



Hardwick, Steven <steven.hardwick@deq.virginia.gov>

Mountain Valley's Response to Request for Additional Information (2), JPA 21-04161 message

Hoover, Matthew S. <MHoover@equitransmidstream.com>

Fri, May 14, 2021 at 1:50 PM

To: "steven.hardwick@deq.virginia.gov" <steven.hardwick@deq.virginia.gov>, "randy.owen@mrc.virginia.gov"

<randy.owen@mrc.virginia.gov>

Cc: "Chalmers, Cory M." <CChalmers@equitransmidstream.com>, "Todd Miller (todd.m.miller@usace.army.mil)"

<todd.m.miller@usace.army.mil>, "Fannin, Adam E CIV USARMY CELRH (USA)" <Adam.E.Fannin@usace.army.mil>, "Pero,

Vincent D CIV USARMY CENAO (USA)" <Vincent.D.Pero@usace.army.mil>, "Jared Pritts (Jared.N.Pritts@usace.army.mil)"

<Jared.N.Pritts@usace.army.mil>

Mr. Hardwick,

Mountain Valley respectfully submits the information associated with your April 30th Request for Additional Information. Please do not hesitate to contact me if you have any questions or need additional information.

Sincerely,

Matt Hoover

Environmental Permitting Supervisor

2200 Energy Drive, 2nd Floor

Canonsburg, PA 15317

Office: (724) 873-3009

Cell: (412) 258-5627

**MVP DEQ RAI JPA 21-0416_Response 2_051421.pdf**

8765K



May 14, 2021

By email: steven.hardwick@deq.virginia.gov

Commonwealth of Virginia
Department of Environmental Quality
ATTN: Steve Hardwick
1111 East Main Street, Suite 1400
Richmond, Virginia 23219

Re: Joint Permit Application No. 21-0416
Mountain Valley Pipeline Project, Giles County, Craig County, Montgomery County, Roanoke
County, Franklin County, Pittsylvania County, Virginia
Response to Additional Information Request Letter (2)

Dear Mr. Hardwick:

This letter is in response to the April 30, 2021 "Additional Information Request Letter (2)" provided to Mountain Valley Pipeline LLC (Mountain Valley or MVP) by the Virginia Department of Environmental Quality's (VDEQ). Mountain Valley respectfully submits the requested information. Based on this submission, it is Mountain Valley's understanding that the application is complete and that VDEQ can proceed with the appropriate reviews.

VDEQ Comment No. 1: Based on the review of Table B-1. Stream Impacts_VA_20210414_revised, Attachment H-3_Virginia Plan and Profile Crossing Drawings, Figure 4 Detail Maps, and other submitted materials, please provide the following information:

- (a) Stream ID Numbers S-S5-Braid-2, S-S5-Braid-1, and S-S5: Table 15 Crossing Method Determination Study Rev 3-1-21 states that the proposed crossing method is a dry ditch, open cut. However, Table 15's Rationale Discussion, and Detail Map 4-536, appear to imply MVP will use a conventional bore to cross these locations. Please clarify the proposed crossing method;

MVP Response: The referenced entry in Table 15 was in error. S-S5 will be crossed via conventional bore. S-S5 (Stony Creek) is VMRC jurisdictional and was permitted under VMRC permit #2017-1609 using the conventional bore method. S-S5 is not included in the February 2021 VMRC permit modification and will therefore remain as conventional bore crossing method covered under the original VMRC authorization. Table 15 will be corrected to indicate the Proposed Crossing Method will be conventional bore. Also note that Mountain Valley identified four other entries in Table 15 that had errors – three in West Virginia and one in Virginia (crossing H-019). This update did not affect the other tables associated with the project.

- (b) Stream ID Number S-YZ1, Doe Creek (Detail Map 4-546), is an intermittent stream running immediately adjacent to the west edge of proposed temporary access road MVP-GI-241.03. Plan Sheet S-YZ1 does not clearly depict the proposed impact. Table B-1 reports three separate impact locations for S-YZ1. On the plan sheet, the road appears to encroach upon the streambed in several locations; however, there is no hatching to indicate impacts versus running along the proposed

roads edge. Please provide clarification or a revised plan sheet illustrating the proposed impacts to stream S-YZ1;

MVP Response: Corrected plan sheets are provided. S-YZ1 runs parallel to MVP-GI-241.03 but only encroaches into the existing two-track road at one location. There is a 102-foot temporary impact at that location due to the placement of timber mats. For the remainder of the road, the sections of S-YZ1 that overlap with the limits-of-disturbance are outside of the existing road and will not be impacted. As shown on the plan sheets, compost filter sock will be installed to protect the stream and avoid inadvertent impacts. Note also that the existing culvert at the entrance of MVP-GI-241.03 was installed prior to MVP's proposed use of the road and will not be modified. Table B-1 has been revised to reflect that the timber mat is the only impact to S-YZ1.

- (c) Stream ID Number S-E25-Downstream, UNT to Sinking Creek (Detail Map 4-553) plan sheet not found. This stream may be unlabeled on plan sheets G-019A or G- 019B. Please clarify or provide a revised plan sheet;

MVP Response: A corrected plan sheet showing S-E25-Downstream (Plan and Profile) was submitted on February 19, 2021. However, the S-E25-Downstream label was omitted from Figure G019A. A corrected version of Figure G019A is attached to this response.

- (d) Stream S-IJ16-a, UNT to Sinking Creek (Detail Map 4-559): The indicated flow line on plan sheet S-IJ16-a appears to run against the apparent topographic gradient. Additionally, the plan sheet does not appear to depict the temporary versus permanent impact locations as listed in Table B-1. Please provide clarification or a revised plan sheet confirming the indicated flow direction for this stream, and depicting temporary versus permanent impacts;

MVP Response: Corrected Figures for S-IJ16 (Detail Map 4-559 and Plan/Profile drawing) are attached to this response. The drawing has been revised to show the correct flow direction and a 31-foot-long permanent impact associated with a box culvert. No changes to Table B-1 were necessary.

- (e) The plan sheet for S-QQ3, UNT to Sinking Creek (Detail Map 4-560) appears to be missing. Please provide clarification or submit a plan sheet;

MVP Response: The plan sheet for the proposed impact to S-QQ3 was inadvertently omitted. It is attached to this response. No changes to Table B-1 were necessary.

- (f) The plan sheet labeled S-MM17 – WMM10 (Detail Map 4-569) depicts a stream labeled S-G38. Please provide clarification or a revised plan sheet;

MVP Response: The stream label was an error. A corrected plan sheet S-MM17-WMM10 is attached to this response.

- (g) Plan sheet SG-40 (Detail Map 4-603) does not show the footprint of the pipe trench. Please clarify the proposed conditions at this crossing or provide a revised plan sheet;

MVP Response: Mountain Valley did not include previously completed impacts on the profile sheets. The pipeline was installed under S-G40 in 2018, and all impacts associated with excavation of the trench and installation of the pipeline under this stream were completed at that time. The completed impact is noted on Table 10 of the Individual Permit

Application. The only proposed impact at this location is a "Timber Mat Crossing," which is shown on the referenced plan sheet and is noted on Table B-1.

- (h) Plan sheet S-PP23 (Detail Map 4-604) does not show the footprint of the pipe trench. Please clarify the proposed conditions at this crossing or provide a revised plan sheet;

MVP Response: Mountain Valley did not include previously completed impacts on the profile sheets. The pipeline was installed under S-PP23 in 2018, and all impacts associated with excavation of the trench and installation of the pipeline under this stream were completed at that time. The completed impact is noted on Table 10 of the Individual Permit Application. The only proposed impact at this location is a "Timber Mat Crossing," which is shown on the referenced plan sheet and is noted on Table B-1

- (i) Stream S-Y7, UNT to Mill Creek (Detail Map 4-656): the plan sheet depicts two separate streams both labeled S-Y8. Please clarify or provide a revised plan sheet;

MVP Response: One of the two streams labeled S-Y8 should have been labeled S-Y7. A corrected plan sheet is attached.

- (j) Stream ID Number S-B21, UNT to Mill Creek, (Detail Map 4-569) plan sheet not found. Please clarify or provide a plan sheet;

MVP Response: An updated plan sheet for S-B21 stream crossing is attached.

- (k) Plan sheet S-IJ10 (Detail Map 4-681) does not show the footprint of the pipe trench. Please clarify the proposed conditions at this crossing or provide a revised plan sheet;

MVP Response: Mountain Valley did not include previously completed impacts on the profile sheets. The pipeline was installed under S-IJ10 in 2018, and all impacts associated with excavation of the trench and installation of the pipeline under this stream were completed at that time. The completed impact is noted on Table 10 of the Individual Permit Application. The only proposed impact at this location is a "Timber Mat Crossing," which is shown on the referenced plan sheet and is noted on Table B-1.

- (l) Stream ID S-E28, Teel's Creek (Detail Map 4-687): plan sheet I-005B appears three times in Table B-1 with three different impact totals. Please clarify the impacts at this crossing;

MVP Response: S-E28 (Teel's Creek) is crossed multiple times by the Project and this is illustrated on Detail Maps 4-587 and 4-590. The impacts are correctly summarized on the tables.

- (m) Stream ID S-GH4, UNT to Teel's Creek (Detail Map 4-688): plan sheet not found. Please clarify or provide a plan sheet;

MVP Response: S-GH4 is displayed on sheet I-001A.

- (n) Stream ID S-GH3, UNT to Teel's Creek (Detail Map 4-688): plan sheet not found. Please clarify or provide a plan sheet;

MVP Response: S-GH3 is displayed on sheet I-001A.

- (o) Stream ID S-D18, UNT to Teel's Creek (Detail Map 4-694): plan sheet not found. Please clarify or provide a plan sheet;

MVP Response: The plan sheet for the proposed impact to S-D18 was inadvertently omitted. It is attached to this response. No changes to Table B-1 were necessary.

- (p) Stream ID S-D20, UNT to Teel's Creek (Detail Map 4-694): plan sheet not found. Please clarify or provide a plan sheet;

MVP Response: The plan sheet for the proposed impact to S-D20 was inadvertently omitted. It is attached to this response. No changes to Table B-1 were necessary.

- (q) Stream ID S-KL38, UNT to Blackwater River (Detail Map 4-702): plan sheet I-022: the plan sheet depicts a dry ditch crossing of S-KL38 by the pipeline; however, Detail Map 4-702 shows this crossing as a culvert on an access road. Please clarify;

MVP Response: There are two crossings of S-KL38. There is a culvert on the access road depicted on Detail Map 4-702. S-KL38 also crosses the pipeline right-of-way, as depicted on Detail Map 4-703. S-KL38 is proposed to be crossed via open-cut construction method as shown in Plan & Profile sheet I-022 submitted February 19, 2021.

- (r) Stream ID S-G22, UNT to Poplar Camp Creek (Detail Map 4-723): S-G22 not found on plan sheet I-047. Please clarify or revise plan sheet I-047 with a label for S-G22;

MVP Response: S-G22 was incorrectly labeled S-G21. A corrected plan sheet is attached.

- (s) Stream ID S-CC1, Cherrystone Creek (Detail Map 4-769): plan sheet not found. Please clarify or provide a plan sheet;

MVP Response: S-CC1, as depicted on Detail Map 4-769, is shown in Plan & Profile sheet I-101B, submitted February 19, 2021.

- (t) Stream ID S-H3, UNT to Little Cherrystone Creek (Detail Map 4-783): plan sheet not found. Please clarify or provide a plan sheet.

MVP Response: The plan sheet for the proposed impact to S-H3 was inadvertently omitted. It is attached to this response. No changes to Table B-2 were necessary.

VDEQ Comment No. 2: Based on the review of Table B-2. Wetland Impacts_VA_20210414_revised, Attachment H-3_Virginia Plan and Profile Crossing Drawings, Figure 4 Detail Maps, and other submitted materials, please provide the following information:

- (a) Wetland ID W-MM10 (Detail Map 4-569) plan sheet S-MM17 – W-MM10: This crossing is located at the terminus of a temporary access road that ends in an apparent residential/farmyard. Does the road's purpose require this impact? Can the road end just prior to the wetland and associated stream to avoid this impact?

MVP Response: MVP-GI-253.03 is a pre-existing road that has been upgraded for use by the Project to facilitate pipeline construction. Although it appears the access road ends at the residential/farmyard, this is actually the entrance of the access road used to travel to the pipeline right-of-way. The stream and wetland are therefore unavoidable and must be

crossed as shown by Detail Map 4-569 and Plan & Profile sheet S-MM17–W-MM10, submitted February 19, 2021.

- (b) Wetland ID W-AD4 (Detail Map 4-569): temporary access road MVP-MN-266.03 impacts this wetland. Plan sheet W-AD4-A labels the feature as W-G4 on the plan view and W-EF6 on the profile view. Please clarify or revise the plan sheet. Additionally, the plan sheet hatching indicates a temporary impact related to a proposed timber mat; however, does not indicate an impact to the wetland located within the proposed roadway. Please clarify if the proposed access road will result in impacts to this wetland beyond the timber mat impact shown in the plan view;

MVP Response: Detail Map 4-569 has been updated to correctly illustrate the impacts to wetland W-AD4. The entire wetland within the LOD will be timbermatted.

- (c) Wetland ID W-C6 (Detail Map 4-610) plan sheet not found. Please clarify or provide a plan sheet;

MVP Response: The plan sheet for the proposed impact to W-C6 was inadvertently omitted. It is attached to this response. No changes to Table B-2 were necessary.

- (d) Wetland ID W-IJ96-PEM (Detail Map 4-650): temporary access road MVP RO-283 crosses this wetland buffer on perennial stream S-IJ85. Detail Map 4-650 indicates "permanent fill" for W-IJ96-PEM within the roadway, but Table B-2 lists only temporary impacts at this crossing. Please clarify;

MVP Response: Table B-2 is correct. Impacts to Wetland W-IJ96-PEM will only be temporary. An updated figure showing this impact as temporary was provided with the April 15, 2021 Request for Additional Information response from Mountain Valley.

- (e) Wetland W-IJ97 (Detail Map 4-650): detail Map 4-650 indicates temporary access road MVP RO-283 impacts wetland W-IJ97 with "permanent fill", but W-IJ97 does not appear on Table B-2 Wetland Impacts. Please clarify;

MVP Response: Figure 4-650 erroneously showed an impact to the resource. The wetland will be avoided and protected with ECDs. An updated Detail Map 4-650 has been attached. No changes to Table B-2 were necessary.

- (f) Wetland ID W-KL48-PEM (Detail Map 4-653): indicated on Detail Map 4-653 as an open cut impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet;

MVP Response: W-KL48-PEM, as depicted on Detail Map 4-653, is shown in Plan & Profile sheet W-KL48-PEM, submitted February 19, 2021.

- (g) Wetland ID W-KL48-PSS-2 (Detail Map 4-653): indicated on Detail Map 4-653 as an open cut impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet;

MVP Response: W-KL48-PSS-2, as depicted on Detail Map 4-653, is shown in Plan & Profile sheet W-KL48-PSS-2 (PSS), submitted February 19, 2021.

- (h) Wetland ID W-KL50 (Detail Map 4-653): indicated on the Detail Map as an open cut. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet;

MVP Response: W-KL50, as depicted on Detail Map 4-653, is shown in Plan & Profile sheet

W-KL48-PSS-2 (PSS) and also W-KL50 (PEM), submitted February 19, 2021.

- (i) Wetland ID W-IJ62 (Detail Map 4-656): indicated on the Detail Map as temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet;

MVP Response: The plan sheet for the proposed impact to W-IJ62 was inadvertently omitted. It is attached to this response. No changes to Table B-2 were necessary.

- (j) Wetland ID W-IJ2-PSS (Detail Map 4-677): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet;

MVP Response: Mountain Valley did not include previously completed impacts on the profile sheets. The pipeline was installed under W-IJ2-PSS in 2018, and all impacts associated with excavation of the trench and installation of the pipeline under this wetland were completed at that time. The travel through this section of the ROW will not impact W-IJ-PSS. The completed impact is noted on Table 10 of the Individual Permit Application. An updated Table B-2, Table 17 (wetland mitigation), and Figure 4-677.

- (k) Wetland ID W-IJ2-PEM (Detail Map 4-677): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet;

MVP Response: Mountain Valley did not include previously completed impacts on the profile sheets. The pipeline was installed under W-IJ2-PEM in 2018, and all impacts associated with excavation of the trench and installation of the pipeline under this wetland were completed at that time. A travel lane through a portion of the wetland is required. The completed impact is noted on Table 10 of the Individual Permit Application. An updated Table B-2, plan sheet, and Figure 4-677 are included.

- (l) Wetland ID W-E7 (Detail Map 4-690): note that constricted LOD expands at this crossing, resulting in additional impacts to W-E7. What is the purpose of the expanded LOD?

MVP Response: The wetland boundary was extended after additional field investigations were completed. The wetland will not be impacted in this section of the LOD and will be protected with the appropriate erosion control devices and proper signage. Update Figure 4-690 is attached.

- (m) Wetland ID W-C1 (Detail Map 4-758): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet;

MVP Response: The plan sheet for the proposed impact to W-C1 was inadvertently omitted. It is attached to this response. No changes to Table B-2 were necessary.

- (n) Wetland ID W-B3 (Detail Map 4-762): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet;

MVP Response: W-B3, as depicted on Detail Map 4-762, is shown in Plan & Profile sheet S-G4, submitted February 19, 2021.

- (o) Wetland ID W-H2 (Detail Map 4-782): indicated on the Detail Map as a temporary impact. The

plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet;

MVP Response: The plan sheet for the proposed impact to W-H2 was inadvertently omitted. It is attached to this response. No changes to Table B-2 were necessary.

- (p) Wetland ID W-IJ21 (Detail Map 4-786): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.

MVP Response: W-IJ21, as depicted on Detail Map 4-786, is shown in Plan & Profile sheet W-IJ21, submitted February 19, 2021.

MVP appreciates the opportunity to provide this additional information and looks forward to continuing to work with the DEQ regarding this Project.

Sincerely,



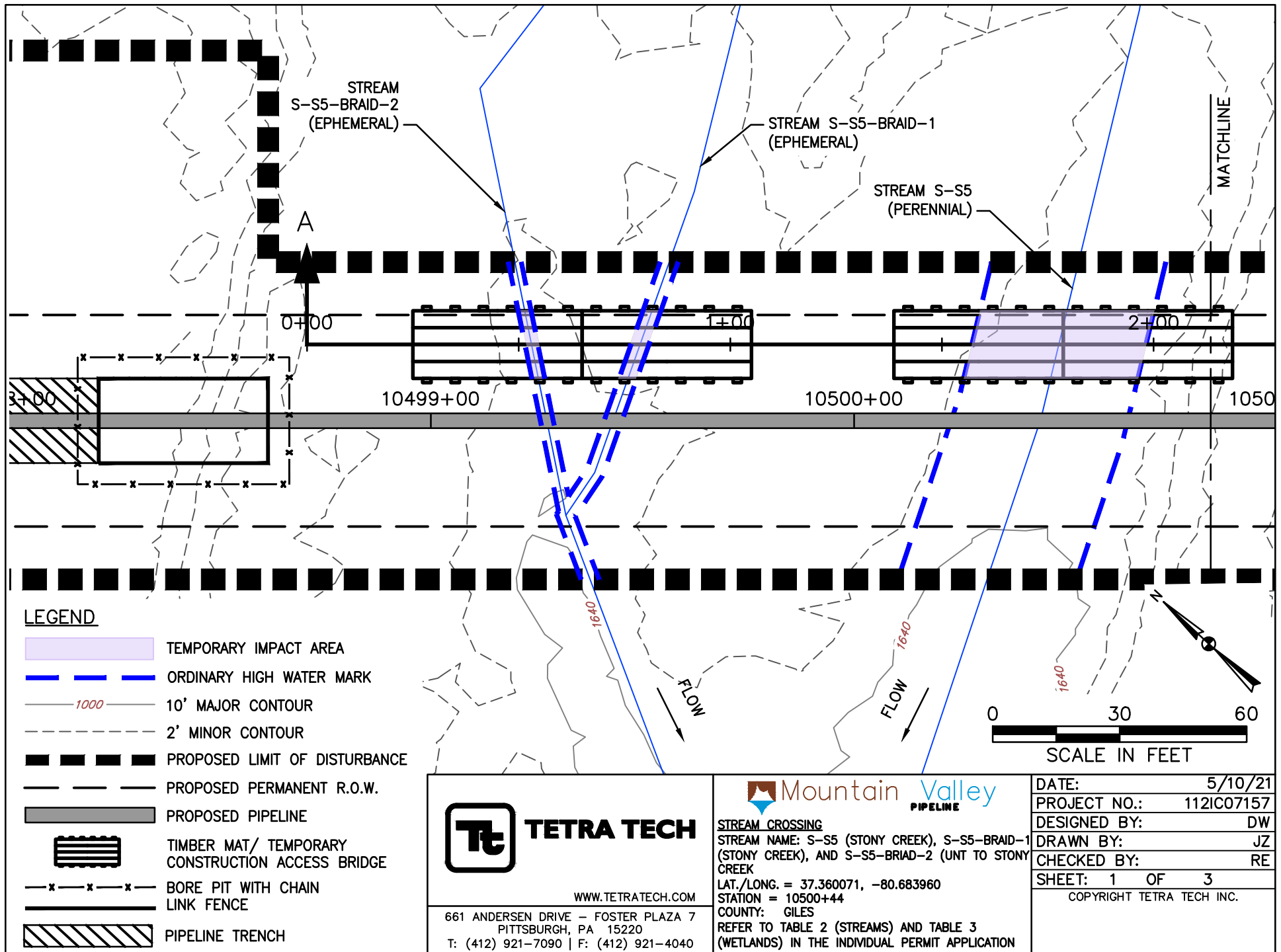
Matthew S. Hoover
Environmental Permitting Supervisor
Mountain Valley Pipeline, LLC

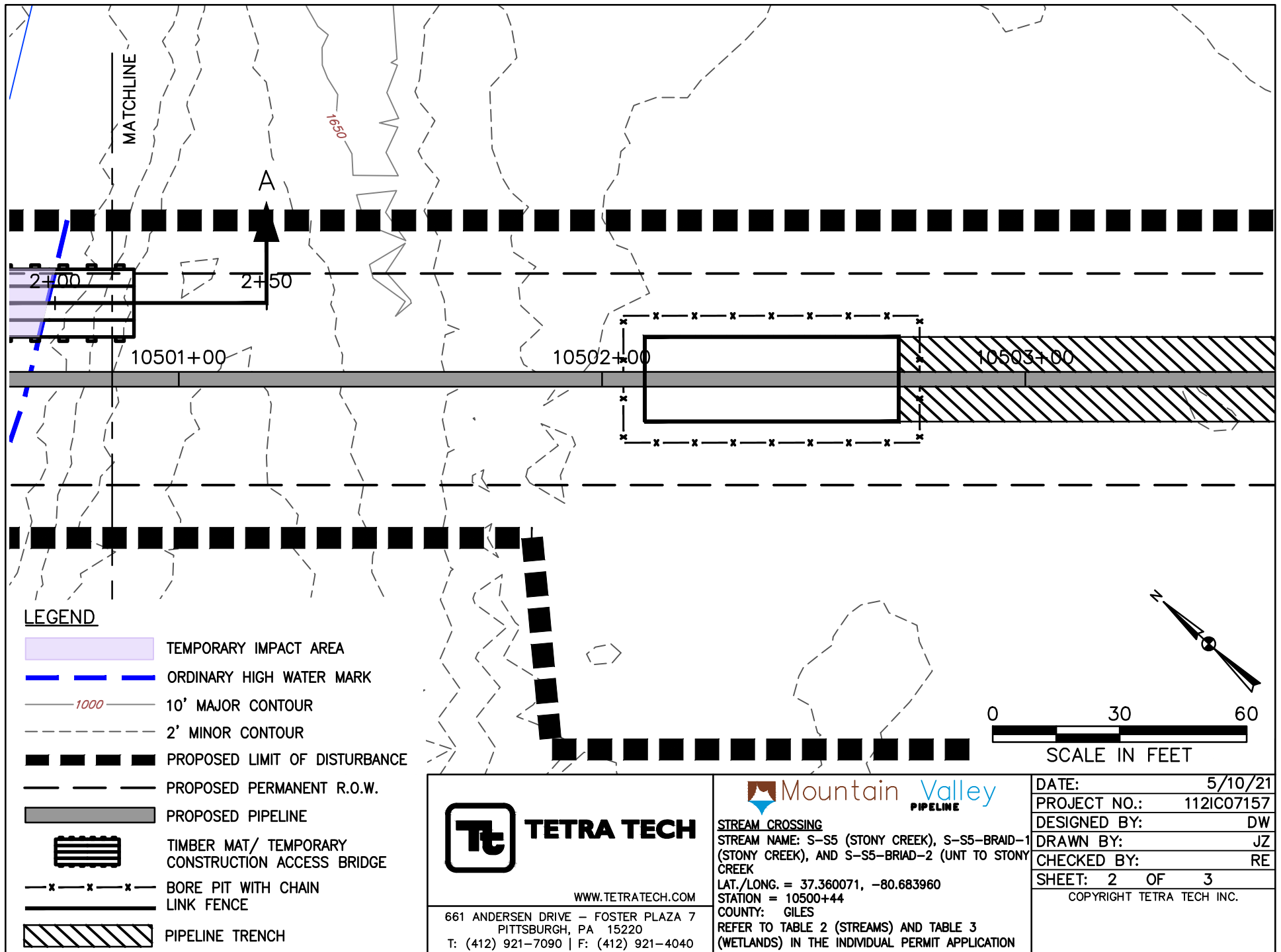
cc: Adam Fannin, USACE
Jared Pritts, USACE
Vinny Pero, USACE

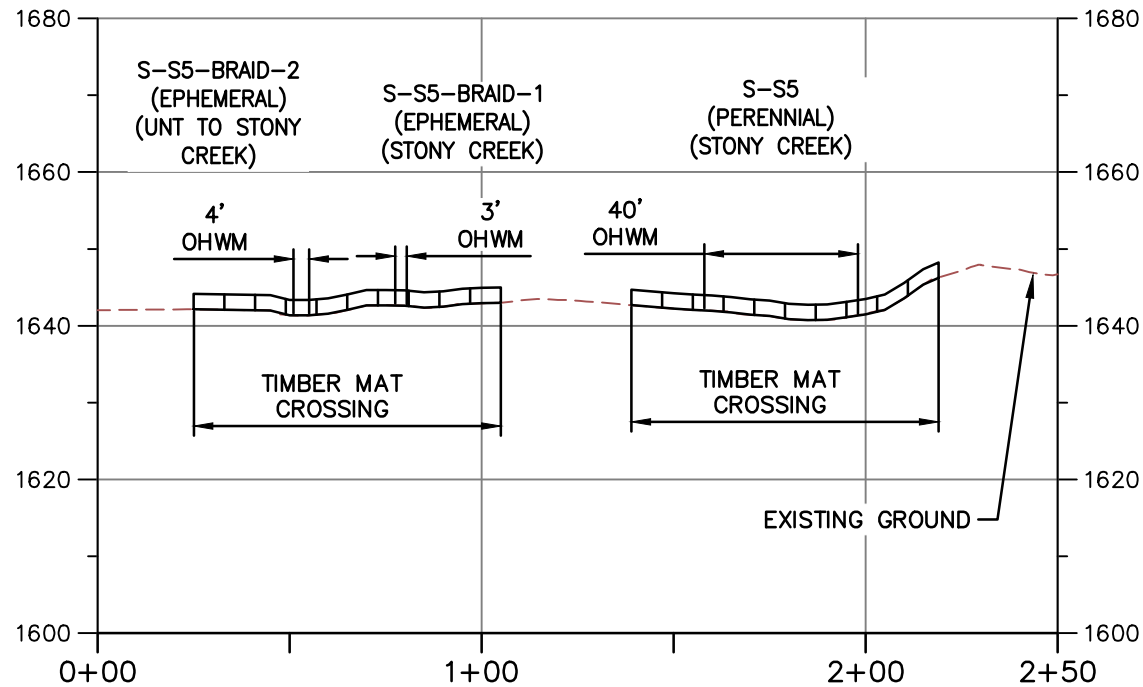
Attachment 1:

Update Plan and Profiles Drawings

(S-S5, S-S5 Braid-1, S-S5 Brad-2; S-E24;S-E25 Downstream; W-KL48-PSS-1; S-Y7 and S-Y8; S-B21; S-GH3; S-D18 and S-D20; S-KL38; S-G22; W-H2, S-H2, S-H5; S-IJ3; S-IJ16a; S-IJ85; S-MM17;S-QQ3; S-YZ1; W-AD4; W-C1; W-C6; W-IJ62; and W-KL48-PSS-2)



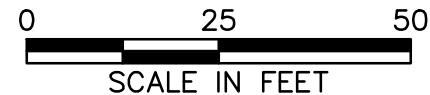
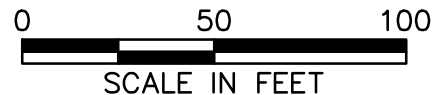




PROFILE A-A

HORIZONTAL

VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
4. PIPELINE NOT SHOWN ON PROFILE BECAUSE IT HAS BEEN PREVIOUSLY CONSTRUCTED AND DOES NOT HAVE A CURRENT IMPACT.



TETRA TECH

WWW.TETRATECH.COM

661 ANDERSEN DRIVE - FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040



STREAM CROSSING

STREAM NAME: S-S5 (STONY CREEK), S-S5-BRAID-1 (STONY CREEK), AND S-S5-BRAID-2 (UNT TO STONY CREEK)

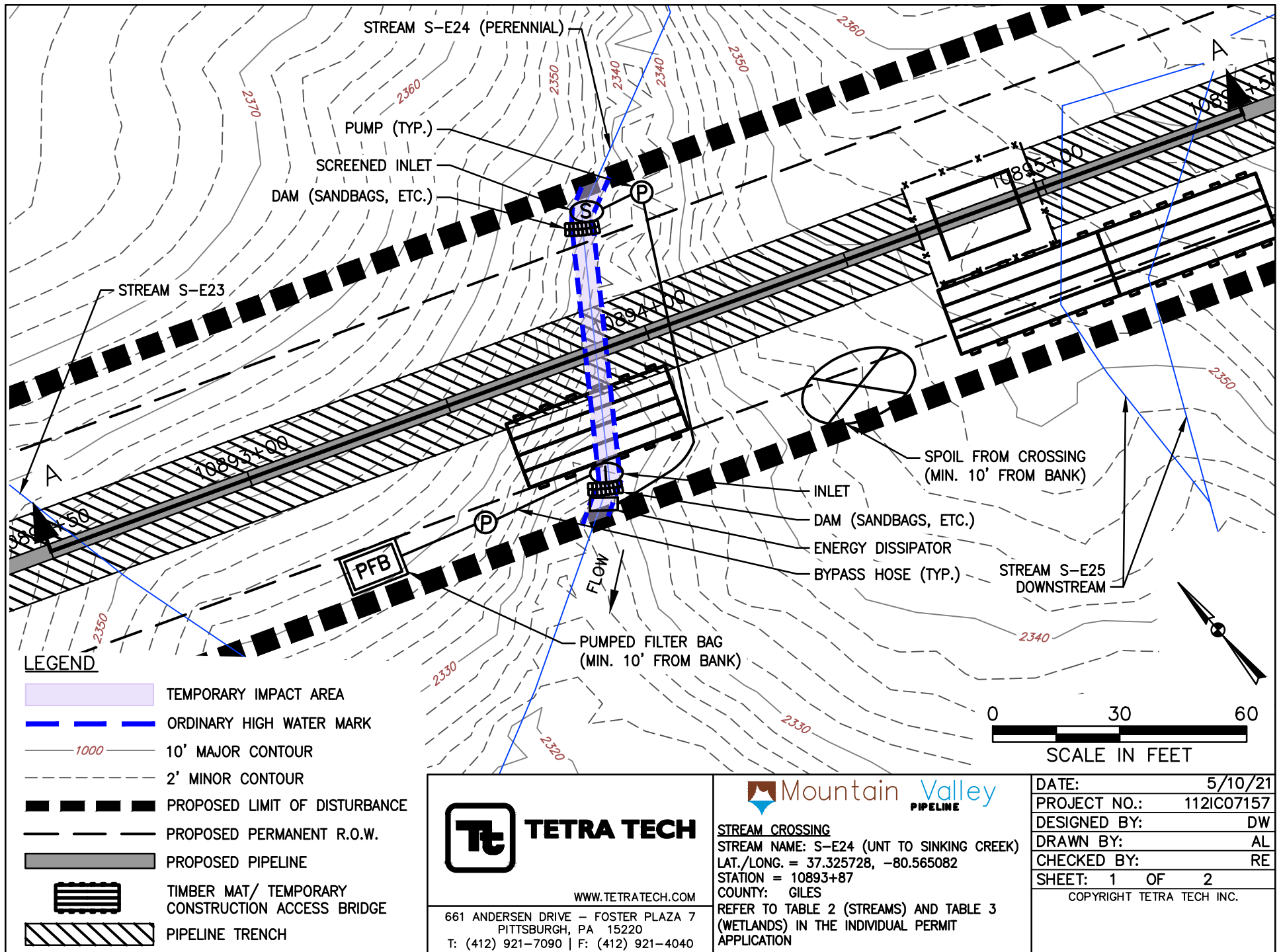
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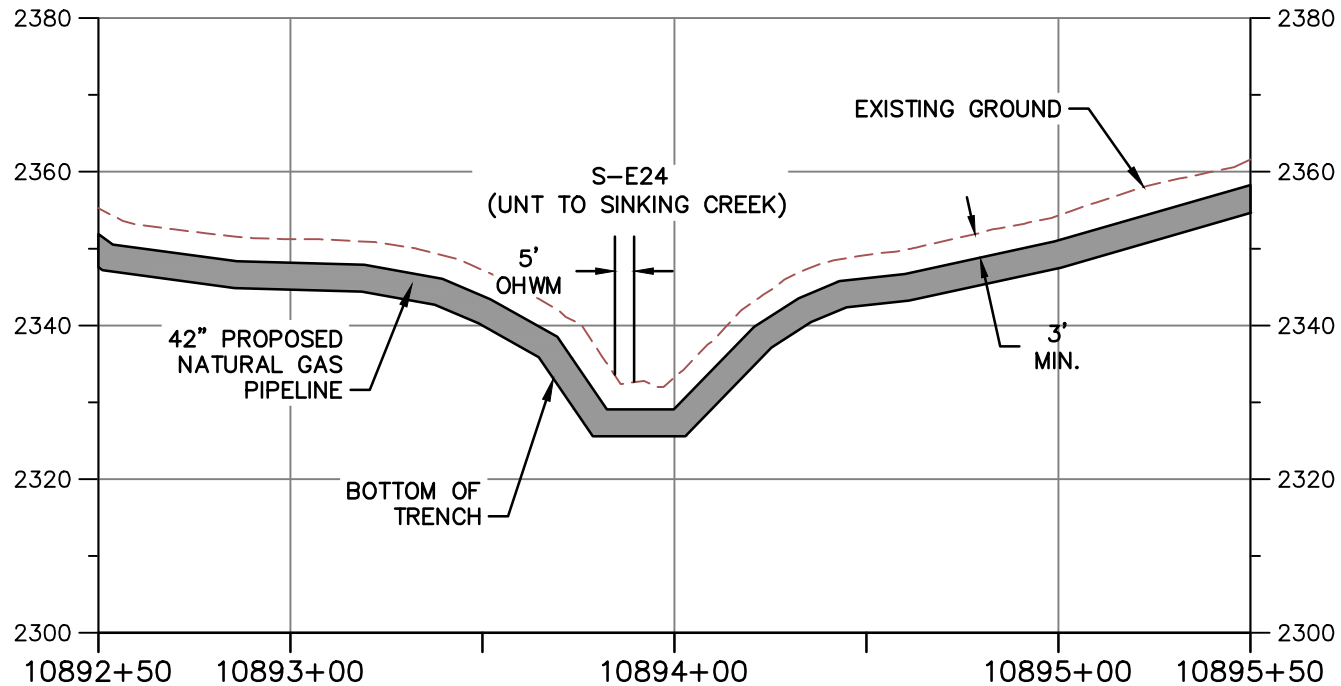
STATION = 10500+44

COUNTY: GILES

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 3 OF 3	
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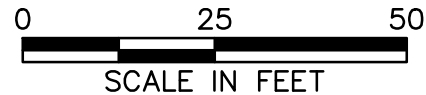


PROFILE A-A

HORIZONTAL



VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
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3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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STREAM CROSSING

STREAM NAME: S-E24 (UNT TO SINKING CREEK)

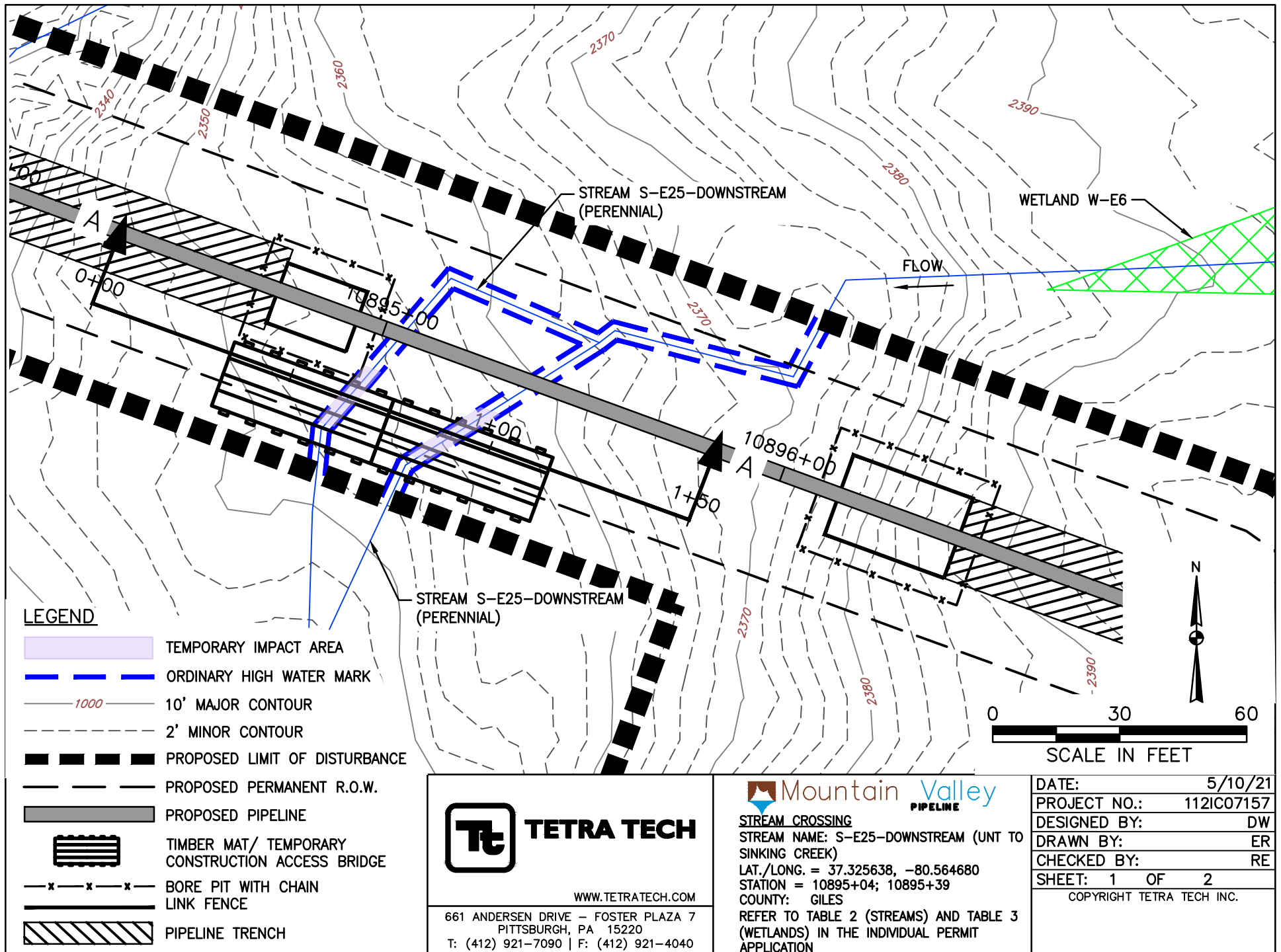
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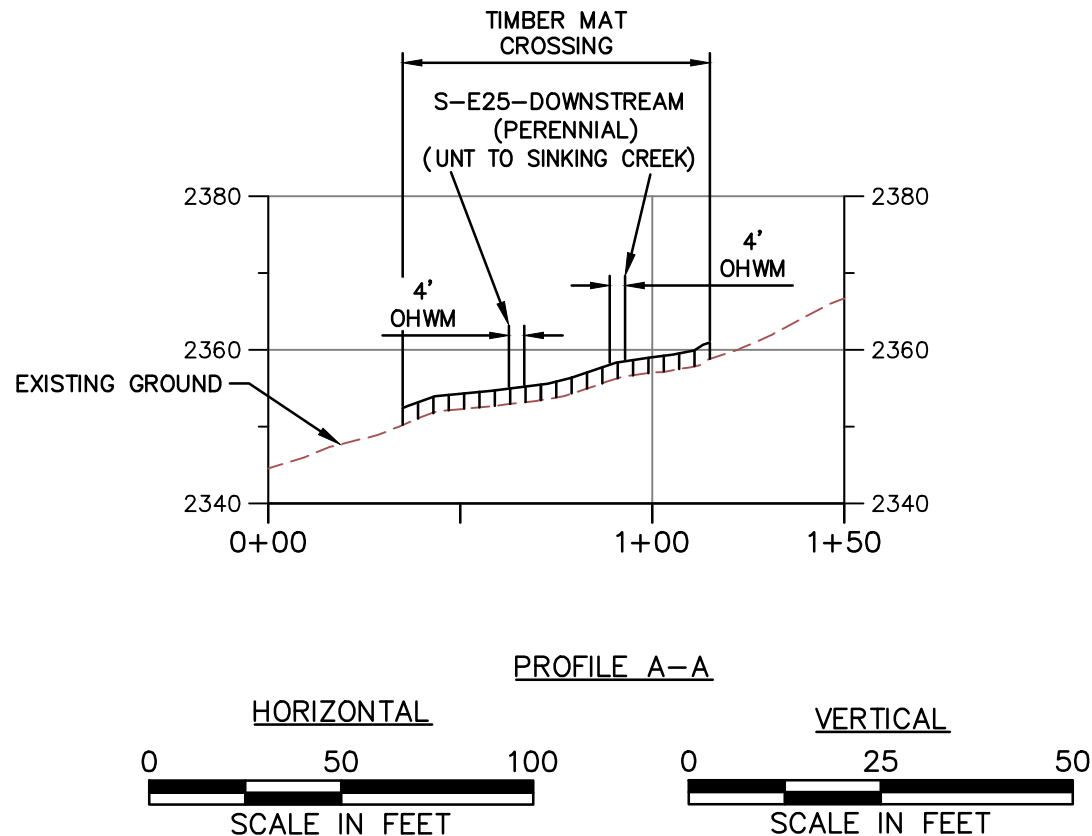
STATION = 10893+87

COUNTY: GILES

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
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CHECKED BY:	RE
SHEET: 2 OF 2	
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NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
4. PIPELINE NOT SHOWN ON PROFILE BECAUSE IT IS A BORE BELOW SURFACE WATER AND DOES NOT CREATE AN IMPACT.



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STREAM CROSSING

STREAM NAME: S-E25-DOWNSTREAM (UNT TO SINKING CREEK)

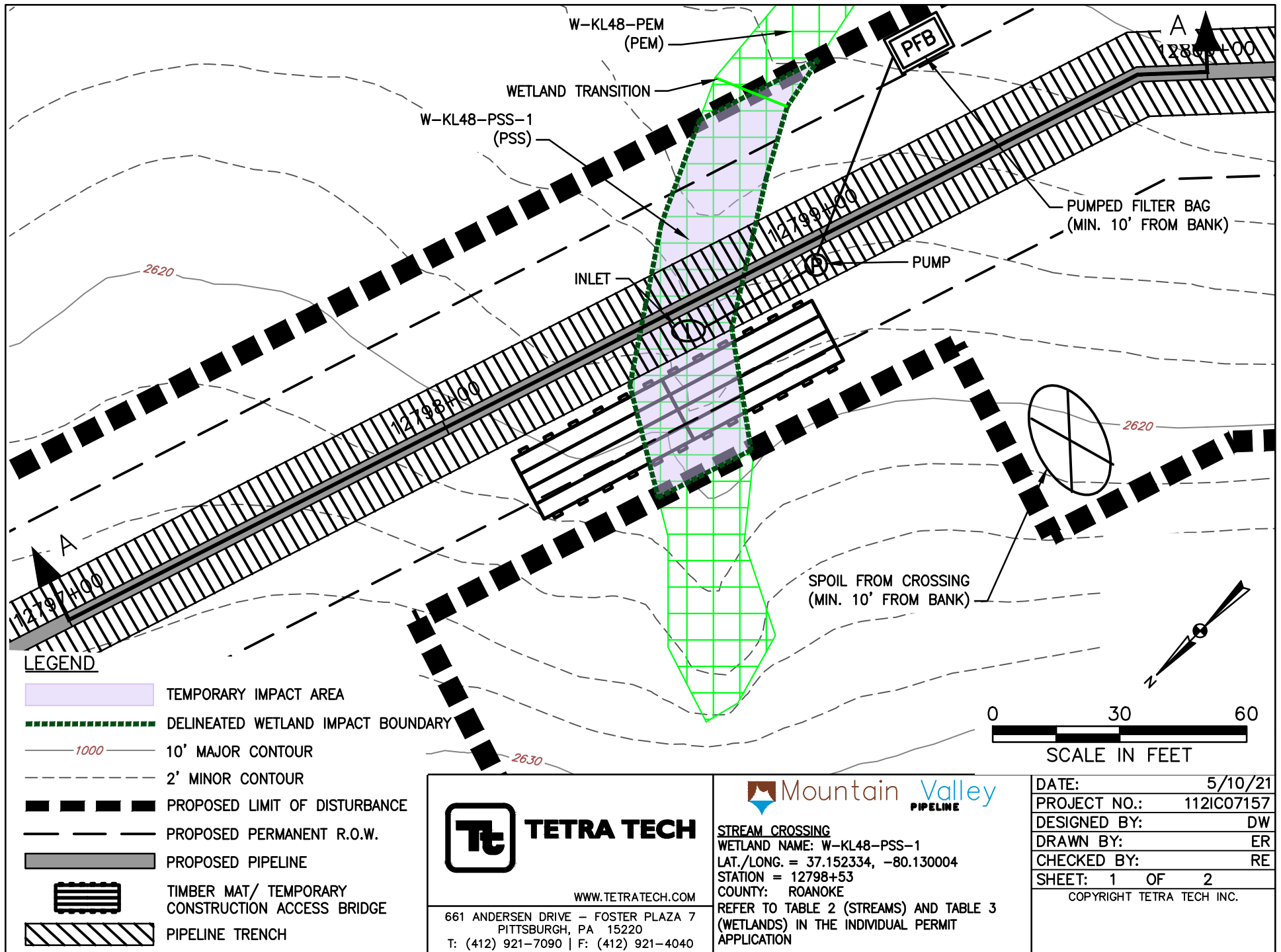
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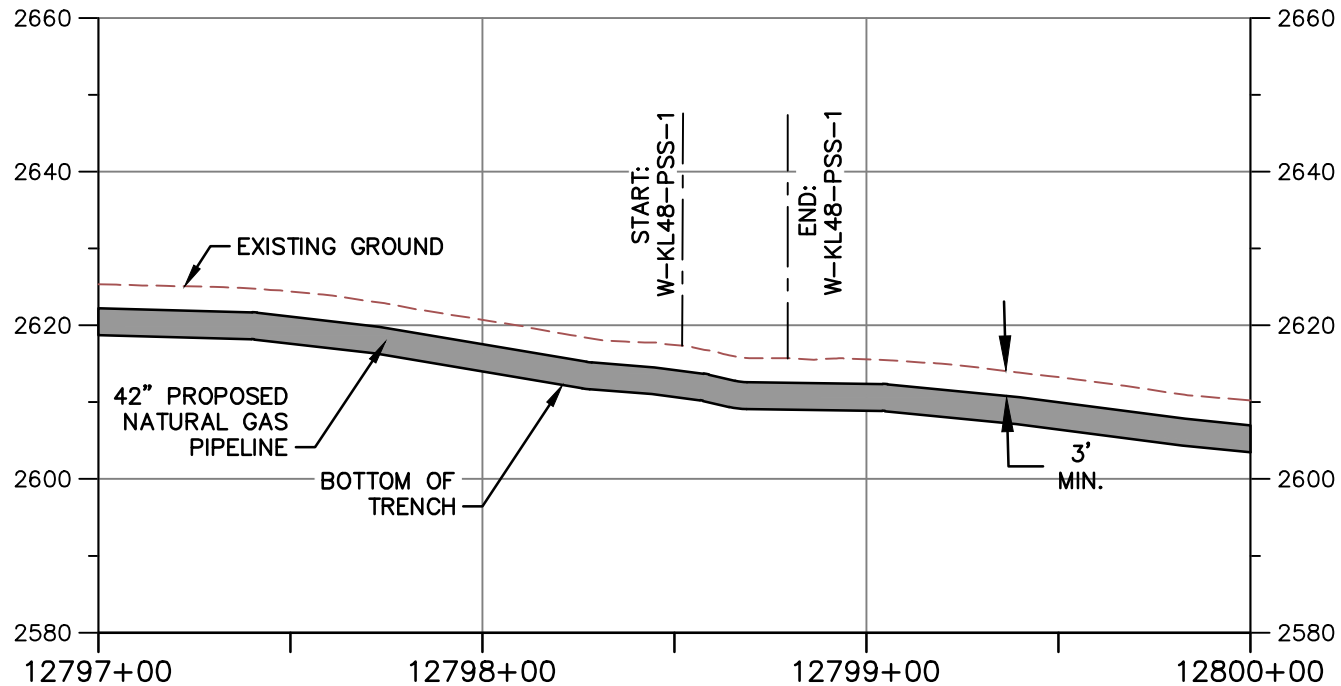
STATION = 10895+04; 10895+39

COUNTY: GILES

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

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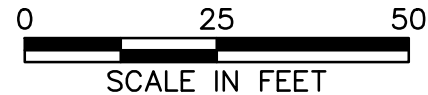




PROFILE A-A

HORIZONTAL

VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
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3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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661 ANDERSEN DRIVE - FOSTER PLAZA 7
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STREAM CROSSING

WETLAND NAME: W-KL48-PSS-1

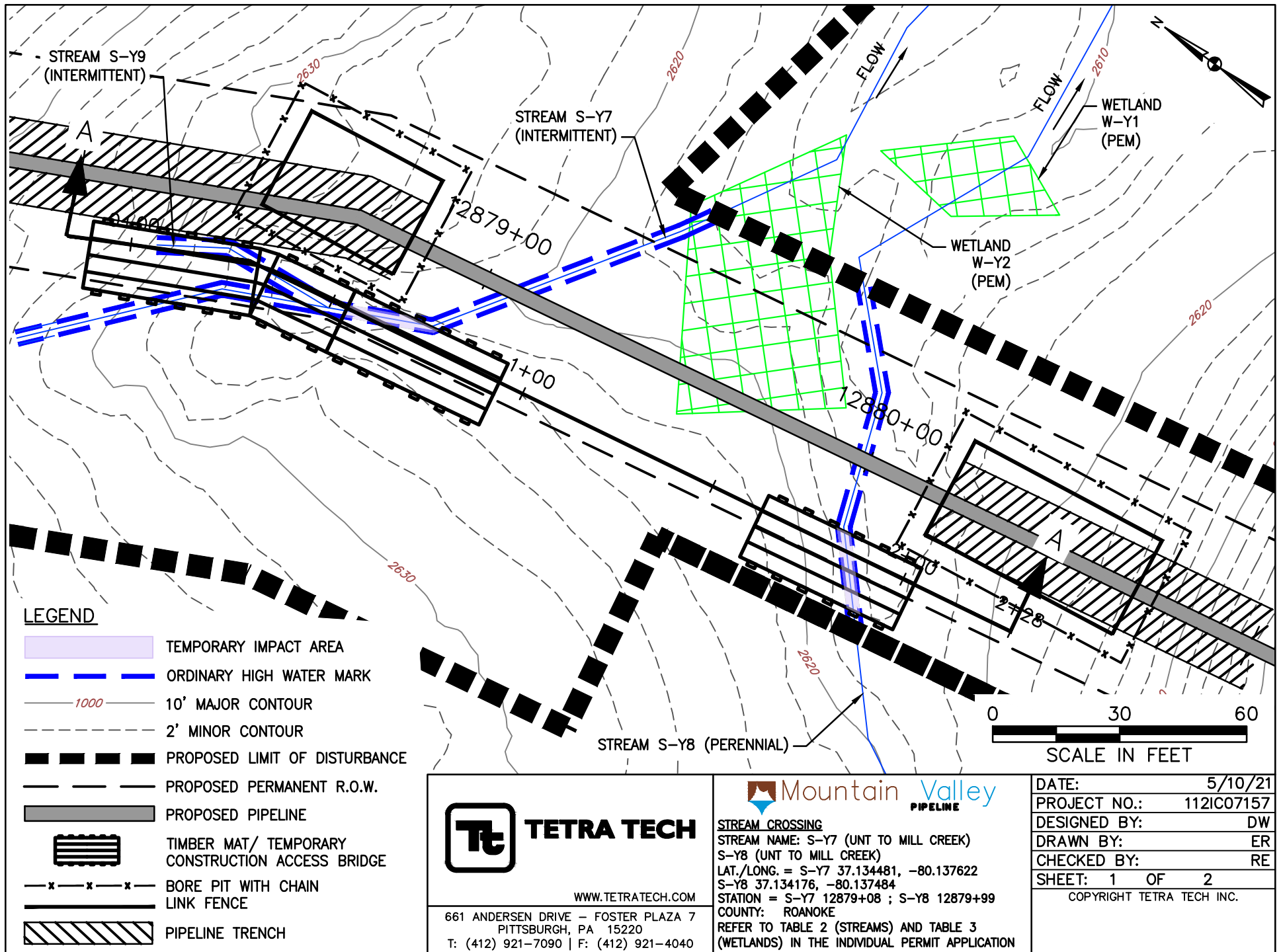
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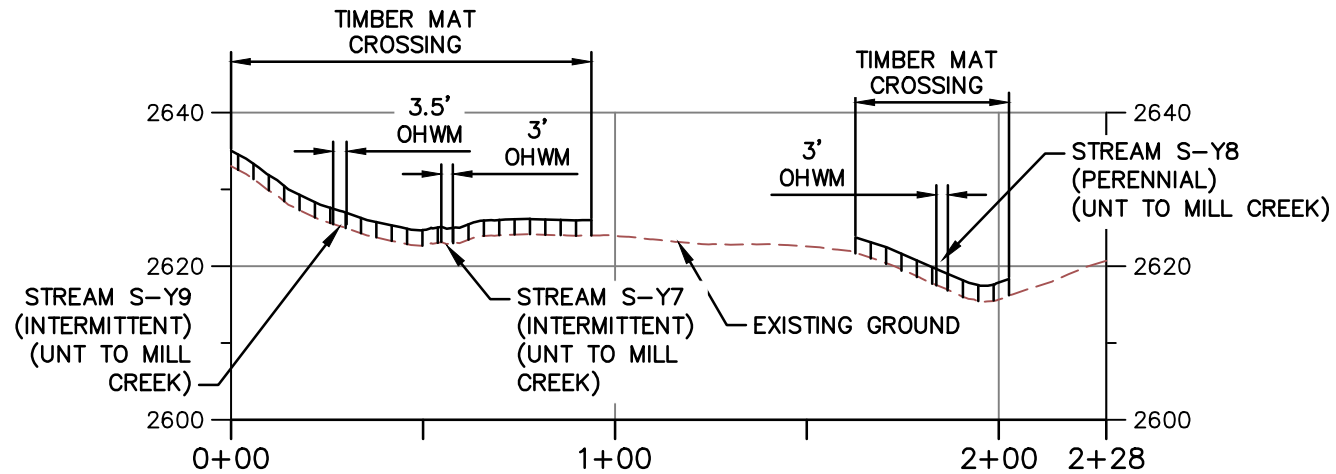
STATION = 12798+53

COUNTY: ROANOKE

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE: 5/10/21
PROJECT NO.: 112IC07157
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PROFILE A-A

HORIZONTAL



VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
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PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

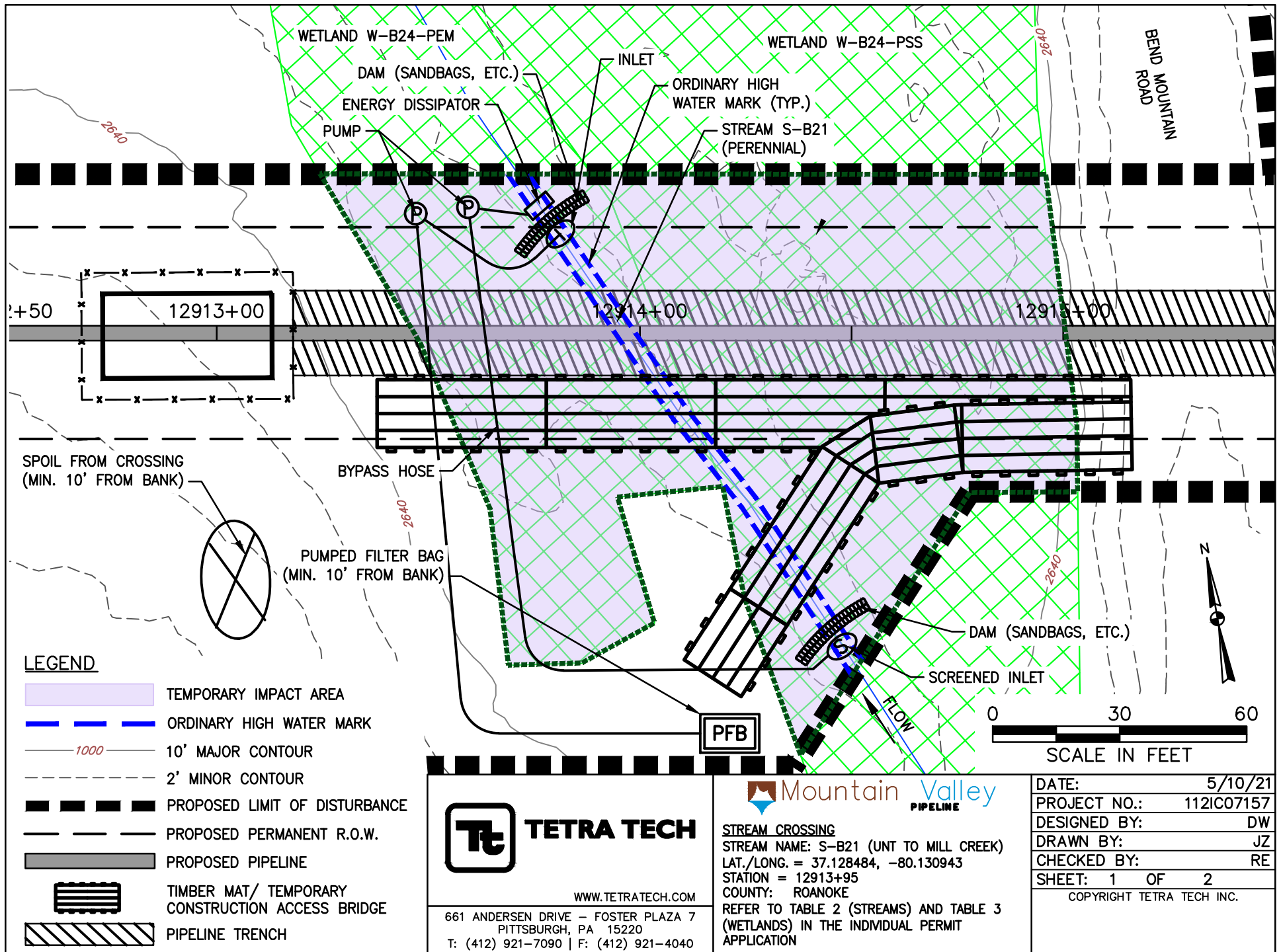


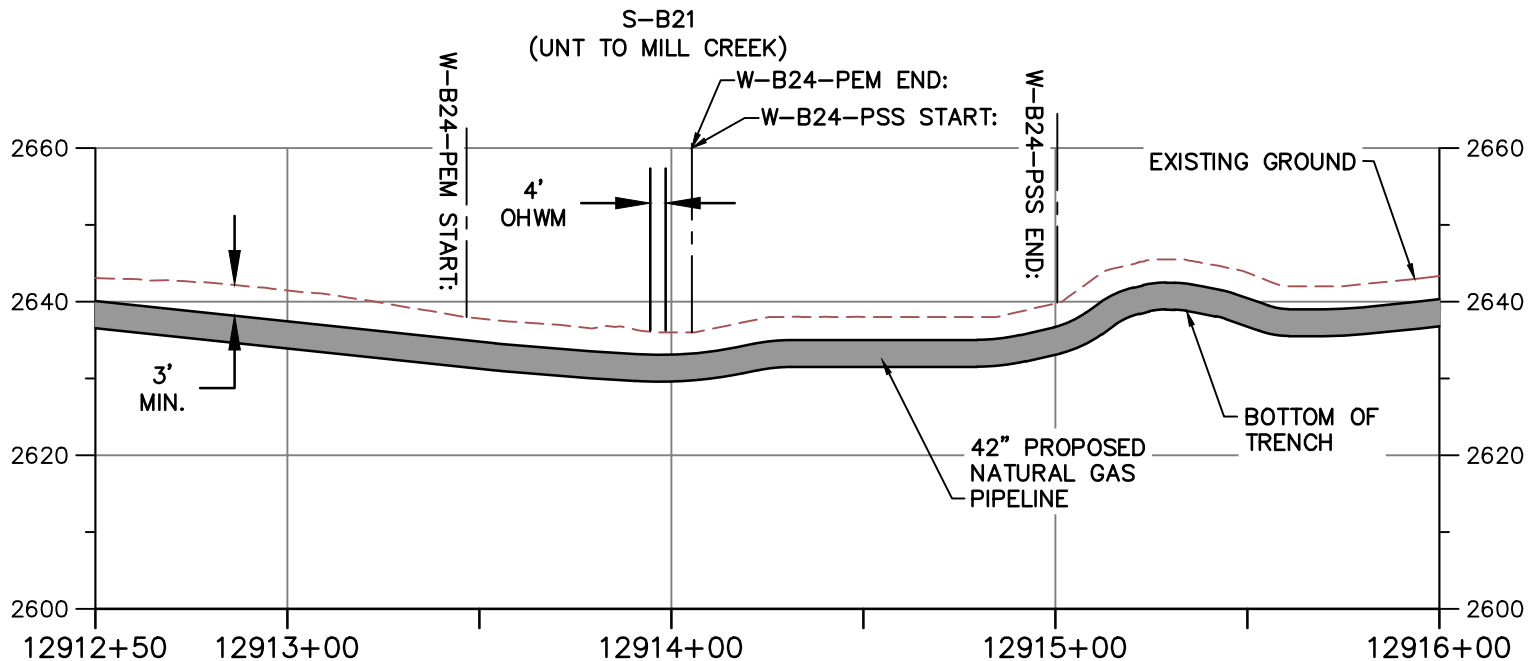
STREAM CROSSING

STREAM NAME: S-Y7 (UNT TO MILL CREEK)
S-Y8 (UNT TO MILL CREEK)
LAT./LONG. = S-Y7 37.134481, -80.137622
S-Y8 37.134176, -80.137484
STATION = S-Y7 12879+08 ; S-Y8 12879+99
COUNTY: ROANOKE
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

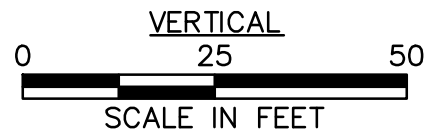
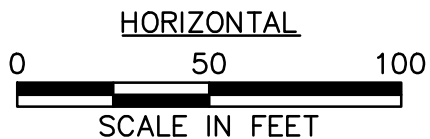
DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	ER
CHECKED BY:	RE
SHEET: 2 OF 2	

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PROFILE A-A



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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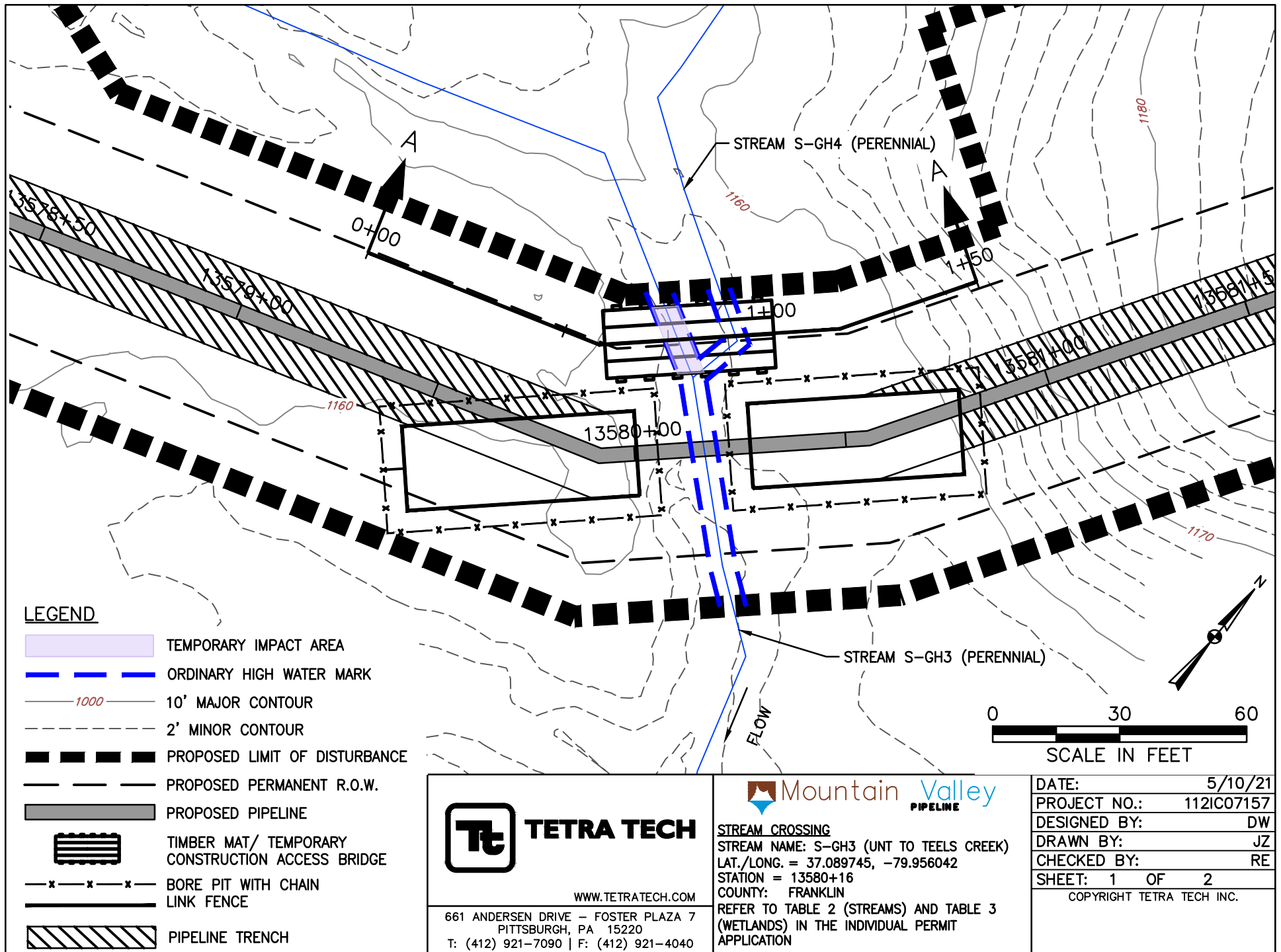
661 ANDERSEN DRIVE - FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

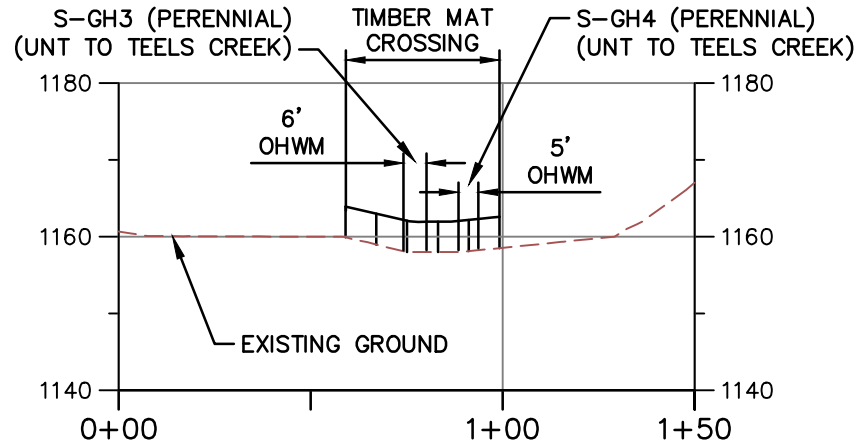


STREAM CROSSING

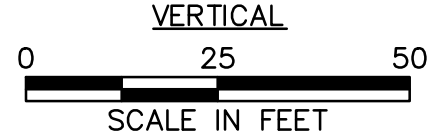
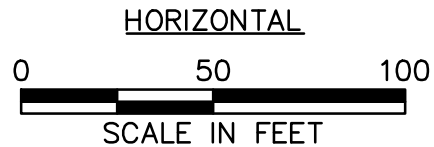
STREAM NAME: S-B21 (UNT TO MILL CREEK)
LAT./LONG. = 37.128484, -80.130943
STATION = 12913+95
COUNTY: ROANOKE
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 2 OF 2	
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PROFILE A-A



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
4. PIPELINE NOT SHOWN ON PROFILE BECAUSE IT IS A BORE BELOW SURFACE WATER AND DOES NOT CREATE AN IMPACT.



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STREAM CROSSING

STREAM NAME: S-GH3 (UNT TO TEELS CREEK)

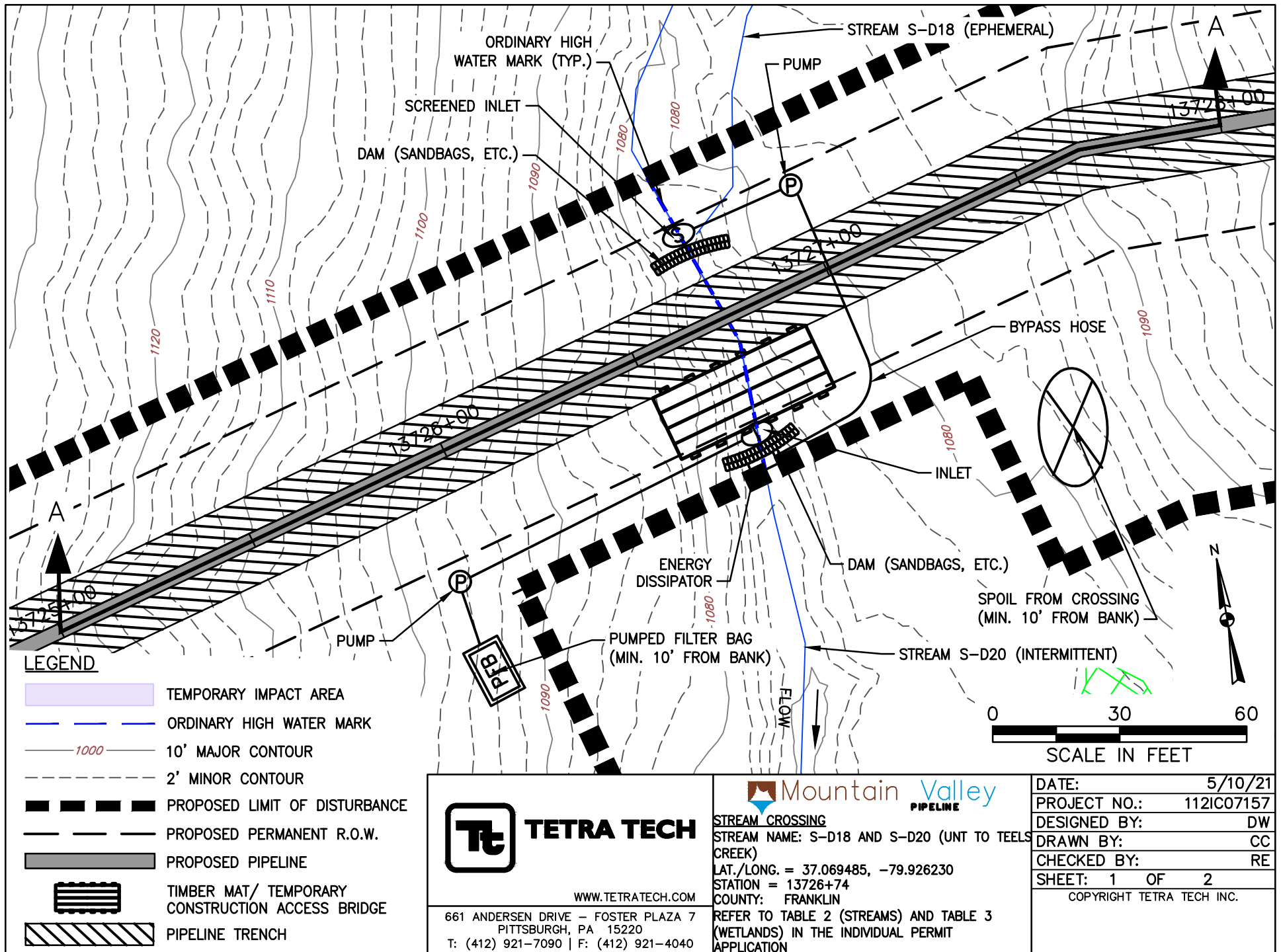
LAT./LONG. = 37.089745, -79.956042

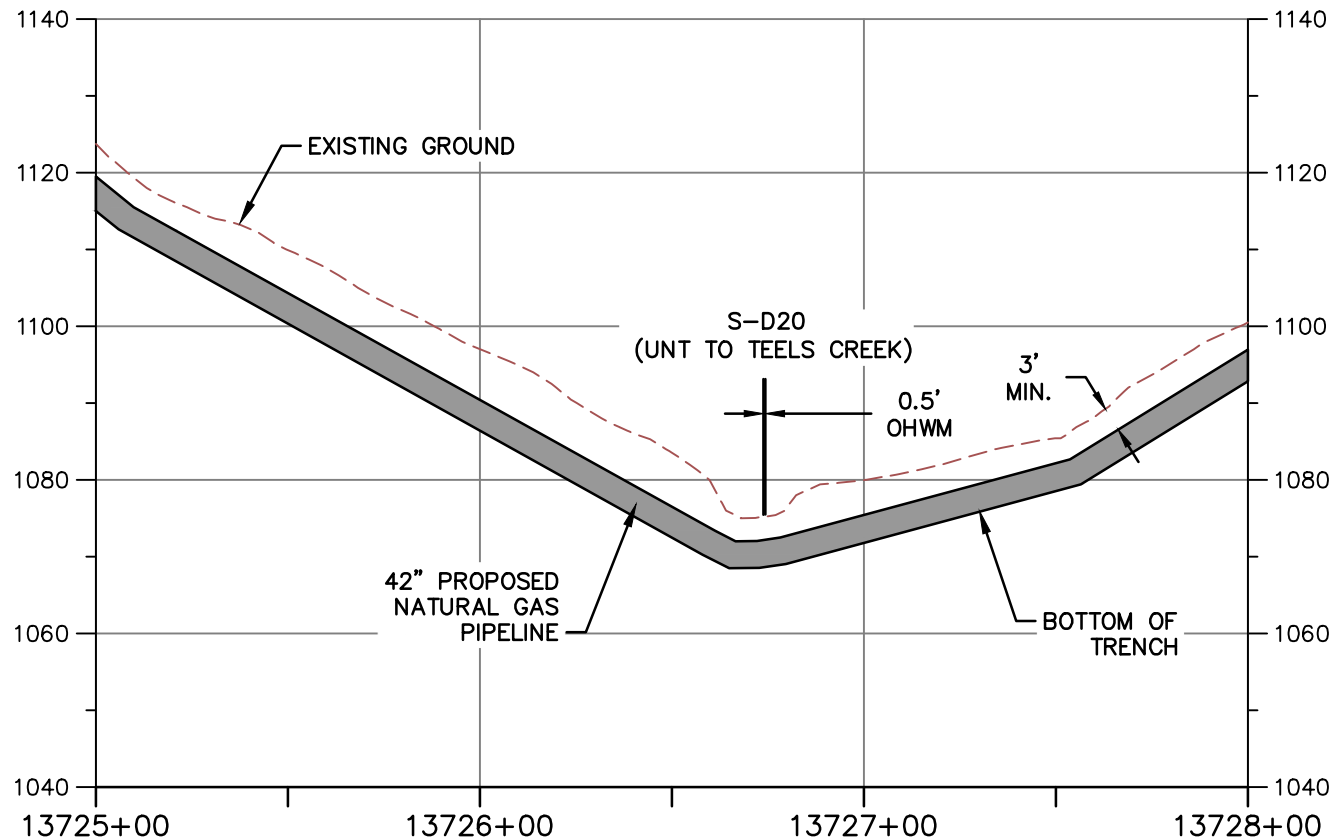
STATION = 13580+16

COUNTY: FRANKLIN

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 2 OF 2	
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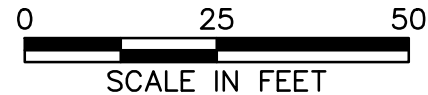




PROFILE A-A

HORIZONTAL

VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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STREAM CROSSING

STREAM NAME: S-D18 AND S-D20 (UNT TO TEELS CREEK)

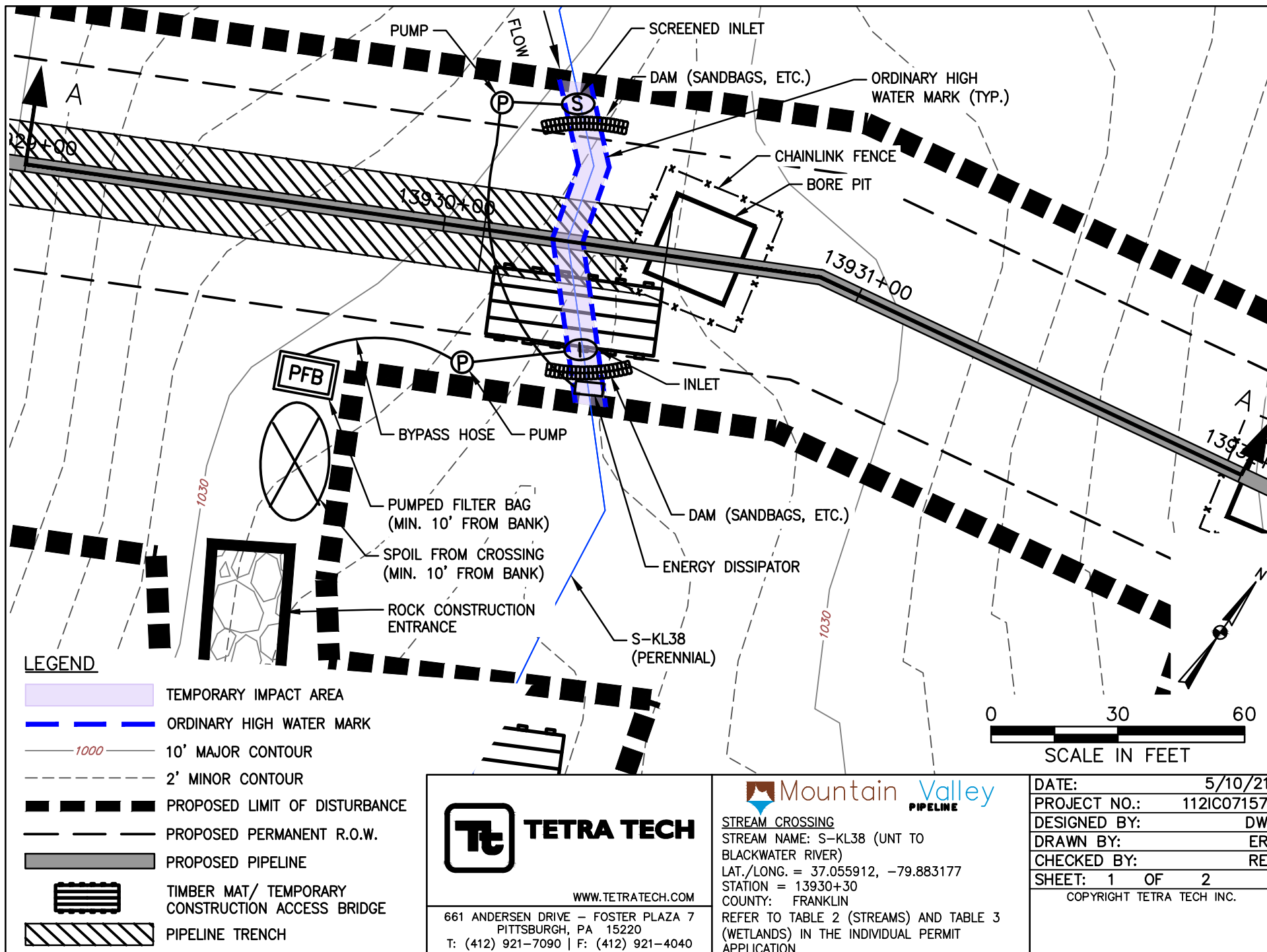
LAT./LONG. = 37.069485, -79.926230

STATION = 13726+74

COUNTY: FRANKLIN

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/12/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	CC
CHECKED BY:	RE
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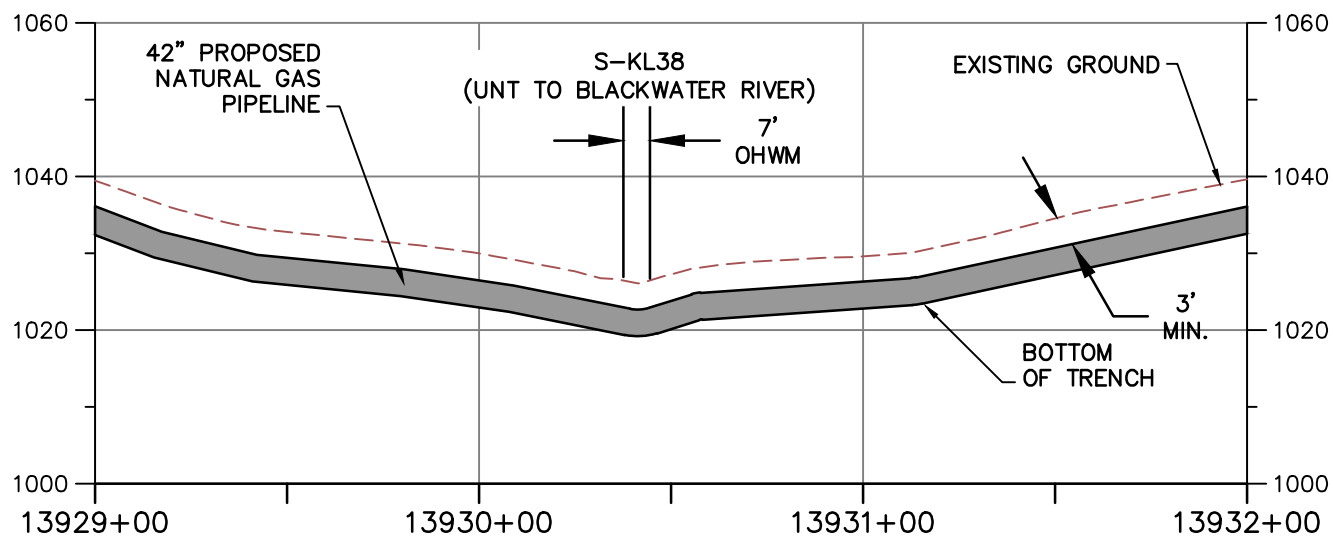


STREAM CROSSING

STREAM NAME: S-KL38 (UNT TO
BLACKWATER RIVER)
LAT./LONG. = 37.055912, -79.883177
STATION = 13930+30
COUNTY: FRANKLIN

REFER TO TABLE 2 (STREAMS) AND TABLE 3
(WETLANDS) IN THE INDIVIDUAL PERMIT
APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
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CHECKED BY:	RE
SHEET:	1 OF 2
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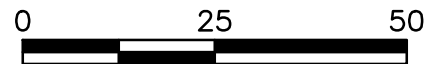
PROFILE A-A

HORIZONTAL



SCALE IN FEET

VERTICAL



SCALE IN FEET

NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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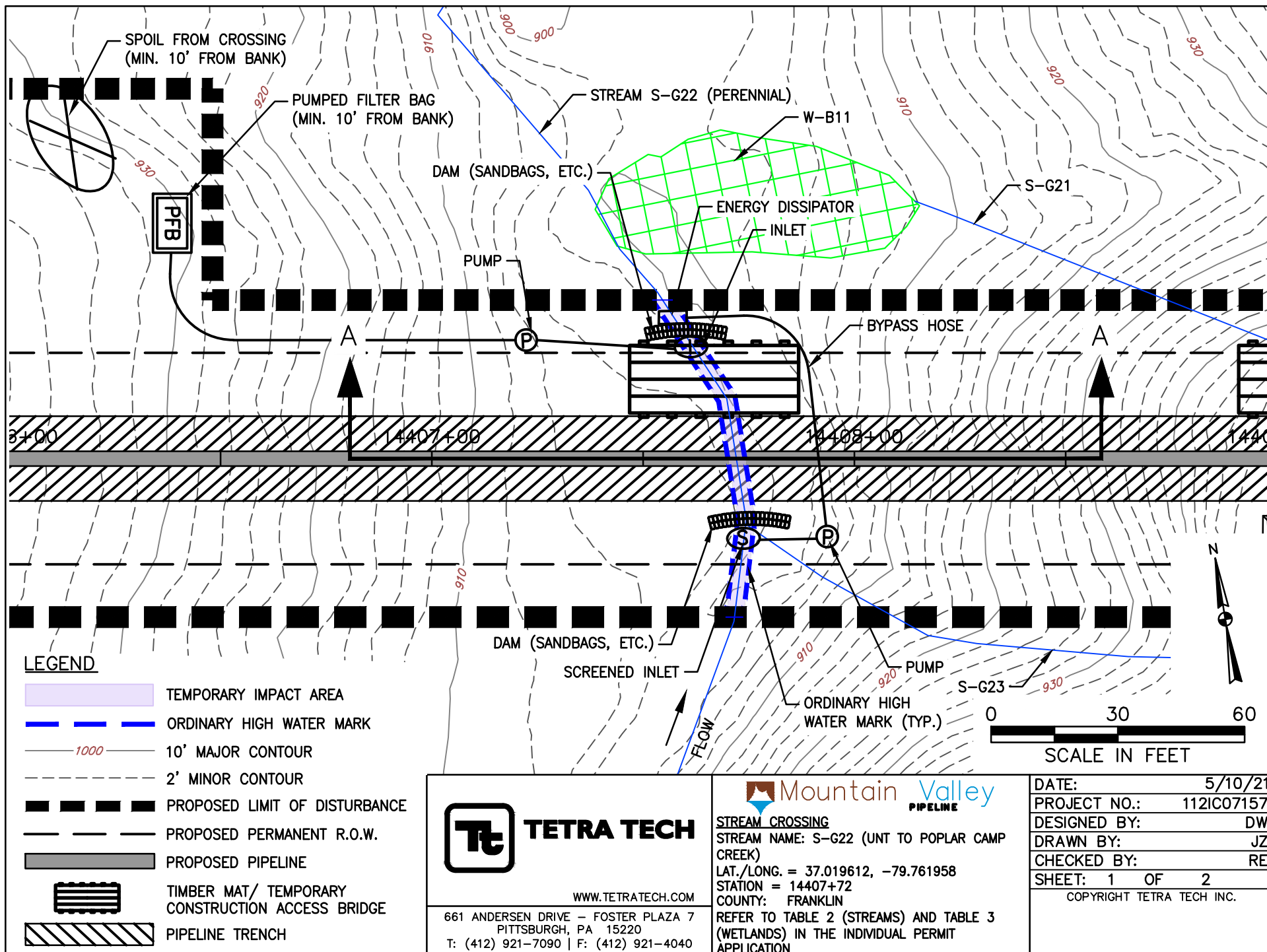


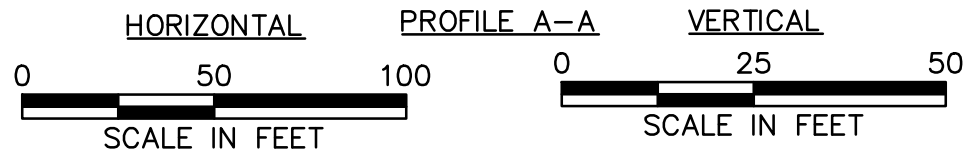
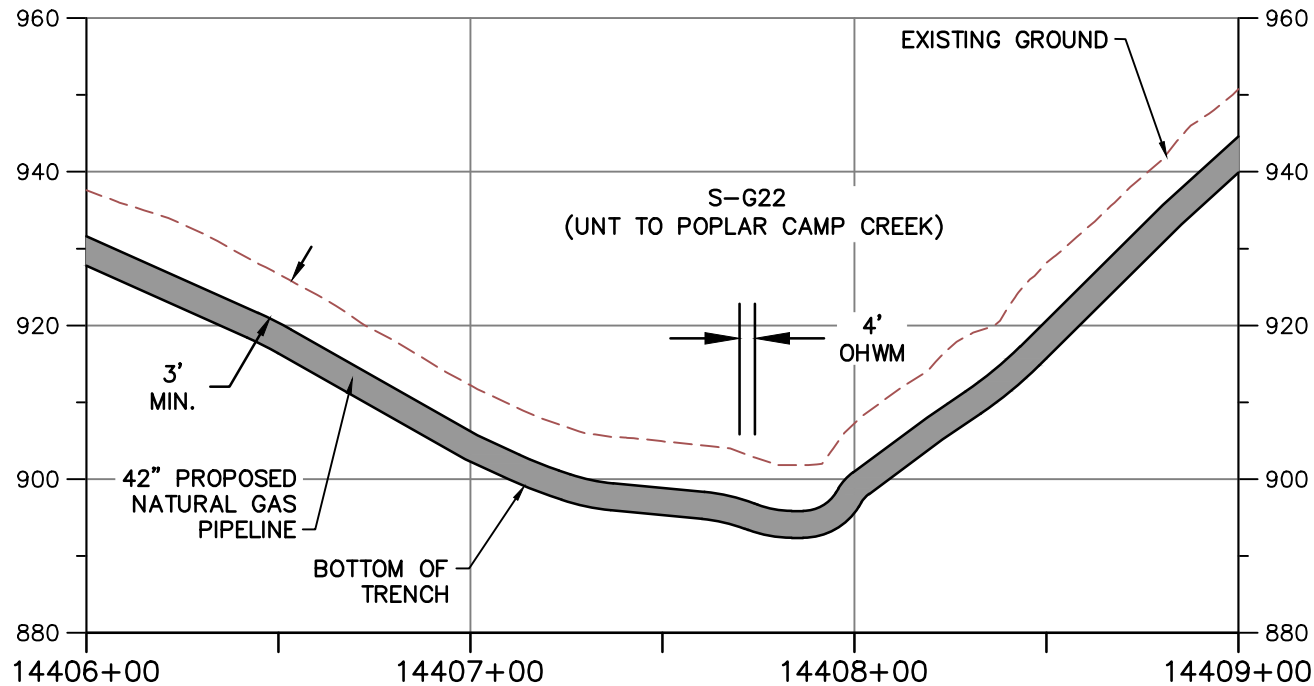
STREAM CROSSING

STREAM NAME: S-KL38 (UNT TO
BLACKWATER RIVER)
LAT./LONG. = 37.055912, -79.883177
STATION = 13930+30
COUNTY: FRANKLIN

REFER TO TABLE 2 (STREAMS) AND TABLE 3
(WETLANDS) IN THE INDIVIDUAL PERMIT
APPLICATION

DATE: 5/10/21
PROJECT NO.: 112IC07157
DESIGNED BY: DW
DRAWN BY: ER
CHECKED BY: RE
SHEET: 2 OF 2
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NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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STREAM CROSSING

STREAM NAME: S-G22 (UNT TO POPLAR CAMP CREEK)

