



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

February 21, 2019

U. S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28805

ATTN: Ms. Nicholle Braspennickx
NCDOT Coordinator

Dear Madam:

Subject: **Application for an Individual Section 404 and Section 401 Water Quality Certification** for the extension and relocation of NC 84 from NC 16 to SR 1008 (Waxhaw-Indian Trail Road) in Union County. Federal Aid Project No. STP-1316(10), Division 10, TIP No. U-3467. Debit \$570 from WBS 39019.1.1.

The North Carolina Department of Transportation (NCDOT) is proposing to extend Rea Road (SR 1316) on new location from NC 16 in Weddington to NC 84 (the new location roadway would be designated as NC 84), and widen existing NC 84 to just beyond Waxhaw-Indian Trail Road (SR 1008) in Wesley Chapel. In addition, a roundabout is proposed at Hardwood Drive. The proposed project is approximately 4.7 miles long.

Please see the enclosed ENG 4345, Division of Mitigation Services (DMS) mitigation acceptance letter, permit drawing review minutes (4B), State Historic Preservation Office (HPO) concurrence forms, State Stormwater Management Plan (SMP), permit drawings, reforestation plans, utility drawings, and design plans for the above referenced project.

Purpose and Need:

The purpose of the proposed project is to improve the mobility and connectivity of Weddington Road (NC 84) in the project study area.

Mobility refers to the movement of people or goods. The measure of performance for evaluating an improvement in mobility along NC 84 in the project area will be level of service (LOS). The proposed project is intended to bring the peak hour operations at study area intersections to an overall LOS D or better.

Connectivity refers to the density of connections in road networks and the directness of links. Improvements to connectivity reduce travel distances and times and provide enhanced route options for travelers and service providers.

Traffic volumes in 2035 are expected to exceed capacity on NC 84 in the project area. In addition, vehicles traveling west on existing NC 84 to Rea Road must follow a longer, indirect route. Currently, westbound traffic on NC 84 must turn left onto NC 16, travel approximately 0.75 mile, and then turn right onto Rea Road. The proposed project is included in the Western Union County Local Area Regional Transportation Plan as NC 84 Relocation (Rea Road Extension). The Plan ranks U-3467 as the No. 1 High Priority Recommended Thoroughfare Plan project.

The proposed project would improve connectivity by providing a more direct link between western Union County and Charlotte/Mecklenburg County. It would provide an alternate route to I-485 and Charlotte, enhancing regional travel options. The proposed project would also provide additional capacity, improving level of service and mobility, on NC 84 in the project area.

Summary of Jurisdictional Impacts:

This project will result in 1,335 linear feet of permanent stream impacts, 401 linear feet of stream bank stabilization, and 0.05 acre (224 linear feet) of temporary stream impacts. There will also be 0.23 acre of permanent wetland impacts, 0.07 acre of permanent open water impacts, and 0.02 acre of temporary open water impacts.

Summary of Utility Impacts:

There will be 0.01 acre of temporary stream impacts associated with the relocation/installation of water line and gravity sewer line utilities.

Summary of Mitigation:

The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the National Environmental Policy Act (NEPA) and design processes. However, project impacts will necessitate compensatory mitigation for the unavoidable impacts. Mitigable impacts include 1,335 linear feet of permanent stream impacts and 0.23 acre of permanent wetland impacts (see Tables 2 and 4). DMS will provide all required mitigation for this project.

NEPA DOCUMENT STATUS

An Environmental Assessment (EA) was completed for this project in May 2015. A Finding of No Significant Impact (FONSI) was completed in April 2018. Additional copies will be provided upon request.

In compliance with the NEPA/404 Merger Process, Concurrence Point 4B was reached on December 13, 2017. It was determined during the 4B meeting that a 4C meeting would not be necessary.

PROJECT SCHEDULE

This project calls for a letting date of September 17, 2019 and a review date of July 30, 2019.

INDEPENDENT UTILITY

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

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

RESOURCE STATUS

Waters within the project area are located in the Catawba River Basin (HUC 03050103). There are no Outstanding Water Resource Waters (ORW), High Quality Waters (HQW), or Water Supply Waters (WS-I or WS-II) within 1.0 mile downstream of the project area. Three named streams as well as their unnamed tributaries are located within the construction footprint (Table 1).

Wetland and stream determinations within U-3467 were conducted using the field delineation method outlined in the 1987 Corps of Engineers Wetland Delineation Manual, the Eastern Mountains and Piedmont Supplement, and the 2010 NCDWR Stream ID Manual. Mr. Steve Kichefski (USACE), Ms. Crystal Amschler (USACE) and Mr. Alan Johnson (NCDWR) verified the water resources on April 4, 2014 and June 19, 2014. A Preliminary Jurisdictional Determination (PJD) was issued by the USACE on September 23, 2014 (Action ID SAW-2013-02321).

Table 1 – Impacted project area streams

Stream Name	Stream Index Number	Best Usage Classification	Description
Mundys Run	11-138-1-2	C	From source to West Fork Twelvemile Creek
Culvert Branch	11-138-1-1	C	From source to West Fork Twelvemile Creek
West Fork Twelvemile Creek	11-138-1	C	From source to Twelvemile Creek

303(d) Impaired Waters:

No streams within or within 1.0 mile downstream of the project area are identified on the North Carolina 2016 Final 303(d) list of impaired waters.

IMPACTS TO WATERS OF THE U.S.

Tables 2, 3 and 4 summarize the impacts to jurisdictional water resources for U-3467. Site numbers correspond with the permit (hydraulic) drawings included in this application. The wetland, pond and stream numbers correspond to the NRTR. A brief description of each impact site will follow the tables.

Table 2 – U-3467 Wetland Impacts*

Site	Wetland Number	Wetland Size (ac)	Permanent Fill in Wetlands (ac)	Excavation (ac)	Mechanized Clearing (ac)	Impacts Requiring Mitigation (ac)
2	WP	0.46	<0.01	--	0.01	0.02
3	WP	0.46	--	<0.01	<0.01	<0.01
4 ¹	WN-1	0.38	--	0.10	0.03	0.14
6 ²	WN-2	0.07	0.07	--	<0.01	0.07
9	WY	0.30	<0.01	--	<0.01	<0.01
Total Wetland Impacts			0.07	0.10	0.06	0.23³

* All wetlands impacted are riparian

¹ Partial loss of northern portion of wetland

² Total take of wetland

³ Values are based on rounding, due to calculating totals with actual numbers to the thousandths

Table 3 – U-3467 Open Water Impacts*

Site	Pond ID	Pond Size (ac)	Temporary Impacts (ac)	Permanent Impacts (ac)
6	PI	0.83	0.02	0.07
Total Open Water Impacts			0.02	0.07

* No mitigation required for open water impacts

Table 4 – U-3467 Stream Impacts

Permit Site	Stream Name/ NRTR ID	Status/ Class	Permanent		Temporary Channel Impacts ac(lf)	ACOE Required Mitigation lf	DWR Required Mitigation lf
			Channel Impacts lf(ac)	Bank Stabilization lf(ac)			
1	UT to Mundys Run SS	Perennial C	333 (0.04)	--	<0.01 (26)	333	333
2	N/A (wetland only)	--	--	--	--	--	--
3	N/A (wetland only)	--	--	--	--	--	--
4	N/A (wetland only)	--	--	--	--	--	--
5	UT to Mundys Run SP	Intermittent C	214 (0.02)	--	<0.01 (10)	214	0
6	N/A (wetland/pond only)	--	--	--	--	--	--
7	UT to Mundys Run SAD	Intermittent C	175 (0.02)	--	<0.01 (20)	175	0
8	Mundys Run	Perennial C	136 (0.04)	94 (0.03)	<0.01 (38)	136	0
8A	UT to Mundys Run SK	Perennial C	--	33 (<0.01)	<0.01 (10)	0	0
9	N/A (wetland only)	--	--	--	--	--	--
10	Culvert Branch	Perennial C	110 (0.03)	160 (0.03)	<0.01 (21)	110	0
11	West Fork Twelvemile Creek	Perennial C	273 (0.08)	114 (0.03)	0.02 (94)	273	387
12	UT to West Fork Twelvemile Creek SZ	Intermittent C	94 (0.01)	--	<0.01 (5)	94	0
Total Stream Impacts			1335	401	0.05* (224)	1335 [†]	720 [†]
			1736				

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

† Final mitigation requirement will be up to the USACE and DWR

Permit Site 1: The new roadway in this location will necessitate installing a 54” reinforced concrete pipe (RCP) to carry stream SS under the road. This will result in 333 linear feet (lf) of permanent stream impacts from the RCP and a short section of channel tie-in at the pipe outlet and <0.01 acre (26 lf) of temporary stream impacts to stream SS.

Permit Site 2: Roadway slopes from the new roadway and a riprap pad from the outlet of an 18” RCP will result in <0.01 acre of permanent wetland fill and 0.01 acre of mechanized clearing in wetland WP.

Permit Site 3: Roadway slopes from the new roadway will result in <0.01 acre of wetland excavation and <0.01 acre of mechanized clearing in wetland WP.

Permit Site 4: Roadway slopes from the new roadway in addition to a constructed tail ditch at the outlet of a new 36” RCP will result in 0.10 acre of wetland excavation and 0.03 acre of mechanized clearing in wetland WN-1. Two small slivers of the northern portion of this wetland

will potentially have their hydrology cut off as a result of these activities, and this partial loss of wetland has been incorporated into the impact numbers at this site.

Permit Site 5: Intermittent stream SP will be carried under the new roadway via 36" RCP. This stream begins just north of the new alignment. This will result in 214 lf of permanent stream impacts and <0.01 acre (10 lf) of temporary stream impacts to SP from the installation of the RCP.

Permit Site 6: The new roadway in this location will result in 0.07 acre of permanent wetland fill and <0.01 acre of mechanized clearing in wetland WN-2, resulting in a total take of this wetland. Acreage from the total take has been incorporated into the impact numbers at this site. The new roadway at this site will also result in 0.07 acre of permanent open water fill impacts and 0.02 acre of temporary open water impacts to a portion of pond PI.

Permit Site 7: The new roadway in this location will necessitate installing a 30" RCP to carry intermittent stream SAD under the road. This will result in 175 lf of permanent stream impacts and <0.01 acre (20 lf) of temporary stream impacts to stream SAD.

Permit Site 8: Mundys Run will be carried in a new 2 @ 11'x8' reinforced concrete box culvert (RCBC) under the new roadway in this location. There will be 136 lf of permanent stream impacts from the new culvert and 94 lf of stream bank stabilization to Mundys Run at the inlet and outlet of the RCBC. There will also be <0.01 acre (38 lf) of temporary stream impacts to Mundys Run.

Permit Site 8A: There will be 33 lf of stream bank stabilization and <0.01 acre (10 lf) of temporary stream impacts to stream SK as a result of installing and stabilizing the nearby culvert carrying Mundys Run.

Permit Site 9: Roadway slopes from the new roadway will result in <0.01 acre of permanent wetland fill and <0.01 acre of mechanized clearing to wetland WY.

Permit Site 10: The existing RCBC carrying Culvert Branch will be replaced with a new 3 @ 12'x7' RCBC to accommodate the wider roadway. This will result in 110 lf of permanent stream impacts, 160 lf of stream bank stabilization, and <0.01 acre (21 lf) of temporary stream impacts to Culvert Branch.

Permit Site 11: The existing RCBC carrying West Fork Twelvemile Creek will be removed and replaced with a new two-span, 220 foot-long, pre-stressed concrete girder bridge. There will be a constructed riffle in the location where the RCBC was removed. In addition to this, the new roadway slopes will necessitate relocating a portion of West Fork Twelvemile Creek downstream of the new bridge. The portion of channel that is relocated will be stabilized and reforested (see reforestation plans following the permit drawings). There will also be a small amount of stream bank stabilization to West Fork Twelvemile Creek in the southeast quadrant to stabilize a ditch outlet. Impacts from all these activities total 273 lf of permanent stream impacts, 114 lf of stream bank stabilization, and 0.02 acre (94 lf) of temporary stream impacts to West Fork Twelvemile Creek.

Permit Site 12: The 42" RCP that currently outlets intermittent stream SZ will be replaced and extended with a 60" RCP resulting in 94 lf of permanent stream impacts and <0.01 acre (5 lf) of temporary stream impacts to stream SZ.

U-3467 Utility Impacts:

There will be 0.01 acre (16 lf) of temporary stream impacts to West Fork Twelvemile Creek associated with the relocation/installation of water and gravity sewer lines at Utility Site 1 (see Table 5 and attached utility drawings). This impact site involves the installation of utility lines via open trench method. A portion of these temporary utility impacts overlaps with some of the bank stabilization impacts identified in Permit Site 11. No mitigation is required for this utility relocation activity as it is temporary and does not constitute a loss of water.

Table 5 – U-3467 Utility Impacts

Site	Stream/ Wetland ID	Impact Type	Temporary Stream Impact (ac)(ft)**	Permanent Stream Impact (ft)	Impacts Requiring Mitigation (ft)
U1*	West Fork Twelvemile Creek	Open Trench	0.01 (16)	0	0
Total Impacts:			0.01 (16)	0	0

* Site partially overlaps with impacts at Permit Site 11

** Values are based on rounding, due to calculating totals with actual numbers to the thousandths

MORATORIUM

There are no trout waters or watersheds within the project area. Therefore, no moratoria are required for this project.

FEDERALLY PROTECTED SPECIES

Plants and animals with Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of June 27, 2018, the USFWS lists three federally protected species for Union County (Table 6).

Table 6 – Federally protected species listed for Union County

Scientific Name	Common Name	Federal Status*	Habitat Present	Biological Conclusion
<i>Lasmigona decorata</i>	Carolina heelsplitter	E	Yes	No Effect
<i>Rhus michauxii</i>	Michaux's sumac	E	Yes	No Effect
<i>Helianthus schweinitzii</i>	Schweinitz's sunflower	E	Yes	No Effect

*E – Endangered

Summary of Species with Habitat:

Carolina heelsplitter: Mussel surveys for this species were conducted in August 2013, August 2017, and October 2017. Based on relatively poor habitat quality, extremely low mussel taxa diversity and abundances, and isolation of the surveyed stream reaches from known occurrences, the mussel surveys determined that the project will have no effect on Carolina heelsplitter.

Michaux's sumac: Walking visual surveys of all areas of potential habitat were conducted in September 2013, October 2015, and October 2017. No individuals of this species were identified within the project during any of the surveys.

Schweinitz's sunflower: Walking visual surveys of all areas of potential habitat were conducted in September 2013, October 2015, October 2017. No individuals of this species were identified within the project during any of the surveys.

INDIRECT CUMULATIVE IMPACT ANALYSIS

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

An Indirect and Cumulative Effects Screening Report was prepared for this project in June 2013. In addition, a Community Characteristics Report was completed in July 2012. Copies of these reports are available upon request.

Based on the information analyzed, there is a lower level of concern for indirect and cumulative effects potential as a result of the proposed project. Therefore, further examination of indirect and cumulative effects is not likely to be warranted.

Indirect and Cumulative Effects to the Human Environment

The project is expected to reduce travel times (by less than five minutes) and the new location portion of the project will provide new access to parcels in the western portion of the study area, including the proposed Woods development. The new connection of NC 84 to Rea Road has the potential to alter travel patterns, particularly in the western portion of the study area, since it will provide an alternate route to I-485 and Charlotte via Rea Road. Development projects in the study area are not necessarily dependent upon construction of the project since the available land and proposed subdivisions in the study area have access to existing roadways. However, development of available land in the western portion of the study area, particularly the proposed Woods development, would likely benefit from the increased exposure and access provided by the new location portion of the project.

Indirect and Cumulative Effects to the Natural Environment

There are three named streams within the project study area, two of which are crossed by the existing alignment of NC 84 and one that will be crossed by the new location portion of the project. There is potential for direct or indirect impacts to water resources as a result of the proposed project. However, use of best management practices during construction, such as NCDOT's BMP-PSW, will minimize direct water quality impacts. Direct natural environmental impacts are addressed programmatically through avoidance, minimization, and mitigation actions consistent with agreements with environmental resource and regulatory agencies and will be further evaluated by the NCDOT Natural Environment Unit during project permitting.

Indirect effects, in the form of changes in land use, will be mitigated by existing development regulations such as ordinances that limit development in designated floodplains and require riparian buffers along streams (see Section 5.1.2.4). The project is located in an urbanizing area

where growth and infill development are planned for, and anticipated by local governments. The proposed project is in accordance with local plans and will support planned growth and development through increased network connectivity. All present and future projects within the project study area must be consistent with local land use plans and development ordinances.

CULTURAL RESOURCES

Historic Architectural Resources:

The potential effect of the preferred alternative (Alternative CA2) on historic architectural resources was evaluated in accordance with Section 106 of the Historic Preservation Act at a meeting on March 20, 2018, with the NC HPO finding:

- The preferred alternative would have No Effect on the John Walker Matthews House.
- The preferred alternative would have No Adverse Effect to Howard House with the condition that construction fencing shall be erected at the back of the ditch line. No work shall take place in, and no utilities shall encroach into, the historic boundary.
- The preferred alternative would have No Adverse Effect to Jacob Allen Deal Farm with the condition of a 25-foot buffer from the historic boundary, delineated by construction fencing erected at the back of the ditch line. The fencing shall extend 500 feet from each access drive, or to the property boundary, whichever is closer.

Determinations regarding the preferred alternative are summarized in HPO's March 20, 2018 concurrence form (attached). No additional historic sites on or eligible for the NRHP were identified in the expanded study area. The Union County Historic Preservation Commission designated Siler Presbyterian Church and the 5.06- acre parcel it is located on at the intersection of NC 84 and Waxhaw-Indian Trail Road as a local Historic Landmark in February 2018. In accordance with North Carolina General Statute 160A-400.9, the Union County Historic Preservation Commission requires that the property owner obtain a Certificate of Appropriateness prior to alterations to exterior features. NCDOT will coordinate with Siler Presbyterian Church to verify a Certificate of Appropriateness for the proposed project's effects on the property has been obtained from the Union County Historic Preservation Commission prior to construction adjacent to the designated parcel.

Archaeological Resources:

An archaeological survey and evaluation of the proposed improvements was conducted from March 20 to June 14, 2017, by qualified archaeologists. As a result of the investigations, 43 new archaeological sites were recorded within the project's area of potential effects (APE). Three of the archaeological sites (31UN400, 31UN402, and 31UN405**) are located within the Preferred Corridor; however, all three sites are recommended Not Eligible for the National Register of Historic Places (NRHP). No further work is recommended at these locations. Two sites recorded were cemeteries (31UN382** and 31UN383**). Both cemeteries (neither of which are recommended eligible for the NRHP) are located well outside of the Preferred Corridor and will not be affected by the project. None of the remaining archaeological sites recorded during the investigation are recommended eligible for the NRHP.

A map review of the extended project study area at the eastern project terminus was conducted on February 27, 2017. A small area east of Wesley Chapel Town Hall was outside of the limits of the initial survey. Based on the existing archaeological site profile produced from the original

survey, the amount of disturbance within the added project area, and the diminutive nature of the proposed construction impacts at this location, no further archaeological consultation or work is advocated. Intact, NRHP eligible archaeological resources are unlikely to be present or preserved in the eastern project area addition.

There are no National Register listed archaeological sites within the project's APE. Subsurface investigations did not reveal the presence of any archaeological resources considered eligible for the National Register. All identified archaeological sites located within the APE have been considered and all compliance for archaeological resources with Section 106 of the National Historic Preservation Act and GS 121-12(a) has been completed for this project. No additional archaeological work is recommended.

Section 6(f) Resources

There are no Section 6(f) properties in the project area.

Section 4(f) Resources

Section 4(f) of the US Department of Transportation Act of 1966 specifies that publicly owned land from a public park, recreation area, wildlife and waterfowl refuge, and all historic sites of national, state, and local significance may be used for federal projects only if there is no feasible and prudent alternative to the use of such land (23 CFR 774.3(a)(1)) and the project includes all possible planning to minimize impacts to 4(f) lands resulting from such use (23 CFR 774.3(a)(2)).

Federal law (SAFETEA-LU Section 6009(a)) amended Section 4(f) to simplify the processing and approval of projects that have only de minimis impacts on lands protected by Section 4(f). Under the new provisions, once the US Department of Transportation (USDOT) determines that a transportation use of Section 4(f) property results in a de minimis impact, analysis of avoidance alternatives is not required and the Section 4(f) evaluation process is complete (FHWA, 2014).

John Walker Matthews House, Howard House and Jacob Allen Deal Farm are subject to Section 4(f) requirements because they have been determined Eligible for the NRHP. No work will be performed in the vicinity of John Walker Matthews House. The HPO found Alternatives A2 and C2 would have No Effect on the property on October 28, 2014. Preferred Alternative CA2 follows the same alignment as Alternative A2 in the vicinity of John Walker Matthews House. The HPO found Alternative CA2 would have No Effect on the property on March 20, 2018.

The preliminary designs for Detailed Study Alternatives A2 and C2 were revised to avoid impacts to Howard House. Construction of the proposed project would result in no impacts to the property. The HPO determined Alternatives A2 and C2 would have No Adverse Effect on Howard House on October 28, 2014 with conditions. Preferred Alternative CA2 follows the same alignment as Alternative A2 in the vicinity of Howard House. The HPO found Alternative CA2 would have No Adverse Effect on the property, with the previously identified conditions, on March 20, 2018.

The preliminary designs for Detailed Study Alternatives A2 and C2 were revised to minimize impacts to Jacob Allen Deal Farm. Alternative A2 would impact 0.2 acre of the property and Alternative C2 would impact 0.56 acre of the property. On October 28, 2014, NCHPO determined Alternatives A2 and C2 would have No Adverse Effect on Jacob Allen Deal Farm with conditions. Preferred Alternative CA2 generally follows the same alignment as Alternative A2 in the vicinity

of Jacob Allen Deal Farm. The HPO found Alternative CA2 would have No Adverse Effect on the property, with the previously identified conditions, on March 20, 2018.

As noted above, under Section 4(f) historic sites of national, state, and local significance cannot, in most cases, be disrupted by highway projects unless it can be shown there are no feasible and prudent alternatives to doing so. FHWA may make a de minimis impact determination in cases where a Section 106 finding of “no adverse effect” or “no historic properties affected” on historic properties is made with the concurrence of the HPO and other parties participating in the consultation.

As identified on the October 28, 2014 Concurrence Form for Assessment of Effects (see attached), FHWA indicated its intent to use HPO’s concurrence as a basis for a de minimis finding for Jacob Allen Deal Farm, pursuant to Section 4(f). The FHWA and NCDOT provided notice of a proposed de minimis impact determination under Section 4(f) for the proposed project’s potential effect on Jacob Allen Deal Farm to the public in a newsletter and meeting materials associated with NCDOT’s U-3467 January 2016 public hearing. FHWA has determined the proposed project’s use of Jacob Allen Deal Farm results in a de minimis impact, thus completing Section 4(f) evaluation process.

Dogwood Park is located on the southeast corner of the NC 84/Lester Davis Road intersection in the Village of Wesley Chapel (see Figure 2I). The park is a Section 4(f) resource because the property is owned by the Village of Wesley Chapel and operated as a public park. By shifting the roadway alignment to avoid impacts to Wesley Chapel Weddington Athletic Association (WCWAA) ballfields and church parking, the proposed project will, to some extent, affect public park resources at Dogwood Park.

As noted above, Section 4(f) of the Department of Transportation Act of 1966 gives special protection to public parks and recreational resources. Under Section 4(f), these resources cannot, in most cases, be disrupted by highway projects unless it can be shown there are no feasible and prudent alternatives to doing so. The FHWA may make a de minimis impact determination in cases where the official with jurisdiction over the park or recreational property concurs that the project would not adversely affect the property. FHWA also considers public comments when evaluating a de minimis impact determination under Section 4(f).

Dogwood Park was developed using monies from the Parks and Recreation Trust Fund (PARTF). PARTF funding rules require that land only be used for public recreation but allow for conversion to other uses if approved by the NC Department of Natural and Cultural Resources (DNCR).

Notice of the proposed PARTF Conversion and potential Section 4(f) impact at Dogwood Park was provided to the public in a newsletter and meeting materials associated with NCDOT’s U-3467 June 2017 public meeting. Community input received during the subsequent public comment period overwhelmingly favored the proposed conversion of PARTF-assisted land at Dogwood Park to save WCWAA Optimist Park ball fields and Southbrook Church parking. The NC DNCR approved the PARTF conversion on September 13, 2018.

The Village of Wesley Chapel was notified of the FHWA's intent to make a de minimis impact finding regarding the effect the proposed NC 84 – Rea Road Extension project will have on a portion of Dogwood Park. In a February 12, 2018 letter to the RRS, the Mayor of the Village of

Wesley Chapel, as the official with jurisdiction over Dogwood Park, concurred with the determination the proposed project will not adversely affect the activities, features or attributes that qualify Dogwood Park for protection under Section 4(f) of the Department of Transportation Act, as amended. Based on this concurrence, FHWA makes a de minimis finding regarding impacts to Dogwood Park, thus satisfying the requirements of Section 4(f).

FEMA COMPLIANCE

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

WILD AND SCENIC RIVER SYSTEM

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

MITIGATION OPTIONS

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

Avoidance and Minimization:

NCDOT has avoided impacting many wetlands and streams and reduced impacts to wetlands and streams to the greatest extent practicable, especially in the development of the new location alignment of this project. Specific examples of avoidance and minimization measures include:

- The new location alignment was adjusted to avoid the confluence of stream SK and Mundys Run.
- Intersection improvements at NC 84 and Lester Davis Road were designed to avoid a major hydraulic crossing of a UT to West Fork Twelvemile Creek.
- Impacts to stream SR and SV were eliminated by shifting the alignment north of these streams.
- The alignment was shifted to a more perpendicular crossing at stream SS, reducing impacts by several hundred feet.
- Impacts to stream SP were reduced by shifting the alignment to the north of pond PI.
- Shifting the new alignment to the north also reduced impacts to stream SAD and Mundys Run.
- The RCBC carrying West Fork Twelvemile Creek will be replaced with a spanning bridge and there will be a constructed riffle where the RCBC is removed. There will be no deck drains on the new bridge discharging directly into the creek.
- The portion of West Fork Twelvemile Creek that has to be relocated due to the new roadway slopes will be stabilized and reforested.

- The proposed stormwater runoff from the proposed roadway is conveyed via storm drainage systems to ditches prior to outletting at jurisdictional resources.
- Non-erosive velocities are attained at locations where ditches/systems discharge prior to wetlands.
- Best Management Practices (BMPs) will be utilized during construction to attempt to reduce the stormwater impacts to receiving streams and wetlands due to erosion and runoff.

Compensation:

The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. Tables 2, 3, and 4 summarize the wetland, open water, and stream impacts for this project as well as a breakdown of the impacts requiring mitigation by the USACE and NCDWR. This project will permanently impact 0.23 acre of wetlands, 0.07 acre of open water, and 1,736 linear feet of streams (1,335 linear feet of permanent fill and 401 linear feet of bank stabilization). This project will temporarily impact 0.02 acre of open water and 0.05 acre of streams.

Per Tables 2 and 4, the total mitigation required by the USACE is 0.23 acre of wetlands and 1,335 linear feet of streams. The DMS will provide compensatory mitigation for these impacts.

REGULATORY APPROVALS

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

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

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Erin Cheely at ekcheely@ncdot.gov or (919) 707-6108. A copy of this application and distribution list will also be posted on the NCDOT website at: <http://connect.ncdot.gov/resources/Environmental/Pages>.

Sincerely,

Carla Dagnino

for Philip S. Harris III, P.E., C.P.M.
Environmental Analysis Unit Head

cc:

NCDOT Permit Application Standard Distribution List

U.S. Army Corps of Engineers (USACE) APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT 33 CFR 325. The proponent agency is CECW-CO-R.		Form Approved - OMB No. 0710-0003 Expires: 01-08-2018	
The public reporting burden for this collection of information, OMB Control Number 0710-0003, is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil . Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR APPLICATION TO THE ABOVE EMAIL.			
PRIVACY ACT STATEMENT			
Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned. System of Record Notice (SORN). The information received is entered into our permit tracking database and a SORN has been completed (SORN #A1145b) and may be accessed at the following website: http://dpcl.dod.mil/Privacy/SORNSIndex/DOD-wide-SORN-Article-View/Article/570115/a1145b-ce.aspx			
(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)			
1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
(ITEMS BELOW TO BE FILLED BY APPLICANT)			
5. APPLICANT'S NAME First - Philip Middle - S Last - Harris III Company - NCDOT E-mail Address -		8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required) First - Middle - Last - Company - E-mail Address -	
6. APPLICANT'S ADDRESS: Address- 1548 Mail Service Center City - Raleigh State - NC Zip - 27699 Country - USA		9. AGENT'S ADDRESS: Address- City - State - Zip - Country -	
7. APPLICANT'S PHONE NOs. w/AREA CODE a. Residence b. Business c. Fax 919-707-6000 919-212-5785		10. AGENTS PHONE NOs. w/AREA CODE a. Residence b. Business c. Fax	
STATEMENT OF AUTHORIZATION			
11. I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.			
_____ SIGNATURE OF APPLICANT		_____ DATE	
NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY			
12. PROJECT NAME OR TITLE (see instructions) U-3467			
13. NAME OF WATERBODY, IF KNOWN (if applicable) Mundys Run, Culvert Branch, WF Twelvemile Creek, and UTs		14. PROJECT STREET ADDRESS (if applicable) Address	
15. LOCATION OF PROJECT Latitude: °N 35.003613 Longitude: °W -80.736275		City - State- Zip-	
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) State Tax Parcel ID Municipality Section - Township - Range -			

17. DIRECTIONS TO THE SITE

Please see attached vicinity map and cover letter.

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

The North Carolina Department of Transportation (NCDOT) proposes to extend Rea Road (SR 1316) on new location from NC 16 in Weddington to NC 84 (the new location roadway would be designated as NC 84), and widen existing NC 84 to just beyond Waxhaw-Indian Trail Road (SR 1008) in Wesley Chapel. See attached cover letter and permit drawings for more details regarding project and stream and wetland impacts.

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

The purpose of this project is to improve the mobility and connectivity of Weddington Road (NC 84). Traffic volumes in 2035 are expected to exceed capacity on NC 84 in the project area. In addition, vehicles traveling west on existing NC 84 to Rea Road must follow a longer, indirect route.

The proposed project is intended to bring the peak hour operations at study area intersections to overall level of service (LOS) D or better. The proposed project would improve connectivity by providing a more direct link between western Union County and Charlotte/Mecklenburg County. It would also provide additional capacity, improving LOS and mobility on NC 84 in the project area.

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

20. Reason(s) for Discharge

Impacts will result from constructing roadway on a new alignment, widening the existing roadway and shoulders, and lengthening/replacing hydraulic structures.

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

Type	Type	Type
Amount in Cubic Yards	Amount in Cubic Yards	Amount in Cubic Yards

See attached cover letter.

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

Acres

or

Linear Feet See attached cover letter.

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

See attached cover letter.

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

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

a. Address- See attached permit drawings.

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

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

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

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

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

Carla Dagnino 2/21/2019

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE
for Phil S. Harris, PE
The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

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



NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

TIM BAUMGARTNER
Director

February 19, 2019

Mr. Philip S. Harris, III, P.E.
Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Subject: Mitigation Acceptance Letter:

U-3467, SR 1316 (Rea Road Extension) from NC 16 to SR 1008 (Waxhaw – Indian Trail Road) in Wesley Chapel, Mecklenburg County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the compensatory stream and wetland mitigation for the subject project. Based on the information supplied by you on February 18, 2019, the impacts are located in CU 03050103 of the Catawba River basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

Catawba 03050103 SP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	0	1,335.0	0.23	0	0	0	0

*Some of the stream and/or wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

DMS commits to implementing sufficient compensatory stream and wetland 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 and consistent with the Guidance for Expanded Service Area for Mitigating Impacts within the Lower Catawba River Basin approved by the IRT. 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 DMS.

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

Sincerely,

James B. Stanfill
DMS Asset Management Supervisor

cc: Mr. Monte Matthews, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, NCDWR
File: U-3467



Subject: U-3467 – SR 1316 (Rea Road Extension) from NC 16 to SR 1008 (Waxhaw-Indian Trail Road) in Union County

Minutes of Interagency (Modified) 4B Hydraulics Design Review – 12/13/2017

An Interagency 4B Hydraulics Design Review meeting was held on December 13, 2017 at 1:00 PM in the NCDOT Century Center Hydraulics Conference Room. The purpose of the meeting was to discuss the environmental impact concerns that may be encountered while completing the hydraulic design that will be provided by CALYX Engineers + Consultants for U-3467.

Team Members:

Matthew Lauffer (Absent)	NCDOT – Hydraulics	919-707-6703	mllauffer@ncdot.gov
Donnie Brew (Absent)	FHWA	---	Donnie.brew@dot.gov
Crystal Amschler (via phone)	USACE	---	crystal.c.amschler@usace.army.mil
Donna Hood (Present)	NCDWR	704-682-2839	donna.hood@ncdenr.gov
Laura Sutton (Present)	NCDOT-PMU	919-707-6030	lsutton@ncdot.gov
Christopher Militcher (Absent)	USEPA	---	Militcher.Chris@epamail.epa.gov
Marla Chambers (via phone)	NCWRC	---	marla.chambers@ncwildlife.org
Robert Cook (Absent)	MPO	---	rwcook@ci.charlotte.nc.us
Marella Buncick (Present)	USFWS	828-285-3939 Ext. 237	marella_buncick@fws.gov

Participants:

Bryan Key	NCDOT – PMU	919-707-6263	bkey@ncdot.gov
Beverly Robinson	NCDOT – PMU	919-707-6041	brobinson@ncdot.gov
Scott Cole (Absent)	NCDOT – Division 10	704-983-4400	scole@ncdot.gov
Rick Baucom (Absent)	NCDOT – Division 10	704-983-4400	rwbaucom@ncdot.gov
Stuart Basham (Absent)	NCDOT – Division 10	704-845-1151	slbasham@ncdot.gov
Larry Thompson (via phone)	NCDOT – Division 10	704-983-4400	lthompson@ncdot.gov
Matthew York	NCDOT – Hydraulics	919-707-6765	miyork@ncdot.gov
Joe Dunnehoo	NCDOT – Hydraulics	919-707-6717	jwdunnehoo@ncdot.gov
Carla Dagnino	NCDOT – EAU	919-707-0992	cdagnino@ncdot.gov
Erin Cheely (Absent)	NCDOT – EAU	919-707-6108	ekcheely@ncdot.gov
Mark Staley (Absent)	NCDOT – REU	919-707-6110	mstaley@ncdot.gov
David Harris (Absent)	NCDOT – REU	919-707-2925	davidharris@ncdot.gov
Keith Paschal (Absent)	NCDOT – SMU	919-707-6481	kpaschal@ncdot.gov
Byron Sanders (Absent)	NCDOT – Utilities	919-707-6696	bsanders@ncdot.gov
Steve Trexler (Absent)	NCDOT – Utilities	919-707-7175	sctrexler@ncdot.gov
Liz Kovasckitz	CALYX E&C	919-858-1808	lkovasckitz@CALYXengineers.com
Johnny Banks	CALYX E&C	919-858-1844	jbanks@CALYXengineers.com
David Bocker	CALYX E&C	704-566-4342	dbocker@CALYXengineers.com
Jay Subedi	CALYX E&C	704-566-4306	jsubedi@CALYXengineers.com
Allison Thompson	CALYX E&C	704-566-4336	athompson@CALYXengineers.com

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

Introductions were made by Matthew York and all in attendance. David Bocker (CALYX Engineers + Consultants) proceeded to give an overview of the project and then proceeded with the review of the project.

Sheet 4/5

- Site 1 - Proposed 48" RCP (buried 1ft) with standard riprap apron is proposed at -L- 23+12. It was requested that larger riprap be used at this outlet and it be embedded. Marella also had concerns about the amount of stormwater that will be discharged at this point. CALYX explained that the design strives to match existing drainage patterns at this location. Also, CALYX should consider realigning the proposed crosspipe and system outlet as currently shown on the 4B Plans to be more in line with the downstream receiving channel. CALYX stated that this will be considered and that the riprap will be shown to be Class 'T' and embedded in the channel as requested.
- Site 2 – Proposed 18" RCP with standard riprap apron is proposed at -L- 26+50 RT drains to wetlands and maintains existing drainage patterns. It was recommended that larger Class 'T' riprap be utilized at this location.
- Site 3 – Roadway Fill impact at -L- 28+83 RT. Roadway grade adjusted to closely match existing ground to minimize project footprint, small cut slope (less than 0.5 ft).
- Site 4 – Proposed 36" RCP (buried 20%) with standard apron is proposed at -L- 33+50 RT. Roadway grade adjusted to closely match existing ground to minimize project footprint, small cut slope (less than 0.5 ft). The current horizontal and vertical alignment was set to avoid impact to the pond and dam north of the project. Donna asked several questions with regards to the pond and its condition. David explained that the pond was not observed to have a primary overflow pipe/outlet, but the western side of the dam seemed to serve as an overflow/emergency spillway (currently in fair condition, no significant signs of erosion). The area is all wooded and no utilities were observed. Crystal questioned why riprap pads are being proposed within the wetlands. David explained that there is approximately 25 CFS (50-YR storm event) at this crossing which is currently at approximately 4% slope; therefore we have proposed riprap to reduce the velocities and minimize erosion at the outlet. David also stated that drop structures are being considered to reduce the slope and velocities internally within the pipe crossing. It was also requested that larger riprap be used at the outlet. Marla was concerned about this area being a sloped wetland. David explained that this area is challenging since even though it is a wetland, it acts more like a stream; therefore the design is treating this more as a stream. In summary, the group recommended that Class 'T' riprap be utilized. CALYX stated that all of these considerations will be considered and implemented during final design to minimize impacts and reduce velocities at this outlet point.

