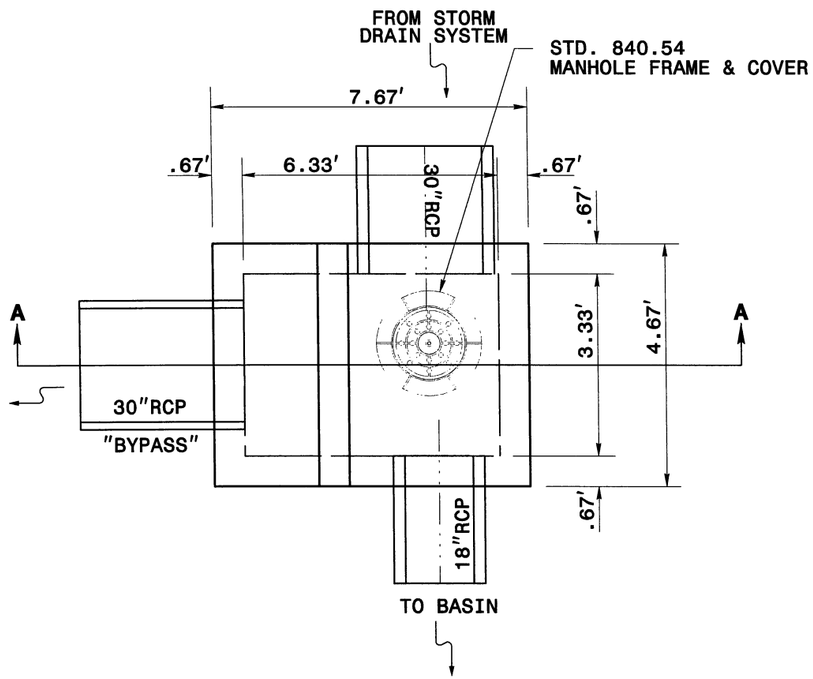
SPLITTER JUNCTION BOX



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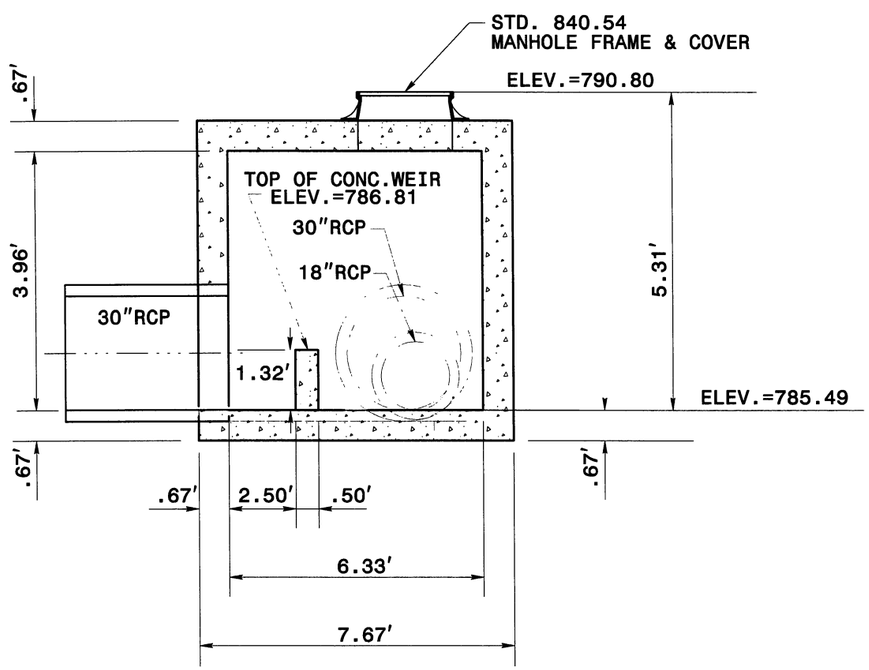

SECTION A-A

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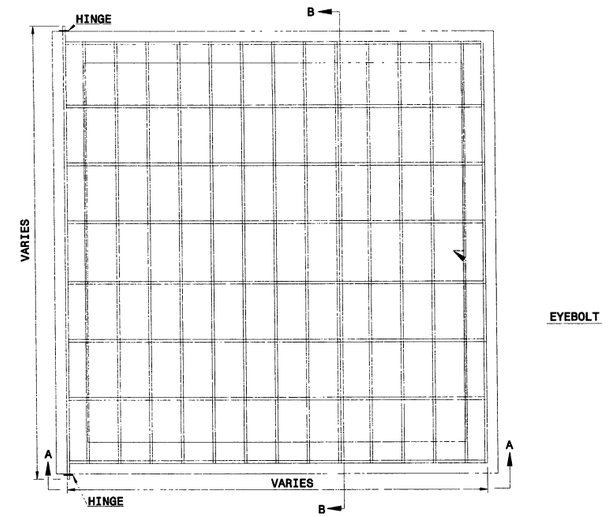
TRASH RACKS FOR OUTLET STRUCTURES



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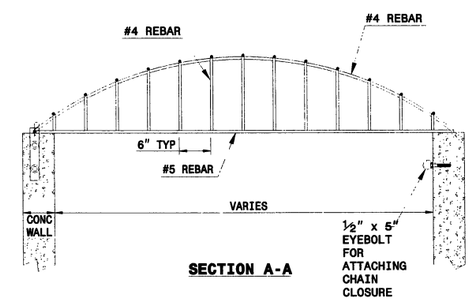

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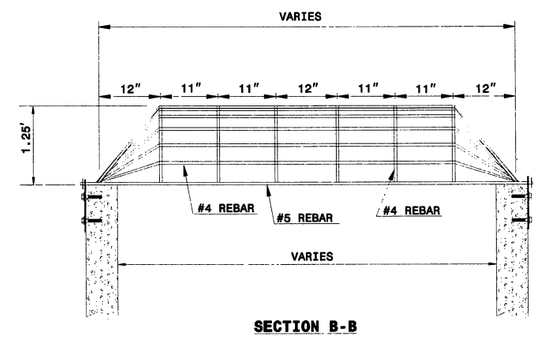

SECTION B-B

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 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 REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.

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Sheet 22 of 68

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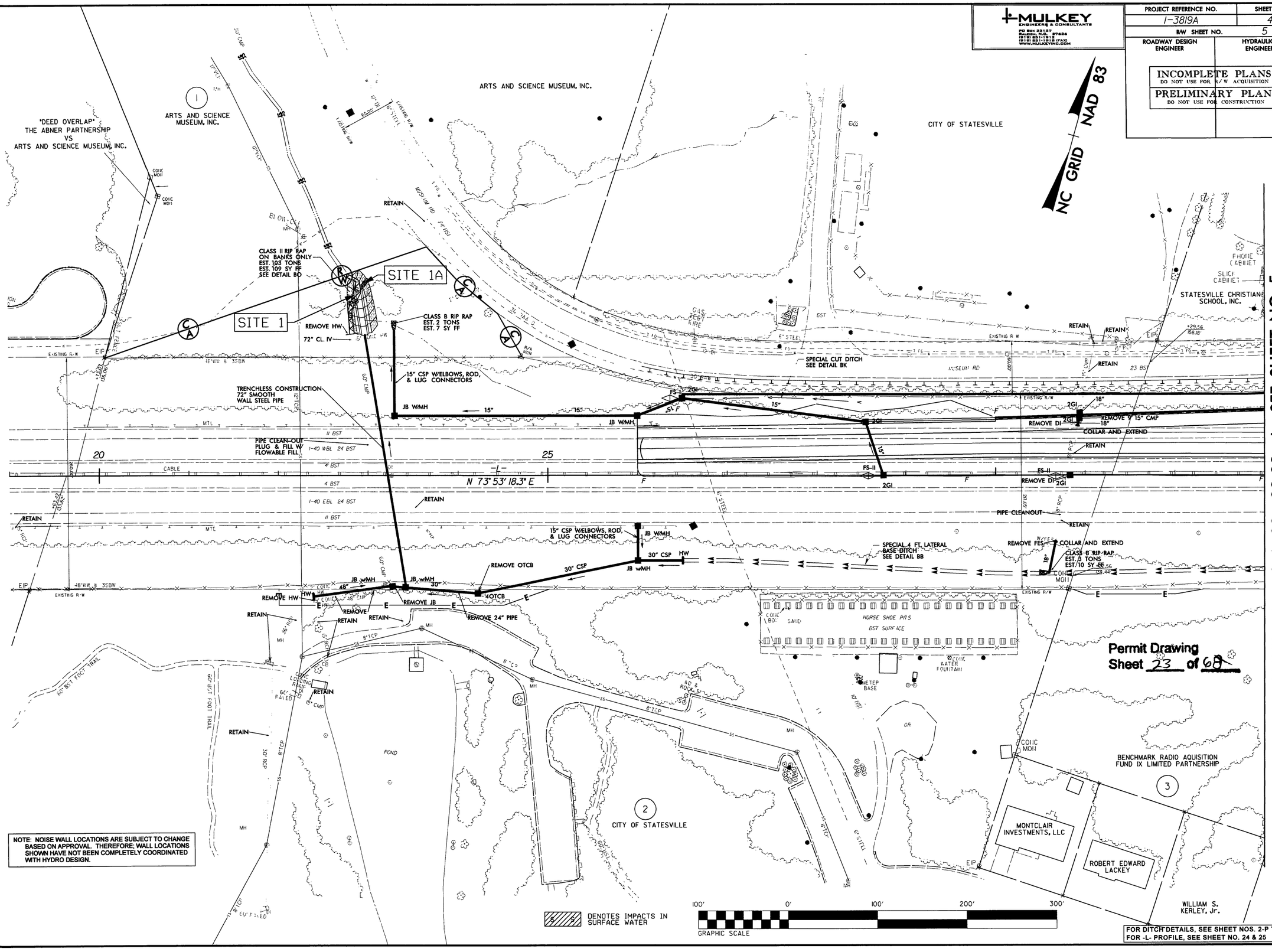
MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	4
R/W SHEET NO.	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



NOTE: NOISE WALL LOCATIONS ARE SUBJECT TO CHANGE BASED ON APPROVAL. THEREFORE; WALL LOCATIONS SHOWN HAVE NOT BEEN COMPLETELY COORDINATED WITH HYDRO DESIGN.

REVISIONS

7/6/2010
Rob Hyer Julie
I:\3819a_Permits_Environmental\Drawings\3819a_hyd_prm_pst04_L1100C-3300_wetlands.dgn

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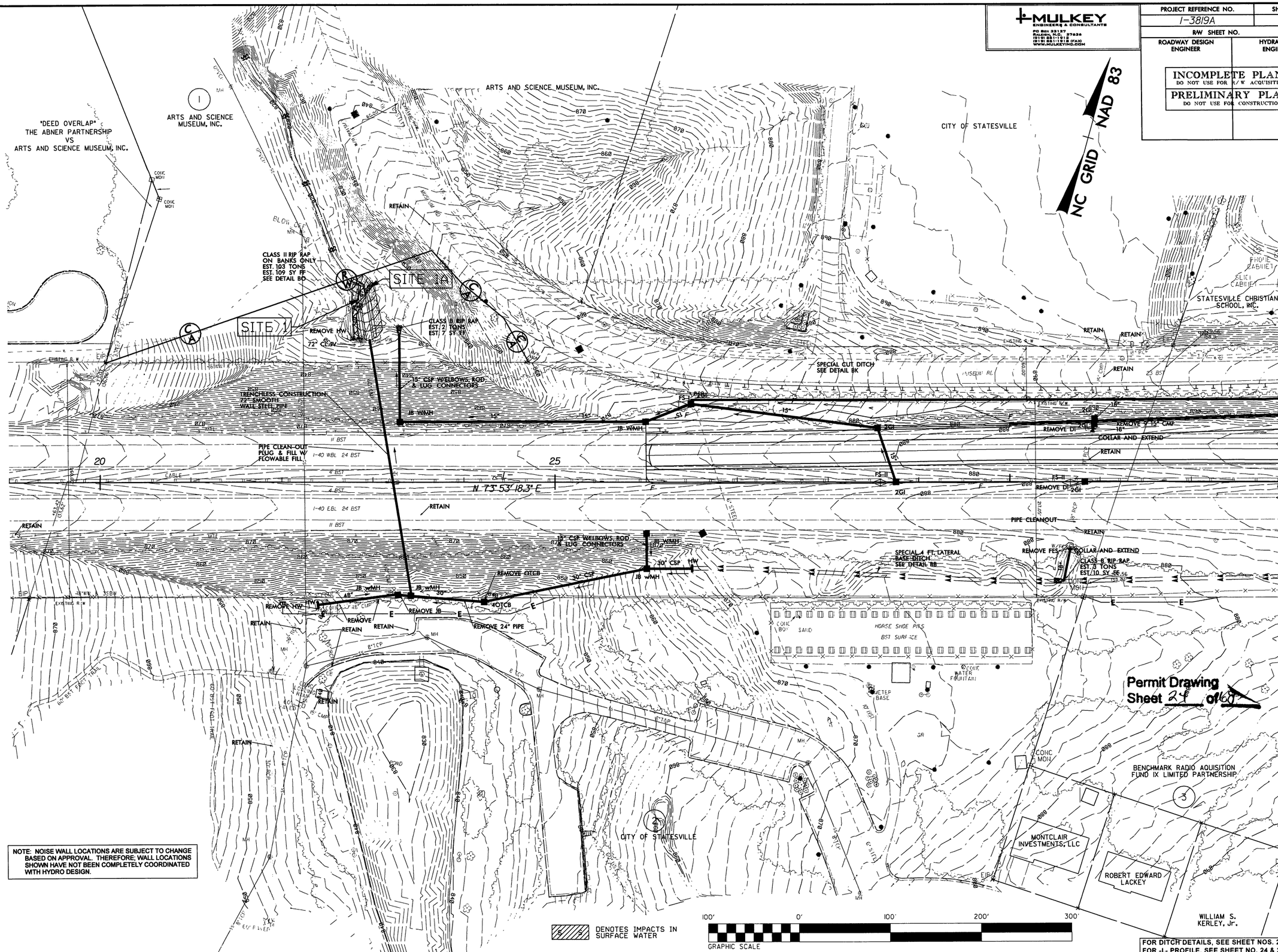
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	4
R/W SHEET NO.	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR DITCH DETAILS, SEE SHEET NOS. 2-P THRU 2-T
FOR -L- PROFILE, SEE SHEET NO. 24 & 25

-MATCHLINE- STA. 33+00.00 -L- SEE SHEET NO. 5

REVISIONS

7/6/2011
5:11pm
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Kimley-Horn and Associates, Inc.

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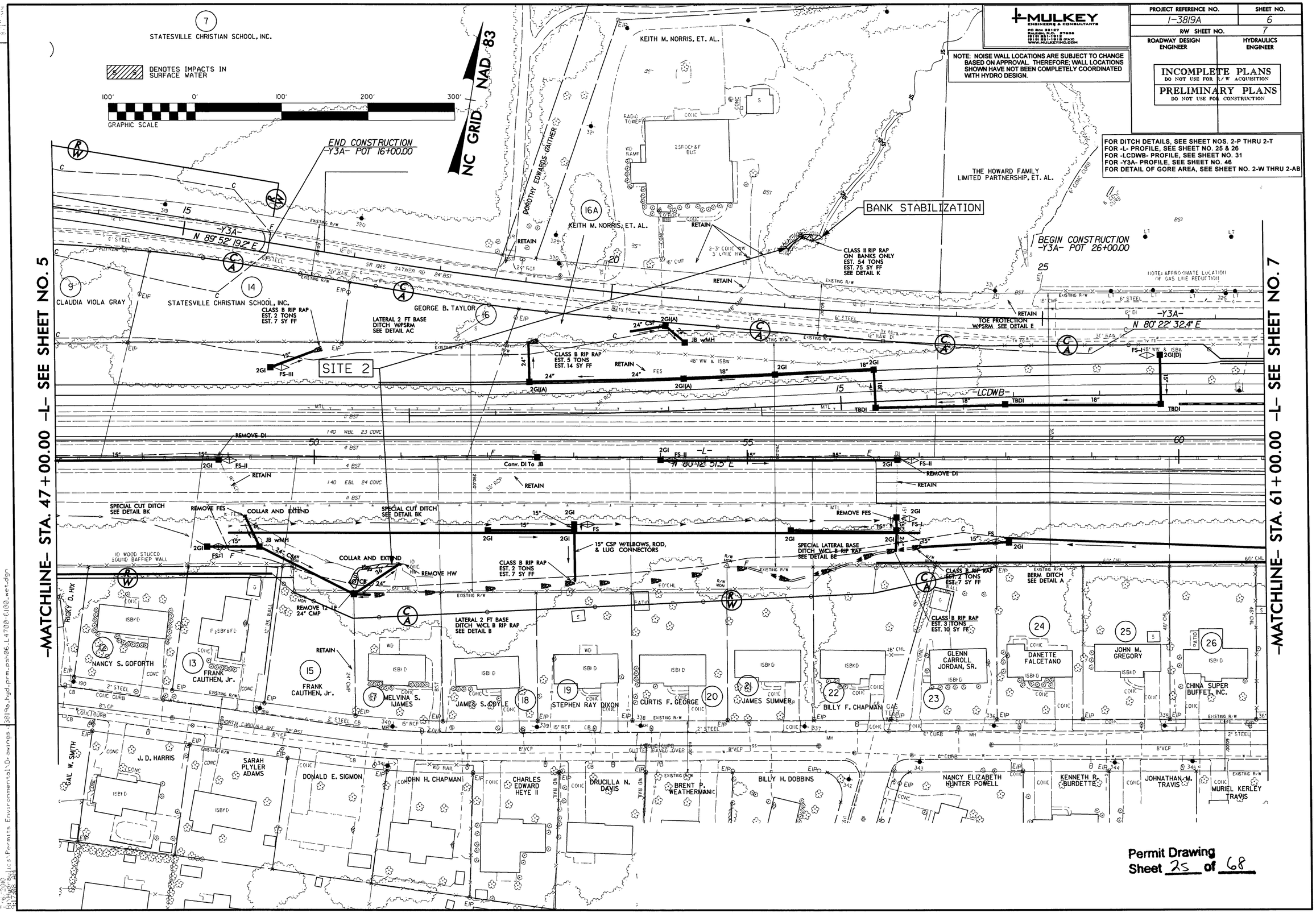
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	6
R/W SHEET NO.	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NOTE: NOISE WALL LOCATIONS ARE SUBJECT TO CHANGE BASED ON APPROVAL. THEREFORE, WALL LOCATIONS SHOWN HAVE NOT BEEN COMPLETELY COORDINATED WITH HYDRO DESIGN.

FOR DITCH DETAILS, SEE SHEET NOS. 2-P THRU 2-T
FOR -L- PROFILE, SEE SHEET NO. 25 & 26
FOR -LCDWB- PROFILE, SEE SHEET NO. 31
FOR -Y3A- PROFILE, SEE SHEET NO. 46
FOR DETAIL OF GORE AREA, SEE SHEET NO. 2-W THRU 2-AB



REVISIONS

Permit Drawing
Sheet 25 of 68

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	6
R/W SHEET NO.	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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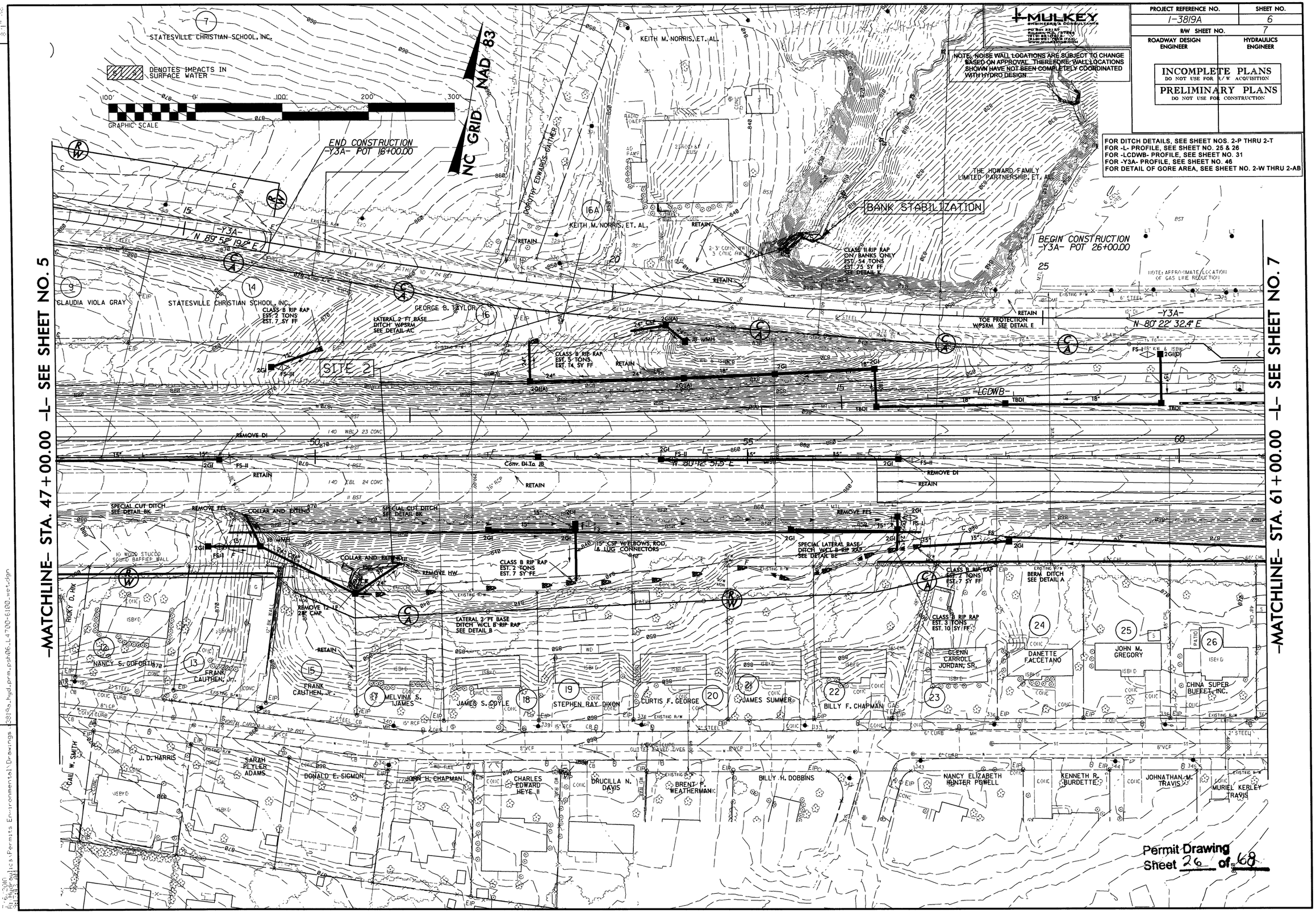
NOTE: NOISE WALL LOCATIONS ARE SUBJECT TO CHANGE BASED ON APPROVAL. THEREFORE, WALL LOCATIONS SHOWN HAVE NOT BEEN COMPLETELY COORDINATED WITH HYDRO DESIGN.

FOR DITCH DETAILS, SEE SHEET NOS. 2-P THRU 2-T
FOR -L- PROFILE, SEE SHEET NO. 25 & 26
FOR -LCDWB- PROFILE, SEE SHEET NO. 31
FOR -Y3A- PROFILE, SEE SHEET NO. 46
FOR DETAIL OF GORE AREA, SEE SHEET NO. 2-W THRU 2-AB



Permit Drawing
Sheet 26 of 68

7-6-2010
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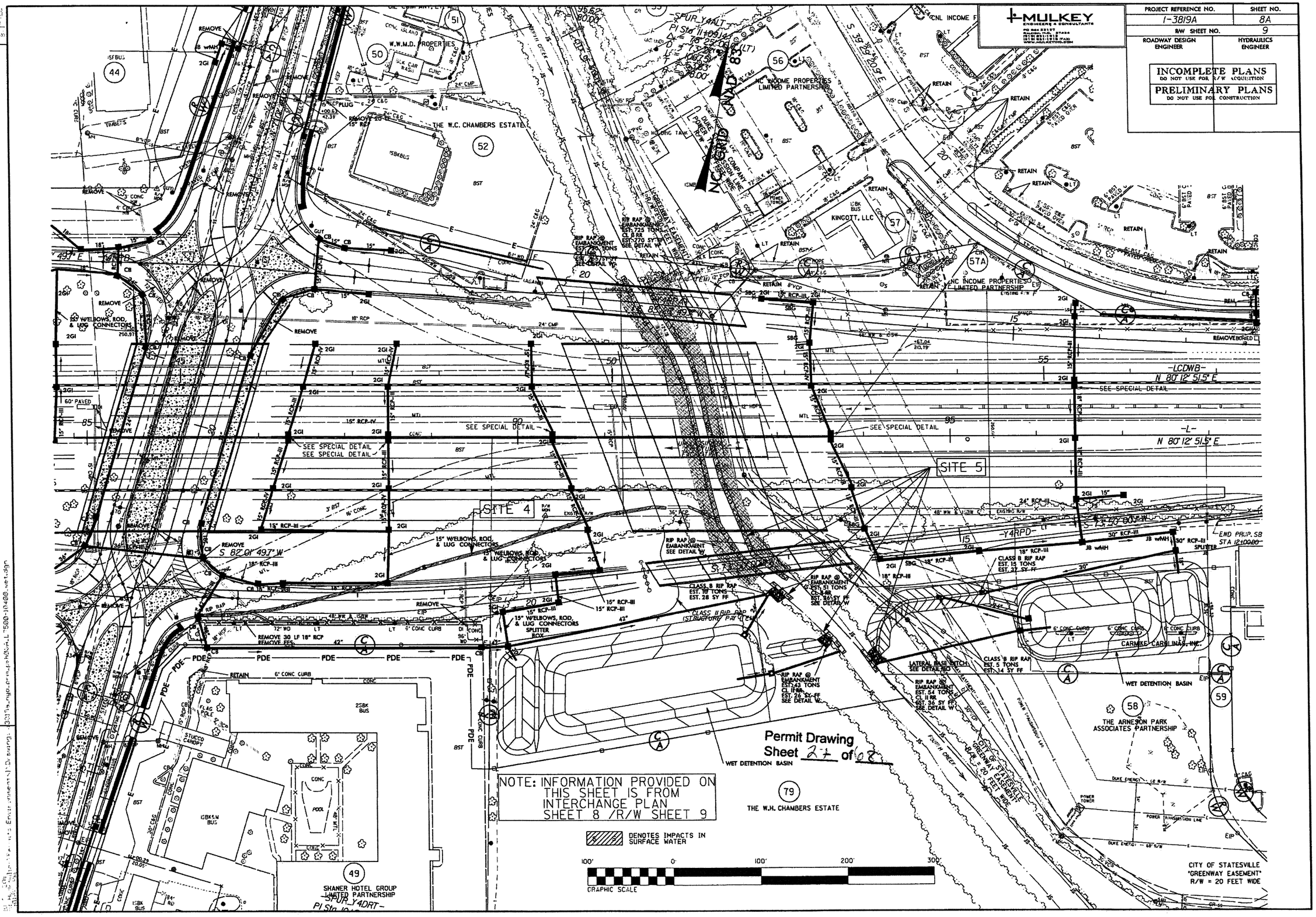
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	8A
R/W SHEET NO.	
9	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
Sheet 27 of 62

NOTE: INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 8 /R/W SHEET 9

REVISIONS

MULKEY ENGINEERS & CONSULTANTS

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	8A
R/W SHEET NO.	
9	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

NOTE: INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 8 /R/W SHEET 9

DENOTES IMPACTS IN SURFACE WATER

Permit Drawing
Sheet 28 of 68

GRAPHIC SCALE 100' 0' 100' 200' 300'

W.W.M.D. PROPERTIES

THE W.C. CHAMBERS ESTATE

NC INCOME PROPERTIES LIMITED PARTNERSHIP

KINGOTT, LLC

CARMIKE CAROLINAS, INC.

THE ARNESON PARK ASSOCIATES PARTNERSHIP

THE W.H. CHAMBERS ESTATE

SHANER HOTEL GROUP UNITED PARTNERSHIP

CITY OF STATESVILLE "GREENWAY EASEMENT" R/W = 20 FEET WIDE

WET DETENTION BASIN

-LCDWB- N 80°12'51.5" E

-L- N 80°12'51.5" E

-YRPD-

SITE 4

SITE 5

END PROP. SB STA. 210+00.00

SEE SPECIAL DETAIL

CLASS B RIP RAP EST. 19 TONS EST. 28 SY FF

CLASS II BIO RIP RAP (STRUCTURE PLATE)

CLASS B RIP RAP EST. 13 TONS EST. 37 SY FF

CLASS B RIP RAP EST. 5 TONS EST. 14 SY FF

RIP RAP @ EMBANKMENT EST. 51 TONS

RIP RAP @ EMBANKMENT EST. 40 TONS CL. II-RR EST. 26 SY-FF SEE DETAIL

RIP RAP @ EMBANKMENT EST. 54 TONS CL. II-RR EST. 30 SY FF SEE DETAIL

LATERAL BASE DITCH SEE DETAIL

15" WELBOWS, ROD & LUG CONNECTORS

15" WELBOWS, ROD, & LUG CONNECTORS SPLITTER BOX

REMOVE 30 LF 18" RCP REMOVE FES

S 85°01'49.7" W

S 39°29'20.2" E

S 50°00'0" W

NAD 83

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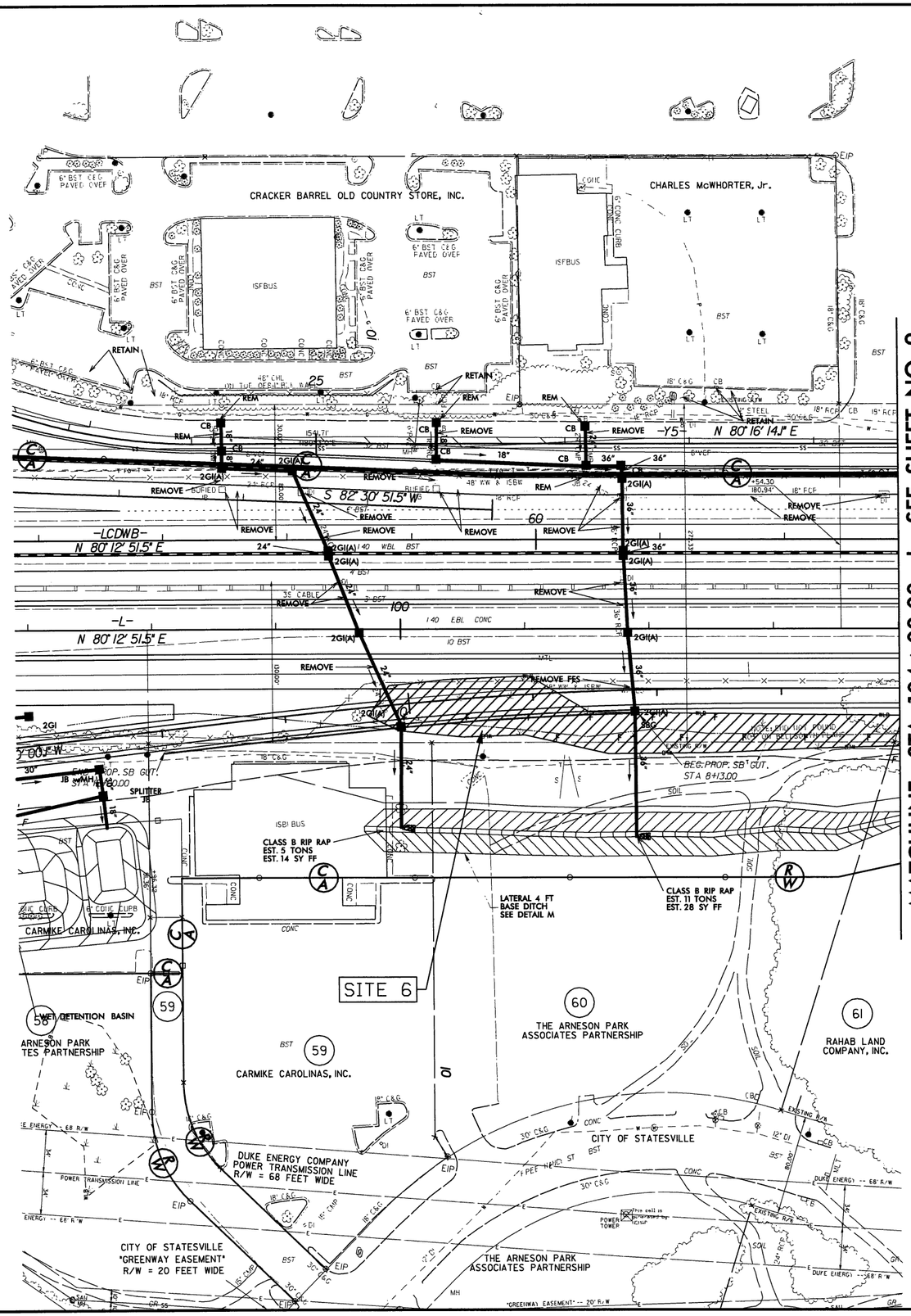
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	8B
R/W SHEET NO.	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



NC GRID NAD 83

NOTE: INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 8 /R/W SHEET 9

DENOTES FILL IN WETLAND

100 0 100 200 300
GRAPHIC SCALE

Permit Drawing
Sheet 29 of 68

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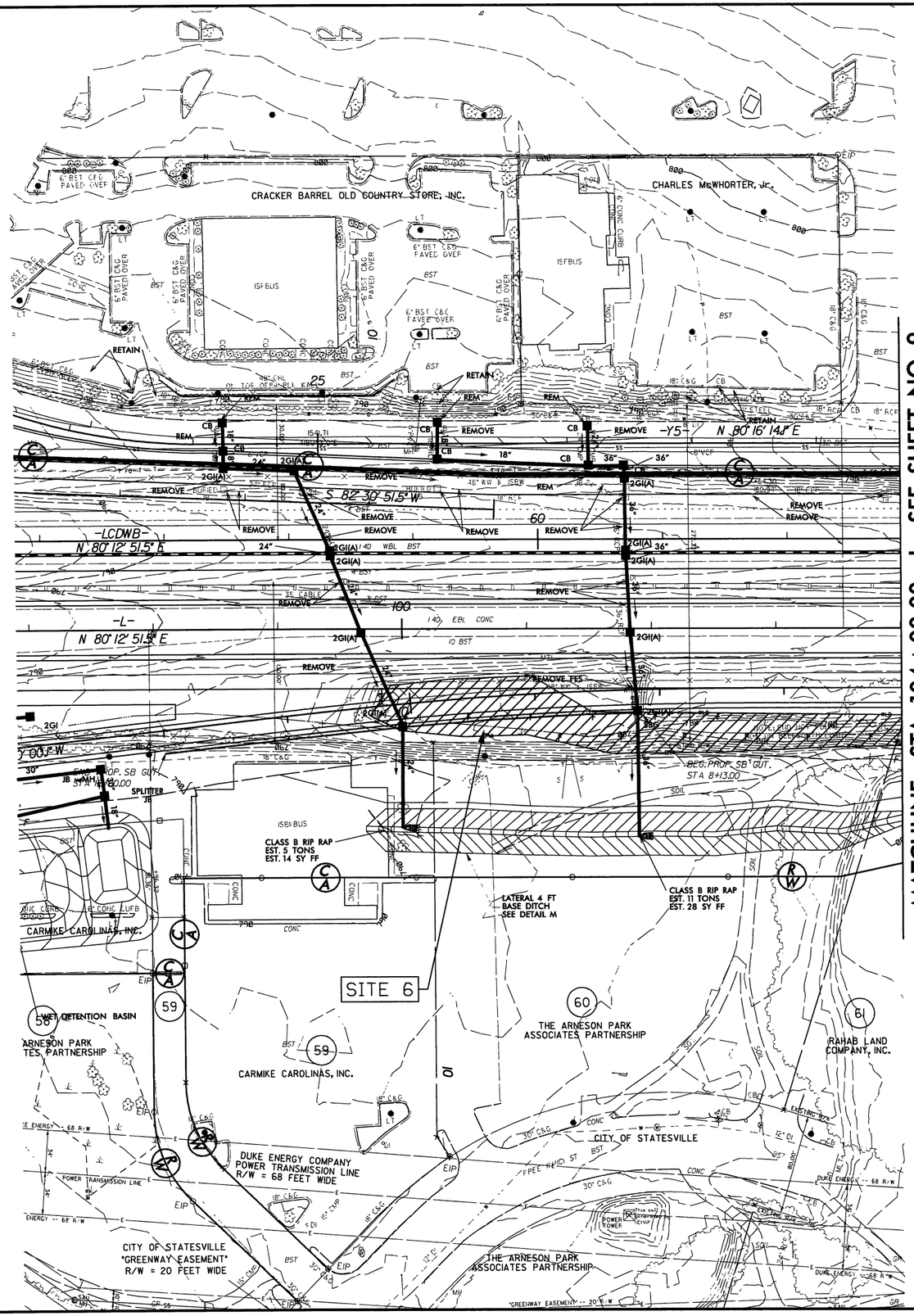
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	8B
R/W SHEET NO.	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



NC GRID NAD 83

NOTE: INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 8 /R/W SHEET 9

DENOTES FILL IN WETLAND

100 0 100 200 300
GRAPHIC SCALE

Permit Drawing
Sheet 30 of 68

REVISIONS

7-6-2006
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PROJECT REFERENCE NO.	SHEET NO.
I-3819A	9A
R/W SHEET NO.	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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INCOMPLETE PLANS
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PRELIMINARY PLANS
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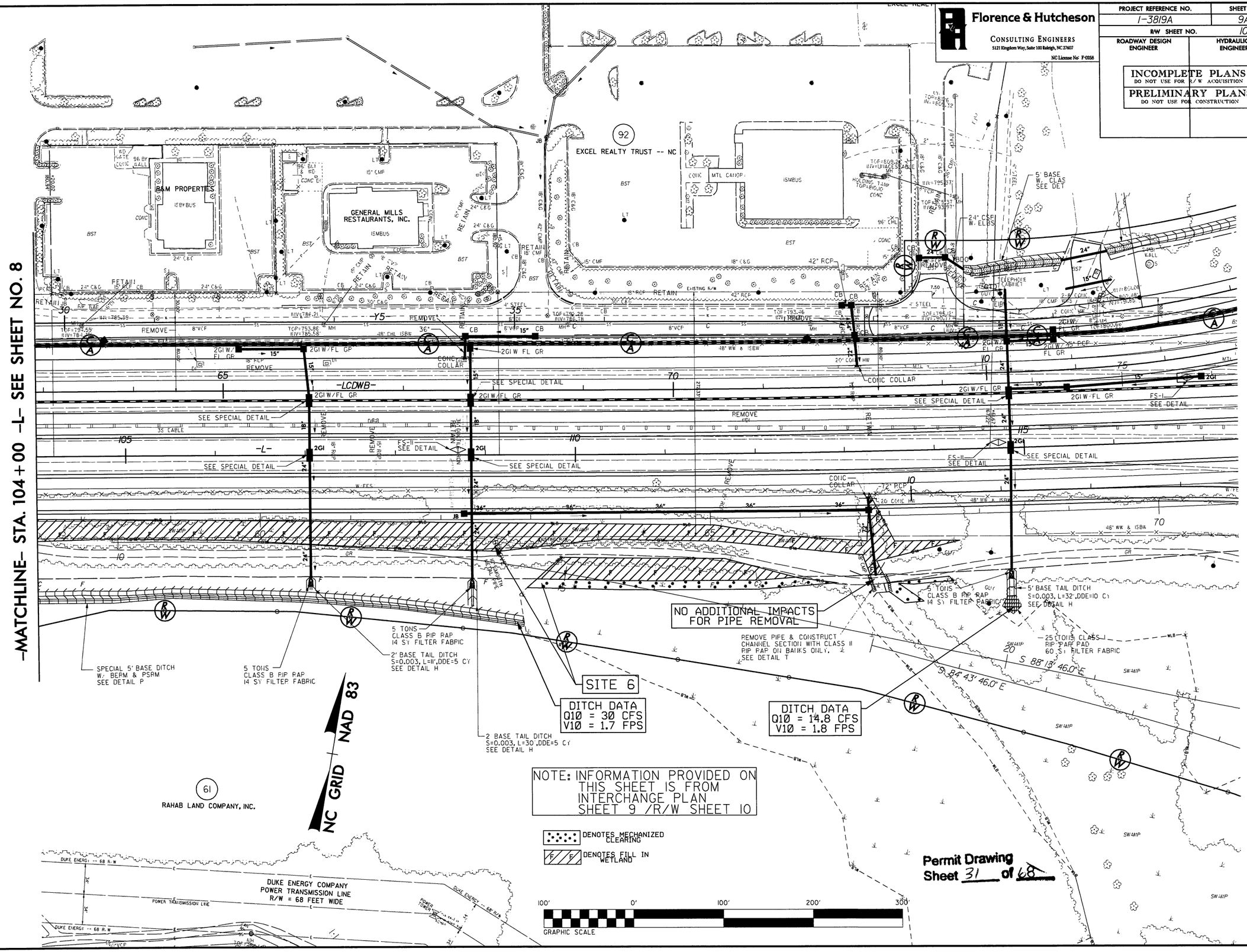
REVISIONS



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PROJECT REFERENCE NO.	SHEET NO.
I-3819A	9A
R/W SHEET NO.	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
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REVISIONS

-MATCHLINE- STA. 104+00 -L- SEE SHEET NO. 8

B&M PROPERTIES
GENERAL MILLS RESTAURANTS, INC.
EXCEL REALTY TRUST -- NC
92
61
RAHAB LAND COMPANY, INC.

NO ADDITIONAL IMPACTS FOR PIPE REMOVAL

SITE 6

DITCH DATA
Q10 = 30 CFS
V10 = 1.7 FPS

DITCH DATA
Q10 = 14.8 CFS
V10 = 1.8 FPS

NOTE: INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 9 /R/W SHEET 10

SPECIAL 5' BASE DITCH W/ BERM & PSPM SEE DETAIL P

5 TONS CLASS B RIP RAP 14 S1 FILTER FABRIC

2' BASE TAIL DITCH S=0.003, L=11', DDE=5 C1 SEE DETAIL H

2 BASE TAIL DITCH S=0.003, L=30', DDE=5 C1 SEE DETAIL H

REMOVE PIPE & CONSTRUCT CHANNEL SECTION WITH CLASS II RIP RAP ON BANKS ONLY. SEE DETAIL T

25 TONS CLASS I RIP RAP PAD 60 S1 FILTER FABRIC

5' BASE TAIL DITCH S=0.003, L=32', DDE=10 C1 SEE DETAIL H

NAD 83
NC GRID

DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND

DUKE ENERGY COMPANY POWER TRANSMISSION LINE R/W = 68 FEET WIDE

GRAPHIC SCALE 100' 0 100' 200' 300

Permit Drawing
Sheet 32 of 68

7-16-2010
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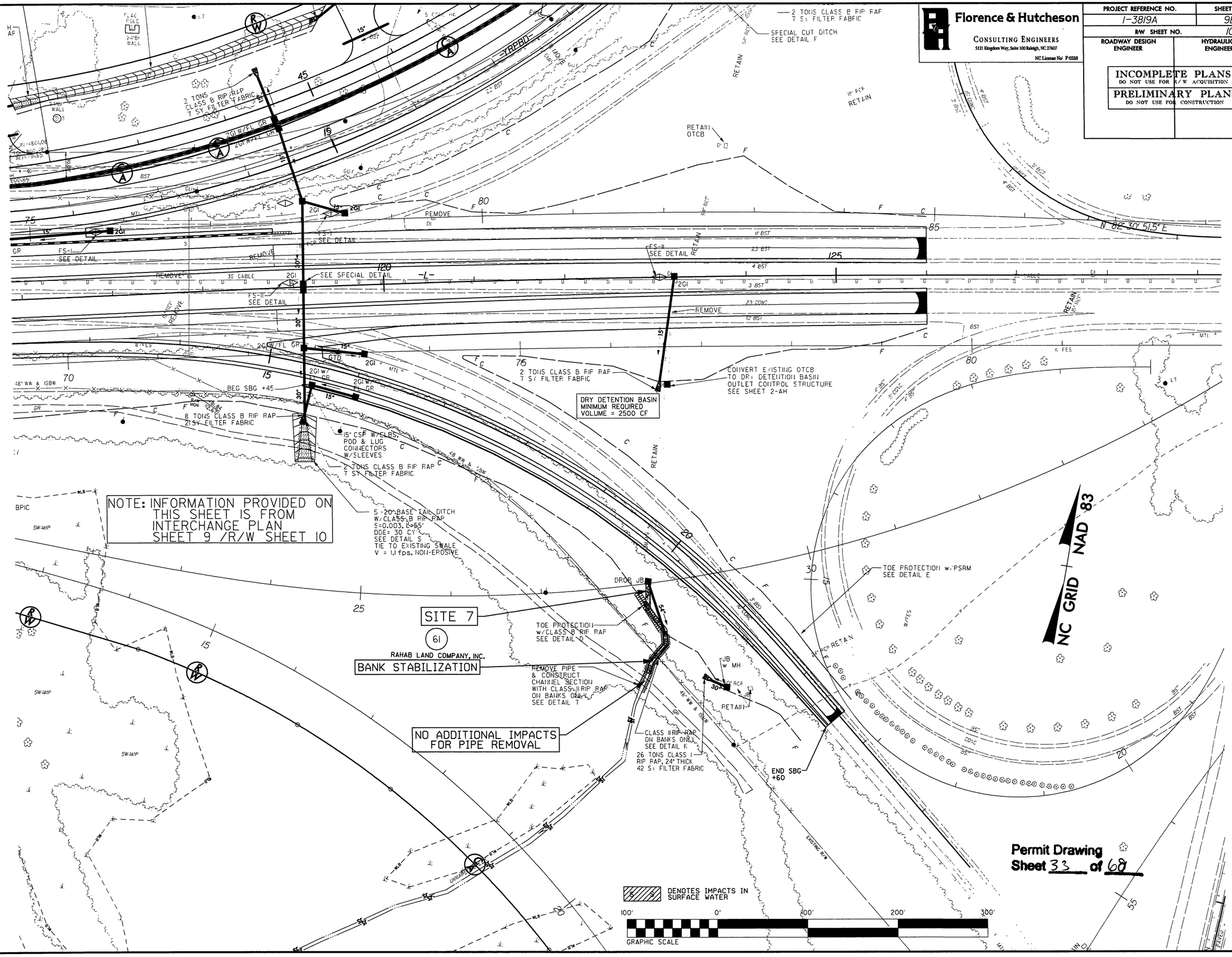
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	9B
R/W SHEET NO.	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



Permit Drawing
Sheet 33 of 68

T.R. JOHNSON
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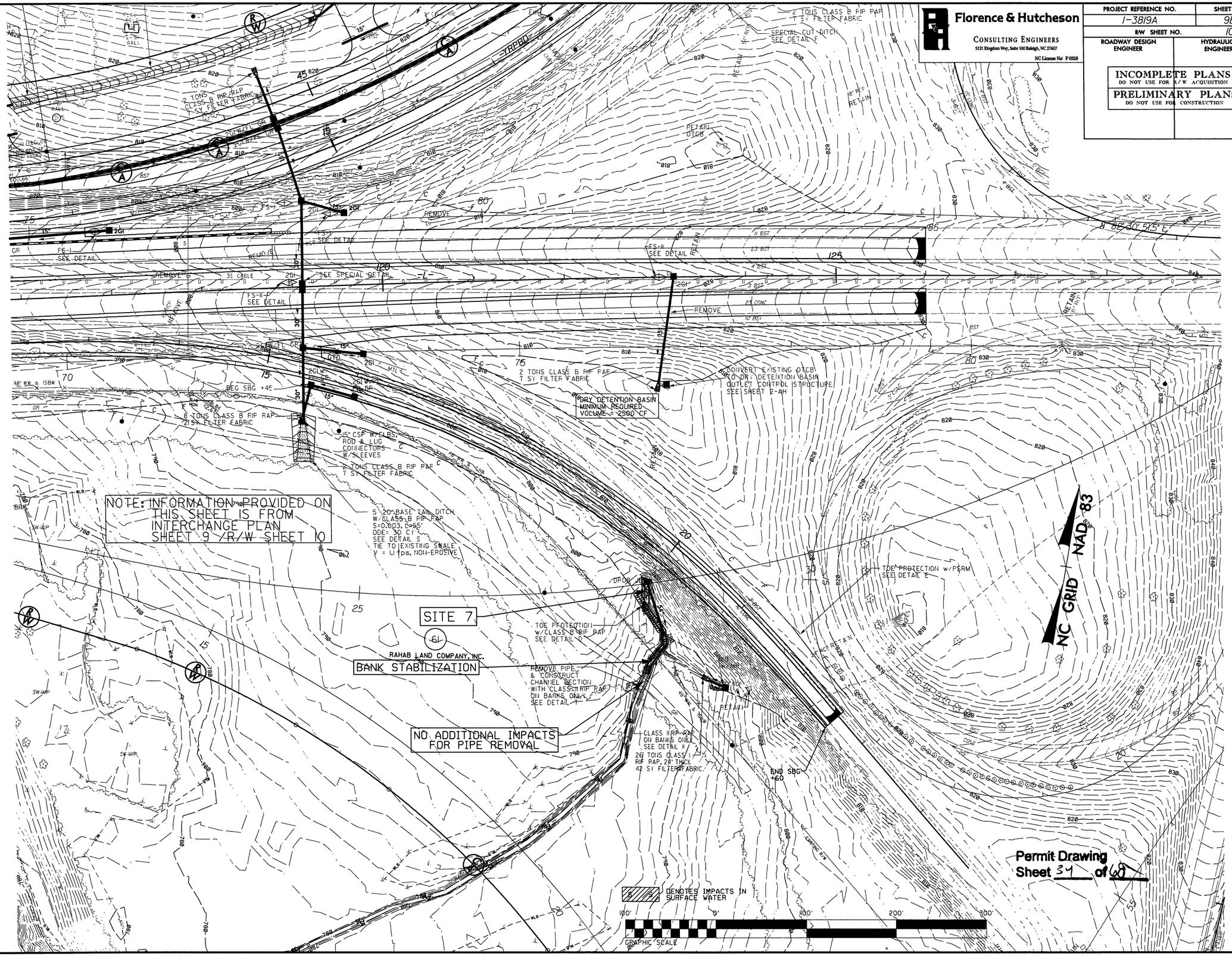
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	9B
R/W SHEET NO.	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



Permit Drawing
Sheet 34 of 68

7-16-2010
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PROJECT REFERENCE NO.	SHEET NO.
I-3819A	9C
R/W SHEET NO.	10 & 15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

GRAPHIC SCALE

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

NC GRID NAD 83

NOTE: INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 9 /R/W SHEET 10 & SHEET 15 /R/W SHEET 23

DOOSAN INTERNATIONAL USA, INC.

MOORESVILLE LODGING, LLC

SITE 8

MATCHLINE STA 24+00 SEE SHEET NO. 15

MATCHLINE STA 24+00 SEE SHEET NO. 15

5 BASE BERM DITCH SEE DETAIL Q

2 BASE BERM DITCH SEE DETAIL Q

3 TONS CLASS B RIP RAP 10 SY FILTER FABRIC

REMOVE 60' OF PIPE

2 TONS CLASS B RIP RAP 7 SY FILTER FABRIC

5' LAT BASE DITCH SEE DETAIL M

5' LAT BASE DITCH W/CLASS I RIP RAP SEE DETAIL B (RIP RAP TO BE FLUSH WITH THE CHANNEL)

7 TONS CLASS I RIP RAP 15 SY FILTER FABRIC (FLUSH w INVERTS)

2 TONS CLASS B RIP RAP 7 SY FILTER FABRIC

SPECIAL CUT DITCH SEE DETAIL F

8 TONS CLASS B RIP RAP 21 SY FILTER FABRIC

2 TONS CLASS B RIP RAP 7 SY FILTER FABRIC

Permit Drawing
Sheet 35 of 68

I-5700 R/W Plans Permits Environmental\Drawings\3819a_hyd_perm_psh09c_L7500-10400_wet.dgn

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	9C
R/W SHEET NO.	10 & 15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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INCOMPLETE PLANS
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PRELIMINARY PLANS
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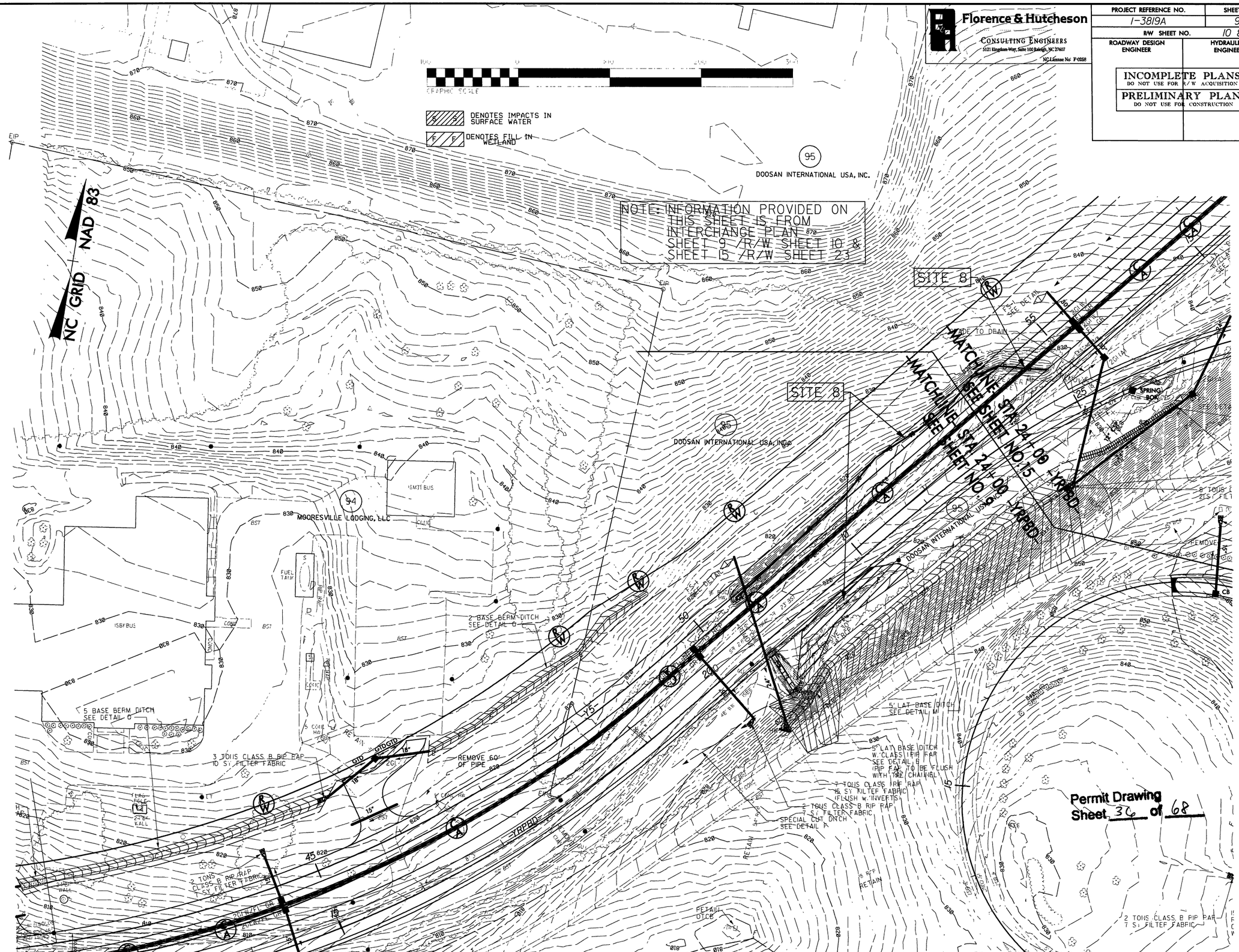
REVISIONS



Permit Drawing
Sheet 36 of 68

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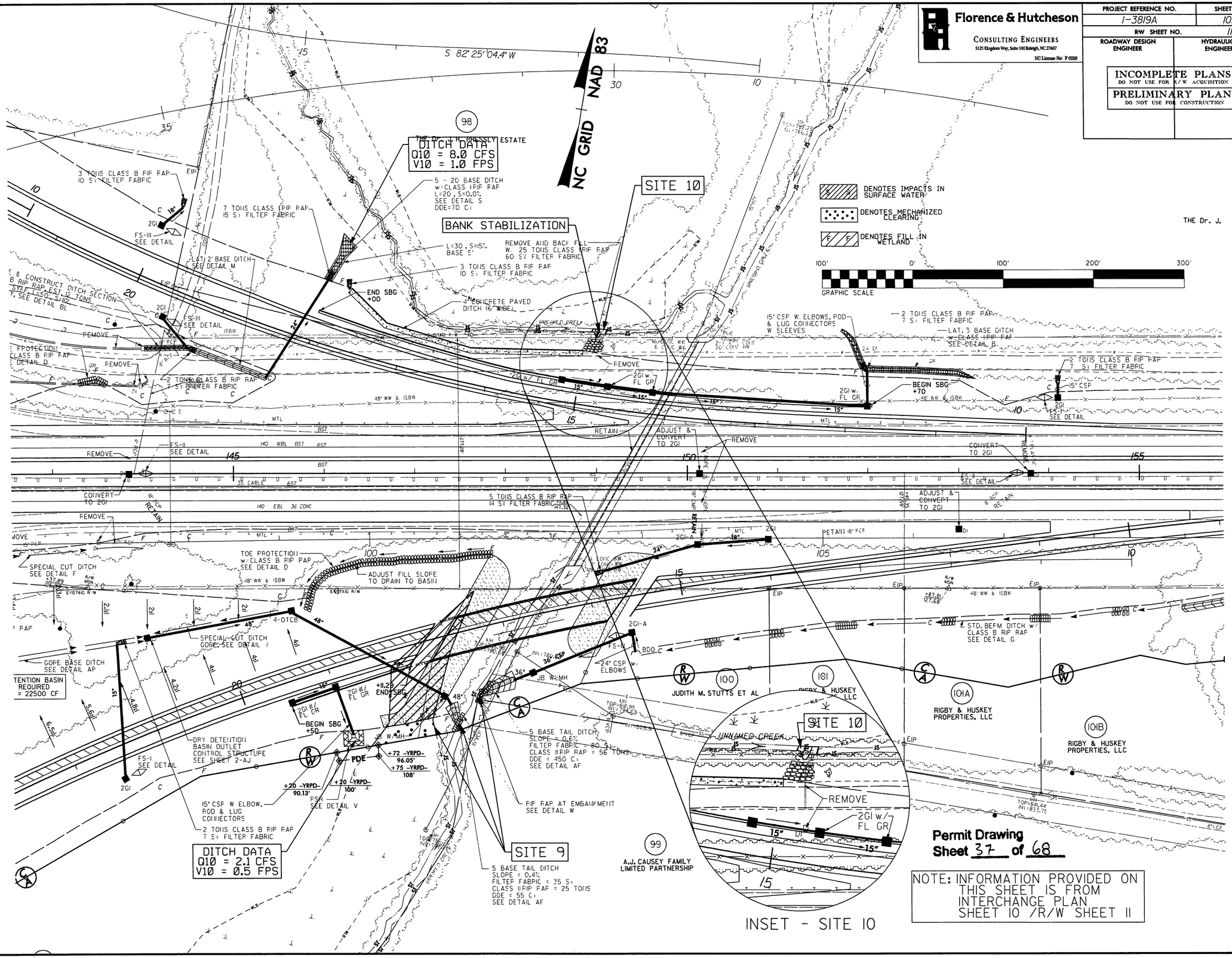
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	10A
R/W SHEET NO.	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

8-2-2011
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PROJECT REFERENCE NO.	SHEET NO.
I-3819A	10A
R/W SHEET NO.	//
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PRELIMINARY PLANS
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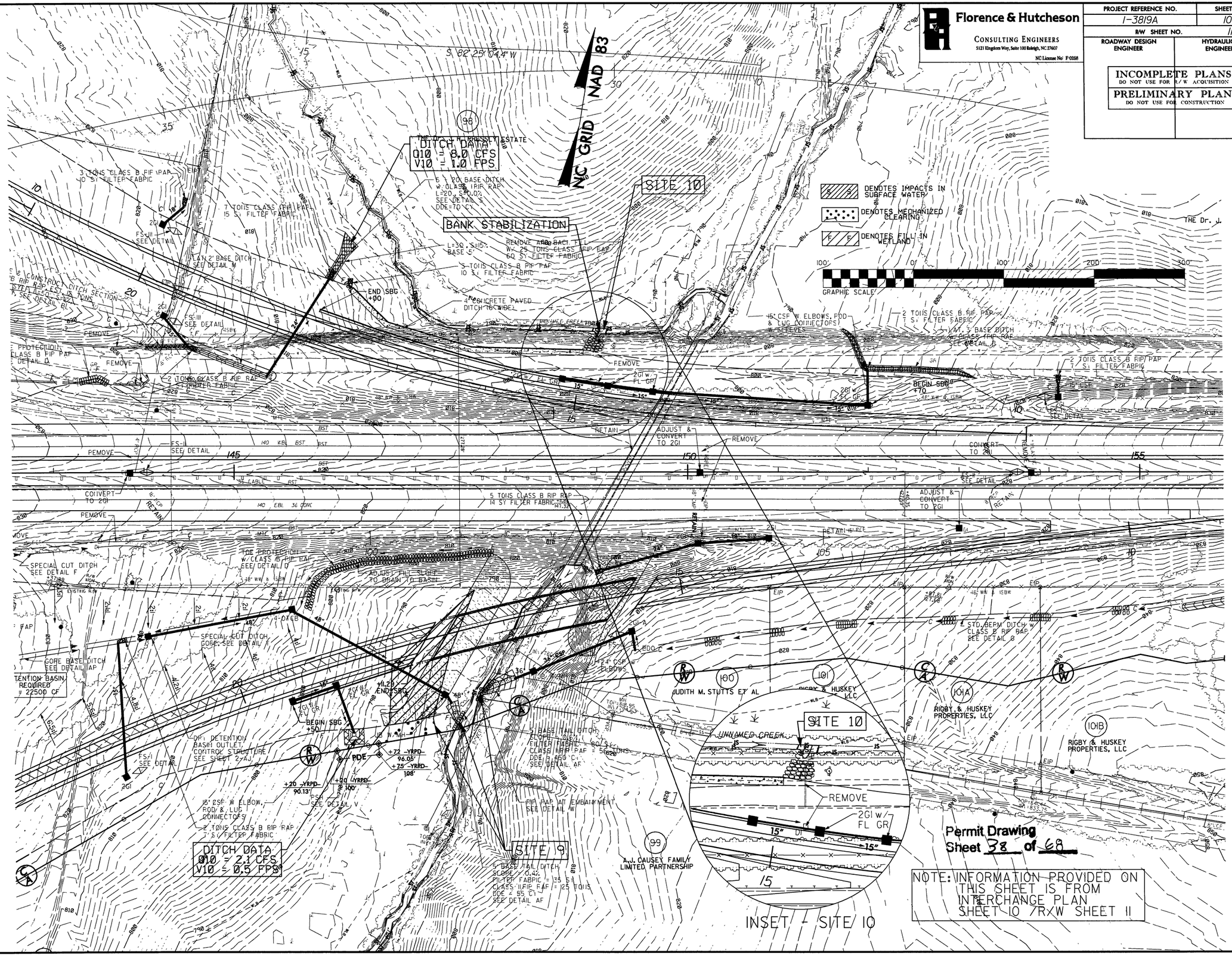
REVISIONS



Permit Drawing
Sheet 38 of 68

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Permits Environmental\Drawings

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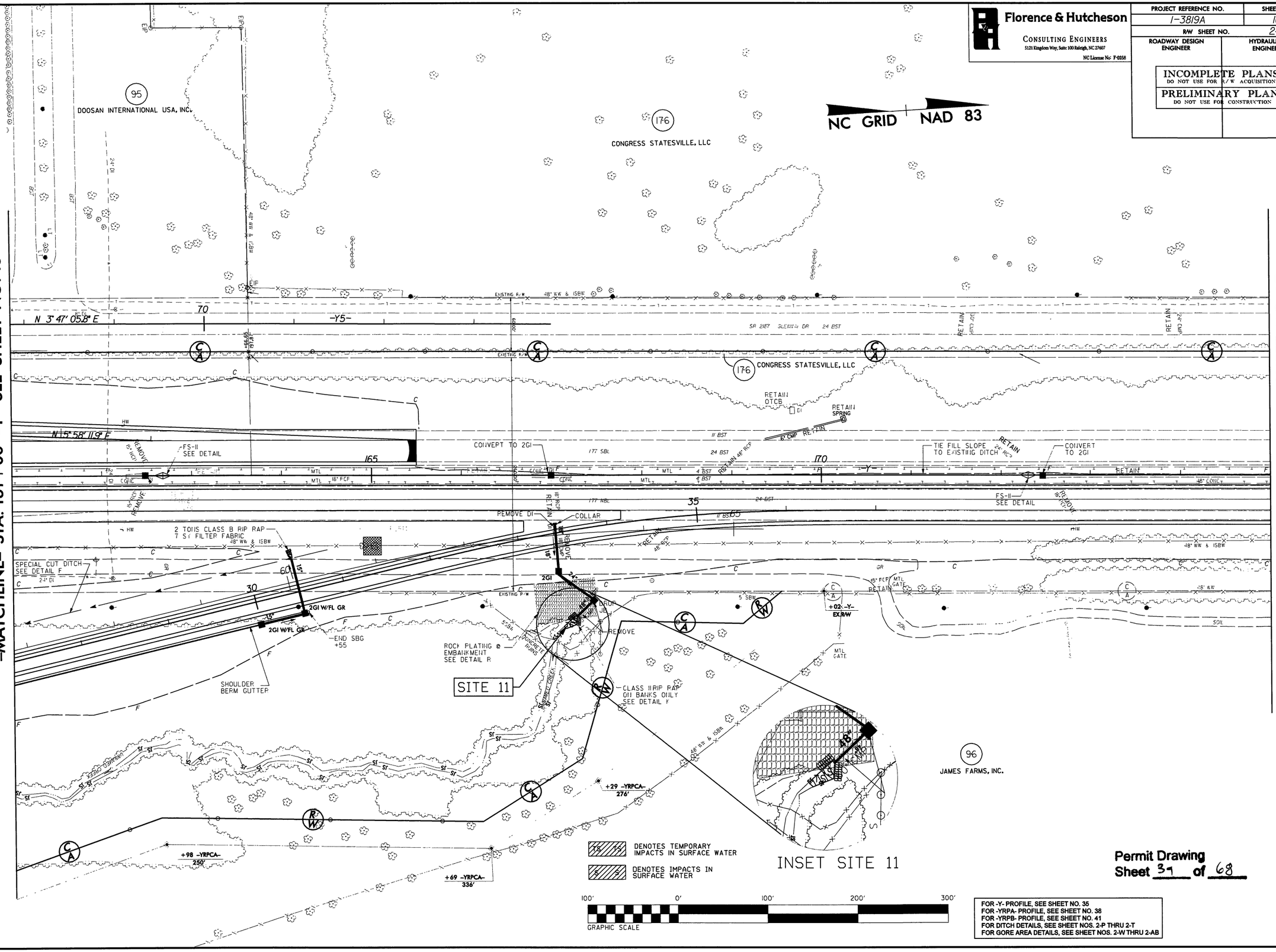
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	16
R/W SHEET NO.	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -Y- PROFILE, SEE SHEET NO. 35
FOR -YRPA- PROFILE, SEE SHEET NO. 38
FOR -YRPB- PROFILE, SEE SHEET NO. 41
FOR DITCH DETAILS, SEE SHEET NOS. 2-P THRU 2-T
FOR GORE AREA DETAILS, SEE SHEET NOS. 2-W THRU 2-AB

Permit Drawing
Sheet 34 of 68

REVISIONS

7-6-2010
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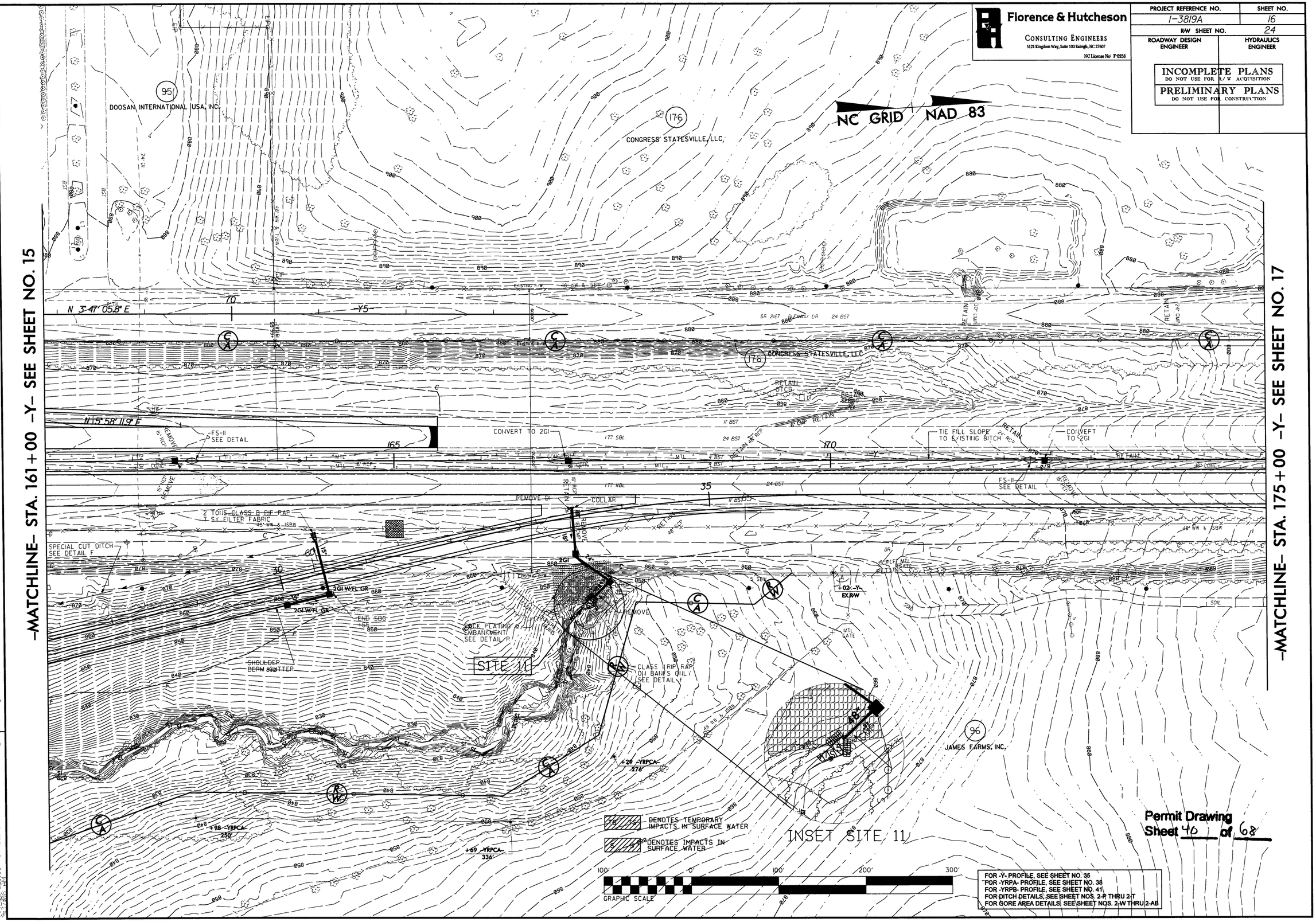

REVISIONS

7/9/2010
By: Hydraulics
3:28:26 AM

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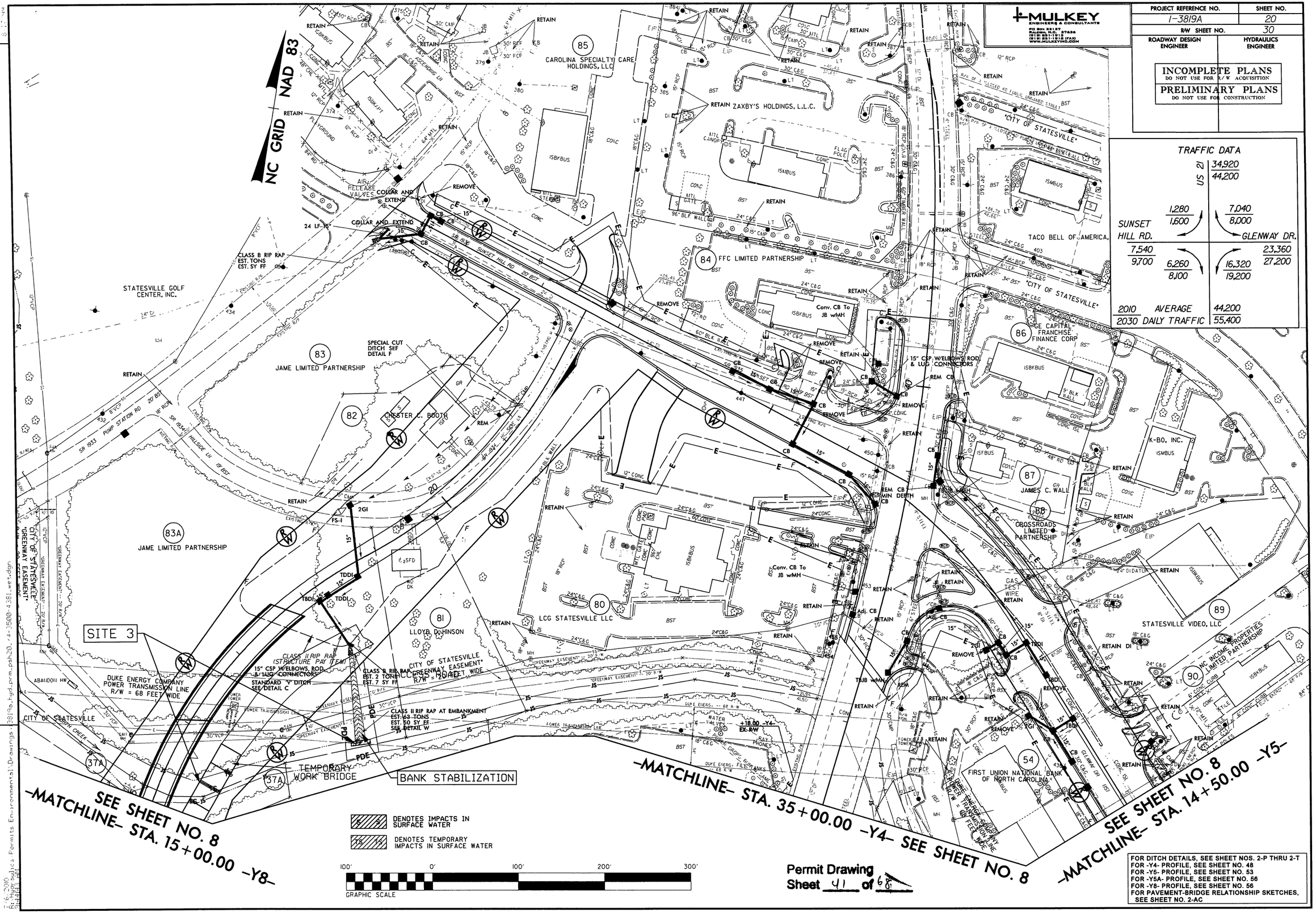

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RALEIGH, N.C. 27636
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PROJECT REFERENCE NO.	SHEET NO.
1-3819A	20
R/W SHEET NO.	30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR DITCH DETAILS, SEE SHEET NOS. 2-P THRU 2-T
FOR -Y4- PROFILE, SEE SHEET NO. 48
FOR -Y5- PROFILE, SEE SHEET NO. 53
FOR -Y5A- PROFILE, SEE SHEET NO. 56
FOR -Y8- PROFILE, SEE SHEET NO. 56
FOR PAVEMENT-BRIDGE RELATIONSHIP SKETCHES, SEE SHEET NO. 2-AC

Permit Drawing
Sheet 41 of 68

REVISIONS

7-6-2010
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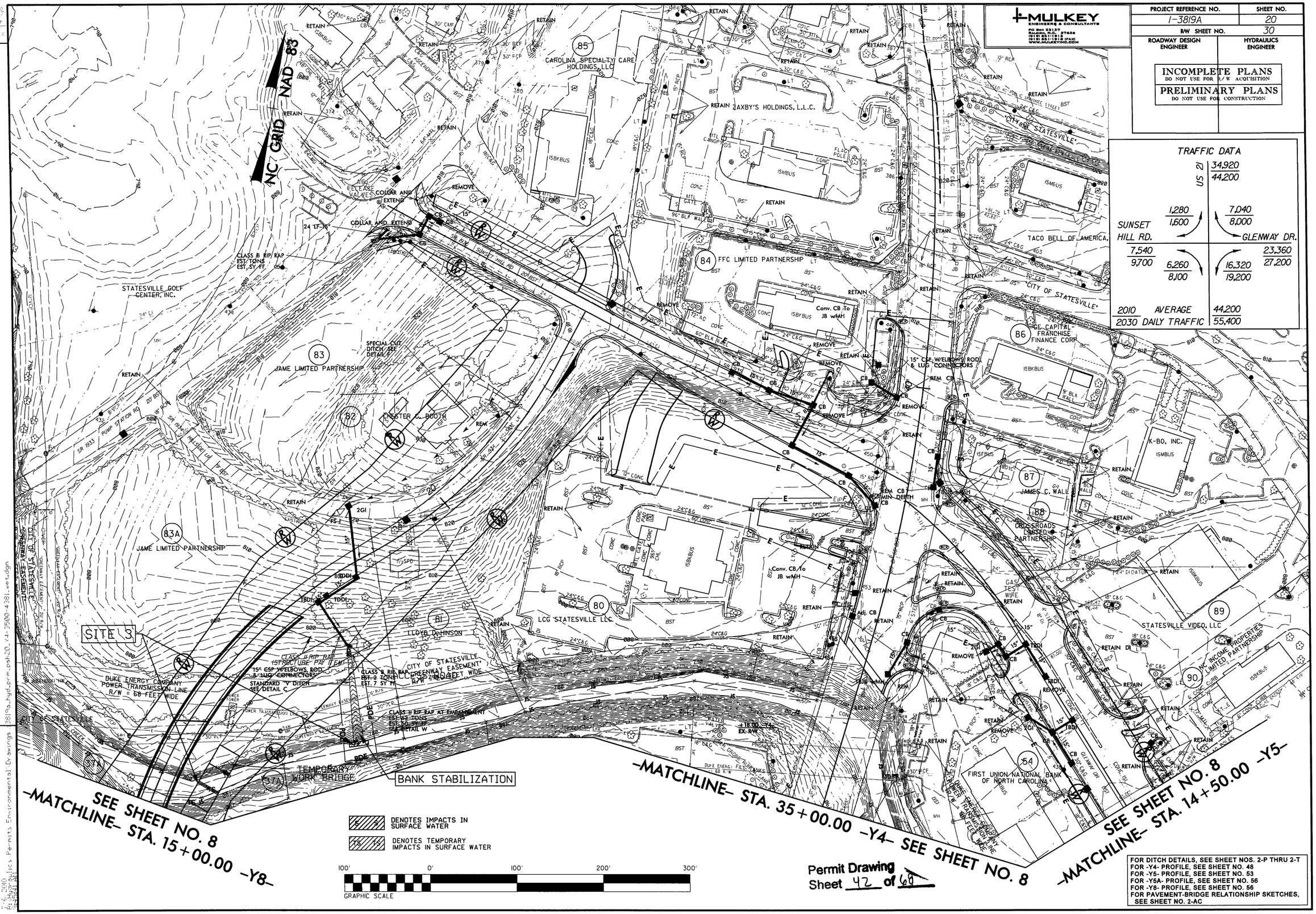
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	20
R/W SHEET NO.	30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TRAFFIC DATA

		US 21	34,920 / 44,200	
SUNSET HILL RD.	1,280 / 1,600		7,040 / 8,000	GLENWAY DR.
	7,540 / 9,700	6,260 / 8,100	16,320 / 19,200	23,360 / 27,200
2010 / 2030	AVERAGE DAILY TRAFFIC		44,200 / 55,400	



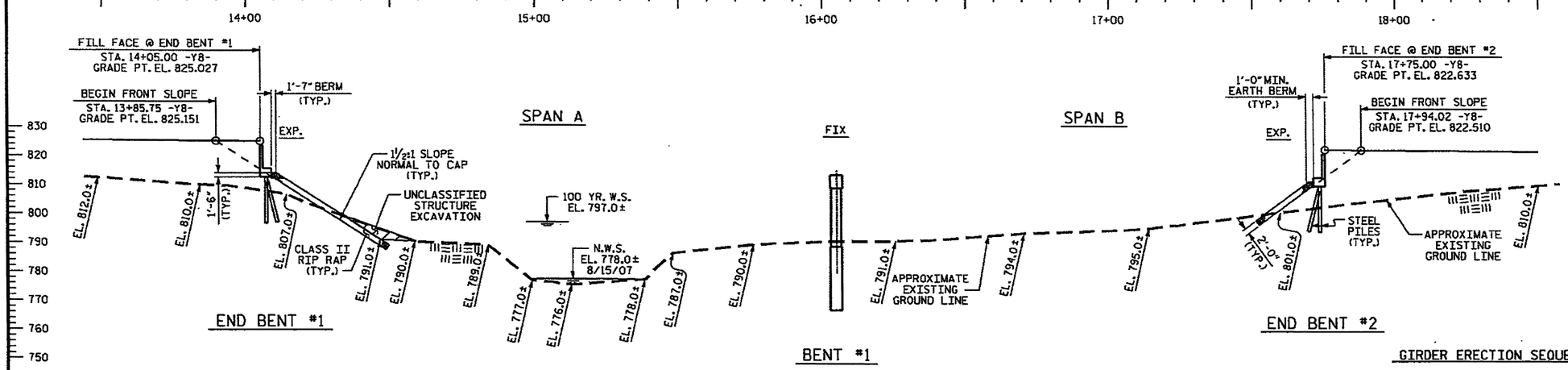
Permit Drawing
Sheet 42 of 68

FOR DITCH DETAILS, SEE SHEET NOS. 2-P THRU 2-T
FOR -Y4- PROFILE, SEE SHEET NO. 48
FOR -Y5- PROFILE, SEE SHEET NO. 53
FOR -Y5A- PROFILE, SEE SHEET NO. 56
FOR -Y8- PROFILE, SEE SHEET NO. 56
FOR PAVEMENT-BRIDGE RELATIONSHIP SKETCHES, SEE SHEET NO. 2-AC

REVISIONS

7-6-2010
8:13am
I:\Hydraulics Permits Environmental\Drawings\3819a_hyd_prm_psh20_r4-3500-4381_wet.dgn

F.A. PROJECT# IMS-40-2(124)



SECTION ALONG -Y8-

GRADE DATA

+0.8753% △ -0.6470%

PI = 14+00.00 -Y8-
EL. = 827.00
VC = 170'

GIRDER ERECTION SEQUENCE

THE STRUCTURAL STEEL SHALL BE SUPPORTED DURING ERECTION IN ITS CAMBERED POSITION. ONE EXTERIOR GIRDER AND ITS ADJACENT INTERIOR GIRDER SHALL BE ERECTED WITH ALL DIAPHRAGMS AND LATERAL BRACING BETWEEN THE GIRDERS IN PLACE AND ALL BOLTS TIGHTENED PRIOR TO RELEASE OF THE GIRDERS. THE REMAINING GIRDERS SHALL THEN BE ERECTED WITH DIAPHRAGMS CONNECTING THE GIRDER TO THE ADJACENT ERECTED GIRDER AND ALL BOLTS TIGHTENED BEFORE RELEASING THE GIRDER.

A MINIMUM OF TWO TEMPORARY BENT SHALL BE USED.

TEMPORARY BENTS SHALL REMAIN IN PLACE UNTIL ALL CROSSFRAMES AND LATERAL BRACING ARE IN PLACE AND HIGH STRENGTH BOLTS TIGHTENED.

TEMPORARY BENTS SHALL PROVIDE BEARING AT CONNECTOR PLATE LOCATIONS.

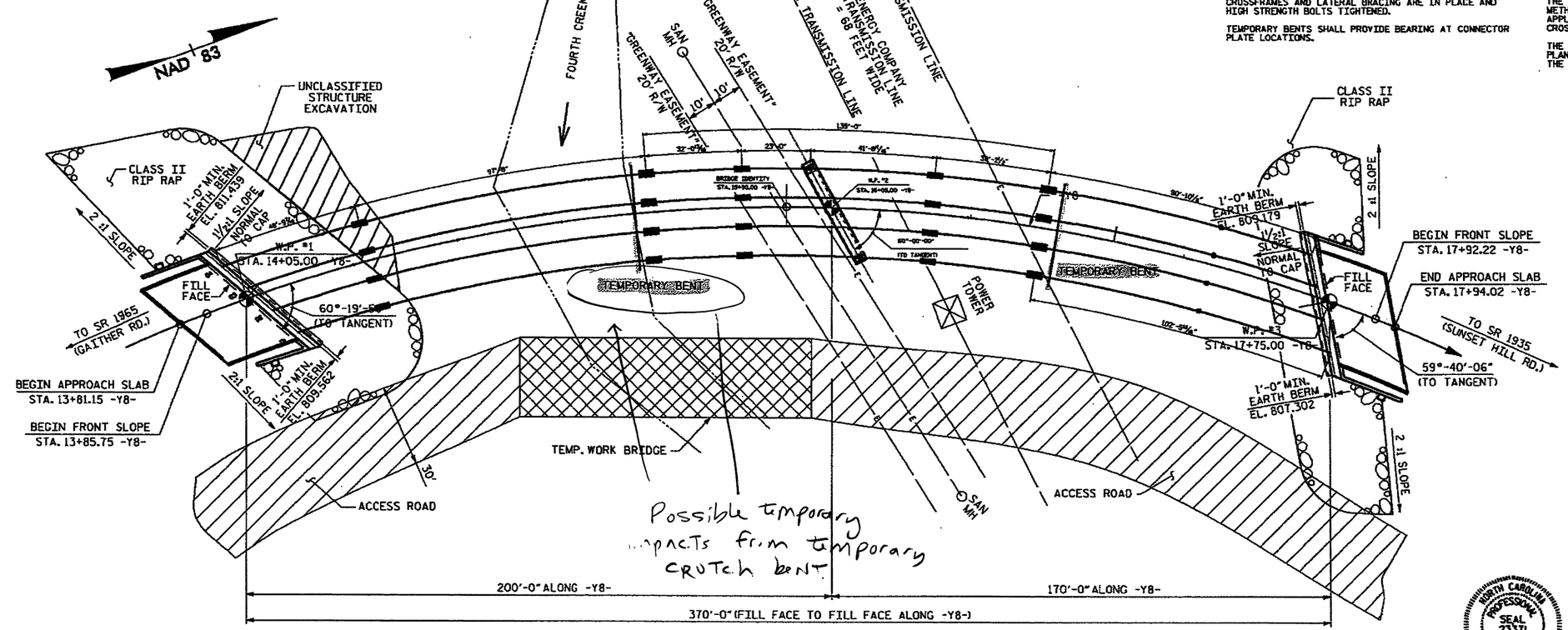
PLANS FOR TEMPORARY BENTS, ERECTION SEQUENCE AND TEMPORARY BENT REMOVAL SHALL BE SUMITTED TO THE ENGINEER FOR REVIEW.

TEMPORARY BENTS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NORTH CAROLINA.

DURING THE GIRDER ERECTION PROCEDURE, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LATERAL BRACING AND OTHER MEANS OF SUPPORT, AS REQUIRED, TO ENSURE STABILITY OF THE GIRDERS, AVOID UPLIFT OF THE GIRDERS AT THE TEMPORARY ERECTION BENTS AND MAINTAIN PLUMBNESS OF THE GIRDER WEBS.

THE CONTRACTOR'S ERECTION PLAN SHALL INCLUDED A METHOD OF TEMPORARY BENT REMOVAL THAT WILL UNIFORMLY APPLY THE STRUCTURAL STEEL WEIGHT TO THE BRIDGE CROSSFRAMES.

THE CONTRACTOR MAY SUBMIT ALTERNATE ERECTION METHODS. PLANS FOR SUCH ERECTION METHODS SHALL BE APPROVED BY THE ENGINEER.



Possible temporary impacts from temporary crutch bent

PLAN

PILES NOT SHOWN FOR CLARITY

PI STA. = 16+04.34 -Y8-
Δ = 72°-36'-06.8" (RT)
D = 10°-44'-58.8"
L = 675.39'
T = 391.54'
R = 533.00'
SE = 0.04

HORIZONTAL CURVE DATA

PROJECT NO. I-3819A
IREDELL COUNTY
STATION: 15+90.00 -Y8-

SHEET 1 OF 4 BRIDGE #567

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE OVER FOURTH CREEK ON SR 1934 (HILLSIDE LN.) BETWEEN SR 1965 AND SR 1935

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-1
1			3				TOTAL SHEETS
2			4				?

DRAWN BY : Keith D. Layne DATE : 9/29/10
CHECKED BY : ? DATE : 9/30/09

Permit Drawing
Sheet 42a of 68

05-OCT-2010 12:17
R:\Structures\Hunt\str6_site7\vipul\I-3819A_sd_Temp bent_06.dgn
vpatel

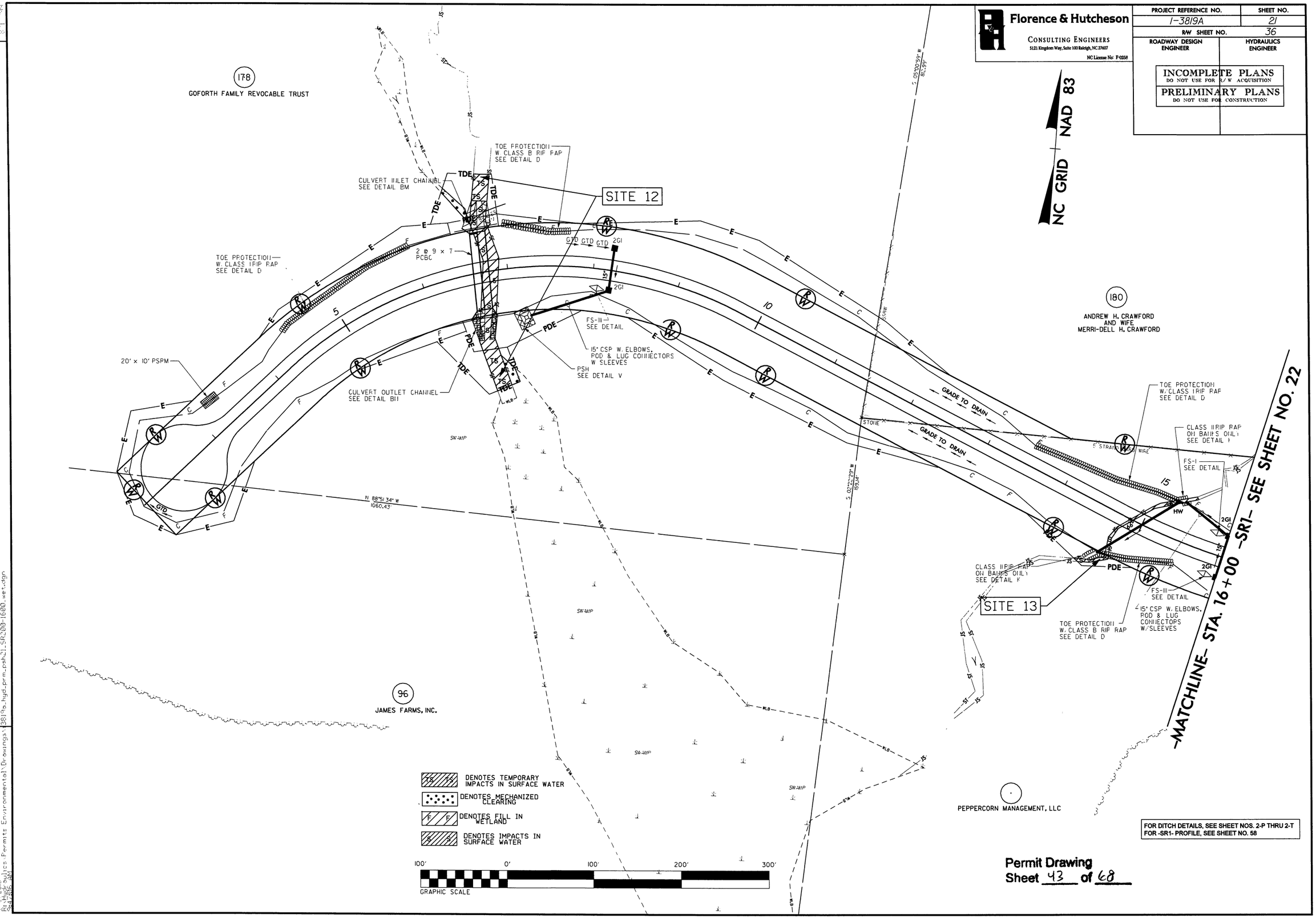
STR. #6

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	21
R/W SHEET NO.	36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR DITCH DETAILS, SEE SHEET NOS. 2-P THRU 2-T
FOR -SR1- PROFILE, SEE SHEET NO. 58

Permit Drawing
Sheet 43 of 68

REVISIONS

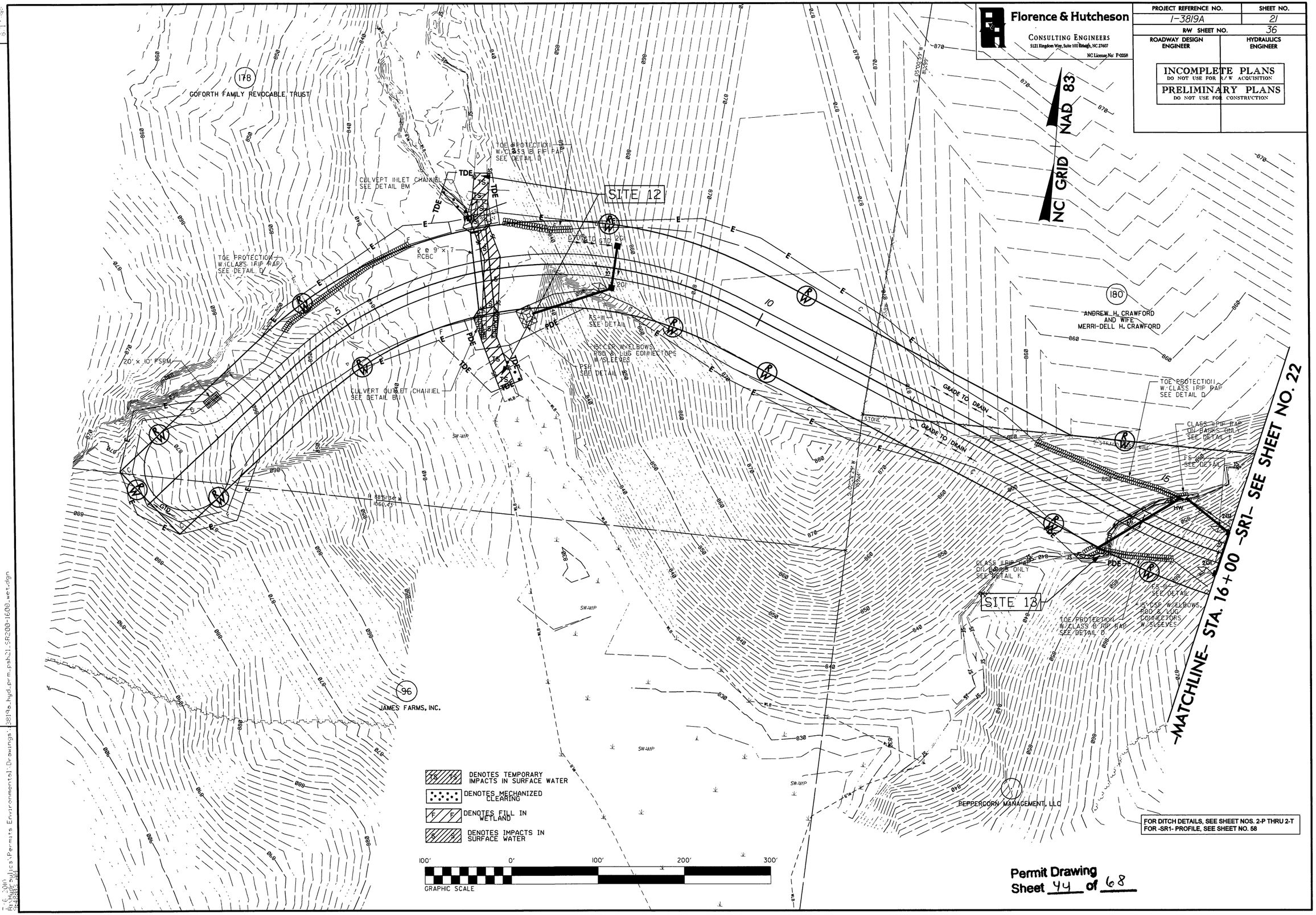
7/6/2016
R:\Hydraulics\Permits\Environmental\Drawings\1-3819a_hyd_prm_psh21_SR200-1600_wet.dgn

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	21
R/W SHEET NO.	
36	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR DITCH DETAILS, SEE SHEET NOS. 2-P THRU 2-T
FOR -SR1- PROFILE, SEE SHEET NO. 58

Permit Drawing
Sheet 44 of 68

REVISIONS

7:6:30M
R:\Hydr Pulls\Permits Environmental\Drawings\3819a_hyd_prm_psh21_SR200-1600_wet.dgn
24 Oct 2013 14:

8/17/99

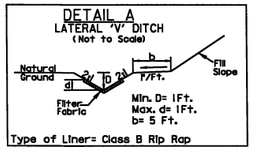
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-R
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0158

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

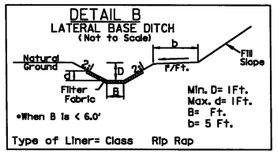
DETAIL A
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= Class B Rip Rap

RDWY	STATION - STATION	SIDE
-YRPB-	15+30 TO 16+00	RT.

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



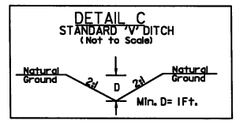
*When B is < 6.0'

Type of Liner= Class Rip Rap

RDWY	STATION - STATION	SIDE	B	LINER
-L-	50+65 TO 55+00	RT.	2'	CLASS B
-YRPA-	22+20 TO 23+00	LT.	4'	CLASS B
-YRPAB-	10+60 TO 12+10	RT.	3'	CLASS I
* -YRPBD-	20+30 TO 21+00	RT.	5'	CLASS I
-YRPBD-	27+80 TO 28+50	LT.	2'	CLASS B
-YRPBD-	59+00 TO 62+00	LT.	5'	CLASS B

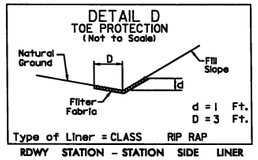
*RIP RAP TO BE FLUSH WITH CHANNEL

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



RDWY	STATION - STATION	SIDE
-SR1-	36+50	LT.
-Y8-	17+50 TO 18+04	RT.

DETAIL D
TOE PROTECTION
(Not to Scale)

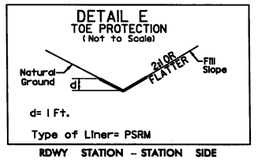


d = 1 Ft.
D = 3 Ft.

Type of Liner = CLASS RIP RAP

RDWY	STATION - STATION	SIDE	LINER
-L-	143+30 TO 143+60	LT.	CLASS B
-SR1-	4+40 TO 6+00	LT.	CLASS I
-SR1-	7+00 TO 7+70	LT.	CLASS B
-SR1-	13+40 TO 15+20	LT.	CLASS I
-SR1-	14+70 TO 15+50	RT.	CLASS B
-Y-	124+00 TO 127+00	RT.	CLASS B
-Y-	153+30 TO 154+20	LT.	CLASS B
-Y1-	17+50 TO 19+25	LT.	CLASS B
-Y8DRIVE-	10+50 TO 11+50	LT.	CLASS B
-YRPA-	21+70 TO 22+20	LT.	CLASS B
-YRPBD-	24+70 TO 26+00	RT.	CLASS B
-YRPBD-	57+70 TO 59+40	RT.	CLASS B
-YRPC-	20+00 TO 20+50	RT.	CLASS B
-YRPD-	17+00 TO 19+10	RT.	CLASS B

DETAIL E
TOE PROTECTION
(Not to Scale)

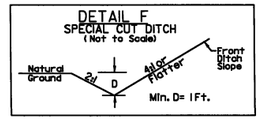


d= 1 Ft.

Type of Liner= PSRM

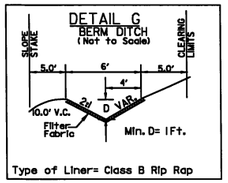
RDWY	STATION - STATION	SIDE
-YRPC-	21+40 TO 22+60	LT.
-L-	54+40 TO 59+20	LT.

DETAIL F
SPECIAL CUT DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE
-L-	36+50 TO 37+50	LT.
-L-	41+00 TO 41+62	LT.
-L-	136+00 TO 138+00	LT.
-L-	142+00 TO 144+00	RT.
-SR1-	24+50 TO 25+35	RT.
-SR1-	30+00 TO 31+50	LT.
-SR1-	30+50 TO 32+00	RT.
-SR1-	34+00 TO 36+50	LT.
-SR1-	33+50 TO 36+50	RT.
-Y5-	65+95 TO 67+00	RT.
-Y8-	10+50 TO 12+50	LT.
-Y8-	10+50 TO 13+25	RT.
-Y8-	19+00 TO 21+50	LT.
-Y8DRIVE-	11+50 TO 11+75	LT.
-Y10A-	13+00 TO 14+00	LT.
-Y10A-	13+50 TO 16+50	RT.
-YRPA-	23+00 TO 31+00	LT.
-YRPB-	16+00 TO 18+50	RT.
-YRPBD-	19+00 TO 20+00	RT.
-Y3A-	15+50 TO 16+05	RT.
-Y3A-	15+50 TO 16+00	LT.

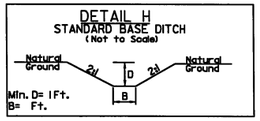
DETAIL G
BERM DITCH
(Not to Scale)



Type of Liner= Class B Rip Rap

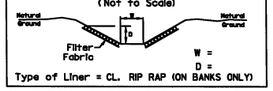
RDWY	STATION - STATION	SIDE
-L-	160+10 TO 165+20	LT.
-YRPD-	9+50 TO 15+60	LT.

DETAIL H
STANDARD BASE DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE	B
-L-	114+80	RT.	5'
-L-	107+00	RT.	2'
-L-	108+90	RT.	2'
-L-	135+54 TO 138+00	LT.	3'
-Y8DRIVE-	11+75	RT.	2'
-SR1-	25+35	LT.	5'

DETAIL K
PROPOSED OUTLET CHANNEL
(Not to Scale)

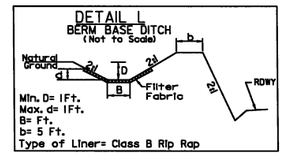


W =
D =

Type of Liner = CL. RIP RAP (ON BANKS ONLY)

RDWY	STATION - STATION	SIDE	W	D	LINER
-L-	55+50	LT.	3' TO 8'	10'	CL. II
-SR1-	14+70	RT.	3'	2'	CL. II
-SR1-	15+30	LT.	3'	2'	CL. II
-YRPA-	33+50	RT.	5'	6'	CL. II
-YRPC-	20+70	RT.	5'	3'	CL. II

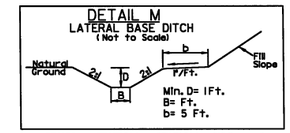
DETAIL L
BERM BASE DITCH
(Not to Scale)



Type of Liner= Class B Rip Rap

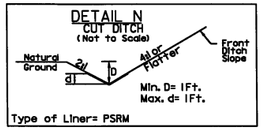
RDWY	STATION - STATION	SIDE	B
-L-	158+31 TO 160+00	RT.	3'
-Y5-	40+00 TO 42+00	LT.	5'

DETAIL M
LATERAL BASE DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE	B
-L-	99+70 TO 104+00	RT.	4'
-YRPAB-	18+30 TO 19+20	LT.	2'
-YRPBD-	21+00 TO 24+50	RT.	5'
-YRPBD-	27+20 TO 27+80	LT.	2'

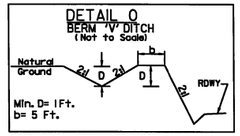
DETAIL N
CUT DITCH
(Not to Scale)



Type of Liner= PSRM

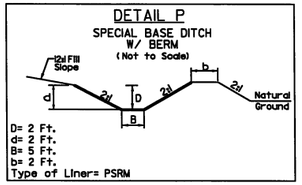
RDWY	STATION - STATION	SIDE
-SR1-	16+00 TO 19+00	RT.
-Y1-	25+00 TO 25+50	RT.

DETAIL O
BERM 'V' DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE
-YRPBD-	31+60 TO 34+00	RT.
-YRPBD-	37+00 TO 40+50	RT.
-YRPBD-	43+00 TO 44+50	RT.

DETAIL P
SPECIAL BASE DITCH
W/ BERM
(Not to Scale)

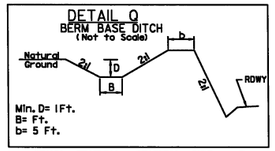


D= 2 Ft.
d= 2 Ft.
B= 5 Ft.
b= 2 Ft.