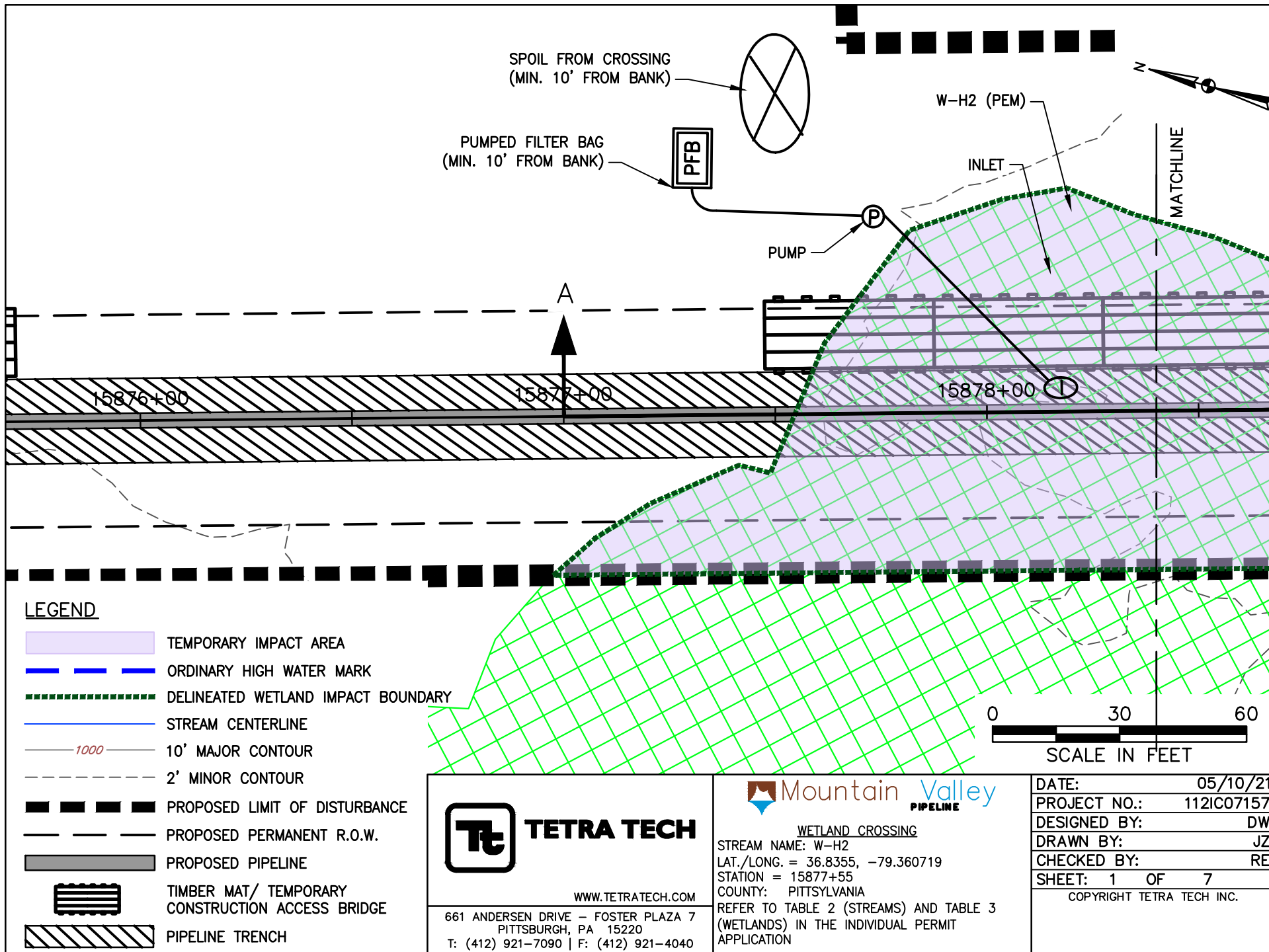
LAT./LONG. = 37.019612, -79.761958

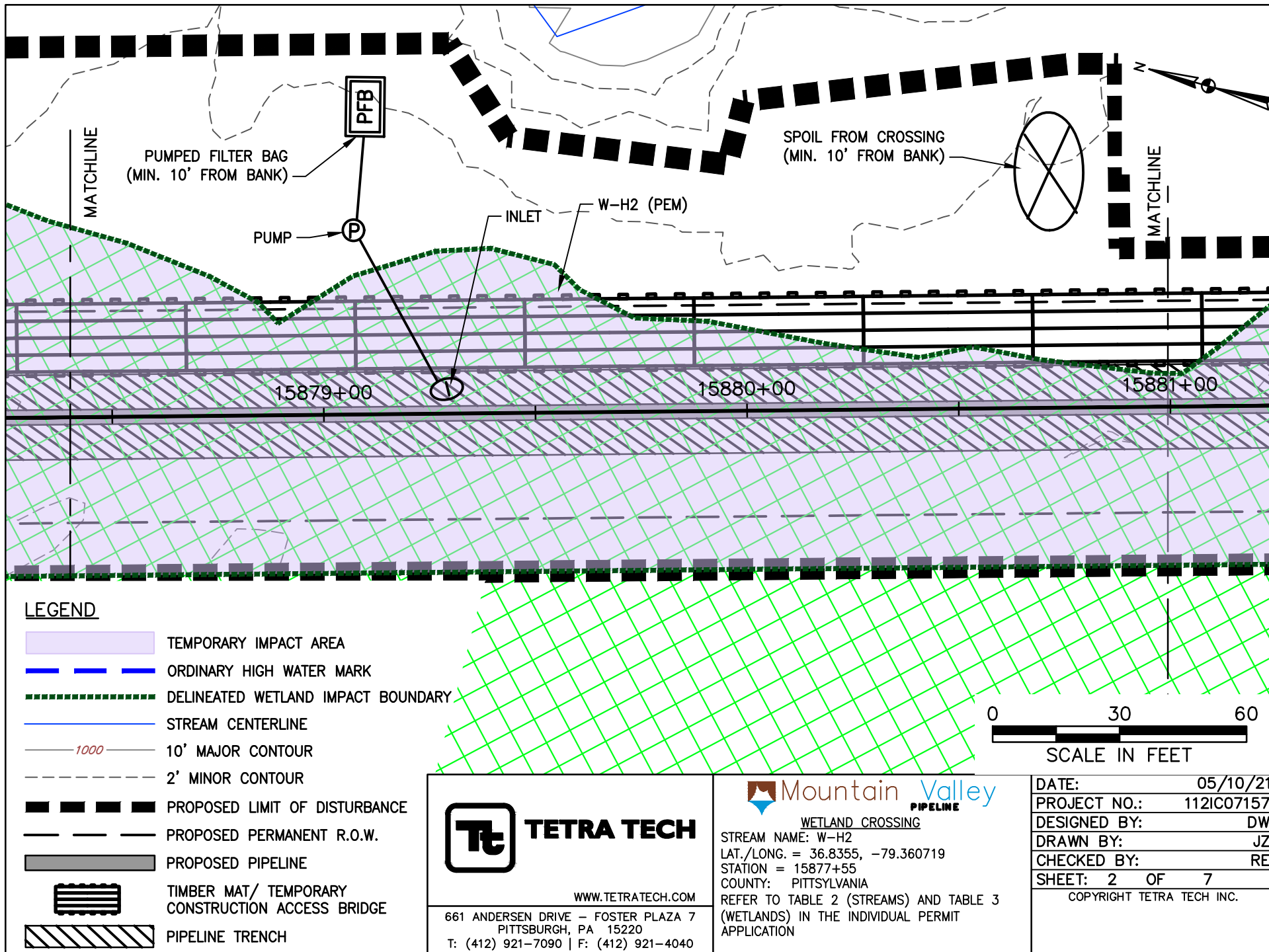
STATION = 14407+72

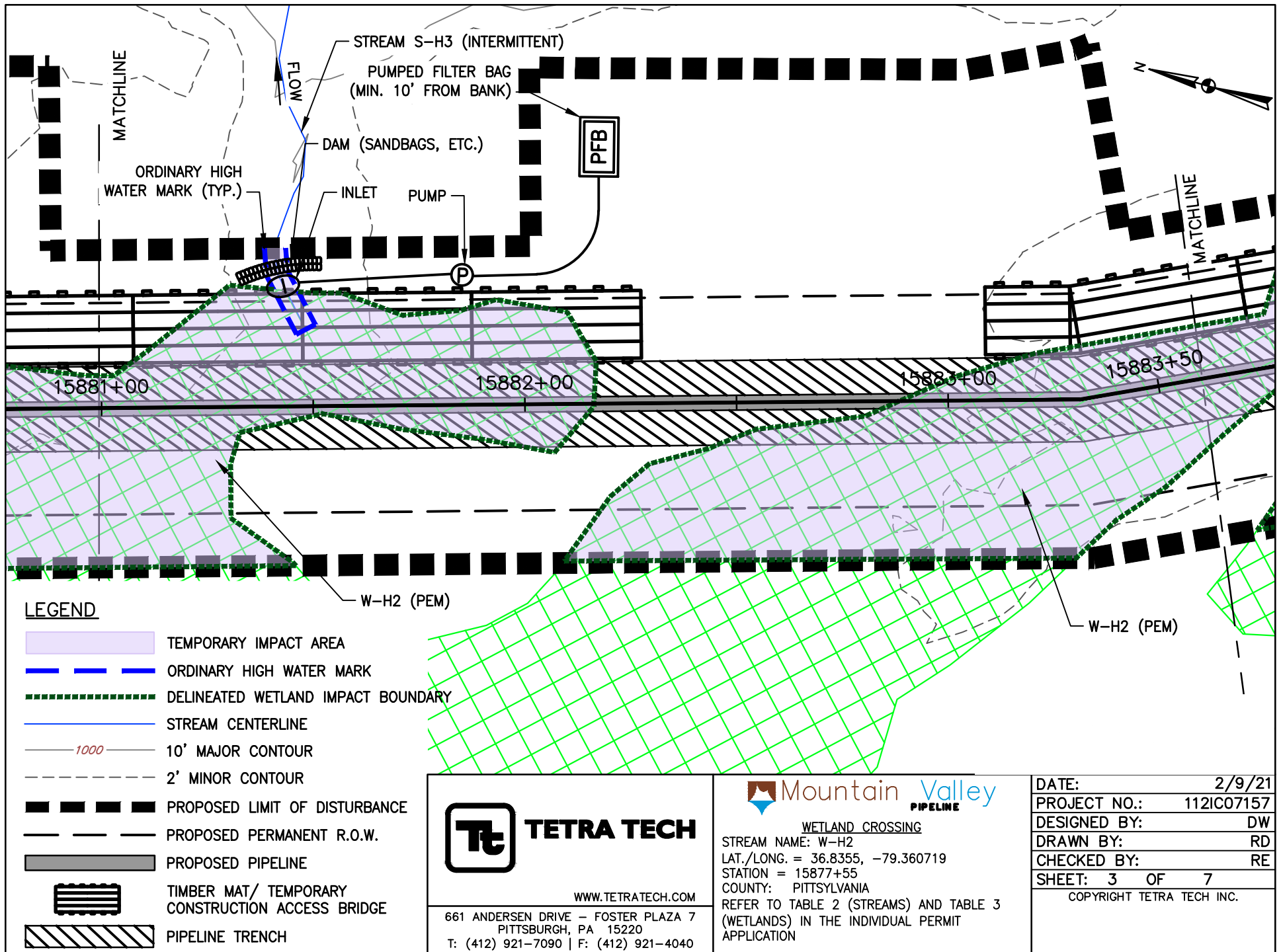
COUNTY: FRANKLIN

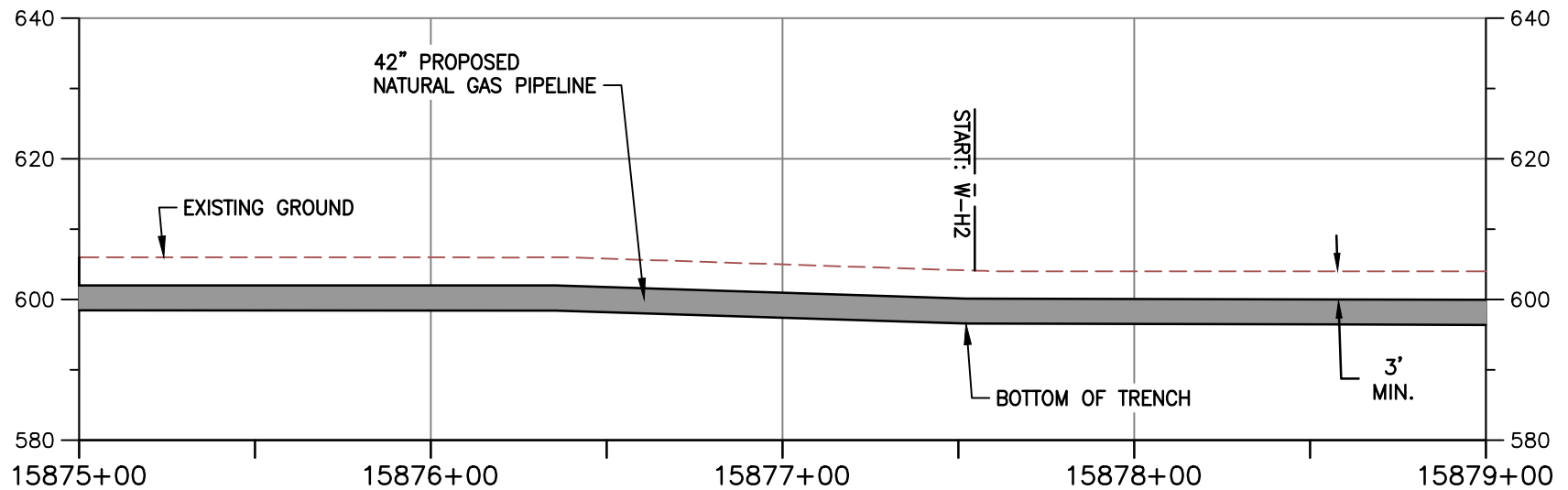
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 2 OF 2	
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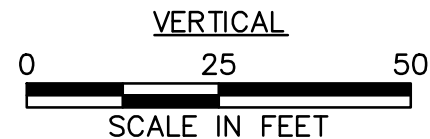
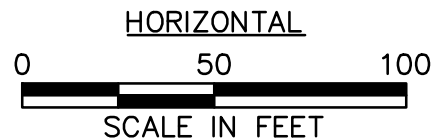








PROFILE A-A



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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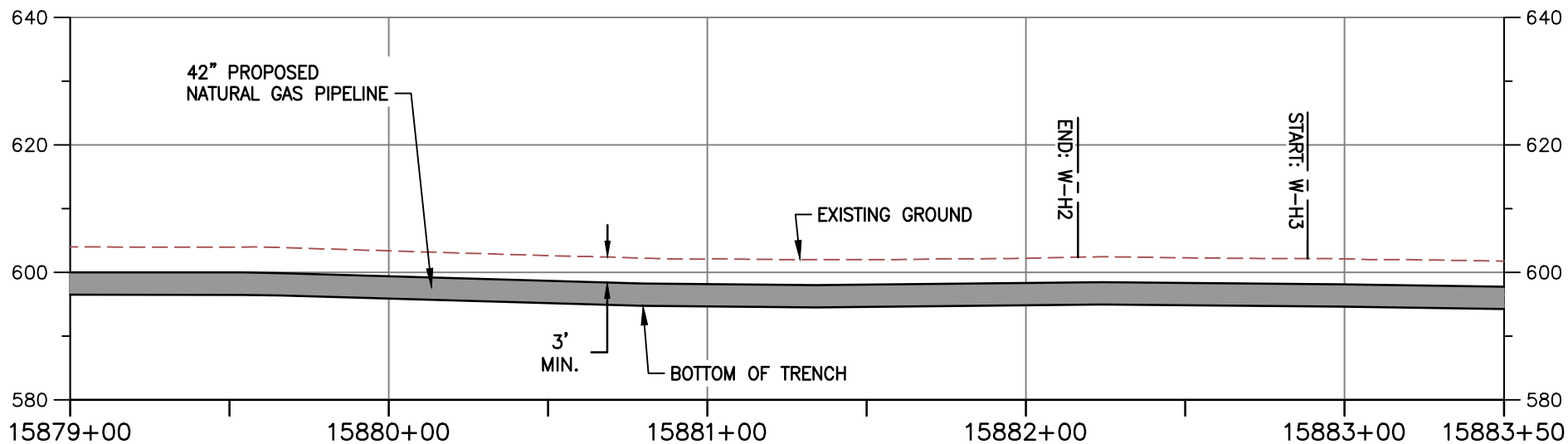
661 ANDERSEN DRIVE - FOSTER PLAZA 7
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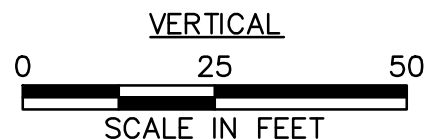
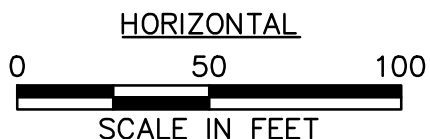
STREAM CROSSING

STREAM NAME: S-H5 (UNT TO
CHERRYSTONE CREEK)
LAT./LONG. = 36.833412, -79.359823
STATION = 15885+61
COUNTY: PITTSYLVANIA
REFER TO TABLE 2 (STREAMS) AND TABLE 3
(WETLANDS) IN THE INDIVIDUAL PERMIT
APPLICATION

DATE:	2/9/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	RD
CHECKED BY:	RE
SHEET: 4 OF 7	
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PROFILE A-A



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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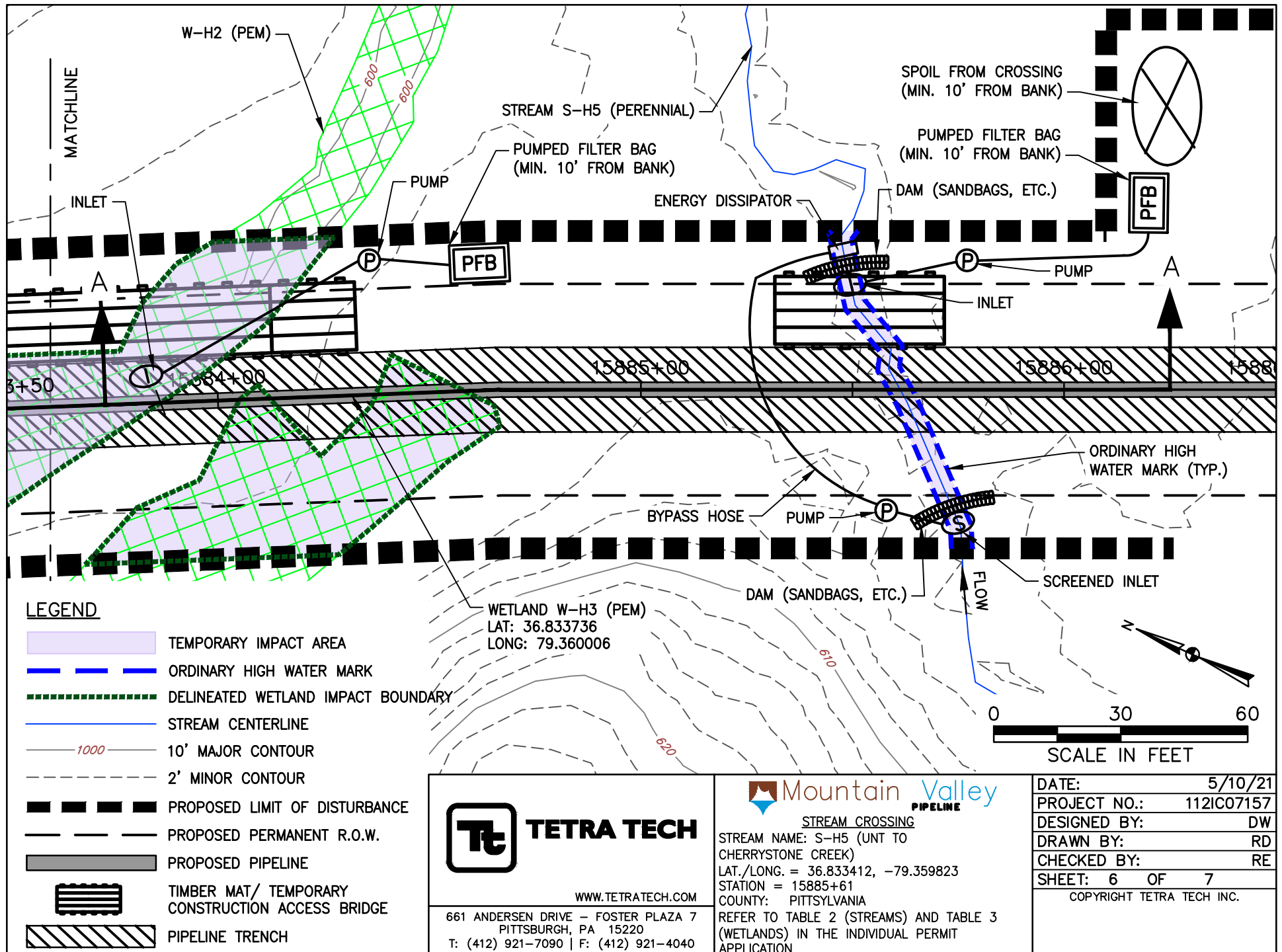


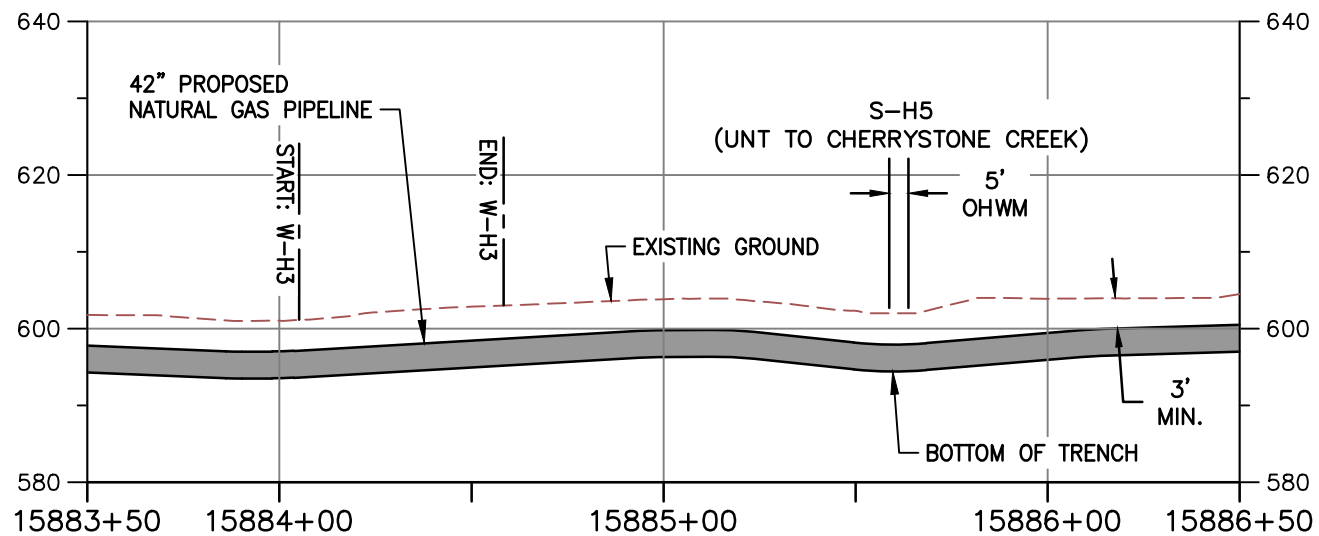
STREAM CROSSING

STREAM NAME: S-H5 (UNT TO
CHERRYSTONE CREEK)
LAT./LONG. = 36.833412, -79.359823
STATION = 15885+61
COUNTY: PITTSYLVANIA

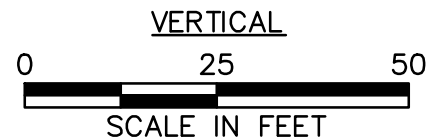
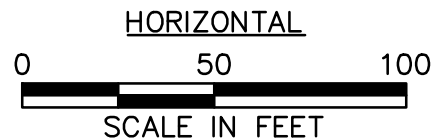
REFER TO TABLE 2 (STREAMS) AND TABLE 3
(WETLANDS) IN THE INDIVIDUAL PERMIT
APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 5 OF 7	
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PROFILE A-A



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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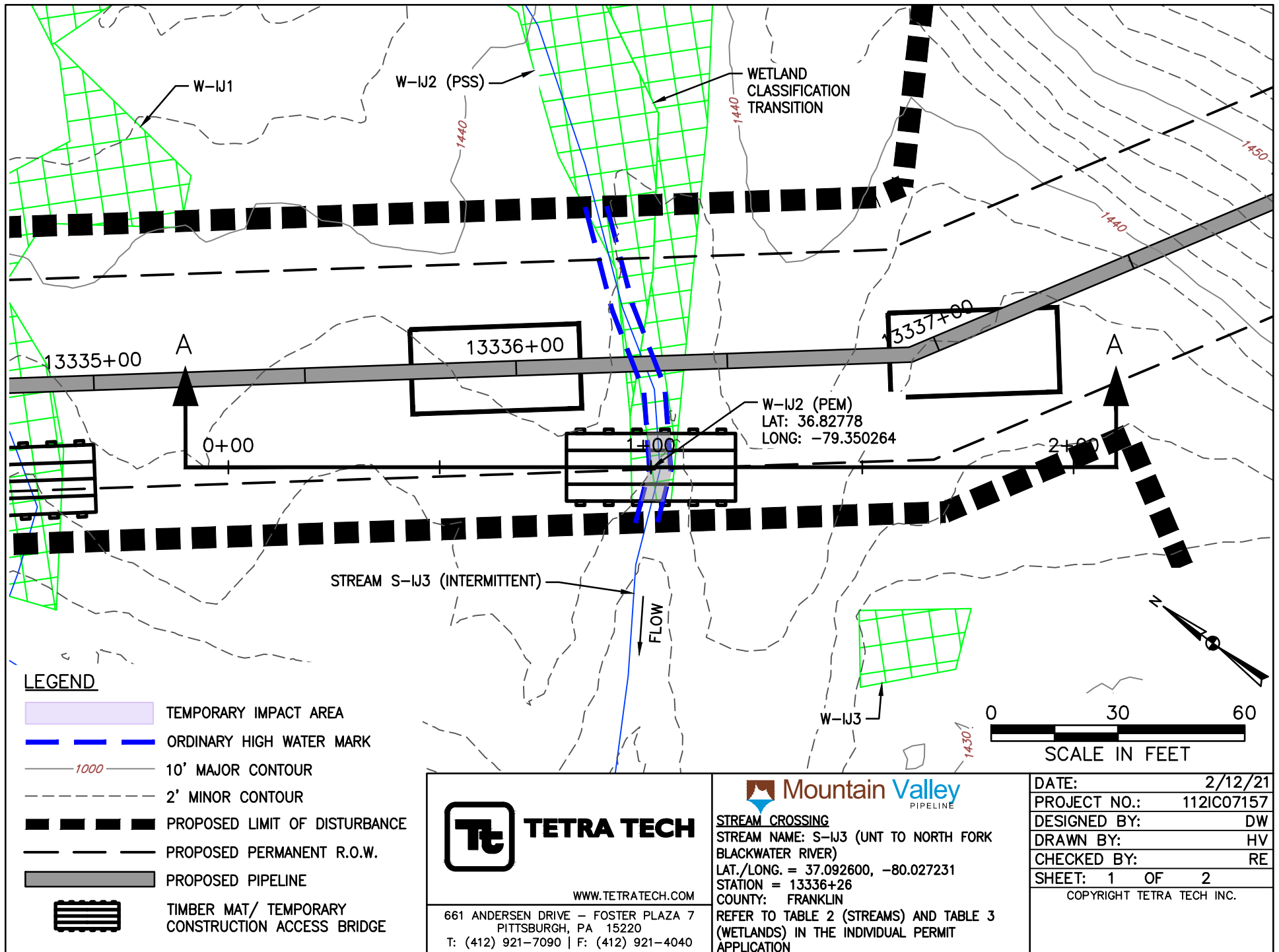
661 ANDERSEN DRIVE - FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

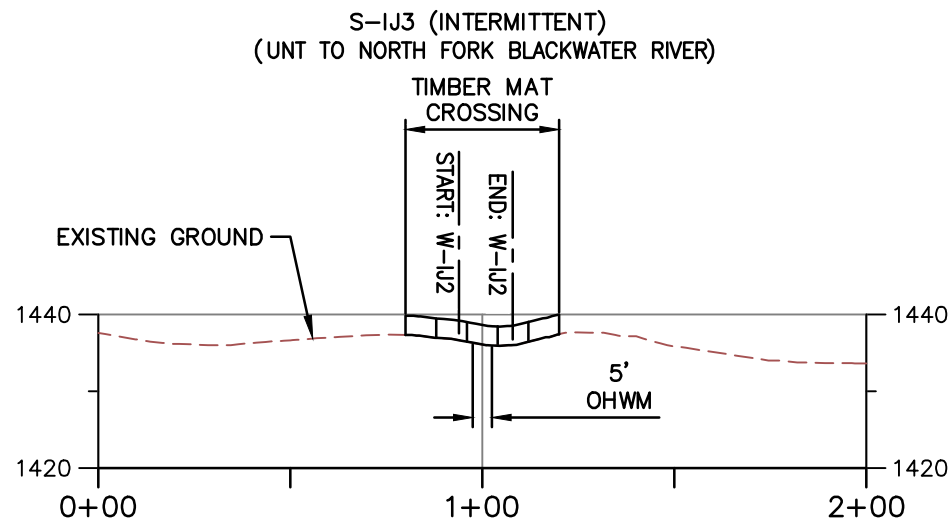


STREAM CROSSING

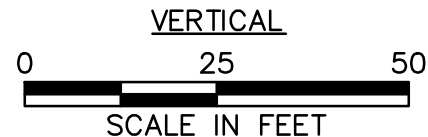
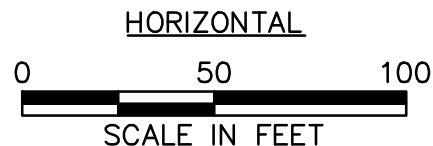
STREAM NAME: S-H5 (UNT TO CHERRYSTONE CREEK)
LAT./LONG. = 36.833412, -79.359823
STATION = 15885+61
COUNTY: PITTSYLVANIA
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE: 5/10/21
PROJECT NO.: 112IC07157
DESIGNED BY: DW
DRAWN BY: RD
CHECKED BY: RE
SHEET: 7 OF 7
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PROFILE A-A



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY
4. PIPELINE NOT SHOWN ON PROFILE BECAUSE IT HAS BEEN PREVIOUSLY CONSTRUCTED AND DOES NOT CREATE A CURRENT IMPACT.



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STREAM CROSSING

STREAM NAME: S-IJ3 (UNT TO NORTH FORK BLACKWATER RIVER)

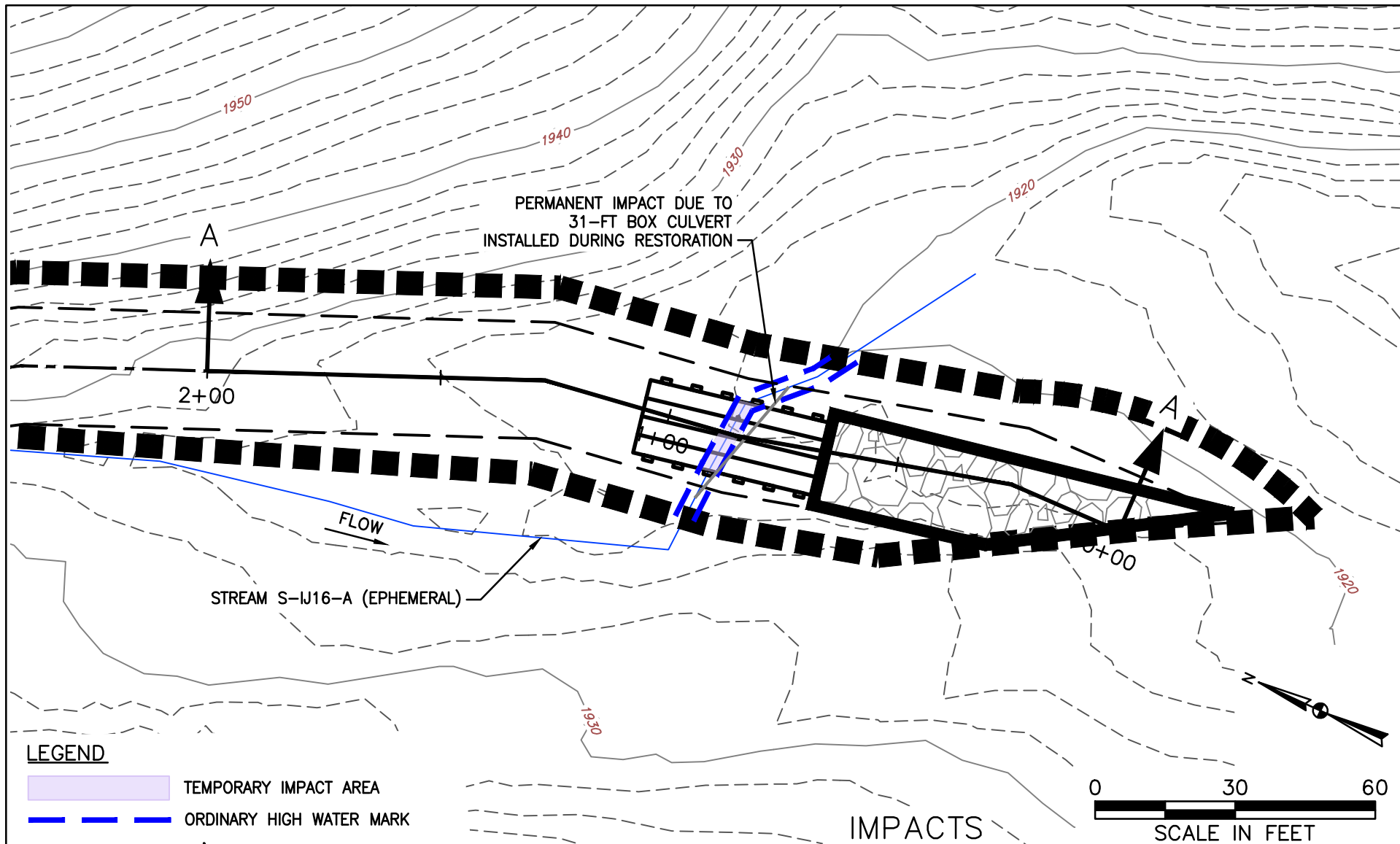
LAT./LONG. = 37.092600, -80.027231

STATION = 13336+26

COUNTY: FRANKLIN

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/12/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	HV
CHECKED BY:	RE
SHEET: 2 OF 2	
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LEGEND

- TEMPORARY IMPACT AREA
- ORDINARY HIGH WATER MARK
- 10' MAJOR CONTOUR
- 2' MINOR CONTOUR
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED PERMANENT R.O.W.
- ACCESS ROAD CENTERLINE
- TIMBER MAT/ TEMPORARY CONSTRUCTION ACCESS BRIDGE

IMPACTS



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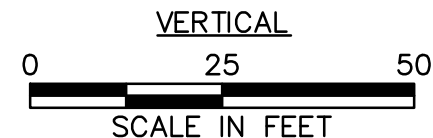
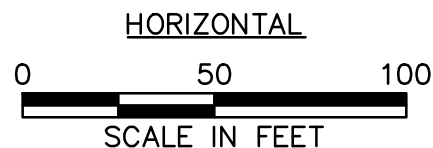
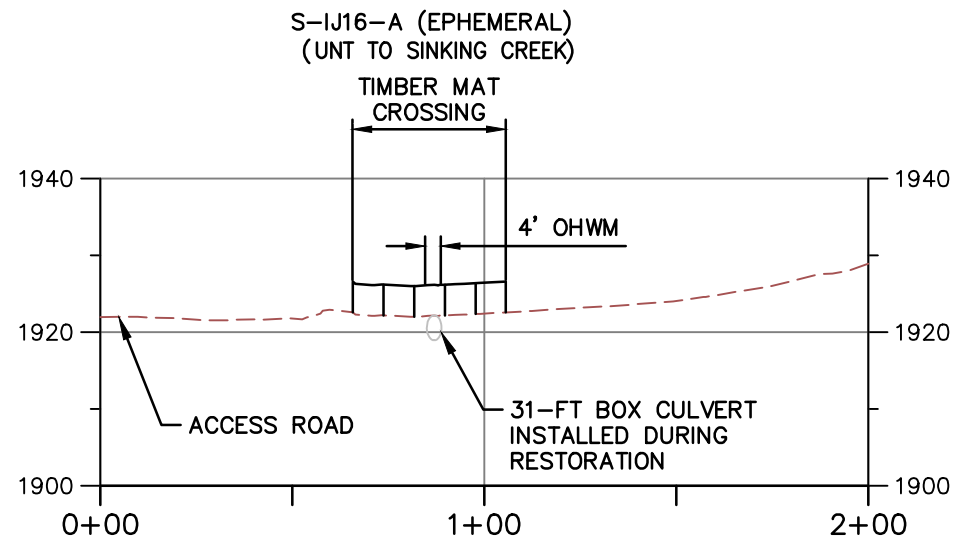


STREAM CROSSING

STREAM NAME: S-IJ16a (UNT TO SINKING CREEK)
LAT./LONG. = 37.311730, -80.544091
AR STATION = 0+87
COUNTY: GILES
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	MP
CHECKED BY:	RE
SHEET: 1 OF 5	

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IMPACTS

NOTE:

1. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
2. EXISTING GRADE SHOWN IN PROFILE A-A BASED ON SAME LIDAR CONTOURS AS SHOWN ON SHEET 1 AND CORRESPONDING ESC PLAN.



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STREAM CROSSING

STREAM NAME: S-IJ16a (UNT TO SINKING CREEK)

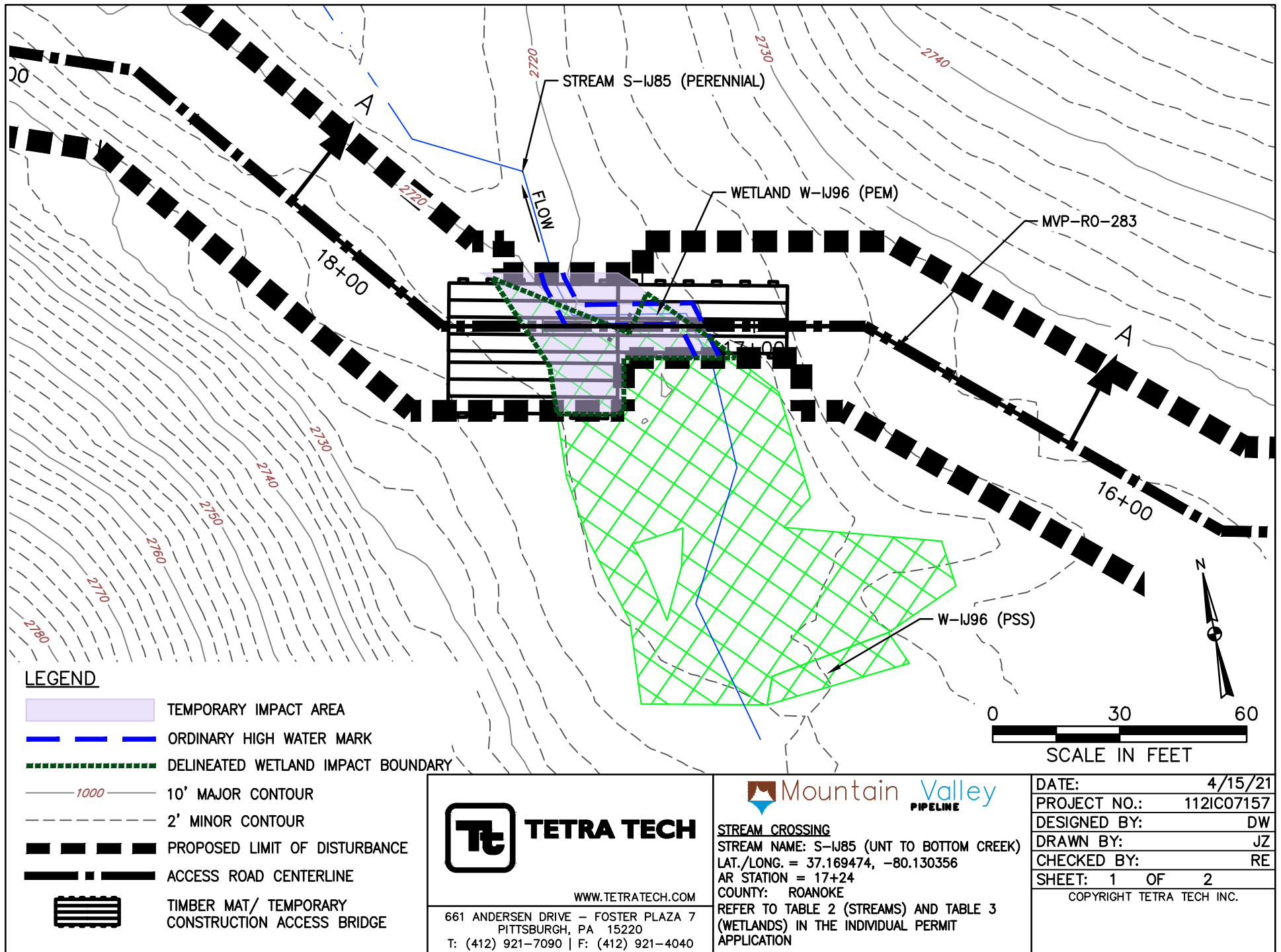
LAT./LONG. = 37.311730, -80.544091

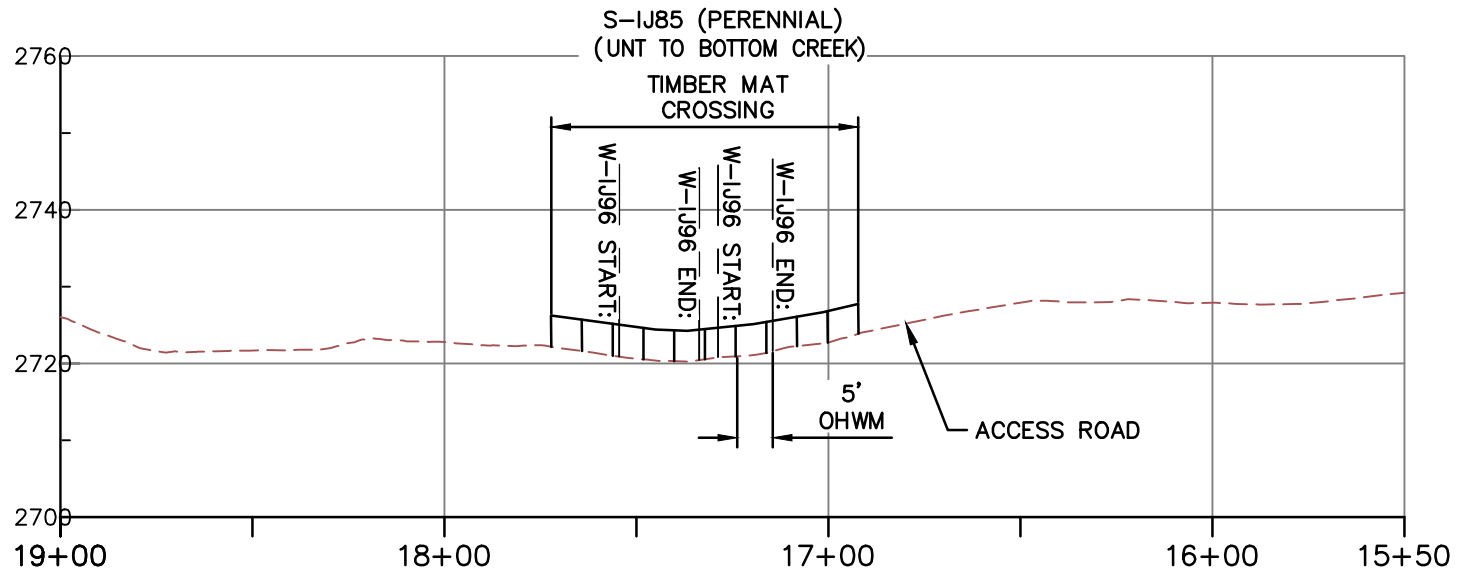
AR STATION = 0+87

COUNTY: GILES

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	MP
CHECKED BY:	RE
SHEET: 2 OF 5	
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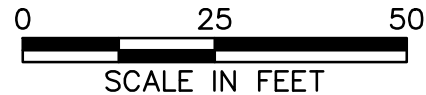


PROFILE A-A

HORIZONTAL



VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.



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STREAM CROSSING

STREAM NAME: S-IJ85 (UNT TO BOTTOM CREEK)

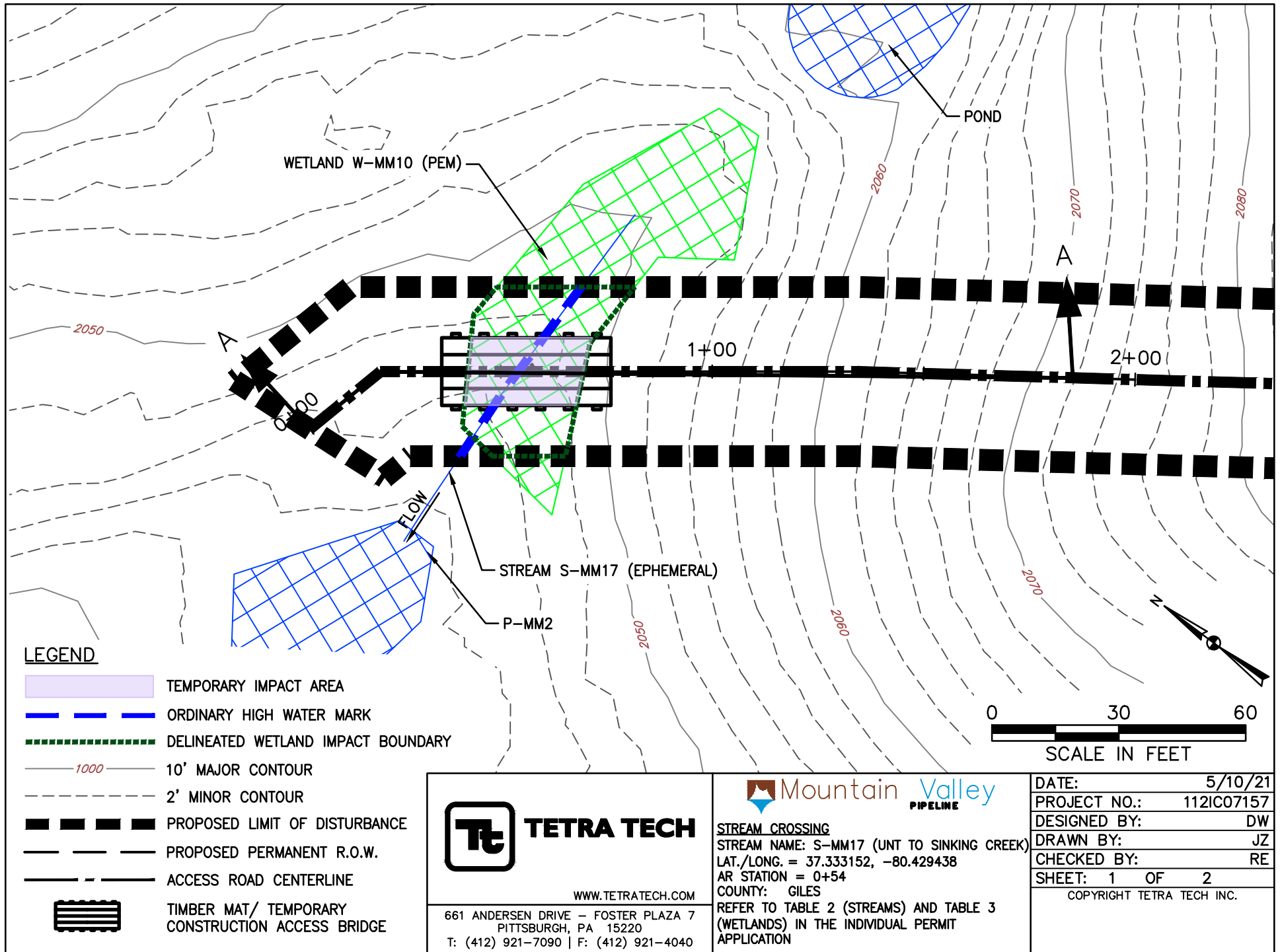
LAT./LONG. = 37.169474, -80.130356

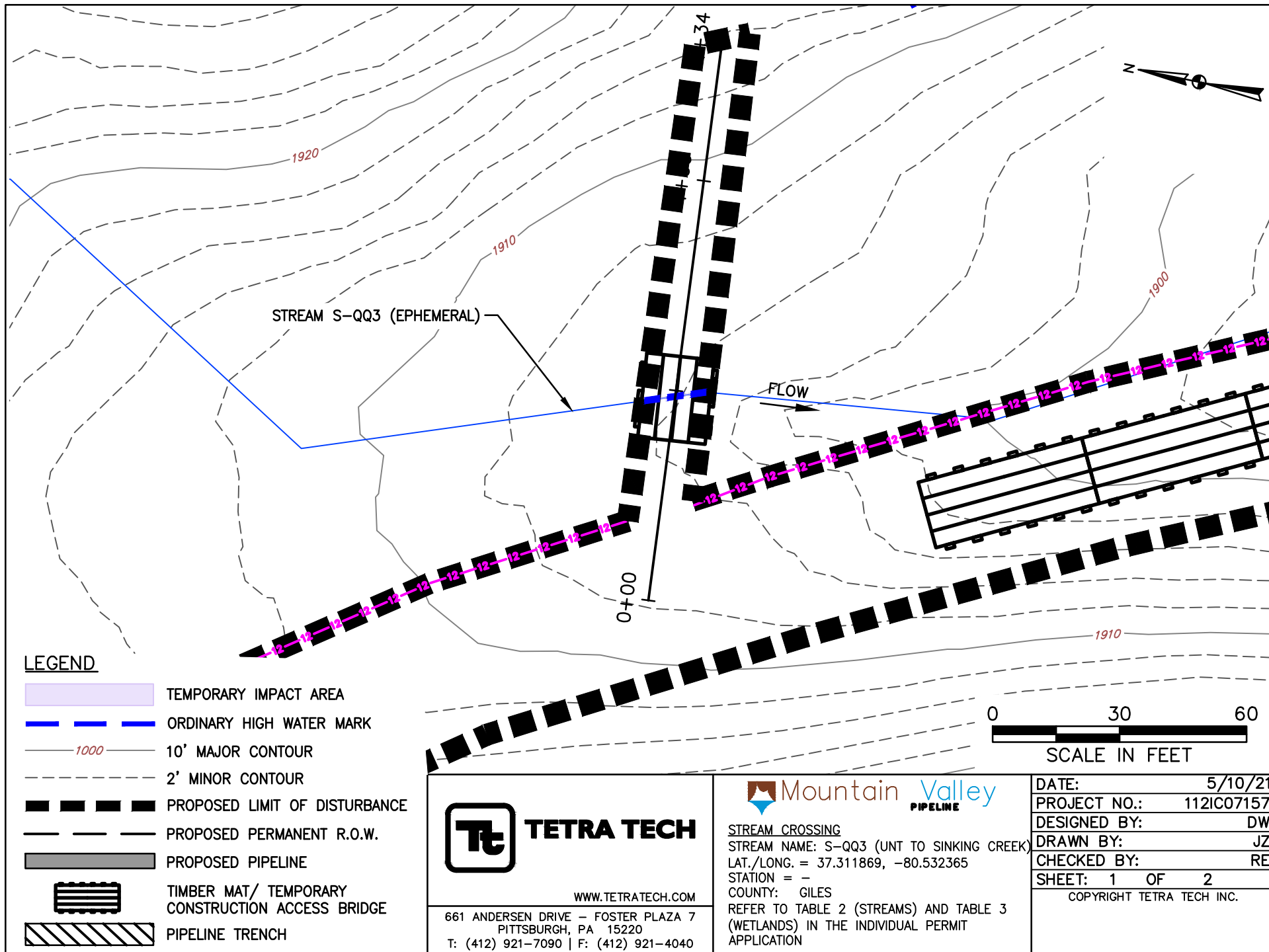
AR STATION = 17+24

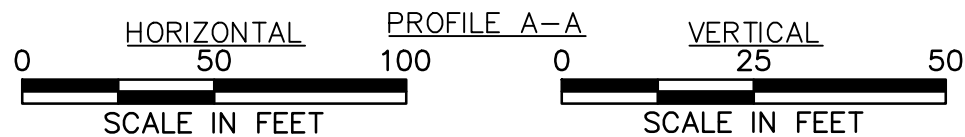
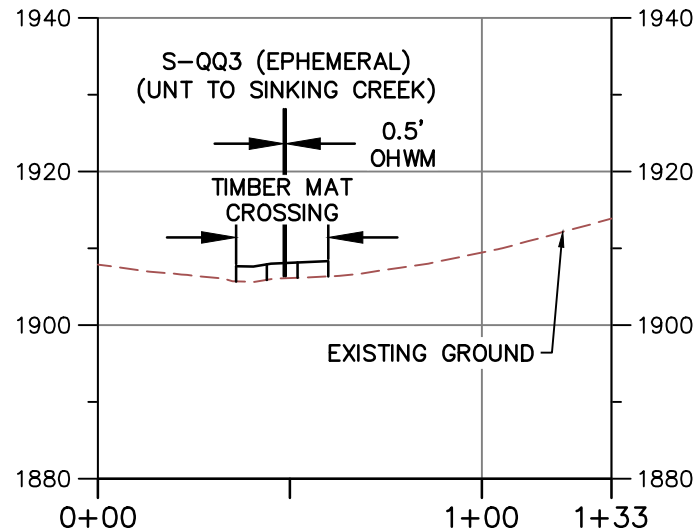
COUNTY: ROANOKE

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	4/15/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 2 OF 2	
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NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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STREAM CROSSING

STREAM NAME: S-QQ3 (UNT TO SINKING CREEK)

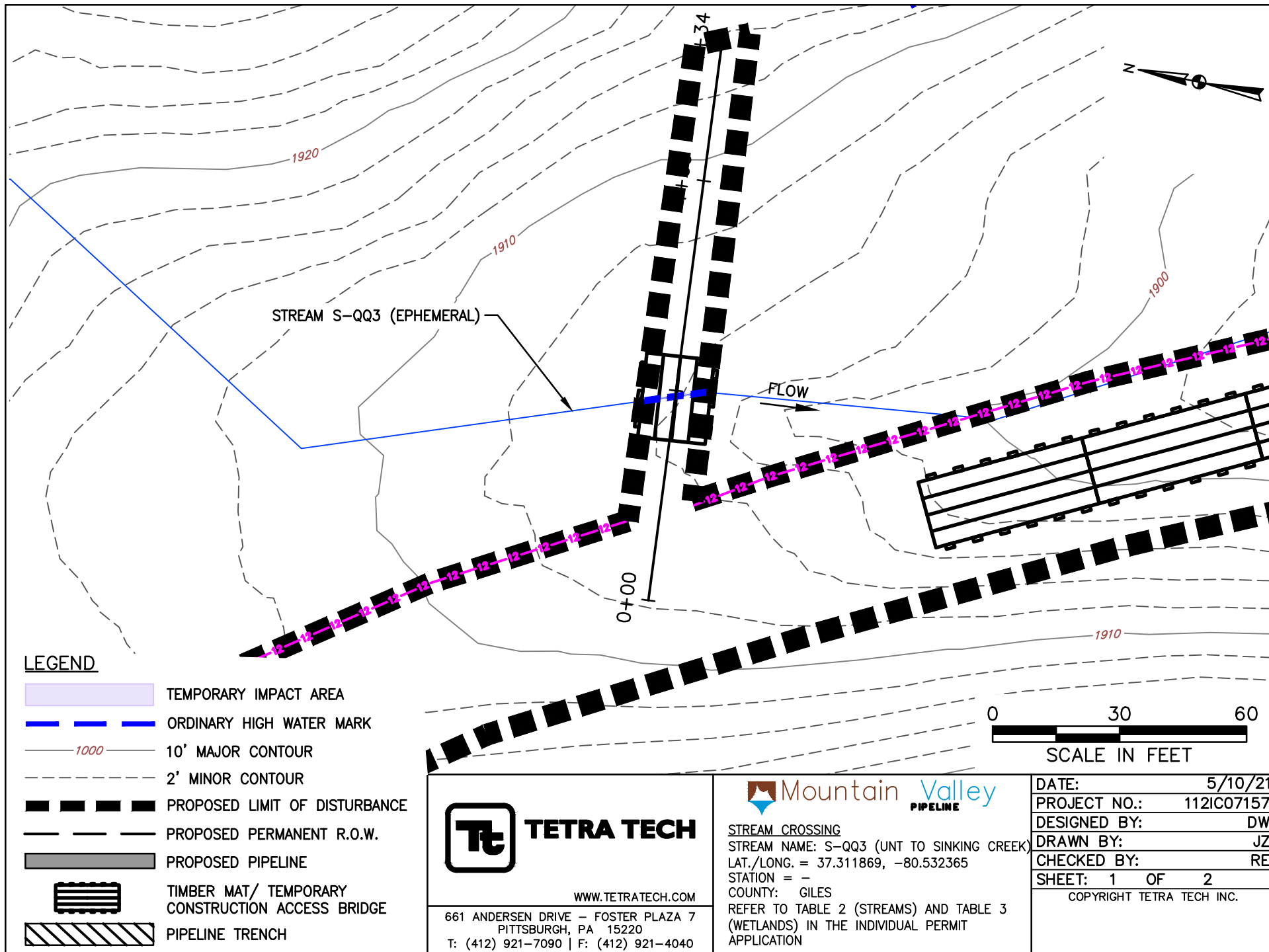
LAT./LONG. = 37.311869, -80.532365

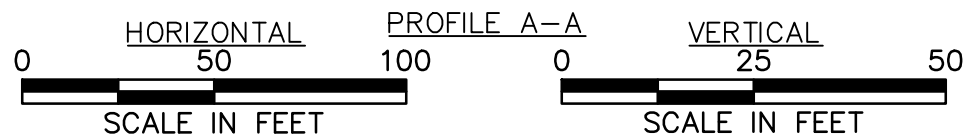
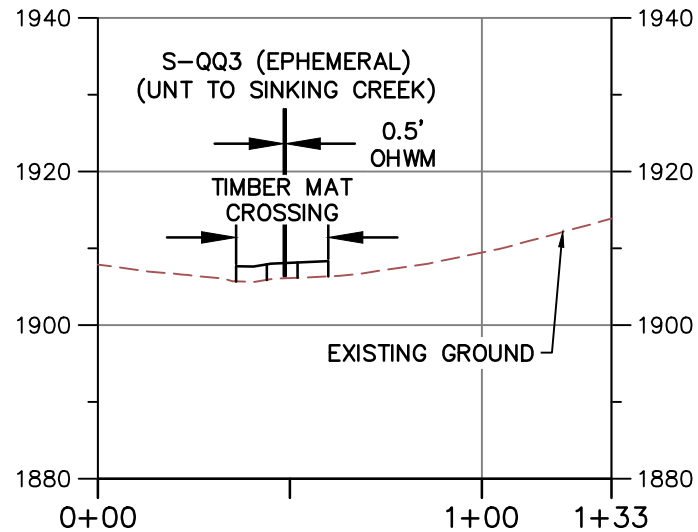
STATION = -

COUNTY: GILES

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 2 OF 2	
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NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY



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STREAM CROSSING

STREAM NAME: S-QQ3 (UNT TO SINKING CREEK)

LAT./LONG. = 37.311869, -80.532365

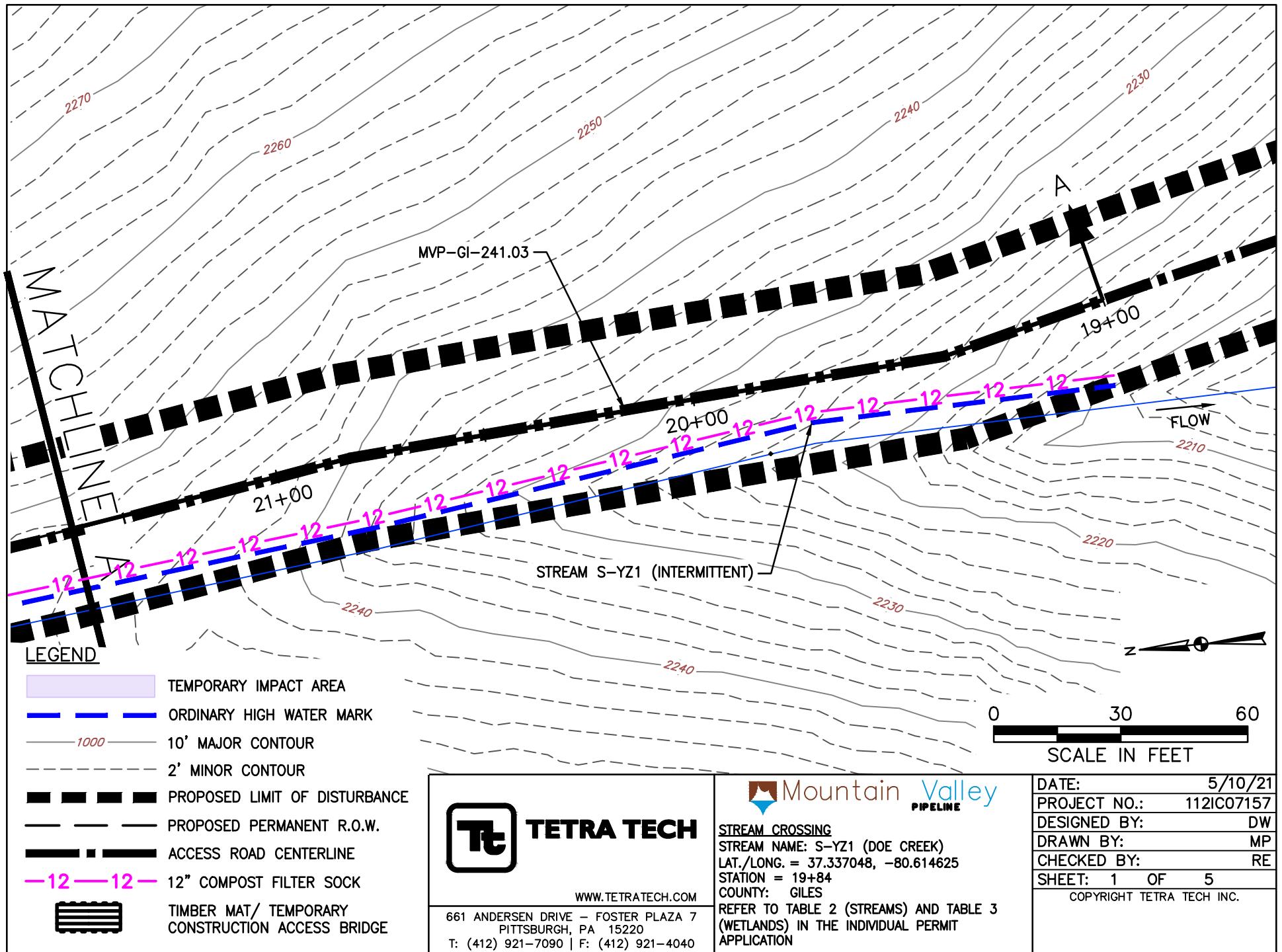
STATION = -

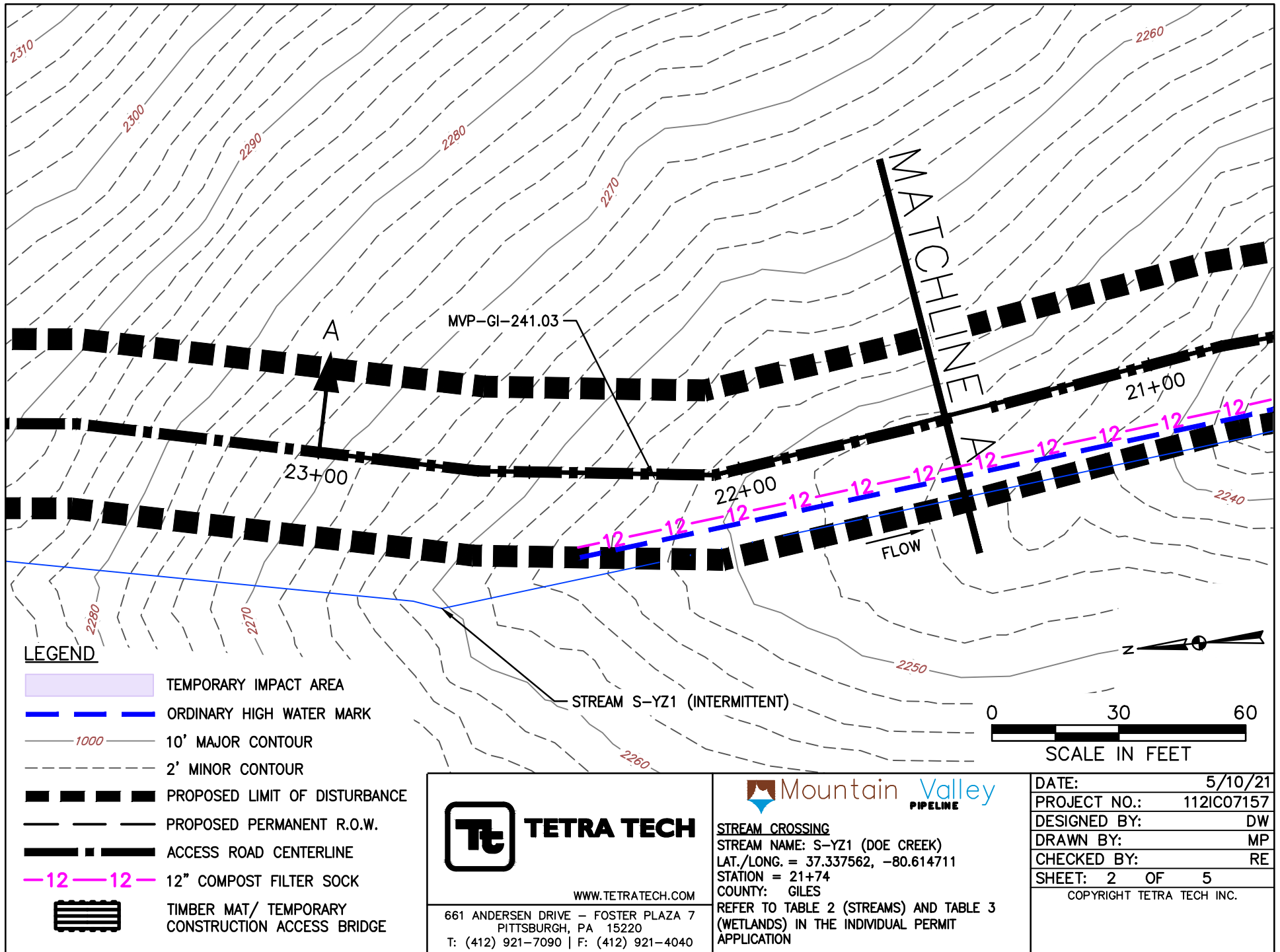
COUNTY: GILES

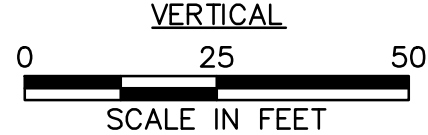
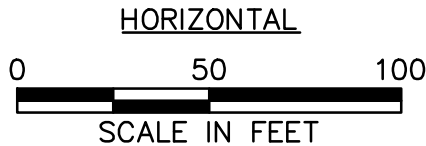
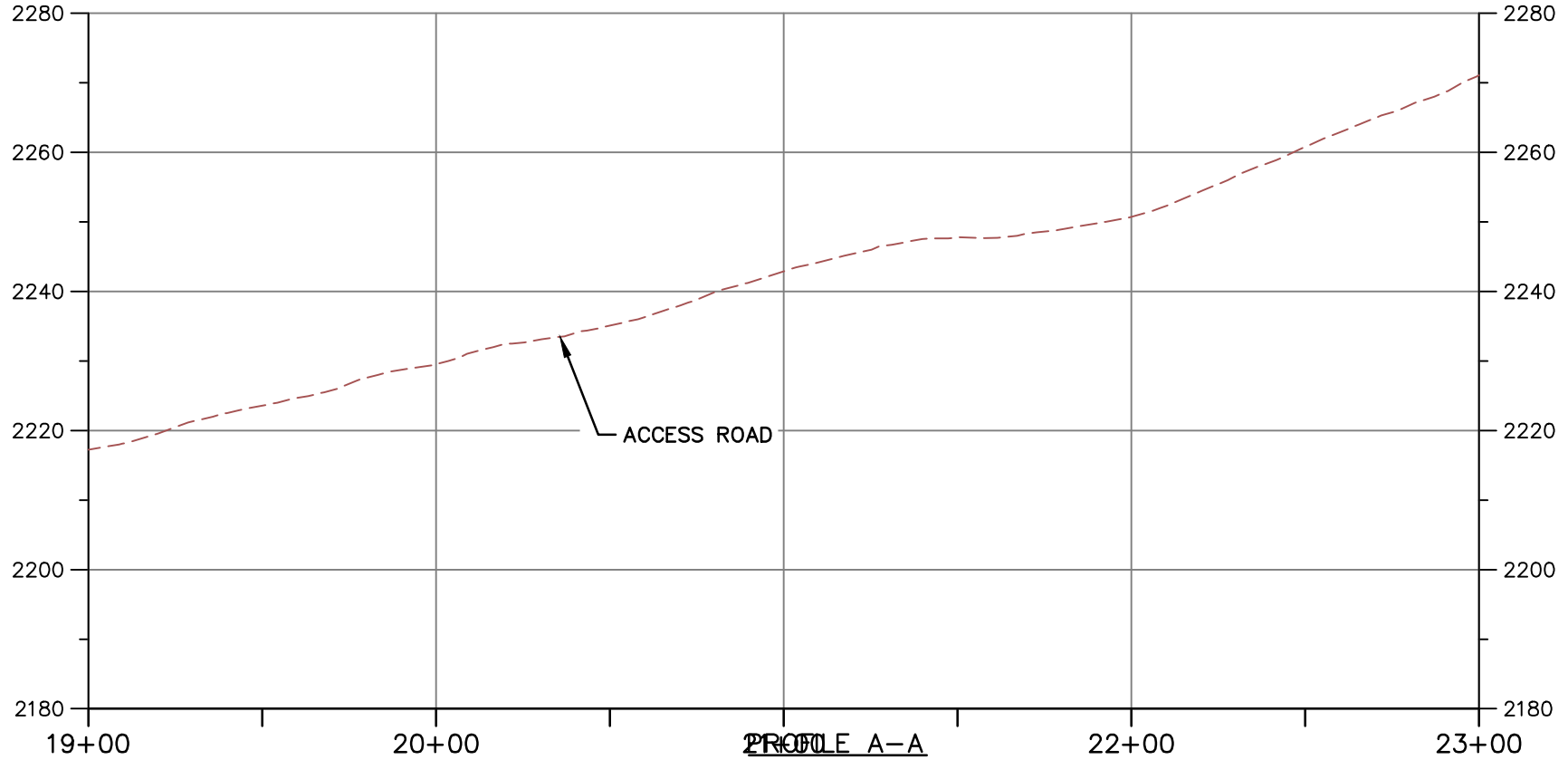
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 2 OF 2	

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NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.



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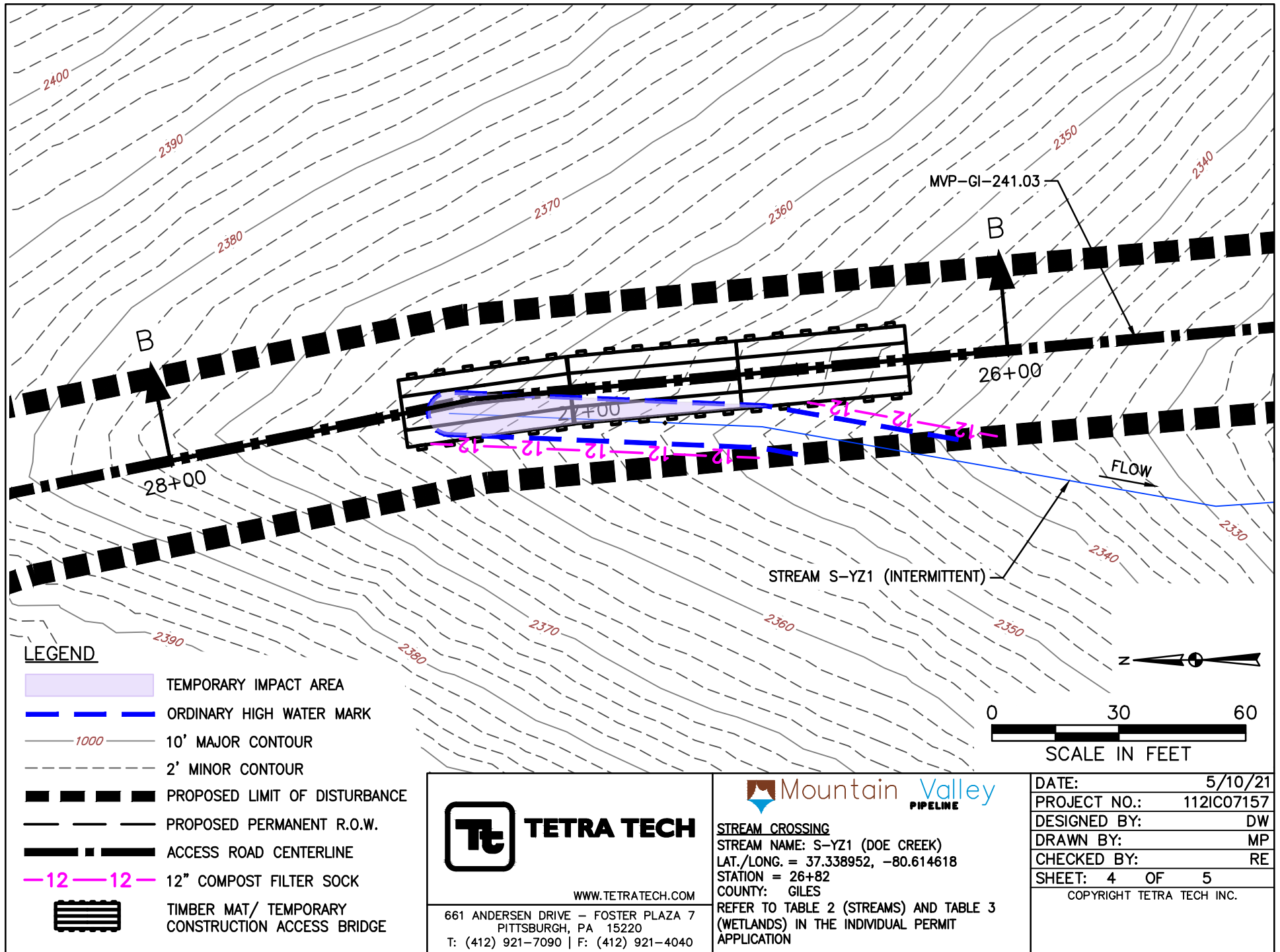
STREAM CROSSING

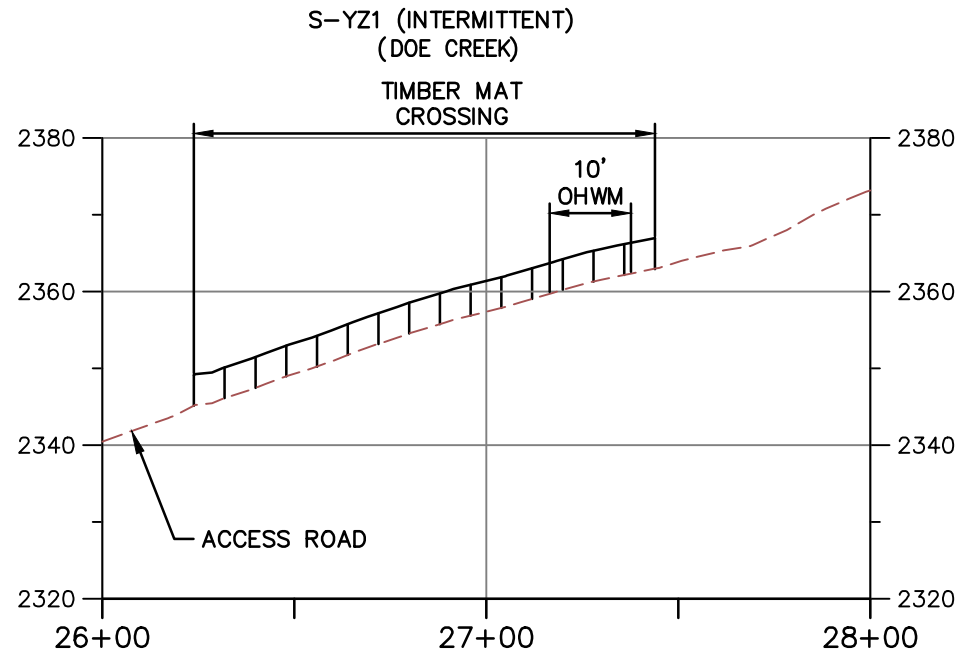
STREAM NAME: S-YZ1 (DOE CREEK)
LAT./LONG. = 37.337048, -80.614625
STATION = 19+84
COUNTY: GILES

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

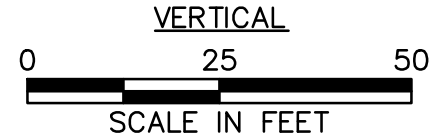
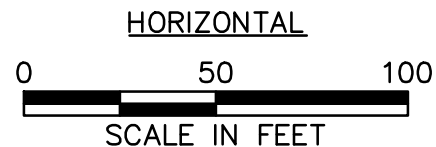
DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	MP
CHECKED BY:	RE
SHEET:	3 OF 5

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PROFILE B-B



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.



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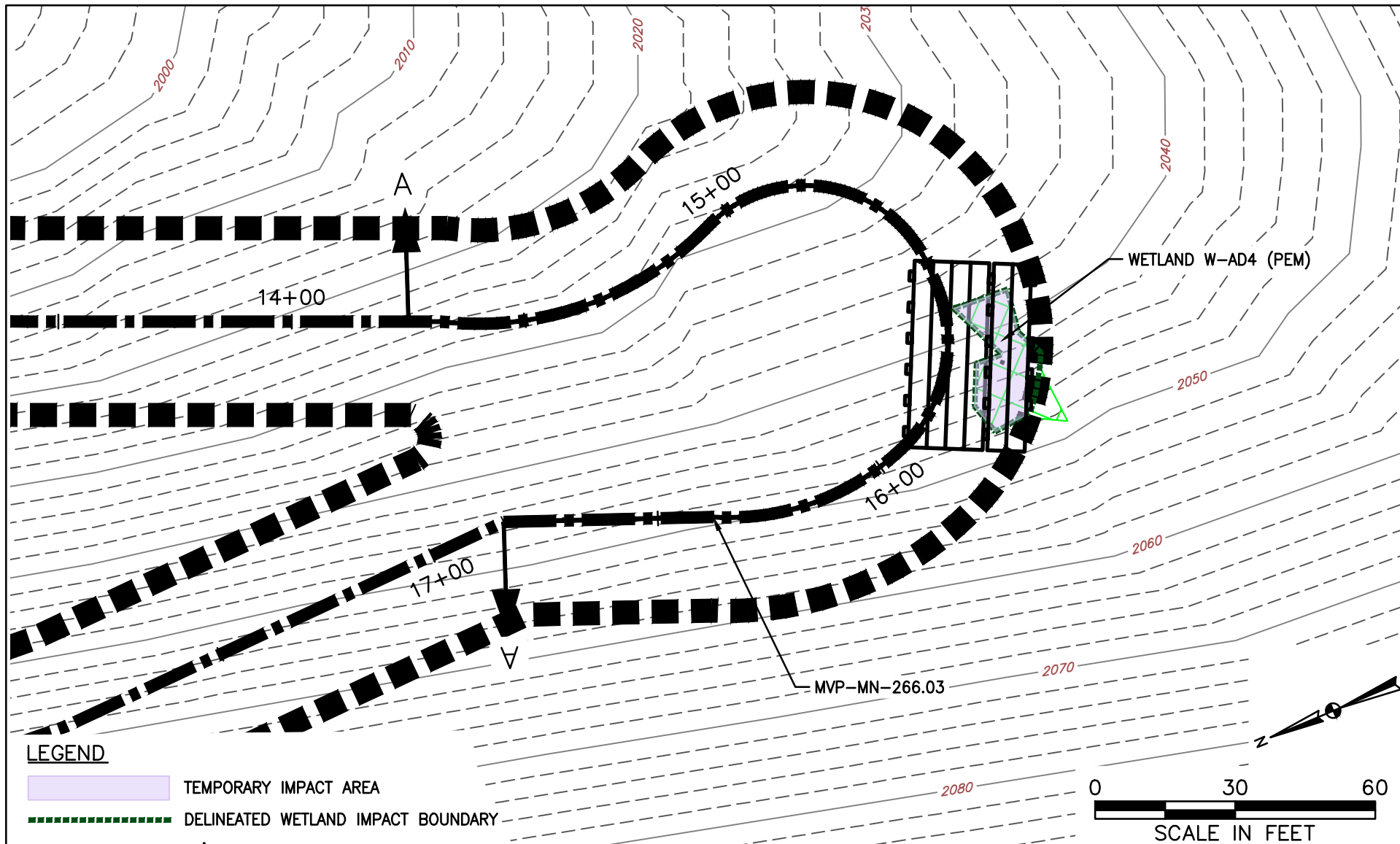
STREAM CROSSING

STREAM NAME: S-YZ1 (DOE CREEK)
LAT./LONG. = 37.338952, -80.614618
STATION = 26+82
COUNTY: GILES

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	MP
CHECKED BY:	RE
SHEET: 5 OF 5	

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LEGEND

- TEMPORARY IMPACT AREA
- DELINEATED WETLAND IMPACT BOUNDARY
- 1000 10' MAJOR CONTOUR
- 2' MINOR CONTOUR
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED PERMANENT R.O.W.
- ACCESS ROAD CENTERLINE
- TIMBER MAT/ TEMPORARY CONSTRUCTION ACCESS BRIDGE



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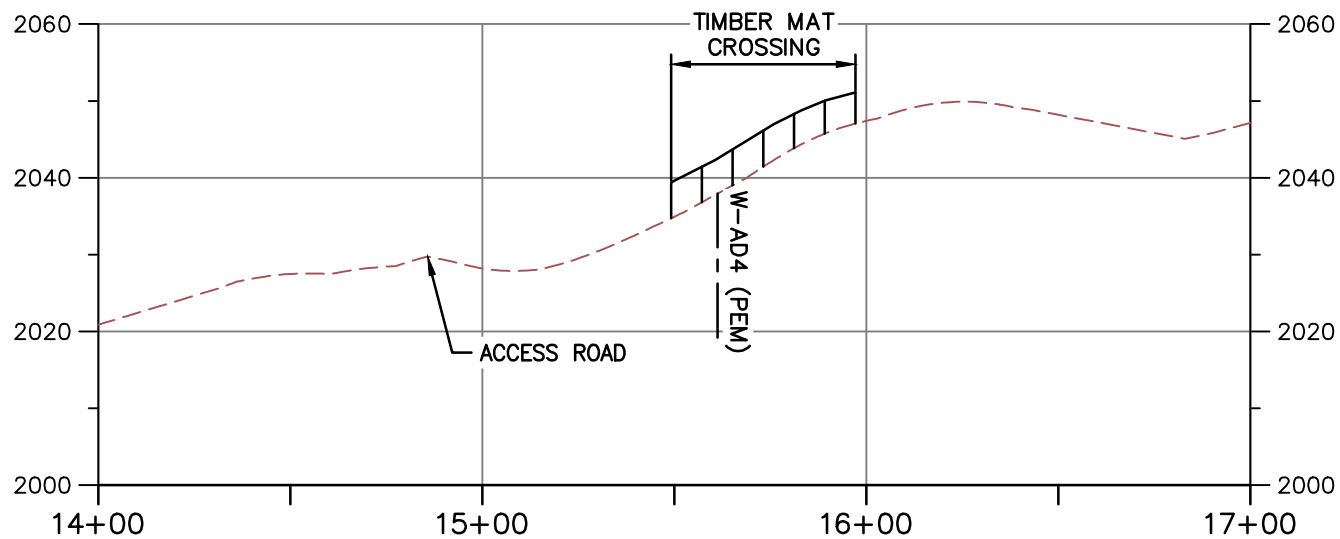


WETLAND CROSSING

WETLAND NAME: W-AD4
LAT./LONG. = 37.286984, -80.330124
AR STATION = 15+68
COUNTY: MONTGOMERY
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET:	1 OF 2

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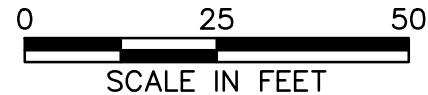


PROFILE A-A

HORIZONTAL



VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.



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PITTSBURGH, PA 15220
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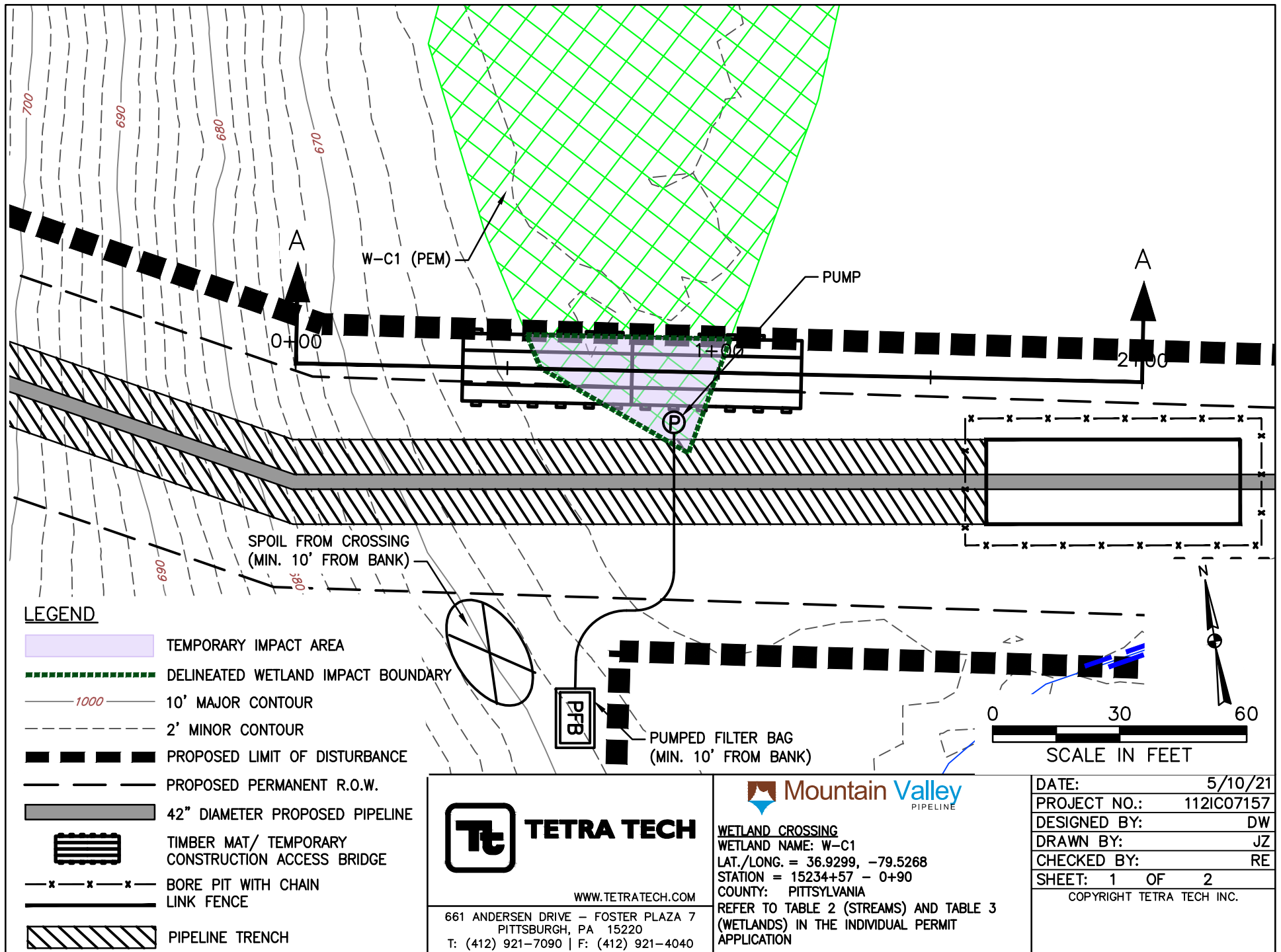
WETLAND CROSSING

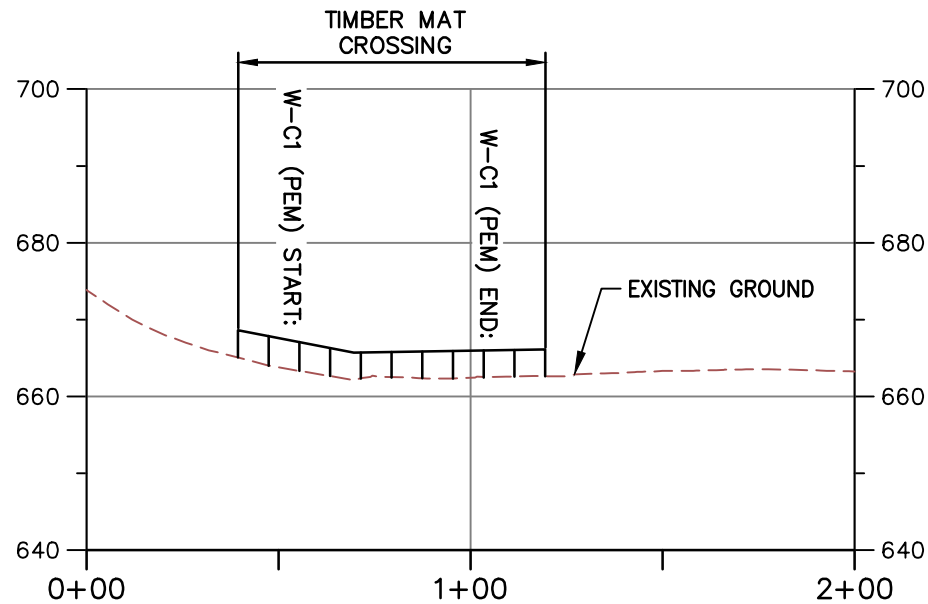
WETLAND NAME: W-AD4
LAT./LONG. = 37.286984, -80.330124
AR STATION = 15+68
COUNTY: MONTGOMERY

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 2 OF 2	

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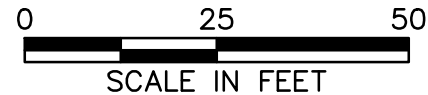


PROFILE A-A

HORIZONTAL



VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
4. PIPELINE NOT SHOWN ON PROFILE BECAUSE IT IS A BORE BELOW SURFACE WATER AND DOES NOT CREATE AN IMPACT.



