STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JOSH STEIN
GOVERNOR

DANIEL H. JOHNSON
SECRETARY

September 1, 2026

MEMORANDUM TO: Division Environmental and Construction Units

FROM: Michael A. Turchy, ECAP Group Leader
Environmental Analysis Unit

SUBJECT: Environmental Permits for the permanent repairs to US 74 A (Gerton Highway) from Bearwallow Mountain Road to Grant Mountain Road. Henderson County, Division 14, WBS 18314.1045039, Work Package 3.

Please find enclosed the following permits for this project:

Agency	Permit Type	Expiration
US Army Corps of Engineers Section 404 Clean Water Act Permit	Regional General Permit 50 Action ID: SAW-2025-01756 Dated August 31, 2026	May 25, 2030
NC Division of Water Resources Section 401 Water Quality Certification	Individual Water Quality Certification Project ID: 20251220 Dated August 31, 2026	expires with above Permit

Work is authorized by the above-referenced documents and must be accomplished in strict accordance with the permitted plans.

The Environmental Coordination and Permitting Group (ECAP) or the Division Environmental Office must be consulted if any deviation from the permit(s) or accompanying drawings is required.

The General Conditions and Certifications for Nationwide and Regional Permits can be referenced at: https://xfer.services.ncdot.gov/pdea/EnvironmentalPermits/_General_Conditions_and_Certifications/

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

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

Location:
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610

404 Permit (USACE)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, WILMINGTON DISTRICT
WILMINGTON REGULATORY OFFICE
69 DARLINGTON AVENUE
WILMINGTON NORTH CAROLINA 28403

August 31, 2026

Regulatory Division
SAW-2025-01756

Sent Via email: maturchy@ncdot.gov

Mr. Michael Turchy
NC Department of Transportation
Natural Environment Section
1598 Mail Service Center
Raleigh, NC 27699-1598

Dear Mr. Turchy:

This letter is in response to the Pre-Construction Notification (PCN) you submitted to the Wilmington District, WRDA on April 29, 2026, for a Department of the Army Nationwide permit (NWP) verification. This project has been assigned the file number SAW-2025-01756 and is known as the US 74A repair project. This file number should be referenced in all correspondence concerning this project.

A review of the information provided indicates that the proposed work would include the post Hurricane Helene repairs to US 74A for Work Package 3 and will result in the re-establishment of 1,534 lf of stream channel, permanent loss of 1,771 lf of stream channel, permanent impact to 561 lf of stream channel due to bank stabilization, and the temporary impact to 1,065 lf of stream channel and the permanent impact to 0.01 acres of wetlands. A permit verification was issued for Work Package 2 on October 10, 2025, and all impacts previously authorized under work Package 2 and impacts proposed in work package 3 are cumulative. As such, this permit verification authorized all impacts for work packages 2 and 3 and hereby replaces the verification issued October 10, 2025.

The project begins near Gerton along US 74A at the Buncombe/Henderson County line and extends 5.75 miles to terminate at the intersection of US 74A with NC 9 in Bat Cave, Henderson County, North Carolina, at Latitude 35.48386 and Longitude -82.35314.

We have determined that the proposed work is authorized by GP 50 pursuant to authorities under Section 404 of the Clean Water Act (33 U.S.C § 1344). The proposed work must be accomplished in strict accordance with the general permit conditions, any regional conditions, the special conditions listed in this letter, the application materials, and the enclosed plans. If the extent of the project area and/or nature of the authorized

impacts to waters are modified, a revised PCN must be submitted to this office for written approval before work is initiated. Any violation of permit conditions or deviation from your submitted plans may subject the permittee to enforcement action.

This verification is valid until May 25, 2030, unless prior to this date the subject GP(s) is suspended, revoked, or is modified such that the activity no longer complies with the terms and conditions of this GP. If you commence or are under contract to commence this activity before the date that the relevant GP is modified or revoked, you will have 12 months from the date of the modification or revocation of the GP to complete the activity under the present terms and conditions of this GP.

Project Specific Special Conditions:

1. The U.S. Fish and Wildlife Service's (USFWS's) Programmatic Biological (PBO) and Conference Opinion (PCO) and Programmatic Conference Report titled "Five Imperiled Bat Species in Western North Carolina" dated April 1, 2025, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that are specified in the PBO/PCO. The USFWS adopted the PBO/PCO as the Programmatic Biological Opinion (PBO) for the effects of this action on July 7, 2025. Your authorization under this Corps permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the PBO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the PBO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your Corps permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its PBO, and with the ESA.
2. Compensatory Mitigation: In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit.
3. Hickory Creek re-establishment/relocation: This project will result in relocation and realignment of Hickory Creek which was heavily impacted during the Helene Hurricane in the fall of 2024. The work sites along Hickory Creek will improve stream stability, reduce hazard mitigation to the roadway structure and create a functional uplift to the currently failed stream. The work on Hyatt Mill Creek will be constructed and monitored in accordance with the enclosed document titled "Mitigation Proposal for the Section 404 Permit and 401 Water Quality Certification for permanent repairs to US 74 A (Gerton Highway from Bearwallow Mountain Road to Grant Mountain Road" dated August 31, 2026.

This NWP verification does not preclude the necessity to obtain any other Federal, State, or local permits, licenses, and/or certifications, which may be required.

If you have any questions related to this verification or have issues accessing documents referenced in this letter, please contact Crystal Amschler, Project Manager of the WRDA/Transportation Branch at 828-526-6013, by mail at the above address, or by email at crystal.c.amschler@usace.army.mil. Please take a moment to complete our customer satisfaction survey located at https:// regulatory.ops.usace.army.mil/customer-service-survey/.

Sincerely,



M. Scott Jones, PWS
WRDA / Transportation Branch Chief
USACE - Wilmington District

Enclosures

U.S. Army Corps of Engineers (USACE)

CERTIFICATION OF COMPLIANCE WITH DEPARTMENT OF THE ARMY PERMIT

For use of this form, see Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act; the proponent agency is CECW-COR.

Form Approved - OMB No. 0710-0003 Expires 2027-10-31

The Agency Disclosure Notice (ADN)

The Public reporting burden for this collection of information, 0710-0003, is estimated to average 10 minutes per response, including 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 the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. 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.

PURPOSE: This form is used by recipients of U.S. Army Corps of Engineer Regulatory permits to certify compliance with the permit terms and conditions.

Your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit, you are subject to permit suspension, modification, or revocation.

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the U.S. Army Corps of Engineers, Wilmington District, Regulatory Office.

The certification can be submitted by email at crystal.c.amschler@usace.army.mil or by mail at the below address:

U.S. Army Corps of Engineers
Wilmington District Office
Street Address: 151 Patton Ave Rm 208
City: Asheville State: NC Zip Code: 28801

COMPLETED BY THE CORPS

Corps Action Number: SAW-2025-01756

Permit Type: General Permit

General Permit Number and Name (*if applicable*):

Name of Permittee: Michael Turchy

Project Name: the US 74A repair project

Project Location (*physical address*): US 74 in Gerton and Bat Cave, North Carolina

PERMITTEE'S CERTIFICATION

Date Work Started:

Date Work Completed:

Enclose photographs showing the completed project (*if available*).

I _____ hereby certify that the work authorized by the above referenced permit has been completed in accordance with all of the permit terms and conditions, and that any required compensatory mitigation has been completed in accordance with the permit conditions.

Name	Date	Signature

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JOSH STEIN
GOVERNOR

DANIEL H. JOHNSON
SECRETARY

August 31, 2026

U.S. Army Corps of Engineers
Water Resources Development Act
(WRDA) Transportation Permitting Branch

NC Division of Water Resources
Transportation Permitting Branch

ATTN: Ms. Crystal Amschler, NCDOT Coordinator

Ms. Amy Annino, NCDOT Coordinator

Subject: **Mitigation Proposal for the Section 404 Permit & 401 Water Quality Certification** for permanent repairs to US 74 A (Gerton Highway) from Bearwallow Mountain Road to Grant Mountain Road. Henderson County, Division 14, WBS 18314.1045039.

Dear NCDOT Coordinators:

Pursuant to the application submitted on April 29, 2026, and the subsequent field meeting on June 12, 2026, and additional correspondence, the North Carolina Department of Transportation (NCDOT) proposes the following mitigation plan for US 74A from Bearwallow Mountain Road to Grant Mountain Road.

The following table is excerpted from the permit application and impact summary table and provides a focus on the mitigation components of the project.
It contains a description of the proposed activity as well as reduced mitigation justifications.

Highlighted values have been adjusted from the original April 29, 2026, permit application based on revisions requested at the June 12, 2026, field meeting.

Streams in the Project Area

Permit Site	Stream Name	Status	Stream Re-Establishment to Pre-Helene Location	Perm Fill (loss)	Bank Stabilization	Temporary Impact	ACOE Mitigation Required	DWR Mitigation Required	Proposed Mitigation Ratio	Impact Description (black text) Stream Relocation/ Reduced Mitigation Justification (blue text)
1	Hickory Creek & UT	Perennial	--	--	95 lf 0.03 ac	35 lf < 0.01 ac	--	--	--	**Permanent bank stabilization** is necessary to stabilize and reduce water velocity at the tributary and Hickory Creek confluence. Temporary impacts upstream and downstream of bridge are shown for construction methods and access.
2	UT Hickory Creek	Perennial	--	--	--	3 lf < 0.01 ac	--	--	--	**The existing 18" CSP requires removal of debris material and a section to be replaced.** The temporary impact is due to outlet protection tying to the jurisdictional stream. Jurisdiction of the stream begins beyond the outlet of the 18" CSP.
3	Hickory Creek	Perennial	157 lf 0.05 ac	276 lf 0.07 ac	65 lf 0.04 ac	75 lf 0.03	**276 lf (138 lf)**	276 lf	**0.5:1**	Stream realignment is necessary due to the roadway repair and moving the channel away from the roadway for future hazard mitigation. The stream relocation is 276 linear feet and the portion of the stream that will be reestablished to pre-Helene alignment is 157 linear feet. This stretch of Hickory Creek runs at the toe of the existing roadway slope of US 74A. Moving the stream away from US 74A will provide a long-term separation from the river and the road and establish a buffer from the roadway. This will allow the stream to experience a typical flood event and not jeopardize the integrity of the US 74A roadway fill slope. NCDOT will minimize tree clearing within the relocated area to provide as much canopy and stabilization benefits as practicable. Due to the above, NCDOT proposes a reduction in mitigation ratios for this system, as stabilization and increased buffer will result in uplift from the current stream condition.
4	UT Hickory Creek	Intermittent	--	--	--	86 lf < 0.01 ac	--	--	--	Temporary stream impacts are due to being located within the Temporary Construction Easement. The stream will be repaired if there are any impacts during construction.
5	UT Hickory Creek	Perennial	--	--	--	27 lf < 0.01 ac	--	--	--	**The existing 6'x4' RCBC requires removal of debris material.** Temporary impacts to the stream are required for equipment to access the pipe and for temporary dewatering (pump around) as well as tie in of the ditches at the pipe RCBC inlet. **Pipe Removal/Stream daylighting**. Permanent stream impacts for outlet protection is needed at the downstream end of the RCBC. The existing 36" RCP will be removed and 60 linear feet of this stream will be daylighted in a 4' base ditch. Due to severe erosion at the outlet of the pipe, there will 9 lf of permeant impact to repair this outlet. Although this impact is greater than bank stabilization, NCDOT does not propose mitigation for this activity as stream stability and continuity will be improved.
6	Hickory Creek	Perennial	--	--	**135 lf 0.05 ac**	**39 lf 0.01 ac**	--	--	--	**Remove Pipe and Replace with Base Ditch/Stream Daylighting.** Temporary impacts are illustrated at Hickory Creek due to replacing the existing pipe with a 4' base ditch and tying in the daylighted section of stream to Hickory Creek. This includes impacts to the extent of the construction easement.
7	UT Hickory Creek	Perennial	--	--	52 lf < 0.01 ac	15 lf < 0.01 ac	--	--	--	**Bank Stabilization.** Existing banks along the stream channel adjacent to the road require permanent bank stabilization. Temporary impacts shown upstream are for dewatering and access, if necessary, during construction.
8	UT Hickory Creek	Perennial	--	--	7 lf < 0.01 ac	28 lf < 0.01 ac	--	--	--	**Bank Stabilization.** Existing banks along the stream channel and adjacent Site 7 require permanent bank stabilization. Temporary impacts shown upstream are for dewatering and access, if necessary, during construction.
9	Hickory Creek	Perennial	--	--	97 lf 0.03 ac	31 lf 0.03 ac	--	--	--	**The existing double barrel culvert requires removal of debris material.** Temporary impacts upstream and downstream are for dewatering and access, if necessary, during construction. **Bank Stabilization.** Existing banks along the stream channel adjacent to the road require permanent bank stabilization upstream and downstream of the double barrel crossing of Hickory Creek.
10	Hickory Creek	Perennial	--	--	--	28 lf <0.01 ac	--	--	--	**24" RCP-IV installation.** An energy dissipator pad is being installed at the outlet of the 24" RCP. The 24" RCP is part of the roadway drainage system and is not associated with a jurisdictional stream. The rip rap pad does not tie to Hickory Creek. Temporary impacts are shown at Hickory Creek within the easement for construction access if needed.
11	UT Hickory Creek	Perennial	--	87 lf 0.01 ac	17 lf <0.01 ac	8 lf <0.01 ac	87 lf	0 lf	2:1	**Replace existing 7'x 8' RCBC with an 8'x 8'RCBC.** Permanent stream impacts are included for bank stabilization necessary at the inlet of the RCBC. Permanent impacts downstream of the RCBC are to tie the unnamed tributary back to the relocated Hickory Creek (Site 12). Temporary impacts shown upstream of the RCBC are for dewatering and construction access.

Permit Site	Stream Name	Status/Class	Stream Re-Establishment to Pre-Helene Location	Perm Fill (loss)	Bank Stabilization	Temporary Impact	ACOE Mitigation Required	DWR Mitigation Required	Proposed Mitigation Ratio	Impact Description (black text) Stream Relocation/ Reduced Mitigation Justification (blue text)
12	Hickory Creek	Perennial	310 lf 0.12 ac	221 lf 0.08 ac	--	14 lf < 0.01 ac	**221 lf (111 lf)**	**221 lf**	**0.5:1**	Stream realignment is necessary due to the roadway repair and moving the channel away from the roadway for future hazard mitigation. The stream relocation is 221 linear feet and the portion of the stream that will be reestablished to pre-Helene alignment is 310 linear feet. Moving the stream away from US 74A will provide a long-term separation from the river and the road and establish a buffer from the roadway. This will allow the stream to experience a typical flood event and not jeopardize the integrity of the US 74A roadway fill slope. Due to the bend in the river and road, additional roadway scouring is likely if the stream is not moved farther away from the road. NCDOT will minimize tree clearing within the relocated area to provide as much canopy and stabilization benefits as practicable. Due to the above, NCDOT proposes a reduction in mitigation ratios for this system, as stabilization and increased buffer will result in uplift from the current degraded damaged stream condition.
13	Hickory Creek	Perennial	--	--	--	320 lf 0.08 ac	--	--		**Temporary Construction Access.** Access is required to build a wall along the roadway from approximately Sta. 107 to 109.
14	Hickory Creek	Perennial	--	--	93 0.01 ac	--	--	--		**Slope Repair / Construction Easement.** Temporary impacts are illustrated at this location due to the construction easement. Permanent impacts along Hickory Creek are for installation of the rip rap at embankment at the base of the grouted base ditch necessary for the slope repair.
15	UT Hickory Creek	Intermittent	--	99 lf 0.01 ac	--	15 lf 0.01 ac	**99 lf (198 lf)**	0 lf	**2:1**	**New pipe system/ loss of water**
16	UT Hickory Creek	Intermittent	--	78 lf < 0.01 ac	--	3 lf < 0.01 ac	**78 lf 9156 lf)**	0 lf	**2:1**	**Install New 36" RCP-IV** This location requires changes to the drainage system with installation of a new 36" RCP, stabilization of the existing channel with a 3' base ditch at the inlet of the pipe, and backfill of the stream channel which is directly adjacent to the roadway. Temporary impacts to the stream are required for equipment to access the pipe and for temporary dewatering (pump around).
17	UT Hickory Creek	Intermittent	--	40 lf < 0.01 ac	--	42 lf < 0.01 ac	**40 lf (80 lf)**	0 lf	**2:1**	**Remove existing 18" RCP and replace with 48" RCP-IV** This location requires changes to the drainage system associated with Site 15. An existing 18" RCP under the road will be replaced with a new 48" RCP with inlet and outlet protection. Temporary impacts to the stream are required for equipment to access the pipe and for temporary dewatering (pump around).
18	UT Hickory Creek	Perennial	17 < 0.01 ac	--	--	18 lf < 0.01 ac	--	--	--	**Channel realignment and 2' x 4' RCBC debris removal.** Stream impacts are due to storm debris blocking the existing 2'x4' RCBC at the inlet which caused a secondary channel to form along the roadway. The existing RCBC will be cleaned and retained. The stream will then be reestablished to a single channel and reconnected to the 2'x4' RCBC crossing.
19	UT Hickory Creek	Intermittent	--	99 lf 0.02 ac	--	14 lf < 0.01 ac	99 lf	0 lf	2:1	**Removal of existing 24" CMP and installation of new 30" RCP-IV/30" CSP/30" RPC-III.** Permanent impacts are a result of stabilization of the existing channel with 3' base ditch at the inlet and outlet protection. Temporary impacts to the stream are required for equipment to access the pipe and for temporary dewatering (pump around).
20	Hickory Creek	Perennial	524 lf 0.2 ac	250 lf 0.09 ac	--	59 lf 0.02 ac	**250 lf (63 lf)**	**250 lf**	**0.25:1**	**Stream realignment.** Damage to the roadway structure from Hurricane Helene requires permanent realignment of the channel at this location. **The stream relocation is 250 linear feet** and the portion of the stream that will be **reestablished to pre-Helene alignment is 524 linear feet**. This relocation reach makes smaller shifts of Hickory Creek away from the road in predominately pre-Helene stream locations. This stretch of stream was scoured and deforested and remains vulnerable to additional destabilization during high flow events. Due to this, NCDOT requests a reduction in mitigation ratios for this system, as stabilization and increased buffer will result in uplift from the current degraded damaged stream condition.

Permit Site	Stream Name	Status/Class	Stream Re-Establishment to Pre-Helene Location	Perm Fill (loss)	Bank Stabilization	Temporary Impact	ACOE Mitigation Required	DWR Mitigation Required	Proposed Mitigation Ratio	Impact Description (black text) Stream Relocation/ Reduced Mitigation Justification (blue text)
21	Hickory Creek & UT to Hickory Creek	Perennial	92 lf 0.03 ac	106 lf 0.04 ac	--	47 lf 0.01 ac 50 lf <0.01 ac	**106 lf (53 lf)**	106 lf	**0.5:1**	**Stream realignment.** Damage to the roadway structure from Hurricane Helene requires permanent realignment of the channel at this location. The **stream relocation is 106 linear feet** and the portion of the stream that will be **reestablished to pre-Helene alignment is 92 linear feet** This is a short reach of relocation that will adjust the stream from bending into the fill slope of US 74A. This relocation will allow for the construction of a small floodplain bench and increase the buffer between the road and the river. Due to this, NCDOT requests a reduction in mitigation ratios for this system, as stabilization and increased buffer will result in uplift from the current degraded damaged stream condition.
22	Hickory Creek	Perennial	434 lf 0.15 ac	492 lf 0.16 ac	--	76 lf 0.02 ac	**492 lf (123 lf)**	492 lf	**0.25:1**	**Stream realignment.** Damage to the roadway structure from Hurricane Helene requires permanent realignment of the channel at this location. The **stream relocation is 492 linear feet** and the portion of the stream that will be **reestablished to pre-Helene alignment is 434** linear feet. This is a long reach of relocation that pulls the stream away from the toe of slope of US 74A. This relocation will significantly increase the distance and buffer between US 74A and the stream. This reach has also been in a braded condition since Hurricane Helene. This work will restore the stream to a more natural, pre-Helene profile and dimension. NCDOT requests a reduction in mitigation ratios for this system, as stabilization and increased buffer will result in uplift from the current degraded damaged stream condition.
23	UT Hickory Creek	Intermittent	--	23 lf < 0.01 ac	--	31 lf < 0.01 ac	**0**	0	--	**Removal of existing concrete box culvert (size unknown) and installation of new 48" RCP-IV.** **Stream realignment.** Inlet stabilization at the 48" RCP inlet at the special "V" ditch tie-in and stream realignment at the outlet to tie into the relocated Hickory Creek. Temporary impacts to the stream are required for equipment to access the pipe and for temporary dewatering (pump around). Pre-Helene, this stream had a sharp 90-degree bend at the road, and then a second 90-degree bend to enter the pipe under US 74A. The location of the new structure will eliminate these bends, as well as the parallel run beside US 74A. Due to the establishment of a more natural transition, as well as the benefit of removing this parallel to US 74 run, NCDOT does not propose mitigation for this 23feet.
Totals			**Stream Re-Establishment to Pre-Helene Location**	**Permanent Fill (loss)**	**Bank Stabilization**	**Temporary Impact**	**ACOE Mitigation Required**	**DWR Mitigation Required**		
			1,534 lf 1.12 acre	**1,771 lf 0.49 ac**	**561 lf 0.17 ac**	**1,065 lf 0.3 ac**	**1,748 lf 1,294 lf (with ratio)**	**1,345**	--	--

Mitigation Plan

Relocation of Hickory Creek

Henderson County

WBS# 18314.1045039

8/5/2026

1.0 Baseline:

The North Carolina Department of Transportation (NCDOT) will perform stream relocation efforts along Hickory Creek that parallels US-74A in Henderson County NC. The relocation project will take place along US-74A between Bearwallow Mountain Road and Grant Mountain Road, southeast of Asheville NC. This area along US-74 was heavily impacted during the Helene Hurricane in the fall of 2024. Hickory Creek is located within the USGS HUC 03050105 Broad River Basin. These 5 relocations sites along Hickory Creek will improve stream stability, reduce hazard mitigation to the roadway structure and create a functional uplift to the currently failed stream.

2.0 Site Selection:

Hickory Creek runs at the toe of the existing roadway section of US-74A. Moving the stream away from US-74A will provide a long-term separation from the river and the established buffer from the existing roadway. These relocation efforts will facilitate a "jump start" to stream stability as well as prevent future destabilization of US-74A during high flow events such as Hellene.

3.0 Site Protection Instrument:

Due to the unique nature of this recovery project, including the presence of adjacent private property requiring access to US 74A, NCDOT will be unable to manage the proposed relocation site or prohibit any use inconsistent with its use as mitigation property.

At this time, NCDOT is aware of the need for potential driveway crossings throughout the project corridor, either by ford or by bridge. NCDOT has no involvement with these private undertakings with the exception of its legal responsibilities to grant driveway permits.

4.0 Objectives:

The goal of these relocation efforts is to relocate 1,345 ln ft of Hickory Creek to new location along the southeast side of US-74A. The functional relocation of these sections of stream will be accomplished through the engineered natural stream design, by Grant Ginn Consulting.

5.0 Mitigation Work Plan:

Due to the unique nature of this recovery project, the relocation sites will be constructed at the same time as the US-74A roadway reconstruction. Construction activities along US-74A will involve the permanent re-establishment of US 74A to modern highway standards, site grading, site planting, and natural stream design. Attached are the design plans of the areas that will be relocated.

6.0 Performance Standards:

Not applicable.

7.0 Monitoring Requirements:

The permittee shall monitor the restored channel for three years. To do this, the permittee shall establish three points along the restored reach (two within 50' on each end), take photographs at these points:
(1) immediately after restoration and stabilization activities have been completed, and
(2) every year after that for three years.
The permittee shall submit these photographs and a text description of observed channel stability within 60 days of completion of the project, then once a year for the next 3 years. If the restored channel is unstable for any reason during this three-year monitoring period (e.g., bank erosion, downcutting, etc.), or causes upstream or downstream bank erosion, the permittee shall immediately contact the USACE suggest corrective actions. Note that the required monitoring period may be extended if corrective actions are necessary.

8.0 Other Information:

Not applicable.

9.0 Determination of Credits:

The success of the relocation area and determination of final credits will be based upon successful completion of the relocation and closeout of the monitoring period to determine the use of this site to offset impacts associated with US-74A.

9.1 Credit Release Schedule:

NCDOT proposes to offset the impacts to the relocated portion of stream at varying stream ratios as noted in the Mitigation Summary document.

10.0 Geographic Service Area:

The proposed Geographic Service Area (GSA) for the relocations is composed of the Hydrologic Cataloging Unit (HUC) (03050105). All stream credits generated during these relocations will be used to offset impacts associated with US-74A (WBS# 18314.1045039)

11.0 Maintenance Plan:

Once monitoring is completed and the site is closed out, the need for long-term maintenance is not anticipated for the relocated sections of stream. Should destabilization or repair be required, NCDOT, in consultation with the appropriate environmental agencies, will propose a plan to re-stabilize an area of stream, if necessary.

12.0 Long Term Adaptative Management Plan

The site will be monitored by NCDOT according to the relocation plan. In the event that unforeseen issues arise that affect the management of the site, any remediation will be addressed by NCDOT, in consultation with the environmental agencies.

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

Permittee: NCDOT Division 14 **Action ID:** SAW-2025-01756
Project Name: post Helene repairs to US 74A **County:** Henderson

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

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

Permitted Impacts and Compensatory Mitigation Requirements

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

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
		1,748				

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

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

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
		1,294				

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

Section to be completed by the Mitigation Sponsor

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

Mitigation Sponsor Name: _____

Name of Sponsor's Authorized Representative: _____

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

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

Conditions for Transfer of Compensatory Mitigation Credit:

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

Comments/Additional Conditions:

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

USACE Project Manager: Crystal Amschler
USACE Field Office: WRDA Transportation Branch
US Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

Email:

Crystal Amschler Digitally signed by Crystal Amschler
Date: 2026.09.01 09:59:34 -04'00'

Wilmington District Project Manager Signature | Click here to enter a date. **Date of Signature**

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

401 Certification (NCDWR)

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

JOSH STEIN
Governor
D. REID WILSON
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

August 31, 2026

DWR #20251220 v3
Henderson County

North Carolina Department of Transportation
Attn: Michael Turchy
1598 Mail Service Center
Raleigh, NC 27606

Delivered via email to: maturchy@ncdot.gov

Subject: **Approval of Individual 401 Water Quality Certification**
Permanent Repairs to US 74A (Gerton Highway) from Bearwallow Mountain Road to Grant Mountain Road; WBS 18314.1045039
USACE Action ID. No. SAW-2025-01756

Location: 35.48386, -82.35314

Dear Mr. Michael Turchy:

Attached hereto is a copy of Certification No. WQC008282 issued to Mr. Michael Turchy and the North Carolina Department of Transportation (NCDOT), dated August 31, 2026. This Certification replaces the Certification issued on August 26, 2026. This Certification is being issued pursuant to a modification request submitted on August 31, 2026, with fee received on April 30, 2026, to account for the revised permanent and temporary impacts at Site 6. All of the authorized activities and conditions of certification associated with the Water Quality Certification No. WQC008282 dated September 26, 2025, still apply except where superseded by this certification.

This Water Quality Certification does not relieve the recipient of the certificate (or the Permittee) of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and Trout Buffer regulations.

Upon the presentation of proper credentials, the Division of Water Resources (Division or DWR) may inspect the property.

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

This Water Quality Certification shall expire on the same day as the expiration date of the corresponding Section 404 Permit that is current at the time this Certification is issued. The conditions shall remain in effect for the life of the project, regardless of the expiration date of this Water Quality Certification.

Non-compliance with or violation of the conditions herein set forth may result in revocation of this Water Quality Certification for the project and may also result in criminal and/or civil penalties.

Notice regarding the right to contest this 401 Water Quality Certification decision is attached to this letter.

This letter completes the DWR's review under Section 401 of the Clean Water Act and 15A NCAC 02H .0500. Please contact Amy Annino at 828-296-4668 or amy.annino@deq.nc.gov if you have any questions or concerns.

Sincerely,

Signed by:
Faith Hardin
3185423002EA45E...
Faith Hardin, Supervisor
401 & Buffer Transportation Permitting Branch
Division of Water Resources, NCDEQ

Electronic cc: Crystal Amschler, USACE Asheville Regulatory Field Office
Holland Youngman, USFWS Asheville Field Office
Dave McHenry, NCWRC
Chad Plemmons, NCDOT Division 14 Environmental Officer
Kevin Mitchell, NCDOT Division 14 Environmental Specialist
Beth Harmon, DMS
DWR 401 & Buffer Permitting Branch Electronic file

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

NOTICE REGARDING THE RIGHT TO CONTEST A DWR 401 WATER QUALITY CERTIFICATION AND/OR BUFFER AUTHORIZATION

Right of Persons Aggrieved to File a Contested Case for the Decision on a 401 Water Quality Certification and/or Buffer Authorization:
The Division's decision is subject to review under NCGS 150B-23.

Rights of Persons Aggrieved to File a Contested Case: Pursuant to NCGS 150B, Article 3, a party or person aggrieved may commence a contested case by filing a petition under NCGS 150B-23 in the Office of Administrative Hearings within 60 days after the Division provides notice of its decision on an application, as provided in NCGS 150B-23(f). If no contested case is commenced within the required time, the Division's decision is final and is not subject to review.

General Filing Instructions: A petition for contested case hearing must be in the form of a written petition, conforming to NCGS 150B-23, and filed with the Office of Administrative Hearings, 1711 New Hope Church Road, Raleigh NC, 27609, along with a fee in an amount provided in NCGS 150B-23.2. A petition for contested case hearing form may be obtained upon request from the Office of Administrative Hearings or on its website at https://www.oah.nc.gov/hearings-division/filing/hearing-forms. Additional specific instructions for filing a petition are set forth at 26 NCAC Chapter 03.

Service Instructions: A party filing a contested case is required to serve a copy of the petition, by any means authorized under 26 NCAC 03 .0102, on the process agent for the Department of Environmental Quality:

Daniel Hirschman, General Counsel
North Carolina Department of Environmental Quality
1601 Mail Service Center
Raleigh, North Carolina 27699-1601

If the party filing the petition is a person aggrieved other than the recipient of the certificate (the "Permittee"), the party must also serve the Permittee in accordance with NCGS 150B-23(a).

Be aware that other rules or laws may apply to the filing of a petition for a contested case. Additional information is available at https://www.oah.nc.gov/hearings-division/hearing-process/filing-contested-case. Please contact the Office of Administrative Hearings at (984) 236-1850 with all questions regarding the filing fee and/or the details of the filing process.

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

NORTH CAROLINA 401 WATER QUALITY CERTIFICATION

CERTIFICATION #WQC008282 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to North Carolina's Regulations in 15 NCAC 02H .0500 and 15A NCAC 02B .0200, to Mr. Michael Turchy and NCDOT, who have authorization for the impacts listed below, as described within your application received by the N.C. Division of Water Resources (DWR) on August 31, 2026, with fee received on April 30, 2026, and by Public Notice issued by the DWR on April 30, 2026, and within the *Reasonable Period of Time* pursuant to 40 CFR Part 121.6.

Type of Impact	Stream Re-Establishment to Pre-Helene Location	Amount Approved Permanent Fill (loss)	Amount Approved Permanent Bank Stabilization	Amount Approved Temporary	Mitigation Amount Required
Perennial Streams					
Site 1 / Hickory Creek / Bank Stabilization	0	0	61 linear feet	35 linear feet	0 credits
Site 1 / UT to Hickory Creek / Bank Stabilization	0	0	34 linear feet	0	0 credits
Site 2 / UT Hickory Creek / 18" CSP Pipe	0	0	0	3 linear feet	0 credits
Site 3 / Hickory Creek / Channel relocation	157 linear feet	276 linear feet	65 linear feet	75 linear feet	276 credits
Site 5 / UT Hickory Creek / Debris removal & stream daylighting	0	0	0	27 linear feet	0 credits
Site 6 / Hickory Creek / Culvert removal & stream daylighting	0	0	135 linear feet	39 linear feet	0 credits
Site 7 / UT Hickory Creek / Bank Stabilization	0	0	52 linear feet	15 linear feet	0 credits
Site 8 / UT Hickory Creek / Bank Stabilization	0	0	7 linear feet	28 linear feet	0 credits
Site 9 / Hickory Creek / Debris removal & bank stabilization	0	0	97 linear feet	31 linear feet	0 credits
Site 10 / Hickory Creek / PDE & temporary construction access	0	0	0	28 linear feet	0 credits
Site 11 / UT Hickory Creek / Replace RCBC culvert & dewatering	0	87 linear feet	17 linear feet	8 linear feet	0 credits
Site 12 / Hickory Creek / Channel relocation	310 linear feet	221 linear feet	0	14 linear feet	221 credits

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

Type of Impact	Stream Re-Establishment to Pre-Helene Location	Amount Approved Permanent Fill (loss)	Amount Approved Permanent Bank Stabilization	Amount Approved Temporary	Mitigation Amount Required
Site 13 / Hickory Creek / Construction access	0	0	0	320 linear feet	0 credits
Site 14 / UT Hickory Creek / Road embankment repair	0	0	93 linear feet	0	0 credits
Site 18 / UT Hickory Creek / Channel re-establishment & debris removal	17 linear feet	0	0	18 linear feet	0 credits
Site 20 / Hickory Creek / Channel relocation	524 linear feet	250 linear feet	0	59 linear feet	250 credits
Site 21 / Hickory Creek & UT Hickory Creek / Channel relocation	92 linear feet	106 linear feet	0	47 linear feet	106 credits
Site 21 / UT Hickory Creek / Dewatering	0	0	0	50 linear feet	0 credits
Site 22 / Hickory Creek / Channel relocation	434 linear feet	492 linear feet	0	76 linear feet	492 credits
Totals:	*1,534 linear feet*	*1,432 linear feet*	*561 linear feet*	*845 linear feet*	**1,294 credits*

** Reflects approved reduction in mitigation ratio*

Intermittent Streams					
Site 4 / UT Hickory Creek / Temporary Construction Easement	0	0	0	86 linear feet	0 credits
Site 15 / UT Hickory Creek / CSP, channel stabilization & dewatering	0	99 linear feet	0	15 linear feet	0 credits
Site 16 / UT Hickory Creek / New RCP & channel stabilization	0	78 linear feet	0	3 linear feet	0 credits
Site 17 / UT Hickory Creek / Replace RCP and add inlet & outlet protection	0	40 linear feet	0	42 linear feet	0 credits
Site 19 / UT Hickory Creek / RCP & CSP with inlet & outlet protection	0	99 linear feet	0	14 linear feet	0 credits
Site 23 / UT Hickory Creek / Replace RCP and stream relocation	0	23 linear feet	0	31 linear feet	0 credits
Totals:	*0 linear feet*	*339 linear feet*	*0 linear feet*	*191 linear feet*	*0 credits*

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

Type of Impact	Amount Approved Permanent Excavation (loss)	Amount Approved Temporary	Amount Approved Temporary Hand Clearing	Mitigation Amount Required
Riparian Wetlands				
Site 4 / Wetland 1 / Excavation for channel realignment	<0.01 acres	0	0.06 acres	*0 credits*
Totals:	*<0.01 acres*	*0*	*0.06 acres*	*0 credits*

The State of North Carolina certifies that this activity will comply with water quality requirements and the applicable portions of Sections 301, 302, 303, 306, 307 of the Public Laws 92-500 and PL 95-217 if conducted in accordance with the application, the supporting documentation, and conditions hereinafter set forth.

The following impacts are hereby approved. No other impacts are approved, including incidental impacts. [15A NCAC 02H .0506(b)]

This approval requires you to follow the conditions listed in the Certification below.

CONDITIONS OF CERTIFICATION [15A NCAC 02H .0507(c)]:

1. Mitigation must be provided for the proposed impacts as specified in the table below. The attached Compensatory Mitigation Responsibility Transfer Form (Form) shall be completed and provided to the Division prior to *any* impacts occurring. If the Mitigation Provider specified on the attached Form(s) for the proposed impacts changes after issuance of this Certificate, then the Permittee shall request a revised Compensatory Mitigation Responsibility Transfer Form from the Division prior to conducting any impacts.

	Compensatory Mitigation Required	River Basin & HUC Number
Stream	1,294 linear feet (credits)	Broad River Basin HUC 03050105

Citation: 15A NCAC 02H .0506(c); 15A NCAC 02H .0507(c)

2. The plans and specifications for this project are incorporated by reference as part of this Water Quality Certification. Any final construction plans for a project must include or reference the application and plans submitted to the DWR. The Permittee must evaluate all other acquired permits to ensure that they are consistent with the plans submitted to the DWR, and all relative impacts are accounted for and shown on the final construction plans. Any modifications or additional impacts to streams and/or wetlands and/or waters within the project require the permittee to notify the DWR and may require submission of a new application package with the appropriate fee.

Citation: 15A NCAC 02H .0506(b)(2) and (3); 15A NCAC 02H .0507(c)

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3. If the property is sold, the Permittee shall provide the new owner with a copy of this Certification and all plans and specifications incorporated by reference. The Permittee may transfer a Certification to the new owner by submitting a letter to the Division with the following statement: *"At the time the property is transferred, the terms and conditions of this 401 Individual Water Quality Certification, including the responsibility to ensure compliance, are binding on the new owner(s) of the property."* The letter shall be signed and dated by both the transferee and the new owner.

   Citation: 15A NCAC 02H .0507(d)(2)

4. The NCDOT Division Environmental Officer or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand the potential issues with stream and pipe alignment at the permitted site. NCDWR staff shall be invited to the pre-construction meeting.

   Citation: 15A NCAC 02H.0506(b)(2) and (b)(3)

5. The stream channel relocation area shall be constructed to ensure that the stream channel will be substantially similar in width and water depth as the existing channel. The channel shall be constructed such that the tie-in with the natural channel at each end shall ensure that upstream and downstream stream beds and stream banks are protected from erosion. The permittee shall provide on-site supervision of the relocation work by an appropriately trained individual. Visual monitoring of the relocated channel tie-in locations shall be conducted at a minimum of quarterly for the first year or two bankfull events (whichever is longer), to confirm the site remains stable.

   Citation: 15A NCAC 02H .0506(b)(1) and (2)

6. All stream channel relocations will be constructed in a dry work area and stabilized before stream flows are diverted. Channel relocations will be completed and stabilized, and must be approved by NCDWR staff, prior to diverting water into the new channel. Vegetation used for bank stabilization shall be limited to native riparian vegetation and should include establishment of a vegetated buffer on both sides of the relocated channel to the maximum extent practicable. All stream banks shall be matted with coir fiber matting. Also, rip-rap may be allowed if it is necessary to maintain the physical integrity of the stream, but the applicant must provide written justification and any calculations used to determine the extent of rip-rap coverage requested. Once the stream has been turned into the new channel, it may be necessary to relocate stranded fish to the new channel to prevent fish kills.

   Citation: 15A NCAC 02H .0506(b)(3)

7. The permittee shall provide on-site supervision of stability work including, but not limited to bank re-sloping, channel re-establishment and relocation, in-stream structure placement, and riparian zone re-establishment, by an appropriately trained individual.

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Citation: 15A NCAC 02H .0506(b)(1) and (2)

8. Visual monitoring of the channel re-establishment and relocation project shall be conducted at a minimum of quarterly for the first year or two bankfull events (whichever is longer), and then annually until the site is stable (particularly after storm events) and vegetation is successful. Any failures of structures, stream banks, or vegetation may require future repairs or replacement, which requires coordination with the Asheville Regional Office to ensure the stability and water quality of the stream and downstream waters.

   Citation: 15A NCAC 02H .0506(b)(1), (2) and/or (3)

9. The stream channel adjacent to the retaining wall at Site 13 shall be temporarily dewatered during construction of the retaining wall. Upon completion of construction activities adjacent to the stream, the natural stream channel shall be reconstructed to match the original pattern and profile, and appropriately stabilized and any sediment deposited within the stream shall be removed by hand prior to redirecting water back into the stream channel. Approved best management practices from the most current version of the NC Sediment and Erosion Control Manual, or the NC Department of Transportation Construction and Maintenance Activities Manual, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water.

   Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200

10. In-stream structures installed to mimic natural channel geomorphology such as step-pool structures, etc. shall be designed and installed in such a manner that allow for continued aquatic life movement.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

11. The permittee shall avoid the removal of existing trees within the Temporary Easement Area adjacent to the stream as much as practicable. The permittee shall provide a Reforestation Plan for areas where trees within an established Riparian buffer are removed to re-establish and relocate the stream channel. The Reforestation Plan shall include riparian tree species native to the North Carolina mountain region and should be submitted to DWR for review and approval. Vegetation must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction.

    Citation: 15A NCAC 02B.0506(b)(2)

12. The permittee shall use *Design Standards in Sensitive Watersheds* (15A NCAC 4B.0124[a]-[e]) in areas draining to Trout (Tr) waters.

13. For projects impacting waters classified by the NC Environmental Management Commission as Trout (Tr), stormwater shall be directed to vegetated buffer areas, grass-lined ditches or other

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means appropriate to the site for the purpose of pre-treating storm water runoff prior to discharging directly into streams. Mowing of existing vegetated buffers is strongly discouraged.

Citation: 15A NCAC 02H .0506(b)(2) and 15A NCAC 04B.0125

14. If the project is covered by NPDES Construction Stormwater Permit Number NCG010000 or NPDES Construction Stormwater Permit Number NCG250000, full compliance with permit conditions including the erosion and sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. Please note the extra protections for the sensitive watersheds.

    Citation: 15A NCAC 02H .0506(b) and (c); 15A NCAC 02H .0507(c)

15. The Permittee shall allow the Director, or an authorized representative (including an authorized contractor acting as a representative of the Director), upon the presentation of credentials and other documents as may be required by law, to: *Citation: 15A NCAC 02H .0502(e); 15A NCAC 02H .0507(c)*

    a. Enter, at reasonable times, upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this certificate;
    b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this certificate;
    c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this certificate; and
    d. Sample or monitor at reasonable times, for the purposes of assuring certificate compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location

16. All wetlands, streams, and surface waters located within the limits of disturbance and within 50 feet of the limits of disturbance/construction area on the project site shall be clearly marked (example- orange fabric fencing) prior to any land disturbing activities. The marking/fencing shall be maintained until the project or project phase is completed. Impacts to areas within the marked area/fencing are prohibited unless otherwise authorized by this certification.

    Citation: 15A NCAC 02H .0506(b)(2); 15A NCAC 02H .0507(c)

17. When requested by DWR, the Permittee and/or authorized agent shall schedule a pre-construction meeting with DWR, shall contact the appropriate DWR Regional Office upon project commencement of construction, shall submit a Certificate of Completion and/or shall provide as-built documentation.

    Citation: 15A NCAC 02H .0502(e); 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

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18. The permittee shall report to the appropriate DWR Regional Office any noncompliance with, and/or any violation of, stream or wetland standards [15A NCAC 02B .0200], including but not limited to sediment impacts to streams or wetlands. Information shall be provided orally within 24 hours (or the next business day if a weekend or holiday) from the time the permittee became aware of the non-compliance circumstances.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

19. No additional temporary or permanent impacts from waste, spoil, solids, fill, excavation, or staging of equipment, shall occur in wetlands or waters beyond the footprint of the impacts (including temporary impacts) identified in this Certification.

    Citation: 15A NCAC 02H .0506; 15A NCAC 02H .0507(c)

20. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sedimentation Pollution Control Act of 1973). Regardless of applicability of the Sedimentation Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur.

    Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the *North Carolina Erosion and Sediment Control Planning and Design Manual*, or the *North Carolina Department of Transportation Erosion and Sediment Control Design and Construction Manual*.

    Appropriate measures should be installed prior to any land clearing activities to protect wetlands, streams, and/or buffers from turbidity and/or sedimentation. These measures should be routinely inspected and properly maintained, and excavated materials should be contained outside wetland, stream, and/or buffer boundaries.

    For installation of bridges that involve driving or drilling activities within stream channels, open waters, or along streambanks turbidity curtains shall be installed within the surface water.

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

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

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If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality Waters (HQW), Outstanding Resource Waters (ORW), Trout (Tr) or 303(d) then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

Citation: 15A NCAC 02H .0506(b)(2); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200; 15A NCAC 02B .0231

21. Sediment and Erosion Control Measures (S&EC) in wetlands or waters should be avoided to the maximum extent possible and any S&EC occurring in wetlands or waters shall be restored to pre-existing conditions upon completion of the project. The Permittee shall utilize sediment and erosion control measures that avoid and minimize the need for the placement of silt fence along streams at the normal water level. Where measures are placed within authorized impact areas then placement of such measures shall not be conducted in a manner that results in a loss of function of any wetlands, streambeds, or streambanks. Any erosion control measures, including silt fence, installed within wetlands shall be removed from wetlands and the natural grade restored and revegetated within two (2) months of the date the appropriate sediment and erosion control program has released the specific area within the project to ensure wetland standards are maintained upon completion of the project.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200; 15A NCAC 02B .0231

22. Erosion control matting shall not be placed within a stream bed. Erosion control matting that incorporates plastic mesh and/or plastic twine shall not be used along streambanks or within wetlands.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

23. The North Carolina Department of Transportation (NCDOT) shall maintain full compliance with the conditions related to construction activities and post construction stormwater design, construction and maintenance, within the most recent version of their Individual NPDES Stormwater Permit Number NCS000250.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200; 15A NCAC 02B .0231

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24. All work in or adjacent to streams, ponds, lakes, and reservoirs shall be conducted so that the work area is isolated from surface waters. Approved best management practices from the most current version of the DEMLR *NC Erosion and Sediment Control Planning and Design Manual*, or the *NC Department of Transportation Best Management Practices For Construction and Maintenance Activities Manual*, such as sandbags, rock berms, cofferdams, pump-arounds, and other diversion structures shall be used to minimize excavation in flowing water. Water that comes in contact with the work area shall be treated through an appropriate sediment/erosion control measure (sediment basin, filter bag, etc) prior to discharging to a surface water. All temporarily disturbed areas for the purpose of isolation/dewatering shall be restored to original grade, including each stream's original cross-sectional dimensions, planform pattern, and longitudinal bed profile. All temporarily impacted sites shall be restored and stabilized with native vegetation as practicable. *Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200*

25. Work within a designated trout watershed as identified by the Wilmington District of the US Army Corps of Engineers or work within identified state or federal endangered or threatened species habitat shall be coordinated with NCWRC and/or DMF prior to initiating of project activities.

    The Permittee shall adhere to NCWRC and/or DMF recommended moratoria. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium. If activities must occur during periods of high biological activity of aquatic species (e.g. sea turtle nesting, fish spawning, or bird nesting) all biological surveys, relocations, and/or monitoring requested by the state agency must be conducted.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 04B .0125

26. Demolition of existing structures, such as culvert or bridge removal, shall be conducted to ensure water quality standards are maintained. NCDOT activities shall adhere to NCDOT's *Best Management Practices for Construction and Maintenance Activities*.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200

27. Rip-rap groins proposed in accordance with 15A NCAC 07H .1401 (NC Division of Coastal Management General Permit for construction of Wooden and Rip-rap Groins in Estuarine and Public Trust Waters) shall meet all the specific conditions for design and construction specified in 15A NCAC 07H .1405.

    Citation: 15A NCAC 02H .0507(c); 15A NCAC 07H .1400

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

28. Culverts shall be designed and installed in such a manner that the original stream profiles are not altered and allows for aquatic life movement during low flows. The dimension, pattern, and profile of the stream above and below a pipe or culvert shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed culvert shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. If the width of the culvert is wider than the stream channel, the culvert shall include multiple boxes/pipes, baffles, benches and/or sills to maintain the natural width of the stream channel. If multiple culverts/pipes/barrels are used, low flows shall be accommodated in one culvert/pipe and additional culverts/pipes shall be installed such that they receive only flows above bankfull.

    Placement of culverts and other structures in streams shall also meet one of the following requirements:

    a. For structures less than 72” in diameter/width and in area where topographic constraints dictate culvert slopes will be greater than 2.5%, culverts shall be installed “at grade” such that low flow conditions in the stream are maintained provided that all alternative options for flattening the slope have been investigated and aquatic life movement/connectivity has been provided when possible (e.g. rock ladders, cross-vanes, sills, baffles etc.); or
    b. When bedrock is present in culvert locations, culvert burial is not required, provided that there is documentation of the presence of bedrock.
    c. For all other culverts:
        i. Culverts with a diameter greater than 48 inches shall be below the elevation of the streambed by one foot
        ii. Culverts with diameter less than or equal to 48 inches shall be below the streambed by 20% of the culvert diameter

    If a culvert outlet is submerged within a pool or scour hole and designed to provide for aquatic passage, then culvert burial into the streambed is not required.

    Documentation such as a location map of the culvert, culvert profile drawings, slope calculations, geotechnical reports, photographs, etc. shall be provided to DWR upon written request.

    For culvert replacements within the same location/footprint, and of similar length, culverts shall be designed and installed to meet the above requirements of this Condition unless prohibited by existing conditions on site, such as existing infrastructure or topographic constraints.

    Installation of culverts in wetlands shall ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. When roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges shall be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

The establishment of native woody vegetation and other soft stream bank stabilization techniques shall be used where practicable instead of rip-rap or other bank hardening methods.

Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

29. Application of fertilizer to establish planted/seeded vegetation within disturbed riparian areas and/or wetlands shall be conducted at agronomic rates and shall comply with all other Federal, State and Local regulations. Fertilizer application shall be accomplished in a manner that minimizes the risk of contact between the fertilizer and surface waters.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0231

30. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in, or adjacent to, surface waters is prohibited.

    Citation: 15A NCAC 02H.0506(b)

31. If concrete is used during construction (including bulkhead components, such as deadman anchors, tie-back systems and concrete caps), then all necessary measures shall be taken to isolate the concrete from waters of the state by maintaining a dry work area to prevent direct contact between curing concrete and surface waters. Drill slurry and water that inadvertently contacts uncured concrete shall not be discharged to waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. Any water that contacts uncured concrete shall be captured, treated, and disposed of properly.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200; 15A NCAC 02B .0231

32. All temporary pipes, culverts, rip-rap pads etc. in streams shall be installed so as not to restrict stream flow or installed in such a manner that restricts aquatic life movement during low flow conditions. All temporary pipes and/or culverts shall be installed as outlined in the most recent edition of the *North Carolina Erosion and Sediment Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* or the *North Carolina Department of Transportation Best Management Practices for Construction and Maintenance Activities*.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

33. All temporary fill and temporary culverts shall be removed, and the impacted area shall be returned to natural conditions, within 60 calendar days after the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross-sectional dimensions, planform pattern, and longitudinal bed profile. All temporarily impacted sites shall be restored and stabilized with native vegetation when practicable. For all areas where wetlands are impacted by temporary roads constructed by temporary fill material, the Permittee shall remove the fill material and conduct activities necessary to restore preconstruction hydrology by addressing soil compaction. When temporary fill has been added to wetlands, or heavy equipment has been placed within a wetland, the Permittee shall ensure restoration of preconstruction soil conditions when restoring wetland areas. Upon restoration of the wetland, the Permittee shall inspect the area quarterly for a minimum of two years to document successful restoration. The Permittee shall provide documentation of inspections to DWR when requested. The monitoring requirement can be relieved with review and written approval by DWR. If the area is not restored to preconstruction conditions the impacts shall be considered permanent, and the Permittee shall request a modified Certification from DWR. With prior written approval from DWR, removal of temporary fill and temporary culverts and restoration of the impacted area may be postponed to accommodate moratorium periods.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

34. Any rip-rap or other armoring materials required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the construction activity covered by this Certification. All rip-rap or other non-natural armoring material placed in streams shall be placed such that the original streambed elevation and streambank contours are restored, and that the finished elevation of the rip rap shall not exceed that of the original stream bed. All rip-rap or other armoring materials shall consist of clean rock or masonry material free of debris or toxic pollutants. Placement of rip-rap or other armoring materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area or be installed in a manner that precludes aquatic life passage.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

35. Any rip-rap or other non-natural armoring material (i.e. gabion baskets, revetments, bulkheads, seawalls, retaining walls) used for stream or shoreline stabilization shall be of a size and density to prevent movement by wave, current action, or stream flows, and shall consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap or other armoring materials shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures. Any rip-rap or other armoring materials placed in the streambed shall be such that the finished elevation of the rip rap or other armoring materials shall not exceed that of the original stream bed.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0201

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

36. All mechanized equipment operated near surface waters shall be inspected and maintained regularly to prevent contamination of surface waters from fuels, lubricants, hydraulic fluids, or other toxic materials. Construction shall be staged in order to minimize the exposure of equipment to surface waters to the maximum extent practicable. Fueling, lubrication, and general equipment maintenance shall be performed in a manner to prevent, to the maximum extent practicable, contamination of surface waters by fuels and oils.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0200; 15A NCAC 02B .0231

37. Heavy equipment working in wetlands shall be placed on mats or non-impact equipment shall be used to ensure no disturbance and/or compaction of soil from equipment except within the footprint of the impacts covered by this Certification. Heavy equipment necessary for in stream activities shall be operated from the banks to the maximum extent practical and in no cases shall cause unstable stream banks or a violation of water quality standards.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c); 15A NCAC 02B .0231

38. In accordance with G.S. 143-215.85(b), the Permittee shall report any petroleum spill of 25 gallons or more; any spill regardless of amount that causes a sheen on surface waters; any petroleum spill regardless of amount occurring within 100 feet of surface waters; and any petroleum spill less than 25 gallons that cannot be cleaned up within 24 hours.

    Citation: 15A NCAC 02H .0507(c); N.C.G.S 143-215.85(b)

39. The Permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

40. A copy of this Certification shall be retained on site during the construction and maintenance of this project, or with the project manager, and be available for inspection at all times. The Permittee shall require its contractors and/or agents to comply with the terms and conditions of this Certification in the construction and maintenance of this project and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this Certification. If the Permittee becomes aware of any inability to comply with any of the conditions of this Certification, they must notify the appropriate Regional Office within 24 hours (or the next business day if a weekend or holiday) from the time the Permittee becomes aware of the circumstances.

    Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

41. This Water Quality Certification neither grants nor affirms any property right, license, or privilege in any lands or waters, or any right of use in any waters. This Water Quality Certification does not authorize any person to interfere with the riparian rights, littoral rights, or

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

water use rights of any other person and does not create any prescriptive right or any right of priority regarding any usage of water. This Water Quality Certification shall not be interposed as a defense in any action respecting the determination of riparian or littoral rights or other rights to water use. No consumptive user is deemed by virtue of this Water Quality Certification to possess any prescriptive or other right of priority with respect to any other consumptive user.

Citation: 15A NCAC 02H .0506(b); 15A NCAC 02H .0507(c)

This Water Quality Certification shall expire on the same day as the expiration date of the corresponding Section 404 Permit that is current at the time this Certification is issued. The conditions shall remain in effect for the life of the project, regardless of the expiration date of this Water Quality Certification.

Upon completion of the proposed project, the applicant shall submit a Certificate of Completion and/or shall provide as-built documentation. Certificates of Completion and/or as-built documentation can be submitted via the DWR website: https://edocs.deq.nc.gov/Forms/Certificate-of-Completion.

This, the 31st day of August 2026

Signed by:
Faith Hardin
3185423002EA45E...

Faith Hardin, Supervisor
401 & Buffer Transportation Permitting Branch
Division of Water Resources, NCDEQ

Docusign Envelope ID: C1C20257-6833-83FF-80AA-0097E389A066

JOSH STEIN
Governor
D. REID WILSON
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

COMPENSATORY MITIGATION RESPONSIBILITY TRANSFER FORM

August 31, 2026

Permittee: North Caroliana Department of Transportation

Project # 20251220 V2

Project Name: Permanent Repairs to US 74A (Gerton Highway) from Bearwallow Mountain Road to Grant Mountain Road; WBS 18314.1045039

County: Henderson

The Division has received an acceptance letter from the NC Division of Mitigation Services (DMS) to satisfy the mitigation requirements set forth in 401 Individual Certification No. WQC008282 issued to the North Caroliana Department of Transportation, dated August 25, 2026, as provided in the table below.

	Compensatory Mitigation	**River Basin & HUC Number**
Perennial Stream	1,294 linear feet (credits)	Broad River Basin / 03050105

The Permittee must provide a copy of this form to DMS, who will then sign the form to verify receipt of payment and the transfer of the mitigation responsibility. Once DMS has signed this form, it is the Permittee's responsibility to ensure that a signed copy of this form is submitted to DEQ.WR.401MRT@deq.nc.gov ***before*** conducting any of the authorized impacts.

The Division of Mitigation Services verifies that the mitigation requirements (credits) shown above will be debited using approved released or advance credits, and for all stream or wetland credits is in accordance with the signed/approved In-Lieu Fee Instrument dated July 28, 2010. By signing below, DMS is accepting full responsibility for the identified mitigation. As a reminder to the Mitigation Provider, no more than 25 percent of the total mitigation required by Division can be met through preservation, unless requested and approved by the Division Director (15A NCAC 02H. 0506(c)(7)).

Signature Authority Name (print): _____

Signature: _____ Date: _____

Permitted Drawings

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.02; Released April 23, 2024)

WBS Element:	TIP/Proj No: 18314.1045039	County(ies): Henderson

General Project Information

WBS Element:		**TIP Number:**	18314.1045039	**Project Type:**	Other	**Date:**	0710/2025
NCDOT Contact:	Nathan Tanner, PE			**Contractor / Designer:**	Davin Morrison, PE		
	Address:	NCDOT Highway Division 14 253 Webster Road Sylva, NC 28779		**Address:**	440 South Church Street Suite 1200 Charlotte, NC 28202-2075		
	Phone:	828 331-5213		**Phone:**	980 337-5181		
	Email:	nrtanner@ncdot.gov		**Email:**	davin.morrison@hdrinc.com		
City/Town:	Gerton & Bat Cave			**County(ies):**	Henderson		
River Basin(s):	Broad			**CAMA County?**	No		
Wetlands within Project Limits?	No						

Project Description

Project Length (lin. miles or feet):	2.17	**Surrounding Land Use:**	Forested, Low Density Residential, Commercial, and Transportation				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	6.9	ac.		6.5	ac.		
Typical Cross Section Description:	Maintain existing two lane highway with 10' wide travel lanes, shoulders, and roadside ditches where Hurricane Helene storm damage to the roadway was minimal or did not occur. Where damage has occurred, roadway will be reconstructed with two 11' wide travel lanes, 3' wide shoulders (6' wide with guardrail), expressway gutter, and roadside ditches.			Pre-Hurricane Helene, US 74A was a two lane highway with 10' wide travel lanes with narrow shoulders and roadside ditches. Post-Hurricane Helene, the road was heavily damaged at several locations.			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	3000	Year: 2040	Existing:	1500	Year:	2017

General Project Narrative: (Description of Minimization of Water Quality Impacts)

This SMP is for Work Package 3 from Bearwallow Mountain Road to Grant Mountain Road. A separate SMP will be submitted for Work Package 4 from Grant Mountain Road to NC 9. Retaining walls and/or 1.25:1 grouted rip rap embankments will be used to repair severely damaged roadway fill slopes adjacent to Hickory Creek. The stream will be relocated to its pre-storm location where needed to protect the roadway. Stream impacts will be kept to a minimum by only relocating the stream where needed, installing retaining walls to keep fill slopes out of the stream, and armoring the roadway embankment with a 1.25:1 grouted rip rap to reduce the impacts that may be caused by a standard 2:1 fill slope. Rip rap aprons and standard base ditches will be used to capture flow from culverts that pass under the roadway to help reduce outlet velocities and erosion.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.02; Released April 23, 2024)

WBS Element:	TIP/Proj No.: 18314.1045039	County(ies): Henderson	Page 2 of 2

General Project Information

Waterbody Information

Surface Water Body (1):	Hickory Creek		**NCDWR Stream Index No.:**	9-14		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	Trout Waters (Tr)			
Other Stream Classification:						
Impairments:						
Aquatic T&E Species?		Comments:				
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	No	**Dissipator Pads Provided in Buffer?**		
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (2):	UT to Hickory Creek		**NCDWR Stream Index No.:**	9-14		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	Trout Waters (Tr)			
Other Stream Classification:						
Impairments:						
Aquatic T&E Species?		Comments:				
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (3):			**NCDWR Stream Index No.:**			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**				
		Supplemental Classification:				
Other Stream Classification:						
Impairments:						
Aquatic T&E Species?		Comments:				
NRTR Stream ID:				**Buffer Rules in Effect:**		
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**		**Dissipator Pads Provided in Buffer?**		
Deck Drains Discharge Over Water Body?		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

09/08/99

TIP PROJECT: 18314.1045039

CONTRACT:

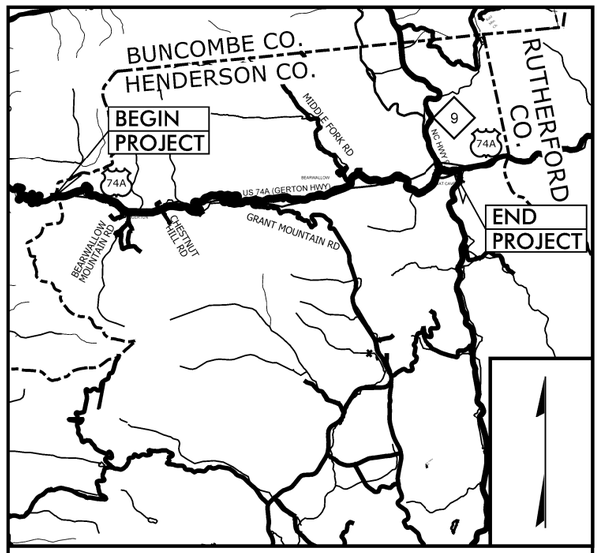
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HENDERSON COUNTY

PERMIT DRAWING SHEET 1 OF 24

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	18314.1045039	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
- - - - - -	N/A	P.E.
- - - - - -	N/A	ROW



VICINITY MAP
(NOT TO SCALE)

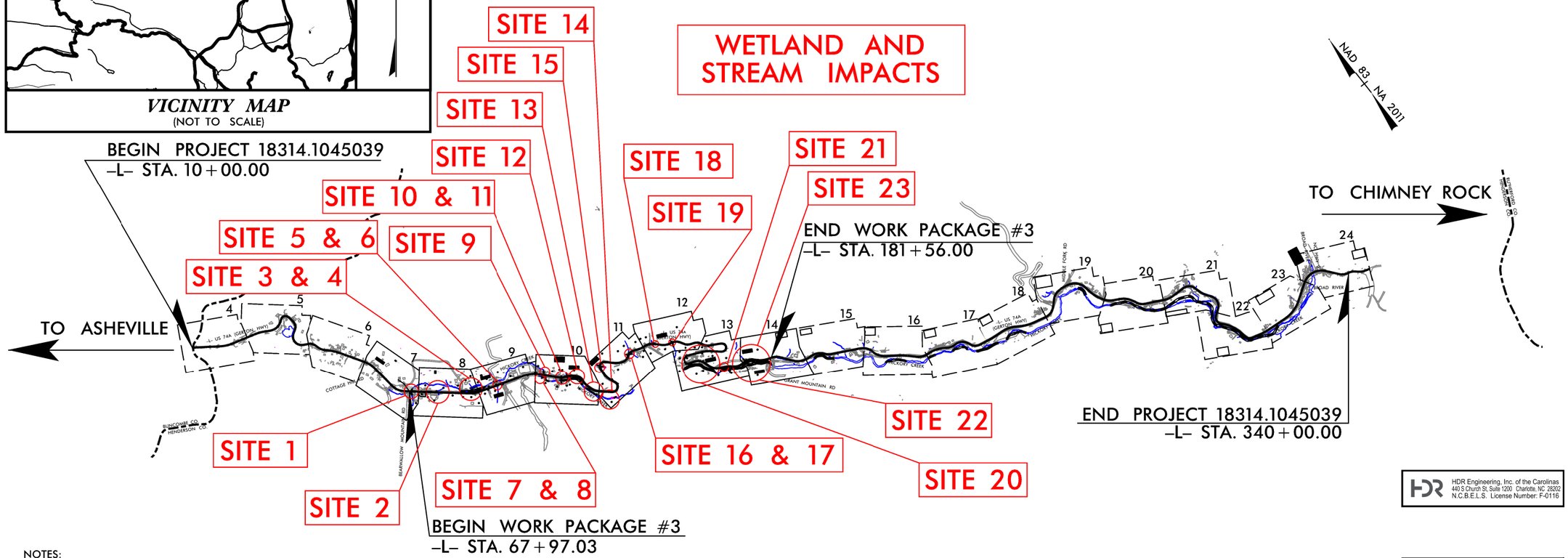


LOCATION: *GERTON HWY (U.S. HWY 74A) FROM WEST OF BEARWALLOW MOUNTAIN RD TO CHIMNEY ROCK ROAD (U.S. HWY 64)*

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

WORK PACKAGE #3: *BEARWALLOW MOUNTAIN ROAD TO GRANT MOUNTAIN ROAD*

WETLAND AND STREAM IMPACTS



NOTES:
1. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
2. THIS IS A NO CONTROL OF ACCESS PROJECT.

HDR Engineering, Inc. of the Carolinas
440 S Church St, Suite 1200 Charlotte, NC 28202
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

2017 = 1,500
ADT 2040 = 3,000
T = 8 %
V = 40 MPH

FUNC CLASS = MINOR ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY WORK PACKAGE #3 = 2.167 MILES

TOTAL LENGTH TIP PROJECT US–74A = 6.250 MILES

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: –

LETTING DATE: –

Prepared In the Office of:
HDR Engineering, Inc. of the Carolinas
440 S Church St, Suite 1200 Charlotte, NC 28202
N.C.B.E.L.S. License Number: F-0116

PHILLIP E. ROGERS, PE
PROJECT ENGINEER

MATTHEW J. WERDER, PE
PROJECT DESIGN ENGINEER

NATHAN R. TANNER, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

PLOT DRIVER: Hydro_color_pdf_levels_on.pltcfg
USER: GJACOBSON
FILE: NCDOT\NCDOT-US_74A_Gerton_CMGC\6.0_CAD_BIM\6.2_WIP\Hydraulics\PERMITS_Environmental\Drawings\Work Package #3\Gerton_CMGC_RDY_TSH.dgn
PENTABLE: NCDOT_TSH.tbl
DATE: 3/4/2026
TIME: 21:34:1 PM

6/2/99

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

LEGEND

- SURFACE WATER IMPACTS
- TEMPORARY SURFACE WATER IMPACTS

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039 (WP3)	07
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

50 25 0 50 100
GRAPHIC SCALE

NAD 83 NA 2011

MATCHLINE -L- STA 69+00 SEE SHEET 8

(SEE WORK PACKAGE #2) MATCHLINE -L- STA 55+00 SEE SHEET 6

BEGIN WORK PACKAGE #3
END WORK PACKAGE #2
-L- STA. 67+02.6234

SITE 1

CONSERVING CAROLINA
Deed Book/Page 000028/00552

FREEMAN, BALES FILMORE HEIRS
Deed Book/Page 01923E/00032

GROSS, RALPH C;GROSS, JACQUELINE S
Deed Book/Page 000948/00604

JOHN NETTLES, ETAL.
Deed Book/Page 0001233/000796

MORALES, JUAN MANUEL GAUSIN
Deed Book/Page 004265/00565

POSTLETHWAITE, JOANNA
Deed Book/Page 003105/00039

MARY LEE RHODES
Deed Book/Page 000452/00001

DERTON VOL. FIRE DEPT.
Deed Book/Page 000602/000857

CUPPS, GERALD LEE JR; CUPPS, ZINAIDA
Deed Book/Page 003892/00600

OCONNOR, A SCOTT;OCONNOR, JEANNE D
Deed Book/Page 001414/00001

NC DEPT OF TRANSPORTATION
Deed Book/Page 001414/00001
EASEMENT

RATTEREE, LORA & MAJORS, ROSA
Deed Book/Page 000492/00439

FREEMAN, SHERRIM
Deed Book/Page 000669/00073

FREEMAN, SHERRIM
Deed Book/Page 000561/00255

SINCLAIR, BARBARA R
Deed Book/Page 001209/00423

PROTO LIVING INC
Deed Book/Page 004179/00191

MURRAY, MICHAEL;MURRAY, PHYLLIS
Deed Book/Page 001072/00307

DAGGETT, ADAM A
Deed Book/Page 004212/00439

BIDDIX, RONALD W.
BIDDIX, MICHELLE LOUISE
Deed Book/Page 003720/00162

BEARWALLOW LLC;PITTILLO, PARKER WAYNE
Deed Book/Page 004043/00088

ERSKINE, LORRIK
Deed Book/Page 001163/00275

RICHARD AMATRIAIN
DB 3642 PG 413
PB 2024 PG 15659

BRYAN MATTIE
Deed Book/Page 000822/00044

BM-4
ELEV.=2705.59'
RR SPIKE IN 24" PINE

BM-5
ELEV.=2676.55'
RR SPIKE IN 18" OAK
INV=2666.98'

BANK STABILIZATION CLASS 'III' RIP RAP EST. 200 TONS SEE DETAIL 7-4

RETAIN EXIST. BRIDGE

BANK STABILIZATION CLASS 'III' RIP RAP EST. 100 TONS SEE DETAIL 7-4

BANK STABILIZATION CLASS 'III' RIP RAP EST. 175 TONS SEE DETAIL 7-4

CONTRACTOR TO AVOID 'PERCHING' OF EXIST. CULVERT OUTLET WITH CONSTRUCTION OF STREAM BANK STABILIZATION

HICKORY CREEK

REPLACEMENT FOR PIPE=20.4

INV=2695.09'

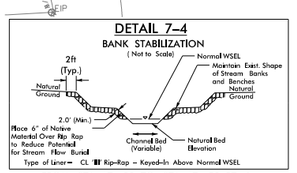
INV=2675.02' 54" CMP PIPE=21

INV=2674.70'

24" CMP PIPE=21.1

54" CMP PIPE=22

DETAIL 7-4
BANK STABILIZATION
(Not to Scale)



FROM STA. 67+00 TO STA. 67+50 RT -L-
STA. 67+15 TO STA. 67+80 LT -L-
STA. 67+50 TO STA. 67+85 RT -L-

PERMIT DRAWING
SHEET 2 OF 24

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng.100.plt
USER: GJACOBSON
FILE: \

PENTABLE: NCDOT_permits_NOCON_WP3.tbl
DATE: 6/18/2026
TIME: 3:42:06 PM

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

LEGEND

- SURFACE WATER IMPACTS
- TEMPORARY SURFACE WATER IMPACTS

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039 (WP3)	07
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

50 25 0 50 100
GRAPHIC SCALE

NAD 83 NA 2011

(SEE WORK PACKAGE #2) SEE SHEET 6
MATCHLINE -L- STA 55+00

MATCHLINE -L- STA 69+00 SEE SHEET 8

BEGIN WORK PACKAGE #3
END WORK PACKAGE #2
-L- STA. 67+02.6234

SITE 1

CONSERVING CAROLINA
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Deed Book/Page 000948/00604

JOHN NETTLES, ETAL.
Deed Book/Page 0001233/000796

MORALES, JUAN MANUEL GAUSIN
Deed Book/Page 004265/00565

POSTLETHWAITE, JOANNA
Deed Book/Page 003105/00039

CUPPS, GERALD LEE JR.; CUPPS, ZINAIDA
Deed Book/Page 003892/00600

OCONNOR, A SCOTT;OCONNOR, JEANNE D
Deed Book/Page

MARY LEE RHODES
Deed Book/Page 000452/00002

DERTON VOL. FIRE DEPT.
Deed Book/Page 000602/000857

BM-4
ELEV.=2705.59'
RR SPIKE IN 24" PINE WOODS

BM-5
ELEV.=2676.55'
RR SPIKE IN 18" OAK

RATTEREEL LORA & MAJORS, ROSA
Deed Book/Page 000492/00439

FREEMAN, SHERRIM
Deed Book/Page 000669/00073

DAGGETT, ADAM A
Deed Book/Page 004212/00439

BIDDIX, RONALD W JR
BIDDIX, MICHELLE LOUISE
Deed Book/Page 003720/00162

FREEMAN, SHERRIM
Deed Book/Page 000561/00255

SINCLAIR, BARBARA R
Deed Book/Page 001209/00423

PROTO LIVING INC
Deed Book/Page 004179/00191

MURRAY, MICHAEL;MURRAY, PHYLLIS
Deed Book/Page 001072/00307

BEARWALLOW LLC;PITTILLO, PARKER WAYNE
Deed Book/Page 004043/00088

ERSKINE, LORRIK
Deed Book/Page 001163/00275

RICHARD AMATRIAIN
DB 3642 PG 413
PB 2024 PG 15659

BRYAN MATTIE
Deed Book/Page 000822/00044

BANK STABILIZATION CLASS 'III' RIP RAP EST. 200 TONS SEE DETAIL 7-4

RETAIN EXIST. BRIDGE

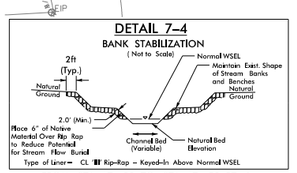
BANK STABILIZATION CLASS 'III' RIP RAP EST. 100 TONS SEE DETAIL 7-4

BANK STABILIZATION CLASS 'III' RIP RAP EST. 175 TONS SEE DETAIL 7-4

CONTRACTOR TO AVOID 'PERCHING' OF EXIST. CULVERT OUTLET WITH CONSTRUCTION OF STREAM BANK STABILIZATION

HICKORY CREEK

DETAIL 7-4
BANK STABILIZATION
(Not to Scale)



FROM STA. 67+00 TO STA. 67+50 RT -L-
STA. 67+15 TO STA. 67+80 LT -L-
STA. 67+50 TO STA. 67+85 RT -L-

PERMIT DRAWING
SHEET 3 OF 24

PLOT DRIVER: NCDOT_pdf_color_eng.100.plt
USER: GJACOBSON
FILE: \

PENTABLE: NCDOT_permits_CON_WP#3.tbl
DATE: 6/18/2026
TIME: 3:42:14 PM

REVISIONS

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	08
RW SHEET NO.	RW-08

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

50 25 0 50 100
GRAPHIC SCALE

LEGEND

S S	SURFACE WATER IMPACTS
TS TS	TEMPORARY SURFACE WATER IMPACTS
HC HC	HAND CLEARING (NON-GRUBBING)
E E	WETLAND EXCAVATION

NAD 83 - NA 2011

MATCH LINE -L- STA 69+00 SEE SHEET 7

MATCH LINE -L- STA 82+00 SEE SHEET 9

SITE 2 — TS — CLASS 'B' RIP RAP EST. 10 TONS 30 SY GEO-TEXTILE GRADE TO DRAIN — REMOVE 16LF OF 18" CSP

SITE 3 — E — CONTRACTOR TO AVOID 'PERCHING' OF EXIST. CULVERT OUTLET WITH CONSTRUCTION OF STREAM BANK STABILIZATION — CLASS 'B' RIP RAP EST. 3 TONS 10 SY GEO-TEXTILE — RETAIN 18" RCP-IV — REMOVE 440263 BY3-3

SITE 4 — TS — PROPOSED STREAM RELOCATION (SEE WORK PACKAGE #3 STREAM RELOCATIONS PLANS)

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

BANK STABILIZATION SEE DETAIL 8-1 CLASS 'III' RIP RAP EST. 100 TONS

EXIST. 12" CSP BRTO TO BE CLEANED OUT AND RETAINED

EXIST. 18" CSP 25LF TO BE CLEANED OUT AND RETAINED

EXIST. 15" CSP TO BE CLEANED OUT AND RETAINED

EXIST. 18" RCP TO BE CLEANED OUT AND RETAINED

FUTURE NCDOT BRIDGE PROJECT DF18314.2045326 ANTICIPATED STREAM IMPACTS ACCORDING TO PLANS DATED 09/10/2025

FILL IN EXISTING STREAMBED WITH NATIVE MATERIAL (SEE STREAM RELOCATION PLANS, TYP.)

HICKORY CREEK

BEAR WILLOW PROPERTY MANAGEMENT, LLC. Deed Book/Page 001537/000130

BEARWALLOW BAPTIST CHURCH INC. A NON PROFIT COMPANY Deed Book/Page 001302/000142

BEARWALLOW BAPTIST CHURCH Deed Book/Page 00756/000404

FRIDDELL, TENA;HOPKINS, RONALD LAWRENCE Deed Book/Page 003327/000357

JOHN NETTLES, ETAL. Deed Book/Page 000233/000796

ARTHUR LEE RHODES, ETAL. Deed Book/Page 001980E/00054

RONALD HOPKINS Deed Book/Page 003961/000287

THOMAS STEPP Deed Book/Page 001391/000594

HARRY QUIETT Deed Book/Page 001637/000641

DALLAS COLLINS DB 3135 PG 553 Deed Book/Page 003135/000553

PETER REESE Deed Book/Page 001644/000313

GERTON VOLUNTEER FIRE DEPARTMENT AND RESCUE INC. Deed Book/Page 001110/00041I

MARY LEE RHODES Deed Book/Page 000323/00041I

ARDEN PROPERTY MANAGEMENT, LLC. Deed Book/Page 001479/00009

GEORGE OWENSBY, ETAL. Deed Book/Page 002010E/000386

EILEEN FERRELL Deed Book/Page 001688/000432

MARGARET WHITT Deed Book/Page 001374/000276

JAMES EARNHARDT Deed Book/Page 001019/000663

440263 BY3-1 — 440263 BY3-2 — 44263-BM-2 ELEV.=2646.30' RR SPIKE IN 18" DBL POPLAR — 44263-BM-3 ELEV.=2630.73' RR SPIKE IN 24" POPLAR — 440262 BY-5 — 440263 BY3-4

US 74 (GERTON HWY) 22' BST

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

PERMIT DRAWING SHEET 4 OF 24

DETAIL 8-1
BANK STABILIZATION
(Not to Scale)

COIR FIBER MATTING (92 SY) — 2ft (Typ.) — Natural Ground — Normal WSEL — Maintain Exist. Shape of Stream Banks and Benches Natural Ground — 2.0' (Min.) — Place 6" of Native Material Over Rip Rap to Reduce Potential for Stream Flow Bursal — B — Channel Bed (Variable) — Natural Bed Elevation — B = 8' Min.

Type of Liner = CL III Rip-Rap - Keyed-In Above Normal WSEL
1.5:1 Max Side Slopes

FROM STA. 78+10 TO STA. 78+77 LT -L-

REVISIONS

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FILE: \
PENTABLE: NCDOT_permits_NOCON_WP#3.tbl
DATE: 6/18/2026
TIME: 4:01:30 PM
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	08
RW SHEET NO.	RW–08

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

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LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

50 25 0 50 100
GRAPHIC SCALE

LEGEND

- SURFACE WATER IMPACTS (S, S)
- TEMPORARY SURFACE WATER IMPACTS (TS, TS)
- HAND CLEARING (NON-GRUBBING) (HC, HC)
- WETLAND EXCAVATION (E, E)

NAD 83 / NA 2011

MATCH LINE –L– STA 69+00 SEE SHEET 7

MATCH LINE –L– STA 82+00 SEE SHEET 9

HICKORY CREEK

SITE 2 — TS — CLASS 'B' RIP RAP EST. 10 TONS 30 SY GEO-TEXTILE GRADE TO DRAIN — REMOVE 16LF OF 18" CSP

SITE 3 — 44263-BY-3 ELEV.=2630.73' RR SPIKE IN 24" POPLAR — E — CLASS 'B' RIP RAP EST. 3 TONS 10 SY GEO-TEXTILE — REMOVE 44263 BY-3 — 18" RCP-IV

SITE 4 — TS — PROPOSED STREAM RELOCATION (SEE WORK PACKAGE #3 STREAM RELOCATIONS PLANS)

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

BANK STABILIZATION SEE DETAIL 8-1 CLASS 'III' RIP RAP EST. 100 TONS

CONTRACTOR TO AVOID PERCHING OF EXIST. CULVERT OUTLET WITH CONSTRUCTION OF STREAM BANK STABILIZATION

RETAIN

EXIST. 12" CSP, BRTO TO BE CLEANED OUT AND RETAINED

EXIST. 18" CSP 25LF TO BE CLEANED OUT AND RETAINED

EXIST. 15" CSP TO BE CLEANED OUT AND RETAINED

EXIST. 18" RCP TO BE CLEANED OUT AND RETAINED

CLASS 'B' RIP RAP EST. 3 TONS 10 SY GEO-TEXTILE

FUTURE NCDOT BRIDGE PROJECT DF18314.2045326 ANTICIPATED STREAM IMPACTS ACCORDING TO PLANS DATED 09/10/2025

FILL IN EXISTING STREAMBED WITH NATIVE MATERIAL (SEE STREAM RELOCATION PLANS, TYP.)

JOHN NETTLES, ETAL. Deed Book/Page 000233/000796

BEARWALLOW BAPTIST CHURCH INC. A NON PROFIT COMPANY Deed Book/Page 001302/000142

FRIDDELL, TENA;HOPKINS, RONALD LAWRENCE Deed Book/Page 003327/000357

THOMAS STEPP Deed Book/Page 001391/000594

44263-BM-2 ELEV.=2646.30 RR SPIKE IN 18" DBL POPLAR

RONALD HOPKINS Deed Book/Page 003961/000287

BEARWALLOW BAPTIST CHURCH Deed Book/Page 001156/000404

ARTHUR LEE RHODES, ETAL. Deed Book/Page 001980E/00054

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Deed Book/Page 001206/00032B

HARRY QUIETT Deed Book/Page 001637/000641

DALLAS COLLINS DB 3135 PG 553 Deed Book/Page 003135/000553

PETER REESE Deed Book/Page 001644/000313

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EILEEN FERRELL Deed Book/Page 001688/000432

MARGARET WHITT Deed Book/Page 001747/002210

GEORGE OWENSBY, ETAL. Deed Book/Page 00210E/000386

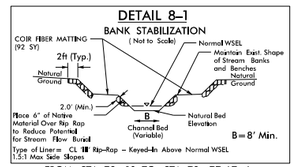
JAMES EARNHARDT Deed Book/Page 00109/000663

MARY LEE RHODES Deed Book/Page 000323/00041I

NOTES:
1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

PERMIT DRAWING SHEET 5 OF 24

DETAIL 8–1
BANK STABILIZATION
(Not to Scale)



FROM STA. 78+10 TO STA. 78+77 LT –L–

REVISIONS

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USER: GJACOBSON
FILE: \
DATE: 6/18/2026
TIME: 4:01:39 PM
PENTABLE: NCDOT_permits_CON_WP#3.tbl

6/2/99

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DATE: 6/18/2026
TIME: 3:49:37 PM
PENTABLE: NCDOT_permits_NOCON_WP*3.tbl

REVISIONS

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	09
RW SHEET NO.	RW-09

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

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555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

LEGEND

S S — SURFACE WATER IMPACTS
TS TS — TEMPORARY SURFACE WATER IMPACTS
HC HC — HAND CLEARING (NON-GRUBBING)

DETAIL 9-1
STANDARD 4' BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, B, Natural Ground

Place 6" of Native Material Over Rip Rap to Reduce Potential for Stream Flow Burial

Min. D = 3.0Ft.
d = 3.0 Ft.
B = 4.0 Ft.
S = 0.034 Ft/Ft

Type of Liner = Class 'II' Rip-Rap, Keyed-In

STA. 86+35 LT –L–; DDE = 110 CY

DETAIL 9-3
RIP RAP AT EMBANKMENT
(Not to Scale)

Pipe Outlet, 10' min., 2', Press Riprap into Channel Bottom Until Refusal

Type of Liner = CL 'III' Rip-Rap, Keyed-In

STA. 82+70 LT –L–

DETAIL 9-5
CHANNEL BANK STABILIZATION
(Not to Scale)

BENCH AT ELEV. 2608' (TYP.), Natural Bed Elevation, Natural Ground, CLASS II RIP RAP (TYP.), BENCH AT ELEV. 2609' (TYP.), Channel Bed (Variable)

Length = See plan
Type of Liner = CL II Rip-Rap – Keyed-In
B = 8 ft min.

STA. 85+29 TO 95+93 –L– LT

NAD 83 – NA 2011

SEE SHEET 9A

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

BANK STABILIZATION SEE DETAIL 9-5 CLASS 'II' RIP RAP EST. 70 TONS

FUTURE NCDOT BRIDGE PROJECT DF18314.2D45327 ANTICIPATED STREAM IMPACTS ACCORDING TO PLANS DATED 05/01/2025

PROPOSED STREAM RELOCATION (SEE WORK PACKAGE #3 STREAM RELOCATIONS PLANS)

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 30 TONS SEE DETAIL 9-3

REMOVE AND REPLACE PIPE WITH STD. 4' BASE DITCH EST. 90 TONS CLASS 'II' RIP RAP SEE DETAIL 9-1

EXIST. 18" CSP TO BE CLEANED OUT AND RETAINED

EXIST. 18" CSP TO BE CLEANED OUT AND RETAINED

GRADE TO DRAIN TO EXIST. PIPE

LINE EXISTING DITCH W/PSRM SEE DETAIL 9-2 EST. 77 SY

RETAIN & DO NOT DISTURB EXIST. BED MATERIAL IN CULVERT BARREL

LINE EXISTING DITCH W/PSRM SEE DETAIL 9-2 EST. 37 SY

EXIST. 18" CSP TO BE CLEANED OUT AND RETAINED

FILL IN EXISTING STREAMBED WITH NATIVE MATERIAL (SEE STREAM RELOCATION PLANS, TYP.)