Sheet 6

- Site 5 - Proposed Roadway Fill in Pond and Wetland; Proposed 30" RCP along with Rock plating along slope on RT side. Roadway slopes currently 3:1 will be reduced to 2:1 to minimize impacts. A drop structure will likely be utilized to obtain a flatter slope of the pipe at this location in order to minimize velocities and erosion potential at the outlet. Wetlands are present at the upper end of project impact area which is at an approximate 5% slope. Crystal asked that the upper end of the wetlands be considered a total impact (LT side of roadway), Donna agreed.
- Site 6 – Proposed 36" RCP (buried 20%) with standard apron is proposed at -L- 46+00 RT. David explained that Site 6 does not exist since it is not identified as a jurisdictional stream.

Sheet 8

- Site 7 – Proposed 24" RCP (buried 20%) with standard riprap apron is proposed at -L- 64+75 RT. 2:1 roadway fill slopes have been utilized to minimize impacts to the stream. Slope of the pipe is approximately 3.8% which matches existing stream slope. CALYX will plan to utilize the larger embedded Class 'T' riprap. Marla expressed concern about the slope. David explained that there will be drop structures within the pipe crossing due to storm drainage tie-ins. Joe asked the

agencies what is the acceptable drop distance within a drainage structure that still allows for aquatic passage. After some discussion, it was decided that a 6" or less drop is acceptable at each drop location.

Sheet 9

- Site 8 – 2 @ 11'x8' RCBC on Mundys Run, base flow carried in eastern culvert (buried one foot). 2nd barrel (western) serves as overflow utilizes a 2' sill with bench (with coir fiber) in channel at the inlet & outlet. It should be noted that this culvert was originally proposed as 2 @ 9'x8' RCBC but due to new hydrology methodology and preliminary design & modeling it has been changed to 2 @ 11'x8' RCBC. Riprap proposed to stabilize channel banks at the inlet & outlet. 2:1 roadway fill slopes have been utilized to minimize impacts to the stream. Proposed ditches which will direct storm drainage from system outlets line ahead and line back are anticipated on the outlet side of the culvert. Riprap at embankment details will be used to stabilize the banks at these outfall locations. A request was made to ensure there is sufficient PDE shown at the inlet and outlet of the culvert. CALYX stated that PDE will be expanded from what is currently shown to ensure there is adequate space for future maintenance and access. There was concern about the tributary that ties in at the inlet, additional bank stabilization/protection along the banks and bend upstream. CALYX will also consider only clearing in this area and not grubbing in order to retain some of the vegetation and root balls to help stabilize this area. It should be noted that the impacts associated with the tributary should be considered a separate site.

Sheet 10

- Site 9 – Proposed 18" RCP (buried 20%) with standard riprap apron is proposed at -L- 94+85 RT. 2:1 roadway fill slopes have been utilized to minimize impacts to the wetlands. CALYX will consider utilizing the larger Class 'T' embedded riprap at this location.

Sheet 14

- Site 10 – Existing 1 @ 12'x7' RCBC on Culvert Branch will be replaced with 3 @ 12'x7' RCBC, base flow carried in center culvert (buried one foot). Outside barrels serve as overflow culverts and utilize a 2' sill with bench (with coir fiber) in channel at the inlet & outlet. Riprap proposed to stabilize channel banks at the inlet & outlet. 2:1 roadway fill slopes have been utilized to minimize impacts to the stream. Proposed ditches which will direct storm drainage from system outlets line ahead and line back are anticipated on the inlet side of the culvert. Riprap at embankment details will be used to stabilize the banks at these outfall locations. Donna requested that the project improvements not result in draining of the upstream wetland. CALYX stated that this can be evaluated during the Erosion control design to ensure no temporary basins or erosion control measured take this into account. CALYX will also ensure that backfill requirements (based on culvert slope) are met and native materials can be held in place within the culvert.

Sheet 16

- Site 11 – Existing 3 @ 11'x12' RCBC on West Fork Twelve Mile Creek will be replaced with Proposed Bridge – 2 spans @ 55' (36" Prestressed Concrete Girder Bridge), which spans the creek. No direct discharge into the creek; deck drains can be used on the bridge.
- Stream relocation is proposed due to roadway fill impacts to stream. Proposed section maintains channel width of 12' in center section which will carry base flow. 5' benches to the channel are proposed on each side for overflow/capacity which will be lined with coir fiber matting. Riprap is proposed as well to provide bank stabilization. Geotech investigations show that no rock is

anticipated in the area of the proposed channel relocation. The existing sanitary sewer line will need to be relocated, be it is anticipated that it will be located between the stream and the roadway. The proposed channel will match existing stream bed elevations and geometric dimensions, no significant slope change is anticipated. The existing stream length (tie-in to tie-in point) is 330' and the proposed channel relocation length is 290'. Some discussion was had amongst the group with regards to the plan for mitigation that will be outlined in the permit application. Crystal recommended that in-stream structures be utilized in order to replicate for stabilization. CALYX will investigate the use of vegetated banks and in-stream structures in order to improve stream function. Matthew York also reminded the team that this is a FEMA regulated floodplain (Detailed Study) which does currently overtop the roadway for the 100-yr storm event and CALYX will need to ensure that a No-Rise is achieved with the channel relocation that is proposed. Donna also requested that the stream and banks be stabilized where the existing culvert is removed. CALYX will include details of this bank stabilization. Joe Dunneho recommended that the existing culvert be removed and a constructed riffle be utilized. This has been used on prior stream restoration projects which creates a natural stream mixture with a combination of larger and smaller rock that somewhat lock in place to stabilize the stream bed which appears to be a good application for this area of the project. Crystal requested that the impact summary table separate the bridge/culvert impacts and the channel relocation impacts. Marla reminded the team that a riprap free, level path be provided for wildlife under the bridge. CALYX explained that there is a flat/level area that will be provided between the toe of the riprap abutment and the top of bank which provides for sufficient area for wildlife passage.

Sheet 19

- Site 12 – Existing 42" RCP to be replaced with 54" RCP (buried), upsized with standard riprap apron at -L- 224+60 RT. Existing concrete slope protection at outlet parallel to drive. CALYX will consider utilizing the larger Class 'T' embedded riprap at this location.

Sheets 7, 11, 12, 13, 15, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, & 30

- No jurisdictional streams or wetlands, therefore, no impacts.

General/ Misc. Questions:

- CALYX asked if the Division had an preference with regards to the use of hand clearing or mechanized clearing being shown on the permit drawing beyond the proposed fill slopes. The Division preferred the showing 10' of Mechanized Clearing in wetland areas beyond the proposed slope stakes.
- Joe Dunneho asked how bank stabilization and embedded riprap should be labeled and shown on the plans and accounted for in the impact table. Crystal explained that Bank Stabilization should be separate from the actual pipe impact and embedded riprap dissipator pad impacts and labeled accordingly.
- Matthew York to investigate new "term" being used by Hydraulics Unit for embedded riprap in the channel to ensure that this is notated properly on the plans and permit drawings.
- Discharge into the wetlands shall have a non-erosive velocity.
- The team agreed that this courtesy 4B meeting was very helpful to ensure team members are aware of the key issues on the project and another meeting (4C) would not be needed. The team agreed that any further reviews can be handled electronically and via e-mail.

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

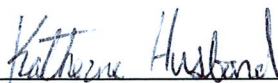
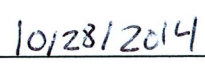

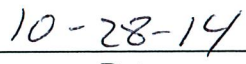
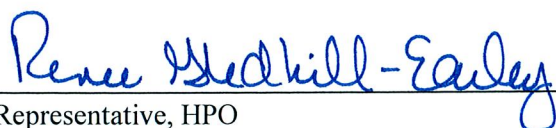
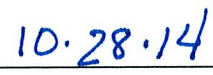
Project Description: Rea Road Extension from Providence Road (NC 16) to Waxhaw-Indian Trail Road (SR 1008).

On September 2, and September 30, 2014, representatives of the

- ☒ North Carolina Department of Transportation (NCDOT)
☒ Federal Highway Administration (FHWA)
☒ North Carolina State Historic Preservation Office (HPO)
☐ Other

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

Signed:

 _____ Representative, NCDOT	 _____ Date
 _____ FHWA, for the Division Administrator, or other Federal Agency	 _____ Date
 _____ Representative, HPO	 _____ Date

Property and Status	Alternative	Effect Finding	Reasons
Property No. 5 John Walker Matthews House Determined Eligible 1996, Remains Eligible	Alternative A/A2	No Effect	It was determined there would be no effect on the property at the September 2, 2014 effects meeting. Although the property falls within the Area of Potential Effects, there will be no work performed within the vicinity of the property.
Property No. 5 John Walker Matthews House Determined Eligible 1996, Remains Eligible	Alternative B	No Effect	It was determined there would be no effect on the property at the September 2, 2014 effects meeting. Although the property falls within the Area of Potential Effects, there will be no work performed within the vicinity of the property.
Property No. 5 John Walker Matthews House Determined Eligible 1996, Remains Eligible	Alternative C/C2	No Effect	It was determined there would be no effect on the property at the September 2, 2014 effects meeting. Although the property falls within the Area of Potential Effects, there will be no work performed within the vicinity of the property.
Property No. 8 Howard House Determined Eligible 1996, Remains Eligible	Alternative A/A2 Original	Adverse Effect	The original design had potential issues with the impact of hydro, utilities, and drainage work, as well as access to the property, which could create an adverse effect. The alternative impacts 0.25 acres of 5.904 acres.
	Avoidance Option	No Adverse Effect	There will be no adverse effect with the minimized footprint and improved access. Construction fencing shall be erected at the back of the ditch line. No work shall take place in, and no utilities shall encroach into, the historic boundary. There will be 0.0 acres of the 5.904 acres impacted.
Property No. 8 Howard House Determined Eligible 1996, Remains Eligible	Alternative B	No Effect	It was determined there would be no effect on the property at the September 2, 2014 effects meeting. Although the property falls within the Area of Potential Effects, there will be no work performed within the vicinity of the property for this alternative.
Property No. 8 Howard House Determined Eligible 1996, Remains Eligible	Alternative C/C2 Original	Adverse Effect	The original design had potential issues with the impact of hydro, utilities, and drainage work, as well as access to the property, which could create an adverse effect. The alternative impacts 0.25 acres of 5.904 acres.
	Avoidance Option	No Adverse Effect	There will be no adverse effect with the minimized footprint and improved access. Construction fencing shall be erected at the back of the ditch line. No work shall take place in, and no utilities shall encroach into, the historic boundary. There will be 0.0 acres of the 5.904 acres impacted.

Property and Status	Alternative	Effect Finding	Reasons
Property No. 15 Jacob Allen Deal Farm Determined Eligible	Alternative A/A2 Original Option	Adverse Effect	The original design of Alternative A would impact 3.02 acres of 39.79 acres and is an adverse effect on the property.
	Avoidance Option Minimization Option	No Adverse Effect No Adverse Effect	There will be no adverse effect with the condition of a 25' buffer from the historic boundary, delineated by construction fencing erected at the back of the ditch line. The fencing shall extend 500' from each access drive, or to the property boundary, whichever is closer. Minimization option will impact 0.2 acres of 39.79 acres, which will have no adverse effect on the property.
Property No. 15 Jacob Allen Deal Farm Determined Eligible	Alternative B Original	Adverse Effect	The original design of Alternative B would impact 2.78 of 39.79 acres and is an adverse effect on the property.
	Avoidance Option	No Adverse Effect	There will be no adverse effect with the condition of a 25' buffer from the historic boundary, delineated by construction fencing erected at the back of the ditch line. The fencing shall extend 500' from each access drive, or to the property boundary, whichever is closer. Minimization option will impact 0.0 acres of 39.79 acres, which will have no adverse effect on the property.
Property No. 15 Jacob Allen Deal Farm Determined Eligible	Alternative C/C2 Avoidance Option	Adverse Effect	The original design of Alternative C would impact 6.34 acres of 39.79 acres and is an adverse effect on the property.
	Avoidance Option Minimization Option	No Adverse Effect No Adverse Effect	There will be no adverse effect with the condition of a 25' buffer from the historic boundary, delineated by construction fencing erected at the back of the ditch line). The fencing shall extend 500' from each access drive, or to the property boundary, whichever is closer. Minimization option will impact 0.56 acres of 39.79 acres, which will have no adverse effect on the property.

Initialed: NCDOT KHFHWA DBHPO Bye

FHWA Intends to use the SHPO's concurrence as a basis for a "de minimis" finding for the following properties, pursuant to Section 4(f):

Alternatives A and C Minimization for the Jacob Allen Deal Farm

Federal Aid #: STP-1316(10)

TIP#: U-3467

County: Union

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: Rea Road Extension from Providence Road (NC 16) to Waxhaw-Indian Trail Road (SR 1008) - addresses alternative CA2

On 3/20/2018 representatives of the

- ☒ North Carolina Department of Transportation (NCDOT)
☐ Federal Highway Administration (FHWA)
☒ North Carolina State Historic Preservation Office (HPO)
☐ Other

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

Signed:

Mary Pope
Representative, NCDOT

3/20/2018
Date

Renee Shedd Michell
FHWA, for the Division Administrator, or other Federal Agency

3/27/18
Date

Renee Sheddhill-Easley
Representative, HPO

3.20.18
Date

Federal Aid #: STP-1316(10)

TIP#: U-3467

County: Union

Property and Status	Alternative	Effect Finding	Reasons
John Walker Matthews House (UN0249)- DE Criterion C	CA2	No effect	No construction activities in vicinity of historic property.
Howard House (UN0831)- DE Criterion C	CA2	No adverse effect	Construction fencing shall be erected @ the back of the ditch line. No work shall take place in, and no utilities shall encroach into the historic boundary. There are 0 acres impacted of 5.904 acres.
Jacob Allen Deal Farm (UN1147)- DE Criteria A&C	CA2	No adverse effect	Condition of 25' buffer from historic boundary, delineated by construction fencing erected @ back of ditch. Fencing shall extend 500' from each access drive, or to property boundary, whichever is closer. Alternative will impact 0.13 acres of 39.79 acres.

Initialed:

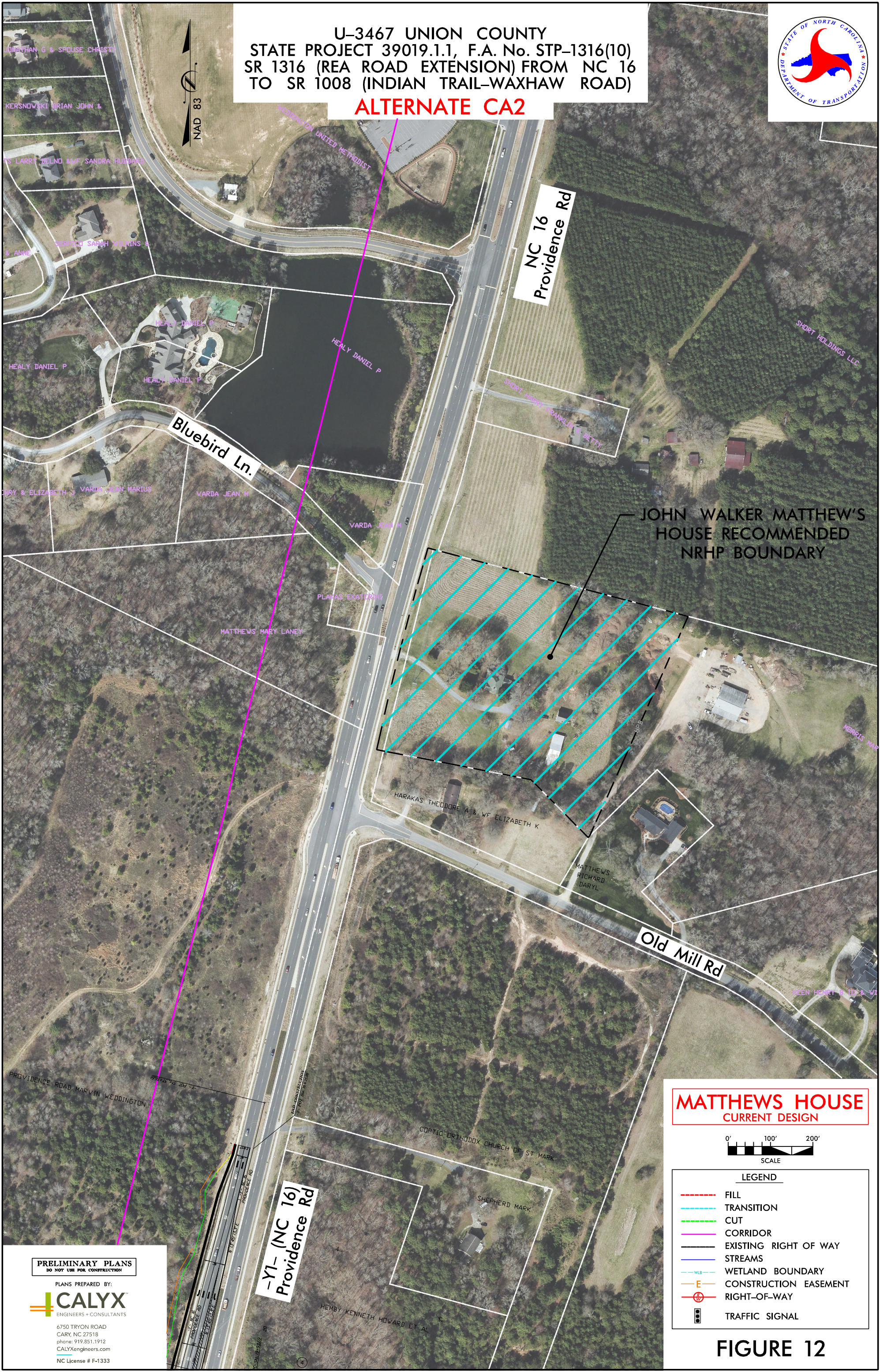
NCDOT MPJ

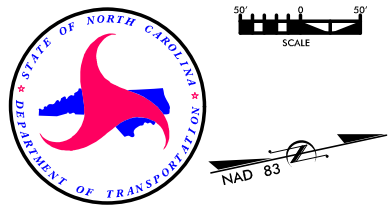
FHWA _____

HPO Rye

FHWA Intends to use the HPO's concurrence as a basis for a "de minimis" finding for the following properties, pursuant to Section 4(f):

Jacob Allen Deal Farm





HOWARD HOUSE ALTERNATIVE CA2

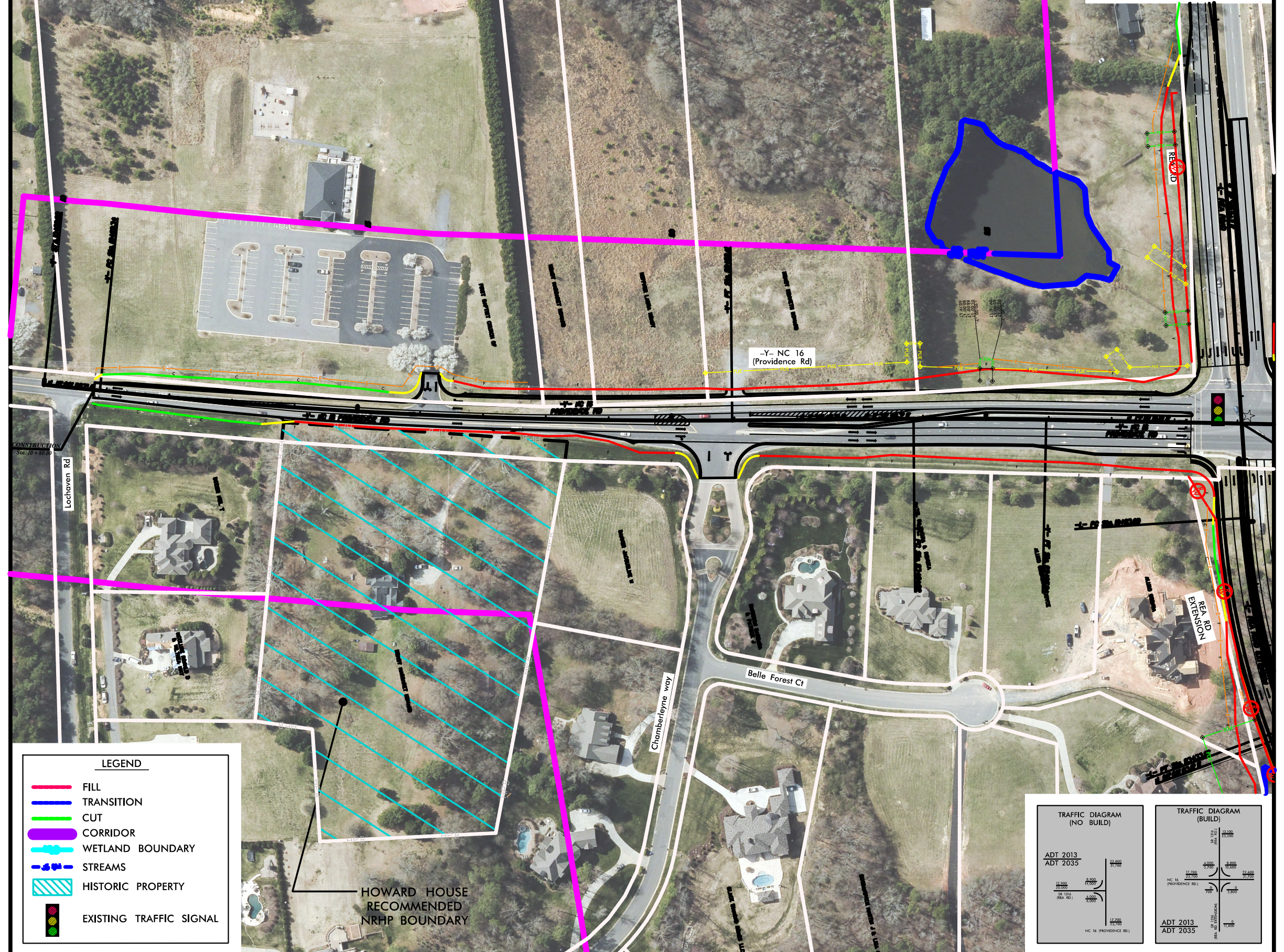
U-3467 UNION COUNTY
STATE PROJECT 39019.1.1
SR 1316 (REA ROAD EXTENSION)
FROM NC 16 TO SR 1008
(WAXHAW-INDIAN TRAIL ROAD)

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PLANS PREPARED BY:



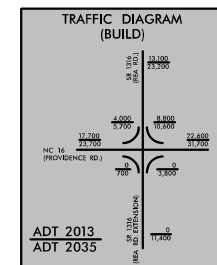
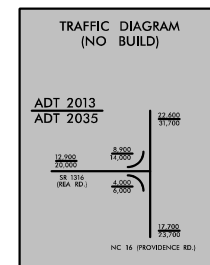
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

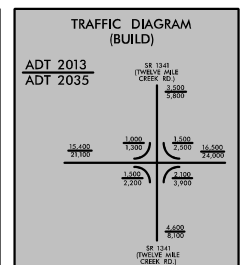


LEGEND

-  FILL
 TRANSITION
 CUT
 CORRIDOR
 WETLAND BOUNDARY
 STREAMS
 HISTORIC PROPERTY
 EXISTING TRAFFIC SIGNAL

— HOWARD HOUSE
RECOMMENDED
NRHP BOUNDARY







North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 39019.1.1 TIP No.: U-3467 County(ies): Union Page 1 of 2

General Project Information

WBS Element:	39019.1.1	TIP Number:	U-3467	Project Type:	New Location	Date:	2/15/2019
NCDOT Contact:	Matthew York, PE	Contractor / Designer:	CALYX Engineers + Consultants / David P. Bocker, PE				
Address:	1020 Birch Ridge Drive Raleigh, NC 27610-150	Address:	7500 East Independence Blvd. Suite 100 Charlotte, NC 28227				
Phone:	919-707-6765	Phone:	704-566-4342				
Email:	myork@ncdot.gov	Email:	dbocker@CALYXengineers.com				
City/Town:	Weddington	County(ies):	Union				
River Basin(s):	Catawba	CAMA County?	No				
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	4.7 Miles	Surrounding Land Use:	Residential / Undeveloped Woods				
	Proposed Project			Existing Site			
Project Built-Up Area (ac.)	62.4	ac.	28.9	ac.			
Typical Cross Section Description:	Proposed 4-lane divided Roadway with raised center median			New Location & Existing 2-lane Roadway (2 @ 12' lanes) with Grass shoulder and ditches			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	32648	Year:	2039	Existing:	23608	Year: 2019
General Project Narrative: (Description of Minimization of Water Quality Impacts)	The project consists of roadway extension and widening of SR 1316 (Rea Road Extension) from NC 16 to SR 1008 (Waxhaw-Indian Trail Road), new culvert (2 @ 11'x8' RCBC) at Mundys Run, culvert replacement at Culvert Branch, and replacement of culvert with new bridge at West Fork Twelvemile Creek. It should be noted that there are no deck drains and thus no direct discharge into the creek at the bridge site; additionally, the proposed bridge layout avoids bents within the creek. The proposed stormwater runoff from the proposed roadway is conveyed via storm drainage systems to ditches prior to outletting at jurisdictional resources. Non-erosive velocities are attained at locations where ditches/systems discharge prior to wetlands.						

Waterbody Information

Surface Water Body (1):	Mundys Run	NCDWR Stream Index No.:	11-138-1-2
NCDWR Surface Water Classification for Water Body	Primary Classification:	Class C	
	Supplemental Classification:		
Other Stream Classification:	None		
Impairments:			
Aquatic T&E Species?	No	Comments:	
NRTR Stream ID:		Buffer Rules in Effect:	N/A
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	Dissipator Pads Provided in Buffer?	N/A
(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	



North Carolina Department of Transportation
Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS



(Version 2.08; Released April 2018)

WBS Element: 39019.1.1 TIP No.: U-3467 County(ies): Union Page 2 of 2

Additional Waterbody Information

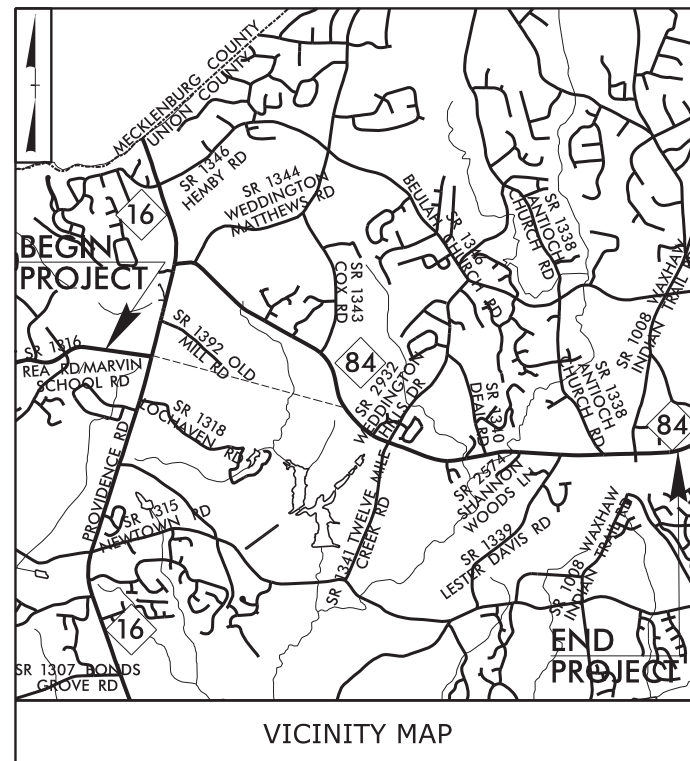
Surface Water Body (2):	Culvert Branch	NCDWR Stream Index No.:	11-138-1-1
NCDWR Surface Water Classification for Water Body	Primary Classification:	Class C	
	Supplemental Classification:		
Other Stream Classification:	None		
Impairments:			
Aquatic T&E Species?	Comments:		
NRTR Stream ID:		Buffer Rules in Effect:	N/A
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)	(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)
	(If yes, provide justification in the General Project Narrative)		

Surface Water Body (3):	West Fork Twelvemile Creek	NCDWR Stream Index No.:	11-138-1
NCDWR Surface Water Classification for Water Body	Primary Classification:	Class C	
	Supplemental Classification:		
Other Stream Classification:	None		
Impairments:			
Aquatic T&E Species?	No	Comments:	
NRTR Stream ID:		Buffer Rules in Effect:	N/A
Project Includes Bridge Spanning Water Body?	Yes	Deck Drains Discharge Over Buffer?	N/A
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)	(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)
	(If yes, provide justification in the General Project Narrative)		

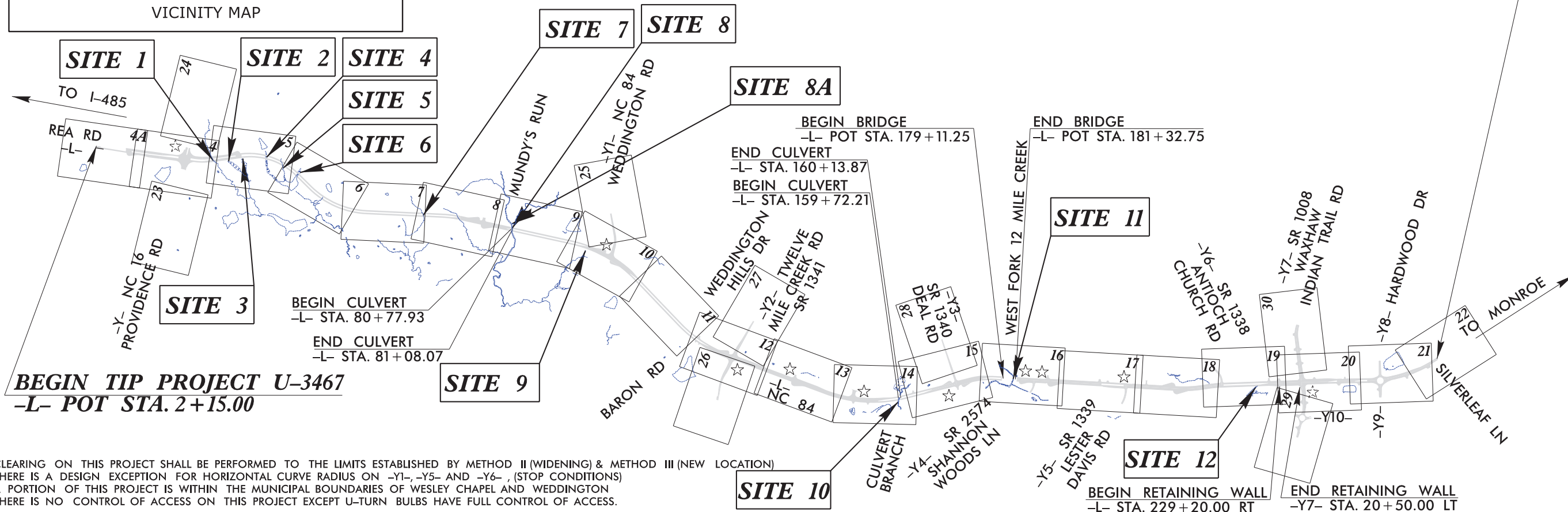
TIP PROJECT: U-3467

CONTRACT:

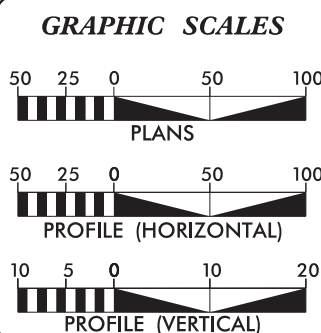
See Sheet 1A For Index of Sheets



VICINITY MAP



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II (WIDENING) & METHOD III (NEW LOCATION). THERE IS A DESIGN EXCEPTION FOR HORIZONTAL CURVE RADIUS ON -Y1-, -Y5- AND -Y6-, (STOP CONDITIONS). A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF WESLEY CHAPEL AND WEDDINGTON. THERE IS NO CONTROL OF ACCESS ON THIS PROJECT EXCEPT U-TURN BULBS HAVE FULL CONTROL OF ACCESS.



DESIGN DATA

ADT 2019 = 23,608
ADT 2039 = 32,648
DHV = 10 %
D = 60 %
T = 4 % *
V = 50 MPH
* TTST = 1% DUAL 3%
FUNC CLASS =
URBAN MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-3467	=	4.653 MILES
LENGTH STRUCTURES TIP PROJECT U-3467	=	0.035 MILES
TOTAL LENGTH TIP PROJECT U-3467	=	<u>4.688 MILES</u>

Prepared in the Office of:



FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY DATE:

MAY 31, 2018

LETTING DATE:

SEPTEMBER 17, 2019

NCDOT CONTACT:

JOHNNY BANKS

CALYX E & C
PROJECT MANAGER

STEPHEN C. BROWDE, PE

CALYX E & C
PROJECT DESIGN ENGINEER

BRYAN KEY, PE

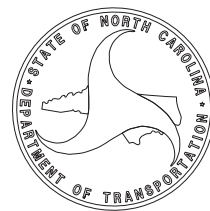
CENTRAL PROJECT MANAGER IN TECHNICAL SERVICES

HYDRAULICS ENGINEER

SIGNATURE: _____ *P.E.*

**ROADWAY DESIGN
ENGINEER**

SIGNATURE: _____ *P.E.* _____



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3467	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
39019.1.1	STP-1316(10)	P.E.	
39019.2.1	STP-1316(10)	R/W, UTL.	

PERMIT DRAWING
SHEET 1 OF 27

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**



☐ UPGRADE EXISTING SIGNAL
☐ NEW SIGNAL

WETLAND AND SURFACE WATER IMPACTS PERMIT

END TIP PROJECT U-3467
-L- POT STA. 258+50.00

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

KENNETH HOWARD HEMBY ET EL
DB 110 PG 256
PC 1PG 839

 DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FROM -L- STA. 23+20 TO STA. 24+00 RT
29 TONS CL-B RIP-RAP
W/62 SY GEOTEXTILE

NOTES:
SEE SHEET 31 FOR -L- PROFILE

25

TRAFFIC DIAGRAM


③

LINE -Y- STA. 23
SEE SHEET 22

REVISIONS

2/18/2019
R:\Hydrau
dbooker

TRAFFIC DIAGRAM			
ADT 2019	-Y- NC 16	22,784	
ADT 2039		30,704	
-L- SR 1316		2,780	12,376 15,256
18,488 23,928	7,944 8,664	3,180	
		4,380 6,780	-L-
		5,328 9,968	
	-Y- NC 16	21,800 35,600	


 DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 4-A
LATERAL 2' BASE DITCH W/ RIPRAP
 (Not to Scale)

Natural Ground

2:1

d

Filter Fabric

2:1

B

b

17' Ft.

Fill Slope

Min. D = 1 Ft.
 Max. d = 1.5 Ft.
 B = 2 Ft.
 b = 5 Ft.

*When B < 6.0'

Type of Liner = CL-B Rip-Rap

EXISTING TRAFFIC SIGNAL
 CONC. SIDEWALK / MEDIAN
 PAVED SHOULDER

NOTES:
 SEE SHEET 31 FOR -L- PROFILE

8/17/99

DESIGN REVISION - 3/11/2019 - NC 16 INTERSECTION DESIGN REVISED IN COORDINATION WITH U-5769.