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WETLAND CROSSING

WETLAND NAME: W-C1

LAT./LONG. = 36.9299, -79.5268

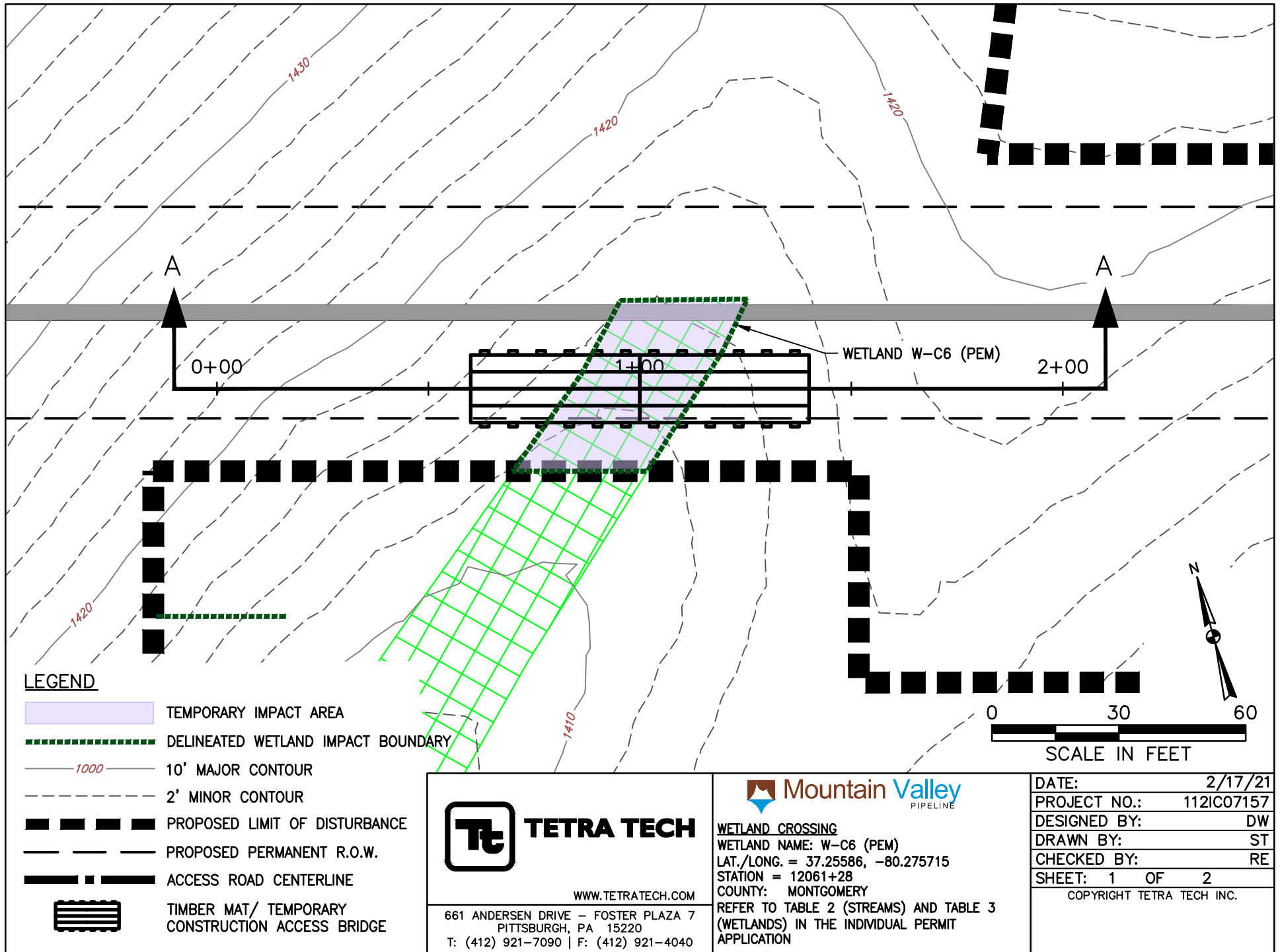
STATION = 15234+57 - 0+90

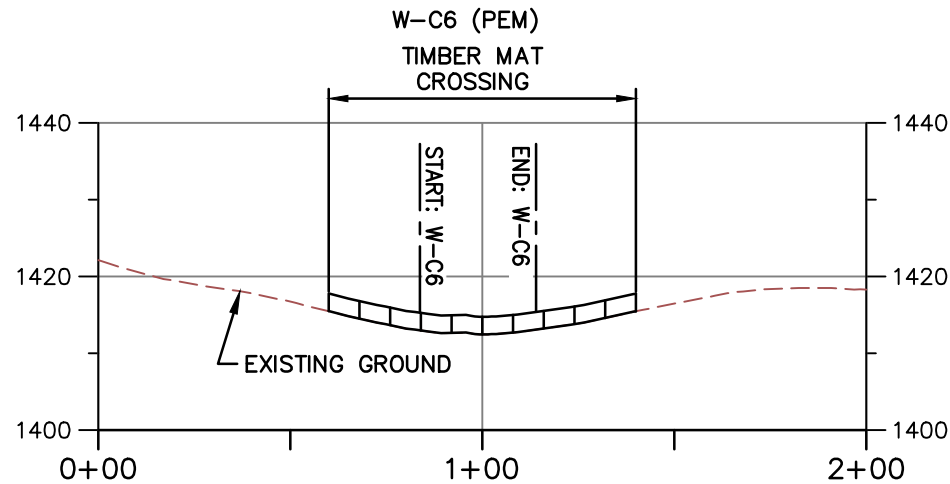
COUNTY: PITTSYLVANIA

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

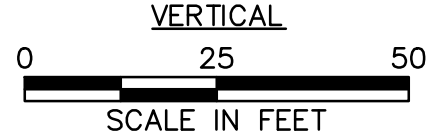
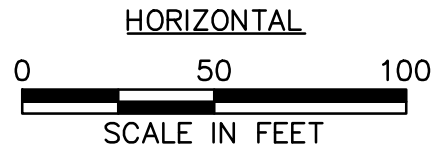
DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 2 OF 2	

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PROFILE A-A



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
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WETLAND CROSSING

WETLAND NAME: W-C6 (PEM)

LAT./LONG. = 37.25586, -80.275715

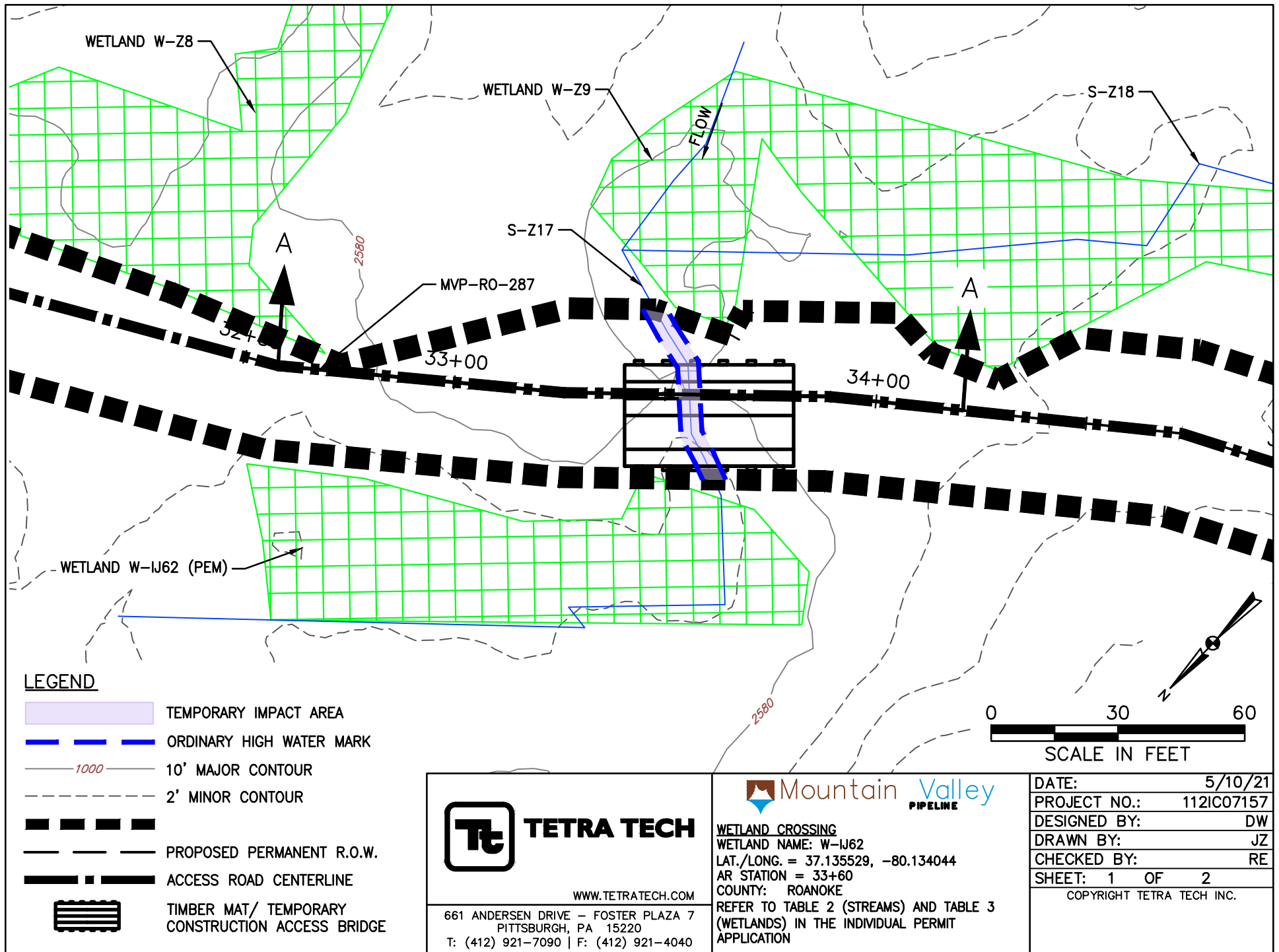
STATION = 12061+28

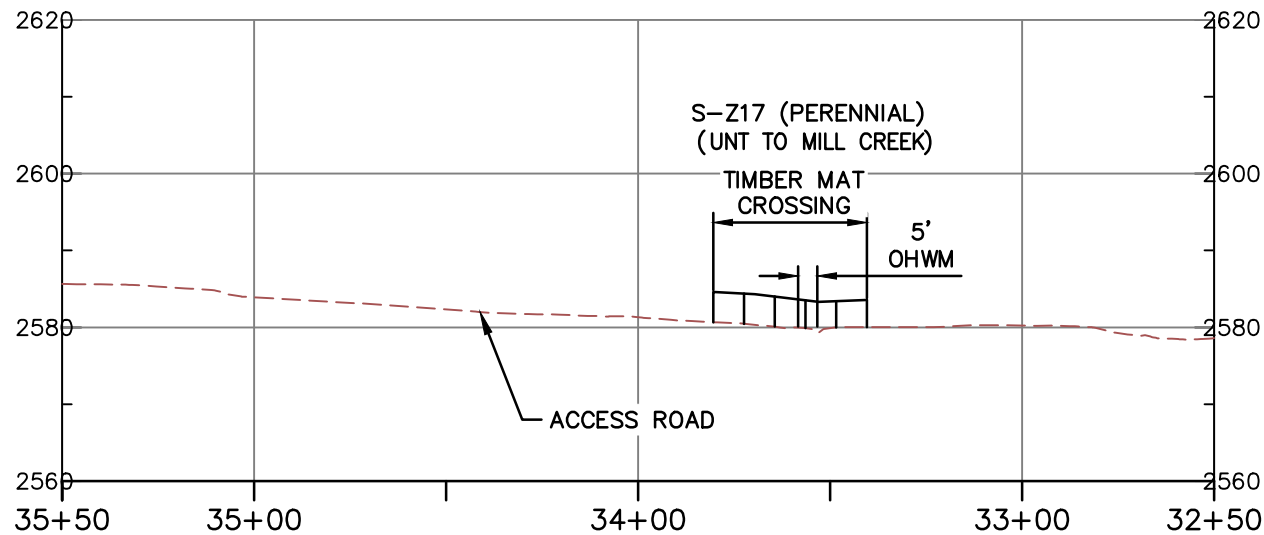
COUNTY: MONTGOMERY

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/16/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	ST
CHECKED BY:	RE
SHEET: 2 OF 2	

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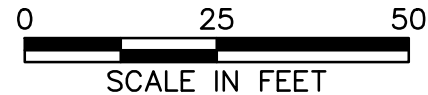


PROFILE A-A

HORIZONTAL



VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.



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WETLAND CROSSING

WETLAND NAME: W-IJ62

LAT./LONG. = 37.135529, -80.134044

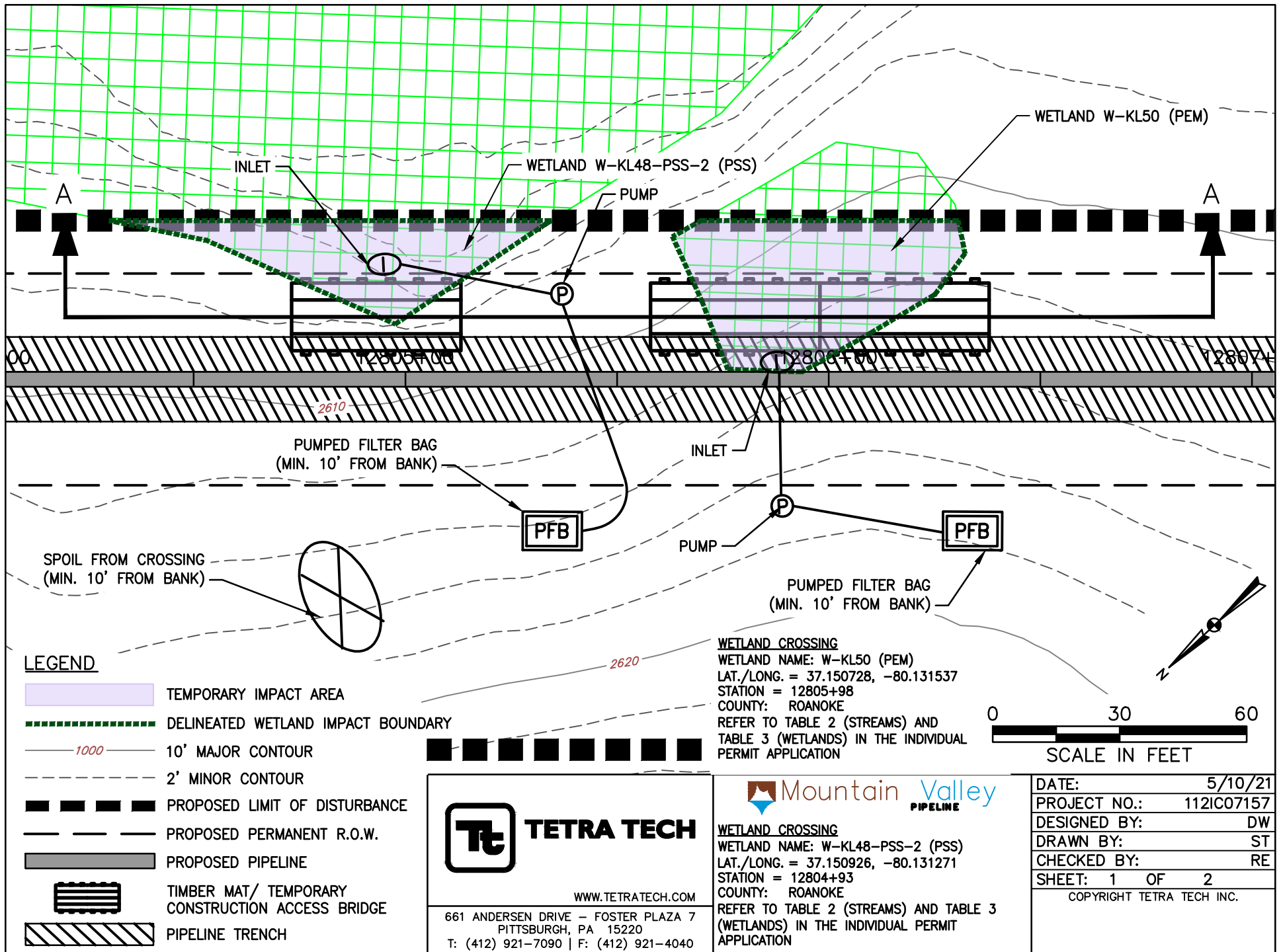
AR STATION = 33+60

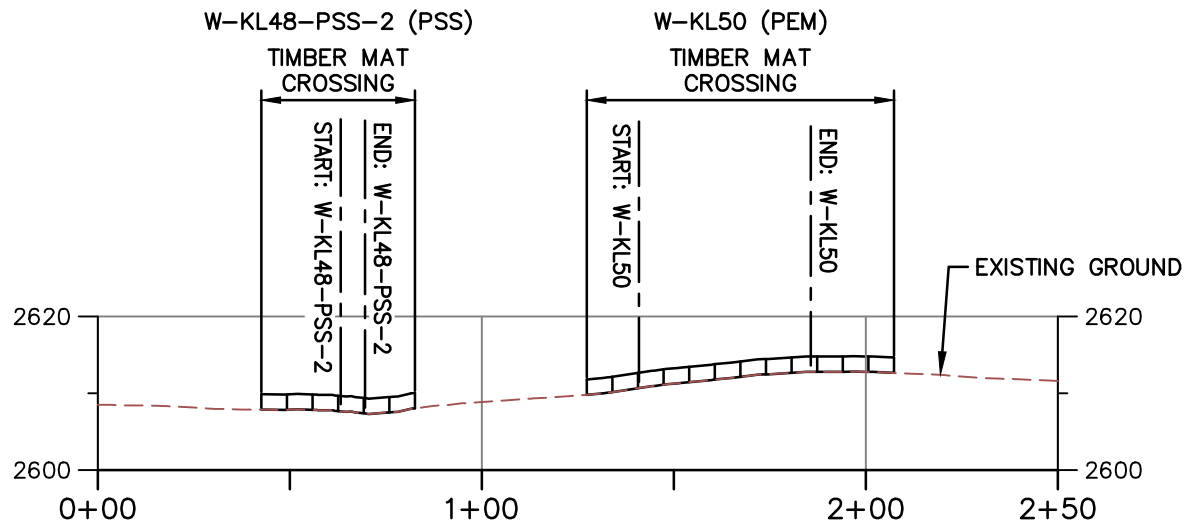
COUNTY: ROANOKE

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	5/10/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 2 OF 2	

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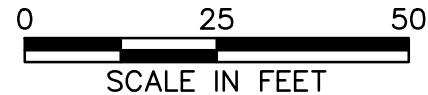


PROFILE A-A

HORIZONTAL



VERTICAL



WETLAND CROSSING

WETLAND NAME: W-KL50 (PEM)
 LAT./LONG. = 37.150728, -80.131537
 STATION = 12805+98
 COUNTY: ROANOKE
 REFER TO TABLE 2 (STREAMS) AND
 TABLE 3 (WETLANDS) IN THE INDIVIDUAL
 PERMIT APPLICATION

NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
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3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.



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WETLAND CROSSING

WETLAND NAME: W-KL48-PSS-2 (PSS)
 LAT./LONG. = 37.150926, -80.131271
 STATION = 12804+93
 COUNTY: ROANOKE

REFER TO TABLE 2 (STREAMS) AND TABLE 3
 (WETLANDS) IN THE INDIVIDUAL PERMIT
 APPLICATION

DATE: 5/10/21
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 CHECKED BY: RE
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Attachment 2:

Updated Figures

(4-546; 4-547; 4-559; 4-650; 4-651; 4-677; and 4-690)



Legend

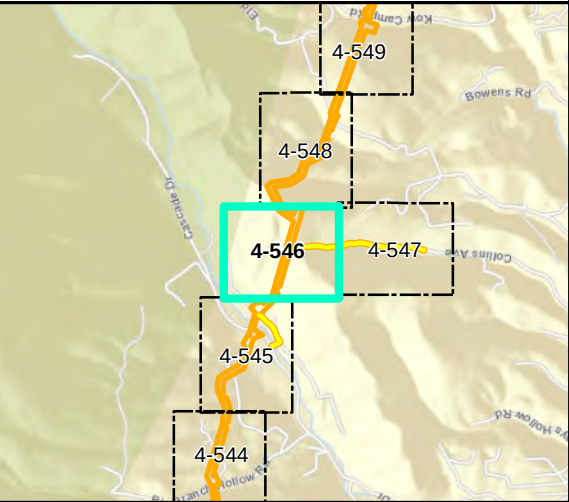
Milepost	Pond
Alignment Centerline	Wetland
Access Road Temporary LOD	Palustrine Forested
Access Road Permanent LOD	Palustrine Emergent
Permanent Facility	Palustrine Scrub-Shrub
Limit of Disturbance	Stream Impact
Bore Pit	Temporary
Culvert	Permanent
Stream	Wetland Impact
Intermittent	Temporary
Ephemeral	Conversion
Perennial	Permanent Fill

Note:
Refer to Table 2 (Streams) and Table 3 (Wetlands) in the Individual Permit Application for information on resource impacts.

NAD 1983 UTM 17N

1 in = 200 ft

200 160 120 80 40 0 200 Feet



Mountain Valley Pipeline Project



Detail Map
Individual Permit Application

Figure 4-546
Giles County, Virginia

May 2021

Data Sources: Imagery from Virginia Geographic Information Network (VGIN) 2017, 2018, 2019. Elevation data derived from LiDAR provided by EQT 2016 and from Radford University DEM files.



Legend

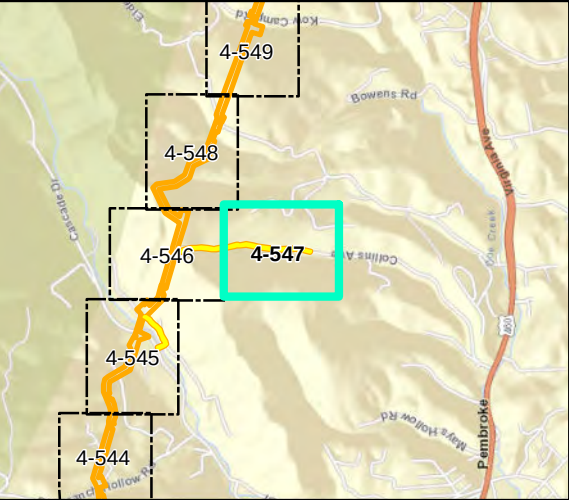
○ Milepost	▨ Pond
- - - Alignment Centerline	Wetland
▭ Access Road Temporary LOD	▨ Palustrine Forested
▭ Access Road Permanent LOD	▨ Palustrine Emergent
▭ Permanent Facility	▨ Palustrine Scrub-Shrub
▭ Limit of Disturbance	Stream Impact
▭ Bore Pit	— Temporary
▭ Culvert	— Permanent
Stream	Wetland Impact
- - - Intermittent	▨ Temporary
— Ephemeral	▨ Conversion
- · - · - Perennial	▨ Permanent Fill

Note:
Refer to Table 2 (Streams) and Table 3 (Wetlands) in the Individual Permit Application for information on resource impacts.

NAD 1983 UTM 17N

1 in = 200 ft

200 160 120 80 40 0 200 Feet



Mountain Valley Pipeline Project

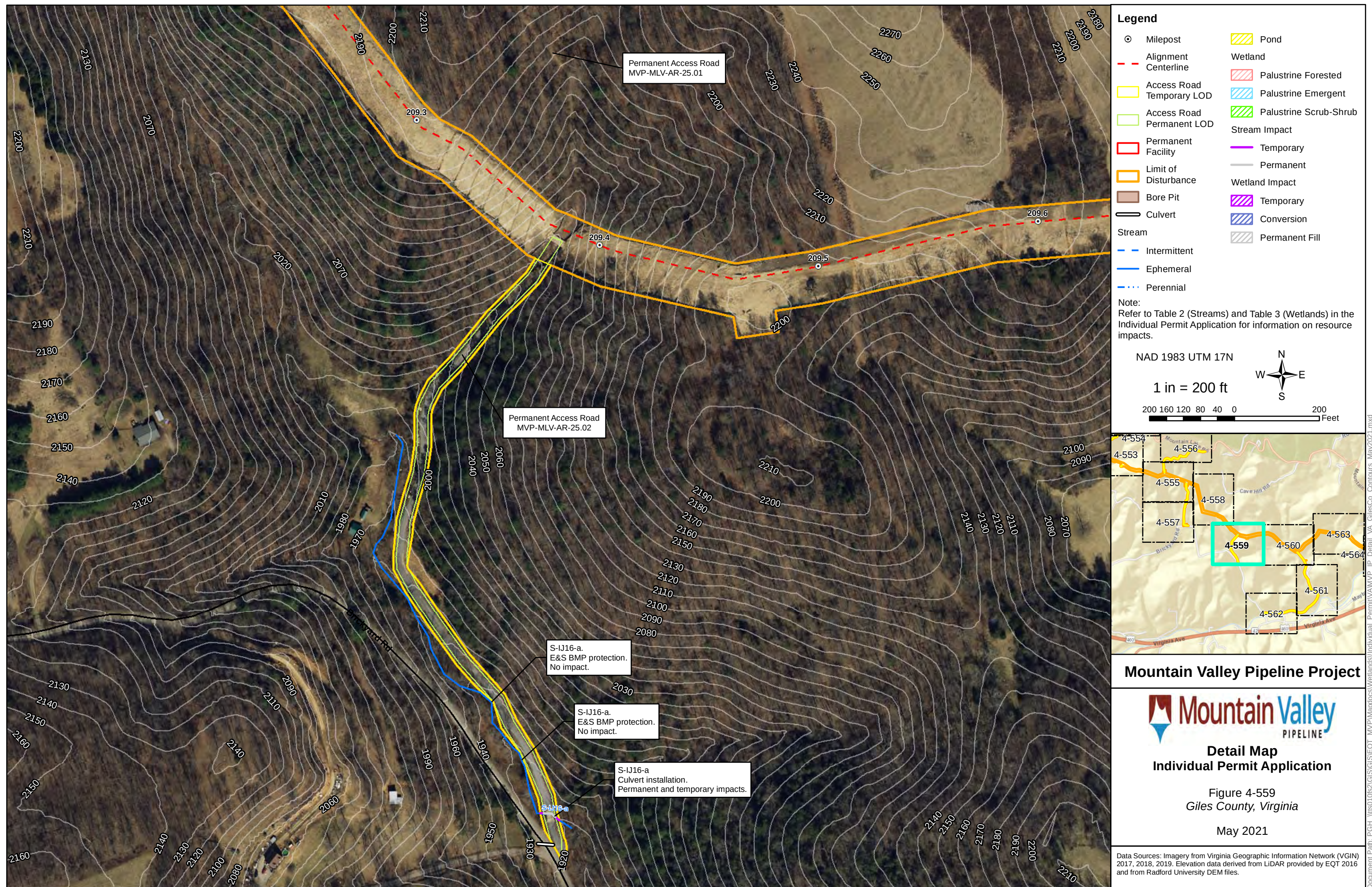
Mountain Valley
PIPELINE

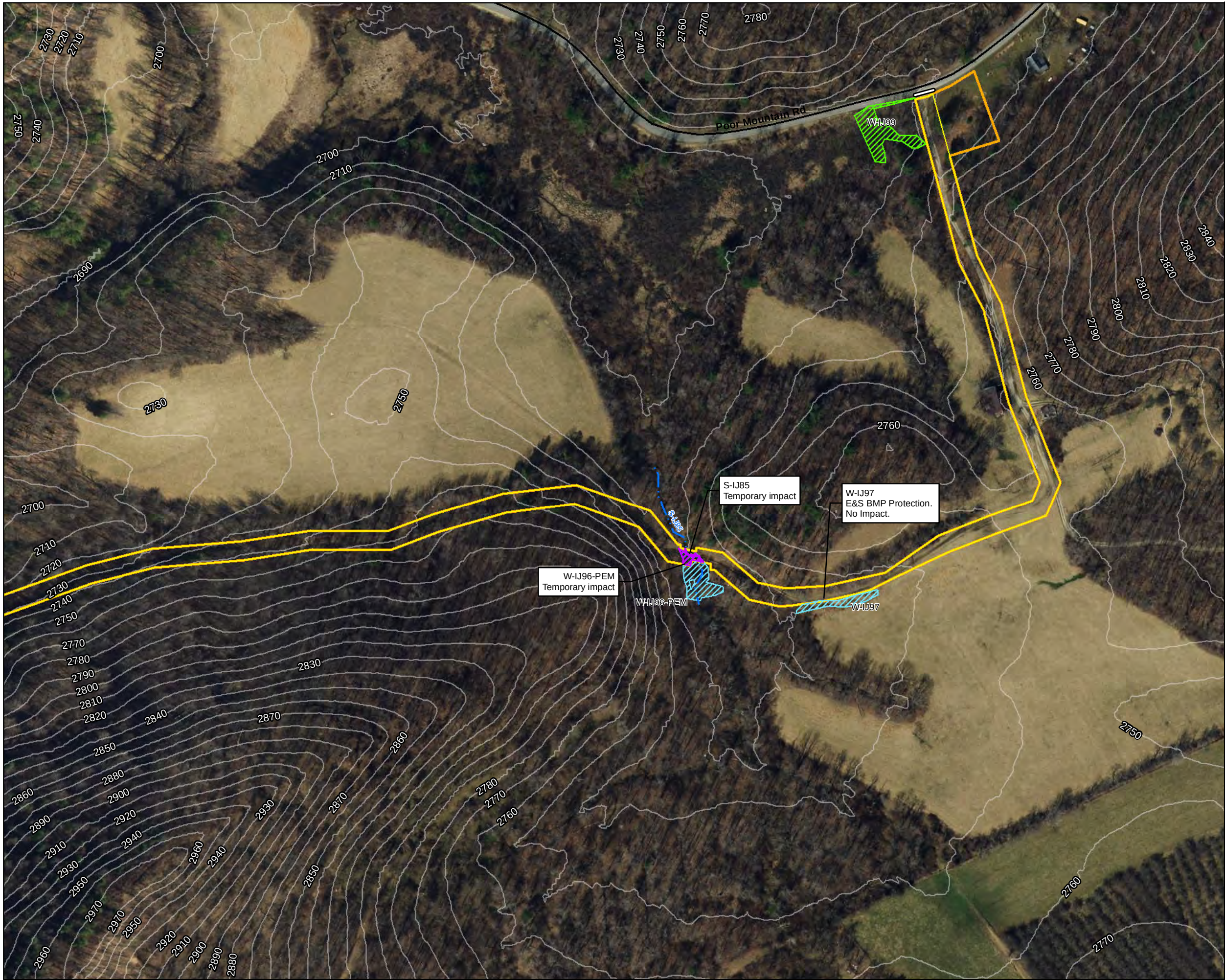
Detail Map
Individual Permit Application

Figure 4-547
Giles County, Virginia

May 2021

Data Sources: Imagery from Virginia Geographic Information Network (VGIN) 2017, 2018, 2019. Elevation data derived from LiDAR provided by EQT 2016 and from Radford University DEM files.





Legend

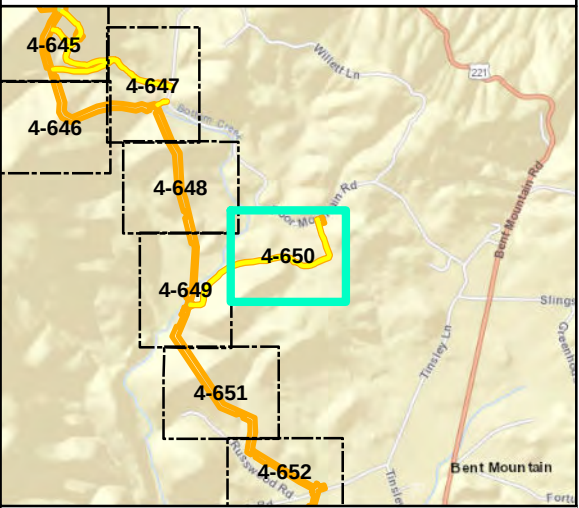
○ Milepost	▨ Pond
— Alignment Centerline	Wetland
▭ Access Road Temporary LOD	▨ Palustrine Forested
▭ Access Road Permanent LOD	▨ Palustrine Emergent
▭ Permanent Facility	▨ Palustrine Scrub-Shrub
▭ Limit of Disturbance	Stream Impact
▭ Bore Pit	— Temporary
— Culvert	— Permanent
Stream	Wetland Impact
— Intermittent	▨ Temporary
— Ephemeral	▨ Conversion
— Perennial	▨ Permanent Fill

Note:
Refer to Table 2 (Streams) and Table 3 (Wetlands) in the Individual Permit Application for information on resource impacts.

NAD 1983 UTM 17N

1 in = 200 ft

200 160 120 80 40 0 200 Feet



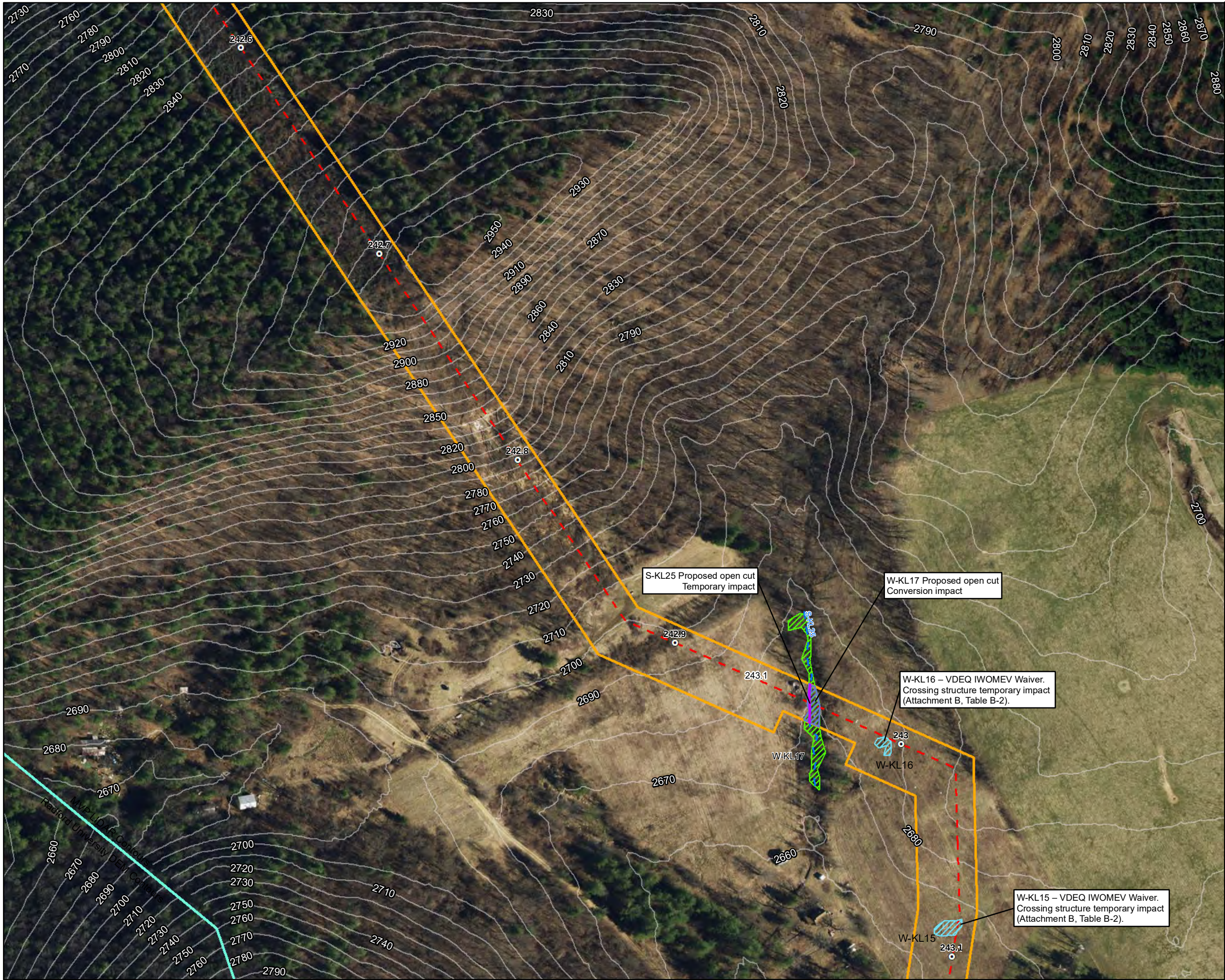
Mountain Valley Pipeline Project

Detail Map
Individual Permit Application

Figure 4-650
Roanoke County, Virginia

Msy 2021

Data Sources: ESRI Streaming Data 2014. Elevation data derived from LIDAR provided by EQT 2016
Map Projection: NAD 1983 UTM 17N



Legend

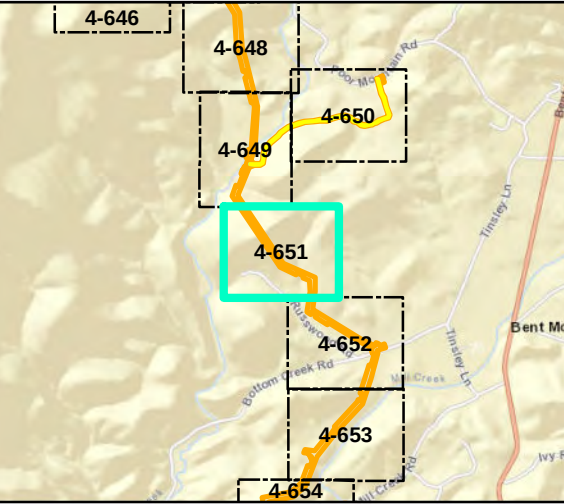
○ Milepost	▨ Pond
- - - Alignment Centerline	Wetland
▭ Access Road Temporary LOD	▨ Palustrine Forested
▭ Access Road Permanent LOD	▨ Palustrine Emergent
▭ Permanent Facility	▨ Palustrine Scrub-Shrub
▭ Limit of Disturbance	Stream Impact
▭ Bore Pit	— Temporary
— Culvert	— Permanent
Stream	Wetland Impact
— Intermittent	▨ Temporary
— Ephemeral	▨ Conversion
— Perennial	▨ Permanent Fill

Note:
Refer to Table 2 (Streams) and Table 3 (Wetlands) in the Individual Permit Application for information on resource impacts.

NAD 1983 UTM 17N

1 in = 200 ft

200 160 120 80 40 0 200 Feet



Mountain Valley Pipeline Project

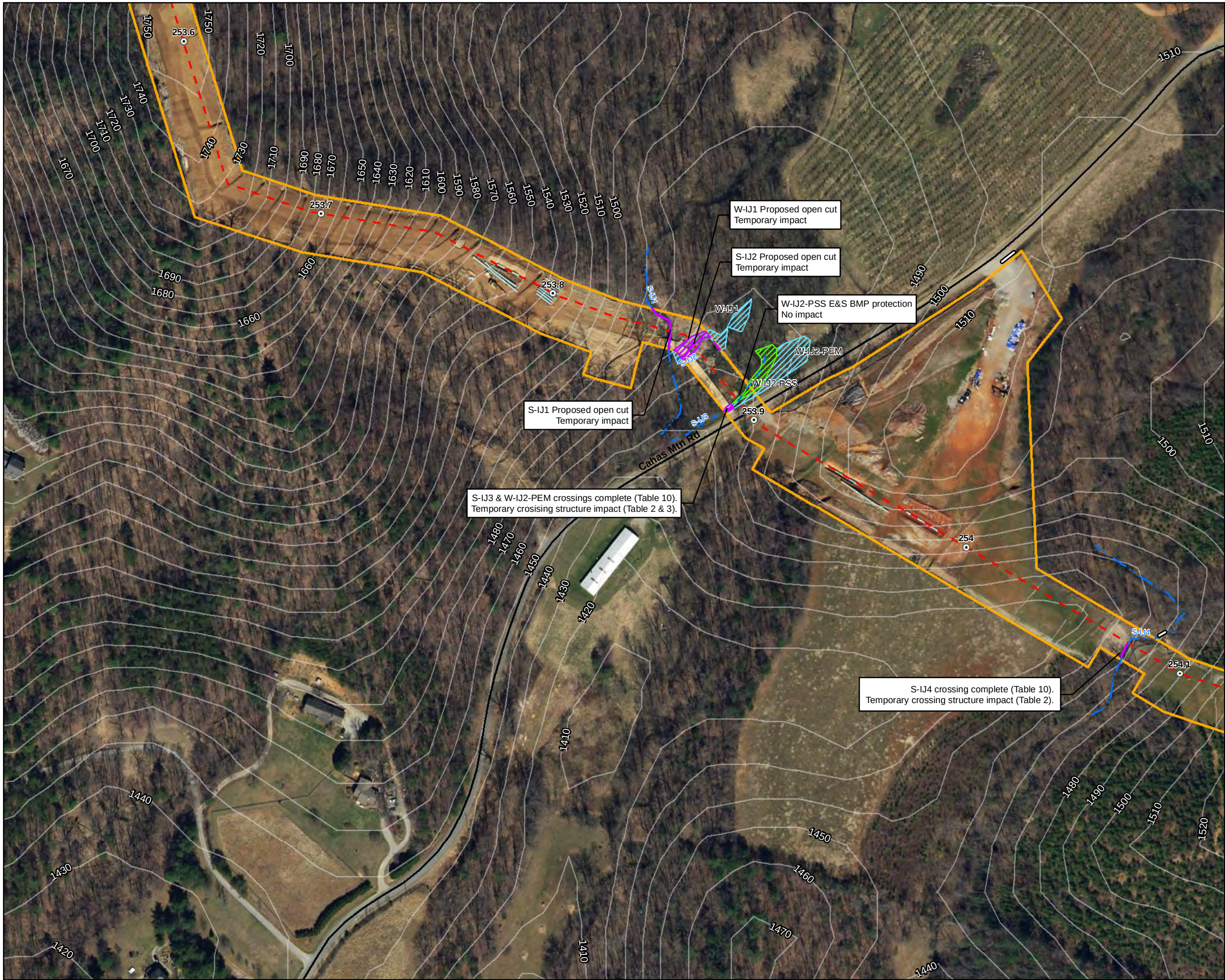


**Detail Map
Individual Permit Application**

Figure 4-651
Roanoke County, Virginia

Msy 2021

Data Sources: ESRI Streaming Data 2014. Elevation data derived from LIDAR provided by EQT 2016
Map Projection: NAD 1983 UTM 17N



Legend

Milepost

Alignment Centerline

Access Road Temporary LOD

Access Road Permanent LOD

Permanent Facility

Limit of Disturbance

Bore Pit

Culvert

Stream Intermittent

Stream Ephemeral

Stream Perennial

Pond

Wetland Palustrine Forested

Wetland Palustrine Emergent

Wetland Palustrine Scrub-Shrub

Stream Impact Temporary

Stream Impact Permanent

Wetland Impact Temporary

Wetland Impact Conversion

Wetland Impact Permanent Fill

Note:
Refer to Table 2 (Streams) and Table 3 (Wetlands) in the Individual Permit Application for information on resource impacts.

NAD 1983 UTM 17N
1 in = 200 ft

200 160 120 80 40 0

200

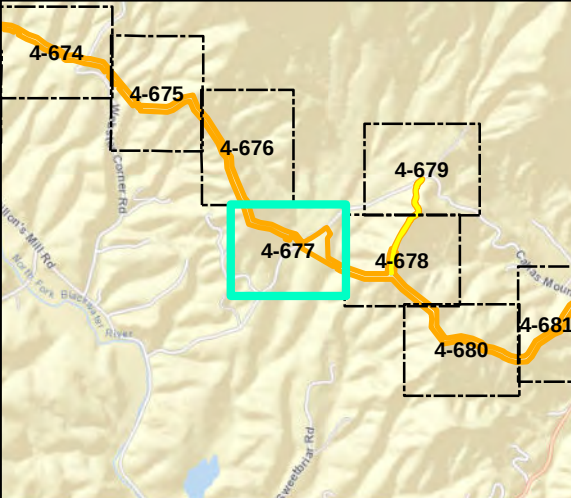
Feet

N

W

E

S



Mountain Valley Pipeline Project



Detail Map
Individual Permit Application

Figure 4-677
Franklin County, Virginia
May 2021

Data Sources: ESRI Streaming Data 2014. Elevation data derived from LIDAR provided by EQT 2016 and from Radford University DEM files.
Map Projection: NAD 1983 UTM 17N



Legend

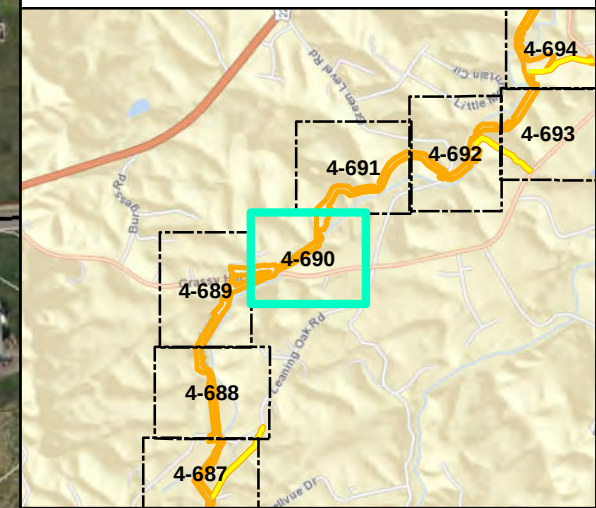
○ Milepost	▨ Pond
- - - Alignment Centerline	Wetland
▭ Access Road Temporary LOD	▨ Palustrine Forested
▭ Access Road Permanent LOD	▨ Palustrine Emergent
▭ Permanent Facility	▨ Palustrine Scrub-Shrub
▭ Limit of Disturbance	Stream Impact
▭ Bore Pit	▨ Temporary
▭ Culvert	▨ Permanent
▭ Stream	Wetland Impact
▭ Intermittent	▨ Temporary
▭ Ephemeral	▨ Conversion
▭ Perennial	▨ Permanent Fill

Note:
Refer to Table 2 (Streams) and Table 3 (Wetlands) in the Individual Permit Application for information on resource impacts.

NAD 1983 UTM 17N
1 in = 200 ft

200 160 120 80 40 0 200 Feet

North Arrow



Mountain Valley Pipeline Project

Mountain Valley PIPELINE

Detail Map
Individual Permit Application

Figure 4-690
Franklin County, Virginia

May 2021

Data Sources: ESRI Streaming Data 2014. Elevation data derived from LIDAR provided by EQT 2016 and from Radford University DEM files. Map Projection: NAD 1983 UTM 17N

Document Path: PGH \1150101052\GIS\GIS\EQT_MVP\Mapdocs\Wetlands\Individual Permit\WAVMP_IP_Detail_VA_FranklinCo_Contours_May2021.mxd

Attachment 3:

Table B-1

Table B-2

Table B-3

Table B-4

Table 10

Table 15

Table B-1. Virginia Stream Impacts (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (square feet) ⁵	Permanent Impact Area (square feet) ⁵	Temporary Fill (cubic yard) ⁵	Permanent Fill (cubic yard) ⁷	Figure
S-Q12	UNT to Kimballton Branch	Giles	37.375311	-80.680878	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	86	-	344	-	127	-	4-531
S-Q13	Kimballton Branch	Giles	37.374377	-80.682038	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	90	-	1350	-	500	-	4-532
S-P6	UNT to Stony Creek	Giles	37.362202	-80.688092	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	78	-	466	-	173	-	4-535
S-S5-Braid-2	Stony Creek	Giles	37.360325	-80.684214	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	122	-	13	-	4-536
S-S5-Braid-1	Stony Creek	Giles	37.360276	-80.684193	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	139	-	16	-	4-536
S-S5	Stony Creek	Giles	37.360071	-80.683960	Perennial	RPW	Candy darter, Green floater, pistol grip, Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	40	-	802	-	178	-	4-536
S-G29	UNT to Dry Branch	Giles	37.350430	-80.658259	Ephemeral	NRPW	-	05050002	Pipeline ROW	30	-	122	-	13	-	4-541
S-G30	UNT to Dry Branch	Giles	37.350373	-80.658230	Ephemeral	NRPW	-	05050002	Pipeline ROW	85	-	680	-	252	-	4-541
S-G32	Dry Branch	Giles	37.349095	-80.652040	Intermittent	RPW	-	05050002	Pipeline ROW	110	-	662	-	244	-	4-542
S-G33	UNT to Dry Branch	Giles	37.348641	-80.647225	Perennial	RPW	-	05050002	Pipeline ROW	99	-	793	-	293	-	4-542
S-G35	UNT to Little Stony Creek	Giles	37.344876	-80.633426	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	25	-	501	-	69	-	4-544
S-SS4	UNT to Little Stony Creek	Giles	37.344859	-80.631295	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	61	-	7	-	4-544
S-G35	UNT to Little Stony Creek	Giles	37.344779	-80.633379	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	25	-	501	-	69	-	4-544
S-Z7	UNT to Little Stony Creek	Giles	37.344278	-80.626185	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	61	-	7	-	4-545
S-Z7-Braid-1	UNT to Little Stony Creek	Giles	37.344277	-80.626113	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	61	-	7	-	4-545
S-Z9	UNT to Little Stony Creek	Giles	37.344163	-80.628400	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	78	-	9	-	4-544
S-Z10	UNT to Little Stony Creek	Giles	37.342351	-80.620823	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	240	-	27	-	4-545
S-Z11	UNT to Little Stony Creek	Giles	37.342236	-80.620542	Perennial	RPW	Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	20	-	100	-	11	-	4-545
S-Z12-EPH	UNT to Little Stony Creek	Giles	37.342214	-80.620312	Ephemeral	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	122	-	13	-	4-545
S-Z13	Little Stony Creek	Giles	37.342172	-80.620090	Perennial	RPW	Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	25	-	501	-	69	-	4-545
S-Z14	UNT to Little Stony Creek	Giles	37.340977	-80.618031	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	78	-	9	-	4-545
S-YZ1	Doe Creek	Giles	37.338952	-80.614618	Intermittent	RPW	-	05050002	Temporary Access Road	102	-	1019	-	113	-	4-546
S-A34	UNT to Doe Creek	Giles	37.337763	-80.606008	Ephemeral	NRPW	-	05050002	Pipeline ROW	86	-	601	-	223	-	4-548
S-A33	UNT to Doe Creek	Giles	37.337639	-80.605571	Ephemeral	NRPW	-	05050002	Pipeline ROW	111	-	775	-	288	-	4-548
S-A32	UNT to Doe Creek	Giles	37.335094	-80.596868	Perennial	RPW	-	05050002	Pipeline ROW	78	-	1250	-	462	-	4-549
S-QQ2	Sinking Creek	Craig	37.333152	-80.429438	Perennial	RPW	Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Temporary Access Road	40	-	1398	-	156	-	4-581
S-MN11-Upstream	UNT to Sinking Creek	Giles	37.332869	-80.559168	Ephemeral	NRPW	-	05050002	Temporary Access Road	15	-	61	-	7	-	4-554
S-MN11-Upstream	UNT to Sinking Creek	Giles	37.332191	-80.559979	Ephemeral	NRPW	-	05050002	Temporary Access Road	30	-	122	-	13	-	4-554
S-MN11-Downstream	UNT to Sinking Creek	Giles	37.332146	-80.560079	Ephemeral	NRPW	-	05050002	Temporary Access Road	37	-	183	-	21	-	4-554
S-Y3	UNT to Doe Creek	Giles	37.331748	-80.583355	Ephemeral	NRPW	-	05050002	Timber Mat Crossing	20	-	200	-	22	-	4-551
S-Y2	Doe Creek	Giles	37.331332	-80.583047	Perennial	RPW	-	05050002	Timber Mat Crossing	25	-	501	-	69	-	4-551
S-PP4	UNT to Sinking Creek	Craig	37.328329	-80.422810	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	84	-	170	-	62	-	4-579
S-PP3	UNT to Sinking Creek	Craig	37.326705	-80.425803	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	82	-	244	-	91	-	4-579
S-RR4	UNT to Sinking Creek	Giles	37.326015	-80.556831	Perennial	RPW	-	05050002	Temporary Access Road	85	-	257	-	28	-	4-556
S-E24	UNT to Sinking Creek	Giles	37.325728	-80.565082	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	81	-	1620	-	600	-	4-553
S-E25-Downstream	UNT to Sinking Creek	Giles	37.325638	-80.564680	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	161	-	18	-	4-553
S-E25-Upstream	UNT to Sinking Creek	Giles	37.325607	-80.564373	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	15	-	148	-	17	-	4-553
S-E25-Downstream	UNT to Sinking Creek	Giles	37.325566	-80.564634	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	161	-	18	-	4-553
S-PP1	UNT to Sinking Creek	Craig	37.324781	-80.431446	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	86	-	257	-	96	-	4-578
S-RR5	UNT to Sinking Creek	Giles	37.323702	-80.555627	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	83	-	832	-	307	-	4-555
S-PA07	UNT to Sinking Creek	Giles	37.323533	-80.555257	Intermittent	RPW	-	05050002	Pipeline ROW	115	-	231	-	85	-	4-555
S-IJ18-EPH	UNT to Sinking Creek	Giles	37.322737	-80.552396	Ephemeral	NRPW	-	05050002	Pipeline ROW	74	-	444	-	164	-	4-555
S-IJ19	UNT to Sinking Creek	Giles	37.322194	-80.553058	Ephemeral	NRPW	-	05050002	Temporary Access Road	43	-	170	-	19	-	4-555
S-IJ19	UNT to Sinking Creek	Giles	37.321823	-80.55311	Ephemeral	NRPW	-	05050002	Temporary Access Road	9	-	35	-	4	-	4-555
S-IJ18-INT	UNT to Sinking Creek	Giles	37.321756	-80.553011	Intermittent	RPW	-	05050002	Temporary Access Road	44	-	174	-	20	-	4-555
S-PP22	UNT to Craig Creek	Montgomery	37.321090	-80.412831	Intermittent	RPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	44	-	174	-	20	-	4-584
S-OO12	UNT to Sinking Creek	Giles	37.318956	-80.440648	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	25	-	48	-	6	-	4-577
S-OO13	UNT to Sinking Creek	Giles	37.318930	-80.440930	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	77	-	1542	-	570	-	4-577
S-OO14	UNT to Sinking Creek	Giles	37.318647	-80.441619	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	86	-	344	-	127	-	4-577
S-IJ17	UNT to Sinking Creek	Giles	37.318324	-80.547720	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	31	-	248	-	28	-	4-558
S-IJ16-b	UNT to Sinking Creek	Giles	37.318246	-80.547711	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	78	-	780	-	289	-	4-558
S-PP21	UNT to Craig Creek	Montgomery	37.317187	-80.409235	Perennial	RPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	20	-	78	-	9	-	4-584

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S-PP20	UNT to Craig Creek	Montgomery	37.316523	-80.408646	Perennial	RPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	20	-	122	-	13	-	4-584
S-RR13	Craig Creek	Montgomery	37.314504	-80.402613	Perennial	RPW	Atlantic Pigtoe, Stockable Trout, Coldwater Fishery	02080201	Temporary Access Road	41	-	1433	-	159	-	4-585
S-HH18	UNT to Craig Creek	Montgomery	37.313910	-80.398683	Perennial	RPW	Atlatic pigtoe, orangefin madtom Coldwater Fishery	02080201	Timber Mat Crossing	20	-	122	-	13	-	4-586
S-RR14	UNT to Craig Creek	Montgomery	37.313615	-80.402521	Ephemeral	NRPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	20	-	139	-	16	-	4-585
S-OO6	Craig Creek	Montgomery	37.313511	-80.404606	Perennial	RPW	Atlantic Pigtoe, Stockable Trout, Coldwater Fishery	02080201	Timber Mat Crossing	35	-	701	-	136	-	4-585
S-QQ3	UNT to Sinking Creek	Giles	37.311735	-80.532304	Ephemeral	NRPW	-	05050002	Temporary Access Road	15	-	30	-	3	-	4-560
S-U16-a	UNT to Sinking Creek	Giles	37.311730	-80.544091	Ephemeral	NRPW	-	05050002	Permanent Access Road	20	-	140	-	16	-	4-559
S-U16-a	UNT to Sinking Creek	Giles	37.311730	-80.544091	Ephemeral	NRPW	-	05050002	Permanent Access Road	-	31	-	217	-	24	4-559
S-NN17	Sinking Creek	Giles	37.311616	-80.515786	Perennial	RPW	Green floater, Non-listed mussels, Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	55	-	1102	-	336	-	4-564
S-KL43	UNT to Sinking Creek	Giles	37.307524	-80.466665	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	75	-	749	-	278	-	4-573
S-NN11	UNT to Sinking Creek	Giles	37.305508	-80.467231	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	84	-	418	-	156	-	4-573
S-NN12	UNT to Sinking Creek	Giles	37.300454	-80.472911	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	88	-	174	-	65	-	4-571
S-MN21	UNT to Mill Creek	Montgomery	37.299397	-80.391243	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	80	-	562	-	207	-	4-588
S-MM17	UNT to Sinking Creek	Giles	37.298226	-80.480624	Perennial	RPW	-	05050002	Temporary Access Road	49	-	96	-	11	-	4-569
S-MN22	UNT to Mill Creek	Montgomery	37.297166	-80.386612	Ephemeral	NRPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	96	-	192	-	71	-	4-589
S-RR2	Greenbriar Branch	Giles	37.296666	-80.494174	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	161	-	18	-	4-567
S-Y26	UNT to Greenbriar Branch	Giles	37.296612	-80.494165	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	122	-	13	-	4-567
S-EF62	UNT to Mill Creek	Montgomery	37.296356	-80.375118	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	76	-	836	-	310	-	4-590
S-MM18	UNT to Sinking Creek	Giles	37.296226	-80.481455	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	88	-	440	-	163	-	4-569
S-IJ52	UNT to Mill Creek	Montgomery	37.296153	-80.367510	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	84	-	1346	-	498	-	4-591
S-EF65	Mill Creek	Montgomery	37.295743	-80.375921	Intermittent	RPW	Orangefin madtom, Non-listed mussels, Natural Trout, Coldwater Fishery, Stockable Trout	03010101	Pipeline ROW	152	-	910	-	338	-	4-590
S-G36	North Fork Roanoke River	Montgomery	37.288586	-80.313161	Perennial	RPW	Roanoke logperch, Orangefin madtom, Non-listed mussels, Natural Trout, Coldwater Fishery	03010101	Temporary Access Road	26	-	518	-	58	-	4-602
S-G38	UNT to North Fork Roanoke River	Montgomery	37.267002	-80.312898	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-603
S-G40	UNT to North Fork Roanoke River	Montgomery	37.264882	-80.307302	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-603
S-PP23	UNT to North Fork Roanoke River	Montgomery	37.264858	-80.307151	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	48	-	6	-	4-604
S-G39	UNT to North Fork Roanoke River	Montgomery	37.264817	-80.308486	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	82	-	492	-	182	-	4-604
S-MM14	UNT to Flatwoods Branch	Montgomery	37.258717	-80.293210	Ephemeral	NRPW	-	03010101	Pipeline ROW	105	-	736	-	272	-	4-608
S-MM15	UNT to Flatwoods Branch	Montgomery	37.258673	-80.296446	Intermittent	RPW	-	03010101	Pipeline ROW	82	-	492	-	182	-	4-608
S-MM11	UNT to Flatwoods Branch	Montgomery	37.258403	-80.288186	Ephemeral	NRPW	-	03010101	Pipeline ROW	80	-	640	-	237	-	4-609
S-F15	UNT to Flatwoods Branch	Montgomery	37.258198	-80.286029	Intermittent	RPW	-	03010101	Pipeline ROW	129	-	775	-	287	-	4-609
S-MM13	UNT to Flatwoods Branch	Montgomery	37.258176	-80.289222	Ephemeral	NRPW	-	03010101	Pipeline ROW	85	-	427	-	157	-	4-608
S-F16a/F16b	UNT to Flatwoods Branch	Montgomery	37.257998	-80.284735	Ephemeral	NRPW	-	03010101	Pipeline ROW	81	-	244	-	90	-	4-609
S-C36	UNT to Flatwoods Branch	Montgomery	37.257260	-80.281611	Intermittent	RPW	-	03010101	Pipeline ROW	96	-	287	-	107	-	4-609
S-C36	UNT to Flatwoods Branch	Montgomery	37.257133	-80.281475	Intermittent	RPW	-	03010101	Pipeline ROW	36	-	109	-	40	-	4-609
S-MM31	UNT to Flatwoods Branch	Montgomery	37.256959	-80.280329	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-609
S-C29	Flatwoods Branch	Montgomery	37.256387	-80.278021	Ephemeral	NRPW	-	03010101	Pipeline ROW	46	-	57	-	20	-	4-610
S-C25	UNT to Bradshaw Creek	Montgomery	37.254342	-80.267895	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	115	-	344	-	128	-	4-611
S-C24	UNT to Bradshaw Creek	Montgomery	37.254135	-80.266743	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	108	-	322	-	120	-	4-611
S-C21	Bradshaw Creek	Montgomery	37.251791	-80.258990	Perennial	RPW	Roanoke logperch, Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	25	-	501	-	69	-	4-613
S-NN19	UNT to Roanoke River	Montgomery	37.244319	-80.206995	Intermittent	RPW	-	03010101	Pipeline ROW	76	-	266	-	99	-	4-627
S-AB16	UNT to Roanoke River	Montgomery	37.231693	-80.198778	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-631
S-11	UNT to Roanoke River	Montgomery	37.231179	-80.198460	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	279	-	31	-	4-631
S-CD12b	UNT to South Fork Roanoke River	Montgomery	37.229764	-80.201144	Perennial	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	122	-	13	-	4-631
S-EF19	UNT to Indian Run	Montgomery	37.216102	-80.197390	Ephemeral	NRPW	Warmwater Fishery, Tier 2	03010101	Pipeline ROW	79	-	396	-	146	-	4-634
S-EF20a	UNT to Roanoke River	Montgomery	37.210922	-80.193318	Perennial	RPW	Orangefin madtom, Non-listed mussels	03010101	Pipeline ROW	80	-	479	-	178	-	4-635
S-MM22	UNT to Roanoke River	Montgomery	37.205284	-80.187282	Perennial	RPW	Orangefin madtom, Non-listed mussels	03010101	Pipeline ROW	175	-	2627	-	972	-	4-637
S-U50	UNT to Roanoke River	Roanoke	37.194064	-80.167933	Perennial	RPW	Orangefin madtom, Non-listed mussels	03010101	Pipeline ROW	77	-	1925	-	713	-	4-641
S-Y13	UNT to Bottom Creek	Roanoke	37.187687	-80.151146	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	85	-	680	-	252	-	4-644
S-Y14	UNT to Bottom Creek	Roanoke	37.187568	-80.151049	Perennial	RPW	Orangefin madtom, Non-listed mussels, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	77	-	1076	-	399	-	4-644
S-EF57	UNT to Bottom Creek	Roanoke	37.181736	-80.148948	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Temporary Access Road	42	-	335	-	37	-	4-645
S-EF55	UNT to Bottom Creek	Roanoke	37.181506	-80.149497	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	33	-	266	-	98	-	4-645
S-EF34b	UNT to Bottom Creek	Roanoke	37.181385	-80.149140	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	81	-	810	-	300	-	4-645

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S-EF33	UNT to Bottom Creek	Roanoke	37.179186	-80.141000	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	148	-	1333	-	493	-	4-647
S-IJ82	UNT to Bottom Creek	Roanoke	37.170458	-80.138216	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-648
S-IJ85	UNT to Bottom Creek	Roanoke	37.169474	-80.130356	Perennial	RPW	Natural Trout, Coldwater Fishery	03010101	Temporary Access Road	50	-	401	-	44	-	4-650
S-IJ83	UNT to Bottom Creek	Roanoke	37.169211	-80.138258	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	148	-	741	-	82	-	4-649
S-IJ88	Bottom Creek	Roanoke	37.168395	-80.138295	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	30	-	1960	-	726	-	4-649
S-IJ84	UNT to Bottom Creek	Roanoke	37.168361	-80.138381	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	35	-	527	-	58	-	4-649
S-IJ89	UNT to Bottom Creek	Roanoke	37.165862	-80.139317	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-649
S-IJ90	UNT to Bottom Creek	Roanoke	37.165685	-80.139378	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-649
S-KL25	UNT to Mill Creek	Roanoke	37.160173	-80.134799	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	82	-	409	-	152	-	4-651
S-ST9b	UNT to Mill Creek	Roanoke	37.154424	-80.129179	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-652
S-KL55	UNT to Mill Creek	Roanoke	37.150009	-80.13246	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-653
S-IJ12	UNT to Mill Creek	Roanoke	37.148333	-80.133919	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	261	-	29	-	4-653
S-EF44	UNT to Bottom Creek	Roanoke	37.143003	-80.138399	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-654
S-IJ43	Mill Creek	Roanoke	37.138636	-80.139715	Perennial	RPW	Orangefin madtom, Stockable Trout, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	362	-	40	-	4-655
S-Y9	UNT to Mill Creek	Roanoke	37.134576	-80.137649	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	44	-	174	-	20	-	4-656
S-Y7	UNT to Mill Creek	Roanoke	37.134481	-80.137622	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	32	-	126	-	14	-	4-656
S-Y8	UNT to Mill Creek	Roanoke	37.134176	-80.137484	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-656
S-B22	UNT to Mill Creek	Roanoke	37.128922	-80.133769	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-659
S-B23	UNT to Mill Creek	Roanoke	37.128853	-80.133910	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	14	-	26	-	3	-	4-659
S-B25	UNT to Mill Creek	Roanoke	37.128490	-80.132601	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	76	-	379	-	42	-	4-659
S-B21	UNT to Mill Creek	Roanoke	37.128484	-80.130943	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	92	-	366	-	136	-	4-659
S-H1	Green Creek	Franklin	37.127733	-80.116787	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-661
S-G26	UNT to Green Creek	Franklin	37.127077	-80.111387	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-662
S-G27	UNT to Green Creek	Franklin	37.126962	-80.111052	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-662
S-G24	UNT to Green Creek	Franklin	37.126412	-80.121398	Intermittent	RPW	-	03010101	Pipeline ROW	75	-	449	-	167	-	4-661
S-G25	UNT to Green Creek	Franklin	37.125398	-80.121401	Intermittent	RPW	-	03010101	Pipeline ROW	42	-	292	-	33	-	4-661
S-RR18	UNT to Green Creek	Franklin	37.125055	-80.113578	Intermittent	RPW	-	03010101	Permanent Access Road	8	-	17	-	2	-	4-662
S-D11	UNT to North Fork Blackwater River	Franklin	37.124137	-80.086182	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-666
S-D8	North Fork Blackwater River	Franklin	37.123098	-80.074673	Perennial	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	78	-	941	-	349	-	4-667
S-D12	UNT to North Fork Blackwater River	Franklin	37.121558	-80.085642	Intermittent	RPW	-	03010101	Pipeline ROW	54	-	322	-	120	-	4-666
S-D13	UNT to North Fork Blackwater River	Franklin	37.121513	-80.085680	Intermittent	RPW	-	03010101	Pipeline ROW	117	-	466	-	173	-	4-666
S-D14	UNT to North Fork Blackwater River	Franklin	37.121473	-80.088457	Intermittent	RPW	-	03010101	Pipeline ROW	234	-	701	-	260	-	4-666
S-II4	UNT to North Fork Blackwater River	Franklin	37.115679	-80.060300	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-670
S-GH7	UNT to North Fork Blackwater River	Franklin	37.106614	-80.054219	Perennial	RPW	-	03010101	Timber Mat Crossing	20	-	179	-	20	-	4-672
S-GH15	UNT to North Fork Blackwater River	Franklin	37.106177	-80.050105	Intermittent	RPW	-	03010101	Pipeline ROW	75	-	301	-	111	-	4-674
S-GH14	UNT to North Fork Blackwater River	Franklin	37.105883	-80.048861	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	305	-	113	-	4-674
S-GH11	UNT to North Fork Blackwater River	Franklin	37.104707	-80.046220	Intermittent	RPW	-	03010101	Pipeline ROW	77	-	231	-	86	-	4-674
S-GH9	UNT to North Fork Blackwater River	Franklin	37.104329	-80.045343	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	78	-	314	-	116	-	4-674
S-RR08	UNT to North Fork Blackwater River	Franklin	37.103290	-80.041868	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-674
S-RR09	UNT to North Fork Blackwater River	Franklin	37.102491	-80.041046	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	693	-	257	-	4-675
S-RR11	UNT to North Fork Blackwater River	Franklin	37.101127	-80.039653	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	540	-	200	-	4-675
S-IJ1	UNT to North Fork Blackwater River	Franklin	37.093062	-80.027724	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	107	-	1285	-	476	-	4-677
S-IJ2	UNT to North Fork Blackwater River	Franklin	37.092891	-80.027593	Intermittent	RPW	-	03010101	Pipeline ROW	40	-	100	-	37	-	4-677
S-II6	UNT to Little Creek	Franklin	37.092697	-79.978402	Intermittent	NRPW	-	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-685
S-IJ3	UNT to North Fork Blackwater River	Franklin	37.092555	-80.027314	Intermittent	RPW	-	03010101	Pipeline ROW	21	-	105	-	12	-	4-677
S-GH6	UNT to Little Creek	Franklin	37.092397	-79.983227	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-684
S-II12	UNT to Little Creek	Franklin	37.091608	-79.987839	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	39	-	4	-	4-684
S-II11	UNT to Little Creek	Franklin	37.091564	-79.988051	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-684
S-II8	UNT to Little Creek	Franklin	37.091413	-79.993944	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	39	-	4	-	4-683
S-II9	UNT to Little Creek	Franklin	37.091382	-79.990620	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	401	-	44	-	4-683
S-II7	UNT to Little Creek	Franklin	37.091354	-79.992013	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-683
S-IJ4	UNT to North Fork Blackwater River	Franklin	37.091189	-80.024366	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-677

Table B-1. Virginia Stream Impacts (revised 5/11/2021)
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Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (square feet) ⁵	Permanent Impact Area (square feet) ⁵	Temporary Fill (cubic yard) ⁵	Permanent Fill (cubic yard) ⁷	Figure
S-KL2	UNT to Little Creek	Franklin	37.090361	-79.996354	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	74	-	8	-	4-682
S-GH2	UNT to Teels Creek	Franklin	37.090153	-79.953936	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	39	-	4	-	4-689
S-GH4	UNT to Teels Creek	Franklin	37.089812	-79.956077	Perennial	RPW	-	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-688
S-GH3	UNT to Teels Creek	Franklin	37.089745	-79.956042	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	122	-	13	-	4-688
S-IJ10	Little Creek	Franklin	37.089179	-80.005026	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-681
S-E29	UNT to Teels Creek	Franklin	37.089178	-79.950110	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	80	-	640	-	237	-	4-689
S-E28	Teels Creek	Franklin	37.089047	-79.9613	Perennial	RPW	-	03010101	Pipeline ROW	82	-	984	-	364	-	4-687
S-E28	Teels Creek	Franklin	37.085247	-79.948057	Perennial	RPW	-	03010101	Pipeline ROW	76	-	910	-	338	-	4-690
S-E28	Teels Creek	Franklin	37.082875	-79.945556	Perennial	RPW	-	03010101	Pipeline ROW	101	-	1211	-	449	-	4-690
S-EF4	UNT to Teels Creek	Franklin	37.078963	-79.941911	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	80	-	880	-	326	-	4-691
S-EF7	UNT to Teels Creek	Franklin	37.074664	-79.941123	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	39	-	4	-	4-692
S-EF7	UNT to Teels Creek	Franklin	37.074636	-79.941336	Ephemeral	NRPW	-	03010101	ATWS	22	-	44	-	5	-	4-692
S-EF12	Teels Creek	Franklin	37.073367	-79.939865	Perennial	RPW	-	03010101	Pipeline ROW	79	-	1581	-	585	-	4-692
S-MM42	UNT to Teels Creek	Franklin	37.070703	-79.937069	Ephemeral	NRPW	-	03010101	Pipeline ROW	81	-	161	-	60	-	4-693
S-D23	Teels Creek	Franklin	37.070322	-79.931039	Perennial	RPW	-	03010101	Pipeline ROW	92	-	2087	-	772	-	4-694
S-D22	UNT to Teels Creek	Franklin	37.070101	-79.929732	Intermittent	RPW	-	03010101	Pipeline ROW	83	-	662	-	246	-	4-694
S-D18	UNT to Teels Creek	Franklin	37.069560	-79.926213	Ephemeral	NRPW	-	03010101	Pipeline ROW	30	-	61	-	7	-	4-694
S-RR15	UNT to Teels Creek	Franklin	37.069542	-79.933892	Perennial	RPW	-	03010101	Timber Mat Crossing	20	-	26	-	31	-	4-694
S-D20	UNT to Teels Creek	Franklin	37.069485	-79.926230	Intermittent	RPW	-	03010101	Pipeline ROW	76	-	610	-	225	-	4-694
S-EF48	UNT to Blackwater River	Franklin	37.064748	-79.874420	Intermittent	RPW	-	03010101	Pipeline ROW	86	-	170	-	64	-	4-705
S-YZ4	UNT to Blackwater River	Franklin	37.064723	-79.878190	Ephemeral	NRPW	-	03010101	Pipeline ROW	84	-	253	-	93	-	4-704
S-C14	Teels Creek	Franklin	37.063956	-79.921985	Perennial	RPW	-	03010101	Pipeline ROW	90	-	3655	-	1,353	-	4-696
S-YZ5	UNT to Blackwater River	Franklin	37.063464	-79.878281	Ephemeral	NRPW	-	03010101	Pipeline ROW	86	-	344	-	127	-	4-704
S-KL41	UNT to Blackwater River	Franklin	37.062262	-79.862639	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	75	-	902	-	333	-	4-706
S-KL39	UNT to Blackwater River	Franklin	37.061193	-79.880018	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	121	-	788	-	291	-	4-704
S-C16	UNT to Teels Creek	Franklin	37.060610	-79.921179	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-696
S-KL54	UNT to Maggodee Creek	Franklin	37.059535	-79.840624	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	758	-	281	-	4-710
S-C8	UNT to Blackwater River	Franklin	37.059098	-79.853595	Intermittent	RPW	-	03010101	Pipeline ROW	86	-	431	-	159	-	4-708
S-F4	UNT to Blackwater River	Franklin	37.059060	-79.853379	Ephemeral	NRPW	-	03010101	Pipeline ROW	82	-	819	-	91	-	4-708
S-C17	Teels Creek	Franklin	37.058390	-79.918015	Perennial	RPW	-	03010101	Timber Mat Crossing	30	-	601	-	100	-	4-696
S-KL52	UNT to Maggodee Creek	Franklin	37.058165	-79.844877	Ephemeral	NRPW	-	03010101	Pipeline ROW	105	-	105	-	39	-	4-709
S-S11	UNT to Maggodee Creek	Franklin	37.057776	-79.838583	Perennial	RPW	-	03010101	Temporary Access Road	41	-	453	-	50	-	4-710
S-F8	UNT to Maggodee Creek	Franklin	37.057724	-79.836406	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	83	-	2492	-	922	-	4-710
S-CD6	Little Creek	Franklin	37.057584	-79.913921	Perennial	RPW	-	03010101	Pipeline ROW	77	-	4426	-	1,639	-	4-698
S-HH4	UNT to Maggodee Creek	Franklin	37.056594	-79.835785	Intermittent	RPW	-	03010101	Pipeline ROW	97	-	871	-	323	-	4-711
S-KL51	UNT to Blackwater River	Franklin	37.056084	-79.850384	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	67	-	370	-	136	-	4-708
S-KL38	UNT to Blackwater River	Franklin	37.055912	-79.883177	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	78	-	545	-	202	-	4-702
S-C20	UNT to Maggodee Creek	Franklin	37.055193	-79.833881	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-711
S-C19	Maggodee Creek	Franklin	37.055147	-79.830098	Perennial	RPW	-	03010101	Pipeline ROW	75	-	3006	-	1,113	-	4-711
S-KL36	UNT to Blackwater River	Franklin	37.053336	-79.884604	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	148	-	17	-	4-702
S-F11	Blackwater River	Franklin	37.052843	-79.825711	Perennial	TNW	Non-listed mussels	03010101	Pipeline ROW	91	-	6765	-	2,506	-	4-712
S-KL35	UNT to Blackwater River	Franklin	37.052125	-79.886182	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	35	-	87	-	10	-	4-702
S-F9b	UNT to Blackwater River	Franklin	37.049238	-79.817223	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	1141	-	422	-	4-713
S-II2	Little Creek	Franklin	37.049219	-79.908513	Perennial	RPW	-	03010101	Pipeline ROW	76	-	3245	-	1,203	-	4-699
S-F10	UNT to Blackwater River	Franklin	37.048037	-79.813934	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	179	-	20	-	4-713
S-CD1	UNT to Blackwater River	Franklin	37.047765	-79.897636	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	104	-	366	-	135	-	4-701
S-F9a	UNT to Blackwater River	Franklin	37.047172	-79.813000	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-713
S-MM29	UNT to Maple Branch	Franklin	37.043871	-79.822898	Perennial	RPW	-	03010101	Temporary Access Road	42	-	632	-	70	-	4-714
S-MM23	Maple Branch	Franklin	37.043854	-79.822974	Perennial	RPW	-	03010101	Temporary Access Road	78	-	1559	-	173	-	4-714
S-GG4	UNT to Blackwater River	Franklin	37.042742	-79.809015	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-716
S-A36	UNT to Foul Ground Creek	Franklin	37.037916	-79.804237	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	309	-	114	-	4-717
S-A38	UNT to Foul Ground Creek	Franklin	37.036271	-79.799442	Intermittent	RPW	-	03010101	Timber Mat Crossing	30	-	270	-	30	-	4-718

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S-A40	UNT to Foul Ground Creek	Franklin	37.036173	-79.799240	Intermittent	RPW	-	03010101	Timber Mat Crossing	13	-	74	-	8	-	4-718
S-A41	Foul Ground Creek	Franklin	37.031714	-79.788213	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	910	-	338	-	4-720
S-GH36	UNT to Foul Ground Creek	Franklin	37.031063	-79.778588	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-721
S-KL17	UNT to Foul Ground Creek	Franklin	37.031011	-79.778435	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-721
S-GH37	UNT to Foul Ground Creek	Franklin	37.030974	-79.778190	Intermittent	RPW	-	03010101	Pipeline ROW	46	-	139	-	15	-	4-721
S-GH38	UNT to Foul Ground Creek	Franklin	37.030972	-79.778083	Intermittent	RPW	-	03010101	Pipeline ROW	7	-	22	-	2	-	4-721
S-GH39	UNT to Foul Ground Creek	Franklin	37.030861	-79.778069	Intermittent	RPW	-	03010101	Pipeline ROW	103	-	414	-	153	-	4-721
S-GH40	UNT to Foul Ground Creek	Franklin	37.028893	-79.774785	Ephemeral	NRPW	-	03010101	Pipeline ROW	89	-	266	-	99	-	4-721
S-GH44	UNT to Foul Ground Creek	Franklin	37.028392	-79.773359	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	103	-	619	-	69	-	4-721
S-G22	UNT to Poplar Camp Creek	Franklin	37.019612	-79.761958	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	80	-	958	-	356	-	4-723
S-G23	UNT to Poplar Camp Creek	Franklin	37.019526	-79.762002	Intermittent	RPW	-	03010101	Pipeline ROW	42	-	126	-	14	-	4-723
S-G21	UNT to Poplar Camp Creek	Franklin	37.019359	-79.761643	Intermittent	RPW	-	03010101	Pipeline ROW	54	-	161	-	18	-	4-723
S-G20	Poplar Camp Creek	Franklin	37.017364	-79.760000	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-724
S-G18	UNT to Blackwater River	Franklin	37.009236	-79.754238	Intermittent	RPW	-	03010101	Pipeline ROW	81	-	161	-	60	-	4-725
S-G17	UNT to Blackwater River	Franklin	37.005496	-79.752655	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-726
S-E18	UNT to Blackwater River	Franklin	37.001271	-79.747749	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	94	-	658	-	244	-	4-727
S-E17	UNT to Blackwater River	Franklin	37.000529	-79.742760	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	95	-	758	-	281	-	4-727
S-E14	UNT to Blackwater River	Franklin	36.995814	-79.735144	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	82	-	1638	-	607	-	4-728
S-H38	UNT to Jacks Creek	Franklin	36.989430	-79.722366	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	240	-	27	-	4-730
S-H32	UNT to Jacks Creek	Franklin	36.988273	-79.708199	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-732
S-H37	UNT to Jacks Creek	Franklin	36.988031	-79.717450	Ephemeral	NRPW	-	03010101	Pipeline ROW	82	-	492	-	182	-	4-731
S-H34	UNT to Jacks Creek	Franklin	36.988009	-79.711881	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-732
S-H36	UNT to Jacks Creek	Franklin	36.988008	-79.714922	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-731
S-H30	UNT to Jacks Creek	Franklin	36.987961	-79.702711	Intermittent	RPW	-	03010101	Pipeline ROW	4	-	4	-	1	-	4-734
S-A18	UNT to Jacks Creek	Franklin	36.987818	-79.700634	Intermittent	RPW	-	03010101	Pipeline ROW	87	-	227	-	84	-	4-734
S-A19/H26	UNT to Jacks Creek	Franklin	36.987719	-79.698901	Intermittent	RPW	-	03010101	Pipeline ROW	212	-	1485	-	550	-	4-734
S-A20	UNT to Jacks Creek	Franklin	36.987715	-79.698555	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-734
S-H28	UNT to Jacks Creek	Franklin	36.985174	-79.692272	Ephemeral	NRPW	-	03010101	Pipeline ROW	16	-	96	-	11	-	4-735
S-H27	UNT to Jacks Creek	Franklin	36.985124	-79.692272	Ephemeral	NRPW	-	03010101	Pipeline ROW	36	-	362	-	40	-	4-735
S-A22	UNT to Jacks Creek	Franklin	36.984846	-79.691870	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	161	-	18	-	4-735
S-MM44	UNT to Little Jacks Creek	Franklin	36.982507	-79.687818	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-735
S-MM46	UNT to Little Jacks Creek	Franklin	36.982240	-79.687500	Intermittent	RPW	-	03010101	Timber Mat Crossing	9	-	26	-	3	-	4-735
S-MM45	UNT to Little Jacks Creek	Franklin	36.981971	-79.686901	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	33	-	131	-	15	-	4-735
S-MM48	UNT to Little Jacks Creek	Franklin	36.979223	-79.684192	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	25	-	174	-	19	-	4-736
S-H25	Little Jacks Creek	Franklin	36.978529	-79.682186	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-736
S-H24	UNT to Little Jacks Creek	Franklin	36.978025	-79.680682	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-736
S-H23	UNT to Turkey Creek	Franklin	36.976421	-79.677525	Ephemeral	NRPW	-	03010101	Pipeline ROW	92	-	462	-	170	-	4-738
S-HH1	UNT to Turkey Creek	Franklin	36.974647	-79.674453	Ephemeral	NRPW	-	03010101	Pipeline ROW	18	-	91	-	10	-	4-738
S-A13	Turkey Creek	Franklin	36.973282	-79.673075	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	161	-	18	-	4-738
S-A11	UNT to Turkey Creek	Franklin	36.973237	-79.669898	Ephemeral	NRPW	-	03010101	Pipeline ROW	55	-	166	-	18	-	4-740
S-H17	Dinner Creek	Franklin	36.972125	-79.662987	Intermittent	RPW	-	03010101	Pipeline ROW	101	-	806	-	299	-	4-741
S-A7	UNT to Dinner Creek	Franklin	36.972032	-79.662504	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	122	-	13	-	4-741
S-SS8	Polecat Creek	Franklin	36.970904	-79.657370	Perennial	RPW	Orangefin madtom,	03010101	Timber Mat Crossing	20	-	161	-	18	-	4-741
S-CD8	UNT to Owens Creek	Franklin	36.970522	-79.653726	Intermittent	RPW	-	03010101	Pipeline ROW	78	-	353	-	130	-	4-742
S-AB8	UNT to Owens Creek	Franklin	36.970133	-79.651328	Intermittent	RPW	-	03010101	Pipeline ROW	84	-	335	-	124	-	4-742
S-DD3	Owens Creek	Franklin	36.969118	-79.645042	Intermittent	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-743
S-G16	Strawfield Creek	Franklin	36.968640	-79.642174	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	30	-	601	-	100	-	4-743
S-G15	UNT to Parrot Branch	Franklin	36.967711	-79.636590	Intermittent	RPW	-	03010101	Pipeline ROW	88	-	793	-	293	-	4-744
S-G13	Parrot Branch	Franklin	36.967025	-79.630747	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	161	-	18	-	4-744
S-D3	UNT to Jonnikin Creek	Pittsylvania	36.965631	-79.605542	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-747
S-D4	UNT to Jonnikin Creek	Pittsylvania	36.965600	-79.604894	Intermittent	RPW	-	03010101	Pipeline ROW	105	-	632	-	233	-	4-747
S-D2	Jonnikin Creek	Pittsylvania	36.965405	-79.599130	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	362	-	40	-	4-748

Table B-1. Virginia Stream Impacts (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (square feet) ⁵	Permanent Impact Area (square feet) ⁵	Temporary Fill (cubic yard) ⁵	Permanent Fill (cubic yard) ⁷	Figure
S-D7	UNT to Jonnikin Creek	Franklin	36.964763	-79.617043	Intermittent	RPW	-	03010101	Pipeline ROW	80	-	640	-	237	-	4-746
S-D1-EPH	UNT to Jonnikin Creek	Pittsylvania	36.964430	-79.595691	Ephemeral	NRPW	-	03010101	Pipeline ROW	61	-	610	-	226	-	4-748
S-D1-INT	UNT to Jonnikin Creek	Pittsylvania	36.964407	-79.595841	Intermittent	RPW	-	03010101	Pipeline ROW	29	-	292	-	32	-	4-748
S-G11	UNT to Jonnikin Creek	Pittsylvania	36.962420	-79.590500	Intermittent	RPW	-	03010101	Pipeline ROW	77	-	462	-	171	-	4-749
S-G9	UNT to Jonnikin Creek	Pittsylvania	36.959361	-79.586437	Intermittent	RPW	-	03010101	Pipeline ROW	79	-	318	-	117	-	4-751
S-G8	UNT to Jonnikin Creek	Pittsylvania	36.957805	-79.583545	Intermittent	RPW	-	03010101	Pipeline ROW	90	-	362	-	133	-	4-751
S-Q15	UNT to Jonnikin Creek	Pittsylvania	36.957580	-79.583492	Ephemeral	NRPW	-	03010101	Pipeline ROW	103	-	514	-	191	-	4-751
S-A6	UNT to Rocky Creek	Pittsylvania	36.952275	-79.580460	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-750
S-H11-Braid	UNT to Rocky Creek	Pittsylvania	36.949615	-79.579553	Ephemeral	NRPW	-	03010101	Pipeline ROW	85	-	170	-	19	-	4-750
S-F2	UNT to Rocky Creek	Pittsylvania	36.944049	-79.571442	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-753
S-C7	UNT to Rocky Creek	Pittsylvania	36.944016	-79.571517	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	401	-	44	-	4-753
S-C3	Harpen Creek	Pittsylvania	36.929762	-79.526109	Perennial	RPW	Roanoke logperch, Orangefin madtom	03010101	Timber Mat Crossing	20	-	362	-	40	-	4-758
S-C4	UNT to Harpen Creek	Pittsylvania	36.929745	-79.526290	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	58	-	231	-	26	-	4-758
S-H13	Harpen Creek	Pittsylvania	36.925105	-79.517350	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	77	-	1542	-	570	-	4-759
S-G6	UNT to Harpen Creek	Pittsylvania	36.920737	-79.505898	Intermittent	RPW	-	03010101	Pipeline ROW	80	-	479	-	178	-	4-761
S-G5	UNT to Harpen Creek	Pittsylvania	36.917694	-79.496604	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	462	-	171	-	4-762
S-G4	Harpen Creek	Pittsylvania	36.916463	-79.492669	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	30	-	601	-	100	-	4-762
S-G3	UNT to Harpen Creek	Pittsylvania	36.915658	-79.490029	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	179	-	20	-	4-762
S-CC16	UNT to Harpen Creek	Pittsylvania	36.913003	-79.487838	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	222	-	24	-	4-763
S-CC14	UNT to Cherrystone Creek	Pittsylvania	36.905329	-79.471492	Intermittent	RPW	-	03010105	Timber Mat Crossing	20	-	161	-	18	-	4-765
S-CC13	UNT to Cherrystone Creek	Pittsylvania	36.905307	-79.471574	Intermittent	RPW	-	03010105	Timber Mat Crossing	20	-	139	-	16	-	4-765
S-MM8	UNT to Cherrystone Creek	Pittsylvania	36.902991	-79.468220	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	122	-	13	-	4-766
S-CC15	UNT to Cherrystone Creek	Pittsylvania	36.901941	-79.466535	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	122	-	13	-	4-766
S-CC8	UNT to Cherrystone Creek	Pittsylvania	36.899437	-79.462685	Intermittent	RPW	-	03010105	Timber Mat Crossing	20	-	161	-	18	-	4-766
S-CC5	UNT to Cherrystone Creek	Pittsylvania	36.899411	-79.462483	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	240	-	27	-	4-766
S-CC5	UNT to Cherrystone Creek	Pittsylvania	36.899248	-79.462396	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	54	-	649	-	240	-	4-766
S-CC9	UNT to Cherrystone Creek	Pittsylvania	36.897740	-79.458046	Ephemeral	NRPW	-	03010105	Pipeline ROW	81	-	444	-	165	-	4-767
S-CC10	UNT to Cherrystone Creek	Pittsylvania	36.897315	-79.456119	Intermittent	RPW	-	03010105	Pipeline ROW	78	-	701	-	260	-	4-767
S-MM10	UNT to Cherrystone Creek	Pittsylvania	36.895915	-79.452960	Intermittent	RPW	-	03010105	Pipeline ROW	9	-	61	-	7	-	4-768
S-CC11	UNT to Cherrystone Creek	Pittsylvania	36.895808	-79.452920	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	87	-	697	-	258	-	4-768
S-CC1	Cherrystone Creek	Pittsylvania	36.894043	-79.445744	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	82	-	1228	-	456	-	4-769
S-CC3	UNT to Cherrystone Creek	Pittsylvania	36.893727	-79.444763	Ephemeral	NRPW	-	03010105	Pipeline ROW	91	-	727	-	270	-	4-769
S-P5	UNT to Cherrystone Creek	Pittsylvania	36.892751	-79.440053	Ephemeral	NRPW	-	03010105	Timber Mat Crossing	20	-	100	-	11	-	4-769
S-U35-EPH	UNT to Pole Bridge Branch	Pittsylvania	36.891451	-79.433781	Ephemeral	NRPW	-	03010105	Pipeline ROW	171	-	684	-	253	-	4-770
S-Q4	UNT to Pole Bridge Branch	Pittsylvania	36.886114	-79.430914	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	100	-	11	-	4-771
S-Q3	Pole Bridge Branch	Pittsylvania	36.884444	-79.428220	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	75	-	1873	-	694	-	4-771
S-Q2	UNT to Pole Bridge Branch	Pittsylvania	36.884284	-79.427914	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	139	-	16	-	4-771
S-B6	UNT to Pole Bridge Branch	Pittsylvania	36.879063	-79.420189	Ephemeral	NRPW	-	03010105	Pipeline ROW	84	-	841	-	311	-	4-772
S-B8	UNT to Pole Bridge Branch	Pittsylvania	36.877937	-79.417992	Intermittent	RPW	-	03010105	Pipeline ROW	82	-	327	-	121	-	4-773
S-B9	UNT to Pole Bridge Branch	Pittsylvania	36.877416	-79.416255	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	78	-	545	-	202	-	4-773
S-DD4-Braid-1	UNT to Mill Creek	Pittsylvania	36.871651	-79.404061	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	67	-	401	-	149	-	4-775
S-DD4	UNT to Mill Creek	Pittsylvania	36.871478	-79.403907	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	147	-	880	-	327	-	4-775
S-KL27	UNT to Mill Creek	Pittsylvania	36.866534	-79.400511	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	84	-	83	-	31	-	4-776
S-C1	Mill Creek	Pittsylvania	36.863513	-79.397914	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	92	-	553	-	204	-	4-777
S-G2	Little Cherrystone Creek	Pittsylvania	36.851931	-79.386051	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	139	-	16	-	4-779
S-B2	UNT to Little Cherrystone Creek	Pittsylvania	36.849394	-79.377780	Ephemeral	NRPW	-	03010105	Timber Mat Crossing	20	-	100	-	11	-	4-780
S-H55	UNT to Little Cherrystone Creek	Pittsylvania	36.843486	-79.369222	Ephemeral	NRPW	-	03010105	Timber Mat Crossing	20	-	61	-	7	-	4-781
S-H54	UNT to Little Cherrystone Creek	Pittsylvania	36.841112	-79.366848	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	240	-	27	-	4-781
S-GG11	UNT to Little Cherrystone Creek	Pittsylvania	36.841093	-79.366942	Perennial	RPW	-	03010105	Timber Mat Crossing	46	-	366	-	41	-	4-781
S-H3	UNT to Little Cherrystone Creek	Pittsylvania	36.834501	-79.360244	Intermittent	RPW	-	03010105	Pipeline ROW	18	-	109	-	12	-	4-783
S-H5	UNT to Little Cherrystone Creek	Pittsylvania	36.833412	-79.359823	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	83	-	662	-	246	-	4-783
S-OO1	UNT to Little Cherrystone Creek	Pittsylvania	36.830285	-79.356618	Intermittent	RPW	-	03010105	Pipeline ROW	84	-	418	-	156	-	4-783

Table B-1. Virginia Stream Impacts (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (square feet) ⁵	Permanent Impact Area (square feet) ⁵	Temporary Fill (cubic yard) ⁵	Permanent Fill (cubic yard) ⁷	Figure
S-H44	UNT to Little Cherrystone Creek	Pittsylvania	36.829823	-79.346016	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	33	-	266	-	29	-	4-785
S-H42	UNT to Little Cherrystone Creek	Pittsylvania	36.828993	-79.344442	Perennial	RPW	Orangefin madtom	03010105	Permanent Access Road	-	32	-	224	-	25	4-785
S-H42	UNT to Little Cherrystone Creek	Pittsylvania	36.828958	-79.344315	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	139	-	16	-	4-785
S-OO2	UNT to Little Cherrystone Creek	Pittsylvania	36.828831	-79.353849	Intermittent	RPW	-	03010105	Pipeline ROW	78	-	392	-	144	-	4-784
S-EF26	Little Cherrystone Creek	Pittsylvania	36.828207	-79.349814	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	401	-	44	-	4-784

Notes:

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- For identified streams without a NHD (National Hydrography Dataset) name, the identified stream was given the name, "Unidentified Tributary (UNT)", of the first named receiving waterbody
- In decimal degrees
- RPW = Relatively Permanent Waters
- NRPW = Non-Relatively Permanent Waters
- TNW = Traditional Navigable Waters
- See Section 1.9.2 and Section 4.2 for more information
- Impact square feet are rounded to the nearest whole number.
- Temporary fill discharge into waters of the U.S. Cubic yards are rounded to the nearest whole number.
- Permanent fill associated with the construction of Permanent access road and facilities. Cubic yards are rounded to the nearest whole number.

