STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

November 5, 2009

U. S. Army Corps of Engineers
69 Darlington Ave
Wilmington, NC 28403

ATTN: Ms. Kimberly Garvey
NCDOT Coordinator

Subject: **Application for Section 404 Nationwide Permits 13, 23, and 33** for the proposed replacement of Bridge No. 73 over Back Creek (Lake Lucas) on SR 1518 in Randolph County, Federal Aid Project No. BRZ-1518(2); Division 9; TIP No. B-4610

Dear Ma'am:

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 73 over Back Creek (Lake Lucas) on SR 1518. There will be 0.02 acres of temporary surface water impacts, 0.01 acres of bank stabilization on open water, and 0.21 acres of permanent open water fill.

Please see enclosed copies of the Pre-Construction Notification (PCN), permit drawings, design plans, and stormwater management plan for the above referenced project. The Programmatic Categorical Exclusion (PCE) was completed December 12, 2008. The document was distributed shortly thereafter. Additional copies are available upon request.

Please note that this project is an accelerated bridge project on NCDOT's Maintenance of Effort list. The NCDOT Administration has deemed these projects highest priority. This project calls for a letting date of June 10, 2010 and a review date of April 22, 2010; however, the let date may advance as additional funding becomes available.

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

TELEPHONE: 919-715-1500
FAX: 919-715-1501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD
PLB SUITE 168
RALEIGH NC 27604

A copy of this permit application will be posted on the NCDOT Website at: http://www.ncdot.org/doh/preconstruct/pe/. If you have any questions or need additional information, please call James Pflaum at (919) 715-7217.

Sincerely,

Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

Cc:
w/attachment
Mr. Brian Wrenn, NCDWQ (2 copies)
W/o attachment (see website for attachments)
Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Tim Johnson, P.E., Division 8 Engineer
Mr. Art King, Division 8 Environmental Officer
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE, Wilmington
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Mrs. Christy Wright, PDEA

Office Use Only:
Corps action ID no. _____
DWQ project no. _____
Form Version 1.3 Dec 10 2008

Pre-Construction Notification (PCN) Form

A. Applicant Information

1. Processing

1a. Type(s) of approval sought from the Corps:	☒ Section 404 Permit	☐ Section 10 Permit
1b. Specify Nationwide Permit (NWP) number: 13, 23, 33 or General Permit (GP) number:		
1c. Has the NWP or GP number been verified by the Corps?	☐ Yes	☒ No

1d. Type(s) of approval sought from the DWQ (check all that apply):

☐ 401 Water Quality Certification – Regular ☐ Non-404 Jurisdictional General Permit

☐ 401 Water Quality Certification – Express ☐ Riparian Buffer Authorization

1e. Is this notification solely for the record because written approval is not required?	For the record only for DWQ 401 Certification: ☒ Yes ☐ No	For the record only for Corps Permit: ☐ Yes ☒ No
1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.		☐ Yes ☒ No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.		☐ Yes ☒ No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?		☐ Yes ☒ No

2. Project Information

2a. Name of project:	Replacement of Bridge No. 73 over Back Creek (Lake Lucas) over SR 1518
2b. County:	Randolph
2c. Nearest municipality / town:	Asheboro
2d. Subdivision name:	*not applicable*
2e. NCDOT only, T.I.P. or state project no:	B-4610

3. Owner Information

3a. Name(s) on Recorded Deed:	North Carolina Department of Transportation
3b. Deed Book and Page No.	*not applicable*
3c. Responsible Party (for LLC if applicable):	*not applicable*
3d. Street address:	4701 Atlantic Ave, Suite 116
3e. City, state, zip:	Raleigh, NC 27604
3f. Telephone no.:	(919) 431-6527
3g. Fax no.:	(919) 431-2002
3h. Email address:	jrpflaum@ncdot.gov

4. Applicant Information (if different from owner)	
4a. Applicant is:	☐ Agent ☐ Other, specify:
4b. Name:	*not applicable*
4c. Business name (if applicable):	
4d. Street address:	
4e. City, state, zip:	
4f. Telephone no.:	
4g. Fax no.:	
4h. Email address:	
5. Agent/Consultant Information (if applicable)	
5a. Name:	*not applicable*
5b. Business name (if applicable):	
5c. Street address:	
5d. City, state, zip:	
5e. Telephone no.:	
5f. Fax no.:	
5g. Email address:	

B. Project Information and Prior Project History		
1. Property Identification		
1a. Property identification no. (tax PIN or parcel ID):	*not applicable*	
1b. Site coordinates (in decimal degrees):	Latitude: 35.742091 (DD.DDDDDD)	Longitude: -79.861596 (-DD.DDDDDD)
1c. Property size:	64 acres	
2. Surface Waters		
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Back Creek (Lake Lucas)	
2b. Water Quality Classification of nearest receiving water:	WS-II, HQW, CA	
2c. River basin:	Yadkin-Pee Dee	
3. Project Description		
3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application: Forested area with rural residential housing and some pasture land.		
3b. List the total estimated acreage of all existing wetlands on the property: 0		
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: 0		
3d. Explain the purpose of the proposed project: To replace a structurally deficient bridge.		
3e. Describe the overall project in detail, including the type of equipment to be used: The project involves replacing a 226-foot long, 16-foot wide, 6 span timber deck on steel girder bridge with a 240-foot long, 34-foot wide, 3 span box beam bridge on the existing alignment with an off site detour. Temporary work bridge will be used to remove and place bridge bents. Standard road building equipment, such as trucks, dozers, and cranes will be used.		
4. Jurisdictional Determinations		
4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past? Comments: No streams, No wetlands in project area	☐ Yes	☒ No ☐ Unknown
4b. If the Corps made the jurisdictional determination, what type of determination was made?	☐ Preliminary	☐ Final
4c. If yes, who delineated the jurisdictional areas? Name (if known):	Agency/Consultant Company: Other:	
4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation.		
5. Project History		
5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?	☐ Yes	☒ No ☐ Unknown
5b. If yes, explain in detail according to "help file" instructions.		
6. Future Project Plans		
6a. Is this a phased project?	☐ Yes	☒ No
6b. If yes, explain.		

C. Proposed Impacts Inventory

1. Impacts Summary

1a. Which sections were completed below for your project (check all that apply):

☐ Wetlands ☐ Streams - tributaries ☐ Buffers

☒ Open Waters ☐ Pond Construction

2. Wetland Impacts

If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.

2a. Wetland impact number – Permanent (P) or Temporary (T)	2b. Type of impact	2c. Type of wetland (if known)	2d. Forested	2e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	2f. Area of impact (acres)
W1 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W2 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W3 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W4 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W5 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W6 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
				2g. **Total wetland impacts**	

2h. Comments:

3. Stream Impacts

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

3a. Stream impact number - Permanent (P) or Temporary (T)	3b. Type of impact	3c. Stream name	3d. Perennial (PER) or intermittent (INT)?	3e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	3f. Average stream width (feet)	3g. Impact length (linear feet)
S1 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S2 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S3 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S4 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S5 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S6 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
					3h. **Total stream and tributary impacts**	

3i. Comments:

4. Open Water Impacts

If there are proposed impacts to lakes, ponds, estuaries, tributaries, sounds, the Atlantic Ocean, or any other open water of the U.S. then individually list all open water impacts below.

4a. Open water impact number – Permanent (P) or Temporary (T)	4b. Name of waterbody (if applicable)	4c. Type of impact	4d. Waterbody type	4e. Area of impact (acres)
O1 ☒ P ☐ T	Back Creek (Lake Lucas)	Fill	Lake	0.21
O2 ☐ P ☒ T	Back Creek (Lake Lucas)	Fill	Lake	0.02
O3 ☒ P ☐ T	Back Creek (Lake Lucas)	Bank Stabilization	Lake	0.01
O4 ☐ P ☐ T				
			4f. Total open water impacts	0.22 Perm 0.02 Temp

4g. Comments:

5. Pond or Lake Construction

If pond or lake construction proposed, then complete the chart below.

5a. Pond ID number	5b. Proposed use or purpose of pond	5c. Wetland Impacts (acres)			5d. Stream Impacts (feet)			5e. Upland (acres)
		Flooded	Filled	Excavated	Flooded	Filled	Excavated	Flooded
P1								
P2								
	5f. Total							

5g. Comments:

5h. Is a dam high hazard permit required?	☐ Yes ☐ No If yes, permit ID no:
5i. Expected pond surface area (acres):	
5j. Size of pond watershed (acres):	
5k. Method of construction:	

6. Buffer Impacts (for DWQ)

If project will impact a protected riparian buffer, then complete the chart below. If yes, then individually list all buffer impacts below. If any impacts require mitigation, then you **MUST** fill out Section D of this form.

6a. Project is in which protected basin?			☐ Neuse ☐ Catawba	☐ Tar-Pamlico ☐ Randleman	☐ Other:
6b. Buffer impact number – Permanent (P) or Temporary (T)	6c. Reason for impact	6d. Stream name	6e. Buffer mitigation required?	6f. Zone 1 impact (square feet)	6g. Zone 2 impact (square feet)
B1 ☐ P ☐ T			☐ Yes ☐ No		
B2 ☐ P ☐ T			☐ Yes ☐ No		
B3 ☐ P ☐ T			☐ Yes ☐ No		
		6h. **Total buffer impacts**			
6i. Comments:					

D. Impact Justification and Mitigation

1. Avoidance and Minimization

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project.

The proposed bridge is 14 feet longer than the existing bridge; it will be replaced at approximately the same location and alignment; an off site detour will be used; 1.5:1 slopes will be used in jurisdictional areas; 5 bents will be removed from Lake Lucas; only 2 bents will be used on the proposed bridge.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques.

NCDOT will implement Best Management practices (BMP's) for bridge demolition and removal. Design Standards in Sensitive Watersheds will be used during construction.

2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?	☐ Yes ☒ No
2b. If yes, mitigation is required by (check all that apply):	☐ DWQ ☐ Corps
2c. If yes, which mitigation option will be used for this project?	☐ Mitigation bank ☐ Payment to in-lieu fee program ☐ Permittee Responsible Mitigation

3. Complete if Using a Mitigation Bank

3a. Name of Mitigation Bank: not applicable

3b. Credits Purchased (attach receipt and letter)	Type	Quantity

3c. Comments:

4. Complete if Making a Payment to In-lieu Fee Program

4a. Approval letter from in-lieu fee program is attached.	☐ Yes
4b. Stream mitigation requested:	linear feet
4c. If using stream mitigation, stream temperature:	☐ warm ☐ cool ☐ cold
4d. Buffer mitigation requested (DWQ only):	square feet
4e. Riparian wetland mitigation requested:	acres
4f. Non-riparian wetland mitigation requested:	acres
4g. Coastal (tidal) wetland mitigation requested:	acres

4h. Comments:

5. Complete if Using a Permittee Responsible Mitigation Plan

5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan.

6. **Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ**				
6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?			☐ Yes	☒ No
6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.				
Zone	6c. Reason for impact	6d. Total impact (square feet)	Multiplier	6e. Required mitigation (square feet)
Zone 1			3 (2 for Catawba)	
Zone 2			1.5	
	6f. **Total buffer mitigation required:**			
6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund).				
6h. Comments:				

E. Stormwater Management and Diffuse Flow Plan (required by DWQ)	
1. Diffuse Flow Plan	
1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?	☐ Yes ☒ No
1b. If yes, then is a diffuse flow plan included? If no, explain why. Comments: See Permit Drawings	☐ Yes ☐ No
2. Stormwater Management Plan	
2a. What is the overall percent imperviousness of this project?	n/a %
2b. Does this project require a Stormwater Management Plan?	☒ Yes ☐ No
2c. If this project DOES NOT require a Stormwater Management Plan, explain why:	
2d. If this project DOES require a Stormwater Management Plan, then provide a brief, narrative description of the plan: See enclosed	
2e. Who will be responsible for the review of the Stormwater Management Plan?	☐ Certified Local Government ☐ DWQ Stormwater Program ☐ DWQ 401 Unit
3. Certified Local Government Stormwater Review	
3a. In which local government's jurisdiction is this project?	not applicable
3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):	☐ Phase II ☐ NSW ☐ USMP ☐ Water Supply Watershed ☐ Other:
3c. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
4. DWQ Stormwater Program Review	
4a. Which of the following state-implemented stormwater management programs apply (check all that apply):	☐ Coastal counties ☒ HQW ☐ ORW ☐ Session Law 2006-246 ☐ Other:
4b. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☒ No
5. DWQ 401 Unit Stormwater Review	
5a. Does the Stormwater Management Plan meet the appropriate requirements?	☐ Yes ☐ No Pending
5b. Have all of the 401 Unit submittal requirements been met?	☐ Yes ☐ No Pending

F. Supplementary Information		
1. Environmental Documentation (DWQ Requirement)		
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	☒ Yes	☐ No
1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?	☒ Yes	☐ No
1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) Comments:	☒ Yes	☐ No
2. Violations (DWQ Requirement)		
2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?	☐ Yes	☒ No
2b. Is this an after-the-fact permit application?	☐ Yes	☒ No
2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):		
3. Cumulative Impacts (DWQ Requirement)		
3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?	☐ Yes	☒ No
3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description. Due to the minimal transportation impact resulting from this bridge replacement, this project will neither influence nearby land uses nor stimulate growth. Therefore, a detailed indirect or cumulative effects study will not be necessary.		
4. Sewage Disposal (DWQ Requirement)		
4a. Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility. not applicable		

5. Endangered Species and Designated Critical Habitat (Corps Requirement)		
5a. Will this project occur in or near an area with federally protected species or habitat?	☒ Yes	☐ No
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	☒ Yes	☐ No
5c. If yes, indicate the USFWS Field Office you have contacted.	☒ Raleigh ☐ Asheville	

5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat?