3/8/2019 R:\Hydraulics\PERMITS\Environmental\Drawings\J3467_Hyd_Prm.psh_05.dgn

STREAM & WETLAND IMPACTS

- DENOTES FILL IN WETLAND
- DENOTES EXCAVATION IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

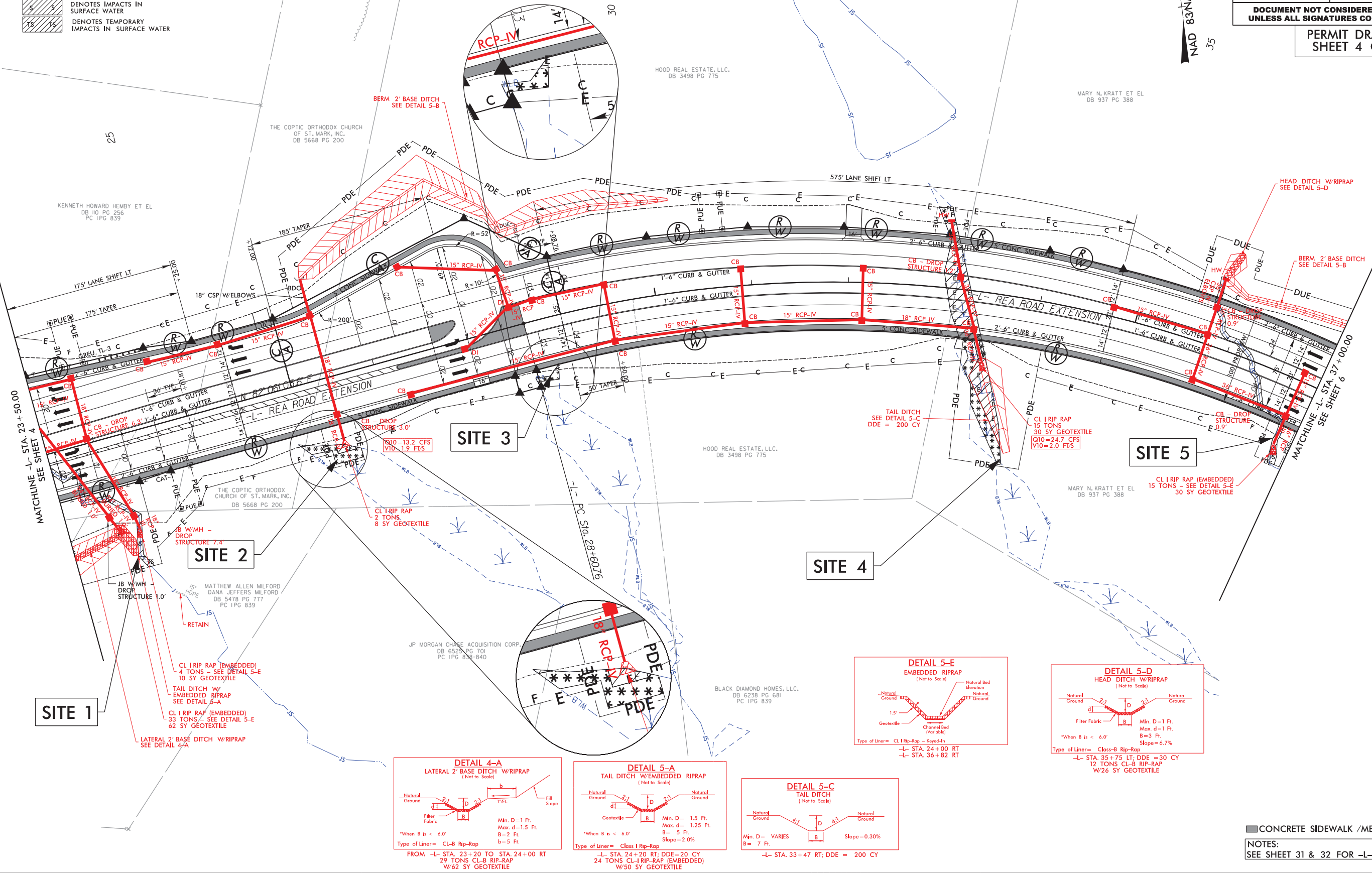
DO NOT ACQUIRE PARCELS ON SHEETS 4A, 4, 5, 23, AND 24 UNTIL U-5769 REVISIONS ARE ADDED

-L-
PI Sta 34+53.08
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 $D = 4' 46" 28.7"$
 $L = 1,100.43'$
 $T = 592.32'$
 $R = 1,200.00'$
 $SE = 04$
 $V = 50 \text{ MPH}$

CALYX
ENGINEERS & CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
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CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.		SHEET NO.
U-3467		5
RW SHEET NO.		HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

PERMIT DRAWING
SHEET 4 OF 27



CONCRETE SIDEWALK /MEDIAN
NOTES:
SEE SHEET 31 & 32 FOR -L- PROFILE

8/17/99

DESIGN REVISION - 3/11/2019 - NC 16 INTERSECTION DESIGN REVISED IN COORDINATION WITH U-5769.

3/8/2019 R:\Hydro\Permits\Environmental\Drawings\U3467_Hyd_Prm.psh_05_W_cont.dgn

STREAM & WETLAND IMPACTS

- Denotes Fill in Wetland
- Denotes Excavation in Wetland
- Denotes Mechanized Clearing
- Denotes Impacts in Surface Water
- Denotes Temporary Impacts in Surface Water

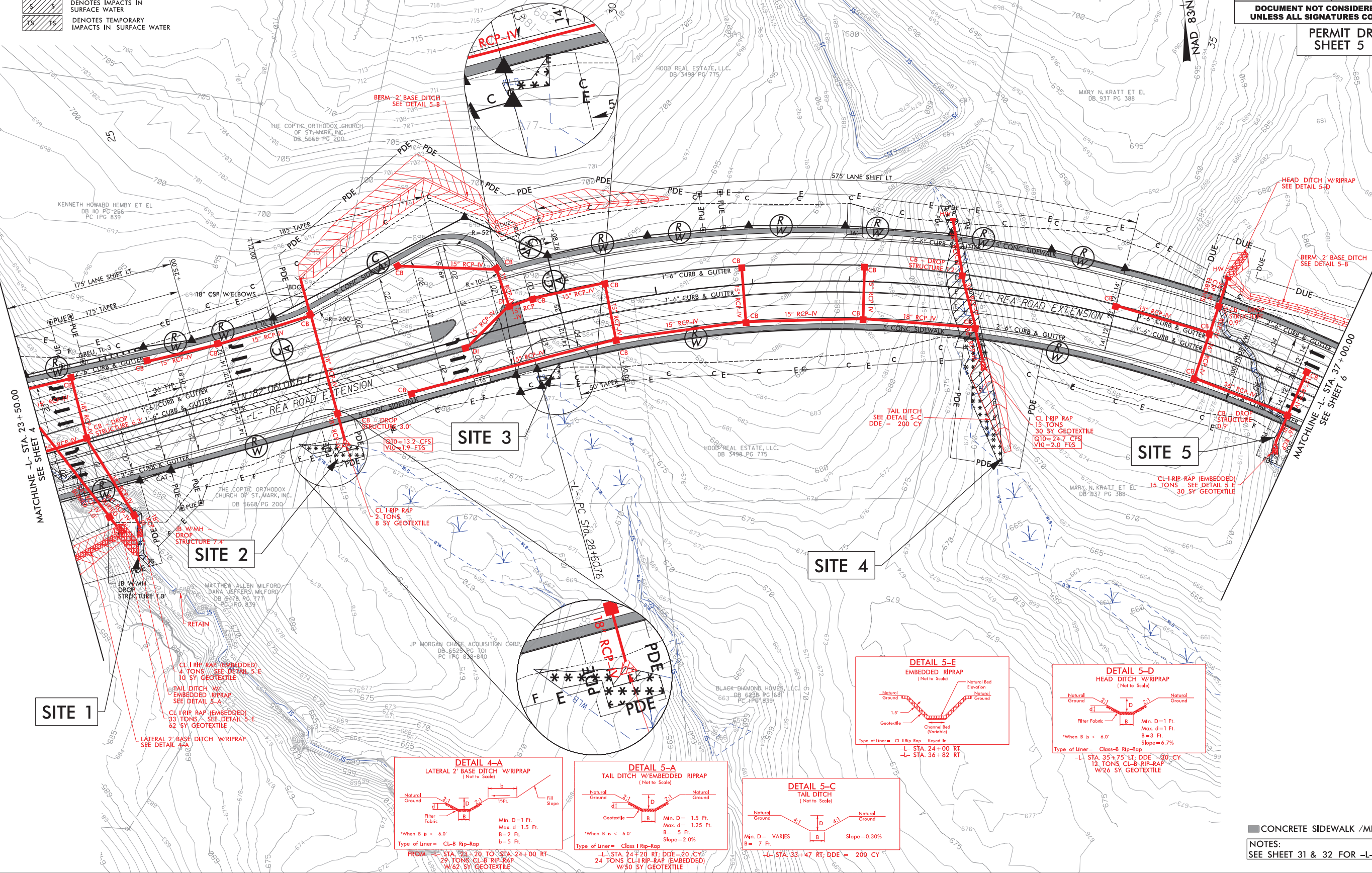
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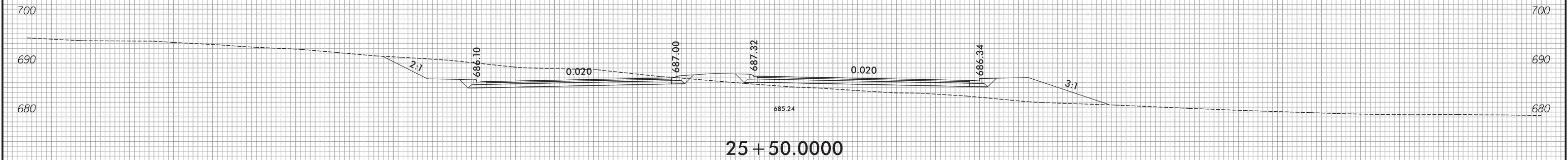
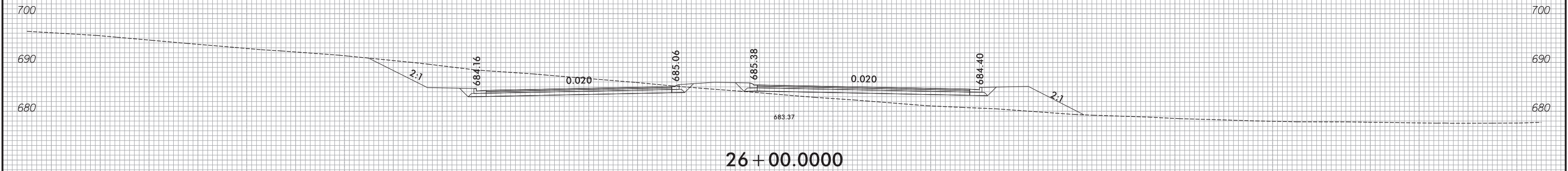
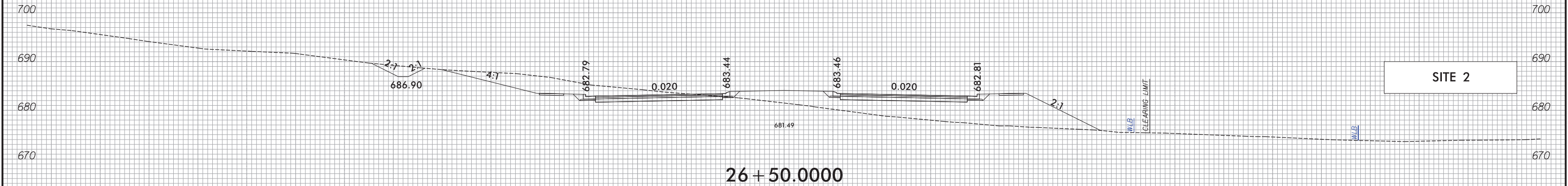
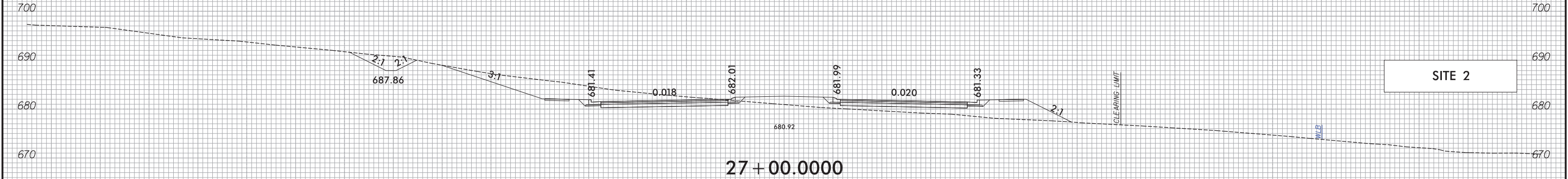
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ROADWAY DESIGN ENGINEER		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

PERMIT DRAWING
SHEET 5 OF 27



6/23/16

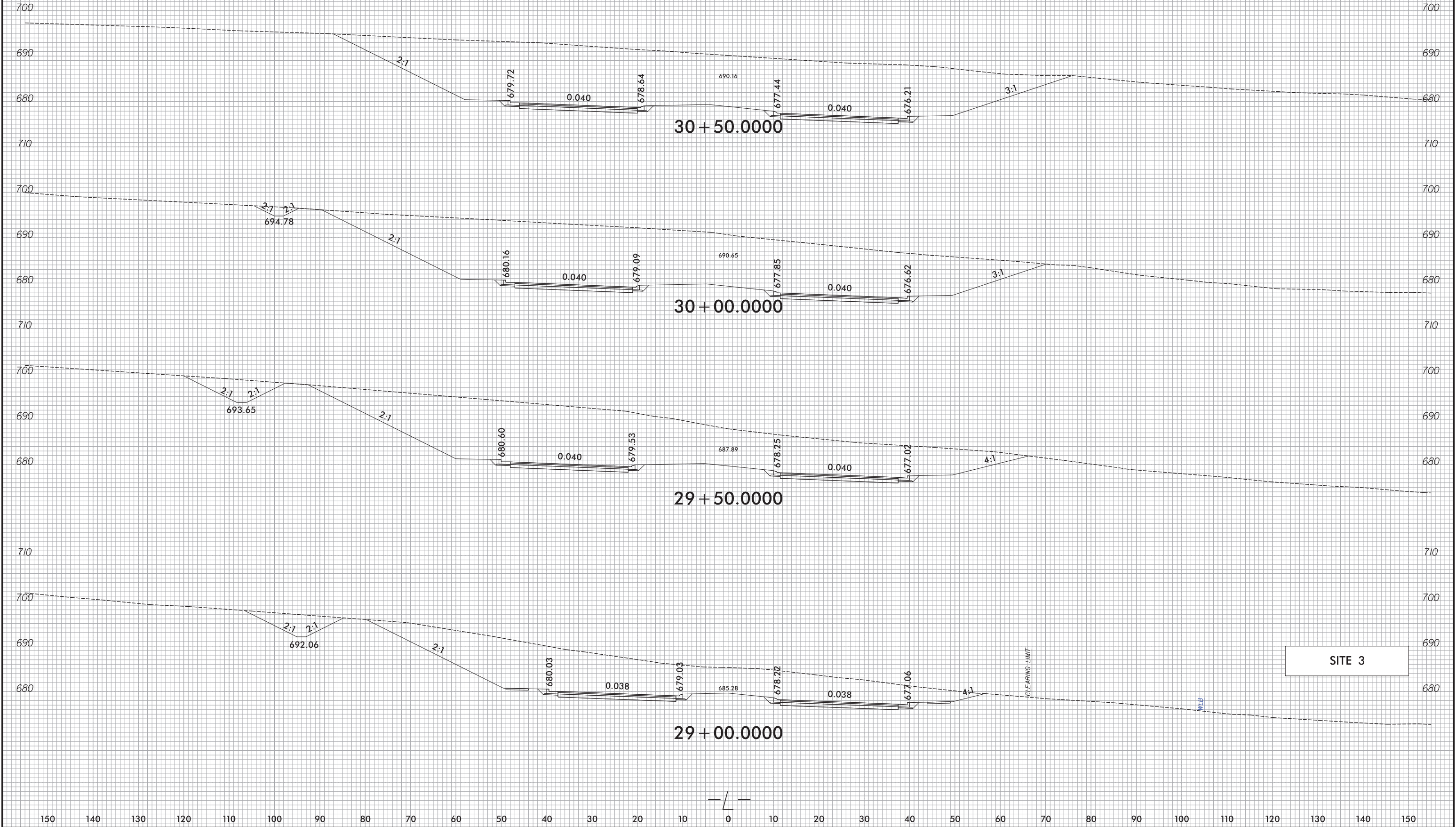
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SHEET 6 OF 27



6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-3467	X-10

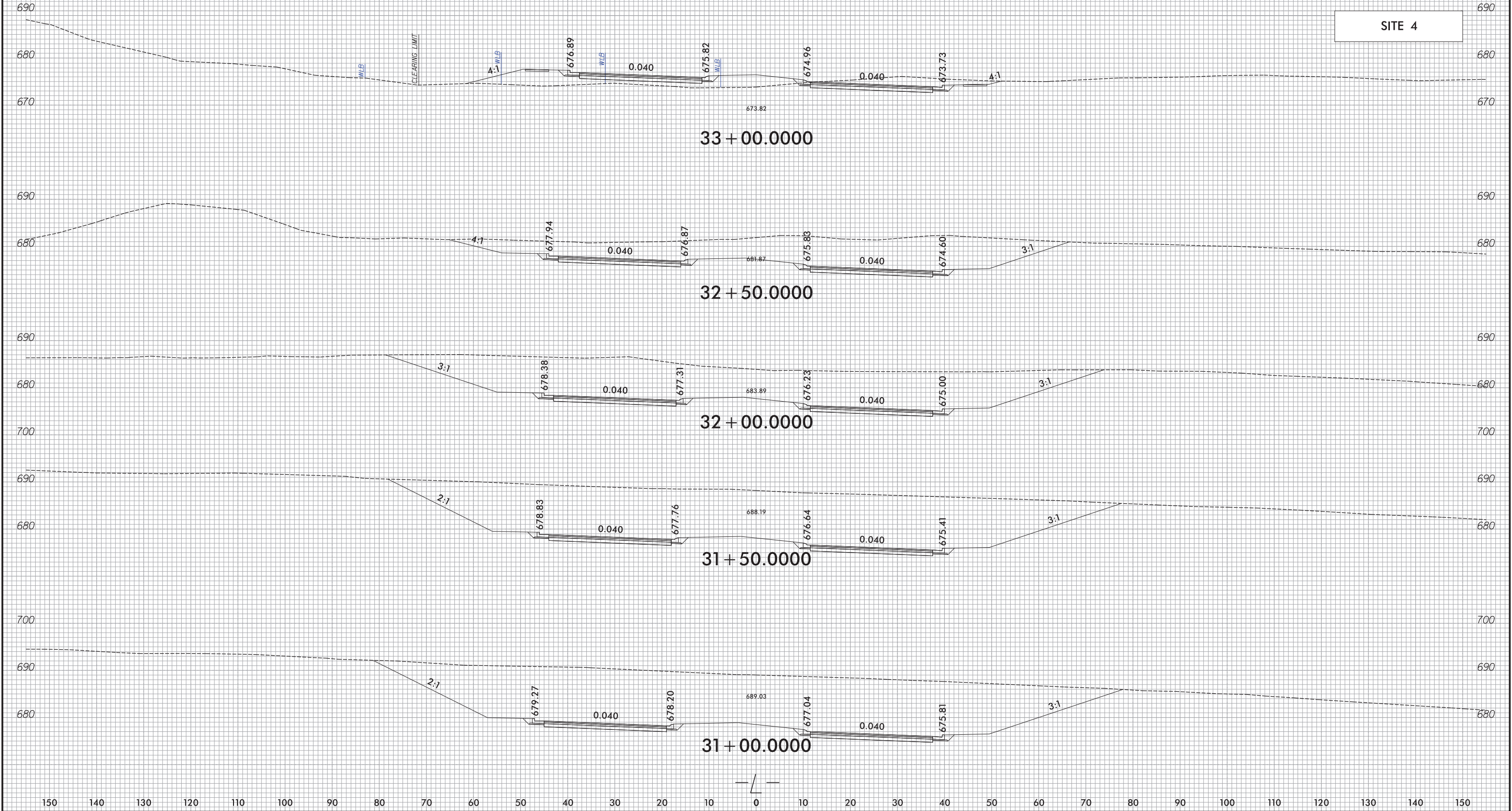
PERMIT DRAWING
SHEET 7 OF 27



6/23/16

PERMIT DRAWING
SHEET 8 OF 27

SITE 4





8/17/99

RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 10 AND 11 EASEMENT ON PARCEL 9.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED DIAL UTILITY EASEMENT AND PERMANENT DRAINAGE EASEMENT ON PARCELS 9, 10 AND 11.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 9, 10 AND 11.

2/18/2019 R:\Hydraulics\PERMITS\Environmental\Drawings\J3467_Hyd_Prm_psh_06.dgn

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PROJECT REFERENCE NO.		SHEET NO.
U-3467		6
RW SHEET NO.		HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

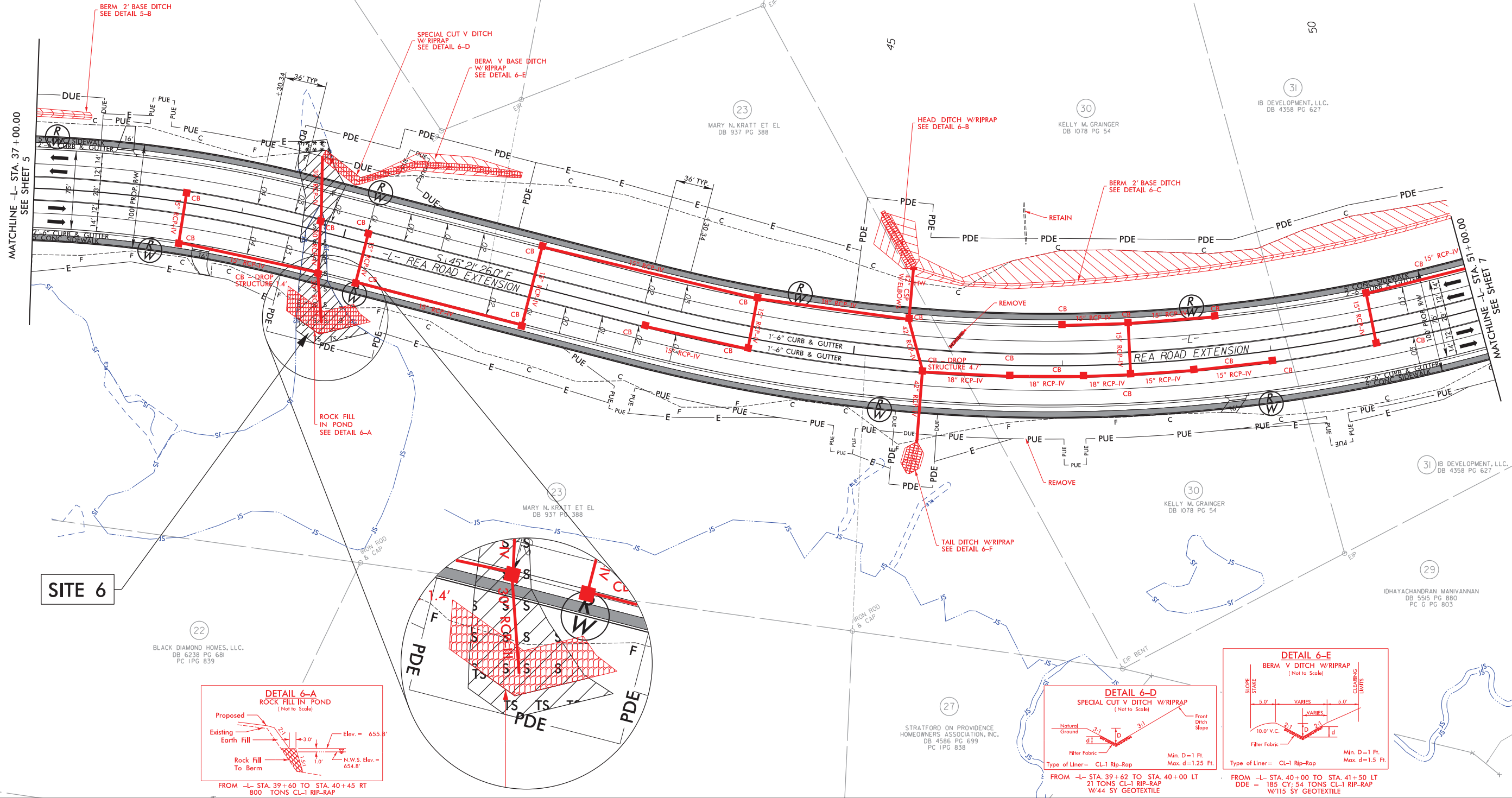
PERMIT DRAWING
SHEET 10 OF 27

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 $R = 1,200.00'$
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 $V = 50 \text{ MPH}$
PI Sta 48+93.00
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 $D = 3' 40' 22.1"$
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 $T = 598.66'$
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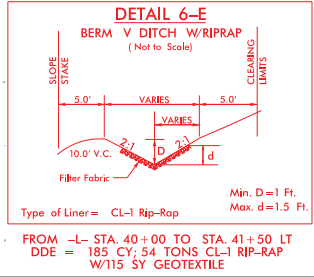
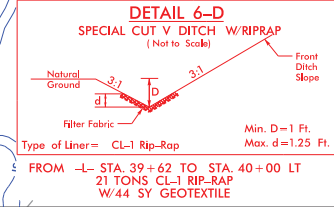
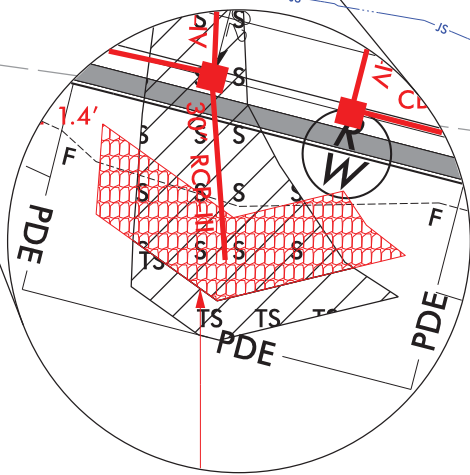
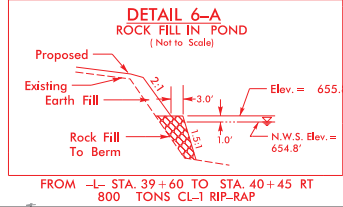
NAD 83/NA 2011

STREAM & WETLAND IMPACTS

	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SITE 6



8/17/99

RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 10 AND 11 EASEMENT ON PARCEL 9.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED DIAL UTILITY EASEMENT AND PERMANENT DRAINAGE EASEMENT ON PARCELS 9, 10 AND 11.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 9, 10 AND 11.

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REVISIONS

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PROJECT REFERENCE NO.		SHEET NO.	
U-3467		6	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

PERMIT DRAWING
SHEET 11 OF 27

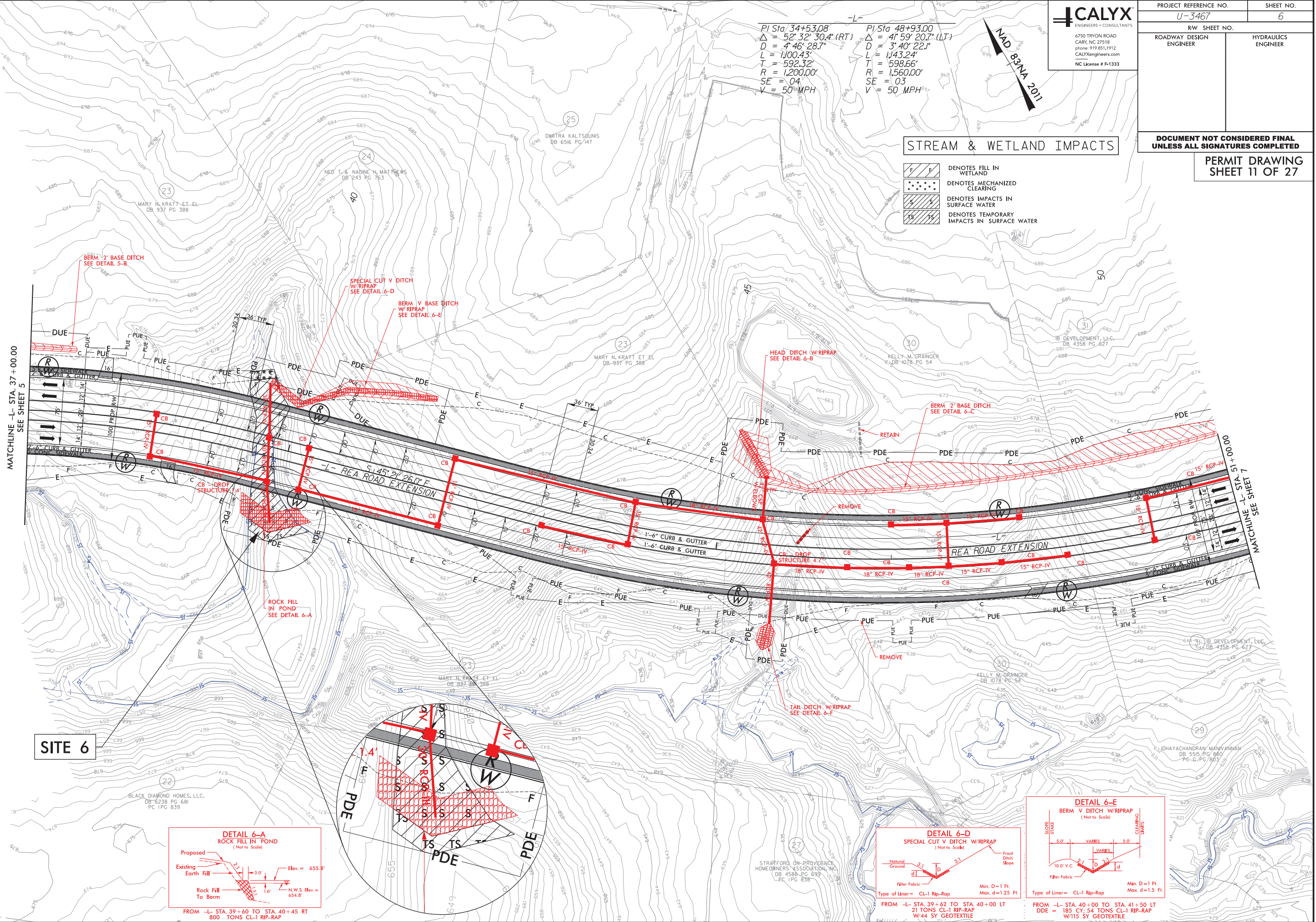
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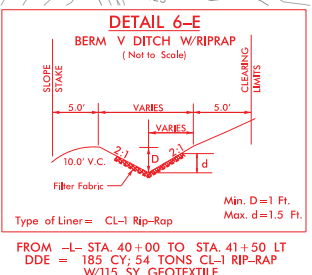
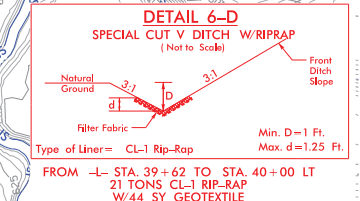
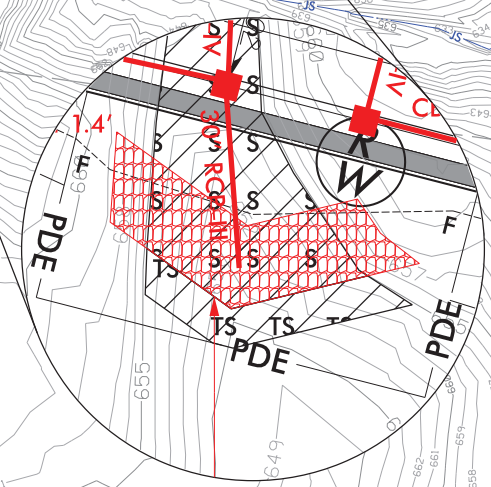
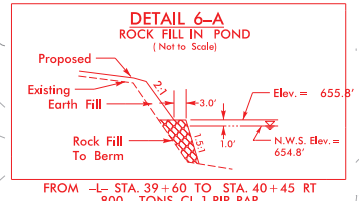
NAD 83 NA 2011

STREAM & WETLAND IMPACTS

	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SITE 6



6/23/16

PERMIT DRAWING
SHEET 12 OF 27

39 + 61.1900

SITE 6

39 + 50.0000

39 + 00.0000

38 + 50.0000

38 + 00.0000

STREAM & WETLAND IMPACTS

70

75

39

4

31

IB DEVELOPMENT, LLC.
DB 4358 PG 627

59

2/18/2019
R:\Hydraulics\PERMITS\Environmental\Drawings\U3467_Hyd.Prm.psh.08.dgn
DESIGN REVISION = 11/01/2008 = MODIFIED U-1 URN BULB L= 31.42' 3900 TO 137900.
RIGHT OF WAY REVISION = 01/30/2019 = REMOVED TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 13. ADDED NO CLAIM LABEL TO PARCEL 13. ADJUSTED TEMPORARY CONSTRUCTION EASEMENT ON PARCELS 11 AND 14.

SITE 7

Diagram illustrating a lined ditch cross-section. The ditch is filled with a 2:1 or flatter slope. The ditch width is labeled b and the depth is labeled d . The ditch is lined with a filter fabric. The ditch is shown in a cross-section view, with the natural ground line indicated. The ditch is labeled "Type of Liner = CL 'T' Rip-Rap".

FROM -L- STA. 64+80 TO STA. 65+50
-L- STA. 70+50 TO STA. 72+00 RT

Diagram illustrating the cross-section of a trench installation. The layers shown are:

- Natural Ground
- 2' from TB
- 1.5'
- Geotextile
- Channel Bed (Varies 5'-6')
- Natural Bed Elevation
- Natural Ground


Type of Liner = CL 1810-Rap - Keyed-In


-L- STA. 64+78 RT

PROJECT REFERENCE NO.	SHEET NO.
U-3467	8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>	

NAD 83 NA 2011

STREAM & WETLAND IMPACTS


 DENOTES IMPACTS IN SURFACE WATER


 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 7

DETAIL 8-C
TOE PROTECTION
 (Not to Scale)

Natural Ground

2:1 or Flatter Fill Slope

b

d = 2 Ft.
 b = 5 Ft.

Filter Fabric

Type of Liner = CL 'T' Rip-Rap

FROM -L- STA. 64+80 TO STA. 65+50 RT
 -L- STA. 70+50 TO STA. 72+00 RT

FROM -L- STA. 64+80 TO STA. 65+50 RT
-L- STA. 70+50 TO STA. 72+00 RT



- L- STA. 64+78 RT

NAD 83NA 2011

(42)
SUGAR MAGNOLIA WEDDINGTON, LLC.
DB 5890 PG 414
PC L PG 458

(31)
IB DEVELOPMENT, LLC.
DB 4358 PG 627

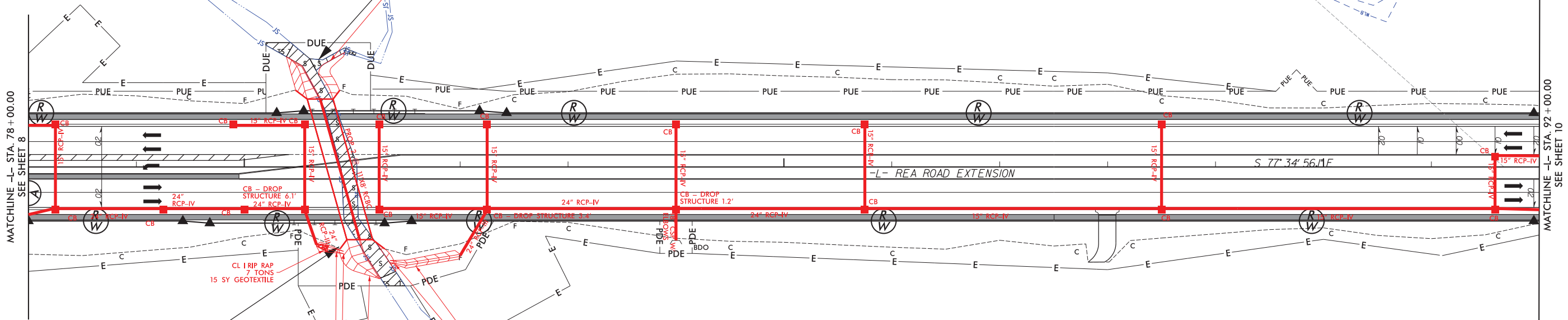
STREAM & WETLAND IMPACTS

 DENOTES IMPACTS IN
SURFACE WATER
 DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

-L-
PI Sta 98+94.39
 $\Delta = 33^{\circ} 49' 47.0''$ (RT)
 $D = 2^{\circ} 29' 28.0''$
 $L = 1,358.01'$
 $T = 699.45'$
 $R = 2,300.00'$
 $SE = 03$
 $V = 50$ MPH

SITE 8A

CHANNEL IMPROVEMENTS
SEE DETAIL 9-D



SITE 8

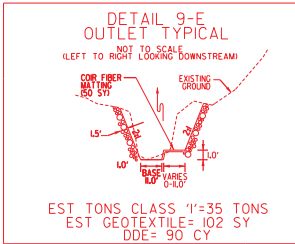
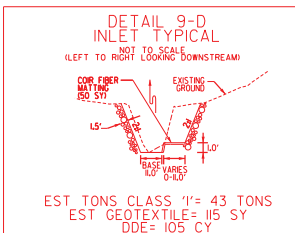
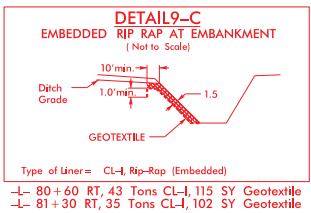
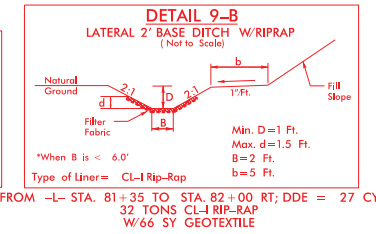
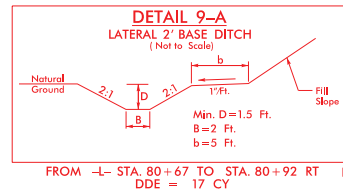
LATERAL 2' BASE DITCH
SEE DETAIL 9-A

RIPRAP AT EMBANKMENT
SEE DETAIL 9-C

CHANNEL IMPROVEMENTS
SEE DETAIL 9-E

LATERAL 2' BASE DITCH W/RIPRAP
SEE DETAIL 9-B


RIPRAP AT EMBANKMENT
SEE DETAIL 9-C



RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCEL II.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT DRAINAGE EASEMENT ON PARCEL II.