Table B-2. Virginia Wetland Impacts (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (square feet) ⁴	Permanent Conversion Impacts (square feet) ⁴	Permanent Fill Impacts (square feet) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-Z11	Giles	Norfolk	37.346591	-80.641713	PEM	NRPWW	05050002	Pipeline ROW	1,141	-	-	423	-	4-543
W-Z3	Giles	Norfolk	37.342244	-80.620612	PSS	RPWWD	05050002	Timber Mat Crossing	-	592	-	66	-	4-545
W-CD12	Giles	Norfolk	37.318644	-80.441717	PEM	RPWWD	05050002	Pipeline ROW	906	-	-	335	-	4-577
W-MM10	Giles	Norfolk	37.298219	-80.480617	PEM	RPWWD	05050002	Temporary Access Road	1,106	-	-	123	-	4-569
W-RR1b	Giles	Norfolk	37.296670	-80.494042	PEM	RPWWD	05050002	Timber Mat Crossing	244	-	-	27	-	4-567
W-IJ46-PEM	Montgomery	Norfolk	37.296153	-80.367508	PEM	RPWWD	03010101	Pipeline ROW	1,281	-	-	474	-	4-591
W-AD4	Montgomery	Norfolk	37.286984	-80.330124	PEM	RPWWD	03010101	Temporary Access Road	301	-	-	33	-	4-596
W-NN6	Montgomery	Norfolk	37.268174	-80.316468	PEM	RPWWN	03010101	Timber Mat Crossing	362	-	-	40	-	4-603
W-F9-PFO	Montgomery	Norfolk	37.258109	-80.285892	PFO	RPWWD	03010101	Pipeline ROW	-	736	-	82	-	4-609
W-C12-PEM	Montgomery	Norfolk	37.257265	-80.281667	PEM	RPWWD	03010101	Pipeline ROW	8,999	-	-	3,333	-	4-609
W-C12	Montgomery	Norfolk	37.257192	-80.281649	PFO	RPWWD	03010101	Pipeline ROW	-	2,278	-	253	-	4-609
W-C11	Montgomery	Norfolk	37.257107	-80.281351	PSS	RPWWD	03010101	Pipeline ROW	-	2,008	-	223	-	4-609
W-C6	Montgomery	Norfolk	37.255860	-80.275715	PEM	NRPWW	03010101	Timber Mat Crossing	605	-	-	67	-	4-610
W-C5	Montgomery	Norfolk	37.255606	-80.274237	PEM	NRPWW	03010101	Pipeline ROW	1,978	-	-	732	-	4-610
W-AB7	Montgomery	Norfolk	37.231426	-80.198615	PEM	RPWWD	03010101	Timber Mat Crossing	174	-	-	19	-	4-631
W-KL58	Montgomery	Norfolk	37.229183	-80.203106	PEM	RPWWD	03010101	Permanent Access Road	-	-	1,707	-	190	4-631
W-EF5-PFO	Montgomery	Norfolk	37.210948	-80.193359	PFO	RPWWD	03010101	Pipeline ROW	-	3,711	-	1,374	-	4-635
W-EF18	Roanoke	Norfolk	37.179449	-80.140665	PSS	RPWWD	03010101	Temporary Access Road	-	227	-	25	-	4-647
W-EF17	Roanoke	Norfolk	37.179402	-80.140600	PFO	RPWWD	03010101	Temporary Access Road	-	976	-	108	-	4-647
W-IJ94-PEM	Roanoke	Norfolk	37.170092	-80.138294	PEM	RPWWD	03010101	Timber Mat Crossing	880	-	-	98	-	4-649
W-IJ96-PEM	Roanoke	Norfolk	37.169461	-80.130376	PEM	RPWWD	03010101	Temporary Access Road	701	-	-	77	-	4-650
W-IJ95-PSS	Roanoke	Norfolk	37.169068	-80.138278	PSS	RPWWD	03010101	Timber Mat Crossing	-	1,106	-	123	-	4-649
W-IJ102	Roanoke	Norfolk	37.168289	-80.138375	PFO	RPWWD	03010101	Timber Mat Crossing	-	436	-	48	-	4-649
W-KL17	Roanoke	Norfolk	37.160152	-80.134774	PSS	RPWWD	03010101	Pipeline ROW	-	1,895	-	702	-	4-651
W-KL16*	Roanoke	Norfolk	37.159927	-80.134257	PEM	ISOLATE	03010101	Timber Mat Crossing	618	-	-	69	-	4-651
W-KL15*	Roanoke	Norfolk	37.158853	-80.133802	PEM	ISOLATE	03010101	Pipeline ROW	1,451	-	-	537	-	4-651
W-EF42	Roanoke	Norfolk	37.157611	-80.133722	PEM	RPWWD	03010101	Pipeline ROW	362	-	-	40	-	4-652
W-HS02	Roanoke	Norfolk	37.157427	-80.133413	PEM	RPWWD	03010101	Pipeline ROW	12,602	-	-	4,668	-	4-652
W-AB6-PEM-2	Roanoke	Norfolk	37.156825	-80.131998	PEM	RPWWD	03010101	Pipeline ROW	14,248	-	-	5,277	-	4-652
W-AB6-PFO-1	Roanoke	Norfolk	37.156713	-80.131681	PFO	RPWWD	03010101	Pipeline ROW	-	2,692	-	997	-	4-652
W-AB6-PEM-1	Roanoke	Norfolk	37.156170	-80.130794	PEM	RPWWD	03010101	Pipeline ROW	2,818	-	-	1,044	-	4-652
W-AB6-PSS	Roanoke	Norfolk	37.156034	-80.130603	PSS	RPWWD	03010101	Pipeline ROW	-	266	-	30	-	4-652
W-AB5	Roanoke	Norfolk	37.155840	-80.130227	PFO	RPWWN	03010101	Pipeline ROW	-	183	-	20	-	4-652
W-AB3-PEM-2	Roanoke	Norfolk	37.155664	-80.129569	PEM	RPWWD	03010101	Pipeline ROW	6,739	-	-	2,495	-	4-652
W-EF46	Roanoke	Norfolk	37.154575	-80.129122	PSS	RPWWD	03010101	Timber Mat Crossing	-	2,971	-	330	-	4-652
W-KL48-PSS-1	Roanoke	Norfolk	37.152292	-80.130022	PSS	RPWWD	03010101	Pipeline ROW	-	1,978	-	733	-	4-653
W-KL48-PEM	Roanoke	Norfolk	37.151965	-80.130049	PEM	RPWWD	03010101	Pipeline ROW	274	-	-	31	-	4-653
W-KL48-PSS-2	Roanoke	Norfolk	37.150926	-80.131271	PSS	RPWWD	03010101	Pipeline ROW	-	1,150	-	128	-	4-653
W-KL50	Roanoke	Norfolk	37.150728	-80.131537	PEM	RPWWN	03010101	Pipeline ROW	1,777	-	-	658	-	4-653
W-KL49	Roanoke	Norfolk	37.150297	-80.132193	PEM	RPWWN	03010101	Timber Mat Crossing	662	-	-	74	-	4-653
W-KL51-PEM	Roanoke	Norfolk	37.150006	-80.132403	PEM	RPWWD	03010101	Timber Mat Crossing	274	-	-	30	-	4-653
W-KL51-PSS	Roanoke	Norfolk	37.149975	-80.132476	PSS	RPWWD	03010101	Timber Mat Crossing	-	348	-	39	-	4-653
W-MN7-PEM	Roanoke	Norfolk	37.148328	-80.133901	PEM	RPWWD	03010101	Timber Mat Crossing	505	-	-	56	-	4-653
W-EF44	Roanoke	Norfolk	37.142977	-80.138322	PEM	RPWWD	03010101	Timber Mat Crossing	370	-	-	41	-	4-654
W-IJ36	Roanoke	Norfolk	37.138922	-80.139845	PSS	RPWWD	03010101	Timber Mat Crossing	-	5,388	-	599	-	4-655
W-Z7	Roanoke	Norfolk	37.136601	-80.128216	PSS	RPWWD	03010101	Temporary Access Road	-	13	-	1	-	4-657
W-Z6	Roanoke	Norfolk	37.136466	-80.128238	PFO	RPWWD	03010101	Temporary Access Road	-	122	-	14	-	4-657
W-IJ62	Roanoke	Norfolk	37.135529	-80.134044	PEM	RPWWD	03010101	Temporary Access Road	4	-	-	1	-	4-656
W-Y2	Roanoke	Norfolk	37.134284	-80.137448	PEM	RPWWD	03010101	Timber Mat Crossing	823	-	-	91	-	4-656
W-IJ10	Roanoke	Norfolk	37.132561	-80.131744	PEM	RPWWD	03010101	Permanent Access Road	87	-	-	10	-	4-656
W-Q11	Roanoke	Norfolk	37.132470	-80.131638	PEM	RPWWD	03010101	Permanent Access Road	566	-	-	63	-	4-656
W-KL1	Roanoke	Norfolk	37.132456	-80.131463	PEM	RPWWN	03010101	Permanent Access Road	78	-	-	9	-	4-656
W-B25-PEM-4	Roanoke	Norfolk	37.128942	-80.133774	PEM	RPWWD	03010101	Timber Mat Crossing	405	-	-	45	-	4-659
W-B25-PEM-1	Roanoke	Norfolk	37.128645	-80.133283	PEM	RPWWD	03010101	Pipeline ROW	8,425	-	-	3,120	-	4-659
W-B24-PSS	Roanoke	Norfolk	37.128540	-80.130794	PSS	RPWWD	03010101	Pipeline ROW	-	7,131	-	2,641	-	4-659
W-B24-PEM	Roanoke	Norfolk	37.128530	-80.131060	PEM	RPWWD	03010101	Pipeline ROW	4,491	-	-	1,663	-	4-659
W-B25-PSS-2	Roanoke	Norfolk	37.128527	-80.132335	PSS	RPWWD	03010101	Timber Mat Crossing	-	3,615	-	402	-	4-659
W-B25-PEM-1	Roanoke	Norfolk	37.128449	-80.132802	PEM	RPWWD	03010101	Timber Mat Crossing	610	-	-	68	-	4-659
W-B25-PEM-2	Roanoke	Norfolk	37.128436	-80.132646	PEM	RPWWD	03010101	Timber Mat Crossing	209	-	-	78	-	4-659
W-ST2-PEM	Franklin	Norfolk	37.125329	-80.121460	PEM	RPWWD	03010101	Pipeline ROW	4,975	-	-	1,842	-	4-661
W-RR4	Franklin	Norfolk	37.125117	-80.113530	PEM	RPWWD	03010101	Permanent Access Road	941	-	-	105	-	4-662
W-RR3	Franklin	Norfolk	37.124214	-80.114746	PEM	RPWWD	03010101	Permanent Access Road	83	-	-	9	-	4-662
W-KL41	Franklin	Norfolk	37.123851	-80.115802	PEM	RPWWD	03010101	Permanent Access Road	998	-	-	111	-	4-661

Table B-2. Virginia Wetland Impacts (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (square feet) ⁴	Permanent Conversion Impacts (square feet) ⁴	Permanent Fill Impacts (square feet) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-D7-PEM	Franklin	Norfolk	37.121559	-80.085750	PEM	RPWWD	03010101	Pipeline ROW	693	-	-	77	-	4-666
W-EF3	Franklin	Norfolk	37.117734	-80.095992	PEM	RPWWD	03010101	Permanent Access Road	1,154	-	-	128	-	4-665
W-IJ1	Franklin	Norfolk	37.092927	-80.027568	PEM	RPWWD	03010101	Pipeline ROW	1,812	-	-	671	-	4-677
W-IJ2-PEM	Franklin	Norfolk	37.092555	-80.027314	PEM	RPWWD	03010101	Timber Mat Crossing	157	-	-	17	-	4-677
W-GH2	Franklin	Norfolk	37.092404	-79.983182	PSS	RPWWD	03010101	Timber Mat Crossing	-	566	-	63	-	4-684
W-II8	Franklin	Norfolk	37.091357	-79.992006	PEM	RPWWD	03010101	Timber Mat Crossing	383	-	-	43	-	4-683
W-IJ6	Franklin	Norfolk	37.089156	-80.005036	PEM	RPWWD	03010101	Timber Mat Crossing	200	-	-	22	-	4-681
W-E7	Franklin	Norfolk	37.084557	-79.947595	PEM	RPWWD	03010101	Pipeline ROW	9,249	-	-	3,426	-	4-690
W-E8	Franklin	Norfolk	37.082843	-79.946100	PEM	RPWWD	03010101	Pipeline ROW	3,010	-	-	1,114	-	4-690
W-EF51	Franklin	Norfolk	37.064781	-79.874460	PEM	RPWWD	03010101	Pipeline ROW	579	-	-	64	-	4-705
W-KL43b	Franklin	Norfolk	37.059608	-79.840707	PEM	RPWWD	03010101	Pipeline ROW	17	-	-	2	-	4-710
W-CD6	Franklin	Norfolk	37.057586	-79.915232	PEM	RPWWN	03010101	Timber Mat Crossing	4,069	-	-	452	-	4-698
W-CD5	Franklin	Norfolk	37.055438	-79.910624	PFO	RPWWN	03010101	Pipeline ROW	-	4,948	-	1,833	-	4-698
W-EF48	Franklin	Norfolk	37.052142	-79.886197	PEM	RPWWD	03010101	Timber Mat Crossing	348	-	-	39	-	4-702
W-CD1	Franklin	Norfolk	37.047767	-79.897568	PFO	RPWWD	03010101	Pipeline ROW	-	4,818	-	1,785	-	4-701
W-DD1	Franklin	Norfolk	37.031961	-79.788589	PEM	RPWWN	03010101	Pipeline ROW	3,541	-	-	1,312	-	4-720
W-A12-PFO	Franklin	Norfolk	37.031754	-79.788099	PFO	RPWWD	03010101	Pipeline ROW	-	174	-	19	-	4-720
W-A12-PEM	Franklin	Norfolk	37.031643	-79.788111	PEM	RPWWD	03010101	Pipeline ROW	2,836	-	-	1,050	-	4-720
W-GH16	Franklin	Norfolk	37.028394	-79.773243	PFO	RPWWD	03010101	Timber Mat Crossing	-	2,862	-	318	-	4-722
W-H17	Franklin	Norfolk	36.989390	-79.722090	PFO	RPWWD	03010101	Timber Mat Crossing	-	1,607	-	179	-	4-730
W-H11	Franklin	Norfolk	36.988077	-79.702803	PEM	RPWWD	03010101	Pipeline ROW	2,039	-	-	755	-	4-734
W-H16	Franklin	Norfolk	36.988073	-79.714967	PEM	RPWWD	03010101	Timber Mat Crossing	1,011	-	-	112	-	4-731
W-H14	Franklin	Norfolk	36.988069	-79.711841	PEM	RPWWD	03010101	Timber Mat Crossing	266	-	-	30	-	4-732
W-A8	Franklin	Norfolk	36.987947	-79.700844	PEM	RPWWD	03010101	Pipeline ROW	671	-	-	75	-	4-734
W-H15	Franklin	Norfolk	36.987938	-79.714829	PSS	RPWWD	03010101	Timber Mat Crossing	-	309	-	35	-	4-731
W-H9	Franklin	Norfolk	36.978536	-79.682057	PEM	RPWWN	03010101	Timber Mat Crossing	370	-	-	41	-	4-736
W-H6	Franklin	Norfolk	36.972189	-79.663042	PEM	RPWWD	03010101	Pipeline ROW	248	-	-	28	-	4-741
W-D3	Pittsylvania	Norfolk	36.965318	-79.598760	PFO	RPWWN	03010101	Timber Mat Crossing	-	1,241	-	138	-	4-748
W-MM17	Franklin	Norfolk	36.964731	-79.617067	PEM	RPWWD	03010101	Pipeline ROW	296	-	-	110	-	4-746
W-B5	Pittsylvania	Norfolk	36.959293	-79.586201	PEM	RPWWN	03010101	Pipeline ROW	209	-	-	23	-	4-751
W-B4-PSS	Pittsylvania	Norfolk	36.957884	-79.583666	PSS	RPWWD	03010101	Pipeline ROW	-	205	-	23	-	4-751
W-C1	Pittsylvania	Norfolk	36.929954	-79.526831	PEM	RPWWN	03010101	Timber Mat Crossing	793	-	-	88	-	4-758
W-H5	Pittsylvania	Norfolk	36.924983	-79.517159	PEM	RPWWD	03010101	Pipeline ROW	9,004	-	-	3,335	-	4-759
W-B3	Pittsylvania	Norfolk	36.916508	-79.492360	PEM	RPWWN	03010101	Timber Mat Crossing	57	-	-	6	-	4-762
W-CC2-PEM	Pittsylvania	Norfolk	36.905418	-79.471566	PEM	RPWWD	03010105	Timber Mat Crossing	1,185	-	-	132	-	4-765
W-MM5	Pittsylvania	Norfolk	36.903012	-79.468192	PSS	RPWWD	03010105	Timber Mat Crossing	-	1,699	-	189	-	4-766
W-MM9	Pittsylvania	Norfolk	36.894087	-79.446110	PEM	RPWWN	03010105	Timber Mat Crossing	470	-	-	52	-	4-769
W-MM8-PEM	Pittsylvania	Norfolk	36.894034	-79.445486	PEM	RPWWN	03010105	Pipeline ROW	2,409	-	-	893	-	4-769
W-MM8-PFO	Pittsylvania	Norfolk	36.893930	-79.445461	PFO	RPWWN	03010105	Pipeline ROW	-	1,834	-	679	-	4-769
W-Q2	Pittsylvania	Norfolk	36.884674	-79.428607	PFO	RPWWD	03010105	Pipeline ROW	-	16,422	-	6,082	-	4-771
W-Q1	Pittsylvania	Norfolk	36.883985	-79.427305	PEM	RPWWD	03010105	Pipeline ROW	636	-	-	236	-	4-771
W-G2	Pittsylvania	Norfolk	36.851816	-79.385930	PEM	RPWWD	03010105	Timber Mat Crossing	1,507	-	-	167	-	4-779
W-H1	Pittsylvania	Norfolk	36.836097	-79.360895	PEM	RPWWN	03010105	Pipeline ROW	479	-	-	53	-	4-782
W-EF6	Pittsylvania	Norfolk	36.835004	-79.339128	PFO	RPWWD	03010105	Pipeline ROW	-	2,905	-	323	-	4-786
W-H2	Pittsylvania	Norfolk	36.834817	-79.360479	PEM	RPWWD	03010105	Pipeline ROW	34,791	-	-	12,886	-	4-782

Table B-2. Virginia Wetland Impacts (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (square feet) ⁴	Permanent Conversion Impacts (square feet) ⁴	Permanent Fill Impacts (square feet) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-IJ21	Pittsylvania	Norfolk	36.834623	-79.338527	PFO	RPWWN	03010105	Timber Mat Crossing	-	462	-	51	-	4-786
W-H3	Pittsylvania	Norfolk	36.833741	-79.360081	PEM	RPWWN	03010105	Pipeline ROW	2,217	-	-	821	-	4-783
W-MM3	Pittsylvania	Norfolk	36.830361	-79.356631	PSS	RPWWD	03010105	Pipeline ROW	-	1,481	-	548	-	4-783
W-IJ22-PEM	Pittsylvania	Norfolk	36.827780	-79.350264	PEM	RPWWD	03010105	Timber Mat Crossing	1,699	-	-	189	-	4-784
W-IJ22-PFO	Pittsylvania	Norfolk	36.827748	-79.350295	PFO	RPWWD	03010105	Timber Mat Crossing	-	3,419	-	380	-	4-784

Notes:

- 1
- In decimal degrees.
- 2
- PEM = Palustrine Emergent
- PSS = Palustrine Scrub-Shrub
- PFO = Palustrine Forested
- 3
- RPWWD = Wetlands directly abutting Relatively Permanent Waters (RPWs) that flow directly or indirectly into Traditional Navigable Waterways (TNWs)
- RPWWN = Wetlands adjacent but not directly abutting RPWs that flow directly or indirectly into TNWs
- NRPWW = Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- 4
- Construction of access roads will not result in impacts to tidal wetlands or wetlands adjacent to tidal waters. Construction, maintenance, or expansion of substation facilities will not result in discharges to non-tidal wetlands adjacent to tidal waters of the United States.
- Impact square feet are rounded to the nearest whole number.
- 5
- Temporary fill discharge into waters of the U.S. Cubic yards are rounded to the nearest whole number.
- 6
- Permanent fill associated with the construction of permanent access road and facilities. Cubic yards are rounded to the nearest whole number.
- *
- VDEQ does not require a VWPP for W-KL15 or W-KL16 per the VDEQ 1/23/2018 IWOMEV Determination

Table B-3. Virginia Stream Impacts Summary (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Cowardin Class	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Fill (cubic yards)	Permanent Fill (cubic yards)
Ephemeral	3,980	31	6,285	24
Intermittent	6,114	0	10,111	0
Perennial	6,971	32	30,338	25
Norfolk District Total	17,065	63	46,734	49

Table B-4. Virginia Wetland Impacts Summary (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Cowardin Class	Temporary Impacts (square feet)¹	Permanent Conversion Impacts (square feet)	Permanent Fill Impacts (square feet)	Temporary Fill (cubic yards)¹	Permanent Fill (cubic yards)
PEM	172,478	0	1,707	56,465	190
PSS	0	32,948	0	6,900	0
PFO	0	51,826	0	14,683	0
Norfolk District Total	172,478	84,774	1,707	78,048	190

Notes:

1

- Includes temporary impacts to W-KL15 and W-KL16, two isolated wetland that VDEQ does not require a VWPP for per the VDEQ 1/23/2018 IWOMEV Determination.

Table 10. Completed Project Crossings (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Feature Name	Water Type	County	USACE District	Latitude ¹	Longitude ¹	Type of Impact	Figure
S-J62	RPW	Harrison	Pittsburgh	39.445033	-80.482635	Pipeline ROW	4-35
S-B75/F49	RPW	Harrison	Pittsburgh	39.436571	-80.475198	Pipeline ROW	4-36
W-B55	RPWWD	Harrison	Pittsburgh	39.436246	-80.474973	Pipeline ROW	4-36
S-B74	RPW	Harrison	Pittsburgh	39.436245	-80.474976	Pipeline ROW	4-36
S-J51	RPW	Harrison	Pittsburgh	39.398116	-80.477174	Pipeline ROW	4-43
S-A10a	RPW	Harrison	Pittsburgh	39.370005	-80.484974	Pipeline ROW	4-49
W-A10a	RPWWD	Harrison	Pittsburgh	39.369569	-80.485054	Pipeline ROW	4-49
S-RR22	RPW	Harrison	Pittsburgh	39.342166	-80.512422	Pipeline ROW	4-55
S-B6a	RPW	Harrison	Pittsburgh	39.317023	-80.526157	Pipeline ROW	4-59
W-B4a	RPWWD	Harrison	Pittsburgh	39.316784	-80.526129	Pipeline ROW	4-59
S-B7a	RPW	Harrison	Pittsburgh	39.316755	-80.526222	Pipeline ROW	4-59
W-F54	NRPWW	Harrison	Pittsburgh	39.249640	-80.550121	Pipeline ROW	4-76
W-F53	NRPWW	Harrison	Pittsburgh	39.249629	-80.549909	Pipeline ROW	4-76
W-F55	NRPWW	Harrison	Pittsburgh	39.249464	-80.551040	Pipeline ROW/Temporary Access Road	4-76
S-K80	RPW	Harrison	Pittsburgh	39.225747	-80.550164	Pipeline ROW	4-80
S-CV9	NRPW	Harrison	Pittsburgh	39.223690	-80.548273	Pipeline ROW	4-81
W-CV15	RPWWD	Harrison	Pittsburgh	39.223490	-80.548109	Pipeline ROW	4-81
S-K81	RPW	Harrison	Pittsburgh	39.223263	-80.547928	Pipeline ROW	4-81
S-CV10	RPW	Harrison	Pittsburgh	39.221719	-80.546951	Pipeline ROW	4-81
S-A106	NRPW	Harrison	Pittsburgh	39.168435	-80.577625	Pipeline ROW	4-92
S-A105	NRPW	Harrison	Pittsburgh	39.168266	-80.577815	Pipeline ROW	4-92
S-I67	RPW	Lewis	Pittsburgh	39.137145	-80.577026	Pipeline ROW	4-99
S-J43	RPW	Lewis	Pittsburgh	39.120579	-80.581328	Pipeline ROW	4-102
S-B67	RPW	Lewis	Pittsburgh	39.079556	-80.581346	Pipeline ROW	4-110
W-B47	RPWWD	Lewis	Pittsburgh	39.079451	-80.581349	Pipeline ROW	4-110
W-B51	NRPWW	Lewis	Pittsburgh	39.078107	-80.581235	Pipeline ROW	4-110
W-B54	NRPWW	Lewis	Pittsburgh	39.073907	-80.581491	Pipeline ROW	4-110
S-H184	NRPW	Lewis	Pittsburgh	39.069684	-80.580583	Pipeline ROW	4-111
S-H184a	NRPW	Lewis	Pittsburgh	39.069645	-80.580591	Pipeline ROW	4-111
S-J66	RPW	Wetzel	Huntington	39.546030	-80.544314	Pipeline ROW	4-5
W-A4a	NRPWW	Wetzel	Huntington	39.544654	-80.542771	Pipeline ROW	4-5
S-A5a	RPW	Wetzel	Huntington	39.534241	-80.540995	Pipeline ROW	4-8
S-A6a	RPW	Wetzel	Huntington	39.534023	-80.540889	Pipeline ROW	4-9
S-A125	RPW	Wetzel	Huntington	39.503477	-80.532902	Pipeline ROW	4-19
W-A35	NRPWW	Wetzel	Huntington	39.491159	-80.520537	Pipeline ROW	4-23
S-J60	RPW	Wetzel	Huntington	39.474354	-80.511825	Pipeline ROW	4-26
S-J56	RPW	Wetzel	Huntington	39.464315	-80.502077	Pipeline ROW	4-28
W-K41	RPWWD	Doddridge	Huntington	39.208990	-80.551957	Pipeline ROW	4-84
S-K54	RPW	Doddridge	Huntington	39.207673	-80.552957	Pipeline ROW	4-84
S-K58	NRPW	Doddridge	Huntington	39.205595	-80.553224	Pipeline ROW	4-84
S-K59	NRPW	Doddridge	Huntington	39.204704	-80.553272	Pipeline ROW	4-84

Table 10. Completed Project Crossings (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Feature Name	Water Type	County	USACE District	Latitude ¹	Longitude ¹	Type of Impact	Figure
S-K60	NRPW	Doddridge	Huntington	39.203779	-80.553410	Pipeline ROW	4-84
S-J46	RPW	Lewis	Huntington	39.094778	-80.584826	Pipeline ROW	4-106
S-J47b	RPW	Lewis	Huntington	39.094003	-80.585481	Pipeline ROW	4-106
W-K34-PEM	RPWWD	Lewis	Huntington	39.093945	-80.585460	Pipeline ROW	4-106
W-H109	NRPWW	Lewis	Huntington	39.053324	-80.582020	Pipeline ROW	4-114
S-I64	RPW	Lewis	Huntington	39.052748	-80.582213	Pipeline ROW	4-114
S-KK3a	NRPW	Lewis	Huntington	39.019605	-80.597895	Pipeline ROW	4-119
W-KK6	RPWWD	Lewis	Huntington	39.017820	-80.596977	Pipeline ROW	4-119
S-KK5	RPW	Lewis	Huntington	39.017783	-80.596853	Pipeline ROW	4-119
S-KK5	RPW	Lewis	Huntington	39.017738	-80.597017	Pipeline ROW	4-119
S-KK5	RPW	Lewis	Huntington	39.017718	-80.597027	Pipeline ROW	4-119
S-KK6	RPW	Lewis	Huntington	39.017621	-80.596939	Pipeline ROW	4-119
S-KK7	RPW	Lewis	Huntington	39.017519	-80.597010	Pipeline ROW	4-119
S-K43	RPW	Lewis	Huntington	39.002045	-80.596098	Pipeline ROW	4-121
S-K38	NRPW	Lewis	Huntington	38.992357	-80.592929	Pipeline ROW	4-123
W-I16	NRPWW	Lewis	Huntington	38.964758	-80.590881	Pipeline ROW	4-129
W-I21	NRPWW	Lewis	Huntington	38.964195	-80.590961	Pipeline ROW	4-129
W-I20	NRPWW	Lewis	Huntington	38.962362	-80.590607	Pipeline ROW	4-129
W-I17	NRPWW	Lewis	Huntington	38.962126	-80.590741	Pipeline ROW	4-129
W-H107	RPWWD	Lewis	Huntington	38.932901	-80.584200	Pipeline ROW	4-135
W-H96	RPWWD	Lewis	Huntington	38.913939	-80.571910	Pipeline ROW	4-142
S-CV3	RPW	Lewis	Huntington	38.913415	-80.571854	Pipeline ROW	4-142
W-H95	RPWWD	Lewis	Huntington	38.913311	-80.571953	Pipeline ROW	4-142
W-VV4-PEM	RPWWD	Lewis	Huntington	38.863280	-80.525705	Pipeline ROW	4-158
S-VV9	RPW	Lewis	Huntington	38.863254	-80.525763	Pipeline ROW	4-158
W-VV4-PFO	RPWWD	Lewis	Huntington	38.863238	-80.525813	Pipeline ROW	4-158
S-L51	RPW	Braxton	Huntington	38.839355	-80.519693	Pipeline ROW	4-161
S-J37	RPW	Braxton	Huntington	38.839133	-80.519716	Pipeline ROW	4-162
S-JJ1	RPW	Braxton	Huntington	38.786930	-80.530028	Pipeline ROW	4-172
S-I60	RPW	Braxton	Huntington	38.781068	-80.524577	Pipeline ROW	4-174
S-K34	RPW	Braxton	Huntington	38.766123	-80.520308	Pipeline ROW	4-178
S-K33	NRPW	Braxton	Huntington	38.765714	-80.520032	Pipeline ROW	4-178
S-H127	RPW	Braxton	Huntington	38.755029	-80.513692	Pipeline ROW	4-180
S-H132	RPW	Braxton	Huntington	38.751499	-80.514919	Pipeline ROW	4-180
S-H129	RPW	Braxton	Huntington	38.749321	-80.514337	Pipeline ROW	4-183
S-H131	NRPW	Braxton	Huntington	38.749215	-80.514370	Pipeline ROW	4-183
W-I11b	NRPWW	Braxton	Huntington	38.708869	-80.489369	Pipeline ROW	4-194
S-E76	NRPW	Webster	Huntington	38.674988	-80.477360	Pipeline ROW	4-200
W-F46	RPWWN	Webster	Huntington	38.664132	-80.479008	Pipeline ROW	4-202
W-H79	NRPWW	Webster	Huntington	38.602069	-80.508493	Pipeline ROW	4-220
W-H81	NRPWW	Webster	Huntington	38.599491	-80.506376	Pipeline ROW	4-220

Table 10. Completed Project Crossings (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Feature Name	Water Type	County	USACE District	Latitude ¹	Longitude ¹	Type of Impact	Figure
W-H82	NRPWW	Webster	Huntington	38.598415	-80.505238	Pipeline ROW	4-221
W-A20-PFO	NRPWW	Webster	Huntington	38.566923	-80.529968	Pipeline ROW	4-232
W-A20-PEM	NRPWW	Webster	Huntington	38.566910	-80.530098	Pipeline ROW	4-232
S-O5	NRPW	Webster	Huntington	38.482251	-80.555499	Pipeline ROW	4-263
S-A79	RPW	Webster	Huntington	38.480782	-80.554682	Pipeline ROW/Temporary Access Road	4-263
S-E58	RPW	Webster	Huntington	38.443669	-80.551989	Pipeline ROW	4-269
S-E55	NRPW	Webster	Huntington	38.440270	-80.559955	Pipeline ROW	4-271
W-F26	NRPWW	Webster	Huntington	38.428623	-80.567054	Pipeline ROW	4-277
S-F35	RPW	Webster	Huntington	38.424082	-80.570710	Pipeline ROW	4-278
W-F29	RPWWD	Webster	Huntington	38.424050	-80.570711	Pipeline ROW	4-278
S-F34	RPW	Webster	Huntington	38.423988	-80.570680	Pipeline ROW	4-278
W-F28	RPWWD	Webster	Huntington	38.423890	-80.570659	Pipeline ROW	4-278
S-C49	NRPW	Webster	Huntington	38.416587	-80.577890	Pipeline ROW	4-279
S-B33	RPW	Webster	Huntington	38.408941	-80.589063	Pipeline ROW	4-281
S-B32-Braid	RPW	Webster	Huntington	38.405871	-80.591069	Pipeline ROW	4-281
S-E52	RPW	Webster	Huntington	38.369110	-80.611761	Pipeline ROW	4-290
W-E16	NRPWW	Nicholas	Huntington	38.364427	-80.614459	Pipeline ROW	4-291
W-E13	RPWWN	Webster	Huntington	38.364017	-80.616570	Pipeline ROW	4-291
S-F21	RPW	Nicholas	Huntington	38.355859	-80.633328	Pipeline ROW	4-293
W-K20	RPWWD	Nicholas	Huntington	38.354644	-80.634586	Pipeline ROW	4-293
S-IJ59	NRPW	Nicholas	Huntington	38.348372	-80.641152	Pipeline ROW	4-295
W-N25	RPWWD	Nicholas	Huntington	38.302028	-80.674533	Pipeline ROW	4-306
W-N24	RPWWN	Nicholas	Huntington	38.299148	-80.675928	Pipeline ROW	4-307
W-N22	RPWWN	Nicholas	Huntington	38.296941	-80.676479	Pipeline ROW	4-307
W-L27	RPWWN	Nicholas	Huntington	38.202610	-80.718505	Pipeline ROW	4-341
S-N8a	RPW	Nicholas	Huntington	38.162363	-80.733602	Pipeline ROW	4-355
W-VV2	RPWWD	Nicholas	Huntington	38.161072	-80.735000	Pipeline ROW	4-355
S-VV1	RPW	Nicholas	Huntington	38.161064	-80.735022	Pipeline ROW	4-355
W-N16	NRPWW	Nicholas	Huntington	38.157063	-80.738304	Pipeline ROW	4-356
W-H41	RPWWN	Nicholas	Huntington	38.127873	-80.733868	Pipeline ROW	4-362
S-J19	NRPW	Greenbrier	Huntington	38.028599	-80.743623	Pipeline ROW	4-382
S-I28	RPW	Greenbrier	Huntington	37.982078	-80.755369	Pipeline ROW	4-397
S-EF38	RPW	Greenbrier	Huntington	37.963259	-80.733162	Pipeline ROW	4-400
S-L24	RPW	Greenbrier	Huntington	37.963068	-80.733141	Pipeline ROW	4-400
S-M5	NRPW	Summers	Huntington	37.792243	-80.728802	Pipeline ROW	4-433
S-I13	RPW	Summers	Huntington	37.782534	-80.719085	Pipeline ROW	4-437
S-I14	RPW	Summers	Huntington	37.781099	-80.719318	Pipeline ROW	4-437
S-I15	RPW	Summers	Huntington	37.779878	-80.720470	Pipeline ROW	4-437
S-I16	RPW	Summers	Huntington	37.779381	-80.721388	Pipeline ROW	4-440
W-EF36	RPWWN	Summers	Huntington	37.675423	-80.732001	Pipeline ROW	4-465
S-G47	NRPW	Summers	Huntington	37.654112	-80.702579	Pipeline ROW	4-471

Table 10. Completed Project Crossings (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Feature Name	Water Type	County	USACE District	Latitude ¹	Longitude ¹	Type of Impact	Figure
W-G7	NRPWW	Summers	Huntington	37.654106	-80.702592	Pipeline ROW	4-471
S-G52	NRPW	Monroe	Huntington	37.627537	-80.695593	Pipeline ROW	4-479
S-G49	RPW	Monroe	Huntington	37.627381	-80.695679	Pipeline ROW	4-479
S-G48	RPW	Monroe	Huntington	37.627308	-80.695759	Pipeline ROW	4-479
S-H61	RPW	Monroe	Huntington	37.618426	-80.699138	Pipeline ROW	4-483
S-IJ64	NRPW	Monroe	Huntington	37.591822	-80.705874	Pipeline ROW	4-488
S-D29	RPW	Monroe	Huntington	37.547394	-80.712099	Pipeline ROW	4-494
S-F18	RPW	Monroe	Huntington	37.536872	-80.716923	Pipeline ROW	4-496
W-NN6	RPWWN	Montgomery	Norfolk	37.268174	-80.316468	Pipeline ROW	4-603
S-G38	NRPW	Montgomery	Norfolk	37.267002	-80.312898	Pipeline ROW	4-603
S-G40	RPW	Montgomery	Norfolk	37.264882	-80.307302	Pipeline ROW	4-603
S-PP23	NRPW	Montgomery	Norfolk	37.264858	-80.307151	Pipeline ROW	4-604
S-H1	RPW	Franklin	Norfolk	37.127733	-80.116787	Pipeline ROW	4-661
S-G26	RPW	Franklin	Norfolk	37.127077	-80.111387	Pipeline ROW	4-662
S-G27	RPW	Franklin	Norfolk	37.126962	-80.111052	Pipeline ROW	4-662
S-II4	RPW	Franklin	Norfolk	37.115679	-80.060300	Pipeline ROW	4-670
S-GH7	RPW	Franklin	Norfolk	37.106614	-80.054219	Pipeline ROW	4-672
S-II6	NRPW	Franklin	Norfolk	37.092697	-79.978402	Pipeline ROW	4-685
S-IJ3	RPW	Franklin	Norfolk	37.092600	-80.027231	Pipeline ROW	4-677
S-GH6	RPW	Franklin	Norfolk	37.092397	-79.983227	Pipeline ROW	4-684
S-II12	RPW	Franklin	Norfolk	37.091608	-79.987839	Pipeline ROW	4-684
S-II11	RPW	Franklin	Norfolk	37.091564	-79.988051	Pipeline ROW	4-684
S-II8	RPW	Franklin	Norfolk	37.091413	-79.993944	Pipeline ROW	4-683
S-II9	RPW	Franklin	Norfolk	37.091382	-79.990620	Pipeline ROW	4-683
S-II7	RPW	Franklin	Norfolk	37.091354	-79.992013	Pipeline ROW	4-683
S-IJ3	RPW	Franklin	Norfolk	37.092600	-80.027231	Pipeline ROW	4-677
W-IJ2-PEM	RPWWD	Franklin	Norfolk	37.092596	-80.027214	Pipeline ROW	4-677
W-IJ2-PSS	RPWWD	Franklin	Norfolk	37.092645	-80.027176	Pipeline ROW	4-677
S-IJ4	RPW	Franklin	Norfolk	37.091189	-80.024366	Pipeline ROW	4-677
S-KL2	RPW	Franklin	Norfolk	37.090361	-79.996354	Pipeline ROW	4-682
S-GH2	RPW	Franklin	Norfolk	37.090153	-79.953936	Pipeline ROW	4-689
S-IJ10	RPW	Franklin	Norfolk	37.089179	-80.005026	Pipeline ROW	4-681
S-EF7	NRPW	Franklin	Norfolk	37.074664	-79.941123	Pipeline ROW	4-692
S-C16	RPW	Franklin	Norfolk	37.060610	-79.921179	Pipeline ROW	4-696
S-G17	NRPW	Franklin	Norfolk	37.005496	-79.752655	Pipeline ROW	4-726

Notes:

1

- in decimal degrees

Table 15. Crossing Method Determination Summary (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	A-001	W-A1a, S-A1a	Dry-Ditch Open-Cut	69	-	N	106	51	648	N	N	\$178,577	Dry-Ditch Open-Cut	This crossing is situated on a long and steep slope on one side that would create logistically difficult construction conditions and provide insufficient area for a bore pit spoils. Additionally, the presence of existing utilities and a completed road crossing do not allow sufficient workspace for excavation of a bore pit and operation of conventional boring or tunneling equipment.
			Conventional Bore	69	28	N	106	51	648	N	N	\$451,592		
Huntington	A-003	S-A3a	Dry-Ditch Open-Cut	47	-	N	71	49	932	N	N	\$64,909	Dry-Ditch Open-Cut	This crossing is situated on a long and steep slope on one side that would involve logistically difficult construction conditions and provide insufficient area for a bore pit spoils. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	47	34	N	71	49	932	N	N	\$754,544		
Huntington	A-005	S-A124	Dry-Ditch Open-Cut	203	-	N	59	44	1432	N	N	\$188,752	Dry-Ditch Open-Cut	This one foot wide stream is situated on a long and steep slope that would involve logistically difficult construction conditions and would require an excessively deep bore pit for a trenchless crossing. An already completed stream crossing is located near this resource which further reduces the available work space and creates an insufficient area for a bore pit soil stockpile. Furthermore, the time to complete a trenchless crossing is nearly four times as long and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	203	48	N	59	44	1432	N	N	\$3,194,292		
Huntington	A-006	W-A27-PFO, W-A27-PEM, S-A118	Dry-Ditch Open-Cut	95	-	N	74	62	1268	N	N	\$90,372	Dry-Ditch Open-Cut	This crossing is located in a valley that has long and steep slopes on both sides which would require a technically and logistically challenging winching system. In addition, the deep bore pits would require additional areas to stockpile soils which may require additional tree clearing in known use Indiana Bat habitat. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	95	36	N	74	62	1268	N	N	\$927,306		
Huntington	A-008	S-A120, S-A119, W-A34	Dry-Ditch Open-Cut	85	-	N	36	20	629	N	Y	\$102,339	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	85	29	N	36	20	629	N	Y	\$506,135		
Pittsburgh	A-009	W-B1a	Dry-Ditch Open-Cut	40	-	N	57	47	350	N	N	\$28,000	Dry-Ditch Open-Cut	This small wetland is located on a steep slope would create logistically difficult construction conditions on both sides of the crossing and provide insufficient room for the spoils from the excessively deep bore pits. The bore duration is estimated to be twice as long and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	40	49	N	57	47	350	N	N	\$2,786,247		
Pittsburgh	A-010/011	S-B2a, W-A40, S-B3a	Dry-Ditch Open-Cut	243	-	N	58	47	711	N	N	\$198,323	Dry-Ditch Open-Cut	This crossing is located on a long and steep slope on one side that would create logistically difficult construction conditions and would require an excessively deep bore pit for a trenchless crossing. Furthermore, the estimated time to complete a trenchless crossing is nearly five times as long and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	243	49	N	58	47	711	N	N	\$3,362,357		
Pittsburgh	A-012	S-A11a, S-A11a-Braid-1, S-A11a-Braid-2	Dry-Ditch Open-Cut	96	-	N	79	59	375	N	N	\$114,692	Dry-Ditch Open-Cut	This crossing is located at the base of a steep slope that would involve logistically difficult construction conditions and would require an excessively deep bore pit for a trenchless crossing. Furthermore, the estimated time to complete a trenchless crossing is nearly four times as long and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	96	43	N	79	59	375	N	N	\$2,617,901		

Table 15. Crossing Method Determination Summary (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Pittsburgh	A-013	W-UU3	Dry-Ditch Open-Cut	30	-	N	38	7	0	N	Y	\$21,000	Dry-Ditch Open-Cut	This narrow wetland (less than five feet wide at the pipeline crossing) would be excessively expensive to complete as a trenchless bore. In addition, the bore pits are of such depth (nearly 40-feet) that benching would be required, thereby increasing the amount of spoils created at the crossing and reducing the amount of available workspace.
			Conventional Bore	30	17	N	38	7	0	N	Y	\$162,784		
Pittsburgh	A-014	S-UU3	Dry-Ditch Open-Cut	73	-	N	55	45	808	N	N	\$264,165	Dry-Ditch Open-Cut	This crossing is located adjacent to long and steep slope that would involve logistically difficult construction conditions, an extensive equipment winching system, and an excessively deep bore pit for a trenchless crossing.
			Conventional Bore	73	36	N	55	45	808	N	N	\$864,870		
Pittsburgh	A-015	S-UU5, W-UU4	Dry-Ditch Open-Cut	190	-	N	48	32	412	N	Y	\$148,124	Dry-Ditch Open-Cut	This crossing is located on long and steep slope that would involve logistically difficult construction conditions, an extensive equipment winching system, and an excessively deep bore pit (37') that would require benching for a trenchless crossing. Furthermore, the estimated time to complete a trenchless crossing is nearly twice as long and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	190	37	N	48	32	412	N	Y	\$1,215,184		
Pittsburgh	A-016	W-K43, S-K73, S-K74, S-K75, W-K44	Dry-Ditch Open-Cut	286	-	N	58	36	453	N	N	\$222,731	Dry-Ditch Open-Cut	This crossing is located in a valley that has long and steep slopes on both sides which would require an extensive equipment winching system. In addition, the deep bore pits would require benching, which increases the total volume of material to be excavated. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. The estimated time to complete a trenchless crossing is nearly double and the cost is excessively expensive.
			Conventional Bore	286	36	N	58	36	453	N	N	\$1,469,361		
Huntington	A-017	W-K45, S-K77	Dry-Ditch Open-Cut	38	-	N	70	35	645	N	N	\$41,532	Dry-Ditch Open-Cut	This crossing is located adjacent to a long and steep slope that would involve logistically difficult construction conditions, a winching system that is beyond standard procedures and a deep bore pit for a trenchless crossing. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	38	28	N	70	35	645	N	N	\$363,615		
Huntington	A-018	S-K67	Dry-Ditch Open-Cut	36	-	N	77	51	341	N	N	\$60,206	Dry-Ditch Open-Cut	This crossing is located adjacent to a steep slope that would involve logistically difficult construction conditions, an extensive winching system and a deep bore pit for a trenchless crossing. In addition, the excessively deep bore pits (nearly 40 feet) would create a large volume of material to be excavated and stockpile. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. The estimated time to complete a trenchless crossing is more than double and the cost is unreasonably high relative to the proposed construction method.
			Conventional Bore	36	39	N	77	51	341	N	N	\$814,673		
Huntington	A-019A	S-K65	Dry-Ditch Open-Cut	37	-	N	64	49	148	N	Y	\$55,234	Dry-Ditch Open-Cut	This crossing is located adjacent to a steep slope that would involve logistically difficult construction conditions and a deep bore pit for a trenchless crossing. In addition, the excessively deep bore pits (over 40 feet) would create a large volume of material to be excavated and stockpiled. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. The estimated time to complete a trenchless crossing is more than four times longer than an open cut and the cost is unreasonably high relative to the proposed construction method.
			Conventional Bore	37	41	N	64	49	148	N	Y	\$2,341,369		
Huntington	B-001	S-A110/K62, W-A23, S-A109	Dry-Ditch Open-Cut	238	-	N	73	33	0	N	Y	\$194,600	Dry-Ditch Open-Cut	The estimated time to complete a trenchless crossing is nearly three times and the cost is excessively expensive. In addition, the bore pits are nearly 40-feet deep which requires benching, trench shoring, and sufficient room to create the bench and store the stockpiled material.
			Conventional Bore	238	39	N	73	33	0	N	Y	\$1,387,946		

Table 15. Crossing Method Determination Summary (revised 5/11/2021)
Individual Permit Application
Mountain Valley Pipeline Project

USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	B-001A	S-A111	Dry-Ditch Open-Cut	38	-	N	75	58	667	N	N	\$77,982	Dry-Ditch Open-Cut	This crossing is located adjacent to a long and steep slope on one side that would involve logistically difficult construction conditions, an extensive winching system and a deep bore pit for a trenchless crossing. The proximity of adjacent resources reduces the available amount of room to store the excavated material. Furthermore, the time to complete the trenchless crossing is more than double and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	38	37	N	75	58	667	N	N	\$783,810		
Pittsburgh	B-002	W-J40, S-K82, S-K94	Dry-Ditch Open-Cut	223	-	N	43	29	291	N	N	\$228,434	Dry-Ditch Open-Cut	The pipeline is already installed through a portion of the wetland at this crossing. The layout of a conventional bore would require excavation of a bore pit unacceptably close to the installed pipe. Boring also would not avoid or minimize impacts to the resources because it would require excavation of a bore pit within the wetland.
			Conventional Bore	223	25	N	43	29	291	N	N	\$861,237		
Pittsburgh	B-003	S-J44	Dry-Ditch Open-Cut	46	-	N	70	44	1017	N	N	\$50,537	Dry-Ditch Open-Cut	This stream is approximately five feet wide where the pipeline crosses. It is located a steep valley, with extremely long slopes that would create logistically difficult construction conditions, require extensive winching systems, and bore pits would be approximately 40 feet deep. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. The estimated time to complete a trenchless crossing is three times longer than an open cut and the cost is excessively expensive.
			Conventional Bore	46	39	N	70	44	1017	N	N	\$843,053		
Huntington	B-005	W-K33-PEM	Dry-Ditch Open-Cut	117	-	N	75	57	496	N	N	\$81,900	Dry-Ditch Open-Cut	This crossing is located adjacent to a long and steep slope that would involve logistically difficult construction conditions, an extensive winching system and a deep bore pit (48-feet) for a trenchless crossing. In addition, the excessively deep bore pits would create a large volume of material to be excavated and stockpiled. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	117	48	N	75	57	496	N	N	\$2,950,226		
Pittsburgh	B-006	W-K31	Dry-Ditch Open-Cut	96	-	N	62	55	220	N	N	\$67,200	Dry-Ditch Open-Cut	This crossing is situated on a steep slope that would involve logistically difficult construction conditions, deep bore pits (nearly 40-feet), and provide insufficient area for a bore pit soil stockpile. Furthermore, the time to complete the trenchless crossing is nearly double of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	96	39	N	62	55	220	N	N	\$984,952		
Pittsburgh	B-007	W-B46	Dry-Ditch Open-Cut	143	-	N	56	21	417	N	N	\$100,100	Dry-Ditch Open-Cut	This crossing is situated on a long and steep slope that would involve logistically difficult construction conditions, extensive winching systems, deep bore pits, and provides insufficient area for a bore pit soil stockpile. Furthermore, the time to complete the trenchless crossing is double of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	143	30	N	56	21	417	N	N	\$953,913		
Pittsburgh	B-008	S-H180	Dry-Ditch Open-Cut	45	-	N	32	20	0	N	Y	\$78,375	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are 39-feet deep, which minimizes the available area to complete an efficient crossing. Furthermore, the time to complete the trenchless crossing is more than double of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	45	39	N	32	20	0	N	Y	\$840,215		
Pittsburgh	B-009	W-H112	Dry-Ditch Open-Cut	260	-	N	9	4	0	N	Y	\$182,000	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to 0.02 acre of PEM. Avoiding/minimizing this minor impact through a conventional bore would require a 20 feet deep bore pit - possibly requiring the operator to work from a shallow bench within the pit. Furthermore, the conventional bore crossing cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method and take nearly triple the amount of time to complete.
			Conventional Bore	260	20	N	9	4	0	N	Y	\$920,569		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	B-010	S-I63	Dry-Ditch Open-Cut	74	-	N	100	59	341	N	N	\$122,275	Dry-Ditch Open-Cut	This crossing is located in a valley that has long and steep slopes on both sides which would require an extensive equipment winching system and excessively deep bore pits. The available area to store the excess material is extremely limited due to the narrowed ROW and county road. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	74	52	N	100	59	341	N	N	\$3,046,374		
Huntington	B-011	W-I15	Dry-Ditch Open-Cut	56	-	N	66	43	661	N	N	\$39,200	Dry-Ditch Open-Cut	This crossing is situated on a long and steep slope that would involve logistically difficult construction conditions, extensive winching systems, deep bore pits, and provides insufficient area for a bore pit soil stockpile. Furthermore the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	56	30	N	66	43	661	N	N	\$707,008		
Huntington	B-012	W-H103, S-H160	Dry-Ditch Open-Cut	148	-	N	33	14	462	N	Y	\$187,175	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	148	24	N	33	14	462	N	Y	\$639,254		
Huntington	B-013	S-H153	Dry-Ditch Open-Cut	42	-	N	58	41	567	N	N	\$82,922	Dry-Ditch Open-Cut	This crossing is situated in a valley with steep slopes on both sides of the resource. The topographical constraints complicate the limits of the winching system, creating a logistically difficult construction condition and deep bore pits. In addition there is insufficient area to store the bore pit stockpile in the immediate area. Furthermore the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	42	36	N	58	41	567	N	N	\$776,893		
Huntington	B-014A	S-H145	Dry-Ditch Open-Cut	32	-	N	76	39	520	N	N	\$85,448	Dry-Ditch Open-Cut	This crossing is adjacent to a long and steep slope that would involve logistically difficult construction conditions, deep bore pits (nearly 40-feet), and provide insufficient area for a bore pit soil stockpile. Furthermore, the time to complete the trenchless crossing is nearly five times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method
			Conventional Bore	32	39	N	76	39	520	N	N	\$803,321		
Huntington	B-014B	S-H165	Dry-Ditch Open-Cut	17	-	N	61	55	599	N	N	\$35,892	Dry-Ditch Open-Cut	This small stream (less than 10-foot wide) is situated on a long and steep slope that would involve logistically difficult construction conditions, 31-feet deep bore pits, and provide insufficient area for a bore pit soil stockpile. Furthermore, the time to complete the trenchless crossing is nearly six times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	17	31	N	61	55	599	N	N	\$614,596		
Huntington	B-015A	S-CD16, S-VV13	Dry-Ditch Open-Cut	193	-	N	17	6	0	N	N	\$206,271	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	193	25	N	17	6	0	N	N	\$776,098		
Huntington	B-015B	S-VV12, W-CD16, W-VV8	Dry-Ditch Open-Cut	132	-	N	63	40	873	N	Y	\$162,400	Dry-Ditch Open-Cut	This multiple resource crossing present several factors that support an open-cut crossing. The resources are located on a steep slope that is extremely long, which would require a winching system of nearly 900-feet. In addition, the bore pits would be 35-feet deep, resulting in an excessive amount of soil, with limited area for storage. The cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	132	35	N	63	40	873	N	Y	\$1,014,042		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	B-016	S-UV11	Dry-Ditch Open-Cut	54	-	N	71	45	782	N	N	\$90,653	Dry-Ditch Open-Cut	Stream S-UV11 is a perennial stream located adjacent to a steep slope that is extremely long, nearly 800 feet in length with an average slope exceed 45%. The bore pits are estimated to be over 20 feet which would require benching and additional area for spoil storage.
			Conventional Bore	54	23	N	71	45	782	N	N	\$363,349		
Huntington	B-017	W-VV3-PEM, W-VV3-PFO, S-VV2	Dry-Ditch Open-Cut	145	-	N	40	32	439	N	N	\$179,415	Dry-Ditch Open-Cut	This crossing is immediately adjacent to a mainline valve. Trenchless crossing methods are logistically difficult because they would require the pipe to be installed too deeply to facilitate connection to the valve site. An open cut crossing is necessary to facilitate connection to the mainline valve. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	145	30	N	40	32	439	N	N	\$959,589		
Huntington	C-001	S-L60	Dry-Ditch Open-Cut	42	-	N	60	32	189	N	N	\$134,876	Dry-Ditch Open-Cut	The pipeline has already been installed under Big Knawl Road and there is a fully restored steep hill adjacent to the pipe tie-in. Trenchless methods are technically and logistically difficult for this crossing because they would require the removal of the completed road bore and are not less environmentally damaging than this temporary stream impact because the steep hill adjacent to the crossing, which has been fully restored, would have to be re-disturbed to complete a bore. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	42	16	N	60	32	189	N	N	\$192,273		
Huntington	C-002	S-LL1	Dry-Ditch Open-Cut	66	-	N	57	48	420	N	N	\$171,170	Dry-Ditch Open-Cut	This crossing is located adjacent to a steep slope that is extremely long, approximately 420-feet in length with an average slope exceeding 45%. The bore pits are estimated to be nearly 30 feet. These factors create logistically difficult construction conditions, complicated winching systems, and excessive spoils. Furthermore, the time to complete the trenchless crossing is nearly double the duration a.
			Conventional Bore	66	30	N	57	48	420	N	N	\$735,388		
Huntington	C-003	S-QR30	Dry-Ditch Open-Cut	47	-	N	79	52	609	N	N	\$58,173	Dry-Ditch Open-Cut	This small stream (less than 10-feet wide) is situated in a valley with long and steep slopes on both approaches. The bore pits are projected to be nearly 50-feet deep, which creates logistically difficult construction conditions and insufficient area for a bore pit soil stockpile. Furthermore, the time to complete the trenchless crossing is five times the duration and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	47	50	N	79	52	609	N	N	\$2,860,658		
Huntington	C-004	S-J70	Dry-Ditch Open-Cut	62	-	N	70	57	886	N	N	\$149,548	Dry-Ditch Open-Cut	This stream is located in a valley with long and steep slopes on both approaches. The bore pits are projected to be nearly 50-feet deep, which creates logistically difficult construction conditions and insufficient area for a bore pit soil stockpile. Furthermore, and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	62	49	N	70	57	886	N	N	\$2,848,682		
Huntington	C-005	S-H123	Dry-Ditch Open-Cut	130	-	N	36	22	431	N	N	\$115,859	Dry-Ditch Open-Cut	This small stream (less than 10-feet wide) is located adjacent to a steep slope, creating an extremely difficult construction procedure due to the winching requirements, bore pit depths (nearly 50-feet deep), and lack of sufficient work space. Furthermore, the time to complete the trenchless crossing is nearly four times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	130	48	N	36	22	431	N	N	\$2,987,120		
Huntington	C-006	W-H90, S-H123	Dry-Ditch Open-Cut	135	-	N	63	37	413	N	N	\$119,359	Dry-Ditch Open-Cut	These resources are located adjacent to a long and steep slopes. The bore pits are projected to be over 50-feet deep and the winch hill length is greater than 400 feet, which creates logistically difficult construction conditions and insufficient area for a bore pit soil stockpile. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method and the construction time is greater than six times an open cut.
			Conventional Bore	135	54	N	63	37	413	N	N	\$3,328,582		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	C-007	S-H117	Dry-Ditch Open-Cut	146	-	N	87	66	571	N	N	\$159,225	Dry-Ditch Open-Cut	This stream is located in a valley with steep slopes on both approaches. The steep slopes, extremely deep bore pits (67-feet), extreme winch hill conditions and lack of sufficient work space create a situation that is conducive to an open cut. Furthermore, the time to complete the trenchless crossing is nearly three times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	146	67	N	87	66	571	N	N	\$4,068,891		
Huntington	C-008	S-L46	Dry-Ditch Open-Cut	95	-	N	47	40	617	N	N	\$119,663	Dry-Ditch Open-Cut	This stream is located in a valley with steep slopes on both approaches. The steep slopes, extremely deep bore pits (65-feet), extreme winch hill conditions and lack of sufficient work space create a situation that is conducive to an open cut. Furthermore, the time to complete the trenchless crossing is more than double the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	95	65	N	47	40	617	N	N	\$3,815,063		
Huntington	C-009	S-L44	Dry-Ditch Open-Cut	57	-	N	38	27	52	N	Y	\$75,133	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit - creating excessive spoil piles, with limited area for storage. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	57	36	N	38	27	52	N	Y	\$819,463		
Huntington	C-010	S-I57	Dry-Ditch Open-Cut	78	-	N	51	34	690	N	N	\$160,343	Dry-Ditch Open-Cut	This stream is located on a steep slope. The steep slope, extremely deep bore pits (49-feet), extreme winch hill conditions and lack of sufficient work space create a situation that is conducive to an open cut. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	78	49	N	51	34	690	N	N	\$2,894,090		
Huntington	C-011	S-A96/A103	Dry-Ditch Open-Cut	80	-	N	43	38	201	N	N	\$75,460	Dry-Ditch Open-Cut	This small stream (less than 10-feet wide) is located on a steep slope, creating an extremely difficult construction procedure due to bore pit depths (nearly 40-feet deep), steep slopes, and lack of sufficient work space. Furthermore, the time to complete the trenchless crossing is nearly three times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	80	37	N	43	38	201	N	N	\$903,006		
Huntington	C-012	S-A97, S-A98	Dry-Ditch Open-Cut	121	-	N	41	35	334	N	N	\$133,056	Dry-Ditch Open-Cut	These small streams are less than 10-feet wide and are located on a steep slope, creating an extremely difficult construction procedure due to bore pit depths (64-feet deep), steep slopes, and lack of sufficient work space. Furthermore, the time to complete the trenchless crossing is nearly 5 times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	121	64	N	41	35	334	N	N	\$3,834,305		
Huntington	C-013A	S-A100	Dry-Ditch Open-Cut	124	-	Y	42	22	460	N	N	\$366,800	Conventional Bore	There are multiple complicating factors at this crossing location that necessitated the development of a unique solution. The Left Fork Holly River at this location is both wide and deep, and it is bounded on one side by a steep slope. Dealing with high water and unfavorable flow conditions, combined with the need to use winched equipment on one side of the river, make an open cut crossing at this location extraordinarily challenging. Mountain Valley's engineering and construction staff developed a plan to complete this crossing with a conventional bore. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	124	24	Y	42	22	460	N	N	\$571,142		
Huntington	C-013B	S-E78/E82/R1	Dry-Ditch Open-Cut	84	-	N	27	7	0	N	Y	\$340,499	Dry-Ditch Open-Cut	The stream is located next to a steep slope and would require a bore pit exceeding 20 feet which creates excessive spoils in a limited area for storage. The duration of the trenchless crossing is nearly three times longer than the open-cut process, thereby increasing the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	84	21	N	27	7	0	N	Y	\$430,219		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	C-015	S-KK2, S-KK3b, S-KK4b	Dry-Ditch Open-Cut	220	-	N	50	30	396	N	N	\$168,097	Dry-Ditch Open-Cut	The open cut method would result in a temporary impacts to three small UNTs to Left Fork Holly River, each less than three feet wide. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 40 feet on the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The construction time for the bore is estimated to be five times as long as the open cut and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	220	38	N	50	30	396	N	N	\$1,318,593		
Huntington	C-018	S-F40	Dry-Ditch Open-Cut	92	-	N	42	24	11	N	N	\$165,892	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	92	29	N	42	24	11	N	N	\$526,000		
Huntington	C-019	W-KK3	Dry-Ditch Open-Cut	51	-	N	60	26	296	N	N	\$35,700	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require an extensive winching system on a long steep slope in an already reduced area of work. In addition the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	51	16	N	60	26	296	N	N	\$217,815		
Huntington	C-020	S-F43	Dry-Ditch Open-Cut	74	-	N	45	28	53	N	N	\$100,144	Dry-Ditch Open-Cut	A trenchless crossing on this hillside would require bore pits that are greater than thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. The construction time for the bore is nearly twice as long as the open cut and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	74	32	N	45	28	53	N	N	\$794,631		
Huntington	C-021	S-E67	Dry-Ditch Open-Cut	147	-	N	62	45	284	N	N	\$426,366	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact Right Fork Holly River. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 30 feet on the edge of a long steep slope and the excavation of an interim ramp/bench. The additional equipment and excess spoil materials will greatly limit the available space in a work area that has already been minimized. The construction time for the bore is nearly three times as long as the open cut.
			Conventional Bore	147	34	N	62	45	284	N	N	\$1,038,342		
Huntington	C-022	S-E68	Dry-Ditch Open-Cut	296	-	Y	47	12	63	N	Y	\$860,247	Guided Conventional Bore	The Elk River will be crossed using Microtunnel trenchless methodology. While Mountain Valley will typically avoid crossings with bore pits of this depth, several logistical constraints complicate the open cut methodology. There are numerous large boulders within the proposed crossing - removing and restoring these to preconstruction contours would be extremely difficult to accomplish. In addition, the stream depth complicates the constructability since a larger instream diversion would be required thereby reducing the available space in a work area that has already been minimized. The Elk River is also classified by the WVDNR as Group 1 mussel stream. While mussel survey and relocation efforts were completed in 2019, completing a trenchless crossing will further minimize any potential impacts to mussel species.
			Guided Conventional Bore	296	49	Y	47	12	63	N	Y	\$3,112,112		
Huntington	C-023	S-E71	Dry-Ditch Open-Cut	84	-	N	26	18	0	N	Y	\$66,476	Dry-Ditch Open-Cut	This small UNT to the Elk River (less than five feet wide) would require a bore pit that is a minimum of 20 feet deep. Due to this depth, it is likely that the use of a bench and interim access ramp would be required which would create a large volume of material to be excavated and stockpile. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	84	20	N	26	18	0	N	Y	\$421,084		
Huntington	C-024	S-H111, S-H114, S-H112	Dry-Ditch Open-Cut	272	-	N	36	12	10	N	N	\$221,802	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	272	18	N	36	12	10	N	N	\$854,144		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	C-025	S-H113	Dry-Ditch Open-Cut	53	-	N	14	9	0	N	Y	\$82,656	Dry-Ditch Open-Cut	This UNT to the Elk River is located in an area that would require a bore pit depth of nearly 30 feet. The excavation to this depth would require the use of a bench and interim access ramp would be required which would create a large volume of material to be excavated and stockpile. The lack of sufficient space to stockpile the material in a work area that has already been minimized further complicates a trenchless crossing. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	53	29	N	14	9	0	N	Y	\$415,319		
Huntington	C-026	W-H75	Dry-Ditch Open-Cut	45	-	N	59	47	369	N	N	\$31,500	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit, with an excavator operating from a bench within the pit, at the edge of a steep slope. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	45	29	N	59	47	369	N	N	\$392,615		
Huntington	C-027	W-H86	Dry-Ditch Open-Cut	78	-	N	13	9	0	N	Y	\$54,600	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact of approximately 0.001 acre of a PEM wetland. Avoiding/minimizing this minor impact through a conventional bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	78	16	N	13	9	0	N	Y	\$294,440		
Huntington	C-028	S-H110	Dry-Ditch Open-Cut	267	-	N	12	9	0	N	Y	\$251,373	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	267	22	N	12	9	0	N	Y	\$958,705		
Huntington	C-029	S-T29	Dry-Ditch Open-Cut	78	-	N	32	13	1903	N	N	\$162,380	Dry-Ditch Open-Cut	The stream (Houston Run) is located in a valley with extremely steep and long approaches. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 20 feet at the edge of long steep slopes. The additional equipment and excess spoil materials will greatly limit the available space in a work area that has already been minimized, which increases the construction difficulty.
			Conventional Bore	78	17	N	32	13	1903	N	N	\$299,008		
Huntington	C-030	S-A83/A91	Dry-Ditch Open-Cut	72	-	N	56	39	866	N	N	\$138,108	Dry-Ditch Open-Cut	This UNT to Camp Creek is adjacent to a steep long slope. A trenchless crossing on this hillside would require bore pits that are nearly 50-feet deep which would necessitate the use of a bench and interim ramp to access the bore pit and a winching system that is technically and logistically difficult. The construction time for the bore is nearly three times as long as the open cut and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	72	47	N	56	39	866	N	N	\$2,767,971		
Huntington	C-031	S-A93, S-A92	Dry-Ditch Open-Cut	120	-	N	78	39	1190	N	N	\$121,741	Dry-Ditch Open-Cut	These two very small UNTs to Camp Creek are located on a long steep slope. Both streams are less than 10 feet wide. A trenchless crossing on this hillside would require bore pits that are over 60-feet deep which would generate a significant amount of spoils and require a significant winching system to be located on the reduced LOD. The construction time for the bore is nearly twice as long as the open cut and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	120	63	N	78	39	1190	N	N	\$3,776,922		
Huntington	C-032	S-H108, W-H67, W-H66, S-H105	Dry-Ditch Open-Cut	367	-	N	57	34	1371	N	N	\$307,728	Dry-Ditch Open-Cut	Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 40 feet on the edge of a very long and steep slope, thereby requiring an extensive winching system and the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The excess spoils and winching system would need to be located on the already reduced LOD. The cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	367	36	N	57	34	1371	N	N	\$1,699,237		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	C-033	S-H107	Dry-Ditch Open-Cut	45	-	N	7	3	0	N	Y	\$39,885	Dry-Ditch Open-Cut	This crossing is immediately adjacent to a mainline valve. Trenchless crossing methods are logistically difficult due to the connection to the valve site. An open cut crossing is necessary to facilitate the connection to the mainline valve.
			Conventional Bore	45	13	N	7	3	0	N	Y	\$187,085		
Huntington	C-034	W-H64-PEM, W-H64-PEM-2, W-H64 PSS, S-H104	Dry-Ditch Open-Cut	172	-	N	48	20	0	N	Y	\$173,907	Dry-Ditch Open-Cut	This crossing is adjacent to a mainline valve. Trenchless crossing methods are logistically difficult because they would require the pipe to be installed too deeply to facilitate connection to the valve site. An open cut crossing is necessary to facilitate connection to the mainline valve.
			Conventional Bore	172	20	N	48	20	0	N	Y	\$670,827		
Huntington	C-035	W-H60, W-H61	Dry-Ditch Open-Cut	312	-	N	20	8	0	N	Y	\$218,400	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	312	16	N	20	8	0	N	Y	\$958,528		
Huntington	C-036	W-B39	Dry-Ditch Open-Cut	101	-	N	36	23	288	N	N	\$70,700	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit - creating excessive spoil piles, with limited area for storage. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	101	24	N	36	23	288	N	N	\$505,869		
Huntington	C-037	W-B31	Dry-Ditch Open-Cut	99	-	N	36	31	1103	N	Y	\$69,300	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit on an extremely long and steep slope which would create excessive spoil piles in a topographical setting that requires an extensive winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	99	25	N	36	31	1103	N	Y	\$509,328		
Huntington	C-038	S-B34, S-B35, S-B36, S-B37, S-B38, W-B35, S-B42, S-B39b, S-B39a/B46, S-B45	Dry-Ditch Open-Cut	339	-	N	54	32	54	N	N	\$345,189	Dry-Ditch Open-Cut	These crossings are located along steep slopes and would require the installation of bore pits nearly 40 feet deep requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The bore pits would need to be located on a steep slope that would require a logistically difficult winching process. The duration of the trenchless crossing is nearly five times longer than the open-cut process, thereby increasing the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	339	38	N	54	32	54	N	N	\$1,656,313		
Huntington	C-039	S-O4	Dry-Ditch Open-Cut	79	-	N	54	35	1723	N	N	\$137,791	Dry-Ditch Open-Cut	This crossing is situated on a long steep slope leading into the resource. The topographical constraints would create an extreme winching system, creating a logistically difficult construction condition and deep bore pits. In addition there is insufficient area to store the bore pit stockpile in the immediate area. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	79	33	N	54	35	1723	N	N	\$827,090		
Huntington	D-002	S-F36b	Dry-Ditch Open-Cut	38	-	N	27	11	0	N	Y	\$97,221	Dry-Ditch Open-Cut	A trenchless crossing method at this location could not be completed without excavating a bore pit within a landowner's driveway and blocking access to their home. This situation would continue for several weeks. Accordingly, a trenchless crossing of this resource has been deemed logistically impracticable. Additionally, boring is not "appropriate and practicable" for this crossing of a perennial UNT to Birch River because the temporary impacts to be avoided are minor, especially when considered in light of the significant adverse impacts on the homeowner.
			Conventional Bore	38	26	N	27	11	0	N	Y	\$345,345		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-004	S-B32, W-B30	Dry-Ditch Open-Cut	59	-	N	39	26	188	N	N	\$74,406	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	59	20	N	39	26	188	N	N	\$350,135		
Huntington	D-005	W-B28, S-B29	Dry-Ditch Open-Cut	112	-	N	52	40	262	N	N	\$103,401	Dry-Ditch Open-Cut	This crossing is located on a slope that would require bore pits greater than 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	112	34	N	52	40	262	N	N	\$939,013		
Huntington	D-006	S-E50, W-E21	Dry-Ditch Open-Cut	50	-	N	35	32	197	N	N	\$57,357	Dry-Ditch Open-Cut	This crossing is located on a slope that would require bore pits that are 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to bore the resources is nearly three times the duration of the open cut and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	50	30	N	35	32	197	N	N	\$689,980		
Huntington	D-007	S-E50, W-E18-PSS, W-E18-PEM	Dry-Ditch Open-Cut	54	-	N	49	39	136	N	N	\$60,157	Dry-Ditch Open-Cut	This crossing is located on a slope that would require bore pits that are nearly 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable. Furthermore, the time to bore the resources is nearly double and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	54	26	N	49	39	136	N	N	\$390,753		
Huntington	D-008	S-E49	Dry-Ditch Open-Cut	29	-	N	44	31	74	N	N	\$23,805	Dry-Ditch Open-Cut	The UNT to Gauley River is approximately one foot in width, creating less than 0.01 acre of temporary impact. This crossing is located on a slope that would require bore pits that are nearly 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to bore the resources is nearly double and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	29	26	N	44	31	74	N	N	\$319,803		
Huntington	D-010	S-E46	Dry-Ditch Open-Cut	59	-	N	35	27	371	N	N	\$151,288	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	59	27	N	35	27	371	N	N	\$414,078		
Huntington	D-011	W-F12, W-F13, W-F15	Dry-Ditch Open-Cut	174	-	N	7	4	0	N	Y	\$121,800	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	174	15	N	7	4	0	N	Y	\$562,319		
Huntington	D-012	S-F20, W-F11	Dry-Ditch Open-Cut	104	-	N	8	4	0	N	Y	\$109,699	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	104	19	N	8	4	0	N	Y	\$381,930		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-013	W-K23	Dry-Ditch Open-Cut	77	-	N	42	26	32	N	Y	\$53,900	Dry-Ditch Open-Cut	This crossing is located adjacent to a slope that would require bore pits that are nearly 20 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	77	17	N	42	26	32	N	Y	\$296,170		
Huntington	D-014	S-IJ57, W-IJ51	Dry-Ditch Open-Cut	37	-	N	54	32	92	N	N	\$38,154	Dry-Ditch Open-Cut	The open cut would result in approximately 0.05 acre of temporary impacts to the wetland and stream system. This crossing is located adjacent to a slope that would require bore pits that are over 30 feet deep requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method and is estimated to take twice as long.
			Conventional Bore	37	33	N	54	32	92	N	N	\$707,895		
Huntington	D-015	W-IJ50	Dry-Ditch Open-Cut	48	-	N	24	17	0	N	Y	\$33,600	Dry-Ditch Open-Cut	This crossing is located on a slope that would require bore pits that are nearly 20 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to complete the bore is nearly double and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	48	19	N	24	17	0	N	Y	\$223,003		
Huntington	D-016	S-IJ60	Dry-Ditch Open-Cut	40	-	N	62	45	119	N	N	\$48,516	Dry-Ditch Open-Cut	The crossing of this small UNT to Rockcamp Run (less than 10 feet in width) open cut would result in less than 0.02 acre of temporary impact. This crossing is located adjacent to a steep slope that would require bore pits that are over 40 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to complete the bore is nearly six times the open cut method and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	40	42	N	62	45	119	N	N	\$2,404,428		
Huntington	D-017	W-IJ55	Dry-Ditch Open-Cut	49	-	N	40	23	0	N	Y	\$34,300	Dry-Ditch Open-Cut	The crossing of the small PEM system would result in approximately 0.02 acre of temporary impacts. This crossing is located on a slope that would require bore pits that are over 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to complete the bore is nearly double the time of the open cut method and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	49	32	N	40	23	0	N	Y	\$723,681		
Huntington	D-018	S-IJ62	Dry-Ditch Open-Cut	18	-	N	54	28	74	N	N	\$20,473	Dry-Ditch Open-Cut	The crossing of this small UNT to Cherry Run (less than 5 feet in width) open cut would result in less than 0.01 acre of temporary impact. This crossing is located adjacent to a steep slope that would require bore pits that are nearly 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to complete the bore is nearly double the time of the open cut method and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	18	32	N	54	28	74	N	N	\$635,704		
Huntington	D-019	S-B28, W-B27	Dry-Ditch Open-Cut	47	-	N	6	3	0	N	Y	\$70,318	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	47	18	N	6	3	0	N	Y	\$215,597		
Huntington	D-020	W-FF6-PEM, W-FF6-PSS	Dry-Ditch Open-Cut	158	-	N	22	11	0	N	Y	\$110,600	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	158	19	N	22	11	0	N	Y	\$535,181		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-021	W-FF3	Dry-Ditch Open-Cut	37	-	N	23	11	0	N	Y	\$25,900	Dry-Ditch Open-Cut	The crossing of the small PEM system would result in approximately 0.04 acre of temporary impacts. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	37	14	N	23	11	0	N	Y	\$168,948		
Huntington	D-022	S-J32	Dry-Ditch Open-Cut	117	-	N	28	19	10	N	N	\$207,247	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	117	23	N	28	19	10	N	N	\$542,142		
Huntington	D-023	S-A76, W-FF4	Dry-Ditch Open-Cut	43	-	N	35	16	21	N	N	\$51,257	Dry-Ditch Open-Cut	The crossing of the small PEM system and UNT to Big Beaver Creek would result in less than 0.02 acre of temporary impacts. The stream is less than ten feet in width. The bore pits associated with this crossing are 20 feet deep, which may require the use of a ramp and benching thereby creating excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	43	20	N	35	16	21	N	N	\$304,727		
Huntington	D-024	W-A17	Dry-Ditch Open-Cut	79	-	N	16	9	0	N	Y	\$55,300	Dry-Ditch Open-Cut	The duration of the trenchless crossing would take longer to complete than the open-cut process, thereby increasing the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside. In addition, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	79	15	N	16	9	0	N	Y	\$292,711		
Huntington	D-025	S-A75	Dry-Ditch Open-Cut	25	-	N	31	13	0	N	Y	\$47,961	Dry-Ditch Open-Cut	Stream S-A75 is an UNT to Big Beaver Creek and would have approximately 0.02 acre of temporary impact. The resource is located adjacent to a slope that would require a bore pit exceeding 20 feet. Bore pits of this depth require an interim ramp and benching to successfully reach the required depth. The deep excavation will create an excessive amount of spoil material that will be difficult to store within the already reduced LOD. In addition, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	25	22	N	31	13	0	N	Y	\$271,913		
Huntington	D-026	S-A74	Dry-Ditch Open-Cut	29	-	N	31	14	0	N	Y	\$32,194	Dry-Ditch Open-Cut	An open cut crossing would create approximately 0.007 acre of temporary impact. However the resource is located on a slope that would require a bore pit nearing 20 feet. Bore pits of this depth may require an interim ramp and benching to successfully reach the required depth. The deep excavation will create an excessive amount of spoil material that will be difficult to store within the already reduced LOD. In addition, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	29	19	N	31	14	0	N	Y	\$169,081		
Huntington	D-027	S-A73, W-A15	Dry-Ditch Open-Cut	59	-	N	18	13	0	N	Y	\$64,472	Dry-Ditch Open-Cut	The open cut would result in approximately 0.10 acre of temporary impacts to the wetland and stream. This crossing is located on a slope requiring bore pits that are over 20 feet deep which necessitate the use of a ramp and benching, resulting in excessive spoil piles, all while being located within an already reduced LOD. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact to the wetland is unavoidable. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	59	23	N	18	13	0	N	Y	\$377,539		
Huntington	D-028	W-A14, S-A72, S-A71, S-A71-Braid	Dry-Ditch Open-Cut	92	-	N	35	25	20	N	N	\$94,208	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	92	22	N	35	25	20	N	N	\$462,058		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-029	S-A67	Dry-Ditch Open-Cut	24	-	N	40	27	50	N	N	\$37,518	Dry-Ditch Open-Cut	Crossings D-029 and D-30 are immediately adjacent to each other and have been evaluated in concert. A trenchless crossing method at this location could not be completed without excavating a bore pit within a landowner's driveway and blocking access to their home. This situation would continue for several weeks. Accordingly, a trenchless crossing of these resources has been deemed logistically impracticable. Additionally, boring is not "appropriate and practicable" for these crossings (a small perennial and intermittent UNT to Big Beaver Creek) because the temporary impacts to be avoided are minor, especially when considered in light of the significant adverse impacts on the homeowner. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	24	23	N	40	27	50	N	N	\$278,209		
Huntington	D-030	S-A69	Dry-Ditch Open-Cut	53	-	N	30	24	0	N	Y	\$62,886	Dry-Ditch Open-Cut	Crossings D-029 and D-30 are immediately adjacent to each other and have been evaluated in concert. A trenchless crossing method at this location could not be completed without excavating a bore pit within a landowner's driveway and blocking access to their home. This situation would continue for several weeks. Accordingly, a trenchless crossing of these resources has been deemed logistically impracticable. Additionally, boring is not "appropriate and practicable" for these crossings (a small perennial and intermittent UNT to Big Beaver Creek) because the temporary impacts to be avoided are minor, especially when considered in light of the significant adverse impacts on the homeowner. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	53	23	N	30	24	0	N	Y	\$360,511		
Huntington	D-031	W-H53, S-H99	Dry-Ditch Open-Cut	37	-	N	24	14	11	N	N	\$40,220	Dry-Ditch Open-Cut	The open cut would result in approximately 0.01 acre of temporary impacts to the wetland and stream. The stream is extremely small, less than five feet in width and the wetland barely enters the LOD. However, the trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	37	20	N	24	14	11	N	N	\$287,699		
Huntington	D-032	S-A65	Dry-Ditch Open-Cut	99	-	N	58	45	441	N	N	\$321,268	Dry-Ditch Open-Cut	The crossing of Big Beaver Creek using a trenchless method would require bore pits up to 40-feet deep. The crossing is also located adjacent to a long steep slope. The combination of deep bore pits and steep slopes would require excessive excavation, the need for significant stock pile storage, and a using an extensive winching system. Furthermore, the time to complete the bore is nearly six times the open cut method and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	99	40	N	58	45	441	N	N	\$2,462,779		
Huntington	D-034	S-N15	Dry-Ditch Open-Cut	40	-	N	39	33	132	N	N	\$70,014	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	40	23	N	39	33	132	N	N	\$323,617		
Huntington	D-035	S-N14	Dry-Ditch Open-Cut	44	-	N	12	6	0	N	Y	\$65,040	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	44	17	N	12	6	0	N	Y	\$202,516		
Huntington	D-036	S-I43, W-I7	Dry-Ditch Open-Cut	73	-	N	26	16	0	N	Y	\$87,745	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	73	20	N	26	16	0	N	Y	\$389,867		
Huntington	D-037	S-I44	Dry-Ditch Open-Cut	32	-	N	28	19	0	N	Y	\$52,288	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	32	19	N	28	19	0	N	Y	\$177,595		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-038	S-145	Dry-Ditch Open-Cut	20	-	N	51	21	10	N	N	\$33,704	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	20	19	N	51	21	10	N	N	\$143,539		
Huntington	D-039	S-147	Dry-Ditch Open-Cut	27	-	N	15	12	0	N	Y	\$24,803	Dry-Ditch Open-Cut	Stream S-147 is an UNT to Gauley River and is very small - less than five feet in width. The temporary impact associated with an open cut is less than 0.01 acre. The cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	27	14	N	15	12	0	N	Y	\$140,568		
Huntington	D-040	S-148	Dry-Ditch Open-Cut	35	-	N	33	16	41	N	N	\$59,850	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	35	14	N	33	16	41	N	N	\$163,272		
Huntington	D-041	S-J29	Dry-Ditch Open-Cut	420	-	N	54	0	1732	N	Y	\$1,389,500	Microtunnel	Mountain Valley has committed to the USFWS that the Gauley River would be bored to prevent possible impacts to potential Candy Darter habitat.
			Microtunnel	420	57	N	54	0	1732	N	Y	\$7,309,091		
Huntington	D-042	W-J8, S-J28	Dry-Ditch Open-Cut	87	-	N	43	27	306	N	N	\$78,505	Dry-Ditch Open-Cut	The open cut would result in approximately 0.06 acre of temporary impacts to the wetland and stream. This crossing is located on a slope that would require bore pits that are nearly 30 feet deep which would create excessive spoil piles and require multiple winching equipment, all while being located within an already reduced LOD. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact to the wetland is unavoidable. Furthermore, the time to bore the resources is double and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	87	26	N	43	27	306	N	N	\$484,406		
Huntington	D-043	S-J25	Dry-Ditch Open-Cut	73	-	N	29	18	0	N	Y	\$69,641	Dry-Ditch Open-Cut	The temporary impact associated with an open cut is less than 0.01 acre. However, the trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	73	21	N	29	18	0	N	Y	\$399,001		
Huntington	D-044	S-J24	Dry-Ditch Open-Cut	73	-	N	31	9	0	N	Y	\$103,246	Dry-Ditch Open-Cut	This area has been subject to frequent flooding from adjacent streams, which previously caused Mountain Valley to relocate a mainline valve to a different location. These conditions present an unacceptable risk for crews and equipment completing a bore at this location over an extended duration. Completing this crossing of a small UNT to Little Laurel Creek with an open cut minimizes the time construction crews and equipment must be onsite, thereby greatly reducing risks to the safety of the crew, the environment, and the success of the crossing installation.
			Conventional Bore	73	17	N	31	9	0	N	Y	\$284,818		
Huntington	D-045	S-J23-EPH	Dry-Ditch Open-Cut	25	-	N	23	14	0	N	Y	\$20,978	Dry-Ditch Open-Cut	Stream S-J23 is an UNT to Little Laurel Creek and is very small - less than two feet in width. The temporary impact associated with an open cut is less than 0.01 acre. However, the trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	25	17	N	23	14	0	N	Y	\$148,594		