SITE 3
SITE 6
SITE 5

MATCH LINE –L– STA 82+00 SEE SHEET 8

MATCH LINE –L– STA 95+00 SEE SHEET 10

FRIDDELL, TENA;HOPKINS, RONALD LAWRENCE
Deed Book/Page 003327/000357

HOPKINS, RONALD LAWRENCE; FRIDDELL, TENA R.
Deed Book/Page 003327/000365

BRETON, AUGUST; BRETON, NICHOLE LEIGH
Deed Book/Page 001519/00434

STEPP, THOMAS L; STEPP, SARAH C
Deed Book/Page 001391/000594

THOMAS STEPP
Deed Book/Page 00139/000594

ROOTED IN GERTON LLC
Deed Book/Page 004307/000597

44262 BM-2
ELEV.=2646.30'
RR SPIKE IN 18" PINE

LASURE, DANIEL W III;LASURE, LAUREN
Deed Book/Page 000433/000380

WAEVER, TAMMY D;CHRISTOPHER, WILLIAM E; ORTEN, MARK R.;ORTEN, JENNIFER L.
Deed Book/Page 004049/000484

UPPER HICKORY NUT GORGE COMMUNITY CENTER
Deed Book/Page 000402/000648

UPPER HICKORY NUT GORGE COMMUNITY CENTER
Deed Book/Page 000448/000141

LEMUEL OATES
Deed Book/Page 000683/000379

LEMUEL OATES
Deed Book/Page 000i362/000380

ISMTLBUS

SLAB ONLY BLDG. GONE

BST

PRIOR UTILITY RIGHTS

EXISTING R/W

US 74 (GERTON HWY.) 23' BST

44262 GPS-102

90+00

85+00

DAVID EARNHARDT, ETAL.
Deed Book/Page 003997/000357

MICHAEL EARNHARDT
Deed Book/Page 000860/000575

CHESTNUT HILLS HOMEOWNERS ASSOC.,INC.
Deed Book/Page 001015/000228

CHESTNUT HILLS HOMEOWNERS ASSOC.,INC.
Deed Book/Page 003699/000450

HICKORY NUT FOREST ASSOC.,INC.
Deed Book/Page 003619/00068

HICKORY NUT FOREST LLC.
Deed Book/Page 001290/00077

JAMES PEINE
Deed Book/Page 00313i/000629

KATHRYN YATES HOVERMALE REVOCABLE TRUST
Deed Book/Page 004489/000046

MAGIC MTN. LODGE, LLC.
Deed Book/Page 003003/000584

JULIA CONSIDINE
Deed Book/Page 003i69/000i53

CONSIDINE, JULIA MARIE;PIERCE, PATRICK SCOTT
Deed Book/Page 003i6i/000234

DETAIL 9-2
EXISTING DITCH STABILIZATION
(Not to Scale)

Natural Ground, D, Ex. Roadway Shoulder, Channel Bed (Variable)

Min D = 1 Ft.
Type of Liner = PSRM "Type 3"

FROM STA. 84+59 TO 86+30 –L– RT
FROM STA. 86+37 TO 87+18 –L– RT

DETAIL 9-4
FALSE SUMP
(Not to Scale)

Outside Ditch Traffic Flow, 10:1, 20:1, 2.0, 0.5' Min. 1.0' Max

S = Ditch Slope
℄ Proposed Ditch

FROM STA. 82+75 TO STA. 83+05 RT –L–

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

50 25 0 50 100
GRAPHIC SCALE

PERMIT DRAWING SHEET 6 OF 24

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	09
RW SHEET NO.	RW-09

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

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LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

LEGEND

S S — SURFACE WATER IMPACTS
TS TS — TEMPORARY SURFACE WATER IMPACTS
HC HC — HAND CLEARING (NON-GRUBBING)

DETAIL 9-1
STANDARD 4' BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, B, 2:1, Natural Ground

Place 6" of Native Material Over Rip Rap to Reduce Potential for Stream Flow Burial

Min. D = 3.0Ft.
d = 3.0 Ft.
B = 4.0 Ft.
S = 0.034 Ft/Ft

Type of Liner = Class 'II' Rip-Rap, Keyed-In

STA. 86+35 LT –L– DDE = 110 CY

DETAIL 9-3
RIP RAP AT EMBANKMENT
(Not to Scale)

Pipe Outlet, 10' min., 2', Press Riprap into Channel Bottom Until Refusal

Type of Liner = CL 'III' Rip-Rap, Keyed-In

STA. 82+70 LT –L–

DETAIL 9-5
CHANNEL BANK STABILIZATION
(Not to Scale)

BENCH AT ELEV. 2608' (TYP.), Natural Ground, Natural Bed Elevation, CLASS II RIP RAP (TYP.), 1.5', 1.5', BENCH AT ELEV. 2609' (TYP.), Channel Bed (Variable)

Length = See plan
Type of Liner = CL II Rip-Rap – Keyed-In
B = 8 ft min.

STA. 85+29 TO 95+93 –L– LT

NAD 83 – NA 2011

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

SEE SHEET 9A

BANK STABILIZATION SEE DETAIL 9-5 CLASS 'II' RIP RAP EST. 70 TONS

FUTURE NCDOT BRIDGE PROJECT DF18314.2045327 ANTICIPATED STREAM IMPACTS ACCORDING TO PLANS DATED 05/01/2025

SITE 6

REMOVE AND REPLACE PIPE WITH STD. 4' BASE DITCH EST. 90 TONS CLASS 'II' RIP RAP SEE DETAIL 9-1

PROPOSED STREAM RELOCATION (SEE WORK PACKAGE #3 STREAM RELOCATIONS PLANS)

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 30 TONS SEE DETAIL 9-3

SITE 3

RETAIN

REMOVE 18" RCP-IV

LINE EXISTING DITCH WPSRM SEE DETAIL 9-2 EST. 77 SY

RETAIN & DO NOT DISTURB EXIST. BED MATERIAL IN CULVERT BARREL

LINE EXISTING DITCH WPSRM SEE DETAIL 9-2 EST. 37 SY

EXIST. 18" CSP TO BE CLEANED OUT AND RETAINED

SITE 5

GRADE TO DRAIN TO EXIST. PIPE

EXIST. 18" CSP TO BE CLEANED OUT AND RETAINED

EXIST. 18" CSP TO BE CLEANED OUT AND RETAINED

FILL IN EXISTING STREAMBED WITH NATIVE MATERIAL (SEE STREAM RELOCATION PLANS, TYP.)

MATCH LINE –L– STA 82+00 SEE SHEET 8

MATCH LINE –L– STA 95+00 SEE SHEET 10

FRIDDELL, TENA;HOPKINS, RONALD LAWRENCE
Deed Book/Page 003327/000357

HOPKINS, RONALD LAWRENCE; FRIDDELL, TENA R.
Deed Book/Page 003327/000365

BRETON, AUGUST; BRETON, NICHOLE LEIGH
Deed Book/Page 001519/00434

STEPP, THOMAS L; STEPP, SARAH C
Deed Book/Page 001391/000594

THOMAS STEPP
Deed Book/Page 001391/000594

LASURE, DANIEL W III;LASURE, LAUREN
Deed Book/Page 000413/000380

WAEVER, TAMMY D;CHRISTOPHER, WILLIAM E; ORTEN, MARK R.;ORTEN, JENNIFER L.
Deed Book/Page 004049/000484

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ROOTED IN GERTON LLC
Deed Book/Page 004307/000597

LEMUEL OATES
Deed Book/Page 000683/000379

LEMUEL OATES
Deed Book/Page 000362/000380

SLAB ONLY BLDG. GONE

ISMTLBUS

BST

44262 BM-2 ELEV.=2646.30 RR SPIKE IN 18" PINE

44262 GPS-102

90+00

85+00

US 74 (GERTON HWY) 23' BST

HICKORY CREEK

PRIOR UTILITY RIGHTS

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JULIA CONSIDINE
Deed Book/Page 003169/000153

CONSIDINE, JULIA MARIE;PIERCE, PATRICK SCOTT
Deed Book/Page 003161/000234

DETAIL 9-2
EXISTING DITCH STABILIZATION
(Not to Scale)

Natural Ground, D, Ex. Roadway Shoulder, Channel Bed (Variable)

Min D = 1 Ft.

Type of Liner = PSRM "Type 3"

FROM STA. 84+59 TO 86+30 –L– RT
FROM STA. 86+37 TO 87+18 –L– RT

DETAIL 9-4
FALSE SUMP
(Not to Scale)

0.5' Min. 1.0' Max, Outside Ditch Traffic Flow, 10:1, 20:1, 2.0, S, S=Ditch Slope, ℄ Proposed Ditch

FROM STA. 82+75 TO STA. 83+05 RT –L–

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

50 25 0 50 100
GRAPHIC SCALE

PERMIT DRAWING SHEET 7 OF 24

REVISIONS

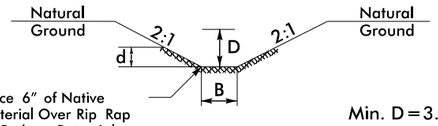
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6/2/99

6/2/99

REVISIONS

DETAIL 9–1
STANDARD 4' BASE DITCH
(Not to Scale)

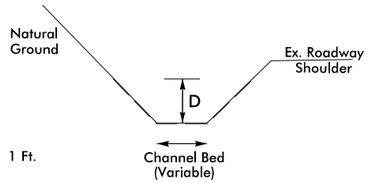


Place 6" of Native Material Over Rip Rap to Reduce Potential for Stream Flow Burial

Min. D = 3.0Ft.
d = 3.0 Ft.
B = 4.0 Ft.
Type of Liner = Class 'II' Rip–Rap, Keyed–In S = 0.034 Ft/Ft

STA. 86 + 35 LT –L–; DDE = 110 CY

DETAIL 9–2
EXISTING DITCH STABILIZATION
(Not to Scale)

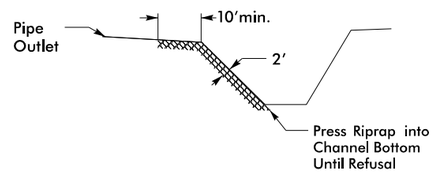


Min D = 1 Ft.

Type of Liner = PSRM "Type 3"

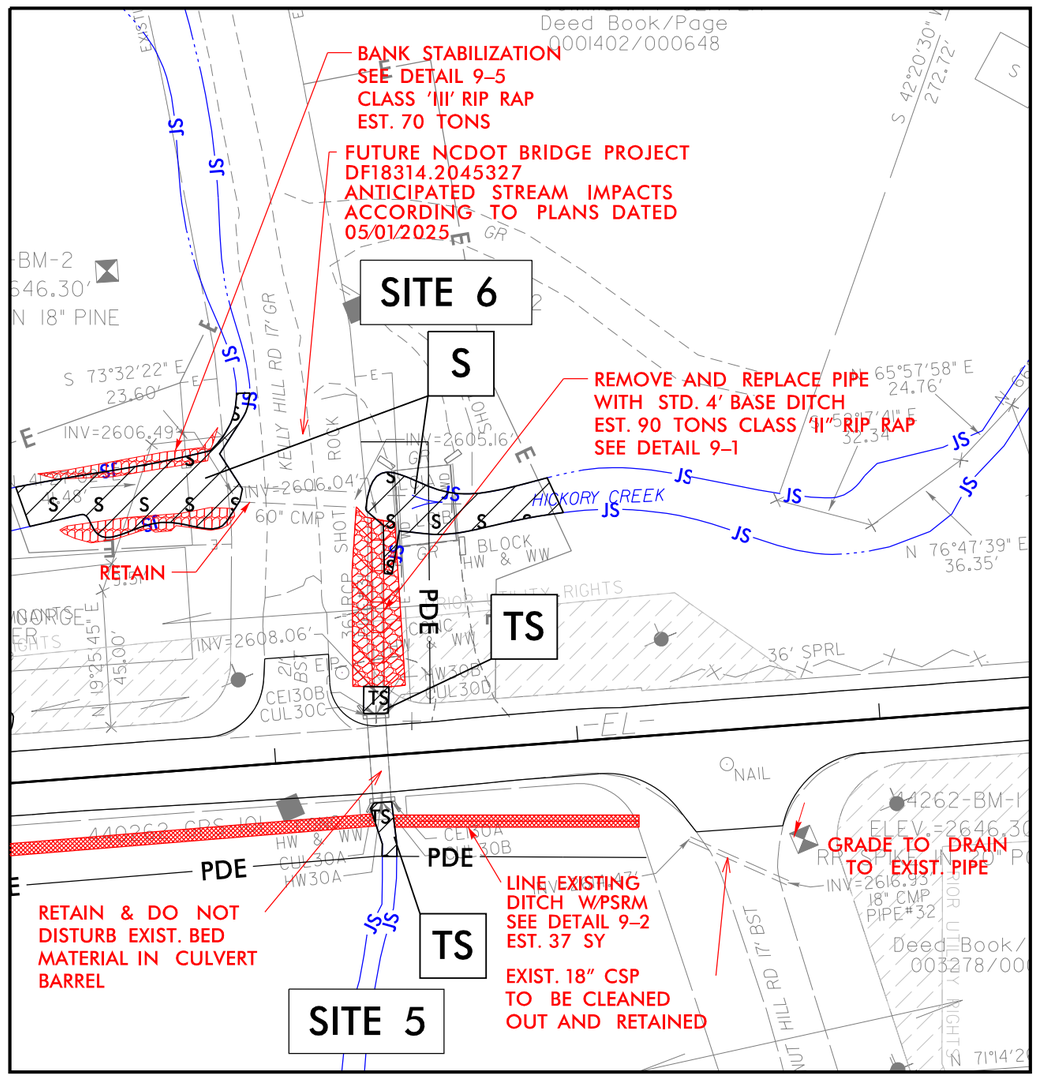
FROM STA. 84 + 59 TO 86 + 30 –L– RT
FROM STA. 86 + 37 TO 87 + 18 –L– RT

DETAIL 9–3
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL 'III' Rip–Rap, Keyed–In

STA. 82 + 70 LT –L–



NAD 83 + NA 2011

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039 (WP3)	09A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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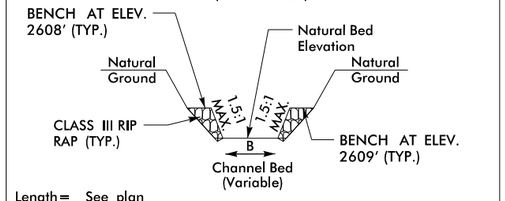
25 12.5 0 25 50
GRAPHIC SCALE

LEGEND

S S SURFACE WATER IMPACTS

TS TS TEMPORARY SURFACE WATER IMPACTS

DETAIL 9–5
CHANNEL BANK STABILIZATION
(Not to Scale)



Length = See plan
Type of Liner = CL III Rip–Rap – Keyed–In B = 8 ft min.

STA. 85 + 29 TO 95 + 93 –L– LT

PERMIT DRAWING
SHEET 8 OF 24

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PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	10
RW SHEET NO.	RW–10

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

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N.C.B.E.L.S. License Number: F-0116

LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

50 25 0 50 100
GRAPHIC SCALE

LEGEND

SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS

NAD 83 – NA 2011

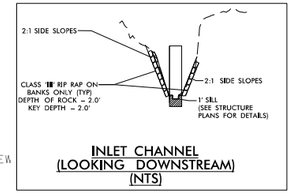
MATCH LINE –L– STA 95+00 SEE SHEET 9

MATCH LINE –L– STA 110+00 SEE SHEET 11

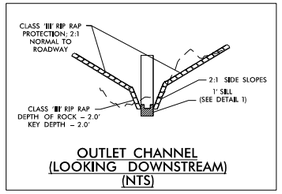
SITE 7
SITE 8
SITE 9
SITE 10
SITE 11
SITE 12
SITE 13

BANK STABILIZATION SEE DETAIL 10–1 CLASS 'III' RIP RAP EST. 310 TONS
REPAIR HEADWALL
RETAIN AND DO NOT DISTURB EXIST. BED MATERIAL IN BOTH CULVERT BARRELS
SPECIAL 'V' DITCH SEE DETAIL 10–2
BANK STABILIZATION CLASS 'III' RIP RAP EST 40 TONS LENGTH = 1/2F SEE DETAIL 10–1
REMOVE EXIST. 7'X8' RCBC REMOVE ENDWALLS
SPECIAL 'V' DITCH SEE DETAIL 10–2
FILL IN EXISTING STREAMBED WITH NATIVE MATERIAL (SEE STREAM RELOCATION PLANS, TYP.)
EXIST. 18" CSP TO BE CLEANED OUT AND RETAINED
BANK STABILIZATION SEE DETAIL 10–1 CLASS 'III' RIP RAP EST. 125 TONS
BANK STABILIZATION SEE DETAIL 10–1 CLASS 'III' RIP RAP EST. 125 TONS
BANK STABILIZATION SEE DETAIL 10–1 CLASS 'III' RIP RAP EST. 150 TONS
REMOVE SYSTEM
CONTRACTOR TO AVOID 'PERCHING' OF EXIST. CULVERT OUTLET WITH CONSTRUCTION OF STREAM BANK STABILIZATION
PROPOSED 8'X8' RCBC BURIED 1'
CONTRACTOR TO AVOID 'PERCHING' OF PROP. CULVERT OUTLET
CLASS 'II' RIP RAP EST. 5 TONS 14 SY GEO–TEXTILE
STD. BASE DITCH W/CLASS 'III' RIP RAP EST 50 TONS S= 0.107 FT/FT SEE DETAIL 10–3
CLASS 'II' RIP RAP EST. 3 TONS 10 SY GEO–TEXTILE
CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.
CONTRACTOR TO PLANT LIVE STAKES & RIPARIAN SEEDING ALONG SLOPE WHERE VEGETATION REMOVED TO INSTALL RETAINING WALL & ROCK SLOPE EMBANKMENT FROM STA. 106+50 TO STA. 109+50 RT

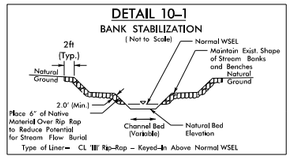
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WILLIAM MITCHELL Deed Book/Page 001135/00044
THOMAS MILROY Deed Book/Page 003828/000005
L&S OATES FAMILY LIMITED PARTNERSHIP Deed Book/Page 001248/000654
HICKORY NUT FOREST LLC Deed Book/Page 001290/00077 002017/10762
HICKORY NUT FOREST LLC. Deed Book/Page 001290/00077 002017/10762
HAROLD LYDA, HEIRS Deed Book/Page 00018E/000614
MICHAEL LUCHTON Deed Book/Page 001484/000541
HICKORY NUT FOREST ASSOC.,INC. Deed Book/Page 00369/000065
LAWSON, JANE ELIZABETH Deed Book/Page 003269/00042
WACKERHAGEN, MATTHEW



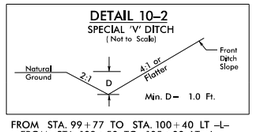
INLET CHANNEL (LOOKING DOWNSTREAM) (NTS)



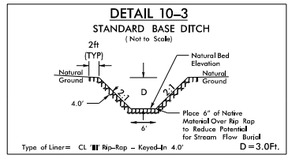
OUTLET CHANNEL (LOOKING DOWNSTREAM) (NTS)



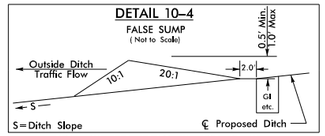
FROM STA. 96+30 TO STA. 97+05 LT –L–
STA. 96+60 TO STA. 97+10 RT –L–
STA. 97+30 TO STA. 97+55 RT –L–
STA. 101+70 TO STA. 102+05 RT –L–



FROM STA. 99+77 TO STA. 100+40 LT –L–
FROM STA. 103+50 TO STA. 105+00 LT –L–
FROM STA. 105+25 TO STA. 106+00 LT –L–



FROM STA. 102+05 TO STA. 102+25 –L– RT; DDE = 75 CY



FROM STA. 105+05 TO STA. 105+35 LT –L–

NOTES:
1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

PERMIT DRAWING SHEET 9 OF 24

REVISIONS

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6/2/99

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	10
RW SHEET NO.	RW–10

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

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LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

50 25 0 50 100
GRAPHIC SCALE

LEGEND
SURFACE WATER IMPACTS (S)
TEMPORARY SURFACE WATER IMPACTS (TS)

NAD 83 – NA 2011

MATCH LINE –L– STA 95+00 SEE SHEET 9

MATCH LINE –L– STA 110+00 SEE SHEET 11

SITE 7
SITE 8
SITE 9
SITE 10
SITE 11
SITE 12
SITE 13

EXIST. 18" CSP TO BE CLEANED OUT AND RETAINED

BANK STABILIZATION SEE DETAIL 10–1 CLASS "III" RIP RAP EST. 125 TONS

BANK STABILIZATION SEE DETAIL 10–1 CLASS "III" RIP RAP EST. 150 TONS

CONTRACTOR TO AVOID 'PERCHING' OF EXIST. CULVERT OUTLET WITH CONSTRUCTION OF STREAM BANK STABILIZATION

BANK STABILIZATION SEE DETAIL 10–1 CLASS "III" RIP RAP EST. 310 TONS

REPAIR HEADWALL

RETAIN AND DO NOT DISTURB EXIST. BED MATERIAL IN BOTH CULVERT BARRELS

SPECIAL 'V' DITCH SEE DETAIL 10–2

BANK STABILIZATION CLASS "III" RIP RAP EST. 40 TONS LENGTH = 15LF SEE DETAIL 10–1

REMOVE SYSTEM

REMOVE EXIST. 7'X8' RCBC REMOVE ENDWALLS

GRADE TO DRAIN

18" RCP–IV

24" RCP–IV

PROPOSED 8'X8' RCBC BURIED 1'

CONTRACTOR TO AVOID 'PERCHING' OF PROP. CULVERT OUTLET

CLASS "II" RIP RAP EST. 5 TONS 14 SY GEO–TEXTILE

STD BASE DITCH W/CLASS "III" RIP RAP EST. 50 TONS S= 0.107 FT/FT SEE DETAIL 10–3

CLASS "II" RIP RAP EST. 3 TONS 10 SY GEO–TEXTILE

FILL IN EXISTING STREAMBED WITH NATIVE MATERIAL (SEE STREAM RELOCATION PLANS, TYP.)

REMOVE

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

CONTRACTOR TO PLANT LIVE STAKES & RIPARIAN SEEDING ALONG SLOPE WHERE VEGETATION REMOVED TO INSTALL RETAINING WALL & ROCK SLOPE EMBANKMENT FROM STA. 106+50 TO STA. 109+50 RT

PAUL WILSON Deed Book/Page 001333/000245

WILLIAM MITCHELL Deed Book/Page 00135/00004

THOMAS MILROY Deed Book/Page 003828/000005

L&S OATES FAMILY LIMITED PARTNERSHIP Deed Book/Page 002248/000654

HICKORY NUT FOREST LLC Deed Book/Page 001290/00077 002011/10762

HAROLD LYDA, HEIRS Deed Book/Page 00018E/000614

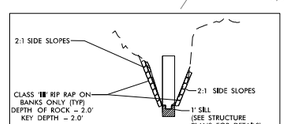
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HICKORY NUT FOREST ASSOC., INC. Deed Book/Page 00369/000065

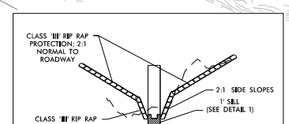
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WACKERHAGEN, MATTHEW

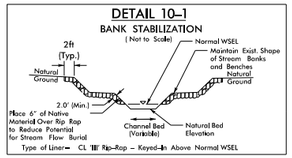
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OUTLET CHANNEL (LOOKING DOWNSTREAM) (NTS)

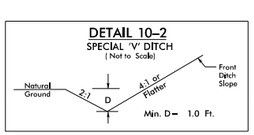


DETAIL 10–1
BANK STABILIZATION
(Not to Scale)



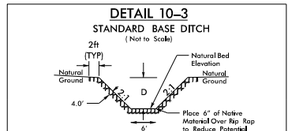
FROM STA. 96+30 TO STA. 97+05 LT –L–
STA. 96+60 TO STA. 97+10 RT –L–
STA. 97+30 TO STA. 97+55 RT –L–
STA. 101+70 TO STA. 102+05 RT –L–

DETAIL 10–2
SPECIAL 'V' DITCH
(Not to Scale)



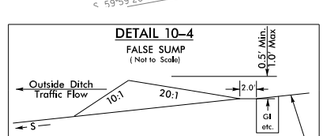
FROM STA. 99+77 TO STA. 100+40 LT –L–
FROM STA. 103+50 TO 105+00 LT –L–
FROM STA. 105+25 TO STA. 106+00 LT –L–

DETAIL 10–3
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 102+05 TO STA. 102+25 –L– RT; DDE = 75 CY

DETAIL 10–4
FALSE SUMP
(Not to Scale)



FROM STA. 105+05 TO STA. 105+35 LT –L–

NOTES:
1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

PERMIT DRAWING SHEET 10 OF 24

REVISIONS
6/2/99

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N.C.B.E.L.S. License Number: F-0116

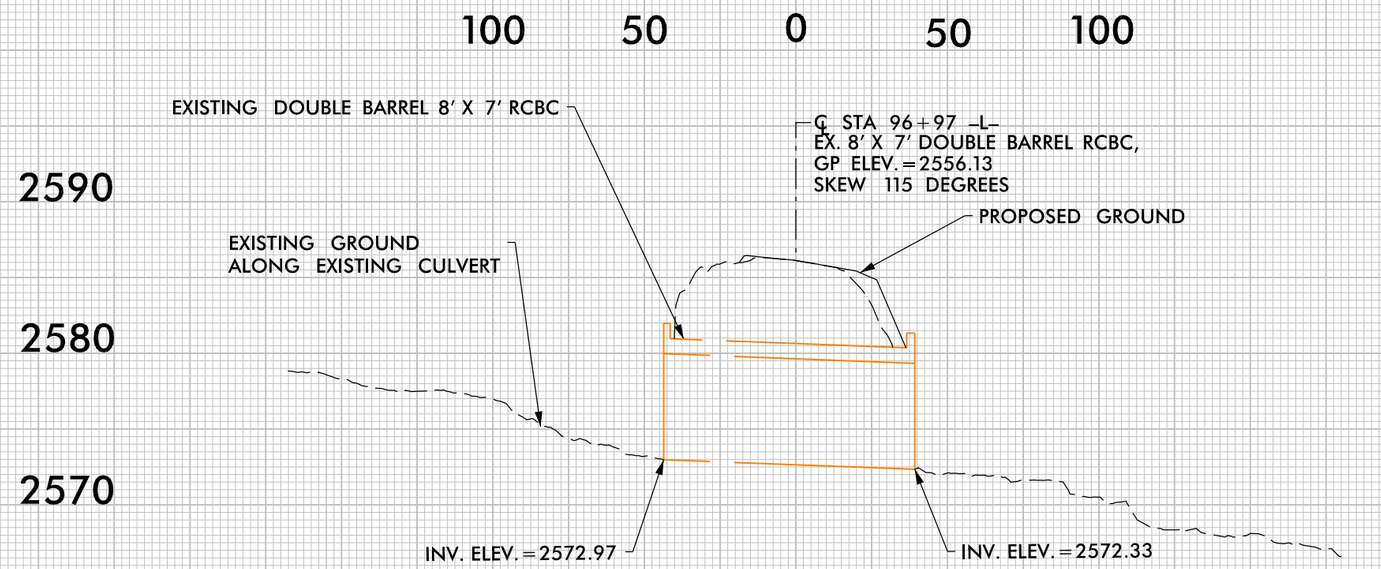
PROJECT REFERENCE NO.	SHEET NO.
18314.1045039 (WP3)	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SCALE:
1" = 25' HORIZONTAL
1" = 5' VERTICAL

SITE 9



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 11 OF 24

REVISIONS

5/14/99

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N.C.B.E.L.S. License Number: F-0116

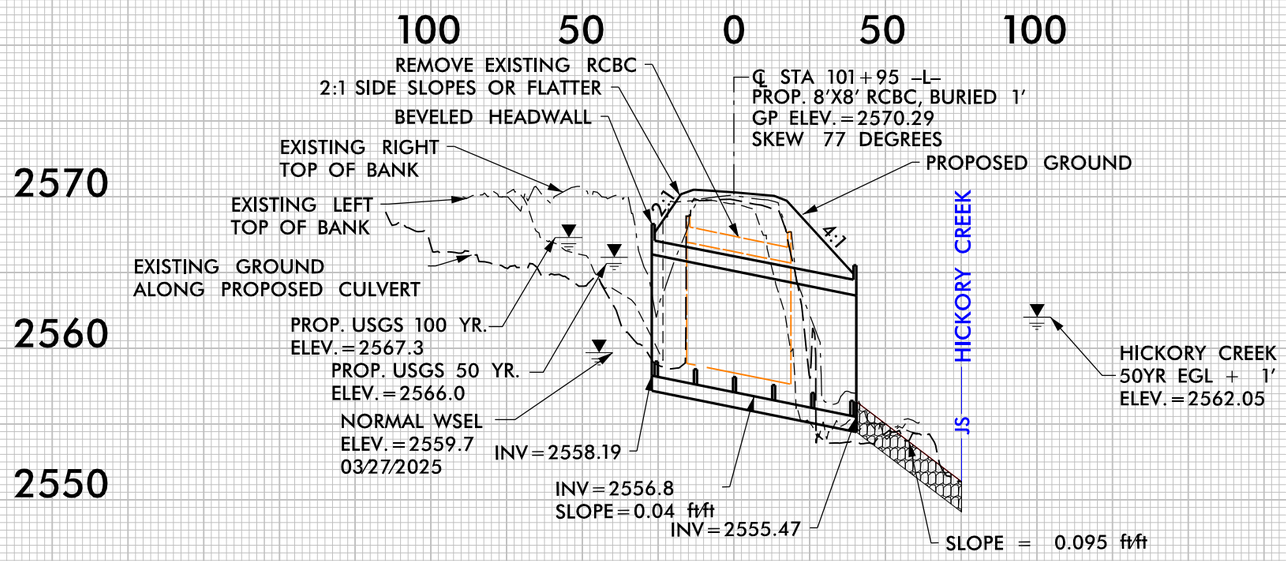
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18314.1045039 (WP3)	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 25' HORIZONTAL
1" = 5' VERTICAL

SITE 11



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 12 OF 24

5/14/99

REVISIONS

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6/2/99

REVISIONS

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LEGEND

- SURFACE WATER IMPACTS
- TEMPORARY SURFACE WATER IMPACTS
- WIRE MESH SLOPE STABILIZATION

GRAPHIC SCALE 50 25 0 50 100

NAD 83 – NA 2011

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	11
R/W SHEET NO.	RW–11

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. MERCER — PRELIMINARY PLANS NOT FOR CONSTRUCTION

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON — PRELIMINARY PLANS NOT FOR CONSTRUCTION

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

MATCH LINE –L– STA 110+00 SEE SHEET 10

MATCH LINE –L– STA 132+00 SEE SHEET 12

SEE SHEET 11A

SITE 14 — SITE 15 — SITE 16 — SITE 17

L&S OATES FAMILY LIMITED PARTNERSHIP
Deed Book/Page 001248/000654

LITTLE BEARWALLOW MOUNTAIN, LLC.
Deed Book/Page 001208/000598

SHEILA A. PADGETT
Deed Book/Page 004326/000636

HENDERSON COUNTY
Deed Book/Page 001530/000528

KATHRYN MAYEUX
Deed Book/Page 004136/000457

EXIST. 3.5'x2.5' RCBC TO BE RETAINED & CLEANED OUT OF DEBRIS RETAIN 8" MIN. OF EXIST. BED MATERIAL

BM-7 ELEV.=2537.35' RR SPIKE IN 24" OAK

BM-8 ELEV.=2537.35' RR SPIKE IN 18" DBL OAK

CLASS 'I' RIP RAP EST. 20 TONS SEE DETAIL 11–6

CLASS 'II' RIP RAP EST. 55 TONS SEE DETAIL 11–6

CONTRACTOR TO AVOID 'PERCHING' OF PROP. CULVERT OUTLET

SPECIAL 'V' DITCH SEE DETAIL 11–2

GRADE TO DRAIN

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

2' CLASS 'III' PARTIALLY GROUTED RIP RAP BASE DITCH, S=0.4429 FT/FT SEE DETAIL 11–4

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 15 TONS SEE DETAIL 11–7

CLASS 'B' RIP RAP EST. 4 TONS 10 SY GEO–TEXTILE SEE DETAIL 11–1

EXIST. 15" RCP TO BE CLEANED OUT AND RETAINED

CLASS 'I' RIP RAP EST. 10 TONS 20 SY GEO–TEXTILE SEE DETAIL 11–1

STD. 4' BASE DITCH CLASS 'II' RIP RAP EST. 20 TONS S=0.4791 FT/FT SEE DETAIL 11–3

STD. 3' BASE DITCH CLASS 'II' RIP RAP EST. 25 TONS S= 0.4980 FT/FT SEE DETAIL 11–3

APPROX. LOCATION OF 30" RCP CONTRACTOR TO UNCOVER AND ASSESS CONDITION DURING CONSTRUCTION

CLASS 'I' RIP RAP EST. 3 TONS 10 SY GEO–TEXTILE

STD. 4' BASE DITCH CLASS 'II' RIP RAP EST. 25 TONS S=0.1646 FT/FT SEE DETAIL 11–3

DETAIL 11–6
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)

Type of Liner= Rip–Rap – Keyed–In (See Plans for Rip–Rap Class)

STA. 120+20 RT –L–; 121+00 LT –L–

DETAIL 11–7
RIP RAP AT EMBANKMENT
(Not to Scale)

Type of Liner= CL 'II' Rip–Rap, Keyed–In

STA. 113+10 RT –L–

DETAIL 11–3
STANDARD BASE DITCH
(Not to Scale)

Min. D=2 Ft.
d= 2 Ft.
B= See Callouts
Type of Liner=Class "II" Rip–Rap, Keyed–In

STA. 128+30 LT –L–, DDE = 15 CY
STA. 128+80 LT –L–, DDE = 6 CY
STA. 128+80 RT –L–, DDE = 9 CY

DETAIL 11–1
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)

Type of Liner= Rip–Rap – Keyed–In (See Plans for Rip–Rap Class)

126+00 LT/RT –L–;

DETAIL 11–2
SPECIAL 'V' DITCH
(Not to Scale)

FROM STA. 116+50 TO STA. 118+75 LT –L–

DETAIL 11–4
PARTIALLY GROUTED RIP RAP BASE DITCH
(Not to Scale)

Type of Liner= Class 'III' Partially Grouted Rip Rap

STA. 113+10 RT –L–

DETAIL 11–5
FALSE SUMP
(Not to Scale)

FROM STA. 118+78 TO STA. 119+08 LT –L–
STA. 122+35 TO STA. 122+65 LT –L–

DETAIL 11–8
FALSE SUMP
(Not to Scale)

STA. 126+05 TO STA. 126+35 LT –L–

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

PERMIT DRAWING SHEET 13 OF 24

SEE SHEETS NO. 28 & 29 FOR –L– PROFILE

6/2/99

REVISIONS

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USER: GJACOBSON
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LEGEND

- SURFACE WATER IMPACTS
- TEMPORARY SURFACE WATER IMPACTS
- WIRE MESH SLOPE STABILIZATION

GRAPHIC SCALE 50 25 0 50 100

NAD 83 – NA 2011

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	11
R/W SHEET NO.	RW–11

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. MERCER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN L. MORRISON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LEGEND
SLOPE EMBANKMENT
PGR
STABILIZED FILL

MATCH LINE –L– STA 110+00 SEE SHEET 10

MATCH LINE –L– STA 132+00 SEE SHEET 12

SEE SHEET 11A

SITE 14
SITE 15
SITE 16
SITE 17

L&S OATES FAMILY LIMITED PARTNERSHIP Deed Book/Page 001248/000654

LITTLE BEARWALLOW MOUNTAIN, LLC. Deed Book/Page 001208/000598

HENDERSON COUNTY Deed Book/Page 000530/000528

SHEILA M. PADGETT Deed Book/Page 004326/000636

KATHRYN MAYEUX Deed Book/Page 004136/000457

EXIST. 3.5'x2.5' RCBC TO BE RETAINED & CLEANED OUT OF DEBRIS RETAIN 8" MIN. OF EXIST. BED MATERIAL

CLASS 'I' RIP RAP EST. 20 TONS SEE DETAIL 11–6

CLASS 'II' RIP RAP EST. 55 TONS SEE DETAIL 11–6

CONTRACTOR TO AVOID 'PERCHING' OF PROP. CULVERT OUTLET

SPECIAL 'V' DITCH SEE DETAIL 11–2

GRADE TO DRAIN

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

2' CLASS 'III' PARTIALLY GROUTED RIP RAP BASE DITCH, S=0.4429 FT/FT SEE DETAIL 11–4

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 15 TONS SEE DETAIL 11–7

EXIST. 15" RCP TO BE CLEANED OUT AND RETAINED

CLASS 'I' RIP RAP EST. 10 TONS 20 SY GEO–TEXTILE SEE DETAIL 11–1

CLASS 'B' RIP RAP EST. 4 TONS 10 SY GEO–TEXTILE SEE DETAIL 11–1

STD. 4' BASE DITCH CLASS 'II' RIP RAP EST. 20 TONS S=0.4791 FT/FT SEE DETAIL 11–3

STD. 3' BASE DITCH CLASS 'II' RIP RAP EST. 25 TONS S= 0.4980 FT/FT SEE DETAIL 11–3

APPROX. LOCATION OF REAR 30" RCP CONTRACTOR TO UNCOVER AND ASSESS CONDITION DURING CONSTRUCTION

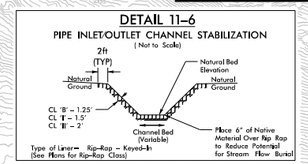
STD. 4' BASE DITCH CLASS 'II' RIP RAP EST. 25 TONS S=0.1646 FT/FT SEE DETAIL 11–3

CONTRACTOR TO AVOID 'PERCHING' OF PROP. CULVERT OUTLET

CLASS 'I' RIP RAP EST. 3 TONS 10 SY GEO–TEXTILE

REMOVE TB 2GI

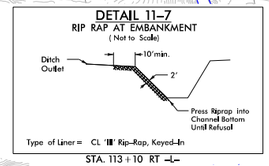
DETAIL 11–6
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)



Type of Liner= Rip–Rap – Keyed–In (See Plans for Rip–Rap Class)

STA. 120+20 RT –L–; 121+00 LT –L–

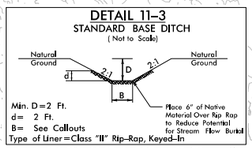
DETAIL 11–7
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= CL 'II' Rip–Rap, Keyed–In

STA. 113+10 RT –L–

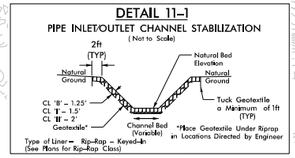
DETAIL 11–3
STANDARD BASE DITCH
(Not to Scale)



Min. D=2 Ft.
d= 2 Ft.
B= See Callouts
Type of Liner=Class "II" Rip–Rap, Keyed–In

STA. 128+30 LT –L–, DDE = 15 CY
STA. 128+80 LT –L–, DDE = 6 CY
STA. 128+80 RT –L–, DDE = 9 CY

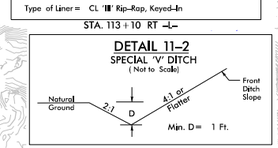
DETAIL 11–1
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)



Type of Liner= Rip–Rap – Keyed–In (See Plans for Rip–Rap Class)

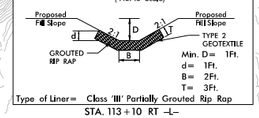
126+00 LT/RT –L–;

DETAIL 11–2
SPECIAL 'V' DITCH
(Not to Scale)



FROM STA. 116+50 TO STA. 118+75 LT –L–

DETAIL 11–4
PARTIALLY GROUTED RIP RAP BASE DITCH
(Not to Scale)

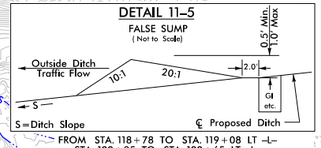


Min. D= 1Ft.
d= 1Ft.
B= 2Ft.
T= 3Ft.

Type of Liner= Class 'III' Partially Grouted Rip Rap

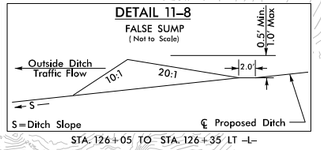
STA. 113+10 RT –L–

DETAIL 11–5
FALSE SUMP
(Not to Scale)



FROM STA. 118+78 TO STA. 119+08 LT –L–
STA. 122+35 TO STA. 122+65 LT –L–

DETAIL 11–8
FALSE SUMP
(Not to Scale)



STA. 126+05 TO STA. 126+35 LT –L–

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

PERMIT DRAWING SHEET 14 OF 24

SEE SHEETS NO. 28 & 29 FOR –L– PROFILE

6/2/99

LEGEND

S S — SURFACE WATER IMPACTS

TS TS — TEMPORARY SURFACE WATER IMPACTS

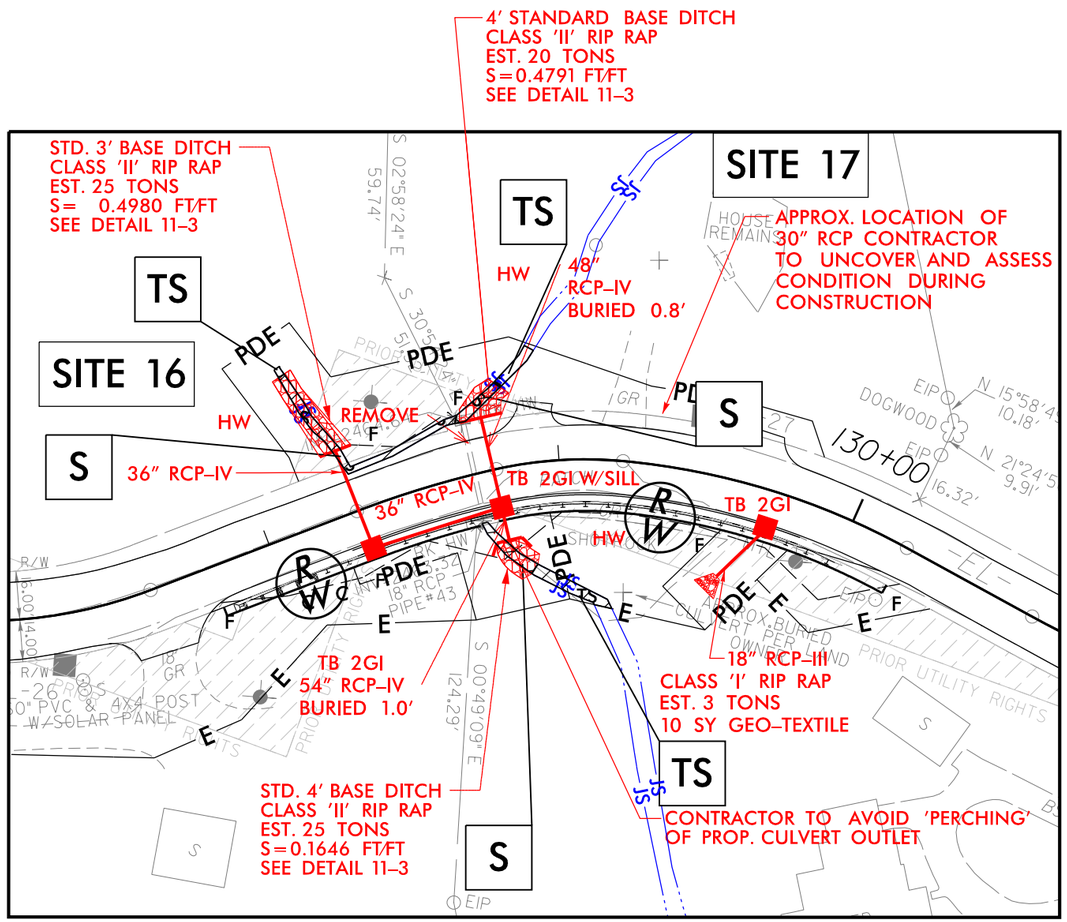
NAD 83 NA 2011

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039 (WP3)	11A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

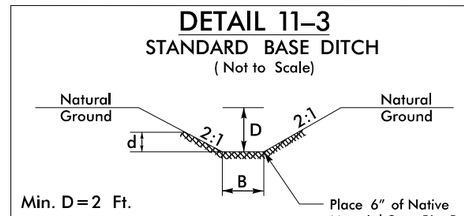
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N.C.B.E.L.S. License Number: F-0116

25 12.5 0 25 50
GRAPHIC SCALE



DETAIL 11–3
STANDARD BASE DITCH
(Not to Scale)



Min. D=2 Ft.
d= 2 Ft.
B= See Callouts
Type of Liner=Class "II" Rip–Rap, Keyed–In

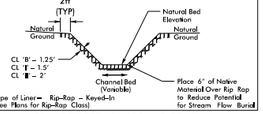
PERMIT DRAWING
SHEET 15 OF 24

REVISIONS

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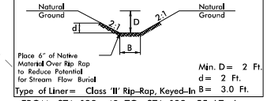
6/2/99

DETAIL 12–1
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)



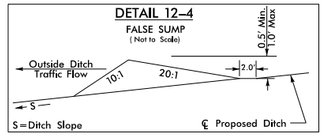
134+25 LT/RT –L–; 138+45 RT –L–

DETAIL 12–2
STANDARD BASE DITCH
(Not to Scale)



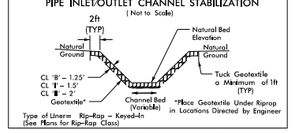
FROM STA. 138+40 TO STA. 138+55 LT –L–
DDE = 16 CY

DETAIL 12–4
FALSE SUMP
(Not to Scale)



FROM STA. 138+74 TO STA. 139+04 LT –L–
STA. 134+35 TO STA. 134+55 LT –L–
STA. 140+40 TO STA. 140+60 LT –L–

DETAIL 12–5
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)



STA. 132+65 RT –L–; 140+35 LT –L–; 144+65 LT/RT –L–

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

LEGEND

- SURFACE WATER IMPACTS
- TEMPORARY SURFACE WATER IMPACTS

NAD 83 / NA 2011

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	12
R/W SHEET NO.	RW–12

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. MERCIER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON

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555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

50 25 0 50 100
GRAPHIC SCALE

CONSERVING CAROLINA
Deed Book/Page 000028/000552

L & S OATES FAMILY
LIMITED PARTNERSHIP
Deed Book/Page 001248/000654

MATCH LINE –L– STA 132+00 SEE SHEET 11

CLASS 'I' RIP RAP
EST. 15 TONS
SEE DETAIL 12–1

EXIST. SYSTEM TO BE CLEANED OUT AND RETAINED

CLASS 'B' RIP RAP
EST. 2 TONS
5 SY. GEO–TEXTILE
SEE DETAIL 12–5

EXIST. 2'X4' RCBC TO BE RETAINED & CLEANED OUT OF DEBRIS. RETAIN 8" MIN. OF EXIST. BED MATERIAL

CLASS 'II' RIP RAP
EST. 15 TONS
SEE DETAIL 12–1

CONTRACTOR TO AVOID 'PERCHING' OF EXIST. CULVERT OUTLET WITH CONSTRUCTION OF OUTLET STABILIZATION

SITE 18

135+00

LITTLE BEARWALLOW MOUNTAIN, LLC.
Deed Book/Page 003098/000346

COLLIN STANFORD
Deed Book/Page 003442/000506

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

SEE SHEET 12A

STD. 3' BASE DITCH WITH CLASS 'I' RIP RAP
EST. 20 TONS
S=0.349 FT/FT
SEE DETAIL 12–2

CLASS 'I' RIP RAP
EST. 25 TONS
SEE DETAIL 12–1

CONTRACTOR TO AVOID 'PERCHING' OF PROP. CULVERT OUTLET WITH CONSTRUCTION OF OUTLET STABILIZATION

SITE 19

CLASS 'I' RIP RAP
EST. 35 TONS
55 SY. GEO–TEXTILE
SEE DETAIL 12–5

140+00

RONALD KLAHR
Deed Book/Page 001056/000405

CLASS 'B' RIP RAP
EST. 9 TONS
20 SY. GEO–TEXTILE
SEE DETAIL 12–5

EXIST. PIPE TO BE CLEANED OUT AND RETAINED

CLASS 'I' RIP RAP
EST. 12 TONS
25 SY. GEO–TEXTILE
SEE DETAIL 12–5

L&S OATES FAMILY LIMITED PARTNERSHIP
Deed Book/Page
001623/000074

MATCH LINE –L– STA 145+00 SEE SHEET 13

PERMIT DRAWING
SHEET 16 OF 24

REVISIONS

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6/2/99

DETAIL 12–1
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)

134+25 LT/RT –L–; 138+45 RT –L–

DETAIL 12–2
STANDARD BASE DITCH
(Not to Scale)

FROM STA. 138+40 TO STA. 138+55 LT –L–
DDE = 16 CY

DETAIL 12–4
FALSE SUMP
(Not to Scale)

FROM STA. 138+74 TO STA. 139+04 LT –L–
STA. 134+35 TO STA. 134+55 LT –L–
STA. 140+40 TO STA. 140+60 LT –L–

DETAIL 12–5
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)

STA. 132+65 RT –L–; 140+35 LT –L–; 144+65 LT/RT –L–

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

LEGEND

- S / S — SURFACE WATER IMPACTS
- TS / TS — TEMPORARY SURFACE WATER IMPACTS

NAD 83 / NA 2011

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	12
R/W SHEET NO.	RW–12

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. MERCIER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON

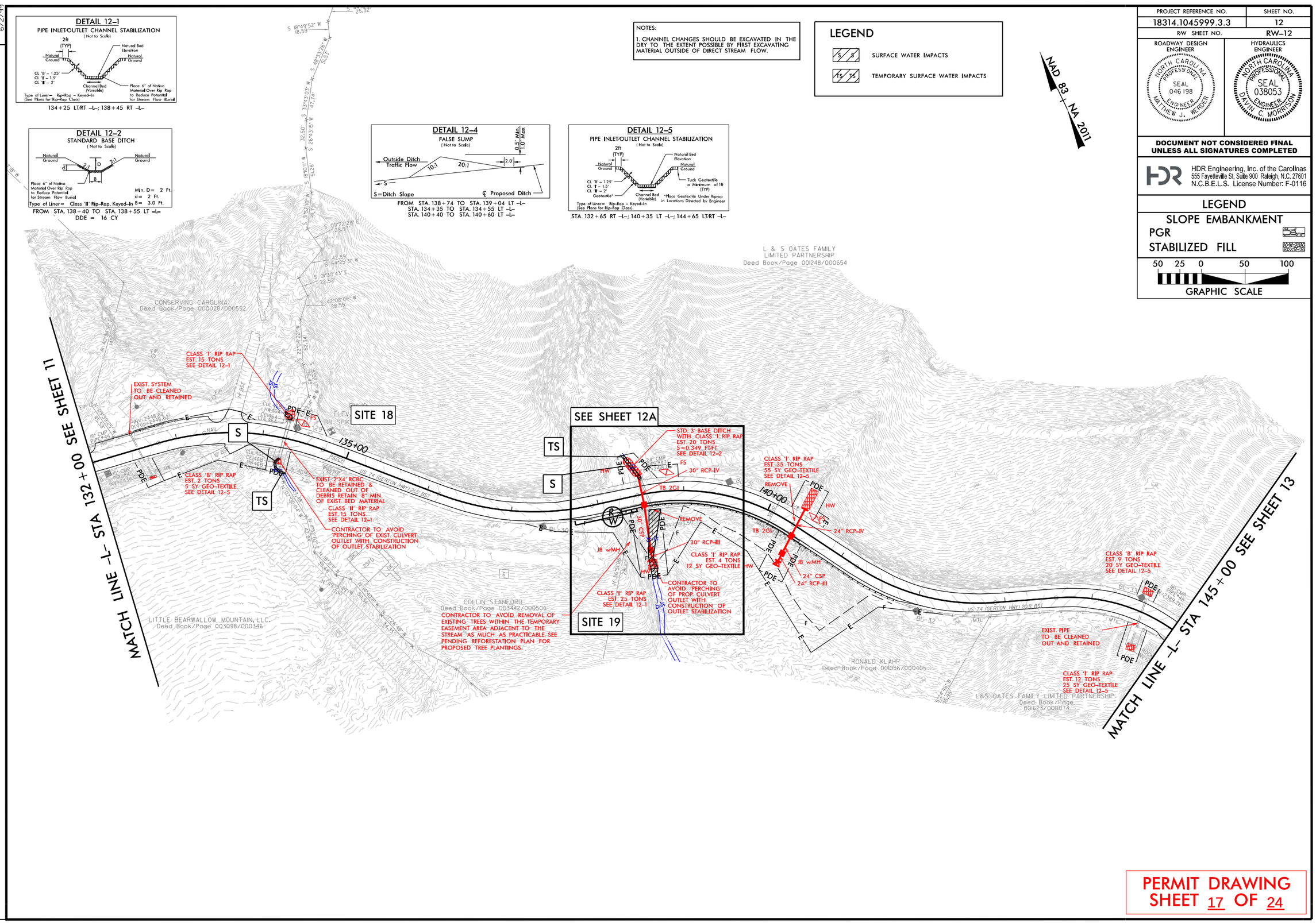
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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N.C.B.E.L.S. License Number: F-0116

LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

50 25 0 50 100
GRAPHIC SCALE



PERMIT DRAWING SHEET 17 OF 24

REVISIONS

PLOT DRIVER: NCDOT_pdf_color-eng-100.plt
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6/2/99

LEGEND

S S — SURFACE WATER IMPACTS

TS TS — TEMPORARY SURFACE WATER IMPACTS

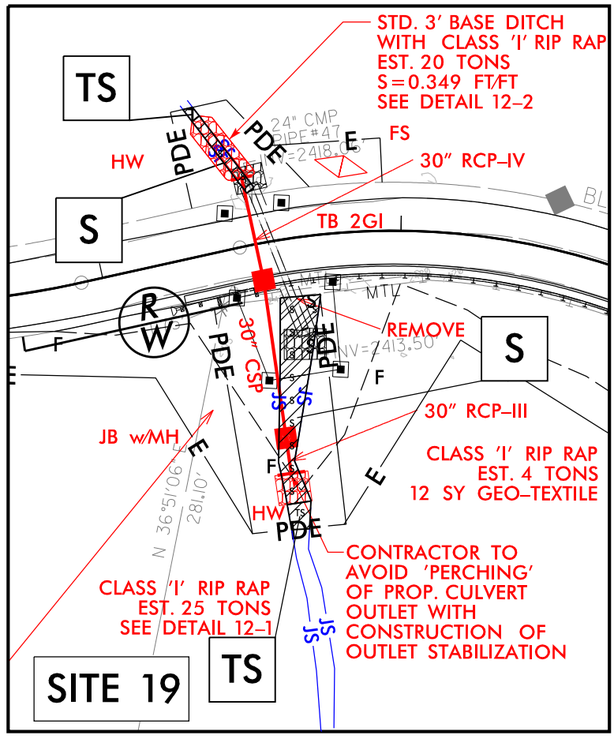
NAD 83 / NA 2011

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039 (WP3)	12A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

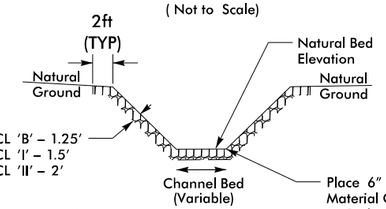
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

25 12.5 0 25 50
GRAPHIC SCALE

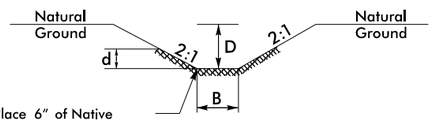


DETAIL 12–1
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)



Type of Liner= Rip–Rap – Keyed–In
(See Plans for Rip–Rap Class)

DETAIL 12–2
STANDARD BASE DITCH
(Not to Scale)



Place 6" of Native
Material Over Rip Rap
to Reduce Potential
for Stream Flow Burial

Min. D= 2 Ft.
d= 2 Ft.
B= 3.0 Ft.

Type of Liner= Class 'II' Rip–Rap, Keyed–In

PERMIT DRAWING
SHEET 18 OF 24

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
USER: GJACOBSON
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6/2/99

LEGEND	
SLOPE EMBANKMENT	
PGR	
STABILIZED FILL	

GRAPHIC SCALE 50 25 0 50 100

PERMIT DRAWING SHEET 19 OF 24

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	13
R/W SHEET NO.	RW–13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

SEE SHEETS NO. 30 & 31 FOR –L– PROFILE

MATCH LINE –L– STA 145+00 SEE SHEET 12

MATCH LINE –L– STA 175+00 SEE SHEET 14

NAD 83 / NA 2011

L & S OATES FAMILY LIMITED PARTNERSHIP
Deed Book/Page 001248/000654

L&S OATES FAMILY LIMITED PARTNERSHIP
Deed Book/Page 001623/000074

BM–II
ELEV.=2382.14'
RR SPIKE IN 24" OAK

RONALD KLAHR
Deed Book/Page 001056/000405

OAKLORE CAPITAL GROUP, LLC.
Deed Book/Page 003907/000512

OAKLORE CAPITAL GROUP, LLC.
Deed Book/Page 003907/000572

BM–I2
ELEV.=2315.76'
RR SPIKE IN 18" DBL EMPRESS

KNABLE, ZACHARY
Deed Book/Page 003828/000016

NIX, NATHAN KEMP
Deed Book/Page 003806/000316

JANE LAWSON
Deed Book/Page 003664/000094

HARVEY, CEINWEN
Deed Book/Page 003832/000087

HALLBERG, ELISHA ANN
Deed Book/Page 004102/000524

CREEKSIDE CAMPING AND DEVELOPMENT LLC A LL COMPANY
Deed Book/Page 001248/000654

US 74 (GERTON HWY) 23' BST

SITE 20

SITE 21

SITE 22

2' BERM BASE DITCH S= 0.0194 FT/FT DITCH SEE DETAIL 13–9

18" CSP W2 ELBOWS & ROD AND LUG CONNECTORS

24" RCP–IV

EXIST. 18" RCP TO BE CLEANED OUT AND RETAINED

STD. 2' BASE DITCH W/CLASS 'I' RIP RAP EST. 150 TONS 200 SY GEOTEXTILE S= 0.067 FT/FT SEE DETAIL 13–5

TOE PROTECTION EST. 75 SY PSRM SEE DETAIL 13–1

GRADE TO DRAIN

JB w/MH

24" RCP–IV TB 2GI

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 60 TONS SEE DETAIL 13–7

PROPOSED STREAM RELOCATION (SEE WORK PACKAGE #3 STREAM RELOCATIONS PLANS)

STD. 2' BASE DITCH W/CLASS 'I' RIP RAP EST. 65 TONS 100 SY GEOTEXTILE S=0.007 FT/FT SEE DETAIL 13–10

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 20 TONS; SEE DETAIL 13–7

EXISTING FORD LOCATION TO BE REVISED WITH A CONSTRUCTION REVISION

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

FILL IN EXISTING STREAMBED WITH NATIVE MATERIAL (SEE STREAM RELOCATION PLANS, TYP.)

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 20 TONS SEE DETAIL 13–7

CLASS 'I' RIP RAP EST. 25 TONS 35 SY GEO–TEXTILE SEE DETAIL 13–4

EXIST. PIPE TO BE CLEANED OUT AND RETAINED

CLASS 'II' RIP RAP EST. 35 TONS 50 SY GEO–TEXTILE SEE DETAIL 13–4

CLASS 'I' RIP RAP EST. 30 TONS 60 SY GEO–TEXTILE SEE DETAIL 13–4

CLASS 'II' RIP RAP EST. 75 TONS 130 SY GEO–TEXTILE SEE DETAIL 13–4

EXIST. 3'X4' RCBC TO BE CLEANED OUT AND RETAINED

EXIST. 15" CSP TO BE CLEANED OUT AND RETAINED

24" CSP W/2 ELBOWS & ROD AND LUG CONNECTORS

SPECIAL 'V' DITCH SEE DETAIL 13–2

REMOVE EXIST. CULVERT

CLASS 'I' RIP RAP EST. 25 TONS 35 SY GEO–TEXTILE SEE DETAIL 13–4

54" RCP–IV TB 2GI

18" RCP–IV TB 2GI

REMOVE TB 2GI

24" CSP HW

18" RCP–IV

TB 2GI 15" RCP–III

TOE PROTECTION EST. 180 SY PSRM SEE DETAIL 13–1

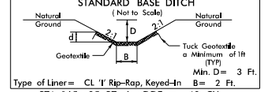
CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

PROPOSED STREAM RELOCATION (SEE WORK PACKAGE #3 STREAM RELOCATION PLANS)

END SITE 21 TEMPORARY IMPACTS BEING; SITE 22 PERMANENT IMPACTS

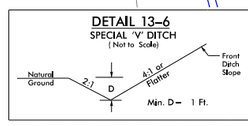
Ⓐ STD. 4' BASE DITCH W/CLASS 'III' RIP RAP EST. 100 TONS; 175 SY GEO–TEXTILE; S=0.023 FT/FT; SEE DETAIL 13–3

DETAIL 13–10
STANDARD BASE DITCH
(Not to Scale)



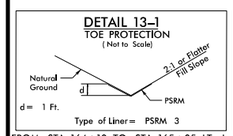
Min. D= 3 Ft.
Type of Liner= CL 'I' Rip–Rap, Keyed–In B= 2 Ft.
STA. 165+05 RT –L–; DDE = 40 CY

DETAIL 13–6
SPECIAL 'V' DITCH
(Not to Scale)



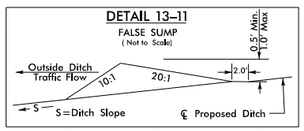
Min. D= 1 Ft.
FROM STA. 172+00 TO STA. 175+75 LT –L–

DETAIL 13–1
TOE PROTECTION
(Not to Scale)



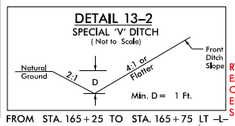
d= 1 Ft.
Type of Liner= PSRM 3
FROM STA. 164+10 TO STA. 165+05 LT –L–
STA. 169+00 TO 171+70 LT –L–

DETAIL 13–11
FALSE SUMP
(Not to Scale)



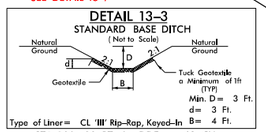
FROM STA. 147+70 TO STA. 148+00 LT –L–; STA. 155+10 TO 155+40 RT –L–; STA. 171+73 TO STA. 172+03 LT –L–

DETAIL 13–2
SPECIAL 'V' DITCH
(Not to Scale)



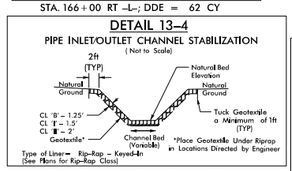
Min. D= 1 Ft.
FROM STA. 165+25 TO STA. 165+75 LT –L–

DETAIL 13–3
STANDARD BASE DITCH
(Not to Scale)



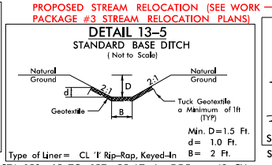
Min. D= 3 Ft.
d= 3 Ft.
Type of Liner= CL 'III' Rip–Rap, Keyed–In B= 4 Ft.
STA. 166+00 RT –L–; DDE = 62 CY

DETAIL 13–4
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)



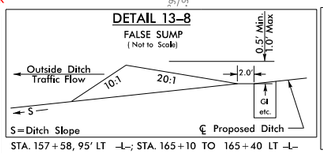
Type of Liner= Rip–Rap – Keyed–In (See Plans for Rip–Rap Class)
STA. 147+60 LT/RT –L–; 154+65 LT –L–; 154+70 RT –L–; 165+98 LT –L–

DETAIL 13–5
STANDARD BASE DITCH
(Not to Scale)



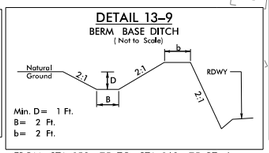
Min. D=1.5 Ft.
d= 1.0 Ft.
Type of Liner= CL 'I' Rip–Rap, Keyed–In B= 2 Ft.
STA. 158+65 TO 157+55 LT –L–; DDE = 42 CY

DETAIL 13–8
FALSE SUMP
(Not to Scale)



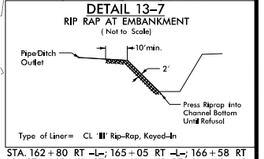
STA. 157+58, 95' LT –L–; STA. 165+10 TO 165+40 LT –L–

DETAIL 13–9
BERM BASE DITCH
(Not to Scale)



Min. D= 1 Ft.
B= 2 Ft.
b= 2 Ft.
FROM STA. 159+75 TO STA. 160+75 RT –L–

DETAIL 13–7
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= CL 'III' Rip–Rap, Keyed–In
STA. 162+80 RT –L–; 165+05 RT –L–; 166+58 RT –L–; STA. 168+60 RT –L–; 171+72 RT –L–; 172+42 RT –L–

LEGEND

S S	SURFACE WATER IMPACTS
TS TS	TEMPORARY SURFACE WATER IMPACTS

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

REVISIONS

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PENTABLE: NCDOT_permits_NOCON_WP#3.tbl
DATE: 6/18/2026
TIME: 3:44:55 PM

6/2/99

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	13
R/W SHEET NO.	RW–13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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50 25 0 50 100
GRAPHIC SCALE

PERMIT DRAWING SHEET 20 OF 24

SEE SHEETS NO. 30 & 31 FOR –L– PROFILE

NAD 83 / NA 2011

MATCH LINE –L– STA 145+00 SEE SHEET 12

MATCH LINE –L– STA 175+00 SEE SHEET 14

LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

SITE 20

SITE 21

SITE 22

RONALD KLAHR Deed Book/Page 001056/000405

OAKLORE CAPITAL GROUP, LLC. Deed Book/Page 003907/000512

OAKLORE CAPITAL GROUP, LLC. Deed Book/Page 003907/000572

JANE LAWSON Deed Book/Page 003664/000094

L & S OATES FAMILY LIMITED PARTNERSHIP Deed Book/Page 001248/000654

L & S OATES FAMILY LIMITED PARTNERSHIP Deed Book/Page 001623/000074

KNABLE, ZACHARY Deed Book/Page 003828/000008

NIX, NATHAN KEMP Deed Book/Page 003806/000316

HARVEY, CEINWEN Deed Book/Page 003832/000087

HARVEY, CEINWEN Deed Book/Page 003832/000087

HALLBERG, ELISHA ANN Deed Book/Page 004102/000524

CREEKSIDE CAMPING AND DEVELOPMENT LLC A LLL COMPANY Deed Book/Page 001248/000654

2' BERM BASE DITCH S= 0.019 FT/FT DITCH SEE DETAIL 13–9

18" CSP W/2 ELBOWS & ROD AND LUG CONNECTORS

24" RCP–IV

2GI(A)

2GI

3OTCB

STD. 2' BASE DITCH W/CLASS 'I' RIP RAP EST. 150 TONS 200 SY GEOTEXTILE S= 0.067 FT/FT SEE DETAIL 13–5

TOE PROTECTION EST. 75 SY PSRM SEE DETAIL 13–1

GRADE TO DRAIN

RR SPIKE IN 18" DBL. EMPRESS

JB w/MH

24" RCP–IV

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 60 TONS SEE DETAIL 13–7

PROPOSED STREAM RELOCATION (SEE WORK PACKAGE #3 STREAM RELOCATIONS PLANS)

STD. 2' BASE DITCH W/CLASS 'I' RIP RAP EST. 65 TONS 100 SY GEOTEXTILE S=0.007 FT/FT SEE DETAIL 13–10

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 20 TONS SEE DETAIL 13–7

EXISTING FORD LOCATION TO BE REVISED WITH A CONSTRUCTION REVISION

EXIST. 15" CSP TO BE CLEANED OUT AND RETAINED

EXIST. 18" RCP TO BE CLEANED OUT AND RETAINED

CLASS 'I' RIP RAP EST. 25 TONS 35 SY GEO–TEXTILE SEE DETAIL 13–4

EXIST. PIPE TO BE CLEANED OUT AND RETAINED

CLASS 'I' RIP RAP EST. 35 TONS 50 SY GEO–TEXTILE SEE DETAIL 13–4

CLASS 'I' RIP RAP EST. 30 TONS 60 SY GEO–TEXTILE SEE DETAIL 13–4

CLASS 'I' RIP RAP EST. 75 TONS 130 SY GEO–TEXTILE SEE DETAIL 13–4

EXIST. 3'X4' RCBC TO BE CLEANED OUT AND RETAINED

SPECIAL 'V' DITCH SEE DETAIL 13–2

REMOVE EXIST. CULVERT

CLASS 'I' RIP RAP EST. 25 TONS 35 SY GEO–TEXTILE SEE DETAIL 13–4

24" CSP W/2 ELBOWS & ROD AND LUG CONNECTORS

15" RCP–IV

54" RCP–IV TB 2GI

18" RCP–IV TB 2GI

24" RCP–IV

REMOVE

HW

Ⓐ STD. 4' BASE DITCH W/CLASS 'III' RIP RAP EST. 100 TONS, 175 SY GEO–TEXTILE; S=0.023 FT/FT, SEE DETAIL 13–3

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

TOE PROTECTION EST. 180 SY PSRM SEE DETAIL 13–1

SPECIAL 'V' DITCH SEE DETAIL 13–6

24" CSP

HW

REMOVE TB 2GI

TB 2GI 15" RCP–III

18" RCP–IV

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 20 TONS SEE DETAIL 13–7

FILL IN EXISTING STREAMBED WITH NATIVE MATERIAL (SEE STREAM RELOCATION PLANS, TYP.)

RIP RAP AT EMBANKMENT CLASS 'III' RIP RAP EST. 20 TONS SEE DETAIL 13–7

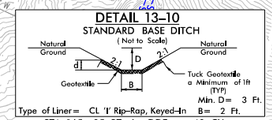
CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

END SITE 21 TEMPORARY IMPACTS BEING SITE 22 PERMANENT IMPACTS

PROPOSED STREAM RELOCATION (SEE WORK PACKAGE #3 STREAM RELOCATION PLANS)

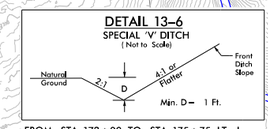
150+00 155+00 160+00 165+00 170+00

DETAIL 13–10
STANDARD BASE DITCH
(Not to Scale)



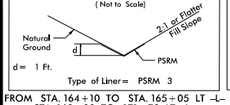
Min. D= 3 Ft.
Type of Liner= CL 'I' Rip–Rap, Keyed–In B= 2 Ft.
STA. 165+05 RT –L–; DDE = 40 CY

DETAIL 13–6
SPECIAL 'V' DITCH
(Not to Scale)



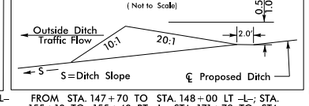
Min. D= 1 Ft.
FROM STA. 172+00 TO STA. 175+75 LT –L–

DETAIL 13–1
TOE PROTECTION
(Not to Scale)



d= 1 Ft.
Type of Liner= PSRM 3
FROM STA. 164+10 TO STA. 165+05 LT –L– STA. 169+00 TO 171+70 LT –L–

DETAIL 13–11
FALSE SUMP
(Not to Scale)



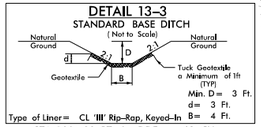
FROM STA. 147+70 TO STA. 148+00 LT –L–; STA. 155+10 TO 155+40 RT –L–; STA. 171+73 TO STA. 172+03 LT –L–

DETAIL 13–2
SPECIAL 'V' DITCH
(Not to Scale)



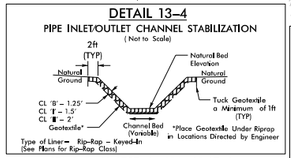
Min. D= 1 Ft.
FROM STA. 165+25 TO STA. 165+75 LT –L–

DETAIL 13–3
STANDARD BASE DITCH
(Not to Scale)



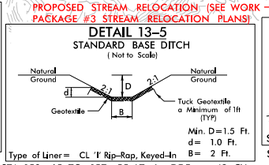
Min. D= 3 Ft.
d= 3 Ft.
Type of Liner= CL 'III' Rip–Rap, Keyed–In B= 4 Ft.
STA. 166+00 RT –L–; DDE = 62 CY

DETAIL 13–4
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)



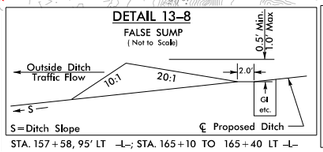
Type of Liner= Rip–Rap – Keyed–In (See Plans for Rip–Rap Class)
STA. 147+60 LT/RT –L–; 154+65 LT –L–; 154+70 RT –L–; 165+98 LT –L–

DETAIL 13–5
STANDARD BASE DITCH
(Not to Scale)



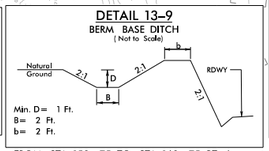
Min. D=1.5 Ft.
d= 1.0 Ft.
Type of Liner= CL 'I' Rip–Rap, Keyed–In B= 2 Ft.
STA. 158+65 TO 157+55 LT –L–; DDE = 42 CY

DETAIL 13–8
FALSE SUMP
(Not to Scale)



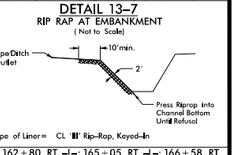
STA. 157+58, 95' LT –L–; STA. 165+10 TO 165+40 LT –L–

DETAIL 13–9
BERM BASE DITCH
(Not to Scale)



Min. D= 1 Ft.
B= 2 Ft.
b= 2 Ft.
FROM STA. 159+75 TO STA. 160+75 RT –L–

DETAIL 13–7
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= CL 'III' Rip–Rap, Keyed–In
STA. 162+80 RT –L–; 165+05 RT –L–; 166+58 RT –L– STA. 168+60 RT –L–; 171+72 RT –L–; 172+42 RT –L–

LEGEND

SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS

NOTES:

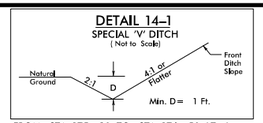
1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

6/2/99

REVISIONS

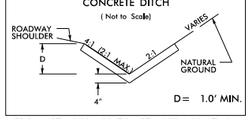
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USER: GJACOBSON DATE: 6/18/2026 TIME: 3:45:15 PM
FILE: \

DETAIL 14–1
SPECIAL 'V' DITCH
(Not to Scale)



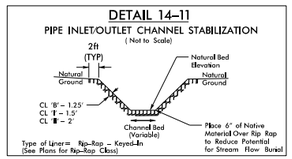
FROM STA. 175+80 TO STA. 176+50 LT –L–
FROM STA. 178+00 TO STA. 179+00 LT –L–
FROM STA. 179+25 TO STA. 180+80 LT –L–

DETAIL 14–2
CONCRETE DITCH
(Not to Scale)



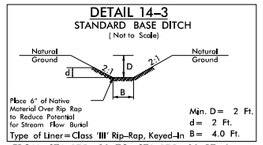
FROM STA. 176+50 TO STA. 177+95 LT –L–

DETAIL 14–11
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)



STA. 175+79 LT –L–

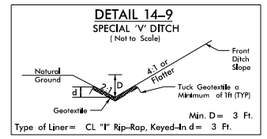
DETAIL 14–3
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 175+80 TO STA. 175+90 RT –L–;
DDE = 36 CY

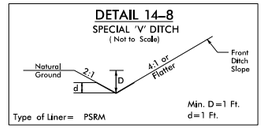
NAD 83 / NA 2011

DETAIL 14–9
SPECIAL 'V' DITCH
(Not to Scale)



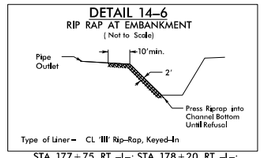
FROM STA. 175+25 TO STA. 175+75 LT –L–

DETAIL 14–8
SPECIAL 'V' DITCH
(Not to Scale)



FROM STA. 181+00 TO STA. 182+55 LT –L–

DETAIL 14–6
RIP RAP AT EMBANKMENT
(Not to Scale)



STA. 177+75 RT –L–; STA. 178+20 RT –L–;
STA. 179+05 RT –L–; STA. 180+65 RT –L–

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	14
RW SHEET NO.	RW–14

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVID C. MORRISON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

50 25 0 50 100
GRAPHIC SCALE

L & S OATES FAMILY LIMITED PARTNERSHIP
Deed Book/Page 001248/000654

BANCER, JOHN D.; BANCER, SUSAN J.
Deed Book/Page 003300/000602

CREEKSIDE CAMPING AND DEVELOPMENT LLC A LL COMPANY
Deed Book/Page 001288/000642

MELISSA SUITE
Deed Book/Page 001530/000506

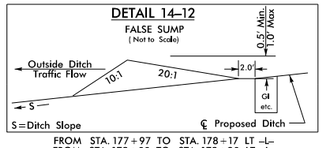
LUNA, LEO FABIO; ACOSTA, GIZELLA JANETH
Deed Book/Page 003625/000432

SITE 23

SITE 22

SPECIAL 'V' DITCH W/CLASS 'I' RIP RAP EST 40 TON 70 SY GEOTEXTILE SEE DETAIL 14–9
CLASS 'II' RIP RAP EST. 30 TONS SEE DETAIL 14–11
48" RCP–IV BURIED 0.8'
FILL IN JS PARALLEL TO ROADWAY
SPECIAL 'V' DITCH SEE DETAIL 14–1
SPECIAL CONCRETE DITCH SEE DETAIL 14–2
15" RCP–IV
TB 2GI
24" RCP–IV
4OTCB
SPECIAL 'V' DITCH SEE DETAIL 14–1
18" RCP–IV
2GI
REMOVE 180+00
SPECIAL 'V' DITCH W/PSRM EST 120 SY SEE DETAIL 14–8
18" RCP–IV
CONTRACTOR TO AVOID 'PERCHING' OF PROP. CULVERT OUTLET
RIP RAP AT EMBANKMENT EST. 50 TONS SEE DETAIL 14–6
FILL IN EXISTING STREAMBED WITH NATIVE MATERIAL (SEE STREAM RELOCATION PLANS, TYP.)
RIP RAP AT EMBANKMENT EST. 20 TONS; SEE DETAIL 14–6
STD. 4' BASE DITCH W/CLASS 'III' RIP RAP EST. 82 TONS; S= 0.040 FT/FT SEE DETAIL 14–3
PROPOSED STREAM RELOCATION (SEE WORK PACKAGE #3 STREAM RELOCATION PLANS)
CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE RIGHT OF WAY AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.
RIP RAP AT EMBANKMENT EST. 20 TONS SEE DETAIL 14–6
BM–13 ELEV.=2209.3' 10" SPIKE IN 30" SYCAMORE
RK HW INV=2200.91'
RK HW INV=2198.68' 18" RCP PIPE=54
18" CMP PIPE=55
US T4 (IGERTON, INV)22" RCP
INV=2184.72'
2'x 2' BOX CUL
18" RCP PIPE=56
MATCH LINE –L– STA 175+00 SEE SHEET 13
MATCH LINE –L– STA 189+00 SEE SHEET 15 (SEE WORK PACKAGE #4)

DETAIL 14–12
FALSE SUMP
(Not to Scale)



FROM STA. 177+97 TO STA. 178+17 LT –L–
FROM STA. 179+00 TO STA. 179+20 LT –L–
FROM STA. 180+82 TO STA. 181+02 LT –L–

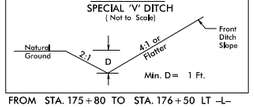
NOTES:
1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

LEGEND
S/S SURFACE WATER IMPACTS
TS/TS TEMPORARY SURFACE WATER IMPACTS

PERMIT DRAWING SHEET 21 OF 24

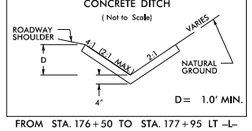
6/2/99

DETAIL 14–1
SPECIAL 'V' DITCH
(Not to Scale)



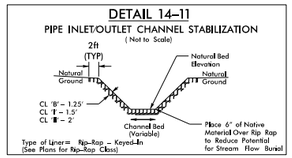
FROM STA. 175+80 TO STA. 176+50 LT –L–
FROM STA. 178+00 TO STA. 179+00 LT –L–
FROM STA. 179+25 TO STA. 180+80 LT –L–

DETAIL 14–2
CONCRETE DITCH
(Not to Scale)



FROM STA. 176+50 TO STA. 177+95 LT –L–

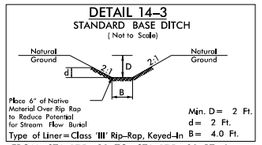
DETAIL 14–11
PIPE INLET/OUTLET CHANNEL STABILIZATION
(Not to Scale)



Type of Liner= Rip–Rap – Keyed–In
(See Plans for Rip–Rap Class)

STA. 175+79 LT –L–

DETAIL 14–3
STANDARD BASE DITCH
(Not to Scale)

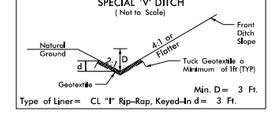


Type of Liner= Class 'III' Rip–Rap, Keyed–In

FROM STA. 175+80 TO STA. 175+90 RT –L–;
DDE = 36 CY

NAD 83 / NA 2011

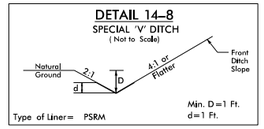
DETAIL 14–9
SPECIAL 'V' DITCH
(Not to Scale)



Type of Liner= CL 'I' Rip–Rap, Keyed–In d= 3 Ft.

FROM STA. 175+25 TO STA. 175+75 LT –L–

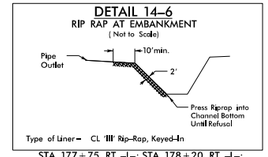
DETAIL 14–8
SPECIAL 'V' DITCH
(Not to Scale)



Type of Liner= PSRM

FROM STA. 181+00 TO STA. 182+55 LT –L–

DETAIL 14–6
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= CL 'III' Rip–Rap, Keyed–In

STA. 177+75 RT –L–; STA. 178+20 RT –L–;
STA. 179+05 RT –L–; STA. 180+65 RT –L–

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	14
RW SHEET NO.	RW–14

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DIVYA C. MORRISON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LEGEND

SLOPE EMBANKMENT
PGR
STABILIZED FILL

50 25 0 50 100
GRAPHIC SCALE

L. K. S. OATES FAMILY LIMITED PARTNERSHIP
Deed Book/Page 001248/000654

BANCER, JOHN D.; BANCER, SUSAN J.
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Deed Book/Page 001530/000506

LUNA, LEO FABIO; ACOSTA, GIZELLA JANETH
Deed Book/Page 003625/000432

OATES
Deed Book/Page 00862/0011

N 29°35'05" E 370.53'

N 29°35'05" E 366.47'

SITE 23

SITE 22

SPECIAL 'V' DITCH W/CLASS 'I' RIP RAP EST. 40 TON 70 SY. GEOTEXTILE SEE DETAIL 14–9

CLASS 'II' RIP RAP EST. 30 TONS SEE DETAIL 14–11

48" RCP–IV BURIED 0.8'

FILL IN JS PARALLEL TO ROADWAY

SPECIAL 'V' DITCH SEE DETAIL 14–1

SPECIAL CONCRETE DITCH SEE DETAIL 14–2

15" RCP–IV

TB 2GI

24" RCP–IV

4OTCB

18" RCP–IV

CONTRACTOR TO AVOID 'PERCHING' OF PROP. CULVERT OUTLET

RIP RAP AT EMBANKMENT EST. 50 TONS SEE DETAIL 14–6

FILL IN EXISTING STREAMBED WITH NATIVE MATERIAL (SEE STREAM RELOCATION PLANS, TYP.)

RIP RAP AT EMBANKMENT EST. 20 TONS; SEE DETAIL 14–6

STD. 4' BASE DITCH W/CLASS 'III' RIP RAP EST. 82 TONS; S= 0.040 FT/FT SEE DETAIL 14–3

PROPOSED STREAM RELOCATION (SEE WORK PACKAGE #3 STREAM RELOCATION PLANS)

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE RIGHT OF WAY AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

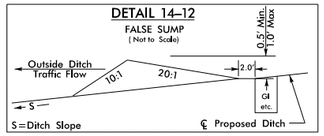
SPECIAL 'V' DITCH W/PSRM EST. 120 SY SEE DETAIL 14–8

RIP RAP AT EMBANKMENT EST. 20 TONS SEE DETAIL 14–6

MATCH LINE –L– STA 175+00 SEE SHEET 13

(SEE WORK PACKAGE #4) MATCH LINE –L– STA 189+00 SEE SHEET 15

DETAIL 14–12
FALSE SUMP
(Not to Scale)



FROM STA. 177+97 TO STA. 178+17 LT –L–
FROM STA. 179+00 TO STA. 179+20 LT –L–
FROM STA. 180+82 TO STA. 181+02 LT –L–

NOTES:

1. CHANNEL CHANGES SHOULD BE EXCAVATED IN THE DRY TO THE EXTENT POSSIBLE BY FIRST EXCAVATING MATERIAL OUTSIDE OF DIRECT STREAM FLOW.

