

17. DIRECTIONS TO THE SITE

From downtown Memphis, TN, take US Highway 51 N approximately 16 miles towards Millington, TN. Take the exit for TN-385 E / Paul Barret Highway and the project location (west end of Area 1) begins on the left (north) of the highway.

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

See attached narrative.

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

See attached narrative.

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

20. Reason(s) for Discharge

See attached narrative.

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

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
Earthen Fill: 8.41 yd3	Concrete: 0.15 yd3	Stone: TBD

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

Acres See Table 1 of attached narrative.

or

Linear Feet See Table 1 of attached narrative.

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

See attached.

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-

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
TDEC	CWA 404 / ARAP	Pending	Concurrent	Pending	
TDEC	Land Disturbance	Pending	Concurrent	Pending	

* 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.

Domen J. Sanders, COUNTY ENGR 8/5/2020 Timur C. Cuy 8/5/2020
SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

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

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

USACE 404 Permit Application - Narrative **Big Creek Wetlands Restoration Project**

The original application was submitted for TDEC review in October 21, 2019. Since the initial review, TDEC issued an additional information request letter on December 18, 2019, and USACE provided comments the following day. The project team discussed the additional information requests with USACE and TDEC on a conference call February 7, 2020. This application has been revised to reflect the additional information requests and conversation. Appropriate details are highlighted in the application below.

Block 18. Nature of Activity

The project design, relative to the permitting for impacts to jurisdictional waters, has been scaled to the following:

- Lower the south bank of Big Creek in critical areas on the east end of the site to the 5-year flood stage level. By lowering the bank at critical points, Big Creek is partially reconnected to its native floodplain and flood waters can be directed under control into and out of the project area.
- Place excavation of existing floodplain in “upland” areas, allowing for flood storage without direct impact to existing wetlands and other waters.
- Install a series of berms to direct flow and limit the inundation of existing wetlands and other waters.
 - By controlling access through the points of entry / exit and with internal berms, impacts to the adjacent TDOT mitigation bank and other onsite wetlands can be controlled and minimized.
 - Berm locations have been chosen to limit, to the extent possible, direct fill impacts to wetlands.
 - Surficial hydraulic connectivity and drainage between wetlands / waters will be maintained to the extent possible via piping, gates, or other controls within the berms.
- To the extent possible the onsite streams have been avoided in terms of direct impact. Where available, crossings for footpaths will be spans with no piers or pilings into the streams.
 - Some piping and culverts within onsite streams for road crossings and drainage through the berms is required.
 - One stream system in Area 3 will be intercepted by the high flow diversion channel and its waters will be realigned into this channel.
 - Grade controls are proposed to help stabilize several onsite stream systems and minimize future incision and bank erosion.

Several currently degraded tributaries of Big Creek located within its floodplain will be stabilized and restored through the use of control structures and by increasing channel sinuosity and constructing appropriate bank full channel dimensions where appropriate and available.

In addition to the floodplain and recreational improvements to the project area south of Big Creek, levee improvements are also planned north of Big Creek. The project proposes to heighten approximately 1 mile of existing levee north of Big Creek from US 51 to the rail line west of Raleigh

Millington Road. A four-foot increase in the levee height would provide adequate freeboard for the 500-year flood event. No impacts to jurisdictional waters will result from construction of this portion of the project.

A new levee and pump station are planned northwest of the existing levee improvements. Beginning at Veterans Parkway, a levee constructed to an average height of 6 feet is proposed for approximately 1,500 feet on the west side of North Fork Creek to protect a neighborhood currently at risk from flooding. This portion of the project will require armoring of approximately 103 linear feet of North Fork Creek with grouted riprap.

Finally, a new levee will be constructed adjacent to existing homes along Sledge Road on the eastern edge of the project area. The levee will protect these homes from future flood events as well as help control offsite flooding south of Paul Barret Parkway caused by flood waters passing through the Sledge Road underpass. A new drainage channel away from the levee will require excavation of portions of an onsite wetland.

All work has been designed to avoid and minimize impacts to jurisdictional waters, to the maximum extent practicable. However, there are unavoidable direct and indirect impacts to wetlands and waters of the U.S. to accomplish the project objectives.

Block 19. Project Purpose

The historical floodplain of Big Creek in Millington, Shelby County, Tennessee has transitioned through the years from an active naturally forested floodplain to cultivated pastures to a currently wooded wetland / shrubs / pasture mix. Over several decades, Big Creek has become a severely incised and over-widened channel that does not adequately convey the discharge it receives from greater than 10-year storm events. As the stream continues to incise and erode, channel degradation exacerbates downstream water quality and threatens the recovery of connected natural aquatic systems.

The primary project area encompasses 1,584 acres on the south side of Big Creek between the creek and Paul Barret Parkway from U.S. Highway 51 to the west to Sledge Road to the east. This acreage is generally discussed in terms of three sub Areas (Figures 1 and 2), Area 1 from US Highway 51 west to Raleigh Millington Road, Area 2 from Raleigh Millington Road southeast to Highway 204 (Singleton Avenue), and Area 3 from Highway 204 east to Sledge Road.

The primary purpose of the proposed project is to alleviate current flooding conditions of adjacent communities and the northern adjacent naval base. This project also intends to restore/enhance the existing floodplain and natural aquatic systems by hydrologically reconnecting them with Big Creek's 5-year and bank full stages. Flood storage is accomplished and controlled through strategic placement of a gated diversion channel and lowered banks, excavation of primarily upland land to provide additional flood storage, and berms and gateways to control the flow and duration of storage.

Block 20. Reason(s) for Discharge

Table 1 below identifies the direct impacts to waters of the U.S. resulting from implementation of the proposed plan. The table identifies these aquatic resources, their length and acreage (where

applicable), and the type of each impact. The proposed impacts are necessary to aid in flood alleviation along Big Creek and construct the proposed recreational facilities. Impacts are shown on Figures 8 through 28 (Attachment 1). All impacts are considered to be permanent.

Table 1: Identified Direct Impacts

Resource ID	Impact ID On Figures	Linear Feet Impact	Acreage Impact	Impact Type
Streams – Direct Fill Impacts				
Big Creek	BC-1	107	N/A	Flood Control Inlet Structure
STR-1	S1-1	234	N/A	Box Culvert
STR-2	S2-1	87	N/A	Box Culvert
STR-2	S2-2	13	N/A	Box Culvert
STR-5 (North Fork Creek)	S5-1	103	N/A	Armoring
STR-10	S10-1	52	N/A	Pipe
STR-11	S11-1	132	N/A	Excavation / Inundation
STR-11	S11-2	40	N/A	Earthen Fill
STR-12	S12-1	248	N/A	Pipe & Box Culvert / Inundation
STR-13	S13-2	70	N/A	Pipe
STR-15	S15-1	136	N/A	Box Culvert
STR-18	S18-2	10	N / A	Stormwater Culvert
Streams – Stream Stabilization and Restoration Impacts				
STR-4	S4-1	398	N/A	Grade Control + Inundation
STR-7	S7-1	584	N/A	Grade Control + Inundation
STR-13	S13-1	1015	N/A	Grade Control + Inundation
STR-17	S17-1	2512	N/A	Realignment
STR-18	S18-1	665	N/A	Realignment
Wetlands				
WTL-8	W8-1	N/A	0.022	Concrete Fill
WTL-8	W8-2	N/A	0.064	Concrete Fill
WTL-8	W8-3	N/A	0.042	Excavation
WTL-8	W8-4	N/A	0.005	Piers
WTL-16	W16-1	N/A	0.122	Fill
WTL-17	W17-1	N/A	0.175	Fill
WTL-18	W18-1	N/A	0.243	Fill
			0.193	Isolation by Fill
WTL-19	W19-1	N/A	0.091	Fill

WTL-20	W20-1	N/A	0.002	Stormwater Culvert
WTL-20	W20-2	N/A	0.021	Fill
WTL-20	W20-3	N/A	0.092	Fill
WTL-21	W21-1	N/A	0.101	Fill
			0.022	Isolation by Fill
WTL-23	W23-1*	N/A	0.130	Excavation for Drainage Channel
WTL-24	W24-1*	N/A	0.057	Excavation for Drainage Channel
WTL-25	W25-1	N/A	0.084	Fill
WTL-26	W26-1	N/A	0.050	Fill
WTL-27	W27-1*	N/A	0.079	Excavation for Drainage Channel
WTL-28	W28-1	N/A	0.035	Fill
			0.032	Isolation by Fill
WTL-29	W29-1	N/A	1.163	Excavation for Drainage Channel
WTL-29	W29-2	N/A	0.082	Fill
WTL-29	W29-3	N/A	0.083	Fill
WTL-29	W29-4**	N/A	0.523	Excavation for Drainage Channel
WTL-29	W29-5*	N/A	0.009	Excavation for Drainage Channel
WTL-29	W29-6*	N/A	0.227	Excavation for Drainage Channel
Other Waters				
Pond @ WTL-10	P2-1	51	N/A	Pier
Pond - Unnamed	P1-1	52	N/A	Pier
Pond - Unnamed	P1-2	17	N/A	Pier

*Wetland impacts W23-1, W24-1, W27-1, W29-5, and W29-6 are new impacts since the original submittal.

**Wetland impact W29-4 proposed impacts increased.

Streams

The majority of impacts to onsite streams are associated with installation of pipes and culverts, with associated riprap inlet and outlet protection, for placement of stream crossings and drainage relative to the proposed floodwater control berms, roadways, and trails. Additional impacts will result from installation of grade controls, and ponding and channel realignments associated with site grading for flood storage and control.

Direct Impacts – Fill and Excavation

Twelve (12) direct impacts, totaling 1,232 linear feet due to fill (piping, culverts, armoring) and excavation, are proposed, as follows:

- Placement of pipes / culverts for new roadways accessing the recreational facilities, totaling 356 linear feet of fill within streams. Impacts will occur to Streams 1 (234 linear feet), 10 (52 linear feet), and 13 (70 linear feet). See Elevation 1 on Figure 3 for a typical pipe fill impact and see Elevation 4 on Figure 4 for a typical box culvert fill impact.
- Placement of pipes, box culverts, and miscellaneous earthen fill for flood control activities, totaling 631 linear feet of impact. 107 linear feet of Big Creek will be impacted by installation of the flood control inlet structure on the east terminus of the project area. Pipe and culvert impacts will occur at two locations to Stream 2 (87 and 13 linear feet), and at one location on Streams 12 (248 linear feet) and Stream 15 (136 linear feet). A short segment (40 linear feet) of Stream 11 will also be filled adjacent to the pipe structures on Stream 12.
- Placement of stormwater headwalls. One headwall structure is located in the southeastern section of Stream 18, impacting approximately 10 linear feet.
- 103 linear feet of Stream 5 (North Fork Creek) will require grouted riprap armoring for placement of the proposed levee and pump station to protect the adjacent neighborhood located northwest of Area 2 between Raleigh Millington Road and the creek.
- Area excavation causing subsequent inundation of approximately 132 linear feet of the headwaters of Stream 11. This excavation is for lowering uplands in Area 2 immediately adjacent to Big Creek for flood storage.

In order to achieve the project purpose and goals, these impacts cannot be avoided and have been minimized to the maximum extent practicable. Compensatory mitigation for the proposed stream impacts that result in loss to the aquatic features are detailed in section 11.1.

Direct Impacts – Stream Stabilization and Restoration Impacts

Direct impacts to streams for stabilization and restoration, totaling 5,174 linear feet, are as follows:

- Placement of three sheet piles as grade control structures with subsequent pooling, on Stream 4 (398 feet pooled), Stream 7 (584 linear feet pooled), and Stream 13 (1015 linear feet pooled). See Elevation 3 on Figure 4 for a typical grade control impact.
- Two streams (17 and 18, which are in actuality one stream system upstream / downstream of a wetland channel convergence) will be intercepted by a new high flow diversion channel in Area 3, which will create a realignment of the channel. Total length of stream realigned is 3,462 linear feet, with the new channel below the intercept point totaling 1,907 linear feet, for a net loss of 1,555 linear feet of stream. Stream 17, essentially the lower reach portion of the overall stream system that is primarily impacted, is incised and exhibits significant bank erosion, and the design of the new channel will provide lift in aquatic resource value and better floodplain connectivity for the system.

Wetlands

Direct Impact - Fill

Areas of direct impact by fill totaling approximately 1.52 acres (less than 0.6% of total onsite wetlands) to eleven of the fifty-six onsite wetlands are proposed (see Elevation 6 on Figure 5 for a typical section of wetland fill). Site activities have been designed to remove any direct fill impacts to wetlands in Areas 1 and 2. The majority of the fill in Area 3 is for placement of the proposed flood control berms and are located on the outer margins of the wetland communities

(the majority of the impacts are 1/10th of an acre or less) near property boundaries or physical barriers (Big Creek, roadways, etc.). Alternate placement of the berms would have caused greater impacts to resources. The berms are designed to control flood waters while maintaining the existing hydrology supporting the wetlands located on the interior of the berm system.

The largest single fill impact to a wetland is 0.436 acres (0.243 direct fill + 0.193 acres hydrologic isolation due to fill) to Wetland 18, a 4.37 acre forested and emergent wetland complex adjoining the TDOT wetland mitigation area in Area 3. Wetland 18 lies between the Paul Barret Parkway off-ramp and the mitigation bank. In this area, the proposed berm protects the highway and ramp from flooding and, due to the adjacency of Wetland 18, cannot be installed without these fill impacts. A portion of this impact is not direct fill but assumed loss of wetland function due to hydrologic isolation of a portion of the wetland due to the fill. For permitting purposes, it is assumed that this hydrologic isolation will result in complete loss of wetland function and is considered a permanent impact.

Other minor fill in Area 3 occurs at Wetland 8 resulting from concrete fill at a picnic area pad (0.022 acres) and an ADA compliant ramp (0.064 acres) allowing access to the trail boardwalk, and piers for an overlook dock (0.005 acres).

In order to achieve the project purpose and goals, the impacts cannot be avoided and have been minimized to the maximum extent practicable as evaluated with a practicable alternatives analysis.

Direct Impact - Excavation

The original permit submission proposed impact to 1.163 acres of wetland for excavation. Since the grading plans have been further engineered, the impacts have increased, totaling 2.23 acres. Excavation for the primary diversion channel will impact the northern edges of Wetland 23 (0.130 acres), Wetland 24 (0.057 acres), Wetland 27 (0.079 acres), and Wetland 29 (0.532 acres). A small berm along the edges of these wetlands and the respective excavations will be installed to prevent additional loss of hydrology from the wetlands due to drainage into the excavated channels.

1.39 acres of Wetland 29 (a forested floodplain wetland) will be excavated in order to install a drainage channel designed to flow stormwater away from the new levee installed to protect existing homes located along Sledge Road on the eastern edge of the project area.

0.04 acres of the eastern edge of Wetland 8 will be excavated for flood storage. This portion of Wetland 8 is forested and located immediately adjacent to Big Creek in the proposed bank layback area of Area 2. The adjoining uplands will be excavated for flood storage, likely causing future ponding of this small portion of Wetland 8 and Stream 11. The portion of the wetland impacted is its discharge area to Stream 11, as discussed above.

See Elevation 6 on Figure 5 for a typical section of wetland excavation.

In order to achieve the project purpose and goals, the impacts cannot be avoided and have been minimized to the maximum extent practicable as evaluated with a practicable alternatives analysis.

Indirect Impacts

The project area is anticipated to be impacted by the potential increase in frequency and duration of inundation resulting from the flood controls proposed for Big Creek. Increases in inundation depth are minimal in the wetland areas and inundation times are typically expected to be less than a few days difference compared to the existing flooding regime. There is no expected conversion of wetland type or loss of functional value for these areas.

Figures representing the predicted hydrological deltas, in both inundation depths and durations, are attached (Attachment 2). The table below presents an approximation of the changes in the larger wetland systems, presented by project area.

Flood Event	Delta Type (Depth/Duration)	Area of Study		
		Area 1	Area 2	Area 3
5 Year	Depth	-5 ft	0 ft	0 to 5 ft
	Duration	0 hrs	48 hrs	24 to 72 hrs
10 Year	Depth	0 ft	0 ft	0 to 5 ft
	Duration	24 hrs	60 hrs	-24 to 96 hrs
25 Year	Depth	0 ft	0 ft	0 to 5 ft
	Duration	24 hrs	60 hrs	-24 to 48 hrs
100 Year	Depth	0 ft	0 ft	0 to 5 ft
	Duration	24 hrs	96 hrs	-70 to 120 hrs

* Due to the size of this area, there is significant variability. For the proposed action, the western side of Area 3 generally tends to hold water longer at a slightly deeper depth, while the eastern portion holds water for a shorter duration but at unchanged depth as compared to the existing flood conditions.

Block 23. Description of Avoidance, Minimization, and Compensation

All work has been designed to avoid and minimize impacts to waters to the maximum extent practicable while still meeting the project purpose and need. The descriptions below detail the direct permanent impacts associated with the project and proposed compensatory mitigation.

The primary purpose of the proposed project is to alleviate flooding conditions of adjacent communities and the northern adjacent Naval Support Activity Mid-South naval base through implementation of a Housing and Urban Development National Disaster Resiliency grant. In addition to alleviating flooding conditions, multiple elements of the proposed project were identified as priorities in the City of Millington Greenway Plan, including developing an integrated, connected system of greenways, paths, and sidewalks to connect the existing park systems, open spaces, and major destination points throughout Millington. The proposed site impacts to jurisdictional waters, detailed below, would occur in meeting these project objectives.