REVISIONS

AIAD 83NA 2011


 DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

✓ CHANNEL IMPROVEMENTS
SEE DETAIL 9-D

LATERAL 2' BASE DITCH
SEE DETAIL 9-A

RIPRAP AT EMBANKMENT
SEE DETAIL 9-C

(Not to Scale)

Natural Ground

2:1

2:1

1% Ft.

Fill Slope

Min. D = 1.5 Ft.
B = 2 Ft.
b = 5 Ft.

(Not to Scale)

Diagram illustrating the cross-section of a trench. The trench is filled with "Fill Slope" material. The bottom of the trench is covered with "Filter Fabric". The trench is defined by "Natural Ground" on the left and right sides. The width of the trench at the bottom is labeled "B". The depth of the trench is labeled "D". The slope of the trench walls is indicated by a ratio of 2:1. The width of the trench at the top is labeled "b". The distance from the natural ground to the edge of the trench is labeled "d". The distance from the edge of the trench to the center of the trench is labeled "1' Ft.". The minimum depth is specified as "Min. D = 1 Ft." and the maximum width is specified as "Max. d = 1.5 Ft.".

(Not to Scale)

10' min.

1:1.5

GEOTEXTILE

Ditch Grade

NOT TO SCALE
LEFT TO RIGHT LOOKING DOWNSTREAM

TONS CLASS 'I'= 43 TONS
EST GEOTEXTILE= 115 SY

NOT TO SCALE
LEFT TO RIGHT LOOKING DOWNSTREAM

A cross-sectional diagram of a V-shaped trench. The trench is 1.0' wide at the bottom and 1.5' deep. The sides are sloped at a 2:1 ratio (horizontal to vertical). The trench is lined with 'COIR FIBER MATTING (50 ST)' and has a '1.0' layer of material at the bottom. The trench is filled with 'EXISTING GROUND'.

TONS CLASS 'I'=35 TONS
ST GEOTEXTILE= 102 SY
PPE= 30 CY

DDE = 90 CY

REVISIONS

2/18/2019
R:\Hydraulics\PERMITS-Environmental\Drawings\J3467_Hyd_Prm_psh_09_W-cont.dgn
B. Harker

8/17/99

MATCHLINE -L- STA. 78+00.00
 SEE SHEET 8

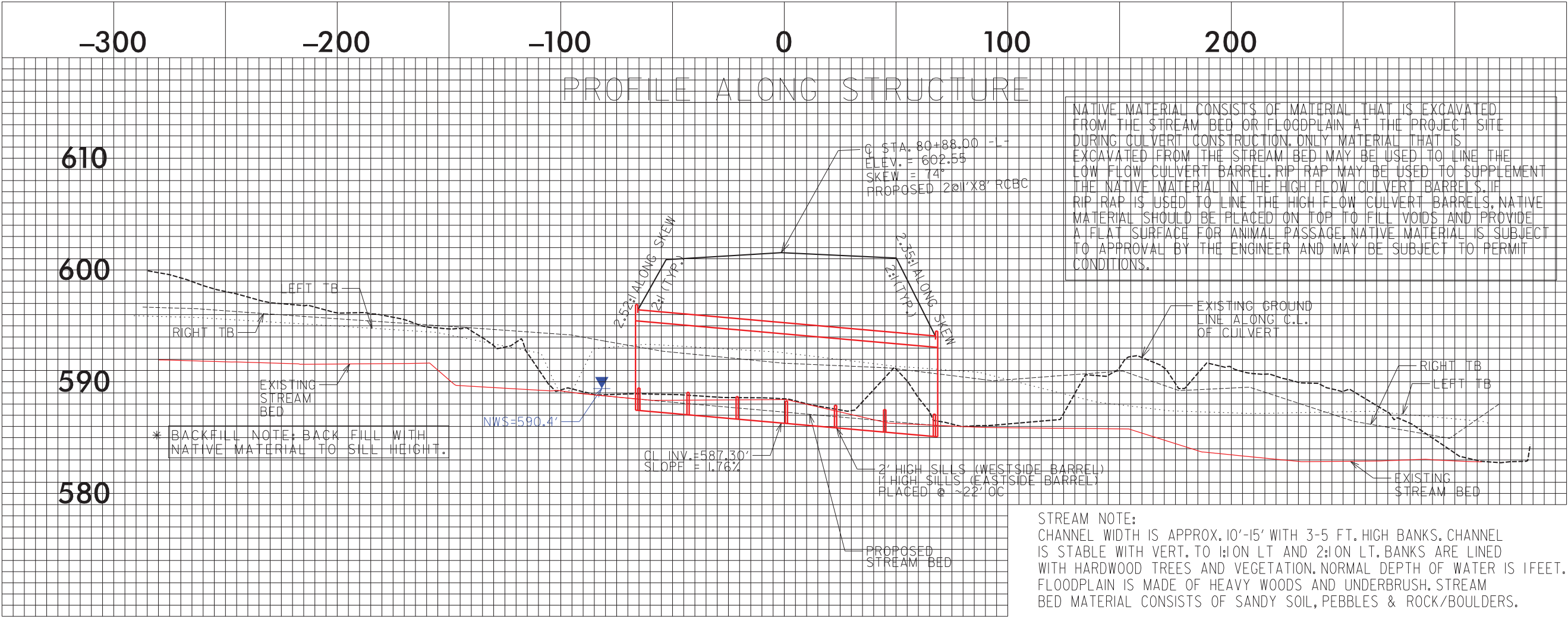
WATCHLINE -L- STA. 92 + 00.00
SEE SHEET 10

PROJECT REFERENCE NO.		SHEET NO.
U-3467		
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	

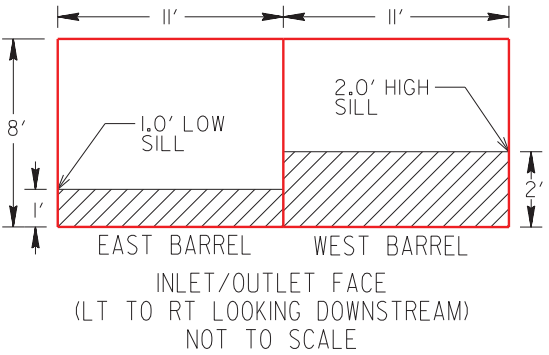
PERMIT DRAWING
SHEET 17 OF 27

SITE 8

-L- 80+88 - 2 @ 11' x 8' RCBC



STREAM NOTE:
CHANNEL WIDTH IS APPROX. 10'-15' WITH 3-5 FT. HIGH BANKS. CHANNEL IS STABLE WITH VERT. TO 1:1 ON LT AND 2:1 ON LT. BANKS ARE LINED WITH HARDWOOD TREES AND VEGETATION. NORMAL DEPTH OF WATER IS 1 FEET. FLOODPLAIN IS MADE OF HEAVY WOODS AND UNDERBRUSH. STREAM BED MATERIAL CONSISTS OF SANDY SOIL, PEBBLES & ROCK/BOULDERS.



REVISIONS
RIGHT OF WAY REVISION - 07/06/2008 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 4.7 AND 8.
RIGHT OF WAY REVISION - 07/06/2008 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 6.7 AND 8.
RIGHT OF WAY REVISION - 07/06/2008 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 6.7 AND 8.

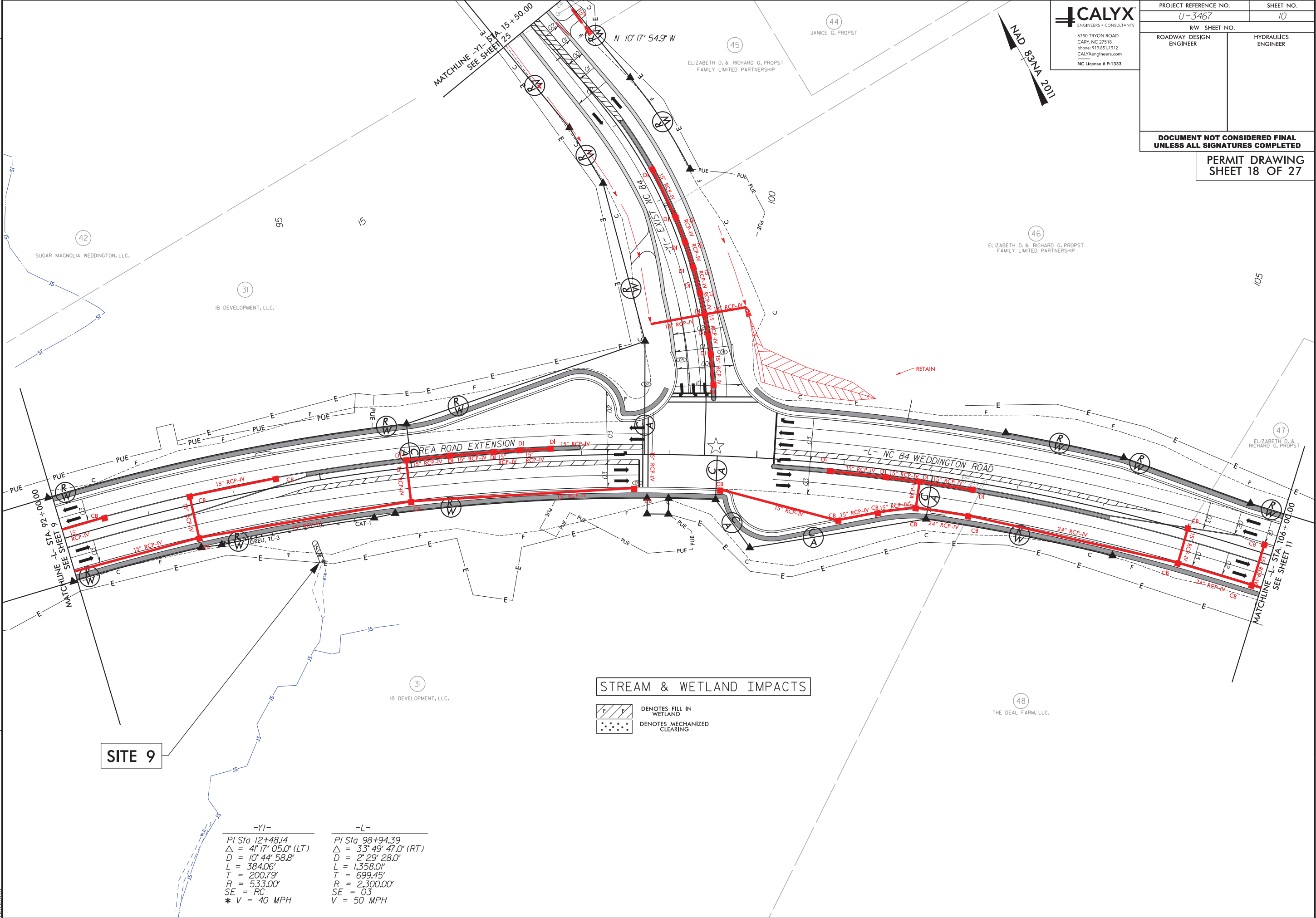
8/17/99

CALYX
ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.		SHEET NO.	
U-3467		10	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

PERMIT DRAWING
SHEET 18 OF 27

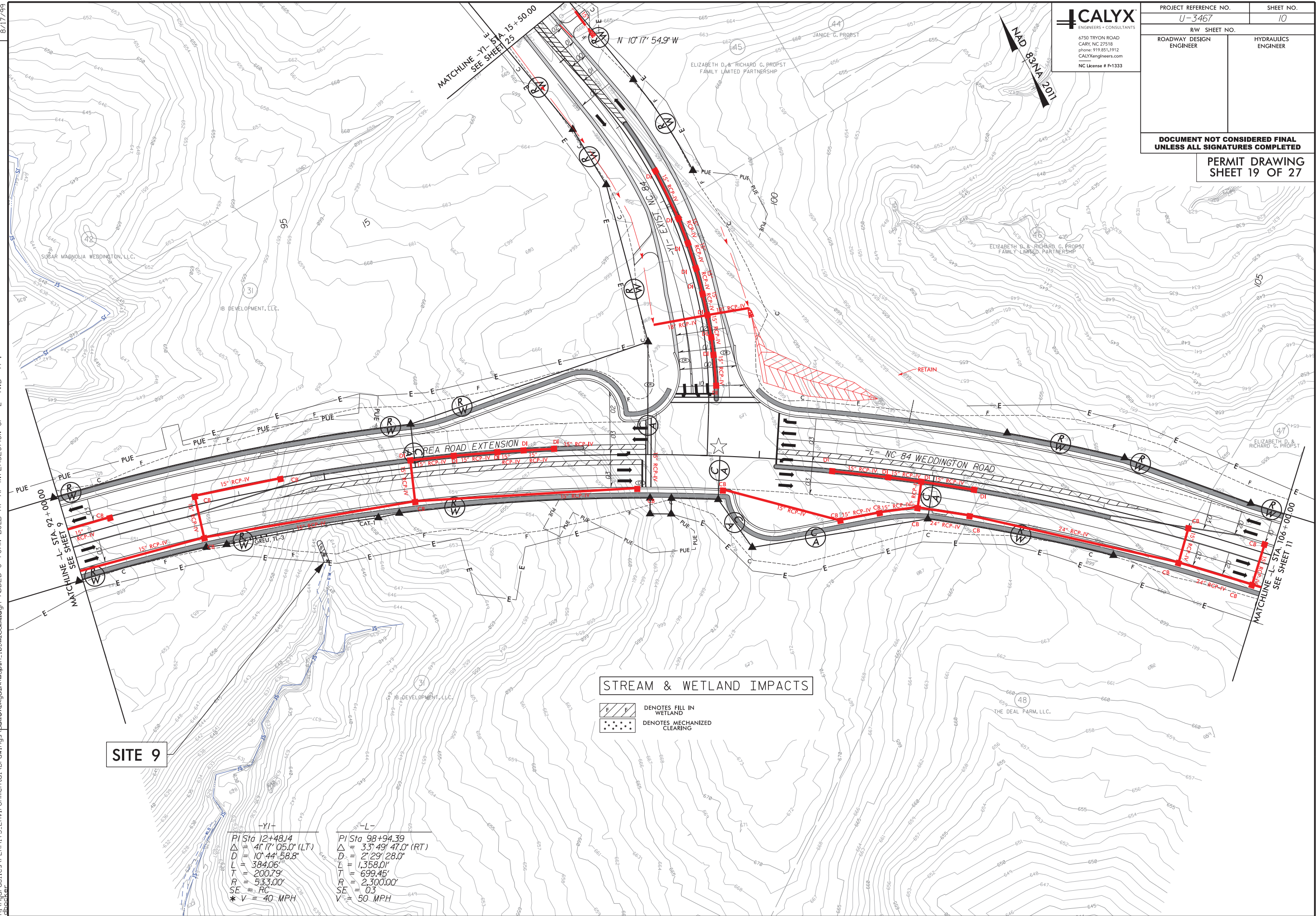
REVISIONS
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 10, 11, 18, AND 19.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 11, 18, AND 19.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 11, 18, AND 19.
DESIGN REVISION - 11/07/2018 - ADDED U-TURN BULB AT INTERSECTION OF -L- AND -YI-.
DESIGN REVISION - 11/07/2018 - ADDED U-TURN BULB AT INTERSECTION OF -L- AND -YI-.

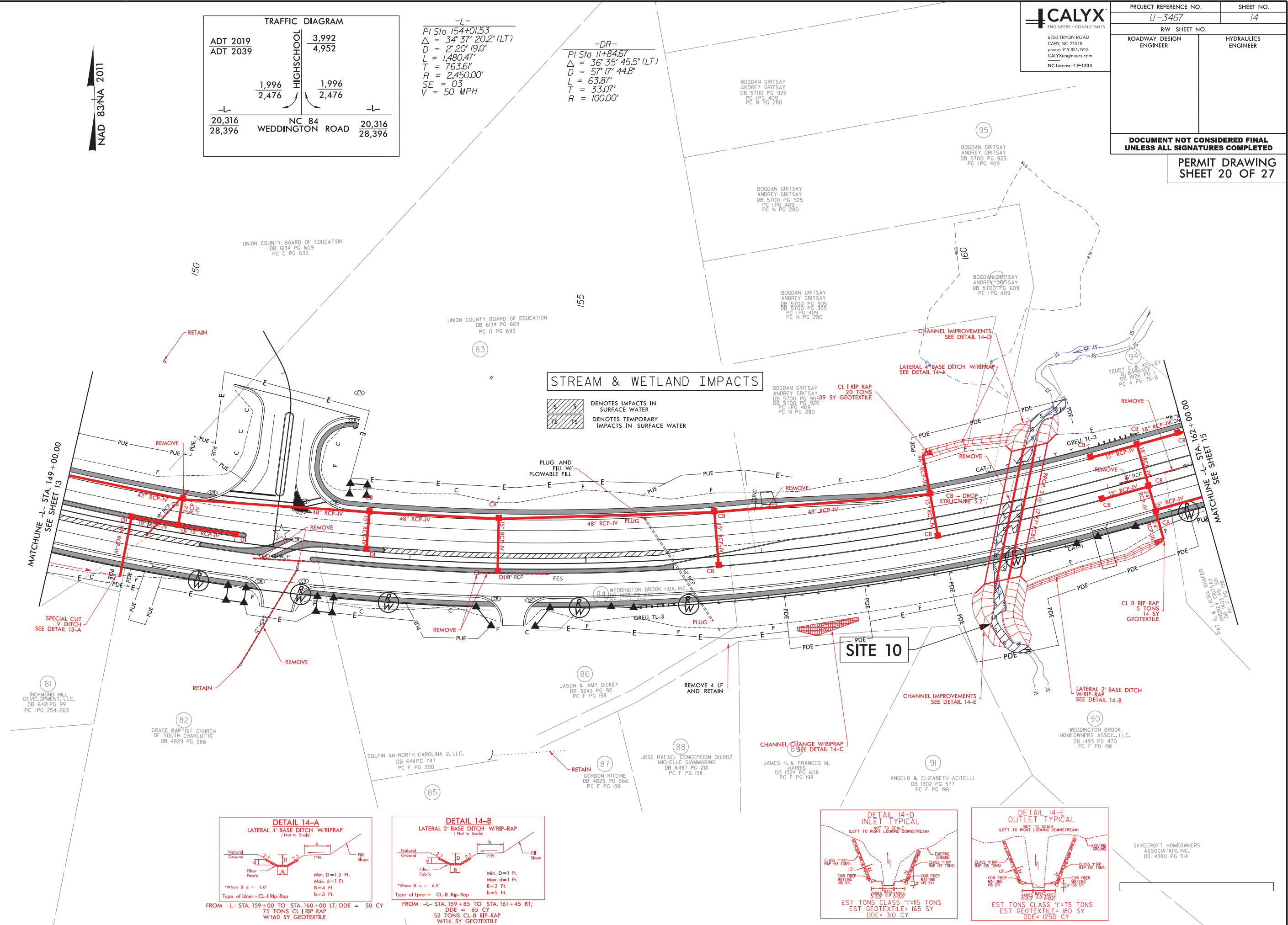


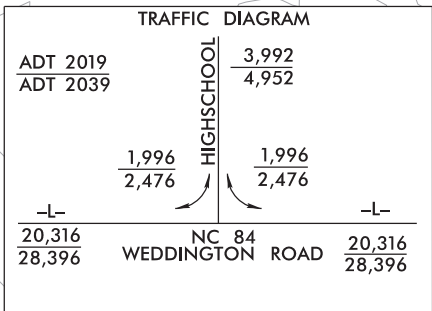
SITE 9

-YI-	-L-
PI Sta 12+48.14	PI Sta 98+94.39
$\Delta = 41^{\circ} 17' 05.0''$ (LT)	$\Delta = 33^{\circ} 49' 47.0''$ (RT)
$D = 10^{\circ} 44' 58.8''$	$D = 2^{\circ} 29' 28.0''$
$L = 384.06'$	$L = 1,358.01'$
$T = 200.79'$	$T = 699.45'$
$R = 533.00'$	$R = 2,300.00'$
$SE = RC$	$SE = 03$
$* V = 40$ MPH	$V = 50$ MPH

2/18/2019
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PERMIT DRAWING
SHEET 19 OF 272/18/2019
R:\Hydrau
dbooker





-L-
PI Sta 154+01.53
 $\Delta = 34' 37" 20.2" (LT)$
 $D = 2' 20' 19.0"$
 $L = 1,480.47'$
 $T = 763.61'$
 $R = 2,450.00'$
 $SE = 03$
 $V = 50 \text{ MPH}$

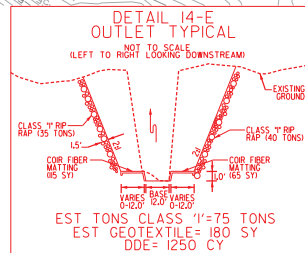
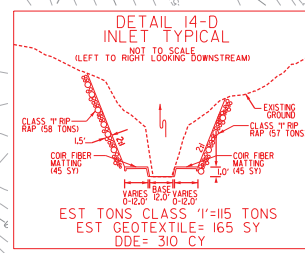
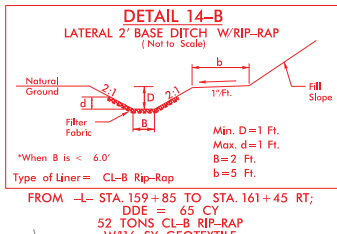
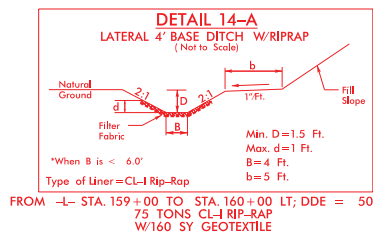
-DR-
PI Sta 11+84.67
 $\Delta = 36' 35' 45.5" (LT)$
 $D = 57' 17' 44.8"$
 $L = 63.87'$
 $T = 33.07'$
 $R = 100.00'$

STREAM & WETLAND IMPACTS

DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PLUG AND FILL W/ FLOWABLE FILL

SITE 10

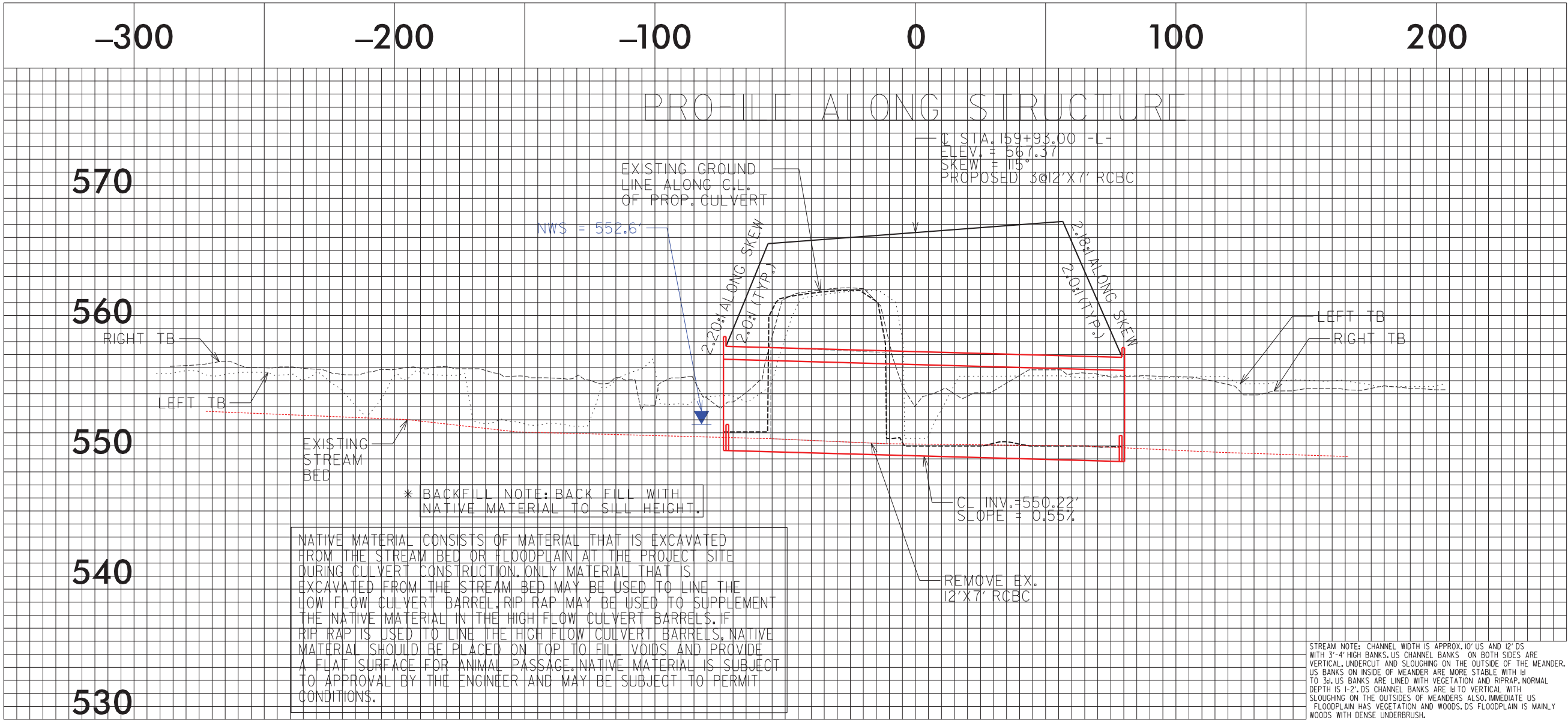


REVISIONS

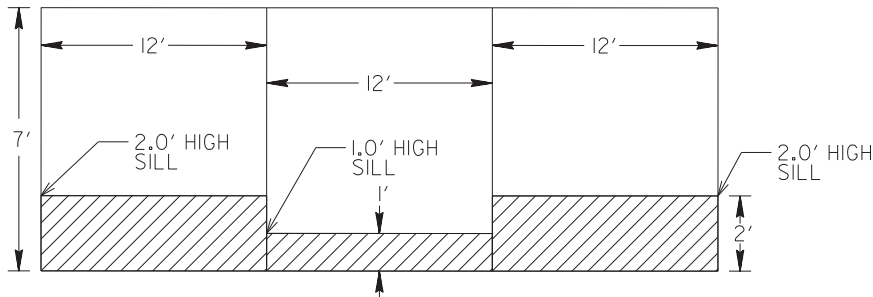
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3	11/07/2018	ADJUSTED PROPERTY LINES ON PARCELS 49 AND 50 ADDED PARCEL 50A.
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100	11/07/2018	ADJUSTED PROPERTY LINES ON PARCELS 49 AND 50 ADDED PARCEL 50A.

SITE 10

-L- 159+93 - 3 @ 12' x 7' RCBC



CULVERT TYPICAL
@ INLET/OUTLET FACE
(LT TO RT LOOKING
DOWNSTREAM)
NOT TO SCALE




REVISIONS
RIGHT OF WAY REVISION - 07/06/2008 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 4.7 AND 8.
RIGHT OF WAY REVISION - 07/06/2008 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 6.7 AND 8.
RIGHT OF WAY REVISION - 07/06/2008 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 6.7 AND 8.

REVISIONS

3/8/2019
R:\Hydro
zalstra



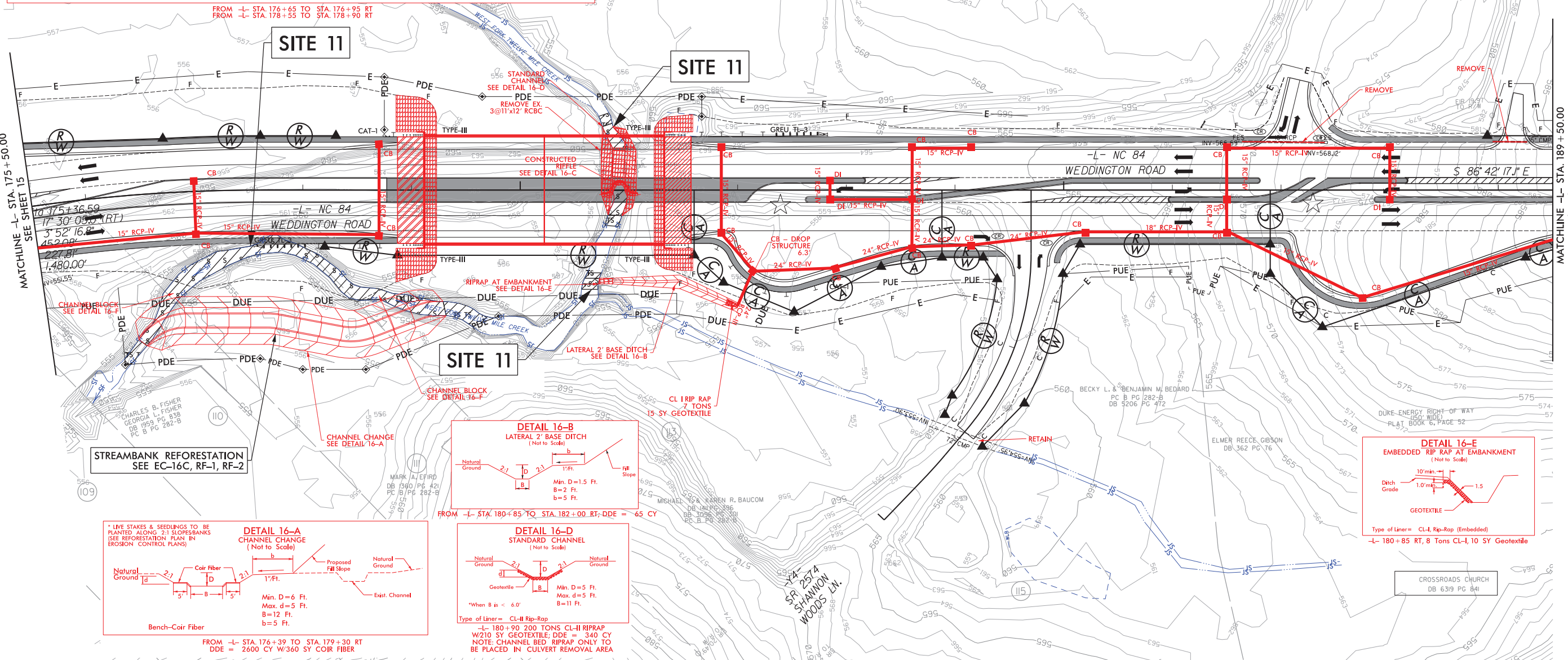
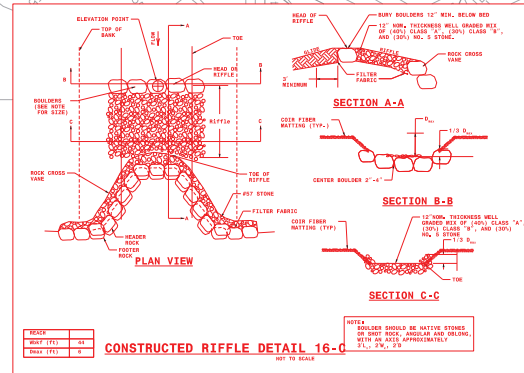

 DENOTES IMPACTS IN
SURFACE WATER
 DENOTES TEMPORARY
IMPACTS IN SURFACE WATER



NAD 83/NA 2011

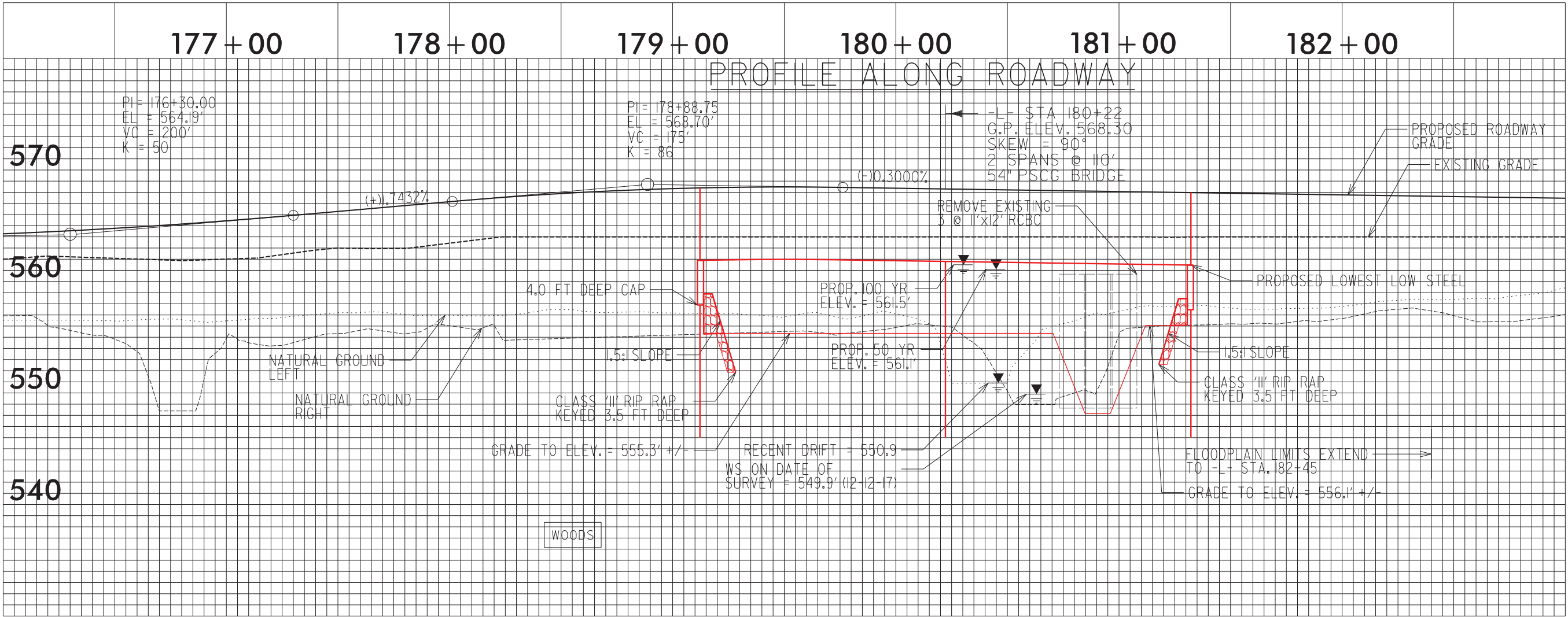
PROJECT REFERENCE NO.	SHEET NO.
<i>U-3467</i>	<i>16</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
PERMIT DRAWING SHEET 23 OF 27	

PERMIT DRAWING
SHEET 23 OF 27



SITE 11

-L- 180+22 - BRIDGE

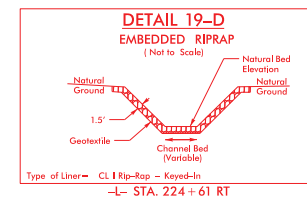


REVISIONS

RIGHT OF WAY REVISION - 07/06/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 4.7 AND 8.
RIGHT OF WAY REVISION - 07/06/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 6.7 AND 8.
RIGHT OF WAY REVISION - 07/06/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 6.7 AND 8.