Type of Liner= PSRM

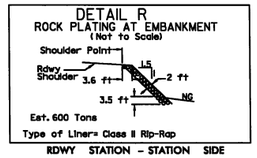
RDWY	STATION - STATION	SIDE
-L-	104+00 TO 109+40	RT.

DETAIL Q
BERM BASE DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE	B
-L-	155+50 TO 158+31	RT.	3'
-Y5-	42+00 TO 45+60	LT.	5'
-Y5-	46+70 TO 49+80	LT.	2'

DETAIL R
ROCK PLATING AT EMBANKMENT
(Not to Scale)

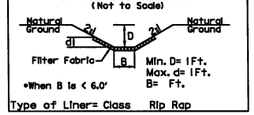


Est. 600 Tons

Type of Liner= Class II Rip-Rap

RDWY	STATION - STATION	SIDE
-YRPA-	33+00 TO 33+80	RT.

DETAIL S
STANDARD BASE DITCH
(Not to Scale)

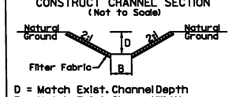


*When B is < 6.0'

Type of Liner= Class Rip Rap

RDWY	STATION - STATION	SIDE	B	LINER
-L-	119+10	RT.	5'-20'	CLASS B
-YRPA-	22+00	RT.	5'-20'	CLASS I
-YRPAB-	18+00	RT.	5'-20'	CLASS I

DETAIL T
CONSTRUCT CHANNEL SECTION
(Not to Scale)

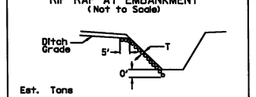


D = Match Exist. Channel Depth
B = Match Exist. Channel Width

LINER = CLASS II RIP RAP (ON BANKS ONLY)

RDWY	STATION - STATION	SIDE
-L-	113+20	RT.
-YRPC-	20+80	RT.

DETAIL W
RIP RAP AT EMBANKMENT
(Not to Scale)

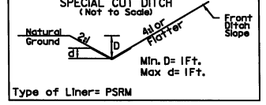


Est. Tons

Type of Liner= Class Rip Rap

RDWY	STATION	SIDE	THICKNESS T (FT)	LINER	TONS
-L-	92+00	CL.	2.0	CL. II	870
-L-	92+30	CL.	2.0	CL. II	870
-Y3A-	40+50	LT.	1.5	CL. I	8
-Y4-	18+14	LT.	1.5	CL. I	10
-Y4RPD-	17+18	LT.	2.0	CL. II	51
-Y4RPD-	16+50	LT.	2.0	CL. II	43
-Y4RPD-	16+15	LT.	2.0	CL. II	54
-Y8-	17+50	RT.	2.0	CL. II	63
-YRPD-	17+40	LT.	2.0	CL. II	5
-YRPD-	17+70	LT.	2.0	CL. II	5

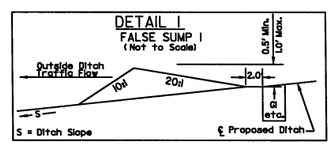
DETAIL X
SPECIAL CUT DITCH
(Not to Scale)



Type of Liner= PSRM

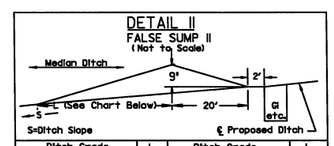
RDWY	STATION - STATION	SIDE
-SR1-	25+35 TO 26+00	RT.

DETAIL I
FALSE SUMP I
(Not to Scale)



RDWY	STATION - STATION	SIDE
-L-	26+35	LT.
-L-	36+00	LT.
-L-	48+75	RT.
-L-	53+15	RT.
-L-	56+90	RT.
-L-	63+20	RT.
-L-	67+30	RT.
-L-	96+60	RT.
-L-	119+50	LT.
-LCDWB-	18+70	LT.
-SR1-	16+00	LT.
-YRPBD-	12+20	RT.
-YRPBD-	26+10	RT.
-YRPBD-	28+40	LT.
-YRPD-	21+67	LT.
-Y5-	50+70	LT.
-Y8-	19+00	LT.
-Y10A-	13+50	LT.

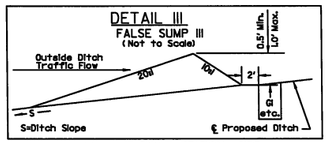
DETAIL II
FALSE SUMP II
(Not to Scale)



Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

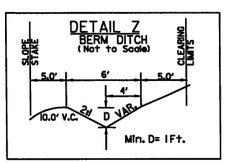
RDWY	STATION - STATION	SIDE
-L-	28+60	MED.
-L-	30+75	MED.
-L-	34+80	MED.
-L-	49+00	MED.
-L-	54+10	MED.
-L-	56+90	MED.
-L-	63+00	MED.
-L-	67+70	MED.
-L-	108+80	MED.
-L-	114+80	MED.
-L-	119+00	MED.
-L-	123+00	MED.
-L-	138+70	MED.
-L-	144+00	MED.
-L-	153+60	MED.
-L-	157+70	MED.
-Y-	129+30	MED.
-Y-	143+60	MED.
-Y-	149+50	MED.
-Y-	152+60	MED.
-Y-	156+60	MED.
-Y-	162+70	MED.
-Y-	172+30	MED.
-Y-	177+30	MED.

DETAIL III
FALSE SUMP III
(Not to Scale)



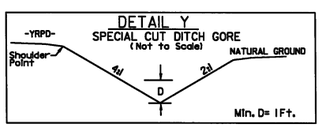
RDWY	STATION - STATION	SIDE
-L-	41+62	LT.
-L-	49+50	LT.
-L-	158+20	RT.
-L-	165+80	RT.
-L-	175+81	RT.
-SR1-	8+20	RT.
-SR1-	16+00	RT.
-Y-	130+30	RT.
-Y-	178+00	RT.
-YRPAB-	19+60	LT.
-YRPAB-	19+90	RT.
-YRPBD-	33+20	LT.
-YRPBD-	36+90	RT.
-YRPBD-	36+90	LT.
-YRPBD-	57+80	RT.
-YRPBD-	58+50	LT.
-Y4RPB-	16+65	LT.
-Y4RPB-	17+30	RT.
-Y8-	12+75	LT.
-Y10A-	13+50	RT.

DETAIL Z
BERM DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE
-L-	165+25 TO 167+50	RT.
-YRPBD-	32+30 TO 33+50	LT.

DETAIL Y
SPECIAL CUT DITCH GORE
(Not to Scale)



RDWY	STATION - STATION	SIDE
-YRPD-	19+20 - 20+70	RT.

Permit Drawing
Sheet 45 of 68

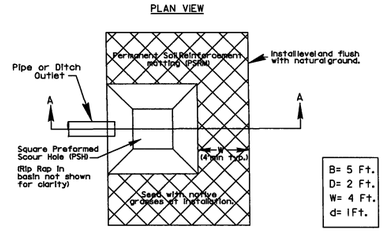
7/8/2010
R:\U-Drainage\13819a_Hyd_Ditch_Details_Shts_2R_2R.dgn
10:20:03 PM

Florence & Hutcheson CONSULTING ENGINEERS 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No: F-0258	PROJECT REFERENCE NO.	SHEET NO.
	1-3819A	2-S
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

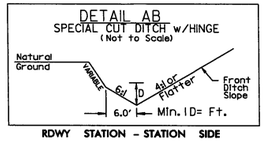
REVISIONS

DETAIL V
PREFORMED SCOUR HOLE



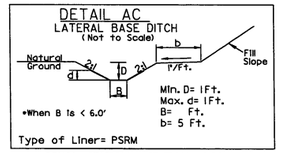
RDWY	STATION - STATION	SIDE
-SR1-	7+15	RT.
-YRPD-	19+00	LT.

DETAIL AB
SPECIAL CUT DITCH w/HINGE
(Not to Scale)



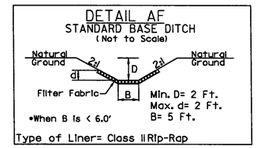
RDWY	STATION - STATION	SIDE
-L-	165+80 TO 166+50	RT.
-YRPBD-	43+30 TO 45+50	RT.

DETAIL AC
LATERAL BASE DITCH
(Not to Scale)



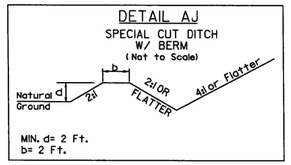
RDWY	STATION - STATION	SIDE	B
-L-	50+00 TO 53+70	LT.	2'

DETAIL AF
STANDARD BASE DITCH
(Not to Scale)



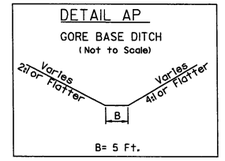
RDWY	STATION - STATION	SIDE
-L-	147+94 TO 148+30	RT.
-YRPD	17+60 TO 17+70	LT.

DETAIL AJ
SPECIAL CUT DITCH
W/ BERM
(Not to Scale)



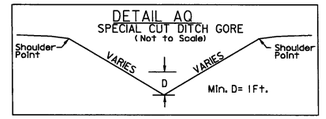
RDWY	STATION - STATION	SIDE
-YRPBD-	43+20 TO 44+15	LT.

DETAIL AP
GORE BASE DITCH
(Not to Scale)



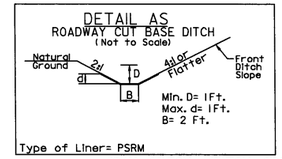
RDWY	STATION - STATION	SIDE
-L-	141+00 TO 144+00	RT.

DETAIL AQ
SPECIAL CUT DITCH GORE
(Not to Scale)



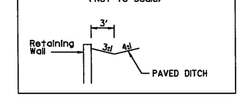
RDWY	STATION - STATION	SIDE
-YRPBD-	44+00 TO 46+50	LT.

DETAIL AS
ROADWAY CUT BASE DITCH
(Not to Scale)



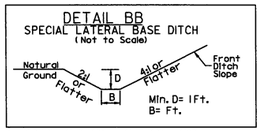
RDWY	STATION - STATION	SIDE
-Y5-	55+30 TO 65+50	LT.

DETAIL AX
PAVED DITCH
(Not to Scale)



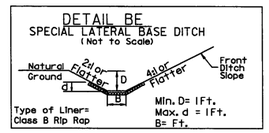
RDWY	STATION - STATION	SIDE
-L-	58+00 TO 60+00	RT.

DETAIL BB
SPECIAL LATERAL BASE DITCH
(Not to Scale)



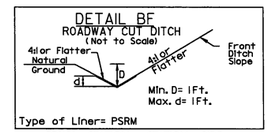
RDWY	STATION - STATION	SIDE	B
-L-	26+50 TO 36+50	RT.	4'
-Y8-	13+25 TO 14+00	RT.	2'

DETAIL BE
SPECIAL LATERAL BASE DITCH
(Not to Scale)



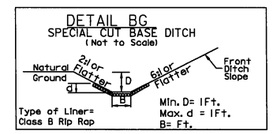
RDWY	STATION - STATION	SIDE	B
-L-	55+00 TO 57+00	RT.	2'

DETAIL BF
ROADWAY CUT DITCH
(Not to Scale)



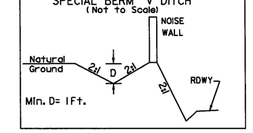
RDWY	STATION - STATION	SIDE
-Y1-	25+50 TO 27+50	RT.

DETAIL BG
SPECIAL CUT BASE DITCH
(Not to Scale)



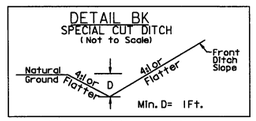
RDWY	STATION - STATION	SIDE	B
-Y1-	25+74 TO 26+90	LT.	4'

DETAIL BJ
SPECIAL BERM "V" DITCH
(Not to Scale)



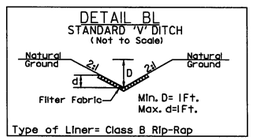
RDWY	STATION - STATION	SIDE
-L-	33+00 TO 37+00	LT.

DETAIL BK
SPECIAL CUT DITCH
(Not to Scale)



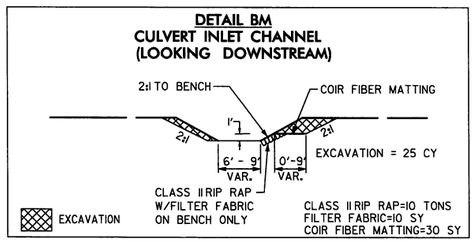
RDWY	STATION - STATION	SIDE
-L-	26+50 TO 28+50	LT.
-L-	46+50 TO 48+75	RT.
-L-	49+00 TO 57+00	RT.
-Y1-	25+00 TO 25+50	RT.
-Y3-	12+20 TO 17+00	RT.
-Y3A-	10+80 TO 12+50	RT.
-Y3A-	13+00 TO 13+50	LT.

DETAIL BL
STANDARD "V" DITCH
(Not to Scale)



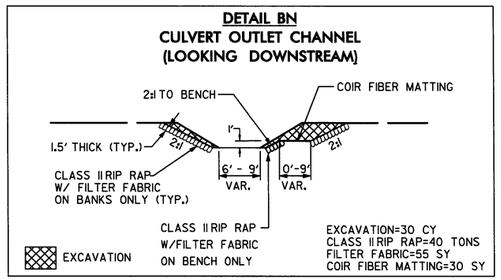
RDWY	STATION - STATION	SIDE
-L-	141+20 TO 141+50	RT.
-L-	141+25 TO 141+45	LT.
-YRPAB-	19+20 TO 19+70	LT.

DETAIL BM
CULVERT INLET CHANNEL
(LOOKING DOWNSTREAM)



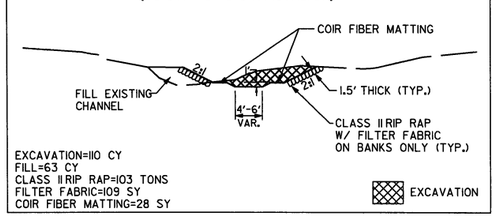
-SR1- 6+70 LT

DETAIL BN
CULVERT OUTLET CHANNEL
(LOOKING DOWNSTREAM)



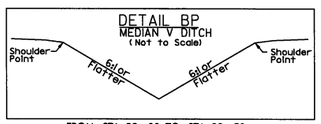
-SR1- 6+70 RT

DETAIL BO
OUTLET CHANNEL
(LOOKING DOWNSTREAM)



-L- 22+98 LT

DETAIL BP
MEDIAN V DITCH
(Not to Scale)



FROM STA. 38+00 TO STA. 39+50

Permit Drawing
Sheet 46 of 68

7/29/2010
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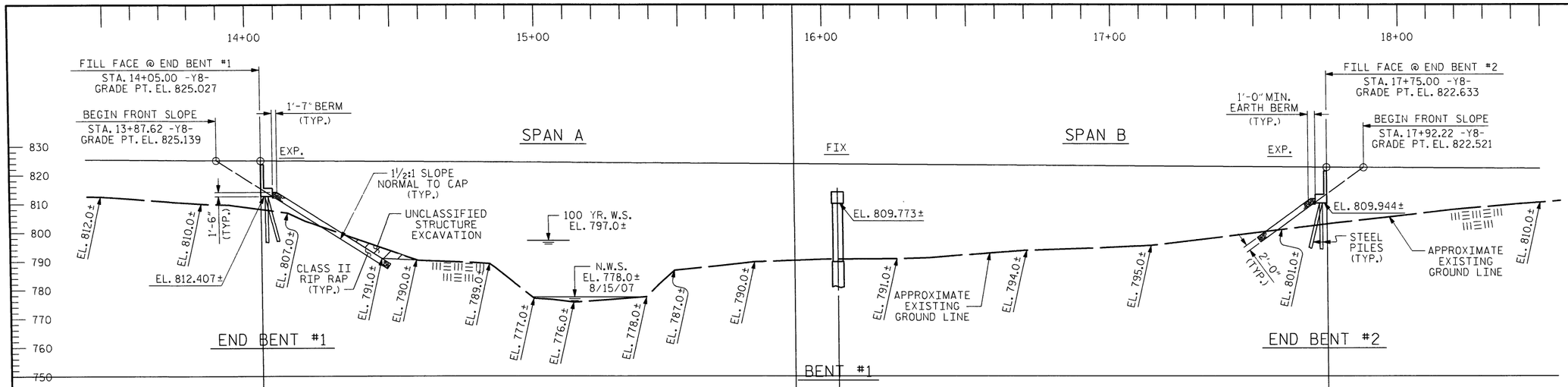
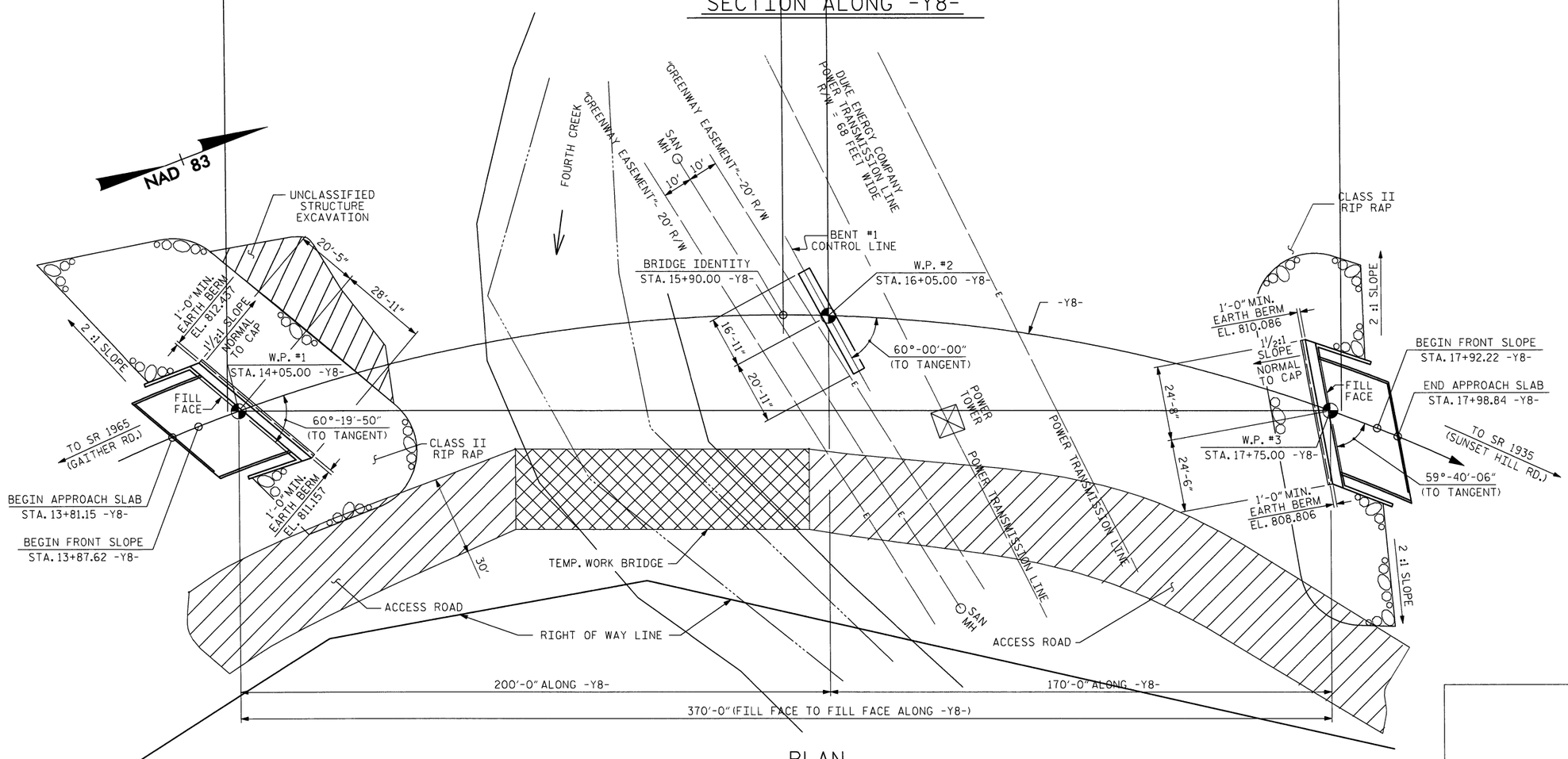
F.A. PROJECT# IMS-40-2(124)



SECTION ALONG -Y8-



PLAN

PILES NOT SHOWN FOR CLARITY

GRADE DATA

+0.8753% △ -0.6470%

PI = 11+00.00 -Y8-
EL. = 827.00
VC = 170'

PI STA. = 16+04.34 -Y8-
△ = 72°-36'-06.8" (RT)
D = 10°-44'-58.8"
L = 675.39'
T = 391.54'
R = 533.00'
SE = 0.04

HORIZONTAL CURVE DATA

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. I-3819A
IREDELL COUNTY
STATION: 15+90.00 -Y8-

SHEET 1 OF 2 BRIDGE #

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRELIMINARY
GENERAL DRAWING
BRIDGE OVER
FOURTH CREEK ON
SR 1934 (HILLSIDE LN.)
BETWEEN
SR 1965 AND SR 1935

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			2

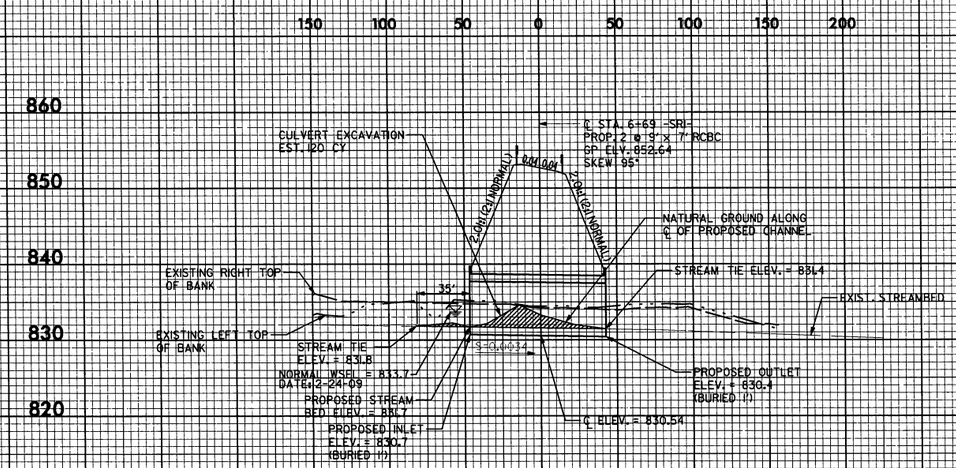
DRAWN BY : Keith D. Layne DATE : 9/09/09
CHECKED BY : T. R. Peterson DATE : 9/30/09

Permit Drawing
Sheet 47 of 68

7/6/2010
DGN

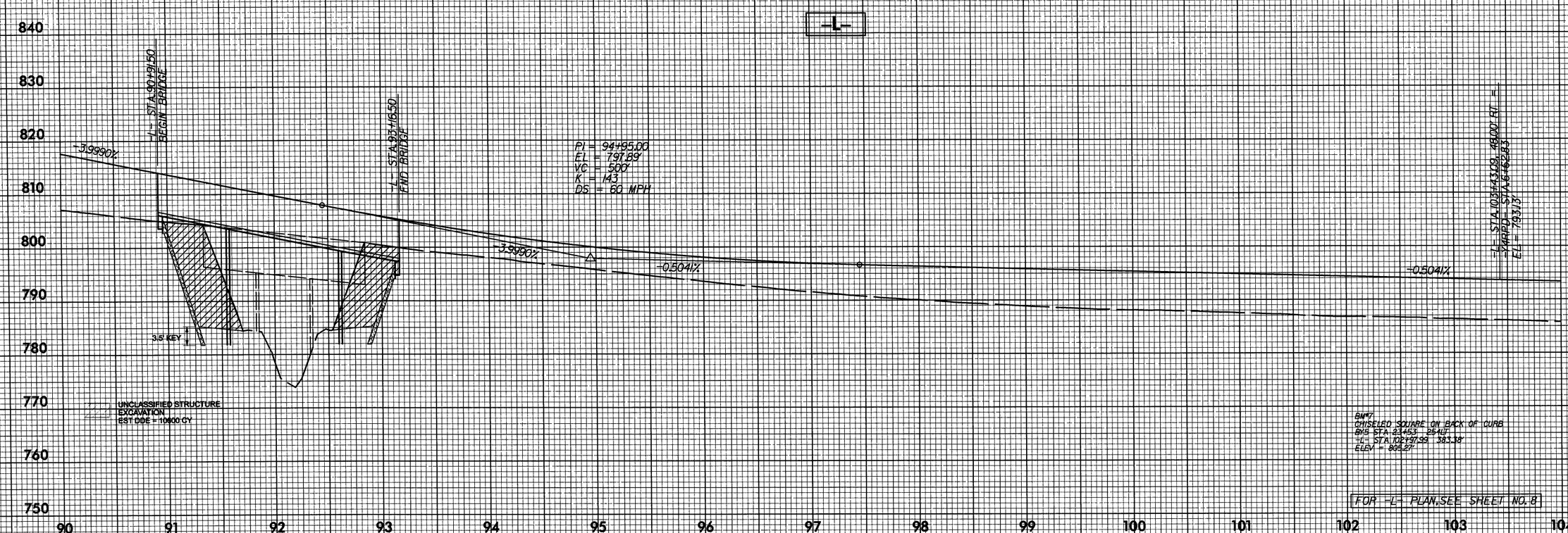
PROJ. REFERENCE NO.	SHEET NO.
1-3819A	

JURISDICTIONAL STREAM PROFILE -SR1- 6+69



Permit Drawing
Sheet 48 of 68

PROJ. REFERENCE NO.	SHEET NO.
I-3819A	



Permit Drawing
Sheet 49 of 68

7/6/2010
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10:18:14 AM

PROJ. REFERENCE NO.	SHEET NO.
I-3819A	

CULVERT HYDRAULIC DATA
STA.-SR1- 6+69

DESIGN DISCHARGE	=	750	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	838.4	FT
BASE DISCHARGE	=	900	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	839.2	FT
OVERTOPPING DISCHARGE	=	2400	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	851.9	FT

PIPE HYDRAULIC DATA
STA.-SR1- 15+00

DRAINAGE AREA	=	70.00	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	130	CFS
DESIGN HW ELEVATION	=	849.1	FT
100 YEAR DISCHARGE	=	210	CFS
100 YEAR HW ELEVATION	=	851.3	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	371	CFS
OVERTOPPING ELEVATION	=	859.0	FT

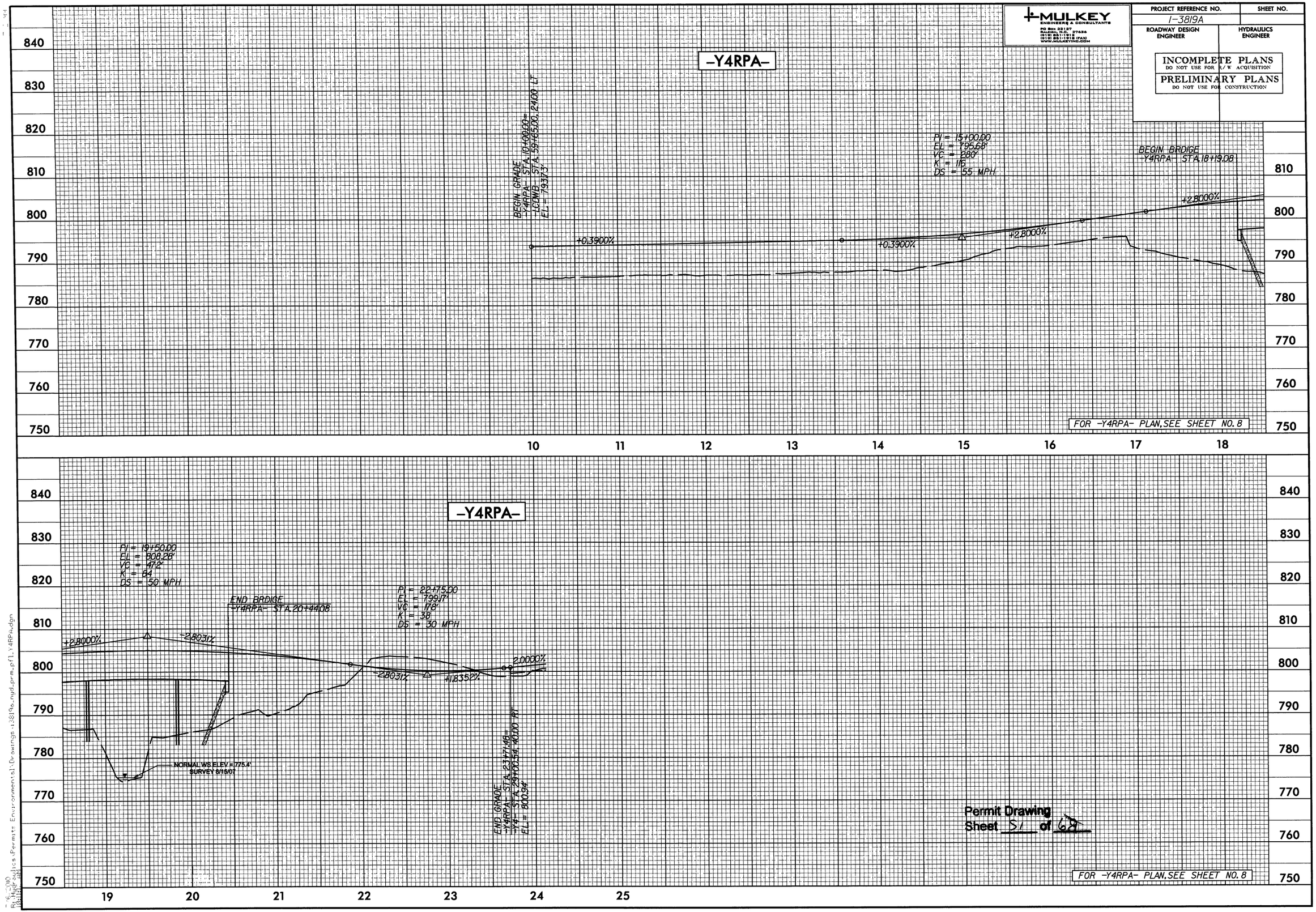
Permit Drawing
Sheet 50 of 68

Fri Jan 20 09:09:54 2006
R:\Hydraulics\Permits\Environmental\Drawings\3819a_hyd_prm_pfl_SR1.dgn

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



Permit Drawing
Sheet 51 of 62

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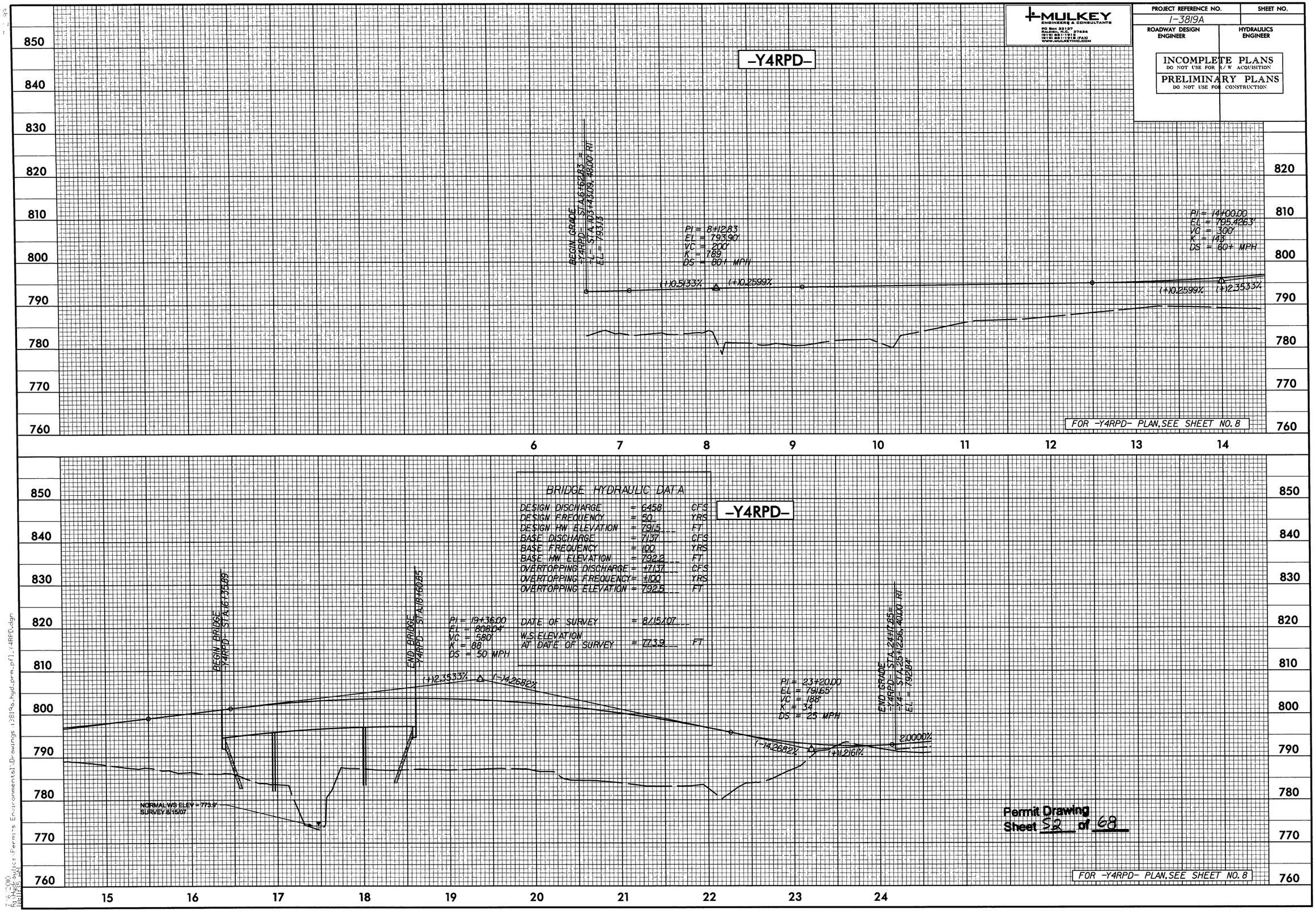
7/16/2010
Bentley

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
RALEIGH, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

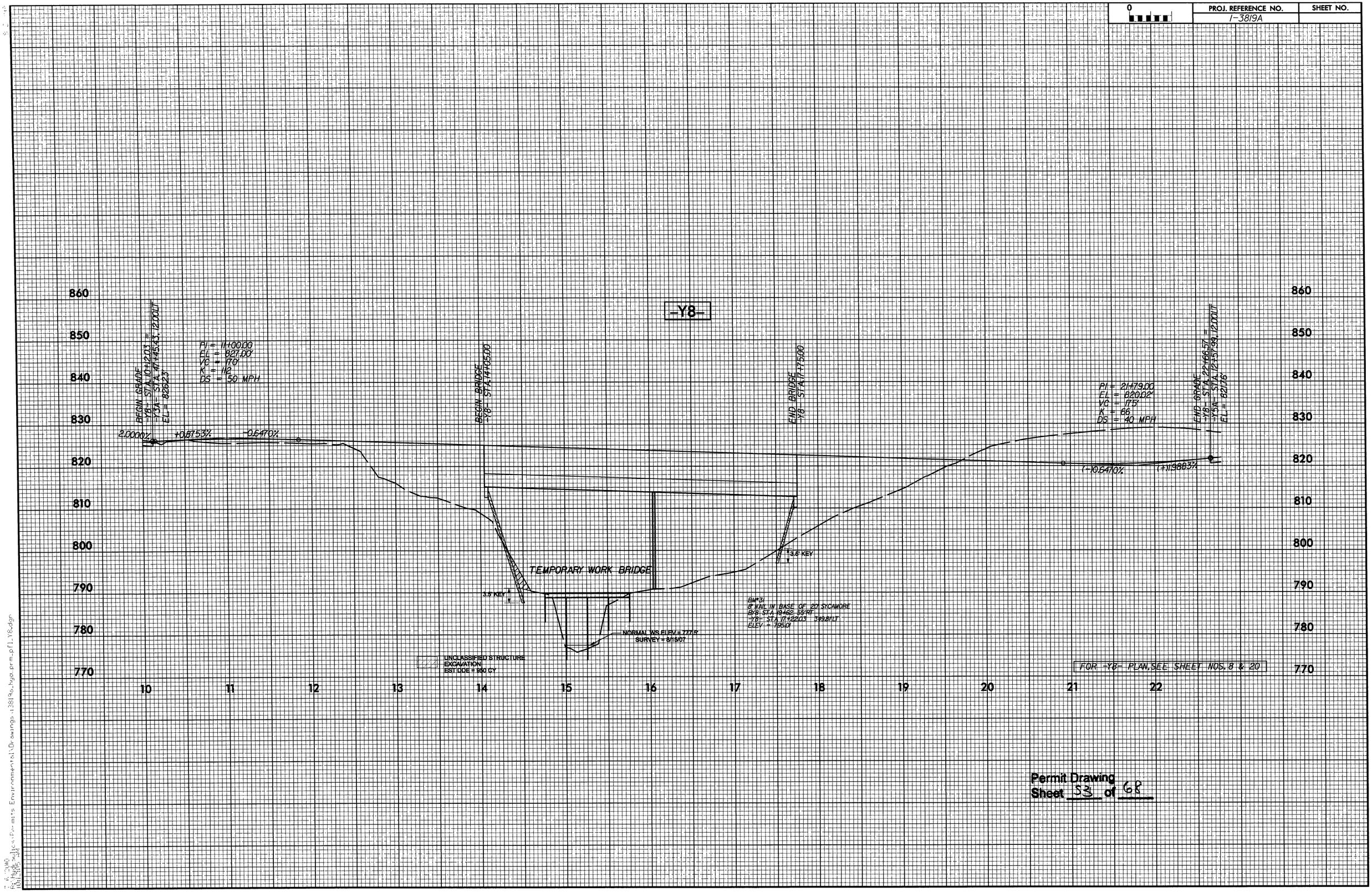
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
Sheet 52 of 68

7/9/2010
Rathde Suttle Permits Environmental\Drawings\3819a_hyd_prm_pfl_Y4RPD.dgn

PROJ. REFERENCE NO.	SHEET NO.
I-3819A	



Permit Drawing
Sheet 53 of 68

F: (2006)
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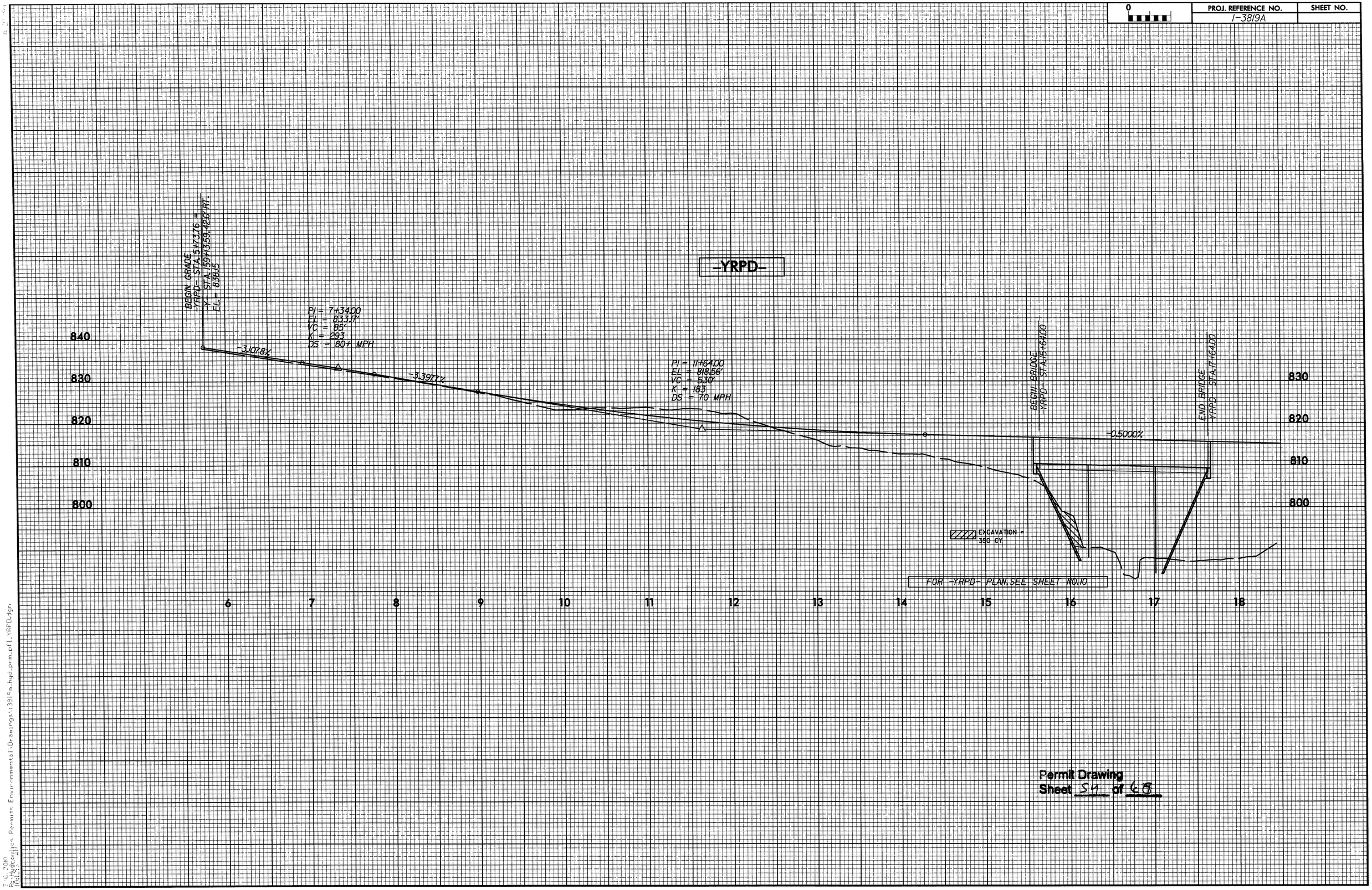
10:38:05 AM

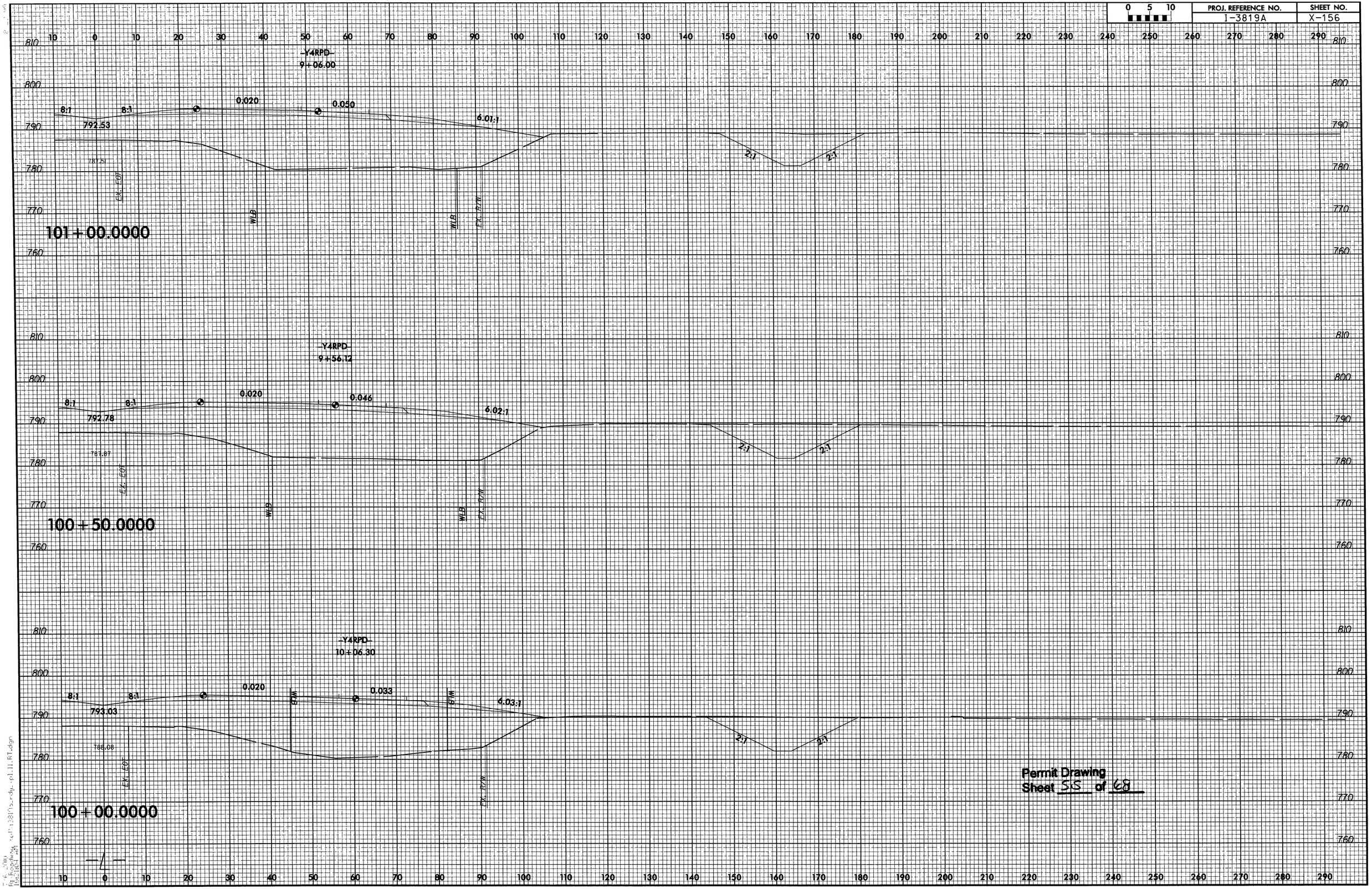
PROJ. REFERENCE NO.	SHEET NO.
I-3819A	



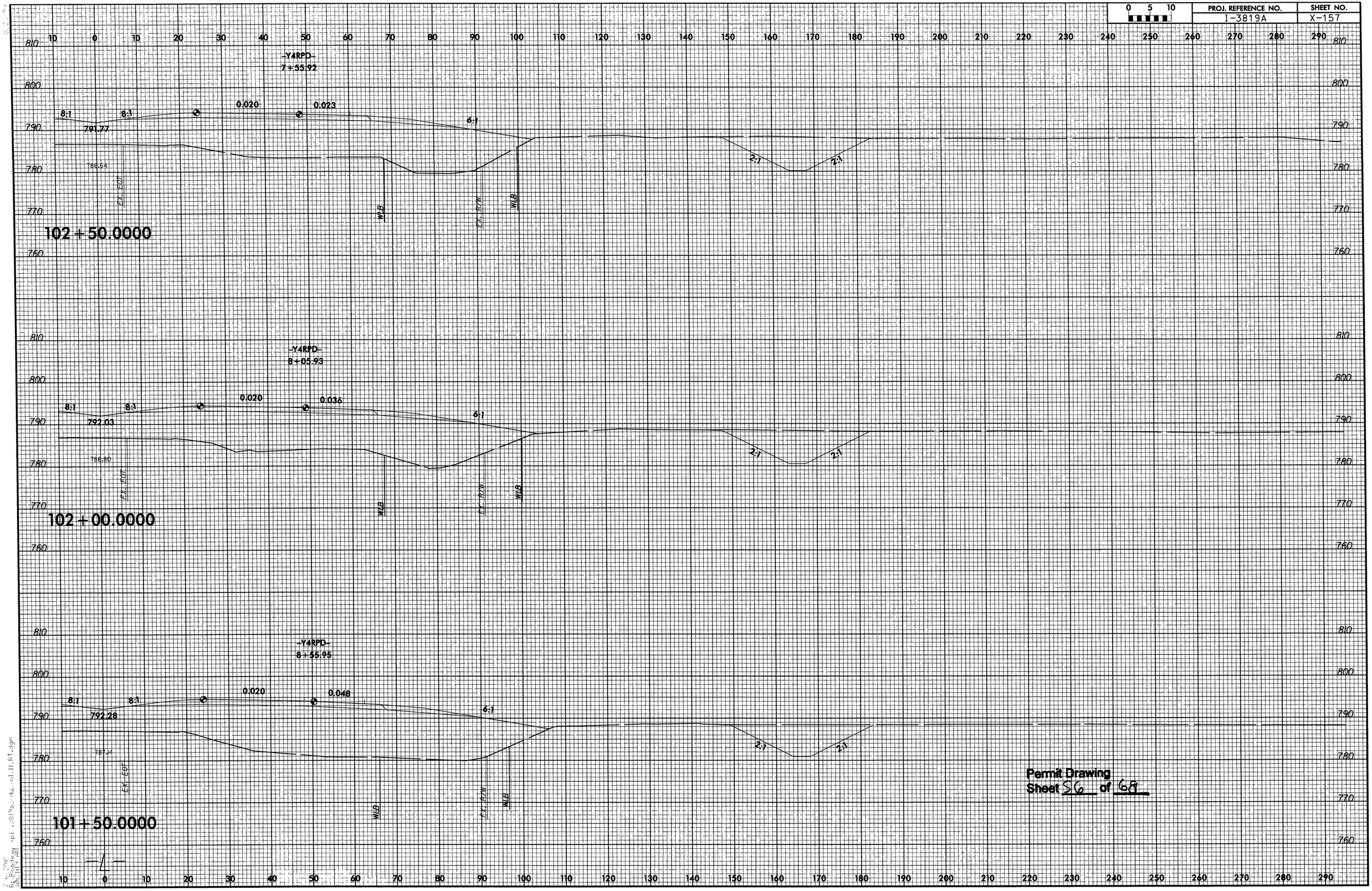
Permit Drawing
Sheet 54 of 68

7-6-2010
Rightwaylive Permits Environmental\Drawings\3819a_hyd_prm_pfl_YRPD.dgn

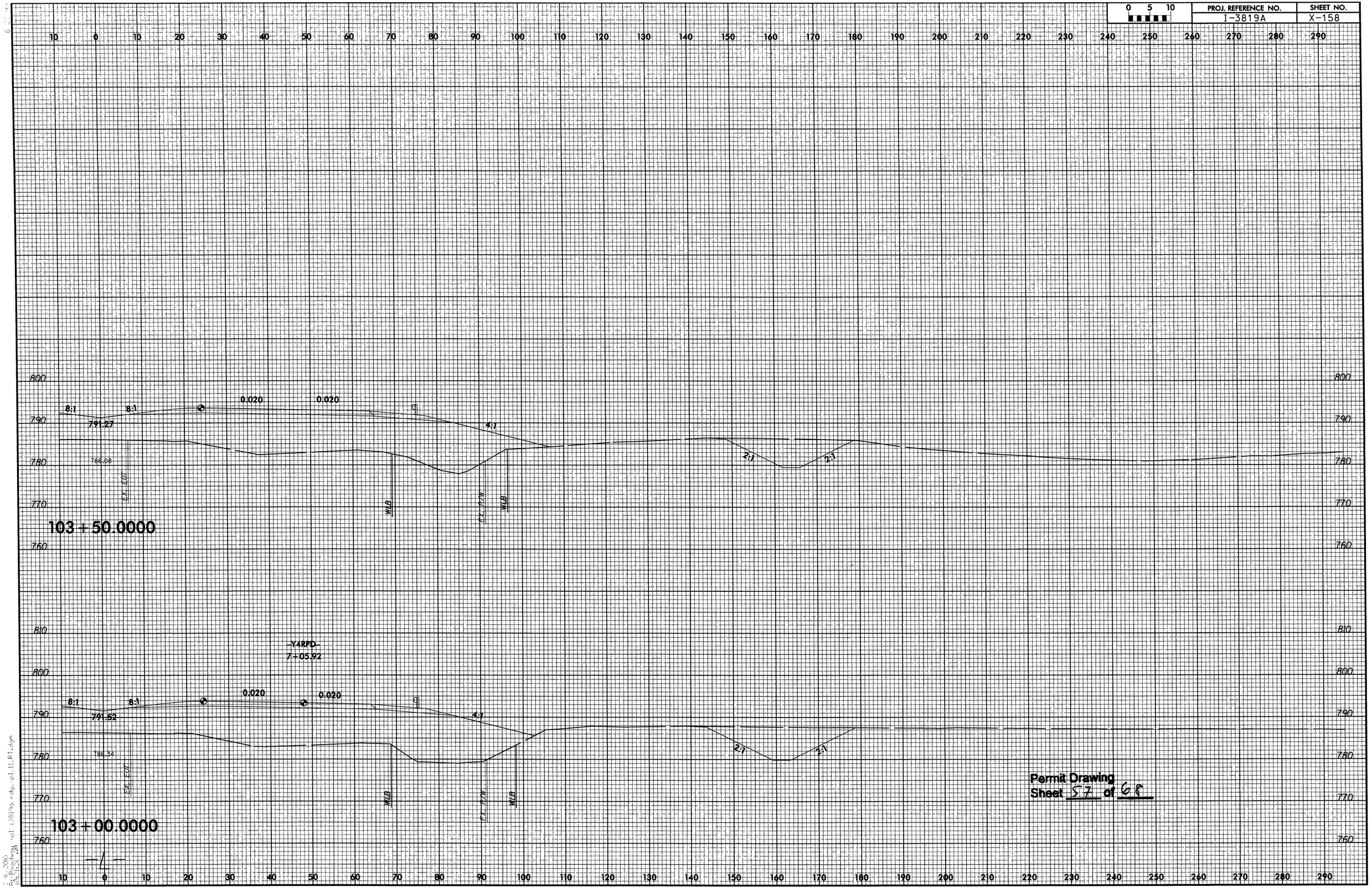
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-156



0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-157

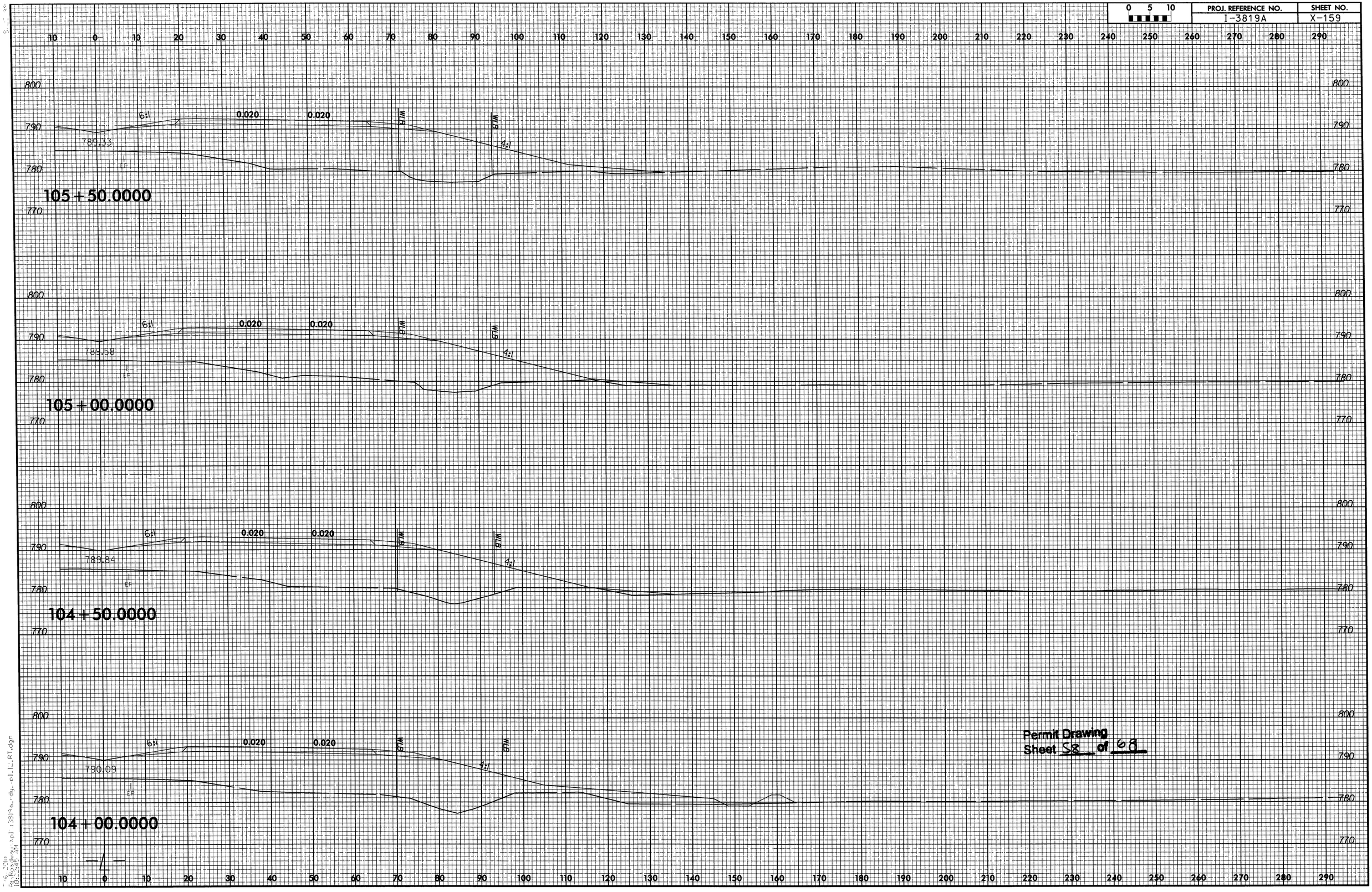


0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-158



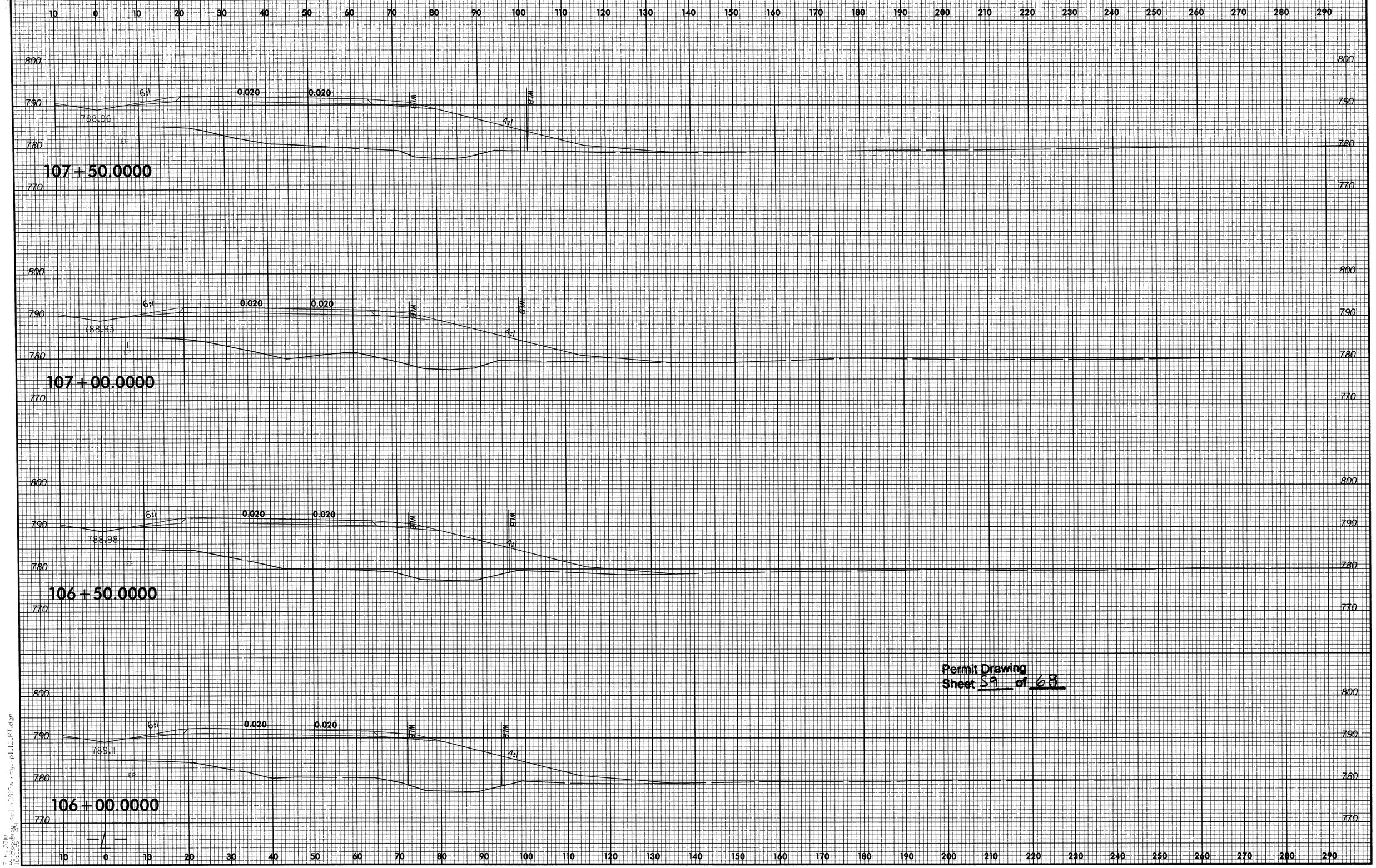
Permit Drawing
Sheet 57 of 68

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-159



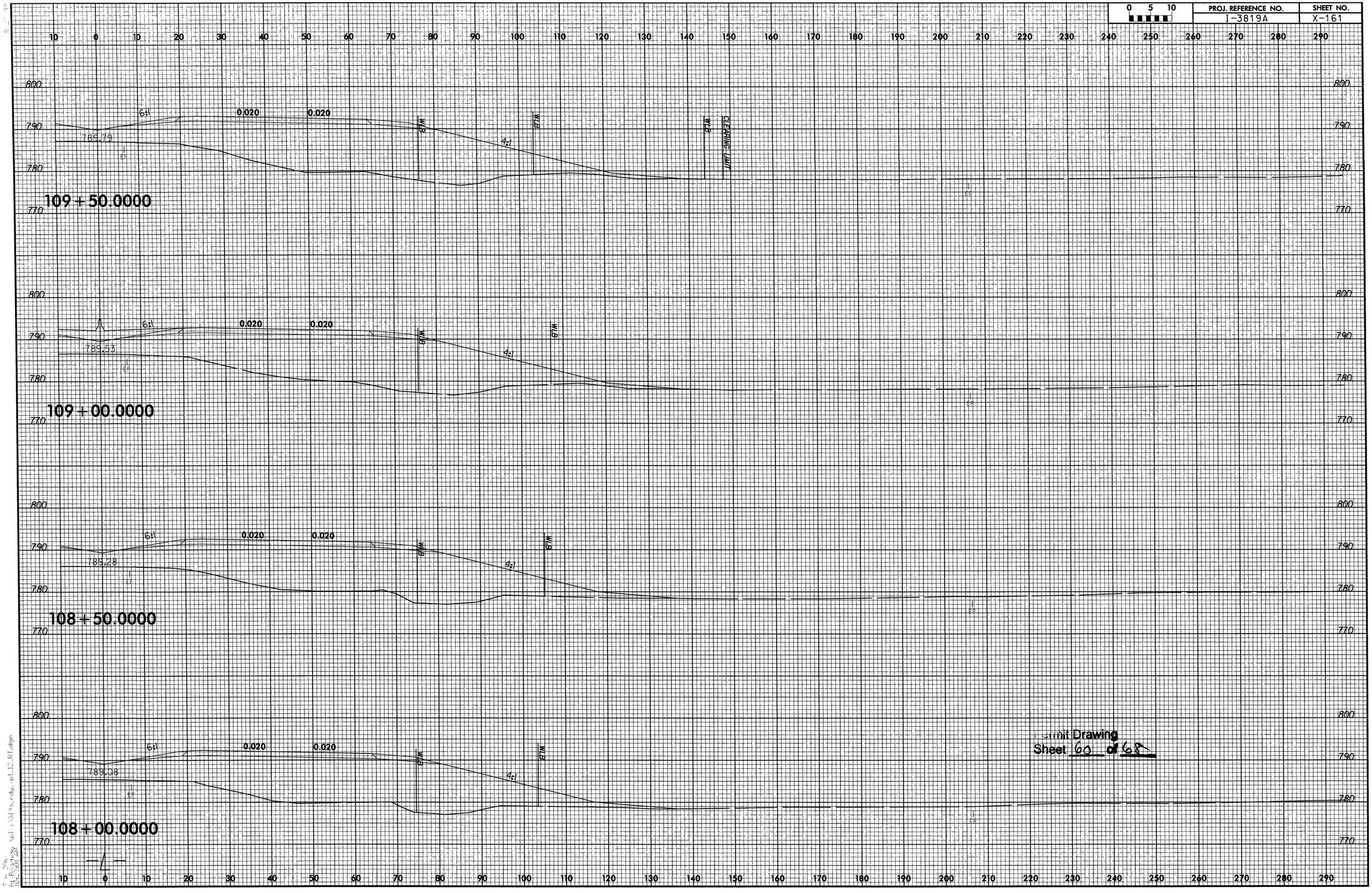
Permit Drawing
Sheet 58 of 68

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-160



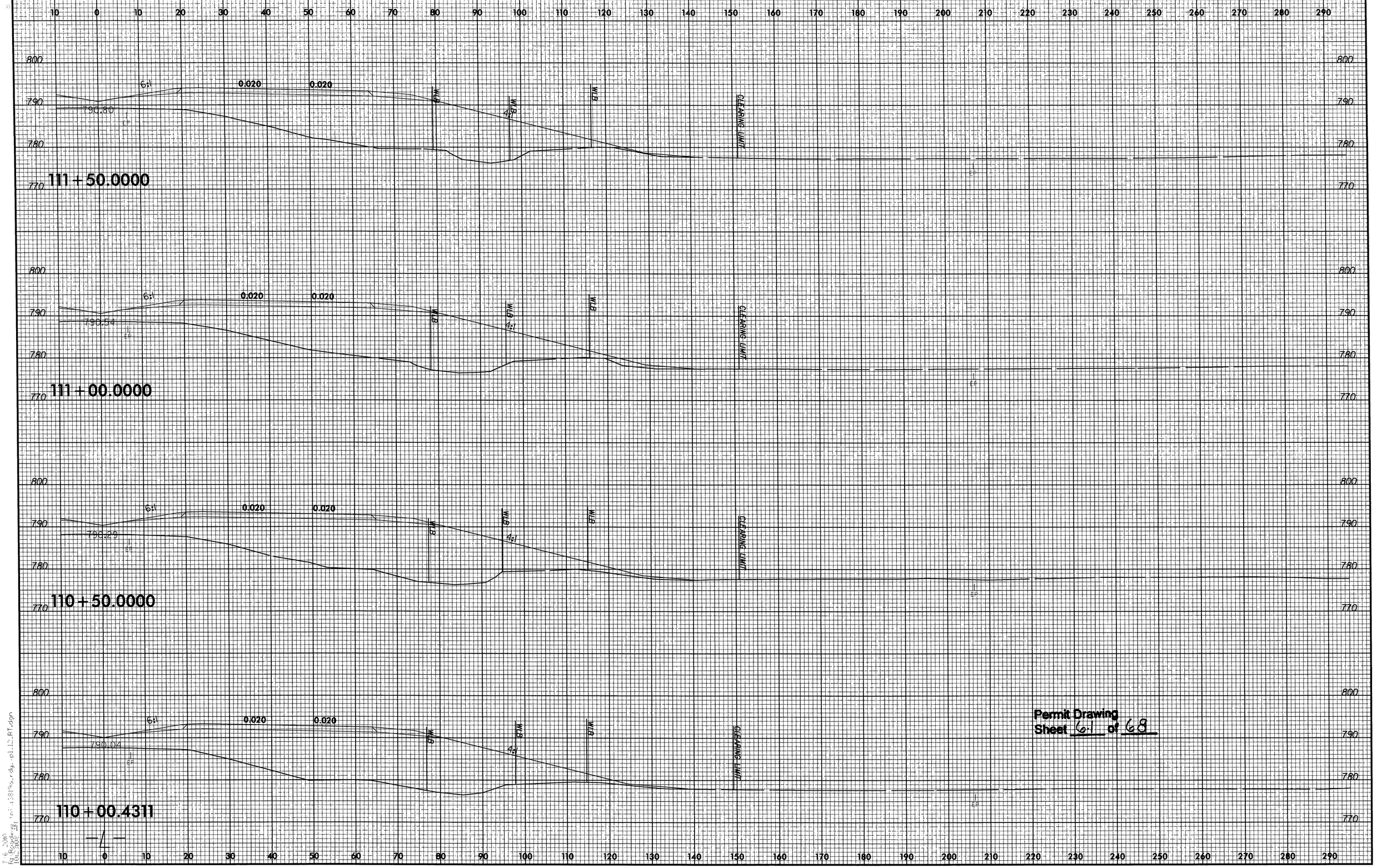
Permit Drawing
Sheet 39 of 68

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-161



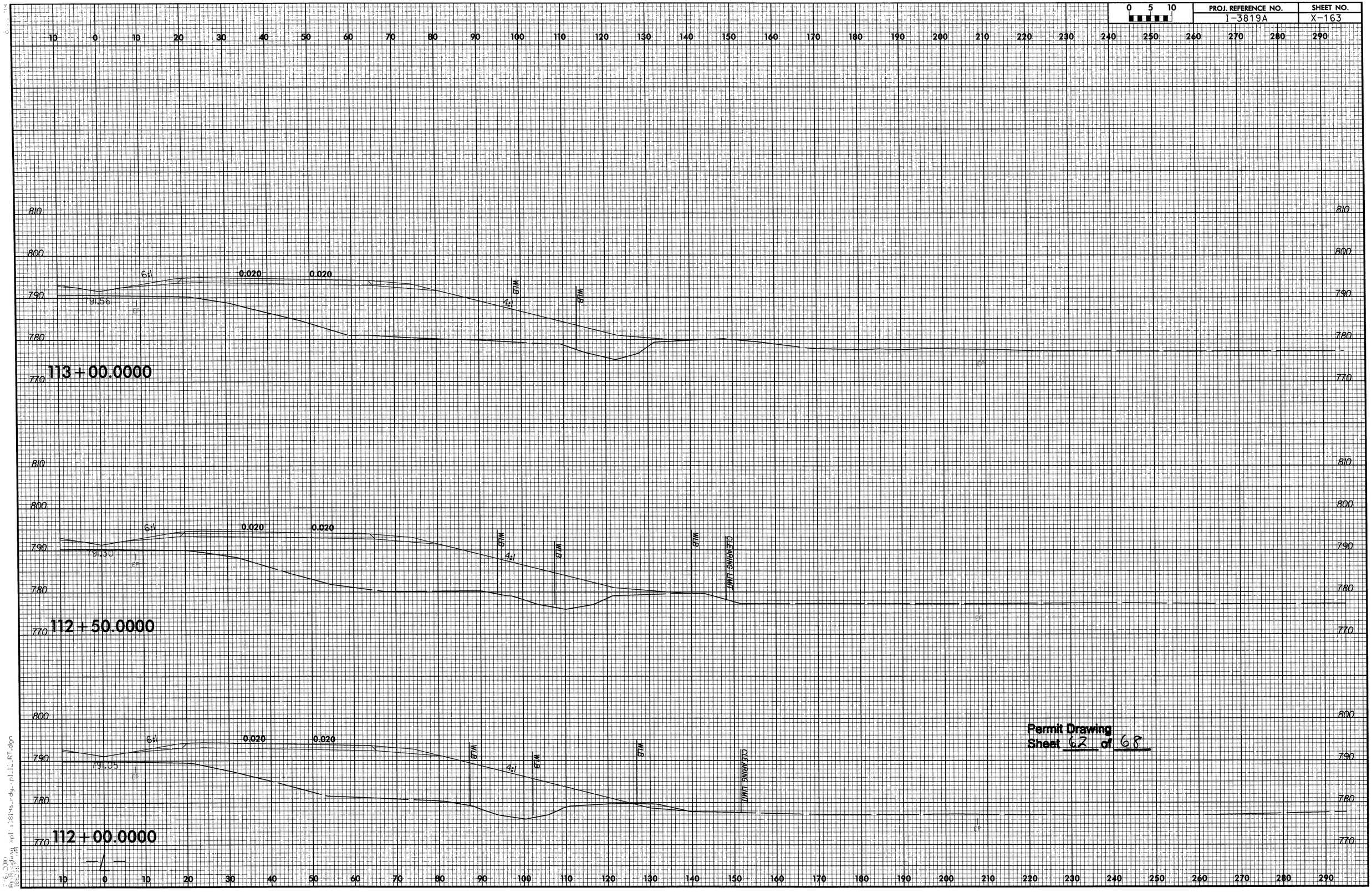
Permit Drawing
Sheet 60 of 68

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-162



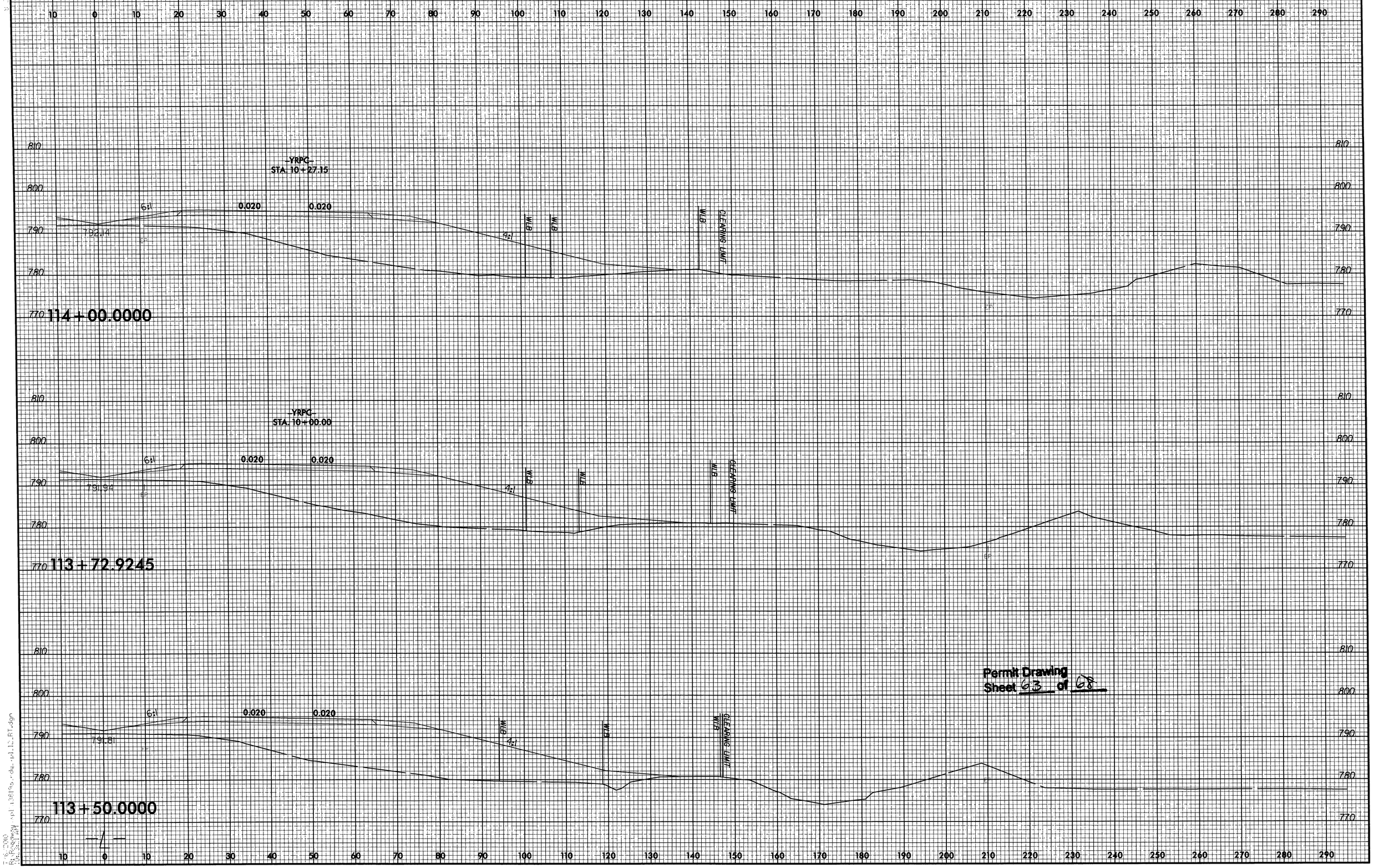
Permit Drawing
Sheet 6.1 of 68

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-163



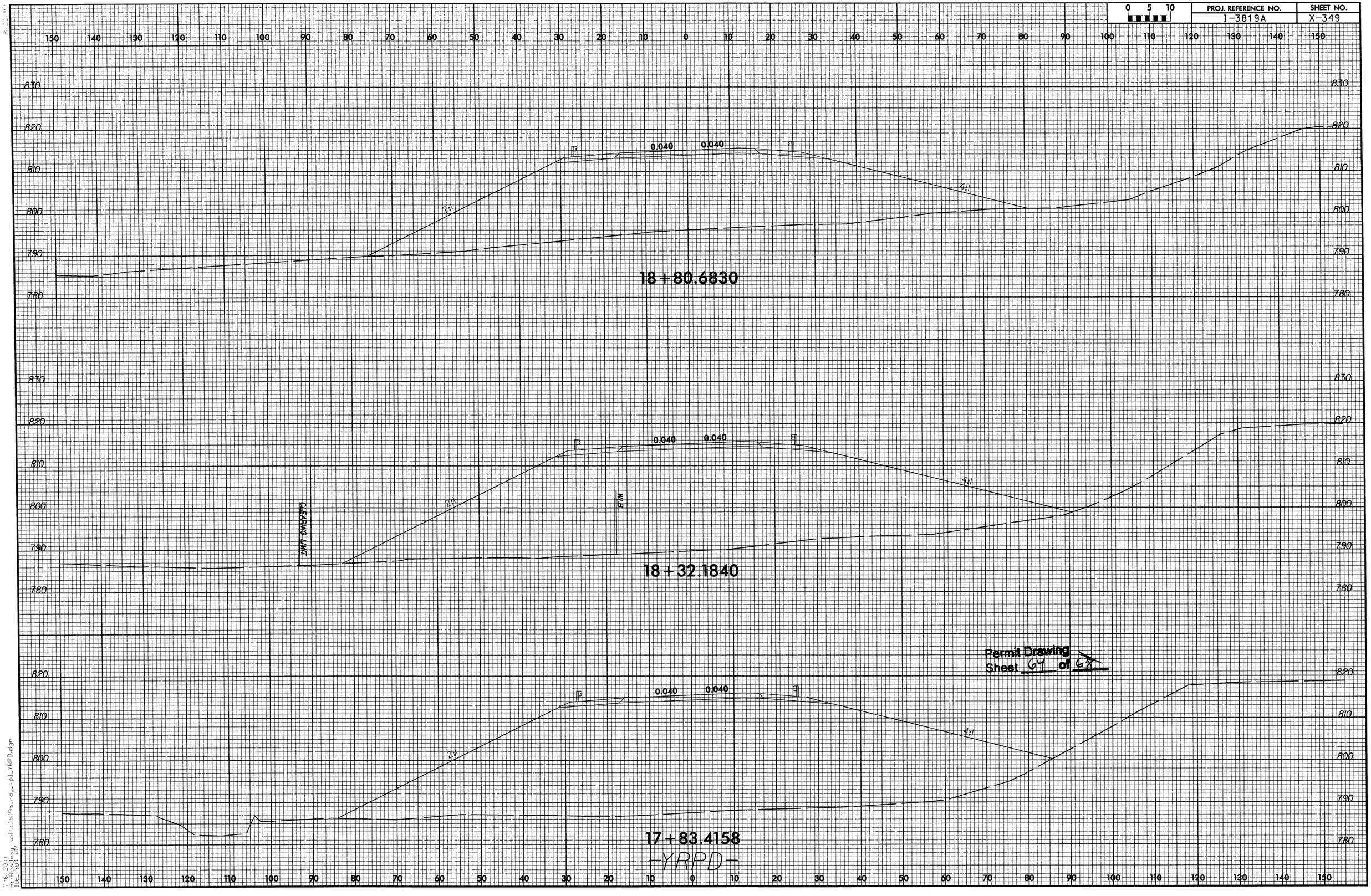
Permit Drawing
Sheet 62 of 68

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-164



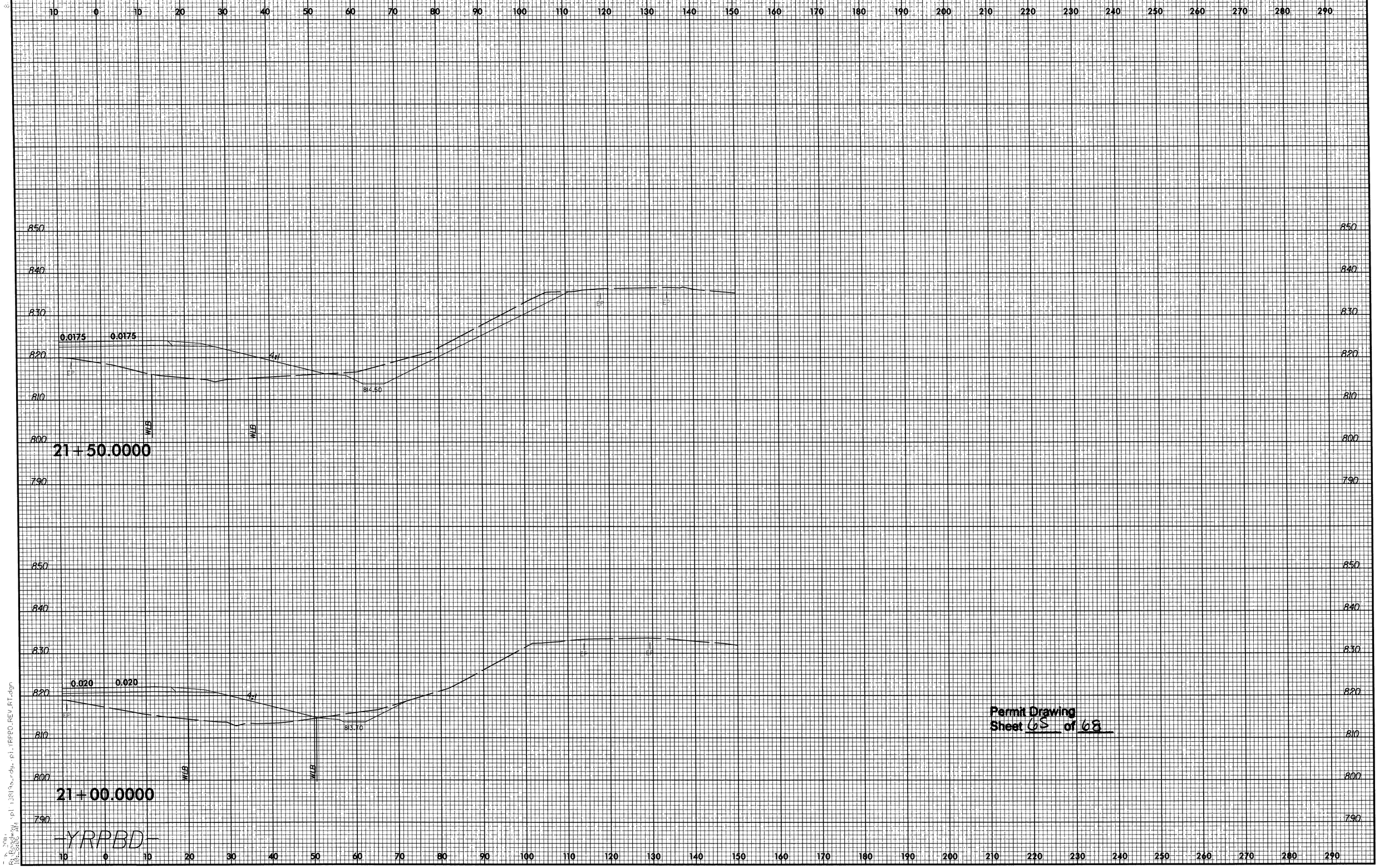
Permit Drawing
Sheet 63 of 68

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-349



Permit Drawing
Sheet 6Y of 6X

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-310



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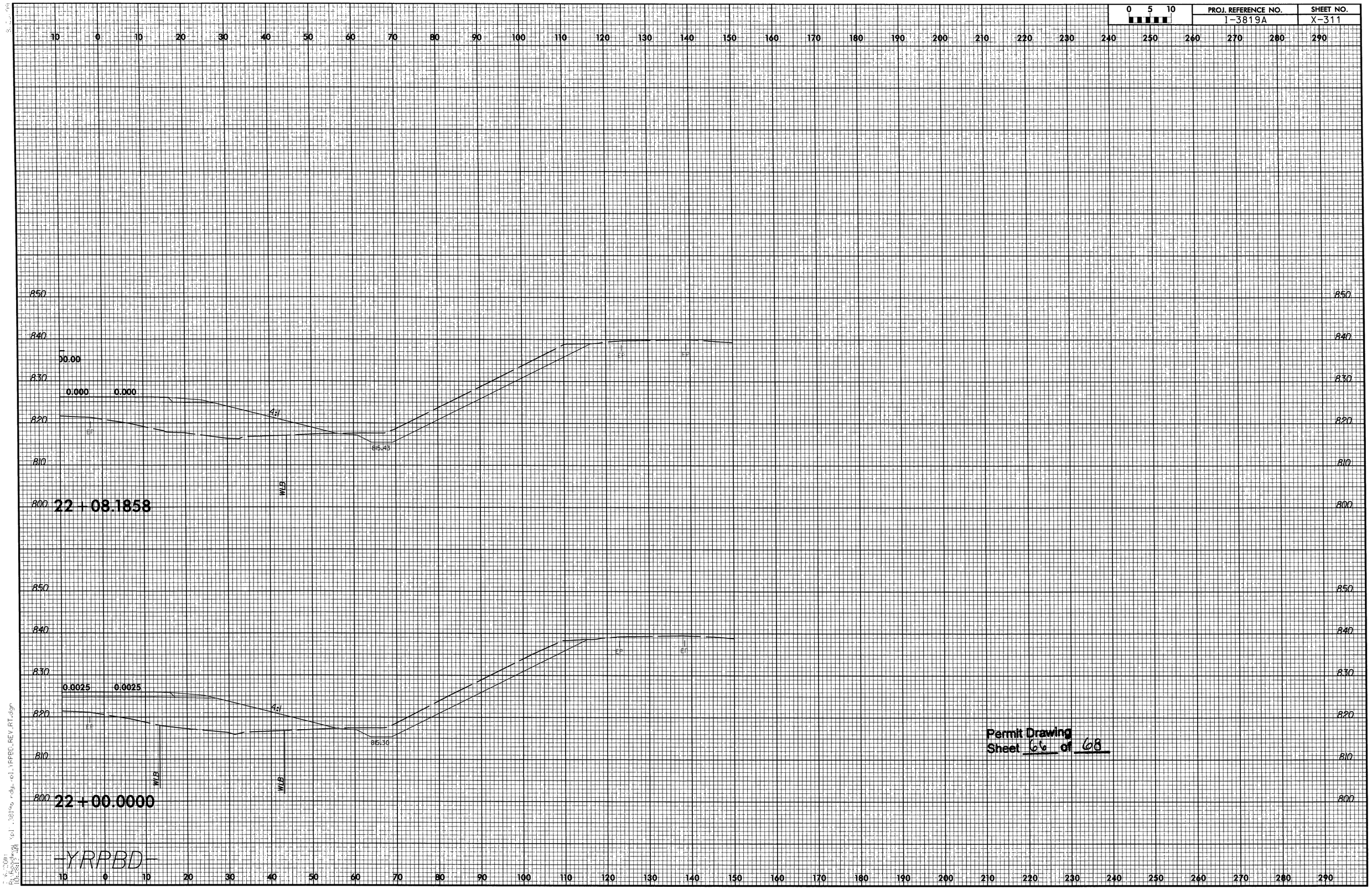
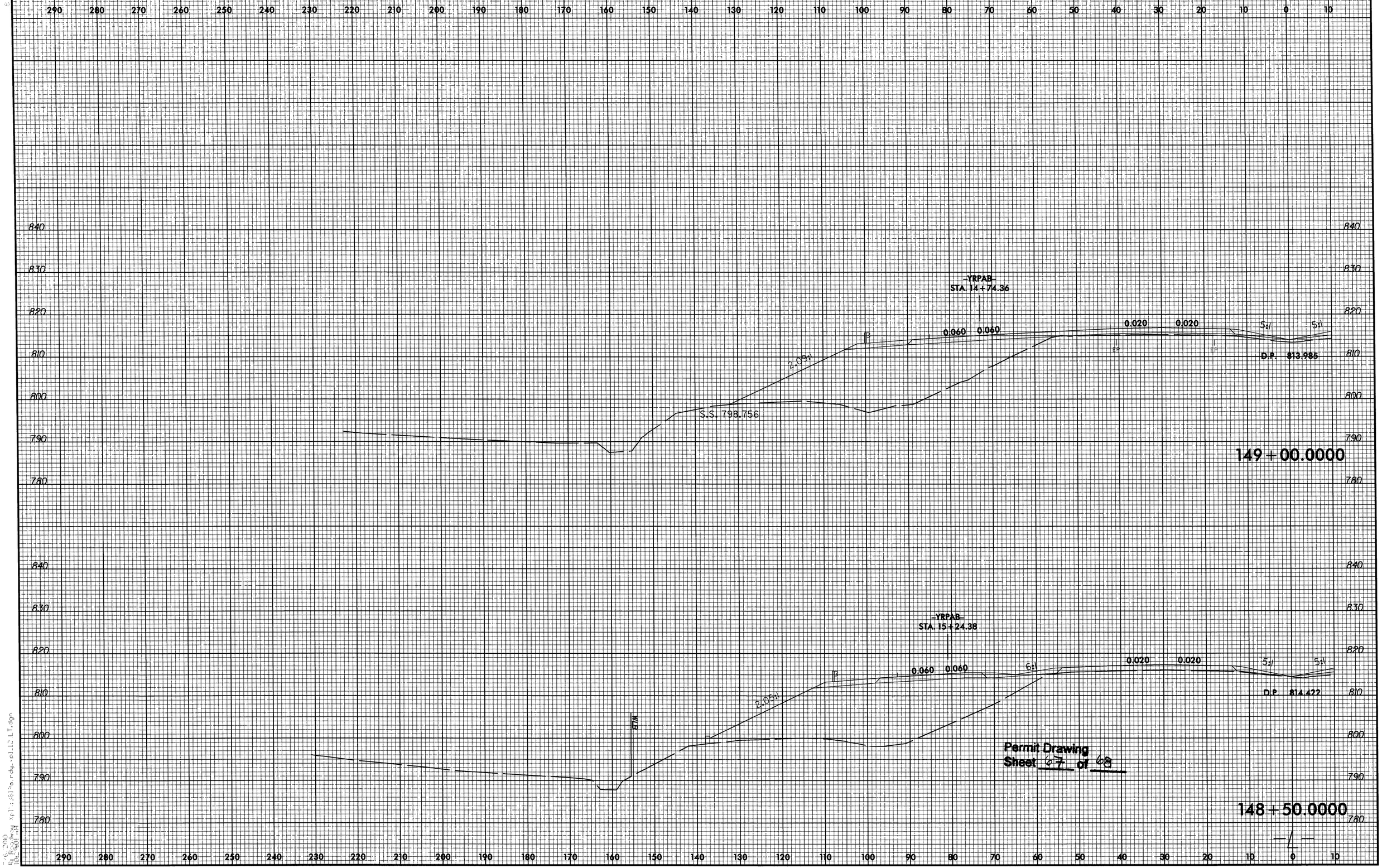
I-3819A	X-311



Permit Drawing
Sheet 66 of 68

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-3819A	X-97



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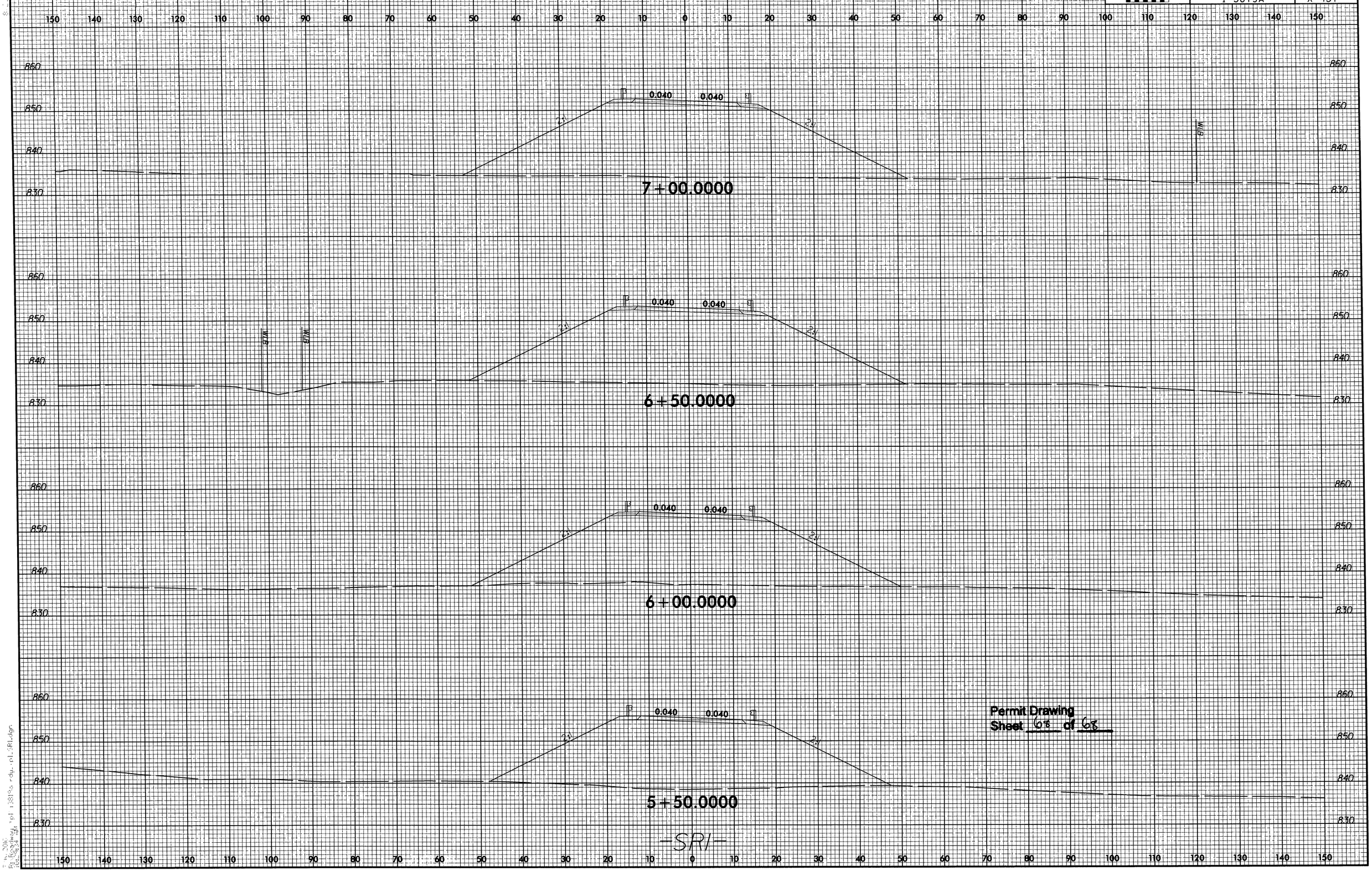
	I-3819A	X-437



Permit Drawing
Sheet 68 of 68

-SR1-

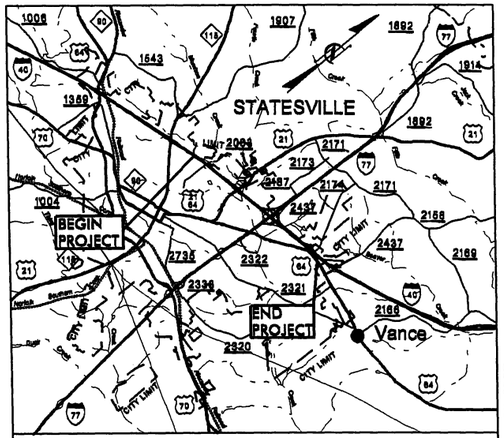
T.I.P. NO.	SHEET NO.
I-3819A	UC-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

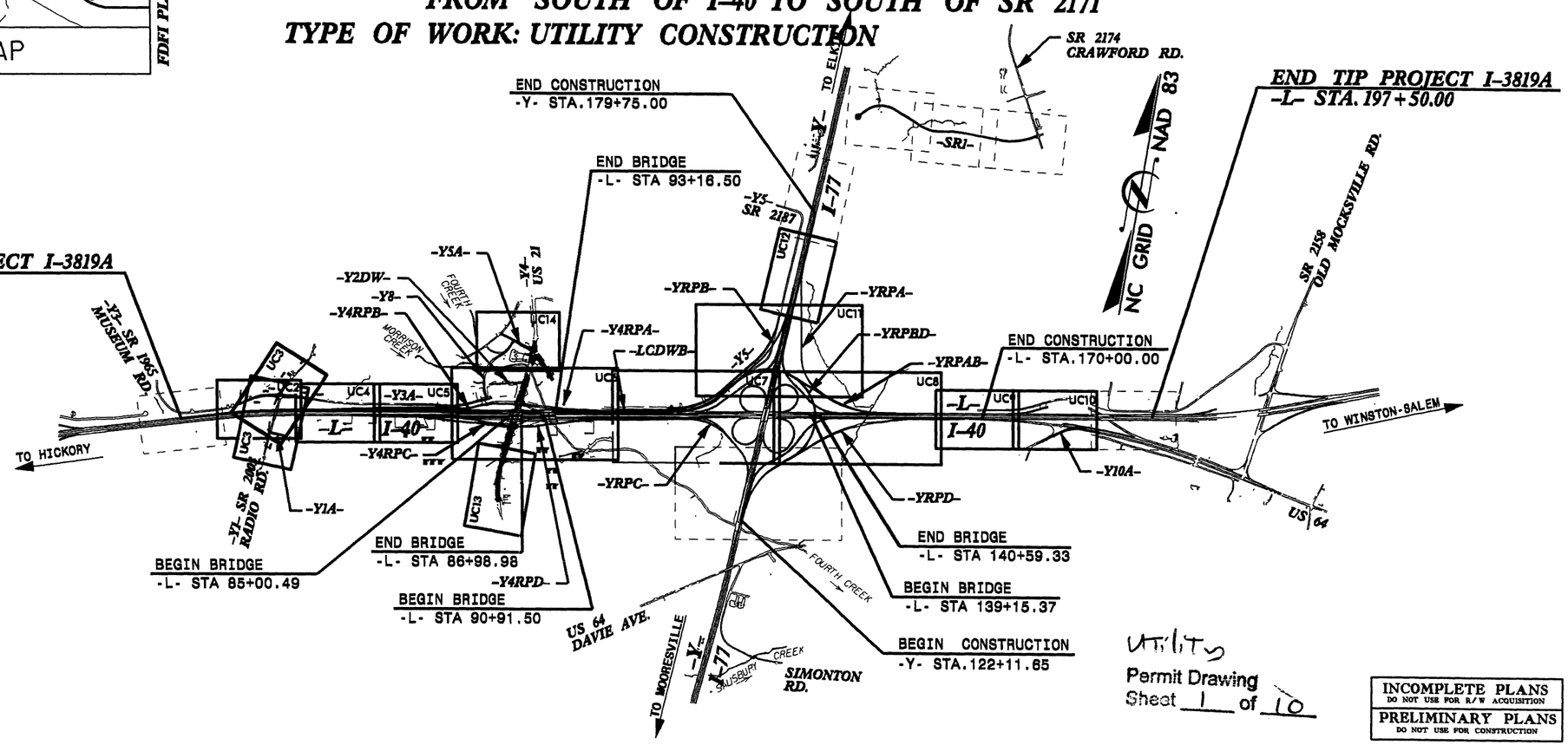
PERMIT DRAWINGS
IREDELL COUNTY

LOCATION: I-40/I-77 INTERCHANGE INCLUDING I-40 FROM WEST OF SR 2003 TO WEST OF SR 2158 & I-77 FROM SOUTH OF I-40 TO SOUTH OF SR 2171

TYPE OF WORK: UTILITY CONSTRUCTION



FDFI PLANS



Utility
Permit Drawing
Sheet 1 of 10

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UC-1	TITLE SHEET
UC-2 THRU UC-14	UTILITY CONSTRUCTION PLAN SHEETS
UC-15	PROFILE SHEET
UC-16	DETAILS SHEET

WATER AND SEWER OWNERS ON PROJECT

(1) WATER - CITY OF STATESVILLE
(2) SANITARY SEWER - CITY OF STATESVILLE
(3) WATER - IREDELL WATER CORPORATION

SEAL

PREPARED IN THE OFFICE OF:
DIVISION OF HIGHWAYS
UTILITIES ENGINEERING SECTION
1591 MAIL SERVICES CENTER
RALEIGH NC 27699-1591
PHONE (919) 250-4128
FAX (919) 250-4119

Roger Worthington, P.E. UTILITIES SECTION ENGINEER
R. B. WILKINS, P.E. UTILITIES SQUAD LEADER PROJECT ENGINEER
MICHAEL R. BRIGHT UTILITIES PROJECT DESIGNER

TIP PROJECT: I-3819A

PROJECT: 34192.1.2

19-JAN-2011 14:17
R:\Utilities\Rdy_Ut\Proj\I-3819A_Ut_Title_UC1_psh.dgn
$$$$USERNAME$$$$

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
U1	151+00 -L-	UTILITIES-24" WAT			0.0024							
U2	152+50 -L-	UTILITIES-24" WAT							0.0009		10.000	
U3	162+50 -Y-	UTILITIES-24" WAT							0.0007		8.000	
U4	147+00 -L-	UTILITIES-AERIAL					0.051					
U5	125+50 -Y-	UTILITIES-AERIAL					0.079					
0	0	0										
0	0	0										
0	0	0										
0	0	0										
0	0	0										
0	0	0										
0	0	0										
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0	0	0										
0	0	0										
0	0	0										
0	0	0										
0	0	0										
0	0	0										
TOTALS:					0.0024		0.131		0.0017		44	

Utility
Permit Drawing
Sheet 8 of 10

ATN Revised 3/31/05

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

IREDELL COUNTY
WBS - 34192.1.2 (I-3819)

SHEET 11/2/2011

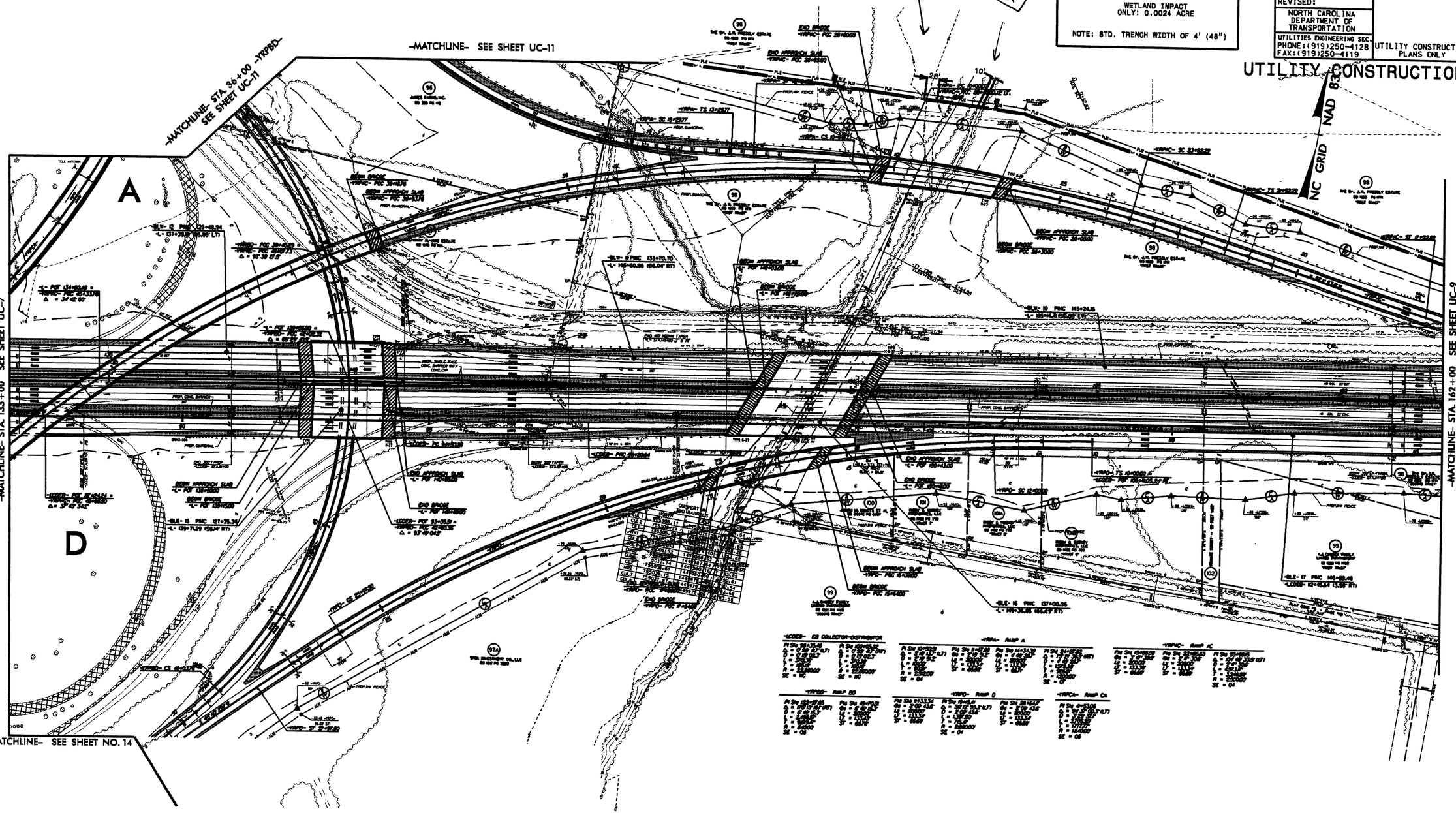
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	UC-8
DESIGNED BY: MRB	
DRAWN BY: MRB	
CHECKED BY: RBW	
APPROVED BY: RBW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE:(919)250-4128 FAX:(919)250-4119	UTILITY CONSTRUCTION PLANS ONLY