LEGEND

S / S — SURFACE WATER IMPACTS

TS / TS — TEMPORARY SURFACE WATER IMPACTS

PERMIT DRAWING SHEET 22 OF 24

REVISIONS

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TIME: 3:45:24 PM

LEGEND

S S — SURFACE WATER IMPACTS

TS TS — TEMPORARY SURFACE WATER IMPACTS

SPECIAL 'V' DITCH
W/CLASS 'I' RIP RAP
EST 40 TON
70 SY GEOTEXTILE
SEE DETAIL 14–9

CLASS 'II' RIP RAP
EST. 30 TONS
SEE DETAIL 14–11

48" RCP–IV
BURIED 0.8'

FILL IN JS PARALLEL
TO ROADWAY

SPECIAL 'V' DITCH
SEE DETAIL 14–1
SPECIAL CONCRETE DITCH
SEE DETAIL 14–2

SITE 23

HW

REMOVE

TS

S

DUE

E

C

F

NAD 83 / NA 2011

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039 (WP3)	14A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

12.5 0 12.5 25
GRAPHIC SCALE

REVISIONS

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PERMIT DRAWING
SHEET 23 OF 24

WETLAND AND SURFACE WATER IMPACTS 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)
1	-L- 67+33 - 67+65	Bank Stabilization Hickory Creek						0.02	< 0.01	61	35	
1	-L- 67+09 - 67+39	Bank Stabilization UT to Hickory Creek						< 0.01		34		
2	-L- 72+82	18" CSP							< 0.01		3	
3	-L- 77+74 - 79+21	Bank Stabilization/Future bridge project impacts						0.04	0.02	65	53	
3	-L- 79+21- 83+75	Hickory Creek Relocation						0.07		276		
3	-L- 79+21- 83+75	Hickory Creek Reestablishing						0.05	< 0.01	157	22	
4	-L- 80+15 - 81+98	Temp Construction Easement/ Stream Relocation			< 0.01		0.06		< 0.01		86	
5	-L- 86+35 RT	6' X4' Culvert							< 0.01		27	
6	-L- 85+21 - 87+00 LT	Hickory Creek/Daylight Stream/Future bridge project impacts						0.05	0.01	135	39	
7	-L- 96+42 - 97+10 RT	Bank Stabilization						< 0.01	< 0.01	52	15	
8	-L- 96+47 - 96+65 RT	Bank Stabilization						< 0.01	< 0.01	7	28	
9	-L- 96+96	Bank Stabilization						0.03	0.03	97	31	
10	-L- 100+40	Hickory Creek/PDE							< 0.01		28	
11	-L- 101+78 - 102+77	8'X8' RCBC						0.01		87		
11	-L- 101+78 - 102+77	Bank Stabilization						< 0.01	< 0.01	17	8	
12	-L- 100+70 -106+22	Hickory Creek Relocation/Temp Construction Easement						0.08		221		
12	-L- 100+70 -106+22	Hickory Creek Reestablishing						0.12	< 0.01	310	14	
13	-L- 106+98 - 109+73	Temporary Contractor Access Point							0.08		320	
14	-L- 113+05 - 113+24	Bank Stabilization						0.01		93		
15	-L- 120+98 - 120+12	Pipe Inlet/Outlet Channel Stabilization						< 0.01	0.01	28	15	
15	-L- 120+85	48" CSP						< 0.01		71		
16	-L- 126+81 - 128+71	36" RCP						< 0.01	< 0.01	78	3	
17	-L- 128+69 - 128+90	48" RCP-IV						< 0.01	< 0.01	40	42	
18	-L- 134+25	Ex. 2'X4' RCBC/ Channel Realignment						< 0.01	< 0.01	17	18	
19	-L- 138+52	36" RCP/30" CSP						0.02	< 0.01	99	14	
20	-L- 162+17 - 169+14	Hickory Creek Relocation						0.09		250		
20	-L- 162+17 - 169+14	Hickory Creek Reestablishing						0.20	0.02	524	59	
21	-L- 169+92 - 172+46	Hickory Creek Relocation						0.04		106		
21	-L- 169+92 - 172+46	Hickory Creek Reestablishing						0.03	0.01	92	47	
21	-L- 171+86-172+08	UT to Hickory Creek							< 0.01		50	
22	-L- 173+40 - 180+79	Hickory Creek Relocation						0.16		492		
22	-L- 173+40 - 180+79	Hickory Creek Reestablishing						0.15	0.02	434	76	
23	-L- 175+80	48" RCP-IV						< 0.01	< 0.01	23	31	
TOTALS*:					< 0.01		0.06	1.20	0.24	3866	1065	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
JUNE 2026
HENDERSON COUNTY
18314.1045039
GERTON HWY - US 74
SHEET 24 OF 24

Revised 2018 Feb

Docusign Envelope ID: 02045896-D948-4E5C-8887-F3EA6E6ED286

6/2/99

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: MWERDER
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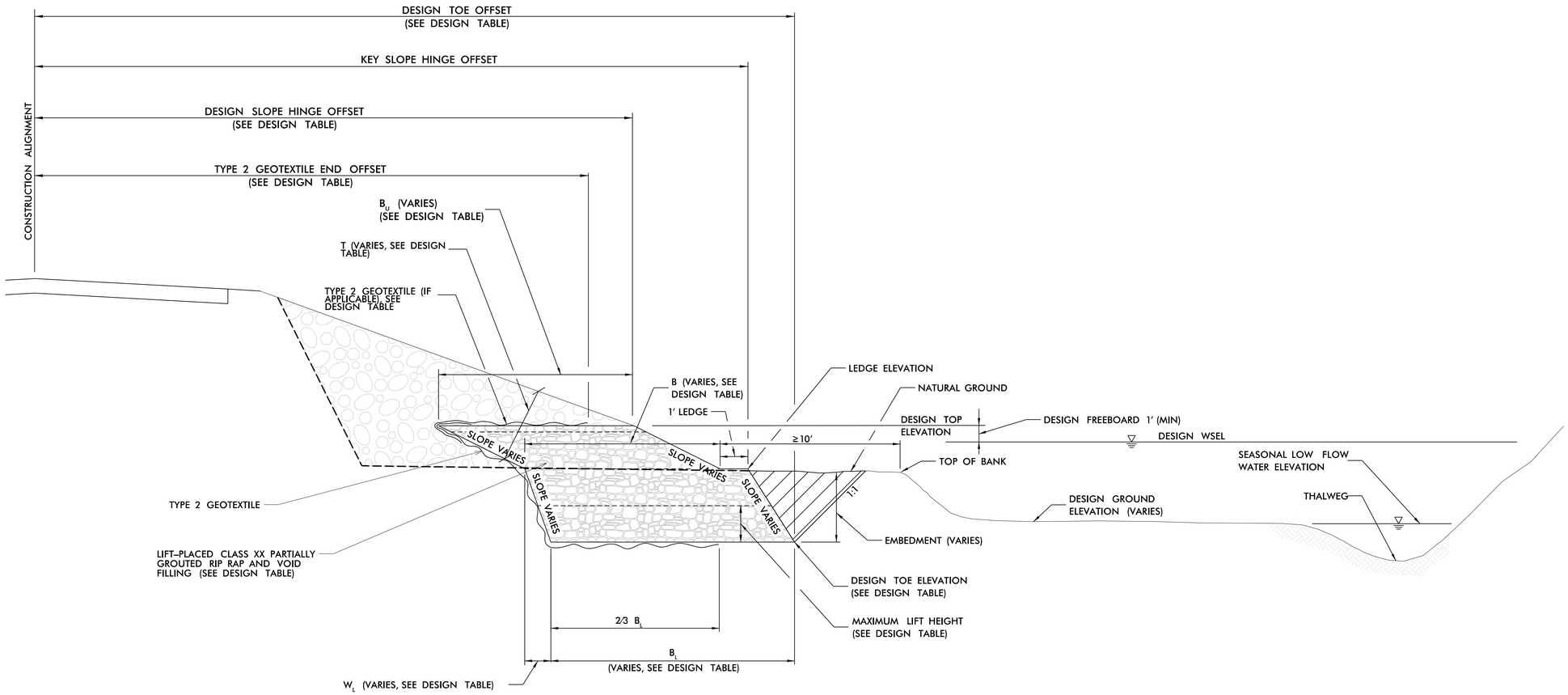
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TIME: 9:24:54 PM

GENERAL NOTES:

1. INSTALL ALL TYPE 2 GEOTEXTILE PER THE PLANS AND MANUFACTURER'S RECOMMENDED INSTALLATION SPECIFICATIONS. OVERLAP TYPE 2 GEOTEXTILE MIN 18 INCHES OR PER MANUFACTURER'S RECOMMENDED INSTALLATION SPECIFICATIONS, WHICHEVER IS GREATER.
2. PLACE TYPE 2 GEOTEXTILE AS A SINGLE PIECE FROM THE TOP OF PLACEMENT DOWN TO THE TOE OF SLOPE.
3. MECHANICALLY INTERLOCK RIP RAP OR SELECT MATERIAL CLASS VIII, FOR PGR TO MAXIMUM PRACTICABLE DENSITY.
4. EXTEND TYPE 2 GEOTEXTILE OVER PGR WHEN PGR EXTENDS INTO THE BEARING PRISM OF THE ROADWAY. SEE DESIGN TABLE FOR REQUIRED EXTENTS.
5. INSTALL VOID FILL ONLY WHEN INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
6. WHEN DEWATERING IS NOT PRACTICABLE, SUBSTITUTE LOOSE CLASS 3 OR SELECT MATERIAL CLASS VIII ROCK AND DOCUMENT EXTENTS OF CHANGE DIRECTED BY THE ENGINEER.
7. WHERE LARGE ROCK OR BEDROCK PREVENTS EXCAVATION TO DESIGN TOE ELEVATION, FOUND EMBANKMENT PROTECTION ON ROCK AND DOCUMENT EXTENTS OF CHANGE AS DIRECTED BY ENGINEER.
8. ENSURE GEOTECHNICAL STABILITY OF TOE. DESIGN OF B_L DIMENSION REQUIRED.
9. MAX PARTIALLY GROUTED RIP RAP (PGR) SLOPE PLACED PER THIS DETAIL IS 1.25:1. THE PGR BASE SECTION MAY HAVE VERTICAL FACES (SEE DESIGN TABLE AND CROSS SECTIONS).

GEOTECHNICALLY–STABILIZED FILL NOTES

1. SEE TABLE FOR MINIMUM REQUIRED THICKNESS OF GEOTECHNICALLY–STABILIZED FILL BEHIND THE PARTIALLY GROUTED RIP RAP. THIS THICKNESS REFLECTS THE MINIMUM REQUIRED BASED ON SLOPE STABILITY ANALYSIS USING THE PRESUMED ROCK LINE SHOWN IN THE CROSS SECTIONS, INCLUDING INTERPOLATION BETWEEN BORING LOCATIONS TO DEVELOP A CONTINUOUS ESTIMATED ROCK PROFILE. MODIFICATIONS TO THESE THICKNESSES MAY REQUIRE ADDITIONAL SLOPE STABILITY ANALYSIS BASED ON VERIFIED ROCK DEPTHS ENCOUNTERED DURING CONSTRUCTION.
2. THE FRONT AND BACKSIDE SLOPES OF THE GEOTECHNICALLY–STABILIZED FILL SHALL MATCH THE BACKSIDE SLOPE OF THE PARTIALLY GROUTED RIP RAP IN AREAS WHERE A MINIMUM REQUIRED THICKNESS IS PROVIDED.
3. REQUIRED THICKNESS MAY BE REDUCED WHERE BEDROCK IS ENCOUNTERED.
4. WHERE NO MINIMUM THICKNESS IS PROVIDED, GEOTECHNICALLY–STABILIZED FILL SHALL BE USED FOR ALL MATERIAL PLACED ON THE EMBANKMENT SLOPE BEHIND AND ABOVE THE PARTIALLY GROUTED RIP RAP, AS SHOWN IN THE CROSS SECTIONS. IF THE CONTRACTOR ELECTS TO USE ANY MATERIAL OTHER THAN GEOTECHNICALLY–STABILIZED FILL IN THESE AREAS, THE CONTRACTOR MAY BE REQUIRED TO PERFORM THEIR OWN SLOPE STABILITY ANALYSIS FOR REVIEW AND APPROVAL BY THE ENGINEER. NO CONSISTENT BACKSIDE SLOPE IS REQUIRED FOR GEOTECHNICALLY–STABILIZED FILL IN THESE LOCATIONS.



LEGEND

NATIVE MATERIAL BACK FILL

GEOTECHNICALLY–STABILIZED FILL
(REFER TO SHEET 2G–5 FOR ROCK EMBANKMENT DETAIL)

LIFT–PLACED PARTIALLY GROUTED RIP RAP EMBANKMENT PROTECTION TYPICAL SECTION WITH GREATER THAN 10' OF OVERBANK

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	2G-1

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER
Matthew Werder
5/13/2026

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON
Davin Morrison
5/13/2026

GEOTECHNICAL ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 037998 ENGINEER THOMAS R WELLS
Thomas R. Wells
5/14/2026

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

Docusign Envelope ID: 02045896-D948-4E5C-8887-F3EA6E6ED286

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REVISIONS

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TIME: 9:24:58 PM

GENERAL NOTES:

1. INSTALL ALL TYPE 2 GEOTEXTILE PER THE PLANS AND MANUFACTURER'S RECOMMENDED INSTALLATION SPECIFICATIONS. OVERLAP TYPE 2 GEOTEXTILE MIN 18 INCHES OR PER MANUFACTURER'S RECOMMENDED INSTALLATION SPECIFICATIONS, WHICHEVER IS GREATER.
2. PLACE TYPE 2 GEOTEXTILE AS A SINGLE PIECE FROM THE TOP OF PLACEMENT DOWN TO THE TOE OF SLOPE.
3. MECHANICALLY INTERLOCK RIP RAP OR SELECT MATERIAL CLASS VIII, FOR PGR TO MAXIMUM PRACTICABLE DENSITY.
4. EXTEND TYPE 2 GEOTEXTILE OVER PGR WHEN PGR EXTENDS INTO THE BEARING PRISM OF THE ROADWAY. SEE DESIGN TABLE FOR REQUIRED EXTENTS.
5. INSTALL VOID FILL ONLY WHEN INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
6. WHEN DEWATERING IS NOT PRACTICABLE, SUBSTITUTE LOOSE CLASS 3 OR SELECT MATERIAL CLASS VIII ROCK AND DOCUMENT EXTENTS OF CHANGE DIRECTED BY THE ENGINEER.
7. WHERE LARGE ROCK OR BEDROCK PREVENTS EXCAVATION TO DESIGN TOE ELEVATION, FOUND EMBANKMENT PROTECTION ON ROCK AND DOCUMENT EXTENTS OF CHANGE AS DIRECTED BY ENGINEER.
8. ENSURE GEOTECHNICAL STABILITY OF TOE. DESIGN OF B_L DIMENSION REQUIRED.
9. MAX PARTIALLY GROUTED RIP RAP (PGR) SLOPE PLACED PER THIS DETAIL IS 1.25:1. THE PGR BASE SECTION MAY HAVE VERTICAL FACES (SEE DESIGN TABLE AND CROSS SECTIONS).

GEOTECHNICALLY–STABILIZED FILL NOTES

1. SEE TABLE FOR MINIMUM REQUIRED THICKNESS OF GEOTECHNICALLY–STABILIZED FILL BEHIND THE PARTIALLY GROUTED RIP RAP. THIS THICKNESS REFLECTS THE MINIMUM REQUIRED BASED ON SLOPE STABILITY ANALYSIS USING THE PRESUMED ROCK LINE SHOWN IN THE CROSS SECTIONS, INCLUDING INTERPOLATION BETWEEN BORING LOCATIONS TO DEVELOP A CONTINUOUS ESTIMATED ROCK PROFILE. MODIFICATIONS TO THESE THICKNESSES MAY REQUIRE ADDITIONAL SLOPE STABILITY ANALYSIS BASED ON VERIFIED ROCK DEPTHS ENCOUNTERED DURING CONSTRUCTION.
2. THE FRONT AND BACKSIDE SLOPES OF THE GEOTECHNICALLY–STABILIZED FILL SHALL MATCH THE BACKSIDE SLOPE OF THE PARTIALLY GROUTED RIP RAP IN AREAS WHERE A MINIMUM REQUIRED THICKNESS IS PROVIDED.
3. REQUIRED THICKNESS MAY BE REDUCED WHERE BEDROCK IS ENCOUNTERED.
4. WHERE NO MINIMUM THICKNESS IS PROVIDED, GEOTECHNICALLY–STABILIZED FILL SHALL BE USED FOR ALL MATERIAL PLACED ON THE EMBANKMENT SLOPE BEHIND AND ABOVE THE PARTIALLY GROUTED RIP RAP, AS SHOWN IN THE CROSS SECTIONS. IF THE CONTRACTOR ELECTS TO USE ANY MATERIAL OTHER THAN GEOTECHNICALLY–STABILIZED FILL IN THESE AREAS, THE CONTRACTOR MAY BE REQUIRED TO PERFORM THEIR OWN SLOPE STABILITY ANALYSIS FOR REVIEW AND APPROVAL BY THE ENGINEER. NO CONSISTENT BACKSIDE SLOPE IS REQUIRED FOR GEOTECHNICALLY–STABILIZED FILL IN THESE LOCATIONS.

PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	2G-2

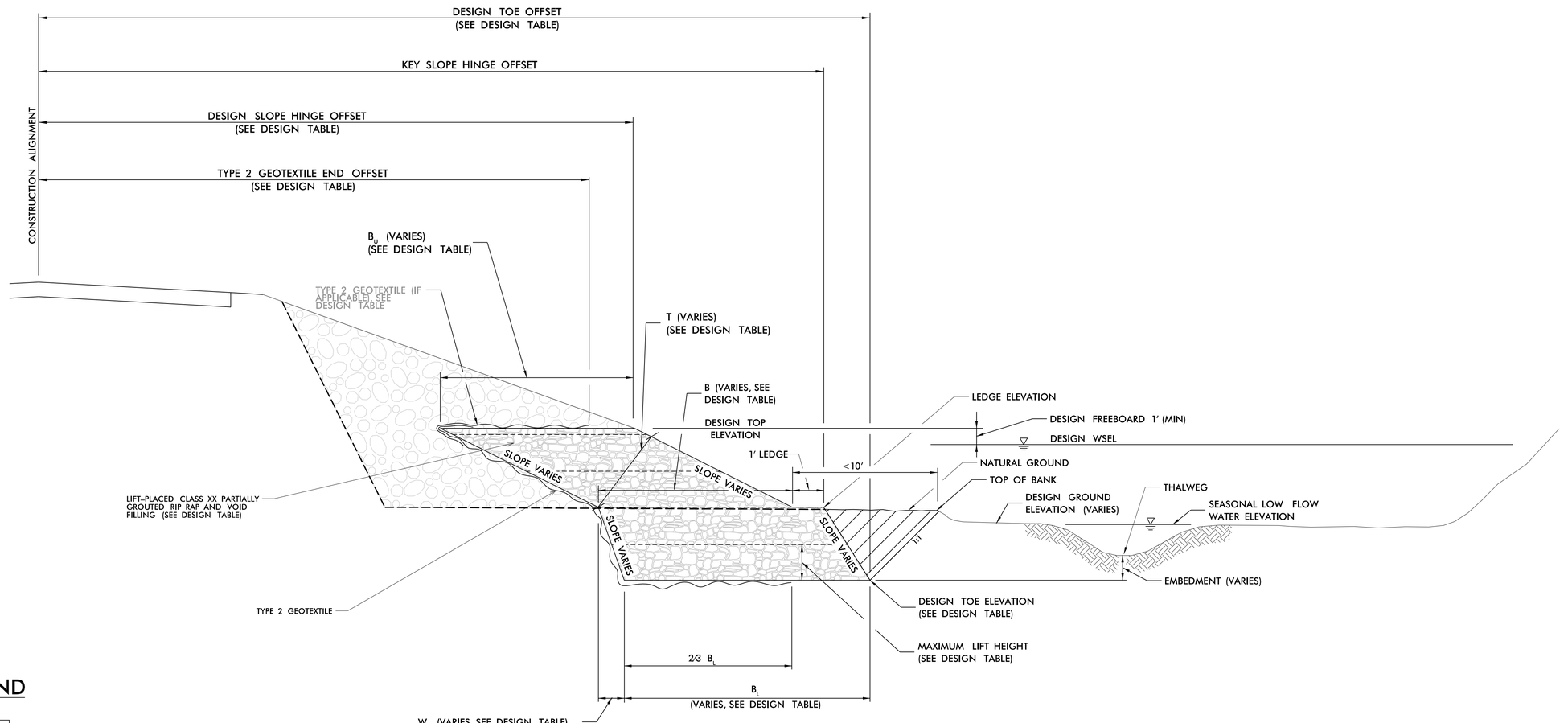
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER
Matthew Werder
5/13/2026

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON
Davin Morrison
5/13/2026

GEOTECHNICAL ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 037998 ENGINEER THOMAS R WELLS
Thomas R. Wells
5/14/2026

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N.C.B.E.L.S. License Number: F-0116



LEGEND

NATIVE MATERIAL BACK FILL

GEOTECHNICALLY–STABILIZED FILL
(REFER TO SHEET 2G–5 FOR ROCK EMBANKMENT DETAIL)

LIFT–PLACED PARTIALLY GROUTED RIP RAP
EMBANKMENT PROTECTION TYPICAL SECTION
WITH LESS THAN 10' OF OVERBANK

Docusign Envelope ID: 02045896-D948-4E5C-8887-F3EA6E6ED286

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REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	2G-3

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER
Matthew Werder 5/13/2026

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON
Davin Morrison 5/13/2026

GEOTECHNICAL ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 037998 ENGINEER THOMAS R WELLS
Thomas R. Wells 5/14/2026

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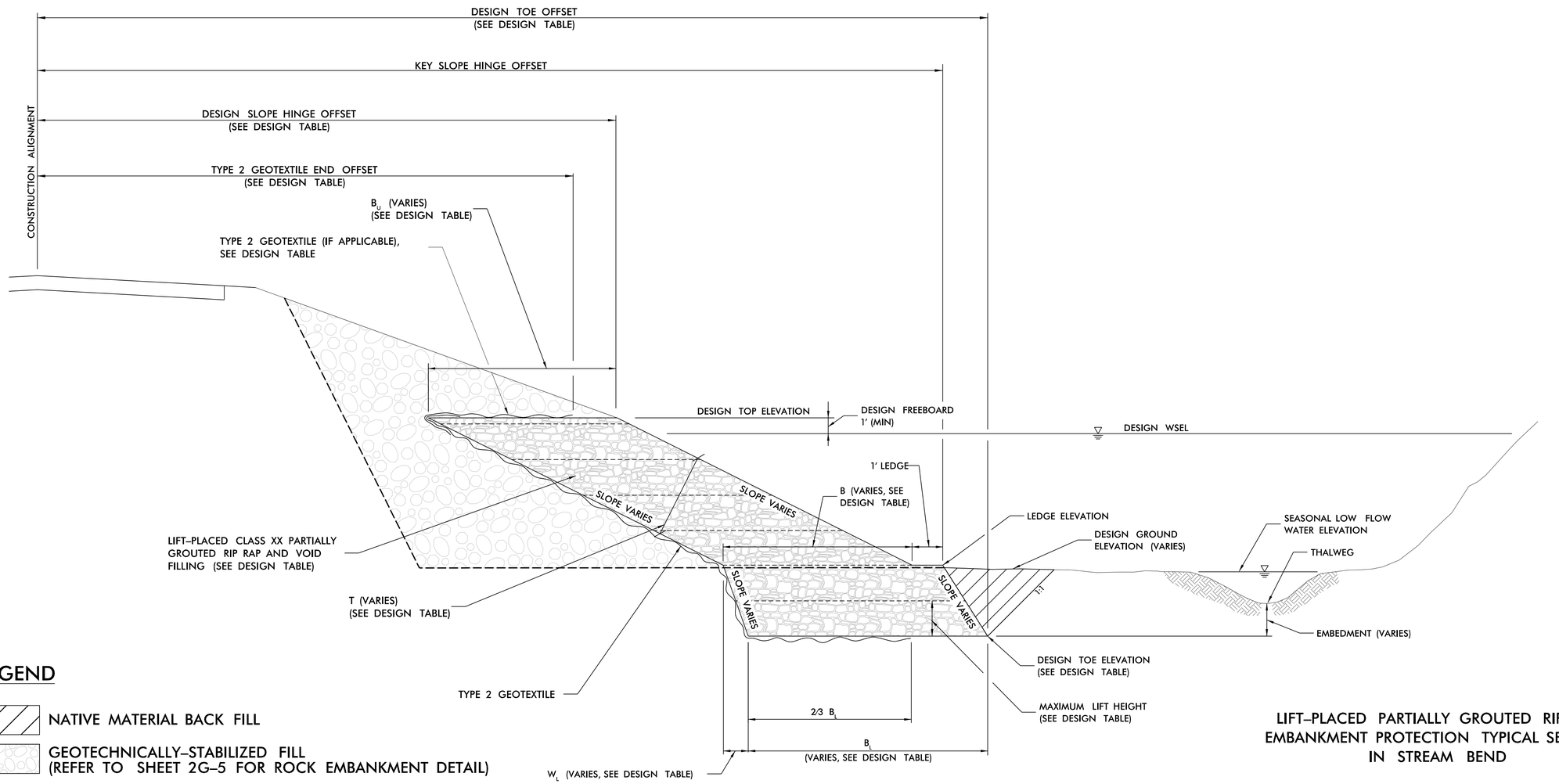
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GEOTECHNICALLY–STABILIZED FILL NOTES

1. SEE TABLE FOR MINIMUM REQUIRED THICKNESS OF GEOTECHNICALLY–STABILIZED FILL BEHIND THE PARTIALLY GROUTED RIP RAP. THIS THICKNESS REFLECTS THE MINIMUM REQUIRED BASED ON SLOPE STABILITY ANALYSIS USING THE PRESUMED ROCK LINE SHOWN IN THE CROSS SECTIONS, INCLUDING INTERPOLATION BETWEEN BORING LOCATIONS TO DEVELOP A CONTINUOUS ESTIMATED ROCK PROFILE. MODIFICATIONS TO THESE THICKNESSES MAY REQUIRE ADDITIONAL SLOPE STABILITY ANALYSIS BASED ON VERIFIED ROCK DEPTHS ENCOUNTERED DURING CONSTRUCTION.
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LEGEND

NATIVE MATERIAL BACK FILL

GEOTECHNICALLY–STABILIZED FILL
(REFER TO SHEET 2G–5 FOR ROCK EMBANKMENT DETAIL)

LIFT–PLACED PARTIALLY GROUTED RIP RAP EMBANKMENT PROTECTION TYPICAL SECTION IN STREAM BEND

Docusign Envelope ID: 02045896-D948-4E5C-8887-F3EA6E6ED286

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REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
18314.1045999.3.3	2G-4

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 046198 ENGINEER MATTHEW J. WERDER

Matthew Werder 5/13/2026

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON

Davin Morrison 5/13/2026

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 037998 ENGINEER THOMAS R WELLS

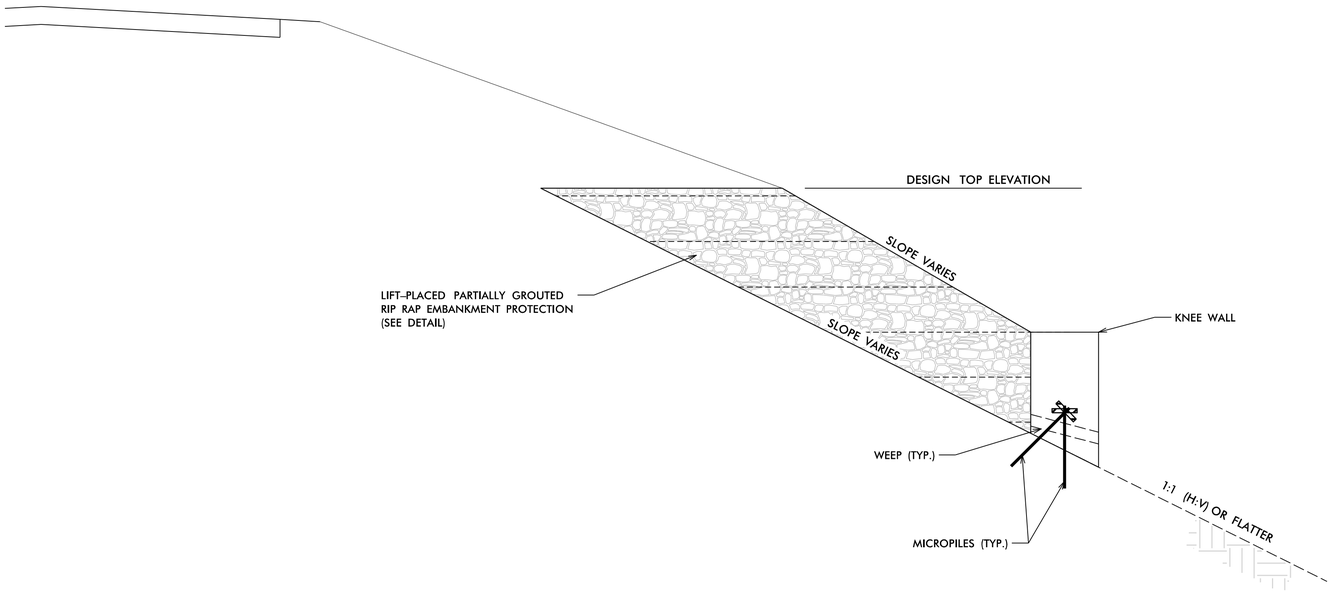
Thomas R. Wells 5/14/2026

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555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

GENERAL NOTES:

1. FOR LIFT–PLACED PARTIALLY GROUTED RIP RAP EMBANKMENT PROTECTION, SEE LIFT–PLACED PARTIALLY GROUTED RIP RAP EMBANKMENT PROTECTION DETAIL AND PROVISIONS.
2. FOR MICROPILE KNEE WALL, SEE MICROPILE AND KNEE WALL DETAILS AND PROVISIONS.
3. ESTIMATED MICROPILE AVERAGE LENGTH FOR KNEE WALL = 15'
4. MINIMUM MICROPILE ROCK BOND LENGTH = 5'
5. BEFORE BEGINNING KNEE WALL DESIGN, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.
6. THIS DETAIL IS NOT SPECIFIED IN THE PLANS BUT MAY BE USED AS A DESIGN ALTERNATIVE IF CONSTRAINTS ARISE DURING CONSTRUCTION AS DETERMINED BY THE ENGINEER.



LIFT–PLACED PARTIALLY GROUTED RIP RAP EMBANKMENT PROTECTION MICROPILE KNEE WALL

09/08/99

TIP PROJECT: 18314.1045999.3.3

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HENDERSON COUNTY

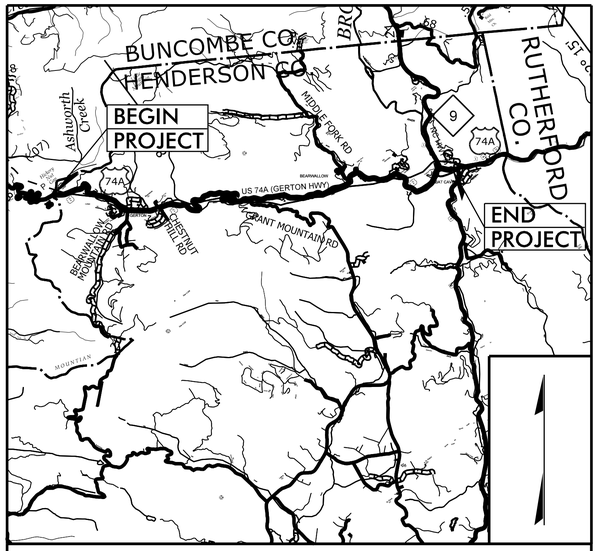
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	18314.1045999.3.3	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
- - - - -	N/A	P.E.
18314.1045999.2.3	N/A	ROW
18314.1045999.3.3	N/A	CONST

LOCATION: *US 74A (GERTON HWY) FROM WEST OF SR 1693 (BEARWALLOW MOUNTAIN RD) TO US 64 (CHIMNEY ROCK RD)*

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

WORK PACKAGE #3: *SR 1693 (BEARWALLOW MOUNTAIN ROAD) TO SR 1602 (GRANT MOUNTAIN ROAD))*



VICINITY MAP
(NOT TO SCALE)

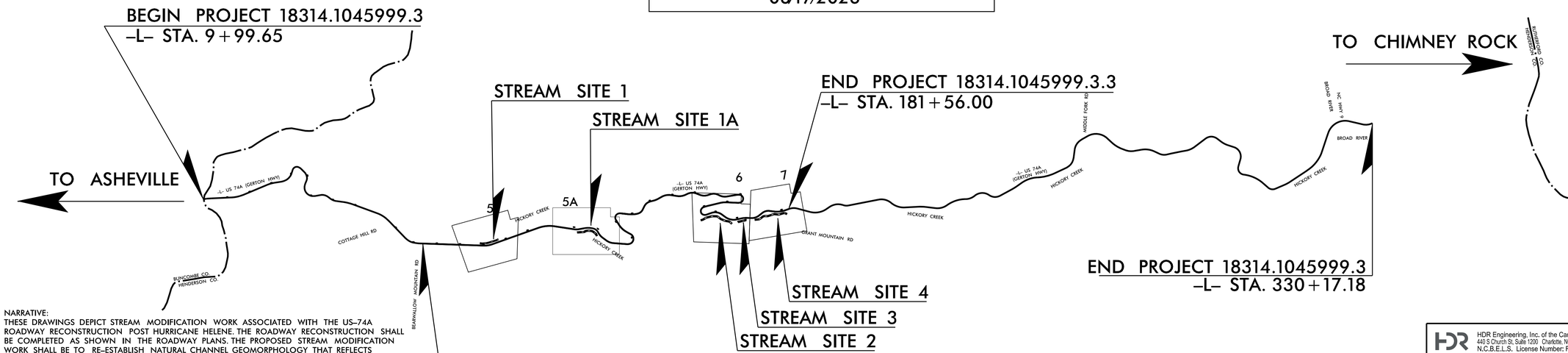
WP#3 RFC PLANS



SHEET	SHEET NO.
TITLE SHEET	1
ALIGNMENT DATA	2D-1 THRU 2D-1A
TYPICAL SECTIONS	2D-2
STREAM DETAILS SHEET	2D-3 THRU 2D-4
PLAN & PROFILE SHEETS	5-7
CROSS SECTIONS	X-1 THRU X-113

NAD 83 - NA 2011

WORK PACKAGE #3
RFC STREAM RELOCATION PLANS
06/17/2026



NARRATIVE:
THESE DRAWINGS DEPICT STREAM MODIFICATION WORK ASSOCIATED WITH THE US–74A ROADWAY RECONSTRUCTION POST HURRICANE HELENE. THE ROADWAY RECONSTRUCTION SHALL BE COMPLETED AS SHOWN IN THE ROADWAY PLANS. THE PROPOSED STREAM MODIFICATION WORK SHALL BE TO RE–ESTABLISH NATURAL CHANNEL GEOMORPHOLOGY THAT REFLECTS APPROPRIATE CHANNEL GEOMETRY, ALIGNMENT, AND PROFILE TO PROTECT THE ADJACENT ROADWAY EMBANKMENT FROM FURTHER EROSION AND INSTABILITY. THE INTENT OF THE PROPOSED STREAM WORK IS TO UTILIZE AND RECONFIGURE EXISTING NATIVE MATERIAL ON–SITE TO ACHIEVE THE PROPOSED DESIGN AS CLOSELY AS PRACTICABLE. ADJUSTMENTS TO CHANNEL ALIGNMENT, PROFILE, AND GEOMETRY MAY BE MADE IN THE FIELD BY THE ENGINEER TO ACCOMODATE EXISTING SITE CONDITIONS AND ENSURE STABILITY AND FUNCTIONALITY OF THE STREAM SYSTEM. PRIORITY SHOULD BE PLACED ON ACHIEVING LONG–TERM CHANNEL AND ROADWAY STABILITY, UTILIZING NATIVE MATERIAL, AND MINIMIZING DISTURBANCE TO SURROUNDING AREAS DURING 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

2022 = 1,500
ADT 2040 = 3,000
T = 8 %
V = 40 MPH

FUNC CLASS =
MINOR ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY WORK PACKAGE #3 = 2.167 MILES

TOTAL LENGTH TIP PROJECT US–74A = 6.064 MILES

Prepared in the Office of:
HDR Engineering, Inc. of the Carolinas
440 S Church St, Suite 1200 Charlotte, NC 28202
N.C.B.E.L.S. License Number: F-0116

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
–

LETTING DATE:
–

PHILLIP E. ROGERS, PE
PROJECT ENGINEER

MATTHEW J. WERDER, PE
PROJECT DESIGN ENGINEER

NATHAN R. TANNER, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER KATIE M. CLATTERBUCK

P.E.

SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.

SIGNATURE:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

HDR Engineering, Inc. of the Carolinas
440 S Church St, Suite 1200 Charlotte, NC 28202
N.C.B.E.L.S. License Number: F-0116

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REVISIONS

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STREAM SITE 1 ALIGNMENT DATA

Chain SS1 contains:
SS1 CUR SS1-1 CUR SS1-2 CUR SS1-3 CUR SS1-4 SS3 SS2

Beginning chain SS1 description

Point SS1 N 645,517.7642 E 1,004,334.8507 Sta 0+00.00

Course from SS1 to PC SS1-1 S 47° 53' 27.17" E Dist 83.7069

Curve Data

Curve SS1-1
P.I. Station 0+91.75 N 645,455.6062 E 1,004,402.2780
Delta = 15° 01' 18.36" (LT)
Degree = 93° 53' 36.22"
Tangent = 8.0455
Length = 15.9987
Radius = 61.0222
External = 0.5281
Long Chord = 15.9530
Mid. Ord. = 0.5236
P.C. Station 0+83.71 N 645,461.6349 E 1,004,396.9503
P.T. Station 0+99.71 N 645,451.1643 E 1,004,408.9862
C.C. N 645,502.0436 E 1,004,442.6760
Back = S 41° 28' 03.58" E
Ahead = S 56° 29' 21.93" E
Chord Bear = S 48° 58' 42.75" E

Course from PT SS1-1 to PC SS1-2 S 58° 20' 46.91" E Dist 125.4961

Curve Data

Curve SS1-2
P.I. Station 2+28.21 N 645,383.8620 E 1,004,518.4504
Delta = 8° 47' 25.84" (LT)
Degree = 146° 27' 48.03"
Tangent = 3.0068
Length = 6.0019
Radius = 39.1195
External = 0.1154
Long Chord = 5.9960
Mid. Ord. = 0.1150
P.C. Station 2+25.20 N 645,385.3061 E 1,004,515.8130
P.T. Station 2+31.20 N 645,382.8379 E 1,004,521.2774
C.C. N 645,419.6186 E 1,004,534.6012
Back = S 61° 17' 47.90" E
Ahead = S 70° 05' 13.75" E
Chord Bear = S 65° 41' 30.83" E

Course from PT SS1-2 to PC SS1-3 S 69° 57' 02.22" E Dist 94.9996

Curve Data

Curve SS1-3
P.I. Station 3+27.70 N 645,349.7786 E 1,004,611.9379
Delta = 3° 22' 12.14" (RT)
Degree = 112° 19' 33.84"
Tangent = 1.5005
Length = 3.0002
Radius = 51.0084
External = 0.0221
Long Chord = 2.9998
Mid. Ord. = 0.0221
P.C. Station 3+26.20 N 645,350.2692 E 1,004,610.5199
P.T. Station 3+29.20 N 645,349.2055 E 1,004,613.3247
C.C. N 645,302.0638 E 1,004,593.8434
Back = S 70° 55' 01.82" E
Ahead = S 67° 32' 49.68" E
Chord Bear = S 69° 13' 55.75" E

Course from PT SS1-3 to PC SS1-4 S 68° 09' 17.63" E Dist 71.5030

Curve Data

Curve SS1-4
P.I. Station 4+05.21 N 645,320.9658 E 1,004,683.8919
Delta = 7° 16' 28.10" (LT)
Degree = 80° 50' 35.20"
Tangent = 4.5052
Length = 8.9983
Radius = 70.8728
External = 0.1430
Long Chord = 8.9922
Mid. Ord. = 0.1428
P.C. Station 4+00.71 N 645,322.5994 E 1,004,679.6934
P.T. Station 4+09.70 N 645,319.8770 E 1,004,688.2636
C.C. N 645,388.8488 E 1,004,705.3920
Back = S 68° 44' 23.51" E
Ahead = S 76° 00' 51.61" E
Chord Bear = S 72° 22' 37.56" E

Course from PT SS1-4 to SS3 S 76° 07' 12.26" E Dist 52.3070

Point SS3 N 645,307.3291 E 1,004,739.0432 Sta 4+62.01

Course from SS3 to SS2 S 85° 52' 50.79" E Dist 35.2509

Point SS2 N 645,304.7970 E 1,004,774.2030 Sta 4+97.26

==========
Ending chain SS1 description

STREAM SITE 2 ALIGNMENT DATA

Chain SS2 contains:
S21 S22 CUR SS2-1 CUR SS2-2 CUR SS2-3 CUR SS2-4 CUR SS2-5 CUR SS2-6 CUR SS2-7 - S24 S25 S26 S23

Beginning chain SS2 description

==========

Point S21 N 642,944.0590 E 1,008,342.6810 Sta 0+00.00

Course from S21 to S22 N 85° 41' 01.63" E Dist 32.4703

Point S22 N 642,946.5027 E 1,008,375.0592 Sta 0+32.47

Course from S22 to PC SS2-1 S 68° 34' 44.48" E Dist 40.9999

Curve Data

Curve SS2-1
P.I. Station 0+83.03 N 642,928.1375 E 1,008,422.1620
Delta = 15° 32' 42.56" (LT)
Degree = 81° 49' 54.15"
Tangent = 9.5569
Length = 18.9965
Radius = 70.0166
External = 0.6492
Long Chord = 18.9383
Mid. Ord. = 0.6433
P.C. Station 0+73.47 N 642,931.5288 E 1,008,413.2270
P.T. Station 0+92.47 N 642,927.2649 E 1,008,431.6790
C.C. N 642,996.9889 E 1,008,438.0725
Back = S 69° 12' 56.29" E
Ahead = S 84° 45' 38.85" E
Chord Bear = S 76° 59' 17.57" E

Course from PT SS2-1 to PC SS2-2 S 85° 59' 19.57" E Dist 57.0000

Curve Data

Curve SS2-2
P.I. Station 1+60.55 N 642,921.9128 E 1,008,499.5355
Delta = 16° 57' 19.71" (RT)
Degree = 77° 04' 26.33"
Tangent = 11.0805
Length = 21.9990
Radius = 74.3387
External = 0.8213
Long Chord = 21.9188
Mid. Ord. = 0.8123
P.C. Station 1+49.47 N 642,923.2776 E 1,008,488.5394
P.T. Station 1+71.47 N 642,917.4005 E 1,008,509.6556
C.C. N 642,849.5050 E 1,008,479.3828
Back = S 92° 55' 28.94" E
Ahead = S 65° 58' 09.23" E
Chord Bear = S 74° 26' 49.09" E

Course from PT SS2-2 to PC SS2-3 S 64° 42' 10.59" E Dist 116.9998

Curve Data

Curve SS2-3
P.I. Station 2+97.51 N 642,863.5821 E 1,008,623.6312
Delta = 13° 45' 03.55" (RT)
Degree = 76° 23' 39.74"
Tangent = 9.0435
Length = 18.0009
Radius = 75.0000
External = 0.5433
Long Chord = 17.9568
Mid. Ord. = 0.5394
P.C. Station 2+88.47 N 642,867.4051 E 1,008,615.4356
P.T. Station 3+06.47 N 642,857.9204 E 1,008,630.6832
C.C. N 642,799.4365 E 1,008,583.7297
Back = S 64° 59' 30.93" E
Ahead = S 51° 14' 27.38" E
Chord Bear = S 58° 06' 59.16" E

Course from PT SS2-3 to PC SS2-4 S 50° 16' 12.64" E Dist 76.9993

Curve Data

Curve SS2-4
P.I. Station 4+06.16 N 642,793.5809 E 1,008,706.8263
Delta = 33° 40' 34.33" (RT)
Degree = 76° 23' 39.74"
Tangent = 22.6983
Length = 44.0820
Radius = 75.0000
External = 3.3595
Long Chord = 43.4503
Mid. Ord. = 3.2155
P.C. Station 3+83.46 N 642,808.7050 E 1,008,689.9008
P.T. Station 4+27.55 N 642,771.6097 E 1,008,712.5252
C.C. N 642,752.7793 E 1,008,639.9276
Back = S 48° 13' 01.63" E
Ahead = S 14° 32' 27.30" E
Chord Bear = S 31° 22' 44.47" E

Course from PT SS2-4 to PC SS2-5 S 14° 32' 27.30" E Dist 71.9180

Curve Data

Curve SS2-5
P.I. Station 5+09.02 N 642,692.7920 E 1,008,733.1358
Delta = 14° 30' 53.75" (LT)
Degree = 76° 23' 39.74"
Tangent = 9.5511
Length = 19.0000
Radius = 75.0000
External = 0.6057
Long Chord = 18.9492
Mid. Ord. = 0.6009
P.C. Station 4+99.46 N 642,701.9953 E 1,008,730.5817
P.T. Station 5+18.46 N 642,684.5226 E 1,008,737.9150
C.C. N 642,722.0512 E 1,008,802.8504
Back = S 15° 30' 36.93" E
Ahead = S 30° 01' 30.68" E
Chord Bear = S 22° 46' 03.80" E

Course from PT SS2-5 to PC SS2-6 S 30° 44' 06.52" E Dist 75.0000

Curve Data

Curve SS2-6
P.I. Station 6+04.02 N 642,610.8208 E 1,008,781.3606
Delta = 14° 32' 46.57" (LT)
Degree = 69° 15' 27.81"
Tangent = 10.5583
Length = 21.0031
Radius = 82.7284
External = 0.6710
Long Chord = 20.9467
Mid. Ord. = 0.6656
P.C. Station 5+93.46 N 642,620.0572 E 1,008,776.2453
P.T. Station 6+14.47 N 642,603.1652 E 1,008,788.6318
C.C. N 642,660.1378 E 1,008,848.6161
Back = S 28° 58' 43.21" E
Ahead = S 43° 31' 29.78" E
Chord Bear = S 36° 15' 06.50" E

Course from PT SS2-6 to PC SS2-7 S 41° 51' 51.87" E Dist 59.9999

Curve Data

Curve SS2-7
P.I. Station 6+97.12 N 642,541.2841 E 1,008,843.4186
Delta = 33° 36' 04.44" (RT)
Degree = 76° 21' 57.62"
Tangent = 22.6531
Length = 44.0003
Radius = 75.0279
External = 3.3452
Long Chord = 43.3724
Mid. Ord. = 3.2025
P.C. Station 6+74.47 N 642,558.4817 E 1,008,828.6739
P.T. Station 7+18.47 N 642,518.8002 E 1,008,846.1823
C.C. N 642,509.6468 E 1,008,771.7149
Back = S 40° 36' 31.61" E
Ahead = S 7° 00' 27.17" E
Chord Bear = S 23° 48' 29.39" E

Course from PT SS2-7 to S24 S 7° 27' 52.56" E Dist 46.0872

Point S24 N 642,473.1036 E 1,008,852.1697 Sta 7+64.56

Course from S24 to S25 S 19° 16' 39.69" E Dist 2.7815

Point S25 N 642,470.4780 E 1,008,853.0880 Sta 7+67.34

Course from S25 to S26 S 8° 32' 04.19" E Dist 14.4268

Point S26 N 642,456.2110 E 1,008,855.2290 Sta 7+81.76

Course from S26 to S23 S 3° 46' 54.44" E Dist 29.8239

Point S23 N 642,426.4520 E 1,008,857.1961 Sta 8+11.59

==========
Ending chain SS2 description

STREAM SITE 3 ALIGNMENT DATA

Chain SS3 contains:
S31 S32 CUR SS3-1 CUR SS3-2 CUR SS3-3 CUR SS3-4 CUR SS3-5 CUR SS3-6 CUR SS3-7 -
S33 S34 CUR SS3-8 CUR SS3-9 CUR SS3-10 CUR SS3-11 S35

Beginning chain SS3 description

==========

Point S31 N 642,407.6722 E 1,008,952.6603 Sta 0+00.00

Course from S31 to S32 N 60° 01' 44.52" E Dist 25.1962

Point S32 N 642,420.2593 E 1,008,974.4873 Sta 0+25.20

Course from S32 to PC SS3-1 N 84° 53' 32.78" E Dist 0.9999

Curve Data

Curve SS3-1
P.I. Station 0+28.20 N 642,420.4397 E 1,008,977.4821
Delta = 4° 32' 12.47" (RT)
Degree = 113° 25' 29.06"
Tangent = 2.0010
Length = 3.9998
Radius = 50.5144
External = 0.0396
Long Chord = 3.9988
Mid. Ord. = 0.0396
P.C. Station 0+26.20 N 642,420.3483 E 1,008,975.4832
P.T. Station 0+30.20 N 642,420.3728 E 1,008,979.4819
C.C. N 642,369.8867 E 1,008,977.7913
Back = N 87° 22' 52.07" E
Ahead = S 88° 04' 55.46" E
Chord Bear = N 89° 38' 58.31" E

Course from PT SS3-1 to PC SS3-2 S 89° 23' 01.85" E Dist 1.0000

STREAM SITE 3 ALIGNMENT DATA (CONTINUED)

Curve Data

Curve SS3-2
P.I. Station 0+32.20 N 642,420.3612 E 1,008,981.4820
Delta = 2° 49' 36.45" (LT)
Degree = 141° 20' 25.51"
Tangent = 1.0002
Length = 2.0000
Radius = 40.5374
External = 0.0123
Long Chord = 1.9998
Mid. Ord. = 0.0123
P.C. Station 0+31.20 N 642,420.3620 E 1,008,980.4818
P.T. Station 0+33.20 N 642,420.4097 E 1,008,982.4810
C.C. N 642,460.8994 E 1,008,980.5146
Back = S 89° 57' 13.28" E
Ahead = N 87° 13' 10.27" E
Chord Bear = N 88° 37' 58.50" E

Course from PT SS3-2 to PC SS3-3 N 87° 19' 59.33" E Dist 2.0000

Curve Data

Curve SS3-3
P.I. Station 0+39.25 N 642,420.7964 E 1,008,988.5235
Delta = 22° 43' 02.29" (RT)
Degree = 283° 49' 20.35"
Tangent = 4.0553
Length = 8.0041
Radius = 20.1872
External = 0.4033
Long Chord = 7.9517
Mid. Ord. = 0.3954
P.C. Station 0+35.20 N 642,420.5028 E 1,008,984.4789
P.T. Station 0+43.20 N 642,419.5052 E 1,008,992.3678
C.C. N 642,400.3685 E 1,008,985.9403
Back = N 85° 50' 54.48" E
Ahead = S 71° 26' 03.23" E
Chord Bear = S 82° 47' 34.37" E

Curve Data

Curve SS3-4
P.I. Station 0+48.22 N 642,417.9681 E 1,008,997.1470
Delta = 12° 40' 41.84" (RT)
Degree = 126° 47' 13.65"
Tangent = 5.0203
Length = 9.9997
Radius = 45.1905
External = 0.2780
Long Chord = 9.9793
Mid. Ord. = 0.2763
P.C. Station 0+43.20 N 642,419.5052 E 1,008,992.3678
P.T. Station 0+53.20 N 642,415.4196 E 1,009,001.4724
C.C. N 642,376.4848 E 1,008,978.5318
Back = S 72° 10' 17.39" E
Ahead = S 59° 29' 35.55" E
Chord Bear = S 65° 49' 56.47" E

Course from PT SS3-4 to PC SS3-5 S 58° 52' 12.69" E Dist 10.9740

Curve Data

Curve SS3-5
P.I. Station 0+68.69 N 642,407.4092 E 1,009,014.7358
Delta = 8° 09' 30.87" (LT)
Degree = 90° 23' 26.96"
Tangent = 4.5206
Length = 9.0259
Radius = 63.3867
External = 0.1610
Long Chord = 9.0183
Mid. Ord. = 0.1606
P.C. Station 0+64.17 N 642,409.7462 E 1,009,010.8661
P.T. Station 0+73.20 N 642,405.6449 E 1,009,018.8979
C.C. N 642,464.0052 E 1,009,043.6357
Back = S 58° 52' 12.69" E
Ahead = S 67° 01' 43.56" E
Chord Bear = S 62° 56' 58.12" E

Course from PT SS3-5 to PC SS3-6 S 66° 29' 19.07" E Dist 10.9999

Curve Data

Curve SS3-6
P.I. Station 0+89.20 N 642,399.2393 E 1,009,033.5604
Delta = 2° 35' 14.33" (RT)
Degree = 25° 52' 23.32"
Tangent = 5.0009
Length = 10.0000
Radius = 221.4488
External = 0.0565
Long Chord = 9.9992
Mid. Ord. = 0.0564
P.C. Station 0+84.20 N 642,401.2567 E 1,009,028.9846
P.T. Station 0+94.20 N 642,397.0174 E 1,009,038.0406
C.C. N 642,198.8272 E 1,008,939.6488
Back = S 66° 12' 29.43" E
Ahead = S 63° 37' 15.09" E
Chord Bear = S 64° 54' 52.26" E

Curve Data

Curve SS3-7
P.I. Station 1+00.70 N 642,394.1603 E 1,009,043.8791
Delta = 0° 40' 14.57" (RT)
Degree = 5° 09' 33.60"
Tangent = 6.5001
Length = 13.0000
Radius = 1,110.5266
External = 0.0190
Long Chord = 12.9999
Mid. Ord. = 0.0190
P.C. Station 0+94.20 N 642,397.0174 E 1,009,038.0406
P.T. Station 1+07.20 N 642,391.2350 E 1,009,049.6837
C.C. N 641,399.5225 E 1,008,549.9081
Back = S 63° 55' 29.28" E
Ahead = S 63° 15' 14.71" E
Chord Bear = S 63° 35' 21.99" E

Course from PT SS3-7 to S33 S 63° 06' 42.08" E Dist 15.0000

Point S33 N 642,384.4512 E 1,009,063.0620 Sta 1+22.20

Course from S33 to S34 S 63° 39' 38.42" E Dist 39.9980

Point S34 N 642,366.7047 E 1,009,098.9076 Sta 1+62.20

Course from S34 to PC SS3-8 S 64° 40' 15.95" E Dist 5.0000

Curve Data

Curve SS3-8
P.I. Station 1+72.20 N 642,362.4051 E 1,009,107.9443
Delta = 7° 43' 28.36" (LT)
Degree = 77° 14' 54.28"
Tangent = 5.0074
Length = 9.9996
Radius = 74.1708
External = 0.1688
Long Chord = 9.9921
Mid. Ord. = 0.1685
P.C. Station 1+67.20 N 642,364.5656 E 1,009,103.4269
P.T. Station 1+77.20 N 642,360.8715 E 1,009,112.7110
C.C. N 642,431.4778 E 1,009,135.4278
Back = S 64° 26' 25.60" E
Ahead = S 72° 09' 53.98" E
Chord Bear = S 68° 18' 09.79" E

Course from PT SS3-8 to PC SS3-9 S 72° 29' 09.46" E Dist 6.9999

Curve Data

Curve SS3-9
P.I. Station 1+89.20 N 642,357.3424 E 1,009,124.1839
Delta = 5° 29' 02.56" (RT)
Degree = 54° 50' 21.21"
Tangent = 5.0039
Length = 10.0002
Radius = 104.4796
External = 0.1198
Long Chord = 9.9964
Mid. Ord. = 0.1196
P.C. Station 1+84.20 N 642,358.7650 E 1,009,119.3864
P.T. Station 1+94.20 N 642,355.4678 E 1,009,128.8234
C.C. N 642,258.5965 E 1,009,089.6835
Back = S 73° 29' 00.03" E
Ahead = S 67° 59' 57.47" E
Chord Bear = S 70° 44' 28.75" E

STREAM SITE 3 ALIGNMENT DATA (CONTINUED)

Curve Data

Curve SS3-10
P.I. Station 2+00.77 N 642,353.1296 E 1,009,134.9643
Delta = 20° 47' 38.33" (RT)
Degree = 159° 59' 05.73"
Tangent = 6.5710
Length = 12.9975
Radius = 35.8132
External = 0.5978
Long Chord = 12.9262
Mid. Ord. = 0.5880
P.C. Station 1+94.20 N 642,355.4678 E 1,009,128.8234
P.T. Station 2+07.19 N 642,348.7636 E 1,009,139.8752
C.C. N 642,321.9986 E 1,009,116.0798
Back = S 69° 09' 19.42" E
Ahead = S 48° 21' 41.09" E
Chord Bear = S 58° 45' 30.26" E

Curve Data

Curve SS3-11
P.I. Station 2+11.00 N 642,346.0407 E 1,009,142.5402
Delta = 1° 22' 52.13" (LT)
Degree = 18° 07' 32.17"
Tangent = 3.8101
Length = 7.6199
Radius = 316.1041
External = 0.0230
Long Chord = 7.6197
Mid. Ord. = 0.0230
P.C. Station 2+07.19 N 642,348.7636 E 1,009,139.8752
P.T. Station 2+14.81 N 642,343.3827 E 1,009,145.2701
C.C. N 642,569.8679 E 1,009,365.7839
Back = S 44° 23' 03.18" E
Ahead = S 45° 45' 55.30" E
Chord Bear = S 45° 04' 29.24" E

Course from PT SS3-11 to S35 S 45° 31' 14.96" E Dist 39.9154

Point S35 N 642,315.4160 E 1,009,173.7500 Sta 2+54.73

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Ending chain SS3 description

STREAM SITE 4 ALIGNMENT DATA

Chain SS4 contains:
ETW325 ETW326 ETW327 S40 CUR SS4-1 CUR SS4-2 CUR SS4-3 CUR SS4-4 CUR SS4-5 CUR-
SS4-6 S41 ETW363 ETW364 ETW365 ETW366 ETW367

Beginning chain SS4 description

==========

Point ETW325 N 642,243.3320 E 1,009,263.4020 Sta 0+00.00

Course from ETW325 to ETW326 S 23° 42' 48.44" E Dist 6.9847

Point ETW326 N 642,236.9370 E 1,009,266.2110 Sta 0+06.98

Course from ETW326 to ETW327 N 67° 19' 54.88" E Dist 4.9352

Point ETW327 N 642,238.8390 E 1,009,270.7650 Sta 0+11.92

Course from ETW327 to S40 N 80° 01' 05.62" E Dist 15.8398

Point S40 N 642,241.5846 E 1,009,286.3650 Sta 0+27.76

Course from S40 to PC SS4-1 S 57° 51' 29.62" E Dist 81.1904

Curve Data

Curve SS4-1
P.I. Station 1+29.08 N 642,187.6802 E 1,009,372.1570
Delta = 30° 02' 56.80" (LT)
Degree = 76° 23' 39.74"
Tangent = 20.1306
Length = 39.3342
Radius = 75.0000
External = 2.6546
Long Chord = 38.8849
Mid. Ord. = 2.5639
P.C. Station 1+08.95 N 642,198.3900 E 1,009,355.1117
P.T. Station 1+48.28 N 642,186.9451 E 1,009,392.2742
C.C. N 642,261.8951 E 1,009,395.0129
Back = S 57° 51' 29.62" E
Ahead = S 87° 54' 26.42" E
Chord Bear = S 72° 52' 58.02" E

Course from PT SS4-1 to PC SS4-2 S 88° 41' 47.25" E Dist 69.8115

Curve Data

Curve SS4-2
P.I. Station 2+43.84 N 642,184.4168 E 1,009,487.7954
Delta = 37° 53' 28.47" (RT)
Degree = 76° 23' 39.74"
Tangent = 25.7450
Length = 49.5995
Radius = 75.0000
External = 4.2957
Long Chord = 48.7006
Mid. Ord. = 4.0630
P.C. Station 2+18.10 N 642,185.3569 E 1,009,462.0676
P.T. Station 2+67.70 N 642,167.8738 E 1,009,507.5219
C.C. N 642,110.4070 E 1,009,459.3290
Back = S 87° 54' 26.42" E
Ahead = S 50° 00' 57.95" E
Chord Bear = S 68° 57' 42.18" E

Course from PT SS4-2 to PC SS4-3 S 50° 20' 45.58" E Dist 50.3674

Curve Data

Curve SS4-3
P.I. Station 3+30.43 N 642,127.7875 E 1,009,555.7735
Delta = 18° 55' 52.23" (LT)
Degree = 77° 15' 57.42"
Tangent = 12.3633
Length = 24.5013
Radius = 74.1540
External = 1.0236
Long Chord = 24.3900
Mid. Ord. = 1.0096
P.C. Station 3+18.06 N 642,135.7319 E 1,009,546.3004
P.T. Station 3+42.56 N 642,123.3463 E 1,009,567.3116
C.C. N 642,192.5505 E 1,009,593.9497
Back = S 50° 00' 57.95" E
Ahead = S 68° 56' 50.18" E
Chord Bear = S 59° 28' 54.07" E

Course from PT SS4-3 to PC SS4-4 S 69° 43' 33.55" E Dist 113.7365

Curve Data

Curve SS4-4
P.I. Station 4+72.33 N 642,078.2508 E 1,009,688.9844
Delta = 24° 07' 17.11" (RT)
Degree = 76° 23' 39.74"
Tangent = 16.0248
Length = 31.5749
Radius = 75.0000
External = 1.6929
Long Chord = 31.3422
Mid. Ord. = 1.6555
P.C. Station 4+56.30 N 642,083.9354 E 1,009,674.0017
P.T. Station 4+87.88 N 642,066.9396 E 1,009,700.3356
C.C. N 642,013.8129 E 1,009,647.3965
Back = S 69° 13' 21.78" E
Ahead = S 45° 06' 04.67" E
Chord Bear = S 57° 09' 43.23" E

Course from PT SS4-4 to PC SS4-5 S 45° 06' 04.67" E Dist 65.6416

STREAM SITE 4 ALIGNMENT DATA (CONTINUED)

Curve Data

Curve SS4-5
P.I. Station 5+67.08 N 642,011.0304 E 1,009,756.4429
Delta = 21° 20' 55.29" (LT)
Degree = 79° 36' 25.44"
Tangent = 13.5661
Length = 26.8176
Radius = 71.9732
External = 1.2674
Long Chord = 26.6627
Mid. Ord. = 1.2454
P.C. Station 5+53.52 N 642,020.6061 E 1,009,746.8332
P.T. Station 5+80.33 N 642,005.6101 E 1,009,768.8791
C.C. N 642,071.5888 E 1,009,797.6359
Back = S 45° 06' 04.67" E
Ahead = S 66° 26' 59.96" E
Chord Bear = S 55° 46' 32.32" E

Course from PT SS4-5 to PC SS4-6 S 67° 42' 19.51" E Dist 98.0415

Curve Data

Curve SS4-6
P.I. Station 6+94.92 N 641,961.6770 E 1,009,874.7017
Delta = 30° 51' 17.20" (RT)
Degree = 95° 33' 59.20"
Tangent = 16.5449
Length = 32.2862
Radius = 59.9539
External = 2.2410
Long Chord = 31.8975
Mid. Ord. = 2.1602
P.C. Station 6+78.38 N 641,968.4162 E 1,009,859.5916
P.T. Station 7+10.66 N 641,948.1422 E 1,009,884.2170
C.C. N 641,913.6614 E 1,009,835.1706
Back = S 65° 57' 46.35" E
Ahead = S 35° 06' 29.15" E
Chord Bear = S 50° 32' 07.75" E

Course from PT SS4-6 to S41 S 25° 09' 47.87" E Dist 46.1110

Point S41 N 641,906.4071 E 1,009,903.8234 Sta 7+56.77

Course from S41 to ETW363 S 50° 17' 34.25" E Dist 4.5802

End Region 1
Equation: Sta 7+61.35 (BK) = Sta 8+17.70 (AH) ----------
Begin Region 2

Point ETW363 N 641,903,4810 E 1,009,907,3470 Sta 8+17,70

Course from ETW363 to ETW364 S 5° 56' 07,11" E Dist 26,8168

Point ETW364 N 641,876,8080 E 1,009,910,1200 Sta 8+44,51

Course from ETW364 to ETW365 S 4° 15' 59,63" W Dist 17,3260

Point ETW365 N 641,859,5300 E 1,009,908,8310 Sta 8+61,84

Course from ETW365 to ETW366 S 17° 08' 38,76" W Dist 13,2372

Point ETW366 N 641,846,8810 E 1,009,904,9290 Sta 8+75,08

Course from ETW366 to ETW367 S 4° 27' 54,42" E Dist 14,4248

Point ETW367 N 641,832.5000 E 1,009,906.0520 Sta 8+89,50

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Ending chain SS4 description

SEE SHEETS NO. 5 FOR –STREAM SITE 1– PROFILE
SEE SHEETS NO. 6–6a FOR –STREAM SITE 2 & 3– PROFILE
SEE SHEETS NO. 7 FOR –STREAM SITE 4– PROFILE

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039	2D–1

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER KATIE M. CLATTERBUCK

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

6/2/99

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: US-74A_CMGC_STREAM.tbl
USER: KCLATTERBU DATE: 6/16/2026 TIME: 5:05:29 PM
FILE: \

STREAM SITE 1A ALIGNMENT DATA

Chain SS1A contains:
SS100 SS101 CUR SS1A-1 CUR SS1A-2 CUR SS1A-3 CUR SS1A-4 CUR SS1A-5 CUR SS1A-6 -
SS102 CUR SS1A-7 CUR SS1A-8 CUR SS1A-9 CUR SS1A-10 CUR SS1A-11 CUR SS1A-12 CUR -
SS1A-13 SS103 SS104

Beginning chain SS1A description
==========

Point SS100 N 644,398.6217 E 1,006,126.4466 Sta 0+00.00

Course from SS100 to SS101 S 46° 10' 49.05" E Dist 24.7572

Point SS101 N 644,381.4800 E 1,006,144.3094 Sta 0+24.76

Course from SS101 to PC SS1A-1 S 56° 09' 49.56" E Dist 8.0000

Curve Data

Curve SS1A-1
P.I. Station 0+34.76 N 644,375.9263 E 1,006,152.6330
Delta = 11° 07' 06.47" (RT)
Degree = 277° 57' 09.47"
Tangent = 2.0064
Length = 4.0001
Radius = 20.6135
External = 0.0974
Long Chord = 3.9939
Mid. Ord. = 0.0970
P.C. Station 0+32.76 N 644,377.0254 E 1,006,150.9545
P.T. Station 0+36.76 N 644,374.5241 E 1,006,154.0680
C.C. N 644,359.7804 E 1,006,139.6617
Back = S 56° 46' 53.23" E
Ahead = S 45° 39' 46.76" E
Chord Bear = S 51° 13' 19.99" E

Course from PT SS1A-1 to PC SS1A-2 S 48° 00' 47.53" E Dist 4.9997

Curve Data

Curve SS1A-2
P.I. Station 0+54.27 N 644,363.5048 E 1,006,167.6649
Delta = 6° 50' 35.67" (LT)
Degree = 27° 22' 52.31"
Tangent = 12.5111
Length = 24.9925
Radius = 209.2523
External = 0.3737
Long Chord = 24.9776
Mid. Ord. = 0.3730
P.C. Station 0+41.76 N 644,371.1795 E 1,006,157.7843
P.T. Station 0+66.75 N 644,357.0620 E 1,006,178.3896
C.C. N 644,536.4357 E 1,006,286.1467
Back = S 52° 09' 42.40" E
Ahead = S 59° 00' 18.07" E
Chord Bear = S 55° 35' 00.24" E

Curve Data

Curve SS1A-3
P.I. Station 0+81.77 N 644,349.7650 E 1,006,191.5151
Delta = 6° 48' 54.94" (RT)
Degree = 22° 43' 03.92"
Tangent = 15.0176
Length = 29.9997
Radius = 252.2070
External = 0.4467
Long Chord = 29.9820
Mid. Ord. = 0.4459
P.C. Station 0+66.75 N 644,357.0620 E 1,006,178.3896
P.T. Station 0+96.75 N 644,340.9619 E 1,006,203.6820
C.C. N 644,136.6295 E 1,006,055.8420
Back = S 60° 55' 42.62" E
Ahead = S 54° 06' 47.68" E
Chord Bear = S 57° 31' 15.15" E

Course from PT SS1A-3 to PC SS1A-4 S 54° 32' 54.96" E Dist 24.0000

Curve Data

Curve SS1A-4
P.I. Station 1+29.25 N 644,322.2672 E 1,006,230.2716
Delta = 4° 51' 54.02" (RT)
Degree = 28° 36' 59.77"
Tangent = 8.5054
Length = 17.0006
Radius = 200.2187
External = 0.1806
Long Chord = 16.9955
Mid. Ord. = 0.1804
P.C. Station 1+20.75 N 644,327.0416 E 1,006,223.2326
P.T. Station 1+37.75 N 644,316.9130 E 1,006,236.8803
C.C. N 644,161.3430 E 1,006,110.8427
Back = S 55° 51' 06.44" E
Ahead = S 50° 59' 12.42" E
Chord Bear = S 53° 25' 09.43" E

Course from PT SS1A-4 to PC SS1A-5 S 51° 14' 58.96" E Dist 11.9998

Curve Data

Curve SS1A-5
P.I. Station 1+66.00 N 644,299.1711 E 1,006,258.8621
Delta = 24° 48' 04.97" (LT)
Degree = 77° 31' 56.39"
Tangent = 16.2487
Length = 31.9884
Radius = 73.8992
External = 1.7653
Long Chord = 31.7393
Mid. Ord. = 1.7241
P.C. Station 1+49.75 N 644,309.4020 E 1,006,246.2388
P.T. Station 1+81.74 N 644,295.1789 E 1,006,274.6128
C.C. N 644,366.8130 E 1,006,292.7691
Back = S 50° 58' 33.59" E
Ahead = S 75° 46' 38.56" E
Chord Bear = S 63° 22' 36.08" E

Course from PT SS1A-5 to PC SS1A-6 S 81° 21' 03.90" E Dist 30.9983

Curve Data

Curve SS1A-6
P.I. Station 2+19.82 N 644,289.3965 E 1,006,312.2580
Delta = 22° 11' 40.45" (RT)
Degree = 158° 32' 23.39"
Tangent = 7.0885
Length = 13.9994
Radius = 36.1397
External = 0.6886
Long Chord = 13.9120
Mid. Ord. = 0.6757
P.C. Station 2+12.74 N 644,290.5174 E 1,006,305.2586
P.T. Station 2+26.74 N 644,285.7147 E 1,006,318.3153
C.C. N 644,254.8324 E 1,006,299.5440
Back = S 80° 54' 06.93" E
Ahead = S 58° 42' 26.48" E
Chord Bear = S 69° 48' 16.70" E

Course from PT SS1A-6 to SS102 S 59° 05' 25.60" E Dist 15.5926

Point SS102 N 644,277.7050 E 1,006,331.6935 Sta 2+42.33

Course from SS102 to PC SS1A-7 S 59° 20' 45.62" E Dist 10.0000

Curve Data

Curve SS1A-7
P.I. Station 2+59.85 N 644,268.9394 E 1,006,346.8670
Delta = 11° 11' 32.52" (RT)
Degree = 74° 36' 24.02"
Tangent = 7.5249
Length = 15.0018
Radius = 76.7971
External = 0.3678
Long Chord = 14.9780
Mid. Ord. = 0.3660
P.C. Station 2+52.33 N 644,272.6064 E 1,006,340.2961
P.T. Station 2+67.33 N 644,264.0667 E 1,006,352.6011
C.C. N 644,205.5456 E 1,006,302.8710
Back = S 60° 50' 06.44" E
Ahead = S 49° 38' 33.92" E
Chord Bear = S 55° 14' 20.18" E

Course from PT SS1A-7 to PC SS1A-8 S 48° 12' 54.03" E Dist 52.9948

STREAM SITE 1A ALIGNMENT DATA (CONTINUED)

Curve Data

Curve SS1A-8
P.I. Station 3+32.35 N 644,220.5427 E 1,006,400.9046
Delta = 9° 24' 23.16" (RT)
Degree = 39° 11' 32.16"
Tangent = 12.0274
Length = 24.0007
Radius = 146.1915
External = 0.4939
Long Chord = 23.9738
Mid. Ord. = 0.4923
P.C. Station 3+20.33 N 644,228.7543 E 1,006,392.1167
P.T. Station 3+44.33 N 644,211.0053 E 1,006,408.2324
C.C. N 644,121.9375 E 1,006,292.3061
Back = S 46° 56' 31.26" E
Ahead = S 37° 32' 08.10" E
Chord Bear = S 42° 14' 19.68" E

Curve Data

Curve SS1A-9
P.I. Station 3+53.38 N 644,203.8477 E 1,006,413.7816
Delta = 15° 35' 35.61" (RT)
Degree = 86° 37' 18.80"
Tangent = 9.0567
Length = 18.0015
Radius = 66.1447
External = 0.6172
Long Chord = 17.9460
Mid. Ord. = 0.6115
P.C. Station 3+44.33 N 644,211.0053 E 1,006,408.2324
P.T. Station 3+62.33 N 644,195.4620 E 1,006,417.2025
C.C. N 644,170.4774 E 1,006,355.9580
Back = S 37° 47' 10.17" E
Ahead = S 22° 11' 34.55" E
Chord Bear = S 29° 59' 22.36" E

Course from PT SS1A-9 to PC SS1A-10 S 19° 25' 46.33" E Dist 31.9887

Curve Data

Curve SS1A-10
P.I. Station 4+03.83 N 644,156.2182 E 1,006,430.6973
Delta = 7° 38' 53.12" (RT)
Degree = 40° 15' 01.02"
Tangent = 9.5148
Length = 19.0013
Radius = 142.3488
External = 0.3176
Long Chord = 18.9872
Mid. Ord. = 0.3169
P.C. Station 3+94.32 N 644,165.2949 E 1,006,427.8435
P.T. Station 4+13.32 N 644,146.8424 E 1,006,432.3177
C.C. N 644,122.6002 E 1,006,292.0483
Back = S 17° 27' 12.40" E
Ahead = S 9° 48' 19.28" E
Chord Bear = S 13° 37' 45.84" E

Curve Data

Curve SS1A-11
P.I. Station 4+28.32 N 644,132.1532 E 1,006,435.3590
Delta = 1° 35' 11.94" (RT)
Degree = 5° 17' 20.11"
Tangent = 15.0007
Length = 29.9995
Radius = 1,083.3172
External = 0.1039
Long Chord = 29.9986
Mid. Ord. = 0.1038
P.C. Station 4+13.32 N 644,146.8424 E 1,006,432.3177
P.T. Station 4+43.32 N 644,117.3855 E 1,006,437.9925
C.C. N 643,927.2009 E 1,005,371.5002
Back = S 11° 41' 51.94" E
Ahead = S 10° 06' 40.00" E
Chord Bear = S 10° 54' 15.97" E

Curve Data

Curve SS1A-12
P.I. Station 4+51.96 N 644,109.1312 E 1,006,440.5619
Delta = 24° 58' 14.66" (RT)
Degree = 146° 45' 17.19"
Tangent = 8.6449
Length = 17.0153
Radius = 39.0419
External = 0.9457
Long Chord = 16.8809
Mid. Ord. = 0.9233
P.C. Station 4+43.32 N 644,117.3855 E 1,006,437.9925
P.T. Station 4+60.33 N 644,100.5639 E 1,006,439.4065
C.C. N 644,105.7818 E 1,006,400.7149
Back = S 17° 17' 24.65" E
Ahead = S 7° 40' 50.01" W
Chord Bear = S 4° 48' 17.32" E

Curve Data

Curve SS1A-13
P.I. Station 4+68.36 N 644,092.5455 E 1,006,438.9999
Delta = 11° 36' 51.49" (RT)
Degree = 72° 34' 43.95"
Tangent = 8.0287
Length = 16.0023
Radius = 78.9428
External = 0.4072
Long Chord = 15.9749
Mid. Ord. = 0.4051
P.C. Station 4+60.33 N 644,100.5639 E 1,006,439.4065
P.T. Station 4+76.33 N 644,084.7732 E 1,006,436.9874
C.C. N 644,104.5617 E 1,006,360.5659
Back = S 2° 54' 10.17" W
Ahead = S 14° 31' 01.66" W
Chord Bear = S 8° 42' 35.92" W

Course from PT SS1A-13 to SS103 S 12° 17' 53.61" W Dist 29.0000

Point SS103 N 644,056.4387 E 1,006,430.8104 Sta 5+05.33

Course from SS103 to SS104 S 0° 15' 54.88" W Dist 34.2103

Point SS104 N 644,022.2287 E 1,006,430.6520 Sta 5+39.54

==========
Ending chain SS1A description

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039	2D–1A

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER KATIE M. CLATTERBUCK

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

SEE SHEETS NO. 5 FOR –STREAM SITE 1– PROFILE
SEE SHEETS NO. 6–6a FOR –STREAM SITE 2 & 3– PROFILE
SEE SHEETS NO. 7 FOR –STREAM SITE 4– PROFILE

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039	2D–2

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

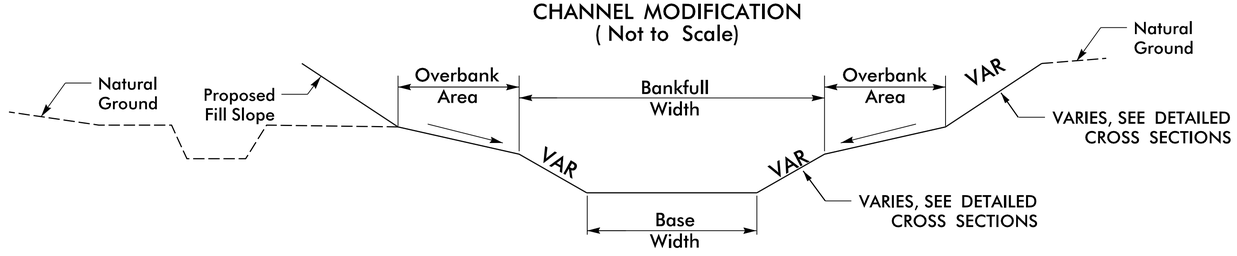
NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER KATIE M. CLATTERBUCK

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

TYPICAL CHANNEL SECTION

CHANNEL MODIFICATION
(Not to Scale)



NOTES:

1. WHERE SUITABLE SOIL MATERIAL EXISTS FOR PLANT GROWTH, OVERBANK AREAS AND HIGHER ELEVATION SLOPES SHALL BE SEEDED WITH RIPARIAN BUFFER SEED MIX. BIOENGINEERING LIVESTAKING SHALL BE PROVIDED AS SHOWN ON PLANS AND IN ALL AREAS WHERE EXISTING TREES ARE REMOVED.

TYPICAL CHANNEL SECTION

VARIABLE	STATION - STATION
STREAM SITE 1	79+20.46 - 83+59.46
STREAM SITE 1A	100+70.04 - 106+17.12
STREAM SITE 2	162+12.67 - 168+83.89
STREAM SITE 3	169+93.93 - 171+91.12
STREAM SITE 4	173+54.26 - 180+72.80

Permanent Riparian Seed Mix (20 lbs/acre w/ cover crop*)

Botanical Name	Common Name	Percentage of Mix	Seed (lbs./acre)
Sorghastrum nutans	Indiangrass	24	4.8
Panicum virgatum	Switchgrass	23	4.6
Andropogon gerardii	Big Bluestem	20.8	4.2
Elymus virginicus	Virginia Wild Rye	20	4
Heliopsis helianthoides	Oxeye Sunflower	3	0.6
Rudbeckia hirta	Black-eyed Susan	3	0.6
Asclepias incarnata	Swamp Milkweed	2	0.4
Monarda fistulosa	Wild Bergamot	1.2	0.2
Helianthus angustifolius	Narrowleaf Sunflower	1	0.2
Aster umbellatus	Flat Topped White Aster	0.5	0.1
Eupatorium perfoliatum	Boneset	0.5	0.1
Solidago nemoralis	Gray Goldenrod	0.5	0.1
Vernonia noveboracensis	New York Ironweed	0.5	0.1

* For a cover crop, use either grain rye (30lbs/acre; 1 Sep to 31 Apr) or Japanese Millet (10 lbs/ acre; 1 May to 31 Aug).

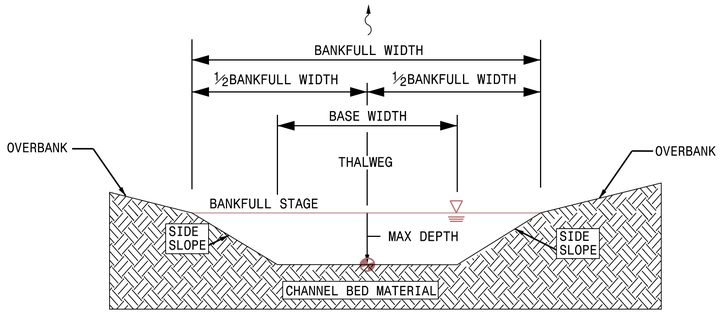
NOTES:

1. CONTRACTOR MAY USE ERNST NC MOUNTAINS RIPARIAN (ERNMX–304) SEED MIX SHOWN IN THE TABLE OR APPROVED EQUAL.

TYPICAL SECTION - RIFFLE

SCALE: NTS
ALL UNITS ARE IN FEET

VARIABLE	STREAM SITE 1	STREAM SITE 1A	STREAM SITE 2	STREAM SITE 3	STREAM SITE 4
BANKFULL WIDTH	25	27	27	29	29
BASE WIDTH	12	12	12	13	13
MAXIMUM DEPTH	2.2	2.5	2.6	2.7	2.7
SIDE SLOPE (H:V)	3:1	3:1	3:1	3:1	3:1



THALWEG (DEEPEST POINT IN CROSS SECTION)
IS LOCATED IN CENTER OF CHANNEL IN A RIFFLE.

NOTES:
- ALL CROSS SECTIONS ARE SHOWN LOOKING IN THE (DOWNSTREAM) DIRECTION.
- ⊕ - GRADE POINT IS THE ELEVATION SHOWN ON PROFILE.
- ALL SHARP CORNERS SHOULD BE ROUNDED
- CONSTRUCT CHANNEL BED USING LOCAL MATERIAL CONSISTING OF GRAVEL, COBBLE, AND BOULDERS. LARGEST LOCAL MATERIAL SHOULD BE UTILIZED IN THE OVERBANK AREA.

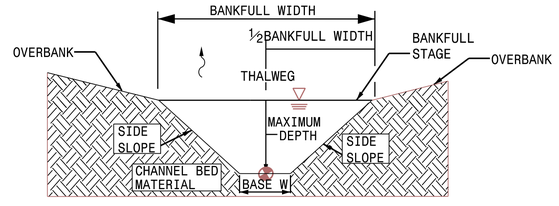
	Estimated Bankfull Flow Based on Regional Curves	
Stream Site	cfs	gpm
SS1	199	89300
SS1A	265	119000
SS2	303	136200
SS3	315	141500
SS4	315	141500

		Stream Site									
		SS1		SS1A		SS2		SS3		SS4	
Parameter	Unit	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Riffle Slope	%	-2	-6	-2	-10	-4	-6	-3	-6	-2	-6
Run Slope	%	-12	-25	-20	-45	-15	-30	-10	-25	-12	-25
Pool Slope	%	2	5	2	5	2	5	2	5	2	5
Glide Slope	%	6	15	5	15	12	25	6	15	6	15
Riffle Length	Ft	20	30	10	20	10	20	25	35	25	35
Pool Length	Ft	15	25	8	15	8	15	20	30	20	30

TYPICAL SECTION - POOL

SCALE: NTS
ALL UNITS ARE IN FEET

VARIABLE	STREAM SITE 1	STREAM SITE 1A	STREAM SITE 2	STREAM SITE 3	STREAM SITE 4
BANKFULL WIDTH	28	30	30	32	32
BASE WIDTH	11.5	11.6	11.5	12.6	12.6
MAX DEPTH	3.2	3.6	3.7	3.8	3.8
SIDE SLOPE (H:V)	2.5:1	2.5:1	2.5:1	2.5:1	2.5:1



THALWEG (DEEPEST POINT IN A CROSS SECTION)
IS LOCATED IN THE MIDDLE OF THE BASE WIDTH.

NOTES:
- ALL CROSS SECTIONS ARE SHOWN LOOKING IN THE (DOWNSTREAM) DIRECTION.
- ⊕ - GRADE POINT IS THE ELEVATION SHOWN ON PROFILE.
- ALL SHARP CORNERS SHOULD BE ROUNDED
- CONSTRUCT CHANNEL BED USING LOCAL MATERIAL CONSISTING OF GRAVEL, COBBLE, AND BOULDERS. LARGEST LOCAL MATERIAL SHOULD BE UTILIZED IN THE OVERBANK AREA.

NOTES:

1. PROVIDED RANGES ARE ALLOWABLE ADJUSTMENTS FROM SPECIFIED DESIGN PARAMETERS DURING IN–FIELD ADJUSTMENTS AS APPROVED BY ENGINEER.

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: US-74A_CMGC_STREAM.tbl
DATE: 6/16/2026
TIME: 5:05:34 PM

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039	2D–3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER KATIE M. CLATTERBUCK

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA

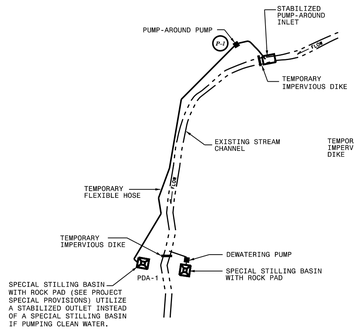
1. INSTALL SPECIAL STILLING BASIN(S).
2. INSTALL STABILIZED PUMP AROUND INLET, UPSTREAM PUMP, AND TEMPORARY FLEXIBLE HOSE.
3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
5. PERFORM STREAM MODIFICATION WORK IN ACCORDANCE WITH THE PLANS.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE. (DOWNSTREAM IMPERVIOUS DIKES FIRST).
7. ALL GRADING AND STABILIZATION MUST BE COMPLETED AT THE END OF EACH WORK DAY WITHIN THE PUMP AROUND AREAS BETWEEN THE IMPERVIOUS DIKES. THE IMPERVIOUS DIKE LOCATIONS AS SHOWN ON THIS SHEET ONLY SHOW THE UPPER AND LOWER EXTENT OF WORK FOR EACH STREAM SEGMENT. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF THE IMPERVIOUS DIKE(S) FOR EACH DAY'S WORK.
8. REMOVE SPECIAL STILLING BASIN(S) AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

NOTES:

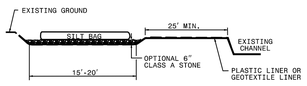
1. ALL EXCAVATION SHALL BE PERFORMED IN ONLY DRY OR ISOLATED SECTIONS OF CHANNEL.
2. IMPERVIOUS DIKES ARE TO BE USED TO ISOLATE WORK FROM STREAM FLOW WHEN NECESSARY.
3. SAND BAGS SHALL BE FILLED WITH CLEAN MASONRY SAND OR CLEAN #57 STONE.
4. ALL GRADED AREAS SHALL BE STABILIZED WITHIN 24 HOURS.
5. MAINTENANCE OF STREAM FLOW OPERATIONS SHALL BE INCIDENTAL TO THE WORK. THIS INCLUDES POLYETHYLENE SHEETING, DIVERSION PIPES, PUMPS AND HOSES.
6. PUMPS AND HOSES SHALL BE OF SUFFICIENT SIZE TO DEWATER THE WORK AREA.
7. SIDESLOPES OF RESTORED CHANNEL SHALL BE MATTED PRIOR TO TURNING WATER INTO CHANNEL. SEE TYPICAL MATTING LOCATION DETAIL.
8. CONTRACTOR IS RESPONSIBLE FOR DETERMINING & AQUIRING THE PROPER SIZED PUMP. SEE BANKFULL CHANNEL FLOW TABLE PROVIDED ON SHEET 2D-2 FOR GUIDANCE.
9. WATER PUMPED FROM EXCAVATIONS SHALL BE DISCHARGED INTO A GEOTEXTILE SILT BAG AND SHALL PROVIDE MEASURES TO PREVENT DISCHARGE FROM EXCEEDING 10 NTU'S. CONTRACTOR MAY UTILIZE FLOCCULANTS TO SETTLE OUT PARTICLES.

PUMP-AROUND OPERATION

SCALE:NTS

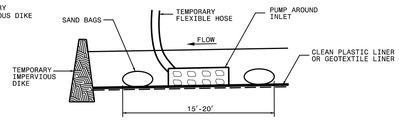


PUMP-AROUND OPERATION
PLAN VIEW

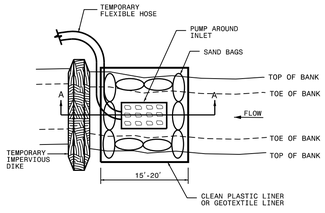


NOTE: PROVIDE STABILIZED OUTLET

STILLING BASIN WITH ROCK PAD



STABILIZED PUMP-AROUND INLET
SECTION A-A



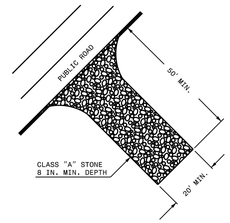
STABILIZED PUMP-AROUND INLET
PLAN VIEW

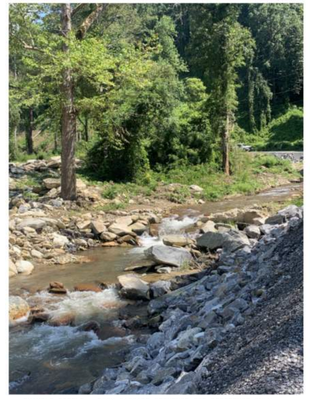
TEMPORARY GRAVEL CONSTRUCTION ENTRANCE

SCALE:NTS

NOTES:

1. TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS SHALL BE PROVIDED.
2. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.
3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOP DRESSING WITH STONE WILL BE NECESSARY.
4. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.
5. GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE MUST BE PROVIDED.
6. FILTER FABRIC TO BE PLACED BENEATH STONE.



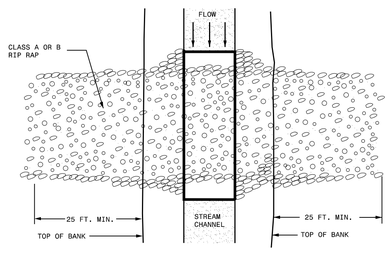


EXAMPLE RIFFLE - ROCK CASCADE SEQUENCE FOR REFERENCE ONLY.