2/8/2019
R:\Hydraulics\PERMITS\Environmental\Drawings\J3467_Hyd_Prm_psh.19.dgn
b:\boccker



WETLAND AND SURFACE WATER IMPACTS SUMMARY												
			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 23+10/24+30	54" RCP-IV BURIED 1.0'						0.04	< 0.01	333	26	
2	-L- 26+00/26+60	Roadway Fill	< 0.01			0.01						
3	-L- 28+60/28+85	Roadway Fill			< 0.01	< 0.01						
4	-L- 32+90/33+80	Roadway Fill			0.10	0.03						
5	-L- 35+70/36+90	30" RCP-IV						0.02	< 0.01	214	10	
6	-L- 39+40/40+40	Roadway Fill/Rock Fill in pond	0.07			< 0.01		0.07	0.02			
7	-L- 64+20/64+80	30" RCP-IV BURIED 0.5'						0.02	< 0.01	175	20	
8	-L- 80+40/81+20	2 @ 11'x8' RCBC						0.04		136		
	-L- 80+40/81+20	Bank Stabilization						0.03	< 0.01	94	38	
8A	-L- 80+64/81+05 LT	Bank Stabilization						< 0.01	< 0.01	33	10	
9	-L- 94+80	Roadway Fill	< 0.01			< 0.01						
10	-L- 159+40/160+65	3 @ 12'x7' RCBC						0.03		110		
	-L- 159+40/160+65	Bank Stabilization						0.03	< 0.01	160	21	
11	-L- 176+35/179+40	Roadway Fill / Channel Relocation						0.08		273		
	-L- 176+35/179+40	Channel Relocation / Bank Stab.						0.02	0.02	58	64	
	-L- 180+55/180+75	Bank Stabilization						< 0.01	< 0.01	5	10	
	-L- 180+75/181+00	Culvert Removal / Bank Stab.						0.01	< 0.01	51	20	
12	-L- 224+45/225+20	Roadway Fill						0.01	< 0.01	94	5	
TOTALS*:			0.07		0.10	0.06		0.41	0.06	1736	224	0

*Rounded totals are sum of actual impacts

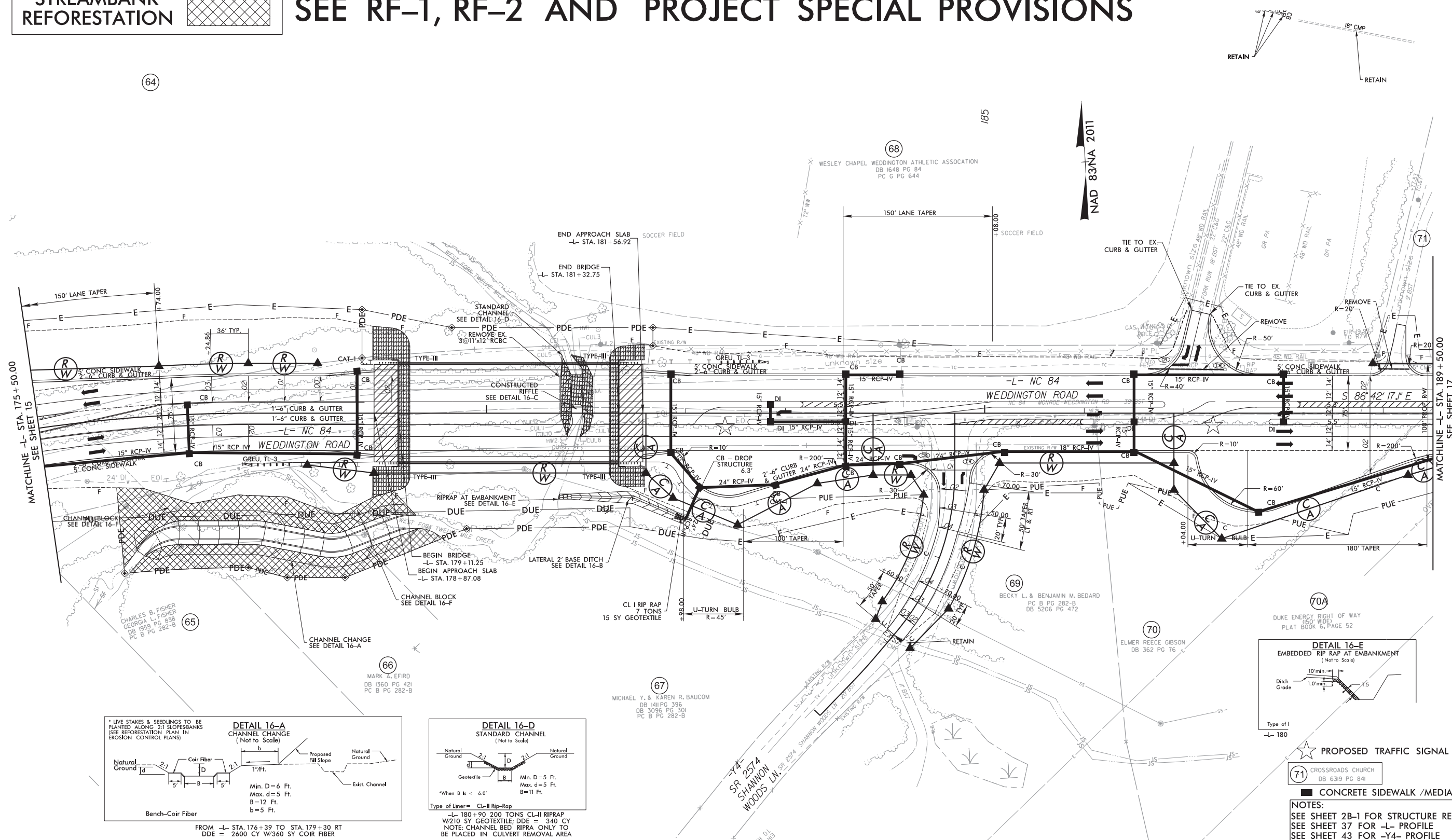
NOTES:

- Site 4 - Partial loss of northern portion of wetland included in impact calculations.
Site 6 - Total take of wetland included in impact calculations.
Site 11 - It should be noted that 0.3 Acre Streambank Reforestation is also a part of Site 11 (See Sheets RF-1 & RF-2 in EC Plans for details)

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
2/18/2019
UNION COUNTY
U-3467
39019.1.1

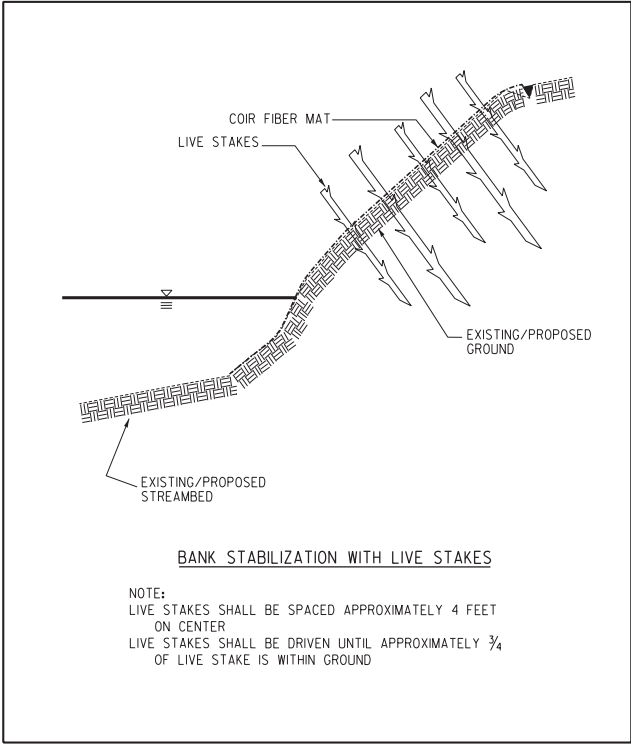
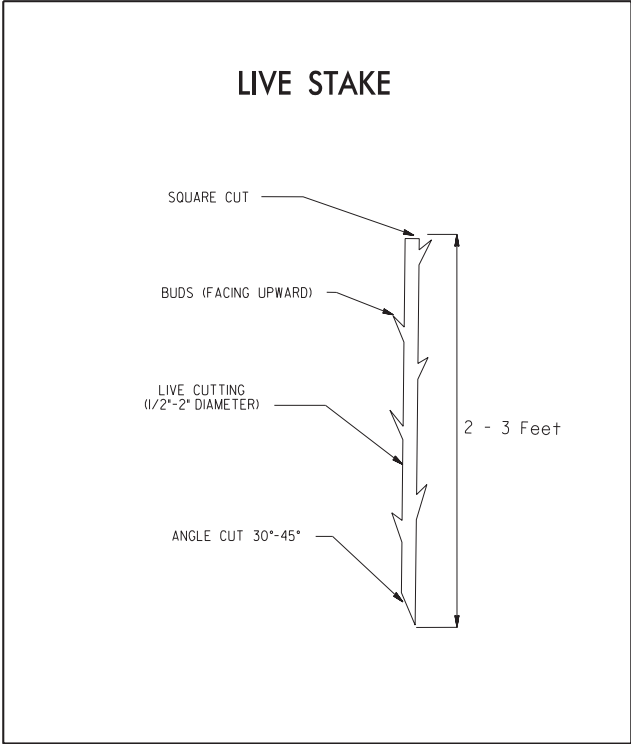
STREAMBANK REFORESTATION

SEE RF-1, RF-2 AND PROJECT SPECIAL PROVISIONS

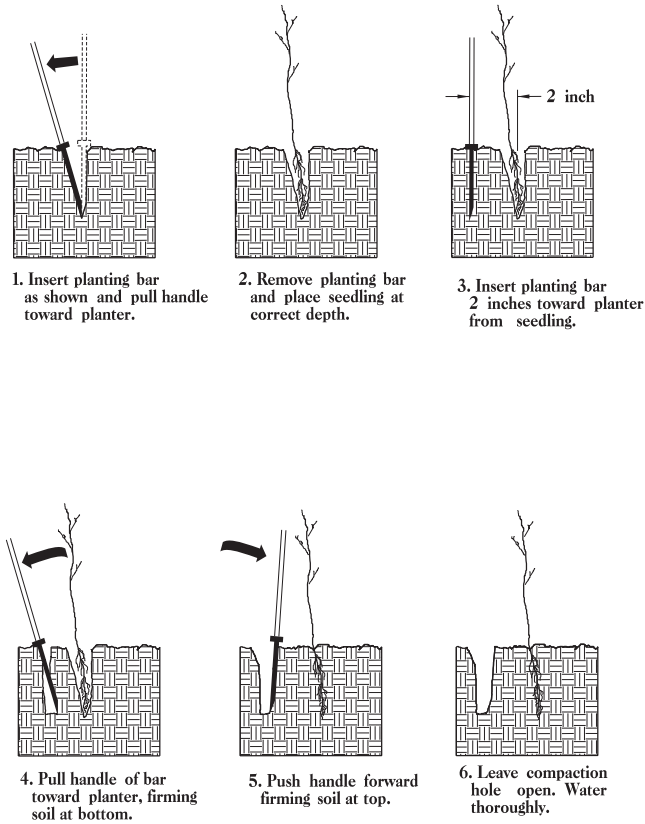


PLANTING DETAILS

LIVE STAKES PLANTING DETAIL



BAREROOT PLANTING DETAIL
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



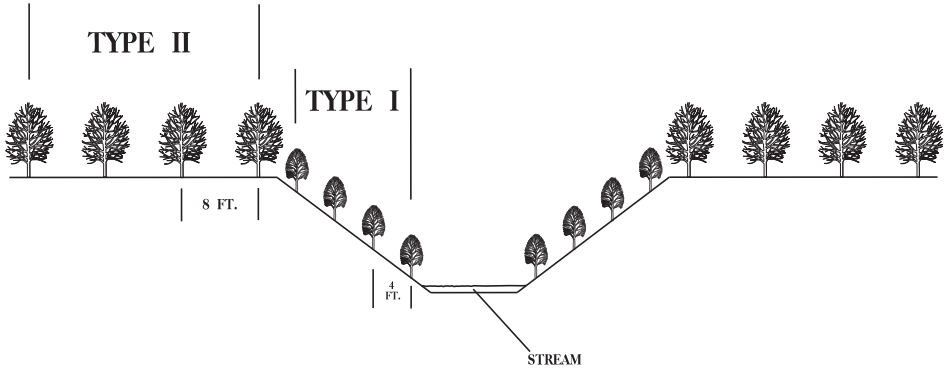
KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

- ☐ TYPE 1 STREAMBANK REFORESTATION SHALL BE PLANTED 3 FT. TO 5 FT. ON CENTER, RANDOM SPACING, AVERAGING 4 FT. ON CENTER, APPROXIMATELY 2724 PLANTS PER ACRE.
- ☐ TYPE 2 STREAMBANK REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.
- ☐ NOTE: TYPE 1 AND TYPE 2 STREAMBANK REFORESTATION SHALL BE PAID FOR AS "STREAMBANK REFORESTATION"

STREAMBANK REFORESTATION TYPICAL



STREAMBANK REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

TYPE 1

50% SALIX NIGRA	BLACK WILLOW	2 ft - 3 ft LIVE STAKES
50% CORNUS AMOMUM	SILKY DOGWOOD	2 ft - 3 ft LIVE STAKES

TYPE 2

25% LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
25% PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in BR
25% FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in BR
25% BETULA NIGRA	RIVER BIRCH	12 in - 18 in BR

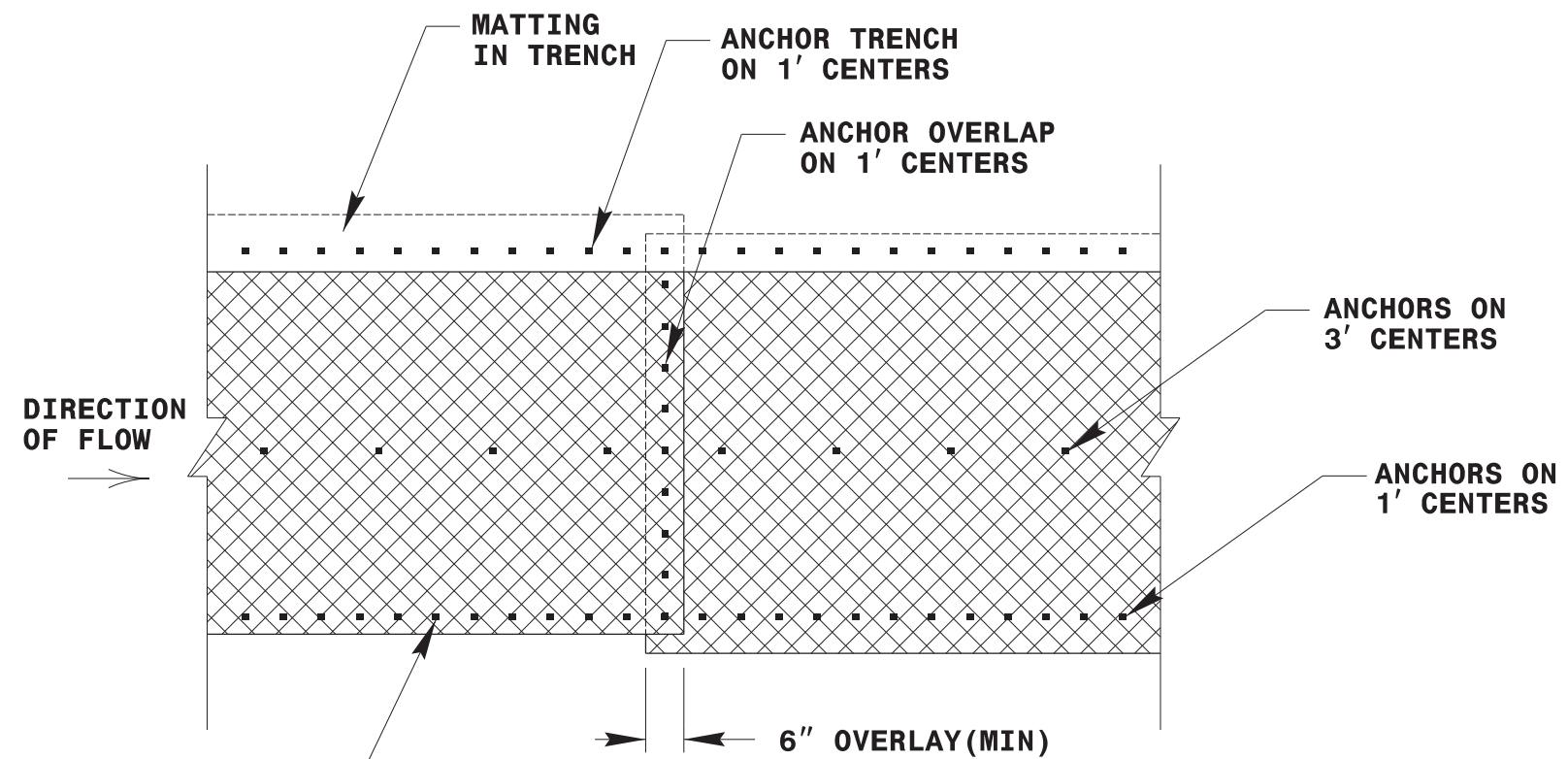
- ☐ SEE PLAN SHEETS FOR AREAS TO BE PLANTED

STREAMBANK REFORESTATION

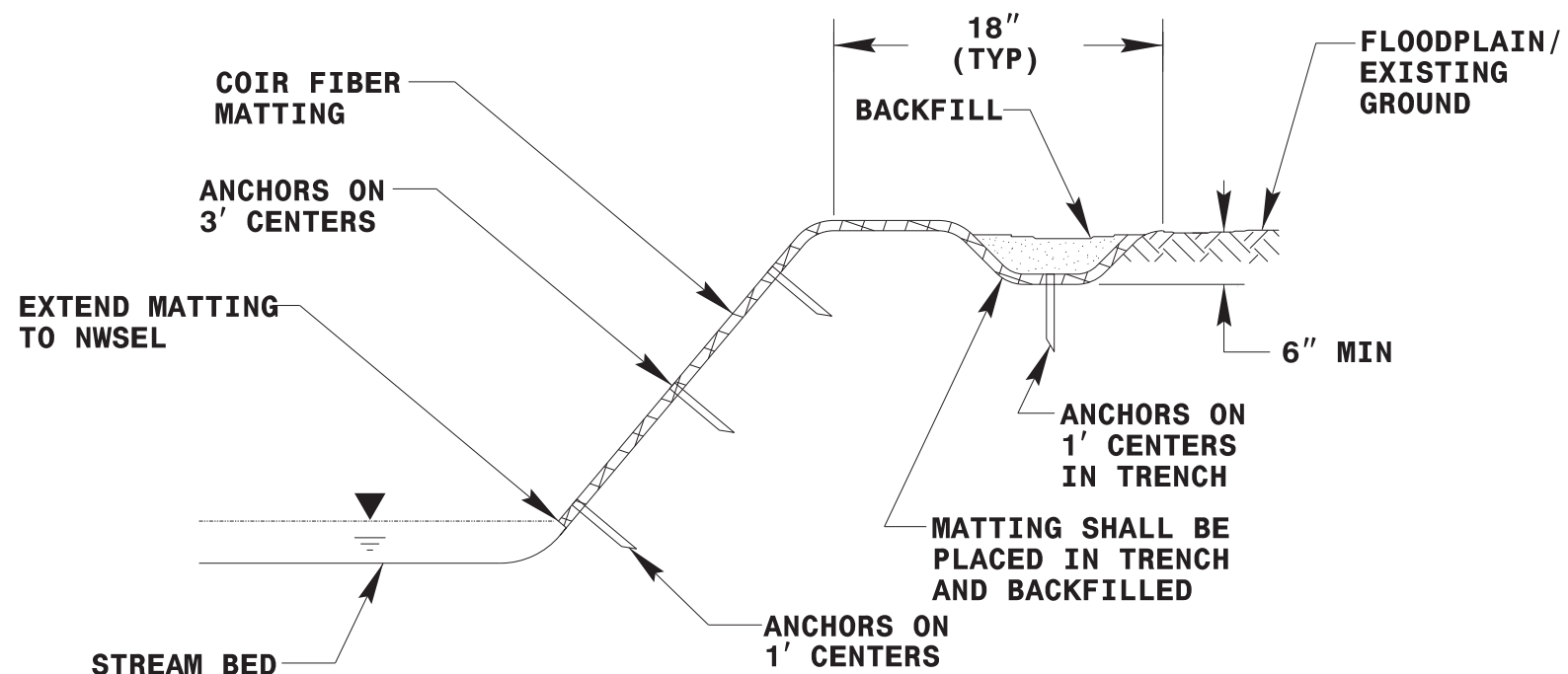
DETAIL SHEET 1 OF 2

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

PROJECT REFERENCE NO.	SHEET NO.
U-3467	RF-2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



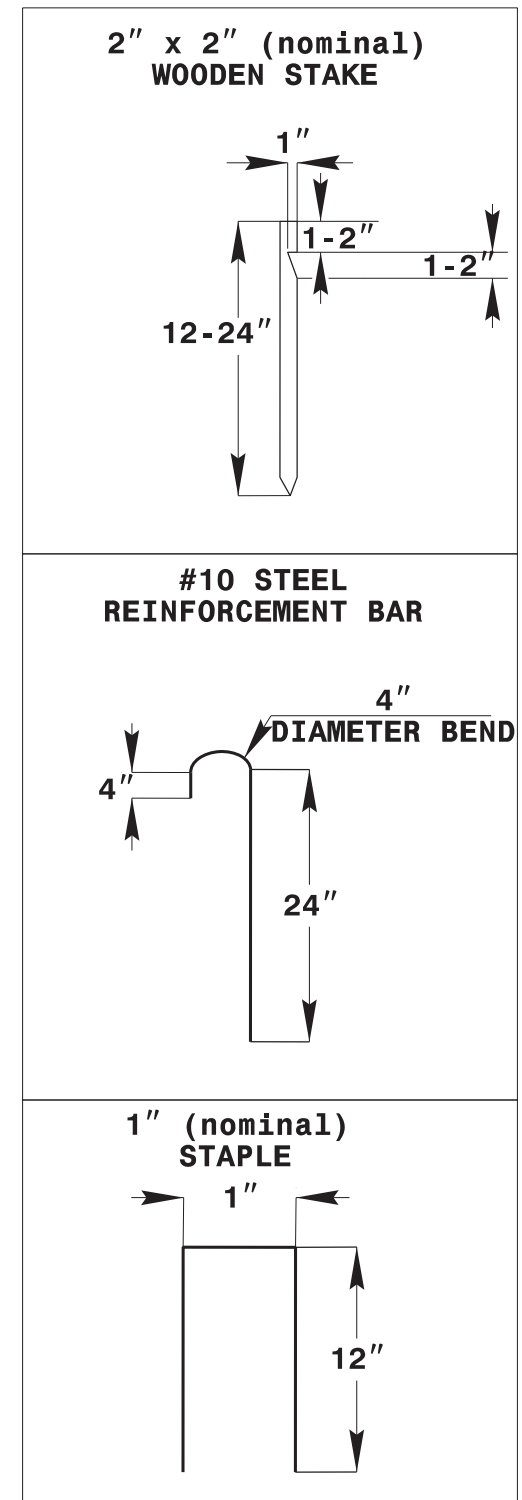
PLAN VIEW



TYPICAL CROSS SECTION

COIR FIBER MATTING DETAIL

NOT TO SCALE



ANCHOR OPTIONS

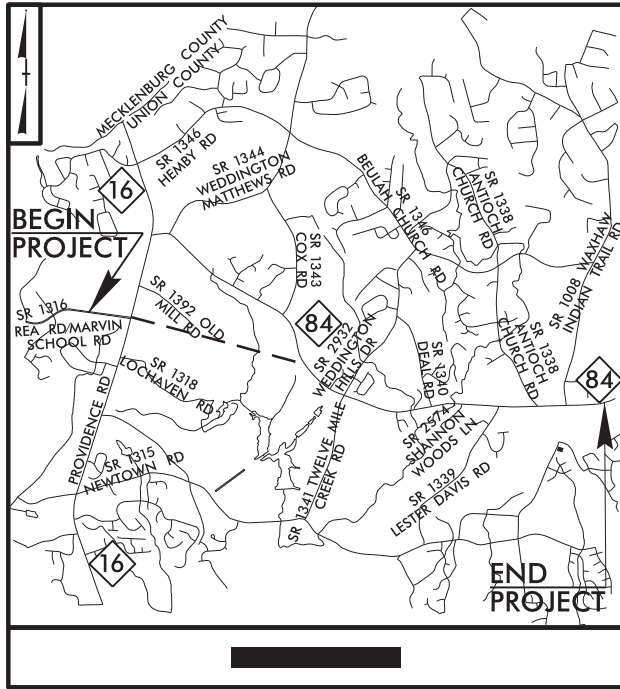
STREAMBANK REFORESTATION

DETAIL SHEET 2 OF 2

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

09/08/99
26-SEP-2018 09:59
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\$\$\$\$\$USERNAME\$\$\$\$\$

TIP PROJECT: U-3467

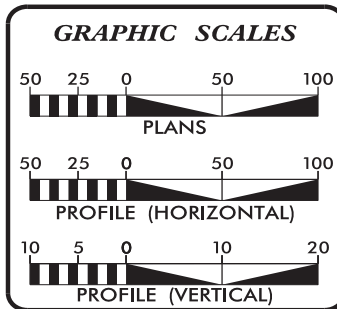
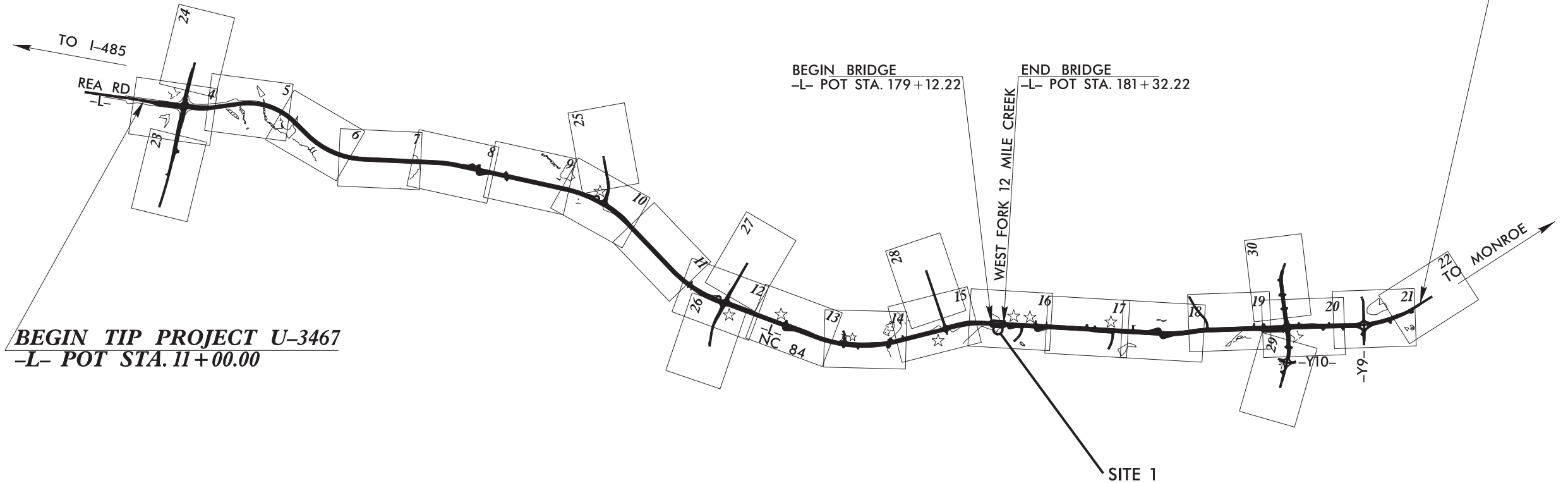


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PERMIT DRAWING
UNION COUNTY

LOCATION: SR 1316 (REA ROAD EXTENSION)
FROM NC 16 TO SR 1008
(MAXHAW-INDIAN TRAIL ROAD)
TYPE OF WORK: TEMPORARY IMPACT IN SURFACE
WATER BY UTILITIES' RELOCATION

END TIP PROJECT U-3467
-L- POT STA. 258+50.00



INDEX OF SHEETS	
SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	UTILITY PERMIT DRAWING

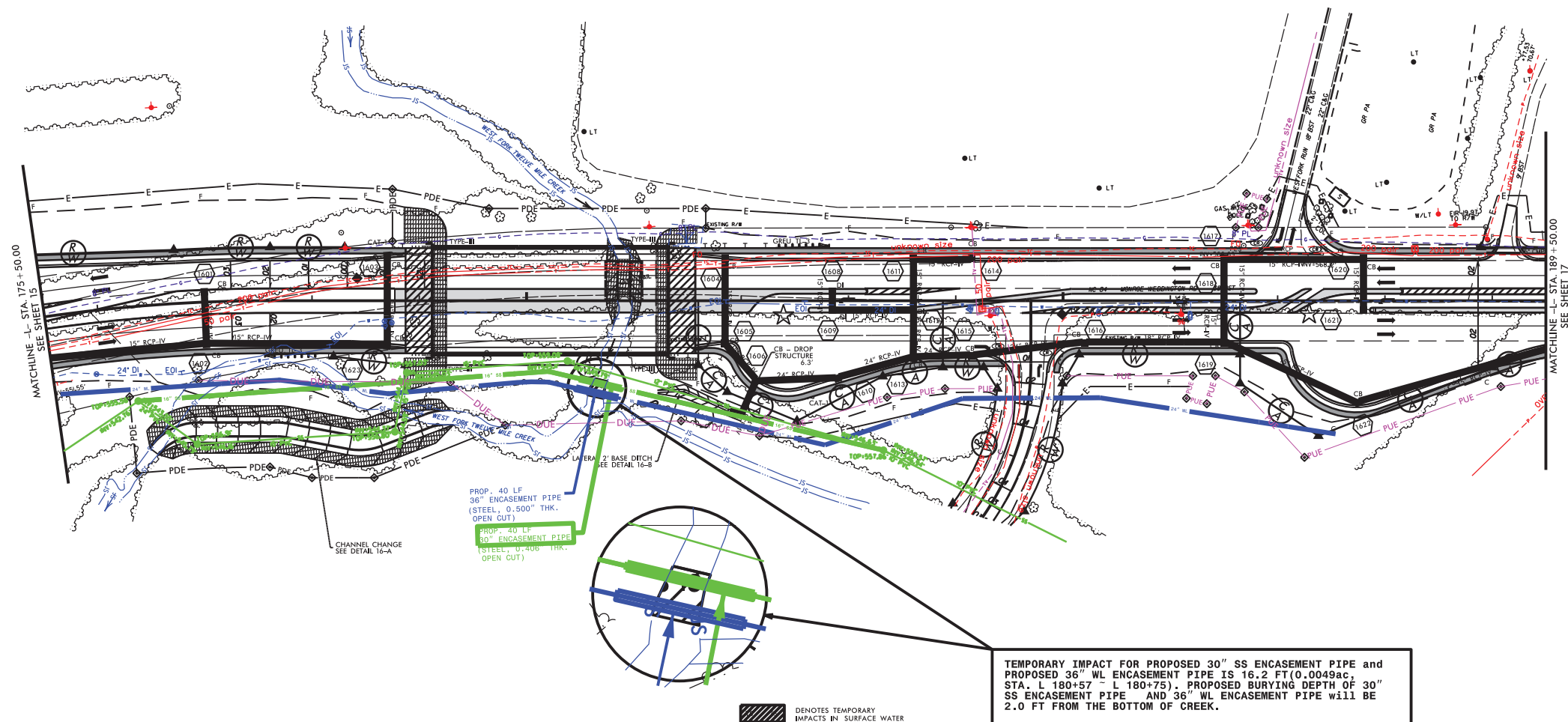
WATER AND SEWER OWNERS ON PROJECT	
(A) WATER : UNION COUNTY WATER & SEWER	
(B) SANITARY SEWER : UNION COUNTY WATER & SEWER	

SEAL

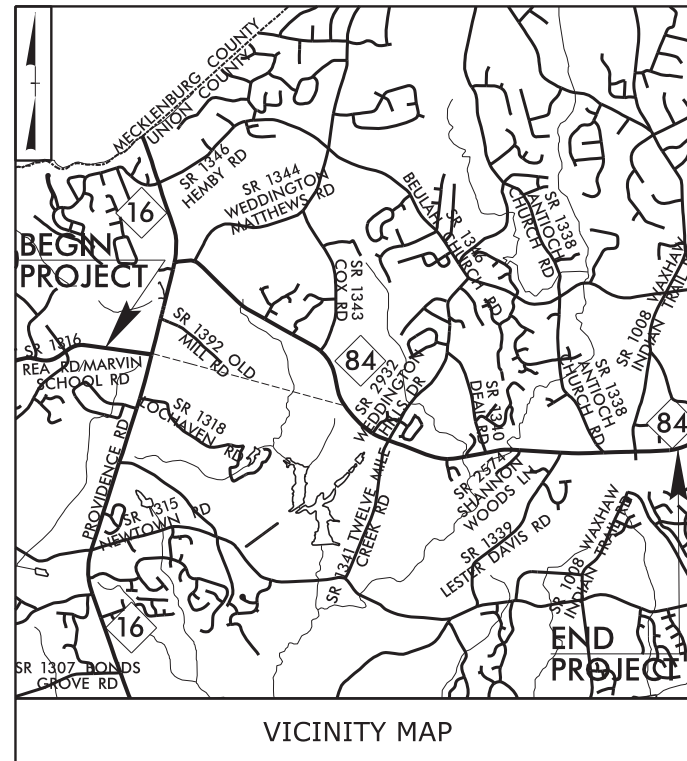
	DIVISION OF HIGHWAYS UTILITIES UNIT 1555 MAIL SERVICES CENTER RALEIGH NC 27699-1555 PHONE (919) 707-6690 FAX (919) 250-4151
MICHAEL BRIGHT	UTILITIES REGIONAL ENGINEER
JT YOON, PE	UTILITIES ENGINEER

UTILITY CONSTRUCTION

AD 83 NA 2011



See Sheet 1A For Index of Sheets



STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

UNION COUNTY

**LOCATION: SR 1316 (REA ROAD EXTENSION)
FROM NC 16 TO SR 1008**

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES, & SIGNALS

**DO NOT ACQUIRE PARCELS ON
SHEETS 4, 5, 23, AND 24 UNTIL
U-5769 REVISIONS ARE ADDED.**

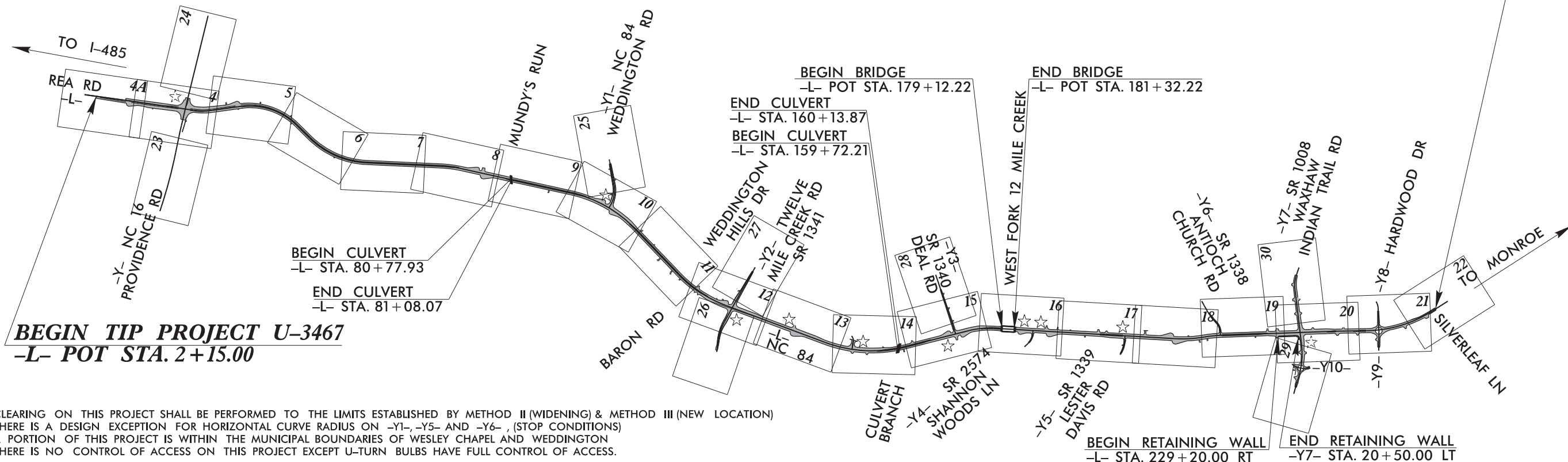


STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3467	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
39019.1.1	STP-1316(10)	P.E.	
39019.2.1	STP-1316(10)	R/W, UTL.	

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

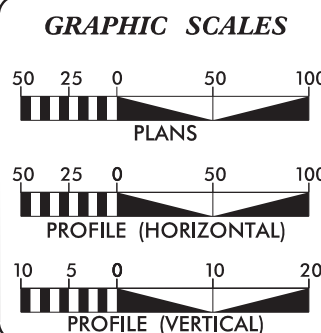
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END TIP PROJECT U-3467
-L- POT STA. 258+50.00



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II (WIDENING) & METHOD III (NEW LOCATION). THERE IS A DESIGN EXCEPTION FOR HORIZONTAL CURVE RADIUS ON -Y1-, -Y5- AND -Y6-, (STOP CONDITIONS). A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF WESLEY CHAPEL AND WEDDINGTON. THERE IS NO CONTROL OF ACCESS ON THIS PROJECT EXCEPT U-TURN BULBS HAVE FULL CONTROL OF ACCESS.

CONTRACT:



DESIGN DATA

ADT 2019 = 23,608
ADT 2039 = 32,648
DHV = 10 %
D = 60 %
T = 4 % *
V = 50 MPH
* TTST =1% DUAL 3%
FUNC CLASS=
URBAN MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-3467	=	4.653 MILES
LENGTH STRUCTURES TIP PROJECT U-3467	=	0.035 MILES
TOTAL LENGTH TIP PROJECT U-3467	=	<u>4.688 MILES</u>

Prepared in the Office of:



FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY DATE:

MAY 31, 2018

LETTING DATE:

SEPTEMBER 17, 2019

NCDOT CONTACT:

BRYAN KEY, PE

CENTRAL PROJECT MANAGER IN TECHNICAL SERVICES

JOHNNY BANKS

CALYX E & C
PROJECT MANAGER

STEPHEN C. BROWDE, PE

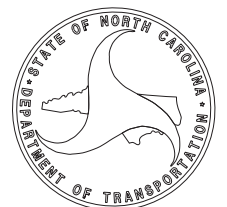
CALYX E & C
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ **P.E.** _____

**ROADWAY DESIGN
ENGINEER**

_____ P.E.
SIGNATURE:



8/17/99

REVISIONS



ENGINEERS + CONSULTANTS

6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO. <i>U-3467</i>		SHEET NO. <i>4A</i>	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

BEGIN CONSTRUCTION TIP U-3467
-L- POT Sta. 2+15.00

HIGHCLERE SUBDIVISION
ENTRANCE - UPDATED
SURVEYS EXPECTED

MATCHLINE -L- STA. 10+50.00
SEE SHEET 4

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2/15/2018
Rdy

8/17/99

RIGHT OF WAY REVISION - 07/06/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 2, 4, AND 5.
RIGHT OF WAY REVISION - 07/06/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 2, 4, AND 5.
RIGHT OF WAY REVISION - 01/30/2019 - ADDED PERMANENT DRAINAGE EASEMENT ON PARCEL 2.
RIGHT OF WAY REVISION - 01/30/2019 - ADJUSTED CONSTRUCTION EASEMENT ON PARCEL 2.