UTILITY IMPACT AREA: 0.0033 ACRE

WETLAND IMPACT ONLY: 0.0024 ACRE

NOTE: STD. TRENCH WIDTH OF 4' (48")

UTILITY CONSTRUCTION



Utility
Permit Drawing
Sheet 3 of 10

02-FEB-2011 14:23
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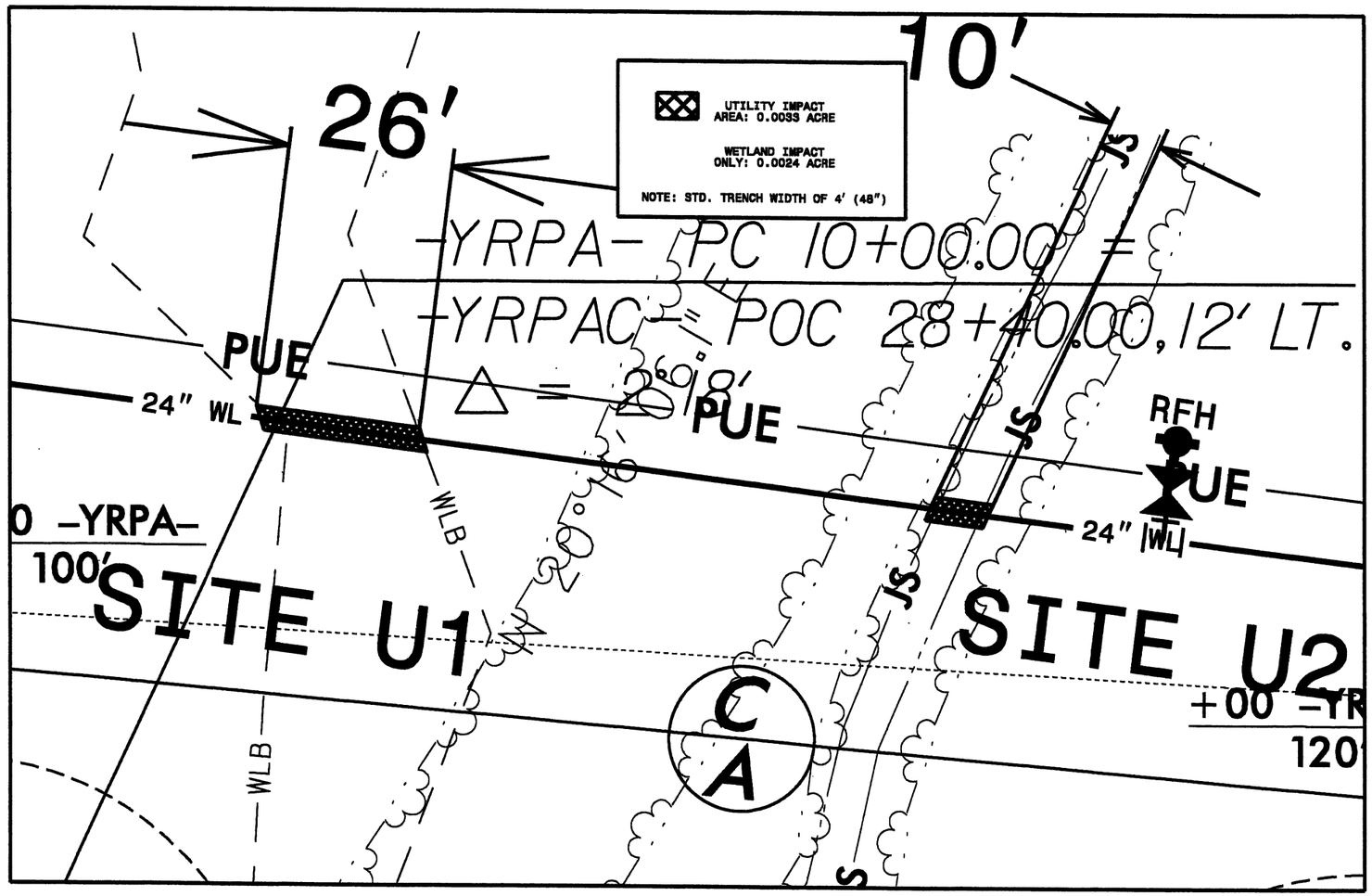
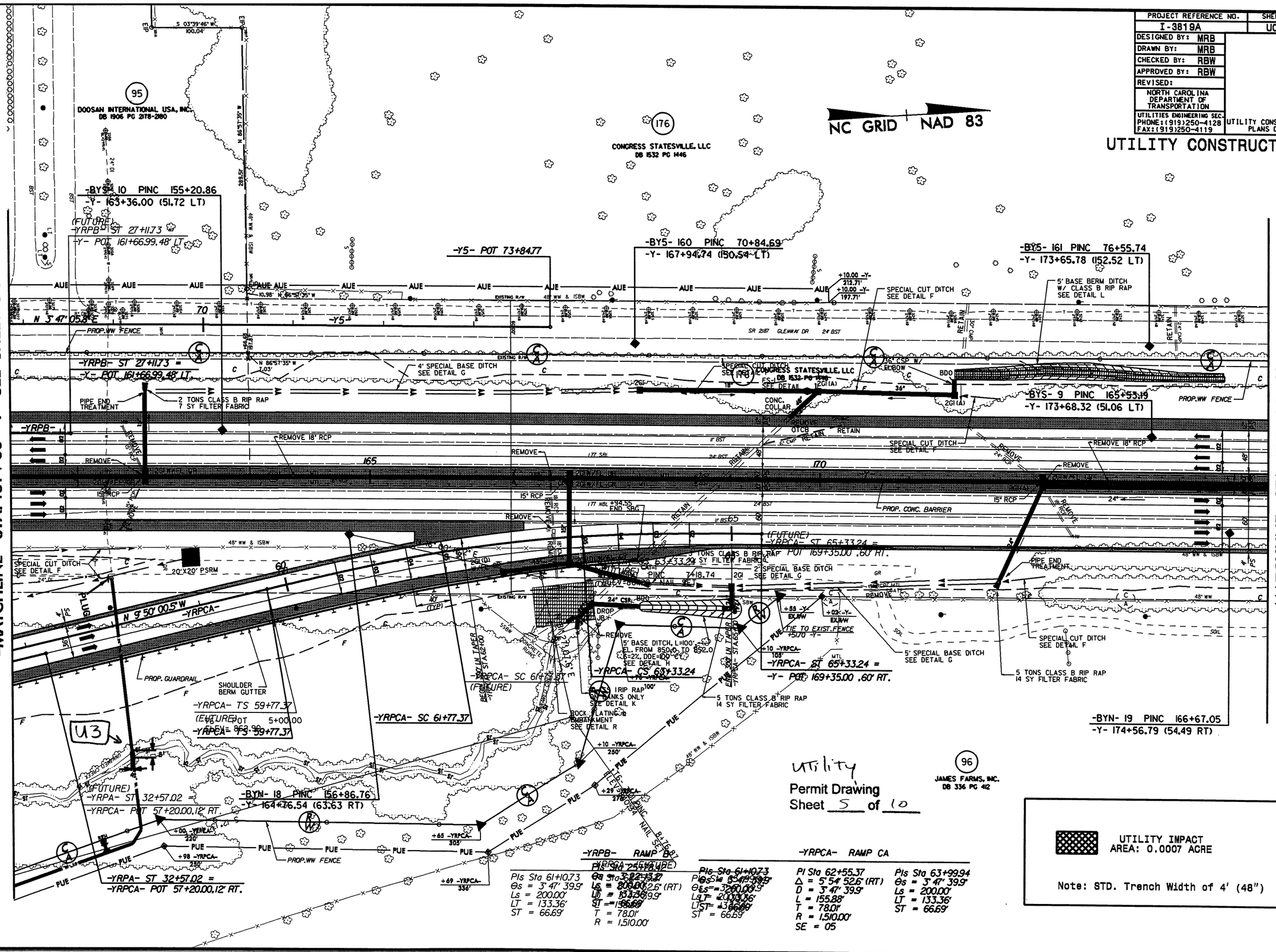


Utility
Permit Drawing
Sheet 4 of 10

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	UC-12
DESIGNED BY: MRB	
DRAWN BY: MRB	
CHECKED BY: RBW	
APPROVED BY: RBW	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919)250-4128 FAX: (919)250-4119	UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

NC GRID NAD 83



5/14/99

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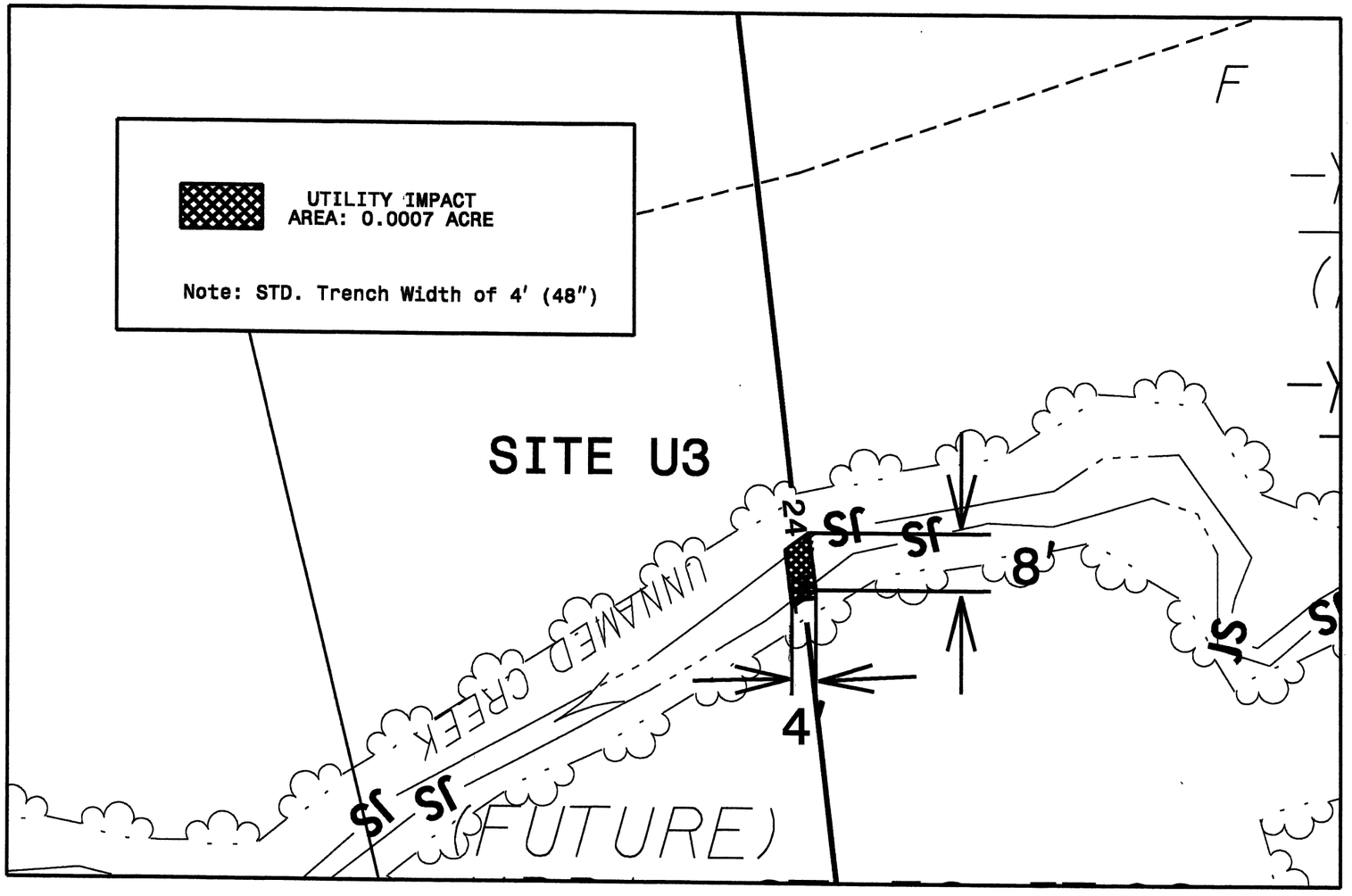
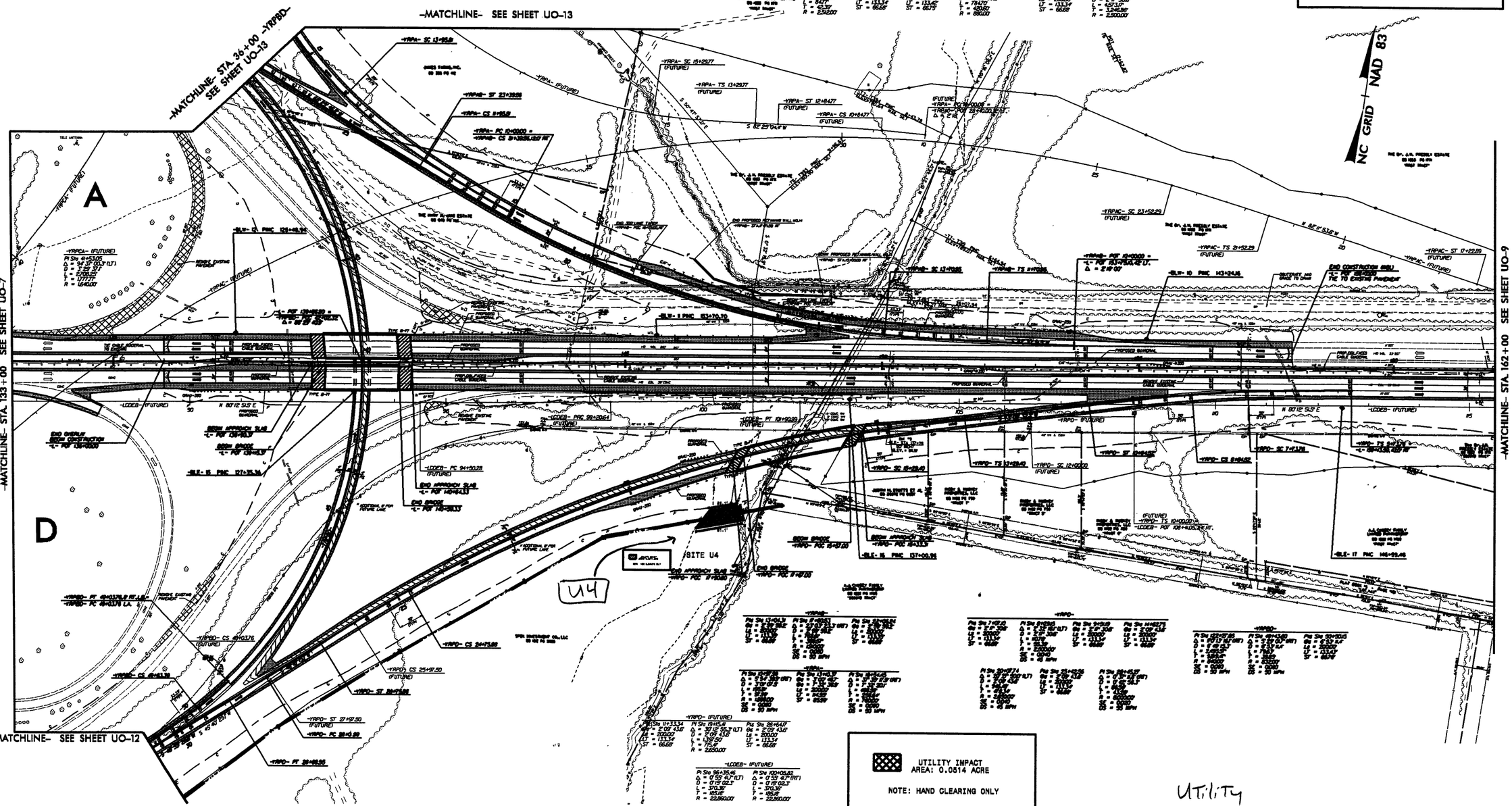


Utility
Permit Drawing
Sheet 6 of 10

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	UO-8

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS



Utility
Permit Drawing
Sheet 7 of 10

02-NOV-2011 15:39
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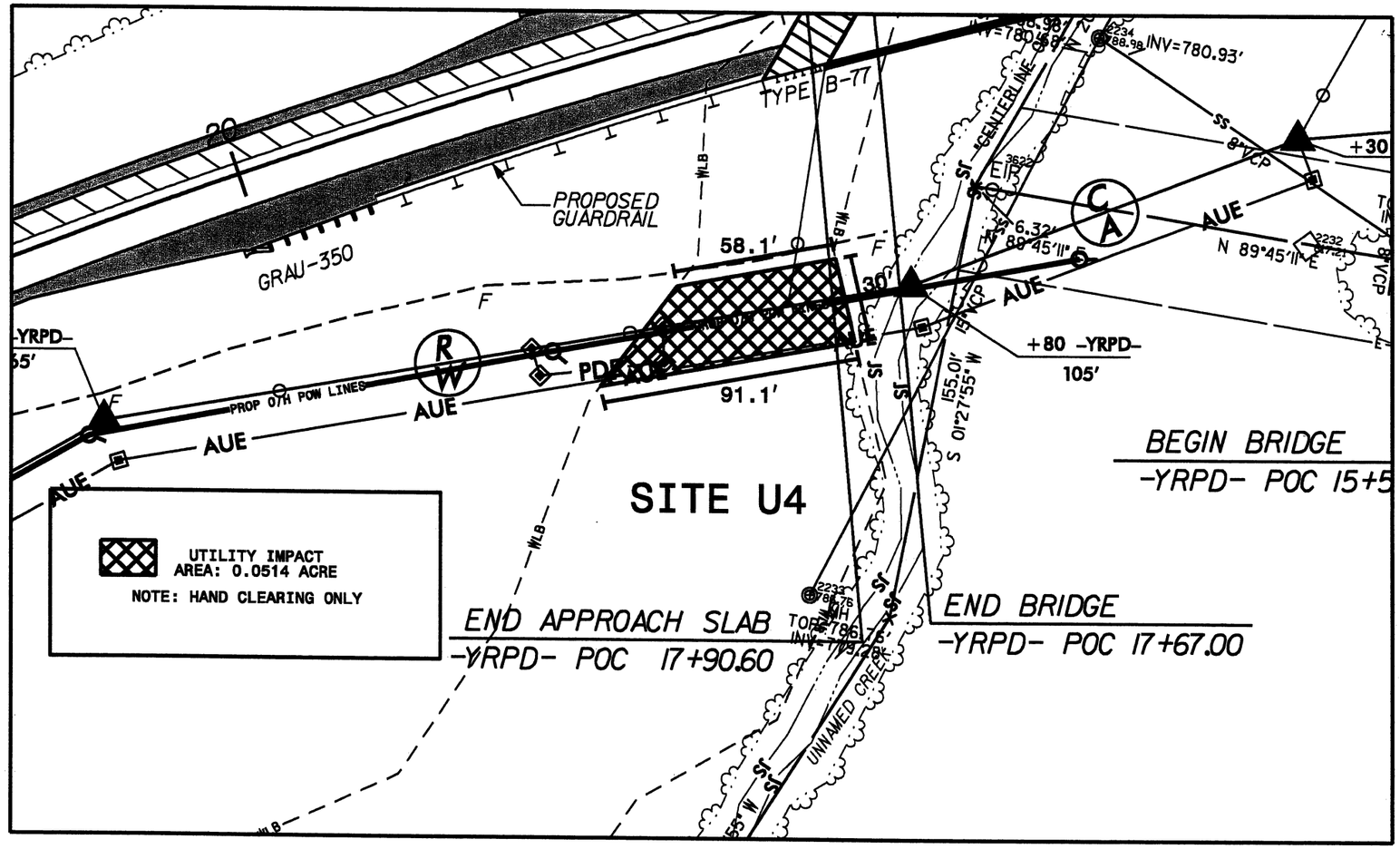
5/14/99

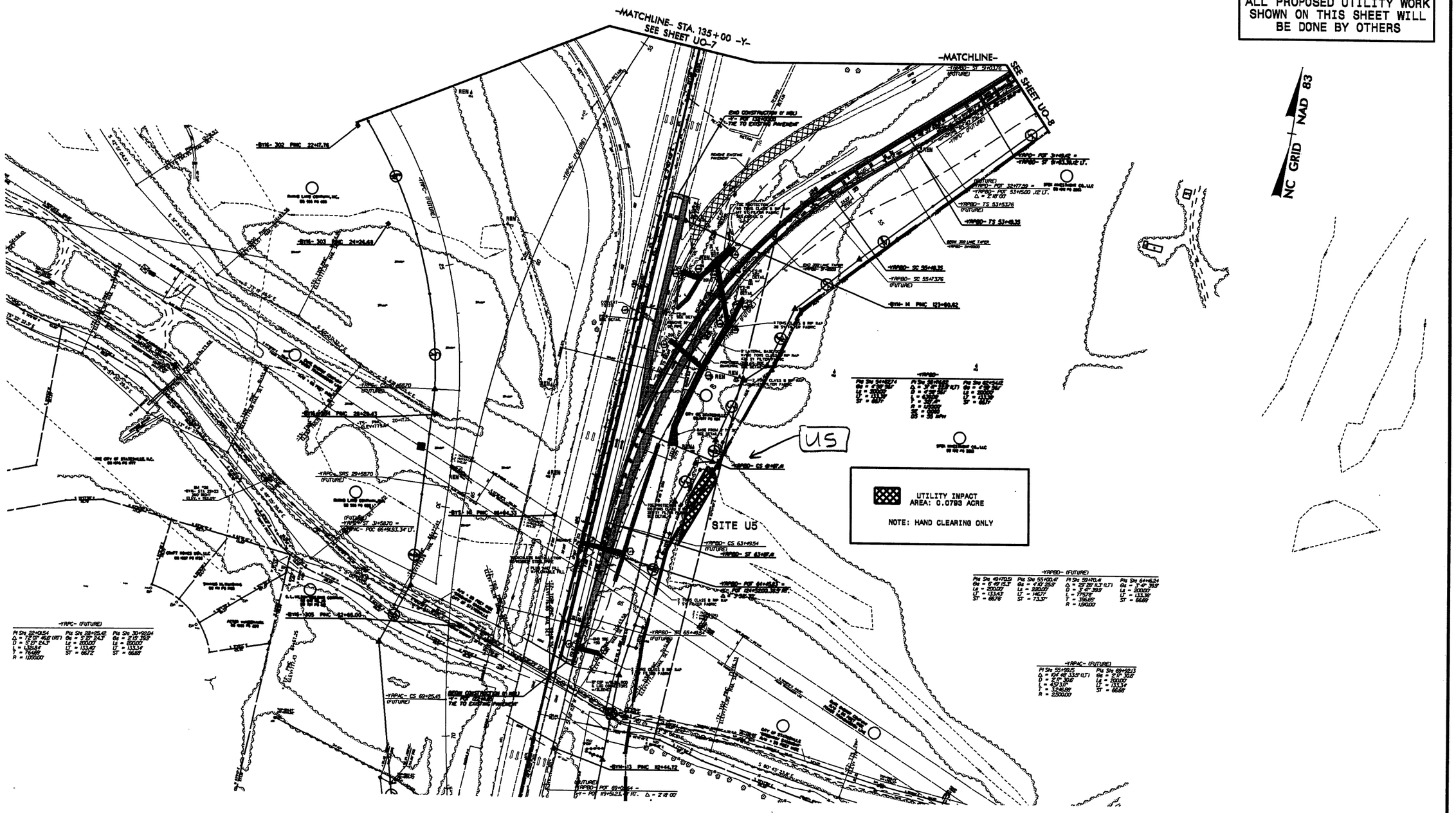


Utility
Permit Drawing
Sheet 8 of 10

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	U0-12

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS



Utility
Permit Drawing
Sheet 9 of 10

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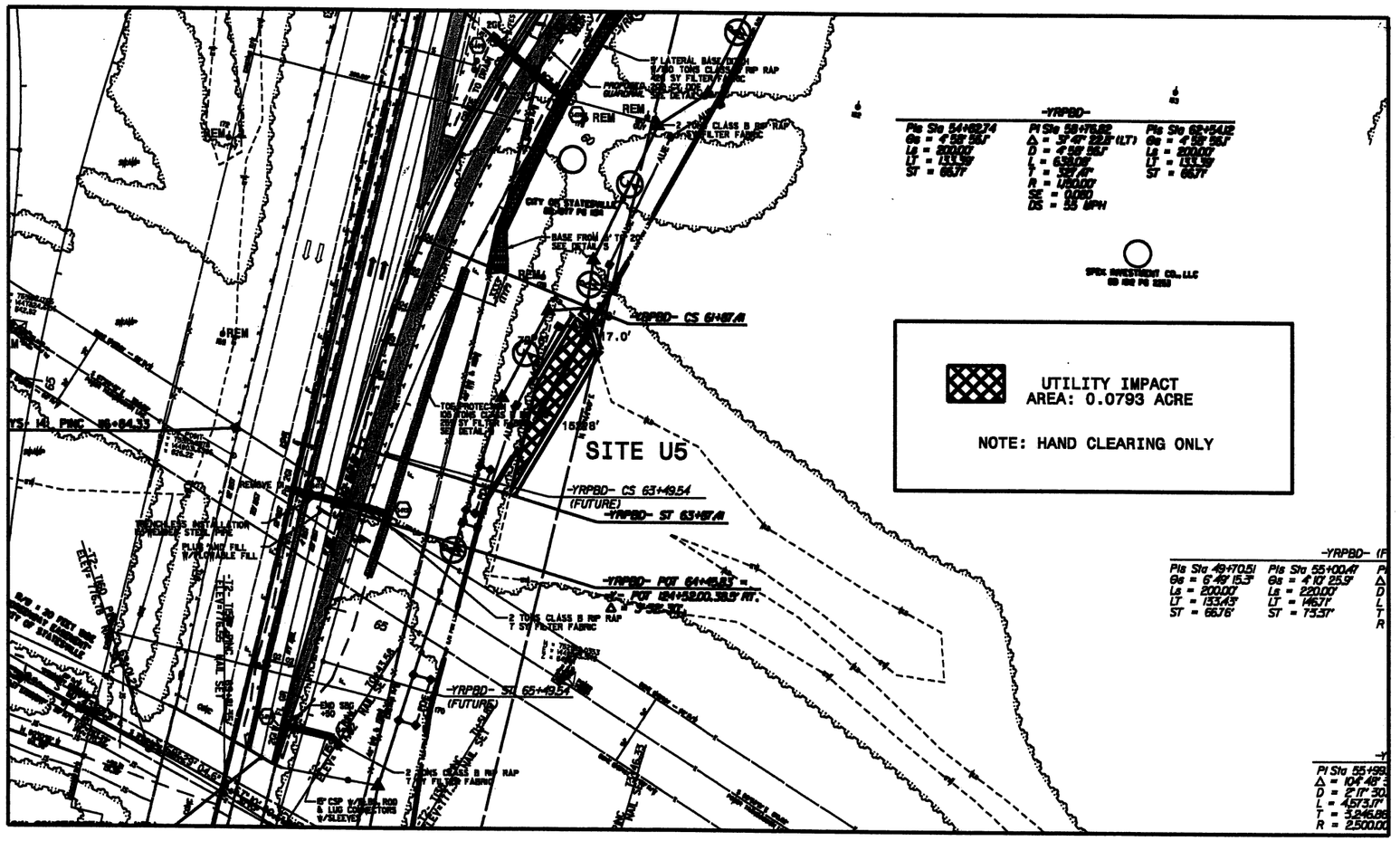


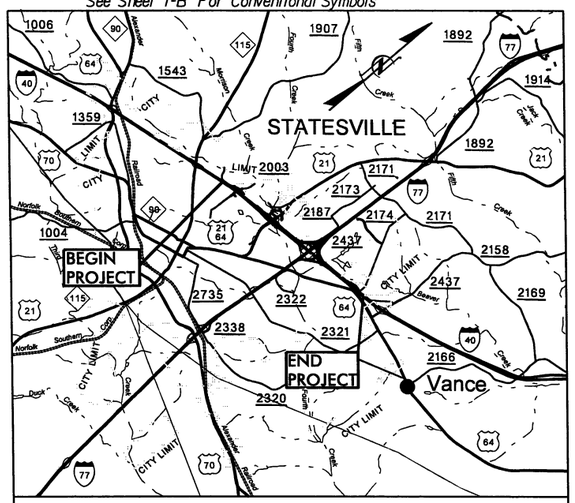
Utility
Permit Drawing
Sheet 10 of 10

09/08/99

TIP PROJECT: I-3819A

CONTRACT: C202602

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

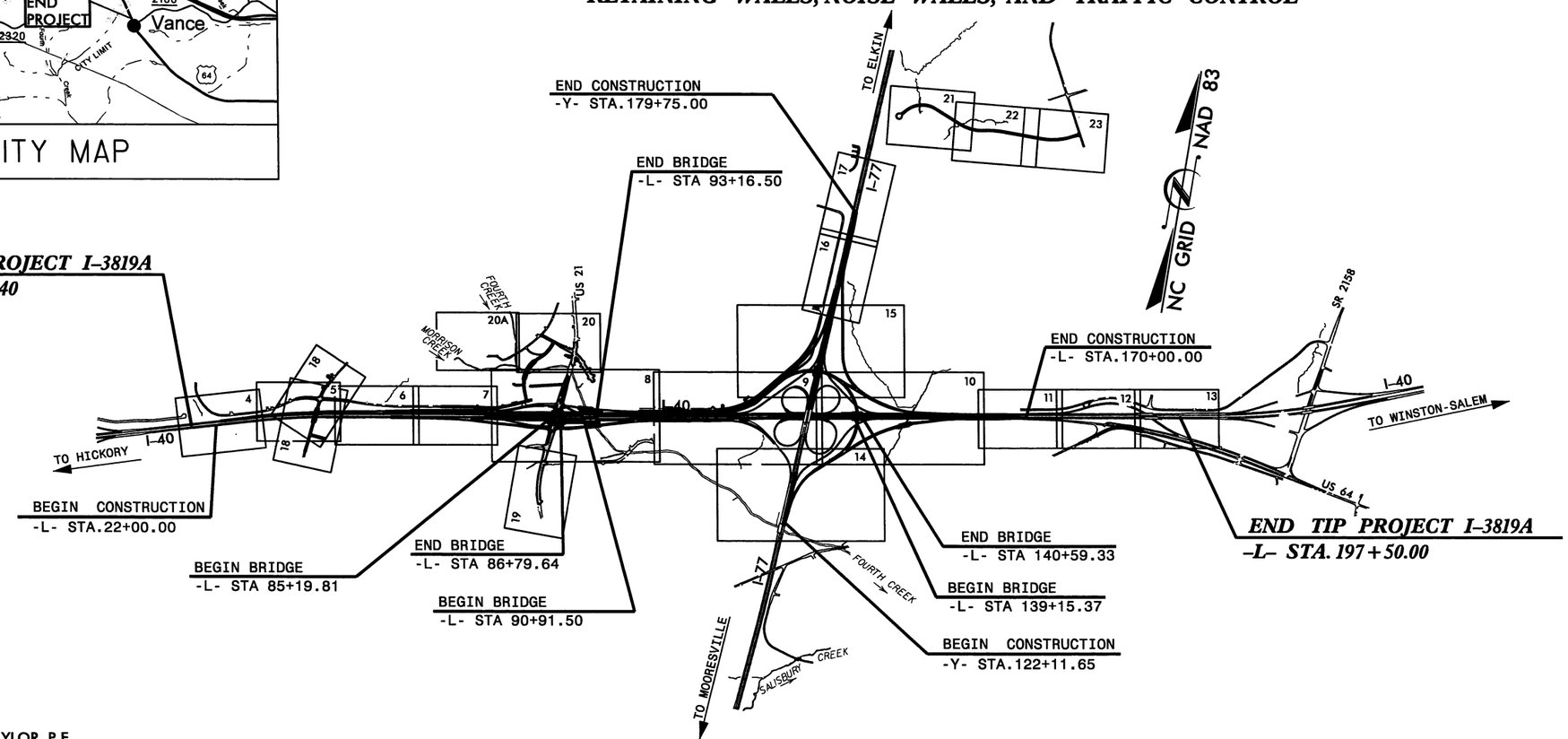
IREDELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-3819A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34192.1.2	IMS-40-2(124)	P.E.
34192.2.GV3	IMS-040-2(145)152	CONST.

LOCATION: I-40/I-77 INTERCHANGE INCLUDING I-40 FROM WEST OF SR 2003 (Radio Rd.) TO WEST OF SR 2158 (Old Mocksville Rd.) & I-77 FROM SOUTH OF I-40 TO SOUTH OF SR 2171 (Jane Sower Rd.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, RETAINING WALLS, NOISE WALLS, AND TRAFFIC CONTROL



NCDOT CONTACT: DOUG TAYLOR, P.E.
ROADWAY DESIGN – ENGINEERING COORDINATION

THIS IS A CONTROLLED ACCESS PROJECT
WITH ACCESS BEING LIMITED TO INTERCHANGES

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

	I-40	I-77
ADT 2010 =	71,100	73,200
ADT 2030 =	99,420	109,040
DHV =	10 %	9 %
D =	60 %	55 %
T =	19 % *	20 % **
V =	60 MPH	60 MPH

* TTST 14 + DUAL 5 (I-40)
** TTST 15 + DUAL 5 (I-77)
CLASSIFICATION: INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT I-3819A	=	3.260
LENGTH STRUCTURES TIP PROJECT I-3819A	=	0.100
TOTAL LENGTH OF TIP PROJECT I-3819A	=	3.360

Prepared In the Office of:

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 19, 2008

LETTING DATE:
MARCH 20, 2012

DAVID C. WALLER, P.E.
PROJECT ENGINEER

BRIAN A. WILES, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

20-SEP-2011 14:20
I:\3819A\Roadway\Proj\3819a_rdy_tsh.dgn
$$$$USERNAME$$$$

3/15/06

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	I-B

Note: Not to Scale

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 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
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch
- False Sump

RAILROADS:

- Standard Gauge — 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
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite Marker
- 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
- Proposed Permanent Easement with Iron Pin and Cap Marker

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
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — 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
- 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:

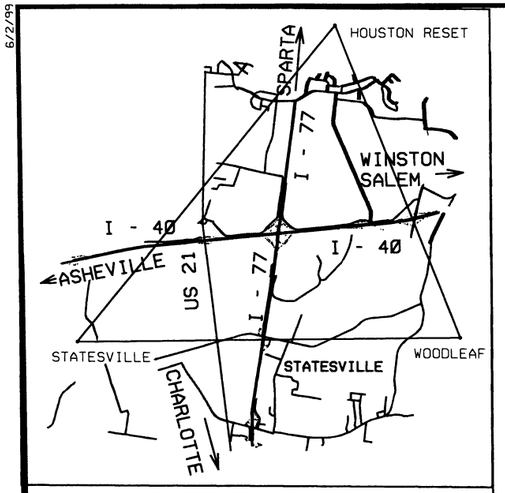
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

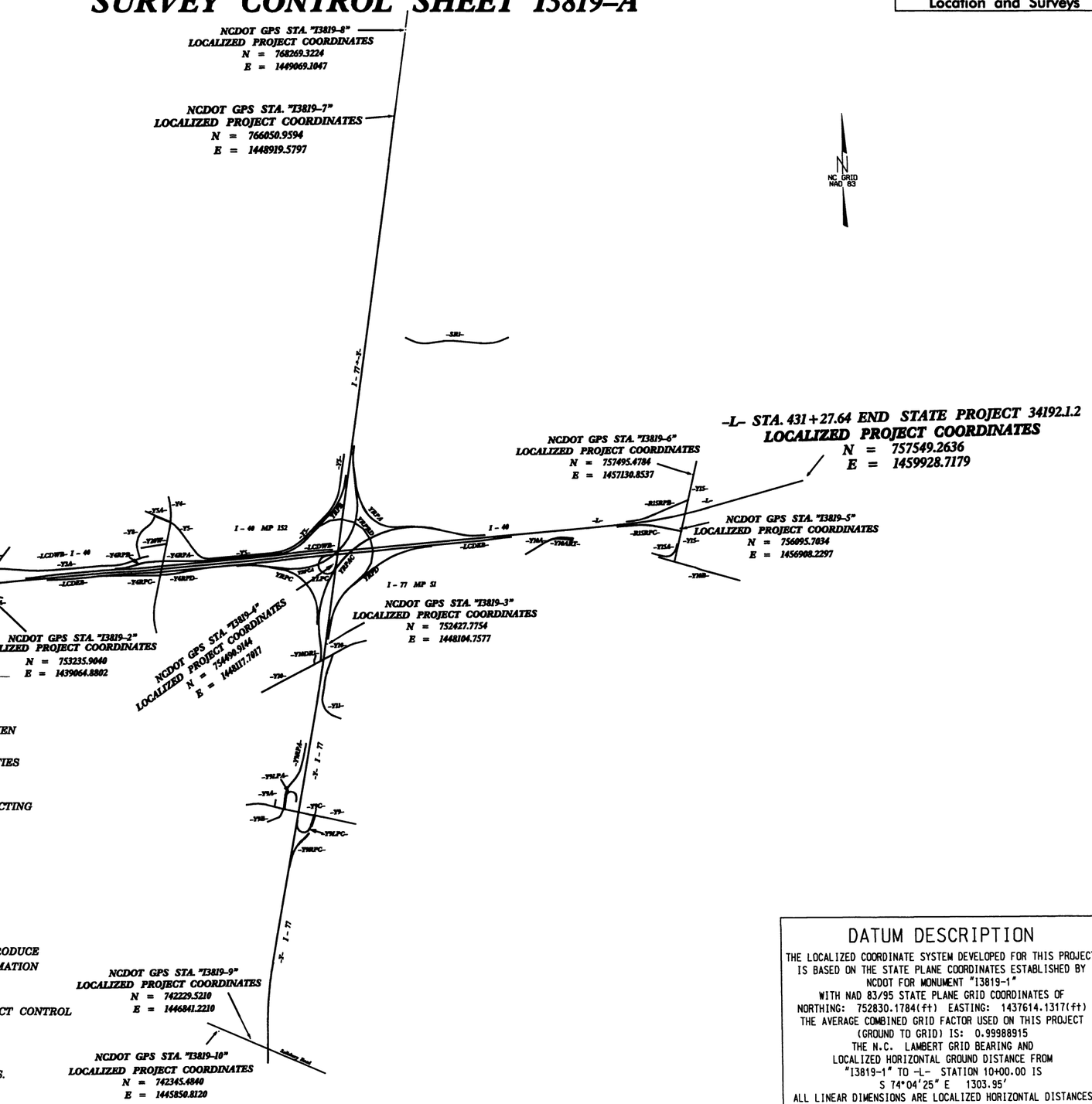
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	1 - C
Location and Surveys	

SURVEY CONTROL SHEET I3819-A



VICINITY MAP



NOTES:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORKWITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.

2. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTP:/WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
I3819A_LS_GPSCALIB_080826.HTML
I3819A_LS_WGS84_080826.TXT
I3819A_LS_LOCAL_080826.TXT
I3819A_LS_CONTROL_080826.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

- INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "I3819-1"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 752830.1784(ft) EASTING: 1437614.1317(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988915
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "I3819-1" TO -L- STATION 10+00.00 IS
S 74°04'25" E 1303.95'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

6/2/99

8/25/2000
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Florence & Hutchinson Inc.

SURVEY CONTROL SHEET I3819-A

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	1 - D

Location and Surveys

DATUM DESCRIPTION

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GPS CALIBRATION REPORT

PROJECT : I3819-A

TIP NUMBER	I3819		
USER NAME	RDWOODS	DATE & TIME	1:29:08 PM 7/22/2008
COORDINATE SYSTEM	US STATE PLANE 1983	ZONE	NORTH CAROLINA 3200
HORIZONTAL DATUM	NAD 1983 (CONUS)		
VERTICAL DATUM	NAVD 88	GEOID MODEL	GEOID99 (CONUS) NC SUB GRID
COORDINATE UNITS	US SURVEY FEET		
DISTANCE UNITS	US SURVEY FEET		
HEIGHT UNITS	US SURVEY FEET		

LOCAL SITE INFORMATION
LOCALIZED AROUND I3819-1
LATITUDE 35°48'13.45817"N
LONGITUDE 80°53'48.26684"W
SITE SCALE FACTOR 0.9999188931
HEIGHT 765.763SFT

THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION USES A LOCALIZED COORDINATE SYSTEM
WHICH IS VERY SIMILAR TO NORTH CAROLINA ZONE 3200 FROM WHICH IT IS DERIVED.
PLEASE TAKE CARE IN UTILIZING THESE COORDINATES TO ELIMINATE CONFUSION OF THE TWO SYSTEMS.
THIS FILE IS TO AID IN THE USE OF REAL TIME KINEMATIC (RTK) GPS DURING CONSTRUCTION LAYOUT.

DATUM TRANSFORMATION PARAMETERS

DATUM TRANSFORMATION COMPUTATION NOT REQUESTED

UPDATED DEFAULT PROJECTION (TRANSVERSE MERCATOR) DEFINITION

UPDATED DEFAULT PROJECTION NOT REQUESTED

HORIZONTAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ROTATION CENTER	754737.680SFT
EASTING COORDINATE OF ROTATION CENTER	1448888.385SFT
ROTATION ABOUT THE CENTER POINT	0°00'00"
TRANSLATION NORTH	0.214SFT
TRANSLATION EAST	1.318SFT
SCALE FACTOR	1.00011704

VERTICAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN POINT	753235.899SFT
EASTING COORDINATE OF ORIGIN POINT	1439064.887SFT
VERTICAL SEPARATION AT ORIGIN	0.171SFT
SLOPE NORTH	5.360PPM
SLOPE EAST	-1.112PPM

GEOID MODEL DEFINITION

GEOID99 (CONUS) NC SUB GRID

RESIDUAL DIFFERENCES BETWEEN GPS (WGS84) AND LOCAL COORDINATES

SUMMARY

	MAXIMUM ERROR	ROOT MEAN SQUARE ERROR	POINT
HORIZONTAL	0.007SFT	0.001	I3819-2_WGS84
VERTICAL	0.112SFT	0.028	I3819-3_WGS84
THREE-DIMENSIONAL	0.112SFT	0.028	I3819-3_WGS84

POINT RESIDUALS

WGS84 COORDINATES	CALCULATED POINT FOR DISPLAY ONLY	LOCAL COORDINATES
POINT I3819-2_WGS84	NORTHING 753235.899SFT	POINT I3819-2_LOCAL
LATITUDE 35°48'17.74346"N	EASTING 1439064.887SFT	NORTHING 753235.904SFT
LONGITUDE 80°53'30.75298"W	ELEVATION 888.185SFT	EASTING 1439064.882SFT
HEIGHT 782.653SFT	HORZ ERROR 0.007SFT	ELEVATION 888.293SFT
	VERT ERROR 0.108SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.109SFT	QUALITY SURVEY QUALITY
POINT I3819-10_WGS84	NORTHING 742345.481SFT	POINT I3819-10_LOCAL
LATITUDE 35°46'31.33729"N	EASTING 1445850.808SFT	NORTHING 742345.484SFT
LONGITUDE 80°52'05.90104"W	ELEVATION 938.683SFT	EASTING 1445850.812SFT
HEIGHT 833.623SFT	HORZ ERROR 0.005SFT	ELEVATION 938.579SFT
	VERT ERROR 0.104SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.104SFT	QUALITY SURVEY QUALITY
POINT I3819-9_WGS84	NORTHING 742229.519SFT	POINT I3819-9_LOCAL
LATITUDE 35°46'30.37488"N	EASTING 1446841.216SFT	NORTHING 742229.521SFT
LONGITUDE 80°51'53.85793"W	ELEVATION 934.095SFT	EASTING 1446841.221SFT
HEIGHT 829.045SFT	HORZ ERROR 0.005SFT	ELEVATION 933.991SFT
	VERT ERROR 0.104SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.104SFT	QUALITY SURVEY QUALITY
POINT I3819-4_WGS84	NORTHING 754490.914SFT	POINT I3819-4_LOCAL
LATITUDE 35°48'31.84442"N	EASTING 1448117.735SFT	NORTHING 754490.911SFT
LONGITUDE 80°51'41.15978"W	ELEVATION 847.456SFT	EASTING 1448117.733SFT
HEIGHT 741.911SFT	HORZ ERROR 0.003SFT	ELEVATION 847.538SFT
	VERT ERROR 0.082SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.082SFT	QUALITY SURVEY QUALITY
POINT I3819-3_WGS84	NORTHING 752427.776SFT	POINT I3819-3_LOCAL
LATITUDE 35°48'11.44316"N	EASTING 1448104.791SFT	NORTHING 752427.772SFT
LONGITUDE 80°51'40.84729"W	ELEVATION 804.493SFT	EASTING 1448104.789SFT
HEIGHT 699.034SFT	HORZ ERROR 0.005SFT	ELEVATION 804.605SFT
	VERT ERROR 0.112SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.112SFT	QUALITY SURVEY QUALITY
POINT I3819-5_WGS84	NORTHING 756095.703SFT	POINT I3819-5_LOCAL
LATITUDE 35°48'49.32846"N	EASTING 1456908.261SFT	NORTHING 756095.700SFT
LONGITUDE 80°49'54.81860"W	ELEVATION 877.261SFT	EASTING 1456908.261SFT
HEIGHT 771.701SFT	HORZ ERROR 0.003SFT	ELEVATION 877.315SFT
	VERT ERROR 0.054SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.054SFT	QUALITY SURVEY QUALITY
POINT I3819-6_WGS84	NORTHING 757495.480SFT	POINT I3819-6_LOCAL
LATITUDE 35°49'03.20913"N	EASTING 1457130.884SFT	NORTHING 757495.475SFT
LONGITUDE 80°49'52.42968"W	ELEVATION 851.527SFT	EASTING 1457130.885SFT
HEIGHT 745.907SFT	HORZ ERROR 0.005SFT	ELEVATION 851.560SFT
	VERT ERROR 0.033SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.034SFT	QUALITY SURVEY QUALITY
POINT I3819-7_WGS84	NORTHING 766050.951SFT	POINT I3819-7_LOCAL
LATITUDE 35°50'26.28988"N	EASTING 1448919.610SFT	NORTHING 766050.956SFT
LONGITUDE 80°51'34.05515"W	ELEVATION 863.172SFT	EASTING 1448919.611SFT
HEIGHT 757.134SFT	HORZ ERROR 0.005SFT	ELEVATION 863.099SFT
	VERT ERROR 0.073SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.073SFT	QUALITY SURVEY QUALITY
POINT I3819-8_WGS84	NORTHING 768269.320SFT	POINT I3819-8_LOCAL
LATITUDE 35°50'48.25098"N	EASTING 1449069.138SFT	NORTHING 768269.319SFT
LONGITUDE 80°51'32.74398"W	ELEVATION 820.522SFT	EASTING 1449069.136SFT
HEIGHT 714.385SFT	HORZ ERROR 0.003SFT	ELEVATION 820.412SFT
	VERT ERROR 0.110SFT	UTILIZED HORZ AND VERT
	3D ERROR 0.110SFT	QUALITY SURVEY QUALITY

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6/2/99
4/5/2010
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PROJECT REFERENCE NO.	SHEET NO.
I-3819A	1-E
Location and Surveys	

SURVEY CONTROL SHEET I3819–A

DATUM DESCRIPTION

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ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BLE

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BLE1	BLE-1	752628.0741	1437876.9080	882.16	17+28.02	55.95 RT
BLE2	BLE-2	752879.3917	1437972.4913	875.54	26+61.00	56.30 RT
BLE3	BLE-3	753149.0589	1438926.7397	880.49	36+55.74	53.15 RT
BLE4	BLE-4	753327.5094	1439779.8936	879.35	45+38.97	54.40 RT
BLE5	BLE-5	753476.0499	1440864.3101	861.00	54+10.44	56.09 RT
BLE6	BLE-6	753631.5231	1441800.1342	849.44	63+35.40	57.20 RT
BLE7	BLE-7	753770.8234	1442430.2130	837.73	72+29.10	56.00 RT
BLE8	BLE-8	753947.8411	1443309.0013	824.00	81+94.70	22.50 RT
BLE9	BLE-9	754099.4040	1444310.2318	803.46	91+27.05	27.09 RT
BLE10	BLE-10	754245.1007	1445131.3933	787.30	99+61.81	23.96 RT
BLE11	BLE-11	754392.8449	1445973.8308	784.02	108+16.86	21.01 RT
BLE12	BLE-12	754544.0745	1446900.9437	797.94	117+54.47	48.07 RT
BLE13	BLE-13	754687.3990	1447834.8378	823.19	124+99.00	69.83 RT
BLE14	BLE-14	754780.8960	1448339.9823	846.09	132+16.26	78.20 RT
BLE15	BLE-15	754920.3110	1449081.9763	837.10	139+71.29	80.14 RT
BLE16	BLE-16	755003.9997	1450034.9422	813.22	149+36.86	86.09 RT
BLE17	BLE-17	755237.7469	1450901.8006	830.60	158+96.33	76.90 RT
BLE18	BLE-18	755481.8049	1451863.6126	863.20	167+92.09	64.83 RT
BLE19	BLE-19	755500.4040	1452802.6337	892.45	177+46.62	89.86 RT
BLE20	BLE-20	755729.2046	1453740.8330	907.85	186+97.71	80.52 RT
BLE21	BLE-21	755872.8684	1454641.2865	905.24	195+11.70	55.22 RT
BLE22	BLE-22	756023.7306	1455453.8900	890.90	204+36.11	61.00 RT
BLE23	BLE-23	756219.7180	1456306.4819	892.00	213+65.00	64.31 RT
BLE24	BLE-24	756513.8332	1457338.9275	885.96	223+73.67	67.40 RT
BLE25	BLE-25	756786.9030	1458161.8841	877.19	232+48.21	97.29 RT
BLE26	BLE-26	757150.8644	1459093.7300	878.81	242+44.11	74.35 RT

BLV

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BLV26	BLV-26	752719.7579	1437813.1303	883.83	16+95.91	56.40 LT
BLV25	BLV-25	752900.7346	1437846.8444	874.13	26+62.78	56.91 LT
BLV24	BLV-24	753246.5210	1438834.7853	880.11	36+80.75	57.43 LT
BLV23	BLV-23	753418.7755	1439814.8085	882.23	43+83.86	82.50 LT
BLV22	BLV-22	753578.9772	1440534.4712	863.86	53+16.34	57.84 LT
BLV21	BLV-21	753734.8211	1441437.2099	850.78	62+33.86	65.06 LT
BLV20	BLV-20	753879.8805	1442283.7364	839.99	70+91.82	66.57 LT
BLV19	BLV-19	754014.8714	1443183.1826	829.13	79+21.31	80.14 LT
BLV18	BLV-18	754109.4827	1444011.9385	818.27	88+45.40	91.71 LT
BLV17	BLV-17	754339.5822	1444951.7989	780.90	90+80.50	99.65 LT
BLV16	BLV-16	754582.1067	1445982.4153	783.82	107+45.30	101.74 LT
BLV15	BLV-15	754600.5522	1446834.8300	798.80	117+15.46	86.92 LT
BLV14	BLV-14	754818.8294	1447803.6411	827.45	125+73.33	63.75 LT
BLV13	BLV-13	754919.9800	1448278.1092	845.60	131+09.09	71.60 LT
BLV12	BLV-12	755001.1937	1448833.8828	843.23	137+39.19	55.86 LT
BLV11	BLV-11	755141.8491	1449843.8833	822.09	145+08.95	56.84 LT
BLV10	BLV-10	755303.1121	1450803.2371	824.73	155+14.41	56.85 LT
BLV9	BLV-9	755477.7729	1451091.7278	856.41	165+37.91	56.76 LT
BLV8	BLV-8	755857.2304	1452009.3082	885.96	175+21.97	89.15 LT
BLV7	BLV-7	755811.1249	1453822.2881	907.13	184+97.84	57.14 LT
BLV6	BLV-6	755906.2865	1454411.8842	905.80	193+99.25	58.99 LT
BLV5	BLV-5	756141.3940	1455378.0941	890.69	203+02.09	67.14 LT
BLV4	BLV-4	756334.2928	1456318.0000	892.30	213+47.82	58.53 LT
BLV3	BLV-3	756591.3495	1457139.0964	885.73	222+12.90	78.82 LT
BLV2	BLV-2	756903.4604	1458131.7794	877.87	232+81.45	97.11 LT
BLV1	BLV-1	757295.0712	1459047.2287	878.79	242+48.35	78.28 LT

BYN

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
BYN1	BYN-1	741949.0000	1447378.0091	985.11	12+81.37	56.78 RT
BYN2	BYN-2	742857.5316	1447343.3172	949.66	18+09.42	72.63 RT
BYN3	BYN-3	743487.8000	1447310.8104	914.30	27+98.34	66.91 RT
BYN4	BYN-4	744409.4785	1447378.4641	877.81	37+55.79	59.00 RT
BYN5	BYN-5	745482.8333	1447463.9782	866.83	48+03.31	52.87 RT
BYN6	BYN-6	746281.0953	1447546.1843	853.16	56+16.43	55.59 RT
BYN7	BYN-7	747228.8577	1447636.1227	821.59	65+79.39	53.96 RT
BYN8	BYN-8	748180.5843	1447723.2730	802.50	74+83.84	56.18 RT
BYN9	BYN-9	749051.0023	1447821.4808	795.04	84+29.70	61.44 RT
BYN10	BYN-10	750046.4780	1447909.4202	796.46	94+17.50	54.38 RT
BYN11	BYN-11	750947.3618	1447997.9784	828.29	103+23.82	56.83 RT
BYN12	BYN-12	751774.9745	1448078.3845	828.30	111+83.20	80.00 RT
BYN13	BYN-13	752808.9713	1448118.3788	796.19	120+38.34	45.40 RT
BYN14	BYN-14	753778.0400	1448109.8831	809.79	131+81.22	53.41 RT
BYN15	BYN-15	754785.8743	1448264.8843	808.78	140+09.29	80.30 RT
BYN16	BYN-16	755291.4805	1448318.2926	873.80	148+77.74	84.25 RT
BYN17	BYN-17	756119.8006	1448381.5400	878.60	155+86.57	84.42 RT
BYN18	BYN-18	757887.0981	1448412.8477	883.09	164+78.54	53.83 RT
BYN19	BYN-19	758008.7134	1448486.4713	878.71	174+58.79	84.49 RT
BYN20	BYN-20	759088.1597	1448529.8238	907.18	184+48.21	53.80 RT
BYN21	BYN-21	759943.2877	1448603.4980	905.20	193+36.92	81.16 RT
BYN22	BYN-22	761800.1818	1448687.8213	889.72	204+76.32	52.85 RT
BYN23	BYN-23	762077.1489	1448722.1217	879.30	214+75.35	52.91 RT
BYN24	BYN-24	763001.1118	1448795.8898	915.38	224+82.14	87.18 RT
BYN25	BYN-25	763900.7451	1448834.3283	924.85	232+80.49	50.84 RT
BYN26	BYN-26	764085.3937	1448874.7409	912.80	239+89.39	49.72 RT
BYN27	BYN-27	765223.3000	1448925.0007	889.31	248+20.85	53.99 RT

BYS

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
BYS26	BYS-26	741982.8026	1447253.0509	985.74	13+21.00	57.78 LT
BYS25	BYS-25	742809.7806	1447228.0409	980.74	19+80.42	58.16 LT
BYS24	BYS-24	743844.8742	1447193.0877	909.87	29+79.09	58.39 LT
BYS23	BYS-23	744831.7023	1447277.1870	878.00	39+80.86	54.40 LT
BYS22	BYS-22	745701.2877	1447381.2412	864.82	50+42.64	53.85 LT
BYS21	BYS-21	746871.5287	1447487.7473	843.37	59+17.28	51.24 LT
BYS20	BYS-20	747814.7870	1447600.0219	813.86	68+64.70	51.87 LT
BYS19	BYS-19	748828.8340	1447658.4887	800.13	78+03.37	51.55 LT
BYS18	BYS-18	749845.7862	1447749.9381	795.49	89+84.79	56.33 LT
BYS17	BYS-17	750805.7805	1447853.4842	815.85	99+49.93	53.25 LT
BYS16	BYS-16	751249.0041	1447918.0921	830.18	105+16.73	52.40 LT
BYS15	BYS-15	752187.4878	1447978.0848	817.76	114+78.36	52.08 LT
BYS14	BYS-14	753127.2985	1448029.8498	786.73	124+99.00	88.87 LT
BYS13	BYS-13	754209.3518	1448103.3381	838.34	138+04.18	61.80 LT
BYS12	BYS-12	754981.0811	1448180.2982	869.90	143+38.38	57.32 LT
BYS11	BYS-11	755754.0909	1448218.1414	874.44	151+32.51	53.29 LT
BYS10	BYS-10	756905.8226	1448288.7305	864.94	163+36.00	51.72 LT
BYS9	BYS-9	757905.1898	1448358.4783	874.82	173+08.32	51.86 LT
BYS8	BYS-8	758919.8172	1448414.9186	904.74	183+84.84	51.87 LT
BYS7	BYS-7	759708.2464	1448478.1817	900.35	191+58.87	50.72 LT
BYS6	BYS-6	760876.2980	1448528.7875	882.84	200+64.81	53.36 LT
BYS5	BYS-5	761777.9734	1448598.4788	887.38	211+80.76	53.33 LT
BYS4	BYS-4	762734.8087	1448689.4859	904.84	221+27.42	51.76 LT
BYS3	BYS-3	763812.2174	1448708.2415	924.15	230+86.87	84.19 LT
BYS2	BYS-2	764208.9122	1448757.4823	918.31	236+76.86	82.95 LT
BYS1	BYS-1	765120.8880	1448813.2189	893.40	245+18.86	51.82 LT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
180	BY1-180	754086.8377	1440081.2877	852.90	OUTSIDE PROJECT LIMITS	
181	BY1-181	754282.9187	1439912.9847	842.88	OUTSIDE PROJECT LIMITS	
182	BY1-182	753090.8372	1439809.2142	891.53	21+96.86	7.84 RT
183	BY1-183	753229.8884	1439645.2833	904.12	17+22.84	83.58 RT
184	BY1-184	752929.9818	1439473.4486	898.79	14+21.78	2.93 LT
185	BY1-185	752483.6308	1439427.2881	896.78	OUTSIDE PROJECT LIMITS	
186	BY1-186	752214.7732	1439488.8886	892.89	OUTSIDE PROJECT LIMITS	

BY1A

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y184	BY1-184	752929.9818	1439473.4486	898.68	41+49.40	380.44 RT
220	BY1A-220	753018.1986	1439829.3928	878.16	45+25.47	389.77 RT
221	BY1A-221	753184.3283	1440838.4976	880.87	47+48.09	287.98 RT
222	BY1A-222	753141.8828	1440478.8188	859.81	51+80.58	380.73 RT
223	BY1A-223	753274.7288	1441884.4882	868.19	57+29.14	314.78 RT
224	BY1A-224	753384.7853	1441629.8493	854.55	63+58.25	342.85 RT

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
291	BY3-291	753217.9993	1437481.0508	839.97	22+84.49	485.08 LT
292	BY3-292	753037.8498	1437787.7249	862.24	25+28.13	146.36 LT
293	BY3-293	753135.1865	1438298.8108	889.69	30+28.08	183.08 LT
294	BY3-294	753202.6379	1438719.7234	900.28	34+80.74	127.87 LT
295	BY3-295	753818.4792	1439093.8889	898.83	39+88.78	285.13 LT
Y182	BY1-182	753090.8372	1439809.2142	891.42	43+79.08	341.18 LT

BY3A

POINT	DESC.	NORTH	EAST	ELEVATION	Y3A STATION	OFFSET
YA182	BY1-182	753090.8372	1439809.2142	891.42	10+28.13	22.21 LT
116	BY3A-116	753729.4936	1440085.3653	871.32	15+24.95	32.38 LT
117	BY3A-117	753783.0812	1440701.4299	842.44	21+08.09	17.15 RT
118	BY3A-118	753774.5781	1441218.2808	864.96	28+08.50	17.97 RT
119	BY3A-119	753881.3822	1441830.8131	883.85	33+09.33	17.34 RT
120	BY3A-120	754089.4882	1442851.9887	831.50	40+35.00	6.22 LT
121	BY3A-121	754219.7971	1443205.8418	823.14	47+79.85	36.38 RT

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
126	BY4-126	756148.0897	1443888.8239	837.66	OUTSIDE PROJECT LIMITS	
127	BY4-127	755670.8614	1443918.2736	824.80	43+28.50	31.28 RT
128	BY4-128	755241.7318	1443963.9818	801.56	38+98.46	38.35 RT
129	BY4-129	754782.7951	1443915.7887	796.05	34+17.87	34.88 RT
130	BY4-130	754250.8878	1443837.3688	799.81	29+87.80	18.88 RT
131	BY4-131	753749.9884	1443776.4833	790.37	23+98.41	28.36 RT
132	BY4-132	753488.1969	1443808.8985	798.42	20+09.09	81.14LT
133	BY4-133	753182.3485	1443788.4289	798.84	18+83.84	22.78 RT
134	BY4-134	752893.1221	1443856.8323	809.80	13+34.84	31.77LT
135	BY4-135	752243.8289	1443799.7441	829.39	OUTSIDE PROJECT LIMITS	

BY5

POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
Y128	BY4-128	755241.7318	1443963.9818	801.56	10+28.34	41.88 LT
151	BY5-151	754928.4808	1444198.7178	793.95	14+09.84	28.63 RT
152	BY5-152	754580.8828	1444497.7387	804.31	18+77.86	24.83 RT
153	BY5-153	754385.2808	1444911.3919	780.28	23+34.05	23.22 RT
154	BY5-154	754403.2447	1445513.7824	794.84	30+43.08	19.98 RT
155	BY5-155	754816.1948	1446384.1885	791.99	38+28.37	19.11 RT
156	BY5-156	754811.3888	1447148.8447	814.87	48+09.27	98.91 RT
157	BY5-157	755381.8979	1447873.1858	821.18	52+18.61	86.27 RT
158	BY5-158	756863.8387	1448897.7333	865.63	59+81.62	144.82 RT
159	BY5-159	756862.1187	1449171.3818	879.32	87+18.09	28.86 RT
160	BY5-160	757419.1484	1449219.4892	888.85	OUTSIDE PROJECT LIMITS	
POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
181	BY5-181	757989.1583	1448254.8894	868.98	173+86.79	182.82LT
182	BY5-182	758828.7493	1448236.8383	893.34	179+83.18	284.85LT

BY5A

POINT	DESC.	NORTH	EAST	ELEVATION	Y5A STATION	OFFSET
YA128	BY4-128	755241.7318	1443963.9818	801.56	OUTSIDE PROJECT LIMITS	
231	BY5A-231	755381.6887	1443856.3138	827.12	12+88.93	21.78 LT

BY6

POINT	DESC.	NORTH	EAST	ELEVATION	Y100 STATION	OFFSET
259	BY6-259	755032.8518	1454234.1888	890.81	OUTSIDE PROJECT LIMITS	
260	BY6-260	755414.8885	1455251.9113	880.74	OUTSIDE PROJECT LIMITS	
261	BY6-261	755380.4848	1456865.9498	885.35	OUTSIDE PROJECT LIMITS	
262	BY6-262	755187.2846	1456767.8898	896.80	13+78.36	84.82 RT

BY8

POINT	DESC.	NORTH	EAST	ELEVATION	Y8 STATION	OFFSET
Y126	BY4-126	756148.6897	1443888.8239	837.80	OUTSIDE PROJECT LIMITS	
225	BY8-225	756808.8931	1443408.8883	819.81	OUTSIDE PROJECT LIMITS	
226	BY8-226	755482.3283	1443288.1188	880.36	OUTSIDE PROJECT LIMITS	
227	BY8-227	755137.4718	1443023.3628	798.80	17+87.78	276.32 LT
228	BY8-228	754896.8633	1442731.7387	796.84	18+84.89	422.29 LT
229	BY8-229	754984.9772	1442438.7884	817.90	16+42.48	723.82 LT

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
280	BY9-280	748800.2671	1448993.2147	880.16	OUTSIDE PROJECT LIMITS	
281	BY9-281	748228.8811	1448744.8372	885.97	13+08.23	28.88 LT
286	BY9-286	748116.8613	1447898.1438	830.28	17+28.78	33.82 RT
Y246	BY9B-246	748883.7858	1447332.8885	828.48	19+87.11	46.99 RT
282	BY9-282	748851.7188	1447848.9781	824.41	21+74.89	31.49 RT
283	BY9-283	747967.8898	1448173.8788	824.32	28+11.28	30.86 RT
284	BY9-284	747995.8871	1448829.1819	847.74	32+81.16	46.15 LT
285	BY9-285	747924.1884	1449887.8465	880.87	37+28.80	38.74 LT

BY9A

POINT	DESC.	NORTH	EAST	ELEVATION	Y9A STATION	OFFSET
Y286	BY9A-286	748116.8613	1447898.1438	830.36	OUTSIDE PROJECT LIMITS	
287	BY9A-287	748417.1988	1447182.8485	848.18	OUTSIDE PROJECT LIMITS	
288	BY9A-288	748893.9887	1447188.4848	824.83	OUTSIDE PROJECT LIMITS	

BY9B

POINT	DESC.	NORTH	EAST	ELEVATION	Y9B STATION	OFFSET
246	BY9B-246	748883.7858	1447332.8885	828.25	15+87.17	18.33 RT
247	BY9B-247	747893.8288	1447281.8743	885.18	13+38.48	21.18 RT
248	BY9B-248	747761.8812	1448938.2719	823.89	OUTSIDE PROJECT LIMITS	

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
280	BY9-280	748800.2671	1448993.2147	880.16	OUTSIDE PROJECT LIMITS	
286	BY9-286	748116.8613	1447898.1438	830.28	OUTSIDE PROJECT LIMITS	
Y246	BY9B-246	748883.7858	1447332.8885	825.48	OUTSIDE PROJECT LIMITS	
282	BY9-282	748851.7188	1447848.9781	824.41	OUTSIDE PROJECT LIMITS	
283	BY9-283	747967.8898	1448173.8788	824.32	OUTSIDE PROJECT LIMITS	
POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
281	BY9-281	748228.8811	1448744.8372	885.97	13+08.23	28.88LT
284	BY9-284	747995.8871	1448829.1819	847.74	32+81.16	46.15 LT
285	BY9-285	747924.1884	1449887.8465	880.87	37+28.80	36.74 LT

BY10

POINT	DESC.	NORTH	EAST	ELEVATION	Y10 STATION	OFFSET
176	BY10-176	751806.3128	1446841.4296	879.96	18+78.24	16.85 RT
177	BY10-177	751846.9471	1447364.3979	873.80	19+24.86	17.42 RT
178	BY10-178	751901.9840	1447919.7303	846.23	26+18.82	28.49 LT
179	BY10-179	752248.8888	1448418.5888	824.43	31+93.99	11.78 RT
180	BY10-180	752531.8448	1448878.2343	792.88	37+37.34	16.28 LT

BY10A

POINT	DESC.	NORTH	EAST	ELEVATION	Y10A STATION	OFFSET
210	BY10A-210	754428.1423	1451978.7113	857.13	OUTSIDE PROJECT LIMITS	
211	BY10A-211	754996.1322	1452783.5146	887.27	OUTSIDE PROJECT LIMITS	
212	BY10A-212	755879.8381	1453646.8884	897.44	17+89.67	7.76 LT
213	BY10A-213	755549.9193	1454585.8485	885.16	OUTSIDE PROJECT LIMITS	
214	BY10A-214	755491.1529	1455178.4968	883.96	OUTSIDE PROJECT LIMITS	
215	BY10A-215	755379.8882	1455983.2858	880.58	OUTSIDE PROJECT LIMITS	
216	BY10A-216	755288.3227	1456548.8883	894.81	OUTSIDE PROJECT LIMITS	
217	BY10A-217	755184.4211	1457293.8922	904.21	OUTSIDE PROJECT LIMITS	
218	BY10A-218	754991.8881	1458111.1446	908.48	OUTSIDE PROJECT LIMITS	

BY11

POINT	DESC.	NORTH	EAST	ELEVATION	Y11 STATION	OFFSET
191	BY11-191	750498.2983	1448923.9818	788.30	OUTSIDE PROJECT LIMITS	
192	BY11-192	750507.0583	1448482.8387	798.81	10+80.94	19.49 LT
193	BY11-193	750787.3743	1448899.2848	809.43	14+87.08	89.98 LT
194	BY11-194	751149.3827	1448839.1688	827.74	18+59.88	36.99 LT
195	BY11-195	751826.1134	1448800.9839	848.78	22+38.29	28.67 LT
196	BY11-196	752003.1280	1448197.2980	837.47	27+98.17	29.80 LT
Y179	BY10-179	752248.8888	1448418.5888	824.88	OUTSIDE PROJECT LIMITS	

BY15

POINT	DESC.	NORTH	EAST	ELEVATION	Y15 STATION	OFFSET
241	BY15-241	758838.9111	1457419.5628	829.18	OUTSIDE PROJECT LIMITS	
242	BY15-242	758317.1272	1457285.8844	838.85	OUTSIDE PROJECT LIMITS	
243	BY15-243	757787.3889	1457242.7586	888.80	35+22.89	49.93 RT
244	BY15-244	758879.8738	1457827.2783	889.27	26+72.81	41.87 LT
245	BY15-245	758295.4989	1456796.8988	898.33	18+71.36	37.38 LT

BY15A

POINT	DESC.	NORTH	EAST	ELEVATION	BLE STATION	OFFSET
250	BY15A-250	755631.5888	1452809.8237	887.28	157+78.88	198.88 LT
251	BY15A-251	755782.1296	1452889.8728	879.45	163+43.67	168.46 LT
252	BY15A-252	756833.8671	1453278.9875	891.38	170+89.88	377.98 LT
253	BY15A-253	756112.4786	1453721.8727	898.82	175+11.46	388.42 LT
254	BY15A-254	758881.9549	1454288.2738	904.39	179+83.88	187.22 LT
255	BY15A-255	756878.4581	1454889.6485	906.24	186+72.96	181.17 LT
256	BY15A-256	756186.6488	1455288.4892	904.19	198+61.36	188.16 LT
257	BY15A-257	756483.7884	1455887.4334	890.92	196+43.19	375.81 LT

BY16

POINT	DESC.	NORTH	EAST	ELEVATION	YRPC STATION	OFFSET
YBLE11	BLE-11	754392.8449	1445973.8308	784.48	OUTSIDE PROJECT LIMITS	
296	BY16-296	754299.2778	1446117.1837	777.68	OUTSIDE PROJECT LIMITS	
297	BY16-297	754287.9894	1446347.9467	777.11	OUTSIDE PROJECT LIMITS	
298	BY16-298	754231.4898	1446829.8884	779.67	11+23.96	48.37 RT
299	BY16-299	754212.9889	1446877.9488	777.78	13+74.82	42.86 RT
300	BY16-300	754133.2984	1447872.9892	783.87	15+94.97	74.84 RT
301	BY16-301	754188.3828	1447324.1836	787.16	18+48.82	11.24 LT
302	BY16-302	753841.3886	1447497.6778	794.81	21+88.93	73.86 RT
303	BY16-303	753884.9282	1447591.9836	777.78	23+82.19	98.86 RT
304	BY16-304	753288.7888	1447788.4331	779.89	28+13.81	46.73 RT
305	BY16-305	752867.3286	1447874.9824	777.36	OUTSIDE PROJECT LIMITS	
306	BY16-306	752433.8922	1447878.7313	811.84	OUTSIDE PROJECT LIMITS	

BM1 ELEVATION - 832.76
N 753283 E 1437382
L STATION 22+07 495 LEFT
8" NAIL IN BASE OF 12" SYCAMORE

BM2 ELEVATION - 902.04
N 753445 E 1439534
L STATION 43+11 105 LEFT
NCGS MONUMENT "GRAY"

BM3 ELEVATION - 868.74
N 754658 E 1439946
L STATION 49+21 1220 LEFT
8" NAIL IN ROOT OF PINE

BM4 ELEVATION - 895.00
N 752311 E 1439460
L STATION 39+99 991 RIGHT
8" NAIL IN PINE TREE STUMP

BM5 ELEVATION - 824.78
N 754305 E 1443523
L STATION 83+86 309 LEFT
CHISELED SQUARE IN SOUTH END OF SIGN

BM6 ELEVATION - 856.34
N 753367 E 1441566
L STATION 62+98 319 RIGHT
CHISELED SQUARE IN CONCRETE SIDEWALK

BM7 ELEVATION - 805.27
N 754704 E 1445394
L STATION 102+98 303 LEFT
CHISELED SQUARE ON BACK OF CURB

BM8 ELEVATION - 835.61
N 754700 E 1447899
L STATION 127+02 4 LEFT
CHISELED SQUARE ON N SIDE OF DI IN MEDIAN OF I-40

BM9 ELEVATION - 811.91
N 755047 E 1450119
L STATION 150+14 117 RIGHT
8" NAIL IN BASE OF 24" RED OAK

BM10 ELEVATION - 878.75
N 755598 E 1452094
L STATION 170+53 90 LEFT
8" NAIL IN BASE OF 18" POPLAR

BM11 ELEVATION - 986.44
N 755861 E 1454467
L STATION 194+36 55 RIGHT
CHISELED "X" ON SE CORNER OF WW

BM12 ELEVATION - 887.15
N 756426 E 1456861
L STATION 218+95 1 RIGHT
CHISELED "X" ON SW CORNER OF CONC PAD FOR DI

BM13 ELEVATION - 869.51
N 757151 E 1459005
L STATION 242+33 70 RIGHT
CHISELED "X" ON NW CORNER OF CONC PAD FOR DI

BM14 ELEVATION - 934.55
N 741981 E 1447816
Y STATION 12+81 503 RIGHT
CHISELED SQUARE IN BASE OF SIGN

BM15 ELEVATION - 882.67
N 745573 E 1447510
Y STATION 49+27 87 RIGHT
8" SPIKE IN BASE OF 18" OAK

BM16 ELEVATION - 801.64
N 747956 E 1447722
Y STATION 73+20 69 RIGHT
8" NAIL IN BASE OF 9" WALNUT

BM17 ELEVATION - 793.51
N 750821 E 1447786
Y STATION 93+81 66 LEFT
CHISELED SQUARE ON THE S END OF A CONC HEAD WALL

BM18 ELEVATION - 858.89
N 755884 E 1448158
Y STATION 152+59 113 LEFT
8" NAIL IN BASE OF TWIN 26" WILD CHERRY

BM19 ELEVATION - 900.97
N 758439 E 1448515
Y STATION 178+32 79 RIGHT
8" NAIL IN BASE OF 18" WHITE OAK

BM20 ELEVATION - 887.71
N 760557 E 1448489
Y STATION 199+44 83 LEFT
8" NAIL IN BASE OF 36" TWIN OAK

BM21 ELEVATION - 945.04
N 763555 E 1448871
Y STATION 229+68 107 RIGHT
CHISELED SQUARE ON NE CORNER OF BRIDGE

BM22 ELEVATION - 904.11
N 765130 E 1448783
Y STATION 245+26 82 LEFT
8" NAIL IN BASE OF 12" WILD CHERRY

BM27 ELEVATION - 782.80
N 753049 E 1447238
Y4RPC STATION 26+05
N 89° 56' 15.7" E DIST 3469.80
8" NAIL SET IN BASE OF 8" SWEET GUM

BM28 ELEVATION - 782.05
N 753092 E 1447433
Y4RPC STATION 26+05
S 78° 22' 55.2" E DIST 3741.72
CHISELED SQUARE WITH PUNCH HOLE ON TOP OF CONCRETE RISER OF SSMH

BM29 ELEVATION - 845.37
N 756257 E 1443800
Y5A STATION 12+34 929 LEFT
CHISELED SQUARE IN CONC BASE OF LT POLE

BM30 ELEVATION - 833.61
N 752260 E 1443857
Y4 STATION 10+00
S 37° 23' 56.9" E DIST 142.87
8" NAIL IN BASE OF 24" OAK TREE

BM31 ELEVATION - 795.01
N 755124 E 1442921
Y8 STATION 17+22 350 LEFT
8" NAIL IN BASE OF 20" SYCAMORE

BM32 ELEVATION - 786.57
N 750539 E 1448909
Y11 STATION 10+00
S 86° 02' 32.8" E DIST 344.52
8" NAIL IN BASE OF 16" SYCAMORE

BM33 ELEVATION - 853.95
N 748043 E 1445920
Y9 STATION 10+00
S 78° 04' 32.1" W DIST 473.60
CHISELED SQUARE IN CONC CATCH BASIN

BM34 ELEVATION - 868.39
N 747927 E 1449106
Y9 STATION 37+42 42 LEFT
8" NAIL IN BASE OF 26" OAK

BM35 ELEVATION - 913.51
N 743592 E 1447451
Y STATION 29+30 204 RIGHT
CHISELED SQUARE IN BASE OF OLD CONC SIGN

BM36 ELEVATION - 837.77
N 746047 E 1447202
Y STATION 53+69 266 LEFT
8" NAIL IN BASE OF 30" OAK

BM37 ELEVATION - 913.51
N 752056 E 1447750
Y STATION 114+13 260 LEFT
8" NAIL IN BASE OF 18" OAK

BM38 ELEVATION - 871.47
N 754666 E 1452211
L STATION 170+11 849 RIGHT
8" NAIL IN BASE OF 36" OAK

BM39 ELEVATION - 909.84
N 755043 E 1458116
Y100 STATION 26+16
N 64° 46' 57.6" E DIST 140.94
CHISELED SQUARE IN CONC BASE OF LT POLE

NOTES:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORKWITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.

2. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
I3819A_LS_GPSCALIB_080826.HTML
I3819A_LS_WGS84_080826.TXT
I3819A_LS_LOCAL_080826.TXT
I3819A_LS_CONTROL_080826.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

- INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

6/2/99

PAVEMENT SCHEDULE

A1	9" PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED WITH DOWELS)	E5	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
A2	11½" PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED WITH DOWELS)	E6	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
A3	13" PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED WITH DOWELS)	E7	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
A4	14" PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED WITH DOWELS)	E8	PROP. APPROX. 6½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 741 LBS. PER SQ. YD.
A5	VAR. DEPTH PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED WITH 10" MINIMUM THICKNESS)	E9	PROP. APPROX. 7½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 855 LBS. PER SQ. YD.
A6	VAR. DEPTH PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED WITH 10½" MINIMUM THICKNESS)	E10	PROP. APPROX. 11½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
A7	VAR. DEPTH PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED WITH 11" MINIMUM THICKNESS)	E11	PROP. APPROX. 12" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
A8	VAR. DEPTH PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED WITH 11½" MINIMUM THICKNESS)	E12	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
C1	PROP. APPROX. 1¼" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 138 LBS. PER SQ. YD.	J1	PROP. 4¼" AGGREGATE BASE COURSE.
C2	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	J2	PROP. 8" AGGREGATE BASE COURSE.
C3	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 336 LBS. PER SQ. YD.	J3	PROP. 10" AGGREGATE BASE COURSE.
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	J4	PROP. VAR. DEPTH AGGREGATE BASE COURSE.
C5	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 336 LBS. PER SQ. YD.	K1	LIME STABILIZATION: (METHOD-SLURRY) 60% OF PROJECT: DEPTH OF 8", AT A RATE OF 20 LBS. PER SQ. YD. OR CEMENT STABILIZATION: 40% OF PROJECT:DEPTH OF 7", AT A RATE OF 55 LBS. PER SQ. YD. ALSO 300 LBS. PER SQ. YD. OF ABC FOR 10% OF CEMENT AREA
C6	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.		
C7	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 336 LBS. PER SQ. YD.	P1	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
C8	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	P2	PRIME COAT AT THE RATE OF .50 GAL PER SQ. YD.
D1	PROP. APPROX. 2½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	R1	1'-6" CONCRETE CURB AND GUTTER.
D2	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	R2	2'-6" CONCRETE CURB AND GUTTER.
D3	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R3	5" MONOLITHIC CONCRETE ISLAND (KEYED IN)
D4	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.	R4	PROPOSED SHOULDER BERM GUTTER
D5	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	R5	CONCRETE EXPRESSWAY GUTTER
D6	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R6	SINGLE FACED CONCRETE BARRIER
D7	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.	R7	DOUBLE FACED CONCRETE BARRIER
D8	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	S	4" CONCRETE SIDEWALK.
D9	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.	T	EARTH MATERIAL.
E1	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	U	EXISTING PAVEMENT.
E2	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	V	MILLING BITUMINUOS PAVEMENT (3" DEPTH)
E3	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL)
E4	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.		

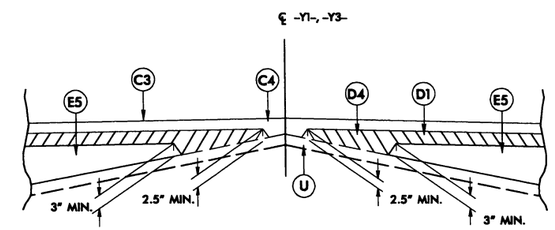
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

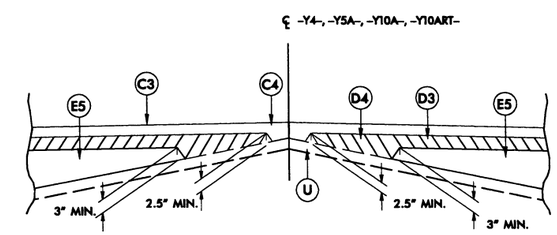
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

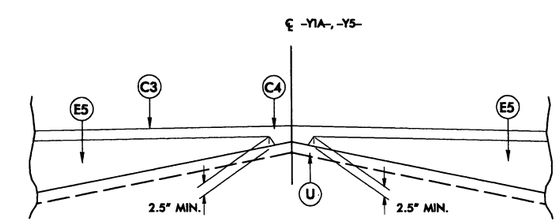
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Detail Showing Method of Wedging



Detail Showing Method of Wedging



Detail Showing Method of Wedging

4/6/2010
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Florence & Hutcheson, Inc.

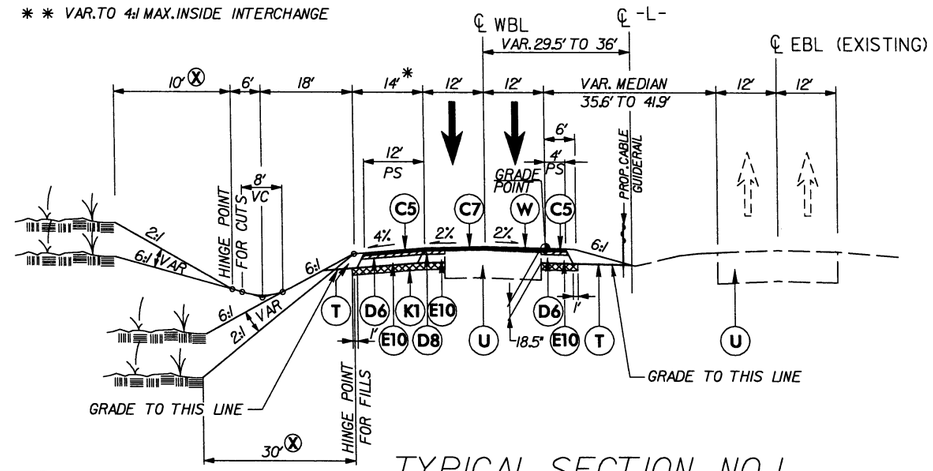
6/2/99

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10' MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11' MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

Ⓧ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 17' WHERE GUARDRAIL REQUIRED

** VAR. TO 4:1 MAX. INSIDE INTERCHANGE

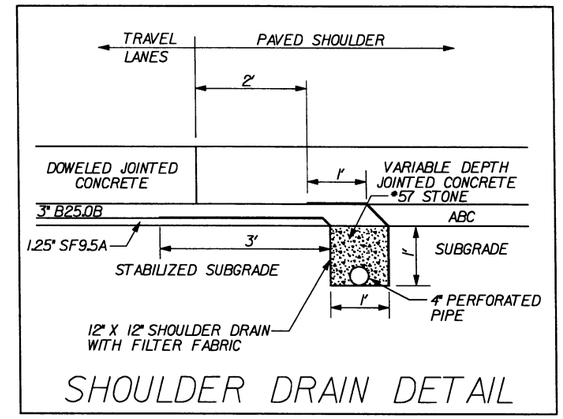


TYPICAL SECTION NO. 1

-L- 1-40

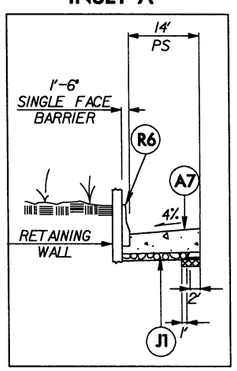
USE TYPICAL SECTION NO. 1

-L- STA. 26+00.00 TO 30+00.00

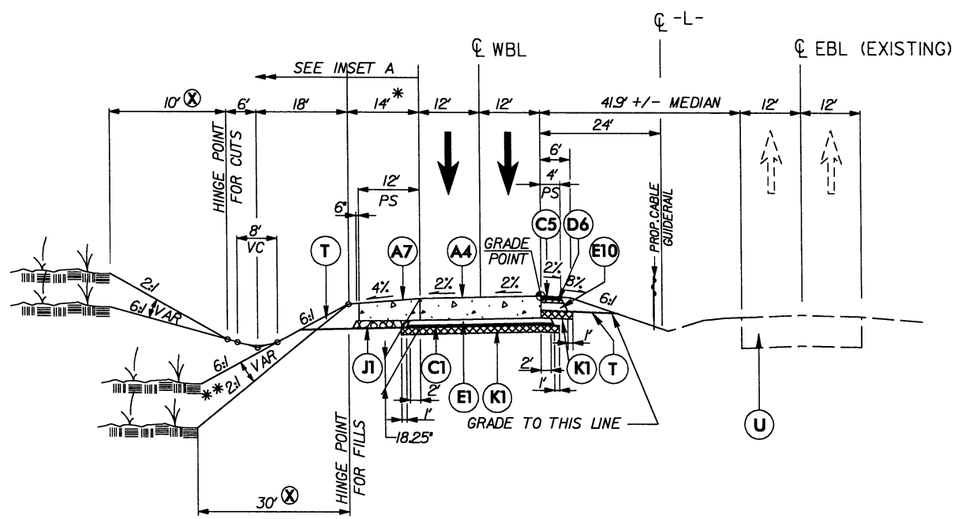


SHOULDER DRAIN DETAIL

INSET A



-L- STA. 30+00.00 TO 35+75.00 LT.



TYPICAL SECTION NO. 2

-L- 1-40

USE TYPICAL SECTION NO. 2

-L- STA. 30+00.00 TO STA. 51+10.00

4/6/2010
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Florence & Hutcheson, Inc.

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0268

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

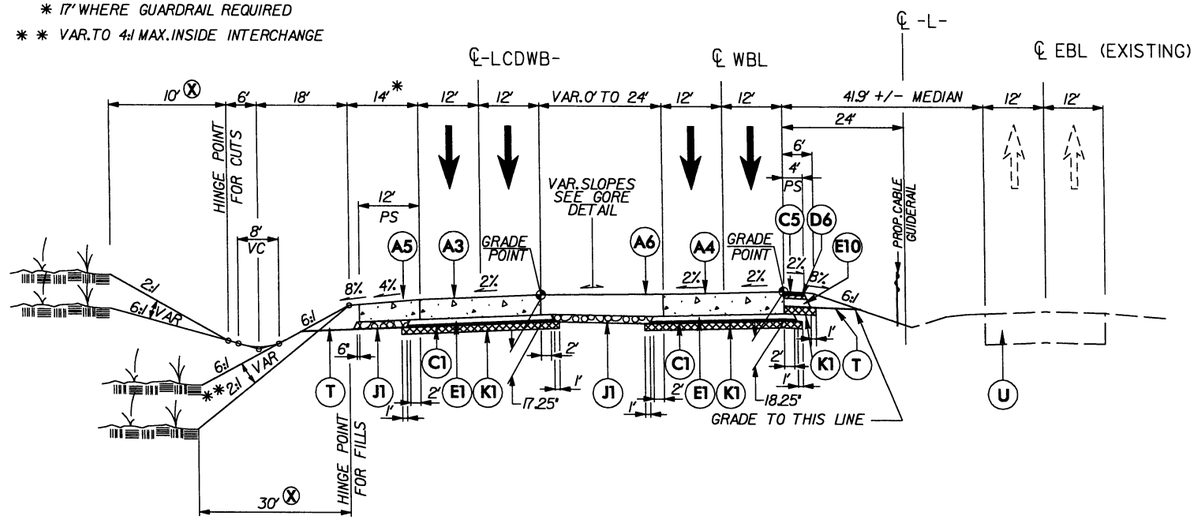
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

Ⓧ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 17' WHERE GUARDRAIL REQUIRED

** VAR. TO 4:1 MAX. INSIDE INTERCHANGE



TYPICAL SECTION NO. 3

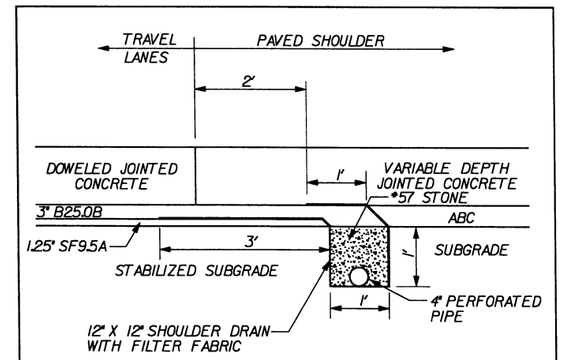
-L- 1-40

USE TYPICAL SECTION NO. 3

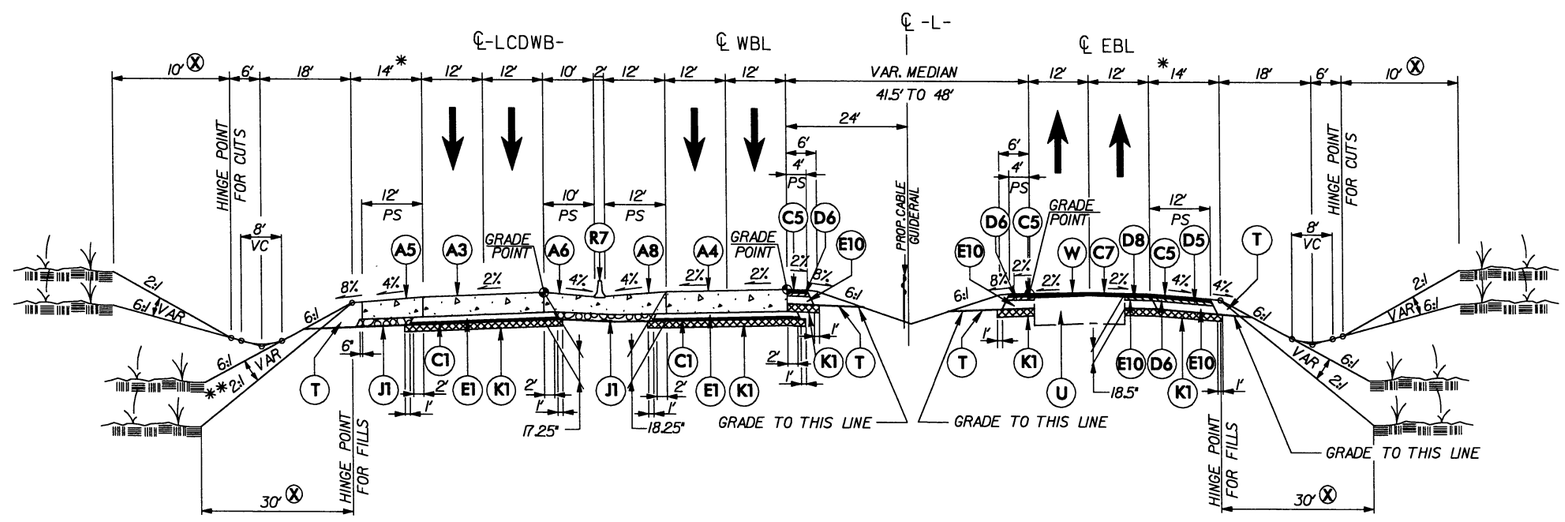
-L- STA. 51+10.00 TO STA. 56+50.00
-LCDWB- STA. 10+00.00 TO STA. 14+07.00

TRANSITION FROM T.S. NO. 3 TO T.S. NO. 5

-LCDWB- STA. 14+07.00 TO STA. 18+91.67



SHOULDER DRAIN DETAIL



TYPICAL SECTION NO. 4

-L- 1-40

USE TYPICAL SECTION NO. 4

-L- STA. 56+50.00 TO STA. 63+00.00
-LCDWB- STA. 18+91.67 TO STA. 21+90.43

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0266

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

6/2/99

4/16/2010
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Florence & Hutcheson, Inc.

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

(X) WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 17' WHERE GUARDRAIL REQUIRED

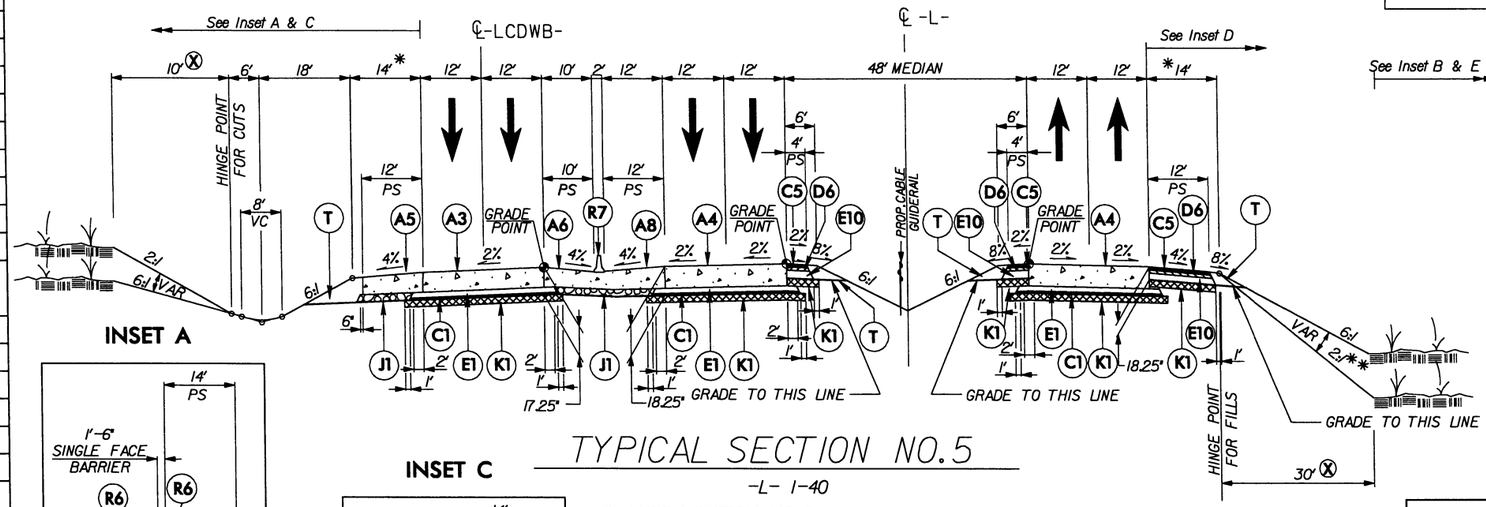
* * VAR. TO 4:1 MAX. INSIDE INTERCHANGE

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0268

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-C
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

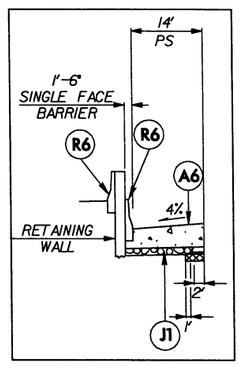


TYPICAL SECTION NO. 5

-L- 1-40

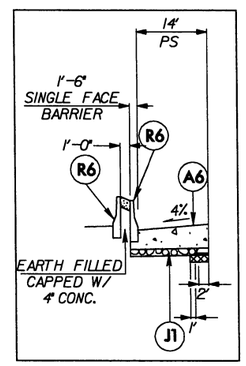
USE TYPICAL SECTION NO. 5
-L- STA. 63+00.00 TO BRIDGE STA 85+00.49
-L- BRIDGE STA. 93+16.45 TO STA 118+80.00
-LCDWB- STA. 21+90.43 TO BRIDGE STA. 44+12.68
-LCDWB- BRIDGE STA. 51+81.20 TO STA. 77+67.53 +/-

INSET A



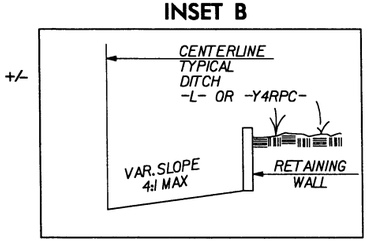
-L- STA. 100+74.57 TO 118+20.00 LT
-L- STA. 113+36.66 TO 114+40.38 LT

INSET C



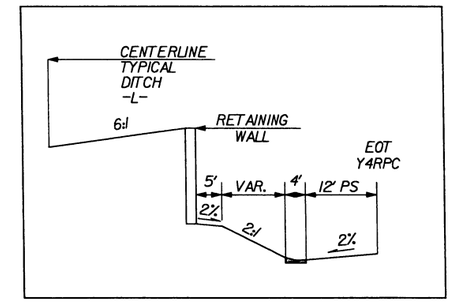
-L- STA. 109+33.78 TO 113+36.66 LT

INSET B

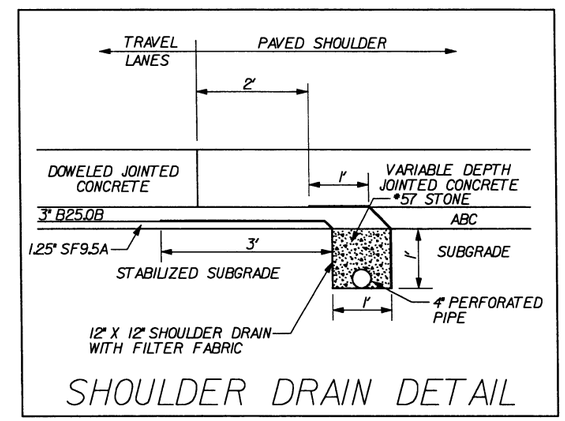


-LCDEB- STA. 11+50 TO -Y4RPC- 11+51 +/- RT.

INSET E

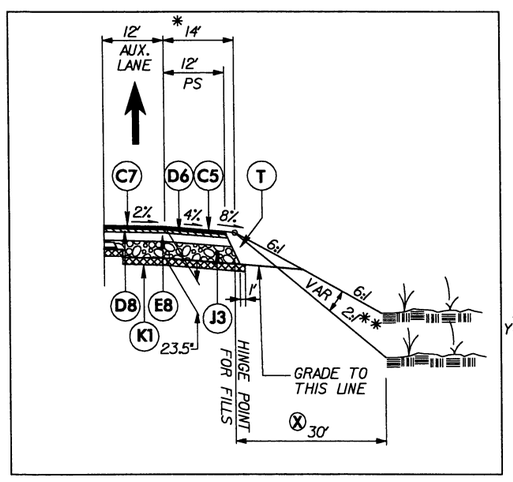


-LCDEB- STA. 31+27.00 BRIDGE WW TO 41+05 RT.

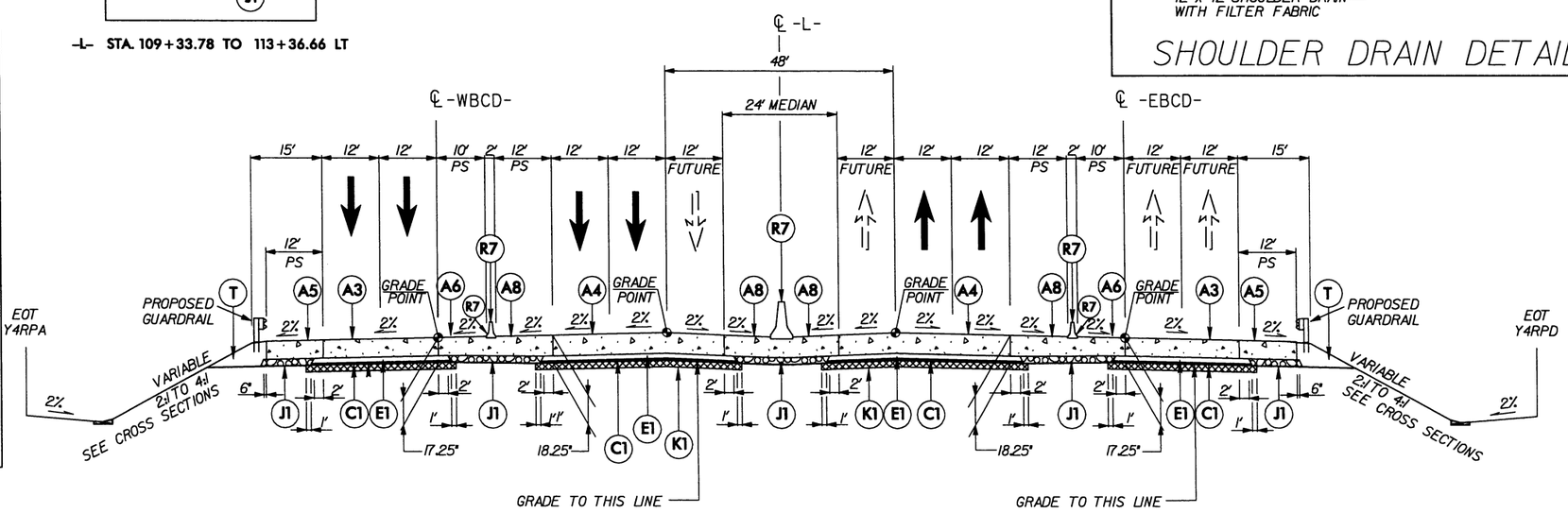


SHOULDER DRAIN DETAIL

INSET D



-L- STA. 103+43.09 TO 113+72.92



USE TYPICAL SECTION NO. 6
-L- BRIDGE STA. 86+98.98 TO BRIDGE STA. 90+91.45
-LCDWB- STA. 46+10.98 TO STA. 49+55.72

TYPICAL SECTION NO. 6

-L- 1-40

6/2/99

4/6/2010
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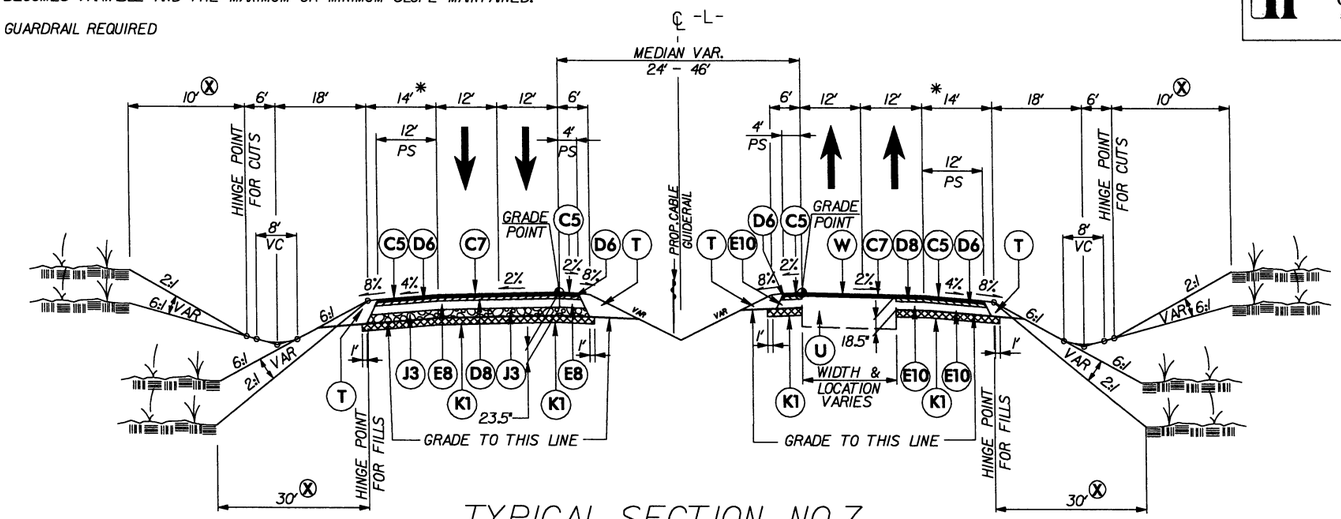
Florence & Hutcheson, Inc.

