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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J.R. "JOEY" HOPKINS
SECRETARY

November 5, 2024

MEMORANDUM TO: Brandon Jones, P.E.
Division 5 Engineer

FROM: Patrick Norman, P.E.
NCTA Chief Engineer

DocuSigned by:
Patrick Norman
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SUBJECT: Triangle Expressway Southeast Extension (Complete 540) from NC 55 Bypass in Apex to US 64/264 (I-87) in Knightdale, Wake and Johnston Counties; Federal Aid No. STP-0540(19), STP-0540(20), and STP-0540(21); WBS Nos. 37673.1.TA1, 35516.1.TA1, and 35517.1.TA1; STIP Project Nos. R-2721, R-2828, and R-2829

Attached are the modified US Army Corps of Engineers (USACE) Phased Section 404 Individual Permit, NC Division of Water Resources (NCDWR) Section 401 Individual Water Quality Certification, Neuse Riparian Buffer Authorization, and Non-404 Jurisdictional Wetlands and Waters Permit for the construction of the Triangle Expressway Southeast Extension (Complete 540) from NC 55 Bypass in Apex to US 64/264 (I-87) in Knightdale, Wake and Johnston Counties. STIP Nos. R- 2721, R-2828, and R-2829. ***The changes are based on the September 17, 2024 revision submittal for the R-2829A section of the project.*** Subject to any requisite permit modifications, all environmental permits have been received for the construction of the final design sections of this project.

A copy of this permit package is posted on the NCDOT website at:
https://xfer.services.ncdot.gov/pdea/PermIssued

cc: w/o attachment (see website for attachments)
Mr. Ron Davenport, P.E. Contracts Management
Mr. Clarence Coleman, P.E., FHWA
Mrs. Heather Montague, Division 5
Mr. Mark Craig, P.E., Division 5
Mr. Boyd Tharrington, P.E., Deputy Chief Engineer
Mr. Bill Martin, P.E., Programming and TIP
Mr. Timothy Ritacco, Utilities Unit
Mr. Matt Lauffer, P.E., Hydraulics Unit
Mr. Brian Hanks, P.E., Structures Management Unit
Mr. Mark Staley, Roadside Environmental
Mr. John Jamison, Environmental Policy Unit
Ms. Beth Harmon, NCDMS
Ms. Deanna Riffey, Natural Environment Unit-Environmental Coordination & Permitting

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
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Website: ncdot.gov

Location:
1 SOUTH WILMINGTON STREET
RALEIGH, NC 27601

PROJECT COMMITMENTS

Complete 540 – Triangle Expressway Southeast Extension
Wake and Johnston Counties, North Carolina

STIP Project Nos. R-2721, R-2828, and R-2829
State Project Nos. 6.401078, 6.401079, and 6.401080
Federal Aid Project Nos. STP-0540(19), STP-0540(20), and STP-0540(21)
WBS Nos. 37673.1.TA1, 35516.1.TA1, and 35517.1.TA1

COMMITMENTS FROM PROJECT DEVELOPMENT AND DESIGN

Item	Responsible Party	Resource	Project Commitment	Project Stage / Status	Applicable STIP Project
1	Environmental Analysis Unit, NCTA	Historic Architectural Resources	NCDOT will coordinate with the NC State Historic Preservation Office and the property owner(s) relative to potential retaining wall design to eliminate the need for permanent easement or right-of-way from the Panther Branch School.	Completed	R-2828
2	Environmental Analysis Unit, NCTA	Archaeological Resources	NCDOT will conduct an archaeological survey of the Preferred Alternative and will coordinate the results with the NC State Historic Preservation Office and the NC Office of State Archaeology.	Completed	R-2721, R-2828, and R-2829
3	Environmental Analysis Unit, NCTA	Archaeological Resources	NCDOT will establish a Memorandum of Agreement with the NC State Historic Preservation Office in order to take into account the project's effect on archaeological resources.	Completed	R-2828
4	Environmental Analysis Unit, NCTA	Archaeological Resources	NCDOT will coordinate with the NC Office of State Archaeology relative to data recovery of materials in the one site determined eligible for the National Register of Historic Places based on the information contained at the site.	Final Design and Construction	R-2828
5	NCTA	Community Resources & Section 4(f)	NCDOT will coordinate with the Town of Cary relative to a potential Section 4(f) de minimis use finding for the Middle Creek School Park.	Completed	R-2721
6	NCTA	Community Resources & Section 4(f)	NCDOT will coordinate with the City of Raleigh relative to a potential Section 4(f) de minimis use finding for the Neuse River Trail.	Completed	R-2829
7	Division 5, NCTA	Recreation Facility	During construction, NCDOT will accommodate trail users along the Neuse River Trail through the project construction zone.	Final Design and Construction	R-2829
8	Environmental Analysis Unit, NCTA	Noise	NCDOT will prepare Design Noise Reports for the Selected Alternative during final design. All feasible and reasonable noise abatement measures will be constructed.	Final Design and Construction	R-2721, R-2828, and R-2829

Item	Responsible Party	Resource	Project Commitment	Project Stage / Status	Applicable STIP Project
9	Hydraulics Unit, NCTA	Stormwater Management	NCDOT will utilize Design Standards in Sensitive Watersheds in the Swift Creek and ~~*in the Lower*~~ Middle Creek watersheds.	Construction and *Final Design	R-2721, R-2828, and R-2829*
10	Environmental Analysis Unit, NCTA	Migratory Birds	NCDOT will comply with requirements set forth in the Migratory Bird Treaty Act (MBTA) of 1918. *On December 22, 2017, after further analysis of the text, history, and purpose of the MBTA, the US Department of Interior issued Opinion M-37050. Opinion M-37050 permanently withdraws and replaces Opinion M-37041. Opinion 37050 concludes that the MBTA applies to only affirmative actions that have as their purpose to reduce migratory birds by taking or killing of migratory birds, their eggs, or their nest.*	Construction	R-2721, R-2828, and R-2829
11	Hydraulics Unit, NCTA	Major Drainage Structures	NCDOT will perform a more detailed hydrologic and hydraulic analysis for each major drainage crossing for the Selected Alternative.	Final Design	R-2721, R-2828, and R-2829
12	Utilities Unit, NCTA	Utilities	NCDOT will coordinate with the appropriate utility owners during design of the Selected Alternative for all utility conflicts, including means to avoid or minimize impacts to utilities.	Final Design	R-2721, R-2828, and R-2829
13	Environmental Analysis Unit, NCTA	Indirect Effects & Cumulative Impacts	NCDOT will prepare a quantitative assessment for indirect and cumulative effects and impacts for the Selected Alternative.	Completed	R-2721, R-2828, and R-2829
14	Environmental Analysis Unit, NCTA	Protected Species	NCDOT will carry out all activities for which it has been assigned responsibility in the Biological Assessment of Potential Impacts to Federally Listed Species (December 2017) and the USFWS Biological Opinion (April 2018) and as amended.	Construction and *Final Design	R-2721, R-2828, and R-2829*
15	Environmental Analysis Unit, NCTA	Protected Species	NCDOT will carry out all activities for which it has been assigned responsibility in the Biological Assessment for Atlantic Sturgeon Critical Habitat (December 2017) and the NMFS concurrence letter (May 2018) and as amended.	Final Design and Construction	R-2829
16	Environmental Analysis Unit, Division 5, NCTA	Protected Species	FHWA and NCDOT will update the 2017 Biological Assessment and coordinate with USFWS in accordance with ESA Section 7 for the Neuse River Waterdog, Carolina Madtom, Atlantic Pigtoe, and Atlantic Pigtoe Critical Habitats.	Completed	R-2721, R-2828, and R-2829
17	Environmental Analysis Unit, Division 5, NCTA	Protected Species	NCDOT will carry out all activities for which it has been assigned responsibility in the Revised Biological Assessment of Potential Impacts to Federally Listed Species (July 2019) and the USFWS Revised Biological/Conference Opinion (October 2019).	Construction and *Final Design	R-2721, R-2828, and R-2829*

COMMITMENTS FROM PERMITTING

Item	Responsible Party	Commitment Source	Project Commitment	Project Stage / Status	Applicable STIP Project
18	Division 5, NCTA	Recreation Facility	During construction, NCDOT will accommodate trail users along the Woodcreek Trail through the project construction zone.	Construction	R-2721A
19	Division 5, NCTA	404 Permit Condition 9 (2)	NCDOT will protect the Atlantic Sturgeon by not blocking greater than 50% of the Neuse River below the ordinary high-water mark with temporary causeways or work bridges. All causeways and work bridges will be removed at the end of the project.	Construction	R-2829
20	Environmental Analysis Unit, Division 5, NCTA	404 Permit Condition 9 (3)	NCDOT will comply with the attached USFWS Biological Opinion-Revised (USFWS BO), dated October 15, 2019 and modified Addendum September 30, 2024.	Construction and *Final Design	R-2721, R-2828, and R-2829*
21	Division 5, NCTA	404 Permit Condition 3 (Attachment: USFWS Biological Opinion (BO) Section 2.4)	NCDOT will invite representatives of the USFWS NCWRC, and other agency personnel to preconstruction meetings prior to incurring impacts in jurisdictional features, as well as to preconstruction meetings associated with installation of structures within 0.25 mile of the Swift Creek crossing.	Completed	R-2828
22	Division 5, NCTA	404 Permit Condition 3 (Attachment: USFWS BO Section 2.4)	NCDOT will not allow any part of the bridging structure for Swift Creek to be within 10 feet of the top of bank on either side of the channel. No permanent structures or temporary structures will be placed in Swift Creek. All permanent and temporary structures will be installed and designed to maintain stability of the stream banks of Swift Creek.	Completed	R-2828
23	Roadside Environmental Unit, Division 5, NCTA	404 Permit Condition 3 (Attachment: USFWS BO Section 2.4)	NCDOT will require construction of two permanent hazardous spill basins (HSBs) at the crossing of Swift Creek. Road runoff from approximately 1.3 miles of road facility will be directed to the HSBs prior to discharge into Swift Creek or Swift Creek tributaries. The HSBs will be designed to contain a spill from a typical tanker truck. NCDOT will implement their standard protocols for upkeep and use of these HSBs.	Completed	R-2828

Item	Responsible Party	Commitment Source	Project Commitment	Project Stage / Status	Applicable STIP Project
24	Environmental Analysis Unit, Division 5, NCTA	404 Permit Condition 9 (3) (Attachment: USFWS BO Sections: 2.4, 8.2 & 8.3)	NCDOT will conduct a preconstruction survey (just prior to construction) at the Swift Creek crossing and remove mussels from a defined salvage area and relocate them to appropriate habitat within Swift Creek outside of the salvage area (relocation site) or if deemed appropriate, after coordination with the USFWS and NCWRC, Dwarf Wedgemussel and Yellow Lance individuals may be taken into captivity to use as brood stock for propagation efforts. The preconstruction survey will be incorporated into a Mussel Relocation Plan, which will identify the salvage area and relocation site, and be developed in coordination with USFWS/NCWRC.	Completed	R-2828
25	Environmental Analysis Unit, Division 5, NCTA	404 Permit Condition 3 (Attachment: USFWS BO Sections: 2.4, 8.2 & 8.3)	NCDOT will provide funding to Wake County and NCWRC, after receiving the Section 404 Permit, to be utilized for the retrofit and upgrade of the existing research facility in the A.E. Finley Center, at the Historic Yates Mill County Park for the purpose of research and propagation of aquatic species.	Completed	R-2721, R-2828, and R-2829
26	Division 5, NCTA	404 Permit Condition 9 (3) (Attachment: USFWS BO Section 8.4)	NCDOT will monitor the Action area for evidence of sediment loss. The USFWS will be contacted if project related sedimentation is occurring beyond 400 meters from the Action area.	Construction	R-2828
27	Environmental Analysis Unit, Division 5, NCTA	404 Permit Condition 17	NCDOT will implement the Memorandum of Agreement (MOA) between the USACE and SHPO dated March 11, 2018 and adhere to the specific Stipulations provided in the MOA attachment.	Construction	R-2721, R-2828, and R-2829
28	Roadside Environmental Unit, Division 5, NCTA	404 Permit Condition 23	NCDOT will segregate topsoil (6-12") in wetland areas where pipelines will be installed via trenching. The topsoil will be used to backfill the trench.	Completed	R-2828
29	Environmental Analysis Unit, Division 5, NCTA	404 Permit Condition 27	NCDOT will only complete construction activities on TIPs R-2721A and B under the Section 404 Permit dated October 24, 2019 and R-2828 dated February 3,2020 and R-2829 as authorized in Section 404 dated October 28, 2024.	Construction	R-2721, R-2828, and R-2829
30	Division 5, NCTA	National Marine Fisheries Service Consultation (Page 3)	NCDOT will stop in-water construction activities if a sturgeon is spotted within 50 feet of operations. (See Attached NMFS Consultation)	Construction	R-2829
31	Division 5, NCTA	National Marine Fisheries Service Consultation (Page 3)	NCDOT will observe an in-water work moratorium of February 15-October 31. This includes installation/removal of causeways and temporary bridges. This will cover the WRC moratorium of February 15-September 30.	Construction	R-2829

Item	Responsible Party	Commitment Source	Project Commitment	Project Stage / Status	Applicable STIP Project
32	Division 5, NCTA	National Marine Fisheries Service Consultation (Page 4)	NCDOT will not blast within 50 feet of the Neuse River.	Construction	R-2829
33	Division 5, NCTA	National Marine Fisheries Service Consultation (Page 4)	NCDOT will adhere to shoreline stabilization Project Design Criteria (PDCs) when installing new bridges and piers.	Construction	R-2829
34	Division 5, NCTA	National Marine Fisheries Service Consultation (Attachment 1)	NCDOT will follow the PDCs outlined in Attachment 1 of the NMFS Consultation	Construction	R-2829
35	Division 5	401 Modification Condition 1 (February 15, 2023)	All protective measures as described in the application received January 11, 2023 and additional information provided February 13, 2023, shall be required as a condition of this certification, including practices described in the bridge demolition plans. Measures stated included the use of geotextile fabric, straw bales and crane mats at the locations of jurisdictional impacts for the bridge demolitions, in order to prevent demolition materials from entering the stream. Once all non-native materials and demolition debris has been removed the sites will be matted, seeded, and revegetated as stated in the application. As stated in the application, in the event that too much demolition material accumulates on the mats and potential for rubble to spread into jurisdictional areas, the process will be paused to clear concrete from the mats.	Completed	R-2828
36	Environmental Analysis Unit, Division 5, NCTA	R-2829 Permit Conditions 9 (4 &5)	NCDOT will comply with the requirements set forth in the Programmatic Biological Opinion (PBO) issued by the USFWS titled, "Programmatic Biological Opinion - Revised, NCDOT Program Effects on the Northern Long-eared Bat in Divisions 1-8", dated December 15, 2022 and the Programmatic Conference Opinion (PCO) titled "NCDOT Program Effects on the Tricolored Bat in Divisions 1-8", dated November 20, 2023.	Construction	R-2829

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

October 28, 2024

Regulatory Program

Sent Via Email: ext-jhharris1@ncdot.gov

Patrick Norman, P.E.
Chief Engineer
North Carolina Turnpike Authority
1578 Mail Service Center
Raleigh, NC 27699-1578

Dear Mr. Norman:

Reference the Department of the Army permit issued to the North Carolina Department of Transportation (NCDOT) on October 24, 2019, and subsequently modified, to authorize the discharge of fill material into waters of the United States, for construction of the Triangle Expressway Southeast Extension (Complete 540) from NC 55 Bypass in Apex to US 64/264 (1-87) in Knightdale, Wake and Johnston Counties. Sections included within this permit are R-2721, R-2828, and R-2829. At the time of permitting, only STIP R-2721 was authorized for construction because the other two sections (R-2828 and R-2829) had not gone through final design, completely minimized impacts to waters and wetlands, and submitted a final compensatory mitigation plan. R- 2828 has since completed final design and was authorized by modification of the permit.

Also, please reference your September 17, 2024, letter requesting modification of the permit to authorize construction authorization for R-2829, Section A. Section R-2829A has recently completed the requirements necessary for construction authorization, including final designs.

The total waters of the U.S. impacts, including wetland, for the R-2829A section are 8.758 acres of wetlands (6.405 acres of permanent wetland loss impacts (riparian and non-riparian), 0.717 acre mechanized clearing in wetlands, 0.765 acre temporary wetland impacts, and 0.871 acre non-404 hand clearing in wetlands), 10,517 linear feet (lf) of tributaries (8,444 lf of permanent stream loss impacts, 882 lf of stream bank/structure stabilization, and 1,191 lf of temporary stream impacts), and 3.49 acres of permanent pond impacts.

The Corps has completed the evaluation of your request and has determined that it is appropriate and reasonable, and that no public notice is required for this modification. Therefore, the permit is modified as requested and as shown on the

enclosed R-2829A Mod Permit Drawings, Sheets 1 – 103 of 103, and Mod Utility Permit Drawings, Sheets 1 – 8 of 8, submitted on September 17, 2024.

Additional compensatory mitigation of 14.24 acres wetland credits, and 16,888 warm water stream credits, is required, in accordance with the provisions outlined on the attached Compensatory Mitigation Responsibility Transfer Forms.

The special conditions for the permit are also enclosed, and have not changed from the original Special Conditions with the exception of Special Condition 9, which is revised to indicate the September 30, 2024 Addendum to the US Fish and Wildlife Service BIOLOGICAL/CONFERENCE OPINION. As requested, the permit expiration date has been extended to December 31, 2029. Should you have any questions, contact Mr. Eric Alsmeyer, via email at Eric.C.Alsmeyer@usace.army.mil or by telephone at (919) 817-1570. 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

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

Enclosures

cc: Deanna Riffey, NCDOT (via driffey@ncdot.gov)

SPECIAL CONDITIONS

Action ID SAW-2009-02240; Complete 540; TIPS R-2721, R-2828, and R-2829

Note: Special Condition 9 was modified on October 28, 2024.

1. **Work Limits:** All work authorized by this permit shall be performed in strict compliance with the attached permit plans submitted on September 12, 2018, and revised on February 8, 2019, which are a part of this permit. The Permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Any modification to the attached permit plans must be approved by the U.S. Army Corps of Engineers (Corps) prior to any active construction in waters or wetlands.

2. **Unauthorized Dredge and/or Fill:** Except as authorized by this permit or any U.S. Army Corps of Engineers approved modification to this permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands, or shall any activities take place that cause the degradation of waters or wetlands. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and waste activities connected with this project. In addition, except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within, into, or out of waters or wetlands or to reduce the reach of waters or wetlands.

3. **Permit Distribution:** The Permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit 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 permit. A copy of this permit, including all conditions and drawings shall be available at the project site during construction and maintenance of this project.

4. **Preconstruction Meeting:** The Permittee shall conduct an onsite preconstruction meeting between its representatives, the contractor's representatives and the appropriate U.S. Army Corps of Engineers Project Manager prior to undertaking any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all terms and conditions contained within the Department of the Army permit. The Permittee shall schedule the preconstruction meeting for a time frame when the Corps, and NCDWR Project Managers can attend. The Permittee shall invite the Corps, and NCDWR Project Managers a minimum of thirty (30) days in advance of the scheduled meeting in order to provide those individuals with ample opportunity to

schedule and participate in the required meeting. The thirty (30) day requirement can be waived with the concurrence of the Corps.

5. **Notification of Construction Commencement and Completion:** The Permittee shall notify the U.S. Army Corps of Engineers in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.

6. **Reporting Address:** All reports, documentation, and correspondence required by the conditions of this permit shall be submitted to the following: U.S. Army Corps of Engineers, Wilmington District Raleigh Regulatory Field Office, Attn: Eric Alsmeyer, 3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587, or eric.c.alsmeyer@usace.army.mil. The Permittee shall reference the following permit number, SAW-2009-02240, on all submittals.

7. **Permit Revocation:** The Permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

8. **Reporting Violations:** Violation of these permit conditions or violation of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act shall be reported to the Corps in writing and by telephone at: 919.554.4884, extension 23, within 24 hours of the Permittee's discovery of the violation.

9. Endangered Species

1) **The Permittee shall implement all necessary measures to ensure the authorized activity does not kill, injure, capture, harass, or otherwise harm any federally-listed thr**eatened or endangered species, except as authorized by the October 15, 2019 US Fish and Wildlife Service BIOLOGICAL/CONFERENCE OPINION, as modified by the September 30, 2024 ADDENDUM. While accomplishing the authorized work, if the Permittee discovers or observes an injured or dead threatened or endangered species, the U.S. Army Corps of Engineers, Wilmington District Raleigh Field Office, telephone 919.554.4884, extension 23, email to eric.c.alsmeyer@usace.army.mil will be immediately notified to initiate the required Federal coordination.

2) Atlantic Sturgeon: In order to protect the federally-listed Atlantic sturgeon, no temporary causeways or work bridges will block more than 50% of the Neuse River below its ordinary high water mark, and will be removed at the end of the project's construction.

3) DWM Biological Opinion: This Department of the Army permit does not authorize you to take an endangered species, in particular the Dwarf wedgemussel, *Alasmidonta heterodon.* In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a BO under ESA Section 7, with "incidental take" provisions with which you must comply). The attached October 15, 2019 US Fish and Wildlife Service BIOLOGICAL/CONFERENCE OPINION, as modified by the September 30, 2024 ADDENDUM (B/CO-A), contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the B/CO-A. Your authorization under this permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the attached B/CO-A, 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 BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your permit. The U.S. Fish and Wildlife Service is the appropriate authority to determine compliance with the terms and conditions of its B/CO-A, and with the ESA.

4) NLEB Programmatic Biological Opinion: 11. The Wilmington District, Federal Highway Administration, U.S. Fish and Wildlife Service (USFWS), and the North Carolina Department of Transportation (NCDOT) have conducted programmatic Section 7(a)(2) consultation for the Northern long-eared bat (NLEB) for NCDOT projects located in Divisions 1-8. The result of this programmatic consultation is a Programmatic Biological Opinion (PBO) issued by the USFWS titled, "Programmatic Biological Opinion – Revised, NCDOT Program Effects on the Northern Long-eared Bat in Divisions 1-8", dated December 15, 2022. This PBO contains agreed upon conservation measures which would minimize take of NLEB. As noted in the PBO, applicability of these conservation measures varies depending on the location of the project. The USFWS has documented that no reasonable and prudent measures, nor terms and conditions, are necessary or appropriate to minimize the amount or extent of incidental take of NLEB caused by the Action; therefore, the incidental take statement does not provide reasonable and prudent measures for this species. Department of the Army (DA) authorization under general permit or standard permit (Individual Permit) is conditional upon the permittee's compliance with applicable, agreed upon conservations measures of the PBO, which is incorporated by reference in this permit. Failure to comply with the applicable conservation measures, where a take of the NLEB occurs, would constitute an unauthorized take by the permittee, and would also constitute permittee non-compliance with this permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its PBO and the ESA. All PBOs can be found on our website at:
https://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/ESA/.

5) TCB Programmatic Biological Opinion: The U.S. Fish and Wildlife Service's (USFWS's) Programmatic Conference Opinion (PCO) titled "NCDOT Program Effects on the Tricolored Bat in Divisions 1-8", dated November 20, 2023, contains

mandatory terms and conditions to implement the reasonable and prudent measures that are associated with “incidental take” that are specified in the PCO. Your authorization under this Corps permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the PCO, 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 PCO, 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 PCO, and with the ESA.

10. **Maintain Flows and Circulation Patterns of Waters:** Except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters and/or wetlands.

11. **Sediment and Erosion Control:**

1) During the clearing phase of the project, heavy equipment shall not be operated in surface waters or stream channels. Temporary stream crossings will be used to access the opposite sides of stream channels. All temporary diversion channels and stream crossings will be constructed of non-erodible materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

2) No fill or excavation impacts for the purposes of sedimentation and erosion control shall occur within jurisdictional waters, including wetlands, unless the impacts are included on the plan drawings and specifically authorized by this permit. This includes, but is not limited to, sediment control fences and other barriers intended to catch sediment losses.

3) The Permittee shall remove all sediment and erosion control measures placed in waters and/or wetlands, and shall restore natural grades on those areas, prior to project completion.

4) The Permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the “North Carolina Sediment and Erosion Control Planning and Design Manual” to ensure compliance with the appropriate turbidity water quality standard. Erosion and sediment control practices shall be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to ensure compliance with the appropriate turbidity water quality standards. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the

project shall remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4). Adequate sedimentation and erosion control measures shall be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures shall be inspected and maintained regularly, especially following rainfall events. All fill material shall be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

12. **Clean Fill:** The Permittee shall use only clean fill material for this project. The fill material shall be free of items such as trash, construction debris, metal and plastic products, and concrete block with exposed metal reinforcement bars. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source.

13. **Water Contamination:** All mechanized equipment shall be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the Permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act shall be followed.

ANADROMOUS FISH / AQUATIC LIFE

14. **Aquatic Life Movement:** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area. All discharges of dredged or fill material within waters of the United States shall be designed and constructed to maintain low flows to sustain the movement of aquatic species.

15. **Prohibitions on Concrete:** The Permittee shall take measures necessary to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with any water in or entering into waters of the United States. Water inside coffer dams or casings that has been in contact with concrete shall only be returned to waters of the United States when it no longer poses a threat to aquatic organisms (concrete is set and cured).

COMPENSATORY MITIGATION

16. 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.

CULTURAL RESOURCES

17. Historic Properties (MOA): The Permittee shall fully implement the Memorandum of Agreement between the Permittee, the North Carolina State Historic Preservation Officer and the U.S. Army Corps of Engineers, Wilmington District, dated last signed 3/11/2018, which is incorporated herein by reference.

CULVERTS

18. Unless otherwise requested in the application and depicted on the approved permit plans, culverts greater than 48 inches in diameter shall be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter and less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain existing channel slope. The bottom of the culvert shall be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Culverts shall be designed and constructed in a manner that minimizes destabilization and head cutting.

19. Measures shall be included in the culvert construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a culvert or pipe 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 opening shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

20. The Permittee shall implement all reasonable and practicable measures to ensure that equipment, structures, fill pads, work, and operations associated with this project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or stream bank erosion. The Permittee shall routinely monitor for these effects, cease all work when detected, take initial corrective measures to correct actively eroding areas, and notify this office immediately. Permanent corrective measures may require additional authorization by the U.S. Army Corps of Engineers.

21. Culverts placed within wetlands must be installed in a manner that does not restrict the flows and circulation patterns of waters of the United States. Culverts placed across wetland fills purely for the purposes of equalizing surface water shall not be buried, but the culverts must be of adequate size and/or number to ensure unrestricted transmission of water.

PONDS

22. Sediment Sluicing: The release of sediments from ponds (sluicing) is not authorized by this permit. The Permittee shall take all measures necessary to control any bottom

sediments that may be sluiced during the drainage of pond(s) on the project site.

UTILITY LINES

23. Temporary Impacts Restoration Measures: Within thirty (30) days of the date of completing the authorized work, the Permittee shall remove all temporary fills in waters of the United States and restore the affected areas to pre-construction contours and elevations. The affected areas shall be re-vegetated with native, non-invasive vegetation as necessary to minimize erosion and ensure site stability. In wetland areas where pipeline installation via trenching is authorized, wetland topsoil shall be segregated from the underlying subsoil, and the top 6 to 12 inches of the trench shall be backfilled with topsoil from the trench.

24. Cleared wetland areas shall be re-vegetated with a wetland seed mix or a mix of native woody species. Fescue grass or any invasive species such as *Lespedeza* spp., shall not be used within the wetland areas.

25. Prior to construction within any jurisdictional areas, the Permittee shall correctly install silt fencing (with or without safety fencing) parallel with the utility line corridor, on both sides of the jurisdictional crossing. This barrier is to serve both as an erosion control measure and a visual identifier of the limits of construction within any jurisdictional area. The Permittee shall maintain the fencing, at minimum, until the wetlands have re-vegetated and stabilized.

26. Hydraulic Fracturing (Fracking): When directional boring or horizontal directional drilling (HDD) under waters of the United States, including wetlands, the Permittee shall closely monitor the project for hydraulic fracturing or “fracking” and material from the drilling operation leaching to the surface and into jurisdictional areas. Any discharge from fracking or leaching into waters of the United States, including wetlands, shall be reported to U.S. Army Corps of Engineers, Wilmington District Raleigh Field Office, telephone 919.554.4884, extension 23, email to eric.c.alsmeyer@usace.army.mil within 48 hours. Restoration and/or mitigation may be required as a result of any unintended discharges.

NCDOT STANDARD PERMIT CONDITIONS

27. Phased Permit and Mitigation: This permit only authorizes work on Sections A and B of TIP R-2721. Construction on Sections of TIP, R-2828 and R-2829 shall not commence until all the following occur:
(a) final design has been completed for those sections and submitted to the U.S. Army Corps of Engineers (Corps); (b) the Permittee has minimized impacts to waters and wetlands to the maximum extent practicable and the Corps concurs with this assessment through standard Merger 4B and 4C meetings; (c) any modification to the plans have been approved by the Corps in writing; and (d) a final compensatory mitigation plan for the relevant TIP project has been submitted by the Permittee and approved by the Corps.

28**. Temporary Fills:** Within thirty (30) days of the date of completing the authorized work, the Permittee shall remove all temporary fills in waters of the United States and restore the affected areas to pre-construction contours and elevations. The affected areas shall be re-vegetated with native, non-invasive vegetation as necessary to minimize erosion and ensure site stability.

29. Borrow and Waste: To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent waters and wetlands, except as authorized by this permit, the Permittee shall require its contractors and/or agents to identify all areas to be used as borrow and/or waste sites associated with this project. The Permittee shall provide the U.S. Army Corps of Engineers with appropriate maps indicating the locations of proposed borrow and/or waste sites as soon as such information is available. The Permittee shall submit to the Corps site-specific information needed to ensure that borrow and/or waste sites comply with all applicable Federal requirements, to include compliance with the Endangered Species Act and the National Historic Preservation Act, such as surveys or correspondence with agencies (e.g., the USFWS, the NC-HPO, etc.). The required information shall also include the location of all aquatic features, if any, out to a distance of 400 feet beyond the nearest boundary of the site. The Permittee shall not approve any borrow and/or waste sites before receiving written confirmation from the Corps that the proposed site meets all Federal requirements, whether or not waters of the U.S., including wetlands, are located in the proposed borrow and/or waste site. All delineations of aquatic sites on borrow and/or waste sites shall be verified by the U.S. Army Corps of Engineers and shown on the approved reclamation plans. The Permittee shall ensure that all borrow and/or waste sites comply with Special Condition 2 of this permit. Additionally, the Permittee shall produce and maintain documentation of all borrow and waste sites associated with this project. This documentation will include data regarding soils, vegetation, hydrology, any delineation(s) of aquatic sites, and any jurisdictional determinations made by the Corps to clearly demonstrate compliance with Special Condition 2. All information will be available to the U.S. Army Corps of Engineers upon request. The Permittee shall require its contractors to complete and execute reclamation plans for each borrow and/or waste site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the U.S. Army Corps of Engineers within 30 days of the completion of the reclamation work.

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ROY COOPER
Governor
MARY PENNY KELLEY
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

October 7, 2024

Patrick Norman, P.E., Chief Engineer
North Carolina Turnpike Authority
1578 Mail Service Center
Raleigh, NC 27699
pnorman@ncdot.gov

Subject: MODIFICATION of 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed construction of the Triangle Expressway Southeast Extension (NC 540) in Wake & Johnston Counties, Federal Aid Project No. 050047, State Project No. 35517.3.TA1, TIP Nos, R-2721, R-2828, & R-2829. (TIP R-2829A for This Modification) NCDWR Project No. 20181249 version 19.

Dear Mr. Norman:

Attached hereto is a copy of Modification to Certification No. 4179 issued to The North Carolina Department of Transportation (NCDOT), Turnpike Authority, originally dated February 15, 2019 and most recent modification dated October 7, 2024.

This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of this Water Quality Certification. If you change your project, you must notify the Division and you may be required to submit a new application package with the appropriate fee. If the property is sold, the new owner must be given a copy of this Certification and is responsible for complying with all conditions. [15A NCAC 02H .0507(d)(2)]. This Certification does not relieve 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, and Water Supply Watershed regulations.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

Signed by:
Susan Locklear
04351F033762414...

Richard E. Rogers Jr, Director
Division of Water Resources

Attachments
Cc: Eric Alsmeyer, US Corps of Engineers, Raleigh Field Office (Eric.C.Alsmeyer@usace.army.mil)
Jennifer Harris, PE, NC Turnpike Authority (ext-jharris1@ncdot.gov)
Deanna Riffey, NCDOT Environmental Analysis (driffey@ncdot.gov)
Gary Jordan, US Fish & Wildlife Service (gary_jordan@fws.gov)
Travis Wilson, NC Wildlife Resources (travis.wilson@ncwildlife.org)
Amanetta Somerville, US EPA (Somerville.amanetta@epa.gov)
Beth Harmon, NC Division of Mitigation Services (beth.harmon@deq.nc.gov)
Camden M. Brunick, Wildlands Engineering Mitigation Credit Sales (cbrunick@wildlandseng.com)
Caitland B. Hooker, Restoration Systems LLC Mitigation Bank (info@restorationsystems.com)
File Copy

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MODIFICATION to 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS MODIFIED CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500. This certification modification authorizes the NC Turnpike Authority to impact 8.758 acres of jurisdictional wetlands and 10517 linear feet of jurisdictional streams in Wake County for section **R-2829A** of the Complete 540 project. The project shall be constructed pursuant to the modification application received September 18, 2024. The authorized impacts for this modification are as described below:

R-2829A Stream Impacts in the Neuse River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Stabilization to Intermittent Stream (linear ft)	Temporary Impact to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Stabilization to Perennial Stream (linear ft)	Temporary Impact to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring NCDWR Mitigation (linear ft)
3	334	0	174	0	0	0	508	0
5	0	0	0	384	63	96	543	447
6	0	0	0	533	86	60	679	619
7	0	0	0	759	0	21	780	759
8	222	24	10	0	0	0	256	0
9	124	0	0	0	0	0	124	0
11	71	0	0	0	0	0	71	0
12	479	22	60	0	0	0	561	0
14	0	0	0	0	70	185	255	0
15	0	0	0	164	5	19	188	0
16	413	0	0	0	0	0	413	0
18	0	0	0	571	34	8	613	605
19	445	21	10	0	0	0	476	0
20	757	47	101	0	0	0	905	0
23	398	20	25	0	0	0	443	0
24	387	163	61	0	0	0	575	0
25	443	46	56	0	0	0	545	0
26	723	21	11	0	0	0	755	0
27	0	0	0	309	37	40	386	346
28	0	0	0	117	75	44	236	0
29	64	20	10	0	0	0	94	0

29A	78	24	22	0	0	0	124	0
30	225	0	0	0	0	0	225	0
31	0	0	0	6	34	90	130	0
32	0	0	0	270	30	19	319	300
33	0	0	0	137	40	48	225	177
34	0	0	0	31	0	11	42	0
35	0	0	0	0	0	10	10	0
Total	**5163**	**408**	**540**	**3281**	**474**	**651**	**10517**	**3253**

R-2829A Total Stream Impacts: 10517 linear feet
R-2829A Total Perennial Stream Impacts Requiring DWR Mitigation: 3253 linear feet

R-2829A Wetland Impacts in the Neuse River Basin

Site	Permanent Fill (ac)	Temporary Fill (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)
1*	0.055	0	0	0	0	0.055
2*	0.098	0	0.023	0	0	0.121
3	0.433	0.765	0.019	0.132	0.697	2.046
4	0.449	0	0	0.034	0	0.483
7	0.113	0	0.015	0.010	0	0.158
8	0.113	0	0	0.001	0	0.114
9	0.264	0	0	0	0	0.264
9*	0	0	0	0.010	0	0.010
10*	0.013	0	0	0.010	0	0.023
11	0.023	0	0	0	0	0.023
12	0.001	0	0	0.005	0	0.006
13*	0.028	0	0	0.004	0	0.032
15	0.760	0	0.061	0.112	0	0.933
16	1.387	0	0.008	0.106	0	1.493
17	0.237	0	0	0.009	0	0.246
19	0.202	0	0	0.020	0	0.222
20A	0	0	0	0.001	0	0.001

21*	0.099	0	0	0	0	0.099
22*	0.059	0	0	0.016	0	0.075
23	1.178	0	0.002	0.061	0	1.241
24	0	0	0	0	0.020	0.020
25	0.450	0	0.024	0.040	0	0.514
27	0.108	0	0.037	0.023	0	0.168
29A	0.021	0	0	0.044	0	0.065
31	0.078	0	0.014	0.040	0.154	0.286
33	0.026	0	0.007	0.034	0	0.067
36*	0	0	0	0.005	0	0.005
Total	**6.195**	**0.765**	**0.210**	**0.717**	**0.871**	**8.758**

Sites marked with asterisk (*) = Non-Riparian Wetland. All other sites are Riparian Wetlands.
R-2829A Total Wetland Impact: 8.758 acres.
R-2829A Total Wetland Mitigation Required: 7.122 acres (6.702 acres Riparian and 0.420 Non-riparian)

Open Water (Ponds) Impacts in the Neuse River Basin

Site	Permanent Fill in Open Waters (ac)	Temporary Fill in Open Waters (ac)	Total Fill in Open Waters (ac)
9	2.695	0	2.695
30	0.792	0	0.792
Total	**3.49**	**0**	**3.49**

R-2829A Total Open Water Impact: 3.49 acres.

The application provides adequate assurance that the discharge of fill material into the waters of the Neuse River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your modification application received September 18, 2024. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7).

For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

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 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 regardless of the quantity of the withdrawal or the date on which the withdrawal was initiated or expanded. Upon the presentation of proper credentials, the Division may inspect the property.

Conditions of Certification:

1. Mitigation must be provided for the proposed impacts in phase R-2829A as specified in the table below.

	Mitigation Provider	**Compensatory Mitigation Required**	**River Basin & HUC Number**
Non-riparian Wetland	NC DMS	0.42 acres	Neuse Basin 03020201 HUC
Riparian Wetland	Private Bank	6.702 acres	Neuse Basin 03020201 HUC
Perennial Stream	Private Banks	3253 linear feet	Neuse Basin 03020201 HUC

[15A NCAC 02H .0506(c); 15A NCAC 02H .0507(c)]

We understand that you have chosen to perform compensatory mitigation for impacts to 0.42 acres of Nonriparian wetlands through the North Carolina Division of Mitigation Services (DMS), and that the DMS has agreed to implement this mitigation for the project. DMS has indicated in a letter dated October 4, 2024 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with DMS's Mitigation Banking Instrument signed July 28, 2010.

For Mitigation of the 6.702 acres of Riparian Wetland impacts and the 3253 linear feet of Perennial Stream impacts, the ***attached*** Compensatory Mitigation Responsibility Acceptance Forms (Forms) shall be completed and provided to the Division prior to ***any*** impacts occurring. If the Mitigation Providers specified on the attached Forms for the proposed impacts changes after issuance of this Certificate, then the Permittee shall request a revised Compensatory Mitigation Responsibility Acceptance Form from the Division prior to conducting any impacts. ***If multiple mitigation banks are used for this project, it is the responsibility of the permittee to verify that the credits from the various banks add up to an amount equal to, or greater than, the amount required in this 401 certification.***

2. This 401 Water Quality Certification Modification is being issued for <u>only</u> the R-2829A phase. (Prior modifications were completed for the R-2721A, R-2721B and R-2828 phases.) When final design plans are completed for phase R-2829B, a modification to the 401 Water Quality Certification and the Neuse Riparian Buffer Authorization shall be submitted with fees and final plans to the NC Division of Water Resources. Final designs shall reflect all appropriate further avoidance, minimization, and updated mitigation for impacts to wetlands, streams, and other surface waters, and buffers. **No** construction activities that impact any wetlands, streams, surface waters, or buffers located in phase R-2829B shall begin until after the permittee applies for, and receives, a written modification of the 401 Water Quality Certification and the Neuse Riparian Buffer Authorization from the NC Division of Water Resources. [15A NCAC 02H.0506(b)]

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3. The final construction drawings shall be furnished to the NCDWR Transportation Permitting Branch prior to the pre-construction meeting. The permittee shall provide written verification that the final construction drawings comply with the permit drawings contained in the application received September 18, 2024. Any deviations from the approved drawings are not authorized unless approved by the NC Division of Water Resources.

4. DWR approves the stormwater drainage design as shown in the 401 application, under the assumption that it meets the requirements of the NCDOT NPDES permit #NCS000250. These plans are enforceable by DWR. Changes to the approved plans are prohibited without prior approval from DWR. If sediment or other pollutants are found to be discharged from the stormwater outfalls, DWR may take enforcement action. NCDOT and DWR shall assess the damage to water quality standards and implement an appropriate action plan to address the impacts. The action plan shall provide an appropriate timeline for implementation as agreed upon by both DWR and NCDOT. This may require NCDOT to obtain a modification to its current 401 and 404 permits.

5. The post-construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations. The impacted areas shall be revegetated with appropriate native species. [15A NCAC 02H .0506(b)(2)]

6. As a condition of this 401 Water Quality Certification, the bridge demolition and construction must be accomplished in strict compliance with the most recent version of NCDOT's Best Management Practices for Construction and Maintenance Activities. [15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)]

7. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. To meet the requirements of NCDOT's NPDES permit NCS0000250 , please refer to the most recent version of the *North Carolina Department of Transportation Stormwater Best Management Practices Toolbox* manual for approved measures. [15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)]

8. Bridge piles and bents shall be constructed using driven piles (hammer or vibratory) or drilled shaft construction methods. More specifically, jetting or other methods of pile driving are prohibited without prior written approval from the NCDWR first. [15A NCAC 02H.0506(b)(2)]

9. No drill slurry or water that has been in contact with uncured concrete shall be allowed to enter surface waters. This water shall be captured, treated, and disposed of properly. [15A NCAC 02H .0506(b)(3)]

10. A turbidity curtain will be installed in the stream if driving or drilling activities occur within the stream channel, on the stream bank, or within 5 feet of the top of bank, or during the removal of bents from an old bridge. This condition can be waived with prior approval from the NCDWR. [15A NCAC 02H .0506(b)(3)]

11. All bridge construction shall be performed from the existing bridge, temporary work bridges, temporary causeways, or floating or sunken barges. If work conditions require barges, they shall be floated into position and then sunk. The barges shall not be sunk and then dragged into position. Under no circumstances should barges be dragged along the bottom of the surface water. [15A NCAC 02H .0506(b)(3)]

12. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams, shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by the NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required. [15A NCAC 02H.0506(b)(2)]

13. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.

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[15A NCAC 02H.0506(b)(2)]

14. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed. [15A NCAC 02H.0506(b)(2)]

15. For all streams being impacted due to site dewatering activities, the site shall be graded to its preconstruction contours and revegetated with appropriate native species. [15A NCAC 02H.0506(b)(2)]

16. The stream channels shall be excavated no deeper than the natural bed material of the stream, to the maximum extent practicable. Efforts must be made to minimize impacts to the stream banks, as well as to vegetation responsible for maintaining the stream bank stability. Any applicable riparian buffer impact for access to stream channel shall be temporary and be revegetated with native riparian species. [15A NCAC 02H.0506(b)(2)]

17. Pipes and culverts used exclusively to maintain equilibrium in wetlands, where aquatic life passage is not a concern, shall not be buried. These pipes shall be installed at natural ground elevation. [15A NCAC 02H.0506(b)]

18. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to turbidity shall be designed, constructed, and operated with sediment and erosion control measures that meet Design Standards in Sensitive Watersheds (15A NCAC 4B .0124). However, due to the size of the project, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres.

19. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to biological criteria exceedances shall not discharge stormwater directly to surface waters. Stormwater shall be treated using appropriate best management practices (e.g., vegetated conveyances, constructed wetlands, detention ponds, etc.) prior to discharging to surface waters.

20. Channel relocations shall be completed and stabilized, and approved by NCDWR staff, prior to diverting water into the new channel. Stream banks shall be matted with coir-fiber matting. 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 practical. 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. [15A NCAC 02H .0506(b)(3)]

21. All clearing of vegetation for purpose of relocating overhead power lines within jurisdictional wetlands shall be performed without the use of mechanized equipment. [15A NCAC 02H.0506(b)(3)]

22. The permittee will need to adhere to any and all appropriate in-water work moratoria (including the use of pile driving or vibration techniques) prescribed by the NC Wildlife Resources Commission, the US Fish & Wildlife Service, and/or the NC Division of Marine Fisheries. [15A NCAC 2H.0506(b)(2) and 15A NCAC 4B.0125]

23. Prior to, and during the construction of project, the permittee shall coordinate with the North Carolina Wildlife Resources Commission and the US Fish & Wildlife Service to ensure that the construction will not result in negative impacts to threatened and endangered mussels. Should either of those agencies require changes to the proposed design or construction activities, a modification to this 401 Water Quality Certification may be required. Any changes to the design authorized by this certification will require approval from the NC Division of Water Resources. [15A NCAC 2H.0506(b)(2) and 15A NCAC 4B.0125]

24. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. 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. [15A NCAC 02B.0200]

25. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers. [15A NCAC 02H.0506(b)(2)]

26. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions. [15A NCAC 02H.0506(b)(2)]

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27. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage. [15A NCAC 02H.0506(b)(2)]

28. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water. [15A NCAC 02H.0506(b)(3) and (c)(3)]

29. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream. [15A NCAC 02H.0506(b)(3)]

30. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. [15A NCAC 02H.0506(b)(3)]

31. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]

32. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]

33. The permittee and its authorized agents shall conduct its 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. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

34. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. Wetland areas impacted by temporary clearing shall be stabilized and reseeded with native wetland seed. [15A NCAC 02H.0506(b)(2)]

35. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

36. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization, including all non-commercial borrow and waste sites associated with the project, shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification. [15A NCAC 02H.0501 and .0502]

37. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

38. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

39.. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

40. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road

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construction activities. [15A NCAC 02H.0506(b)(3) and (c)(3)]

41. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards [15A NCAC 02H.0506(b)(3) and (c)(3)]:

a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

42. At locations where ponds will be drained, proper measures will be taken to drain the pond with limited impact to upstream and downstream channel stability as well as to native aquatic species. Proper measures will be taken to avoid sediment release and/or sediment accumulation downstream as a result of pond draining. If typical pond draining techniques will create significant disturbance to native aquatic species, additional measures such as collection and relocation may be necessary to prevent a significant fish kill. NCDOT shall consult with NC Wildlife Resources staff to determine if there are any sensitive species, and the most appropriate measures to limit impacts to these species. The permittee shall observe any natural channel re-establishment, to ensure that the jurisdictional stream channel above and below the drained pond (if applicable) remain stable, and that no additional impacts occur within the natural stream channel as a result of draining the pond. [15A NCAC 2H.0506(b)(3)]

43. Sediment and erosion control measures shall not be placed in wetlands or surface waters, or within 5 feet of the top of bank, without prior approval from DWR. [15A NCAC 02H.0506(b)(3) and (c)(3)]

443. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and 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. [15A NCAC 02H .0506{b)(3) and (c)(3) and 15A NCAC 02B .0200]

45. 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 Sediment and Erosion Control Manual,* or for linear transportation projects, the *NCDOT Sediment and Erosion Control Manual.*
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.
If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, Trout, WS-1, WS-11, High Quality Waters (HQW), Outstanding Resource Waters (ORW), Critical Area (CA), and/or 303(d) Impaired Waters, then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*. [15A NCAC 02H.0506(b)(3) and (c)(3)]

46. All prior conditions of the original 401 Water Quality Certification for this project issued February 15, 2019, and all subsequent modifications since, are still all applicable.

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This approval and its conditions are final and binding unless contested [G.S. 143-215.5]. Please be aware that impacting waters without first applying for and securing the issuance of a 401 Water Quality Certification violates Title 15A of the North Carolina Administrative Code (NCAC) 2H .0500. Title 15A NCAC 2H .0500 requires certifications pursuant to Section 401 of the Clean Water Act whenever construction or operation of facilities will result in a discharge into navigable waters, including wetlands, as described in 33 Code of Federal Regulations (CFR) Part 323. It also states any person desiring issuance of the State certification or coverage under a general certification required by Section 401 of the Federal Water Pollution Control Act shall file with the Director of the North Carolina Division of Water Quality. Pursuant to G.S. 143-215.6A, these violations and any future violations are subject to a civil penalty assessment of up to a maximum of $25,000.00 per day for each violation.

This Certification can be contested as provided in Chapter 150B of the North Carolina General Statutes by filing a Petition for a Contested Case Hearing (Petition) with the North Carolina Office of Administrative Hearings (OAH) **within sixty (60) calendar days**. Requirements for filing a Petition are set forth in Chapter 150B of the North Carolina General Statutes and Title 26 of the North Carolina Administrative Code. Additional information regarding requirements for filing a Petition and Petition forms may be accessed at http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000.

A party filing a Petition must serve a copy of the Petition on:
William F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

If the party filing the Petition is not the permittee, then the party must also serve the recipient of the Certification in accordance with N.C.G.S 150B-23(a).

This the 7th Day of October 2024

DIVISION OF WATER RESOURCES

Signed by:
Susan Locklear
04351F033762414...

Richard E. Rogers, Jr, Director

WQC No. 4179

Docusign Envelope ID: 11BD231C-9607-4987-A318-0CE3BFEAAD4B

COMPENSATORY MITIGATION RESPONSIBILITY ACCEPTANCE FORM

October 7, 2024

Permittee: NC Turnpike Authority / NCDOT

DWR Project #20181249 ver 19

Project Name: NC 540 Phase R-2829A

County: Wake

The Division has received a Statement of Availability (SOA) from Wildlands Holdings III, LLC for the Falling Creek Mitigation Site to satisfy the Riparian Wetland mitigation requirements set forth in 401 Individual Certification No. WQC 4179 issued to NC Turnpike Authority dated October 7, 2024 as provided in the table below.

	Compensatory Mitigation	**River Basin & HUC Number**
Riparian Wetland	6.702 acres	Neuse 03020201

The Permittee must provide a copy of this form to the Mitigation Provider specified above who will then sign the form to verify receipt of payment and the transfer of the mitigation responsibility. Once the Mitigation Provider has signed this form, it is the Permittee's responsibility to ensure that a signed copy of this form and the mitigation transfer certificate is submitted to the Division ***before*** conducting any of the authorized impacts.

The Mitigation Provider verifies that the mitigation requirements (credits) shown above, have been released and are available at the identified bank site(s). By signing below, the Mitigation Provider 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): Daniel Johnson

Signature: Daniel Johnson

Date: 10/29/2024

Submit one copy of signed & completed forms each to:
Rob Ridings, DWR Transportation Permitting Branch: rob.ridings@deq.nc.gov
and Maria Polizzi, Mitigation Coordinator, DWR 401 Permitting: maria.polizzi@deq.nc.gov

Docusign Envelope ID: 11BD231C-9607-4987-A318-0CE3BFEAAD4B

COMPENSATORY MITIGATION RESPONSIBILITY ACCEPTANCE FORM

October 7, 2024

Permittee: NC Turnpike Authority / NCDOT

DWR Project #20181249 ver 19

Project Name: NC 540 Phase R-2829A

County: Wake

The Division has received a Statement of Availability (SOA) from Wildlands Holdings III, LLC for the Falling Creek Mitigation Site to partially satisfy the Perennial Stream mitigation requirements set forth in 401 Individual Certification No. WQC 4179 issued to NC Turnpike Authority dated October 7, 2024 as provided in the table below.

	Compensatory Mitigation	River Basin & HUC Number
Perennial Stream	9,866 linear feet	Neuse 03020201

The Permittee must provide a copy of this form to the Mitigation Provider specified above who will then sign the form to verify receipt of payment and the transfer of the mitigation responsibility. Once the Mitigation Provider has signed this form, it is the Permittee's responsibility to ensure that a signed copy of this form and the mitigation transfer certificate is submitted to the Division ***before*** conducting any of the authorized impacts.

The Mitigation Provider verifies that the mitigation requirements (credits) shown above, have been released and are available at the identified bank site(s). By signing below, the Mitigation Provider 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): Daniel Johnson

Signature: Daniel Johnson

Date: 10/29/2024

** Compensatory mitigation is shown above as a 2:1 ratio amount.

Submit one copy of signed & completed forms each to:
Rob Ridings, DWR Transportation Permitting Branch: rob.ridings@deq.nc.gov
and Maria Polizzi, Mitigation Coordinator, DWR 401 Permitting: maria.polizzi@deq.nc.gov

Docusign Envelope ID: 11BD231C-9607-4987-A318-0CE3BFEAAD4B

COMPENSATORY MITIGATION RESPONSIBILITY ACCEPTANCE FORM

October 7, 2024

Permittee: NC Turnpike Authority / NCDOT

DWR Project #20181249 ver 19

Project Name: NC 540 Phase R-2829A

County: Wake

The Division has received a Statement of Availability (SOA) from Wildlands Holdings III, LLC for the Grantham Branch Mitigation Site to partially satisfy the Perennial Stream mitigation requirements set forth in 401 Individual Certification No. WQC 4179 issued to NC Turnpike Authority dated October 7, 2024 as provided in the table below.

	Compensatory Mitigation	River Basin & HUC Number
Perennial Stream	584 linear feet	Neuse 03020201

The Permittee must provide a copy of this form to the Mitigation Provider specified above who will then sign the form to verify receipt of payment and the transfer of the mitigation responsibility. Once the Mitigation Provider has signed this form, it is the Permittee's responsibility to ensure that a signed copy of this form and the mitigation transfer certificate is submitted to the Division ***before*** conducting any of the authorized impacts.

The Mitigation Provider verifies that the mitigation requirements (credits) shown above, have been released and are available at the identified bank site(s). By signing below, the Mitigation Provider 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): Daniel Johnson

Signature: Daniel Johnson

Date: 10/29/2024

** Compensatory mitigation is shown above as a 2:1 ratio amount.

Submit one copy of signed & completed forms each to:
Rob Ridings, DWR Transportation Permitting Branch: rob.ridings@deq.nc.gov
and Maria Polizzi, Mitigation Coordinator, DWR 401 Permitting: maria.polizzi@deq.nc.gov

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COMPENSATORY MITIGATION RESPONSIBILITY ACCEPTANCE FORM

October 7, 2024

Permittee: NC Turnpike Authority / NCDOT

DWR Project #20181249 ver 19

Project Name: NC 540 Phase R-2829A

County: Wake

The Division has received a Statement of Availability (SOA) from Restoration Systems, LLC for the Milburnie Dam Mitigation Bank to partially satisfy the Perennial Stream mitigation requirements set forth in 401 Individual Certification No. WQC 4179 issued to NC Turnpike Authority dated October 7, 2024 as provided in the table below.

	Compensatory Mitigation	River Basin & HUC Number
Perennial Stream	6,438 linear feet	Neuse 03020201

The Permittee must provide a copy of this form to the Mitigation Provider specified above who will then sign the form to verify receipt of payment and the transfer of the mitigation responsibility. Once the Mitigation Provider has signed this form, it is the Permittee's responsibility to ensure that a signed copy of this form and the mitigation transfer certificate is submitted to the Division ***before*** conducting any of the authorized impacts.

The Mitigation Provider verifies that the mitigation requirements (credits) shown above, have been released and are available at the identified bank site(s). By signing below, the Mitigation Provider 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): Barrett Jenkins

Signature: [signature] Date: Oct 31, 2024

**** Compensatory mitigation is shown above as a 2:1 ratio amount.*

Submit one copy of signed & completed forms each to:
Rob Ridings, DWR Transportation Permitting Branch: rob.ridings@deq.nc.gov
and Maria Polizzi, Mitigation Coordinator, DWR 401 Permitting: maria.polizzi@deq.nc.gov

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ROY COOPER
Governor
MARY PENNY KELLEY
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

October 7, 2024

DWR #20181249 ver 19
Wake County

Patrick Norman, P.E., Chief Engineer
North Carolina Turnpike Authority
1578 Mail Service Center
Raleigh, NC 27699
pnorman@ncdot.gov

Subject: MODIFICATION of APPROVAL of NEUSE RIPARIAN BUFFER IMPACTS WITH ADDITIONAL CONDITIONS
PROJECT: TIP #R-2829A: NC 540 Extension of Triangle Expressway

Dear Mr. Norman:

You have our approval for the impacts listed below for the purpose described in your application received by the Division of Water Resources (Division) on September 18, 2024. These impacts are covered by the Neuse Buffer Rules and the conditions listed below. Please note that you should get any other federal, state or local permits before proceeding with your project, including those required by (but not limited to) Sediment and Erosion Control, Non-Discharge, and Water Supply Watershed regulations.
The following impacts are hereby approved, provided that all of the Conditions listed below and all of the conditions of the Neuse Buffer Rules are met. No other impacts are approved, including incidental impacts. [15A NCAC 02B.0611(b)(2)]

R-2829A Neuse Riparian Buffer Impacts

Site	Zone 1 Impact (sq ft)	*minus* Wetlands in Zone 1 (sq ft)	= Zone 1 Buffers (not wetlands) (sq ft)	Zone 1 Buffer Mitigation Required (using 3:1 ratio)		Zone 2 Impact (sq ft)	*minus* Wetlands in Zone 2 (sq ft)	= Zone 2 Buffers (not wetlands) (sq ft)	Zone 2 Buffer Mitigation Required (using 1.5:1 ratio)
3	29782	14933	14849	44547		23982	5374	18608	27912
5	28877	0	28877	86631		15537	0	15537	23305.5
6	35906	0	35906	107718		21030	0	21030	31545
7	46871	5152	41719	125157		30603	0	30603	45904.5
8	17618	1651	15967	47901		11963	1085	10878	16317

9	56361	7356	49005	147015		40386	2447	37939	56908.5
11	3272	67	3205	N/A		2607	325	2282	NA
12	30849	412	30437	91311		18794	123	18671	28006.5
12U	10341	0	10341	31023		5473	0	5473	8209.5
14	28224	0	28224	N/A		18386	0	18386	N/A
15	12233	8053	4180	12540		9537	4017	5520	8280
16	28382	11578	16804	50412		20727	10282	10445	15667.5
18	37277	13751	23526	70578		23720	9196	14524	21786
19	29264	8191	21073	63219		19579	142	19437	29155.5
20	47166	0	47166	141498		30260	0	30260	45390
20Um	4679	0	4679	14037		2964	0	2964	4446
20Ua	0	0	0	N/A		249	0	249	N/A
23	27372	18620	8752	26256		19144	8475	10669	16003.5
24	33039	0	33039	99117		20649	0	20649	30973.5
24U	2110	715	1395	4185		1268	0	1268	1902
25	29121	11692	17429	52287		15656	2873	12783	19174.5
26	38653	3382	35271	105813		23438	98	23340	35010
27	24466	6569	17897	53691		15544	168	15376	23064
28	14200	0	14200	42600		9344	0	9344	14016
29	5463	0	5463	N/A		3197	0	3197	N/A
29A	6983	1870	5113	N/A		4483	497	3986	N/A
29U	1983	0	1983	5949		2013	0	2013	3019.5
30	39290	2225	37065	111195		10258	576	9682	14523
31	2350	728	1622	N/A		2397	547	1850	N/A
31U	590	532	58	174		1174	1174	0	0
32	11974	0	11974	35922		7535	0	7535	11302.5
32Ua	118	0	118	N/A		512	0	512	N/A
32Um	815	0	815	2445		727	0	727	1090.5
33	9237	706	8531	N/A		4493	863	3630	N/A

35	297	0	297	N/A		214	0	214	N/A
37	1625	102	1523	N/A		1881	0	1881	N/A
37U	1018	0	1018	N/A		706	0	706	N/A
38	134	0	134	N/A		1572	0	1572	N/A
Totals	**697940**	**118285**	**579655**	**1573221**		**442002**	**48262**	**393740**	**532913**

R-2829A Total Buffer Impact: 1139942 square feet.
R2829A Buffer Mitigation Required: 2106134 square feet.
* n/a = Site impact Allowable: no mitigation required

This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of this Authorization Certificate. If you change your project, you must notify the Division and you may be required to submit a new application package. If the property is sold, the new owner must be given a copy of this Authorization Certificate and is responsible for complying with all conditions. [15A NCAC 02B.0611(b)]. If you are unable to comply with any of the conditions below, you must notify the DWR Transportation Permitting Branch within 24 hours (or the next business day if a weekend or holiday) from the time the permittee becomes aware of the circumstances.
The permittee shall report to the NC Division of Water Resources any noncompliance with the conditions of this Authorization Certificate and/or any violation of state regulated riparian buffer rules [15A NCAC 02B.0611(b)]. Information shall be provided orally within 24 hours (or the next business day if a weekend or holiday) from the time the applicant became aware of the circumstances.

Conditions of Approval:

1. Compensatory mitigation for impacts to 524407 square feet of protected riparian buffers in Zone 1 and 355275 square feet of protected riparian buffers in Zone 2 shall be required. We understand that you have chosen to perform compensatory mitigation for impacts to protected buffers through use of the North Carolina Division of Mitigation Services (DMS). Mitigation for unavoidable impacts to Neuse Riparian Buffers shall be provided in the Neuse River Basin and done in accordance with 15A NCAC 2B.0295**.** The DMS has indicated in a letter dated October 4, 2024 that they will assume responsibility for satisfying the compensatory mitigation requirements for the above-referenced project, in accordance with DMS's Mitigation Banking Instrument signed June 14, 2016.

2. This Neuse Buffer Authorization Modification is being issued for <u>only</u> the R-2829A phase. (Prior modifications were completed for the R-2721A, R-2721B and R-2828 phases.) When final design plans are completed for phase R-2829B, a modification to the 401 Water Quality Certification and the Neuse Riparian Buffer Authorization shall be submitted with fees and final plans to the NC Division of Water Resources. Final designs shall reflect all appropriate further avoidance, minimization, and updated mitigation for impacts to wetlands, streams, and other surface waters, and buffers. **No** construction activities that impact any wetlands, streams, surface waters, or buffers located in phase R-2829B shall begin until after the permittee applies for, and receives, a written modification of the 401 Water Quality Certification and the Neuse Riparian Buffer Authorization from the NC Division of Water Resources. [15A NCAC 02H.0506(b)] & [15A NCAC 2B.0714]

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3. All riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated. Maintained buffers shall be permanently revegetated with non-woody species by the end of the growing season following completion of construction. For the purpose of this condition, maintained buffer areas are defined as areas within the transportation corridor that will be subject to regular NCDOT maintenance activities including mowing. The area with non-maintained buffers shall be permanently revegetated with native woody species before the next growing season following completion of construction. [15A NCAC 02B.0714]

4. Pursuant to 15A NCAC 2B.0714, sediment and erosion control devices shall not be placed in Zone 1 of any Neuse Buffer without prior approval by the NCDWR. At this time, the NCDWR has approved no sediment and erosion control devices in Zone 1, outside of the approved project impacts, anywhere on this project. Moreover, sediment and erosion control devices shall be allowed in Zone 2 of the buffers provided that Zone 1 is not compromised and that discharge is released as diffuse flow.

5. All stormwater runoff shall be directed as sheetflow through stream buffers at non-erosive velocities, unless otherwise approved by this certification. [15A NCAC 02B.0714]

4. Native riparian vegetation (i.e., trees and shrubs native to your geographic region) 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. [15A NCAC 02B.0714] & [15A NCAC 02B.0506(b)(2)]

5. All prior conditions of the original 401 Water Quality Certification for this project issued February 15, 2019, and all subsequent modifications since, are still all applicable.

This approval and its conditions are final and binding unless contested. [G.S. 143-215.5]
This Authorization Certificate can be contested as provided in Chapter 150B of the North Carolina General Statutes by filing a Petition for a Contested Case Hearing (Petition) with the North Carolina Office of Administrative Hearings (OAH) **within sixty (60) calendar days**. Requirements for filing a Petition are set forth in Chapter 150B of the North Carolina General Statutes and Title 26 of the North Carolina Administrative Code. Additional information regarding requirements for filing a Petition and Petition forms may be accessed at http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000. One (1) copy of the Petition must also be served to the North Carolina Department of Environmental Quality:

William F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

This Authorization shall expire five (5) years from the date of this letter.

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This letter completes the review of the Division under the Neuse Riparian Buffer Rules as described in 15A NCAC 02B.0714. Please contact Rob Ridings at rob.ridings@deq.nc.gov or 919-707-8786 if you have any questions or concerns.

Sincerely,

Signed by:
Susan Locklear
04351F033762414...

Richard E. Rogers, Jr., Director
Division of Water Resources

cc:
Eric Alsmeyer, US Corps of Engineers, Raleigh Field Office (Eric.C.Alsmeyer@usace.army.mil)
Jennifer Harris, PE, NC Turnpike Authority (ext-jharris1@ncdot.gov)
Deanna Riffey, NCDOT Environmental Analysis (driffey@ncdot.gov)
Gary Jordan, US Fish & Wildlife Service (gary_jordan@fws.gov)
Travis Wilson, NC Wildlife Resources (travis.wilson@ncwildlife.org)
Amanetta Somerville, US EPA (Somerville.amanetta@epa.gov)
Beth Harmon, NC Division of Mitigation Services (beth.harmon@deq.nc.gov)
Camden M. Brunick, Wildlands Engineering Mitigation Credit Sales (cbrunick@wildlandseng.com)
Caitland B. Hooker, Restoration Systems LLC Mitigation Bank (info@restorationsystems.com)
File Copy

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

Permittee: NCDOT Turnpike Authority **Action ID:** SAW-2009-02240
Project Name: Complete 540, R-2829A Mod **Counties:** Johnston, Wake

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:** 03020201, Neuse River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
					0.420	

*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:** 03020201, Neuse River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
					0.840	

Mitigation Site Debited: NCDMS
(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: NCDMS

Name of Sponsor's Authorized Representative: Beth Harmon

Elizabeth Harmon — 10/29/2024

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:

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Comments/Additional Conditions:

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USACE Project Manager: Eric Alsmeyer
US Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27587
Email: **eric.c.alsmeyer@usace.army.mil**

Eric Alsmeyer

Wilmington District Project Manager Signature

October 28, 2024

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.

ROY COOPER
Governor
MARY PENNY KELLEY
Secretary
MARC RECKTENWALD
Director

NORTH CAROLINA
Environmental Quality

October 4, 2024

Mr. Jamie Lancaster, P.E.
Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Lancaster:

Subject: Mitigation Acceptance Letter: **TIP R-2829A**, Complete NC 540 from I-40 to South of Rock Quarry Road, Wake and Johnston Counties

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the mitigation for the subject project. Based on the information supplied by you on October 3, 2024, the impacts are located in CU 03020201 of the Neuse River basin as follows:

Stream and Wetlands	Service Area	Stream			Wetlands		
		Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh
Impacts	Neuse 03020201	0	0	0	0	0.420	0

*Some of the impacts may be proposed to be mitigated at various ratios. See permit application for details. DMS will provide the amount of stream and wetland mitigation included in the environmental permits.

All buffer mitigation requests and approvals are administrated through the Riparian Restoration Buffer Fund. The NCDOT will be responsible to ensure that appropriate compensation for the buffer mitigation will be provided in the agreed upon method of fund transfer. Upon receipt of the NCDWR's Buffer Authorization Certification, DMS will transfer funds from the NCDOT Fund into the Riparian Restoration Buffer Fund. Upon completion of transfer payment, NCDOT will have completed its riparian buffer mitigation responsibility for TIP R-2829A. Subsequently, DMS will conduct a review of current NCDOT ILF Program mitigation projects in the river basin to determine if available buffer mitigation credits exist. If there are buffer mitigation credits available, then the Riparian Restoration Buffer Fund will purchase the appropriate amount of buffer mitigation credits from NCDOT ILF Program.

Buffer	Service Area	Buffer Impacts		
		Zone 1	Zone 2	TOTAL
Impacts	Neuse 01 Outside Falls	524,407.000	355,275.000	879,682.000

This mitigation acceptance letter replaces the mitigation acceptance letter issued on September 13, 2024. The impacts and associated mitigation needs were not projected by the NCDOT in the 2024 impact data. NCDEQ – DMS will commit to implement sufficient compensatory mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from NCDEQ – DMS.

If you have any questions or need additional information, please contact Beth Harmon at 919-707-8420.

Sincerely,

Elizabeth Harmon

Elizabeth A. Harmon
DMS NCDOT ILF Coordinator

cc: Mr. Scott Jones, USACE
Mr. Rob Ridings, NCDWR
Mr. Brad Chilton, NCDOT – EAU
File: R-2829A Revised

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

Permittee: NCDOT Turnpike Authority **Action ID:** SAW-2009-02240
Project Name: Complete 540, R-2829A Mod **Counties:** Johnston, Wake

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:** 03020201, Neuse River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
4,933						

*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:** 03020201, Neuse River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
9,866						

Mitigation Site Debited: Wildland Holdings III, LLC; Falling Creek Umbrella Mitigation Bank: Falling Creek Mitigation Site
(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: Wildlands Holdings III, LLC

Name of Sponsor's Authorized Representative: Daniel Johnson

Daniel Johnson 10/29/2024

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

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

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Comments/Additional Conditions:

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USACE Project Manager: Eric Alsmeyer
US Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27587
Email: **eric.c.alsmeyer@usace.army.mil**

Eric Alsmeyer

Wilmington District Project Manager Signature

October 28, 2024

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.

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

Permittee: NCDOT Turnpike Authority **Action ID:** SAW-2009-02240
Project Name: Complete 540, R-2829A Mod **Counties:** Johnston, Wake

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.

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Permitted Impacts and Compensatory Mitigation Requirements

Permitted Impacts Requiring Mitigation*: **8-digit HUC and Basin:** 03020201, Neuse River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
292						

*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:** 03020201, Neuse River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
584						

Mitigation Site Debited: Wildland Holdings III, LLC; Falling Creek Umbrella Mitigation Bank: Grantham Branch Mitigation Site
(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

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Mitigation Sponsor Name: Wildlands Holdings III, LLC

Name of Sponsor's Authorized Representative: Daniel Johnson

Daniel Johnson 10/29/2024

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

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

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US Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27587
Email: **eric.c.alsmeyer@usace.army.mil**

Eric Alsmeyer

Wilmington District Project Manager Signature

October 28, 2024

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.

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

Permittee: NCDOT Turnpike Authority **Action ID:** SAW-2009-02240
Project Name: Complete 540, R-2829A Mod **Counties:** Johnston, Wake

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.

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Permitted Impacts and Compensatory Mitigation Requirements

Permitted Impacts Requiring Mitigation*: **8-digit HUC and Basin:** 03020201, Neuse River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
3,219						

*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:** 03020201, Neuse River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
6,438						

Mitigation Site Debited: Restoration Systems, LLC; Milburnie Dam Mitigation Bank
(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).

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Mitigation Sponsor Name: Restoration Systems

Name of Sponsor's Authorized Representative: Barrett Jenkins

Barrett Jenkins 11-4-2024
Signature of Sponsor's Authorized Representative **Date of Signature**

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

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USACE Project Manager: Eric Alsmeyer
US Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27587
Email: **eric.c.alsmeyer@usace.army.mil**

Eric Alsmeyer

Wilmington District Project Manager Signature

October 28, 2024

Date of Signature

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

Permittee: NCDOT Turnpike Authority **Action ID:** SAW-2009-02240
Project Name: Complete 540, R-2829A Mod **Counties:** Johnston, Wake

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Permitted Impacts and Compensatory Mitigation Requirements

Permitted Impacts Requiring Mitigation*: **8-digit HUC and Basin:** 03020201, Neuse River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
				6.700		

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Compensatory Mitigation Requirements: **8-digit HUC and Basin:** 03020201, Neuse River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
				13.400		

Mitigation Site Debited: Wildland Holdings III, LLC; Falling Creek Umbrella Mitigation Bank: Falling Creek Mitigation Site
(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).

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Mitigation Sponsor Name: Wildlands Holdings III, LLC

Name of Sponsor's Authorized Representative: Daniel Johnson

Daniel Johnson 10/29/2024

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

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

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- 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: Eric Alsmeyer
US Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27587
Email: **eric.c.alsmeyer@usace.army.mil**

Eric Alsmeyer

Wilmington District Project Manager Signature

October 28, 2024

Date of Signature

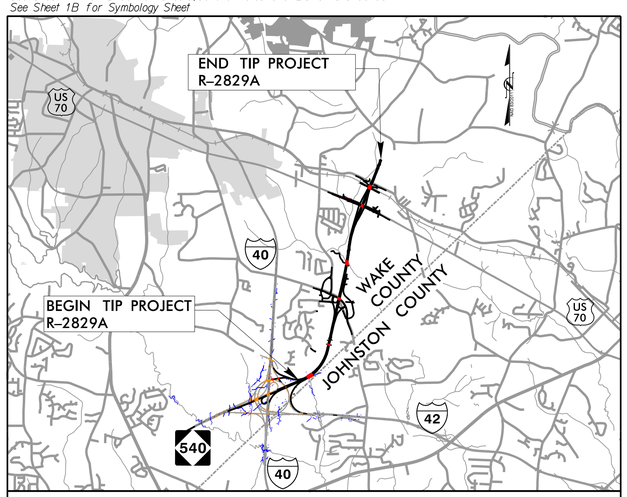
Current Wilmington District mitigation guidance, including information on mitigation ratios, functional assessments, and mitigation bank location and availability, and credit classifications (including stream temperature and wetland groupings) is available at http://ribits.usace.army.mil.

09/08/99

TIP PROJECT: R-2829A

CONTRACT: C204824

See Sheet 1A for Index of Sheets, General Notes and List of Standards
See Sheet 1B for Symbology Sheet



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2829A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
35517.3.TA1	N/A, 0540047	DESIGN-BUILD
35517.3. TAGV1	N/A, 0540047	DESIGN-BUILD

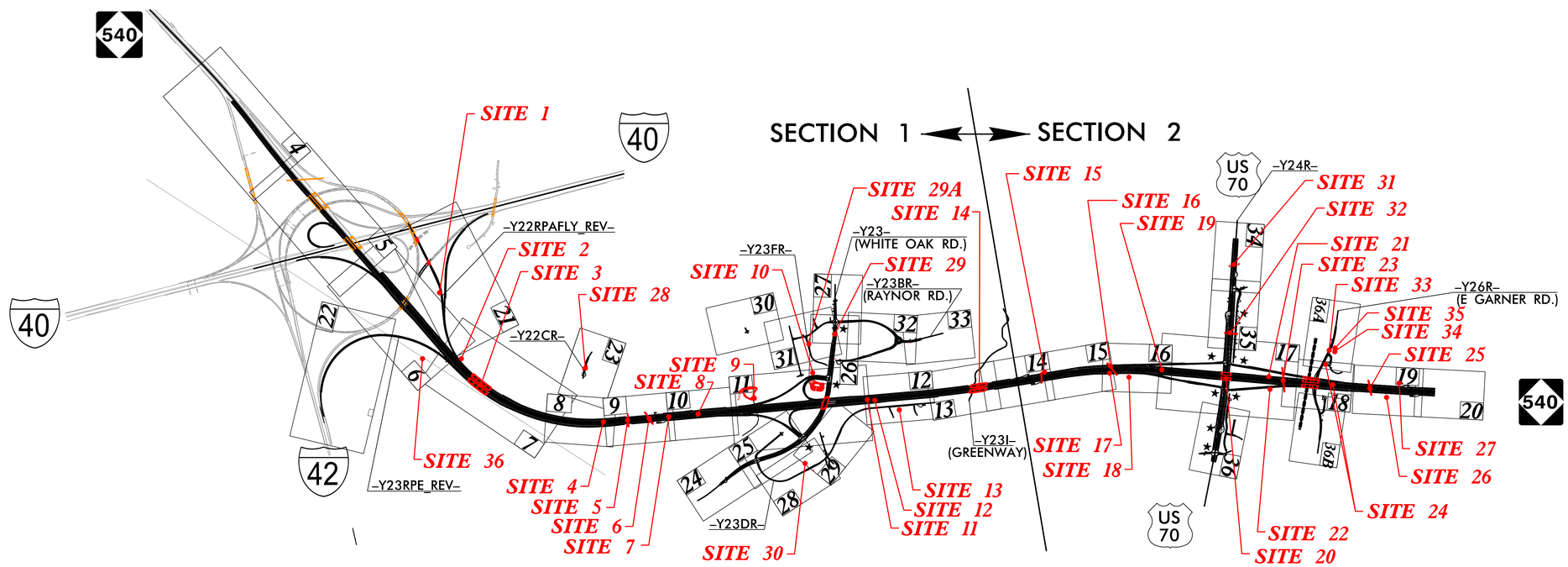
LOCATION: TRIANGLE EXPRESSWAY SOUTHEAST EXTENSION FROM I-40 TO SOUTH OF SR 2542 (ROCK QUARRY RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, LIGHTING, SIGNING, ITS, CULVERTS & STRUCTURES

SAFETEA-LU SECTION 6002
HYDRAULIC DESIGN MEETING PLANS

PERMIT DRAWING
SHEET 1 OF 103

Submittal September 17, 2024



NOTES:
1. THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

★ PROPOSED TRAFFIC SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2023 = 15,440
ADT 2043 = 22,040
K = 12%
D = 65%
T = 10% *
V = 75 MPH

FUNC CLASS: INTERSTATE
* (TTST 4% + DUALS 6%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2829A.....3.922 MILES
LENGTH STRUCTURE TIP PROJECT R-2829A.....0.242 MILES
TOTAL LENGTH TIP PROJECT R-2829A.....4.164 MILES

NCTA CONTACT

Ron McCollum, PE
DEPUTY CHIEF ENGINEER for PRECONSTRUCTION
TURNPIKE AUTHORITY

PLANS PREPARED BY:

RK&K
RUMMEL, KLEPPER & KAHL, LLP
8601 SIX FORKS ROAD, FORUM 1, SUITE 700
RALEIGH, NORTH CAROLINA 27615-3960
NC LICENSE NO. F-0112

FOR NORTH CAROLINA TURNPIKE AUTHORITY

2018 STANDARD SPECIFICATIONS

LETTING DATE:
October 17, 2023

C. Byron Holden, PE
PROJECT ENGINEER

Anthony A. Houser, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

9/3/2024
R:\Hydraulics\Permits_Environmental\Drawings\4C\R-2829A_hyd_wet_tsh.dgn
aburke

Submittal September 17, 2024

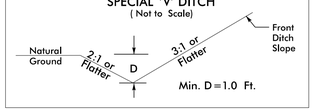
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-1

HYDRAULICS DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 2 OF 103

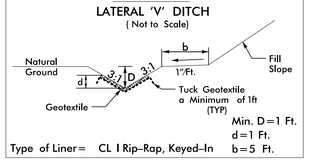
DETAIL A
SPECIAL 'V' DITCH
(Not to Scale)



–Y22RPE_REV– STA. 42+00 TO STA. 45+50 LT
–Y22RPE_REV– STA. 48+88 TO STA. 51+93 RT
–L– STA. 996+00 TO STA. 1000+00 LT
–L– STA. 1000+00 TO STA. 1001+00 LT
–L– STA. 1000+50 TO STA 1002+10 RT
–L1– STA. 1025+50 TO STA. 1026+50 LT
–L1– STA. 1027+50 TO STA. 1030+35 LT
–L1– STA. 1040+35 TO STA. 1044+50 RT
–L1– STA. 1045+50 TO STA. 1048+50 RT
–L1– STA. 1057+00 TO STA. 1057+50 LT
–L1– STA. 1071+50 TO STA. 1073+00 LT
–L1– STA. 1093+50 TO STA. 1094+00 RT
–Y22CR– STA. 15+00 TO STA 15+50 LT
–Y23R– STA. 16+00 TO STA. 16+50 LT
–Y23R– STA. 16+00 TO STA. 17+00 RT
–Y23R– STA. 17+84 TO STA. 18+50 RT
–Y23R– STA. 19+00 TO STA. 20+00 RT
–Y23R– STA. 22+50 TO STA 23+80 RT
–Y23R– STA. 23+80 TO STA. 25+30 LT
–Y23R– STA. 23+80 TO STA. 25+25 RT
–Y23R– STA. 26+00 TO STA. 27+15 RT
–Y23R– STA. 62+00 TO STA. 63+35 RT
–Y23R– STA. 63+00 TO STA. 63+32 LT
–Y23R– STA. 68+75 TO STA. 69+00 RT
–Y23AR– STA. 10+30 TO STA. 12+50 RT
–Y23AR– STA. 16+50 TO STA. 17+50 RT
–Y23DR– STA. 10+50 TO STA. 11+50 LT
–Y23DR– STA. 15+00 TO STA. 15+50 LT
–Y23DR– STA. 10+50 TO STA. 16+50 RT
–Y23DR– STA. 20+50 TO STA. 23+50 RT
–Y23DR– STA. 37+00 TO STA. 40+00 LT
–Y23DR– STA. 38+38 TO STA. 41+00 RT
–Y23DR– STA. 54+94 TO STA. 55+65 RT
–Y23E– STA. 10+00 TO STA. 10+56 RT
–Y23E– STA. 10+20 TO STA. 10+50 LT
–Y23G– STA. 10+50 TO STA. 11+50 LT
–Y23J– STA. 14+00 TO STA. 15+30 RT
–DR2– STA. 10+24 TO STA. 11+50 LT
–DR2– STA. 10+70 TO STA. 11+50 RT
–Y23BR_REV– STA. 10+59 TO STA. 12+00 RT
–Y23BR_REV– STA. 10+80 TO STA. 14+50 LT
–Y23BR_REV– STA. 22+50 TO STA. 24+59 LT
–Y23BR_RAB– STA. 11+37 TO STA. 12+00 RT
–Y23BR_RAB– STA. 10+50 TO STA. 10+67 RT
–Y23BR_RAB– STA. 13+53 TO STA. 13+58 LT
–Y23CR_REV– STA. 23+00 TO STA. 24+00 LT
–Y23CR_A– STA. 14+00 TO STA. 14+91 LT

–Y24A– STA. 11+85 TO STA. 13+49 LT
–Y24E– STA. 10+50 TO STA. 11+00 LT
–Y24F– STA. 10+50 TO STA. 12+50 LT
–Y24R– STA. 13+00 TO STA. 16+00 RT
–Y24R– STA. 14+00 TO STA. 15+50 LT
–Y24R– STA. 23+50 TO STA. 24+48 LT
–Y24R– STA. 25+75 TO STA. 26+50 LT
–Y24RPC– STA. 26+30 TO STA. 28+50 LT
–Y26R– STA. 13+00 TO STA. 14+50 LT
–Y26_DRW1– STA. 10+10 TO STA. 12+50 LT
–Y26_DRW1– STA. 10+50 TO STA. 12+50 RT
–Y26RSR1– STA. 12+25 TO STA. 13+82 RT
–Y26RSR2– STA. 10+10 TO STA. 10+50 RT
–L1– STA. 1094+00 TO STA. 1097+00 RT
–Y26R– STA. 13+00 TO STA. 13+50 RT
–L1– STA. 1131+00 TO STA. 1134+50 RT

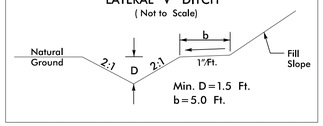
DETAIL M
LATERAL 'V' DITCH
(Not to Scale)



–Y23RPB– STA. 28+50 TO STA. 29+80 LT
–Y22RPA_REV– STA. 10+00 TO STA. 12+00 RT
–Y22RPAFLY_REV– STA. 19+75 TO 21+46 RT

–Y26R– STA. 22+02 TO STA. 22+40 LT

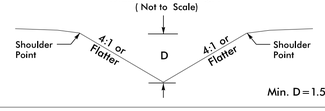
DETAIL B
LATERAL 'V' DITCH
(Not to Scale)



*–Y22RPAFLY_REV– STA. 32+50 TO STA. 34+50 RT
–Y22RPAFLY_REV– STA. 18+54 TO STA. 20+00 LT
–Y22RPA_REV– STA. 21+36 TO STA. 23+00 LT
–Y22RPE_REV– STA. 35+50 TO STA. 39+00 LT
–Y23R– STA. 48+00 TO STA. 49+50 RT
–Y23R– STA. 59+00 TO STA. 60+00 RT
–Y23BR– STA. 22+00 TO STA. 22+75 LT
–L1– STA. 1026+50 TO STA. 1027+50 LT
–L1– STA. 1033+00 TO STA. 1034+00 LT
–L1– STA. 1069+50 TO STA. 1071+50 LT

–L1– STA. 1135+50 TO STA. 1136+00 RT
–L1– STA. 1164+50 TO STA. 1168+50 LT

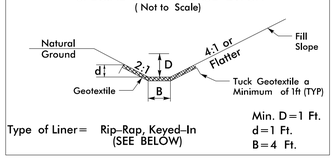
DETAIL G
MEDIAN V DITCH
(Not to Scale)



*–L– STA. 962+50 TO STA. 964+00 RT
–L1– STA. 1038+50 TO STA. 1043+50 CL
–L1– STA. 1038+00 TO STA. 1040+35 RT
–L1– STA. 1038+00 TO STA. 1040+50 LT
–L1– STA. 1044+50 TO STA. 1045+00 RT
–L1– STA. 1060+00 TO STA. 1071+00 RT
–Y23RPB– STA. 24+50 TO STA. 25+50 RT
–Y23RPC– STA. 19+00 TO STA. 20+00 LT

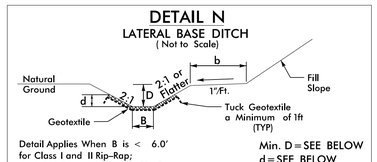
–L1– STA. 1128+50 TO STA. 1131+00 RT

DETAIL J
SPECIAL LATERAL BASE DITCH
(Not to Scale)



*DETAIL ONLY USED IN EARLY START

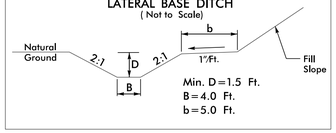
DETAIL N
LATERAL BASE DITCH
(Not to Scale)



–Y22RPAFLY_REV– STA. 15+37 TO 19+75 RT, D/d=2.75'
–Y22RPAFLY_REV– STA. 21+24 TO STA. 28+00 LT, D/d=2.5'
–L– STA. 979+00 TO STA. 982+00 RT, D/d=1.5'
–L– STA. 980+24 TO STA. 986+00 LT, D/d=1.5'
–Y23R– STA. 31+50 TO STA. 34+75 RT, D/d=1.5'
–Y23DR– STA. 24+50 TO STA. 27+50 LT, D/d=1.0'
–Y23DR– STA. 24+00 TO STA. 24+75 RT, D/d=1.0'
–Y23DR– STA. 32+50 TO STA. 34+15 LT, D/d=1.0'
–Y23DR– STA. 51+93 TO STA. 52+50 RT, D/d=1.0'

–L1– STA. 1163+00 TO STA. 1164+50 RT, D/d=1.5'
–L1– STA. 1163+00 TO STA. 1164+50 LT, D/d=1.5'
–L1– STA. 1165+50 TO STA. 1167+50 RT, D/d=1.5'
–L1– STA. 1170+00 TO STA. 1171+38 RT, D/d=1.5'
–L1– STA. 1179+40 TO STA. 1181+00 LT, D/d=1.5'
–Y24RPAR– STA. 21+00 TO STA. 21+78 RT, D/d=1.5'
–Y24RPDR– STA. 12+80 TO STA. 14+24 LT, D/d=1.5'
–Y24R– STA. 15+50 TO STA. 18+00 LT, D/d=1.5'
–Y24R– STA. 16+00 TO STA. 19+00 RT, D/d=1.5'

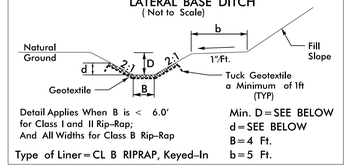
DETAIL C
LATERAL BASE DITCH
(Not to Scale)



–L– STA. 1003+00 TO STA. 1004+34 RT
–Y23R– STA. 53+00 TO STA. 55+00 RT
–Y23R– STA. 55+00 TO STA. 56+16 LT
–Y23R– STA. 60+95 TO STA. 62+00 RT
–Y22RPA_REV– STA. 14+55 TO STA. 19+50 RT
–Y22RPE_REV– STA. 41+00 TO STA. 42+00 LT

–Y26R– STA. 29+25 TO STA. 34+50 RT

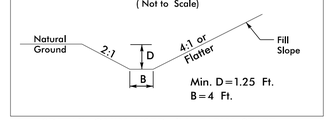
DETAIL H
LATERAL BASE DITCH
(Not to Scale)



–Y22RPA_REV– 19+50 TO STA. 20+73 RT, D/d=1.0'
–Y22RPE_REV– STA. 39+00 TO STA. 41+00 LT, D/d=1.0'
–L– STA. 966+00 TO STA. 971+50 LT, D/d=3.0'
–L– STA. 1002+40 TO STA. 1003+00 RT, D/d=1.5'
–L1– STA. 1015+50 TO STA. 1018+00 LT, D/d=1.0'
–L1– STA. 1017+85 TO STA. 1019+00 RT, D/d=1.0'
–L1– STA. 1087+00 TO STA. 1089+50 RT, D/d=1.0'
–L1– STA. 1092+00 TO STA. 1094+00 LT, D/d=1.0'
–Y23DR– STA. 34+15 TO STA. 36+00 LT D/d=1.0'
–Y23DR– STA. 51+00 TO STA. 51+93 RT, D/d=1.0'
–Y23RPB– STA. 22+50 TO STA. 23+50 RT, D/d=1.0'

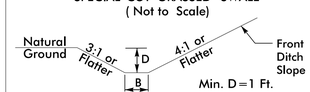
–Y24RPDR– STA. 14+75 TO STA. 17+48 LT, D/d=2.0'
–Y24RPC– STA. 19+00 TO STA. 21+50 RT, D/d=1.0'

DETAIL K
SPECIAL LATERAL BASE DITCH
(Not to Scale)



*DETAIL ONLY USED IN EARLY START

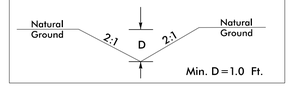
DETAIL O
SPECIAL CUT GRASSED SWALE
(Not to Scale)



–L– STA. 992+00 TO STA. 996+00 LT
–L– STA. 1001+00 TO STA. 1003+00 LT
–L1– STA. 1005+50 TO STA. 1007+00 RT
–L1– STA. 1010+50 TO STA. 1012+86 RT
–L1– STA. 1018+00 TO STA. 1021+50 LT
–L1– STA. 1019+00 TO STA. 1020+00 RT
–L1– STA. 1022+50 TO STA. 1024+18 RT
–L1– STA. 1026+00 TO STA. 1029+50 RT
–L1– STA. 1054+50 TO STA. 1056+00 RT
–L1– STA. 1059+00 TO STA. 1060+50 LT
–Y23R– STA. 18+50 TO STA. 19+00 LT
–Y23R– STA. 38+20 TO STA. 39+00 LT
–Y23RPC– STA. 14+29 TO STA. 17+00 RT
–Y23RPC– STA. 18+00 TO STA. 19+00 RT
–Y23RPC– STA. 20+00 TO STA. 23+50 LT
–Y23RPC– STA. 19+00 TO STA. 24+00 RT
–Y23LPC– STA. 14+00 TO STA. 15++45 RT
–Y23RPB– STA. 16+08 TO STA. 17+12 LT
–Y23RPB– STA. 18+05 TO STA. 22+50 RT
–Y23AR– STA. 13+30 TO STA. 14+50 RT
–Y23DR– STA. 21+00 TO STA. 23+00 LT
–Y23DR– STA. 29+85 TO STA. 32+50 LT
–Y23DR– STA. 36+00 TO STA. 37+00 LT
–Y23DR– STA. 44+43 TO STA. 45+43 RT
–Y23J– STA. 14+00 TO STA. 14+85 LT

–L1– STA. 1094+00 TO STA. 1098+00 LT
–L1– STA. 1097+00 TO STA. 1098+50 RT
–L1– STA. 1101+00 TO STA. 1101+50 RT
–L1– STA. 1119+00 TO STA. 1124+50 RT
–Y24R– STA. 32+50 TO STA. 33+99 RT
–Y24A– STA. 19+51 TO STA. 20+01 LT
–Y24RPBR– STA. 30+50 TO STA. 32+00 LT
–Y24RPC– STA. 21+50 TO STA. 24+50 RT
–L1– STA. 1094+00 TO STA. 1096+16 LT
–L1– STA. 1180+00 TO STA. 1181+50 RT

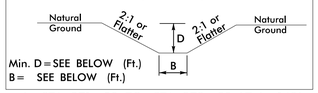
DETAIL D
STANDARD 'V' DITCH
(Not to Scale)



–Y22RPE_REV– STA. 51+93 TO STA. 53+40 RT
BEGIN ELEV=245.6, END ELEV=242.3
S=2.3%, L=151'
—Y23DR– STA. 55+65 TO STA. 56+18 RT
BEGIN ELEV=278.7, END ELEV=277.5
S=4.5%, L=53'

–L1– STA. 1161+20 RT
BEGIN ELEV=308.10, END ELEV=307.60
S=1.9%, L=26'
–Y24RPC– STA. 28+50 TO 28+76 LT
BEGIN ELEV=300.0, END ELEV=299.8
S=0.3%, L=58'

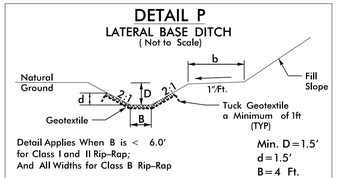
DETAIL I
STANDARD BASE DITCH
(Not to Scale)



–L– STA. 971+50 TO STA. 972+93 LT, L=143'
BEGIN ELEV=217.5', END ELEV=217.0', S=0.3%
MIN D=2.75', B=10'
–Y23R– STA. 23+80 RT, L=82', S=0.3%
BEGIN ELEV=335.25, END ELEV=335.0',
MIN D=1.5', B=4'
–Y23DR– STA. 15+50 RT, L=100', S=0.3%
BEGIN ELEV=316.5, END ELEV=316.2',
MIN D=1.5', B=4'
–L1– STA. 1027+00 LT, L=205', S=0.3%
BEGIN ELEV=296.7, END ELEV=296.0,
MIN D=1.5', B=4'
–L1– STA. 1030+35 LT, L=172', S=0.5%
BEGIN ELEV=301.8, END ELEV=301.0,
MIN D=1.5', B=4'
–Y23DR– STA. 51+00 LT, L=97', S=1.2%
BEGIN ELEV=265.0 END ELEV=263.8,
MIN D=2.0', B=4'
–Y23BR_REV– STA. 24+25 LT, L=116', S=0.34%
BEGIN ELEV=330.50 END ELEV=330.10,
MIN D=1.5', B=4'

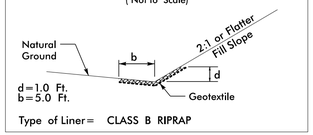
–Y24E– STA. 10+60 LT
BEGIN ELEV=336.2', END ELEV=336.0', L=58', S=0.3%
MIN D=1', B=2'
–Y24R– STA. 37+00 RT
BEGIN ELEV=264.2', END ELEV=264.1', L=37', S=0.3%
MIN D=2', B=4'

DETAIL P
LATERAL BASE DITCH
(Not to Scale)



–Y24RPBR– STA. 32+00 TO STA. 34+00 LT

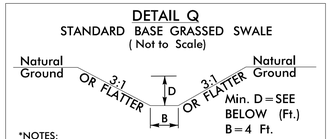
DETAIL E
TOE PROTECTION
(Not to Scale)



*–Y22RPAFLY1– STA. 62+90 TO 63+70 LT
*–Y22RPAFLY_REV– STA. 39+50 TO 39+69 LT
*–Y22LPC– STA. 24+13 TO STA. 26+25 RT
*–L– STA. 930+24 TO STA. 930+72 RT
–Y22RPE– STA. 27+50 TO STA. 33+50 RT
–Y22RPE_REV– STA. 39+00 TO STA. 43+00 RT
–L– STA. 1002+00 TO STA. 1002+75 RT
–L– STA. 1003+50 TO STA. 1004+50 LT
–L– STA. 1004+25 TO STA. 1004+75 RT
–L1– STA. 1007+00 TO STA. 1010+00 RT
–L1– STA. 1007+50 TO STA. 1008+75 LT
–L1– STA. 1011+60 TO STA. 1012+41 LT
–L1– STA. 1013+00 TO STA. 1014+00 RT
–L1– STA. 1091+69 TO STA. 1093+51 LT
–Y22CR– STA. 15+50 TO STA. 16+00 LT
–Y22CR– STA. 15+50 TO STA 16+00 RT
–Y23RPB– STA. 12+50 TO STA. 15+15 LT
–Y23R– STA. 39+00 TO STA. 40+60 RT
–Y23R– STA. 55+93 TO STA. 57+88 RT
–Y23DR– STA. 34+70 TO STA. 35+50 RT
–Y23DR– STA. 51+88 TO STA. 52+47 RT
–Y23E– STA. 10+66 TO STA. 10+81 RT
–DR1– STA. 10+33 TO STA. 11+12 RT
–Y23DR– STA. 47+54 TO STA. 47+92 RT
–Y23DR– STA. 49+24 TO STA. 49+83 RT
–Y23RPB– STA. 27+50 TO STA. 28+00 LT
–Y23FR– STA. 11+15 TO STA. 11+67 LT

–Y24RPAR– STA. 22+86 TO STA. 24+04 RT
–Y24RPDR– STA. 24+10 TO STA. 25+50 LT
–Y26R– STA. 21+70 TO STA. 22+75 RT
–L1– STA. 1104+59 TO STA. 1105+35 LT
–L1– STA. 1170+60 TO STA. 1172+00 LT
–L1– STA. 1123+12 TO STA. 1124+20 LT
–L1– STA. 1125+00 TO STA. 1126+07 LT
–L1– STA. 1128+50 TO STA. 1129+00 LT
–L1– STA. 1098+63 TO STA. 1104+59 LT
–L1– STA. 1169+54 TO STA. 1170+37 LT
–L1– STA. 1174+50 TO STA. 1175+55 LT
–L1– STA. 1113+24 TO STA. 1114+41 RT
–L1– STA. 1110+09 TO STA. 1113+58 LT
–L1– STA. 1113+86 TO STA. 1116+96 LT
–L1– STA. 1124+19 TO STA. 1125+00 LT
–Y23RPBR– STA. 27+50 TO STA. 28+00 LT
–Y24R– STA. 19+75 TO STA. 20+50 LT
–Y24R– STA. 20+00 TO STA. 21+50 RT
–Y24R– STA. 61+15 TO STA. 62+50 LT
–Y24RPAR– STA. 21+70 TO STA. 22+86 RT
–Y24RPDR– STA. 14+30 TO STA. 14+80 LT
–Y24RPDR– STA. 17+40 TO STA. 18+00 LT
–Y26R– STA. 16+80 TO STA. 18+40 RT

DETAIL Q
STANDARD BASE GRASSED SWALE
(Not to Scale)

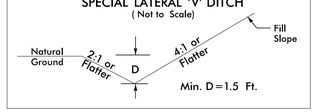


*NOTES:
1) LONGITUDINAL SLOPES BETWEEN 0.3% AND 4.0%.
2) MODIFICATIONS MAY BE NEEDED, AS APPROVED BY ENGINEER.