As of January 31, 2008 the USFWS list two protected species in Randolph County, Schweinitiz's sunflower and the Cape Fear Shiner. Suitable habitat for the Cape Fear Shiner is not present in the project area due to absence of available stream habitat and the presence of Lake Lucas. Suitable habitat for Schweinitiz's sunflower is present in the study area along roadside shoulders and embankments. Surveys were conducted by NCDOT biologists throughout areas of suitable habitat on September 15, 2009. No individuals were observed. A review of NCNHP records, updated July 2009, indicates no known occurrences of the Cape Fear Shiner or Schweinitiz's sunflower within 1.0 mile of the study area. This project will have no effect on the Cape Fear Shiner or Schweinitiz's sunflower.

Suitable foraging habitat is present for the Bald eagle. Surveys for the bald eagle were conducted on November 4, 2009. No bald eagles or nests were observed within the project study area or within 660 feet of the project study area. Trees were predominantly hardwoods and scattered pines less than 60 years of age that are typically unsuitable for nesting.

6. Essential Fish Habitat (Corps Requirement)		
6a. Will this project occur in or near an area designated as essential fish habitat?	☐ Yes	☒ No

6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat?

NMFS County Index

7. Historic or Prehistoric Cultural Resources (Corps Requirement)		
7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?	☐ Yes	☒ No

7b. What data sources did you use to determine whether your site would impact historic or archeological resources?

Programmatic Categorical Exclusion B-4610

8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	☒ Yes	☐ No

8b. If yes, explain how project meets FEMA requirements: Hydraulics Unit coordinating with FEMA

8c. What source(s) did you use to make the floodplain determination? FEMA maps

Gregory J. Thorpe, Ph D Applicant/Agent's Printed Name	E. L. Lude Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	11-5-09 Date

STORMWATER MANAGEMENT PLAN

TIP No. B-4610
Project: 33794.1.1
Randolph County

WBT 10/19/2009

ROADWAY DESCRIPTION

The purpose of this project is to replace Randolph County Bridge No. 73 on SR 1518 over Lake Lucas (Back Creek). The overall length of the project is approximately 0.2 miles. The approaches will be widened to provide two 11-foot lanes. Eight-foot grass shoulders will be provided on each side. Where guardrail is required, the shoulder will be widened an additional 3 feet. The roadway has been designed as a Rural Local Route using the Sub-Regional Tier Design Guidelines for Bridge Projects. The project drainage design consists of cross pipe, grated inlets with associated pipe systems, tail ditch, roadside ditches, and grass swales.

ENVIROMENTAL DESCRIPTION

The project is located over Lake Lucas (Back Creek) in the Yadkin-Pee Dee River Basin. Back Creek in the project area is classified WS-II, HQW, CA. The proposed roadway embankment encroaches laterally into the jurisdictional surface waters (pond).

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. Non-structural BMPs for this project include grass shoulder filtration, rock fill in lake, reduction of proposed impervious areas via use of the Sub-Regional Tier Design Guidelines for Bridge Projects, and the widening the bridge shoulder on the left side to accommodate the design spread and eliminate direct discharge to the jurisdictional surface waters (pond), and stormwater diversion, as much as practical, to separate on-site pavement runoffs for treatment. In addition to the non-Structural BMPs, grass swales have been used as Structural BMP on this project for the bridge and approach runoff.

Bridge on -L- 17+80 to 20+20:
Deck drains are not required. Bridge shoulder has been widened to eliminate the need for deck drains. All deck pavement runoffs will be collected through grated inlets and storm system and be drained to a grass swale for treatment (-L- 21+50 to 22+25 LT). A grass tailditch (-L- Sta 22+25 LT) is provided with a tapered base to provide a non-erosive outlet velocity to the pond. Approach pavement runoffs will be collected through grated inlets and storm system and be drained to a grass swale for treatment (-L- 17+00 to 16+50 RT). Grass Swale Treatment Sheet is attached.

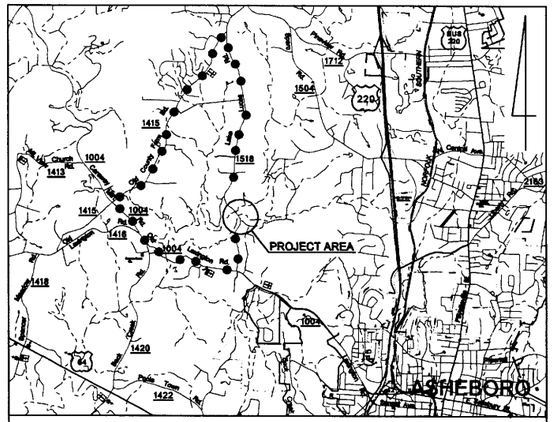
Attachment

09/08/09

TIP PROJECT: B-4610

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

RW PLANS

OFFSITE DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

NAD 83 (CORS 96)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4610	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33794.1.1	BRZ-1518(2)	P.E.
33794.2.1	BRZ-1518(2)	R/W

LOCATION: ***BRIDGE NO. 73 OVER LAKE LUCAS ON SR 1518***

TYPE OF WORK: ***GRADING, DRAINAGE, PAVING, & STRUCTURE***

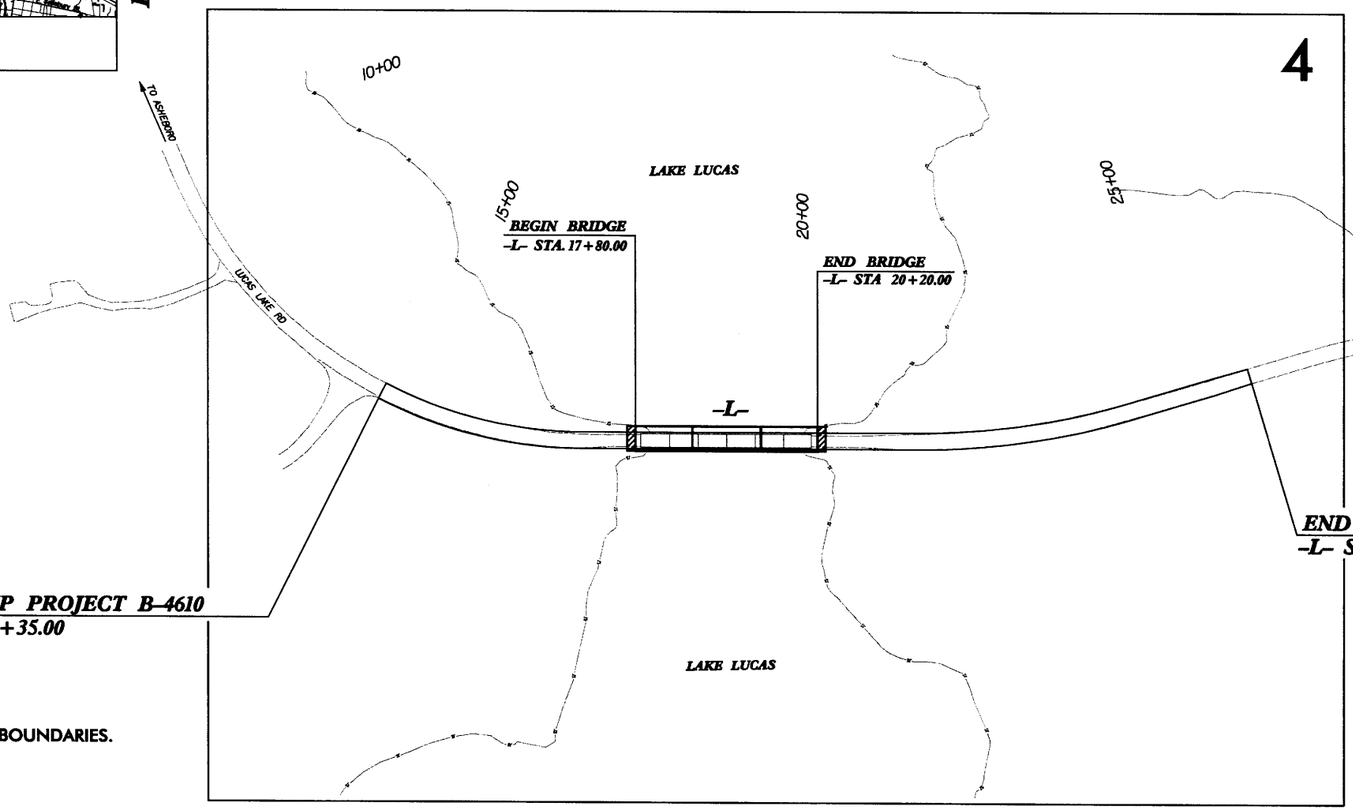
WETLAND & STREAM IMPACTS

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

PROJECT: 33794.1.1 (B-4610)

BRIDGE NO. 73 ON SR 1518
OVER LAKE LUCAS

SHEET 1 OF 7



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

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

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

RECEIVED
NOV 3 2009
OFFICE OF NATURAL ENVIRONMENT

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS 50 25 0 50 100

PROFILE (HORIZONTAL) 50 25 0 50 100

PROFILE (VERTICAL) 10 5 0 10 20

DESIGN DATA

ADT 2010 = 1,200
ADT 2030 = 2,000
DHV = 10 %
D = 60 %
T = 3 % *
V = 50 MPH
*(TTST 1% + DUAL 2%)
FUNC. CLASS. = RURAL LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT	*B-4610*	=	*0.175 mi.*
LENGTH STRUCTURE TIP PROJECT	*B-4610*	=	*0.046 mi.*
TOTAL LENGTH OF TIP PROJECT	*B-4610*	=	*0.221 mi.*

Prepared In the Office of:
for North Carolina Department of Transportation

KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company
3131 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-4866

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: NOVEMBER 2, 2009

LETTING DATE: MAY 18, 2010

BRIAN A. WILES, P.E.
PROJECT ENGINEER

YVETTE T. MARIOTTE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

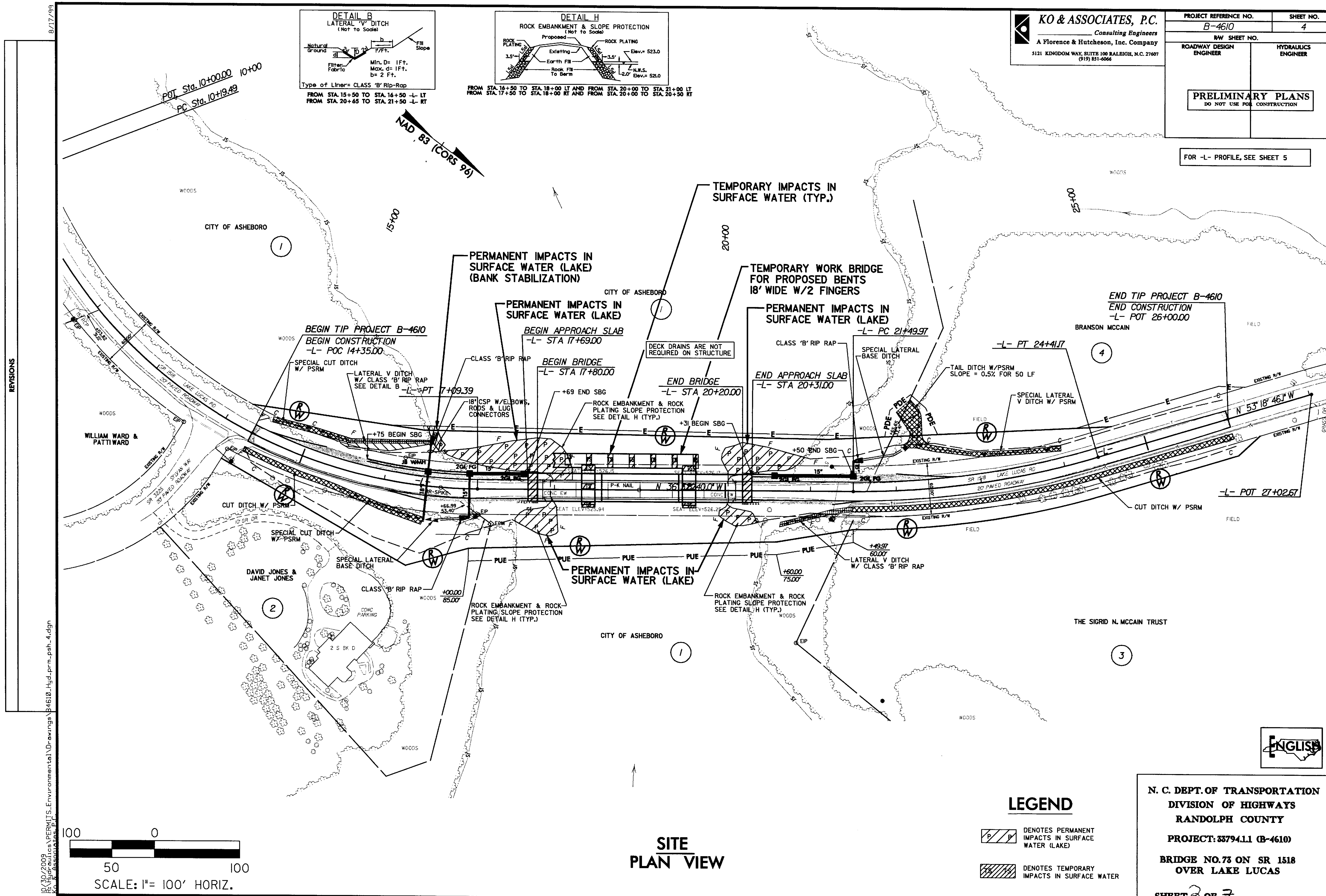
SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

10/30/2009
R:\Hydraulics\PERMITS_Environmental\Drawings\B4610_Hyd_prm_tsh.dgn
Ko & Associates, P.C.