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

Ⓧ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 17' WHERE GUARDRAIL REQUIRED

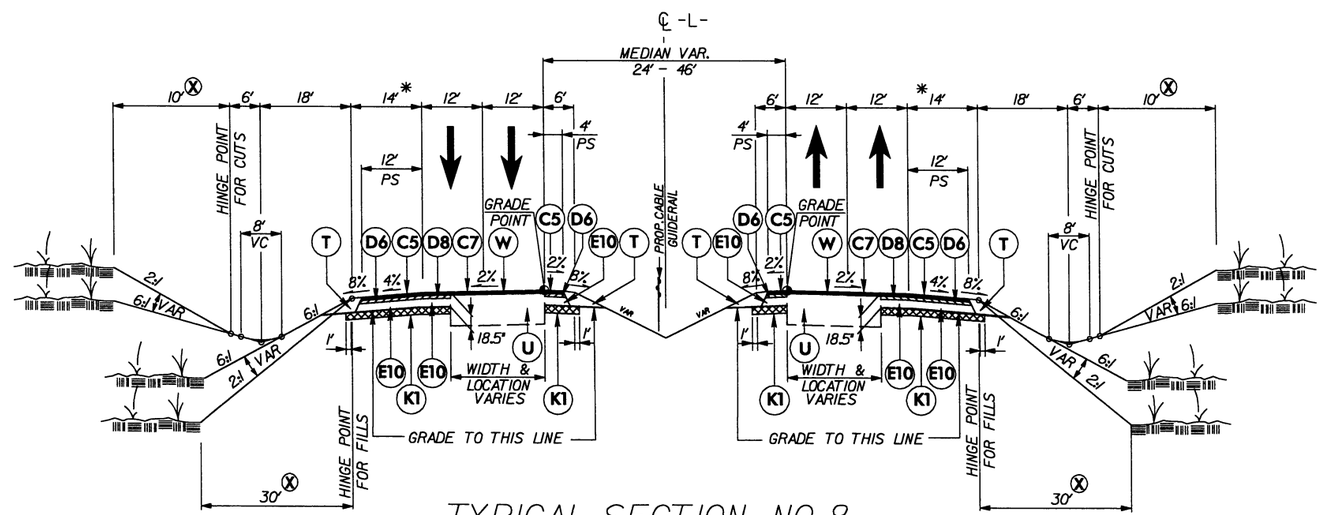


TYPICAL SECTION NO.7

-L- I-40

USE TYPICAL SECTION NO. 7

-L- STA. 118+80.00 TO 122+25.00



TYPICAL SECTION NO.8

-L- I-40

USE TYPICAL SECTION NO. 8

-L- STA. 122+25.00 TO 126+00.00

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No. F-0268

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-D
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

6/2/99

4/6/2010
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Florence & Hutcheson, Inc.

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	8½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

Ⓧ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

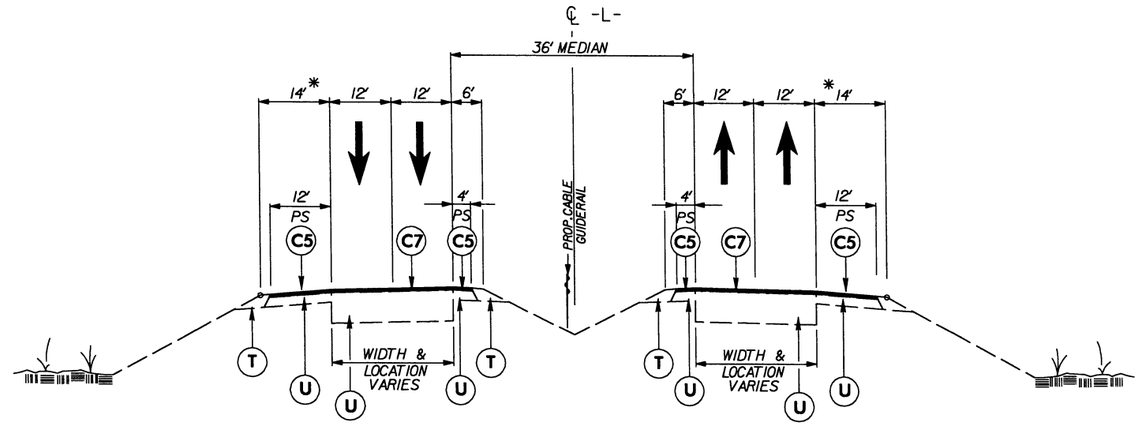
* 17' WHERE GUARDRAIL REQUIRED

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0268

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-E
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

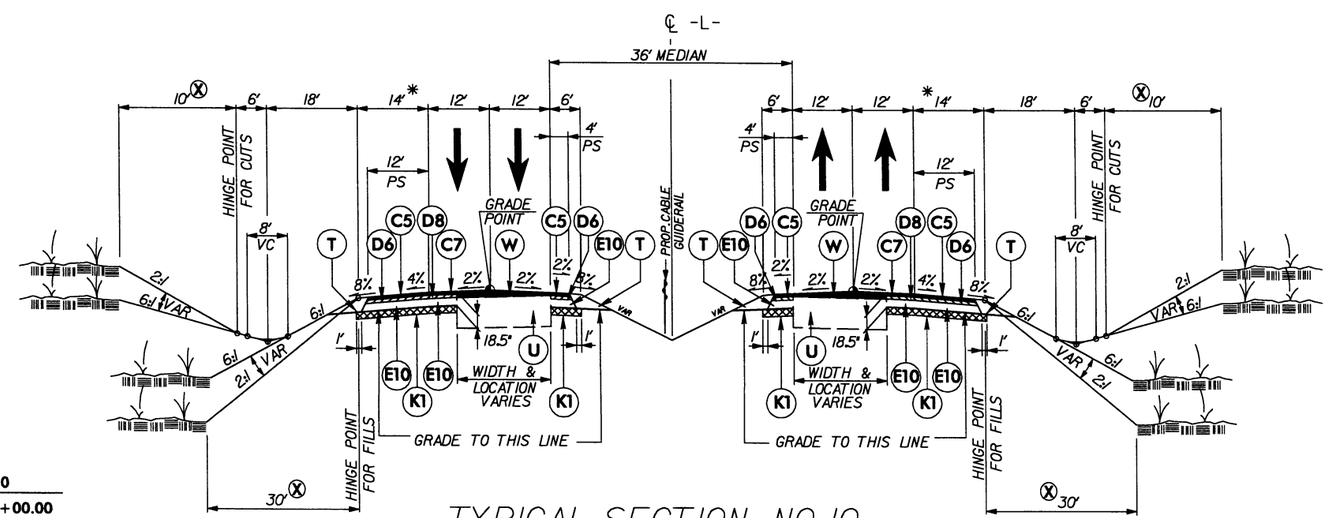


USE TYPICAL SECTION NO. 9

-L- STA. 126+00.00 TO 136+00.00

TYPICAL SECTION NO. 9

-L- I-40



USE TYPICAL SECTION NO. 10

-L- STA. 136+00.00 TO 138+00.00
-L- STA. 144+00.00 TO 148+25.00
-L- STA. 152+50.00 TO 158+00.00 WBL
-L- STA. 152+50.00 TO 170+00.00 EBL

TYPICAL SECTION NO. 10

-L- I-40

6/2/99

4/6/2010
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Florence & Hutcheson, Inc.

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

(X) WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 17' WHERE GUARDRAIL REQUIRED

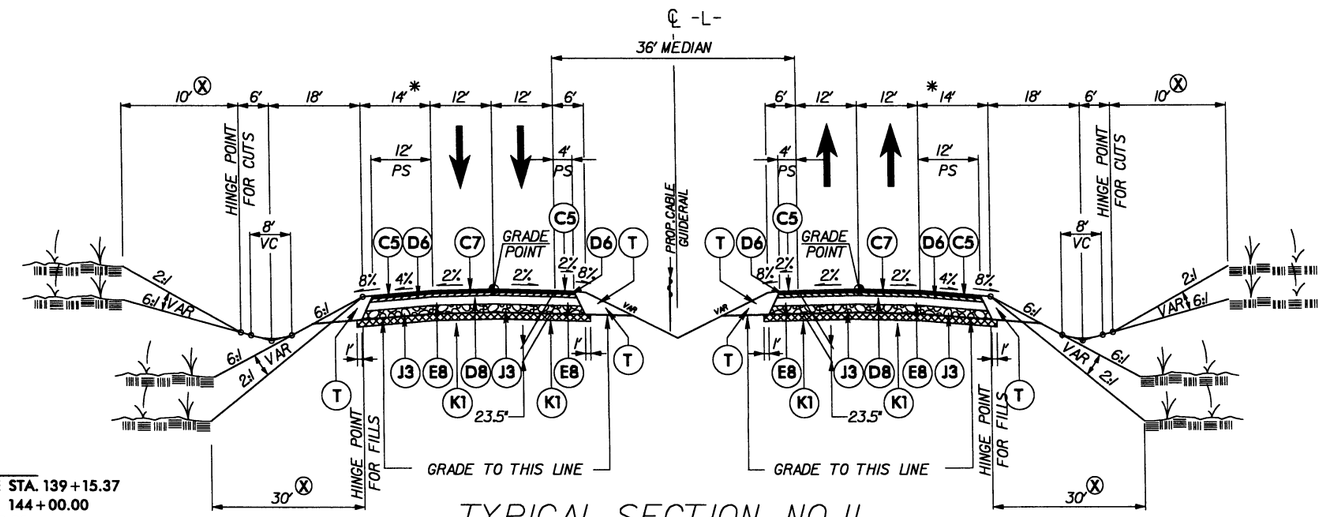
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0268

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-F
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

USE TYPICAL SECTION NO. 11
-L- STA. 138+00.00 TO BRIDGE STA. 139+15.37
-L- BRIDGE STA. 140+59.33 TO 144+00.00
-L- STA. 148+25.00 TO 152+50.00

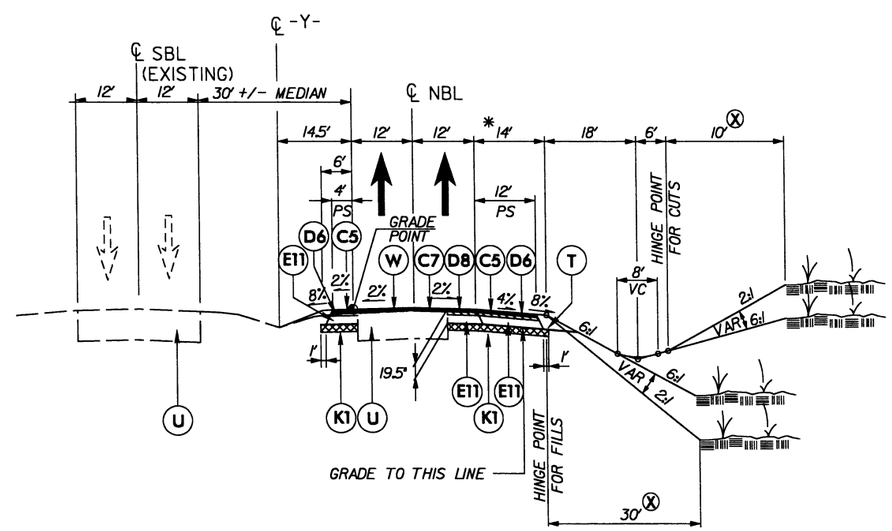


TYPICAL SECTION NO. 11
-L- I-40

USE TYPICAL SECTION NO. 12
-Y- STA. 122+50.00 TO 131+50.00

TRANSITION FROM EXISTING TO T.S. NO. 12
-Y- STA. 122+11.05 TO 122+50.00

TRANSITION FROM T.S. NO. 12 TO EXISTING
-Y- STA. 131+50.00 TO 132+00.00



TYPICAL SECTION NO. 12
-Y- I-77

6/2/99

4/22/2010
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Florence & Hutcheson, Inc.

6/2/99

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. (10" MIN.) PCCP	E9	7½" B25.0C
A6	VAR. (10½" MIN.) PCCP	E10	11½" B25.0C
A7	VAR. (11" MIN.) PCCP	E11	12" B25.0C
A8	VAR. (11½" MIN.) PCCP	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" NCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

(X) WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 17' WHERE GUARDRAIL REQUIRED

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-G
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

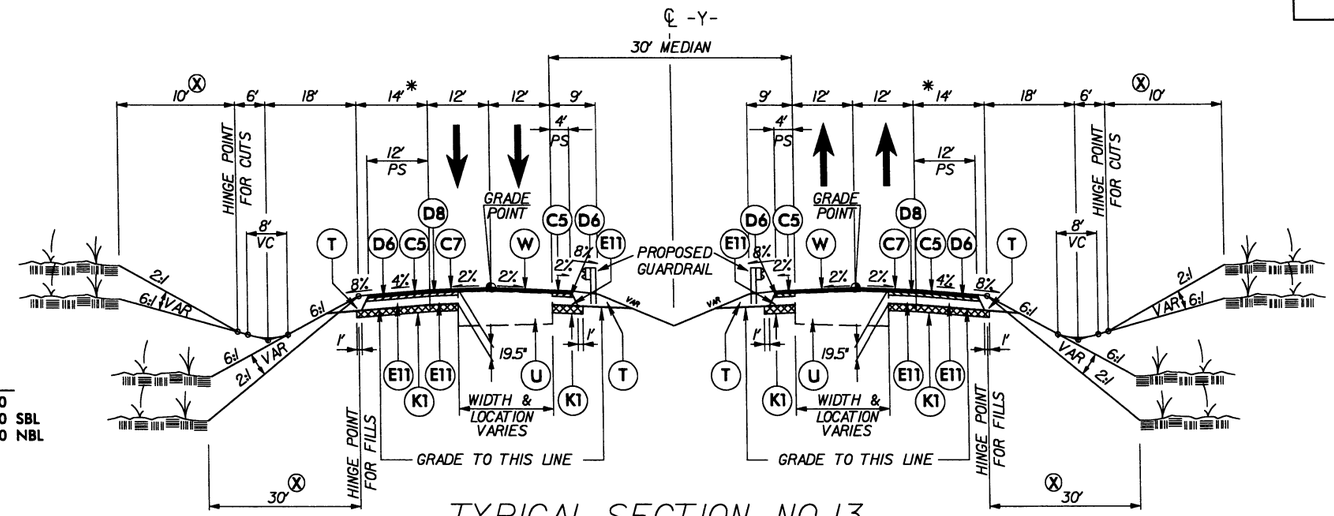
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

USE TYPICAL SECTION NO. 13

-Y- STA. 143+47.54 TO 146+00.00
-Y- STA. 154+00.00 TO 165+00.00 SBL
-Y- STA. 154+00.00 TO 178+75.00 NBL

TRANSITION FROM T.S. NO. 13 TO EXISTING

-Y- STA. 165+00.00 TO 165+49.95 SBL
-Y- STA. 178+75.00 TO 179+75.00 NBL

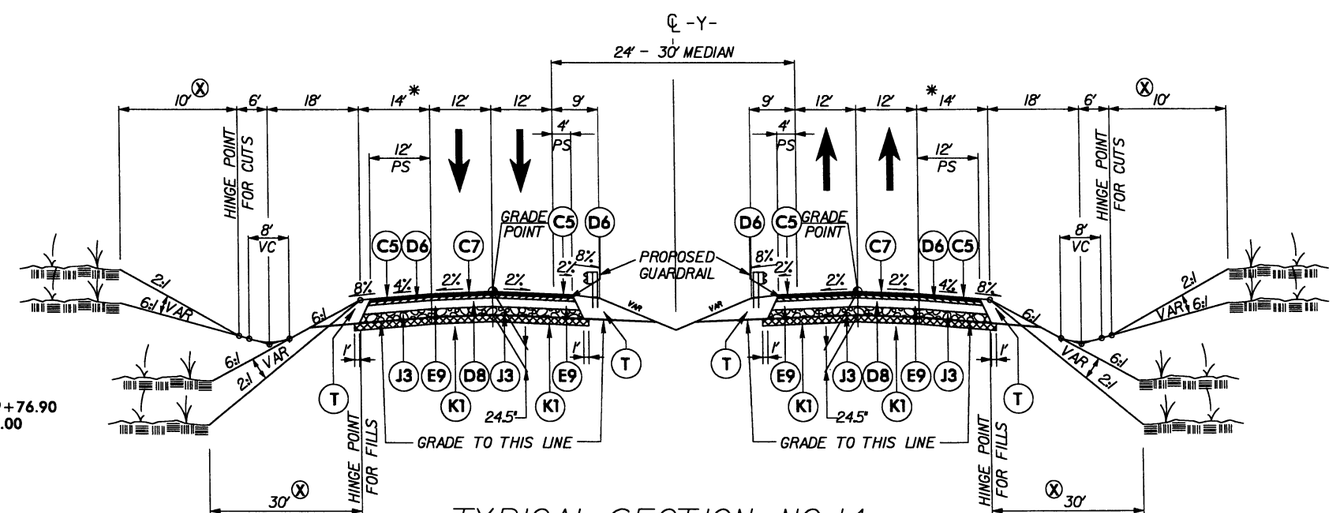


TYPICAL SECTION NO.13

-Y- I-77

USE TYPICAL SECTION NO. 14

-Y- STA. 146+00.00 TO BRIDGE STA. 149+76.90
-Y- BRIDGE STA. 150+96.40 TO 154+00.00



TYPICAL SECTION NO.14

-Y- I-77

4/22/2010
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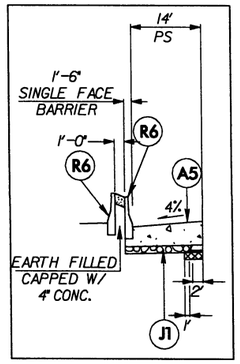
Florence & Hutcheson, Inc.

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

INSET A



-YRPBD- STA. 19+70.65 TO 20+85.85 LT

(X) WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 17' WHERE GUARDRAIL REQUIRED

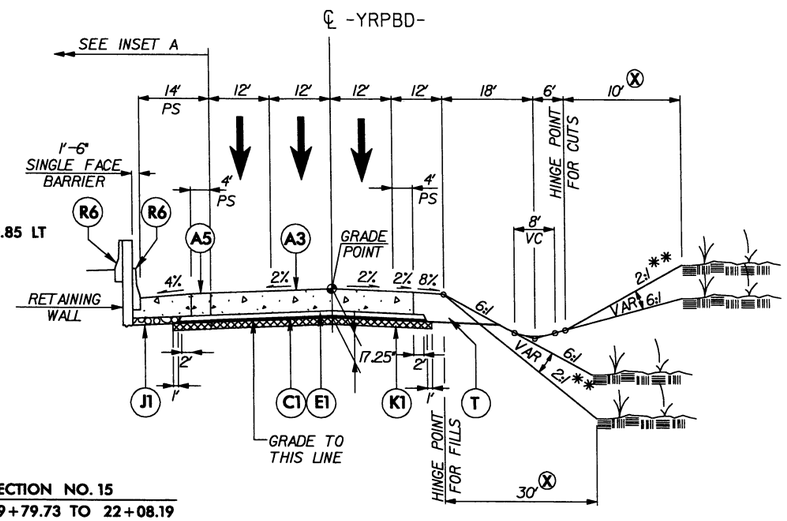
** VAR. TO 4:1 MAX. INSIDE INTERCHANGE

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-H
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

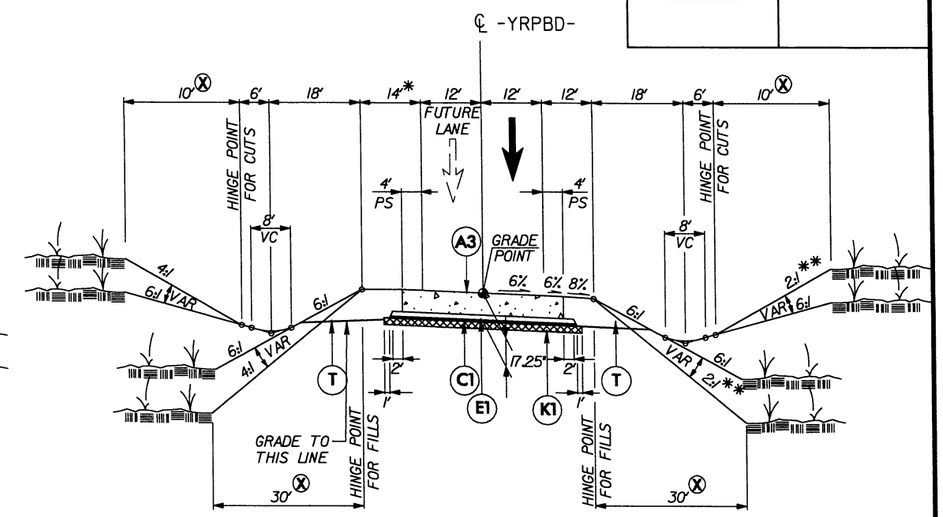
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



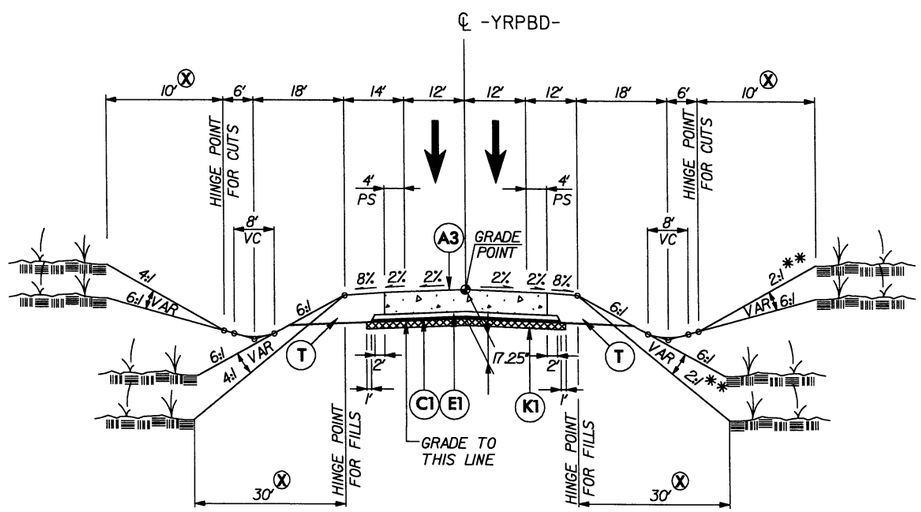
USE TYPICAL SECTION NO. 15
-YRPBD- STA. 9+79.73 TO 22+08.19

TYPICAL SECTION NO.15
-YRPBD- RAMP BD



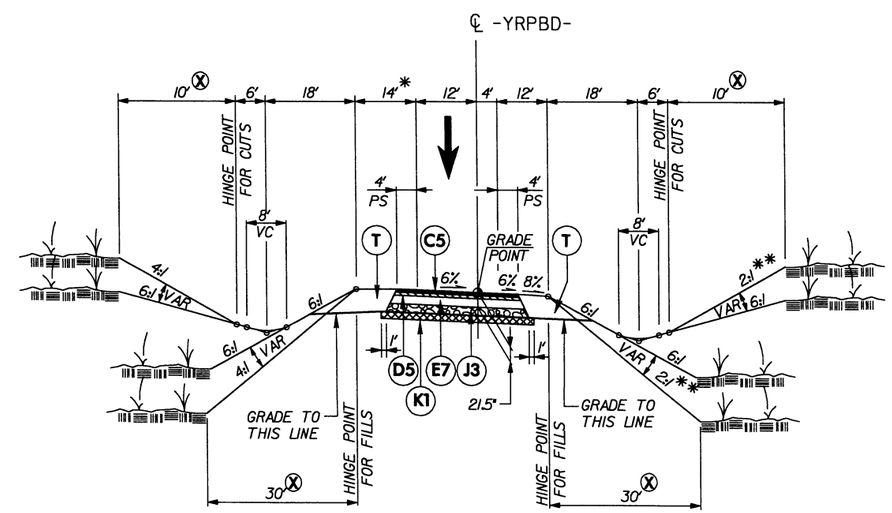
USE TYPICAL SECTION NO. 17
-YRPBD- STA. 32+64.62 TO 49+03.76

TYPICAL SECTION NO.17
-YRPBD- RAMP BD



USE TYPICAL SECTION NO. 16
-YRPBD- STA. 22+08.19 TO 32+64.62

TYPICAL SECTION NO.16
-YRPBD- RAMP BD



USE TYPICAL SECTION NO. 18
-YRPBD- STA. 49+03.76 TO 64+45.83

TYPICAL SECTION NO.18
-YRPBD- RAMP BD

6/2/99

4/15/2010
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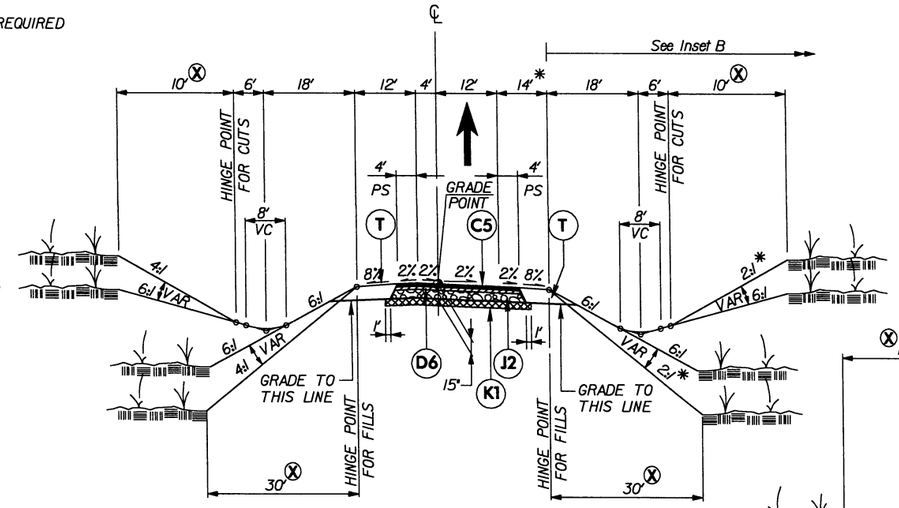
Florence & Hutcheson Inc.

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

Ⓧ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 17" WHEN GUARDRAIL REQUIRED

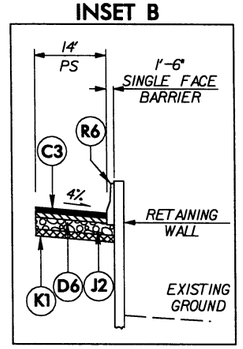
USE TYPICAL SECTION NO. 19
-YRPAB- STA. 10+00.00 TO 30+44.00
-YRPA- STA. 10+00.00 TO 37+12.25



TYPICAL SECTION NO. 19

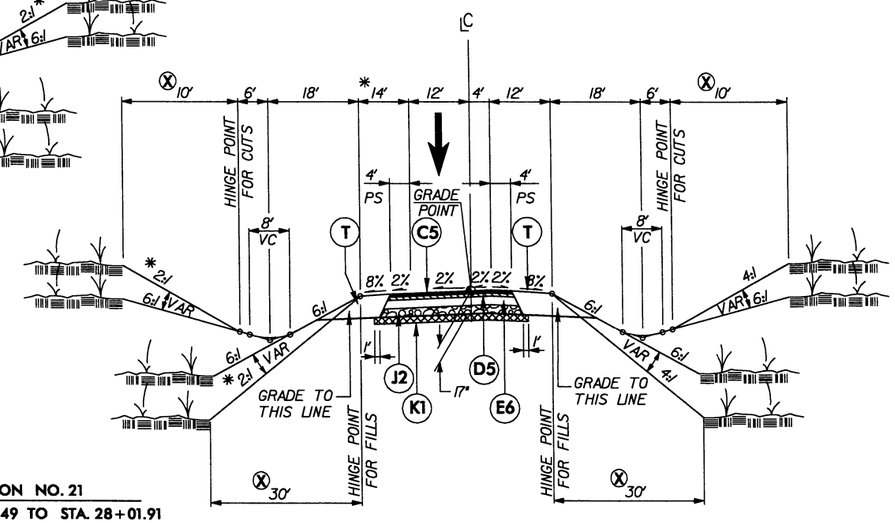
-YRPAB- RAMP AB
-YRPA- RAMP A

INSET B



-YRPAB- STA. 15+00.00 TO 17+71.50 RT

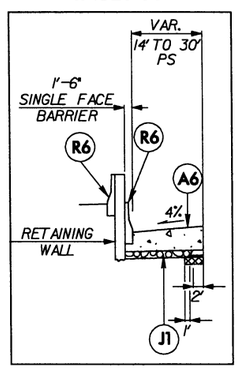
USE TYPICAL SECTION NO. 21
-YRPB- STA. 24+43.49 TO STA. 28+01.91
-YRPD- STA. 5+73.76 TO STA. 15+64.00
-YRPD- STA. 24+75.88 TO STA. 31+49.42



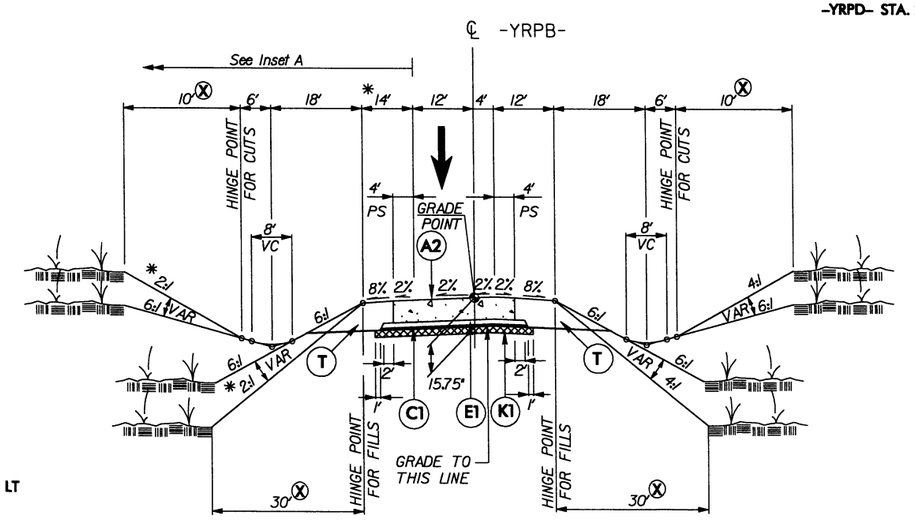
TYPICAL SECTION NO. 21

-YRPB- RAMP B
-YRPD- RAMP D

INSET A



-YRPB- STA. 10+00.00 TO 19+95.00 LT

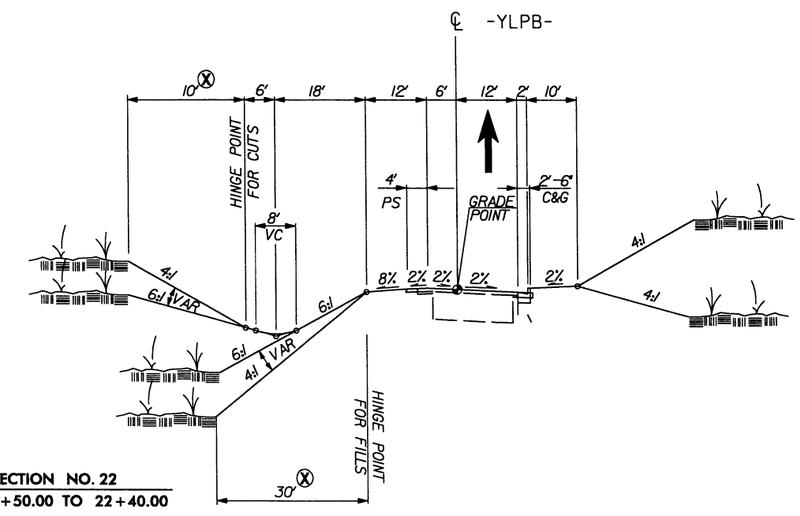


TYPICAL SECTION NO. 20

-YRPB- RAMP B

USE TYPICAL SECTION NO. 20
-YRPB- STA. 10+00.00 TO 24+43.49

USE TYPICAL SECTION NO. 22
-YLPB- STA. 18+50.00 TO 22+40.00



TYPICAL SECTION NO. 22

-YLPB- LOOP B

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0268

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

6/2/99

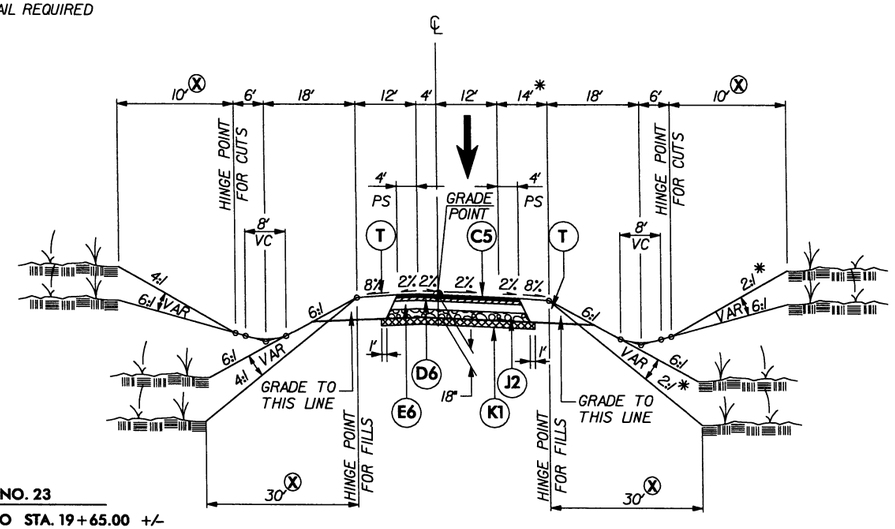
4/6/2010
R:\Roadway\Proj\13819a_Rdy_typ.dgn
Florence & Hutcheson, Inc.

6/2/99

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. (10" MIN.) PCCP	E9	7½" B25.0C
A6	VAR. (10½" MIN.) PCCP	E10	11½" B25.0C
A7	VAR. (11" MIN.) PCCP	E11	12" B25.0C
A8	VAR. (11½" MIN.) PCCP	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

Ⓧ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 17' WHEN GUARDRAIL REQUIRED

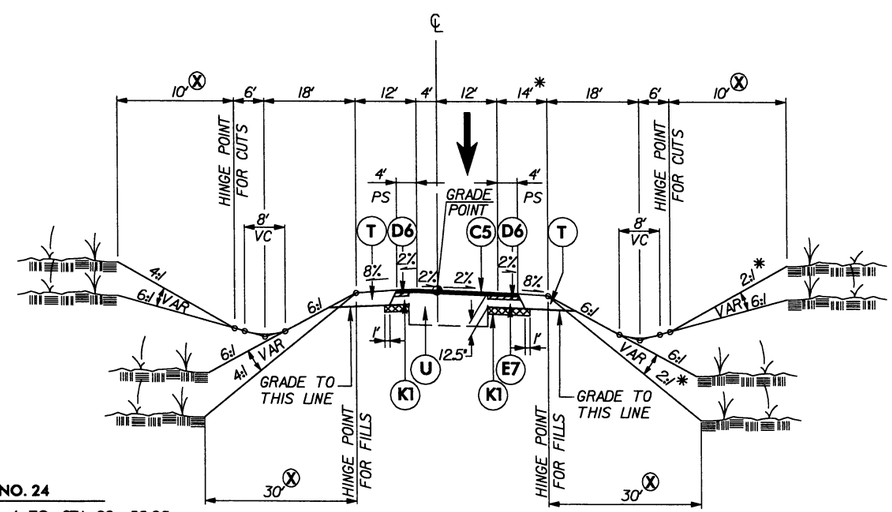


USE TYPICAL SECTION NO. 23

-YRPC- STA. 10+00.00 TO STA. 19+65.00 +/-

TYPICAL SECTION NO. 23

-YRPC- RAMP C



USE TYPICAL SECTION NO. 24

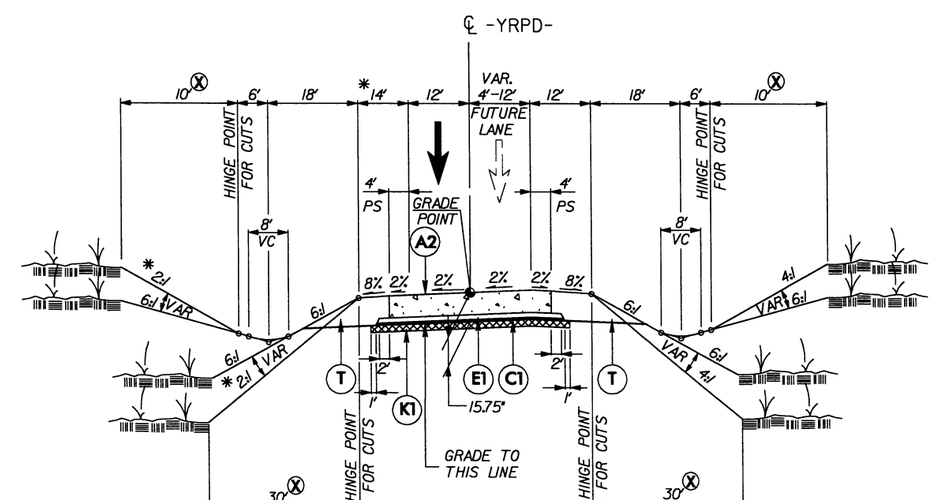
-YRPC- STA. 19+65.00 +/- TO STA. 22+55.25

TYPICAL SECTION NO. 24

-YRPC- RAMP C

USE TYPICAL SECTION NO. 25

-YRPD- BRIDGE STA. 17+64.00 TO 24+75.88



TYPICAL SECTION NO. 25

-YRPD- RAMP D

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0258

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-J
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

4/6/2010
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Florence & Hutcheson Inc.

6/2/99

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

Ⓧ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 14' WHEN GUARDRAIL REQUIRED

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-K
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

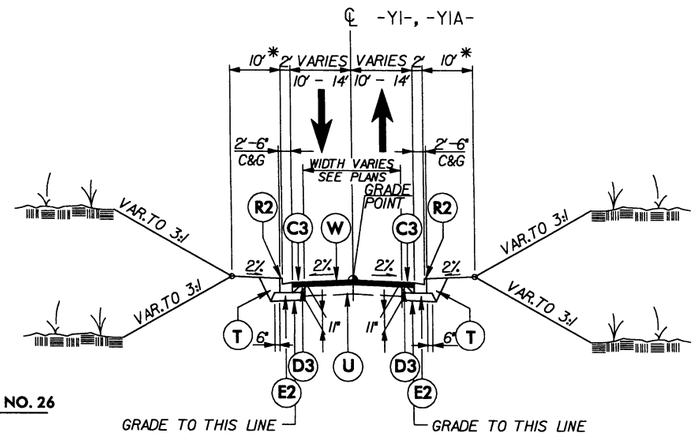
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TRANSITION FROM EXISTING TO T.S. NO. 26
-Y1- STA. 10+65.00 TO 11+65.00

USE TYPICAL SECTION NO. 26
-Y1- STA. 11+65.00 TO 13+00.00
-Y1A- STA. 12+50.00 TO 12+60.00

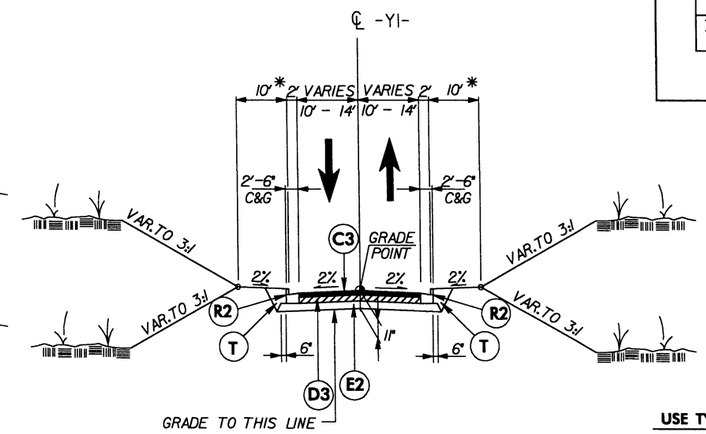
TRANSITION FROM T.S. NO. 26 TO EXISTING
-Y1A- STA. 12+60.00 TO 13+15.00



TYPICAL SECTION NO. 26

-Y1- RADIO ROAD
-Y1A- CAROLINA AVENUE

* 14' WHEN GUARDRAIL REQUIRED

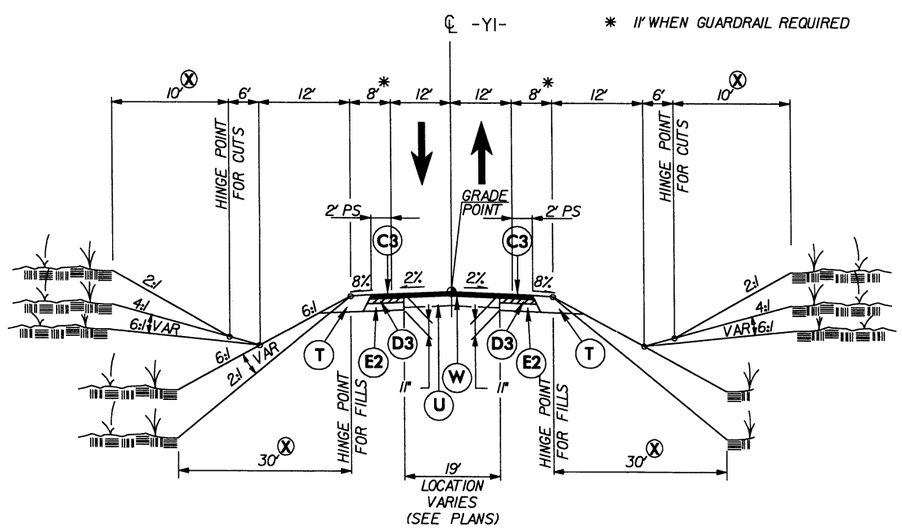


TYPICAL SECTION NO. 22

-Y1- RADIO ROAD

USE TYPICAL SECTION NO. 22
-Y1- STA. 13+00.00 TO 15+50.00

* 11' WHEN GUARDRAIL REQUIRED



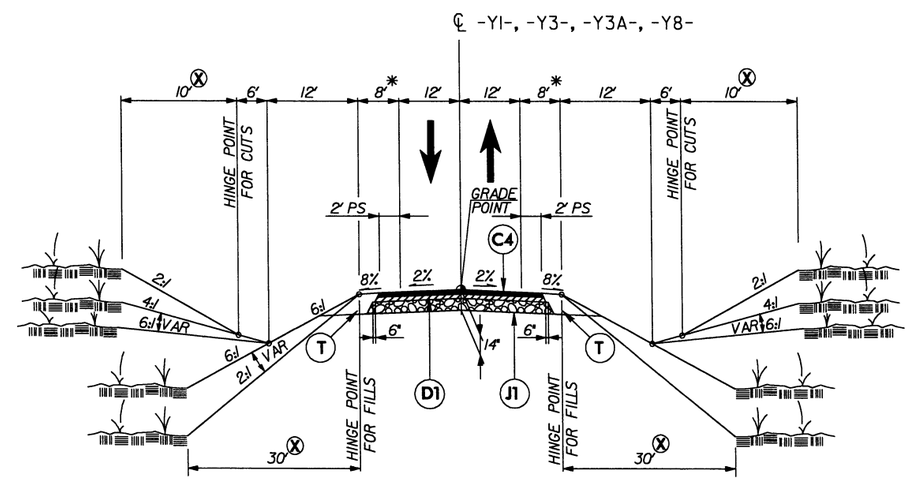
TYPICAL SECTION NO. 23

-Y1- RADIO ROAD

USE TYPICAL SECTION NO. 23
-Y1- STA. 22+50.00 TO 24+80.00

TRANSITION FROM T.S. NO. 23 TO EXISTING
-Y1- STA. 24+80.00 TO 25+30.00

* 11' WHEN GUARDRAIL REQUIRED



TYPICAL SECTION NO. 24

-Y1- RADIO ROAD
-Y3- MUSEUM ROAD
-Y3A- GATHER ROAD
-Y8- HILLSIDE LANE & PUMP STATION ROAD

USE TYPICAL SECTION NO. 24
-Y1- STA. 15+50.00 TO BRIDGE STA. 16+87.44
-Y1- BRIDGE STA. 19+60.46 TO STA. 22+50.00
-Y3- STA. 11+00.00 TO 17+24.71
-Y3A- STA. 10+00.00 TO 14+00.00
-Y8- STA. 10+00.00 TO BRIDGE STA. 14+05.00
-Y8- BRIDGE STA. 17+75.00 TO STA. 22+78.57

4/6/2010
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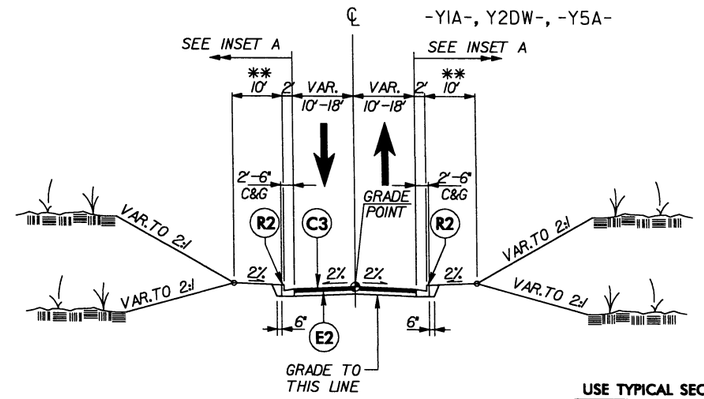
Florence & Hutcheson, Inc.

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

Ⓧ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.



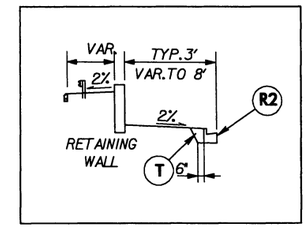
USE TYPICAL SECTION NO. 25

-Y1A- STA. 10+12.11 TO 12+50.00
-Y2DW- STA. 10+00.00 TO 15+99.31
-Y5A- STA. 10+00.00 TO 16+51.81

TYPICAL SECTION NO. 25

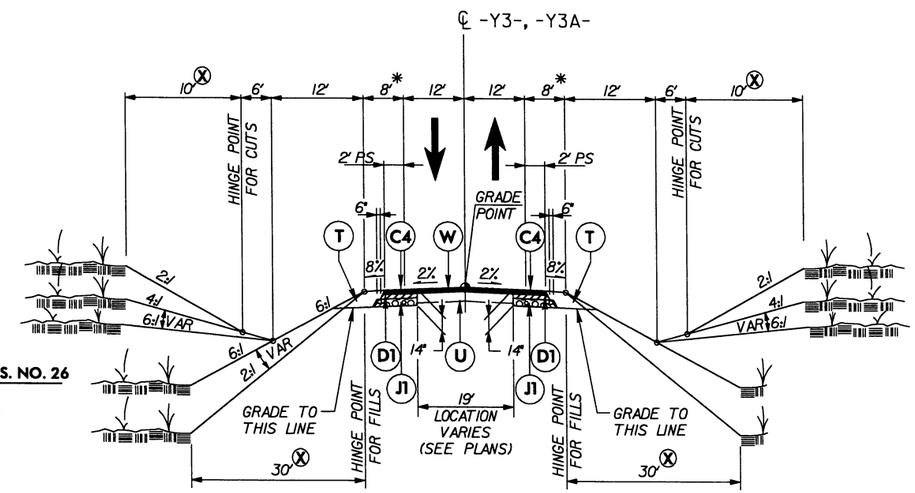
-Y1A- CAROLINA AVENUE
-Y2DW- DRIVEWAY AT SLEEP INN
-Y5A- SUNSET HILL ROAD

INSET A



-Y2DW- STA. 12+55 TO 13+85 LT.
-Y2DW- STA. 13+10 TO 15+35 RT.

* 11' WHEN GUARDRAIL REQUIRED



TRANSITION FROM EXISTING TO T.S. NO. 26

-Y3- STA. 10+00.00 TO 10+50.00
-Y3A- STA. 32+00.00 TO 33+50.00

USE TYPICAL SECTION NO. 26

-Y3- STA. 10+50.00 TO 11+00.00
-Y3A- STA. 14+00.00 TO 16+00.00
-Y3A- STA. 33+50.00 TO 48+00.00

TRANSITION FROM T.S. NO. 26 TO EXISTING

-Y3A- STA. 48+00.00 TO 48+50.00

TYPICAL SECTION NO. 26

-Y3- MUSEUM ROAD
-Y3A- GAITHER ROAD

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0368

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-L
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

6/2/99

4/6/2010
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Florence & Hutcheson, Inc.

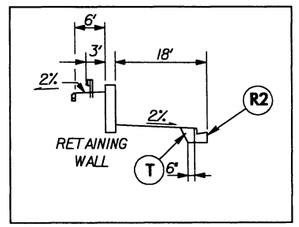
A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

UNDER THE BRIDGE INCREASE BERM WIDTH TO 22' FOR FUTURE LANE AND SIDEWALK

** VAR. TO 4:1 MAX. INSIDE INTERCHANGE

*** 14' WHEN GUARDRAIL REQUIRED

INSET B



-Y4- STA. 29+75 TO 31+26 LT.

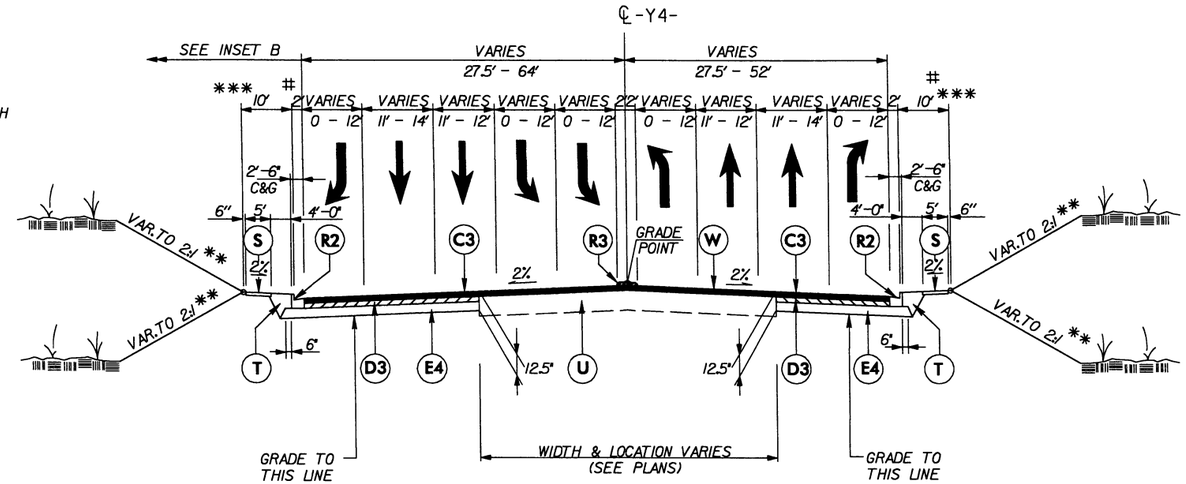
TRANSITION FROM EXISTING TO T.S. NO. 27
-Y4- STA. 10+90.00 TO 12+40.00

USE TYPICAL SECTION NO. 27
-Y4- STA. 12+40.00 TO STA. 33+00.00

TRANSITION FROM T.S. NO. TO EXISTING APPROACH SLAB
-Y4- STA. 33+00.00 TO STA. 34+57.34
(VAR DEPTH MILLING & RESURFACEING)

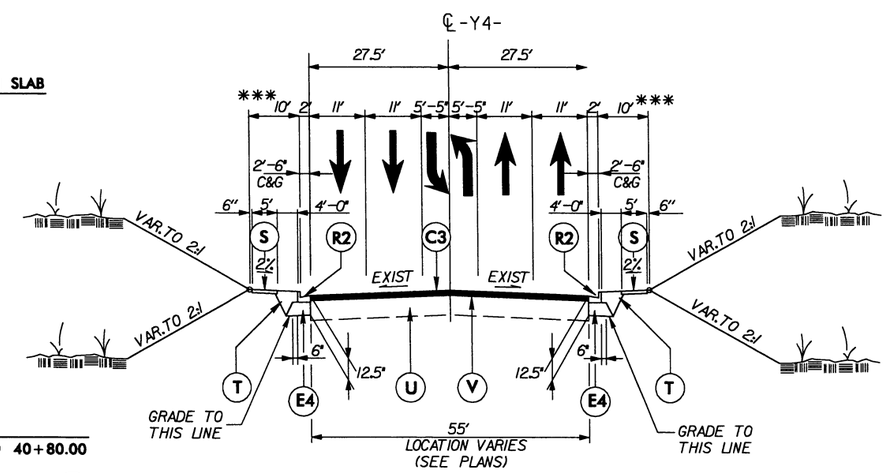
USE TYPICAL SECTION NO. 28
-Y4- EX. BRIDGE STA. 36+77.12 TO 40+80.00

MILLING 3" AND REPLACE WITH 3" S9.5B (C3)



TYPICAL SECTION NO. 27

-Y4- US 21



TYPICAL SECTION NO. 28

-Y4- US 21

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0268

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-M
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

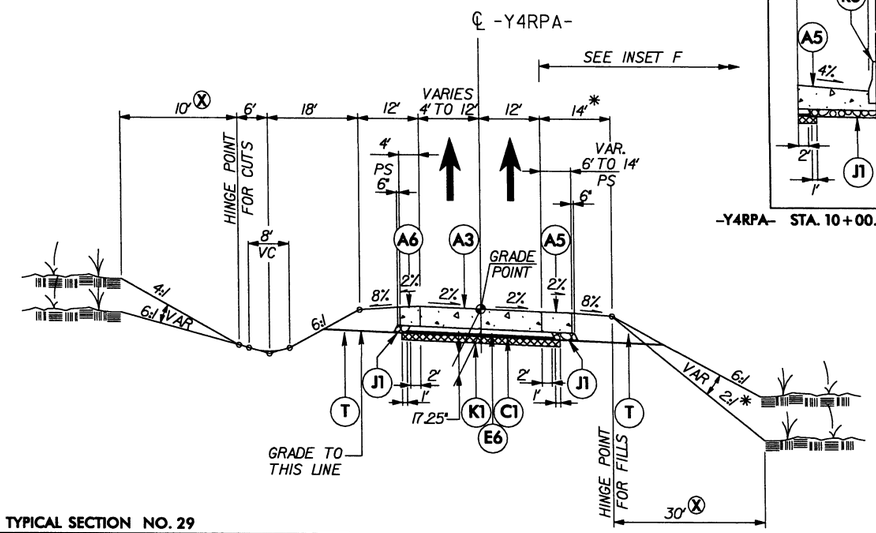
6/2/99

4/6/2010
R:\Roadway\Proj\13819a_Rdy_typ.dgn
Florence & Hutcheson, Inc.

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

(X) WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

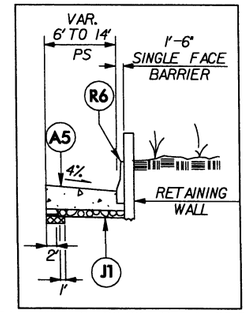
* 17' WHEN GUARDRAIL REQUIRED



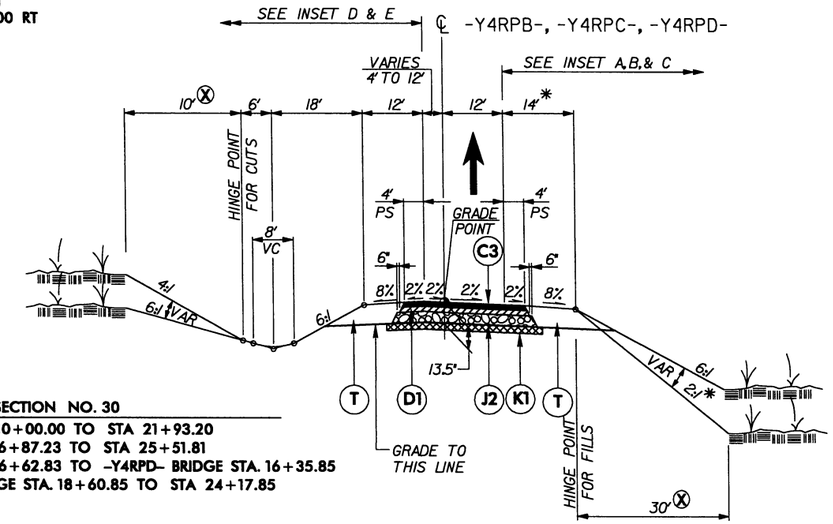
USE TYPICAL SECTION NO. 29
-Y4RPA- STA. 10+00.00 TO BRIDGE STA. 18+19.08

TYPICAL SECTION NO. 29
-Y4RPA- RAMP A

INSET F

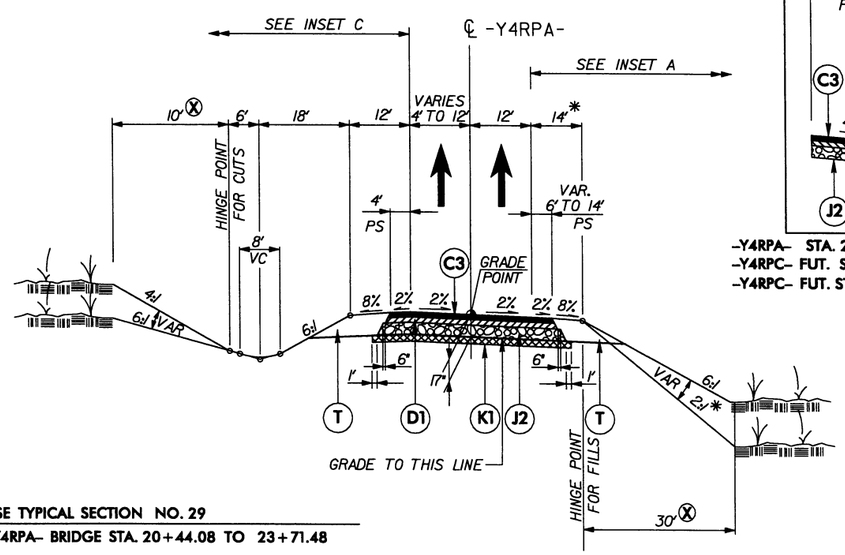


-Y4RPA- STA. 10+00.00 TO 14+00.00 RT



USE TYPICAL SECTION NO. 30
-Y4RPB- STA. 10+00.00 TO STA 21+93.20
-Y4RPC- STA. 6+87.23 TO STA 25+51.81
-Y4RPD- STA. 6+62.83 TO -Y4RPD- BRIDGE STA. 16+35.85
-Y4RPD- BRIDGE STA. 18+60.85 TO STA 24+17.85

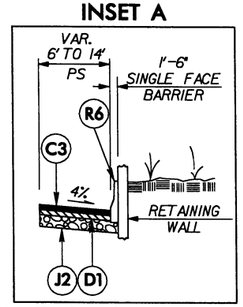
TYPICAL SECTION NO. 30
-Y4RPB- RAMP B
-Y4RPC- RAMP C
-Y4RPD- RAMP D



USE TYPICAL SECTION NO. 29
-Y4RPA- BRIDGE STA. 20+44.08 TO 23+71.48

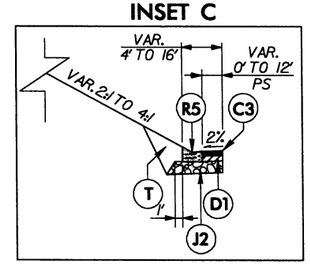
TYPICAL SECTION NO. 29
-Y4RPA- RAMP A

INSET A



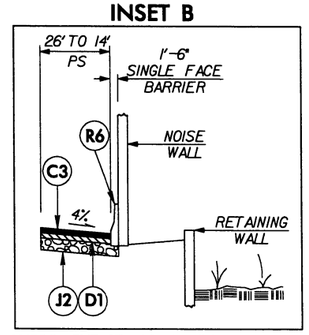
-Y4RPA- STA. 20+56.78 TO 22+55.00 RT
-Y4RPC- FUT. STA. 17+50.00 TO -Y4RPC- 21+00.00 RT
-Y4RPC- FUT. STA. 11+50 +/- TO 13+25 RT.

INSET C



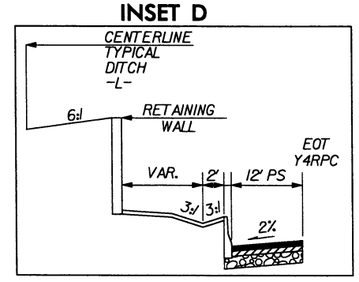
-Y4RPA- STA. 20+60 +/- TO 23+35.00 LT
-Y4RPB- STA. 20+40.00 TO 21+50.00 RT
-Y4RPD- STA. 18+90 +/-TO 23+66.00 RT
-Y4RPC- STA. 22+35 TO 25+19 LT.

INSET B



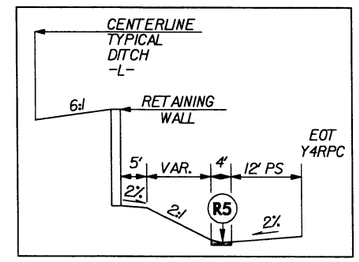
-Y4RPC- FUT. STA. 13+75 TO 17+50 RT.

INSET D



-Y4RPC- STA. 18+25.49 TO 22+35 LT.

INSET E



-Y4RPC- STA. 22+35 TO 25+19 LT.

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingstown Way, Suite 100 Raleigh, NC 27607
NC License No: P-0358

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-N
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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

6/2/99

4/15/2010
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Florence & Hutcheson Inc.

6/2/99

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0268

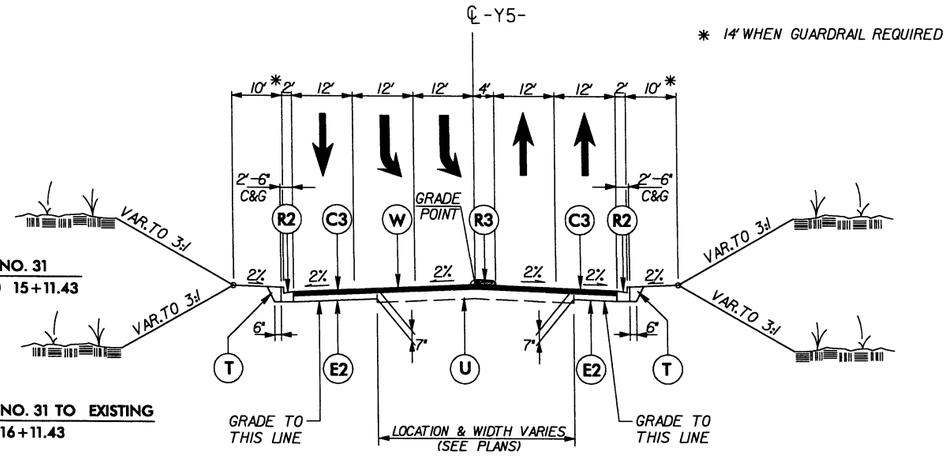
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-0
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

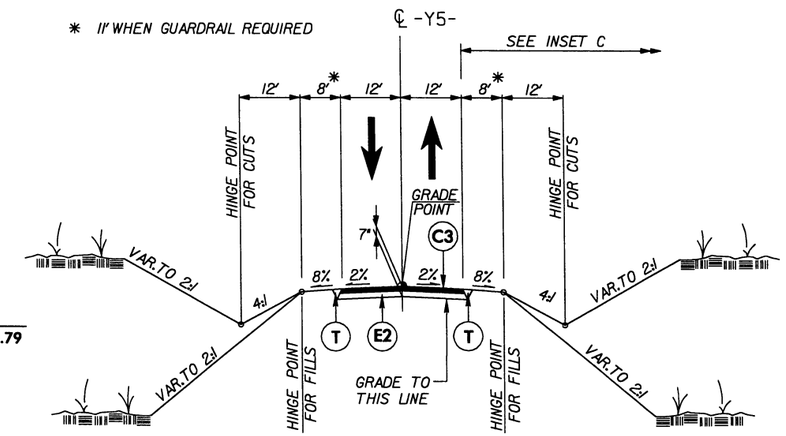
USE TYPICAL SECTION NO. 31
-Y5- STA. 10+42.82 TO 15+11.43

TRANSITION FROM T.S. NO. 31 TO EXISTING
-Y5- STA. 15+11.43 TO 16+11.43



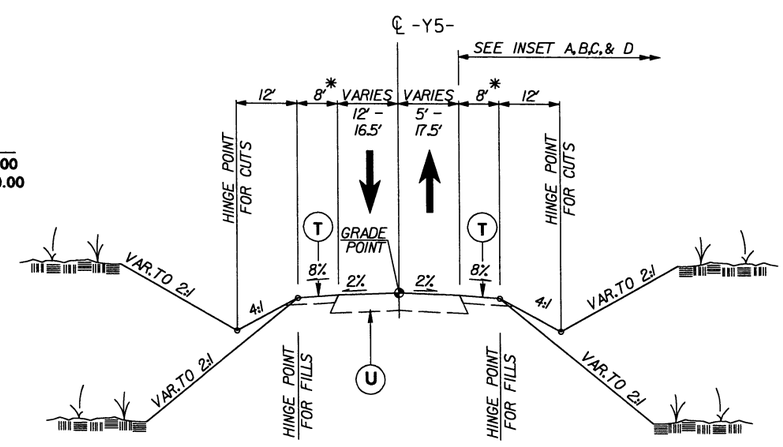
TYPICAL SECTION NO. 31
-Y5- GLENWAY DRIVE

USE TYPICAL SECTION NO. 33
-Y5- STA. 38+90.00 TO 63+34.79



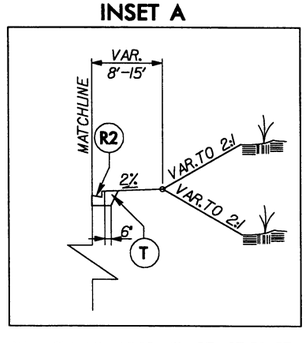
TYPICAL SECTION NO. 33
-Y5- GLENWAY DRIVE

USE TYPICAL SECTION NO. 32
-Y5- STA. 19+68.10 TO 38+90.00
-Y5- STA. 63+34.79 TO 67+00.00



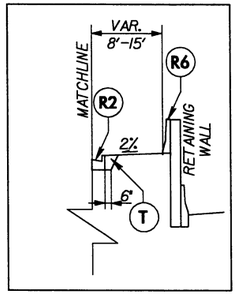
TYPICAL SECTION NO. 32
-Y5- GLENWAY DRIVE

INSET A



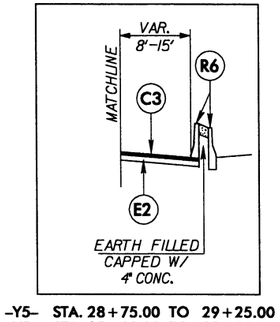
-Y5- STA. 19+68.10 TO 27+17.50 RT

INSET B



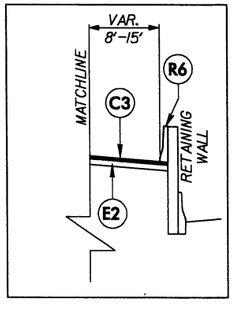
-Y5- STA. 27+17.50 TO 28+75.00 RT
-Y5- STA. 29+25.00 TO 35+00.00 RT
-Y5- STA. 39+00.00 TO 40+75.00 RT

INSET C



-Y5- STA. 28+75.00 TO 29+25.00 RT (C&G)
-Y5- STA. 35+00.00 TO 39+00.00 RT
-Y5- STA. 49+50.00 TO 50+00.00 RT

INSET D



-Y5- STA. 40+75.00 TO 49+50.00 RT
-Y5- STA. 50+00.00 TO 61+65.00 RT

4/6/2010
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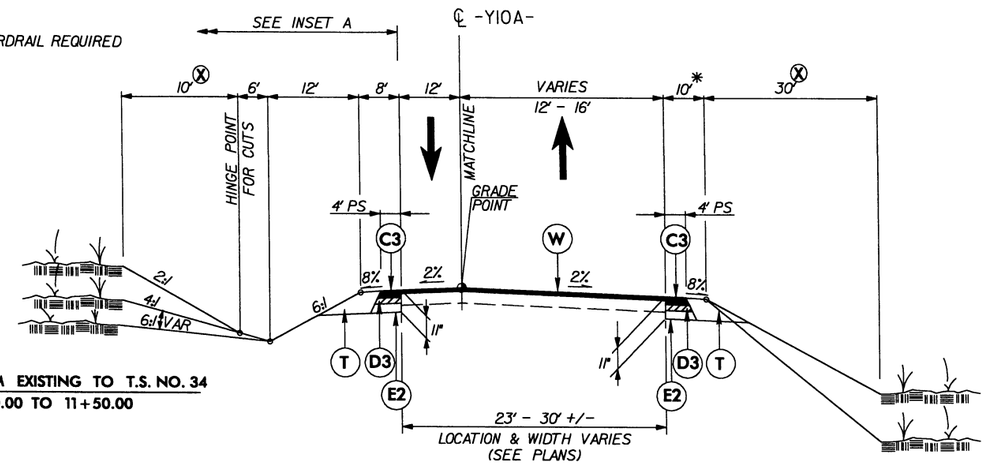
Florence & Hutcheson, Inc.

6/2/99

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

Ⓧ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 13' WHEN GUARDRAIL REQUIRED



TRANSITION FROM EXISTING TO T.S. NO. 34
-Y10A- STA. 11+00.00 TO 11+50.00

USE TYPICAL SECTION NO. 34
-Y10A- STA. 11+50.00 TO 16+05.89

TYPICAL SECTION NO. 34

-Y10A- US 64

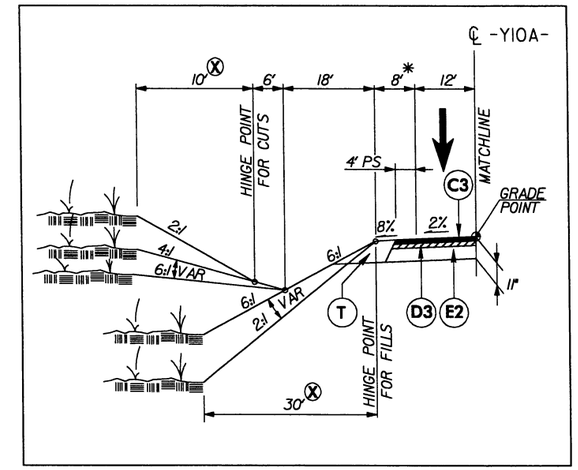
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0268

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-P
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

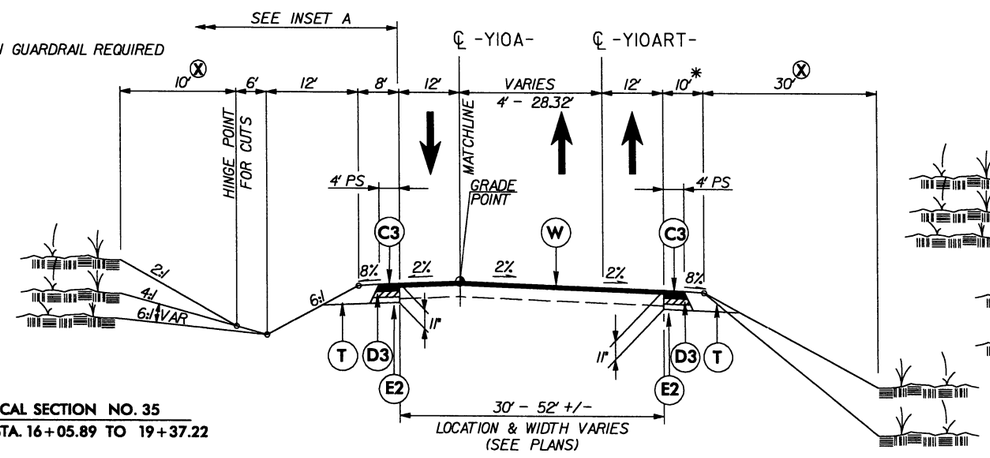
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INSET A



-Y10A- STA. 14+08.74 TO 19+37.22 LT

* 13' WHEN GUARDRAIL REQUIRED

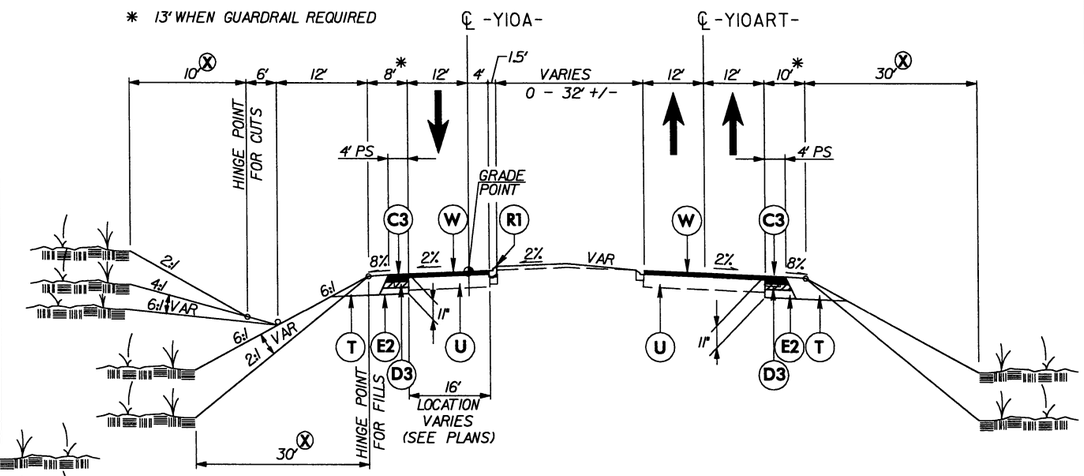


USE TYPICAL SECTION NO. 35
-Y10A- STA. 16+05.89 TO 19+37.22

TYPICAL SECTION NO. 35

-Y10A- US 64

* 13' WHEN GUARDRAIL REQUIRED



TYPICAL SECTION NO. 36

-Y10A- US 64

USE TYPICAL SECTION NO. 36
-Y10A- STA. 19+37.22 TO 23+00.00

4/6/2010
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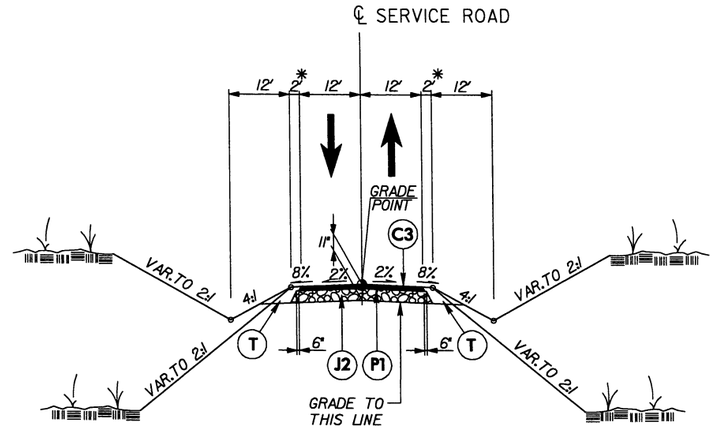
Florence & Hutcheson, Inc.

A1	9" PCCP	E5	VAR. B25.0B
A2	11½" PCCP	E6	3" B25.0C
A3	13" PCCP	E7	5½" B25.0C
A4	14" PCCP	E8	6½" B25.0C
A5	VAR. PCCP (10" MIN.)	E9	7½" B25.0C
A6	VAR. PCCP (10½" MIN.)	E10	11½" B25.0C
A7	VAR. PCCP (11" MIN.)	E11	12" B25.0C
A8	VAR. PCCP (11½" MIN.)	E12	VAR. B25.0C
C1	1¼" SF9.5A	J1	4½" ABC
C2	1½" S9.5B	J2	8" ABC
C3	3" S9.5B	J3	10" ABC
C4	VAR. S9.5B	J4	VAR. ABC
C5	3" S9.5C	K1	LIME STAB. OR CEMENT STAB.
C6	VAR. S9.5C		
C7	3" S9.5D	P1	.35 PRIME COAT
C8	VAR. S9.5D	P2	.50 PRIME COAT
D1	2½" I19.0B	R1	1'-6" C & G
D2	3" I19.0B	R2	2'-6" C & G
D3	4" I19.0B	R3	5" MCI
D4	VAR. I19.0B	R4	SBG
D5	3" I19.0C	R5	EXP GUTTER
D6	4" I19.0C	R6	SINGLE FACED CONCRETE BARRIER
D7	VAR. I19.0C	R7	DOUBLE FACED CONCRETE BARRIER
D8	4" I19.0D	S	4" SIDEWALK
D9	VAR. I19.0D	T	EARTH MATERIAL
E1	3" B25.0B	U	EX PAVEMENT
E2	4" B25.0B	V	MILLING PAVM'T
E3	5" B25.0B	W	WEDGING
E4	5½" B25.0B		

(X) WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 2:1 TO 6:1, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

* 5' WHEN GUARDRAIL REQUIRED

USE TYPICAL SECTION NO. 37
-SR1- STA. 2+00.00 TO 36+57.13



TYPICAL SECTION NO. 37

SERVICE ROAD

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0268

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-Q
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

6/2/99

4/6/2010
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Florence & Hutcheson, Inc.

8/17/99

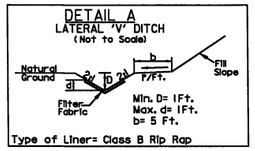
REVISIONS

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0358

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-R
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

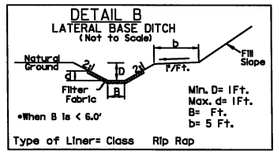
DETAIL A
LATERAL "V" DITCH
(Not to Scale)



Type of Liner= Class B Rip Rap

RDWY	STATION - STATION	SIDE
-YRPB-	15+30 TO 16+00	RT.

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



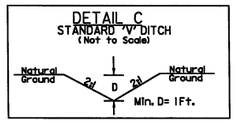
*When B is < 6.0'

Type of Liner= Class Rip Rap

RDWY	STATION - STATION	SIDE	B	LINER
-L-	50+65 TO 55+00	RT.	2'	CLASS B
-YRPA-	22+20 TO 23+00	LT.	4'	CLASS B
-YRPAB-	10+60 TO 12+10	RT.	3'	CLASS I
* -YRPBD-	20+30 TO 21+00	RT.	5'	CLASS I
-YRPBD-	27+80 TO 28+50	LT.	2'	CLASS B
-YRPBD-	59+00 TO 62+00	LT.	5'	CLASS B

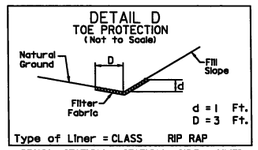
*RIP RAP TO BE FLUSH WITH CHANNEL

DETAIL C
STANDARD "V" DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE
-SR1-	36+50	LT.
-Y8-	17+50 TO 18+04	RT.

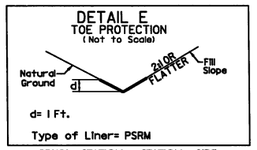
DETAIL D
TOE PROTECTION
(Not to Scale)



Type of Liner = CLASS RIP RAP

RDWY	STATION - STATION	SIDE	LINER
-L-	143+30 TO 143+60	LT.	CLASS B
-SR1-	4+40 TO 6+00	LT.	CLASS I
-SR1-	7+00 TO 7+70	LT.	CLASS B
-SR1-	13+40 TO 15+20	LT.	CLASS I
-SR1-	14+70 TO 15+50	RT.	CLASS B
-Y-	124+00 TO 127+00	RT.	CLASS B
-Y-	153+30 TO 154+20	LT.	CLASS B
-Y1-	17+50 TO 19+25	LT.	CLASS B
-YBDRIVE-	10+50 TO 11+50	LT.	CLASS B
-YRPA-	21+70 TO 22+20	LT.	CLASS B
-YRPBD-	24+70 TO 26+00	RT.	CLASS B
-YRPBD-	57+70 TO 59+40	RT.	CLASS B
-YRPC-	20+00 TO 20+50	RT.	CLASS B
-YRPD-	17+00 TO 19+10	RT.	CLASS B

DETAIL E
TOE PROTECTION
(Not to Scale)

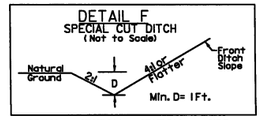


d= 1 Ft.

Type of Liner= PSRM

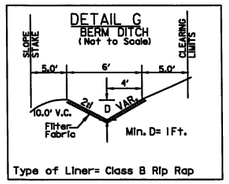
RDWY	STATION - STATION	SIDE
-YRPC-	21+40 TO 22+60	LT.
-L-	54+40 TO 59+20	LT.

DETAIL F
SPECIAL CUT DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE
-L-	36+50 TO 37+50	LT.
-L-	41+00 TO 41+62	LT.
-L-	136+00 TO 138+00	LT.
-L-	142+00 TO 144+00	RT.
-SR1-	24+50 TO 25+35	RT.
-SR1-	30+00 TO 31+50	LT.
-SR1-	30+50 TO 32+00	RT.
-SR1-	34+00 TO 36+50	LT.
-SR1-	33+50 TO 36+50	RT.
-Y5-	65+95 TO 67+00	RT.
-Y8-	10+50 TO 12+50	LT.
-Y8-	10+50 TO 13+25	RT.
-Y8-	19+00 TO 21+50	LT.
-Y8DRIVE-	11+50 TO 11+75	LT.
-Y10A-	13+00 TO 14+00	LT.
-Y10A-	13+50 TO 16+50	RT.
-YRPA-	23+00 TO 31+00	LT.
-YRPB-	16+00 TO 18+50	RT.
-YRPBD-	19+00 TO 20+00	RT.
-Y3A-	15+50 TO 16+05	RT.
-Y3A-	15+50 TO 16+00	LT.

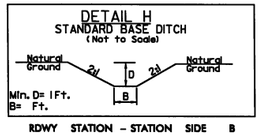
DETAIL G
BERM DITCH
(Not to Scale)



Type of Liner= Class B Rip Rap

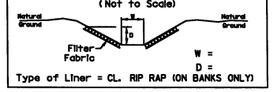
RDWY	STATION - STATION	SIDE
-L-	160+10 TO 165+20	LT.
-YRPD-	9+50 TO 15+60	LT.

DETAIL H
STANDARD BASE DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE	B
-L-	114+80	RT.	5'
-L-	107+00	RT.	2'
-L-	108+90	RT.	2'
-L-	135+54 TO 138+00	LT.	3'
-Y8DRIVE-	11+75	RT.	2'
-SR1-	25+35	LT.	5'

DETAIL K
PROPOSED OUTLET CHANNEL
(Not to Scale)

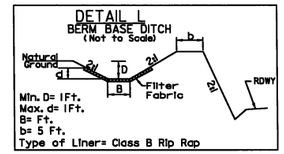


W =
D =

Type of Liner = CL. RIP RAP (ON BANKS ONLY)

RDWY	STATION - STATION	SIDE	W	D	LINER
-L-	55+50	LT.	3' TO 8'	10'	CL. II
-SR1-	14+70	RT.	3'	2'	CL. II
-SR1-	15+30	LT.	3'	2'	CL. II
-YRPA-	33+50	RT.	5'	6'	CL. II
-YRPC-	20+70	RT.	5'	3'	CL. II

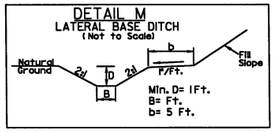
DETAIL L
BERM BASE DITCH
(Not to Scale)



Type of Liner= Class B Rip Rap

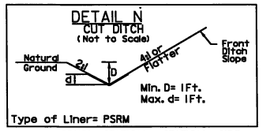
RDWY	STATION - STATION	SIDE	B
-L-	158+31 TO 160+00	RT.	3'
-Y5-	40+00 TO 42+00	LT.	5'

DETAIL M
LATERAL BASE DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE	B
-L-	99+70 TO 104+00	RT.	4'
-YRPAB-	18+30 TO 19+20	LT.	2'
-YRPBD-	21+00 TO 24+50	RT.	5'
-YRPBD-	27+20 TO 27+80	LT.	2'

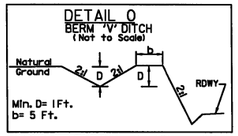
DETAIL N
CUT DITCH
(Not to Scale)



Type of Liner= PSRM

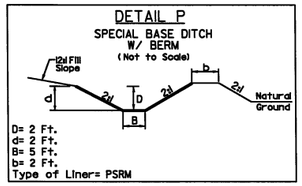
RDWY	STATION - STATION	SIDE
-SR1-	16+00 TO 19+00	RT.
-Y1-	25+00 TO 25+50	RT.

DETAIL O
BERM "V" DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE
-YRPBD-	31+60 TO 34+00	RT.
-YRPBD-	37+00 TO 40+50	RT.
-YRPBD-	43+00 TO 44+50	RT.

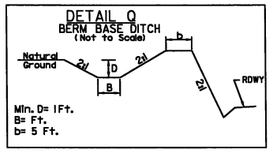
DETAIL P
SPECIAL BASE DITCH
W/ BERM
(Not to Scale)



Type of Liner= PSRM

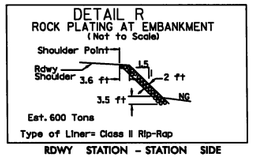
RDWY	STATION - STATION	SIDE
-L-	104+00 TO 109+40	RT.

DETAIL Q
BERM BASE DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE	B
-L-	155+50 TO 158+31	RT.	3'
-Y5-	42+00 TO 45+60	LT.	5'
-Y5-	46+70 TO 49+80	LT.	2'

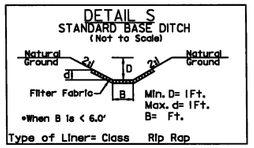
DETAIL R
ROCK PLATING AT EMBANKMENT
(Not to Scale)



Type of Liner= Class II Rip-Rap

RDWY	STATION - STATION	SIDE
-YRPA-	33+00 TO 33+80	RT.

DETAIL S
STANDARD BASE DITCH
(Not to Scale)

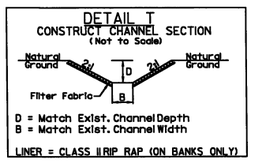


*When B is < 6.0'

Type of Liner= Class Rip Rap

RDWY	STATION - STATION	SIDE	B	LINER
-L-	119+10	RT.	5'-20'	CLASS B
-YRPA-	22+00	RT.	5'-20'	CLASS I
-YRPAB-	18+00	RT.	5'-20'	CLASS I

DETAIL T
CONSTRUCT CHANNEL SECTION
(Not to Scale)

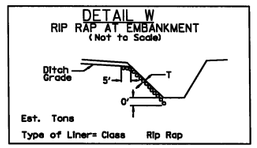


D = Match Exist. Channel Depth
B = Match Exist. Channel Width

LINER = CLASS II RIP RAP (ON BANKS ONLY)

RDWY	STATION - STATION	SIDE
-L-	113+20	RT.
-YRPC-	20+80	RT.

DETAIL W
RIP RAP AT EMBANKMENT
(Not to Scale)

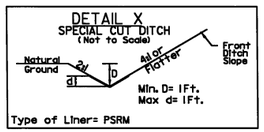


Est. Tons

Type of Liner= Class Rip Rap

RDWY	STATION	SIDE	THICKNESS T (FT)	LINER	TONS
-L-	92+00	CL.	2.0	CL. II	870
-L-	92+30	CL.	2.0	CL. II	870
-Y3A-	40+50	LT.	1.5	CL. I	8
-Y4-	18+14	LT.	1.5	CL. I	10
-Y4RPD-	17+18	LT.	2.0	CL. II	51
-Y4RPD-	16+50	LT.	2.0	CL. II	43
-Y4RPD-	16+15	LT.	2.0	CL. II	54
-Y8-	17+50	RT.	2.0	CL. II	63
-YRPD-	17+40	LT.	2.0	CL. II	5
-YRPD-	17+70	LT.	2.0	CL. II	5

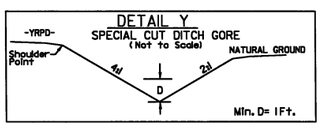
DETAIL X
SPECIAL CUT DITCH
(Not to Scale)



Type of Liner= PSRM

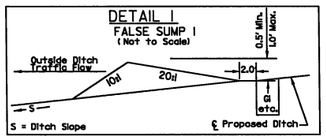
RDWY	STATION - STATION	SIDE
-SR1-	25+35 TO 26+00	RT.

DETAIL Y
SPECIAL CUT DITCH GORE
(Not to Scale)



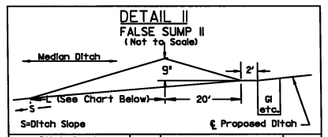
RDWY	STATION - STATION	SIDE
-YRPD-	19+20 - 20+70	RT.

DETAIL I
FALSE SUMP I
(Not to Scale)



RDWY	STATION - STATION	SIDE
-L-	26+35	LT.
-L-	36+00	LT.
-L-	48+75	RT.
-L-	53+15	RT.
-L-	56+90	RT.
-L-	63+20	RT.
-L-	67+30	RT.
-L-	96+60	RT.
-L-	119+50	LT.
-LCDWB-	18+70	LT.
-SR1-	16+00	LT.
-YRPBD-	12+20	RT.
-YRPBD-	26+10	RT.
-YRPBD-	28+40	LT.
-YRPD-	21+67	LT.
-Y5-	50+70	LT.
-Y8-	19+00	LT.
-Y10A-	13+50	LT.

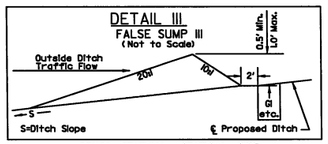
DETAIL II
FALSE SUMP II
(Not to Scale)



Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

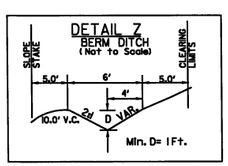
RDWY	STATION - STATION	SIDE
-L-	28+60	MED.
-L-	30+75	MED.
-L-	34+80	MED.
-L-	49+00	MED.
-L-	54+10	MED.
-L-	56+90	MED.
-L-	63+00	MED.
-L-	67+70	MED.
-L-	108+80	MED.
-L-	114+80	MED.
-L-	119+00	MED.
-L-	123+00	MED.
-L-	138+70	MED.
-L-	144+00	MED.
-L-	153+60	MED.
-L-	157+70	MED.
-Y-	129+30	MED.
-Y-	143+60	MED.
-Y-	149+50	MED.
-Y-	152+60	MED.
-Y-	156+60	MED.
-Y-	162+70	MED.
-Y-	172+30	MED.
-Y-	177+30	MED.

DETAIL III
FALSE SUMP III
(Not to Scale)



RDWY	STATION - STATION	SIDE
-L-	41+62	LT.
-L-	49+50	LT.
-L-	158+20	RT.
-L-	165+80	RT.
-L-	175+81	RT.
-SR1-	8+20	RT.
-SR1-	16+00	RT.
-Y-	130+30	RT.
-Y-	178+00	RT.
-YRPAB-	19+60	LT.
-YRPAB-	19+90	RT.
-YRPBD-	33+20	LT.
-YRPBD-	36+90	RT.
-YRPBD-	36+90	LT.
-YRPBD-	57+80	RT.
-YRPBD-	58+50	LT.
-Y4RPB-	16+65	LT.
-Y4RPB-	17+30	RT.
-Y8-	12+75	LT.
-Y10A-	13+50	RT.

DETAIL Z
BERM DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE
-L-	165+25 TO 167+50	RT.
-YRPBD-	32+30 TO 33+50	LT.

7/8/2010
R:\Roadway\Proj\3819a_Hyd_Ditch_Details_Shts_2R_2S.dgn
12:04 PM

8/17/99

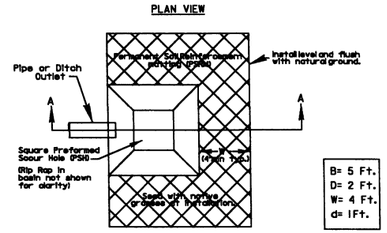
REVISIONS

Florence & Hutcheson
CONSULTING ENGINEERS
3121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-S
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

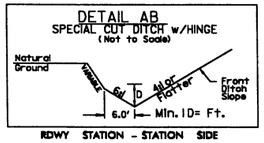
DETAIL V
PREFORMED SCOUR HOLE



5/05

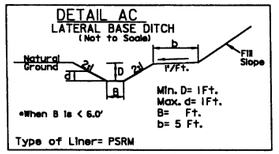
RDWY	STATION - STATION	SIDE
-SR1-	7+15	RT.
-YRPD-	19+00	LT.

DETAIL AB
SPECIAL CUT DITCH w/HINGE
(Not to Scale)



RDWY	STATION - STATION	SIDE
-L-	165+80 TO 166+50	RT.
-YRPBD-	43+30 TO 45+50	RT.

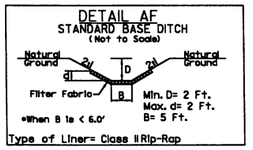
DETAIL AC
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= PSRM

RDWY	STATION - STATION	SIDE	B
-L-	50+00 TO 53+70	LT.	2'

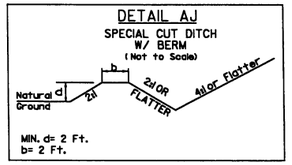
DETAIL AF
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class II Rip-Rap

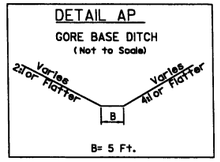
RDWY	STATION - STATION	SIDE
-L-	147+94 TO 148+30	RT.
-YRPD	17+60 TO 17+70	LT.

DETAIL AJ
SPECIAL CUT DITCH
W/ BERM
(Not to Scale)



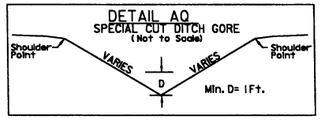
RDWY	STATION - STATION	SIDE
-YRPBD-	43+20 TO 44+15	LT.

DETAIL AP
GORE BASE DITCH
(Not to Scale)



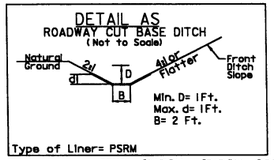
RDWY	STATION - STATION	SIDE
-L-	141+00 TO 144+00	RT.

DETAIL AQ
SPECIAL CUT DITCH GORE
(Not to Scale)



RDWY	STATION - STATION	SIDE
-YRPBD-	44+00 TO 46+50	LT.

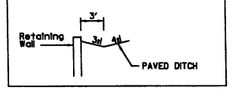
DETAIL AS
ROADWAY CUT BASE DITCH
(Not to Scale)



Type of Liner= PSRM

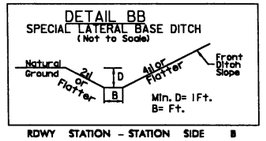
RDWY	STATION - STATION	SIDE
-YS-	55+30 TO 65+50	LT.

DETAIL AX
PAVED DITCH
(Not to Scale)



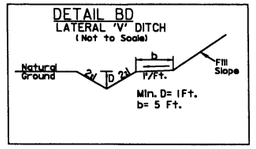
RDWY	STATION - STATION	SIDE
-L-	58+00 TO 60+00	RT.

DETAIL BB
SPECIAL LATERAL BASE DITCH
(Not to Scale)



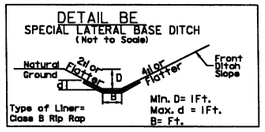
RDWY	STATION - STATION	SIDE	B
-L-	26+50 TO 36+50	RT.	4'
-Y8-	13+25 TO 14+00	RT.	2'

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



RDWY	STATION - STATION	SIDE
-Y3-	13+00 TO 13+85	RT.
-Y3-	13+85 TO 16+00	RT.
20+30 -Y1- TO 10+50 -Y3A-		RT.

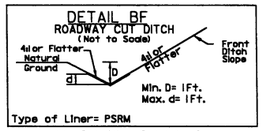
DETAIL BE
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class B Rip Rap

RDWY	STATION - STATION	SIDE	B
-L-	55+00 TO 57+00	RT.	2'

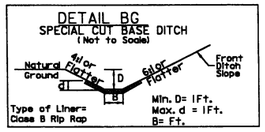
DETAIL BF
ROADWAY CUT DITCH
(Not to Scale)



Type of Liner= PSRM

RDWY	STATION - STATION	SIDE
-Y1-	23+50 TO 25+00	RT.

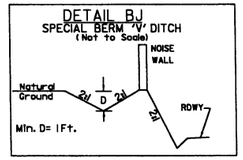
DETAIL BG
SPECIAL CUT BASE DITCH
(Not to Scale)



Type of Liner= Class B Rip Rap

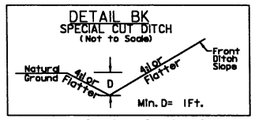
RDWY	STATION - STATION	SIDE	B
-Y1-	23+82 TO 25+00	LT.	4'

DETAIL BJ
SPECIAL BERM 'V' DITCH
(Not to Scale)



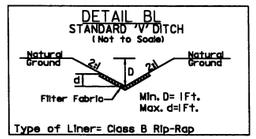
RDWY	STATION - STATION	SIDE
-L-	33+00 TO 37+00	LT.

DETAIL BK
SPECIAL CUT DITCH
(Not to Scale)



RDWY	STATION - STATION	SIDE
-L-	26+50 TO 28+50	LT.
-L-	46+50 TO 48+75	RT.
-L-	49+00 TO 57+00	RT.

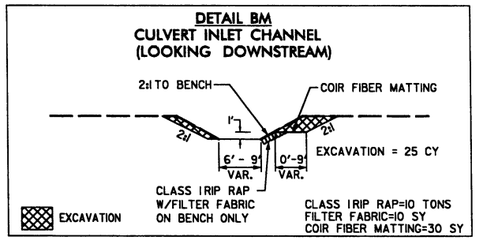
DETAIL BL
STANDARD 'V' DITCH
(Not to Scale)



Type of Liner= Class B Rip-Rap

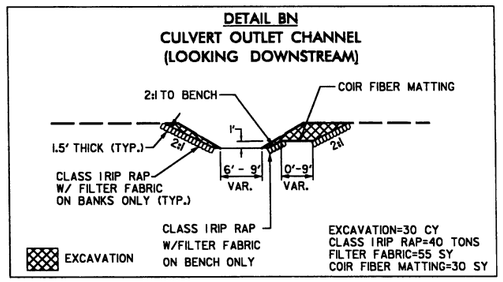
RDWY	STATION - STATION	SIDE
-L-	141+20 TO 141+50	RT.
-L-	141+25 TO 141+45	LT.
-YRPAB-	19+20 TO 19+70	LT.

DETAIL BM
CULVERT INLET CHANNEL
(LOOKING DOWNSTREAM)



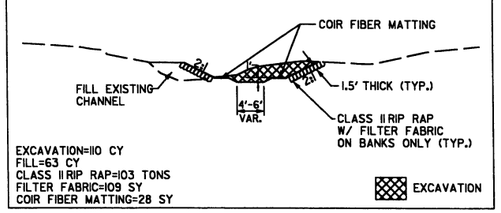
-SR1- 6+70 LT

DETAIL BN
CULVERT OUTLET CHANNEL
(LOOKING DOWNSTREAM)



-SR1- 6+70 RT

DETAIL BO
OUTLET CHANNEL
(LOOKING DOWNSTREAM)



-L- 22+98 LT

DETAIL BP
MEDIAN V DITCH
(Not to Scale)

FROM STA. 38+00 TO STA. 39+50

4/23/2010
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PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-T
R/W SHEET NO.	

HYDRAULICS ENGINEER

MULKEY ENGINEERS & CONSULTANTS

MATERIALS

A	GEOTEXTILE FABRIC
B	POLYPROPYLENE WOVEN MONOFILAMENT GEOTEXTILE FABRIC
C	18" INLET PIPE
D	18" OUTLET PIPE
E	TWO LINES OF 6" PERFORATED HDPE (UNDERDRAIN PIPE)(SEE SHEET 2-AR)
F	PRECAST DI BOX
G	6" THICKNESS OF ENGINEERED SOIL (80%-85% SAND, 8%-12% FINES (SILT & CLAY), 3%-5% ORGANICS) (FILTER BED)
H	PERMANENT SOIL REINFORCEMENT MAT TO BE USED ON ALL 2:1 SLOPES THAT ARE NOT RIP RAPPED EST 700 SY FF
I	IMPERVIOUS LINER

DIMENSIONS FOR UNDERDRAIN PIPE & FILTER BED (TABLE A)

BASIN	UNDERDRAIN PIPE DIM.	FILTER BED DIMENSIONS AT EL. 829.0	
	LENGTH	WIDTH	LENGTH
-L- 73+00 LT.	60.0 FT.	4.0 FT.	62.0'

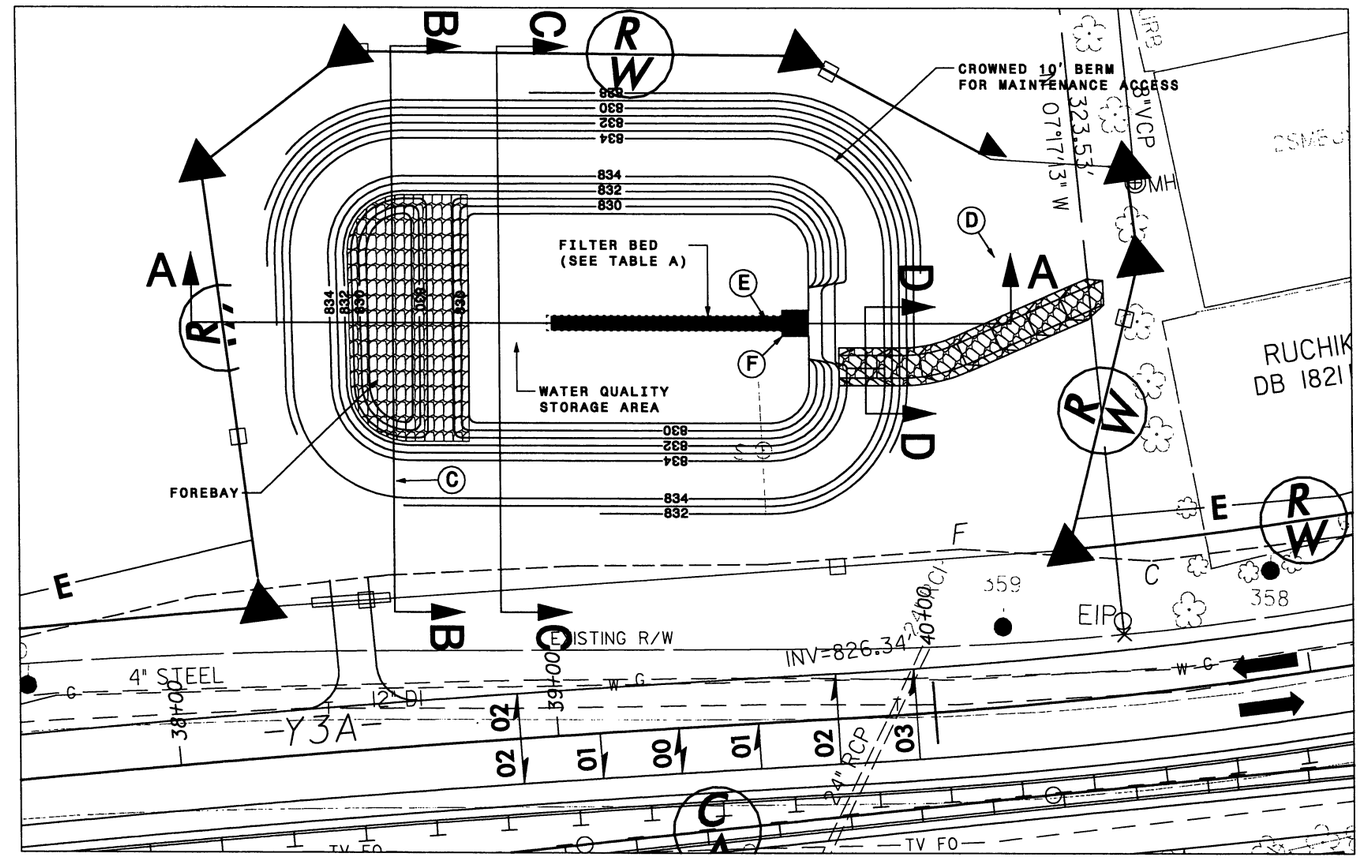
NOTE:

ENGINEERED SOIL SURFACE AREA AT ELEV. 829.0 = 248.0 SF.
BOTTOM OF TOTAL BASIN SURFACE AREA AT ELEV. 829.0 = 6380 SF.
BOTTOM OF FOREBAY SURFACE AREA AT ELEV. 829.0 = 606 SF.

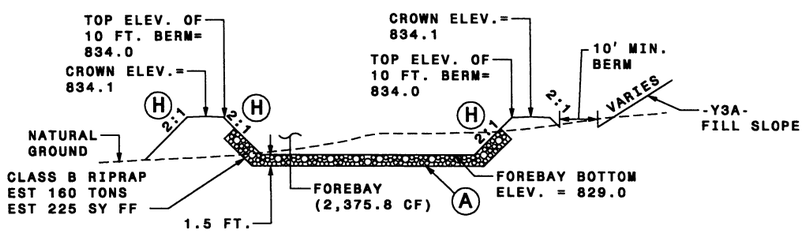
DRY DETENTION DETAIL (-L- 73+00 LT.)