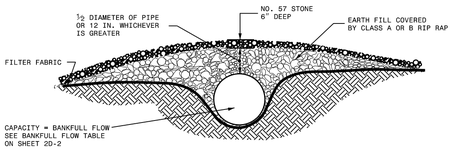
TEMPORARY STREAM CROSSING

SCALE:NTS

NOTES:
1. FOR USE IN EXISTING CHANNEL ONLY. NOT FOR USE IN MODIFIED CHANNEL.
2. LOG MAT BRIDGE MAY BE USED IN LIEU OF TEMPORARY PIPE CROSSING.



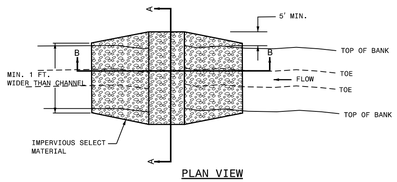
PLAN VIEW



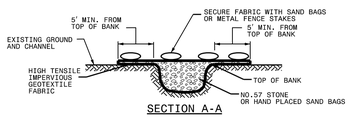
PROFILE VIEW

TEMPORARY IMPERVIOUS CHANNEL PLUG

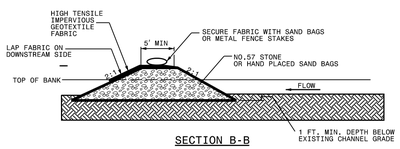
SCALE: NTS



PLAN VIEW



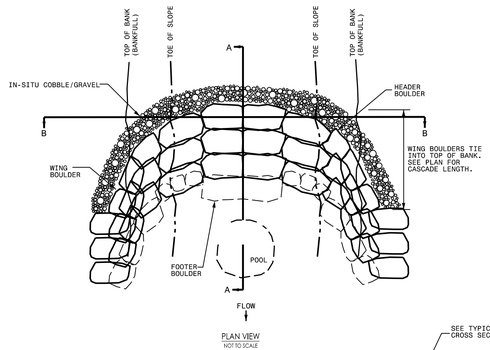
SECTION A-A



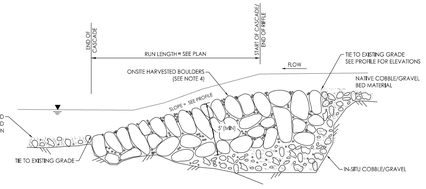
SECTION B-B

RIFFLE - ROCK CASCADE SEQUENCE

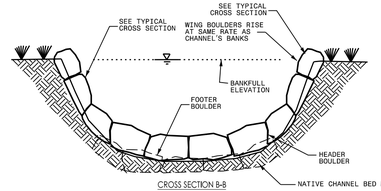
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PLAN VIEW
NOT TO SCALE



SECTION A-A
NOT TO SCALE



CROSS SECTION B-B
NOT TO SCALE

NOTES:

1. DIMENSIONS ARE APPROXIMATE AND MAY BE SUBJECT TO CHANGE BASED ON FIELD CONDITIONS AND THE DIRECTION OF THE ENGINEER AND/OR THE CLIENT REPRESENTATIVE.
2. CONSTRUCT CASCADE STRUCTURE BEGINNING AT THE DOWNSTREAM END AND MOVING IN THE UPSTREAM DIRECTION.
3. PLACE BOULDERS SO THEY ARE TOUCHING AND ORIENTED WITH THEIR DOWNSTREAM END PITCHED UP INTO THE FLOW AS SHOWN.
4. BOULDERS SHALL BE SOURCED ON SITE WITH SIZE DIMENSIONS MEETING THE MINIMUM RANGE OF 36"-48"(L) X 36"-48"(W) X 24"-36"(D). NON-NATIVE CLASS VII AND LARGER RIPRAP AND BOULDERS CAN BE USED IN NON-EXPOSED LOWER LAYERS OF THE IN-STREAM CONSTRUCTION WHEN A SUFFICIENT AMOUNT OF ONSITE HARVESTED BOULDERS ARE NOT AVAILABLE.

REVISIONS

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DATE: 5/8/2026
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PROJECT REFERENCE NO.	SHEET NO.
18314.1045039	2D–4

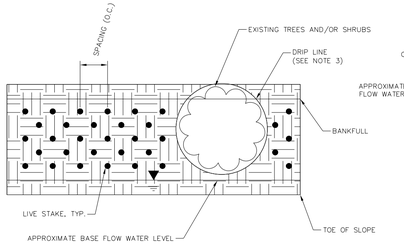
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

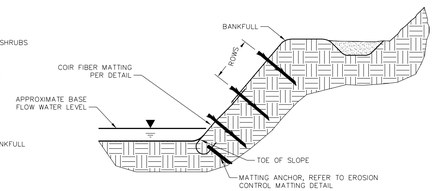
NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER KATIE M. CLATTERBUCK

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116



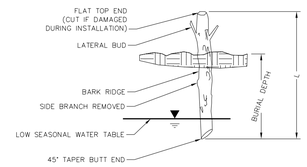
PLAN VIEW



TYPICAL SECTION

NOTES:

1. LIVE STAKES SHALL BE INSTALLED ON FINISHED STREAM BANKS. "FINISHED" GENERALLY REFERS TO ANY AND/OR ALL OF THE FOLLOWING AS SPECIFIED BY THE DESIGNER:
   A. GRADED
   B. PREPARED (ROTO-TILLED, RAKED, AND AMENDED),
   C. SEEDED,
   D. MULCHED, AND
   E. COVERED WITH EROSION CONTROL MATTING.
2. LIVE STAKES SHALL BE FASHIONED FROM DORMANT CUTTINGS OF WOODY PLANT SPECIES (TREES AND SHRUBS) IN ACCORDANCE WITH THE PLANTING TABLE THIS SHEET OR APPROVED EQUAL.
3. LIVE STAKES SHALL NOT BE PLACED WITHIN THE DRIP LINE OF ANY EXISTING TREES AND/OR SHRUBS THAT REMAIN ON THE BANKS.
4. LIVE STAKES SHALL NOT BE PLANTED WITHIN 5 FEET OF HEADWALL, WINGWALL, OR OTHER INFRASTRUCTURE.
5. DETAILED HANDLING, PREPARATION, AND INSTALLATION GUIDELINES FOR LIVE STAKES SHALL BE SPECIFIED BY THE DESIGNER, INCLUDING:
   A. LIVE STAKES MAY BE STORED UP TO 10 DAYS IN WATER.
   B. ALL LATERAL BRANCHES SHALL BE CAREFULLY REMOVED FROM THE WOODY CUTTINGS PRIOR TO INSTALLATION.
   C. LIVE STAKES SHALL BE DRIVEN INTO THE GROUND USING A "DEAD BLOW" PLASTIC HAMMER, BY CREATING A PILOT HOLE AND SLIPPING THE STAKE INTO IT, OR WITH THE USE OF A HYDRAULIC INJECTION SYSTEM. SOIL SHALL BE FIRMLY PACKED AROUND THE HOLE AFTER INSTALLATION.
   D. SPLIT OR OTHERWISE DAMAGED LIVE STAKES SHALL NOT BE USED.



LIVE STAKE DETAIL

DESIGN VARIABLES	
DIAMETER	1/2"–2"
LENGTH	2' – 3'
BURIAL DEPTH	4/5L
SPACING (O.C.)	3'
ROWS [1]	SEE PLANS
PLACEMENT OF 1ST ROW FROM TOE OF SLOPE	0.5'

[1] ROWS SHOULD BE EQUALLY SPACED WITHIN THE IDENTIFIED PLANTING AREAS SHOWN ON THE PLANS.

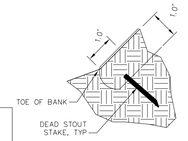
NOT TO SCALE

LIVE STAKING

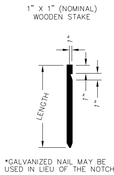
Live Stakes			
Botanical Name	**Common Name**	**Stratum**	**Percent of Total Livestakes by Stream Site**
Cornus amomum	Silky Dogwood	Shrub	25
Salix nigra	Black Willow	Shrub	30
Salix sericea	Silky Willow	Shrub	30
Sambucus canadensis	Elderberry	Shrub	15

NOTES:

1. THE SLOPE AND/OR STREAM BANK SHALL BE PREPARED (GRADED, TILLED, SMOOTHED, ETC.) AND SEEDED AND MULCHED AS SPECIFIED BY THE DESIGNER PRIOR TO THE PLACEMENT OF THE MATTING.
2. THE MATTING SHALL BE INSTALLED SO AS TO NOT BE IN TENSION, BUT BE PLACED NEATLY, FLUSH AGAINST THE SOIL, AND WITH NO GAPS OR WRINKLES.
3. MATTING SHALL BE NEATLY SECURED AROUND ANY PROJECT STRUCTURES, STRUCTURE ARMS, AND/OR SILLS TO PREVENT ANY LOOSE OR FRAYED EDGES.
4. THERE SHALL BE NO LOOSE ENDS OR UNSECURED MATTING ON THE COMPLETED WORK.

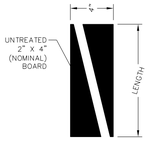


MATTING ANCHOR DETAIL



*GALVANIZED NAIL MAY BE USED IN LIEU OF THE NOTCH.

STAKE - OPTION 1



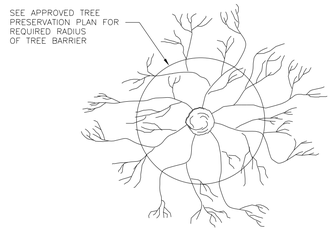
DEAD STOUT STAKE - OPTION 2

NOT TO SCALE

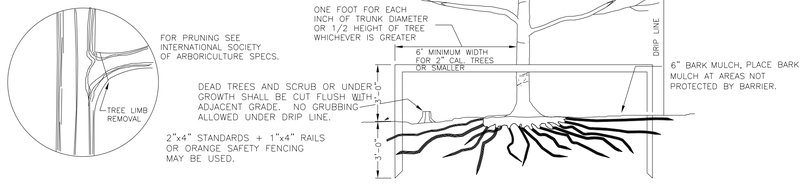
COIR MATTING BANK STABILIZATION

NOTES:

1. REMOVE ALL BARRIERS UPON COMPLETION OF PROJECT.



PLAN VIEW OF ROOT ZONE



TREE PROTECTION

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: US-74A_CMGC_STREAM.tbl
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PROJECT REFERENCE NO.	SHEET NO.
18314.1045039	05

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER MATTIE M. CLATTERBUCK

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

NAD 83 / NA 2011

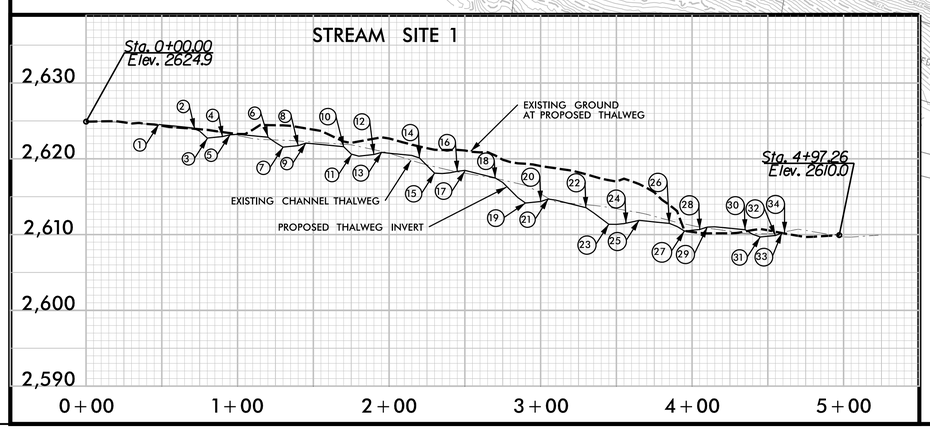
STREAM SITE 1

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

PT Sta. 0+99.78
PC Sta. 0+83.41
PC Sta. 4+00.71
PT Sta. 4+09.70
PT Sta. 4+62.01
POT Sta. 4+97.26
PC Sta. 2+25.20
PT Sta. 2+31.20
STREAM CONSTRUCTION LIMITS
POT Sta. 0+00.00
BEGIN STREAM CONSTRUCTION SS1 Sta. 0+48.10 L Sta. 79+20.46
END STREAM CONSTRUCTION SS1 Sta. 4+67.41 L Sta. 83+59.46
PROPOSED STREAM CENTERLINE
BOTTOM OF BANK
TOP OF BANK
EXISTING CENTERLINE
PC Sta. 3+26.20
PT Sta. 3+29.20
PROPOSED SLOPE EMBANKMENT PROTECTION SEE ROADWAY PLANS

KONATOSA CIR
KELLY HILL RD
POND LN
HICKORY CREEK
ROCK OUTCROP
75+00
85+00
-L-

FRIDDELL, TENA;HOPKINS, RONALD LAWRENCE Deed Book/Page 003327/000357
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BRETON, AUGUST; BRETON, NICHOLE LEIGH Deed Book/Page 00I5I9/00434
ROOTED IN GERTON LLC Deed Book/Page 004307/000597
STEPP, THOMAS L; STEPP, SARAH C Deed Book/Page 00139I/000594
THOMAS STEPP Deed Book/Page 00139I/000594
RONALD HOPKINS Deed Book/Page 00396I/00028I
BEARWALLOW BAPTIST CHURCH Deed Book/Page 00156/000404
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OWENSBY, ETAL. Book/Page DE/000396
EILEEN FENRELL Deed Book/Page 00I68I/000432
MARGARET WHITT Deed Book/Page 00I374/000276
DAVID EARNHARDT, ETAL. Deed Book/Page 003997/000357
CHESTNUT HILLS HOMEOWNERS ASSOC., INC. Deed Book/Page 00I015/000228
UPPER HICKORY NUT GORGE COMMUNITY CENTER Deed Book/Page 000402/000648
LASURE, DANIEL W III;LASURE, L/ Deed Book/Page 0004133/000380



POINTID	FEATURE	STATION	CHANNEL CL ELEV	CHANNEL SLOPE	BKF ELEV	BKF WIDTH (FT)	BKF DEPTH (FT)
1	Head of Riffle	0+48.10	2624.53	-2.00%	2626.73	25	2.2
2	Head of Cascade	0+73.10	2624.03	-20.00%		25	
3	Mid Pool	0+79.60	2622.73	2.00%	2625.93	28	3.2
4	Glide	0+92.60	2622.99	8.00%		28	
5	Head of Riffle	0+96.60	2623.31	-2.00%	2625.51	25	2.2
6	Head of Cascade	1+21.60	2622.81	-20.00%		25	
7	Mid Pool	1+28.10	2621.51	2.00%	2624.71	28	3.2
8	Glide	1+41.10	2621.77	8.00%		28	
9	Head of Riffle	1+45.10	2622.09	-2.00%	2624.29	25	2.2
10	Head of Cascade	1+70.10	2621.59	-20.00%		25	
11	Mid Pool	1+76.60	2620.29	2.00%	2623.49	28	3.2
12	Glide	1+89.60	2620.55	8.00%		28	
13	Head of Riffle	1+93.60	2620.87	-2.00%	2623.07	25	2.2
14	Head of Cascade	2+18.60	2620.37	-20.00%		25	
15	Mid Pool	2+30.60	2617.97	2.00%	2621.17	28	3.2
16	Glide	2+43.60	2618.23	9.00%		28	
17	Head of Riffle	2+47.60	2618.59	-5.00%	2620.79	25	2.2
18	Head of Cascade	2+72.60	2617.34	-20.00%		25	
19	Mid Pool	2+88.60	2614.14	2.00%	2617.34	28	3.2
20	Glide	3+01.60	2614.40	9.00%		28	
21	Head of Riffle	3+05.60	2614.76	-5.00%	2616.96	25	2.2
22	Head of Cascade	3+30.60	2613.51	-15.00%		25	
23	Mid Pool	3+45.60	2611.26	2.00%	2614.46	28	3.2
24	Glide	3+58.60	2611.52	10.00%		28	
25	Head of Riffle	3+62.60	2611.92	-2.00%	2614.12	25	2.2
26	Head of Cascade	3+87.60	2611.42	-15.00%		25	
27	Mid Pool	3+94.10	2610.45	2.00%	2613.65	28	3.2
28	Glide	4+07.10	2610.71	10.00%		28	
29	Head of Riffle	4+11.10	2611.11	-2.00%	2613.31	25	2.2
30	Head of Cascade	4+36.10	2610.61	-15.00%		25	
31	Mid Pool	4+42.60	2609.63	2.00%	2612.83	28	3.2
32	Glide	4+55.60	2609.89	10.00%		28	
33	Head of Riffle	4+59.60	2610.29	-4.00%	2612.49	25	2.2
34	Tie-In	4+61.91	2610.20			25	

LEGEND:
- BIOENGINEERING LIVE STAKING AREA
- REFORESTATION AREA

NOTE:
1. ENGINEER MAY MAKE CHANNEL ALIGNMENT AND PROFILE ADJUSTMENTS IN THE FIELD BASED ON SITE CONDITIONS INCLUDING EXISTING STREAM CROSSING STRUCTURES.
2. PRIVATE BRIDGES AND CULVERTS TO BE DESIGNED IN SEPARATE PROJECTS AND NOT INCLUDED ON THESE PLANS.

SEE SHEET 2D-1 FOR STREAM ALIGNMENT DATA

REVISIONS

6/2/99

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TIME: 5:05:52 PM

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039	05A

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER KATIE M. CLATTERBUCK

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LEGEND:

BIOENGINEERING LIVE STAKING AREA

REFORESTATION AREA

NOTE:
1. ENGINEER MAY MAKE CHANNEL ALIGNMENT AND PROFILE ADJUSTMENTS IN THE FIELD BASED ON SITE CONDITIONS INCLUDING EXISTING STREAM CROSSING STRUCTURES.
2. PRIVATE BRIDGES AND CULVERTS TO BE DESIGNED IN SEPARATE PROJECTS AND NOT INCLUDED ON THESE PLANS.

SEE SHEET 2D–1A FOR STREAM ALIGNMENT DATA

NAD 83 – NA 2011

STREAM SITE 1A

CONTRACTOR TO AVOID REMOVAL OF EXISTING TREES WITHIN THE TEMPORARY EASEMENT AREA ADJACENT TO THE STREAM AS MUCH AS PRACTICABLE. SEE PENDING REFORESTATION PLAN FOR PROPOSED TREE PLANTINGS.

PROPOSED SLOPE EMBANKMENT PROTECTION SEE ROADWAY PLANS

BEGIN STREAM CONSTRUCTION SS1A Sta. 0+24.76 L Sta. 100+70.04

END STREAM CONSTRUCTION SS1A Sta. 5+05.33 L Sta. 106+17.12

STREAM CONSTRUCTION LIMITS

PROPOSED STREAM CENTERLINE

TOP OF BANK

BOTTOM OF BANK

EXISTING STREAM CENTERLINE

PI Sta. 2+42.33
PT Sta. 1+81.74
PC Sta. 1+49.75
PRC Sta. 0+66.75
PC Sta. 0+41.76
PI Sta. 0+24.76
POT Sta. 0+00.00

PC Sta. 0+32.76
PT Sta. 0+36.76
PT Sta. 0+96.75
PC Sta. 1+20.75
PT Sta. 1+37.75

PC Sta. 2+12.74
PT Sta. 2+26.74
PC Sta. 2+52.33
PT Sta. 2+67.33

PC Sta. 3+20.33
PCC Sta. 3+44.33
PT Sta. 3+62.33
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PT Sta. 4+76.33
PI Sta. 5+05.33
POT Sta. 5+39.54

PAUL WILSON Deed Book/Page 001333/000245

WILLIAM MITCHELL Deed Book/Page 003828/000005

L&S OATES FAMILY LIMITED PARTNERSHIP Deed Book/Page 001248/000654

HICKORY NUT FOREST LLC Deed Book/Page 001290/00077 002017/10762

HICKORY NUT FOREST LLC Deed Book/Page 001290/00077 002017/10762

MICHAEL LUCHI ANN Deed Book/Page 001484/00059

HICKORY NUT FOREST HOMEOWNERS ASSOC., INC. Deed Book/Page 003168/000065

HICKORY CREEK

POINT ID	FEATURE	STATION	CHANNEL CL ELEV	CHANNEL SLOPE	BKF ELEV	BKF WIDTH (FT.)	BKF DEPTH (FT.)
1	Head of Riffle	0+24.76	2561.30	-10.00%	2563.6	27	2.5
2	Head of Cas cade	0+37.76	2560.00	-35.00%		27	
3	Mid Pool	0+41.76	2558.60	-2.00%	2562.2	30	3.6
4	Glide	0+47.76	2558.72	5.00%		30	
5	Head of Riffle	0+53.76	2559.87	-10.00%	2561.37	27	2.5
6	Head of Cas cade	0+63.76	2557.57	-29.00%		27	
7	Mid Pool	0+67.76	2556.41	3.00%	2560.01	30	3.6
8	Glide	0+73.76	2556.59	7.00%		30	
9	Head of Riffle	0+76.76	2556.60	-6.00%	2559.3	27	2.5
10	Head of Cas cade	0+89.76	2556.02	-29.00%		27	
11	Mid Pool	0+93.76	2554.86	3.00%	2558.46	30	3.6
12	Glide	0+99.76	2555.04	7.00%		30	
13	Head of Riffle	1+02.76	2555.25	-6.00%	2557.75	27	2.5
14	Head of Cas cade	1+15.76	2554.47	-29.00%		27	
15	Mid Pool	1+19.76	2553.31	3.00%	2556.91	30	3.6
16	Glide	1+25.76	2553.49	7.00%		30	
17	Head of Riffle	1+28.76	2553.70	-6.00%	2556.2	27	2.5
18	Head of Cas cade	1+41.76	2552.92	-29.00%		27	
19	Mid Pool	1+45.76	2551.76	3.00%	2555.36	30	3.6
20	Glide	1+51.76	2551.94	7.00%		30	
21	Head of Riffle	1+54.76	2552.15	-6.00%	2554.65	27	2.5
22	Head of Cas cade	1+67.76	2551.37	-29.00%		27	
23	Mid Pool	1+71.76	2550.21	3.00%	2553.81	30	3.6
24	Glide	1+77.76	2550.38	7.00%		30	
25	Head of Riffle	1+80.76	2550.60	-6.00%	2553.1	27	2.5
26	Head of Cas cade	1+93.76	2549.82	-29.00%		27	
27	Mid Pool	1+97.76	2548.66	3.00%	2552.26	30	3.6
28	Glide	2+03.76	2548.84	7.00%		30	
29	Head of Riffle	2+06.76	2549.05	-6.00%	2551.55	27	2.5
30	Head of Cas cade	2+19.76	2548.27	-29.00%		27	
31	Mid Pool	2+23.76	2547.11	3.00%	2550.71	30	3.6
32	Glide	2+29.76	2547.29	7.00%		30	
33	Head of Riffle	2+32.76	2547.50	-6.00%	2550	27	2.5
34	Head of Cas cade	2+45.76	2546.72	-29.00%		27	
35	Mid Pool	2+49.76	2546.56	3.00%	2549.16	30	3.6
36	Glide	2+55.76	2546.74	7.00%		30	
37	Head of Riffle	2+58.76	2546.95	-6.00%	2548.45	27	2.5
38	Head of Cas cade	2+71.76	2546.17	-29.00%		27	
39	Mid Pool	2+75.76	2544.01	3.00%	2547.61	30	3.6
40	Glide	2+81.76	2544.19	7.00%		30	
41	Head of Riffle	2+84.76	2544.40	-3.00%	2546.9	27	2.5
42	Head of Cas cade	2+97.76	2544.01	-21.00%		27	
43	Mid Pool	3+01.76	2543.17	2.00%	2546.77	30	3.6
44	Glide	3+07.76	2543.29	8.00%		30	
45	Head of Riffle	3+10.76	2543.53	-3.00%	2546.03	27	2.5
46	Head of Cas cade	3+23.76	2543.14	-21.00%		27	
47	Mid Pool	3+27.76	2542.30	2.00%	2545.9	30	3.6
48	Glide	3+33.76	2542.42	8.00%		30	
49	Head of Riffle	3+36.76	2542.66	-3.00%	2545.16	27	2.5
50	Head of Cas cade	3+49.76	2542.27	-21.00%		27	
51	Mid Pool	3+53.76	2541.43	2.00%	2545.03	30	3.6
52	Glide	3+59.76	2541.55	8.00%		30	
53	Head of Riffle	3+62.76	2541.79	-3.00%	2544.29	27	2.5
54	Head of Cas cade	3+75.76	2541.40	-21.00%		27	
55	Mid Pool	3+79.76	2540.56	2.00%	2544.16	30	3.6
56	Glide	3+85.76	2540.68	8.00%		30	
57	Head of Riffle	3+88.76	2540.92	-3.00%	2543.42	27	2.5
58	Head of Cas cade	4+01.76	2540.53	-21.00%		27	
59	Mid Pool	4+05.76	2539.69	2.00%	2543.29	30	3.6
60	Glide	4+11.76	2539.81	8.00%		30	
61	Head of Riffle	4+14.76	2540.05	-21.00%	2542.55	27	2.5
62	Head of Cas cade	4+24.76	2537.96	-45.00%		27	
63	Mid Pool	4+37.76	2532.10	3.00%	2535.7	30	3.6
64	Glide	4+43.76	2532.28	4.00%		30	
65	Head of Riffle	4+49.76	2532.40	-2.50%	2534.9	27	2.5
66	Head of Cas cade	4+59.76	2532.08	-25.00%		27	
67	Mid Pool	4+63.76	2531.08	3.00%	2534.675	30	3.6
68	Glide	4+69.76	2531.26	12.00%		30	
69	Head of Riffle	4+72.76	2531.62	-2.50%	2534.115	27	2.5
70	Head of Cas cade	4+85.76	2531.29	-25.00%		27	
71	Mid Pool	4+89.76	2530.29	3.00%	2533.89	30	3.6
72	Glide	4+95.76	2530.47	12.00%		30	
73	Head of Riffle	4+98.76	2530.83	-2.00%	2533.33	27	2.5
74	Tie-In	5+05.69	2530.69			27	

STREAM SITE 1A

EXISTING GROUND AT PROPOSED THALWEG

EXISTING CHANNEL THALWEG

PROPOSED THALWEG INVERT

Sta. 0+00.00 Elev. 2562.3

Sta. 5+39.54 Elev. 2528.9

2,565
2,555
2,545
2,535
2,525

0+00 1+00 2+00 3+00 4+00 5+00

REVISIONS

6/2/99

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PROJECT REFERENCE NO.	SHEET NO.
18314.1045039	06

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER KATIE M. CLATTERBUCK

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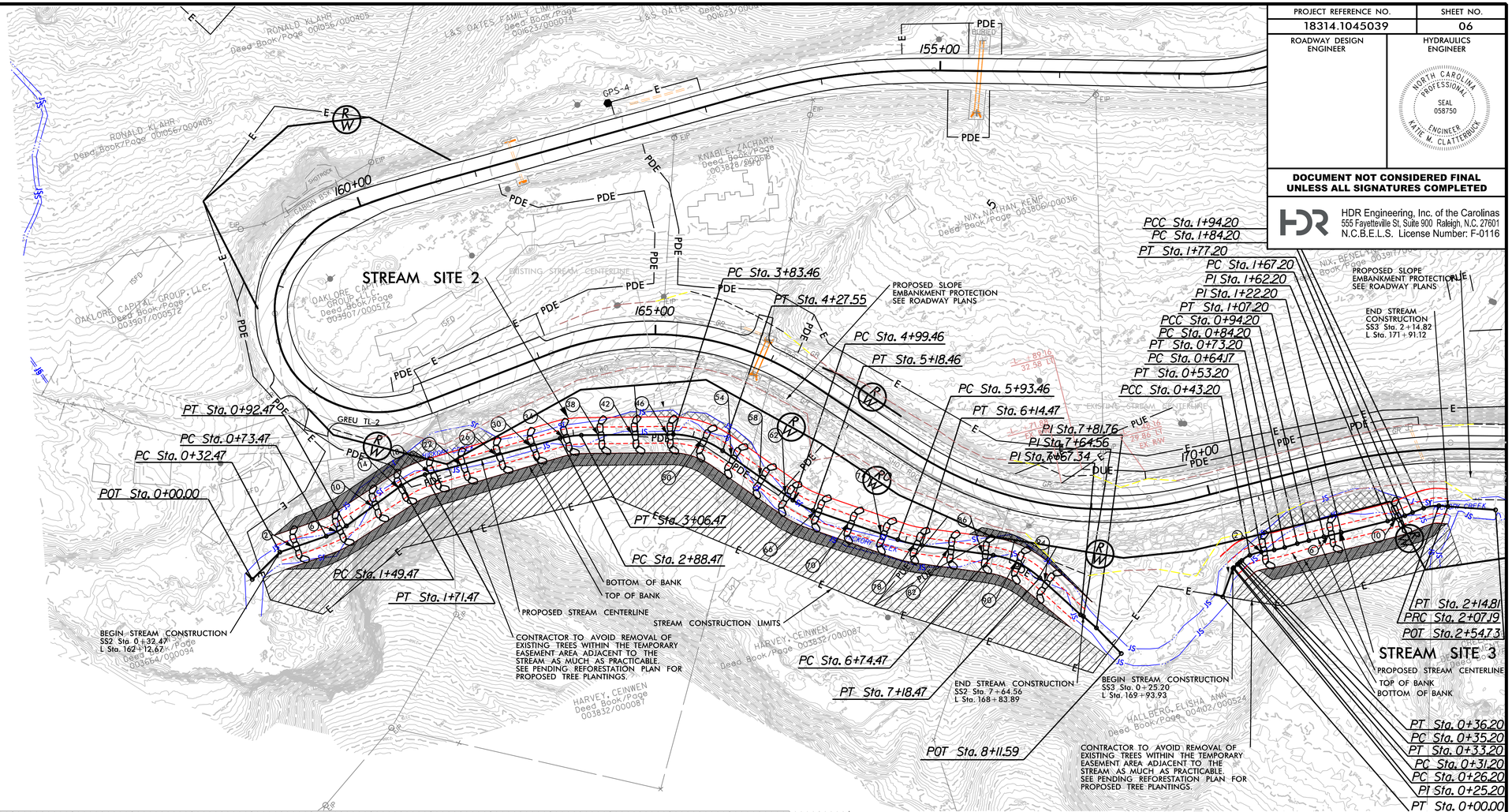
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

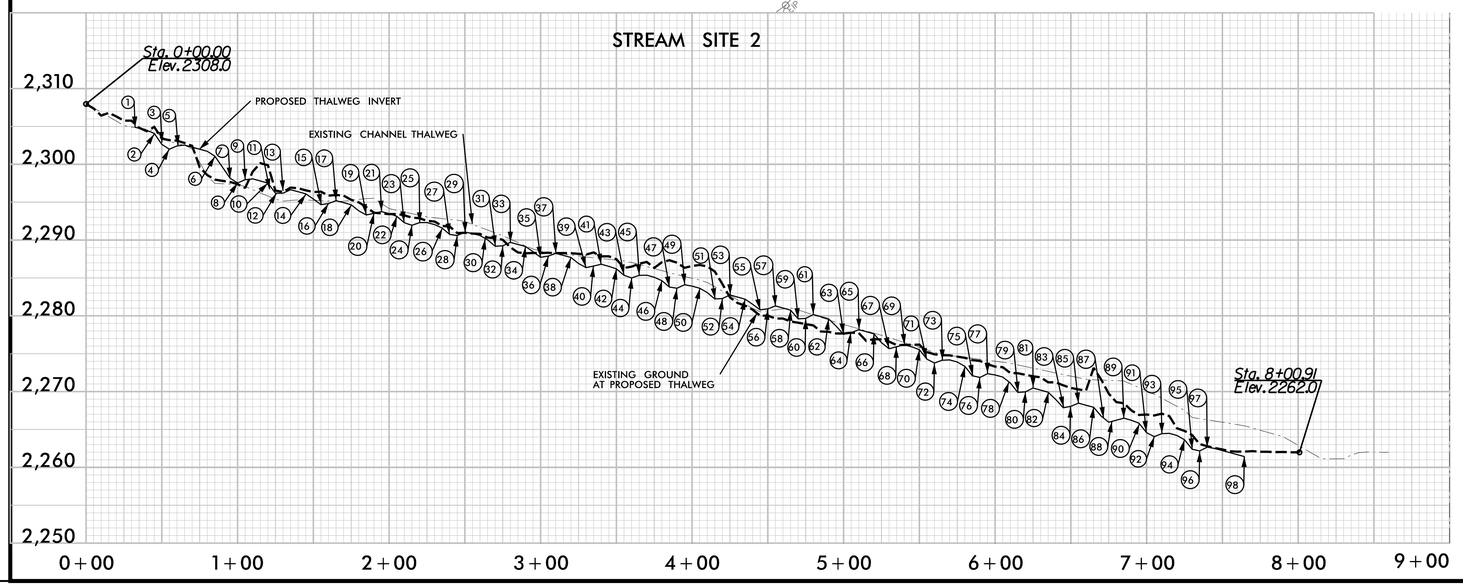
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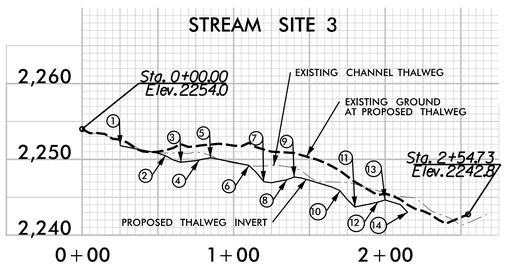
NOTE:
1. ENGINEER MAY MAKE CHANNEL ALIGNMENT AND PROFILE ADJUSTMENTS IN THE FIELD BASED ON SITE CONDITIONS INCLUDING EXISTING STREAM CROSSING STRUCTURES.
2. PRIVATE BRIDGES AND CULVERTS TO BE DESIGNED IN SEPARATE PROJECTS AND NOT INCLUDED ON THESE PLANS.

LEGEND:

- BIOENGINEERING LIVE STAKING AREA
- REFORESTATION AREA







SEE SHEET 2D-1 FOR STREAM ALIGNMENT DATA
SEE SHEET 06A FOR PROFILE POINT TABLES

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
18314.1045039	06A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER KATIE M. CLATTERBUCK

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STREAM SITE 2

POINTID	FEATURE	STATION	CHANNEL CL ELEV	CHANNEL SLOPE	BKF ELEV	BKF WIDTH (FT.)	BKF DEPTH (FT.)
1	Head of Riffle	0+32.47	2304.90	-5.50%	2307.5	27	2.6
2	Head of Cascade	0+44.47	2304.24	-29.00%		27	
3	Mid Pool	0+52.47	2301.92	3.00%	2305.62	30	3.7
4	Glide	0+58.47	2302.10	21.00%		30	
5	Head of Riffle	0+61.47	2302.73	-5.50%	2305.33	27	2.6
6	Head of Cascade	0+83.47	2301.52	-29.00%		27	
7	Mid Pool	0+97.47	2297.46	3.00%	2301.16	30	3.7
8	Glide	1+03.47	2297.64	21.00%		30	
9	Head of Riffle	1+06.47	2298.27	-5.50%	2300.87	27	2.6
10	Head of Cascade	1+20.47	2297.50	-29.00%		27	
11	Mid Pool	1+25.47	2296.05	3.00%	2299.75	30	3.7
12	Glide	1+31.47	2296.23	15.00%		30	
13	Head of Riffle	1+34.47	2296.68	-5.50%	2299.28	27	2.6
14	Head of Cascade	1+46.47	2296.02	-17.00%		27	
15	Mid Pool	1+54.47	2294.66	3.00%	2298.36	30	3.7
16	Glide	1+60.47	2294.84	15.00%		30	
17	Head of Riffle	1+63.47	2295.29	-5.50%	2297.89	27	2.6
18	Head of Cascade	1+75.47	2294.63	-17.00%		27	
19	Mid Pool	1+83.47	2293.27	3.00%	2296.97	30	3.7
20	Glide	1+89.47	2293.45	15.00%		30	
21	Head of Riffle	1+92.47	2293.90	-5.50%	2296.5	27	2.6
22	Head of Cascade	2+04.47	2293.24	-17.00%		27	
23	Mid Pool	2+12.47	2291.88	3.00%	2295.58	30	3.7
24	Glide	2+18.47	2292.06	15.00%		30	
25	Head of Riffle	2+21.47	2292.51	-5.50%	2295.11	27	2.6
26	Head of Cascade	2+33.47	2291.85	-17.00%		27	
27	Mid Pool	2+41.47	2290.49	3.00%	2294.19	30	3.7
28	Glide	2+47.47	2290.67	15.00%		30	
29	Head of Riffle	2+60.47	2291.12	-5.50%	2293.72	27	2.6
30	Head of Cascade	2+62.47	2290.46	-17.00%		27	
31	Mid Pool	2+70.47	2289.10	3.00%	2292.8	30	3.7
32	Glide	2+76.47	2289.28	15.00%		30	
33	Head of Riffle	2+79.47	2289.73	-5.50%	2292.33	27	2.6
34	Head of Cascade	2+91.47	2289.07	-17.00%		27	
35	Mid Pool	2+99.47	2287.71	3.00%	2291.41	30	3.7
36	Glide	3+05.47	2287.89	15.00%		30	
37	Head of Riffle	3+08.47	2288.34	-5.50%	2290.94	27	2.6
38	Head of Cascade	3+20.47	2287.68	-17.00%		27	
39	Mid Pool	3+28.47	2286.32	3.00%	2290.02	30	3.7
40	Glide	3+34.47	2286.50	15.00%		30	
41	Head of Riffle	3+37.47	2286.95	-5.50%	2289.55	27	2.6
42	Head of Cascade	3+49.47	2286.29	-17.00%		27	
43	Mid Pool	3+57.47	2284.93	3.00%	2288.63	30	3.7
44	Glide	3+63.47	2285.11	15.00%		30	
45	Head of Riffle	3+66.47	2285.56	-5.50%	2288.16	27	2.6
46	Head of Cascade	3+78.47	2284.90	-17.00%		27	
47	Mid Pool	3+86.47	2283.54	3.00%	2287.24	30	3.7
48	Glide	3+92.47	2283.72	15.00%		30	
49	Head of Riffle	3+95.47	2284.17	-5.50%	2286.77	27	2.6
50	Head of Cascade	4+07.47	2283.51	-17.00%		27	
51	Mid Pool	4+15.47	2282.15	3.00%	2285.85	30	3.7
52	Glide	4+21.47	2282.33	15.00%		30	
53	Head of Riffle	4+24.47	2282.78	-5.50%	2285.38	27	2.6
54	Head of Cascade	4+36.47	2282.12	-17.00%		27	
55	Mid Pool	4+44.47	2280.76	3.00%	2284.46	30	3.7
56	Glide	4+50.47	2280.94	15.00%		30	
57	Head of Riffle	4+53.47	2281.39	-5.50%	2283.99	27	2.6
58	Head of Cascade	4+65.47	2280.73	-25.00%		27	
59	Mid Pool	4+70.47	2279.48	4.00%	2283.18	30	3.7
60	Glide	4+76.47	2279.72	16.00%		30	
61	Head of Riffle	4+79.47	2280.20	-5.50%	2282.8	27	2.6
62	Head of Cascade	4+91.47	2279.54	-25.00%		27	
63	Mid Pool	4+99.47	2277.54	4.00%	2281.24	30	3.7
64	Glide	5+05.47	2277.78	16.00%		30	
65	Head of Riffle	5+08.47	2278.26	-5.50%	2280.86	27	2.6
66	Head of Cascade	5+20.47	2277.60	-25.00%		27	
67	Mid Pool	5+28.47	2275.60	4.00%	2279.3	30	3.7
68	Glide	5+34.47	2275.84	16.00%		30	
69	Head of Riffle	5+37.47	2276.32	-5.50%	2278.92	27	2.6
70	Head of Cascade	5+49.47	2275.66	-25.00%		27	
71	Mid Pool	5+57.47	2273.66	4.00%	2277.36	30	3.7
72	Glide	5+63.47	2273.90	16.00%		30	
73	Head of Riffle	5+66.47	2274.38	-5.50%	2276.98	27	2.6
74	Head of Cascade	5+78.47	2273.72	-25.00%		27	
75	Mid Pool	5+86.47	2271.72	4.00%	2275.42	30	3.7
76	Glide	5+92.47	2271.96	16.00%		30	
77	Head of Riffle	5+95.47	2272.44	-5.50%	2275.04	27	2.6
78	Head of Cascade	6+07.47	2271.78	-25.00%		27	
79	Mid Pool	6+15.47	2269.78	4.00%	2273.48	30	3.7
80	Glide	6+21.47	2270.02	16.00%		30	
81	Head of Riffle	6+24.47	2270.50	-5.50%	2273.1	27	2.6
82	Head of Cascade	6+36.47	2269.84	-25.00%		27	
83	Mid Pool	6+44.47	2267.84	4.00%	2271.54	30	3.7
84	Glide	6+50.47	2268.08	16.00%		30	
85	Head of Riffle	6+53.47	2268.56	-5.50%	2271.16	27	2.6
86	Head of Cascade	6+65.47	2267.90	-25.00%		27	
87	Mid Pool	6+73.47	2265.90	4.00%	2269.6	30	3.7
88	Glide	6+79.47	2266.14	16.00%		30	
89	Head of Riffle	6+82.47	2266.62	-5.50%	2269.22	27	2.6
90	Head of Cascade	6+94.47	2265.96	-25.00%		27	
91	Mid Pool	7+02.47	2263.96	4.00%	2267.66	30	3.7
92	Glide	7+08.47	2264.20	16.00%		30	
93	Head of Riffle	7+11.47	2264.68	-5.50%	2267.28	27	2.6
94	Head of Cascade	7+23.47	2264.02	-25.00%		27	
95	Mid Pool	7+31.47	2262.02	4.00%	2265.72	30	3.7
96	Glide	7+37.47	2262.26	16.00%		30	
97	Head of Riffle	7+40.47	2262.74	-5.50%	2265.34	27	2.6
98	Tie-In	7+64.56	2261.42			27	

STREAM SITE 3

POINTID	FEATURE	STATION	CHANNEL CL ELEV	CHANNEL SLOPE	BKF ELEV	BKF WIDTH (FT.)	BKF DEPTH (FT.)
1	Head of Riffle	0+25.20	2251.80	-4.00%	2254.50	29	2.7
2	Head of Cascade	0+53.20	2250.68	-11.00%		29	
3	Mid Pool	0+63.20	2249.58	2.00%	2253.38	32	3.8
4	Glide	0+78.20	2249.88	8.00%		32	
5	Head of Riffle	0+83.20	2250.28	-4.00%	2252.98	29	2.7
6	Head of Cascade	1+11.20	2249.16	-24.00%		29	
7	Mid Pool	1+21.20	2246.76	4.00%	2250.56	32	3.8
8	Glide	1+36.20	2247.36	8.00%		32	
9	Head of Riffle	1+41.20	2247.76	-6.00%	2250.46	29	2.7
10	Head of Cascade	1+69.20	2246.08	-24.00%		29	
11	Mid Pool	1+79.20	2243.68	4.00%	2247.48	32	3.8
12	Glide	1+94.20	2244.28	8.00%		32	
13	Head of Riffle	1+99.20	2244.68	-6.00%	2247.38	29	2.7
14	Tie-In	2+14.82	2243.74			29	

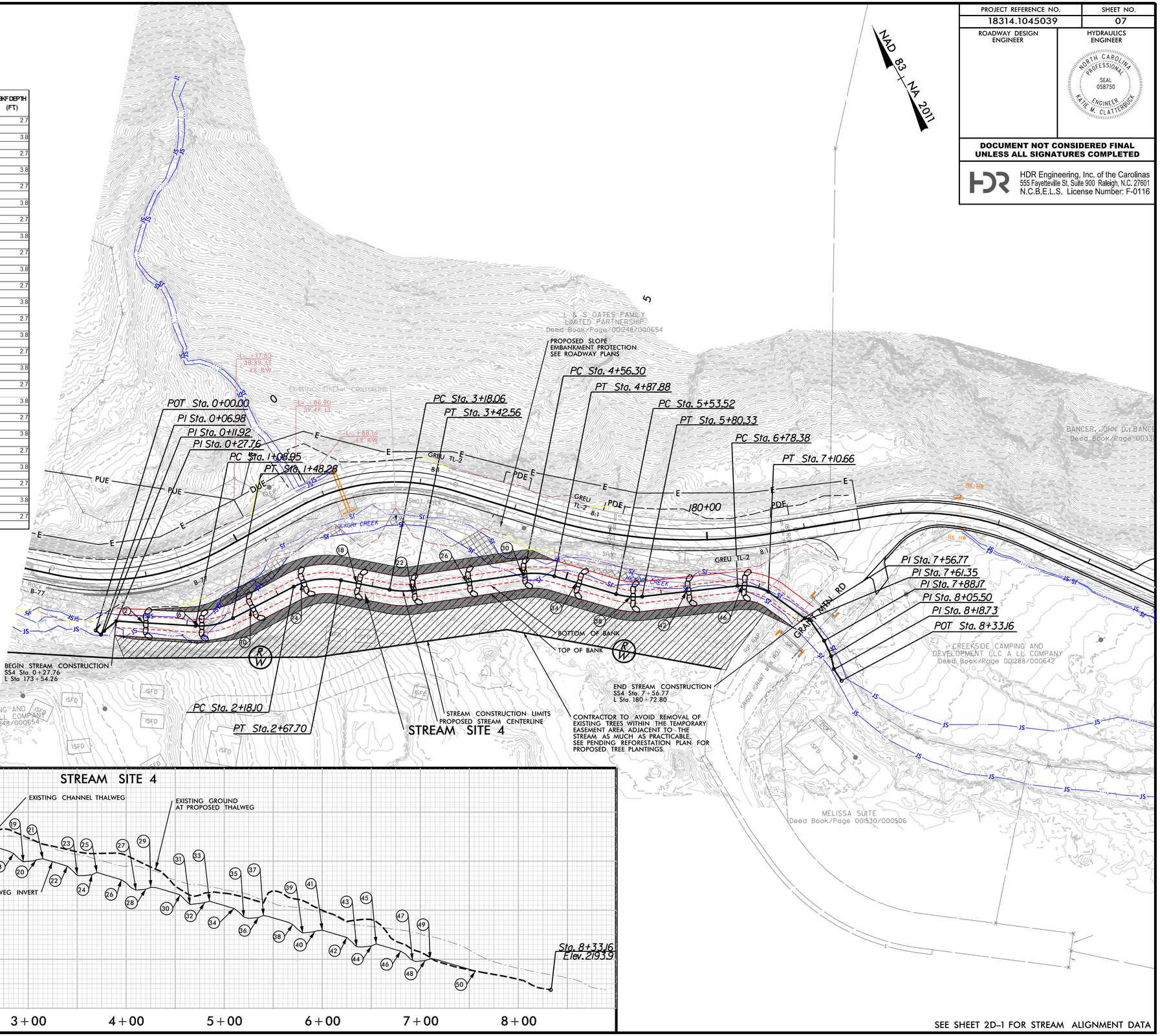
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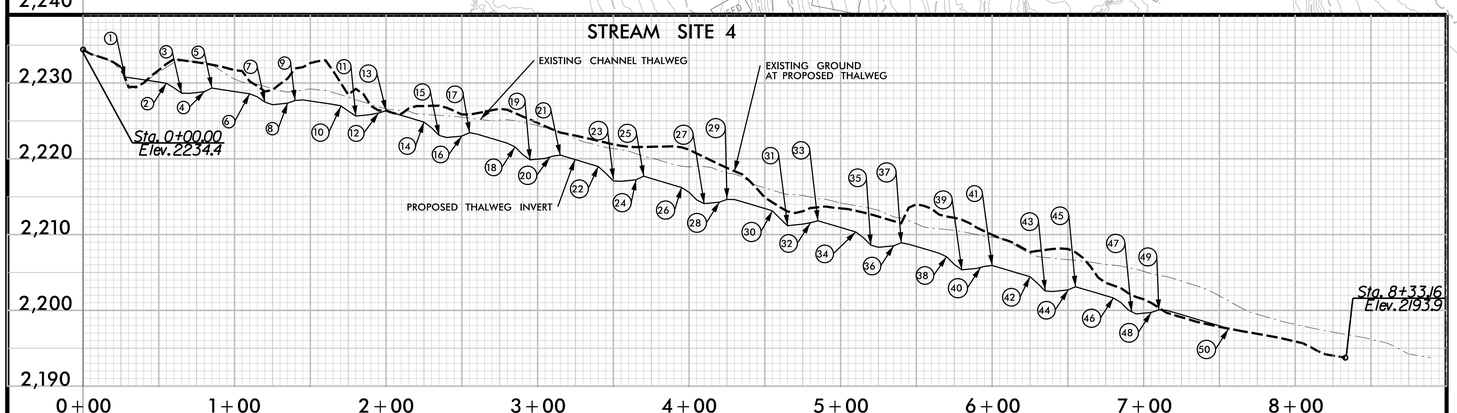
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TIME: 5:06:17 PM

NOTE:
1. ENGINEER MAY MAKE CHANNEL ALIGNMENT AND PROFILE ADJUSTMENTS IN THE FIELD BASED ON SITE CONDITIONS INCLUDING EXISTING STREAM CROSSING STRUCTURES.
2. PRIVATE BRIDGES AND CULVERTS TO BE DESIGNED IN SEPARATE PROJECTS AND NOT INCLUDED ON THESE PLANS.

POINTID	FEATURE	STATION	CHANNEL CL ELEV	CHANNEL SLOPE	BKF ELEV	BKF WIDTH (FT)	BKF DEPTH (FT)
1	Head of Riffle	0+27.76	2230.80	-3.00%	2233.5	29	2.7
2	Head of Cascade	0+55.76	2229.96	-14.00%		29	
3	Mid Pool	0+65.76	2228.56	2.00%	2232.36	32	3.8
4	Glide	0+79.76	2228.84	10.00%		32	
5	Head of Riffle	0+84.76	2229.34	-3.00%	2232.04	29	2.7
6	Head of Cascade	1+12.76	2228.50	-14.00%		29	
7	Mid Pool	1+22.76	2227.10	2.00%	2230.9	32	3.8
8	Glide	1+36.76	2227.38	10.00%		32	
9	Head of Riffle	1+41.76	2227.88	-3.00%	2230.58	29	2.7
10	Head of Cascade	1+69.76	2227.04	-14.00%		29	
11	Mid Pool	1+79.76	2225.64	2.00%	2229.44	32	3.8
12	Glide	1+93.76	2225.92	10.00%		32	
13	Head of Riffle	1+98.76	2226.42	-6.00%	2229.12	29	2.7
14	Head of Cascade	2+26.76	2224.74	-20.00%		29	
15	Mid Pool	2+36.76	2222.74	2.00%	2226.54	32	3.8
16	Glide	2+50.76	2223.02	10.00%		32	
17	Head of Riffle	2+55.76	2223.52	-6.00%	2226.22	29	2.7
18	Head of Cascade	2+83.76	2221.84	-20.00%		29	
19	Mid Pool	2+93.76	2219.84	2.00%	2223.64	32	3.8
20	Glide	3+07.76	2220.12	10.00%		32	
21	Head of Riffle	3+12.76	2220.62	-6.00%	2223.32	29	2.7
22	Head of Cascade	3+40.76	2218.94	-20.00%		29	
23	Mid Pool	3+50.76	2216.94	2.00%	2220.74	32	3.8
24	Glide	3+64.76	2217.22	10.00%		32	
25	Head of Riffle	3+69.76	2217.72	-6.00%	2220.42	29	2.7
26	Head of Cascade	3+97.76	2216.04	-20.00%		29	
27	Mid Pool	4+07.76	2214.04	2.00%	2217.84	32	3.8
28	Glide	4+21.76	2214.32	10.00%		32	
29	Head of Riffle	4+26.76	2214.82	-5.90%	2217.52	29	2.7
30	Head of Cascade	4+54.76	2213.17	-20.00%		29	
31	Mid Pool	4+64.76	2211.17	2.00%	2214.968	32	3.8
32	Glide	4+78.76	2211.45	9.00%		32	
33	Head of Riffle	4+83.76	2211.90	-5.90%	2214.598	29	2.7
34	Head of Cascade	5+11.76	2210.25	-20.00%		29	
35	Mid Pool	5+21.76	2208.25	2.00%	2212.046	32	3.8
36	Glide	5+35.76	2208.53	9.00%		32	
37	Head of Riffle	5+40.76	2208.98	-5.90%	2211.676	29	2.7
38	Head of Cascade	5+68.76	2207.32	-20.00%		29	
39	Mid Pool	5+78.76	2205.32	2.00%	2209.124	32	3.8
40	Glide	5+92.76	2205.60	9.00%		32	
41	Head of Riffle	5+97.76	2206.05	-5.90%	2208.754	29	2.7
42	Head of Cascade	6+25.76	2204.40	-20.00%		29	
43	Mid Pool	6+35.76	2202.40	2.00%	2206.202	32	3.8
44	Glide	6+49.76	2202.68	9.00%		32	
45	Head of Riffle	6+54.76	2203.13	-5.90%	2205.832	29	2.7
46	Head of Cascade	6+82.76	2201.48	-20.00%		29	
47	Mid Pool	6+92.76	2199.48	2.00%	2203.28	32	3.8
48	Glide	7+06.76	2199.76	9.00%		32	
49	Head of Riffle	7+11.76	2200.21	-5.90%	2202.91	29	2.7
50	Tie-In	7+56.77	2197.55			29	

LEGEND:
- BIOENGINEERING LIVE STAKING AREA
- REFORESTATION AREA





SEE SHEET 2D-1 FOR STREAM ALIGNMENT DATA

PROJECT REFERENCE NO.	SHEET NO.
18314.1045039	07

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058750 ENGINEER KATIE M. CLATTERBUCK

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555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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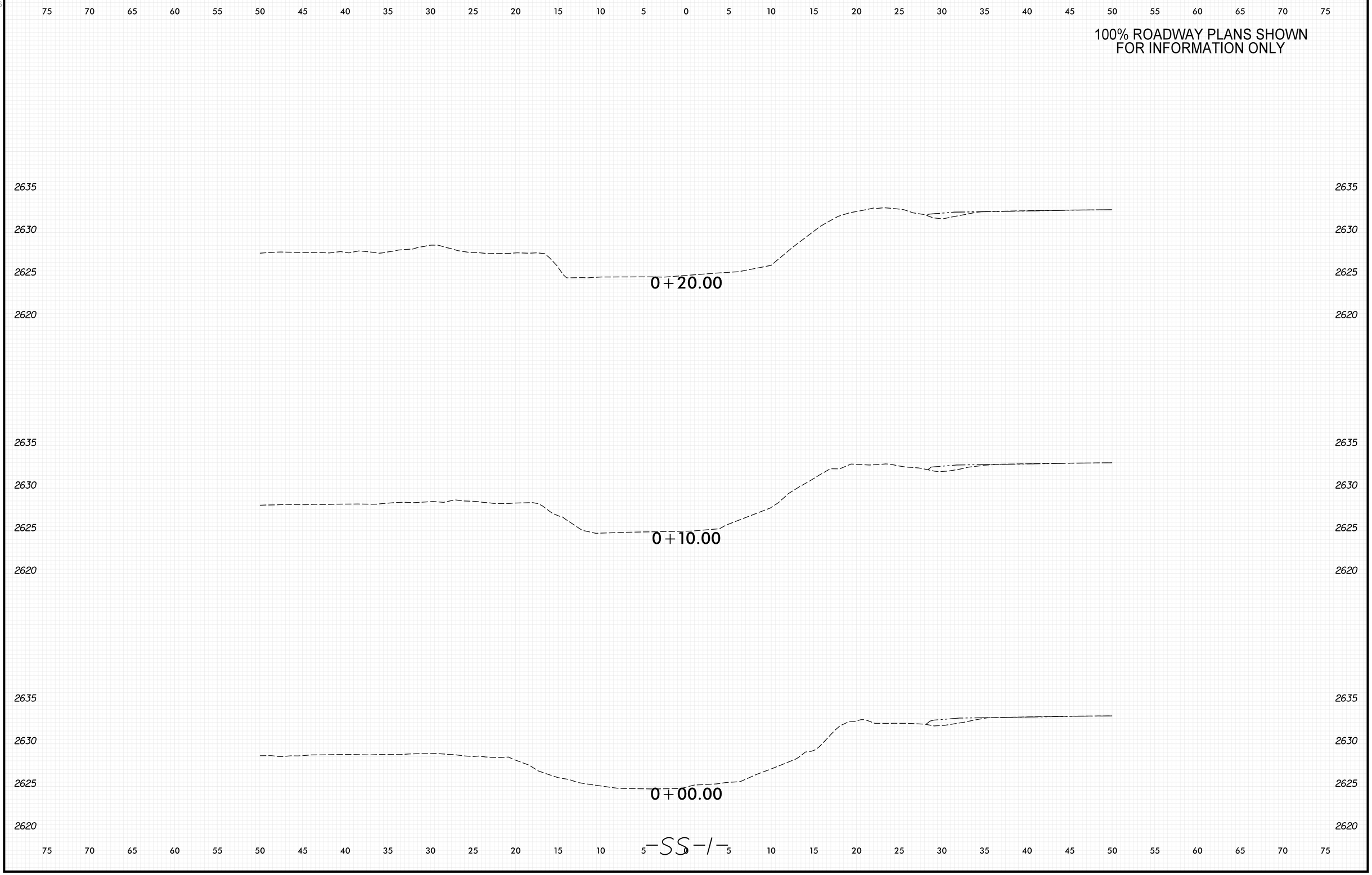
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	18314.1045039	X-1

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



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PROJ. REFERENCE NO.	SHEET NO.
18314.1045039	X-2

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:24 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-3

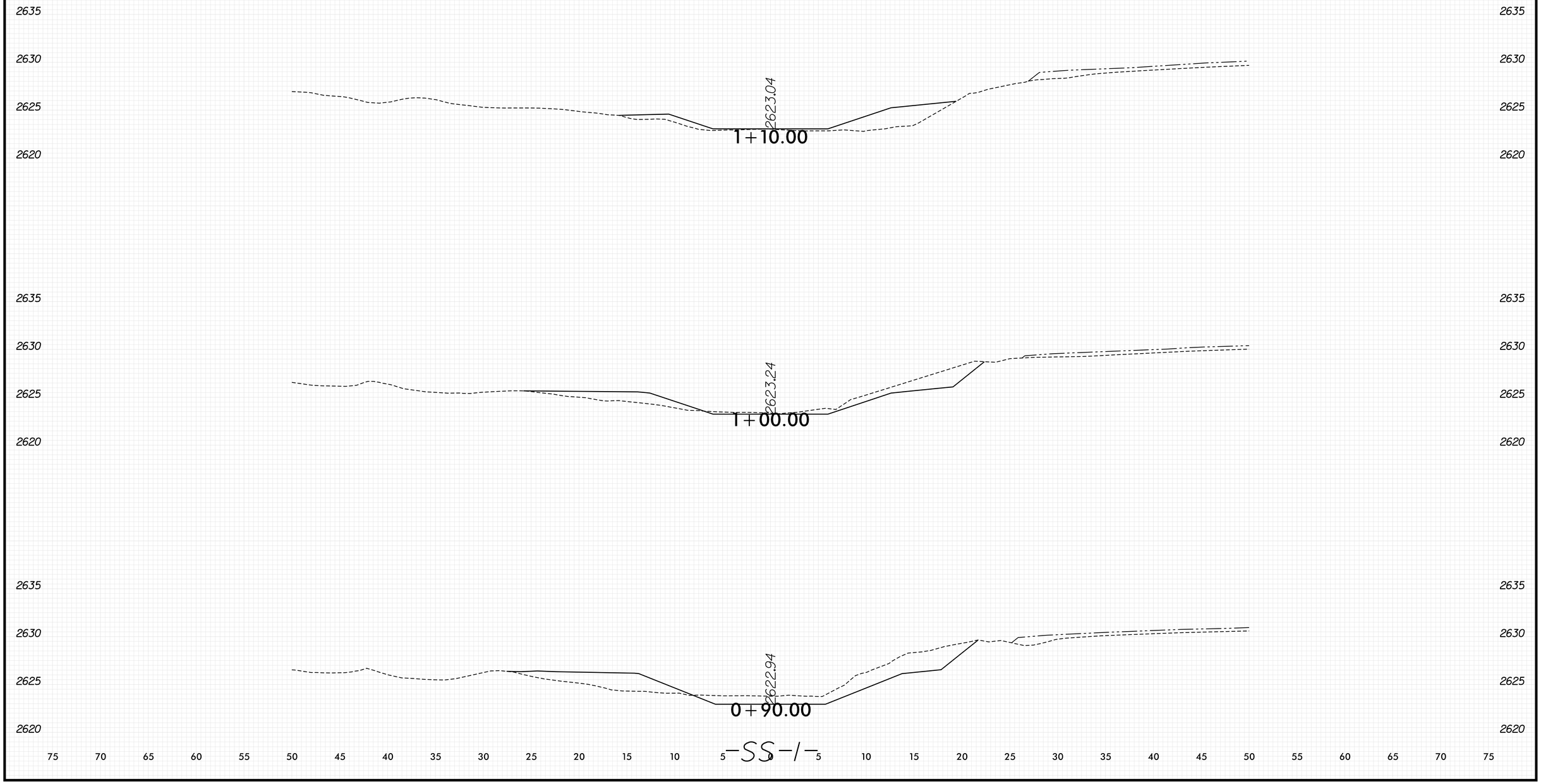
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

-SS-/-

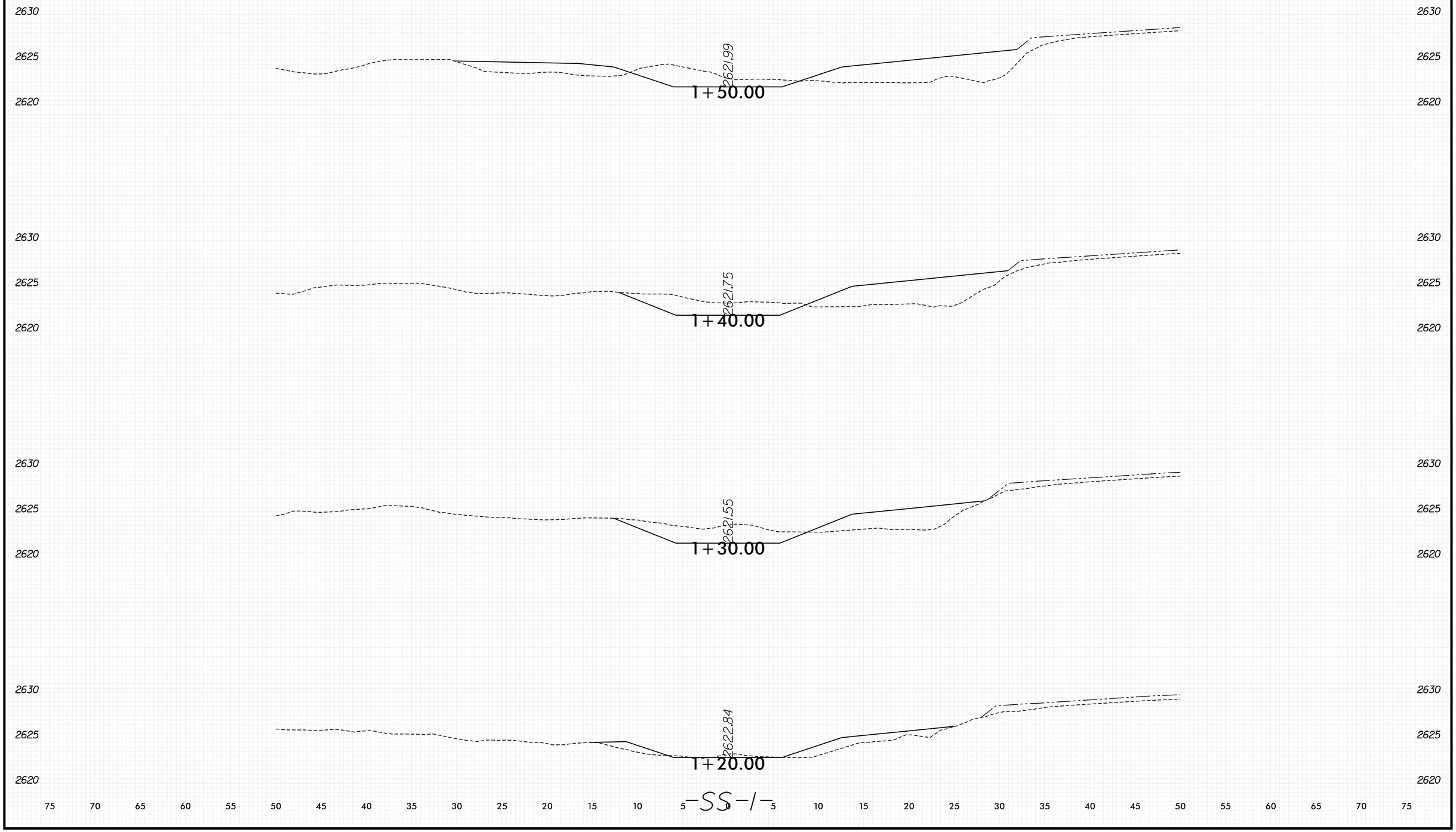
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:26 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

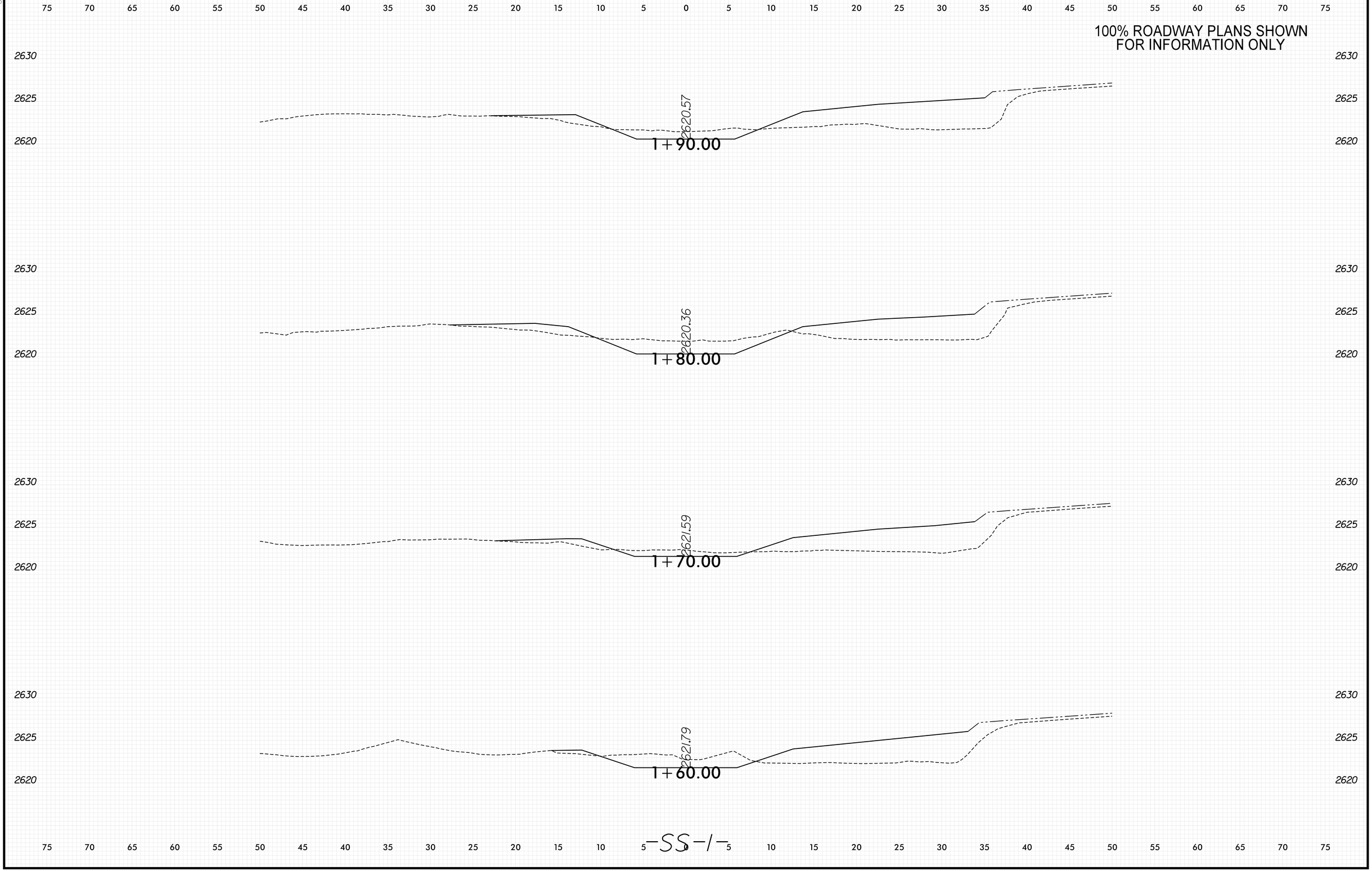


PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:28 AM
8/23/99

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

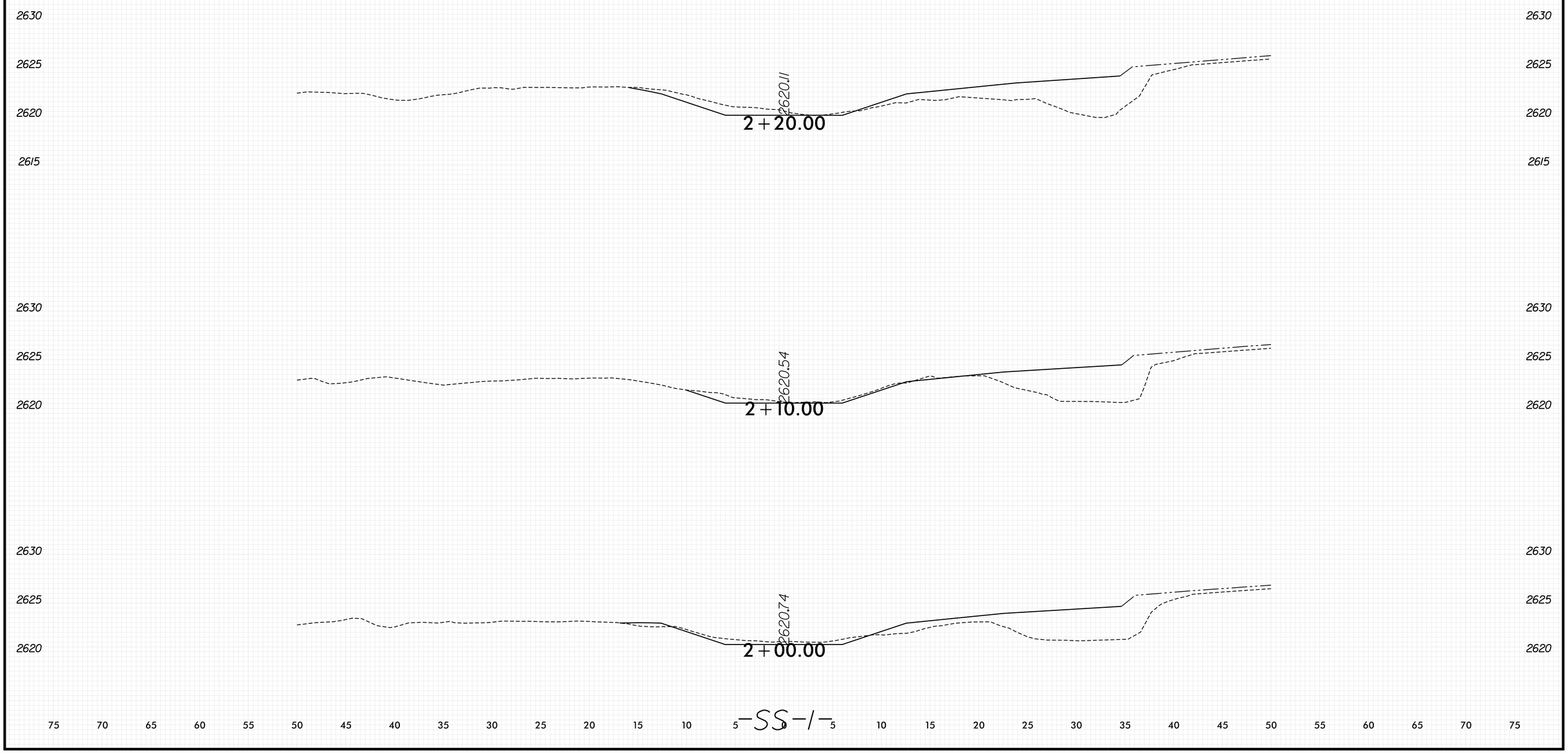


100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PENTABLE: xpl_en_v8.tbl
TIME: 9:37:32 AM
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
DATE: 5/8/2026
USER: KCLATTERBU
FILE: \

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:33 AM

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

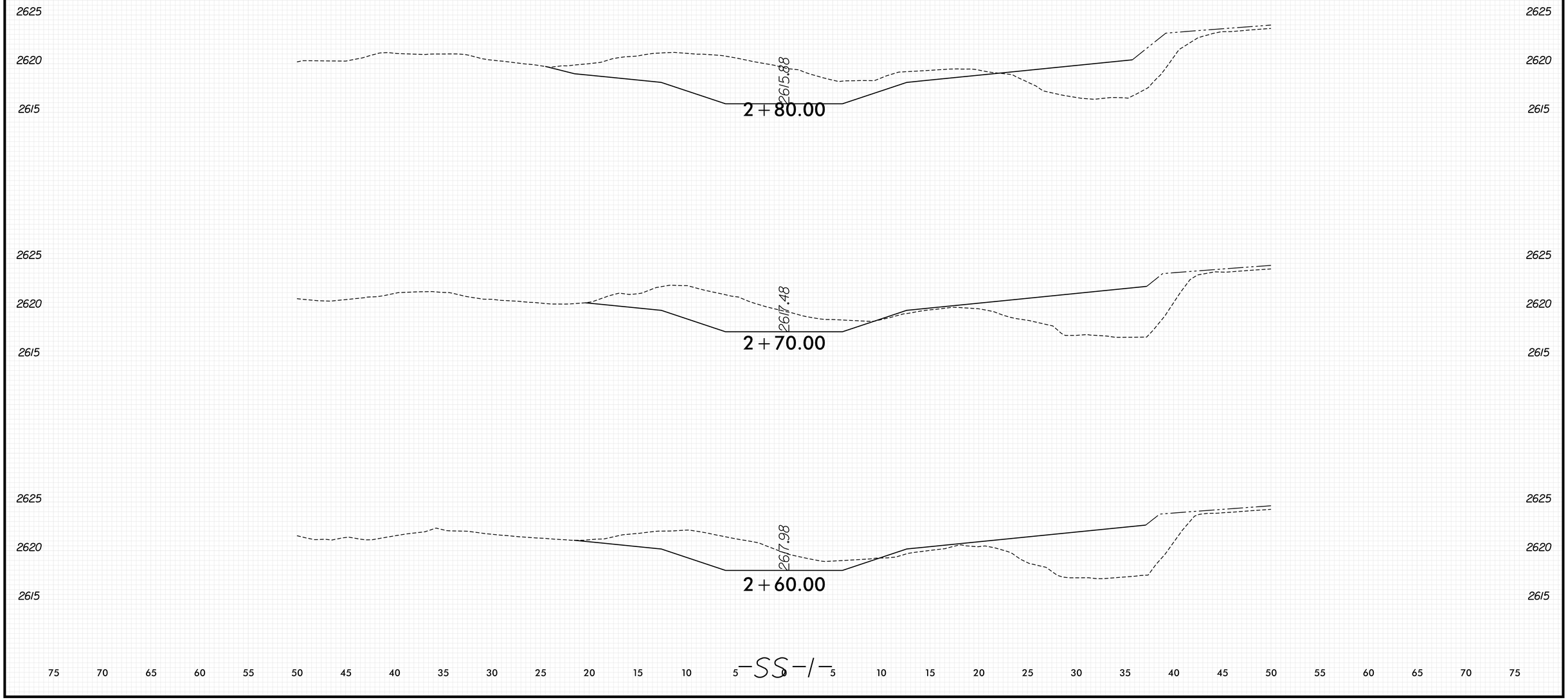
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

-SS-/-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:35 AM
8/23/99

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

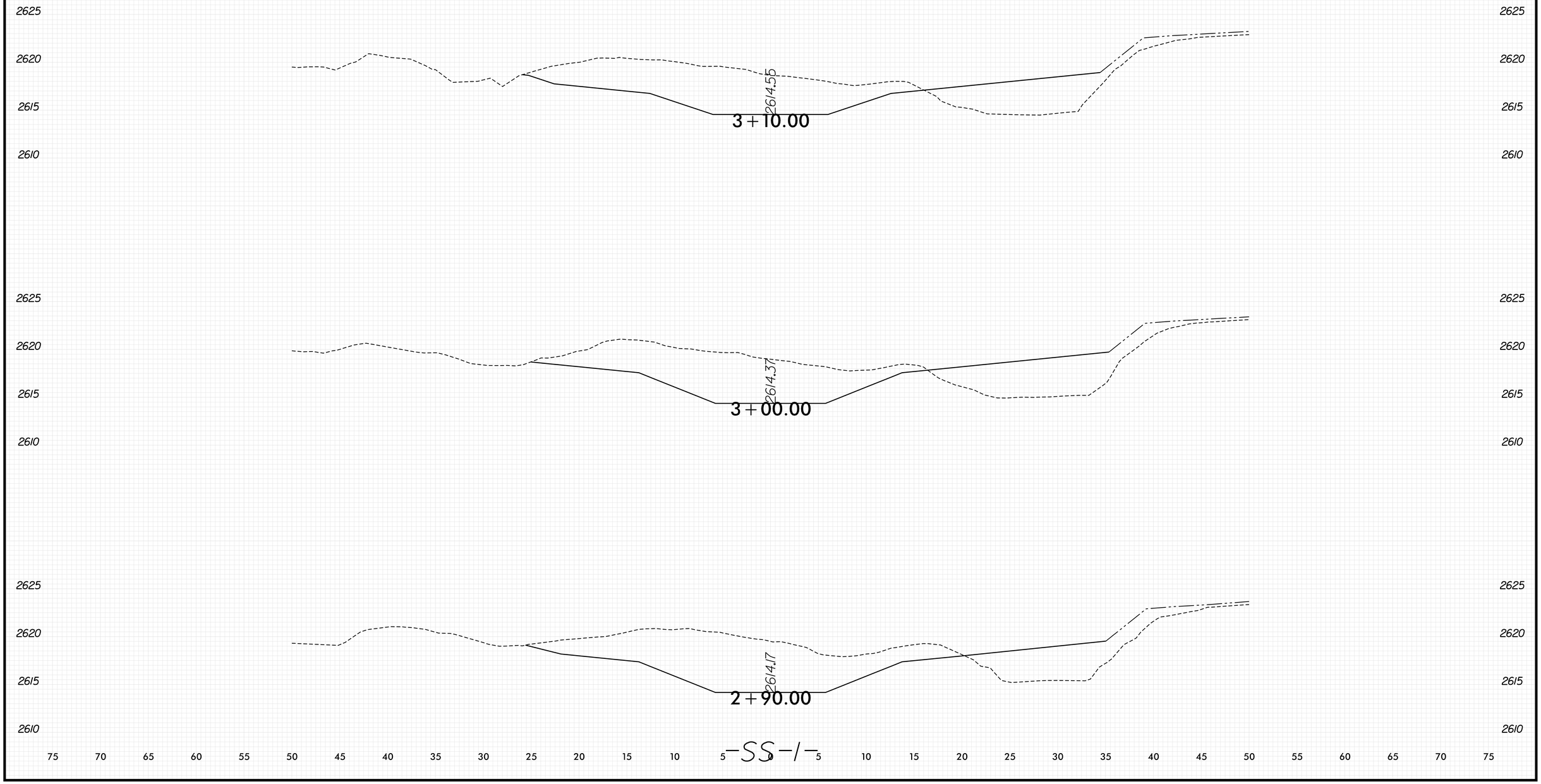


75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:36 AM

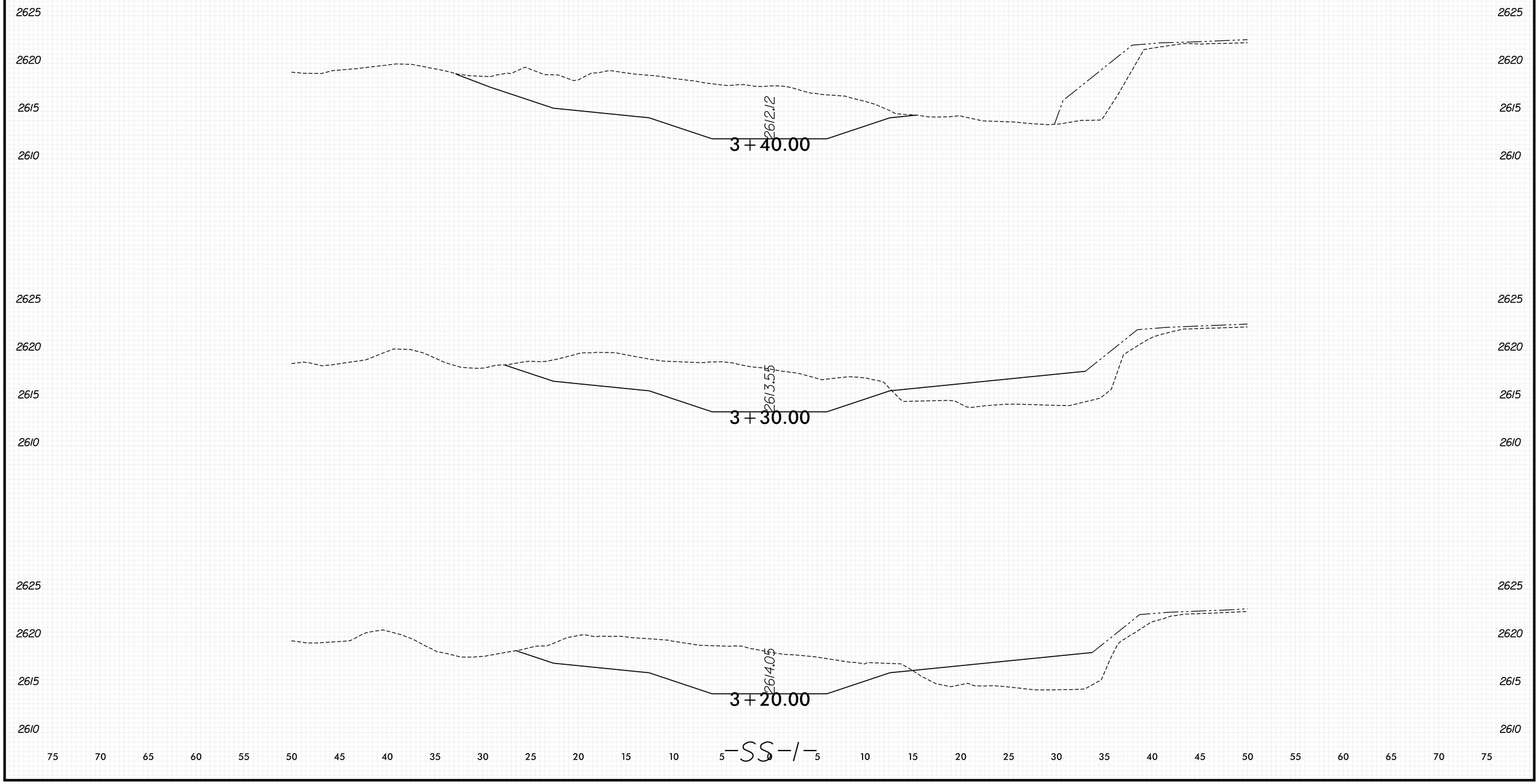
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:37 AM
8/23/99

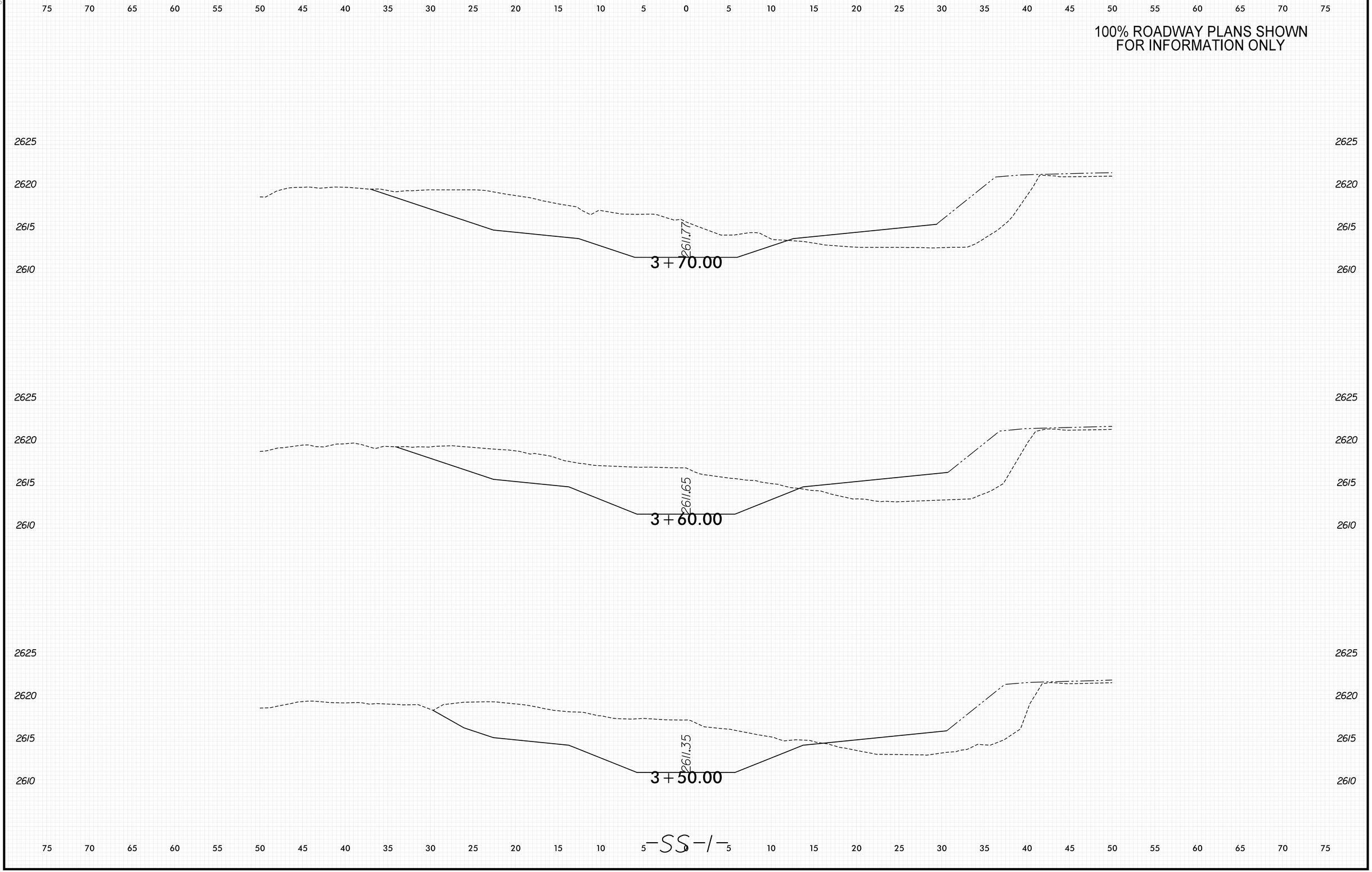
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:38 AM
8/23/99