DETAIL B
LATERAL 'V' DITCH
(Not to Scale)
Min. D= 1Ft.
Max. d= 1Ft.
b= 2 Ft.
Type of Liner= CLASS 'B' Rip-Rap
FROM STA. 15+50 TO STA. 16+50 -L- LT
FROM STA. 20+65 TO STA. 21+50 -L- RT
DETAIL H
ROCK EMBANKMENT & SLOPE PROTECTION
(Not to Scale)
FROM STA. 16+50 TO STA. 18+00 LT AND FROM STA. 20+00 TO STA. 21+00 LT
FROM STA. 17+50 TO STA. 18+00 RT AND FROM STA. 20+00 TO STA. 20+50 RT
KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066
PROJECT REFERENCE NO. B-4610
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
FOR -L- PROFILE, SEE SHEET 5
POT Sta. 10+00.00
PC Sta. 10+19.49
NAD 83 (CORS 96)
CITY OF ASHEBORO
PERMANENT IMPACTS IN SURFACE WATER (LAKE) (BANK STABILIZATION)
PERMANENT IMPACTS IN SURFACE WATER (LAKE)
TEMPORARY IMPACTS IN SURFACE WATER (TYP.)
TEMPORARY WORK BRIDGE FOR PROPOSED BENTS 18' WIDE W/2 FINGERS
BEGIN TIP PROJECT B-4610
BEGIN CONSTRUCTION
-L- POC 14+35.00
BEGIN APPROACH SLAB
-L- STA 17+69.00
BEGIN BRIDGE
-L- STA 17+80.00
END BRIDGE
-L- STA 20+20.00
END APPROACH SLAB
-L- STA 20+31.00
-L- PC 21+49.97
-L- PT 17+09.39
-L- PT 24+41.17
END TIP PROJECT B-4610
END CONSTRUCTION
-L- POT 26+00.00
-L- POT 27+02.67
DECK DRAINS ARE NOT REQUIRED ON STRUCTURE
SPECIAL CUT DITCH W/ PSRM
LATERAL V DITCH W/ CLASS 'B' RIP RAP SEE DETAIL B
CLASS 'B' RIP RAP
18" CSP W/ELBOWS, RODS & LUG CONNECTORS
+69 END SBG
+75 BEGIN SBG
+31 BEGIN SBG
+50 END SBG
ROCK EMBANKMENT & ROCK PLATING SLOPE PROTECTION SEE DETAIL H (TYP.)
SPECIAL LATERAL BASE DITCH
TAIL DITCH W/PSRM SLOPE = 0.5% FOR 50 LF
SPECIAL LATERAL V DITCH W/ PSRM
CUT DITCH W/ PSRM
LATERAL V DITCH W/ CLASS 'B' RIP RAP
N 53°18'46" W
SR 1518 LAKE LUCAS RD
20' PAVED ROADWAY
WILLIAM WARD & PATTI WARD
DAVID JONES & JANET JONES
BRANSON MCCAIN
THE SIGRID N. MCCAIN TRUST
WOODS
FIELD
PUE
PDE
15+00
20+00
25+00
LEGEND
DENOTES PERMANENT IMPACTS IN SURFACE WATER (LAKE)
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SITE PLAN VIEW
SCALE: 1"= 100' HORIZ.
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 33794.1.1 (B-4610)
BRIDGE NO. 73 ON SR 1518 OVER LAKE LUCAS
SHEET 2 OF 7
ENGLISH
REVISIONS
8/17/99
10/30/2009
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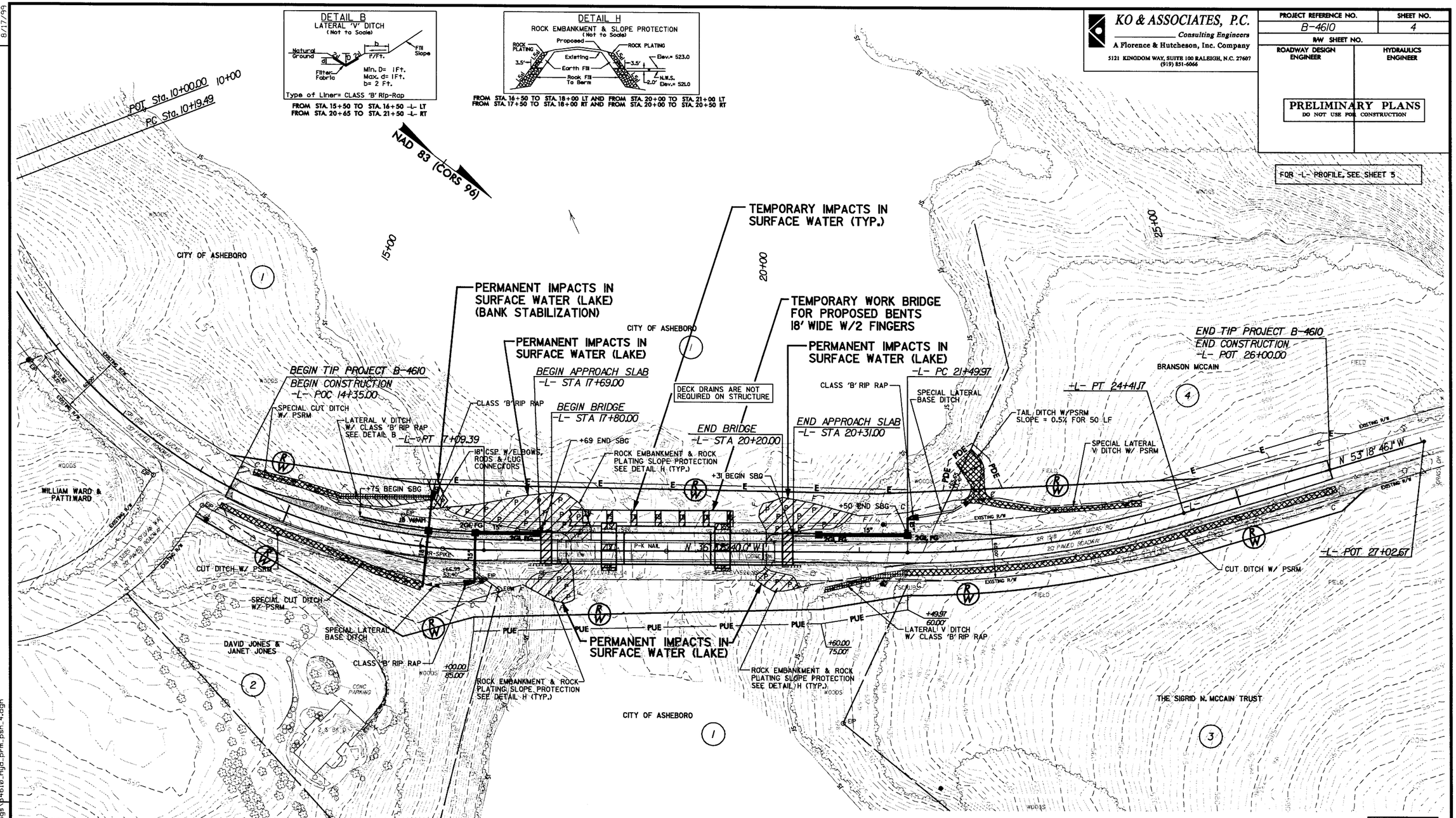
Ko & Associates, P.C.

8/17/99

REVISIONS



SITE PLAN VIEW

LEGEND

- P P — DENOTES PERMANENT IMPACTS IN SURFACE WATER (LAKE)
- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

ENGLISH

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

PROJECT: 33794.1.1 (B-4610)

BRIDGE NO. 73 ON SR 1518 OVER LAKE LUCAS

SHEET 3 OF 7

10/30/2009
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Ko & Associates, P.C.

5/14/99

KO & ASSOCIATES, P.C.	PROJECT REFERENCE NO.	SHEET NO.
Consulting Engineers A Florence & Hutcheson, Inc. Company 5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607 (919) 851-6066	B-4610	5
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

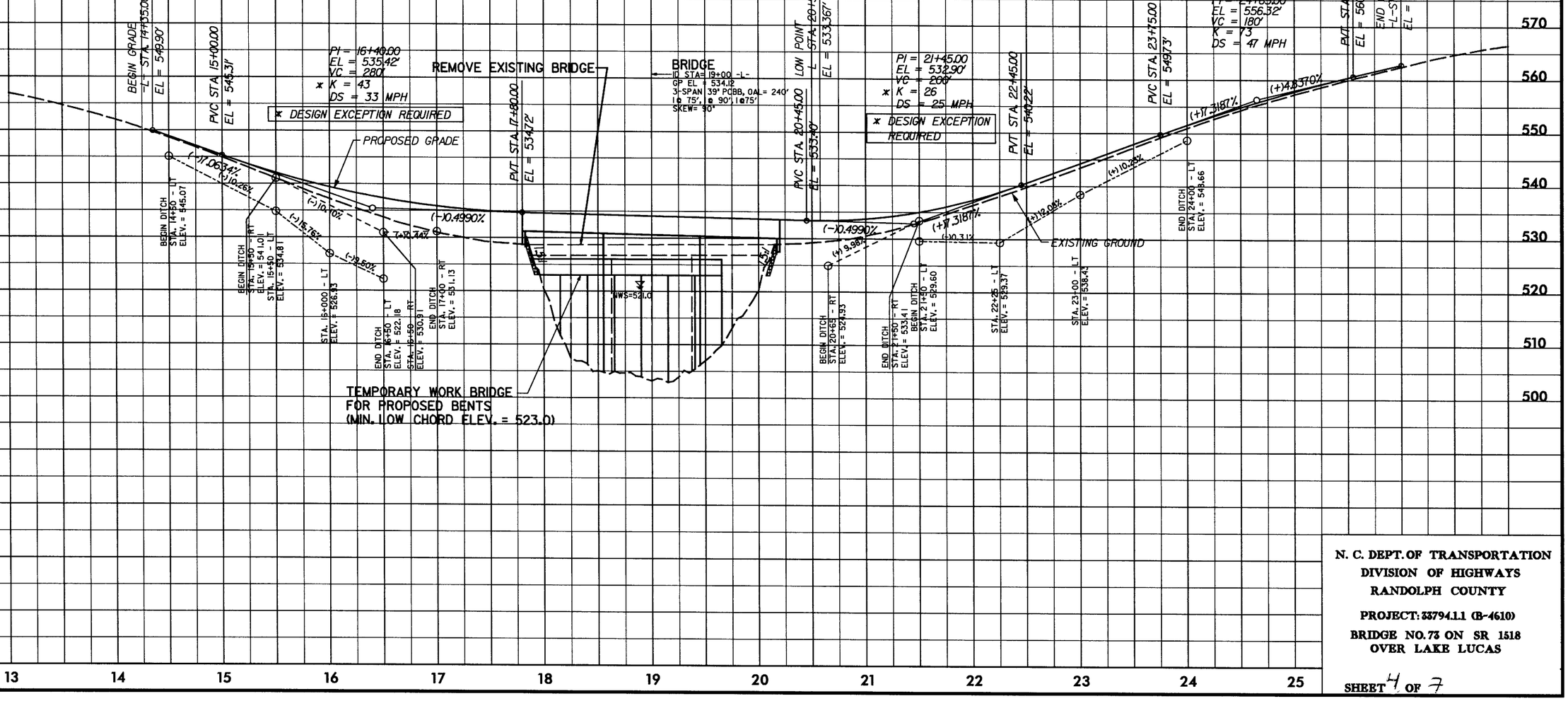
BM#1
rRR SPIKE IN BASE OF 15" PINE TREE
BL STA 7+78 110' LT
-L- STA 14+05.95 78.60' LT
ELEV = 541.68'

-L-

FOR PLAN, SEE SHEET NO. 4

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	2300	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	526.8	FT
BASE DISCHARGE	=	3400	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	528.2	FT
OVERTOPPING DISCHARGE	=	14,000 +/-	CFS
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING ELEVATION	=	533.6	FT
DATE OF SURVEY	=	1/9/2009	
W.S. ELEVATION AT DATE OF SURVEY	=	521.5	FT



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

PROJECT: 33794.1.1 (B-4610)

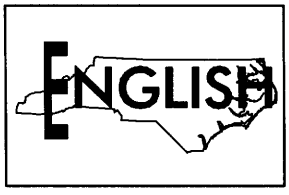
BRIDGE NO. 73 ON SR 1518
OVER LAKE LUCAS

SHEET 4 OF 7

10/30/2009
K:\Projects\PERMITS_Environmental\SWM Permit Appl\B4610_Hyd_prm_pf1.5.dgn
KO & Associates, P.A.