Table 15. Crossing Method Determination Summary (revised 5/11/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-046	S-J22, W-J7	Dry-Ditch Open-Cut	58	-	N	23	18	0	N	Y	\$52,396	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	58	21	N	23	18	0	N	Y	\$356,431		
Huntington	D-047	S-N10, S-N10-Braid	Dry-Ditch Open-Cut	84	-	N	25	18	0	N	Y	\$78,469	Dry-Ditch Open-Cut	The resources are very small (less than five feet in width) UNT to Skelt Run. The trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	84	20	N	25	18	0	N	Y	\$421,084		
Huntington	D-048	S-EE1	Dry-Ditch Open-Cut	30	-	N	17	11	0	N	Y	\$33,872	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	30	15	N	17	11	0	N	Y	\$153,650		
Huntington	D-049	S-N13	Dry-Ditch Open-Cut	27	-	N	38	18	0	N	Y	\$26,485	Dry-Ditch Open-Cut	The stream is a very small (less than five feet in width) UNT to Skelt Run. The trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	27	18	N	38	18	0	N	Y	\$158,838		
Huntington	D-050	S-L41	Dry-Ditch Open-Cut	88	-	N	77	63	644	N	N	\$132,036	Dry-Ditch Open-Cut	The crossing of the Jims Creek (S-L41) using a trenchless method would require bore pits that are nearly 60 feet deep. In addition, the crossing is at the base of an extremely long and steep approach. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method and would take more than twice as long to complete.
			Conventional Bore	88	58	N	77	63	644	N	N	\$3,413,379		
Huntington	D-051	S-L38	Dry-Ditch Open-Cut	66	-	N	34	29	21	N	N	\$56,701	Dry-Ditch Open-Cut	Stream S-L38 is an UNT to Riley Branch and is very small - less than five feet in width. The crossing is located adjacent to a steep slope. The temporary impact associated with an open cut is less than 0.01 acre. The trenchless crossing would require bore pits that are approximately 30 feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	66	32	N	34	29	21	N	N	\$771,927		
Huntington	D-052	S-L35	Dry-Ditch Open-Cut	28	-	N	29	21	10	N	N	\$34,350	Dry-Ditch Open-Cut	S-L35 is Riley Branch is less than four feet wide through the project area. Crossing #D-052, 053, and 054 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with D-054 exceeding 30 feet. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Each of these crossings is also located near a steep slope which reduces the available area to stockpile soils without compromising worker safety. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	28	21	N	29	21	10	N	N	\$271,292		
Huntington	D-053	S-L35	Dry-Ditch Open-Cut	42	-	N	30	16	0	N	Y	\$46,900	Dry-Ditch Open-Cut	S-L35 is Riley Branch is less than four feet wide through the project area. Crossing #D-052, 053, and 054 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with D-054 exceeding 30 feet. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Each of these crossings is also located near a steep slope which reduces the available area to stockpile soils without compromising worker safety. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	42	21	N	30	16	0	N	Y	\$311,024		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-054	S-L35	Dry-Ditch Open-Cut	51	-	N	32	25	20	N	N	\$53,200	Dry-Ditch Open-Cut	S-L35 is Riley Branch is less than four feet wide through the project area. Crossing #D-052, 053, and 054 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with D-054 exceeding 30 feet. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Each of these crossings is also located near a steep slope which reduces the available area to stockpile soils without compromising worker safety. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	51	33	N	32	25	20	N	N	\$747,627		
Huntington	D-055	S-I37	Dry-Ditch Open-Cut	36	-	N	38	25	32	N	Y	\$46,550	Dry-Ditch Open-Cut	This resource is an extremely small UNT to Hominy Creek. The width of the stream is less than 10 feet. Due to the location on steep slopes, the bore pits for this stream are nearly 20 feet in depth. Avoiding/minimizing this minor impact through a conventional bore would create excessively deep bore pits and spoil piles. Furthermore the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	36	20	N	38	25	32	N	Y	\$284,861		
Huntington	D-056	S-I38, S-I39	Dry-Ditch Open-Cut	142	-	N	63	45	436	N	N	\$126,985	Dry-Ditch Open-Cut	Both of these resources are UNT to Hominy Creek and each is less than 10 feet in width. Due to the location on steep slopes, the bore pits for this crossing are nearly 50 feet in depth. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	142	47	N	63	45	436	N	N	\$2,966,630		
Huntington	D-057	S-I40	Dry-Ditch Open-Cut	24	-	N	59	27	104	N	N	\$39,183	Dry-Ditch Open-Cut	Stream S-I40 is an UNT to Hominy Creek and is very small - less than ten feet in width. The trenchless crossing would require bore pits that are more than 20 feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit near a steep slope which would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	24	26	N	59	27	104	N	N	\$305,614		
Huntington	D-058	W-I11a, S-I41	Dry-Ditch Open-Cut	47	-	N	42	10	489	N	Y	\$62,159	Dry-Ditch Open-Cut	D-058 and D-059 are adjacent crossings are discussed together due to their proximity. These crossings present multiple confounding constructability challenges that limit the available options and necessitated the development of a unique solution. The access to the location of these crossings is severely limited by long steep slopes, and there is insufficient suitable workspace available for construction equipment and spoil piles necessary to complete a trenchless crossing. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	47	13	N	42	10	489	N	Y	\$192,761		
Huntington	D-059	S-I36	Dry-Ditch Open-Cut	116	-	Y	16	7	840	N	N	\$279,787	Dry-Ditch Open-Cut	D-058 and D-059 are adjacent crossings are discussed together due to their proximity. These crossings present multiple confounding constructability challenges that limit the available options and necessitated the development of a unique solution. The access to the location of these crossings is severely limited by long steep slopes, and there is insufficient suitable workspace available for construction equipment and spoil piles necessary to complete a trenchless crossing. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	116	26	Y	16	7	840	N	N	\$566,708		
Huntington	D-061	S-I31	Dry-Ditch Open-Cut	25	-	N	38	32	424	N	N	\$26,015	Dry-Ditch Open-Cut	The bore pits for this crossing are greater than 20 feet in depth and the crossing is located on a long steep slope. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	25	22	N	38	32	424	N	N	\$271,913		
Huntington	E-001	S-H88	Dry-Ditch Open-Cut	37	-	N	45	35	122	N	N	\$167,104	Dry-Ditch Open-Cut	A trenchless crossing method at this location could not be completed without excavating a bore pit within proximity to a landowner private drive. Completing an open cut in this location greatly reduces the construction duration and access can be maintained using road plates. A trenchless crossing of this resource has been deemed logistically impracticable due to the need to maintain the landowner's access over an extended duration and the safety risk of operating heavy equipment for an extended time with a private landowner in close proximity and traversing the site.
			Conventional Bore	37	32	N	45	35	122	N	N	\$689,625		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	E-002	S-H71, W-H33, W-H35	Dry-Ditch Open-Cut	150	-	N	75	46	282	N	N	\$157,500	Dry-Ditch Open-Cut	This group of resources are located adjacent to a steep slope with bore pits to be 80 feet deep. Avoiding/minimizing this minor impact through a conventional bore would create extremely excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	150	80	N	75	46	282	N	N	\$4,789,334		
Huntington	E-003	S-H67	Dry-Ditch Open-Cut	30	-	N	39	24	31	N	N	\$60,392	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are more than 20 feet deep. Avoiding/minimizing this minor impact (approximately 0.02 acre) through a conventional bore would require a deep bore pit creating excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	30	24	N	39	24	31	N	N	\$304,372		
Huntington	E-004	S-H64, W-H31	Dry-Ditch Open-Cut	54	-	N	26	10	0	N	Y	\$52,782	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are more than 20 feet deep. Avoiding/minimizing this minor impact (approximately 0.03 acre) through a conventional bore would require a deep bore pit creating excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	54	24	N	26	10	0	N	Y	\$372,484		
Huntington	E-005	S-V3	Dry-Ditch Open-Cut	56	-	N	47	26	342	N	N	\$240,231	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	56	23	N	47	26	342	N	N	\$369,025		
Huntington	E-006	W-EF31, S-EF41	Dry-Ditch Open-Cut	55	-	N	20	9	0	N	Y	\$44,212	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are more than 20 feet deep, which would necessitate benching and stockpiling significant amounts of spoil material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	55	21	N	20	9	0	N	Y	\$347,918		
Huntington	E-009	W-M18	Dry-Ditch Open-Cut	223	-	N	35	10	0	N	Y	\$156,100	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	223	17	N	35	10	0	N	Y	\$710,515		
Huntington	E-010	W-M22, W-M23	Dry-Ditch Open-Cut	86	-	N	26	16	0	N	Y	\$60,200	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are nearly 20 feet deep, which may necessitate benching and stockpiling significant amounts of spoil material. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method and would take twice as long to complete.
			Conventional Bore	86	17	N	26	16	0	N	Y	\$321,711		
Huntington	E-011	W-J6	Dry-Ditch Open-Cut	101	-	N	26	10	0	N	Y	\$70,700	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are nearly 20 feet deep, which may necessitate benching and stockpiling significant amounts of spoil material. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method .
			Conventional Bore	101	15	N	26	10	0	N	Y	\$355,146		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	E-012	S-J20	Dry-Ditch Open-Cut	255	-	N	43	16	327	N	N	\$298,496	Conventional Bore	FERC has approved the variance for this crossing which will be completed during the boring of the adjacent rail line.
			Conventional Bore	255	37	N	43	16	327	N	N	\$1,399,653		
Huntington	E-013	S-I25	Dry-Ditch Open-Cut	89	-	N	34	24	10	N	N	\$79,837	Dry-Ditch Open-Cut	Stream S-I25 is an UNT to Meadow Creek and is very small - less than ten feet in width. The trenchless crossing would require bore pits that are more than 20 feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	89	26	N	34	24	10	N	N	\$490,082		
Huntington	E-014	S-I26	Dry-Ditch Open-Cut	26	-	N	31	20	10	N	N	\$33,826	Dry-Ditch Open-Cut	Stream S-I26 is an UNT to Meadow Creek and is very small - less than ten feet in width. The trenchless crossing would require bore pits that are more than 20 feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	26	20	N	31	20	10	N	N	\$256,481		
Huntington	E-015	S-I27	Dry-Ditch Open-Cut	41	-	N	17	13	0	N	Y	\$46,828	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	41	18	N	17	13	0	N	Y	\$198,570		
Huntington	E-016	W-HS1	Dry-Ditch Open-Cut	41	-	N	54	33	724	N	N	\$28,700	Dry-Ditch Open-Cut	The bore pits for this crossing are greater than 30 feet in depth . Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit on an extremely long and steep slope which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	41	32	N	54	33	724	N	N	\$700,977		
Huntington	E-017	W-QR2	Dry-Ditch Open-Cut	322	-	N	10	8	0	N	Y	\$225,400	Dry-Ditch Open-Cut	A trenchless crossing in this location would require bore pits that are nearly 30 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	322	27	N	10	8	0	N	Y	\$1,160,467		
Huntington	E-018	S-L26, W-L16	Dry-Ditch Open-Cut	42	-	N	27	9	0	N	Y	\$42,210	Dry-Ditch Open-Cut	This crossing is immediately adjacent to a mainline valve. Trenchless crossing methods are logistically difficult because they would require the pipe to be installed too deeply to facilitate connection to the valve site. An open cut crossing is necessary to facilitate connection to the mainline valve. Furthermore, using a conventional bore method to avoid a temporary impact to this small intermittent stream and wetland would be unreasonably high relative to the proposed construction method.
			Conventional Bore	42	23	N	27	9	0	N	Y	\$329,293		
Huntington	E-019	S-L27	Dry-Ditch Open-Cut	90	-	N	18	11	0	N	Y	\$70,012	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	90	19	N	18	11	0	N	Y	\$342,198		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	E-020	S-L30, W-L19, W-L12, W-L13, S-L22	Dry-Ditch Open-Cut	315	-	N	77	46	1723	N	N	\$325,500	Dry-Ditch Open-Cut	Due to the location on steep slopes, the bore pits for this crossing are greater than 60 feet in depth which would create extremely excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method and would take nearly 60 days as long to complete.
			Conventional Bore	315	62	N	77	46	1723	N	N	\$4,275,783		
Huntington	E-021	W-L11, S-L20	Dry-Ditch Open-Cut	53	-	N	76	43	765	N	N	\$54,697	Dry-Ditch Open-Cut	Due to the location, the bore pits for this crossing are greater than 30 feet in depth. Avoiding/minimizing this minor impact (approximately 0.03 acre) through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	53	31	N	76	43	765	N	N	\$716,764		
Huntington	E-022	W-L4, S-L10, S-L11, W-L2	Dry-Ditch Open-Cut	92	-	N	32	20	0	N	Y	\$85,538	Dry-Ditch Open-Cut	A trenchless crossing in this location would require bore pits that are greater than 20 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	92	25	N	32	20	0	N	Y	\$489,462		
Huntington	E-023	S-I21, S-I22	Dry-Ditch Open-Cut	70	-	N	37	28	249	N	N	\$66,994	Dry-Ditch Open-Cut	A trenchless crossing in this location would require bore pits that are greater than 20 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	70	28	N	37	28	249	N	N	\$454,430		
Huntington	F-001	W-K7, S-K17, W-IJ30, W-UV9, W-UV11, W-UV10, W-K9-PEM-1, S-K19	Dry-Ditch Open-Cut	1168	-	N	28	20	92	N	Y	\$887,600	Dry-Ditch Open-Cut	A trenchless crossing in this location would require bore pits that are nearly 20 feet deep. Numerous cultural resources have been avoided by the current alignment. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. The trenchless crossing method would take nearly 160 days to complete, while the proposed method would take approximately 24 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Direct Pipe	1168	15	N	28	20	92	N	Y	\$9,412,510		
Huntington	F-002	S-K21, S-K22	Dry-Ditch Open-Cut	123	-	N	78	32	185	N	N	\$125,156	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to Buffalo Creek. Avoiding/minimizing this minor impact through a conventional bore would require an excessively deep bore pit greater than 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	123	48	N	78	32	185	N	N	\$2,967,254		
Huntington	F-003	S-UV6, W-UV4	Dry-Ditch Open-Cut	70	-	N	49	27	52	N	N	\$75,861	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Morris Fork and wetlands system would require bore pits that are nearly 30 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	70	27	N	49	27	52	N	N	\$445,295		
Huntington	F-004	W-UV8, S-UV2	Dry-Ditch Open-Cut	345	-	N	65	52	371	N	N	\$290,616	Dry-Ditch Open-Cut	This crossing of a small UNT to Morris Fork presents multiple challenges that limit the available options and necessitate the development of a unique solution. A bore pit depth just short of 40 feet would required the excavation of an interim ramp and bench and dramatically increases the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to this waterbody also increase the complexity of a bored crossing, increase safety risk to personnel, and add risk of impact to the waterbody from upland work during a bore. In addition, this crossing is in close proximity to residences, and a trenchless crossing of this location would take longer than six weeks to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration thereby minimizing the disruption the affected residences and businesses. Accordingly, a trenchless crossing of this resource has been deemed logistically difficult due to the compounding constructability constraints.
			Guided Conventional Bore	345	36	N	65	52	371	N	N	\$1,169,818		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-004A	S-U22	Dry-Ditch Open-Cut	593	-	N	52	35	293	N	Y	\$461,800	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a site-specific solution. The proximity of this stream to the adjacent bore of Interstate-64 makes it difficult to tie-in a bore of this resource. A bore pit depth nearing 40 feet at this location requires the excavation of an interim ramp and bench and dramatically increases the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to the waterbody increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. A trenchless crossing would take more than six weeks to be completed. Use of the open-cut method would reduce the construction duration and minimize noise and other disruptions to nearby persons due to construction activities. Accordingly, a trenchless crossing of this resource has been deemed logistically difficult due to the compounding constructability constraints.
			Guided Conventional Bore	593	37	N	52	35	293	N	Y	\$1,556,221		
Huntington	F-005	W-EE4, S-EE4	Dry-Ditch Open-Cut	154	-	N	19	12	0	N	Y	\$120,716	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Red Spring Branch and wetland system would require bore pits greater than 30 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	154	32	N	19	12	0	N	Y	\$1,021,669		
Huntington	F-006	S-M6, W-M2	Dry-Ditch Open-Cut	163	-	N	47	32	51	N	N	\$130,313	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Red Spring Branch and wetland system would require bore pits that are nearly 40 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method and would also take three times as long to complete.
			Conventional Bore	163	38	N	47	32	51	N	N	\$1,156,828		
Huntington	F-007	S-J13	Dry-Ditch Open-Cut	37	-	N	25	15	0	N	Y	\$43,400	Dry-Ditch Open-Cut	S-J13 is an UNT to Patterson Creek, a very small stream, and is crossed three times by the project. Crossing # F-007, 008, and 009 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with F-009 being nearly thirty feet deep. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Crossing F-009 is in a topographical setting that would require a technically and logistically difficult winching system. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	37	22	N	25	15	0	N	Y	\$305,969		
Huntington	F-008	S-J13	Dry-Ditch Open-Cut	45	-	N	32	21	21	N	Y	\$49,000	Dry-Ditch Open-Cut	S-J13 is an UNT to Patterson Creek, a very small stream, and is crossed three times by the project. Crossing # F-007, 008, and 009 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with F-009 being nearly thirty feet deep. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Crossing F-009 is in a topographical setting that would require a technically and logistically difficult winching system. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	45	21	N	32	21	21	N	Y	\$319,538		
Huntington	F-009	S-J13	Dry-Ditch Open-Cut	75	-	N	42	34	419	N	Y	\$70,000	Dry-Ditch Open-Cut	S-J13 is an UNT to Patterson Creek, a very small stream, and is crossed three times by the project. Crossing # F-007, 008, and 009 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with F-009 being nearly thirty feet deep. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Crossing F-009 is in a topographical setting that would require a technically and logistically difficult winching system. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	75	27	N	42	34	419	N	Y	\$459,485		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-010	S-I17	Dry-Ditch Open-Cut	43	-	N	56	44	1538	N	N	\$38,855	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Lick Creek. The crossing is located at the base of an extremely long and steep slope and require bore pits exceeding forty feet. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	43	31	N	56	44	1538	N	N	\$688,384		
Huntington	F-011	S-I19	Dry-Ditch Open-Cut	66	-	N	50	36	1200	N	N	\$101,669	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to Lick Creek. The crossing is located at the base of an extremely long and steep slope and require bore pits exceeding forty feet. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	66	44	N	50	36	1200	N	N	\$2,587,307		
Huntington	F-011A	S-I20	Dry-Ditch Open-Cut	39	-	N	78	57	735	N	N	\$76,000	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Lick Creek. The crossing is located on an extremely long and steep slope and require bore pits that are nearly forty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit on which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	39	35	N	78	57	735	N	N	\$750,110		
Huntington	F-012	S-N5	Dry-Ditch Open-Cut	63	-	N	33	24	10	N	N	\$52,226	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Hungard Creek would require bore pits greater than 20 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	63	24	N	33	24	10	N	N	\$398,025		
Huntington	F-013	S-K14	Dry-Ditch Open-Cut	35	-	N	40	34	252	N	N	\$44,164	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Hungard Creek would require bore pits greater than twenty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	35	22	N	40	34	252	N	N	\$300,293		
Huntington	F-014	S-N3	Dry-Ditch Open-Cut	106	-	N	6	3	0	N	Y	\$97,922	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	106	15	N	6	3	0	N	Y	\$369,336		
Huntington	F-015	S-N2	Dry-Ditch Open-Cut	48	-	N	36	10	0	N	Y	\$107,232	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	48	15	N	36	10	0	N	Y	\$204,733		
Huntington	F-016	S-CD23	Dry-Ditch Open-Cut	128	-	N	8	3	0	N	Y	\$98,350	Conventional Bore	This crossing is adjacent to planned bores, which will allow the existing bore pits to be utilized to avoid/minimize the aquatic impact at this location by boring. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	128	15	N	8	3	0	N	Y	\$431,772		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-017	S-N4, W-EF40	Dry-Ditch Open-Cut	99	-	N	9	4	0	N	Y	\$83,735	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	99	16	N	9	4	0	N	Y	\$354,038		
Huntington	F-019	S-KL29	Dry-Ditch Open-Cut	208	-	N	46	0	0	N	Y	\$299,600	Dry-Ditch Open-Cut	The pipeline has already been installed under an adjacent road (East Clayton Rd). There is no feasible way to tie the two sections of pipe together if a trenchless method is used to install this crossing. Lastly, substantial increase in cost and lost time (four weeks to complete bore) to avoid a temporary impact to this small, one-foot-wide stream is not appropriate and practicable.
			Conventional Bore	208	35	N	46	0	0	N	Y	\$1,229,729		
Huntington	F-020	W-MM20-PFO, S-CV17	Dry-Ditch Open-Cut	0	-	N	0	0	0	N	Y	-\$700	Dry-Ditch Open-Cut	Crossing these resources requires the pipeline to negotiate a bend that cannot be completed with any available trenchless crossing technology.
			Conventional Bore	0	0	N	0	0	0	N	Y	\$0		
Huntington	F-021	S-I8	Dry-Ditch Open-Cut	1250	-	Y	9	3	0	N	Y	\$2,287,563	Direct Pipe	The Greenbrier River will be crossed using the Direct Pipe trenchless methodology. The stream depth would require an instream diversion system that would severely limit the amount of usable workspace in an already reduced LOD. The Greenbrier River is also classified by the WVDNR as Group 1 mussel stream. While mussel survey and relocation efforts were completed in 2020, completing a trenchless crossing will further minimize any potential impacts to mussel species.
			Direct Pipe	1250	13	Y	9	3	0	N	Y	\$10,059,375		
Huntington	F-022	S-I9	Dry-Ditch Open-Cut	91	-	N	14	6	0	N	Y	\$124,405	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	91	18	N	14	6	0	N	Y	\$340,469		
Huntington	F-023	S-L4	Dry-Ditch Open-Cut	30	-	N	42	33	293	N	N	\$51,375	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Greenbrier River would require bore pits greater than thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	30	33	N	42	33	293	N	N	\$688,029		
Huntington	F-024	S-L2	Dry-Ditch Open-Cut	41	-	N	37	35	105	N	N	\$42,713	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Greenbrier River would require bore pits greater that are nearly 30 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	41	29	N	37	35	105	N	N	\$381,263		
Huntington	F-025	W-K2-PEM, S-L1	Dry-Ditch Open-Cut	40	-	N	60	41	146	N	N	\$49,003	Dry-Ditch Open-Cut	A trenchless crossing of this small wetland and small UNT to Kelly Creek would require bore pits greater than thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	40	32	N	60	41	146	N	N	\$698,139		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-026	S-J5	Dry-Ditch Open-Cut	42	-	N	82	57	240	N	N	\$100,783	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a unique solution. A bore pit depth greater than 20 feet requires the excavation of an interim ramp and bench and increases the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to these waterbodies increase the complexity of a bored crossing, increase safety risk to personnel, and add risk of impact to the waterbody from upland work during a bore. In addition, this crossing is on a property with a well or spring. The open cut method reduces the construction duration near the well/spring.
			Conventional Bore	42	24	N	82	57	240	N	N	\$338,428		
Huntington	F-027	S-J4	Dry-Ditch Open-Cut	30	-	N	47	34	173	N	N	\$37,647	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	30	19	N	47	34	173	N	N	\$171,919		
Huntington	F-028	W-OP1-PEM, S-OP1	Dry-Ditch Open-Cut	104	-	N	72	25	228	N	N	\$83,831	Dry-Ditch Open-Cut	The pipeline is already installed through a portion of the wetland at this crossing. The layout of a conventional bore would require excavation of a bore pit unacceptably close to the installed pipe. Additionally, a trenchless method would require excavation of a bore pit within the wetland, meaning that that a longer-duration bore pit in the wetland is not less environmentally damaging than a much shorter duration impact associated with an open cut through the wetland and adjacent stream. Lastly, the cost to avoid a temporary impact to these resources is unreasonably high relative to the proposed construction method, especially in light of the fact that boring does not materially avoid or minimize the impact at this location.
			Conventional Bore	104	19	N	72	25	228	N	N	\$381,930		
Huntington	F-029-030	S-A63, W-A13, S-A61, S-A60	Dry-Ditch Open-Cut	742	-	N	20	9	0	N	Y	\$554,400	Dry-Ditch Open-Cut	A trenchless crossing in this area would require bore pits that are nearly 20 feet deep. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. A trenchless crossing of this area would take approximately three times longer to complete than the proposed construction method -- compounding the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Direct Pipe	742	15	N	20	9	0	N	Y	\$6,004,510		
Huntington	F-031	S-D31	Dry-Ditch Open-Cut	81	-	N	55	42	99	N	N	\$284,433	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a unique solution. A bore pit depth of nearly 40 feet will require the excavation of an interim ramp and bench and dramatically increase the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to stream increases the complexity of a bored crossing, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. In addition, this crossing is in close proximity to residences and/or businesses, which would cause increased noise and other impacts to persons nearby for the approximately seven weeks that would be required to complete a trenchless crossing. The open-cut method would reduce construction duration and minimize disruptions to persons due to construction activities.
			Conventional Bore	81	38	N	55	42	99	N	N	\$924,113		
Huntington	F-032	S-D25	Dry-Ditch Open-Cut	32	-	N	23	11	74	N	Y	\$36,432	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	32	19	N	23	11	74	N	Y	\$177,595		
Huntington	F-034	S-Z5, S-Z4	Dry-Ditch Open-Cut	31	-	N	32	25	10	Y	N	\$30,454	Dry-Ditch Open-Cut	Site conditions do not allow sufficient space to stockpile spoils from bore pits. Karst terrain increases the risk of bore failure and environmental impact. Furthermore, avoiding this temporary impact to this small stream with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	31	26	N	32	25	10	Y	N	\$325,479		
Huntington	F-035	W-MN15, W-MN14, S-MN2	Dry-Ditch Open-Cut	88	-	N	51	33	191	N	N	\$86,108	Dry-Ditch Open-Cut	A trenchless crossing of these small wetlands and small UNT to Hans Creek would require bore pits that are 20 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is also shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	88	20	N	51	33	191	N	N	\$432,436		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-036	S-CV19	Dry-Ditch Open-Cut	84	-	N	53	28	536	N	N	\$148,571	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a unique solution. A bore pit depth of nearly 30 feet will require the excavation of an interim ramp and bench and dramatically increase the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to stream increases the complexity of a bored crossing, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. In addition, the topographical constraints create a technical and logistical limit on a winching system further increasing the worker safety risk. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is also shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside. Accordingly, a trenchless crossing of this resource has been deemed logistically difficult due to the multiple compounding constraints.
			Conventional Bore	84	33	N	53	28	536	N	N	\$841,280		
Huntington	F-037	S-MN39, S-MN40, W-CV24, S-MN38, S-MN37, W-MN18-PFO, W-MN18-PEM, W-MN1	Dry-Ditch Open-Cut	180	-	N	64	54	254	N	N	\$140,000	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a unique solution. Installing a trenchless crossing at this location would require a deep bore pit (38 feet) at the bottom of a steep hill that would require winched equipment. There is insufficient space available at this location to stockpile spoils from the bore pit. Avoiding/minimize impacts to this cluster of small aquatic resources would require an extended construction period greater than six weeks and triple the total greenhouse gas emissions associated with completed the crossing. Lastly, the cost to avoid a temporary impact to these resources is unreasonably high relative to the proposed construction method
			Conventional Bore	180	38	N	64	54	254	N	N	\$1,205,073		
Huntington	F-038	S-G44	Dry-Ditch Open-Cut	34	-	N	30	23	0	N	Y	\$38,869	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Hans Creek would require bore pits that are greater than 20 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	34	24	N	30	23	0	N	Y	\$315,724		
Huntington	F-039	S-G43, W-MN1	Dry-Ditch Open-Cut	52	-	N	40	27	73	N	N	\$56,420	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	52	19	N	40	27	73	N	N	\$234,355		
Huntington	F-040	W-G6, S-G42	Dry-Ditch Open-Cut	83	-	N	61	51	312	N	N	\$69,021	Dry-Ditch Open-Cut	A trenchless crossing of this small wetland and UNT to Hans Creek would require bore pits that are greater than thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is also shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	83	34	N	61	51	312	N	N	\$856,711		
Huntington	F-041	S-MN45, W-MN24	Dry-Ditch Open-Cut	42	-	N	45	33	342	N	N	\$36,464	Dry-Ditch Open-Cut	A trenchless crossing of this small wetland and UNT to Hans Creek would require bore pits that are thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. In addition the crossing is located at the bottom of a long, steep slope, further complicating construction and worker safety. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is also shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	42	30	N	45	33	342	N	N	\$667,277		
Huntington	F-042	W-CV25-PEM-2, W-CV25-PSS-1, S-CV27	Dry-Ditch Open-Cut	50	-	N	27	13	0	N	Y	\$40,250	Dry-Ditch Open-Cut	A trenchless crossing of these small wetlands and UNT to Hans Creek would require bore pits that are approximately twenty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	50	20	N	27	13	0	N	Y	\$324,593		
Huntington	F-043	S-E43, S-E45	Dry-Ditch Open-Cut	42	-	N	34	30	210	Y	N	\$58,269	Dry-Ditch Open-Cut	Site conditions do not allow sufficient space to stockpile spoils from bore pits. Karst terrain presents greater logistical and technical challenges. Furthermore, avoiding this temporary impact to this small stream with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	42	28	N	34	30	210	Y	N	\$374,967		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-044	W-E12, S-E40, S-E41	Dry-Ditch Open-Cut	48	-	N	41	25	295	Y	N	\$78,651	Dry-Ditch Open-Cut	Site conditions reduce the available space to stockpile spoils from bore pits. Karst terrain presents greater logistical and technical challenges.
			Conventional Bore	48	14	N	41	25	295	Y	N	\$200,166		
Huntington	F-045	W-C14, W-C13, S-C38, S-C39	Dry-Ditch Open-Cut	181	-	N	31	19	10	N	Y	\$151,803	Dry-Ditch Open-Cut	A trenchless crossing of these small wetlands and Painters Run would require bore pits that are approximately thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. In addition, the presence of steep slopes logistical and technical challenges. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The time to complete the proposed crossing method is also shorter in duration (nearly half), which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	181	29	N	31	19	10	N	Y	\$778,581		
Huntington	F-046	S-C41	Dry-Ditch Open-Cut	72	-	N	56	46	295	N	N	\$61,161	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to this small UNT to Painters Run. The crossing is located on a steep slope and require bore pits nearly 30 feet. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles, all while being located within an already reduced LOD. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take over forty days to complete.
			Conventional Bore	72	29	N	56	46	295	N	N	\$469,241		
Norfolk	G-001	S-Q12	Dry-Ditch Open-Cut	42	-	N	64	44	75	Y	N	\$43,449	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to this small UNT to Kimballton Branch. The crossing is located on a steep slope and require bore pits exceeding fifty feet. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles. Karst terrain presents greater logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take six times longer to complete.
			Conventional Bore	42	55	N	64	44	75	Y	N	\$3,119,195		
Norfolk	G-002	S-Q13	Dry-Ditch Open-Cut	69	-	N	45	29	331	Y	N	\$118,248	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to Kimballton Branch. The crossing is located on a steep slope and require bore pits exceeding thirty feet. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles. Karst terrain increases the risk of bore failure and environmental impact. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take three times longer to complete.
			Conventional Bore	69	33	N	45	29	331	Y	N	\$798,710		
Norfolk	G-003	S-P6	Dry-Ditch Open-Cut	44	-	N	42	32	84	Y	N	\$51,841	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to UNT to Stony Creek. The crossing is located adjacent to a steep slope and require bore pits nearly thirty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take nearly twice as long to complete.
			Conventional Bore	44	29	N	42	32	84	Y	N	\$389,777		
Norfolk	G-004	S-S5-Braid-1, S-S5-Braid-2, S-S5	Dry-Ditch Open-Cut	300	-	N	21	5	66	N	N	\$356,008	Guided Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Guided Conventional Bore	300	0	N	21	5	66	N	N	\$445,322		
Norfolk	G-005	S-G30, S-G29	Dry-Ditch Open-Cut	58	-	N	49	38	110	Y	N	\$70,917	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two UNT to Dry Branch. Both streams are very small - less than ten feet in width. The crossing is located adjacent to a steep slope and require bore pits nearly forty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take three times longer to complete.
			Conventional Bore	58	38	N	49	38	110	Y	N	\$858,839		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	G-006	S-G32	Dry-Ditch Open-Cut	100	-	N	46	28	607	Y	N	\$100,749	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to Dry Branch. The crossing is located adjacent to a steep slope and require bore pits greater than twenty feet. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit adjacent to an extremely long and steep slope which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would take twice as long to complete.
			Conventional Bore	100	24	N	46	28	607	Y	N	\$503,031		
Norfolk	G-007	S-G33	Dry-Ditch Open-Cut	90	-	N	38	34	289	N	N	\$93,649	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Dry Branch (less than 10 feet) would require bore pits that are approximately thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is also shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	90	30	N	38	34	289	N	N	\$803,500		
Norfolk	G-008	W-Z11	Dry-Ditch Open-Cut	60	-	N	39	26	220	N	N	\$42,000	Dry-Ditch Open-Cut	A trenchless crossing of this small wetland would require bore pits that are greater than twenty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	60	21	N	39	26	220	N	N	\$362,107		
Norfolk	G-009	S-G35	Dry-Ditch Open-Cut	139	-	N	38	34	608	N	N	\$225,223	Conventional Bore	Mountain Valley must use a conventional bore to cross an adjacent road (Big Branch Hollow Road). The bore can be extended to avoid this resource.
			Conventional Bore	139	30	N	38	34	608	N	N	\$942,561		
Norfolk	G-010	S-SS4	Dry-Ditch Open-Cut	30	-	N	22	16	0	N	Y	\$30,059	Conventional Bore	This stream is listed as trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	30	27	N	22	16	0	N	Y	\$331,776		
Norfolk	G-011	S-Z9	Dry-Ditch Open-Cut	48	-	N	45	29	21	N	N	\$49,564	Conventional Bore	This stream is listed as trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	48	27	N	45	29	21	N	N	\$382,860		
Norfolk	G-012	S-Z7, S-Z7-Braid-1	Dry-Ditch Open-Cut	47	-	N	24	14	0	N	Y	\$44,128	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	47	19	N	24	14	0	N	Y	\$220,165		
Norfolk	G-013	S-Z10, S-Z11, S-Z12-EPH, W-Z3, S-Z13	Dry-Ditch Open-Cut	331	-	N	9	4	0	N	Y	\$322,599	Guided Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Guided Conventional Bore	331	23	N	9	4	0	N	Y	\$701,437		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	G-014	S-Z14	Dry-Ditch Open-Cut	53	-	N	37	32	292	N	N	\$53,882	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	53	15	N	37	32	292	N	N	\$218,923		
Norfolk	G-015A	S-A34	Dry-Ditch Open-Cut	77	-	N	36	32	330	Y	N	\$74,900	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Doe Creek. The stream is very small - less than ten feet in width and would require bore pits nearly thirty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	77	29	N	36	32	330	Y	N	\$483,431		
Norfolk	G-015B	S-A33	Dry-Ditch Open-Cut	58	-	N	36	30	388	Y	Y	\$68,849	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Doe Creek. The stream is very small - less than ten feet in width and would require bore pits greater than twenty feet deep on a steep slope. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	58	24	N	36	30	388	Y	Y	\$383,836		
Norfolk	G-016	S-A32	Dry-Ditch Open-Cut	103	-	N	36	32	975	Y	N	\$130,827	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an UNT to Doe Creek. The crossing is located adjacent to a steep slope and require bore pits up to forty feet in depth. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit adjacent to an extremely long and steep slope which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take eight times longer to complete. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	103	40	N	36	32	975	Y	N	\$2,474,130		
Norfolk	G-017	S-Y3, S-Y2	Dry-Ditch Open-Cut	246	-	N	52	25	328	Y	N	\$263,200	Conventional Bore	Mountain Valley must use a conventional bore to cross an adjacent road (Doe Creek Road). The bore can be extended to avoid this resource.
			Conventional Bore	246	37	N	52	25	328	Y	N	\$1,374,111		
Norfolk	G-019A	S-E24	Dry-Ditch Open-Cut	69	-	N	28	13	0	N	Y	\$120,466	Dry-Ditch Open-Cut	This crossing is immediately adjacent to another crossing (G-019B) that will be bored. A significant change in elevation between the two crossing locations does not allow the pipeline to be tied-in together unless this crossing is completed with an open cut. Furthermore, avoiding this temporary impact to a UNT to Sinking Creek with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	69	32	N	28	13	0	N	Y	\$780,441		
Norfolk	G-019B	S-E25-Downstream	Dry-Ditch Open-Cut	92	-	N	48	20	450	N	Y	\$99,400	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	92	19	N	48	20	450	N	Y	\$347,874		
Norfolk	G-020	S-RR5	Dry-Ditch Open-Cut	154	-	N	56	45	400	N	N	\$146,371	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an UNT to Sinking Creek. The crossing is located adjacent to a steep slope and require bore pits nearly forty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit adjacent to an extremely long and steep slope which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take longer to complete.
			Conventional Bore	154	35	N	56	45	400	N	N	\$1,076,478		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	G-020A	S-IJ18	Dry-Ditch Open-Cut	22	-	N	41	13	11	N	N	\$21,300	Dry-Ditch Open-Cut	A trenchless crossing of this small stream (UNT to Sinking Creek) would require bore pits that are nearly twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	22	19	N	41	13	11	N	N	\$149,215		
Norfolk	G-022	S-IJ16-b	Dry-Ditch Open-Cut	50	-	N	70	42	537	Y	N	\$52,912	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an UNT to Sinking Creek. The crossing is located adjacent to a steep slope and require bore pits up to thirty feet in depth. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take nearly twice as long to complete. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	50	33	N	70	42	537	Y	N	\$744,789		
Norfolk	G-023	S-NN17	Dry-Ditch Open-Cut	140	-	N	62	40	372	Y	N	\$296,363	Conventional Bore	Mountain Valley must use a conventional bore to cross an adjacent road (Rt. 604). The bore can be extended to avoid this resource.
			Conventional Bore	140	23	N	62	40	372	Y	N	\$607,416		
Norfolk	G-024	S-RR2, S-YZ6, W-RR1b	Dry-Ditch Open-Cut	133	-	N	63	42	702	Y	N	\$129,388	Conventional Bore	Mountain Valley must use a conventional bore to cross an adjacent road (Rt. 42). The bore can be extended to avoid this resource.
			Conventional Bore	133	28	N	63	42	702	Y	N	\$633,223		
Norfolk	G-025	S-MM18	Dry-Ditch Open-Cut	35	-	N	45	41	349	Y	N	\$43,253	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Sinking Creek. The stream is very small - less than ten feet in width and would require bore pits approximately twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require creating excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take three times as long to complete.
			Conventional Bore	35	20	N	45	41	349	Y	N	\$282,023		
Norfolk	G-026	S-NN12	Dry-Ditch Open-Cut	41	-	N	41	28	276	Y	N	\$37,317	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Sinking Creek. The stream is very small - less than five feet in width and would require bore pits that are twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take longer to complete.
			Conventional Bore	41	20	N	41	28	276	Y	N	\$299,051		
Norfolk	G-027	S-NN11	Dry-Ditch Open-Cut	147	-	N	38	26	43	Y	N	\$121,499	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Sinking Creek. The stream is very small - less than five feet in width and would require bore pits greater than twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take longer to complete.
			Conventional Bore	147	24	N	38	26	43	Y	N	\$636,416		
Norfolk	G-028	S-KL43	Dry-Ditch Open-Cut	48	-	N	43	28	102	Y	N	\$61,648	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Sinking Creek. The stream is very small - less than ten feet in width and would require bore pits greater than twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges.
			Conventional Bore	48	19	N	43	28	102	Y	N	\$223,003		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	G-029	W-CD12, S-0014	Dry-Ditch Open-Cut	70	-	N	23	11	0	Y	Y	\$63,367	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small wetland and small UNT to Sinking Creek. The stream is very small - less than ten feet in width and would require bore pits greater than twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take longer to complete.
			Conventional Bore	70	22	N	23	11	0	Y	Y	\$399,622		
Norfolk	G-030	S-0012, S-0013	Dry-Ditch Open-Cut	45	-	N	41	21	73	Y	N	\$101,903	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to Sinking Creek. This crossing is in proximity to a residence, and a trenchless crossing of this location would take nearly three times as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Karst terrain increases the logistical and technical challenges.
			Conventional Bore	45	18	N	41	21	73	Y	N	\$209,921		
Norfolk	G-031	S-PP1	Dry-Ditch Open-Cut	46	-	N	16	8	0	Y	Y	\$43,348	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) intermittent UNT to Sinking Creek. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take four times as long to complete - compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Karst terrain increases the logistical and technical challenges.
			Conventional Bore	46	15	N	16	8	0	Y	Y	\$199,057		
Norfolk	G-032	S-PP3	Dry-Ditch Open-Cut	25	-	N	17	12	0	Y	Y	\$26,364	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) UNT to Sinking Creek. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	25	17	N	17	12	0	Y	Y	\$148,594		
Norfolk	G-033	S-PP4	Dry-Ditch Open-Cut	38	-	N	22	11	0	Y	Y	\$34,742	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (two-foot wide) intermittent UNT to Sinking Creek. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	11	N	22	11	0	Y	Y	\$158,084		
Norfolk	G-034	S-PP22	Dry-Ditch Open-Cut	48	-	N	57	48	203	N	N	\$44,100	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	48	19	N	57	48	203	N	N	\$223,003		
Norfolk	G-035	S-PP21	Dry-Ditch Open-Cut	35	-	N	33	26	0	N	N	\$38,975	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	35	22	N	33	26	0	N	N	\$300,293		
Norfolk	G-036	S-PP20	Dry-Ditch Open-Cut	48	-	N	26	9	0	N	Y	\$58,844	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	48	18	N	26	9	0	N	Y	\$218,435		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	G-037	S-006	Dry-Ditch Open-Cut	61	-	N	20	8	0	N	Y	\$166,001	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	61	11	N	20	8	0	N	Y	\$223,358		
Norfolk	G-038	S-RR14	Dry-Ditch Open-Cut	38	-	N	33	19	21	N	N	\$52,813	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	38	13	N	33	19	21	N	N	\$167,219		
Norfolk	G-039	S-HH18	Dry-Ditch Open-Cut	55	-	N	42	24	216	N	N	\$59,609	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	55	29	N	42	24	216	N	N	\$420,995		
Norfolk	G-040	S-MN21	Dry-Ditch Open-Cut	32	-	N	53	42	287	N	N	\$40,296	Dry-Ditch Open-Cut	Access to this crossing location is extremely limited and requires removal and replacement of approximately 200 waterbars per day during period of active construction. Operating a boring operation at this location is logistically and technically challenging. Furthermore, avoiding this temporary impact to this small stream with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	32	28	N	53	42	287	N	N	\$346,587		
Norfolk	G-041	S-MN22	Dry-Ditch Open-Cut	40	-	N	30	24	0	N	Y	\$43,706	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-feet wide) stream. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	40	20	N	30	24	0	N	Y	\$296,213		
Norfolk	G-042	S-EF65	Dry-Ditch Open-Cut	88	-	N	43	27	560	Y	N	\$166,301	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The stream is also located on a steep slope that would require logistically and technically challenging winching system in an already reduced work area. Karst terrain increases the logistical and technical challenges.
			Conventional Bore	88	22	N	43	27	560	Y	N	\$450,706		
Norfolk	G-043	S-EF62	Dry-Ditch Open-Cut	38	-	N	28	17	293	Y	N	\$58,103	Dry-Ditch Open-Cut	The stream is located on a steep slope that would require logistically and technically challenging winching system in an already reduced work area. Karst terrain increases the logistical and technical challenges.
			Conventional Bore	38	16	N	28	17	293	Y	N	\$180,921		
Norfolk	G-044	S-IJ52, W-IJ46-PEM	Dry-Ditch Open-Cut	46	-	N	63	35	178	Y	N	\$57,673	Dry-Ditch Open-Cut	Site conditions do not allow sufficient space to stockpile spoils from bore pits. Karst terrain increases the logistical and technical challenges. Furthermore, avoiding this temporary impact to this small stream with a conventional bore crossing would be unreasonably expensive and would take longer to complete.
			Conventional Bore	46	24	N	63	35	178	Y	N	\$349,780		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-001	S-G39	Dry-Ditch Open-Cut	301	-	N	74	46	1576	N	N	\$232,364	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (six-foot wide) intermittent UNT to Roanoke River. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. A conventional bore crossing would extend the duration of this crossing from 6 to 79 days, thereby increasing the greenhouse gas emissions associated with the crossing by nearly 1,400%. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	301	36	N	74	46	1576	N	N	\$1,511,931		
Norfolk	H-002	S-MM15	Dry-Ditch Open-Cut	37	-	N	39	29	74	N	N	\$47,979	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (six-foot wide) intermittent UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	37	33	N	39	29	74	N	N	\$707,895		
Norfolk	H-003	S-MM14	Dry-Ditch Open-Cut	100	-	N	42	33	243	N	N	\$104,394	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	100	37	N	42	33	243	N	N	\$959,765		
Norfolk	H-004	S-MM13	Dry-Ditch Open-Cut	33	-	N	59	34	33	N	N	\$41,924	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-foot wide) UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	33	32	N	59	34	33	N	N	\$678,274		
Norfolk	H-005	S-MM11	Dry-Ditch Open-Cut	34	-	N	46	24	33	N	N	\$54,178	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (nine-foot wide) UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	34	25	N	46	24	33	N	N	\$324,859		
Norfolk	H-006	W-F9-PFO, S-F15	Dry-Ditch Open-Cut	55	-	N	56	17	0	N	Y	\$85,276	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an intermittent UNT to Flatwoods Branch and an adjacent PFO wetland (0.02 ac). Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to residences, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	55	35	N	56	17	0	N	Y	\$795,517		
Norfolk	H-007	S-F16a/F16b	Dry-Ditch Open-Cut	32	-	N	30	15	0	N	Y	\$32,899	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	32	27	N	30	15	0	N	Y	\$337,452		
Norfolk	H-008	S-C33, S-C36, W-C11	Dry-Ditch Open-Cut	313	-	N	21	15	0	N	Y	\$240,100	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit more than 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. A conventional bore crossing would extend the duration of this crossing from 2 to 30 days, thereby increasing the greenhouse gas emissions associated with the crossing by over 1500%.
			Conventional Bore	313	23	N	21	15	0	N	Y	\$1,098,387		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-009	S-MM31	Dry-Ditch Open-Cut	40	-	N	5	3	0	N	Y	\$43,566	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	40	11	N	5	3	0	N	Y	\$163,760		
Norfolk	H-010	S-C29	Dry-Ditch Open-Cut	44	-	N	21	16	0	N	Y	\$35,326	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (one-foot wide) Flatwoods Branch. A conventional bore crossing would extend the duration of this crossing from 2 to 9 days, thereby increasing the greenhouse gas emissions associated with the crossing by over 450%. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	44	17	N	21	16	0	N	Y	\$202,516		
Norfolk	H-012	W-C5	Dry-Ditch Open-Cut	68	-	N	31	19	0	N	Y	\$47,600	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact to a PEM wetland (0.05 ac). Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. A conventional bore crossing would extend the duration of this crossing from 2 to 8 days, thereby increasing the greenhouse gas emissions associated with the crossing by over 400%. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	68	23	N	31	19	0	N	Y	\$403,081		
Norfolk	H-013	S-C25	Dry-Ditch Open-Cut	65	-	N	39	29	52	N	N	\$62,093	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-feet wide) UNT to Bradshaw Creek. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. A conventional bore crossing would extend the duration of this crossing from 2 to 18 days, thereby increasing the greenhouse gas emissions associated with the crossing by over 900%. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	65	38	N	39	29	52	N	N	\$878,705		
Norfolk	H-014	S-C24	Dry-Ditch Open-Cut	67	-	N	38	20	21	N	N	\$64,412	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Bradshaw Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. A conventional bore crossing would extend the duration of this crossing from 2 to 18 days, thereby increasing the greenhouse gas emissions associated with the crossing by over 900%. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	67	34	N	38	20	21	N	N	\$811,304		
Norfolk	H-015	S-C21	Dry-Ditch Open-Cut	90	-	N	18	6	21	N	N	\$168,191	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	90	26	N	18	6	21	N	N	\$492,920		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-017	S-OO16	Dry-Ditch Open-Cut	360	-	N	45	36	282	Y	N	\$266,002	Conventional Bore	Mountain Valley must use a conventional bore to cross an adjacent road (I-81). The bore can be extended to avoid this resource.
			Conventional Bore	360	39	N	45	36	282	Y	N	\$1,734,180		
Norfolk	H-018	S-NN19	Dry-Ditch Open-Cut	34	-	N	53	27	11	Y	N	\$36,153	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-feet wide) UNT to Roanoke River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take three weeks to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	34	33	N	53	27	11	Y	N	\$699,381		
Norfolk	H-019	S-NN16, W-NN8	Dry-Ditch Open-Cut	316	-	N	23	14	0	Y	Y	\$504,735	Microtunnel	Mountain Valley must use microtunneling to cross an adjacent road (Rt. 11). The bore can be extended to avoid this resource.
			Microtunnel	316	31	N	23	14	0	Y	Y	\$3,726,351		
Norfolk	H-020	S-I1, S-AB16, W-AB7	Dry-Ditch Open-Cut	280	-	N	4	3	74	Y	Y	\$244,999	Conventional Bore	Mountain Valley must use microtunneling to cross an adjacent road (Rt. 11). The bore can be extended to avoid this resource.
			Conventional Bore	280	16	N	4	3	74	Y	Y	\$867,713		
Norfolk	H-021	S-CD12b	Dry-Ditch Open-Cut	38	-	N	3	2	0	N	Y	\$37,100	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	38	11	N	3	2	0	N	Y	\$158,084		
Norfolk	H-022	W-KL58	Dry-Ditch Open-Cut	114	-	N	1	0	0	N	Y	\$79,800	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	114	12	N	1	0	0	N	Y	\$378,338		
Norfolk	H-023	S-EF19	Dry-Ditch Open-Cut	30	-	N	76	60	647	N	N	\$24,179	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (one-foot wide) UNT to Indian Run. Avoiding/minimizing this minor impact through a trenchless crossing would require an excessively deep bore pit exceeding 50 feet, thereby requiring the excavation of an interim ramp and up to three benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. Using a trenchless method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Microtunnel	30	51	N	76	60	647	N	N	\$3,081,818		
Norfolk	H-024	W-EF5-PFO, S-EF20a	Dry-Ditch Open-Cut	83	-	N	63	52	768	N	N	\$80,005	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-feet wide) UNT to Roanoke River and an adjacent PFO wetland (0.11 ac). Avoiding/minimizing these minor impacts through a conventional bore would require an excessively deep bore pit greater than 40 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. In forested wetlands, a 30-foot corridor generally must be maintained free of trees. Accordingly, conversion impacts to the PFO wetland are unavoidable, even if a bore is used. This crossing also is in close proximity to a residence, and a trenchless crossing of this location would take 27 days -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	83	44	N	63	52	768	N	N	\$2,635,553		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-025	S-MM22	Dry-Ditch Open-Cut	200	-	N	33	25	2582	N	N	\$192,500	Dry-Ditch Open-Cut	The stream is located on a slope that will increase the logistical and technical difficulty of crossing this small stream. The bore pits are nearly 20 feet deep which makes stockpiling the spoils on such steep slope and logistical challenge.
			Conventional Bore	200	17	N	33	25	2582	N	N	\$645,242		
Norfolk	H-026	S-IJ50	Dry-Ditch Open-Cut	88	-	N	74	66	2681	N	N	\$96,784	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Roanoke River. Avoiding/minimizing this minor impact through a trenchless crossing would require an excessively deep bore pit of nearly 60 feet, thereby requiring the excavation of an interim ramp and up to three benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. Using a trenchless method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Microtunnel	88	59	N	74	66	2681	N	N	\$4,098,182		
Norfolk	H-027	S-Y13, S-Y14	Dry-Ditch Open-Cut	104	-	N	66	45	670	N	N	\$124,613	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to Bottom Creek. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	104	38	N	66	45	670	N	N	\$989,387		
Norfolk	H-028	S-EF34b, S-EF55	Dry-Ditch Open-Cut	100	-	N	63	51	508	N	N	\$105,000	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to Bottom Creek. Avoiding/minimizing these minor impacts through a conventional bore would require an excessively deep bore pit greater than 40 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	100	45	N	63	51	508	N	N	\$2,738,344		
Norfolk	H-029	S-EF33	Dry-Ditch Open-Cut	43	-	N	42	19	560	N	N	\$48,809	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-foot wide) intermittent UNT to Bottom Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	43	31	N	42	19	560	N	N	\$688,384		
Norfolk	H-030	S-IJ82	Dry-Ditch Open-Cut	73	-	N	25	14	0	N	Y	\$70,275	Conventional Bore	The stream is a trout water and the direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	73	27	N	25	14	0	N	Y	\$453,809		
Norfolk	H-031	W-IJ94-PEM, W-IJ95-PSS, S-IJ83, S-IJ88, S-IJ84, W-IJ102	Dry-Ditch Open-Cut	362	-	N	25	12	0	N	Y	\$292,224	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	362	28	N	25	12	0	N	Y	\$1,283,121		
Norfolk	H-032	S-IJ89, S-IJ90	Dry-Ditch Open-Cut	108	-	N	34	22	212	N	N	\$94,134	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	108	22	N	34	22	212	N	N	\$507,465		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-033	W-KL17, S-KL25	Dry-Ditch Open-Cut	59	-	N	14	9	521	N	N	\$53,001	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-feet wide) intermittent UNT to Mill Creek and a PSS wetland (0.04 ac). The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. This crossing also is in close proximity to a residence, and a trenchless crossing of this location increases the duration of the crossing work -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents.
			Conventional Bore	59	16	N	14	9	521	N	N	\$240,519		
Norfolk	H-035	W-KL15	Dry-Ditch Open-Cut	59	-	N	15	12	0	N	Y	\$41,300	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact to a PEM wetland (0.03 ac). This crossing is in close proximity to residences, and a trenchless crossing of this location nearly triples the duration of the crossing work -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize the impact to this PEM would be unreasonably expensive.
			Conventional Bore	59	16	N	15	12	0	N	Y	\$240,519		
Norfolk	H-036	W-EF42, W-HS02, W-AB6-PEM-2, W-AB6-PFO-1, W-AB6-PEM-1, W-AB6-PSS, W-AB5, W-AB3-PEM-2	Dry-Ditch Open-Cut	1600	-	N	4	2	0	N	Y	\$1,120,000	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impacts several closely grouped wetland features. To avoid excavating bore pits in wetland areas, Direct Pipe would be necessary to span the excessively long crossing distance. The trenchless crossing would take more than one month to complete (as opposed to three days for an open cut crossing). The greenhouse gas footprint of the crossing would therefore increase by over 1,400%. Furthermore, using a Direct Pipe crossing method to avoid/minimize the temporary impacts to these features would be unreasonably expensive. A minor temporary impact associated with the bore to maintain access will be required.
			Direct Pipe	1600	10	N	4	2	0	N	Y	\$12,845,673		
Norfolk	H-040	W-EF46, S-ST9b	Dry-Ditch Open-Cut	179	-	N	31	17	10	N	N	\$152,132	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	179	21	N	31	17	10	N	N	\$699,827		
Norfolk	H-041	W-KL48-PSS-1	Dry-Ditch Open-Cut	70	-	N	10	5	0	N	Y	\$49,000	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact to PSS wetland. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	70	17	N	10	5	0	N	Y	\$276,304		
Norfolk	H-042	W-KL49-PEM, W-KL51-PEM, S-KL55, W-KL51-PSS	Dry-Ditch Open-Cut	202	-	N	17	13	0	N	Y	\$181,156	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	202	22	N	17	13	0	N	Y	\$774,236		
Norfolk	H-043	W-MN7-PEM, S-IJ12	Dry-Ditch Open-Cut	87	-	N	31	22	340	N	N	\$74,999	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	87	25	N	31	22	340	N	N	\$475,272		
Norfolk	H-044	S-EF44, W-EF44	Dry-Ditch Open-Cut	45	-	N	45	33	84	N	N	\$49,054	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	45	21	N	45	33	84	N	N	\$319,538		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-045	W-IJ36, S-IJ43	Dry-Ditch Open-Cut	282	-	N	43	26	230	N	N	\$251,003	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	282	30	N	43	26	230	N	N	\$1,348,393		
Norfolk	H-046	S-Y7, W-Y2, S-Y8	Dry-Ditch Open-Cut	140	-	N	44	24	43	N	N	\$117,275	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	140	25	N	44	24	43	N	N	\$625,685		
Norfolk	H-047A	S-B22	Dry-Ditch Open-Cut	64	-	N	9	5	0	N	Y	\$59,056	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	64	14	N	9	5	0	N	Y	\$245,574		
Norfolk	H-047B	W-B25-PEM-1	Dry-Ditch Open-Cut	154	-	N	9	4	0	N	Y	\$107,800	Dry-Ditch Open-Cut	The open cut method would result in a small (0.19 ac) temporary impact to PEM wetland. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take 30 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents.
			Conventional Bore	154	13	N	9	4	0	N	Y	\$496,425		
Norfolk	H-048A	W-B25-PSS-2, S-B25	Dry-Ditch Open-Cut	253	-	N	3	1	0	N	Y	\$202,035	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	253	11	N	3	1	0	N	Y	\$768,251		
Norfolk	H-048B	W-B24-PEM, W-B24-PSS, S-B21	Dry-Ditch Open-Cut	228	-	N	9	6	0	N	Y	\$176,494	Dry-Ditch Open-Cut	The pipeline is already installed through a portion of the wetland at this crossing. The layout of a conventional bore would require excavation of a bore pit unacceptably close to the installed pipe. Additionally, a trenchless method would require excavation of a bore pit within the wetland, meaning that that a longer-duration bore pit in the wetland (3 to 4 weeks) is not less environmentally damaging than a much shorter duration impact associated with an open cut through the wetlands and adjacent four-foot-wide UNT to Mill Creek.
			Conventional Bore	228	20	N	9	6	0	N	Y	\$829,754		
Norfolk	H-051	W-ST2-PEM, S-G24, S-G25	Dry-Ditch Open-Cut	96	-	N	57	48	130	N	N	\$95,320	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to Green Creek and a PEM wetland. Avoiding/minimizing these minor impacts through a conventional bore would require a deep bore pit of nearly 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location increases the duration of the crossing from 2 to 19 days -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	96	36	N	57	48	130	N	N	\$930,144		
Norfolk	H-052	S-D14	Dry-Ditch Open-Cut	79	-	N	34	24	729	N	N	\$65,800	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) UNT. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit.
			Conventional Bore	79	19	N	34	24	729	N	N	\$310,980		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-053	W-D7-PEM, S-D13, S-D12	Dry-Ditch Open-Cut	89	-	N	27	20	83	N	N	\$84,077	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small intermittent UNTs to North Fork Blackwater River and a PEM wetland. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit exceeding 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	89	24	N	27	20	83	N	N	\$471,813		
Norfolk	H-054	S-D11	Dry-Ditch Open-Cut	81	-	N	33	10	51	N	N	\$119,688	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	81	22	N	33	10	51	N	N	\$430,840		
Norfolk	H-055	S-D8	Dry-Ditch Open-Cut	60	-	N	43	37	585	N	N	\$107,791	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) UNT to North Fork Blackwater River. Avoiding/minimizing these minor impacts through a conventional bore would require a deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	60	35	N	43	37	585	N	N	\$809,707		
Norfolk	H-056	S-GH15	Dry-Ditch Open-Cut	35	-	N	62	54	148	N	N	\$38,526	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) intermittent UNT to North Fork Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	35	24	N	62	54	148	N	N	\$318,562		
Norfolk	H-057	S-GH14	Dry-Ditch Open-Cut	54	-	N	48	34	109	N	N	\$52,050	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) UNT to North Fork Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	54	36	N	48	34	109	N	N	\$810,949		
Norfolk	H-058	S-GH11	Dry-Ditch Open-Cut	31	-	N	54	42	231	N	N	\$32,688	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) intermittent UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take longer to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	31	32	N	54	42	231	N	N	\$672,598		
Norfolk	H-059	S-GH9	Dry-Ditch Open-Cut	48	-	N	47	24	62	N	N	\$48,203	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) UNT to North Fork Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	48	34	N	47	24	62	N	N	\$757,382		
Norfolk	H-060	S-RR08	Dry-Ditch Open-Cut	43	-	N	20	12	0	N	Y	\$54,799	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	43	15	N	20	12	0	N	Y	\$190,543		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-061	S-RR09	Dry-Ditch Open-Cut	30	-	N	56	34	64	N	N	\$48,428	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (nine-foot wide) UNT to North Fork Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	30	31	N	56	34	64	N	N	\$651,490		
Norfolk	H-062	S-RR11	Dry-Ditch Open-Cut	38	-	N	39	26	136	N	N	\$51,125	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (seven-foot wide) UNT to North Fork Blackwater River Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require an excessively deep bore pit greater than 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	27	N	39	26	136	N	N	\$354,480		
Norfolk	H-063	S-IJ1, W-IJ1, S-IJ2	Dry-Ditch Open-Cut	133	-	N	44	37	928	N	N	\$135,744	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to North Fork Blackwater River and a PEM wetland (0.002 ac). Avoiding/minimizing these minor impacts through a conventional bore would require an excessively deep bore pit greater than 40 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly three times as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	133	41	N	44	37	928	N	N	\$2,613,815		
Norfolk	I-001	S-E28	Dry-Ditch Open-Cut	56	-	N	46	18	0	N	Y	\$95,200	Dry-Ditch Open-Cut	This crossing is immediately adjacent to a mainline valve. Trenchless crossing methods are logistically difficult because they would require the pipe to be installed too deeply to facilitate connection to the valve site. An open cut crossing is necessary to facilitate connection to the mainline valve.
			Conventional Bore	56	16	N	46	18	0	N	Y	\$232,005		
Norfolk	I-001A	S-GH3	Dry-Ditch Open-Cut	22	-	N	41	19	31	N	N	\$33,100	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	22	14	N	41	19	31	N	N	\$126,378		
Norfolk	I-002	S-E29	Dry-Ditch Open-Cut	52	-	N	4	2	0	N	Y	\$65,383	Dry-Ditch Open-Cut	This UNT to Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location.
			Conventional Bore	52	14	N	4	2	0	N	Y	\$211,518		
Norfolk	I-003	S-E28	Dry-Ditch Open-Cut	45	-	N	15	3	0	N	Y	\$87,500	Dry-Ditch Open-Cut	Teels Creek in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location.
			Conventional Bore	45	15	N	15	3	0	N	Y	\$196,219		
Norfolk	I-004	W-E7	Dry-Ditch Open-Cut	298	-	N	18	6	0	N	Y	\$208,600	Dry-Ditch Open-Cut	Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take 14 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize the impact to this PEM would be unreasonably expensive.
			Conventional Bore	298	21	N	18	6	0	N	Y	\$1,037,547		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-005A	W-E8	Dry-Ditch Open-Cut	150	-	N	37	29	0	N	Y	\$105,000	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact (0.07 ac) to a PEM wetland. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 30 feet on the edge of a steep slope, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take 19 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize the impact to this PEM would be unreasonably expensive.
			Conventional Bore	150	27	N	37	29	0	N	Y	\$672,334		
Norfolk	I-005B	S-E28	Dry-Ditch Open-Cut	67	-	N	24	18	0	N	Y	\$102,900	Dry-Ditch Open-Cut	This Section of Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location.
			Conventional Bore	67	23	N	24	18	0	N	Y	\$400,243		
Norfolk	I-006	S-EF4	Dry-Ditch Open-Cut	59	-	N	48	29	62	N	N	\$81,979	Dry-Ditch Open-Cut	This intermittent UNT to Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. Furthermore, it would be unreasonably expensive to use a trenchless crossing to avoid only a fraction of the aquatic impact to this small (three-foot wide) stream.
			Conventional Bore	59	34	N	48	29	62	N	N	\$788,600		
Norfolk	I-007	S-EF12	Dry-Ditch Open-Cut	68	-	N	8	2	124	N	N	\$123,232	Dry-Ditch Open-Cut	This UNT to Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location.
			Conventional Bore	68	16	N	8	2	124	N	N	\$266,060		
Norfolk	I-008	S-MM42	Dry-Ditch Open-Cut	43	-	N	25	18	0	N	Y	\$37,690	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (two-foot wide) UNT to Teels Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	43	23	N	25	18	0	N	Y	\$332,131		
Norfolk	I-009	S-RR15	Dry-Ditch Open-Cut	60	-	N	25	12	30	N	N	\$102,185	Conventional Bore	Although the bore pits associated with this crossing are 20 feet deep, the relatively flat approaches are reasonable for winching equipment and the excessive spoils associated with deeper bore pits can be managed appropriately.
			Conventional Bore	60	20	N	25	12	30	N	N	\$352,973		
Norfolk	I-010	S-D23	Dry-Ditch Open-Cut	71	-	N	39	19	87	N	N	\$136,216	Dry-Ditch Open-Cut	The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. This location has construction constraints, including winch-hill construction and limited space for soil stockpiles. The open cut method also reduces the construction duration near a private drinking water well on the property.
			Conventional Bore	71	28	N	39	19	87	N	N	\$457,268		
Norfolk	I-011	S-D22	Dry-Ditch Open-Cut	42	-	N	31	21	0	N	Y	\$61,662	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (eight-foot wide) intermittent UNT to Teels Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearly 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	42	21	N	31	21	0	N	Y	\$311,024		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-012	S-D20	Dry-Ditch Open-Cut	29	-	N	35	27	113	N	N	\$43,964	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (eight-feet wide) intermittent UNT to Teels Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	29	28	N	35	27	113	N	N	\$338,073		
Norfolk	I-013	S-C14	Dry-Ditch Open-Cut	90	-	N	40	28	53	N	N	\$271,204	Dry-Ditch Open-Cut	Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. Construction constraints at this location include a bore pit depth of nearly 40 feet and steep slopes on both sides of the creek, one of which would require winched equipment. The open cut method also reduces the construction duration near a private drinking water well on the property.
			Conventional Bore	90	38	N	40	28	53	N	N	\$949,655		
Norfolk	I-014	S-C17	Dry-Ditch Open-Cut	62	-	N	21	16	0	N	Y	\$187,051	Conventional Bore	Roanoke loggerch habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	62	20	N	21	16	0	N	Y	\$358,649		
Norfolk	I-015	S-CD6	Dry-Ditch Open-Cut	109	-	N	4	1	0	N	Y	\$276,201	Dry-Ditch Open-Cut	Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location.
			Conventional Bore	109	20	N	4	1	0	N	Y	\$492,034		
Norfolk	I-016	W-CD6	Dry-Ditch Open-Cut	94	-	N	4	1	0	N	Y	\$65,800	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	94	11	N	4	1	0	N	Y	\$317,011		
Norfolk	I-017	W-CD5	Dry-Ditch Open-Cut	88	-	N	67	54	122	N	N	\$61,600	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact (0.11 ac) to a PFO wetland. Avoiding/minimizing these minor impacts through a conventional bore would require an excessively deep bore pit exceeding 50 feet on the edge of a very steep slope, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to a residence, and a trenchless crossing of this location would increase the duration of the crossing from 4 to 35 days -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable with any crossing method. Using a conventional bore crossing method to avoid/minimize a portion of the impact to this PFO would be unreasonably expensive.
			Conventional Bore	88	52	N	67	54	122	N	N	\$3,086,106		
Norfolk	I-018	S-II2	Dry-Ditch Open-Cut	98	-	N	13	3	0	N	Y	\$278,804	Dry-Ditch Open-Cut	Little Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. The open cut method also reduces the construction duration near a private drinking water wells on the property.
			Conventional Bore	98	20	N	13	3	0	N	Y	\$460,816		
Norfolk	I-019	S-CD1, W-CD1	Dry-Ditch Open-Cut	110	-	N	22	12	0	N	Y	\$89,800	Dry-Ditch Open-Cut	This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly four times longer to long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents.
			Conventional Bore	110	18	N	22	12	0	N	Y	\$394,390		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-020	S-KL35, W-EF48	Dry-Ditch Open-Cut	72	-	N	32	14	106	N	N	\$62,773	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	72	16	N	32	14	106	N	N	\$277,412		
Norfolk	I-021	S-KL36	Dry-Ditch Open-Cut	39	-	N	34	18	32	N	Y	\$55,130	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	39	17	N	34	18	32	N	Y	\$188,326		
Norfolk	I-022	S-KL38	Dry-Ditch Open-Cut	200	-	N	54	24	0	N	Y	\$165,254	Dry-Ditch Open-Cut	The pipeline has already been installed under an adjacent road (Hwy. 220). There is no feasible way to tie the two sections of pipe together if a trenchless method is used to install this crossing. Furthermore, avoiding this temporary impact to this small UNT to the Blackwater River with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	200	35	N	54	24	0	N	Y	\$1,207,025		
Norfolk	I-023	S-KL39	Dry-Ditch Open-Cut	98	-	N	40	31	85	N	N	\$92,713	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (seven-foot wide) UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open cut method would reduce the construction duration near private drinking water wells on the property. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	98	32	N	40	31	85	N	N	\$862,742		
Norfolk	I-024	S-YZ5	Dry-Ditch Open-Cut	40	-	N	31	19	0	N	Y	\$43,080	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	40	28	N	31	19	0	N	Y	\$369,291		
Norfolk	I-025	S-YZ4	Dry-Ditch Open-Cut	32	-	N	37	28	52	N	N	\$33,182	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take longer to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	32	22	N	37	28	52	N	N	\$291,779		
Norfolk	I-026	S-EF48, W-EF51	Dry-Ditch Open-Cut	42	-	N	32	29	0	N	Y	\$36,404	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (two-foot wide) intermittent UNT to Blackwater River and an adjacent PEM wetland (0.01 ac). Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	42	28	N	32	29	0	N	Y	\$374,967		
Norfolk	I-027	S-KL41	Dry-Ditch Open-Cut	48	-	N	41	32	83	N	N	\$75,690	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 8 to 33 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	48	33	N	41	32	83	N	N	\$739,113		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-028	S-C8	Dry-Ditch Open-Cut	44	-	N	32	23	31	N	N	\$48,854	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-foot wide) intermittent UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 5 to 11 days. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	44	28	N	32	23	31	N	N	\$380,643		
Norfolk	I-029	S-KL51	Dry-Ditch Open-Cut	45	-	N	36	27	105	N	N	\$50,762	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (six-foot wide) stream. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	45	24	N	36	27	105	N	N	\$346,942		
Norfolk	I-030	S-KL52	Dry-Ditch Open-Cut	59	-	N	23	18	0	N	Y	\$45,967	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (one-foot wide) stream. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and a bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open-cut method would reduce the construction duration near private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	59	23	N	23	18	0	N	Y	\$377,539		
Norfolk	I-031	S-KL54	Dry-Ditch Open-Cut	32	-	N	29	21	0	N	Y	\$57,639	Dry-Ditch Open-Cut	The open-cut method would result in a temporary impact to a small (one-foot wide) stream. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit that is nearly 20 feet deep, potentially requiring the excavation of an interim ramp and a bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to a residence, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open-cut method would reduce the construction duration near private drinking water wells on the property.
			Conventional Bore	32	20	N	29	21	0	N	Y	\$273,509		
Norfolk	I-032	S-F8	Dry-Ditch Open-Cut	206	-	N	32	26	0	N	Y	\$257,327	Dry-Ditch Open-Cut	The pipeline has already been installed under an adjacent road (Rt. 122). There is no feasible way to tie the two sections of pipe together if a trenchless method is used to install this crossing. If a trenchless crossing were attempted, it would require a bore pit depth exceeding 40 feet, which would require the excavation of an interim ramp and bench and dramatically increase the space occupied by the bore pit and spoil pile. Lastly, avoiding this temporary impact to this small UNT to the Maggodee Creek with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	206	41	N	32	26	0	N	Y	\$2,820,988		
Norfolk	I-033	S-HH4	Dry-Ditch Open-Cut	63	-	N	29	18	20	N	N	\$77,464	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an intermittent UNT to Maggodee Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take 17 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	63	32	N	29	18	20	N	N	\$763,413		
Norfolk	I-034	S-C20	Dry-Ditch Open-Cut	52	-	N	20	13	0	N	Y	\$50,437	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	52	17	N	20	13	0	N	Y	\$225,220		
Norfolk	I-035	S-C19	Dry-Ditch Open-Cut	100	-	N	49	41	234	N	N	\$227,598	Dry-Ditch Open-Cut	The open-cut method would result in a temporary impact to Maggodee Creek. Avoiding/minimizing this minor impact through a conventional bore would require an excessively deep bore pit of greater than 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take 34 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a microtunnel crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Microtunnel	100	46	N	49	41	234	N	N	\$3,509,091		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-036	S-F11	Dry-Ditch Open-Cut	139	-	N	56	40	100	N	N	\$415,926	Dry-Ditch Open-Cut	The Blackwater River's banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. A trenchless crossing at this location also faces significant constructability constraints. The bore pits for this crossing would be just short of 40-feet deep. Site conditions do not allow sufficient space to stockpile spoils from bore pits of that size.
			Conventional Bore	139	39	N	56	40	100	N	N	\$1,106,985		
Norfolk	I-037	S-F9b	Dry-Ditch Open-Cut	56	-	N	37	30	62	N	N	\$92,048	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take 16 days to complete --compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	56	31	N	37	30	62	N	N	\$725,278		
Norfolk	I-038	S-F10	Dry-Ditch Open-Cut	47	-	N	16	9	0	N	Y	\$72,699	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	47	16	N	16	9	0	N	Y	\$206,463		
Norfolk	I-039	S-F9a	Dry-Ditch Open-Cut	66	-	N	20	12	0	N	Y	\$98,700	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	66	20	N	20	12	0	N	Y	\$370,001		
Norfolk	I-040	S-GG4	Dry-Ditch Open-Cut	53	-	N	18	13	0	N	Y	\$56,010	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	53	17	N	18	13	0	N	Y	\$228,058		
Norfolk	I-041	S-A36	Dry-Ditch Open-Cut	51	-	N	21	10	0	N	Y	\$49,896	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-feet wide) UNT to Foul Ground Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	51	22	N	21	10	0	N	Y	\$345,700		
Norfolk	I-042	S-A38	Dry-Ditch Open-Cut	78	-	N	20	16	0	N	Y	\$92,243	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	78	20	N	20	16	0	N	Y	\$404,056		
Norfolk	I-043A	S-A41	Dry-Ditch Open-Cut	114	-	N	14	10	0	N	Y	\$121,800	Dry-Ditch Open-Cut	Foul Ground Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. Lastly, it would be unreasonably expensive to use a trenchless crossing to avoid only a fraction of the aquatic impact to this resource.
			Conventional Bore	114	17	N	14	10	0	N	Y	\$401,175		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-043B	W-DD1	Dry-Ditch Open-Cut	110	-	N	14	7	0	N	Y	\$77,000	Dry-Ditch Open-Cut	The open cut method would result in a small (0.05 ac) temporary impact to PEM wetland. The open cut method would reduce construction time for this crossing by 11 days. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	110	18	N	14	7	0	N	Y	\$394,390		
Norfolk	I-044A	S-GH36, S-KL17	Dry-Ditch Open-Cut	103	-	N	21	9	0	N	Y	\$89,600	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	103	19	N	21	9	0	N	Y	\$379,092		
Norfolk	I-044B	S-GH39	Dry-Ditch Open-Cut	61	-	N	27	23	0	N	Y	\$56,700	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) intermittent UNT to Foul Ground Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 8 to 25 days. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	61	26	N	27	23	0	N	Y	\$410,619		
Norfolk	I-045	S-GH40	Dry-Ditch Open-Cut	57	-	N	17	13	0	N	Y	\$50,751	Dry-Ditch Open-Cut	The open-cut method would result in a temporary impact to a small (three-foot wide) UNT to Foul Ground Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would double the duration of the crossing. The open-cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	57	22	N	17	13	0	N	Y	\$362,728		
Norfolk	I-046	S-GH44, S-GH38, S-IJ47, W-GH16	Dry-Ditch Open-Cut	217	-	N	11	7	0	N	Y	\$181,597	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	217	20	N	11	7	0	N	Y	\$798,536		
Norfolk	I-047	S-G22	Dry-Ditch Open-Cut	48	-	N	50	38	87	N	N	\$76,133	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Poplar Camp Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 40 feet on the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 44 days. The open cut method would reduce the construction duration near two private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	48	37	N	50	38	87	N	N	\$812,190		
Norfolk	I-048	S-G20	Dry-Ditch Open-Cut	62	-	N	39	18	93	N	N	\$81,267	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	62	15	N	39	18	93	N	N	\$244,465		
Norfolk	I-049	S-G18	Dry-Ditch Open-Cut	37	-	N	35	18	10	N	N	\$33,422	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (two-foot wide) intermittent UNT to the Blackwater River. The open cut method would reduce by half the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	37	19	N	35	18	10	N	N	\$191,785		

Table 15. Crossing Method Determination Summary (revised 5/11/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-050	S-E18	Dry-Ditch Open-Cut	38	-	N	27	18	0	N	Y	\$54,216	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (eight-feet wide) UNT to Blackwater River. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	21	N	27	18	0	N	Y	\$299,672		
Norfolk	I-051	S-E17	Dry-Ditch Open-Cut	77	-	N	35	16	32	N	Y	\$88,594	Dry-Ditch Open-Cut	The open-cut method would result in a temporary impact to a UNT to the Blackwater River. This crossing is in proximity to a residence, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open-cut method would reduce the construction duration near a private drinking water well on the property.
			Conventional Bore	77	16	N	35	16	32	N	Y	\$291,602		
Norfolk	I-052	S-E14	Dry-Ditch Open-Cut	60	-	N	25	18	0	N	Y	\$117,336	Dry-Ditch Open-Cut	The open-cut method would result in a temporary impact to a UNT to the Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to a residence, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property.
			Conventional Bore	60	25	N	25	18	0	N	Y	\$398,646		
Norfolk	I-053	S-H38, W-H17	Dry-Ditch Open-Cut	169	-	N	18	6	0	N	Y	\$164,668	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	169	22	N	18	6	0	N	Y	\$680,582		
Norfolk	I-054	S-H37	Dry-Ditch Open-Cut	35	-	N	47	23	31	N	N	\$45,685	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-feet wide) UNT to Jacks Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet on the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take 15 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	35	33	N	47	23	31	N	N	\$702,219		
Norfolk	I-055	S-H36, W-H16	Dry-Ditch Open-Cut	84	-	N	31	25	10	N	N	\$168,404	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	84	30	N	31	25	10	N	N	\$786,472		
Norfolk	I-056	S-H34	Dry-Ditch Open-Cut	32	-	N	40	24	32	N	N	\$33,003	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	32	24	N	40	24	32	N	N	\$310,048		
Norfolk	I-057	S-H32	Dry-Ditch Open-Cut	46	-	N	38	29	74	N	N	\$68,296	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	46	26	N	38	29	74	N	N	\$368,049		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-058	W-H11	Dry-Ditch Open-Cut	83	-	N	32	18	0	N	Y	\$58,100	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact to a PEM wetland. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take 17 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	83	30	N	32	18	0	N	Y	\$783,634		
Norfolk	I-059	S-A18	Dry-Ditch Open-Cut	92	-	N	26	17	0	N	Y	\$80,003	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (four-feet wide) intermittent UNT to Jacks Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to a residence, and a trenchless crossing of this location would take 13 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	92	24	N	26	17	0	N	Y	\$480,327		
Norfolk	I-060A	S-A19/H26	Dry-Ditch Open-Cut	93	-	N	39	28	52	N	Y	\$149,100	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an intermittent UNT to Jacks Creek. Avoiding/minimizing this minor impact through a conventional bore would require an excessively deep bore pit of greater than 40 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	93	41	N	39	28	52	N	Y	\$2,500,296		
Norfolk	I-060B	S-A20	Dry-Ditch Open-Cut	82	-	N	39	23	0	N	Y	\$81,900	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	82	39	N	39	23	0	N	Y	\$945,220		
Norfolk	I-061A	S-A22	Dry-Ditch Open-Cut	52	-	N	27	18	0	N	Y	\$67,900	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	52	16	N	27	18	0	N	Y	\$220,653		
Norfolk	I-061B	S-H27	Dry-Ditch Open-Cut	60	-	N	28	14	0	N	Y	\$77,000	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Jacks Creek. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	60	29	N	28	14	0	N	Y	\$435,185		
Norfolk	I-062	S-MM44	Dry-Ditch Open-Cut	54	-	N	36	24	0	N	Y	\$54,544	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	54	36	N	36	24	0	N	Y	\$810,949		
Norfolk	I-063	S-MM48	Dry-Ditch Open-Cut	83	-	N	29	18	0	N	Y	\$91,845	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	83	29	N	29	18	0	N	Y	\$500,459		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-064	S-H25, W-H9	Dry-Ditch Open-Cut	31	-	N	40	21	31	N	N	\$53,320	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	31	26	N	40	21	31	N	N	\$325,479		
Norfolk	I-065	S-H24	Dry-Ditch Open-Cut	79	-	N	31	21	0	N	Y	\$216,378	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	79	28	N	31	21	0	N	Y	\$479,972		
Norfolk	I-066	S-H23	Dry-Ditch Open-Cut	45	-	N	30	23	0	N	Y	\$49,679	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (five-foot wide) intermittent UNT to Turkey Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	45	27	N	30	23	0	N	Y	\$374,346		
Norfolk	I-067	S-A13	Dry-Ditch Open-Cut	54	-	N	21	16	0	N	Y	\$81,560	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	54	20	N	21	16	0	N	Y	\$335,945		
Norfolk	I-069A	S-A7	Dry-Ditch Open-Cut	61	-	N	23	10	0	N	Y	\$74,200	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	61	19	N	23	10	0	N	Y	\$259,897		
Norfolk	I-069B	S-H17	Dry-Ditch Open-Cut	90	-	N	27	20	0	N	Y	\$86,898	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (seven-foot wide) intermittent Dinner Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearing 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to a residence, and a trenchless crossing of this location would take 22 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	90	28	N	27	20	0	N	Y	\$511,190		
Norfolk	I-070	S-SS8	Dry-Ditch Open-Cut	51	-	N	31	24	0	N	Y	\$77,803	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	51	26	N	31	24	0	N	Y	\$382,239		
Norfolk	I-071	S-CD8	Dry-Ditch Open-Cut	38	-	N	27	24	0	N	Y	\$43,598	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-foot wide) intermittent UNT to Owens Creek. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	27	N	27	24	0	N	Y	\$354,480		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-072	S-AB8	Dry-Ditch Open-Cut	44	-	N	35	24	11	N	N	\$49,580	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-foot wide) intermittent UNT to Owens Creek. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit exceeding 30 feet on the edge of a short but steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	44	34	N	35	24	11	N	N	\$746,030		
Norfolk	I-073	S-DD3	Dry-Ditch Open-Cut	81	-	N	10	8	91	N	Y	\$121,514	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	81	16	N	10	8	91	N	Y	\$302,954		
Norfolk	I-074	S-G16	Dry-Ditch Open-Cut	53	-	N	34	23	0	N	Y	\$142,157	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	53	31	N	34	23	0	N	Y	\$716,764		
Norfolk	I-075	S-G15	Dry-Ditch Open-Cut	54	-	N	31	20	10	N	Y	\$72,205	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small intermittent UNT to Parrott Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet on the edge of a short but steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would more than double the duration of the crossing. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	54	33	N	31	20	10	N	Y	\$756,141		
Norfolk	I-076	S-G13	Dry-Ditch Open-Cut	42	-	N	57	36	107	N	N	\$57,417	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	42	26	N	57	36	107	N	N	\$356,697		
Norfolk	I-077	S-D7, W-MM17	Dry-Ditch Open-Cut	39	-	N	36	20	21	N	N	\$57,474	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (nine-foot wide) intermittent UNT to Jonnikin Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet on the edge of a short but steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	39	25	N	36	20	21	N	N	\$339,049		
Norfolk	I-078	S-D3	Dry-Ditch Open-Cut	43	-	N	28	16	0	N	Y	\$65,776	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	43	16	N	28	16	0	N	Y	\$195,111		
Norfolk	I-079	S-D4	Dry-Ditch Open-Cut	62	-	N	35	20	10	N	N	\$73,648	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (six-foot wide) intermittent UNT to Jonnikin Creek. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 40 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	62	38	N	35	20	10	N	N	\$870,191		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-080	S-D2, W-D3	Dry-Ditch Open-Cut	54	-	N	41	21	96	N	N	\$102,144	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	54	19	N	41	21	96	N	N	\$240,031		
Norfolk	I-081	S-D1-EPH	Dry-Ditch Open-Cut	82	-	N	28	19	0	N	Y	\$95,632	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. It would be unreasonably expensive to use a trenchless crossing to avoid only a fraction of the aquatic impact to this UNT to Jonnikin Creek.
			Conventional Bore	82	29	N	28	19	0	N	Y	\$497,621		
Norfolk	I-082	S-G11	Dry-Ditch Open-Cut	55	-	N	35	16	0	N	Y	\$59,983	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-foot wide) intermittent UNT to Jonnikin Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	55	33	N	35	16	0	N	Y	\$758,979		
Norfolk	I-083	S-G9, W-B5	Dry-Ditch Open-Cut	44	-	N	24	14	10	N	N	\$45,226	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (four-foot wide) intermittent UNT to Jonnikin Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet on the edge of a short slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing by one week. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	44	20	N	24	14	10	N	N	\$307,565		
Norfolk	I-084A	S-G8	Dry-Ditch Open-Cut	41	-	N	24	16	0	N	Y	\$42,700	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (four-foot wide) intermittent UNT to Jonnikin Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 5 to 17 days. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	41	21	N	24	16	0	N	Y	\$308,186		
Norfolk	I-084B	S-Q15	Dry-Ditch Open-Cut	48	-	N	26	22	0	N	Y	\$54,600	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-foot wide) UNT to Jonnikin Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 5 to 17 days. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	48	25	N	26	22	0	N	Y	\$364,590		
Norfolk	I-085	S-A6	Dry-Ditch Open-Cut	44	-	N	28	21	0	N	Y	\$51,308	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	44	22	N	28	21	0	N	Y	\$325,834		
Norfolk	I-086	S-C7	Dry-Ditch Open-Cut	65	-	N	42	19	96	N	N	\$115,499	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	65	19	N	42	19	96	N	N	\$271,248		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-087	S-C4, S-C3	Dry-Ditch Open-Cut	126	-	N	34	27	115	N	N	\$153,189	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	126	27	N	34	27	115	N	N	\$604,222		
Norfolk	I-088	S-H13, W-H5	Dry-Ditch Open-Cut	173	-	N	33	25	21	N	N	\$191,262	Dry-Ditch Open-Cut	The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. Lastly, it would be unreasonably expensive to use a trenchless crossing to avoid only a fraction of the aquatic impact to this UNT to Little Cherrystone Creek and adjacent wetland.
			Conventional Bore	173	35	N	33	25	21	N	N	\$1,130,399		
Norfolk	I-089	S-G6	Dry-Ditch Open-Cut	60	-	N	30	23	0	N	Y	\$63,951	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-foot wide) UNT to Harpen Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would more than double the duration of the crossing. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	60	34	N	30	23	0	N	Y	\$791,438		
Norfolk	I-090	S-G5	Dry-Ditch Open-Cut	50	-	N	26	17	0	N	Y	\$56,003	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-foot wide) UNT to Harpen Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 10 days. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	50	26	N	26	17	0	N	Y	\$379,401		
Norfolk	I-091	S-G4	Dry-Ditch Open-Cut	74	-	N	30	18	0	N	Y	\$167,471	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	74	32	N	30	18	0	N	Y	\$794,631		
Norfolk	I-092	S-G3	Dry-Ditch Open-Cut	39	-	N	31	17	0	N	Y	\$61,935	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	39	20	N	31	17	0	N	Y	\$293,375		
Norfolk	I-093	S-CC16	Dry-Ditch Open-Cut	52	-	N	18	11	0	N	Y	\$75,678	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	52	16	N	18	11	0	N	Y	\$220,653		
Norfolk	I-094	S-CC13, S-CC14	Dry-Ditch Open-Cut	110	-	N	25	18	0	N	Y	\$105,108	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	110	23	N	25	18	0	N	Y	\$522,276		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-095	S-MM8, W-MM5	Dry-Ditch Open-Cut	39	-	N	20	14	0	N	Y	\$48,302	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	39	19	N	20	14	0	N	Y	\$197,461		
Norfolk	I-096	S-CC15	Dry-Ditch Open-Cut	33	-	N	18	14	0	N	Y	\$45,144	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	33	18	N	18	14	0	N	Y	\$175,866		
Norfolk	I-097	S-CC8, S-CC5	Dry-Ditch Open-Cut	78	-	N	32	11	10	N	N	\$128,994	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	78	14	N	32	11	10	N	N	\$285,306		
Norfolk	I-098	S-CC9	Dry-Ditch Open-Cut	42	-	N	45	26	21	N	N	\$48,685	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-foot wide) UNT to Cherrystone Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 10 days. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	42	35	N	45	26	21	N	N	\$758,623		
Norfolk	I-099	S-CC10	Dry-Ditch Open-Cut	38	-	N	38	20	21	N	N	\$58,726	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (nine-foot wide) intermittent UNT to Cherrystone Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 10 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	32	N	38	20	21	N	N	\$692,463		
Norfolk	I-100	S-CC11	Dry-Ditch Open-Cut	42	-	N	44	19	0	N	Y	\$60,039	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (nine-foot wide) UNT to Cherrystone Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet on the edge of a short but steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 10 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	42	27	N	44	19	0	N	Y	\$365,832		
Norfolk	I-101A	W-MM9	Dry-Ditch Open-Cut	35	-	N	44	26	52	N	N	\$83,561	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	35	18	N	44	26	52	N	N	\$181,542		
Norfolk	I-101B	W-MM8-PFO, W-MM8-PEM, S-CC1	Dry-Ditch Open-Cut	161	-	N	20	8	32	N	Y	\$172,200	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small intermittent UNT to Cherrystone Creek and two adjacent wetland features (PEM and PFO). Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 40 feet , thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 60 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable with any crossing method. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	161	38	N	20	8	32	N	Y	\$1,151,152		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-102	S-CC3	Dry-Ditch Open-Cut	38	-	N	40	21	0	N	Y	\$56,288	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (eight-foot wide) UNT to Cherrystone Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet on the edge, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 10 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	30	N	40	21	0	N	Y	\$655,925		
Norfolk	I-103	S-P5	Dry-Ditch Open-Cut	47	-	N	12	10	0	N	Y	\$56,790	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	47	11	N	12	10	0	N	Y	\$183,626		
Norfolk	I-104	S-IJ35-EPH	Dry-Ditch Open-Cut	32	-	N	23	16	0	N	Y	\$36,895	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (five-foot wide) UNT to Pole Bridge Branch. Avoiding/minimizing this minor impact through a conventional bore would increase the duration of the crossing from 4 to 11 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	32	23	N	23	16	0	N	Y	\$300,913		
Norfolk	I-105	S-Q4	Dry-Ditch Open-Cut	48	-	N	22	7	0	N	Y	\$56,601	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	48	19	N	22	7	0	N	Y	\$223,003		
Norfolk	I-106A	S-Q2	Dry-Ditch Open-Cut	51	-	N	17	15	0	N	Y	\$123,204	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	51	16	N	17	15	0	N	Y	\$217,815		
Norfolk	I-106B	W-Q2, S-Q3	Dry-Ditch Open-Cut	319	-	N	17	6	0	N	Y	\$253,621	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a site-specific solution. A bore pit depth exceeding 20 feet at this location requires the excavation of an interim ramp and bench and dramatically increases the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to the waterbody increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. The open cut method also reduces the construction duration near private drinking water wells on the property. Attempting a conventional bore would extend the duration of this crossing from 5 days for an open cut to 60 days for a guided conventional bore -- which also would increase the total greenhouse gas emissions associated with this crossing by 15 times. Furthermore, the other significant environmental impacts associated with a trenchless crossing method at this location outweigh the minimized temporary impact to Pole Bridge Branch.
			Guided Conventional Bore	319	26	N	17	6	0	N	Y	\$711,028		
Norfolk	I-107	W-Q1	Dry-Ditch Open-Cut	55	-	N	10	8	0	N	Y	\$38,500	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact to a PEM wetland. Avoiding/minimizing this minor impact through a conventional bore would increase the duration of the crossing from 4 to 43 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	55	16	N	10	8	0	N	Y	\$229,167		
Norfolk	I-108	S-B6	Dry-Ditch Open-Cut	55	-	N	42	19	0	N	Y	\$80,024	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (five-foot wide) intermittent UNT to Pole Bridge Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 40 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 11 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	55	36	N	42	19	0	N	Y	\$813,787		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-109	S-B8	Dry-Ditch Open-Cut	43	-	N	31	16	0	N	Y	\$46,214	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (five-foot wide) intermittent UNT to Pole Bridge Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 44 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	43	29	N	31	16	0	N	Y	\$386,939		
Norfolk	I-110	S-B9	Dry-Ditch Open-Cut	41	-	N	19	13	0	N	Y	\$53,226	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (seven-foot wide) UNT to Pole Bridge Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	41	22	N	19	13	0	N	Y	\$317,320		
Norfolk	I-111	S-DD4	Dry-Ditch Open-Cut	230	-	N	9	5	0	N	Y	\$213,500	Dry-Ditch Open-Cut	The pipeline has already been installed under an adjacent railroad. There is no feasible way to tie the two sections of pipe together if a trenchless method is used to install this crossing. Furthermore, the railroad bore encountered difficult conditions, which indicates that completing another crossing at this location has a higher degree of potential failure.
			Conventional Bore	230	17	N	9	5	0	N	Y	\$730,381		
Norfolk	I-111A	S-DD4	Dry-Ditch Open-Cut	33	-	N	23	13	0	N	Y	\$75,600	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	33	15	N	23	13	0	N	Y	\$162,164		
Norfolk	I-112	S-KL27	Dry-Ditch Open-Cut	33	-	N	12	7	0	N	Y	\$27,032	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (one-foot wide) UNT to Mill Creek. It also would double the duration of the crossing. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	33	15	N	12	7	0	N	Y	\$162,164		
Norfolk	I-113	S-C1	Dry-Ditch Open-Cut	61	-	N	38	11	0	N	Y	\$64,849	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small intermittent Mill Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet with an excavator operating from a bench within the pit, at the edge of short but steep slope, and nearly triple the duration of the crossing. It also would require the excavation of an interim ramp and bench, thereby dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	61	31	N	38	11	0	N	Y	\$739,468		
Norfolk	I-114	S-G2, W-G2	Dry-Ditch Open-Cut	122	-	N	35	16	11	N	Y	\$111,010	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	122	21	N	35	16	11	N	Y	\$538,062		
Norfolk	I-115	S-B2	Dry-Ditch Open-Cut	40	-	N	21	12	0	N	Y	\$46,015	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	40	18	N	21	12	0	N	Y	\$195,732		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-116	S-H55	Dry-Ditch Open-Cut	40	-	N	13	8	0	N	Y	\$38,950	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	40	16	N	13	8	0	N	Y	\$186,597		
Norfolk	I-117	S-H54	Dry-Ditch Open-Cut	56	-	N	15	9	0	N	Y	\$88,685	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	56	16	N	15	9	0	N	Y	\$232,005		
Norfolk	I-118	S-H5, W-H1, W-H2, S-H3, W-H3	Dry-Ditch Open-Cut	835	-	N	22	7	0	N	Y	\$616,507	Dry-Ditch Open-Cut	Due a close cluster of wetlands that would be crossed in one undertaking, this crossing is unusually long at over 800 feet. The direct pipe method would be necessary to cross these features. That crossing would method would extend the duration of this crossing from seven days for an open cut to 99 days for the trenchless method (increasing greenhouse gas emissions associated with the crossing by nearly 1,900%). The open cut method would reduce the construction duration near multiple private drinking water wells on the property. Using a Direct Pipe crossing method to avoid/minimize these minor temporary impacts two a small (6-foot wide) intermittent stream, small (8-foot wide) perennial stream, and two small PEM wetlands would be unreasonably expensive.
			Direct Pipe	835	0	N	22	7	0	N	Y	\$6,680,000		
Norfolk	I-119	S-OO1, W-MM3	Dry-Ditch Open-Cut	59	-	N	35	20	10	N	N	\$58,931	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small intermittent UNT to Little Cherrystone Creek and an adjacent PSS wetland. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, with equipment operating within a bore pit at the edge of short but steep slope, as well as more than quadrupling the duration of the crossing and the relevant greenhouse gas emissions. The open cut method would reduce the construction duration near multiple private drinking water wells on the property. Lastly, using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	59	27	N	35	20	10	N	N	\$414,078		
Norfolk	I-120	S-OO2	Dry-Ditch Open-Cut	37	-	N	40	22	0	N	Y	\$44,417	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small intermittent UNT to Little Cherrystone Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet with an excavator operating from a bench within the pit, at the edge of short but steep slope, and more than double the duration of the crossing. Furthermore, using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	37	31	N	40	22	0	N	Y	\$671,356		
Norfolk	I-121	S-EF26, W-IJ22-PFO, W-IJ22-PEM	Dry-Ditch Open-Cut	405	-	N	18	9	0	N	Y	\$357,812	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	405	19	N	18	9	0	N	Y	\$1,236,163		
Norfolk	I-122	S-H44	Dry-Ditch Open-Cut	68	-	N	10	8	0	N	Y	\$87,003	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	68	17	N	10	8	0	N	Y	\$270,628		
Norfolk	I-123	S-H42	Dry-Ditch Open-Cut	43	-	N	20	8	0	N	Y	\$68,600	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	43	23	N	20	8	0	N	Y	\$332,131		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-124	W-EF6	Dry-Ditch Open-Cut	155	-	N	5	3	30	N	N	\$108,500	Dry-Ditch Open-Cut	To protect the integrity of the pipeline coating, woody vegetation cannot be allowed to grow close to the pipe. In forested wetlands, a 30-foot corridor generally must be maintained free of trees. Accordingly, conversion impacts to this wetland are unavoidable. The conventional bore method also entails significant environmental consequences at this location. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly four weeks to complete --compounding the noise, aesthetic, and other impacts on nearby residents. The longer-duration bore also nearly quadruples the greenhouse gas emissions associated with the crossing.
			Conventional Bore	155	13	N	5	3	30	N	N	\$499,263		



April 15, 2021

Commonwealth of Virginia
Department of Environmental Quality
ATTN: Steve Hardwick
1111 East Main Street, Suite 1400
Richmond, Virginia 23219

Re: Joint Permit Application No. 21-0416
Mountain Valley Pipeline Project, Giles County, Craig County, Montgomery County, Roanoke
County, Franklin County, Pittsylvania County, Virginia
Response to Additional Information Request Letter

Dear Mr. Hardwick:

This letter is in response to the March 16, 2021 "Additional Information Request Letter" provided to Mountain Valley Pipeline LLC (Mountain Valley or MVP) by the Virginia Department of Environmental Quality's (VDEQ). Mountain Valley respectfully submits the following information:

VDEQ Comment No. 1: Please provide revised site plan figures at permanent stream impact locations SIJ16a, SIJ85 and S-H42 to include:

- a. A longitudinal profile of the culvert position and stream bed thalweg, or spot elevations of the stream thalweg at the beginning and end of the culvert, extending to a minimum of 10 feet beyond the limits of the proposed impact;
- b. Proposed structures and grading contours of sufficient detail to evaluate the culvert's interface with the stream at its inlet and outlet, and to illustrate culvert countersinking.

Mountain Valley Response No. 1: As found in Attachment No. 1, revised site plan figures at permanent stream impact locations S-IJ16a and S-H42 are provided to show the longitudinal profiles of the permanent culvert and proposed grading contours. As part of the continued evaluation by the project to minimize and avoid impacts, no permanent impacts will occur in S-IJ85. Since S-IJ85 will not be impacted permanently, it is therefore excluded from this response. A revised figure demonstrating temporary impacts is attached.

VDEQ Comment No. 2: Please provide revised site plan figures at permanent wetland impact locations W-KL58, W-IJ96 PEM, W-IJ97, and W-D4 to include:

- a. Proposed contours and sufficient details to evaluate potential secondary impacts associated with permanent access road crossings.

Mountain Valley Response No. 2: As found in Attachment No. 2, a revised site plan figure at permanent wetland impact location W-KL58 is provided. The site plan demonstrates how the installation of the permanent access road will not cause secondary impacts to the remainder of W-KL58 present outside of the permanent easement.

As part of the continued evaluation by the project to minimize and avoid impacts, both W-IJ97 and W-D4 will be avoided and will have no temporary or permanent impacts and are therefore excluded from this response. Additionally, W-IJ96 is being excluded from this response as this wetland will have no permanent impacts. See attachment 1 for the revised figure (S-IJ85 & W-IJ96) demonstrating temporary impacts.

VDEQ Comment No. 3: Please provide documentation of the preliminary jurisdictional determination from the U.S. Army Corps of Engineers (USACE), or other correspondence from USACE or DEQ indicating approval of the boundary of applicable jurisdictional surface waters.