–L1– STA. 1056+00 RT, D=1'
BEGIN ELEV=311.9, END ELEV=311.0, S=0.9%, L=100'
–L1– STA. 1084+71 TO STA. 1087+00 RT, D=2'
BEGIN ELEV=230.0, END ELEV=230.8, S=0.4%, L=279'
–L1– STA. 1085+06 TO –L– 1086+20 LT, D=2'
BEGIN ELEV=229.9, END ELEV=229.3, S=0.5%, L=114'

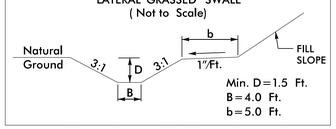
–L1– STA. 1118+85 TO STA. 1119+00 RT, D=1'
–L1– STA. 1179+10 TO STA. 1180+00 RT, D=1'

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



*–Y22RPA_REV– STA. 23+00 TO STA. 27+50 RT
*–Y22RPA_REV– STA. 23+00 TO STA. 27+85 LT
–Y23R– STA. 21+50 TO STA 22+50 RT
*–L– STA. 958+00 TO STA. 962+50 RT
*–L– STA. 957+00 TO STA. 962+50 LT

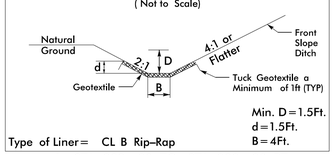
DETAIL L
LATERAL GRASSED SWALE
(Not to Scale)



–L– STA. 1003+00 TO STA. 1003+80 LT
–L1– STA. 1009+03 TO STA. 1011+50 LT
–L1– STA. 1014+00 TO STA. 1015+50 LT
–L1– STA. 1023+00 TO STA. 1023+84 LT
–L1– STA. 1024+18 TO STA. 1025+00 RT
–L1– STA. 1034+00 TO STA. 1036+38 LT
–L1– STA. 1089+50 TO STA. 1093+50 RT
–L1– STA. 1090+00 TO STA. 1092+00 LT
–Y23R– STA. 19+00 TO STA. 23+00 LT
–Y23R– STA. 39+00 TO STA. 41+00 LT
–Y23R– STA. 49+50 TO STA. 53+00 RT
–Y23R– STA. 60+00 TO STA. 60+95 RT
–Y23RPC– STA. 17+00 TO STA. 18+00 RT
–Y23FR– STA. 10+25 TO STA. 11+15 LT
–Y23FR– STA. 11+69 TO STA. 12+40 RT
–Y23FR– STA. 11+94 TO STA. 13+50 LT

–L1– STA. 1136+00 TO STA. 1137+00 RT
–L1– STA. 1164+50 TO STA. 1165+50 RT
–L1– STA. 1167+50 TO STA. 1170+00 RT
–L1– STA. 1168+50 TO STA. 1169+50 LT
–Y24RPBR– STA. 29+50 TO STA. 30+50 LT
–Y24RPDR– STA. 11+60 TO STA. 12+80 LT
–Y24R– STA. 18+00 TO STA. 19+17 LT
–Y24R– STA. 19+00 TO STA. 20+11 RT
–Y24R– STA. 33+99 TO STA. 34+68 RT
–L1– STA. 1113+00 TO STA. 1113+26 RT

DETAIL R
SPECIAL BASE DITCH
(Not to Scale)



–L– STA. 982+00 TO STA. 988+00 RT
–L1– STA. 1025+00 TO STA. 1026+00 RT
–L1– STA. 1029+50 TO STA. 1030+35 RT
–Y23K– STA. 11+98 TO STA. 12+60 LT
(BEGIN ELEV=308.2, END ELEV=304.5, S=6.0%. L=62')
–Y23AR– STA. 11+50 TO STA. 15+50 LT (Min. D=2.0')

NOTE: * INDICATE DITCHES INSIDE THE EARLY START PACKAGE

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aburke

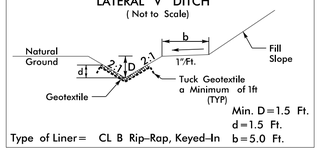
Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-2
	HYDRAULICS DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 3 OF 103

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



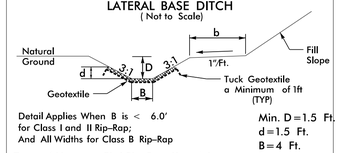
Min. D=1.5 Ft.
d=1.5 Ft.
b=5.0 Ft.

Type of Liner= CL B Rip-Rap, Keyed-In

–Y22RPAFLY_REV– STA. 20+00 TO STA. 21+24 LT
–Y23R– STA. 41+00 TO STA. 43+00 LT
–Y23RPB– STA. 23+50 TO STA. 24+50 RT
–Y23FR– STA. 13+50 TO STA. 14+00 LT

–Y26R– STA. 20+30 TO STA. 22+02 LT
–Y26R– STA. 28+50 TO STA. 29+25 RT

DETAIL T
LATERAL BASE DITCH
(Not to Scale)



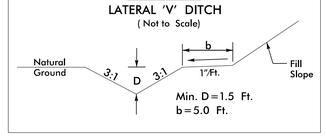
Detail Applies When B is < 6.0'
for Class I and II Rip-Rap;
And All Widths for Class B Rip-Rap

Min. D=1.5 Ft.
d=1.5 Ft.
B=4 Ft.
b=5 Ft.

Type of Liner= CL I Rip-Rap, Keyed-In

–Y23RPB– STA. 28+20 TO STA. 28+50 LT
–Y22RPAFLY_REV– STA. 28+00 TO STA. 30+00 LT

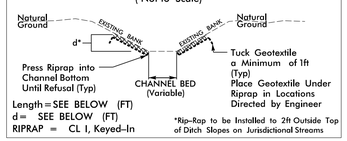
DETAIL U
LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
b=5.0 Ft.

–Y23AR– STA. 14+50 TO STA. 16+50 RT
–Y23AR– STA. 17+50 TO STA. 19+80 RT

DETAIL V
BANK STABILIZATION
(Not to Scale)

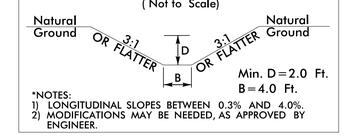


Length=SEE BELOW (FT)
d= SEE BELOW (FT)
RIPRAP = CL I, Keyed-In

*Rip-Rap to be Installed to 2ft Outside Top of Ditch Slopes on Jurisdictional Streams

–Y26R– STA. 22+25 LT,
L=72', d=3'
48 TONS CL I RIPRAP, W/107 SY GEOFAB

DETAIL W
STANDARD BASE GRASSED SWALE
(Not to Scale)

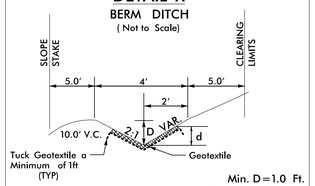


Min. D=2.0 Ft.
B=4.0 Ft.

*NOTES:
1) LONGITUDINAL SLOPES BETWEEN 0.3% AND 4.0%.
2) MODIFICATIONS MAY BE NEEDED, AS APPROVED BY ENGINEER.

–Y23RPB– STA. 23+50 RT, L=143'
BEGIN ELEV=317.1', END ELEV=315.7', S=1.0%
MIN D=1.0', B=4'

DETAIL X
BERM DITCH
(Not to Scale)



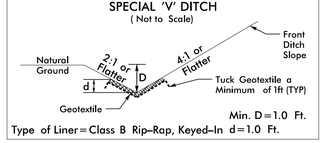
Min. D=1.0 Ft.
d=1.0 Ft.

Type of Liner=CLASS B RIPRAP, Keyed-In

–Y23RPC– STA. 14+29 TO STA. 16+00 RT
–L1– STA. 1053+30 TO STA. 1058+00 LT

–L1– STA. 1108+85 TO STA. 1112+50 RT

DETAIL Y
SPECIAL 'V' DITCH
(Not to Scale)



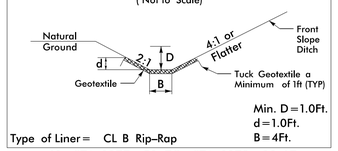
Min. D=1.0 Ft.

Type of Liner=Class B Rip-Rap, Keyed-In d=1.0 Ft.

–L1– STA. 1021+50 TO STA. 1022+00 LT
–L1– STA. 1020+00 TO STA. 1021+00 RT
–L1– STA. 1096+50 TO STA. 1097+00 RT
–L1– STA. 1073+00 TO STA. 1075+50 LT
–Y22CR– STA. 14+50 TO STA 15+00 LT
–Y23BR_REV– STA. 21+00 TO STA. 22+50 RT
–Y23CR_REV– STA. 21+50 TO STA. 23+00 LT
–Y23R– STA. 64+65 TO STA. 69+00 LT
–Y23R– STA. 66+50 TO STA. 68+30 RT
–Y23LPB– STA. 14+50 TO STA. 15+00 LT
–Y23DR– STA. 27+50 TO STA. 28+80 LT
–Y23DR– STA. 36+00 TO STA. 38+38 RT

–L1– STA. 1181+50 TO STA. 1182+50 RT
–Y24R– STA. 31+00 TO STA. 32+50 RT
–Y24A– STA. 10+90 TO STA. 11+45 LT (L=83')
–Y24A– STA. 10+75 TO 11+00 RT (L=33')
–Y24A– STA. 11+00 TO 12+65 RT (L=97')
–Y24A– STA. 12+65 TO 13+49 RT
–Y24A– STA. 19+01 TO STA. 19+51 LT

DETAIL Z
SPECIAL BASE DITCH
(Not to Scale)

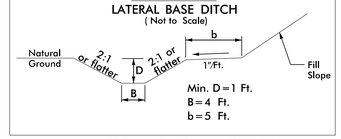


Min. D=1.0Ft.
d=1.0Ft.
B=4Ft.

Type of Liner= CL B Rip-Rap

–L1– STA. 1077+50 TO STA. 1079+00 LT
–Y23DR– STA. 23+50 TO STA. 24+00 RT
–L1– STA. 1061+00 TO STA. 1062+61 LT
–Y23R– STA. 64+50 TO STA. 66+50 RT

DETAIL AA
LATERAL BASE DITCH
(Not to Scale)

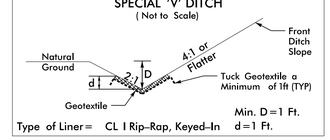


Min. D=1 Ft.
B=4 Ft.
b=5 Ft.

–L1– STA. 1075+50 TO STA. 1077+50 LT
–L1– STA. 1066+00 TO STA. 1069+50 LT

–L1– STA. 1098+00 TO STA. 1098+80 LT
–Y24R– STA. 37+00 TO STA. 39+50 RT
–Y24RPDR– STA. 18+00 TO STA. 21+50 LT
–L1– STA. 1114+70 TO STA 1115+77 RT

DETAIL AB
SPECIAL 'V' DITCH
(Not to Scale)



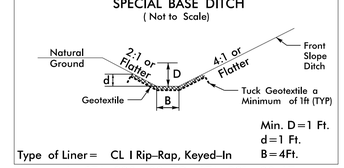
Min. D=1 Ft.

Type of Liner= CL I Rip-Rap, Keyed-In d=1 Ft.

–Y23I_REV– STA. 14+00 TO STA. 14+90 RT
–Y23I_REV– STA. 14+00 TO STA. 15+00 LT
–Y23DR– STA. 52+50 TO STA 53+23 RT
–Y23FR– STA. 13+50 TO STA. 14+00 RT

–Y24B– STA. 10+26 TO STA. 11+00 RT

DETAIL AC
SPECIAL BASE DITCH
(Not to Scale)



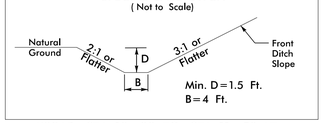
Min. D=1 Ft.
d=1 Ft.
B=4Ft.

Type of Liner= CL I Rip-Rap, Keyed-In

–L– STA. 990+00 TO STA. 991+00 LT
–Y23DR– STA. 23+00 TO STA. 24+50 LT
–Y23H– STA. 10+50 TO STA. 11+85 RT
–Y23R– STA. 32+50 TO STA. 33+50 LT

–Y24R– STA. 47+00 TO STA. 51+50 RT

DETAIL AD
SPECIAL BASE DITCH
(Not to Scale)

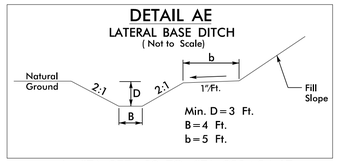


Min. D=1.5 Ft.
B=4 Ft.

–Y23AR– STA. 10+30 TO STA. 11+50 LT
–Y23R– STA. 33+50 TO STA. 36+00 LT
–Y23RPC– STA. 24+00 TO STA. 27+00 RT

–Y26R– STA. 34+50 TO STA. 39+50 RT

DETAIL AE
LATERAL BASE DITCH
(Not to Scale)

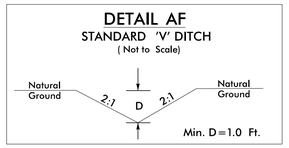


Min. D=3 Ft.
B=4 Ft.
b=5 Ft.

–L– STA. 977+00 TO STA. 980+24 LT

–Y24RPC– STA. 15+67 TO STA. 17+32 RT

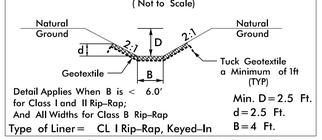
DETAIL AF
STANDARD 'V' DITCH
(Not to Scale)



Min. D=1.0 Ft.

–Y23CR_REV– STA. 12+07 TO STA. 14+50,
BEGIN ELEV=347.50', END ELEV=354.73'
S=2.8%, L=266'

DETAIL AG
CHANNEL CHANGE
(Not to Scale)



Detail Applies When B is < 6.0'
for Class I and II Rip-Rap;
And All Widths for Class B Rip-Rap

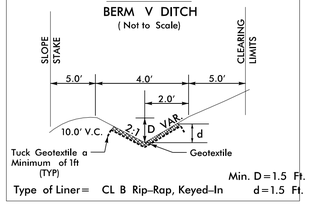
Min. D=2.5 Ft.
d=2.5 Ft.
B=4 Ft.

Type of Liner= CL I Rip-Rap, Keyed-In

–Y23DR– STA. 24+75 RT, L=38', S=0.5%
BEGIN ELEV=279.6', END ELEV=279.4', D/d=3.5'

–L1– STA. 1161+40 TO 1162+07 LT
BEGIN ELEV=291.0', END ELEV=288.5', L=110', S=2.3%
–L1– STA. 1162+07 TO 1163+00 LT
BEGIN ELEV=294.5', END ELEV=291.0', L=108', S=3.2%

DETAIL AH
BERM V DITCH
(Not to Scale)

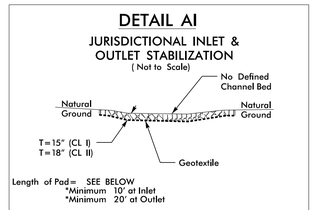


Min. D=1.5 Ft.
d=1.5 Ft.

Type of Liner= CL B Rip-Rap, Keyed-In

–L1– STA. 1030+50 TO STA. 1034+50 RT

DETAIL AI
JURISDICTIONAL INLET & OUTLET STABILIZATION
(Not to Scale)



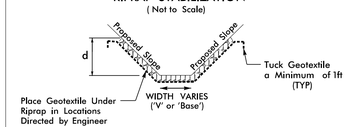
Length of Pad= SEE BELOW
*Minimum 10' at Inlet
*Minimum 20' at Outlet

Width of Pad = See STD. 876.02

Type of Liner= CL I or CL II Rip-Rap – Keyed-In/Countersunk

–L– STA. 1004+00 LT, CL I RIPRAP, L=20'
–L1– STA. 1036+50 LT, CL I RIPRAP, L=20'

DETAIL AJ
RIPRAP STABILIZATION
(Not to Scale)



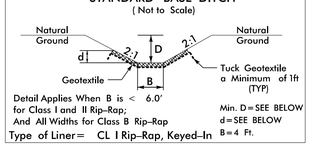
*NOTE: DETAIL FOR RIPRAP INSTALLATION SHALL BE USED IN CONJUNCTION WITH ANY PROPOSED DITCH DETAIL AND/OR ROADWAY TYPICAL DITCH.

Length= SEE BELOW (Ft.)
Type of Liner= CL B or I Rip-Rap – Keyed-In (SEE BELOW)

–Y22RPA_REV– STA. 20+80 LT (RDY TYPICAL DITCH)
L=110', MIN d=1.0'
45 TONS CL B RIPRAP, W/101 SY GEOFAB
–Y23DR– STA. 15+50 RT (END OF STD. DITCH),
L=6', MIN d=1.5'
3 TONS CL B RIPRAP, W/9 SY GEOFAB
–Y23DR– STA. 51+07 RT (END OF STD. DITCH),
L=6', MIN d=2.0'
4 TONS CL I RIPRAP, W/9 SY GEOFAB
–L1– STA. 1086+20 RT (END OF SWALE),
L=20', MIN d=2.0'
18 TONS CL I RIPRAP, W/37 SY GEOFAB
–L1– STA. 1084+85 RT (END OF SWALE),
L=20', MIN d=2.0'
18 TONS CL I RIPRAP, W/37 SY GEOFAB
–L1– STA. 1087+05 LT (END OF SWALE),
L=20', MIN d=2.0'
23 TONS CL I RIPRAP, W/46 SY GEOFAB

–L1– STA. 1145+00 TO 1147+00 RT
L=200', MIN d=1.0'
82 TONS CL B RIPRAP, W/183 SY GEOFAB
–L1– STA. 1179+10 RT (END OF SWALE),
L=12', MIN d=1.0'
6 TONS CL B RIPRAP, W/14 SY GEOFAB

DETAIL AK
STANDARD BASE DITCH
(Not to Scale)



Detail Applies When B is < 6.0'
for Class I and II Rip-Rap;
And All Widths for Class B Rip-Rap

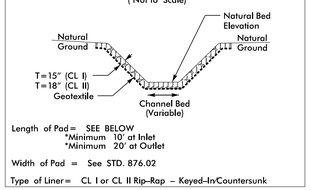
Min. D=SEE BELOW
d=SEE BELOW
B=4 Ft.

Type of Liner= CL I Rip-Rap, Keyed-In

–Y23R– STA. 60+95 RT, L=80', S=7.5%
BEGIN ELEV=332.0, END ELEV=326.0', D/d=1.0'
–Y23AR– STA. 11+50 RT, L=24', S=1.4%
BEGIN ELEV=299.0', END ELEV=298.67', D/d=2.5'
–L– STA. 975+75 TO STA. 977+00 LT, L=125', S=0.3%
BEGIN ELEV=214.5', END ELEV=214.9', D/d=3.5'
–Y23DR– STA. 23+85 LT, L=91', S=8.0%
BEGIN ELEV=293.4', END ELEV=286.1', D/d=1.5'
–Y23DR– STA. 38+35 RT, L=27', S=6.7%
BEGIN ELEV=293.8', END ELEV=292.0', D/d=1.0'
–L1– STA. 1034+79 LT, L=60'
BEGIN ELEV=284.0', END ELEV=284.5', S=0.8%
MIN D=1.5, B=4'
–L1– STA. 1035+11 LT, L=67'
BEGIN ELEV=284.5', END ELEV=292.0', S=1.1%
MIN D=1.5', B=4'

–Y26– STA. 14+50 LT, L=73', S=14.0%, D/d=1.0'
BEGIN ELEV=300.0', END ELEV=289.8'
–Y26_DRW1– STA. 10+50 RT, L=40', S=16.6%, D/d=1.0'
BEGIN ELEV=297.3', END ELEV=290.6'

DETAIL AL
JURISDICTIONAL INLET & OUTLET CHANNEL STABILIZATION
(Not to Scale)



Length of Pad= SEE BELOW
*Minimum 10' at Inlet
*Minimum 20' at Outlet

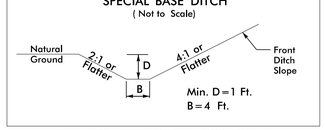
Width of Pad = See STD. 876.02

Type of Liner= CL I or CL II Rip-Rap – Keyed-In/Countersunk

–L– STA. 1003+00 RT, CL I RIPRAP, L=16'
–L1– STA. 1023+00 LT, CL II RIPRAP, L=20'
–L1– STA. 1062+62 LT, CL I RIPRAP, L=16'
–Y23DR– STA. 46+25 RT, CL I RIPRAP, L=20'
–Y23R– STA. 61+14 LT, CL I RIPRAP, L=20'
–Y23DR– STA. 34+15 LT, CL I RIPRAP, L=16'
–Y23DR– STA. 34+31 RT, CL I RIPRAP, L=20'
–Y23FR– STA. 11+71 LT, CL II RIPRAP, L=20'
–Y23FR– STA. 11+64 RT, CL II RIPRAP, L=20'

–L1– STA. 1024+00 LT, CL II RIPRAP, L=20'
–L1– STA. 1163+00 RT, CL II RIPRAP, L=20'
–Y24RPBR– STA. 34+00 RT, CL II RIPRAP, L=20'
–Y24RPDR– STA. 24+73 LT, CL I RIPRAP, L=20'
–Y26R– STA. 21+69 RT, CL II RIPRAP, L=20'
–Y26R– STA. 22+02 LT, CL II RIPRAP, L=20'

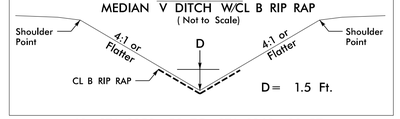
DETAIL AM
SPECIAL BASE DITCH
(Not to Scale)



Min. D=1 Ft.
B=4 Ft.

–L– STA. 991+00 TO STA. 992+00 LT
–L1– STA. 1046+00 TO STA. 1047+50 LT
–L1– STA. 1057+50 TO STA. 1059+00 LT
–Y23R– STA. 23+00 TO STA. 23+80 LT
–Y23R– STA. 31+50 TO STA. 32+50 LT
–Y23LPB– STA. 13+22 TO STA. 14+50 LT

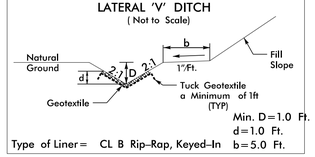
DETAIL AN
MEDIAN V DITCH W/CL B RIP RAP
(Not to Scale)



D= 1.5 Ft.

–L1– STA. 1059+50 TO STA. 1060+00 RT

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



Min. D=1.0 Ft.
d=1.0 Ft.
b=5.0 Ft.

Type of Liner= CL B Rip-Rap, Keyed-In

–Y22CR– STA. 13+61 TO STA 14+50 LT
–Y22CR– STA. 14+26 TO STA 15+50 RT
–L1– STA. 1070+50 TO STA. 1071+50 RT

–L1– STA. 1161+20 TO STA. 1161+60 RT

NOTE: * INDICATE DITCHES INSIDE THE EARLY START PACKAGE

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aburke

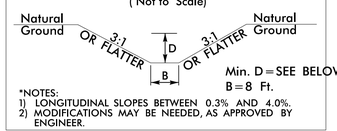
Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-3
	HYDRAULICS DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 4 OF 103

DETAIL AP
STANDARD BASE GRASSED SWALE
(Not to Scale)

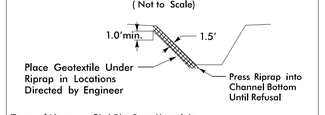


Min. D = SEE BELOW (Ft.)
B = 8 Ft.

*NOTES:
1) LONGITUDINAL SLOPES BETWEEN 0.3% AND 4.0%.
2) MODIFICATIONS MAY BE NEEDED, AS APPROVED BY ENGINEER.

–L1– STA. 1086 + 92 TO STA. 1090 + 00 LT, D = 2 FT
–BEGIN ELEV = 230.0, END ELEV = 231.0 S = 0.3%, L = 312'

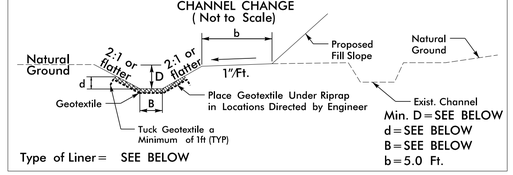
DETAIL AQ
BANK STABILIZATION
(Not to Scale)



Type of Liner = CL I Rip–Rap, Keyed–In

–L1– STA. 1086 + 29 LT
5 TONS CL I RIPRAP, W/10 SY GEOFAB
–L1– STA. 1086 + 92 LT
5 TONS CL I RIPRAP, W/10 SY GEOFAB
–L1– STA. 1086 + 75 RT
5 TONS CL I RIPRAP, W/10 SY GEOFAB

DETAIL AR
CHANNEL CHANGE
(Not to Scale)



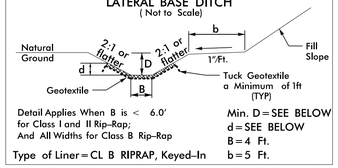
Min. D = SEE BELOW
d = SEE BELOW
B = SEE BELOW
b = 5.0 Ft.

Type of Liner = SEE BELOW

–L1– 1014 + 00 RT, B = 7', CL II RIPRAP, D/d = 3.0'
BEGIN ELEV. = 255.5, END ELEV. = 257.0, L = 73' (RCBC INLET)
–L1– STA. 1014 + 50 TO STA. 1015 + 10 RT, B = 7', CL II RIPRAP, MIN D/d = 3.0'
–L1– STA. 1015 + 10 TO STA. 1016 + 00 RT, B = 7', CL II RIPRAP, MIN D/d = 1.0'
–L1– STA. 1016 + 50 TO STA. 1018 + 29 RT, B = 5', GRASS, MIN D/d = 1.5'

–L1– STA. 1171 + 38 TO STA. 1176 + 30 RT, CL I RIPRAP, MIN D/d = 4.0'
–L1– STA. 1175 + 56 TO STA. 1178 + 09 LT, CL I RIPRAP, MIN D/d = 4.0'
–L1– STA. 1115 + 82 TO STA. 1118 + 00 RT, CL II RIP RAP, MIN D/d = 2.5, B = 8'
–L1– STA. 1118 + 85 TO STA. 1119 + 12 RT, CL II RIP RAP, MIN D/d = 3.0, B = 4–8'
–L1– STA. 1179 + 00 TO STA. 1179 + 40 LT, CL I RIP RAP, MIN D/d = 5.0, B = 4'

DETAIL AS
LATERAL BASE DITCH
(Not to Scale)



Detail Applies When B is < 6.0' for Class I and II Rip–Rap; And All Widths for Class B Rip–Rap

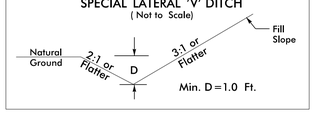
Min. D = SEE BELOW
d = SEE BELOW
B = 4 Ft.
b = 5 Ft.

Type of Liner = CL B RIPRAP, Keyed–In

–L1– STA. 1079 + 00 TO STA. 1084 + 50 LT, D/d = 1.0'

–L1– STA. 1159 + 62 TO STA. 1161 + 20 RT, D/d = 1.0'
–L1– STA. 1161 + 60 TO STA. 1163 + 00 RT, D/d = 1.0'

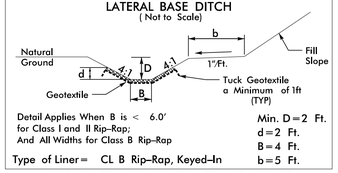
DETAIL AT
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 1.0 Ft.

–Y26RSR2– STA. 10 + 70 TO STA. 14 + 20 LT

DETAIL AU
LATERAL BASE DITCH
(Not to Scale)



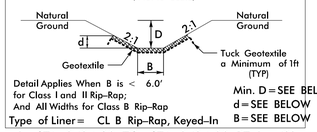
Detail Applies When B is < 6.0' for Class I and II Rip–Rap; And All Widths for Class B Rip–Rap

Min. D = 2 Ft.
d = 2 Ft.
B = 4 Ft.
b = 5 Ft.

Type of Liner = CL B Rip–Rap, Keyed–In

–Y23AR– STA. 16 + 55 TO STA. 18 + 90 LT

DETAIL AV
STANDARD BASE DITCH
(Not to Scale)



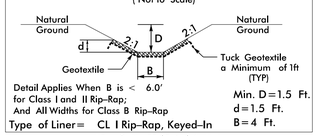
Detail Applies When B is < 6.0' for Class I and II Rip–Rap; And All Widths for Class B Rip–Rap

Min. D = SEE BELOW
d = SEE BELOW
B = SEE BELOW

Type of Liner = CL B Rip–Rap, Keyed–In

–L– STA. 978 + 30 TO STA. 979 + 00 RT, L = 78'
BEGIN ELEV = 221.8', END ELEV = 222.1', S = 0.4%
MIN D = 2.5', B = 6'
–Y22RPE_REV– STA. 42 + 00 RT, L = 330'
BEGIN ELEV = 252.7', END ELEV = 240.4', S = 3.8%
MIN D = 1.5', B = 4'
–Y22RPE_REV– STA. 45 + 00 RT, L = 100'
BEGIN ELEV = 240.4', END ELEV = 240.0', S = 0.4%
MIN D = 2.5', B = 4'

DETAIL AW
STANDARD BASE DITCH
(Not to Scale)



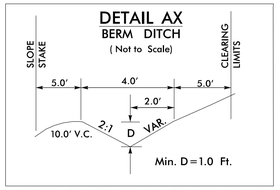
Detail Applies When B is < 6.0' for Class I and II Rip–Rap; And All Widths for Class B Rip–Rap

Min. D = 1.5 Ft.
d = 1.5 Ft.
B = 4 Ft.

Type of Liner = CL I Rip–Rap, Keyed–In

–L1– STA. 1161 + 64 LT
BEGIN ELEV = 295.0', END ELEV = 289.6', L = 90', S = 6.0%

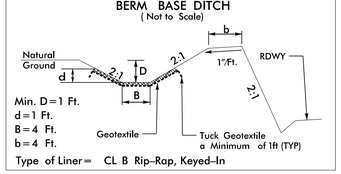
DETAIL AX
BERM DITCH
(Not to Scale)



Min. D = 1.0 Ft.

–Y23DR– STA. 13 + 00 TO STA. 23 + 00 LT

DETAIL AY
BERM BASE DITCH
(Not to Scale)



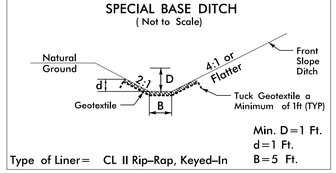
Min. D = 1 Ft.
d = 1 Ft.
B = 4 Ft.
b = 4 Ft.

Type of Liner = CL B Rip–Rap, Keyed–In

–L– STA. 987 + 50 TO STA. 997 + 50 RT
–L1– STA. 1058 + 00 TO STA. 1060 + 50 LT

–L1– STA. 1103 + 79 TO STA. 1108 + 85 RT

DETAIL AZ
SPECIAL BASE DITCH
(Not to Scale)

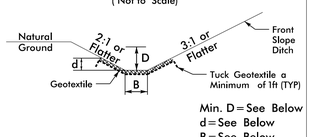


Min. D = 1 Ft.
d = 1 Ft.
B = 5 Ft.

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

–L1– STA. 1100 + 00 TO STA. 1101 + 00 RT

DETAIL BB
CHANNEL CHANGE
(Not to Scale)



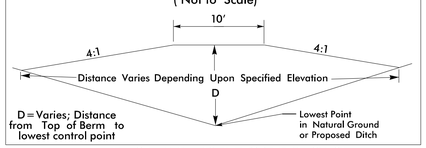
Min. D = See Below
d = See Below
B = See Below

Type of Liner = CL I OR II RIPRAP, Keyed–In

–L1– STA. 1016 + 00 TO STA. 1016 + 50 RT, CL I RIPRAP
MIN D/d = 1.0, B = 7'

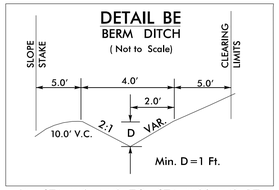
–L1– STA. 1118 + 00 TO STA. 1118 + 85 RT, CL II RIPRAP
MIN D/d = 2.5', B = 8'

DETAIL BC
10' WIDE BERM
(Not to Scale)



–L1– STA. 1161 + 60 LT, TOP ELEV = 311.0'

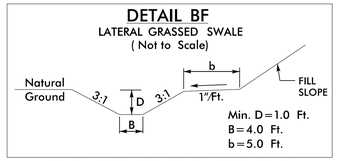
DETAIL BE
BERM DITCH
(Not to Scale)



Min. D = 1 Ft.

–L1– STA. 1101 + 50 TO STA. 1103 + 79 RT

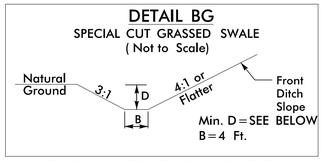
DETAIL BF
LATERAL GRASSED SWALE
(Not to Scale)



Min. D = 1.0 Ft.
B = 4.0 Ft.
b = 5.0 Ft.

–L1– STA. 1099 + 00 TO STA. 1100 + 00 RT
–L1– STA. 1098 + 50 TO STA. 1098 + 83 RT
–Y24A– STA. 20 + 01 TO STA. 20 + 50 LT

DETAIL BG
SPECIAL CUT GRASSED SWALE
(Not to Scale)

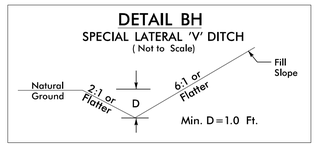


Min. D = SEE BELOW
B = 4 Ft.

–L– STA. 986 + 00 TO STA. 990 + 00 LT, D = 1.5'
–L1– STA. 1060 + 50 TO STA. 1061 + 00 LT, D = 1.5'

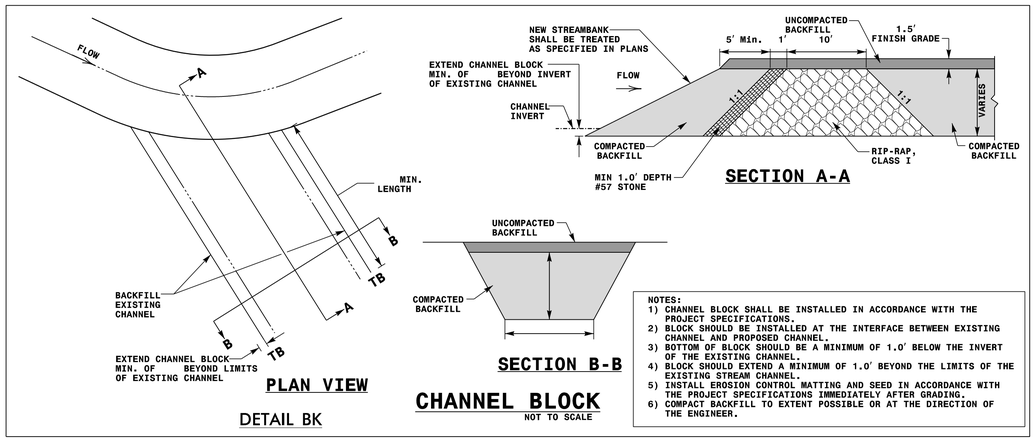
–Y24RPC– STA. 24 + 50 TO STA. 29 + 00 RT, D = 2'

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



Min. D = 1.0 Ft.

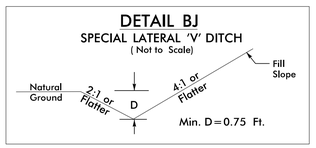
–Y24R– STA. 41 + 75 TO STA. 43 + 00 LT



NOTES:
1) CHANNEL BLOCK SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
2) BLOCK SHOULD BE INSTALLED AT THE INTERFACE BETWEEN EXISTING CHANNEL AND PROPOSED CHANNEL.
3) BOTTOM OF BLOCK SHOULD BE A MINIMUM OF 1.0' BELOW THE INVERT OF THE EXISTING CHANNEL.
4) BLOCK SHOULD EXTEND A MINIMUM OF 1.0' BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
5) INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
6) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.

DETAIL BK

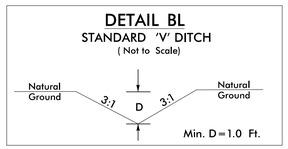
DETAIL BJ
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 0.75 Ft.

–Y24E– STA. 10 + 80 TO STA. 12 + 00 RT

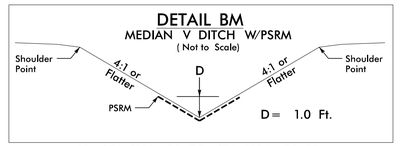
DETAIL BL
STANDARD 'V' DITCH
(Not to Scale)



Min. D = 1.0 Ft.

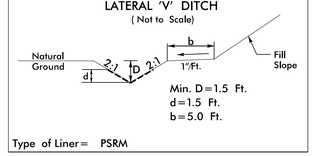
–Y23J– STA. 13 + 00 TO STA. 14 + 00 RT
BEGIN ELEV = 321.7', END ELEV = 318.0'
S = 3.7%, L = 100'
–Y23J– STA. 13 + 00 TO STA. 14 + 00 LT
BEGIN ELEV = 323.1', END ELEV = 317.0'
S = 6.1%, L = 100'

DETAIL BM
MEDIAN V DITCH W/PSRM
(Not to Scale)



–L1– STA. 1131 + 00 TO STA. 1134 + 50 RT

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



Min. D = 1.5 Ft.
d = 1.5 Ft.
b = 5.0 Ft.

Type of Liner = PSRM

–Y22RPAFLY_REV– STA. 30 + 00 TO STA. 31 + 50 LT

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NOTE: * INDICATE DITCHES INSIDE THE EARLY START PACKAGE

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aburke

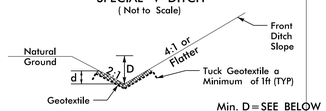
Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-4
	HYDRAULICS DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 5 OF 103

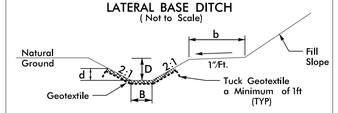
DETAIL BO
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = SEE BELOW Ft.
Type of Liner = CL I Rip-Rap, Keyed-In d = SEE BELOW Ft.

-L1- STA. 1063+00 TO STA. 1066+00 LT, D/d = 2.0'
-L1- STA. 1057+50 TO STA. 1058+00 LT, D/d = 1.5'

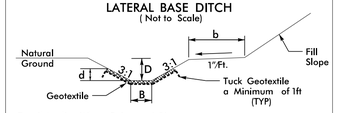
DETAIL BP
LATERAL BASE DITCH
(Not to Scale)



Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D = SEE BELOW Ft.
d = SEE BELOW Ft.
B = 4 Ft.
b = 5 Ft.
Type of Liner = CL I Rip-Rap, Keyed-In

-Y24RPC- STA. 17+32 TO STA. 19+00 RT, D/d = 2.5'
-L1- STA. 1124+50 TO STA. 1125+30 RT, D/d = 1.0'

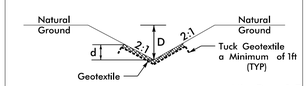
DETAIL BQ
LATERAL BASE DITCH
(Not to Scale)



Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D = SEE BELOW Ft.
d = SEE BELOW Ft.
B = 4 Ft.
b = 5 Ft.
Type of Liner = CL I Rip-Rap, Keyed-In

-Y23RPB- STA. 28+75 TO STA. 30+45 RT
-Y22RPE_REV-STA. 28+00 TO STA. 30+00 LT

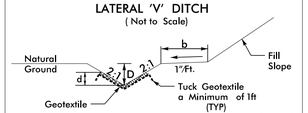
DETAIL BR
STANDARD 'V' DITCH
(Not to Scale)



Min. D = 1 Ft.
Type of Liner = CL B Rip-Rap, Keyed-In d = 1 Ft.

-Y23J- STA. 9+50 TO STA. 10+00 RT
BEGIN ELEV=316.8, END ELEV=313.8
S=6.0%, L=50'

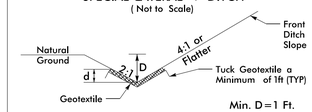
DETAIL BT
LATERAL 'V' DITCH
(Not to Scale)



Min. D = 1 Ft.
d = 1 Ft.
Type of Liner = CL I Rip-Rap, Keyed-In b = 5 Ft.

-Y23FR- STA. 12+40 TO STA. 13+50 RT

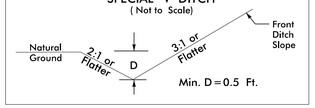
DETAIL BU
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 1 Ft.
Type of Liner = CL B Rip-Rap, Keyed-In d = 1 Ft.

-Y23R- STA. 20+00 TO STA. 21+50 RT

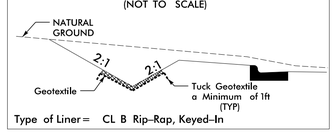
DETAIL BV
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = 0.5 Ft.

-Y24R- STA. 54+00 TO STA. 54+50 RT

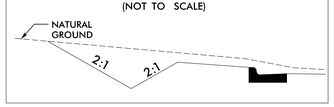
DETAIL BX
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



Type of Liner = CL B Rip-Rap, Keyed-In

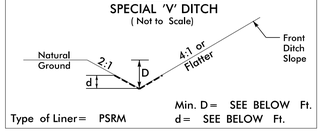
-Y23CR_REV- STA. 11+14 TO STA. 12+20 RT

DETAIL BY
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



-Y23CR_REV- STA. 10+00 TO STA. 10+93 RT

DETAIL BZ
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = SEE BELOW Ft.
Type of Liner = PSRM d = SEE BELOW Ft.

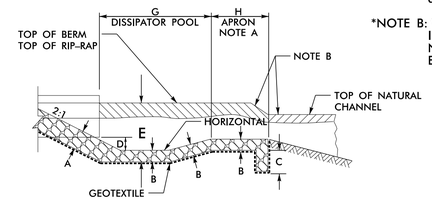
-Y23BR_REV- STA. 23+00 TO STA. 24+02 RT, D/d = 1.0'
-Y23BR_REV- STA. 24+02 TO STA. 24+39 RT, D/d = 1.5'

DETAIL BS
RIP-RAPPED ENERGY DISSIPATOR BASIN

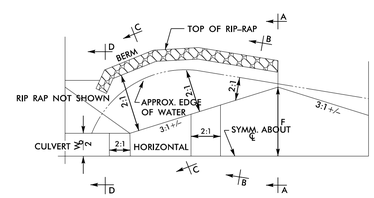
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q des/(CROSS SECTION AREA AT SEC. A-A) = SPECIFIED VELOCITY.

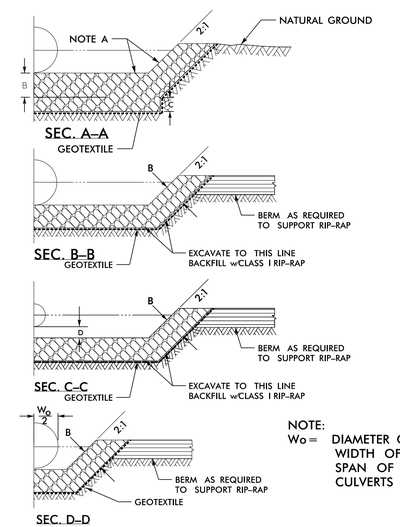
*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP-RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

℄ SECTION



HALF PLAN





NOTE:
Wo = DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE-ARCH CULVERTS

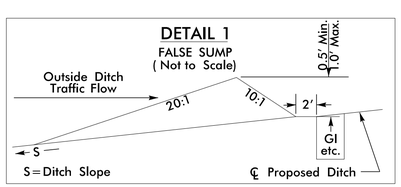
DIM.	RIP RAP BASIN # 1	2	3	4	5	6	7	8
A	0.4'	0.4'						
B	0.3'	0.3'						
C	3.0'	3.0'						
D	2.1'	4.7'						
E	3.3'	5.2'						
F	15.0'	17.6'						
G	21.1'	47.0'						
H	10.5'	23.5'						

*ALL DIMENSIONS APPROXIMATE IN FT

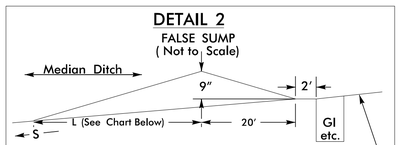
BASIN #	LOCATION (AT OUTLET)
1	-Y23RPB- 23+55
2	-L1- STA. 1105+37 LT
3	
4	
5	
6	
7	
8	

5/05

DETAIL 1
FALSE SUMP
(Not to Scale)

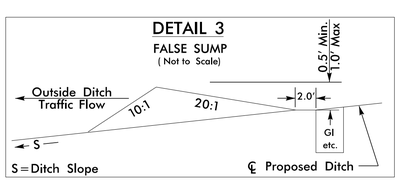


DETAIL 2
FALSE SUMP
(Not to Scale)



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

DETAIL 3
FALSE SUMP
(Not to Scale)



NOTE: * INDICATE DITCHES INSIDE THE EARLY START PACKAGE

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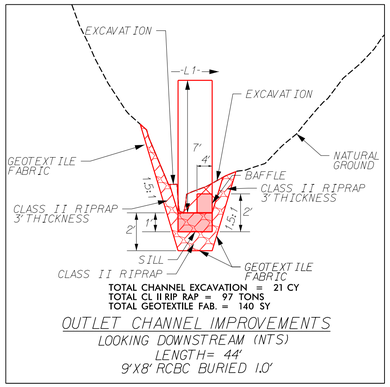
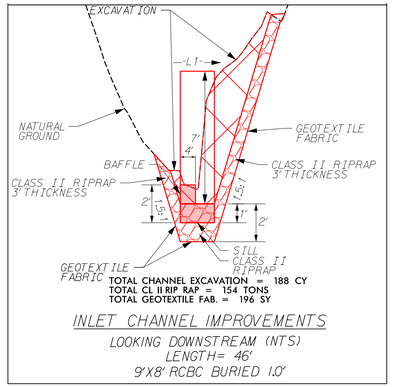
Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-5
	HYDRAULICS DESIGN ENGINEER

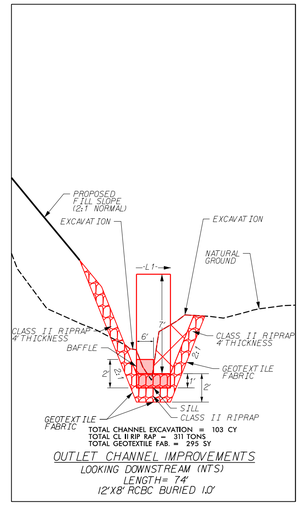
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

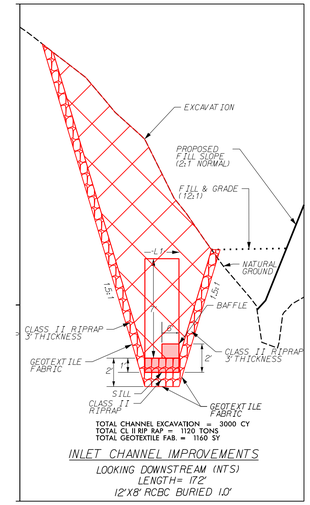
PERMIT DRAWING SHEET 6 OF 103



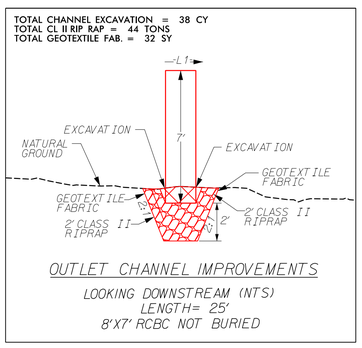


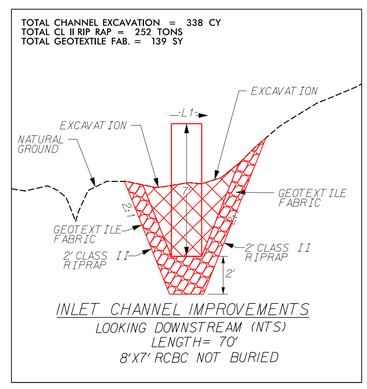
CULVERT INLET/OUTLET DETAILS
C100
-L1- STA. 1008+75
(DETAIL CA)



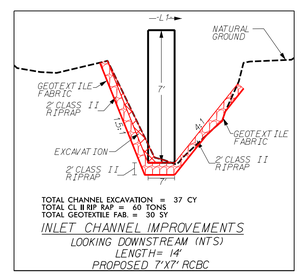


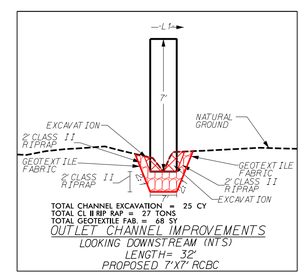
CULVERT INLET/OUTLET DETAILS
C200
-L1- STA. 1013+50
(DETAIL CB)



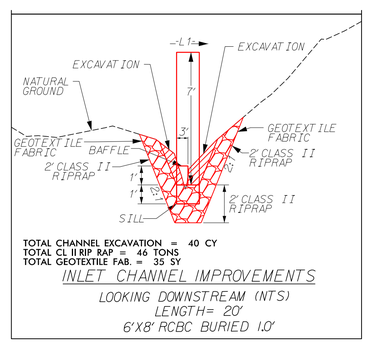


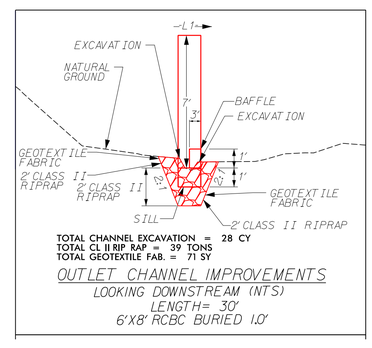
CULVERT INLET/OUTLET DETAILS
C300
-L1- STA. 1099+00
(DETAIL CC)





CULVERT INLET/OUTLET DETAILS
C400
-L1- STA. 1114+75
(DETAIL CD)





CULVERT INLET/OUTLET DETAILS
C500
-L1- STA. 1152+00
(DETAIL CE)

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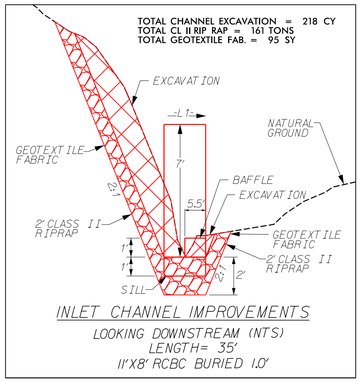
aburke

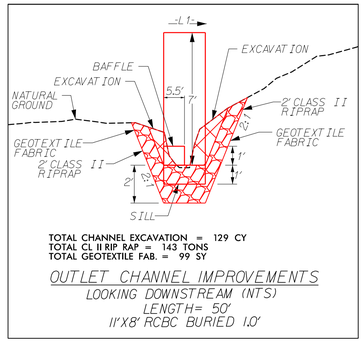
Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-6
	HYDRAULICS DESIGN ENGINEER

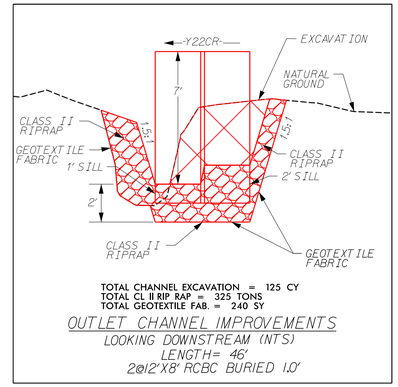
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

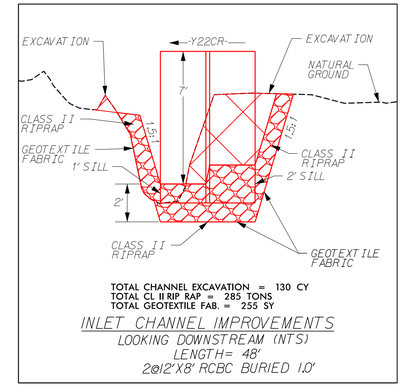
PERMIT DRAWING SHEET 7 OF 103



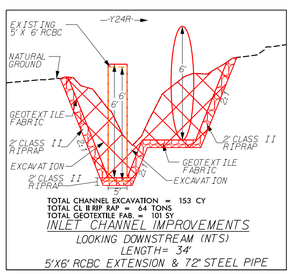


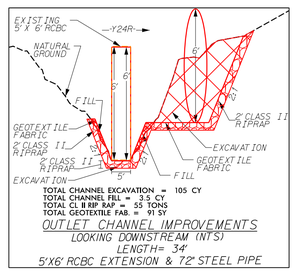
CULVERT INLET/OUTLET DETAILS
C600
-L1- STA. 1171+00
(DETAIL CF)





CULVERT INLET/OUTLET DETAILS
C700
-Y22CR- STA. 14+00
(DETAIL CG)





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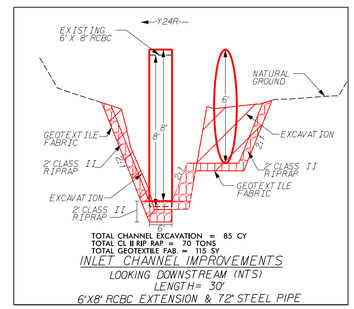
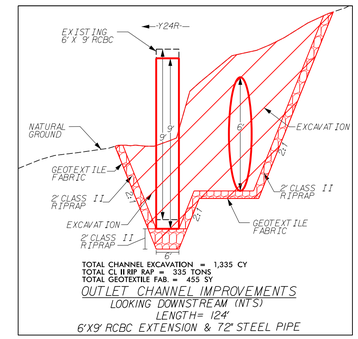
C800
-Y24R- 19+50
(DETAIL CH)





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C900
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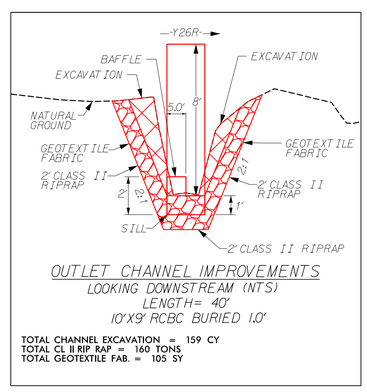
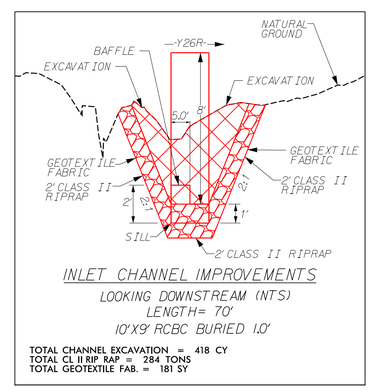
(DETAIL CI)





CULVERT INLET/OUTLET DETAILS
C1000
-Y26R- 18+75
(DETAIL CJ)

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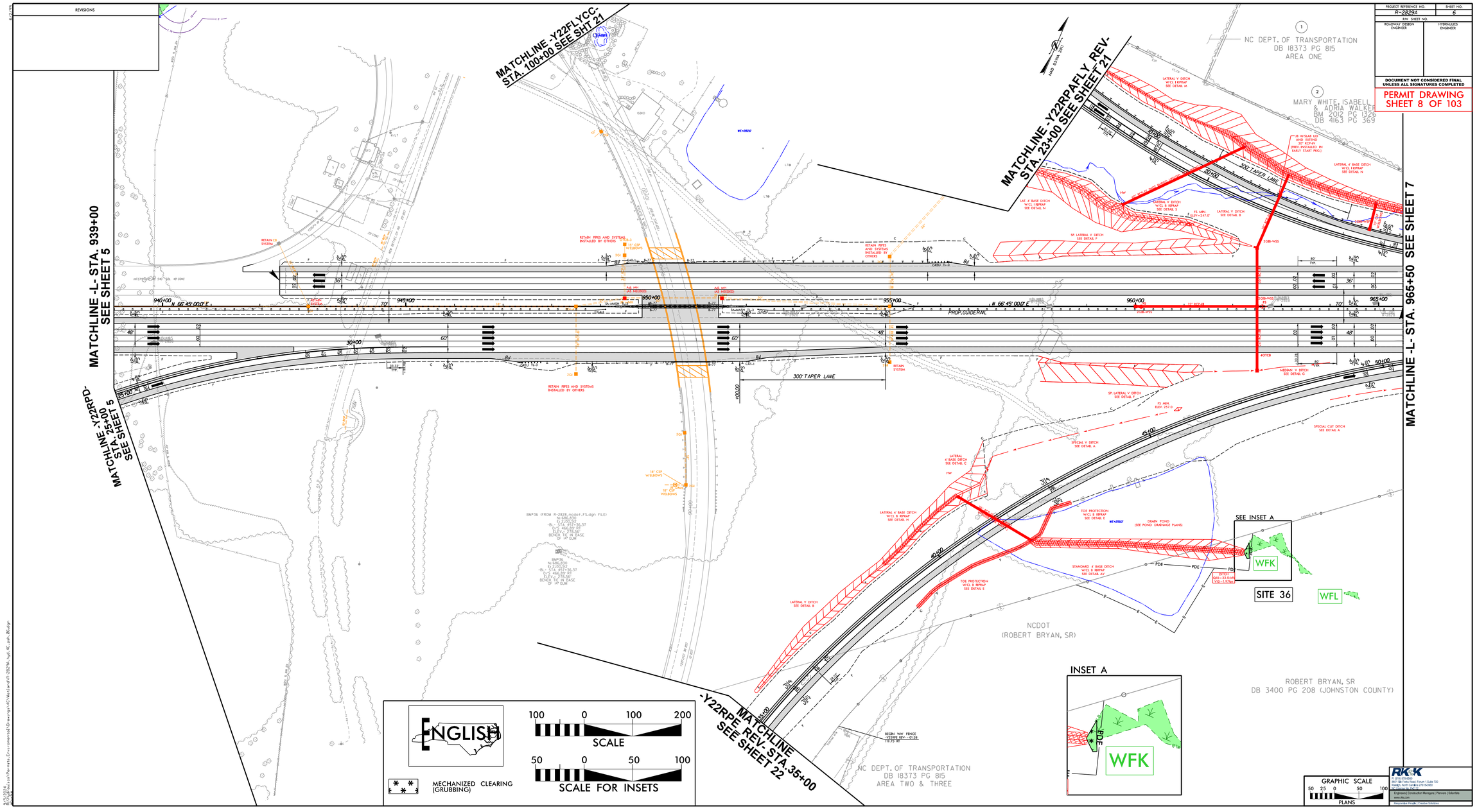
R:\Hydraulics\Permits_Environmental\Drawings\4C\R-2829A_hyd_wet_DitchDetails.dgn
aburke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MATCHLINE -Y22RAFLY REV- STA. 23+00 SEE SHEET 21
MATCHLINE -L- STA. 939+00 SEE SHEET 5
MATCHLINE -L- STA. 965+50 SEE SHEET 7
MATCHLINE -Y22RPD- STA. 25+00 SEE SHEET 5
MATCHLINE -Y22RPE REV- STA. 35+00 SEE SHEET 22
NC DEPT. OF TRANSPORTATION DB 18373 PG 815 AREA ONE
MARY WHITE, ISABELL & ADRIA WALKER BM 2012 PG 1326 DB 4163 PG 369
NC DEPT. OF TRANSPORTATION DB 18373 PG 815 AREA TWO & THREE
NCDOT (ROBERT BRYAN, SR)
ROBERT BRYAN, SR DB 3400 PG 208 (JOHNSTON COUNTY)
300' TAPER LANE
PROP. GUIDERAIL
N 66°45'00.0" E
SEE INSET A
SITE 36
WFK
WFL
INSET A
ENGLISH
MECHANIZED CLEARING (GRUBBING)
SCALE
SCALE FOR INSETS
GRAPHIC SCALE
PLANS
PROJECT REFERENCE NO. R-2828A
SHEET NO. 6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 8 OF 103
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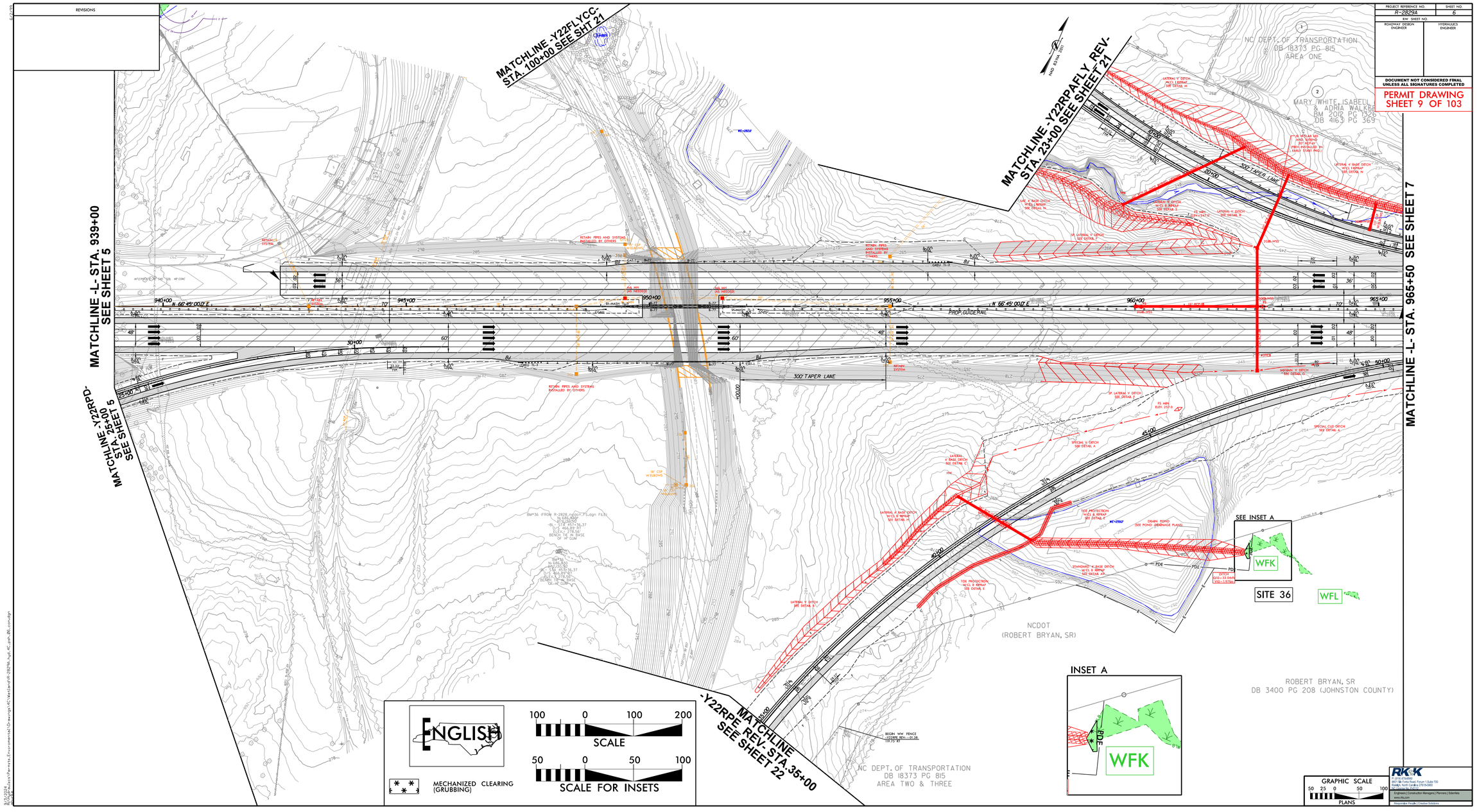
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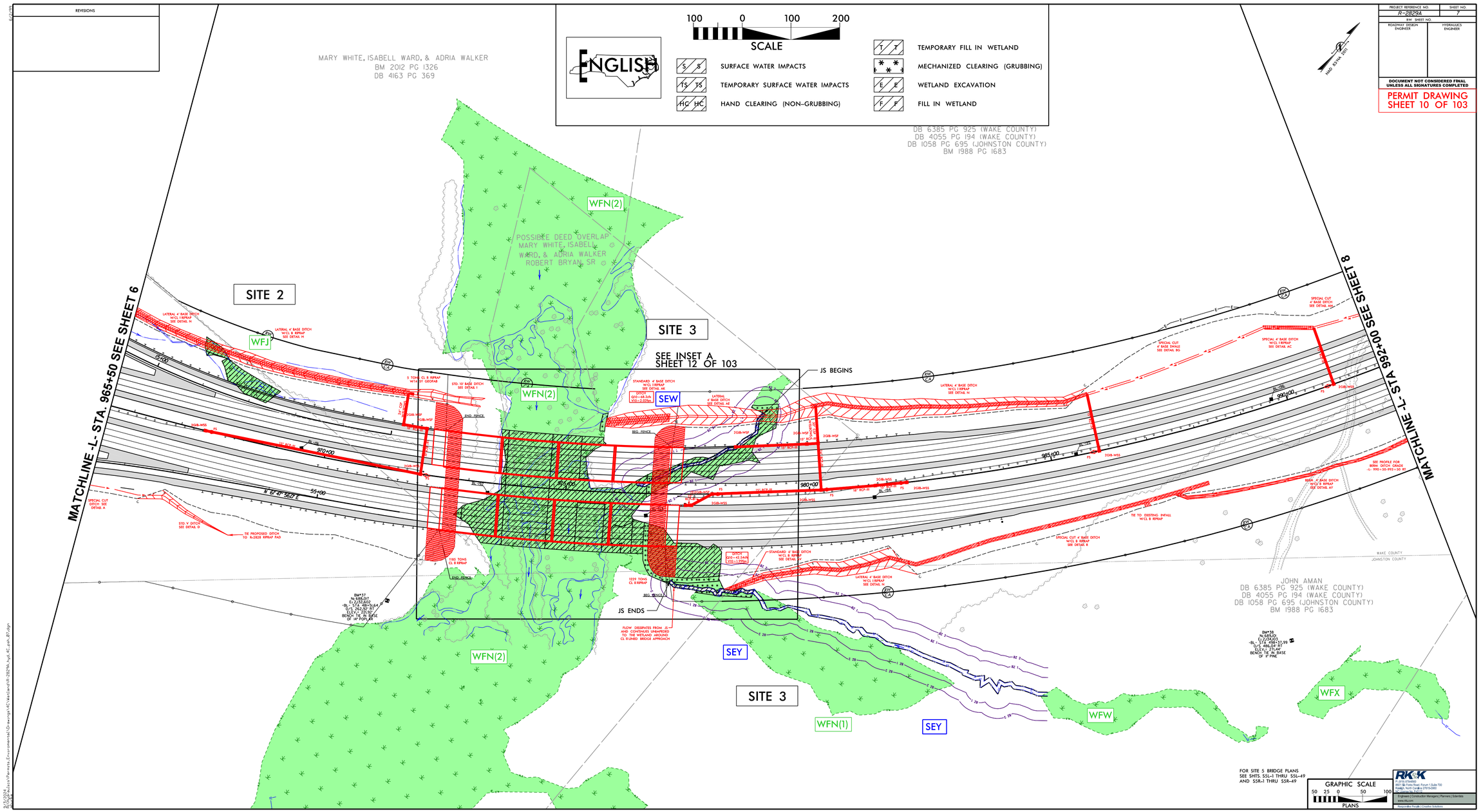
MATCHLINE -Y22FLYCC- STA. 100+00 SEE SHT 21
MATCHLINE -Y22RAFLY REV- STA. 23+00 SEE SHEET 21
MATCHLINE -L- STA. 939+00 SEE SHEET 5
MATCHLINE -L- STA. 965+50 SEE SHEET 7
MATCHLINE -Y22RPD- STA. 25+00 SEE SHEET 5
MATCHLINE -Y22RPE REV- STA. 35+00 SEE SHEET 22
NC DEPT. OF TRANSPORTATION DB 18373 PG 815 AREA ONE
MARY WHITE, ISABELL & ADRIA WALKER BM 2012 PG 1326 DB 4163 PG 369
NCDOT (ROBERT BRYAN, SR)
ROBERT BRYAN, SR DB 3400 PG 208 (JOHNSTON COUNTY)
NC DEPT. OF TRANSPORTATION DB 18373 PG 815 AREA TWO & THREE
300' TAPER LANE
PROP. GUIDE RAIL
N 66°45'00" E
SEE INSET A
SITE 36
WFK
WFL
INSET A
PDE
PD
ENGLISH
MECHANIZED CLEARING (GRUBBING)
SCALE
SCALE FOR INSETS
GRAPHIC SCALE
PLANS
RK&K
PROJECT REFERENCE NO. R-2829A
SHEET NO. 6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 9 OF 103


REVISIONS
SCALE
100 0 100 200
ENGLISH
S S SURFACE WATER IMPACTS
TS TS TEMPORARY SURFACE WATER IMPACTS
HC HC HAND CLEARING (NON-GRUBBING)
T T TEMPORARY FILL IN WETLAND
MECHANIZED CLEARING (GRUBBING)
E E WETLAND EXCAVATION
F F FILL IN WETLAND
PROJECT REFERENCE NO.
R-2829A
SHEET NO.
7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 10 OF 103
MARY WHITE, ISABELL WARD, & ADRIA WALKER
BM 2012 PG 1326
DB 4163 PG 369
DB 6385 PG 925 (WAKE COUNTY)
DB 4055 PG 194 (WAKE COUNTY)
DB 1058 PG 695 (JOHNSTON COUNTY)
BM 1988 PG 1683
POSSIBLE DEED OVERLAP
MARY WHITE, ISABELL WARD, & ADRIA WALKER
ROBERT BRYAN, SR
WFN(2)
SITE 2
SITE 3
WFJ
SEE INSET A
SHEET 12 OF 103
JS BEGINS
JS ENDS
SEW
SEY
WFN(1)
WFW
WFX
MATCHLINE -L- STA. 965+50 SEE SHEET 6
MATCHLINE -L- STA. 992+00 SEE SHEET 8
JOHN AMAN
DB 6385 PG 925 (WAKE COUNTY)
DB 4055 PG 194 (WAKE COUNTY)
DB 1058 PG 695 (JOHNSTON COUNTY)
BM 1988 PG 1683
WAKE COUNTY
JOHNSTON COUNTY
FOR SITE 5 BRIDGE PLANS
SEE SHTS SSL-1 THRU SSL-49
AND SSR-1 THRU SSR-49
GRAPHIC SCALE
50 25 0 50 100
PLANS
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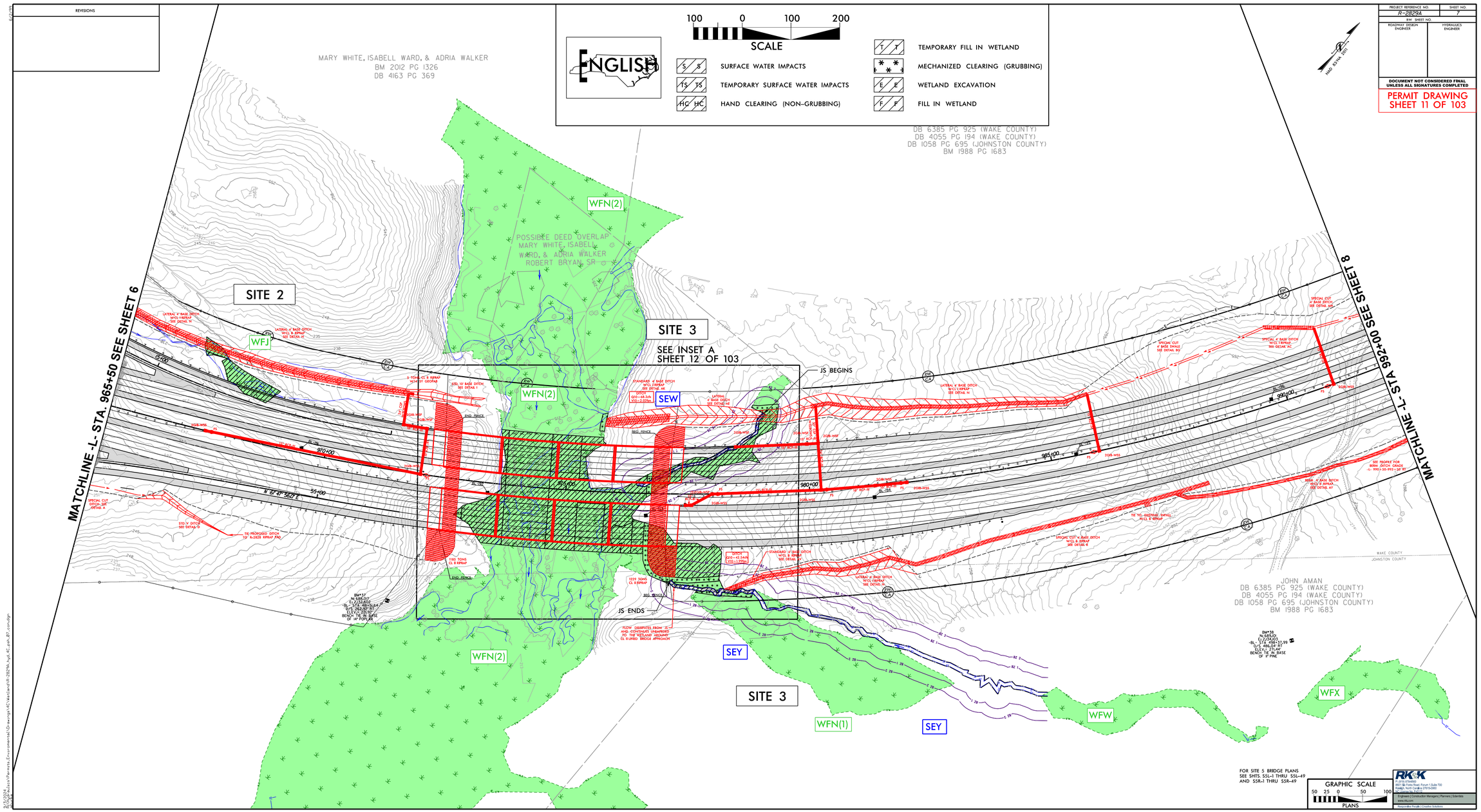

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ENGLISH

25 0 25 50
SCALE FOR INSETS

S S	SURFACE WATER IMPACTS	F F	FILL IN WETLAND
TS TS	TEMPORARY SURFACE WATER IMPACTS	* *	MECHANIZED CLEARING (GRUBBING)
HC HC	HAND CLEARING (NON-GRUBBING)	E E	WETLAND EXCAVATION
		T T	TEMPORARY FILL IN WETLAND

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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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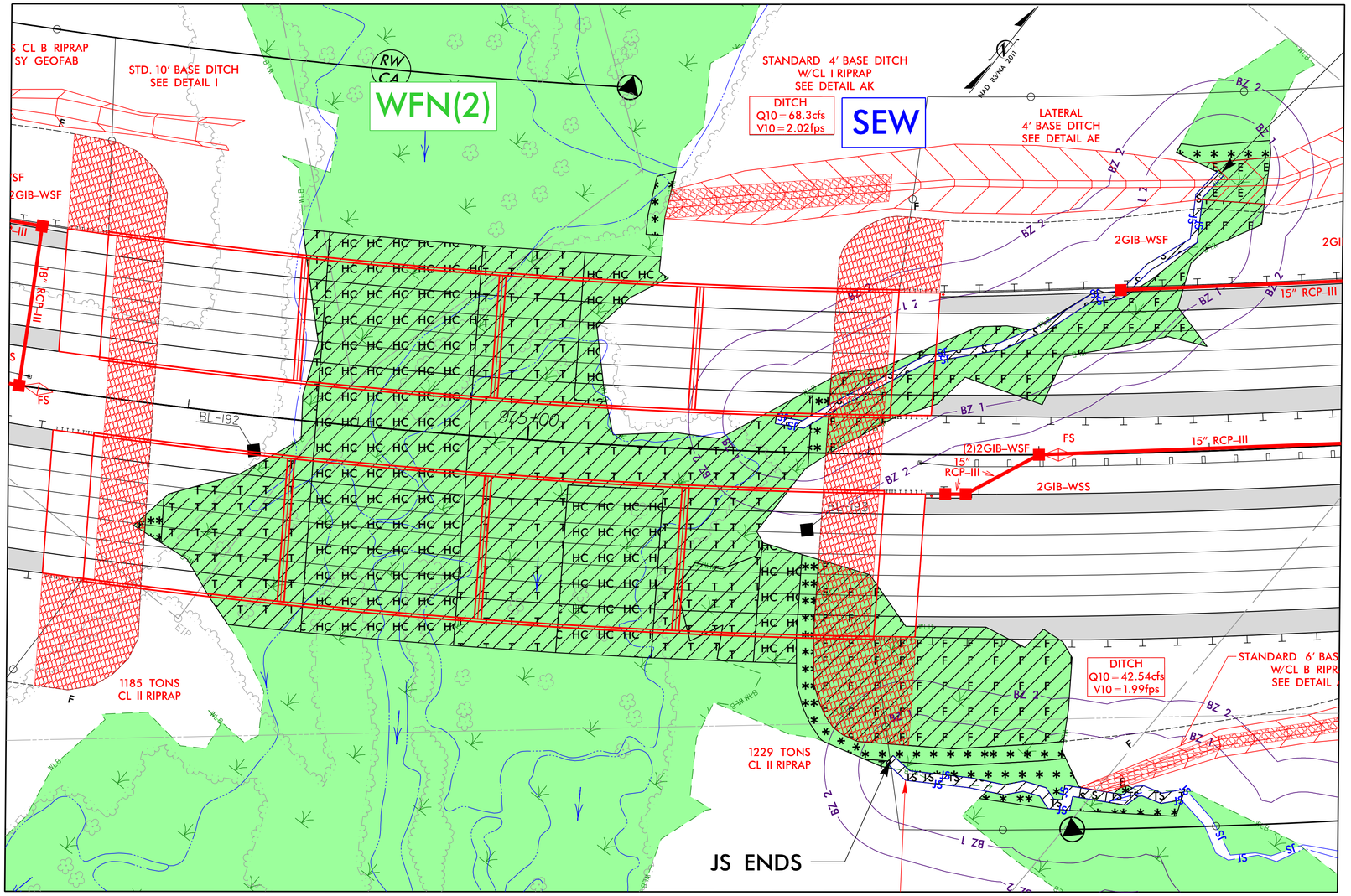
PERMIT DRAWING
SHEET 12 OF 103

SITE 3

INSET A



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9/4/2024
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R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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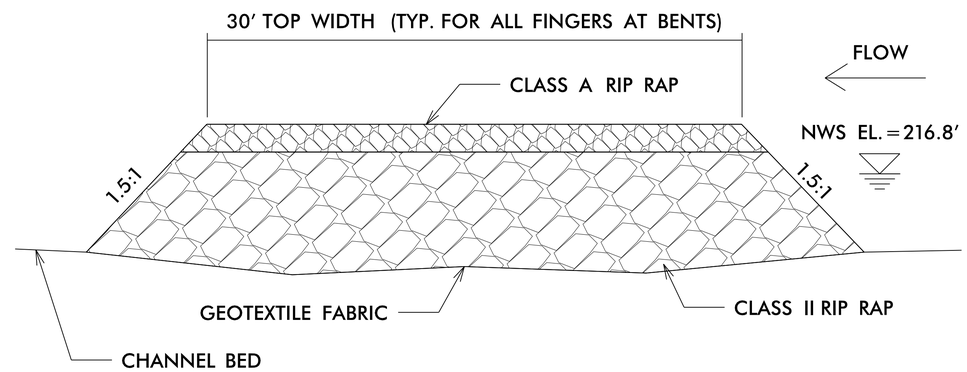
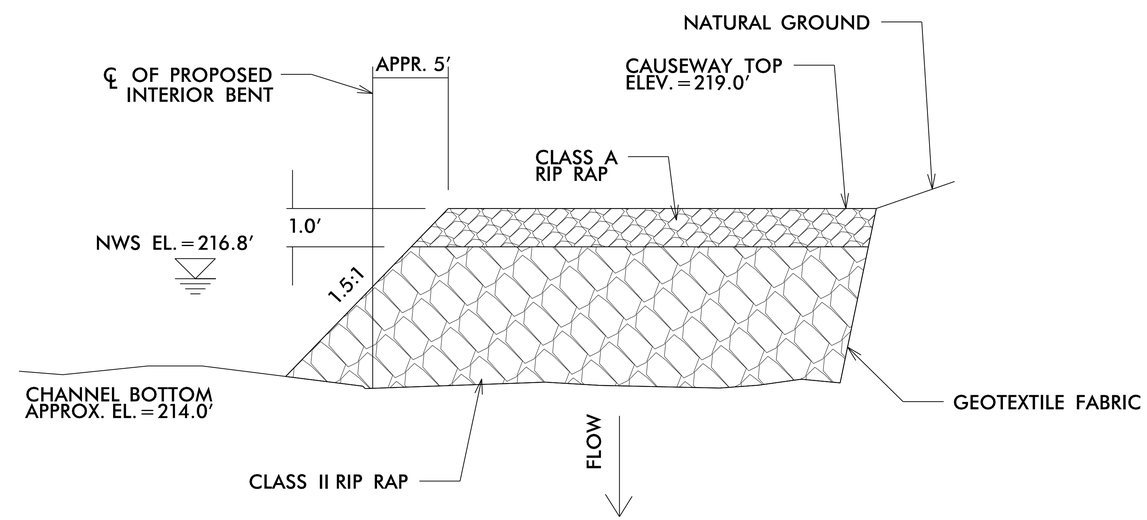
PERMIT DRAWING
SHEET 13 OF 103

TEMPORARY WORK PAD DETAIL

NOT TO SCALE





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8/31/2024
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dbuse

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	39
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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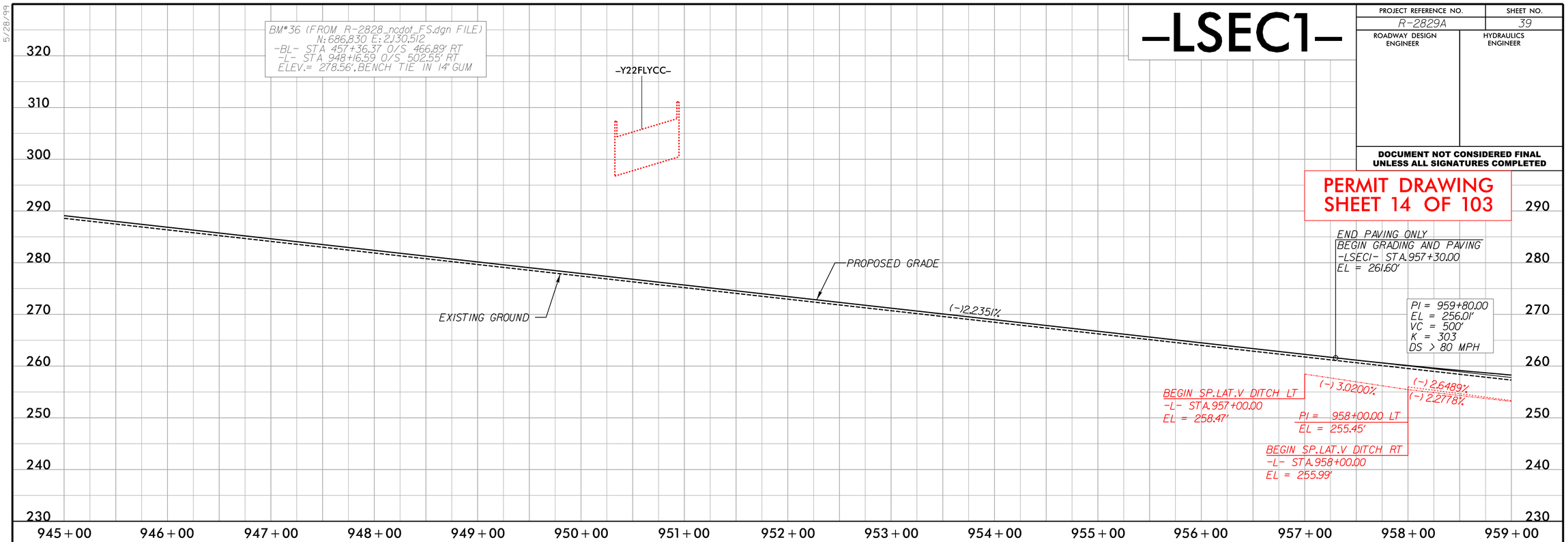
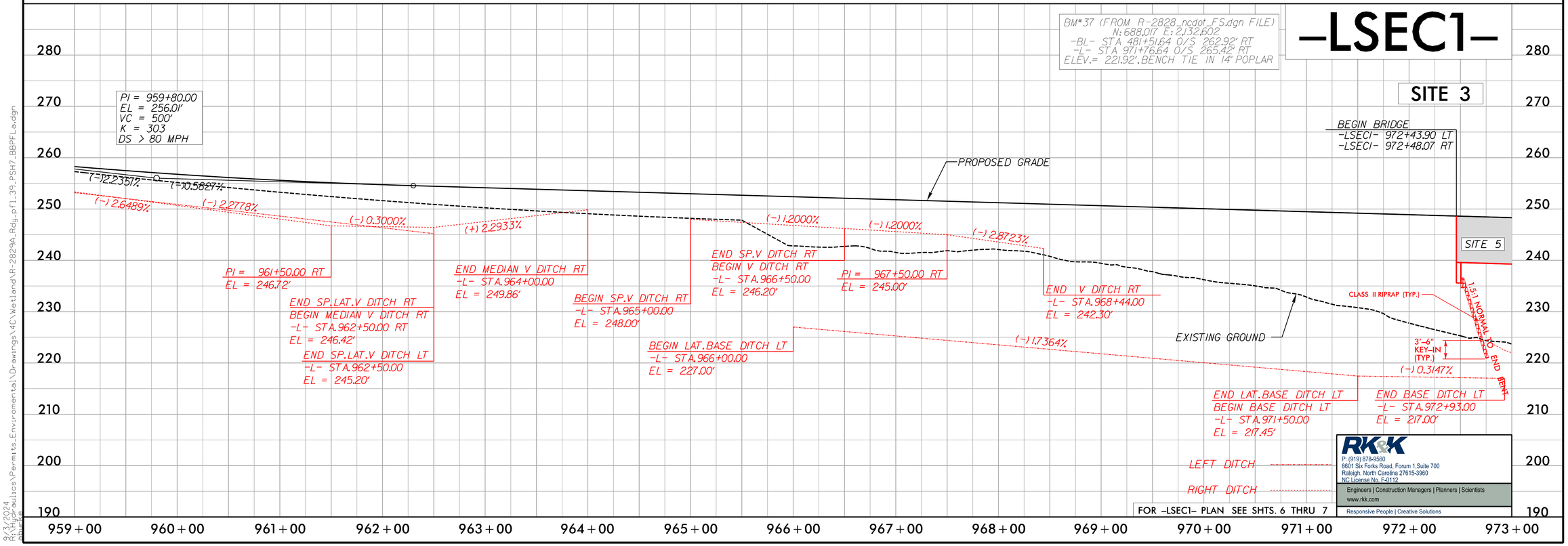
PERMIT DRAWING
SHEET 14 OF 103

-LSEC1-



-LSEC1-

SITE 3



FOR -LSEC1- PLAN SEE SHTS. 6 THRU 7

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	40
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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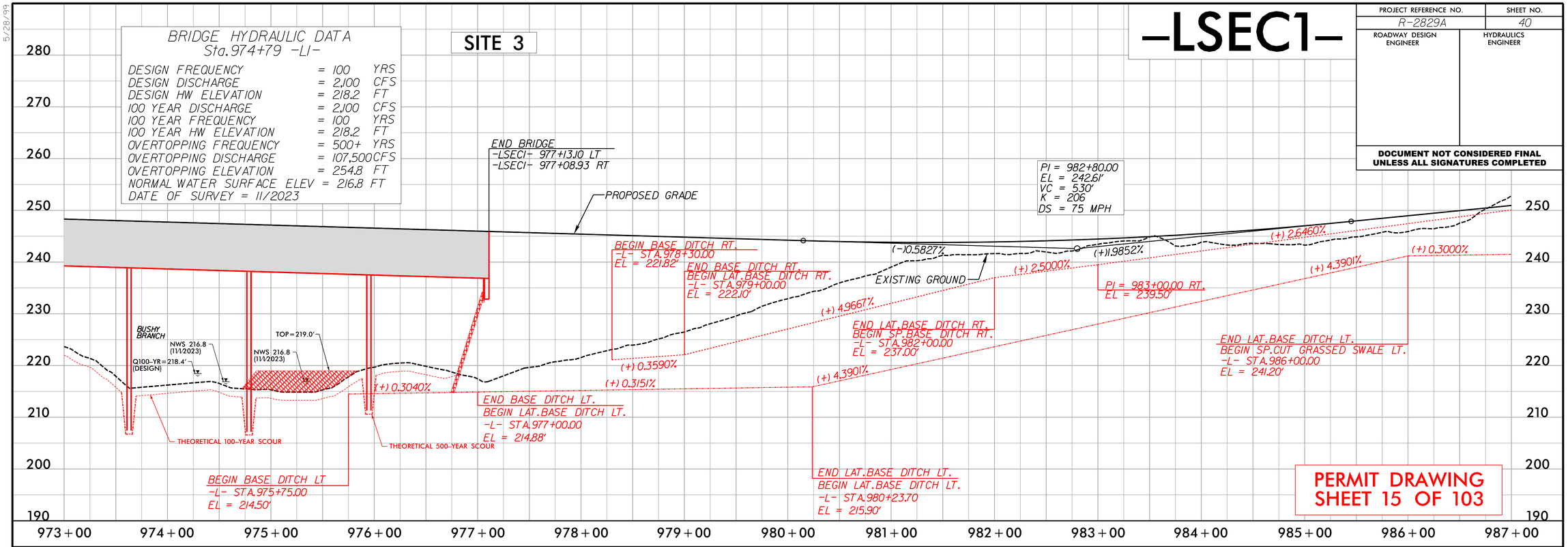
-LSEC1-

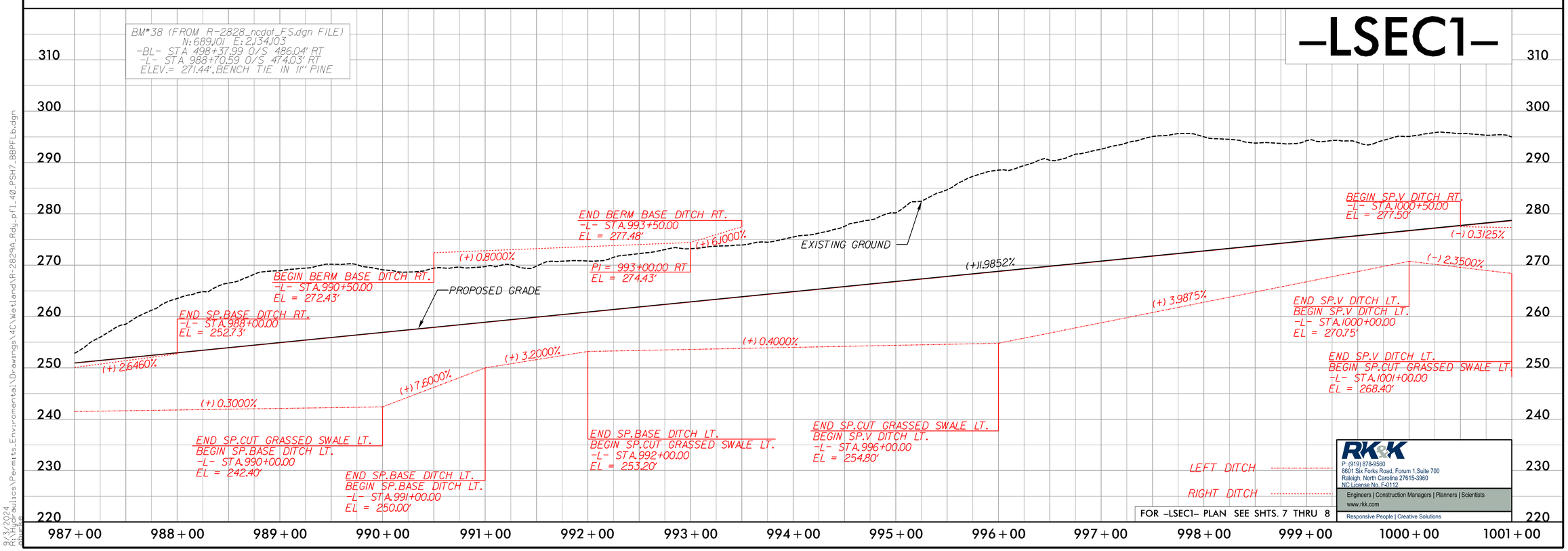
SITE 3

BRIDGE HYDRAULIC DATA
Sta.974+79 -L1-

DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 2,100	CFS
DESIGN HW ELEVATION	= 218.2	FT
100 YEAR DISCHARGE	= 2,100	CFS
100 YEAR FREQUENCY	= 100	YRS
100 YEAR HW ELEVATION	= 218.2	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 107,500	CFS
OVERTOPPING ELEVATION	= 254.8	FT

NORMAL WATER SURFACE ELEV = 216.8 FT
DATE OF SURVEY = 11/2023





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8/31/2024
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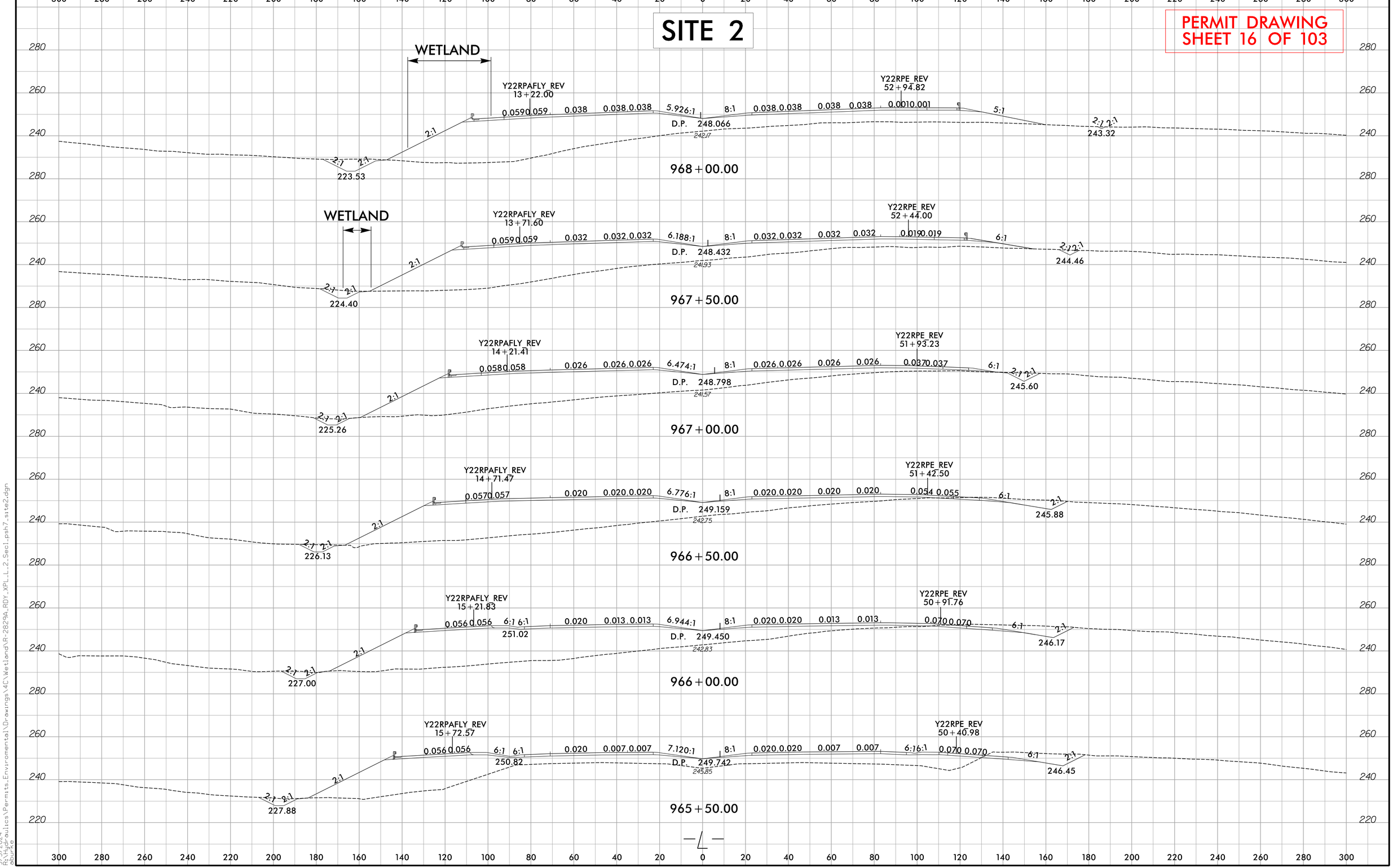
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S1 X-42

SITE 2

PERMIT DRAWING
SHEET 16 OF 103



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9/3/2024
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dbruce

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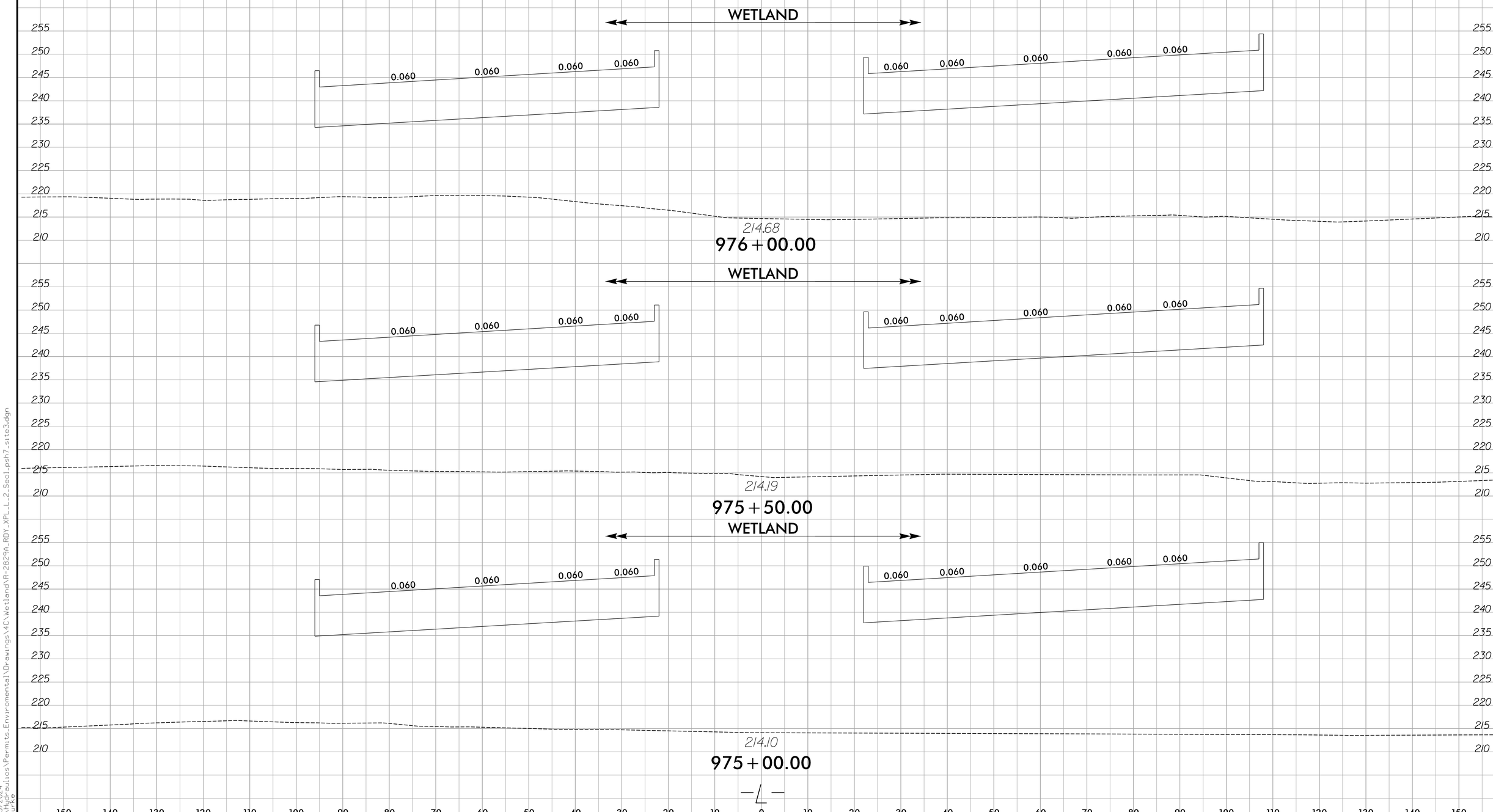
SITE 3