SCALE: 1" = 20'

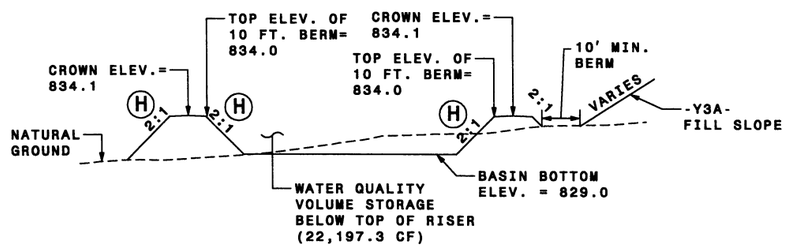
NC GRID NAD 83



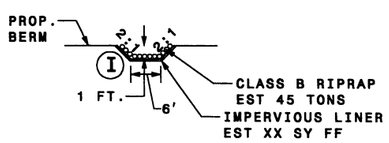
SECTION B-B



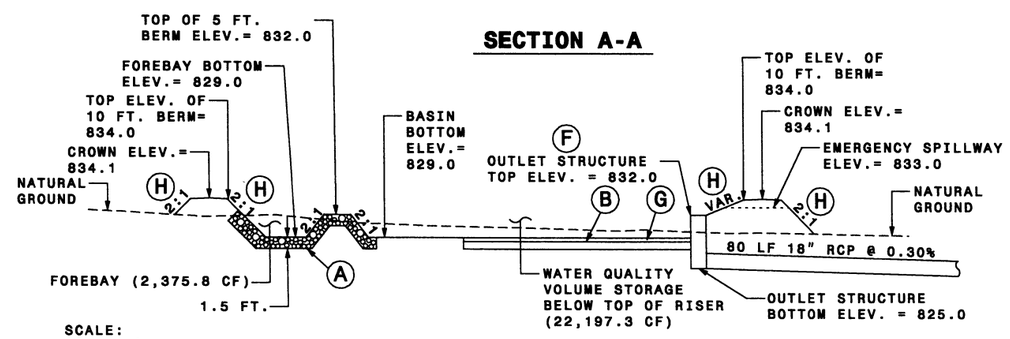
SECTION C-C



SECTION D-D



SECTION A-A



SCALE:
1" = 20' HORIZ
1" = 10' VERT

REVISIONS

8/17/99

4/5/2010
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Florence & Hutchason Inc.

MULKEY
ENGINEERS & CONSULTANTS
PO Box 92187
Raleigh, N.C. 27626
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-U
R/W SHEET NO.	

HYDRAULICS ENGINEER

DRY DETENTION BASIN NOTES

SEQUENCE OF CONSTRUCTION FOR DRY DETENTION BASIN

1. INSTALL ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. EXCAVATE FOR THE BASIN AND FOREBAY. PREPARE THE BASIN FLOOR AT THE GIVEN GRADE.
3. CONSTRUCT FOREBAY.
4. CONSTRUCT MAIN POND.
5. CONSTRUCT UNDERDRAIN SYSTEM (SEE DETAIL SHEET 2-X)
6. SEE SHEET 2-X FOR DETAILS OF SOIL LAYERING SEQUENCE. LAY GEOTEXTILE FABRIC, PLACE & GRADE 6" OF ENGINEERED SOIL, PLACE SOD OR NATIVE GRASSES IN BASIN.
7. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
8. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR DRY DETENTION BASIN

1. APPLY SEEDING OVER THE SIDE SLOPES AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.

2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   -INVERTS IN THE PIPE AND THE BOXES.

3. THE BERM SHALL BE CONSTRUCTED WITH SUITABLE FILL MATERIAL PER THE ENGINEER.

4. ANY FILL MATERIAL SHALL BE COMPACTED.

MAINTENANCE RECOMMENDATIONS

1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.
2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.
3. CHECK INLETS AND OUTLETS FOR STRUCTURAL REPAIR TO CONFIRM THAT THEY ARE OPERATIONAL.
4. MOW AS NECESSARY TO LIMIT UNWANTED VEGETATION AND REMOVE CLIPPINGS AS PRACTICAL.
5. NO PORTION OF THE DRY DETENTION POND SHOULD BE FERTILIZED AFTER THE FIRST INITIAL FERTILIZATION THAT IS REQUIRED TO ESTABLISH VEGETATION.
6. STABLE GROUNDCOVER SHOULD BE MAINTAINED IN THE DRAINAGE AREA TO REDUCE THE SEDIMENT LOAD TO THE DRY DETENTION POND.
7. ONCE A YEAR, A DAM SAFETY EXPERT SHOULD INSPECT THE EMBANKMENT (IF APPLICABLE).
8. RECORDS OF OPERATION AND MAINTENANCE SHOULD BE KEPT IN A KNOWN SET LOCATION AND MUST BE AVAILABLE UPON REQUEST.

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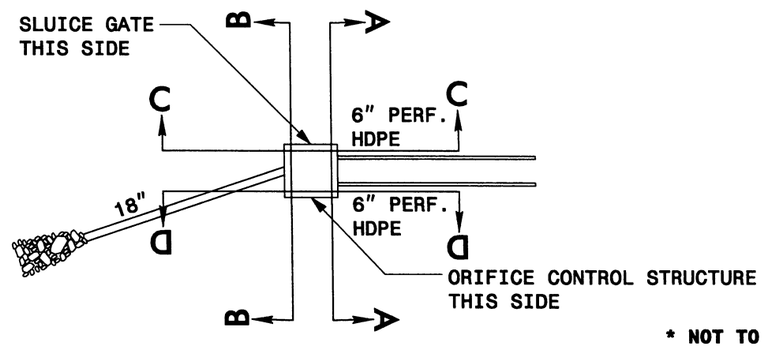
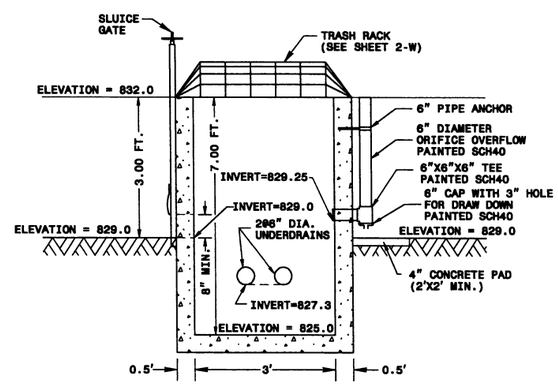
MULKEY ENGINEERS & CONSULTANTS	PROJECT REFERENCE NO.	SHEET NO.
	1-3819A	2-V
	R/W SHEET NO.	
	HYDRAULICS ENGINEER	

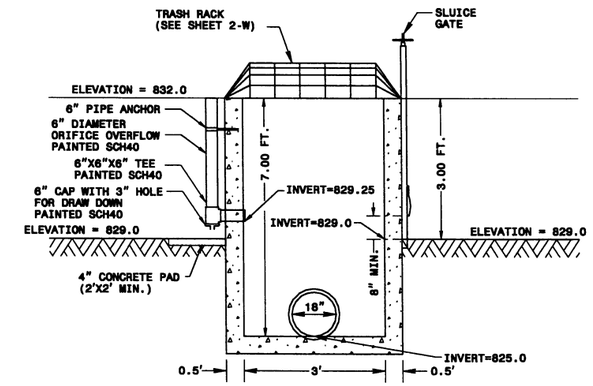
SECTION VIEW SCHEMATIC OF OUTLET STRUCTURE



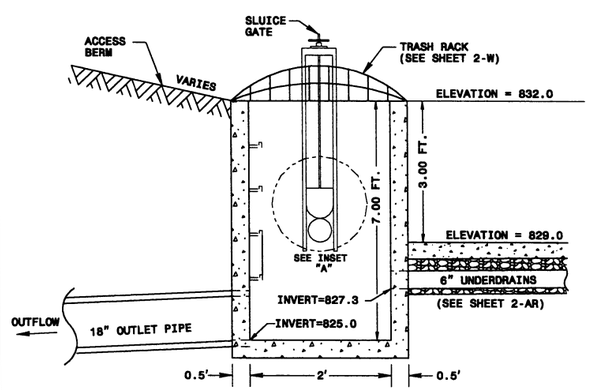
* NOT TO SCALE



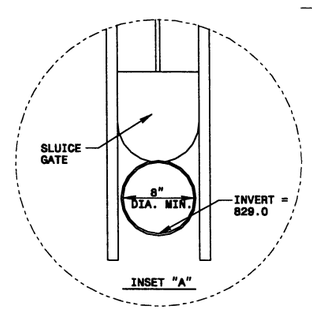
SECTION A-A

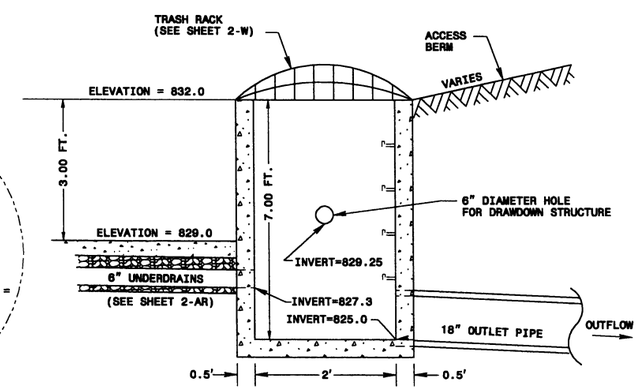


SECTION B-B



SECTION C-C





SECTION D-D

NOTES

1. 6" UNDERDRAINS ARE SECONDARY DRAWDOWN DEVICES AND ARE NOT INTENDED TO BE PRIMARY DRAWDOWN DEVICES.
2. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.

* NOT TO SCALE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

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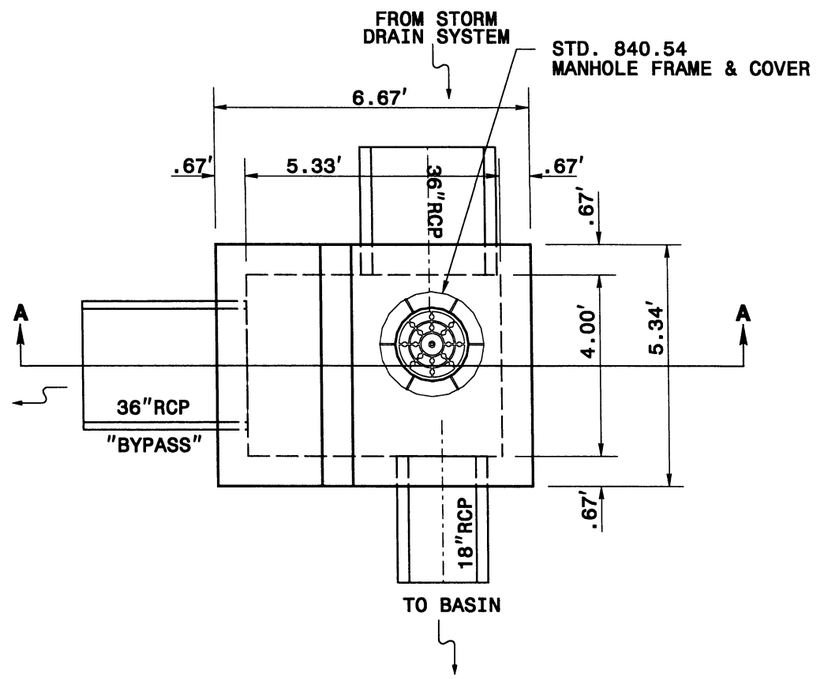
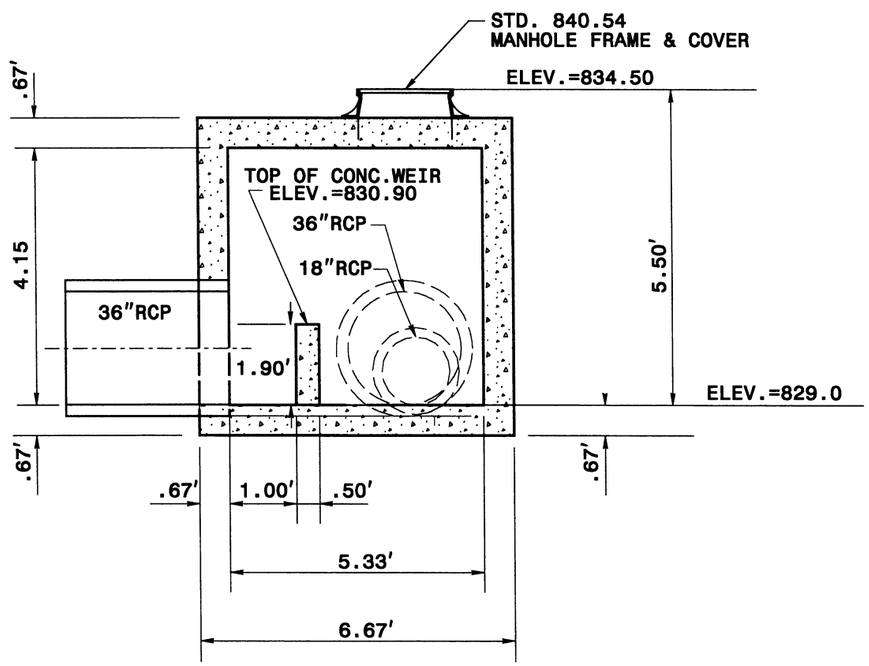
MULKEY ENGINEERS & CONSULTANTS	PROJECT REFERENCE NO.	SHEET NO.
PO Box 33127 Raleigh, N.C. 27636 (919) 851-1912 (919) 851-1918 (FAX) WWW.MULKEYINC.COM	1-3819A	2-W
	R/W SHEET NO.	
	HYDRAULICS	

SPLITTER JUNCTION BOX



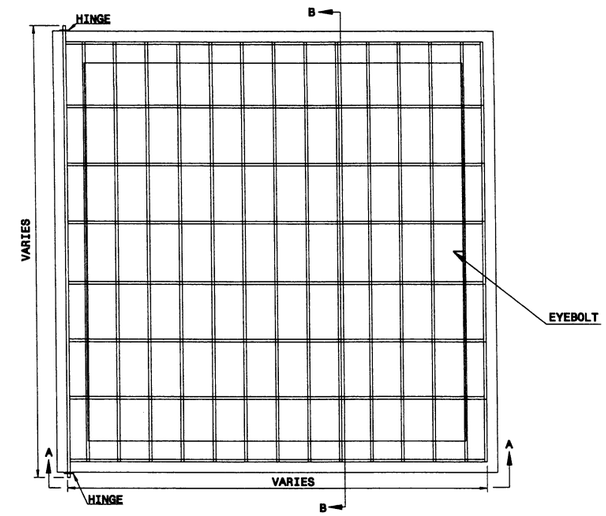
PLAN



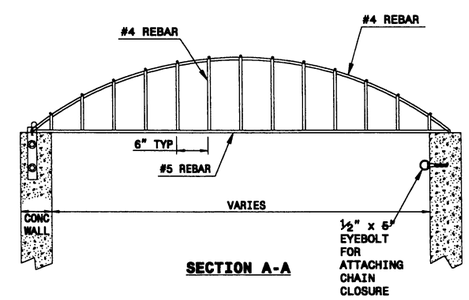
SECTION A-A

* NOT TO SCALE

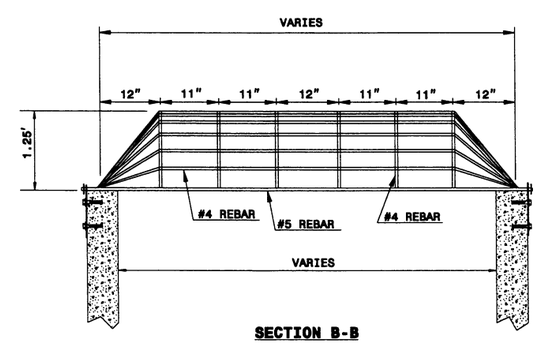
TRASH RACKS FOR OUTLET STRUCTURES



PLAN



SECTION A-A



SECTION B-B

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 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 REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.

* NOT TO SCALE

4/23/2010
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Engineer: J. Hutchason, Jr.

MULKEY ENGINEERS & CONSULTANTS

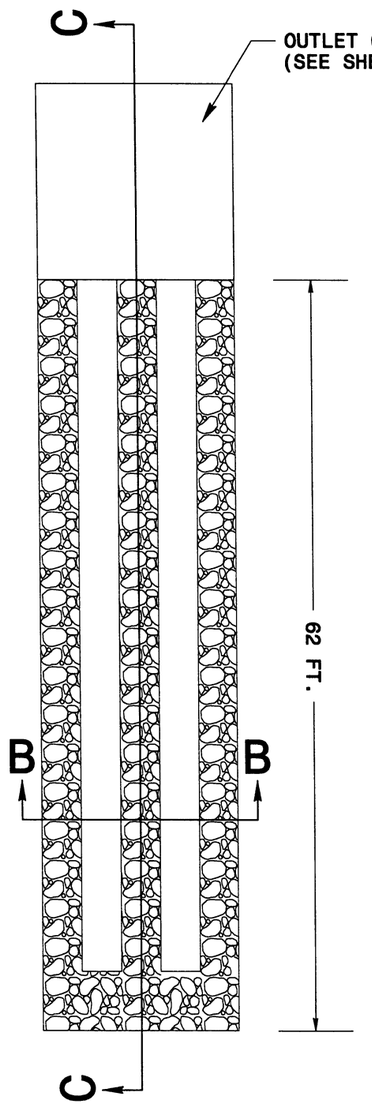
PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-X
R/W SHEET NO.	

HYDRAULICS ENGINEER

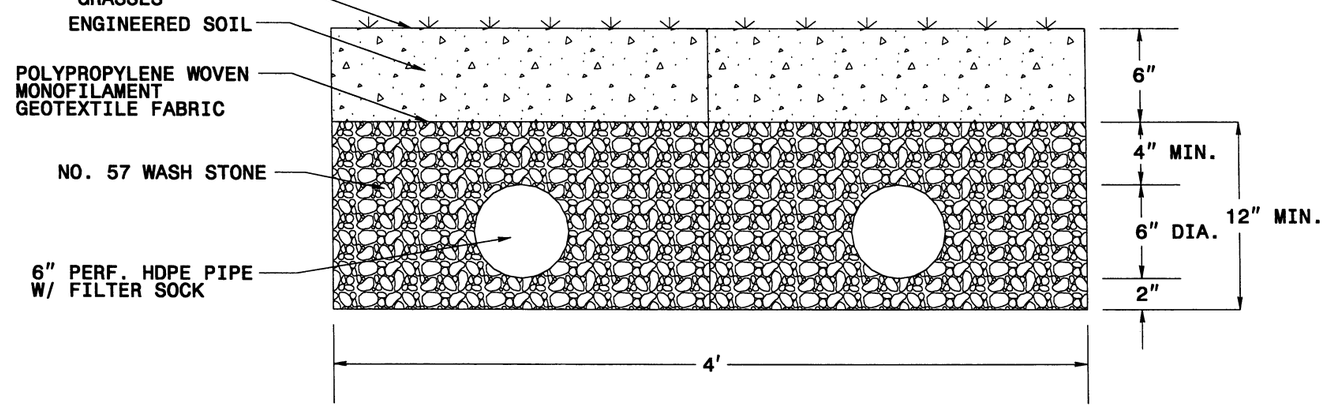
DRY DETENTION BASIN

"UNDERDRAIN SYSTEM"

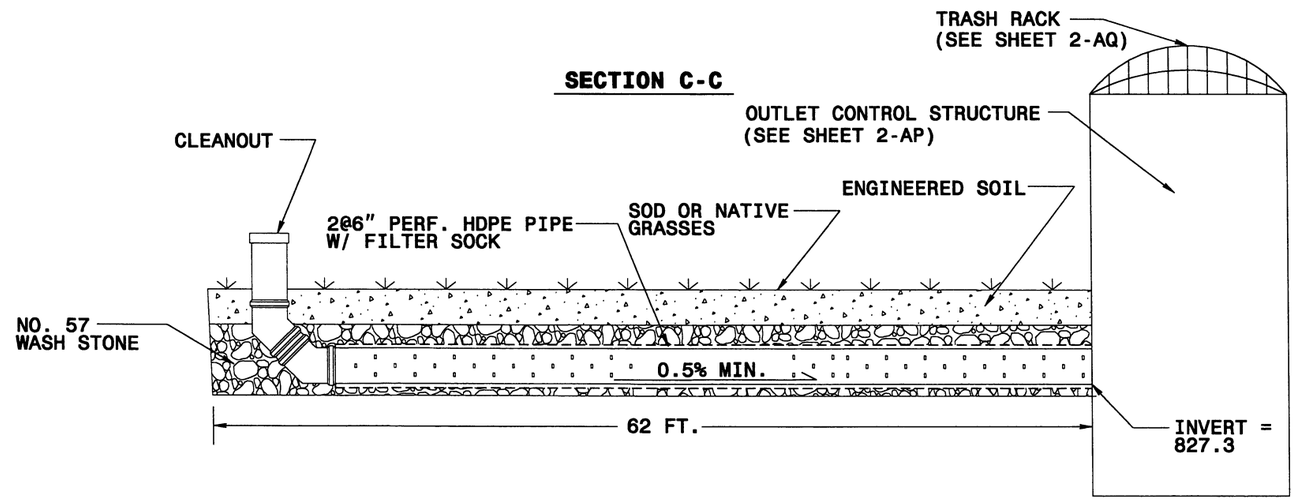
* NOT TO SCALE



SECTION B-B



SECTION C-C



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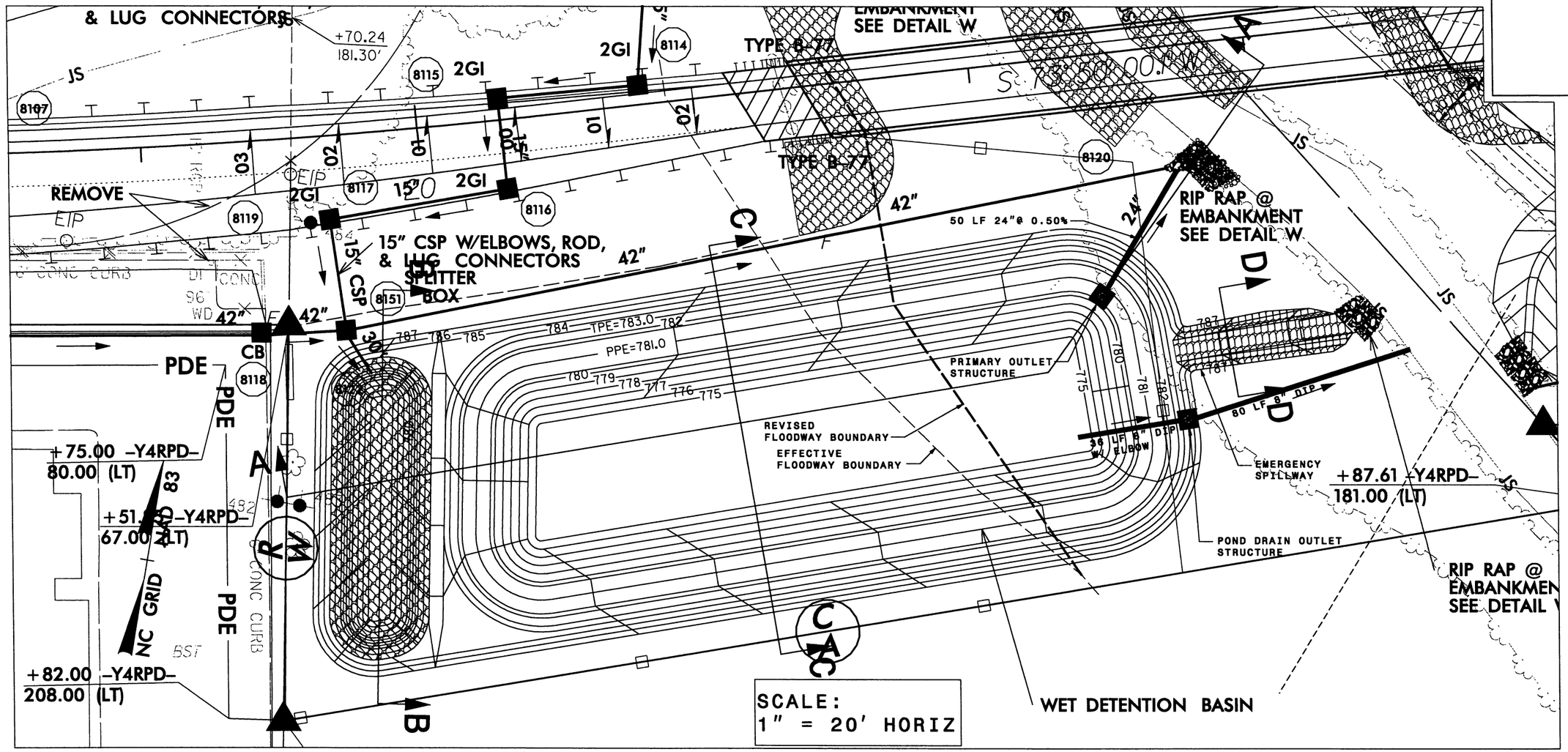
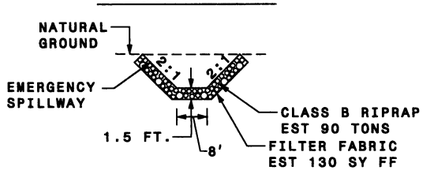
WET DETENTION BASIN DETAIL (-L- 91+00 RT.)

MULKEY ENGINEERS & CONSULTANTS

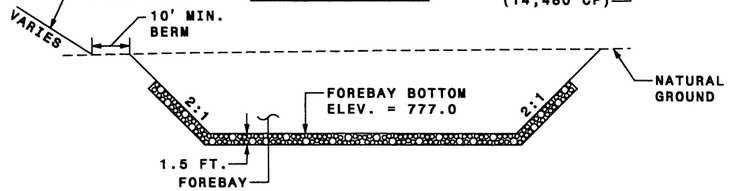
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-Y
R/W SHEET NO.	
HYDRAULICS ENGINEER	



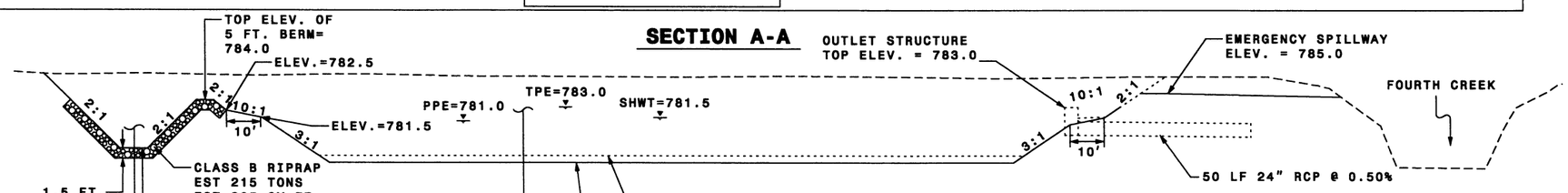
SECTION D-D



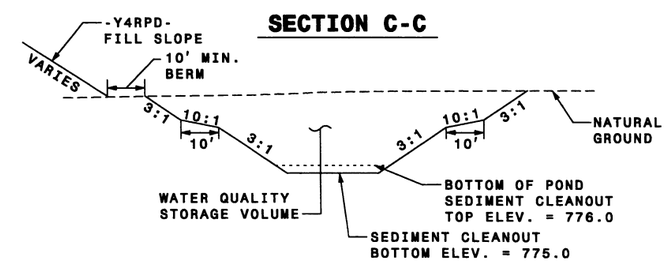
SECTION B-B



SECTION A-A



SECTION C-C



REVISIONS

8/17/99

4/5/2010
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WET DETENTION BASIN NOTES

SEQUENCE OF CONSTRUCTION FOR WET DETENTION BASIN

1. INSTALL ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. EXCAVATE FOR THE BASIN AND FOREBAY. PREPARE THE BASIN FLOOR AT THE GIVEN GRADE.
3. CONSTRUCT FOREBAY.
4. CONSTRUCT MAIN POND.
5. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
6. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR WET DETENTION BASIN

1. APPLY SEEDING ABOVE VEGETATED SHELF AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.

2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   - -INVERTS IN THE PIPE AND THE BOXES
   - -ELEVATION OF EMERGENCY SPILLWAY INVERT

VEGETATION NOTES FOR WET DETENTION BASIN

1. NO TREES OR SHRUBS SHOULD BE PLANTED WITHIN 10 FEET OF INLET OR OUTLET PIPES, OR MANMADE DRAINAGE STRUCTURES SUCH AS SPILLWAYS OR FLOW SPREADERS. SPECIES WITH ROOTS THAT SEEK WATER (E.G. WILLOW OR POPLAR), SHOULD BE AVOIDED WITHIN 50 FEET OF PIPES OR MANMADE STRUCTURES.

2. ALL LANDSCAPE MATERIAL, INCLUDING GRASS, SHOULD BE PLANTED IN GOOD TOPSOIL. NATIVE UNDERLYING SOILS MAY BE SUITABLE FOR PLANTING IF AMENDED WITH 4 INCHES OF WELL-AGED COMPOST TILLED INTO THE SUBGRADE COMPOST USED SHOULD MEET SPECIFICATIONS FOR GRADE A COMPOST QUALITY.

3. SOIL IN WHICH TREE OR SHRUBS ARE PLANTED MAY NEED ADDITIONAL ENRICHMENT OR ADDITIONAL COMPOST TOP-DRESSING DEPENDING ON THE RESULTS OF THE SOIL ANALYSIS. CONSULT A NURSERYMAN, LANDSCAPE PROFESSIONAL, OR ARBORIST FOR SITE-SPECIFIC RECOMMENDATIONS.

4. RECOMMENDED PLANTS TO BE USED ON VEGETATED SHELF (ABOVE SHWT):
   LINDERA BENZOIN - SPICEBRUSH
   ITEA VIRGINICA - VIRGINIA SWEETSPIRE
   VIBURNUM NUDUM - POSSUMHAW
   CORNUS AMOMUM - SILKY DOGWOOD
   CEPHALANTHUS OCCIDENTALIS - BOTTONBUS
   HIBISCUS MOSCHENUTOS - ROSE MALLOW
   SAMBUCUS CANADENSIS - ELDERBERRY

5. RECOMMENDED PLANTS TO BE USED ON VEGETATED SHELF (BELOW SHWT):
   PONTEDERIA CORDATA - PICKERELWEED
   PELTANDRA VIRGINICA - ARROW ARUM
   JUNCUS EFFUSUS - SOFT RUSH
   ITEA VIRGINICA - VIRGINIA SWEETSPIRE
   OSMUNDA REGALIS - ROYAL FERN

MAINTENANCE RECOMMENDATIONS

1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.

2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.

3. CHECK INLETS AND OUTLETS FOR STRUCTURAL REPAIR TO CONFIRM THAT THEY ARE OPERATIONAL.

4. IMMEDIATELY AFTER THE WET DETENTION BASIN IS ESTABLISHED, THE PLANTS ON THE VEGETATED SHELF AND PERIMETER OF THE BASIN SHOULD BE WATERED TWICE WEEKLY IF NEEDED, UNTIL THE PLANTS BECOME ESTABLISHED (COMMONLY SIX WEEKS).

5. NO PORTION OF THE WET DETENTION POND SHOULD BE FERTILIZED AFTER THE FIRST INITIAL FERTILIZATION THAT IS REQUIRED TO ESTABLISH THE PLANTS ON THE VEGETATED SHELF.

6. STABLE GROUNDCOVER SHOULD BE MAINTAINED IN THE DRAINAGE AREA TO REDUCE THE SEDIMENT LOAD TO THE WET DETENTION POND.

7. IF THE BASIN MUST BE DRAINED FOR AN EMERGENCY OR TO PERFORM MAINTENANCE, THE FLUSHING OF SEDIMENT THROUGH THE EMERGENCY DRAIN SHOULD BE MINIMIZED TO THE MAXIMUM EXTENT POSSIBLE.

8. ONCE A YEAR, A DAM SAFETY EXPERT SHOULD INSPECT THE EMBANKMENT (IF APPLICABLE).

9. WATER CLARITY & ALGAE GROWTH SHOULD BE MONITORED REGULARLY.

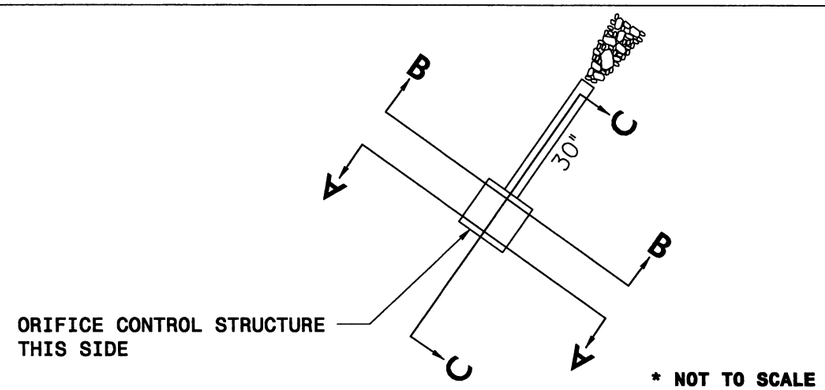
10. AFTER THE WET DETENTION POND IS ESTABLISHED, IT SHOULD BE INSPECTED ONCE A MONTH AND WITHIN 24 HOURS AFTER EVERY STORM EVENT GREATER THAN 1.0 INCHES.

11. RECORDS OF OPERATION AND MAINTENANCE SHOULD BE KEPT IN A KNOWN SET LOCATION AND MUST BE AVAILABLE UPON REQUEST.

4/5/2010
Florence & Hutcheson, Inc.

MULKEY ENGINEERS & CONSULTANTS	PROJECT REFERENCE NO.	SHEET NO.
	1-3819A	2-AA
	R/W SHEET NO.	
	HYDRAULICS ENGINEER	

SECTION VIEW SCHEMATIC OF PRIMARY OUTLET STRUCTURE



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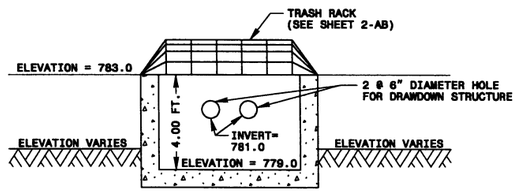
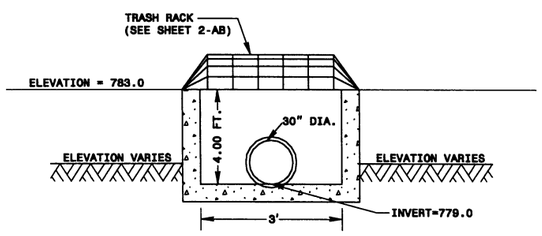
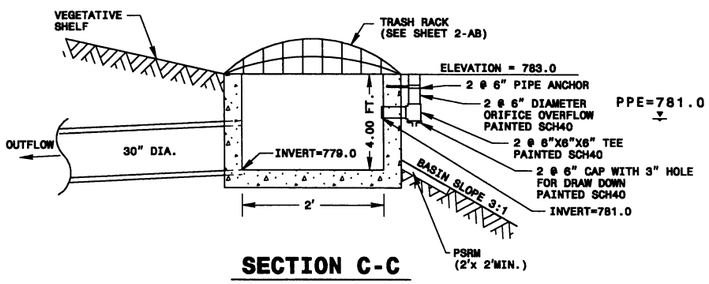


SECTION A-A



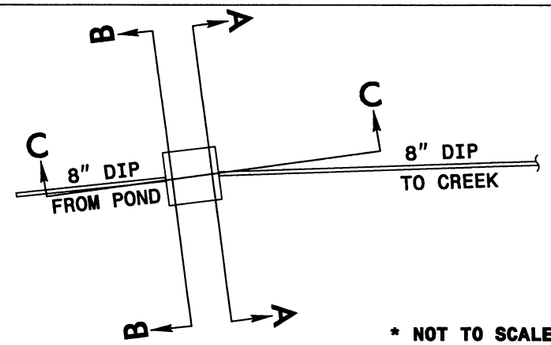
SECTION B-B



SECTION C-C

* NOT TO SCALE

SECTION VIEW SCHEMATIC OF POND DRAIN OUTLET STRUCTURE



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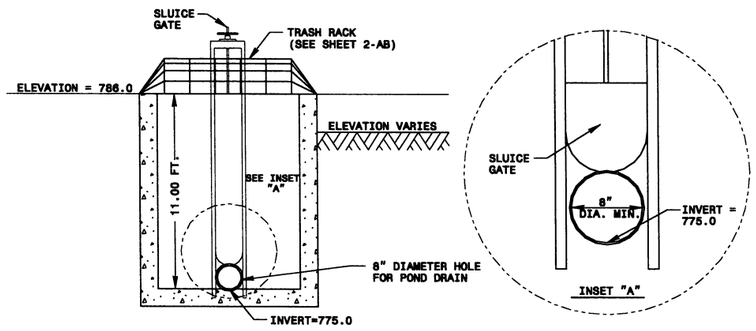

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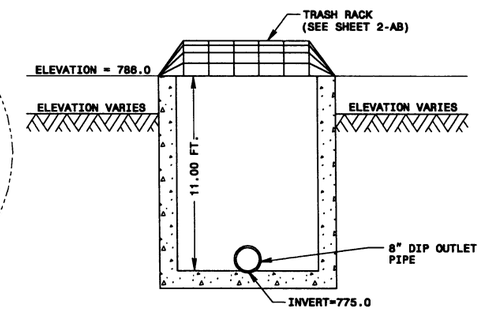
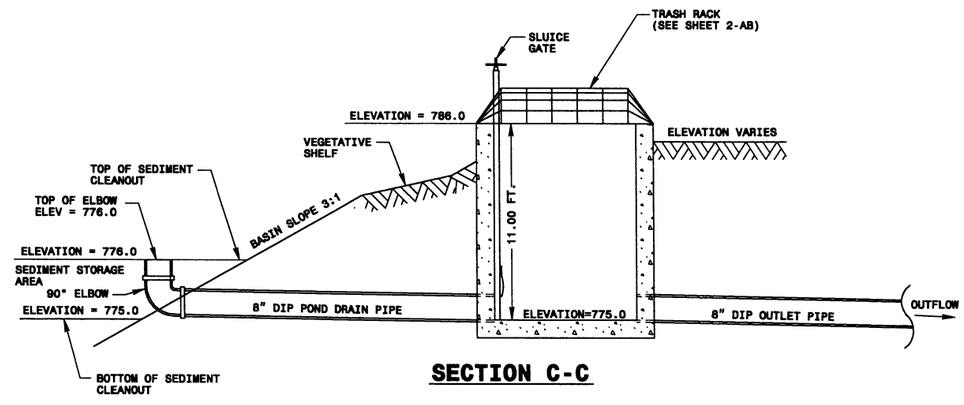


SECTION B-B



SECTION C-C

NOTES

1. 8" DIP POND DRAIN IS A POND DRAIN DEVICE AND IS NOT INTENDED TO BE A SECONDARY DRAWDOWN DEVICE.
2. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.

4/5/2010
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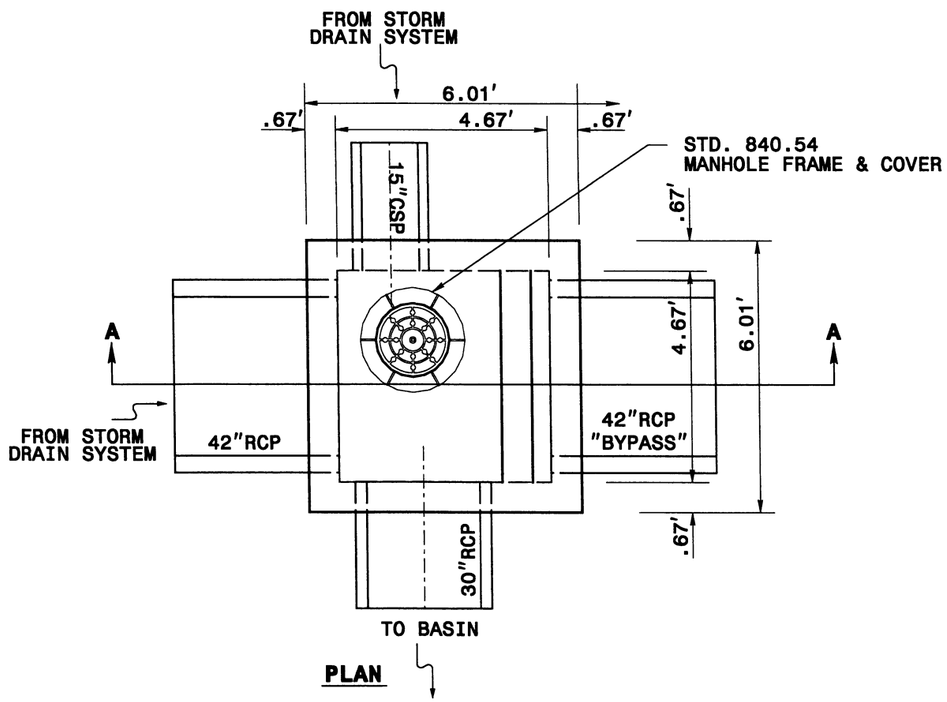
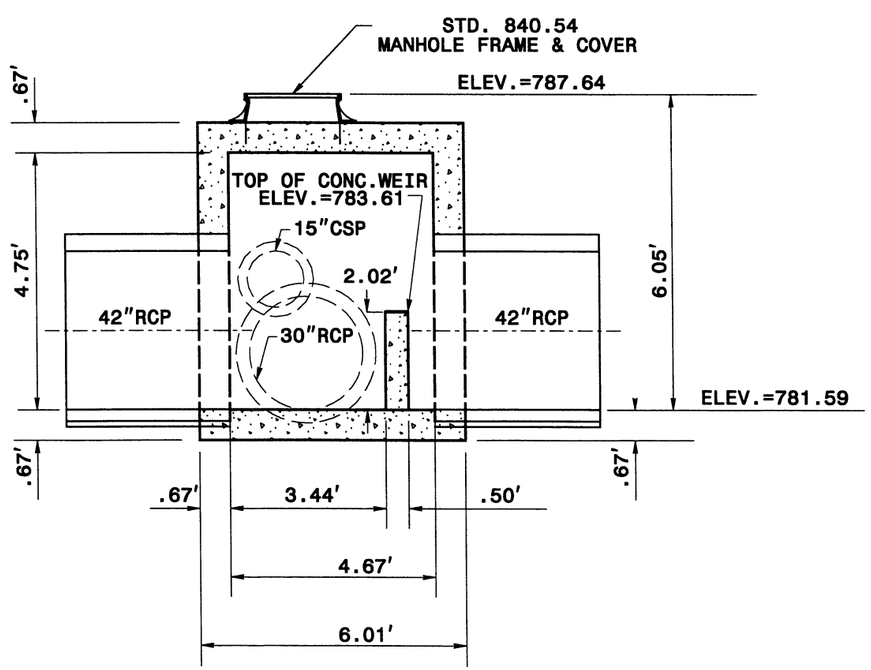
Florence & Hutchason, Inc.

MULKEY ENGINEERS & CONSULTANTS	PROJECT REFERENCE NO.	SHEET NO.
	1-3819A	2-AB
	R/W SHEET NO.	
	HYDRAULICS	

JUNCTION BOX SPLITTER BOX



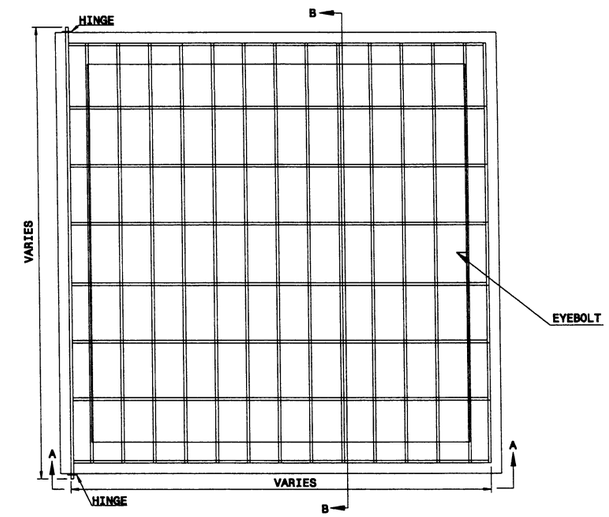
PLAN



SECTION A-A

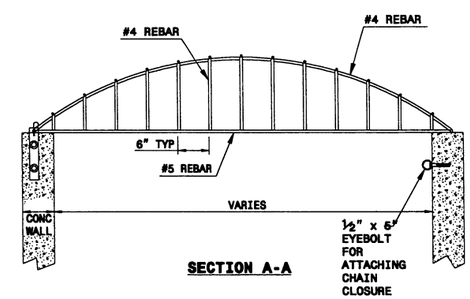
* NOT TO SCALE

TRASH RACKS FOR OUTLET STRUCTURES



PLAN

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 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 REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.



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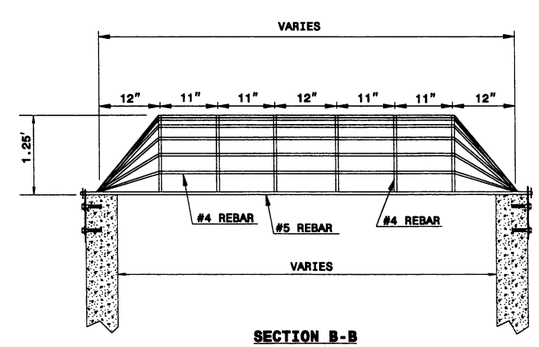

SECTION B-B

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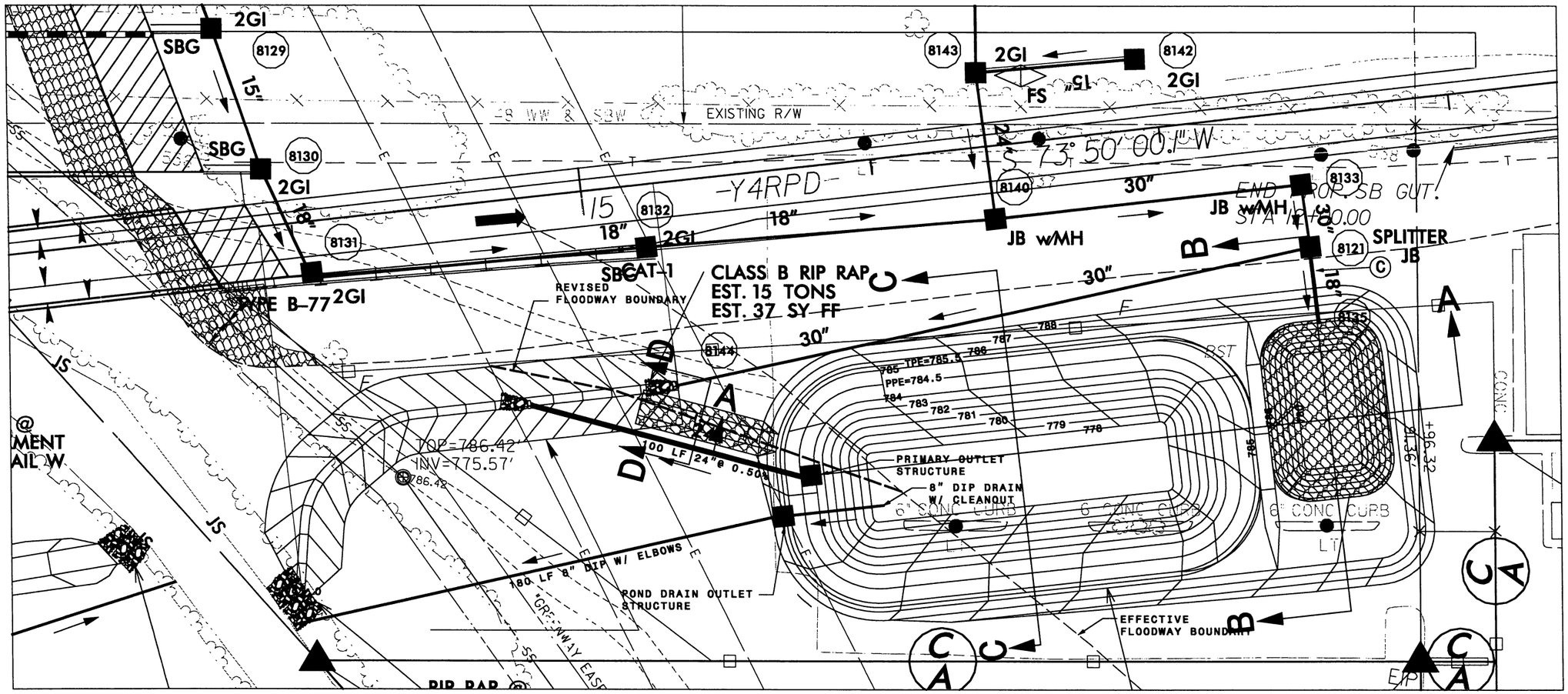
Florence & Hutchesson Inc.

WET DETENTION BASIN DETAIL (-L- 95+50 RT.)

MULKEY ENGINEERS & CONSULTANTS

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AC
R/W SHEET NO.	
HYDRAULICS ENGINEER	



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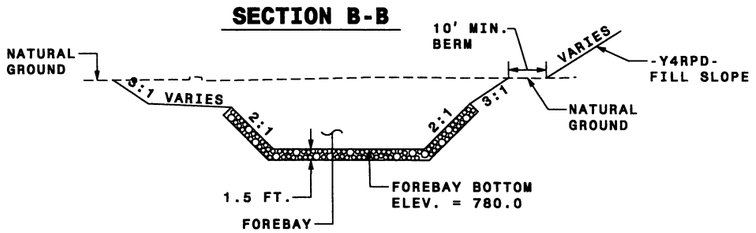
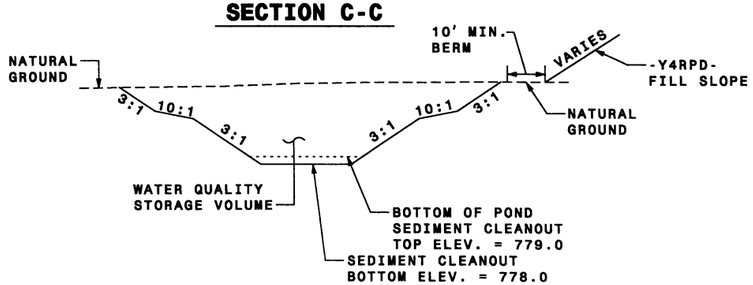
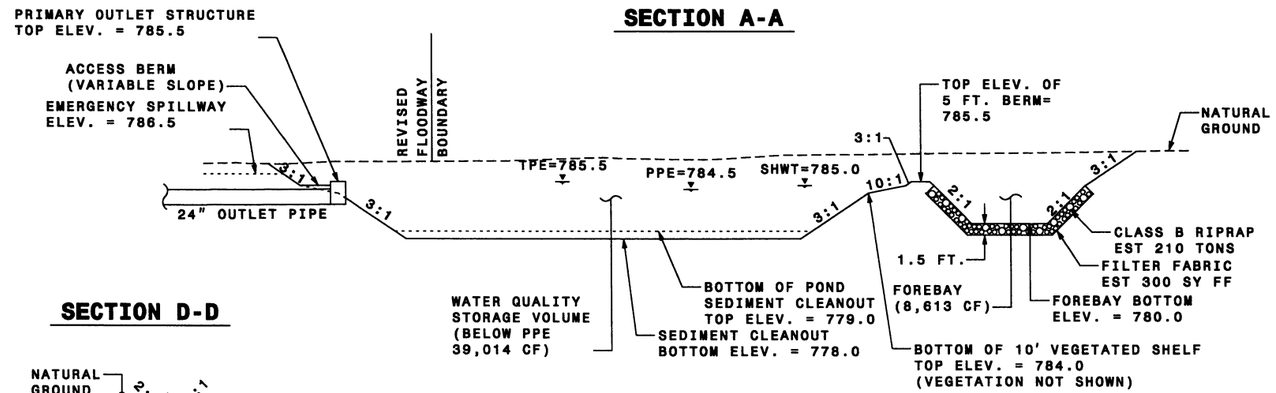


SECTION C-C



SECTION A-A



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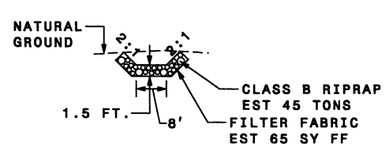

REVISIONS

8/17/99

4/5/2010
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Flowpaths & Hydroshed, Inc.

WET DETENTION BASIN NOTES

SEQUENCE OF CONSTRUCTION FOR WET DETENTION BASIN

1. INSTALL ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. EXCAVATE FOR THE BASIN AND FOREBAY. PREPARE THE BASIN FLOOR AT THE GIVEN GRADE.
3. CONSTRUCT FOREBAY.
4. CONSTRUCT MAIN POND.
5. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
6. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR WET DETENTION BASIN

1. APPLY SEEDING ABOVE VEGETATED SHELF AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.

2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   -INVERTS IN THE PIPE AND THE BOXES

VEGETATION NOTES FOR WET DETENTION BASIN

1. NO TREES OR SHRUBS SHOULD BE PLANTED WITHIN 10 FEET OF INLET OR OUTLET PIPES, OR MANMADE DRAINAGE STRUCTURES SUCH AS SPILLWAYS OR FLOW SPREADERS. SPECIES WITH ROOTS THAT SEEK WATER (E.G. WILLOW OR POPLAR), SHOULD BE AVOIDED WITHIN 50 FEET OF PIPES OR MANMADE STRUCTURES.

2. ALL LANDSCAPE MATERIAL, INCLUDING GRASS, SHOULD BE PLANTED IN GOOD TOPSOIL. NATIVE UNDERLYING SOILS MAY BE SUITABLE FOR PLANTING IF AMENDED WITH 4 INCHES OF WELL-AGED COMPOST TILLED INTO THE SUBGRADE COMPOST USED SHOULD MEET SPECIFICATIONS FOR GRADE A COMPOST QUALITY.

3. SOIL IN WHICH TREE OR SHRUBS ARE PLANTED MAY NEED ADDITIONAL ENRICHMENT OR ADDITIONAL COMPOST TOP-DRESSING DEPENDING ON THE RESULTS OF THE SOIL ANALYSIS. CONSULT A NURSERYMAN, LANDSCAPE PROFESSIONAL, OR ARBORIST FOR SITE-SPECIFIC RECOMMENDATIONS.

4. RECOMMENDED PLANTS TO BE USED ON VEGETATED SHELF (ABOVE SHWT):
   LINDERA BENZOIN - SPICEBRUSH
   ITEA VIRGINICA - VIRGINIA SWEETSPIRE
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   CORNUS AMOMUM - SILKY DOGWOOD
   CEPHALANTHUS OCCIDENTALIS - BOTTONBUS
   HIBISCUS MOSCHENUTOS - ROSE MALLOW
   SAMBUCUS CANADENSIS - ELDERBERRY

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   PELTANDRA VIRGINICA - ARROW ARUM
   JUNCUS EFFUSUS - SOFT RUSH
   ITEA VIRGINICA - VIRGINIA SWEETSPIRE
   OSMUNDA REGALIS - ROYAL FERN

MAINTENANCE RECOMMENDATIONS

1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.

2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.

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8. ONCE A YEAR, A DAM SAFETY EXPERT SHOULD INSPECT THE EMBANKMENT (IF APPLICABLE).

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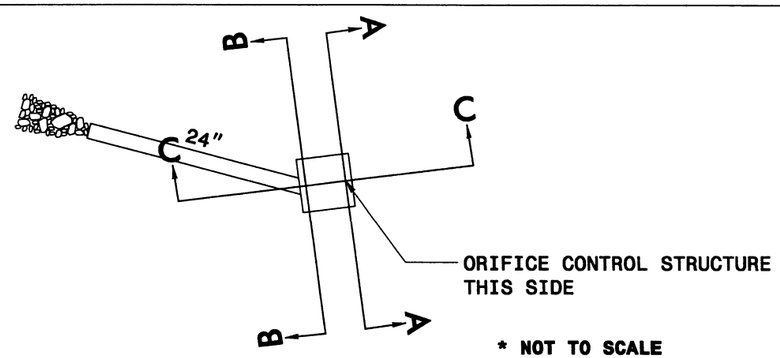
11. RECORDS OF OPERATION AND MAINTENANCE SHOULD BE KEPT IN A KNOWN SET LOCATION AND MUST BE AVAILABLE UPON REQUEST.

4/5/2010
Mulkey Engineers\Proj\3819a_hyd_det_L_9550_RT.dgn
Florence & Hutchason Inc.

MULKEY ENGINEERS & CONSULTANTS	PROJECT REFERENCE NO.	SHEET NO.
	1-3819A	2-AE
	R/W SHEET NO.	
	HYDRAULICS ENGINEER	

SECTION VIEW SCHEMATIC OF PRIMARY OUTLET STRUCTURE



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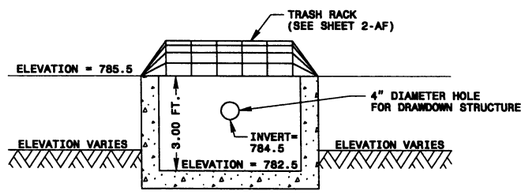
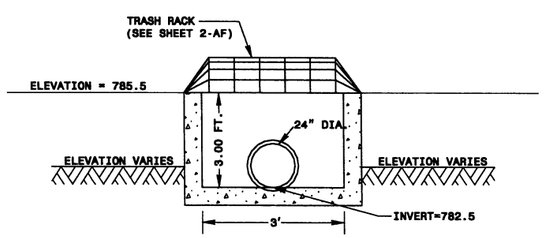
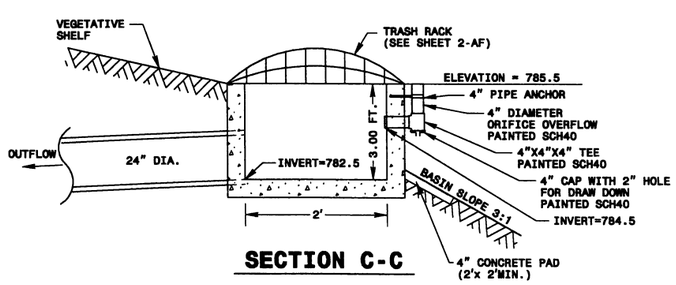


SECTION A-A



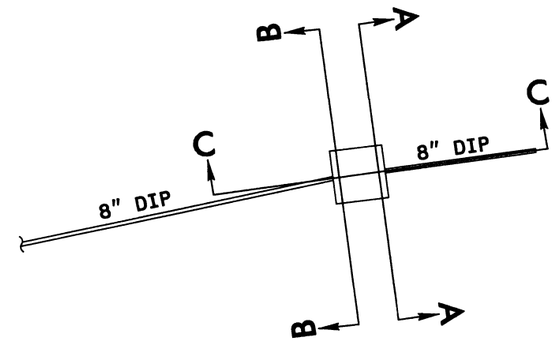
SECTION B-B



SECTION C-C

* NOT TO SCALE

SECTION VIEW SCHEMATIC OF POND DRAIN OUTLET STRUCTURE



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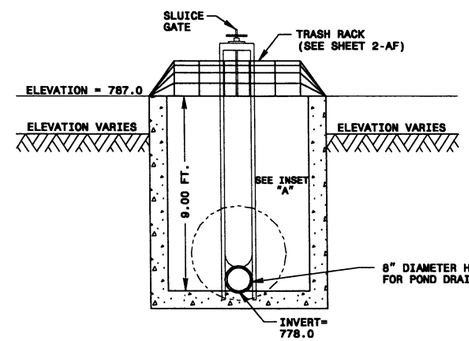

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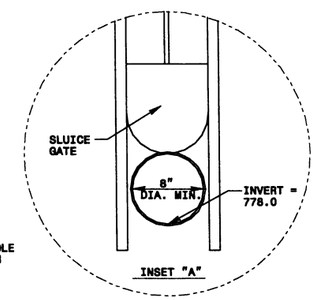

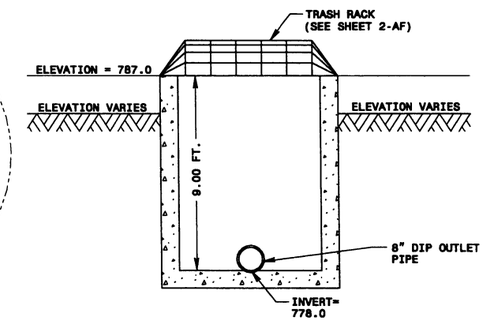

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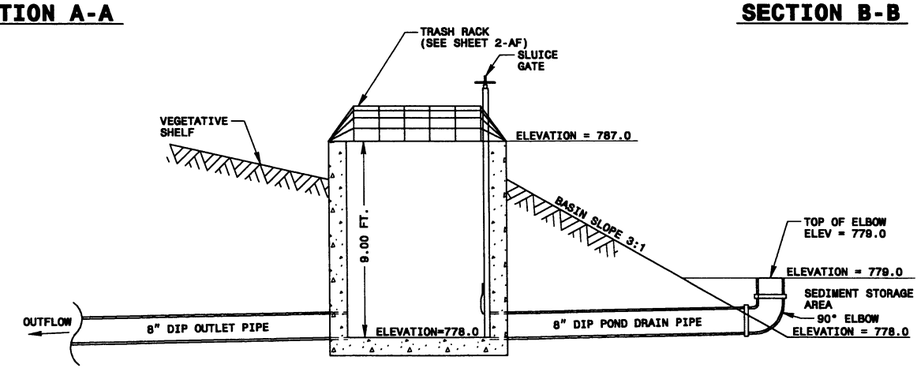

SECTION C-C

NOTES

1. 8" DIP POND DRAIN IS A POND DRAIN DEVICE AND IS NOT INTENDED TO BE A SECONDARY DRAWDOWN DEVICE.
2. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.

4/5/2010
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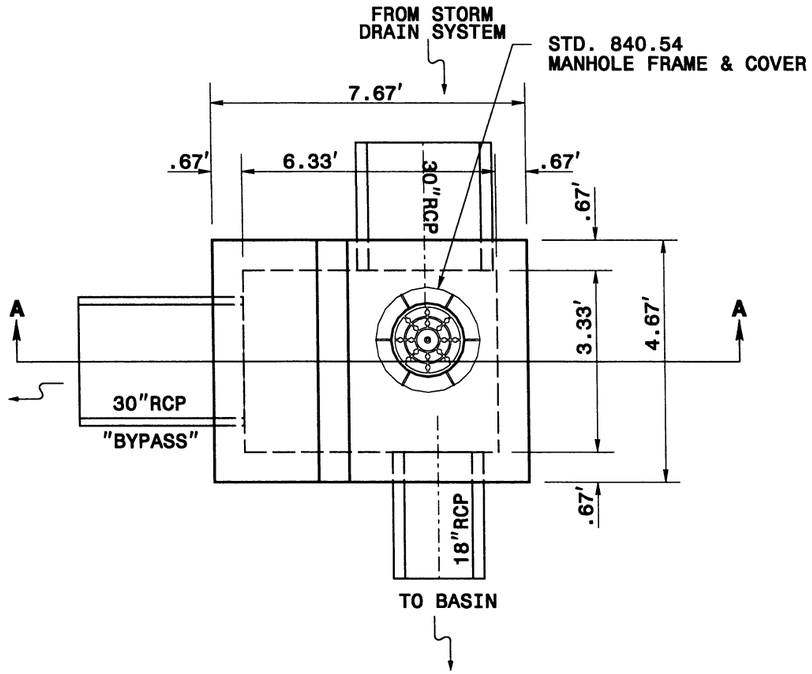
Florence & Hutcheson, Inc.

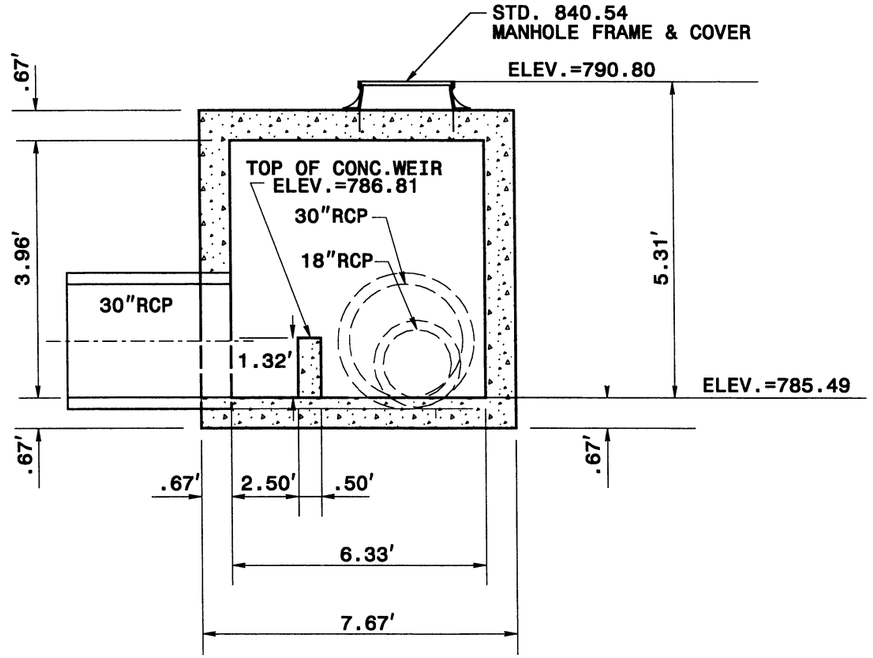
PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-AF
R/W SHEET NO.	
HYDRAULICS	

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

SPLITTER JUNCTION BOX



PLAN



SECTION A-A

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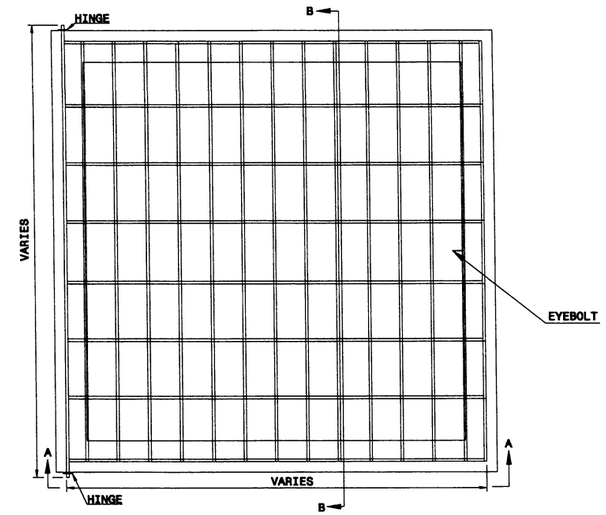
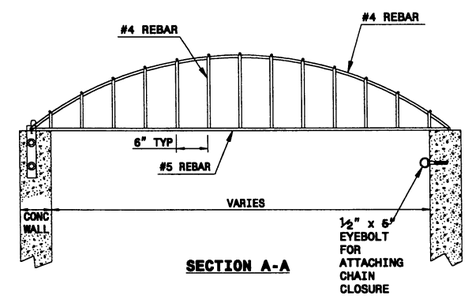
TRASH RACKS FOR OUTLET STRUCTURES



PLAN

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 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 REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.



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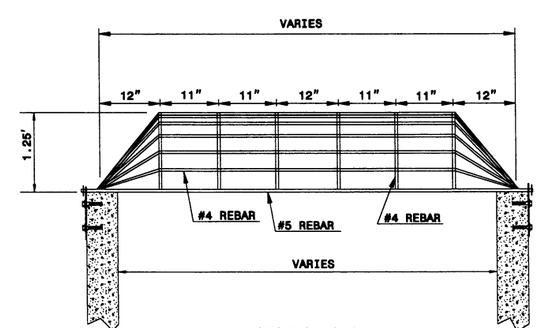

SECTION B-B

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Elizabeth Hutchison.lpc

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AG
R/W SHEET NO.	
HYDRAULICS ENGINEER	

DRY DETENTION BASIN NOTES @ -L- 123+00 RT.

SEQUENCE OF CONSTRUCTION FOR DRY DETENTION BASIN

1. INSTALL ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
3. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR DRY DETENTION BASIN

1. APPLY SEEDING OVER THE SIDE SLOPES AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.

2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   -INVERTS IN THE PIPE AND THE BOXES.

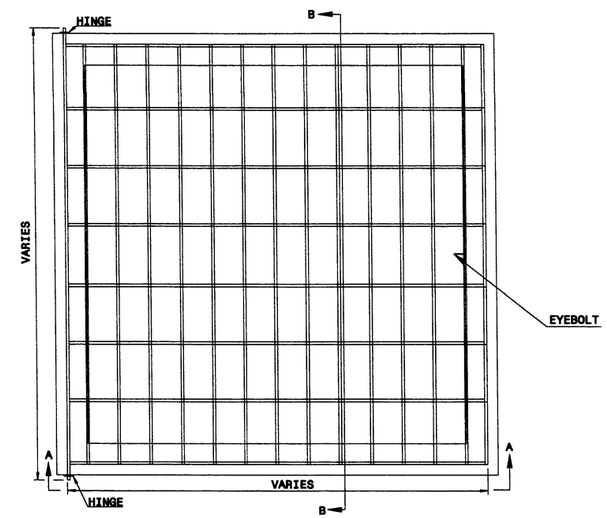
3. THE BERM SHALL BE CONSTRUCTED WITH SUITABLE FILL MATERIAL PER THE ENGINEER.

4. ANY FILL MATERIAL SHALL BE COMPACTED.

MAINTENANCE RECOMMENDATIONS

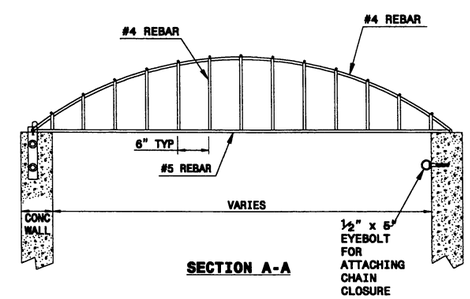
1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.
2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.
3. CHECK INLETS AND OUTLETS FOR STRUCTURAL REPAIR TO CONFIRM THAT THEY ARE OPERATIONAL.
4. MOW AS NECESSARY TO LIMIT UNWANTED VEGETATION AND REMOVE CLIPPINGS AS PRACTICAL.
5. NO PORTION OF THE DRY DETENTION POND SHOULD BE FERTILIZED AFTER THE FIRST INITIAL FERTILIZATION THAT IS REQUIRED TO ESTABLISH VEGETATION.
6. STABLE GROUNDCOVER SHOULD BE MAINTAINED IN THE DRAINAGE AREA TO REDUCE THE SEDIMENT LOAD TO THE DRY DETENTION POND.
7. ONCE A YEAR, A DAM SAFETY EXPERT SHOULD INSPECT THE EMBANKMENT (IF APPLICABLE).
8. RECORDS OF OPERATION AND MAINTENANCE SHOULD BE KEPT IN A KNOWN SET LOCATION AND MUST BE AVAILABLE UPON REQUEST.

TRASH RACKS FOR OUTLET STRUCTURES

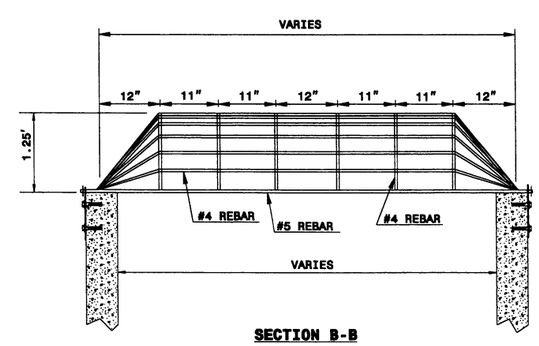


PLAN

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 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 REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.



SECTION A-A



SECTION B-B

* NOT TO SCALE

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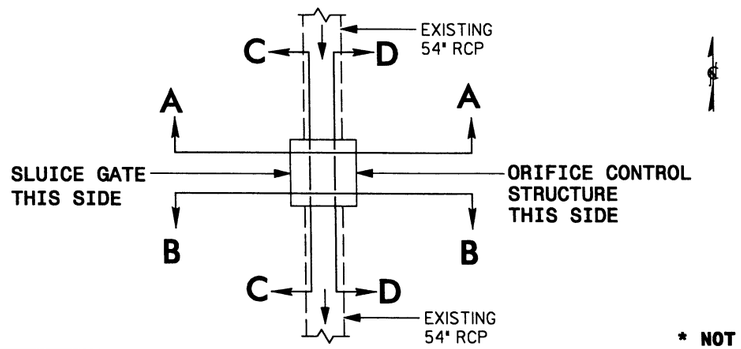
	1-3819A	2-AH
	R/W SHEET NO.	
	HYDRAULICS ENGINEER	

-L- STA. 123+00 RT.
CONVERT EXISTING OTCB TO DRY DETENTION BASIN OUTLET CONTROL STRUCTURE

SECTION VIEW SCHEMATIC OF OUTLET STRUCTURE



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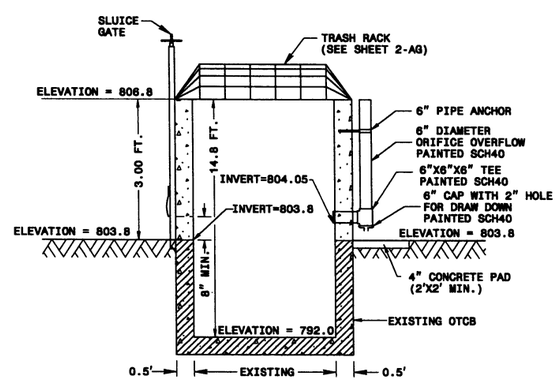
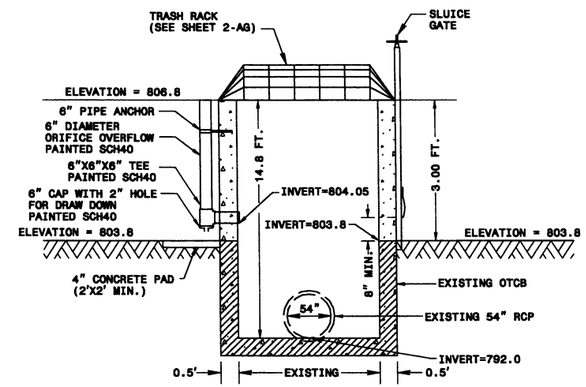
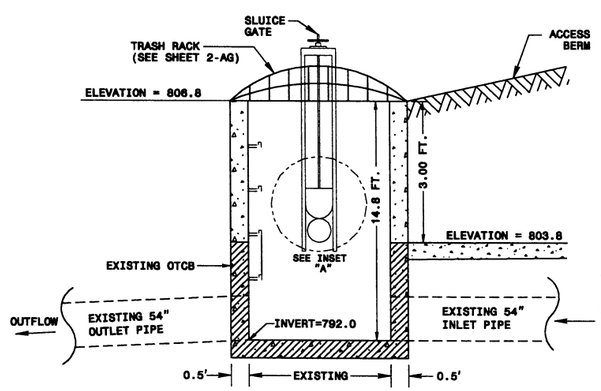


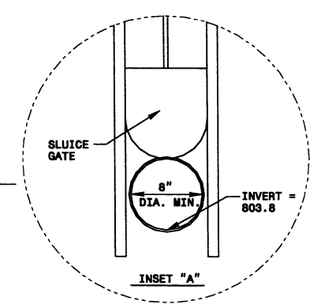
SECTION A-A



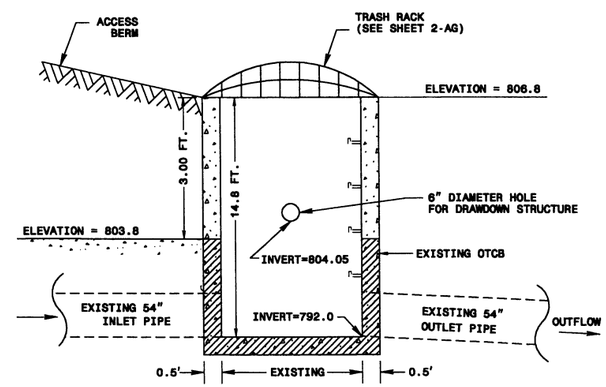
SECTION B-B



SECTION C-C



INSET "A"



SECTION D-D

NOTES

1. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.

* NOT TO SCALE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

4/5/2010
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CONSULTING ENGINEERS
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NC License No: P-0258

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-A1
R/W SHEET NO.	

HYDRAULICS ENGINEER

DRY DETENTION BASIN NOTES @ -L- 144+00 RT.

SEQUENCE OF CONSTRUCTION FOR DRY DETENTION BASIN

1. INSTALL ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
2. EXCAVATE FOR THE BASIN PER CROSS SECTIONS FOR -L-, -YRPD-, & -YRPBD-. PREPARE THE BASIN FLOOR PER DITCH PROFILE.
3. CONSTRUCT MAIN POND.
4. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
5. ADD GRATES/TRASH RACK ON ALL BOXES.

GENERAL NOTES FOR DRY DETENTION BASIN

1. APPLY SEEDING OVER THE SIDE SLOPES AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.

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3. THE BERM SHALL BE CONSTRUCTED WITH SUITABLE FILL MATERIAL PER THE ENGINEER.

4. ANY FILL MATERIAL SHALL BE COMPACTED.

MAINTENANCE RECOMMENDATIONS

1. REMOVE DEBRIS, TRASH AND SEDIMENT BUILDUP FROM THE BASIN AS NECESSARY TO MINIMIZE OUTLET CLOGGING AND IMPROVE AESTHETICS.
2. REPAIR AND REVEGETATE ERODED AREAS AS NEEDED.
3. CHECK INLETS AND OUTLETS FOR STRUCTURAL REPAIR TO CONFIRM THAT THEY ARE OPERATIONAL.
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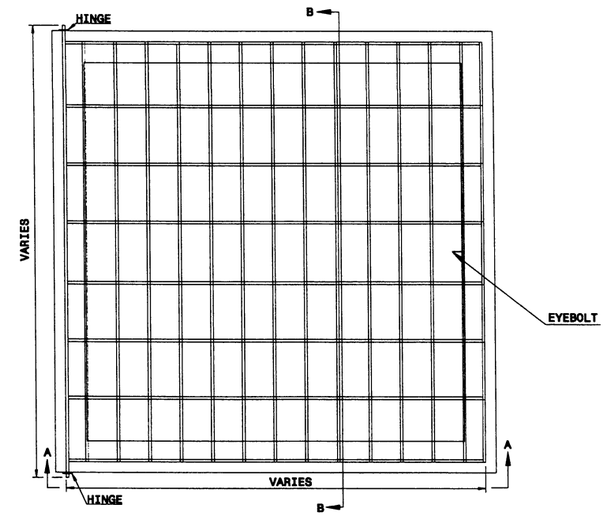
TRASH RACKS FOR OUTLET STRUCTURES



PLAN

RISER TRASH RACK NOTES:
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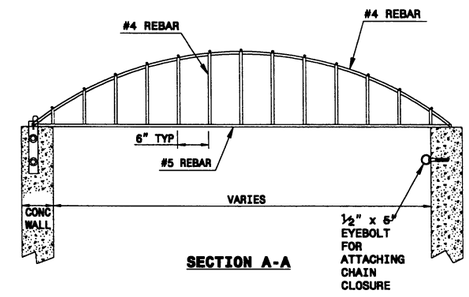
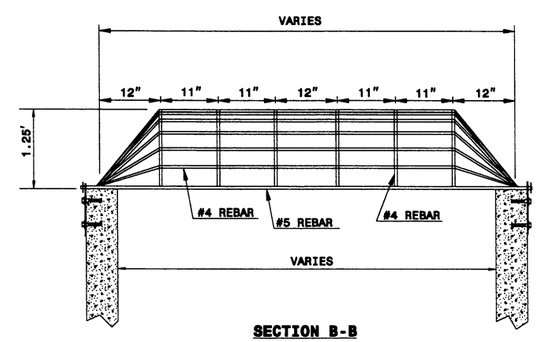


SECTION A-A



SECTION B-B

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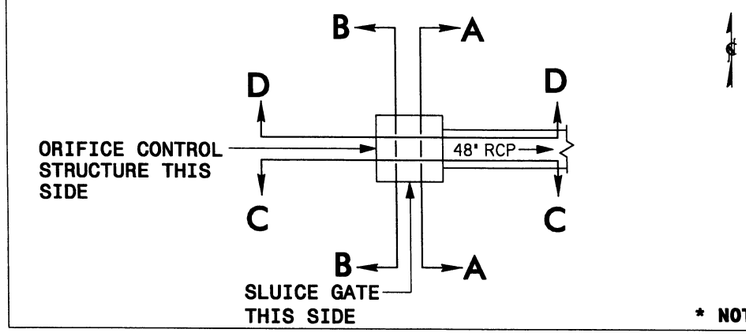
Florence & Hutcheson Consulting Engineers, 5121 Kingdom Way, Suite 100 Raleigh, NC 27607, NC License No: F-0368	PROJECT REFERENCE NO.	SHEET NO.
	1-3819A	2-AJ
	R/W SHEET NO.	
	HYDRAULICS ENGINEER	

-L- STA. 144+00 RT.
DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

SECTION VIEW SCHEMATIC OF OUTLET STRUCTURE



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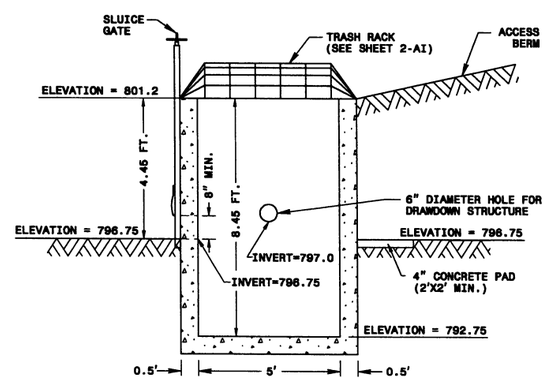

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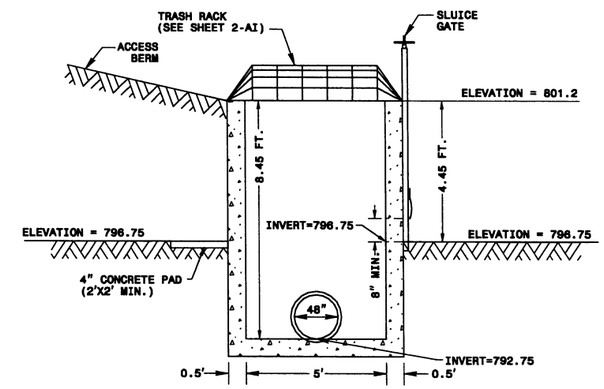
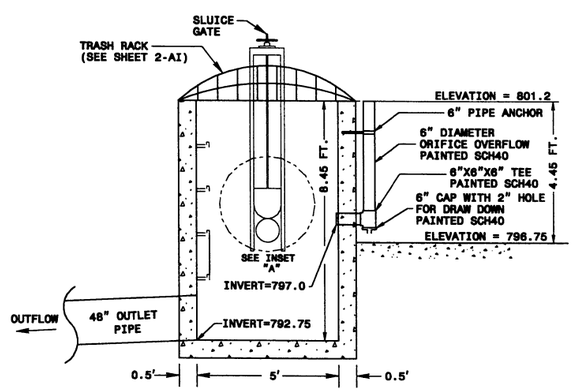
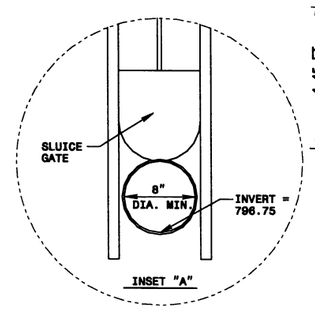
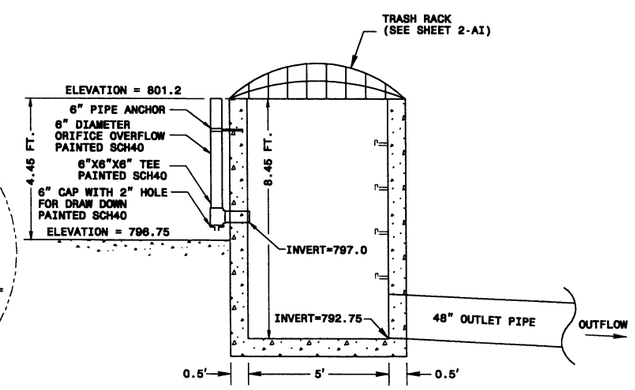


SECTION A-A



SECTION C-C





SECTION D-D

NOTES

1. 8" MIN. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.

* NOT TO SCALE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

DRY DETENTION BASIN
OUTLET CONTROL STRUCTURE

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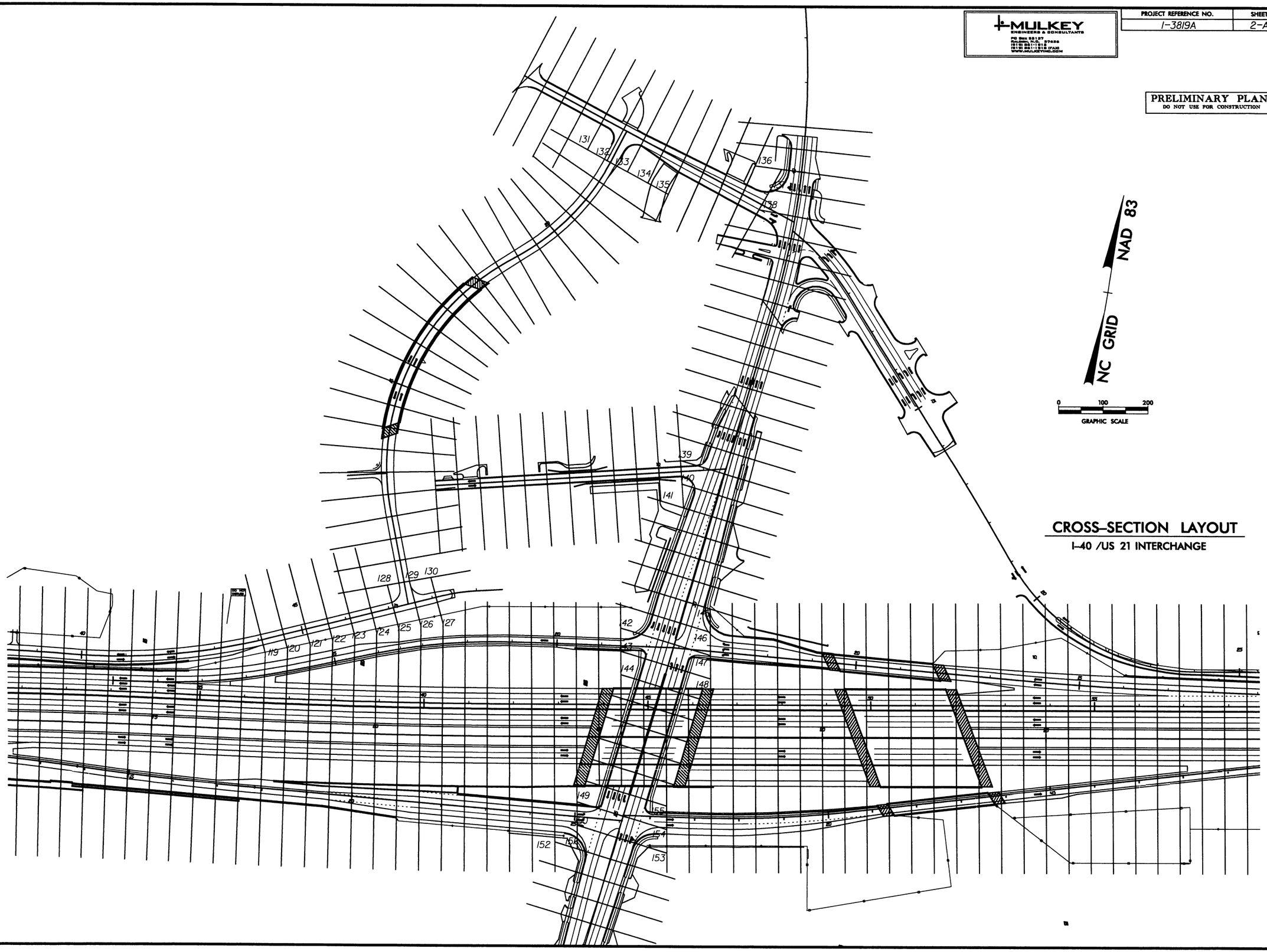
REVISIONS

MULKEY
ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AK

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



CROSS-SECTION LAYOUT

I-40 /US 21 INTERCHANGE

4/6/2010
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5/14/99

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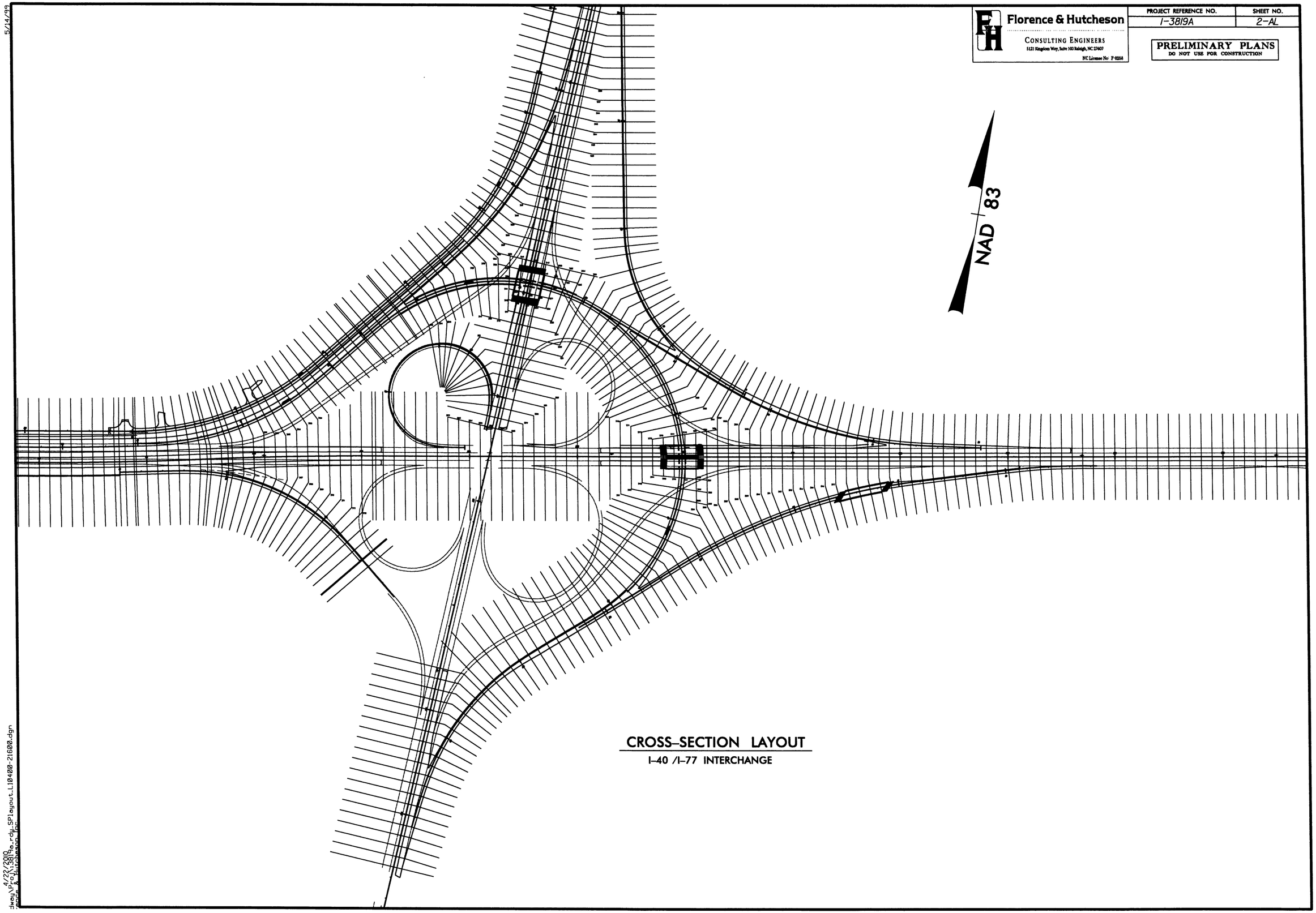
NC License No: F-0268

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AL

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



CROSS-SECTION LAYOUT

I-40 /I-77 INTERCHANGE

4/22/2010
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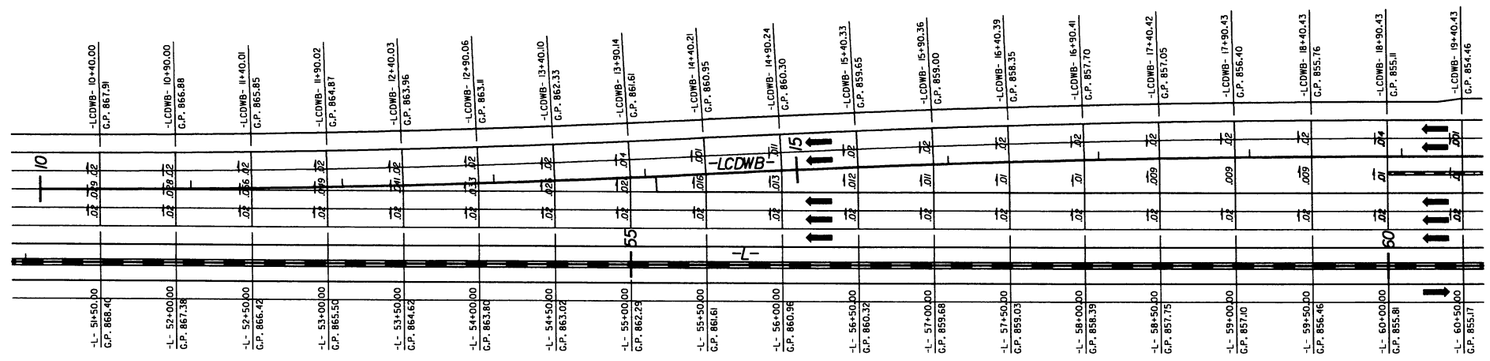
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AM
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



GORE AREA DETAIL

-L- & -LCDWB-
(WEST END)

FOR PLAN, SEE SHEET NO. 7

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4/5/2010
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PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-AN
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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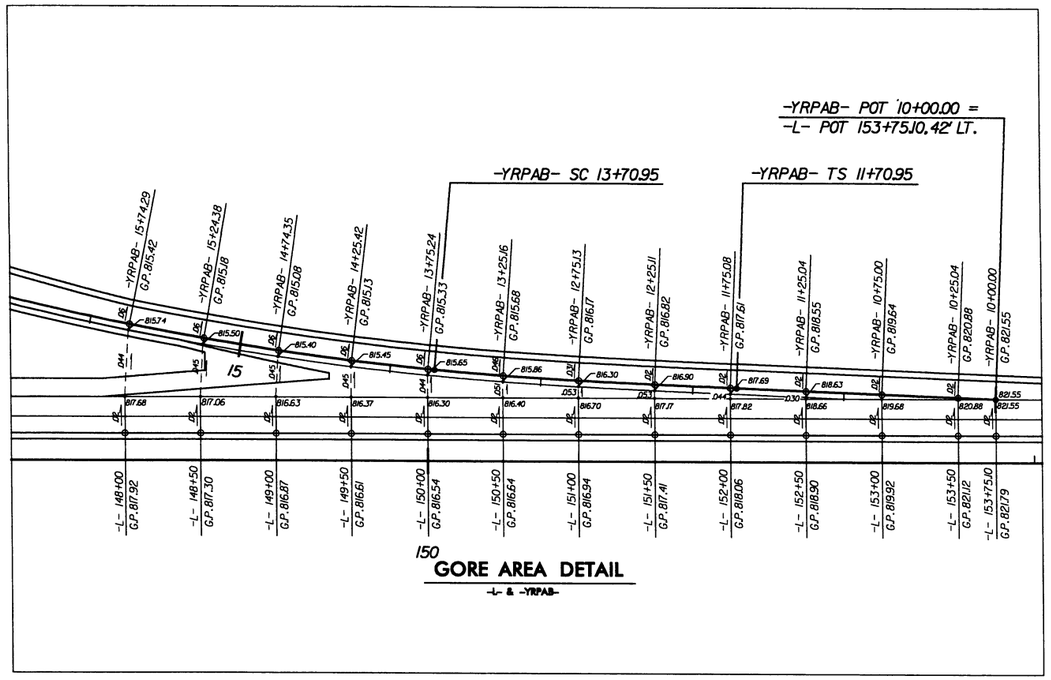
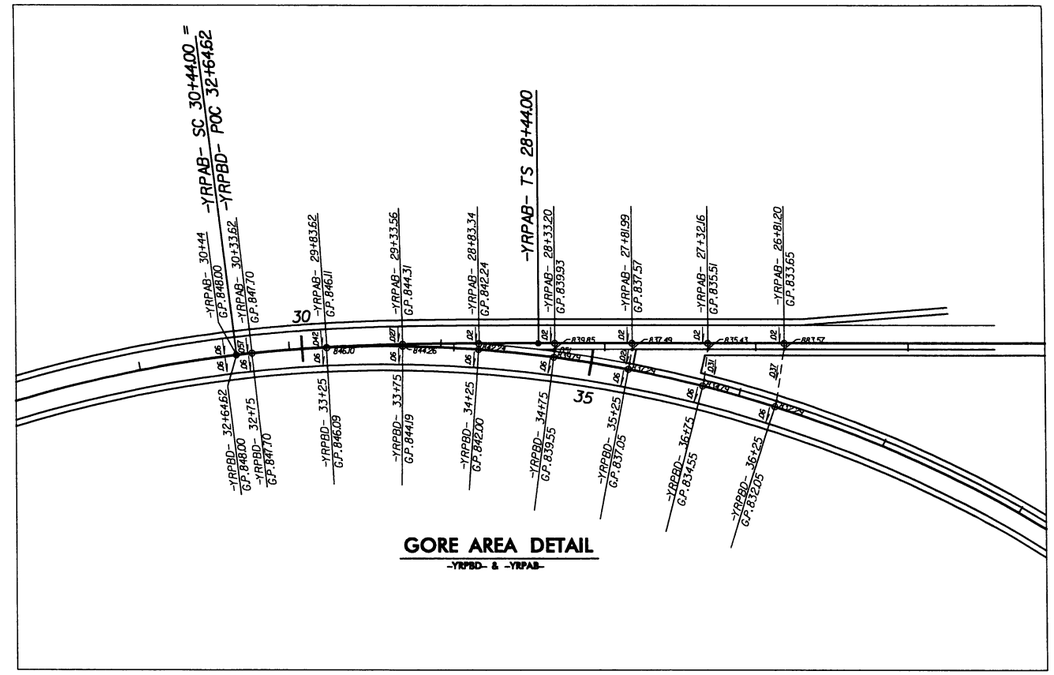
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



GORE AREA DETAIL
-L- & -YRPAB-



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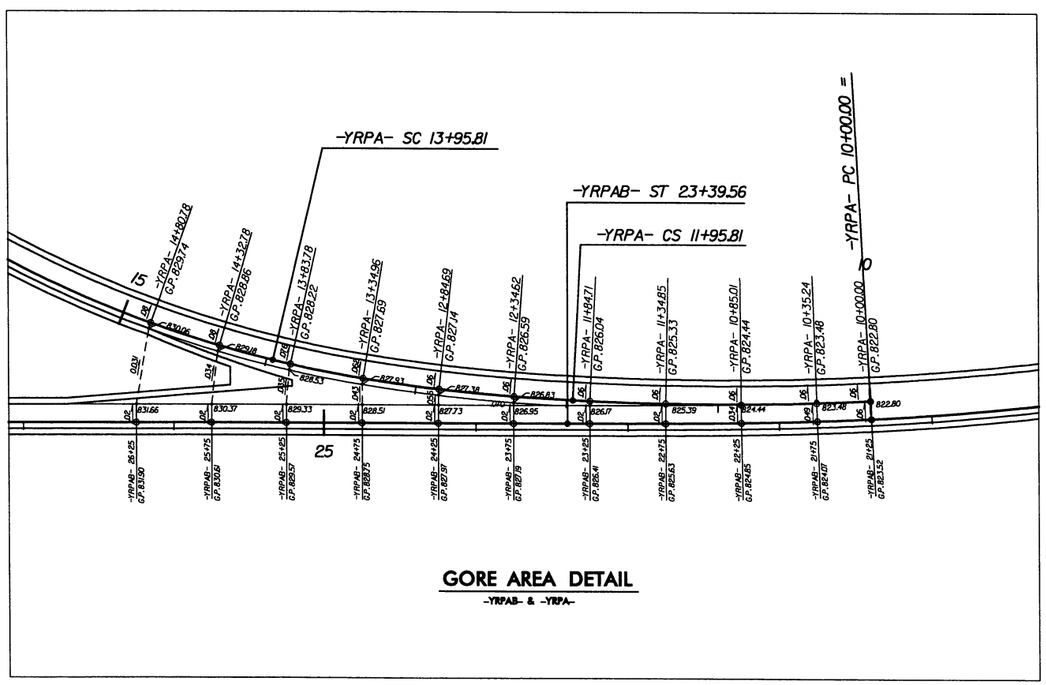
-YRPBD- & -YRPAB-



GORE AREA DETAIL
-YRPAB- & -YRPA-

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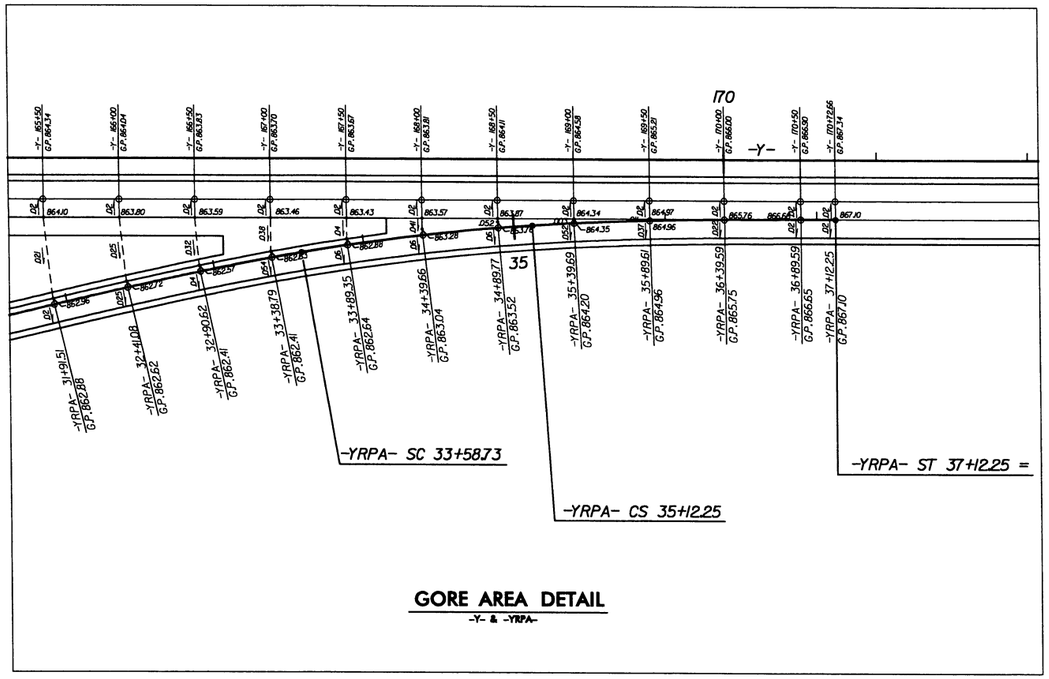
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-A0
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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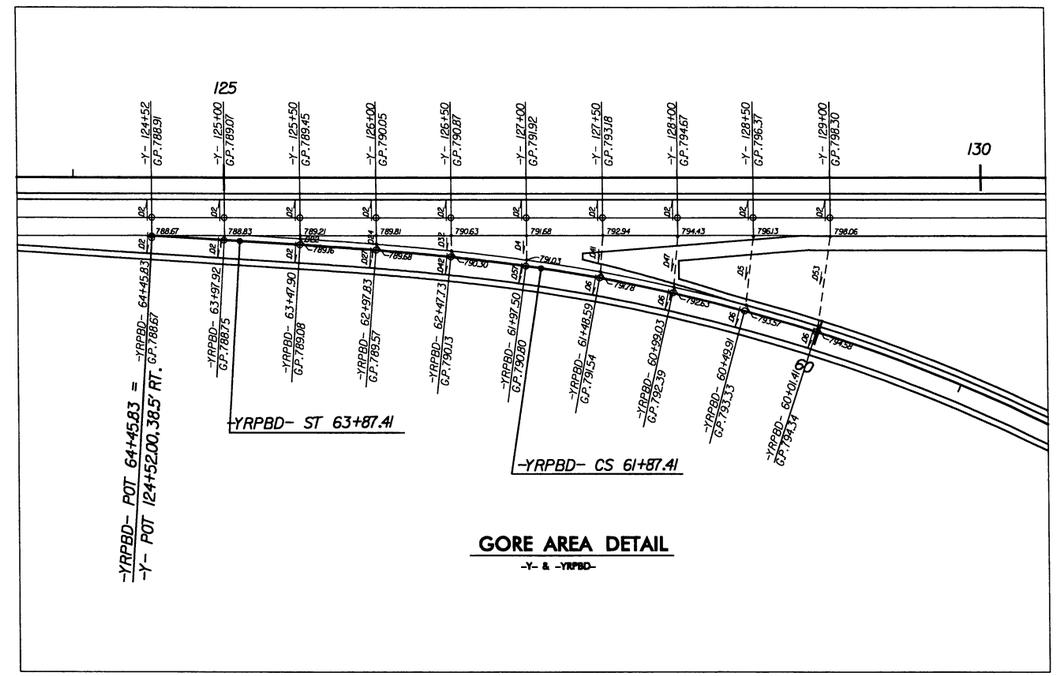
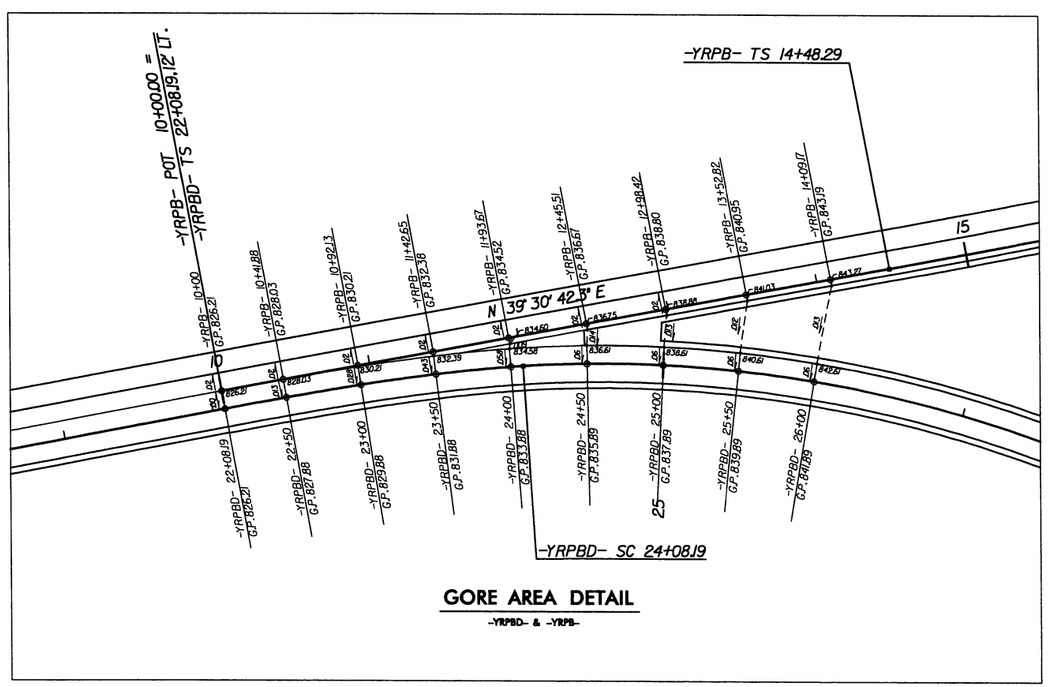
-Y- & -YRPA-