Mountain Valley Response No. 3: As also provided under separate cover in an email from Todd Miller dated April 8, 2021, the project's Preliminary Jurisdictional Determination can be found in attachment No. 3.

VDEQ Comment No. 4: A permit application fee is required for the proposed activity, and to complete the application. Once the proposed impact information has been determined, DEQ will notify you of the fee amount.

Mountain Valley Response No. 4: Mountain Valley will provide the permit application fee when notice is provided.

VDEQ Comment No. 5: In addition to the above information required to complete the permit application, the following information is necessary to assist in DEQ's review of the application:

- a. Please provide the following tables in a spreadsheet format:
 - Table B-1 Virginia Stream Impacts (*revised 3/1/2021*);
 - Table B-2 Virginia Wetland Impacts (*revised 3/1/2021*);
 - Attachment B-5 Riparian Property Owner Information;
 - Table 15 Crossing Method Determination Summary (*revised 3/1/2021*);
 - Table 17 Compensatory Wetland Mitigation (*revised 3/2/2021*);
 - Table 18 Compensatory Stream Mitigation (*revised 3/2/2021*).
- b. Please provide GIS shape files, or the equivalent, showing the project's overall limits of disturbance and aquatic resource impacts within Virginia.

Mountain Valley Response No. 5: As requested, updated tables in spreadsheet format are provided in Attachment No. 4. GIS shapefiles, also updated to reflect the additional resource avoidance actions noted in this response, have been provided via email distribution.

MVP appreciates the opportunity to provide this additional information and looks forward to continuing to work with the DEQ regarding this Project.

Sincerely,

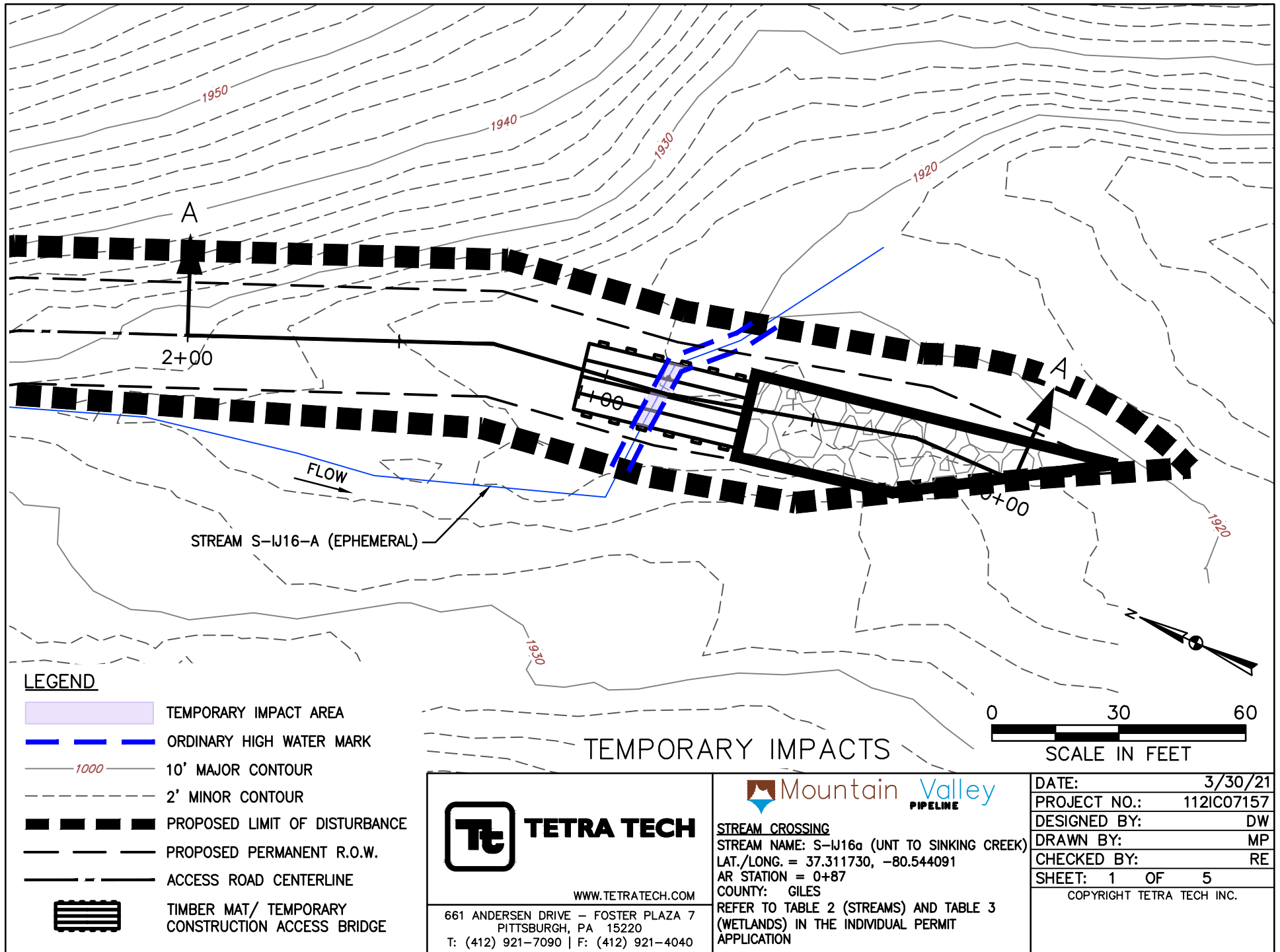


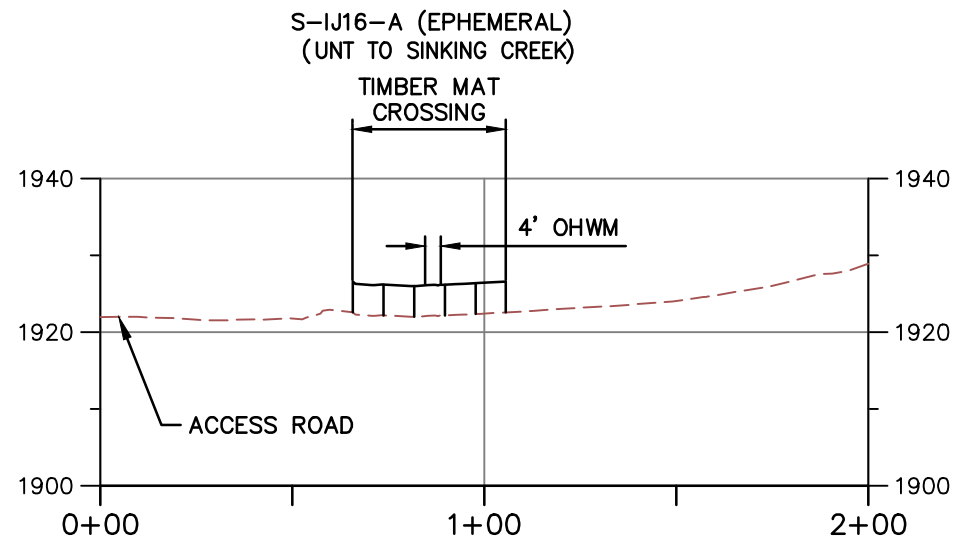
Robert J. Cooper
Senior Vice President, Construction Services
Mountain Valley Pipeline, LLC

cc: Adam Fannin, USACE
Jared Pritts, USACE
Vinny Pero, USACE

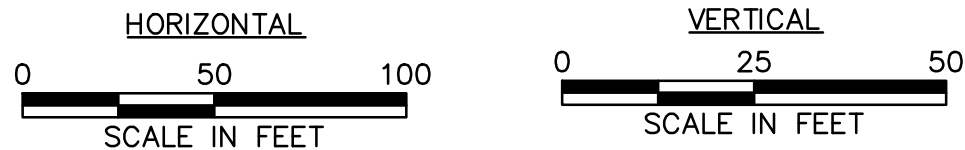
ATTACHMENT 1

Site Plan S-IJ16-a
Site Plan S-IJ85
Site Plan S-H42





PROFILE A-A



TEMPORARY IMPACTS

NOTE:

1. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
2. EXISTING GRADE SHOWN IN PROFILE A-A BASED ON SAME LIDAR CONTOURS AS SHOWN ON SHEET 1 AND CORRESPONDING ESC PLAN.



TETRA TECH

WWW.TETRATECH.COM

661 ANDERSEN DRIVE - FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040



STREAM CROSSING

STREAM NAME: S-IJ16a (UNT TO SINKING CREEK)

LAT./LONG. = 37.311730, -80.544091

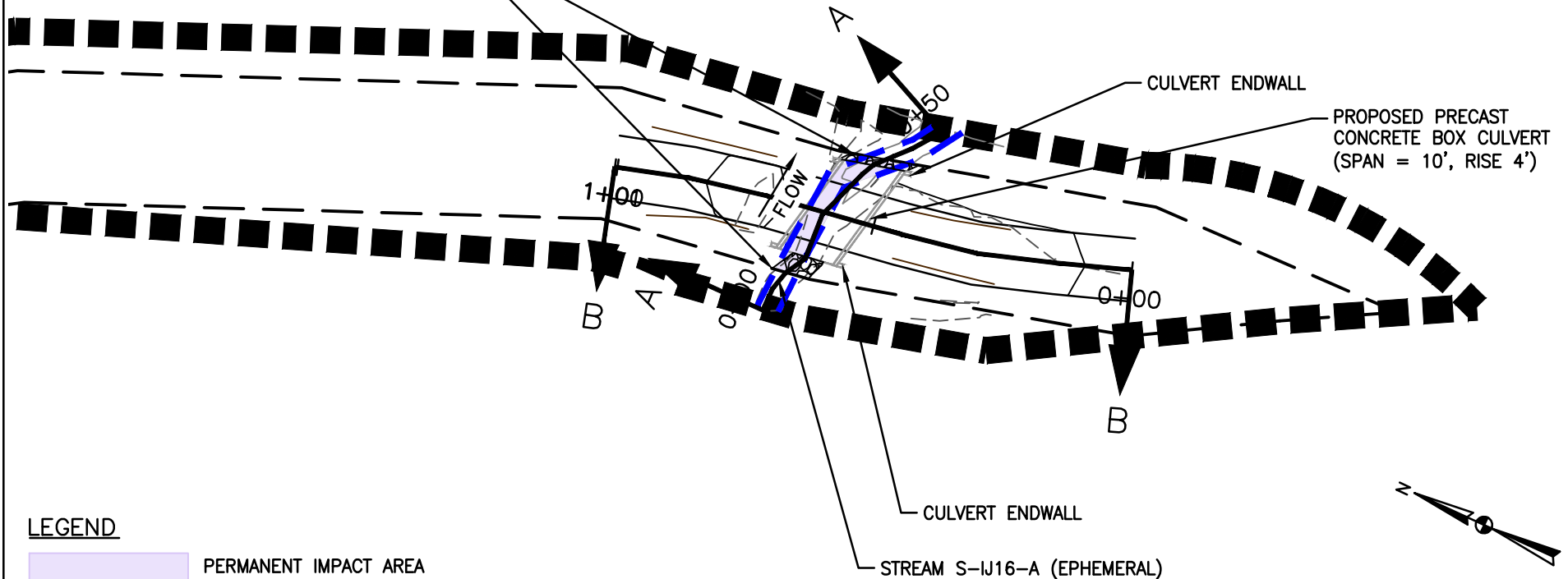
AR STATION = 0+87

COUNTY: GILES

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	3/30/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	MP
CHECKED BY:	RE
SHEET: 2 OF 5	
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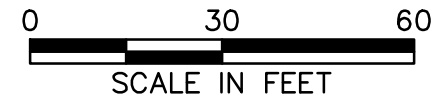
VDOT CLASS II RIPRAP STREAM
BED/BANK PROTECTION, OR
EQUIVALENT SIZE NATIVE MATERIAL



LEGEND

- PERMANENT IMPACT AREA
- ORDINARY HIGH WATER MARK
- EXISTING 10' MAJOR CONTOUR
- EXISTING 2' MINOR CONTOUR
- 10' MAJOR CONTOUR
- 2' MINOR CONTOUR
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED PERMANENT R.O.W.
- PROPOSED BOX CULVERT

PERMANENT IMPACTS



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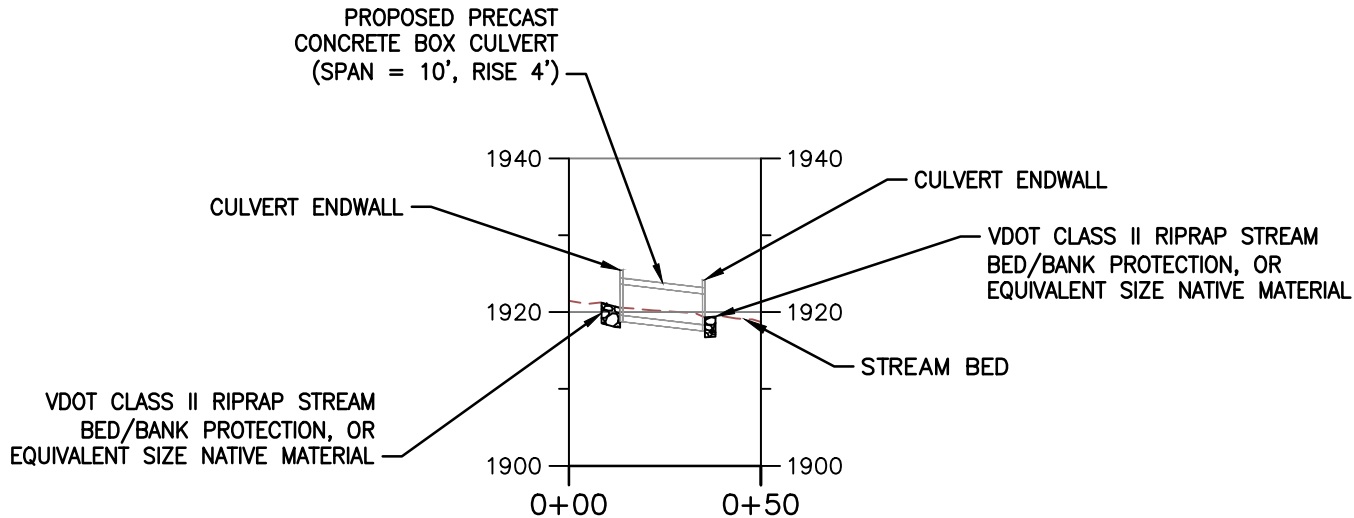
661 ANDERSEN DRIVE - FOSTER PLAZA 7
PITTSBURGH, PA 15220
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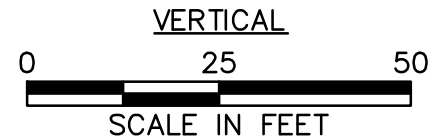
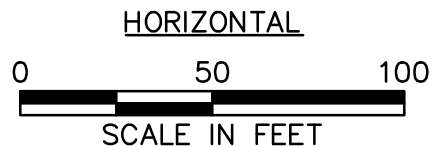
STREAM CROSSING

STREAM NAME: S-IJ16a (UNT TO SINKING CREEK)
LAT./LONG. = 37.311730, -80.544091
AR STATION = 0+87
COUNTY: GILES
REFER TO TABLE 2 (STREAMS) AND TABLE 3
(WETLANDS) IN THE INDIVIDUAL PERMIT
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PROFILE A-A



PERMANENT IMPACTS

NOTE:

1. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
2. EXISTING GRADE SHOWN IN PROFILE A-A BASED ON SURVEY OF STREAM AND OVBANK AREAS AS SHOWN ON SHEET 3, WHICH WAS COMPLETED TO DEVELOP CULVERT DESIGN AND PROPOSED GRADING PLAN.



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STREAM CROSSING

STREAM NAME: S-IJ16a (UNT TO SINKING CREEK)

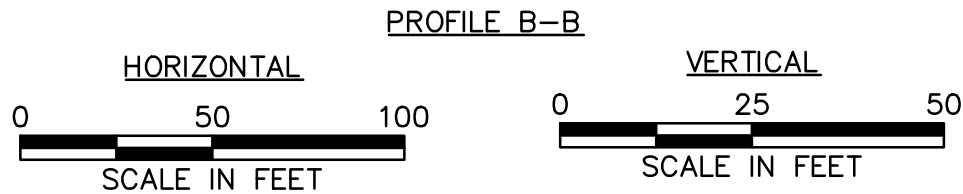
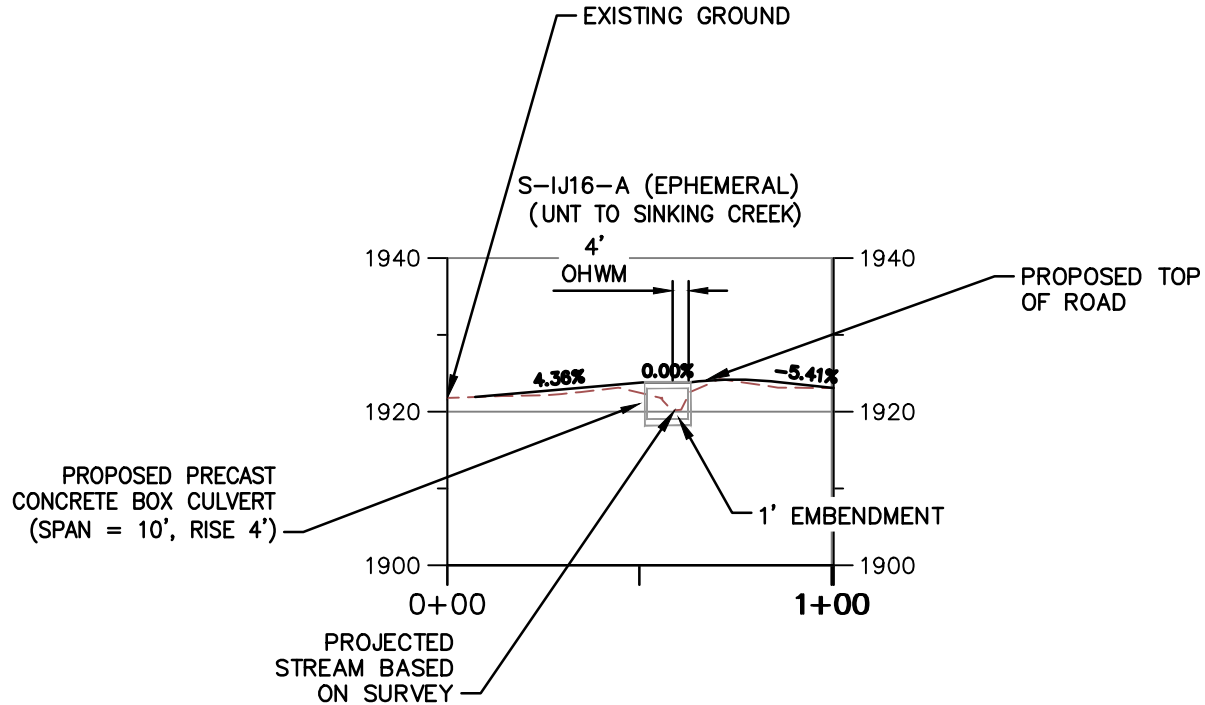
LAT./LONG. = 37.311730, -80.544091

AR STATION = 0+87

COUNTY: GILES

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

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PERMANENT IMPACTS

NOTE:

1. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
2. EXISTING GRADE SHOWN IN PROFILE B-B BASED ON SURVEY OF STREAM AND OVBANK AREAS AS SHOWN ON SHEET 3, WHICH WAS COMPLETED TO DEVELOP CULVERT DESIGN AND PROPOSED GRADING PLAN.



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STREAM CROSSING

STREAM NAME: S-IJ16a (UNT TO SINKING CREEK)

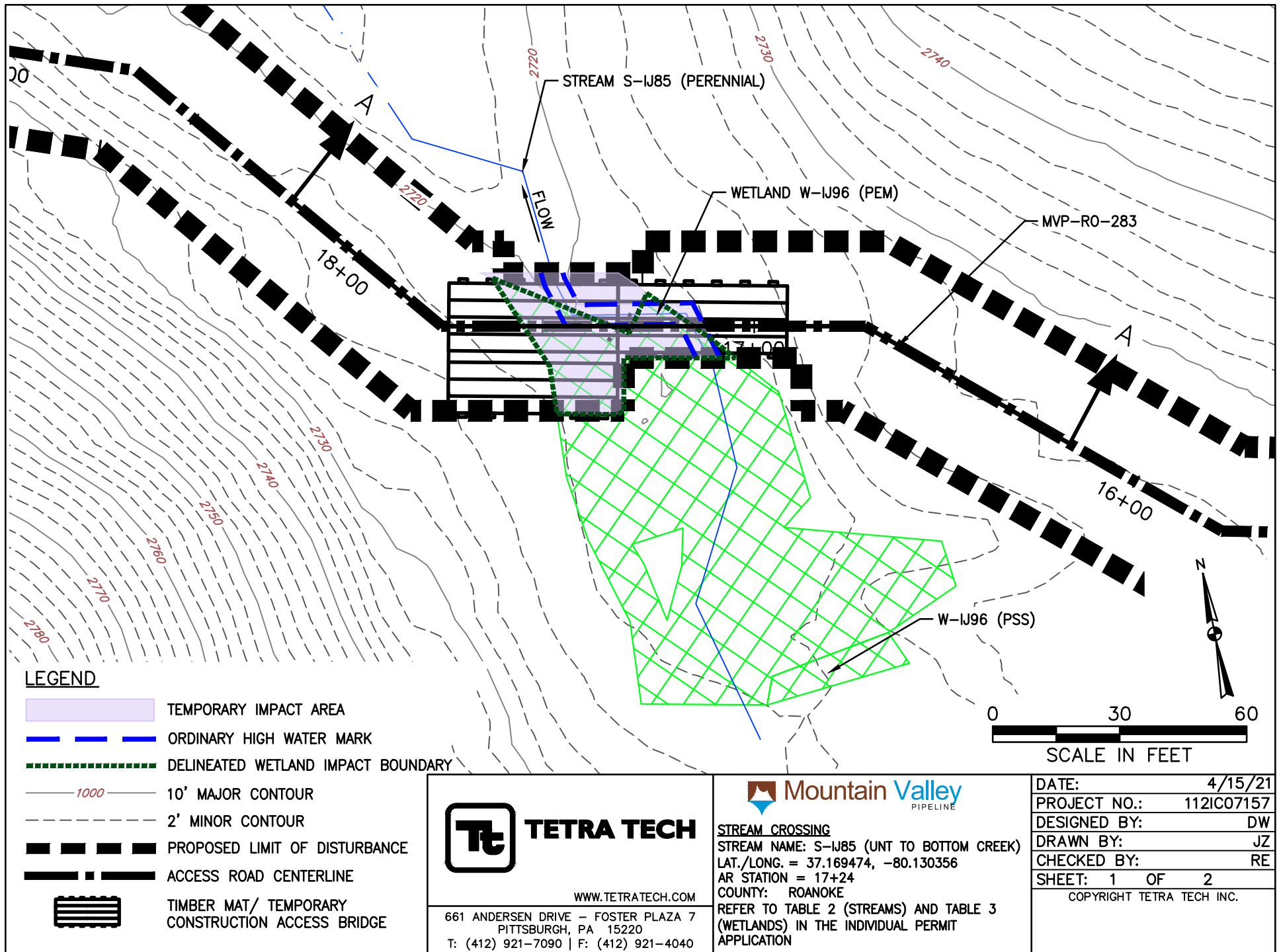
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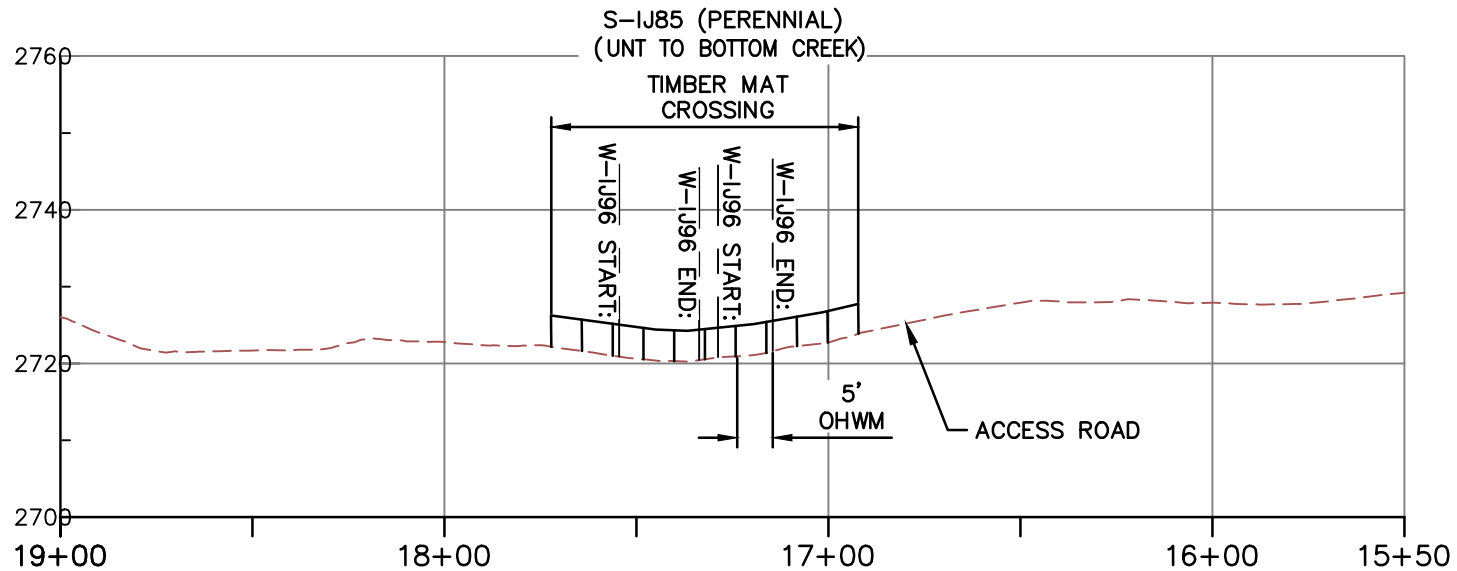
AR STATION = 0+87

COUNTY: GILES

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	3/30/21
PROJECT NO.:	112IC07157
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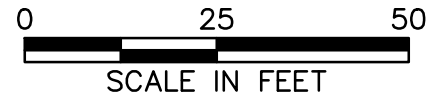


PROFILE A-A

HORIZONTAL



VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.



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STREAM CROSSING

STREAM NAME: S-IJ85 (UNT TO BOTTOM CREEK)

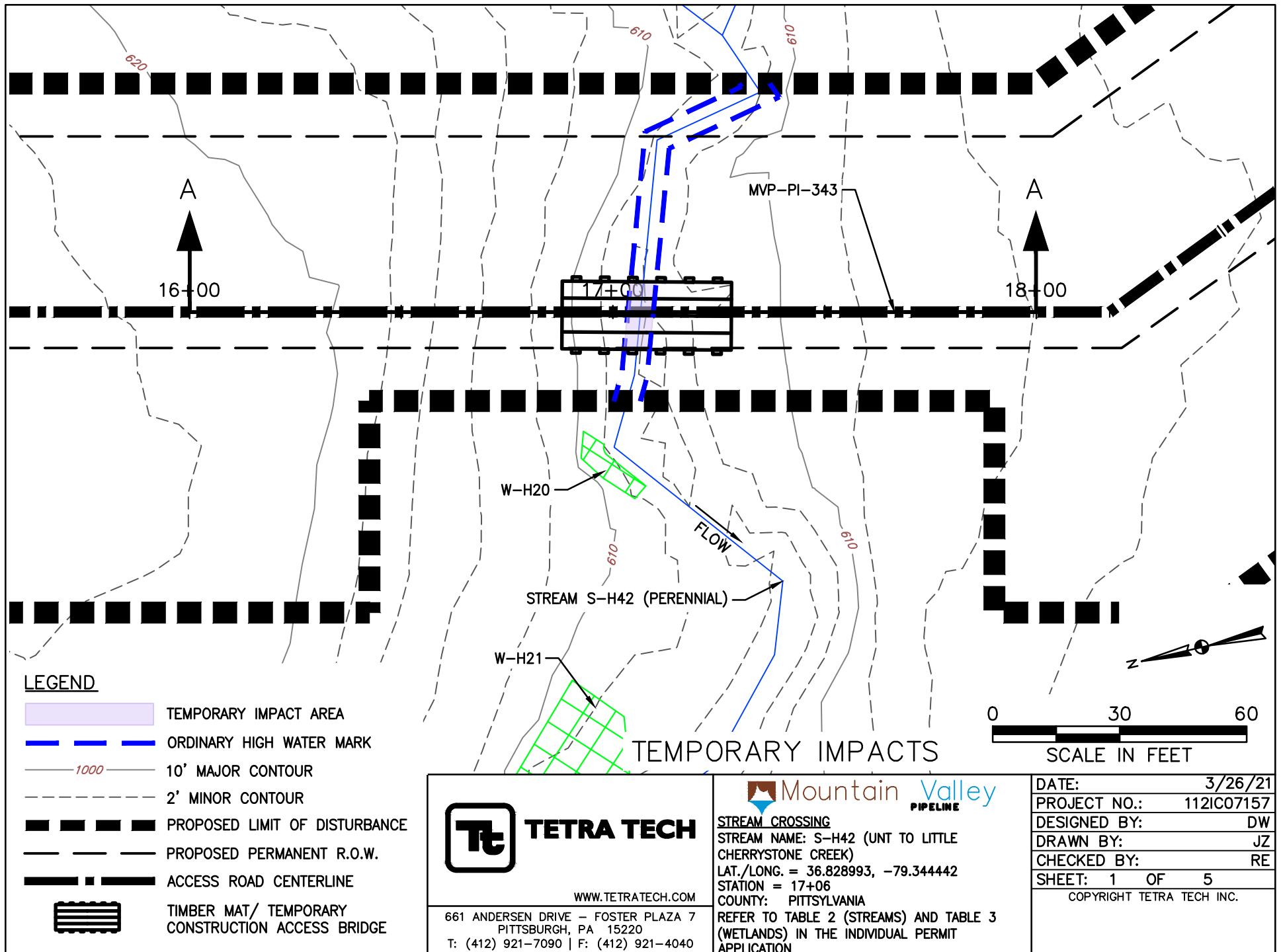
LAT./LONG. = 37.169474, -80.130356

AR STATION = 17+24

COUNTY: ROANOKE

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	4/15/21
PROJECT NO.:	112IC07157
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STREAM CROSSING

STREAM NAME: S-H42 (UNT TO LITTLE
CHERRYSTONE CREEK)

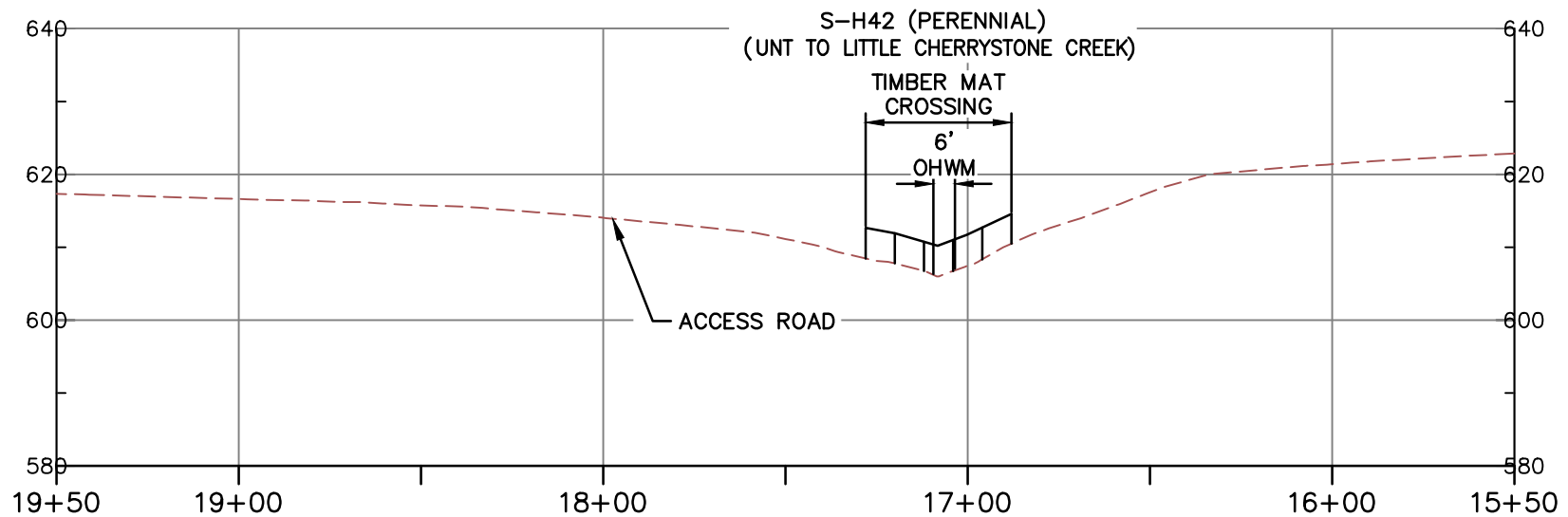
LAT./LONG. = 36.828993, -79.344442
STATION = 17+06

COUNTY: PITTSYLVANIA

REFER TO TABLE 2 (STREAMS) AND TABLE 3
(WETLANDS) IN THE INDIVIDUAL PERMIT
APPLICATION

DATE: 3/26/21
PROJECT NO.: 112IC07157
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CHECKED BY: RE
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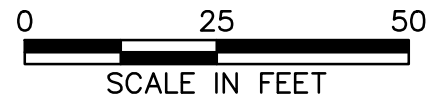


PROFILE A-A

HORIZONTAL



VERTICAL



TEMPORARY IMPACTS

NOTE:

1. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
2. EXISTING GRADE SHOWN IN PROFILE A-A BASED ON SAME LIDAR CONTOURS AS SHOWN ON SHEET 1 AND CORRESPONDING ESC PLAN.



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STREAM CROSSING

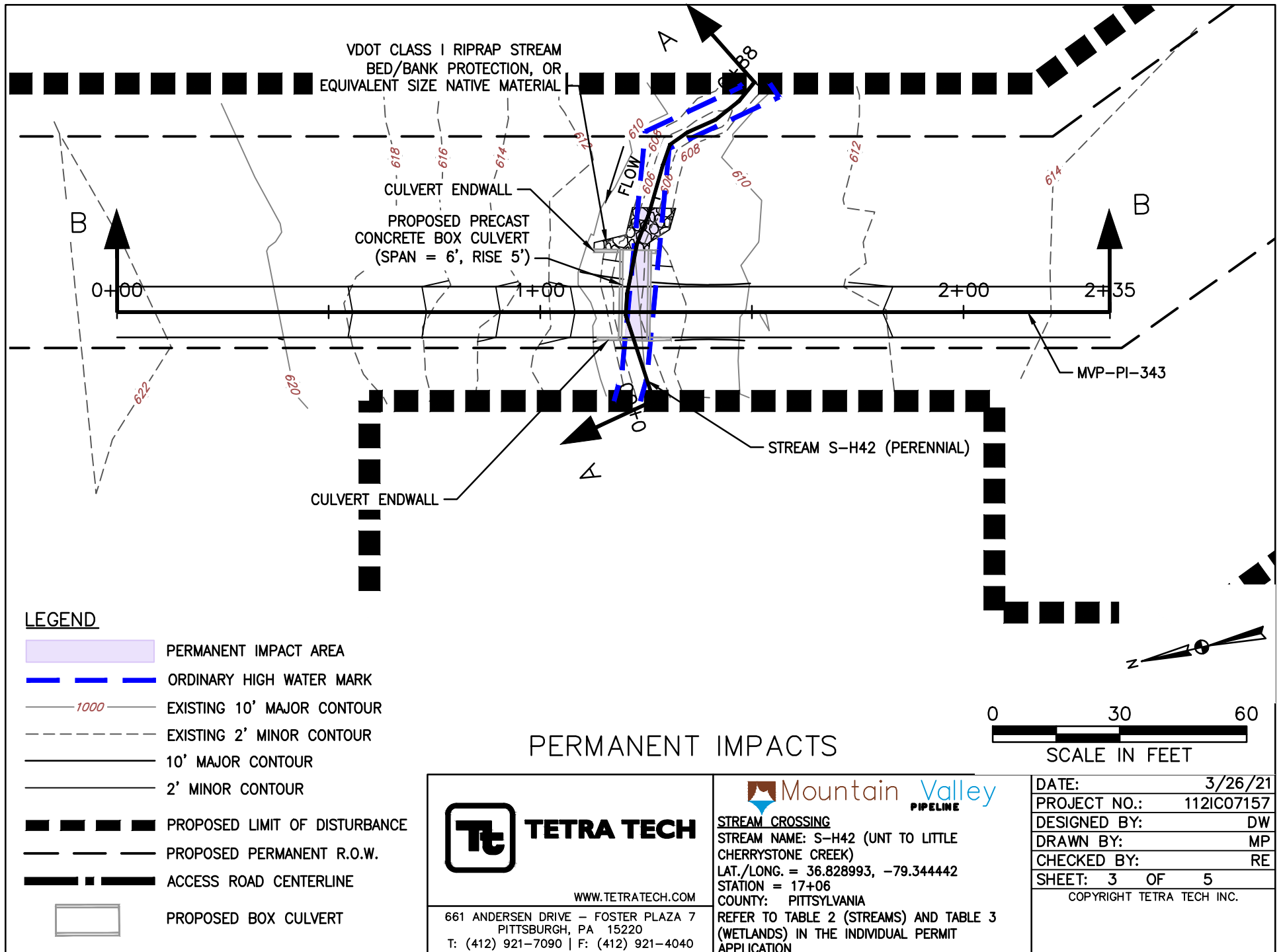
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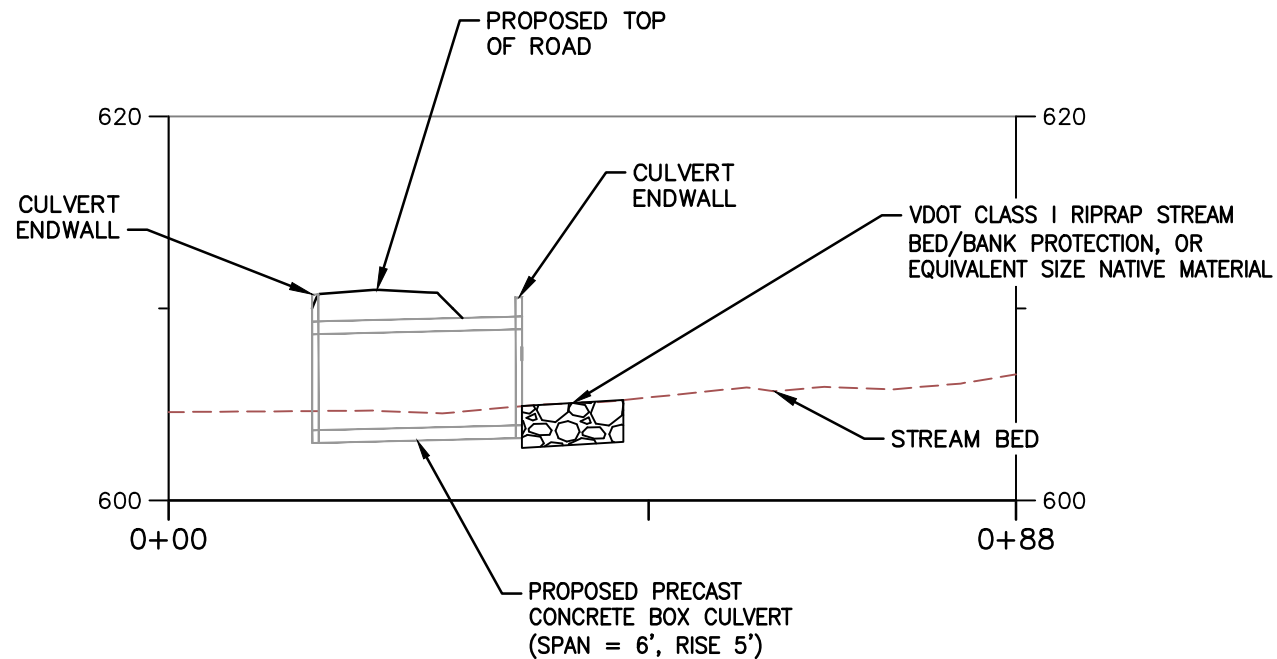
LAT./LONG. = 36.828993, -79.344442
STATION = 17+06

COUNTY: PITTSYLVANIA

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

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PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
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SHEET: 2 OF 5	
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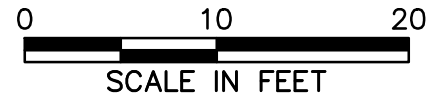




PROFILE A-A

HORIZONTAL

VERTICAL



PERMANENT IMPACTS

NOTE:

1. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
2. EXISTING GRADE SHOWN IN PROFILE A-A BASED ON SURVEY OF STREAM AND OVBANK AREAS AS SHOWN ON SHEET 3, WHICH WAS COMPLETED TO DEVELOP CULVERT DESIGN AND PROPOSED GRADING PLAN.



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STREAM CROSSING

STREAM NAME: S-H42 (UNT TO LITTLE
CHERRYSTONE CREEK)

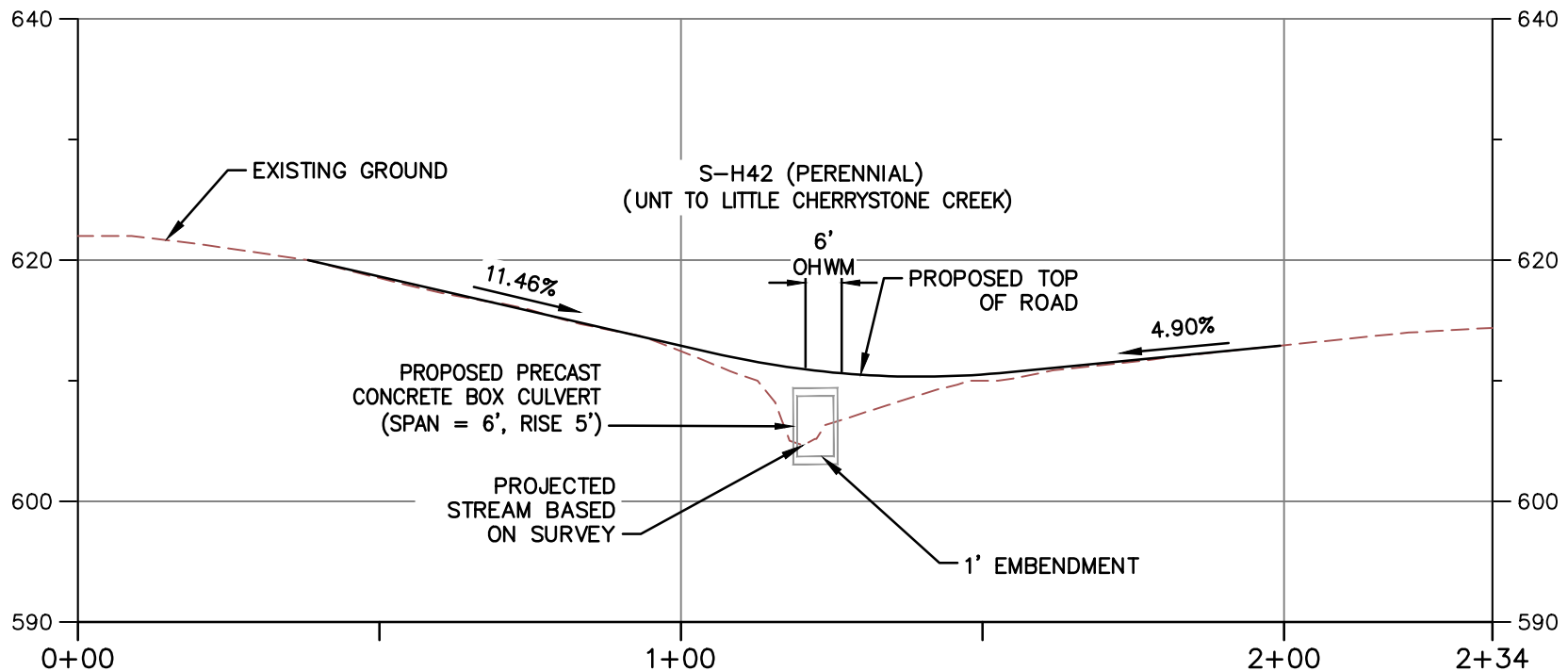
LAT./LONG. = 36.828993, -79.344442
STATION = 17+06

COUNTY: PITTSYLVANIA

REFER TO TABLE 2 (STREAMS) AND TABLE 3
(WETLANDS) IN THE INDIVIDUAL PERMIT
APPLICATION

DATE: 3/26/21
PROJECT NO.: 112IC07157
DESIGNED BY: DW
DRAWN BY: JZ
CHECKED BY: RE
SHEET: 4 OF 5

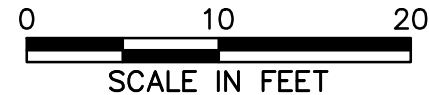
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PROFILE B-B

HORIZONTAL

VERTICAL



PERMANENT IMPACTS

NOTE:

1. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
2. EXISTING GRADE SHOWN IN PROFILE B-B BASED ON SURVEY OF STREAM AND OVBANK AREAS AS SHOWN ON SHEET 3, WHICH WAS COMPLETED TO DEVELOP CULVERT DESIGN AND PROPOSED GRADING PLAN.



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PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040



STREAM CROSSING

STREAM NAME: S-H42 (UNT TO LITTLE CHERRYSTONE CREEK)

LAT./LONG. = 36.828993, -79.344442
STATION = 17+06

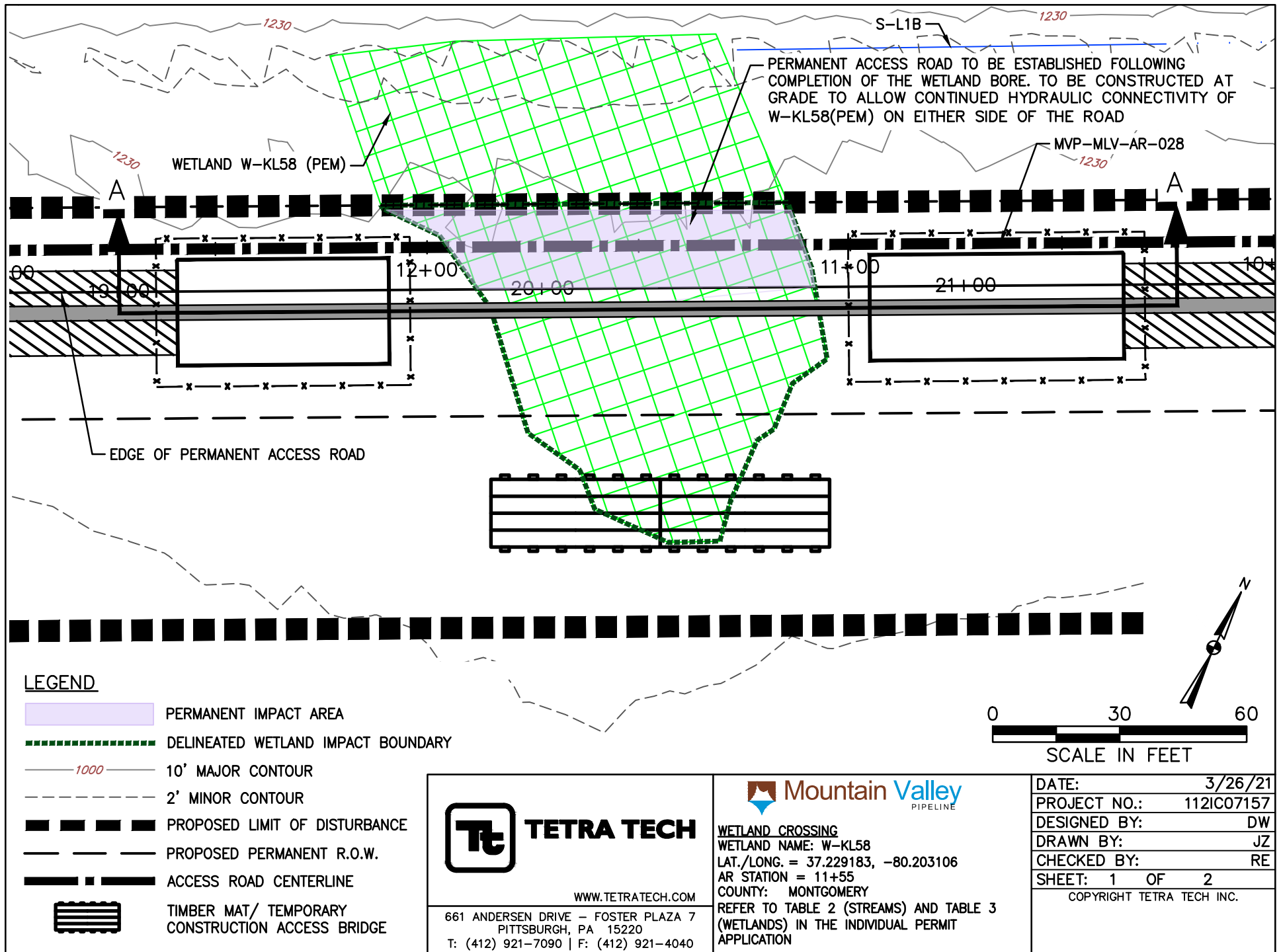
COUNTY: PITTSYLVANIA

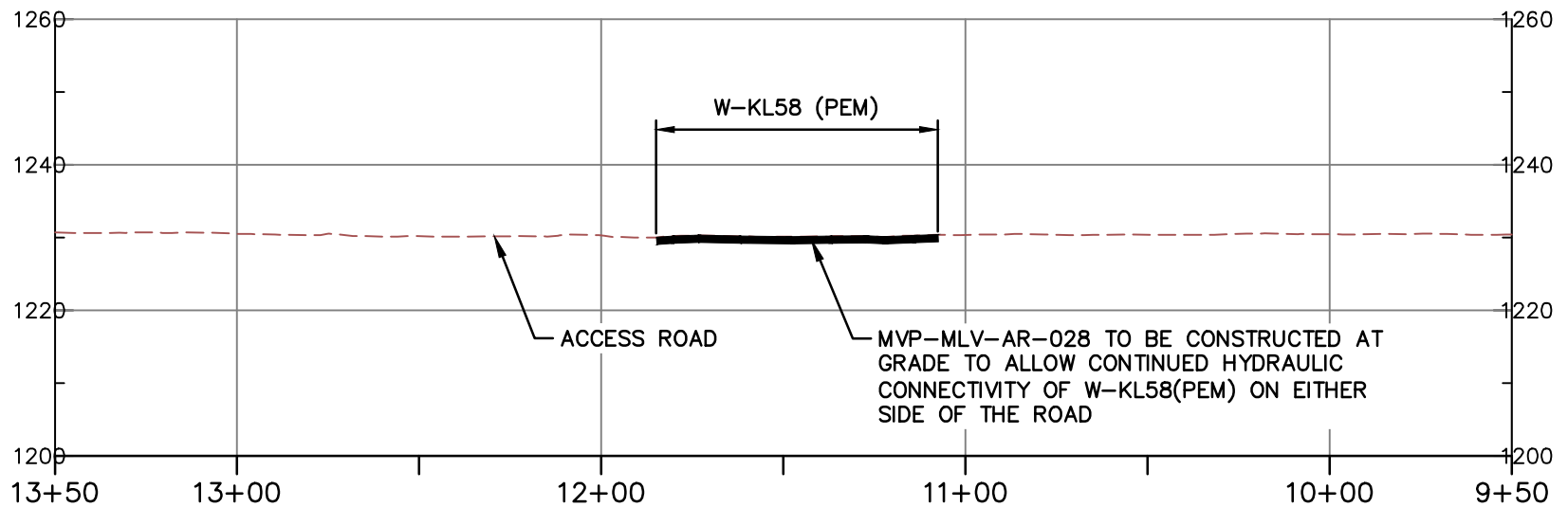
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	3/26/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	MP
CHECKED BY:	RE
SHEET: 5 OF 5	
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ATTACHMENT 2

Site Plan W-KL58



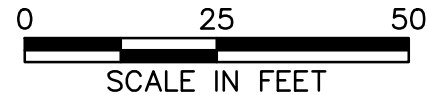


PROFILE A-A

HORIZONTAL



VERTICAL



NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
4. PIPELINE NOT SHOWN ON PROFILE BECAUSE IT IS A BORE BELOW SURFACE WATER AND DOES NOT CREATE AN IMPACT.



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WETLAND CROSSING

WETLAND NAME: W-KL58

LAT./LONG. = 37.229183, -80.203106

AR STATION = 11+55

COUNTY: MONTGOMERY

REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	3/26/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
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SHEET: 2 OF 2	

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ATTACHMENT 3

USACE Norfolk- Preliminary Jurisdictional Determination



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

April 8, 2021

PRELIMINARY JURISDICTIONAL DETERMINATION

Western Virginia Regulatory Section
NAO-2015-0898

Mountain Valley Pipeline, LLC
Attn: Robert Cooper
2200 Energy Drive
Canonsburg, PA 15317

Dear Mr. Cooper:

This letter is in regard to your request for a preliminary jurisdictional determination for waters of the U.S. (including wetlands) on a project known as Mountain Valley Pipeline (MVP), located on easements through Giles, Montgomery, Craig, Roanoke, Franklin, and Pittsylvania Counties, Virginia.

The maps entitled "USGS Project Location Map", Figure 4 Index 4, and "Detail Map" Figure 4-1 thru 4-42 Pittsylvania County, Virginia; "USGS Project Location Map", Figure 4 Index 1-4, and "Detail Map" Figure 4-1 thru 4-91 Franklin County, Virginia; "USGS Project Location Map" Figure 4 Index 1-3, and "Detail Map" Figures 4-1 thru 4-43, 4-45, 4-49 thru 4-52, 4-78, Montgomery County, Virginia, "Detail Map", Figures 4-53 thru 4-54, Montgomery/Roanoke County, "Detail Map" Figures 4-55 thru 4-77, Roanoke County, Virginia; "USGS Project Location Map", Figure 4 Index 1-6, and "Detail Map" Figure 4-1 thru 4-62, 4-69 Giles County, Virginia, "Detail Map" Figure 4-63 thru 4-64, Craig/Giles County, Virginia, "Detail Map" Figure 4-65 thru 4-68, Craig County, Virginia, by Tetra Tech, Inc. and submitted by Mountain Valley Pipeline, LLC dated September 2017 and received by the Corps September 11, 2017 (*on file at the Corps*) provides the locations of the waters on the property listed above. The basis for this delineation includes application of the Corps' 1987 Wetland Delineation Manual and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountain and Piedmont Regional Supplement, the positive indicators of wetland hydrology, hydric soils, and hydrophytic vegetation, and the presence of an ordinary high water mark. This letter is not confirming the Cowardin classifications of these aquatic resources.

The Norfolk District has relied on the information and data provided by the applicant or agent. If such information and data subsequently prove to be materially false or materially incomplete, this verification may be suspended or revoked, in whole or in part, and the Government may institute appropriate legal proceedings.

Discharges of dredged or fill material, including those associated with mechanized landclearing, into waters on this site may require a Department of the Army permit and

authorization by state and local authorities including a Virginia Water Protection Permit from the Virginia Department of Environmental Quality (DEQ), a permit from the Virginia Marine Resources Commission (VMRC) and a permit from your local wetlands board. This letter is a confirmation of the Corps preliminary jurisdiction for the waters on the subject property and does not authorize any work in these areas. Please obtain all required permits before starting work in the delineated waters.

This is a preliminary jurisdictional determination and is not a legally binding determination regarding whether Corps jurisdiction applies to the waters in question. Accordingly, you may either consent to jurisdiction as set out in this preliminary jurisdictional determination and the attachments hereto, or you may request and obtain an approved jurisdictional determination.

Enclosed is a copy of the "Preliminary Jurisdictional Determination Form". Please review the document, sign, and return one copy to Vincent Pero, of my staff, either via email (Vincent.d.pero@usace.army.mil) or via standard mail to US Army Corps of Engineers, Regulatory Office, and ATTN: Vincent Pero, 920 Gardens Blvd., Suite 103B, Charlottesville, Virginia 22901 within 30 days of receipt and keep one for your records. This delineation of waters can be relied upon for no more than five years from the date of this letter. New information may warrant revision.

If you have any questions, please contact Vincent Pero, of my staff, either via telephone at (434) 973-0568 or via email at vincent.d.pero@usace.army.mil.

Sincerely,

Todd M. Miller

FOR Jennifer Serafin
Chief, Western Virginia
Regulatory Section

Enclosure(s):
Appeals Form
Preliminary Jurisdictional Determination Form

Cc:
Virginia Department of Environmental Quality

Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: 7 April 2021

B. NAME AND ADDRESS OF PERSON REQUESTING PJD:

Mountain Valley Pipeline, LLC 555 Southpointe Blvd., Suite 200 Canonsburg, PA 15317

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:

Norfolk District, Richmond Field Office, Mountain Valley Pipeline, NAO-2015-0787

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:

(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: Virginia County/parish/borough: attachment City: Multiple

Center coordinates of site (lat/long in degree decimal format): 37.402524° N, 80.689885° W

Lat.: xx.xxx° Long.: yy.yyy°

Universal Transverse Mercator:

Name of nearest waterbody: Multiple

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: September 2017

☒ Field Determination. Date(s): Various dates 2016 to 2017

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION.

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)
			See Attachment		

- 1) The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.
- 2) In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there "may be" waters of the U.S. and/or that there "may be" navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for PJD (check all that apply)

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

- ☒ Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:
Map: Detail Maps Sept '17.
- ☒ Data sheets prepared/submitted by or on behalf of the PJD requestor.
☒ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report. Rationale: _____.
- ☐ Data sheets prepared by the Corps: _____.
- ☐ Corps navigable waters' study: _____.
- ☐ U.S. Geological Survey Hydrologic Atlas: _____.
- ☐ USGS NHD data.
- ☐ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name: Numerous maps on route
- ☒ Natural Resources Conservation Service Soil Survey. Citation: Virginia maps on route
- ☒ National wetlands inventory map(s). Cite name: Virginia maps on route
- ☐ State/local wetland inventory map(s): _____.
- ☐ FEMA/FIRM maps: _____.
- ☐ 100-year Floodplain Elevation is: _____. (National Geodetic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date): Google Earth Pro
or ☐ Other (Name & Date): _____.
- ☐ Previous determination(s). File no. and date of response letter: _____.
- ☐ Other information (please specify): _____.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and date of
Regulatory staff member
completing PJD



Signature and date of
person requesting PJD
(REQUIRED, unless obtaining
the signature is impracticable)¹

¹ Districts may establish timeframes for requestor to return signed PJD forms. If the requestor does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

Wetland ID	Wetland Habitat ID	County	Latitude ¹	Longitude ¹	Cowardin Class ²	HGM ³	Water Type ⁴	Associated Waterbodies	Size (Acres) ⁵	Size (square feet) ⁵	Open/Closed Boundary	Dominant Species	Figure
W-ST2	W-ST2-PEM	Franklin	37.126686	-80.120259	PEM	Riverine	RPWWD	S-G25 (UNT to Green Creek)	1.64	71,241	Closed	<i>Juncus effusus</i> , <i>Microstegium vimineum</i> , <i>Liriodendron tulipifera</i> , <i>Acer rubrum</i>	4-1
W-RR4	W-RR4	Franklin	37.125070	-80.113581	PEM	Riverine	RPWWD	S-RR18 (UNT to Green Creek)	0.07	2,930	Closed	<i>Liriodendron tulipifera</i> , <i>Polygonum sagittatum</i> , <i>Impatiens capensis</i> , <i>Scirpus cyperinus</i> , <i>Cerastium arvense</i>	4-2
W-RR3	W-RR3	Franklin	37.124165	-80.114765	PEM	Riverine	RPWWD	UNT to Green Creek	0.16	6,829	Closed	<i>Carex lacustris</i> , <i>Solidago rugosa</i> , <i>Polygonum sagittatum</i> , <i>Toxicodendron radicans</i>	4-3
W-KL41	W-KL41	Franklin	37.123842	-80.115800	PEM	Riverine	RPWWD	S-RR16 (Green Creek)	0.14	5,992	Open	<i>Juncus effusus</i> , <i>Scirpus polyphyllus</i> , <i>Persicaria sagittata</i> , <i>Scirpus atrovirens</i> , <i>Persicaria pensylvanica</i>	4-3
W-EF11	W-EF11	Franklin	37.123339	-80.075901	PEM	Riverine	RPWWD	S-D9, S-D10 (UNTs to North Fork Blackwater River)	0.17	7,383	Closed	<i>Juncus effusus</i> , <i>Carex lurida</i> , <i>Anthraxon hispidus</i> , <i>Polygonum</i> sp.	4-9
W-D4	W-D4	Franklin	37.122614	-80.076217	PEM	Slope	RPWWN	S-D9 (UNT to North Fork Blackwater River)	0.02	1,060	Open	<i>Juncus effusus</i> , <i>Carex</i> sp.	4-9
W-D7	W-D7-PEM	Franklin	37.121675	-80.085716	PEM	Riverine	RPWWD	S-D12, S-D13 (UNTs to North Fork Blackwater River)	0.15	6,611	Closed	<i>Carex lurida</i> , <i>Microstegium vimineum</i> , <i>Lonicera japonica</i> , <i>Lindera benzoin</i> , <i>Rosa multiflora</i> , <i>Platanus occidentalis</i>	4-8
W-D6	W-D6	Franklin	37.121578	-80.084351	PFO	Slope	RPWWN	S-D11 (UNT to North Fork Blackwater River)	0.00	85	Closed	<i>Platanus occidentalis</i> , <i>Carpinus carolinian</i> , <i>Lindera benzoin</i> , <i>Rosa multiflora</i> , <i>Lonicera japonica</i> , <i>Smilax rotundifolia</i>	4-8
W-IJ70	W-IJ70-PFO-1	Franklin	37.121499	-80.081487	PFO	Slope	RPWWD	S-MM26 (UNT to North Fork Blackwater River)	0.06	2757	Closed	<i>Acer rubrum</i> , <i>Fraxinus pennsylvanica</i> , <i>Lindera benzoin</i> , <i>Poa</i> sp.	4-8
	W-IJ70-PFO-2		37.121273	-80.081592	PFO	Slope	RPWWD	S-MM26 (UNT to North Fork Blackwater River)	0.05	2283	Closed	<i>Acer rubrum</i> , <i>Fraxinus pennsylvanica</i> , <i>Lindera benzoin</i> , <i>Poa</i> sp.	4-8
	W-IJ70-PSS	Franklin	37.121406	-80.081672	PSS	Slope	RPWWD	S-MM26 (UNT to North Fork Blackwater River)	0.15	6526	Closed	<i>Alnus serrulata</i> , <i>Rubus</i> sp., <i>Persicaria sagittata</i> , <i>Poa</i> sp., <i>Microstegium vimineum</i>	4-8
W-IJ69	W-IJ69	Franklin	37.121453	-80.084155	PSS	Slope	RPWWN	S-MM26 (UNT to North Fork Blackwater River)	0.08	3534	Closed	<i>Alnus serrulata</i> , <i>Carpinus caroliniana</i> , <i>Acer rubrum</i> , <i>Saxifraga micracthes</i> , <i>Microstegium vimineum</i> , <i>Poa</i> sp.	4-8
W-IJ67	W-IJ67	Franklin	37.121339	-80.081147	PEM	Slope	RPWWD	S-MM26 (UNT to North Fork Blackwater River)	0.03	1348	Closed	<i>Carex lurida</i>	4-8
W-D8	W-D8-PEM-2	Franklin	37.121267	-80.085124	PEM	Slope	RPWWD	S-D13 (UNT to North Fork Blackwater River)	0.04	1,554	Closed	<i>Liriodendron tulipifera</i> , <i>Platanus occidentalis</i> , <i>Juncus effusus</i> , <i>Impatiens capensis</i> , <i>Carex lurida</i>	4-8
	W-D8-PEM-1	Franklin	37.121259	-80.085441	PEM	Slope	RPWWD	S-D13 (UNT to North Fork Blackwater River)	0.03	1,116	Closed	<i>Liriodendron tulipifera</i> , <i>Platanus occidentalis</i> , <i>Juncus effusus</i> , <i>Impatiens capensis</i> , <i>Carex lurida</i>	4-8
	W-D8-PFO	Franklin	37.121237	-80.085243	PFO	Slope	RPWWD	S-D13 (UNT to North Fork Blackwater River)	0.06	2,570	Closed	<i>Platanus occidentalis</i> , <i>Lindera benzoin</i> , <i>Salix nigra</i> , <i>Carex lurida</i> , <i>Vinca minor</i> , <i>Lonicera japonica</i>	4-8
W-IJ68	W-IJ68	Franklin	37.121252	-80.084756	PEM	Riverine	RPWWD	S-D13 (UNT to North Fork Blackwater River)	0.04	1664	Closed	<i>Juncus effusus</i> , <i>Leersia oryzoides</i>	4-8
W-IJ66	W-IJ66	Franklin	37.121077	-80.083434	PEM	Slope	RPWWD	S-MM26 (UNT to North Fork Blackwater River)	0.01	639	Closed	<i>Microstegium vimineum</i> , <i>Saxifraga micranthidifolia</i>	4-8
W-IJ71	W-IJ71	Franklin	37.121075	-80.079364	PEM	Slope	RPWWD	S-MM26 (UNT to North Fork Blackwater River)	0.08	3509	Closed	<i>Carex lurida</i> , <i>Persicaria sagittata</i> , <i>Juncus effusus</i>	4-8
W-EF3	W-EF3	Franklin	37.117665	-80.096080	PEM	Slope	RPWWD	S-EF17 (UNT to Green Creek)	0.09	3,913	Open	<i>Acer negundo</i> , <i>Packera aurea</i> , <i>Scirpus atrovirens</i>	4-6
W-II5	W-II5	Franklin	37.115953	-80.059688	PEM	Slope	RPWWN	S-II4 (UNT to North Fork Blackwater River)	0.01	396	Closed	<i>Microstegium vimineum</i> , <i>Carex lurida</i> , <i>Boehmeria cylindrica</i>	4-11
W-II4	W-II4	Franklin	37.115831	-80.060074	PEM	Slope	RPWWN	S-II4 (UNT to North Fork Blackwater River)	0.01	268	Closed	<i>Scirpus polyphyllus</i> , <i>Microstegium vimineum</i>	4-11
W-GH4	W-GH4	Franklin	37.106992	-80.052875	PEM	Riverine	RPWWD	S-GH7 (UNT to North Fork Blackwater River)	0.14	5,931	Open	<i>Acorus calamus</i> , <i>Carex lurida</i> , <i>Impatiens capensis</i>	4-13
W-GH5	W-GH5	Franklin	37.105820	-80.050127	PEM	Slope	RPWWD	S-GH15 (UNT to North Fork Blackwater River)	0.01	488	Closed	<i>Carex lurida</i> , <i>Juncus effusus</i>	4-13
W-IJ1	W-IJ1	Franklin	37.093078	-80.027242	PEM	Slope	RPWWD	S-IJ1,S-IJ2 (UNTs to North Fork Blackwater River)	0.11	4,784	Open	<i>Glyceria striata</i> , <i>Acer rubrum</i> , <i>Lindera benzoin</i> , <i>Rosa multiflora</i>	4-17
W-II7	W-II7	Franklin	37.092842	-79.978276	PFO	Riverine	RPWWD	S-II6 (UNT to Little Creek)	0.01	479	Closed	<i>Salix nigra</i> , <i>Acer rubrum</i> , <i>Juncus effusus</i> , <i>Microstegium vimineum</i> , <i>Scirpus polyphyllus</i>	4-25
W-GH2	W-GH2	Franklin	37.092786	-79.983205	PSS	Riverine	RPWWD	S-GH6 (UNT to Little Creek)	0.13	5,455	Open	<i>Salix nigra</i> , <i>Dichanthelium clandestinum</i> , <i>Scirpus atrovirens</i>	4-24
W-IJ2	W-IJ2-PEM	Franklin	37.092772	-80.02698	PEM	Slope	RPWWD	S-IJ3 (UNT to North Fork Blackwater River)	0.15	6,345	Open	<i>Alnus serrulata</i> , <i>Leersia oryzoides</i> , <i>Juncus effusus</i> , <i>Carex vulpinoidea</i>	4-17
	W-IJ2-PSS	Franklin	37.092734	-80.027067	PSS	Slope	RPWWD	S-IJ3 (UNT to North Fork Blackwater River)	0.07	2,962	Open	<i>Alnus serrulata</i> , <i>Lindera benzoin</i> , <i>Sambucus nigra</i> , <i>Glyceria striata</i> , <i>Impatiens capensis</i>	4-17
W-IJ3	W-IJ3	Franklin	37.092360	-80.027289	PEM	Depressional	RPWWN	S-IJ1 (UNT to North Fork Blackwater River)	0.01	394	Closed	<i>Alnus serrulata</i> , <i>Microstegium vimineum</i> , <i>Juncus effusus</i> , <i>Hesperis matronalis</i>	4-17
W-IJ4	W-IJ4	Franklin	37.092033	-80.027172	PEM	Depressional	ISOLATE	-	0.04	1,567	Closed	<i>Alnus serrulata</i> , <i>Microstegium vimineum</i> , <i>Lemna minor</i>	4-17
W-IJ5	W-IJ5	Franklin	37.091437	-80.023960	PEM	Riverine	RPWWD	S-IJ4, S-IJ6 (UNTs to Blackwater River)	0.01	333	Open	<i>Microstegium vimineum</i> , <i>Bidens frondosa</i>	4-18
W-II8	W-II8	Franklin	37.091352	-79.992006	PEM	Depressional	RPWWD	S-II7 (UNT to Little Creek)	0.08	3,524	Open	<i>Juncus effusus</i> , <i>Scirpus polyphyllus</i> , <i>Leersia orzoides</i>	4-23
W-EF43	W-EF43	Franklin	37.089826	-79.996387	PEM	Slope	RPWWN	S-KI2 (UNT to Little Creek)	0.02	1,069	Closed	<i>Arthraxon hispidus</i> , <i>Carex lurida</i> , <i>Microstegium vimineum</i>	4-22

Table 1.
Identified Wetlands

Wetland ID	Wetland Habitat ID	County	Latitude ¹	Longitude ¹	Cowardin Class ²	HGM ³	Water Type ⁴	Associated Waterbodies	Size (Acres) ⁵	Size (square feet) ⁵	Open/Closed Boundary	Dominant Species	Figure
W-IJ7	W-IJ7	Franklin	37.089393	-80.005068	PEM	Slope	RPWWN	S-IJ10 (Little Creek)	0.08	3,671	Closed	<i>Juncus effusus</i> , <i>Poa trivialis</i> , <i>Festuca rubra</i>	4-21
W-IJ6	W-IJ6	Franklin	37.089197	-80.005076	PEM	Riverine	RPWWD	S-IJ10 (Little Creek)	0.01	564	Closed	<i>Carex vulpinoidea</i> , <i>Poa trivialis</i> , <i>Juncus effusus</i>	4-21
W-EF4	W-EF4	Franklin	37.085917	-79.947789	PEM	Riverine	RPWWD	S-EF16 (UNT to Teels Creek)	0.45	19,761	Open	<i>Juncus effusus</i> , <i>Poa trivialis</i> , <i>Carex lurida</i>	4-32
W-E10	W-E10	Franklin	37.084814	-79.948178	PEM	Depressional	RPWWN	S-E28 (Teels Creek)	0.01	539	Closed	<i>Juncus effusus</i>	4-32
W-E7	W-E7	Franklin	37.084565	-79.947192	PEM	Depressional	RPWWD	S-E28 (Teels Creek)	0.09	4,019	Closed	<i>Juncus effusus</i>	4-32
W-E9	W-E9	Franklin	37.083095	-79.945808	PEM	Riverine	RPWWD	S-E28 (Teels Creek)	0.02	725	Closed	<i>Salix nigra</i> , <i>Cornus amomum</i> , <i>Juncus effusus</i> , <i>Carex lurida</i> , <i>Impatiens capensis</i>	4-32
W-E8	W-E8	Franklin	37.082906	-79.945926	PEM	Depressional	RPWWD	S-E28 (Teels Creek)	0.07	3,159	Closed	<i>Juncus effusus</i> , <i>Microstegium vimineum</i>	4-32
W-MM19	W-MM19	Franklin	37.073227	-79.937910	PEM	Riverine	RPWWD	S-MM41 (Teels Creek)	0.05	2,304	Closed	<i>Acer negundo</i> , <i>Acer saccharinum</i> , <i>Verbesina alternifolia</i>	4-34
W-EF2	W-EF2	Franklin	37.069174	-79.925977	PEM	Slope	RPWWD	S-EF14 (UNT to Teels Creek)	0.02	770	Closed	<i>Alnus serrulata</i> , <i>Rosa palustris</i> , <i>Carex vulpinoidea</i> , <i>Juncus effusus</i>	4-36
W-EF51	W-EF51	Franklin	37.064795	-79.874476	PEM	Riverine	RPWWD	S-EF48 (UNT to Blackwater River)	0.01	584	Open	<i>Microstegium vimineum</i> , <i>Smilax rotundifolia</i>	4-47
W-YZ7	W-YZ7	Franklin	37.064439	-79.874086	PEM	Depressional	RPWWD	S-EF48 (UNT to Blackwater River)	0.02	671	Closed	<i>Scirpus cyperinus</i> , <i>Smilax rotundifolia</i> , <i>Juniperus virginiana</i>	4-47
W-EF50	W-EF50	Franklin	37.061619	-79.880285	PEM	Riverine	RPWWD	S-KL39 (UNT to Blackwater River)	0.02	968	Closed	<i>Microstegium vimineum</i> , <i>Boehmeria cylindrica</i> , <i>Lindera benzoin</i>	4-47
W-KL32	W-KL32	Franklin	37.061069	-79.879720	PFO	Slope	RPWWD	S-KL39 (UNT to Blackwater River)	0.11	4,676	Open	<i>Acer rubrum</i> , <i>Lindera benzoin</i> , <i>Alnus serrulata</i> , <i>Arthraxon hispidus</i> , <i>Boehmeria cylindrica</i> , <i>Viola blanda</i> , <i>Phalaris arundinacea</i>	4-46
W-C2	W-C2	Franklin	37.060418	-79.921745	PFO	Depressional	RPWWN	S-E28 (Teels Creek)	0.15	6,464	Closed	<i>Acer rubrum</i> , <i>Carpinus caroliniana</i> , <i>Lindera benzoin</i> , <i>Stellaria media</i> , <i>Lonicera japonicus</i>	4-38
W-KL43	W-KL43a	Franklin	37.059949	-79.840903	PEM	Riverine	RPWWD	S-KL54 (UNT to Maggodee Creek)	0.02	654.00	Closed	<i>Salix nigra</i> , <i>Leersia oryzoides</i> , <i>Persicaria pensylvanica</i>	4-52
	W-KL43b	Franklin	37.059662	-79.840732	PEM	Riverine	RPWWD	S-KL54 (UNT to Maggodee Creek)	0.01	501	Open	<i>Salix nigra</i> , <i>Leersia oryzoides</i> , <i>Persicaria pensylvanica</i>	4-52
W-CD6	W-CD6	Franklin	37.057857	-79.915165	PEM	Slope	RPWWN	S-CD6 (Little Creek)	0.31	13,574	Closed	<i>Poa trivialis</i>	4-40
W-CD5	W-CD5	Franklin	37.055396	-79.910955	PFO	Riverine	RPWWN	S-CD6 (Little Creek)	0.40	17,224	Open	<i>Acer negundo</i> , <i>Liriodendron tulipifera</i> , <i>Lindera benzoin</i>	4-40
W-EF49	W-EF49	Franklin	37.053554	-79.884961	PSS	Riverine	RPWWD	S-EF47 (UNT to Blackwater River)	0.02	927	Closed	<i>Lindera benzoin</i> , <i>Microstegium vimineum</i>	4-44
W-EF48	W-EF48	Franklin	37.052158	-79.886263	PEM	Riverine	RPWWD	S-KL35 (UNT to Blackwater River)	0.07	3,247	Closed	<i>Leersia oryzoides</i> , <i>Impatiens capensis</i> , <i>Cyperus esculentus</i>	4-44
W-GH3	W-GH3	Franklin	37.051916	-79.909559	PSS	Depressional	ISOLATE	-	0.02	1,083	Closed	<i>Acer negundo</i> , <i>Salix nigra</i>	4-41
W-II2	W-II2	Franklin	37.050111	-79.906984	PFO	Depressional	RPWWD	S-II2 (Little Creek)	1.21	52,501	Closed	<i>Platanus occidentalis</i> , <i>Salix nigra</i> , <i>Ligustrum sinense</i> , <i>Alnus serrulata</i> , <i>Carpinus caroliniana</i> , <i>Scirpus atrovirens</i> , <i>Acorus calamus</i> , <i>Microstegium vimineum</i>	4-41
W-II3	W-II3	Franklin	37.049377	-79.907937	PEM	Depressional	RPWWD	S-II2 (Little Creek)	0.04	1,732	Closed	<i>Scirpus atrovirens</i> , <i>Microsteguim vimineum</i>	4-41
W-CD1	W-CD1	Franklin	37.048245	-79.897661	PFO	Slope	RPWWD	S-CD (UNT to Blackwater River)	1.41	61,298	Open	<i>Acer rubrum</i> , <i>Liriodendron tulipifera</i> , <i>Nyssa sylvatica</i> , <i>Lindera benzoin</i> , <i>Poa trivialis</i> , <i>Microstegium vimineum</i>	4-43
W-A11	W-A11	Franklin	37.036044	-79.799598	PEM	Riverine	RPWWD	S-A38 (UNT to Foul Ground Creek)	0.00	113	Closed	<i>Carex lurida</i> , <i>Microstegium vimineum</i> , <i>Juncus effusus</i> , <i>Oxydendrum arboreum</i> , <i>Quercus alba</i> , <i>Kalmia latifolia</i>	4-60
W-GG2	W-GG2	Franklin	37.035895	-79.799639	PSS	Slope	RPWWD	S-GG5 (UNT to Foul Ground Creek)	0.03	1,474	Closed	<i>Ilex verticillata</i> , <i>Microstegium vimineum</i>	4-60
W-A12	W-A12-PFO	Franklin	37.032272	-79.787447	PFO	Riverine	RPWWD	S-A41 (Foul Ground Creek)	3.69	160,835	Open	<i>Acer rubrum</i> , <i>Alnus serrulata</i> , <i>Lindera benzoin</i> , <i>Impatiens pallida</i> , <i>Poa sp.</i>	4-62
W-DD1	W-DD1	Franklin	37.031960	-79.788631	PEM	Riverine	RPWWN	S-A41 (Foul Ground Creek)	0.27	11,554	Open	<i>Salix nigra</i> , <i>Platanus occidentalis</i> , <i>Leersia oryzoides</i>	4-62
W-GH14	W-GH14	Franklin	37.031050	-79.778029	PFO	Riverine	RPWWD	S-GH37, S-GH38, S-GH39 (UNT to Foul Ground Creek)	0.01	421	Closed	<i>Fraxinus pennsylvanica</i> , <i>Acer rubrum</i> , <i>Liriodendron tulipifera</i> , <i>Lindera benzoin</i> , <i>Glyceria striata</i> , <i>Carex prasina</i>	4-63
W-KL11	W-KL11	Franklin	37.030490	-79.778191	PFO	Riverine	RPWWD	S-GH39 (UNT to Foul Ground Creek)	0.02	747	Closed	<i>Acer rubrum</i> , <i>Fraxinus pennsylvanica</i> , <i>Lindera benzoin</i> , <i>Carex lurida</i> , <i>Microstegium vimineum</i>	4-63
W-GH16	W-GH16	Franklin	37.028471	-79.773183	PFO	Riverine	RPWWD	S-GH44, S-IJ47 (UNTs to Foul Ground Creek)	0.28	12,091	Closed	<i>Fraxinus pennsylvanica</i> , <i>Acer rubrum</i> , <i>Lindera benzoin</i> , <i>Symplocarpus foetidus</i> , <i>Smilax rotundifolia</i>	4-64
W-IJ35	W-IJ35	Franklin	37.027878	-79.772801	PFO	Riverine	RPWWD	S-GH44 (UNT to Foul Ground Creek)	0.22	9,620	Open	<i>Fraxinus pennsylvanica</i> , <i>Carpinus caroliniana</i> , <i>Lindera benzoin</i> , <i>Symplocarpus foetidus</i> , <i>Osmundastrum cinnamomea</i>	4-64
W-IJ34	W-IJ34	Franklin	37.027767	-79.772207	PFO	Riverine	RPWWD	S-GH44 (UNT to Foul Ground Creek)	0.05	2,271	Closed	<i>Fraxinus pennsylvanica</i> , <i>Carpinus caroliniana</i> , <i>Asimina triloba</i> , <i>Symplocarpus foetidus</i> , <i>Microstegium vimineum</i>	4-64
W-B11	W-B11	Franklin	37.019695	-79.761775	PEM	Slope	RPWWD	S-G22, S-G21 (UNTs to Poplar Camp Creek)	0.04	1,701	Closed	<i>Rosa multiflora</i> , <i>Lindera benzoin</i> , <i>Rubus allegheniensis</i> , <i>Carex lurida</i> , <i>Juncus effusus</i> , <i>Glyceria striata</i>	4-65

Wetland ID	Wetland Habitat ID	County	Latitude ¹	Longitude ¹	Cowardin Class ²	HGM ³	Water Type ⁴	Associated Waterbodies	Size (Acres) ⁵	Size (square feet) ⁵	Open/Closed Boundary	Dominant Species	Figure
W-B10	W-B10	Franklin	37.017663	-79.759864	PEM	Slope	ISOLATE	-	0.01	305	Closed	<i>Carex lurida</i> , <i>Scirpus atrovirens</i>	4-66
W-B9	W-B9	Franklin	37.016046	-79.758240	PEM	Slope	RPWWD	Stream Outside Project Study Area	0.14	5,989	Closed	<i>Juncus effusus</i>	4-66
W-B8	W-B8	Franklin	37.014704	-79.757328	PEM	Riverine	RPWWD	UNT to Poplar Camp Creek	0.57	25,032	Open	<i>Carex vulpinoidea</i> , <i>Juncus effusus</i>	4-66
W-E5	W-E5	Franklin	37.000930	-79.747748	PFO	Slope	RPWWD	S-II5 (UNT to Blackwater River)	0.06	2,562	Open	<i>Liriodendron tulipifera</i> , <i>Carpinus caroliniana</i> , <i>Viburnum prunifolium</i> , <i>Lindera benzoin</i> , <i>Actaea racemosa</i> , <i>Lonicera japonica</i>	4-69
W-II6	W-II6	Franklin	36.995751	-79.735835	PEM	Riverine	RPWWD	S-E14 (UNT to Blackwater River)	0.03	1,337	Closed	<i>Salix nigra</i> , <i>Juncus effusus</i> , <i>Microstegium vimineum</i>	4-70
W-E4	W-E4	Franklin	36.995516	-79.735492	PEM	Riverine	RPWWD	S-E15 (UNT to Blackwater River)	0.01	419	Closed	<i>Ludwigia alternifolia</i> , <i>Poa trivialis</i> , <i>Microstegium vimineum</i> , <i>Juncus effusus</i>	4-70
W-H17	W-H17	Franklin	36.989609	-79.722113	PFO	Depressional	RPWWD	S-H38 (UNT to Jacks Creek)	0.57	25,013	Open	<i>Platanus occidentalis</i> , <i>Acer saccharum</i> , <i>Acer rubrum</i> , <i>Lindera benzoin</i> , <i>Diphasiastrum digitatum</i> , <i>Microstegium vimineum</i> , <i>Lonicera japonica</i>	4-72
W-H11	W-H11	Franklin	36.988089	-79.702810	PEM	Slope	RPWWD	S-H30 (UNT to Jacks Creek)	0.05	2,078	Closed	<i>Rosa multiflora</i> , <i>Microstegium vimineum</i> , <i>Juncus effusus</i>	4-76
W-H16	W-H16	Franklin	36.988081	-79.715000	PEM	Riverine	RPWWD	S-H36 (UNT to Jacks Creek)	0.05	2,253	Closed	<i>Microstegium vimineum</i> , <i>Juncus effusus</i>	4-74
W-H14	W-H14	Franklin	36.988079	-79.711846	PEM	Riverine	RPWWD	S-H34 (UNT to Jacks Creek)	0.01	508	Closed	<i>Smilax rotundifolia</i> , <i>Microstegium vimineum</i> , <i>Juncus effusus</i>	4-74
W-H13	W-H13	Franklin	36.988066	-79.708125	PEM	Riverine	RPWWD	S-H32 (UNT to Jacks Creek)	0.01	495	Closed	<i>Smilax rotundifolia</i> , <i>Microstegium vimineum</i> , <i>Juncus effusus</i>	4-74
W-H12	W-H12	Franklin	36.988035	-79.705399	PEM	Slope	RPWWD	S-H31 (UNT to Jacks Creek)	0.02	923	Closed	<i>Juncus effusus</i> , <i>Ludwigia alternifolia</i>	4-74
W-H15	W-H15	Franklin	36.987943	-79.714826	PSS	Riverine	RPWWD	S-H36 (UNT to Jacks Creek)	0.01	337	Closed	<i>Alnus serrulata</i> , <i>Carex crinita</i> , <i>Impatiens capensis</i> , <i>Microstegium vimineum</i>	4-73
W-A8	W-A8	Franklin	36.987928	-79.700807	PEM	Slope	RPWWD	S-A18 (UNT to Jacks Creek)	0.04	1,592	Closed	<i>Rosa multiflora</i> , <i>Rubus allegheniensis</i> , <i>Juncus effusus</i> , <i>Carex lurida</i>	4-76
W-H10	W-H10	Franklin	36.987906	-79.699220	PEM	Slope	RPWWD	S-A19/S-H26 (UNT to Jacks Creek)	0.00	33	Closed	<i>Smilax rotundifolia</i> , <i>Phalaris arundinacea</i> , <i>Scirpus cyperinus</i> , <i>Juncus effusus</i>	4-76
W-H9	W-H9	Franklin	36.978539	-79.682071	PEM	Depressional	RPWWN	S-H25 (Little Jacks Creek)	0.01	504	Closed	<i>Microstegium vimineum</i> , <i>Ludwigia alternifolia</i> , <i>Juncus effusus</i>	4-78
W-H8	W-H8	Franklin	36.978171	-79.680328	PEM	Slope	RPWWD	S-H24 (UNT to Little Jacks Creek)	0.00	39	Closed	<i>Impatiens capensis</i> , <i>Persicaria sagittata</i>	4-78
W-SS1	W-SS1	Franklin	36.972897	-79.673186	PEM	Riverine	RPWWD	Turkey Creek	0.02	830	Closed	<i>Impatiens capensis</i>	4-80
W-H6	W-H6	Franklin	36.972242	-79.663049	PEM	Riverine	RPWWD	S-H17 (Dinner Creek)	0.15	6,562	Open	<i>Rosa multiflora</i> , <i>Carex lurida</i> , <i>Juncus effusus</i>	4-83
W-CD7	W-CD7	Franklin	36.970946	-79.653765	PEM	Slope	RPWWD	S-CD8 (UNT to Owens Creek)	0.01	490	Closed	<i>Poa trivialis</i>	4-84
W-CD8	W-CD8	Franklin	36.970678	-79.653760	PEM	Slope	RPWWD	S-CD8 (UNT to Owens Creek)	0.02	684	Closed	<i>Carex sp.</i>	4-84
W-AB2	W-AB2	Franklin	36.970547	-79.651390	PEM	Riverine	RPWWD	S-AB8, S-AB9, S-AB10 (UNT to Ownes Creek)	0.01	381	Closed	<i>Juncus effusus</i> , <i>Scirpus cyperinus</i> , <i>Lonicera japonica</i>	4-84
W-B7	W-B7	Franklin	36.968167	-79.641893	PSS	Depressional	RPWWN	S-G16 (Strawfield Creek)	0.04	1,555	Closed	<i>Lindera benzoin</i> , <i>Alnus serrulata</i> , <i>Impatiens capensis</i> , <i>Poa trivialis</i> , <i>Carex crinita</i>	4-85
W-B6	W-B6	Franklin	36.967378	-79.636403	PEM	Riverine	RPWWD	S-G15 (UNT to Parrot Branch)	0.09	4,014	Open	<i>Platanus occidentalis</i> , <i>Fagus grandifolia</i> , <i>Liriodendron tulipifera</i> , <i>Impatiens capensis</i> , <i>Rumex crispus</i>	4-86
W-MM17	W-MM17	Franklin	36.964582	-79.617061	PEM	Riverine	RPWWD	S-D7 (UNT to Jonnikin Creek)	0.02	801	Closed	<i>Lindera benzoin</i> , <i>Rosa multiflora</i> , <i>Cyperus esculentus</i> , <i>Persicaria pensylvanica</i> , <i>Poa sp.</i> , <i>Rumex sp.</i> , <i>Lonicera japonica</i>	4-88
W-KL44	W-KL44	Franklin	36.947335	-79.881475	PEM	Slope	Isolate	-	0.07	3,078	Closed	<i>Carex lurida</i> , <i>Juncus effusus</i> , <i>Luzula acuminata</i>	4-91
W-KL45	W-KL45	Franklin	36.946465	-79.879355	PEM	Depressional	Isolate	-	0.11	4,634	Closed	<i>Carex lurida</i> , <i>Juncus effusus</i> , <i>Anthoxanthum odoratum</i>	4-91

- Notes:**
- 1

- In decimal degrees. Coordinates show wetland test pit locations
- 2

- PEM = Palustrine Emergent
- PSS = Palustrine Scrub-Shrub
- PFO = Palustrine Forested
- 3

- HGM = Hydrogeomorphic
- 4

- RPWWD = Wetlands directly abutting Relatively Permanent Waters (RPWs) that flow directly or indirectly into Traditional Navigable Waterways (TNWs)
- RPWWN = Wetlands adjacent but not directly abutting RPWs that flow directly or indirectly into TNWs
- NRPWW = Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- Isolate = Isolated (interstate or intrastate) waters, including isolated wetlands
- 5

- Size of wetlands with open boundaries may be larger than shown in this table. See Section 3.1 for more information