PERMIT DRAWING
SHEET 17 OF 103



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9/3/2024
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ebunce

Submittal September 17, 2024

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 18 OF 103

ENGLISH

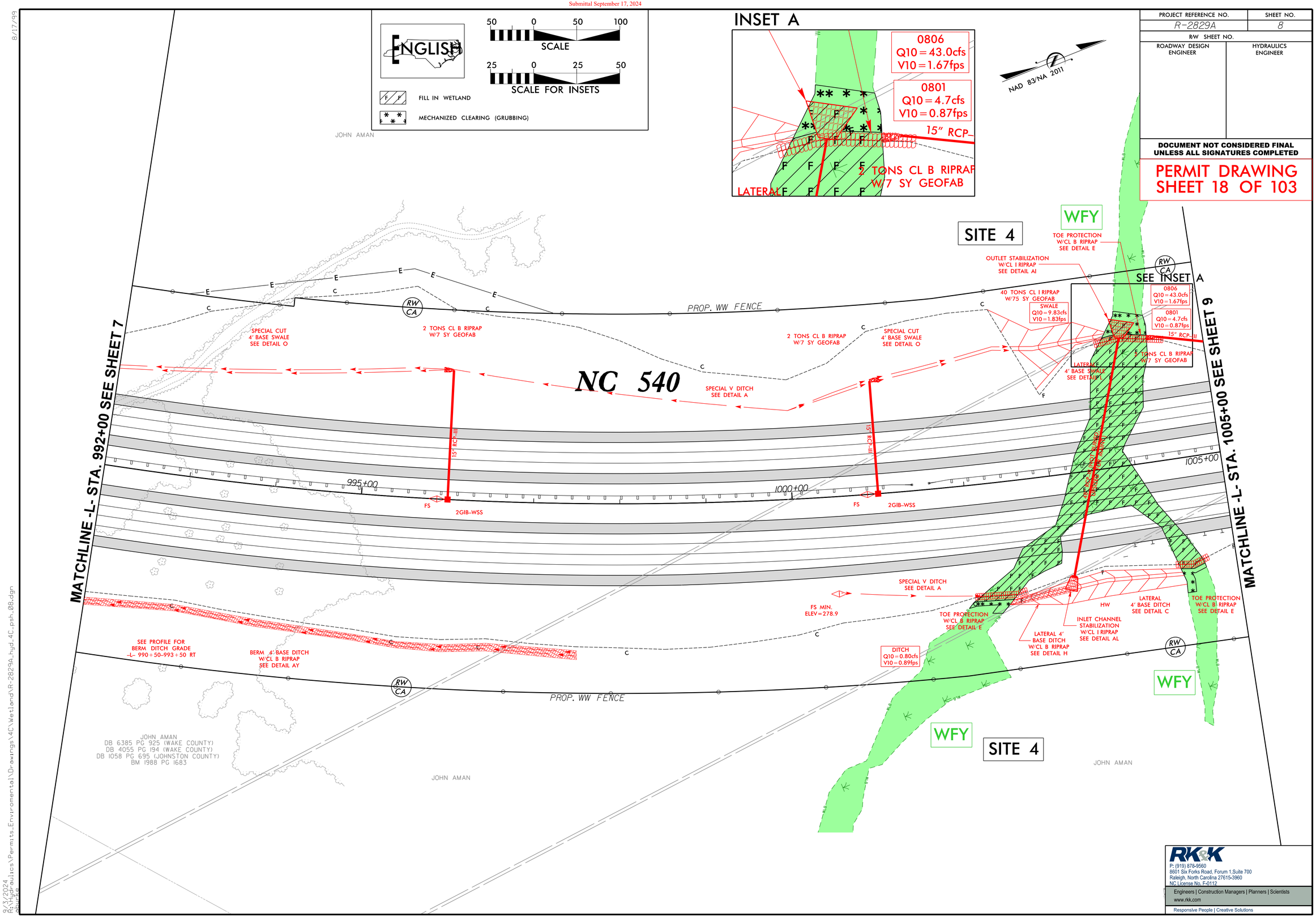
SCALE: 50 0 50 100

SCALE FOR INSETS: 25 0 25 50

FILL IN WETLAND

MECHANIZED CLEARING (GRUBBING)

NAD 83/NA 2011



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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING SHEET 19 OF 103

ENGLISH

SCALE: 50 0 50 100

SCALE FOR INSETS: 25 0 25 50

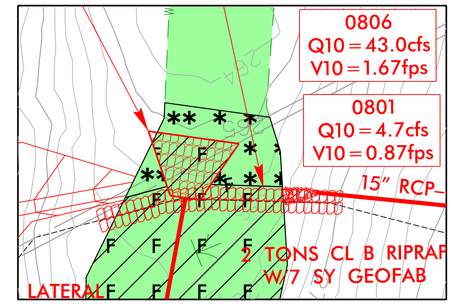
FILL IN WETLAND

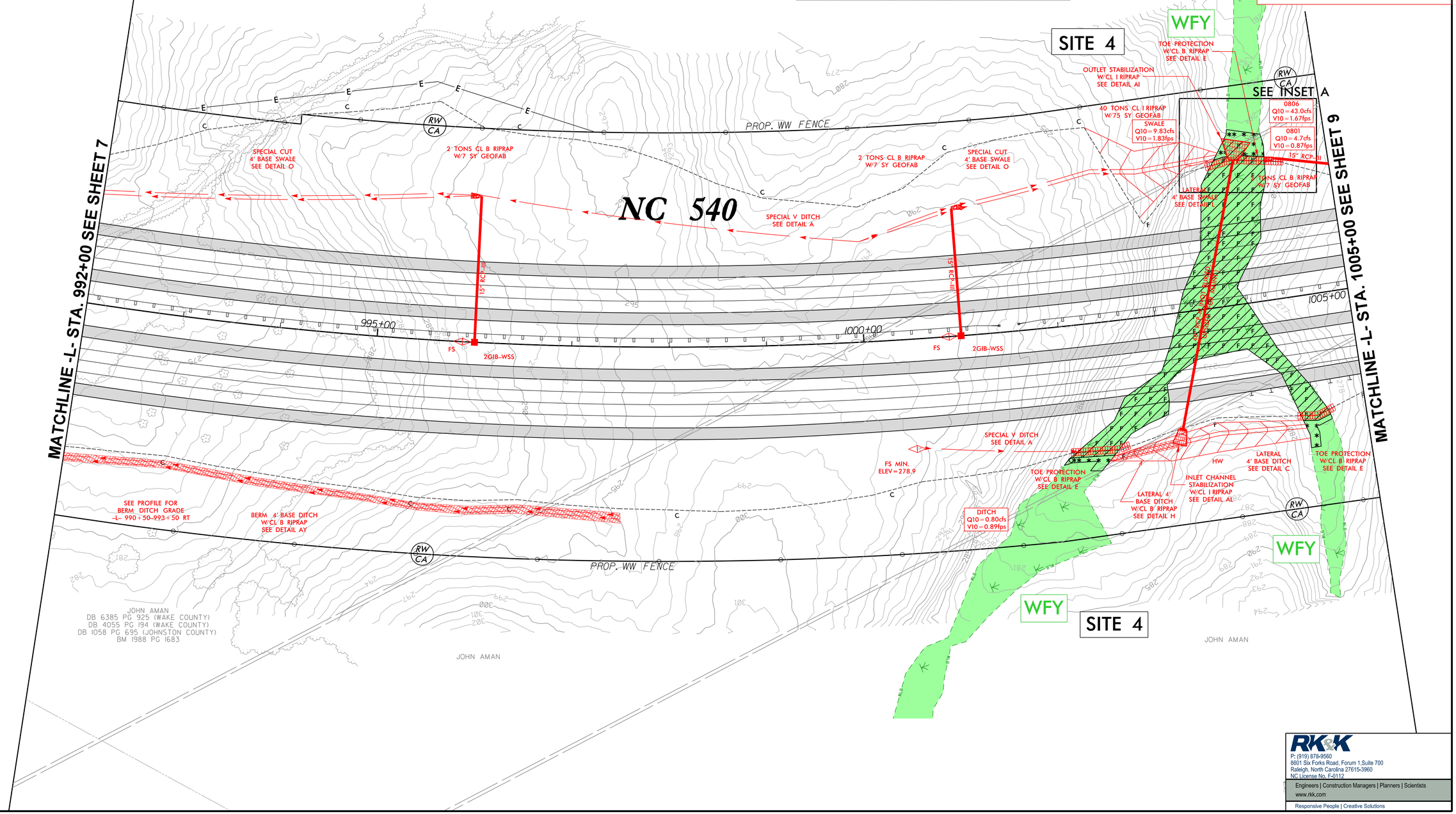
MECHANIZED CLEARING (GRUBBING)

JOHN AMAN

NAD 83/NA 2011

INSET A





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dbuce

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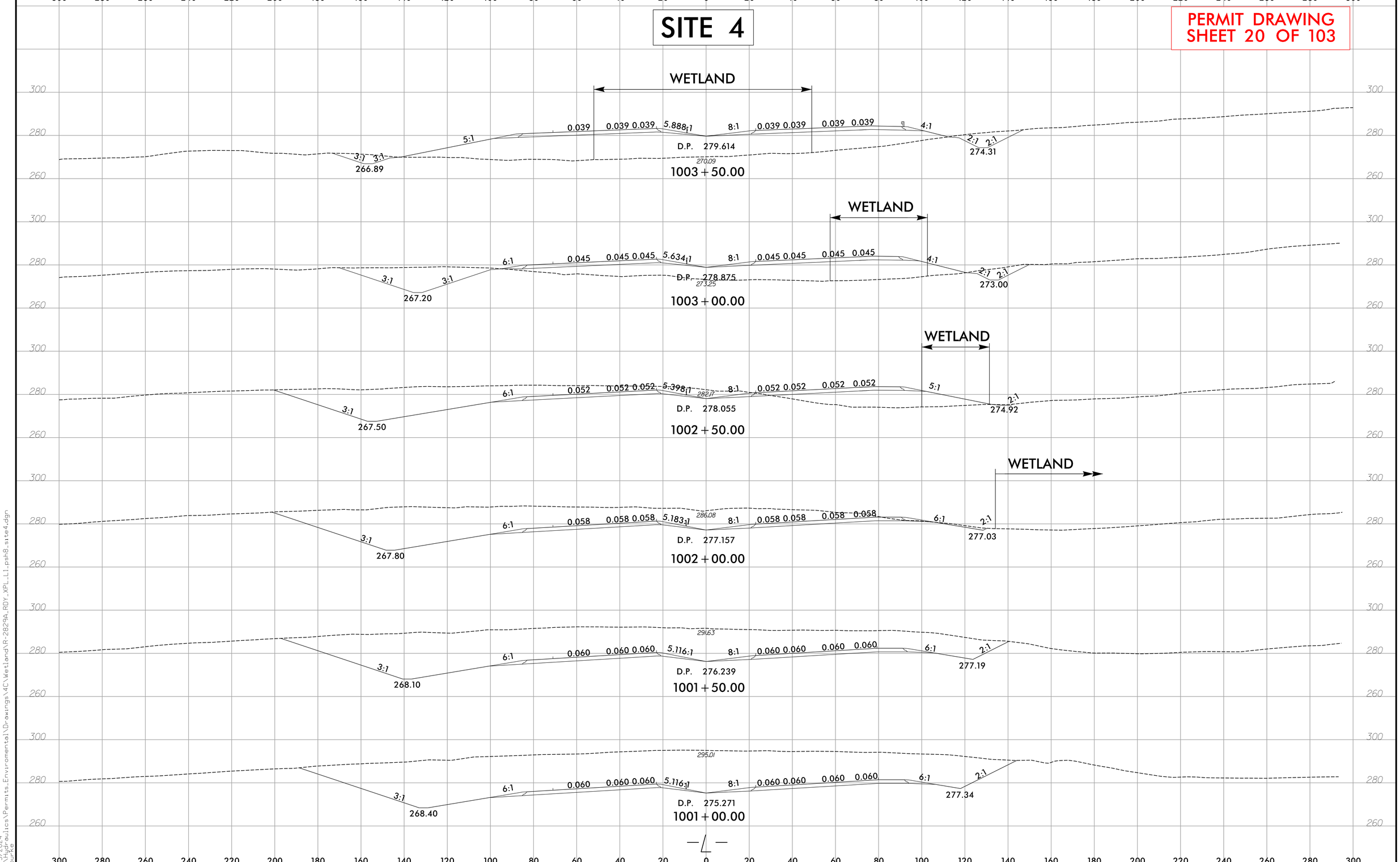
PROJ. REFERENCE NO.	SHEET NO.
R-2829A	S1 X-56

SITE 4

PERMIT DRAWING
SHEET 20 OF 103



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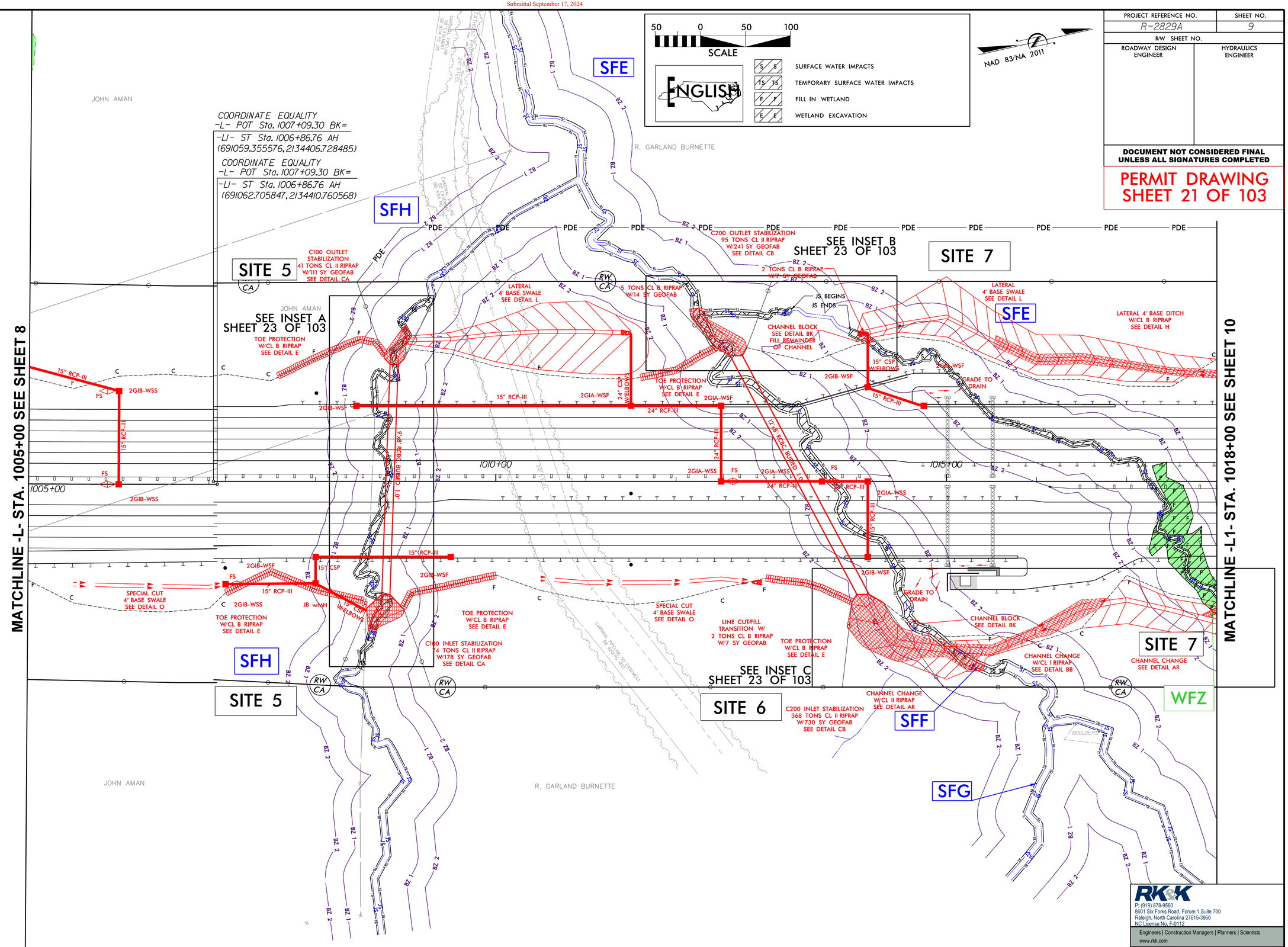
dbuice

Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 21 OF 103



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8/3/2024
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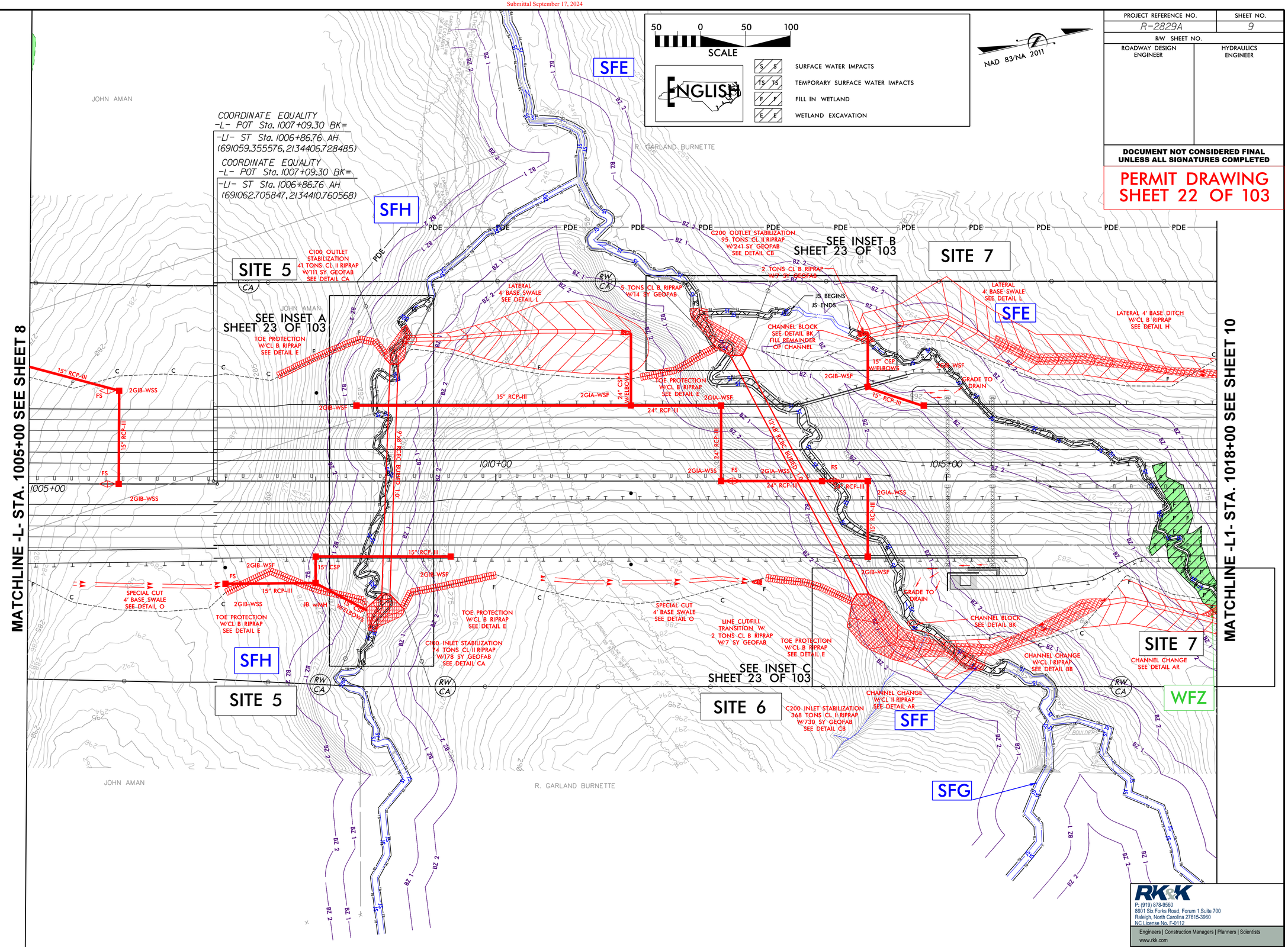
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 22 OF 103



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9/4/2024
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8/17/99

25 0 25 50
SCALE FOR INSET

ENGLISH

* *	MECHANIZED CLEARING (GRUBBING)
S S	SURFACE WATER IMPACTS
TS TS	TEMPORARY SURFACE WATER IMPACTS
F F	FILL IN WETLAND
E E	WETLAND EXCAVATION

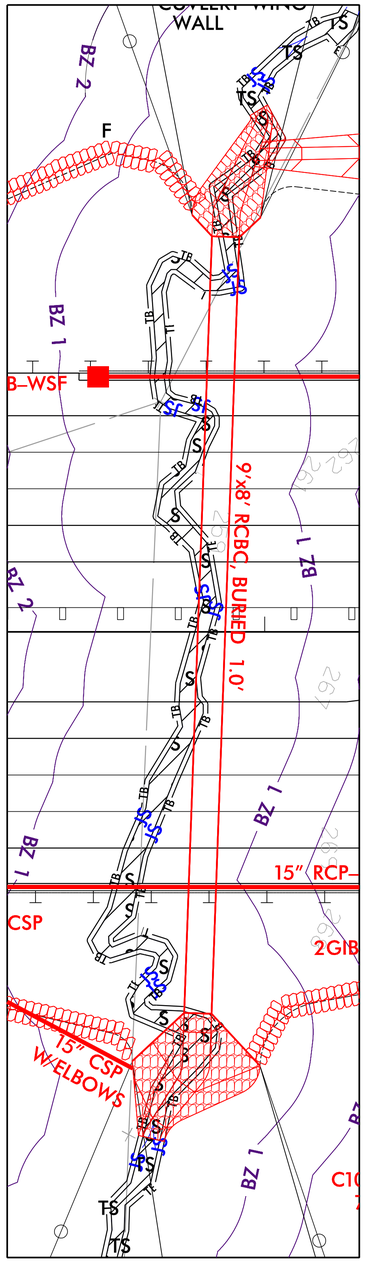
NAD 83/NA 2011

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

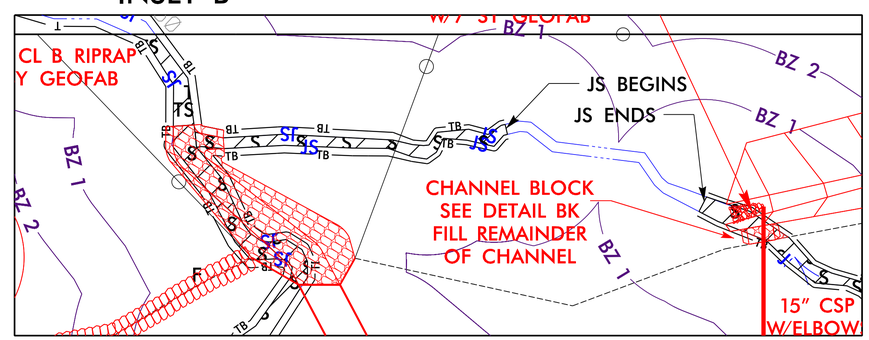
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 23 OF 103

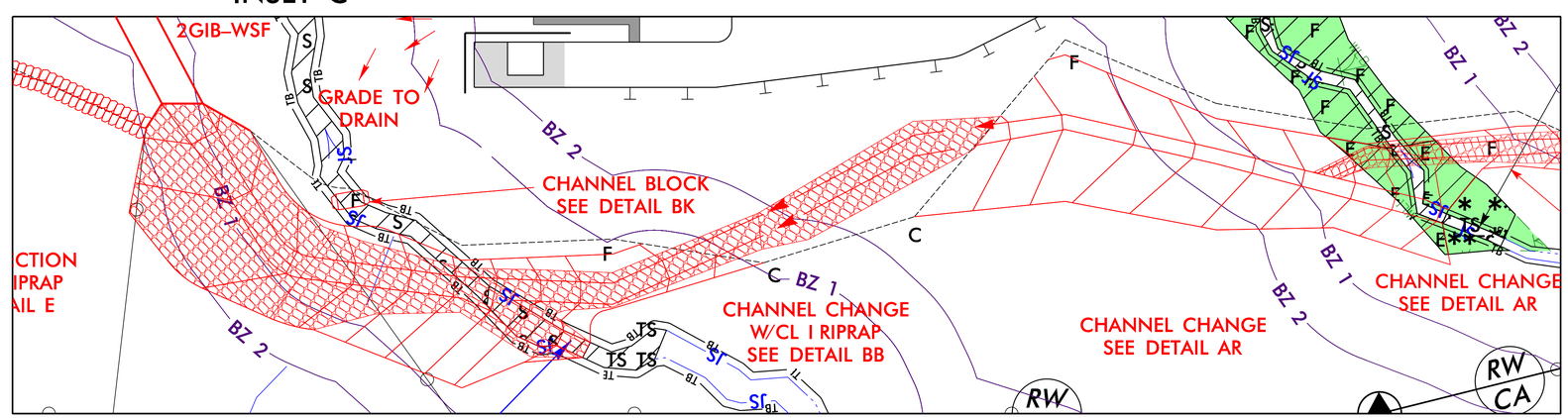
INSET A



INSET B



INSET C



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dpuce

Submittal September 17, 2024

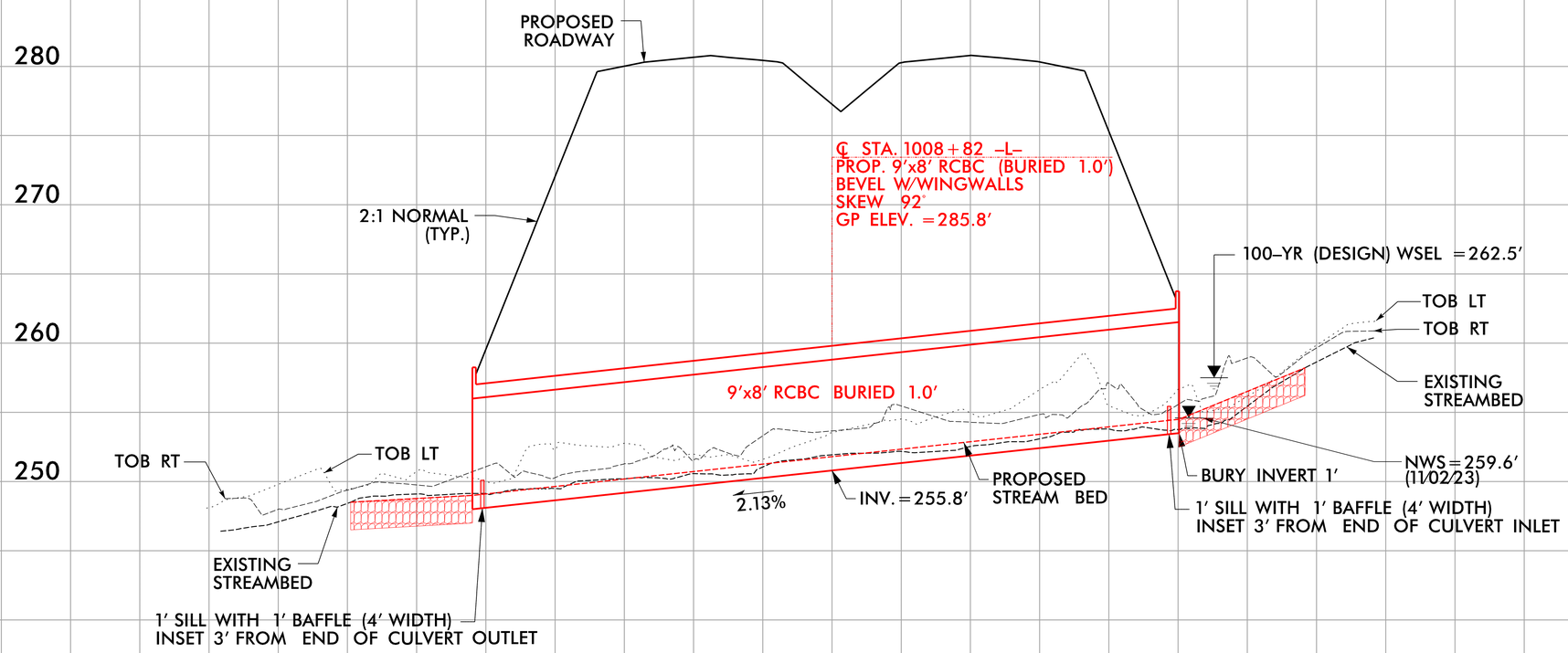
PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 24 OF 103

ENGLISH

SITE 5
–L1– STA. 1008 + 82



9'x8' RCBC
(Buried 1.0', Length = 258')

5/14/99
8/31/2024
R:\Hydraulics\Permits_Environmental\Drawings\4C\Wetland\R-2829A_hyd_4C_psh_01_SITE5_PFL.dgn

Submittal September 17, 2024

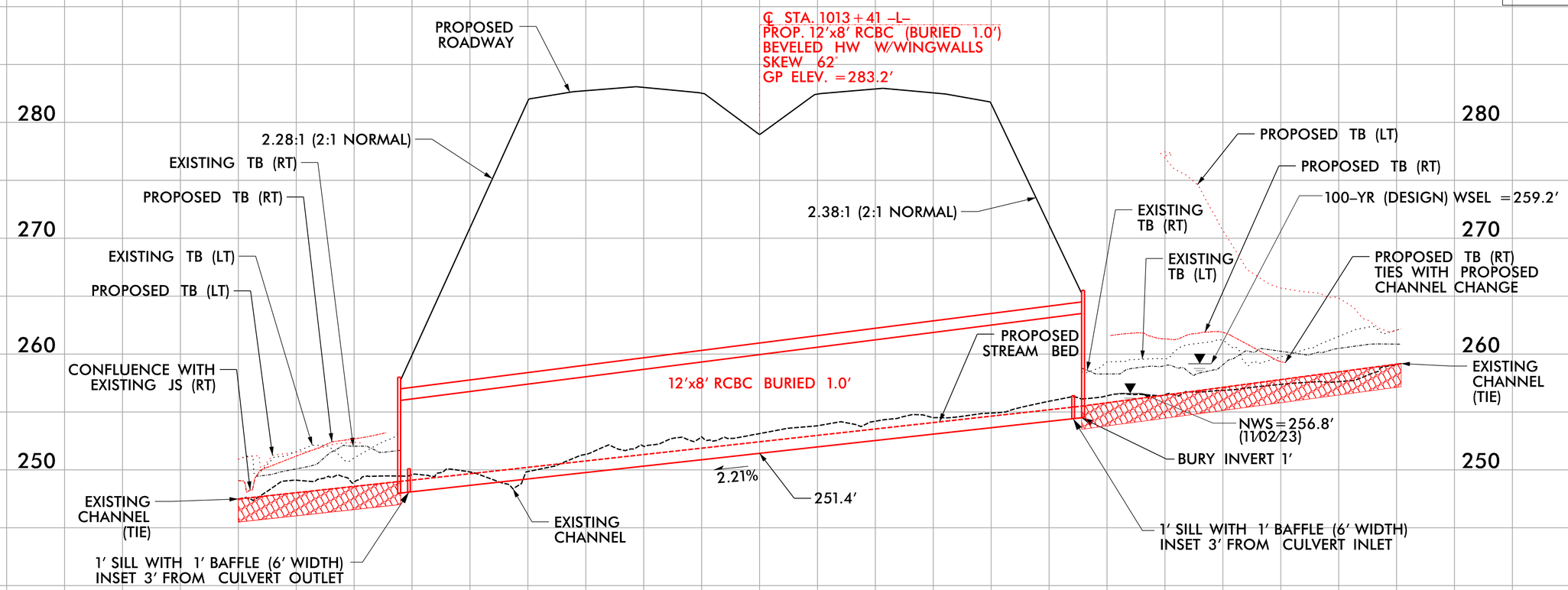
PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 25 OF 103

ENGLISH

SITE 6
–L1– STA. 1013 + 41



12'x8' RCBC
(Buried 1.0', Length = 294')

5/14/99
8/3/2024
2:19:08 pm
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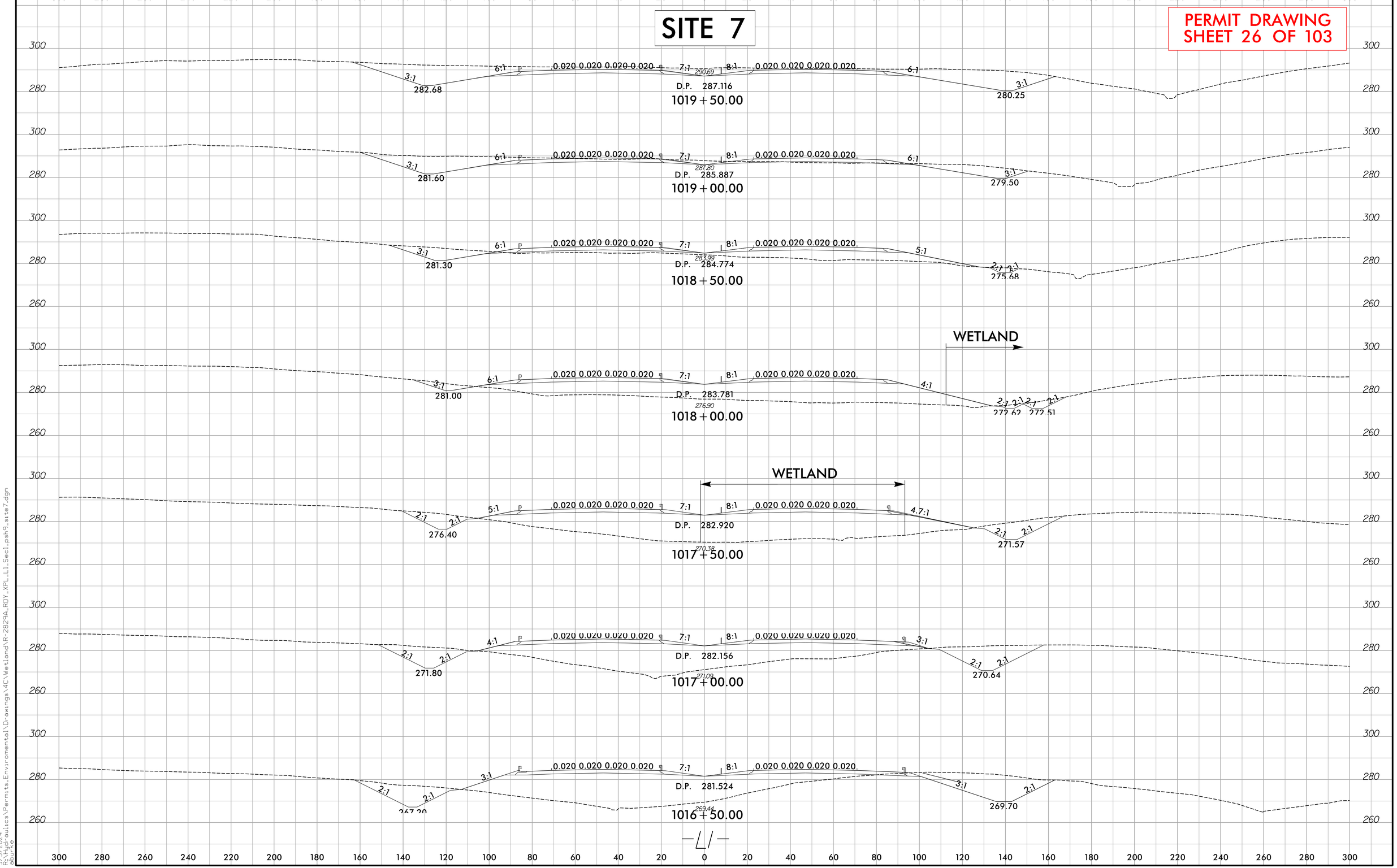
Submittal September 17, 2024

6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S1 X-64

SITE 7

PERMIT DRAWING
SHEET 26 OF 103



9/3/2024
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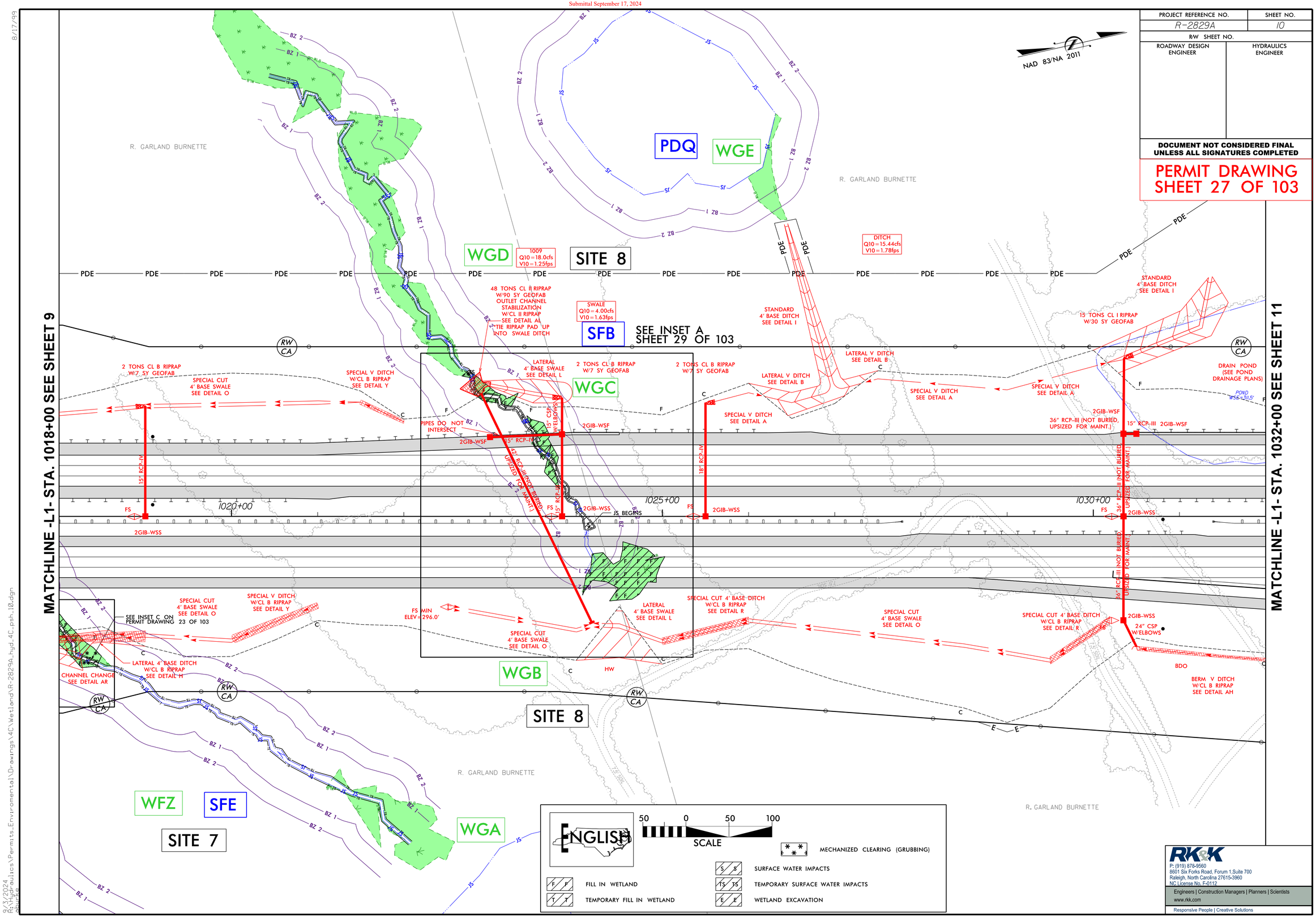
dbunce

Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 27 OF 103



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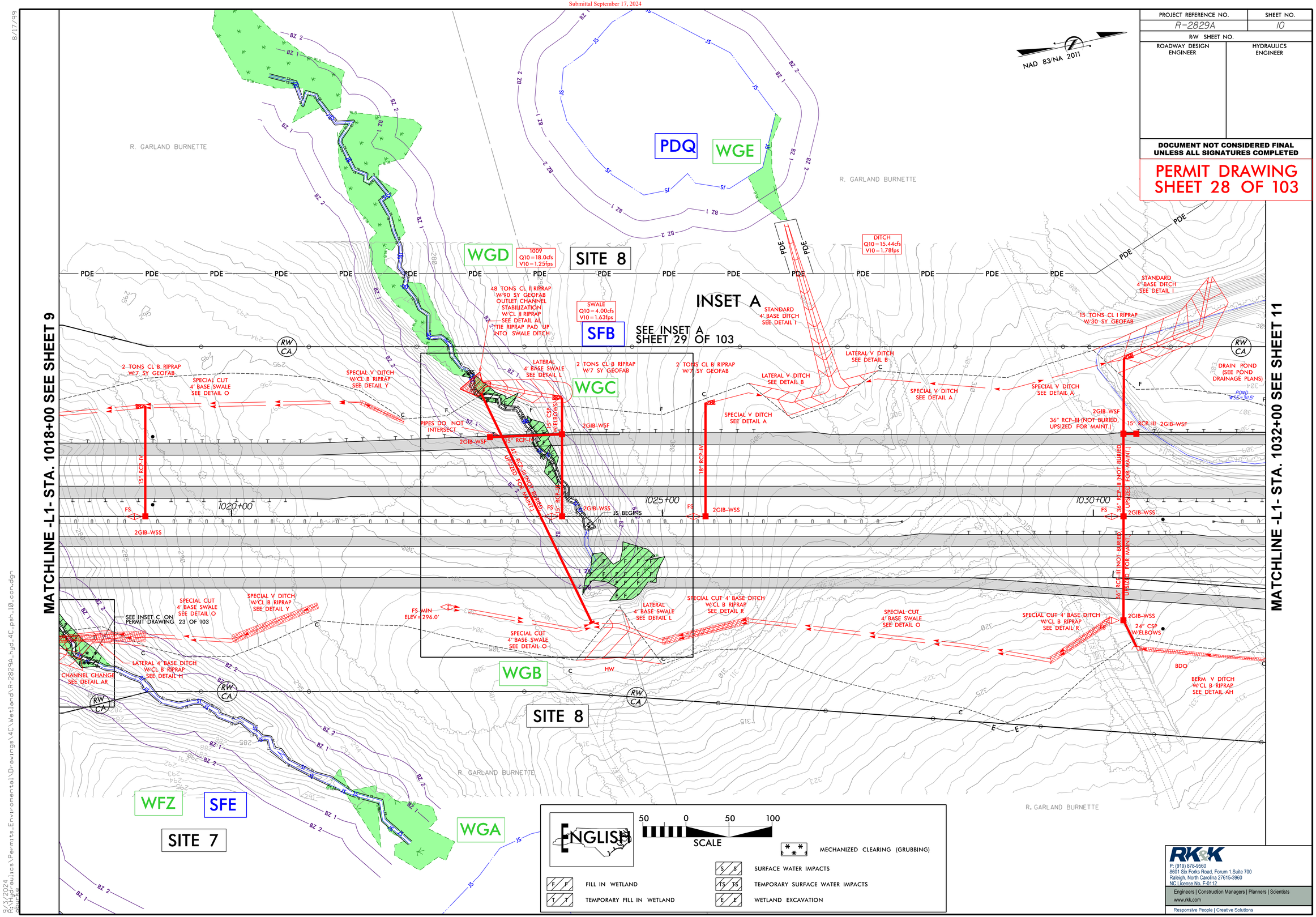
Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 28 OF 103



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Submittal September 17, 2024

8/17/99

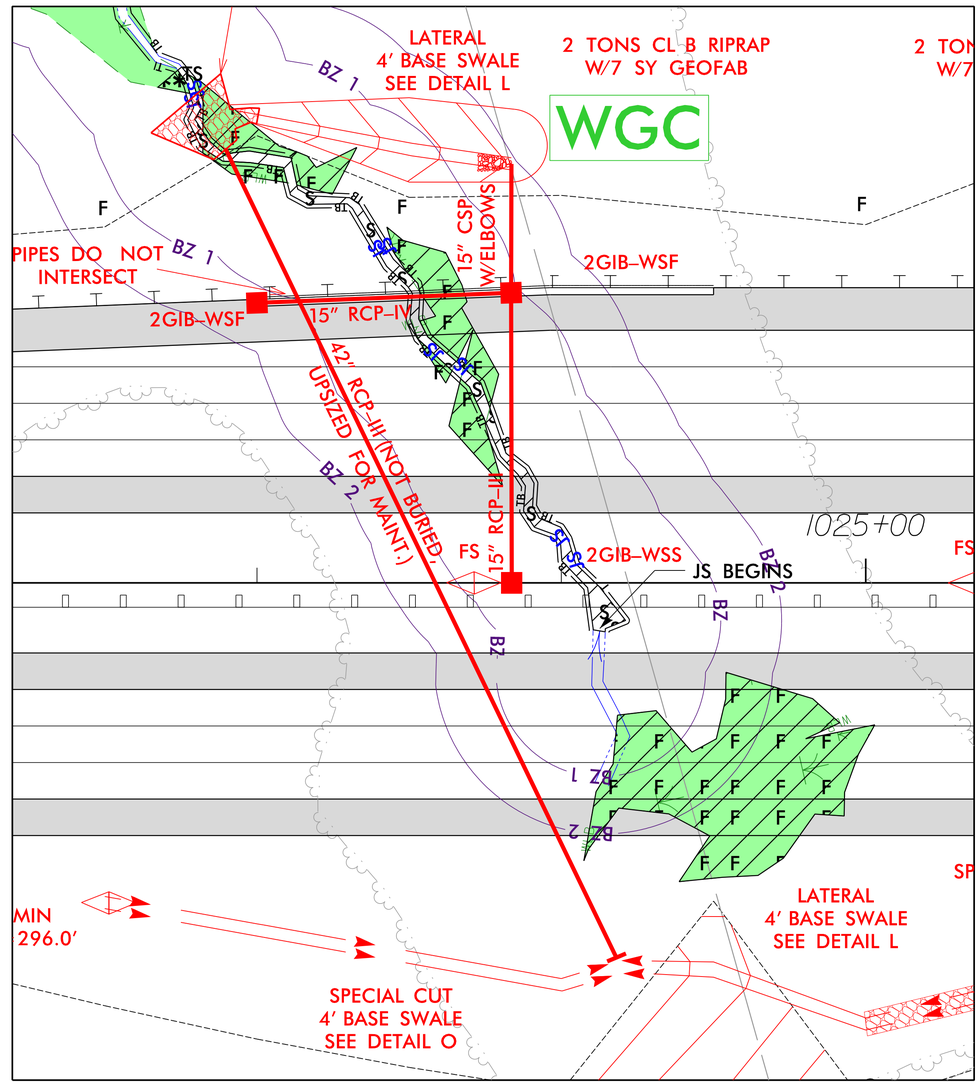
PROJECT REFERENCE NO.	SHEET NO.
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 29 OF 103

NAD 83/NA 2011

INSET A



ENGLISH

25 0 25 50
SCALE FOR INSET

MECHANIZED CLEARING (GRUBBING)

F F FILL IN WETLAND

T T TEMPORARY FILL IN WETLAND

S S SURFACE WATER IMPACTS

TS TS TEMPORARY SURFACE WATER IMPACTS

E E WETLAND EXCAVATION

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dbuffo

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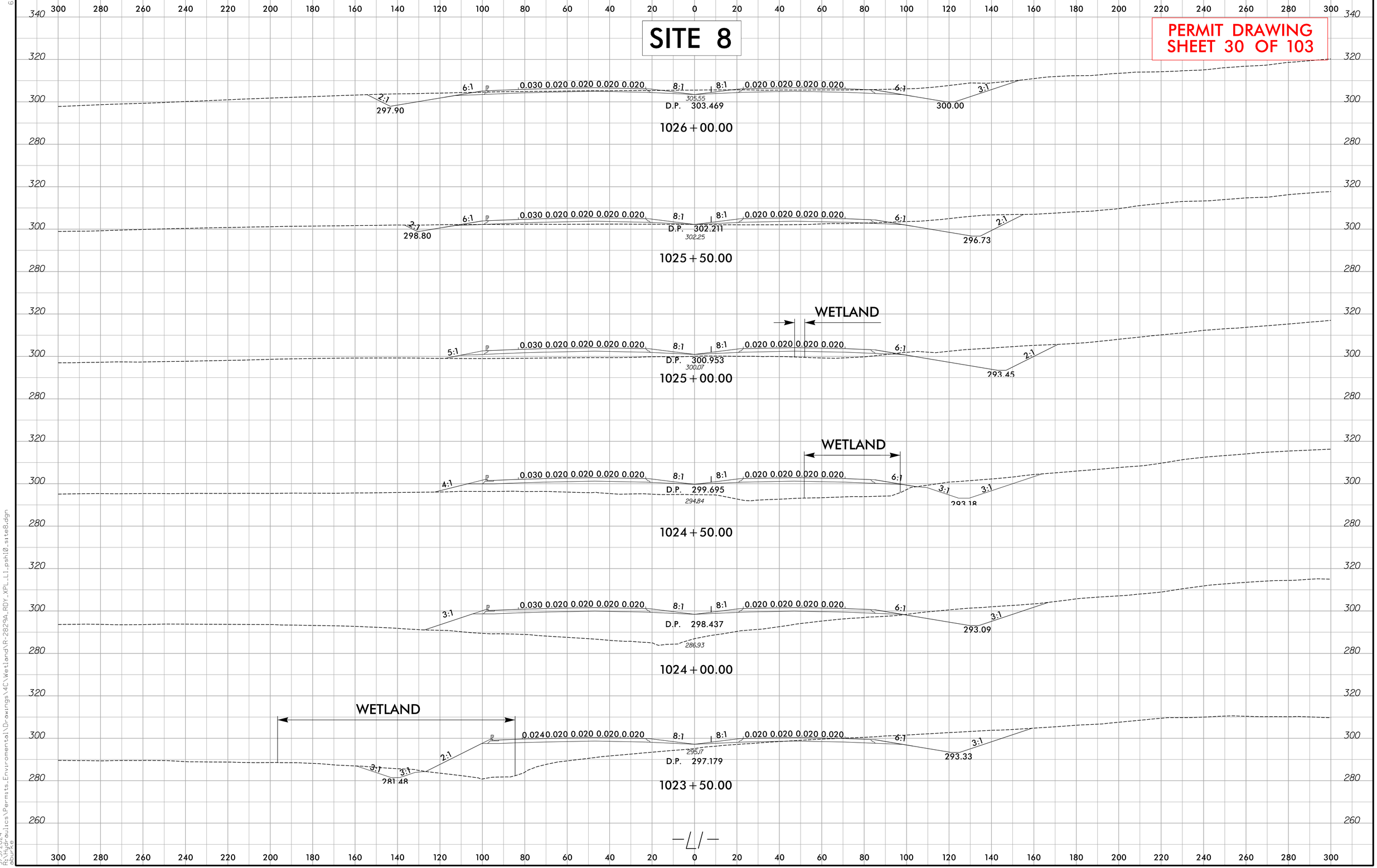
6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S1 X-66

SITE 8

PERMIT DRAWING
SHEET 30 OF 103



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ebunce

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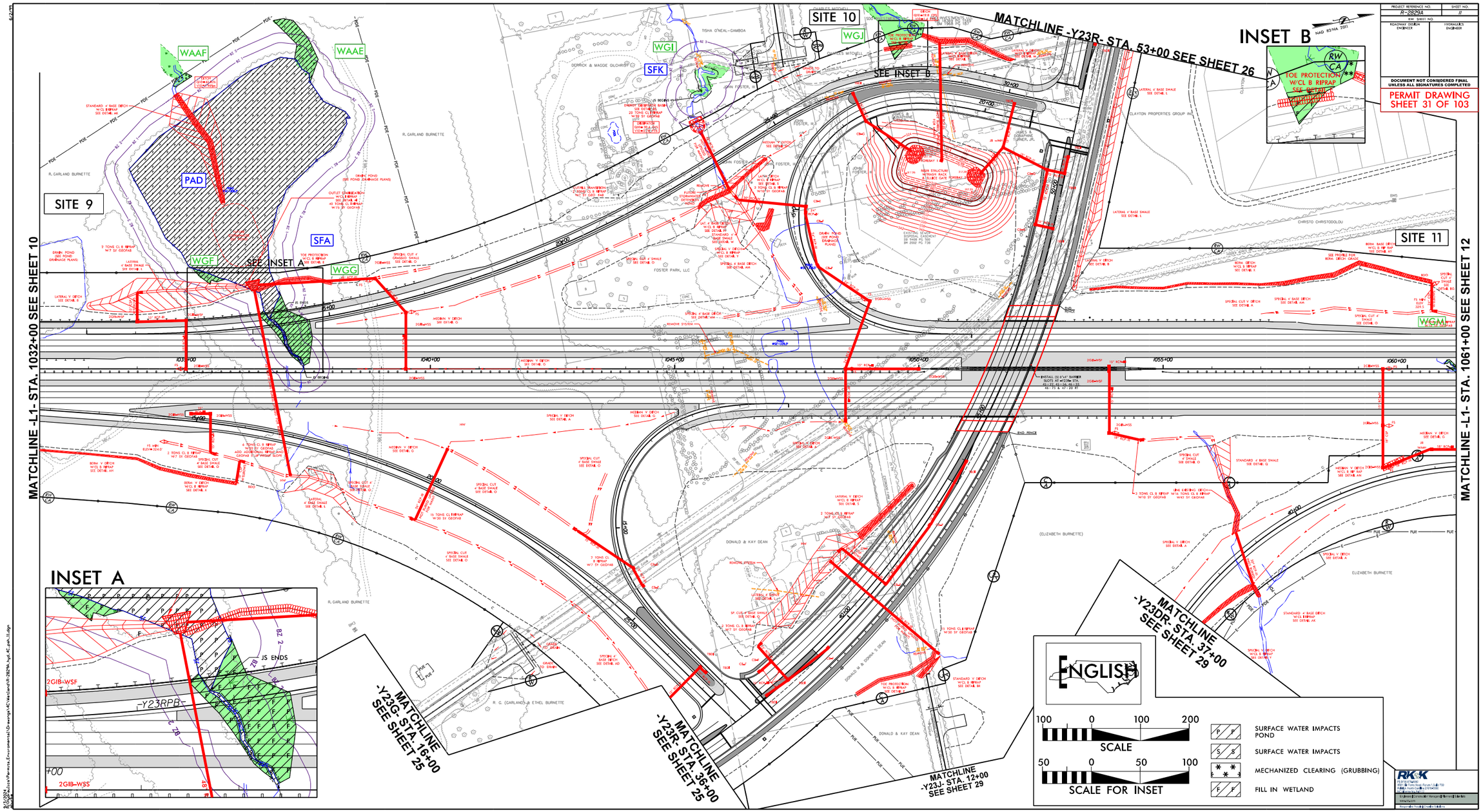

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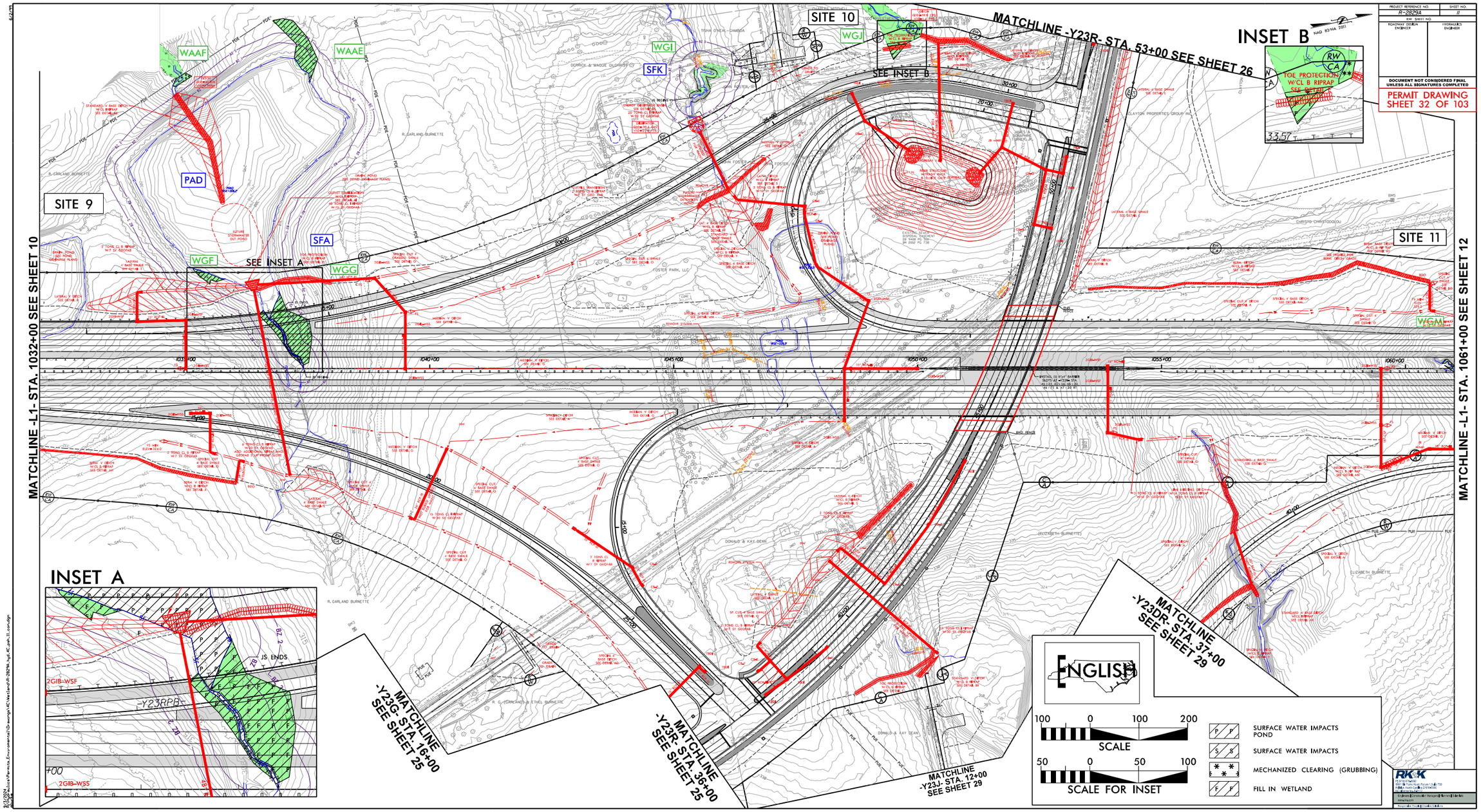

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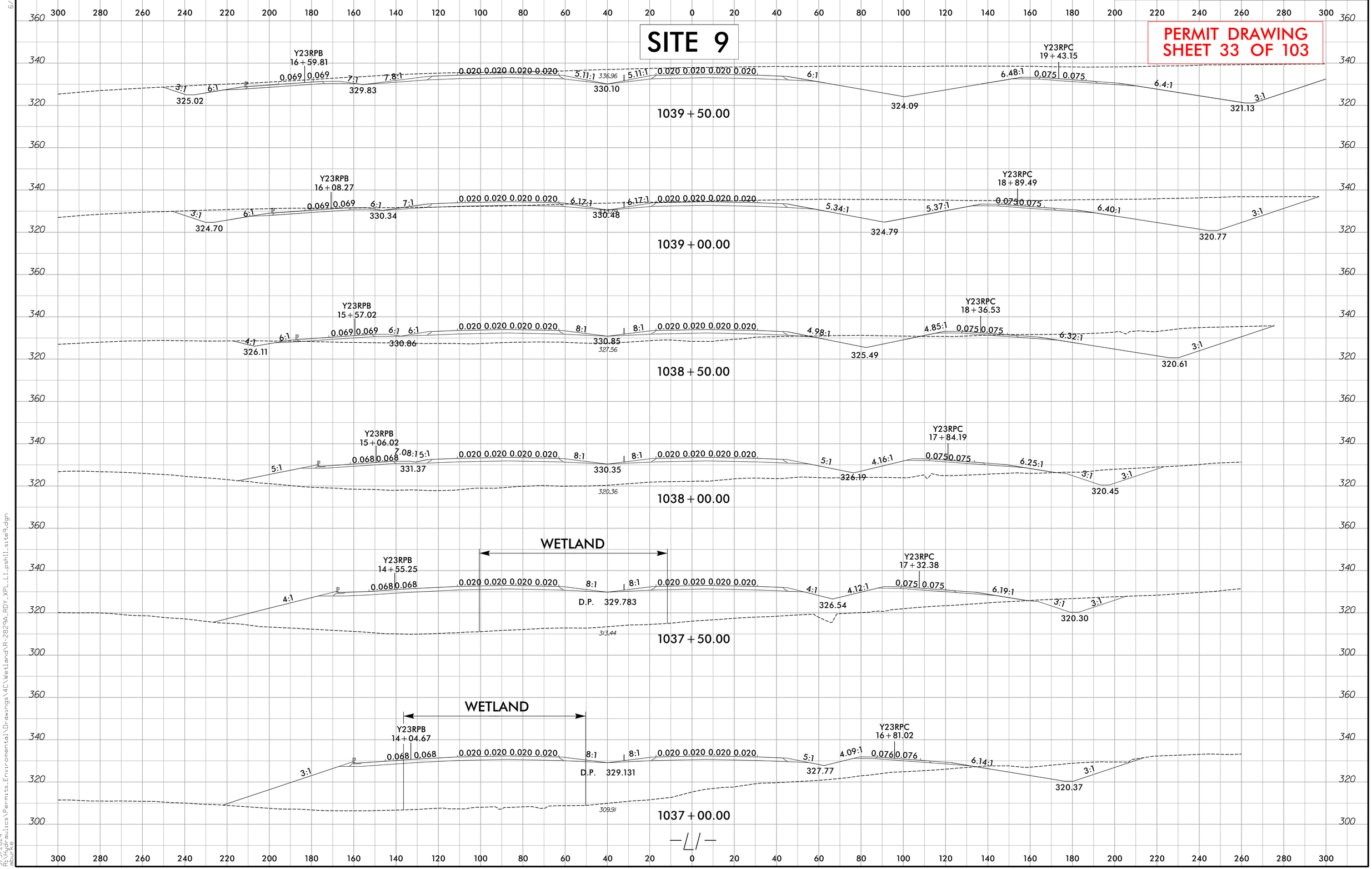
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S1 X-71

SITE 9

PERMIT DRAWING
SHEET 33 OF 103



6/23/16

9/3/2024
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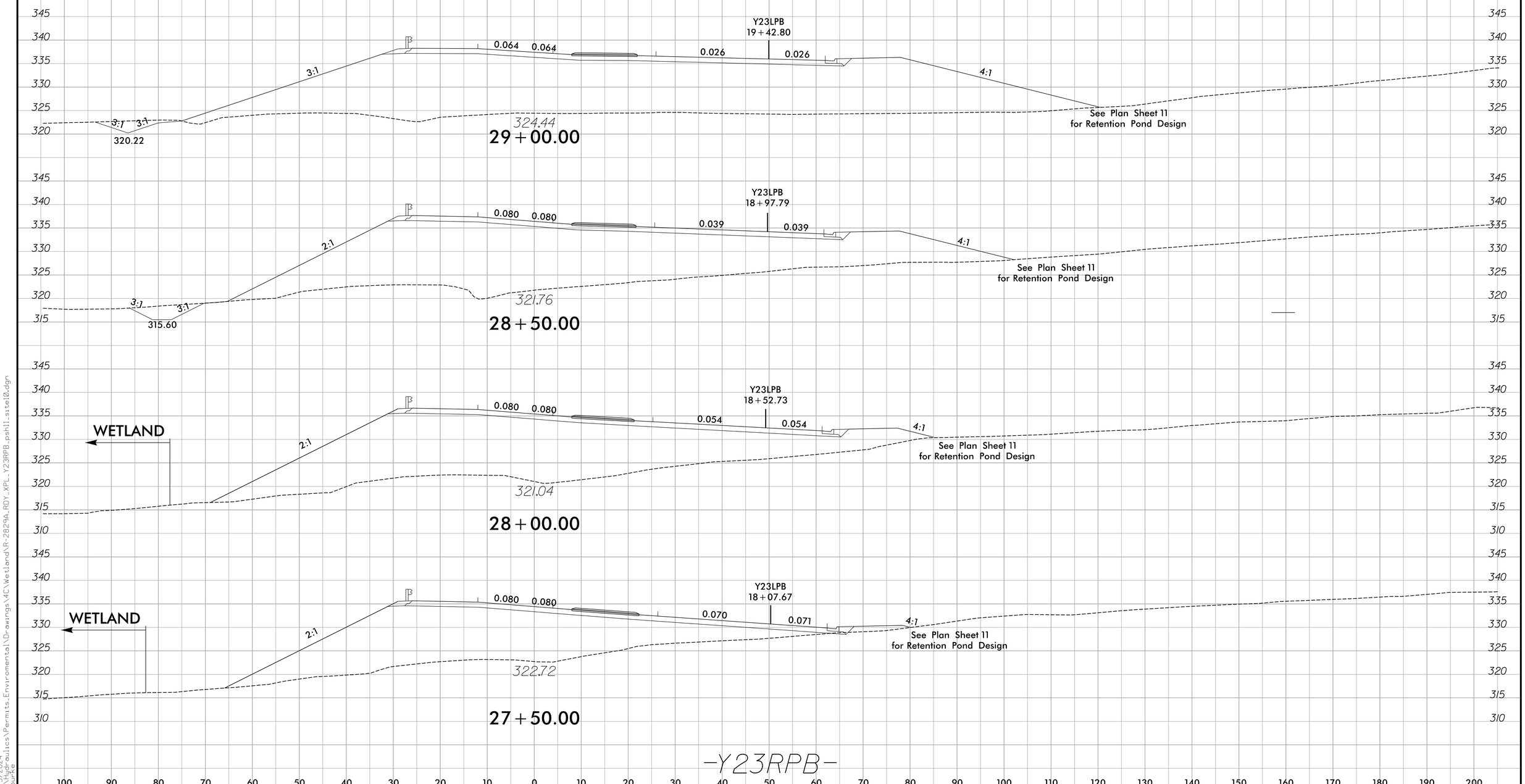
dbunce

Submittal September 17, 2024

PROJ. REFERENCE NO.	SHEET NO.
R-2829A	S1 X-164

SITE 10

PERMIT DRAWING
SHEET 34 OF 103



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9/3/2024
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dbuice

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 35 OF 103

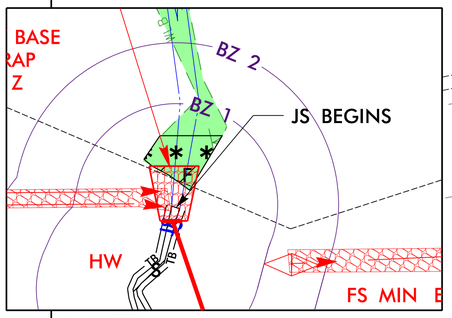
ENGLISH

- FILL IN WETLAND
- MECHANIZED CLEARING (GRUBBING)
- SURFACE WATER IMPACTS
- TEMPORARY SURFACE WATER IMPACTS

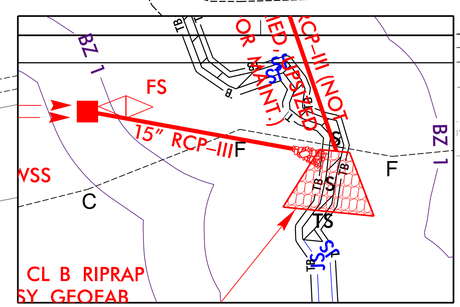
SCALE: 50 0 50 100

SCALE FOR INSET: 25 0 25 50

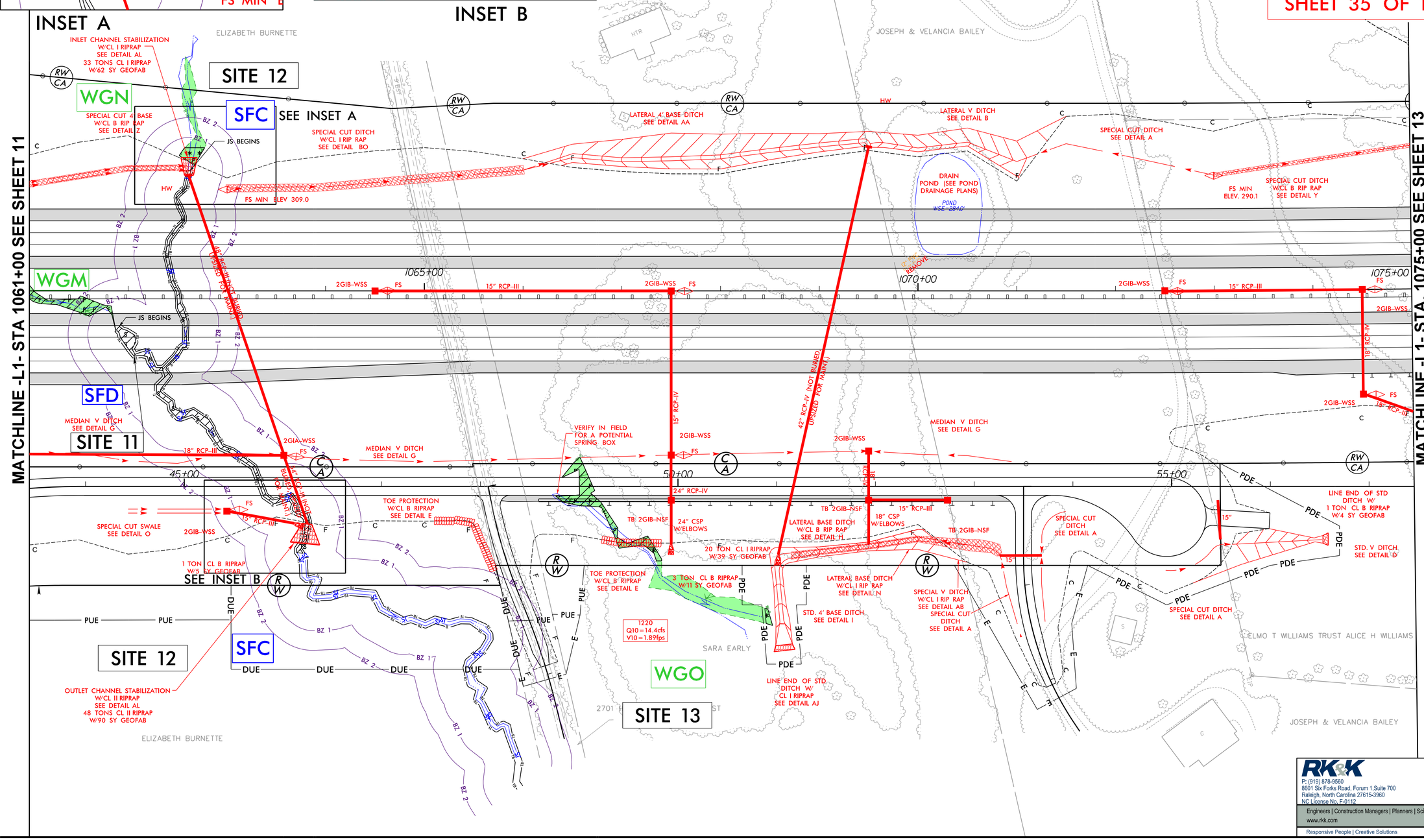
NAD 83/NA 2011



INSET A



INSET B



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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 36 OF 103

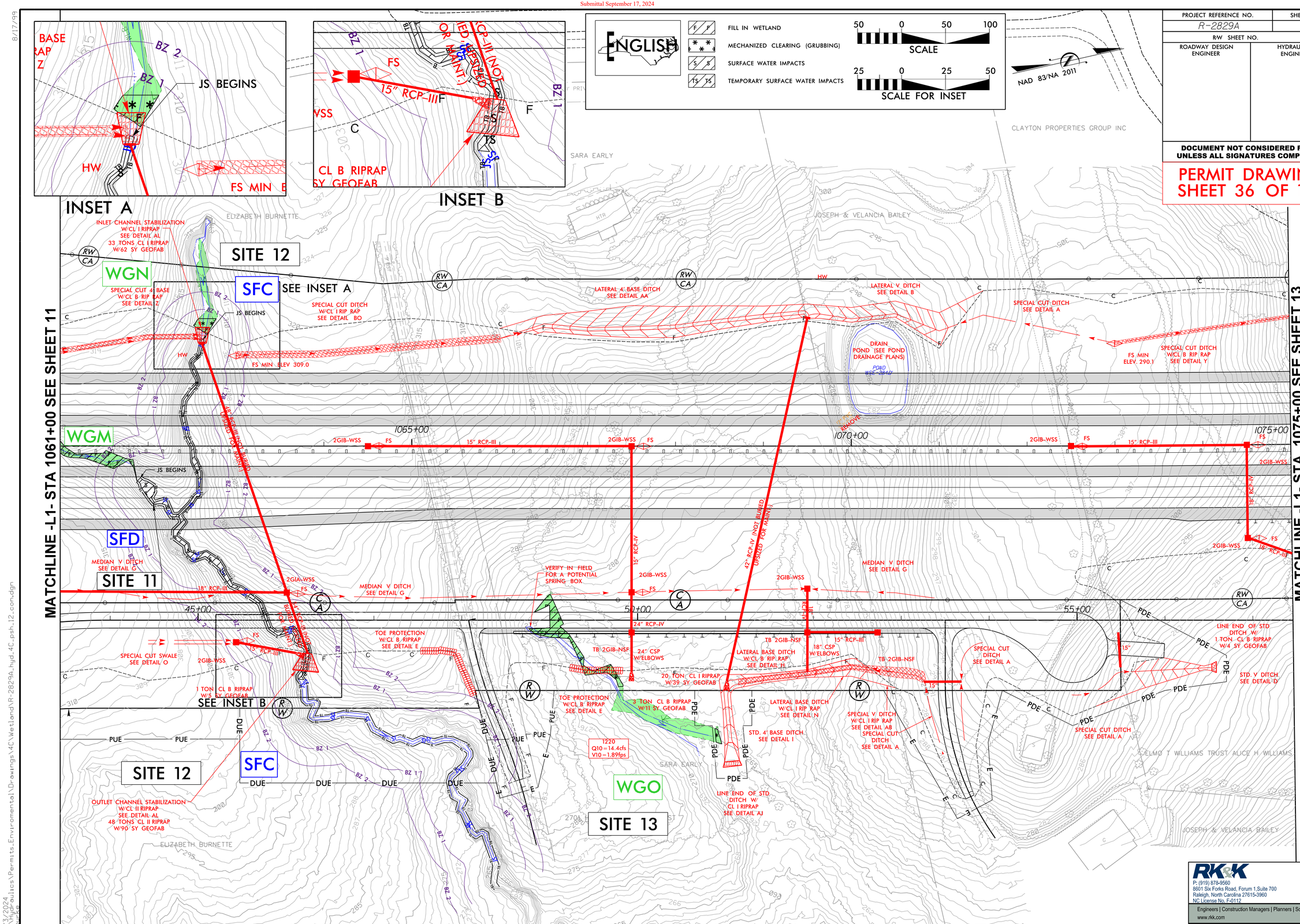
ENGLISH

F F	FILL IN WETLAND
* *	MECHANIZED CLEARING (GRUBBING)
S S	SURFACE WATER IMPACTS
TS TS	TEMPORARY SURFACE WATER IMPACTS

SCALE: 50 0 50 100

SCALE FOR INSET: 25 0 25 50

NAD 83/NA 2011



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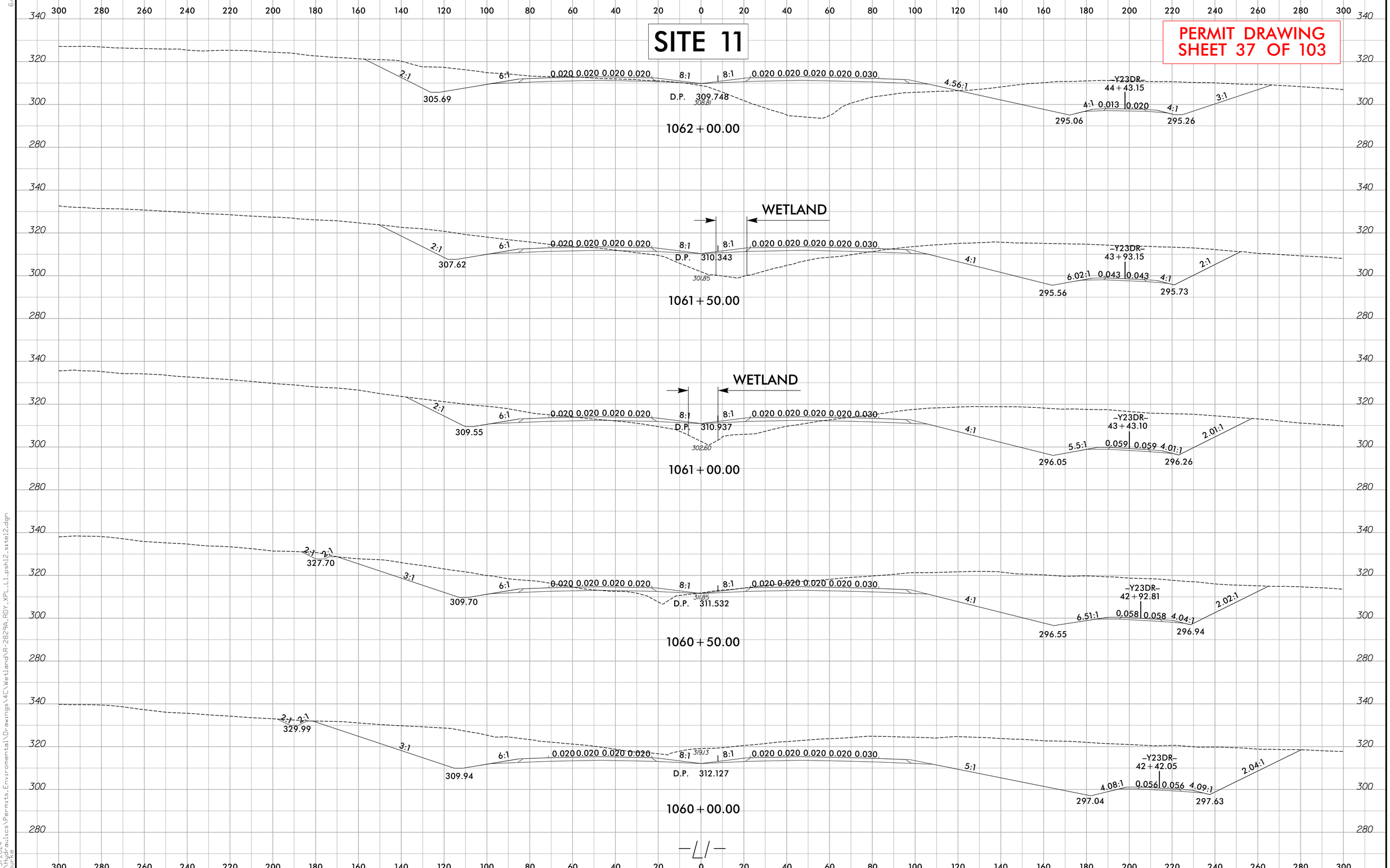
6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S1 X-79

SITE 11

PERMIT DRAWING
SHEET 37 OF 103



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dbunce

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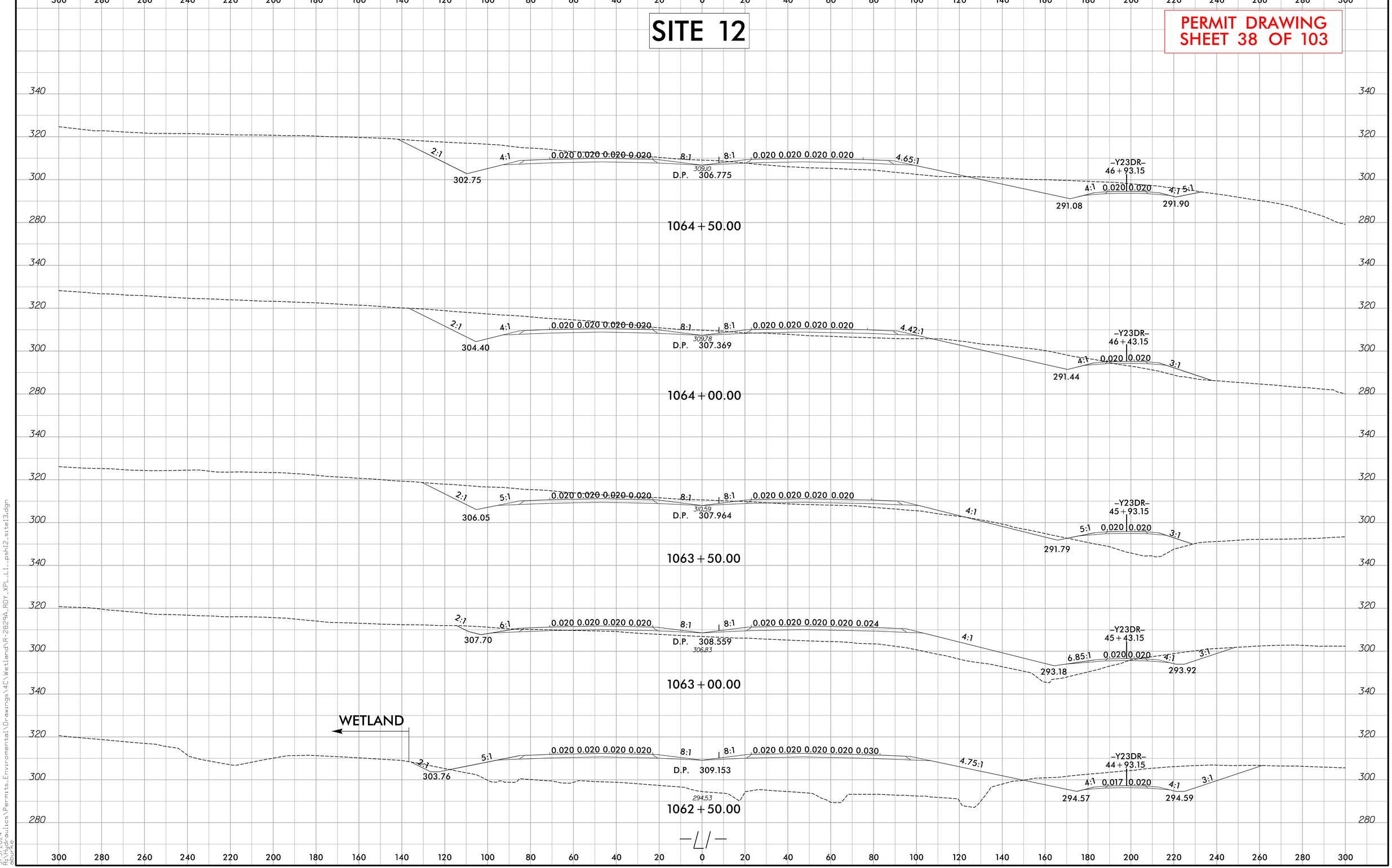
6/23/16

PROJ. REFERENCE NO.	SHEET NO.
R-2829A	S1 X-80

0 10 20

SITE 12

PERMIT DRAWING
SHEET 38 OF 103



9/3/2024
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Bruce

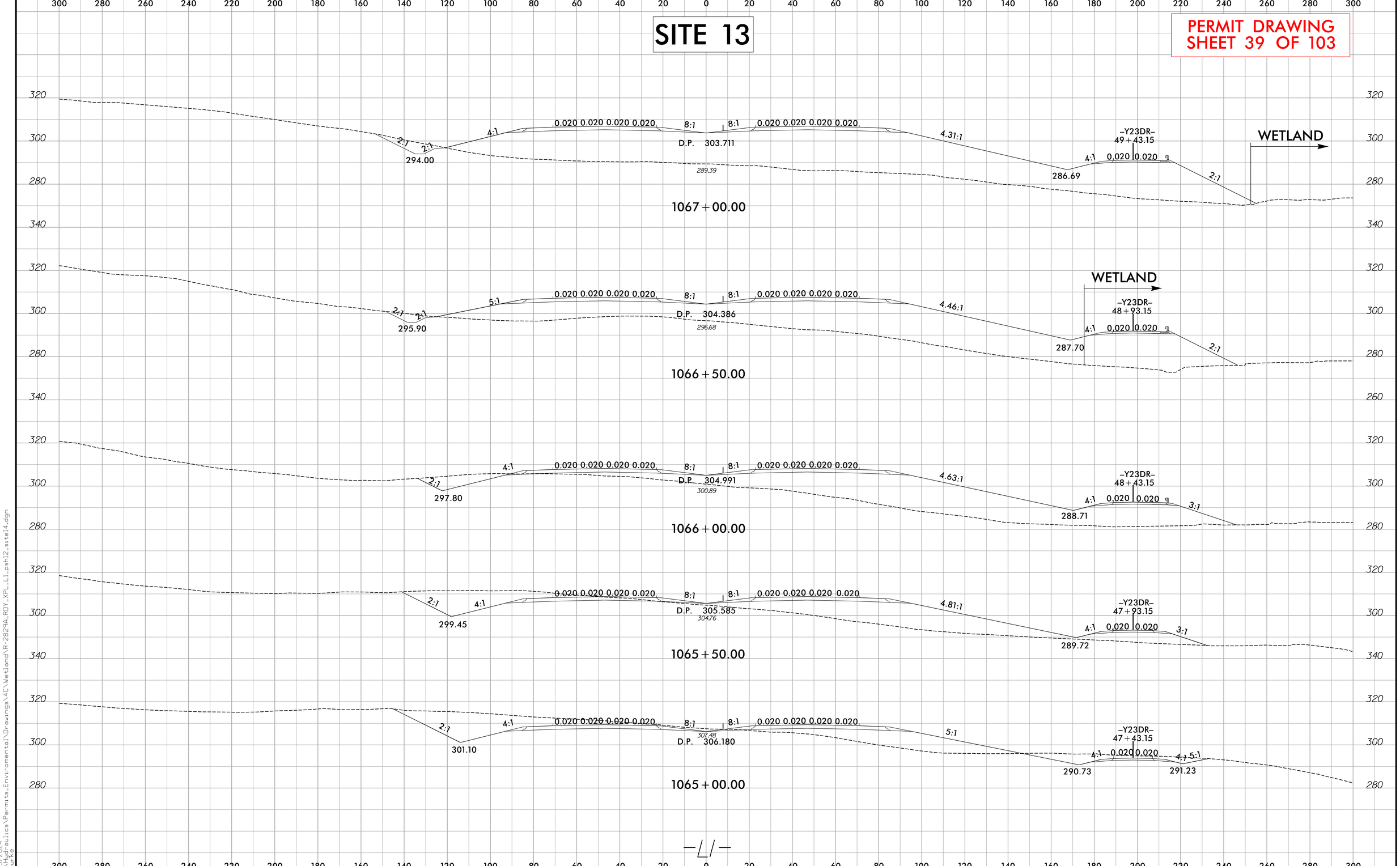
Submittal September 17, 2024

6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S1 X-81

SITE 13

PERMIT DRAWING
SHEET 39 OF 103



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ebunce

Submittal September 17, 2024

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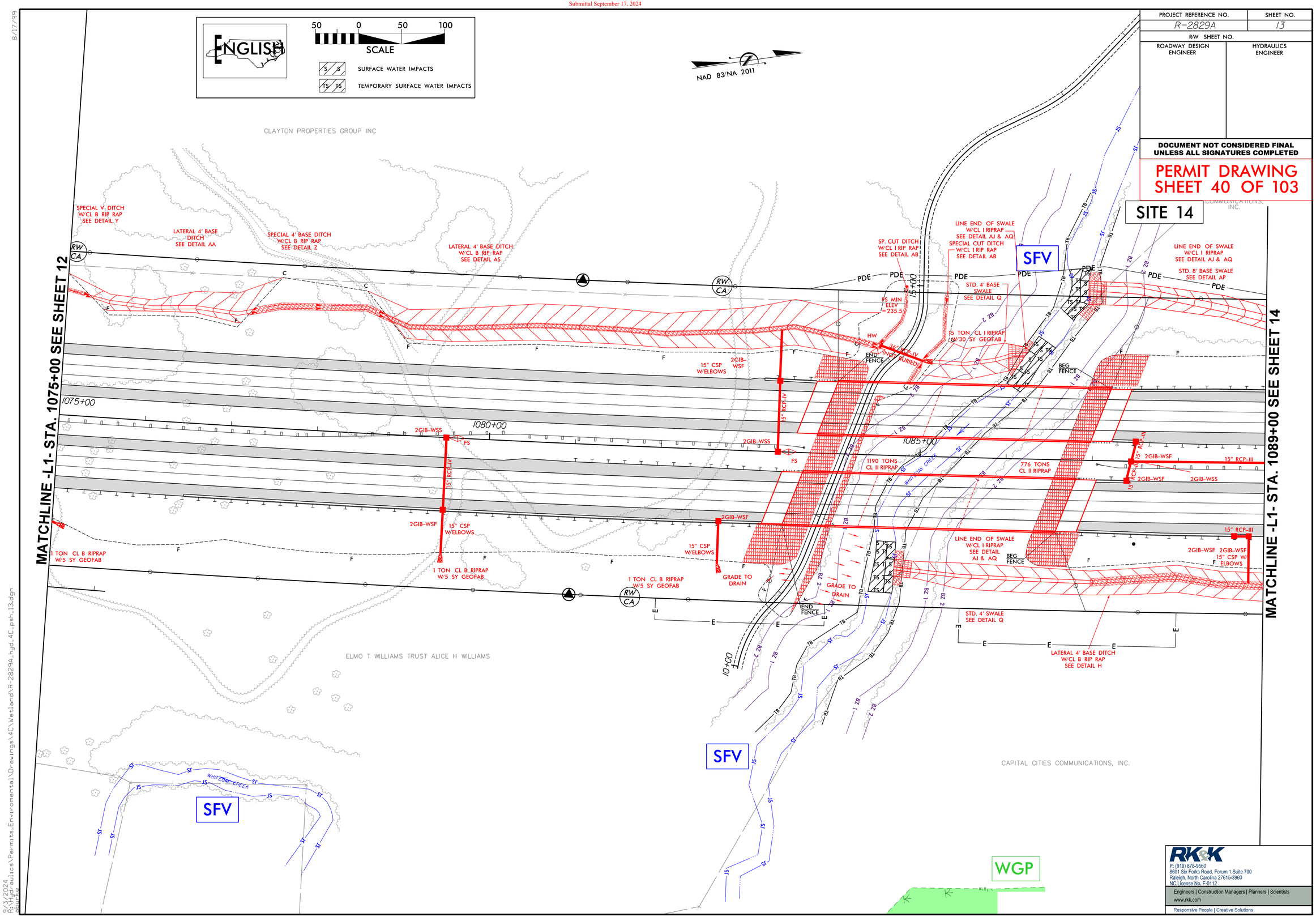
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 40 OF 103



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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING SHEET 41 OF 103

SITE 14

ENGLISH

SCALE 50 0 50 100

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

NAD 83/NA 2011

CLAYTON PROPERTIES GROUP INC

MATCHLINE -L1- STA. 1075+00 SEE SHEET 12

MATCHLINE -L1- STA. 1089+00 SEE SHEET 14

SPECIAL V DITCH W/CL B RIP RAP SEE DETAIL Y

LATERAL 4' BASE DITCH SEE DETAIL AA

SPECIAL 4' BASE DITCH W/CL B RIP RAP SEE DETAIL Z

LATERAL 4' BASE DITCH W/CL B RIP RAP SEE DETAIL AS

SP. CUT DITCH W/CL I RIP RAP SEE DETAIL AB

LINE END OF SWALE W/CL I RIPRAP SEE DETAIL AJ & AQ

SPECIAL CUT DITCH W/CL I RIP RAP SEE DETAIL AB

STD. 4' BASE SWALE SEE DETAIL Q

LINE END OF SWALE W/CL I RIPRAP SEE DETAIL AJ & AQ

STD. 8' BASE SWALE SEE DETAIL AP

15 TON CL I RIPRAP W/ 30 SY GEOFAB

1190 TONS CL II RIPRAP

776 TONS CL II RIPRAP

1 TON CL B RIPRAP W/5 SY GEOFAB

15" CSP W/ELBOWS

2GIB-WSS

2GIB-WSF

15" RCP-IV

15" RCP-III

FS MIN ELEV = 235.5

HW

END FENCE

BEG FENCE

GRADE TO DRAIN

STD. 4' SWALE SEE DETAIL Q

LATERAL 4' BASE DITCH W/CL B RIP RAP SEE DETAIL H

PDE

1075+00

1080+00

1085+00

1090+00

WHITEOAK CREEK

SFV

WGP

ELMO T WILLIAMS TRUST ALICE H WILLIAMS

CAPITAL CITIES COMMUNICATIONS, INC.