WETLAND IMPACTS
SUMMARY OF AFFECTED PROPERTY OWNERS

TRACT NO.	PROPERTY OWNER	ADDRESS	SITE NO.
(1)	CITY OF ASHEBORO	P.O. BOX 1106 ASHEBORO N.C. 27204	1



NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 33794.1.1 (B-4610)

BRIDGE NO. 73 ON SR 1518
OVER LAKE LUCAS

SHEET 5 OF 7

10/30/2009
8:42:23 AM
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WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation in Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing in Wetlands (ac)	WETLAND IMPACTS: Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	SURFACE WATER IMPACTS: Temp. SW impacts (ac)	SURFACE WATER IMPACTS: Existing Channel Impacts Permanent (ft)	SURFACE WATER IMPACTS: Existing Channel Impacts Temp. (ft)	SURFACE WATER IMPACTS: Natural Stream Design (ft)
	STA. 16+57 LT.	BANK STABILIZATION	---	---	---	---	---	0.01	---	---	---	---
	16+67 TO 18+21	ROCK EMBANKMENT	---	---	---	---	---	0.13	---	---	---	---
	19+93 TO 20+93	ROCK EMBANKMENT	---	---	---	---	---	0.08	---	---	---	---
	17+80 TO 20+20	*3-SPAN BRIDGE	---	---	---	---	---	---	---	---	---	---
	17+98 TO 19+65	TEMPORARY WORK	---	---	---	---	---	---	0.02	---	---	---
		BRIDGE, L= 254'										
TOTALS:								0.22	0.02			

* Permanent SW impacts for proposed bents = 64 SF

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

RANDOLPH COUNTY
WBS - 33794.1.1 (B-4610)

SHEET 6 OF 7 10/30/2009

SHT 5 OF 5

ATN Revised 3/31/05

Grass Swales (4)

KO & ASSOCIATES, P.C.

Raleigh, North Carolina

GRASS SWALE TREATMENT SHEET

I.D. NO. B-4610
PROJ. NO. 33794.1.1
COUNTY RANDOLPH

DATE: 10/19/2009
DESIGNED BY: SHB
CHECKED BY: WHT 10/19/09

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

I_2 = 3.7 in/hr I_5 = 4.9 in/hr I_{10} = 5.5 in/hr

SHT.	Align	Str Num.	Station		Type	Drainage Area Ac	Rational C	Required length for treatment (ft.)	Actual Length (ft)	Channel Slope (ft/ft)	Channel Base (ft)	Side Slopes	Discharge Treated?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided	Remarks
4	L		14+50	L	SDG	0.15	0.70	15.0	15	0.130	0	3	**NO**	0.4	1.72	0.6	1.90	GSF	PSRM
4	L		15+50	L	SDG	0.15	0.70	15.0	100	0.103	0	3	**NO**	0.4	2.93	0.6	3.23	GSF	PSRM
4	L		16+00	L	LAT	0.26	0.70	26.0	50	0.158	0	3	**NO**	0.7	2.12	1.0	2.34	GSF	CL "B"
4	L		16+50	L	LAT	0.26	0.70	26.0	50	0.095	0	3	**NO**	0.7	1.75	1.0	1.94	GSF	CL "B"
4	L		15+50	R		2.62	0.30	262.0	115	0.070	0	3	**NO**	2.9	2.37	4.3	2.62	OFFSITE Q	PSRM
4	L		16+50	R	SDG	2.62	0.30	262.0	100	0.101	0	3	**NO**	2.9	2.80	4.3	3.09	OFFSITE Q	PSRM
4	L		16+50	R	SDG	0.13	0.90	13.0	50	0.004	2	3	**YES**	0.4	0.83	0.6	0.94	GS	
~~4~~	~~L~~		~~17+55~~	~~R~~	~~LAT~~	~~2.96~~	~~0.35~~	~~296.0~~	~~55~~	~~0.166~~	~~2~~	~~2~~	~~**NO**~~	~~3.8~~	~~3.95~~	~~5.7~~	~~4.44~~	---	~~CL "B"~~
4	L		20+65	R	LAT	2.80	0.30	280.0	85	0.100	0	2	**NO**	3.1	3.24	4.6	3.58	OFFSITE Q	CL "B"
4	L		21+50	R		2.63	0.30	263.0	450	0.060	0	3	**NO**	2.9	2.21	4.3	2.44	OFFSITE Q	PSRM
4	L		22+25	L	SDG	0.35	0.90	35.0	75	0.003	2	3	**YES**	1.2	0.54	1.7	0.60	GS	
4	L		22+20	L		0.64	0.75	64.0	50	0.005	5	3	**NO**	1.8	1.14	2.6	1.30	PT	
4	L		22+25	L	LAT	0.44	0.65	44.0	75	0.121	0	3	**NO**	1.1	2.15	1.6	2.37	GSF	PSRM
4	L		23+00	L	LAT	0.44	0.65	44.0	100	0.102	0	3	**NO**	1.1	2.02	1.6	2.23	GSF	PSRM
4	L		24+00	L		0.26	0.65	26.0	200	0.059	0	3	**NO**	0.6	1.44	0.9	1.59	GSF	Too Steep

GSF

2GI = 2 GRATED INLET
CB = CATCH BASIN
OPEN = OPEN END PIPE
LAT=LATERAL SWALE
RDWY= ROADWAY SWALE

BDOS = BERM DRAINAGE OUTLET STRUCTURE
OTCB = OPEN THROAT CATCH BASIN
SBG = SHOULDER BERM GUTTER
SDG=SPECIAL DITCH GRADE
TOE = TOE PROTECTION

PT= PREVIOUSLY TREATED
GS = GRASS SWALE
LS = LEVEL SPREADER
DST= DOWN SWALE TREATMENT
OPTB = OUTFALLS PRIOR TO BUFFER

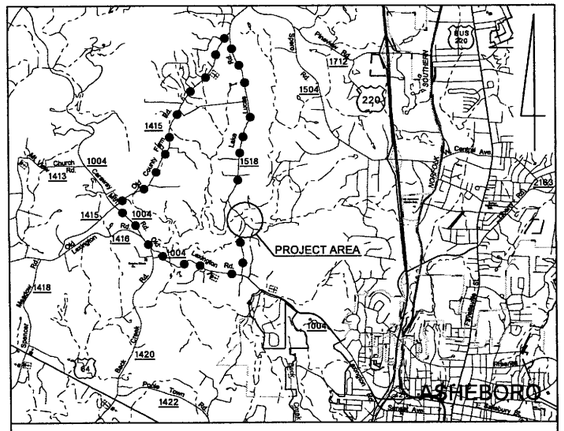
DDB = DRY DETENTION BASIN
B = BASIN
PSH = PRE FORMED SCOUR HOLE
GSF = GRASS SHOULDER FILTRATION

09/08/99

TIP PROJECT: B-4610

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

OFFSITE DETOUR ROUTE ●—●—●—●—●

R/W PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

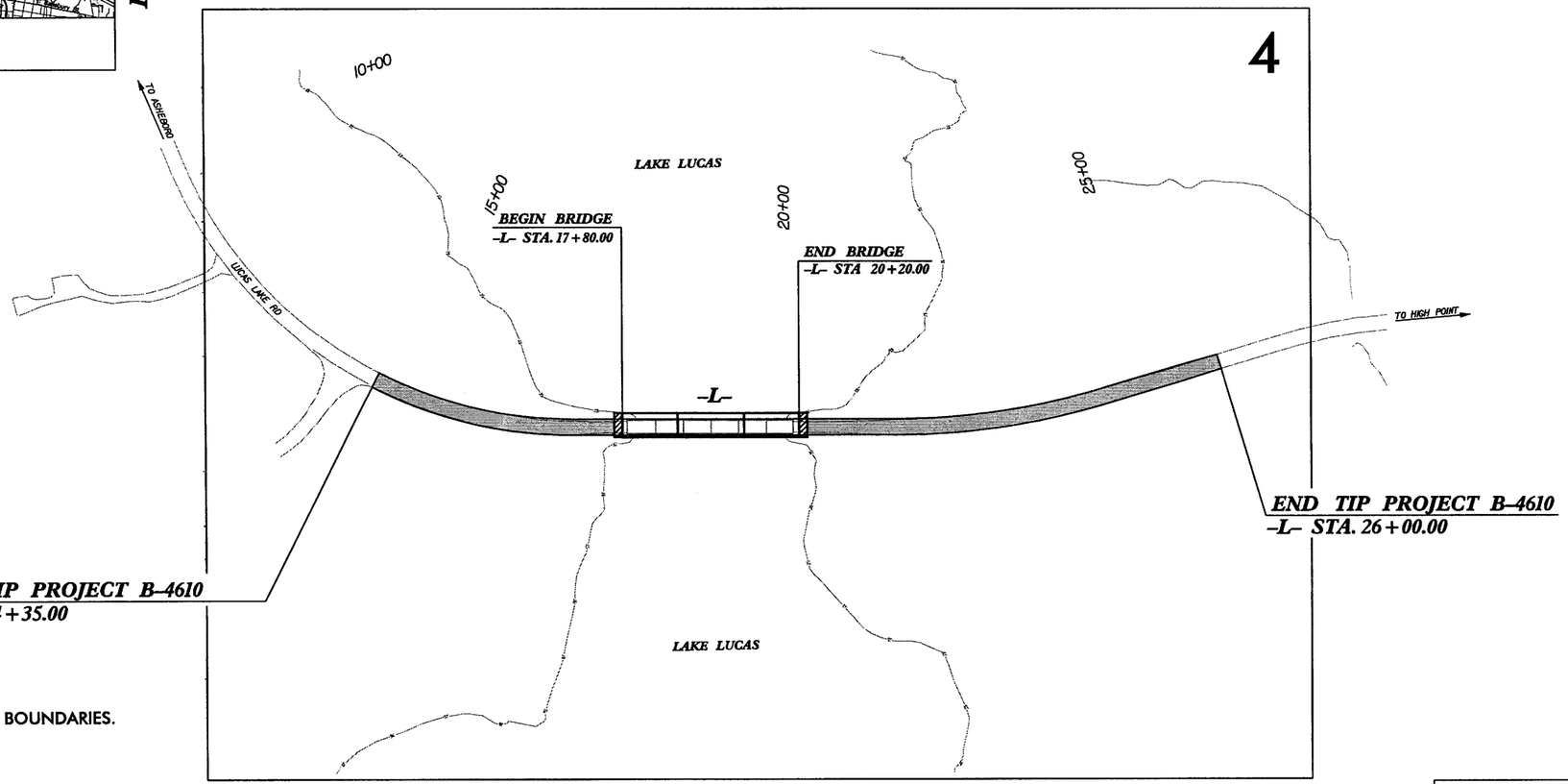
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4610	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33794.1.1	BRZ-1518(2)	P.E.
33794.2.1	BRZ-1518(2)	R/W

NAD 83 (CORS 96)

LOCATION: BRIDGE NO. 73 OVER LAKE LUCAS ON SR 1518

TYPE OF WORK: GRADING, DRAINAGE, PAVING, & STRUCTURE



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

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

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2010 = 1,200
ADT 2030 = 2,000
DHV = 10 %
D = 60 %
T = 3 % *
V = 50 MPH
*(TTST 1% + DUAL 2%)
FUNC. CLASS. = RURAL LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT	*B-4610*	=	*0.175 mi.*
LENGTH STRUCTURE TIP PROJECT	*B-4610*	=	*0.046 mi.*
TOTAL LENGTH OF TIP PROJECT	*B-4610*	=	*0.221 mi.*

Prepared In the Office of:
for North Carolina Department of Transportation

KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 2, 2009

LETTING DATE:
MAY 18, 2010

BRIAN A. WILES, P.E.
PROJECT ENGINEER

YVETTE T. MARIOTTE
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

10/30/2009
R:\Roadway\Proj\B4610_Rdy_tsh.dgn
KO & Associates, P.C.

3/15/06

PROJECT REFERENCE NO.	SHEET NO.
B-4610	1-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 — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- 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.

6/2/99

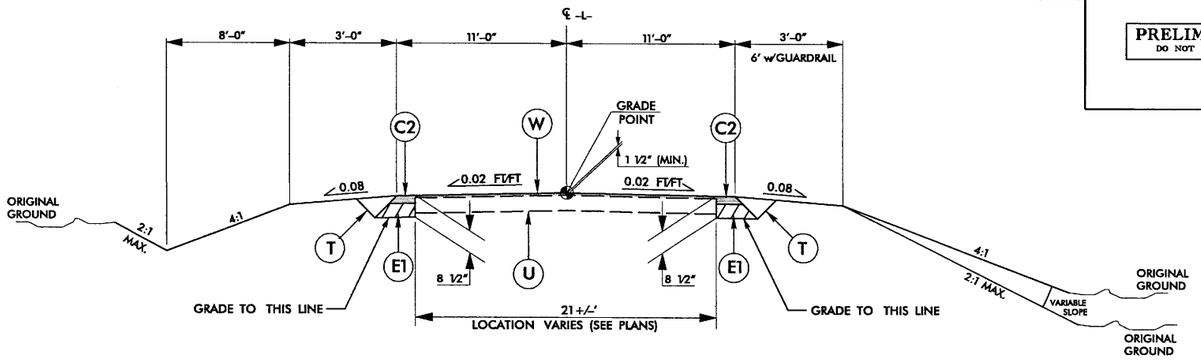
KO & ASSOCIATES, P.C. Consulting Engineers A Florence & Hutcheson, Inc. Company 5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607 (919) 851-6066	PROJECT REFERENCE NO. B-4610	SHEET NO. 2
	ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAVEMENT SCHEDULE

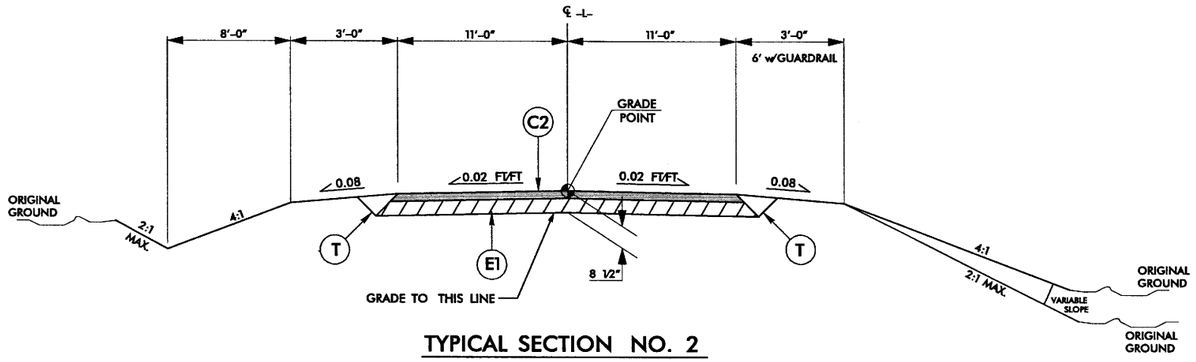
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
E1	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E2	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.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE TYPICAL WEDGING DETAIL THIS SHEET.)