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-H2	UNT to Green Creek	Franklin	37.128162	-80.116571	Perennial	RPW	R3UB3	5	4-2
S-H1	Green Creek	Franklin	37.127751	-80.116772	Perennial	RPW	R2UB2	10	4-2
S-G26	UNT to Green Creek	Franklin	37.127049	-80.111389	Intermittent	RPW	R4SB2	7	4-2
S-G27	UNT to Green Creek	Franklin	37.127027	-80.111014	Perennial	RPW	R3RB2	7	4-2
S-G28	UNT to Green Creek	Franklin	37.126504	-80.110642	Perennial	RPW	R3RB2	9	4-2
S-G24	UNT to Green Creek	Franklin	37.126423	-80.121401	Intermittent	RPW	R4SB3	6	4-1
S-G25	UNT to Green Creek	Franklin	37.126208	-80.120724	Intermittent	RPW	R4SB4	7	4-1
S-RR18	UNT to Green Creek	Franklin	37.125002	-80.113604	Intermittent	RPW	R4SB5	2	4-2
S-RR17	UNT to Green Creek	Franklin	37.124804	-80.113774	Perennial	RPW	R3UB2	13	4-2
S-RR16	Green Creek	Franklin	37.123817	-80.115646	Perennial	RPW	R2UB3	6	4-3
S-D10	UNT to North Fork Blackwater River	Franklin	37.122433	-80.076289	Intermittent	RPW	R4SB3	8	4-9
S-D9	UNT to North Fork Blackwater River	Franklin	37.122350	-80.075694	Intermittent	RPW	R4SB4	7	4-9
S-D8	North Fork Blackwater River	Franklin	37.122143	-80.075438	Perennial	RPW	R2UB1	18	4-9
S-D11	UNT to North Fork Blackwater River	Franklin	37.121964	-80.084049	Perennial	RPW	R3UB1	10	4-8
S-D12	UNT to North Fork Blackwater River	Franklin	37.121685	-80.085819	Intermittent	RPW	R4SB4	6	4-8
S-MM26	UNT to North Fork Blackwater River	Franklin	37.121675	-80.075091	Perennial	RPW	R3UB1	12	4-8
S-IJ73	UNT to North Fork Blackwater River	Franklin	37.121543	-80.081468	Perennial	RPW	R3UB2	8	4-8
S-D13	UNT to North Fork Blackwater River	Franklin	37.121532	-80.085840	Intermittent	RPW	R4SB4	4	4-8
S-D17	UNT to North Fork Blackwater River	Franklin	37.121529	-80.088575	Intermittent	RPW	R4SB3	7	4-7
S-HH2	UNT to North Fork Blackwater River	Franklin	37.121236	-80.084042	Perennial	RPW	R3RB2	4	4-7
S-D14	UNT to North Fork Blackwater River	Franklin	37.120880	-80.087263	Intermittent	RPW	R4SB4	3	4-7
S-HH3	UNT to North Fork Blackwater River	Franklin	37.120853	-80.084279	Perennial	RPW	R3UB1	12	4-8
S-EF17	UNT to Green Creek	Franklin	37.117683	-80.096069	Intermittent	RPW	R4SB3	1.5	4-6
S-II4	UNT to North Fork Blackwater River	Franklin	37.115811	-80.060411	Perennial	RPW	R3UB1	15	4-11
S-EF18	UNT to Green Creek	Franklin	37.114703	-80.097450	Intermittent	RPW	R4SB3	2.5	4-6
S-GH8	UNT to North Fork Blackwater River	Franklin	37.106987	-80.052594	Perennial	RPW	R3UB1	6	4-13
S-GH7	UNT to North Fork Blackwater River	Franklin	37.106880	-80.053734	Perennial	RPW	R3UB1	20	4-13
S-GH15	UNT to North Fork Blackwater River	Franklin	37.106131	-80.050116	Intermittent	RPW	R4SB5	5	4-13
S-GH13	UNT to North Fork Blackwater River	Franklin	37.106097	-80.048475	Intermittent	RPW	R4SB5	4	4-14
S-GH14	UNT to North Fork Blackwater River	Franklin	37.105862	-80.048883	Perennial	RPW	R3UB3	20	4-13 & 4-14
S-GH11	UNT to North Fork Blackwater River	Franklin	37.104782	-80.046187	Intermittent	RPW	R4SB4	10	4-14
S-GH10	UNT to North Fork Blackwater River	Franklin	37.104623	-80.044563	Intermittent	RPW	R4SB5	8	4-14
S-GH9	UNT to North Fork Blackwater River	Franklin	37.104431	-80.045200	Perennial	RPW	R3UB1	18	4-14
S-RR08	UNT to North Fork Blackwater River	Franklin	37.103273	-80.041887	Ephemeral	NRPW	R6	7	4-14 & 4-15
S-RR09	UNT to North Fork Blackwater River	Franklin	37.102479	-80.041057	Ephemeral	NRPW	R6	9	4-15
S-RR11	UNT to North Fork Blackwater River	Franklin	37.101117	-80.039678	Ephemeral	NRPW	R6	7	4-15
S-RR12	UNT to North Fork Blackwater River	Franklin	37.100713	-80.039766	Perennial	RPW	R3UB3	8	4-15
S-IJ1	UNT to North Fork Blackwater River	Franklin	37.092916	-80.027731	Perennial	RPW	R3UB1	14	4-17
S-IJ2	UNT to North Fork Blackwater River	Franklin	37.092863	-80.027625	Intermittent	RPW	R4SB3	4	4-17
S-II6	UNT to Little Creek	Franklin	37.092637	-79.978425	Intermittent	RPW	R4SB5	3	4-25
S-IJ3	UNT to North Fork Blackwater River	Franklin	37.092552	-80.027297	Intermittent	RPW	R4SB5	8	4-17
S-GH6	UNT to Little Creek	Franklin	37.092401	-79.983228	Perennial	RPW	R3UB2	8	4-24
S-II10	UNT to Little Creek	Franklin	37.091651	-79.990476	Intermittent	RPW	R4SB3	8	4-23
S-II12	UNT to Little Creek	Franklin	37.091577	-79.987853	Intermittent	RPW	R4RB4	2	4-24
S-II11	UNT to Little Creek	Franklin	37.091513	-79.987995	Perennial	RPW	R3UB2	4	4-24
S-II8	UNT to Little Creek	Franklin	37.091495	-79.993900	Intermittent	RPW	R4SB4	2	4-23
S-II7	UNT to Little Creek	Franklin	37.091447	-79.991995	Intermittent	RPW	R4SB4	4	4-23
S-IJ6	UNT to North Fork Blackwater River	Franklin	37.091389	-80.023959	Intermittent	RPW	R4SB5	4	4-18
S-II9	UNT to Little Creek	Franklin	37.091339	-79.990636	Perennial	RPW	R3UB1	20	4-23
S-IJ5	UNT to North Fork Blackwater River	Franklin	37.091256	-80.024154	Intermittent	RPW	R4SB3	5	4-18
S-IJ4	UNT to North Fork Blackwater River	Franklin	37.091227	-80.024056	Perennial	RPW	R3UB1	10	4-17 & 4-18
S-IJ7	UNT to North Fork Blackwater River	Franklin	37.090745	-80.024276	Intermittent	RPW	R4SB5	5	4-17 & 4-18
S-KL1	UNT to Little Creek	Franklin	37.090570	-79.996921	Perennial	RPW	R3UB1	15	4-22
S-KL2	UNT to Little Creek	Franklin	37.090432	-79.996403	Perennial	RPW	R3UB2	10	4-22
S-GH4	UNT to Teels Creek	Franklin	37.089975	-79.956256	Perennial	RPW	R3UB1	8	4-30

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-GH2	UNT to Teels Creek	Franklin	37.089912	-79.954037	Intermittent	RPW	R4SB4	8	4-31
S-IJ33	UNT to Little Creek	Franklin	37.089899	-80.004455	Ephemeral	NRPW	R6	5	4-21
S-GH3	UNT to Teels Creek	Franklin	37.089785	-79.956520	Perennial	RPW	R3UB2	10	4-30
S-MN24	UNT to Teels Creek	Franklin	37.089571	-79.949809	Ephemeral	NRPW	R6	2	4-31
S-KL3	UNT to Little Creek	Franklin	37.089390	-79.994716	Intermittent	RPW	R4SB4	4	4-23
S-GH5	UNT to Teels Creek	Franklin	37.089376	-79.961449	Intermittent	RPW	R4SB4	10	4-27
S-IJ8	UNT to Little Creek	Franklin	37.089367	-80.018112	Ephemeral	NRPW	R6	4	4-18
S-IJ11	Little Creek	Franklin	37.089345	-80.005214	Perennial	RPW	R2UB1	3	4-21
S-IJ10	Little Creek	Franklin	37.089138	-80.004983	Perennial	RPW	R3RB1	9	4-21
S-IJ9	UNT to Little Creek	Franklin	37.088498	-80.005640	Ephemeral	NRPW	R6	6	4-21
S-E29	UNT to Teels Creek	Franklin	37.088483	-79.950278	Perennial	RPW	R3UB1	8	4-31
S-E30	UNT to Teels Creek	Franklin	37.088257	-79.951154	Ephemeral	NRPW	R6	5	4-31
S-EF16	UNT to Teels Creek	Franklin	37.085872	-79.947796	Intermittent	RPW	R4SB5	6	4-32
S-E28	Teels Creek	Franklin	37.085497	-79.948736	Perennial	RPW	R2UB2	25	4-27 to 4-32
S-E28-Braid	Teels Creek	Franklin	37.088196	-79.950501	Perennial	RPW	R2UB2	5	4-31
S-E31	UNT to Teels Creek	Franklin	37.085471	-79.948921	Intermittent	RPW	R4SB3	5	4-32
S-E33	UNT to Teels Creek	Franklin	37.085298	-79.947668	Intermittent	RPW	R4SB5	5	4-32
S-E32	UNT to Teels Creek	Franklin	37.085025	-79.948517	Ephemeral	NRPW	R6	4	4-32
S-E34	UNT to Teels Creek	Franklin	37.083416	-79.946004	Intermittent	RPW	R4SB5	5	4-32
S-E35	UNT to Teels Creek	Franklin	37.083340	-79.946168	Intermittent	RPW	R4SB5	3	4-32
S-EF2	UNT to Teels Creek	Franklin	37.082317	-79.945915	Intermittent	RPW	R4SB5	5	4-32
S-EF3	UNT to Teels Creek	Franklin	37.079722	-79.941609	Intermittent	RPW	R4SB5	6	4-33
S-EF5	Teels Creek	Franklin	37.079354	-79.942469	Perennial	RPW	R2UB1	30	4-33
S-EF4	UNT to Teels Creek	Franklin	37.079104	-79.941820	Perennial	RPW	R3UB1	20	4-33
S-EF6	UNT to Teels Creek	Franklin	37.074852	-79.940402	Ephemeral	NRPW	R6	3	4-34
S-EF7	UNT to Teels Creek	Franklin	37.074722	-79.940954	Ephemeral	NRPW	R6	1.5	4-34
S-EF8	UNT to Teels Creek	Franklin	37.074206	-79.941558	Ephemeral	NRPW	R6	3.5	4-34
S-EF12	Teels Creek	Franklin	37.073537	-79.940685	Perennial	RPW	R2UB1	25	4-34
S-MM41	Teels Creek	Franklin	37.073413	-79.937967	Perennial	RPW	R2UB1	20	4-34
S-EF9	UNT to Teels Creek	Franklin	37.073398	-79.940788	Ephemeral	NRPW	R6	2	4-34
S-EF11	UNT to Teels Creek	Franklin	37.073201	-79.940521	Ephemeral	NRPW	R6	6	4-34
S-EF10	UNT to Teels Creek	Franklin	37.073158	-79.940606	Ephemeral	NRPW	R6	5	4-34
S-MM42	UNT to Teels Creek	Franklin	37.070708	-79.937051	Ephemeral	NRPW	R6	2	4-35
S-D23	Teels Creek	Franklin	37.070432	-79.931141	Perennial	RPW	R2UB2	20	4-36
S-D22	UNT to Teels Creek	Franklin	37.070397	-79.929551	Intermittent	RPW	R4SB4	8	4-36
S-D19	UNT to Teels Creek	Franklin	37.070058	-79.925894	Ephemeral	NRPW	R6	3	4-36
S-D18	UNT to Teels Creek	Franklin	37.069967	-79.925813	Ephemeral	NRPW	R6	2	4-36
S-EF15	Teels Creek	Franklin	37.069621	-79.934293	Perennial	RPW	R2UB1	30	4-35 & 4-36
S-D20	UNT to Teels Creek	Franklin	37.069478	-79.926227	Intermittent	RPW	R4SB4	8	4-36
S-RR15	UNT to Teels Creek	Franklin	37.069193	-79.933876	Perennial	RPW	R3UB3	14	4-36
S-EF14	UNT to Teels Creek	Franklin	37.069096	-79.926065	Intermittent	RPW	R4SB5	2	4-36
S-C12	UNT to Teels Creek	Franklin	37.068809	-79.922934	Perennial	RPW	R3UB1	35	4-37
S-EF13	UNT to Teels Creek	Franklin	37.067124	-79.923725	Ephemeral	NRPW	R6	9	4-37
S-YZ3	UNT to Blackwater River	Franklin	37.066359	-79.877344	Ephemeral	NRPW	R6	12	4-46
S-EF48	UNT to Blackwater River	Franklin	37.064822	-79.874559	Intermittent	RPW	R4SB3	5	4-47
S-YZ4	UNT to Blackwater River	Franklin	37.064651	-79.878345	Ephemeral	NRPW	R6	9	4-46
S-KL61	UNT to Blackwater River	Franklin	37.064305	-79.872833	Ephemeral	NRPW	R6	4	4-47
S-C13	UNT to Teels Creek	Franklin	37.063979	-79.921572	Perennial	RPW	R3UB1	25	4-38
S-YZ5	UNT to Blackwater River	Franklin	37.063486	-79.878234	Ephemeral	NRPW	R6	12	4-46
S-C15	UNT to Teels Creek	Franklin	37.062769	-79.921069	Intermittent	RPW	R4SB4	5	4-38
S-C14	Teels Creek	Franklin	37.062623	-79.921118	Perennial	RPW	R2UB1	50	4-38
S-KL41	UNT to Blackwater River	Franklin	37.062406	-79.862726	Perennial	RPW	R3RB1	14	4-48
S-KL40	UNT to Blackwater River	Franklin	37.061694	-79.880348	Intermittent	RPW	R4SB4	5	4-46
S-KL39	UNT to Blackwater River	Franklin	37.061528	-79.880206	Perennial	RPW	R3UB1	7	4-46
S-C16	UNT to Teels Creek	Franklin	37.060626	-79.920804	Perennial	RPW	R3UB1	15	4-38

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-KL54	UNT to Maggodee Creek	Franklin	37.059656	-79.840762	Perennial	RPW	R3UB1	10	4-52
S-C8	UNT to Blackwater River	Franklin	37.059228	-79.853306	Intermittent	RPW	R4SB5	5	4-50
S-F4	UNT to Blackwater River	Franklin	37.059048	-79.853316	Ephemeral	NRPW	R6	10	4-50
S-C17	Teels Creek	Franklin	37.058490	-79.918078	Perennial	RPW	R2UB1	30	4-40
S-KL52	UNT to Maggodee Creek	Franklin	37.058220	-79.845162	Ephemeral	NRPW	R6	1	4-51
S-KL53	UNT to Maggodee Creek	Franklin	37.058089	-79.844379	Intermittent	RPW	R4SB3	7	4-51
S-CD7	UNT to Little Creek	Franklin	37.057962	-79.915153	Intermittent	RPW	R4SB5	5	4-40
S-S11	UNT to Maggodee Creek	Franklin	37.057772	-79.838571	Perennial	RPW	R3UB3	11	4-52
S-S10	UNT to Maggodee Creek	Franklin	37.057716	-79.839013	Perennial	RPW	R3UB2	11	4-52
S-F8	UNT to Maggodee Creek	Franklin	37.057708	-79.836428	Perennial	RPW	R3RB1	30	4-51 & 4-52
S-CD6-Braid	Little Creek	Franklin	37.057562	-79.912983	Ephemeral	NRPW	R6	12	4-40
S-CD6	Little Creek	Franklin	37.057323	-79.914138	Perennial	RPW	R2UB1	70	4-40
S-HH4	UNT to Maggodee Creek	Franklin	37.056286	-79.835918	Intermittent	RPW	R4SB3	9	4-53
S-KL51	UNT to Blackwater River	Franklin	37.056126	-79.850377	Perennial	RPW	R3UB2	5.5	4-50
S-KL38	UNT to Blackwater River	Franklin	37.055870	-79.883129	Perennial	RPW	R3UB1	10	4-44 & 4-45
S-C20	UNT to Maggodee Creek	Franklin	37.055217	-79.833884	Ephemeral	NRPW	R6	4	4-53
S-C19	Maggodee Creek	Franklin	37.055101	-79.830082	Perennial	RPW	R2UB1	45	4-53
S-MM43	UNT to Maggodee Creek	Franklin	37.054822	-79.834646	Ephemeral	NRPW	R6	4	4-53
S-KL37	UNT to Blackwater River	Franklin	37.053546	-79.884791	Perennial	RPW	R3UB1	10	4-44
S-EF47	UNT to Blackwater River	Franklin	37.053514	-79.884950	Intermittent	RPW	R4SB4	2.5	4-44
S-KL36	UNT to Blackwater River	Franklin	37.053197	-79.884102	Perennial	RPW	R3UB1	10	4-44
S-F11	Blackwater River	Franklin	37.052798	-79.825763	Perennial	TNW	R2	90	4-44
S-KL35	UNT to Blackwater River	Franklin	37.052080	-79.885564	Perennial	RPW	R3UB1	4	4-44
S-II2	Little Creek	Franklin	37.050229	-79.907717	Perennial	RPW	R2RB1	60	4-41
S-F9b	UNT to Blackwater River	Franklin	37.049179	-79.817171	Perennial	RPW	R3UB1	15	4-55
S-F9a	UNT to Blackwater River	Franklin	37.047179	-79.813345	Intermittent	RPW	R4SB3	15	4-55
S-CD1	UNT to Blackwater River	Franklin	37.048036	-79.897625	Perennial	RPW	R3UB2	7	4-43
S-F10	UNT to Blackwater River	Franklin	37.047976	-79.814071	Ephemeral	NRPW	R6	9	4-55
S-MM29	UNT to Maple Branch	Franklin	37.043839	-79.822842	Perennial	RPW	R3RB1	15	4-56
S-MM23	Maple Branch	Franklin	37.043715	-79.823066	Perennial	RPW	R2RB1	20	4-56
S-GG4	UNT to Blackwater River	Franklin	37.042691	-79.809035	Ephemeral	NRPW	R6	5	4-58
S-A36	UNT to Foul Ground Creek	Franklin	37.038092	-79.804231	Ephemeral	NRPW	R6	4	4-59
S-A37	UNT to Blackwater River	Franklin	37.037484	-79.801550	Ephemeral	NRPW	R6	8.5	4-59
S-A38	UNT to Foul Ground Creek	Franklin	37.036379	-79.799583	Intermittent	RPW	R4SB4	9	4-60
S-A40	UNT to Foul Ground Creek	Franklin	37.036033	-79.799288	Intermittent	RPW	R4SB4	5.8	4-60
S-GG5	UNT to Foul Ground Creek	Franklin	37.035892	-79.799596	Intermittent	RPW	R4SB4	2	4-60
S-A41	Foul Ground Creek	Franklin	37.032030	-79.787994	Perennial	RPW	R2UB1	12	4-62
S-GH36	UNT to Foul Ground Creek	Franklin	37.031187	-79.778447	Intermittent	RPW	R4SB5	8	4-63
S-GH38	UNT to Foul Ground Creek	Franklin	37.031084	-79.777959	Intermittent	RPW	R4SB4	5	4-63
S-GH37	UNT to Foul Ground Creek	Franklin	37.031068	-79.778065	Intermittent	RPW	R4SB3	7	4-63
S-KL17	UNT to Foul Ground Creek	Franklin	37.030963	-79.778452	Intermittent	RPW	R4SB3	7	4-63
S-GH39	UNT to Foul Ground Creek	Franklin	37.030868	-79.778138	Intermittent	RPW	R4SB4	12	4-63
S-GH40	UNT to Foul Ground Creek	Franklin	37.029265	-79.774628	Ephemeral	NRPW	R6	8	4-63
S-GH44	UNT to Foul Ground Creek	Franklin	37.028527	-79.773483	Perennial	RPW	R3UB2	8	4-63 & 4-64
S-IJ47	UNT to Foul Ground Creek	Franklin	37.028172	-79.773360	Ephemeral	NRPW	R6	4	4-64
S-IJ46	UNT to Foul Ground Creek	Franklin	37.028033	-79.772790	Intermittent	RPW	R4SB3	6	4-64
S-IJ44	UNT to Foul Ground Creek	Franklin	37.027924	-79.772555	Intermittent	RPW	R4SB3	6	4-64
S-IJ45	UNT to Foul Ground Creek	Franklin	37.027858	-79.772518	Intermittent	RPW	R4SB3	6	4-64
S-G22	UNT to Poplar Camp Creek	Franklin	37.019601	-79.761973	Perennial	RPW	R3UB1	12	4-65
S-G21	UNT to Poplar Camp Creek	Franklin	37.019445	-79.761665	Intermittent	RPW	R4SB4	3	4-65
S-G23	UNT to Poplar Camp Creek	Franklin	37.019416	-79.761980	Intermittent	RPW	R4SB2	3	4-65
S-G20	Poplar Camp Creek	Franklin	37.017404	-79.759962	Perennial	RPW	R2UB1	10	4-66
S-G19	UNT Poplar Camp Creek	Franklin	37.016284	-79.758354	Intermittent	RPW	R4SB4	3	4-65
S-G18	UNT to Blackwater River	Franklin	37.009355	-79.754023	Intermittent	RPW	R4SB4	2	4-67
S-G17	UNT to Blackwater River	Franklin	37.005500	-79.752637	Ephemeral	NRPW	R6	5	4-68

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-E19	UNT to Blackwater River	Franklin	37.005265	-79.752891	Ephemeral	NRPW	R6	3	4-68
S-E18	UNT to Blackwater River	Franklin	37.001224	-79.747735	Perennial	RPW	R3UB1	7	4-69
S-II5	UNT to Blackwater River	Franklin	37.000857	-79.747730	Intermittent	RPW	R4SB5	3	4-69
S-E17	UNT to Blackwater River	Franklin	37.000474	-79.742850	Perennial	RPW	R3RB1	8	4-69
S-E13	UNT to Blackwater River	Franklin	36.995794	-79.734266	Perennial	RPW	R3UB1	8	4-70 & 4-71
S-E14	UNT to Blackwater River	Franklin	36.995658	-79.735303	Perennial	RPW	R2UB2	20	4-70
S-E15	UNT to Blackwater River	Franklin	36.995551	-79.735385	Intermittent	RPW	R4SB4	3	4-70
S-AB7	UNT to Jacks Creek	Franklin	36.994185	-79.707333	Ephemeral	NRPW	R6	3	4-75
S-H40	UNT to Jacks Creek	Franklin	36.989791	-79.722359	Ephemeral	NRPW	R6	4	4-72
S-H38	UNT to Jacks Creek	Franklin	36.989476	-79.722379	Perennial	RPW	R3UB2	12	4-72
S-H39	UNT to Jacks Creek	Franklin	36.989330	-79.722490	Ephemeral	NRPW	R6	6	4-72
S-H33	UNT to Jacks Creek	Franklin	36.988503	-79.708075	Ephemeral	NRPW	R6	10	4-74
S-H32	UNT to Jacks Creek	Franklin	36.988314	-79.708174	Perennial	RPW	R3UB2	10	4-74
S-H35	UNT to Jacks Creek	Franklin	36.988270	-79.711764	Intermittent	RPW	R4SB3	4	4-74
S-A19/H26	UNT to Jacks Creek	Franklin	36.988054	-79.699227	Ephemeral	NRPW	R6	7	4-76
S-A19/H26	UNT to Jacks Creek	Franklin	36.988054	-79.699227	Intermittent	RPW	R4SB3	7	4-76
S-H31	UNT to Jacks Creek	Franklin	36.988008	-79.705321	Ephemeral	NRPW	R6	8	4-74
S-H37	UNT to Jacks Creek	Franklin	36.988004	-79.717452	Ephemeral	NRPW	R6	6	4-73
S-H36	UNT to Jacks Creek	Franklin	36.987901	-79.714803	Perennial	RPW	R3UB1	3	4-73
S-H34	UNT to Jacks Creek	Franklin	36.987889	-79.711849	Perennial	RPW	R3UB2	3	4-74
S-H30	UNT to Jacks Creek	Franklin	36.987776	-79.702611	Intermittent	RPW	R4SB5	1	4-76
S-A20	UNT to Jacks Creek	Franklin	36.987769	-79.698584	Perennial	RPW	R3RB1	7	4-76
S-A20a	UNT to Jacks Creek	Franklin	36.988055	-79.698514	Ephemeral	NRPW	R6	4	4-76
S-A18	UNT to Jacks Creek	Franklin	36.987689	-79.700488	Intermittent	RPW	R4SB5	2.6	4-76
S-A21	UNT to Jacks Creek	Franklin	36.987428	-79.697102	Ephemeral	NRPW	R6	7	4-76
S-H27	UNT to Jacks Creek	Franklin	36.985184	-79.692236	Ephemeral	NRPW	R6	10	4-77
S-H28	UNT to Jacks Creek	Franklin	36.985173	-79.692271	Ephemeral	NRPW	R6	6	4-77
S-A22	UNT to Jacks Creek	Franklin	36.984864	-79.691832	Intermittent	RPW	R4SB4	8	4-77
S-A23	UNT to Jacks Creek	Franklin	36.984125	-79.691225	Intermittent	RPW	R4SB5	8	4-77
S-A24	UNT to Jacks Creek	Franklin	36.983922	-79.690799	Intermittent	RPW	R4SB5	6	4-77
S-MM44	UNT to Little Jacks Creek	Franklin	36.982321	-79.687709	Perennial	RPW	R3UB1	4	4-77
S-MM46	UNT to Little Jacks Creek	Franklin	36.982167	-79.687483	Intermittent	RPW	R4SB5	3	4-77
S-MM45	UNT to Little Jacks Creek	Franklin	36.981903	-79.687120	Ephemeral	NRPW	R6	4	4-77
S-MM47	UNT to Little Jacks Creek	Franklin	36.981869	-79.687335	Intermittent	RPW	R4SB5	3	4-77
S-MM49	UNT to Little Jacks Creek	Franklin	36.979677	-79.684077	Perennial	RPW	R3UB2	4	4-78
S-MM48	UNT to Little Jacks Creek	Franklin	36.979175	-79.684174	Perennial	RPW	R3UB1	7	4-78
S-A16	UNT to Little Jacks Creek	Franklin	36.978991	-79.681928	Ephemeral	NRPW	R6	3	4-78
S-H25	Little Jacks Creek	Franklin	36.978648	-79.682054	Perennial	RPW	R2UB2	7	4-78
S-A17	UNT to Little Jacks Creek	Franklin	36.978218	-79.680111	Intermittent	RPW	R4SB4	2.5	4-78
S-H24	UNT to Little Jacks Creek	Franklin	36.978012	-79.681159	Perennial	RPW	R3UB2	10	4-78
S-H24-Braid	UNT to Little Jacks Creek	Franklin	36.978315	-79.682448	Ephemeral	NRPW	R6	12	4-78
S-A15	UNT to Little Jacks Creek	Franklin	36.977950	-79.681171	Intermittent	RPW	R4SB3	6	4-78
S-H23	UNT to Turkey Creek	Franklin	36.976411	-79.677530	Ephemeral	NRPW	R6	5	4-80
S-A14	UNT to Turkey Creek	Franklin	36.976171	-79.676738	Ephemeral	NRPW	R6	4	4-80
S-HH1	UNT to Turkey Creek	Franklin	36.973968	-79.674605	Ephemeral	NRPW	R6	5	4-80
S-H21	UNT to Turkey Creek	Franklin	36.973731	-79.673046	Perennial	RPW	R3UB1	11	4-80 & 4-82
S-A12	UNT to Turkey Creek	Franklin	36.973688	-79.671344	Ephemeral	NRPW	R6	3	4-82
S-H22	UNT to Turkey Creek	Franklin	36.973626	-79.672872	Intermittent	RPW	R4SB3	4	4-82
S-A13	Turkey Creek	Franklin	36.973500	-79.672933	Perennial	RPW	R2UB1	8	4-80
S-A11	UNT to Turkey Creek	Franklin	36.973446	-79.670056	Ephemeral	NRPW	R6	3	4-82
S-A9	UNT to Turkey Creek	Franklin	36.973236	-79.667212	Ephemeral	NRPW	R6	5	4-82
S-H20	UNT to Turkey Creek	Franklin	36.972985	-79.672583	Intermittent	RPW	R4SB5	2	4-82
S-H19	UNT to Dinner Creek	Franklin	36.972394	-79.663090	Ephemeral	NRPW	R6	3	4-83
S-H17	Dinner Creek	Franklin	36.971983	-79.662988	Intermittent	RPW	R4SB4	8	4-83
S-A7	UNT to Dinner Creek	Franklin	36.971931	-79.662582	Perennial	RPW	R3UB1	6	4-83

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-H18	UNT to Dinner Creek	Franklin	36.971914	-79.663390	Ephemeral	NRPW	R6	8	4-83
S-SS8	Polecat Creek	Franklin	36.970877	-79.657360	Perennial	RPW	R3UB1	8	4-83
S-AB10	UNT to Owens Creek	Franklin	36.970590	-79.651695	Intermittent	RPW	R4SB3	3	4-84
S-AB11	UNT to Owens Creek	Franklin	36.970555	-79.652029	Ephemeral	NRPW	R6	2.5	4-84
S-CD8	UNT to Owens Creek	Franklin	36.970474	-79.653714	Intermittent	RPW	R4SB4	6.5	4-84
S-AB9	UNT to Owens Creek	Franklin	36.970451	-79.650979	Ephemeral	NRPW	R6	3	4-84
S-CD9	UNT to Owens Creek	Franklin	36.970329	-79.654073	Ephemeral	NRPW	R6	10	4-84
S-AB8	UNT to Owens Creek	Franklin	36.970095	-79.651302	Intermittent	RPW	R4SB3	7	4-84
S-DD3	Owens Creek	Franklin	36.968931	-79.644924	Intermittent	RPW	R4SB3	15	4-85
S-G16	Strawfield Creek	Franklin	36.968703	-79.642159	Perennial	RPW	R3RB1	30	4-85
S-G15	UNT to Parrot Branch	Franklin	36.967664	-79.636574	Intermittent	RPW	R4SB3	9	4-86
S-G14	UNT to Parrot Branch	Franklin	36.967429	-79.630877	Intermittent	RPW	R4SB4	5	4-86
S-G13	Parrot Branch	Franklin	36.966990	-79.630775	Perennial	RPW	R2UB1	8	4-86
S-D7	UNT to Jonnikin Creek	Franklin	36.964814	-79.617047	Intermittent	RPW	R4SB3	8	4-88

Notes:

- 1
- For identified streams without a NHD (National Hydrography Dataset) name, the identified stream was given the name, “Unidentified Tributary (UNT)”, of the first named receiving waterbody
- 2
- In decimal degrees
- 3
- RPW = Relatively Permanent Waters
- NRPW = Non-Relatively Permanent Waters
- TNW = Traditional Navigable Waters
- 4
- See Cowardin et al., 1979

Table 1.
Identified Wetlands

Wetland ID	Wetland Habitat ID	County	Latitude ¹	Longitude ¹	Cowardin Class ²	HGM ³	Water Type ⁴	Associated Waterbodies	Size (Acres) ⁵	Size (square feet) ⁵	Open/Closed Boundary	Dominant Species	Figure
W-KL14	W-KL14	Giles	37.395903	-80.680455	PSS	Depressional	ISOLATE	-	0.004	161	Closed	<i>Nyssa sylvatica, Vaccinium corymbosum, Acer rubrum, Viola blanda</i>	4-2
W-UU11	W-UU11	Giles	37.380254	-80.720485	PEM	Slope	NRPWW	Clendennin Creek	0.02	736	Open	<i>Kalmia latifolia, Rhododendron maximum, Polytrichum commune, Linder benzoin, Scirpus cyperinus</i>	4-10
W-UU12	W-UU12	Giles	37.378364	-80.722579	PEM	Depressional	NRPWW	-	0.003	148	Closed	<i>Kalmia latifolia, Scirpus cyperinus, Mentha arvensis</i>	4-10
W-HH15	W-HH15	Giles	37.371087	-80.736164	PEM	Depressional	NRPWW	-	0.03	1,413	Open	<i>Glyceria melicaria, Impatiens capensis</i>	4-12
W-HH14	W-HH14	Giles	37.371001	-80.737201	PEM	Slope	RPWWD	S-HH15 (UNT to Clendennin Creek)	0.01	619	Closed	<i>Scirpus polyphyllus, Glyceria melicaria</i>	4-13
W-CD42	W-CD42	Giles	37.359849	-80.680752	PEM	Depressional	ISOLATE	-	0.20	8,585	Closed	<i>Typha angustifolia</i>	4-21
W-S1	W-S1	Giles	37.359304	-80.680935	PEM	Depressional	ISOLATE	-	0.50	21,577	Closed	<i>Typha glauca, Rumex crispus</i>	4-21
W-C3	W-C3	Giles	37.357774	-80.681567	PEM	Depressional	ISOLATE	-	0.21	9,237	Closed	<i>Acer negundo, Typha glauca, Rumex crispus</i>	4-21
W-Z11	W-Z11	Giles	37.346541	-80.641737	PEM	Depressional	NRPWW	UNT to Little Stony Creek	0.04	1,637	Closed	<i>Poa trivialis, Panicum virgatum</i>	4-28
W-Z3	W-Z3	Giles	37.342235	-80.620665	PSS	Riverine	RPWWD	S-Z6, S-Z11 (UNTs to Little Stony Creek), S-Z13 (Little Stony Creek)	0.03	1,168	Closed	<i>Acer saccharum, Linder benzoin, Carex vulpinoidea</i>	4-30
W-Z5	W-Z5	Giles	37.340926	-80.617390	PEM	Slope	NRPWW	-	0.001	53	Closed	<i>Betula nigra, Rubus idaeus, Symphyotrichum puniceum, Bidens tripartida, Verbesina alternifolia</i>	4-31
W-MN13	W-MN13b	Giles	37.334839	-80.806722	PEM	Depressoinal	TNWW	New River	0.029739	1295.435689	Closed	<i>Eleocharis obtusa, Juncus tenuis</i>	4-69
	W-MN13a	Giles	37.334723	-80.806356	PEM	Depressional	TNWW	UNT to the New River	0.166096	7235.124500	Closed	<i>Juncus tenui, Eleocharis microcarpa, Carex lurida</i>	4-69
W-MN12	W-MN12	Giles	37.334398	-80.802305	PEM	Slope	NRPWW	UNT to the New River	0.014861	647.341594	Closed	<i>Equisetum hyemale, Conium maculatum, Verbesina alternifolia</i>	4-69
W-AD1	W-AD1	Giles	37.334359	-80.806857	PEM	Riverine	TNWW	New River	0.033193	1445.886385	Closed	<i>Persicaria maculosa, Eleocharis microcarpa, Echinochloa crus-galli</i>	4-69
W-AC1	W-AC1	Giles	37.334226	-80.805125	PEM	Depressoinal	TNWW	New River	0.057000	2482.915216	Closed	<i>Echinochloa crus-galli, Eleocharis obtusa, Juncus tenuis</i>	4-69
W-AC2	W-AC2	Giles	37.334036	-80.804747	PEM	Depressoinal	TNWW	New River	0.007381	321.507002	Closed	<i>Eleocharis obrusa, Persicaria maculosa, Juncus tenuis</i>	4-69
W-AC3	W-AC3	Giles	37.333989	-80.806273	PEM	Depressoinal	TNWW	New River	0.184506	8037.037211	Closed	<i>Eleocharis obtusa, Carex vulpinoidea</i>	4-69
W-PP4	W-PP4	Craig	37.328098	-80.422532	PEM	Riverine	RPWWD	S-PP4 (UNT to Sinking Creek)	0.09	3,943	Open	<i>Juncus effusus, Carex lurida, Festuca spp.</i>	4-66
W-PP3	W-PP3	Craig	37.326940	-80.426338	PEM	Riverine	RPWWD	S-PP3 (UNT to Sinking Creek)	0.02	901	Open	<i>Ailanthus altissima, Leersia oryzoides, Impatiens capensis</i>	4-65
W-UV1	W-UV1	Craig	37.326337	-80.425564	PEM	Riverine	RPWWD	S-PP3 (UNT to Sinking Creek)	0.005	200	Closed	<i>Carex lurida, Poa pratensis</i>	4-65
W-E6	W-E6	Giles	37.325624	-80.563328	PSS	Slope	RPWWD	S-E25, S-E26 (UNTs to Sinking Creek)	0.38	16,380	Closed	<i>Linder benzoin, Aesculus flava, Impatiens capensis</i>	4-38
W-PP2	W-PP2	Craig	37.324421	-80.431089	PEM	Riverine	RPWWD	S-PP1 (UNT to Sinking Creek)	0.02	847	Open	<i>Impatiens capensis, Carex lurida</i>	4-64
W-RR2	W-RR2	Giles	37.322988	-80.555366	PEM	Riverine	RPWWD	S-RR5 (UNT to Sinking Creek)	0.10	4,271	Closed	<i>Juniperus virginiana, Eupatorium perfoliatum, Leersia oryzoides, Eleocharis obtusa</i>	4-41
W-KL47	W-KL47	Giles	37.319143	-80.441098	PEM	Riverine	RPWWD	S-OO13 (UNT to Sinking Creek)	0.003877	168.880427	Closed	<i>Lindea benzoin, Carex prasina, Glyceria striata, Impatiens capensis</i>	4-63
W-OO6	W-OO6	Giles	37.319014	-80.441791	PEM	Riverine	RPWWD	S-OO15 (UNT to Sinking Creek)	0.04	1,559	Closed	<i>Vernonia gigantea, Persicaria hydropiper, Boehmeria cylindrica</i>	4-63
W-CD12	W-CD12	Giles	37.318656	-80.441741	PEM	Riverine	RPWWD	S-OO14 (UNT to Sinking Creek)	0.02	904	Closed	<i>Poa trivialis, Linder benzoin</i>	4-63
W-MM10	W-MM10	Giles	37.298209	-80.480531	PEM	Riverine	RPWWD	S-MM17 (UNT to Sinking Creek)	0.06	2,646	Closed	<i>Leersia oryzoides, Juncus effusus, Persicaria pennsylvanica, Mentha spicata, Cyperus esculentes, Eupatorium perfoliatum</i>	4-55
W-RR1	W-RR1a	Giles	37.296406	-80.493821	PEM	Riverine	RPWWD	S-RR1 (UNT to Greenbriar Branch)	0.02	899	Closed	<i>Salix nigra, Iva frutescend, Impatiens capensis, Cardemine rotundifolia</i>	4-53
	W-RR1b	Giles	37.296330	-80.494052	PEM	Riverine	RPWWD	S-RR2 (Greenbriar Branch)	0.004	169	Closed	<i>Salix nigra, Iva frutescend, Impatiens capensis, Cardemine rotundifolia</i>	4-53

Notes:

- 1

- In decimal degrees. Coordinates show wetland test pit locations
- 2

- PEM = Palustrine Emergent
- PSS = Palustrine Scrub-Shrub
- PFO = Palustrine Forested
- 3

- HGM = Hydrogeomorphic
- 4

- RPWWD = Wetlands directly abutting Relatively Permanent Waters (RPWs) that flow directly or indirectly into Traditional Navigable Waterways (TNWs)
- RPWWN = Wetlands adjacent but not directly abutting RPWs that flow directly or indirectly into TNWs
- NRPWW = Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- Isolate = Isolated (interstate or intrastate) waters, including isolated wetlands
- 5

- Size of wetlands with open boundaries may be larger than shown in this table. See Section 3.1 for more information

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-KL24	UNT to Kimballton Branch	Giles	37.400694	-80.687779	Ephemeral	NRPW	R6	3	4-1
S-PP14	Kimballton Branch	Giles	37.392676	-80.693871	Perennial	RPW	R2RB1	14	4-6
S-PP15	UNT to Kimballton Branch	Giles	37.392628	-80.690067	Perennial	RPW	R3RB1	6	4-5
S-PP17	UNT to New River	Giles	37.386744	-80.700408	Intermittent	RPW	R4SB3	2	4-7
S-PP18	Curve Branch	Giles	37.385499	-80.708750	Perennial	RPW	R2UB1	4	4-9
S-PP19	UNT to Curve Branch	Giles	37.382048	-80.714071	Intermittent	RPW	R4SB5	3	4-9
S-UU8-Braid	Clendennin Creek	Giles	37.381470	-80.719305	Perennial	RPW	R2UB1	3	4-10
S-UU8	Clendennin Creek	Giles	37.381467	-80.719287	Perennial	RPW	R2UB1	3	4-10
S-UU9	Clendennin Creek	Giles	37.381405	-80.719414	Perennial	RPW	R2UB1	5	4-10
S-Q10	UNT to Stony Creek	Giles	37.380659	-80.676314	Ephemeral	NRPW	R6	3	4-15
S-HH16	UNT to Clendennin Creek	Giles	37.376291	-80.725779	Intermittent	RPW	R4SB2	5	4-11
S-Q12	UNT to Kimballton Branch	Giles	37.375109	-80.680822	Ephemeral	NRPW	R6	4	4-16
S-Q13	Kimballton Branch	Giles	37.374574	-80.682346	Perennial	RPW	R2UB1	15	4-17
S-MN17	UNT to Clendennin Creek	Giles	37.373961	-80.732119	Intermittent	RPW	R4SB3	3	4-12
S-MN17-Braid	UNT to Clendennin Creek	Giles	37.373838	-80.731963	Intermittent	RPW	R4SB3	3	4-12
S-MN20	UNT to Clendennin Creek	Giles	37.373901	-80.731631	Intermittent	RPW	R4SB3	4	4-12
S-UV1	UNT to Kimballton Branch	Giles	37.371092	-80.685281	Ephemeral	NRPW	R6	2	4-17
S-Q14	Kimballton Branch	Giles	37.371058	-80.678948	Intermittent	RPW	R4SB3	12	4-18
S-HH15	UNT to Clendennin Creek	Giles	37.370798	-80.737186	Perennial	RPW	R3UB1	5	4-13
S-HH14	UNT to Clendennin Creek	Giles	37.370790	-80.738127	Intermittent	RPW	R4SB5	3	4-13
S-HH13	UNT to Clendennin Creek	Giles	37.366221	-80.744635	Perennial	RPW	R3RB2	8	4-14
S-HH12	UNT to Clendennin Creek	Giles	37.366134	-80.746301	Ephemeral	NRPW	R6	3	4-14
S-SS2	UNT to Clendennin Creek	Giles	37.365645	-80.749167	Intermittent	RPW	R4SB3	10	4-14
S-P6	UNT to Stony Creek	Giles	37.362146	-80.688181	Ephemeral	NRPW	R6	6	4-20
S-S5-Braid-2	UNT to Stony Creek	Giles	37.360490	-80.684011	Ephemeral	NRPW	R6	6	4-21
S-S5-Braid-1	Stony Creek	Giles	37.360298	-80.684131	Ephemeral	NRPW	R6	7	4-21
S-S5	Stony Creek	Giles	37.360047	-80.684028	Perennial	RPW	R2UB1	40	4-21
S-G32-Upstream	Dry Branch	Giles	37.351587	-80.649654	Intermittent	RPW	R4SB5	15	4-27
S-G32-Downstream	Dry Branch	Giles	37.349047	-80.652163	Intermittent	RPW	R4SB5	6	4-27
S-G29	UNT to Dry Branch	Giles	37.350688	-80.658579	Ephemeral	NRPW	R6	4	4-26
S-G30	UNT to Dry Branch	Giles	37.350545	-80.658166	Ephemeral	NRPW	R6	8	4-26
S-AB13	UNT to Dry Branch	Giles	37.350459	-80.648252	Ephemeral	NRPW	R6	3	4-27
S-G33	UNT to Dry Branch	Giles	37.348508	-80.647396	Perrenial	RPW	R3RB2	8	4-27
S-G35	UNT to Little Stony Creek	Giles	37.345654	-80.633690	Perennial	RPW	R3RB2	25	4-29
S-SS4	UNT to Little Stony Creek	Giles	37.345042	-80.631285	Ephemeral	NRPW	R6	3	4-29
S-Z7-Braid-1	UNT to Little Stony Creek	Giles	37.344230	-80.626039	Ephemeral	NRPW	R6	3	4-30
S-Z7-Braid-2	UNT to Little Stony Creek	Giles	37.343839	-80.626128	Ephemeral	NRPW	R6	4	4-30
S-Z7	UNT to Little Stony Creek	Giles	37.343693	-80.625907	Intermittent	RPW	R4SB3	3	4-30
S-Z9	UNT to Little Stony Creek	Giles	37.343990	-80.628376	Perennial	RPW	R3UB1	4	4-29
S-Z6	UNT to Little Stony Creek	Giles	37.342739	-80.621112	Intermittent	RPW	R4SB3	8	4-30
S-Z10	UNT to Little Stony Creek	Giles	37.342537	-80.620812	Intermittent	RPW	R4SB4	12	4-30
S-Z13	Little Stony Creek	Giles	37.342325	-80.619966	Perennial	RPW	R2RB2	25	4-30
S-Z11	UNT to Little Stony Creek	Giles	37.342229	-80.620620	Perennial	RPW	R3UB2	5	4-30
S-Z12-EPH	UNT to Little Stony Creek	Giles	37.342312	-80.620266	Ephemeral	NRPW	R6	6	4-30
S-Z12-INT	UNT to Little Stony Creek	Giles	37.342200	-80.620329	Intermittent	RPW	R4SB3	6	4-30
S-Z14	UNT to Little Stony Creek	Giles	37.341478	-80.618229	Intermittent	RPW	R4SB3	4	4-31
S-A34	UNT to Doe Creek	Giles	37.337981	-80.606035	Ephemeral	NRPW	R6	7	4-33
S-A33	UNT to Doe Creek	Giles	37.337711	-80.605332	Ephemeral	NRPW	R6	7	4-33
S-YZ1	Doe Creek	Giles	37.336487	-80.614550	Intermittent	RPW	R4SB3	10	4-31 & 32
S-A32	UNT to Doe Creek	Giles	37.335221	-80.596854	Perennial	RPW	R3RB1	16	4-34
S-MN35	UNT to New River	Giles	37.335201	-80.807706	Ephemeral	NRPW	R6	15	4-69
S-QQ2	Sinking Creek	Craig	37.333151	-80.429428	Perennial	RPW	R2UB1	35	4-67
S-MN11-Upstream	UNT to Sinking Creek	Giles	37.332807	-80.559237	Ephemeral	NRPW	R6	4	4-39
S-MN11-Downstream	UNT to Sinking Creek	Giles	37.332085	-80.560323	Ephemeral	NRPW	R6	5	4-39
S-Y3	UNT to Doe Creek	Giles	37.331874	-80.583183	Ephemeral	NRPW	R6	10	4-36
S-Y2	Doe Creek	Giles	37.331308	-80.583509	Perennial	RPW	R2UB2	25	4-36

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-CD13	UNT to Sinking Creek	Craig	37.330441	-80.426012	Intermittent	RPW	R4SB5	8	4-67
S-PP4	UNT to Sinking Creek	Craig	37.328083	-80.422564	Intermittent	RPW	R4SB5	2	4-66
S-RR3	UNT to Sinking Creek	Giles	37.327590	-80.551717	Ephemeral	NRPW	R6	7	4-42
S-PP3	UNT to Sinking Creek	Craig	37.326822	-80.426007	Perennial	RPW	R3UB1	3	4-65
S-RR4	UNT to Sinking Creek	Giles	37.326049	-80.556788	Perennial	RPW	R3RB2	3	4-42
S-E24	UNT to Sinking Creek	Giles	37.325786	-80.565033	Perennial	RPW	R3UB2	20	4-38
S-E25-Upstream	UNT to Sinking Creek	Giles	37.325767	-80.563538	Perennial	RPW	R3UB1	10	4-38
S-E25-Downstream	UNT to Sinking Creek	Giles	37.325593	-80.564729	Perennial	RPW	R3RB2	6	4-38
S-E26	UNT to Sinking Creek	Giles	37.325700	-80.563491	Intermittent	RPW	R4SB4	1	4-38
S-PP1	UNT to Sinking Creek	Craig	37.324749	-80.431325	Intermittent	RPW	R4SB3	3	4-64
S-PP2	UNT to Sinking Creek	Craig	37.324587	-80.430811	Intermittent	RPW	R4SB3	3	4-64
S-RR5	UNT to Sinking Creek	Giles	37.323559	-80.555588	Perennial	RPW	R3UB2	10	4-41
S-IJ18	UNT to Sinking Creek	Giles	37.322077	-80.552835	Intermittent	RPW	R4SB2	4	4-41
S-IJ19	UNT to Sinking Creek	Giles	37.321930	-80.553155	Ephemeral	NRPW	R6	4	4-41
S-CD14	UNT to Sinking Creek	Craig	37.320792	-80.435680	Ephemeral	NRPW	R6	5.5	4-64
S-CD14-Braid	UNT to Sinking Creek	Craig	37.320728	-80.435704	Ephemeral	NRPW	R6	2.5	4-64
S-OO13	UNT to Sinking Creek	Giles	37.319102	-80.441449	Perennial	RPW	R3RB2	20	4-63
S-OO15	UNT to Sinking Creek	Giles	37.319030	-80.441837	Intermittent	RPW	R4SB2	2	4-63
S-OO12	UNT to Sinking Creek	Giles	37.318758	-80.440041	Ephemeral	NRPW	R6	2	4-63
S-OO14	UNT to Sinking Creek	Giles	37.318572	-80.441613	Perennial	RPW	R3RB2	4	4-63
S-OO14-Braid	UNT to Sinking Creek	Giles	37.318303	-80.441560	Intermittent	RPW	R4SB3	5	4-63
S-IJ17	UNT to Sinking Creek	Giles	37.318499	-80.547834	Ephemeral	NRPW	R6	8	4-44
S-IJ16-b	UNT to Sinking Creek	Giles	37.318283	-80.547700	Ephemeral	NRPW	R6	10	4-44
S-IJ16-a	UNT to Sinking Creek	Giles	37.312740	-80.545017	Ephemeral	NRPW	R6	7	4-45
S-Y12	UNT to Sinking Creek	Giles	37.312537	-80.515875	Intermittent	RPW	R4SB3	6	4-50
S-QQ3	UNT to Sinking Creek	Giles	37.311638	-80.532287	Ephemeral	NRPW	R6	2	4-46 & 47
S-QQ3-b	UNT to Sinking Creek	Giles	37.309923	-80.532236	Ephemeral	NRPW	R6	6	4-47
S-NN17	Sinking Creek	Giles	37.311304	-80.516401	Perennial	RPW	R2UB1	70	4-50
S-KL43	UNT to Sinking Creek	Giles	37.307576	-80.466823	Perennial	RPW	R3UB1	10	4-59
S-NN9	UNT to Sinking Creek	Giles	37.307390	-80.467848	Perennial	RPW	R3UB1	5	4-49
S-NN18	UNT to Sinking Creek	Giles	37.307346	-80.512204	Ephemeral	NRPW	R6	4	4-51
S-NN11	UNT to Sinking Creek	Giles	37.305926	-80.467531	Intermittent	RPW	R4SB1	5	4-49
S-KL9	Sinking Creek	Giles	37.304466	-80.535400	Perennial	RPW	R2UB1	50	4-47 & 48
S-NN14	UNT to Sinking Creek	Giles	37.304205	-80.465675	Ephemeral	NRPW	R6	5	4-59
S-NN13	UNT to Sinking Creek	Giles	37.301701	-80.466394	Intermittent	RPW	R4SB3	2	4-58 & 59
S-CD25	Greenbrier Branch	Giles	37.301135	-80.489856	Perennial	RPW	R2UB1	8	4-54
S-EF23	UNT to Sinking Creek	Giles	37.300810	-80.472994	Perennial	RPW	R3UB1	8	4-57
S-NN12	UNT to Sinking Creek	Giles	37.300352	-80.472924	Ephemeral	NRPW	R6	2	4-57
S-MM17	UNT to Sinking Creek	Giles	37.299376	-80.481447	Perennial	RPW	R3UB1	2	4-55
S-EF24	UNT to Greenbrier Branch	Giles	37.297487	-80.493532	Intermittent	RPW	R4SB3	6	4-53
S-YZ6	UNT to Greenbriar Branch	Giles	37.296441	-80.494163	Intermittent	RPW	R4SB5	6	4-53
S-RR1	UNT to Greenbriar Branch	Giles	37.296306	-80.493814	Intermittent	RPW	R4SB4	3	4-53
S-RR2	Greenbriar Branch	Giles	37.296289	-80.494081	Perennial	RPW	R3RB2	8	4-53
S-MM18	UNT to Sinking Creek	Giles	37.296020	-80.481170	Ephemeral	NRPW	R6	5	4-55

Notes:

- 1
- For identified streams without a NHD (National Hydrography Dataset) name, the identified stream was given the name, “Unidentified Tributary (UNT)”, of the first named receiving waterbody
- 2
- In decimal degrees
- 3
- RPW = Relatively Permanent Waters
- NRPW = Non-Relatively Permanent Waters
- TNW = Traditional Navigable Waters
- 4
- See Cowardin et al., 1979

Table 1.
Identified Wetlands

Wetland ID	Wetland Habitat ID	County	Latitude ¹	Longitude ¹	Cowardin Class ²	HGM ³	Water Type ⁴	Associated Waterbodies	Size (Acres) ⁵	Size (square feet) ⁵	Open/Closed Boundary	Dominant Species	Figure
W-CD46	W-CD46	Montgomery	37.316173	-80.408603	PSS	Slope	NRPWW	UNT to Craig Creek	0.02	689	Closed	<i>Nyssa sylvatica, Acer rubrum, Carex intumescens, Boehmeria cylindrica</i>	4-2
W-KL46	W-KL46	Montgomery	37.298918	-80.39134	PEM	Riverine	RPWWD	S-MN21 (UNT to Mill Creek)	0.01	443	Closed	<i>Glyceria striata, Carex brunnescens</i>	4-6
W-IJ46	W-IJ46-PFO	Montgomery	37.296507	-80.367592	PFO	Riverine	RPWWD	S-IJ52 (UNT to Mill Creek)	0.09	3873	Open	<i>Platanus occidentalis, Rosa multiflora, Lindera benzoin, Verbesina alternifolia, Impatiens capensis, Carex crinita</i>	4-8
	W-IJ46-PEM	Montgomery	37.296224	-80.367493	PEM	Riverine	RPWWD	S-IJ52 (UNT to Mill Creek)	0.06	2419	Closed	<i>Verbesina alternifolia, Dichanthelium clandestinum, Impatiens capensis</i>	4-8
W-AD4	W-AD4	Montgomery	37.286987	-80.330144	PEM	Slope	NRPWW	UNT to Dry Run	0.01	344	Closed	<i>Juncus tenuis, Carex vulpinoidea, Scirpus atrovirens</i>	4-13
W-OO5	W-OO5	Montgomery	37.271859	-80.249254	PEM	Riverine	RPWWD	S-OO9 (UNT to Bradshaw Creek)	0.02	1074	Closed	<i>Boehmeria cylindrica, Microstegium vimineum, Ulmus americana</i>	4-36
W-NN7	W-NN7	Montgomery	37.269695	-80.313337	PEM	Slope	RPWWN	S-NN8b (UNT to North Fork Roanoke River)	0.02	978	Closed	<i>Leersia oryzoides, Impatiens capensis</i>	4-20
W-NN6	W-NN6	Montgomery	37.268527	-80.316574	PEM	Slope	RPWWN	UNT to North Fork Roanoke River	0.03	1279	Closed	<i>Carex lurida, Juncus effusus</i>	4-20
W-MN6	W-MN6	Montgomery	37.268	-80.3213	PEM	Slope	RPWWD	S-MN15 (UNT North Fork Roanoke River)	0.00	215	Open	<i>Leersia oryzoides, Impatiens capensis, Lonicera japonica</i>	4-19
W-G3	W-G3	Montgomery	37.267326	-80.316256	PEM	Depressional	RPWWD	S-G36 (North Fork Roanoke River)	0.03	1189	Closed	<i>Hydrilla verticillata, Glyceria striata</i>	4-20
W-G4	W-G4	Montgomery	37.267144	-80.312820	PEM	Riverine	NRPWW	S-G38 (UNT to Fork Fork Roanoke River)	0.01	387	Closed	<i>Lysimachia nummularia, Galium asprellum, Verbesina alternifolia, Glyceria acutiflora</i>	4-20
W-PP8	W-PP8	Montgomery	37.264606	-80.306970	PEM	Slope	RPWWD	S-G40 (UNT to North Fork Roanoke River)	0.02	923	Closed	<i>Dichanthelium clandestinum, Eupatorium perfoliatum</i>	4-21
W-F9	W-F9-PFO	Montgomery	37.258049	-80.285880	PFO	Riverine	RPWWD	S-F15 (UNT to Flatwoods Branch)	0.05	2209	Closed	<i>Quercus bicolor, Lindera benzoin</i>	4-26
	W-F9-PEM	Montgomery	37.257924	-80.285619	PEM	Riverine	RPWWD	S-F15 (UNT to Flatwoods Branch)	0.04	1770	Closed	<i>Carex vulpinoidea, Carex lurida, Juncus effusus, Poa sp.</i>	4-26
W-KL6	W-KL6	Montgomery	37.258002	-80.276767	PEM	Depressional	NRPWW	UNT outside survey corridor to Flatwoods Branch	0.11	4739	Closed	<i>Juncus effusus, Carex stricta, Juncus acuminatus</i>	4-27
W-EF47	W-EF47	Montgomery	37.257855	-80.277014	PEM	Slope	NRPWW	UNT outside survey corridor to Flatwoods Branch	0.01	465	Closed	<i>Carex vulpinoidea, Scirpus sp.</i>	4-27
W-F8	W-F8	Montgomery	37.257604	-80.284941	PEM	Slope	RPWWN	S-F16 (UNT to Flatwoods Branch)	0.00	120	Closed	<i>Carex lurida</i>	4-26
W-C12	W-C12	Montgomery	37.257125	-80.281757	PFO	Riverine	RPWWD	S-C33, S-C36 (UNTs to Flatwoods Branch)	0.09	3877	Closed	<i>Quercus bicolor, Acer rubrum, Lindera benzoin, Lonicera japonica, Smilax rotundifolia</i>	4-26
W-C11	W-C11	Montgomery	37.257071	-80.281424	PSS	Riverine	RPWWD	S-C32, S-C36, S-C37 (UNTs to Flatwoods Branch)	0.30	13099	Closed	<i>Lindera benzoin, Rosa multiflora, Arthraxon hispidus, Juncus effusus, Lonicera japonica</i>	4-26
W-C10	W-C10	Montgomery	37.256799	-80.281447	PEM	Riverine	RPWWD	S-C33 (UNT to Flatwoods Branch)	0.06	2594	Open	<i>Arthraxon hispidus, Juncus effusus, Lonicera japonica</i>	4-26
W-C8	W-C8	Montgomery	37.256618	-80.280572	PEM	Riverine	RPWWD	S-C32 (UNT to Flatwoods Branch)	0.15	6668	Closed	<i>Juncus effusus, Cyperus strigosus</i>	4-26
W-C5	W-C5	Montgomery	37.255500	-80.274193	PEM	Slope	NRPWW	S-C28 (UNT to Womack Branch)	0.13	5699	Closed	<i>Arthraxon hispidus, Toxicodendron vernix, Rosa multiflora</i>	4-27
W-C6	W-C6	Montgomery	37.255364	-80.276305	PEM	Depressional	ISOLATE	-	0.30	13212	Closed	<i>Carex stricta, Scirpus atrovirens</i>	4-27
W-OO8	W-OO8	Montgomery	37.235836	-80.228527	PEM	Depressional	ISOLATE	-	0.10	4379	Open	<i>Platanus occidentalis, Persicaria pensylvanica, Leersia oryzoides, Nasturtium officinale</i>	4-78
W-MN10	W-MN10	Roanoke	37.2512	-80.2029	PFO	Riverine	RPWWD	S-MN12c (UNT to Roanoke River)	0.19	8363	Open	<i>Platanus occidentalis, Impatiens capensis, Equisetum sylvaticum</i>	4-44
W-MN11	W-MN11	Roanoke	37.248315	-80.207068	PEM	Riverine	RPWWD	S-MN12c (UNT to Roanoke River)	0.07	2945	Open	<i>Impatiens capensis, Verbesina alternifolia, Lindera benzoin, Cara cordiformis</i>	4-43
W-OO7	W-OO7	Montgomery	37.235161	-80.194596	PEM	Riverine	RPWWD	S-AB15 (UNT to Roanoke River)	0.03	1196	Open	<i>Leersia oryzoides, Cardamine rotundifolia</i>	4-47
W-NN8	W-NN8	Montgomery	37.233558	-80.197654	PFO	Riverine	RPWWD	S-NN16 (Roanoke River)	0.18	8045	Open	<i>Platanus occidentalis, Lindera benzoin, Betula nigra, Micristegium viminium, Dichanthelium clandestinu, Vitis aestivali, Toxicodendron radicans</i>	4-49
W-AB7	W-AB7	Montgomery	37.231473	-80.198483	PEM	Slope	RPWWD	S-AB17 (UNT to Roanoke River)	0.07	3224	Closed	<i>Typha angustifolia, Equisetum arvense</i>	4-49
W-CD11	W-CD11	Montgomery	37.228102	-80.200038	PEM	Riverine	RPWWD	S-CD12 (UNT to South Fork Roanoke River)	0.19	8185	Open	<i>Poa trivialis</i>	4-50
W-EF5	W-EF5-PFO	Montgomery	37.210645	-80.193790	PFO	Riverine	RPWWD	S-EF20 (UNT to Roanoke River)	0.62	26937	Open	<i>Platanus occidentalis, Acer negundo, Lindera benzoin, Rosa multiflora, Microstegium vimineum</i>	4-52
	W-EF5-PEM	Montgomery	37.210563	-80.193849	PEM	Riverine	RPWWD	S-EF20 (UNT to Roanoke River)	0.02	910	Open	<i>Typha latifolia, Leersia oryzoides</i>	4-52
W-EF22	W-EF22	Roanoke	37.180920	-80.143551	PFO	Riverine	RPWWD	S-EF34 (UNT to Bottom Run)	0.15	6556	Open	<i>Ulmus americana, Scirpus polyphyllus, Impatiens capensis, Boehmeria cylindrica</i>	4-63
W-KL20	W-KL20	Roanoke	37.180599	-80.142844	PEM	Slope	RPWWN	S-EF34 (UNT to Bottom Creek)	0.02	1009	Closed	<i>Microsteguim vimineum, Poa trivialis</i>	4-63
W-EF14	W-EF14	Roanoke	37.180566	-80.140107	PEM	Riverine	RPWWD	S-EF32 (Bottom Creek)	0.01	642	Closed	<i>Sium suave, Impatiens capensis, Leersia oryzoides</i>	4-63
W-KL19	W-KL19	Roanoke	37.180542	-80.142539	PEM	Riverine	RPWWD	S-EF34 (UNT to Bottom Creek)	0.00	188	Closed	<i>Glyceria striata, Boehmeria cylindrica, Viola blanda, Ligustrum sinense, Rosa multiflora</i>	4-63
W-EF16	W-EF16	Roanoke	37.180526	-80.141054	PEM	Riverine	RPWWD	S-EF34 (UNT to Bottom Creek)	0.07	3069	Closed	<i>Reynoutria japonica, Symlocarpus foetidus</i>	4-63

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Identified Wetlands

Wetland ID	Wetland Habitat ID	County	Latitude ¹	Longitude ¹	Cowardin Class ²	HGM ³	Water Type ⁴	Associated Waterbodies	Size (Acres) ⁵	Size (square feet) ⁵	Open/Closed Boundary	Dominant Species	Figure
W-EF15	W-EF15	Roanoke	37.180448	-80.140254	PSS	Riverine	RPWWD	S-EF32 (Bottom Creek)	0.01	602	Open	<i>Salix nigra, Acer negundo, Microstegium vimineum, Impatiens capensis</i>	4-63
W-EF21	W-EF21	Roanoke	37.180046	-80.142769	PEM	slope	RPWWN	S-EF35 (UNT to Bottom Creek)	0.36	15530	Closed	<i>Leersia oryzoides, Juncus effusus, Carex crinita, Acer rubrum</i>	4-63
W-EF18	W-EF18	Roanoke	37.179441	-80.140791	PSS	Riverine	RPWWD	S-EF35 (UNT to Bottom Creek)	0.07	3102	Open	<i>Lindera benzoin, Symplocarpus foetidus, Sium suave</i>	4-63
W-EF17	W-EF17	Roanoke	37.179429	-80.140528	PFO	Riverine	RPWWD	S-EF32 (Bottom Creek) & S-EF33 (UNT to Bottom Creek)	0.10	4433	Open	<i>Fraxinus pennsylvanica, Lindera benzoin, Symplocarpus foetidus, Boehmeria cylindrica</i>	4-63
W-EF19	W-EF19	Roanoke	37.179415	-80.141701	PSS	Slope	RPWWD	S-EF35 (UNT to Bottom Creek)	0.08	3547	Closed	<i>Lindera benzoin, Scirpus polyphyllus, Solidago gigantea</i>	4-63
W-EF20	W-EF20	Roanoke	37.178987	-80.141323	PSS	Riverine	RPWWD	S-EF33 & S-EF36 (UNT to Bottom Creek)	0.06	2608	Open	<i>Acer saccharum, Lindera benzoin, Onoclea sensibilis, Impatiens capensis, Viola cucullata</i>	4-63
W-IJ93	W-IJ93	Roanoke	37.172340	-80.139107	PEM	Riverine	RPWWD	S-IJ81 (UNT to Bottom Creek)	0.08	3589	Closed	<i>Leersia oryzoides, Impatiens capensis, Microstegium vimineum</i>	4-64
W-IJ99	W-IJ99	Roanoke	37.171884	-80.128704	PSS	Riverine	PRWWD	S-IJ87 (UNT to Bottom Creek)	0.15	6564	Open	<i>Lindera benzoin, Alnus serrulata, Cornus amomum, Symplocarpus foetidus, Impatiens capensis, Smilax rotundifolia</i>	4-66
W-IJ94	W-IJ94-PEM	Roanoke	37.169947	-80.138260	PEM	Riverine	RPWWD	S-IJ82 (UNT to Bottom Creek)	0.14	6038	Closed	<i>Cicuta maculata, Impatien capensis</i>	4-65
	W-IJ94-PSS	Roanoke	37.169811	-80.138501	PSS	Riverine	RPWWD	S-IJ82 & S-IJ83 (UNT to Bottom Creek)	0.17	7339	Open	<i>Alnus serrulata, Lindera benzoin, Cicuta maculata, Impatien capensis</i>	4-65
W-IJ98	W-IJ98	Roanoke	37.169947	-80.127991	PEM	Slope	RPWWN	UNT to Bottom Creek	0.04	1536	Open	<i>Cyperus esculentus, Dicanthelium clandestinum, Trifolium pratense</i>	4-66
W-IJ95	W-IJ95	Roanoke	37.169736	-80.138288	PSS	Riverine	RPWWD	S-IJ83 (UNT to Bottom Creek) & S-IJ88 (Bottom Creek)	1.28	55811	Open	<i>Acer rubrum, Alnus serrulata, Lindera benzoin, Impatiens capensis</i>	4-65
	W-IJ95	Roanoke	37.169024	-80.137648	PEM	Riverine	RPWWD	S-IJ83 (UNT to Bottom Creek) & S-IJ88 (Bottom Creek)	0.33	14271	Open	<i>Solidago gigantea, Amphicarpaea bracteata, Leersia oryzoides</i>	4-65
W-IJ96	W-IJ96-PEM	Roanoke	37.169450	-80.130305	PEM	Riverine	RPWWD	S-IJ85 (UNT to Bottom Creek)	0.12	5028	Closed	<i>Lindera benzoin.,Hammamelis virginiana, Pinus strobus,Cicuta maculata, Rudbeckia laciniata</i>	4-66
	W-IJ96-PSS	Roanoke	37.169223	-80.130246	PSS	Riverine	RPWWD	S-IJ85 (UNT to Bottom Creek)	0.01	233	Open	<i>Alnus serrulata, Cicuta maculata, Rudbeckia laciniata</i>	4-66
W-IJ97	W-IJ97	Roanoke	37.169202	-80.129255	PEM	Slope	RPWWD	S-IJ86 (UNT to Bottom Creek)	0.06	2657	Closed	<i>Leersia oryzoides, Persicaria sagittata, Solidago gigantea</i>	4-66
W-IJ102	W-IJ102	Roanoke	37.168206	-80.138548	PFO	Riverine	RPWWD	S-IJ88 (Bottom Creek)	0.14	6183	Closed	<i>Acer rubrum, Acer negundo, Lindera benzoin, Cornus amomum, Impatiens capensis, Cicuta maculata</i>	4-65
W-IJ103	W-IJ103	Roanoke	37.167640	-80.139024	PSS	Riverine	RPWWD	S-IJ88 (Bottom Creek)	0.39	17138	Closed	<i>Cornus amomum, Rudbeckia laciniata, Amphicarpaea bracteata</i>	4-65
W-IJ104	W-IJ104	Roanoke	37.167222	-80.139103	PSS	Riverine	PRWWD	S-IJ88 (Bottom Creek)	0.13	5528	Open	<i>Lindera benzoin, Rudbeckia laciniata, Amphicarpaea bracteata</i>	4-65
W-IJ105	W-IJ105	Roanoke	37.166936	-80.139039	PEM	Riverine	RPWWD	S-IJ88 (Bottom Creek)	0.04	1664	Closed	<i>Rudbeckia laciniata, Amphicarpaea bracteata, Scirpus polyphyllus</i>	4-65
W-IJ100	W-IJ100	Roanoke	37.166203	-80.139445	PFO	Riverine	RPWWD	S-IJ88 (Bottom Creek)	0.20	8828	Closed	<i>Acer rubrum, Lindera benzoin, Rhododendron maximum, Urtica dioica, Osmunda cinnamomea, Verbesina alternifolia, Rudbeckia laciniata</i>	4-65
W-IJ101	W-IJ101	Roanoke	37.165618	-80.139884	PSS	Riverine	RPWWD	S-IJ89 & S-IJ90 (UNT to Bottom Creek)	0.12	5025	Open	<i>Alnus, serrulata, Cornus amomum, Salix nigra, Scripus atrovirens, Impatiens capensis</i>	4-65
W-KL17	W-KL17	Roanoke	37.160108	-80.134768	PSS	Riverine	RPWWD	S-KL25 (UNT to Mill Creek)	0.17	7385	Open	<i>Alnus serrulata, Eupatorium perfoliatum, Scirpus atrovirens</i>	4-67
W-KL16	W-KL16	Roanoke	37.159946	-80.134250	PEM	Depressional	ISOLATE	-	0.02	817	Cloaed	<i>Juncus effusus, Solidago gigantea, Gelsemium sempervirens</i>	4-67
W-KL15	W-KL15	Roanoke	37.158831	-80.133861	PEM	Depressional	ISOLATE	-	0.03	1451	Closed	<i>Juncus effusus, Solidago gigantea, Gelsemium sempervirens</i>	4-67
W-EF42	W-EF42	Roanoke	37.157446	-80.133824	PEM	Slope	RPWWD	S-ST9 (UNT to Mill Creek)	0.04	1627	Open	<i>Leersia orizoides, Impatiens capensis</i>	4-68
W-AB6	W-AB6-PEM-2	Roanoke	37.156806	-80.132027	PEM	Slope	RPWWD	S-ST9 (UNT to Mill Creek)	1.36	59296	Open	<i>Solidago altissima, Agrimonia parviflora, Holcus lanatus, Toxicodendron radicans, Cornus amomum, Fraxinus pennsylvanica</i>	4-68
	W-AB6-PFO-1	Roanoke	37.156744	-80.131617	PFO	Slope	RPWWD	S-ST9 (UNT to Mill Creek)	0.11	4718	Closed	<i>Pinus strobus, Acer rubrum, Rosa multiflora, Toxicodendron radicans, Solidago gigantea</i>	4-68
	W-AB6-PFO-2	Roanoke	37.156268	-80.131745	PFO	Slope	RPWWD	S-ST9 (UNT to Mill Creek)	0.14	6238	Closed	<i>Pinus strobus, Cornus amomum, Rosa multiflora, Symplocarpus foetidus, Leersia oryzoides, Onoclea sensibilis</i>	4-68
	W-AB6-PEM-1	Roanoke	37.156044	-80.130746	PEM	Slope	RPWWD	S-ST9 (UNT to Mill Creek)	0.37	16126	Open	<i>Leersia oryzoides, Juncus effusus, Carex lurida, Solidago gigantea, Elaeagnus umbellata, Acer rubrum, Pinus strobus</i>	4-68
	W-AB6-PSS	Roanoke	37.155952	-80.130555	PSS	Slope	RPWWD	S-ST9 (UNT to Mill Creek)	0.11	4859	Closed	<i>Acer rubrum, Rosa palustris, Poa trivialis, Fragaria virginiana</i>	4-68
W-KL31	W-KL31	Roanoke	37.156325	-80.130147	PEM	Slope	RPWWN	UNT to Mill Creek	0.02	882	Closed	<i>Poa trivialis, Trifolium pratense, Juncus effusus, Juncus tenuis</i>	4-68
W-AB5	W-AB5	Roanoke	37.155633	-80.130171	PFO	Depressional	RPWWN	UNT to Mill Creek	0.07	3105	Closed	<i>Acer rubrum, Cornus amomum,Solidago gigantea</i>	4-68
W-AB4	W-AB4	Roanoke	37.155475	-80.130102	PEM	Slope	RPWWD	UNT to Mill Creek	0.08	3458	Open	<i>Sambucus nigra, Juncus effusus, Symplocarpus foetidus</i>	4-68
W-AB3	W-AB3-PEM-2	Roanoke	37.155415	-80.129456	PEM	Slope	RPWWD	UNT to Mill Creek	0.88	38323	Open	<i>Cyperus esculentus, Juncus effusus, Leersia oryzoides, Phalaris arundinacea</i>	4-68
	W-AB3-PSS-1	Roanoke	37.155288	-80.129532	PSS	Slope	RPWWD	UNT to Mill Creek	0.02	891	Closed	<i>Cornus amomum, Symplocarpus foetidus, Poa trvialis, Impatiens capensis</i>	4-68
	W-AB3-PEM-1	Roanoke	37.155217	-80.129614	PEM	Slope	RPWWD	UNT to Mill Creek	0.08	3461	Open	<i>Poa trivialis, Symplocarpus foetidus</i>	4-68

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Identified Wetlands

Wetland ID	Wetland Habitat ID	County	Latitude ¹	Longitude ¹	Cowardin Class ²	HGM ³	Water Type ⁴	Associated Waterbodies	Size (Acres) ⁵	Size (square feet) ⁵	Open/Closed Boundary	Dominant Species	Figure
	W-AB3-PSS-2	Roanoke	37.155180	-80.129532	PSS	Slope	RPWWD	UNT to Mill Creek	0.03	1270	Open	<i>Cornus amomum, Symplocarpus foetidus, Poa trvialis, Impatiens capensis</i>	4-68
W-EF46	W-EF46	Roanoke	37.154675	-80.128932	PSS	Riverine	RPWWD	S-EF46 (UNT to Mill Creek)	0.39	16807	Open	<i>Alnus serrulata, Ilex verticillata, Impatiens capensis, Leersia oryzoides, Nyssa sylvatica, Acer rubrum</i>	4-68
W-KL48	W-KL48-PEM	Roanoke	37.152148	-80.12992	PEM	Riverine	RPWWD	Mill Creek	0.16	7028	Closed	<i>Symplocarpus foetidus, Glyceria striata</i>	4-69
	W-KL48-PSS-1	Roanoke	37.152231	-80.129942	PSS	Riverine	RPWWD	Mill Creek	0.07	3150	Closed	<i>Prunus serotina, Cornus amomum, Eleagnus angustifolia, Impatiens capensis, Leersia oryzoides, Glyceria striata, Symplocarpus foetidus</i>	4-69
	W-KL48-PSS-2	Roanoke	37.15112	-80.130937	PSS	Riverine	RPWWD	Mill Creek	1.54	66970	Open	<i>Alnus serrulata, Cornus amomum, Symplocarpus foetidus, Impatiens capensis</i>	4-69
W-KL55	W-KL55	Roanoke	37.150991	-80.138583	PEM	Riverine	RPWWD	S-EF51 (UNT to Bottom Creek)	0.01	219	Closed	<i>Symplocarpus foetidus, Impatiens capensis, Carex vulpinoidea</i>	4-70
W-KL50	W-KL50	Roanoke	37.150715	-80.131499	PEM	Slope	RPWWN	Mill Creek	0.06	2491	Closed	<i>Carex lurida, Juncus effusus, Glyceria striata, Anthoxanthum odoratum</i>	4-69
W-KL49	W-KL49	Roanoke	37.150507	-80.132654	PEM	Slope	RPWWN	S-KL55 (UNT to Mill Creek)	0.21	9258	Open	<i>Carex vulpinoidea, Anthoxanthum odoratum</i>	4-69
W-EF54	W-EF54	Roanoke	37.150187	-80.138608	PEM	Riverine	RPWWD	S-EF52 (UNT to Bottom Creek)	0.01	405	Closed	<i>Persicaria sagittata, Pilea pumila, Impatiens capensis</i>	4-70
W-KL52	W-KL52	Roanoke	37.150102	-80.132895	PSS	Riverine	RPWWD	S-KL56 (UNT to Mill Creek)	0.02	1051	Closed	<i>Linderabenzoin, Prunus serotina, Symplocarpus foetidus, Impatiens capensis, Smilax rotundifolia</i>	4-69
W-KL51	W-KL51-PSS	Roanoke	37.149971	-80.132561	PSS	Riverine	RPWWD	S-KL55 (UNT to Mill Creek)	0.03	1509	Open	<i>Libndera benzoin, Rubus allegheniensis, Symplocarpus foetidus, Impatiens capensis, Smilax rotundifolia</i>	4-69
	W-KL51-PEM	Roanoke	37.149856	-80.132163	PEM	Riverine	RPWWD	S-KL55 (UNT to Mill Creek)	0.16	6554	Open	<i>Symplocarpus foetidus, Impatiens capensis, Cornus amomum</i>	4-69
W-EF55	W-EF55	Roanoke	37.149590	-80.137796	PEM	Slope	RPWWD	UNT to Bottom Creek	0.21	8959	Open	<i>Phalaris arundinacaea, Leersia oryzoidea</i>	4-70
W-MN9	W-MN9	Roanoke	37.149393	-80.136797	PFO	Slope	RPWWN	S-306 (UNT to Mill Creek)	0.03	1296	Closed	<i>Fraxinus pennsylvanica, Linder benzion, Viburnum dentatum, Solidago gigantea</i>	4-70
W-MN8	W-MN8	Roanoke	37.149247	-80.13597	PEM	Slope	RPWWD	S-MN26 (UNT to Mill Creek)	0.04	1559	Open	<i>Microstegium vimineum</i>	4-70
W-KL54	W-KL54	Roanoke	37.148743	-80.134405	PEM	Slope	RPWWN	S-IJ12 (UNT to Mill Creek)	0.09	3991	Closed	<i>Carex vulpinoidea, Carex scoparia, Anthoxanthum odoratum</i>	4-69
W-KL53	W-KL53	Roanoke	37.148708	-80.134678	PEM	Slope	RPWWN	S-IJ12 (UNT to Mill Creek)	0.10	4342	Closed	<i>Carex vulpinoidea, Carex scoparia, Anthoxanthum odoratum</i>	4-69
W-MN7	W-MN7-PEM	Roanoke	37.14851	-80.134136	PEM	Riverine	RPWWD	S-IJ12(UNT to Mill Creek)	0.19	5856	Closed	<i>Scirpus polyphyllus, Impatiens capensis</i>	4-69
	W-MN7-PSS	Roanoke	37.148094	-80.133545	PSS	Riverine	RPWWD	S-IJ12(UNT to Mill Creek)	0.09	3948	Open	<i>Acer rubrum, Alnus serrulata, Rosa multiflora, Symplocarpus foetidus, Leersia oryzoides, Carex stipata, Amphicarpaea bracteata</i>	4-69
W-CD9	W-CD9	Roanoke	37.144624	-80.135343	PEM	Slope	RPWWD	UNT to Mill Creek	0.03	1110	Open	<i>Poa trivialis, Carex lurida</i>	4-71
W-EF44	W-EF44	Roanoke	37.142954	-80.138177	PEM	Slope	RPWWD	S-EF44 (UNT to Bottom Creek)	0.05	2000	Closed	<i>Pilea pumila, Impatiens capensis</i>	4-71
W-EF45	W-EF45	Roanoke	37.142278	-80.139125	PEM	Slope	RPWWN	S-EF45 (UNT to Bottom Creek)	0.02	738	Closed	<i>Pilea pumila, Impatiens capensis, Leersia virginica</i>	4-71
W-IJ36	W-IJ36	Roanoke	37.138840	-80.139959	PSS	Riverine	RPWWD	S-IJ43 (Mill Creek)	1.93	84105	Open	<i>Cornus amomum, Apocynum cannabinum, Agromonia parviflora, Rudbeckia laciniata, Phalaris arundiniaeae, Impatiens capensis, Clematis virginiana</i>	4-72
W-IJ63	W-IJ63	Roanoke	37.137560	-80.139693	PEM	Riverine	RPWWD	S-Y10 (UNT to Mill Creek)	0.03	1409	Open	<i>Linder benzoin, Osmundastrom cinnamomea</i>	4-72
W-Z7	W-Z7	Roanoke	37.136590	-80.128366	PSS	Riverine	RPWWD	S-Z16 (UNT to Mill Creek)	0.11	4822	Open	<i>Symplocarpus foetidus, Solidago canadensis, Rosa palustris</i>	4-74
W-Z6	W-Z6	Roanoke	37.136344	-80.128296	PFO	Riverine	RPWWD	S-Z16 (UNT to Mill Creek)	0.02	1061	Open	<i>Acer saccharum, Rosa multiflora, Impatiens capensis, Solidago canadensis</i>	4-74
W-Z8	W-Z8	Roanoke	37.135654	-80.133520	PFO	Slope	RPWWN	S-Z17 (UNT to Mill Creek)	0.10	4174	Open	<i>Tsuga canadensis, Quercus rubra, Linder benzoin, Symplocarpus foetidus, Microstegium vimineum</i>	4-73
W-IJ62	W-IJ62	Roanoke	37.135526	-80.134158	PEM	Riverine	RPWWD	S-Z17 (UNT to Mill Creek)	0.09	3727	Open	<i>Juncus effuses, Scirpus atrovirens, Persicaria sagittata</i>	4-73
W-Z9	W-Z9	Roanoke	37.135371	-80.133855	PFO	Riverine	RPWWD	S-Z17, S-Z18 (UNTs to Mill Creek)	0.15	6562	Open	<i>Quercus palustris, Betula nigra, Rhododendron maximum, Fragaria vesca, Symplocarpus foetidus, Impatiens capensis</i>	4-73
W-Y3	W-Y3	Roanoke	37.134855	-80.135020	PFO	Riverine	RPWWD	S-Y11 (UNT to Mill Creek)	0.15	6547	Open	<i>Alnus serrulata, Symplocarpus foetidus</i>	4-73
W-Z10	W-Z10	Roanoke	37.134424	-80.136769	PEM	Riverine	RPWWD	S-Y7 (UNT to Mill Creek)	0.02	899	Open	<i>Symplocarpus foetidus, Parathelypteris noveboracensis, Viola hastata, Linder benzoin, Rosa multiflora</i>	4-73
W-Y2	W-Y2	Roanoke	37.134344	-80.137399	PEM	Riverine	RPWWD	S-Y7 (UNT to Mill Creek)	0.05	2038	Closed	<i>Impatiens capensis, Glyceria striata, Viola sororia, Linder benzoin</i>	4-73
W-Y1	W-Y1	Roanoke	37.134237	-80.137251	PEM	Riverine	RPWWD	S-Y8 (UNT to Mill Creek)	0.01	512	Closed	<i>Athyrium filix-femia, Osmundastrum cinnamomeum</i>	4-73
W-IJ10	W-IJ10	Roanoke	37.132691	-80.131986	PEM	Riverine	RPWWD	S-Q20 (UNT to Mill Creek)	0.11	4930	Open	<i>Phalaris arundinacea, Poa trivialis, Dactylis glomerata, Cornus amomum</i>	4-73
W-Q11	W-Q11	Roanoke	37.132470	-80.131727	PEM	Depressional	RPWWD	S-Q20 (UNT to Mill Creek)	0.46	19888	Open	<i>Phalaris arundinicea, Leerisa oryzoides, Salix babylonica</i>	4-73
W-KL1	W-KL1	Roanoke	37.132464	-80.131428	PEM	Slope	RPWWN	S-Q20 (UNT to Mill Creek)	0.06	2518	Closed	<i>Juncus effusus</i>	4-73
W-Q10	W-Q10	Roanoke	37.132378	-80.131874	PEM	Depressional	RPWWD	S-Q20 (UNT to Mill Creek)	0.10	4218	Open	<i>Dichanthelium scabriusculum, Phalaris arundinicea, Cornus amomum, Salix nigra, Salix babylonica</i>	4-73

Table 1.
Identified Wetlands

Wetland ID	Wetland Habitat ID	County	Latitude ¹	Longitude ¹	Cowardin Class ²	HGM ³	Water Type ⁴	Associated Waterbodies	Size (Acres) ⁵	Size (square feet) ⁵	Open/Closed Boundary	Dominant Species	Figure
W-KL3	W-KL3	Roanoke	37.131706	-80.133095	PEM	Depressional	RPWWN	S-KL4 (UNT to Mill Creek)	0.11	4821	Closed	<i>Typha latifolia, Juncus effusus</i>	4-73
W-KL4	W-KL4-PEM-2	Roanoke	37.131575	-80.133348	PEM	Riverine	RPWWD	S-KL4 (UNT to Mill Creek)	0.06	2648	Closed	<i>Rosa muliflora, Juncus effusus, Symplocarcus foetidus</i>	4-73
	W-KL4-PEM	Roanoke	37.131463	-80.134141	PEM	Riverine	RPWWD	S-KL4 (UNT to Mill Creek)	0.17	7503	Closed	<i>Rosa muliflora, Juncus effusus, Symplocarcus foetidus</i>	4-73
	W-KL4-PSS	Roanoke	37.131462	-80.133489	PSS	Slope	RPWWD	S-KL4 (UNT to Mill Creek)	0.09	4010	Closed	<i>Cornus amomum, Rubus allegheniensis, Symplocarpus foetidus, Solidago canadensis</i>	4-73
W-KL5	W-KL5	Roanoke	37.131270	-80.133104	PEM	Slope	RPWWD	S-Q20 (UNT to Mill Creek)	0.05	2274	Open	<i>Juncus effusus, Cornus amomum</i>	4-73
W-B25	W-B25-PEM-1	Roanoke	37.129427	-80.133250	PEM	Slope	RPWWD	S-B22, S-B24, S-B25 (UNTs to Mill Creek)	2.91	126822	Open	<i>Juncus effusus, Carex lurida, Rubus allegheniensis</i>	4-76
	W-B25-PSS-1	22	37.129384	-80.133947	PSS	Slope	RPWWD	S-B24 (UNT to Mill Creek)	0.27	11626	Closed	<i>Populus deltoides, Prunus virginiana, Symplocarpus foetidus, Juncus effusus, Agrostis stolonifera</i>	4-76
	W-B25-PSS-2	Roanoke	37.128444	-80.132058	PSS	Slope	RPWWD	S-B25 (UNT to Mill Creek)	0.81	35145	Closed	<i>Cornus foemina, Alnus serrulata, Scirpus cyperinus, Carex lurida</i>	4-76
	W-B25-PEM-2	Roanoke	37.128113	-80.132045	PEM	Slope	RPWWD	S-B25 (UNT to Mill Creek)	0.09	3915	Open	<i>Juncus effusus, Impatiens capensis</i>	4-76
W-B24	W-B24-PSS	Roanoke	37.128922	-80.130779	PSS	Riverine	RPWWD	S-B20, S-B21 (UNT to Mill Creek)	1.02	44408	Open	<i>Cornus foemina, Salix nigra, Glyceria striata</i>	4-76
	W-B24-PEM	Roanoke	37.128372	-80.131018	PEM	Riverine	RPWWD	S-B21 (UNT to Mill Creek)	0.32	13851	Open	<i>Symplocarpus foetidus, Solidago gigantea, Poa trivialis</i>	4-76
W-KL2	W-KL2	Roanoke	37.128852	-80.134343	PEM	Slope	RPWWN	S-B23 (UNT to Mill Creek)	0.14	6043	Closed	<i>Juncus effusus, Impatiens capensis, Scirpus atrovirens, Alnus serrulata</i>	4-76
W-ST1	W-ST1	Roanoke	37.127817	-80.130188	PSS	Riverine	RPWWD	S-B21 (UNT to Mill Creek)	0.33	14274	Closed	<i>Acer rubrum, Fraxinus pennsylvanica, Cornus amomum, Alnus glutinos, Symplocarpus foetidus, Impatiens capensis</i>	4-76
W-IJ65	W-IJ65	Roanoke	37.126429	-80.126502	PEM	Slope	RPWWD	S-ST24 (UNT to Mill Creek)	0.04	2011	Open	<i>Poa trivialis, Anthoxanthum odoratum</i>	4-77
W-IJ64	W-IJ64	Roanoke	37.126096	-80.126207	PEM	Slope	RPWWD	S-ST24 (UNT to Mill Creek)	0.15	6823	Open	<i>Carex stricta, Juncus effusus</i>	4-77

Notes:

- 1

- In decimal degrees. Coordinates show wetland test pit locations
- 2

- PEM = Palustrine Emergent
- PSS = Palustrine Scrub-Shrub
- PFO = Palustrine Forested
- 3

- HGM = Hydrogeomorphic
- 4

- RPWWD = Wetlands directly abutting Relatively Permanent Waters (RPWs) that flow directly or indirectly into Traditional Navigable Waterways (TNWs)
- RPWWN = Wetlands adjacent but not directly abutting RPWs that flow directly or indirectly into TNWs
- NRPWW = Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- Isolate = Isolated (interstate or intrastate) waters, including isolated wetlands
- 5

- Size of wetlands with open boundaries may be larger than shown in this table. See Section 3.1 for more information

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-PP22	UNT to Craig Creek	Montgomery	37.321203	-80.412889	Intermittent	RPW	R4SB5	2.5	4-1
S-PP21	UNT to Craig Creek	Montgomery	37.317297	-80.409219	Perennial	RPW	R3UB1	4	4-2
S-PP20	UNT to Craig Creek	Montgomery	37.316550	-80.408634	Perennial	RPW	R3UB1	6	4-2
S-HH17	Craig Creek	Montgomery	37.314554	-80.398420	Perennial	RPW ⁵	R2UB1	18	4-3
S-RR13	Craig Creek	Montgomery	37.314380	-80.402946	Perennial	RPW ⁵	R2UB1	35	4-3
S-HH18	UNT to Craig Creek	Montgomery	37.314001	-80.398651	Perennial	RPW	R3RB1	6	4-3
S-RR14	UNT to Craig Creek	Montgomery	37.313894	-80.402445	Ephemeral	NRPW	R6	7	4-3
S-OO6	Craig Creek	Montgomery	37.313067	-80.405230	Perennial	RPW ⁵	R2UB1	35	4-2 & 3
S-OO7	UNT to Craig Creek	Montgomery	37.313021	-80.405091	Intermittent	RPW	R4SB3	3	4-3
S-MN21	UNT to Mill Creek	Montgomery	37.299442	-80.391223	Perennial	RPW	R3US1	7	4-6
S-MN22	UNT to Mill Creek	Montgomery	37.297107	-80.386559	Ephemeral	NRPW	R6	2	4-5
S-EF63	UNT to Mill Creek	Montgomery	37.296638	-80.375442	Ephemeral	NRPW	R6	5	4-7
S-EF62	UNT to Mill Creek	Montgomery	37.296254	-80.375045	Perennial	RPW	R3UB1	11	4-7
S-IJ52	UNT to Mill Creek	Montgomery	37.296108	-80.367529	Perennial	RPW	R3UB1	16	4-8
S-EF65	Mill Creek	Montgomery	37.295742	-80.375924	Intermittent	RPW	R4SB3	6	4-7
S-EF49	Dry Run	Montgomery	37.291412	-80.335222	Perennial	RPW	R2UB1	6	4-12
S-AD1	UNT to Dry Run	Montgomery	37.291278	-80.336112	Intermittent	RPW	R4SB5	3	4-12
S-AC1	Dry Run	Montgomery	37.290577	-80.32955	Perennial	RPW	R2UB1	13	4-14
S-OO10	Bradshaw Creek	Montgomery	37.274263	-80.251463	Perennial	RPW	R2UB1	15	4-36
S-OO9	UNT to Bradshaw Creek	Montgomery	37.272074	-80.249448	Intermittent	RPW	R4SB3	3	4-36
S-EF22	UNT to North Fork Roanoke River	Montgomery	37.270952	-80.326869	Ephemeral	NRPW	R6	4.5	4-18 & 19
S-NN8b	UNT to North Fork Roanoke River	Montgomery	37.270542	-80.314124	Ephemeral	NRPW	R6	5	4-20
S-EF21	UNT to North Fork Roanoke River	Montgomery	37.270235	-80.326332	Ephemeral	NRPW	R6	2	4-18 & 19
S-OO8	UNT to Bradshaw Creek	Montgomery	37.270115	-80.250227	Intermittent	RPW	R4SB2	4	4-35
S-MN16	UNT North Fork Roanoke River	Montgomery	37.268988	-80.321396	Intermittent	RPW	R4SB5	3	4-19
S-MN15	UNT North Fork Roanoke River	Montgomery	37.268003	-80.321315	Intermittent	RPW	R4SB5	3	4-19
S-GH22	UNT to Bradshaw Creek	Montgomery	37.267921	-80.250404	Ephemeral	NRPW	R6	5	4-35
S-G38	UNT to North Fork Roanoke River	Montgomery	37.267276	-80.312683	Ephemeral	NRPW	R6	3	4-20
S-G40	UNT to North Fork Roanoke River	Montgomery	37.265639	-80.308227	Perennial	RPW	R3RB2	3	4-21
S-G36	North Fork Roanoke River	Montgomery	37.265488	-80.318682	Perennial	RPW ⁵	R2UB1	20	4-19 & 20
S-G39	UNT to North Fork Roanoke River	Montgomery	37.265002	-80.308578	Intermittent	RPW	R4SB1	6	4-21
S-PP23	UNT to North Fork Roanoke River	Montgomery	37.264970	-80.306904	Ephemeral	NRPW	R6	2.5	4-21
S-GH21	UNT to Bradshaw Creek	Montgomery	37.261394	-80.245127	Ephemeral	NRPW	R6	15	4-33
S-MM14	UNT to Flatwoods Branch	Montgomery	37.258823	-80.293294	Ephemeral	NRPW	R6	7	4-25
S-MM12	UNT to Flatwoods Branch	Montgomery	37.258705	-80.288287	Ephemeral	NRPW	R6	8	4-26
S-MM15	UNT to Flatwoods Branch	Montgomery	37.258549	-80.296372	Intermittent	RPW	R4SB4	6	4-25
S-KL5	Flatwoods Branch	Montgomery	37.258393	-80.278100	Intermittent	RPW	R4SB5	7	4-27
S-MM11	UNT to Flatwoods Branch	Montgomery	37.258211	-80.288196	Ephemeral	NRPW	R6	8	4-26
S-F15	UNT to Flatwoods Branch	Montgomery	37.258144	-80.285921	Intermittent	RPW	R4SB3	6	4-26
S-F16a/F16b	UNT to Flatwoods Branch	Montgomery	37.258057	-80.284677	Ephemeral	NRPW	R6	3	4-26
S-F16a/F16b	UNT to Flatwoods Branch	Montgomery	37.257688	-80.285092	Intermittent	RPW	R4SB5	4	4-26
S-MM13	UNT to Flatwoods Branch	Montgomery	37.257987	-80.288865	Ephemeral	NRPW	R6	5	4-25 & 26
S-C36	UNT to Flatwoods Branch	Montgomery	37.257185	-80.281586	Intermittent	RPW	R4SB4	3	4-26
S-MM31	UNT to Flatwoods Branch	Montgomery	37.256948	-80.280326	Ephemeral	NRPW	R6	4	4-26
S-C32	UNT to Flatwoods Branch	Montgomery	37.256655	-80.280509	Perennial	RPW	R3UB3	2	4-26
S-C34	UNT to Flatwoods Branch	Montgomery	37.256635	-80.281466	Perennial	RPW	R3UB2	5	4-26
S-C33	UNT to Flatwoods Branch	Montgomery	37.256633	-80.281248	Perennial	RPW	R3UB3	6	4-26
S-EF31	UNT to Flatwoods Branch	Montgomery	37.256280	-80.285505	Ephemeral	NRPW	R6	3.5	4-26
S-C29	Flatwoods Branch	Montgomery	37.256124	-80.278280	Ephemeral	NRPW	R6	2	4-27
S-C30	UNT to Flatwoods Branch	Montgomery	37.256013	-80.278636	Ephemeral	NRPW	R6	2.5	4-27
S-C28	UNT to Womack Branch	Montgomery	37.255154	-80.274123	Ephemeral	NRPW	R6	3.5	4-27
S-C25	UNT to Bradshaw Creek	Montgomery	37.254416	-80.267962	Intermittent	RPW	R4SB3	3	4-28
S-GH20	UNT to Bradshaw Creek	Montgomery	37.254366	-80.243738	Ephemeral	NRPW	R6	4	4-32
S-C24	UNT to Bradshaw Creek	Montgomery	37.254127	-80.266735	Intermittent	RPW	R4SB1	3	4-28
S-C23	UNT to Bradshaw Creek	Montgomery	37.253971	-80.267781	Intermittent	RPW	R4SB3	5.5	4-28
S-C22	UNT to Bradshaw Creek	Montgomery	37.252887	-80.262943	Ephemeral	NRPW	R6	2	4-30
S-C21	Bradshaw Creek	Montgomery	37.252169	-80.259374	Perennial	RPW	R2UB1	25	4-30