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dbuhler

Submittal September 17, 2024

5/28/99

–L1SEC1–

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

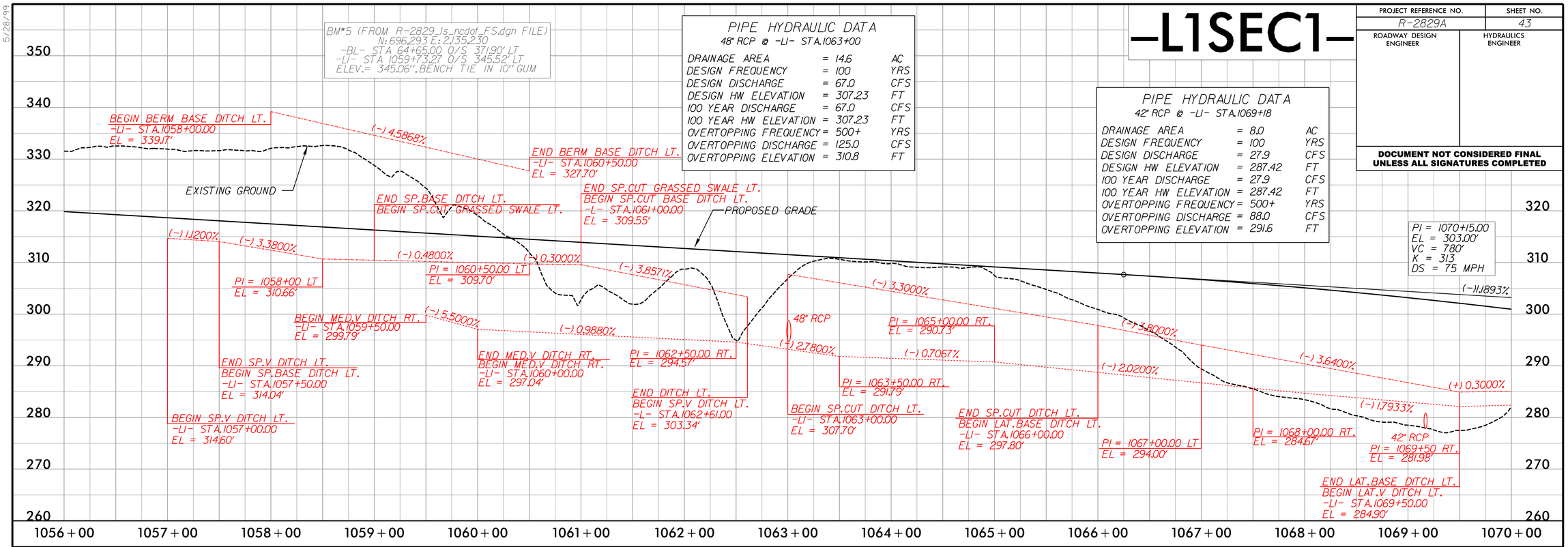
BM#5 (FROM R-2829_ls_ncdot_FS.dgn FILE)
N: 696,293 E: 2,135,230
-BL- STA 64+65.00 O/S 371.90' LT
-L1- STA 1059+73.27 O/S 345.52' LT
ELEV.= 345.06', BENCH TIE IN 10" GUM

PIPE HYDRAULIC DATA
48" RCP @ -L1- STA.1063+00

DRAINAGE AREA	= 14.6	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 67.0	CFS
DESIGN HW ELEVATION	= 307.23	FT
100 YEAR DISCHARGE	= 67.0	CFS
100 YEAR HW ELEVATION	= 307.23	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 125.0	CFS
OVERTOPPING ELEVATION	= 310.8	FT

PIPE HYDRAULIC DATA
42" RCP @ -L1- STA.1069+18

DRAINAGE AREA	= 8.0	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 27.9	CFS
DESIGN HW ELEVATION	= 287.42	FT
100 YEAR DISCHARGE	= 27.9	CFS
100 YEAR HW ELEVATION	= 287.42	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 88.0	CFS
OVERTOPPING ELEVATION	= 291.6	FT

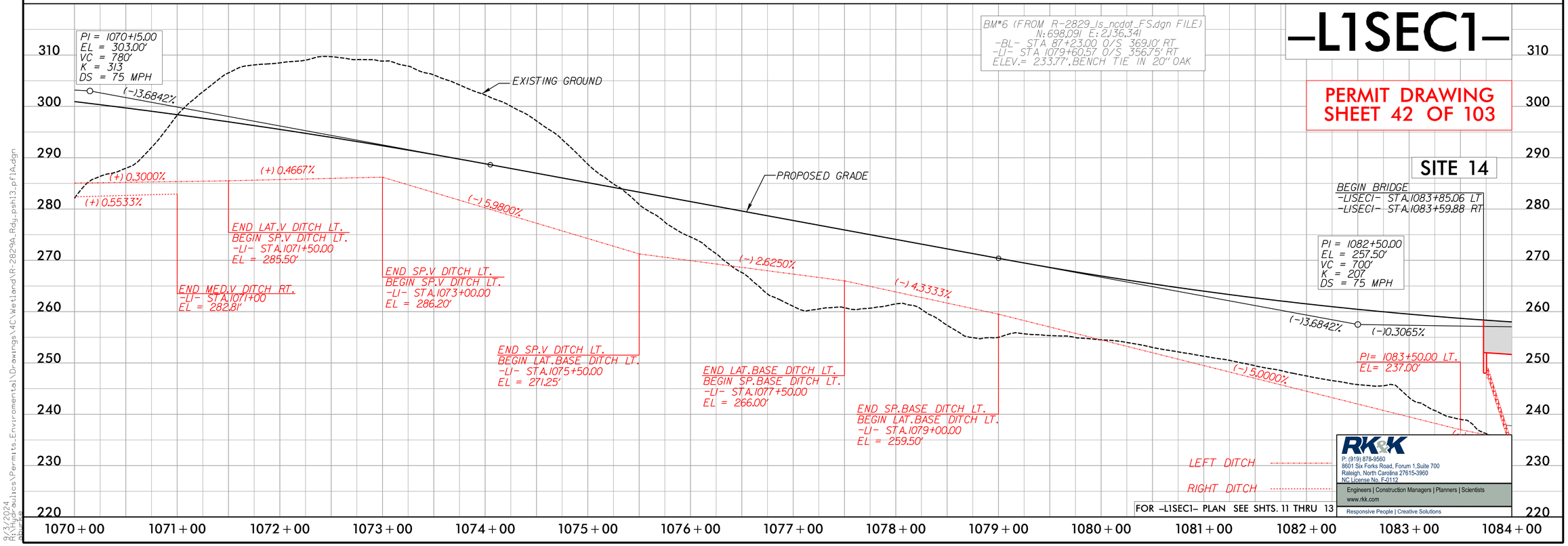


–L1SEC1–

BM#6 (FROM R-2829_ls_ncdot_FS.dgn FILE)
N: 698,091 E: 2,136,341
-BL- STA 87+23.00 O/S 369.10' RT
-L1- STA 1079+60.57 O/S 356.75' RT
ELEV.= 233.77', BENCH TIE IN 20" OAK

PERMIT DRAWING SHEET 42 OF 103

SITE 14



FOR –L1SEC1– PLAN SEE SHTS. 11 THRU 13

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Submittal September 17, 2024

–L1SEC2–

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	44
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

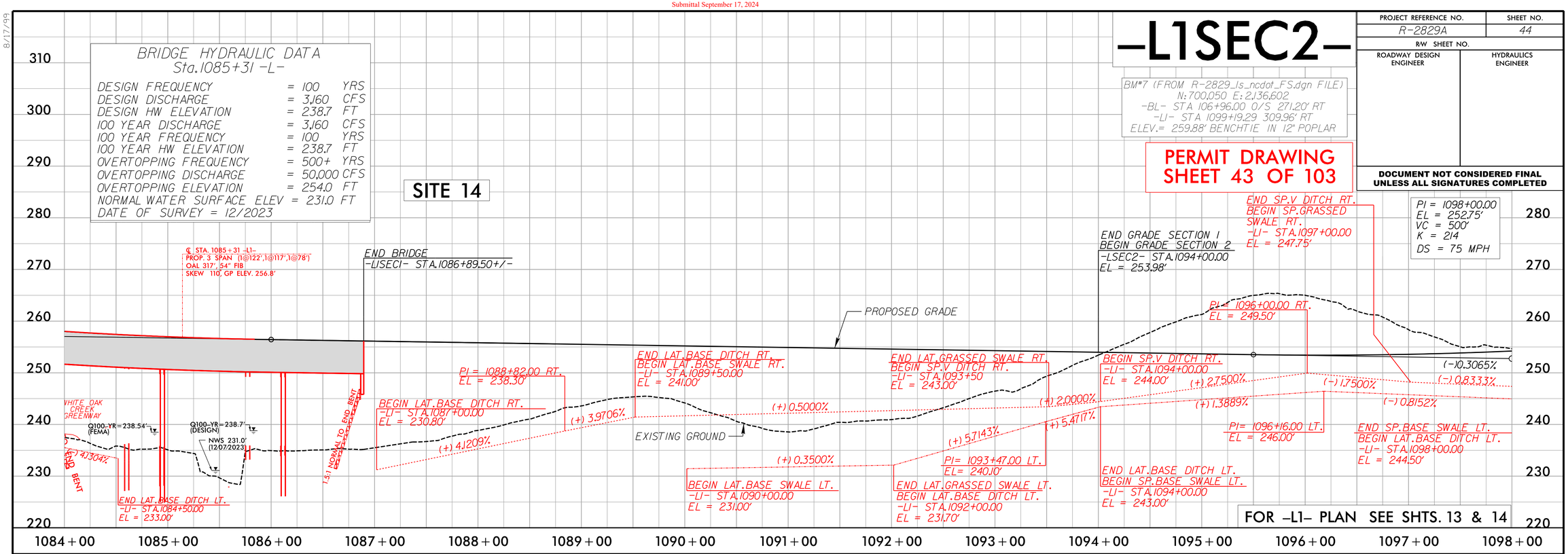
BM#7 (FROM R-2829_ls_ncdot_FS.dgn FILE)
N: 700,050 E: 2,136,602
-BL- STA 106+96.00 O/S 271.20' RT
-L1- STA 1099+19.29 309.96' RT
ELEV.= 259.88' BENCHTIE IN 12" POPLAR

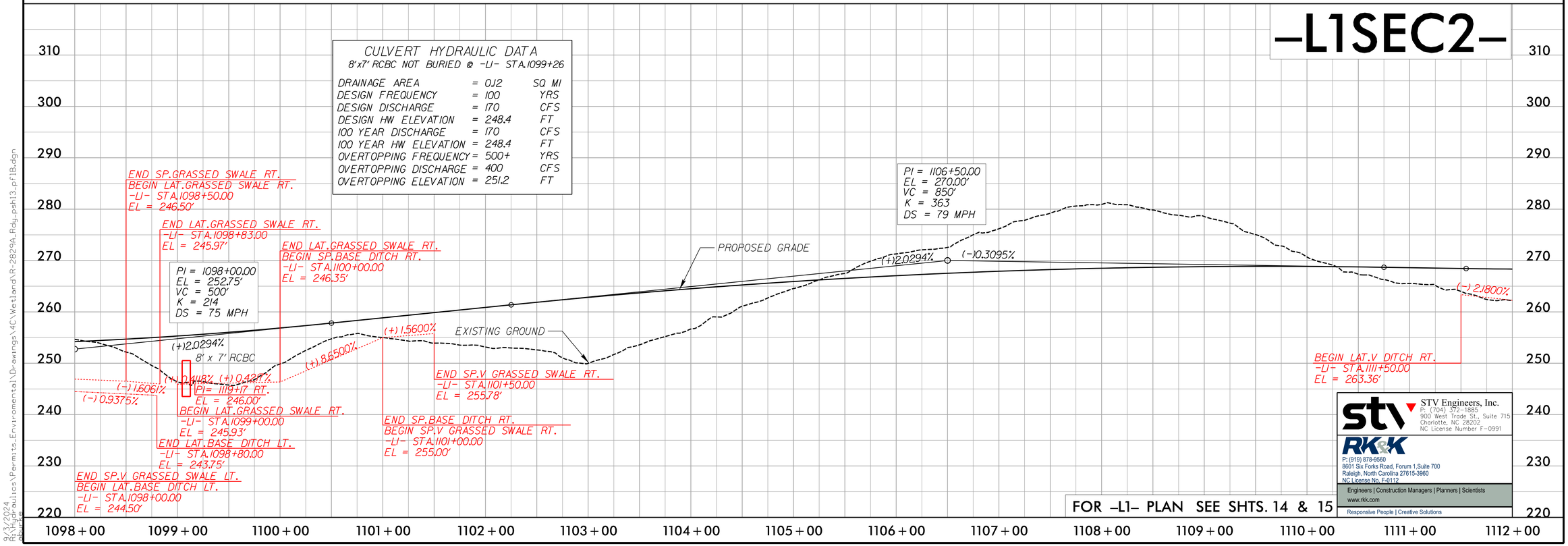
PERMIT DRAWING SHEET 43 OF 103

SITE 14

BRIDGE HYDRAULIC DATA
Sta.1085+31 -L-

DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 3,160	CFS
DESIGN HW ELEVATION	= 238.7	FT
100 YEAR DISCHARGE	= 3,160	CFS
100 YEAR FREQUENCY	= 100	YRS
100 YEAR HW ELEVATION	= 238.7	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 50,000	CFS
OVERTOPPING ELEVATION	= 254.0	FT
NORMAL WATER SURFACE ELEV	= 231.0	FT
DATE OF SURVEY = 12/2023		





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8/3/2024
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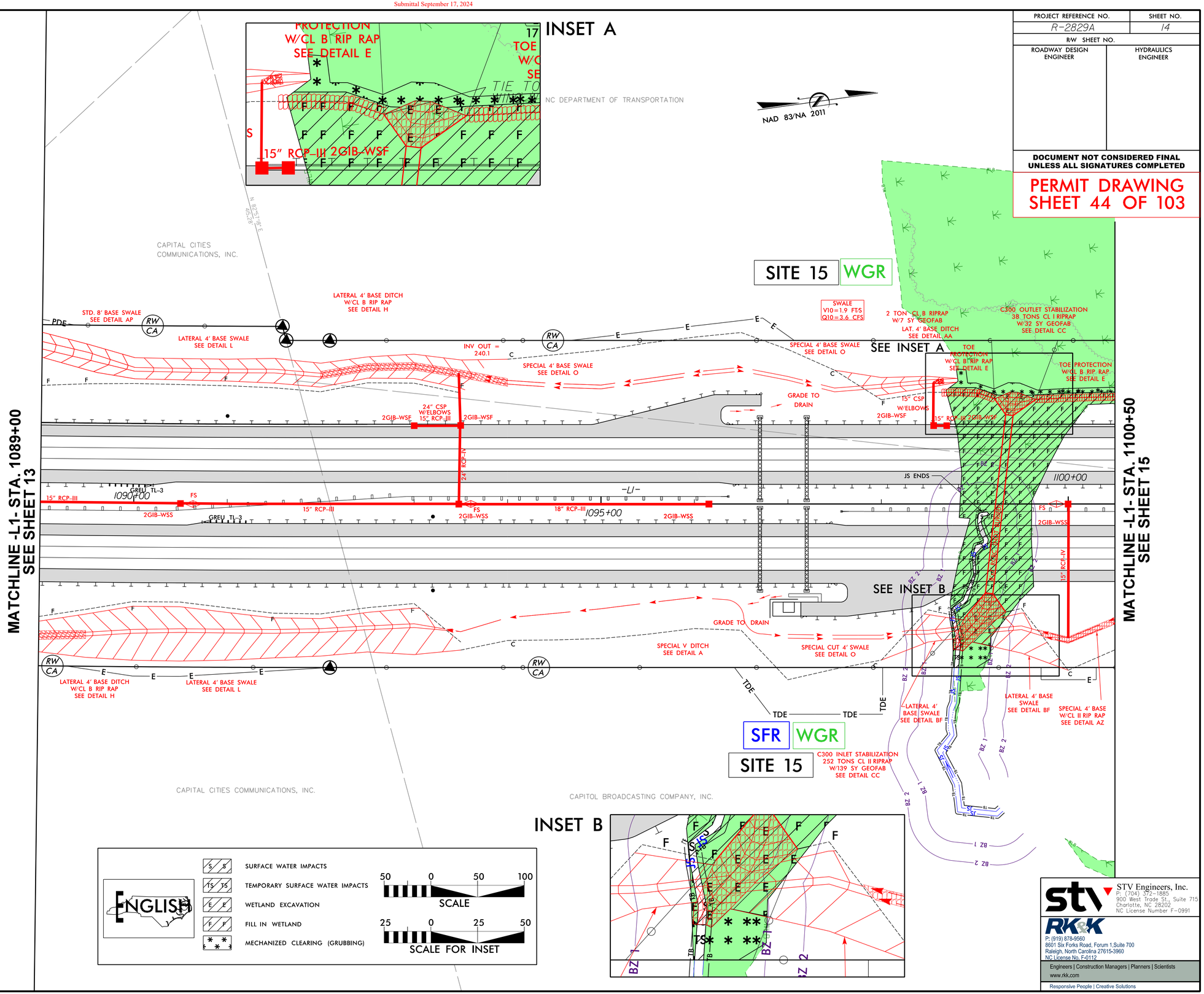
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 44 OF 103



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dbuce

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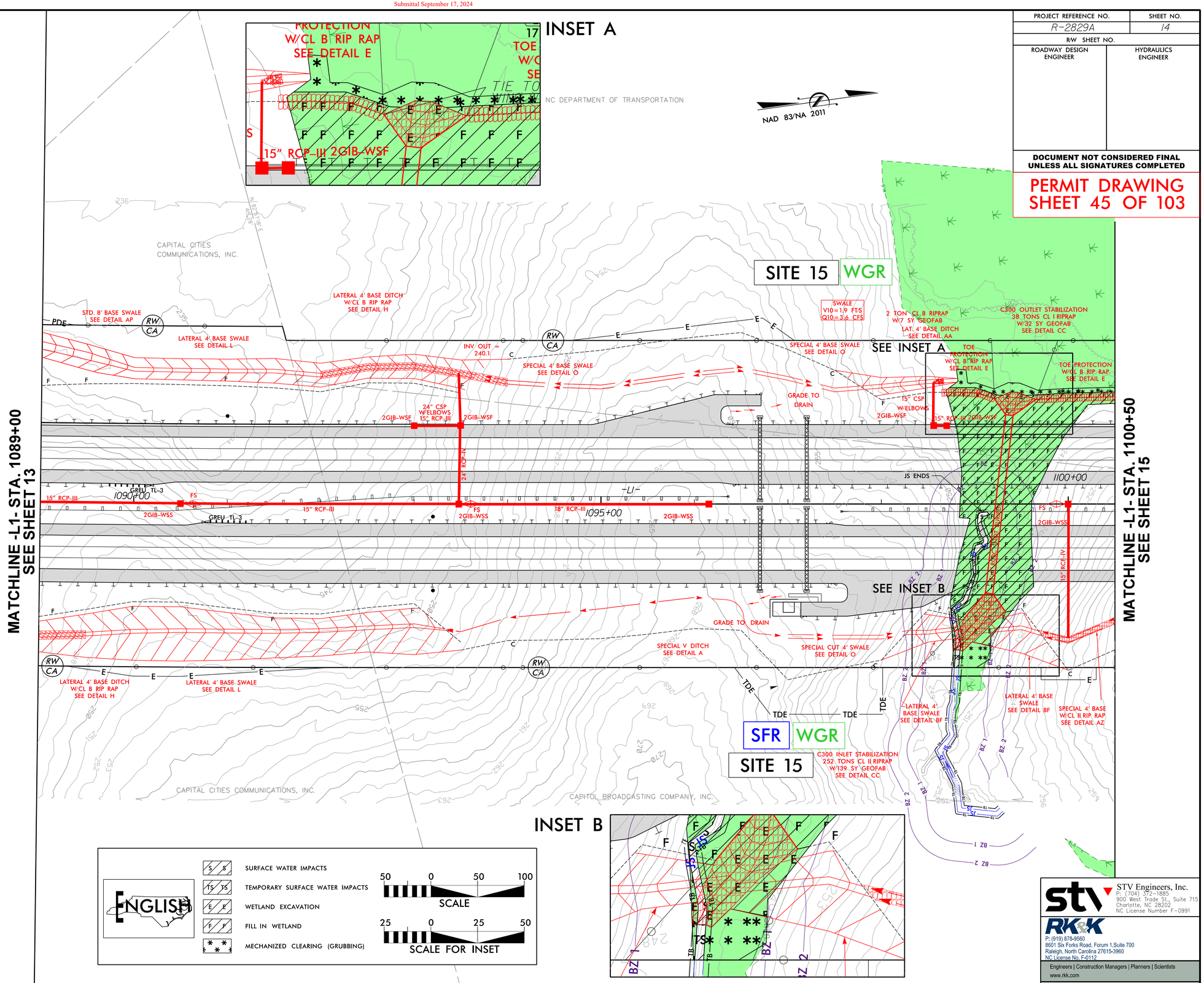
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 45 OF 103



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dbuse

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PROJECT REFERENCE NO.	SHEET NO.

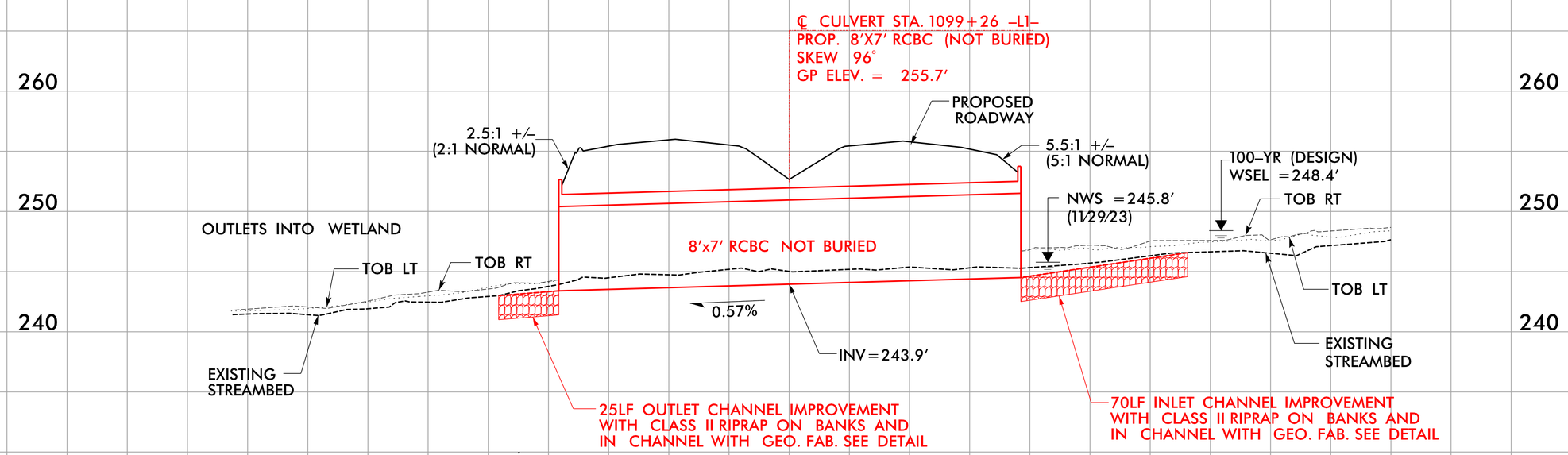
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 46 OF 103

ENGLISH

SITE 15
–L1– STA. 1099+00



8'x7' RCBC
(Not Buried, Length =192')

5/14/99
8/31/2024
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ebunce

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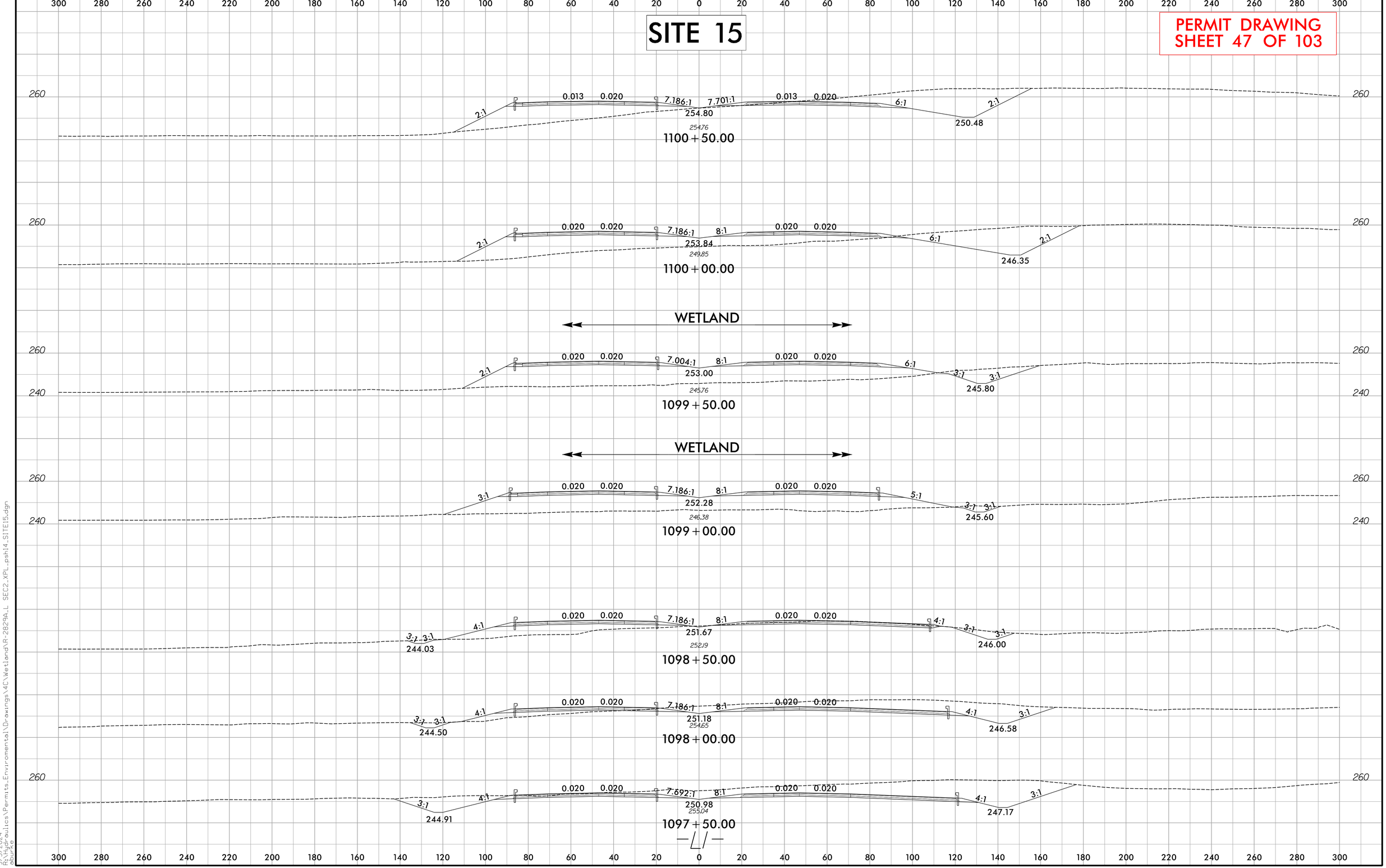
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-2

SITE 15

PERMIT DRAWING
SHEET 47 OF 103



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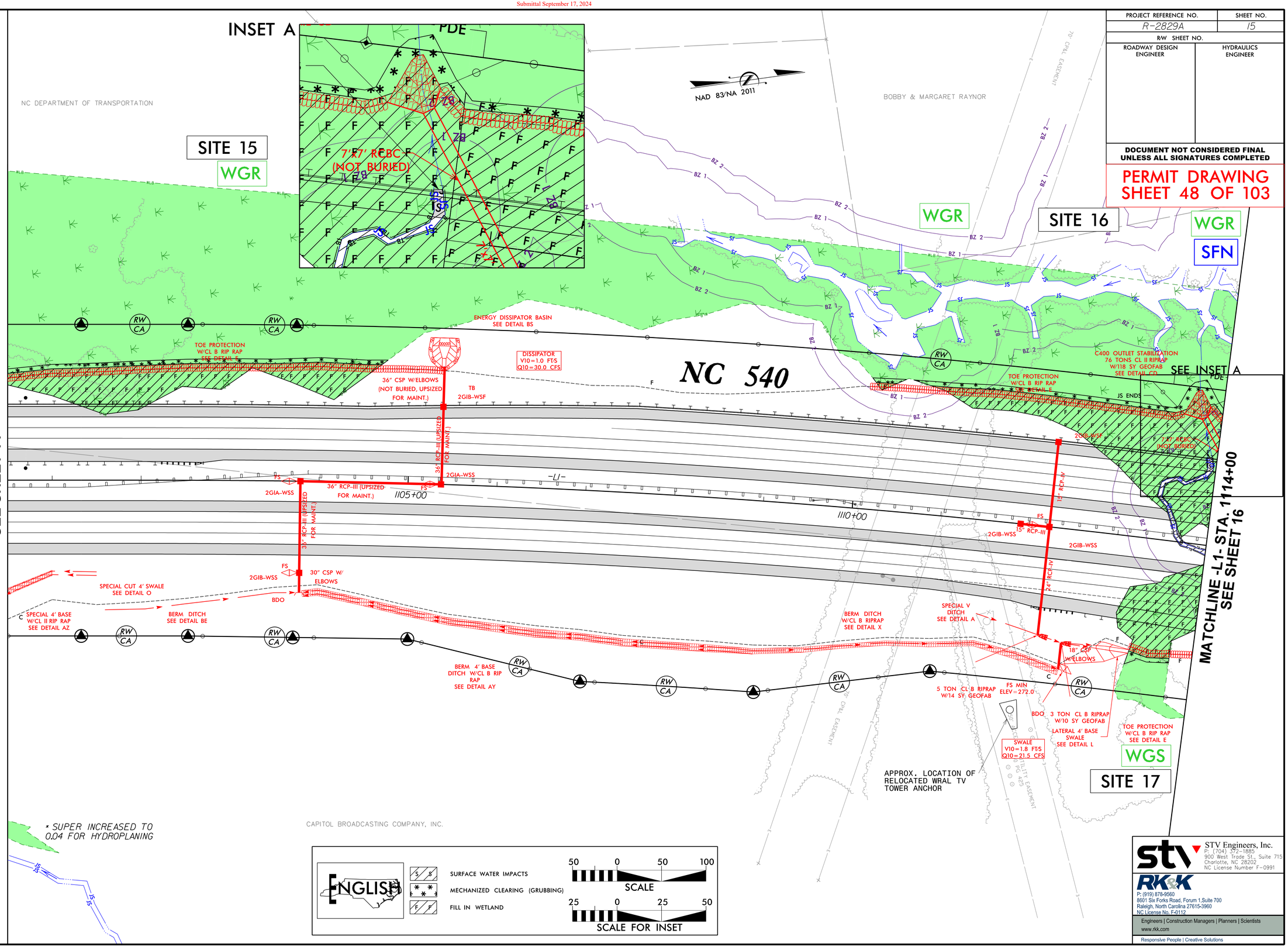
ebunce

Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 48 OF 103



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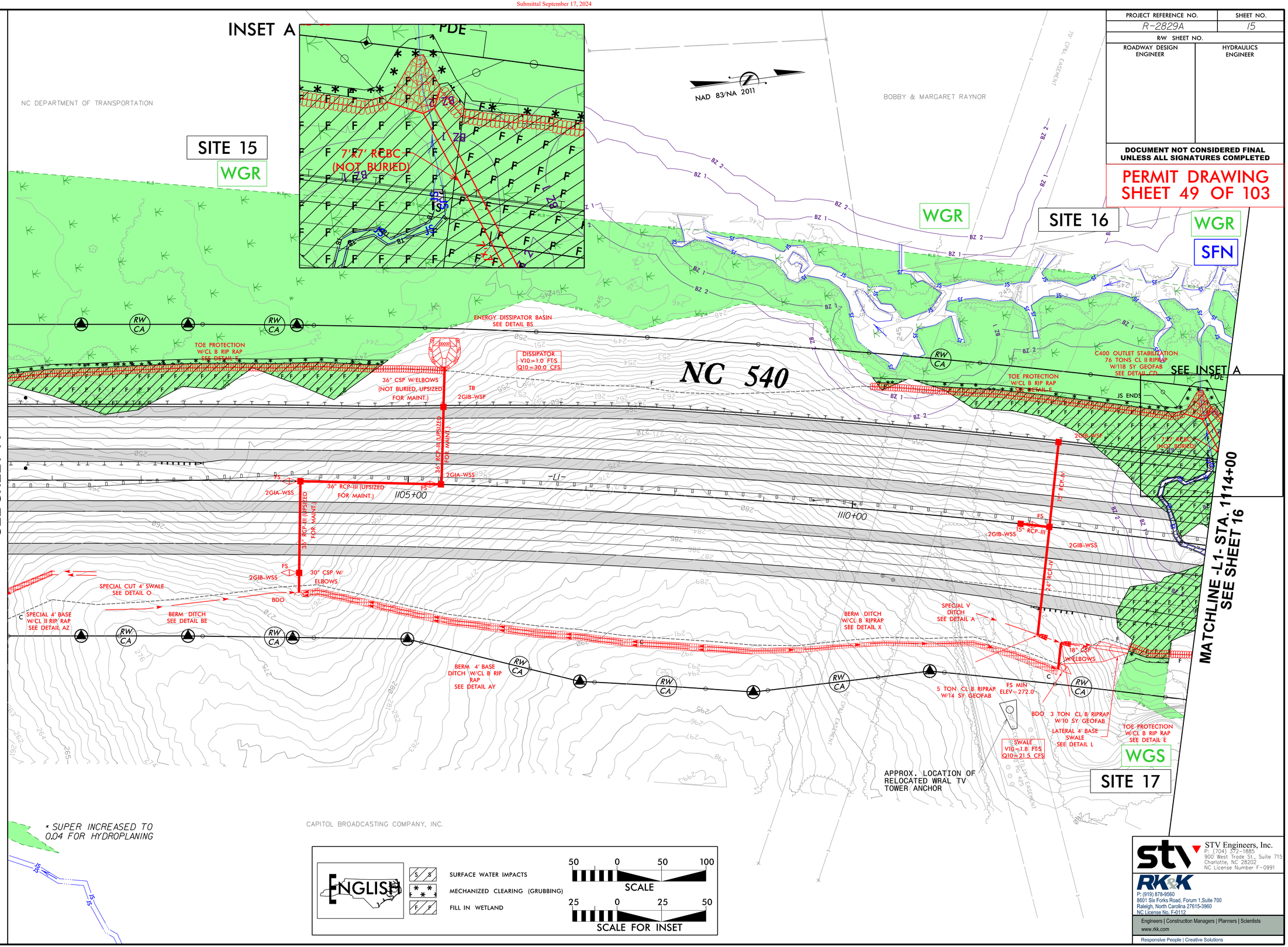
hydraulics\Permits_Environmental\Drawings\4C\Wetland\R-2829A_hyd_4C_psh_15.dgn

Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 49 OF 103



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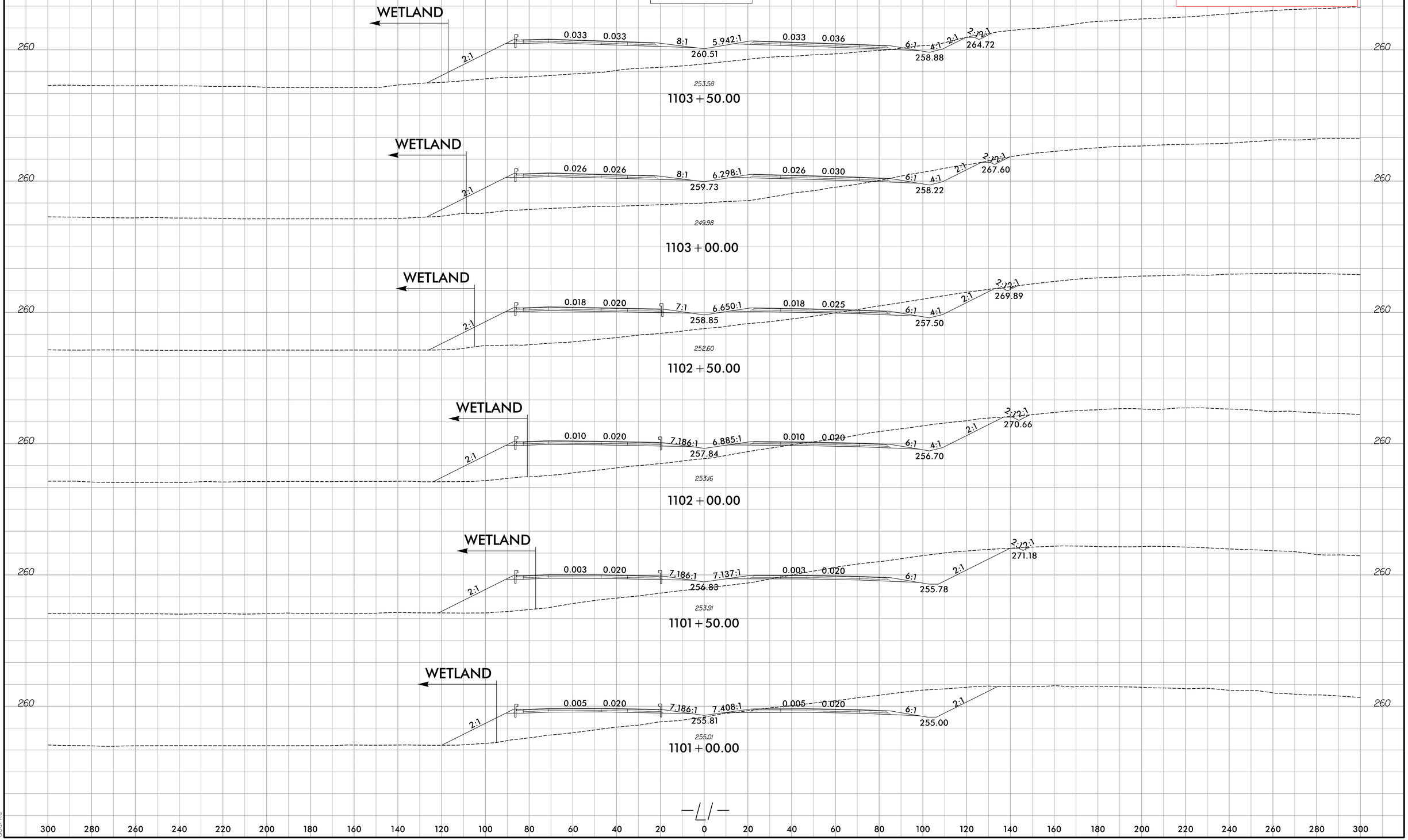
Submittal September 17, 2024

6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-3

PERMIT DRAWING
SHEET 50 OF 103

SITE 15



9/3/2024
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ds_ue

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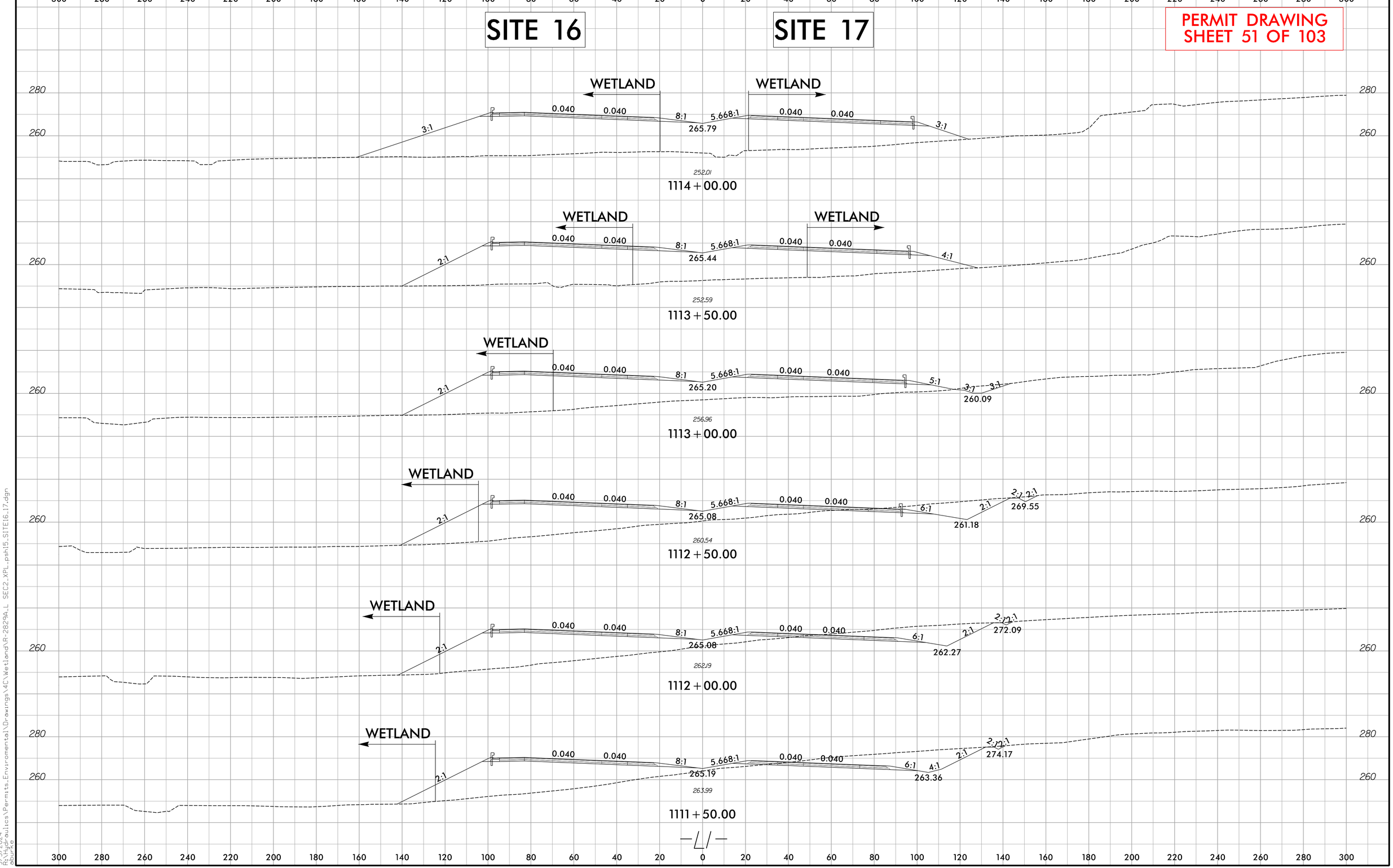
6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-7

PERMIT DRAWING
SHEET 51 OF 103

SITE 16 SITE 17



9/13/2024
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obunce

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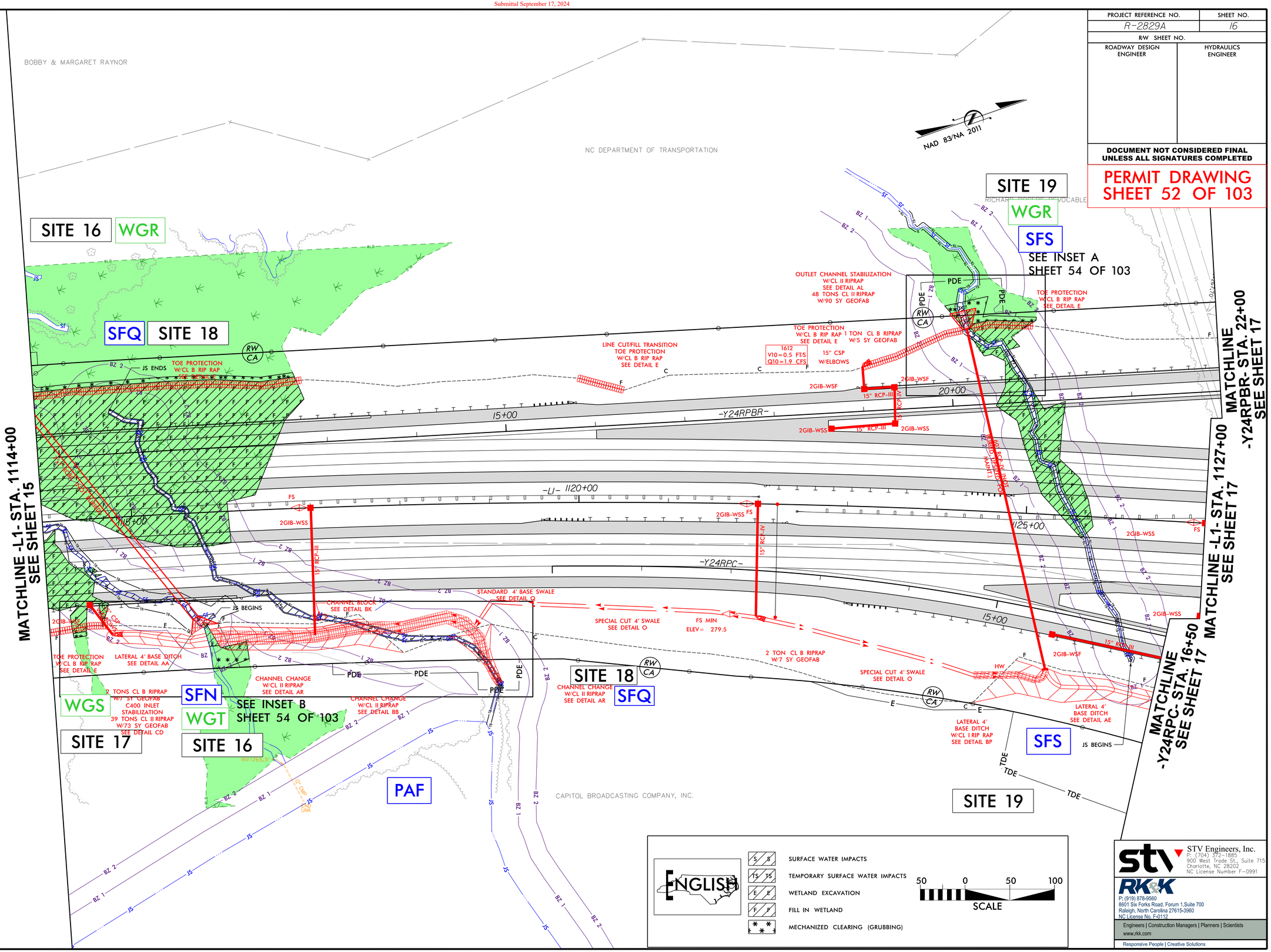
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 52 OF 103



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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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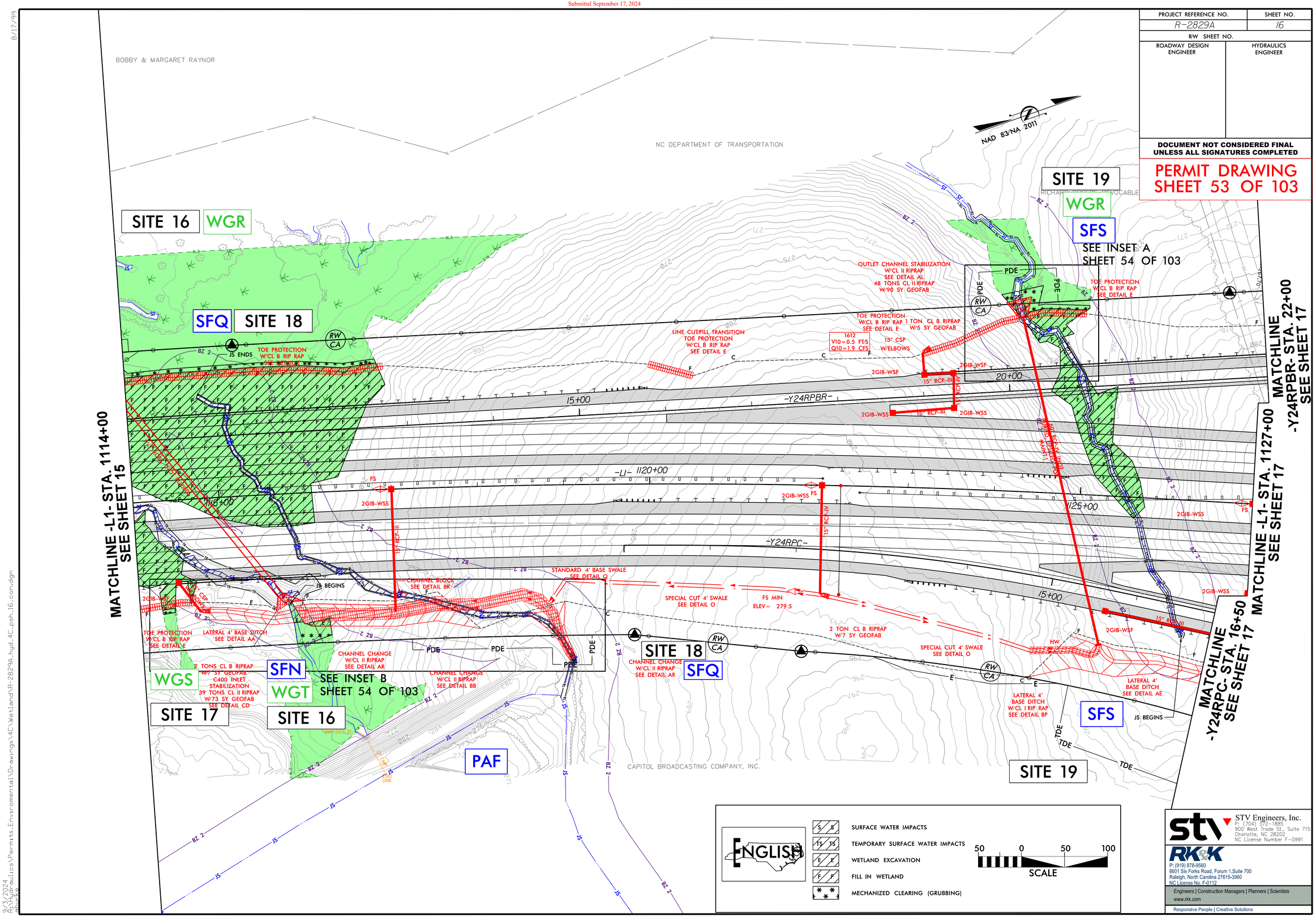
PERMIT DRAWING SHEET 53 OF 103



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

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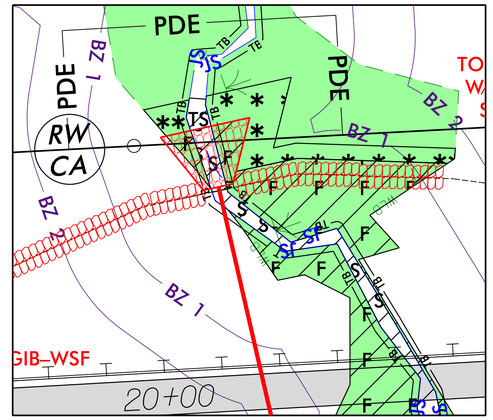
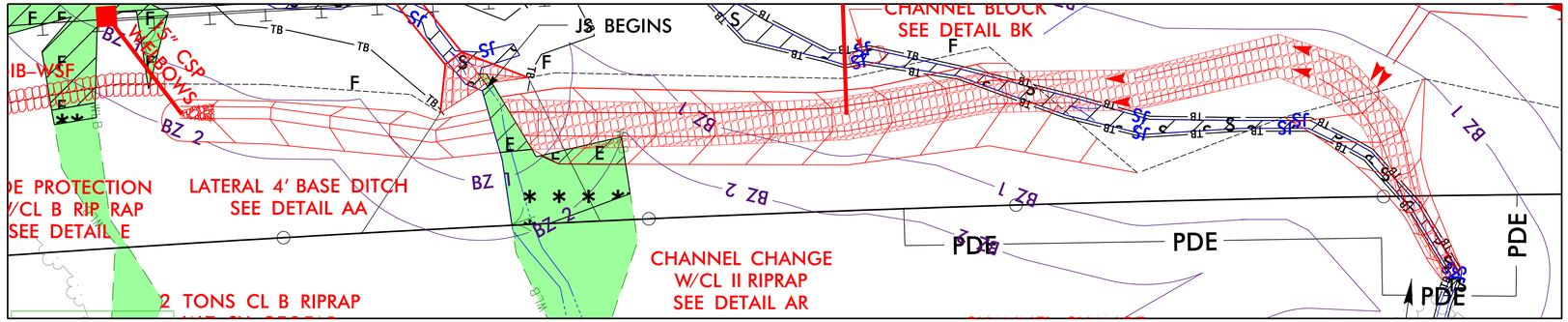
PERMIT DRAWING SHEET 54 OF 103

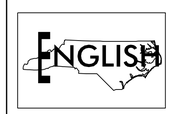
NAD 83/NA 2011



INSET A



INSET B



S S	SURFACE WATER IMPACTS
TS TS	TEMPORARY SURFACE WATER IMPACTS
E E	WETLAND EXCAVATION
F F	FILL IN WETLAND
* *	MECHANIZED CLEARING (GRUBBING)

25 0 25 50

SCALE FOR INSERT

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dbowie

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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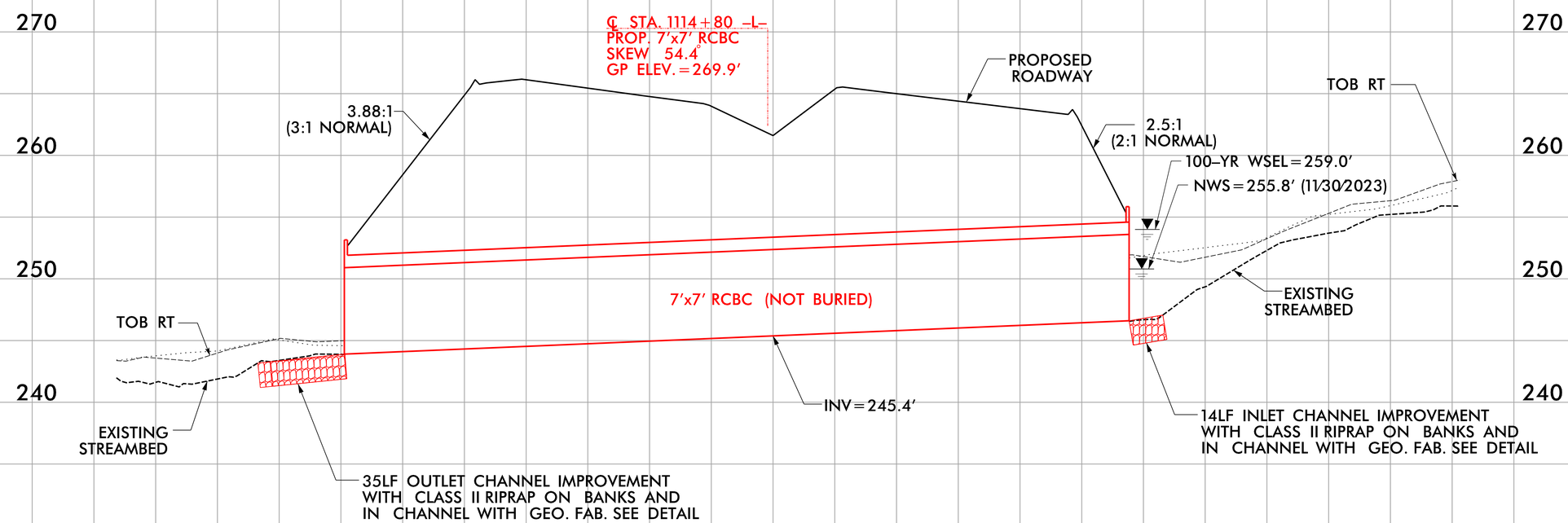
PERMIT DRAWING
SHEET 55 OF 103

ENGLISH

SITE 16, 17, & 18
–L1– STA. 1114 + 80



7'x7' RCBC
(Not buried, Length = 318')

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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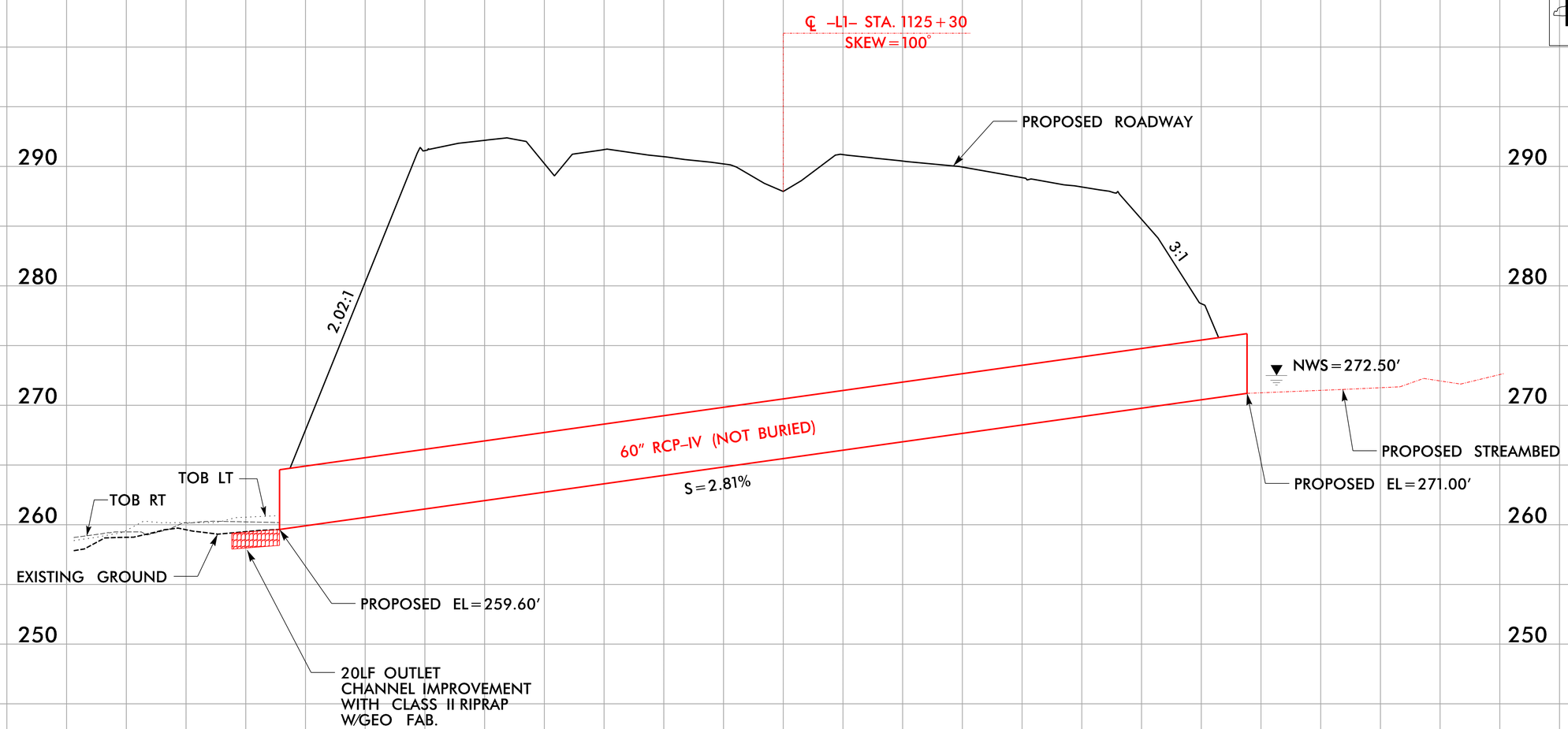
PERMIT DRAWING
SHEET 56 OF 103

ENGLISH

SITE 19
–L1– STA. 1125 + 30



60” RCP–IV
(Not buried, Length = 405’)

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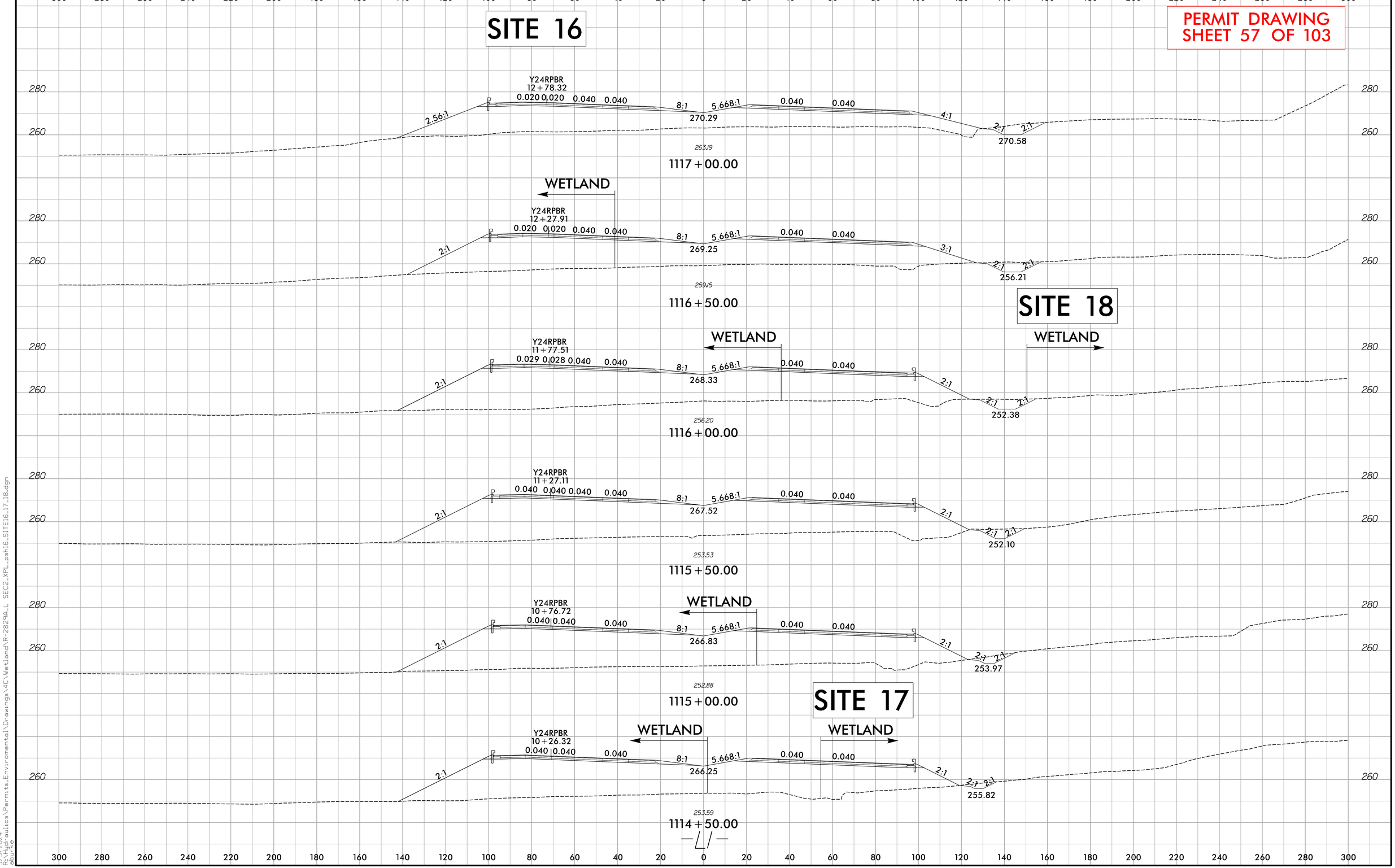
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-8

PERMIT DRAWING
SHEET 57 OF 103



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ebourne

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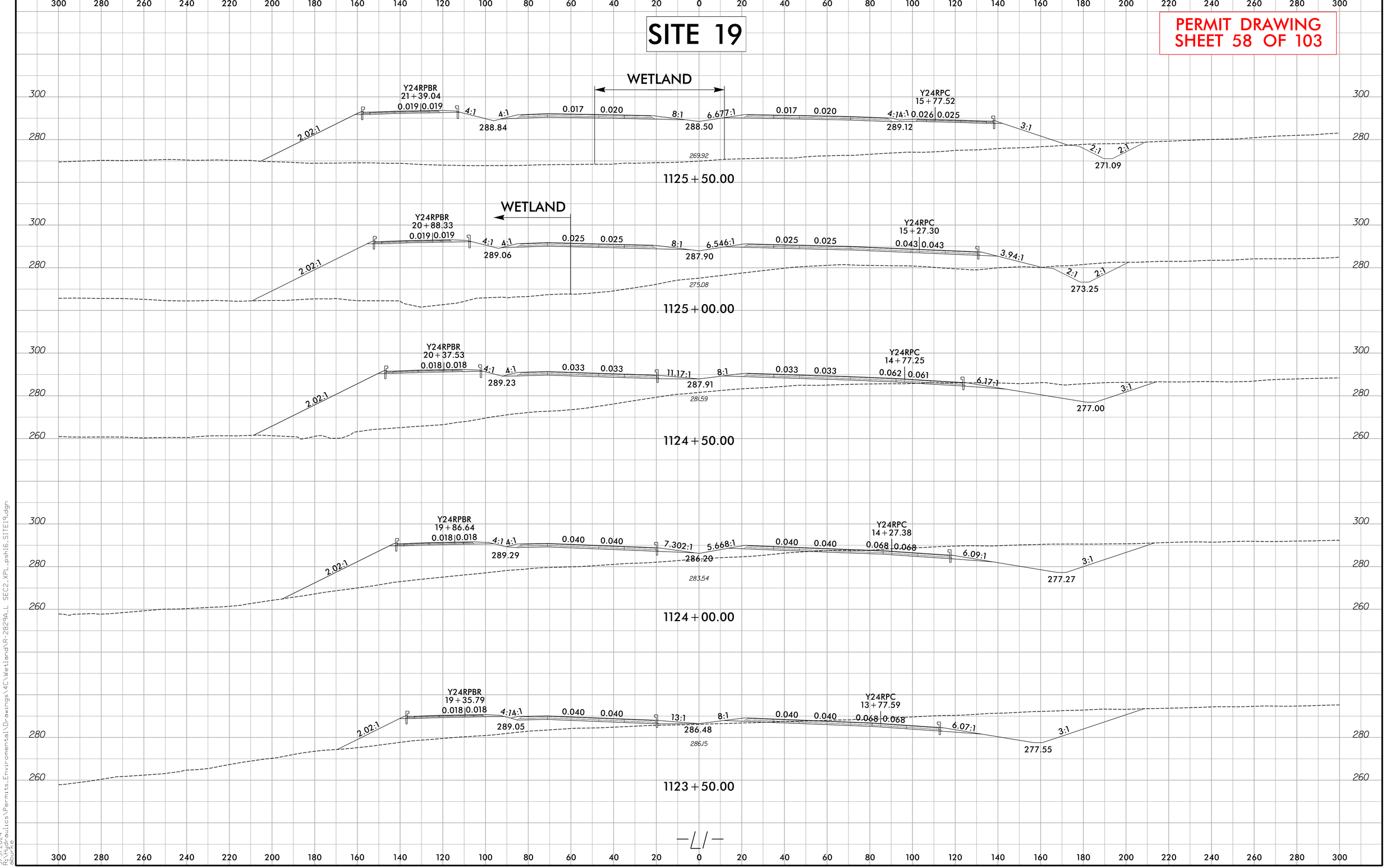
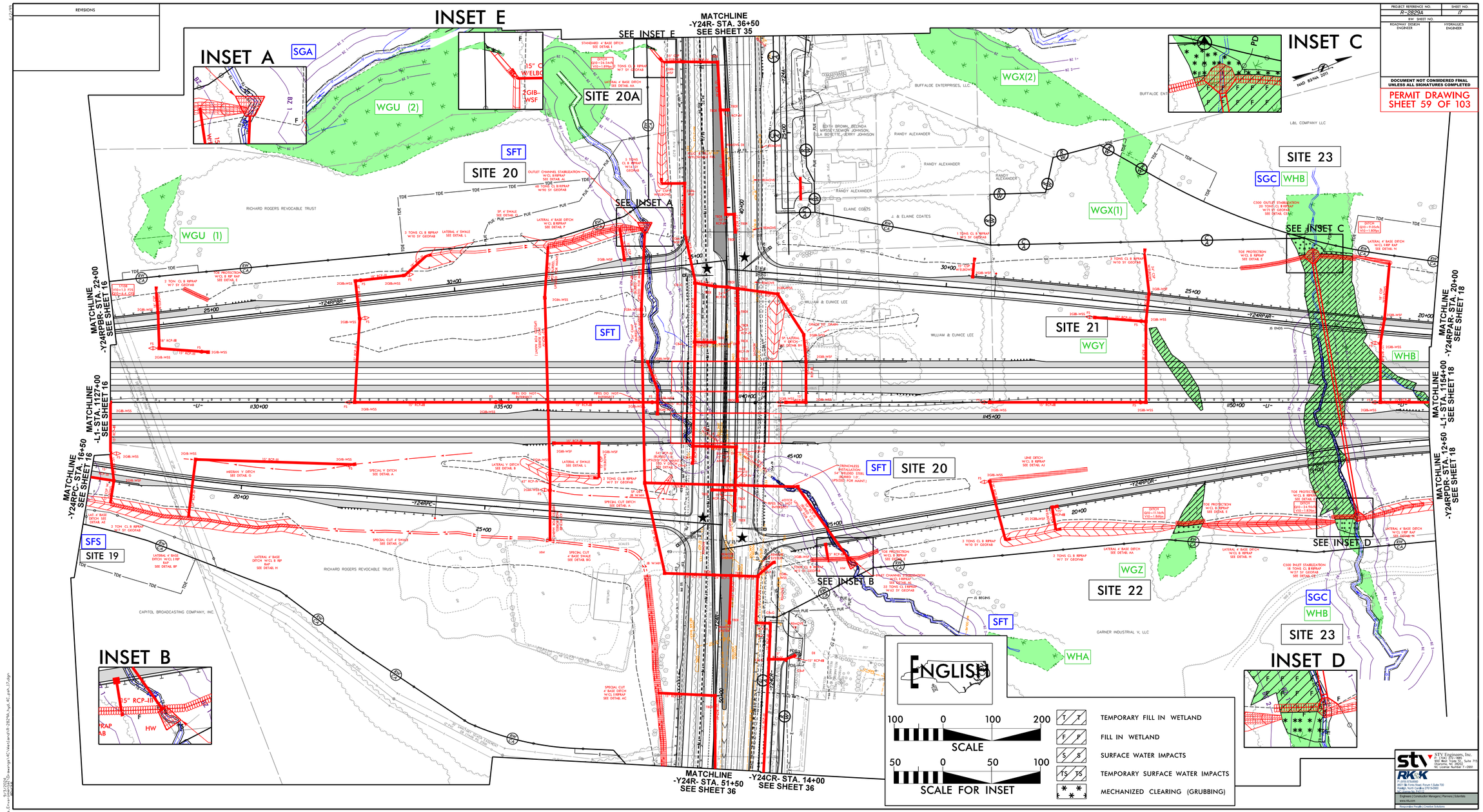
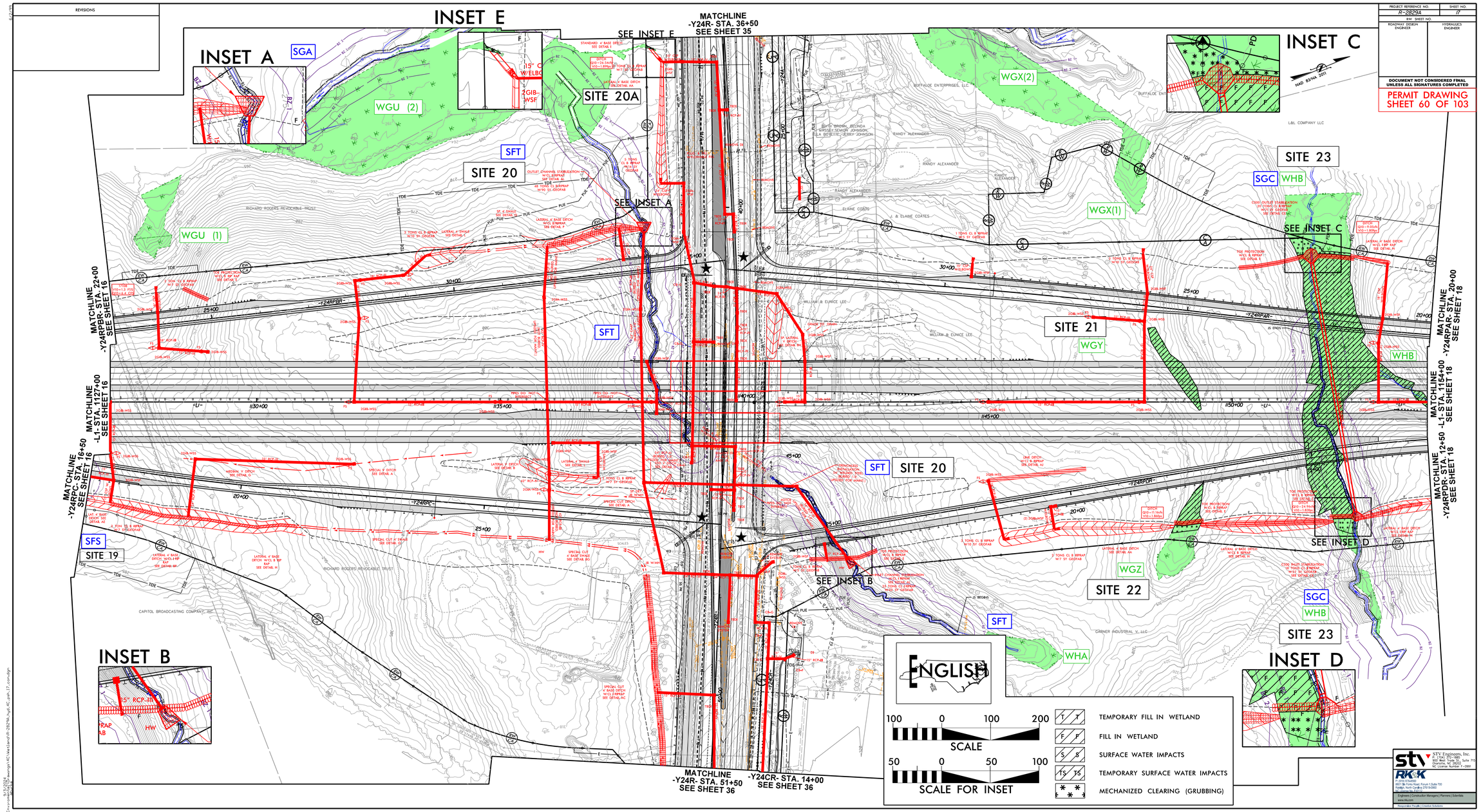
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-11

PERMIT DRAWING
SHEET 58 OF 103

SITE 19




REVISIONS
INSET A
INSET B
INSET C
INSET D
INSET E
SEE INSET A
SEE INSET B
SEE INSET C
SEE INSET D
SEE INSET E
MATCHLINE -Y24R- STA. 36+50 SEE SHEET 35
MATCHLINE -Y24RPBR- STA. 22+00 SEE SHEET 16
MATCHLINE -L1- STA. 1127+00 SEE SHEET 16
MATCHLINE -Y24RPC- STA. 16+50 SEE SHEET 16
MATCHLINE -Y24RPDR- STA. 20+00 SEE SHEET 18
MATCHLINE -L1- STA. 1154+00 SEE SHEET 18
MATCHLINE -Y24RPDR- STA. 12+50 SEE SHEET 18
MATCHLINE -Y24R- STA. 51+50 SEE SHEET 36
-Y24CR- STA. 14+00 SEE SHEET 36
SITE 19
SITE 20
SITE 20A
SITE 21
SITE 22
SITE 23
SGA
SFT
SFS
WGU (1)
WGU (2)
WGX(1)
WGX(2)
WGY
WGZ
WHA
WHB
SGC
RICHARD ROGERS REVOCABLE TRUST
CAPITOL BROADCASTING COMPANY, INC.
BUFFALOE ENTERPRISES, LLC
RANDY ALEXANDER
ELAINE COATES
WILLIAM & EUNICE LEE
L&L COMPANY LLC
GARNER INDUSTRIAL V, LLC
ENGLISH
100 0 100 200
SCALE
50 0 50 100
SCALE FOR INSET
TEMPORARY FILL IN WETLAND
FILL IN WETLAND
SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS
MECHANIZED CLEARING (GRUBBING)
PROJECT REFERENCE NO. R-2829A
SHEET NO. 17
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 59 OF 103
STV Engineers, Inc.
RK&K


REVISIONS
INSET A
INSET B
INSET C
INSET D
INSET E
SEE INSET A
SEE INSET B
SEE INSET C
SEE INSET D
SEE INSET E
MATCHLINE -Y24R- STA. 36+50 SEE SHEET 35
MATCHLINE -Y24R- STA. 51+50 SEE SHEET 36
MATCHLINE -Y24CR- STA. 14+00 SEE SHEET 36
MATCHLINE -Y24RPBR- STA. 22+00 SEE SHEET 16
MATCHLINE -L1- STA. 1127+00 SEE SHEET 16
MATCHLINE -Y24RPC- STA. 16+50 SEE SHEET 16
MATCHLINE -Y24RPAR- STA. 20+00 SEE SHEET 18
MATCHLINE -L1- STA. 1154+00 SEE SHEET 18
MATCHLINE -Y24RPDR- STA. 12+50 SEE SHEET 18
SITE 19
SITE 20
SITE 20A
SITE 21
SITE 22
SITE 23
SGA
SGC
WHB
WHA
WGU (1)
WGU (2)
WGX(1)
WGX(2)
WGY
WGZ
SFT
SFS
ENGLISH
SCALE
SCALE FOR INSET
TEMPORARY FILL IN WETLAND
FILL IN WETLAND
SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS
MECHANIZED CLEARING (GRUBBING)
PROJECT REFERENCE NO. R-2829A
SHEET NO. 17
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
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PERMIT DRAWING SHEET 60 OF 103
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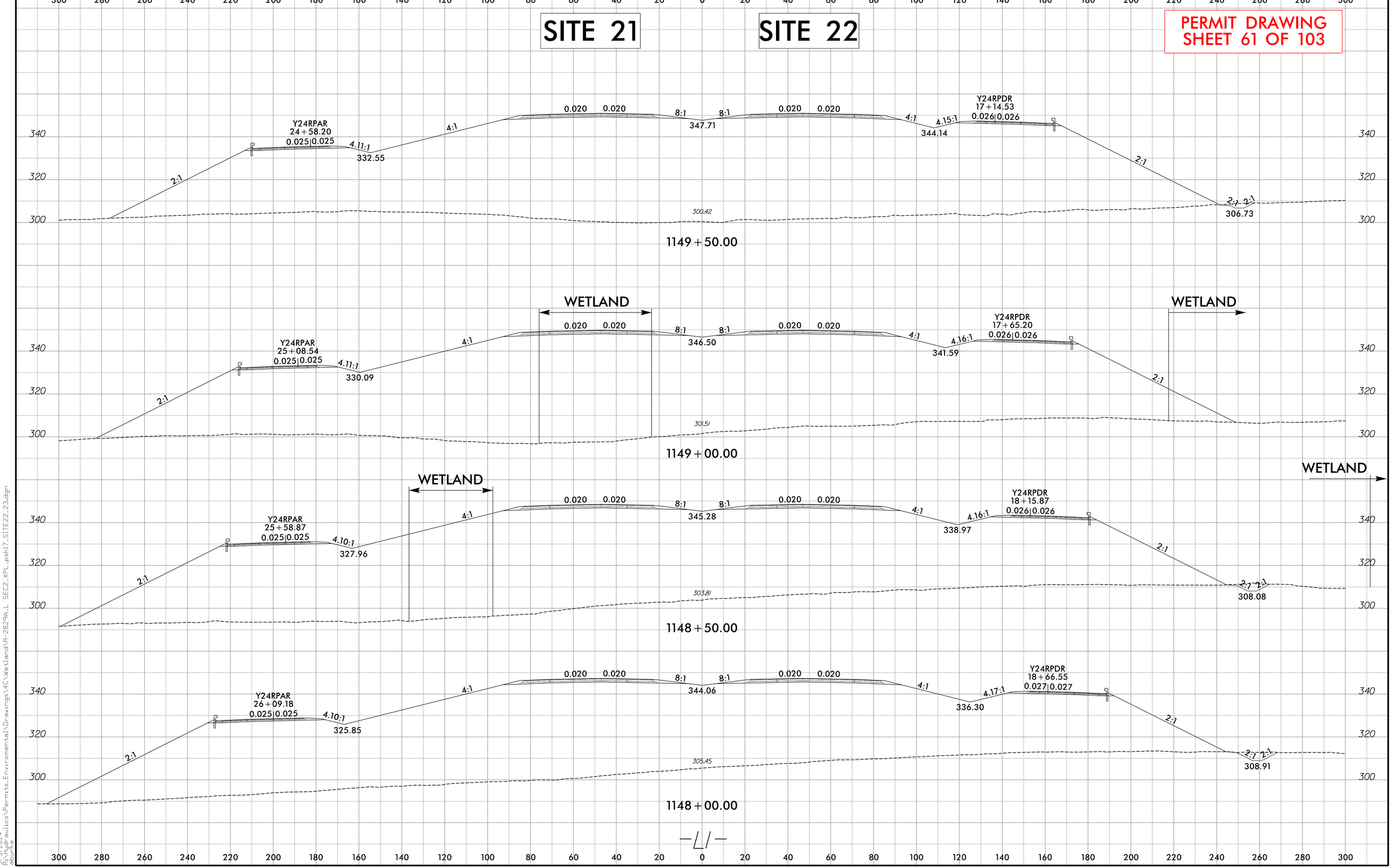
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-20

PERMIT DRAWING
SHEET 61 OF 103

SITE 21 SITE 22



9/3/2024
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ebunce

Submittal September 17, 2024

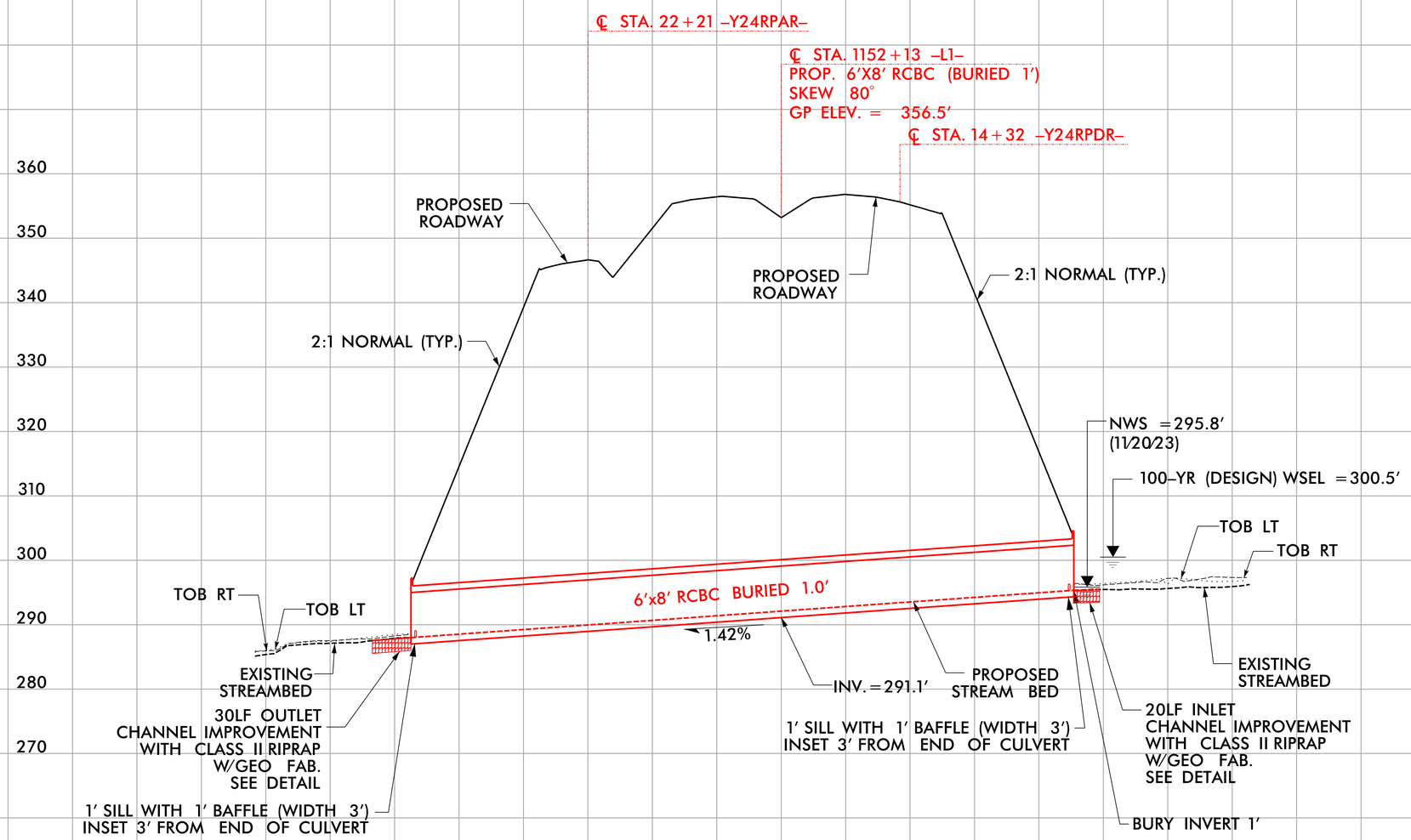
PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 62 OF 103

ENGLISH

SITE 23
–L1– STA. 1152+13



6'x8' RCBC
(Buried 1.0', Length =516')

5/14/99
8/31/2024
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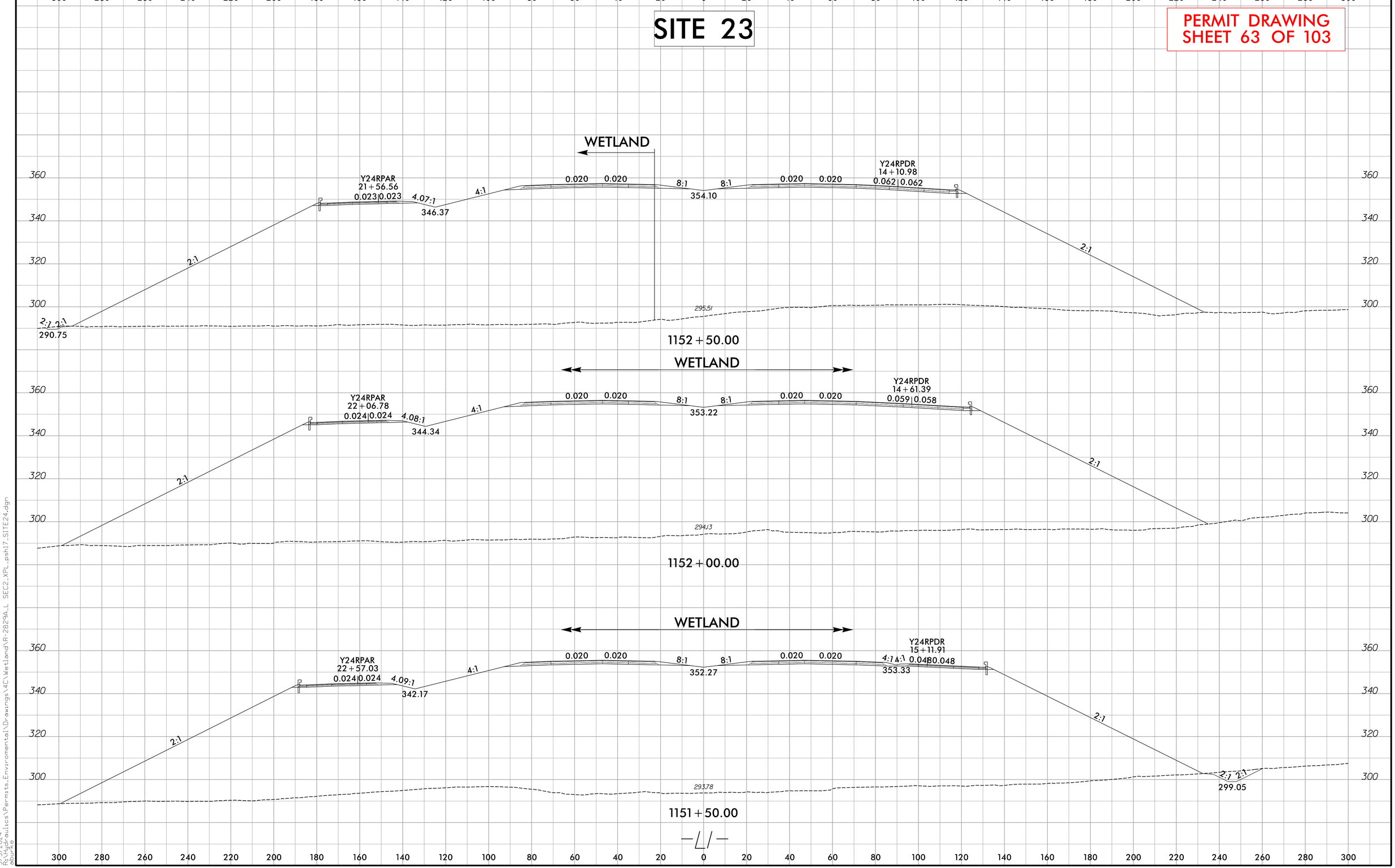
Submittal September 17, 2024

6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-22

SITE 23

PERMIT DRAWING
SHEET 63 OF 103



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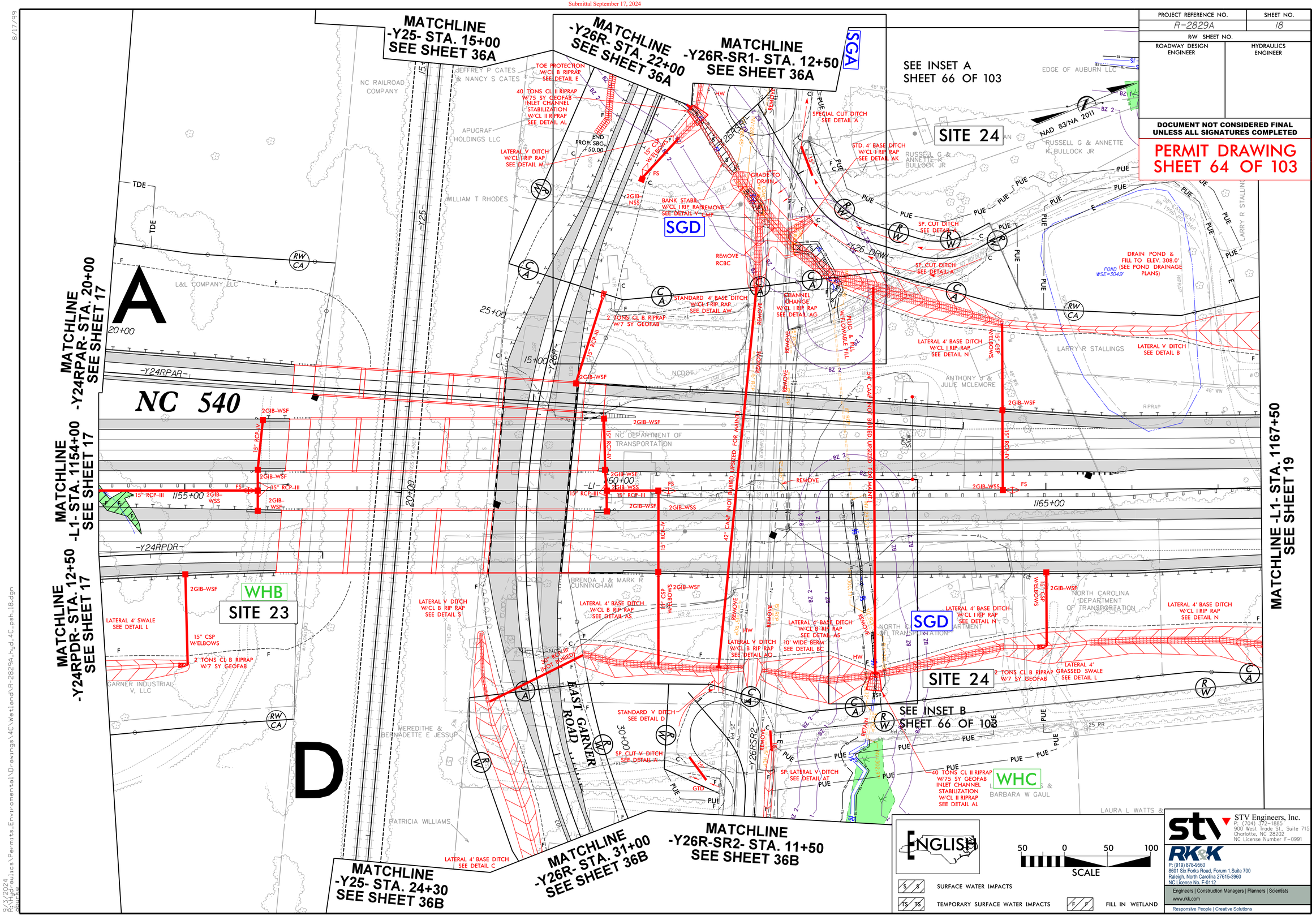
dbunce

Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 64 OF 103



8/17/99

8/31/2024
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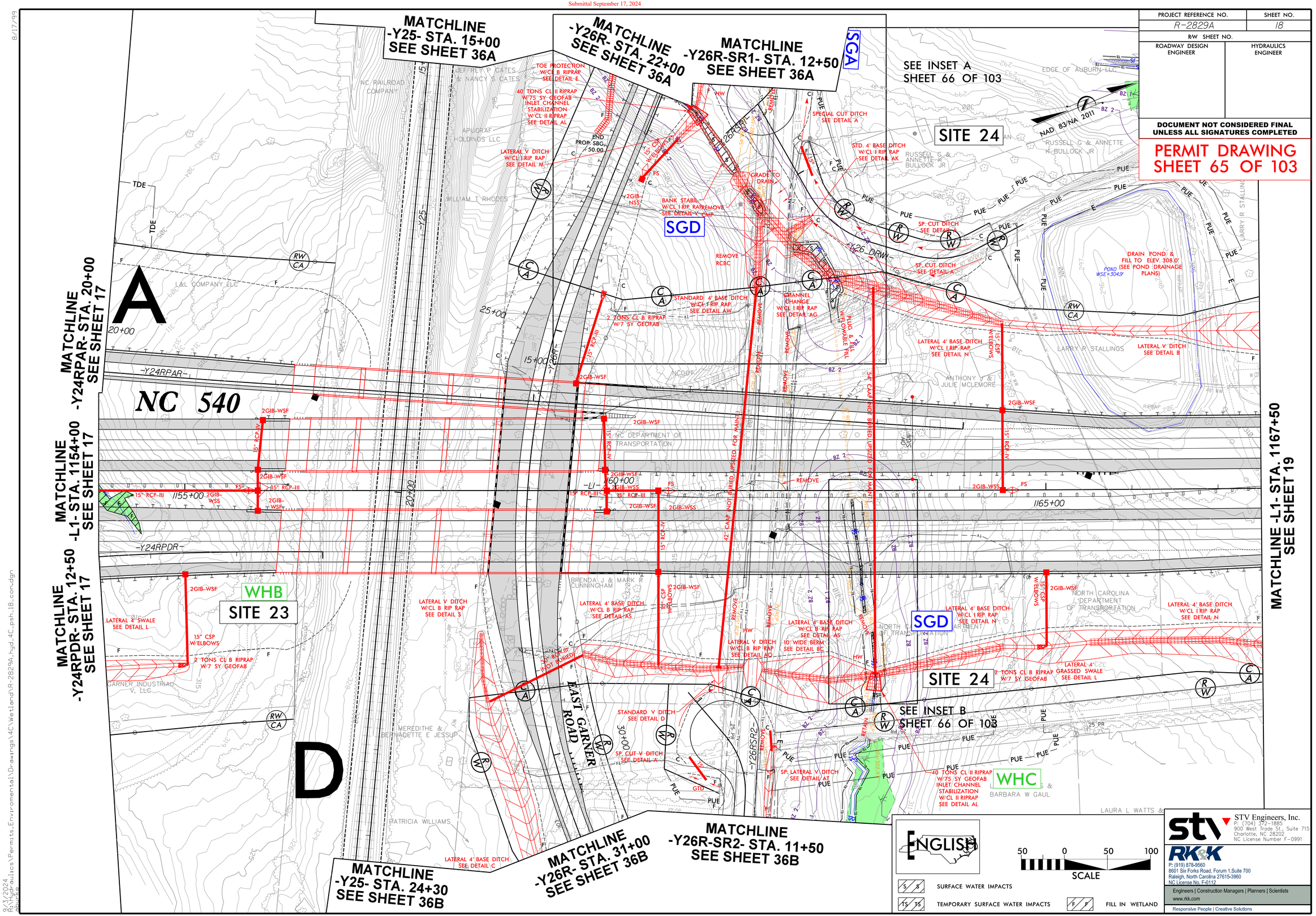
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 65 OF 103



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dbruce

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

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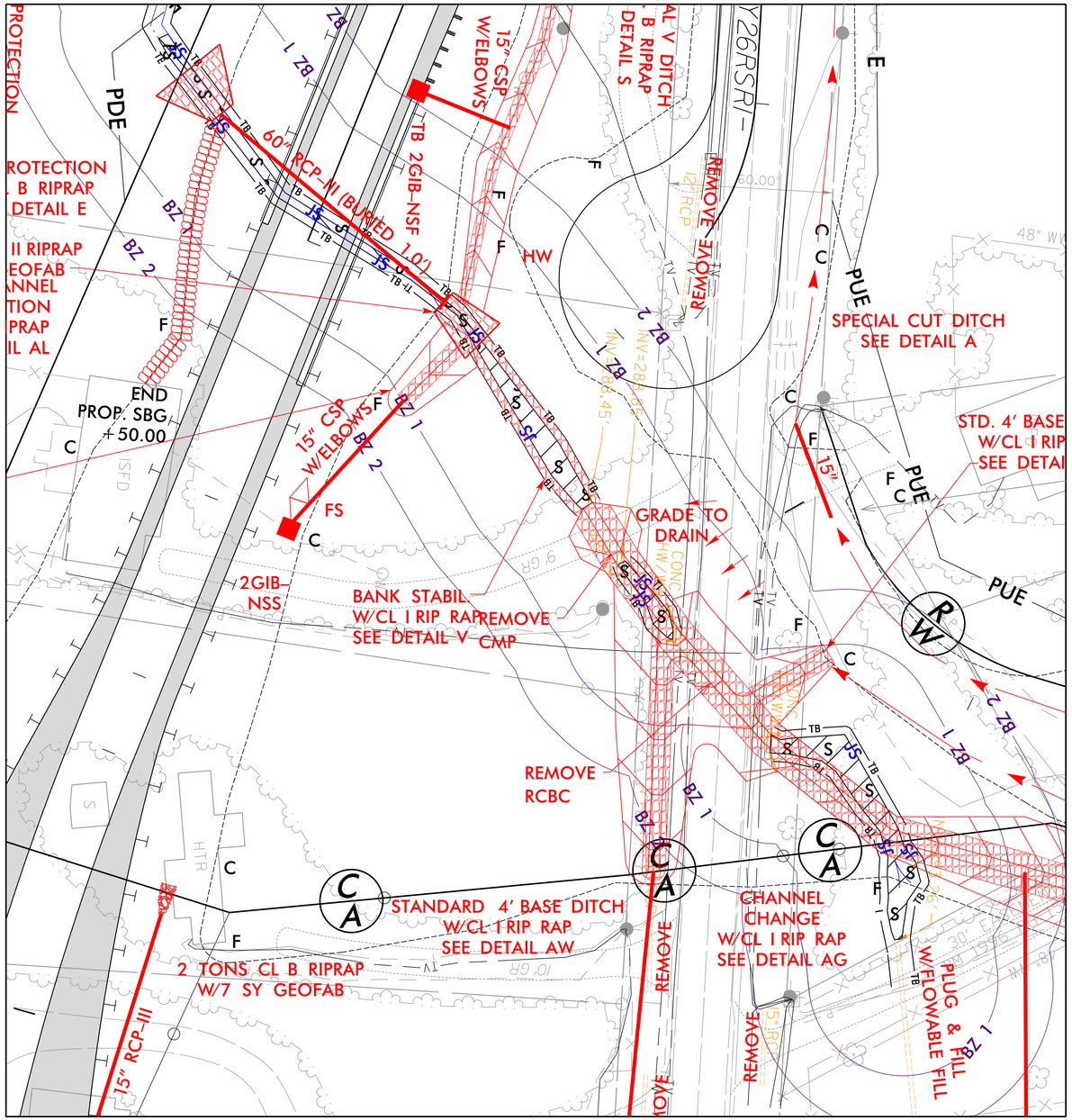
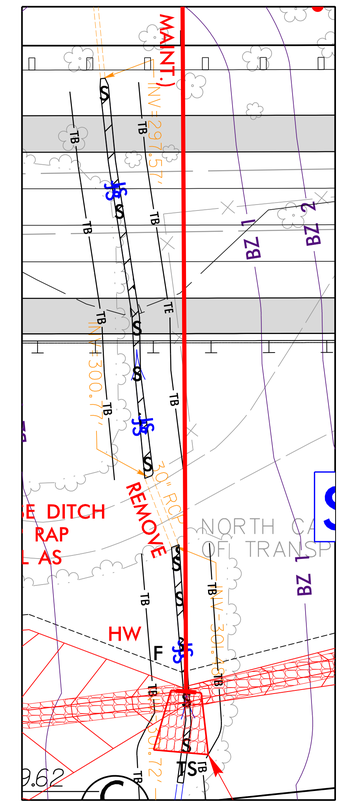
PERMIT DRAWING SHEET 66 OF 103