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2/15/2019 10:04:00 AM

TRAFFIC DIAGRAM				
ADT 2019 ADT 2039		-Y- NC 16	22,784 30,704	
-L- SR 1316	7,944 8,664		2,780 3,180	12,376 15,256
	18,488 23,928			
	5,328 9,968		4,380 6,780	-L-
	21,800 35,600	-Y- NC 16		

DO NOT ACQUIRE PARCELS ON SHEETS 4, 5, 23, AND 24
UNTIL U-5769 REVISIONS ARE ADDED

UNION ELECTRIC MEMBERSHIP CORPORATION
DB 6696 PG 637
PC N PG 184

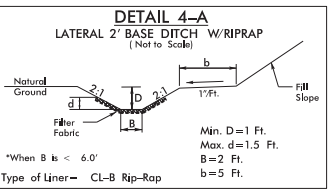
PROVIDENCE ROAD MARVIN WEDDINGTON
JOINT VENTURE
DB 584 PG 83

WILBERT & BETTY LOVE
DB 209 PG 83

RAJENDRA & RENUKA PATEL
DB 5302 PG 743
PC G PG 194

GBENGA & JOYCE ALUKO
DB 4128 PG 273
PC 1 PG 839

MATTHEW ALLEN MILFORD
DANA JEFFERS MILFORD
DB 5478 PG 777
PC 1 PG 839



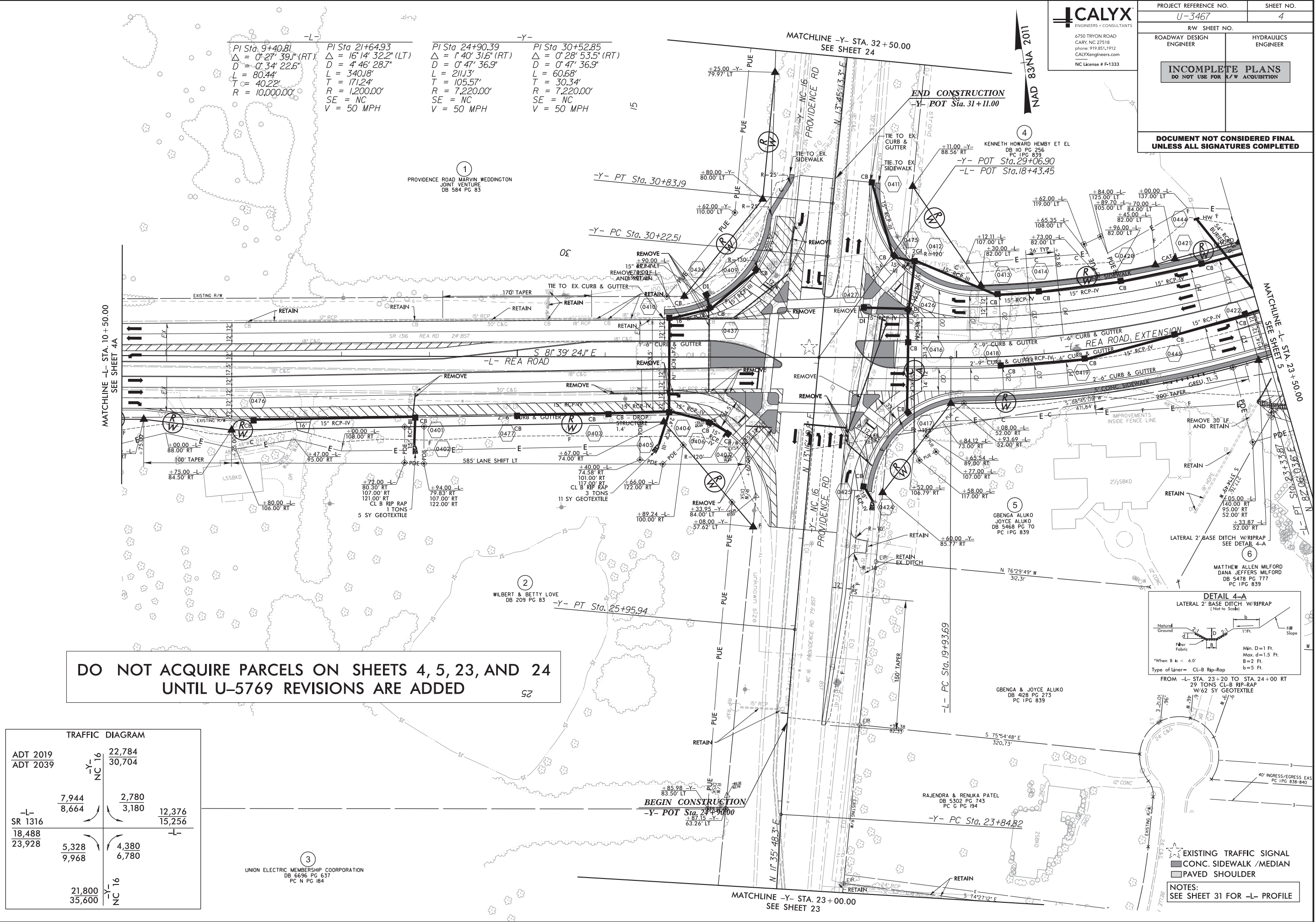
FROM -L- STA. 23+20 TO STA. 24+00 RT
29 TONS CL-B RIP-RAP
W/ 62 SY GEOTEXTILE

EXISTING TRAFFIC SIGNAL
CONC. SIDEWALK / MEDIAN
PAVED SHOULDER

NOTES:
SEE SHEET 31 FOR -L- PROFILE

CALYX
ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.		SHEET NO.
U-3467		4
RW SHEET NO.		HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER		
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



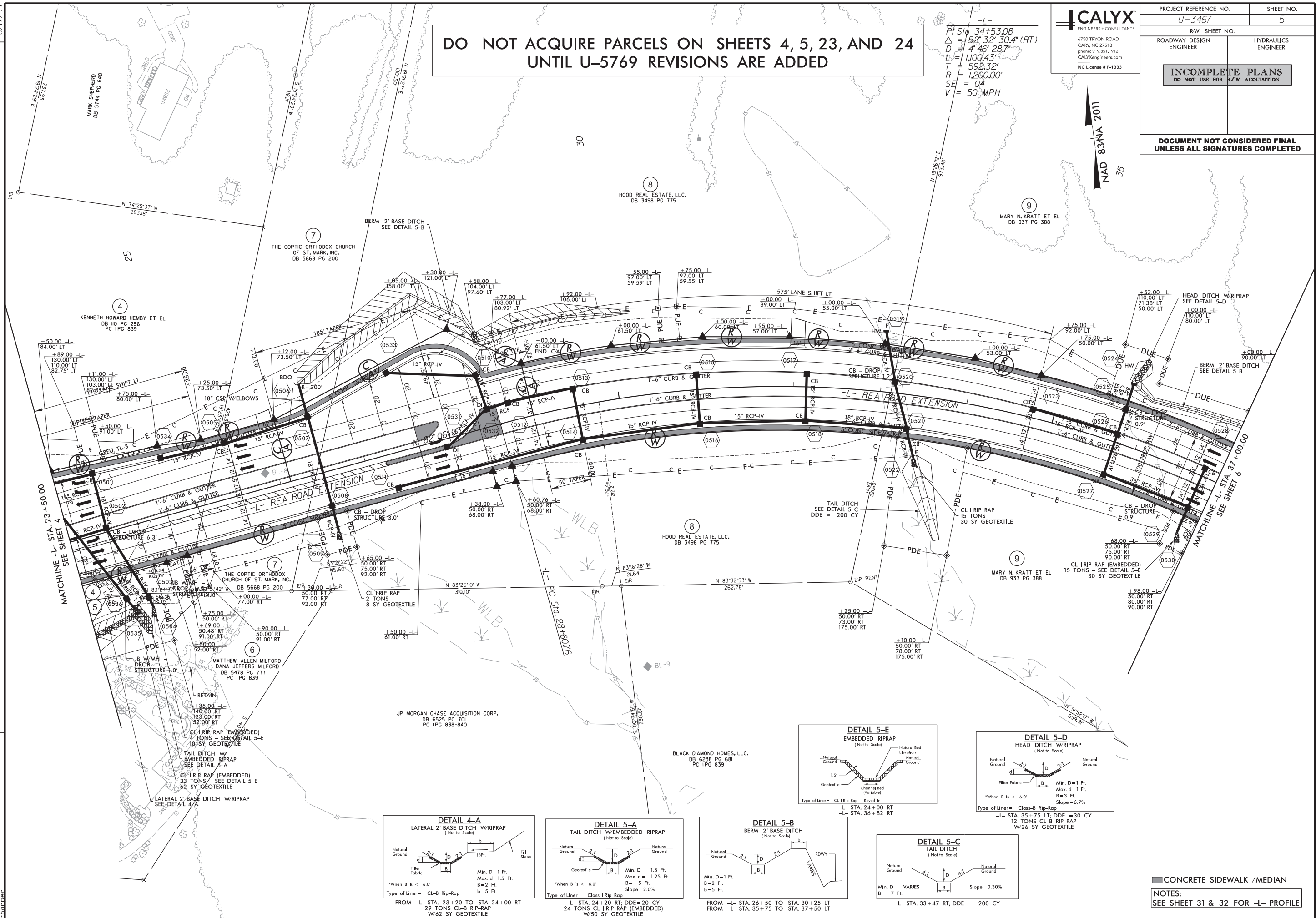
CALYX
ENGINEERS + CONSULTANTS

6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com

NC License # F-1333

PROJECT REFERENCE NO.	SHEET NO.
U-3467	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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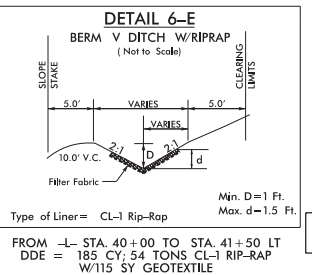
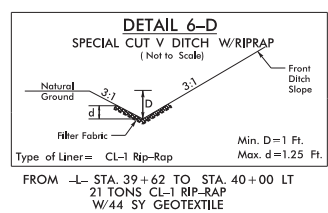
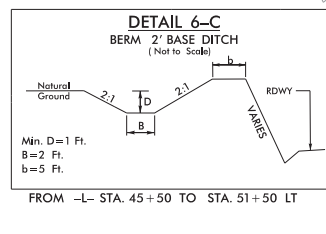
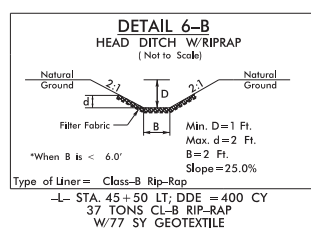
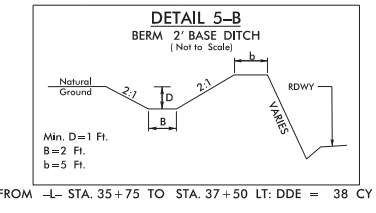
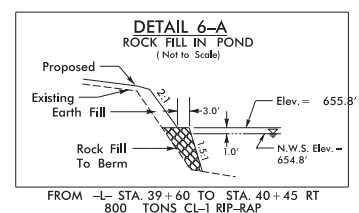
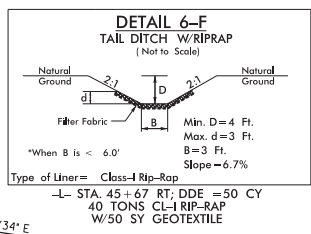
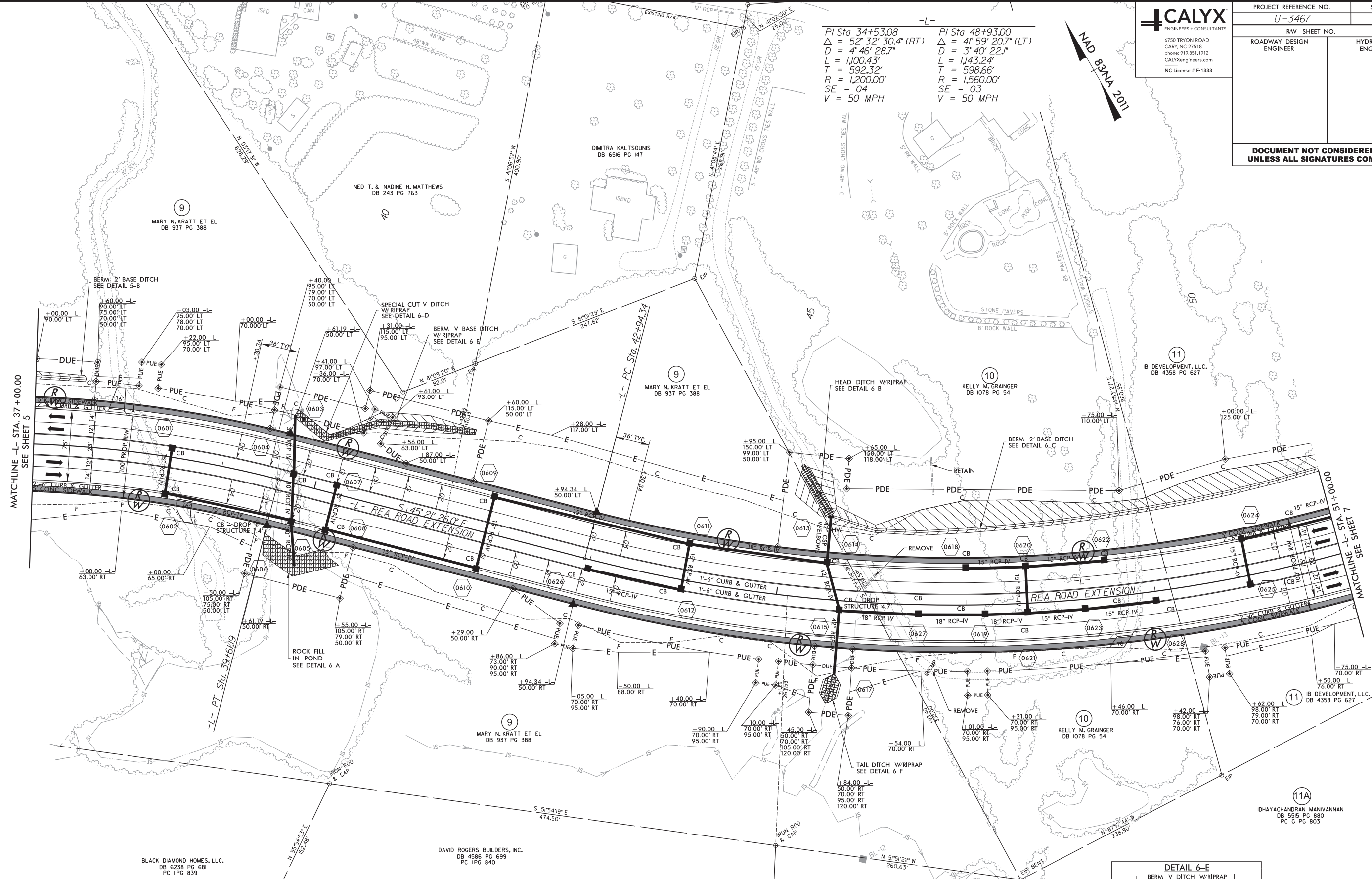
	REVISIONS	
RIGHT OF WAY	REVISION - 07/06/2018	- ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 4.7 AND 8.
RIGHT OF WAY	REVISION - 07/06/2018	- ADJUSTED DIAL UTILITY EASEMENT ON PARCEL 8.
RIGHT OF WAY	REVISION - 07/06/2018	- ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 6.7 AND 8.
RIGHT OF WAY	REVISION - 10/26/2018	- ADJUSTED RIGHT OF WAY ON PARCEL 8.



-L-

$PI\ Sta\ 34+53.08$ $\Delta = 52^\circ 32' 30.4" (RT)$ $D = 4' 46" 28.7"$ $L = 1,100.43'$ $T = 592.32'$ $R = 1,200.00'$ $SE = 04$ $V = 50\ MPH$	$PI\ Sta\ 48+93.00$ $\Delta = 41^\circ 59' 20.7" (LT)$ $D = 3' 40" 22.1"$ $L = 1,143.24'$ $T = 598.66'$ $R = 1,560.00'$ $SE = 03$ $V = 50\ MPH$
--	--

NAD 83/NA 2011



CONCRETE SIDEWALK

NOTES:
SEE SHEET 32 FOR -L- PROFILE

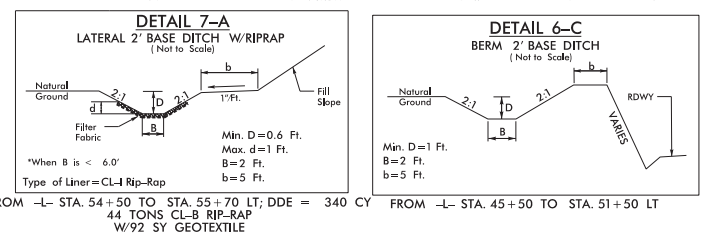
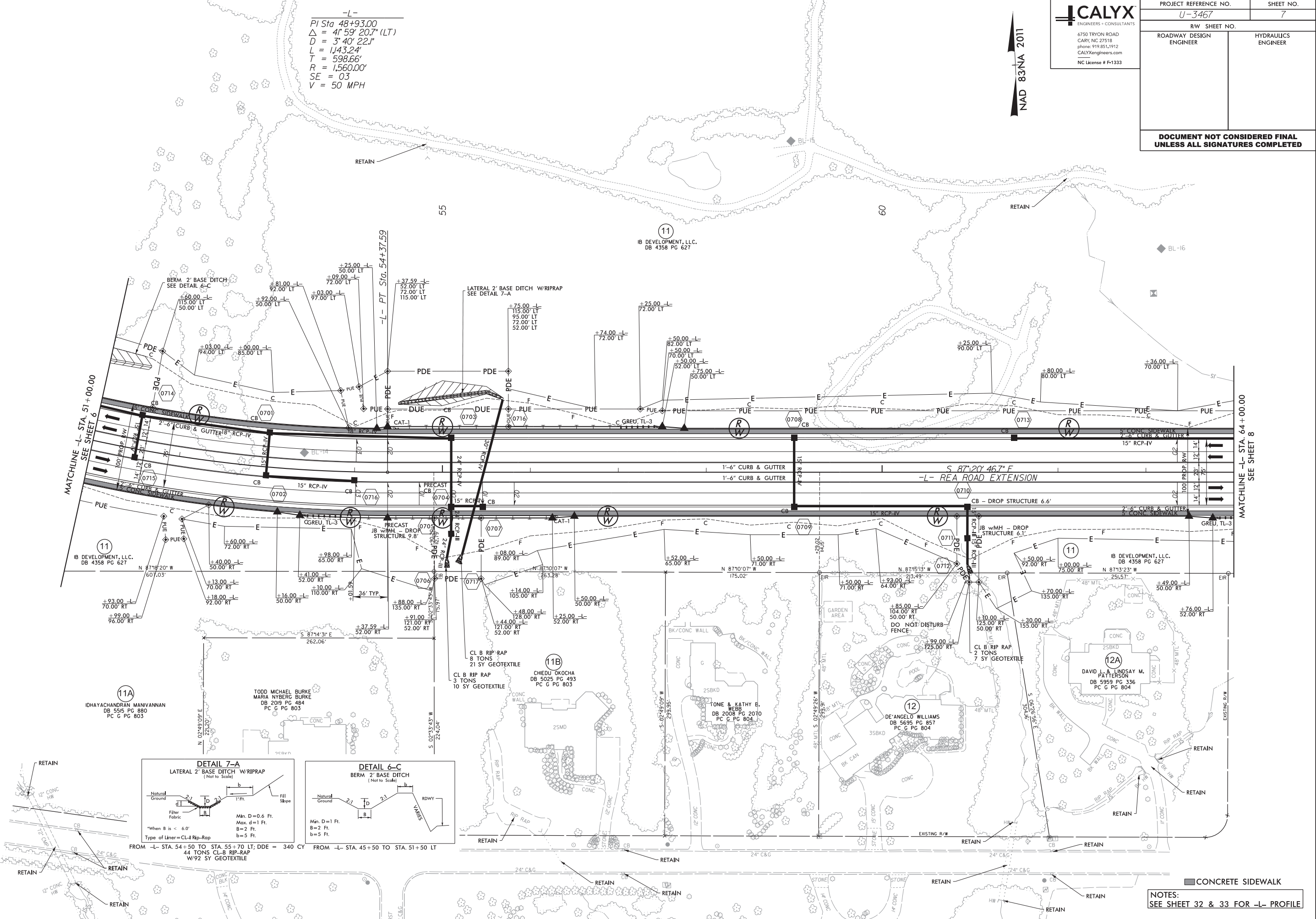
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RIGHT OF WAY REVISION = 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 9, 10 AND 11.
RIGHT OF WAY REVISION = 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 9, 10 AND 11.

8/17/99
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15/24/2019
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8/17/99

RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCEL 11.
RIGHT OF WAY REVISION - 11/07/2018 - ADDED PARCELS 11A, 11B AND 12A-ADDED CONSTRUCTION EASEMENT ON PARCELS 11 AND 12A.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 11 AND 12.
RIGHT OF WAY REVISION - 11/07/2018 - ADDED PERMANENT DRAINAGE EASEMENT ON PARCEL 11B.
RIGHT OF WAY REVISION - 02/04/2019 - ADJUSTED PERMANENT DRAINAGE EASEMENT ON PARCEL 12-ADDED 'DO NOT DISTURB' FENCE LABEL TO PARCEL 12.

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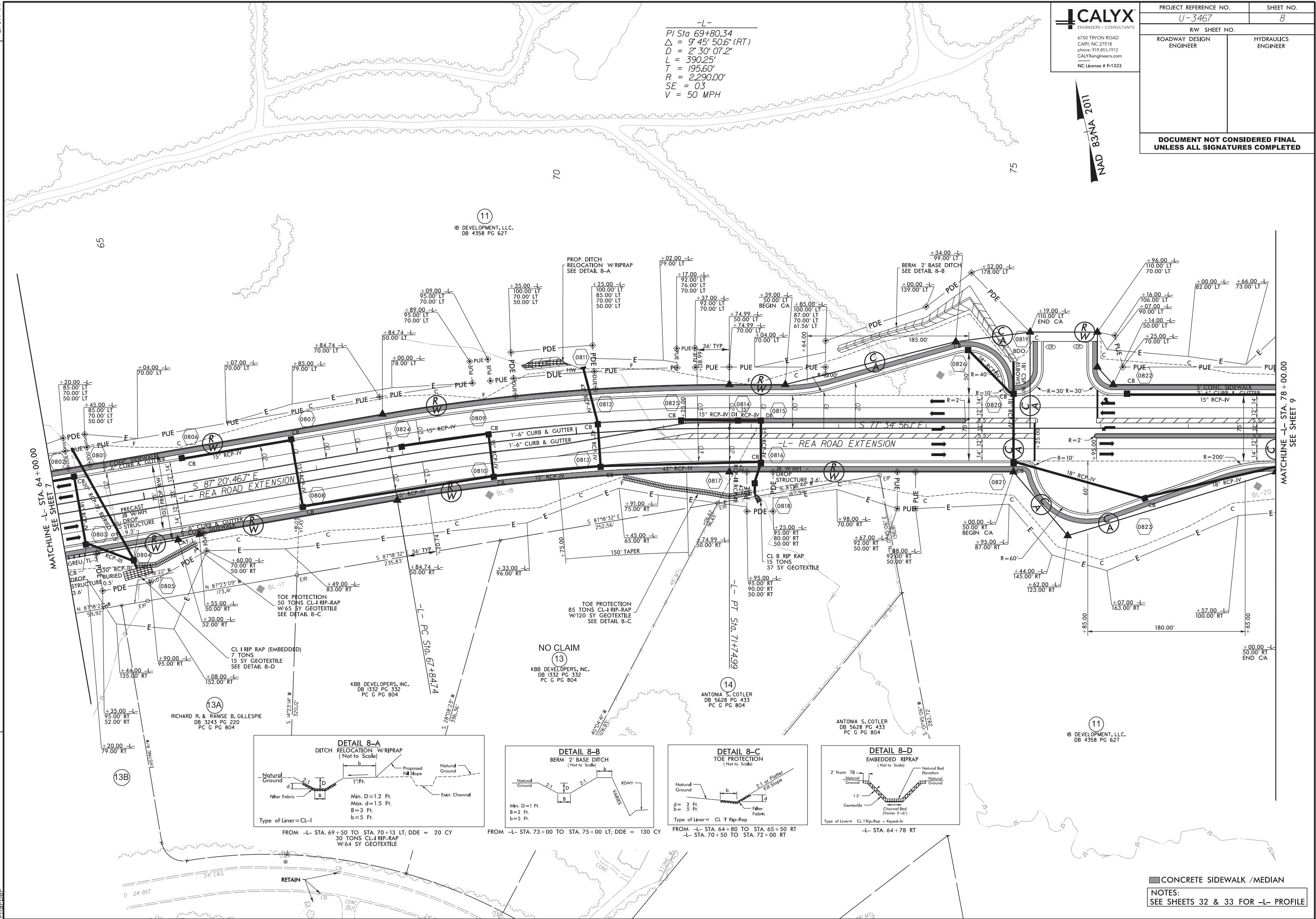


NOTES:
SEE SHEET 32 & 33 FOR -L- PROFILE

2011 NAAD 83NA

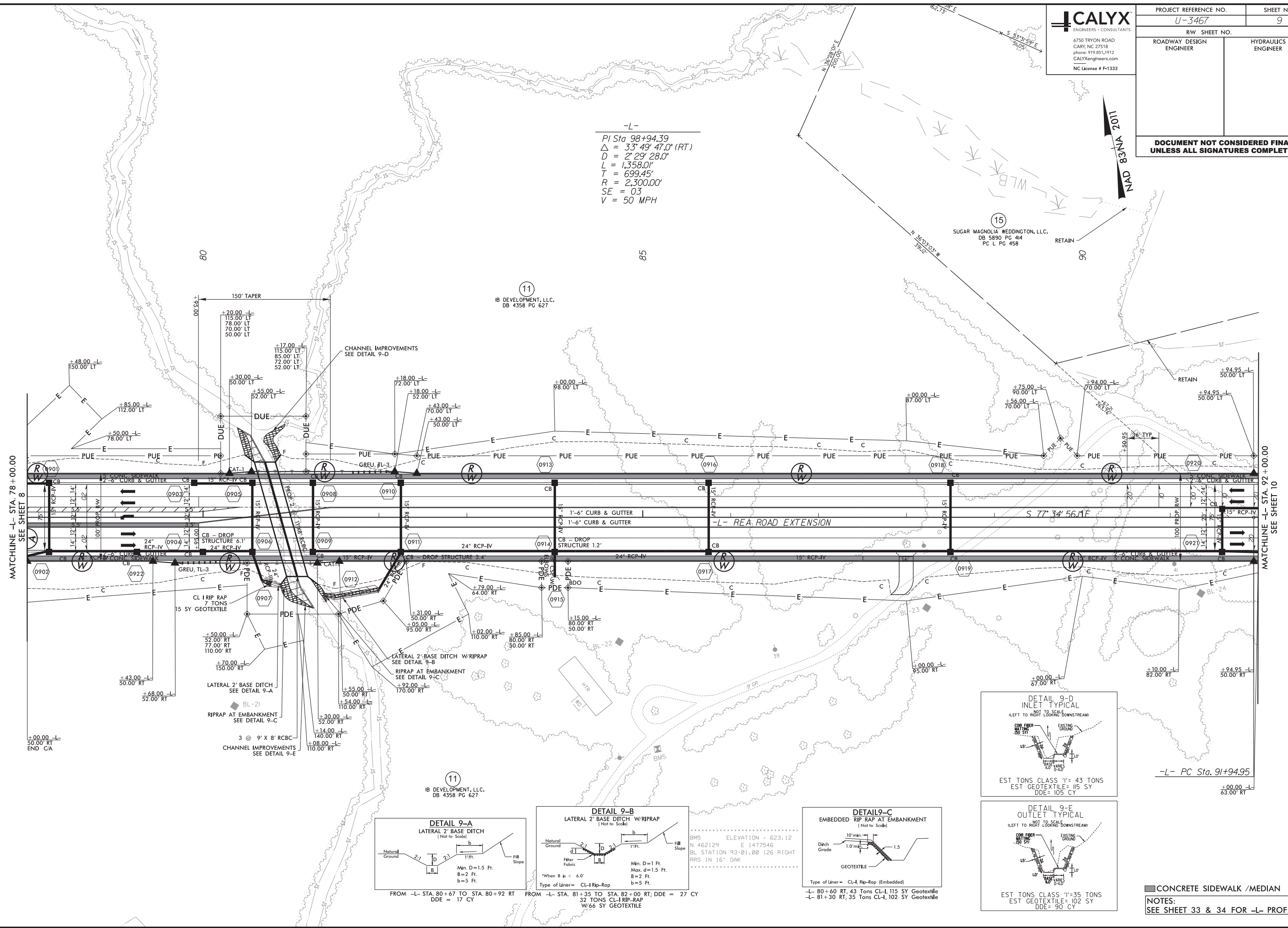
REVISION	DATE	DESCRIPTION
RIGHT OF WAY REVISION	11/07/2018	ADDED CONTROL OF ACCESS ON PARCEL II.
RIGHT OF WAY REVISION	11/07/2018	ADJUSTED RIGHT OF WAY ON PARCEL II.
RIGHT OF WAY REVISION	11/07/2018	ADJUSTED DUAL UTILITY EASEMENT ON PARCEL II.
RIGHT OF WAY REVISION	11/07/2018	ADJUSTED PERMANENT DRAINAGE EASEMENT ON PARCEL II.
RIGHT OF WAY REVISION	11/07/2018	ADJUSTED CONSTRUCTION EASEMENT ON PARCEL II.
RIGHT OF WAY REVISION	11/07/2018	ADDED PARCELS 13A AND 13B.
RIGHT OF WAY REVISION	11/07/2018	ADDED CONSTRUCTION EASEMENT ON PARCEL 13.
RIGHT OF WAY REVISION	11/07/2018	ADDED TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 13.
RIGHT OF WAY REVISION	11/07/2018	REMOVED TEMPORARY CONSTRUCTION EASEMENT ON PARCELS II AND 14.

2/15/2019
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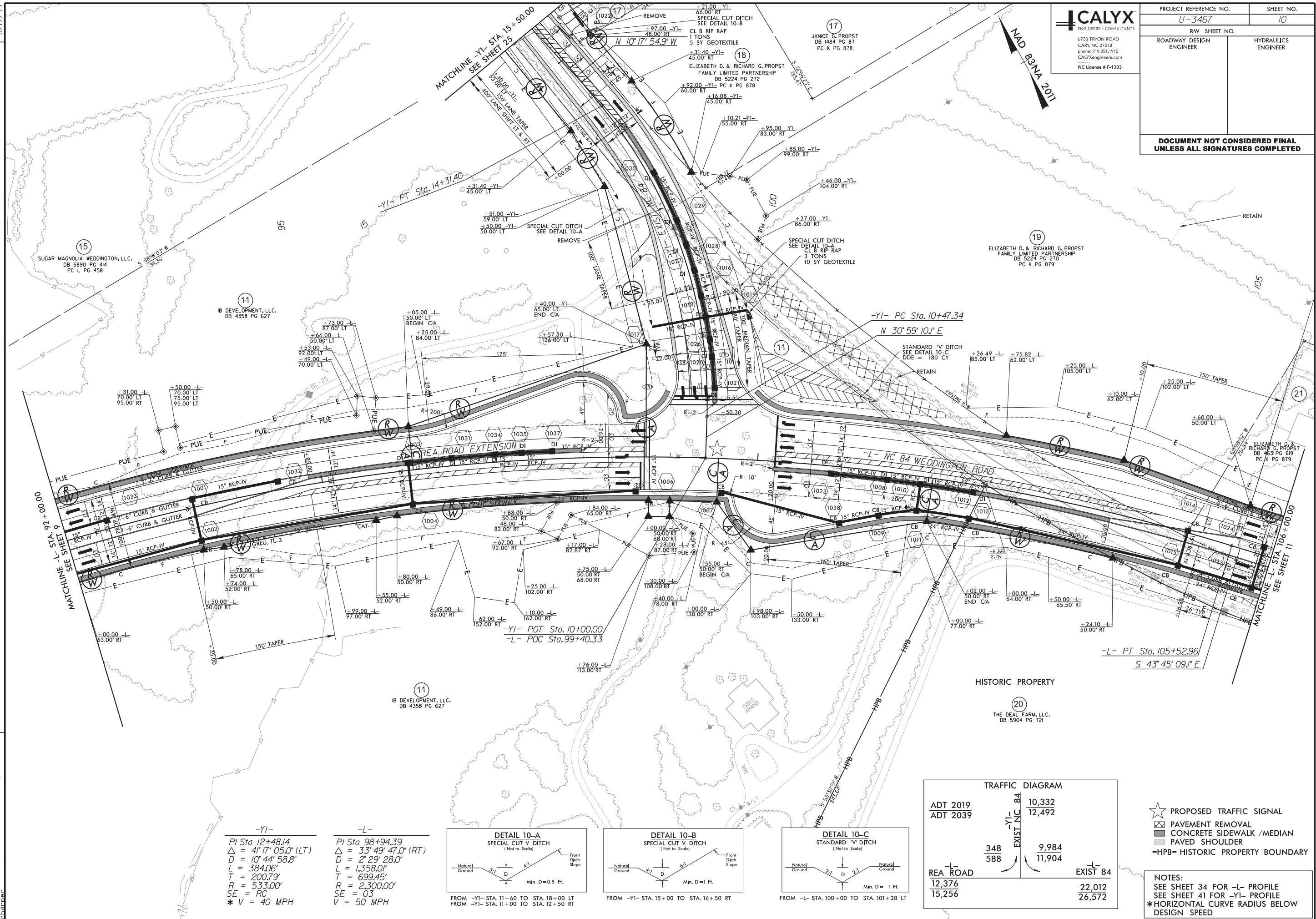
REVISIONS

2/15/2019
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RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 10, 11, 18, AND 19.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 11, 18, AND 20.
DESIGN REVISION - 11/07/2018 - ADJUSTED U-TURN BULB TO INTERSECTION OF -L- AND -YI-.
DESIGN REVISION - 11/07/2018 - ADDED U-TURN BULB RT AT INTERSECTION OF -L- AND -YI-.