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



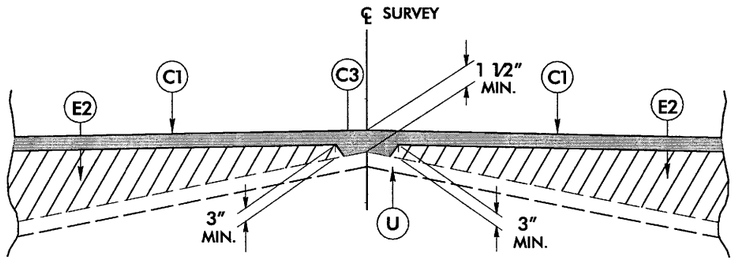
TYPICAL SECTION NO. 1
-L- (SR 1518)

STA 14+35.00 TO STA 16+25.00
STA 21+75.00 TO STA 26+00.00

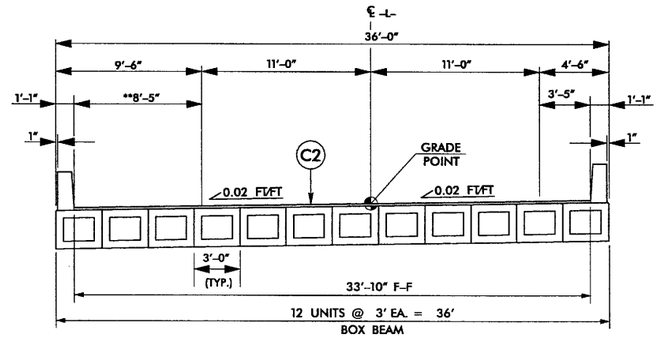


TYPICAL SECTION NO. 2
-L- (SR 1518)

STA 16+25.00 TO STA 17+80.00 (BEGIN BRIDGE)
STA 20+20.00 (END BRIDGE) TO STA 21+75.00



Detail Showing Method of Wedging (W)



TYPICAL SECTION NO. 3
-L- (SR 1518)

STA 17+80.00 (BEGIN BRIDGE) TO STA 20+20.00 (END BRIDGE)

** ADDITIONAL WIDTH NEEDED FOR SPREAD

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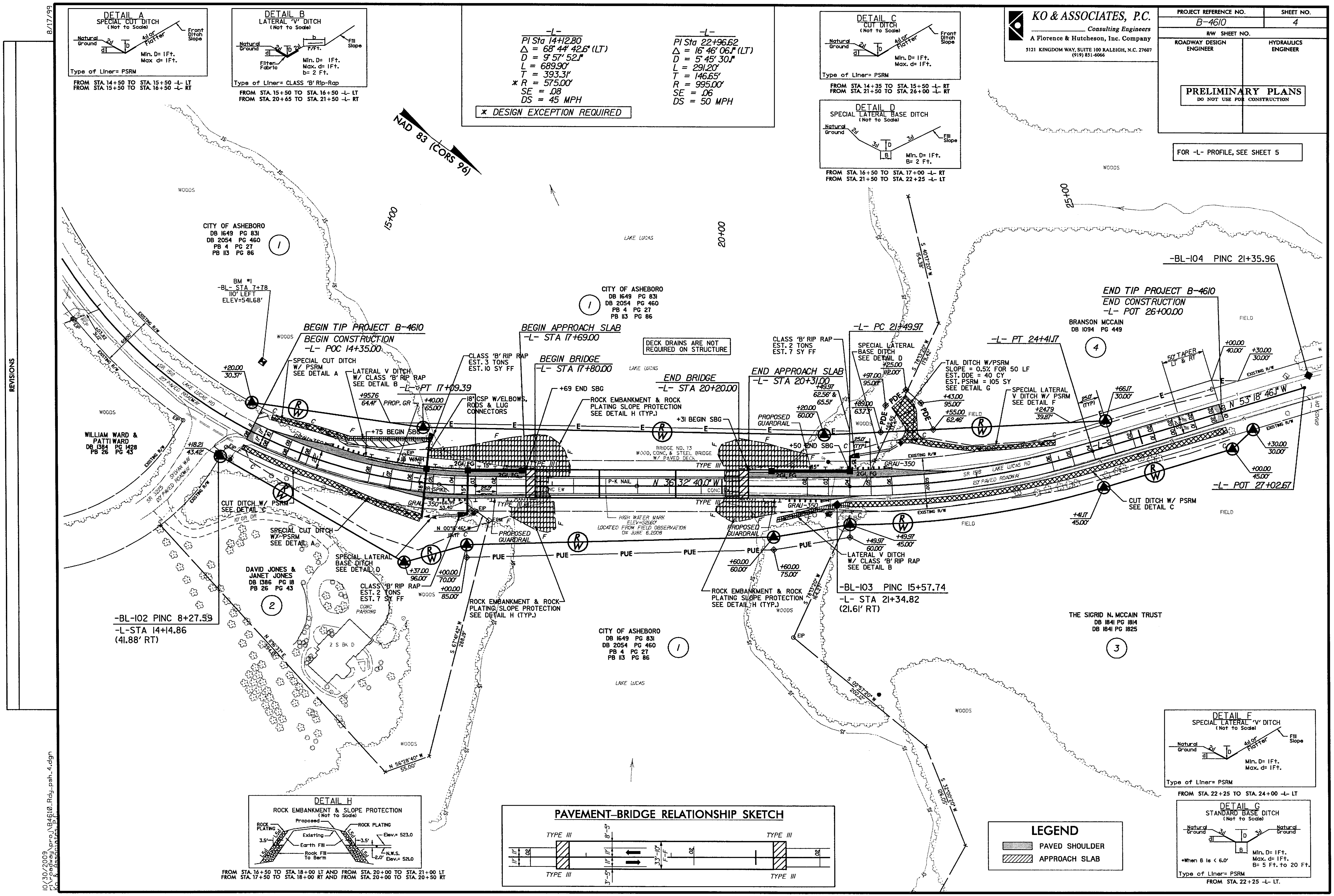
KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066
PROJECT REFERENCE NO. B-4610
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
FOR -L- PROFILE, SEE SHEET 5
REVISIONS
8/17/99
DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
4:1 or Flatter
Min. D= 1Ft.
Max d= 1Ft.
Type of Liner= PSRM
FROM STA. 14+50 TO STA. 15+50 -L- LT
FROM STA. 15+50 TO STA. 16+50 -L- RT
DETAIL B
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Fill Slope
Filter Fabric
Min. D= 1Ft.
Max. d= 1Ft.
b= 2 Ft.
Type of Liner= CLASS 'B' Rip-Rap
FROM STA. 15+50 TO STA. 16+50 -L- LT
FROM STA. 20+65 TO STA. 21+50 -L- RT
-L-
PI Sta 14+12.80
Δ = 68° 44' 42.6" (LT)
D = 9° 57' 52.1"
L = 689.90'
T = 393.31'
* R = 575.00'
SE = .08
DS = 45 MPH
* DESIGN EXCEPTION REQUIRED
-L-
PI Sta 22+96.62
Δ = 16° 46' 06.1" (RT)
D = 5° 45' 30.1"
L = 291.20'
T = 146.65'
R = 995.00'
SE = .06
DS = 50 MPH
DETAIL C
CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
4:1 or Flatter
Min. D= 1Ft.
Max. d= 1Ft.
Type of Liner= PSRM
FROM STA. 14+35 TO STA. 15+50 -L- RT
FROM STA. 21+50 TO STA. 26+00 -L- RT
DETAIL D
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Fill Slope
Min. D= 1Ft.
B= 2 Ft.
FROM STA. 16+50 TO STA. 17+00 -L- RT
FROM STA. 21+50 TO STA. 22+25 -L- LT
NAD 83 (CORS 96)
CITY OF ASHEBORO
DB 1649 PG 831
DB 2054 PG 460
PB 4 PG 27
PB 113 PG 86
LAKE LUCAS
WOODS
BM #1
-BL- STA 7+78
110' LEFT
ELEV=541.68'
BEGIN TIP PROJECT B-4610
BEGIN CONSTRUCTION
-L- POC 14+35.00
BEGIN APPROACH SLAB
-L- STA 17+69.00
BEGIN BRIDGE
-L- STA 17+80.00
END BRIDGE
-L- STA 20+20.00
END APPROACH SLAB
-L- STA 20+31.00
DECK DRAINS ARE NOT REQUIRED ON STRUCTURE
-L- PC 21+49.97
-L- PT 24+41.17
-L- PT 17+09.39
END TIP PROJECT B-4610
END CONSTRUCTION
-L- POT 26+00.00
-BL-104 PINC 21+35.96
BRANSON MCCAIN
DB 1094 PG 449
WILLIAM WARD & PATTI WARD
DB 1384 PG 1428
PB 26 PG 43
DAVID JONES & JANET JONES
DB 1386 PG 18
PB 26 PG 43
THE SIGRID N. MCCAIN TRUST
DB 1841 PG 1814
DB 1841 PG 1825
SPECIAL CUT DITCH W/ PSRM SEE DETAIL A
LATERAL V DITCH W/ CLASS 'B' RIP RAP SEE DETAIL B
CLASS 'B' RIP RAP EST. 3 TONS EST. 10 SY FF
18" CSP W/ELBOWS, RODS & LUG CONNECTORS
ROCK EMBANKMENT & ROCK PLATING SLOPE PROTECTION SEE DETAIL H (TYP.)
CLASS 'B' RIP RAP EST. 2 TONS EST. 7 SY FF
SPECIAL LATERAL BASE DITCH SEE DETAIL D
TAIL DITCH W/PSRM SLOPE = 0.5% FOR 50 LF EST. DDE = 40 CY EST. PSRM = 105 SY SEE DETAIL G
SPECIAL LATERAL V DITCH W/ PSRM SEE DETAIL F
CUT DITCH W/ PSRM SEE DETAIL C
BRIDGE NO. 73 WOOD, CONC. & STEEL BRIDGE W/ PAVED DECK
N 36° 32' 40.0" W
N 53° 18' 46.1" W
HIGH WATER MARK ELEV=521.67' LOCATED FROM FIELD OBSERVATION ON JUNE 6, 2008
PROPOSED GUARDRAIL
-BL-102 PINC 8+27.59
-L-STA 14+14.86
(41.88' RT)
-BL-103 PINC 15+57.74
-L- STA 21+34.82
(21.61' RT)
-L- POT 27+02.67
SR 1518 LAKE LUCAS RD
SR 1525 SYLVAN WAY
FIELD
15+00
20+00
25+00
DETAIL F
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Fill Slope
4:1 or Flatter
Min. D= 1Ft.
Max. d= 1Ft.
Type of Liner= PSRM
FROM STA. 22+25 TO STA. 24+00 -L- LT
DETAIL G
STANDARD BASE DITCH
(Not to Scale)
Natural Ground
*When B is < 6.0'
Min. D= 1Ft.
Max. d= 1Ft.
B= 5 Ft. to 20 Ft.
Type of Liner= PSRM
FROM STA. 22+25 -L- LT.
DETAIL H
ROCK EMBANKMENT & SLOPE PROTECTION
(Not to Scale)
ROCK PLATING
Proposed
Existing
Earth Fill
Rock Fill To Berm
Elev.= 523.0
N.W.S. Elev.= 521.0
FROM STA. 16+50 TO STA. 18+00 LT AND FROM STA. 20+00 TO STA. 21+00 LT
FROM STA. 17+50 TO STA. 18+00 RT AND FROM STA. 20+00 TO STA. 20+50 RT
PAVEMENT-BRIDGE RELATIONSHIP SKETCH
TYPE III
LEGEND
PAVED SHOULDER
APPROACH SLAB
10/30/2009
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5/14/99

BM#1
rRR SPIKE IN BASE OF 15" PINE TREE
BL STA 7+78 110' LT
-L- STA 14+05.95 78.60' LT
ELEV = 541.68'

-L-

FOR PLAN, SEE SHEET NO. 4

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	2300	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	526.8	FT
BASE DISCHARGE	=	3400	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	528.2	FT
OVERTOPPING DISCHARGE	=	14,000 +/-	CFS
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING ELEVATION	=	533.6	FT
DATE OF SURVEY	=	1/9/2009	
W.S.ELEVATION AT DATE OF SURVEY	=	521.5	FT