NAD 83/NA 2011



INSET A



INSET B

ENGLISH

SCALE FOR INSET: 25 0 25 50

S/S SURFACE WATER IMPACTS

TS/TS TEMPORARY SURFACE WATER IMPACTS

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8/31/2024
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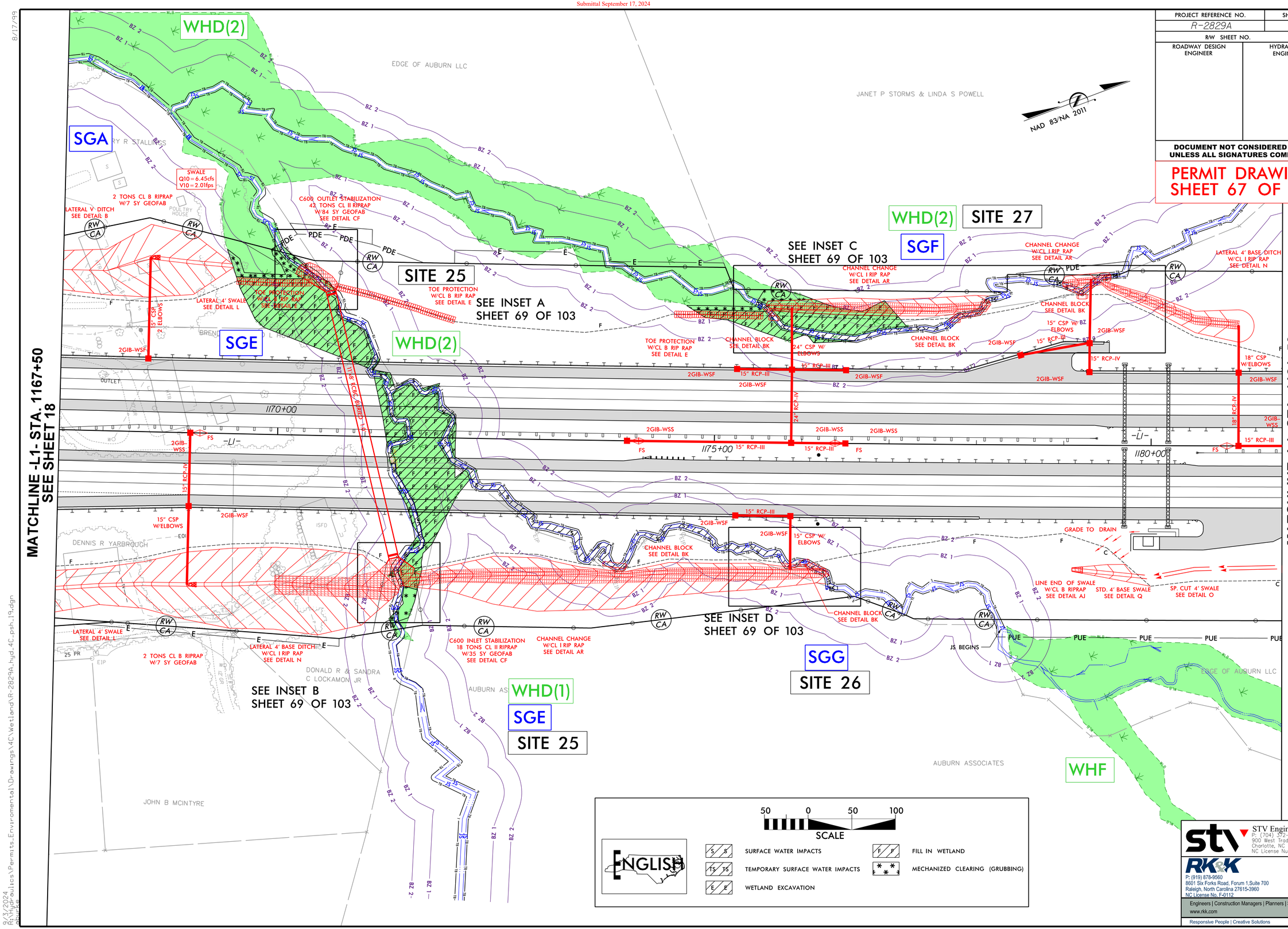
Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	19
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 67 OF 103



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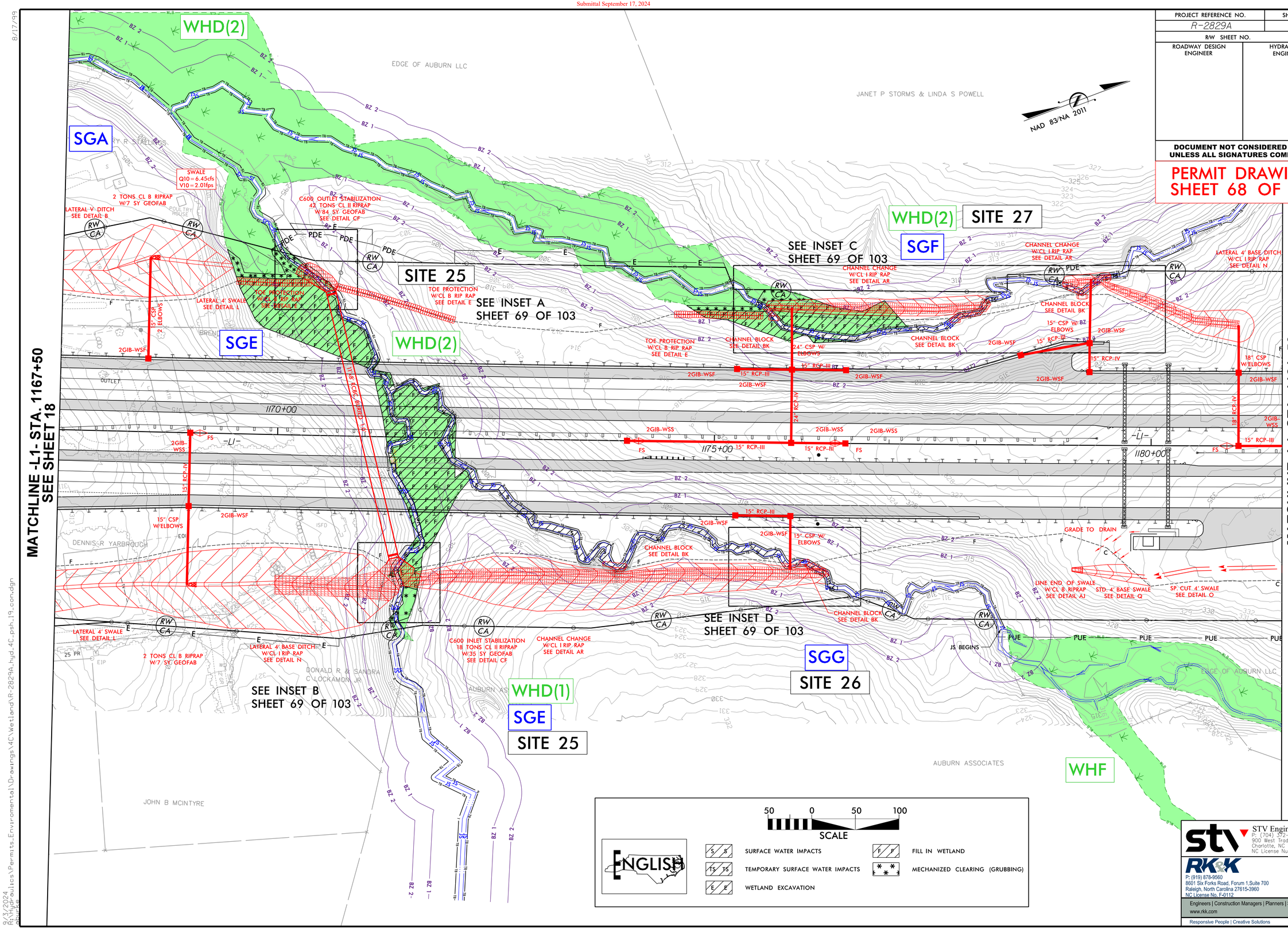
Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	19
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 68 OF 103



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

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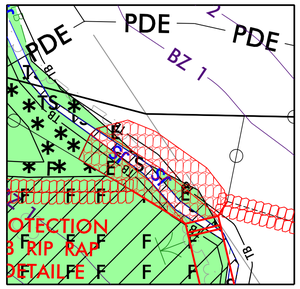
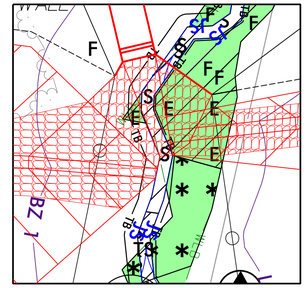
PERMIT DRAWING SHEET 69 OF 103

NAD 83/NA 2011

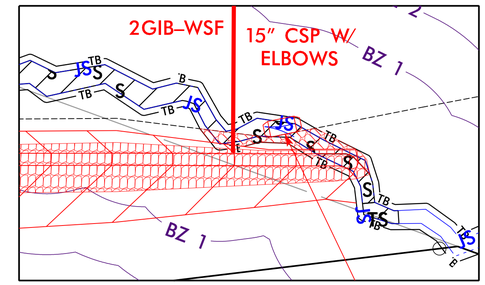
INSET A

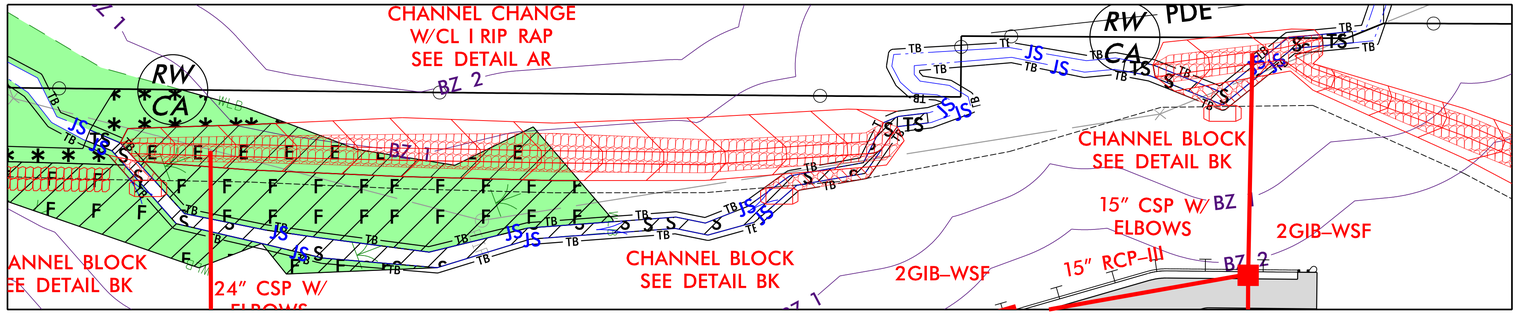


INSET B



INSET D





INSET C

25 0 25 50

SCALE FOR INSET

ENGLISH

S S	SURFACE WATER IMPACTS	F F	FILL IN WETLAND
TS TS	TEMPORARY SURFACE WATER IMPACTS	* *	MECHANIZED CLEARING (GRUBBING)
E E	WETLAND EXCAVATION		

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dsuttle

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PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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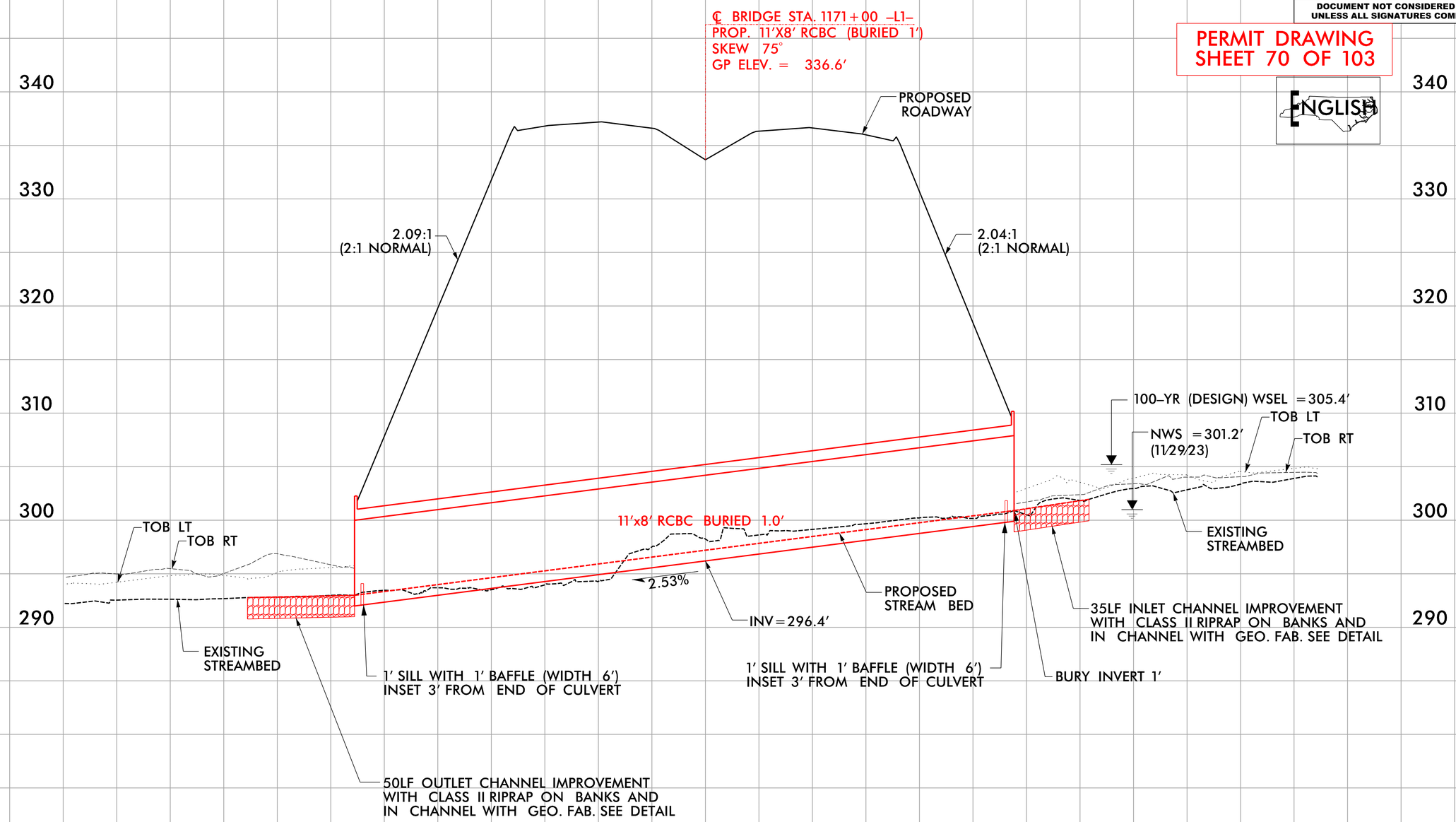
PERMIT DRAWING
SHEET 70 OF 103

ENGLISH

SITE 25
–L1– STA. 1171+00



11'x8' RCBC
(Buried 1.0', Length =313')

5/14/99

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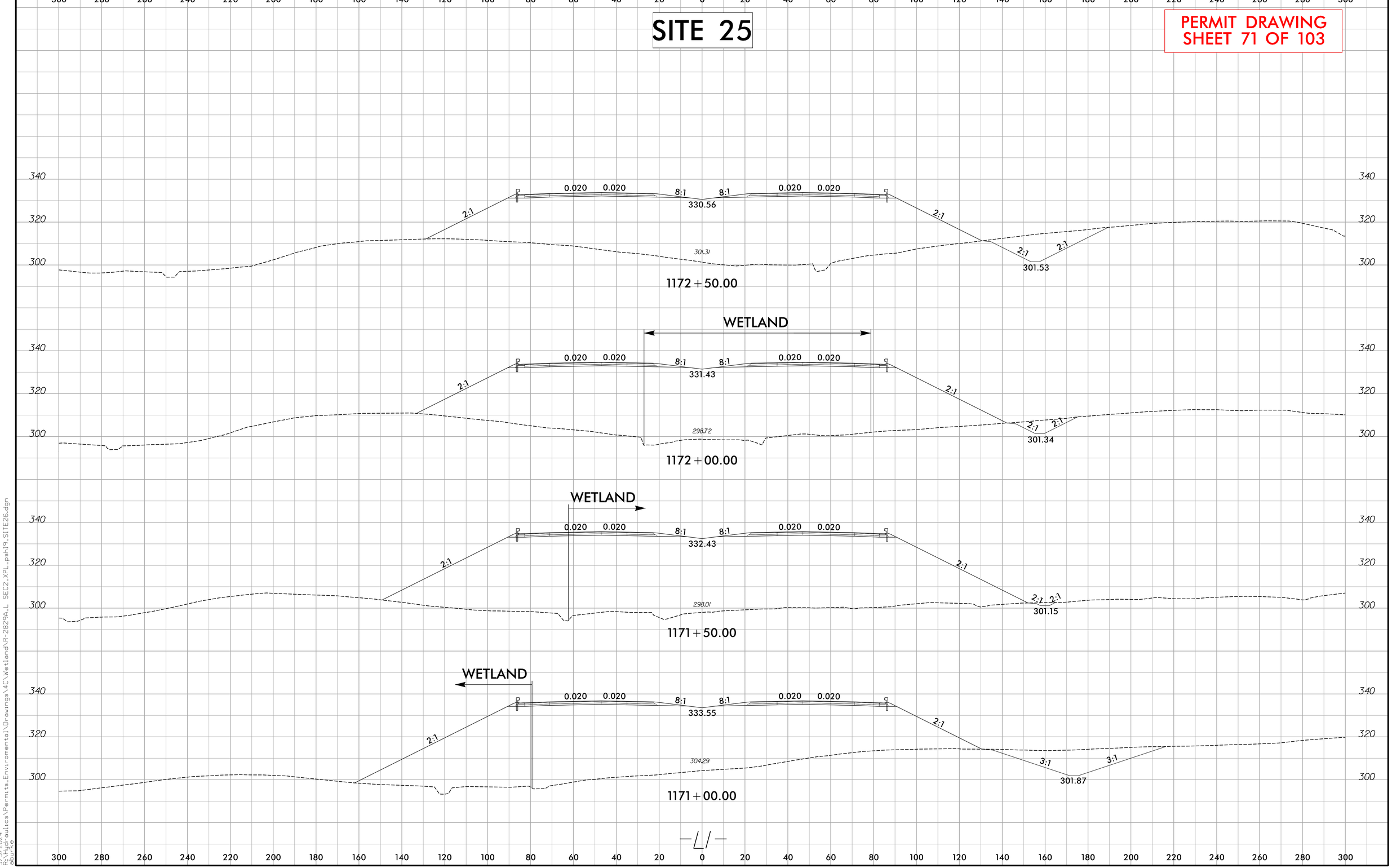
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-32

SITE 25

PERMIT DRAWING
SHEET 71 OF 103



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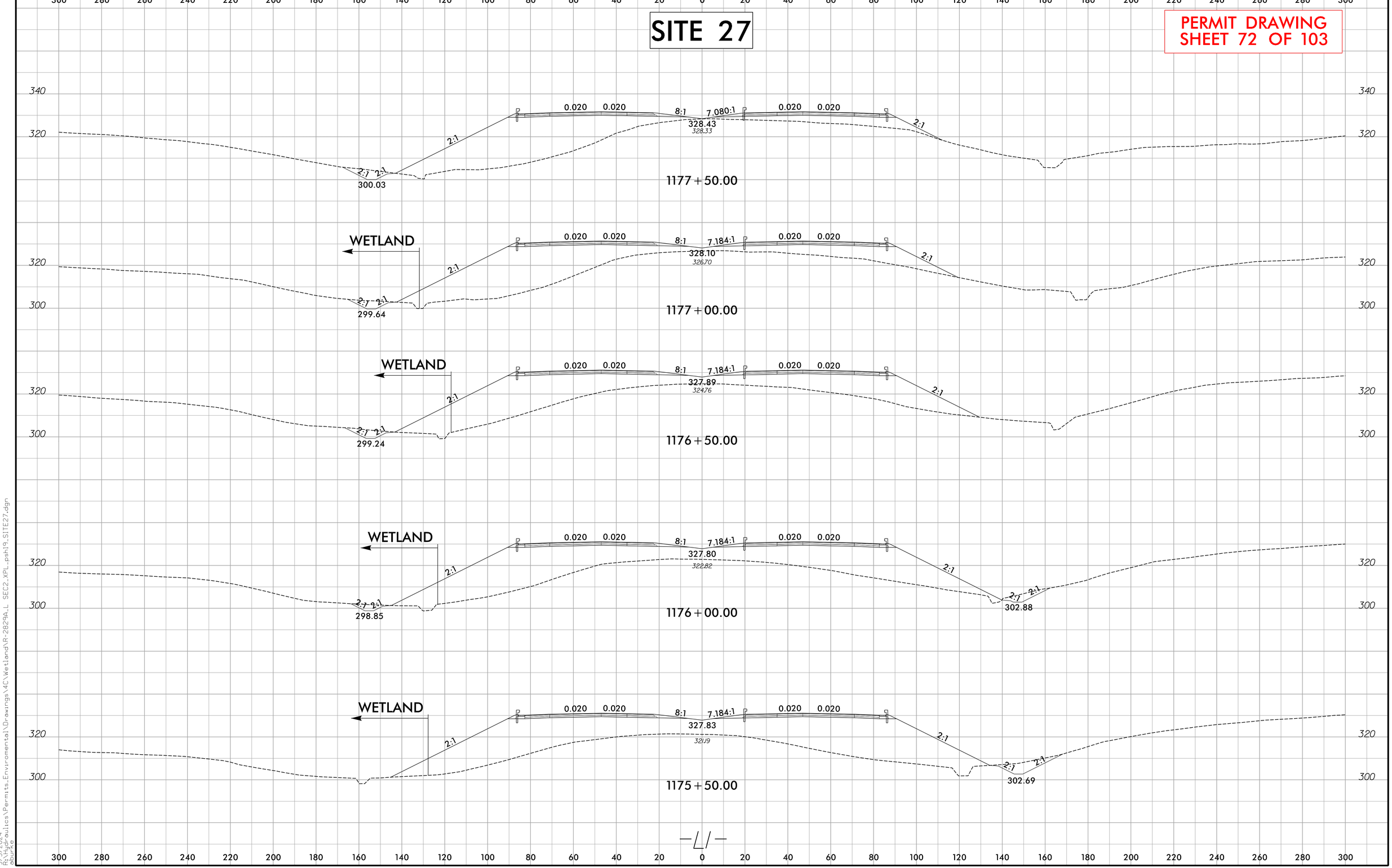
Submittal September 17, 2024

6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-34

SITE 27

PERMIT DRAWING
SHEET 72 OF 103



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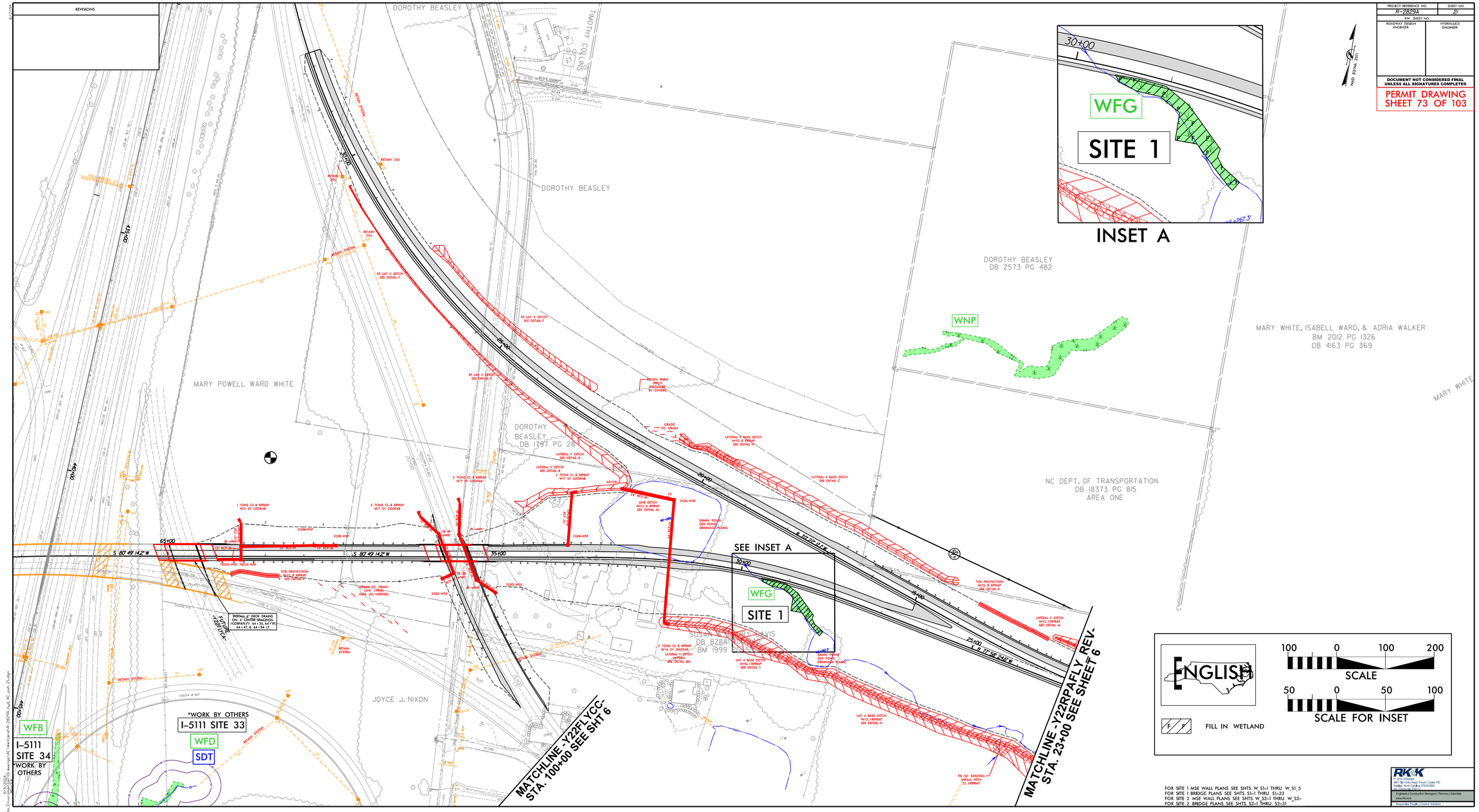
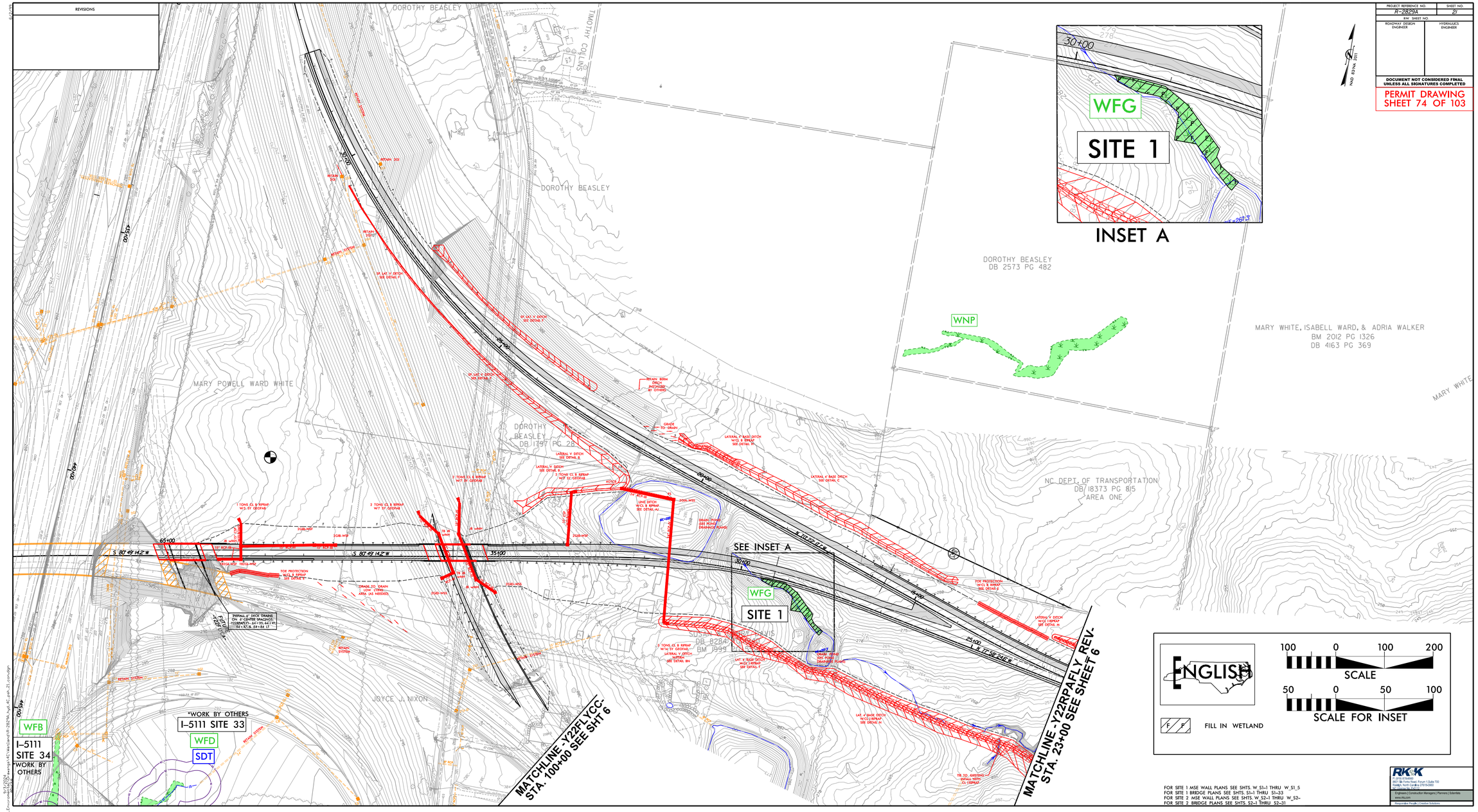

REVISIONS
DOROTHY BEASLEY
TIMOTHY COLLINS
DOROTHY BEASLEY
MARY POWELL WARD WHITE
DOROTHY BEASLEY
DB 1797 PG 28
DOROTHY BEASLEY
DB 2573 PG 482
MARY WHITE, ISABELL WARD, & ADRIA WALKER
BM 2012 PG 1326
DB 4163 PG 369
NC DEPT. OF TRANSPORTATION
DB 18373 PG 815
AREA ONE
SUSAN WOODRUFF DAVIS
DB 8284 PG 1
BM 1999
JOYCE J. NIXON
WNP
WFG
SITE 1
INSET A
SEE INSET A
WFG
SITE 1
WFB
I-5111
SITE 34
WORK BY OTHERS
*WORK BY OTHERS
I-5111 SITE 33
WFD
SDT
MATCHLINE - Y22FLYCC-
STA. 100+00 SEE SHT 6
MATCHLINE - Y22RPAFLY REV-
STA. 23+00 SEE SHEET 6
S 80 49 14.2" W
N 80 49 14.2" W
FILL IN WETLAND
ENGLISH
SCALE
SCALE FOR INSET
PROJECT REFERENCE NO.
R-2829A
SHEET NO.
27
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 73 OF 103
FOR SITE 1 MSE WALL PLANS SEE SHTS. W_S1-1 THRU W_S1_5
FOR SITE 1 BRIDGE PLANS SEE SHTS. S1-1 THRU S1-33
FOR SITE 2 MSE WALL PLANS SEE SHTS. W_S2-1 THRU W_S2-
FOR SITE 2 BRIDGE PLANS SEE SHTS. S2-1 THRU S2-31
RK&K


REVISIONS
PROJECT REFERENCE NO.
R-2829A
SHEET NO.
27
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 74 OF 103
NAD 83/NSRS 2011
INSET A
WFG
SITE 1
30+00
DOROTHY BEASLEY
TIMOTHY COLLINS
DOROTHY BEASLEY
DOROTHY BEASLEY
DB 2573 PG 482
WNP
MARY WHITE, ISABELL WARD, & ADRIA WALKER
BM 2012 PG 1326
DB 4163 PG 369
MARY WHITE
MARY POWELL WARD WHITE
DOROTHY BEASLEY
DB 1197 PG 28
NC DEPT. OF TRANSPORTATION
DB 18373 PG 815
AREA ONE
SEE INSET A
WFG
SITE 1
SUSAN WARD WHITE
DB 8284
BM 1999
JOYCE J. NIXON
S 80 49 14.2" W
S 80 49 14.2" W
65+00
35+00
25+00
45+00
55+00
*WORK BY OTHERS
I-5111 SITE 33
WFD
SDT
WFB
I-5111
SITE 34
*WORK BY OTHERS
MATCHLINE -Y22FLYCC-
STA. 100+00 SEE SHT 6
MATCHLINE -Y22RPAFLY REV-
STA. 23+00 SEE SHEET 6
ENGLISH
FILL IN WETLAND
100 0 100 200
SCALE
50 0 50 100
SCALE FOR INSET
FOR SITE 1 MSE WALL PLANS SEE SHTS. W_S1-1 THRU W_S1_5
FOR SITE 1 BRIDGE PLANS SEE SHTS. S1-1 THRU S1-33
FOR SITE 2 MSE WALL PLANS SEE SHTS. W_S2-1 THRU W_S2-
FOR SITE 2 BRIDGE PLANS SEE SHTS. S2-1 THRU S2-31
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0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S1 X-105

SITE 1

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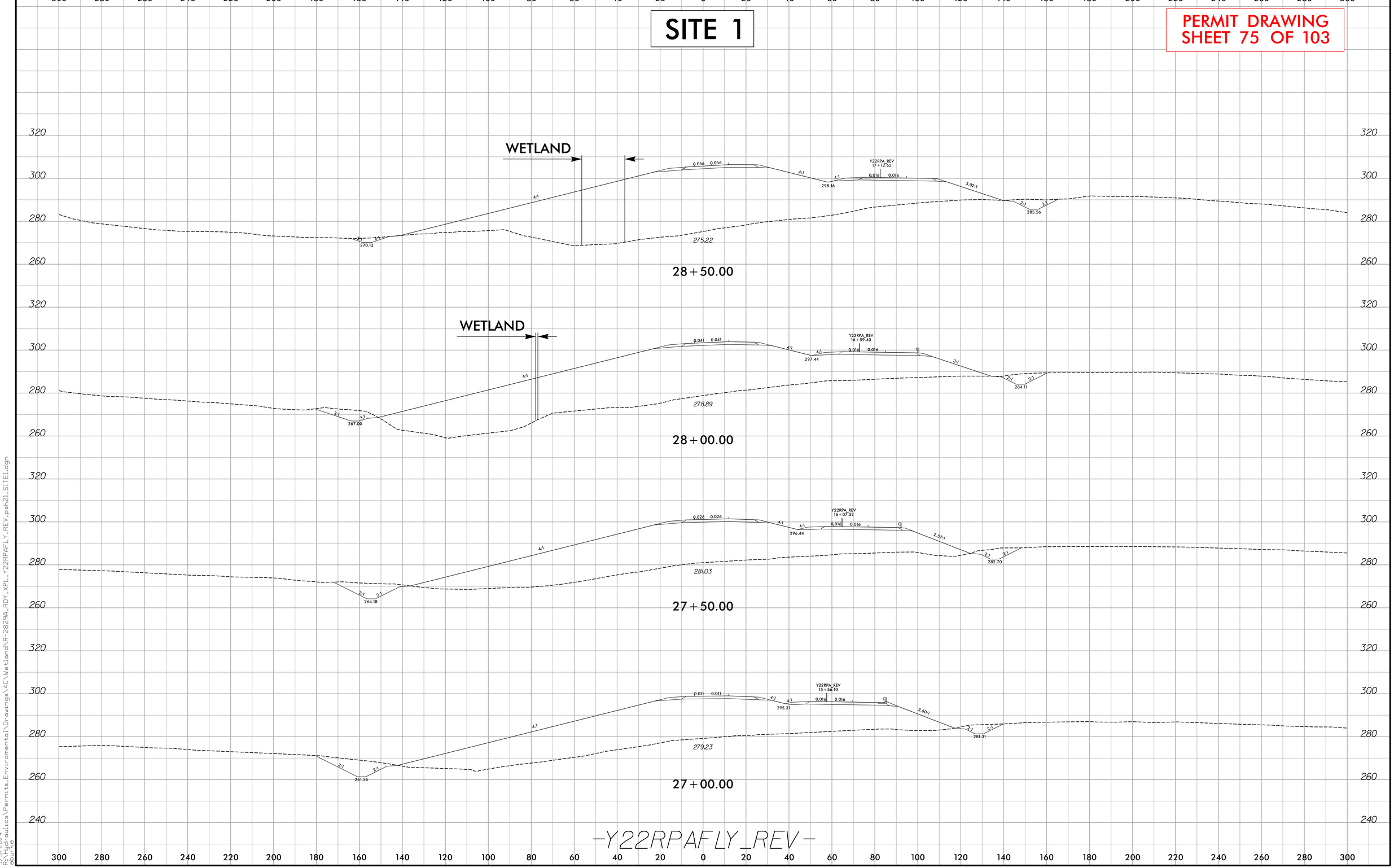
SHEET 75 OF 103



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9/3/2024
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ebunce

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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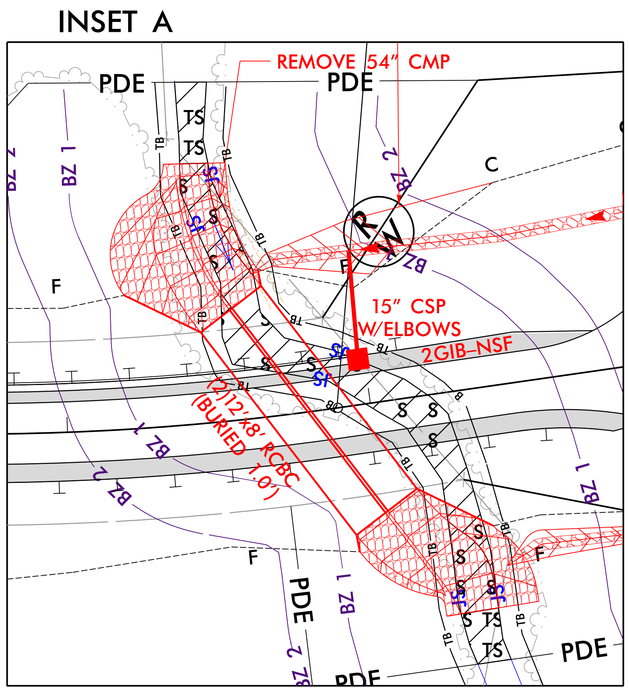
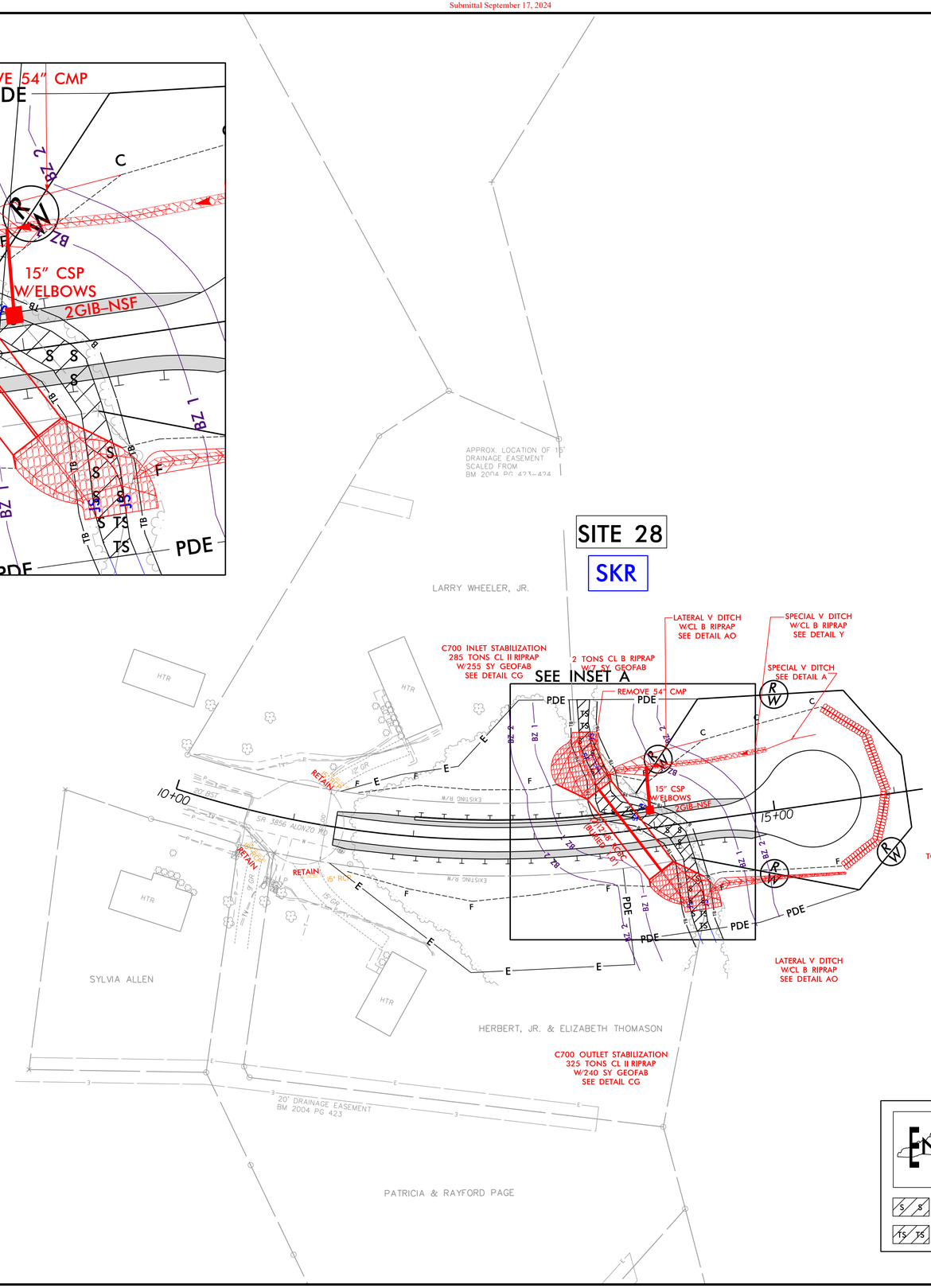
PERMIT DRAWING SHEET 76 OF 103





ENGLISH

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

50 0 50 100
SCALE

25 0 25 50
SCALE FOR INSET

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8/31/2024
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dbruce

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

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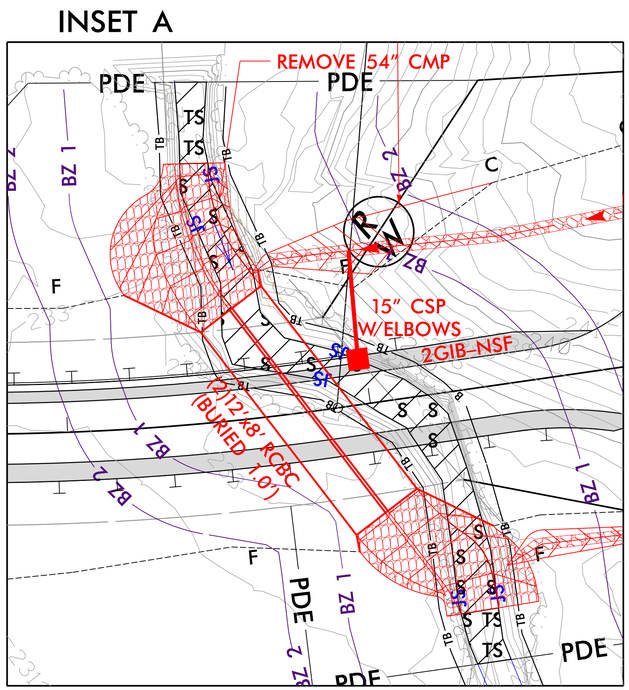
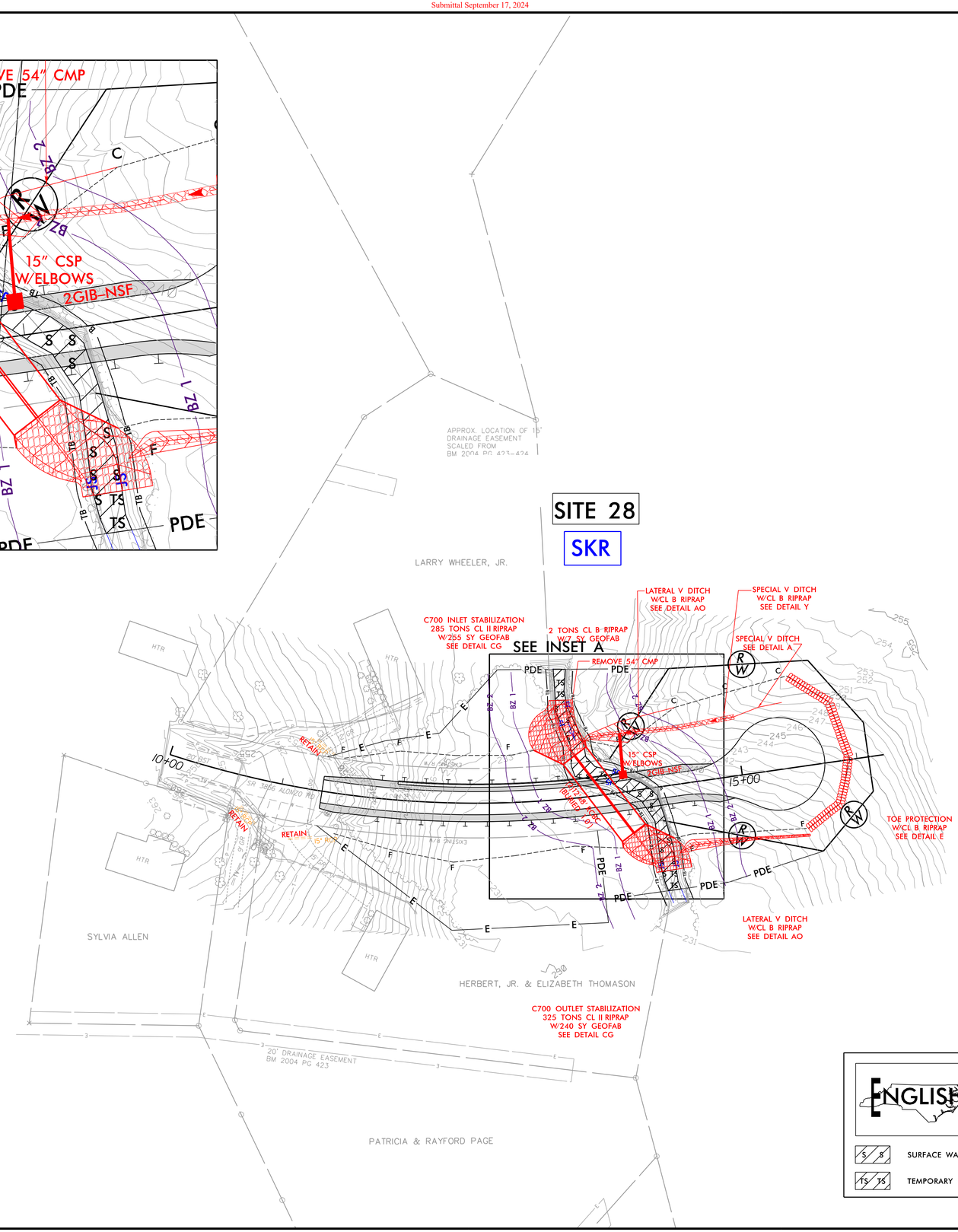
PERMIT DRAWING SHEET 77 OF 103





ENGLISH

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

50 0 50 100
SCALE

25 0 25 50
SCALE FOR INSET

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8/31/2024
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dbruce

Submittal September 17, 2024

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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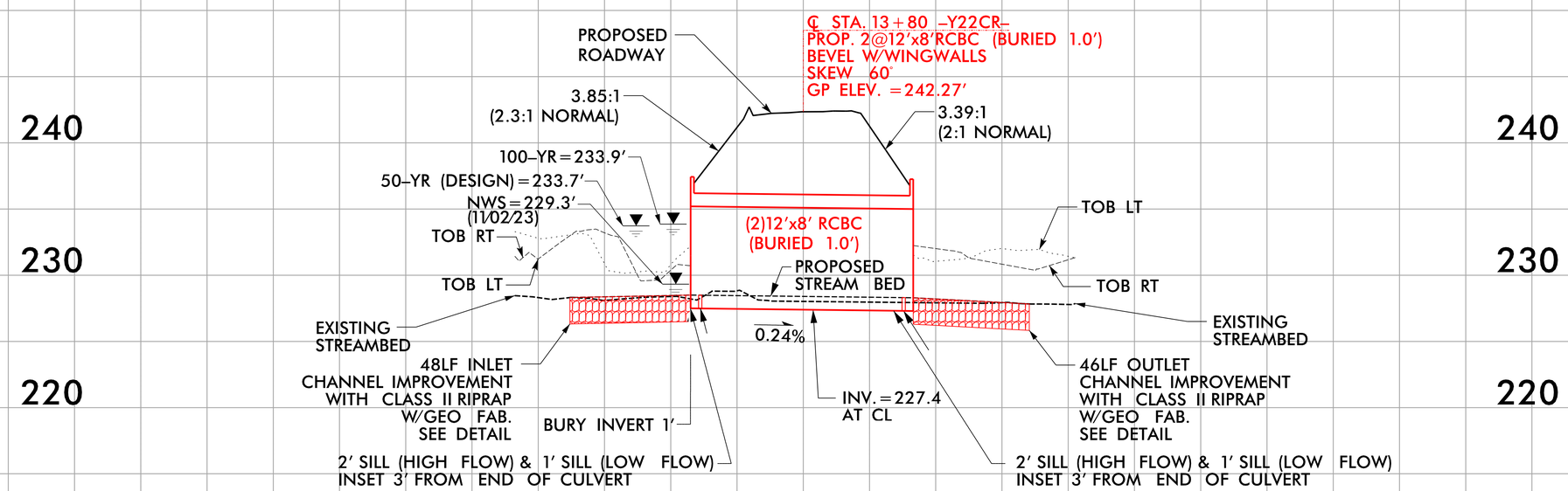
PERMIT DRAWING
SHEET 78 OF 103

ENGLISH

SITE 28
–Y22CR– STA. 14+00



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(Buried 1.0', Length =80')

9/3/2024
8:19:26 AM
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Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 79 OF 103

ENGLISH

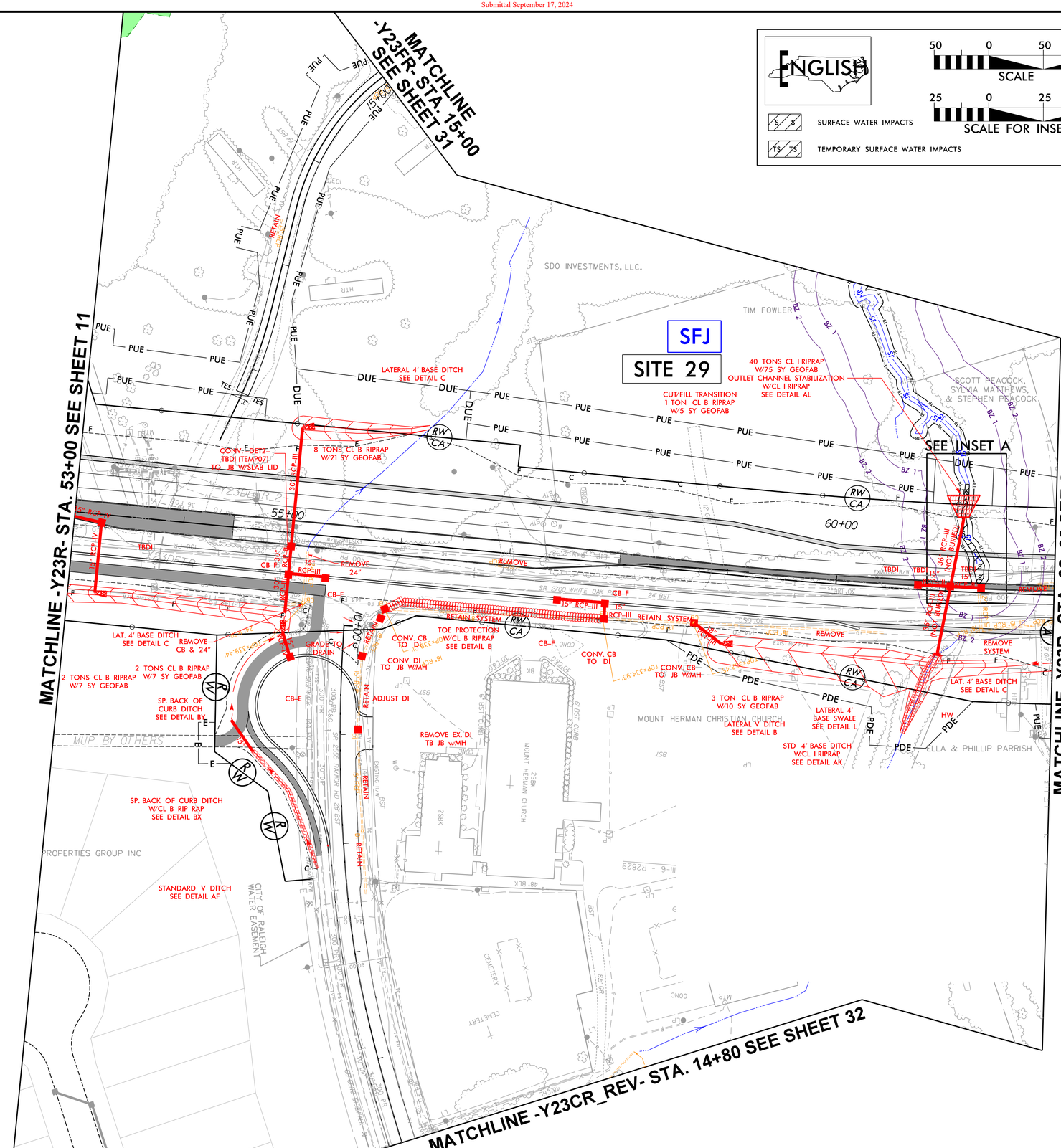
SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

SCALE 50 0 50 100

SCALE FOR INSET 25 0 25 50

NAD 83/NA 2011



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Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 80 OF 103

ENGLISH

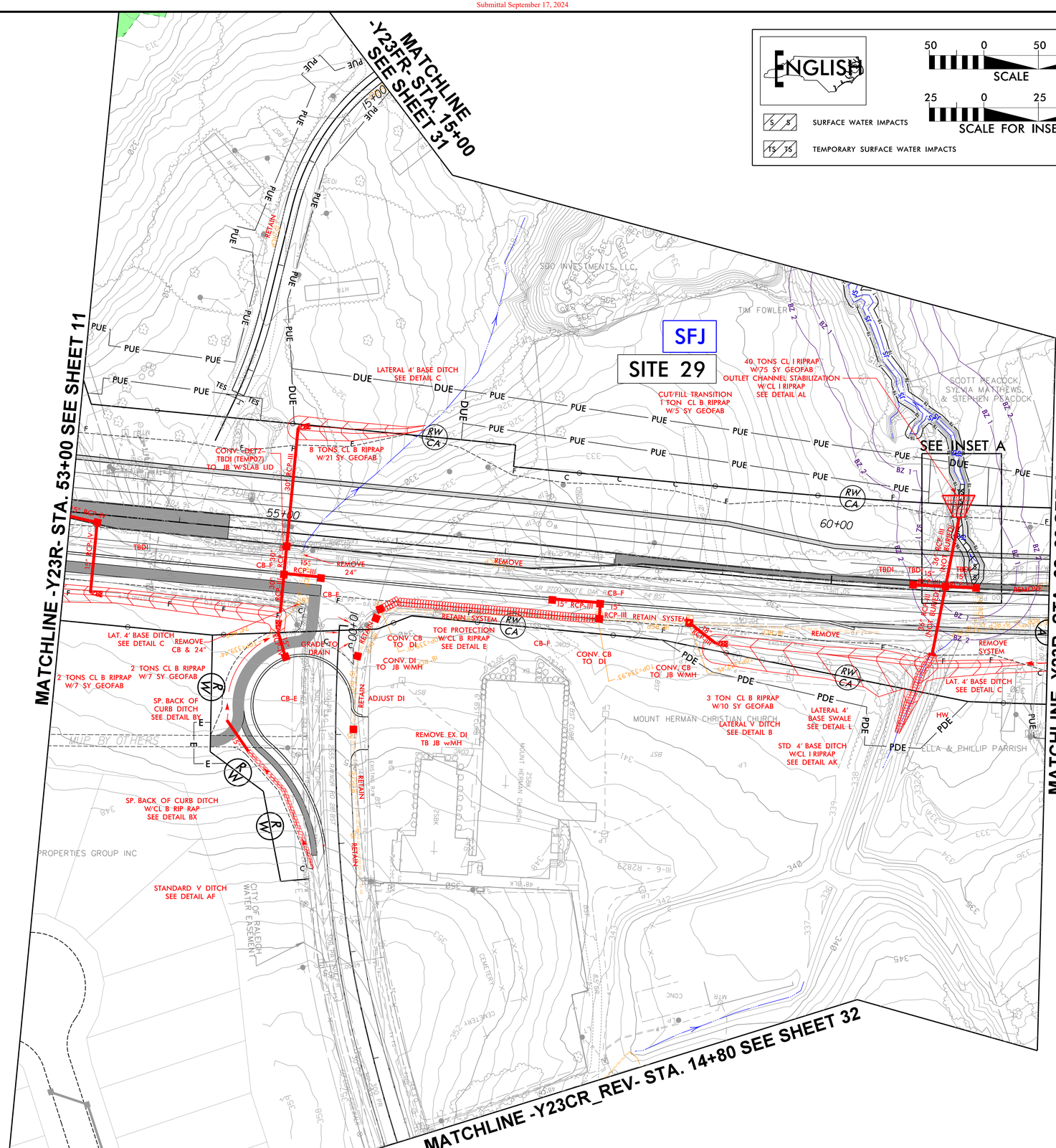
SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

SCALE 50 0 50 100

SCALE FOR INSET 25 0 25 50

NAD 83/NA 2011



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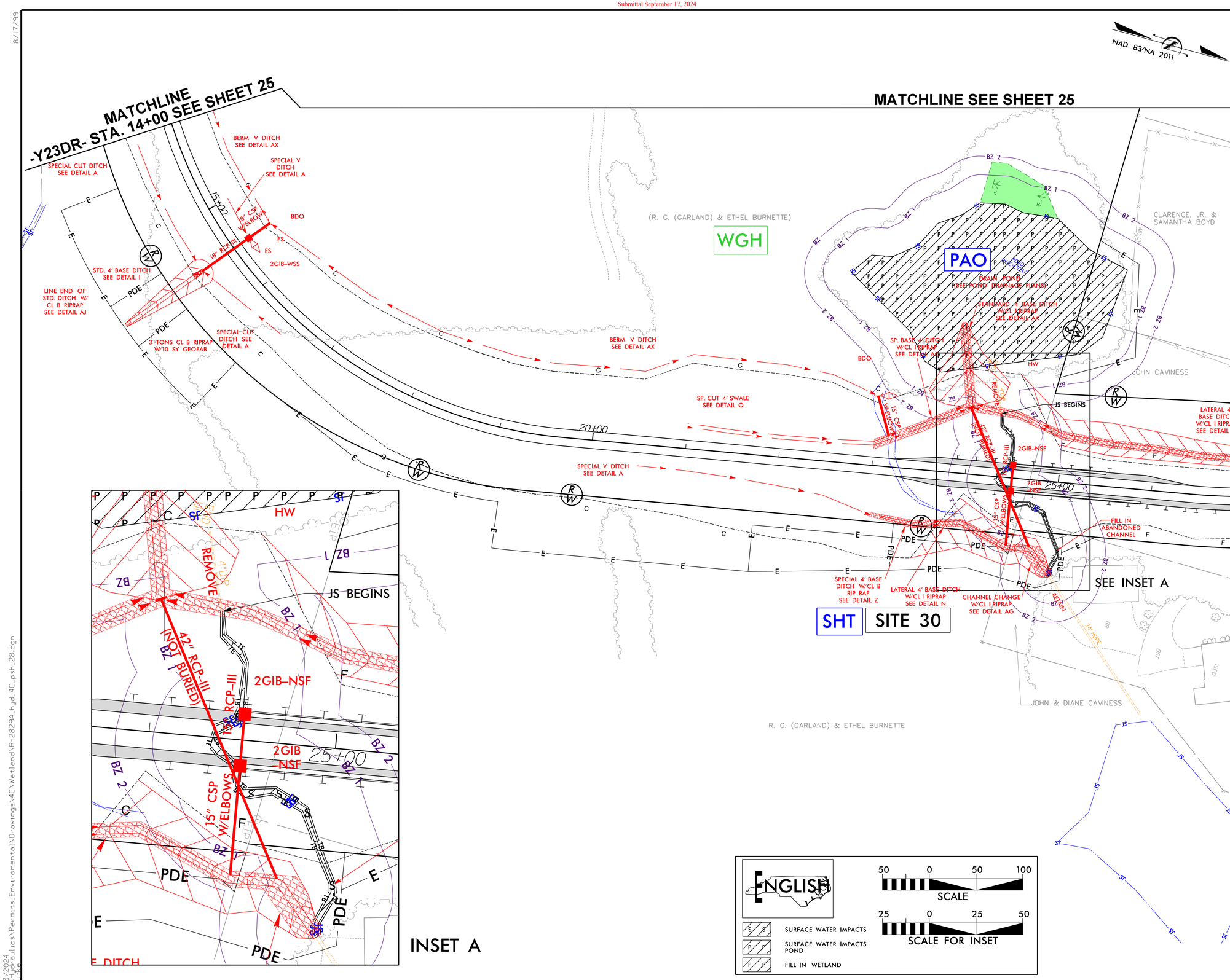
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 81 OF 103



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8/31/2024
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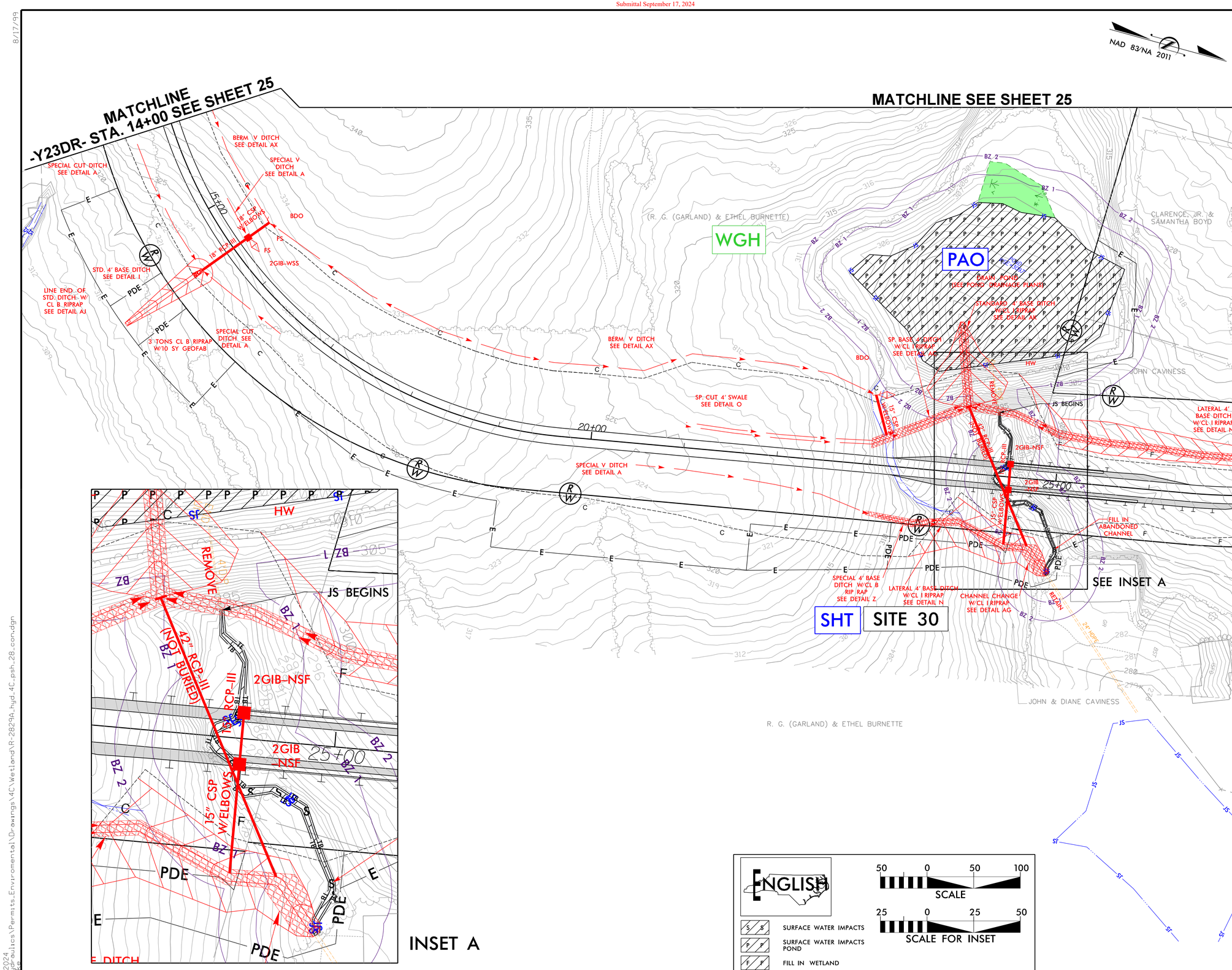
dbuse

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 82 OF 103



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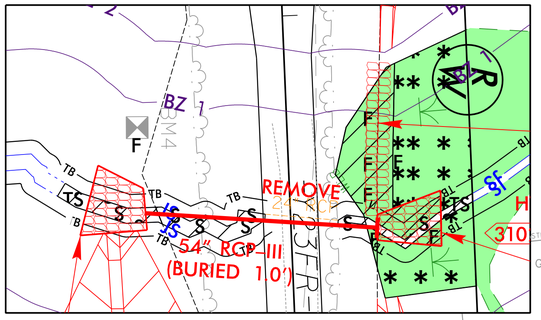
dbuse

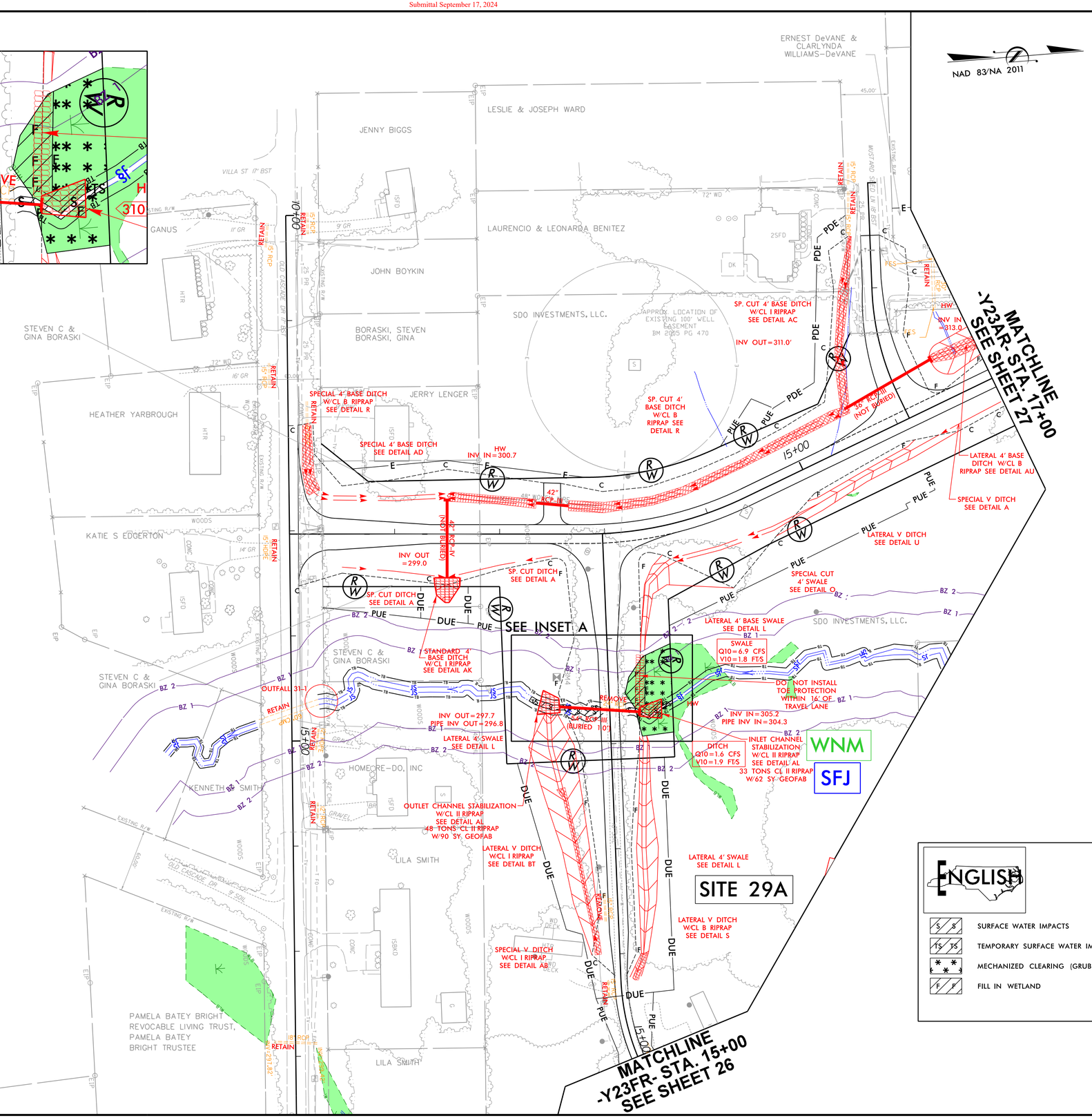
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 83 OF 103



INSET A



ENGLISH

SCALE: 50 0 50 100

SCALE FOR INSET: 25 0 25 50

- SURFACE WATER IMPACTS
- TEMPORARY SURFACE WATER IMPACTS
- MECHANIZED CLEARING (GRUBBING)
- FILL IN WETLAND

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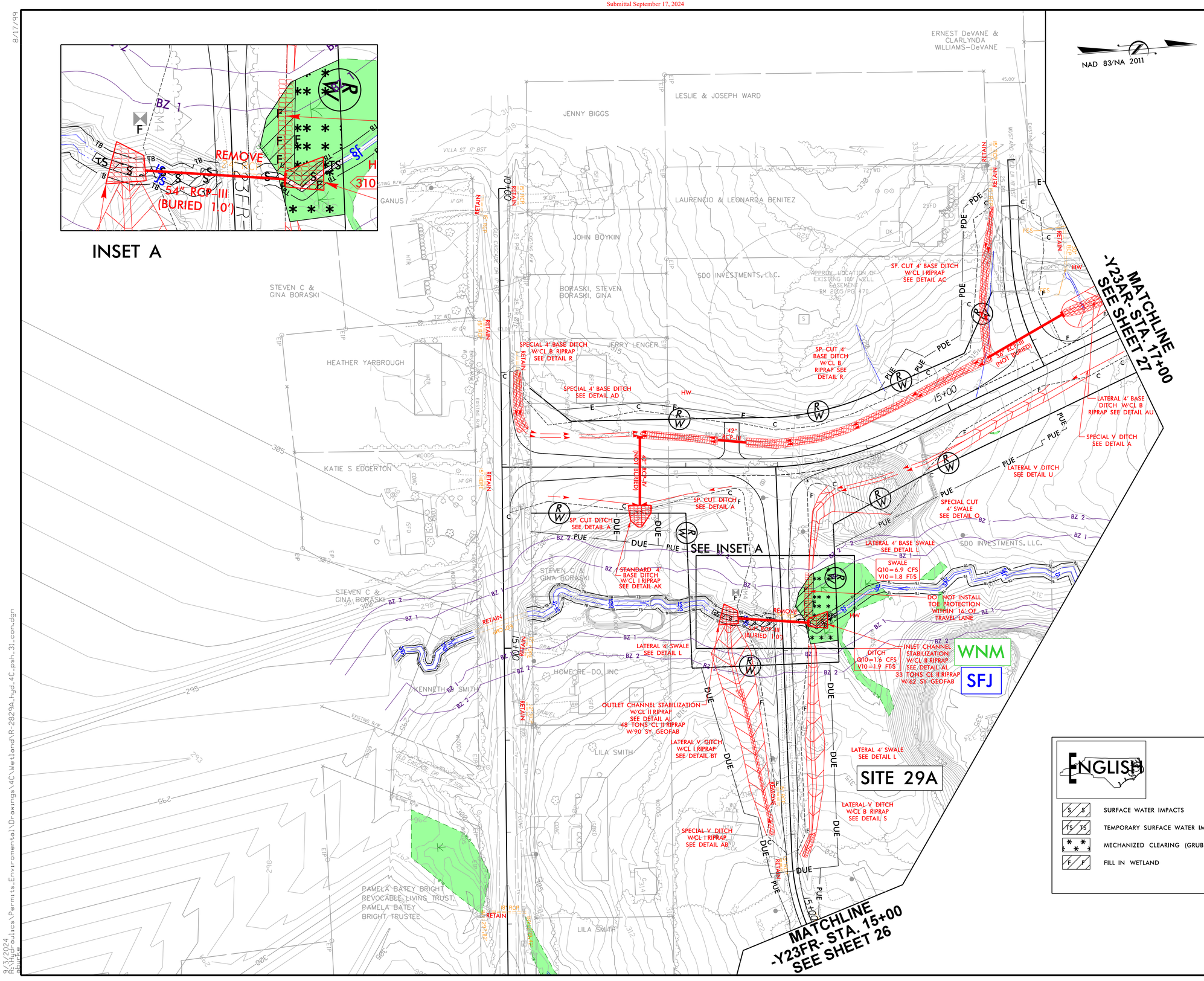
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 84 OF 103

NAD 83/NA 2011

INSET A



ENGLISH

SCALE: 50 0 50 100

SCALE FOR INSET: 25 0 25 50

S S	SURFACE WATER IMPACTS
TS TS	TEMPORARY SURFACE WATER IMPACTS
* * * *	MECHANIZED CLEARING (GRUBBING)
F F	FILL IN WETLAND

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dbuffaloe

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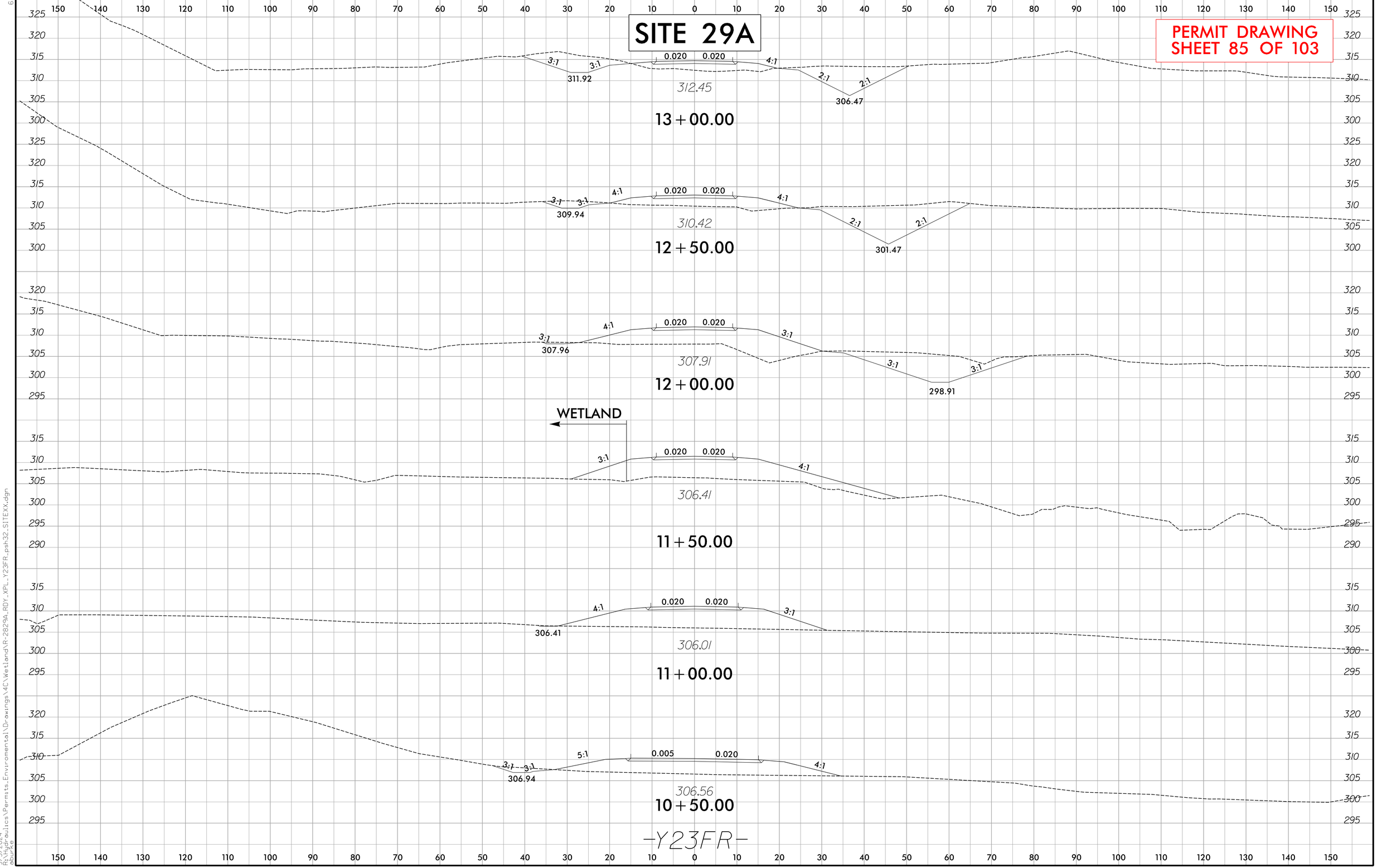
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S1 X-211

SITE 29A

PERMIT DRAWING
SHEET 85 OF 103



9/3/2024
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ebunce

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 86 OF 103

ENGLISH

SCALE 50 0 50 100

SCALE FOR INSET 25 0 25 50

- S / S — SURFACE WATER IMPACTS
- TS / TS — TEMPORARY SURFACE WATER IMPACTS
- F / F — FILL IN WETLAND
- * * — MECHANIZED CLEARING (GRUBBING)

NAD 83/NA 2011

STEC

SEVENTY EAST ASSOCIATES, LLC.

CHRISTOPHER DANIELS

DAVID HAWLEY

R. GARLAND BURNETTE

SITE 31

WGW

SITE 31

WGV(1)

SFY

SFZ(1)

C800 INLET STABILIZATION
58 TONS CL II RIPRAP
W/86 SY GEOFAB
SEE DETAIL CH

C800 OUTLET STABILIZATION
51 TONS CL II RIPRAP
W/68 SY GEOFAB
SEE DETAIL CH

3406
Q10 = 1.03cfs
V10 = 0.36fps

SWALE
Q10 = 12.57cfs
V10 = 1.97fps

SWALE
Q10 = 25.43cfs
V10 = 1.94fps

LATERAL 4' BASE DITCH
W/CL I RIPRAP
SEE DETAIL N

LATERAL
4' BASE SWALE
SEE DETAIL L

LATERAL
4' BASE SWALE
SEE DETAIL

2 TONS CL B RIPRAP
W/7 SY GEOFAB

TOE PROTECTION
W/CL B RIPRAP
SEE DETAIL E

LINE CUT FILL
TRANSITION W/
2 TONS CL B RIPRAP
W/7 SY GEOFAB

1 TONS CL B RIPRAP
W/5 SY GEOFAB

RETAIN SYSTEM

SEE INSET A

MATCHLINE -Y24R- STA. 24+00
SEE SHEET 35

INSET A

SEE DETAIL E

PUE
2 TONS CL B RIPRAP
W/7 SY GEOFAB

SP. DET. HW.

CONC HW/WW

EXTEND EXISTING 5'x6'

2GIB –WSF

15" CSP W/ELBOWS

BY3-314

TRENCHLESS INSTALLATION 72" WELDED STEEL

REMOVE 60' EXIST 15"

20+00

FS

REMOVE DI

2GIB–

TB JB w/MH

15" RCP–III

PLUG & FILL W/FF

15" CSP W/ELBOWS

EXTEND EXISTING 5'x6'

JS BEGINS SP. DET. HW.

BZ 1

BZ 2

PUE

DUE

REMOVE CONC. PAVED DITCH ~ 100 LF

CONC PAVED DITCH

RETAIN

2GIB–WSS

US 70 BUS WB 31' BST

US 70 BUS EB 31' BST

1 TONS CL B RIPRAP
W/5 SY GEOFAB

TOE PROTECTION
W/CL B RIPRAP
SEE DETAIL E

SPECIAL V DITCH
SEE DETAIL

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8/31/2024
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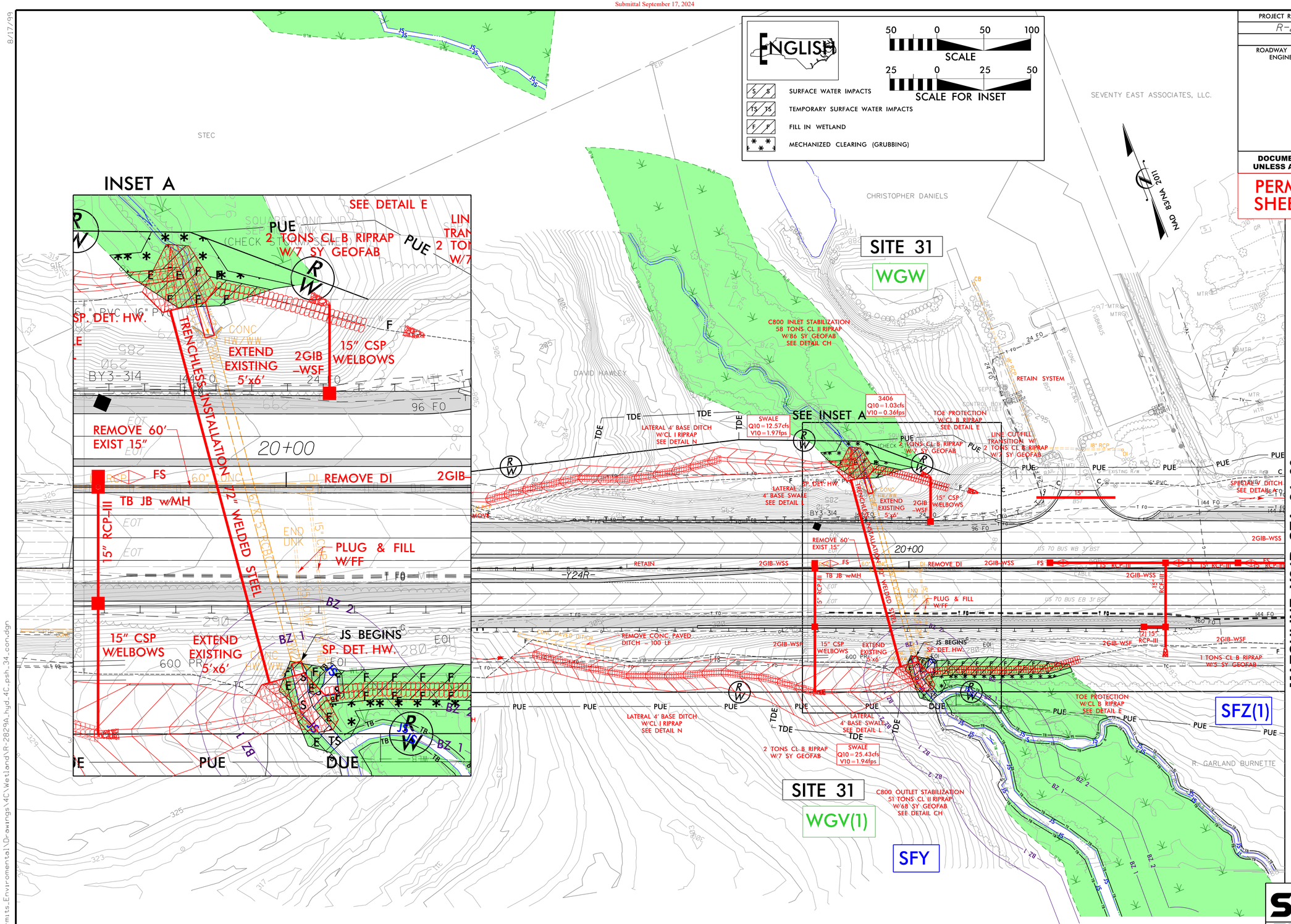
Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 87 OF 103



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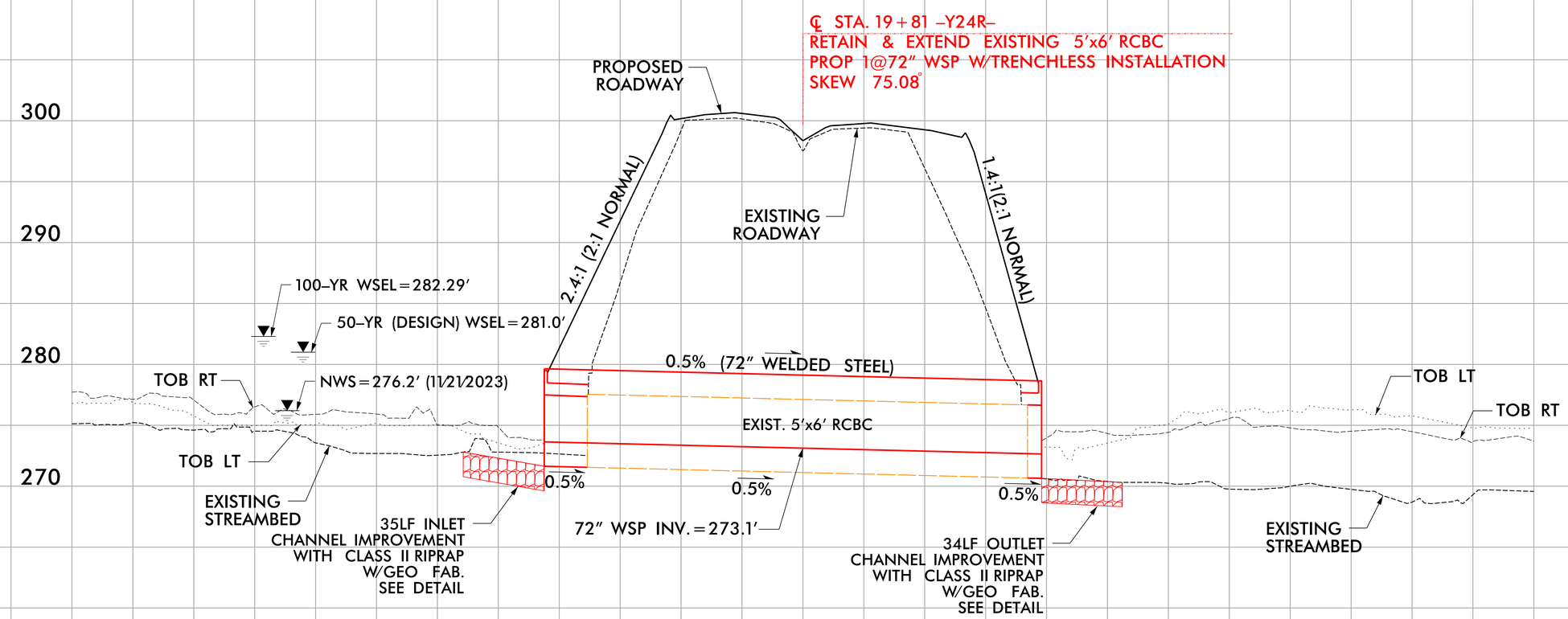
PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 88 OF 103

ENGLISH

SITE 31
–Y24R– STA. 19 + 81



RETAIN AND EXTEND 5'x6' RCBC + 72" WELDED STEEL PIPE
(Not buried, Length = 181')

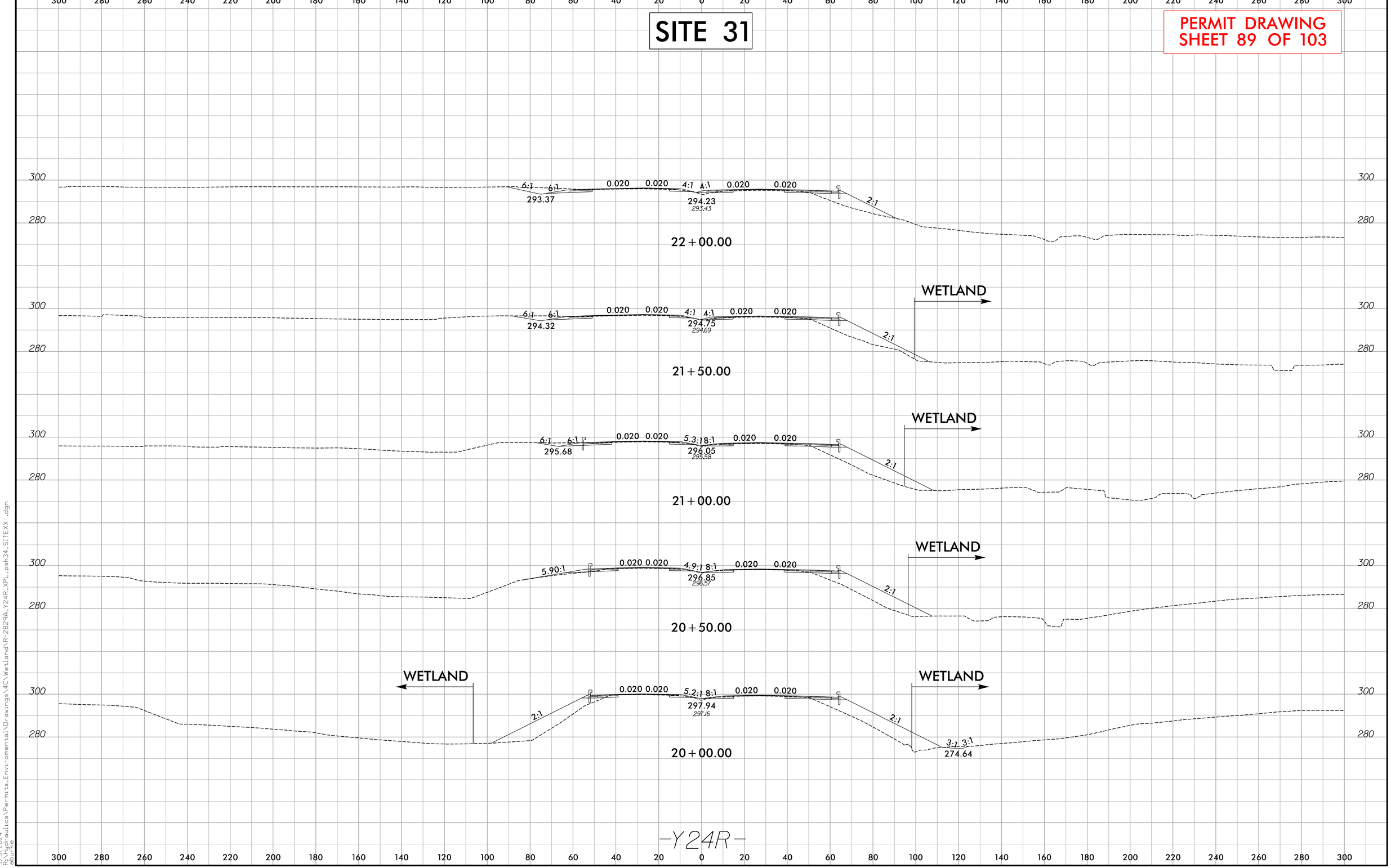
5/14/99
9/3/2024
R:\Hydraulics\Permits_Environmental\Drawings\4C\Wetland\R-2829A_hyd_4C_psh_34_SITEXX_PFL.dgn

Submittal September 17, 2024

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-40

SITE 31

PERMIT DRAWING
SHEET 89 OF 103



6/23/16

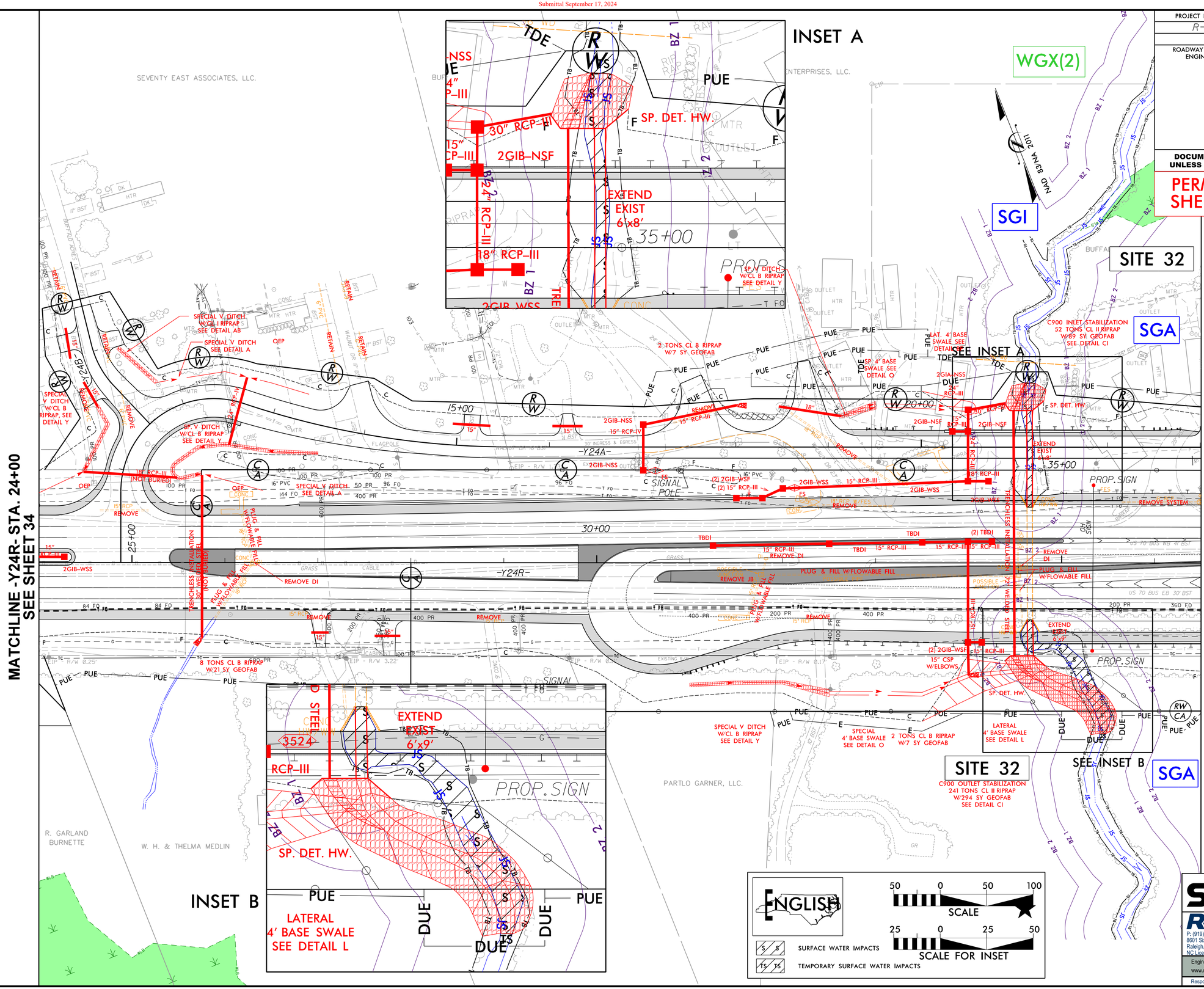
9/3/2024
R:\Hydraulics\Permits_Environmental\Drawings\4C\Wetland\R-2829A_Y24R_XPL_psh34_SITEXX_dgn
dbruce

Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 90 OF 103



ENGLISH

SCALE 50 0 50 100

SCALE FOR INSET 25 0 25 50

S S SURFACE WATER IMPACTS

TS TS TEMPORARY SURFACE WATER IMPACTS

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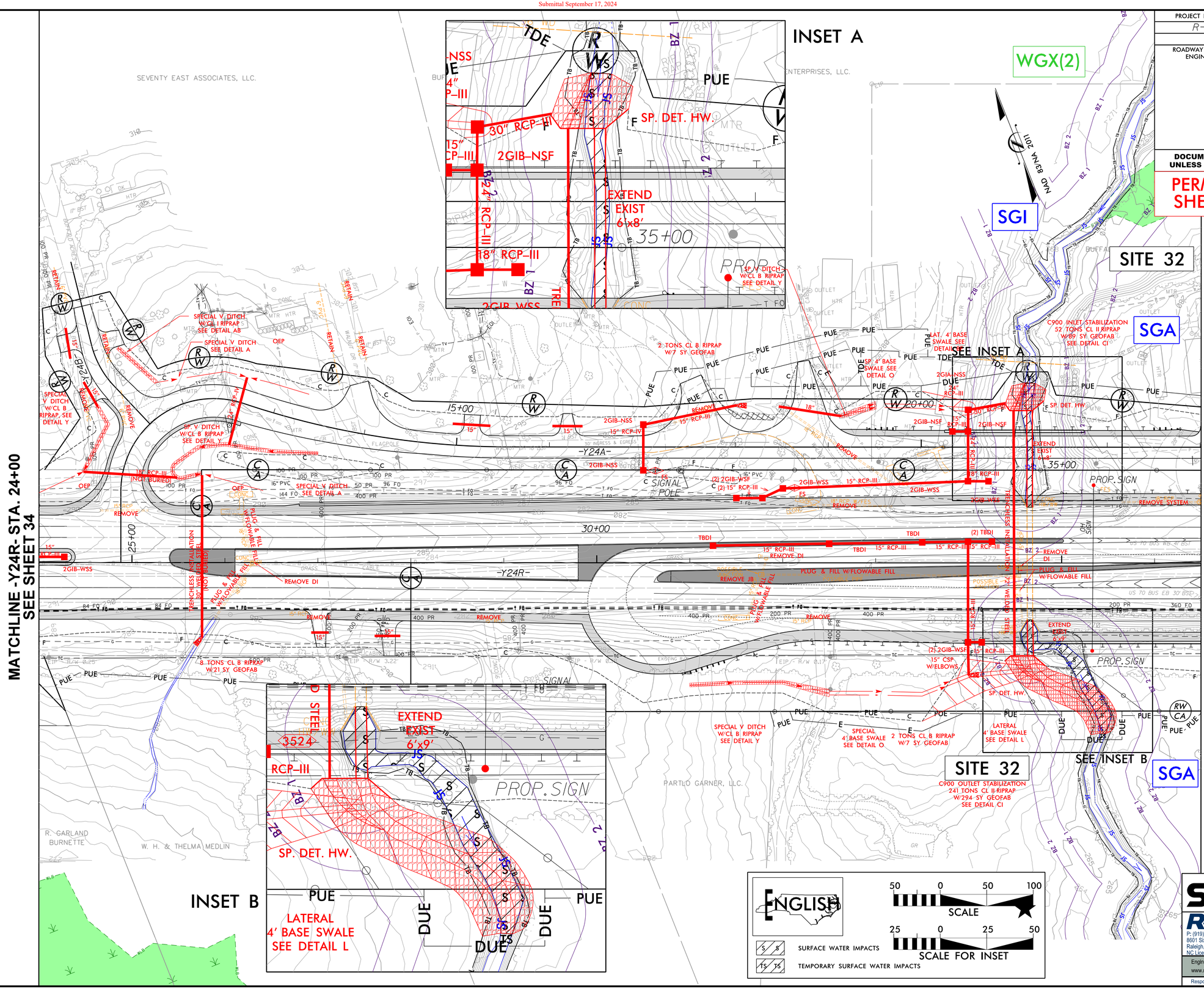
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 91 OF 103