Streams

Table 11-1: Stream Impacts to be Compensated For

Resource ID	Impact ID On Figures	Linear Feet Impact	Impact Type
Big Creek	BC-1	107	Flood Control Inlet Structure
STR-1	S1-1	234	Box Culvert
STR-2	S2-1	87	Box Culvert

STR-2	S2-2	13	Box Culvert
STR-5 (North Fork Creek)	S5-1	103	Armoring
STR-10	S10-1	52	Pipe
STR-11	S11-1	132	Excavation / Inundation
STR-11	S11-2	40	Earthen Fill
STR-12	S12-1	248	Pipe & Box Culvert / Inundation
STR-13	S13-2	70	Pipe
STR-15	S15-1	136	Box Culvert
STR-18	S18-2	10	Stormwater Culvert

Direct fill impacts to streams are proposed to be mitigated on-site. Streams 17, 18, and 19 were field evaluated for mitigation suitability. Appropriate SQT forms depicting the existing and proposed condition scores, including the functional uplift, are being prepared and will be submitted under separate cover.

Stream 18 was noted to be highly channelized, with slight erosion along the reach. Adjacent wetlands WTL-27 and WTL-29 had hydrologic connection through drainages. Average bank heights ranged from 8 feet at the furthest downstream location, to 5 feet at the upstream portion along the right bank, and between 5 to 12 feet along the left bank. Currently, man-made berms separate large portions of likely floodplain to the potential stream restoration area.

Based on this evaluation, stream restoration on the upper reach of Stream 18 has been determined to be a viable mitigation option for the site. With the removal or trimming of the berm height, flood waters from the streams can be dissipated into the adjacent wetlands that would act as large floodplains, minimalizing erosion issues. It is anticipated, these mitigation efforts will provide functional lift to Stream 18. This mitigation effort will compensate for minimal functional losses anticipated to other onsite streams resulting from the proposed direct impacts associated with the installation of pipes and culverts.

Restoration of a section of Big Creek in Area 1 immediately downstream of the rail crossing is proposed. The banks of Big Creek are heavily eroded in this area (35.332677° W, 89.902247° N) and a significant scour hole and pooling has formed. According to local authorities, this area is extremely hazardous to human life when used as access for fishing and recreation. The project proposes to install a sheet pile grade control structure across the creek immediately downstream of the rail support structure and use local fill and hard armoring to fill the erosion and grade and stabilize the banks. These measures will reduce bank erosion potential in the area and are expected to minimize hazards when used as an access point for fishing and recreation.

Similarly, where grade control structures are installed or streams are realigned, instream functions are expected to be lifted, through the provision of increased morphological stream stability and increased water quality due to decreased sediment loading. Therefore, no compensatory mitigation is proposed to offset those specific stream impacts.

Wetlands

As a result of unavoidable impacts, 3.75 acres of wetlands will be permanently impacted by the proposed project and are detailed below:

Table 11-2: Wetland Impacts to be Compensated For

Resource ID	Impact ID On Figures	Acreage Impact	Impact Type
WTL-8	W8-1	0.022	Concrete Fill
WTL-8	W8-2	0.064	Concrete Fill
WTL-8	W8-3	0.042	Excavation
WTL-8	W8-4	0.005	Piers
WTL-16	W16-1	0.122	Fill
WTL-17	W17-1	0.175	Fill
WTL-18	W18-1	0.243	Fill
		0.193	Isolation by Fill
WTL-19	W19-1	0.091	Fill
WTL-20	W20-1	0.002	Stormwater Culvert
WTL-20	W20-2	0.021	Fill
WTL-20	W20-3	0.092	Fill
WTL-21	W21-1	0.101	Fill
		0.022	Isolation by Fill
WTL-23	W23-1*	0.13	Excavation for Drainage Channel
WTL-24	W24-1*	0.057	Excavation for Drainage Channel
WTL-25	W25-1	0.084	Fill
WTL-26	W26-1	0.05	Fill
WTL-27	W27-1*	0.079	Excavation for Drainage Channel
WTL-28	W28-1	0.035	Fill
		0.032	Isolation by Fill
WTL-29	W29-1	1.163	Excavation for Drainage Channel
WTL-29	W29-2	0.082	Fill
WTL-29	W29-3	0.083	Fill
WTL-29	W29-4**	0.523	Excavation for Drainage Channel
WTL-29	W29-5*	0.009	Excavation for Drainage Channel
WTL-29	W29-6*	0.227	Excavation for Drainage Channel

Per coordination with TDEC via email dated February 2020, Barge evaluated the value of the wetlands onsite using the non-HGM TRAM method. The TRAM forms are enclosed herein. In summary, the wetlands scored at about medium or average quality.

In order to compensate for the loss of aquatic resources on site, the Applicant proposes to purchase wetland mitigation credits from a USACE and TDEC approved wetland mitigation bank

located within the same HUC-8 as the proposed project. Due to the medium quality wetlands on-site and that the Applicant proposes to purchase credits from a bank within the same 8-digit HUC as the project, the Applicant proposes to mitigate at a 2:1 ratio. Based on the conference call with USACE and TDEC dated February 7, 2020, USACE and TDEC agreed this is an appropriate method and ratio for wetland compensatory mitigation.

Description of No Net Loss

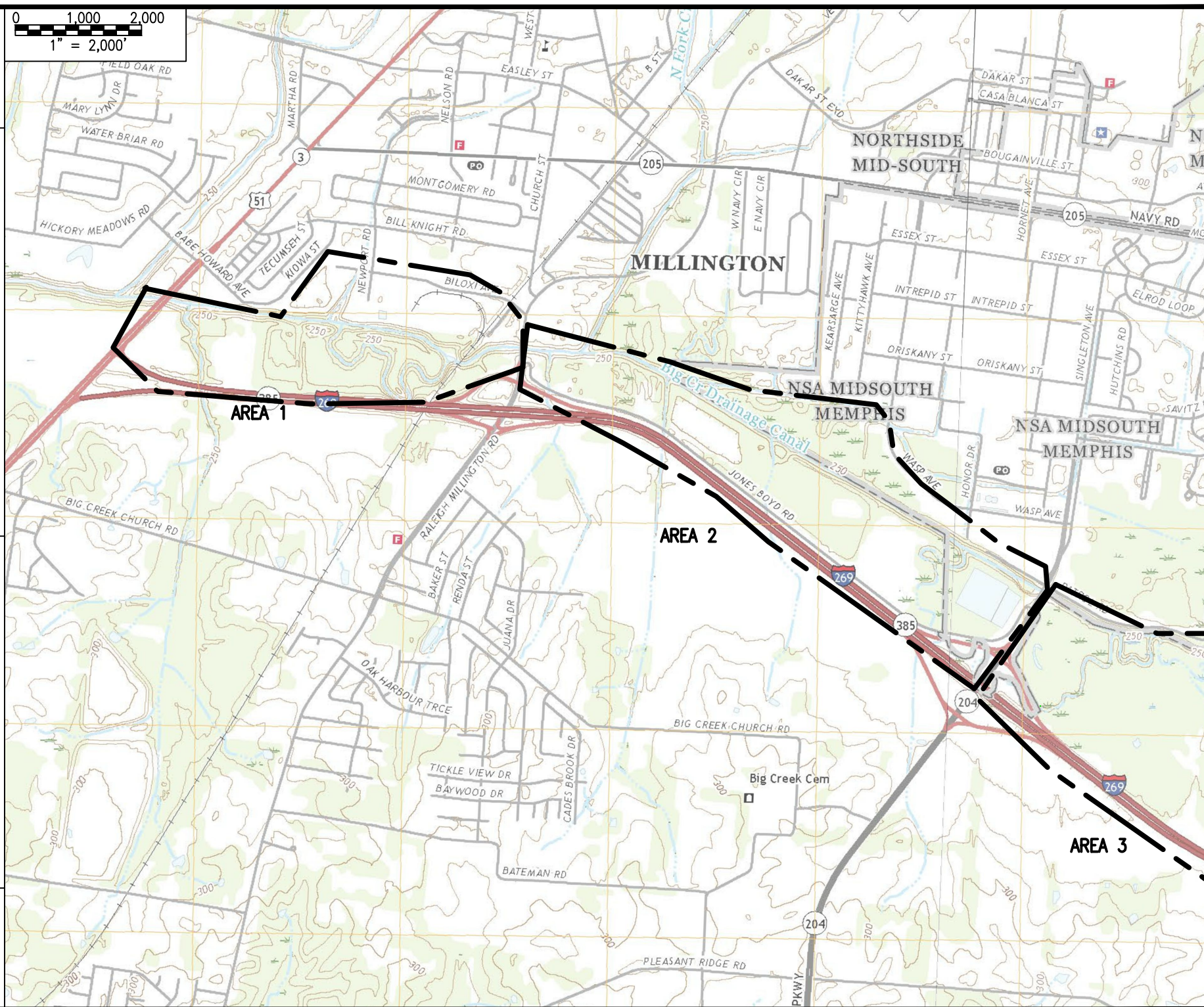
Stream losses from impacts will be mitigated through restoration and enhancement of other onsite resources, such that no net losses in stream resource value would occur.

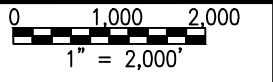
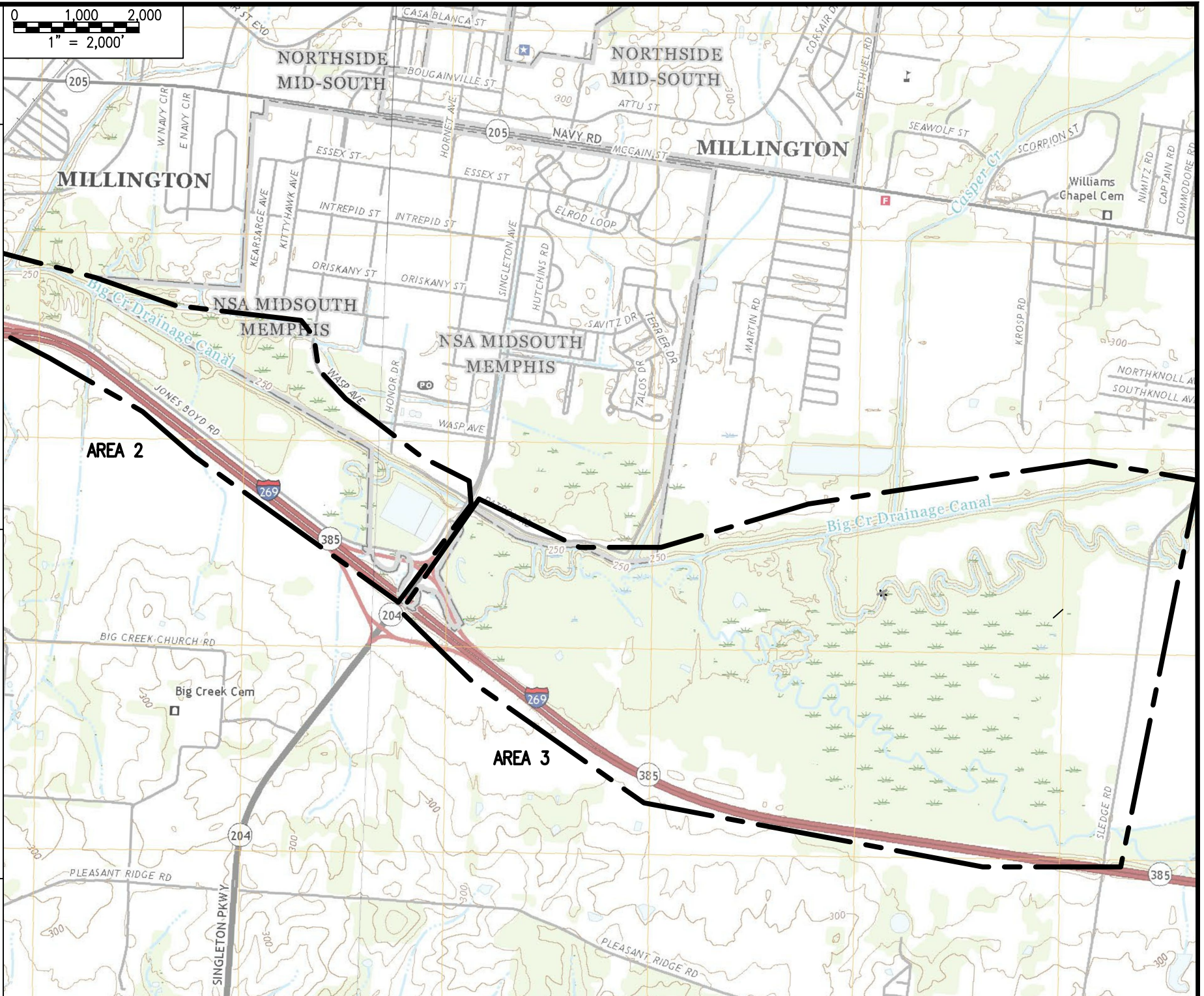
In order to compensate for the loss of wetland resources on site, the Applicant proposes to purchase wetland mitigation credits from a USACE and TDEC approved wetland mitigation bank located within the same HUC-8 as the proposed project. Due to the medium quality wetlands on-site and that the Applicant proposes to purchase credits from a bank within the same 8-digit HUC as the project, the Applicant proposes to mitigate at a 2:1 ratio. Based on the conference call with USACE and TDEC dated February 7, 2020, USACE and TDEC agreed this is an appropriate method and ratio for wetland compensatory mitigation and will result in No Net Loss of wetland resources for the project.

Mitigation Plan

A detailed mitigation plan will be prepared once mitigation design is finalized.

BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING		
DESCRIPTION:	PROJECT #:	
TOPOGRAPHIC MAP - WEST	57802.00	
LOCATION:	DATE:	
MILLINGTON, TN	OCTOBER 2019	





12,000



Tioqa

ENVIRONMENTAL CONSULTANTS

**BIG CREEK WETLAND & RECREATION AREA
JURISDICTIONAL WATERS PERMITTING**

DESCRIPTION:
TOPOGRAPHIC MAP - EAST

PROJECT #:
57802.00

LOCATION:
MILLINGTON, TN

DATE:
OCTOBER 2019

NOT TO SCALE

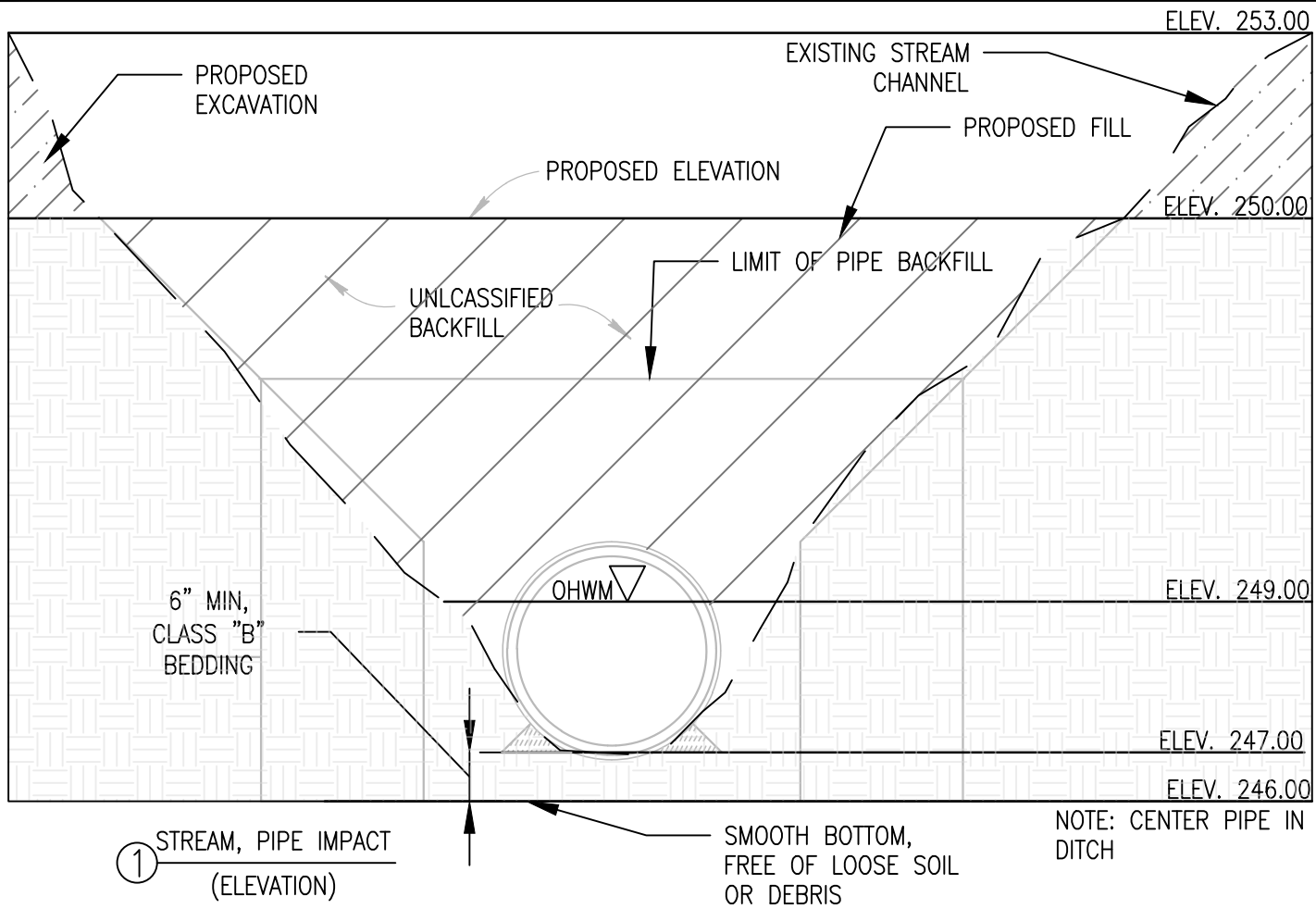


Tioja
ENVIRONMENTAL CONSULTANTS

BIG CREEK DRG
JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:	STREAM SECTION VIEW
LOCATION:	MILLINGTON, TN
PROJECT #:	57802.00
DATE:	MAY 2019