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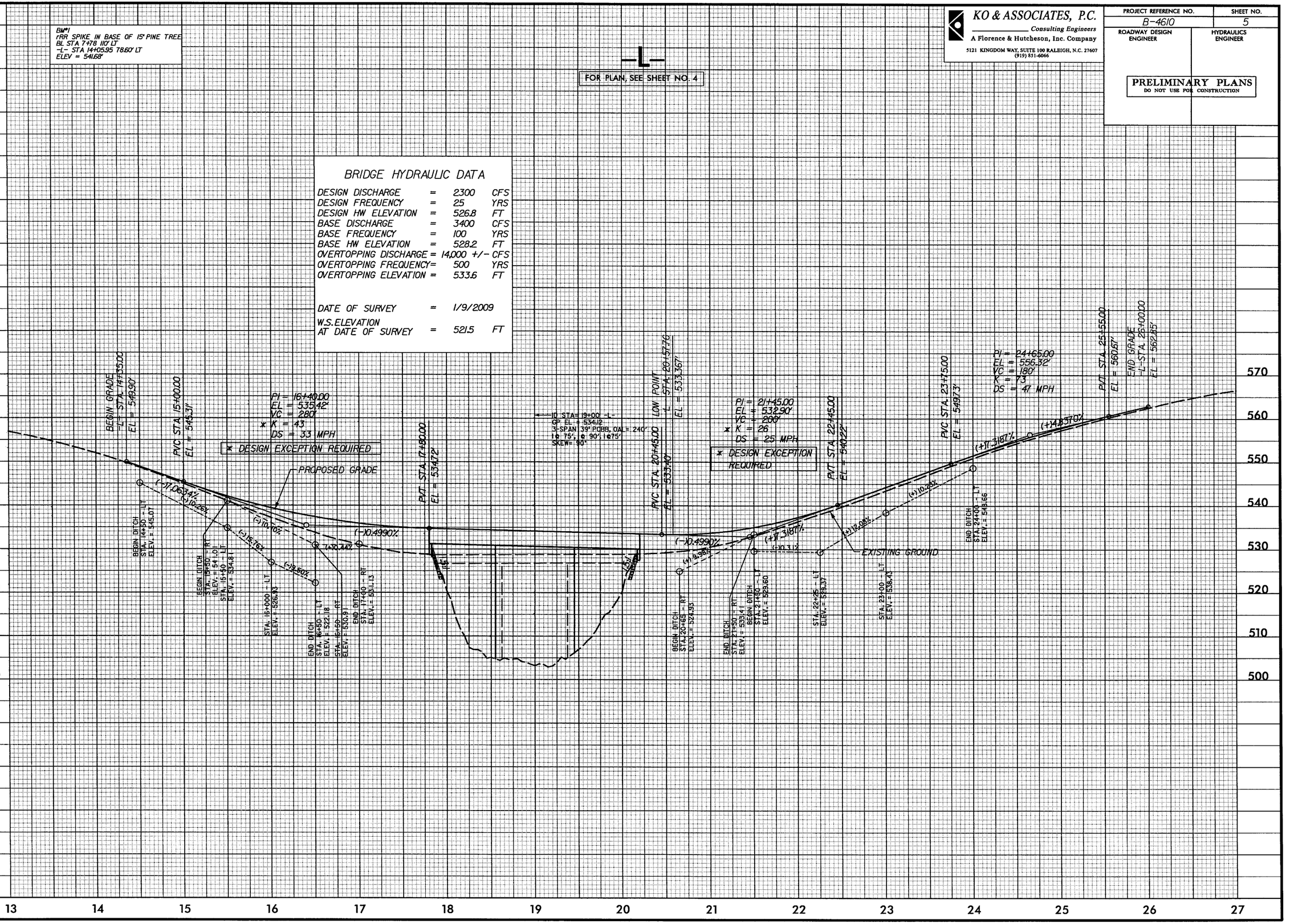
5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607
(919) 851-6066

PROJECT REFERENCE NO.	SHEET NO.
B-4610	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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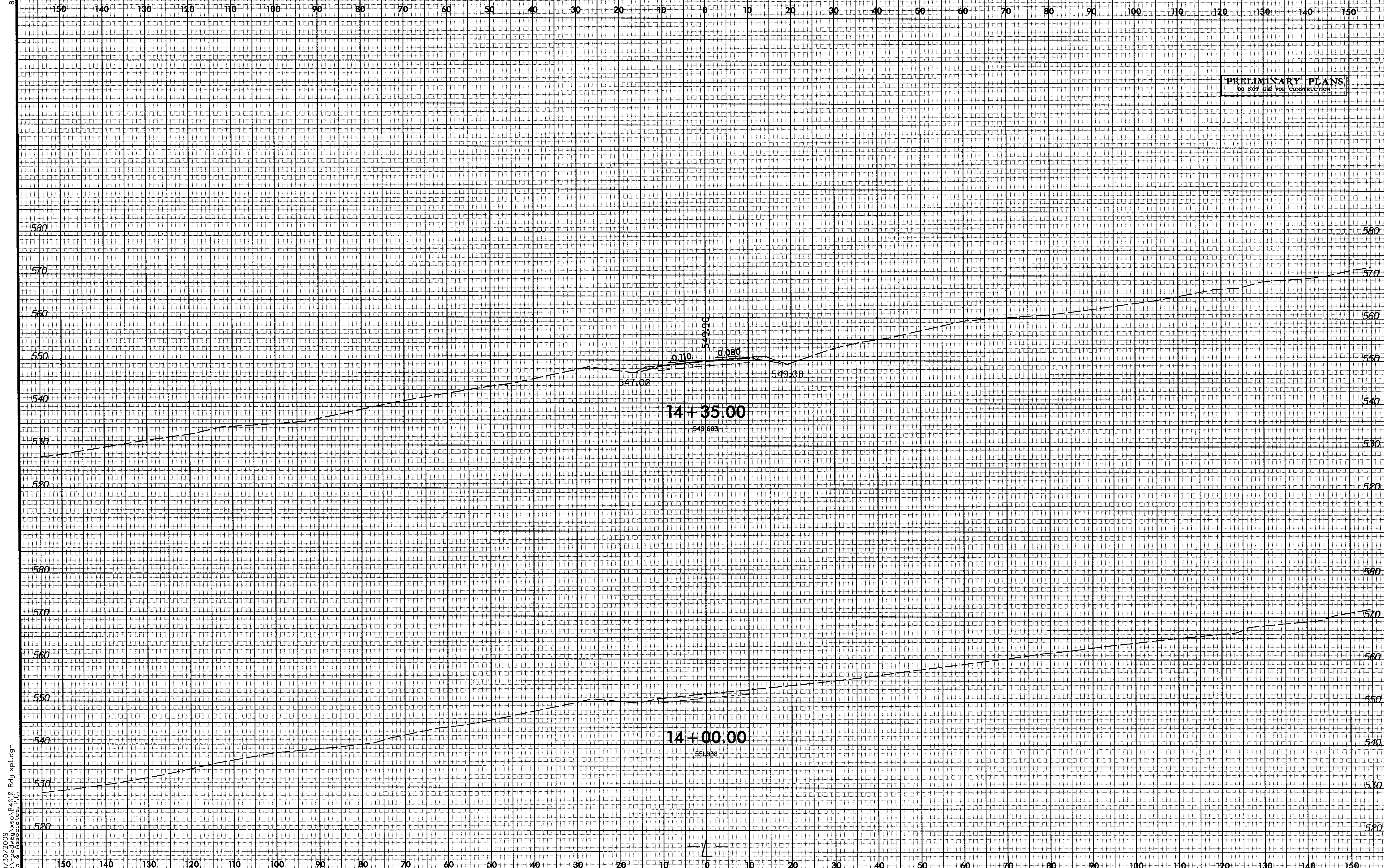
	B-4610	X-2

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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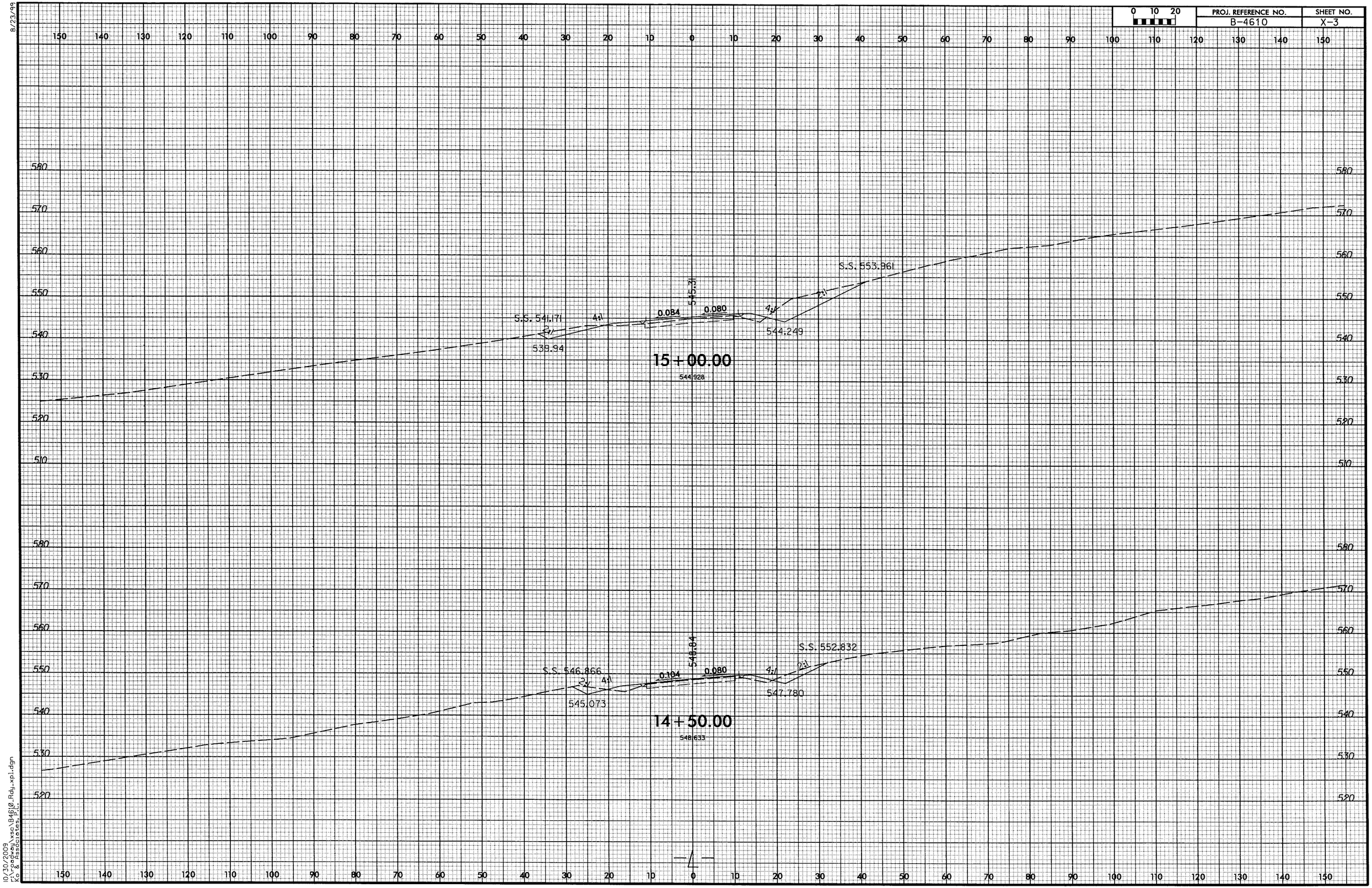
-4-