GORE AREA DETAIL
-Y- & -YRPBD-



GORE AREA DETAIL
-YRPBD- & -YRPB-

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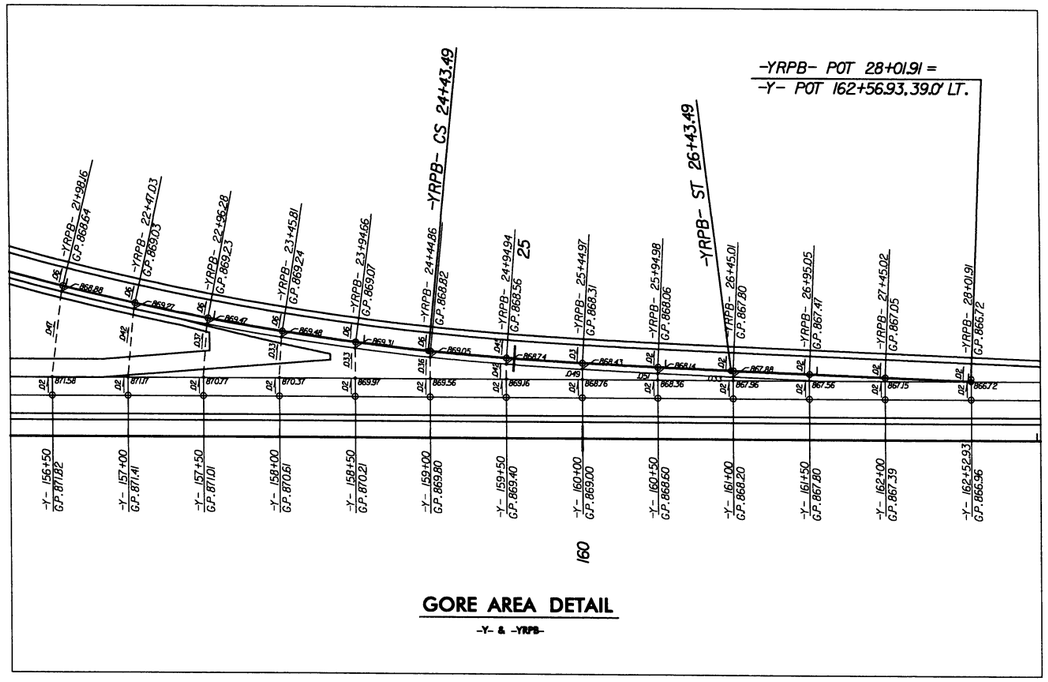
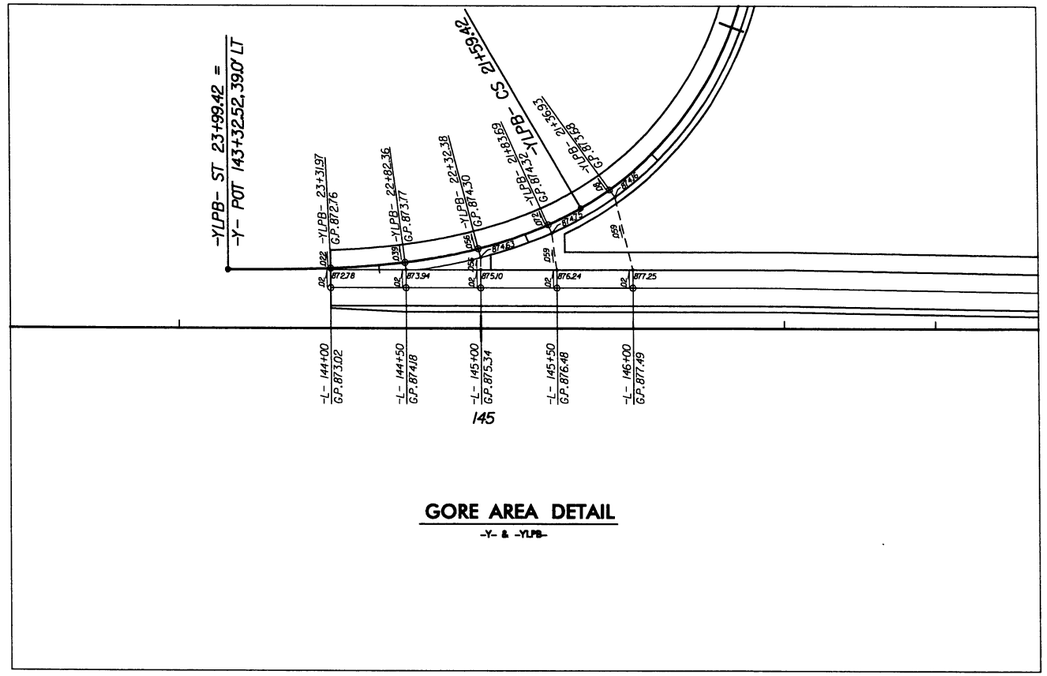
	I-3819A	2-AP
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

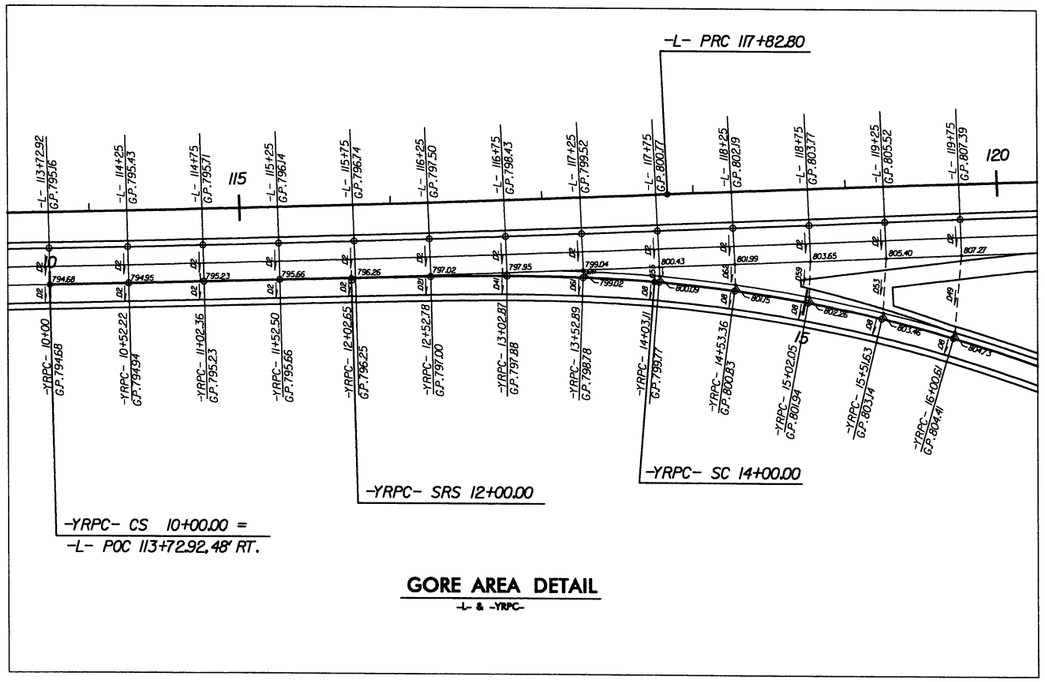
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



GORE AREA DETAIL
-Y- & -YRPB-



GORE AREA DETAIL
-Y- & -YLPB-



GORE AREA DETAIL
-L- & -YRPC-

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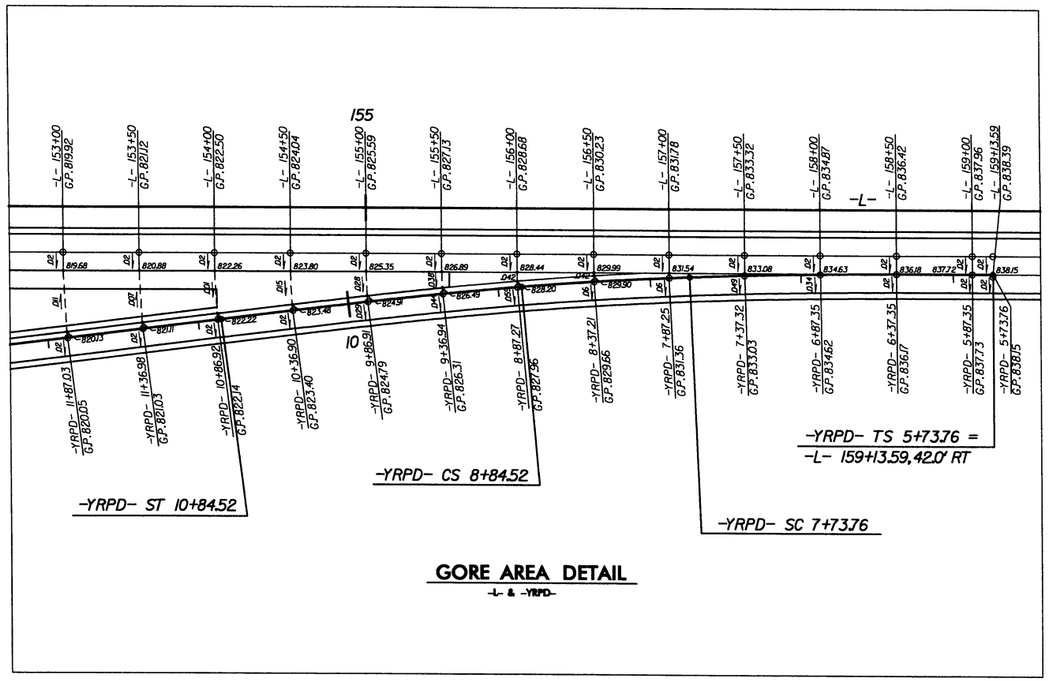
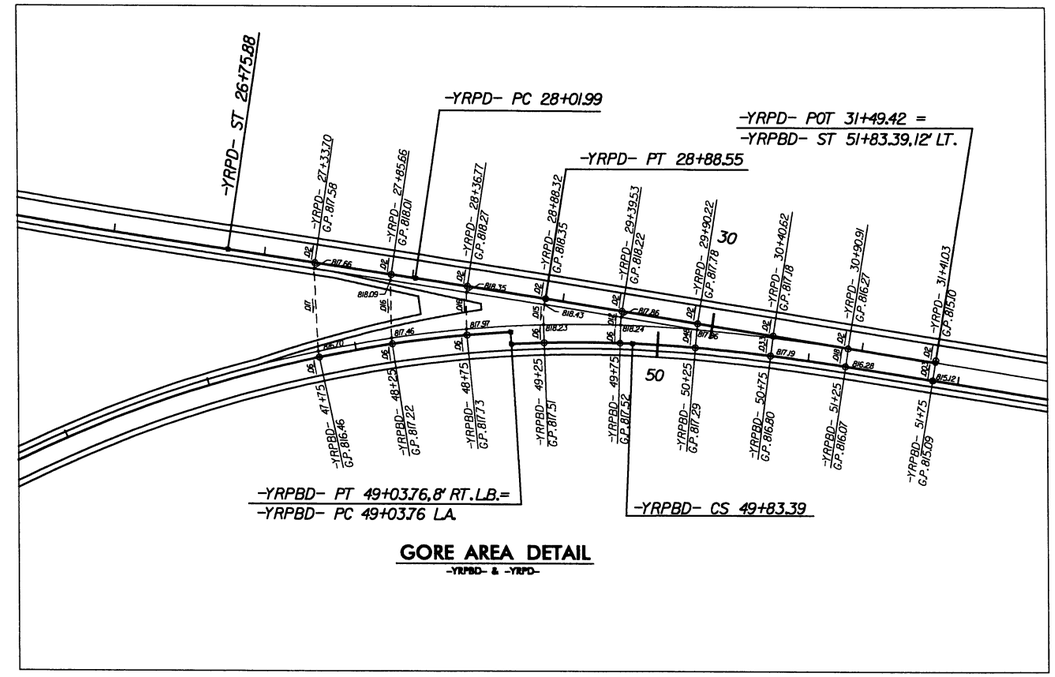
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



GORE AREA DETAIL
-L- & -YRPD-



GORE AREA DETAIL
-YRPBD- & -YRPD-

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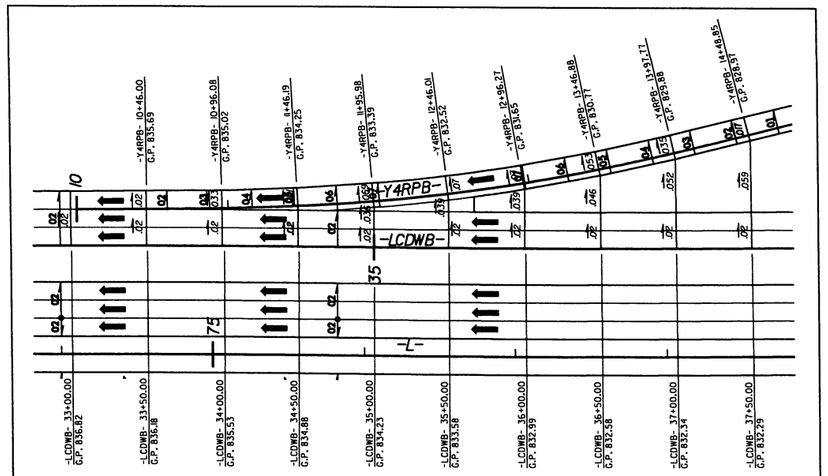
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AR
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

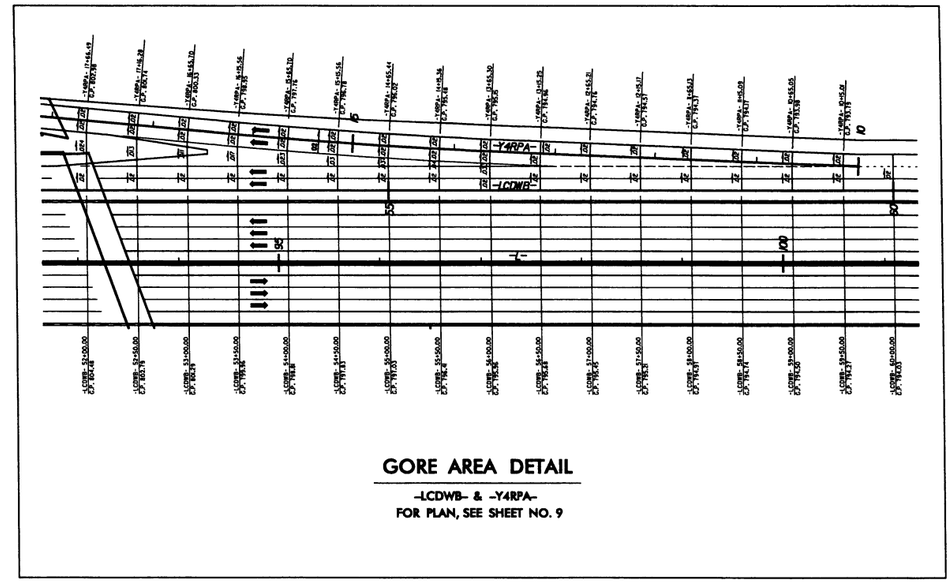
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



GORE AREA DETAIL

-LCDWB- & -Y4RPB-

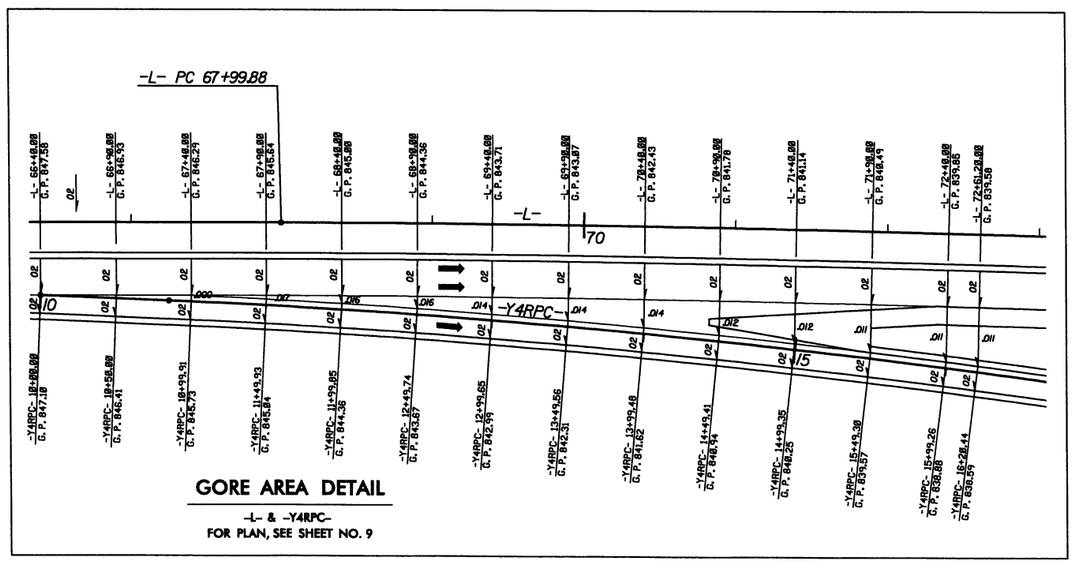
FOR PLAN, SEE SHEET NO. 9



GORE AREA DETAIL

-LCDWB- & -Y4RPA-

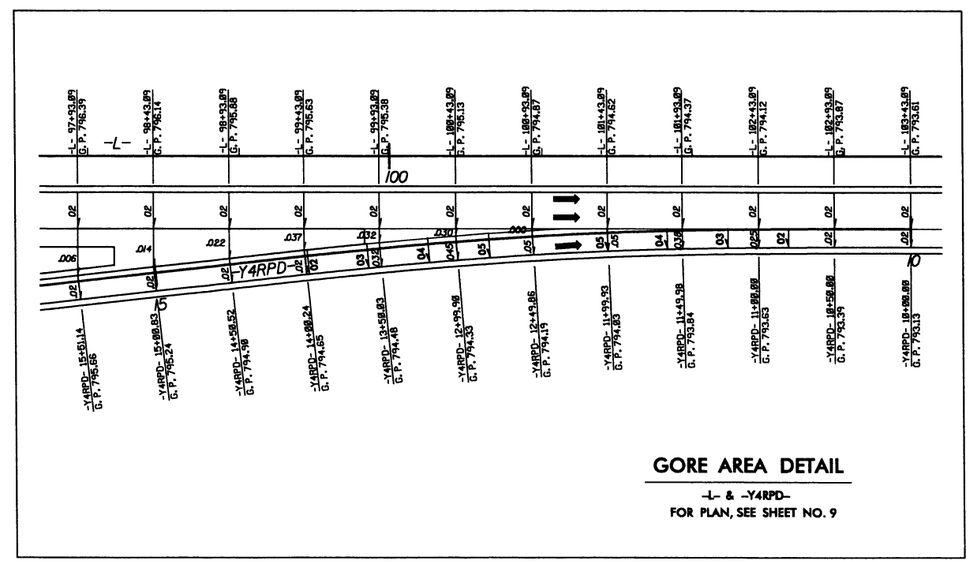
FOR PLAN, SEE SHEET NO. 9



GORE AREA DETAIL

-L- & -Y4RPC-

FOR PLAN, SEE SHEET NO. 9



GORE AREA DETAIL

-L- & -Y4RPD-

FOR PLAN, SEE SHEET NO. 9

4/5/2010
R:\Roadway\Proj\I3819a_Rdy_det_Gores.dgn
Florence & Hutcheson, Inc.

MULKEY ENGINEERS & CONSULTANTS
PO BOX 52107
RALEIGH, NC 27626
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

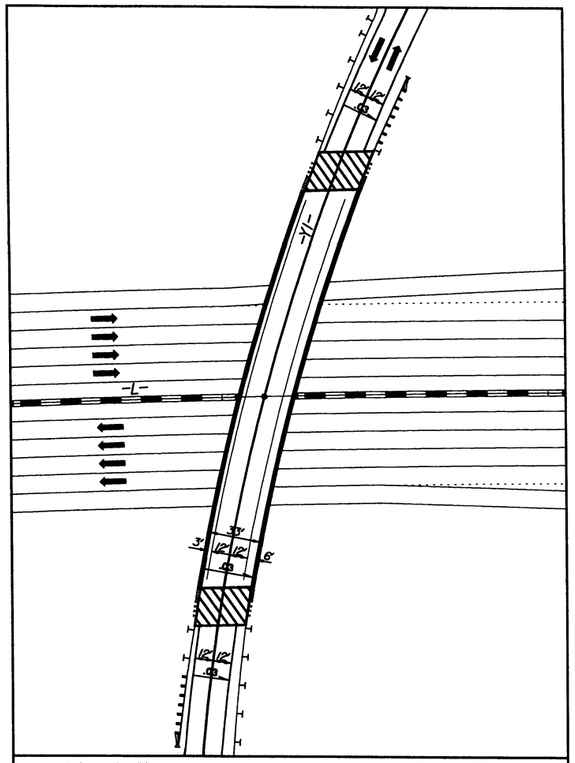
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AS
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

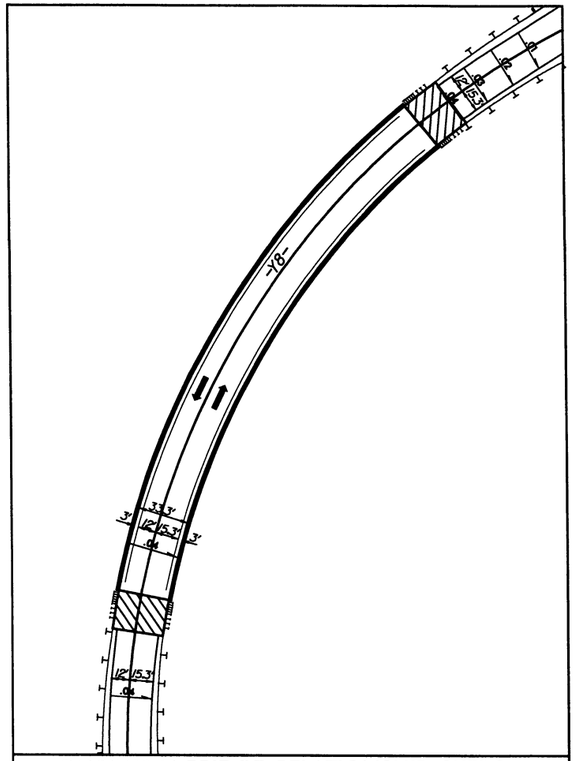
NC GRID NAD 83

NOTE: FOR OTHER PAVEMENT-BRIDGE RELATIONSHIP SKETCHES, SEE PLAN SHEETS.



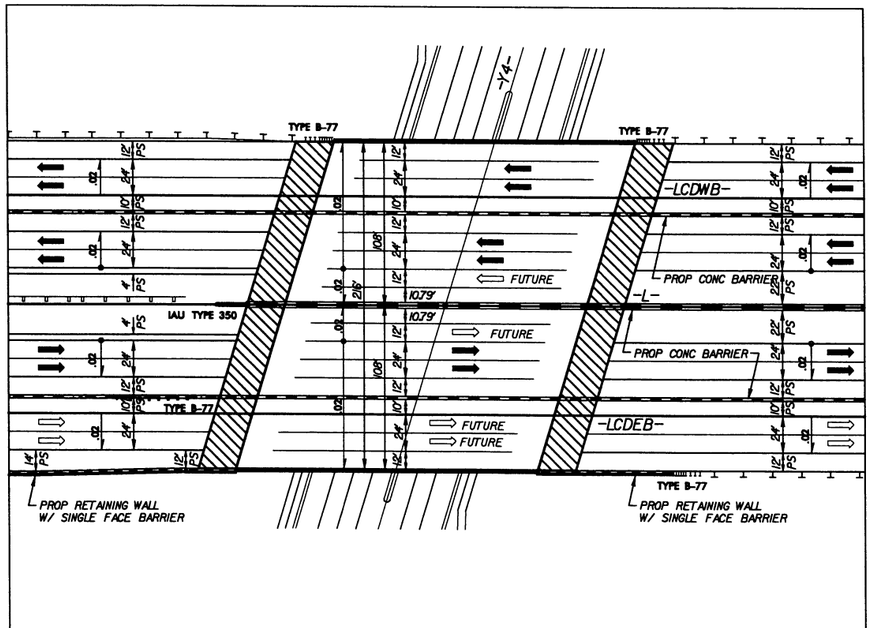
PAVEMENT-BRIDGE RELATIONSHIP SKETCH

-Y1- OVER -L- (I-40)



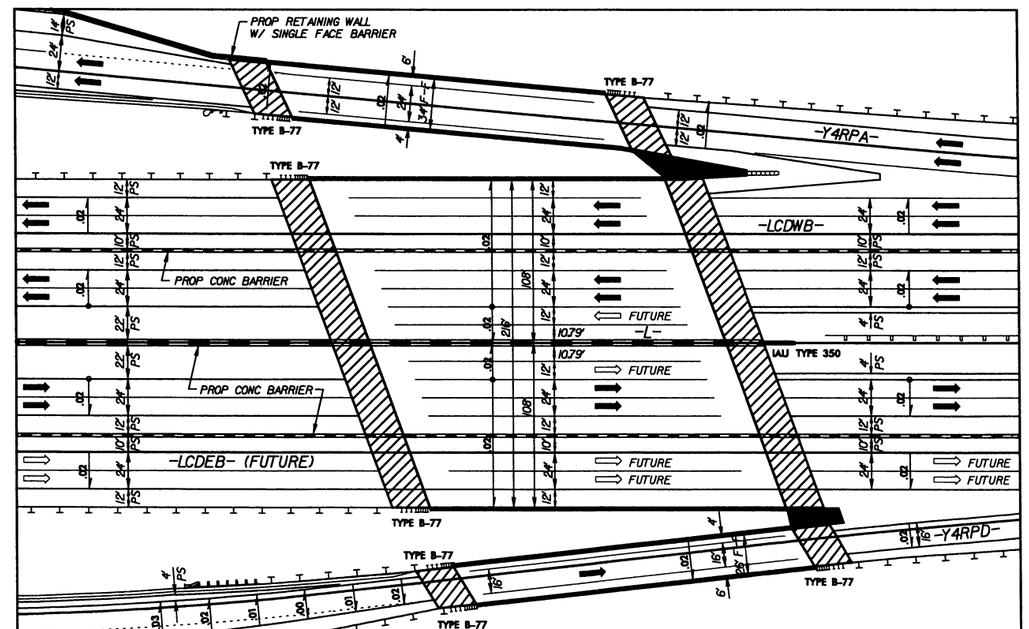
PAVEMENT-BRIDGE RELATIONSHIP SKETCH

-Y8- OVER FOURTH CREEK



PAVEMENT-BRIDGE RELATIONSHIP SKETCH

-L- (I-40) OVER -Y4-



PAVEMENT-BRIDGE RELATIONSHIP SKETCH

-L- (I-40), -Y4RPA-, & -Y4RPD- OVER FOURTH CREEK

REVISIONS

8/17/99

4/5/2010
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Florence & Hutchison Inc.

8/17/99

REVISIONS

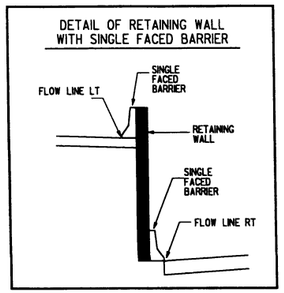
PLAN OF RETAINING WALL NO. 1

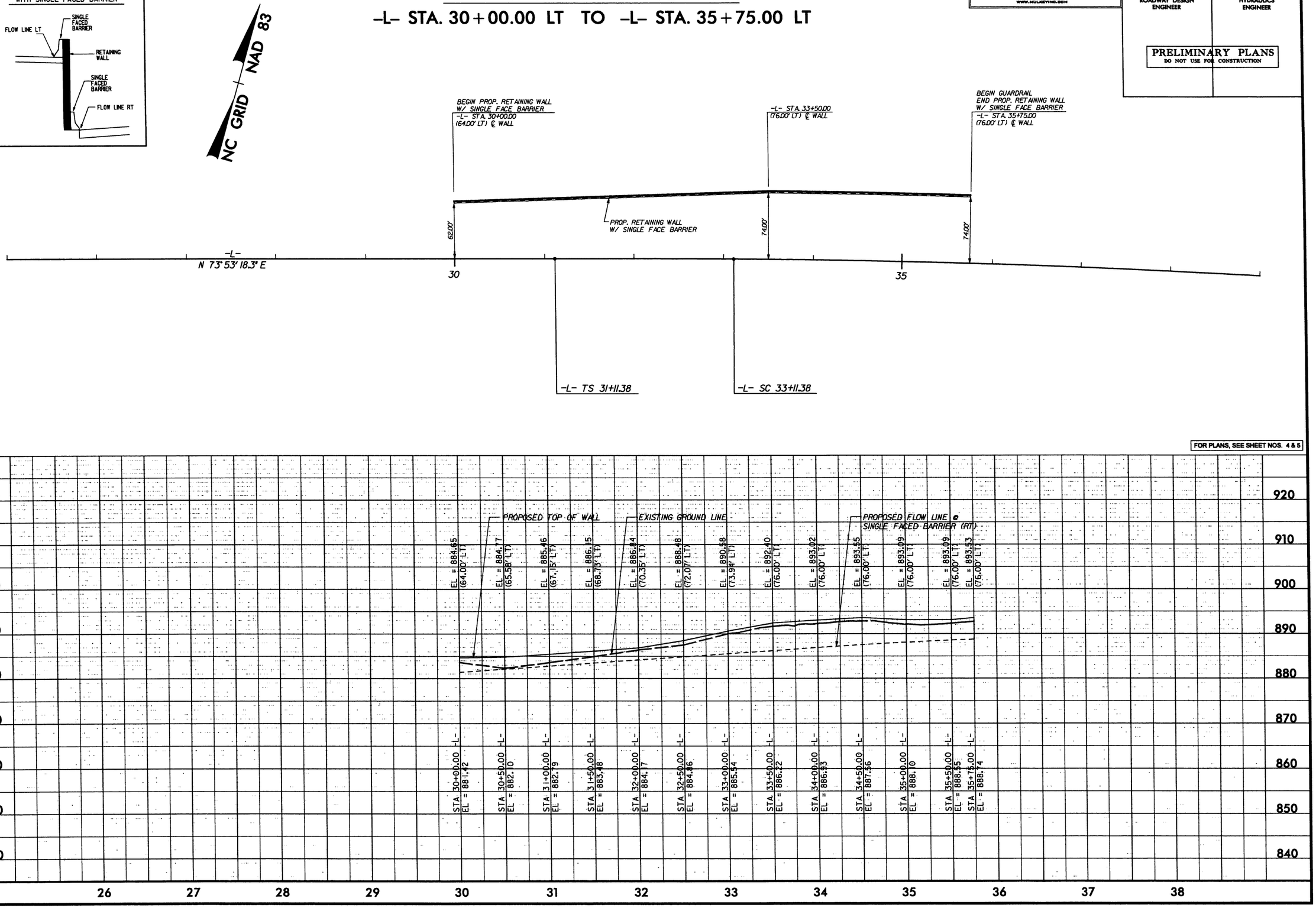
-L- STA. 30+00.00 LT TO -L- STA. 35+75.00 LT

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AT
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





4/6/2010
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Florence & Hutcheson, Inc.

8/17/99

REVISIONS

PLAN OF RETAINING WALL NO. 2

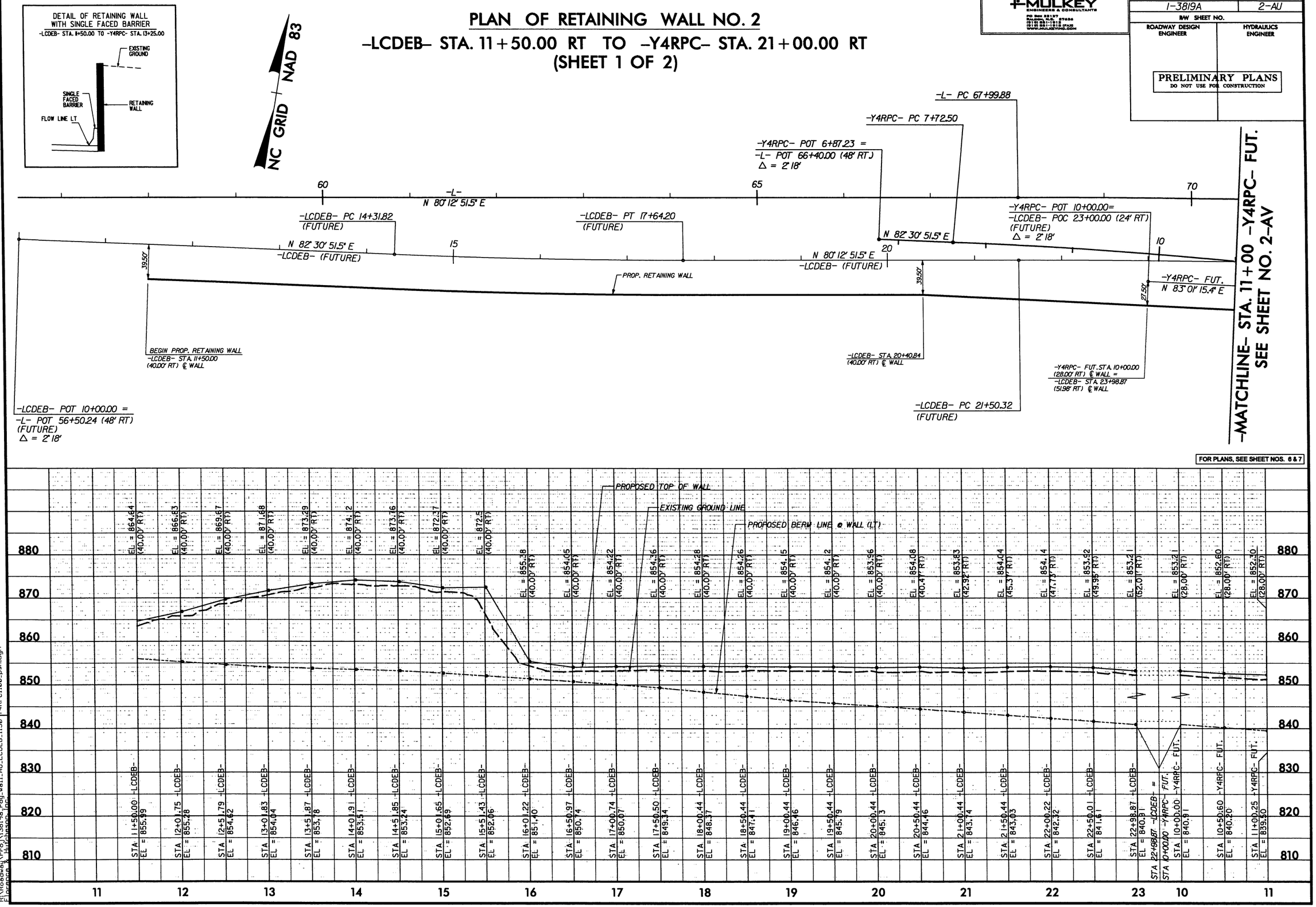
-LCDEB- STA. 11+50.00 RT TO -Y4RPC- STA. 21+00.00 RT

(SHEET 1 OF 2)

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-AU
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



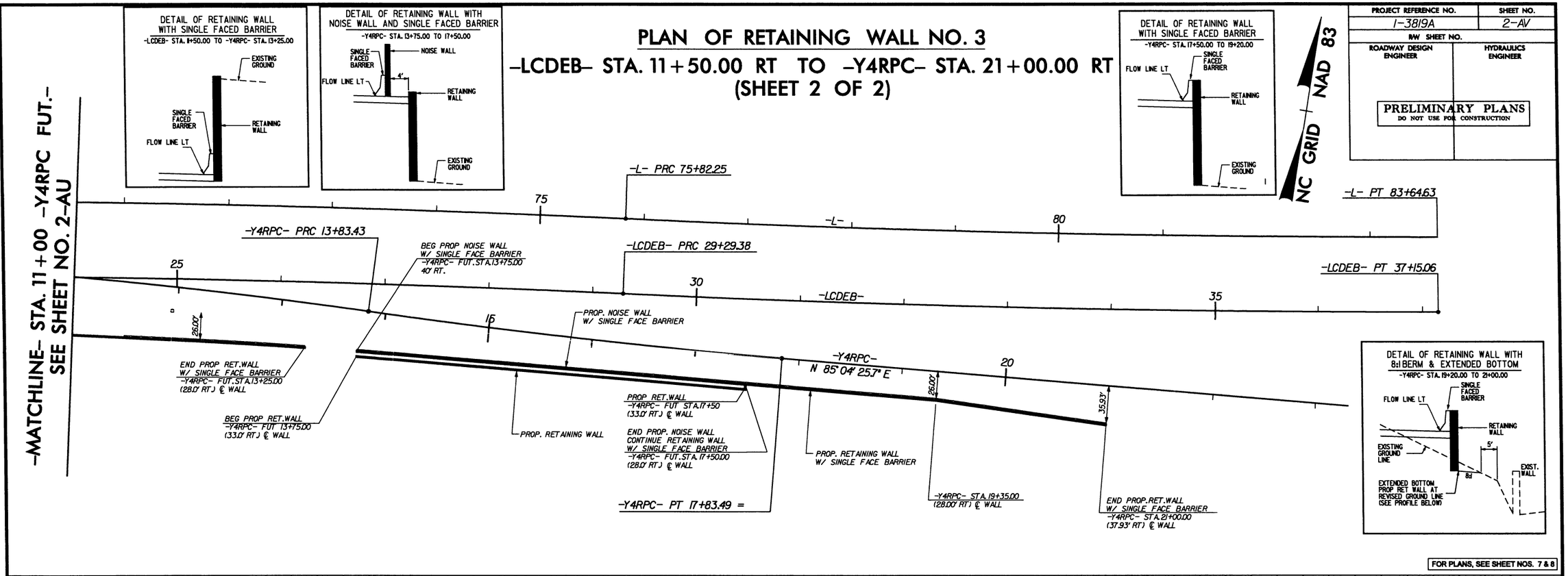
4/5/2010
R:\Roadway\Proj\3819a_rdy_wal1_AU_LCDEB_1150_Y4RPC1100_psh.dgn
Florence & Hutchison Inc.

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-AV
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PLAN OF RETAINING WALL NO. 3

-LCDEB- STA. 11+50.00 RT TO -Y4RPC- STA. 21+00.00 RT
(SHEET 2 OF 2)



REVISIONS

8/17/99

4/6/2010
R:\Roadway\Proj\3819a_rdy_wal1_AV_Y4RPC_1150_2100_psh.dgn
Florence & Hutchison Inc.

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AW
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

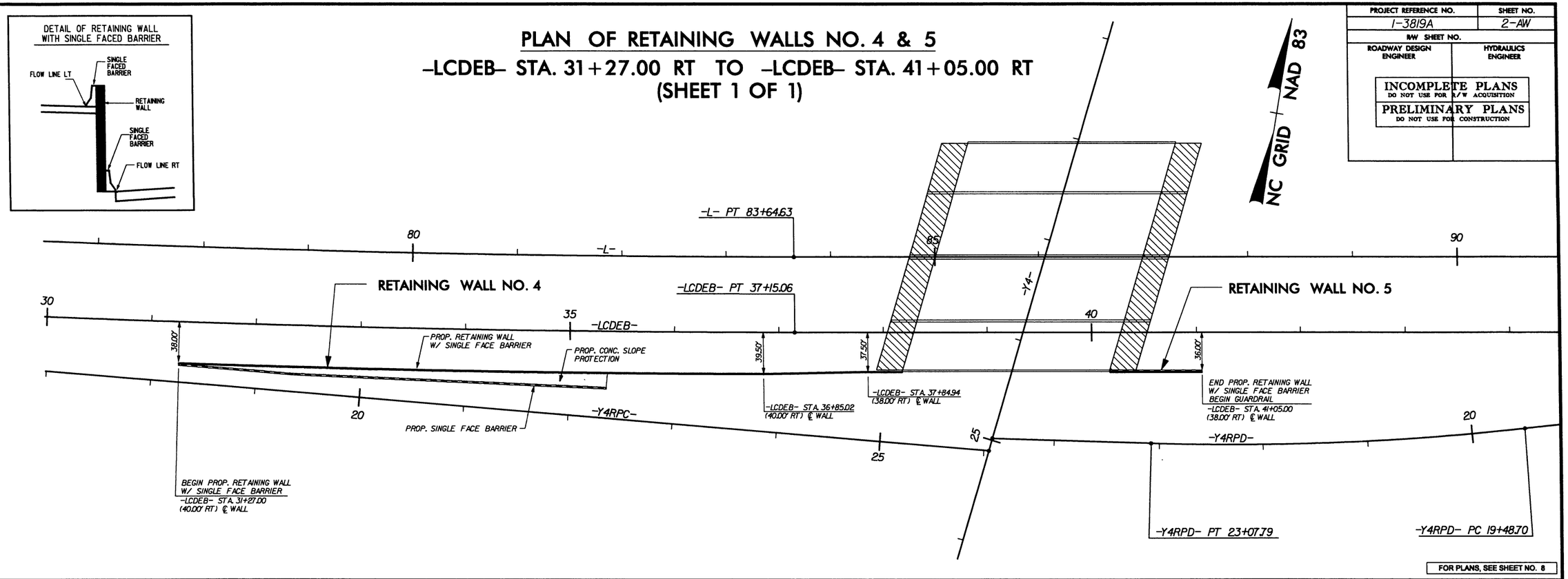
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PLAN OF RETAINING WALLS NO. 4 & 5

-LCDEB- STA. 31+27.00 RT TO -LCDEB- STA. 41+05.00 RT

(SHEET 1 OF 1)



REVISIONS

8/17/99

4/5/2010
R:\Roadway\Proj\3819a_rdy_wall_AW_LCDEB_3127_4105_psh.dgn
Florence & Hutcheson, Inc.

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-AX
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

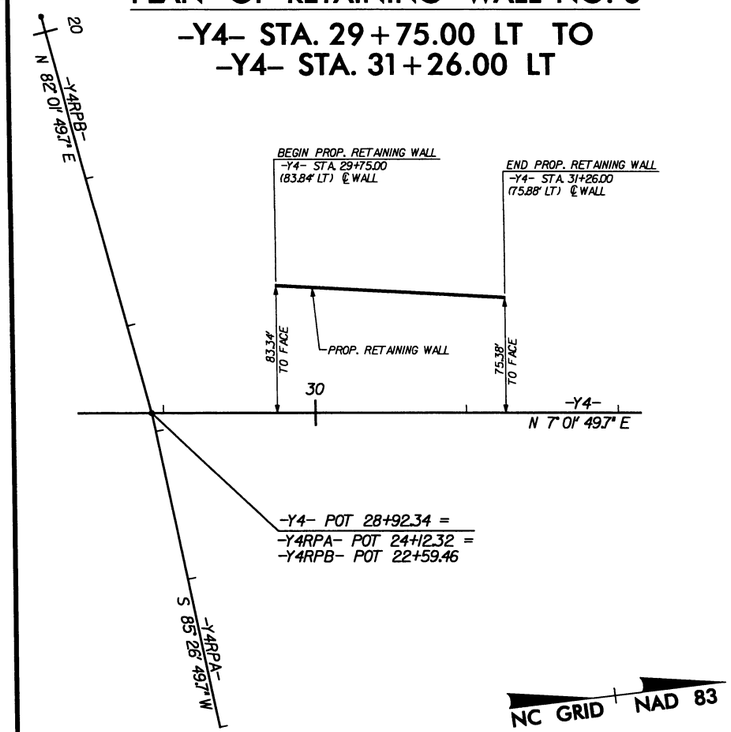
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

8/17/99

PLAN OF RETAINING WALL NO. 6

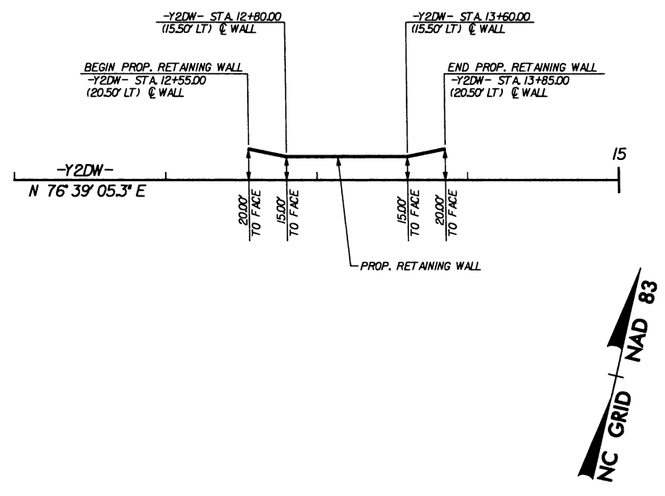
-Y4- STA. 29+75.00 LT TO -Y4- STA. 31+26.00 LT



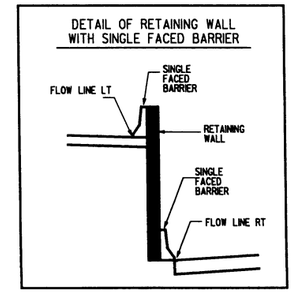
FOR PLANS, SEE SHEET NO. 8

PLAN OF RETAINING WALL NO. 7

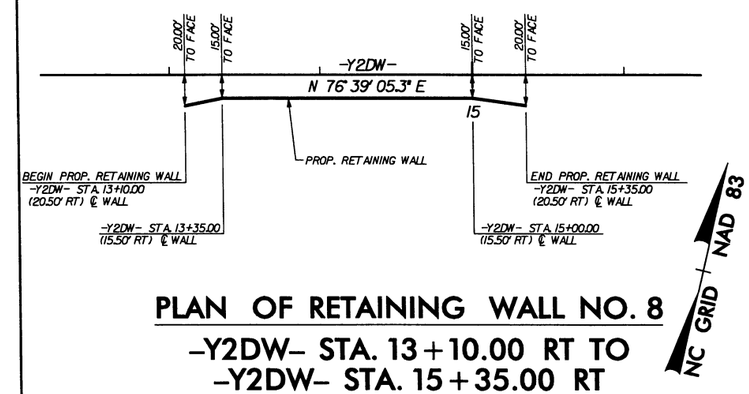
-Y2DW- STA. 12+55.00 LT TO -Y2DW- STA. 13+85.00 LT



FOR PLANS, SEE SHEET NO. 8

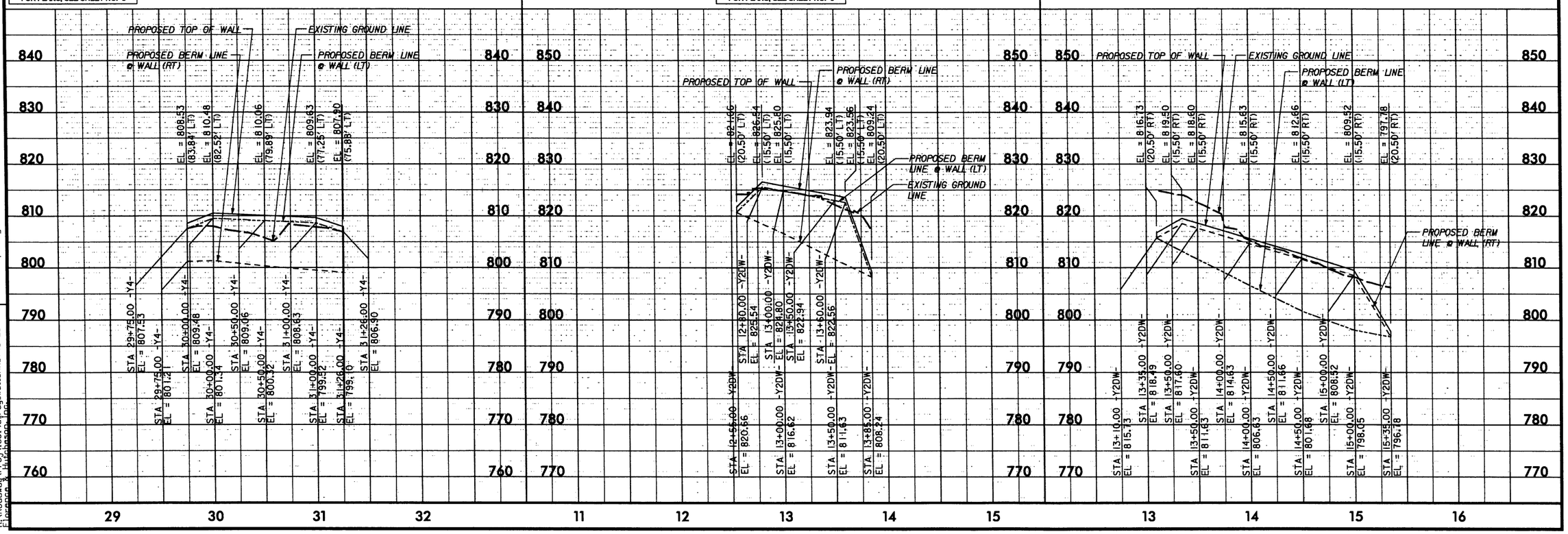


FOR PLANS, SEE SHEET NO. 8



PLAN OF RETAINING WALL NO. 8

-Y2DW- STA. 13+10.00 RT TO -Y2DW- STA. 15+35.00 RT



4/6/2010
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Pl\proposed_rtl\psheet.dgn

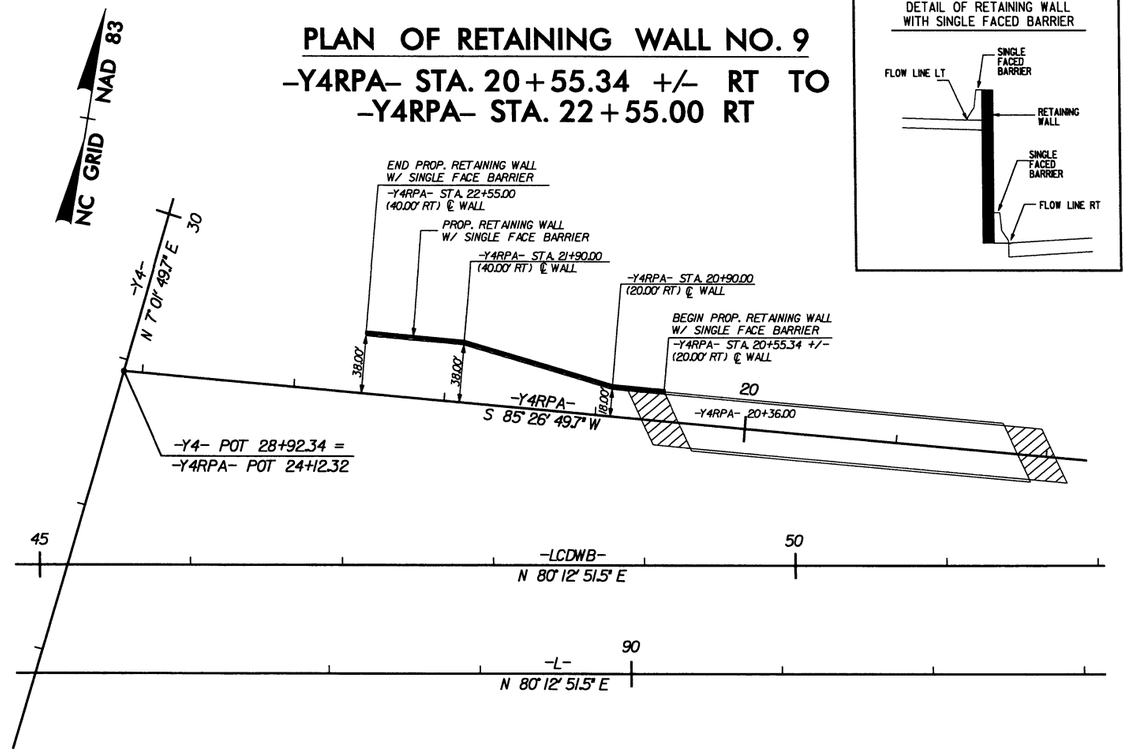
PROJECT REFERENCE NO.	SHEET NO.
1-3819A	2-AY
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

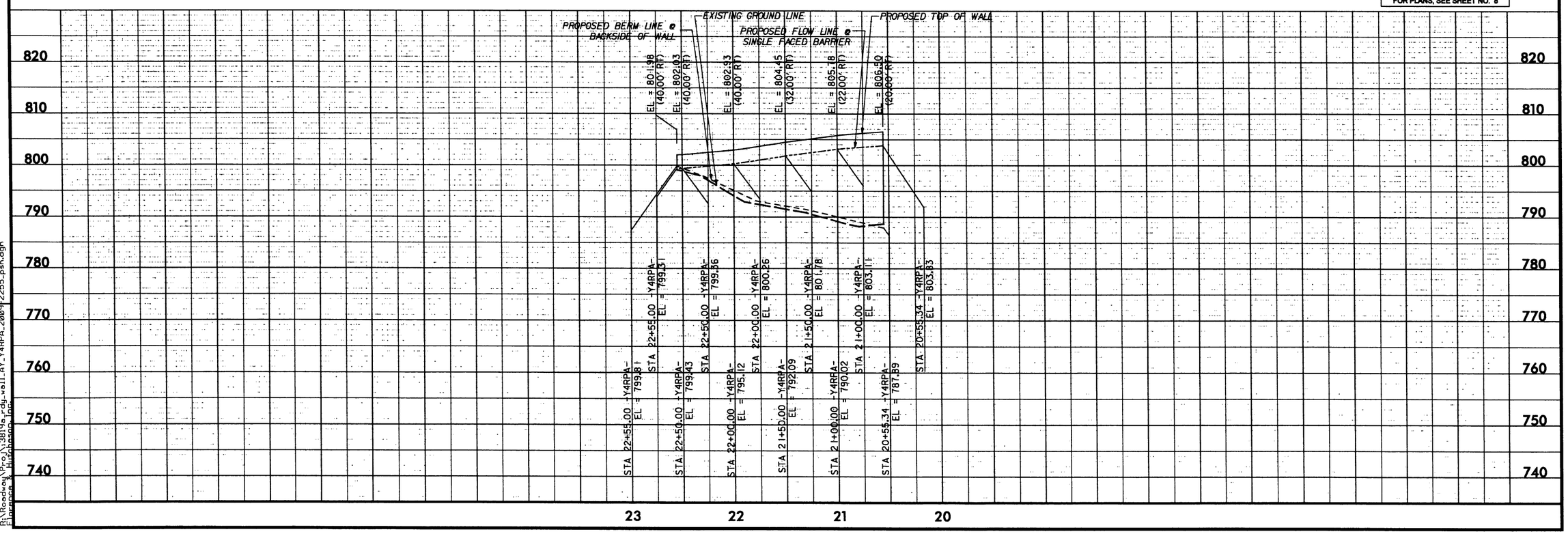
PLAN OF RETAINING WALL NO. 9

-Y4RPA- STA. 20+55.34 +/- RT TO -Y4RPA- STA. 22+55.00 RT



DETAIL OF RETAINING WALL WITH SINGLE FACED BARRIER

FOR PLANS, SEE SHEET NO. 8



REVISIONS

8/17/99

4/6/2010
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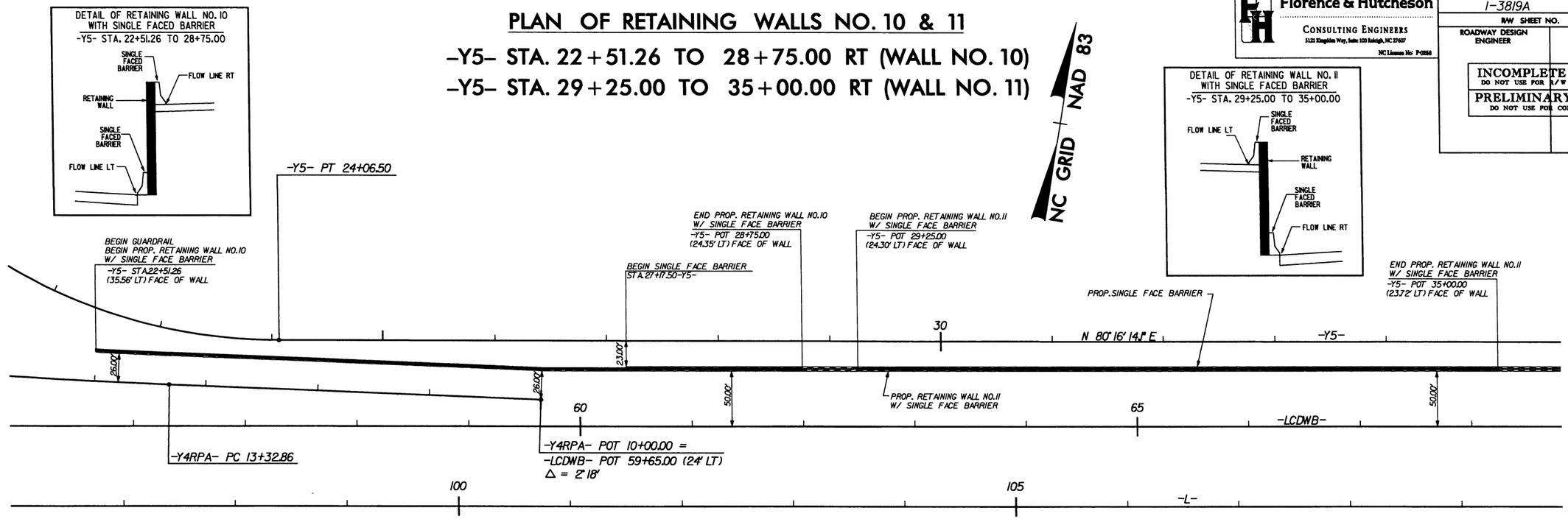
Kimley-Horn & Associates, Inc.
Florence & Hutchenson, Inc.

PLAN OF RETAINING WALLS NO. 10 & 11

-Y5- STA. 22+51.26 TO 28+75.00 RT (WALL NO. 10)
-Y5- STA. 29+25.00 TO 35+00.00 RT (WALL NO. 11)



Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-AZ
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

REVISIONS

8/17/99

4/6/2010
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Florence & Hutcheson, Inc.

PLAN OF RETAINING WALL NO. 12

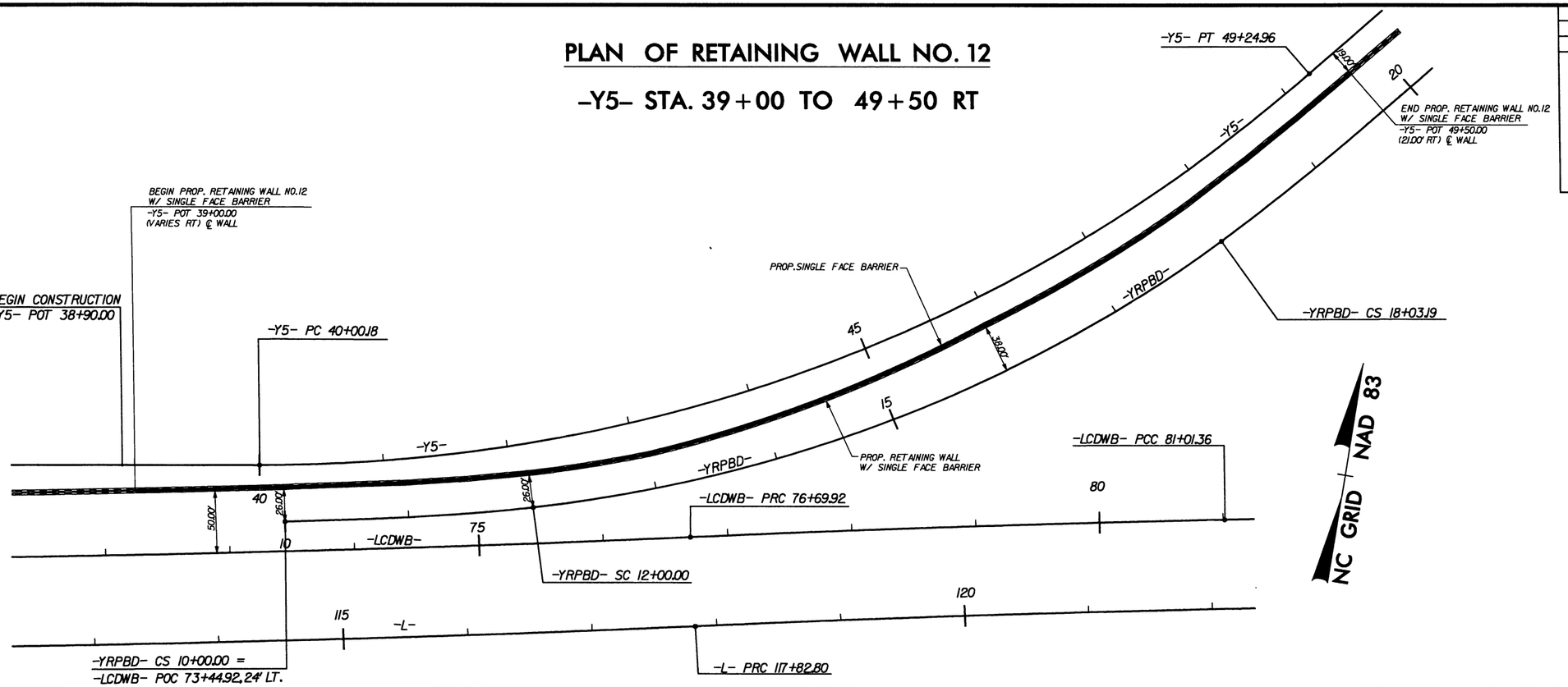
-Y5- STA. 39+00 TO 49+50 RT

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-BA
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

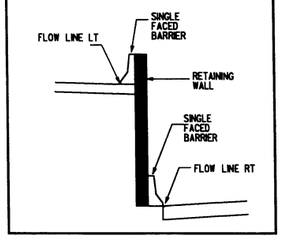
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

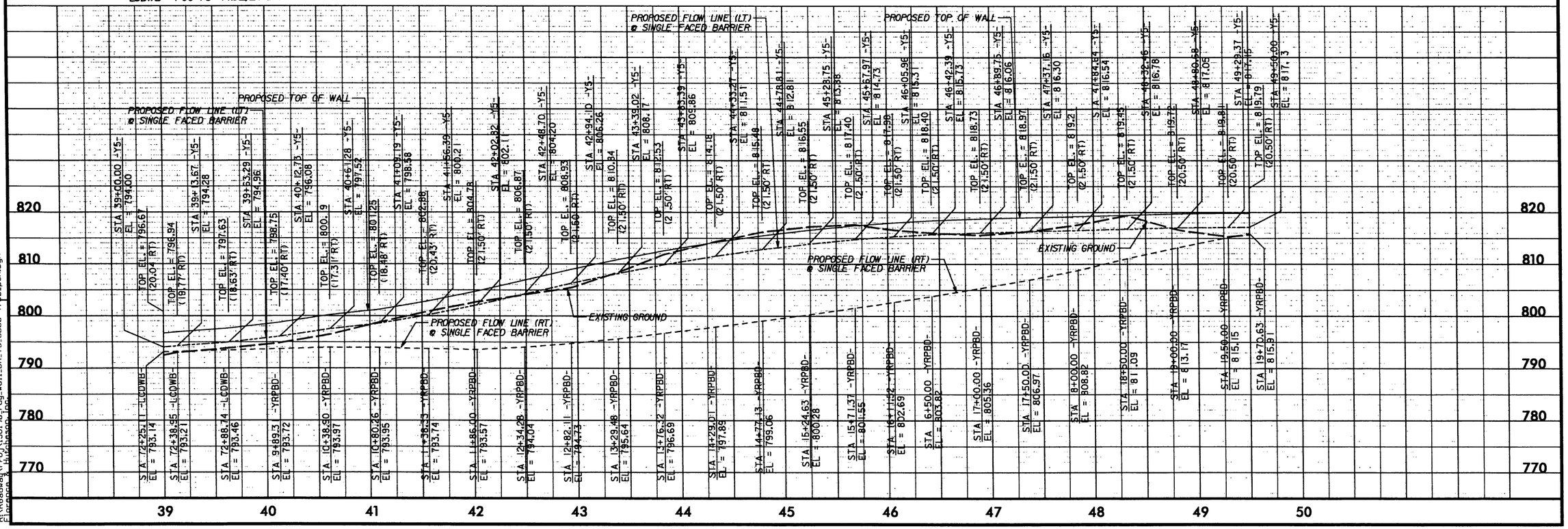
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0268



DETAIL OF RETAINING WALL
WITH SINGLE FACED BARRIER



FOR PLANS, SEE SHEET NO. 9



REVISIONS

8/17/99

4/6/2010
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Florence & Hutcheson, Inc.

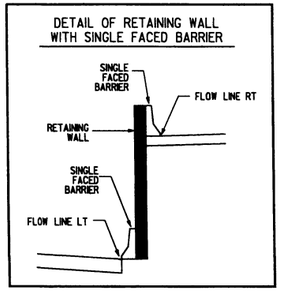
PLAN OF RETAINING WALL NO. 13

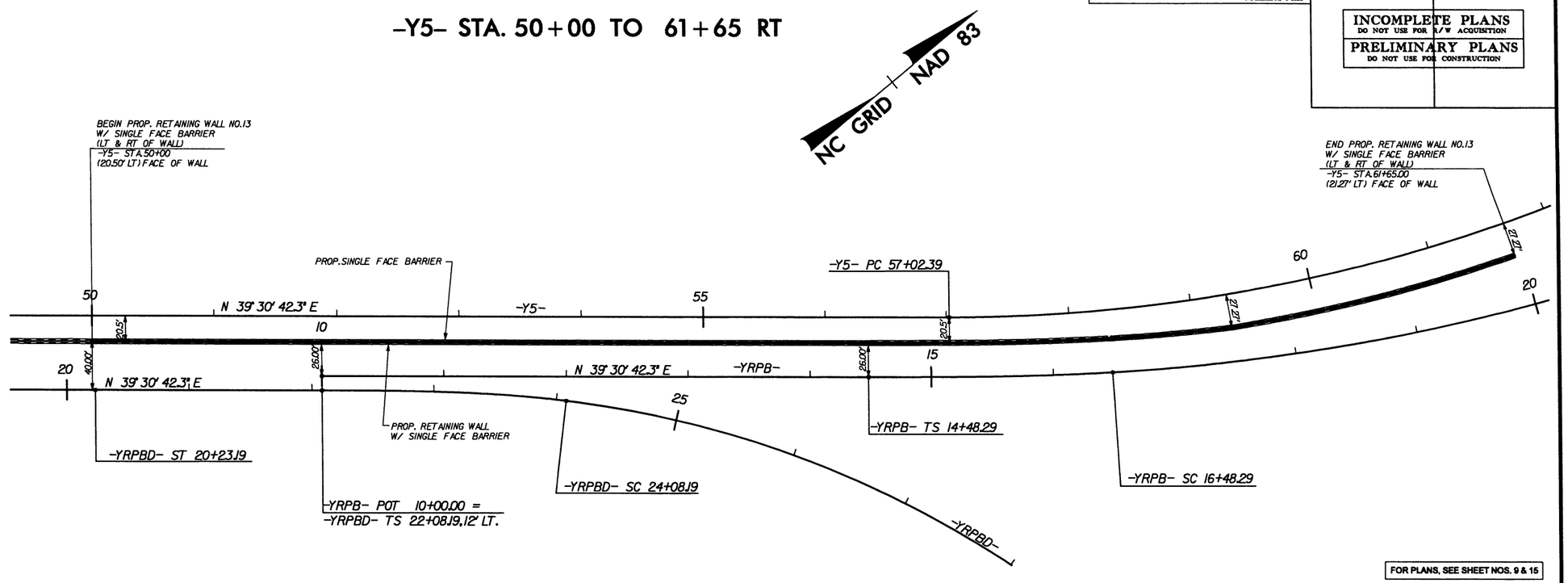
-Y5- STA. 50+00 TO 61+65 RT

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0268

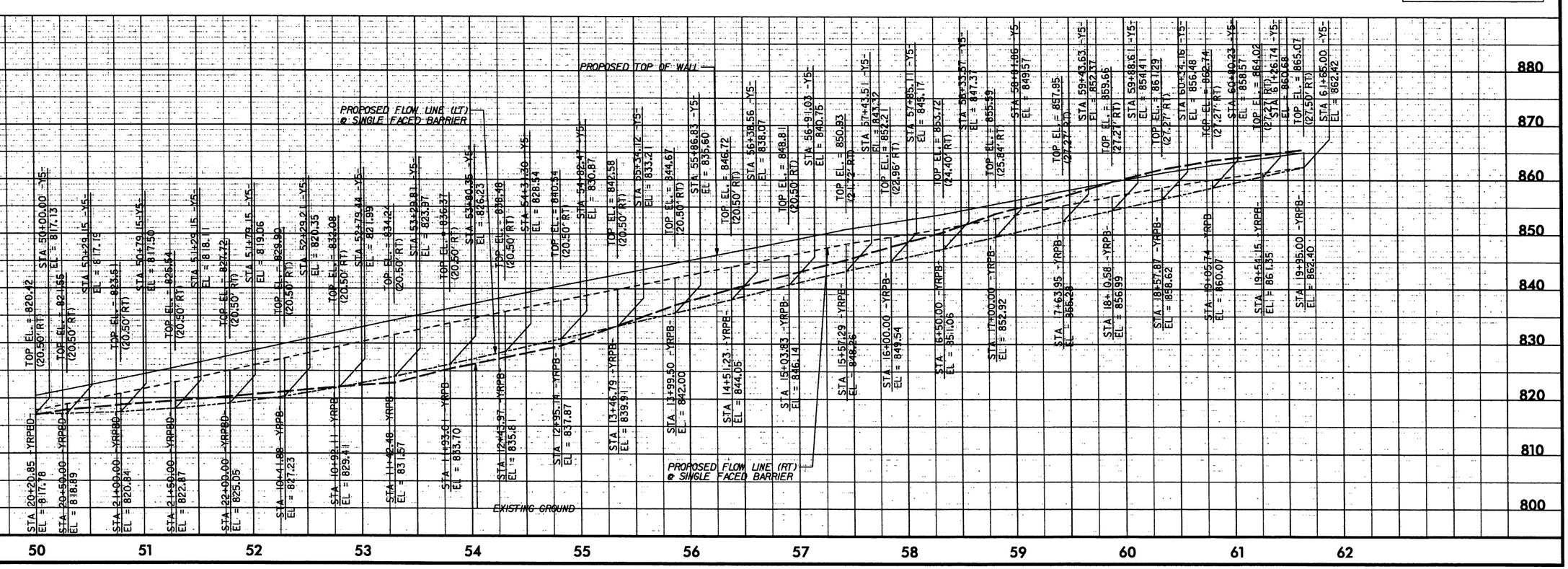
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-BB
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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





FOR PLANS, SEE SHEET NOS. 9 & 15



8/17/99

4/6/2010
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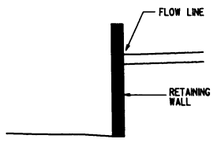
Florence & Hutcheson, Inc.

8/17/99

REVISIONS

DETAIL OF RETAINING WALL



PLAN OF RETAINING WALL NO. 14

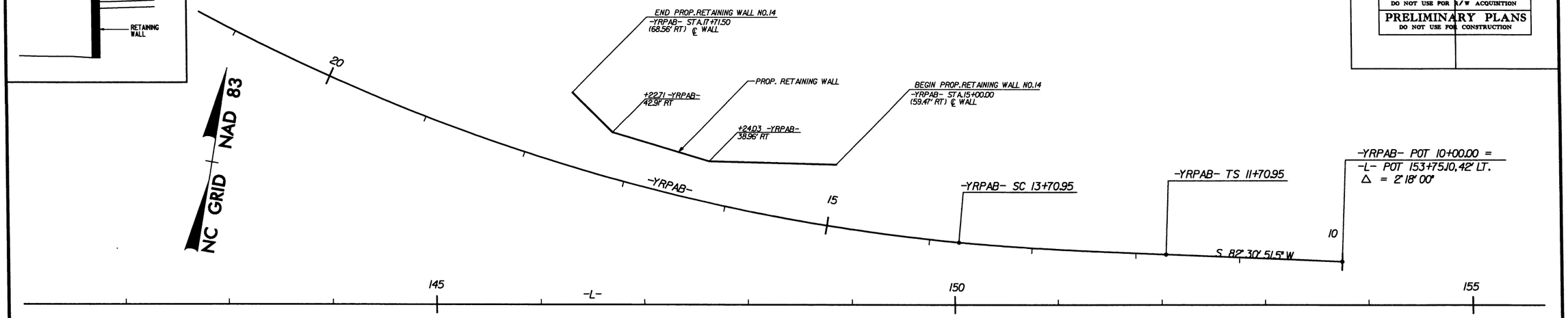
-YRPAB- 15+00.00 RT TO -YRPAB- 17+71.50 RT

Florence & Hutcheson
CONSULTING ENGINEERS
3121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

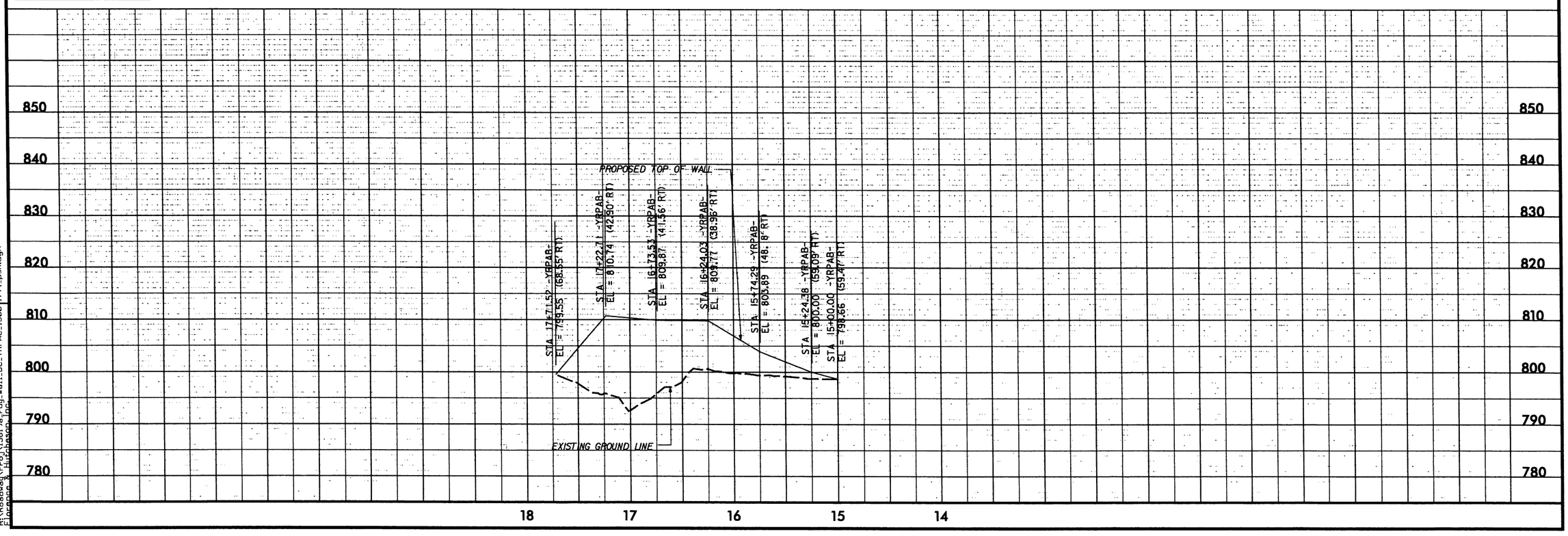
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	2-BC
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR PLANS, SEE SHEET NO. 10



4/6/2010
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Florence & Hutcheson Inc.

COMPUTED BY: DATE:
CHECKED BY: DATE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
SUMMARY NO. 1					
-L- 26+00.00 TO 56+00.00	30141		41616	11475	
-Y1- 10+65.00 TO 27+14.00	70		5801	5731	
-Y1- 10+65.00 TO 27+14.00	606		3313	2707	
-Y1A- 10+00.00 TO 13+15.00	20		2888	2868	
-Y3- 10+00.00 TO 17+00.00	9		15164	15155	
-Y3A- 10+50.00 TO 48+50.00	4060		972		3088
TOTAL SUMMARY NO. 1	34906		69753	37936	3088
SUMMARY NO. 2					
-L- 56+00.00 TO 85+00.49	42251		102724	60473	
-Y2DW- 10+00.00 TO 15+50.00	5848		106		5742
TOTAL SUMMARY NO. 2	48099		102830	60473	5742
SUMMARY NO. 3					
-L- 86+98.98 TO 90+91.50	993		83182	82189	
-Y4- 10+50.00 TO 34+50.00	18120		2680		15441
-Y5- 10+00.00 TO 16+00.00	246		255	9	
-Y5A- 10+00.00 TO 16+50.00	5495		2583		2912
-Y8- 10+00.00 TO 14+05.00	1165		4354	3189	
-Y8- 17+75.00 TO 22+50.00	6956		3710		3246
TOTAL SUMMARY NO. 3	32975		96763	85387	21599
SUMMARY NO. 4					
-L- 93+16.50 TO 104+00.00	331		71847	71516	
TOTAL SUMMARY NO. 4	331		71847	71516	0
SUMMARY NO. 5					
-L- 104+00.00 TO 126+00.00	23246		70524	47278	
-YRPBD- 15+71.37 TO 49+00.00	365321		18167		347154
-YRPB- 16+00.00 TO 19+54.15	7390		765		6625
-YLPB- 18+53.07 TO 20+00.00	31		1063	1032	
-YRPC- 18+00.00 TO 22+60.00	819		4181	3362	
TOTAL SUMMARY NO. 5	396807		94699	51672	353780
SUMMARY NO. 6					
-L- 136+00.00 TO 139+15.00	231		657	426	
-Y- 122+50.00 TO 132+00.00	1845		9543	7698	
-Y- 144+00.00 TO 149+70.86	109		7381	7272	
-Y- 151+13.81 TO 179+75.00	21332		8620		12712
-YRPAB- 20+50.00 TO 23+32.21	18239		654		17585
-YRPA- 18+06.75 TO 26+44.12	21453		14985		6469
-YRPBD- 49+00.00 TO 57+00.00	75218		0		75218
-YRPD- 17+83.42 TO 24+03.38	47684		18606		29078
-SR1- 2+00.00 TO 36+68.36	39860		22465		17395
TOTAL SUMMARY NO. 6	225971		82910	15395	158456
SUMMARY NO. 7					
-L- 140+60.00 TO 170+00.00	38336		30223		8113
-Y10A- 10+50.00 TO 23+08.06	1490		171		1319
TOTAL SUMMARY NO. 7	39826		30395	0	9432
SUB-TOTAL	778915		549197	322378	552096
ADDITIONAL UNDERCUT					
EST. LOSS DUE TO CLEAR. & GRUB.					
SUB-TOTAL					
WASTE IN LIEU OF BORROW				-322378	-322378
GRAND TOTALS	778915		549197	0	229718
SAY	779000				229800

PROJECT REFERENCE NO. I-3819A
SHEET NO. 3-A

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	4
R/W SHEET NO.	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NC GRID NAD 83

-MATCHLINE- STA. 33+00.00 -L- SEE SHEET NO. 5

REVISIONS

8/17/99

ARTS AND SCIENCE MUSEUM, INC.
DB 812 PG 66

-BY3- 291 POT 5+00.00

-BY3- 292 PINC 8+55.38 =
-L- 25+28.13 (146.36' LT)

"DEED OVERLAP"
THE ABNER PARTNERSHIP
VS
ARTS AND SCIENCE MUSEUM, INC.

ARTS AND SCIENCE MUSEUM, INC.
DB 812 PG 66

CITY OF STATESVILLE
DB 22 PG 419

-BY3- 293 PINC 13+57.85
-L- 30+28.80 (103.88' LT)

-L- TS 31+11.38

STATESVILLE CHRISTIAN SCHOOL, INC.
DB 1313 PG 2383

-BLW- 25 PINC 13+66.87 =
-L- 25+62.78 (56.91' LT)

-BLE- 2 PINC 14+33.06 =
-L- 26+61.88 (56.38' RT)

BEGIN TIP PROJECT I-3819A
BEGIN CONSTRUCTION
-L- POT 26+00.00

N 73° 53' 18.3" E

-L- 1-40

Pls Sta 32+44.72	PI Sta 38+68.72
Θs = 0° 28' 53.3"	Δ = 5° 21' 46.6" (RT)
Ls = 200.00'	D = 0° 28' 53.3"
LT = 133.33'	L = 1,113.85'
ST = 66.67'	T = 557.33'
	R = 11,900.00'
	SE = NC

NOTE: NOISE WALL LOCATIONS ARE SUBJECT TO CHANGE BASED ON APPROVAL. THEREFORE; WALL LOCATIONS SHOWN HAVE NOT BEEN COMPLETELY COORDINATED WITH HYDRO DESIGN.

LEGEND
- PAVED SHOULDER
- APPROACH SLAB
- PAVEMENT REMOVAL

FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S
FOR -L- PROFILE, SEE SHEET NO. 24 & 25

4/23/2010
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PROJECT REFERENCE NO.	SHEET NO.
I-3819A	5
R/W SHEET NO.	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

MULKEY ENGINEERS & CONSULTANTS

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

-L- I-40

PIs Sta 32+44.72
Θs = 0° 28' 53.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 38+68.72
Δ = 5° 21' 46.6" (RT)
D = 0° 28' 53.3"
L = 1,113.85'
T = 557.33'
R = 11,900.00'
SE = NC
DS = 60 mph

PIs Sta 44+91.90
Θs = 0° 28' 53.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-Y1-

PI Sta 14+25.14
Δ = 10° 26' 16.0" (LT)
D = 4° 10' 55.8"
L = 249.58'
T = 125.14'
R = 1,370.00'
SE = 03
Runoff = 63'
DS = 40 mph

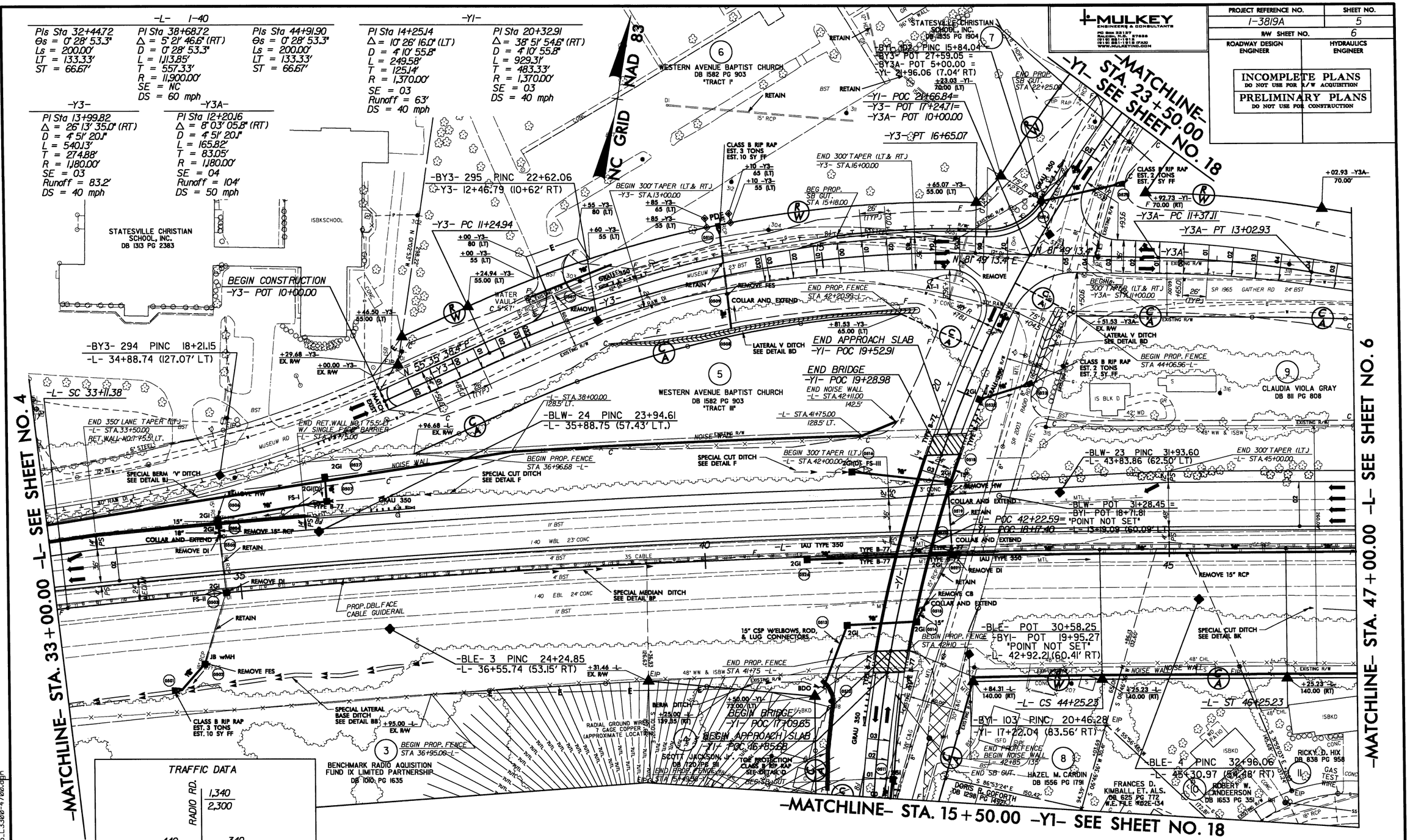
PI Sta 20+32.91
Δ = 38° 51' 54.6" (RT)
D = 4° 10' 55.8"
L = 929.31'
T = 483.33'
R = 1,370.00'
SE = 03
DS = 40 mph

-Y3-

PI Sta 13+99.82
Δ = 26° 13' 35.0" (RT)
D = 4° 51' 20.1"
L = 540.13'
T = 274.88'
R = 1,180.00'
SE = 03
Runoff = 83.2'
DS = 40 mph

-Y3A-

PI Sta 12+20.16
Δ = 8° 03' 05.8" (RT)
D = 4° 51' 20.1"
L = 165.82'
T = 83.05'
R = 1,180.00'
SE = 04
Runoff = 104'
DS = 50 mph



NOTE: NOISE WALL LOCATIONS ARE SUBJECT TO CHANGE BASED ON APPROVAL. THEREFORE; WALL LOCATIONS SHOWN HAVE NOT BEEN COMPLETELY COORDINATED WITH HYDRO DESIGN.

FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S
FOR -L- PROFILE, SEE SHEET NO. 25
FOR -Y1- PROFILE, SEE SHEET NO. 44
FOR -Y3- PROFILE, SEE SHEET NO. 45
FOR -Y3A- PROFILE, SEE SHEET NO. 46
FOR PAVEMENT-BRIDGE RELATIONSHIP SKETCHES, SEE SHEET NO. 2-AS

LEGEND
- PAVED SHOULDER
- APPROACH SLAB
- PAVEMENT REMOVAL

4/23/2010
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PROJECT REFERENCE NO.	SHEET NO.
I-3819A	6
R/W SHEET NO.	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

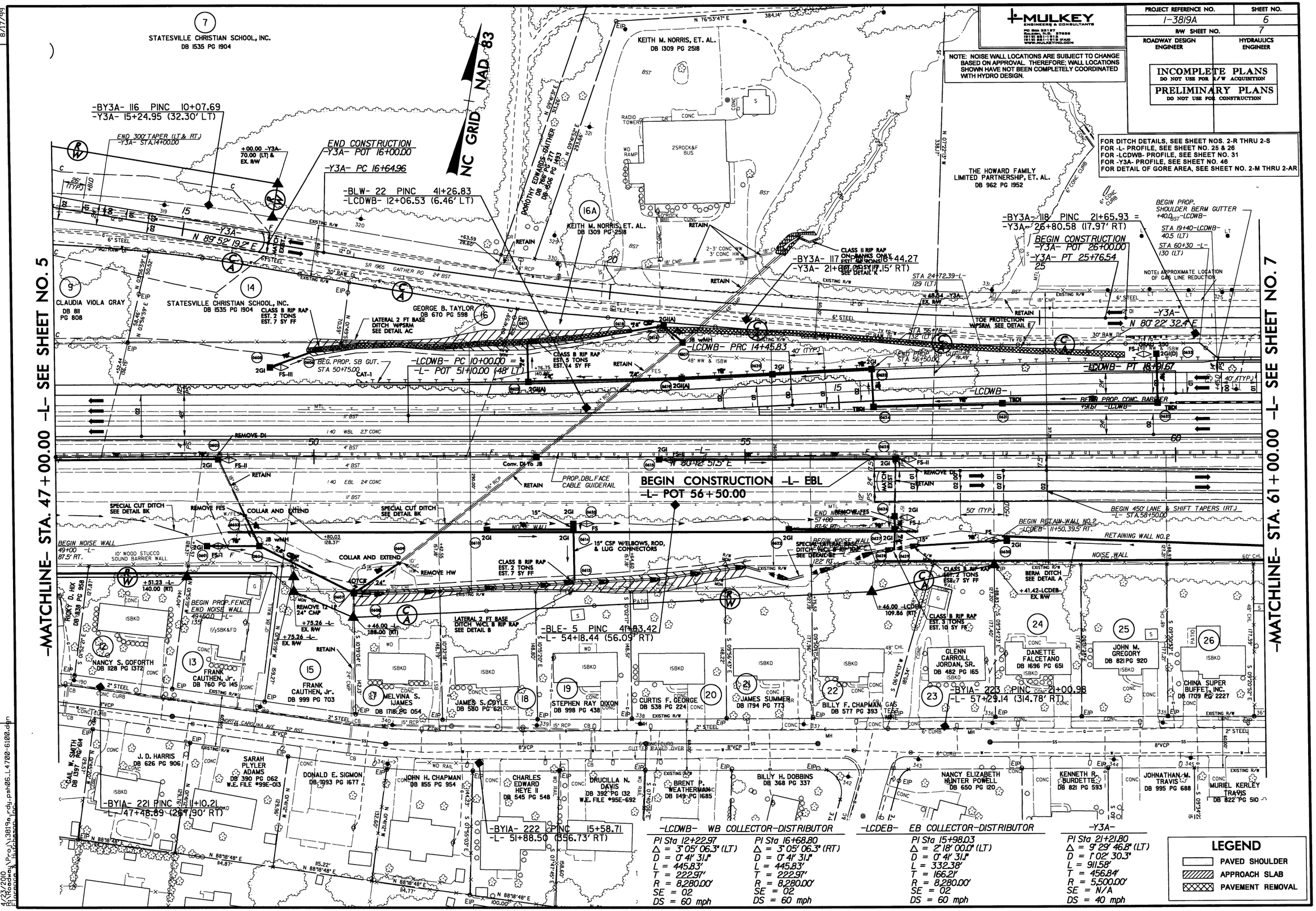
MULKEY ENGINEERS & CONSULTANTS

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NOTE: NOISE WALL LOCATIONS ARE SUBJECT TO CHANGE BASED ON APPROVAL. THEREFORE; WALL LOCATIONS SHOWN HAVE NOT BEEN COMPLETELY COORDINATED WITH HYDRO DESIGN.

FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S
FOR -L- PROFILE, SEE SHEET NO. 25 & 26
FOR -LCDWB- PROFILE, SEE SHEET NO. 31
FOR -Y3A- PROFILE, SEE SHEET NO. 46
FOR DETAIL OF GORE AREA, SEE SHEET NO. 2-M THRU 2-AR



REVISIONS

8/17/99

4/23/2010

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	7
R/W SHEET NO.	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127 Raleigh, N.C. 27636 (919) 851-1912 (919) 851-1918 (FAX) www.MULKEYINC.COM

FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S
FOR -L- PROFILE, SEE SHEET NO. 26
FOR -LCDWB- PROFILE, SEE SHEET NO. 31
FOR -Y3A- PROFILE, SEE SHEET NO. 46 & 47
FOR -Y4RPB- PROFILE, SEE SHEET NO. 50
FOR -Y4RPC- PROFILE, SEE SHEET NO. 51
FOR DETAIL OF GORE AREA, SEE SHEET NOS. 2-AM THRU 2-AR

-Y3A-
PI Sta 31+70.21
Δ = 0° 26' 03.5" (LT)
D = 0° 11' 37.5"
L = 224.14'
T = 112.07'
R = 29,570.00'
SE = NC
DS = 60 mph

PI Sta 37+60.69
Δ = 4° 53' 58.0" (RT)
D = 1° 08' 45.3"
L = 427.56'
T = 213.91'
R = 5,000.00'
SE = NC
DS = 40 mph

PI Sta 42+00.20
Δ = 18° 43' 24.3" (LT)
D = 4° 10' 55.8"
L = 447.70'
T = 225.86'
R = 1,370.00'
SE = 03
Runoff = 63'
DS = 40 mph

-MATCHLINE- STA. 61+00.00 -L- SEE SHEET NO. 6

-MATCHLINE- STA. 75+00.00 -L- SEE SHEET NO. 8

THE HOWARD FAMILY LIMITED PARTNERSHIP, ET. AL. DB 962 PG 1952

THE HOWARD FAMILY LIMITED PARTNERSHIP, ET. AL. DB 962 PG 1949

LOU M. BELL, ET. AL. DB 962 PG 1955

RUCHIKA, LLC DB 1821 PG 1494

KEITH S. RAINWATER, ET. AL. DB 1083 PG 795

ARTHUR OLAND DB 1679 PG 1708

PHYLLIS ELDER STEWART DB 786 PG 771

WILLIAM L. BOYD DB 1546 PG 2367

CITY OF STATESVILLE BOARD OF EDUCATION DB 323 PG 212

ROBERT GLENN HAITHCOX DB 467 PG 389

KELLY L. RUDISILL DB 671 PG 591

HARRY W. CAMPBELL DB 505 PG 241 W.E. FILE #99-641

WILLIAM LARRY CAMPBELL DB 1220 PG 113

LARRY J. SNODDY

NORTHVIEW PROFESSIONAL PARK CONDOMINIUMS DB 541 PG 575 DB 693 PG 836 DB 693 PG 809 DB 693 PG 783 DB 922 PG 1214

-BLW- 21 PINC 50+44.37
-LCDWB- 21+24.28 (6.94' RT)

-BY3A- 119 PINC 27+94.81
-Y3A- 33+09.33 (17.34' RT)

-BY3A- 120 PINC 35+20.49
-Y3A- 40+35.08 (6.22' LT)

-Y4RPB- TS 10+00.00 =
-LCDWB- POC 33+04.06 (24' LT)

-Y3A- PC 30+58.14
-Y3A- PT 32+82.28
-Y3A- PRC 39+74.34
-Y3A- PC 35+46.78
-Y3A- N 79° 56' 28.9" E
N 80° 22' 32.4" E
SR 1965 GAITHER RD 24' BST
-LCDWB- N 80° 12' 51.5" E
-LCDWB- PC 26+90.31
-L- N 80° 12' 51.5" E
-L- PC 67+99.88
N 82° 30' 51.5" E
-BLW- 20 PINC 59+03.17
-LCDWB- 29+93.18 (5.43' RT)
-Y4RPC- POT 6+87.23 =
-L- POT 66+40.00 (48' RT)
Δ = 2° 18'
-Y4RPC- PC 7+72.50
-Y4RPC- PRC 13+83.43
-BLE- 6 PINC 51+00.39
63+35.40 (57.28' RT)
-BLE- 7 PINC 59+92.67 =
-L- 66+00.00 =
(56.50' RT)
-BYIA- 224 ROT 27+30.68
-L- 63+58.25 (342.05' RT)
-BY2- 233 PINC 7+59.22
-Y4RPC- 13+22.57 (206.17' RT)

BEGIN 300' TAPER (LT) -LCDWB- STA.24+00.00
BEGIN PROP. SHOULDER BERM GUTTER -Y3A-
END 300' TAPER (LT) -LCDWB- STA.27+00.00
END 450' LANE & SHIFT TAPERS (RT) -L- STA.63+00.00
PROP. RETAINING WALL NO.2
PROP. NOISE WALL
PROP. SHOULDER BERM GUTTER
PROP. DBL. FACE CABLE GUIDERAIL
RIP RAP @ EMBANKMENT SEE DETAIL W
DRY DETENTION BASIN
NOTE: NOISE WALL LOCATIONS ARE SUBJECT TO CHANGE BASED ON APPROVAL. THEREFORE; WALL LOCATIONS SHOWN HAVE NOT BEEN COMPLETELY COORDINATED WITH HYDRO DESIGN.

-L- I-40
PI Sta 71+91.14
Δ = 2° 38' 12.7" (RT)
D = 0° 20' 13.3"
L = 782.37'
T = 391.26'
R = 17,000.00'
SE = NC
DS = 75 mph

-LCDWB- WB COLLECTOR-DISTRIBUTOR
PI Sta 30+83.22
Δ = 2° 38' 12.7" (RT)
D = 0° 20' 08.2"
L = 785.69'
T = 392.91'
R = 17,072.00'
SE = NC
DS = 75 mph

-Y4RPC- RAMP C
PI Sta 10+78.23
Δ = 5° 50' 02.4" (RT)
D = 0° 57' 17.7"
L = 610.93'
T = 305.73'
R = 6,000.00'
SE = 02
DS = 50 mph

PI Sta 15+83.52
Δ = 3° 16' 28.2" (LT)
D = 0° 49' 06.6"
L = 400.06'
T = 200.08'
R = 7,000.00'
SE = 02
DS = 50 mph

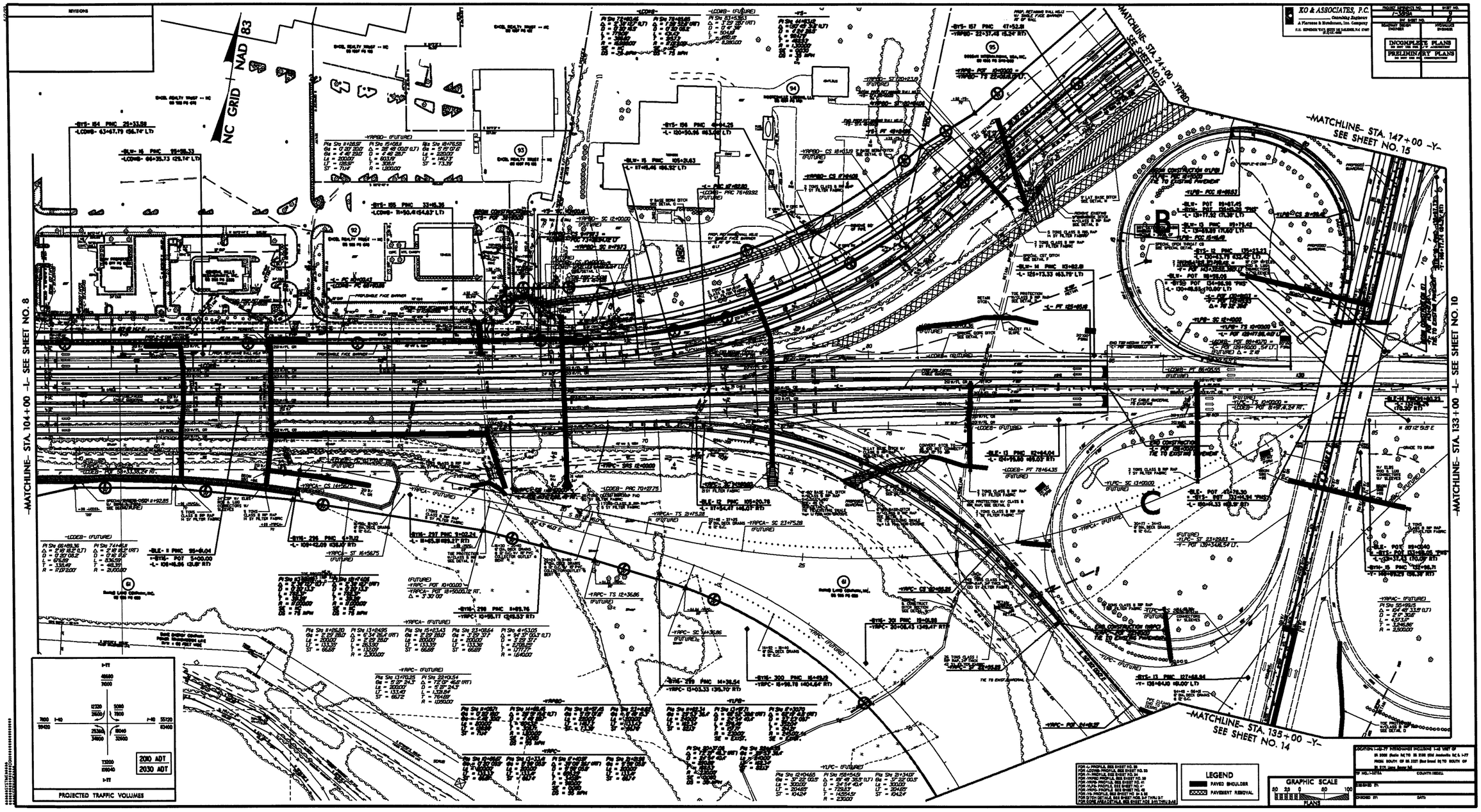
LEGEND
- PAVED SHOULDER
- APPROACH SLAB
- PAVEMENT REMOVAL

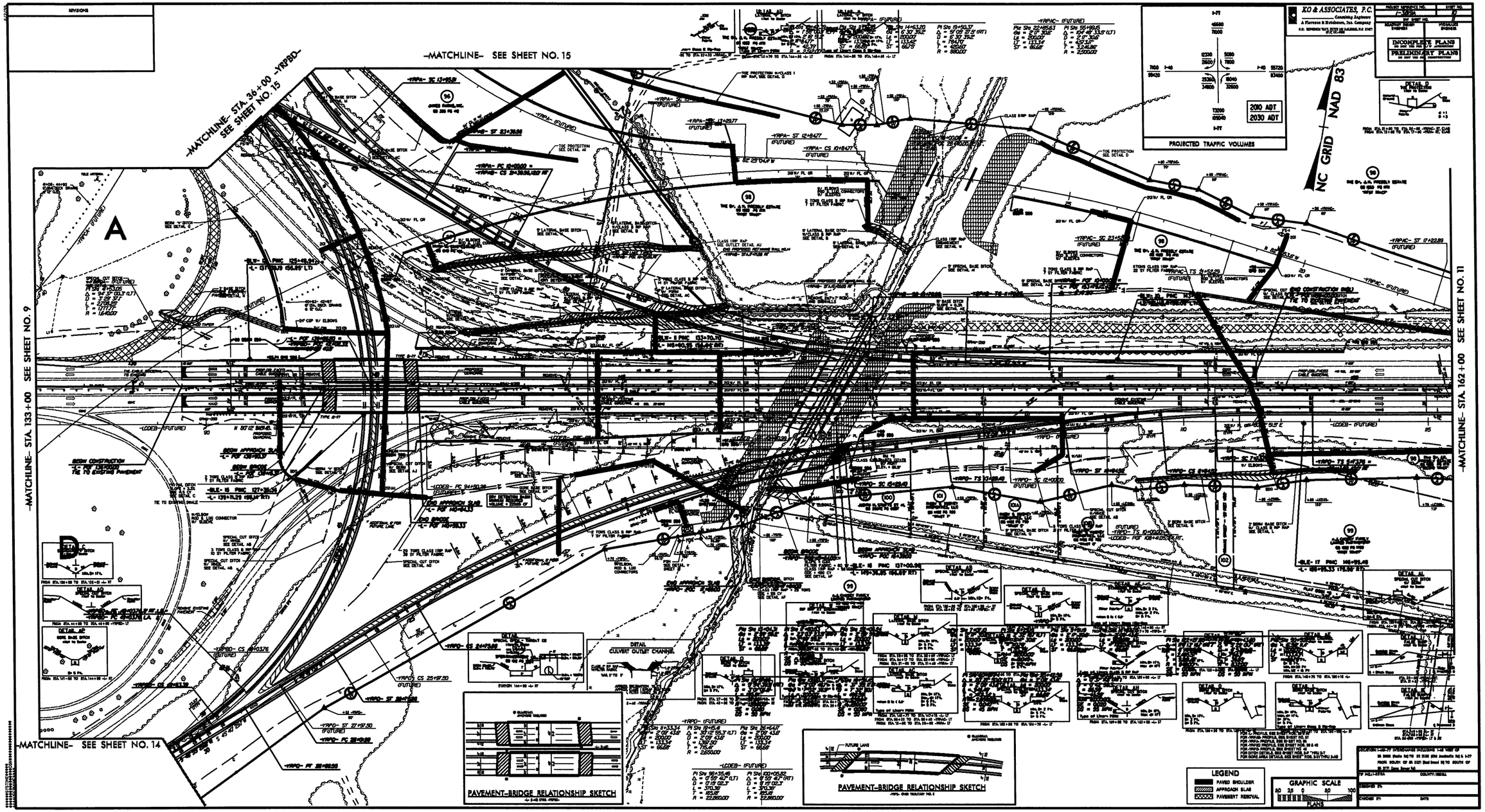
REVISIONS

8/17/99

4/23/2010

SEE SHEET NO. 20
-MATCHLINE-
STA. 15+00.00 -Y8-
SEE SHEET NO. 20
-MATCHLINE- STA. 35+00.00 -Y4-
SEE SHEET NO. 20
-MATCHLINE-
STA. 14+50.00 -Y5-
NC GRID NAD 83
MULKEY
TRAFFIC DATA
-MATCHLINE- STA 75+00.00 -L- SEE SHEET NO. 7
-MATCHLINE- STA 104+00.00 -L- SEE SHEET NO. 9
-MATCHLINE- STA. 20+50.00 -Y4- SEE SHEET NO. 19
-LCDEB- FUT. EB COLLECTOR-DISTRIBUTOR
-Y4RPD- FUTURE RAMP D
LEGEND
PAVED SHOULDER
APPROACH SLAB
PAVEMENT REMOVAL
GRAPHIC SCALE
PLANS
REVISIONS


REVISIONS
NC GRID NAD 83
-MATCHLINE- STA. 104+00 -L- SEE SHEET NO. 8
-MATCHLINE- STA. 133+00 -L- SEE SHEET NO. 10
-MATCHLINE- STA. 147+00 -Y- SEE SHEET NO. 15
-MATCHLINE- STA. 135+00 -Y- SEE SHEET NO. 14
-MATCHLINE- STA. 24+00 -YRPD- SEE SHEET NO. 15
B
C
2010 ADT
2030 ADT
PROJECTED TRAFFIC VOLUMES
LEGEND
PAVED SHOULDER
PAVEMENT REMOVAL
GRAPHIC SCALE
PLANS
XO & ASSOCIATES, P.C.
Consulting Engineers
A Parsons & Brinckerhoff, Inc. Company
INCOMPLETE PLANS
PRELIMINARY PLANS
COUNTY: IREDELL


-MATCHLINE- SEE SHEET NO. 15
-MATCHLINE- STA. 36+00 -YRPBD- SEE SHEET NO. 15
-MATCHLINE- STA. 133+00 SEE SHEET NO. 9
-MATCHLINE- STA. 162+00 SEE SHEET NO. 11
-MATCHLINE- SEE SHEET NO. 14
NC GRID NAD 83
KO & ASSOCIATES, P.C.
Consulting Engineers
A Flowers & Kittelsson, Inc. Company
INCOMPLETE PLANS
PRELIMINARY PLANS
PROJECTED TRAFFIC VOLUMES
2010 ADT
2030 ADT
DETAIL D
PAVEMENT-BRIDGE RELATIONSHIP SKETCH
DETAIL
CULVERT OUTLET CHANNEL
LEGEND
PAVED SHOULDER
APPROACH SLAB
PAVEMENT REMOVAL
GRAPHIC SCALE
PLANS

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingsdown Way, Suite 100 Raleigh, NC 27607
NC License No: F-0268

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	11
R/W SHEET NO.	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

NC GRID NAD 83

-MATCHLINE- STA. 162+00 -L- SEE SHEET NO. 10

-MATCHLINE- STA. 176+00 -L- SEE SHEET NO. 12

-YRPAC- (FUTURE)

PIs Sta 12+53.36	PI Sta 14+21.60	PIs Sta 15+89.59
Θs = 3° 47' 39.9"	Δ = 7° 41' 55.1" (RT)	Θs = 3° 47' 39.9"
Ls = 200.00'	D = 3° 47' 39.9"	Ls = 200.00'
LT = 133.36'	L = 202.89'	LT = 133.36'
ST = 66.69'	T = 101.60'	ST = 66.69'
	R = 1,510.00'	

98
THE Dr. J. H. PRESSLY ESTATE
DB 1653 PG 1771
"FIRST TRACT"

-BLW- 9 PINC 153+47.66
-L- 165+37.91 (56.76' LT)

-BY15A- 250 POT 5+00.00
-L- 170+04.83 (132.24' LT)

-BY15A- 251 PINC 10+74.41
-L- 175+78.59 (104.94' LT)

-BLW- 8 PINC 163+31.79
-L- 175+21.97 (69.15' LT)

-YRPAC- CS 15+22.89
(FUTURE)

-YRPAC- SC 13+20.00
(FUTURE)

-YRPAC- TS 11+20.00
(FUTURE)

(FUTURE)
-YRPAC- POT 10+00.00 =
-L- POT 168+75.00 .60' LT.
Δ = 2° 18'

BM #10
-BY15A- STA 5+50
140' RIGHT
ELEV. = 870.75'

3 TONS CLASS B RIP RAP
10 SY FILTER FABRIC

REMOVE EXISTING PAVEMENT

PROP. WW FENCE

BEGIN 12' PAVED SHOULDER
-L- STA. 170+55.00

SAW CUT PAVEMENT 12' OUTSIDE EDGE OF TRAVEL LANE

REMOVE EXISTING GUARDRAIL

PROP. DBL. FACED CABLE GUIDERAIL

N 80° 12' 51.5" E

82° 30' 51.5" W

TIE CABLE GUIDERAIL TO EXISTING

REMOVE EXISTING CABLE GUIDERAIL

REMOVE EXISTING PAVEMENT

BEGIN 300' LANE TAPER
-L- POT 165+20.00

END 300' LANE TAPER
-L- POT 168+20.00

100' TAPER TO EXIST.