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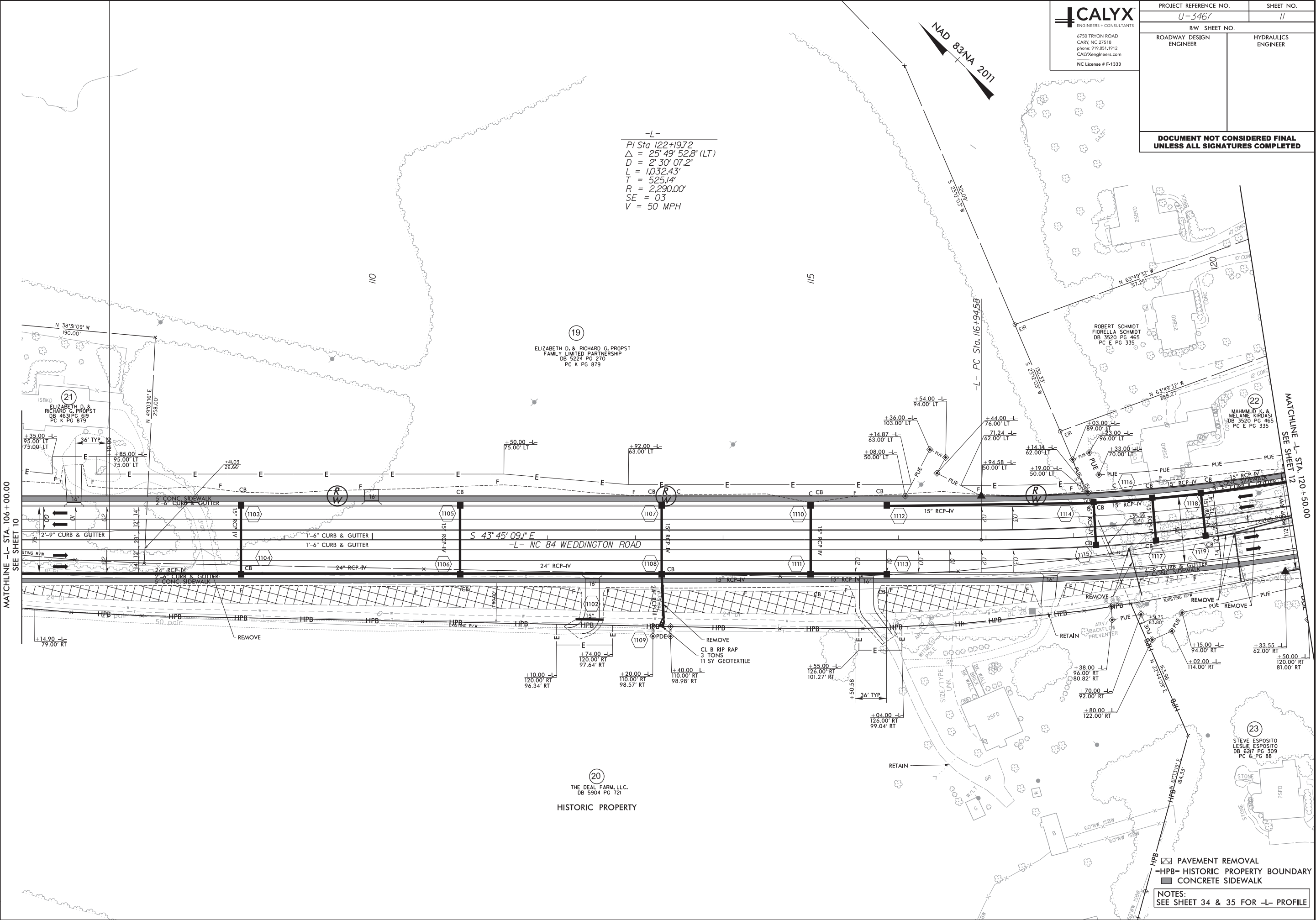
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CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.		SHEET NO.	
U-3467		11	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

-L-
PI Sta 122+19.72
 $\Delta = 25^\circ 49' 52.8''$ (LT)
 $D = 2^\circ 30' 07.2''$
 $L = 1,032.43'$
 $T = 525.14'$
 $R = 2,290.00'$
 $SE = 03$
 $V = 50$ MPH

NAD 83NA 2011



(20)
THE DEAL FARM, LLC.
DB 5904 PG 721
HISTORIC PROPERTY

PAVEMENT REMOVAL
-HPB- HISTORIC PROPERTY BOUNDARY
CONCRETE SIDEWALK
NOTES:
SEE SHEET 34 & 35 FOR -L- PROFILE

REVISIONS

2/15/2018 R:\Roadway\Proj\U3467_Rdy_psh_11.dgn

8/17/99

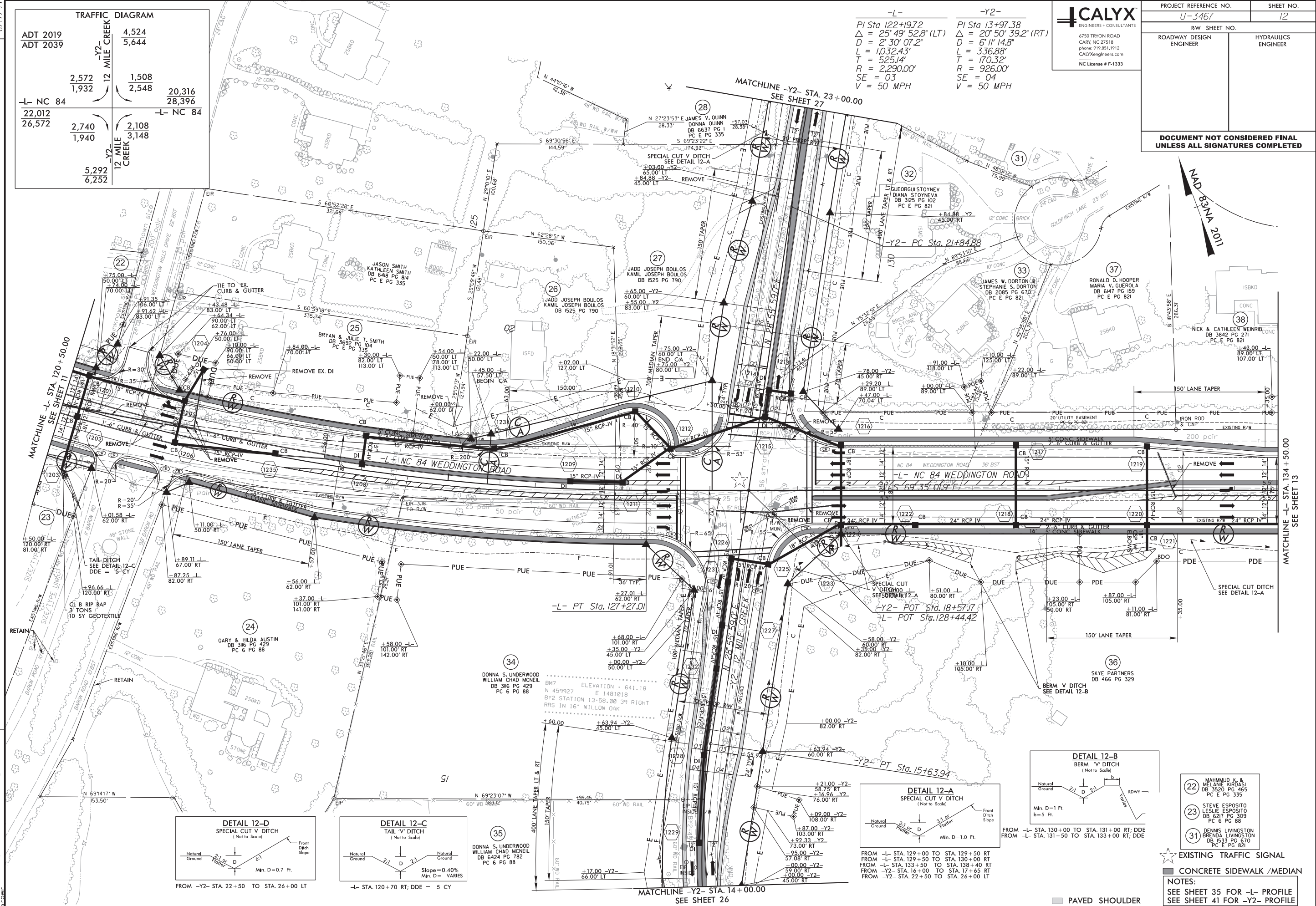
TRAFFIC DIAGRAM			
ADT 2019	ADT 2039	-Y2- 12 MILE CREEK	4,524
			5,644
-L- NC 84	-L- NC 84	-Y2- 12 MILE CREEK	20,316
			28,396
22,012	26,572	2,740	2,108
		1,940	3,148
		5,292	6,252

-L-	-Y2-
PI Sta 122+97.72	PI Sta 13+97.38
$\Delta = 25' 49" 52.8" (LT)$	$\Delta = 20' 50" 39.2" (RT)$
$D = 2' 30" 07.2"$	$D = 6' 11" 14.8"$
$L = 1,032.43'$	$L = 336.88'$
$T = 525.14'$	$T = 170.32'$
$R = 2,290.00'$	$R = 926.00'$
$SE = 03$	$SE = 04$
$V = 50 \text{ MPH}$	$V = 50 \text{ MPH}$

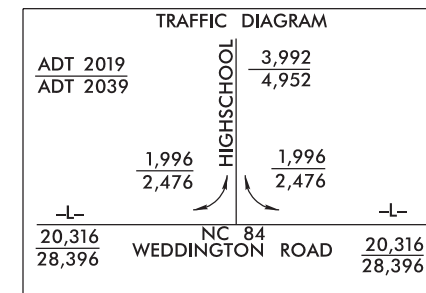
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phone: 919.851.1912
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NC License # F-1333

PROJECT REFERENCE NO.		SHEET NO.	
U-3467		12	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 24, 33, 34, 37 AND 38.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 24, 25, 26, 27, 33, 34, 36, 37 AND 38.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED RIGHT OF WAY ON PARCELS 26, 27 AND 36.
RIGHT OF WAY REVISION - 11/07/2018 - ADDED CONTROL OF ACCESS ON PARCELS 26 AND 27.
DESIGN REVISION - 11/07/2018 - ADDED U-TURN BULB LT AT INTERSECTION OF -L- AND -Y2-

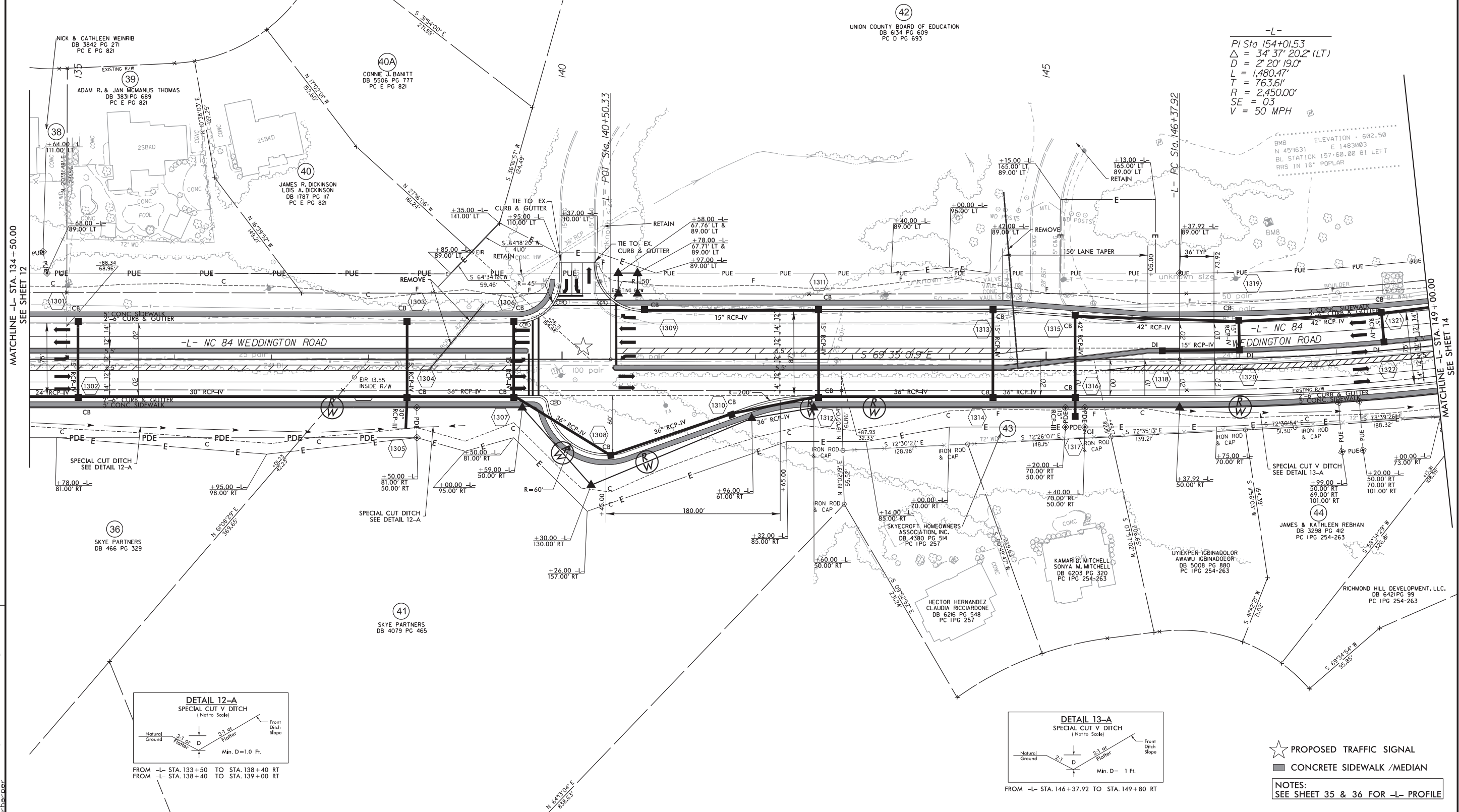


- NOTES:
- SEE SHEET 35 FOR -L- PROFILE
 - SEE SHEET 41 FOR -Y2- PROFILE
- EXISTING TRAFFIC SIGNAL
- CONCRETE SIDEWALK / MEDIAN
- PAVED SHOULDER

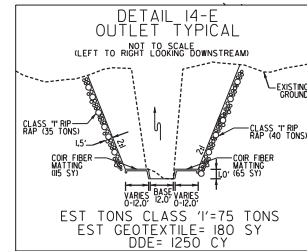
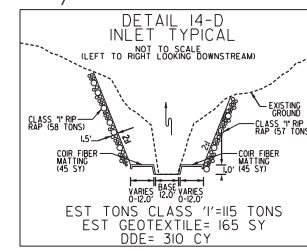
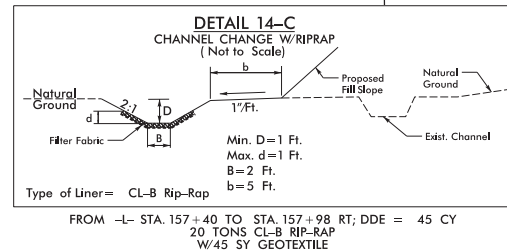
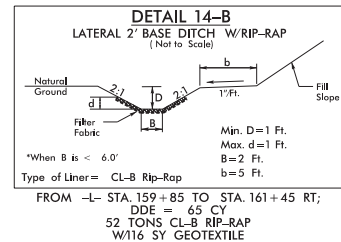
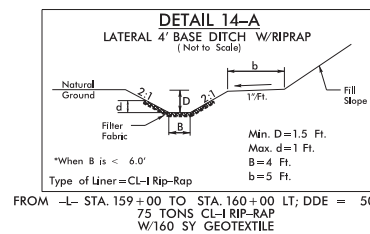
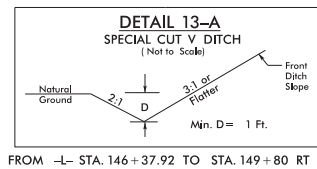
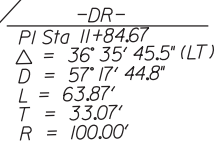
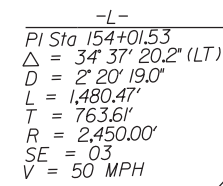




-L-

PI Sta 154+01.53
 $\Delta = 34^{\circ} 37' 20.2''$ (LT)
 $D = 2^{\circ} 20' 19.0''$
 $L = 1,480.47'$
 $T = 763.61'$
 $R = 2,450.00'$
 $SE = 03$
 $V = 50$ MPH



**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

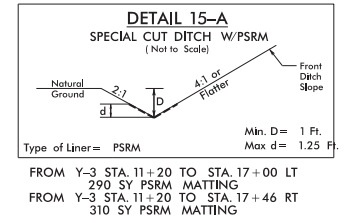


 PROPOSED TRAFFIC SIGNAL
 CONCRETE SIDEWALK /MEDIAN
 NOTES:
 SEE SHEET 36 FOR -L- PROFILE
 SEE SHEET 46 FOR -DR- PROFILE

PROJECT REFERENCE NO.		SHEET NO.
U-3467		15
RW SHEET NO.		HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

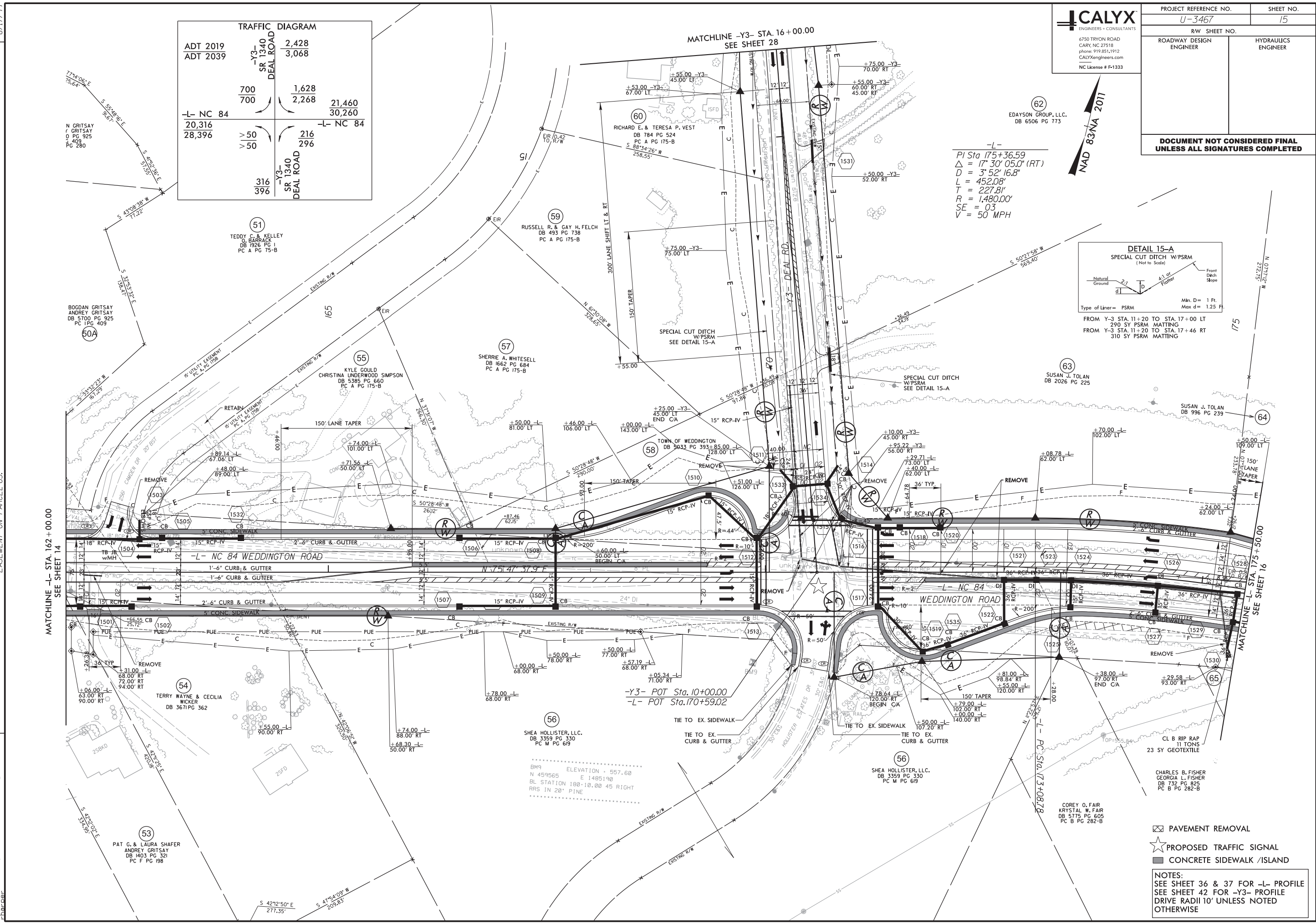
TRAFFIC DIAGRAM			
ADT 2019	ADT 2039	Y3- SR 1340 DEAL ROAD	2,428
			3,068
-L- NC 84		700	1,628
		700	2,268
			21,460
			30,260
20,316		> 50	216
28,396		> 50	296
		316	
		396	
		Y3- SR 1340 DEAL ROAD	

-L-
PI Sta 175+36.59
 $\Delta = 17^{\circ} 30' 05.0''$ (RT)
D = 3' 52" 16.8"
L = 452.08'
T = 227.81'
R = 1,480.00'
SE = 0.3
V = 50 MPH



REVISIONS

RIGHT OF WAY REVISION - 11/07/2018	- ADJUSTED PERMANENT UTILITY EASEMENT ON PARCEL 56 AND 58.
RIGHT OF WAY REVISION - 11/07/2018	- ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 56 AND 58.
RIGHT OF WAY REVISION - 11/07/2018	- ADJUSTED RIGHT OF WAY ON PARCELS 56 AND 58.
RIGHT OF WAY REVISION - 11/07/2018	- ADJUSTED CONTROL OF ACCESS EASEMENT ON PARCELS 56 AND 58.
RIGHT OF WAY REVISION - 11/07/2018	- ADJUSTED U-TURN BUILD RT AT INTERSECTION OF -L- AND -Y3-
RIGHT OF WAY REVISION - 11/07/2018	- ADDED MODIFIED PERMANENT DRAINAGE EASEMENT ON PARCELS 54 AND 56, REMOVED PERMANENT UTILITY EASEMENT AND DRAINAGE AND UTILITY EASEMENT ON PARCEL 65.
RIGHT OF WAY REVISION - 12/17/2018	- REMOVED TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 53, ADDED PERMANENT UTILITY EASEMENT AND DRAINAGE AND UTILITY EASEMENT ON PARCEL 65.

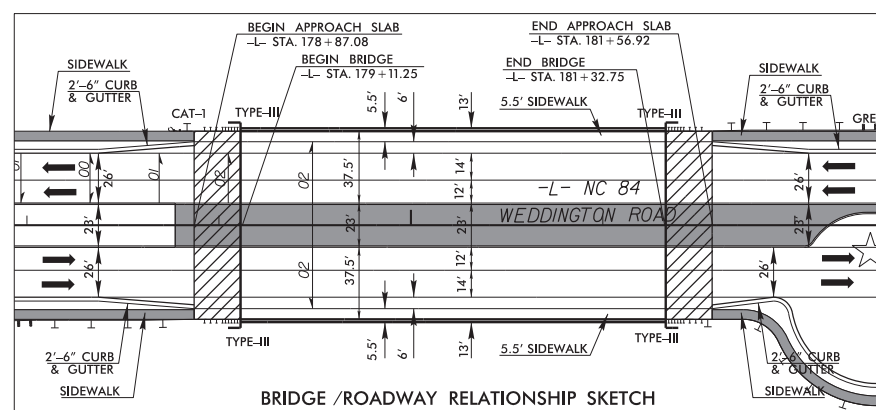


PAVEMENT REMOVAL

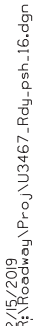
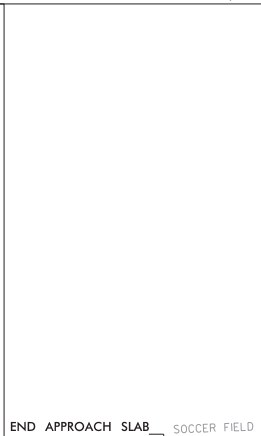
PROPOSED TRAFFIC SIGNAL

CONCRETE SIDEWALK / ISLAND

NOTES:
SEE SHEET 36 & 37 FOR -L- PROFILE
SEE SHEET 42 FOR -Y3- PROFILE
DRIVE RADII 10' UNLESS NOTED OTHERWISE



NAD 83 NA 2011



8/17/99

RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCEL 74.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED ROW ON PARCEL 74.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONTROL ACCESS ON PARCEL 70A.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONTROL ACCESS ON PARCEL 70A.
DESIGN REVISION - 11/07/2018 MODIFIED - U-TURN BULB RT AT INTERSECTION OF -L- AND WESTFORK RUN
DESIGN REVISION - 12/11/2018 - MODIFIED PERMANENT DRAINAGE EASEMENT AND TEMPORARY CONSTRUCTION EASEMENT ON PARCELS 70,70A,73,AND 75.

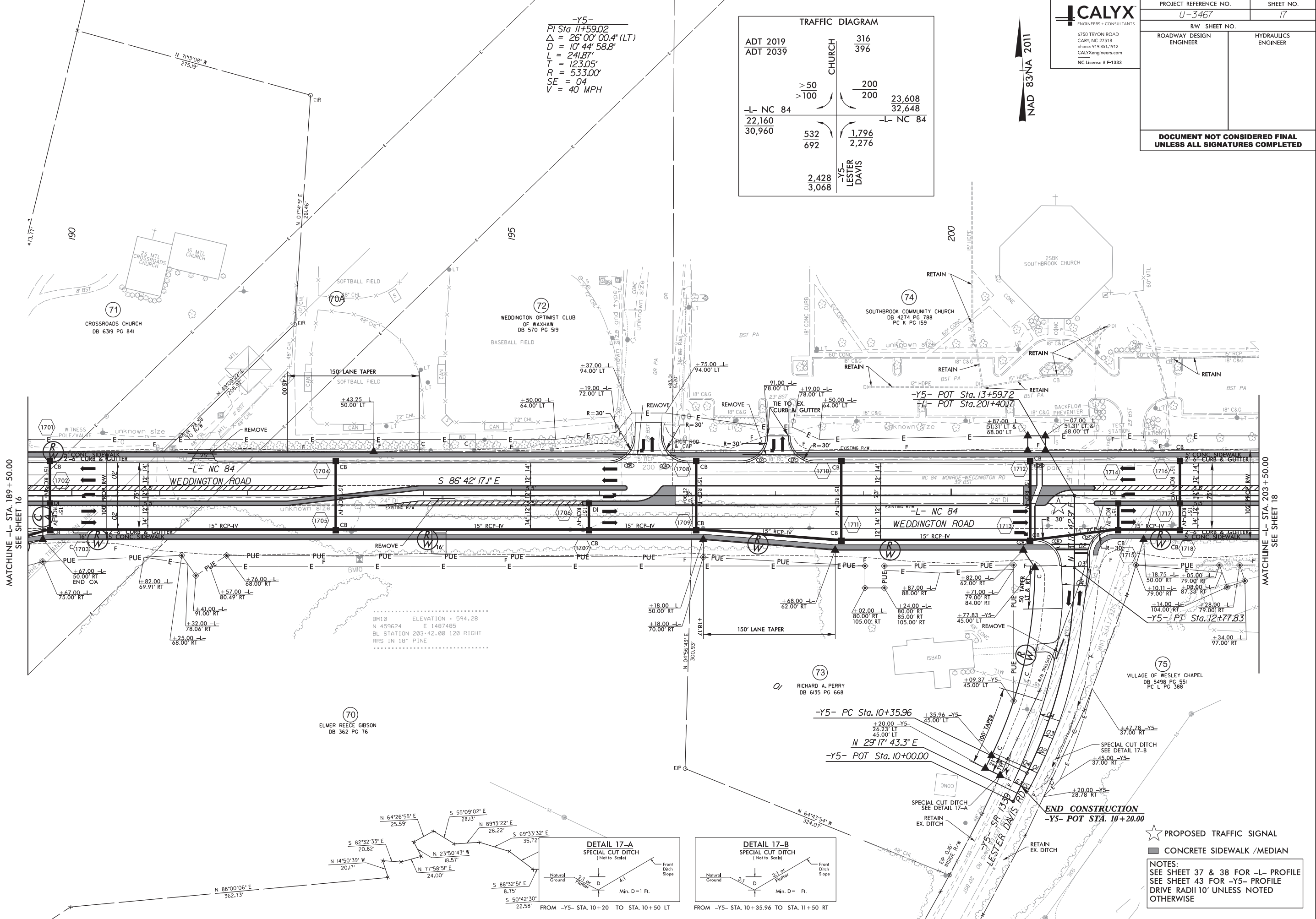
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12/15/2018

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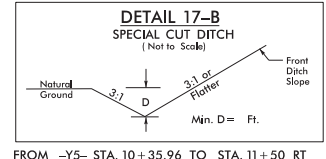
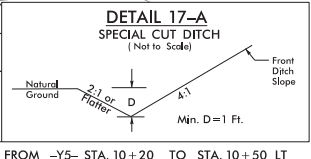
PROJECT REFERENCE NO. <i>U-3467</i>		SHEET NO. <i>17</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

TRAFFIC DIAGRAM			
ADT 2019	CHURCH	316	
ADT 2039		396	
	>50	200	
	>100	200	
-L- NC 84		23,608	
22,160		32,648	
30,960			-L- NC 84
	532	1,796	
	692	2,276	
	2,428		
	3,068		
		-Y5- LESTER DAVIS	

NAD 83NA 2011



-Y5-
PI Sta 11+59.02
Δ = 26° 00' 00.4" (LT)
D = 10° 44' 58.8"
L = 241.87'
T = 123.05'
R = 533.00'
SE = 04
V = 40 MPH



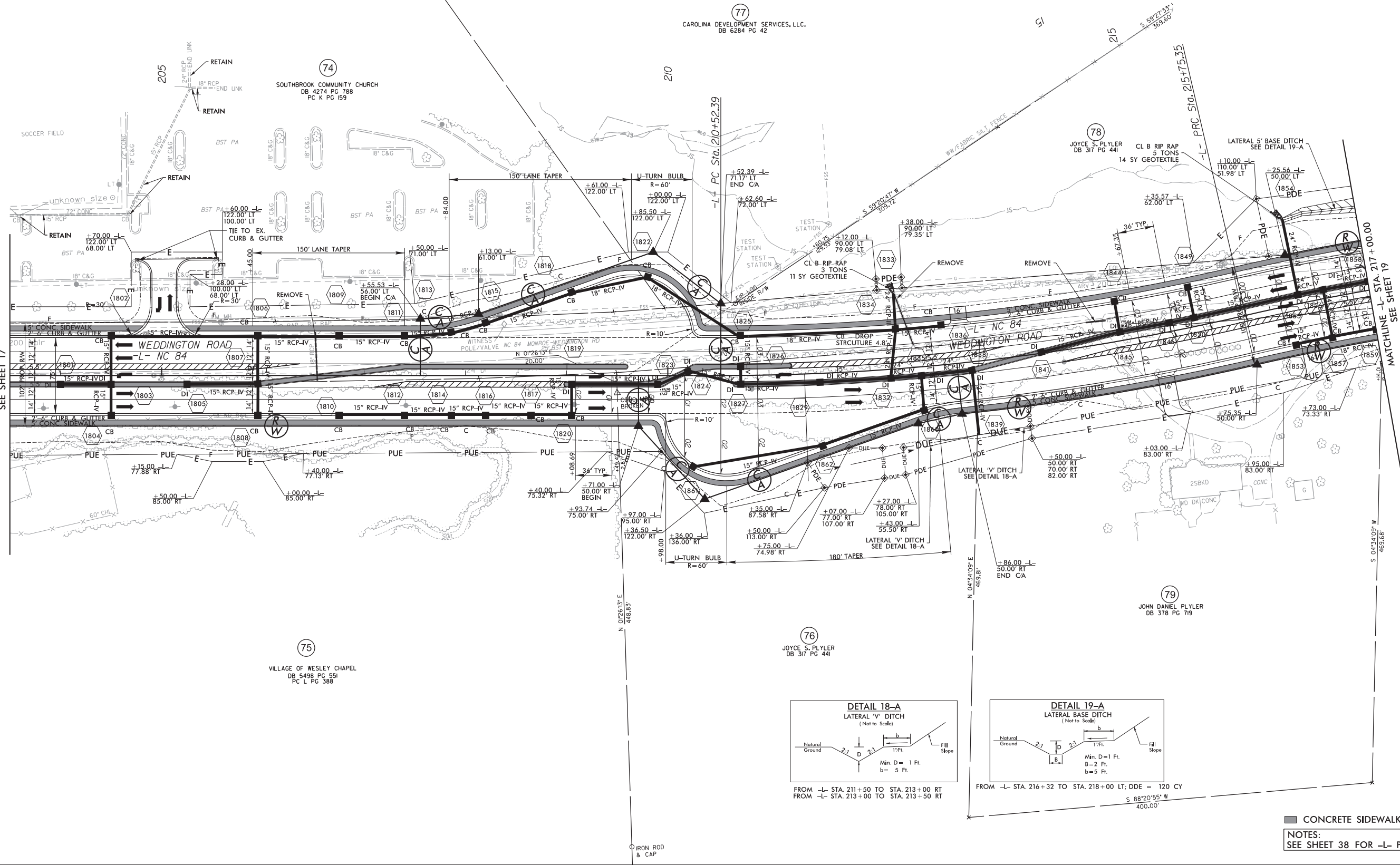
★ PROPOSED TRAFFIC SIGNAL
■ CONCRETE SIDEWALK / MEDIAN
NOTES:
SEE SHEET 37 & 38 FOR -L- PROFILE
SEE SHEET 43 FOR -Y5- PROFILE
DRIVE RADII 10' UNLESS NOTED OTHERWISE

RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 74 AND 78.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT DRAINAGE EASEMENT ON PARCELS 76, 78 AND 79.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED DUAL UTILITY DRAINAGE EASEMENT ON PARCEL 79.
RIGHT OF WAY REVISION - 12/17/2018 - MODIFIED PERMANENT DRAINAGE EASEMENT ON PARCELS 76 AND 79.
RIGHT OF WAY REVISION - 12/17/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 75, 76, 78 AND 79.
RIGHT OF WAY REVISION - 12/17/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 75, 76, 78 AND 79.
RIGHT OF WAY REVISION - 12/17/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 75, 76, 78 AND 79.

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2/15/2019
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REVISIONS

MATCHLINE -L- STA. 203 + 50.00
SEE SHEET 17



-L-
PI Sta 213+15.01
 $\Delta = 13^{\circ}05'04.2''$ (LT)
 $D = 2^{\circ}30'07.2''$
 $L = 522.96'$
 $T = 262.62'$
 $R = 2,290.00'$
 $SE = 03$
 $V = 50$

CAROLINA DEVELOPMENT SERVICES, LLC.
DB 3644 PG 147

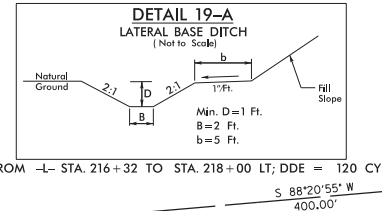
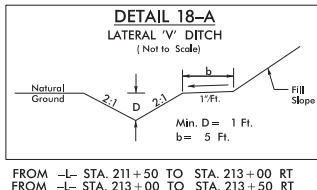
CAROLINA DEVELOPMENT SERVICES, LLC.
DB 6284 PG 42

(74)
SOUTHBROOK COMMUNITY CHURCH
DB 4274 PG 788
PC K PG 159

(75)
VILLAGE OF WESLEY CHAPEL
DB 5498 PG 551
PC L PG 368

(76)
JOYCE S. PLYLER
DB 317 PG 441

(79)
JOHN DANIEL PLYLER
DB 378 PG 719



CONCRETE SIDEWALK / MEDIAN

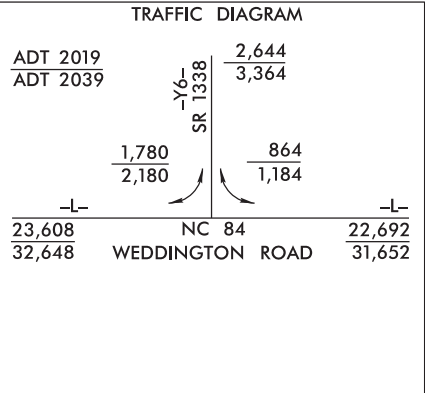
NOTES:
SEE SHEET 38 FOR -L- PROFILE

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PROJECT REFERENCE NO.		SHEET NO.	
U-3467		18	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

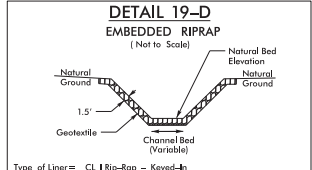
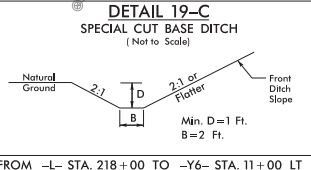
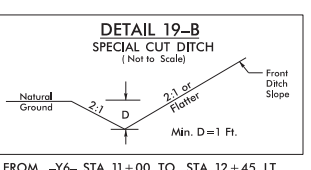
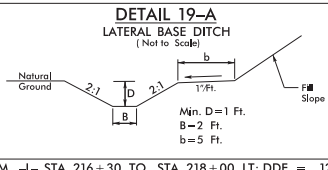
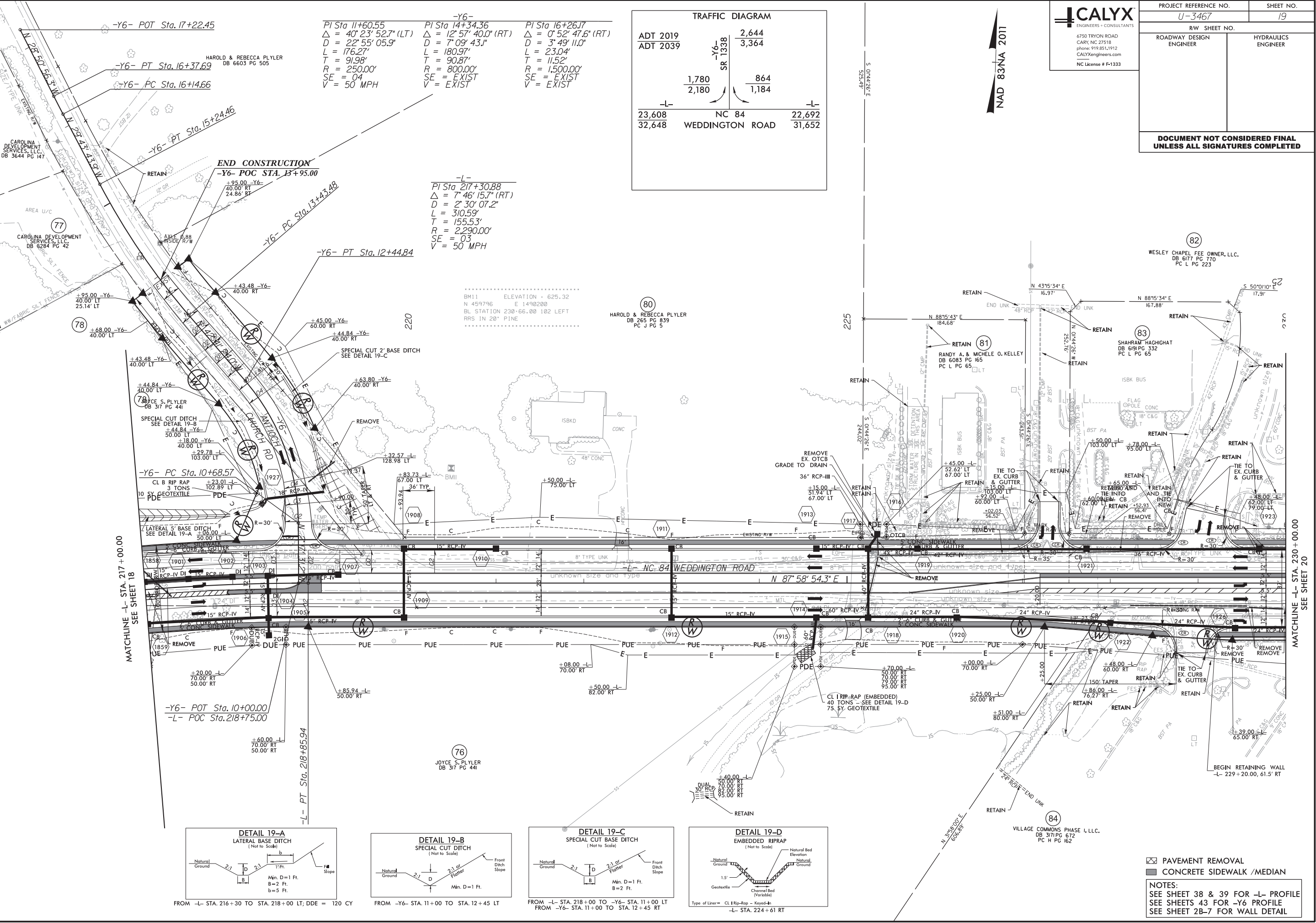
NAD 83/NA 2011

PROJECT REFERENCE NO.		SHEET NO.
U-3467		19
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



NAD 83NA 2011

RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCELS 78 AND 84.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT DRAINAGE EASEMENT ON PARCEL 76.
RIGHT OF WAY REVISION - 12/11/2018 - MODIFIED PERMANENT DRAINAGE EASEMENT ON PARCELS 76, 82, AND 84.
RIGHT OF WAY REVISION - 12/11/2018 - MODIFIED TEMPORARY CONSTRUCTION EASEMENT ON PARCELS 76, 82, AND 84.
RIGHT OF WAY REVISION - 12/11/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 76, 79, AND 84.
RIGHT OF WAY REVISION - 12/11/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 76, 79, AND 84.
RIGHT OF WAY REVISION - 12/11/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 76, 79, AND 84.