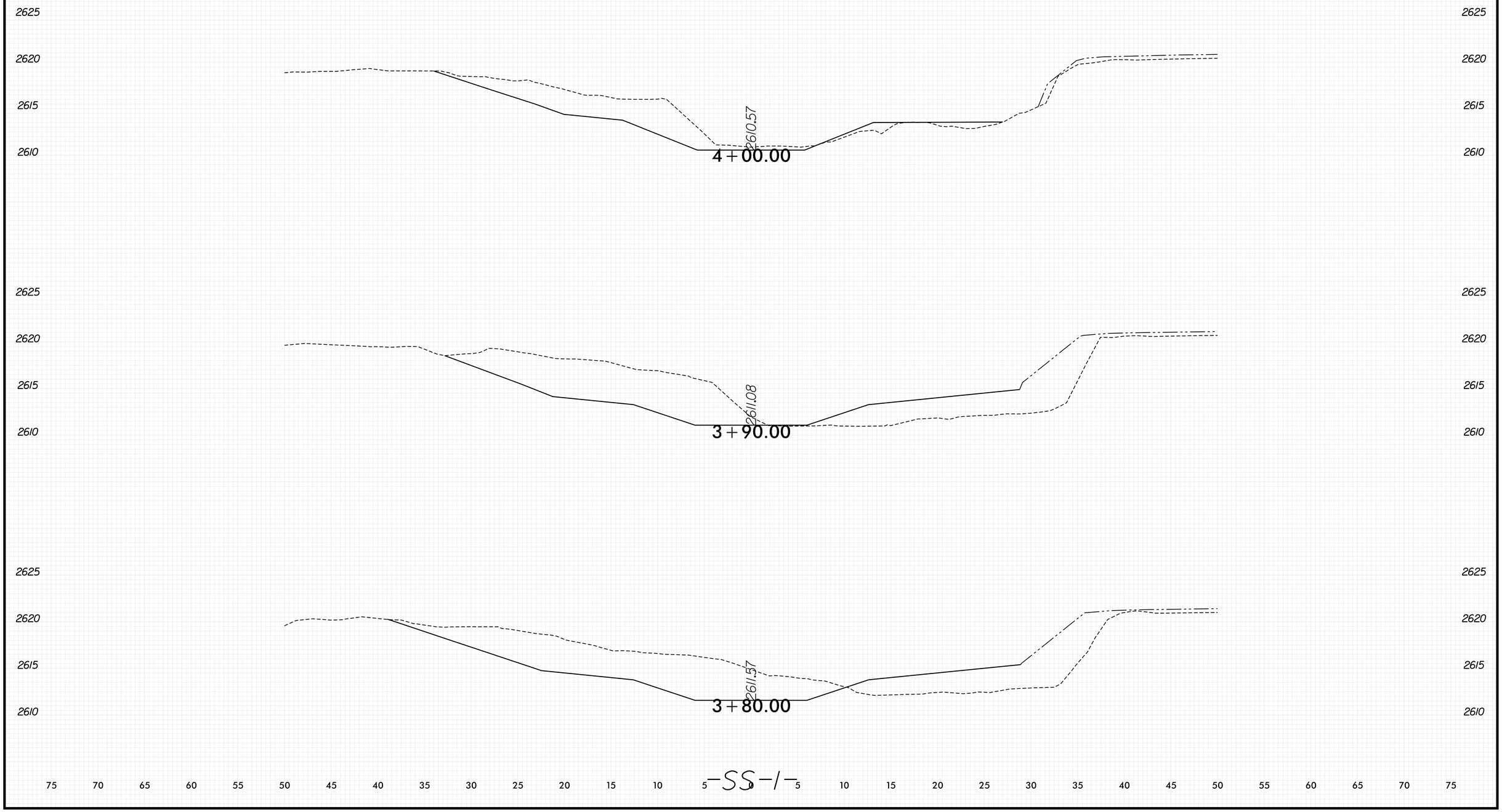
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-12

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:39 AM
8/23/99

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

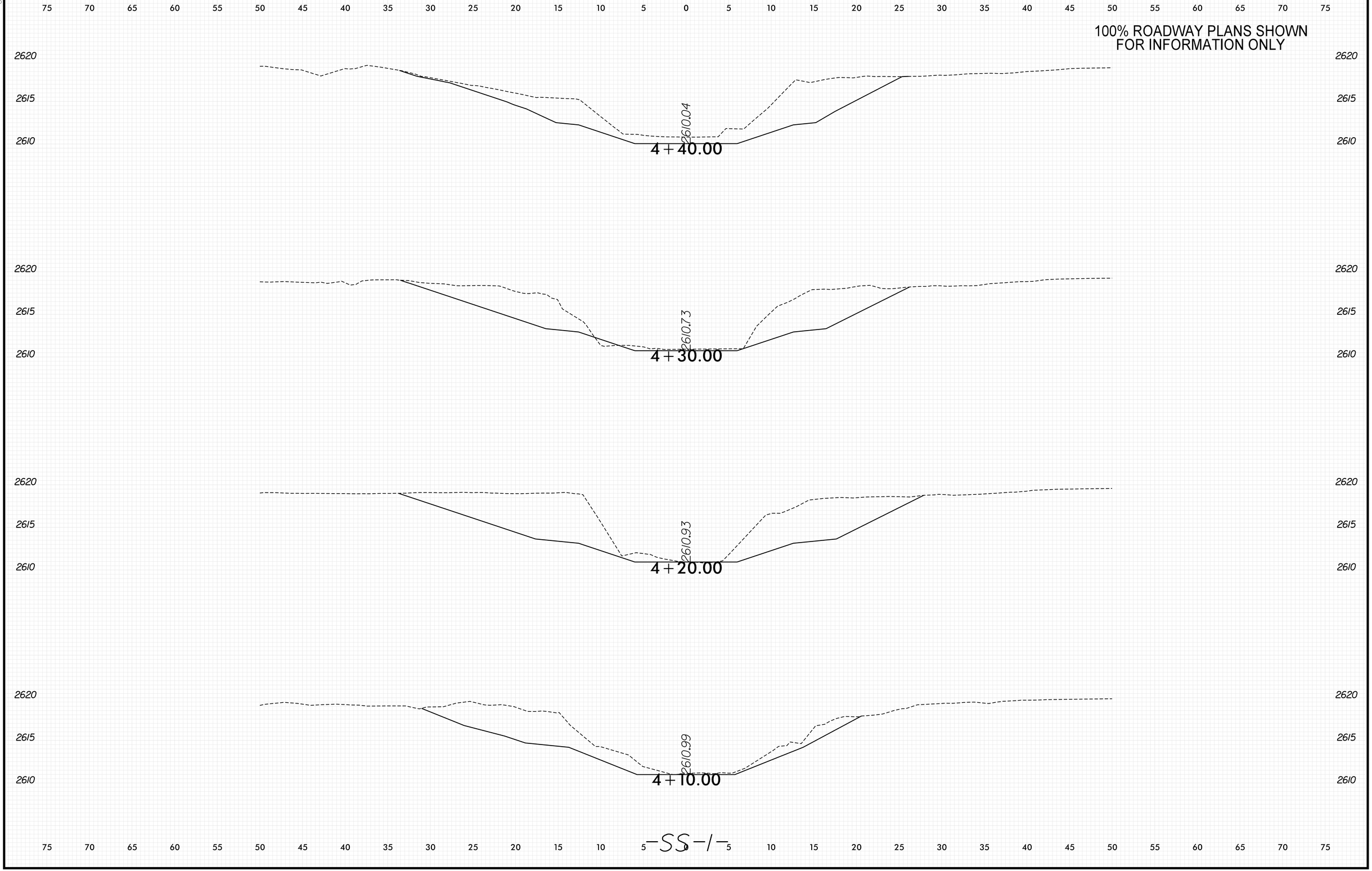


-SS-1-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:40 AM
8/23/99

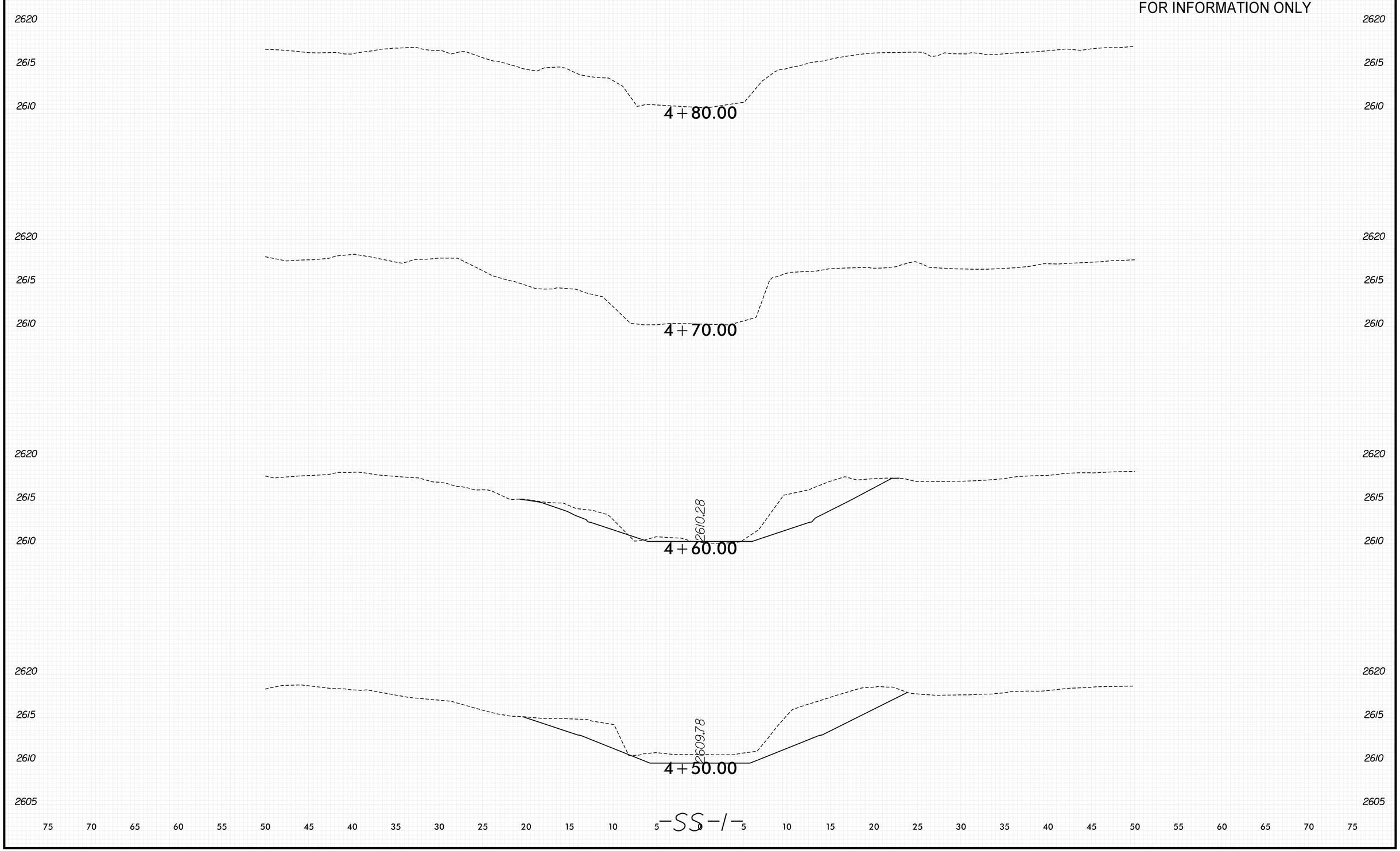
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-14

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:42 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



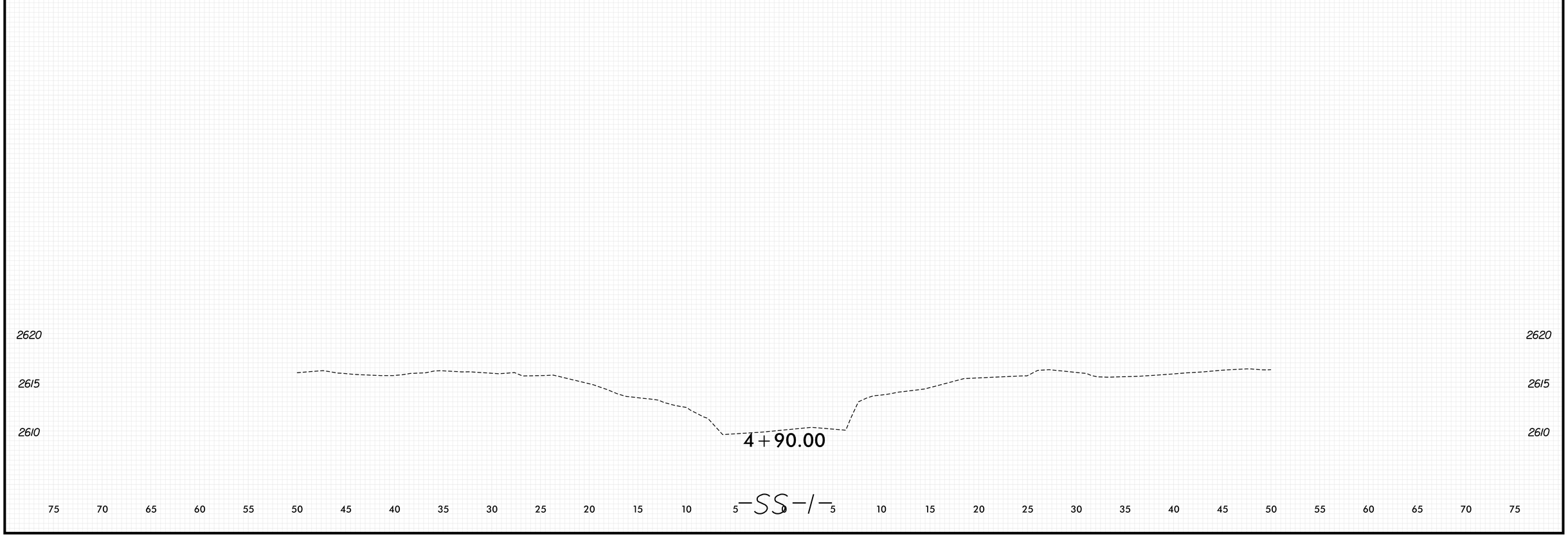
8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:43 AM

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
18314.1045039	X-16

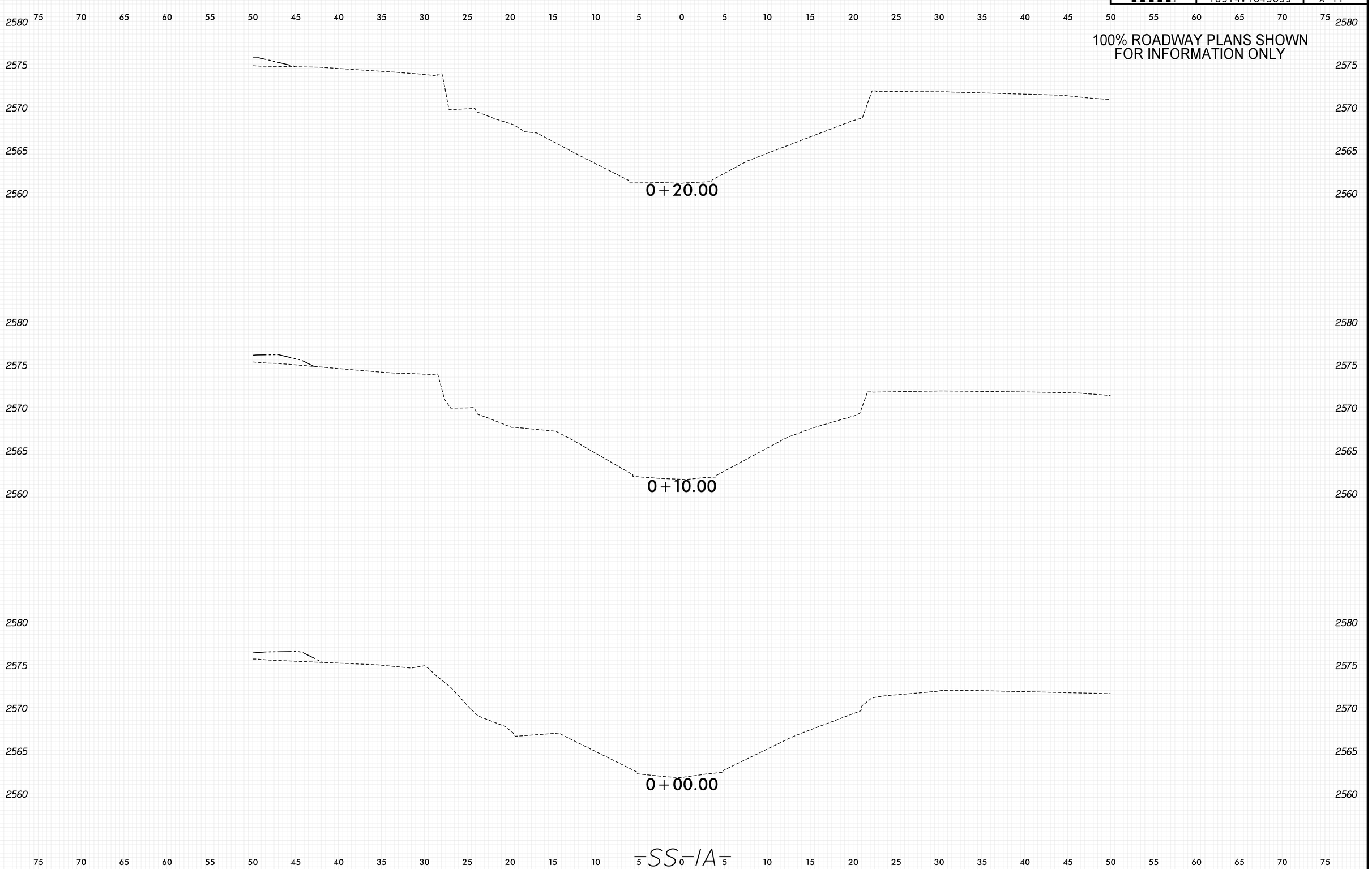
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



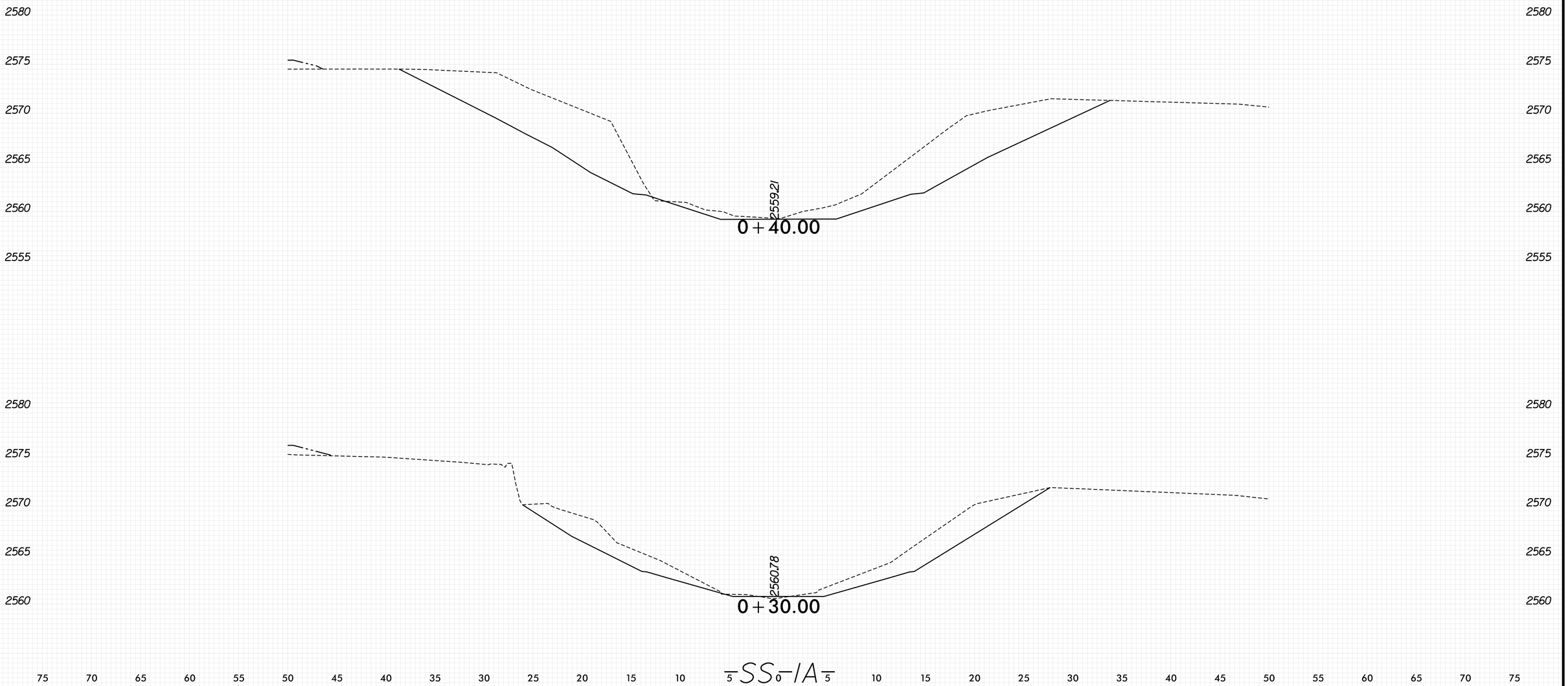
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:45 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



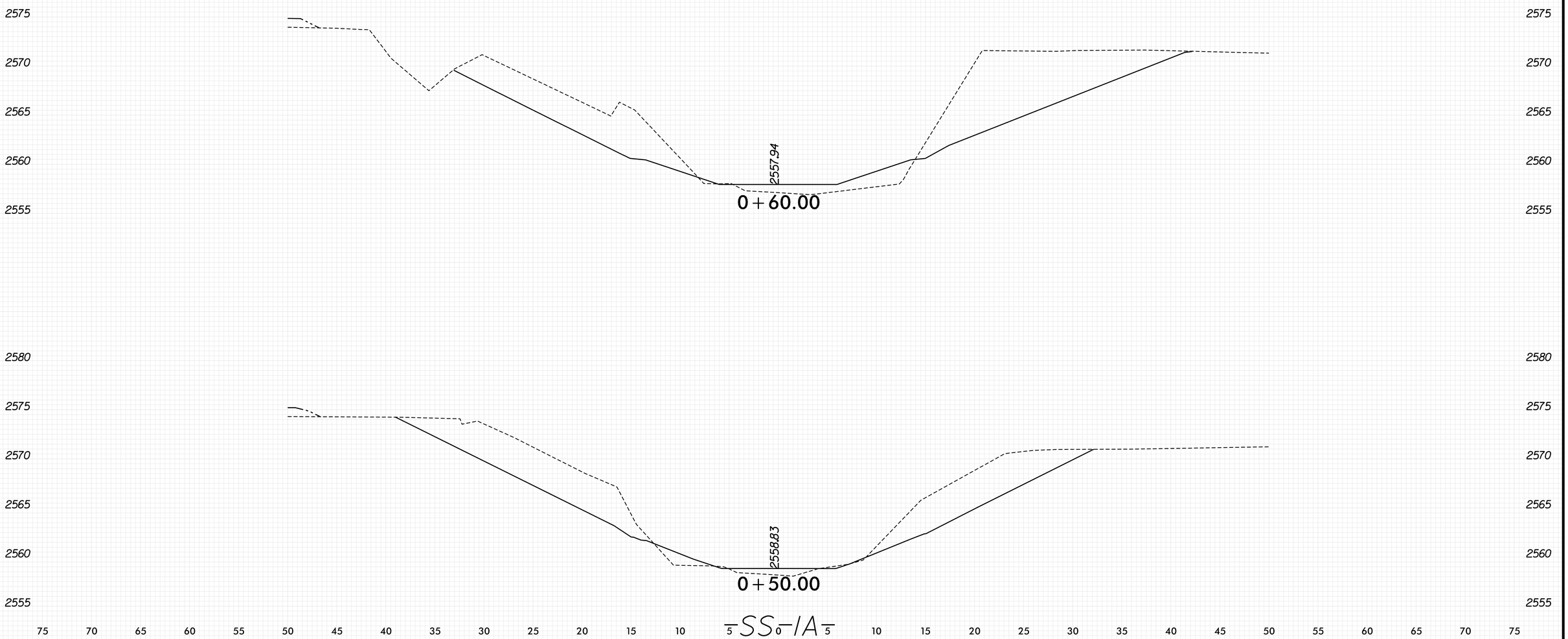
8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpLeh_v8.tbl
TIME: 9:37:50 AM
DATE: 5/8/2026

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



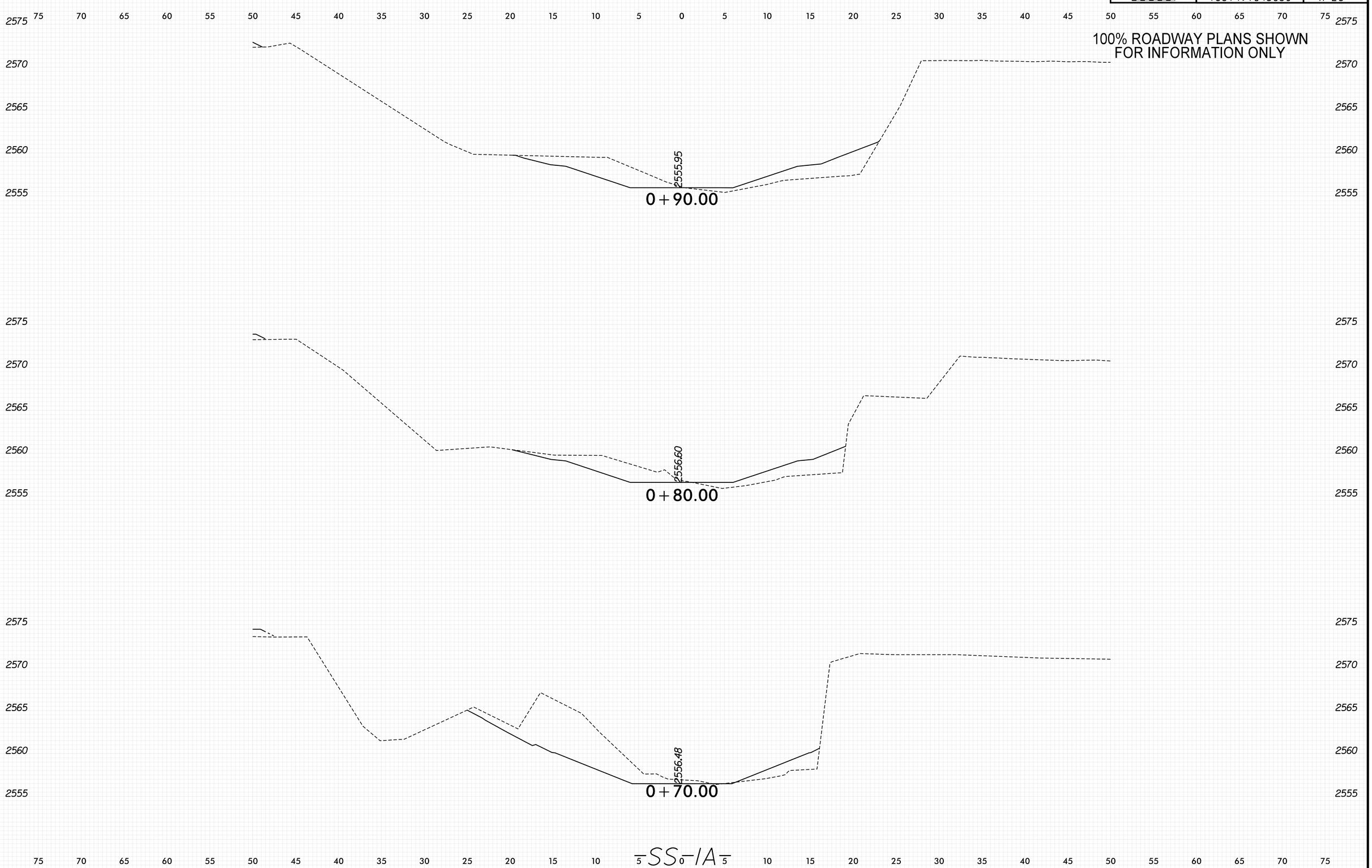
8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng.tbl PENTABLE: xpl_en_v8.tbl
USER: KCLATTERBU DATE: 5/8/2026 TIME: 9:37:51 AM
FILE: \

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:52 AM

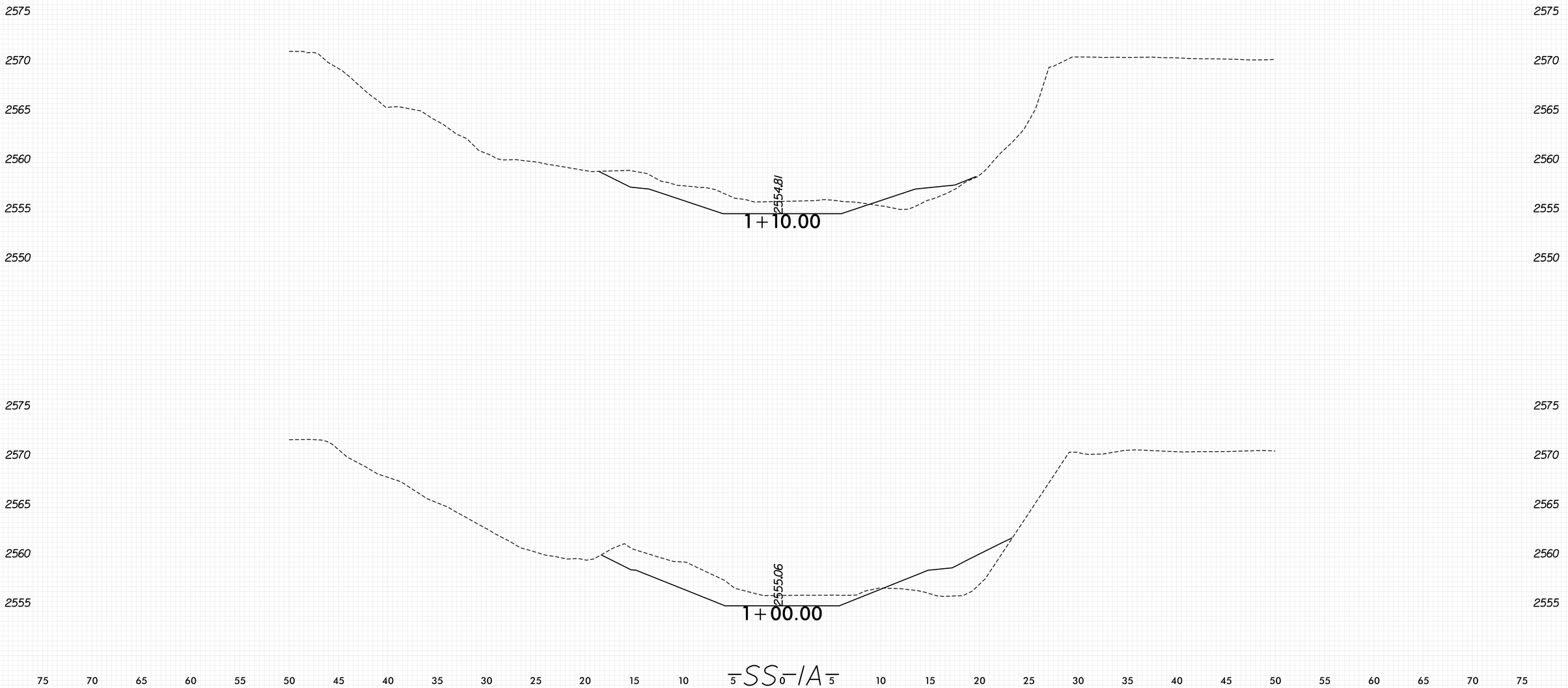
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng.50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:53 AM

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

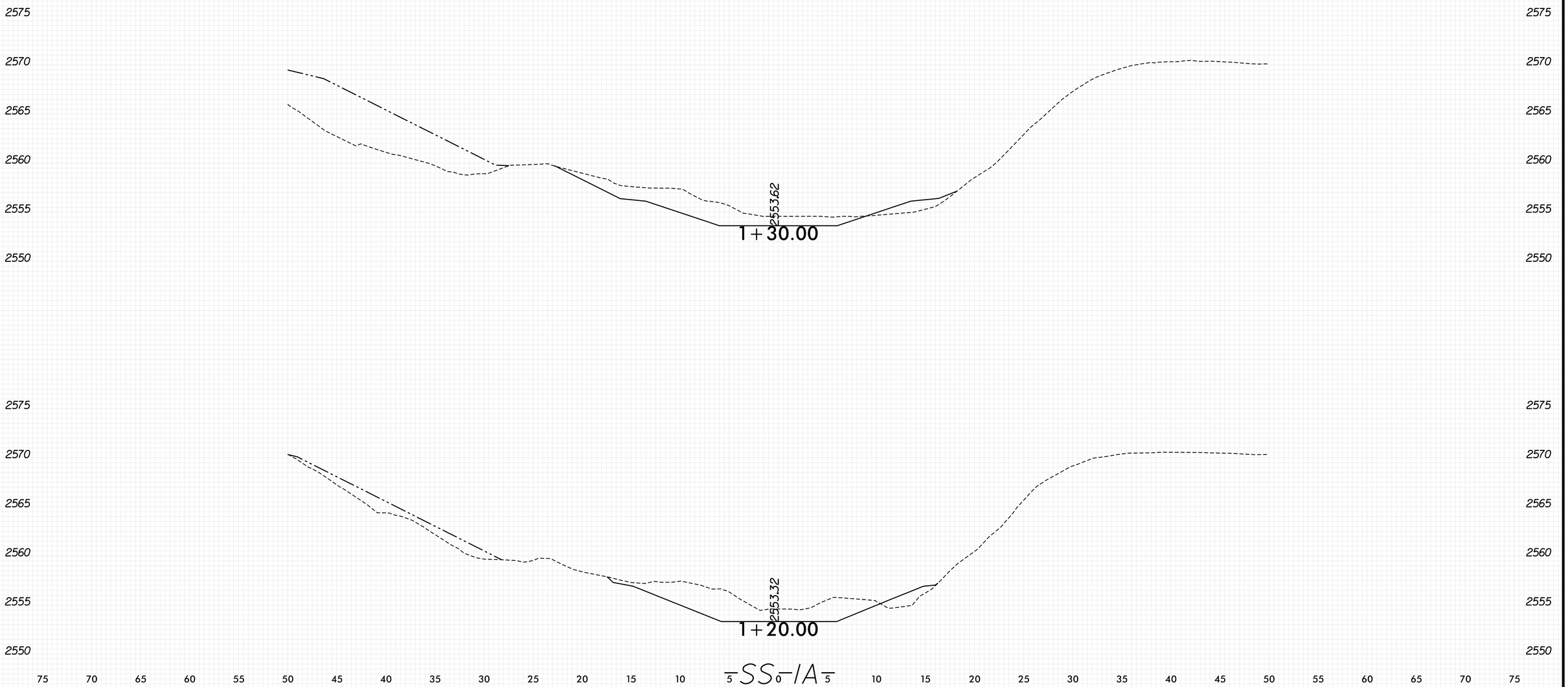
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:37:55 AM
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-22

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

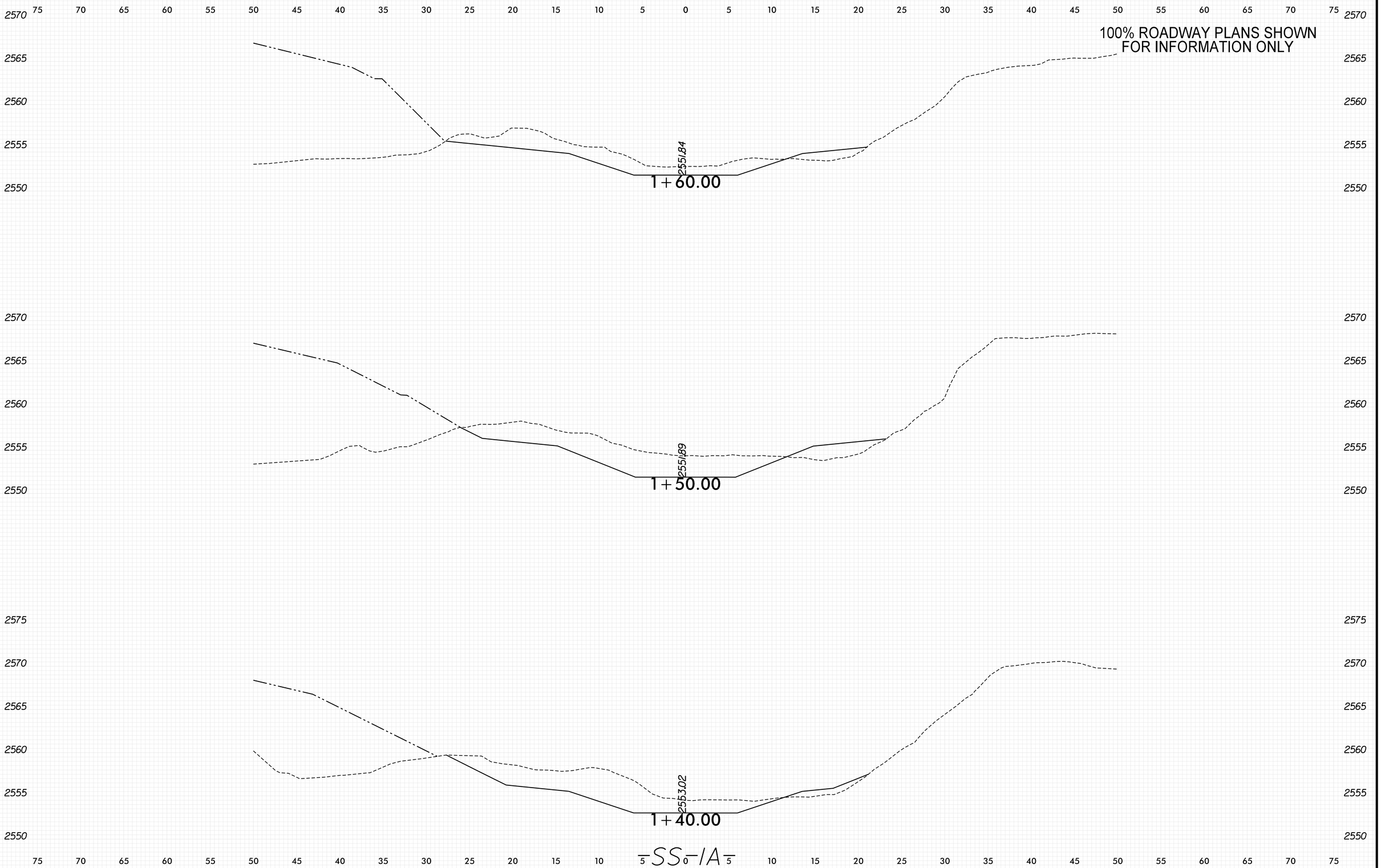


PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLAITERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:37:56 AM

8/23/99

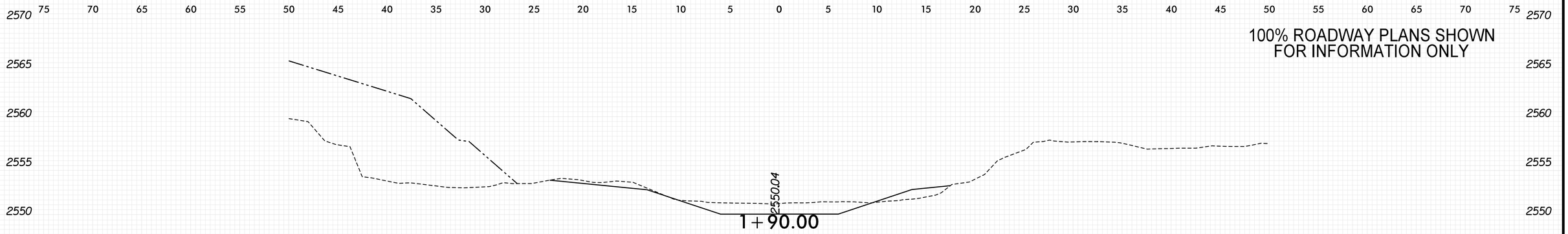
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-23

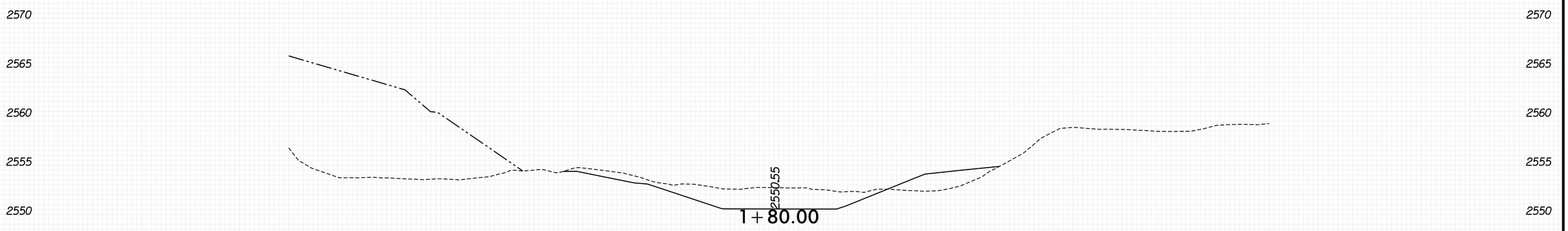
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

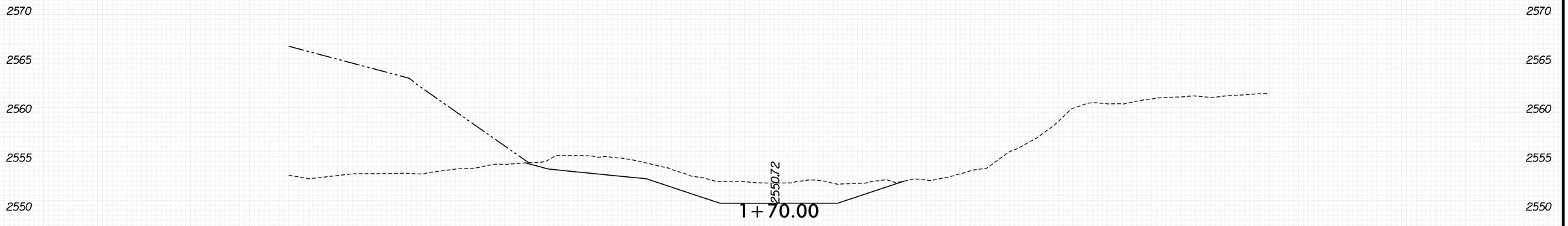


PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:37:57 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

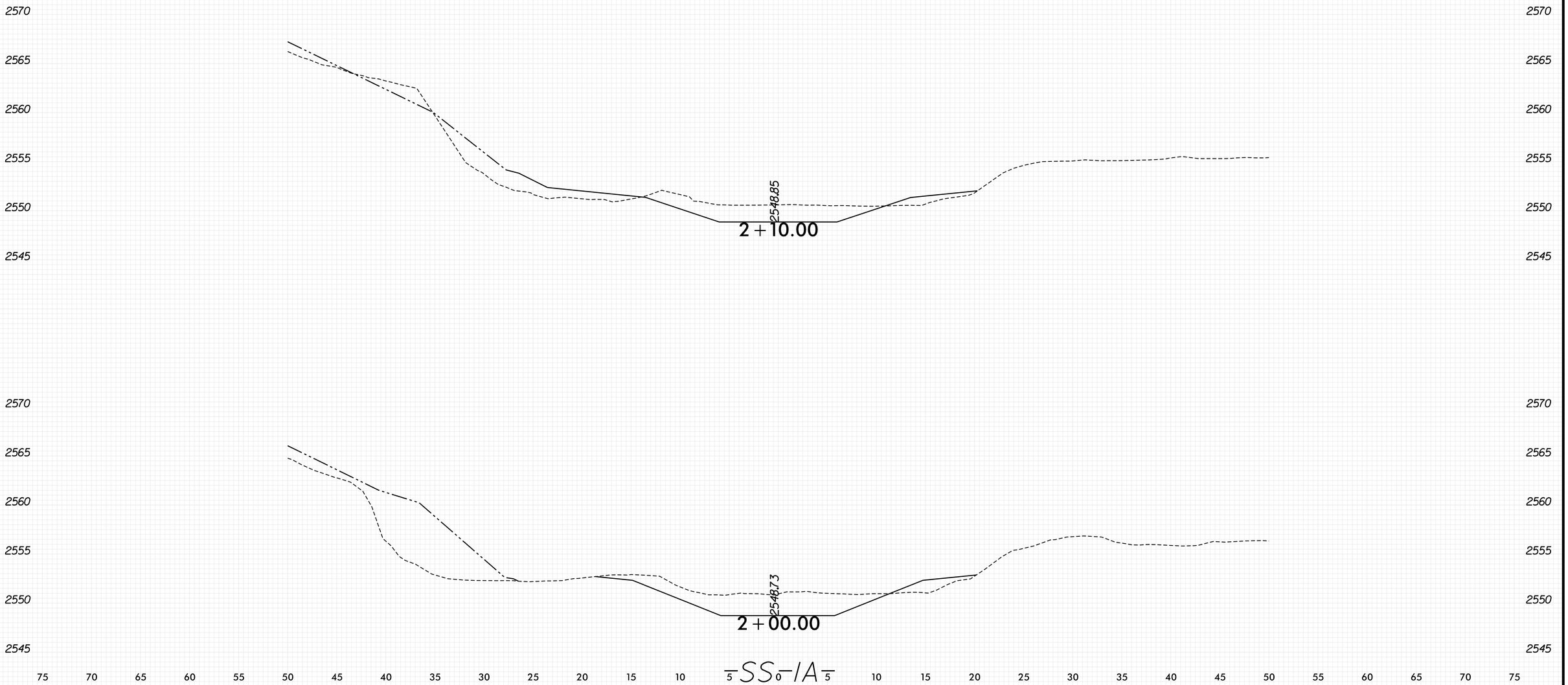






PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:37:58 AM
8/23/99

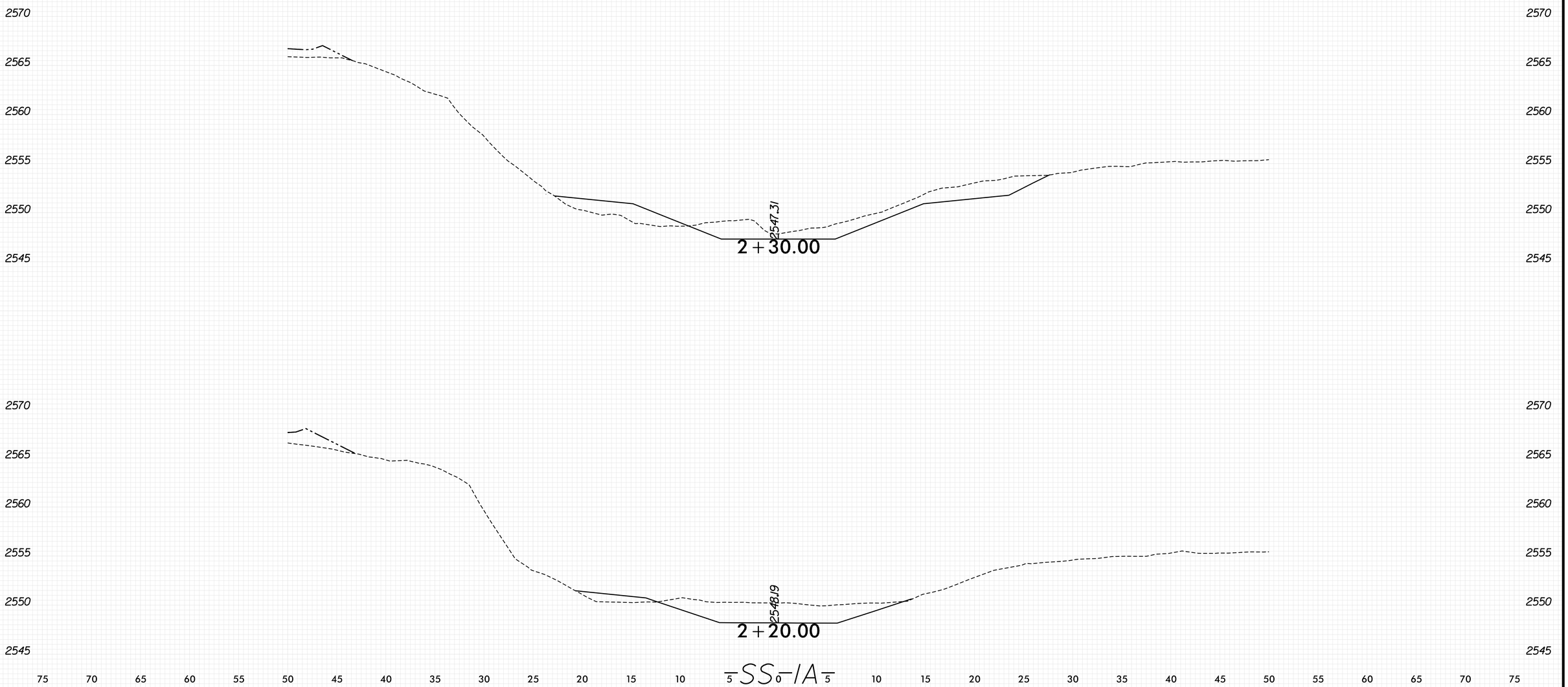
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:38:00 AM

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-27

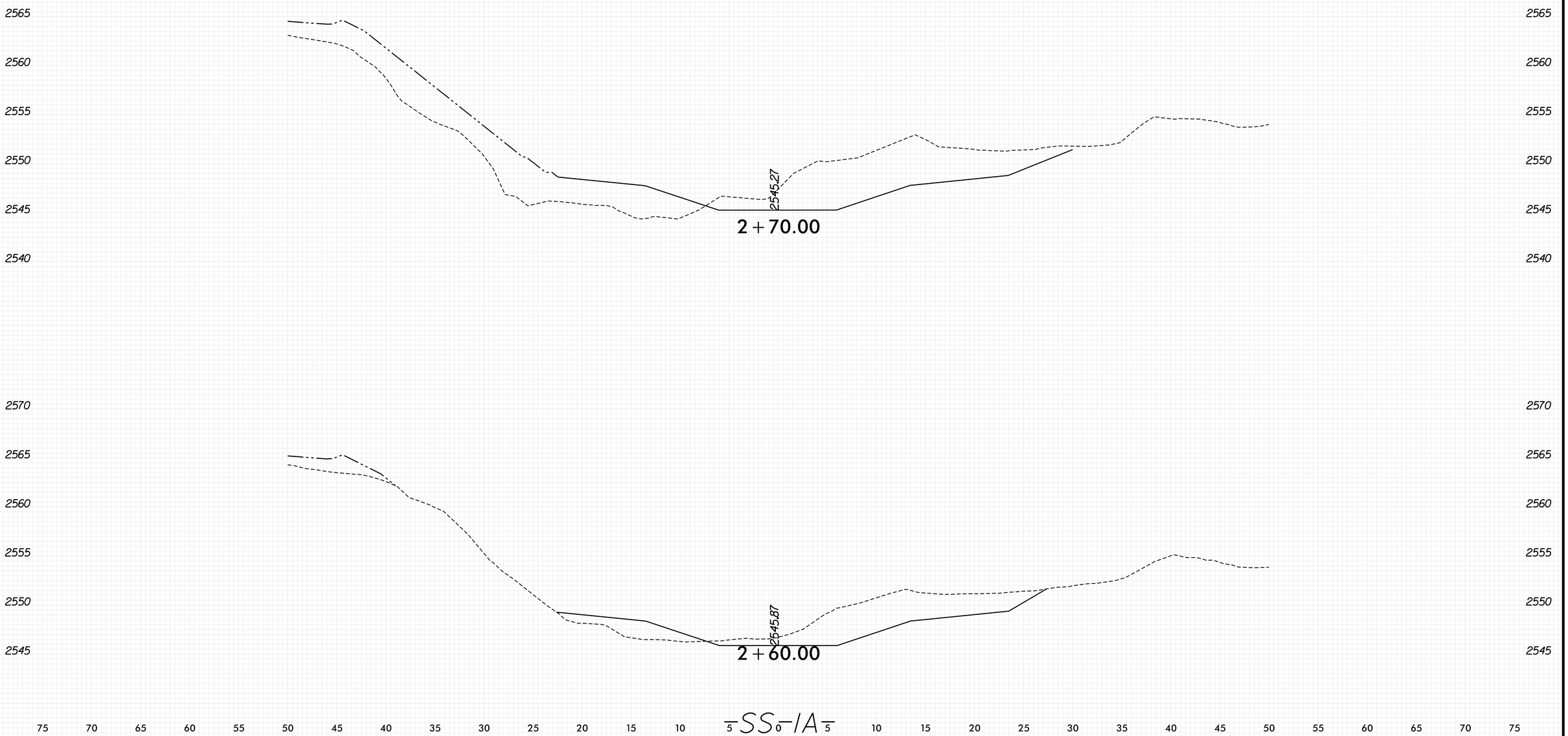
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpLeh_v8.tbl
TIME: 9:38:02 AM
DATE: 5/8/2026

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

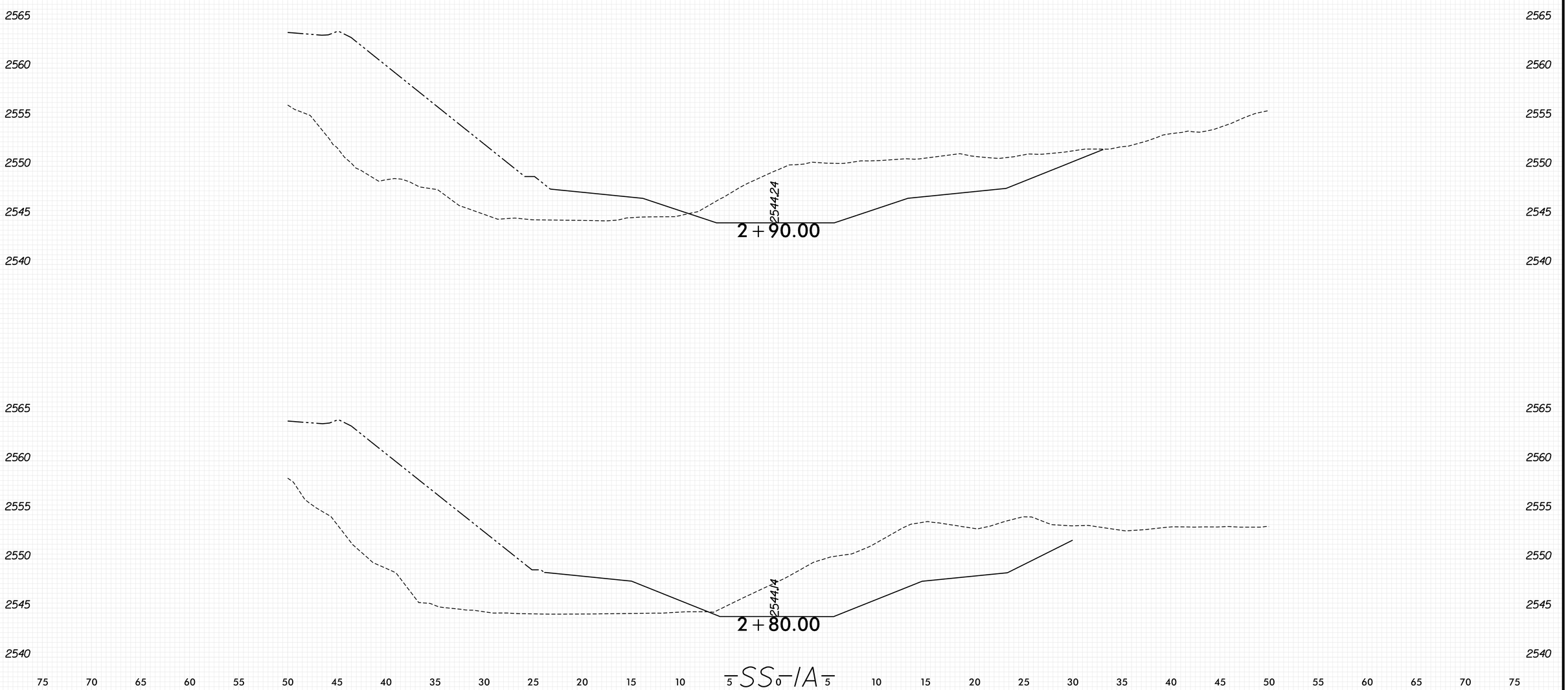
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



-SS0-1A-

8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:38:03 AM

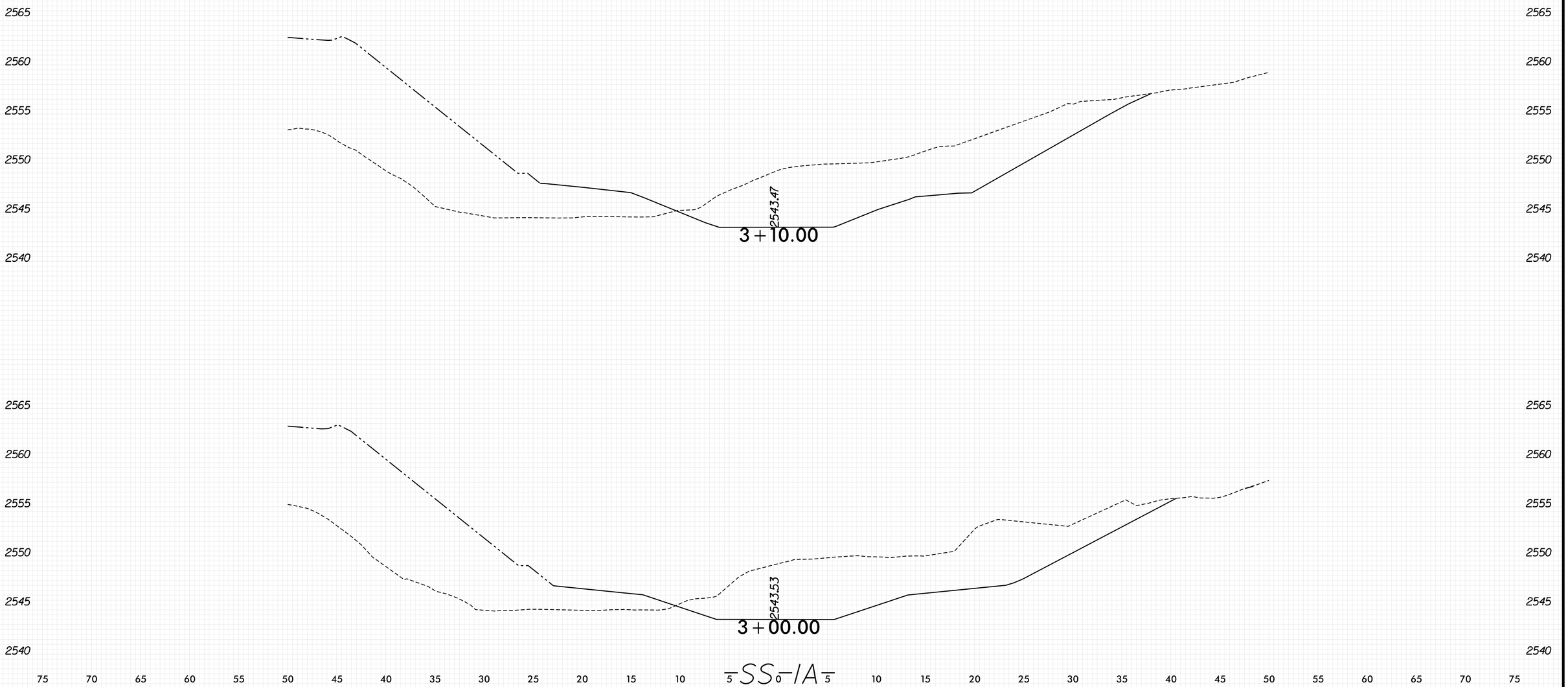
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:05 AM

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



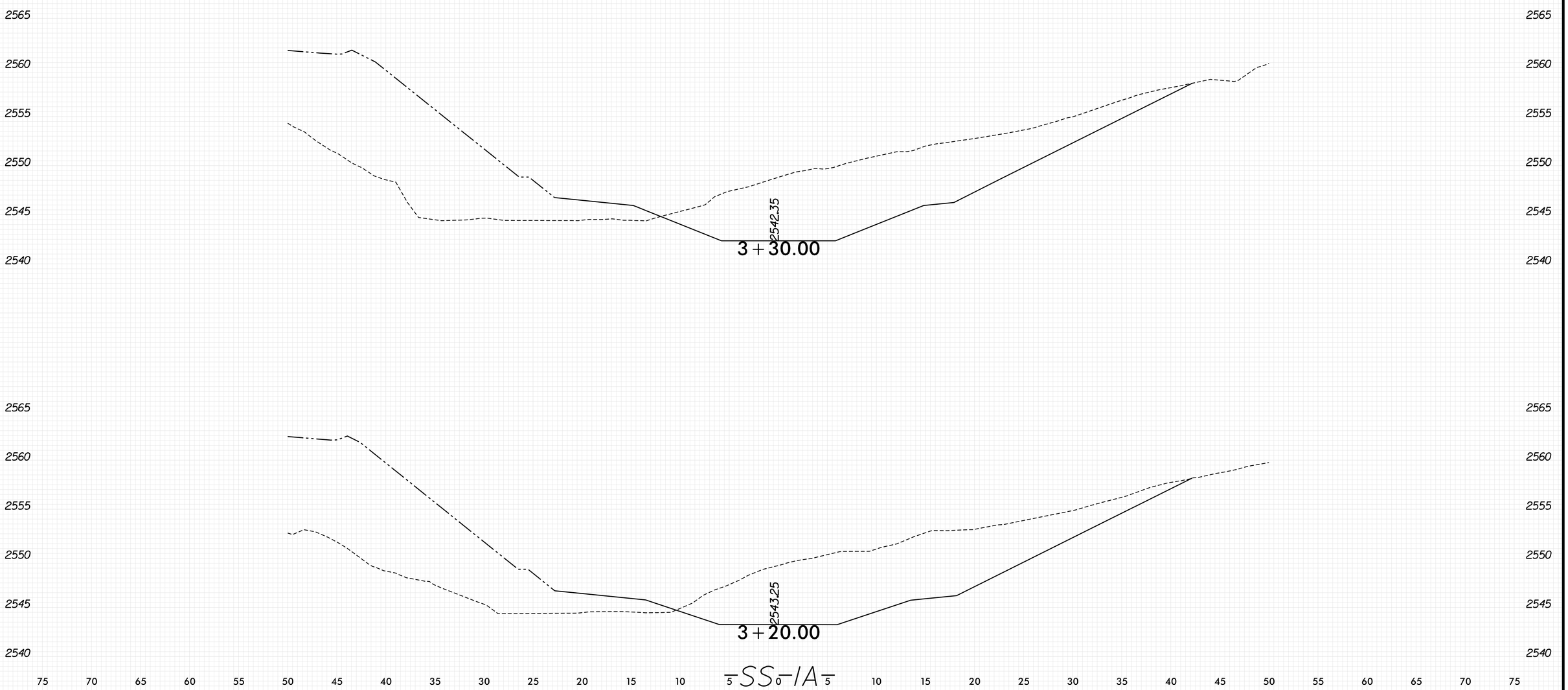
8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
DATE: 5/8/2026
PENTABLE: xpl_eh_v8.tbl
TIME: 9:38:06 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-31

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

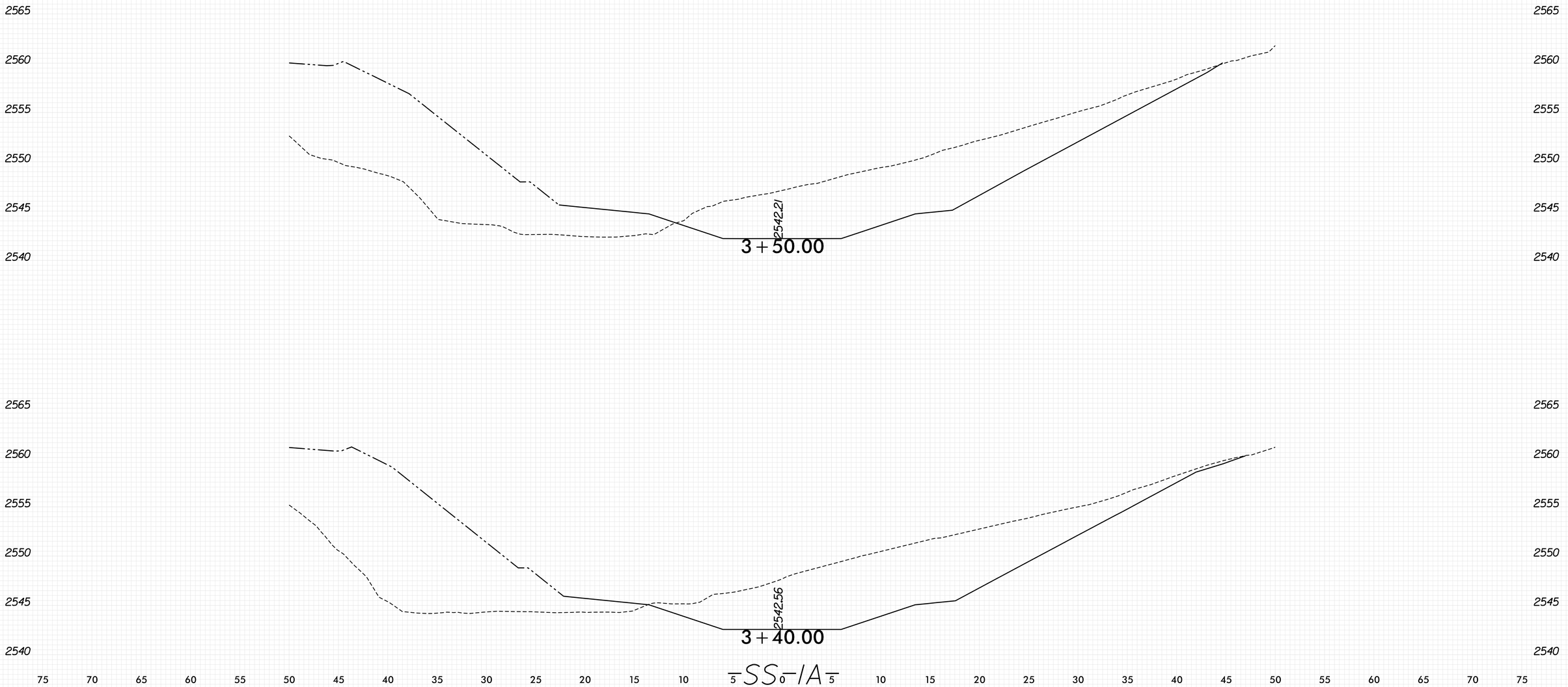
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
DATE: 5/8/2026
PENTABLE: xpl_eh_v8.tbl
TIME: 9:38:07 AM

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

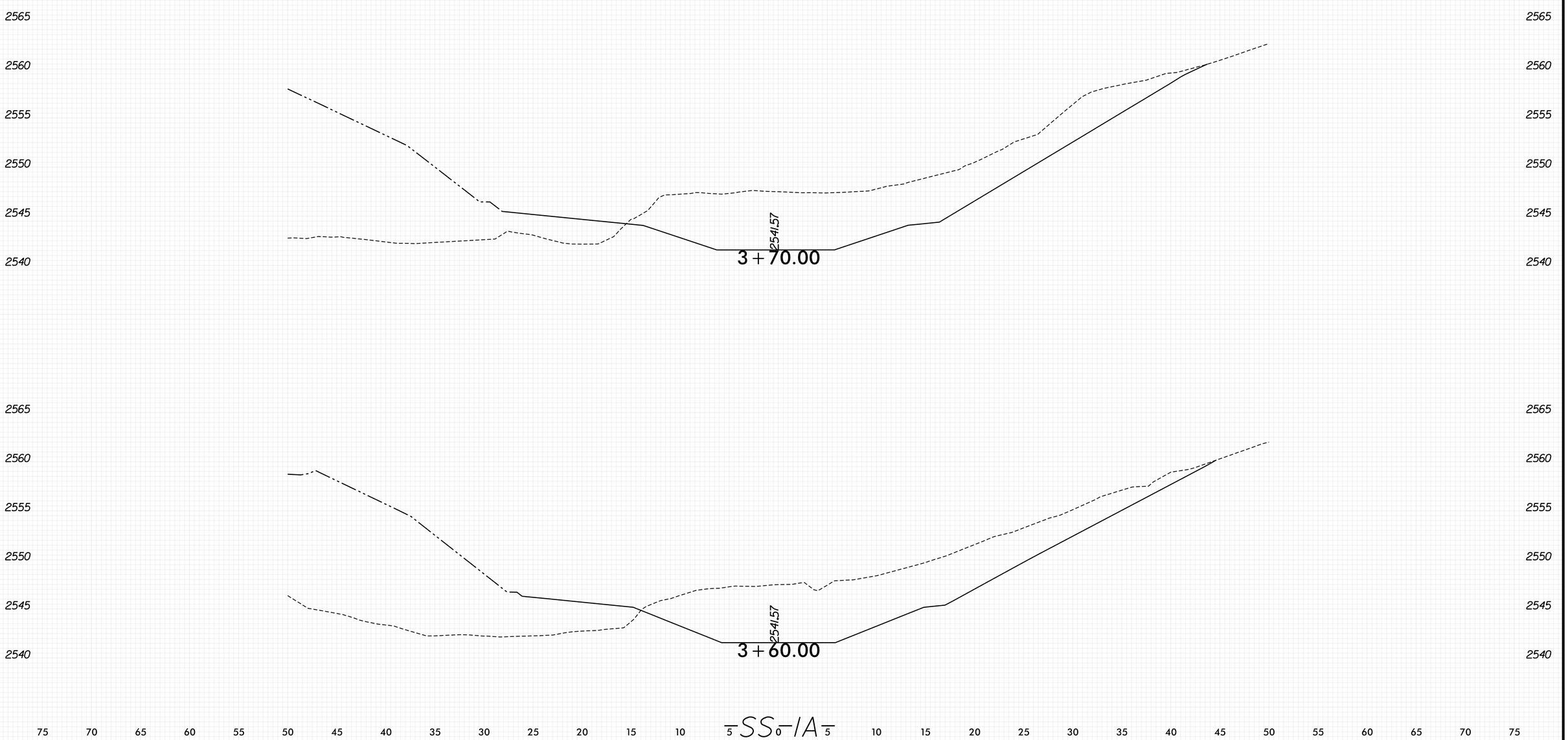
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:38:09 AM
8/23/99

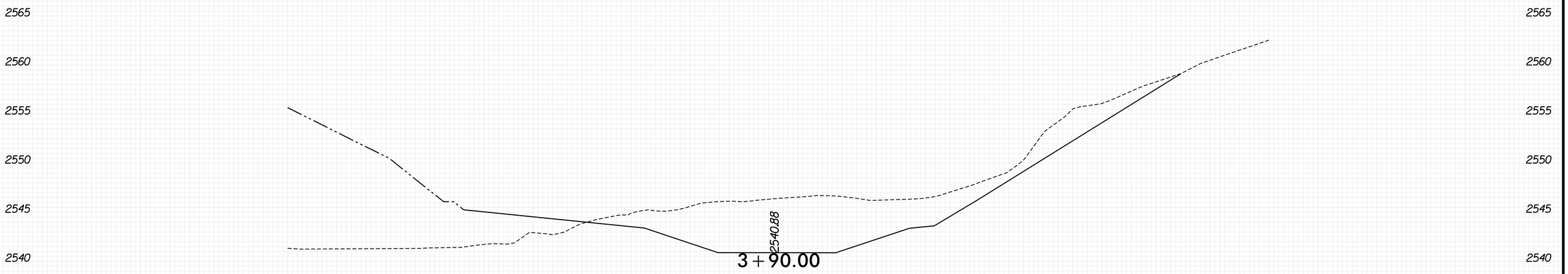
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-33

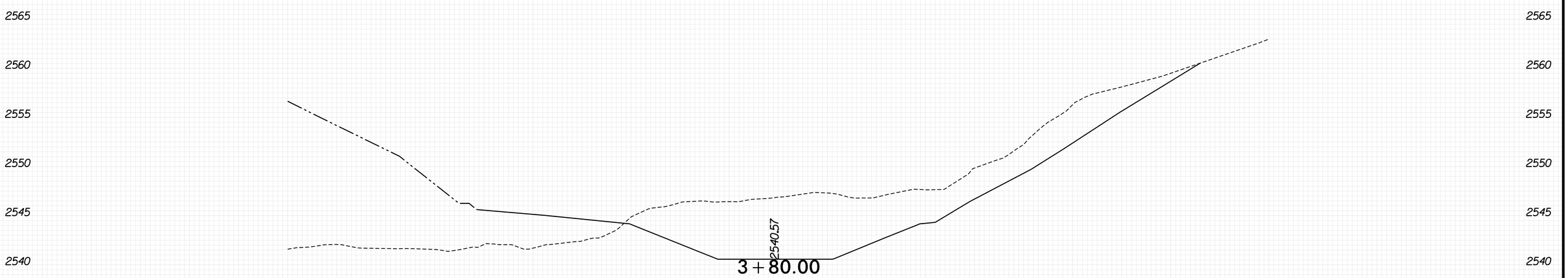
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



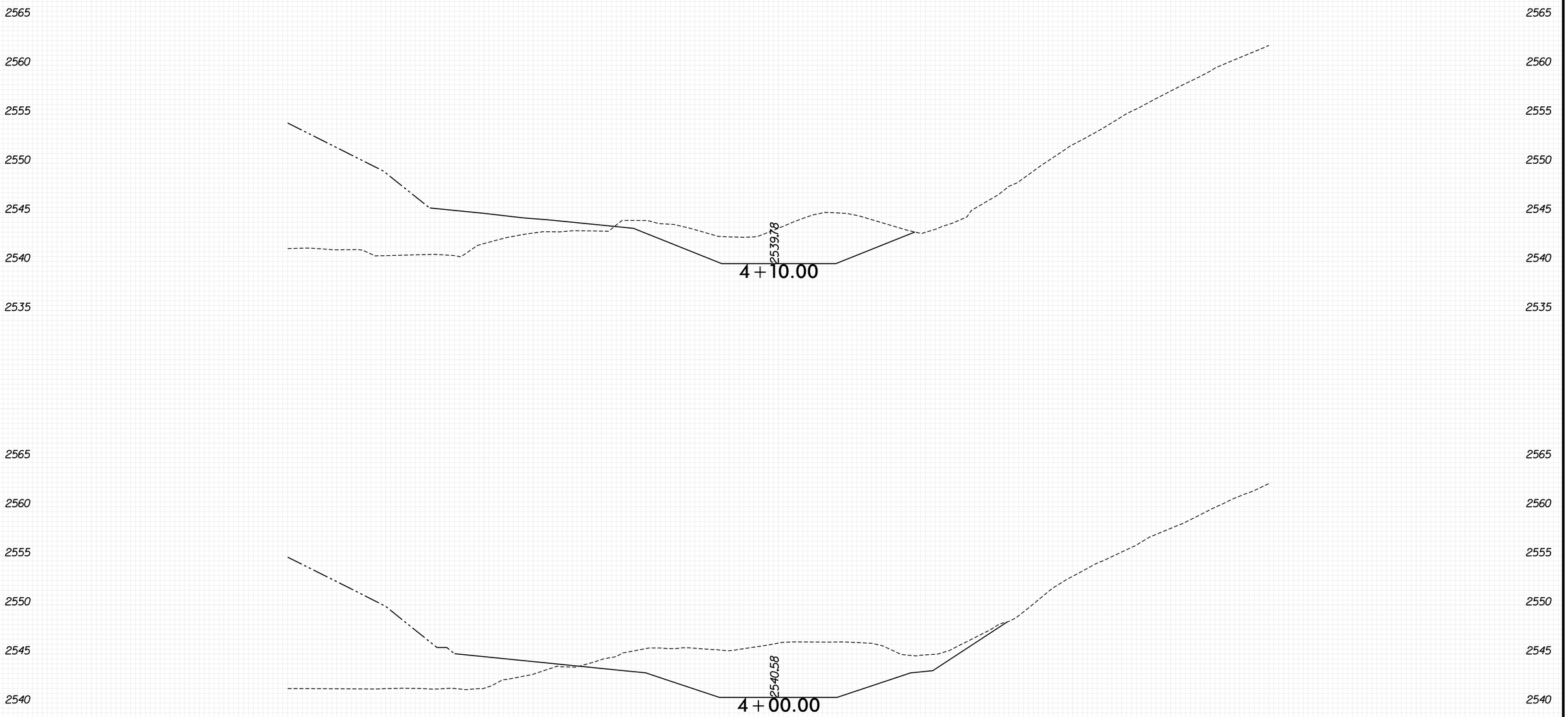


-SS-/A-

8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:38:11 AM

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

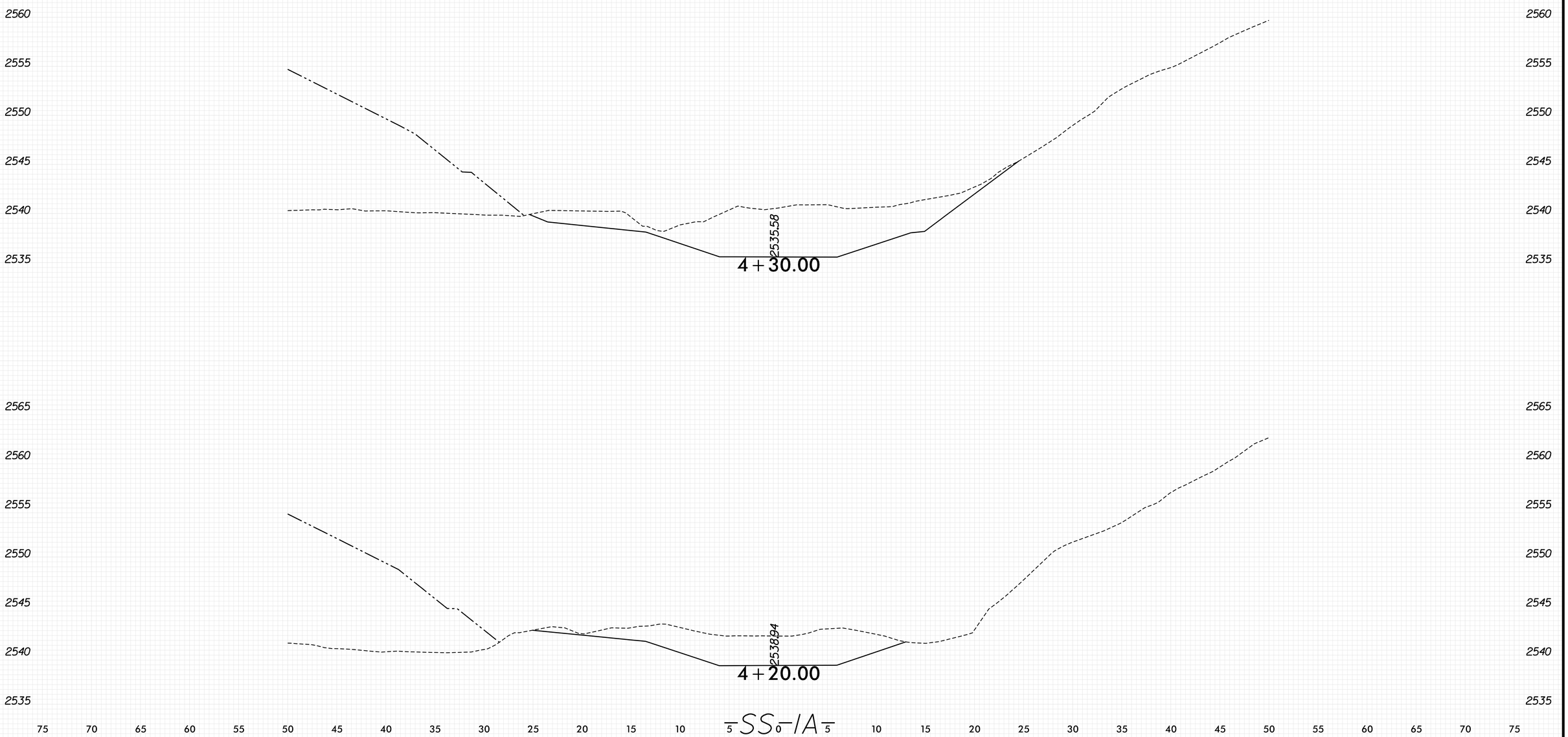


-SS-/A-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:38:13 AM
8/23/99

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

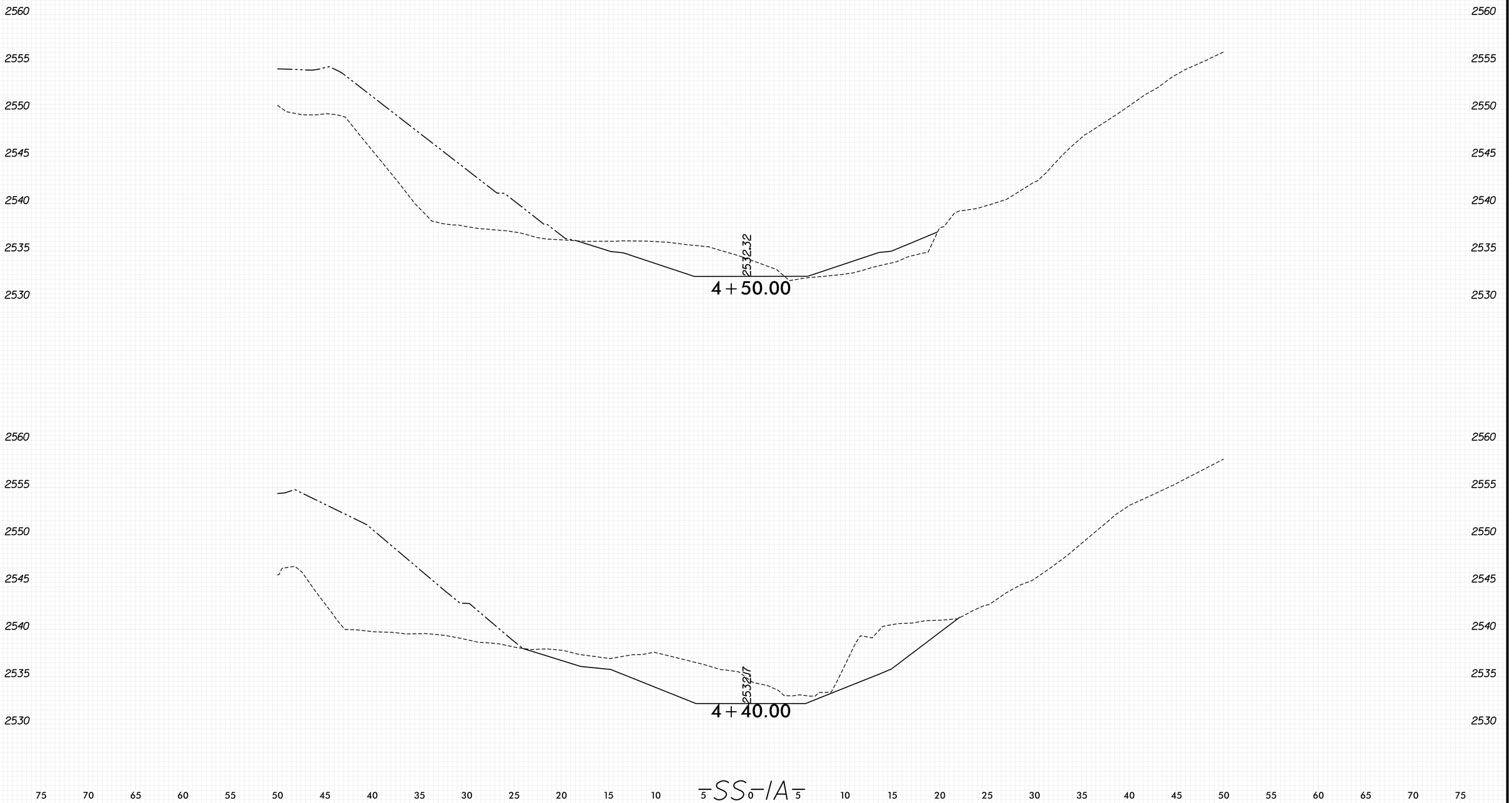
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:14 AM