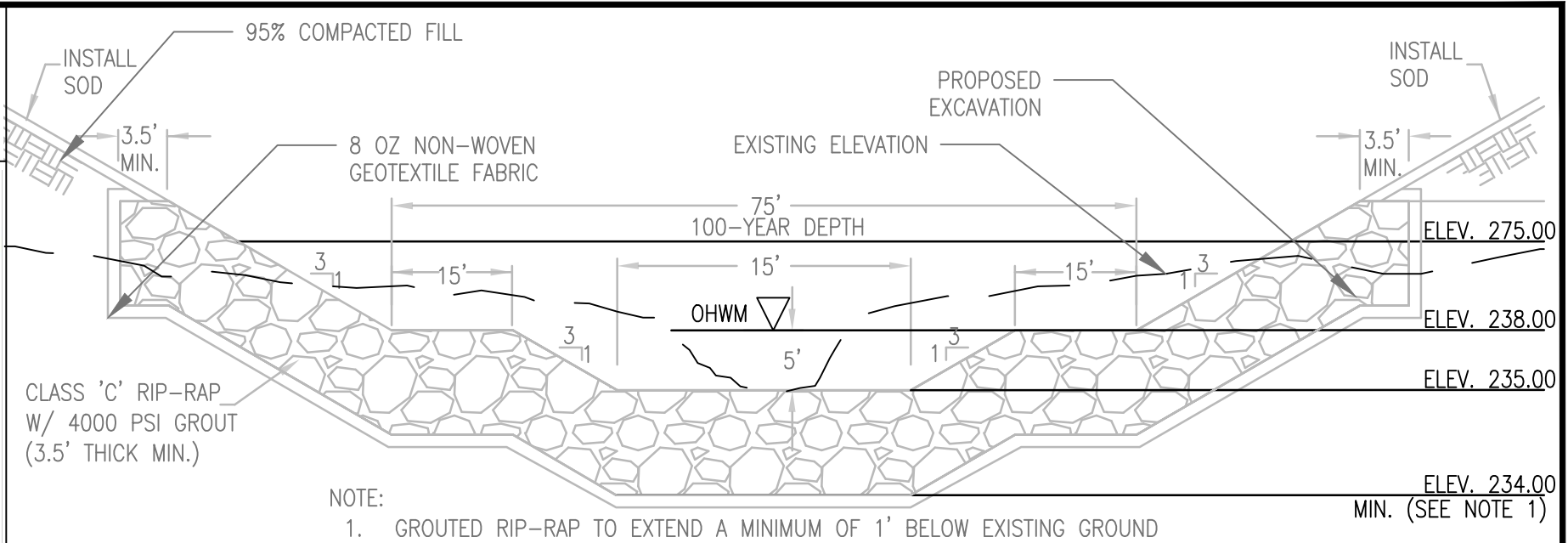
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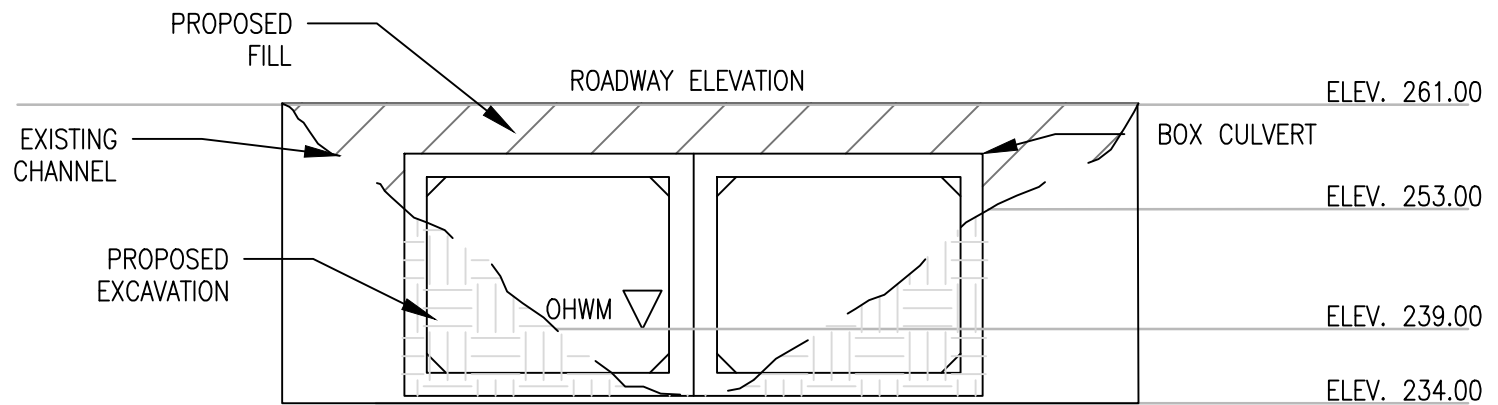
NOT TO SCALE



Tioga
ENVIRONMENTAL CONSULTANTS



③ STREAM, GRADE CONTROL STRUCTURE
(ELEVATION)



④ STREAM, BOX CULVERT IMPACT
(ELEVATION)

BIG CREEK DRG
JURISDICTIONAL WATERS PERMITTING
DESCRIPTION: STREAM SECTION VIEW
LOCATION: MILLINGTON, TN
PROJECT #: 57802.00
DATE: MAY 2019



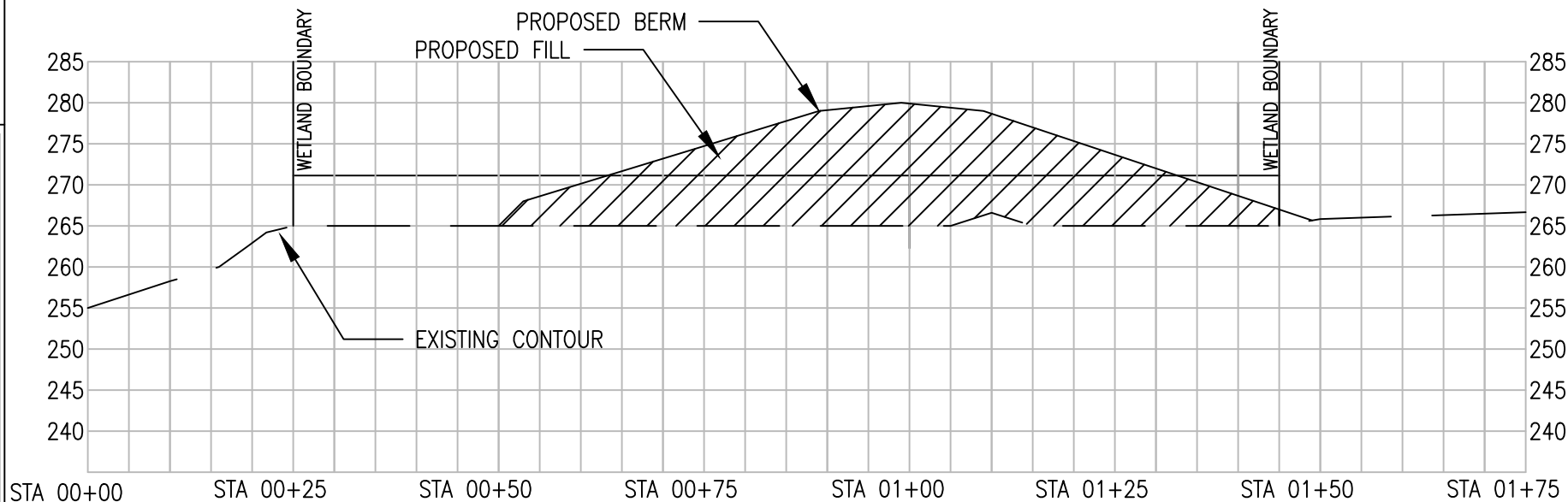
Tiooga
ENVIRONMENTAL CONSULTANTS

BIG CREEK DRG
JURISDICTIONAL WATERS PERMITTING

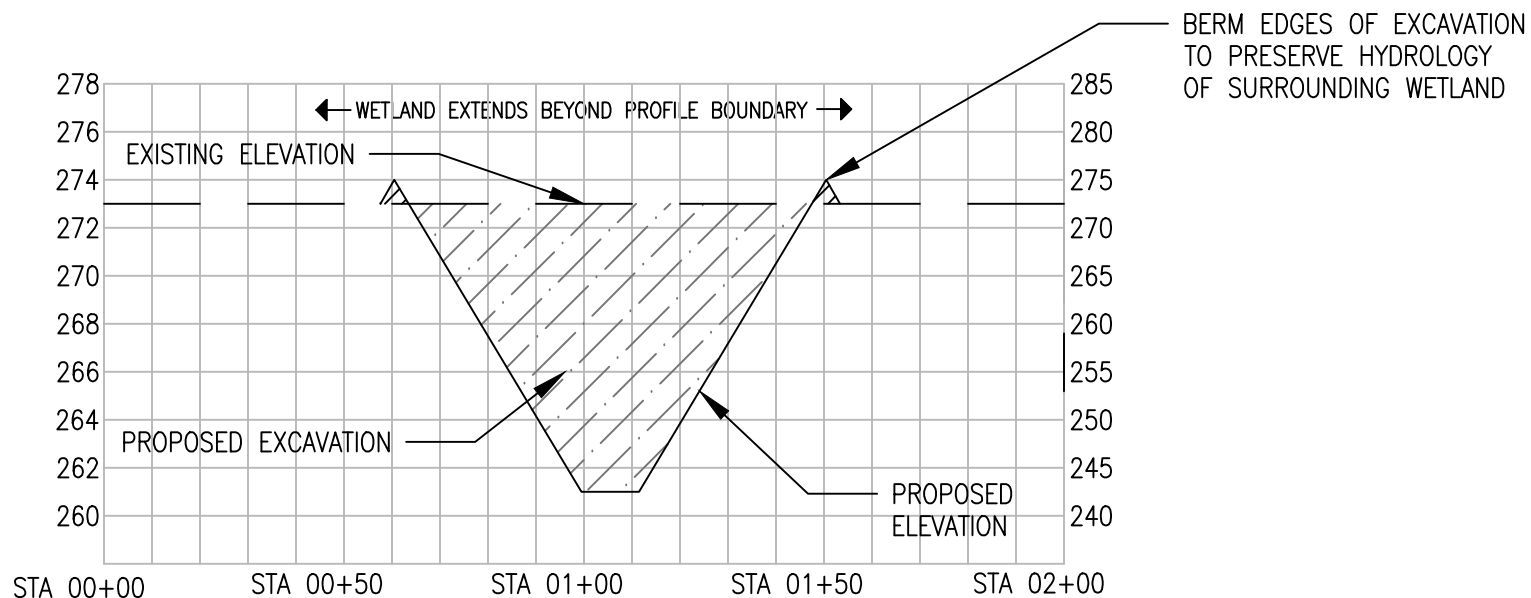
DESCRIPTION: WETLAND PROFILE
LOCATION: MILLINGTON, TN
PROJECT #: 57802.00
DATE: MAY 2019

5

1"=20' HOR
1"=20' VER



⑤ WETLAND FILL IMPACT
(ELEVATION)



⑥ WETLAND EXCAVATION IMPACT
(ELEVATION)

1"=40' HOR
1"=8' VER



1:2,000

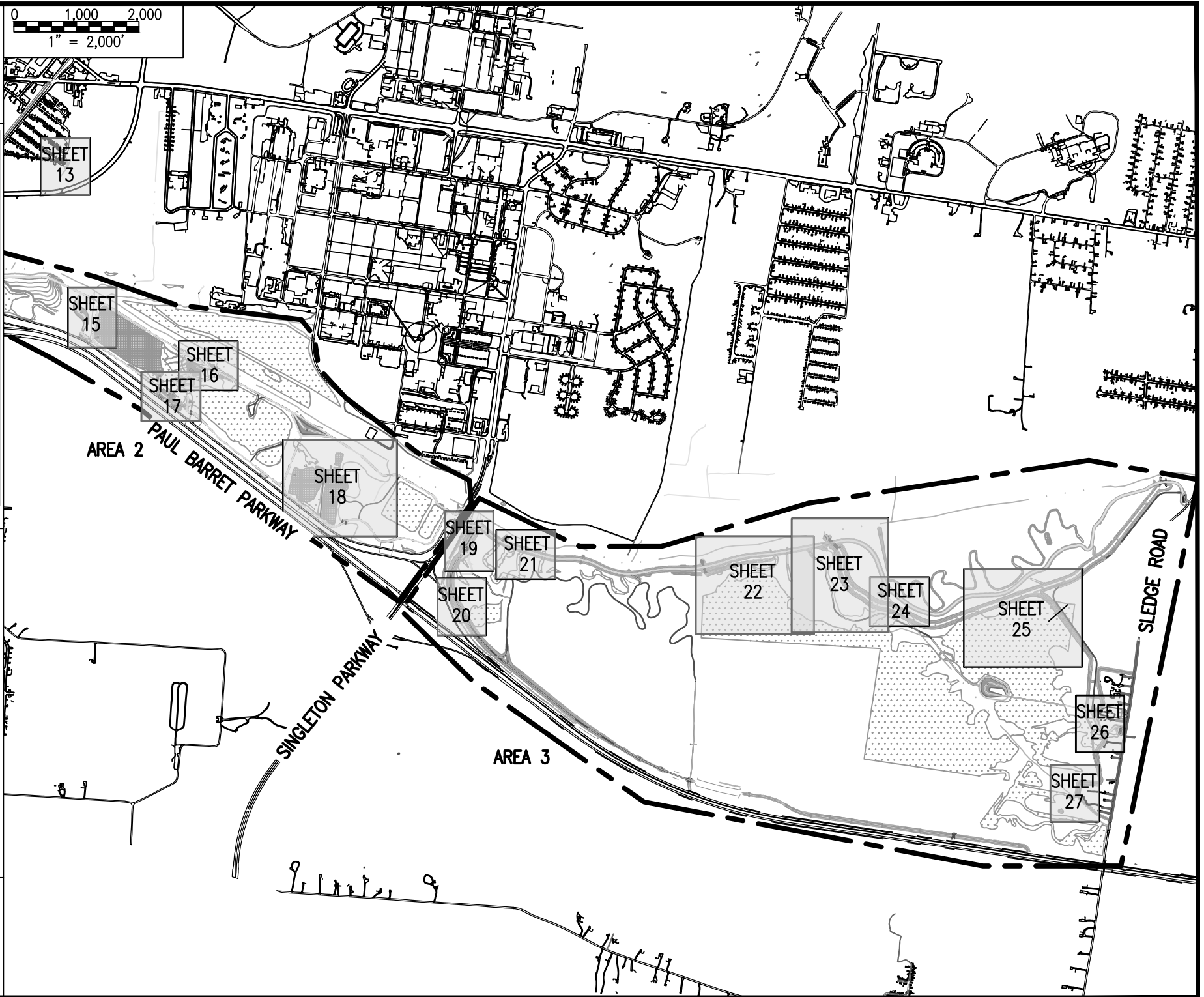


0 1,000 2,000
1" = 2,000'



Tiooga
ENVIRONMENTAL CONSULTANTS

BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING	
DESCRIPTION: MAP KEY - WEST	PROJECT #: 57802.00
LOCATION: MILLINGTON, TN	DATE: OCTOBER 2019