PAVEMENT REMOVAL
CONCRETE SIDEWALK / MEDIAN

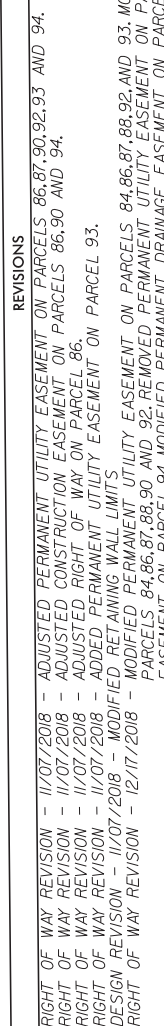
NOTES:
SEE SHEET 38 & 39 FOR -L- PROFILE
SEE SHEETS 43 FOR -Y6- PROFILE
SEE SHEET 2B-7 FOR WALL DETAIL

★ EXISTING TRAFFIC SIGNAL

■ CONCRETE SIDEWALK / MEDIAN

□ PAVED SHOULDER

NOTES:
SEE SHEETS 39 FOR -L- PROFILE
SEE SHEET 44 FOR -Y7- PROFILE
SEE SHEET 2B-7 FOR WALL DETAILS



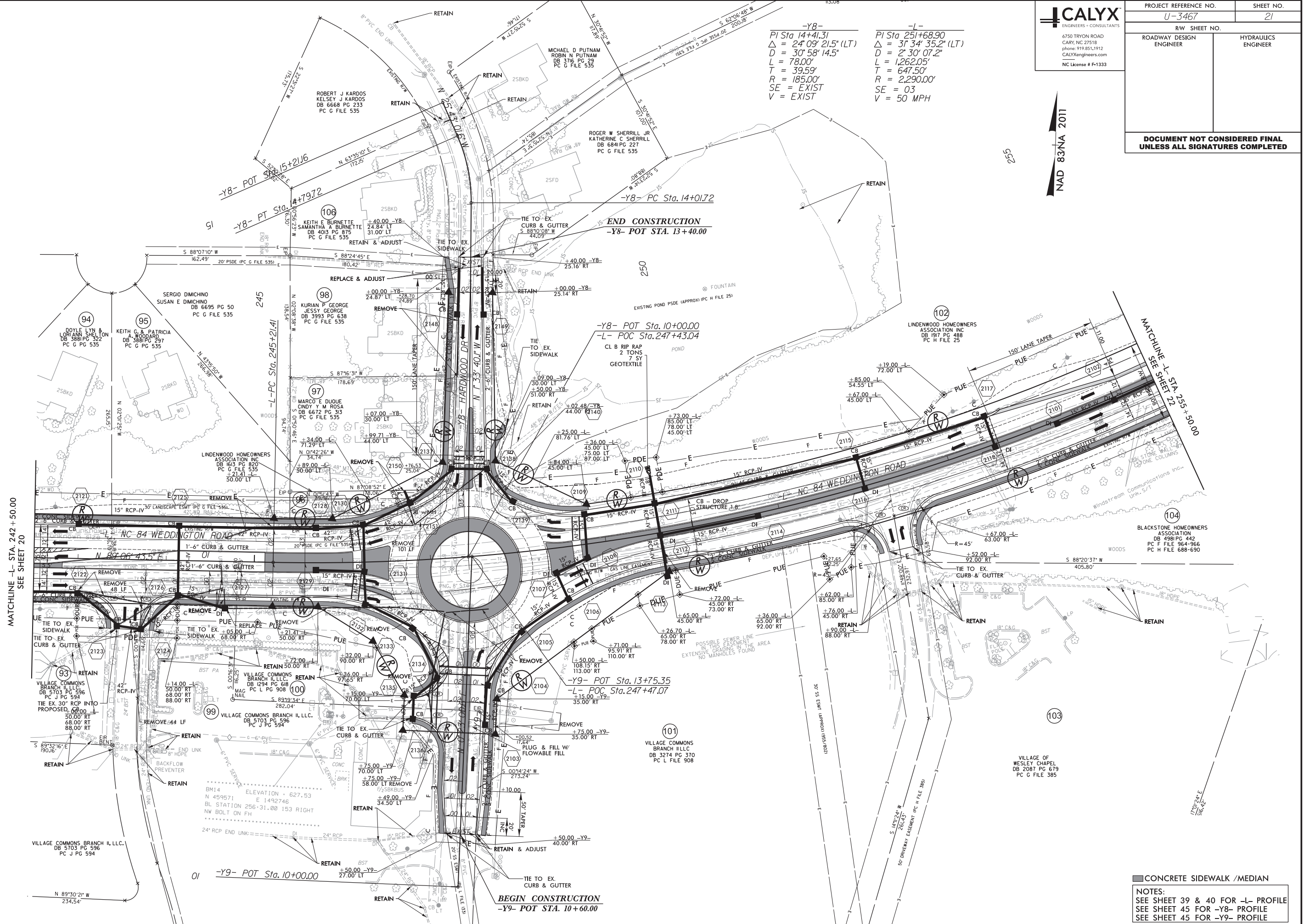
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RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCELS 94, 95, 97 AND 102.
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCEL 102.
RIGHT OF WAY REVISION - 12/17/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 93, 99, 100, 101 AND 102.
RIGHT OF WAY REVISION - 12/17/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 101 AND 102.
RIGHT OF WAY REVISION - 12/17/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 94, 95, 97, 99, 100, 101 AND 102.
RIGHT OF WAY REVISION - 12/17/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 94, 95, 97, 99, 100, 101 AND 102.
RIGHT OF WAY REVISION - 12/17/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 94, 95, 97, 99, 100, 101 AND 102.

2/15/2019 R:\Roadway\Proj\U3467.Rdw.psh-21.dgn

8/17/99

MATCHLINE -L- STA. 242 + 50.00
SEE SHEET 20



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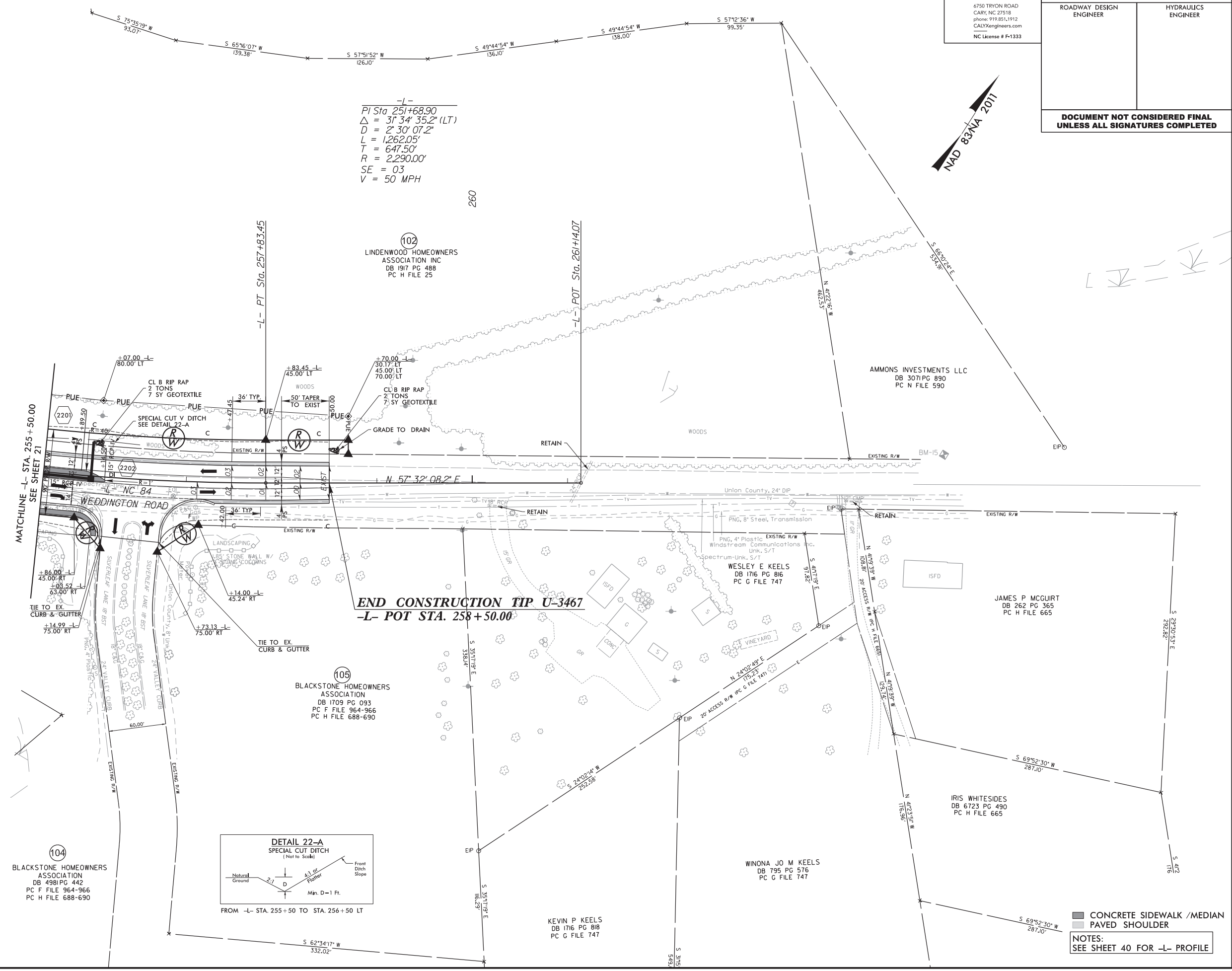
PROJECT REFERENCE NO.		SHEET NO.	
U-3467		21	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

RIGHT OF WAY REVISION - 12/17/2018 - ADJUSTED PERMANENT UTILITY EASEMENT ON PARCEL 102. ADJUSTED TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 102. REMOVED DRAINAGE AND UTILITY EASEMENT ON PARCEL 102. ADDED PERMANENT DRAINAGE EASEMENT ON PARCEL 102.

8/17/99
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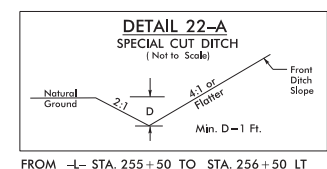
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CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.		SHEET NO.
U-3467		22
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
</		



-L-
PI Sta. 251+68.90
 $\Delta = 31^{\circ} 34' 35.2''$ (LT)
D = 2' 30' 07.2"
L = 1,262.05'
T = 647.50'
R = 2,290.00'
SE = 03
V = 50 MPH

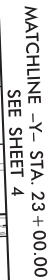
END CONSTRUCTION TIP U-3467
-L- POT STA. 258+50.00



CONCRETE SIDEWALK /MEDIAN
PAVED SHOULDER

NOTES:
SEE SHEET 40 FOR -L- PROFILE

-Y-	
<i>PI</i> Sta 15+93.40	<i>PI</i> Sta 24+90.39
$\Delta = 6^\circ 24' 40.4''$ (LT)	$\Delta = 1^\circ 40' 31.6''$ (RT)
<i>D</i> = 0' 38" 11.8"	<i>D</i> = 0' 47" 36.9"
<i>L</i> = 1,007.07'	<i>L</i> = 211.33'
<i>T</i> = 504.06'	<i>T</i> = 105.57'
<i>R</i> = 9,000.00'	<i>R</i> = 7,220.00'
<i>SE</i> = NC	<i>SE</i> = NC
<i>V</i> = 50 MPH	<i>V</i> = 50 MPH



MATCHLINE -Y- STA. 32+50.00
SEE SHEET 4

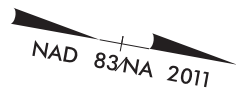
2/15/2019 R:\Roadway\Proj\U3467_Rdy_psh_24.dgn rjordan	8/17/99
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8/17/99

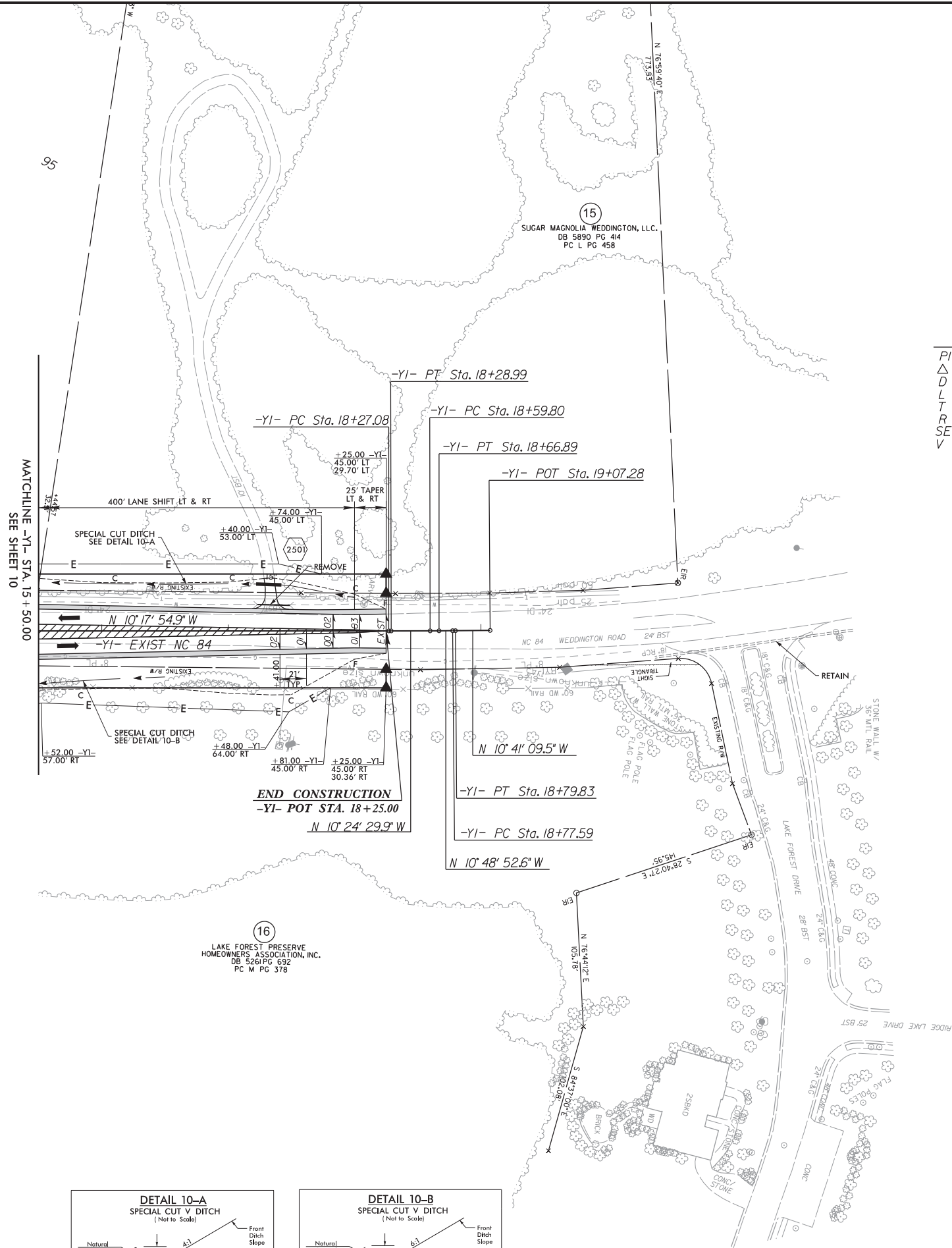
REVISIONS
RIGHT OF WAY REVISION - 07/06/2018 - ADJUSTED CONSTRUCTION EASEMENT ON PARCEL 16.

2/15/2019
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chp

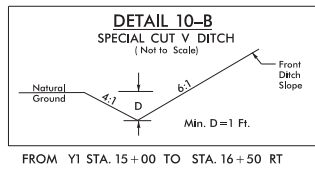
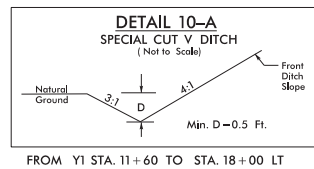
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PROJECT REFERENCE NO.		SHEET NO.
U-3467		25
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



-YI-		
PI Sta 18+28.04 $\Delta = 0^{\circ}06'35.0''$ (LT) $D = 5^{\circ}43'46.5''$ $L = 1.92'$ $T = 0.96'$ $R = 1,000.00'$ $SE = EXIST$ $V = EXIST$	PI Sta 18+63.34 $\Delta = 0^{\circ}24'22.6''$ (LT) $D = 5^{\circ}43'46.5''$ $L = 7.09'$ $T = 3.55'$ $R = 1,000.00'$ $SE = EXIST$ $V = EXIST$	PI Sta 18+78.71 $\Delta = 0^{\circ}07'43.1''$ (RT) $D = 5^{\circ}43'46.5''$ $L = 2.25'$ $T = 1.12'$ $R = 1,000.00'$ $SE = EXIST$ $V = EXIST$



PAVED SHOULDER

NOTES:
SEE SHEET 41 FOR -YI- PROFILE

8/17/99

REVISIONS



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PROJECT REFERENCE NO.		SHEET NO.
U-3467		26
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
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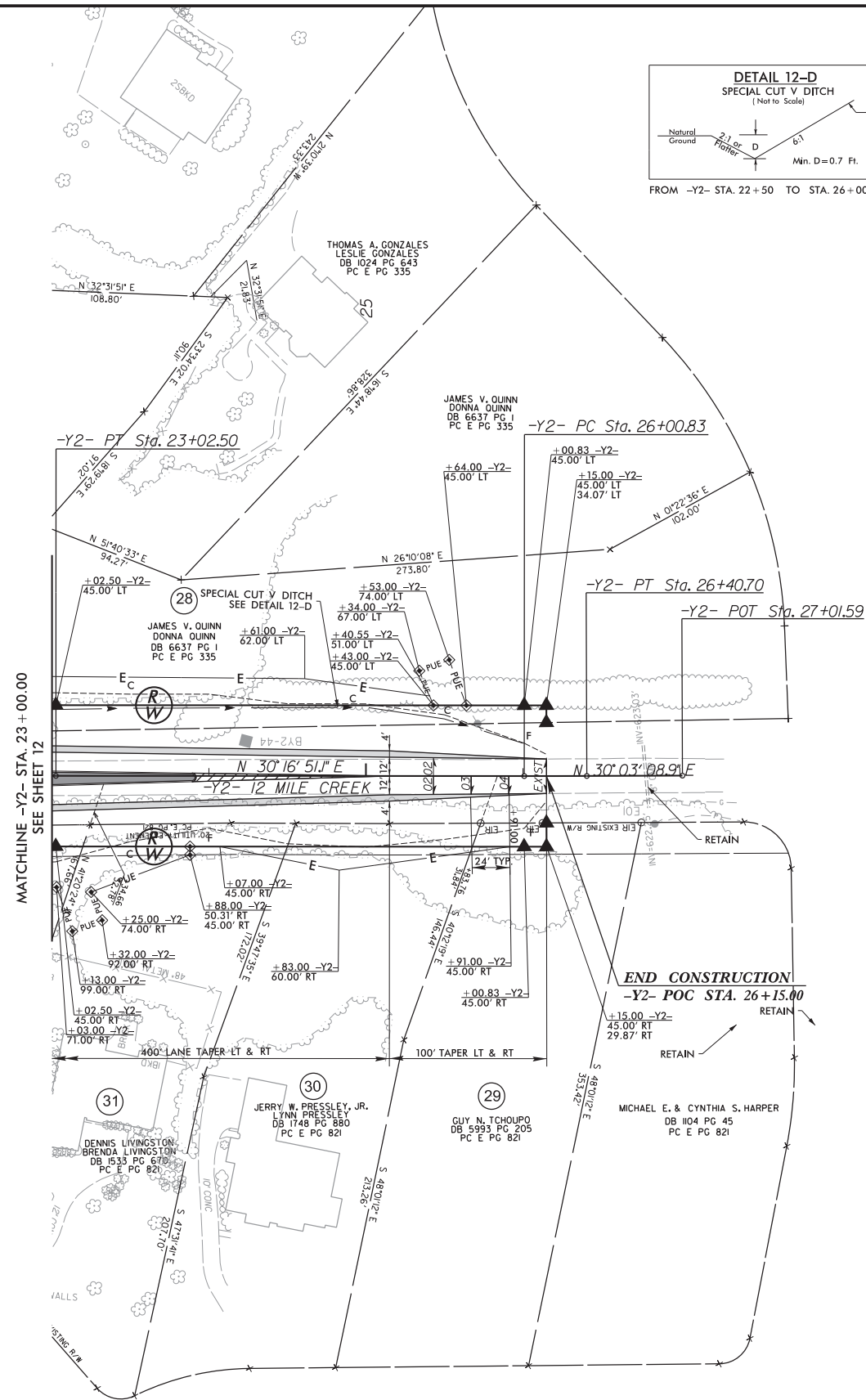
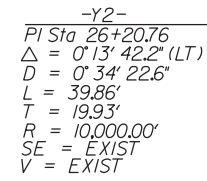
-Y2-
PI Sta 13+97.38
 $\Delta = 20^{\circ} 50' 39.2''$ (RT)
 $D = 6' 11'' 14.8''$
 $L = 336.88'$
 $T = 170.32'$
 $R = 926.00'$
 $SE = 04$
 $V = 50$ MPH

BEGIN CONSTRUCTION
-Y2- POT STA. 10+30.00

- CONCRETE MEDIAN
- PAVED SHOULDER

NOTES:
SEE SHEET 41 & 42 FOR -Y2- PROFILE

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chopper



NOTES:
SEE SHEET 41 & 42 FOR -Y2- PROFILE

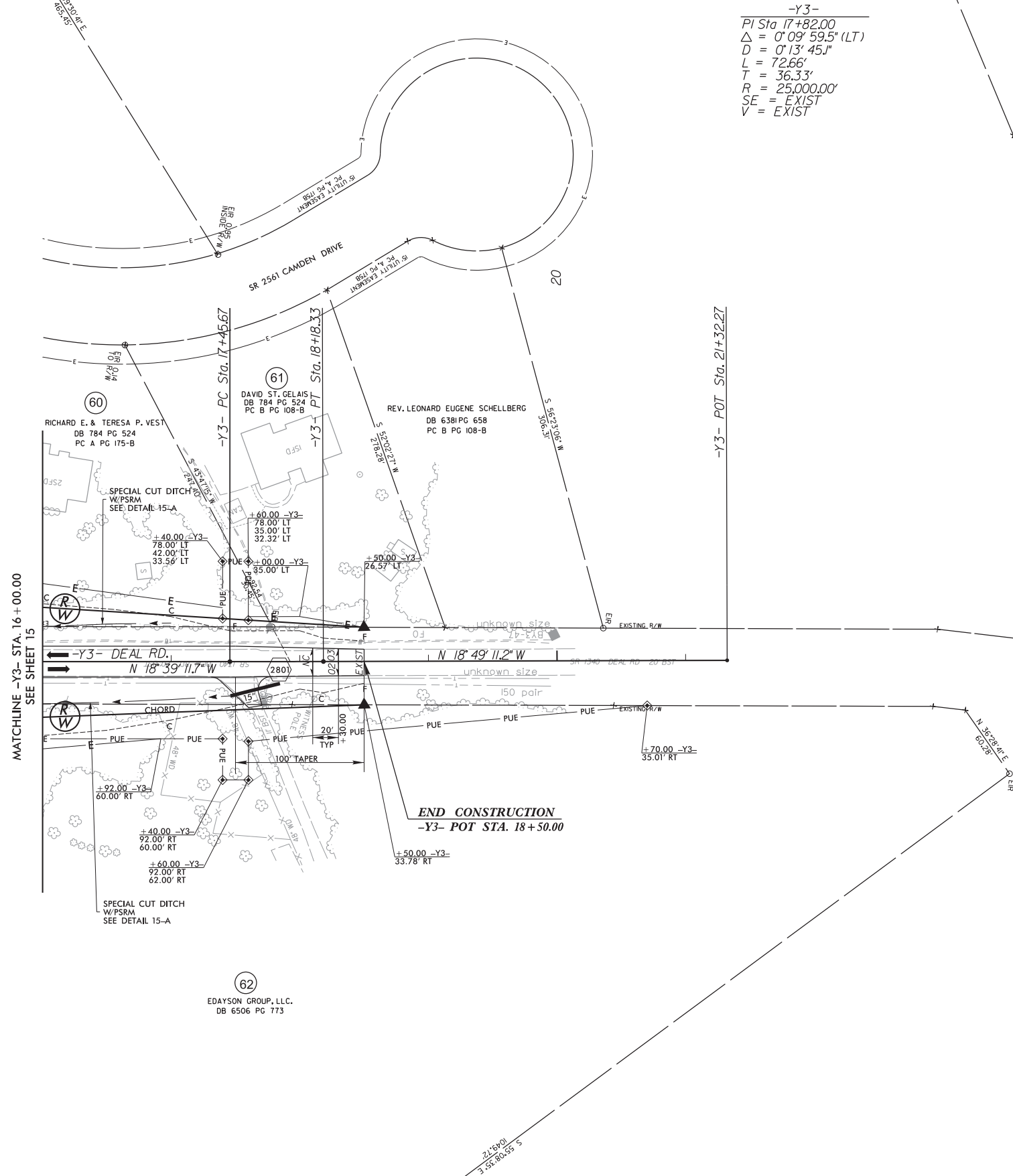
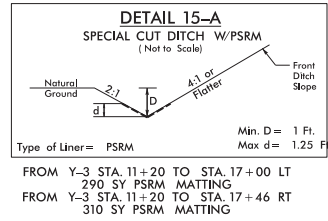
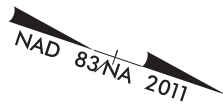
8/17/99

REVISIONS

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2/15/2018
Rdy_psh_28.dgn

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PROJECT REFERENCE NO.		SHEET NO.	
U-3467		28	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	



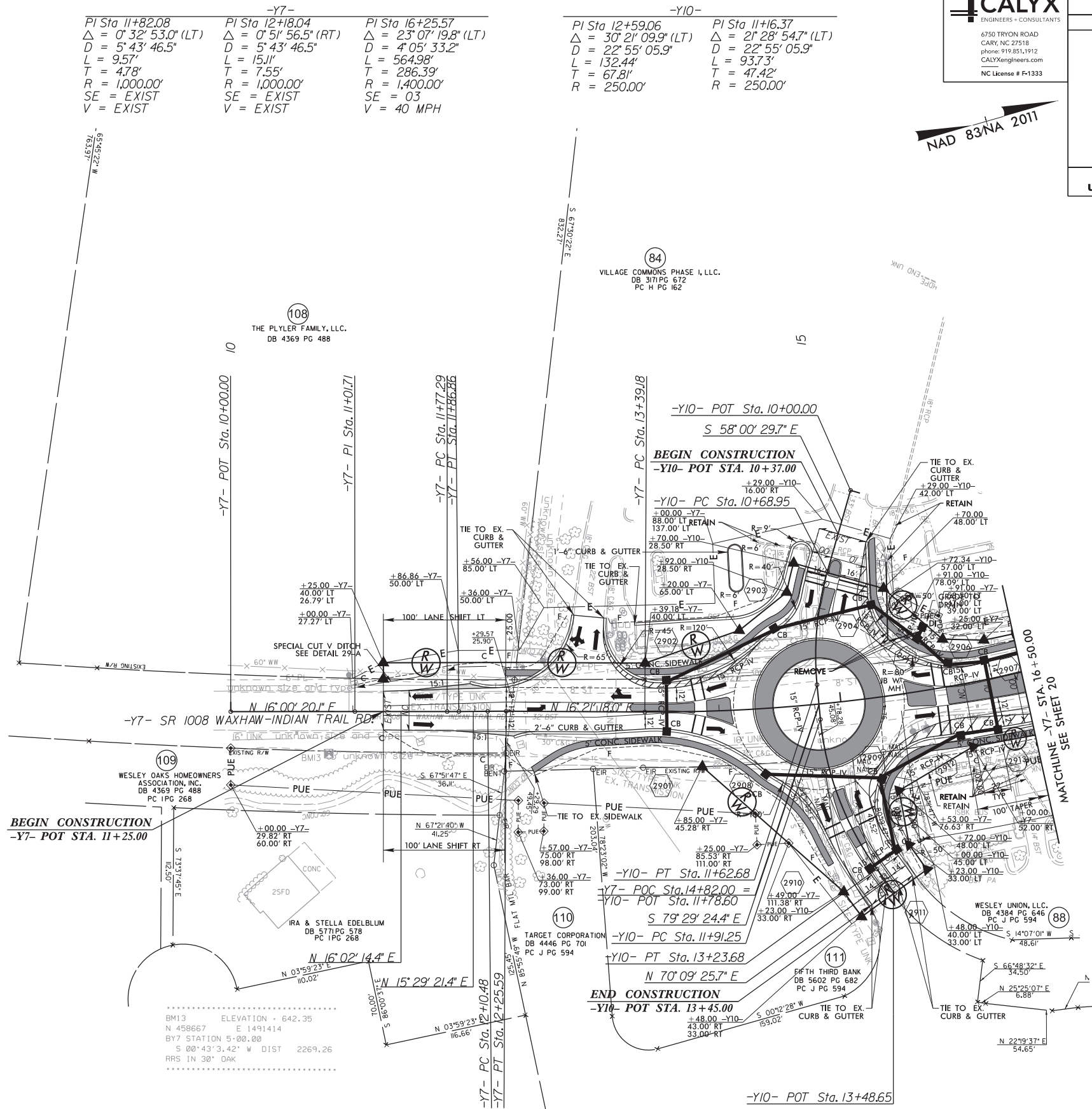
-Y3-
PI Sta 17+82.00
 $\Delta = 0'09''59.5''$ (LT)
 $D = 0'13''45.1''$
 $L = 72.66'$
 $T = 36.33'$
 $R = 25,000.00'$
 $SE = EXIST$
 $V = EXIST$

NOTES:
SEE SHEET 42 FOR -Y3- PROFILE

8/17/99

REVISIONS
RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED RIGHT OF WAY ON PARCELS 88 AND 111.
RIGHT OF WAY REVISION - 12/17/2018 - MODIFIED PERMANENT UTILITY EASEMENT ON PARCELS 84, 88, 109, 110, AND 111. MODIFIED TEMPORARY CONSTRUCTION EASEMENT ON PARCELS 84, 88, AND 111.

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2/15/2019
chopper



NAD 83 N 2011

PROJECT REFERENCE NO.		SHEET NO.
U-3467		29
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
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PAVED SHOULDERS
CONCRETE SIDEWALK / MEDIAN

NOTES:
SEE SHEET 44 FOR -Y7- PROFILE
SEE SHEET 46 FOR -Y10- PROFILE

8/17/99

REVISIONS

RIGHT OF WAY REVISION - 11/07/2018 - ADJUSTED RIGHT OF WAY ON PARCEL 91.

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2/15/2018
chapel

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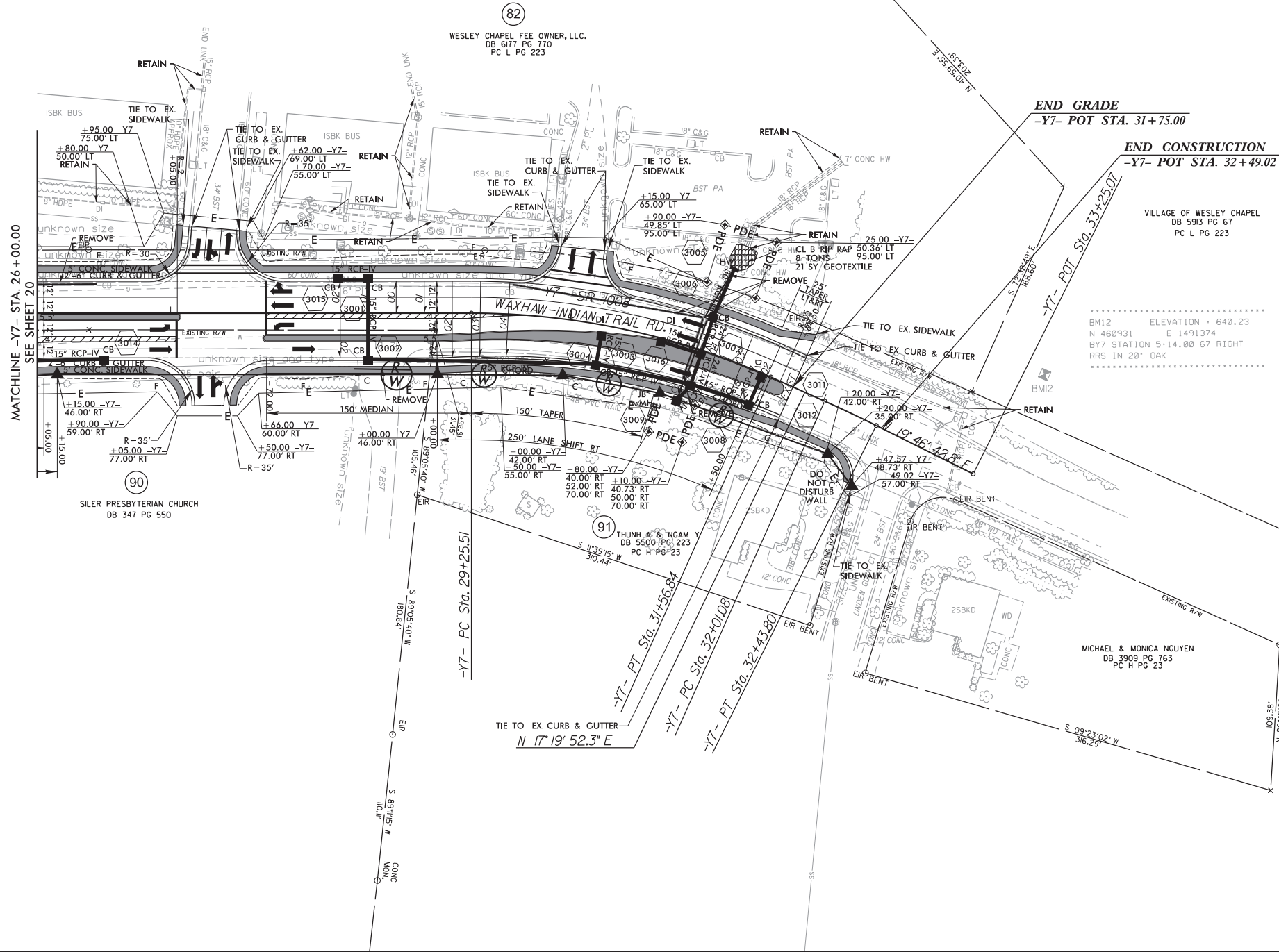
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PROJECT REFERENCE NO.		SHEET NO.
U-3467		30
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	

-Y7-

PI Sta 30+42.91	PI Sta 32+22.44
$\Delta = 24^{\circ}05'54.1''$ (RT)	$\Delta = 2^{\circ}26'50.5''$ (RT)
$D = 10^{\circ}25'02.7''$	$D = 5^{\circ}43'46.5''$
$L = 231.33'$	$L = 42.71'$
$T = 117.40'$	$T = 21.36'$
$R = 550.00'$	$R = 1,000.00'$
$SE = 04$	$SE = NC$
$V = 50$ MPH	$V = 50$ MPH

NAD 83/NA 2011



■ PAVED SHOULDERS
■ CONCRETE SIDEWALK / MEDIAN

NOTES:
SEE SHEET 44 FOR -Y7- PROFILE