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

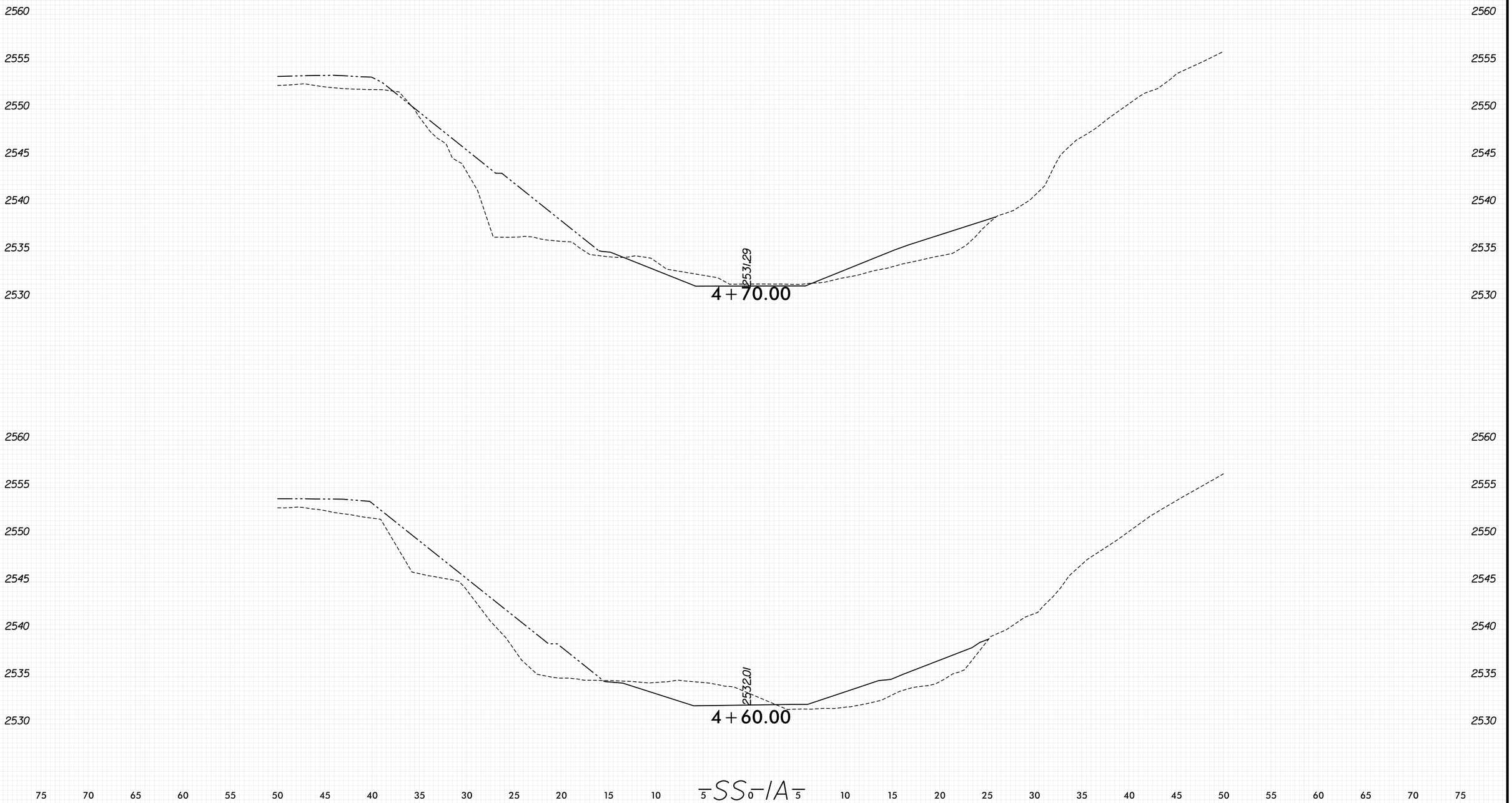
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
DATE: 5/8/2026
PENTABLE: xpl_eh_v8.tbl
TIME: 9:38:15 AM

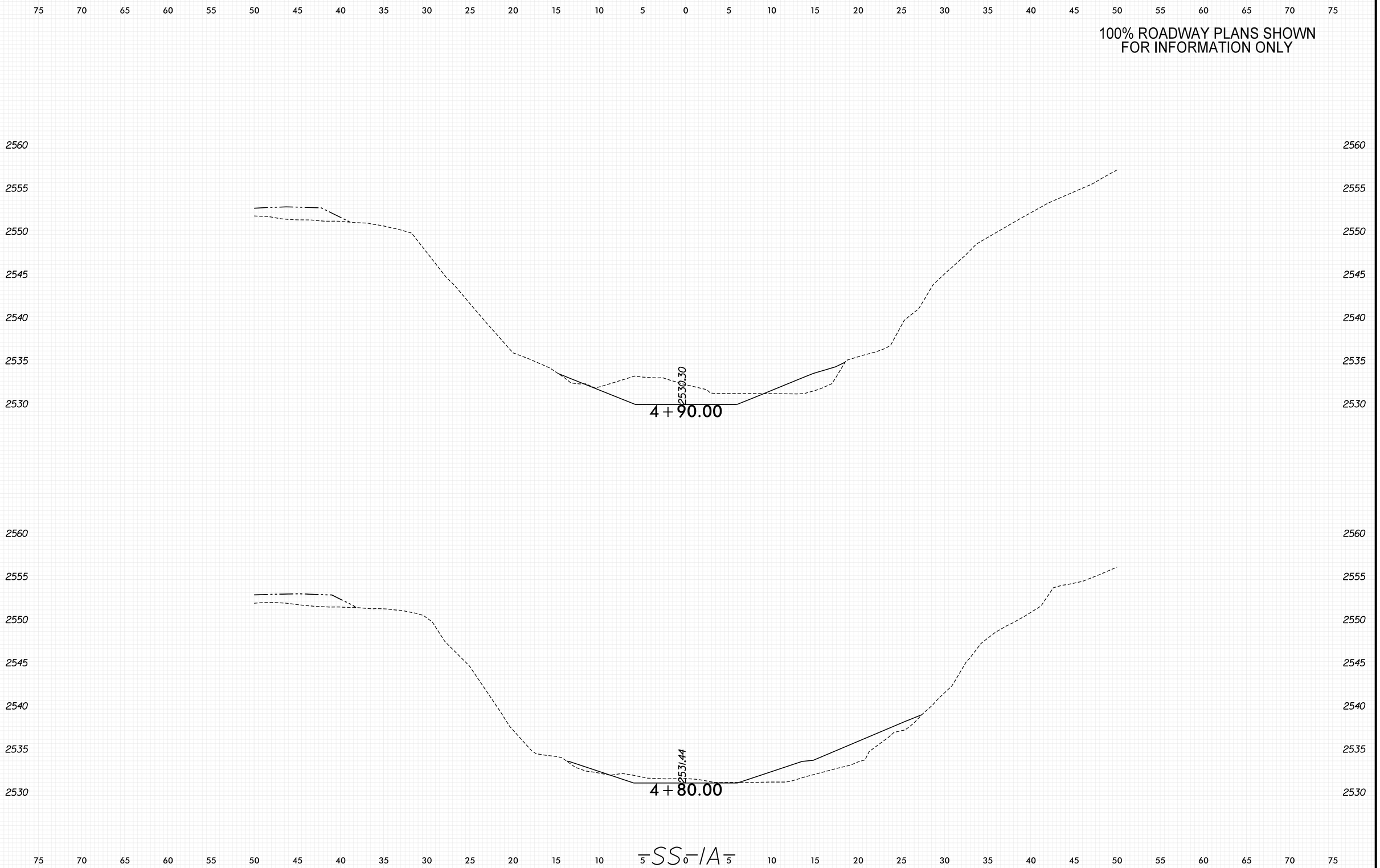
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



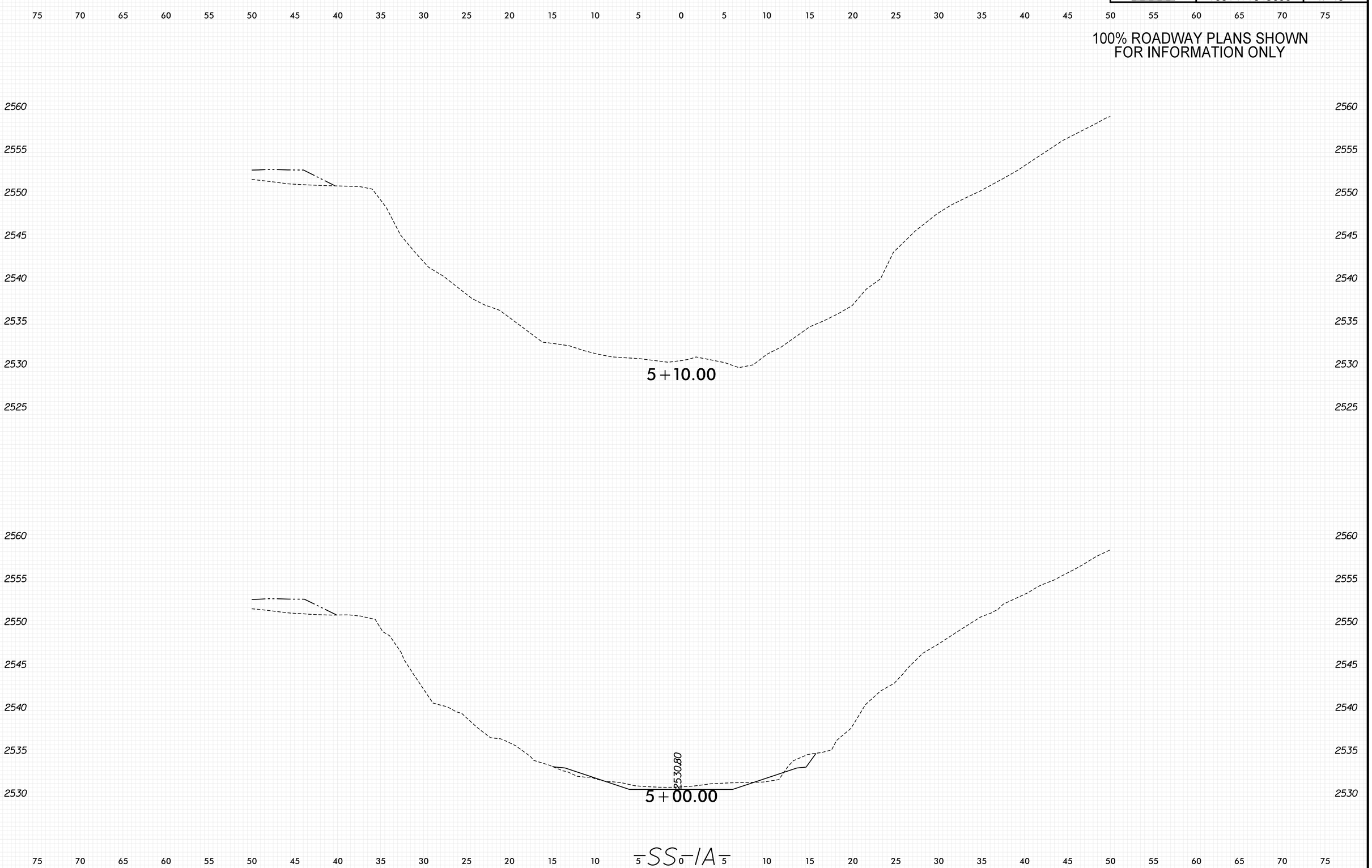
8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:16 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



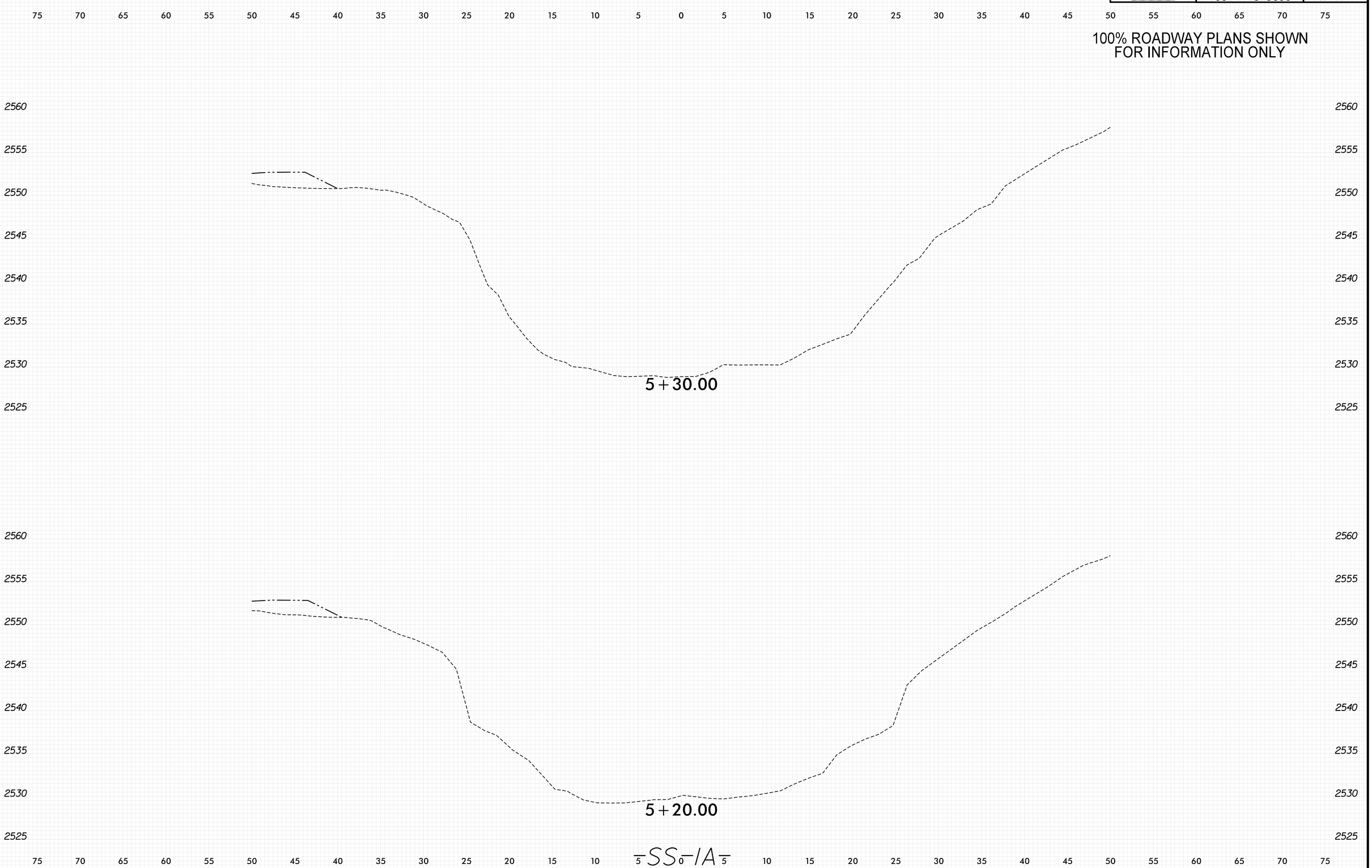
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:38:17 AM
8/23/99

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:38:18 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



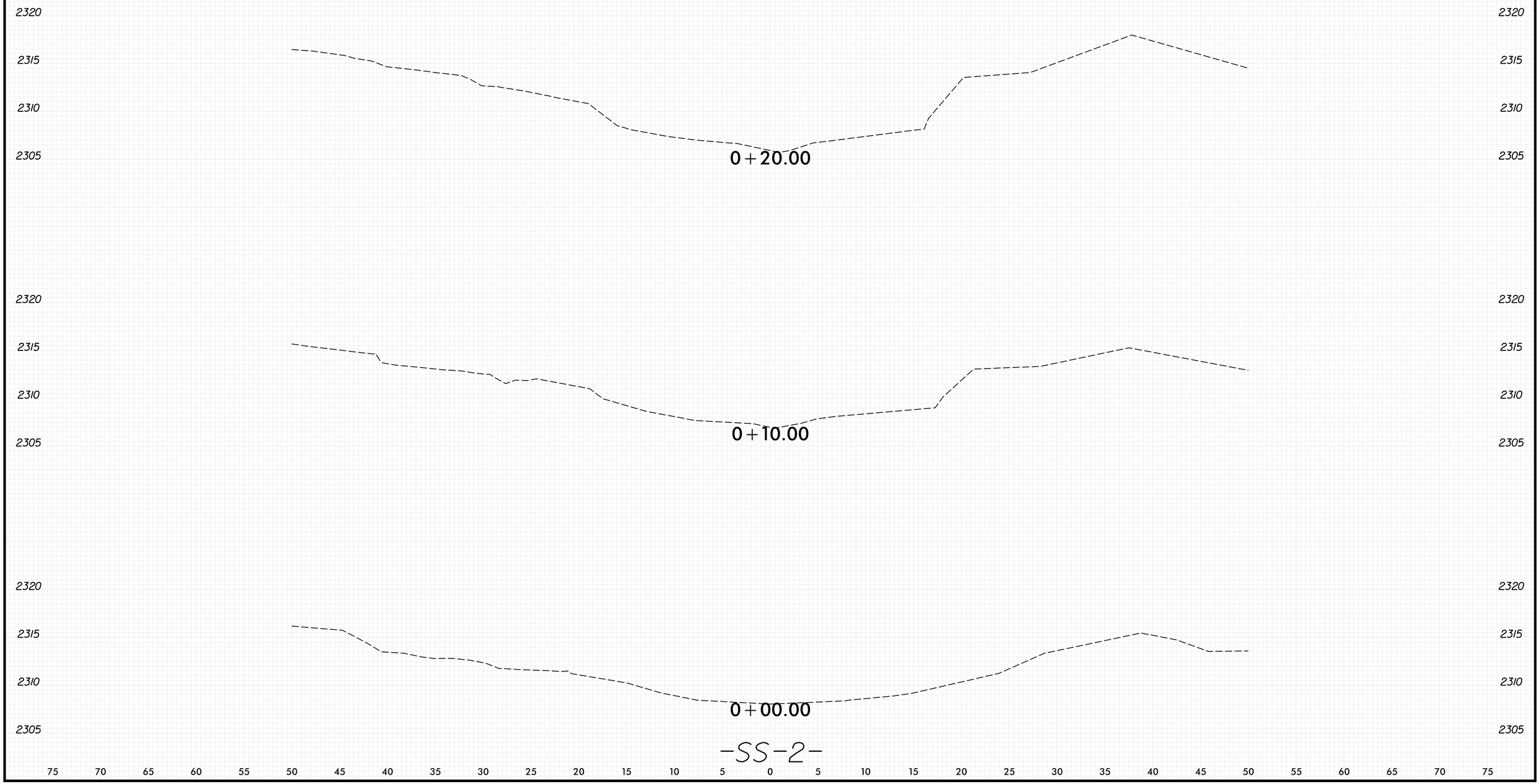
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt | PENTABLE: xpl_eh_v8.tbl
USER: KCLATTERBU DATE: 5/8/2026 TIME: 9:38:19 AM
FILE: \

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-42

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



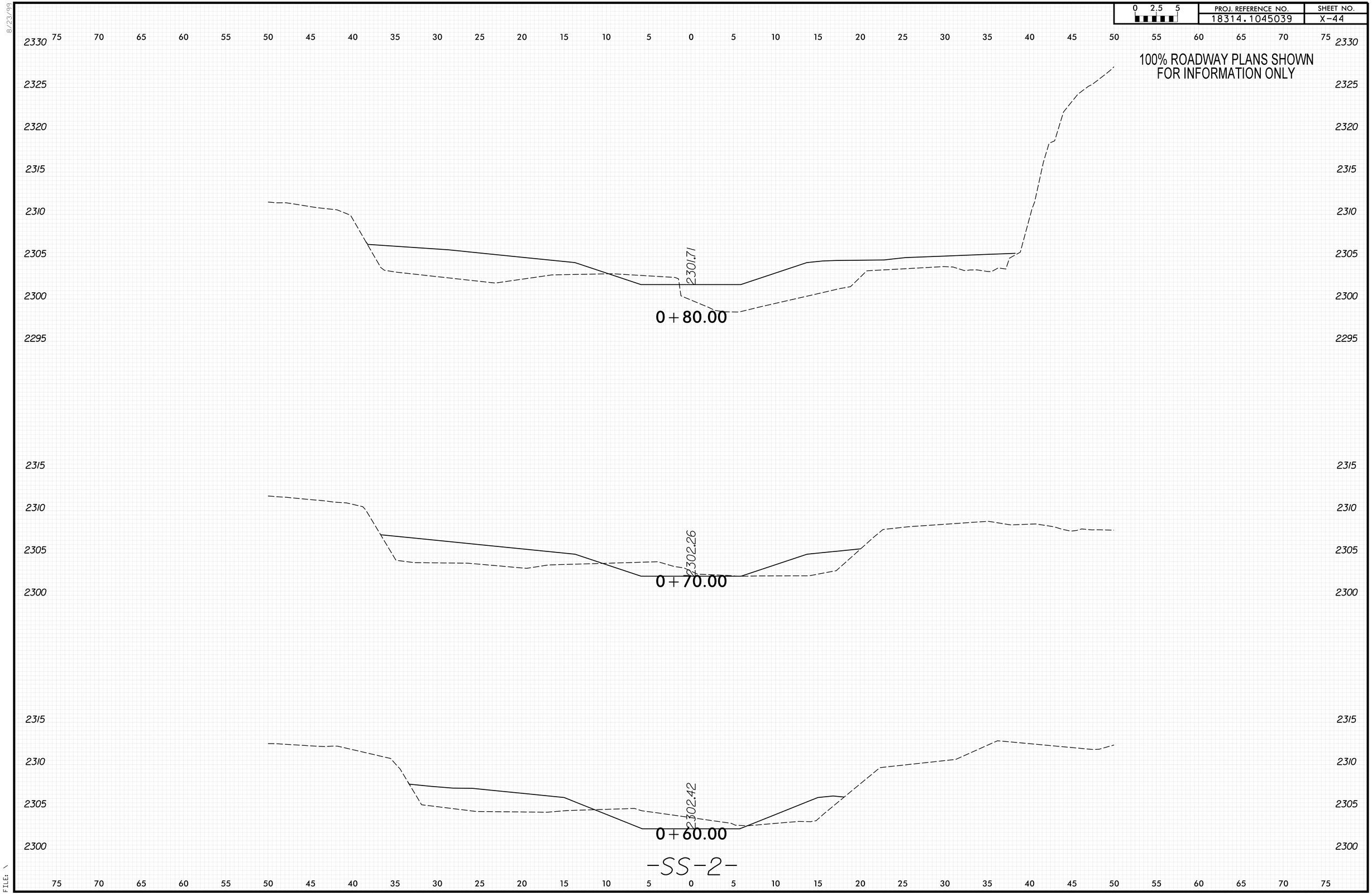
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
DATE: 5/8/2026
PENTABLE: xpl_en_v8.tbl
TIME: 9:38:23 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

-SS-2-

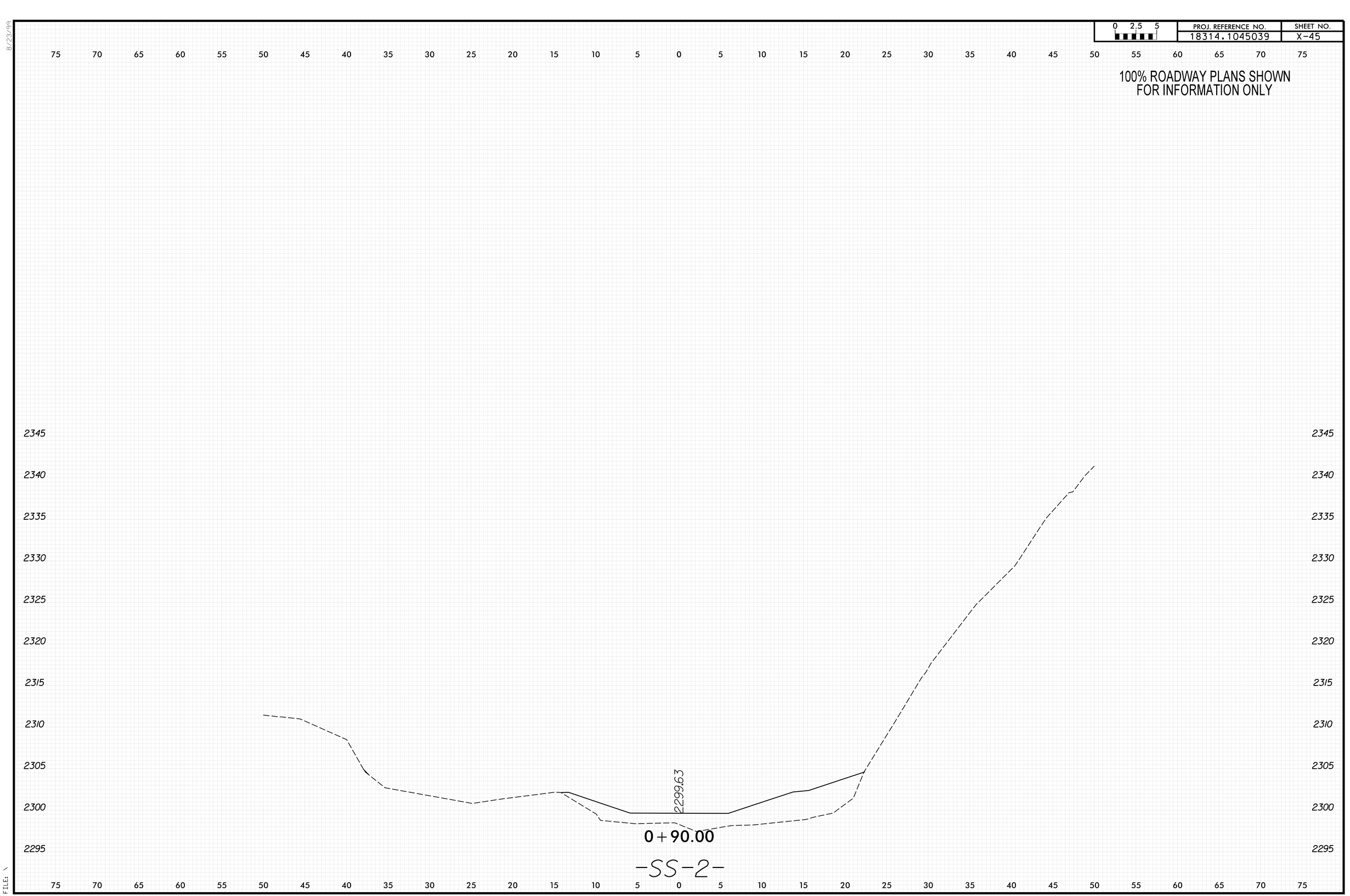
8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:24 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:26 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

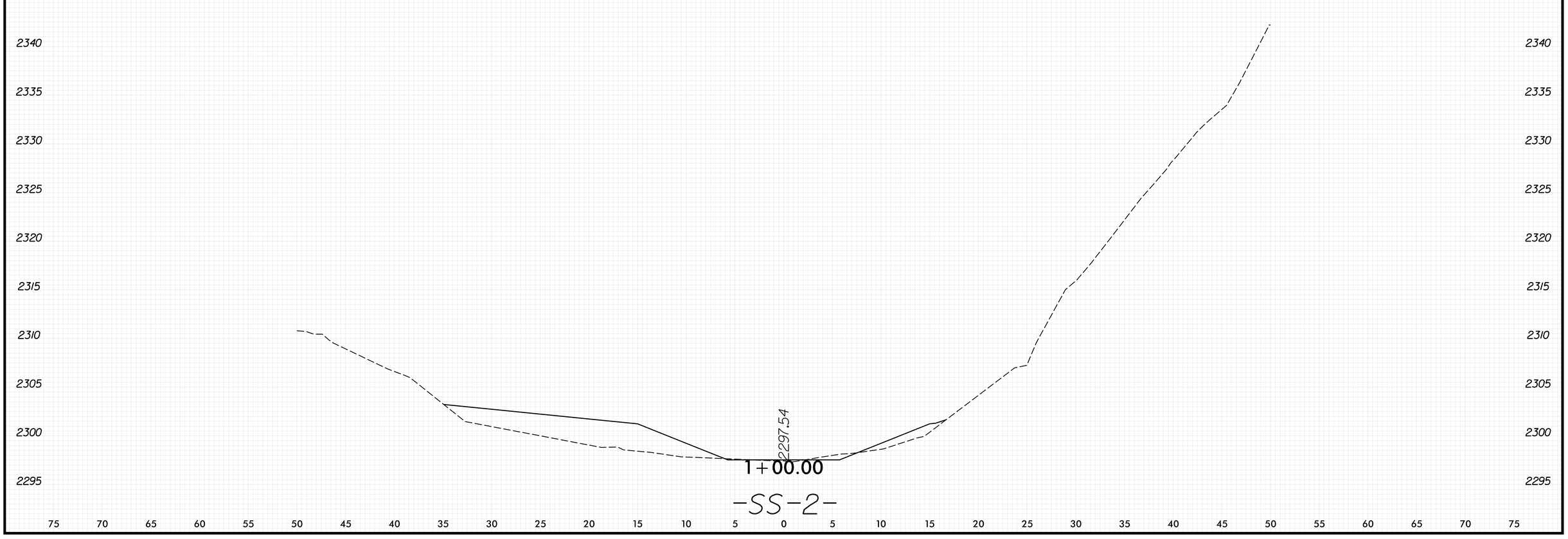


PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:27 AM
8/23/99

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-46

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

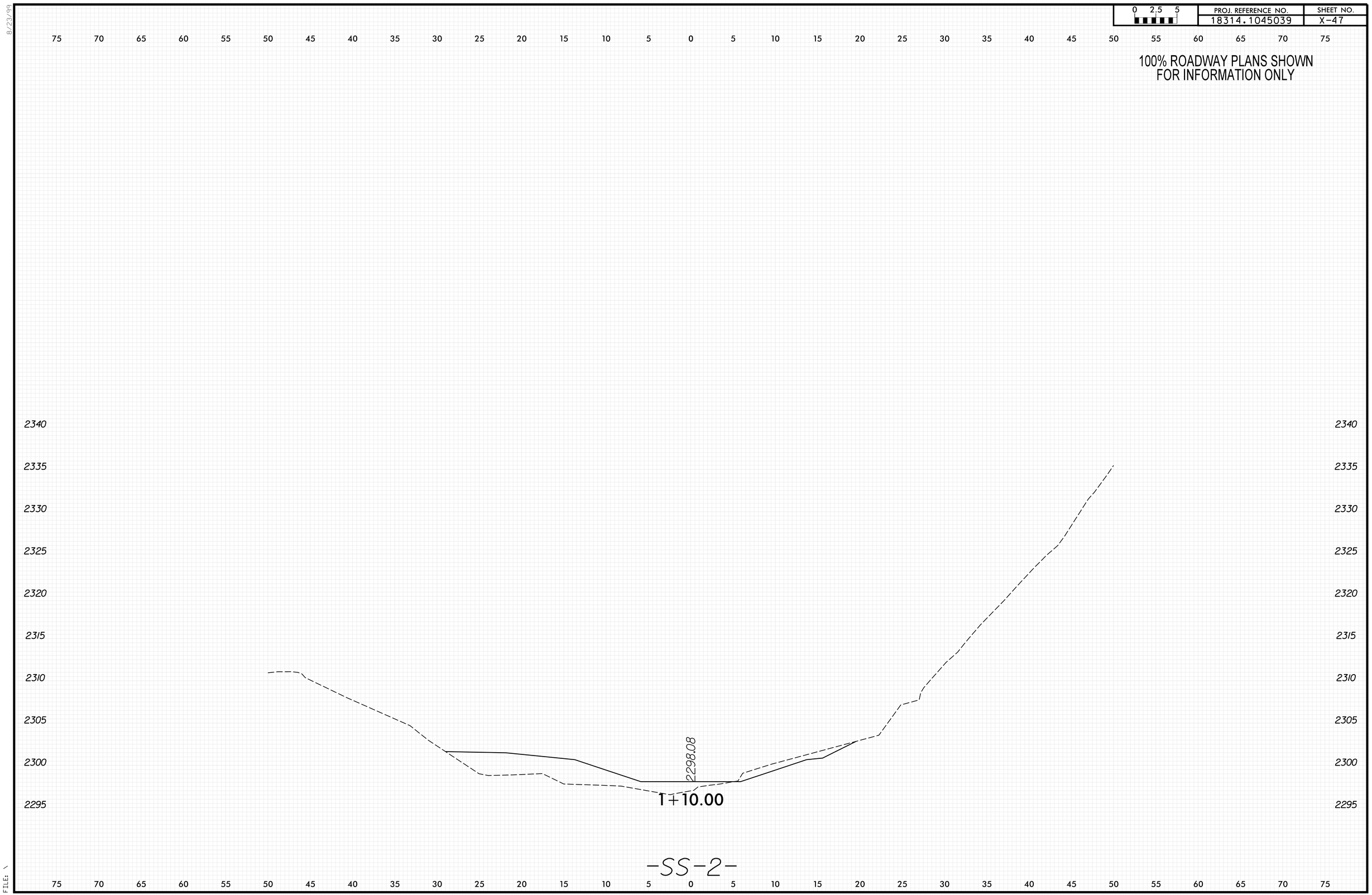


PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
DATE: 5/8/2026
PENTABLE: xpl_en_v8.tbl
TIME: 9:38:28 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-47

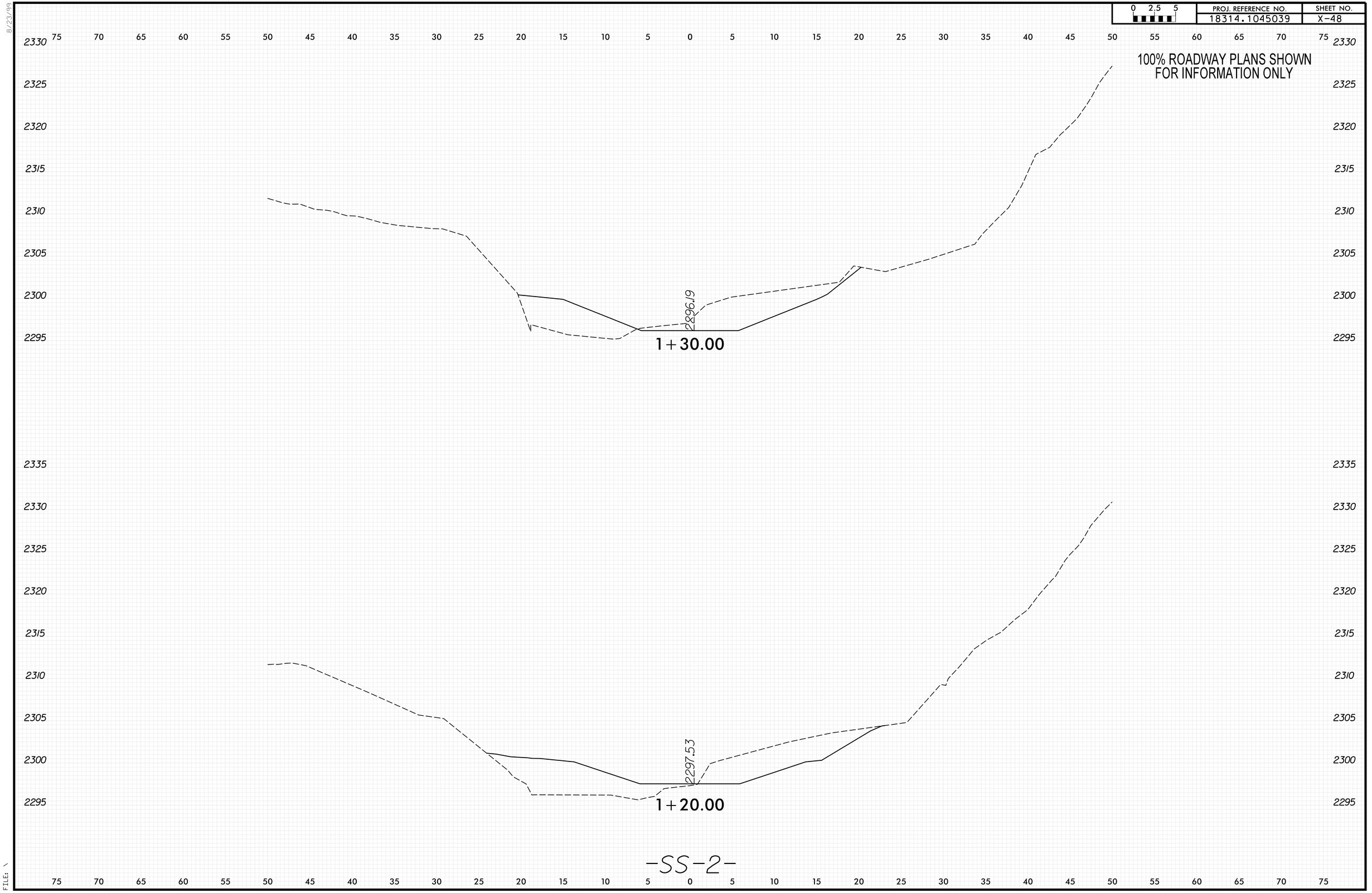
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:29 AM

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-48

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



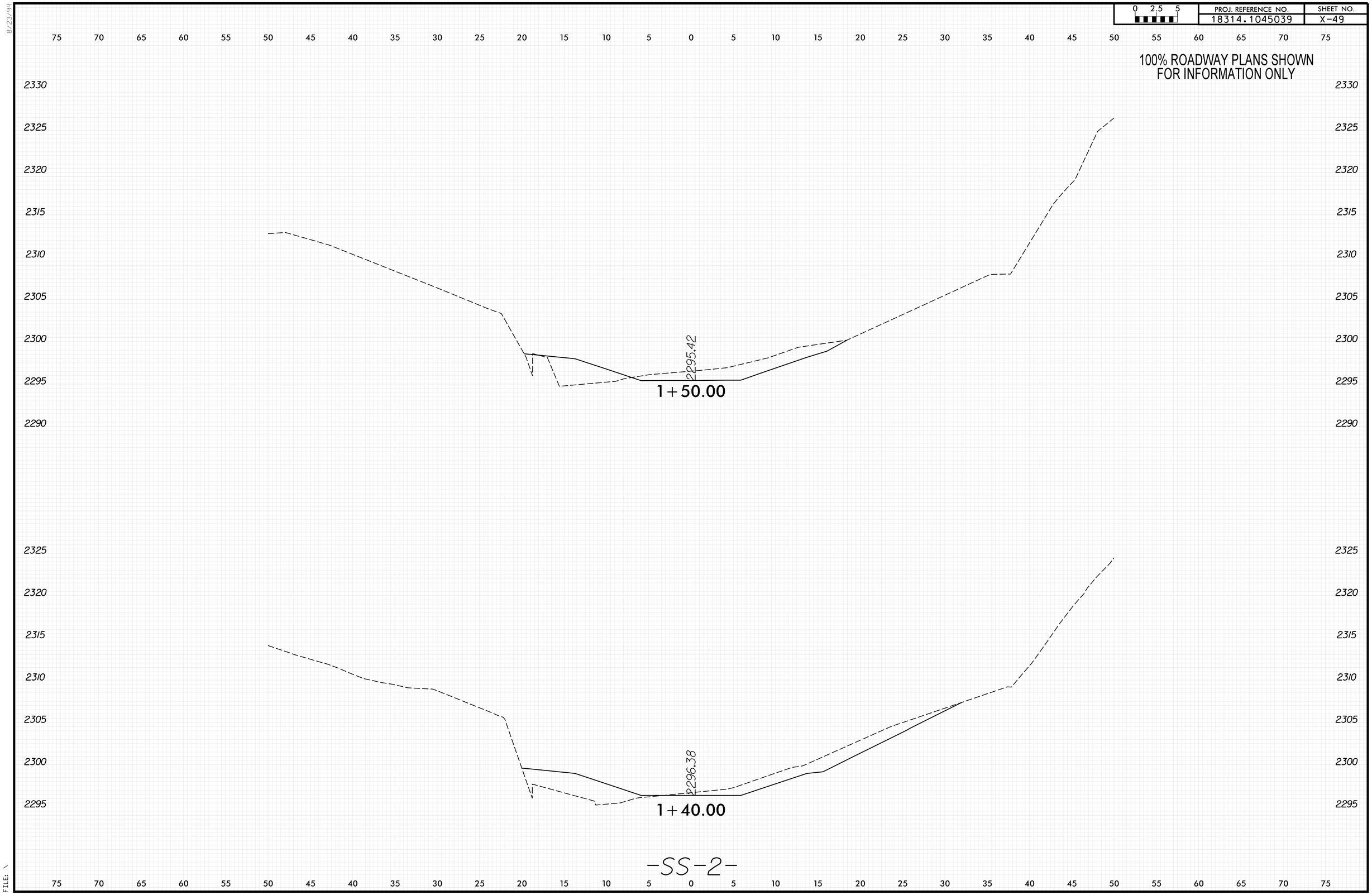
-SS-2-

8/23/99

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:30 AM

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-49

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

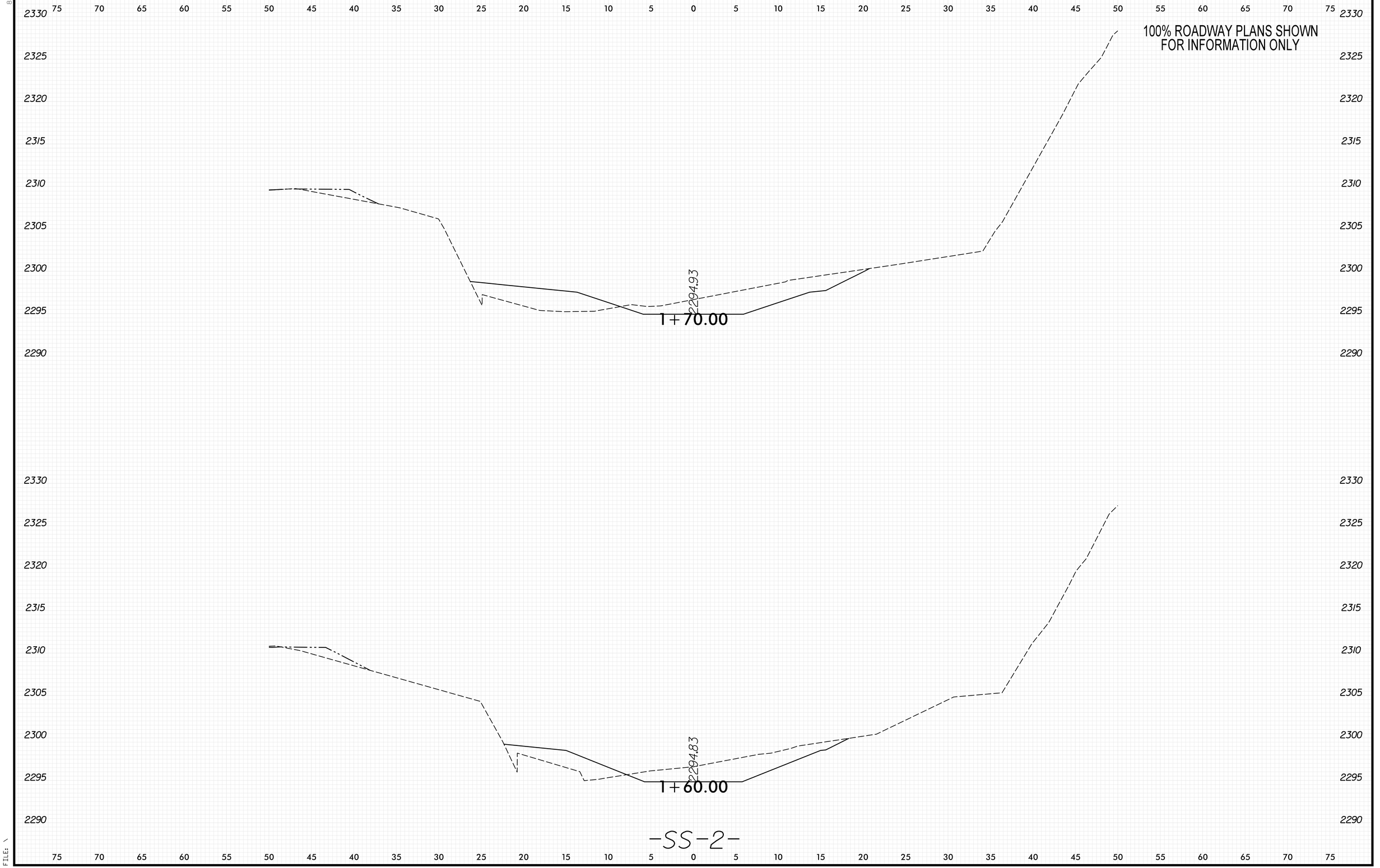


8/23/99

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:32 AM

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-50

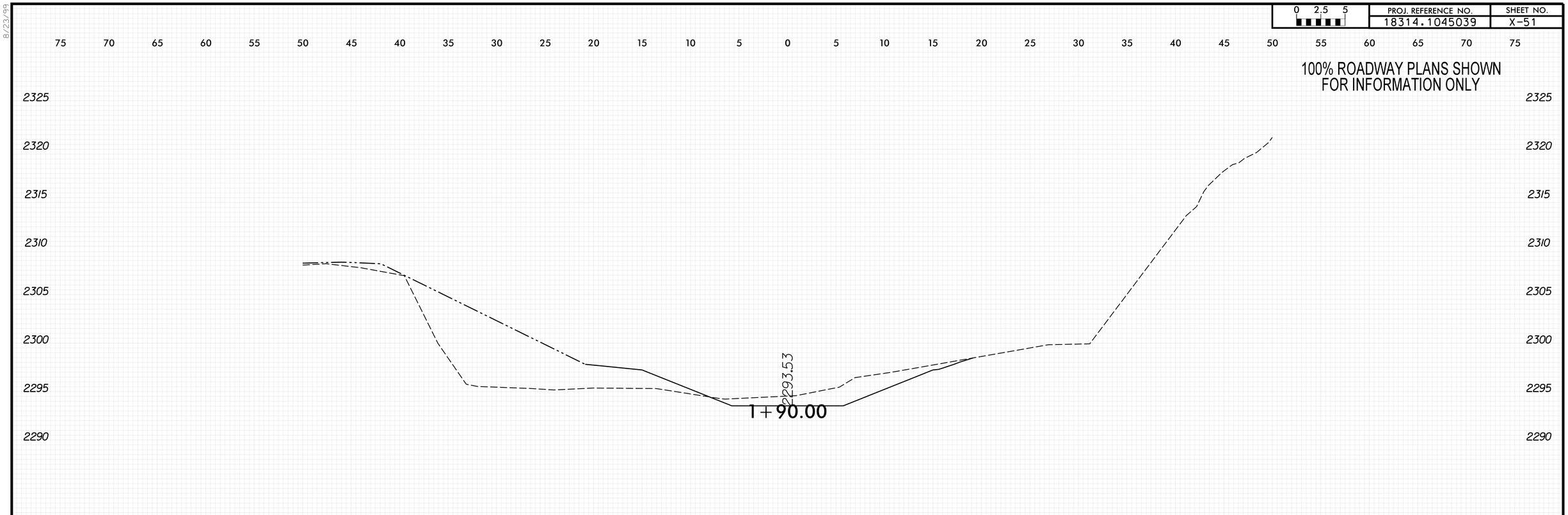
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

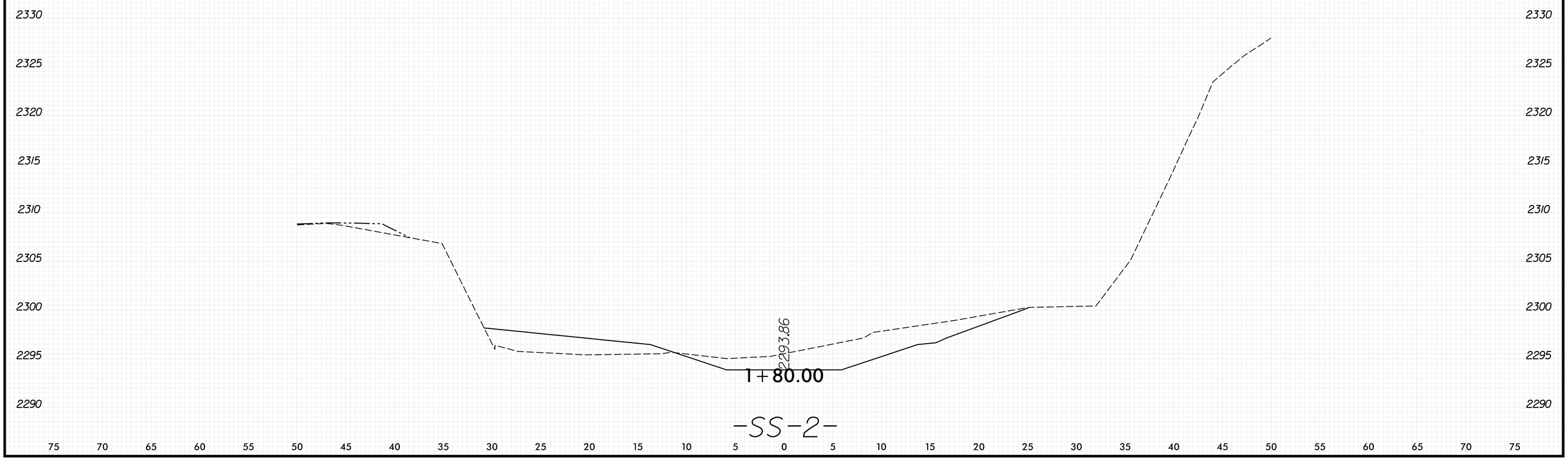


8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-51

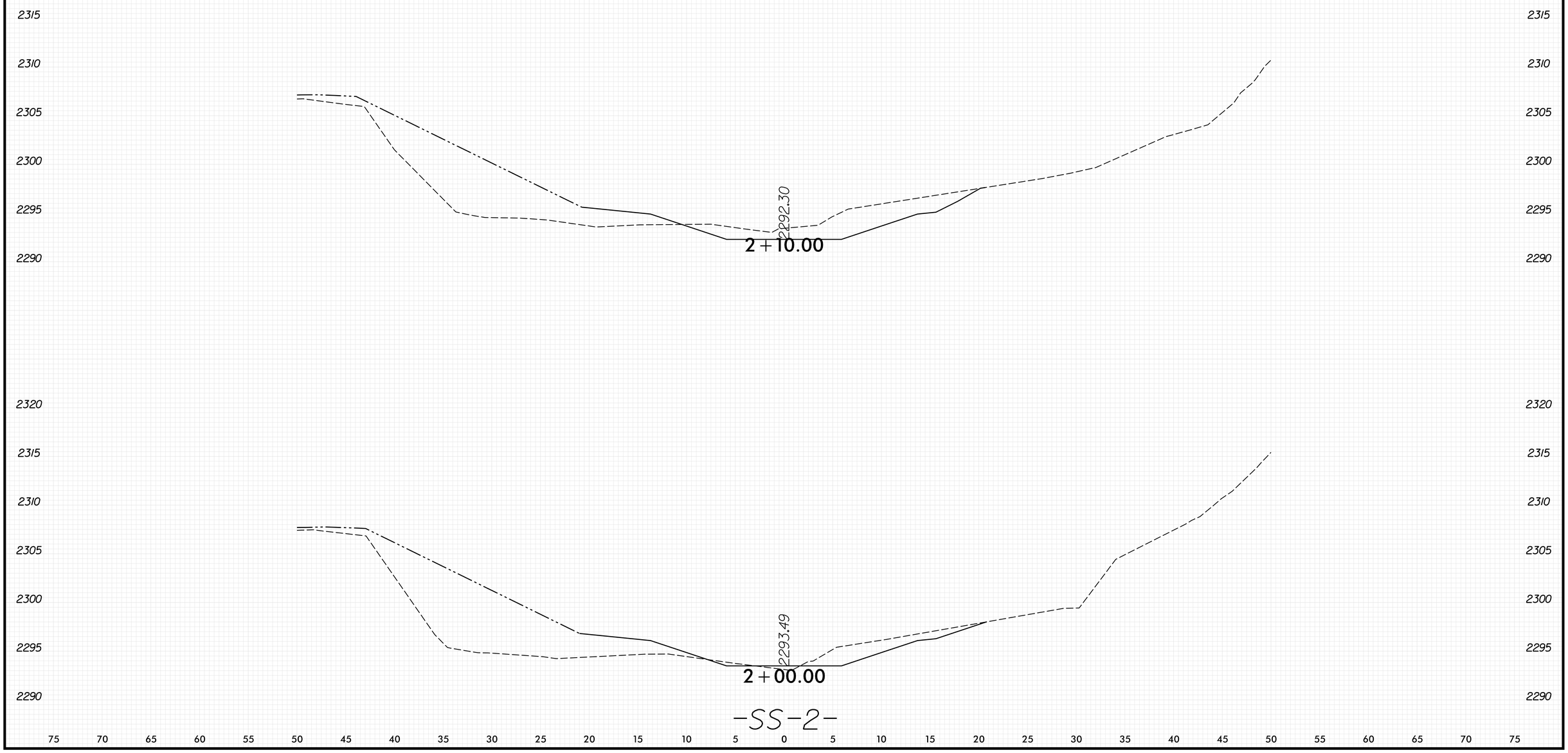
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY





PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:34 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT.pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
DATE: 5/8/2026
PENTABLE: xpl_eh_v8.tbl
TIME: 9:38:36 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-53

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

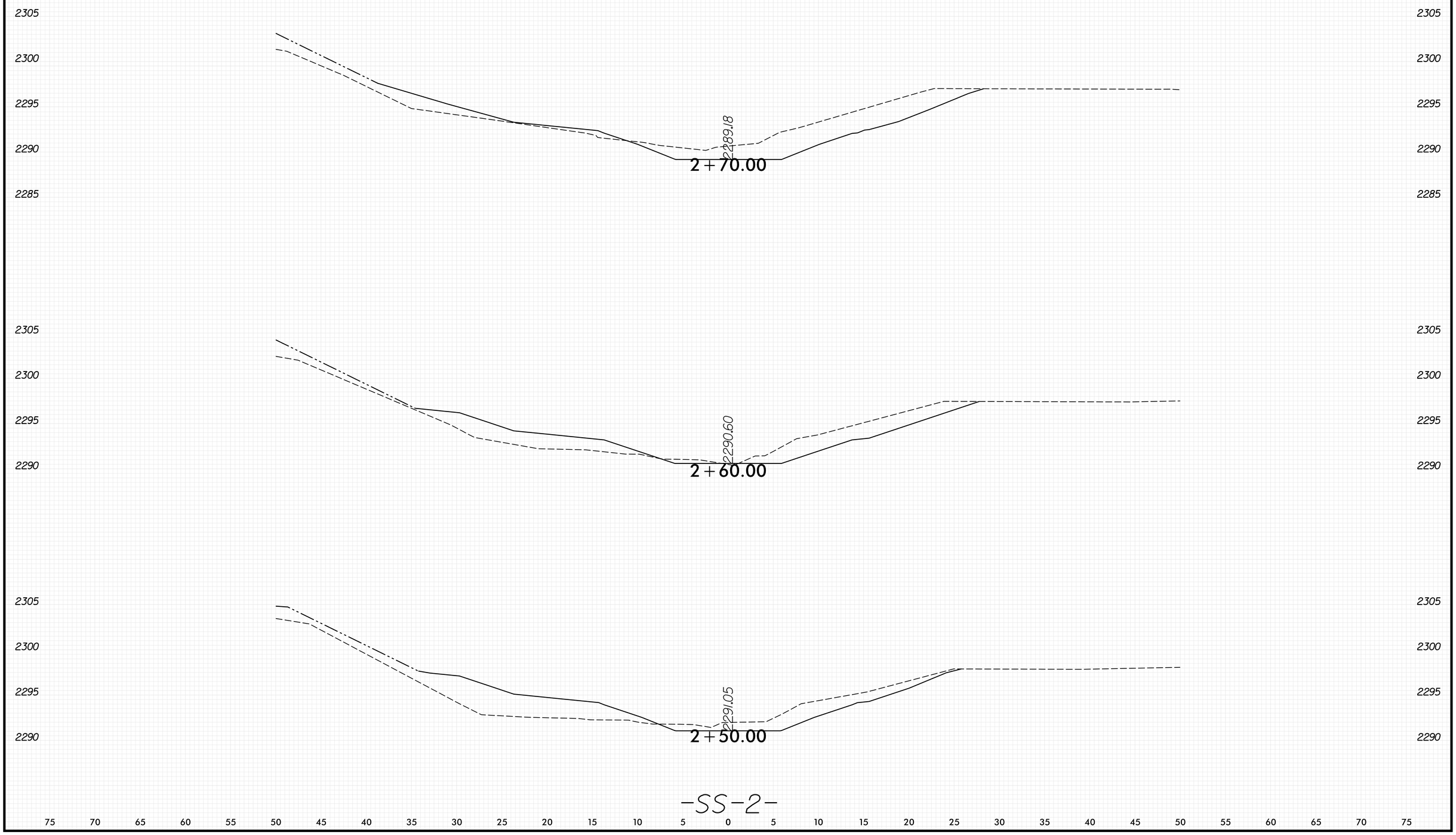
PLOT DRIVER: NCDOT.pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:38:37 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-54

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



-SS-2-

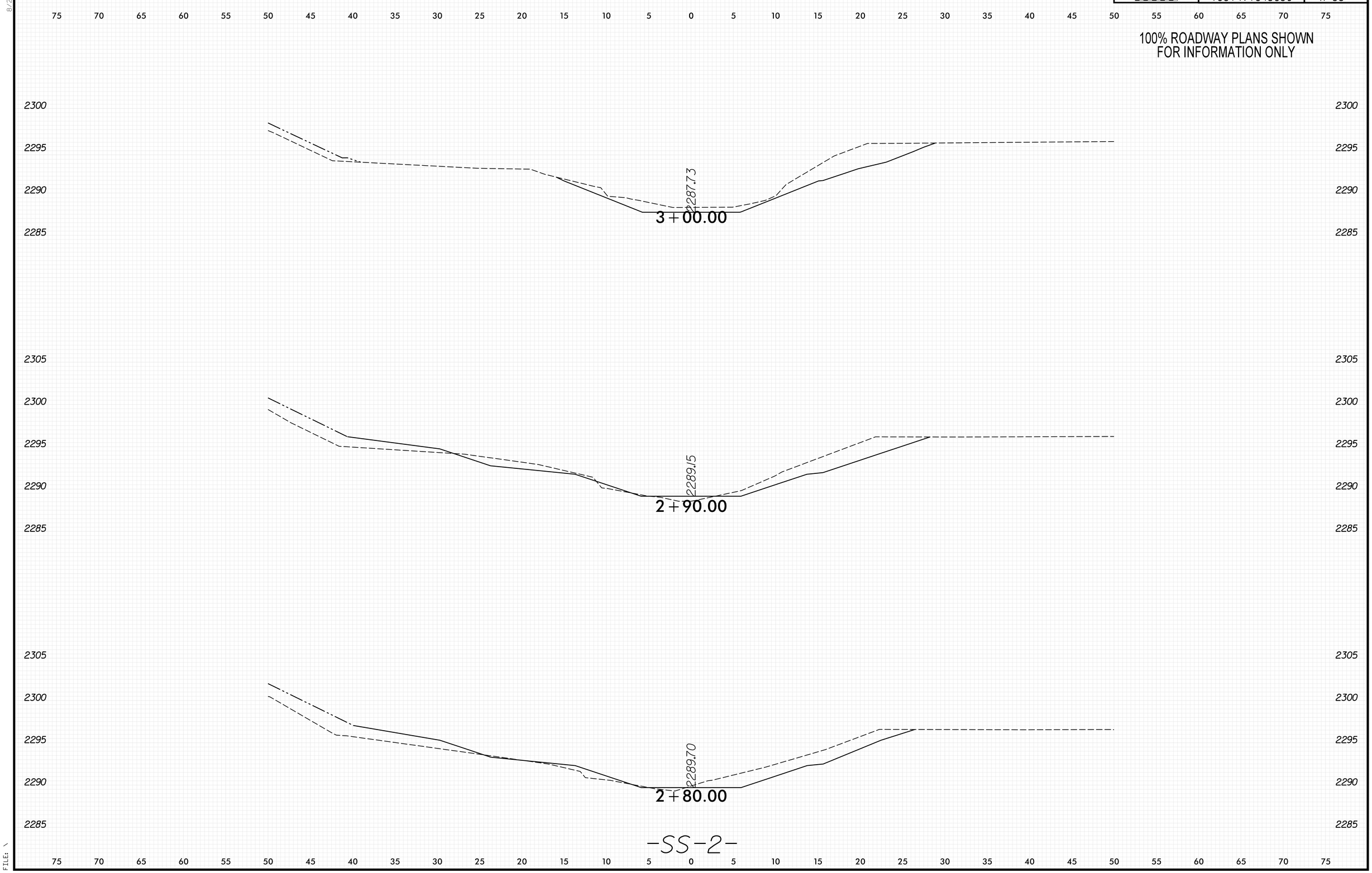
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:38 AM

8/23/99

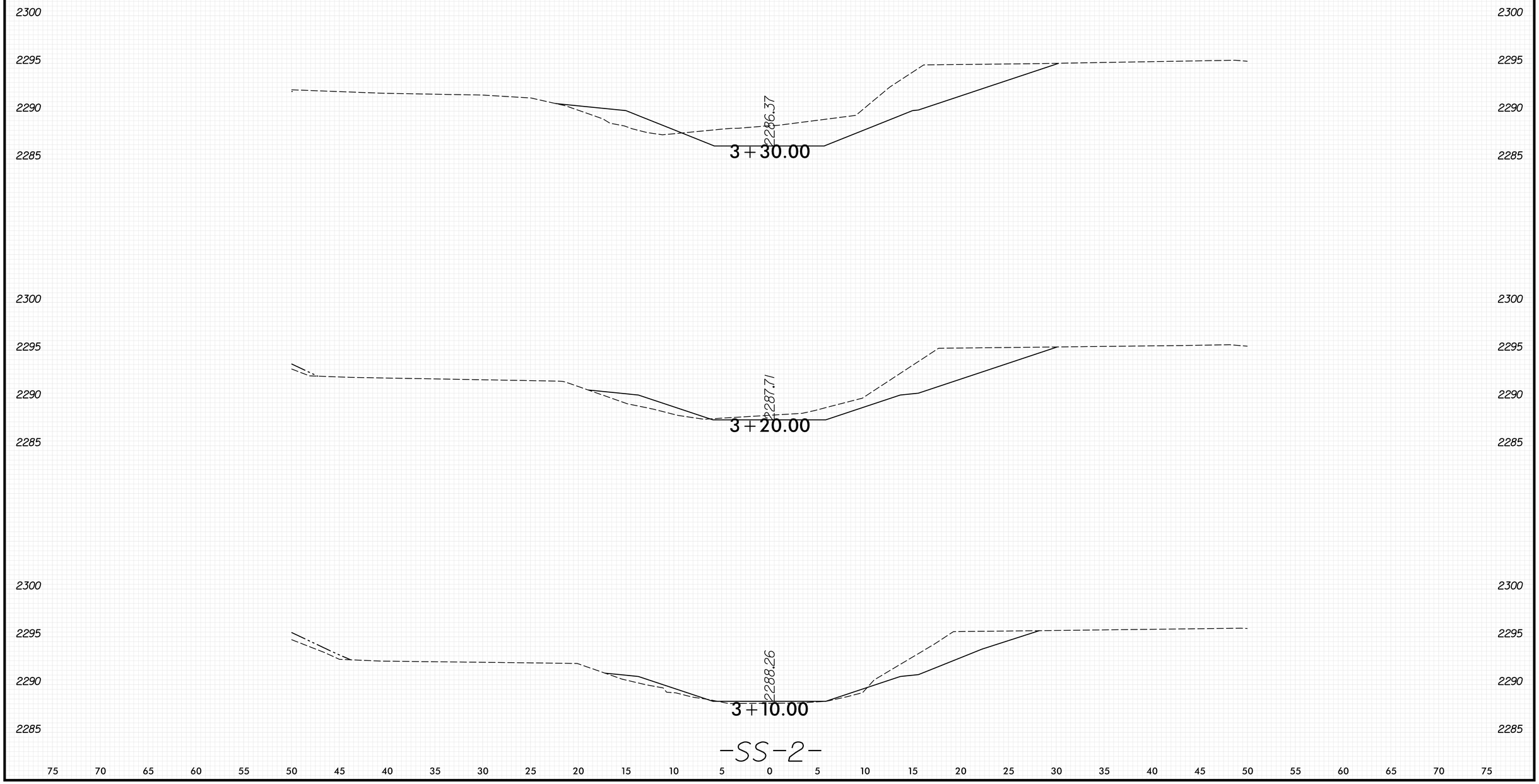
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-55

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



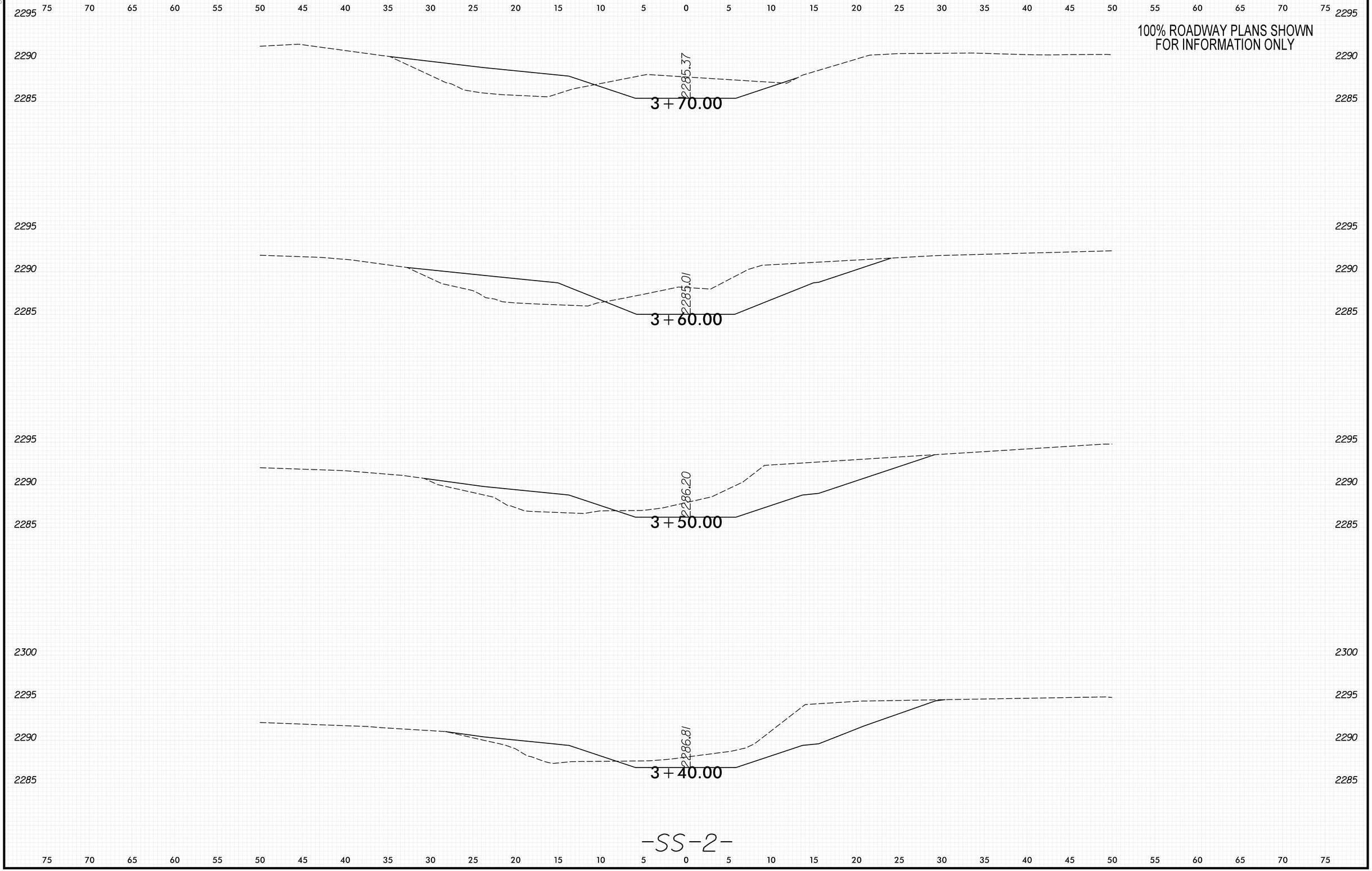
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:39 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:41 AM
8/23/99

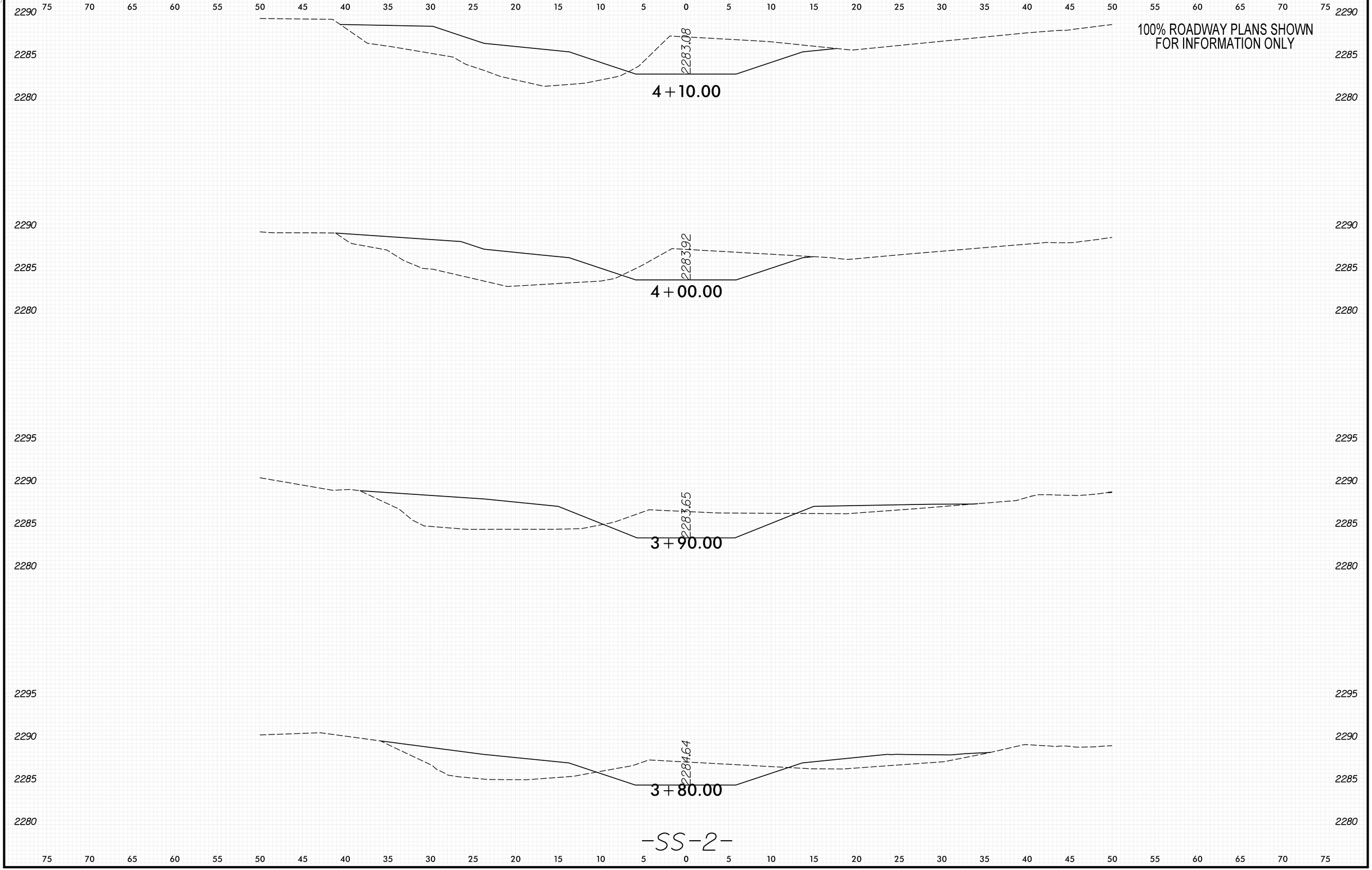
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



-SS-2-

8/23/99
PENTABLE: xpl_en_v8.tbl
TIME: 9:38:42 AM
DATE: 5/8/2026
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

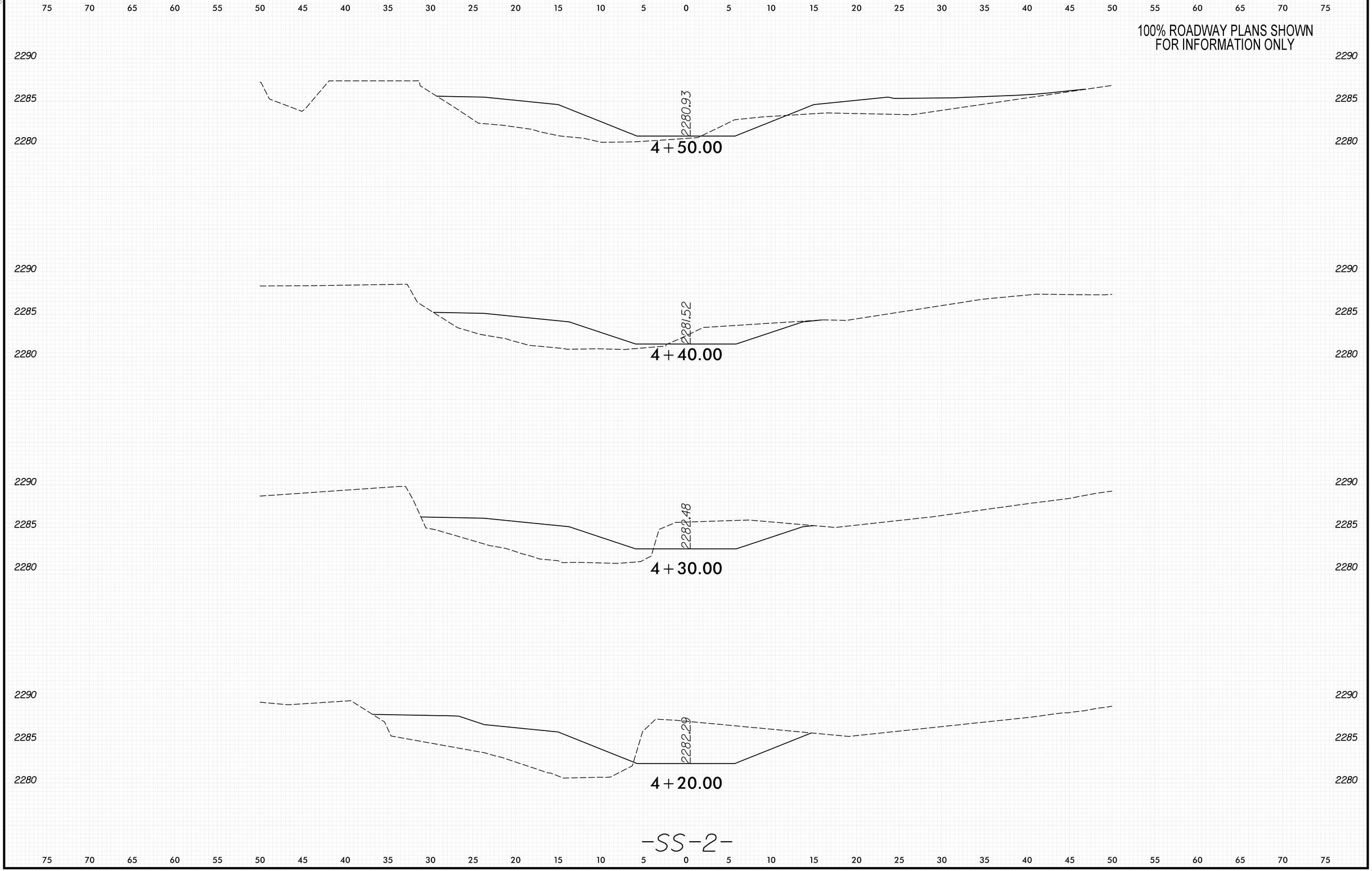


-SS-2-

8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:43 AM

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-59

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

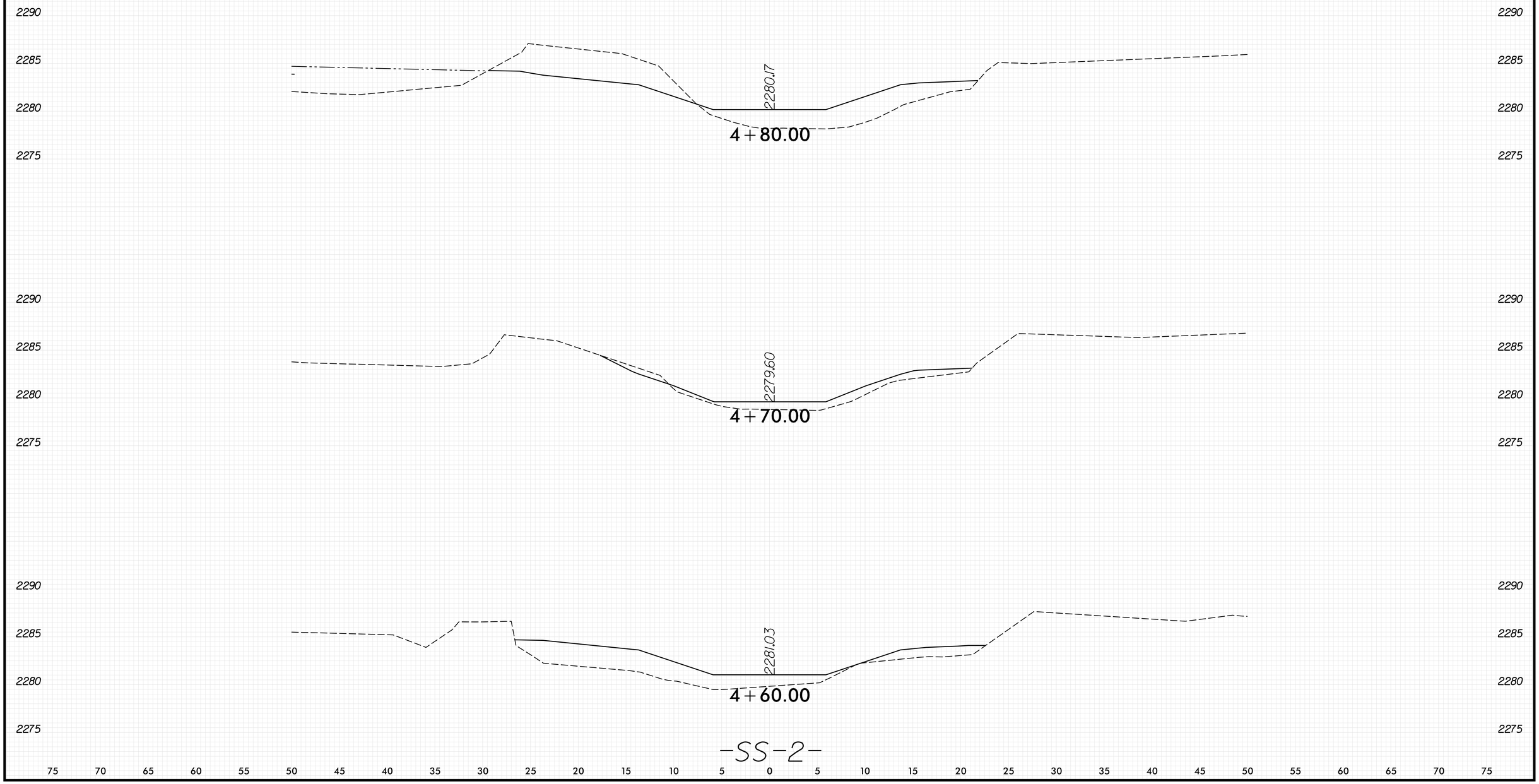


-SS-2-

8/23/99

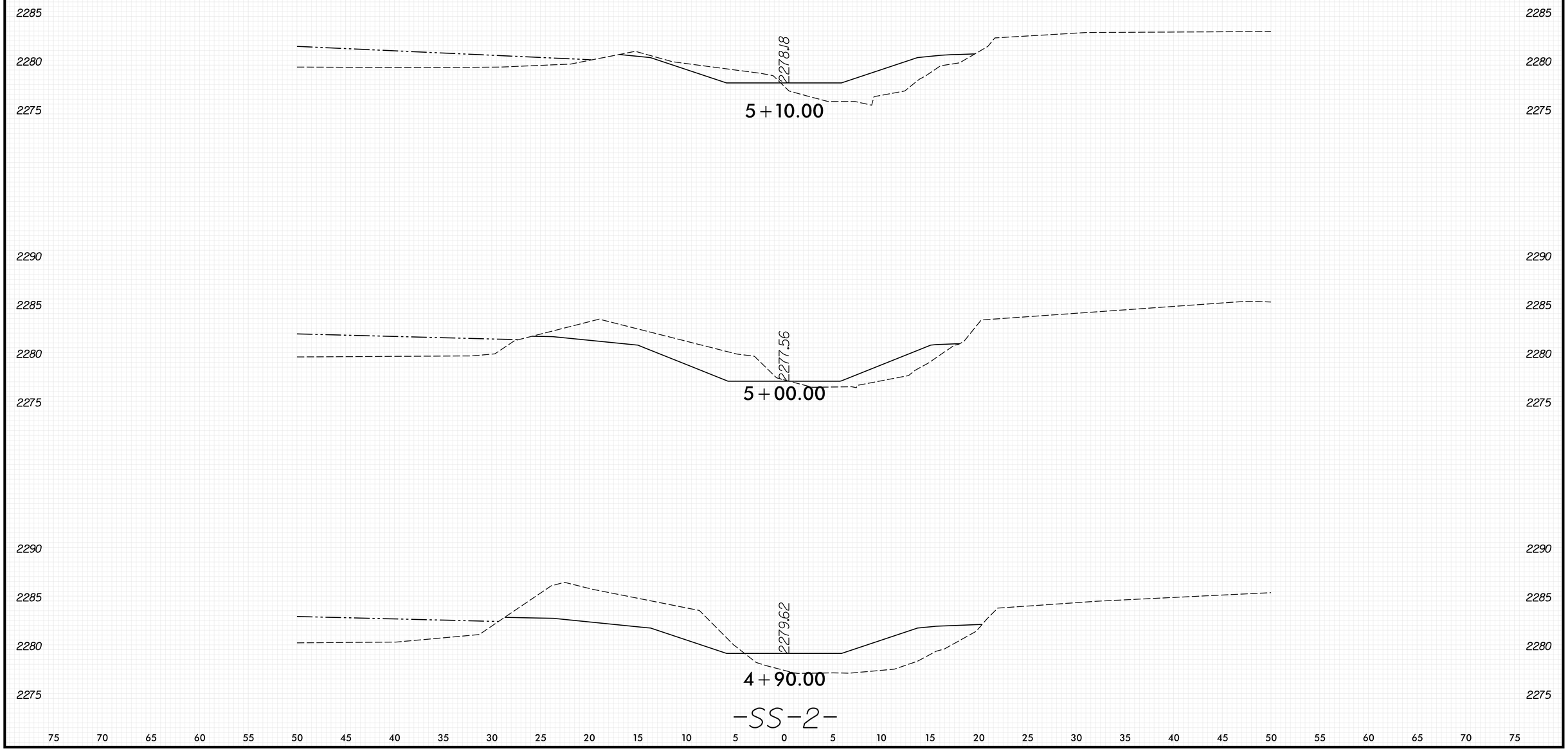
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:44 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



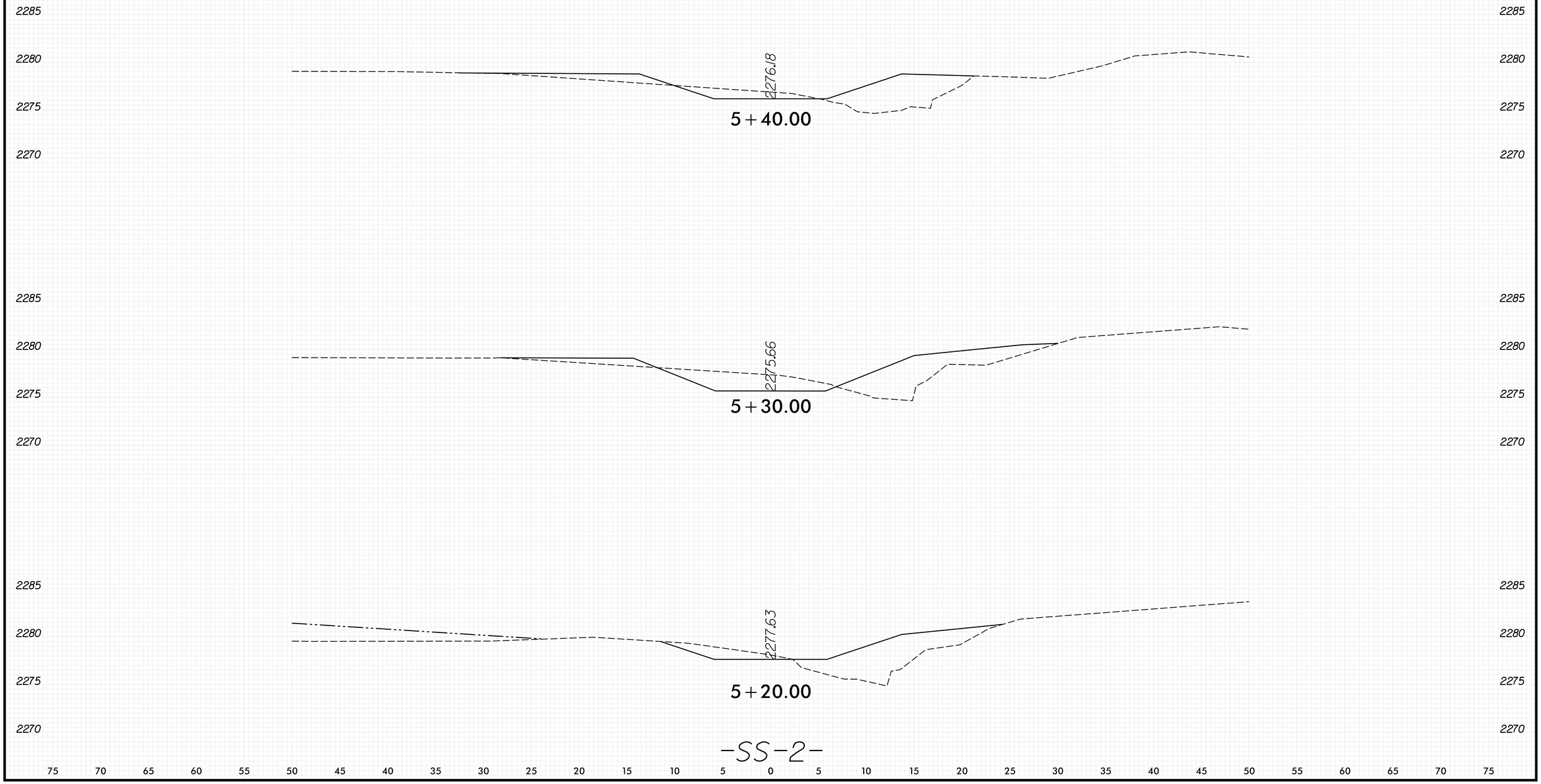
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:45 AM
8/23/99