SPECIAL CUT DITCH W/HINGE SEE DETAIL AB

STANDARD BERM DITCH SEE DETAIL Z

REMOVE AND GRADE TO DRAIN

STD. BERM DITCH w/ CLASS B RIP RAP SEE DETAIL G

-LCDEB- PC 120+00.31
(FUTURE)

-LCDEB- PRC 124+46.15
(FUTURE)

(FUTURE)
-LCDEB- PT 128+91.95
-L- POT 175+41.24, 48' RT.

END CONSTRUCTION (EBL)
-L- POT 170+00.00
TIE TO EXISTING PAVEMENT

-BLE- 18 PINC 155+57.12
-L- 167+92.89 (64.53' RT)

98
The Dr. J.H. PRESSLY ESTATE
DB 1653 PG 1771
"SECOND TRACT"

99
A.J. CAUSEY FAMILY LIMITED PARTNERSHIP
DB 1222 PG 1409
"FIRST TRACT"

103
ROBERT B. CASHION, ET. AL.
DB 726 PG 958

104
JAMES RENTALS, L.L.C.
DB 1714 PG 271
DB 760 PG 854
"TRACT 4"

104A
JAMES RENTALS, L.L.C.
DB 1714 PG 271
DB 760 PG 854
"TRACT 3"

105
VOLK FAMILY LIMITED PARTMERSHIP
DB 1177 PG 2053

105A
MATHURDAS MAHIDAS KOTHADIA
DB 985 PG 2004
"TRACT 3"

-LCDEB- (FUTURE)

PI Sta 122+23.28	PI Sta 126+69.12
Δ = 3° 05' 06.3" (LT)	Δ = 3° 05' 06.3" (RT)
D = 0° 41' 31.1"	D = 0° 41' 31.1"
L = 445.83'	L = 445.83'
T = 222.97'	T = 222.97'
R = 8,280.00'	R = 8,280.00'

LEGEND
PAVED SHOULDER
PAVEMENT REMOVAL

FOR -L- PROFILE, SEE SHEET NO. 30
FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S

REVISIONS

8/17/99

4/22/2010
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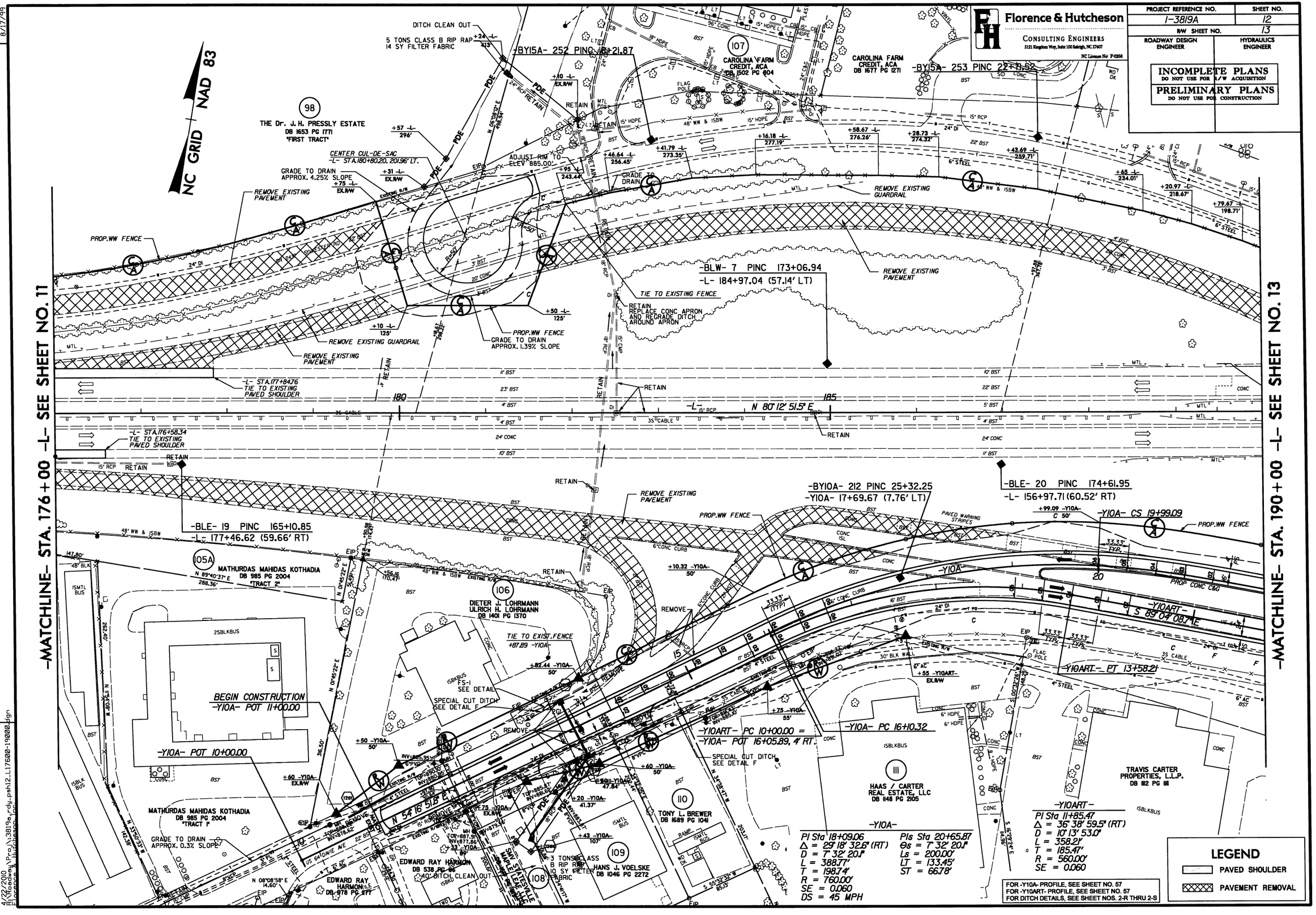
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	12
R/W SHEET NO.	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

8/17/99

4/22/2010
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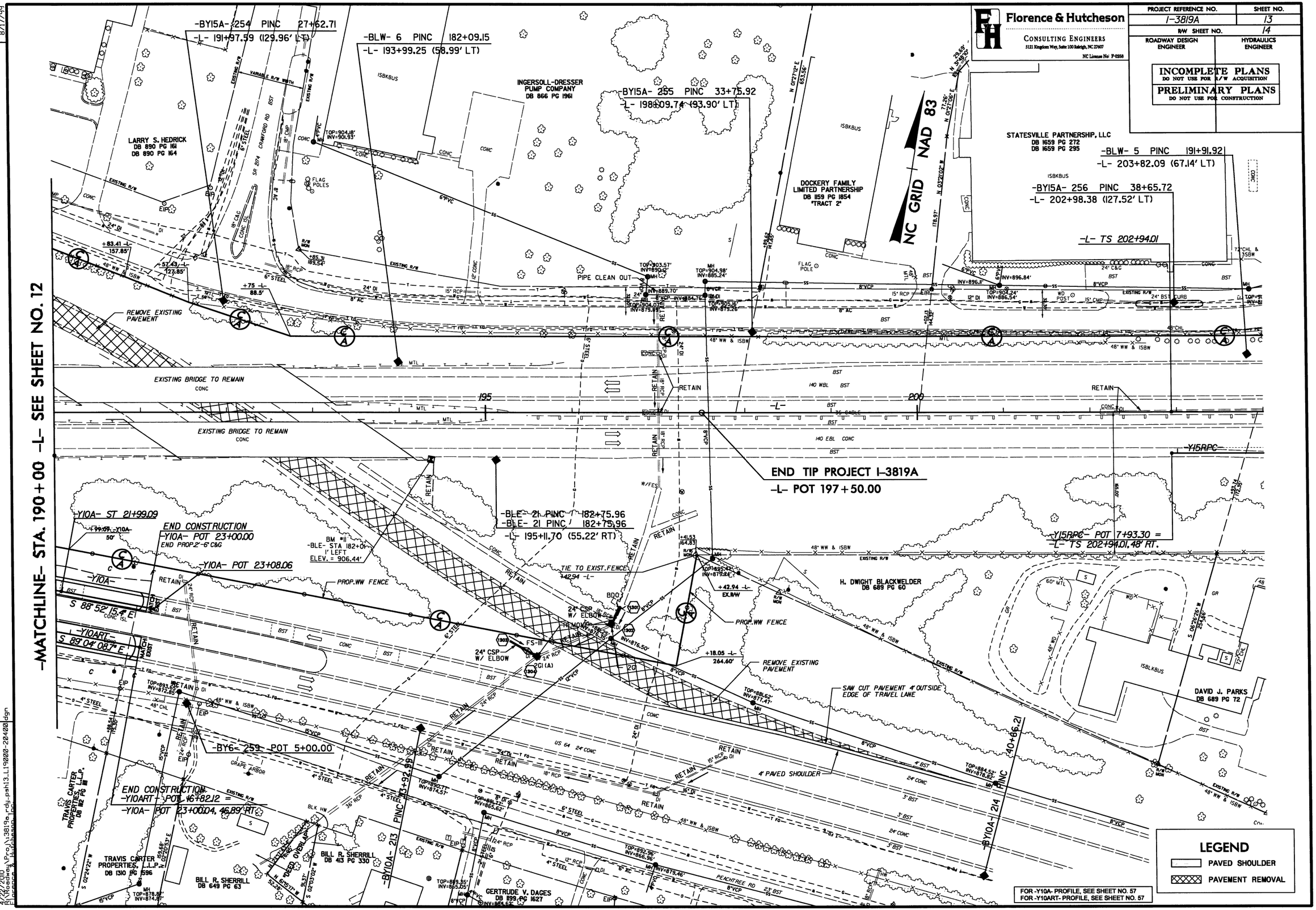
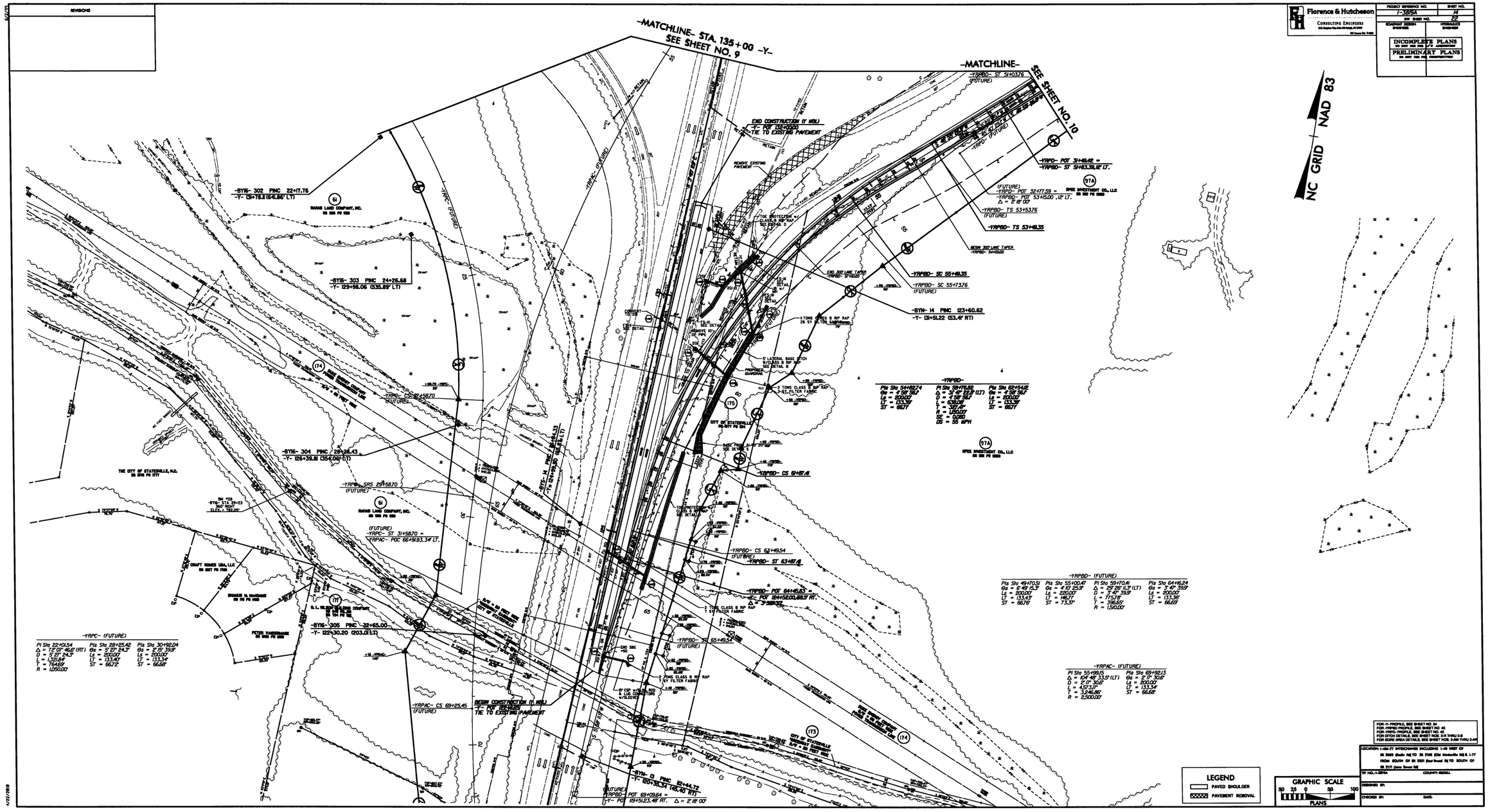

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258
PROJECT REFERENCE NO.
1-3819A
SHEET NO.
13
R/W SHEET NO.
14
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
8/17/99
REVISIONS
-MATCHLINE- STA. 190+00 -L- SEE SHEET NO. 12
-BY15A- 254 PINC 27+62.71
-L- 191+97.59 (129.96' LT)
-BLW- 6 PINC 182+09.15
-L- 193+99.25 (58.99' LT)
INGERSOLL-DRESSER PUMP COMPANY
DB 866 PG 1961
-BY15A- 255 PINC 33+75.92
-L- 198+09.74 (93.90' LT)
LARRY S. HEDRICK
DB 890 PG 161
DB 890 PG 164
DOCKERY FAMILY LIMITED PARTNERSHIP
DB 1159 PG 1854
"TRACT 2"
NC GRID NAD 83
STATESVILLE PARTNERSHIP, LLC
DB 1659 PG 272
DB 1659 PG 295
-BLW- 5 PINC 191+91.92
-L- 203+82.09 (67.14' LT)
-BY15A- 256 PINC 38+65.72
-L- 202+98.38 (127.52' LT)
-L- TS 202+94.01
REMOVE EXISTING PAVEMENT
EXISTING BRIDGE TO REMAIN
END TIP PROJECT I-3819A
-L- POT 197+50.00
-Y10A- ST 21+99.09
END CONSTRUCTION
-Y10A- POT 23+00.00
END PROP 2"-6" C&G
-Y10A- POT 23+08.06
-BLE- 21 PINC 182+75.96
-BLE- 21 PINC 182+75.96
-L- 195+11.70 (55.22' RT)
BM #11
-BLE- STA 182+01
1' LEFT
ELEV. = 906.44'
TIE TO EXIST. FENCE
PROP. WW FENCE
H. DWIGHT BLACKWELDER
DB 689 PG 60
-Y15RPC- POT 7+93.30 =
-L- TS 202+94.01, 48' RT.
REMOVE EXISTING PAVEMENT
SAW CUT PAVEMENT 4' OUTSIDE EDGE OF TRAVEL LANE
4' PAVED SHOULDER
DAVID J. PARKS
DB 689 PG 72
-BY6- 259 POT 5+00.00
END CONSTRUCTION
-Y10ART- POT 46+82.12 =
-Y10A- POT 23+00.04, 46.89' RT
TRAVIS CARTER PROPERTIES, L.L.P.
DB 1310 PG 1596
BILL R. SHERRILL
DB 649 PG 63
BILL R. SHERRILL
DB 413 PG 330
GERTRUDE V. DAGES
DB 899 PG 1627
-BY10A- 213 PINC 43+32.99
-BY10A- 214 PINC 40+66.21
LEGEND
PAVED SHOULDER
PAVEMENT REMOVAL
FOR -Y10A- PROFILE, SEE SHEET NO. 57
FOR -Y10ART- PROFILE, SEE SHEET NO. 57
4/22/2010
FLHcadwy\Proj\3819a_rdy_psh13_L190100-20400.dgn

REVISIONS

Florence & Hutcheson
CONSULTING ENGINEERS
2125 Stephen Drive, Suite 100 Raleigh, NC 27607
NC License No. F-0832

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	14
R/W SHEET NO.	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -Y- PROFILE, SEE SHEET NO. 24
FOR -YRPD PROFILE, SEE SHEET NO. 40
FOR -YRPD- PROFILE, SEE SHEET NO. 45
FOR DITCH DETAILS, SEE SHEET NOS. 3-A THRU 3-E
FOR CORE AREA DETAILS, SEE SHEET NOS. 3-AB THRU 3-AF

LOCATION: I-40/I-77 INTERCHANGE INCLUDING I-40 WEST OF SR 2000 (Radio Rd) TO SR 2100 (Old Mocksville Rd) & I-77 FROM SOUTH OF SR 2321 (East Broad Rd) TO SOUTH OF SR 2121 (Jane Sowers Rd)

TIP NO. I-3819A COUNTY: IREDELL

DESIGNED BY:

CHECKED BY: DATE:

4/23/2019

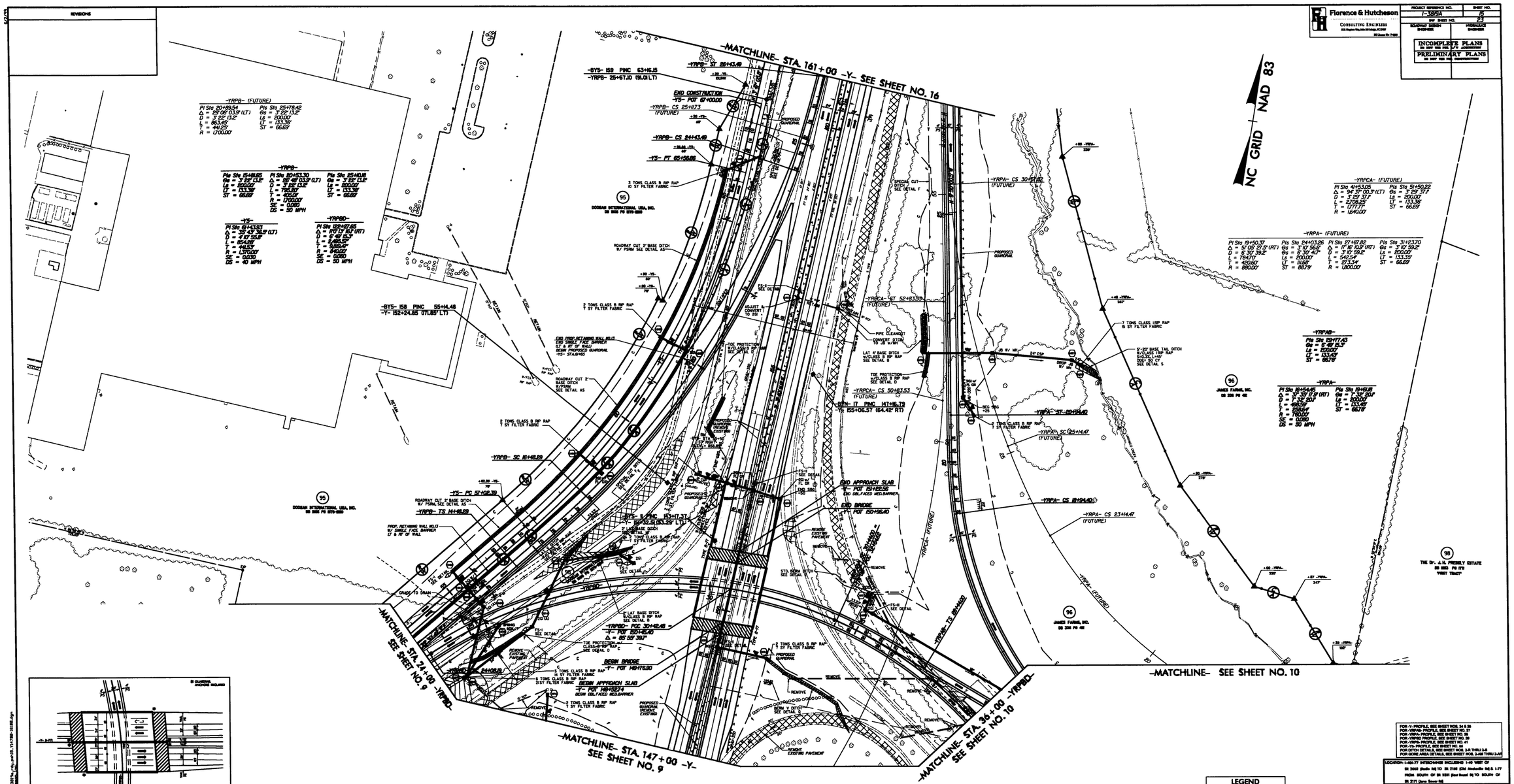
REVISIONS

Florence & Hutcheson
CONSULTING ENGINEERS

PROJECT REFERENCE NO.	SHEET NO.
I-3818A	15
R/W SHEET NO.	23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION PURPOSES

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION PURPOSES



FOR -Y- PROFILE, SEE SHEET NOS. 34 & 35
FOR -YRPAD- PROFILE, SEE SHEET NO. 37
FOR -YRPBD- PROFILE, SEE SHEET NO. 38
FOR -YRPAD PROFILE, SEE SHEET NO. 39
FOR -YRPB- PROFILE, SEE SHEET NO. 41
FOR -YS- PROFILE, SEE SHEET NO. 42
FOR DITCH DETAILS, SEE SHEET NOS. 2-5 THRU 2-8
FOR DONE AREA DETAILS, SEE SHEET NOS. 3-AM THRU 3-AP

LOCATION: I-26/-77 INTERCHANGE INCLUDING I-40 WEST OF SR 2002 (Radio Rd) TO SR 2185 (Old Statesville Rd) & I-77 FROM SOUTH OF SR 2224 (Sun Forest Rd) TO SOUTH OF SR 2171 (Iron Duff Rd)

TIP NO. I-3818A COUNTY: IREDELL

DESIGNED BY:

CHECKED BY: DATE:

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	16
R/W SHEET NO.	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

REVISIONS

8/17/99

NC GRID NAD 83

-MATCHLINE- STA. 161+00 -Y- SEE SHEET NO. 15

-MATCHLINE- STA. 175+00 -Y- SEE SHEET NO. 17

95
DOOSAN INTERNATIONAL USA, INC.
DB 1906 PG 2178-2180

176
CONGRESS STATESVILLE, LLC
DB 1532 PG 1446

96
JAMES FARMS, INC.
DB 336 PG 412

-YRPB- ST 27+11.73 (FUTURE)
-Y- POT 161+66.99, 48' LT.

-YRPB- POT 28+101.91 =
-Y- POT 162+56.93, 39.0' LT.
Δ = 2° 18' 00"

-Y5- POT 73+84.77

-BY5- 160 PINC 70+84.69
-Y- 167+94.74 (150.54 LT)

-BY5- 161 PINC 76+55.74
-Y- 173+65.78 (152.52 LT)

-BYS- 10 PINC 155+20.86
-Y- 163+36.00 (51.72 LT)

END CONSTRUCTION (Y SBL)
-Y- POT 165+49.95
TIE TO EXISTING PAVEMENT

-BYS- 9 PINC 165+53.19
-Y- 173+68.32 (51.06 LT)

-BYN- 18 PINC 156+86.76
-Y- 164+76.54 (63.63 RT)

-BYN- 19 PINC 166+67.05
-Y- 174+56.79 (54.49 RT)

-YRPCA- TS 59+77.37 (FUTURE)

-YRPCA- SC 61+10.73 (FUTURE)

-YRPA- TS 31+58.73

-YRPA- SC 33+58.73

-YRPCA- CS 63+33.24 (FUTURE)

-YRPA- CS 35+12.25

-YRPA- ST 37+12.25 =
-Y- POT 170+72.66, 39.0' RT.

-YRPCA- ST 65+33.24 =
-Y- POT 169+35.00, 60' RT. (FUTURE)

-YRPA- ST 32+57.02 = (FUTURE)
-YRPCA- POT 57+20.00, 12' RT.

SR 2187 GLENWAY DR 24' BST

N 3° 47' 05.8" E

N 5° 58' 11.9" E

N 86° 57' 35" W 7.03'

S 03° 39' 46" W 100.04'

N 86° 57' 35" W 289.51'

10.98' N 86° 57' 35" W

PROPOSED GUARDRAIL

FS-II SEE DETAIL

ADJUST & CONVERT TO 2GI

CONVERT TO 2GI

TIE TO EXISTING GUARDRAIL

RETAIN OTCB

RETAIN SPRING

PROPOSED GUARDRAIL (REMOVE EXISTING)

TIE FILL SLOPE TO EXISTING DITCH

REMOVE DI

COLLAR

2 TONS CLASS B RIP RAP
7 SY FILTER FABRIC

20' x 20' PSRM

SPECIAL CUT DITCH SEE DETAIL E

2GI W/FL GR

END SBG +55

SHOULDER BERM GUTTER

ROCK PLATING @ EMBANKMENT SEE DETAIL R

DROP JB

CLASS I RIP RAP ON BANKS ONLY SEE DETAIL K

TIE TO EXISTING FENCE +51.70

+55 -Y- EX.R/W

+10 -YRPCA- 105'

+70 -YRPCA- 100'

+10 -YRPCA- 250'

+00 -YRPCA- 220'

+65 -YRPCA- 305'

33.33' (TYP)

-YRPCA- (FUTURE)

Pls Sta 61+10.73	Pl Sta 62+55.37	Pls Sta 63+99.94
Θs = 3° 47' 39.9"	Δ = 5° 54' 52.6" (RT)	Θs = 3° 47' 39.9"
Ls = 200.00'	D = 3° 47' 39.9"	Ls = 200.00'
LT = 133.36'	L = 155.88'	LT = 133.36'
ST = 66.69'	T = 78.01'	ST = 66.69'
	R = 1,510.00'	

-YRPA-

Pls Sta 32+92.09	Pl Sta 34+35.56	Pls Sta 35+78.94
Θs = 3° 49' 11.0"	Δ = 5° 51' 50.5" (RT)	Θs = 3° 49' 11.0"
Ls = 200.00'	D = 3° 49' 11.0"	Ls = 200.00'
LT = 133.36'	L = 153.52'	LT = 133.36'
ST = 66.69'	T = 76.83'	ST = 66.69'
	R = 1,500.00'	
	SE = 0.060	
	DS = 45 MPH	

FOR -Y- PROFILE, SEE SHEET NO. 35
FOR -YRPA- PROFILE, SEE SHEET NO. 38
FOR -YRPB- PROFILE, SEE SHEET NO. 41
FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S
FOR GORE AREA DETAILS, SEE SHEET NOS. 2-AM THRU 2-AR

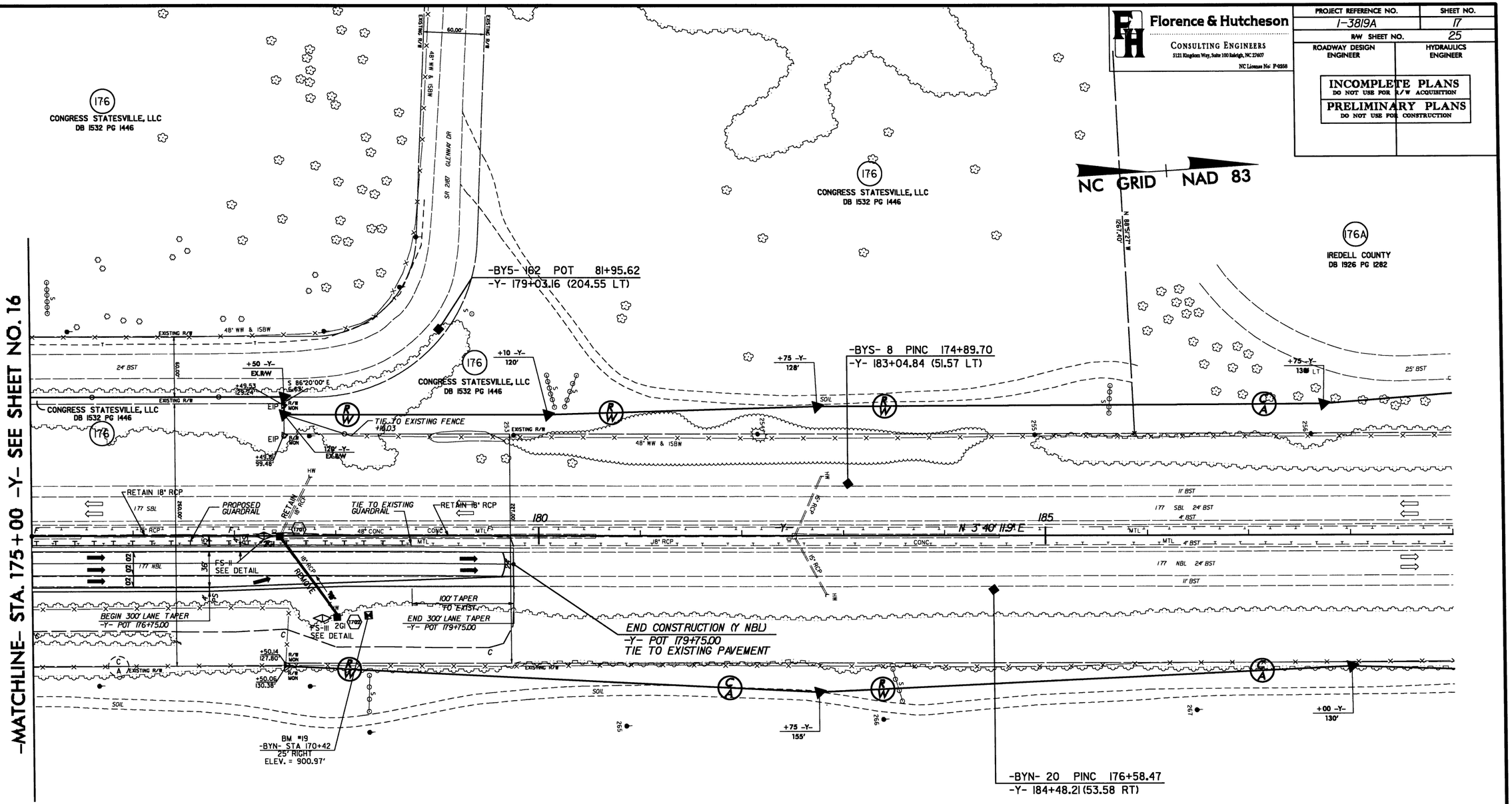
LEGEND
PAVED SHOULDER
PAVEMENT REMOVAL

4/22/2010
R:\Roadway\Proj\3819a_rdy_psh16_Y16100-17500.dgn
florence & hutcheson

Florence & Hutcheson
CONSULTING ENGINEERS
3121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	17
R/W SHEET NO.	25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



FOR -Y- PROFILE, SEE SHEET NOS. 35 & 36
FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S

LEGEND

PAVED SHOULDER

PAVEMENT REMOVAL

REVISIONS

8/17/99

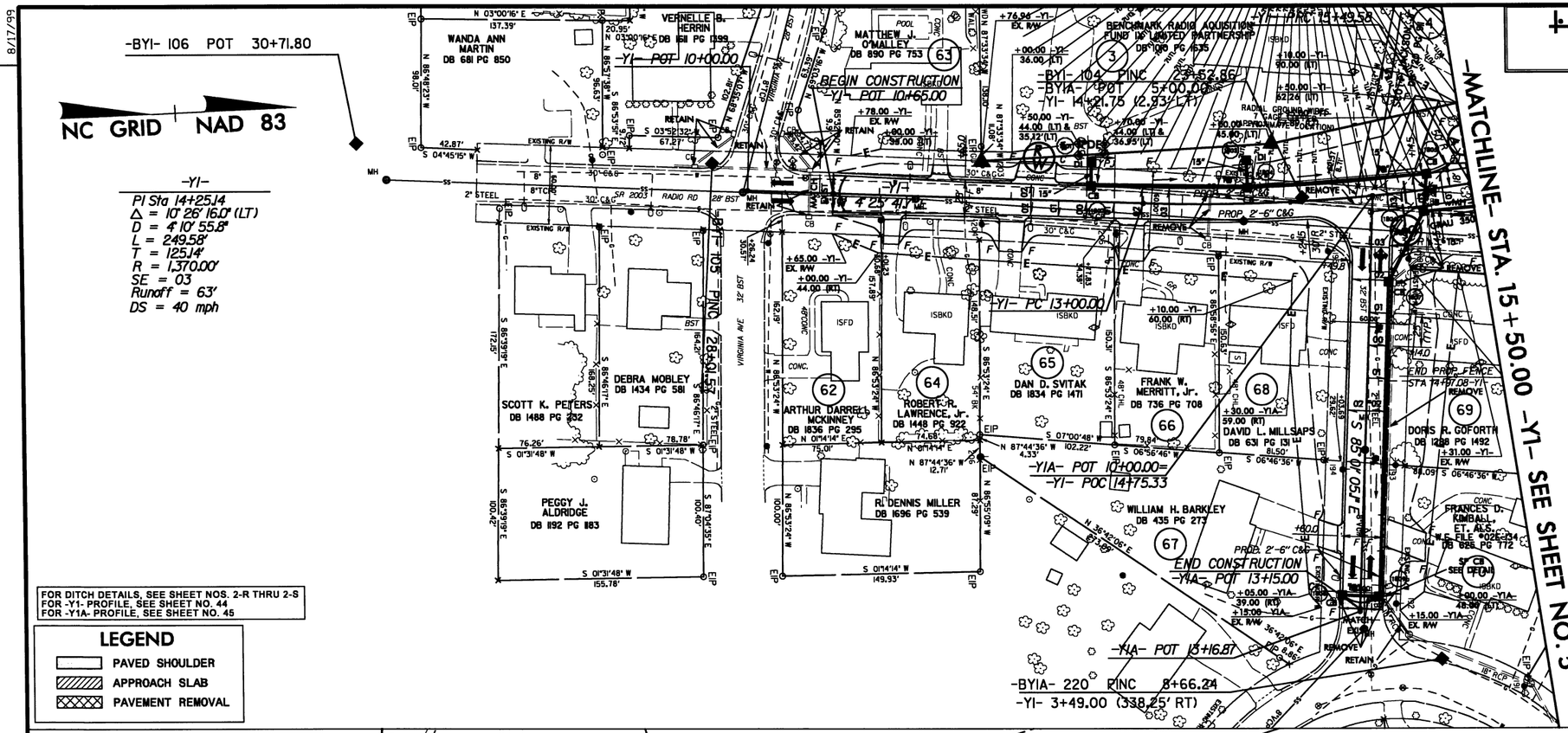
4/22/2010
H:\Feedback\Proj\3819a_rdy_psh17_Y17500-18900.dgn
FLorence & Hutcheson, Inc.

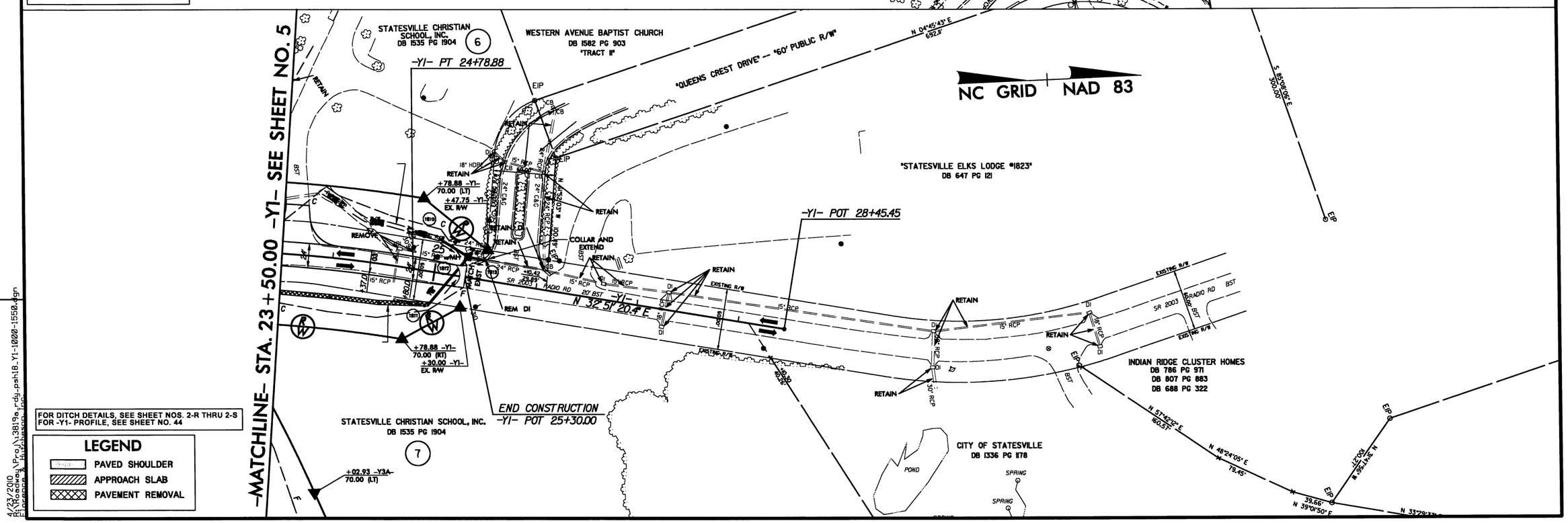
PROJECT REFERENCE NO.	SHEET NO.
1-3819A	18
R/W SHEET NO.	
28	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

MULKEY ENGINEERS & CONSULTANTS

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





REVISIONS

8/17/99

4/23/2010
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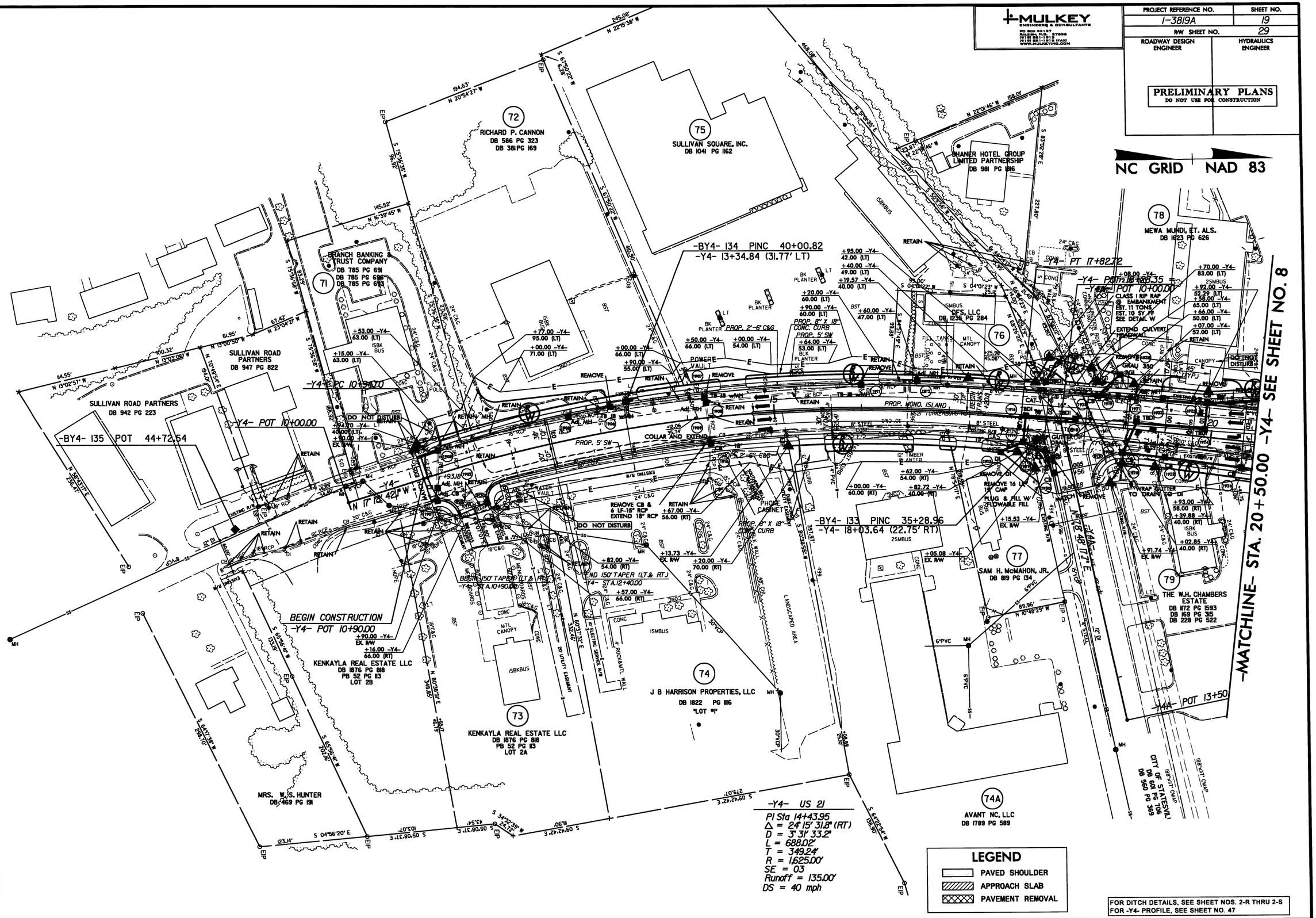
(919) 851-1912 (919) 851-1918 (FAX)
www.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	19
R/W SHEET NO.	
29	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NC GRID NAD 83



FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S
FOR -Y4- PROFILE, SEE SHEET NO. 47

REVISIONS

8/17/09

4/23/2010
Pl:\Roadway\Proj\3819a_rdy_psh19_Y4-1000-2050.dgn
Plot Scale: 1in=20ft

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	20
R/W SHEET NO.	30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

MULKEY ENGINEERS & CONSULTANTS

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y4- US 21
PI Sta 40+38.94
Δ = 21° 01' 58.4" (LT)
D = 3° 01' 53.5"
L = 693.81'
T = 350.85'
R = 1,890.00'
SE = EXIST
DS = 40 mph

-Y5-
PI Sta 11+08.57
Δ = 19° 49' 11.3" (RT)
D = 10° 18' 18.0"
L = 192.33'
T = 97.14'
R = 556.00'
SE = 04
Runoff = 168'
DS = 40 mph

-Y8-
PI Sta 16+04.34
Δ = 72° 36' 06.8" (RT)
D = 10° 44' 58.8"
L = 675.39'
T = 391.54'
R = 533.00'
SE = 04
Runoff = 84'
DS = 40 mph

PI Sta 20+51.42
Δ = 34° 03' 17.3" (LT)
D = 10° 44' 58.8"
L = 316.80'
T = 163.23'
R = 533.00'
SE = 04
Runoff = 84'
DS = 40 mph

NC GRID NAD 83

-BY8- 226 PINC 14+39.50 =
-Y5A- 10+00.00 (32.04' LT)
-Y5A- POT 10+00.00

BEGIN CONSTRUCTION
-Y5A- POT 10+00.00

-BY5- 23 POT 9+30.92 =
-BY5G- POT 15+00.00 =
-Y5A- 12+80.93 (21.76' LT)

END CONSTRUCTION
-Y4- POC 40+80.00

-BY4- 127 PINC 9+75.85
-Y4- 43+28.58 (31.28' RT)

-BY4- 128 PINC 14+15.68
= -BY5- POT 5+00.00
= -BY5A- POT 5+00.00
-Y4- 38+95.45 (35.35' RT)

-Y8- PT 22+78.57=
-Y5A- POT 12+57.99

-Y8- PT 22+04.98

-Y8- PRC 18+88.18

-BY8- 227 PINC 18+74.26 =
-Y8- 17+67.75 (276.32' LT)

END APPROACH SLAB
-Y8- POC 17+98.84

END BRIDGE
-Y8- POC 17+75.00

-BY5B-232 POT 8+46.05 =
-Y8- 19+52.17 (11.23' LT)

-Y4- POC 38+87.21=
-Y5A- PT 16+80.67=
-Y4- POC 38+67.70=
-Y5- PC 10+11.43

-Y4- PC 36+86.09

-Y5- PT 12+03.76

-BY5- 15
PINC 8+93.31 =
Y5- 14+09.54
(28.63' RT)

TRAFFIC DATA

US 21			34,920	44,200
SUNSET HILL RD.	1,280	1,600	7,040	8,000
	7,540	9,700	6,260	8,100
GLENWAY DR.	23,360	27,200	16,320	19,200
2010 AVERAGE			44,200	
2030 DAILY TRAFFIC			55,400	

LEGEND
- PAVED SHOULDER
- APPROACH SLAB
- PAVEMENT REMOVAL

FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S
FOR -Y4- PROFILE, SEE SHEET NO. 48
FOR -Y5- PROFILE, SEE SHEET NO. 53
FOR -Y5A- PROFILE, SEE SHEET NO. 56
FOR -Y8- PROFILE, SEE SHEET NO. 56
FOR PAVEMENT-BRIDGE RELATIONSHIP SKETCHES, SEE SHEET NO. 2-AS

SEE SHEET NO. 8
-MATCHLINE- STA. 15+00.00 -Y8-

-MATCHLINE- STA. 35+00.00 -Y4- SEE SHEET NO. 8

SEE SHEET NO. 8
-MATCHLINE- STA. 14+50.00 -Y5-

REVISIONS

7/6/2010
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11:19:19 AM

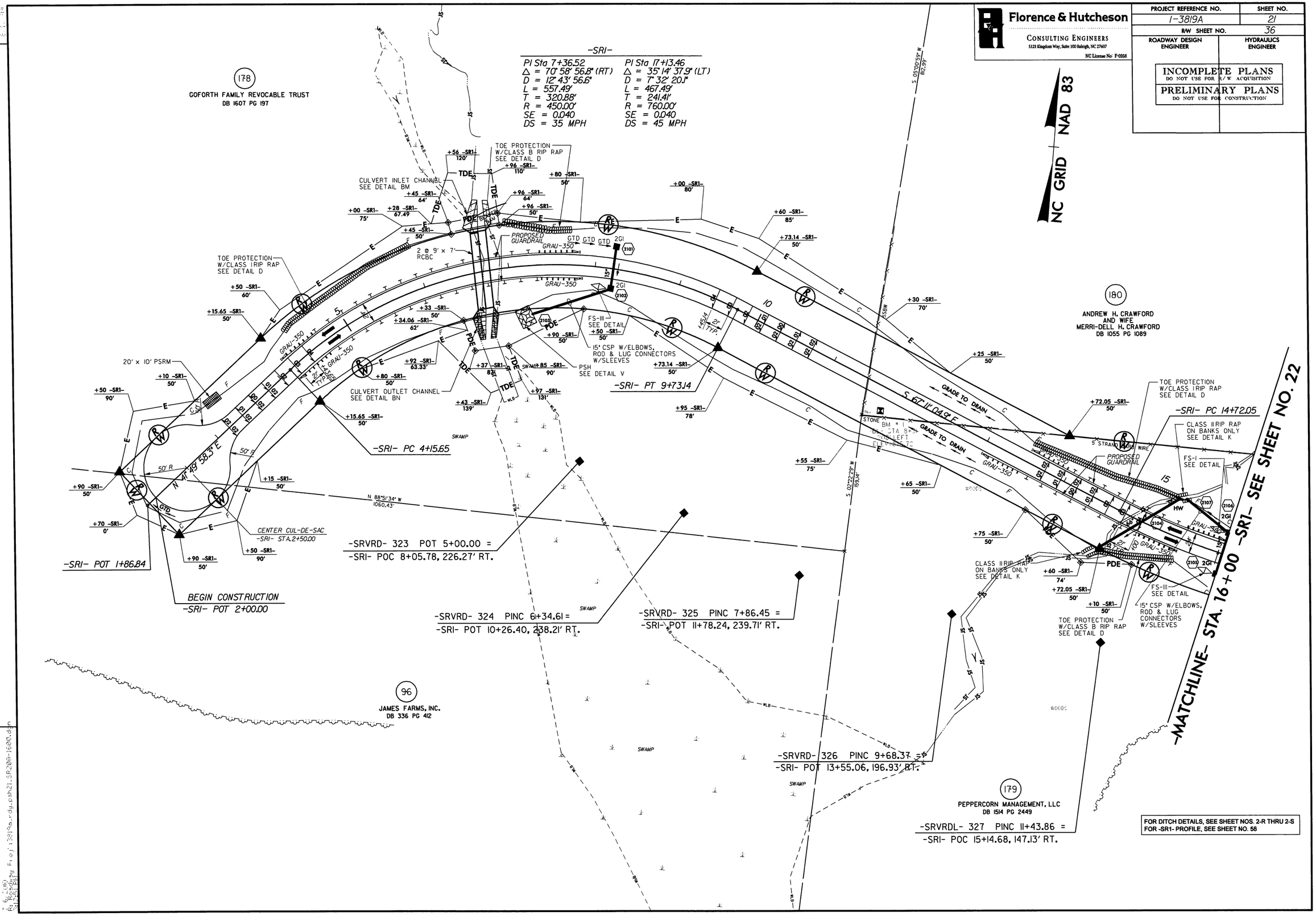
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	21
R/W SHEET NO.	36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

NC GRID NAD 83

REVISIONS



FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S
FOR -SR1- PROFILE, SEE SHEET NO. 58

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	22
R/W SHEET NO.	37
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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CONSULTING ENGINEERS
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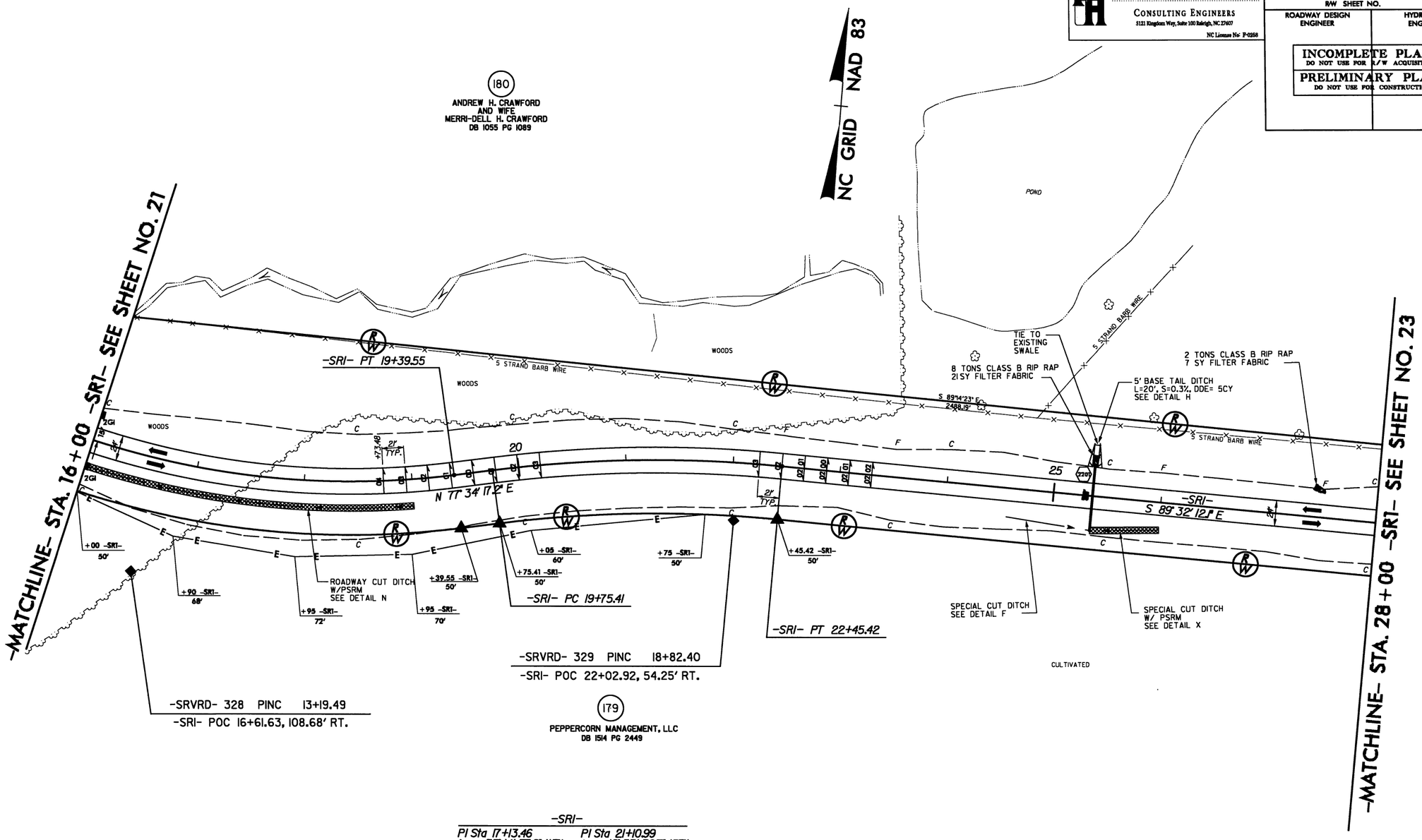
NC License No: F-0258



-SRI-	
PI Sta 17+13.46	PI Sta 21+10.99
Δ = 35°14' 37.9" (LT)	Δ = 12°53' 30.7" (RT)
D = 7° 32' 20.1"	D = 4° 46' 28.7"
L = 467.49'	L = 270.01'
T = 241.41'	T = 135.58'
R = 760.00'	R = 1,200.00'
SE = 0.040	SE = 0.030
DS = 45 MPH	DS = 35 MPH

FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2S
FOR -SR1- PROFILE, SEE SHEET NO. 58

REVISIONS

8/17/99

4/22/2010
R:\Roadway\Proj\3819a_rdy_psh22_SR1600-2800.dgn
FLorence & Hutcheson, Inc.

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	23
R/W SHEET NO.	38
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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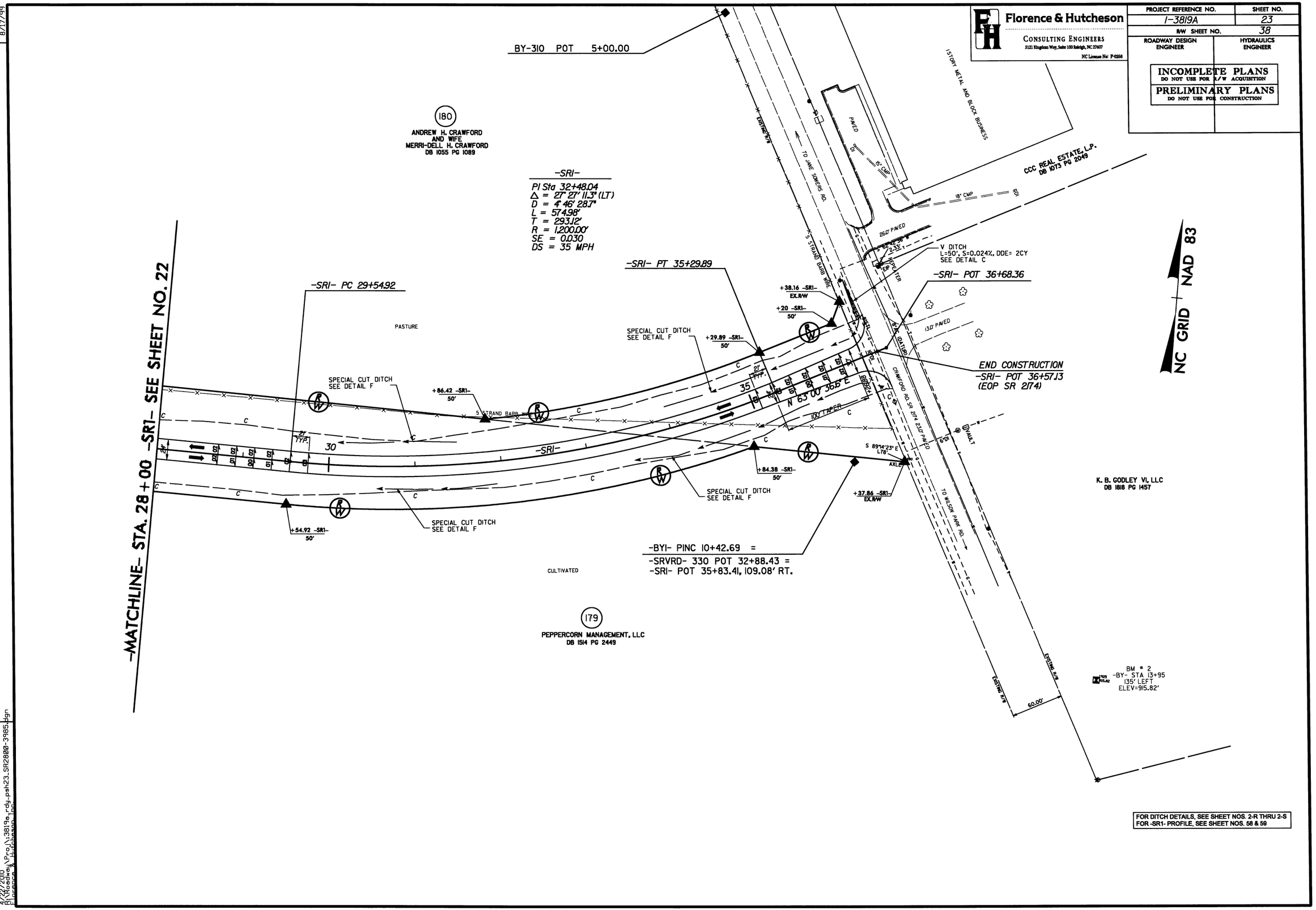
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR DITCH DETAILS, SEE SHEET NOS. 2-R THRU 2-S
FOR -SR1- PROFILE, SEE SHEET NOS. 58 & 59

REVISIONS

8/17/99

4/22/2010
R:\Roadway\Proj\3819a_rdy_psh23_SR2800-3985.dgn

5/28/99

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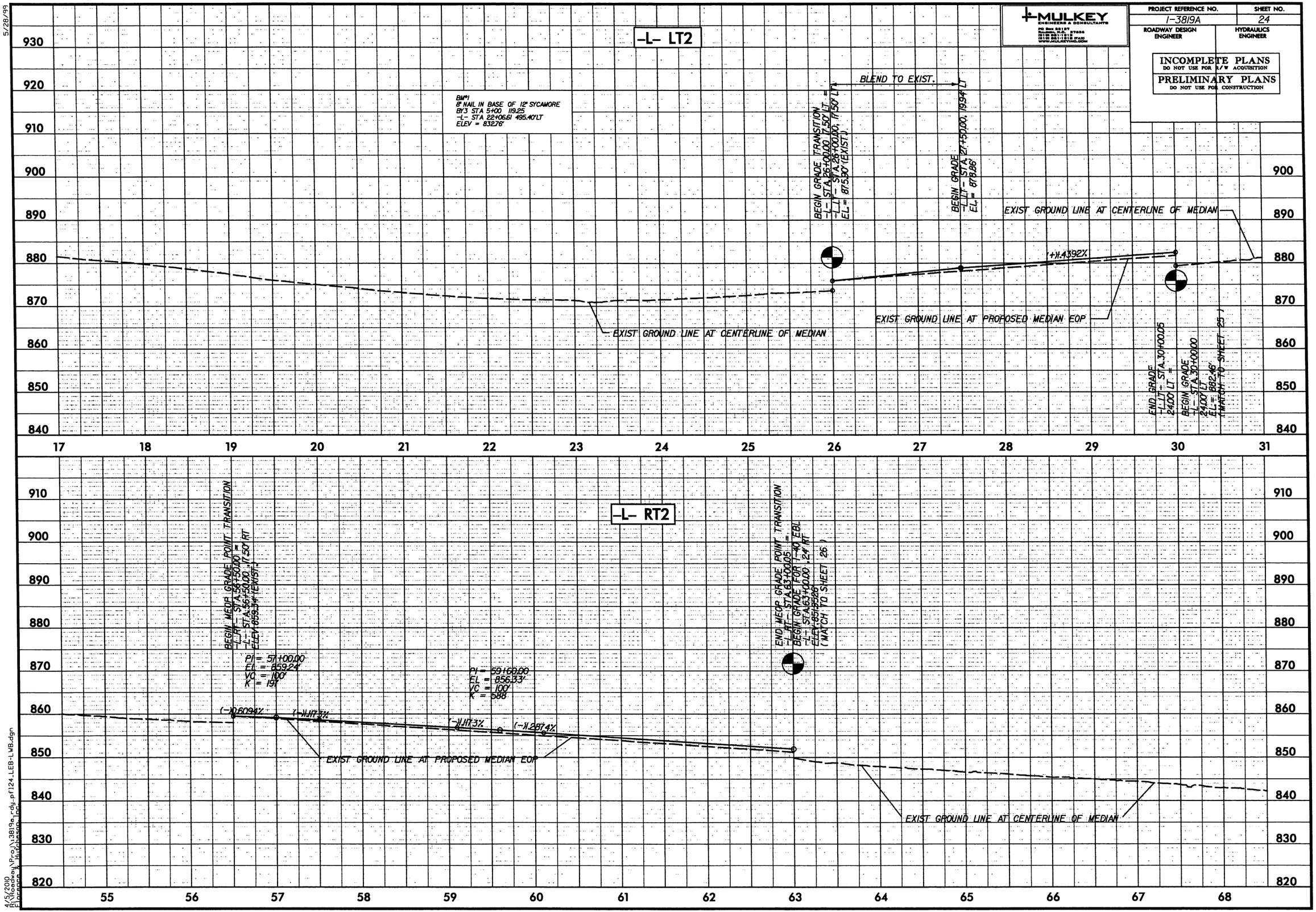
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



4/5/2010
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5/28/99

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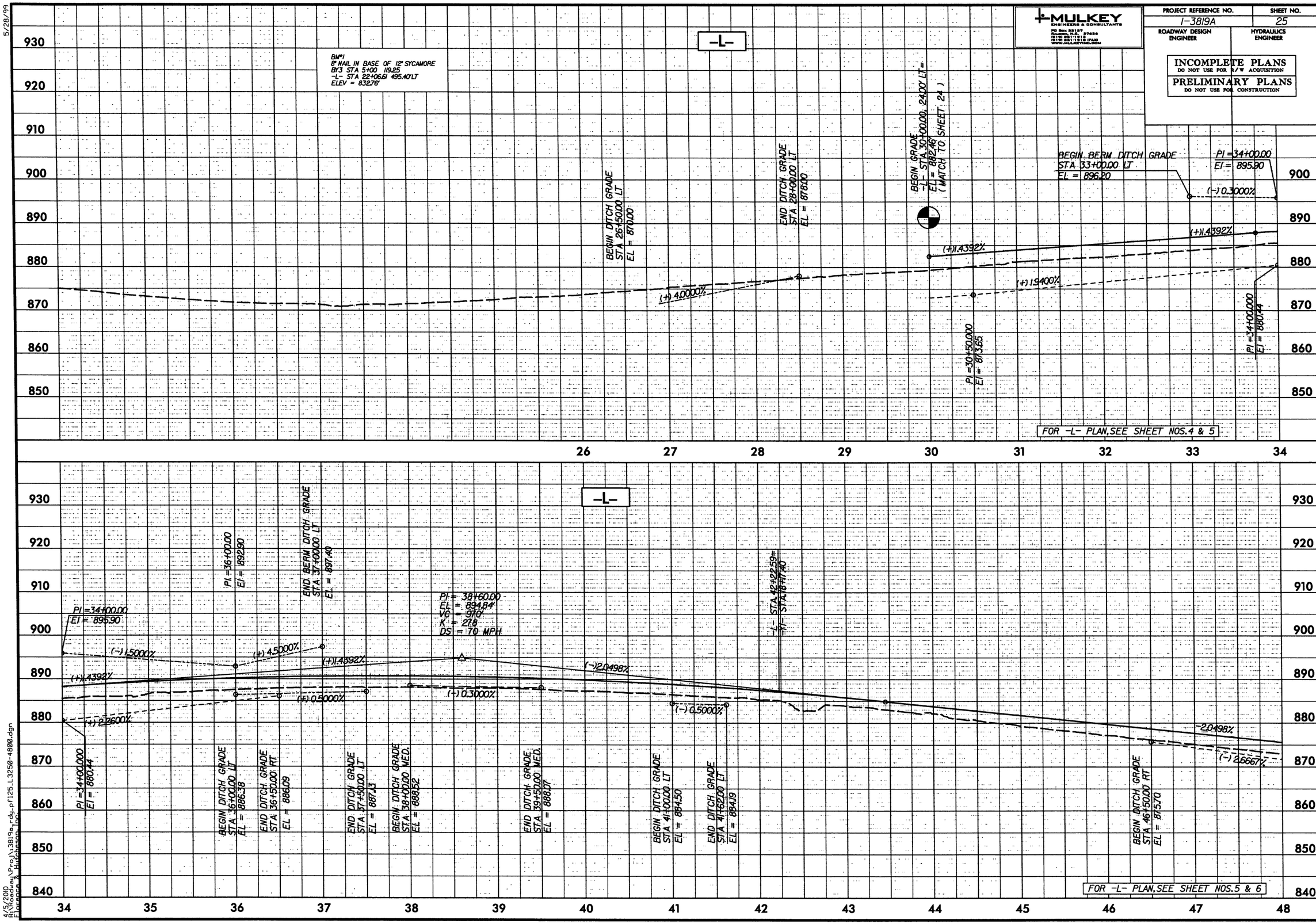
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



4/5/2010
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Florence & Hutcheson, Inc.

5/28/99

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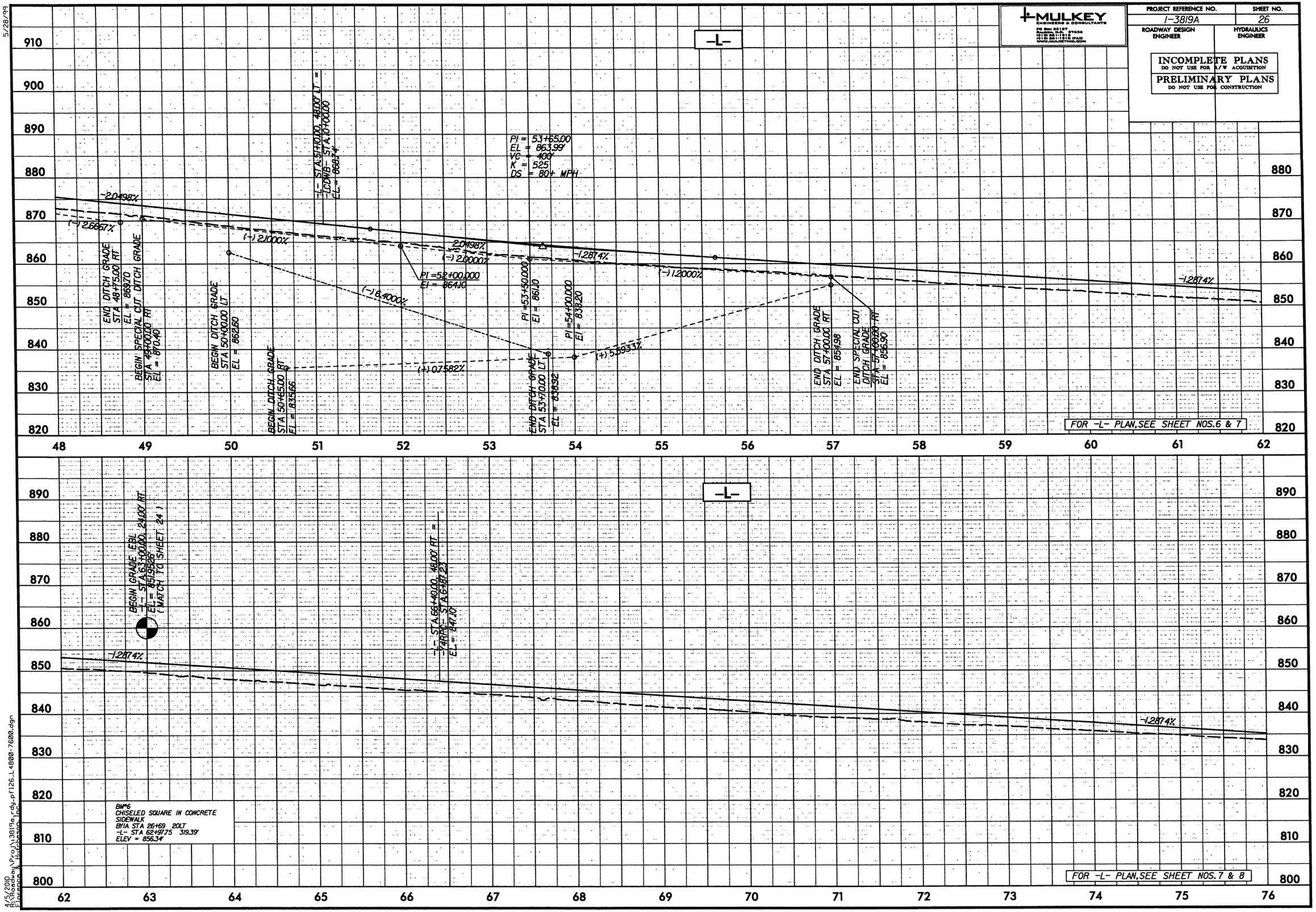
PO Box 83107
Lincoln, NE 68501-3107
(402) 441-7813
(402) 441-7818 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



4/5/2010
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Florence & Hutchinson Inc.

5/28/99

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
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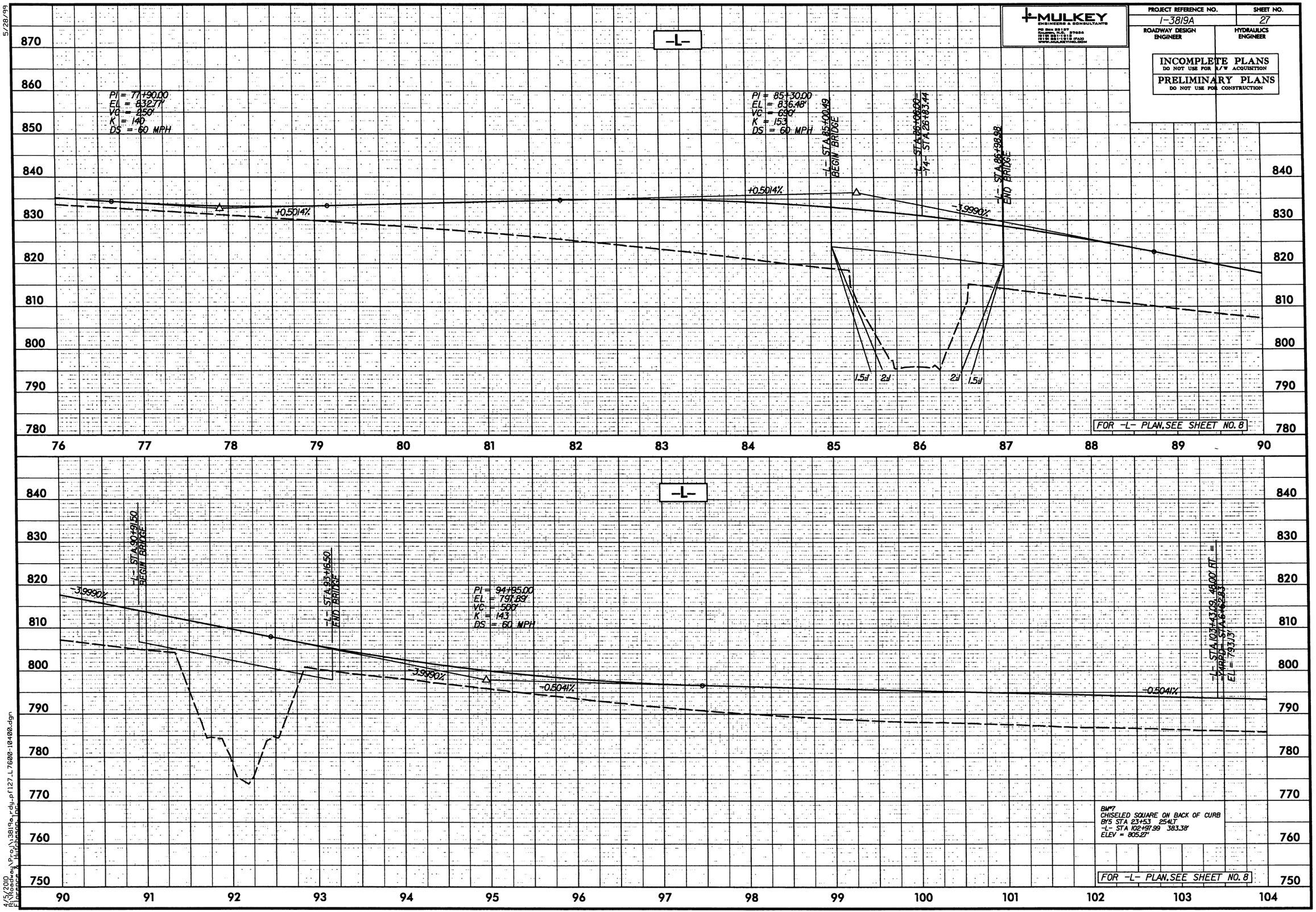
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



4/5/2010
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Florence & Hutcheson Inc.

5/28/99

Florence & Hutcheson
CONSULTING ENGINEERS
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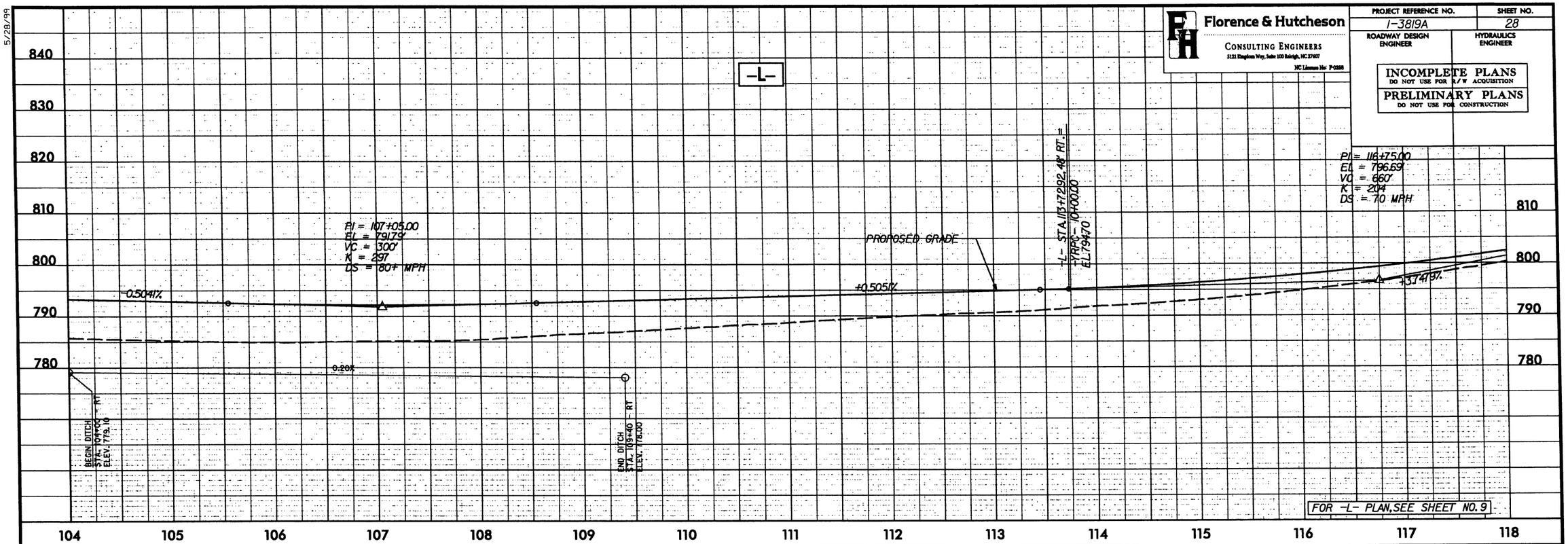
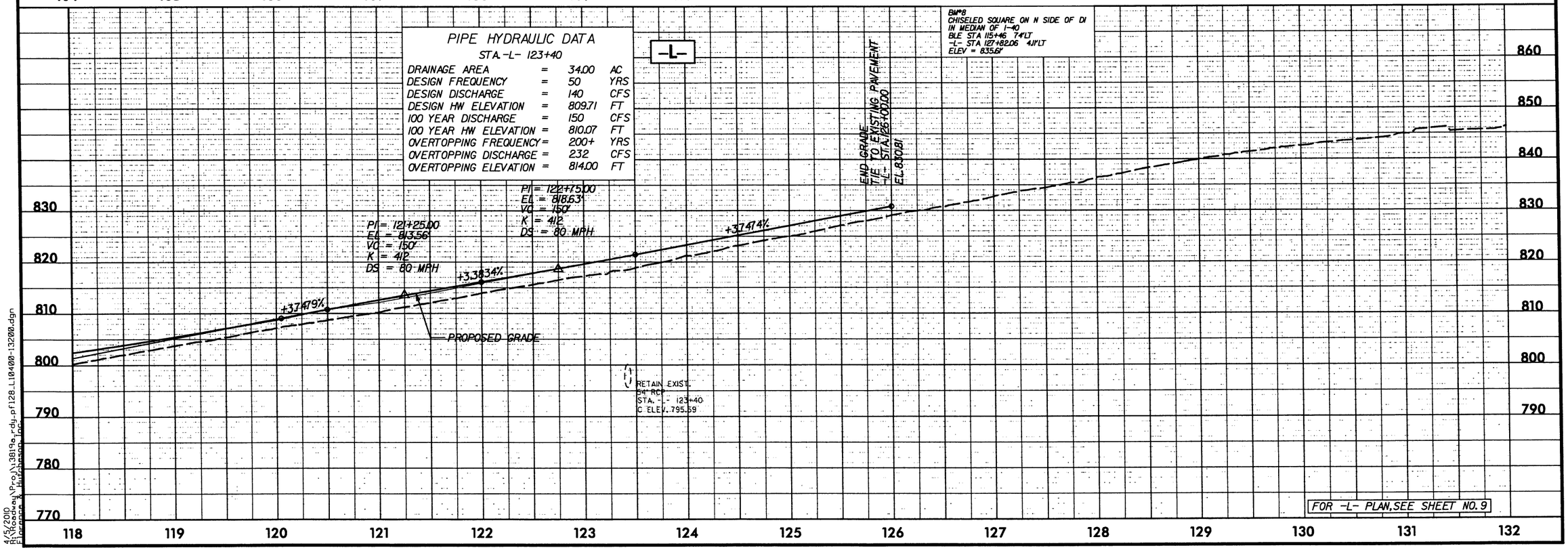
NC License No: P-0268

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





4/5/2010
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Florence & Hutcheson, Inc.

5/28/99

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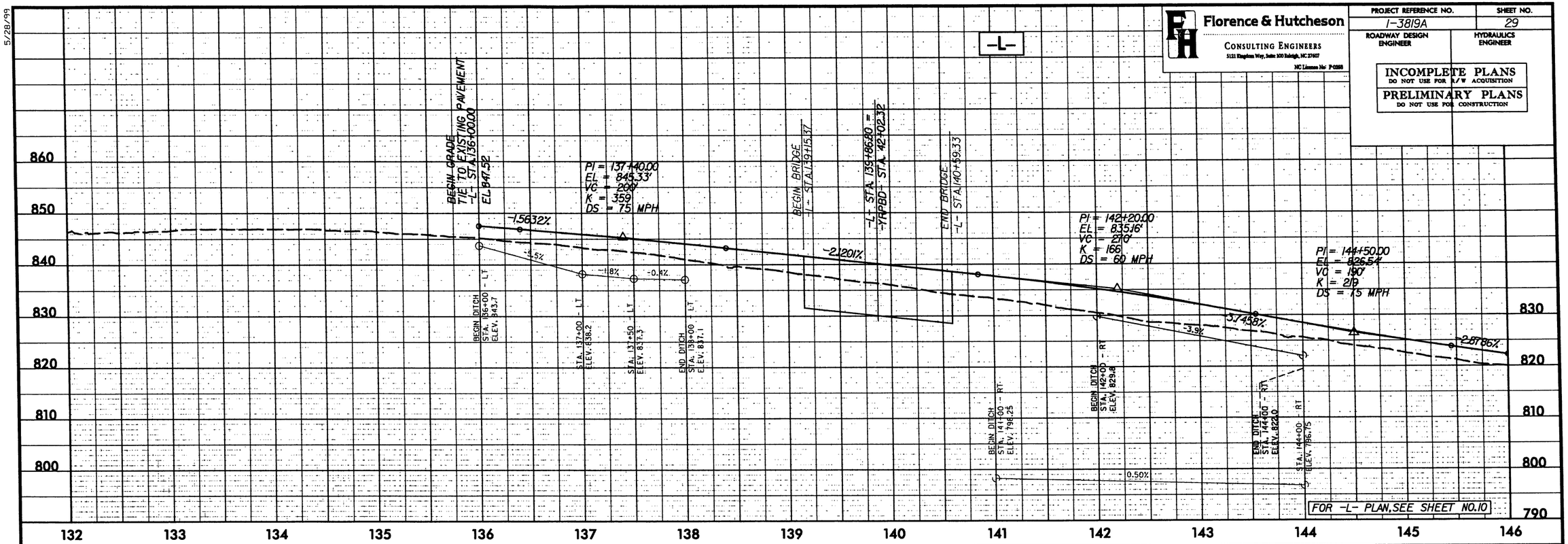
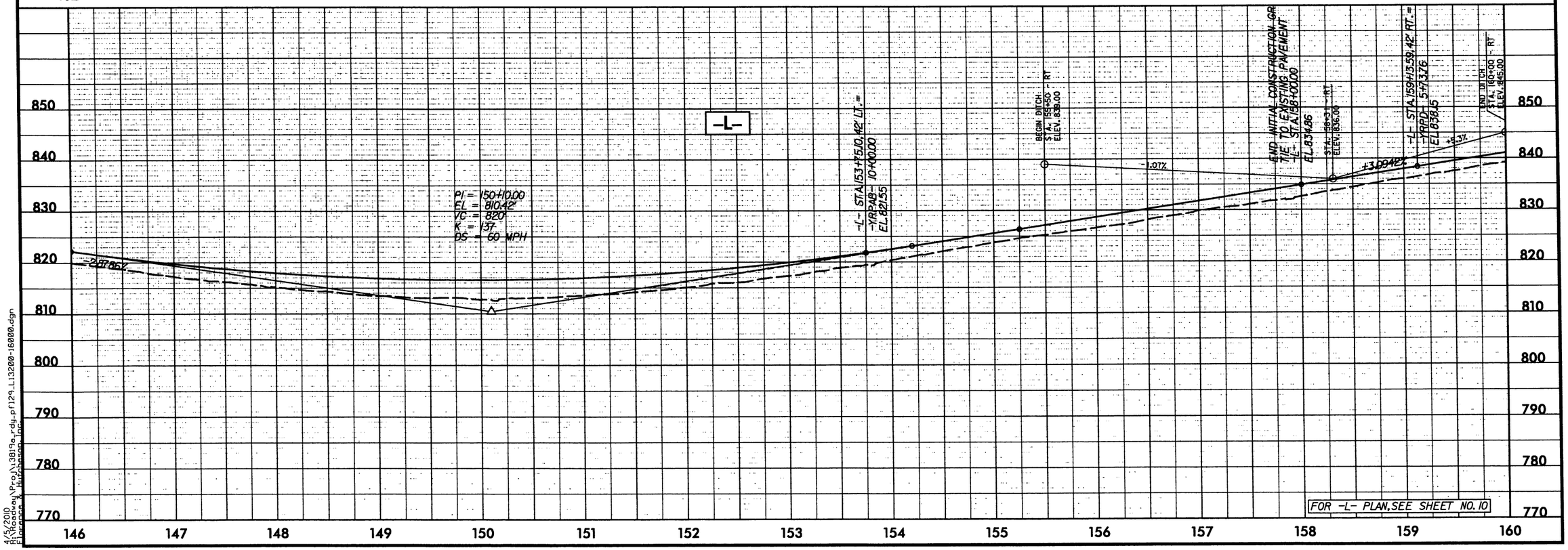
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0268

PROJECT REFERENCE NO.	SHEET NO.
1-3819A	29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





4/5/2010
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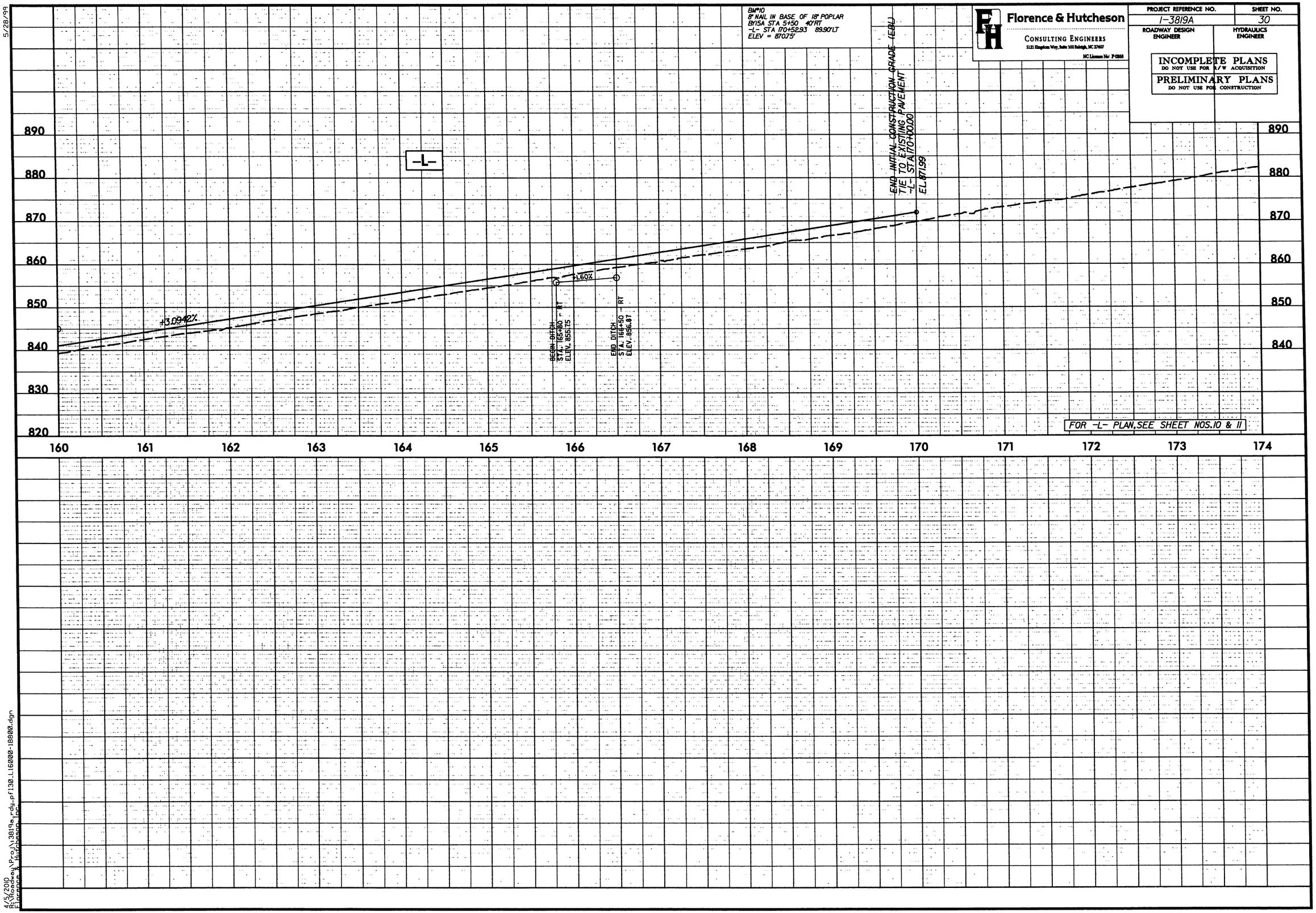

4/5/2010
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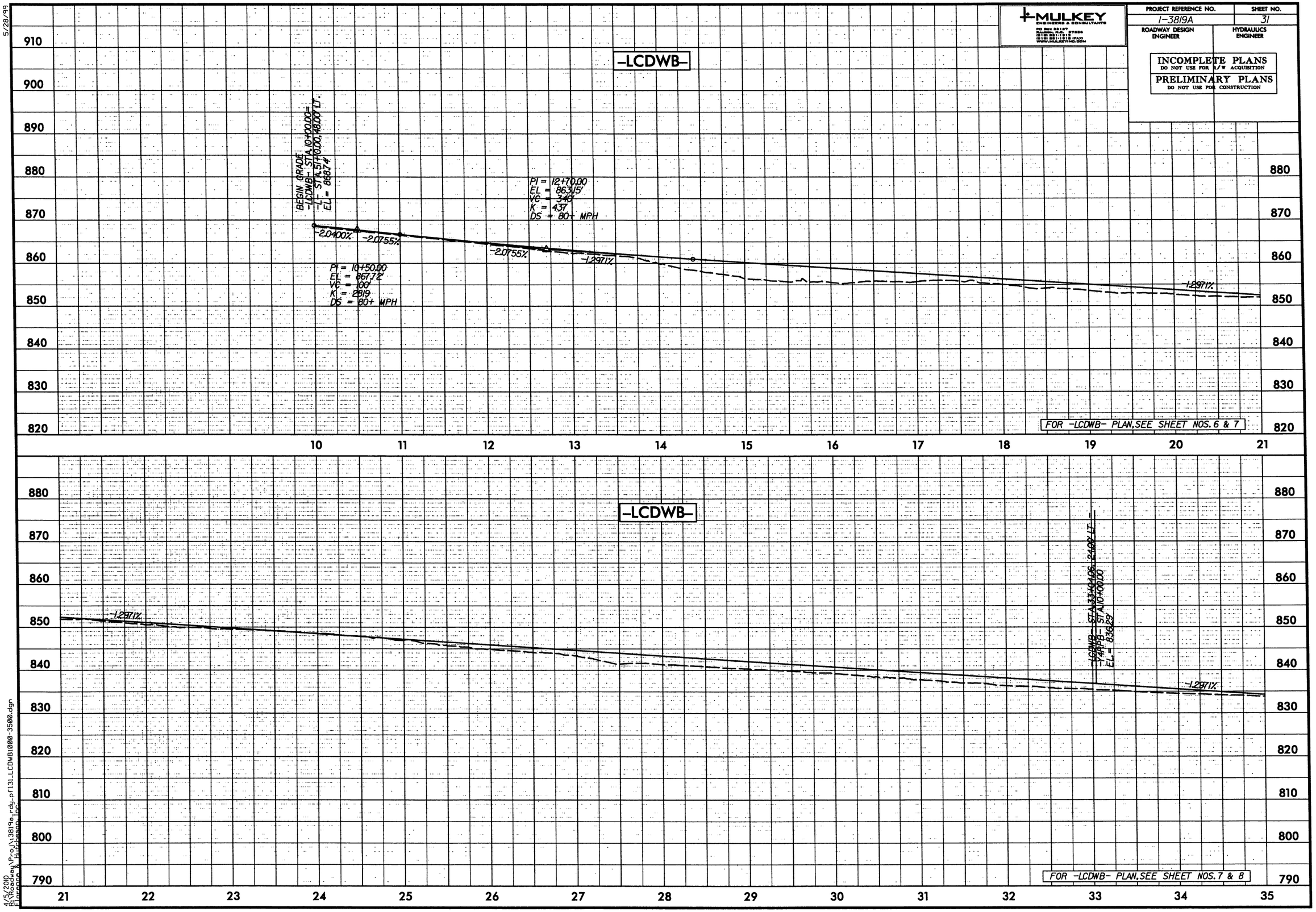
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



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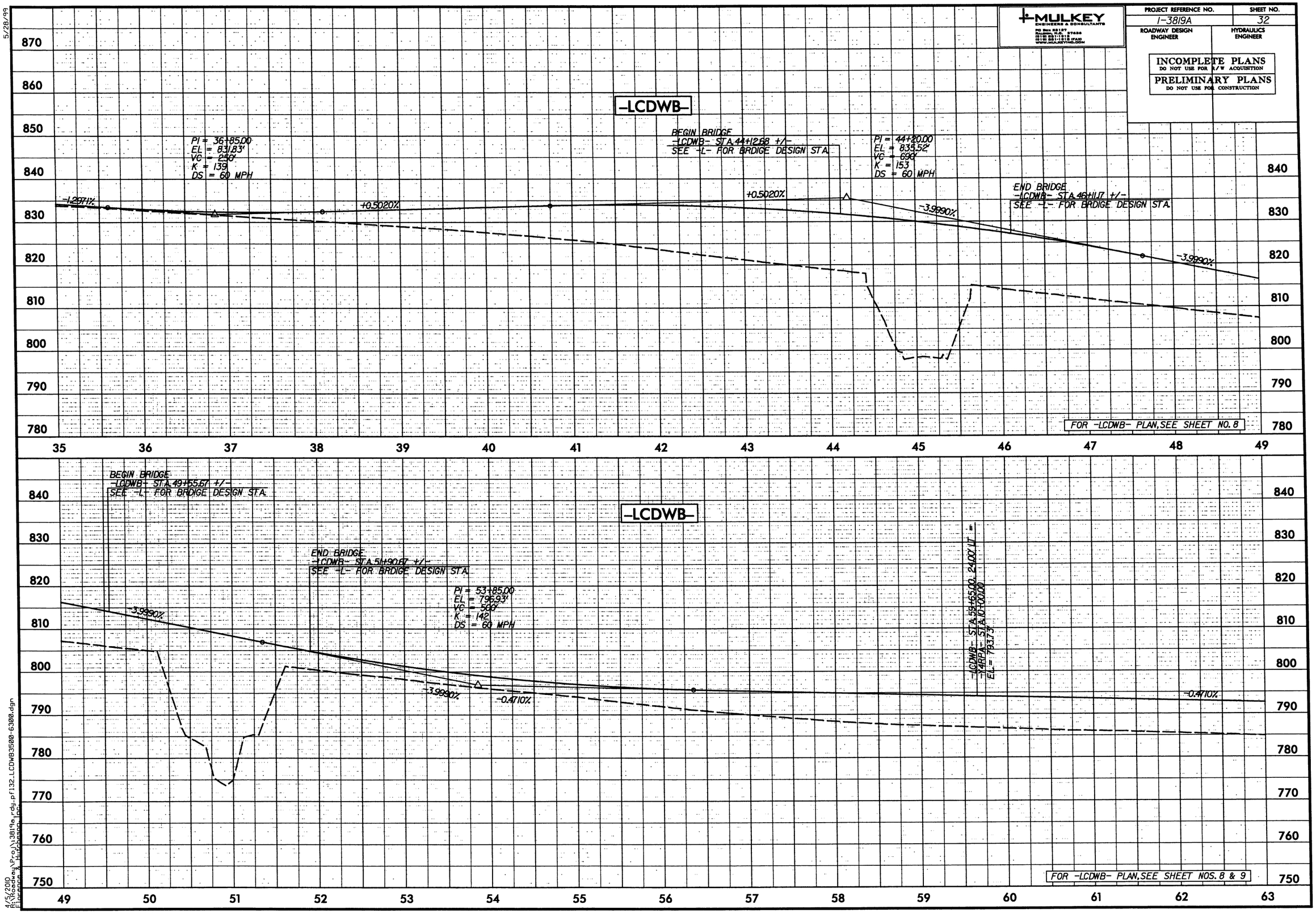
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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R:\Roadway\Proj\3819a_rdy_pf132_LCDWB3500-6300.dgn
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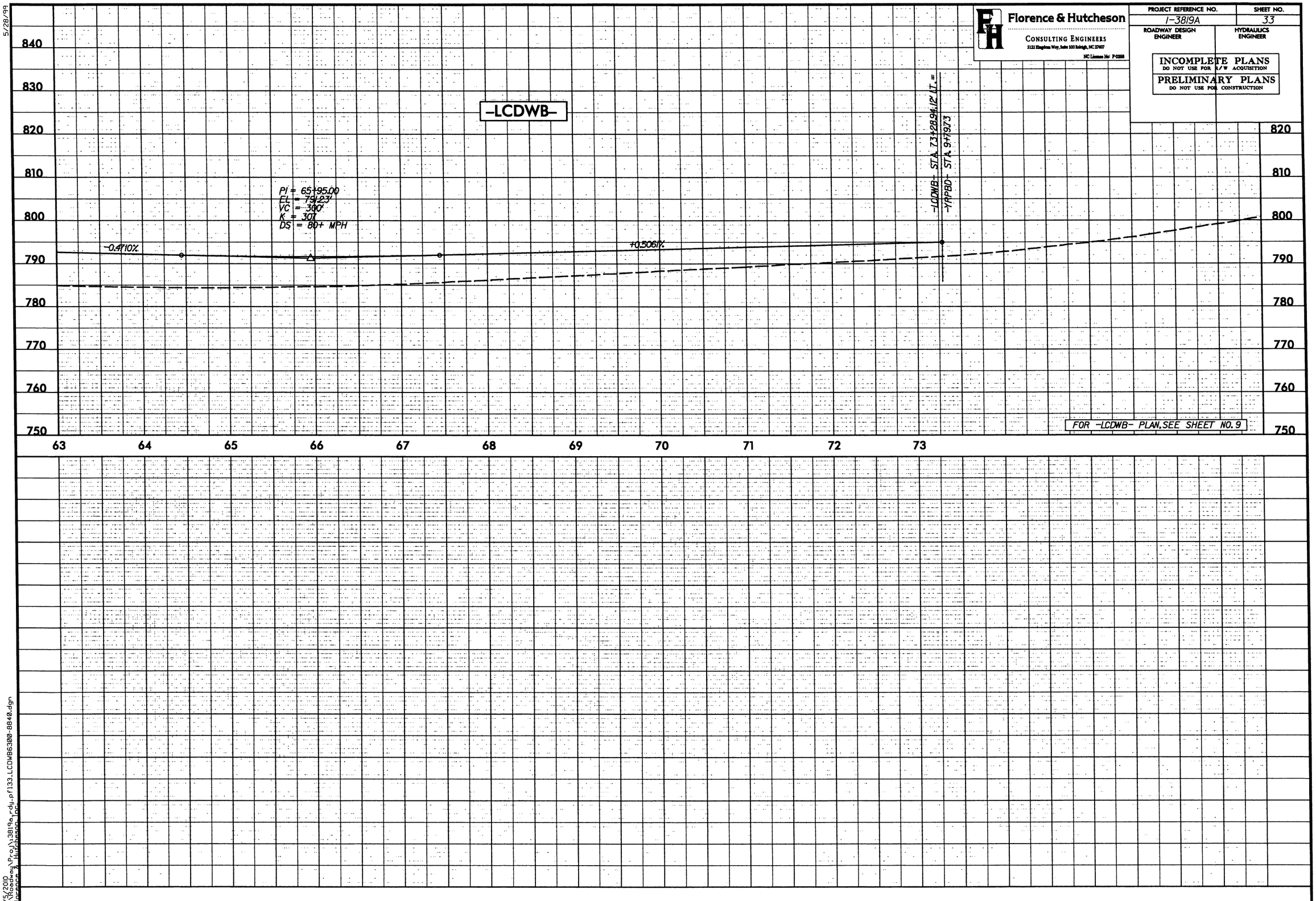
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



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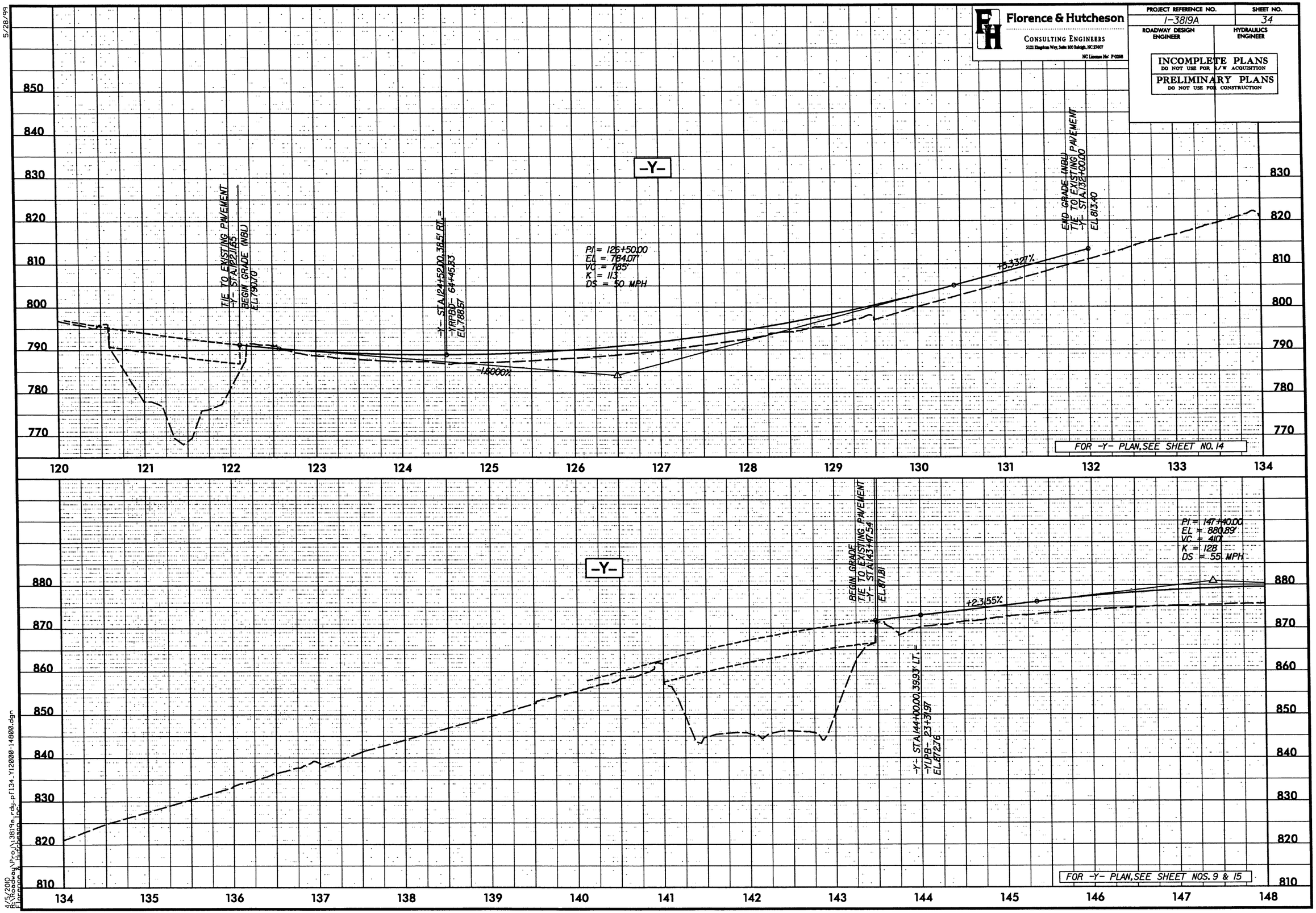
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



4/5/2010
R:\Roadway\Proj\3819a_rdy_pf134_Y12000-14800.dgn
Florence & Hutcheson inc.