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	B-4610	X-3



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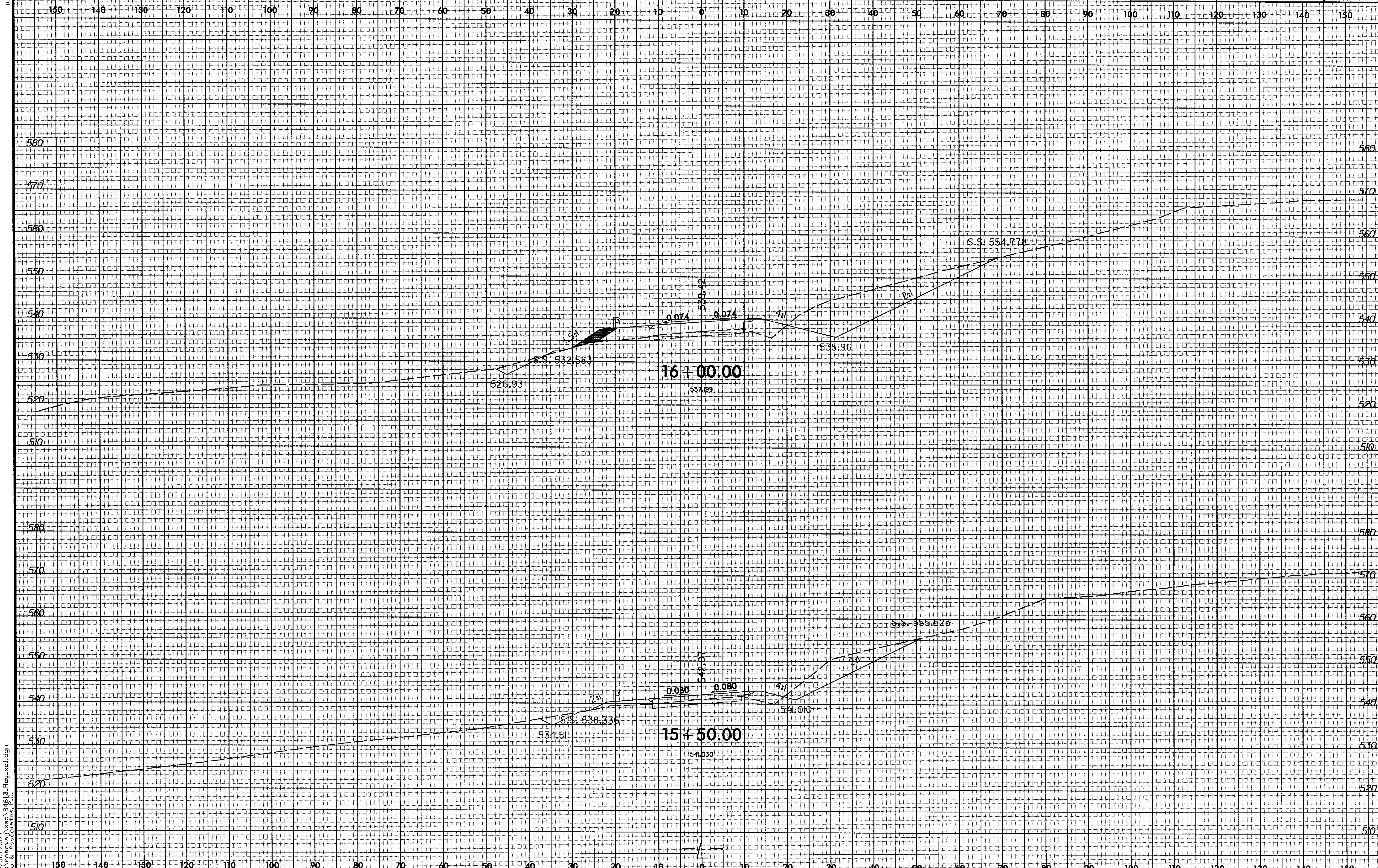
PROJ. REFERENCE NO.	SHEET NO.
B-4610	X-4



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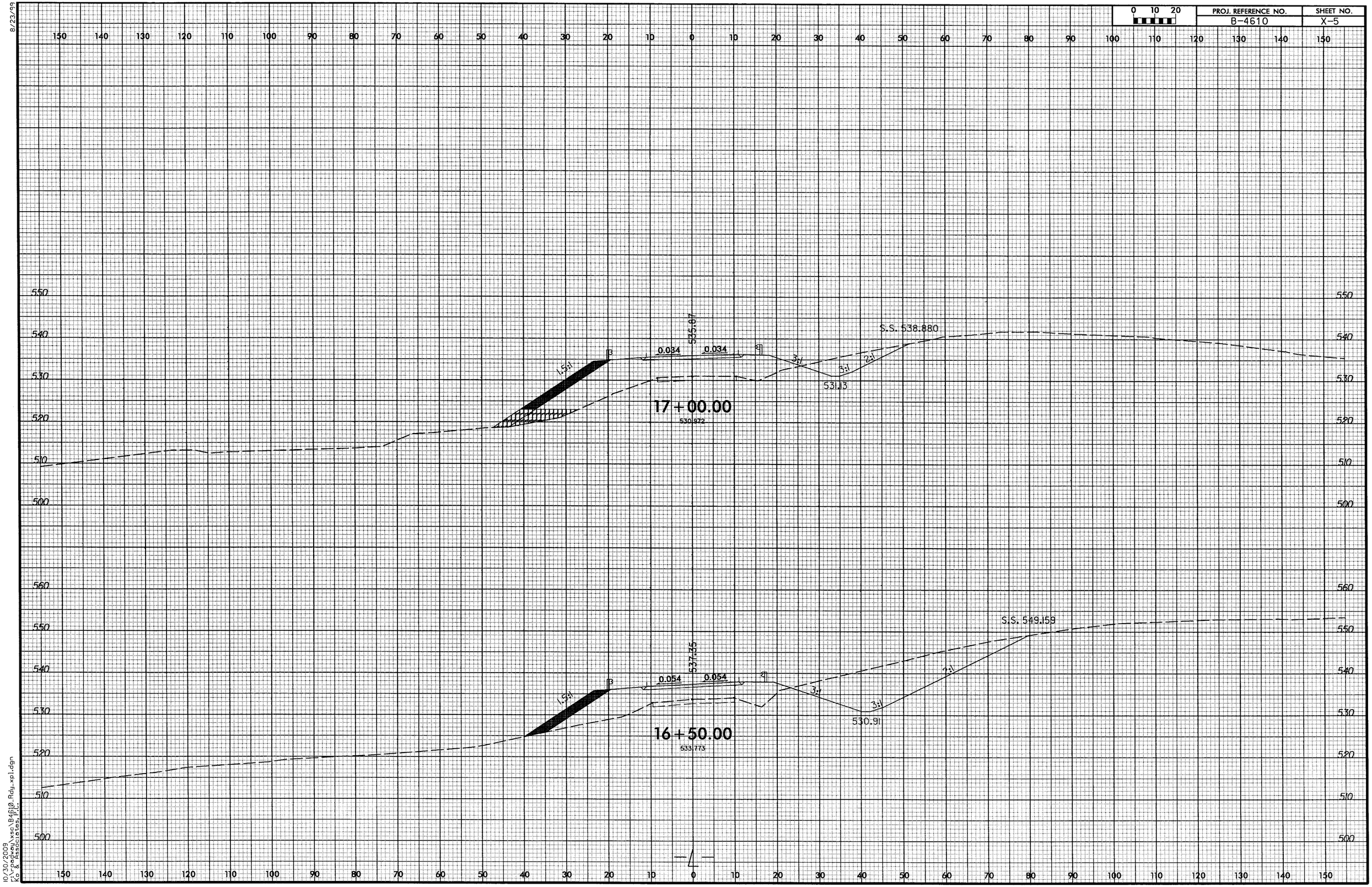
	B-4610	X-5



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0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	B-4610	X-6

534.62

0.020 0.020

18+00.00

520.287

BEGIN BRIDGE 17+80.00

534.72

0.020 0.020

1.5:1 1.5:1

17+80.00

520.752

534.98

0.020 0.020

1.5:1 1.5:1

17+50.00

529.195

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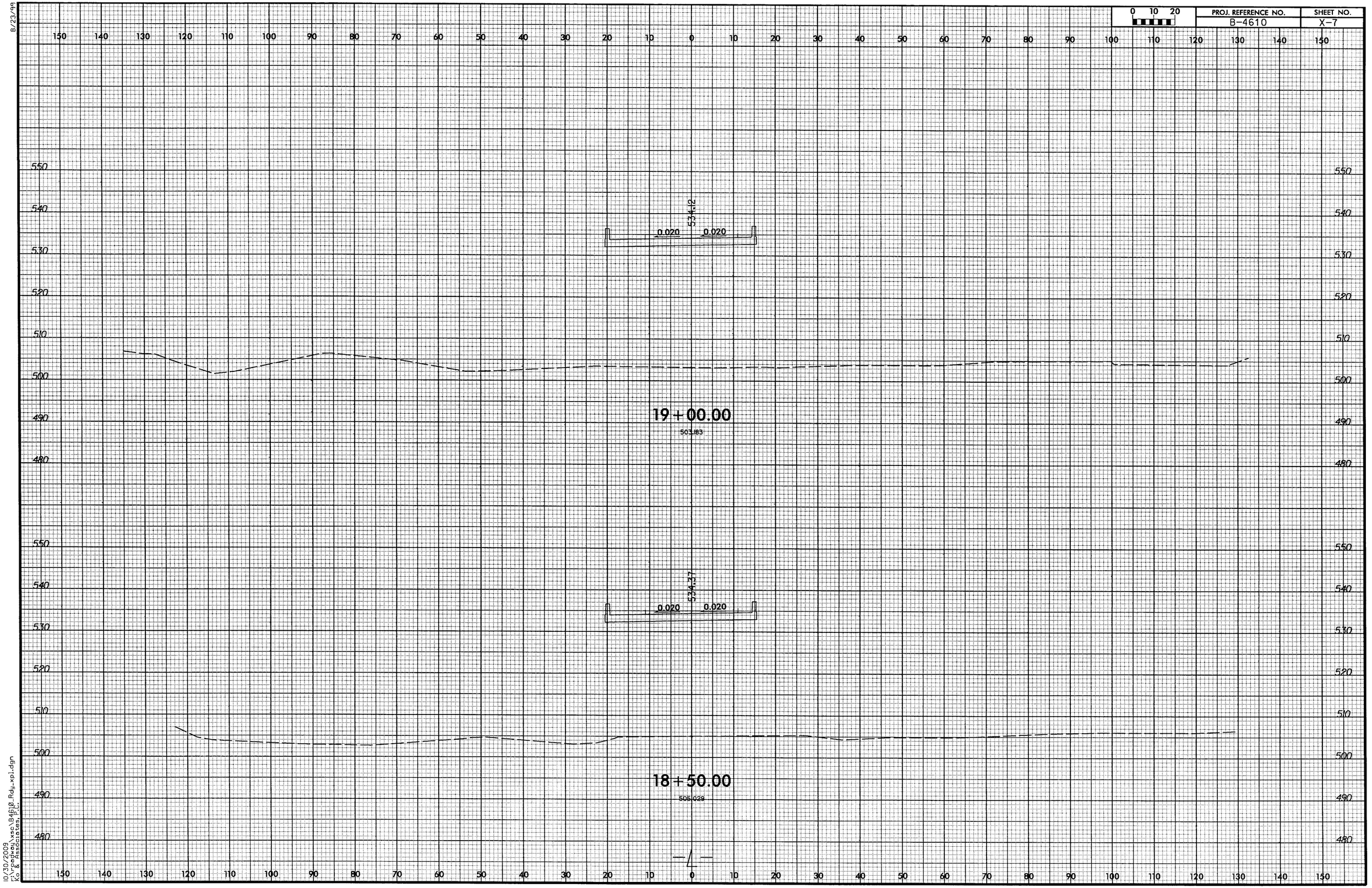
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	B-4610	X-7



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K&A Associates, P.C.

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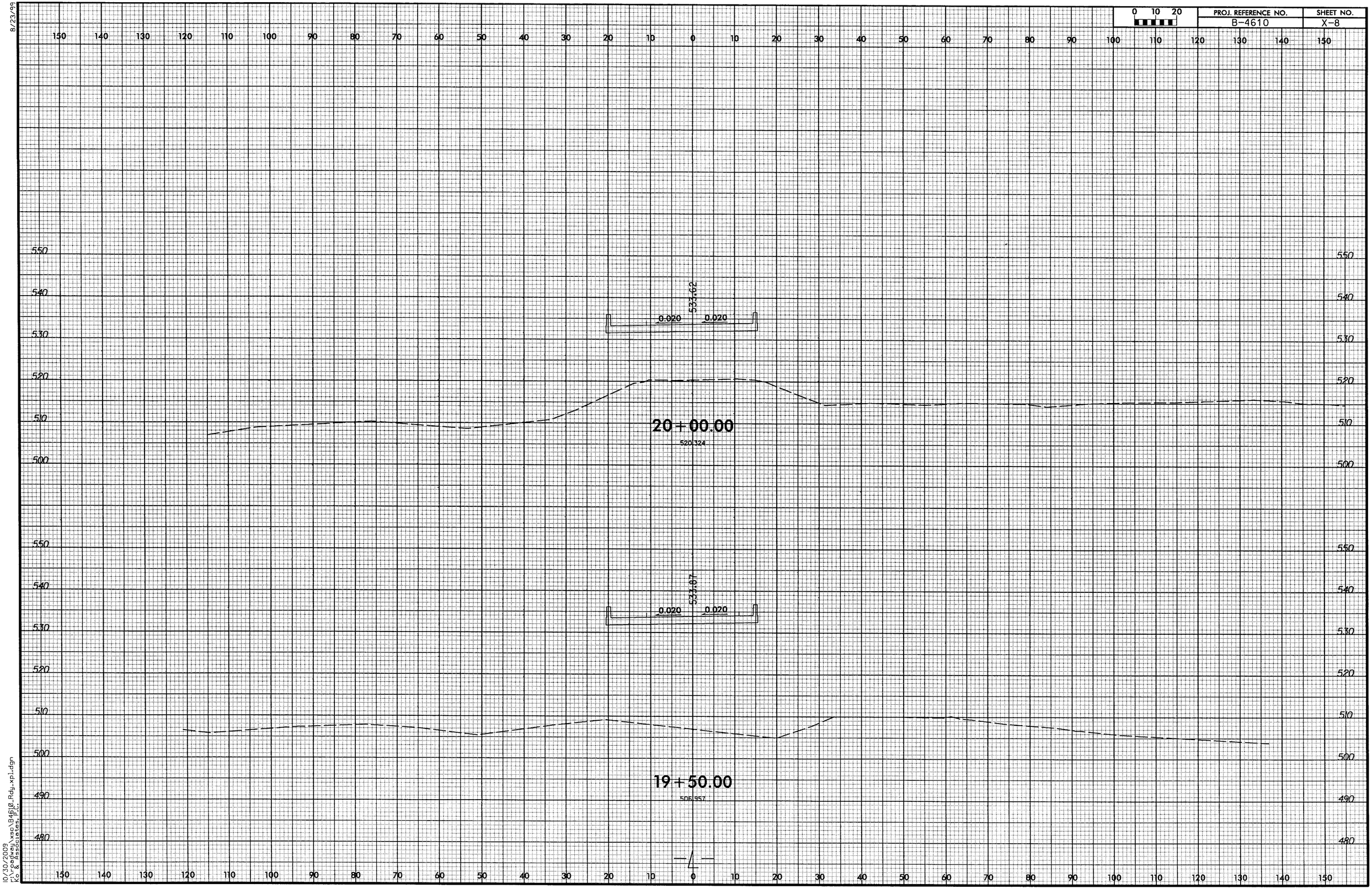
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	B-4610	X-8