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dbruce

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PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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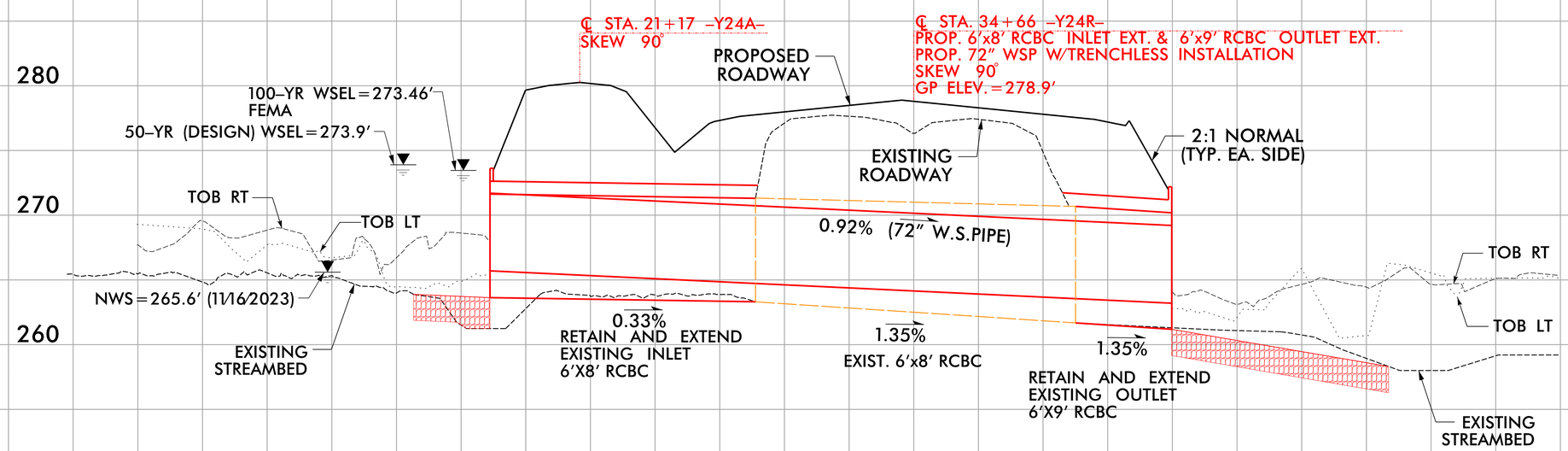
PERMIT DRAWING
SHEET 92 OF 103

ENGLISH

SITE 32
–Y24– STA. 34+66



5'x6' RETAIN AND EXTEND EXISTING RCBC
72" WELDED STEEL SUPPLEMENTAL PIPE
(Not buried, Length =124')

5/14/99
8/31/2024
Hydraulics\Permits_Environmental\Drawings\4C\Wetland\R-2829A_hyd_4C_psh_35_SITE64_PFL.dgn

Submittal September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	36A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 93 OF 103

ENGLISH

SCALE 50 0 50 100

SCALE FOR INSET 25 0 25 50

- SURFACE WATER IMPACTS
- TEMPORARY SURFACE WATER IMPACTS
- FILL IN WETLAND
- MECHANIZED CLEARING (GRUBBING)
- WETLAND EXCAVATION

NAD 83/NA 2011

BOBBY B GRADY

JANET P STORMS & LINDA S POWELL

JANET P HINTON

JANET P STORMS & LINDA S POWELL

JANET P BOBBY GERALD

POND WSE=304.4'

SAAL

SITE 35

SAAK

SITE 34

SITE 33

WAAJ

WAAK

SITE 33

SGA

SGD

SITE 24

WHD(2)

EDGE OF AUBURN LLC

JEFFREY P CATES & NANCY S CATES

L & L COMPANY LLC

NC RAILROAD COMPANY

NORFOLK-SOUTHERN RR

SR 1004 EAST GARNER RD 20' BST

-Y26R-

-Y26RSR1-

-Y25-

15+00

10+00

STANDARD 4' BASE DITCH W/CL I RIP RAP SEE DETAIL AK

SPECIAL CUT DITCH SEE DETAIL A

C1000 INLET STABILIZATION 39 TONS CL II RIPRAP W/73 SY GEOFAB SEE DETAIL CI

FILL IN ABANDONED CHANNELS

CHANNEL BLOCKS SEE DETAIL BK

SEE INSET A

GRADE TO DRAIN

REMOVE

2GIB-NSS

TB 2GIB-NSF

15" CSP W/ELBOWS

1 TONS CL B RIP RAP W/5 SY GEOFAB

36A05 Q10=1.00cfs V10=1.22fps

TOE PROTECTION W/CL B RIPRAP SEE DETAIL E

C1000 OUTLET STABILIZATION 76 TONS CL II RIPRAP W/118 SY GEOFAB SEE DETAIL CJ

48 TONS CL II RIPRAP W/98 SY GEOFAB OUTLET CHANNEL STABILIZATION W/CL II RIPRAP SEE DETAIL AL

LATERAL V DITCH W/CL B RIPRAP SEE DETAIL S

SPECIAL CUT DITCH SEE DETAIL A 2 TONS CL B RIP RAP W/7 SY GEOFAB

RETAIN

MATCHLINE -Y26R-SR1- STA. 12+50 SEE SHEET 18

MATCHLINE -Y26R- STA. 22+00 SEE SHEET 18

MATCHLINE -Y25- STA. 15+00 SEE SHEET 18

INSET A

GRADE TO DRAIN

REMOVE

TB 2GIB-NSF

15" RCP

15" CSP W/ELBOWS

10'x3' RCBC

1 TONS CL B RIP RAP W/5 SY GEOFAB

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	36A
R/W SHEET NO.	
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 94 OF 103

ENGLISH

SCALE 50 0 50 100

SCALE FOR INSET 25 0 25 50

- SS — SURFACE WATER IMPACTS
- TS — TEMPORARY SURFACE WATER IMPACTS
- F — FILL IN WETLAND
- E — WETLAND EXCAVATION
- MECHANIZED CLEARING (GRUBBING)

NAD 83/NA 2011

BOBBY B GRADY

JANET P STORMS & LINDA S POWELL

JANET P HINTON

JANET P STORMS & LINDA S POWELL

JANET P BOBBY GERALD

EDGE OF AUBURN LLC

JEFFREY P CATES & NANCY S CATES

NC RAILROAD COMPANY

SAAL

SITE 35

SAAK

SITE 34

SITE 33

WAAJ

WAAK

SITE 33

SGA

SGD

SITE 24

WHD(2)

SEE INSET A

POND WSE=304.5'

STANDARD 4' BASE DITCH W/CL I RIP RAP SEE DETAIL AK

SPECIAL CUT DITCH SEE DETAIL A

C1000 INLET STABILIZATION 39 TONS CL II RIPRAP W/73 SY GEOFAB SEE DETAIL CI

FILL IN ABANDONED CHANNELS

CHANNEL BLOCKS SEE DETAIL BK

GRADE TO DRAIN

REMOVE

2GIB-NSS

TB 2GIB-NSF

15" RCP

15" CSP W/ELBOWS

1 TONS CL B RIP RAP W/5 SY GEOFAB

36A05 Q10=1.00cfs V10=1.22fps

TOE PROTECTION W/CL B RIPRAP SEE DETAIL E

LATERAL V DITCH W/CL B RIPRAP SEE DETAIL S

C1000 OUTLET STABILIZATION 76 TONS CL II RIPRAP W/118 SY GEOFAB SEE DETAIL CJ

48 TONS CL II RIPRAP W/98 SY GEOFAB OUTLET CHANNEL STABILIZATION W/CL II RIPRAP SEE DETAIL AL

2 TONS CL B RIP RAP W/7 SY GEOFAB

-Y26R-

-Y26RSR1-

-Y25-

MATCHLINE -Y26R-SR1- STA. 12+50 SEE SHEET 18

MATCHLINE -Y26R- STA. 22+00 SEE SHEET 18

MATCHLINE -Y25- STA. 15+00 SEE SHEET 18

INSET A

STV Engineers, Inc.
P: (704) 372-1885
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

RK&K
P: (919) 878-9560
8601 Six Forks Road, Forum 1,Suite 700
Raleigh, North Carolina 27615-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

8/17/99

8/31/2024 11:16:29 AM
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Submittal September 17, 2024

5/14/99

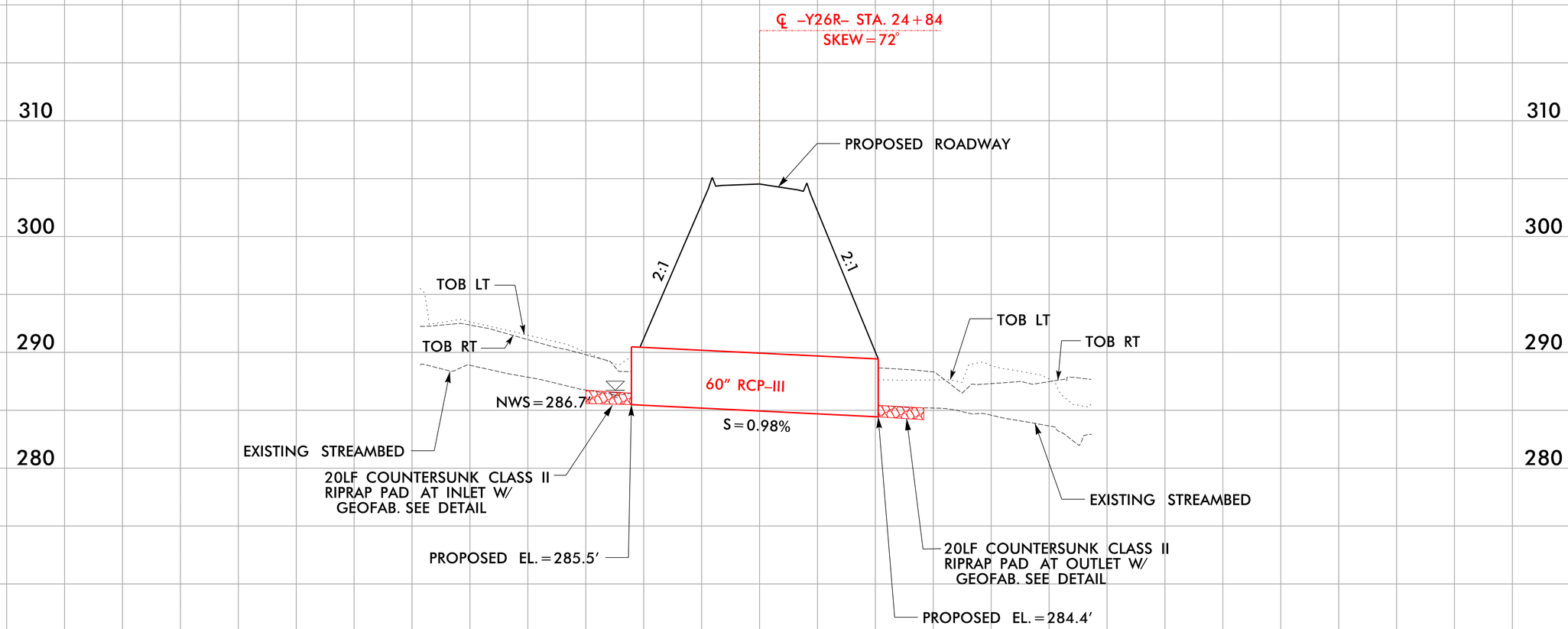
PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 95 OF 103

ENGLISH

SITE 24
–Y26R– STA. 24 + 84



60" RCP–III
(Buried 1.0', Length = 107')

8/3/2024
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Submittal September 17, 2024

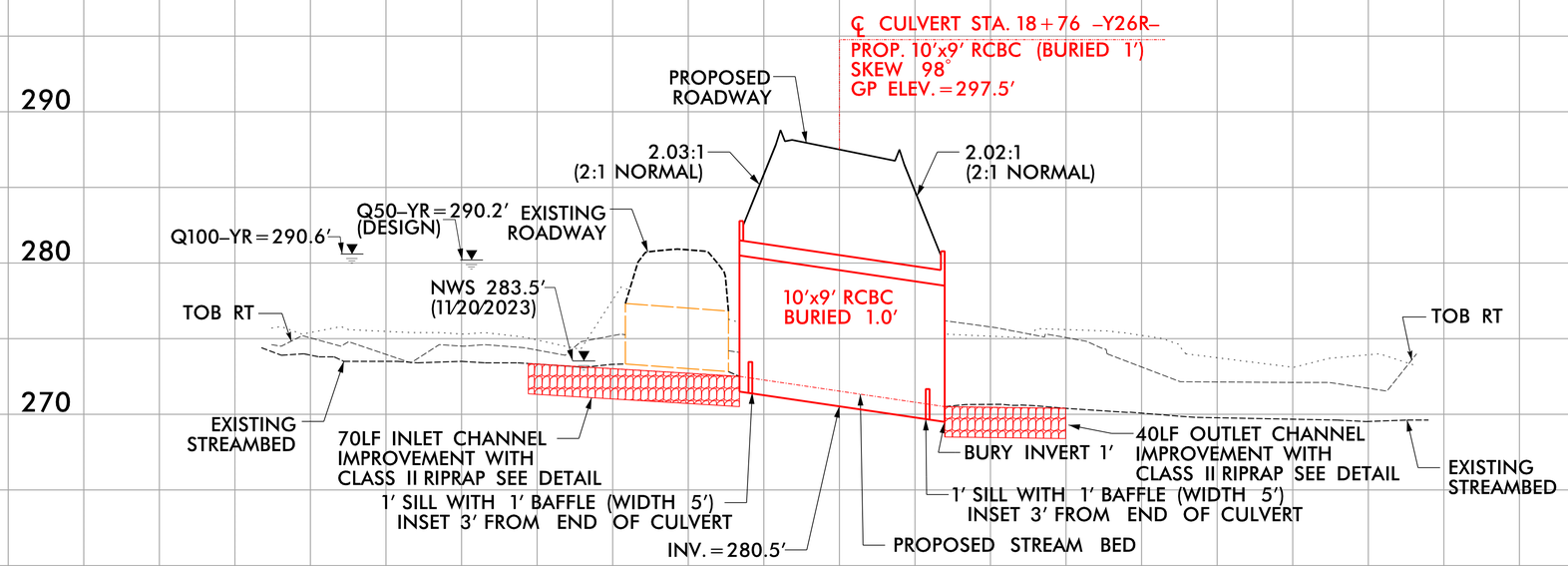
PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 96 OF 103

ENGLISH

SITE 33, 34, & 35 –Y26R– STA. 18+75



10'x9' RCBC
(Buried 1.0', Length =68')

5/14/99
9/3/2024
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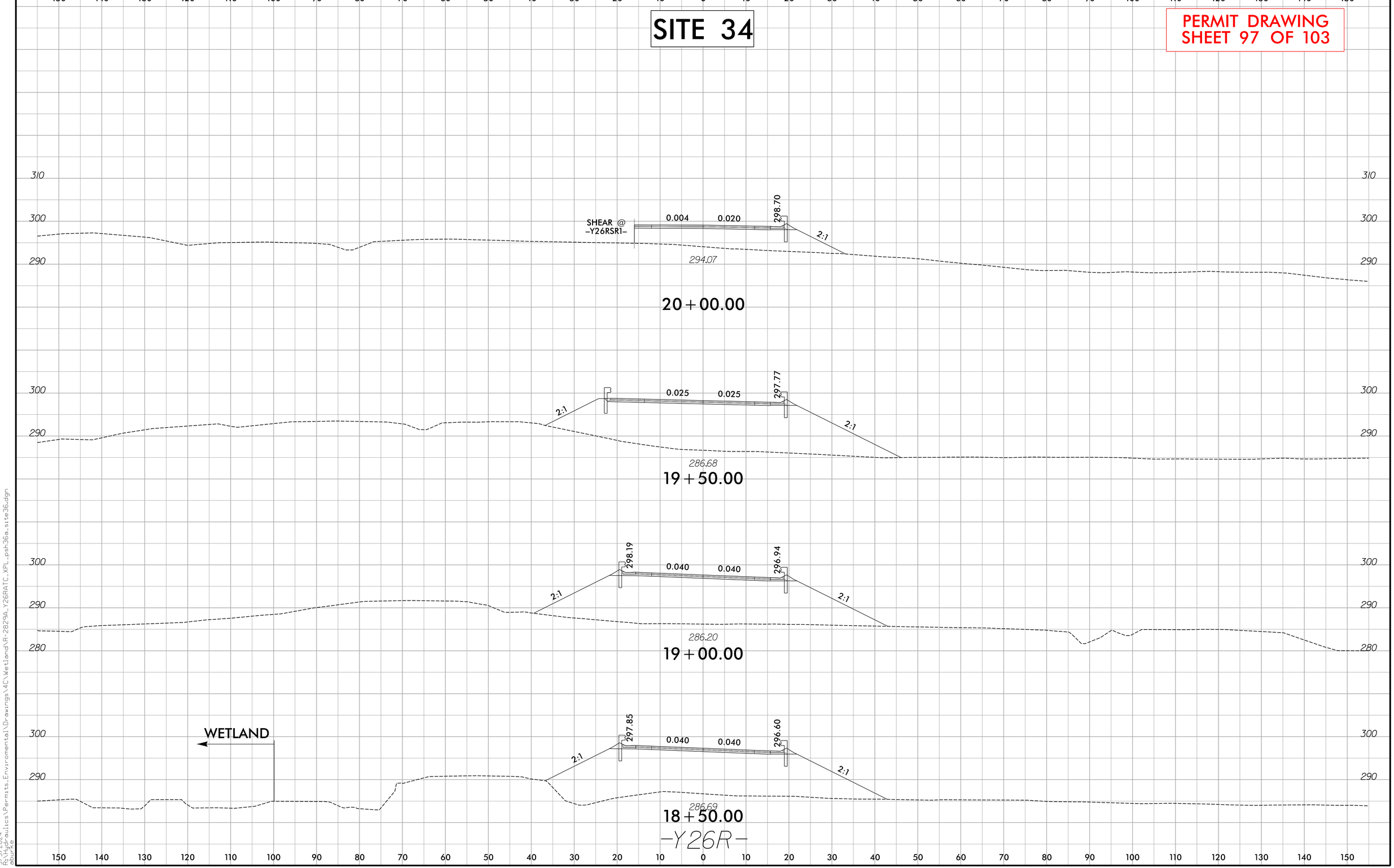
Submittal September 17, 2024

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-85

SITE 34

PERMIT DRAWING
SHEET 97 OF 103



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ebunce

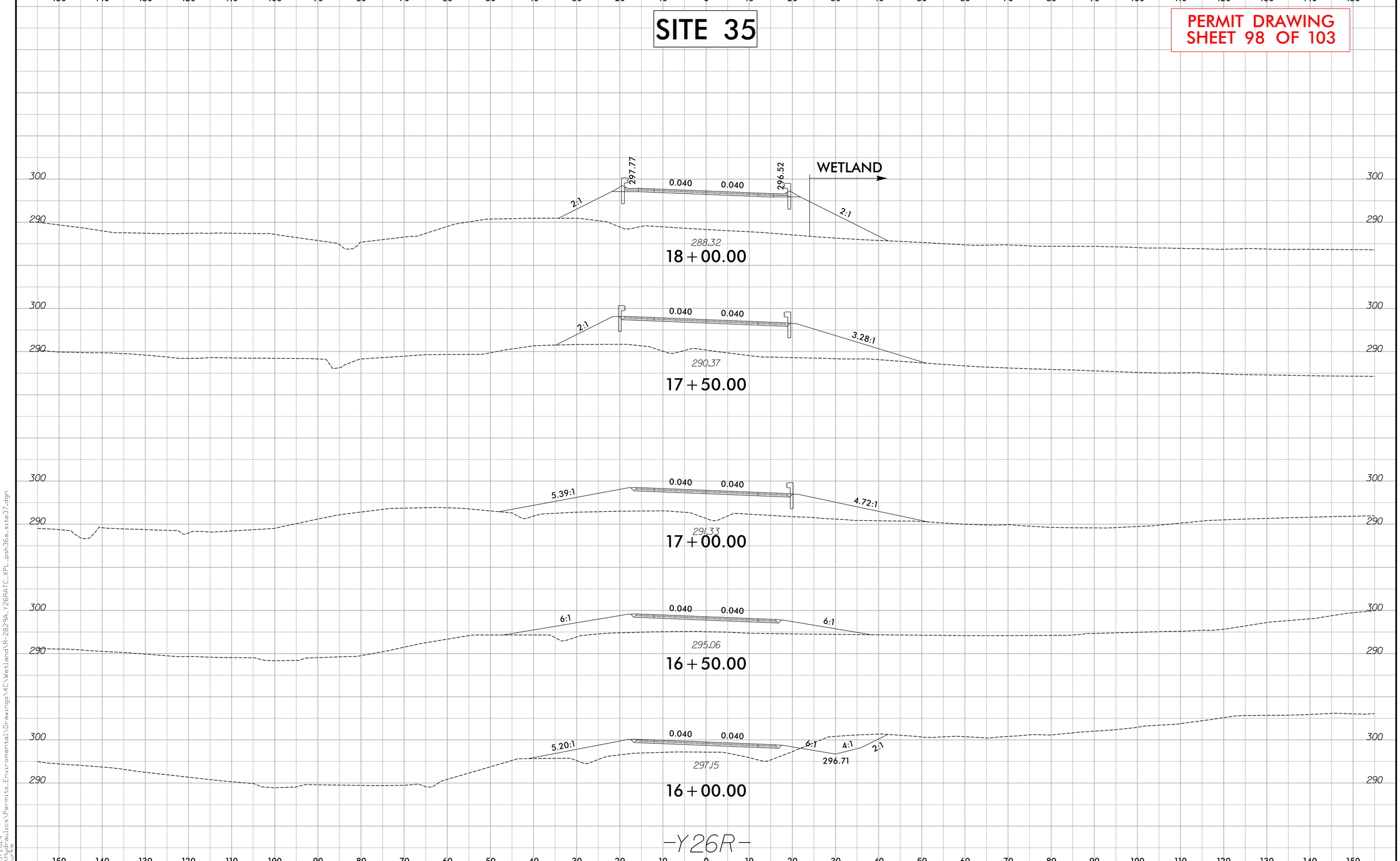
Submittal September 17, 2024

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-84

SITE 35

PERMIT DRAWING
SHEET 98 OF 103



9/3/2024
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Bruce

WETLAND AND SURACE 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	-Y22RPAFLY_REV- 28+00 - 29+58 LT	Roadway Fill: WFG	0.055									
2	-L- 967+04 - 968+83 LT	Roadway Fill: WFJ	0.098		0.023							
3	-L- 972+77 - 979+44 LT	Bridge: SEW						0.031		319		
		WFN(2)	0.176	0.716	0.018	0.034	0.660					
	-L- 976+61 - 978+80 RT	Roadway Fill: SEY						0.002	0.023	15	174	
		WFN(1)	0.257	0.049	0.001	0.098	0.037					
4	-L- 1001+92 - 1004+65 RT	48" RCP: WFY	0.449			0.034						
5	-L1- 1008+79	9'x8' RCBC, SFH						0.042	0.010	384	96	
		Structure Stabilization						0.007		63		
6	-L1- 1013+72	12'x8' RCBC, SFF						0.070	0.009	533	60	
		Structure Stabilization						0.012		86		
7	-L1- 1012+26 LT - 1018+49 RT	Roadway Fill: SFE						0.060	0.002	759	21	
		WFZ	0.113		0.015	0.010						
8	-L1- 1022+67 LT - 1025+03 RT	42" RCP: SFB						0.017		222		
		Structure Stabilization						0.001	0.001	24	10	
		WGD	0.021			0.001						
		WGC	0.013									
		WGB	0.079									
SHEET TOTALS*:			**1.261**	**0.765**	**0.057**	**0.177**	**0.697**	**0.242**	**0.045**	**2405**	**361**	**0**

*Rounded totals are sum of actual impacts

NOTES:

Site 3: 4 interior bents with 4 @ 3.5' diameter columns per bent= total 154.4sq ft (0.004ac) permanent wetland impact (included above)

Site 3: WFN(1) piece above SEW is a total take in summary above; hatching outside construction impacts is not shown

Site 7: WFZ is a total take in summary above; hatching outside construction impacts is not shown

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

Revised 2018 Feb

WETLAND AND SURACE 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)
9	-L1- 1035+14 - 1037+70 LT	48" RCP: SFA						0.008		124		
		WGF	0.016									
		WGG	0.156									
		WAAE	0.092									
		WAAF				0.010						
	-L1- 1033+83 - 1038+36 LT	PAD						2.695				
10	-Y23RPB- 27+59 - 28+23 LT	Roadway Fill: WGJ	0.013			0.010						
11	-L1- 1060+75 - 1062+35 CL	Roadway Fill: SFD						0.009		71		
		WGM	0.023									
12	-L1- 1062+62 LT - 1063+75 RT	Roadway Fill: SFC						0.038		479		
		Structure Stabilization						0.002	0.001	22	12	
		WGN	0.001			0.005						
13	-L1- 1066+33 - 1067+40 RT	Roadway Fill: WGO	0.028			0.004						
14	-L1- 1084+46 RT - 1086+92 LT	Bank Stabilization: Ditches; SFV						0.017	0.080	70	185	
		(White Oak Creek)										
15	-L1- 1098+69 - 1104+74 LT	8'x7' RCBC, SFR						0.014	0.002	164	19	
		Structure Stabilization						0.001		5		
		WGR	0.760		0.061	0.112						
SHEET TOTALS*:			**1.089**	**0.000**	**0.061**	**0.141**	**0.000**	**2.784**	**0.083**	**935**	**216**	**0**

*Rounded totals are sum of actual impacts

NOTES:

Site 15: WGR is a total take in summary above; hatching outside construction impacts is not shown

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
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Submittal September 17, 2024

WETLAND AND SURACE 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)
16	-L1- 1110+56 LT - 1116+24 RT	Roadway Fill, 7'x7' RCBC: SFN						0.041		413		
		WGR	1.387			0.088						
		WGT			0.008	0.018						
17	-L1- 1113+08 - 1114+68 RT	Roadway Fill: WGS	0.237			0.009						
18	-L1- 1114+82 LT - 1119+07 RT	Roadway Fill: SFQ						0.048	0.001	571	8	
		Structure Stabilization						0.002		34		
19	-L1- 1124+16 LT - 1126+26 RT	60" RCP: SFS						0.031		445		
		Structure Stabilization						0.003	0.002	21	10	
		WGR	0.202			0.020						
20	-L1- 1137+84 LT - 1142+30 RT	54" RCP/WSP/CAAP: SFT						0.054		757		
		Structure Stabilization						0.004	0.002	47	25	
20A	-Y24R- 36+70 RT	Ditch: WGU(2)				0.001						
21	-L1- 1148+27 LT - 1149+37 RT	Roadway Fill: WGY	0.099									
22	-L1- 1148+75 - 1149+39 RT	Roadway Fill: WGZ	0.059			0.016						
23	-L1- 1151+32 LT - 1154+50 RT	6'x8' RCBC, SGC						0.026	0.002	398	25	
		Structure Stabilization						0.001		20		
		WHB	1.178		0.002	0.061						
SHEET TOTALS*:			**3.162**	**0.000**	**0.010**	**0.213**	**0.000**	**0.210**	**0.007**	**2706**	**68**	**0**

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

Revised 2018 Feb

Submittal September 17, 2024

WETLAND AND SURACE 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)
24	-L1- 1159+88 LT - 1162+99 RT	54" CAAP / 60" RCP: SGD						0.034		387		
		Structure Stabilization						0.007	0.003	92	25	
	-L1- 1161+00 - 1161+40 LT	Bank Stabilization						0.010		71		
25	-L1- 1169+38 LT - 1172+22 RT	11'x8' RCBC: SGE						0.036	0.002	443	23	
		Structure Stabilization						0.003	0.002	46	33	
		WHD(1)	0.255		0.015	0.027						
		WHD(2)	0.195		0.009	0.013						
26	-L1- 1171+28 LT - 1178+18 RT	Roadway Fill: SGG						0.084	0.001	723	11	
		Structure Stabililzation						0.002		21		
27	-L1- 1174+66 - 1179+63 LT	Roadway Fill: SGF						0.030	0.004	309	40	
		Structure Stabililzation						0.003		37		
		WHD(2)	0.108		0.037	0.023						
28	-Y22CR- 13+50 LT - 14+26 RT	2 @ 12'x8' RCBC: SKR						0.036	0.011	117	44	
		Structure Stabilization						0.016		75		
29	-Y23R- 61+16 LT	36" RCP: SFJ						0.008		64		
		Structure Stabilization						0.002	0.001	20	10	
29A	-Y23FR- 11+07 - 12+01 LT	54" RCP: SFJ						0.007	0.001	78	12	
		Structure Stabilization						0.003	0.001	24	10	
		WNM	0.021			0.044						
SHEET TOTALS*:			**0.579**	**0.000**	**0.061**	**0.107**	**0.000**	**0.281**	**0.026**	**2507**	**208**	**0**

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

Revised 2018 Feb

WETLAND AND SURACE 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)
30	-Y23DR- 23+90 LT - 25+00 RT	42" RCP: SHT						0.011		225		
	-Y23DR- 23+59 - 25+53 LT	PAO						0.792				
31	-Y24R- 19+06 LT - 21+74 RT	5'x6' RCBC Ext / 72" WSP: SFY						0.001		6		
		Structure Stabilization						0.005	0.002	34	10	
		WGW	0.023		0.004	0.019						
		WGV(1)	0.055		0.010	0.021						
32	-Y24R- 34+65 CT	6'x8'/9' RCBC Ext / 72" WSP: SGA						0.064	0.001	270	7	
		Structure Stabilization						0.007	0.003	30	12	
33	-Y26R- 18+73 CT	10'x9' RCBC: SGA						0.016	0.001	137	11	
		Structure Stabilization						0.007	0.006	40	37	
		WHD(2)			0.007	0.014						
		WAAK	0.026			0.020						
34	-Y26R- 18+50 LT	10'x9' RCBC: SAAK						0.002	0.001	31	11	
35	-Y26R- 18+35 LT	10'x9' RCBC: SAAL							0.001		10	
36	-Y22RPE_REV- 45+95 - 46+14 RT	Ditch: WFK				0.005						
SHEET TOTALS*:			**0.104**	**0.000**	**0.021**	**0.079**	**0.000**	**0.905**	**0.015**	**773**	**98**	**0**
PROJECT TOTALS*:			**6.195**	**0.765**	**0.210**	**0.717**	**0.697**	**4.422**	**0.176**	**9326**	**951**	**0**

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

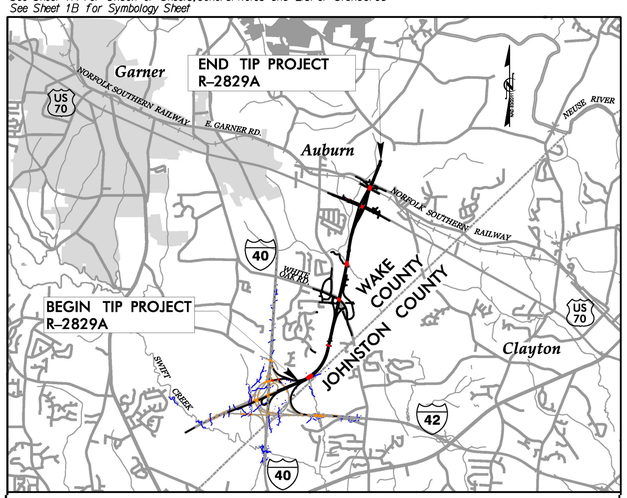
Revised 2018 Feb

09/08/99

TIP PROJECT: R-2829A

CONTRACT: C204824

See Sheet 1A for Index of Sheets, General Notes and List of Standards
See Sheet 1B for Symbology Sheet



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2829A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
35517.3.TA1	N/A, 0540047	DESIGN-BUILD
35517.3. TAGV1	N/A, 0540047	DESIGN-BUILD

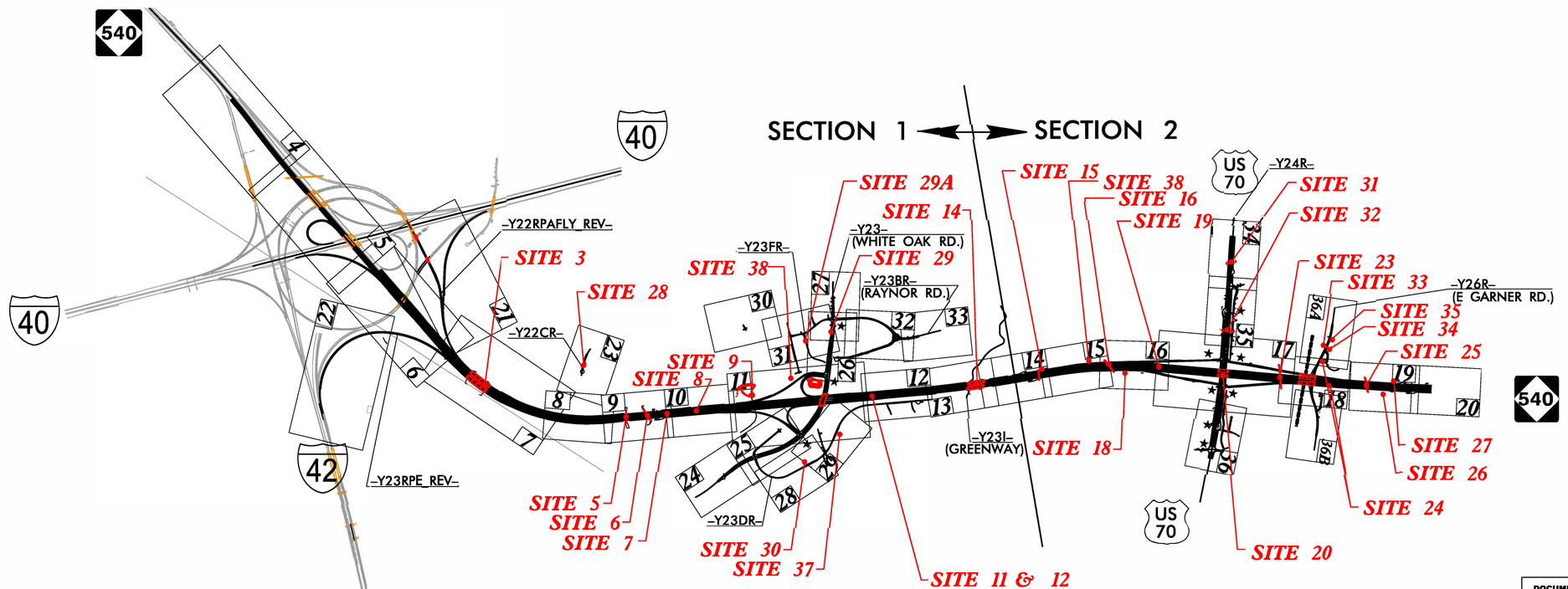
LOCATION: TRIANGLE EXPRESSWAY SOUTHEAST EXTENSION FROM I-40 TO SOUTH OF SR 2542 (ROCK QUARRY RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, LIGHTING, SIGNING, ITS, CULVERTS & STRUCTURES

SAFETEA-LU SECTION 6002
HYDRAULIC DESIGN MEETING PLANS

BUFFER DRAWING
SHEET 1 OF 36

Submitted September 17, 2024



NOTES:
1. THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

★ PROPOSED TRAFFIC SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2023 = 15,440
ADT 2043 = 22,040
K = 12%
D = 65%
T = 10% *
V = 75 MPH

FUNC CLASS: INTERSTATE
* (TTST 4% + DUALS 6%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2829A.....3.922 MILES
LENGTH STRUCTURE TIP PROJECT R-2829A.....0.242 MILES
TOTAL LENGTH TIP PROJECT R-2829A.....4.164 MILES

NCTA CONTACT

Ron McCollum, PE
DEPUTY CHIEF ENGINEER for PRECONSTRUCTION
TURNPIKE AUTHORITY

PLANS PREPARED BY:

RK&K
RUMMEL, KLEPPER & KAHL, LLP
8601 SIX FORKS ROAD, FORUM 1, SUITE 700
RALEIGH, NORTH CAROLINA 27615-3960
NC LICENSE NO. F-0112

FOR NORTH CAROLINA TURNPIKE AUTHORITY

2018 STANDARD SPECIFICATIONS

LETTING DATE:
October 17, 2023

C. Byron Holden, PE
PROJECT ENGINEER

Anthony A. Houser, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

9/3/2024
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aburke

Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-1

HYDRAULICS DESIGN ENGINEER

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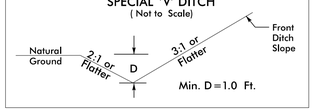
BUFFER DRAWING SHEET 2 OF 36

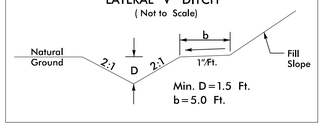
DETAIL A
SPECIAL 'V' DITCH
(Not to Scale)



–Y22RPE_REV– STA. 42+00 TO STA. 45+50 LT
–Y22RPE_REV– STA. 48+88 TO STA. 51+93 RT
–L– STA. 996+00 TO STA. 1000+00 LT
–L– STA. 1000+00 TO STA. 1001+00 LT
–L– STA. 1000+50 TO STA 1002+10 RT
–L1– STA. 1025+50 TO STA. 1026+50 LT
–L1– STA. 1027+50 TO STA. 1030+35 LT
–L1– STA. 1040+35 TO STA. 1044+50 RT
–L1– STA. 1045+50 TO STA. 1048+50 RT
–L1– STA. 1057+00 TO STA. 1057+50 LT
–L1– STA. 1071+50 TO STA. 1073+00 LT
–L1– STA. 1093+50 TO STA. 1094+00 RT
–Y22CR– STA. 15+00 TO STA 15+50 LT
–Y23R– STA. 16+00 TO STA. 16+50 LT
–Y23R– STA. 16+00 TO STA. 17+00 RT
–Y23R– STA. 17+84 TO STA. 18+50 RT
–Y23R– STA. 19+00 TO STA. 20+00 RT
–Y23R– STA. 22+50 TO STA 23+80 RT
–Y23R– STA. 23+80 TO STA. 25+30 LT
–Y23R– STA. 23+80 TO STA. 25+25 RT
–Y23R– STA. 26+00 TO STA. 27+15 RT
–Y23R– STA. 62+00 TO STA. 63+35 RT
–Y23R– STA. 63+00 TO STA. 63+32 LT
–Y23R– STA. 68+75 TO STA. 69+00 RT
–Y23AR– STA. 10+30 TO STA. 12+50 RT
–Y23AR– STA. 16+50 TO STA. 17+50 RT
–Y23DR– STA. 10+50 TO STA. 11+50 LT
–Y23DR– STA. 15+00 TO STA. 15+50 LT
–Y23DR– STA. 10+50 TO STA. 16+50 RT
–Y23DR– STA. 20+50 TO STA. 23+50 RT
–Y23DR– STA. 37+00 TO STA. 40+00 LT
–Y23DR– STA. 38+38 TO STA. 41+00 RT
–Y23DR– STA. 54+94 TO STA. 55+65 RT
–Y23E– STA. 10+00 TO STA. 10+56 RT
–Y23E– STA. 10+20 TO STA. 10+50 LT
–Y23G– STA. 10+50 TO STA. 11+50 LT
–Y23J– STA. 14+00 TO STA. 15+30 RT
–DR2– STA. 10+24 TO STA. 11+50 LT
–DR2– STA. 10+70 TO STA. 11+50 RT
–Y23BR_REV– STA. 10+59 TO STA. 12+00 RT
–Y23BR_REV– STA. 10+80 TO STA. 14+50 LT
–Y23BR_REV– STA. 22+50 TO STA. 24+59 LT
–Y23BR_RAB– STA. 11+37 TO STA. 12+00 RT
–Y23BR_RAB– STA. 10+50 TO STA. 10+67 RT
–Y23BR_RAB– STA. 13+53 TO STA. 13+58 LT
–Y23CR_REV– STA. 23+00 TO STA. 24+00 LT
–Y23CR_A– STA. 14+00 TO STA. 14+91 LT

–Y24A– STA. 11+85 TO STA. 13+49 LT
–Y24E– STA. 10+50 TO STA. 11+00 LT
–Y24F– STA. 10+50 TO STA. 12+50 LT
–Y24R– STA. 13+00 TO STA. 16+00 RT
–Y24R– STA. 14+00 TO STA. 15+50 LT
–Y24R– STA. 23+50 TO STA. 24+48 LT
–Y24R– STA. 25+75 TO STA. 26+50 LT
–Y24RPC– STA. 26+30 TO STA. 28+50 LT
–Y26R– STA. 13+00 TO STA. 14+50 LT
–Y26_DRW1– STA. 10+10 TO STA. 12+50 LT
–Y26_DRW1– STA. 10+50 TO STA. 12+50 RT
–Y26RSR1– STA. 12+25 TO STA. 13+82 RT
–Y26RSR2– STA. 10+10 TO STA. 10+50 RT
–L1– STA. 1094+00 TO STA. 1097+00 RT
–Y26R– STA. 13+00 TO STA. 13+50 RT
–L1– STA. 1131+00 TO STA. 1134+50 RT

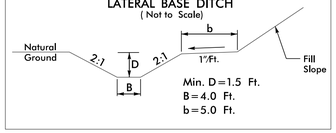
DETAIL B
LATERAL 'V' DITCH
(Not to Scale)



*–Y22RPAFLY_REV– STA. 32+50 TO STA. 34+50 RT
–Y22RPAFLY_REV– STA. 18+54 TO STA. 20+00 LT
–Y22RPA_REV– STA. 21+36 TO STA. 23+00 LT
–Y22RPE_REV– STA. 35+50 TO STA. 39+00 LT
–Y23R– STA. 48+00 TO STA. 49+50 RT
–Y23R– STA. 59+00 TO STA. 60+00 RT
–Y23BR– STA. 22+00 TO STA. 22+75 LT
–L1– STA. 1026+50 TO STA. 1027+50 LT
–L1– STA. 1033+00 TO STA. 1034+00 LT
–L1– STA. 1069+50 TO STA. 1071+50 LT

–L1– STA. 1135+50 TO STA. 1136+00 RT
–L1– STA. 1164+50 TO STA. 1168+50 LT

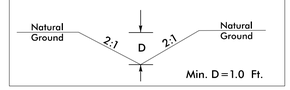
DETAIL C
LATERAL BASE DITCH
(Not to Scale)



–L– STA. 1003+00 TO STA. 1004+34 RT
–Y23R– STA. 53+00 TO STA. 55+00 RT
–Y23R– STA. 55+00 TO STA. 56+16 LT
–Y23R– STA. 60+95 TO STA. 62+00 RT
–Y22RPA_REV– STA. 14+55 TO STA. 19+50 RT
–Y22RPE_REV– STA. 41+00 TO STA. 42+00 LT

–Y26R– STA. 29+25 TO STA. 34+50 RT

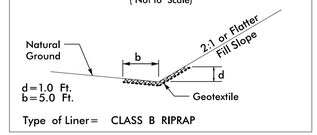
DETAIL D
STANDARD 'V' DITCH
(Not to Scale)



–Y22RPE_REV– STA. 51+93 TO STA. 53+40 RT
BEGIN ELEV=245.6, END ELEV=242.3
S=2.3%, L=151'
—Y23DR– STA. 55+65 TO STA. 56+18 RT
BEGIN ELEV=278.7, END ELEV=277.5
S=4.5%, L=53'

–L1– STA. 1161+20 RT
BEGIN ELEV=308.10, END ELEV=307.60
S=1.9%, L=26'
–Y24RPC– STA. 28+50 TO 28+76 LT
BEGIN ELEV=300.0, END ELEV=299.8
S=0.3%, L=58'

DETAIL E
TOE PROTECTION
(Not to Scale)

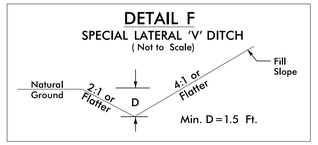


Type of Liner= CLASS B RIPRAP

*–Y22RPAFLY1– STA. 62+90 TO 63+70 LT
*–Y22RPAFLY_REV– STA. 39+50 TO 39+69 LT
*–Y22LPC– STA. 24+13 TO STA. 26+25 RT
*–L– STA. 930+24 TO STA. 930+72 RT
–Y22RPE– STA. 27+50 TO STA. 33+50 RT
–Y22RPE_REV– STA. 39+00 TO STA. 43+00 RT
–L– STA. 1002+00 TO STA. 1002+75 RT
–L– STA. 1003+50 TO STA. 1004+50 LT
–L– STA. 1004+25 TO STA. 1004+75 RT
–L1– STA. 1007+00 TO STA. 1010+00 RT
–L1– STA. 1007+50 TO STA. 1008+75 LT
–L1– STA. 1011+60 TO STA. 1012+41 LT
–L1– STA. 1013+00 TO STA. 1014+00 RT
–L1– STA. 1091+69 TO STA. 1093+51 LT
–Y22CR– STA. 15+50 TO STA. 16+00 LT
–Y22CR– STA. 15+50 TO STA 16+00 RT
–Y23RPB– STA. 12+50 TO STA. 15+15 LT
–Y23R– STA. 39+00 TO STA. 40+60 RT
–Y23R– STA. 55+93 TO STA. 57+88 RT
–Y23DR– STA. 34+70 TO STA. 35+50 RT
–Y23DR– STA. 51+88 TO STA. 52+47 RT
–Y23E– STA. 10+66 TO STA. 10+81 RT
–DR1– STA. 10+33 TO STA. 11+12 RT
–Y23DR– STA. 47+54 TO STA. 47+92 RT
–Y23DR– STA. 49+24 TO STA. 49+83 RT
–Y23RPB– STA. 27+50 TO STA. 28+00 LT
–Y23FR– STA. 11+15 TO STA. 11+67 LT

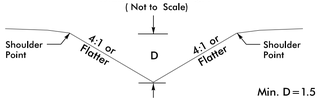
–Y24RPAR– STA. 22+86 TO STA. 24+04 RT
–Y24RPDR– STA. 24+10 TO STA. 25+50 LT
–Y26R– STA. 21+70 TO STA. 22+75 RT
–L1– STA. 1104+59 TO STA. 1105+35 LT
–L1– STA. 1170+60 TO STA. 1172+00 LT
–L1– STA. 1123+12 TO STA. 1124+20 LT
–L1– STA. 1125+00 TO STA. 1126+07 LT
–L1– STA. 1128+50 TO STA. 1129+00 LT
–L1– STA. 1098+63 TO STA. 1104+59 LT
–L1– STA. 1169+54 TO STA. 1170+37 LT
–L1– STA. 1174+50 TO STA. 1175+55 LT
–L1– STA. 1113+24 TO STA. 1114+41 RT
–L1– STA. 1110+09 TO STA. 1113+58 LT
–L1– STA. 1113+86 TO STA. 1116+96 LT
–L1– STA. 1124+19 TO STA. 1125+00 LT
–Y23RPBR– STA. 27+50 TO STA. 28+00 LT
–Y24R– STA. 19+75 TO STA. 20+50 LT
–Y24R– STA. 20+00 TO STA. 21+50 RT
–Y24R– STA. 61+15 TO STA. 62+50 LT
–Y24RPAR– STA. 21+70 TO STA. 22+86 RT
–Y24RPDR– STA. 14+30 TO STA. 14+80 LT
–Y24RPDR– STA. 17+40 TO STA. 18+00 LT
–Y26R– STA. 16+80 TO STA. 18+40 RT

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



*–Y22RPA_REV– STA. 23+00 TO STA. 27+50 RT
*–Y22RPA_REV– STA. 23+00 TO STA. 27+85 LT
–Y23R– STA. 21+50 TO STA 22+50 RT
*–L– STA. 958+00 TO STA. 962+50 RT
*–L– STA. 957+00 TO STA. 962+50 LT

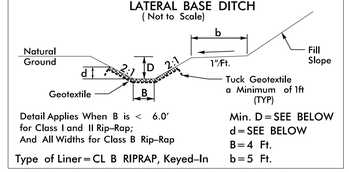
DETAIL G
MEDIAN V DITCH
(Not to Scale)



*–L– STA. 962+50 TO STA. 964+00 RT
–L1– STA. 1038+50 TO STA. 1043+50 CL
–L1– STA. 1038+00 TO STA. 1040+35 RT
–L1– STA. 1038+00 TO STA. 1040+50 LT
–L1– STA. 1044+50 TO STA. 1045+00 RT
–L1– STA. 1060+00 TO STA. 1071+00 RT
–Y23RPB– STA. 24+50 TO STA. 25+50 RT
–Y23RPC– STA. 19+00 TO STA. 20+00 LT

–L1– STA. 1128+50 TO STA. 1131+00 RT

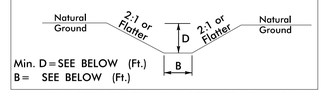
DETAIL H
LATERAL BASE DITCH
(Not to Scale)



–Y22RPA_REV– 19+50 TO STA. 20+73 RT, D/d=1.0'
–Y22RPE_REV– STA. 39+00 TO STA. 41+00 LT, D/d=1.0'
–L– STA. 966+00 TO STA. 971+50 LT, D/d=3.0'
–L– STA. 1002+40 TO STA. 1003+00 RT, D/d=1.5'
–L1– STA. 1015+50 TO STA. 1018+00 LT, D/d=1.0'
–L1– STA. 1017+85 TO STA. 1019+00 RT, D/d=1.0'
–L1– STA. 1087+00 TO STA. 1089+50 RT, D/d=1.0'
–L1– STA. 1092+00 TO STA. 1094+00 LT, D/d=1.0'
–Y23DR– STA. 34+15 TO STA. 36+00 LT D/d=1.0'
–Y23DR– STA. 51+00 TO STA. 51+93 RT, D/d=1.0'
–Y23RPB– STA. 22+50 TO STA. 23+50 RT, D/d=1.0'

–Y24RPDR– STA. 14+75 TO STA. 17+48 LT, D/d=2.0'
–Y24RPC– STA. 19+00 TO STA. 21+50 RT, D/d=1.0'

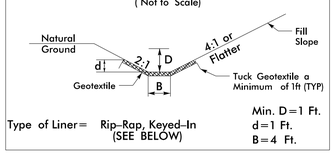
DETAIL I
STANDARD BASE DITCH
(Not to Scale)



–L– STA. 971+50 TO STA. 972+93 LT, L=143'
BEGIN ELEV=217.5', END ELEV=217.0', S=0.3%
MIN D=2.75', B=10'
–Y23R– STA. 23+80 RT, L=82', S=0.3%
BEGIN ELEV=335.25, END ELEV=335.0',
MIN D=1.5', B=4'
–Y23DR– STA. 15+50 RT, L=100', S=0.3%
BEGIN ELEV=316.5, END ELEV=316.2',
MIN D=1.5', B=4'
–L1– STA. 1027+00 LT, L=205', S=0.3%
BEGIN ELEV=296.7, END ELEV=296.0,
MIN D=1.5', B=4'
–L1– STA. 1030+35 LT, L=172', S=0.5%
BEGIN ELEV=301.8, END ELEV=301.0,
MIN D=1.5', B=4'
–Y23DR– STA. 51+00 LT, L=97', S=1.2%
BEGIN ELEV=265.0 END ELEV=263.8,
MIN D=2.0', B=4'
–Y23BR_REV– STA. 24+25 LT, L=116', S=0.34%
BEGIN ELEV=330.50 END ELEV=330.10,
MIN D=1.5', B=4'

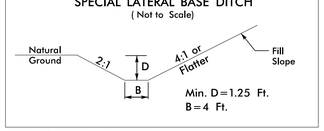
–Y24E– STA. 10+60 LT
BEGIN ELEV=336.2', END ELEV=336.0', L=58', S=0.3%
MIN D=1', B=2'
–Y24R– STA. 37+00 RT
BEGIN ELEV=264.2', END ELEV=264.1', L=37', S=0.3%
MIN D=2', B=4'

DETAIL J
SPECIAL LATERAL BASE DITCH
(Not to Scale)



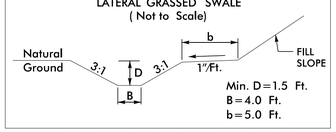
*DETAIL ONLY USED IN EARLY START

DETAIL K
SPECIAL LATERAL BASE DITCH
(Not to Scale)



*DETAIL ONLY USED IN EARLY START

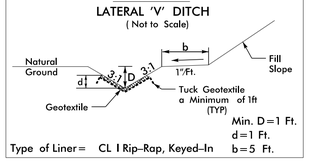
DETAIL L
LATERAL GRASSED SWALE
(Not to Scale)



–L– STA. 1003+00 TO STA. 1003+80 LT
–L1– STA. 1009+03 TO STA. 1011+50 LT
–L1– STA. 1014+00 TO STA. 1015+50 LT
–L1– STA. 1023+00 TO STA. 1023+84 LT
–L1– STA. 1024+18 TO STA. 1025+00 RT
–L1– STA. 1034+00 TO STA. 1036+38 LT
–L1– STA. 1089+50 TO STA. 1093+50 RT
–L1– STA. 1090+00 TO STA. 1092+00 LT
–Y23R– STA. 19+00 TO STA. 23+00 LT
–Y23R– STA. 39+00 TO STA. 41+00 LT
–Y23R– STA. 49+50 TO STA. 53+00 RT
–Y23R– STA. 60+00 TO STA. 60+95 RT
–Y23RPC– STA. 17+00 TO STA. 18+00 RT
–Y23FR– STA. 10+25 TO STA. 11+15 LT
–Y23FR– STA. 11+69 TO STA. 12+40 RT
–Y23FR– STA. 11+94 TO STA. 13+50 LT

–L1– STA. 1136+00 TO STA. 1137+00 RT
–L1– STA. 1164+50 TO STA. 1165+50 RT
–L1– STA. 1167+50 TO STA. 1170+00 RT
–L1– STA. 1168+50 TO STA. 1169+50 LT
–Y24RPBR– STA. 29+50 TO STA. 30+50 LT
–Y24RPDR– STA. 11+60 TO STA. 12+80 LT
–Y24R– STA. 18+00 TO STA. 19+17 LT
–Y24R– STA. 19+00 TO STA. 20+11 RT
–Y24R– STA. 33+99 TO STA. 34+68 RT
–L1– STA. 1113+00 TO STA. 1113+26 RT

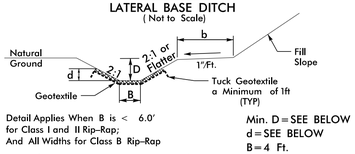
DETAIL M
LATERAL 'V' DITCH
(Not to Scale)



–Y23RPB– STA. 28+50 TO STA. 29+80 LT
–Y22RPA_REV– STA. 10+00 TO STA. 12+00 RT
–Y22RPAFLY_REV– STA. 19+75 TO 21+46 RT

–Y26R– STA. 22+02 TO STA. 22+40 LT

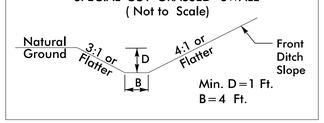
DETAIL N
LATERAL BASE DITCH
(Not to Scale)



–Y22RPAFLY_REV– STA. 15+37 TO 19+75 RT, D/d=2.75'
–Y22RPAFLY_REV– STA. 21+24 TO STA. 28+00 LT, D/d=2.5'
–L– STA. 979+00 TO STA. 982+00 RT, D/d=1.5'
–L– STA. 980+24 TO STA. 986+00 LT, D/d=1.5'
–Y23R– STA. 31+50 TO STA. 34+75 RT, D/d=1.5'
–Y23DR– STA. 24+50 TO STA. 27+50 LT, D/d=1.0'
–Y23DR– STA. 24+00 TO STA. 24+75 RT, D/d=1.0'
–Y23DR– STA. 32+50 TO STA. 34+15 LT, D/d=1.0'
–Y23DR– STA. 51+93 TO STA. 52+50 RT, D/d=1.0'

–L1– STA. 1163+00 TO STA. 1164+50 RT, D/d=1.5'
–L1– STA. 1163+00 TO STA. 1164+50 LT, D/d=1.5'
–L1– STA. 1165+50 TO STA. 1167+50 RT, D/d=1.5'
–L1– STA. 1170+00 TO STA. 1171+38 RT, D/d=1.5'
–L1– STA. 1179+40 TO STA. 1181+00 LT, D/d=1.5'
–Y24RPAR– STA. 21+00 TO STA. 21+78 RT, D/d=1.5'
–Y24RPDR– STA. 12+80 TO STA. 14+24 LT, D/d=1.5'
–Y24R– STA. 15+50 TO STA. 18+00 LT, D/d=1.5'
–Y24R– STA. 16+00 TO STA. 19+00 RT, D/d=1.5'

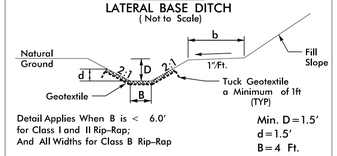
DETAIL O
SPECIAL CUT GRASSED SWALE
(Not to Scale)



–L– STA. 992+00 TO STA. 996+00 LT
–L– STA. 1001+00 TO STA. 1003+00 LT
–L1– STA. 1005+50 TO STA. 1007+00 RT
–L1– STA. 1010+50 TO STA. 1012+86 RT
–L1– STA. 1018+00 TO STA. 1021+50 LT
–L1– STA. 1019+00 TO STA. 1020+00 RT
–L1– STA. 1022+50 TO STA. 1024+18 RT
–L1– STA. 1026+00 TO STA. 1029+50 RT
–L1– STA. 1054+50 TO STA. 1056+00 RT
–L1– STA. 1059+00 TO STA. 1060+50 LT
–Y23R– STA. 18+50 TO STA. 19+00 LT
–Y23R– STA. 38+20 TO STA. 39+00 LT
–Y23RPC– STA. 14+29 TO STA. 17+00 RT
–Y23RPC– STA. 18+00 TO STA. 19+00 RT
–Y23RPC– STA. 20+00 TO STA. 23+50 LT
–Y23RPC– STA. 19+00 TO STA. 24+00 RT
–Y23LPC– STA. 14+00 TO STA. 15++45 RT
–Y23RPB– STA. 16+08 TO STA. 17+12 LT
–Y23RPB– STA. 18+05 TO STA. 22+50 RT
–Y23AR– STA. 13+30 TO STA. 14+50 RT
–Y23DR– STA. 21+00 TO STA. 23+00 LT
–Y23DR– STA. 29+85 TO STA. 32+50 LT
–Y23DR– STA. 36+00 TO STA. 37+00 LT
–Y23DR– STA. 44+43 TO STA. 45+43 RT
–Y23J– STA. 14+00 TO STA. 14+85 LT

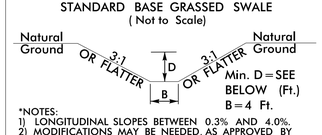
–L1– STA. 1094+00 TO STA. 1098+00 LT
–L1– STA. 1097+00 TO STA. 1098+50 RT
–L1– STA. 1101+00 TO STA. 1101+50 RT
–L1– STA. 1119+00 TO STA. 1124+50 RT
–Y24R– STA. 32+50 TO STA. 33+99 RT
–Y24A– STA. 19+51 TO STA. 20+01 LT
–Y24RPBR– STA. 30+50 TO STA. 32+00 LT
–Y24RPC– STA. 21+50 TO STA. 24+50 RT
–L1– STA. 1094+00 TO STA. 1096+16 LT
–L1– STA. 1180+00 TO STA. 1181+50 RT

DETAIL P
LATERAL BASE DITCH
(Not to Scale)



–Y24RPBR– STA. 32+00 TO STA. 34+00 LT

DETAIL Q
STANDARD BASE GRASSED SWALE
(Not to Scale)

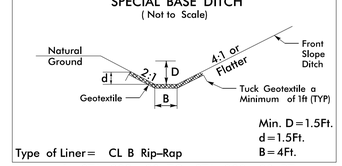


*NOTES:
1) LONGITUDINAL SLOPES BETWEEN 0.3% AND 4.0%.
2) MODIFICATIONS MAY BE NEEDED, AS APPROVED BY ENGINEER.

–L1– STA. 1056+00 RT, D=1'
BEGIN ELEV=311.9, END ELEV=311.0, S=0.9%, L=100'
–L1– STA. 1084+71 TO STA. 1087+00 RT, D=2'
BEGIN ELEV=230.0, END ELEV=230.8, S=0.4%, L=279'
–L1– STA. 1085+06 TO –L– 1086+20 LT, D=2'
BEGIN ELEV=229.9, END ELEV=229.3, S=0.5%, L=114'

–L1– STA. 1118+85 TO STA. 1119+00 RT, D=1'
–L1– STA. 1179+10 TO STA. 1180+00 RT, D=1'

DETAIL R
SPECIAL BASE DITCH
(Not to Scale)



–L– STA. 982+00 TO STA. 988+00 RT
–L1– STA. 1025+00 TO STA. 1026+00 RT
–L1– STA. 1029+50 TO STA. 1030+35 RT
–Y23K– STA. 11+98 TO STA. 12+60 LT
(BEGIN ELEV=308.2, END ELEV=304.5, S=6.0%. L=62')
–Y23AR– STA. 11+50 TO STA. 15+50 LT (Min. D=2.0')

NOTE: * INDICATE DITCHES INSIDE THE EARLY START PACKAGE

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R:\Hydraulics\Permits_Environmental\Drawings\4C\R-2829A_hyd_buf_DitchDetails.dgn
aburke

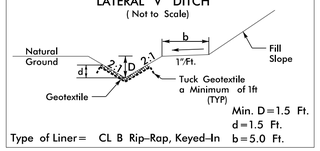
Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-2
	HYDRAULICS DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BUFFER DRAWING SHEET 3 OF 36

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



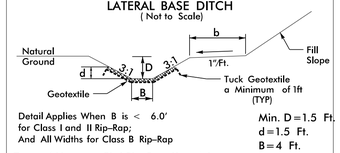
Min. D=1.5 Ft.
d=1.5 Ft.
b=5.0 Ft.

Type of Liner= CL B Rip-Rap, Keyed-In

–Y22RPAFLY_REV– STA. 20+00 TO STA. 21+24 LT
–Y23R– STA. 41+00 TO STA. 43+00 LT
–Y23RPB– STA. 23+50 TO STA. 24+50 RT
–Y23FR– STA. 13+50 TO STA. 14+00 LT

–Y26R– STA. 20+30 TO STA. 22+02 LT
–Y26R– STA. 28+50 TO STA. 29+25 RT

DETAIL T
LATERAL BASE DITCH
(Not to Scale)



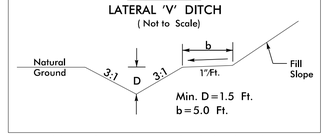
Detail Applies When B is < 6.0'
for Class I and II Rip-Rap;
And All Widths for Class B Rip-Rap

Min. D=1.5 Ft.
d=1.5 Ft.
B=4 Ft.
b=5 Ft.

Type of Liner= CL I Rip-Rap, Keyed-In

–Y23RPB– STA. 28+20 TO STA. 28+50 LT
–Y22RPAFLY_REV– STA. 28+00 TO STA. 30+00 LT

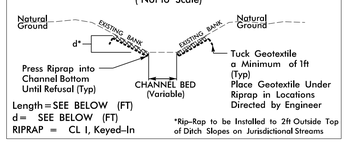
DETAIL U
LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
b=5.0 Ft.

–Y23AR– STA. 14+50 TO STA. 16+50 RT
–Y23AR– STA. 17+50 TO STA. 19+80 RT

DETAIL V
BANK STABILIZATION
(Not to Scale)

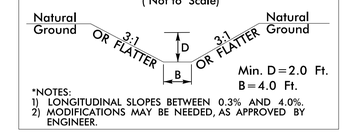


Length=SEE BELOW (FT)
d= SEE BELOW (FT)
RIPRAP = CL I, Keyed-In

*Rip-Rap to be Installed to 2ft Outside Top of Ditch Slopes on Jurisdictional Streams

–Y26R– STA. 22+25 LT,
L=72', d=3'
48 TONS CL I RIPRAP, W/107 SY GEOFAB

DETAIL W
STANDARD BASE GRASSED SWALE
(Not to Scale)

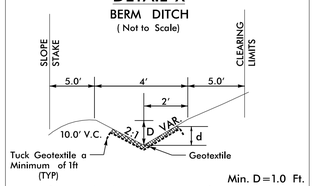


Min. D=2.0 Ft.
B=4.0 Ft.

*NOTES:
1) LONGITUDINAL SLOPES BETWEEN 0.3% AND 4.0%.
2) MODIFICATIONS MAY BE NEEDED, AS APPROVED BY ENGINEER.

–Y23RPB– STA. 23+50 RT, L=143'
BEGIN ELEV=317.1', END ELEV=315.7', S=1.0%
MIN D=1.0', B=4'

DETAIL X
BERM DITCH
(Not to Scale)



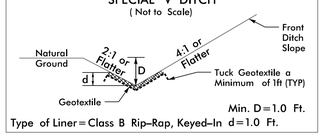
Min. D=1.0 Ft.
d=1.0 Ft.

Type of Liner=CLASS B RIPRAP, Keyed-In

–Y23RPC– STA. 14+29 TO STA. 16+00 RT
–L1– STA. 1053+30 TO STA. 1058+00 LT

–L1– STA. 1108+85 TO STA. 1112+50 RT

DETAIL Y
SPECIAL 'V' DITCH
(Not to Scale)



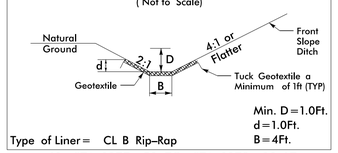
Min. D=1.0 Ft.

Type of Liner=Class B Rip-Rap, Keyed-In d=1.0 Ft.

–L1– STA. 1021+50 TO STA. 1022+00 LT
–L1– STA. 1020+00 TO STA. 1021+00 RT
–L1– STA. 1096+50 TO STA. 1097+00 RT
–L1– STA. 1073+00 TO STA. 1075+50 LT
–Y22CR– STA. 14+50 TO STA 15+00 LT
–Y23BR_REV– STA. 21+00 TO STA. 22+50 RT
–Y23CR_REV– STA. 21+50 TO STA. 23+00 LT
–Y23R– STA. 64+65 TO STA. 69+00 LT
–Y23R– STA. 66+50 TO STA. 68+30 RT
–Y23LPB– STA. 14+50 TO STA. 15+00 LT
–Y23DR– STA. 27+50 TO STA. 28+80 LT
–Y23DR– STA. 36+00 TO STA. 38+38 RT

–L1– STA. 1181+50 TO STA. 1182+50 RT
–Y24R– STA. 31+00 TO STA. 32+50 RT
–Y24A– STA. 10+90 TO STA. 11+45 LT (L=83')
–Y24A– STA. 10+75 TO 11+00 RT (L=33')
–Y24A– STA. 11+00 TO 12+65 RT (L=97')
–Y24A– STA. 12+65 TO 13+49 RT
–Y24A– STA. 19+01 TO STA. 19+51 LT

DETAIL Z
SPECIAL BASE DITCH
(Not to Scale)

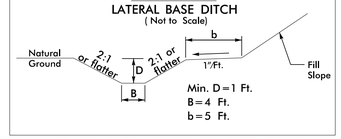


Min. D=1.0Ft.
d=1.0Ft.
B=4Ft.

Type of Liner= CL B Rip-Rap

–L1– STA. 1077+50 TO STA. 1079+00 LT
–Y23DR– STA. 23+50 TO STA. 24+00 RT
–L1– STA. 1061+00 TO STA. 1062+61 LT
–Y23R– STA. 64+50 TO STA. 66+50 RT

DETAIL AA
LATERAL BASE DITCH
(Not to Scale)

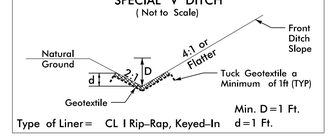


Min. D=1 Ft.
B=4 Ft.
b=5 Ft.

–L1– STA. 1075+50 TO STA. 1077+50 LT
–L1– STA. 1066+00 TO STA. 1069+50 LT

–L1– STA. 1098+00 TO STA. 1098+80 LT
–Y24R– STA. 37+00 TO STA. 39+50 RT
–Y24RPDR– STA. 18+00 TO STA. 21+50 LT
–L1– STA. 1114+70 TO STA 1115+77 RT

DETAIL AB
SPECIAL 'V' DITCH
(Not to Scale)



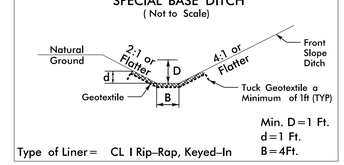
Min. D=1 Ft.
d=1 Ft.

Type of Liner= CL I Rip-Rap, Keyed-In

–Y23I_REV– STA. 14+00 TO STA. 14+90 RT
–Y23I_REV– STA. 14+00 TO STA. 15+00 LT
–Y23DR– STA. 52+50 TO STA 53+23 RT
–Y23FR– STA. 13+50 TO STA. 14+00 RT

–Y24B– STA. 10+26 TO STA. 11+00 RT

DETAIL AC
SPECIAL BASE DITCH
(Not to Scale)



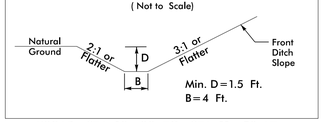
Min. D=1 Ft.
d=1 Ft.
B=4Ft.

Type of Liner= CL I Rip-Rap, Keyed-In

–L– STA. 990+00 TO STA. 991+00 LT
–Y23DR– STA. 23+00 TO STA. 24+50 LT
–Y23H– STA. 10+50 TO STA. 11+85 RT
–Y23R– STA. 32+50 TO STA. 33+50 LT

–Y24R– STA. 47+00 TO STA. 51+50 RT

DETAIL AD
SPECIAL BASE DITCH
(Not to Scale)

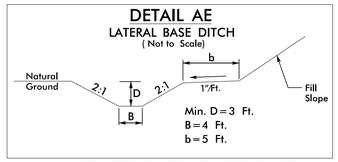


Min. D=1.5 Ft.
B=4 Ft.

–Y23AR– STA. 10+30 TO STA. 11+50 LT
–Y23R– STA. 33+50 TO STA. 36+00 LT
–Y23RPC– STA. 24+00 TO STA. 27+00 RT

–Y26R– STA. 34+50 TO STA. 39+50 RT

DETAIL AE
LATERAL BASE DITCH
(Not to Scale)

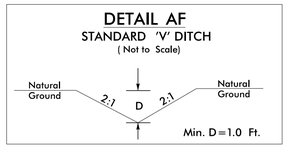


Min. D=3 Ft.
B=4 Ft.
b=5 Ft.

–L– STA. 977+00 TO STA. 980+24 LT

–Y24RPC– STA. 15+67 TO STA. 17+32 RT

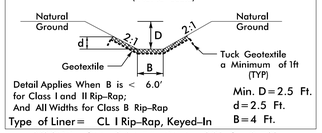
DETAIL AF
STANDARD 'V' DITCH
(Not to Scale)



Min. D=1.0 Ft.

–Y23CR_REV– STA. 12+07 TO STA. 14+50,
BEGIN ELEV=347.50', END ELEV=354.73'
S=2.8%, L=266'

DETAIL AG
CHANNEL CHANGE
(Not to Scale)



Detail Applies When B is < 6.0'
for Class I and II Rip-Rap;
And All Widths for Class B Rip-Rap

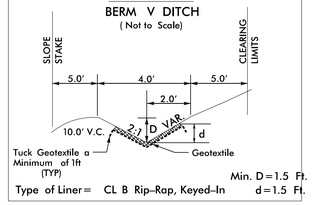
Min. D=2.5 Ft.
d=2.5 Ft.
B=4 Ft.

Type of Liner= CL I Rip-Rap, Keyed-In

–Y23DR– STA. 24+75 RT, L=38', S=0.5%
BEGIN ELEV=279.6', END ELEV=279.4', D/d=3.5'

–L1– STA. 1161+40 TO 1162+07 LT
BEGIN ELEV=291.0', END ELEV=288.5', L=110', S=2.3%
–L1– STA. 1162+07 TO 1163+00 LT
BEGIN ELEV=294.5', END ELEV=291.0', L=108', S=3.2%

DETAIL AH
BERM V DITCH
(Not to Scale)

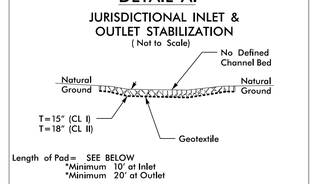


Min. D=1.5 Ft.
d=1.5 Ft.

Type of Liner= CL B Rip-Rap, Keyed-In

–L1– STA. 1030+50 TO STA. 1034+50 RT

DETAIL AI
JURISDICTIONAL INLET & OUTLET STABILIZATION
(Not to Scale)



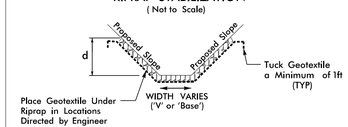
Length of Pad= SEE BELOW
*Minimum 10' at Inlet
*Minimum 20' at Outlet

Width of Pad = See STD. 876.02

Type of Liner= CL I or CL II Rip-Rap – Keyed-In/Countersunk

–L– STA. 1004+00 LT, CL I RIPRAP, L=20'
–L1– STA. 1036+50 LT, CL I RIPRAP, L=20'

DETAIL AJ
RIPRAP STABILIZATION
(Not to Scale)



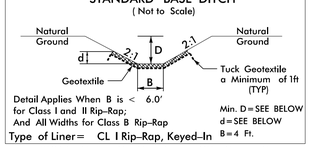
*NOTE: DETAIL FOR RIPRAP INSTALLATION SHALL BE USED IN CONJUNCTION WITH ANY PROPOSED DITCH DETAIL AND/OR ROADWAY TYPICAL DITCH.

Length= SEE BELOW (Ft.)
Type of Liner= CL B or I Rip-Rap – Keyed-In (SEE BELOW)

–Y22RPA_REV– STA. 20+80 LT (RDY TYPICAL DITCH)
L=110', MIN d=1.0'
45 TONS CL B RIPRAP, W/101 SY GEOFAB
–Y23DR– STA. 15+50 RT (END OF STD. DITCH),
L=6', MIN d=1.5'
3 TONS CL B RIPRAP, W/9 SY GEOFAB
–Y23DR– STA. 51+07 RT (END OF STD. DITCH),
L=6', MIN d=2.0'
4 TONS CL I RIPRAP, W/9 SY GEOFAB
–L1– STA. 1086+20 RT (END OF SWALE),
L=20', MIN d=2.0'
18 TONS CL I RIPRAP, W/37 SY GEOFAB
–L1– STA. 1084+85 RT (END OF SWALE),
L=20', MIN d=2.0'
18 TONS CL I RIPRAP, W/37 SY GEOFAB
–L1– STA. 1087+05 LT (END OF SWALE),
L=20', MIN d=2.0'
23 TONS CL I RIPRAP, W/46 SY GEOFAB

–L1– STA. 1145+00 TO 1147+00 RT
L=200', MIN d=1.0'
82 TONS CL B RIPRAP, W/183 SY GEOFAB
–L1– STA. 1179+10 RT (END OF SWALE),
L=12', MIN d=1.0'
6 TONS CL B RIPRAP, W/14 SY GEOFAB

DETAIL AK
STANDARD BASE DITCH
(Not to Scale)



Detail Applies When B is < 6.0'
for Class I and II Rip-Rap;
And All Widths for Class B Rip-Rap

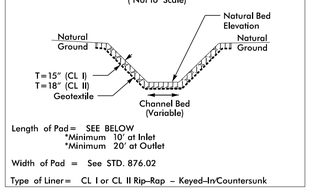
Min. D=SEE BELOW
d=SEE BELOW
B=4 Ft.

Type of Liner= CL I Rip-Rap, Keyed-In

–Y23R– STA. 60+95 RT, L=80', S=7.5%
BEGIN ELEV=332.0, END ELEV=326.0', D/d=1.0'
–Y23AR– STA. 11+50 RT, L=24', S=1.4%
BEGIN ELEV=299.0', END ELEV=298.67', D/d=2.5'
–L– STA. 975+75 TO STA. 977+00 LT, L=125', S=0.3%
BEGIN ELEV=214.5', END ELEV=214.9', D/d=3.5'
–Y23DR– STA. 23+85 LT, L=91', S=8.0%
BEGIN ELEV=293.4', END ELEV=286.1', D/d=1.5'
–Y23DR– STA. 38+35 RT, L=27', S=6.7%
BEGIN ELEV=293.8', END ELEV=292.0', D/d=1.0'
–L1– STA. 1034+79 LT, L=60'
BEGIN ELEV=284.0', END ELEV=284.5', S=0.8%
MIN D=1.5, B=4'
–L1– STA. 1035+11 LT, L=67'
BEGIN ELEV=284.5', END ELEV=292.0', S=1.1%
MIN D=1.5', B=4'

–Y26– STA. 14+50 LT, L=73', S=14.0%, D/d=1.0'
BEGIN ELEV=300.0', END ELEV=289.8'
–Y26_DRW1– STA. 10+50 RT, L=40', S=16.6%, D/d=1.0'
BEGIN ELEV=297.3', END ELEV=290.6'

DETAIL AL
JURISDICTIONAL INLET & OUTLET CHANNEL STABILIZATION
(Not to Scale)



Length of Pad= SEE BELOW
*Minimum 10' at Inlet
*Minimum 20' at Outlet

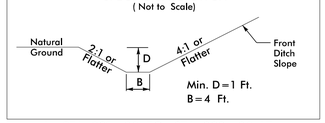
Width of Pad = See STD. 876.02

Type of Liner= CL I or CL II Rip-Rap – Keyed-In/Countersunk

–L– STA. 1003+00 RT, CL I RIPRAP, L=16'
–L1– STA. 1023+00 LT, CL II RIPRAP, L=20'
–L1– STA. 1062+62 LT, CL I RIPRAP, L=16'
–Y23DR– STA. 46+25 RT, CL I RIPRAP, L=20'
–Y23R– STA. 61+14 LT, CL I RIPRAP, L=20'
–Y23DR– STA. 34+15 LT, CL I RIPRAP, L=16'
–Y23DR– STA. 34+31 RT, CL I RIPRAP, L=20'
–Y23FR– STA. 11+71 LT, CL II RIPRAP, L=20'
–Y23FR– STA. 11+64 RT, CL II RIPRAP, L=20'

–L1– STA. 1024+00 LT, CL II RIPRAP, L=20'
–L1– STA. 1163+00 RT, CL II RIPRAP, L=20'
–Y24RPBR– STA. 34+00 RT, CL II RIPRAP, L=20'
–Y24RPDR– STA. 24+73 LT, CL I RIPRAP, L=20'
–Y26R– STA. 21+69 RT, CL II RIPRAP, L=20'
–Y26R– STA. 22+02 LT, CL II RIPRAP, L=20'

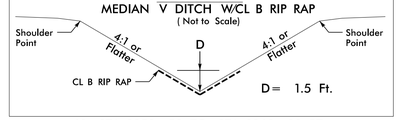
DETAIL AM
SPECIAL BASE DITCH
(Not to Scale)



Min. D=1 Ft.
B=4 Ft.

–L– STA. 991+00 TO STA. 992+00 LT
–L1– STA. 1046+00 TO STA. 1047+50 LT
–L1– STA. 1057+50 TO STA. 1059+00 LT
–Y23R– STA. 23+00 TO STA. 23+80 LT
–Y23R– STA. 31+50 TO STA. 32+50 LT
–Y23LPB– STA. 13+22 TO STA. 14+50 LT

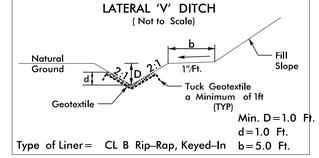
DETAIL AN
MEDIAN V DITCH W/CL B RIP RAP
(Not to Scale)



D= 1.5 Ft.

–L1– STA. 1059+50 TO STA. 1060+00 RT

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



Min. D=1.0 Ft.
d=1.0 Ft.
b=5.0 Ft.

Type of Liner= CL B Rip-Rap, Keyed-In

–Y22CR– STA. 13+61 TO STA 14+50 LT
–Y22CR– STA. 14+26 TO STA 15+50 RT
–L1– STA. 1070+50 TO STA. 1071+50 RT

–L1– STA. 1161+20 TO STA. 1161+60 RT

NOTE: * INDICATE DITCHES INSIDE THE EARLY START PACKAGE

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9/3/2024 R:\Hydraulics\Permits_Environmental\Drawings\4C\R-2829A_hyd_buf_DitchDetails.dgn
aburke

Submitted September 17, 2024

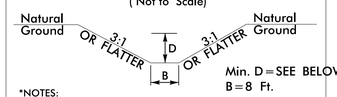
PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-3

HYDRAULICS DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BUFFER DRAWING SHEET 4 OF 36

DETAIL AP
STANDARD BASE GRASSED SWALE
(Not to Scale)

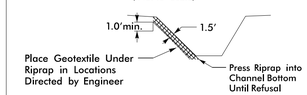


Min. D = SEE BELOW (Ft.)
B = 8 Ft.

*NOTES:
1) LONGITUDINAL SLOPES BETWEEN 0.3% AND 4.0%.
2) MODIFICATIONS MAY BE NEEDED, AS APPROVED BY ENGINEER.

–L1– STA. 1086 + 92 TO STA. 1090 + 00 LT, D = 2 FT
–BEGIN ELEV = 230.0, END ELEV = 231.0 S = 0.3%, L = 312′

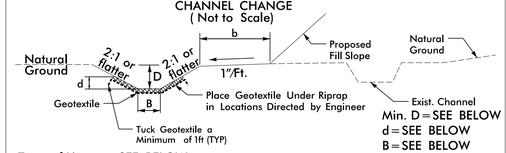
DETAIL AQ
BANK STABILIZATION
(Not to Scale)



Type of Liner = CL I Rip–Rap, Keyed–In

–L1– STA. 1086 + 29 LT
5 TONS CL I RIPRAP, W/10 SY GEOFAB
–L1– STA. 1086 + 92 LT
5 TONS CL I RIPRAP, W/10 SY GEOFAB
–L1– STA. 1086 + 75 RT
5 TONS CL I RIPRAP, W/10 SY GEOFAB

DETAIL AR
CHANNEL CHANGE
(Not to Scale)



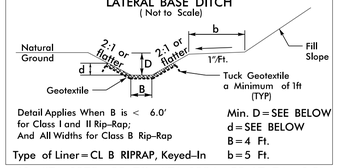
Min. D = SEE BELOW
d = SEE BELOW
B = SEE BELOW
b = 5.0 Ft.

Type of Liner = SEE BELOW

–L1– 1014 + 00 RT, B = 7′, CL II RIPRAP, D/d = 3.0′
BEGIN ELEV. = 255.5, END ELEV. = 257.0, L = 73′ (RCBC INLET)
–L1– STA. 1014 + 50 TO STA. 1015 + 10 RT, B = 7′, CL II RIPRAP, MIN D/d = 3.0′
–L1– STA. 1015 + 10 TO STA. 1016 + 00 RT, B = 7′, CL II RIPRAP, MIN D/d = 1.0′
–L1– STA. 1016 + 50 TO STA. 1018 + 29 RT, B = 5′, GRASS, MIN D/d = 1.5′

–L1– STA. 1171 + 38 TO STA. 1176 + 30 RT, CL I RIPRAP, MIN D/d = 4.0′
–L1– STA. 1175 + 56 TO STA. 1178 + 09 LT, CL I RIPRAP, MIN D/d = 4.0′
–L1– STA. 1115 + 82 TO STA. 1118 + 00 RT, CL II RIP RAP, MIN D/d = 2.5, B = 8′
–L1– STA. 1118 + 85 TO STA. 1119 + 12 RT, CL II RIP RAP, MIN D/d = 3.0, B = 4–8′
–L1– STA. 1179 + 00 TO STA. 1179 + 40 LT, CL I RIP RAP, MIN D/d = 5.0, B = 4′

DETAIL AS
LATERAL BASE DITCH
(Not to Scale)



Detail Applies When B is < 6.0′ for Class I and II Rip–Rap; And All Widths for Class B Rip–Rap

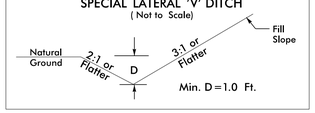
Min. D = SEE BELOW
d = SEE BELOW
B = 4 Ft.
b = 5 Ft.

Type of Liner = CL B RIPRAP, Keyed–In

–L1– STA. 1079 + 00 TO STA. 1084 + 50 LT, D/d = 1.0′

–L1– STA. 1159 + 62 TO STA. 1161 + 20 RT, D/d = 1.0′
–L1– STA. 1161 + 60 TO STA. 1163 + 00 RT, D/d = 1.0′

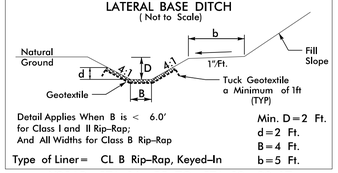
DETAIL AT
SPECIAL LATERAL ′V′ DITCH
(Not to Scale)



Min. D = 1.0 Ft.

–Y26RSR2– STA. 10 + 70 TO STA. 14 + 20 LT

DETAIL AU
LATERAL BASE DITCH
(Not to Scale)



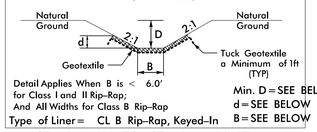
Detail Applies When B is < 6.0′ for Class I and II Rip–Rap; And All Widths for Class B Rip–Rap

Min. D = 2 Ft.
d = 2 Ft.
B = 4 Ft.
b = 5 Ft.

Type of Liner = CL B Rip–Rap, Keyed–In

–Y23AR– STA. 16 + 55 TO STA. 18 + 90 LT

DETAIL AV
STANDARD BASE DITCH
(Not to Scale)



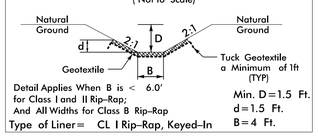
Detail Applies When B is < 6.0′ for Class I and II Rip–Rap; And All Widths for Class B Rip–Rap

Min. D = SEE BELOW
d = SEE BELOW
B = SEE BELOW

Type of Liner = CL B Rip–Rap, Keyed–In

–L– STA. 978 + 30 TO STA. 979 + 00 RT, L = 78′
BEGIN ELEV = 221.8′, END ELEV = 222.1′, S = 0.4%
MIN D = 2.5′, B = 6′
–Y22RPE_REV– STA. 42 + 00 RT, L = 330′
BEGIN ELEV = 252.7′, END ELEV = 240.4′, S = 3.8%
MIN D = 1.5′, B = 4′
–Y22RPE_REV– STA. 45 + 00 RT, L = 100′
BEGIN ELEV = 240.4′, END ELEV = 240.0′, S = 0.4%
MIN D = 2.5′, B = 4′

DETAIL AW
STANDARD BASE DITCH
(Not to Scale)



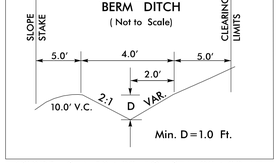
Detail Applies When B is < 6.0′ for Class I and II Rip–Rap; And All Widths for Class B Rip–Rap

Min. D = 1.5 Ft.
d = 1.5 Ft.
B = 4 Ft.

Type of Liner = CL I Rip–Rap, Keyed–In

–L1– STA. 1161 + 64 LT
BEGIN ELEV = 295.0′, END ELEV = 289.6′, L = 90′, S = 6.0%

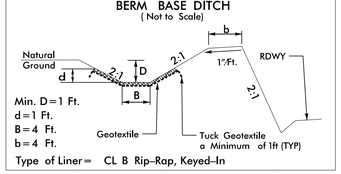
DETAIL AX
BERM DITCH
(Not to Scale)



Min. D = 1.0 Ft.

–Y23DR– STA. 13 + 00 TO STA. 23 + 00 LT

DETAIL AY
BERM BASE DITCH
(Not to Scale)



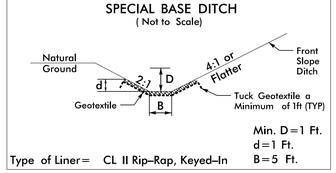
Min. D = 1 Ft.
d = 1 Ft.
B = 4 Ft.
b = 4 Ft.

Type of Liner = CL B Rip–Rap, Keyed–In

–L– STA. 987 + 50 TO STA. 997 + 50 RT
–L1– STA. 1058 + 00 TO STA. 1060 + 50 LT

–L1– STA. 1103 + 79 TO STA. 1108 + 85 RT

DETAIL AZ
SPECIAL BASE DITCH
(Not to Scale)

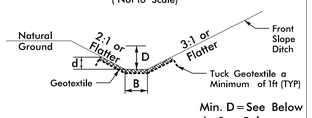


Min. D = 1 Ft.
d = 1 Ft.
B = 5 Ft.

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

–L1– STA. 1100 + 00 TO STA. 1101 + 00 RT

DETAIL BB
CHANNEL CHANGE
(Not to Scale)



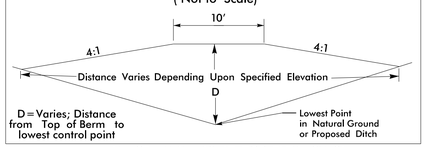
Min. D = See Below
d = See Below
B = See Below

Type of Liner = CL I OR II RIPRAP, Keyed–In

–L1– STA. 1016 + 00 TO STA. 1016 + 50 RT, CL I RIPRAP
MIN D/d = 1.0, B = 7′

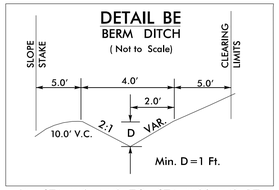
–L1– STA. 1118 + 00 TO STA. 1118 + 85 RT, CL II RIPRAP
MIN D/d = 2.5′, B = 8′

DETAIL BC
10′ WIDE BERM
(Not to Scale)



–L1– STA. 1161 + 60 LT, TOP ELEV = 311.0′

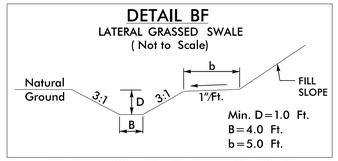
DETAIL BE
BERM DITCH
(Not to Scale)



Min. D = 1 Ft.

–L1– STA. 1101 + 50 TO STA. 1103 + 79 RT

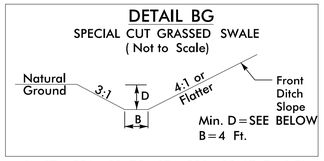
DETAIL BF
LATERAL GRASSED SWALE
(Not to Scale)



Min. D = 1.0 Ft.
B = 4.0 Ft.
b = 5.0 Ft.

–L1– STA. 1099 + 00 TO STA. 1100 + 00 RT
–L1– STA. 1098 + 50 TO STA. 1098 + 83 RT
–Y24A– STA. 20 + 01 TO STA. 20 + 50 LT

DETAIL BG
SPECIAL CUT GRASSED SWALE
(Not to Scale)

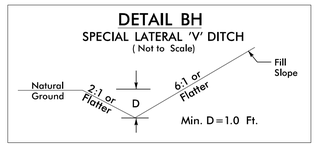


Min. D = SEE BELOW
B = 4 Ft.

–L– STA. 986 + 00 TO STA. 990 + 00 LT, D = 1.5′
–L1– STA. 1060 + 50 TO STA. 1061 + 00 LT, D = 1.5′

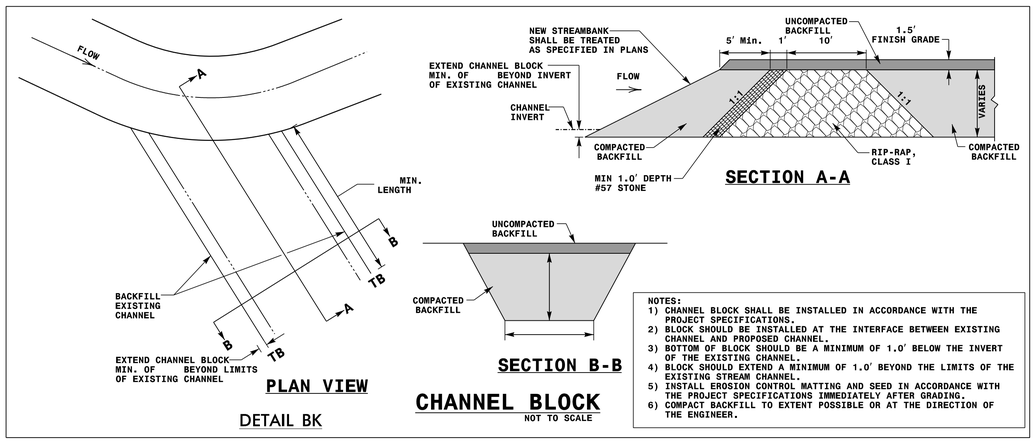
–Y24RPC– STA. 24 + 50 TO STA. 29 + 00 RT, D = 2′

DETAIL BH
SPECIAL LATERAL ′V′ DITCH
(Not to Scale)



Min. D = 1.0 Ft.

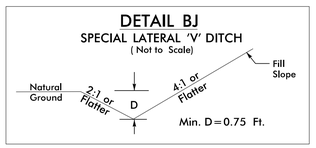
–Y24R– STA. 41 + 75 TO STA. 43 + 00 LT



NOTES:
1) CHANNEL BLOCK SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
2) BLOCK SHOULD BE INSTALLED AT THE INTERFACE BETWEEN EXISTING CHANNEL AND PROPOSED CHANNEL.
3) BOTTOM OF BLOCK SHOULD BE A MINIMUM OF 1.0′ BELOW THE INVERT OF THE EXISTING CHANNEL.
4) BLOCK SHOULD EXTEND A MINIMUM OF 1.0′ BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
5) INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
6) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.

DETAIL BK

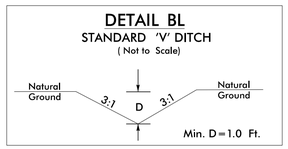
DETAIL BJ
SPECIAL LATERAL ′V′ DITCH
(Not to Scale)



Min. D = 0.75 Ft.

–Y24E– STA. 10 + 80 TO STA. 12 + 00 RT

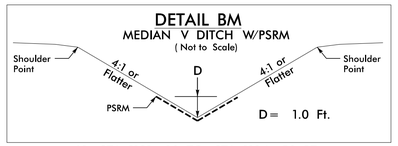
DETAIL BL
STANDARD ′V′ DITCH
(Not to Scale)



Min. D = 1.0 Ft.

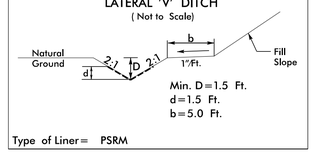
–Y23J– STA. 13 + 00 TO STA. 14 + 00 RT
BEGIN ELEV = 321.7′, END ELEV = 318.0′
S = 3.7%, L = 100′
–Y23J– STA. 13 + 00 TO STA. 14 + 00 LT
BEGIN ELEV = 323.1′, END ELEV = 317.0′
S = 6.1%, L = 100′

DETAIL BM
MEDIAN V DITCH W/PSRM
(Not to Scale)



–L1– STA. 1131 + 00 TO STA. 1134 + 50 RT

DETAIL BN
LATERAL ′V′ DITCH
(Not to Scale)



Min. D = 1.5 Ft.
d = 1.5 Ft.
b = 5.0 Ft.

Type of Liner = PSRM

–Y22RPAFLY_REV– STA. 30 + 00 TO STA. 31 + 50 LT

NOTE: * INDICATE DITCHES INSIDE THE EARLY START PACKAGE

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R:\Hydraulics\Permits_Environmental\Drawings\4C\R-2829A_hyd_buf_DitchDetails.dgn
aburke

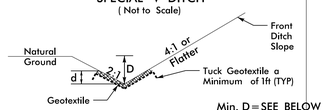
Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-4
	HYDRAULICS DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BUFFER DRAWING SHEET 5 OF 36

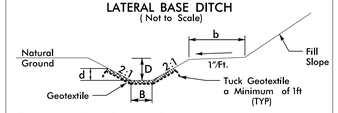
DETAIL BO
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = SEE BELOW Ft.
Type of Liner = CL I Rip-Rap, Keyed-In d = SEE BELOW Ft.

-L1- STA. 1063+00 TO STA. 1066+00 LT, D/d = 2.0'
-L1- STA. 1057+50 TO STA. 1058+00 LT, D/d = 1.5'

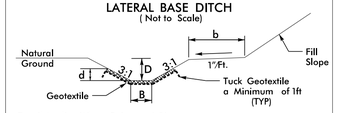
DETAIL BP
LATERAL BASE DITCH
(Not to Scale)



Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D = SEE BELOW Ft.
d = SEE BELOW Ft.
B = 4 Ft.
b = 5 Ft.
Type of Liner = CL I Rip-Rap, Keyed-In

-Y24RPC- STA. 17+32 TO STA. 19+00 RT, D/d = 2.5'
-L1- STA. 1124+50 TO STA. 1125+30 RT, D/d = 1.0'

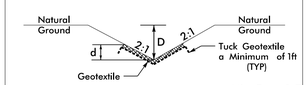
DETAIL BQ
LATERAL BASE DITCH
(Not to Scale)



Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D = SEE BELOW Ft.
d = SEE BELOW Ft.
B = 4 Ft.
b = 5 Ft.
Type of Liner = CL I Rip-Rap, Keyed-In

-Y23RPB- STA. 28+75 TO STA. 30+45 RT
-Y22RPE_REV-STA. 28+00 TO STA. 30+00 LT

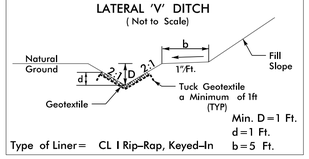
DETAIL BR
STANDARD 'V' DITCH
(Not to Scale)



Min. D = 1 Ft.
Type of Liner = CL B Rip-Rap, Keyed-In d = 1 Ft.

-Y23J- STA. 9+50 TO STA. 10+00 RT
BEGIN ELEV=316.8, END ELEV=313.8
S=6.0%, L=50'

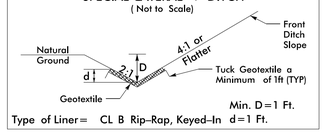
DETAIL BT
LATERAL 'V' DITCH
(Not to Scale)



Min. D = 1 Ft.
d = 1 Ft.
Type of Liner = CL I Rip-Rap, Keyed-In b = 5 Ft.

-Y23FR- STA. 12+40 TO STA. 13+50 RT

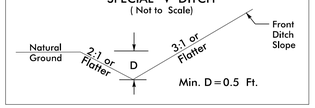
DETAIL BU
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 1 Ft.
Type of Liner = CL B Rip-Rap, Keyed-In d = 1 Ft.

-Y23R- STA. 20+00 TO STA. 21+50 RT

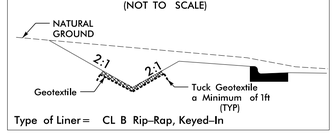
DETAIL BV
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = 0.5 Ft.