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:47 AM
8/23/99

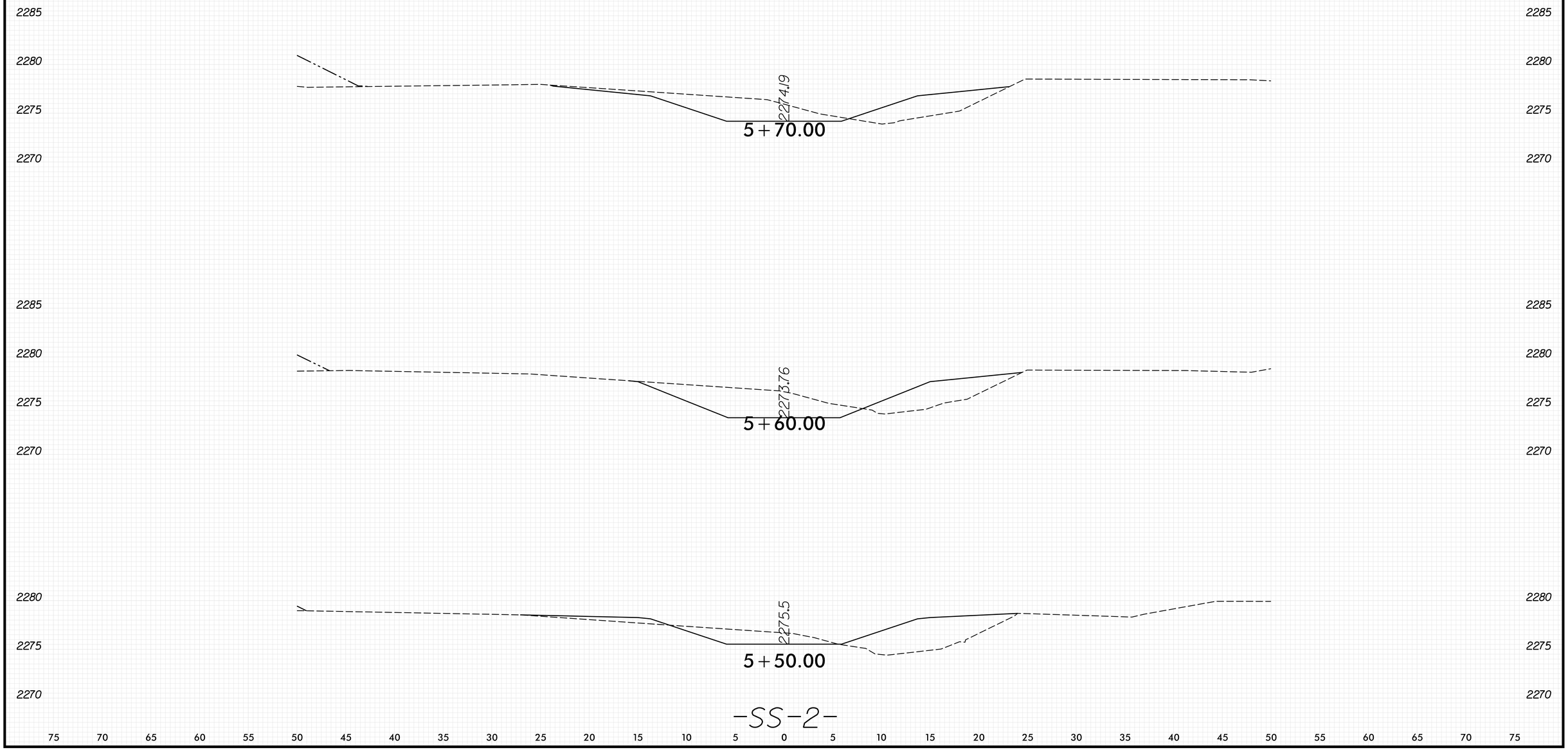
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:48 AM
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-63

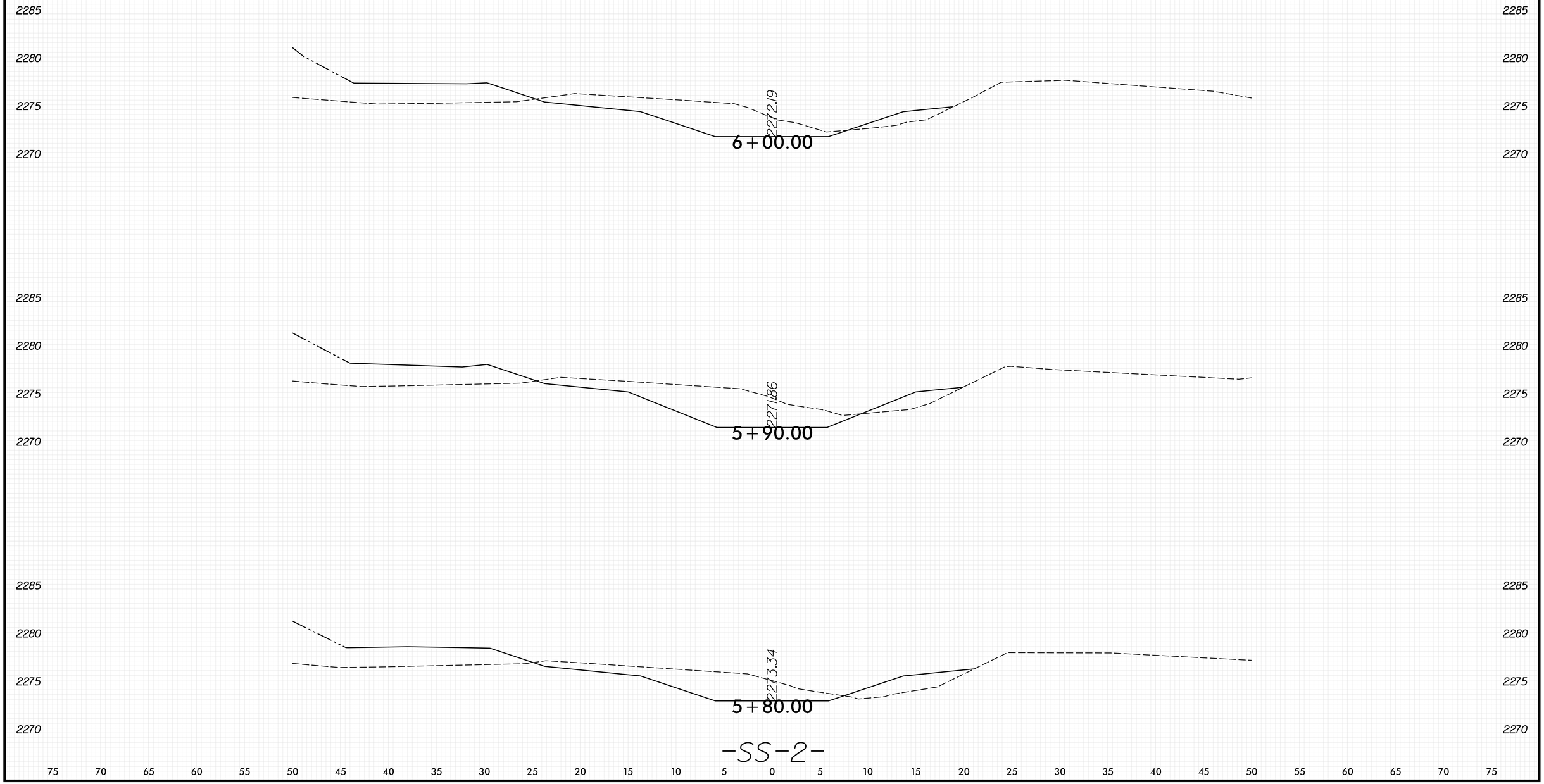
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:49 AM
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-64

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

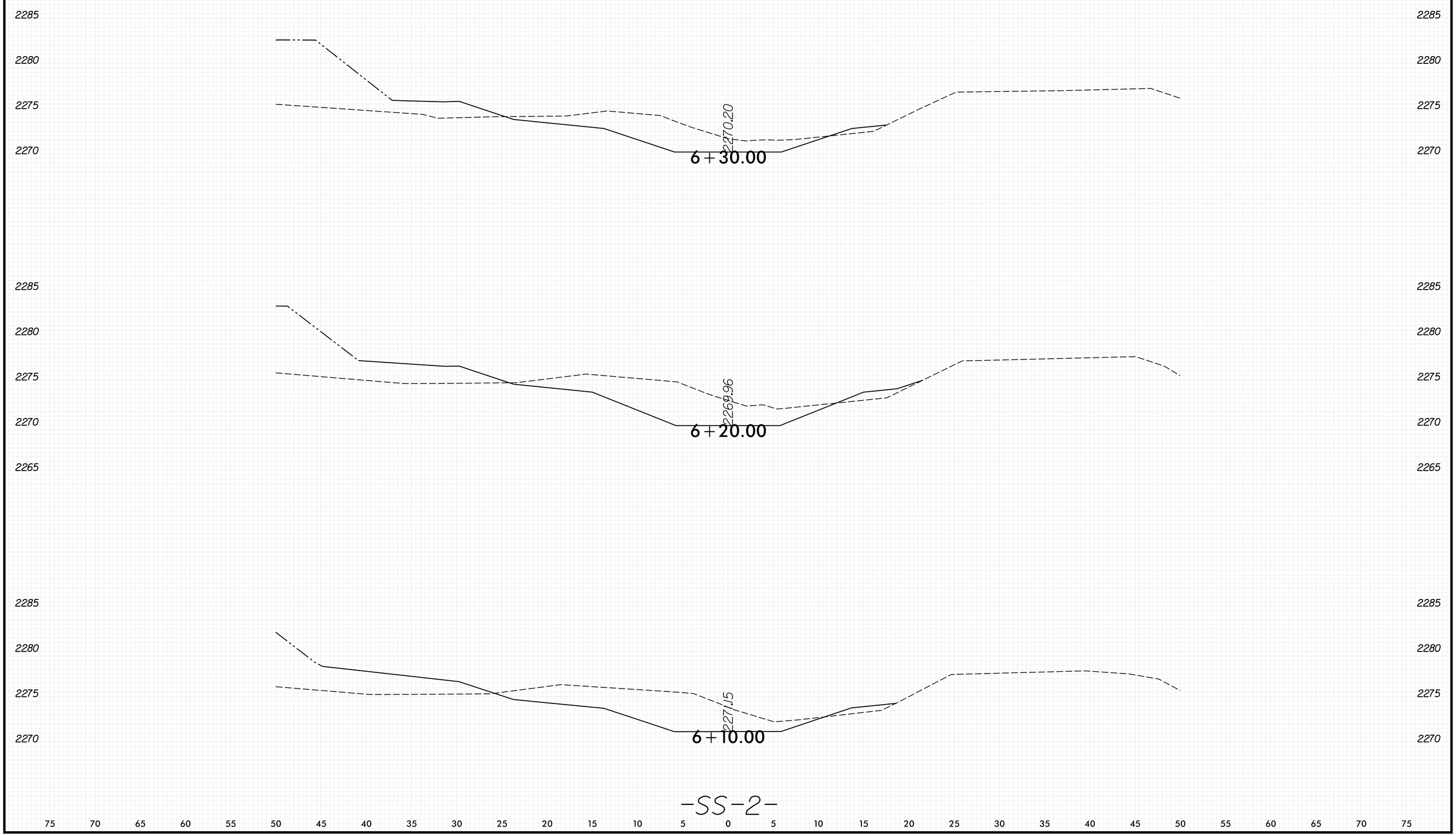


-SS-2-

8/23/99

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:50 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



-SS-2-

8/23/99
PENTABLE: xpl_en_v8.tbl
TIME: 9:38:52 AM
DATE: 5/8/2026
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \

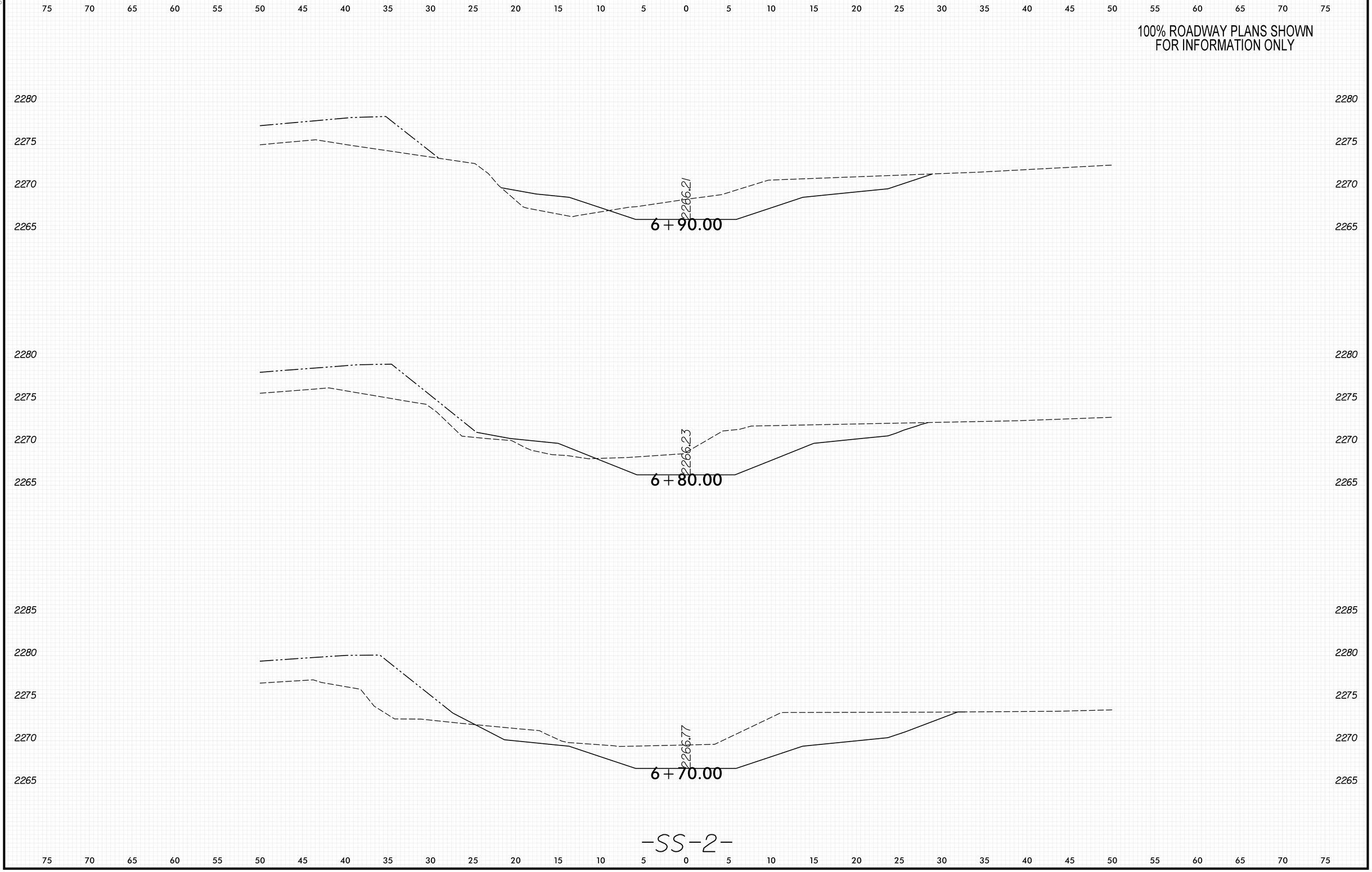
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

-SS-2-

8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE:
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:53 AM

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-67

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

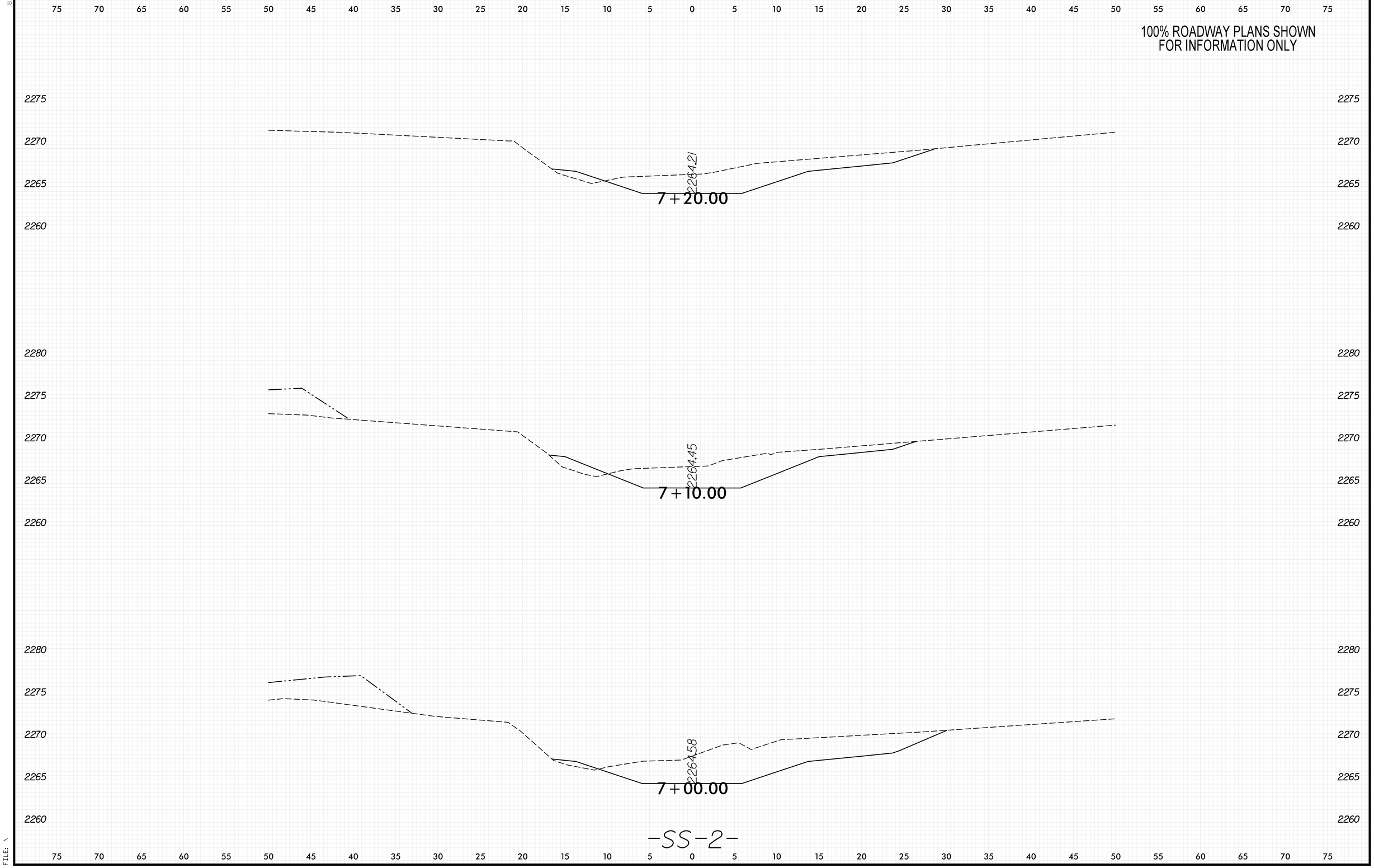


PLOT DRIVER: NCDOT.pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
DATE: 5/8/2026
PENTABLE: xpl_en_v8.tbl
TIME: 9:38:55 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-68

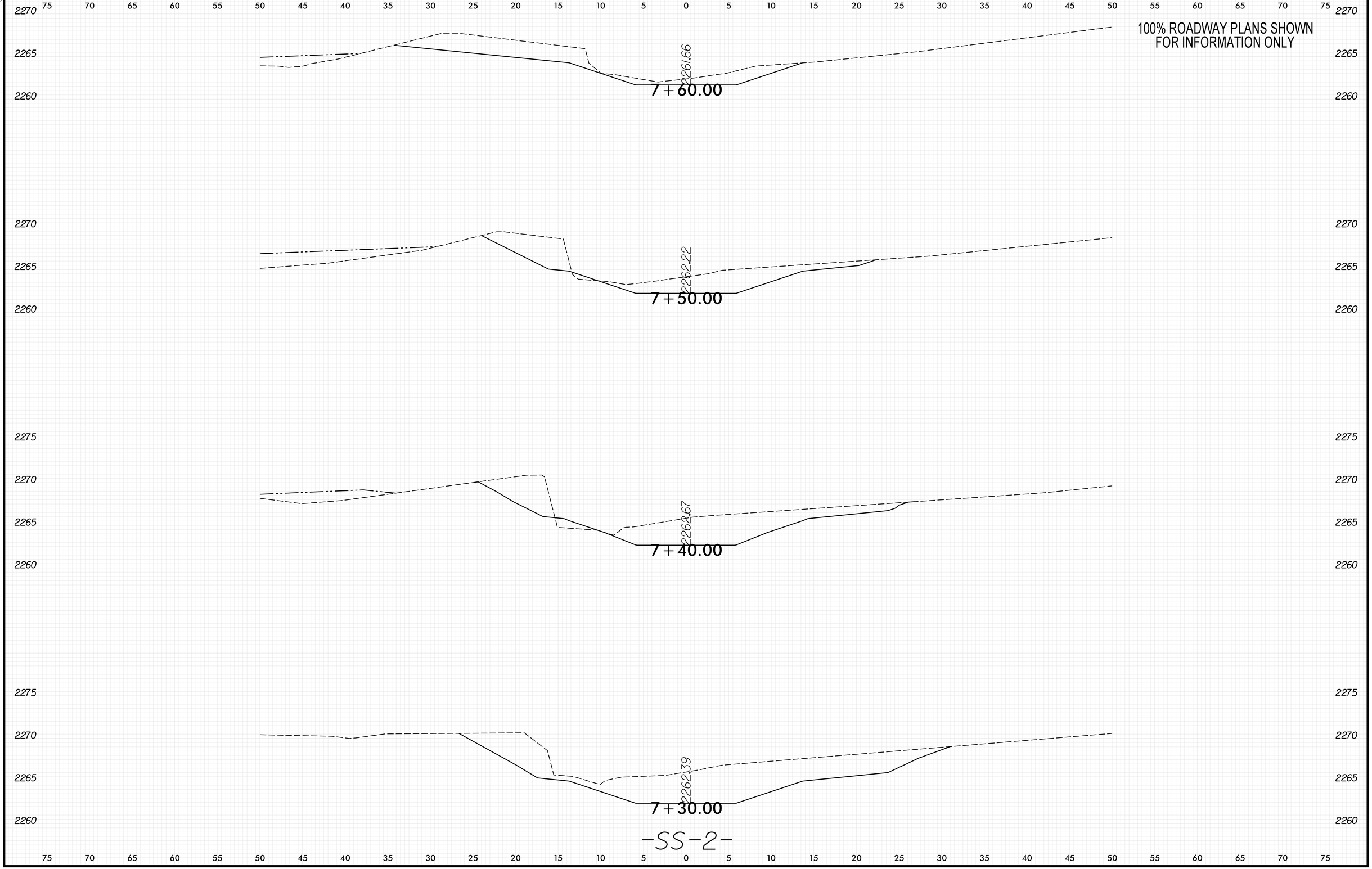
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \

PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:56 AM

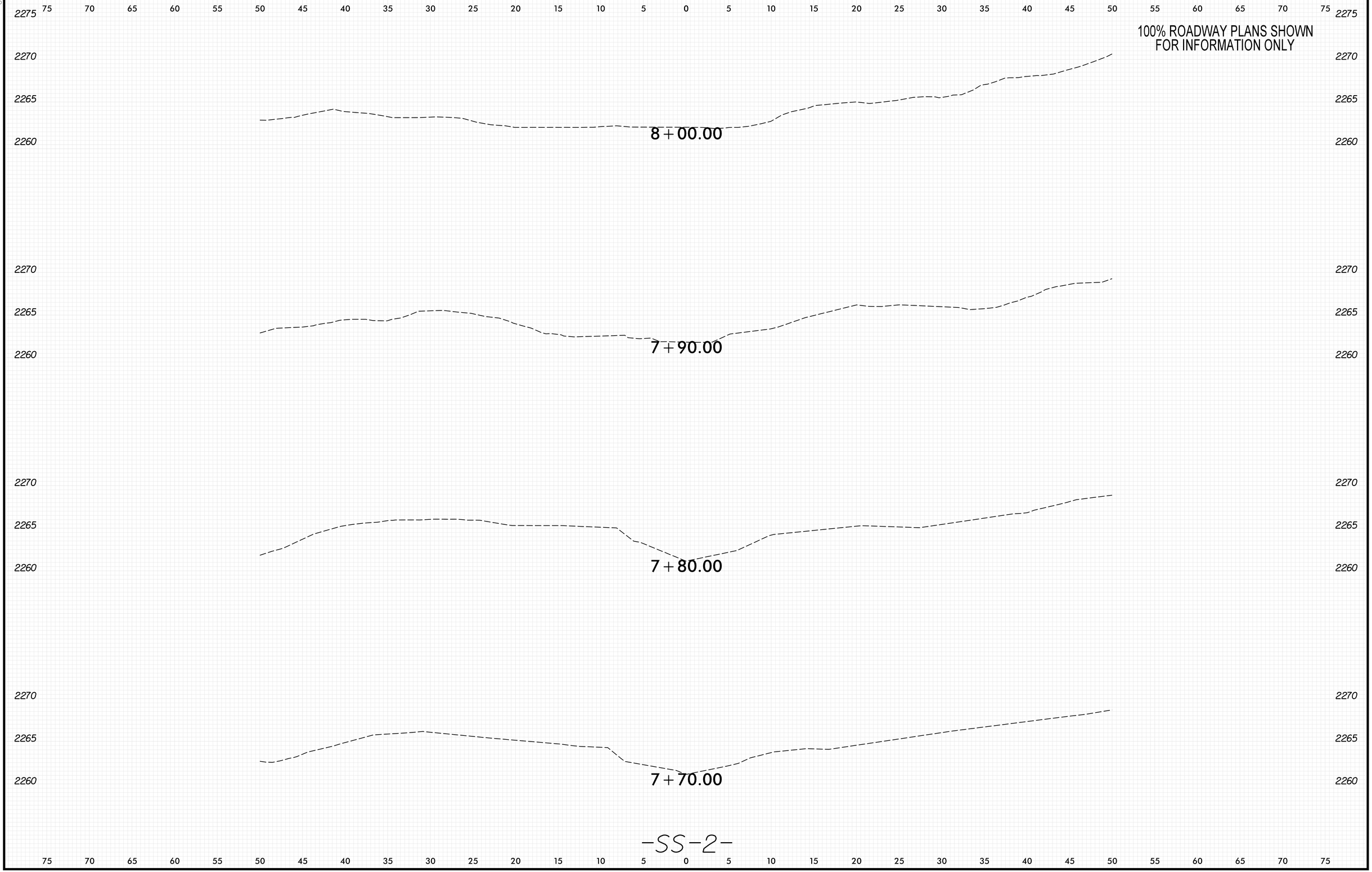
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



-SS-2-

8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:57 AM

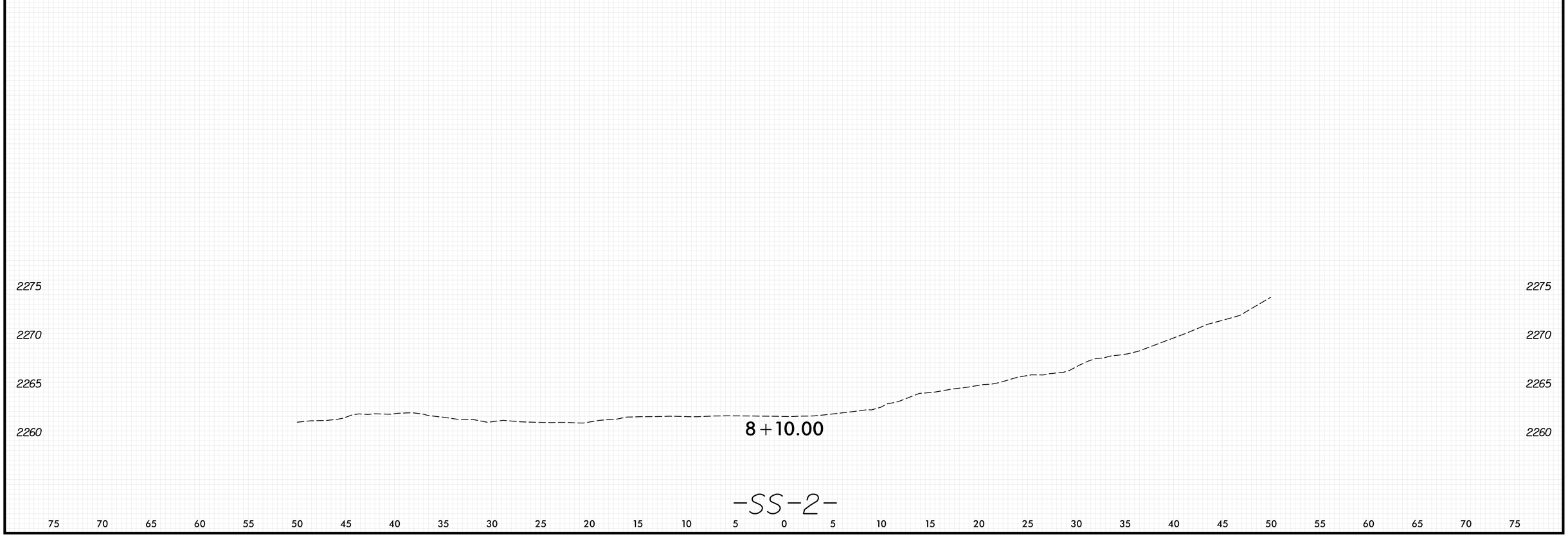
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



-SS-2-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
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FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:38:59 AM
8/23/99

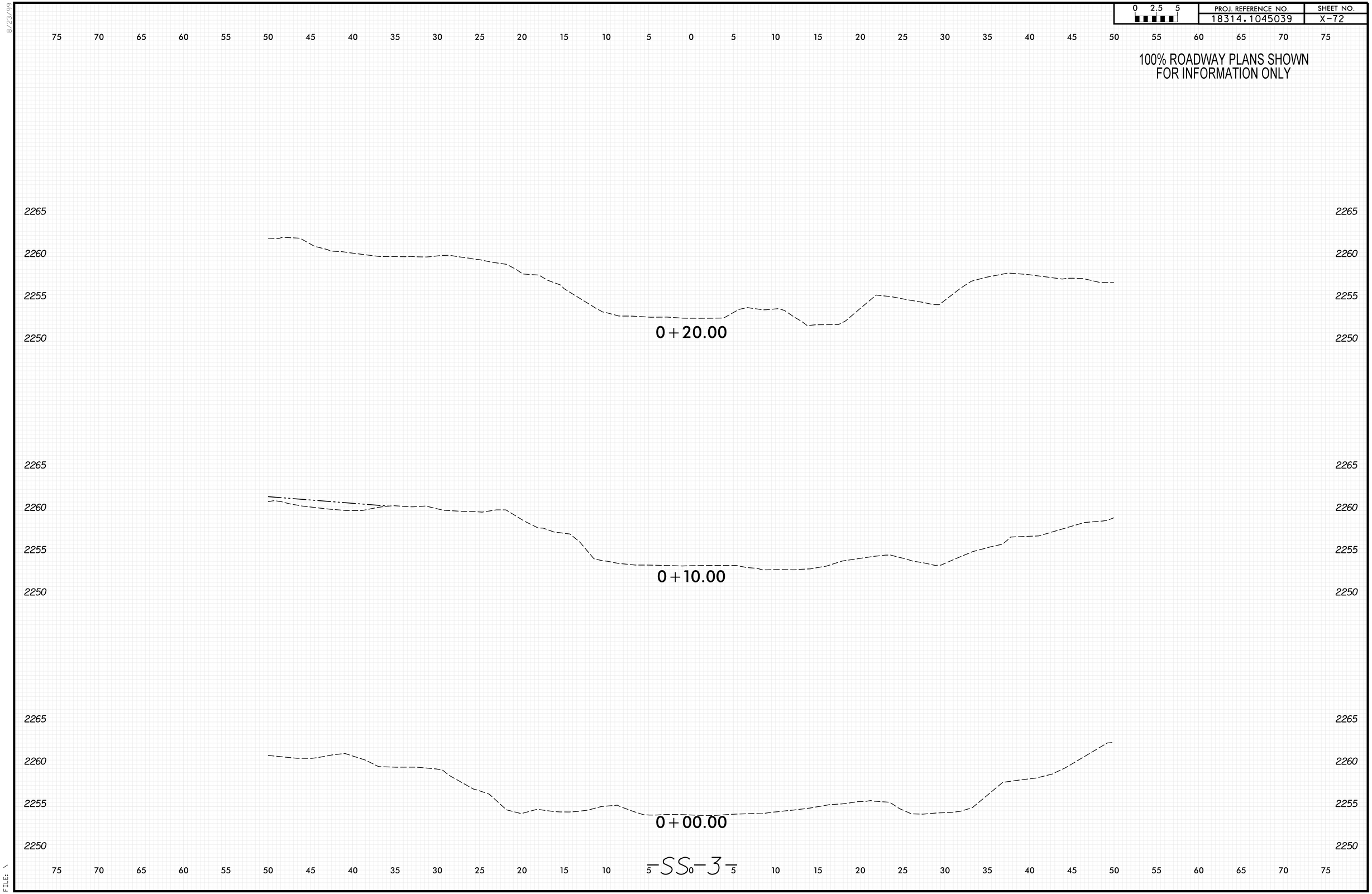
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:00 AM

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-72

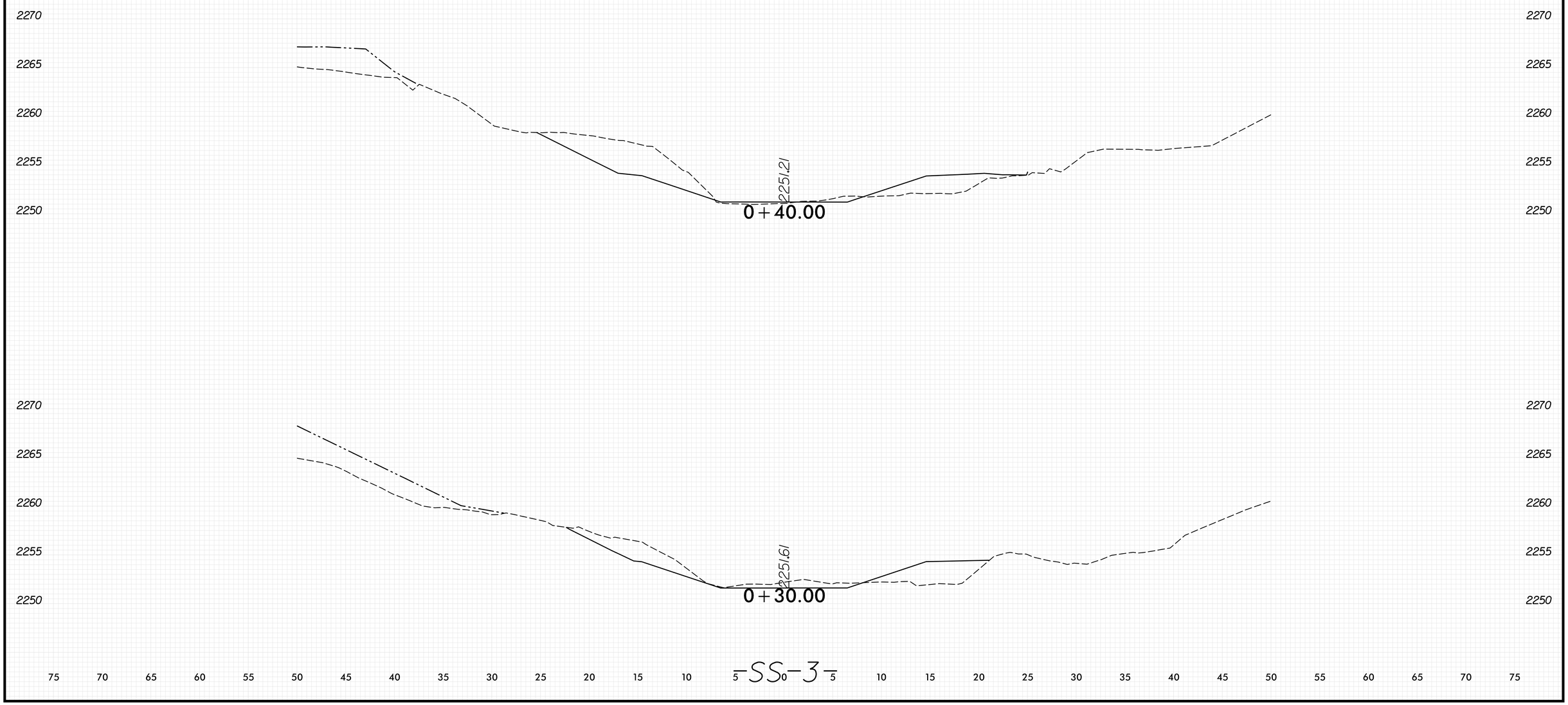
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99

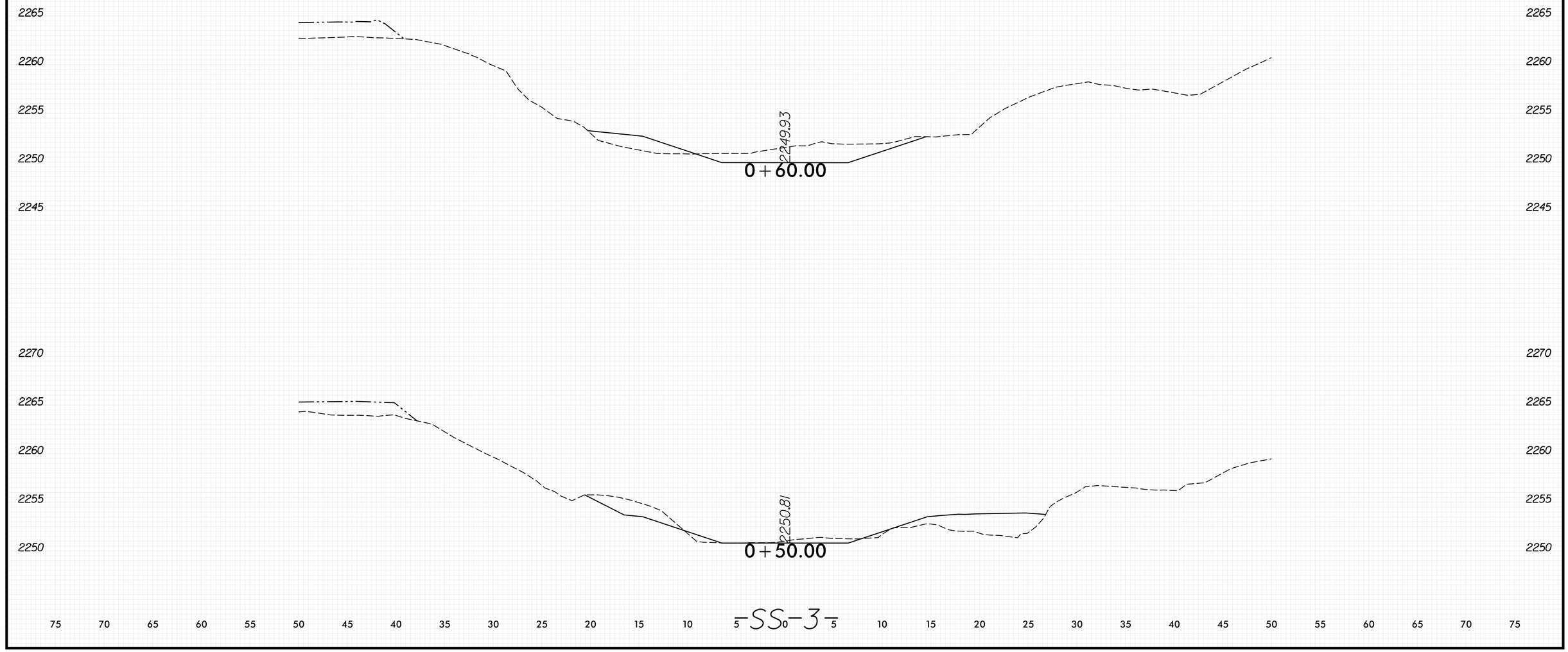
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TIME: 9:39:04 AM
DATE: 5/8/2026
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color-eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:06 AM
8/23/99

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

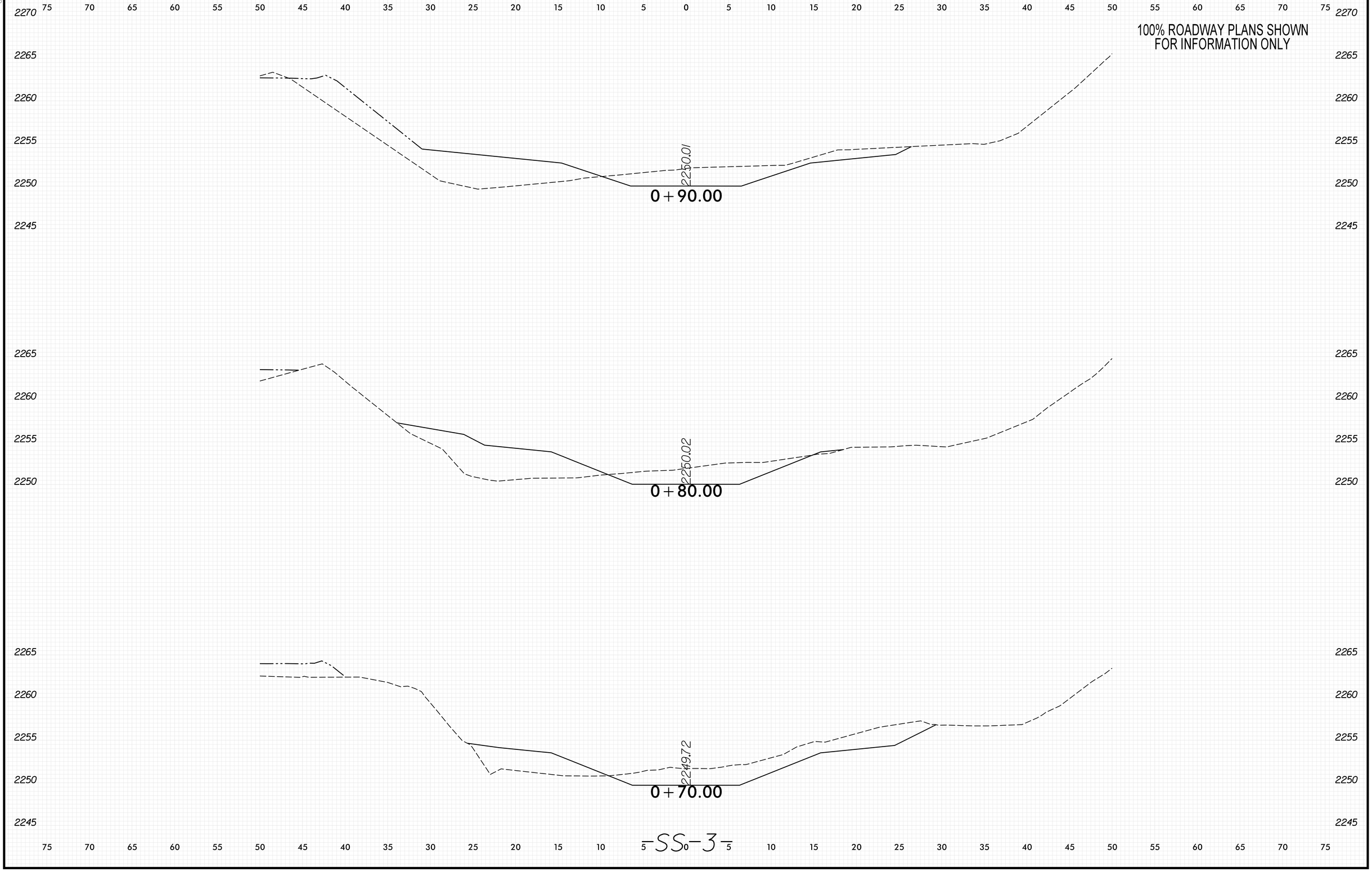


8/23/99
PENTABLE: xpl_en_v8.tbl
TIME: 9:39:07 AM
DATE: 5/8/2026
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

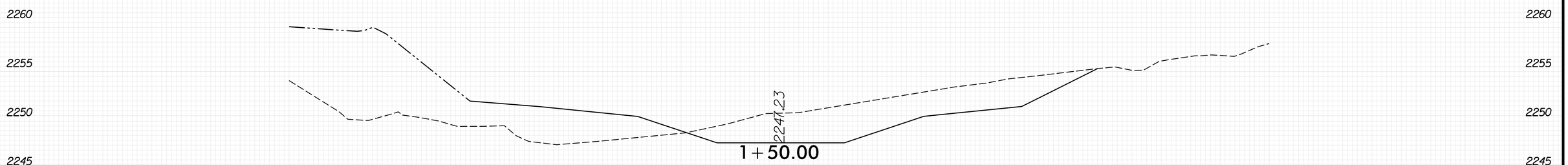


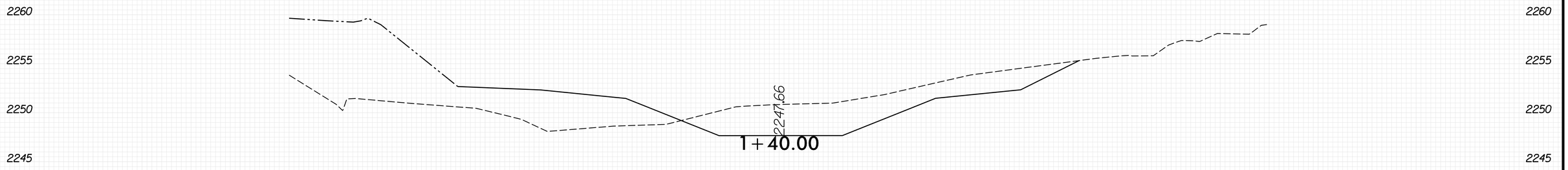
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USER: KCLATTERBU
FILE: \
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DATE: 5/8/2026
TIME: 9:39:08 AM

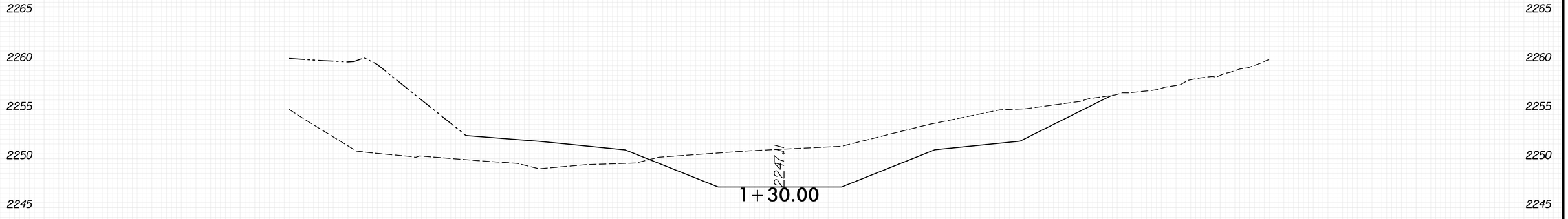
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:09 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY







-SS-3-

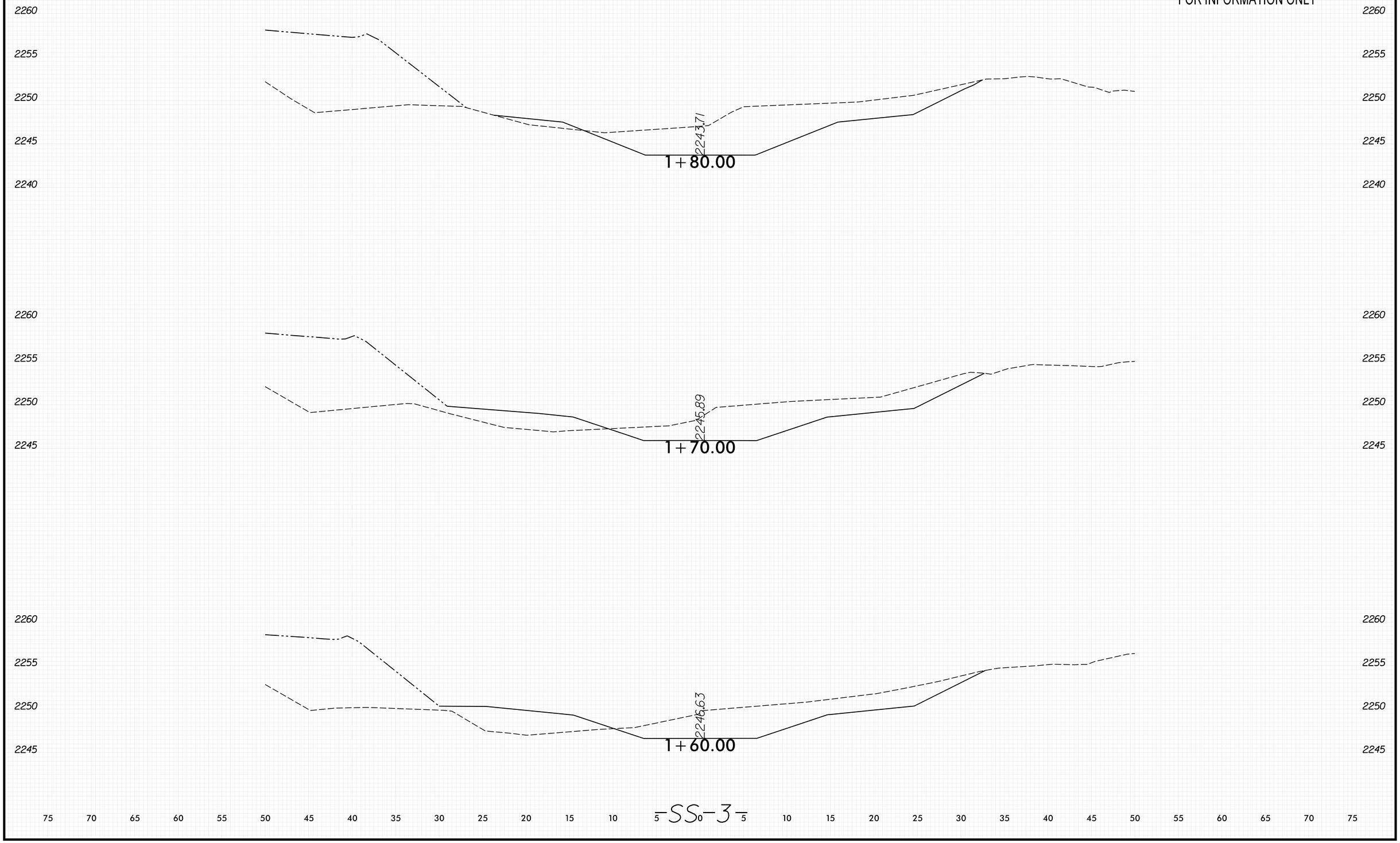
8/23/99

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:10 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-78

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



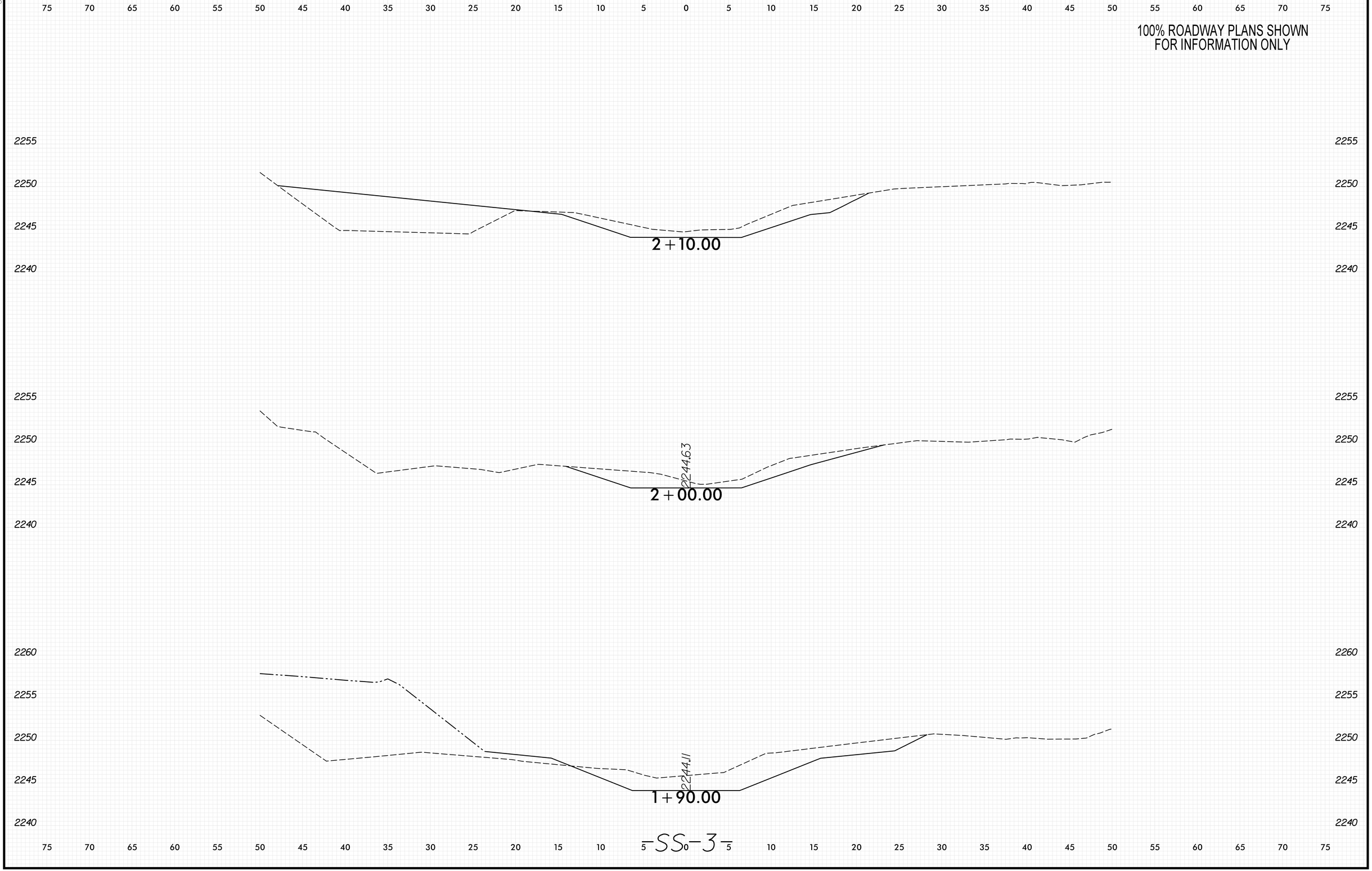
-SS-3-

PLOT DRIVER: NCDOT.pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:11 AM

8/23/99

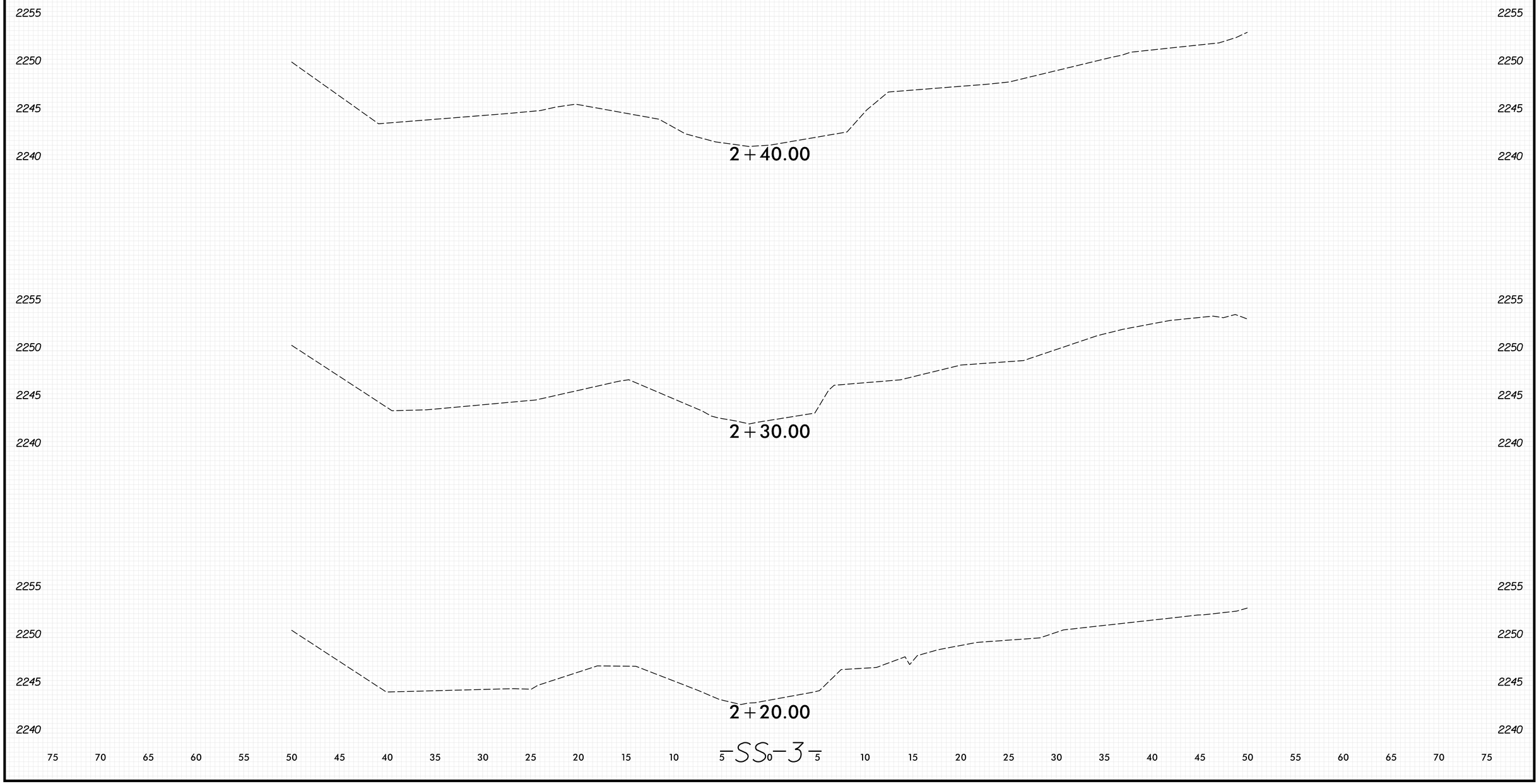
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-79

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:12 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



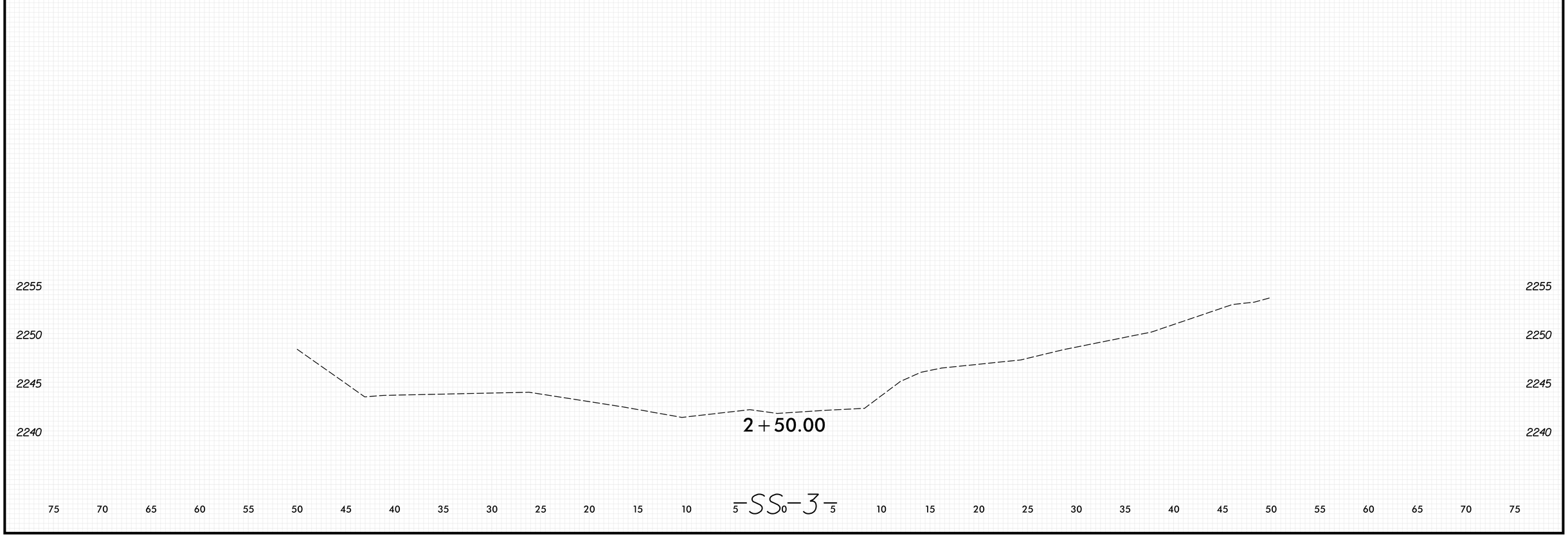
8/23/99
PENTABLE: xpl_en_v8.tbl
TIME: 9:39:14 AM
DATE: 5/8/2026
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-81

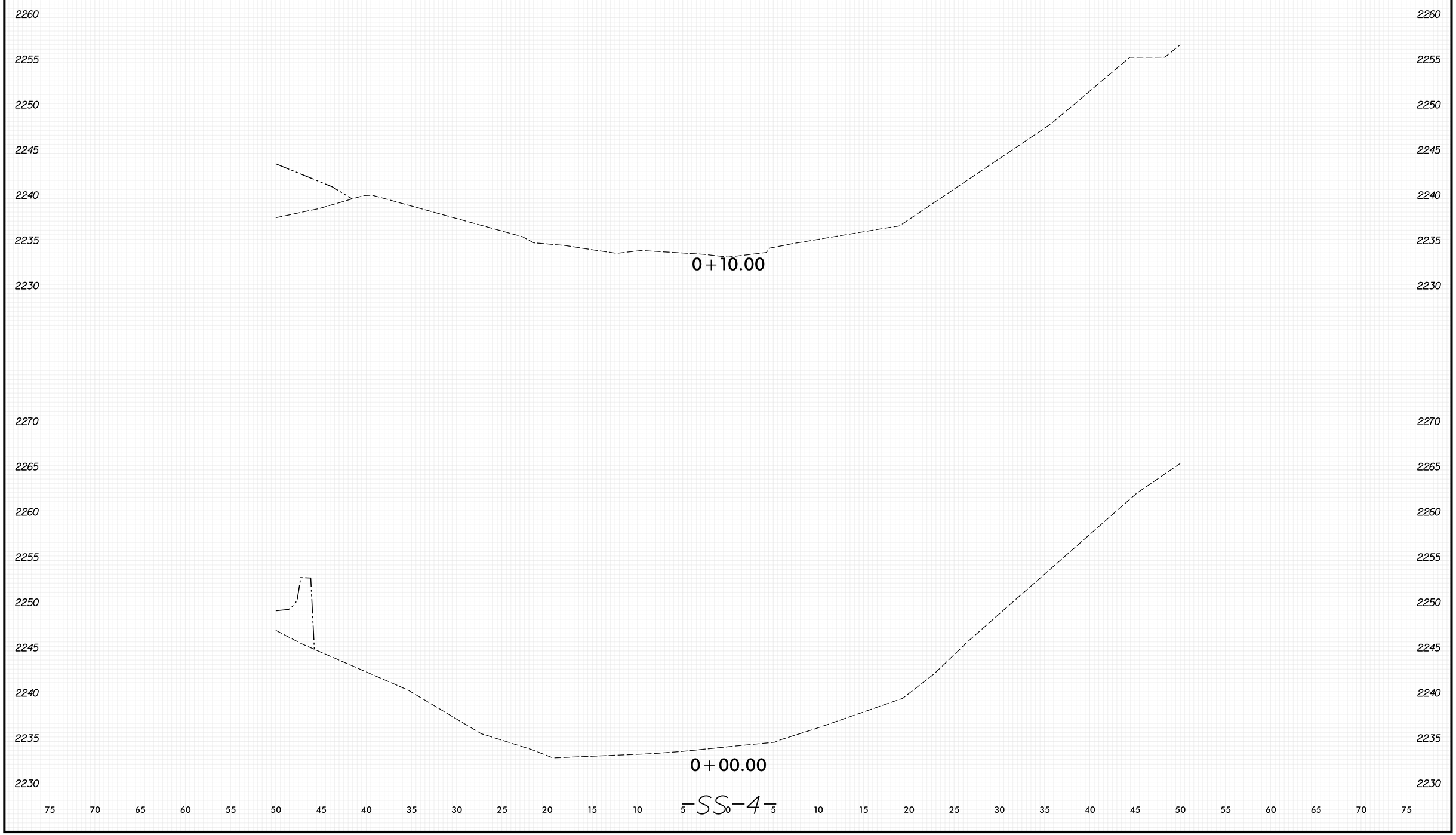
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
DATE: 5/8/2026
PENTABLE: xpl_en_v8.tbl
TIME: 9:39:15 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



-SS-4-

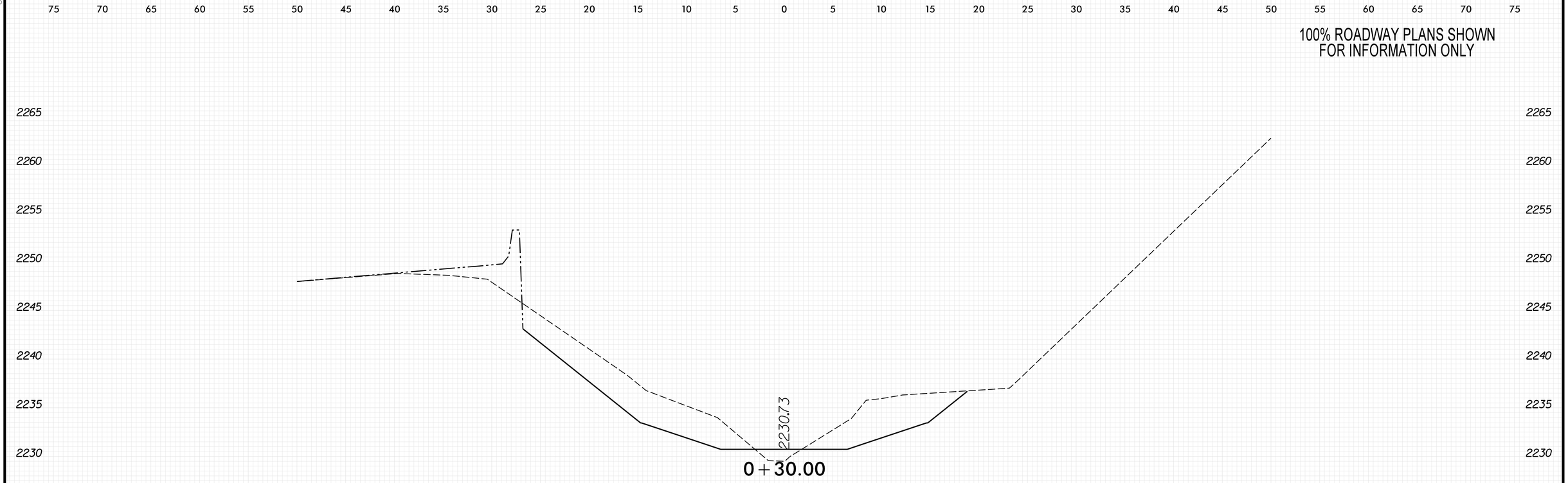
8/23/99

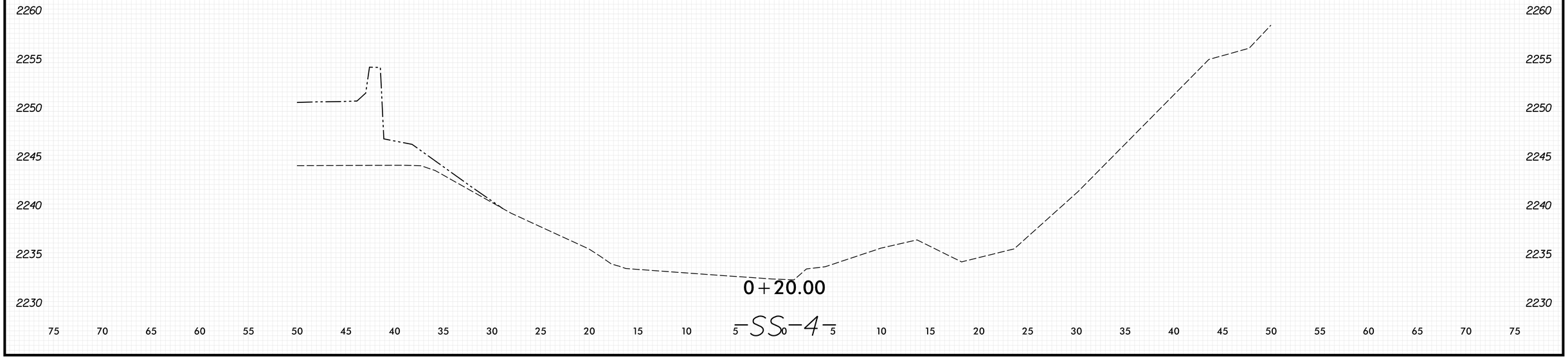
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USER: KCLATTERBU
FILE: /
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:19 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-83

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY





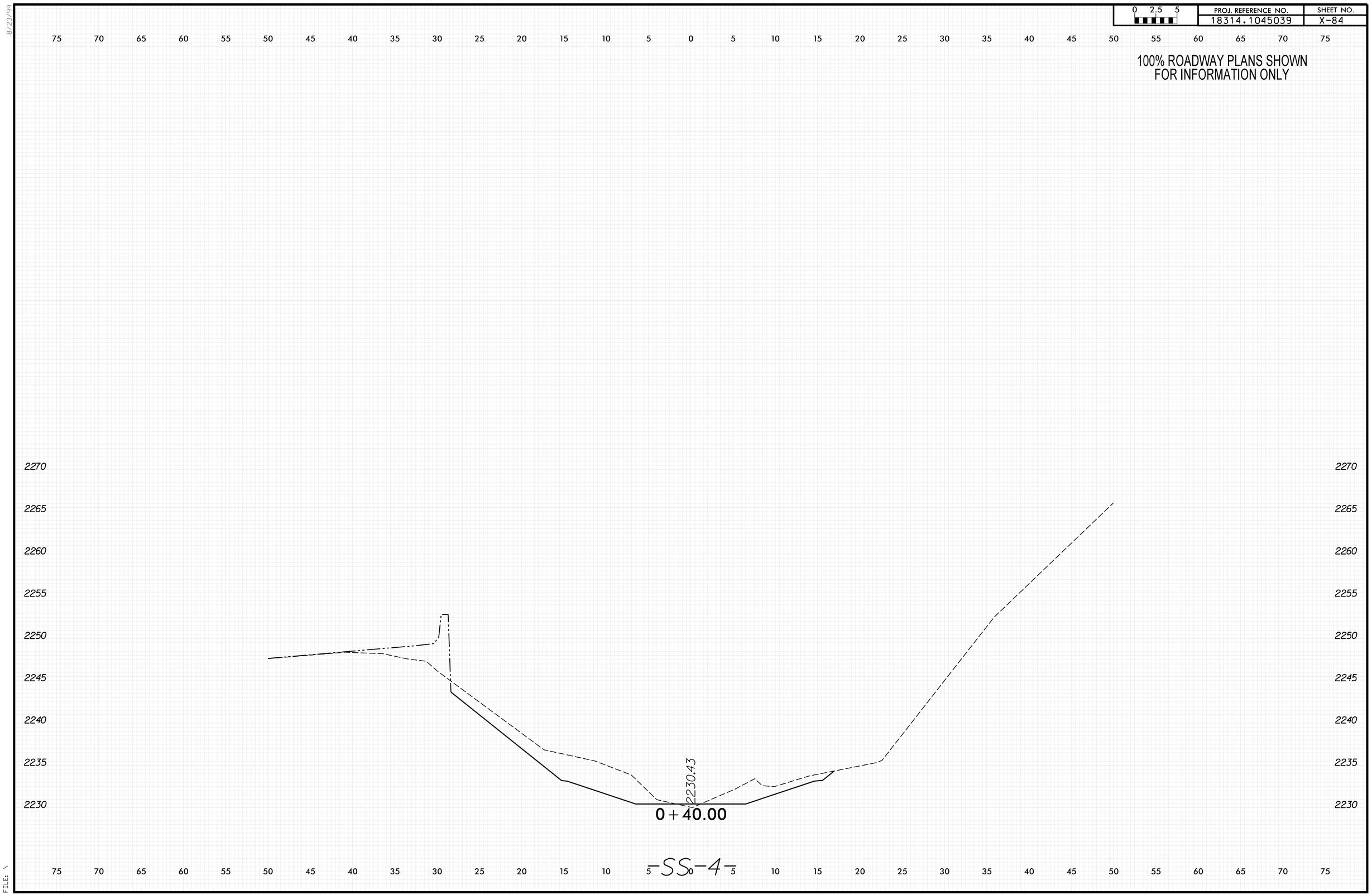
-SS-4-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: /
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:20 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-84

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

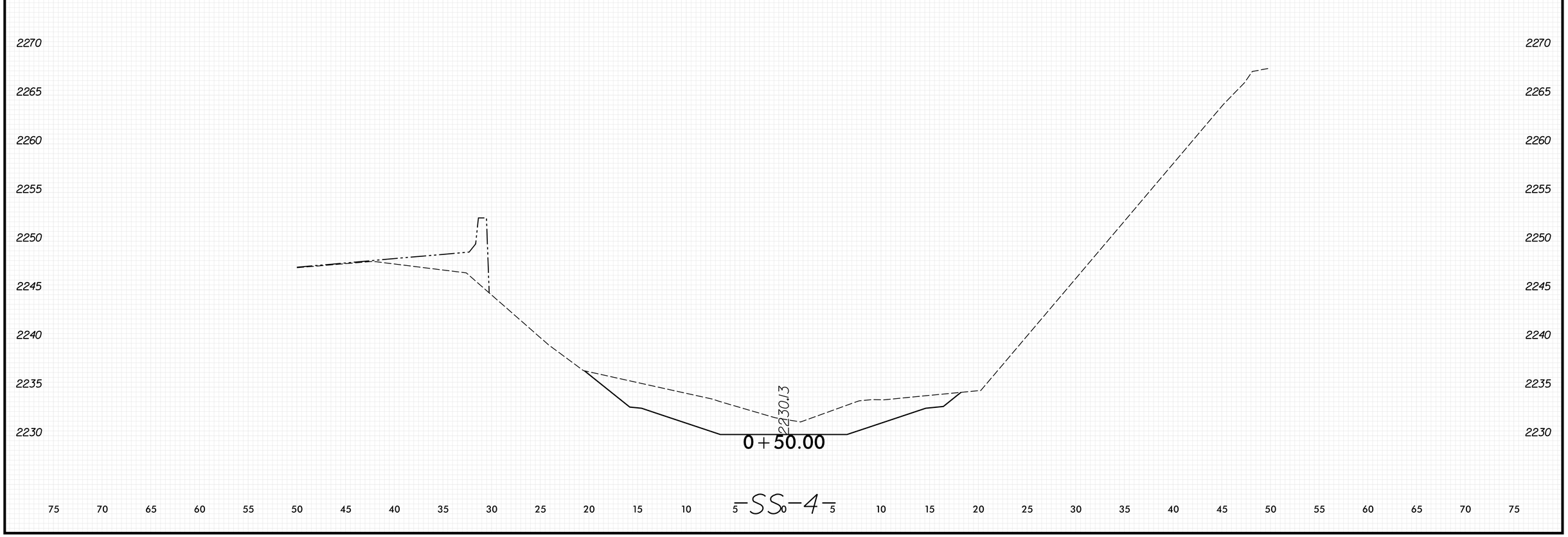


PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:21 AM

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
18314.1045039	X-85

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

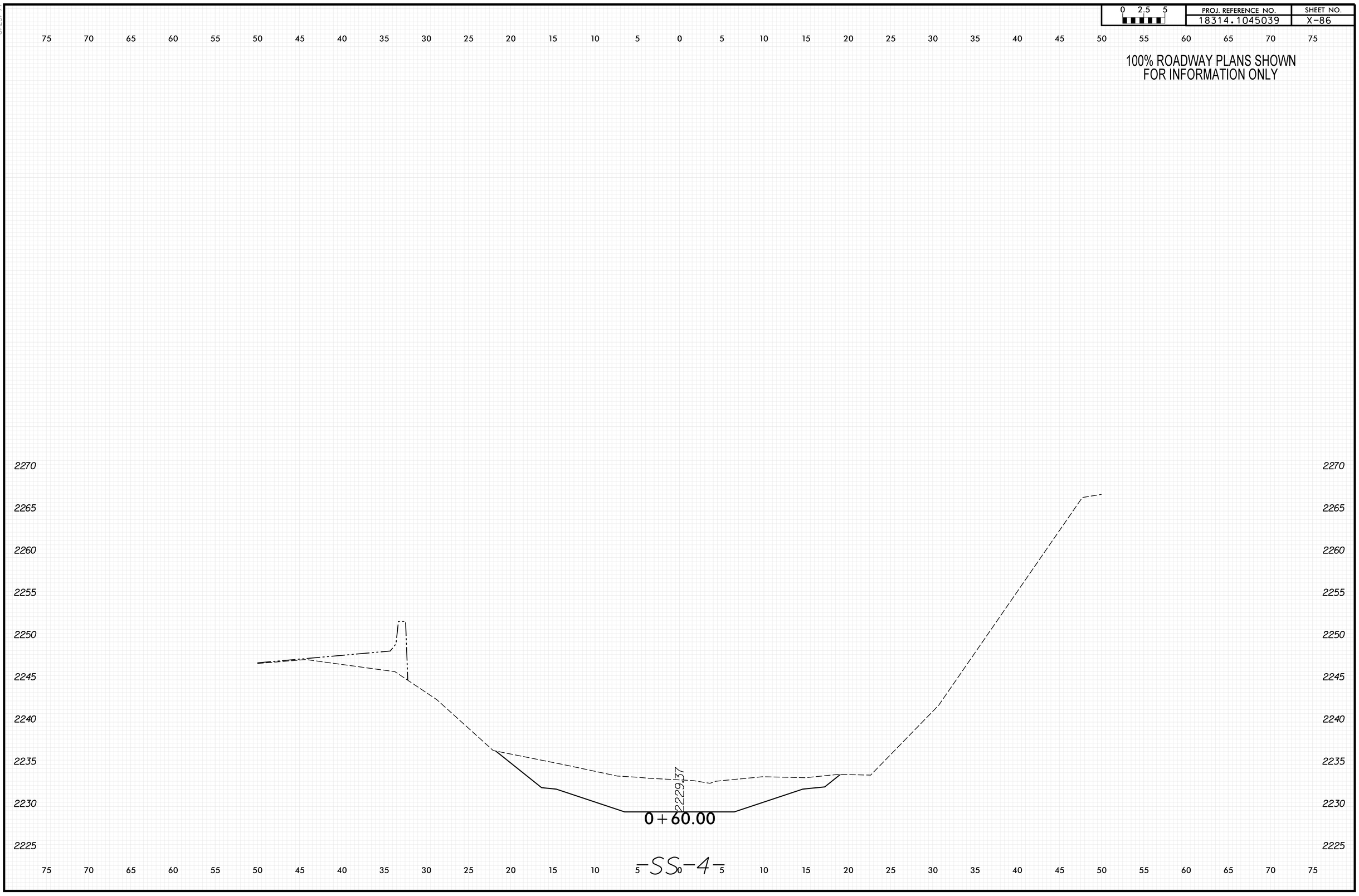


PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:22 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-86

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

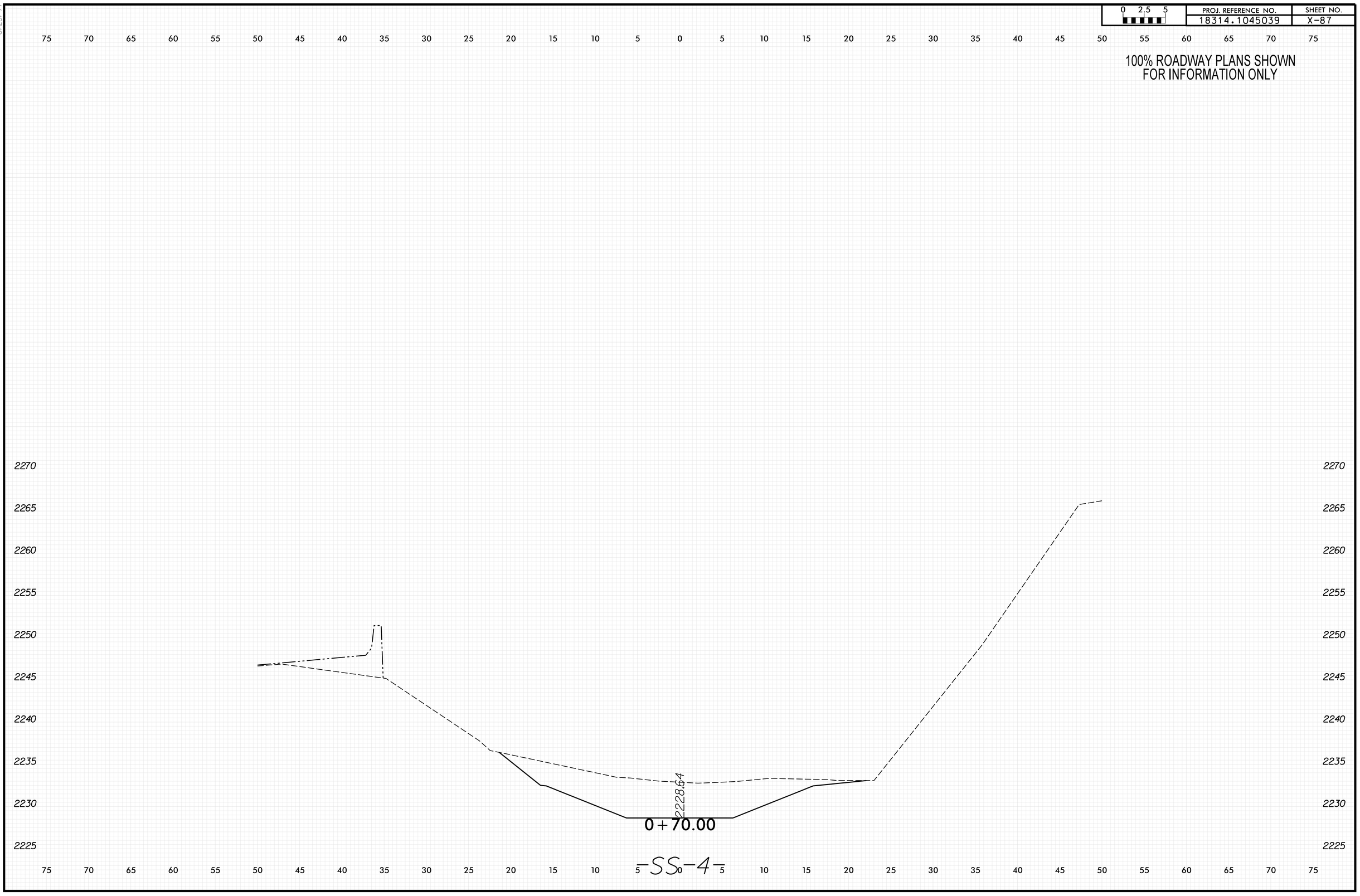


PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:23 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-87

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

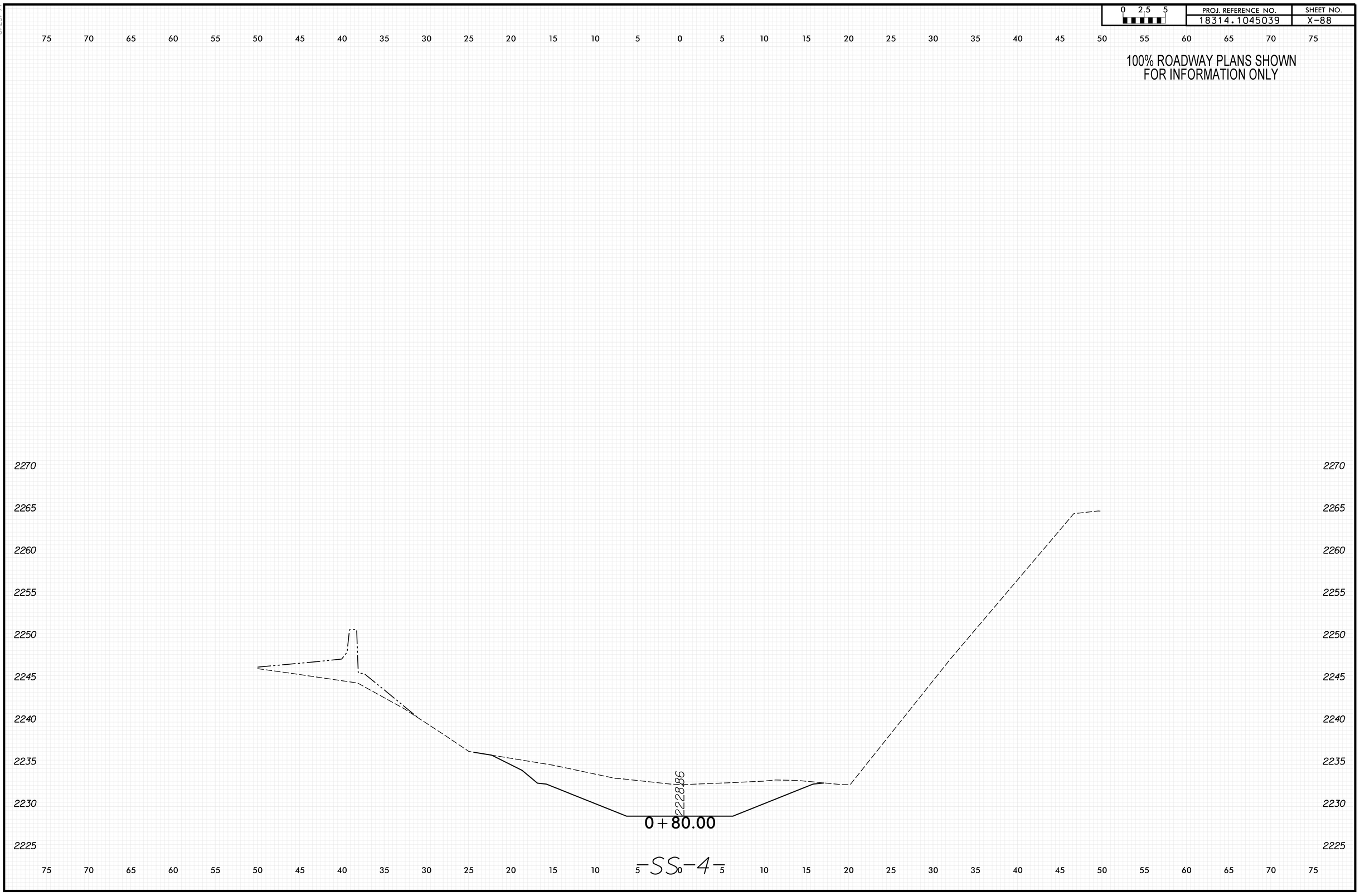


PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:25 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-88