1:2,000

















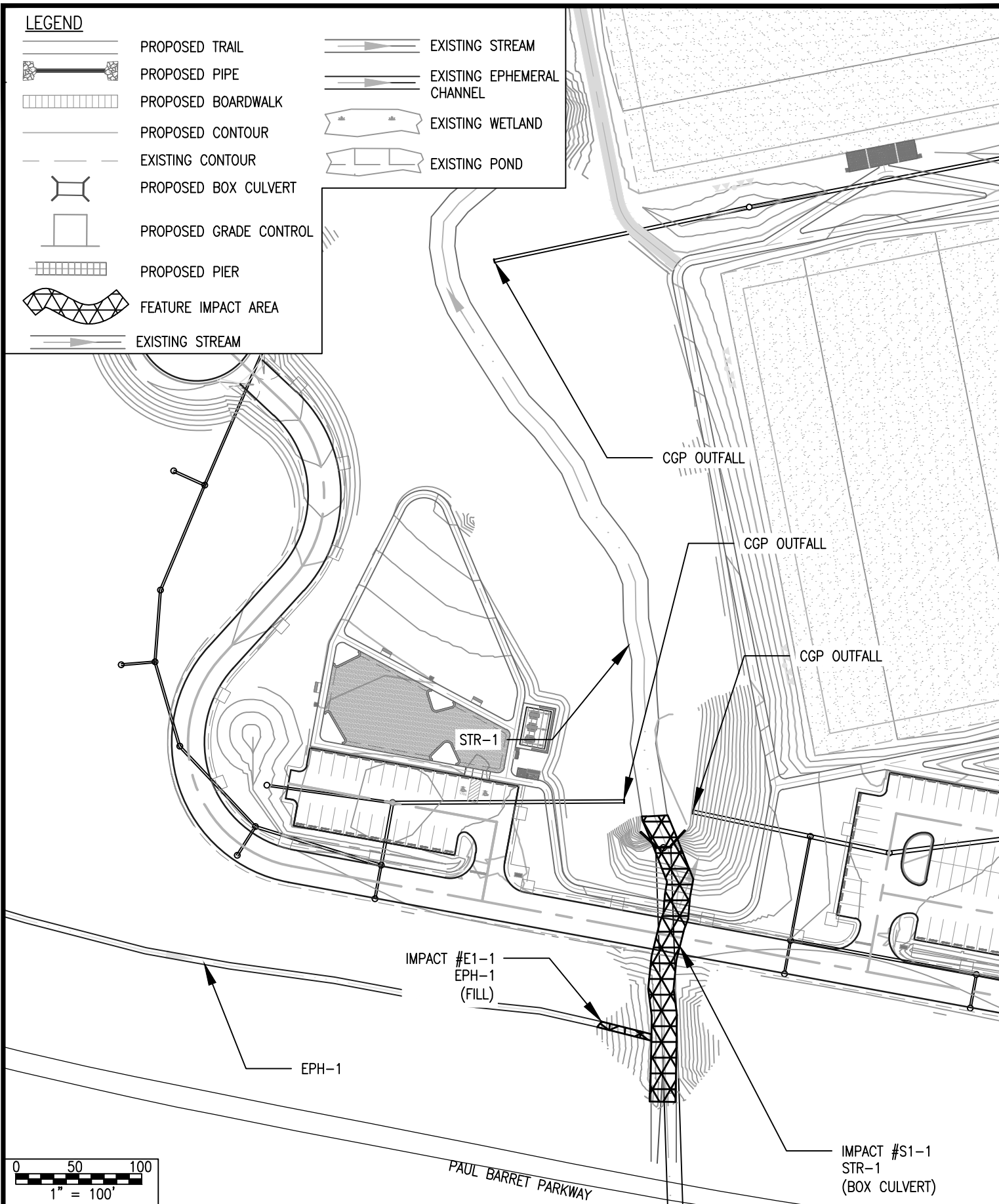
Tioga
ENVIRONMENTAL CONSULTANTS

DESCRIPTION:		PROJECT #:	
MAP KEY - EAST		57802.00	
LOCATION:		DATE:	
MILLINGTON, TN		OCTOBER 2019	

BIG CREEK WETLAND & RECREATION AREA
JURISDICTIONAL WATERS PERMITTING

LEGEND

	PROPOSED TRAIL		EXISTING STREAM
	PROPOSED PIPE		EXISTING EPHEMERAL CHANNEL
	PROPOSED BOARDWALK		EXISTING WETLAND
	PROPOSED CONTOUR		EXISTING POND
	EXISTING CONTOUR		
	PROPOSED BOX CULVERT		
	PROPOSED GRADE CONTROL		
	PROPOSED PIER		
	FEATURE IMPACT AREA		
	EXISTING STREAM		
















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ENVIRONMENTAL CONSULTANTS

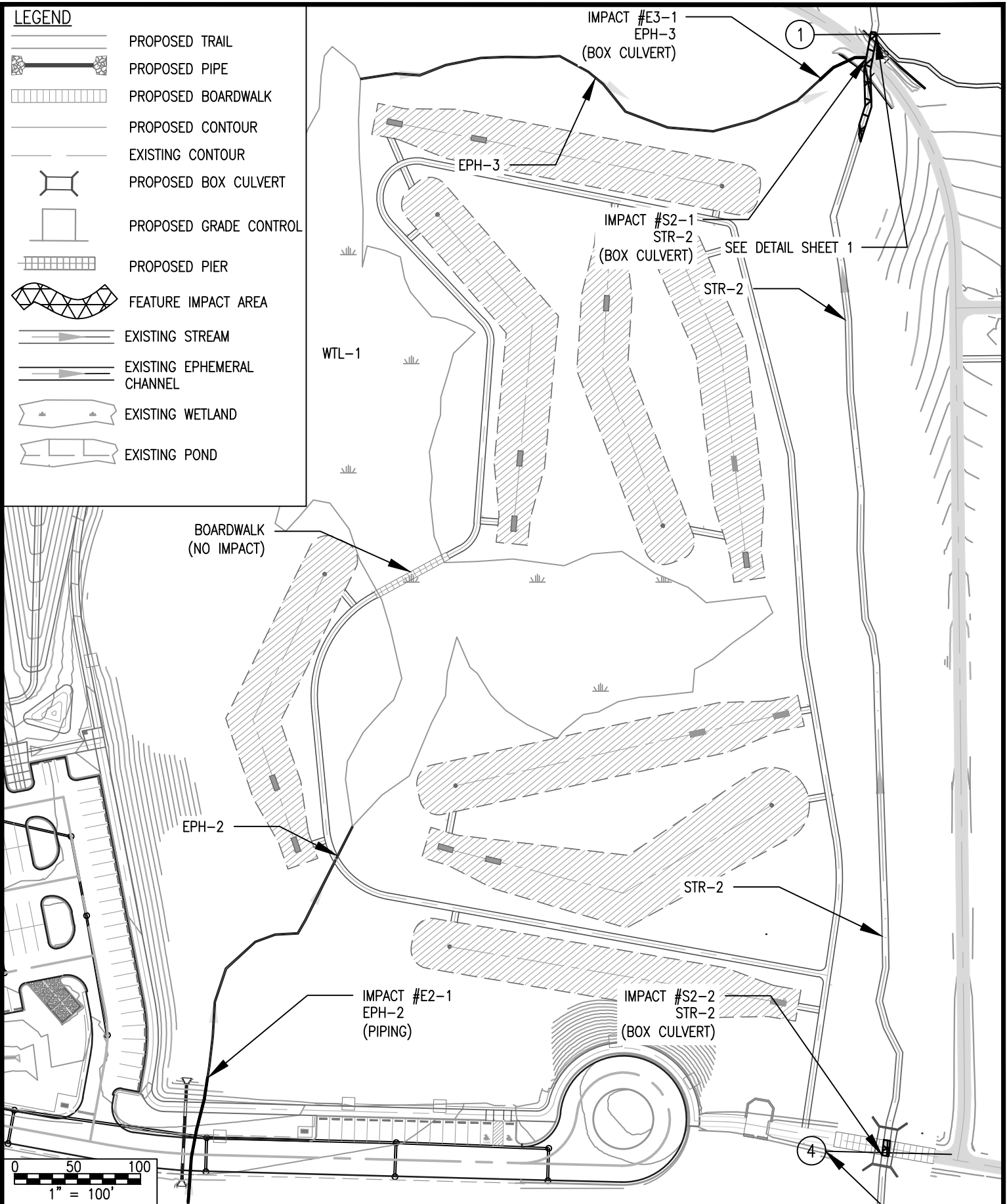
BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW
LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00
DATE:
OCTOBER 2019

LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND



BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING















DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW

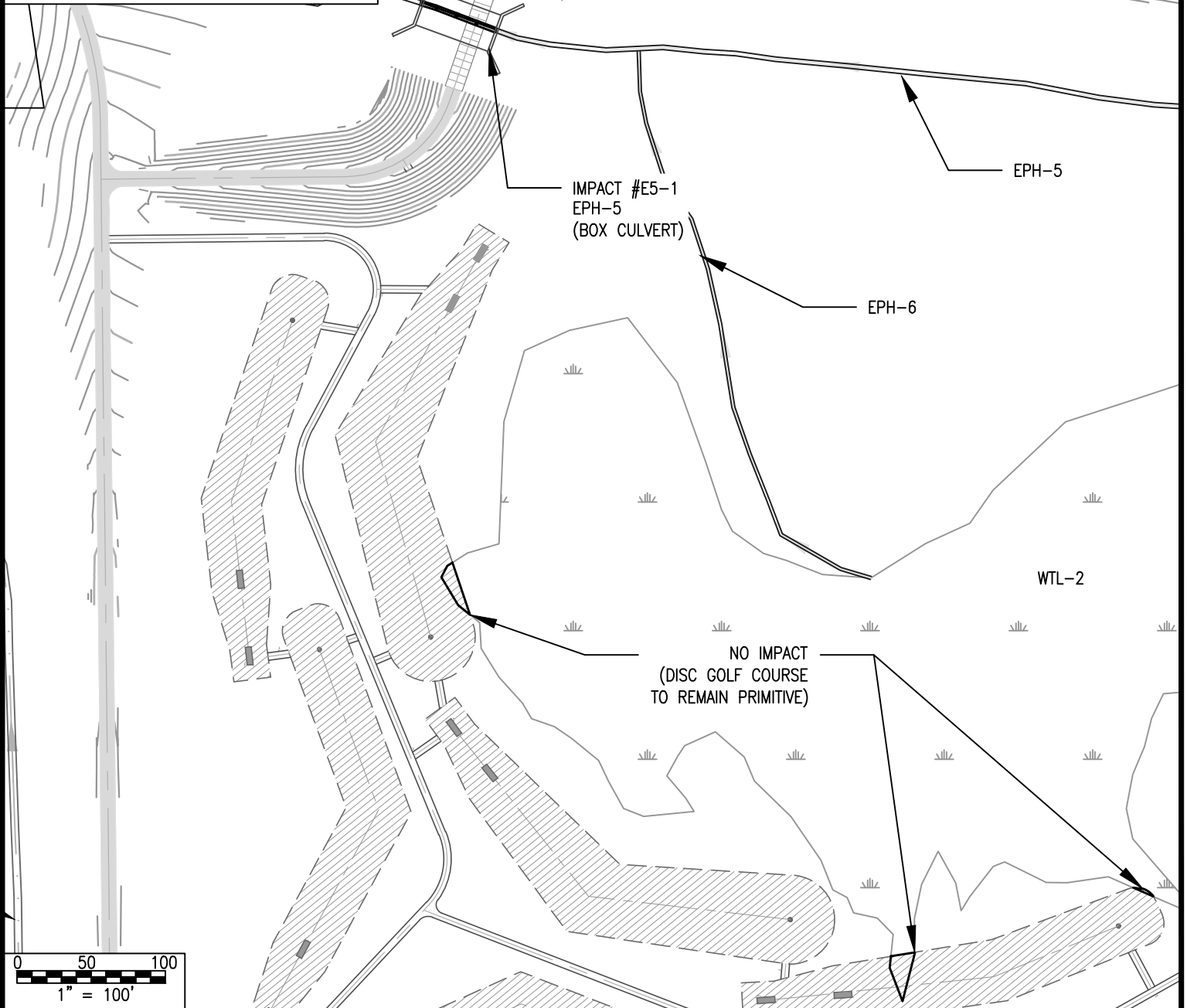
PROJECT #:
57802.00

LOCATION:
MILLINGTON, TN

DATE:
OCTOBER 2019

LEGEND

	PROPOSED TRAIL		EXISTING STREAM
	PROPOSED PIPE		EXISTING EPHEMERAL CHANNEL
	PROPOSED BOARDWALK		EXISTING WETLAND
	PROPOSED CONTOUR		EXISTING POND
	EXISTING CONTOUR		
	PROPOSED BOX CULVERT		
	PROPOSED GRADE CONTROL		
	PROPOSED PIER		
	FEATURE IMPACT AREA		
	EXISTING STREAM		






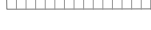









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ENVIRONMENTAL CONSULTANTS

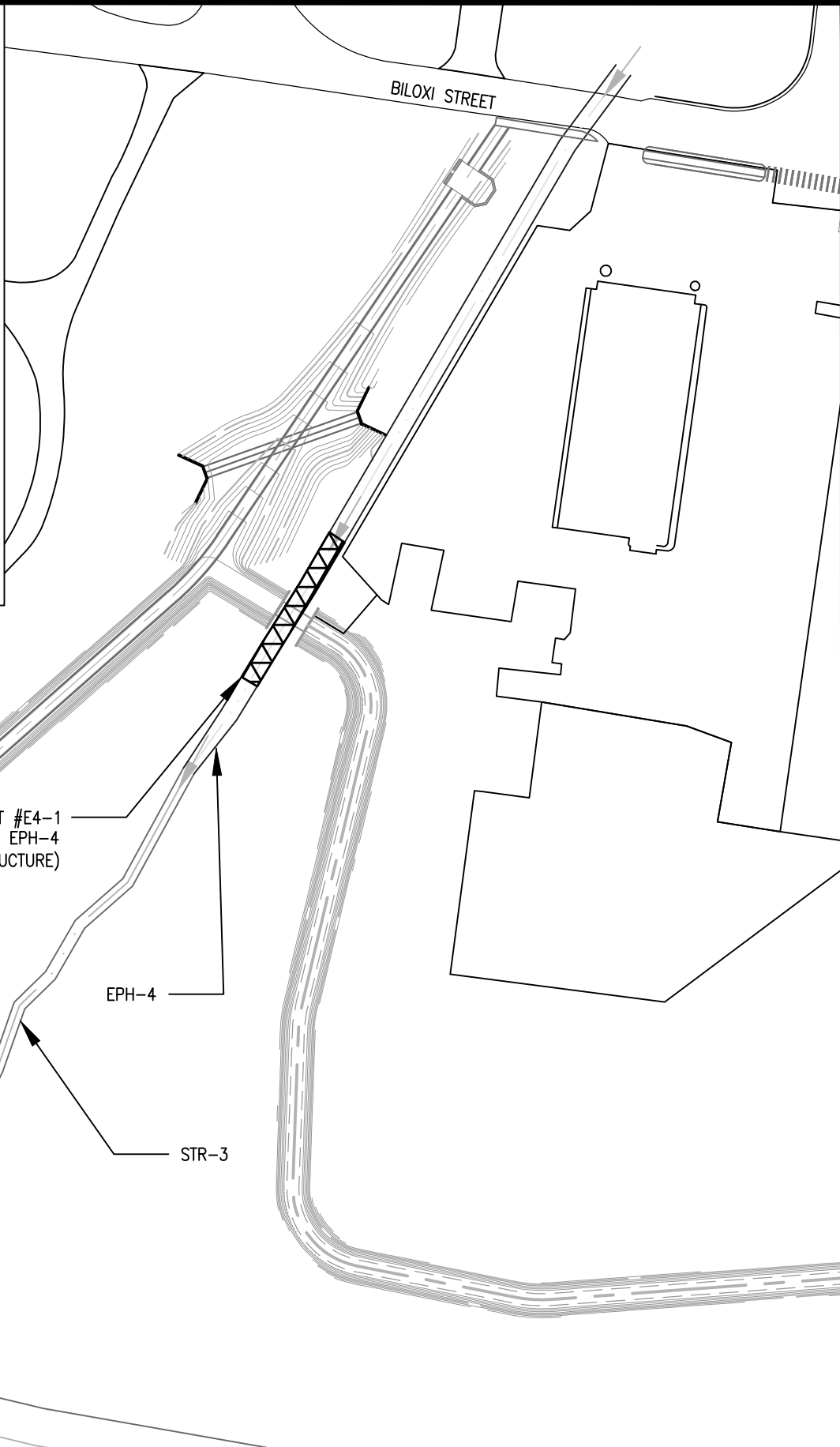
BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW
LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00
DATE:
OCTOBER 2019

LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND







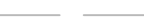







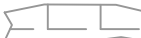
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ENVIRONMENTAL CONSULTANTS