-Y24R- STA. 54+00 TO STA. 54+50 RT

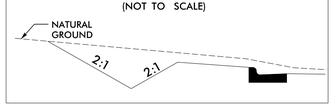
DETAIL BX
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



Type of Liner = CL B Rip-Rap, Keyed-In

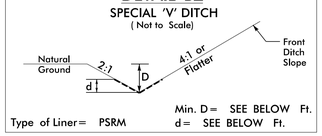
-Y23CR_REV- STA. 11+14 TO STA. 12+20 RT

DETAIL BY
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



-Y23CR_REV- STA. 10+00 TO STA. 10+93 RT

DETAIL BZ
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = SEE BELOW Ft.
Type of Liner = PSRM d = SEE BELOW Ft.

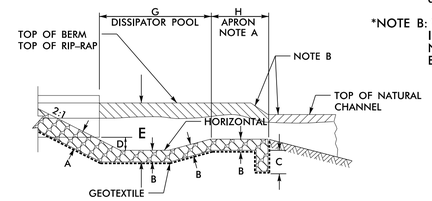
-Y23BR_REV- STA. 23+00 TO STA. 24+02 RT, D/d = 1.0'
-Y23BR_REV- STA. 24+02 TO STA. 24+39 RT, D/d = 1.5'

DETAIL BS
RIP-RAPPED ENERGY DISSIPATOR BASIN

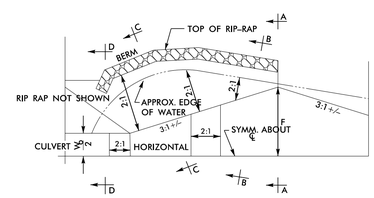
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q des/(CROSS SECTION AREA AT SEC. A-A) = SPECIFIED VELOCITY.

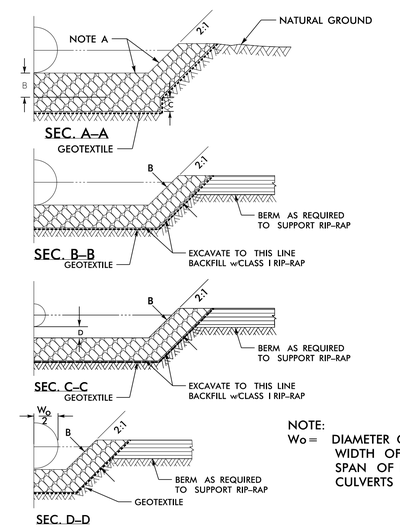
*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP-RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

℄ SECTION



HALF PLAN





DIM.	RIP RAP BASIN # 1	2	3	4	5	6	7	8
A	0.4'	0.4'						
B	0.3'	0.3'						
C	3.0'	3.0'						
D	2.1'	4.7'						
E	3.3'	5.2'						
F	15.0'	17.6'						
G	21.1'	47.0'						
H	10.5'	23.5'						

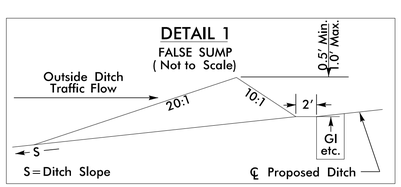
*ALL DIMENSIONS APPROXIMATE IN FT

BASIN #	LOCATION (AT OUTLET)
1	-Y23RPB- 23+55
2	-L1- STA. 1105+37 LT
3	
4	
5	
6	
7	
8	

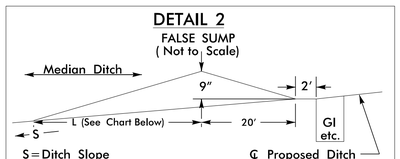
NOTE:
Wo = DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE-ARCH CULVERTS

5/05

DETAIL 1
FALSE SUMP
(Not to Scale)

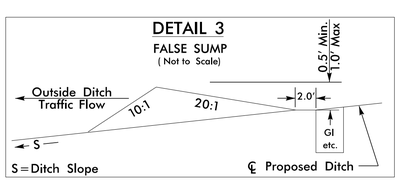


DETAIL 2
FALSE SUMP
(Not to Scale)



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

DETAIL 3
FALSE SUMP
(Not to Scale)



NOTE: * INDICATE DITCHES INSIDE THE EARLY START PACKAGE

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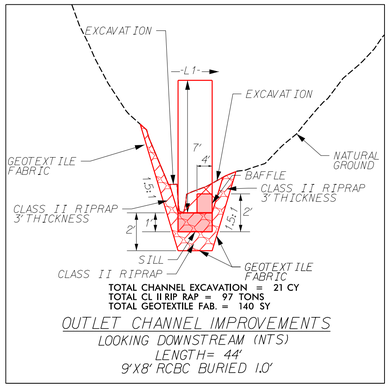
R:\Hydraulics\Permits_Environmental\Drawings\4C\R-2829A_hyd_buf_DitchDetails.dgn
aburke

Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-5
	HYDRAULICS DESIGN ENGINEER

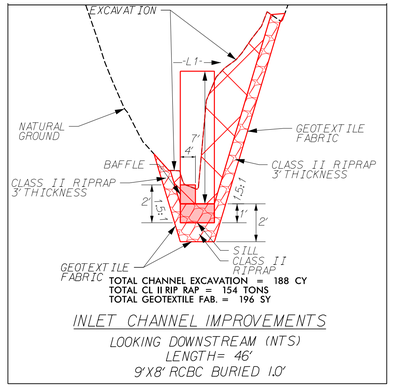
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BUFFER DRAWING SHEET 6 OF 36



TOTAL CHANNEL EXCAVATION = 21 CY
TOTAL CL II RIP RAP = 97 TONS
TOTAL GEOTEXTILE FAB. = 140 SY

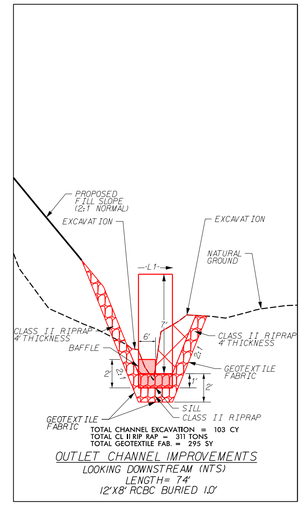
OUTLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH= 44'
9'X8' RCBC BURIED 1.0'



TOTAL CHANNEL EXCAVATION = 188 CY
TOTAL CL II RIP RAP = 154 TONS
TOTAL GEOTEXTILE FAB. = 196 SY

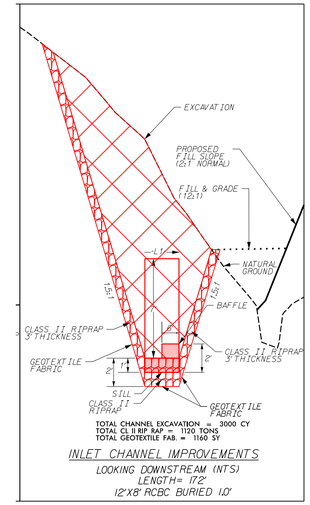
INLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH= 46'
9'X8' RCBC BURIED 1.0'

CULVERT INLET/OUTLET DETAILS
C100
-L1- STA. 1008+75
(DETAIL CA)



TOTAL CHANNEL EXCAVATION = 103 CY
TOTAL CL II RIP RAP = 311 TONS
TOTAL GEOTEXTILE FAB. = 295 SY

OUTLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH= 74'
12'X8' RCBC BURIED 1.0'

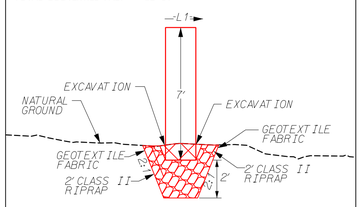


TOTAL CHANNEL EXCAVATION = 3000 CY
TOTAL CL II RIP RAP = 1120 TONS
TOTAL GEOTEXTILE FAB. = 1160 SY

INLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH= 172'
12'X8' RCBC BURIED 1.0'

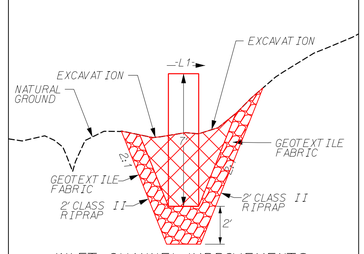
CULVERT INLET/OUTLET DETAILS
C200
-L1- STA. 1013+50
(DETAIL CB)

TOTAL CHANNEL EXCAVATION = 38 CY
TOTAL CL II RIP RAP = 44 TONS
TOTAL GEOTEXTILE FAB. = 32 SY



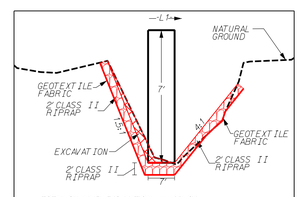
OUTLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH= 25'
8'X7' RCBC NOT BURIED

TOTAL CHANNEL EXCAVATION = 338 CY
TOTAL CL II RIP RAP = 252 TONS
TOTAL GEOTEXTILE FAB. = 139 SY



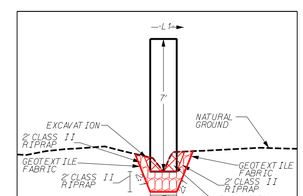
INLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH= 70'
8'X7' RCBC NOT BURIED

CULVERT INLET/OUTLET DETAILS
C300
-L1- STA. 1099+00
(DETAIL CC)



TOTAL CHANNEL EXCAVATION = 37 CY
TOTAL CL II RIP RAP = 60 TONS
TOTAL GEOTEXTILE FAB. = 30 SY

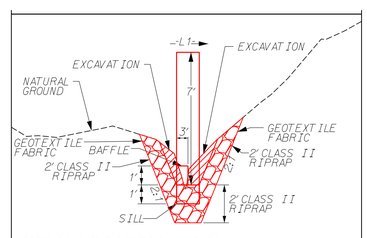
INLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH= 14'
PROPOSED 7'X7' RCBC



TOTAL CHANNEL EXCAVATION = 25 CY
TOTAL CL II RIP RAP = 27 TONS
TOTAL GEOTEXTILE FAB. = 68 SY

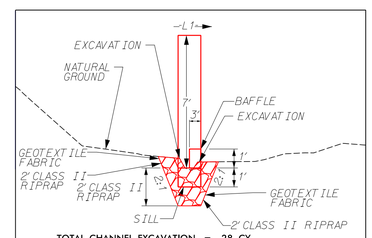
OUTLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH= 32'
PROPOSED 7'X7' RCBC

CULVERT INLET/OUTLET DETAILS
C400
-L1- STA. 1114+75
(DETAIL CD)



TOTAL CHANNEL EXCAVATION = 40 CY
TOTAL CL II RIP RAP = 46 TONS
TOTAL GEOTEXTILE FAB. = 35 SY

INLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH= 20'
6'X8' RCBC BURIED 1.0'



TOTAL CHANNEL EXCAVATION = 28 CY
TOTAL CL II RIP RAP = 39 TONS
TOTAL GEOTEXTILE FAB. = 71 SY

OUTLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH= 30'
6'X8' RCBC BURIED 1.0'

CULVERT INLET/OUTLET DETAILS
C500
-L1- STA. 1152+00
(DETAIL CE)

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Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	2D-6
	HYDRAULICS DESIGN ENGINEER

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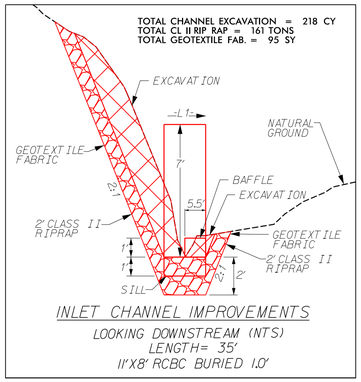
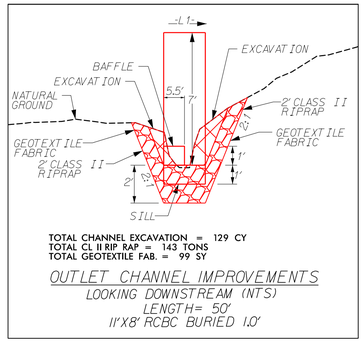
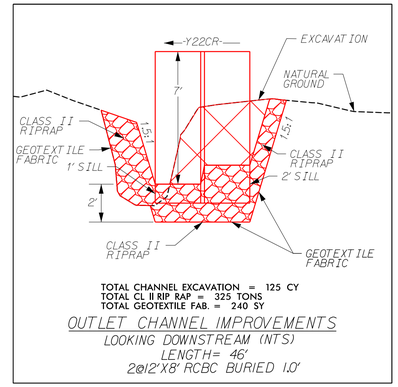
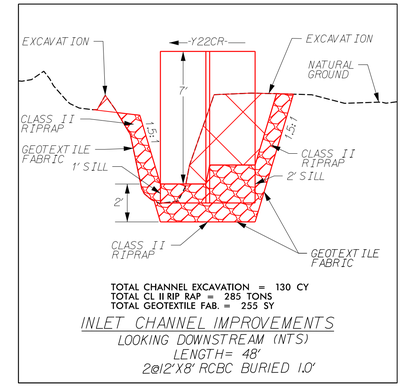
BUFFER DRAWING SHEET 7 OF 36



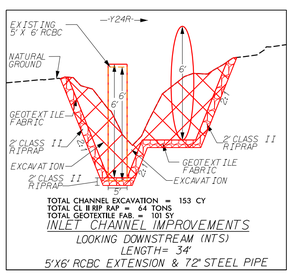


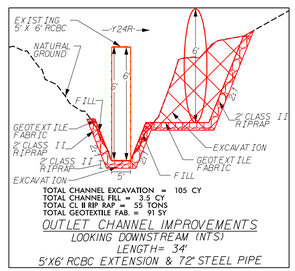
CULVERT INLET/OUTLET DETAILS
C600
-L1- STA. 1171+00
(DETAIL CF)



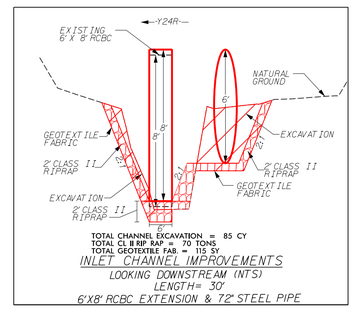


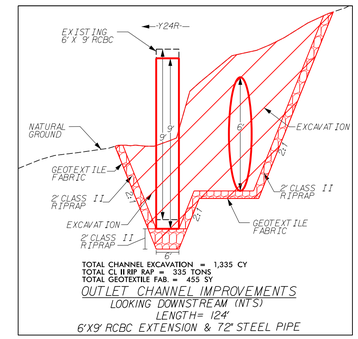
CULVERT INLET/OUTLET DETAILS
C700
-Y22CR- STA. 14+00
(DETAIL CG)



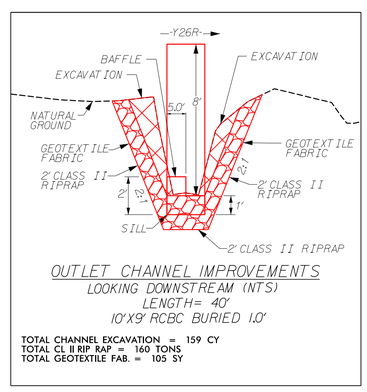


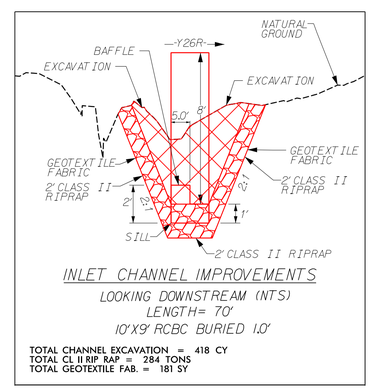
CULVERT INLET/OUTLET DETAILS
C800
-Y24R- 19+50
(DETAIL CH)





CULVERT INLET/OUTLET DETAILS
C900
-Y24R- 34+50
(DETAIL CI)





CULVERT INLET/OUTLET DETAILS
C1000
-Y26R- 18+75
(DETAIL CJ)

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aburke

Submitted September 17, 2024

SECTION 1 – SWALE DATA

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	SWALE DATA

BUFFER DRAWING SHEET 8 OF 36

GRASS SWALE DATA						
DA =	6.86	AC				
SLOPE =	0.30	%				
L REQ=	686	FT				
L PRO.=	400	FT				
Q2=	21.95	CFS				
V2=	1.98	FT/S				
D2=	1.24	FT				
Q10=	28.09	CFS				
V10=	2.11	FT/S				
D10=	1.39	FT				
STA=	L	98600	TO	99000	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	4.02	AC				
SLOPE =	0.40	%				
L REQ=	402	FT				
L PRO.=	400	FT				
Q2=	12.86	CFS				
V2=	1.90	FT/S				
D2=	0.89	FT				
Q10=	16.46	CFS				
V10=	2.04	FT/S				
D10=	1.01	FT				
STA=	L	99200	TO	99600	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	1.91	AC				
SLOPE =	0.60	%				
L REQ=	191	FT				
L PRO.=	200	FT				
Q2=	6.98	CFS				
V2=	1.95	FT/S				
D2=	0.61	FT				
Q10=	8.94	CFS				
V10=	2.09	FT/S				
D10=	0.70	FT				
STA=	L	100100	TO	100300	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	2.10	AC				
SLOPE =	0.63	%				
L REQ=	210	FT				
L PRO.=	80	FT				
Q2=	7.68	CFS				
V2=	1.70	FT/S				
D2=	0.73	FT				
Q10=	9.83	CFS				
V10=	1.83	FT/S				
D10=	0.83	FT				
STA=	L	100300	TO	100380	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.43	AC				
SLOPE =	0.49	%				
L REQ=	43	FT				
L PRO.=	150	FT				
Q2=	1.39	CFS				
V2=	1.03	FT/S				
D2=	0.25	FT				
Q10=	1.78	CFS				
V10=	1.12	FT/S				
D10=	0.29	FT				
STA=	L1	100550	TO	100700	RT	

GRASS SWALE DATA						
DA =	3.34	AC				
SLOPE =	0.73	%				
L REQ=	334	FT				
L PRO.=	247	FT				
Q2=	10.68	CFS				
V2=	1.97	FT/S				
D2=	0.83	FT				
Q10=	13.68	CFS				
V10=	2.12	FT/S				
D10=	0.95	FT				
STA=	L1	100903	TO	101150	LT	

GRASS SWALE DATA						
DA =	4.70	AC				
SLOPE =	0.58	%				
L REQ=	470	FT				
L PRO.=	173	FT				
Q2=	12.89	CFS				
V2=	1.91	FT/S				
D2=	0.97	FT				
Q10=	16.50	CFS				
V10=	2.05	FT/S				
D10=	1.10	FT				
STA=	L1	101377	TO	101550	LT	

GRASS SWALE DATA						
DA =	2.11	AC				
SLOPE =	0.60	%				
L REQ=	211	FT				
L PRO.=	100	FT				
Q2=	6.75	CFS				
V2=	1.93	FT/S				
D2=	0.60	FT				
Q10=	8.64	CFS				
V10=	2.07	FT/S				
D10=	0.69	FT				
STA=	L1	101800	TO	101900	LT	

GRASS SWALE DATA						
DA =	0.54	AC				
SLOPE =	2.16	%				
L REQ=	54	FT				
L PRO.=	250	FT				
Q2=	1.97	CFS				
V2=	1.96	FT/S				
D2=	0.21	FT				
Q10=	2.53	CFS				
V10=	2.13	FT/S				
D10=	0.24	FT				
STA=	L1	101900	TO	102150	LT	

GRASS SWALE DATA						
DA =	0.88	AC				
SLOPE =	0.79	%				
L REQ=	88	FT				
L PRO.=	236	FT				
Q2=	2.82	CFS				
V2=	1.04	FT/S				
D2=	0.46	FT				
Q10=	3.60	CFS				
V10=	1.11	FT/S				
D10=	0.53	FT				
STA=	L1	101050	TO	101286	RT	

GRASS SWALE DATA						
DA =	0.75	AC				
SLOPE =	1.50	%				
L REQ=	75	FT				
L PRO.=	100	FT				
Q2=	2.40	CFS				
V2=	1.85	FT/S				
D2=	0.26	FT				
Q10=	3.07	CFS				
V10=	2.00	FT/S				
D10=	0.30	FT				
STA=	L1	101900	TO	102000	RT	

GRASS SWALE DATA						
DA =	0.56	AC				
SLOPE =	0.48	%				
L REQ=	56	FT				
L PRO.=	168	FT				
Q2=	1.79	CFS				
V2=	1.15	FT/S				
D2=	0.30	FT				
Q10=	2.29	CFS				
V10=	1.24	FT/S				
D10=	0.34	FT				
STA=	L1	102250	TO	102418	RT	

GRASS SWALE DATA						
DA =	0.98	AC				
SLOPE =	0.95	%				
L REQ=	98	FT				
L PRO.=	84	FT				
Q2=	3.13	CFS				
V2=	1.51	FT/S				
D2=	0.40	FT				
Q10=	4.00	CFS				
V10=	1.63	FT/S				
D10=	0.46	FT				
STA=	L1	102300	TO	102384	LT	

GRASS SWALE DATA						
DA =	5.25	AC				
SLOPE =	0.55	%				
L REQ=	525	FT				
L PRO.=	82	FT				
Q2=	14.40	CFS				
V2=	1.94	FT/S				
D2=	1.04	FT				
Q10=	18.43	CFS				
V10=	2.07	FT/S				
D10=	1.18	FT				
STA=	L1	102418	TO	102500	RT	

GRASS SWALE DATA						
DA =	2.67	AC				
SLOPE =	0.57	%				
L REQ=	267	FT				
L PRO.=	350	FT				
Q2=	8.54	CFS				
V2=	1.85	FT/S				
D2=	0.64	FT				
Q10=	10.93	CFS				
V10=	1.98	FT/S				
D10=	0.72	FT				
STA=	L1	102600	TO	102950	RT	

GRASS SWALE DATA						
DA =	1.78	AC				
SLOPE =	1.16	%				
L REQ=	178	FT				
L PRO.=	233	FT				
Q2=	5.69	CFS				
V2=	1.94	FT/S				
D2=	0.53	FT				
Q10=	7.29	CFS				
V10=	2.09	FT/S				
D10=	0.60	FT				
STA=	L1	103400	TO	103633	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	1.34	AC				
SLOPE =	0.88	%				
L REQ=	134	FT				
L PRO.=	271	FT				
Q2=	4.29	CFS				
V2=	1.92	FT/S				
D2=	0.42	FT				
Q10=	5.49	CFS				
V10=	2.08	FT/S				
D10=	0.48	FT				
STA=	Y23RPC	1429	TO	1700	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	12.02	AC				
SLOPE =	0.30	%				
L REQ=	1202	FT				
L PRO.=	100	FT				
Q2=	32.96	CFS				
V2=	1.94	FT/S				
D2=	1.81	FT				
Q10=	42.19	CFS				
V10=	2.06	FT/S				
D10=	2.03	FT				
STA=	Y23RPC	1700	TO	1800	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	8.45	AC				
SLOPE =	0.30	%				
L REQ=	845	FT				
L PRO.=	100	FT				
Q2=	23.17	CFS				
V2=	1.96	FT/S				
D2=	1.24	FT				
Q10=	29.66	CFS				
V10=	2.09	FT/S				
D10=	1.39	FT				
STA=	Y23RPC	1800	TO	1900	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.28	AC				
SLOPE =	0.62	%				
L REQ=	28	FT				
L PRO.=	103	FT				
Q2=	1.02	CFS				
V2=	1.05	FT/S				
D2=	0.21	FT				
Q10=	1.31	CFS				
V10=	1.14	FT/S				
D10=	0.24	FT				
STA=	Y23RPB	1608.27	TO	1711.67	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.35	AC				
SLOPE =	3.53	%				
L REQ=	35	FT				
L PRO.=	85	FT				
Q2=	0.96	CFS				
V2=	1.82	FT/S				
D2=	0.12	FT				
Q10=	1.23	CFS				
V10=	1.98	FT/S				
D10=	0.14	FT				
STA=	Y23J	1400	TO	1485	LT	

GRASS SWALE DATA						
DA =	1.00	AC				
SLOPE =	1.13	%				
L REQ=	100	FT				
L PRO.=	265	FT				
Q2=	2.74	CFS				
V2=	1.78	FT/S				
D2=	0.30	FT				
Q10=	3.51	CFS				
V10=	1.93	FT/S				
D10=	0.35	FT				
STA=	Y23DR	2985	TO	3250	LT	

GRASS SWALE DATA						
DA =	0.60	AC				
SLOPE =	3.00	%				
L REQ=	60	FT				
L PRO.=	100	FT				
Q2=	1.37	CFS				
V2=	1.96	FT/S				
D2=	0.15	FT				
Q10=	1.76	CFS				
V10=	2.13	FT/S				
D10=	0.18	FT				
STA=	Y23DR	3600	TO	3700	LT	

GRASS SWALE DATA						
DA =	3.55	AC				
SLOPE =	0.47	%				
L REQ=	355	FT				
L PRO.=	95	FT				
Q2=	13.47	CFS				
V2=	1.80	FT/S				
D2=	1.05	FT				
Q10=	17.24	CFS				
V10=	1.93	FT/S				
D10=	1.18	FT				
STA=	Y23R	6000	TO	6095	RT	

GRASS SWALE DATA						
DA =	1.80	AC				
SLOPE =	0.95	%				
L REQ=	180	FT				
L PRO.=	105	FT				
Q2=	5.35	CFS				
V2=	1.78	FT/S				
D2=	0.54	FT				
Q10=	6.84	CFS				
V10=	1.91	FT/S				
D10=	0.61	FT				
STA=	Y23R	6095	TO	6200	RT	

GRASS SWALE DATA						
DA =	1.82	AC				
SLOPE =	1.00	%				
L REQ=	182	FT				
L PRO.=	90	FT				
Q2=	5.41	CFS				
V2=	1.81	FT/S				
D2=	0.53	FT				
Q10=	6.92	CFS				
V10=	1.95	FT/S				
D10=	0.61	FT				
STA=	Y23FR	1025	TO	1115	LT	

GRASS SWALE DATA						
DA =	1.70	AC				
SLOPE =	0.50	%				
L REQ=	170	FT				
L PRO.=	120	FT				
Q2=	5.05	CFS				
V2=	1.62	FT/S				
D2=	0.53	FT				
Q10=	6.46	CFS				
V10=	1.74	FT/S				
D10=	0.61	FT				
STA=	Y23AR	1330	TO	1450	RT	

GRASS SWALE DATA						
DA =	0.35	AC				
SLOPE =	3.90	%				
L REQ=	35	FT				
L PRO.=	71	FT				
Q2=	0.80	CFS				
V2=	1.96	FT/S				
D2=	0.34	FT				
Q10=	1.02	CFS				
V10=	2.15	FT/S				
D10=	0.40	FT				
STA=	Y23FR	1169	TO	1240	RT	

GRASS SWALE DATA						
DA =	0.50	AC				
SLOPE =	3.96	%				
L REQ=	50	FT				
L PRO.=	156	FT				
Q2=	1.26	CFS				
V2=	1.78	FT/S				
D2=	0.16	FT				
Q10=	1.61	CFS				
V10=	1.95	FT/S				
D10=	0.18	FT				
STA=	Y23FR	1194	TO	1350	LT	

GRASS SWALE DATA						
DA =	1.42	AC				
SLOPE =	1.31	%				
L REQ=	142	FT				
L PRO.=	445	FT				
Q2=	2.60	CFS				
V2=	1.84	FT/S				
D2=	0.28	FT				
Q10=	3.32	CFS				
V10=	1.99	FT/S				
D10=	0.32	FT				
STA=	Y23RPB	1805	TO	2250	RT	

GRASS SWALE DATA						
DA =	2.32	AC				
SLOPE =	0.98	%				
L REQ=	232	FT				
L PRO.=	143	FT				
Q2=	5.83	CFS				
V2=	1.84	FT/S				
D2=	0.56	FT				
Q10=	7.46	CFS				
V10=	1.98	FT/S				
D10=	0.64	FT				
STA=	Y23RPB	2350	TO	-	RT	

GRASS SWALE DATA						
DA =	2.52	AC				
SLOPE =	0.41	%				
L REQ=	252	FT				
L PRO.=	162	FT				
Q2=	6.91	CFS				
V2=	1.42	FT/S				
D2=	0.77	FT				
Q10=	8.85	CFS				
V10=	1.53	FT/S				
D10=	0.87	FT				
STA=	Y23R	3900	TO	4062	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	2.31	AC				
SLOPE =	0.53	%				
L REQ=	231	FT				
L PRO.=	38	FT				
Q2=	9.50	CFS				
V2=	1.70	FT/S				
D2=	0.85	FT				
Q10=	12.16	CFS				
V10=	1.82	FT/S				
D10=	0.97	FT				
STA=	Y23R	4062	TO	4100	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	1.60	AC				
SLOPE =	0.47	%				
L REQ=	160	FT				
L PRO.=	150	FT				
Q2=	4.75	CFS				
V2=	1.52	FT/S				
D2=	0.52	FT				
Q10=	6.08	CFS				
V10=	1.63	FT/S				
D10=	0.59	FT				
STA=	L1	105450	TO	105600	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	2.10	AC				
SLOPE =	0.90	%				
L REQ=	210	FT				
L PRO.=	100	FT				
Q2=	4.74	CFS				
V2=	2.44	FT/S				
D2=	0.70	FT				
Q10=	6.24	CFS				
V10=	1.82	FT/S				
D10=	0.59	FT				
STA=	L1	105600	TO	-	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	3.10	AC				
SLOPE =	0.31	%				
L REQ=	310	FT				
L PRO.=	350	FT				
Q2=	8.50	CFS				
V2=	1.60	FT/S				
D2=	0.79	FT				
Q10=	10.88	CFS				
V10=	1.71	FT/S				
D10=	0.89	FT				
STA=	Y23RPC	2000	TO	2350	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.50	AC				
SLOPE =	3.10	%				
L REQ=	50	FT				
L PRO.=	145	FT				
Q2=	0.91	CFS				
V2=	1.71	FT/S				
D2=	0.12	FT				
Q10=	1.17	CFS				
V10=	1.87	FT/S				
D10=	0.14	FT				
STA=	Y23LPC	1400	TO	1545	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	1.60	AC				
SLOPE =	0.76	%				
L REQ=	160	FT				
L PRO.=	500	FT				
Q2=	4.39	CFS				
V2=	1.58	FT/S				
D2=	0.49	FT				
Q10=	5.62	CFS				
V10=	1.94	FT/S				
D10=	0.50	FT				
STA=	Y23RPC	1900	TO	2400	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.15	AC				
SLOPE =	3.90	%				
L REQ=	15	FT				
L PRO.=	50	FT				
Q2=	0.31	CFS				
V2=	1.23	FT/S				
D2=	0.06	FT				
Q10=	0.39	CFS				
V10=	1.35	FT/S				
D10=	0.07	FT				
STA=	Y23R	1850	TO	1900	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	1.10	AC				
SLOPE =	1.52	%				
L REQ=	110	FT				
L PRO.=	400	FT				
Q2=	2.26	CFS				
V2=	1.59	FT/S				
D2=	0.29	FT				
Q10=	2.90	CFS				
V10=	1.72	FT/S				
D10=	0.34	FT				
STA=	Y23R	1900	TO	2300	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	1.30	AC				
SLOPE =	0.93	%				
L REQ=	130	FT				
L PRO.=	200	FT				
Q2=	3.56	CFS				
V2=	1.81	FT/S				
D2=	0.37	FT				
Q10=	4.56	CFS				
V10=	1.95	FT/S				
D10=	0.43	FT				
STA=	Y23DR	2100	TO	2300	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	2.00	AC				
SLOPE =	1.03	%				
L REQ=	200	FT				
L PRO.=	350	FT				
Q2=	5.94	CFS				
V2=	1.88	FT/S				
D2=	0.56	FT				
Q10=	7.61	CFS				
V10=	2.02	FT/S				
D10=	0.64	FT				
STA=	Y23R	4950	TO	5300	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.65	AC				
SLOPE =	1.10	%				
L REQ=	65	FT				
L PRO.=	300	FT				
Q2=	1.49	CFS				
V2=	1.41	FT/S				
D2=	0.21	FT				
Q10=	1.90	CFS				
V10=	1.57	FT/S				
D10=	0.25	FT				
STA=	Y23BR	1850	TO	2150	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	1.00	AC				
SLOPE =	0.90	%				
L REQ=	100	FT				
L PRO.=	100	FT				
Q2=	2.29	CFS				
V2=	1.34	FT/S				
D2=	0.34	FT				
Q10=	2.93	CFS				
V10=	1.45	FT/S				
D10=	0.39	FT				
STA=	Y23BR	2150	TO	2250	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.65	AC				
SLOPE =	1.60	%				
L REQ=	65	FT				
L PRO.=	200	FT				
Q2=	2.08	CFS				
V2=	1.83	FT/S				
D2=	0.24	FT				
Q10=	2.66	CFS				
V10=	1.99	FT/S				
D10=	0.27	FT				
STA=	Y23CR	2050	TO	2250	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.75	AC				
SLOPE =	2.15	%				
L REQ=	75	FT				
L PRO.=	65	FT				
Q2=	2.40	CFS				
V2=	1.82	FT/S				
D2=	0.27	FT				
Q10=	3.07	CFS				
V10=	1.98	FT/S				
D10=	0.31	FT				
STA=	Y23CR	2250	TO	2315	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.70	AC				
SLOPE =	3.31	%				
L REQ=	70	FT				
L PRO.=	160	FT				
Q2=	1.60	CFS				
V2=	1.83	FT/S				
D2=	0.19	FT				
Q10=	2.05	CFS				
V10=	1.99	FT/S				
D10=	0.22	FT				
STA=	Y23BR	2340	TO	2500	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.80	AC				
SLOPE =	0.60	%				
L REQ=	80	FT				
L PRO.=	50	FT				
Q2=	2.01	CFS				
V2=	1.12	FT/S				
D2=	0.36	FT				
Q10=	2.57	CFS				
V10=	1.21	FT/S				
D10=	0.41	FT				
STA=	Y23BR	2500	TO	2550	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	6.61	AC				
SLOPE =	0.60	%				
L REQ=	661	FT				
L PRO.=	114	FT				
Q2=	18.43	CFS				
V2=	1.98	FT/S				
D2=	1.22	FT				
Q10=	23.59	CFS				
V10=	2.28	FT/S				
D10=	1.31	FT				
STA=	L1	108506	TO	108620	LT	

GRASS SWALE DATA						
DA =	8.28	AC				
SLOPE =	0.35	%				
L REQ=	828	FT				
L PRO.=	229	FT				
Q2=	22.70	CFS				
V2=	1.86	FT/S				
D2=	1.46	FT				
Q10=	29.06	CFS				
V10=	1.98	FT/S				
D10=	1.64	FT				
STA=	L1	108471	TO	108700	RT	

GRASS SWALE DATA						
DA =	4.41	AC				
SLOPE =	0.50	%				
L REQ=	441	FT				
L PRO.=	400	FT				
Q2=	14.11	CFS				
V2=	1.86	FT/S				
D2=	1.06	FT				
Q10=	18.06	CFS				
V10=	1.99	FT/S				
D10=	1.20	FT				
STA=	L1	108950	TO	109350	RT	

GRASS SWALE DATA						
DA =	10.03	AC				
SLOPE =	0.32	%				
L REQ=	1003	FT				
L PRO.=	308	FT				
Q2=	34.38	CFS				
V2=	1.93	FT/S				
D2=	1.44	FT				
Q10=	41.07	CFS				
V10=	2.04	FT/S				
D10=	1.58	FT				
STA=	L1	108692	TO	109000	LT	

GRASS SWALE DATA						
DA =	3.37	AC				
SLOPE =	0.35	%				
L REQ=	337	FT				
L PRO.=	200	FT				
Q2=	13.09	CFS				
V2=	1.60	FT/S				
D2=	1.11	FT				
Q10=	16.76	CFS				
V10=	1.71	FT/S				
D10=	1.26	FT				
STA=	L1	109000	TO	109200	LT	

GRASS SWALE DATA						
DA =	0.67	AC				
SLOPE =	1.34	%				
L REQ=	67	FT				
L PRO.=	100	FT				
Q2=	2.14	CFS				
V2=	1.77	FT/S				
D2=	0.25	FT				
Q10=	2.74	CFS				
V10=	1.92	FT/S				
D10=	0.29	FT				
STA=	Y23DR	4443.15	TO	4543.15	RT	

GRASS SWALE DATA						
DA =	2.25	AC				
SLOPE =	0.48	%				
L REQ=	225	FT				
L PRO.=	200	FT				
Q2=	7.71	CFS				
V2=	1.85	FT/S				
D2=	0.69	FT				
Q10=	9.87	CFS				
V10=	1.99	FT/S				
D10=	0.78	FT				
STA=	L1	105850	TO	106050	LT	

GRASS SWALE DATA						
DA =	5.17	AC				
SLOPE =	0.30	%				
L REQ=	517	FT				
L PRO.=	50	FT				
Q2=	14.18	CFS				
V2=	1.86	FT/S				
D2=	1.06	FT				
Q10=	18.15	CFS				
V10=	1.99	FT/S				
D10=	1.20	FT				
STA=	L1	106050	TO	106100

Submitted September 17, 2024

SECTION 2 – SWALE DATA

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	SWALE DATA

BUFFER DRAWING SHEET 9 OF 36

GRASS SWALE DATA						
DA =	0.60	AC				
SLOPE =	1.39	%				
L REQ=	60	FT				
L PRO.=	216	FT				
Q2=	2.33	CFS				
V2=	1.56	FT/S				
D2=	0.30	FT				
Q10=	2.98	CFS				
V10=	1.69	FT/S				
D10=	0.35	FT				
STA=	L1	109400	TO	109615.6	LT	

GRASS SWALE DATA						
DA =	0.47	AC				
SLOPE =	0.81	%				
L REQ=	47	FT				
L PRO.=	184	FT				
Q2=	1.72	CFS				
V2=	1.18	FT/S				
D2=	0.30	FT				
Q10=	2.20	CFS				
V10=	1.28	FT/S				
D10=	0.34	FT				
STA=	L1	109615.6	TO	109800	LT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.83	AC				
SLOPE =	0.50	%				
L REQ=	83	FT				
L PRO.=	150	FT				
Q2=	2.66	CFS				
V2=	1.48	FT/S				
D2=	0.35	FT				
Q10=	3.40	CFS				
V10=	1.47	FT/S				
D10=	0.44	FT				
STA=	L1	109700	TO	109850	RT	

GRASS SWALE DATA						
DA =	0.91	AC				
SLOPE =	1.61	%				
L REQ=	91	FT				
L PRO.=	33	FT				
Q2=	3.33	CFS				
V2=	1.89	FT/S				
D2=	0.38	FT				
Q10=	3.73	CFS				
V10=	1.96	FT/S				
D10=	0.40	FT				
STA=	L1	109850	TO	109883	RT	

GRASS SWALE DATA						
DA =	2.17	AC				
SLOPE =	0.41	%				
L REQ=	217	FT				
L PRO.=	17	FT				
Q2=	7.93	CFS				
V2=	1.41	FT/S				
D2=	0.75	FT				
Q10=	10.16	CFS				
V10=	1.58	FT/S				
D10=	0.94	FT				
STA=	L1	109900	TO	109917	RT	

GRASS SWALE DATA						
DA =	2.02	AC				
SLOPE =	0.42	%				
L REQ=	202	FT				
L PRO.=	83	FT				
Q2=	7.39	CFS				
V2=	1.47	FT/S				
D2=	0.67	FT				
Q10=	9.45	CFS				
V10=	1.44	FT/S				
D10=	0.77	FT				
STA=	L1	109917	TO	110000	RT	

GRASS SWALE DATA						
DA =	0.60	AC				
SLOPE =	1.56	%				
L REQ=	60	FT				
L PRO.=	50	FT				
Q2=	2.06	CFS				
V2=	1.84	FT/S				
D2=	0.24	FT				
Q10=	2.63	CFS				
V10=	2.00	FT/S				
D10=	0.27	FT				
STA=	L1	110100	TO	110150	RT	

GRASS SWALE DATA						
DA =	4.91	AC				
SLOPE =	0.35	%				
L REQ=	491	FT				
L PRO.=	26	FT				
Q2=	16.83	CFS				
V2=	1.71	FT/S				
D2=	1.26	FT				
Q10=	21.54	CFS				
V10=	1.82	FT/S				
D10=	1.43	FT				
STA=	L1	111300	TO	111326	RT	

*TREATMENT PROVIDED IS ADDITIONAL & TO A NON-BUFFERED AREA

GRASS SWALE DATA						
DA =	0.98	AC				
SLOPE =	1.47	%				
L REQ=	98	FT				
L PRO.=	15	FT				
Q2=	3.58	CFS				
V2=	1.82	FT/S				
D2=	0.38	FT				
Q10=	4.59	CFS				
V10=	1.97	FT/S				
D10=	0.44	FT				
STA=	L1	111885	TO	111900	RT	

GRASS SWALE DATA						
DA =	0.92	AC				
SLOPE =	1.48	%				
L REQ=	92	FT				
L PRO.=	275	FT				
Q2=	3.36	CFS				
V2=	1.79	FT/S				
D2=	0.37	FT				
Q10=	4.31	CFS				
V10=	1.94	FT/S				
D10=	0.42	FT				
STA=	L1	111900	TO	112175	RT	

GRASS SWALE DATA						
DA =	2.10	AC				
SLOPE =	0.55	%				
L REQ=	210	FT				
L PRO.=	275	FT				
Q2=	7.68	CFS				
V2=	1.62	FT/S				
D2=	0.76	FT				
Q10=	9.83	CFS				
V10=	1.74	FT/S				
D10=	0.86	FT				
STA=	L1	112175	TO	112450	RT	

GRASS SWALE DATA						
DA =	0.70	AC				
SLOPE =	1.47	%				
L REQ=	70	FT				
L PRO.=	300	FT				
Q2=	2.56	CFS				
V2=	1.64	FT/S				
D2=	0.32	FT				
Q10=	3.28	CFS				
V10=	1.77	FT/S				
D10=	0.36	FT				
STA=	Y24RPC	2150	TO	2450	RT	

GRASS SWALE DATA						
DA =	3.00	AC				
SLOPE =	0.83	%				
L REQ=	300	FT				
L PRO.=	120	FT				
Q2=	7.54	CFS				
V2=	1.88	FT/S				
D2=	0.67	FT				
Q10=	9.65	CFS				
V10=	2.01	FT/S				
D10=	0.76	FT				
STA=	Y24RPDR	1160.23	TO	1280	LT	

GRASS SWALE DATA						
DA =	0.83	AC				
SLOPE =	2.00	%				
L REQ=	83	FT				
L PRO.=	100	FT				
Q2=	2.28	CFS				
V2=	1.75	FT/S				
D2=	0.27	FT				
Q10=	2.91	CFS				
V10=	1.89	FT/S				
D10=	0.31	FT				
STA=	L1	116450	TO	116550	RT	

GRASS SWALE DATA						
DA =	1.84	AC				
SLOPE =	1.15	%				
L REQ=	184	FT				
L PRO.=	100	FT				
Q2=	5.05	CFS				
V2=	1.86	FT/S				
D2=	0.49	FT				
Q10=	6.46	CFS				
V10=	2.01	FT/S				
D10=	0.57	FT				
STA=	L1	116850	TO	116950	LT	

GRASS SWALE DATA						
DA =	12.10	AC				
SLOPE =	0.32	%				
L REQ=	1210	FT				
L PRO.=	250	FT				
Q2=	33.18	CFS				
V2=	1.99	FT/S				
D2=	1.79	FT				
Q10=	42.47	CFS				
V10=	2.12	FT/S				
D10=	2.00	FT				
STA=	L1	116750	TO	117000	RT	

GRASS SWALE DATA						
DA =	2.52	AC				
SLOPE =	0.74	%				
L REQ=	252	FT				
L PRO.=	188	FT				
Q2=	6.91	CFS				
V2=	2.00	FT/S				
D2=	0.55	FT				
Q10=	8.85	CFS				
V10=	2.15	FT/S				
D10=	0.63	FT				
STA=	Y24RPC	2450	TO	2638	RT	

GRASS SWALE DATA						
DA =	10.88	AC				
SLOPE =	0.31	%				
L REQ=	1088	FT				
L PRO.=	262	FT				
Q2=	23.45	CFS				
V2=	2.02	FT/S				
D2=	1.27	FT				
Q10=	30.41	CFS				
V10=	2.17	FT/S				
D10=	1.44	FT				
STA=	Y24RPC	2638	TO	2900	RT	

GRASS SWALE DATA						
DA =	0.75	AC				
SLOPE =	1.00	%				
L REQ=	75	FT				
L PRO.=	100	FT				
Q2=	2.40	CFS				
V2=	1.41	FT/S				
D2=	0.34	FT				
Q10=	3.07	CFS				
V10=	1.52	FT/S				
D10=	0.39	FT				
STA=	L1	113600	TO	113700	RT	

GRASS SWALE DATA						
DA =	3.25	AC				
SLOPE =	0.80	%				
L REQ=	325	FT				
L PRO.=	100	FT				
Q2=	8.91	CFS				
V2=	1.94	FT/S				
D2=	0.74	FT				
Q10=	11.41	CFS				
V10=	2.08	FT/S				
D10=	0.84	FT				
STA=	Y24RPBR	2950	TO	3050	LT	

GRASS SWALE DATA						
DA =	3.25	AC				
SLOPE =	0.80	%				
L REQ=	325	FT				
L PRO.=	150	FT				
Q2=	8.91	CFS				
V2=	1.94	FT/S				
D2=	0.74	FT				
Q10=	11.41	CFS				
V10=	2.08	FT/S				
D10=	0.84	FT				
STA=	Y24RPBR	3050	TO	3200	LT	

GRASS SWALE DATA						
DA =	3.07	AC				
SLOPE =	0.64	%				
L REQ=	307	FT				
L PRO.=	117	FT				
Q2=	9.82	CFS				
V2=	1.84	FT/S				
D2=	0.82	FT				
Q10=	12.57	CFS				
V10=	1.97	FT/S				
D10=	0.94	FT				
STA=	Y24R	1800	TO	1917	LT	

GRASS SWALE DATA						
DA =	6.21	AC				
SLOPE =	0.36	%				
L REQ=	621	FT				
L PRO.=	111	FT				
Q2=	19.87	CFS				
V2=	1.81	FT/S				
D2=	1.36	FT				
Q10=	25.43	CFS				
V10=	1.94	FT/S				
D10=	1.53	FT				
STA=	Y24R	1900	TO	2011	RT	

GRASS SWALE DATA						
DA =	1.00	AC				
SLOPE =	1.40	%				
L REQ=	100	FT				
L PRO.=	50	FT				
Q2=	3.20	CFS				
V2=	1.98	FT/S				
D2=	0.31	FT				
Q10=	4.10	CFS				
V10=	2.14	FT/S				
D10=	0.35	FT				
STA=	Y24A	1951	TO	2001	LT	

GRASS SWALE DATA						
DA =	1.04	AC				
SLOPE =	2.02	%				
L REQ=	104	FT				
L PRO.=	49	FT				
Q2=	3.33	CFS				
V2=	1.99	FT/S				
D2=	0.33	FT				
Q10=	4.26	CFS				
V10=	2.15	FT/S				
D10=	0.38	FT				
STA=	Y24A	2001.06	TO	2050.45	LT	

GRASS SWALE DATA						
DA =	2.14	AC				
SLOPE =	0.60	%				
L REQ=	214	FT				
L PRO.=	149	FT				
Q2=	6.85	CFS				
V2=	1.94	FT/S				
D2=	0.61	FT				
Q10=	8.76	CFS				
V10=	2.09	FT/S				
D10=	0.69	FT				
STA=	Y24R	3250	TO	3399.34	RT	

GRASS SWALE DATA						
DA =	3.20	AC				
SLOPE =	0.68	%				
L REQ=	320	FT				
L PRO.=	69	FT				
Q2=	10.24	CFS				
V2=	1.90	FT/S				
D2=	0.83	FT				
Q10=	13.10	CFS				
V10=	2.04	FT/S				
D10=	0.94	FT				
STA=	Y24R	3399.34	TO	3468.33	RT	

GRASS SWALE DATA						
DA =	2.00	AC				
SLOPE =	1.30	%				
L REQ=	200	FT				
L PRO.=	90	FT				
Q2=	5.48	CFS				
V2=	1.99	FT/S				
D2=	0.50	FT				
Q10=	7.02	CFS				
V10=	2.15	FT/S				
D10=	0.57	FT				
STA=	L1	117910	TO	118000	RT	

GRASS SWALE DATA						
DA =	1.79	AC				
SLOPE =	0.92	%				
L REQ=	179	FT				
L PRO.=	50	FT				
Q2=	4.89	CFS				
V2=	1.91	FT/S				
D2=	0.43	FT				
Q10=	6.27	CFS				
V10=	2.06	FT/S				
D10=	0.49	FT				
STA=	L1	118000	TO	118050	RT	

GRASS SWALE DATA						
DA =	1.71	AC				
SLOPE =	1.07	%				
L REQ=	171	FT				
L PRO.=	100	FT				
Q2=	4.69	CFS				
V2=	1.99	FT/S				
D2=	0.40	FT				
Q10=	6.00	CFS				
V10=	2.14	FT/S				
D10=	0.46	FT				
STA=	L1	118050	TO	118150	RT	

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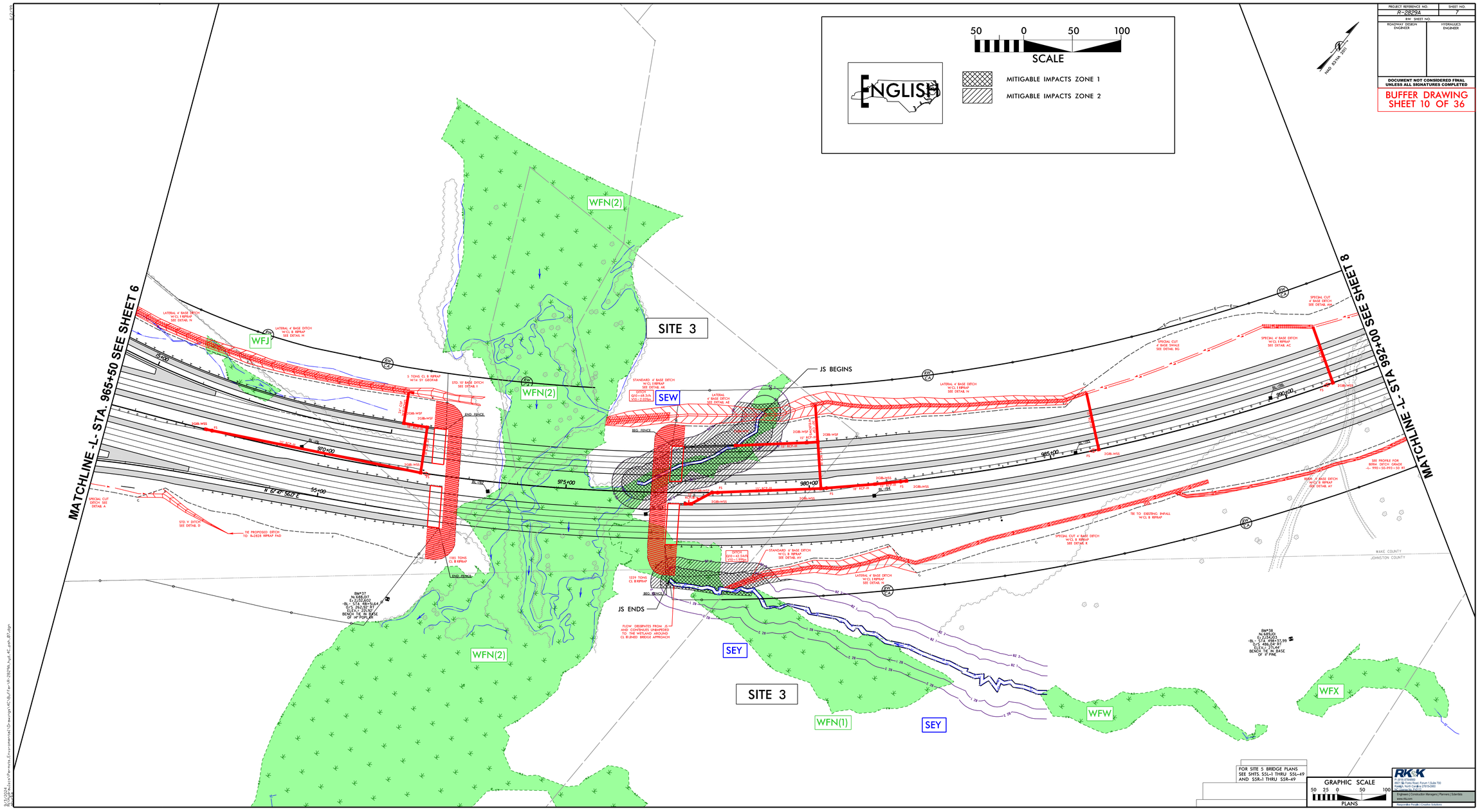
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ENGLISH
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
NAD 83/NSRS 2011
PROJECT REFERENCE NO.
R-2829A
SHEET NO.
7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
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BUFFER DRAWING SHEET 10 OF 36
MATCHLINE -L- STA. 965+50 SEE SHEET 6
MATCHLINE -L- STA 992+00 SEE SHEET 8
SITE 3
WFN(2)
WFJ
SEW
SEY
WFN(1)
WFW
WFX
JS BEGINS
JS ENDS
N 67° 41' 56.0" E
970+00
975+00
980+00
985+00
990+00
55+00
BEG. FENCE
END. FENCE
STD. 10' BASE DITCH SEE DETAIL I
STANDARD 4' BASE DITCH W/CL I RIPRAP SEE DETAIL AA
LATERAL 4' BASE DITCH SEE DETAIL AA
LATERAL 4' BASE DITCH W/CL I RIPRAP SEE DETAIL N
LATERAL 4' BASE DITCH W/CL II RIPRAP SEE DETAIL H
SPECIAL CUT 4' BASE DITCH SEE DETAIL AM
SPECIAL CUT 4' BASE SHALE SEE DETAIL BG
SPECIAL 4' BASE DITCH W/CL I RIPRAP SEE DETAIL AC
SPECIAL CUT 4' BASE DITCH SEE DETAIL AN
SEE PROFILE FOR BERM DITCH CHECK
SPECIAL CUT 4' BASE DITCH W/CL II RIPRAP SEE DETAIL K
TIE TO EXISTING RIPRAP W/CL II RIPRAP
SPECIAL CUT A
STD. V DITCH SEE DETAIL D
TIE PROPOSED DITCH TO R-2829A RIPRAP PAD
5 TONS CL II RIPRAP W/14 SY GEOFAB
1229 TONS CL II RIPRAP
FLOW DISSIPATES FROM JS AND CONTINUES UNIMPEDED TO THE WETLAND AROUND CL BLENDED BRIDGE APPROACH
WAKE COUNTY
JOHNSTON COUNTY
FOR SITE 5 BRIDGE PLANS SEE SHTS. SSL-1 THRU SSL-49 AND SSR-1 THRU SSR-49
GRAPHIC SCALE
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PLANS
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50 0 50 100
SCALE

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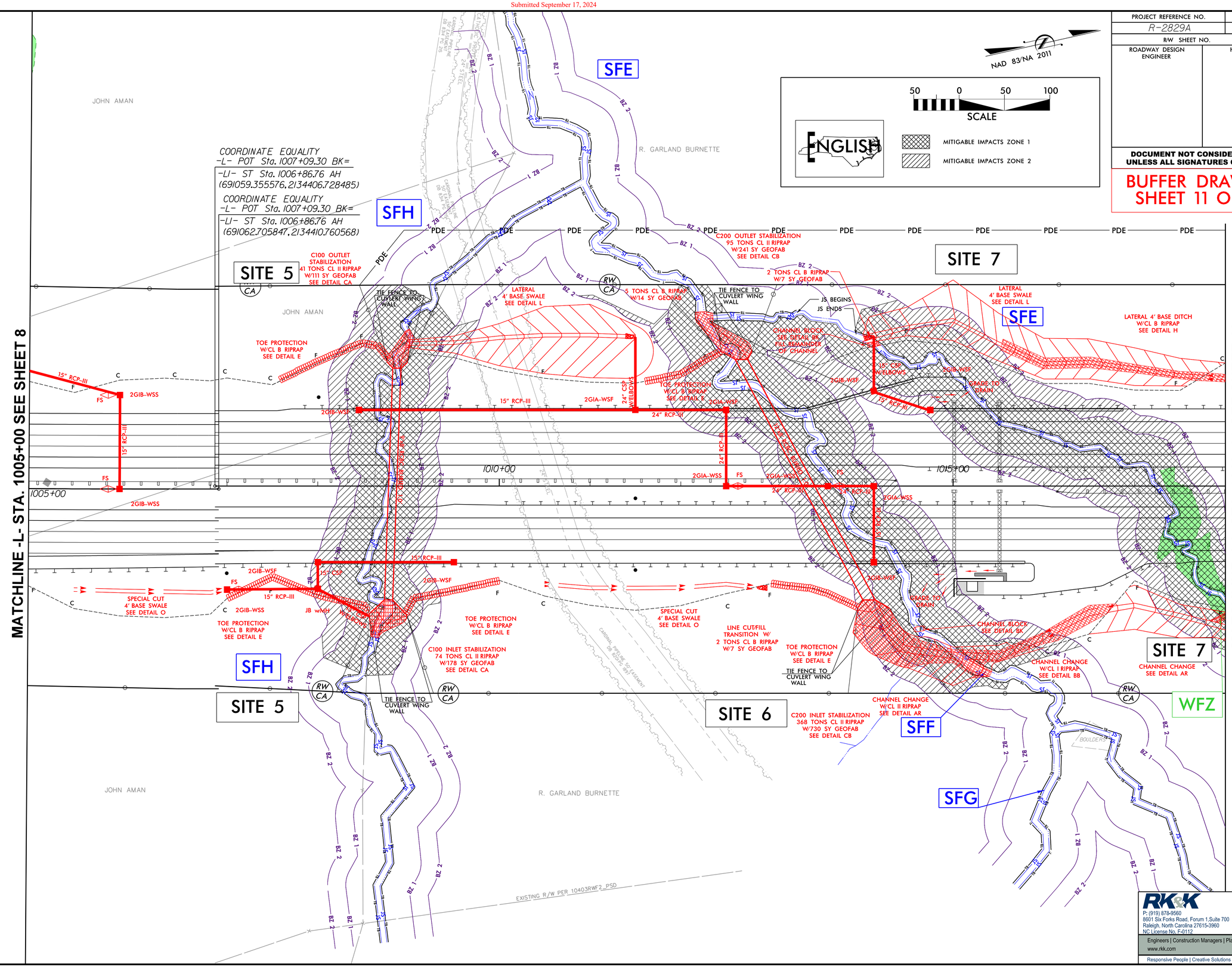
MITIGABLE IMPACTS ZONE 2



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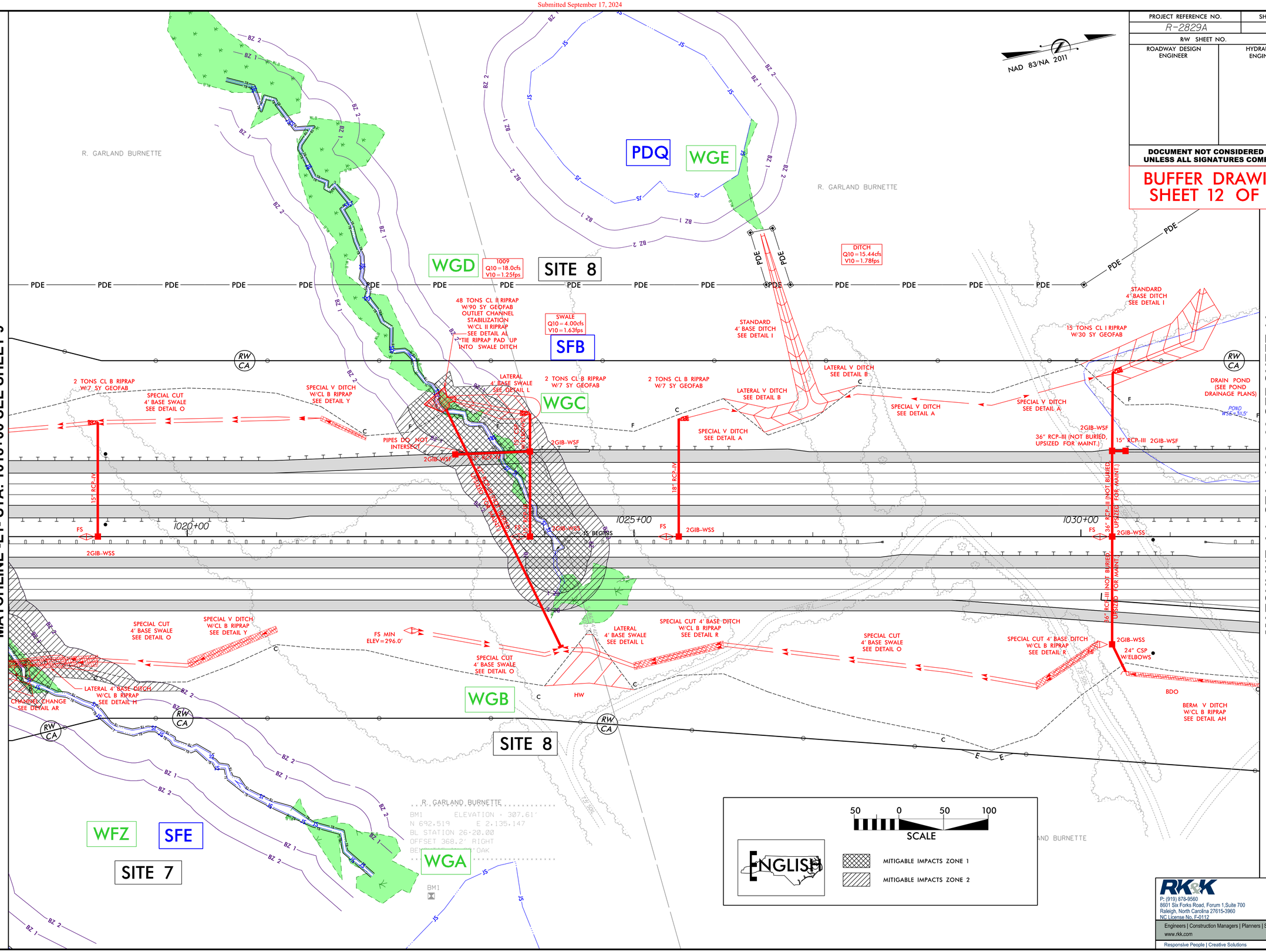

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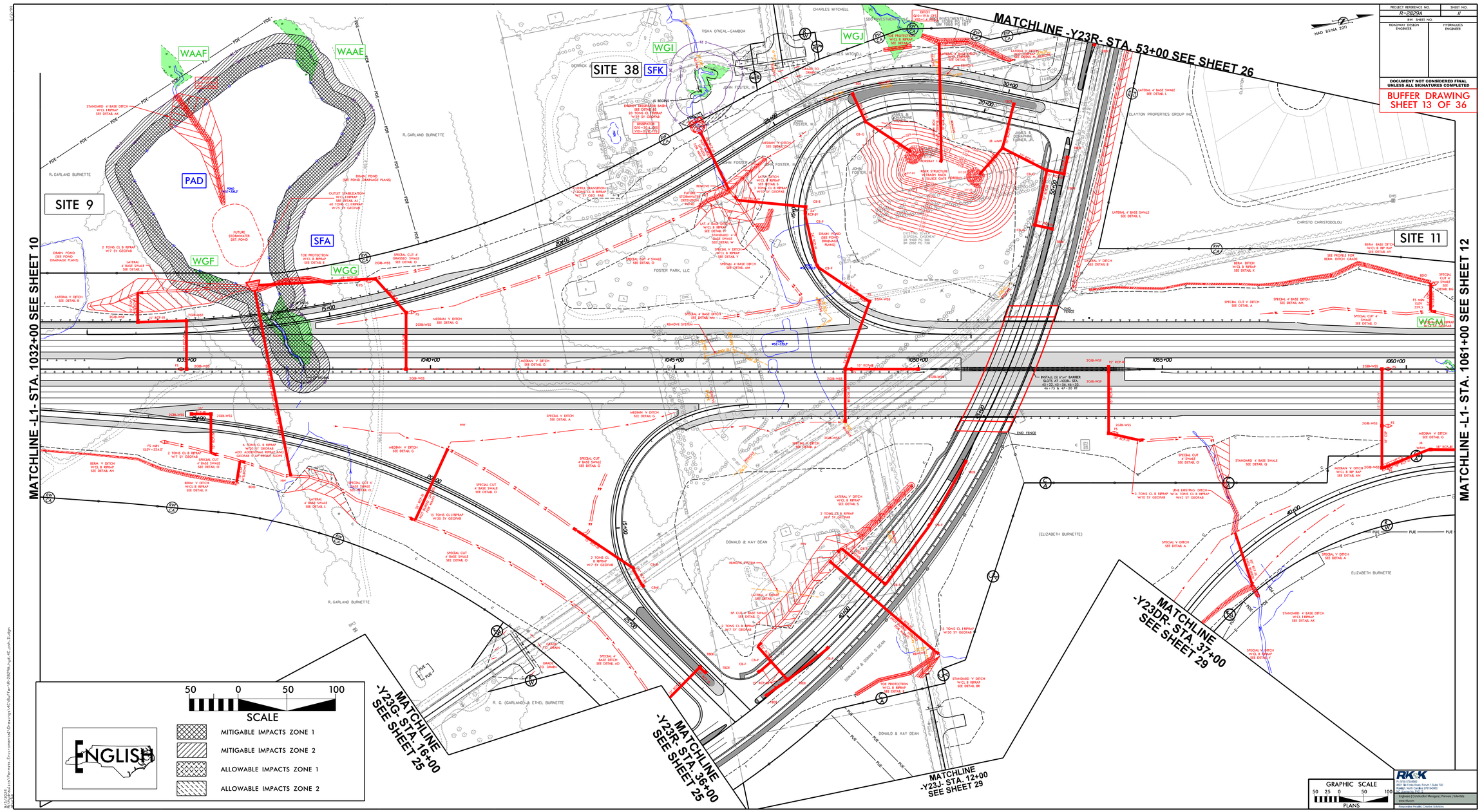

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R/W SHEET NO.	
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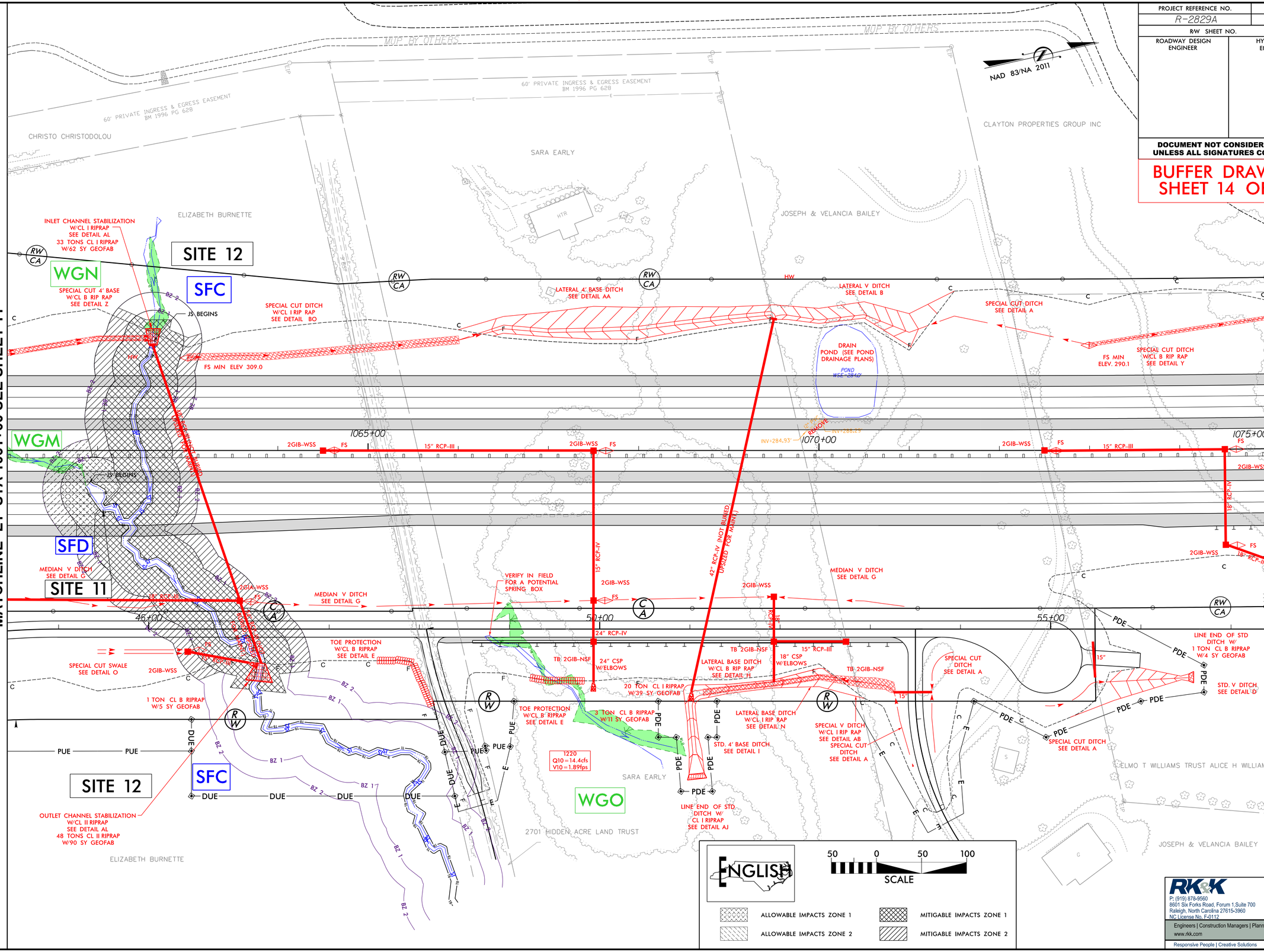

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R/W SHEET NO.	
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SCALE 50 0 50 100

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ALLOWABLE IMPACTS ZONE 2

NAD 83/NA 2011

CLAYTON PROPERTIES GROUP INC

SITE 14

MATCHLINE -L1- STA. 1075+00 SEE SHEET 12

MATCHLINE -L1- STA. 1089+00 SEE SHEET 14

SPECIAL V DITCH W/CL B RIP RAP SEE DETAIL Y

LATERAL 4' BASE DITCH SEE DETAIL AA

SPECIAL 4' BASE DITCH W/CL B RIP RAP SEE DETAIL Z

LATERAL 4' BASE DITCH W/CL B RIP RAP SEE DETAIL AS

SP. CUT DITCH W/CL I RIP RAP SEE DETAIL AB

LINE END OF SWALE W/CL I RIPRAP SEE DETAIL AJ & AQ

SPECIAL CUT DITCH W/CL I RIP RAP SEE DETAIL AB

STD. 4' BASE SWALE SEE DETAIL Q

LINE END OF SWALE W/CL I RIPRAP SEE DETAIL AJ & AQ

STD. 8' BASE SWALE SEE DETAIL AP

SFV

PDE

RW CA

N 38°12'58.2"W

N 17°36'33.5"W

N 80°45'20.6"W

N 80°25'12.6"W

1075+00

1080+00

1085+00

1090+00

FS MIN ELEV = 235.5

HW

36" RCP-IV INSET BURIED

END FENCE

BEG FENCE

15 TON CL I RIPRAP W/30 SY GEOFAB

15" CSP W/ELBOWS

2GIB-WSF

2GIB-WSS

15" RCP-IV

15" RCP-III

776 TONS CL II RIPRAP

1 TON CL B RIPRAP W/5 SY GEOFAB

GRADE TO DRAIN

LINE END OF SWALE W/CL I RIPRAP SEE DETAIL AJ & AQ

STD. 4' SWALE SEE DETAIL Q

LATERAL 4' BASE DITCH W/CL B RIP RAP SEE DETAIL H

WHITEOAK CREEK

ELMO T WILLIAMS TRUST ALICE H WILLIAMS

BM6

CAPITAL CITIES COMMUNICATIONS, INC.

WGP

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R-2829A	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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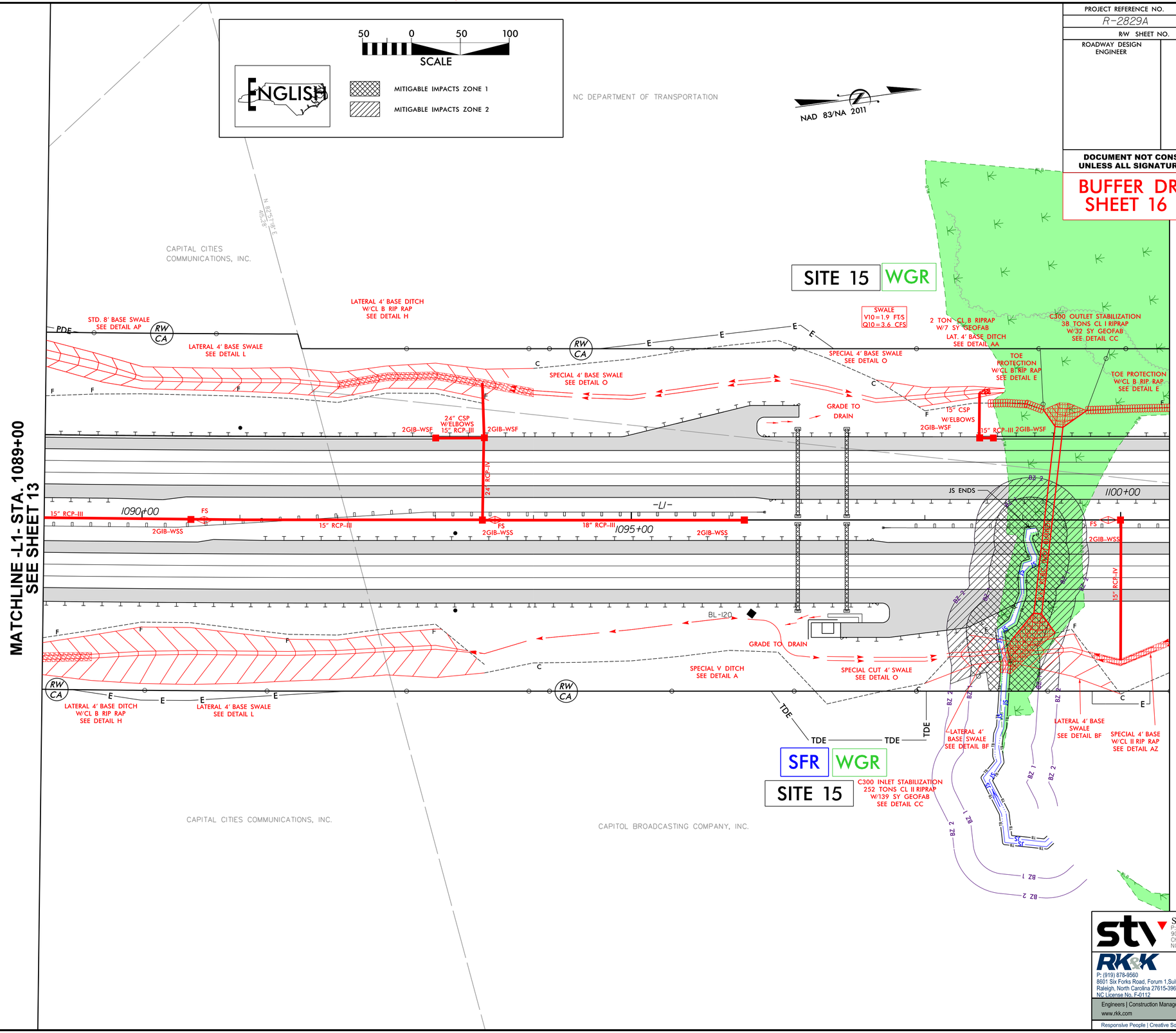

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R-2829A	15
RW SHEET NO.	
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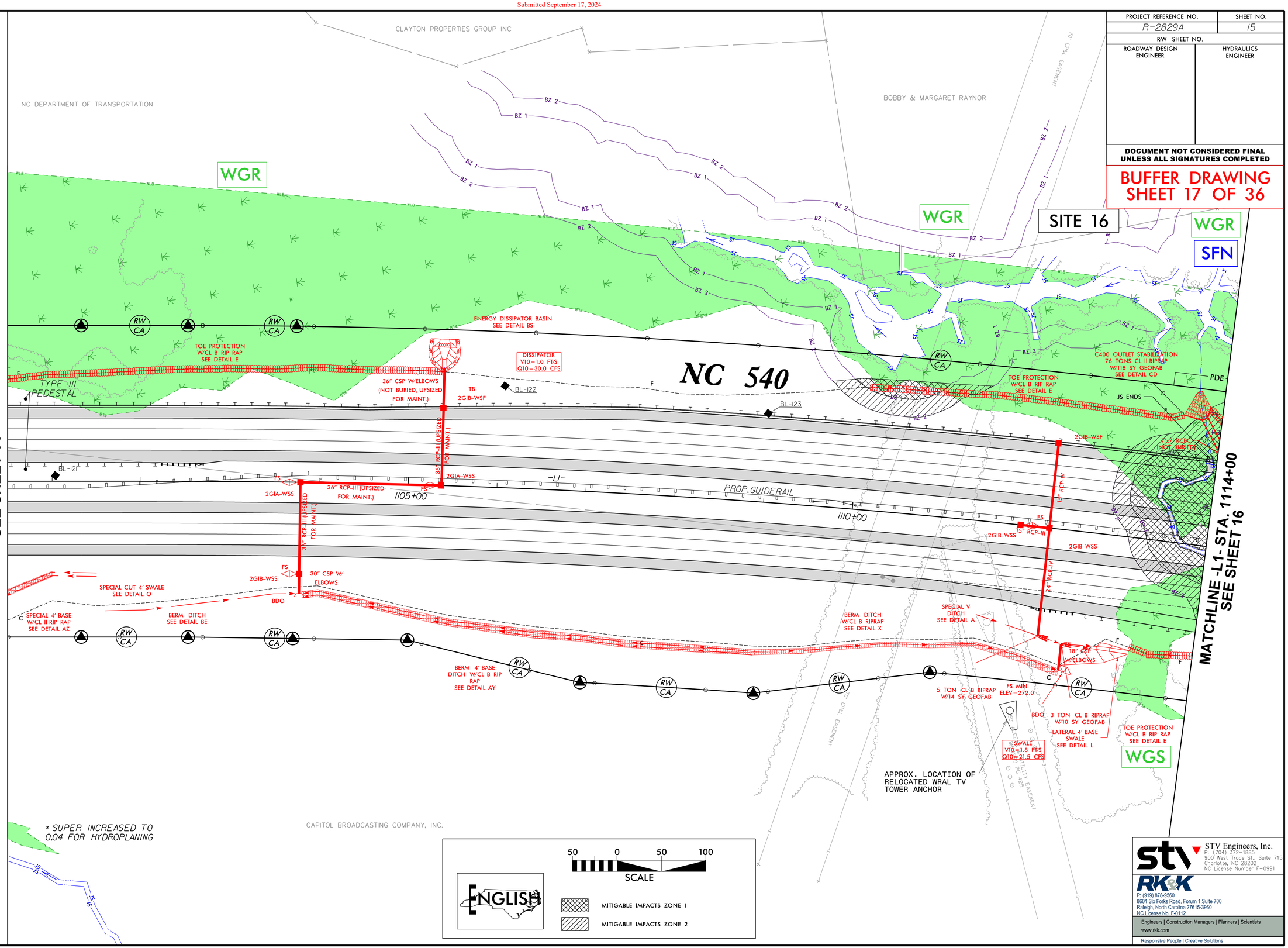

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	16
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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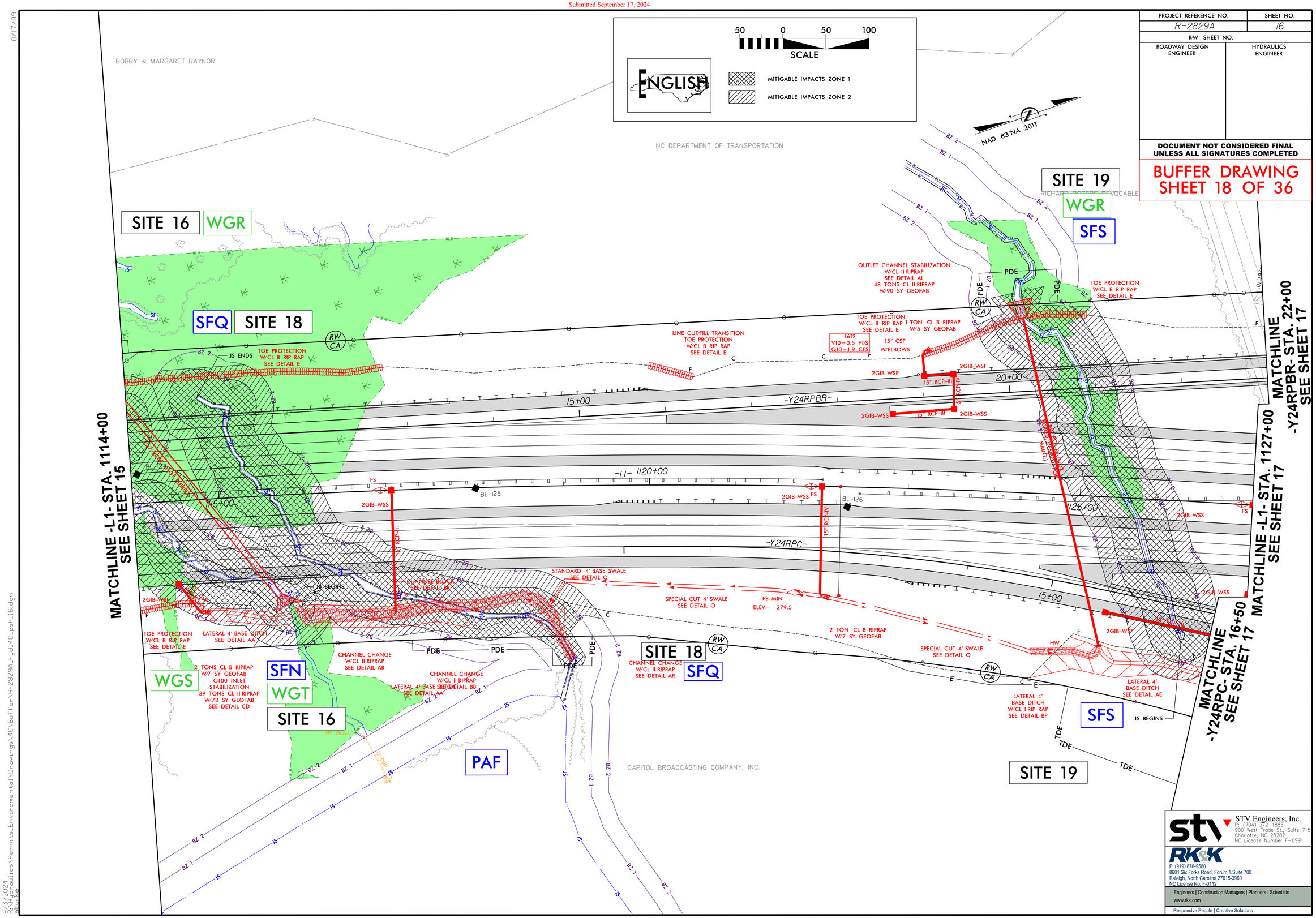
BUFFER DRAWING SHEET 18 OF 36



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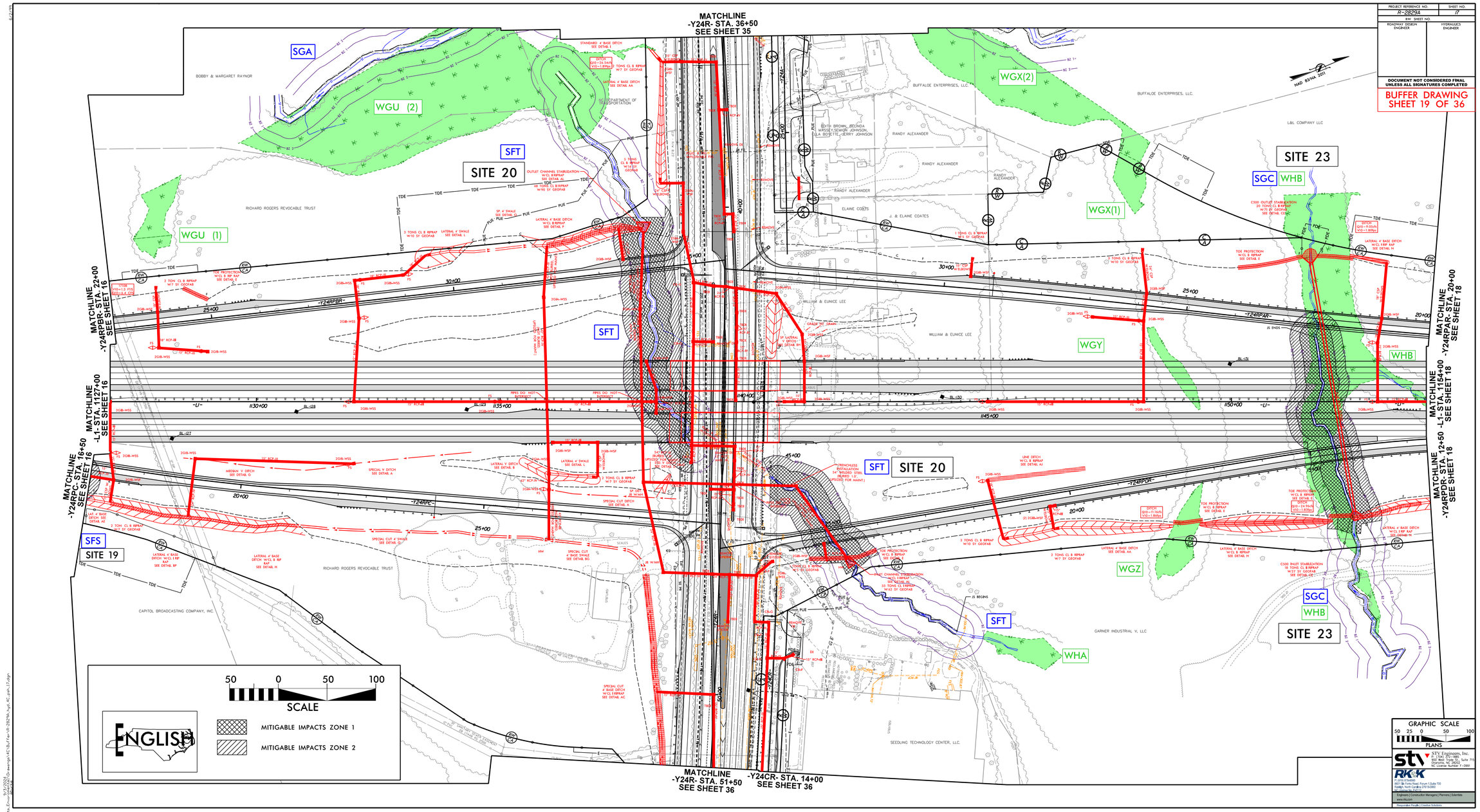

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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BUFFER DRAWING
SHEET 19 OF 36

GRAPHIC SCALE
50 25 0 50 100
PLANS

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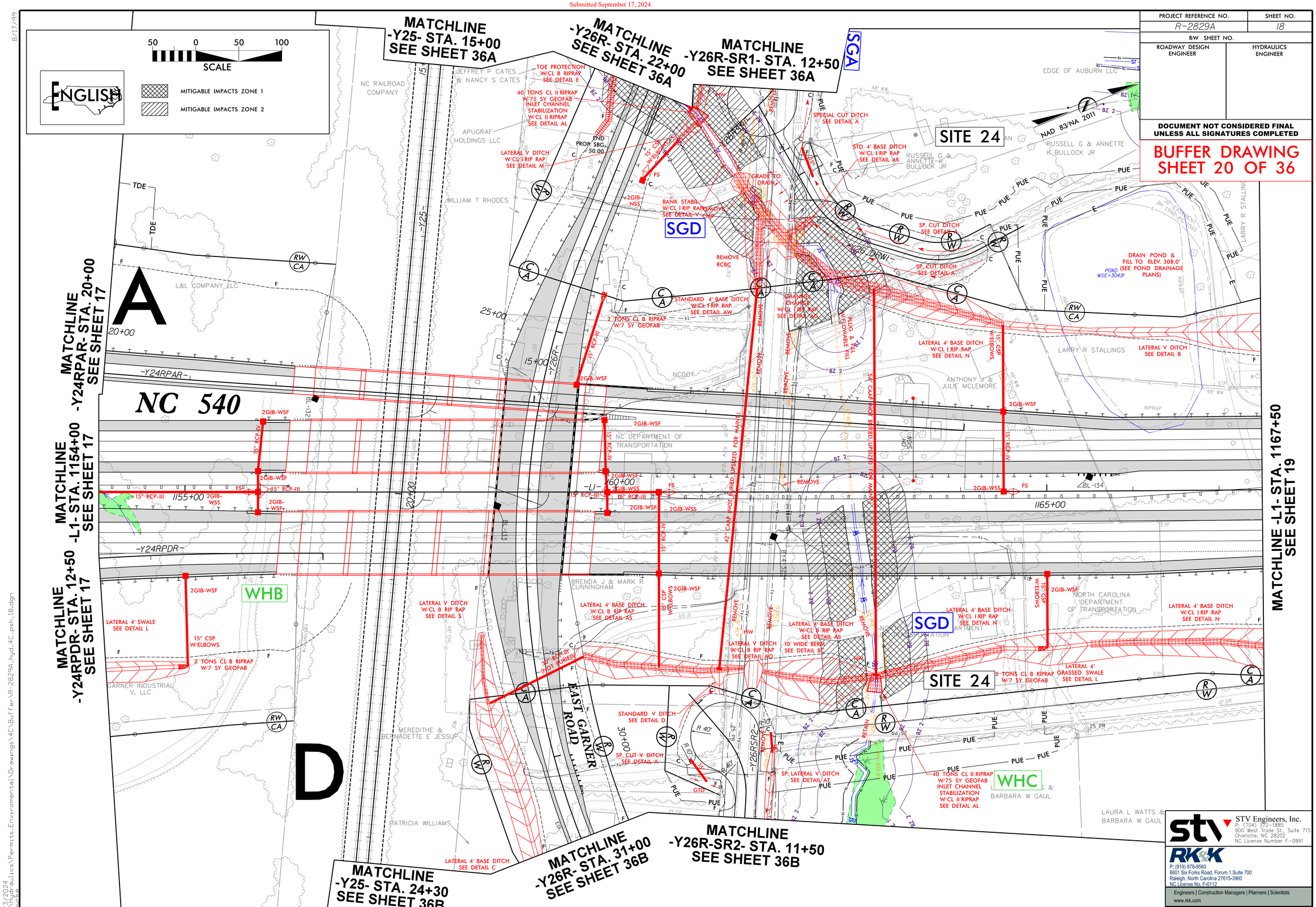

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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BUFFER DRAWING SHEET 20 OF 36

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	19
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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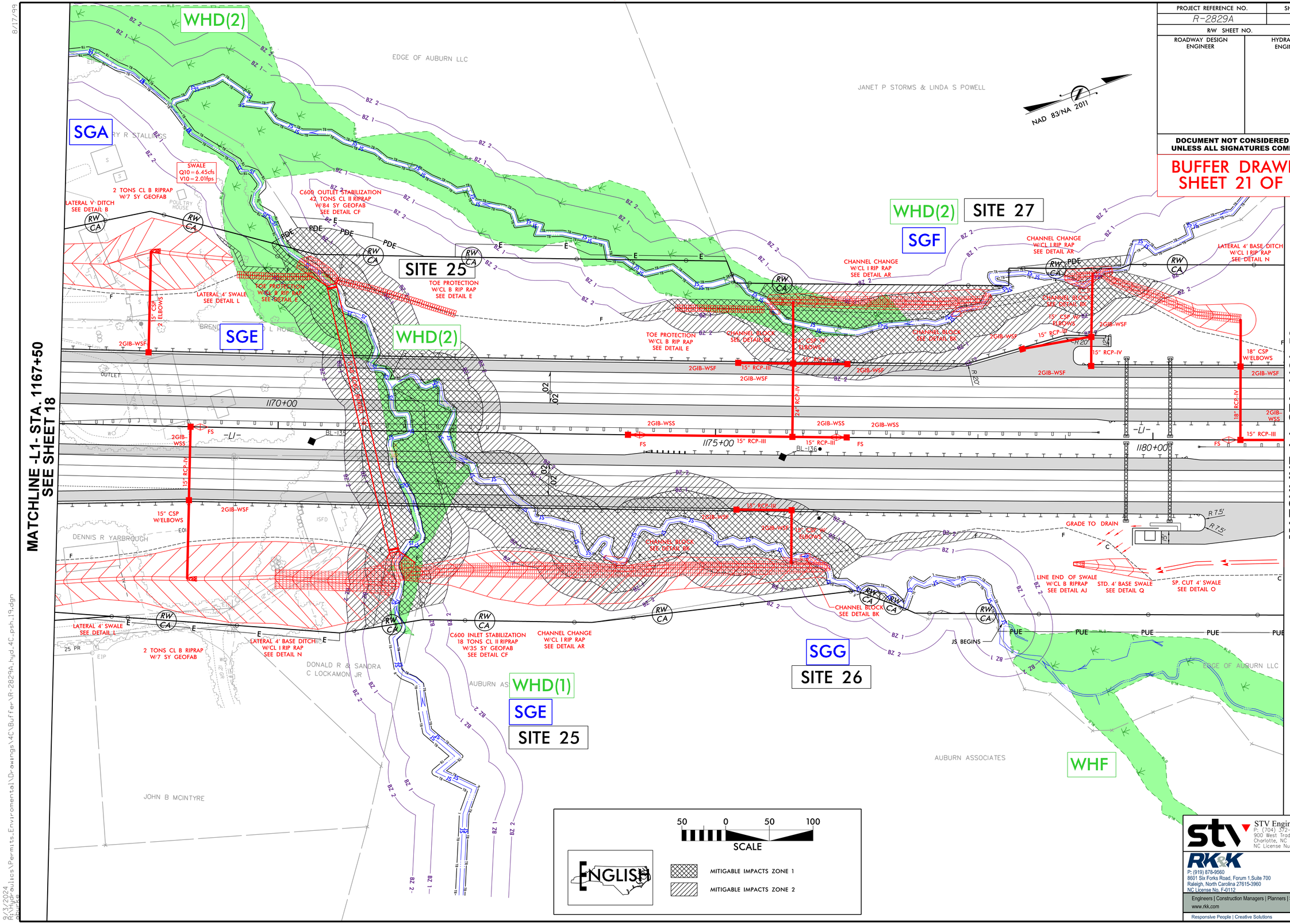
BUFFER DRAWING SHEET 21 OF 36



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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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BUFFER DRAWING SHEET 22 OF 36

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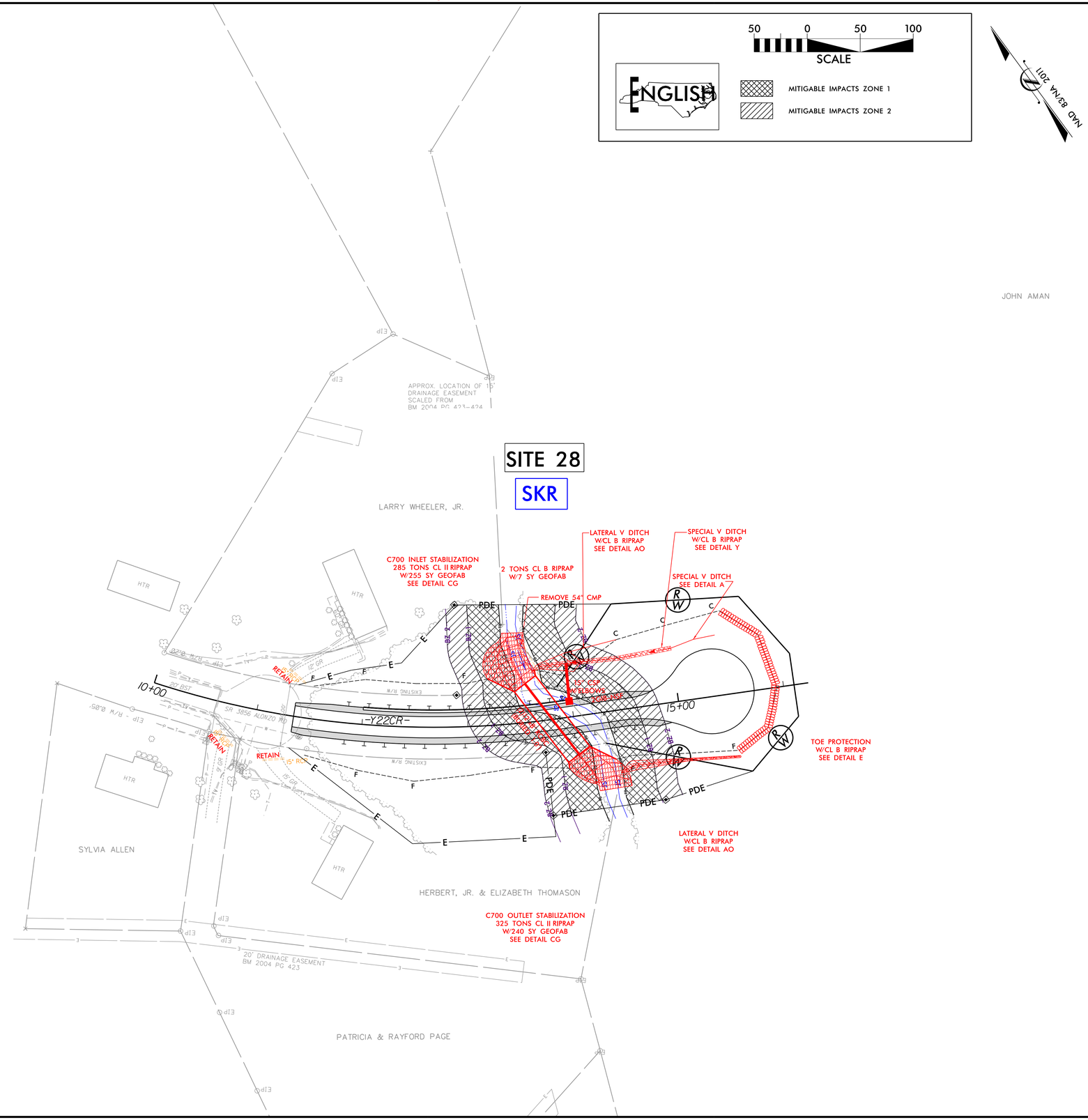
SCALE