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



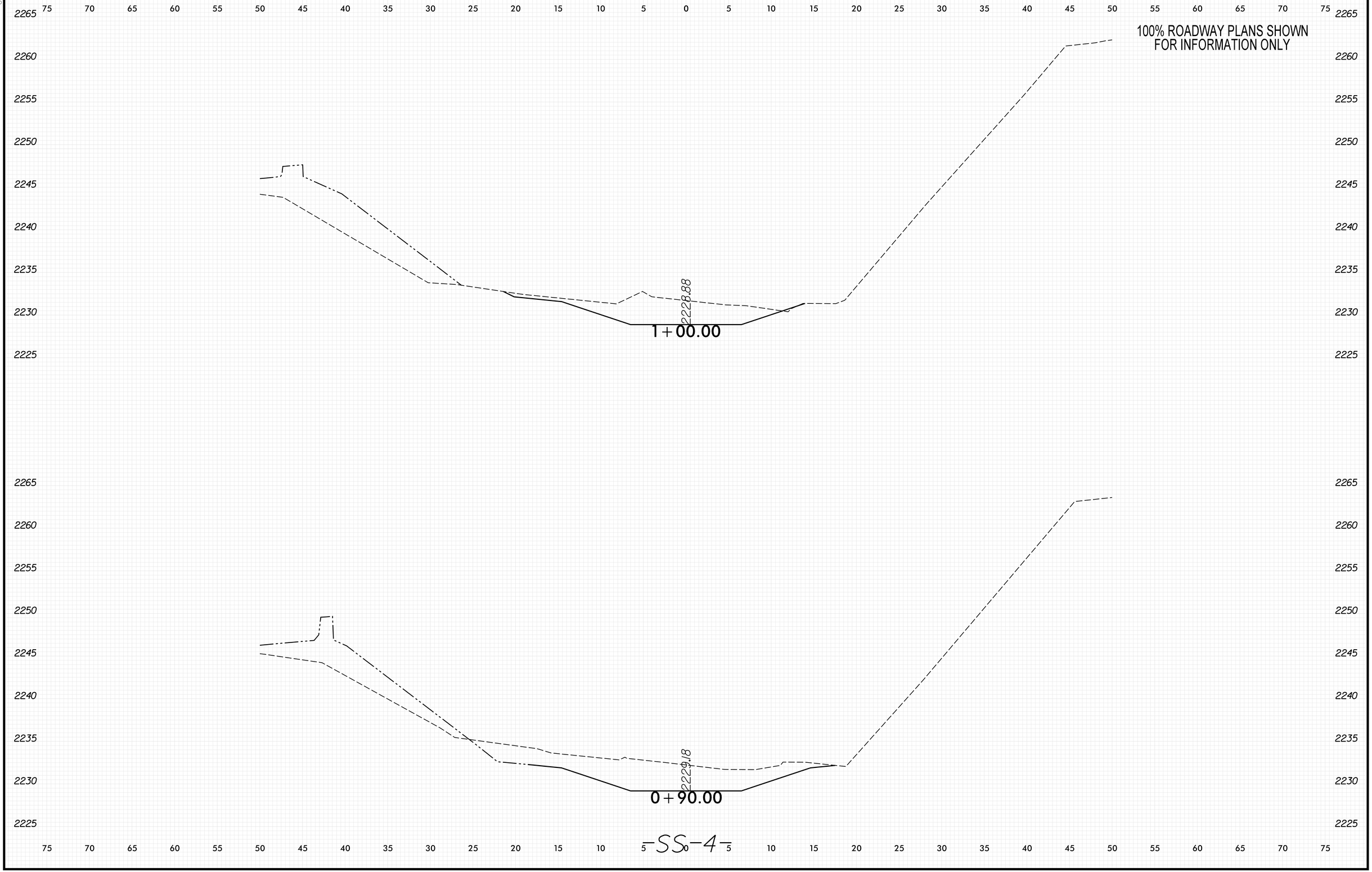
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:26 AM

8/23/99

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
18314.1045039	X-89

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

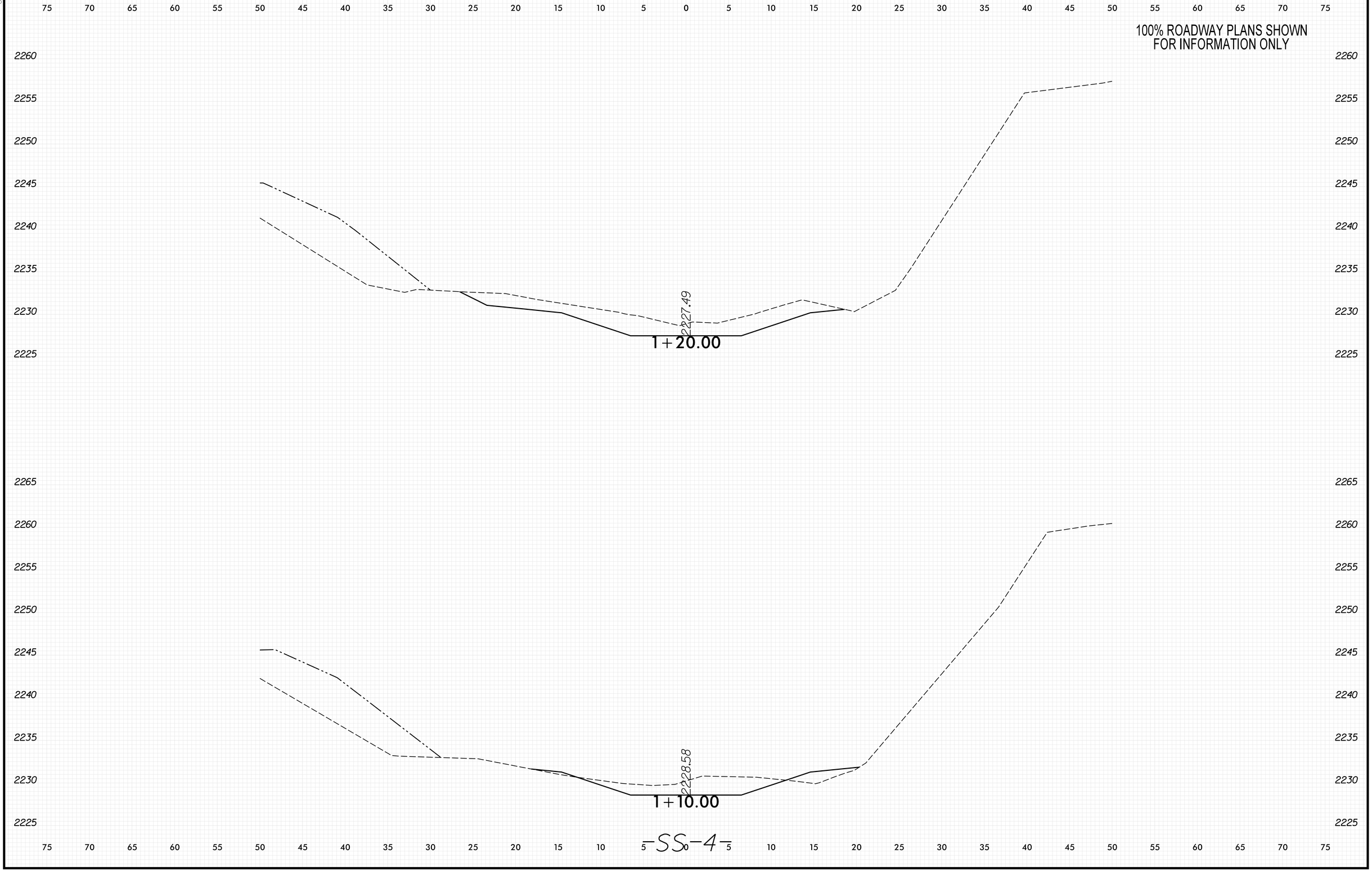


-SS-4-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:27 AM

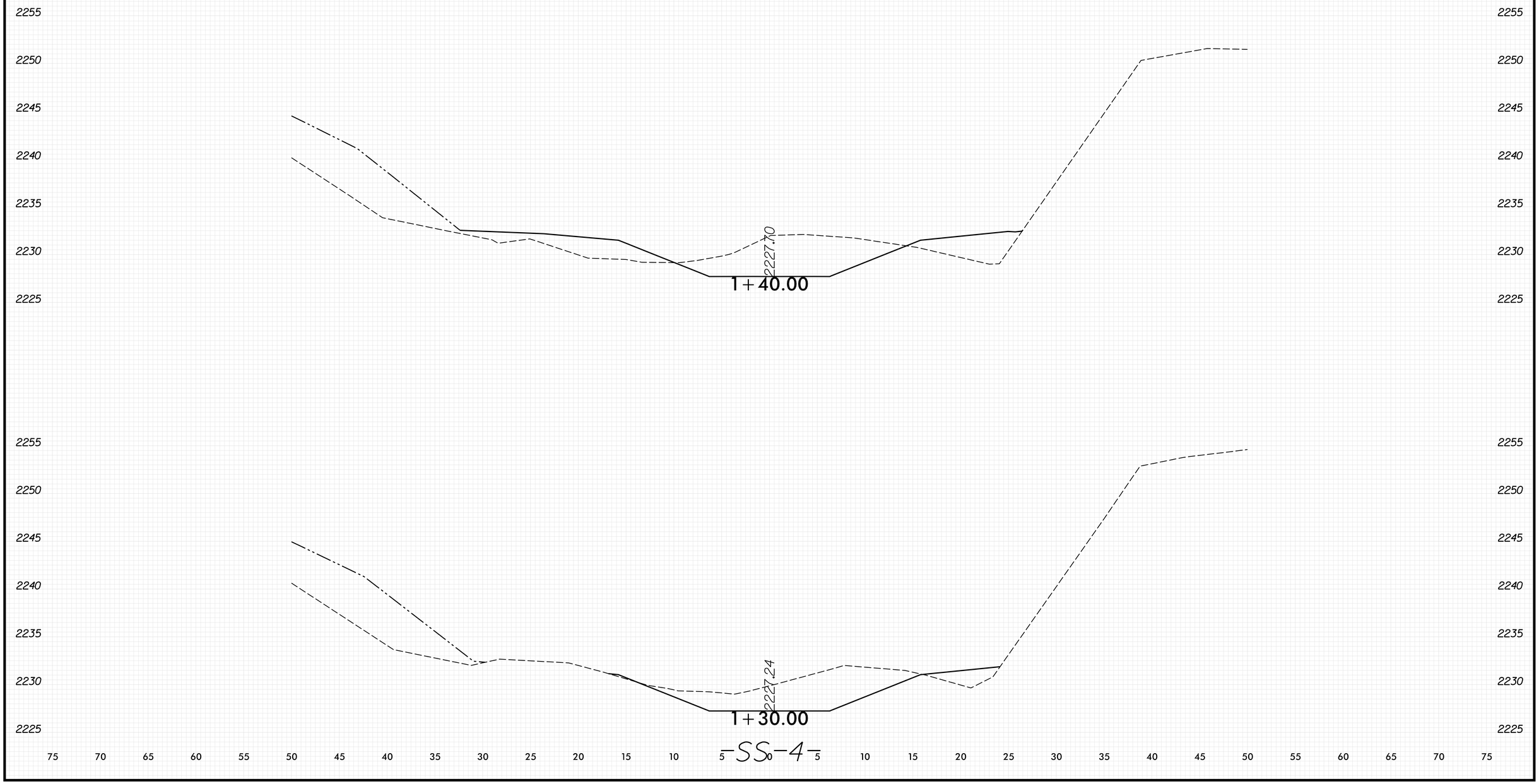
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-90

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

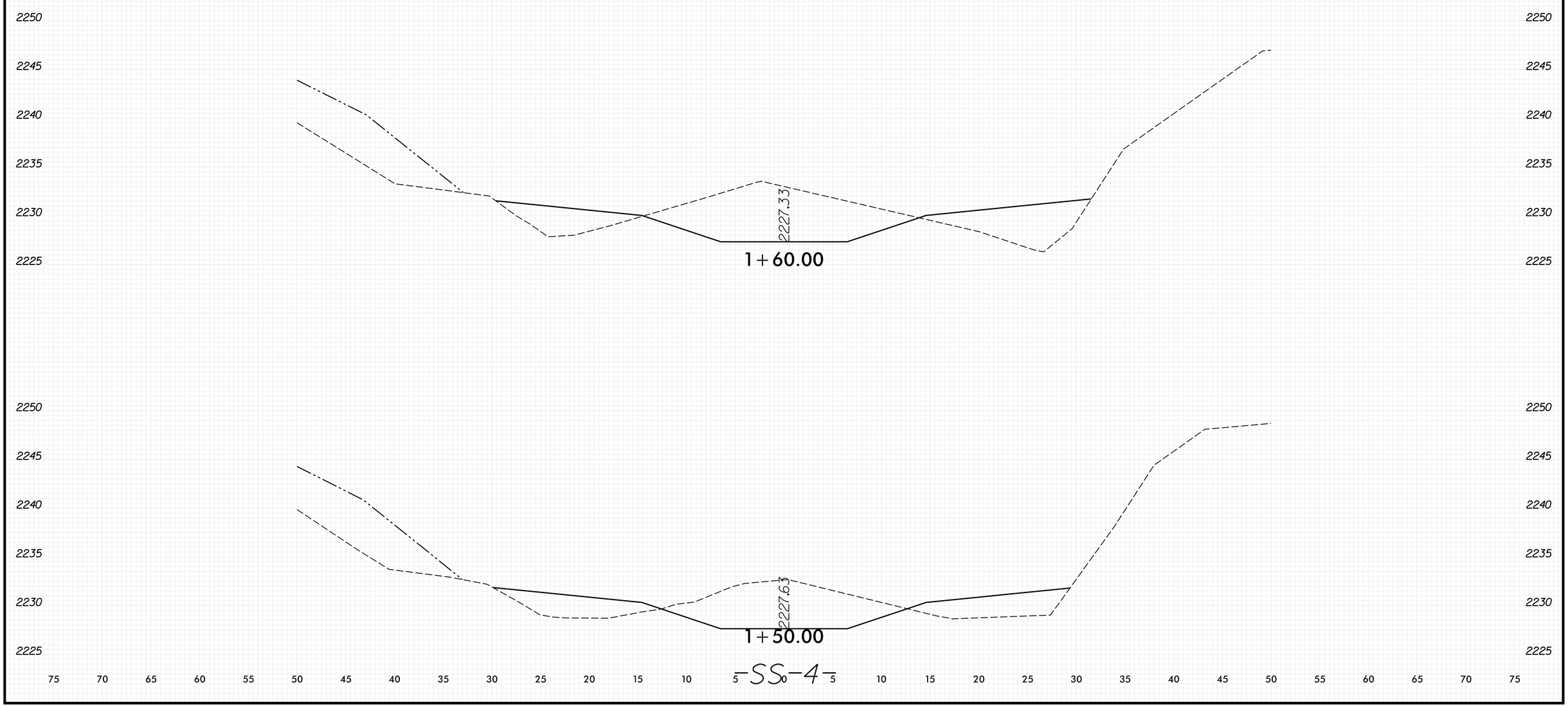
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:30 AM
8/23/99

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

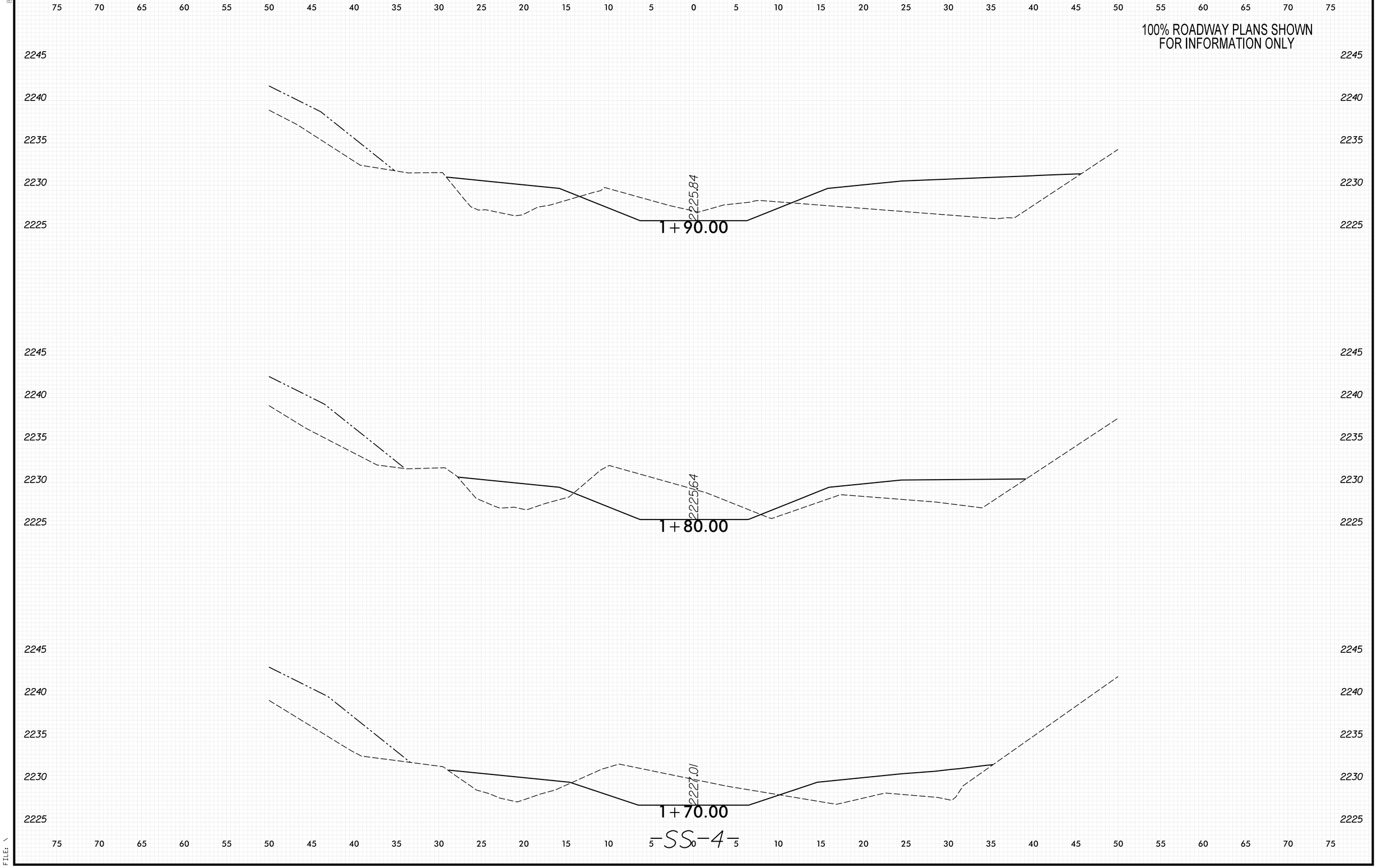


8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE:
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:31 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-93

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



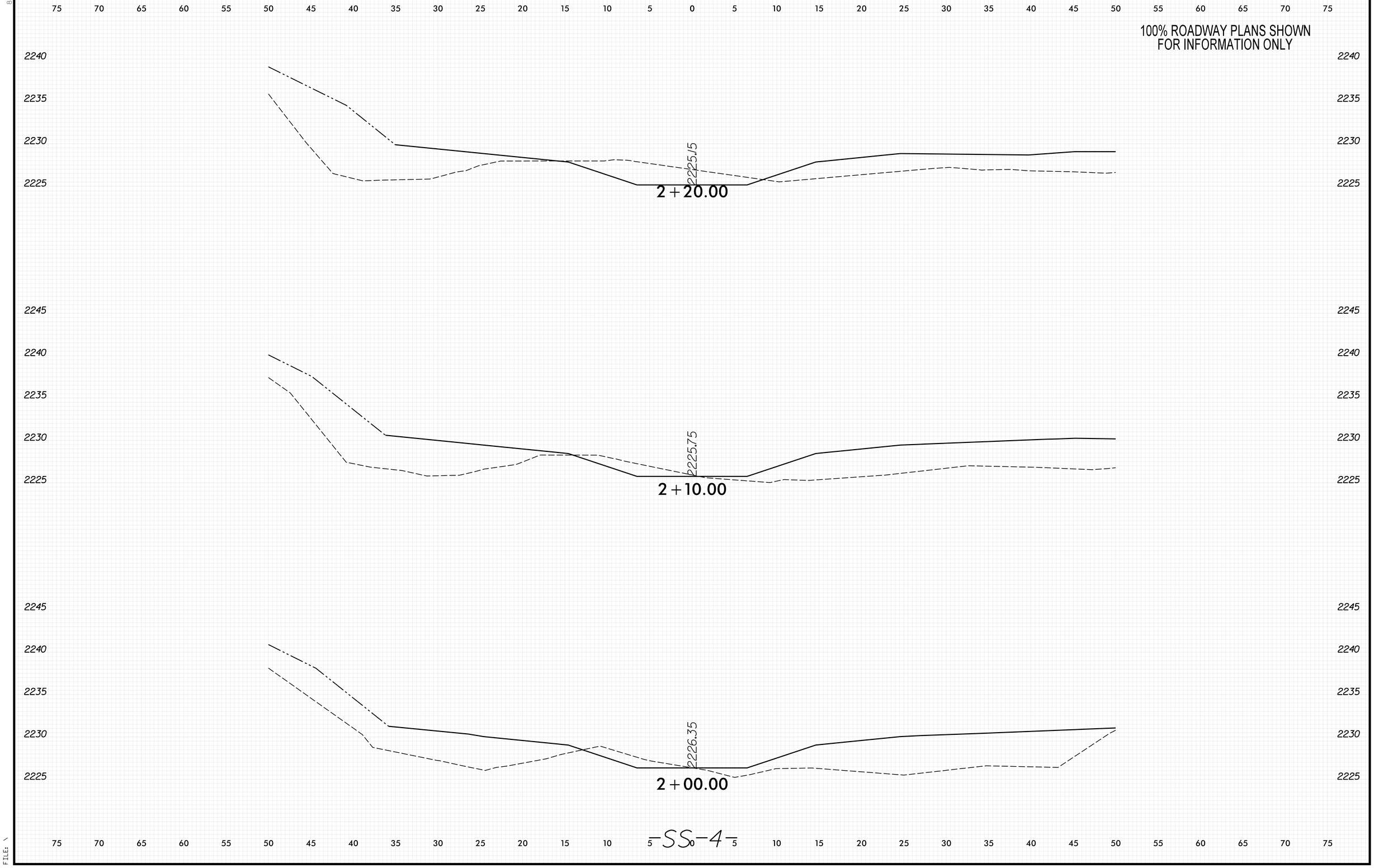
-SS-4-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:32 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-94

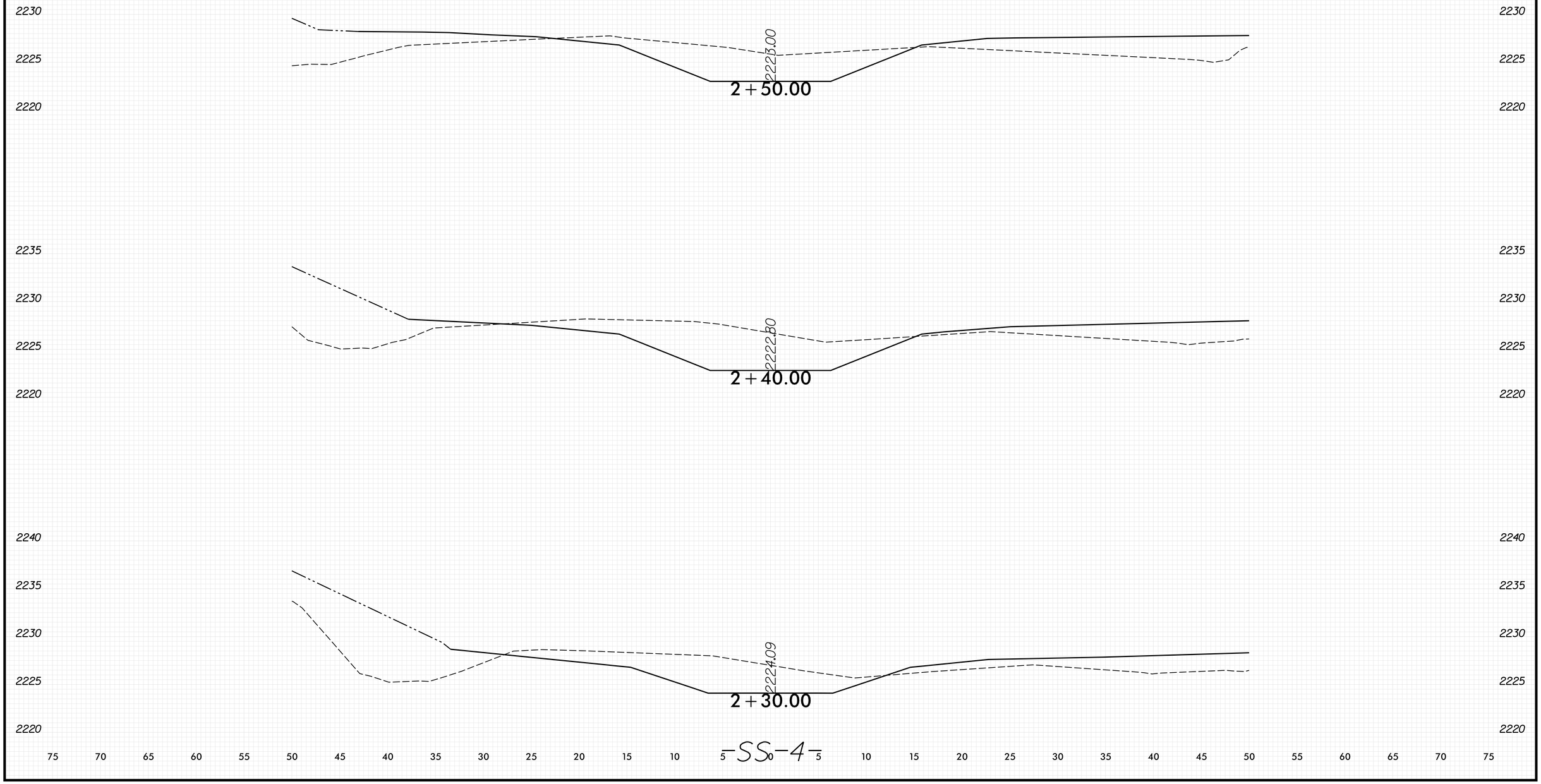
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \

PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:34 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



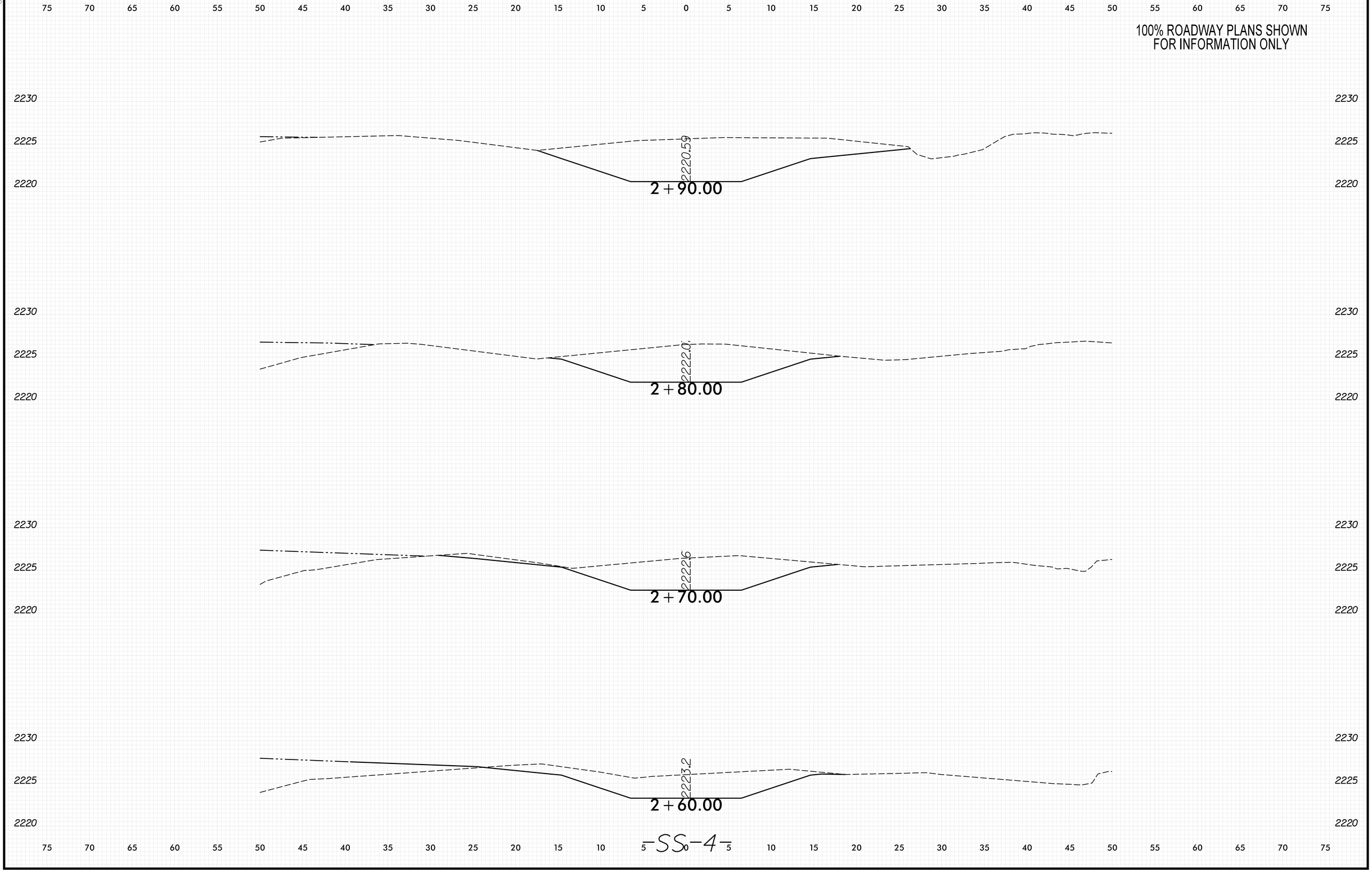
-SS-4-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:35 AM
8/23/99

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-96

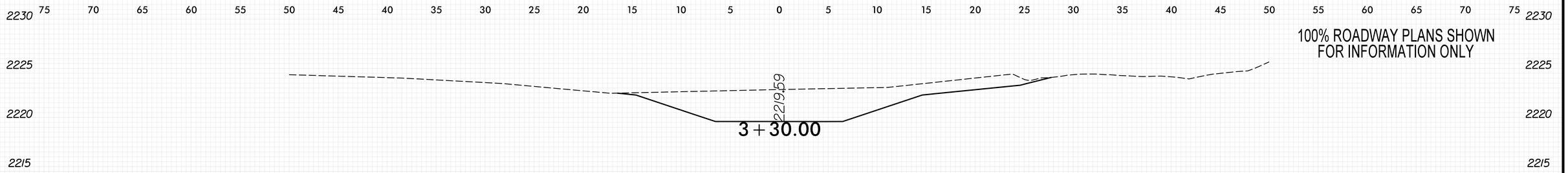
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

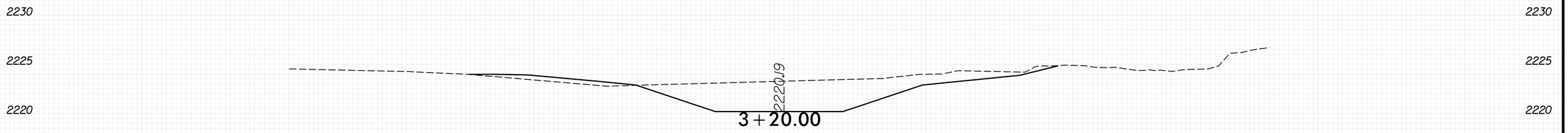


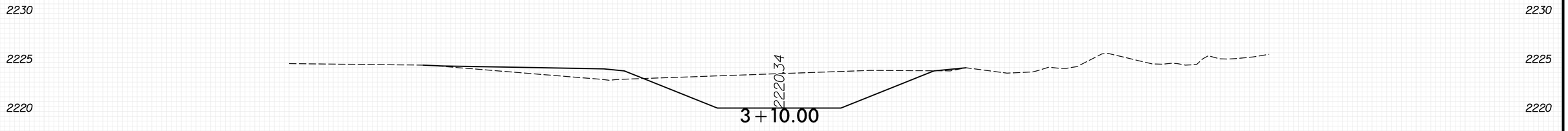
-SS-4-

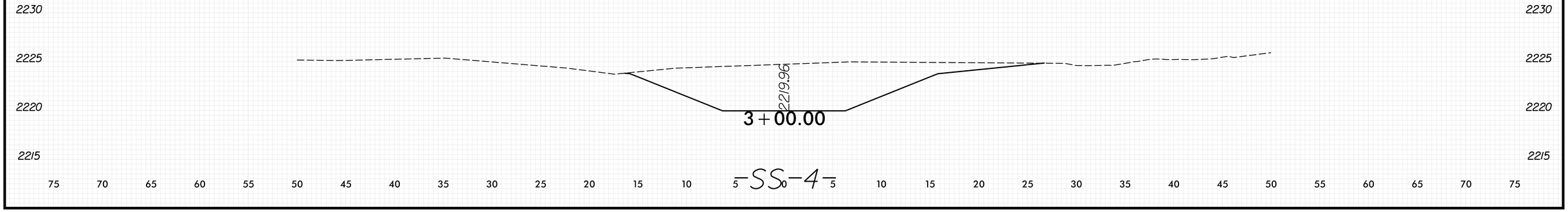
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:36 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY







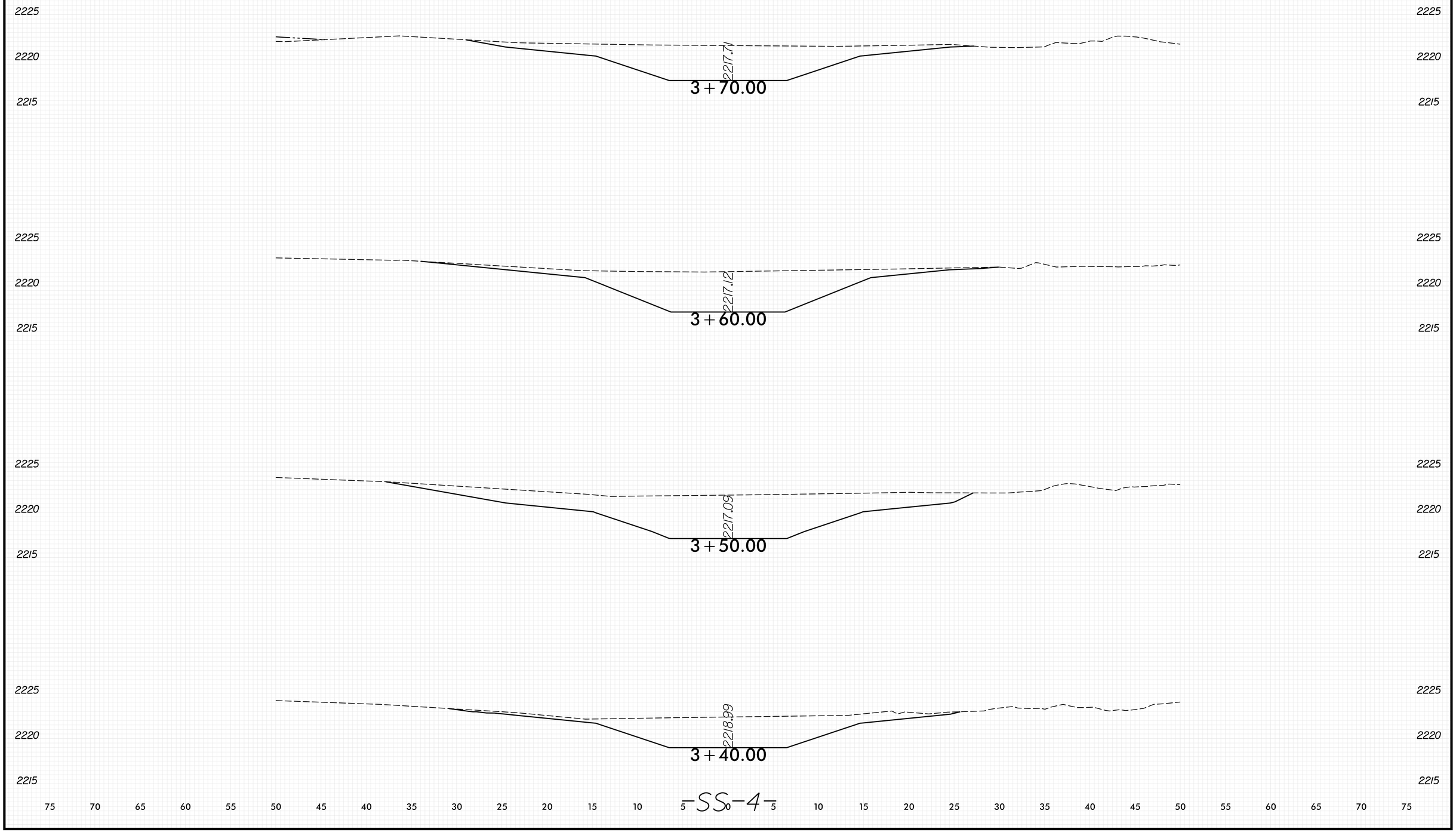


-SS-4-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
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FILE: \
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DATE: 5/8/2026
TIME: 9:39:37 AM
8/23/99

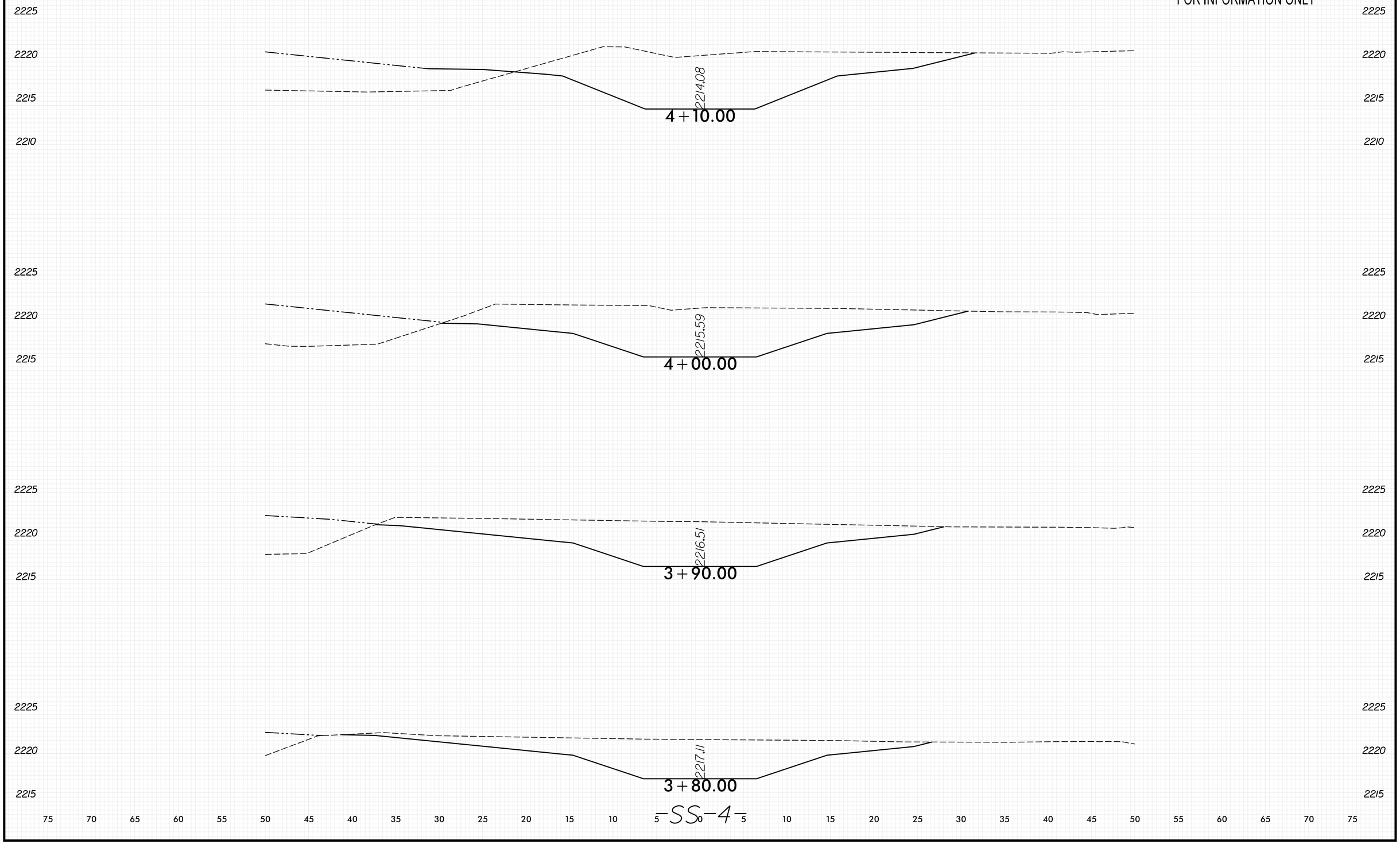
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100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



-SS-4-

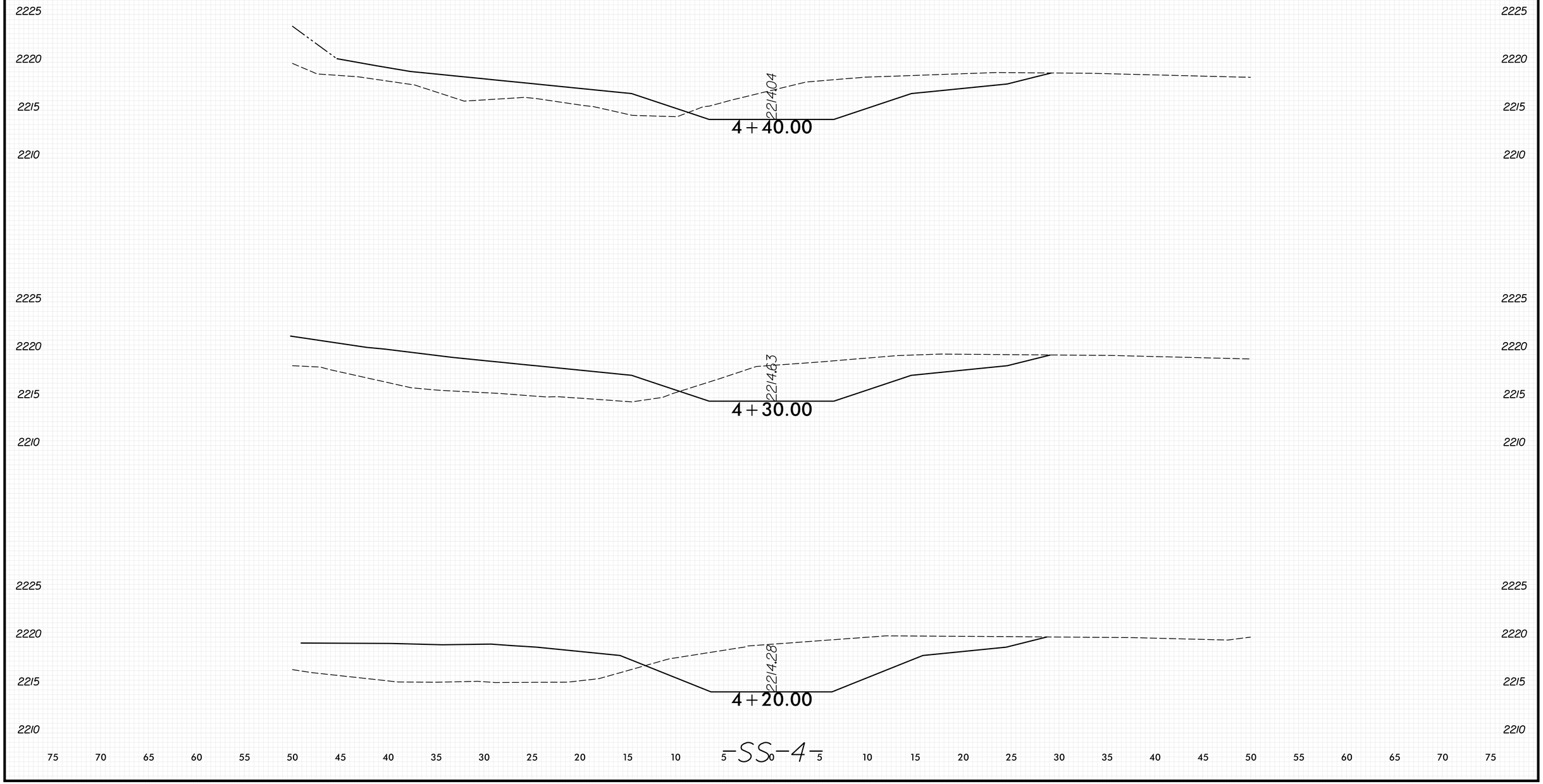
100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:39:39 AM

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100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

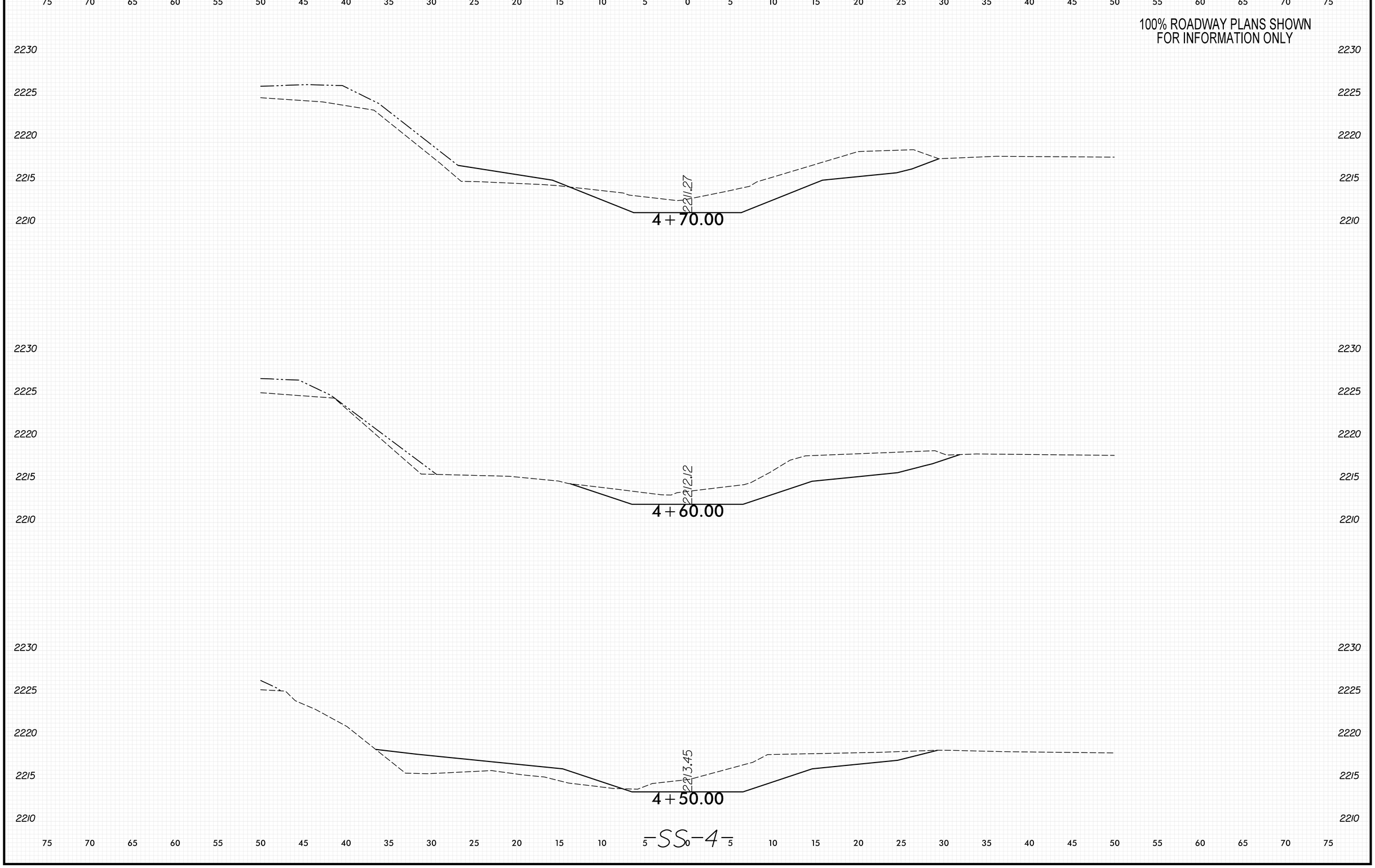


-SS-4-

8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
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FILE: \
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DATE: 5/8/2026
TIME: 9:39:41 AM

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-101

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99

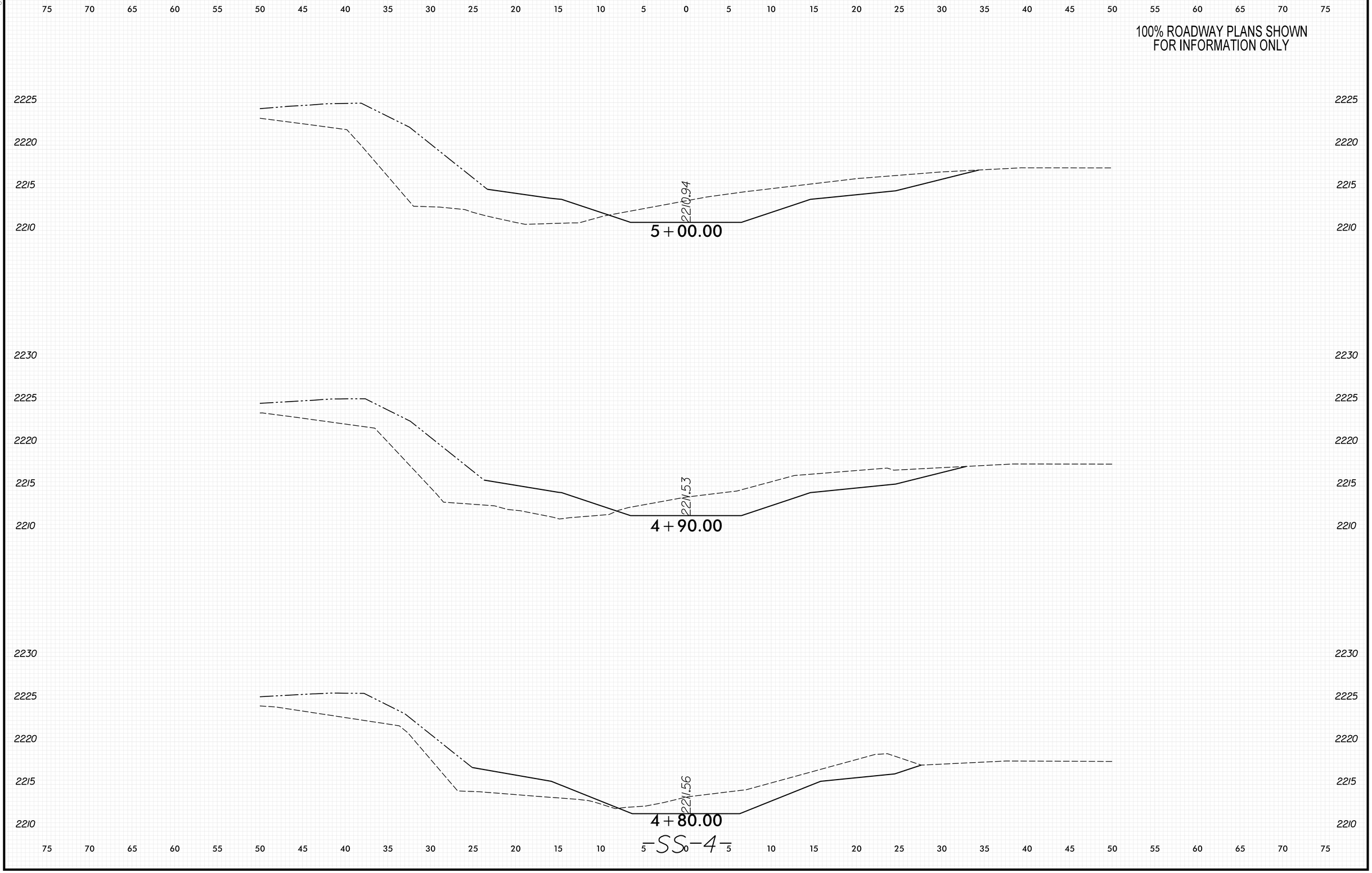
PLOT DRIVER: NCDOT_pdf_color-eng_50.plt
USER: KCLATTERBU
FILE: \

PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:40:27 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-102

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



-SS-4-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \

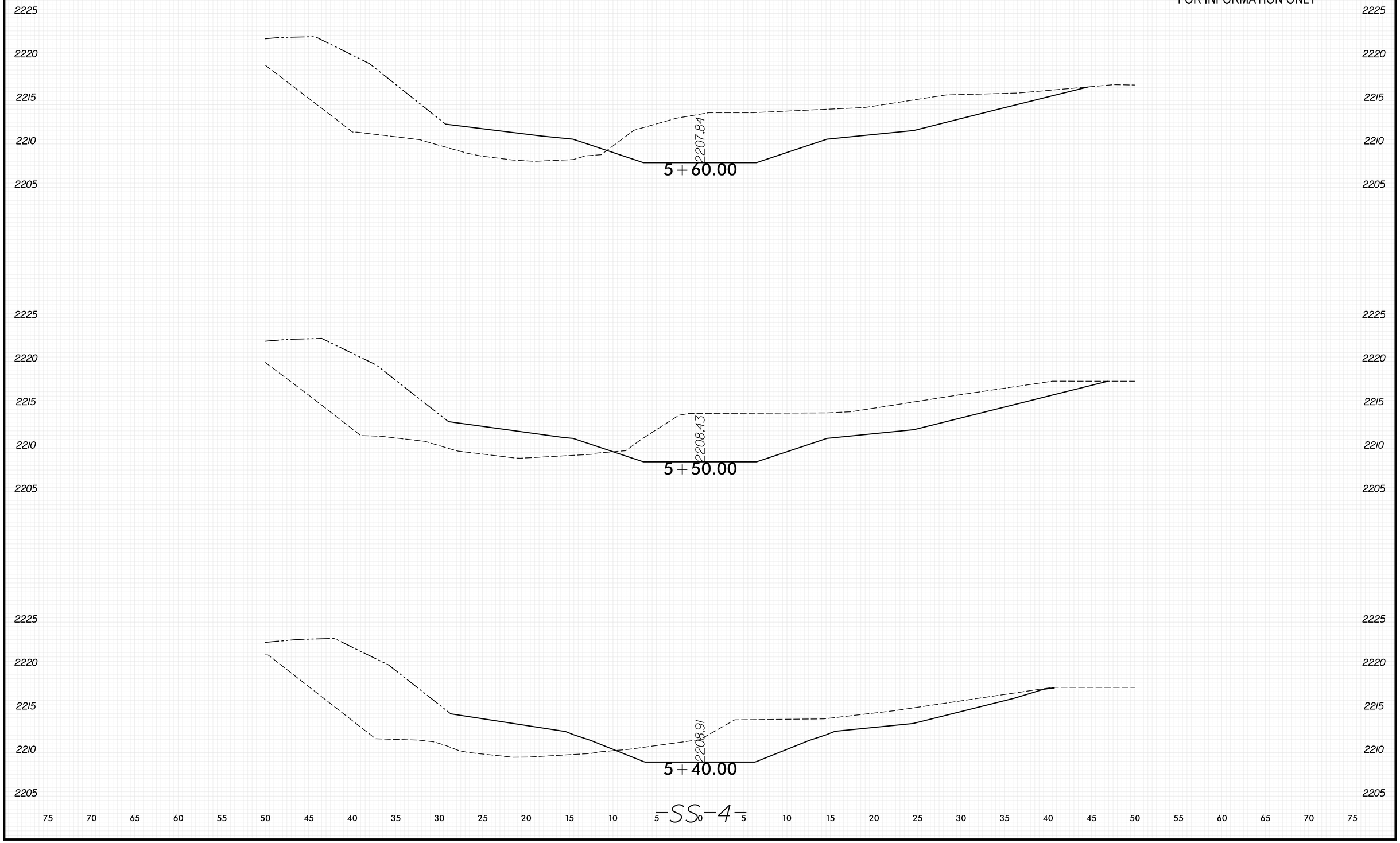
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TIME: 9:40:29 AM
DATE: 5/8/2026

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

-SS-4-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
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8/23/99

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



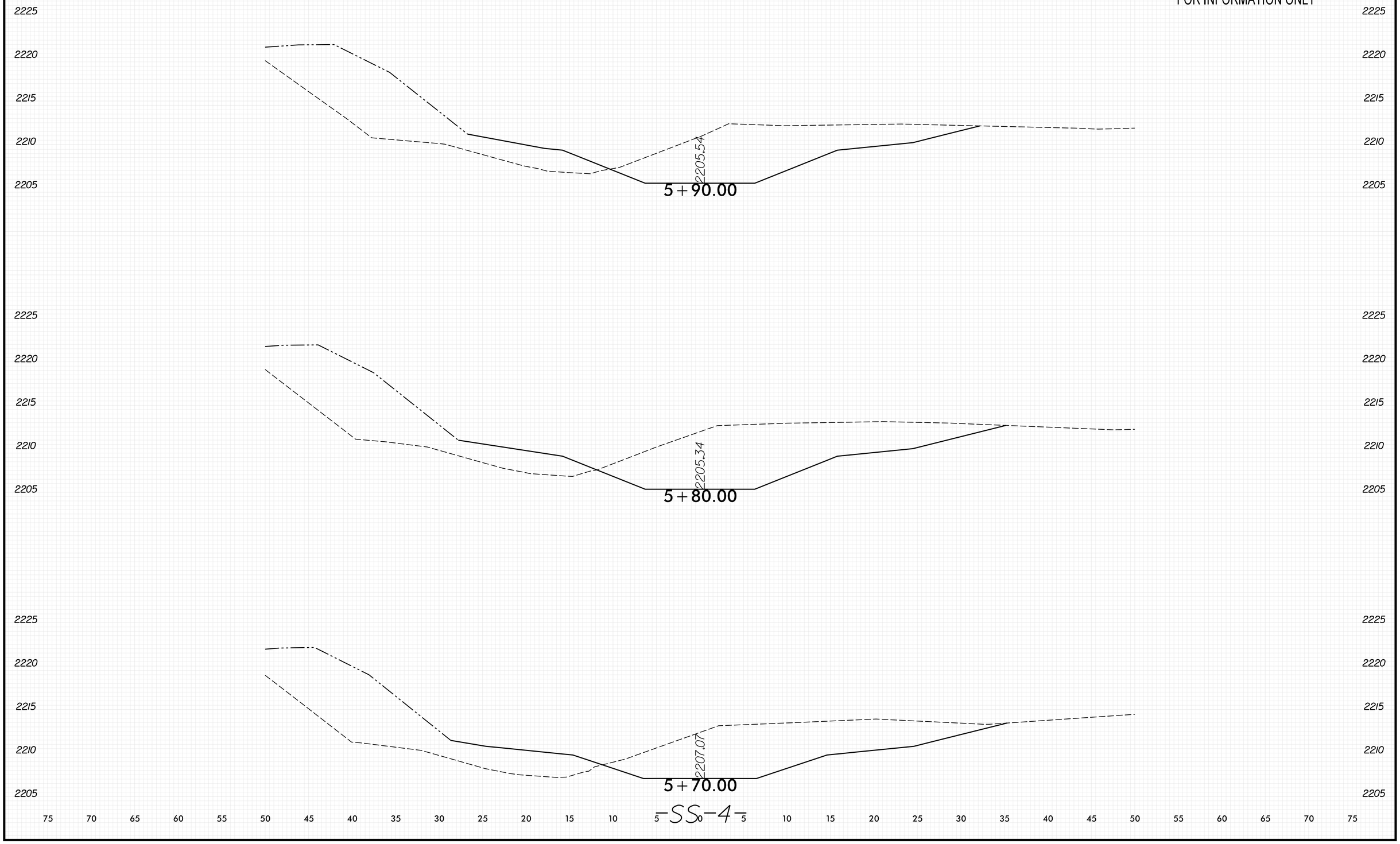
-SS-4-

8/23/99
PLOT DRIVER: NCDOT_pdf_color-eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:40:31 AM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-105

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



-SS-4-

PLOT DRIVER: NCDOT.pdf.color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_eh_v8.tbl
DATE: 5/8/2026
TIME: 9:40:32 AM

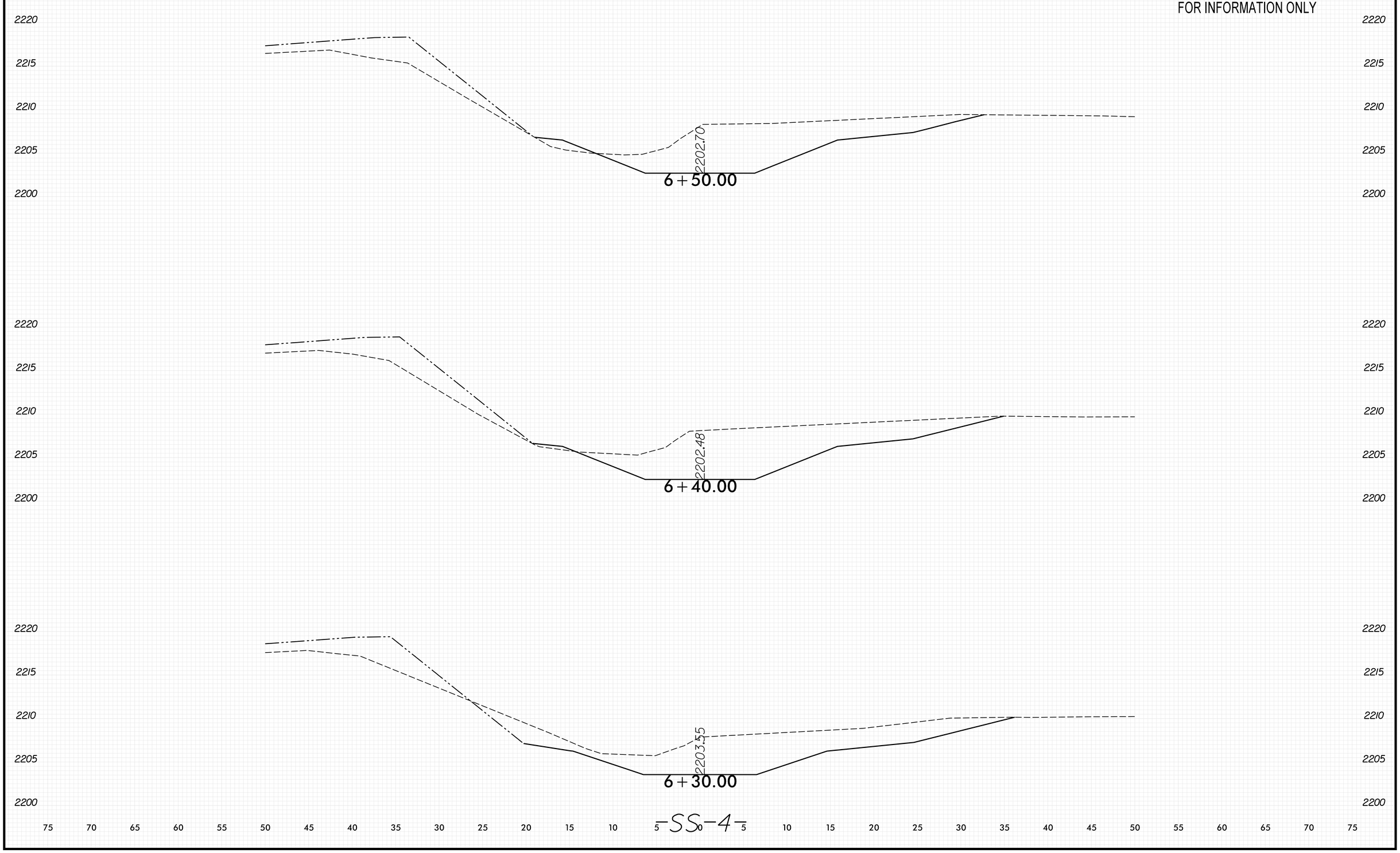
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-106

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

-SS-4-

8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:40:34 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

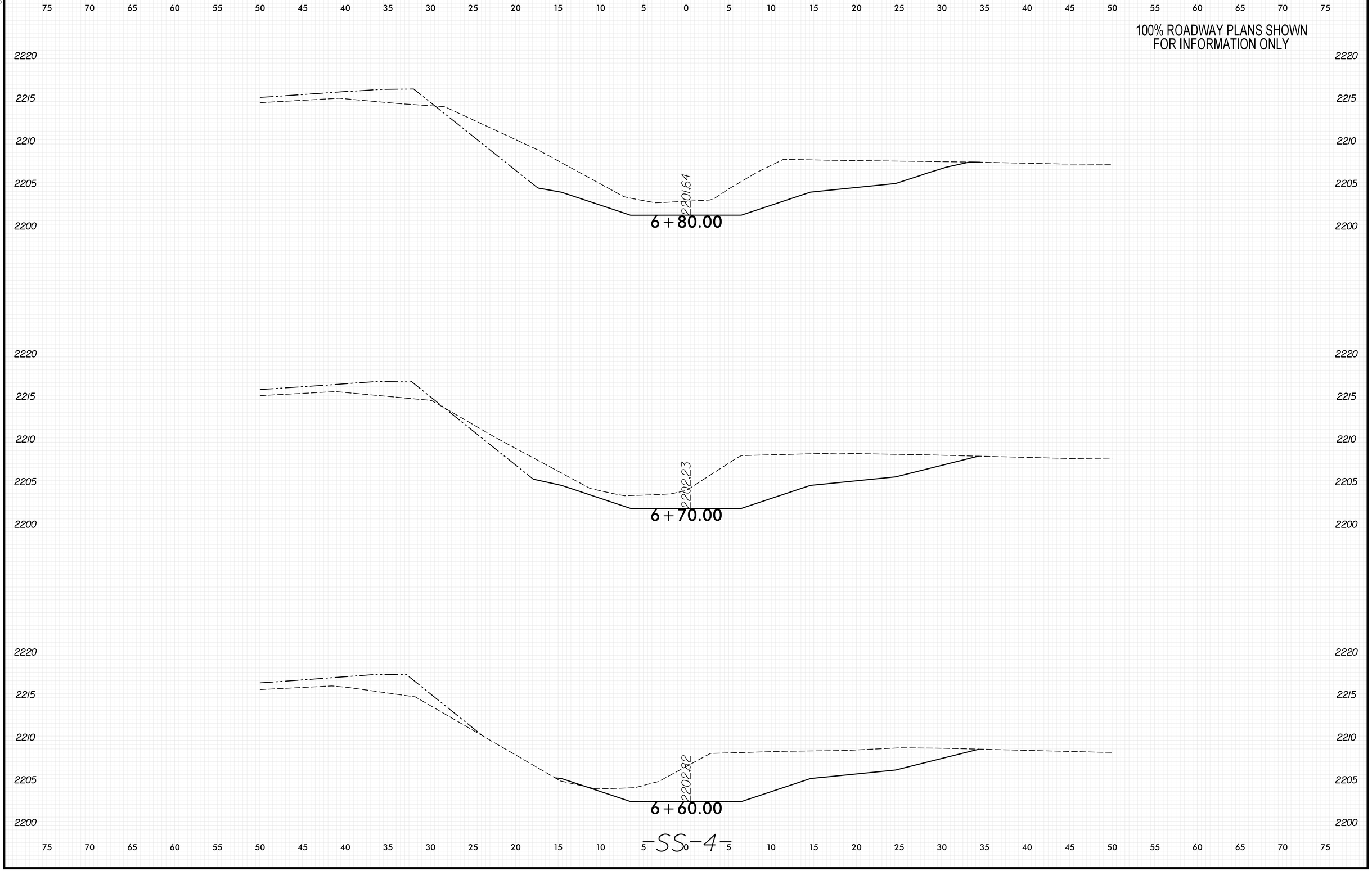


-SS-4-

8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:40:36 AM

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	18314.1045039	X-108

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



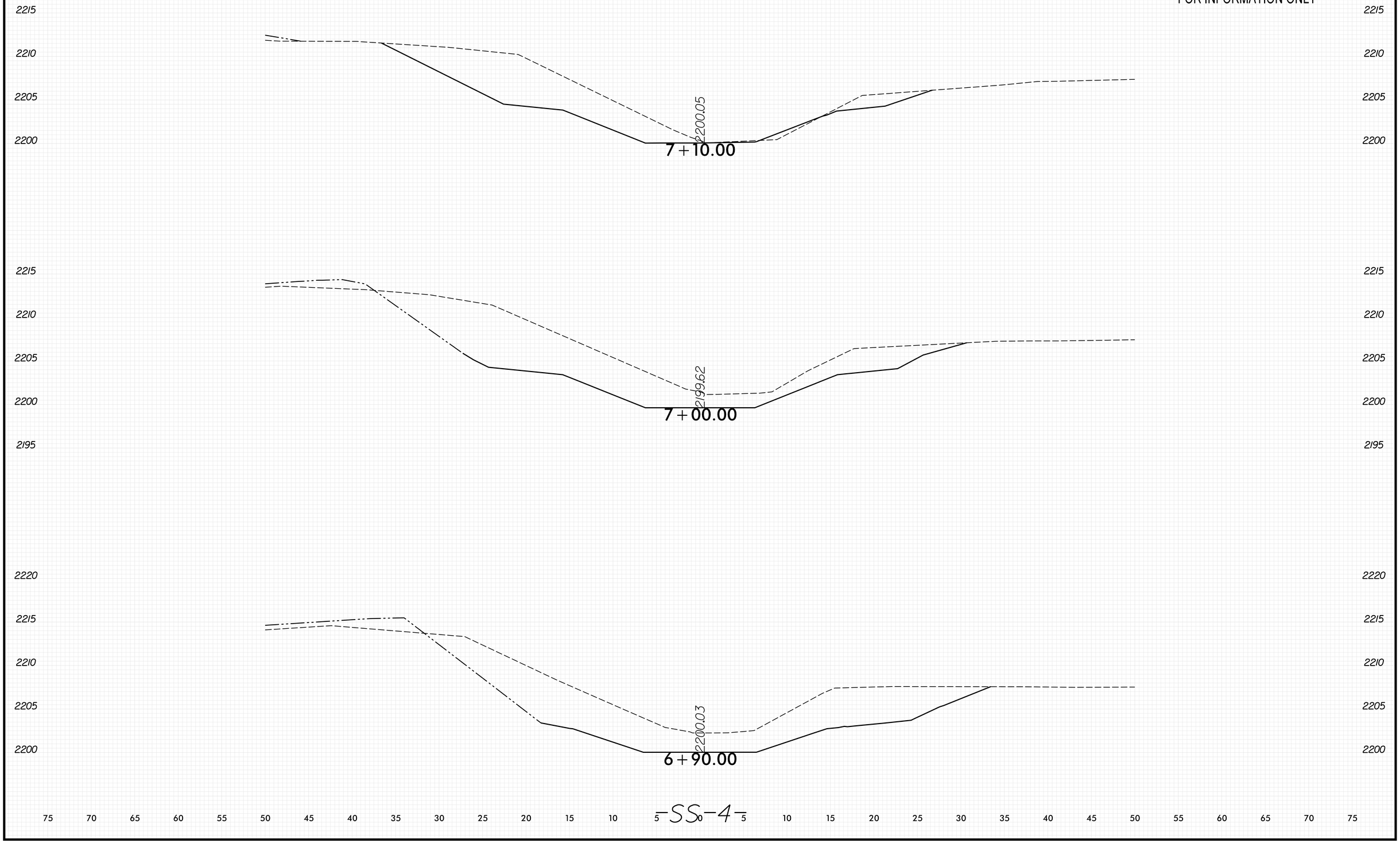
-SS-4-

8/23/99

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
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TIME: 9:40:38 AM
DATE: 5/8/2026

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

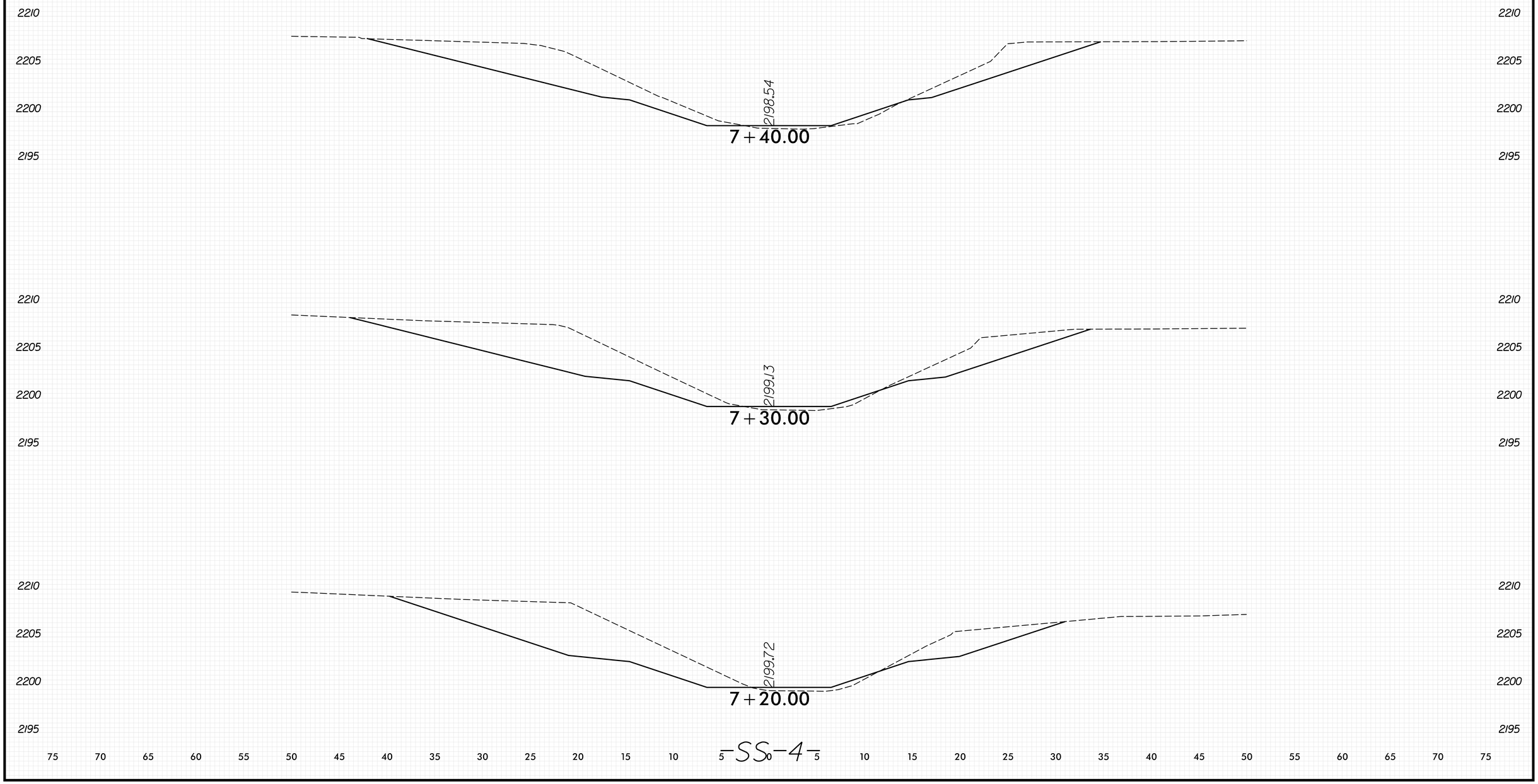


-SS-4-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt | PENTABLE: xpl_en_v8.tbl
USER: KCLATTERBU | DATE: 5/8/2026 | TIME: 9:40:39 AM
FILE: \

8/23/99

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY

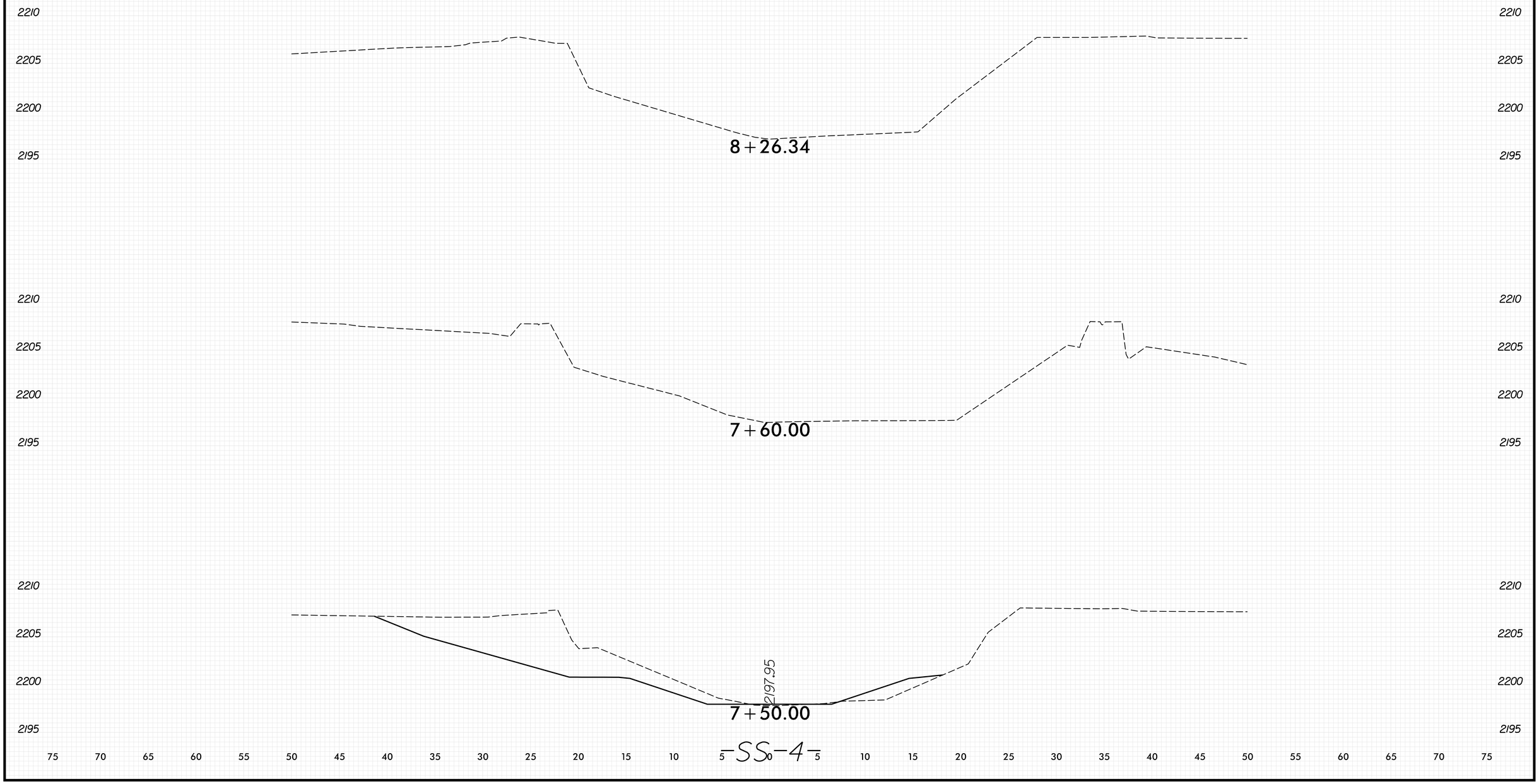


-SS-4-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
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FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:40:40 AM
8/23/99

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN FOR INFORMATION ONLY

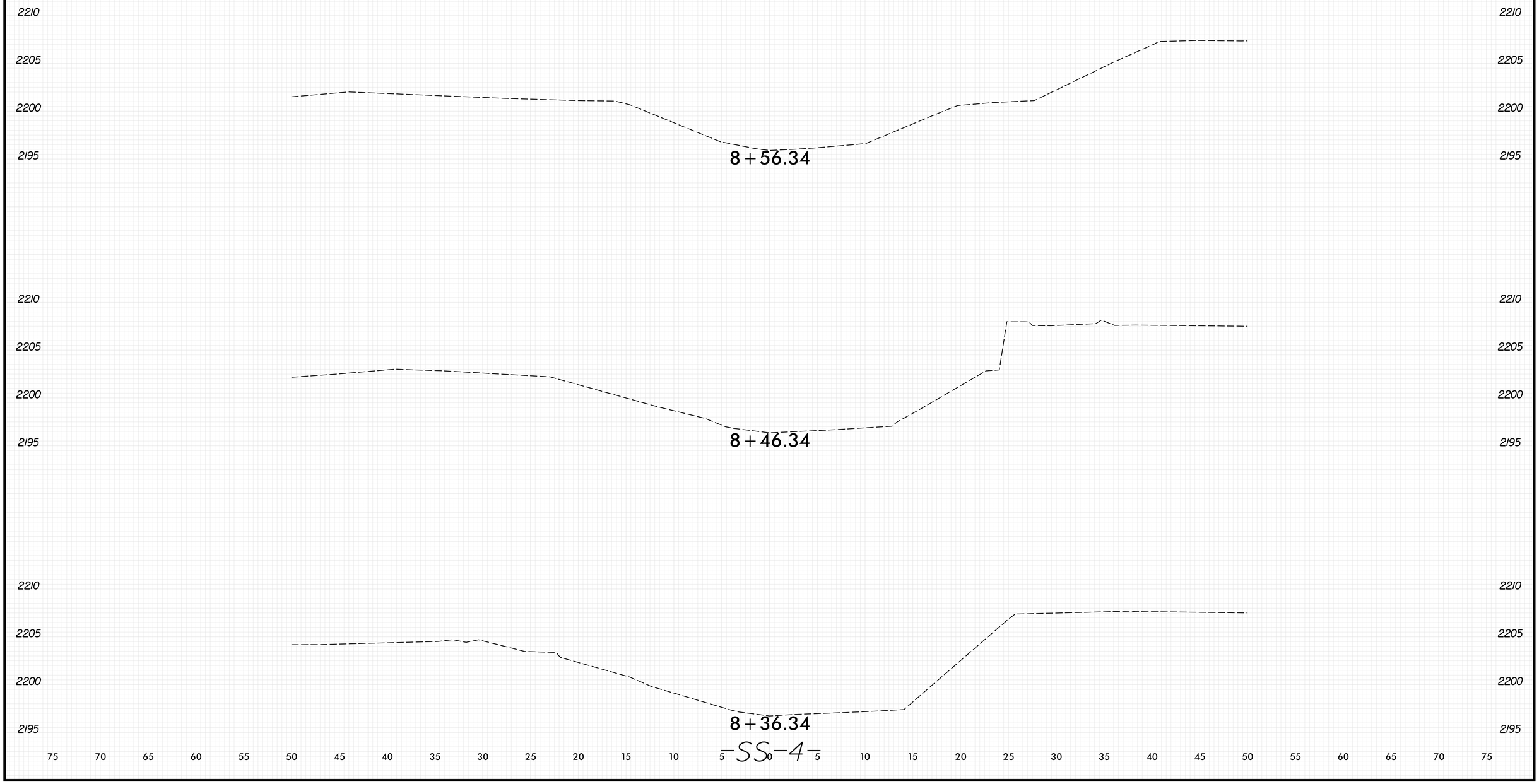


-SS-4-

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
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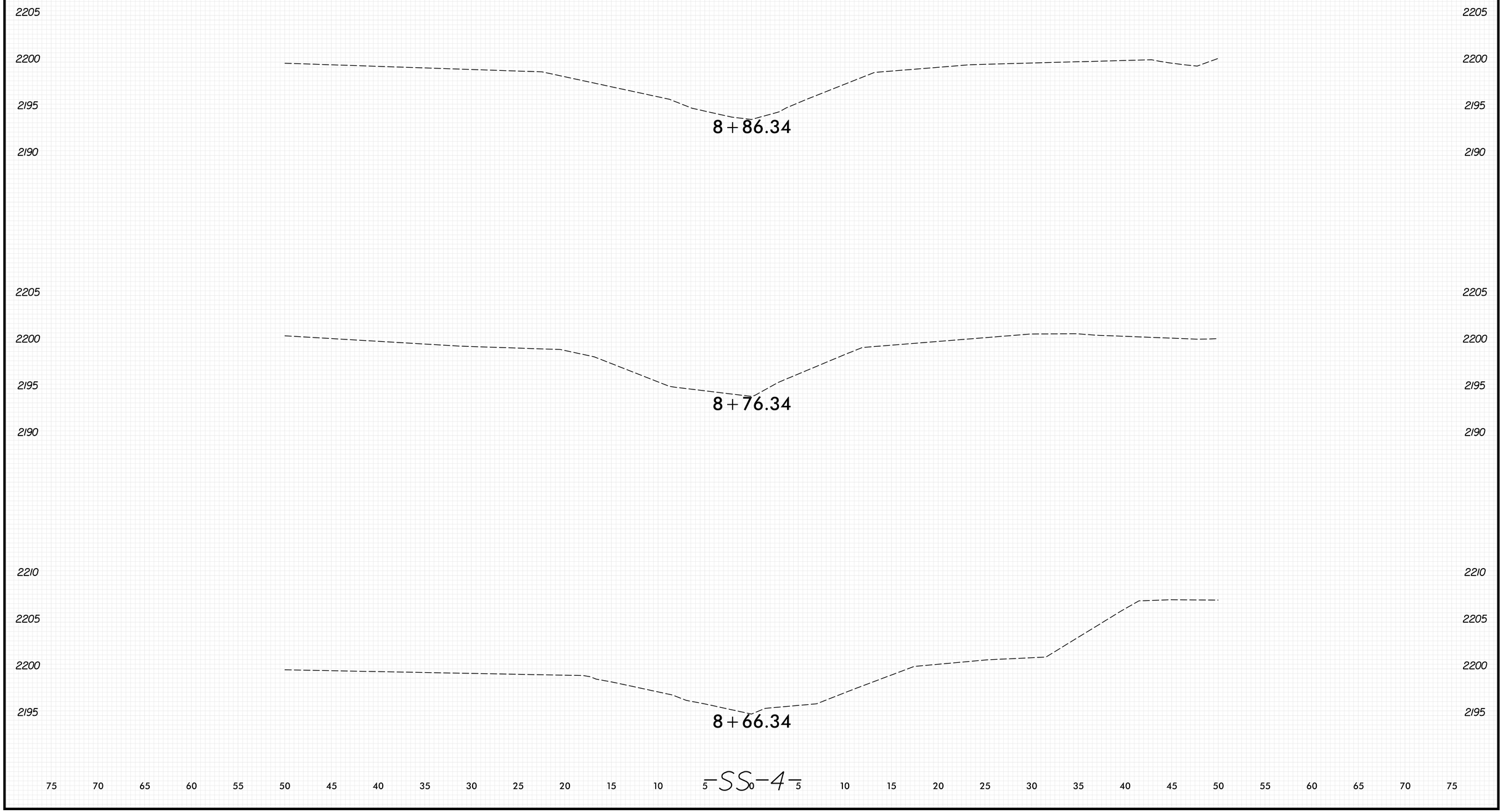
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:40:43 AM

100% ROADWAY PLANS SHOWN
FOR INFORMATION ONLY



8/23/99
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
USER: KCLATTERBU
FILE: \
PENTABLE: xpl_en_v8.tbl
DATE: 5/8/2026
TIME: 9:40:44 AM