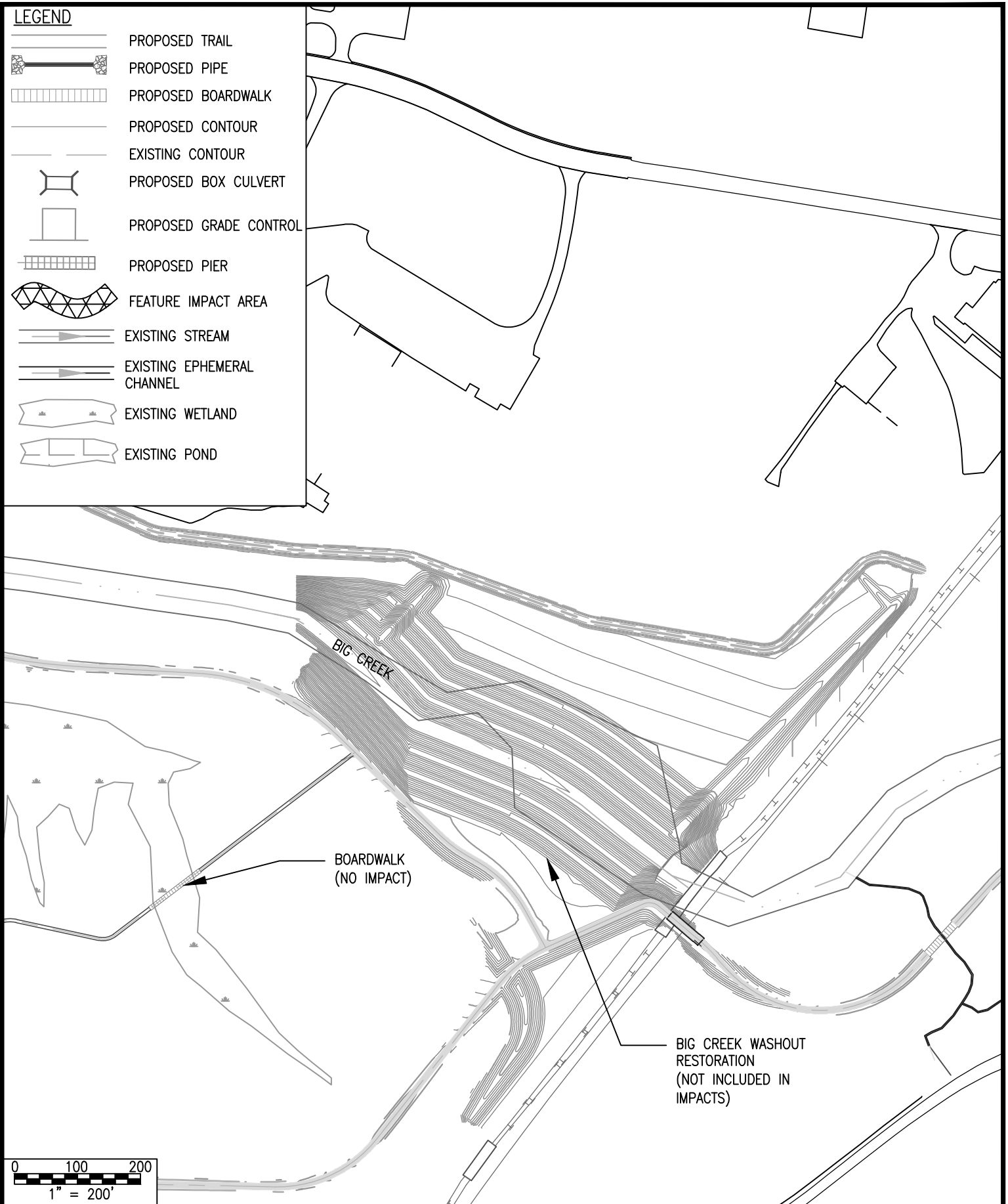
BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW
LOCATION: MILLINGTON, TN

PROJECT #:
57802.00
DATE:
OCTOBER 2019

LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND



0 100 200
1" = 200'



1:100








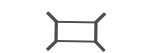




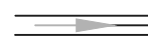


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ENVIRONMENTAL CONSULTANTS

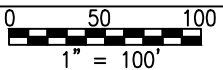
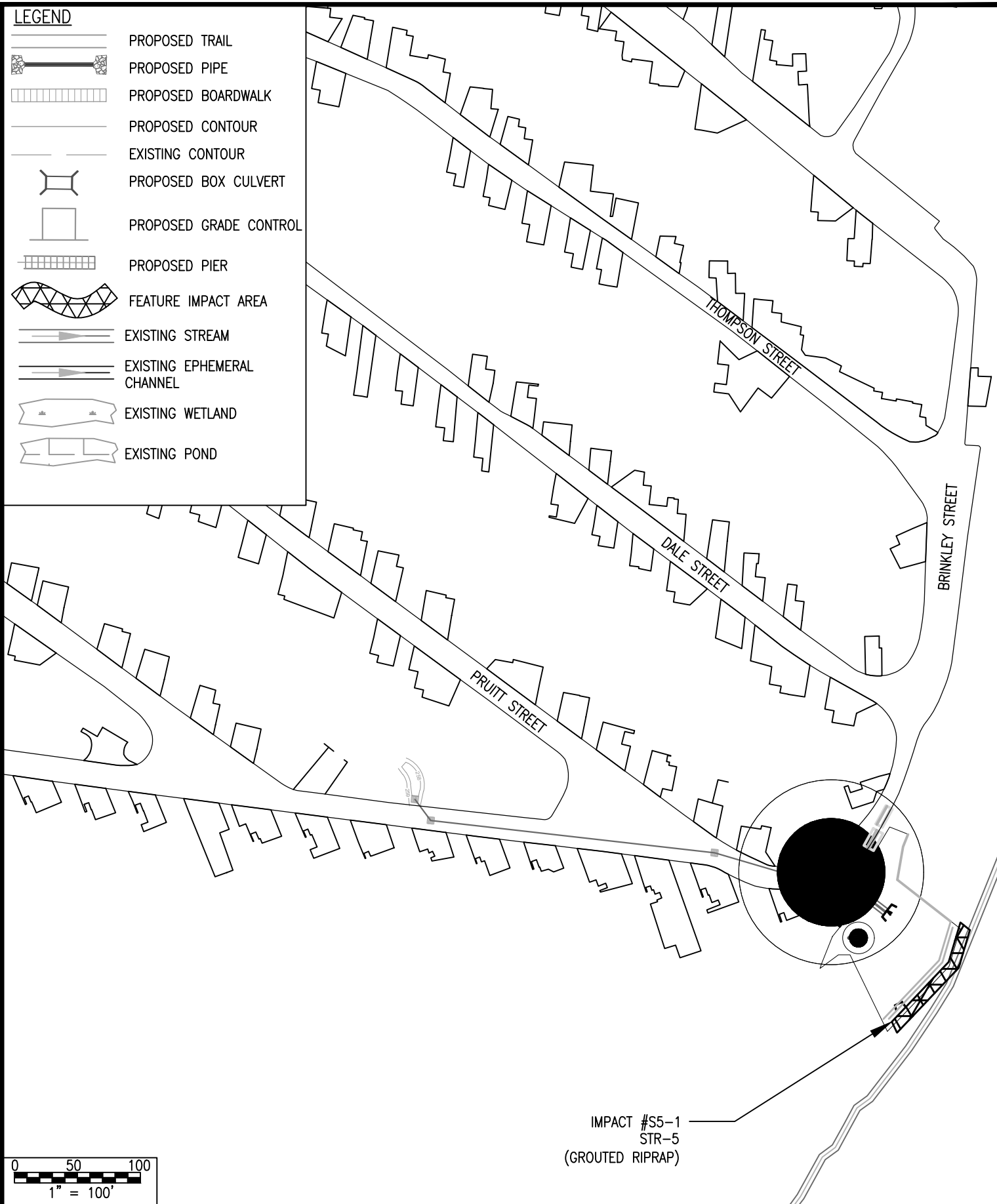
BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW
LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00
DATE:
OCTOBER 2019

LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND








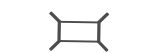







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ENVIRONMENTAL CONSULTANTS

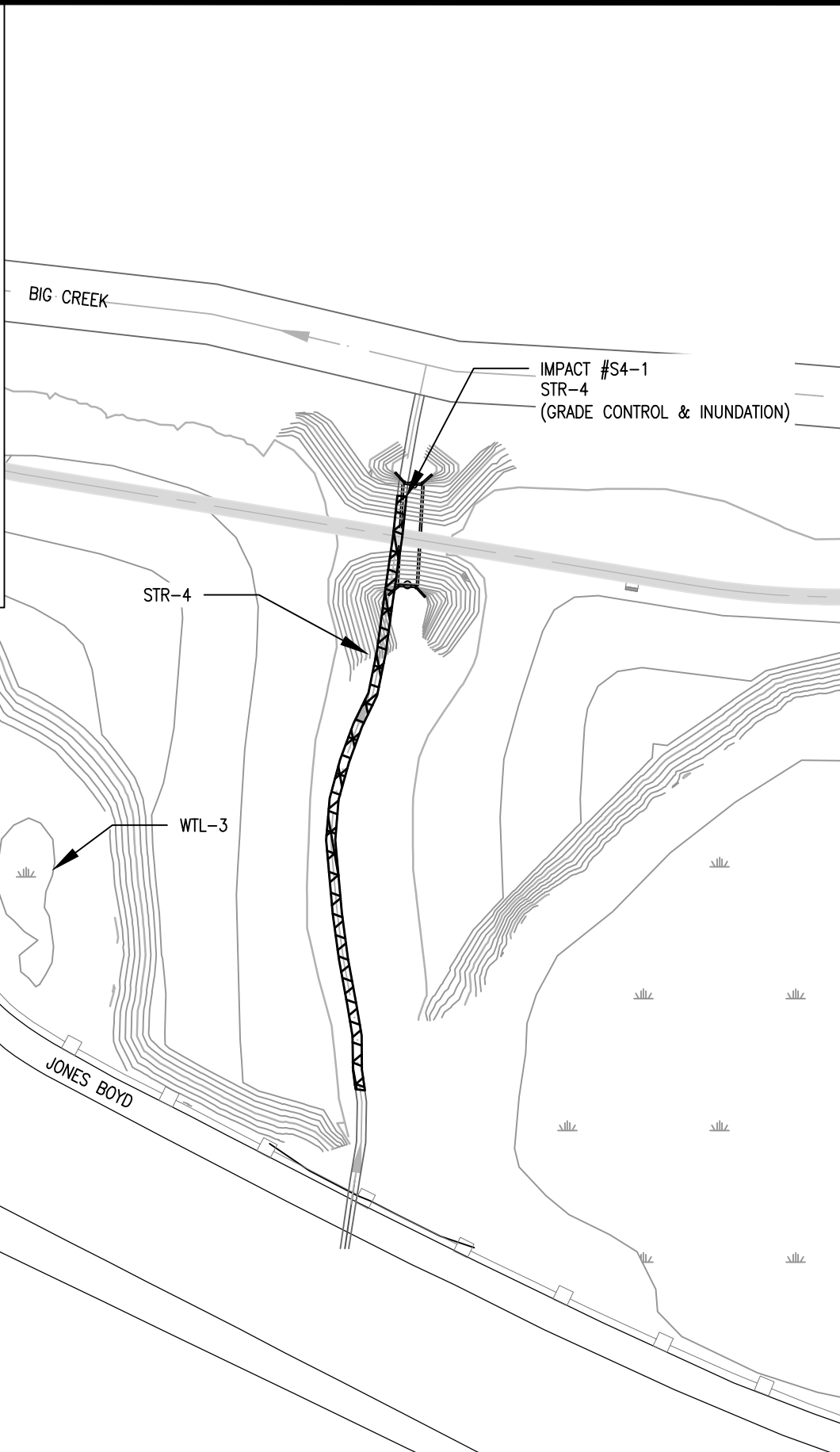
BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW
LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00
DATE:
OCTOBER 2019

LEGEND

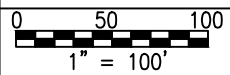
-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND



IMPACT #S4-1
STR-4
(GRADE CONTROL & INUNDATION)

STR-4

WTL-3






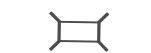









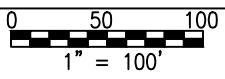
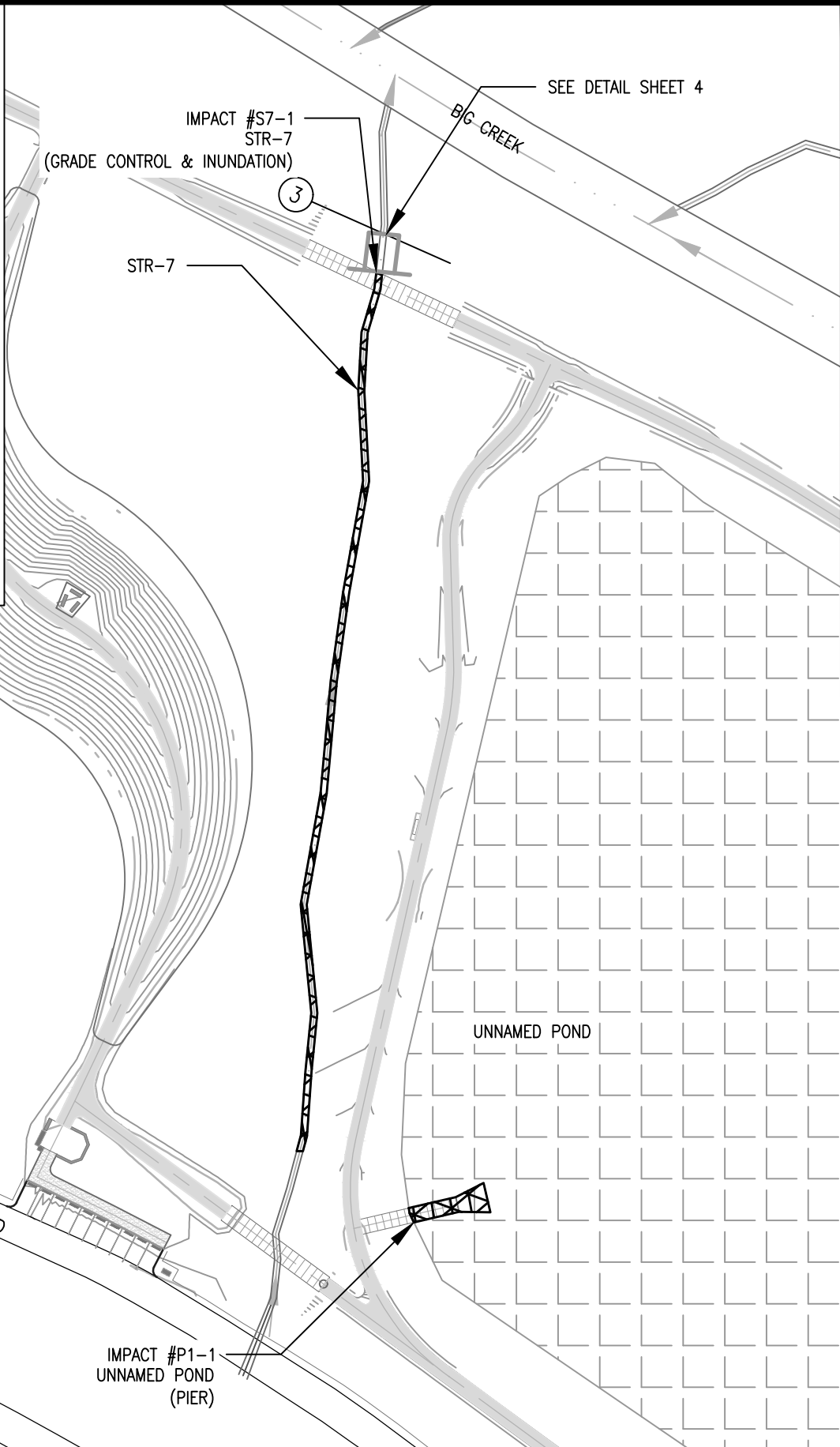
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ENVIRONMENTAL CONSULTANTS

BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION: INDIVIDUAL IMPACTS PLAN VIEW	PROJECT #: 57802.00
LOCATION: MILLINGTON, TN	DATE: OCTOBER 2019

LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND



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BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION: INDIVIDUAL IMPACTS PLAN VIEW	PROJECT #: 57802.00
LOCATION: MILLINGTON, TN	DATE: OCTOBER 2019

1:100



0 50 100
1" = 100'

Tiooga
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**BIG CREEK WETLAND & RECREATION AREA
JURISDICTIONAL WATERS PERMITTING**

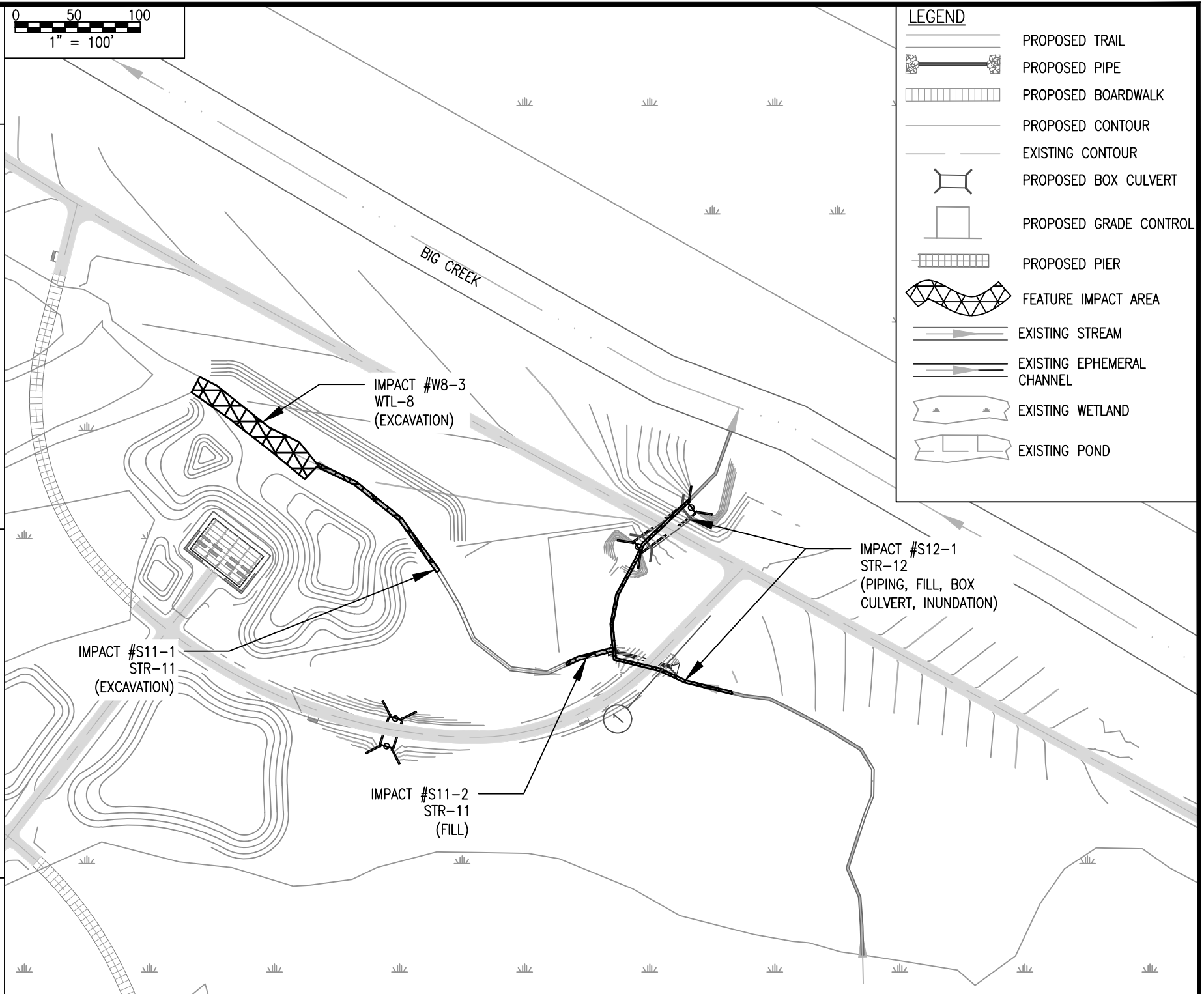
DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW

LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00

DATE:
OCTOBER 2019

16





0 50 100
1" = 100'



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ENVIRONMENTAL CONSULTANTS

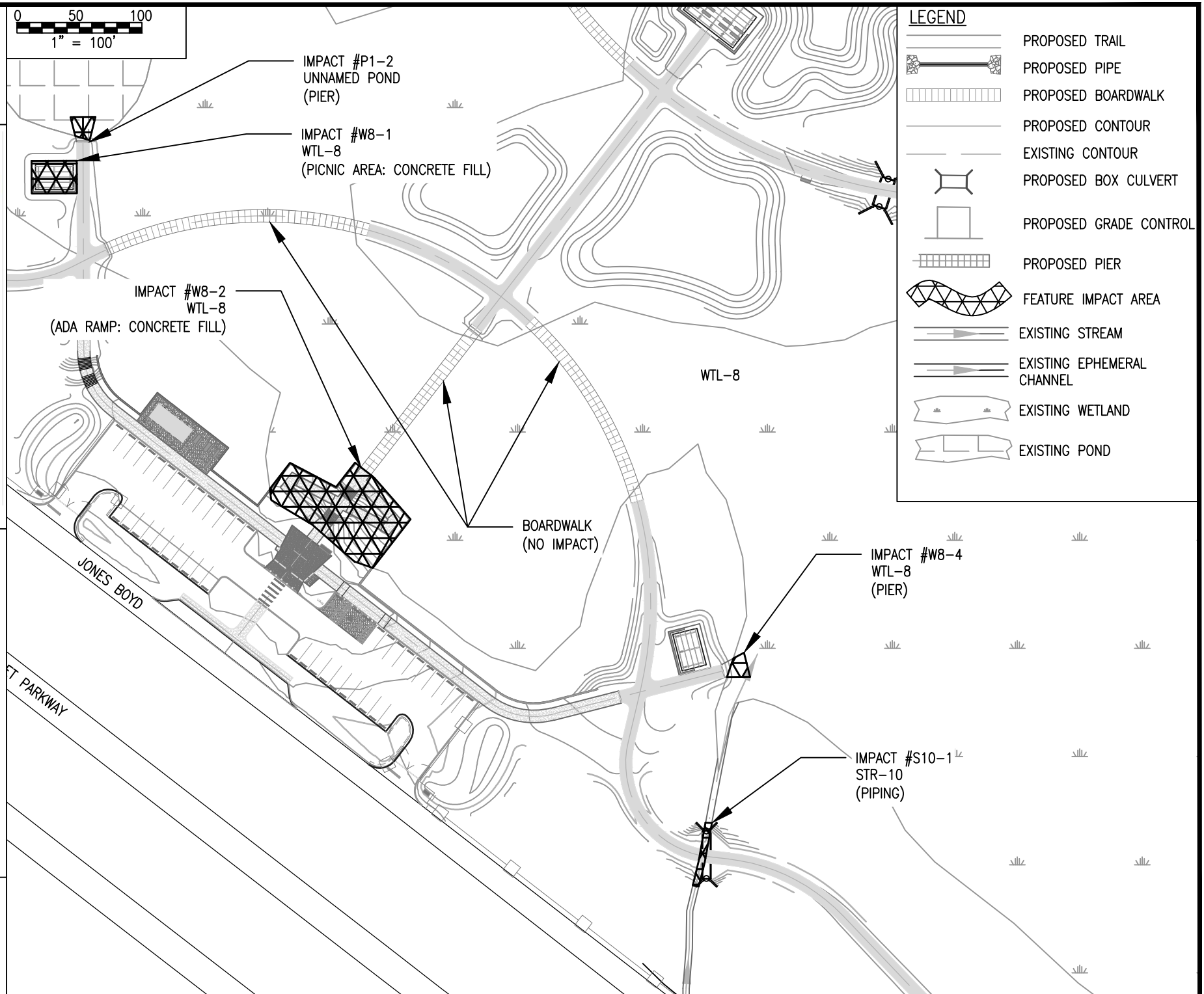
**BIG CREEK WETLAND & RECREATION AREA
JURISDICTIONAL WATERS PERMITTING**

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW

LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00

DATE:
OCTOBER 2019



1:200



0 100 200
1" = 200'



Tiooga
ENVIRONMENTAL CONSULTANTS

**BIG CREEK WETLAND & RECREATION AREA
JURISDICTIONAL WATERS PERMITTING**

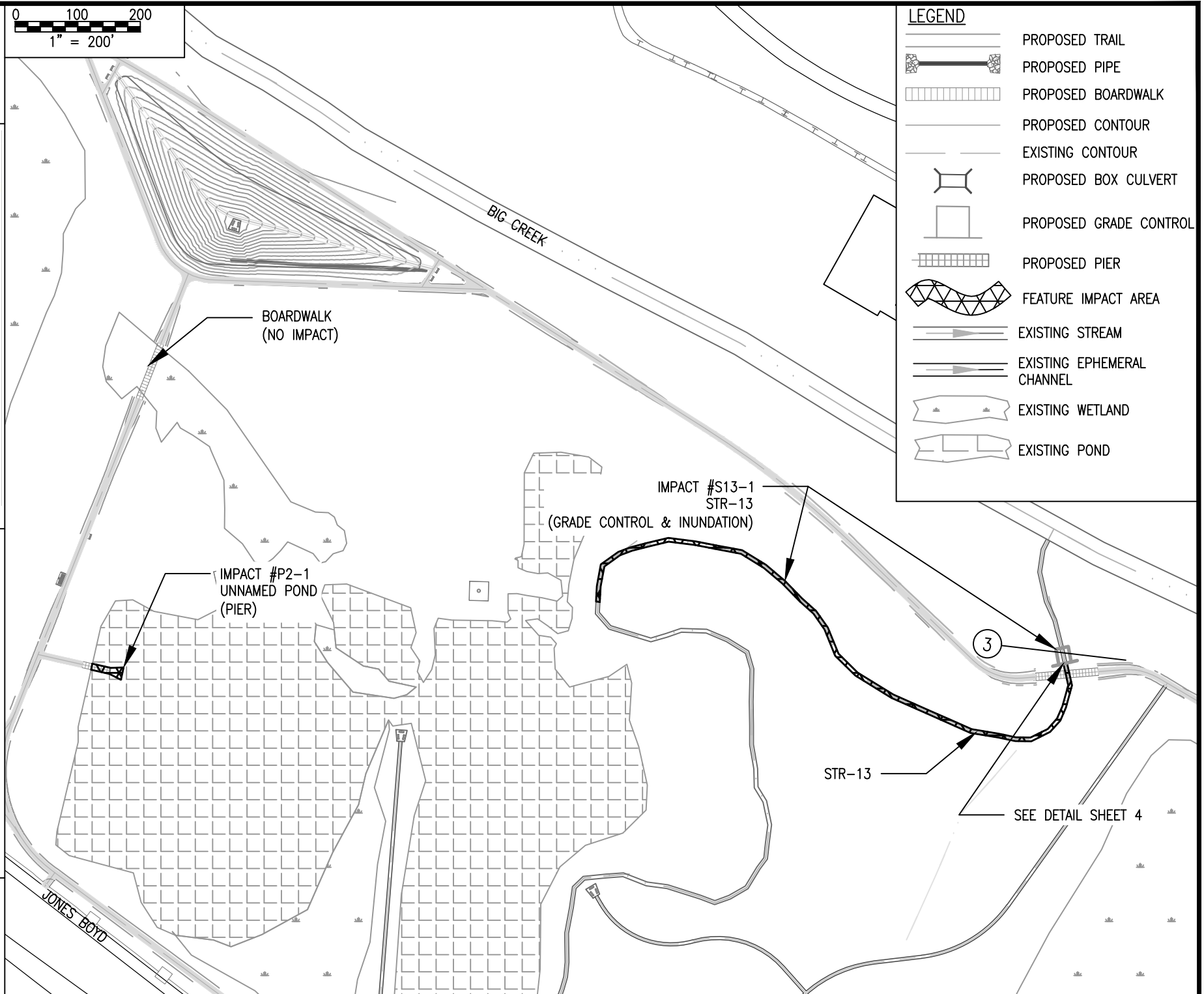
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INDIVIDUAL IMPACTS PLAN VIEW

LOCATION:
MILLINGTON, TN














PROJECT #:
57802.00

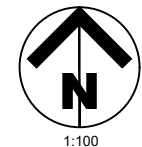
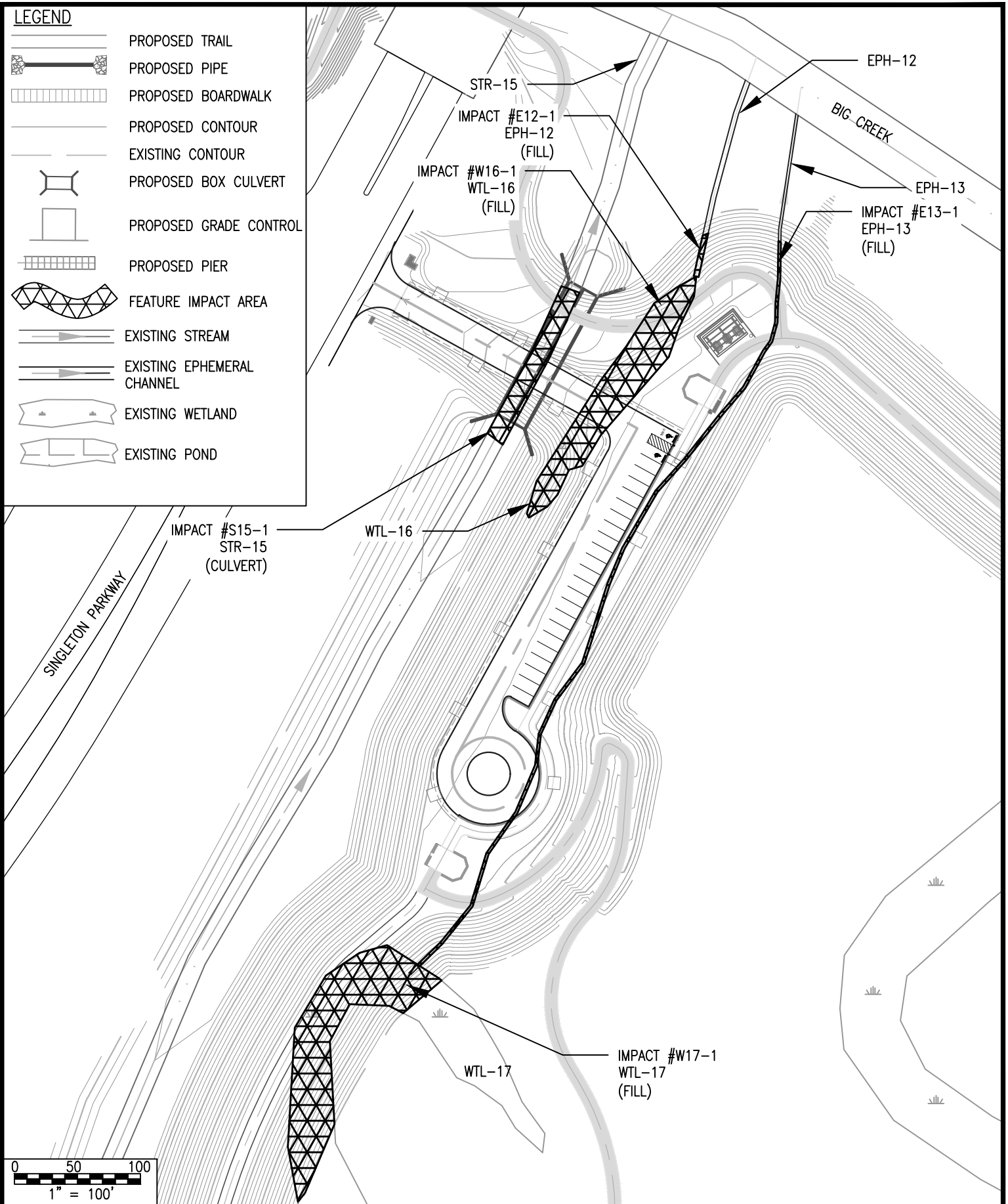
DATE:
OCTOBER 2019

18



LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND
















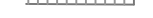
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ENVIRONMENTAL CONSULTANTS

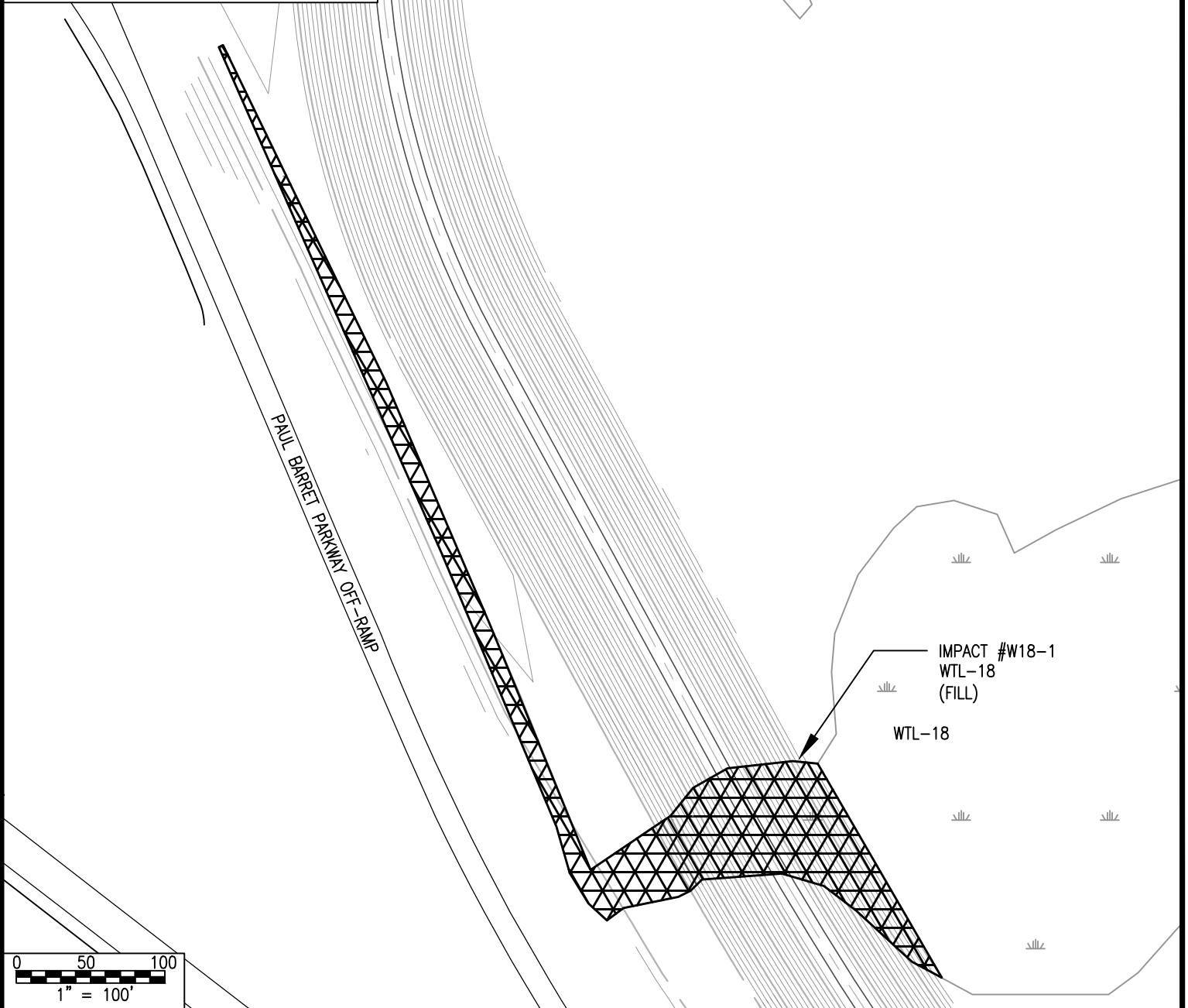
BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW
LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00
DATE:
OCTOBER 2019