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CONSULTING ENGINEERS
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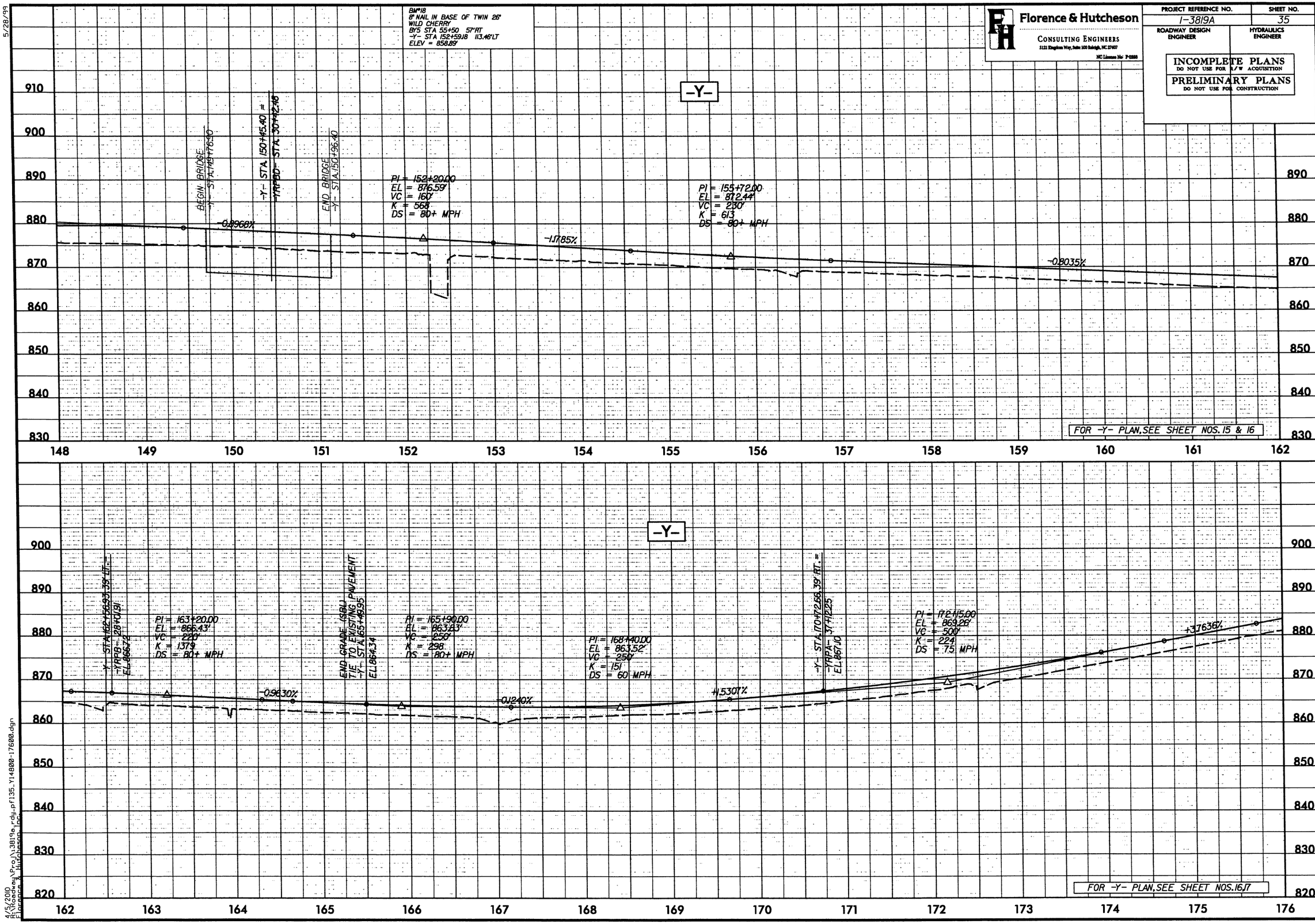
PROJECT REFERENCE NO.	SHEET NO.
1-3819A	35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



4/5/2010
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Florence Hutcheson Inc.

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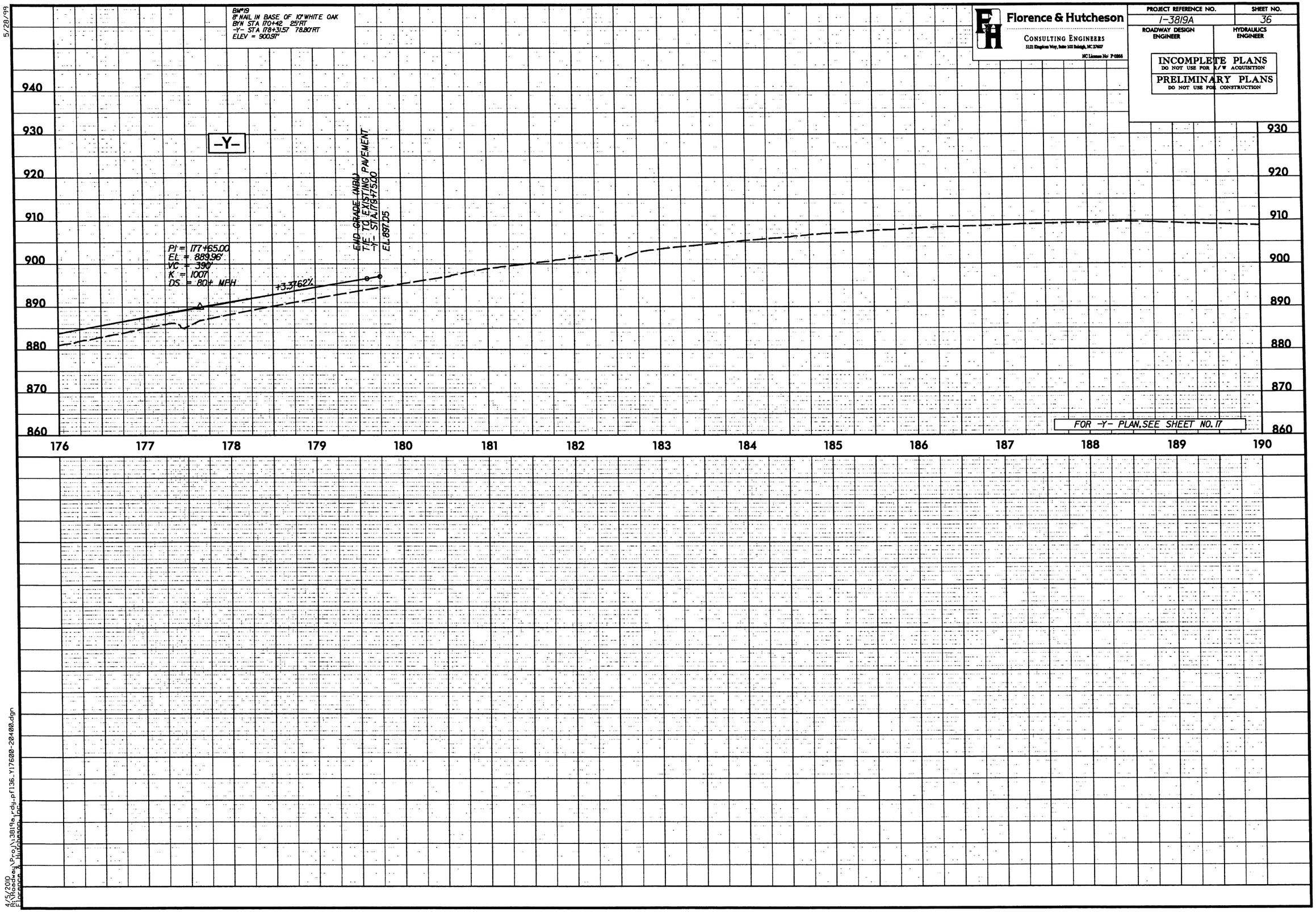

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NC License No: F-0266

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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PROJECT REFERENCE NO.	SHEET NO.
1-3819A	37
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

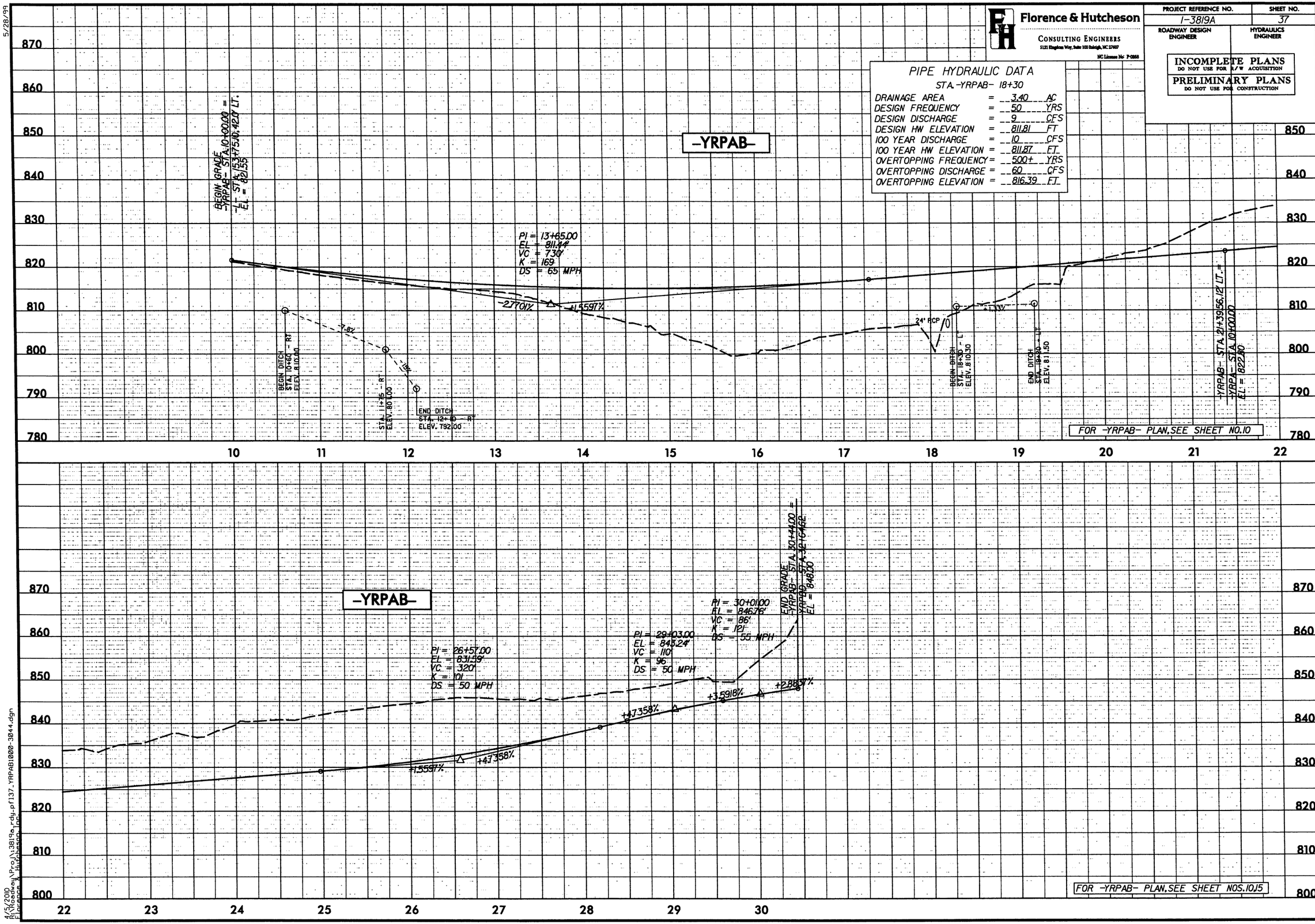
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PIPE HYDRAULIC DATA

STA.-YRPAB- 18+30

DRAINAGE AREA	=	3.40	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	9	CFS
DESIGN HW ELEVATION	=	811.81	FT
100 YEAR DISCHARGE	=	10	CFS
100 YEAR HW ELEVATION	=	811.87	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	60	CFS
OVERTOPPING ELEVATION	=	816.39	FT



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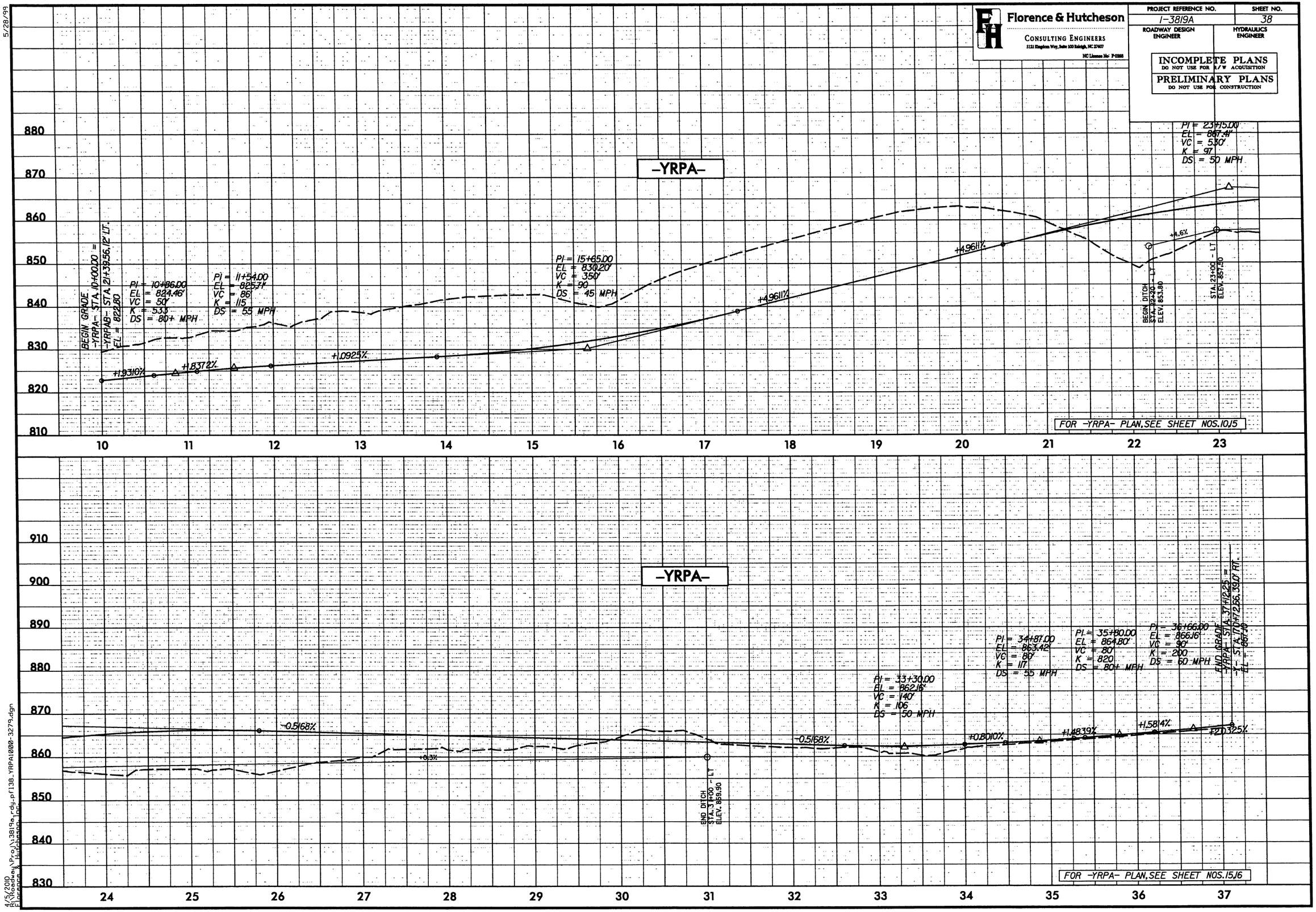
PROJECT REFERENCE NO.	SHEET NO.
1-3819A	38
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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R:\Roadway\Proj\13819a_rdy_pf138_YRPA1000-3279.dgn
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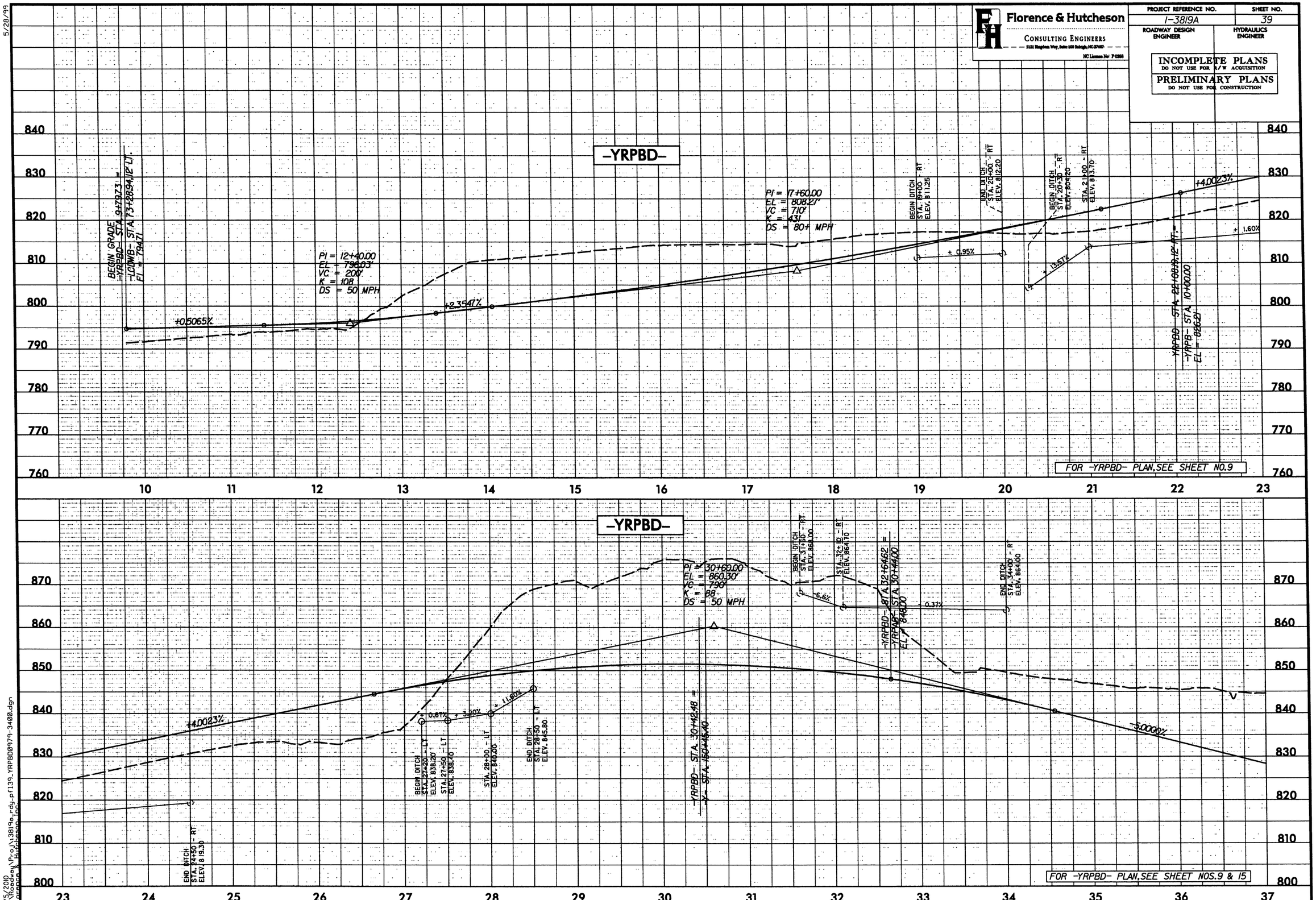
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	39
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



4/5/2010
R:\Roadway\Proj\3819a_rdu_pf139_YRPBD0979-3400.dgn
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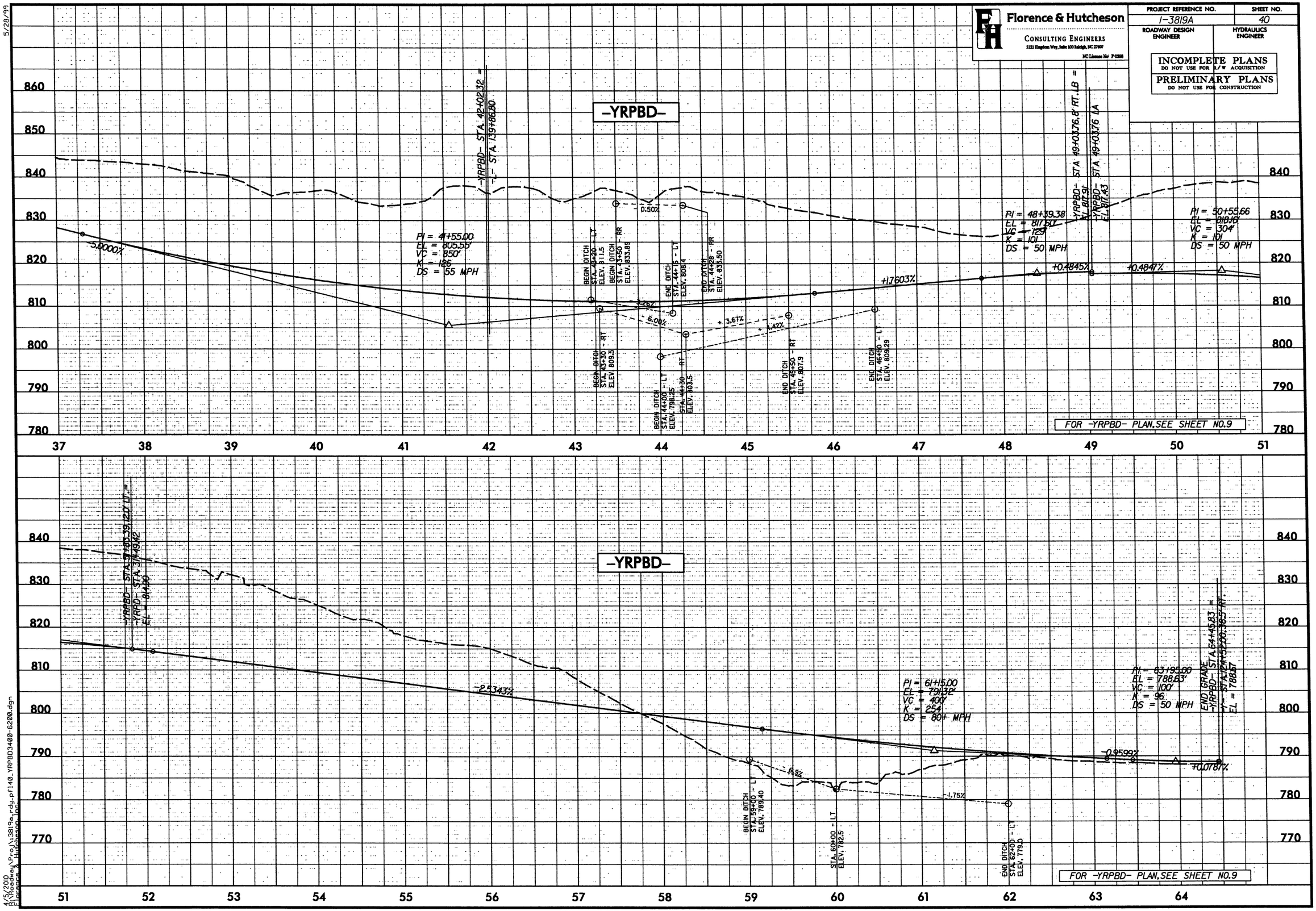
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	40
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



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Florence & Hutcheson, Inc.

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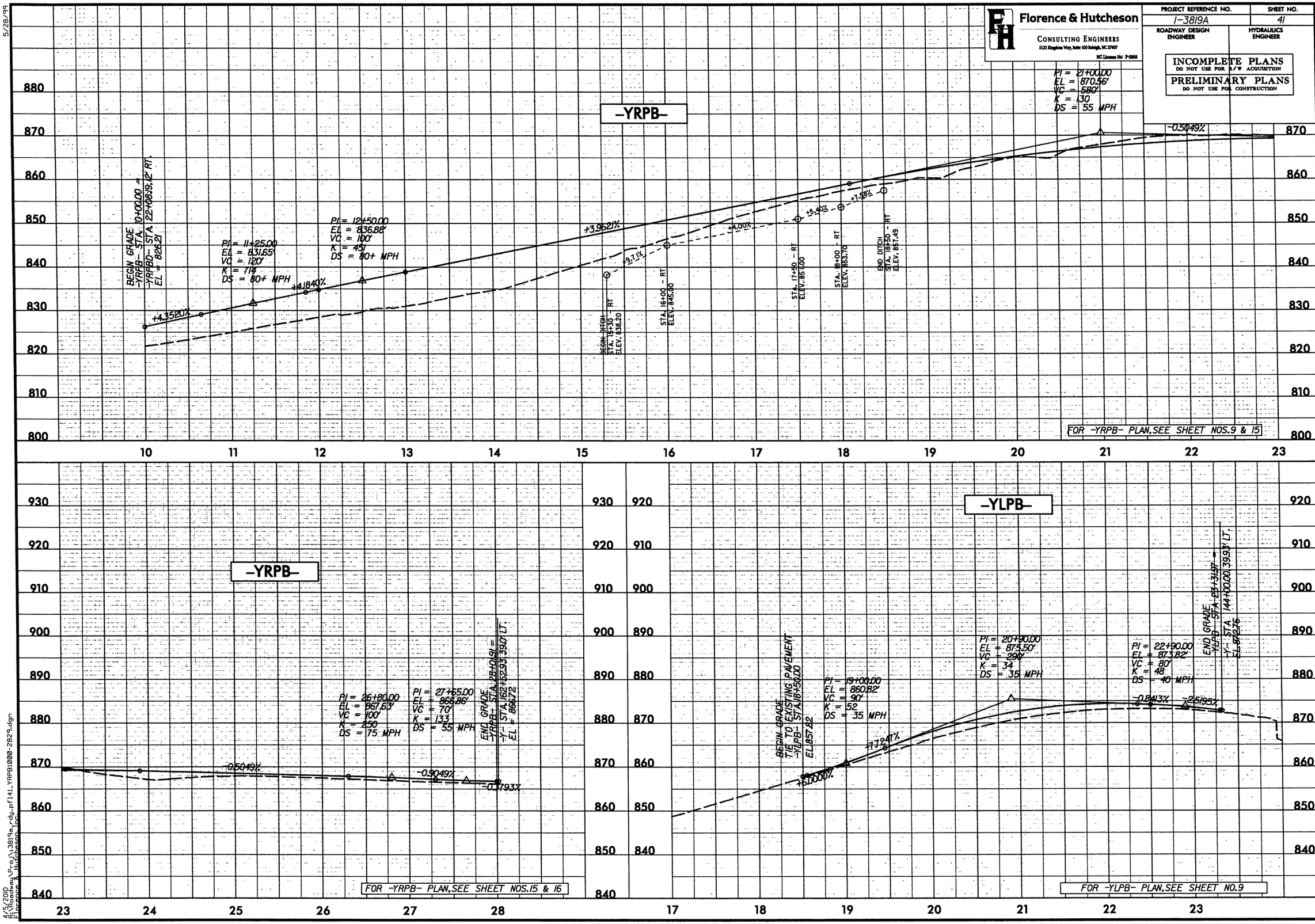
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	41
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



4/5/2010
R:\Roadway\Proj\3819a_rdy_pf141_YRPB1000-2829.dgn
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BM#27
8" NAIL SET IN BASE OF 8"
SWEET GUM
BY16 STA 20+68 213'RT
-YRPC- STA 19+25.82 253.31'RT
ELEV = 782.80'

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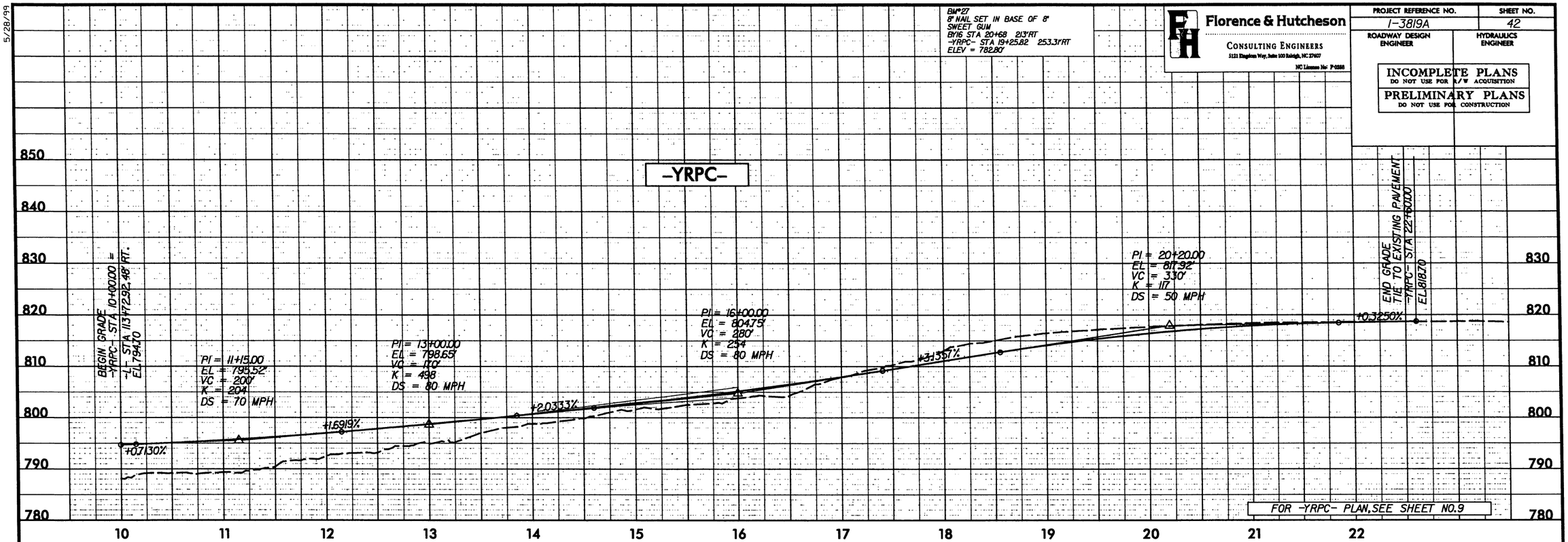
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	42
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -YRPC- PLAN, SEE SHEET NO.9

4/5/2010
R:\Roadway\Proj\3819a_rdy_pf142_YRPC1000-2260.dgn
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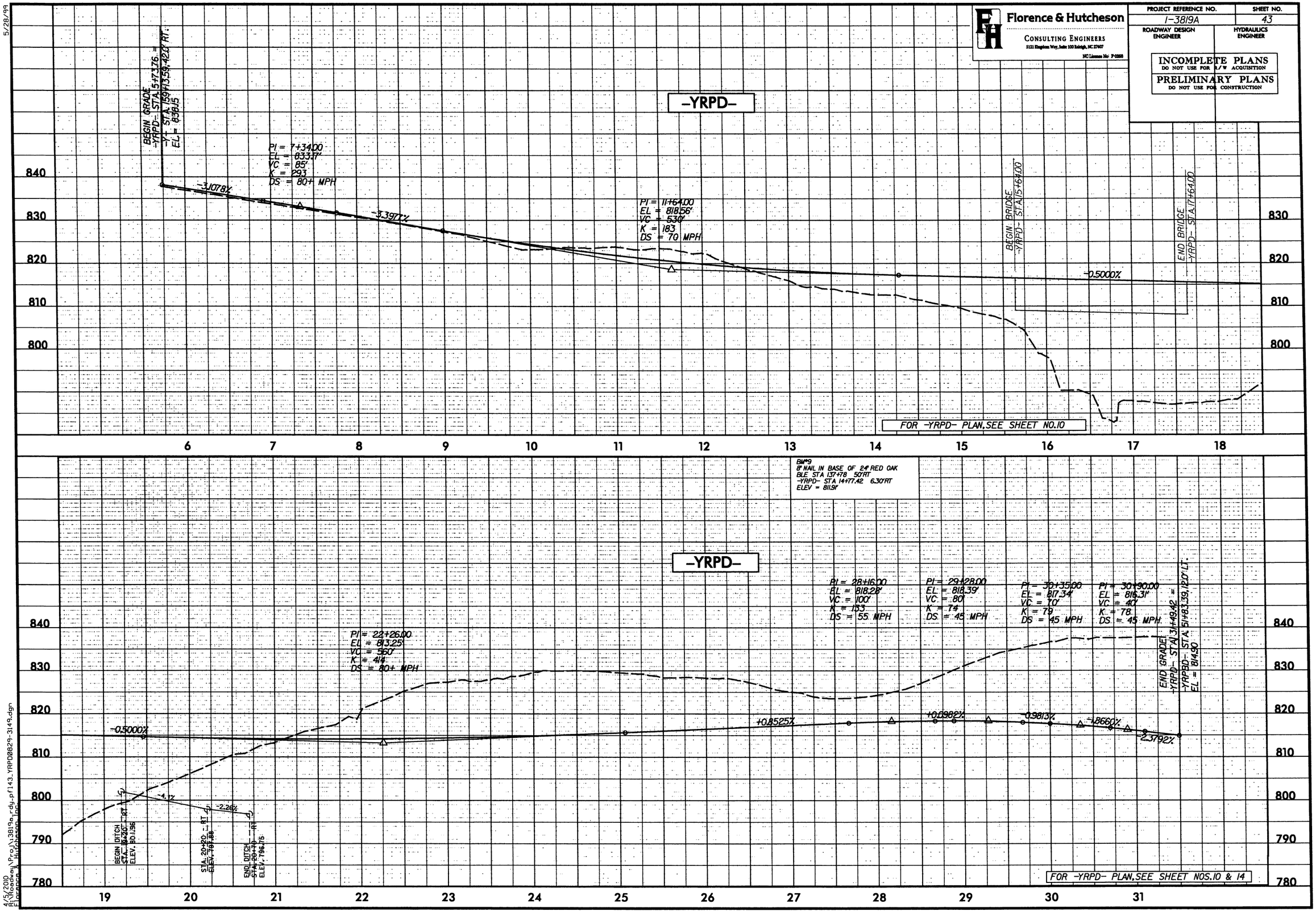
PROJECT REFERENCE NO.	SHEET NO.
1-3819A	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



4/26/2010
R:\Roadway\Proj\3819a_rdy_pf143_YRPD0829-3149.dgn
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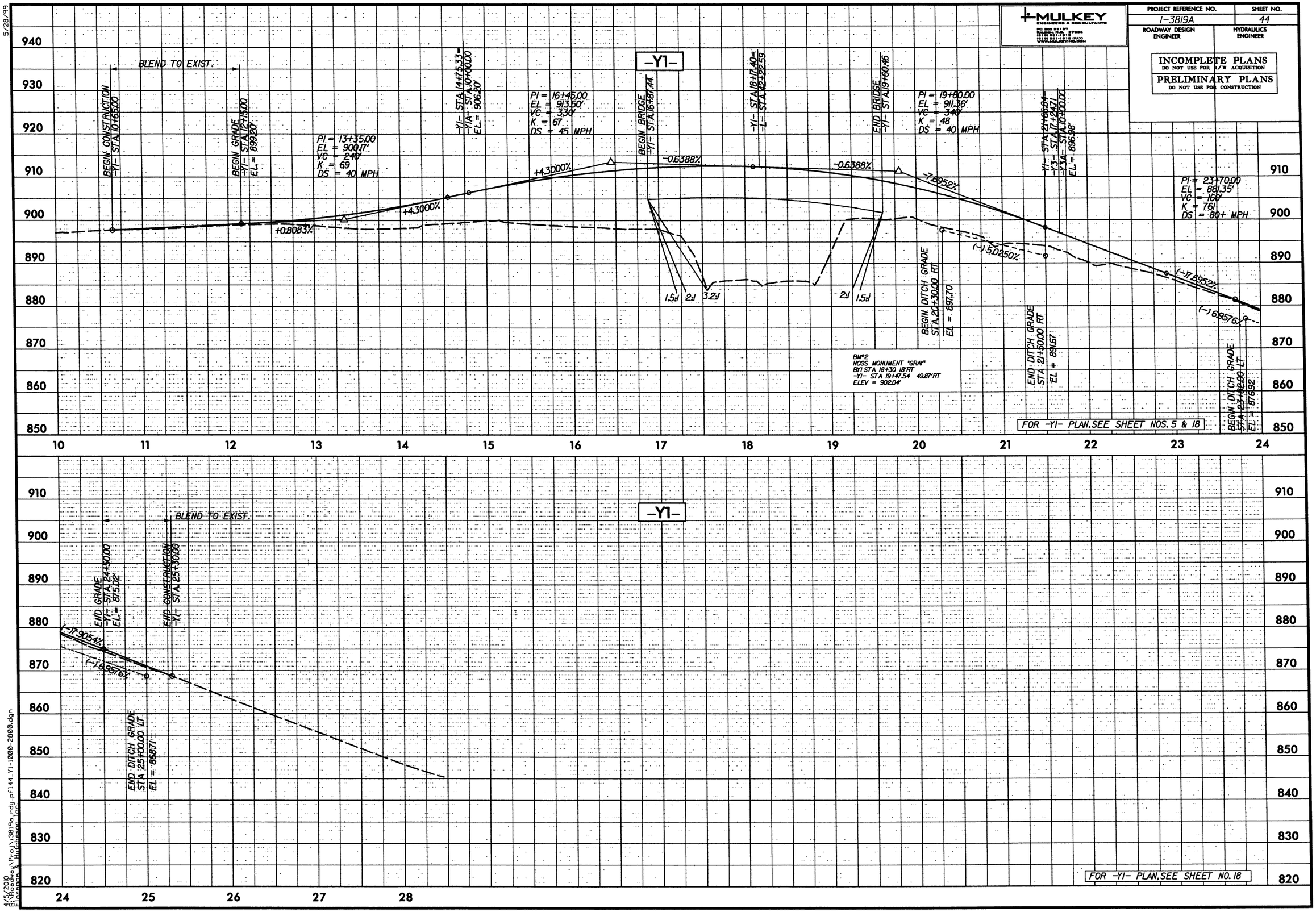
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



4/5/2010
R:\Roadway\Proj\I-3819a_rdy_pf144_Y1-1000-2800.dgn
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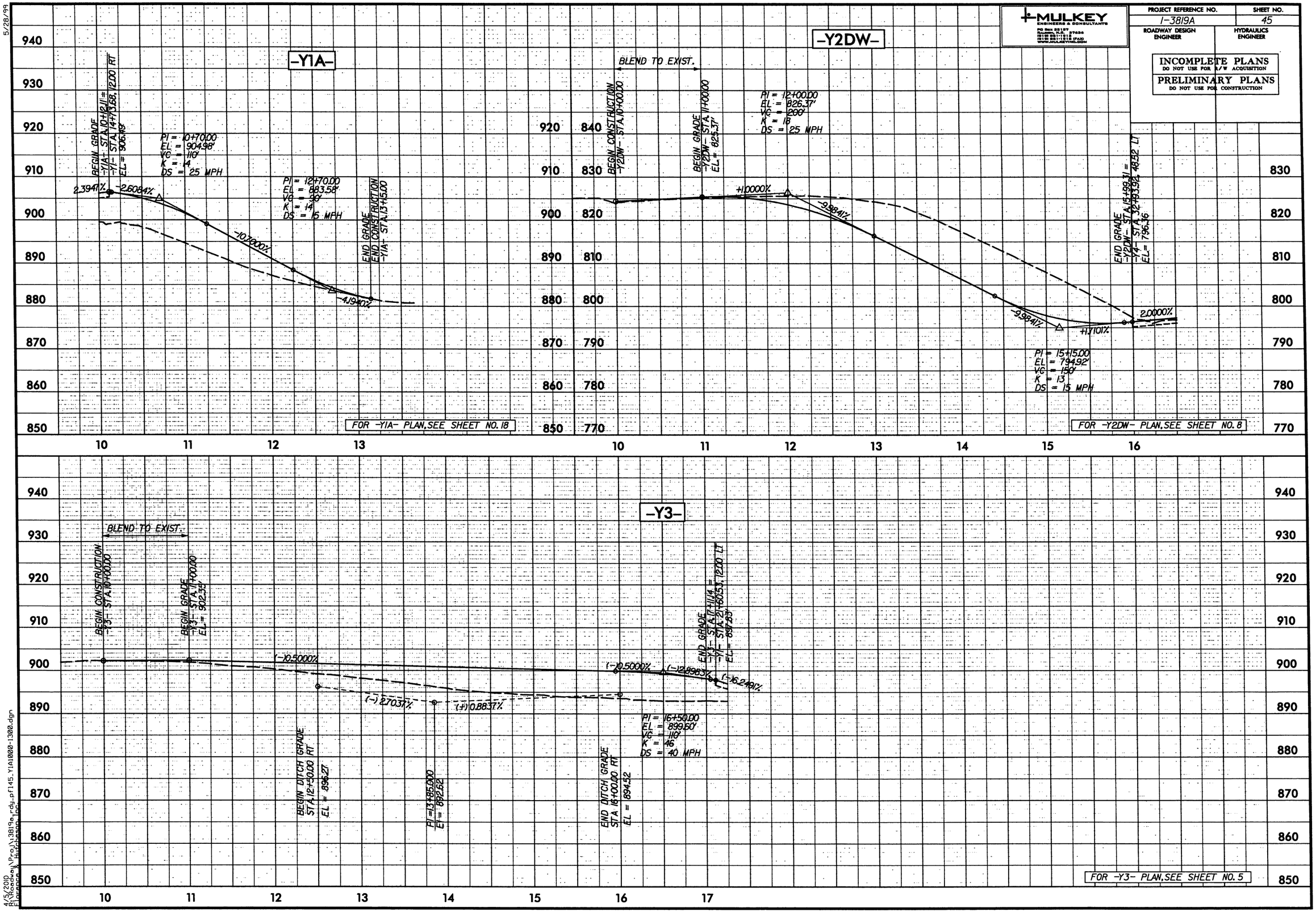
PROJECT REFERENCE NO.	SHEET NO.
1-3819A	45
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



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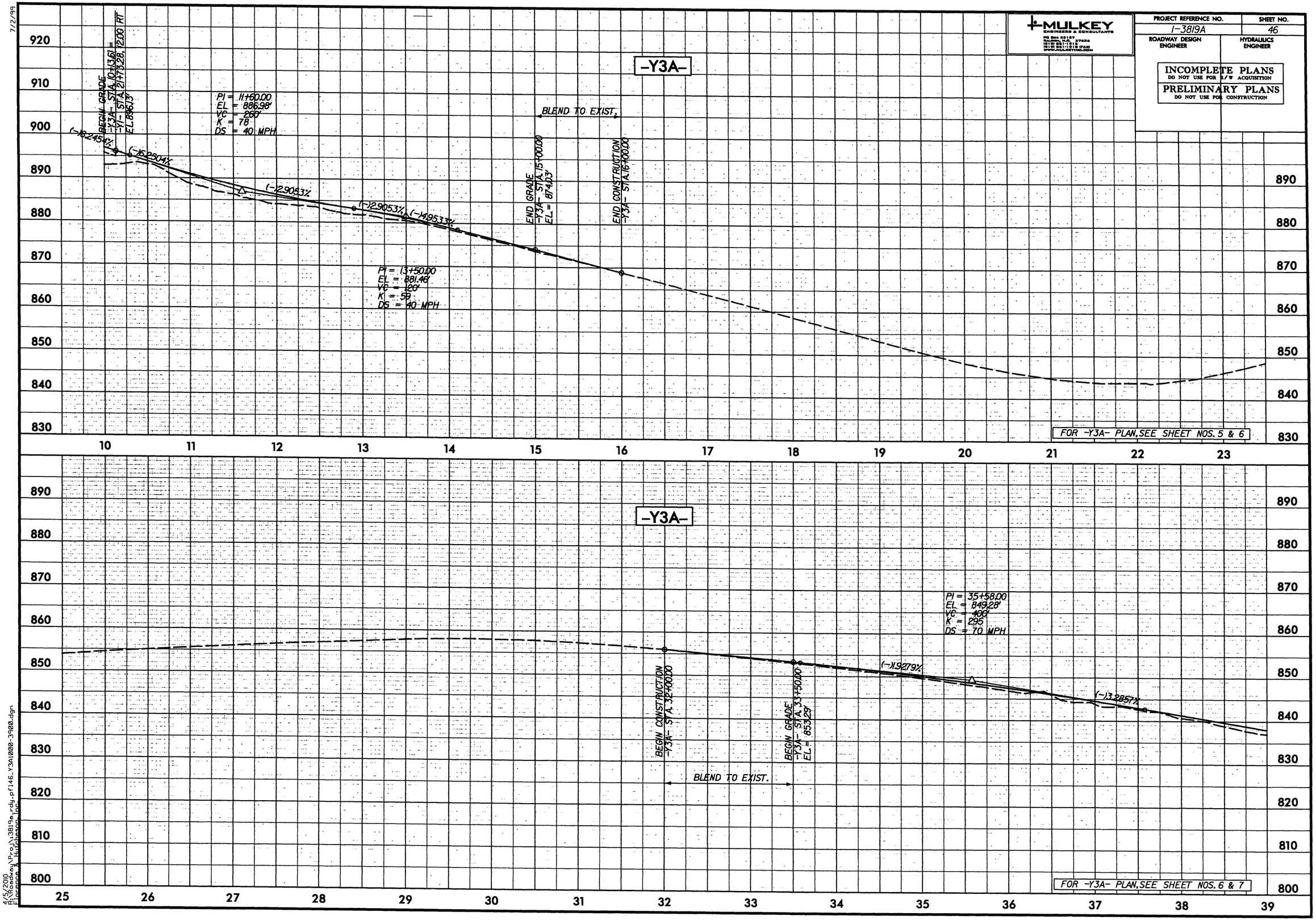
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	46
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



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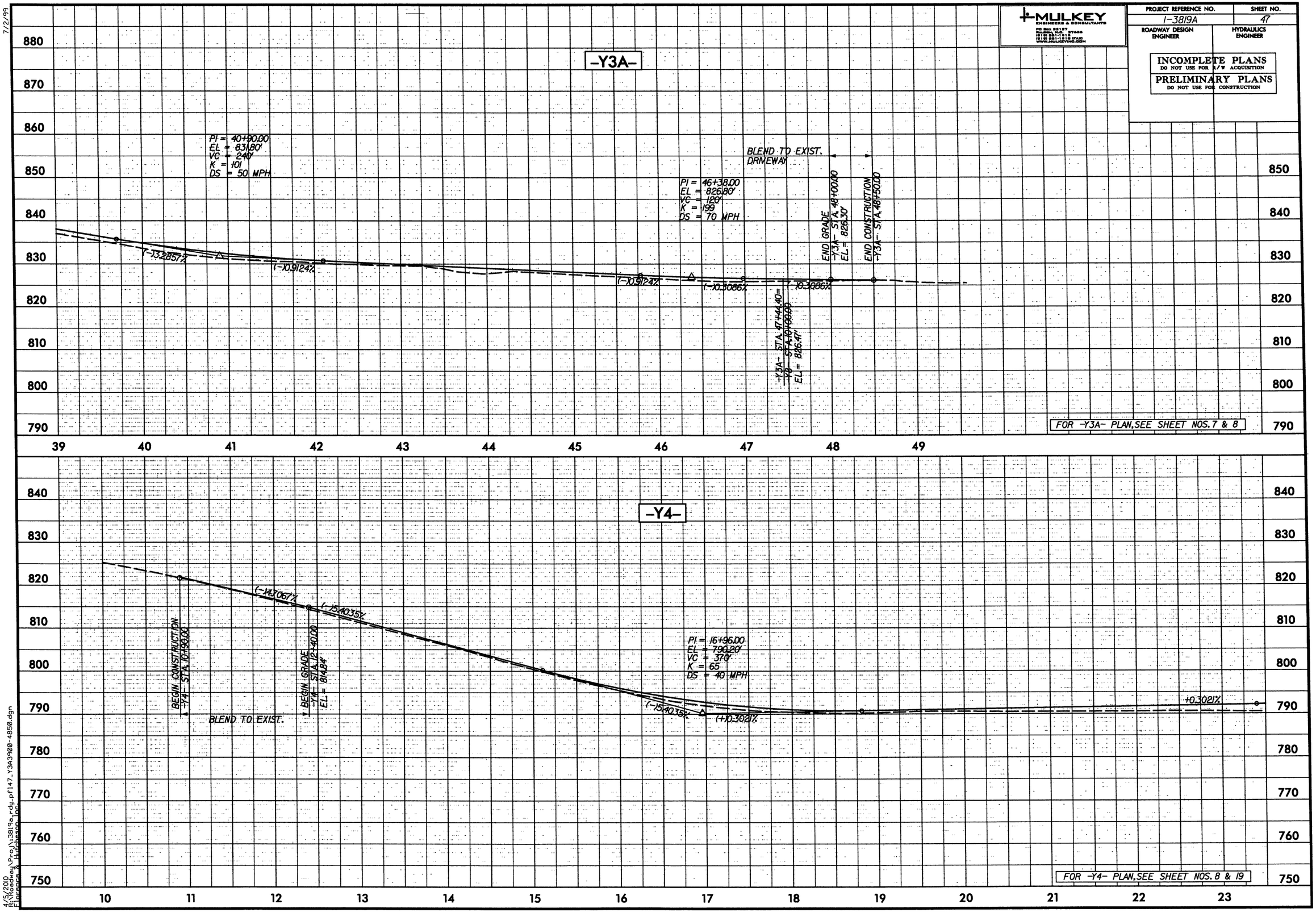
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	47
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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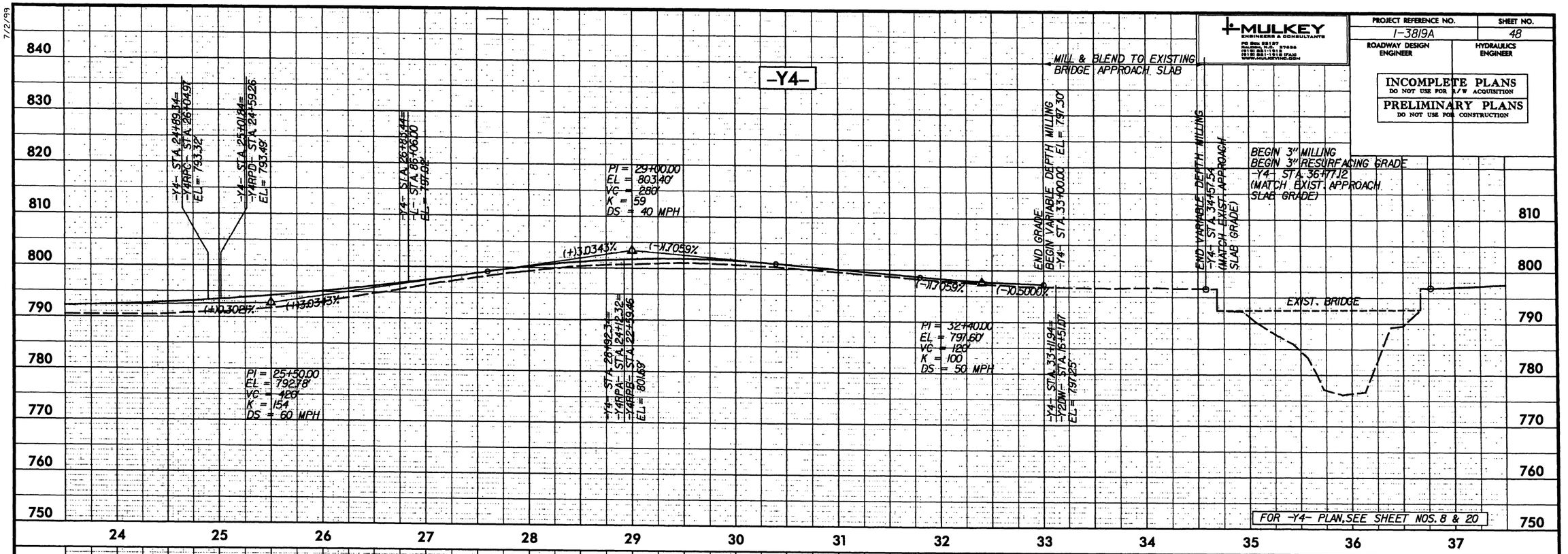
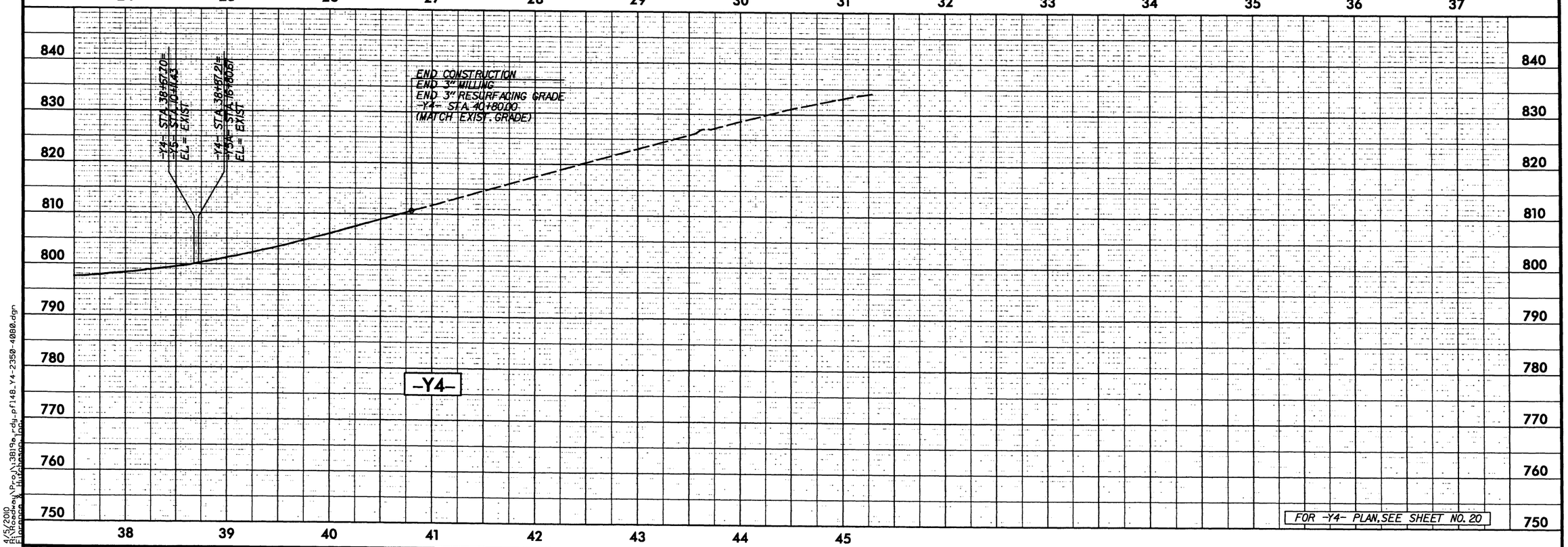
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	48
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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





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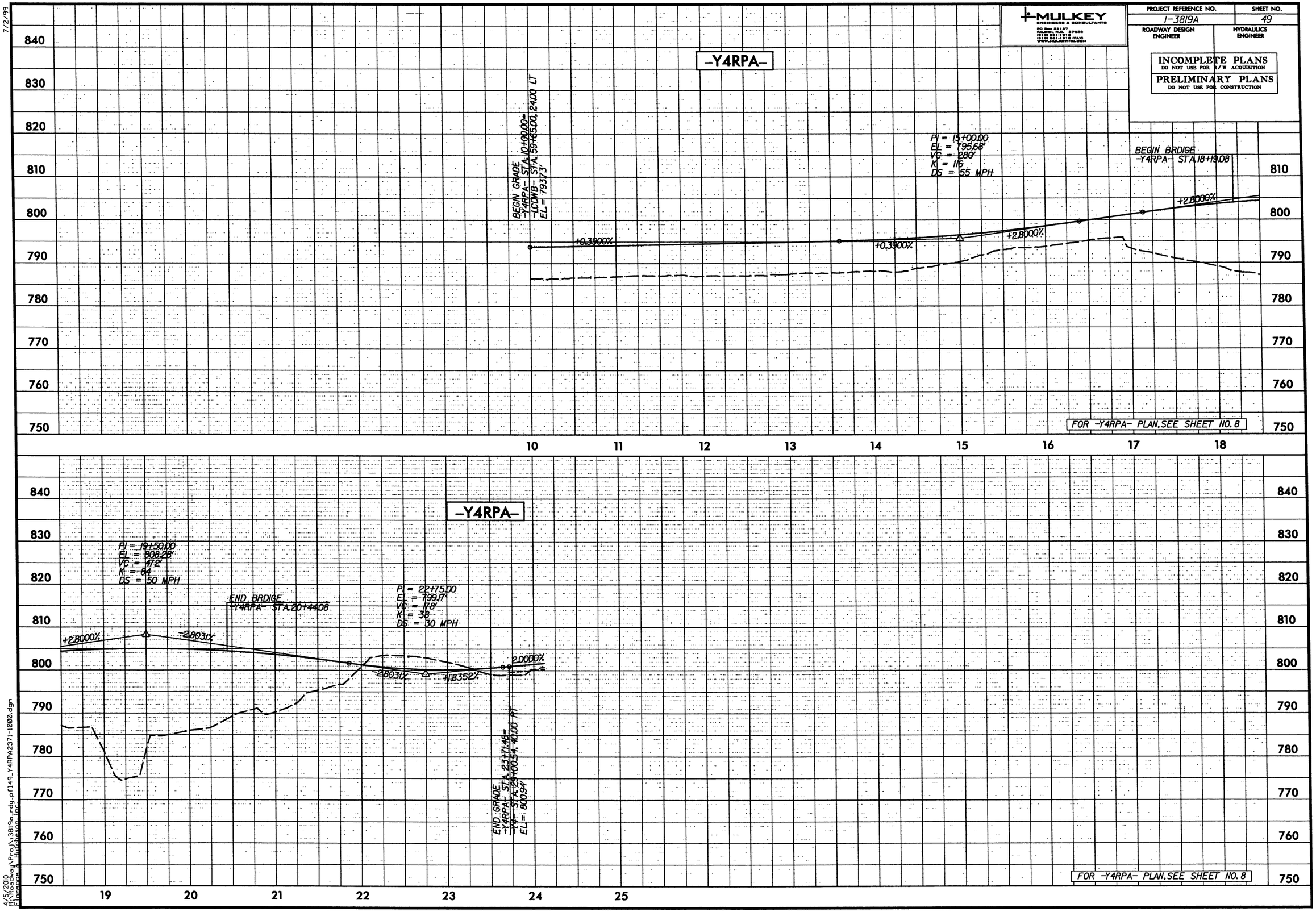
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	49
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



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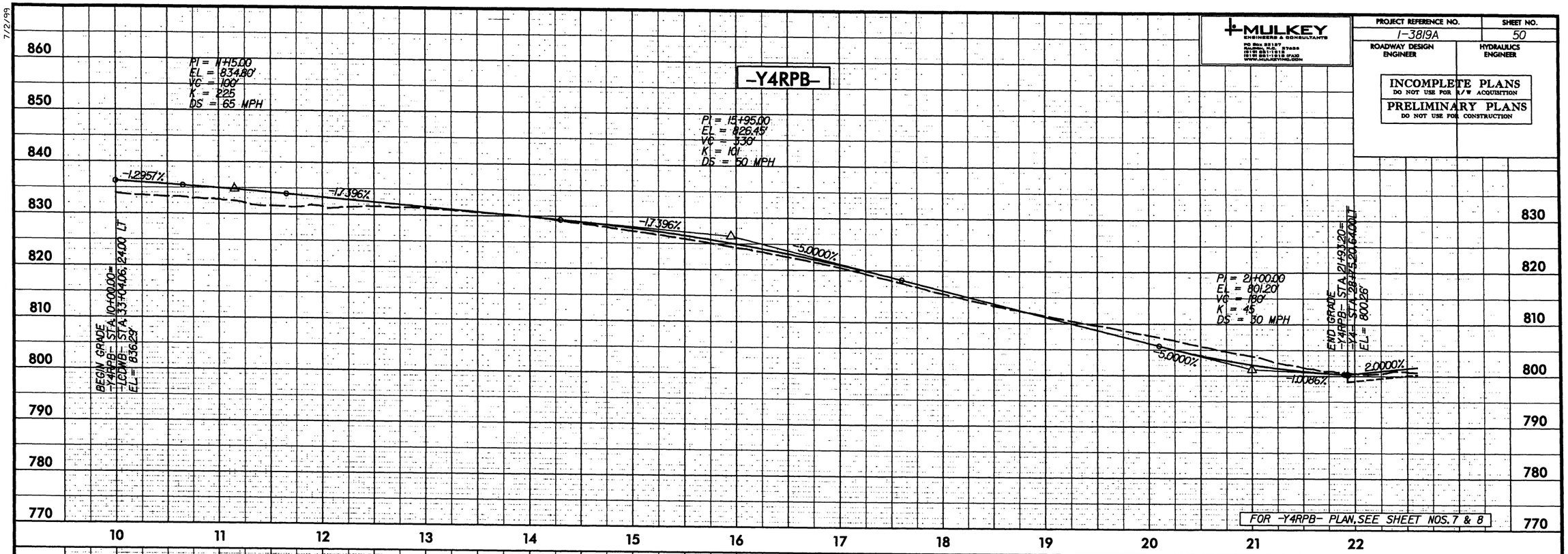

4/23/2010
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Flexcode: Hudspeth Inc.

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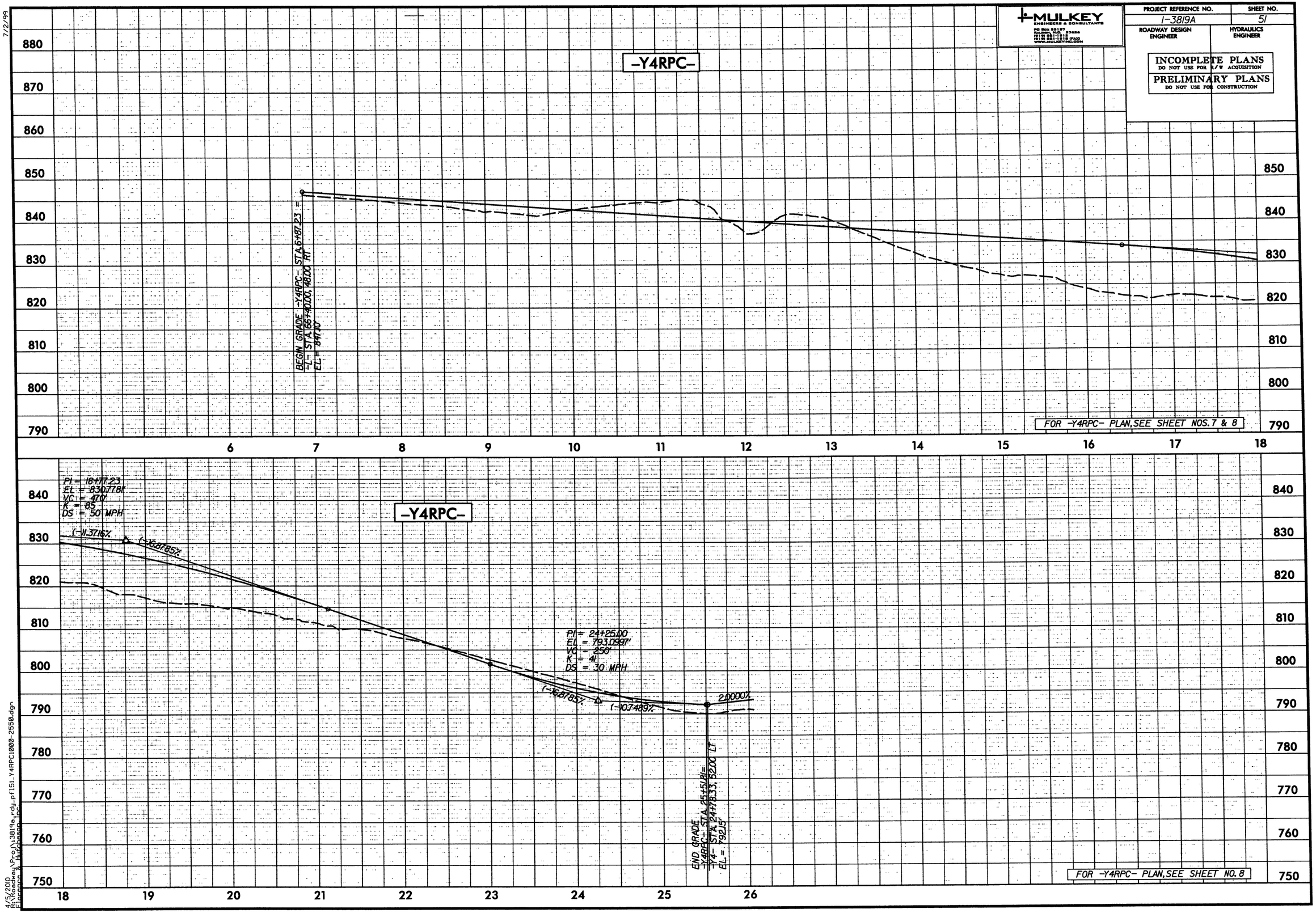
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



4/5/2010
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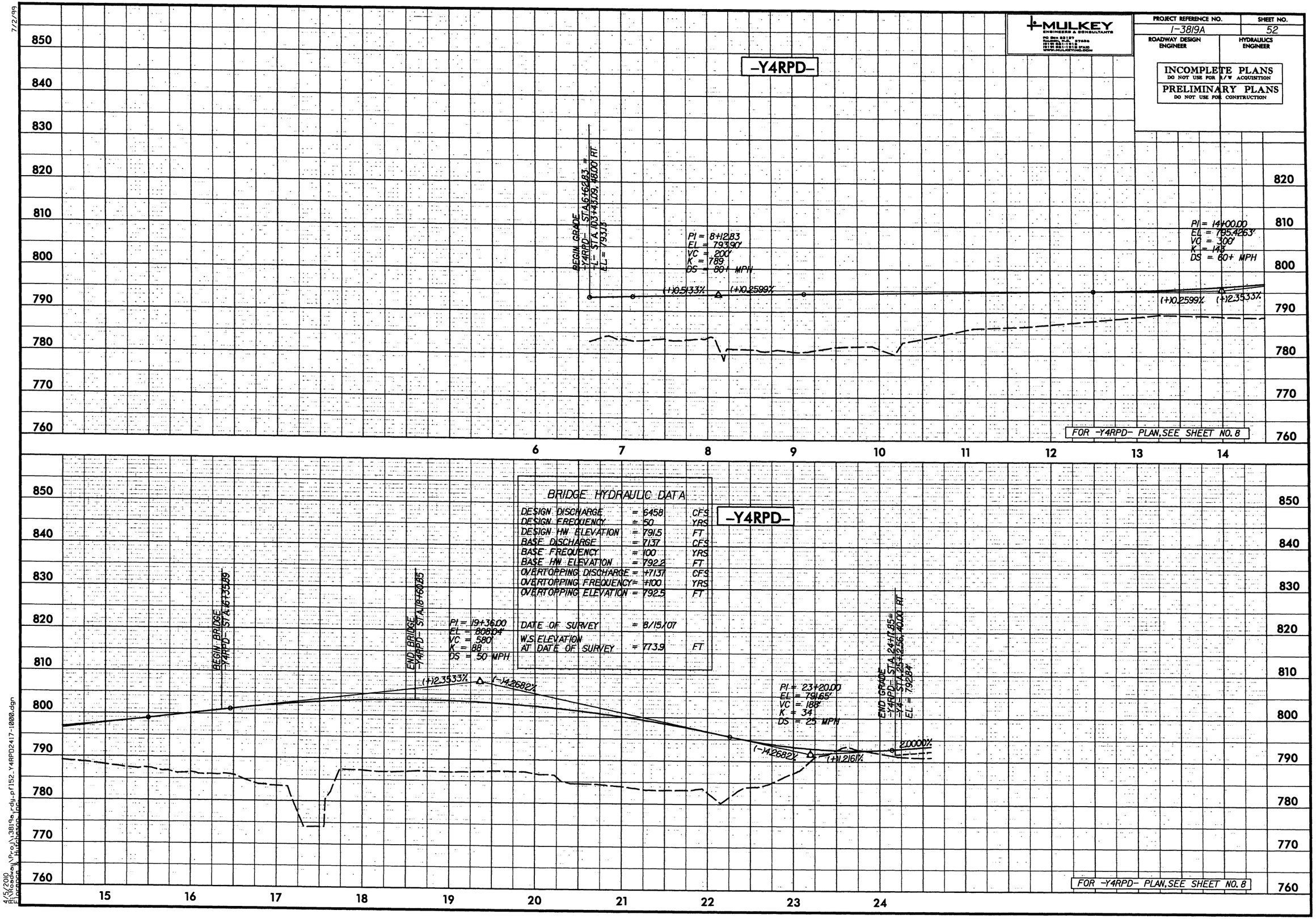
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	52
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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8:36:00 am \Proj\3819a_rdu_pf152_Y4RPD2417-1000.dgn
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PROJECT REFERENCE NO.	SHEET NO.
I-3819A	53
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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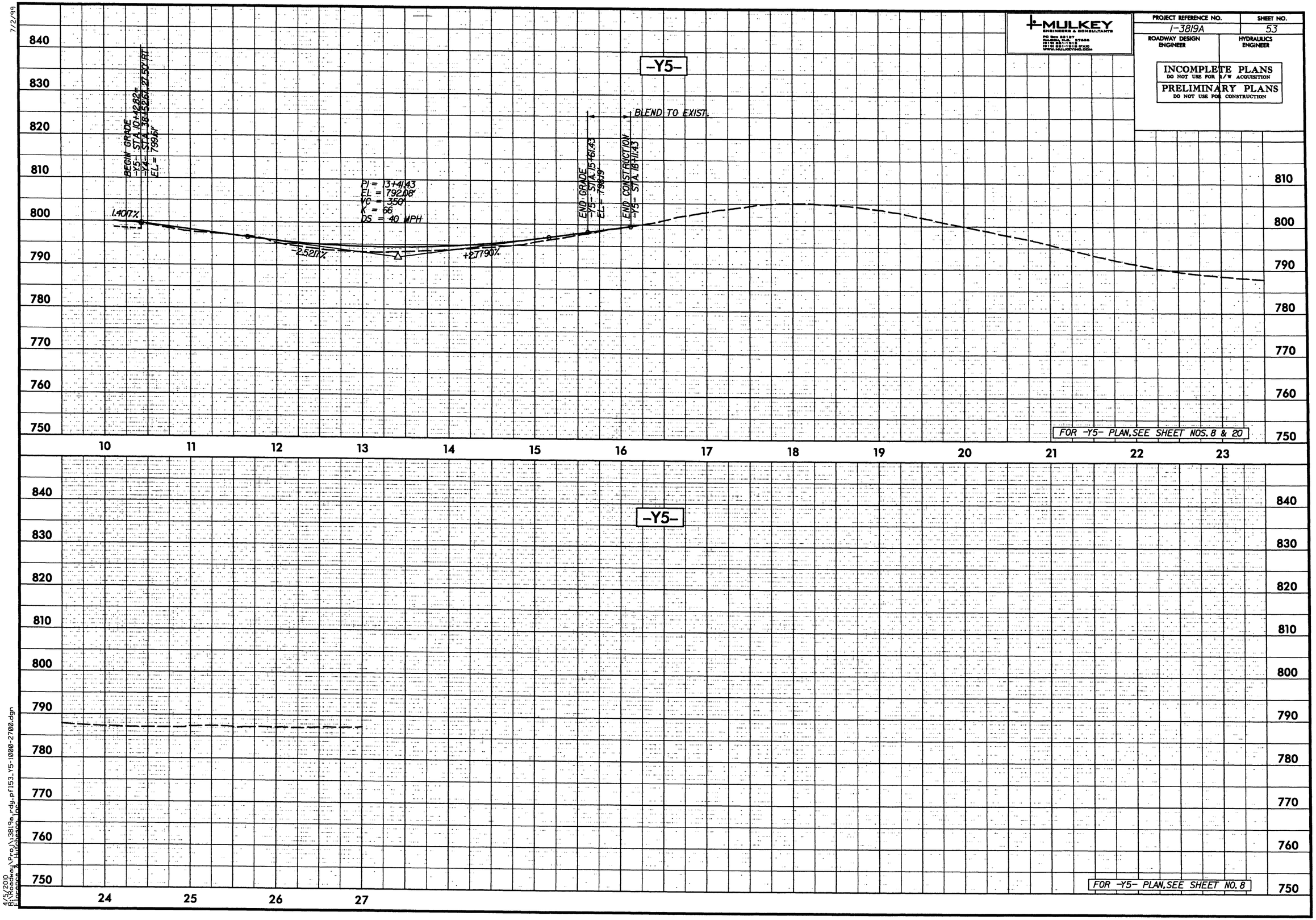
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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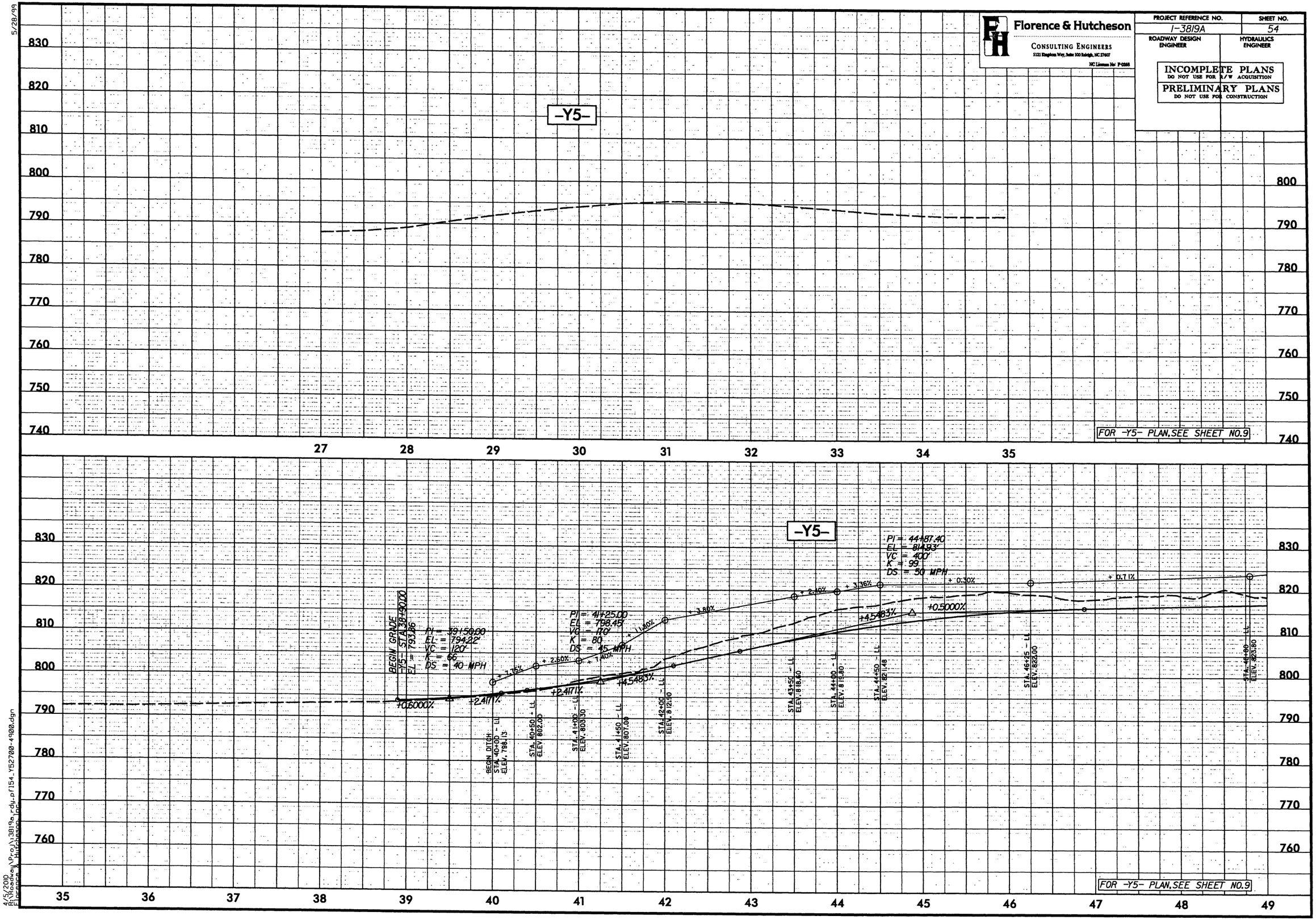
NC License No. F-0266

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



4/5/2010
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5/28/99

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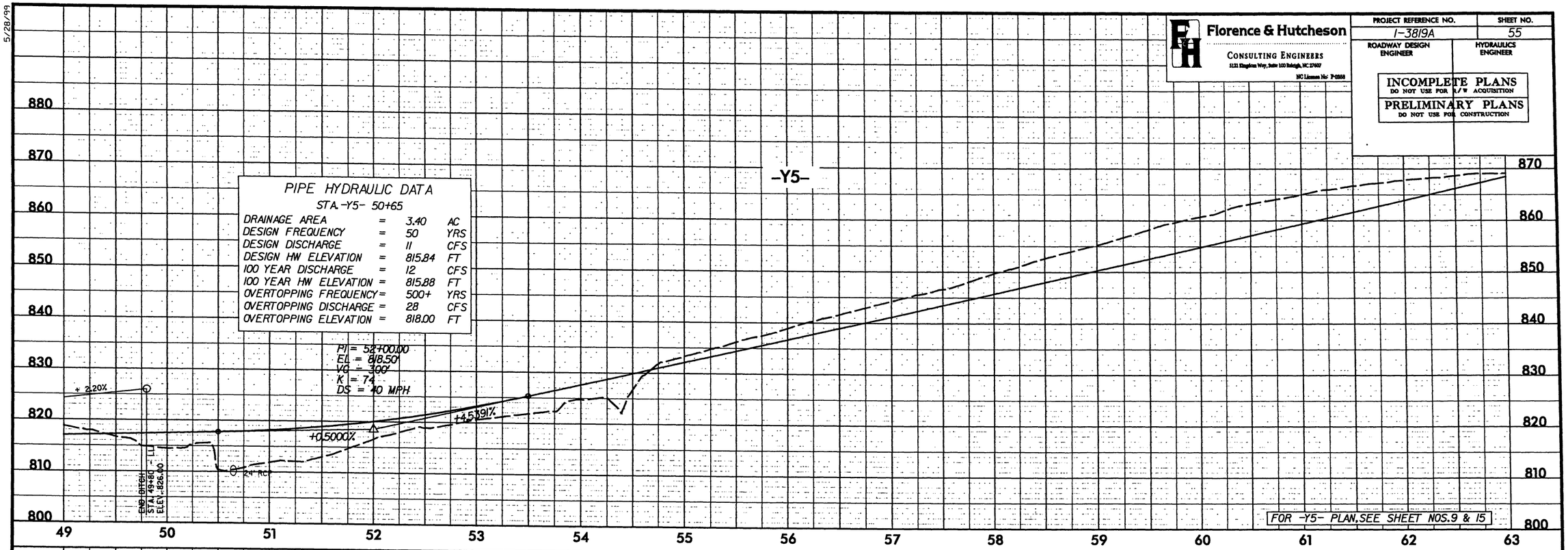
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	55
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

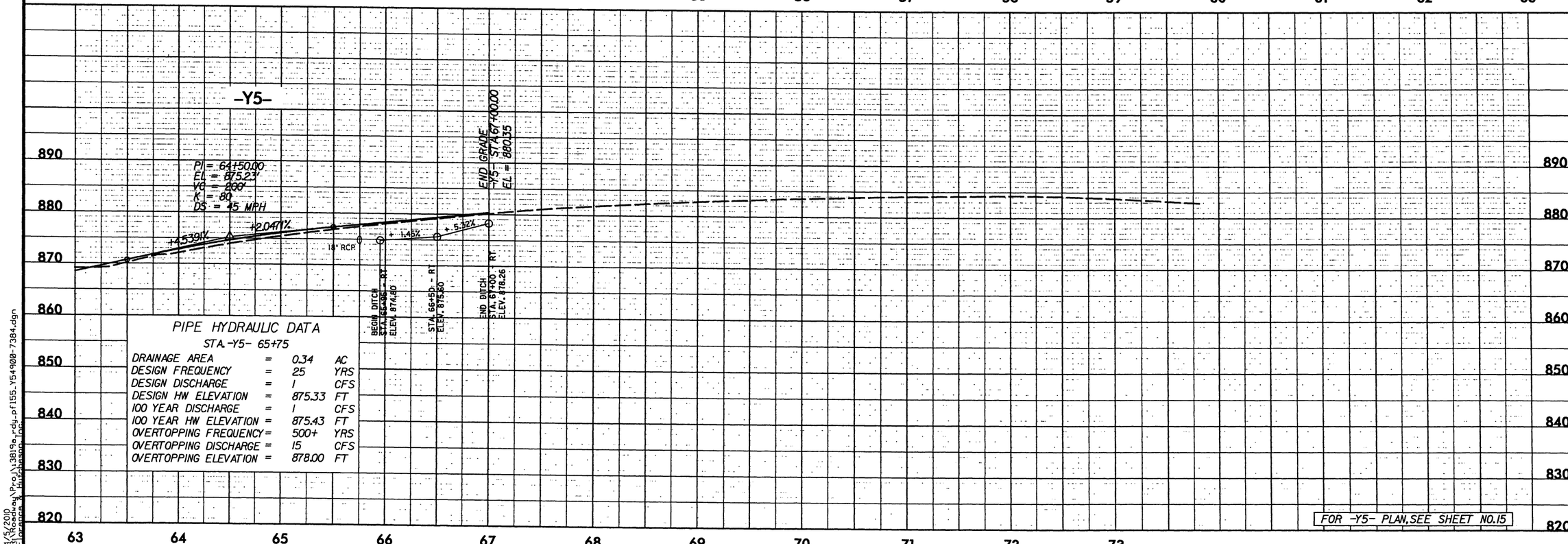
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PIPE HYDRAULIC DATA
STA. -Y5- 50+65

DRAINAGE AREA	=	3.40	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	11	CFS
DESIGN HW ELEVATION	=	815.84	FT
100 YEAR DISCHARGE	=	12	CFS
100 YEAR HW ELEVATION	=	815.88	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	28	CFS
OVERTOPPING ELEVATION	=	818.00	FT



PIPE HYDRAULIC DATA
STA. -Y5- 65+75

DRAINAGE AREA	=	0.34	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	1	CFS
DESIGN HW ELEVATION	=	875.33	FT
100 YEAR DISCHARGE	=	1	CFS
100 YEAR HW ELEVATION	=	875.43	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	15	CFS
OVERTOPPING ELEVATION	=	878.00	FT

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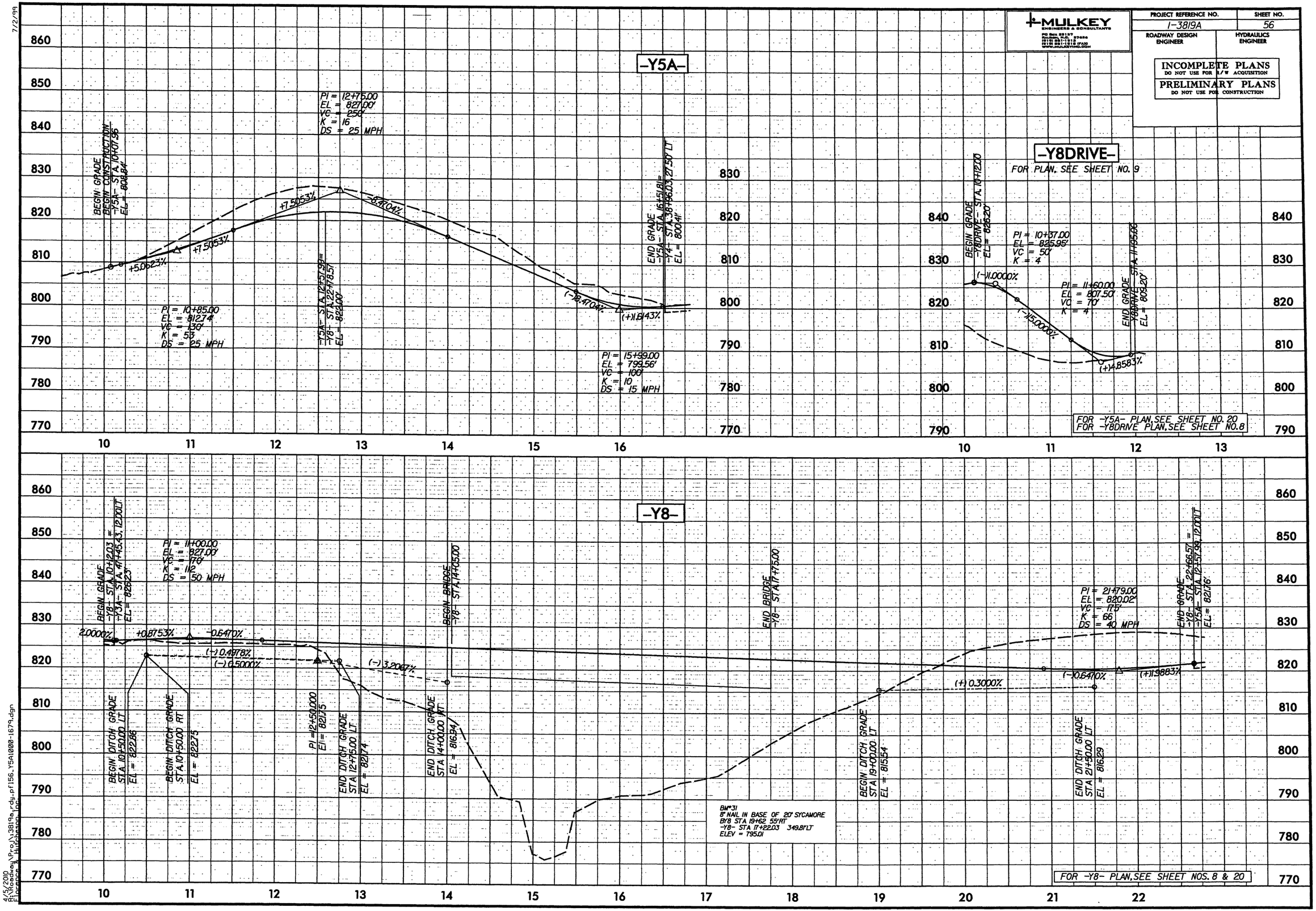
7/12/99

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127 Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	56
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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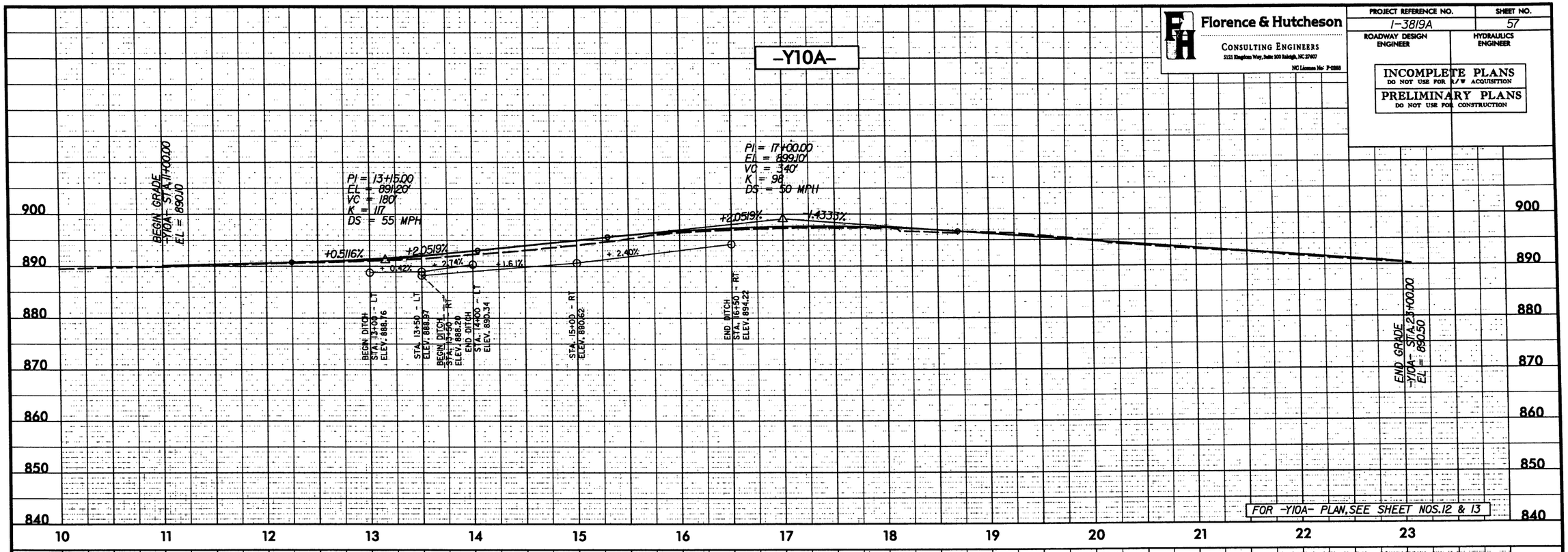
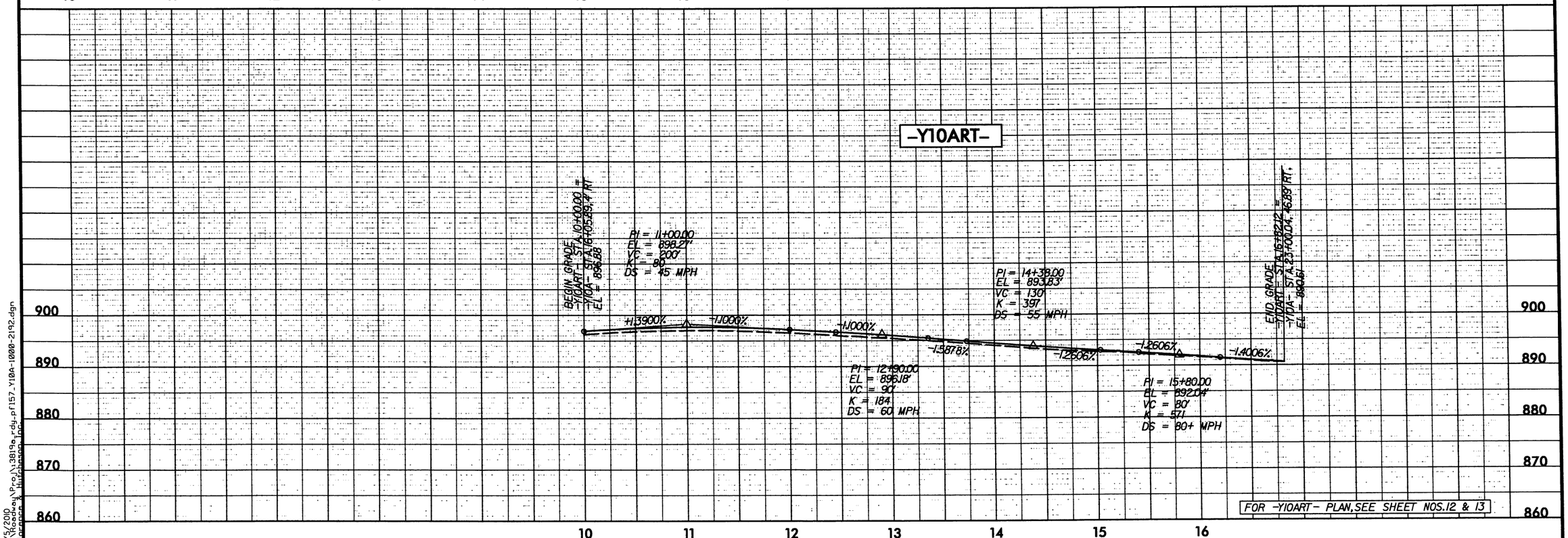
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	57
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -Y10A- PLAN, SEE SHEET NOS. 12 & 13



FOR -Y10ART- PLAN, SEE SHEET NOS. 12 & 13

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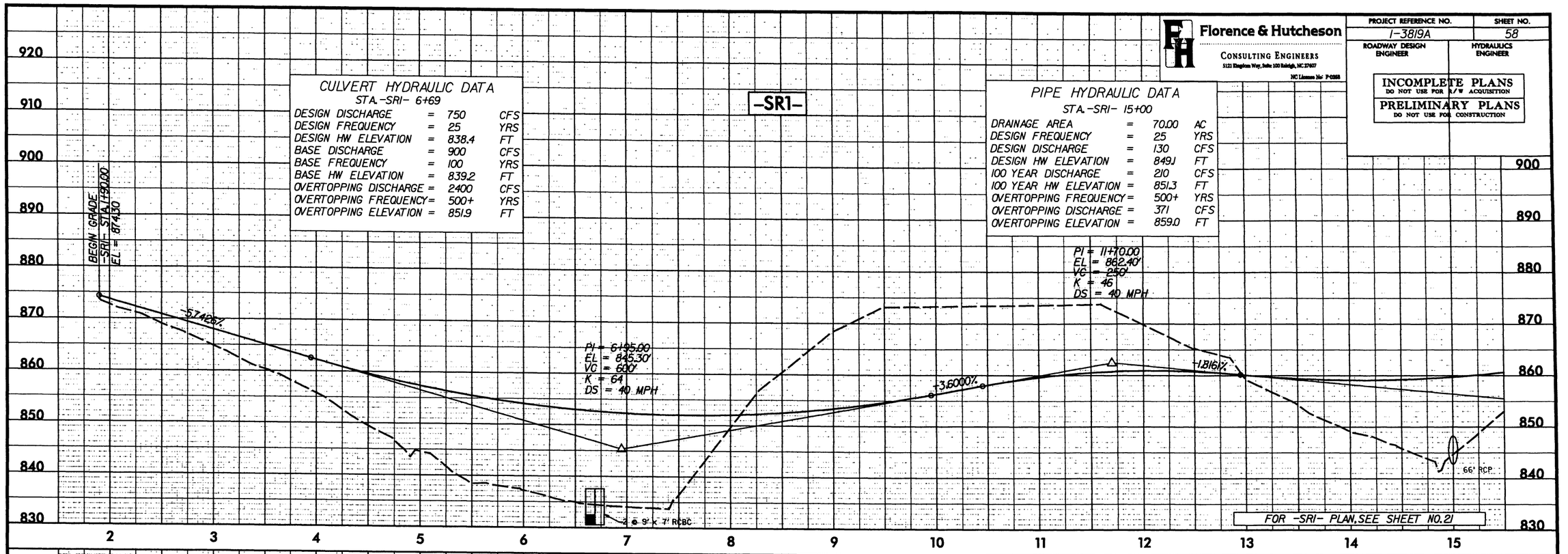
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	58
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

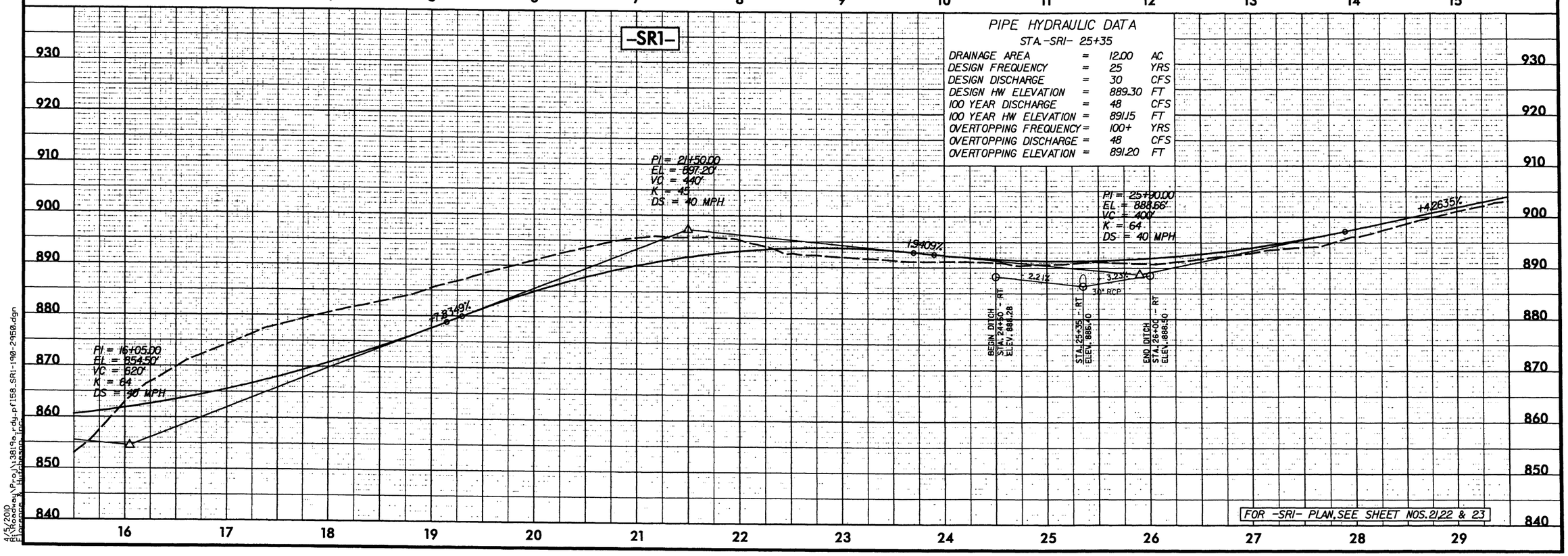


CULVERT HYDRAULIC DATA
STA.-SRI- 6+69

DESIGN DISCHARGE	=	750	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	838.4	FT
BASE DISCHARGE	=	900	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	839.2	FT
OVERTOPPING DISCHARGE	=	2400	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	851.9	FT

PIPE HYDRAULIC DATA
STA.-SRI- 15+00

DRAINAGE AREA	=	70.00	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	130	CFS
DESIGN HW ELEVATION	=	849.1	FT
100 YEAR DISCHARGE	=	210	CFS
100 YEAR HW ELEVATION	=	851.3	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	371	CFS
OVERTOPPING ELEVATION	=	859.0	FT



PIPE HYDRAULIC DATA
STA.-SRI- 25+35

DRAINAGE AREA	=	12.00	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	30	CFS
DESIGN HW ELEVATION	=	889.30	FT
100 YEAR DISCHARGE	=	48	CFS
100 YEAR HW ELEVATION	=	891.15	FT
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING DISCHARGE	=	48	CFS
OVERTOPPING ELEVATION	=	891.20	FT

4/5/2010
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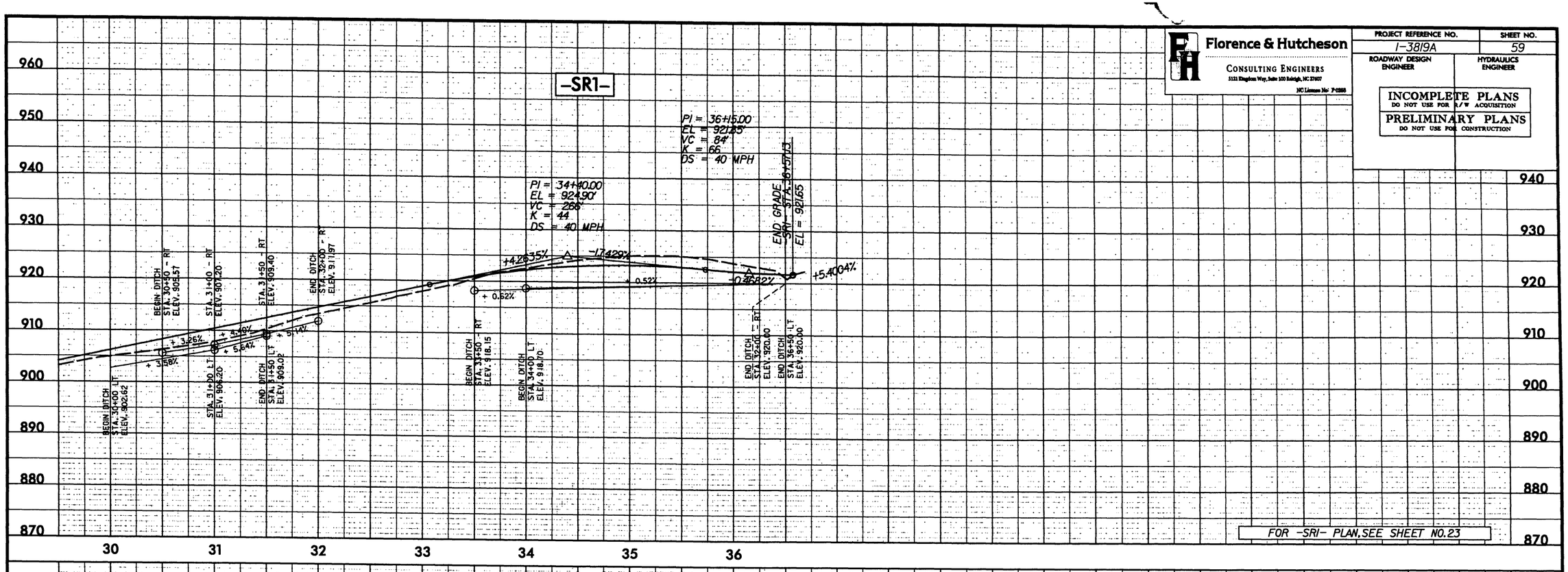
NC License No: P-0268

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	59
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



FOR -SR1- PLAN, SEE SHEET NO. 23

4/15/2010
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