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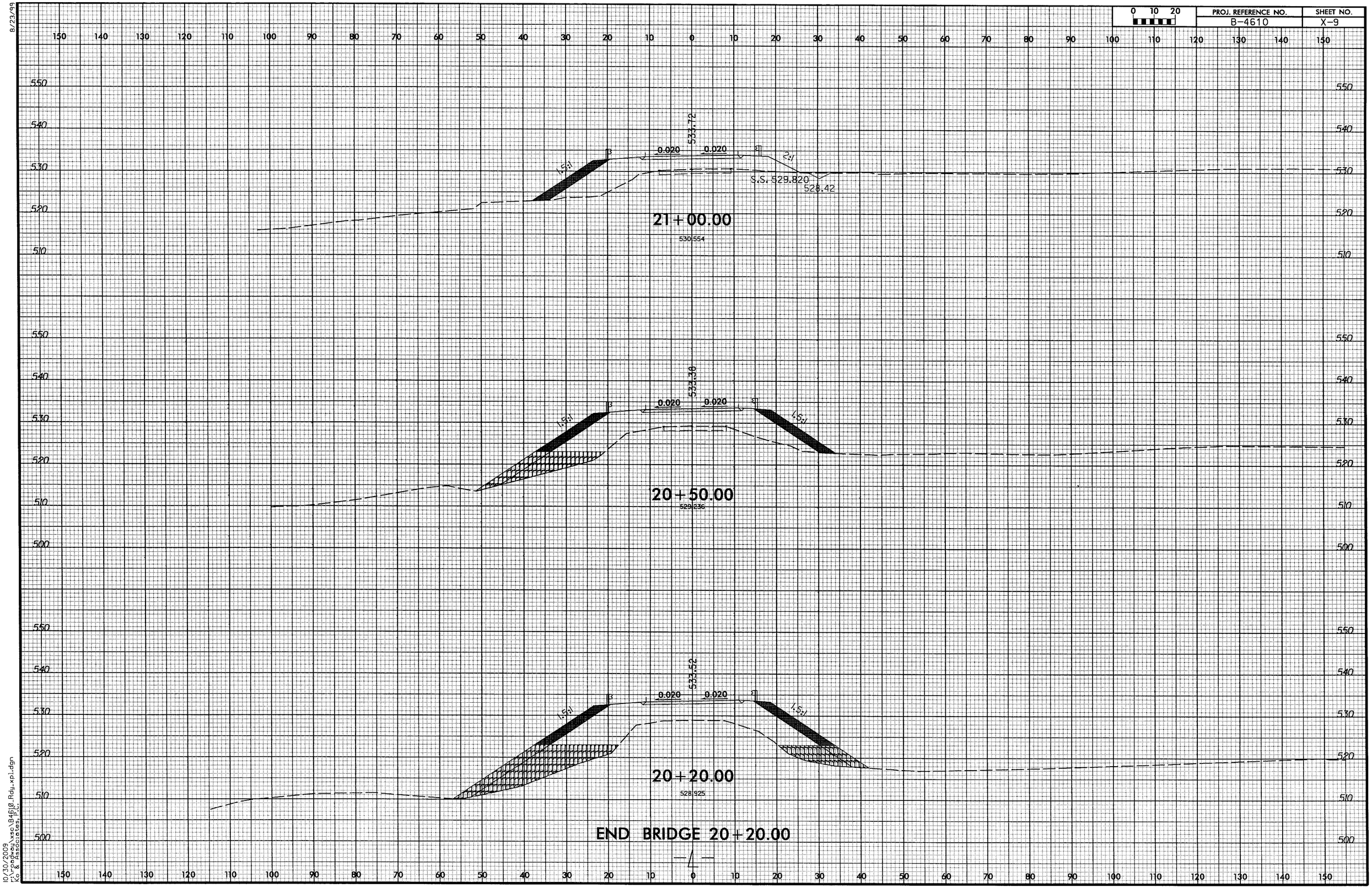
	B-4610	X-9



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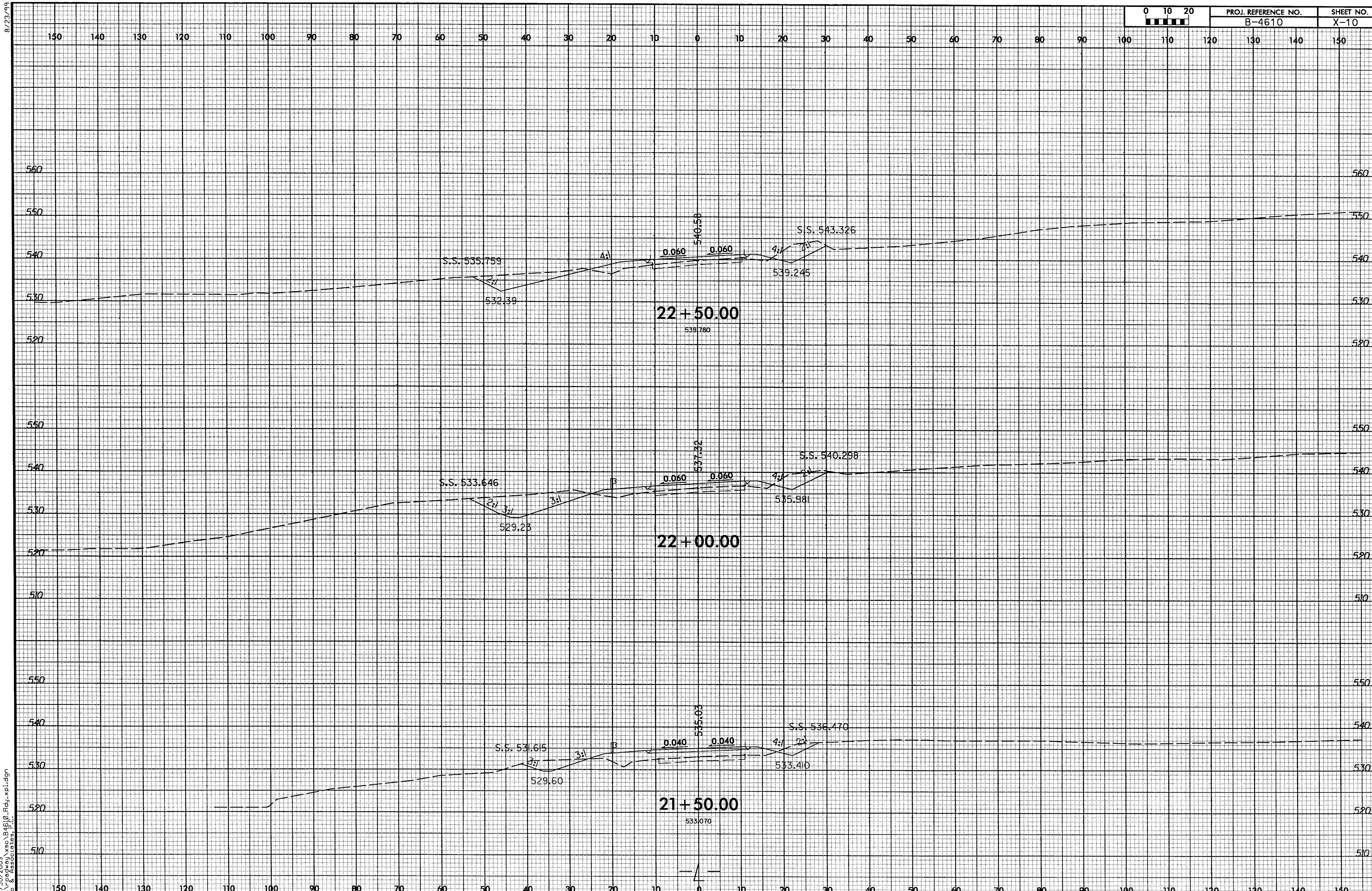
PROJ. REFERENCE NO.	SHEET NO.
B-4610	X-10



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0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	B-4610	X-11

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

580 570 560 550 540 530 520

S.S. 550.272
2:1
4:1
548.659
0.056
0.056
551.52
4:1
2:1
S.S. 556.916
550.130

24+00.00

550.916

S.S. 546.156
2:1
4:1
543.55
0.060
0.060
547.96
4:1
2:1
S.S. 551.527
546.563

23+50.00

547.228

S.S. 540.605
2:1
4:1
538.43
0.060
0.060
544.24
4:1
2:1
S.S. 546.682
542.904

23+00.00

543.448

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	B-4610	X-12

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

590 580 570 560 550 540 530

S.S. 557.820
2:1 4:1
555.344
557.80
0.020 0.016
4:1 2:1
S.S. 56.645
555.855

25+00.00
557.271

S.S. 554.327
2:1 4:1
552.193
554.83
0.036 0.036
4:1 2:1
S.S. 559.554
553.165

24+50.00
554.298

590 580 570 560 550 540 530

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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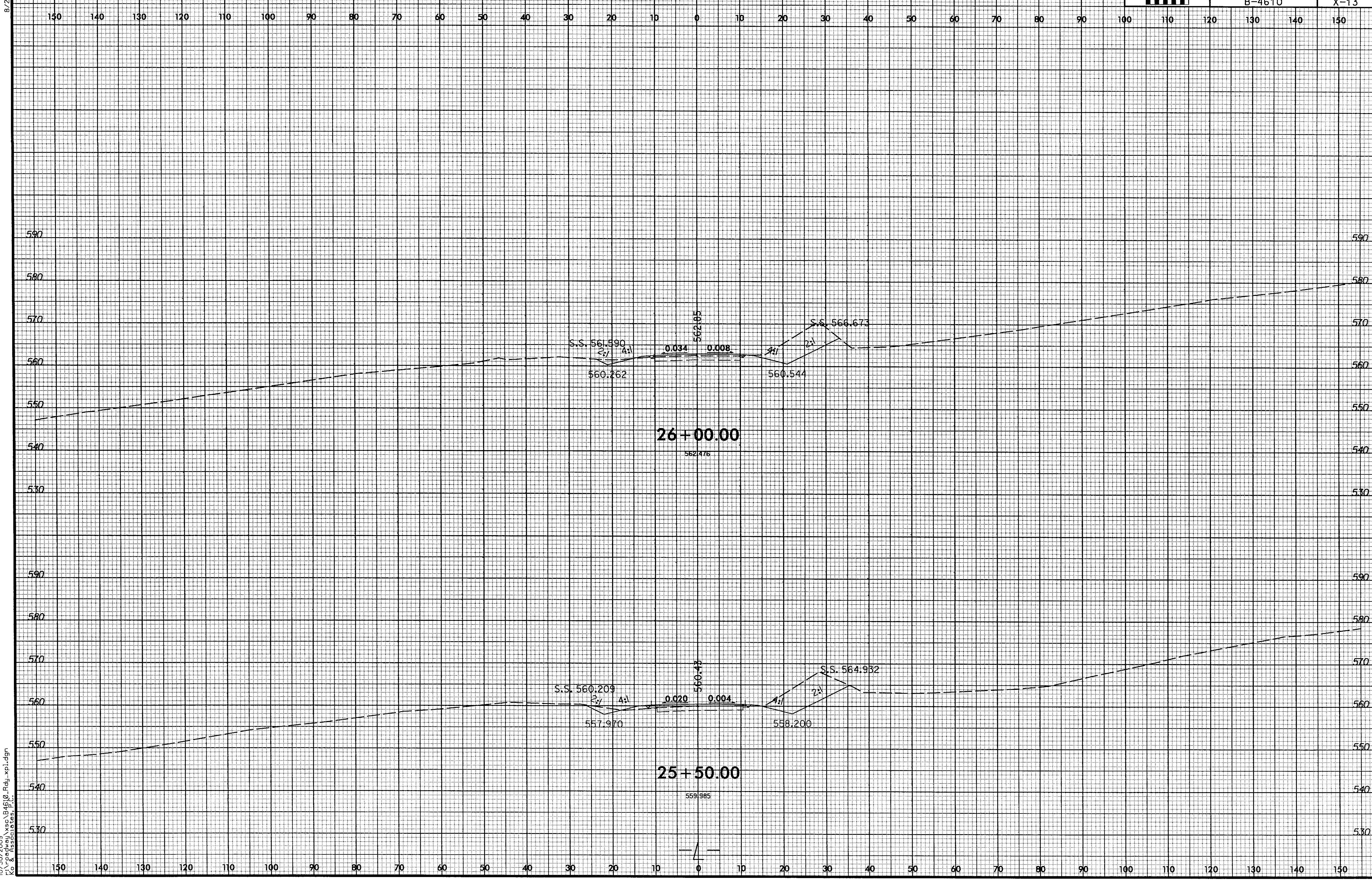
PROJ. REFERENCE NO.	SHEET NO.
B-4610	X-13



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8/23/99

0 10 20

PROJ. REFERENCE NO.	SHEET NO.
B-4610	X-14

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

590
580
570
560
550
540
530

26+50.00

564.740

10/30/2009
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