LEGEND

	PROPOSED TRAIL		EXISTING STREAM
	PROPOSED PIPE		EXISTING EPHEMERAL CHANNEL
	PROPOSED BOARDWALK		EXISTING WETLAND
	PROPOSED CONTOUR		EXISTING POND
	EXISTING CONTOUR		
	PROPOSED BOX CULVERT		
	PROPOSED GRADE CONTROL		
	PROPOSED PIER		
	FEATURE IMPACT AREA		
	EXISTING STREAM		



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BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW
LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00
DATE:
OCTOBER 2019

1:100



0 50 100
1" = 100'



Tioqa
ENVIRONMENTAL CONSULTANTS

**BIG CREEK WETLAND & RECREATION AREA
JURISDICTIONAL WATERS PERMITTING**

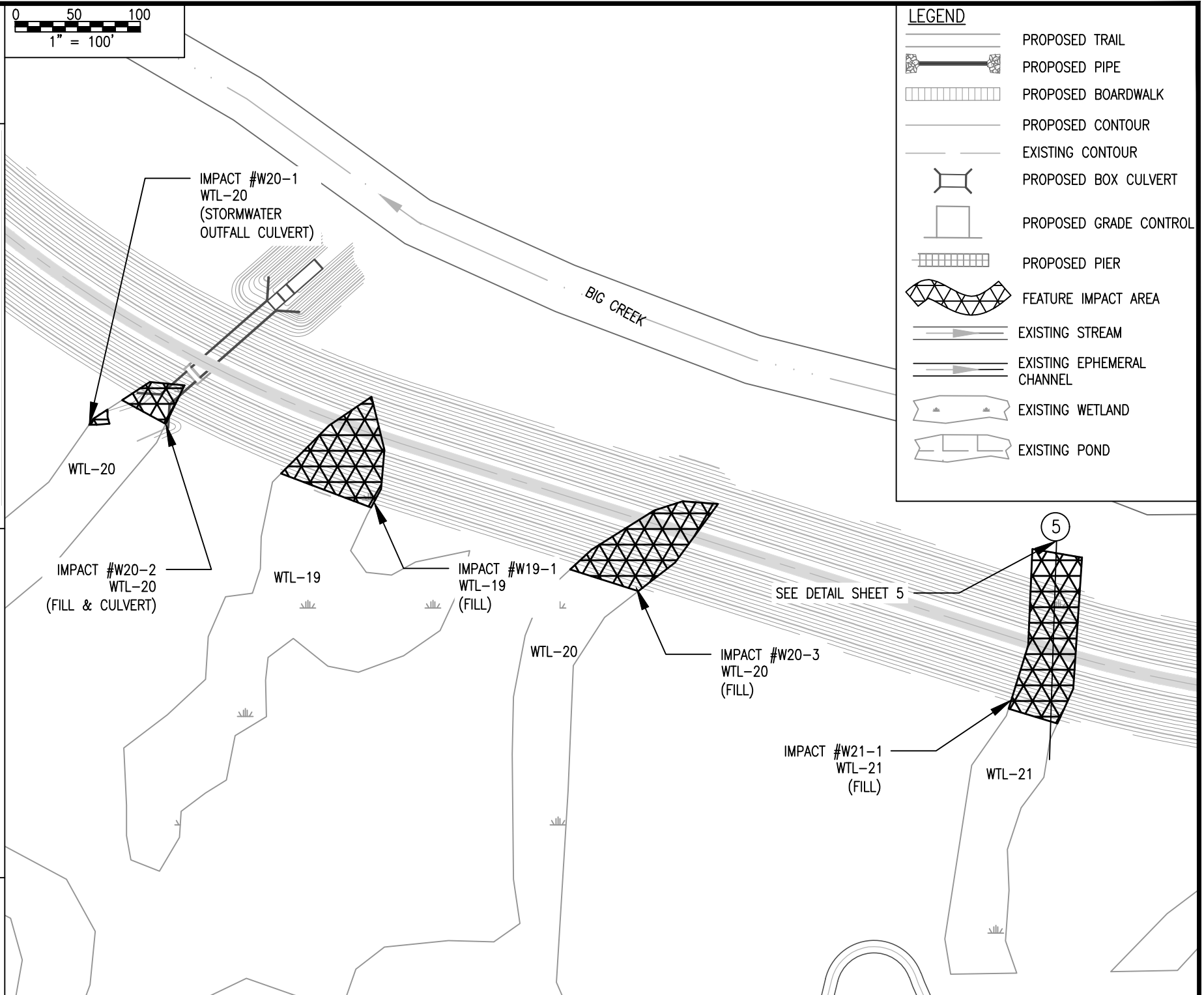
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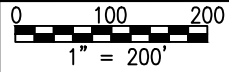
LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00

DATE:
OCTOBER 2019

21





Tioqa
ENVIRONMENTAL CONSULTANTS

**BIG CREEK WETLAND & RECREATION AREA
JURISDICTIONAL WATERS PERMITTING**











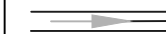


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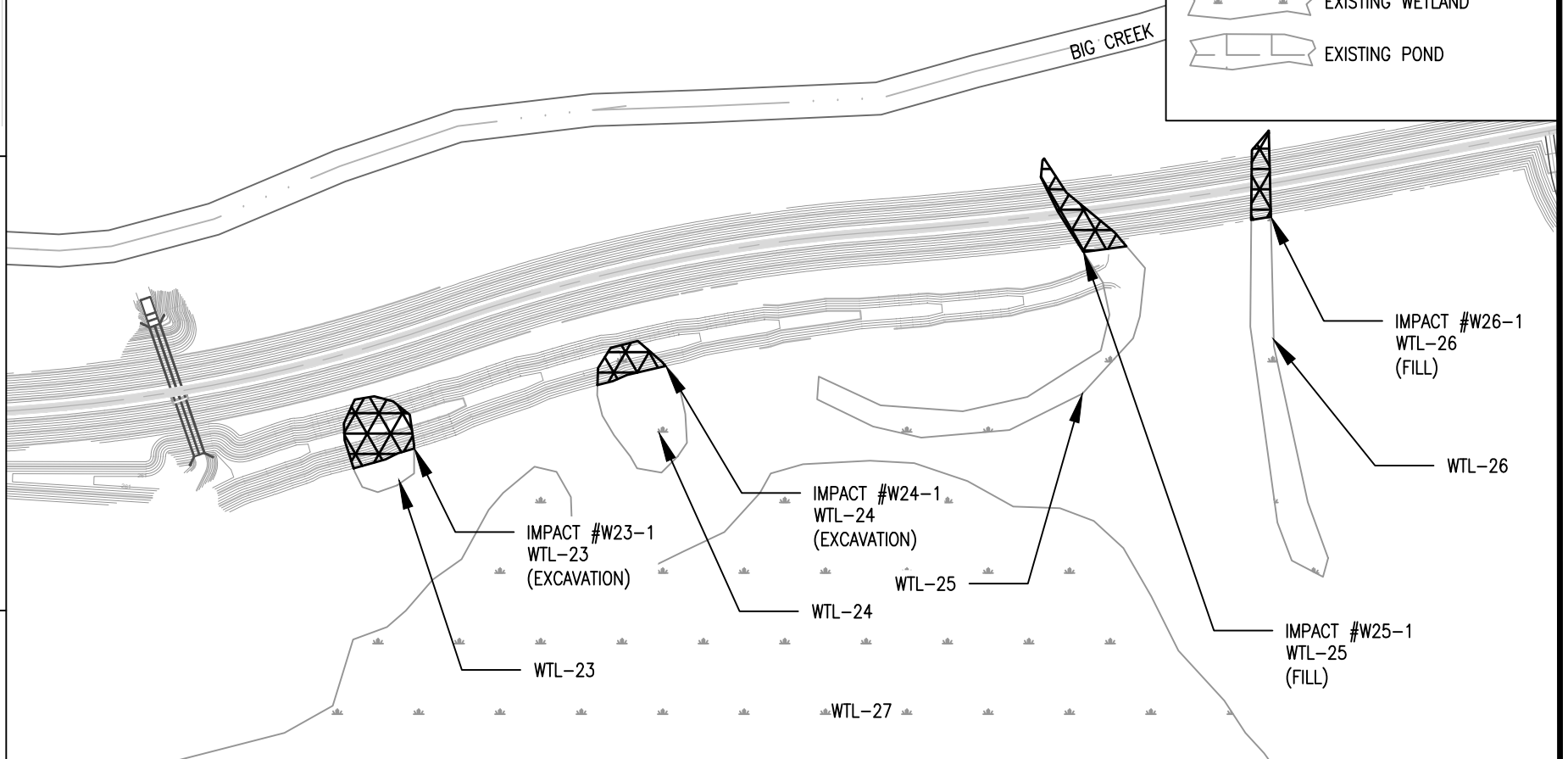
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MILLINGTON, TN

PROJECT #:
57802.00






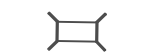







DATE:
OCTOBER 2019

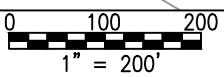
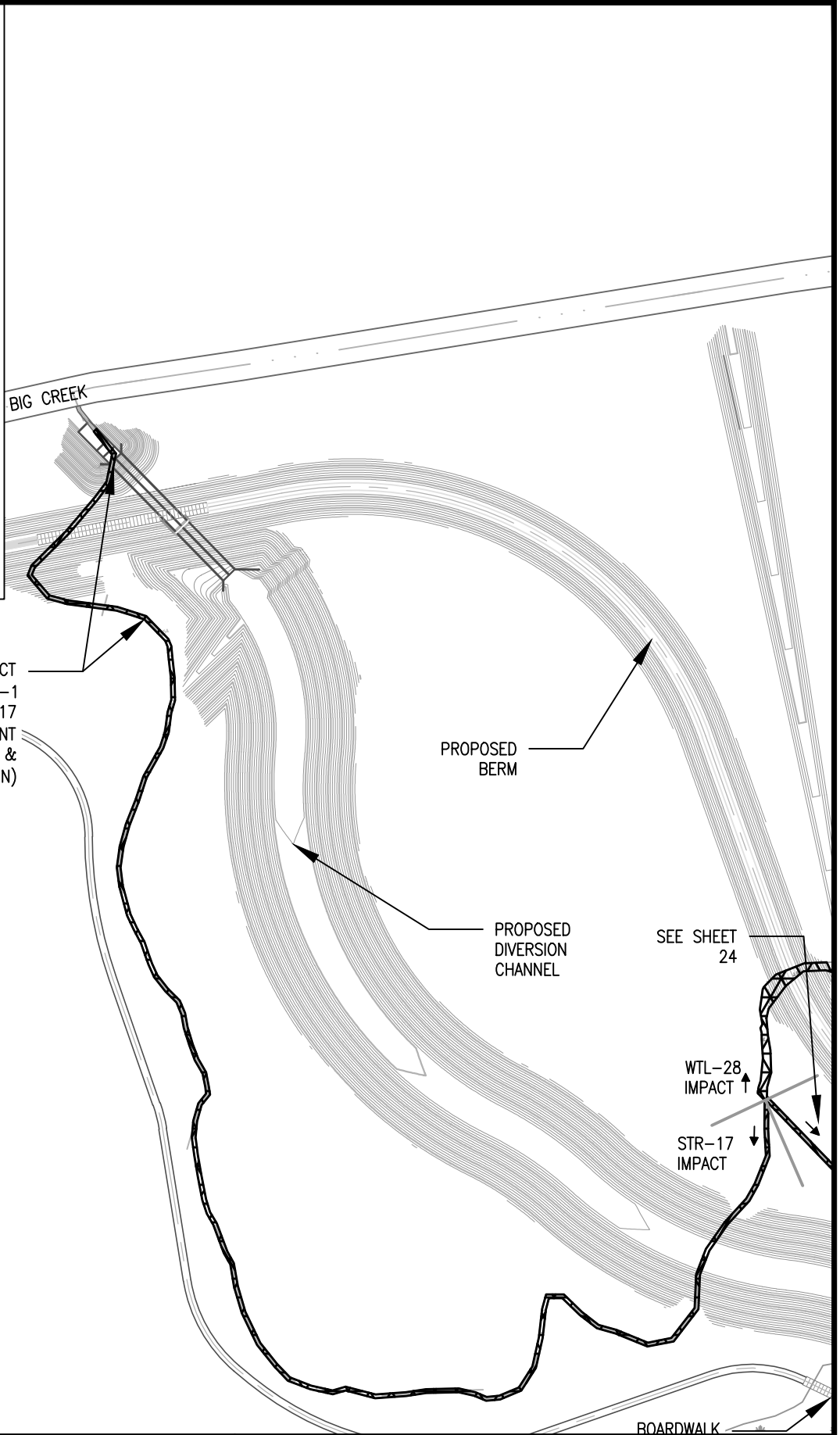
LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND



LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND



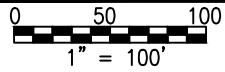
Tioga
ENVIRONMENTAL CONSULTANTS

BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW
LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00
DATE:
OCTOBER 2019

1:100



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ENVIRONMENTAL CONSULTANTS

**BIG CREEK WETLAND & RECREATION AREA
JURISDICTIONAL WATERS PERMITTING**

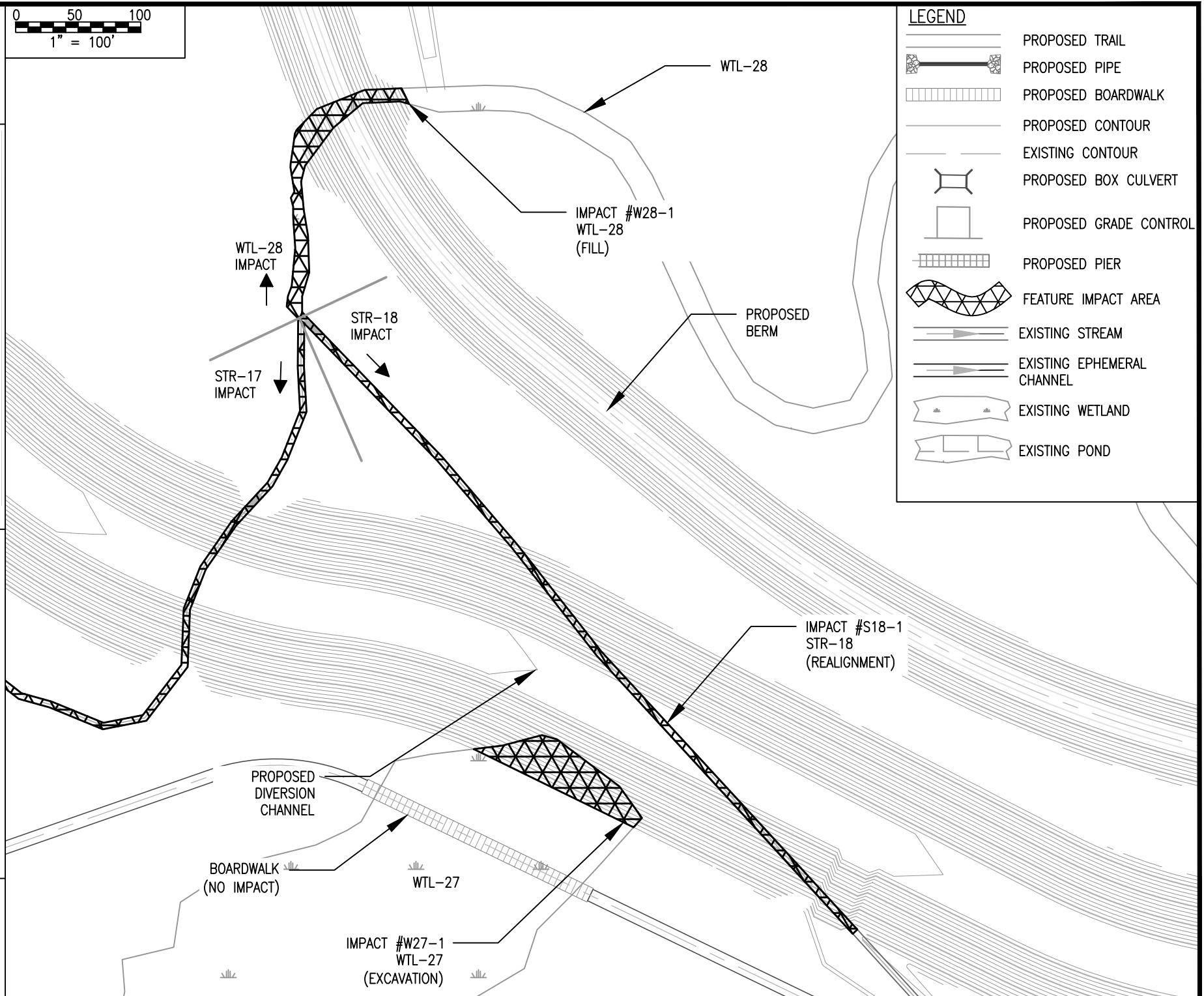
DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW

LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00

DATE:
OCTOBER 2019

24



LEGEND

- PROPOSED TRAIL
- PROPOSED PIPE
- PROPOSED BOARDWALK
- PROPOSED CONTOUR
- EXISTING CONTOUR
- PROPOSED BOX CULVERT
- PROPOSED GRADE CONTROL
- PROPOSED PIER
- FEATURE IMPACT AREA
- EXISTING STREAM
- EXISTING EPHEMERAL CHANNEL
- EXISTING WETLAND
- EXISTING POND

1:200



0 100 200
1" = 200'



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ENVIRONMENTAL CONSULTANTS

**BIG CREEK WETLAND & RECREATION AREA
JURISDICTIONAL WATERS PERMITTING**

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW

LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00

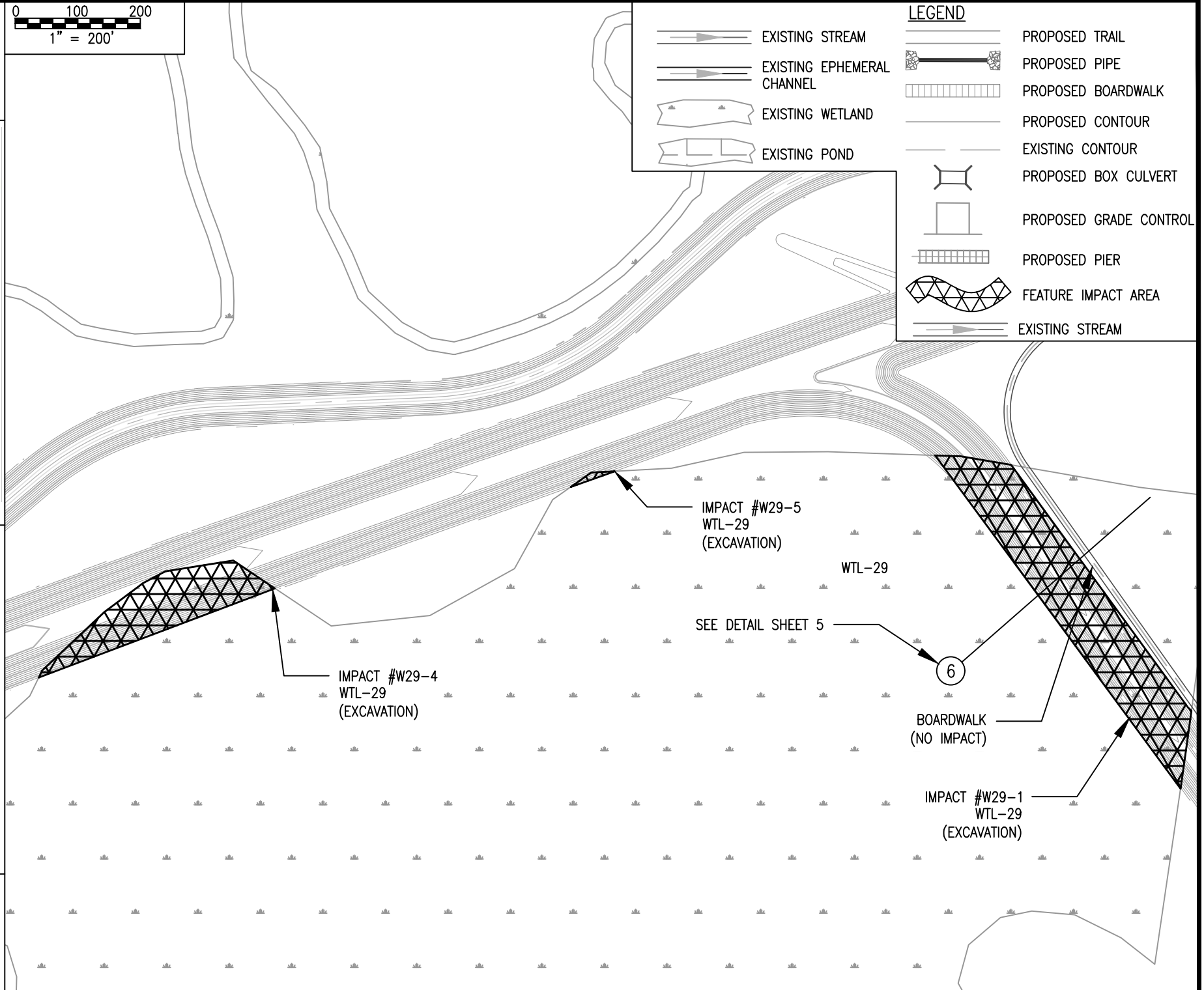
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OCTOBER 2019

25






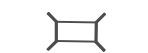







- EXISTING STREAM
- EXISTING EPHEMERAL CHANNEL
- EXISTING WETLAND
- EXISTING POND

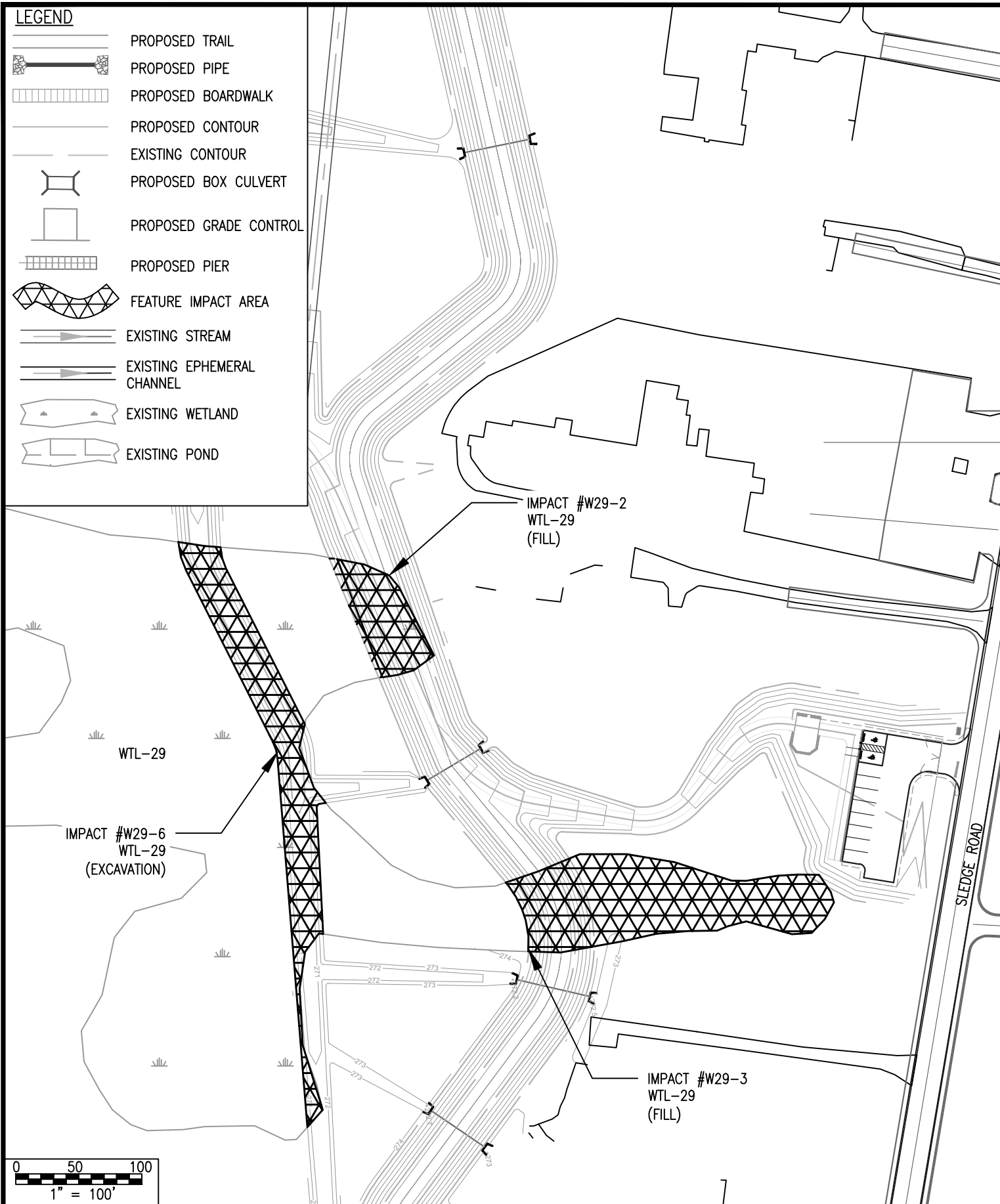
LEGEND

- PROPOSED TRAIL
- PROPOSED PIPE
- PROPOSED BOARDWALK
- PROPOSED CONTOUR
- EXISTING CONTOUR
- PROPOSED BOX CULVERT
- PROPOSED GRADE CONTROL
- PROPOSED PIER
- FEATURE IMPACT AREA
- EXISTING STREAM



LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND








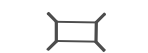




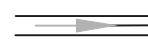


Tioga
ENVIRONMENTAL CONSULTANTS

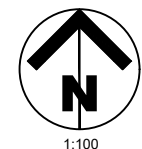
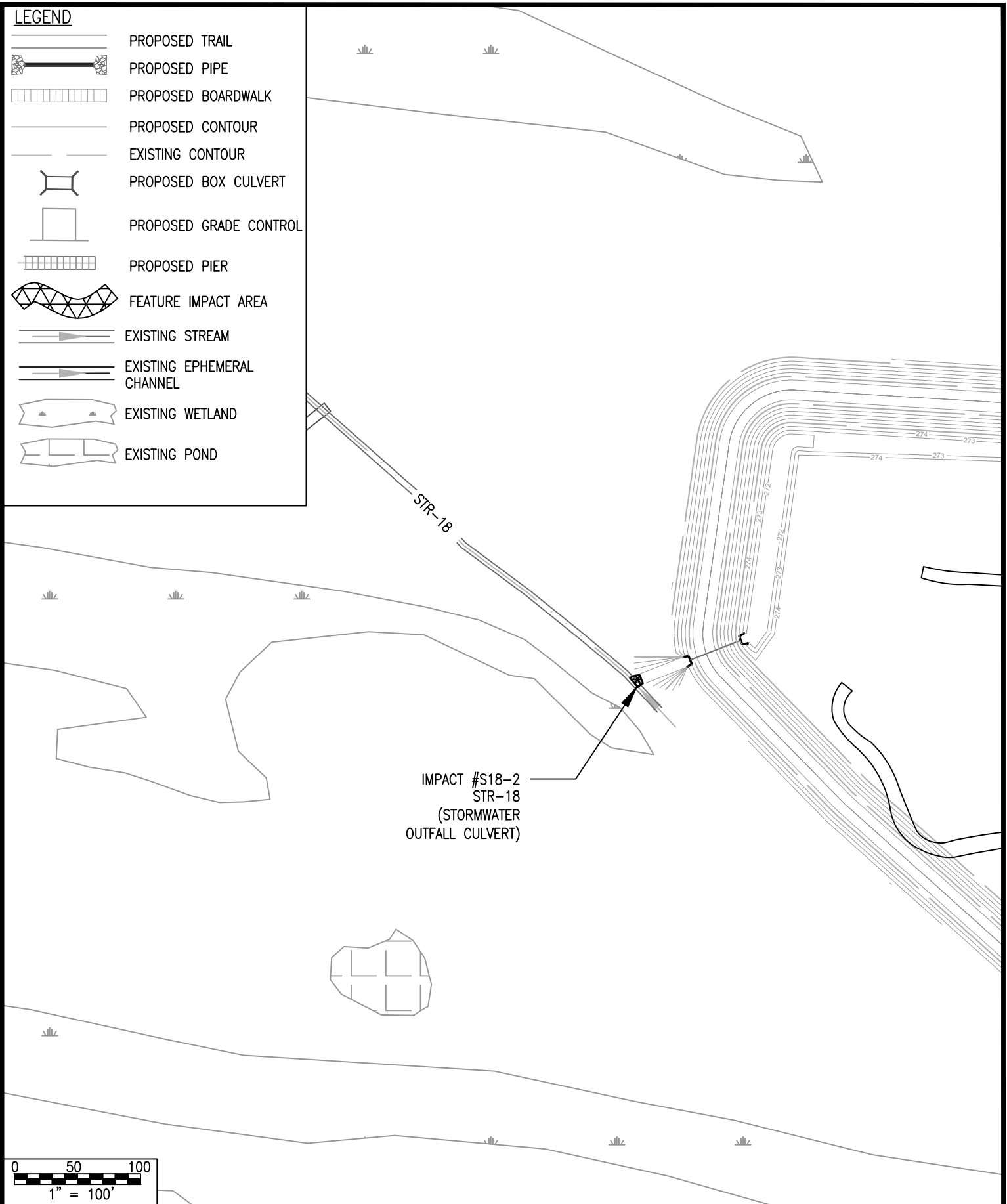
BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW
LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00
DATE:
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LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
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-  EXISTING WETLAND
-  EXISTING POND








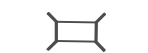







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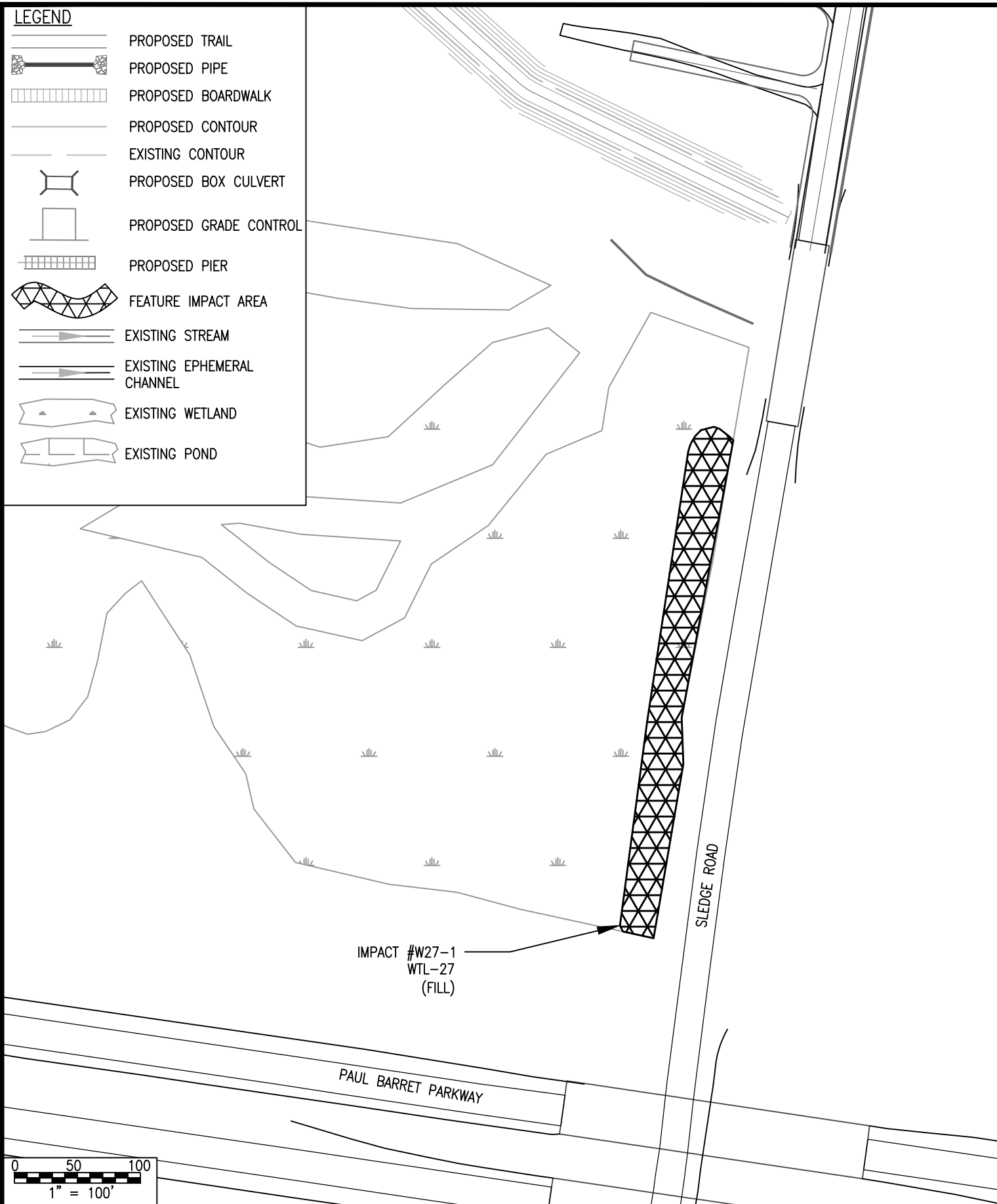
BIG CREEK WETLAND & RECREATION AREA JURISDICTIONAL WATERS PERMITTING

DESCRIPTION:
INDIVIDUAL IMPACTS PLAN VIEW
LOCATION:
MILLINGTON, TN

PROJECT #:
57802.00
DATE:
OCTOBER 2019

LEGEND

-  PROPOSED TRAIL
-  PROPOSED PIPE
-  PROPOSED BOARDWALK
-  PROPOSED CONTOUR
-  EXISTING CONTOUR
-  PROPOSED BOX CULVERT
-  PROPOSED GRADE CONTROL
-  PROPOSED PIER
-  FEATURE IMPACT AREA
-  EXISTING STREAM
-  EXISTING EPHEMERAL CHANNEL
-  EXISTING WETLAND
-  EXISTING POND



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