ENGLISH

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NAD 83/NA 2011



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PROJ. REFERENCE NO.	SHEET NO.
R-2829A	

BUFFER DRAWING
SHEET 23 OF 36

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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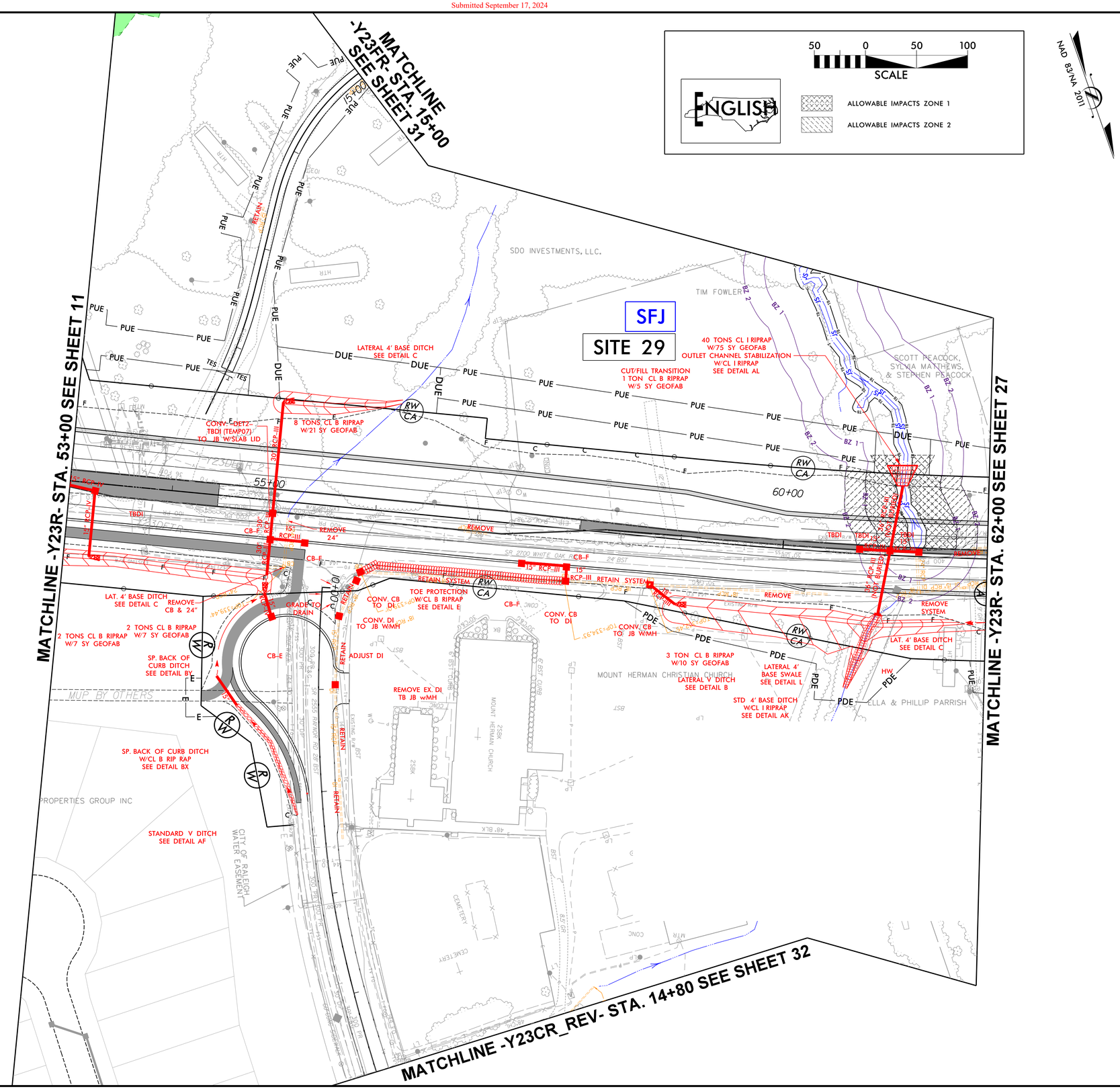
BUFFER DRAWING SHEET 24 OF 36



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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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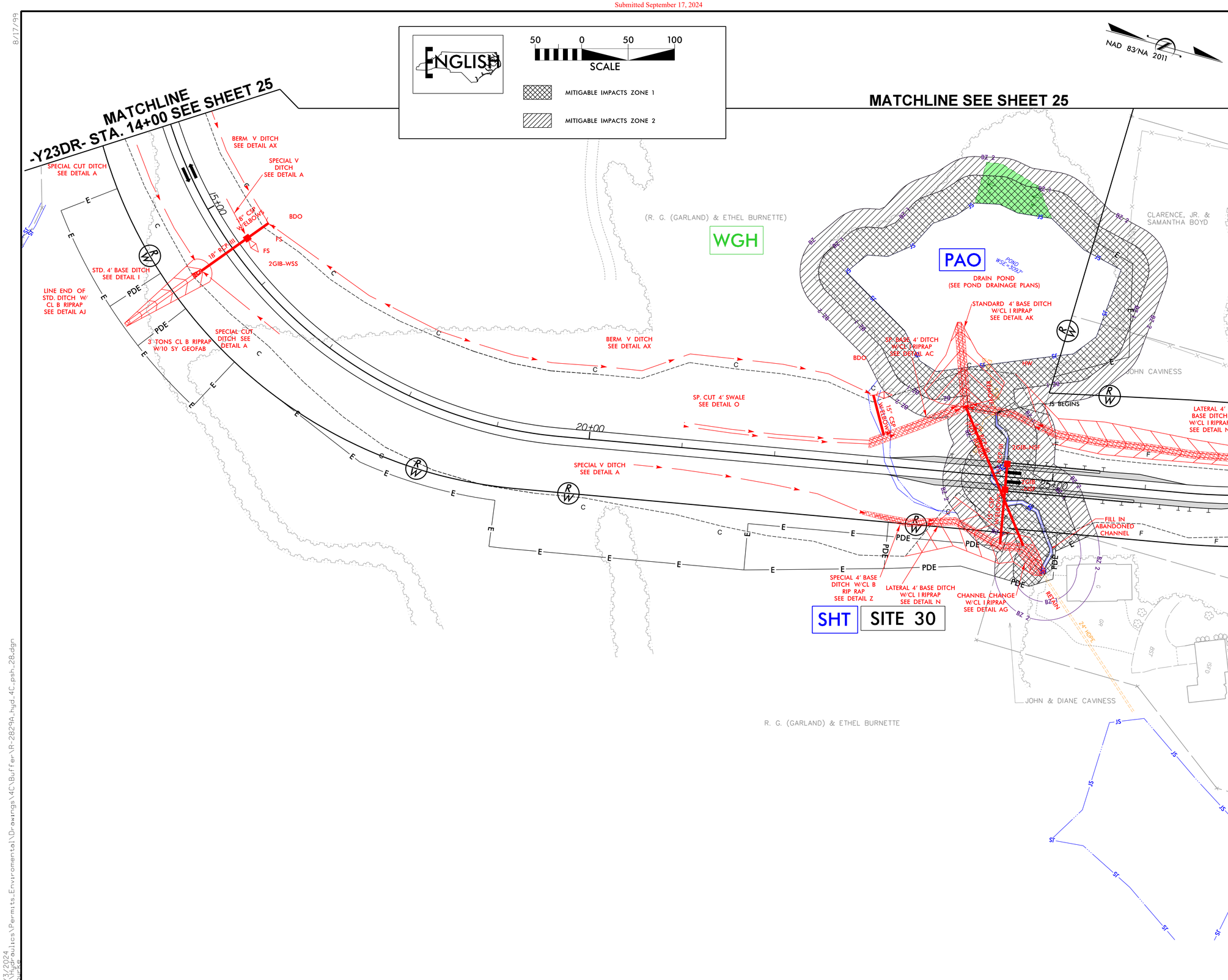
BUFFER DRAWING SHEET 25 OF 36



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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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BUFFER DRAWING SHEET 26 OF 36

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SCALE

ENGLISH

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

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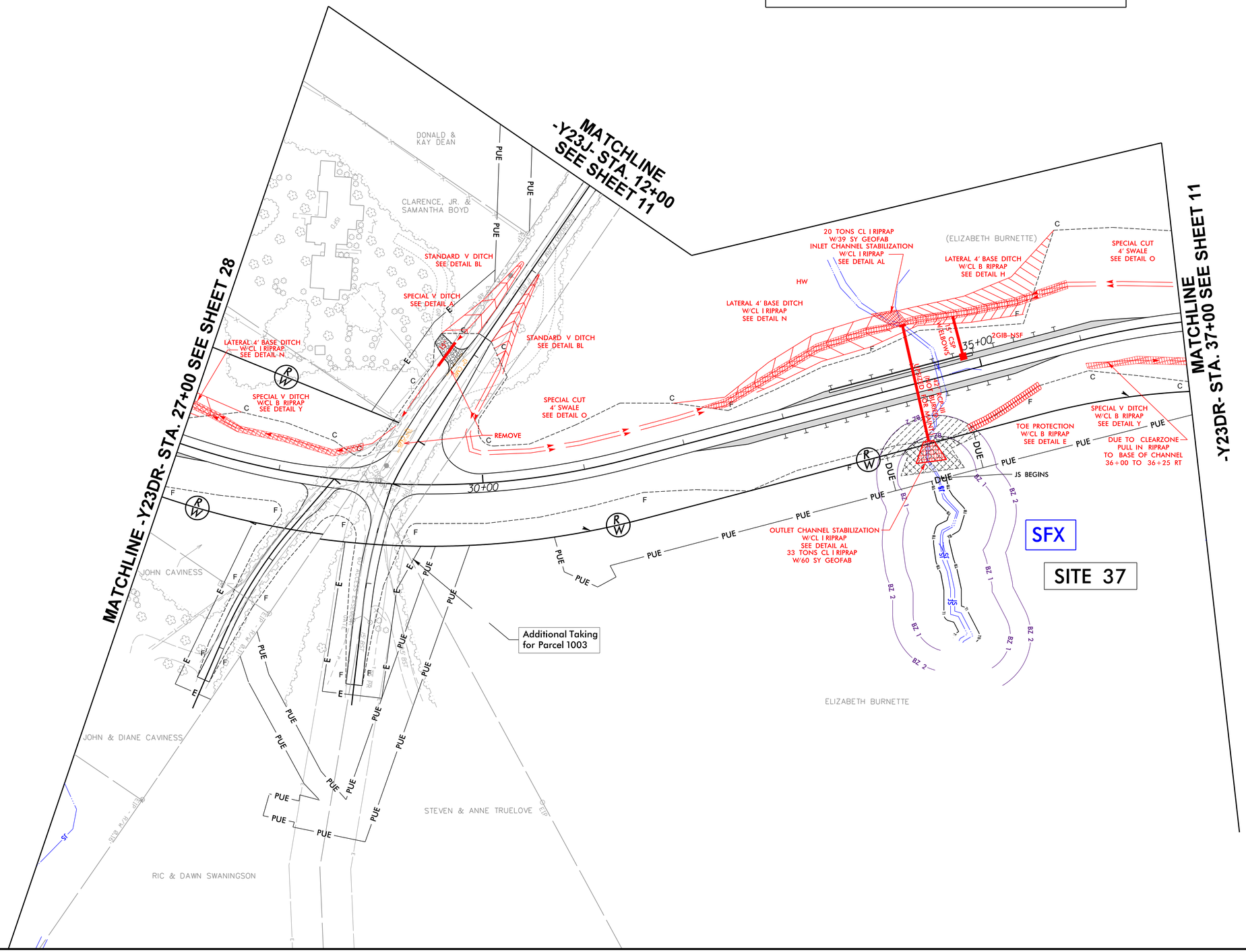

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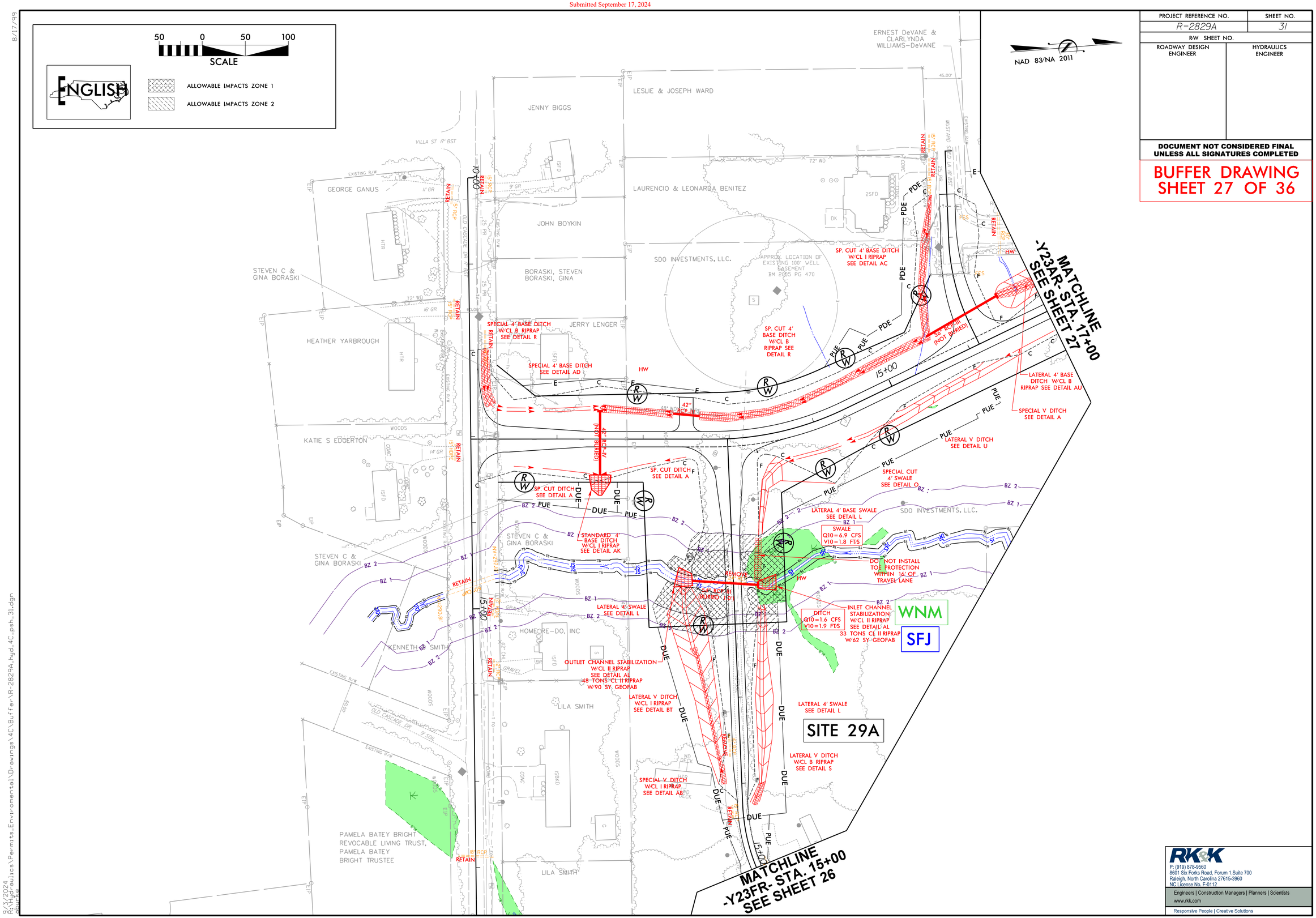

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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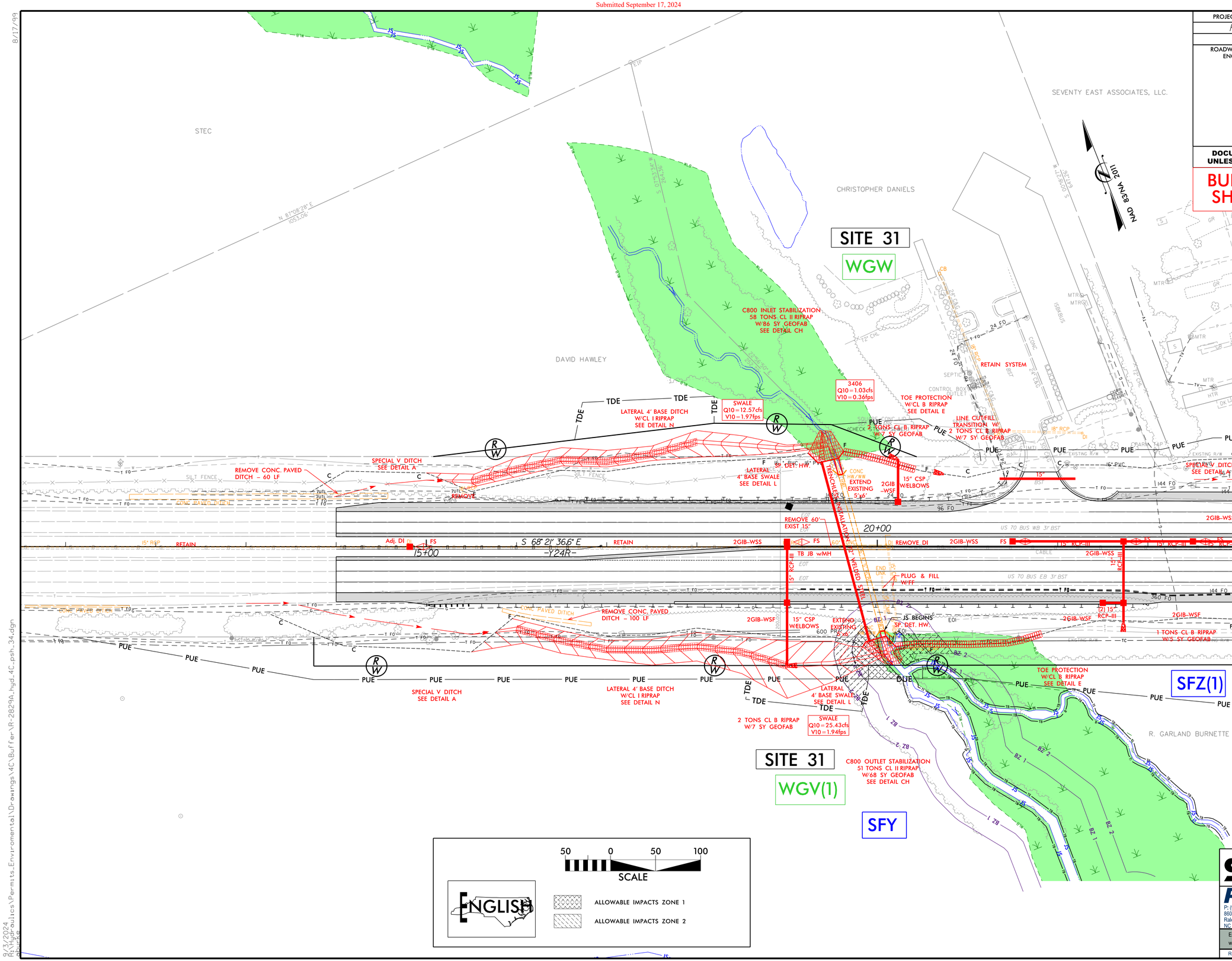

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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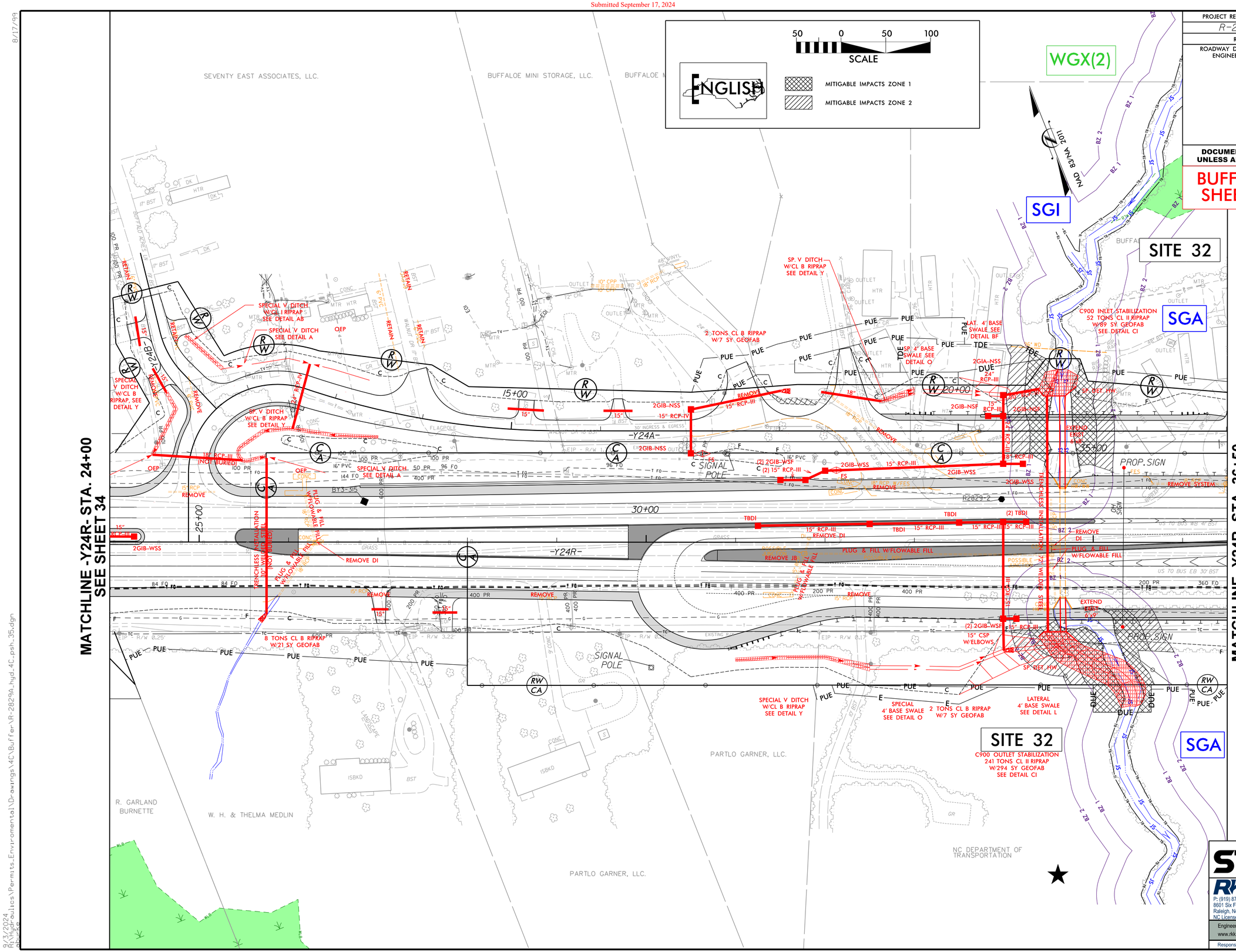

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R-2829A	36A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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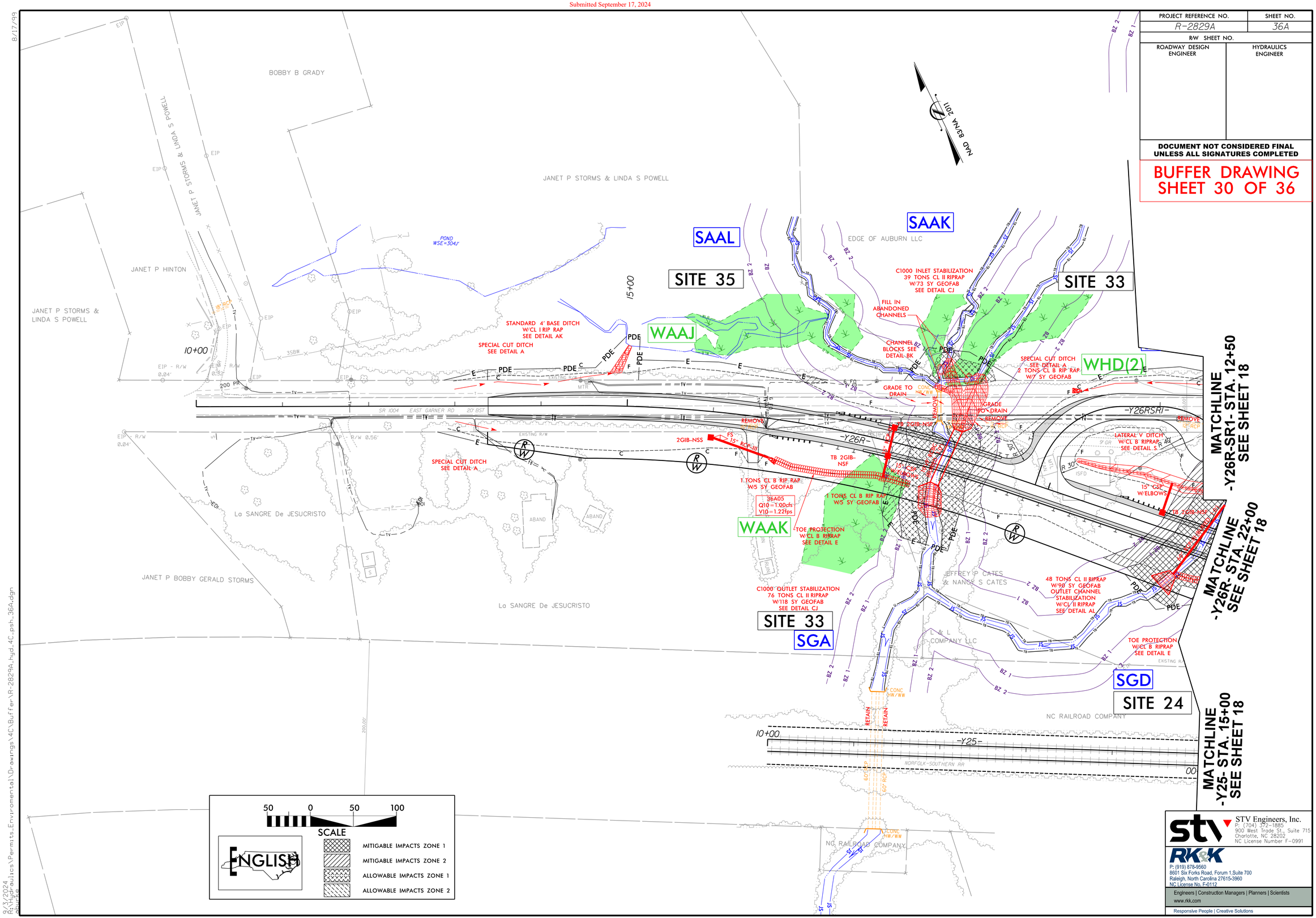

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RIPARIAN BUFFER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	IMPACTS									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
3	-L- 975+94 - 979+70 LT	Bridge & Roadway Fill: SEW		X					22475	18026	40501		
	-L- 976+79 - 980+27 RT	Bridge & Roadway Fill: SEY			X				7307	5956	13263		
5	-L1- 1007+92 - 1009+78	Proposed 9'x8' RCBC: SFH	X						28877	15537	44414		
6	-L1- 1010+87 - 1016+55	Proposed 12'x8' RCBC: SFF	X						35906	21030	56936		
7	-L1- 1012+32 LT - 1019+97	Roadway Fill: SFE	X						46871	30603	77474		
8	-L1- 1022+33 LT - 1024+72	42" RCP: SFB	X						17618	11963	29581		
9	-L1- 1033+27 - 1038+89 LT	48" RCP: SFA	X						9205	7844	17049		
		Drain Pond: PAO	X						47156	32542	79698		
11	-L1- 1061+42 - 1062+34 RT	Roadway Fill: SFD	X			3272	2607	5879					
12	-L1- 1061+90 LT - 1065+96	48" RCP: SFC	X						30849	18794	49643		
14	-L1- 1083+35 RT - 1087+56	BRIDGE: SFV		X		28224	18386	46610					
15	-L1- 1098+23 - 1099+67 RT	8'x7' RCBC: SFR	X						12233	9537	21770		
SHEET TOTALS*:						**31496**	**20993**	**52489**	**258497**	**171832**	**430329**	**0**	**0**

NOTES:
Site 3: SEW buffer is a total take in summary above; hatching outside construction impacts is not shown
Site 7: Downstream end of SFE buffer is a total take in summary above; hatching outside construction impacts is not shown
Site 11: Shown as mitigable due to proximity to Site 12 and Site 12 being a mitigable impact.

Submitted September 17, 2024

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

Revised 2018 Feb

WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)		WETLANDS IN BUFFERS ZONE 1 (ft^2)	WETLANDS IN BUFFERS ZONE 2 (ft^2)
3	-L- 975+94 - 979+70		14933	5374
7	-L1- 1012+32 LT - 1019+97		5152	
8	-L1- 1022+33 LT - 1024+72		1651	1085
9	-L1- 1033+27 - 1038+89 LT		7356	2447
11	-L1- 1061+42 - 1062+34 RT		67	325
12	-L1- 1061+90 LT - 1065+96		412	123
15	-L1- 1098+23 - 1099+67 RT		8053	4017
SHEET TOTAL:			**37624**	**13371**

Submitted September 17, 2024

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

Revised 2018 Feb

Rev. Jan 2009

RIPARIAN BUFFER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	IMPACTS									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
16	-L1- 1112+89 LT - 1116+23	Proposed 7'x7' RCBC: SFN	X						26808	17524	44332		
	-L1- 1109+67 - 1111+44 LT	Roadway Fill: SFN	X						1574	3203	4777		
18	-L1- 1114+31 LT - 1119+44	Roadway Fill: SFQ	X						37277	23720	60997		
19	-L1- 1123+75 LT - 1126+80	60" RCP: SFS	X						29264	19579	48843		
20	-L1- 1136+80 LT - 1142+77	54" RCP/WSP/CAAP: SFT	X						47166	30260	77426		
23	-L1- 1151+13 - 1153+09	Proposed 6'x8' RCBC: SGC	X						27372	19144	46516		
24	-Y26R- 21+00 RT - 22+90 LT	60" RCP: SGD	X						13415	7967	21382		
	-Y26R- 22+58 - 23+47 LT	Roadway Ditch: SGD	X						6205	3826	10031		
	-L1- 1162+07 - 1163+15 LT	Roadway Fill: SGD	X						11996	7367	19363		
	-L1- 1162+17 - 1163+63 RT	54" CAAP: SGD	X						1423	1489	2912		
25	-L1- 1169+25 LT - 1172+20	Proposed 11'x8' RCBC: SGE	X						29121	15656	44777		
26	-L1- 1171+27 LT - 1177+70	Roadway Fill: SGG	X						38653	23438	62091		
27	-L1- 1173+89 - 1180+26 LT	Roadway Fill: SGF			X				24466	15544	40010		
28	-Y22CR- 12+89 LT - 14+89	Proposed 2 @ 12'x8' RCBC: SKR	X						14200	9344	23544		
SHEET TOTALS*:						**0**	**0**	**0**	**308940**	**198061**	**507001**	**0**	**0**

NOTES:
Site 16: SFN buffer at -L- 1115+75 RT is a total take in summary above; hatching outside construction impacts is not shown
Site 18: SFQ buffer at -L- 1116+60 LT and up to limit of stream impact at -L- 1119+00 RT is a total take in summary above; hatching outside construction impacts is not shown

Submitted September 17, 2024

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

Revised 2018 Feb

WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)		WETLANDS IN BUFFERS ZONE 1 (ft^2)	WETLANDS IN BUFFERS ZONE 2 (ft^2)
16	-L1- 1112+89 LT - 1116+23		11142	9727
	-L1- 1109+67 - 1111+44 LT		436	555
18	-L1- 1114+31 LT - 1119+44		13751	9196
19	-L1- 1123+75 LT - 1126+80		8191	142
23	-L1- 1151+13 - 1153+09		18620	8475
25	-L1- 1169+25 LT - 1172+20		11692	2873
26	-L1- 1171+27 LT - 1177+70		3382	98
27	-L1- 1173+89 - 1180+26 LT		6569	168
SHEET TOTAL:			**73783**	**31234**

Submitted September 17, 2024

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

RIPARIAN BUFFER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	IMPACTS									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
29	-Y23R- 60+57 - 61+89 LT	36" RCP: SFJ	X			5463	3197	8660					
29A	-Y23FR- 10+96 LT - 12+29	54" RCP: SFJ	X			6983	4483	11466					
30	-Y23DR- 21+73 - 26+13	42" RCP: SHT	X						13221	8303	21524		
		Drain Pond: PAO							26069	1955	28024		
31	-Y24R- 19+52 - 21+38 RT	5'x6' RCBC Ext / 72" WSP: SFY	X			2350	2397	4747					
32	-Y24R- 34+03 - 35+90	6'x8'/9' RCBC Ext / 72" WSP: SGA	X						11974	7535	19509		
33	-Y26R- 18+03 - 19+32	Proposed 10'x9' RCBC: SGA	X			9237	4493	13730					
35	-Y26R- 16+88 - 18+47 LT	Proposed 10'x9' RCBC: SAAL	X			297	214	511					
37	-Y23DR- 33+79 - 34+82 RT	42" RCP: SFX	X			1625	1881	3506					
38	-Y23RPB- 23+37 - 24+97 LT	42" Energy Dissipator: SFK	X			134	1572	1706					
SHEET TOTALS*:						**26089**	**18237**	**44326**	**51264**	**17793**	**69057**	**0**	**0**
PROJECT TOTALS*:						**57585**	**39230**	**96815**	**618701**	**387686**	**1006387**	**0**	**0**

NOTES:
Site 30: Buffer impact outside ROW / PDE at -Y23DR- 24+75 RT is a total take in summary above;
hatching outside construction impacts is not shown

Submitted September 17, 2024

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

Revised 2018 Feb

WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)		WETLANDS IN BUFFERS ZONE 1 (ft^2)	WETLANDS IN BUFFERS ZONE 2 (ft^2)
29A	-Y23FR- 10+96 LT - 12+29		1870	497
30	-Y23DR- 23+89 - 24+74 LT		2225	576
31	-Y24R- 19+52 - 21+38 RT		728	547
33	-Y26R- 18+03 - 19+32		706	863
35	-Y26R- 16+88 - 18+47 LT		102	0
SHEET TOTAL:			**5631**	**2483**
PROJECT TOTAL:			**117038**	**47088**

NOTES:
SITE 30: Wetland WGH located inside Pond PAO limits is not to be impacted

Submitted September 17, 2024

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

Revised 2018 Feb

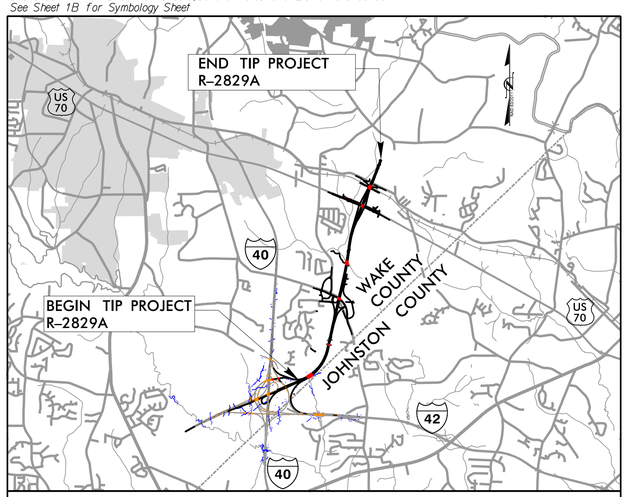
Rev. Jan 2009

09/08/99

TIP PROJECT: R-2829A

CONTRACT: C204824

See Sheet 1A for Index of Sheets, General Notes and List of Standards
See Sheet 1B for Symbology Sheet



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2829A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
35517.3.TA1	N/A, 0540047	DESIGN-BUILD
35517.3. TAGV1	N/A, 0540047	DESIGN-BUILD

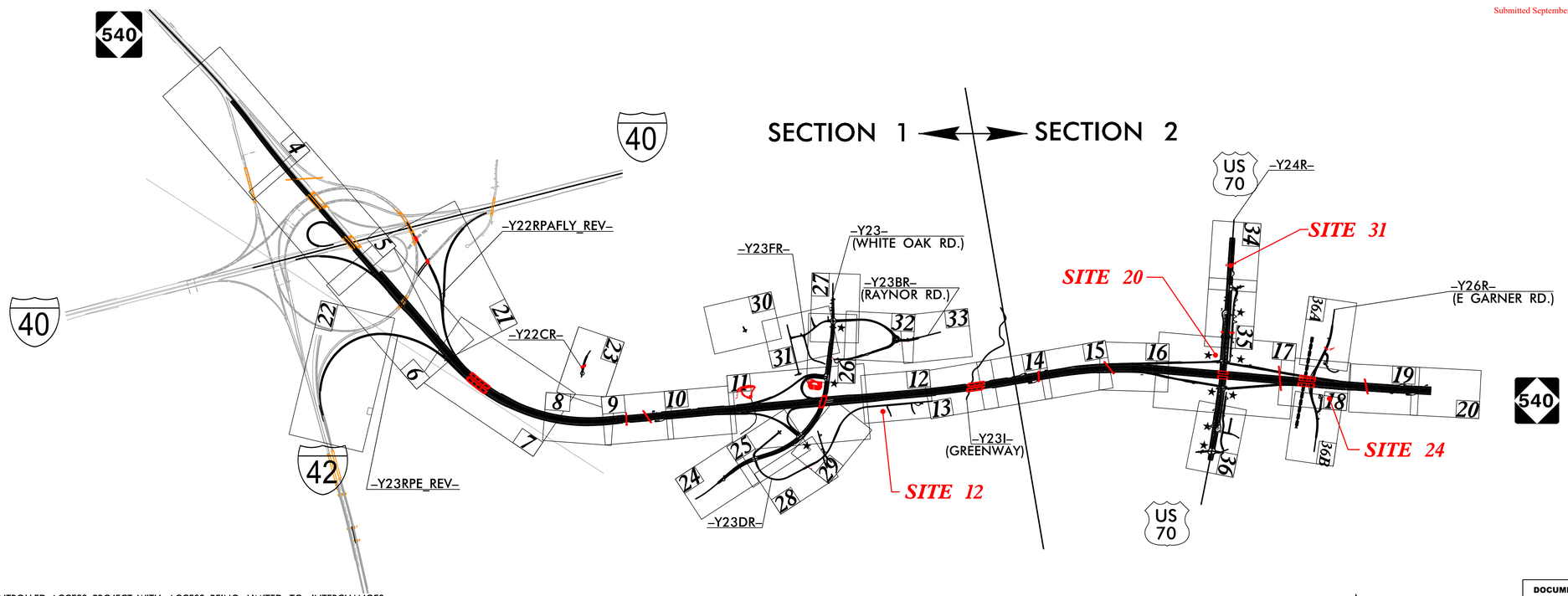
LOCATION: TRIANGLE EXPRESSWAY SOUTHEAST EXTENSION FROM I-40 TO SOUTH OF SR 2542 (ROCK QUARRY RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, LIGHTING, SIGNING, ITS, CULVERTS & STRUCTURES

SAFETEA-LU SECTION 6002
HYDRAULIC DESIGN MEETING PLANS

UTILITY PERMIT DRAWING
SHEET 1 OF 8

Submitted September 17, 2024



NOTES:
1. THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

★ PROPOSED TRAFFIC SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2023 = 15,440
ADT 2043 = 22,040
K = 12%
D = 65%
T = 10% *
V = 75 MPH

FUNC CLASS: INTERSTATE
* (TTST 4% + DUALS 6%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2829A.....3.922 MILES
LENGTH STRUCTURE TIP PROJECT R-2829A.....0.242 MILES
TOTAL LENGTH TIP PROJECT R-2829A.....4.164 MILES

NCTA CONTACT

Ron McCollum, PE
DEPUTY CHIEF ENGINEER for PRECONSTRUCTION
TURNPIKE AUTHORITY

PLANS PREPARED BY:

RK&K
RUMMEL, KLEPPER & KAHL, LLP
8601 SIX FORKS ROAD, FORUM 1, SUITE 700
RALEIGH, NORTH CAROLINA 27615-3960
NC LICENSE NO. F-0112

FOR NORTH CAROLINA TURNPIKE AUTHORITY

2018 STANDARD SPECIFICATIONS

LETTING DATE:
October 17, 2023

C. Byron Holden, PE
PROJECT ENGINEER

Anthony A. Houser, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

9/3/2024
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aburke

Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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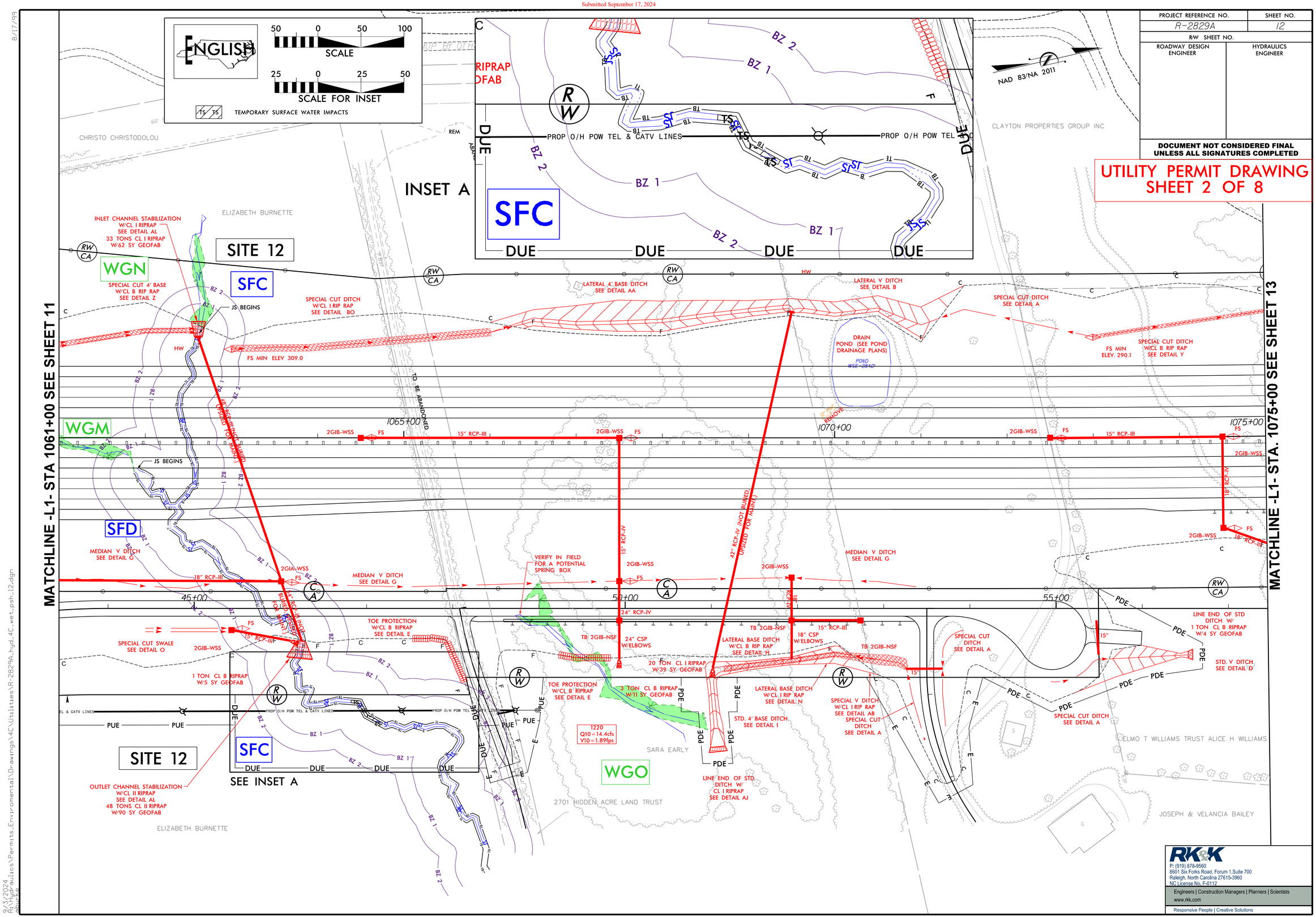
UTILITY PERMIT DRAWING SHEET 2 OF 8



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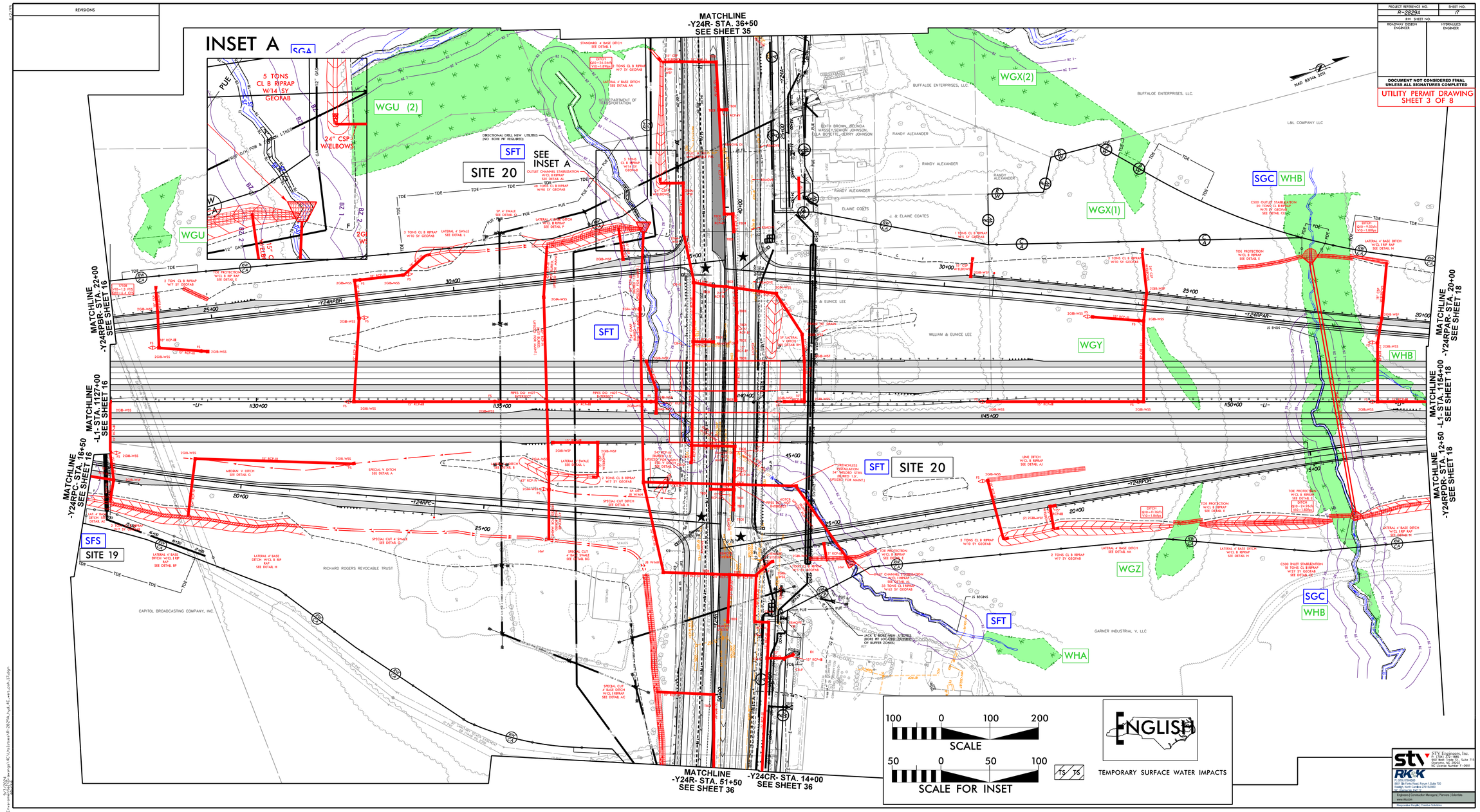

Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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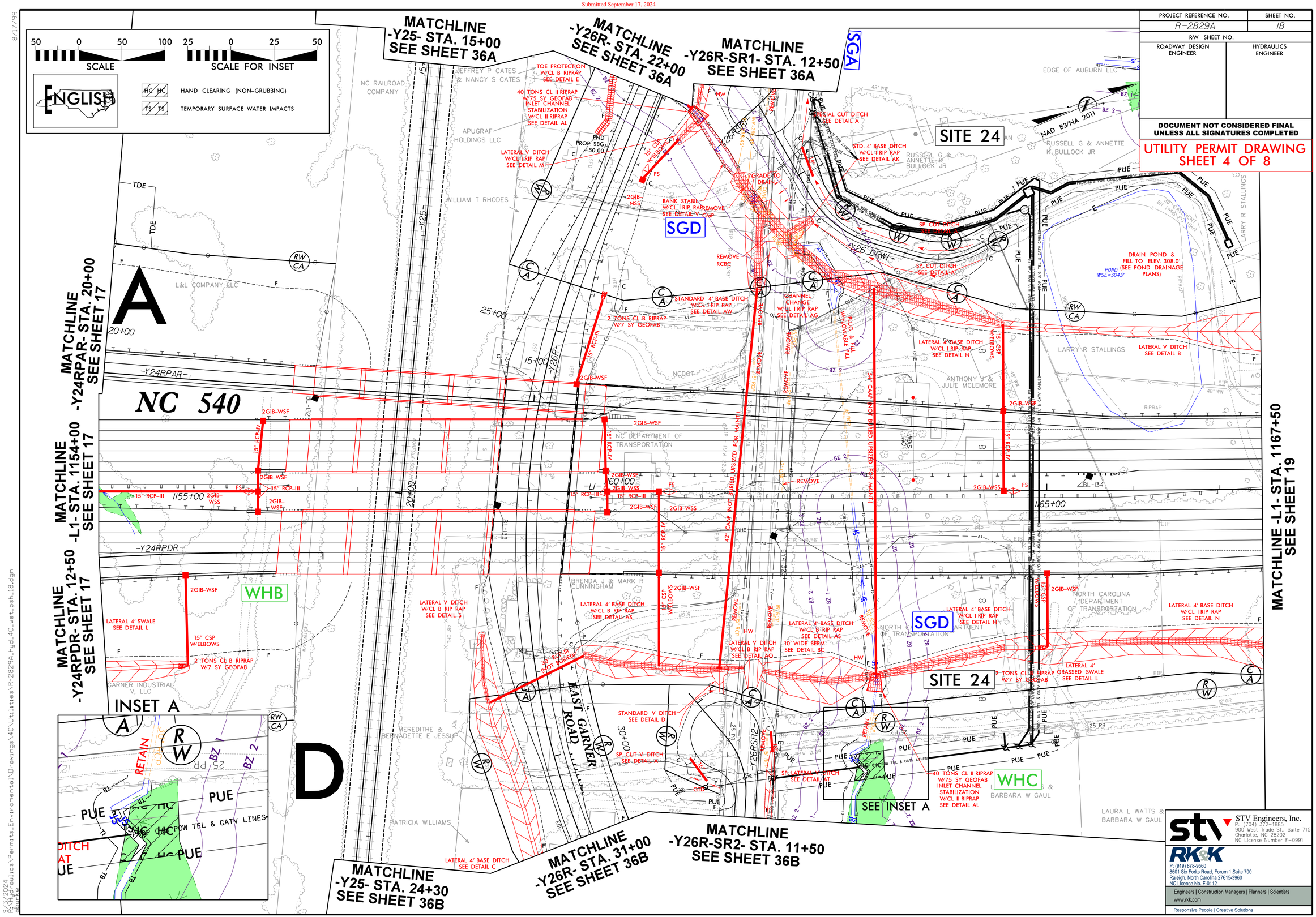
UTILITY PERMIT DRAWING SHEET 4 OF 8



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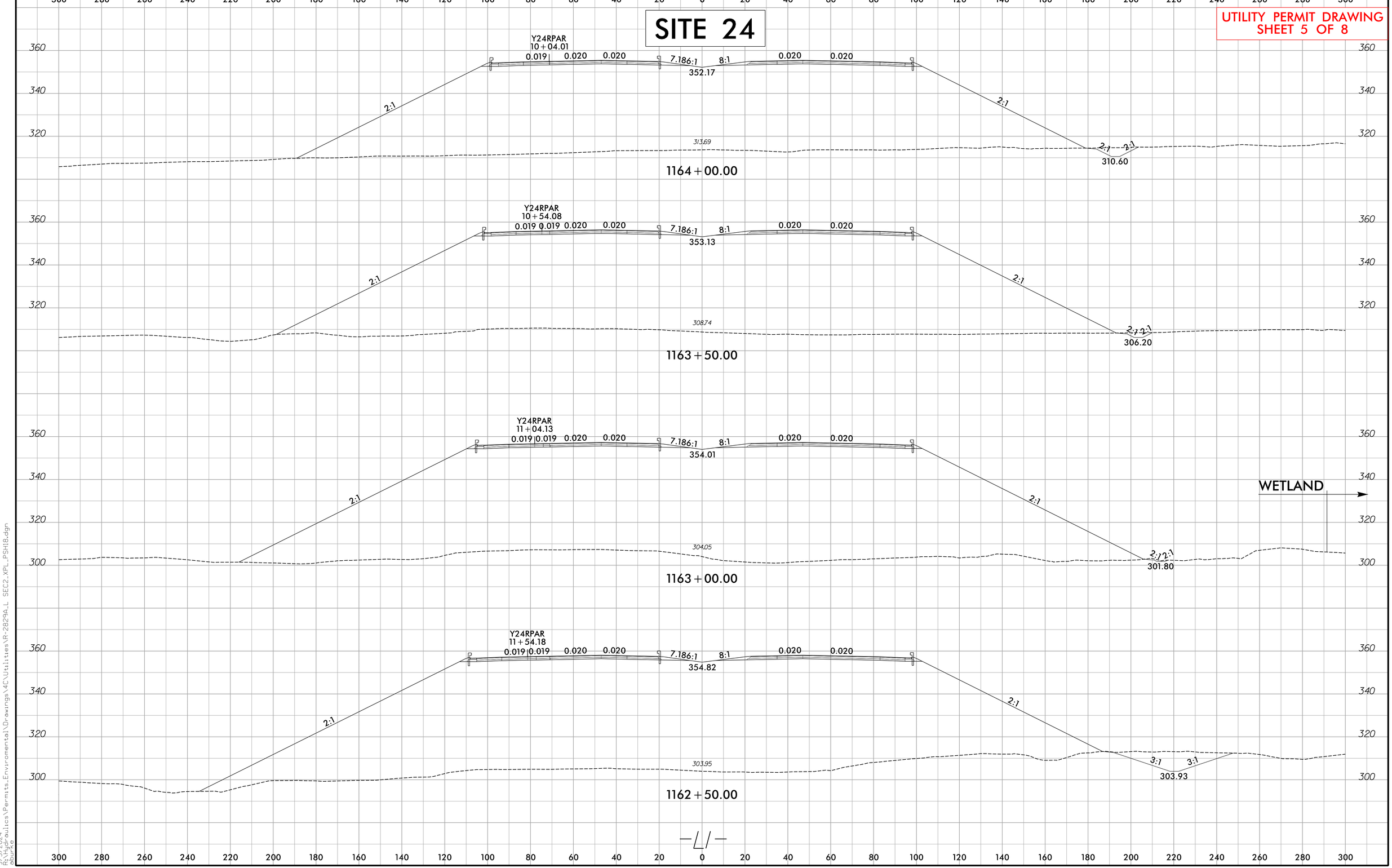
Submitted September 17, 2024

6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-28

UTILITY PERMIT DRAWING
SHEET 5 OF 8

SITE 24



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ebunce

Submitted September 17, 2024

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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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UTILITY PERMIT DRAWING
SHEET 6 OF 8

ENGLISH

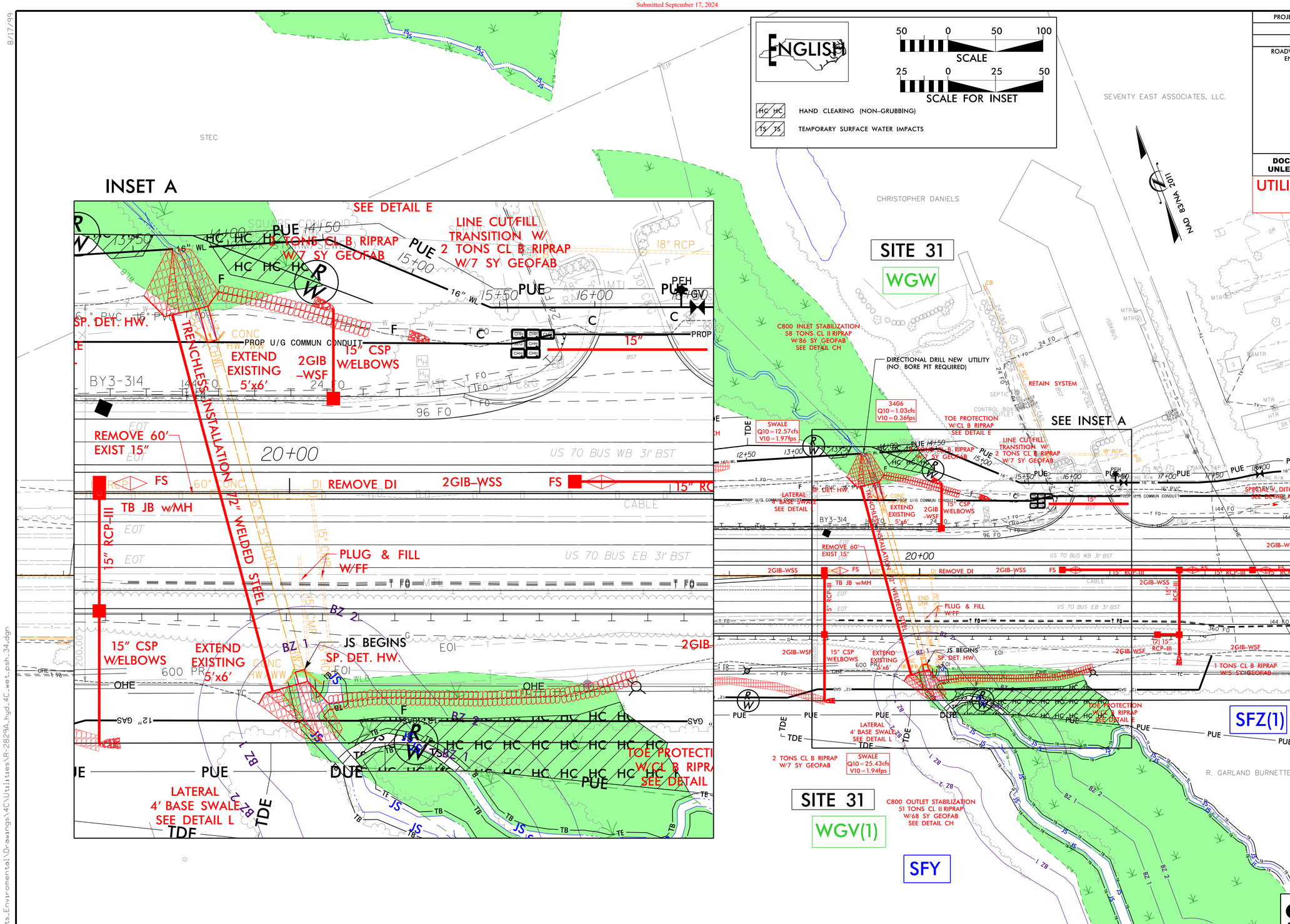
SCALE 50 0 50 100

SCALE FOR INSET 25 0 25 50

HC HC — HAND CLEARING (NON-GRUBBING)

TS TS — TEMPORARY SURFACE WATER IMPACTS

NAD 83/NA 2011



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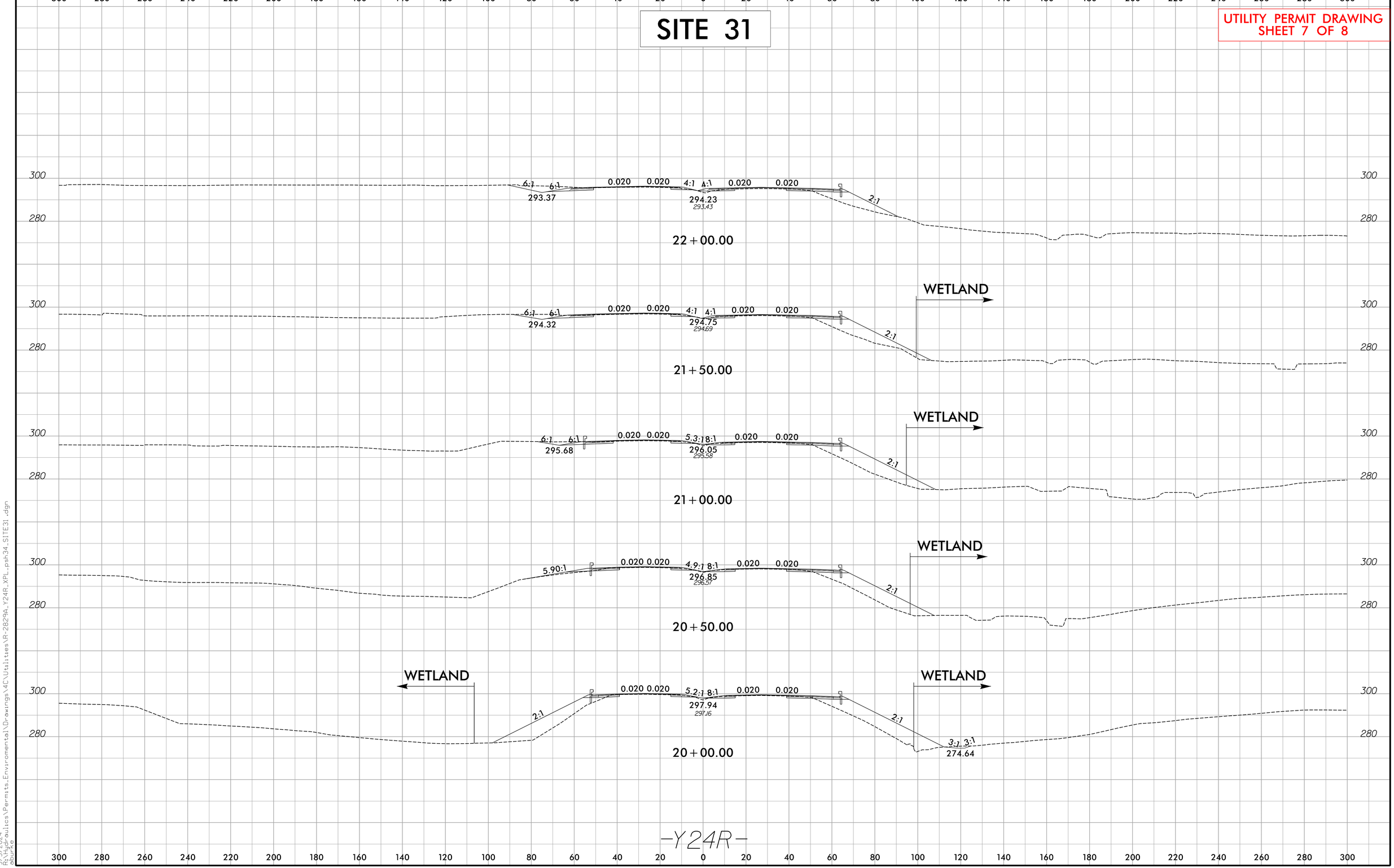
Submitted September 17, 2024

6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2829A	S2 X-40

UTILITY PERMIT DRAWING
SHEET 7 OF 8

SITE 31



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dbrown

Submitted September 17, 2024

WETLAND AND SURACE 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)
12	-Y23DR- 46+82 - 47+18 RT	Overhead Power: SFC							0.003		48	
20	-L1- 1137+51 - 1137+85 LT	Overhead Power, UG Gas & Telephone: SFT							0.006		76	
24	-L1- 1162+71 - 1163+11 RT	Overhead Power: SGD							0.003		36	
		WHC					0.020					
31	-Y24R- 18+90 - 20+18 LT	UG Waterline: WGW					0.034					
	-Y24R-20+37 - 22+10 RT	Overhead Power & Anticipated Utility Line: SFY							0.007		68	
		WGV(1)					0.120					
	-Y24R- 20+25 - 20+38 RT	SFZ(1)							0.002		12	
PROJECT TOTALS*:			**0.000**	**0.000**	**0.000**	**0.000**	**0.174**	**0.000**	**0.021**	**0**	**240**	**0**

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

Revised 2018 Feb

09/08/99

TIP PROJECT: R-2829A

CONTRACT: C204824

See Sheet 1A for Index of Sheets, General Notes and List of Standards
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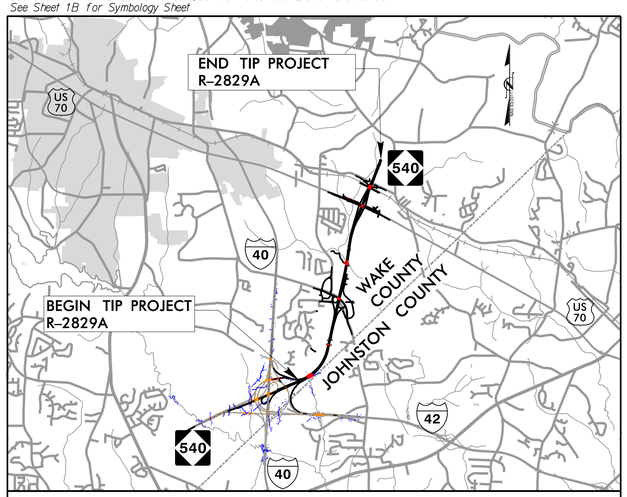


VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2829A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
35517.3.TA1	N/A, 0540047	DESIGN-BUILD
35517.3. TAGV1	N/A, 0540047	DESIGN-BUILD

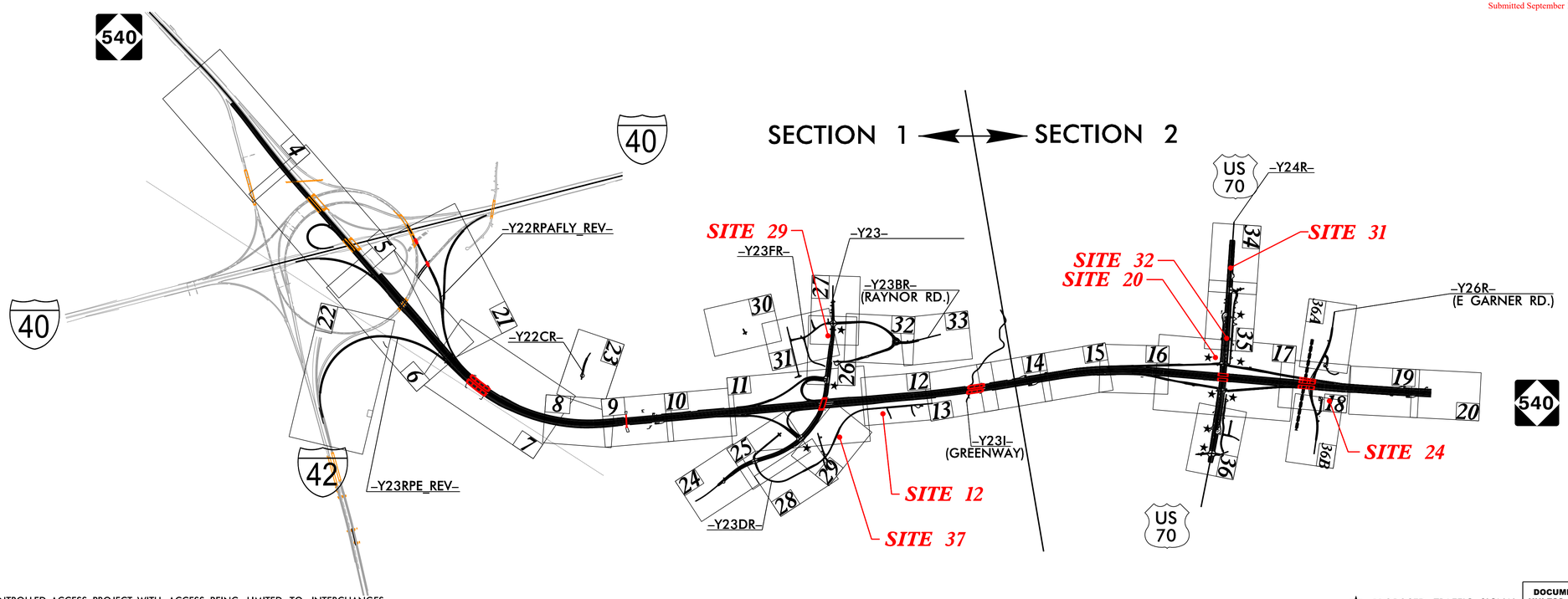
LOCATION: ***TRIANGLE EXPRESSWAY SOUTHEAST EXTENSION FROM I-40 TO SOUTH OF SR 2542 (ROCK QUARRY RD.)***

TYPE OF WORK: ***GRADING, DRAINAGE, PAVING, LIGHTING, SIGNING, ITS, CULVERTS & STRUCTURES***

SAFETEA-LU SECTION 6002
HYDRAULIC DESIGN MEETING PLANS

UTILITY BUFFER DRAWING
SHEET 1 OF 10

Submitted September 17, 2024



NOTES:
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GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2023 = 15,440
ADT 2043 = 22,040
K = 12%
D = 65%
T = 10% *
V = 75 MPH

FUNC CLASS: INTERSTATE
* (TTST 4% + DUALS 6%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2829A.....3.922 MILES
LENGTH STRUCTURE TIP PROJECT R-2829A.....0.242 MILES
TOTAL LENGTH TIP PROJECT R-2829A.....4.164 MILES

NCTA CONTACT

Ron McCollum, PE
DEPUTY CHIEF ENGINEER for PRECONSTRUCTION
TURNPIKE AUTHORITY

PLANS PREPARED BY:

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RALEIGH, NORTH CAROLINA 27615-3960
NC LICENSE NO. F-0112

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2018 STANDARD SPECIFICATIONS

LETTING DATE:
October 17, 2023

C. Byron Holden, PE
PROJECT ENGINEER

Anthony A. Houser, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

9/3/2024
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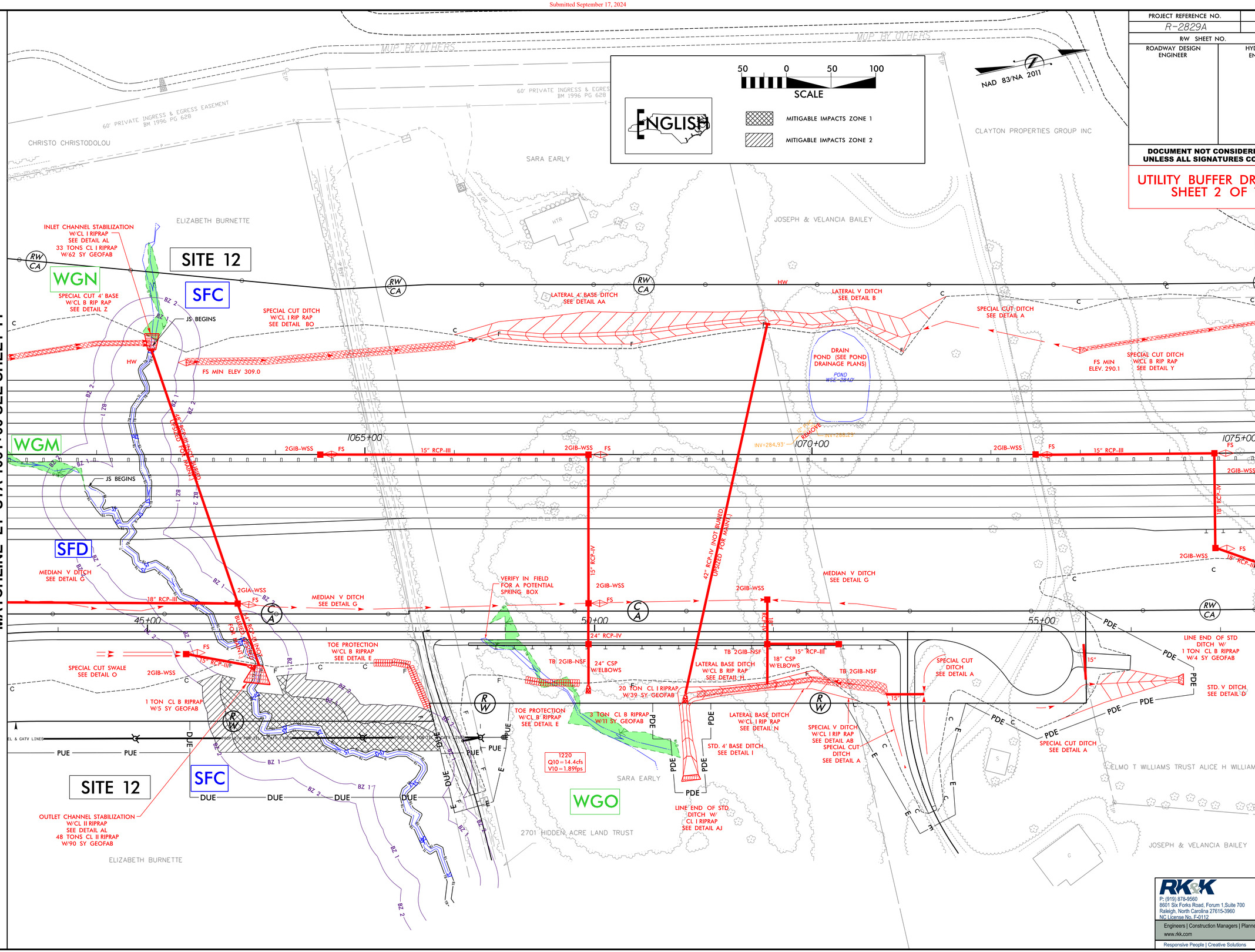
aburke

Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

UTILITY BUFFER DRAWING SHEET 2 OF 10



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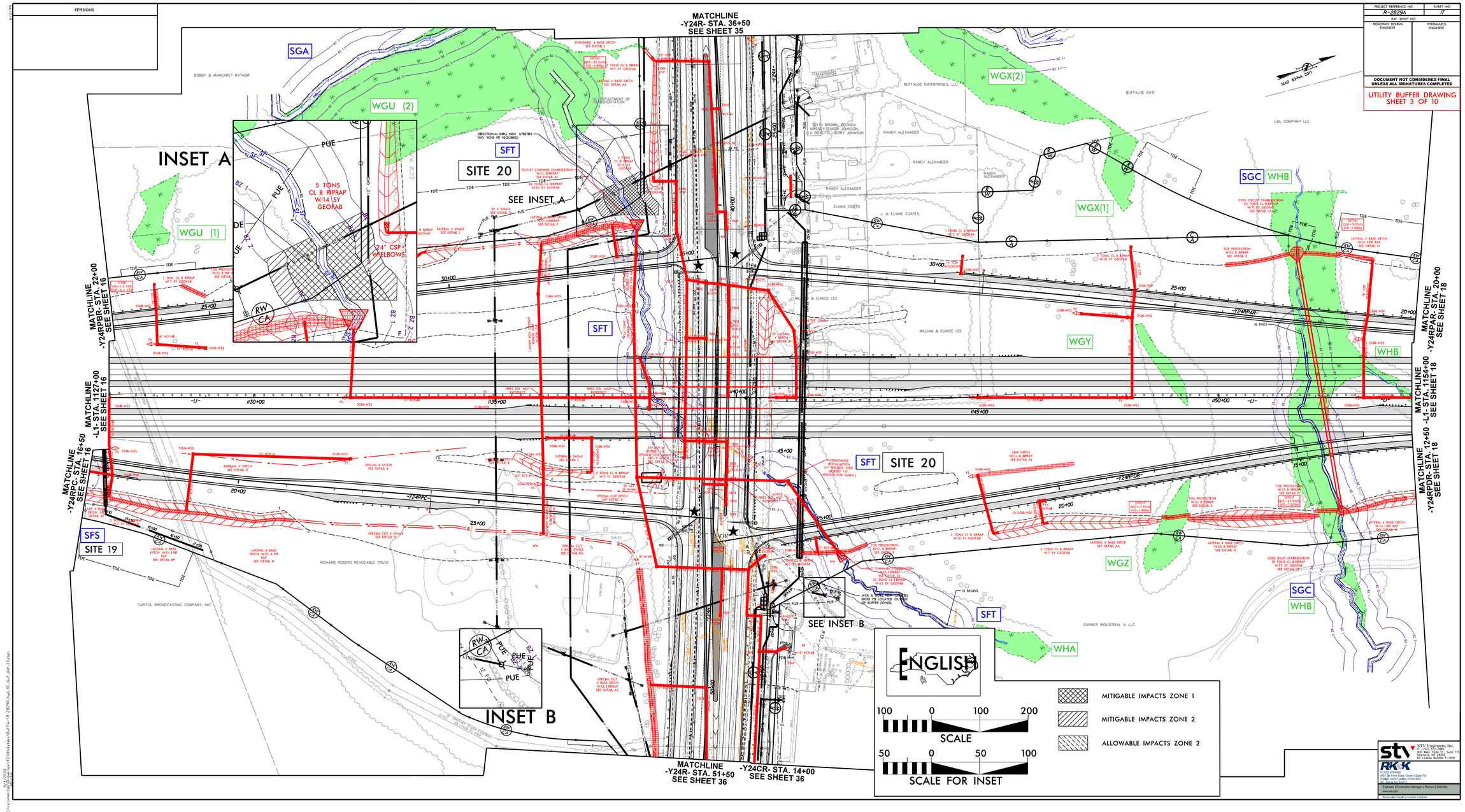
dbunce

Submitted September 17, 2024



PROJECT REFERENCE NO.	SHEET NO.
R-2829A	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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UTILITY BUFFER DRAWING SHEET 3 OF 10

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Raleigh, North Carolina 27615-3960
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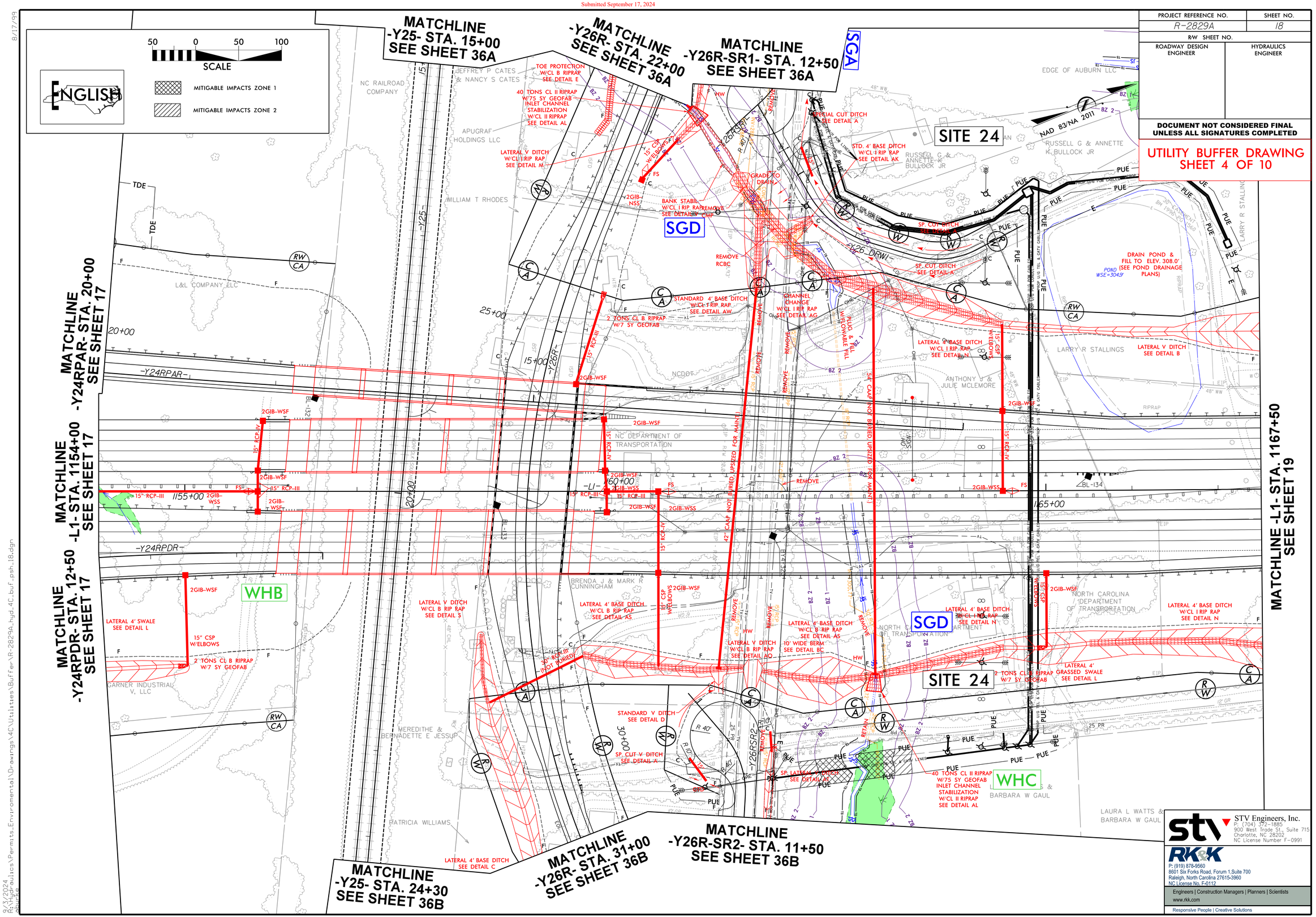
Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

UTILITY BUFFER DRAWING SHEET 4 OF 10



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Submitted September 17, 2024

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

UTILITY BUFFER DRAWING SHEET 5 OF 10

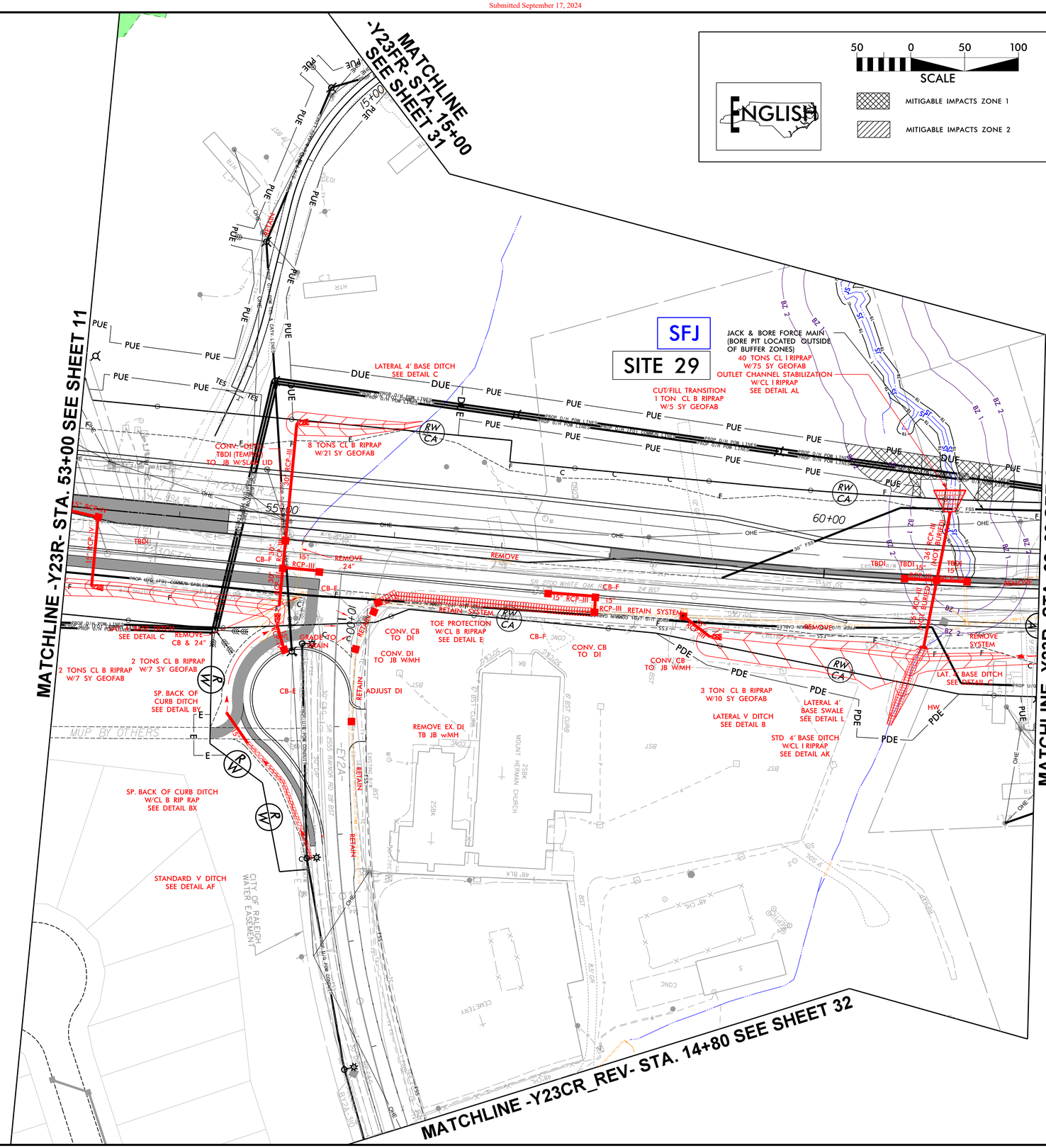
ENGLISH

50 0 50 100
SCALE

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NAD 83/NA 2011



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PROJECT REFERENCE NO.	SHEET NO.
R-2829A	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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UTILITY BUFFER DRAWING
SHEET 6 OF 10

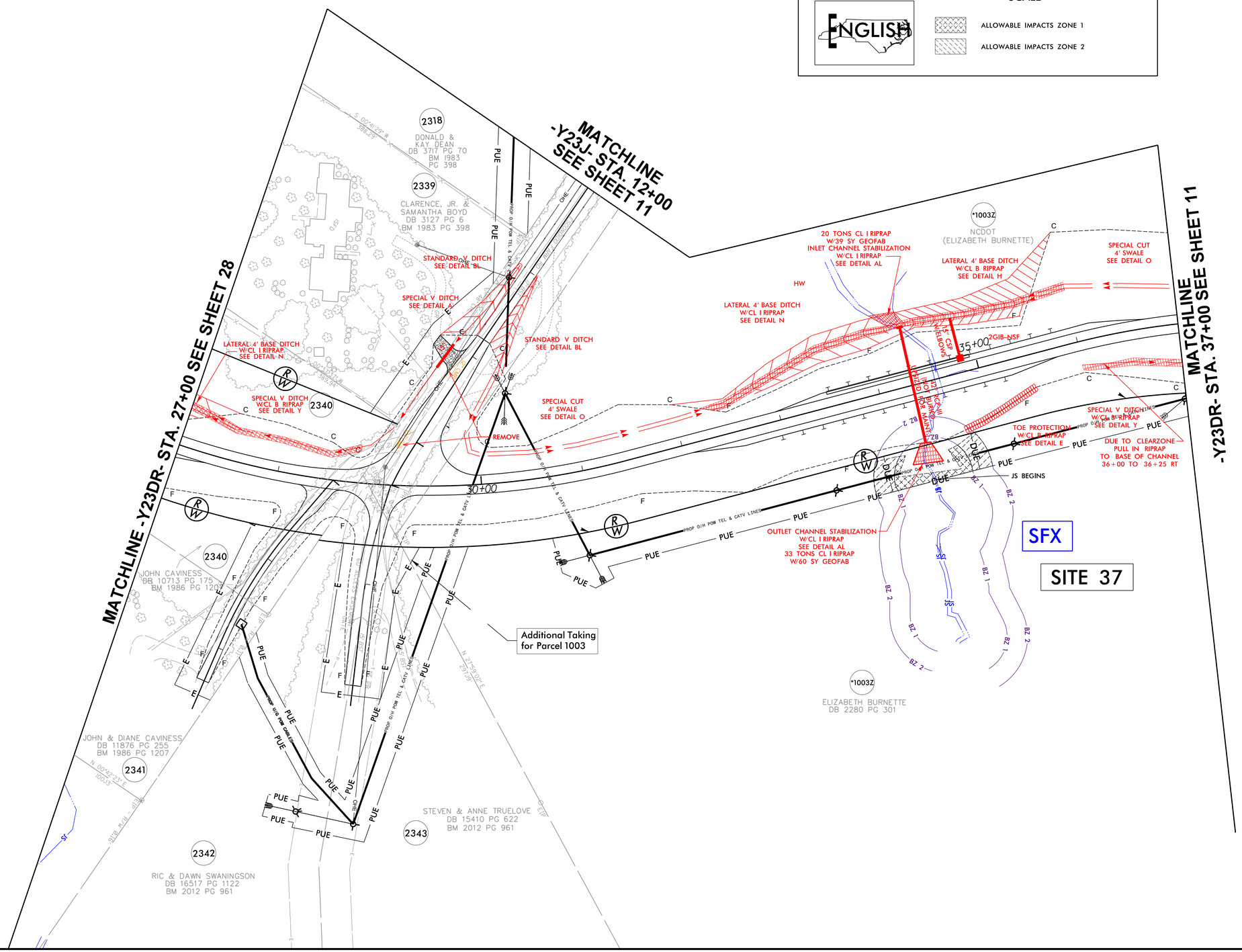
NAD 83/NA 2011

50 0 50 100
SCALE

ENGLISH

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2



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Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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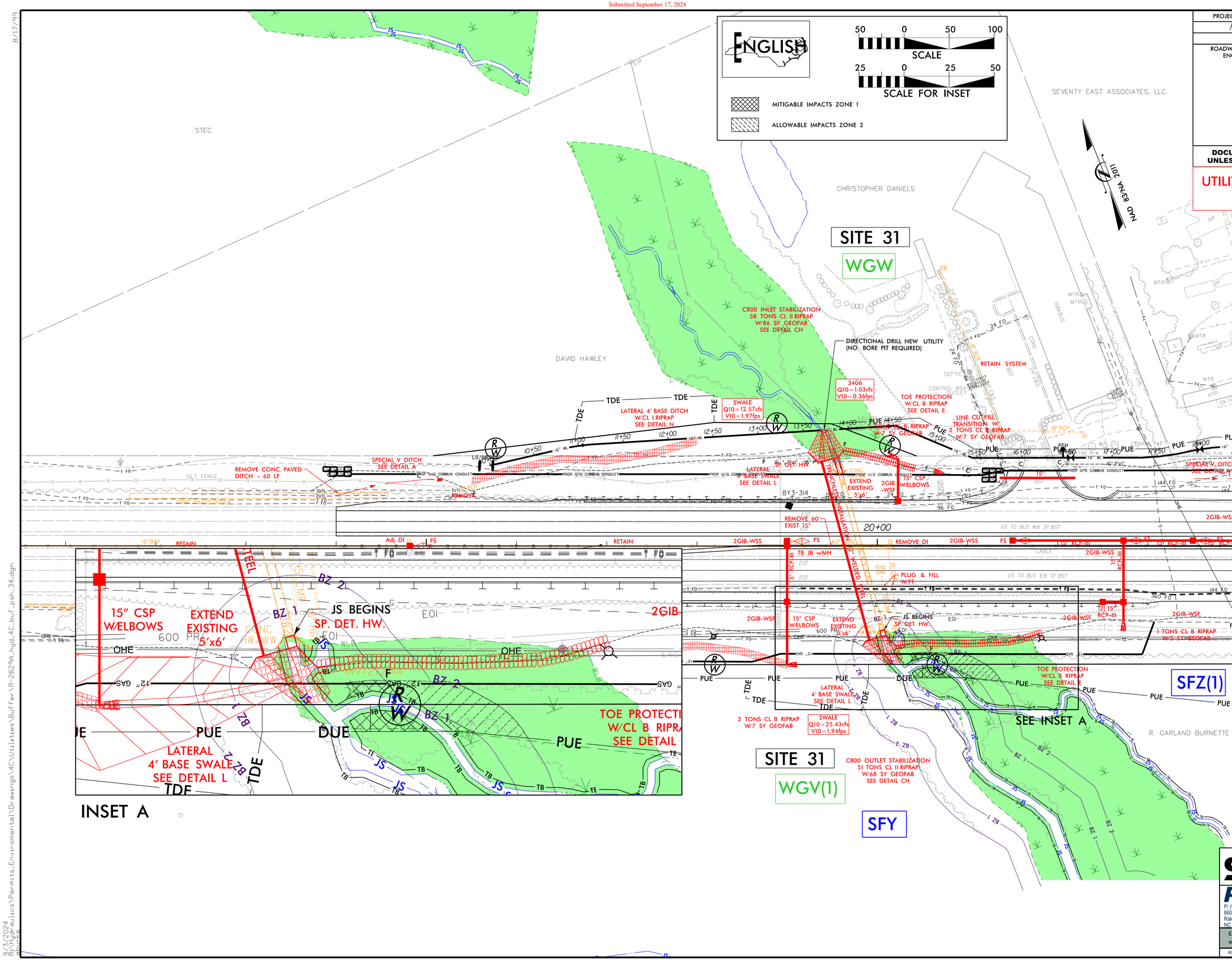
UTILITY BUFFER DRAWING SHEET 7 OF 10



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Submitted September 17, 2024

PROJECT REFERENCE NO.	SHEET NO.
R-2829A	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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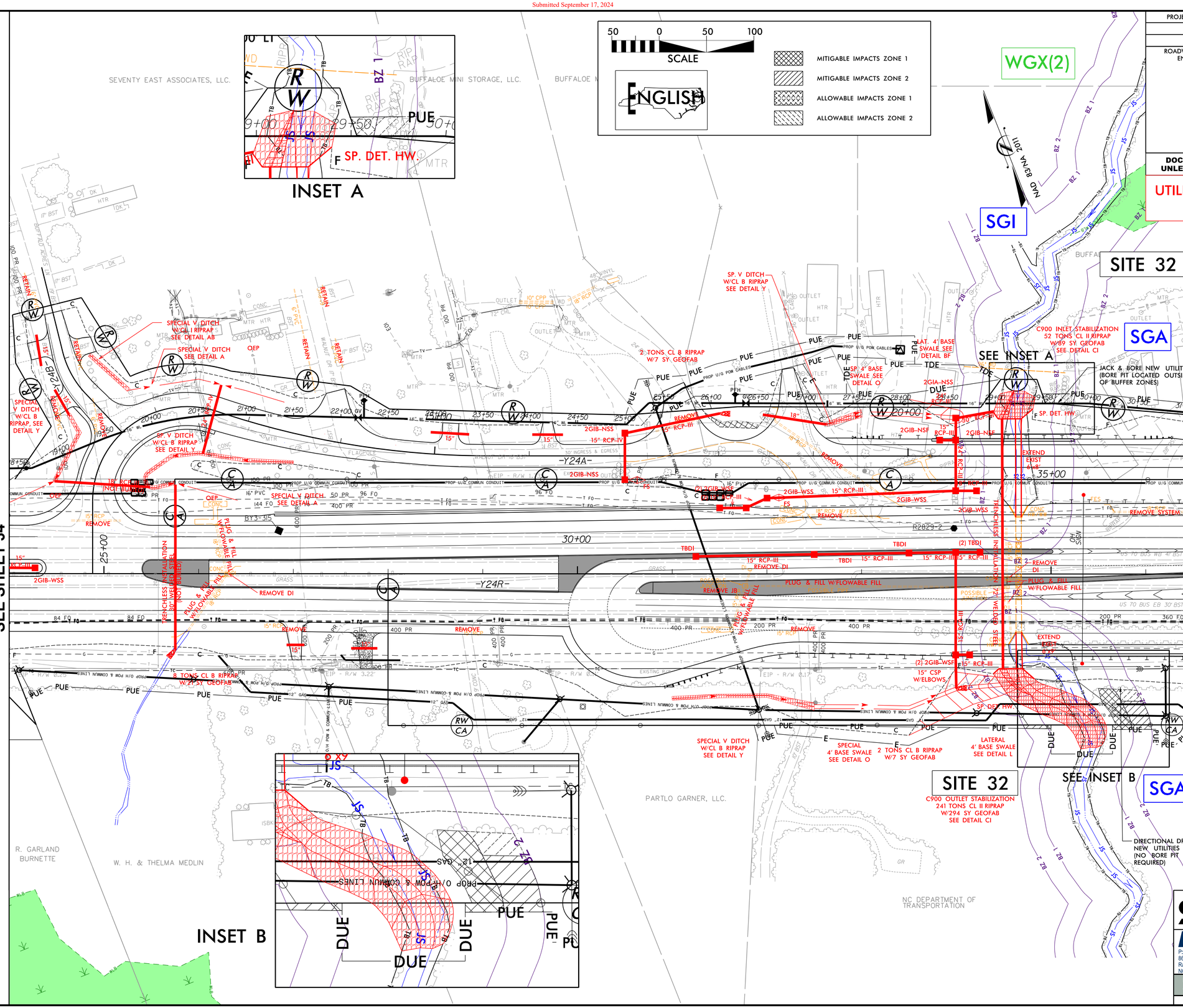
UTILITY BUFFER DRAWING SHEET 8 OF 10



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8/17/99

8/31/2024
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Submitted September 17, 2024

RIPARIAN BUFFER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	IMPACTS									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
12	-Y23DR- 45+55- 48+40 RT	Overhead Power: SFC	X						10341	5473	15814		
20	-Y24R- 39+28 - 40+20 RT	Overhead Power, UG Gas & Telephone: SFT	X						4679	2964	7643		
	-Y24RPDR- 24+84 - 25+03 LT	Overhead Power: SFT	X				249	249					
24	-L1- 1162+12 - 1163+45 RT	Overhead Power: SGD, WHC	X						2110	1268	3378		
29	-Y23R- 60+10- 61+74 LT	Overhead Power: SFJ	X						1983	2013	3996		
31	-Y24R- 20+37 - 21+38 RT	UG Gas: SFY, WGV(1)	X				1174	1174	590		590		
32	-Y24R- 34+93 - 35+25 LT	UG Waterline: SGA	X			118	232	350					
	-Y24R- 35+50 - 36+06 RT	UG Gas, UG Telephone & Overhead Power: SGA	X				280	280	815	727	1542		
37	-Y23DR- 33+72 - 34+89 RT	Overhead Power: SFX	X			1018	706	1724					
TOTALS*:						**1136**	**2641**	**3777**	**20518**	**12445**	**32963**	**0**	**0**

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9/4/2024
Wake County
R-2829A

Revised 2018 Feb

WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)		WETLANDS IN BUFFERS ZONE 1 (ft^2)	WETLANDS IN BUFFERS ZONE 2 (ft^2)
24	-L1- 1162+12 RT		715	
31	-Y24R- 20+50 RT		532	1174
TOTAL:			**1247**	**1174**

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Rev. Jan 2009