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-MN28	UNT to Roanoke River	Roanoke	37.252515	-80.199224	Ephemeral	NRPW	R6	1.5	4-44
S-MN29	UNT to Roanoke River	Roanoke	37.252003	-80.19951	Intermittent	RPW	R4SB5	4	4-44
S-OO11	UNT to Bradshaw Creek	Montgomery	37.251775	-80.257060	Ephemeral	NRPW	R6	2	4-30
S-MN12a	UNT to Roanoke River	Montgomery	37.252306	-80.199449	Ephemeral	NRPW	R6	3	4-44
S-MN12b	UNT to Roanoke River	Roanoke	37.251743	-80.199627	Perennial	RPW	R3UB1	8	4-44
S-MN12c	UNT to Roanoke River	Montgomery/Roanoke	37.249814	-80.205536	Perennial	RPW	R3UB1	9	4-43 & 44
S-KL7	UNT to Flatwoods Branch	Montgomery	37.251391	-80.289103	Perennial	RPW	R3UB3	6	4-24
S-EF50	UNT to Bradshaw Creek	Montgomery	37.251367	-80.258944	Ephemeral	NRPW	R6	3.5	4-30
S-KL6	UNT to Flatwoods Branch	Montgomery	37.251367	-80.288883	Perennial	RPW	R3UB1	6	4-24
S-MN13	UNT to Roanoke River	Roanoke	37.251291	-80.203178	Ephemeral	NRPW	R6	4	4-44
S-MN13b	UNT to Roanoke River	Roanoke	37.251122	-80.203137	Intermittent	RPW	R4SB3	4	4-44
S-MN31	UNT to Roanoke River	Roanoke	37.251206	-80.202773	Ephemeral	NRPW	R6	2	4-44
S-MN34	UNT to Roanoke River	Roanoke	37.250481	-80.204971	Intermittent	RPW	R4SB3	5	4-44
S-MN33	UNT to Roanoke River	Roanoke	37.249537	-80.206186	Ephemeral	NRPW	R6	5	4-43 & 44
S-MN32	UNT to Roanoke River	Montgomery	37.248563	-80.207761	Perennial	RPW	R3UB1	11	4-43
S-OO16	UNT to Roanoke River	Montgomery	37.245551	-80.208298	Perennial	RPW	R3RB	4	4-45
S-OO17	UNT to Roanoke River	Montgomery	37.245532	-80.209937	Ephemeral	NRPW	R6	2	4-45
S-NN19	UNT to Roanoke River	Montgomery	37.244317	-80.206998	Intermittent	RPW	R4SB3	4	4-45
S-NN15	UNT to Roanoke River	Montgomery	37.244273	-80.207526	Ephemeral	NRPW	R6	2	4-45
S-GH17	UNT to North Fork Roanoke River	Montgomery	37.236980	-80.239040	Ephemeral	NRPW	R6	3	4-39
S-GH16	North Fork Roanoke River	Montgomery	37.236594	-80.239020	Perennial	TNW	R2UB1	90	4-39
S-AB15	UNT to Roanoke River	Montgomery	37.235542	-80.194568	Intermittent	RPW	R4SB3	7	4-47
S-NN16	Roanoke River	Montgomery	37.233464	-80.197144	Perennial	TNW	R2UB1	70	4-47 & 49
S-AB16	UNT to Roanoke River	Montgomery	37.231689	-80.198788	Intermittent	RPW	R4SB5	5	4-49
S-AB17	UNT to Roanoke River	Montgomery	37.231588	-80.198227	Intermittent	RPW	R4SB5	3	4-49
S-I1	UNT to Roanoke River	Montgomery	37.231265	-80.198246	Intermittent	RPW	R4SB3	14	4-49
S-I1b	UNT to Roanoke River	Montgomery	37.230192	-80.201052	Perennial	RPW	R3UB2	10	4-49
S-CD12b	UNT to South Fork Roanoke River	Montgomery	37.229186	-80.20072	Perennial	RPW	R3US3	6	4-49
S-CD12	UNT to South Fork Roanoke River	Montgomery	37.227790	-80.200017	Perennial	RPW	R3UB3	18	4-50
S-CD11	UNT to South Fork Roanoke River	Montgomery	37.228095	-80.203883	Ephemeral	NRPW	R6	3.5	4-50
S-CD10	UNT to South Fork Roanoke River	Montgomery	37.227735	-80.203524	Ephemeral	NRPW	R6	4	4-50
S-KL32	UNT to Roanoke River	Roanoke	37.218649	-80.187297	Perennial	RPW	R3UB1	6	4-53
S-EF19	UNT to Indian Run	Montgomery	37.216094	-80.197424	Ephemeral	NRPW	R6	5	4-51
S-EF20d	UNT to Roanoke River	Roanoke	37.217097	-80.188421	Perennial	RPW	R3UB3	10	4-53
S-EF20c	UNT to Roanoke River	Montgomery	37.215178	-80.189565	Perennial	RPW	R3UB1	22	4-53
S-EF20b	UNT to Roanoke River	Montgomery	37.212876	-80.191564	Perennial	RPW	R3UB3	4	4-52
S-EF20a	UNT to Roanoke River	Montgomery	37.211225	-80.192773	Perennial	RPW	R3UB1	6	4-52
S-EF54	UNT to Roanoke River	Montgomery	37.212182	-80.192379	Ephemeral	NRPW	R6	3	4-52
S-MM22	UNT to Roanoke River	Montgomery/Roanoke	37.205478	-80.187350	Ephemeral	NRPW	R6	15	4-54
S-IJ50	UNT to Roanoke River	Roanoke	37.193573	-80.167730	Perennial	RPW	R3RB1	25	4-58
S-Y13	UNT to Bottom Creek	Roanoke	37.187806	-80.150955	Intermittent	RPW	R4SB3	8	4-61
S-Y14	UNT to Bottom Creek	Roanoke	37.187564	-80.150853	Perennial	RPW	R3UB1	14	4-61
S-EF34	UNT to Bottom Creek	Roanoke	37.180559	-80.142320	Perennial	RPW	R3UB1	10	4-63
S-EF32	Bottom Creek	Roanoke	37.179696	-80.140350	Perennial	RPW	R3UB1	18	4-63
S-EF35	UNT to Bottom Creek	Roanoke	37.179391	-80.141088	Intermittent	RPW	R4SB3	8	4-63
S-EF36	UNT to Bottom Creek	Roanoke	37.178949	-80.141199	Ephemeral	NRPW	R6	4	4-63
S-EF33	UNT to Bottom Creek	Roanoke	37.178925	-80.141495	Intermittent	RPW	R4SB3	9	4-63
S-IJ81	UNT to Bottom Creek	Roanoke	37.172212	-80.139171	Intermittent	RPW	R4SB4	3	4-64
S-IJ87	UNT to Bottom Creek	Roanoke	37.171994	-80.129082	Perennial	RPW	R3UB2	5	4-66
S-IJ82	UNT to Bottom Creek	Roanoke	37.170810	-80.137934	Intermittent	RPW	R4SB4	15	4-65
S-IJ85	UNT to Bottom Creek	Roanoke	37.169583	-80.130428	Perennial	RPW	R3UB2	8	4-66
S-IJ83	UNT to Bottom Creek	Roanoke	37.169406	-80.138303	Intermittent	RPW	R4SB4	5	4-65
S-IJ86	UNT to Bottom Creek	Roanoke	37.169048	-80.129685	Ephemeral	NRPW	R6	5	4-66
S-IJ84	UNT to Bottom Creek	Roanoke	37.168496	-80.138487	Perennial	RPW	R3UB2	15	4-65
S-IJ88	UNT to Bottom Creek	Roanoke	37.167408	-80.139098	Perennial	RPW	R3UB1	20	4-65
S-IJ89	UNT to Bottom Creek	Roanoke	37.165786	-80.139154	Perennial	RPW	R3UB1	10	4-65
S-IJ90	UNT to Bottom Creek	Roanoke	37.165672	-80.139335	Intermittent	RPW	R4SB3	5	4-65

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-KL25	UNT to Mill Creek	Roanoke	37.160182	-80.134799	Intermittent	RPW	R4SB5	5	4-67
S-ST9	UNT to Mill Creek	Roanoke	37.156516	-80.132357	Perennial	RPW	R3UB2	15	4-68
S-ST9b	UNT to Mill Creek	Roanoke	37.154464	-80.129223	Perennial	RPW	R3US2	8	4-68
S-EF46	UNT to Mill Creek	Roanoke	37.154395	-80.128747	Perennial	RPW	R3UB3	6	4-68
S-EF51	UNT to Bottom Creek	Roanoke	37.150891	-80.138818	Intermittent	RPW	R4SB3	3	4-70
S-EF52	UNT to Bottom Creek	Roanoke	37.150190	-80.138570	Intermittent	RPW	R4SB3	8	4-70
S-KL56	UNT to Mill Creek	Roanoke	37.150091	-80.132902	Intermittent	RPW	R4SB4	7	4-69
S-KL55	UNT to Mill Creek	Roanoke	37.150003	-80.132423	Perennial	RPW	R3UB2	15	4-69
S-MN27	UNT to Bottom Creek	Roanoke	37.149397	-80.138206	Ephemeral	NRPW	R6	2	4-70
S-MN26	UNT to Bottom Creek	Roanoke	37.149316	-80.136012	Intermittent	RPW	R4SB4	5	4-70
S-IJ12	UNT to Mill Creek	Roanoke	37.148313	-80.133864	Perennial	RPW	R3UB2	13	4-69
S-MN25	UNT to Mill Creek	Roanoke	37.148183	-80.133501	Intermittent	RPW	R4SB4	2	4-69
S-EF44	UNT to Bottom Creek	Roanoke	37.142998	-80.138331	Intermittent	RPW	R4SB3	7	4-71
S-EF45	UNT to Bottom Creek	Roanoke	37.142165	-80.139132	Intermittent	RPW	R4SB4	4	4-71
S-IJ43-Braid	Mill Creek	Roanoke	37.138948	-80.139606	Intermittent	RPW	R4SB5	5	4-72
S-IJ43	Mill Creek	Roanoke	37.138729	-80.139434	Perennial	RPW	R2UB2	18	4-72
S-Y10	UNT to Mill Creek	Roanoke	37.137677	-80.139886	Intermittent	RPW	R4SB5	4	4-72
S-Z16	UNT to Mill Creek	Roanoke	37.136548	-80.128272	Perennial	RPW	R3UB3	3	4-74
S-Z17	UNT to Mill Creek	Roanoke	37.135436	-80.133910	Perennial	RPW	R3UB1	6	4-73
S-Z18	UNT to Mill Creek	Roanoke	37.135252	-80.134134	Perennial	RPW	R3UB2	4	4-73
S-Y11	UNT to Mill Creek	Roanoke	37.134722	-80.135339	Perennial	RPW	R3UB2	6	4-73
S-Y9	UNT to Mill Creek	Roanoke	37.134576	-80.137649	Intermittent	RPW	R4SB5	4	4-73
S-Y7	UNT to Mill Creek	Roanoke	37.134315	-80.137151	Intermittent	RPW	R4SB5	4	4-73
S-Y8	UNT to Mill Creek	Roanoke	37.134166	-80.137519	Perennial	RPW	R3UB3	4	4-73
S-Q20	UNT to Mill Creek	Roanoke	37.132665	-80.131887	Perennial	RPW	R3UB1	5	4-73
S-KL4	UNT to Mill Creek	Roanoke	37.131492	-80.133760	Intermittent	RPW	R4SB4	6	4-73
S-B24	UNT to Mill Creek	Roanoke	37.129289	-80.133792	Intermittent	RPW	R4SB5	3	4-76
S-B22	UNT to Mill Creek	Roanoke	37.128925	-80.133596	Perennial	RPW	R3UB2	4	4-76
S-B20	UNT to Mill Creek	Roanoke	37.128886	-80.130892	Ephemeral	NRPW	R6	1.5	4-76
S-B23	UNT to Mill Creek	Roanoke	37.128771	-80.134188	Intermittent	RPW	R4SB4	2	4-76
S-B25	UNT to Mill Creek	Roanoke	37.128725	-80.132767	Ephemeral	NRPW	R6	5	4-76
S-B21	UNT to Mill Creek	Roanoke	37.128070	-80.130490	Perennial	RPW	R3UB2	4	4-76
S-ST24	UNT to Mill Creek	Roanoke	37.126197	-80.126614	Perennial	RPW	R3UB1	14	4-77

Notes:

- 1
- For identified streams without a NHD (National Hydrography Dataset) name, the identified stream was given the name, “Unidentified Tributary (UNT)”, of the first named receiving waterbody
- 2
- In decimal degrees
- 3
- RPW = Relatively Permanent Waters
- NRPW = Non-Relatively Permanent Waters
- TNW = Traditional Navigable Waters
- 4
- See Cowardin et al., 1979
- 5
- Upstream of USACE-specified limit of TNW

Table 1.
Identified Wetlands

Wetland ID	Wetland Habitat ID	County	Latitude ¹	Longitude ¹	Cowardin Class ²	HGM ³	Water Type ⁴	Associated Waterbodies	Size (Acres) ⁵	Size (square feet) ⁵	Open/Closed Boundary	Dominant Species	Figure
W-D3	W-D3	Pittsylvania	36.965249	-79.598711	PFO	Slope	RPWWN	S-D2 (UNT to Jonnikin Creek)	0.05	2,095	Closed	<i>Fraxinus pennsylvanica</i> , <i>Carpinus caroliniana</i> , <i>Juncus sp.</i> , <i>Carex sp.</i> , <i>Daucus carota</i> , <i>Impatiens capensis</i> , <i>Lonicera japonica</i>	4-3
W-B5	W-B5	Pittsylvania	36.959307	-79.586214	PEM	Depressional	RPWWN	S-G9 (UNT to Jonnikin Creek)	0.00	209	Closed	<i>Glyceris striata</i>	4-4
W-B4	W-B4-PSS	Pittsylvania	36.957885	-79.583734	PSS	Riverine	RPWWD	S-G8 (UNT to Jonnikin Creek)	0.05	2,349	Closed	<i>Platanus occidentalis</i> , <i>Lindera benxoin</i> , <i>Microstegium vimineum</i> , <i>Leersia oryzoides</i> , <i>Carex vulpinoidea</i> , <i>Smilax rotundifolia</i> , <i>Lonicera japonica</i>	4-5
	W-B4-PEM	Pittsylvania	36.957632	-79.583874	PEM	Riverine	RPWWD	S-G8, S-Q15 (UNTs to Jonnikin Creek)	0.16	6,841	Open	<i>Scirpus polyphyllus</i> , <i>Impateins capensis</i> , <i>Alnus serrulata</i> , <i>Liriodendron tulipifera</i>	4-5
W-A5	W-A5	Pittsylvania	36.952167	-79.579939	PFO	Riverine	RPWWD	S-A6 (UNT to Rocky Creek)	0.15	6,333	Closed	<i>Fraxinus pennsylvanica</i> , <i>Lindera benzoin</i> , <i>Asimina triloba</i> , <i>Impatiens pallida</i> , <i>Carex emoryi</i> , <i>Microstegium vimineum</i> , <i>Smilax rotundifolia</i> , <i>Lonicera japonica</i>	4-6
W-F1	W-F1	Pittsylvania	36.940210	-79.563690	PEM	Depressional	ISOLATE	-	0.01	454	Closed	<i>Juncus effusus</i> , <i>Carex lurida</i>	4-8
W-A4	W-A4	Pittsylvania	36.933309	-79.537634	PEM	Riverine	RPWWN	S-E11 (Pigg River)	0.05	2,298	Closed	<i>Juncus effusus</i> , <i>Microstegium vimineum</i> , <i>Salix nigra</i> ,	4-11
W-A3	W-A3	Pittsylvania	36.932029	-79.532845	PFO	Riverine	RPWWD	S-H7 (UNT to Pigg River)	0.05	2,111	Closed	<i>Platanus occidentalis</i> , <i>Betula nigra</i> , <i>Salix nigra</i> , <i>Carex crinita</i> , <i>Boehmeria cylindrica</i>	4-12
W-C1	W-C1	Pittsylvania	36.930072	-79.526893	PEM	Depressional	RPWWN	S-C3 (Harpen Creek)	0.25	11,011	Closed	<i>Juncus effusus</i> , <i>Persicaria sagittata</i> , <i>Arthraxon hispidus</i>	4-13
W-H5	W-H5	Pittsylvania	36.925084	-79.516876	PEM	Depressional	RPWWD	S-H13 (Harpen Creek)	1.17	51,166	Open	<i>Symplocarpus foetidus</i> , <i>Podophyllum peltatum</i> , <i>Lindera benzoin</i>	4-14
W-B3	W-B3	Pittsylvania	36.916571	-79.492414	PEM	Depressional	RPWWN	S-G4 (Harpen Creek)	0.00	213	Closed	<i>Carex lurida</i> , <i>Scirpus atrovirens</i> , <i>Poa trivialis</i> , <i>Carpinus caroliniana</i>	4-17
W-CC2	W-CC2-PFO	Pittsylvania	36.905496	-79.471803	PFO	Riverine	RPWWD	S-CC13, S-CC14 (UNTs to Cherrystone Creek)	0.03	1,401	Closed	<i>Platanus occidentalis</i> , <i>Acer rubrum</i> , <i>Liriodendron tulipifera</i> , <i>Carex lurida</i> , <i>Rubus allegheniensis</i> , <i>Smilax rotundifolia</i>	4-20
	W-CC2-PEM	Pittsylvania	36.905439	-79.471596	PEM	Riverine	RPWWD	S-CC13, S-CC14 (UNTs to Cherrystone Creek)	0.05	2,165	Closed	<i>Leersia oryzoides</i> , <i>Juncus effusus</i> , <i>Fraxinus americana</i>	4-20
W-MM5	W-MM5	Pittsylvania	36.903230	-79.467976	PSS	Riverine	RPWWD	S-MM8 (UNT to Cherrystone Creek)	0.09	3,954	Open	<i>Alnus serrulata</i> , <i>Acer rubrum</i> , <i>Carpinus caroliniana</i> , <i>Juncus effusus</i> , <i>Eupatorium perfoliatum</i> , <i>Cyperus esculentus</i>	4-21
W-MM6	W-MM6	Pittsylvania	36.902674	-79.468581	PSS	Riverine	RPWWD	S-MM8 (UNT to Cherrystone Creek)	0.00	199	Closed	<i>Acer rubrum</i> , <i>Carpinus caroliniana</i> , <i>Acer negundo</i> , <i>Carex lurida</i> , <i>Woodwardia areolata</i> , <i>Smilax rotundifolia</i>	4-21
W-CC1	W-CC1	Pittsylvania	36.898918	-79.462513	PSS	Riverine	RPWWD	S-CC7 (UNT to Cherrystone Creek)	0.01	332	Closed	<i>Salix nigra</i> , <i>Carex lurida</i> , <i>Juncus effusus</i>	4-22
W-MM9	W-MM9	Pittsylvania	36.894075	-79.446112	PEM	Depressional	RPWWN	Cherrystone Creek (S-CC1)	0.02	684	Closed	<i>Microstegium vimineum</i> , <i>Persicaria sagittata</i> , <i>Onoclea sensibilis</i> , <i>Lamium purpureum</i>	4-24
W-MM8	W-MM8-PEM	Pittsylvania	36.894058	-79.445521	PEM	Depressional	RPWWN	S-CC1 (Cherrystone Creek), S-CC2 (UNT to Cherrystone Creek)	0.06	2,664	Closed	<i>Microstegium vimineum</i> , <i>Verbesina alternifolia</i> , <i>Poa trivialis</i> , <i>Eupatorium perfoliatum</i> , <i>Dryopteris sp.</i>	4-24
	W-MM8-PFO	Pittsylvania	36.893821	-79.445473	PFO	Depressional	RPWWN	S-CC1 (Cherrystone Creek), S-CC2 (UNT to Cherrystone Creek)	0.10	4,399	Closed	<i>Acer rubrum</i> , <i>Lindera benzoin</i> , <i>Carpinus caroliniana</i> , <i>Microstegium vimineum</i> , <i>Carex crinita</i>	4-24
W-Q2	W-Q2	Pittsylvania	36.885231	-79.428669	PFO	Riverine	RPWWD	S-Q3 (Pole Bridge Branch), S-Q4 (UNT to Pole Bridge Branch)	2.97	129,398	Open	<i>Acer rubrum</i> , <i>Platanus occidentalis</i> , <i>Rosa multiflora</i> , <i>Microstegium vimineum</i> , <i>Leersia oryzoides</i>	4-26
W-Q1	W-Q1	Pittsylvania	36.884188	-79.427360	PEM	Depressional	RPWWD	S-Q2 (UNT to Pole Bridge Branch)	0.09	3,798	Closed	<i>Scirpus atrovirens</i> , <i>Carex vulpinoidea</i> , <i>Juncus tenuis</i> , <i>Microstegium vimineum</i> , <i>Toxicodendron radicans</i>	4-26
W-DD2	W-DD2	Pittsylvania	36.883171	-79.428256	PEM	Depressional	RPWWN	S-Q3 (Pole Bridge Branch)	0.10	4,241	Open	<i>Schoenoplectus tabernaemontani</i>	4-26
W-KL12	W-KL12	Pittsylvania	36.877519	-79.415630	PSS	Riverine	RPWWD	S-ZZ2 (UNT to Pole Bridge Branch), S-B9 (UNT to Pole Bridge Branch)	0.02	661	Open	<i>Acer rubrum</i> , <i>Viburnum nudum</i> , <i>Carpinus caroliniana</i> , <i>Carex stricta</i> , <i>Carex intumescens</i>	4-28
W-KL13	W-KL13	Pittsylvania	36.877369	-79.416579	PSS	Slope	RPWWN	S-B9 (UNT to Pole Bridge Branch)	0.00	75	Closed	<i>Carpinus caroliniana</i> , <i>Glyceria striata</i> , <i>Arisaema triloba</i>	4-28
W-B15	W-B15	Pittsylvania	36.876988	-79.416098	PSS	Slope	RPWWD	S-B10 (UNT to Pole Bridge Branch)	0.01	445	Closed	<i>Fagus grandifolia</i> , <i>Acer rubrum</i> , <i>Carpinus caroliniana</i> , <i>Carex lurida</i> , <i>Woodwardia aerolata</i> , <i>Glyceria striata</i> , <i>Smilax rotundifolia</i>	4-28
W-F6	W-F6	Pittsylvania	36.876693	-79.415815	PFO	Slope	RPWWD	S-B10 (UNT to Pole Bridge Branch)	0.03	1,476	Closed	<i>Carpinus caroliniana</i> , <i>Fraxinus pensylvanica</i> , <i>Pinus virginiana</i> , <i>Carex lurida</i>	4-28
W-KL18	W-KL18	Pittsylvania	36.871045	-79.402112	PFO	Depressional	RPWWD	S-KL26 (UNT to Mill Creek)	0.02	870	Open	<i>Acer rubrum</i> , <i>Arundinaria tecta</i> , <i>Microstegium vimineum</i> , <i>Juncus effusus</i> , <i>Juniperus virginiana</i>	4-30
W-UU13	W-UU13	Pittsylvania	36.870832	-79.404908	PFO	Depressional	ISOLATE	-	0.01	311	Open	<i>Acer rubrum</i> , <i>Pinus virginiana</i> , <i>Quercus lyrata</i> , <i>Arthraxon hispidus</i> , <i>Rubus arvensis</i> , <i>Vitis vulpina</i> , <i>Lonicera japonica</i>	4-30
W-A1	W-A1-PFO	Pittsylvania	36.852031	-79.388531	PFO	Depressional	RPWWD	S-G1 (UNT to Little Cherrystone Creek)	0.16	7,017	Closed	<i>Acer rubrum</i> , <i>Fraxinus pennsylvanica</i> , <i>Alnus serrulata</i> , <i>Onoclea sensibilis</i> , <i>Smilax rotundifolia</i>	4-34
	W-A1-PEM	Pittsylvania	36.851917	-79.387971	PEM	Riverine	RPWWD	S-G1 (UNT to Little Cherrystone Creek)	0.17	7,544	Open	<i>Carex vulpinoidea</i> , <i>Juncus effusus</i> , <i>Vernonia noveboracensis</i> , <i>Scirpus atrovirens</i> , <i>Onoclea sensibilis</i> , <i>Alnus serrulata</i>	4-34
W-G2	W-G2	Pittsylvania	36.851874	-79.385794	PEM	Riverine	RPWWD	S-G1 (UNT to Little Cherrystone Creek)	0.73	31,743	Open	<i>Juncus effusus</i> , <i>Microstegium vinineum</i> , <i>Carex lurida</i> , <i>Lindera benzoin</i> , <i>Acer rubrum</i>	4-34
W-B1	W-B1	Pittsylvania	36.850979	-79.382879	PEM	Slope	RPWWN	S-B1 (Little Cherrystone Creek)	0.01	635	Closed	<i>Scirpus atrovirens</i> , <i>Juncus effusus</i>	4-34
W-B2	W-B2	Pittsylvania	36.850668	-79.381875	PSS	Riverine	RPWWD	S-B1 (Little Cherrystone Creek)	0.15	6,619	Open	<i>Rubus allegheninesis</i> , <i>Liriodendron rulipifera</i> , <i>Acer rubrum</i> , <i>Juncus effusu</i> , <i>Carex stipata</i> , <i>Scirpus cyoerinus</i>	4-34
W-H26	W-H26	Pittsylvania	36.848141	-79.373994	PFO	Depressional	ISOLATE	-	0.02	654	Closed	<i>Quercus phellos</i> , <i>Acer rubrum</i> , <i>Quercus palustris</i> , <i>Smilax rotundifolia</i>	4-35
W-H25	W-H25	Pittsylvania	36.841695	-79.366764	PFO	Depressional	RPWWN	S-H54 (UNT to Little Cherrystone Creek)	0.08	3,330	Closed	<i>Acer rubrum</i> , <i>Fraxinus pennsylvanica</i> , <i>Liguesrum vulgare</i> , <i>Microstegium vimineum</i>	4-36
W-H24	W-H24	Pittsylvania	36.841266	-79.366454	PEM	Depressional	RPWWN	S-H55 (UNT to Little Cherrystone Creek)	0.00	56	Closed	<i>Microstegium vimineum</i> , <i>Acer negundo</i>	4-37

Table 1.
Identified Wetlands

Wetland ID	Wetland Habitat ID	County	Latitude ¹	Longitude ¹	Cowardin Class ²	HGM ³	Water Type ⁴	Associated Waterbodies	Size (Acres) ⁵	Size (square feet) ⁵	Open/Closed Boundary	Dominant Species	Figure
W-H1	W-H1	Pittsylvania	36.836109	-79.360897	PEM	Depressional	RPWWN	S-H4 (Little Cherrystone Creek)	0.01	481	Closed	<i>Juncus effusus</i> , <i>Carex vulpinoidea</i> , <i>Dactylis glomerata</i> , <i>Juncus tenuis</i> , <i>Pericaria sp.</i>	4-37
W-H2	W-H2	Pittsylvania	36.835624	-79.360988	PEM	Depressional	RPWWD	S-H3 (UNT to Little Cherrystone Creek), S-H4 (Little Cherrystone Creek)	2.77	120,545	Closed	<i>Juncus effusus</i> , <i>Carex lurida</i> , <i>Pericaria sp.</i>	4-37 & 4-38
W-EF6	W-EF6	Pittsylvania	36.835020	-79.338535	PFO	Riverine	RPWWD	S-IJ26 (UNT to Banister River)	0.58	25,197	Closed	<i>Salix nigra</i> , <i>Acer rubrum</i> , <i>Rubus alleghiensis</i> , <i>Toxicodendron radicans</i> , <i>Microstegium vimineum</i> , <i>Lonicera japonica</i>	4-41
W-IJ21	W-IJ21	Pittsylvania	36.834718	-79.338446	PFO	Slope	RPWWN	S-IJ25 (UNT to Banister River)	0.04	1,540	Closed	<i>Acer rubrum</i> , <i>Quercus phellos</i> , <i>Nyssa sylvatica</i> , <i>Pericaria maculata</i> , <i>Smilax rotundifolia</i>	4-41
W-GH15	W-GH15	Pittsylvania	36.833911	-79.344962	PEM	Riverine	RPWWD	S-GH43, S-GH41 (UNT to Little Cherrystone Creek)	0.03	1,244	Closed	<i>Juncus effusus</i> , <i>Sambucus nigra</i>	4-41
W-H3	W-H3	Pittsylvania	36.833703	-79.360035	PEM	Depressional	RPWWN	S-H5 (UNT to Little Cherrystone Creek), S-H4 (Little Cherrystone Creek)	0.08	3,548	Closed	<i>Juncus tenuis</i> , <i>Pericaria sp.</i>	4-38
W-OO1	W-OO1	Pittsylvania	36.833103	-79.360072	PEM	Riverine	RPWWD	S-H5 (UNT to Little Cherrystone Creek)	0.03	1,103	Closed	<i>Pericaria sagittata</i> , <i>Amphicarpaea bracteata</i> , <i>Carex typhina</i> , <i>Salix nigra</i>	4-38
W-MM15	W-MM15-PFO	Pittsylvania	36.831324	-79.341757	PFO	Slope	RPWWD	S-H42 (UNT to Little Cherrystone Creek)	0.42	18,462	Closed	<i>Acer rubrum</i> , <i>Liquidambar styraciflua</i> , <i>Pinus taeda</i> , <i>Onoclea sensibilis</i> , <i>Leersia oryzoides</i>	4-40
	W-MM15-PSS	Pittsylvania	36.830932	-79.342268	PSS	Slope	RPWWD	S-H42 (UNT to Little Cherrystone Creek)	1.17	50942	Closed	<i>Pinus taeda</i> , <i>Liquidambar styraciflua</i> , <i>Rubus allegheniensis</i> , <i>Solidago gigantea</i> , <i>Juncus effuses</i>	4-40
W-OO2	W-OO2	Pittsylvania	36.830892	-79.356702	PSS	Riverine	RPWWD	S-OO1 (UNT to Little Cherrystone Creek), S-H4 (Little Cherrystone Creek)	0.09	3,808	Open	<i>Ligustrum vulgare</i> , <i>Lonicera japonica</i> , <i>Acer rubrum</i> , <i>Liquidambar styraciflua</i> , <i>Boehmeria cylindrica</i> , <i>Impatiens capensis</i> , <i>Microstegium vimineum</i>	4-38
W-KL7	W-KL7	Pittsylvania	36.830689	-79.345095	PSS	Riverine	RPWWD	S-H45 (UNT to Little Cherrystone Creek)	0.03	1,506	Closed	<i>Alnus serrulata</i> , <i>Rubus allegheniensis</i> , <i>Impatiens capensis</i> , <i>Juncus effusus</i> , <i>Carex stipata</i>	4-40
W-MM3	W-MM3	Pittsylvania	36.830595	-79.356573	PSS	Riverine	RPWWD	S-OO1 (UNT to Little Cherrystone Creek)	0.08	3,428	Closed	<i>Carpinus caroliniana</i> , <i>Lindera benzoin</i> , <i>Lonicera tatarica</i> , <i>Liriodendron tulipifera</i> , <i>Carex lurida</i>	4-38
W-MM4	W-MM4	Pittsylvania	36.829309	-79.353682	PEM	Riverine	RPWWD	S-OO2 (UNT to Cherrystone Creek)	0.06	2,539	Open	<i>Microstegium vimineum</i> , <i>Impatiens capensis</i> , <i>Carpinus caroliniana</i> , <i>Liquidambar styraciflua</i>	4-39
W-EF7	W-EF7	Pittsylvania	36.829189	-79.349726	PEM	Depressional	ISOLATE	-	0.02	721	Closed	<i>Juncus effusus</i> , <i>Solidago gigantea</i> , <i>Rubus flagellaris</i> , <i>Liriodendron tulipifera</i> , <i>Acer rubrum</i> , <i>Liquidambar styraciflua</i>	4-39
W-H20	W-H20	Pittsylvania	36.829041	-79.344565	PEM	Slope	RPWWD	S-H42 (UNT to Little Cherrystone Creek)	0.00	86	Closed	<i>Pericaria hydropiper</i> , <i>Poa trivialis</i> , <i>Lonicera japonica</i>	4-40
W-IJ22	W-IJ22-PEM	Pittsylvania	36.827550	-79.350404	PEM	Riverine	RPWWD	S-EF26 (Little Cherrystone Creek)	0.21	9,031	Closed	<i>Glyceria striata</i> , <i>Quercos phellos</i> , <i>Betula nigra</i>	4-39
	W-IJ22-PFO	Pittsylvania	36.826929	-79.350604	PFO	Riverine	RPWWD	S-EF26 (Little Cherrystone Creek)	2.40	104,732	Open	<i>Acer rubrum</i> , <i>Plantanus occidentalis</i> , <i>Rosa multiflora</i> , <i>Viburnum dentatum</i> , <i>Ulmus americana</i> , <i>Microstegium viminium</i>	4-39

Notes:

- 1

- In decimal degrees. Coordinates show wetland test pit locations
- 2

- PEM = Palustrine Emergent
- PSS = Palustrine Scrub-Shrub
- PFO = Palustrine Forested
- 3

- HGM = Hydrogeomorphic
- 4

- RPWWD = Wetlands directly abutting Relatively Permanent Waters (RPWs) that flow directly or indirectly into Traditional Navigable Waterways (TNWs)
- RPWWN = Wetlands adjacent but not directly abutting RPWs that flow directly or indirectly into TNWs
- NRPWW = Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- Isolate = Isolated (interstate or intrastate) waters, including isolated wetlands
- 5

- Size of wetlands with open boundaries may be larger than shown in this table. See Section 3.1 for more information

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-D4	UNT to Jonnikin Creek	Pittsylvania	36.965583	-79.604950	Intermittent	RPW	R4SB5	6	4-2
S-D3	UNT to Jonnikin Creek	Pittsylvania	36.965544	-79.605520	Perennial	RPW	R2UB1	10	4-2
S-D2	Jonnikin Creek	Pittsylvania	36.965415	-79.599126	Perennial	RPW	R3UB1	18	4-2 & 4-3
S-D5	UNT to Jonnikin Creek	Pittsylvania	36.965133	-79.609672	Intermittent	RPW	R4SB4	3	4-1
S-P7	UNT to Jonnikin Creek	Pittsylvania	36.964951	-79.586811	Ephemeral	NRPW	R6	3	4-4
S-D1-EPH	UNT to Jonnikin Creek	Pittsylvania	36.964480	-79.595465	Ephemeral	NRPW	R6	10	4-3
S-D1-INT	UNT to Jonnikin Creek	Pittsylvania	36.964330	-79.596088	Intermittent	RPW	R4SB5	10	4-3
S-D6	UNT to Jonnikin Creek	Pittsylvania	36.964292	-79.614850	Ephemeral	NRPW	R6	1	4-1
S-G12	UNT to Jonnikin Creek	Pittsylvania	36.962686	-79.590401	Intermittent	RPW	R4SB3	6	4-3 & 4-4
S-G11	UNT to Jonnikin Creek	Pittsylvania	36.962525	-79.590422	Intermittent	RPW	R4SB3	6	4-4
S-DD5	UNT to Jonnikin Creek	Pittsylvania	36.959429	-79.585912	Intermittent	RPW	R4SB2	8	4-4
S-G10	UNT to Jonnikin Creek	Pittsylvania	36.959427	-79.586954	Intermittent	RPW	R4SB3	5	4-4
S-G9	UNT to Jonnikin Creek	Pittsylvania	36.959424	-79.586352	Intermittent	RPW	R4SB3	4	4-4
S-G8	UNT to Jonnikin Creek	Pittsylvania	36.957799	-79.583528	Intermittent	RPW	R4SB3	4	4-5
S-Q15	UNT to Jonnikin Creek	Pittsylvania	36.957586	-79.583496	Ephemeral	NRPW	R6	5	4-5
S-A5	UNT to Rocky Creek	Pittsylvania	36.954141	-79.580479	Ephemeral	NRPW	R6	8	4-5
S-A6	UNT to Rocky Creek	Pittsylvania	36.952088	-79.580170	Perennial	RPW	R3UB3	5	4-6
S-H11-Braid	UNT to Rocky Creek	Pittsylvania	36.949615	-79.579553	Ephemeral	NRPW	R6	2	4-6
S-H11	UNT to Rocky Creek	Pittsylvania	36.949269	-79.579150	Ephemeral	NRPW	R6	3	4-6
S-H12	UNT to Rocky Creek	Pittsylvania	36.949420	-79.579738	Ephemeral	NRPW	R6	3	4-6
S-H10	UNT to Rocky Creek	Pittsylvania	36.948809	-79.578610	Ephemeral	NRPW	R6	2	4-6
S-H9	UNT to Rocky Creek	Pittsylvania	36.948347	-79.579128	Ephemeral	NRPW	R6	2	4-6
S-ST4	UNT to Rocky Creek	Pittsylvania	36.945989	-79.577384	Ephemeral	NRPW	R6	2	4-7
S-C6	UNT to Rocky Creek	Pittsylvania	36.945810	-79.574554	Ephemeral	NRPW	R6	4	4-7
S-F1	UNT to Rocky Creek	Pittsylvania	36.944501	-79.572823	Ephemeral	NRPW	R6	8	4-7 & 4-8
S-F2	UNT to Rocky Creek	Pittsylvania	36.944192	-79.571278	Ephemeral	NRPW	R6	7	4-8
S-C7	UNT to Rocky Creek	Pittsylvania	36.944079	-79.571458	Perennial	RPW	R3UB3	20	4-8
S-E12	UNT to Pigg River	Pittsylvania	36.936050	-79.549270	Ephemeral	NRPW	R6	3	4-10
S-E11	Pigg River	Pittsylvania	36.933340	-79.538297	Perennial	RPW	R2UB3	100	4-11
S-H8	UNT to Pigg River	Pittsylvania	36.932413	-79.535119	Ephemeral	NRPW	R6	6	4-12
S-A4	UNT to Pigg River	Pittsylvania	36.932375	-79.533360	Perennial	RPW	R3UB2	8	4-12
S-H7	UNT to Pigg River	Pittsylvania	36.931861	-79.532647	Intermittent	RPW	R4SB4	5	4-12
S-C4	UNT to Harpen Creek	Pittsylvania	36.929711	-79.526554	Perennial	RPW	R3UB1	4	4-13
S-C3	Harpen Creek	Pittsylvania	36.929687	-79.526108	Perennial	RPW	R2UB2	18	4-13
S-H15	UNT to Harpen Creek	Pittsylvania	36.928491	-79.522712	Intermittent	RPW	R4SB5	7	4-14
S-H16	UNT to Harpen Creek	Pittsylvania	36.928440	-79.522841	Intermittent	RPW	R4SB5	12	4-13 & 4-14
S-H14	UNT to Harpen Creek	Pittsylvania	36.925472	-79.517169	Ephemeral	NRPW	R6	5	4-14
S-H13	Harpen Creek	Pittsylvania	36.925109	-79.517347	Perennial	RPW	R2UB2	20	4-14
S-G6	UNT to Harpen Creek	Pittsylvania	36.920702	-79.505898	Intermittent	RPW	R4SB4	6	4-16
S-G7	UNT to Harpen Creek	Pittsylvania	36.920403	-79.506377	Intermittent	RPW	R4SB4	10	4-16
S-G5	UNT to Harpen Creek	Pittsylvania	36.917691	-79.496605	Ephemeral	NRPW	R6	6	4-17
S-G4	Harpen Creek	Pittsylvania	36.916620	-79.492747	Perennial	RPW	R2UB1	30	4-17
S-G3	UNT to Harpen Creek	Pittsylvania	36.915647	-79.490034	Perennial	RPW	R3UB1	9	4-17 & 4-18
S-CC16	UNT to Harpen Creek	Pittsylvania	36.913180	-79.485181	Perennial	RPW	R3US2	11	4-18
S-CC17	UNT to Harpen Creek	Pittsylvania	36.912755	-79.483314	Intermittent	RPW	R4SB5	5	4-18
S-CC14	UNT to Cherrystone Creek	Pittsylvania	36.905275	-79.471495	Intermittent	RPW	R4SB5	8	4-20
S-CC13	UNT to Cherrystone Creek	Pittsylvania	36.905230	-79.471619	Intermittent	RPW	R4SB5	7	4-20
S-MM8	UNT to Cherrystone Creek	Pittsylvania	36.902986	-79.468224	Perennial	RPW	R3UB2	6	4-21
S-CC15	UNT to Cherrystone Creek	Pittsylvania	36.901906	-79.466558	Perennial	RPW	R3UB2	6	4-21
S-CC8	UNT to Cherrystone Creek	Pittsylvania	36.899404	-79.462707	Intermittent	RPW	R4SB4	10	4-21
S-CC5	UNT to Cherrystone Creek	Pittsylvania	36.899237	-79.462662	Perennial	RPW	R3UB1	12	4-21 & 4-22

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-CC6	UNT to Cherrystone Creek	Pittsylvania	36.899191	-79.462912	Perennial	RPW	R3UB2	8	4-21
S-CC7	UNT to Cherrystone Creek	Pittsylvania	36.898939	-79.462560	Perennial	RPW	R3UB3	6	4-22
S-CC9	UNT to Cherrystone Creek	Pittsylvania	36.897974	-79.457987	Ephemeral	NRPW	R6	5.5	4-22
S-CC10	UNT to Cherrystone Creek	Pittsylvania	36.897244	-79.456147	Intermittent	RPW	R4SB5	9	4-22
S-MM10	UNT to Cherrystone Creek	Pittsylvania	36.895984	-79.452876	Intermittent	RPW	R4SB3	7	4-23
S-CC11	UNT to Cherrystone Creek	Pittsylvania	36.895771	-79.452925	Perennial	RPW	R3UB2	8	4-23
S-CC2	UNT to Cherrystone Creek	Pittsylvania	36.894314	-79.445411	Intermittent	RPW	R4SB4	4.5	4-24
S-CC1	Cherrystone Creek	Pittsylvania	36.894067	-79.445750	Perennial	RPW	R2UB1	15	4-24
S-CC3	UNT to Cherrystone Creek	Pittsylvania	36.893788	-79.444442	Ephemeral	NRPW	R6	8	4-24
S-P5	UNT to Cherrystone Creek	Pittsylvania	36.892720	-79.440527	Ephemeral	NRPW	R6	5	4-24
S-CC4	UNT to Pole Bridge Branch	Pittsylvania	36.892642	-79.434964	Intermittent	RPW	R4SB4	10	4-25
S-IJ35-INT	UNT to Pole Bridge Branch	Pittsylvania	36.891915	-79.433830	Intermittent	RPW	R4SB4	12	4-25
S-IJ35-EPH	UNT to Pole Bridge Branch	Pittsylvania	36.891446	-79.433782	Ephemeral	NRPW	R6	4.5	4-25
S-Q6	UNT to Pole Bridge Branch	Pittsylvania	36.886300	-79.430517	Ephemeral	NRPW	R6	5	4-26
S-Q5	UNT to Pole Bridge Branch	Pittsylvania	36.886058	-79.430046	Ephemeral	NRPW	R6	2	4-26
S-Q4	UNT to Pole Bridge Branch	Pittsylvania	36.885979	-79.430010	Perennial	RPW	R3UB2	5	4-26
S-Q3	Pole Bridge Branch	Pittsylvania	36.884682	-79.428018	Perennial	RPW	R2UB1	25	4-26
S-Q2	UNT to Pole Bridge Branch	Pittsylvania	36.884188	-79.426837	Perennial	RPW	R3UB3	7	4-26
S-Q1	UNT to Pole Bridge Branch	Pittsylvania	36.883789	-79.425583	Ephemeral	NRPW	R6	4	4-26 & 4-27
S-B6	UNT to Pole Bridge Branch	Pittsylvania	36.879319	-79.420188	Ephemeral	NRPW	R6	10	4-27
S-HH6	UNT to Pole Bridge Branch	Pittsylvania	36.878798	-79.420412	Ephemeral	NRPW	R6	3	4-27
S-F12	UNT to Pole Bridge Branch	Pittsylvania	36.878017	-79.418939	Ephemeral	NRPW	R6	4	4-27
S-B8	UNT to Pole Bridge Branch	Pittsylvania	36.877988	-79.417944	Intermittent	RPW	R4SB3	4	4-28
S-ZZ1	UNT to Pole Bridge Branch	Pittsylvania	36.877681	-79.415889	Intermittent	RPW	R4SB4	6	4-28
S-KL20	UNT to Pole Bridge Branch	Pittsylvania	36.877586	-79.415953	Intermittent	RPW	R4SB4	7	4-28
S-ZZ2	UNT to Pole Bridge Branch	Pittsylvania	36.877522	-79.415636	Perennial	RPW	R3UB2	6	4-28
S-B9	UNT to Pole Bridge Branch	Pittsylvania	36.877273	-79.416621	Perennial	RPW	R3UB1	7	4-28
S-B10	UNT to Pole Bridge Branch	Pittsylvania	36.876261	-79.415303	Intermittent	RPW	R4SB3	7	4-28
S-IJ34	UNT to Pole Bridge Branch	Pittsylvania	36.875338	-79.412003	Ephemeral	NRPW	R6	5	4-28
S-E7	UNT to Mill Creek	Pittsylvania	36.871723	-79.406789	Ephemeral	NRPW	R6	5	4-29 & 4-30
S-DD4	UNT to Mill Creek	Pittsylvania	36.871011	-79.403314	Intermittent	RPW	R4SB4	6	4-30
S-KL26	UNT to Mill Creek	Pittsylvania	36.870928	-79.402231	Intermittent	RPW	R4SB5	2	4-30
S-E5	UNT to Mill Creek	Pittsylvania	36.870400	-79.405354	Perennial	RPW	R3UB1	10	4-30
S-UU10	UNT to Mill Creek	Pittsylvania	36.870341	-79.405244	Ephemeral	NRPW	R6	3	4-30
S-KL27	UNT to Mill Creek	Pittsylvania	36.866639	-79.400419	Ephemeral	NRPW	R6	2	4-31
S-C1	Mill Creek	Pittsylvania	36.863507	-79.397913	Intermittent	RPW	R4SB4	6	4-32
S-G2	Little Cherrystone Creek	Pittsylvania	36.851848	-79.386289	Perennial	RPW	R2UB2	7	4-34
S-G1	UNT of Little Cherrystone Creek	Pittsylvania	36.851841	-79.387625	Intermittent	RPW	R4SB4	5.5	4-34
S-B1	Little Cherrystone Creek	Pittsylvania	36.850491	-79.381224	Perennial	RPW	R2UB2	10	4-34
S-B2	UNT to Little Cherrystone Creek	Pittsylvania	36.849493	-79.377758	Ephemeral	NRPW	R6	5	4-35
S-H55	UNT to Little Cherrystone Creek	Pittsylvania	36.843213	-79.369176	Ephemeral	NRPW	R6	3	4-36
S-H54	UNT to Little Cherrystone Creek	Pittsylvania	36.841309	-79.366745	Perennial	RPW	R3UB1	12	4-36 & 4-37
S-GG11	UNT to Little Cherrystone Creek	Pittsylvania	36.841223	-79.367466	Perennial	RPW	R3UB1	8	4-36 & 4-37
S-H52	UNT to Little Cherrystone Creek	Pittsylvania	36.839198	-79.364643	Ephemeral	NRPW	R6	5	4-37
S-GG12	Little Cherrystone Creek	Pittsylvania	36.837557	-79.361024	Perennial	RPW	R2UB2	12	4-37
S-IJ25	UNT to Banister River	Pittsylvania	36.835050	-79.338262	Perennial	RPW	R3UB3	4	4-41
S-IJ26	UNT to Banister River	Pittsylvania	36.835005	-79.338402	Intermittent	RPW	R4SB5	4	4-41
S-GH42	UNT to Little Cherrystone Creek	Pittsylvania	36.834607	-79.345047	Ephemeral	NRPW	R6	6	4-41
S-H3	UNT to Little Cherrystone Creek	Pittsylvania	36.834515	-79.360124	Intermittent	RPW	R4SB4	6	4-38
S-GH43	UNT to Little Cherrystone Creek	Pittsylvania	36.833956	-79.344881	Intermittent	RPW	R4SB4	6	4-41
S-H4	Little Cherrystone Creek	Pittsylvania	36.833678	-79.359068	Perennial	RPW	R2UB2	30	4-38
S-H5	UNT to Little Cherrystone Creek	Pittsylvania	36.833484	-79.359734	Perennial	RPW	R3UB2	8	4-38
S-GH41	Little Cherrystone Creek	Pittsylvania	36.833247	-79.345134	Intermittent	RPW	R4SB4	6	4-41
S-H44	UNT to Little Cherrystone Creek	Pittsylvania	36.831092	-79.345679	Perennial	RPW	R3UB2	8	4-40

Table 2.
Identified Streams

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Cowardin Class ⁴	Top of Bank Width (ft)	Figure
S-H45	UNT to Little Cherrystone Creek	Pittsylvania	36.830568	-79.345286	Intermittent	RPW	R4SB4	3	4-40
S-H46	UNT to Little Cherrystone Creek	Pittsylvania	36.830389	-79.345679	Ephemeral	NRPW	R6	7	4-40
S-OO1	UNT to Little Cherrystone Creek	Pittsylvania	36.830281	-79.356624	Intermittent	RPW	R4SB3	5	4-38
S-H47	UNT to Little Cherrystone Creek	Pittsylvania	36.829612	-79.346017	Ephemeral	NRPW	R6	3	4-40
S-H42	UNT to Little Cherrystone Creek	Pittsylvania	36.829057	-79.343877	Perennial	RPW	R3UB2	7	4-40
S-EF25	UNT to Little Cherrystone Creek	Pittsylvania	36.829014	-79.346983	Perennial	RPW	R3UB1	12	4-40
S-OO2	UNT to Little Cherrystone Creek	Pittsylvania	36.828900	-79.353834	Intermittent	RPW	R4SB3	5	4-39
S-EF26	Little Cherrystone Creek	Pittsylvania	36.828255	-79.349849	Perennial	RPW	R2UB1	22	4-39

Notes:

- 1
- For identified streams without a NHD (National Hydrography Dataset) name, the identified stream was given the name, “Unidentified Tributary (UNT)”, of the first named receiving waterbody
- 2
- In decimal degrees
- 3
- RPW = Relatively Permanent Waters
- NRPW = Non-Relatively Permanent Waters
- TNW = Traditional Navigable Waters
- 4
- See Cowardin et al., 1979

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Mountain Valley Pipeline, LLC		File Number: 2015-0898	Date: 4/8/2021
Attached is:			See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A	
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B	
	PERMIT DENIAL	C	
	APPROVED JURISDICTIONAL DETERMINATION	D	
X	PRELIMINARY JURISDICTIONAL DETERMINATION	E	

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/appeals.aspx> or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

Todd Miller
Chief Southern Virginia Regulatory Section
U.S. Army Corps of Engineers
9100 Arboretum Pkwy, Ste 235
Richmond, Virginia 23236
(o)804-586-2938
todd.m.miller@usace.army.mil

If you only have questions regarding the appeal process you may also contact:

Ms. Naomi J. Handell
Regulatory Program Manager (CENAD-PD-OR)
U.S. Army Corps of Engineers
Fort Hamilton Military Community
301 General Lee Avenue
Brooklyn, New York 11252-6700
Telephone number: (917) 789-4841
Naomi.J.Handell@usace.army.mil

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.

Date:

Telephone number:

ATTACHMENT 4

Attachment B-5 (Riparian Property Owner Information)

Table 2 (Stream Impacts)

Table 3 (Wetland Impacts)

Table 4 (Stream Impacts Summary)

Table 5 (Wetland Impacts Summary)

Table 15 (Crossing Method Determination Summary)

Table 17 (Compensatory Wetland Mitigation)

Table 18 (Compensatory Stream Mitigation)

Table B-1 (Virginia Stream Impacts)

Table B-2 (Virginia Wetland Impacts)

Table B-3 (Virginia Stream Impacts Summary)

Table B-4 (Virginia Wetland Impacts Summary)

Property Owner Information

Owner Phone Number, Email, Fax, SCC unknown. Not included.

MAP ID	GPIN	Owner Name	Owner Street Address	County	City, State, Zip	Latitude	Longitude
1	120-A-16	GARY RICHARD AND JANET ELIZABETH DIFABLO BUSS		Craig County	VA	37.3138319	-80.42752238
2	121-A-15	TIMOTHY SHAWN HUGHES		Craig County	VA	37.32890445	-80.41430551
3	121-A-11 12 13	JESSICA DANIELLE HALL		Craig County	VA	37.32827578	-80.41978722
4	121-A-2 4 5 6	STACY SMITH		Craig County	VA	37.32647645	-80.42479285
5	121-A-14	JESSICA DANIELLE HALL		Craig County	VA	37.32560091	-80.41558161
6	120-A-14A	HELENA DELANEY TEEKEL TRUST		Craig County	VA	37.32438372	-80.42815633
7	120-A-8	RAMON A. ARELLANO		Craig County	VA	37.32326774	-80.44109213
8	120-A-8A	ROGER M. AND VICKI S. POWELL		Craig County	VA	37.32194644	-80.44217917
9	120-A-13	GORDON WAYNE AND DONNA W. JONES		Craig County	VA	37.32153495	-80.42850293
10	120-A-12	HELENA DELANEY TEEKEL TRUST		Craig County	VA	37.32130212	-80.43090826
11	120-A-9	DAWN E. CISEK		Craig County	VA	37.32081423	-80.44149687
12	120-A-10A	STEVEN C. AND JUDY R. HODGES		Craig County	VA	37.32079699	-80.43341381
13	240002100	WIMMER VIRGIL WYATT & ANTHONY EARL		Franklin County	CALLAWAY,VA 24067	37.1285098	-80.10545629
14	240000200	CRAIGHEAD DAVID M & NANCY G		Franklin County	CALLAWAY,VA 24067	37.1272228	-80.09603274
15	240000400	JAMISON SHIRLEY BOWMAN	4753 DILLONS MILL ROAD	Franklin County	CALLAWAY,VA 24067	37.12627296	-80.07823064
16	240002300	PRICE MARION WALDRON & WALDRON ANNE & R & MORGAN &	18210 CALLAWAY ROAD	Franklin County	CALLAWAY,VA 24067	37.1264036	-80.11572017
17	240000500	CRAIGHEAD SHERMAN E & MICHAEL EDWARD		Franklin County	CALLAWAY,VA 24067	37.12390067	-80.07457091
18	240000500	CRAIGHEAD SHERMAN E & MICHAEL EDWARD		Franklin County	CALLAWAY,VA 24067	37.12382282	-80.07164912
19	240001400	BOWMAN KEVIN P & CELENA G	1733 ADNEY GAP RD	Franklin County	CALLAWAY,VA 24067	37.12353374	-80.08230547
20	240001900	BOWMAN KEVIN P & CELENA G		Franklin County	CALLAWAY,VA 24067	37.12353018	-80.0875386
21	240001300	BOWMAN E P & EZRA S		Franklin County	CALLAWAY,VA 24067	37.12250905	-80.07733418
22	240003400	PRICE LUCY A		Franklin County	CALLAWAY,VA 24067	37.12197425	-80.10071035
23	240001800	FOLEY RUTH	1395 ADNEY GAP RD	Franklin County	CALLAWAY,VA 24067	37.12159131	-80.09014901
24	240000900	BROWN ALFRED L & DORIS ANN QUINN	555 FLANDERS RD	Franklin County	CALLAWAY,VA 24067	37.1211906	-80.05789959
25	240002700	WIMMER VIRGIL WYATT & ANTHONY EARL	76 SIGNAL HILL DR	Franklin County	CALLAWAY,VA 24067	37.12125589	-80.10891269
26	240004400	JAMISON SHIRLEY BOWMAN		Franklin County	CALLAWAY,VA 24067	37.12113676	-80.09535192
27	0240001001B	CLINGENPEEL LLOYD R & ROXIE C		Franklin County	CALLAWAY,VA 24067	37.12075533	-80.06890968
28	240001100	JAMISON SHIRLEY BOWMAN	1868 ADNEY GAP RD	Franklin County	CALLAWAY,VA 24067	37.1206927	-80.07196971
29	240000900	BROWN ALFRED L & DORIS ANN QUINN	555 FLANDERS RD	Franklin County	CALLAWAY,VA 24067	37.12051305	-80.06357571
30	240001700	BOWMAN E P & GRACE		Franklin County	CALLAWAY,VA 24067	37.1186917	-80.0882065
31	240001001	MEADOR DONALD L	5040 DILLONS MILL RD	Franklin County	CALLAWAY,VA 24067	37.11821681	-80.06795
32	240004000	NICHOLS JESSE WILLARD		Franklin County	CALLAWAY,VA 24067	37.11770116	-80.09756002
33	250002100	WRAY L BENTON JR & DIANE S & ALVIN E & LINDA L	989 WADES GAP RD	Franklin County	CALLAWAY,VA 24067	37.11704066	-80.05631224
34	240004100	WRAY WILLIAM HUBERT	140 ADNEY GAP ROAD	Franklin County	CALLAWAY,VA 24067	37.11428398	-80.09633348
35	240005400	CALLAWAY RUSSELL E & HEIDE K	4230 DILLONS MILL RD	Franklin County	CALLAWAY,VA 24067	37.11261653	-80.06387843
36	250002200	WRAY LUTHER & KATHLEEN (LE) & ALVIN & LINDA & L BE	703 WADES GAP RD	Franklin County	CALLAWAY,VA 24067	37.10935551	-80.05517866
37	250002400	WEBSTER JESSE ALBERT		Franklin County	CALLAWAY,VA 24067	37.10877674	-80.04430242
38	250002500	HARTMAN ALAN R	422 WADES GAP RD	Franklin County	CALLAWAY,VA 24067	37.10777947	-80.04653386
39	250002501	HARTMAN ALAN RANDOLPH	422 WADES GAP ROAD	Franklin County	CALLAWAY,VA 24067	37.10680347	-80.05029201
40	250002800	WEBSTER JESSE ALBERT	280 WADES GAP ROAD	Franklin County	CALLAWAY,VA 24067	37.10371945	-80.05095466
41	250003700	RHUDY ALEX C	744 WEBSTER CORNER	Franklin County	CALLAWAY,VA 24067	37.10327216	-80.03521743
42	250003300	FLORA JOHN B & JUDY R (TRUSTEES) & BURTNER JANET F		Franklin County	CALLAWAY,VA 24067	37.10226488	-80.04067806
43	250003801	MCDARMON MARTHA A	634 WEBSTER CORNER RD	Franklin County	CALLAWAY,VA 24067	37.09871508	-80.03681701
44	250004100	OCCANNEECHI INC	1185 CAHAS MOUNTAIN RD	Franklin County	BOONES MILL,VA 24065	37.09807345	-80.02740074
45	038000201D	MCDARMON RICHARD H JR & WALTON ELLEN C	167 BEECH TREE LN	Franklin County	CALLAWAY,VA 24067	37.09627165	-80.03476423
46	038000201B	MCDARMON RICHARD H JR & WALTON ELLEN C	211 BEECH TREE LN	Franklin County	CALLAWAY,VA 24067	37.09563864	-80.03442126
47	370001301	WINGFIELD JAMES H & MILDRED K	LEANING OAK ROAD	Franklin County	BOONES MILL,VA 24065	37.09409706	-79.97341811
48	380002602	WOOD REBA KATHRYN	351 HOUSE ROCK RD	Franklin County	BOONES MILL,VA 24065	37.09388841	-79.99347056
49	370001106	LOVELESS GLENN W & JUNE S	255 MONTY RD	Franklin County	BOONES MILL,VA 24065	37.09371882	-79.97930885
50	380000904	KANE SCOTT W & WENDY H	526 SHAMROCK FARM LN	Franklin County	CALLAWAY,VA 24067	37.09397918	-80.03324212
51	370001116	S & S DEVELOPMENT INC	BETHELEHM ROAD	Franklin County	BOONES MILL,VA 24065	37.09348539	-79.98294662
52	380001900	FRITH GLENN C & LINDA K	580 WILDWOOD RD	Franklin County	BOONES MILL,VA 24065	37.09360097	-80.00135123
53	370001100	FIKE JAMES R	331 MONTY RD	Franklin County	BOONES MILL,VA 24065	37.09320738	-79.97723774
54	370001115	J & M GRANTS INC	BETHELEHM ROAD	Franklin County	BOONES MILL,VA 24065	37.09292624	-79.98308201
55	370001111	J & M GRANTS INC	MONTY ROAD	Franklin County	BOONES MILL,VA 24065	37.09279754	-79.98044823
56	370001800	KINSEY RAY A JR	LEANING OAK ROAD	Franklin County	BOONES MILL,VA 24065	37.09250559	-79.96140494
57	370001900	KINSEY RAY A JR	GRASSY HILL ROAD	Franklin County	BOONES MILL,VA 24065	37.09237396	-79.9563289
58	370001110	J & M GRANTS INC	MONTY ROAD	Franklin County	BOONES MILL,VA 24065	37.09258311	-79.98147496
59	380002500	HUGHES ETHEL NELSON	442 WILDWOOD RD	Franklin County	BOONES MILL,VA 24065	37.0923767	-79.99570618
60	380002600	WOOD REBA K		Franklin County	BOONES MILL,VA 24065	37.09228333	-79.98810503
61	370001114	J & M GRANTS INC	BETHELEHM ROAD	Franklin County	BOONES MILL,VA 24065	37.09212312	-79.98323338
62	370001510	WORRELL RAYMOND THOMAS & LINDA D	320 HONEYBEE TRL	Franklin County	BOONES MILL,VA 24065	37.09165618	-79.97157269
63	370001000	FIKE JAMES R	331 MONTY RD	Franklin County	BOONES MILL,VA 24065	37.09172608	-79.97998309
64	370001511	WALTERS CARL W SR & CHERYL H	349 HONEYBEE TRL	Franklin County	BOONES MILL,VA 24065	37.09138784	-79.96923949
65	370001090	HEATHERWOOD PROPERTIES INC	MONTY ROAD	Franklin County	BOONES MILL,VA 24065	37.09133899	-79.97672841
66	380001501	OCCANNEECHI INC	854 CAHAS MOUNTAIN RD	Franklin County	BOONES MILL,VA 24065	37.09163978	-80.02033303
67	370001800	KINSEY RAY A JR	LEANING OAK ROAD	Franklin County	BOONES MILL,VA 24065	37.09116371	-79.96534896
68	370001112	J & M GRANTS INC	MONTY ROAD	Franklin County	BOONES MILL,VA 24065	37.09112372	-79.98152669
69	370001113	J & M GRANTS INC	MONTY ROAD	Franklin County	BOONES MILL,VA 24065	37.09011151	-79.98177893
70	370001070	WINGFIELD JAMES H & MILDRED K	MONTY ROAD	Franklin County	BOONES MILL,VA 24065	37.08975489	-79.9759489
71	370001600	WRAY HAROLD E & CAROLYN M	SAINT CLAIR LANE	Franklin County	BOONES MILL,VA 24065	37.08910568	-79.96732843
72	370001803	DRAPER JEFFREY B	855 LEANING OAK RD	Franklin County	BOONES MILL,VA 24065	37.08901283	-79.96310857
73	380001400	BOWLING WAYNE J & MARGIE SHIVELY	2280 CAHAS MOUNTAIN RD	Franklin County	BOONES MILL,VA 24065	37.08941783	-80.01265426
74	370001901	BERNARD STEPHEN W & ANNE W	GRASSY HILL ROAD	Franklin County	BOONES MILL,VA 24065	37.08857303	-79.94956937
75	370009906	COPENHAVER GEORGE W & JANICE P	887 LABELLEVEU DR	Franklin County	BOONES MILL,VA 24065	37.08854374	-79.96932669
76	0370009906A	FLINT RICHARD E III		Franklin County	BOONES MILL,VA 24065	37.08848988	-79.97096044
77	370001606	KEATON JOSEPH A & DAVID A	SAINT CLAIR LANE	Franklin County	BOONES MILL,VA 24065	37.08830981	-79.9640629
78	380002000	FLORA WENDELL WRAY & MARY MCNEIL	150 FLORADALE FARMS LANE	Franklin County	BOONES MILL,VA 24065	37.08813037	-80.00089914
79	0380002204B	OWEN EMILIE M	574 WILDWOOD RD	Franklin County	BOONES MILL,VA 24065	37.08767504	-79.99227297
80	0370001803A	DRAPER JOANNE H		Franklin County	BOONES MILL,VA 24065	37.08736733	-79.96164368
81	370001605	WADDELL EARNESTINE	89 SAINT CLAIR LN	Franklin County	BOONES MILL,VA 24065	37.08729275	-79.96263279
82	0370009305A	HANES DEREK T & MARION C	7681 GRASSY HILL RD	Franklin County	BOONES MILL,VA 24065	37.08660488	-79.95074427
83	3700010100	FLINT RICHARD E III	567 HAWK RIDGE LN	Franklin County	BOONES MILL,VA 24065	37.08678699	-79.97233002
84	370009301	FLORA LYNN R & CYNTHIA D	GRASSY HILL ROAD	Franklin County	BOONES MILL,VA 24065	37.0865655	-79.94815758
85	0370001803A	DRAPER JOANNE H		Franklin County	BOONES MILL,VA 24065	37.08664367	-79.96111291
86	380002002	FLORA CHARLES FREDRICK & STEPHANIE M		Franklin County	BOONES MILL,VA 24065	37.08695753	-80.00726409
87	380002203	HURT MARY FRANCES KING & MICHAEL S		Franklin County	BOONES MILL,VA 24065	37.08723686	-79.99596429
88	380001501	OCCANNEECHI INC	854 CAHAS MOUNTAIN RD	Franklin County	BOONES MILL,VA 24065	37.08558037	-80.01434922
89	370009303	CUSTER CAREY E & BETTY C	7565 GRASSY HILL RD	Franklin County	BOONES MILL,VA 24065	37.08479009	-79.94981093
90	380001300	JAMISON J CLARK JR & SHIRLEY BOWMAN & J CLARK SR &		Franklin County	BOONES MILL,VA 24065	37.08535676	-80.01954356
91	370008500	FLORA LYNN RAY	GRASSY HILL ROAD	Franklin County	BOONES MILL,VA 24065	37.08383185	-79.94571394
92	0380003402E	KINSEY BRIAN H & GEORGE D JR & STEVEN D	114 KINSEY HILL LANE	Franklin County	BOONES MILL,VA 24065	37.08369759	-80.00977964
93	370009600	PERKINSON DIANA M	2065 GREEN LEVEL RD	Franklin County	BOONES MILL,VA 24065	37.08268855	-79.96023787
94	380005100	JAMISON J CLARK JR & SHIRLEY BOWMAN & J CLARK SR &		Franklin County	BOONES MILL,VA 24065	37.0826406	-80.01769228
95	3700017302	MORAN JEFFERY L & DANA A	GREEN LEVEL ROAD	Franklin County	ROCKY MOUNT,VA 24151	37.08161178	-79.94495751
96	3700017700	IKENBERRY ROBERT G	GREEN LEVEL ROAD	Franklin County	BOONES MILL,VA 24065	37.08029671	-79.94072677
97	370005400	COUNTY OF FRANKLIN	VIRGIL H GOODE HWY	Franklin County	ROCKY MOUNT,VA 24151	37.07576178	-79.92552156
98	370018101	ANDERSON ORREN RICHARD & GENEVA BELL	GREEN LEVEL ROAD	Franklin County	ROCKY MOUNT,VA 24151	37.07601796	-79.93898255
99	370018000	CONNER BERNICE M & MARGIE S	3266 GREEN LEVEL RD	Franklin County	ROCKY MOUNT,VA 24151	37.07498744	-79.94062049
100	370018000	CONNER BERNICE M & MARGIE S	3266 GREEN LEVEL RD	Franklin County	ROCKY MOUNT,VA 24151	37.07414686	-79.94066481
101	370015400	FLORA DAVID C & JANIE B (LE) & GARY & D & VAN L &	190 WINDSWPT LN	Franklin County	BOONES MILL,VA 24065	37.07226073	-79.93933604
102	370015500	FLORA DAVID C & JANIE B (LE) & GARY & D & VAN L &	133 WINDSWPT LN	Franklin County	BOONES MILL,VA 24065	37.0713624	-79.93951603
103	370015601	RUTROUGH GARY W & HELEN J TRUSTEES	GRASSY HILL ROAD	Franklin County	BOONES MILL,VA 24065	37.07085646	-79.94064332
104	370015601	RUTROUGH GARY W & HELEN J TRUSTEES	GRASSY HILL ROAD	Franklin County	BOONES MILL,VA 24065	37.07073894	-79.93948828
105	370015600	RUTROUGH GARY W & HELEN J TRUSTEES	6370 GRASSY HILL ROAD	Franklin County	BOONES MILL,VA 24065	37.07029728	-79.94054171

Property Owner Information

Owner Phone Number, Email, Fax, SCC unknown. Not included.

MAP ID	GPIN	Owner Name	Owner Street Address	County	City, State, Zip	Latitude	Longitude
106	370015600	RUTROUGH GARY W & HELEN J TRUSTEES	6370 GRASSY HILL ROAD	Franklin County	BOONES MILL, VA 24065	37.07021143	-79.94005822
107	370015300	RUTROUGH GARY W & HELEN J TRUSTEES	6360 GRASSY HILL RD	Franklin County	BOONES MILL, VA 24065	37.06994122	-79.93968418
108	430003400	SAUL CHRISTINE PETERS (LE) & OTHER	6258 GRASSY HILL RD	Franklin County	BOONES MILL, VA 24065	37.06970902	-79.93752299
109	430004300	ECKLES GENEVA A & KENNETH EARL(LE)& ECKLES BUDDY	1407 BRICK CHURCH RD	Franklin County	ROCKY MOUNT, VA 24151	37.06892559	-79.93306858
110	430005005	WILSON PAUL L & PEGGY M	54 CLOVERDALE LN	Franklin County	ROCKY MOUNT, VA 24151	37.06830776	-79.92418912
111	440020300	ANGLE LEALDA T	1619 ANGLE PLANTATION ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.06716906	-79.86247324
112	430005005	WILSON PAUL L & PEGGY M	54 CLOVERDALE LN	Franklin County	ROCKY MOUNT, VA 24151	37.06806732	-79.92494014
113	430005006	CONNER STEVEN L	108 CLOVERDALE LN	Franklin County	ROCKY MOUNT, VA 24151	37.06733891	-79.92355619
114	430004900	FISHER C KEVIN	1884 BRICK CHURCH RD	Franklin County	ROCKY MOUNT, VA 24151	37.06692911	-79.92218076
115	440019900	SANDY RIDGE BAPTIST CHURCH	1444 BONBROOK MILL RD	Franklin County	ROCKY MOUNT, VA 24151	37.06632741	-79.87363107
116	440018700	MORGAN ROBERT WAYNE & PATRICIA ANN	BONBROOK MILL ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.06619762	-79.87658922
117	430005007	CASTLEMAN JOHN E & LOUISE T	186 CLOVERDALE LN	Franklin County	ROCKY MOUNT, VA 24151	37.06659307	-79.92309295
118	430005006	CONNER STEVEN L	108 CLOVERDALE LN	Franklin County	ROCKY MOUNT, VA 24151	37.06647402	-79.92538876
119	430004400	ECKLES GENEVA A & KENNETH EARL(LE)& ECKLES BUDDY		Franklin County	BOONES MILL, VA 24065	37.06610601	-79.9320034
120	440206400	DYE TIMOTHY L & AMY S	1338 BONBROOK MILL RD	Franklin County	ROCKY MOUNT, VA 24151	37.06542091	-79.87461079
121	430005007	CASTLEMAN JOHN E & LOUISE T	186 CLOVERDALE LN	Franklin County	ROCKY MOUNT, VA 24151	37.06596064	-79.92455748
122	430005008	CASTLEMAN JOHN EDWIN & LOUISE T		Franklin County	ROCKY MOUNT, VA 24151	37.06590002	-79.92264594
123	440206500	QUINN CATHERINE B	BONBROOK MILL ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.06484959	-79.87482348
124	440018701	MORGAN KIMBERLY A	1345 BONBROOK MILL RD	Franklin County	ROCKY MOUNT, VA 24151	37.06494607	-79.87738281
125	430005008	CASTLEMAN JOHN EDWIN & LOUISE T		Franklin County	ROCKY MOUNT, VA 24151	37.06523073	-79.92390044
126	4402002001	HAYNES JAMES GLYNWOOD JR	WIRTZ ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.06416959	-79.86751504
127	440206600	NOVITZKI ANTHONY B	1214 BONBROOK MILL RD	Franklin County	ROCKY MOUNT, VA 24151	37.06442855	-79.87464856
128	440204000	LAW DEREK C & SHELBY A	155 SINK DR	Franklin County	ROCKY MOUNT, VA 24151	37.06413856	-79.87754843
129	430005009	SWITZER GREGORY B & PATRICIA F	333 CLOVERDALE LN	Franklin County	ROCKY MOUNT, VA 24151	37.0644264	-79.92309473
130	440204000	GARBER STEPHEN H & BETTY H	1321 ANGLE PLANTATION RD	Franklin County	ROCKY MOUNT, VA 24151	37.06332674	-79.86292395
131	0440019801A	DIVERS MARK A & MARIE P	BONBROOK MILL ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.06390176	-79.87050988
132	440200500	DUDLEY LACY F & ROSE MARIE	SINK DR	Franklin County	ROCKY MOUNT, VA 24151	37.06369657	-79.87840331
133	0440016301A	CRAWFORD PAUL F & MARY STICKMAN & PAUL A & TERESA	575 THREE BROOKS LN	Franklin County	ROCKY MOUNT, VA 24151	37.06377028	-79.8798543
134	440204001	BECKNER CATHERINE R	ANGLE PLANTATION ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.06327623	-79.85925018
135	440019801	SINK BEN A & JILL L	BONBROOK MILL ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.06290808	-79.87233587
136	430105200	JONES BOBBY I (LE) & RICHARD WAYNE	487 TEEL BROOKE RD	Franklin County	ROCKY MOUNT, VA 24151	37.06339236	-79.92247318
137	440200600	WOOD BRUCE M & JENNIFER	SINK DR	Franklin County	ROCKY MOUNT, VA 24151	37.06253634	-79.87797398
138	450009002	SMITHERS C KELLY	180 JONESMILL LN	Franklin County	ROCKY MOUNT, VA 24151	37.06214519	-79.85678884
139	430105100	LINKOUS KELVIN D & DEBRA D	495 TEEL BROOKE RD	Franklin County	ROCKY MOUNT, VA 24151	37.06263083	-79.92172026
140	440016301	CRAWFORD PAUL F & MARY STICKMAN	209 THREE BROOKS LN	Franklin County	ROCKY MOUNT, VA 24151	37.06195949	-79.88013445
141	440019500	HAYNES JAMES GLYNWOOD JR	844 BONBROOK MILL RD	Franklin County	ROCKY MOUNT, VA 24151	37.06156135	-79.86794823
142	450006800	SMITHERS C KELLY	BOOKERTWASHINGTON HWY	Franklin County	ROCKY MOUNT, VA 24151	37.06115134	-79.83766754
143	440016300	MARTIN WILLIAM C III	110 THREE BROOKS LN	Franklin County	ROCKY MOUNT, VA 24151	37.0608705	-79.88093387
144	430105000	LANCASTER FRANKLIN D & SANDRA H	492 TEEL BROOKE RD	Franklin County	ROCKY MOUNT, VA 24151	37.06116647	-79.92133904
145	430104900	HODGES FLOYD CLAYTON & RITA SMITH	484 TEEL BROOKE RD	Franklin County	ROCKY MOUNT, VA 24151	37.06096898	-79.92242001
146	440016100	ENGLISH TOMMY LEE	95 PRICE LN	Franklin County	ROCKY MOUNT, VA 24151	37.06058496	-79.882139
147	440019300	HAYNES JAMES GLYNWOOD JR	BONBROOK MILL ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.06018515	-79.86494988
148	450001600	SMITHERS C KELLY & GAIL D	3175 BOOKER T WASHINGT HWY	Franklin County	ROCKY MOUNT, VA 24151	37.05995052	-79.84175411
149	440016000	CONNEL DOUGLAS JACK	161 PRICE LN	Franklin County	ROCKY MOUNT, VA 24151	37.05979084	-79.88127483
150	450009002	SMITHERS C KELLY	180 JONESMILL LN	Franklin County	ROCKY MOUNT, VA 24151	37.05934524	-79.85292503
151	440004300	WERNER DAVID J & BETTY B & REILLY & IAN ELLIOTT &	605 PARKVIEW DR	Franklin County	ROCKY MOUNT, VA 24151	37.05963428	-79.91550836
152	450008000	LYNCH RICHARD TRUSTEE OF CATHERINE R BECKNER TRUST	485 ANGLE PLANTATION ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.05892098	-79.84612941
153	0440004302A	ROSS DAVID E & KARI D	201 OLD MILL CREEK LANE	Franklin County	ROCKY MOUNT, VA 24151	37.05931494	-79.91003926
154	440015800	LDS HOLDINGS LC	180 AMT TECH DR	Franklin County	ROCKY MOUNT, VA 24151	37.05852032	-79.88210805
155	440015700	BROWN LYDIA LAVERNE	195 BONBROOK MILL RD	Franklin County	ROCKY MOUNT, VA 24151	37.05808964	-79.88023862
156	430021500	LONGVIEW HOLSTEINS INC		Franklin County	ROCKY MOUNT, VA 24151	37.05816158	-79.92451408
157	450003200	ROOPE WALLACE ALFRED & MARTHA JANE & (LE) & OSBORN	450 LONGWOOD RD	Franklin County	ROCKY MOUNT, VA 24151	37.05642718	-79.83000105
158	450006800	SMITHERS C KELLY	BOOKERTWASHINGTON HWY	Franklin County	ROCKY MOUNT, VA 24151	37.05640104	-79.83588149
159	440011600	FITTS MICHAEL L & ANGELA D	VIRGIL H GOODE HWY	Franklin County	ROCKY MOUNT, VA 24151	37.05691621	-79.88598815
160	450001500	SMITHERS C KELLY & GAIL D	BOOKERTWASHINGTON HWY	Franklin County	ROCKY MOUNT, VA 24151	37.05646689	-79.83983092
161	440203800	HUNLEY RAYMOND MILTON & BARBARA	160 BONBROOK MILL RD	Franklin County	ROCKY MOUNT, VA 24151	37.05667682	-79.88031491
162	450003401	STARKEY MICHAEL L & MARILYN R	393 LONGWOOD RD	Franklin County	ROCKY MOUNT, VA 24151	37.05605932	-79.82882263
163	440015200	FITTS MARY L	VIRGIL H GOODE HWY	Franklin County	ROCKY MOUNT, VA 24151	37.05629769	-79.88172725
164	450006802	ANGLE EDWARD M & HELENE S	411 FLINT HILL RD	Franklin County	ROCKY MOUNT, VA 24151	37.05613536	-79.83296579
165	440004400	BURFORD GUY W & MARGARET S	985 IRON RIDGE RD	Franklin County	ROCKY MOUNT, VA 24151	37.05625192	-79.91419098
166	450003300	ROOPE WALLACE ALFRED & MARTHA JANE	445 LONGWOOD ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.0552931	-79.82962952
167	450006403	STARKEY MICHAEL L & MARILYN R	KNOLL RIDGE LANE	Franklin County	ROCKY MOUNT, VA 24151	37.05509449	-79.83309568
168	450003400	STARKEY VIRGINIA S	313 LONGWOOD RD	Franklin County	ROCKY MOUNT, VA 24151	37.05490447	-79.82748137
169	450008000	LYNCH RICHARD TRUSTEE OF CATHERINE R BECKNER TRUST	485 ANGLE PLANTATION ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.0547573	-79.84808031
170	450006404	ANGLE EDWARD M & HELENE S	KNOLL RIDGE LANE	Franklin County	ROCKY MOUNT, VA 24151	37.05430929	-79.8317278
171	450006801	ANGLE MARK W & JUDITH M	FLINT HILL ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.05417721	-79.8367091
172	450006600	STARKEY MICHAEL L & MARILYN R	KNOLL RIDGE LANE	Franklin County	ROCKY MOUNT, VA 24151	37.05410902	-79.82987835
173	450005500	NOVAK RAYMOND H II & KELLY L	939 FARM VIEW ROAD	Franklin County	GLADE HILL, VA 24092	37.05253963	-79.81263778
174	450006400	CARNER IRENE D & LYNCH HAZEL G	REDWOOD ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.05251284	-79.82540345
175	440011700	SINK JAMES W (TRUSTEE) & SINK EDITH G (TRUSTEE)	18863 VIRGIL H GOODE HWY	Franklin County	ROCKY MOUNT, VA 24151	37.05300166	-79.88717825
176	440006400	ANGLE DALE E & MARY A (TRUSTEES)	1116 IRON RIDGE RD	Franklin County	ROCKY MOUNT, VA 24151	37.05313019	-79.91104788
177	440006500	ANGLE DALE E & MARY A (TRUSTEES)	1556 IRON RIDGE ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.05213341	-79.90827737
178	440008900	SINK JOSEPH L & ALLEN LYNN SINK (TRUSTEES)	301 FOGGY RIDGE RD	Franklin County	ROCKY MOUNT, VA 24151	37.05172766	-79.8922095
179	450006100	BOARD O S JR		Franklin County	GLADE HILL, VA 24092	37.05046536	-79.81967307
180	440006600	ANGLE DEAN A & BETTY DENISE	1770 IRON RIDGE RD	Franklin County	ROCKY MOUNT, VA 24151	37.05061464	-79.90598088
181	440009000	SINK JOSEPH L & ALLEN LYNN SINK	FOGGY RIDGE ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.05011727	-79.89155013
182	440007300	BARNHART LOIS N & DONALD B	184 FOGGY RIDGE RD	Franklin County	ROCKY MOUNT, VA 24151	37.04788372	-79.901829
183	450005900	BROWN JOSEPH WYATT & SUSAN HOGAN	GREENWAY ROAD	Franklin County	GLADE HILL, VA 24092	37.04695601	-79.81492401
184	440008702	SINK J W	195 TOMJUL LN	Franklin County	ROCKY MOUNT, VA 24151	37.04754242	-79.89216758
185	440007400	MCBRIDE DARIUS ASHTON	356 FOGGY RIDGE ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.04707965	-79.89633583
186	450012003	MYERS SUSAN BOARD & BOARD WILLIAM D & KENNETH C &		Franklin County	GLADE HILL, VA 24092	37.04625726	-79.82105226
187	450013500	ALTICE RUSSELL EDWARD	FARM VIEW ROAD	Franklin County	GLADE HILL, VA 24092	37.04537721	-79.80521336
188	450013000	BROWN JOSEPH WYATT & SUSAN HOGAN	955 GREENWAY RD	Franklin County	GLADE HILL, VA 24092	37.04495182	-79.8118542
189	450012100	CAMPBELL DANIEL CURTIS	BOARD LANE	Franklin County	GLADE HILL, VA 24092	37.04486667	-79.82015654
190	450013600	WOLFE TERRY WAYNE & LINDA B (TRUSTEES)	1807 GOLDEN VIEW RD	Franklin County	GLADE HILL, VA 24092	37.04300005	-79.80166199
191	450012005	BOARD ONLEY S JR (LE) & BOARD WILLIAM D	GREENWAY ROAD	Franklin County	GLADE HILL, VA 24092	37.04317996	-79.82081143
192	450012001	BOARD O S JR & WILLIAM DAVID & KENNETH CRAIG		Franklin County	GLADE HILL, VA 24092	37.04287512	-79.8237695
193	450012200	WYATT RALPH DWIGHT & CATHERINE LORRAINE		Franklin County	GLADE HILL, VA 24092	37.04220417	-79.82137538
194	450013506	MARTIN DOTTIE T	345 GREENWAY RD	Franklin County	GLADE HILL, VA 24092	37.04148471	-79.80856665
195	450013502	ROBINSON JOHN	390 FARM VIEW RD	Franklin County	GLADE HILL, VA 24092	37.04099601	-79.80692283
196	450013602	VENNING & CO DEVELOPERS LLC	1808 GOLDEN VIEW ROAD	Franklin County	GLADE HILL, VA 24092	37.04023352	-79.80498532
197	540203000	MICHAEL R BAILEY CONSTRUCTION INC	GOLDEN VIEW ROAD	Franklin County	GLADE HILL, VA 24092	37.03935472	-79.79605995
198	540020601	HUBBARD KARL N	1697 GOLDEN VIEW RD	Franklin County	GLADE HILL, VA 24092	37.03898553	-79.80655247
199	540021600	RICH BEULAH CLEDITH PERDUE	1804 GOLDEN VIEW RD	Franklin County	GLADE HILL, VA 24092	37.03784659	-79.80379555
200	540021200	SMITH HERMAN F & MITZIE L	2076 GOLDEN VIEW RD	Franklin County	GLADE HILL, VA 24092	37.03767582	-79.79977531
201	540021800	FORD OKEY RAY & LORRAINE PERDUE		Franklin County	GLADE HILL, VA 24092	37.03705809	-79.80449996
202	540021700	FORD OKEY RAY & LORRAINE PERDUE		Franklin County	GLADE HILL, VA 24092	37.03802583	-79.80393226
203	540020701	MICHAEL R BAILEY CONSTRUCTION INC		Franklin County	GLADE HILL, VA 24092	37.03668558	-79.79678958
204	530000100	LUMSDEN JERRE C		Franklin County	GLADE HILL, VA 24092	37.03472233	-79.78387613
205	540020700	LUMSDEN JERRE C		Franklin County	GLADE HILL, VA 24092	37.03285835	-79.7913589
206	540021400	DAVIS CASTEEN R	1020 GOLDEN VIEW ROAD	Franklin County	GLADE HILL, VA 24092	37.03164419	-79.80299707
207	540020800	LUMSDEN JOHN S		Franklin County	GLADE HILL, VA 24092	37.03094541	-79.79618543
208	530000300	RIDDLE JAMES T & MARY P	WEBSTER ROAD	Franklin County	GLADE HILL, VA 24092	37.03057474	-79.78468072
209	530000200	RIDDLE JAMES T & MARY P	WEBSTER ROAD	Franklin County	GLADE HILL, VA 24092	37.03049741	-79.78337308
210	530000800	HOLLAND P L JR <ESTATE>	220 HOLLAND FARM LANE	Franklin County	GLADE HILL, VA 24092	37.02962149	-79.7772087

Property Owner Information

Owner Phone Number, Email, Fax, SCC unknown. Not included.

MAP ID	GPIN	Owner Name	Owner Street Address	County	City, State, Zip	Latitude	Longitude
211	530000606	BROWN WILLIAM R & DIANNE B	1567 WEBSTER RD	Franklin County	GLADE HILL, VA 24092	37.0295734	-79.78617872
212	530000603	SMITHVIEW MANAGEMENT CORPORATION	85 POPLAR COURT LANE	Franklin County	GLADE HILL, VA 24092	37.02892035	-79.78282031
213	530000400	LUMSDEN PATSY S	1507 WEBSTER RD	Franklin County	GLADE HILL, VA 24092	37.02939741	-79.78871711
214	053000603X	LUMSDEN	1819 WEBSTER RD	Franklin County	GLADE HILL, VA 24092	37.02766795	-79.78213427
215	530200100	WORRELL TIMOTHY L	1819 WEBSTER RD	Franklin County	GLADE HILL, VA 24092	37.02759743	-79.7818219
216	530001700	MILLS ALICE K <TRUSTEE>		Franklin County	GLADE HILL, VA 24092	37.02740168	-79.77112474
217	530012101	FRANKLIN REAL ESTATE COMPANY		Franklin County	GLADE HILL, VA 24092	37.02613135	-79.76577396
218	530011900	COOKE RICKY JAMES & JAMIE LYNN	POWELLS STORE ROAD	Franklin County	GLADE HILL, VA 24092	37.02391098	-79.76278742
219	530012500	JOHNSON GLADYS H & AVELINE BRENDA & ANN JOHNSON (T		Franklin County	GLADE HILL, VA 24092	37.02183483	-79.76012968
220	530012600	FRANKLIN REAL ESTATE COMPANY	1142 AYERS ROAD	Franklin County	GLADE HILL, VA 24092	37.01825304	-79.76365434
221	530011400	HODGES WALTER L & BETTY W	1979 TIMBER RIDGE RD	Franklin County	GLADE HILL, VA 24092	37.01601215	-79.75445251
222	530013100	DUDLEY SHELBY S	1401 TIMBER RIDGE RD	Franklin County	GLADE HILL, VA 24092	37.01282163	-79.75943642
223	650401400	BANK OF THE JAMES	TIMBER RIDGE ROAD	Franklin County	GLADE HILL, VA 24092	37.01200587	-79.75574836
224	650401600	PEGRAM ROBERT ALAN	1705 TIMBER RIDGE RD	Franklin County	GLADE HILL, VA 24092	37.01154816	-79.75434627
225	650401500	BANK OF THE JAMES	TIMBER RIDGE ROAD	Franklin County	GLADE HILL, VA 24092	37.01143512	-79.75493264
226	650402500	BANK OF THE JAMES	TIMBER RIDGE ROAD	Franklin County	GLADE HILL, VA 24092	37.01020622	-79.75412691
227	650402300	BANK OF THE JAMES	TIMBER RIDGE ROAD	Franklin County	GLADE HILL, VA 24092	37.0097742	-79.753123
228	650402600	BANK OF THE JAMES	TIMBER RIDGE ROAD	Franklin County	GLADE HILL, VA 24092	37.00854708	-79.75590057
229	650003400	LAW ELNORA P	414 TOBACCO ROAD	Franklin County	GLADE HILL, VA 24092	37.00760653	-79.75141784
230	650003200	POTTER JAMES DONALD & KAY D	93 TOBACCO RD	Franklin County	GLADE HILL, VA 24092	37.00557685	-79.75488368
231	650003402	LAW ELTON W	414 TOBACCO RD	Franklin County	GLADE HILL, VA 24092	37.00491546	-79.75088144
232	650003400	LAW ELNORA P	414 TOBACCO ROAD	Franklin County	GLADE HILL, VA 24092	37.00300592	-79.74878389
233	650004200	ROBERTSON CLAUDE THOMAS	753 SIMMONS CREEK RD	Franklin County	UNION HALL, VA 24176	36.99975194	-79.73895115
234	650005102	CRAUN DAVID W & JULIE P	815 KENWOOD ROAD	Franklin County	UNION HALL, VA 24176	36.99923084	-79.74503641
235	650004200	ROBERTSON CLAUDE THOMAS	753 SIMMONS CREEK RD	Franklin County	UNION HALL, VA 24176	36.99768083	-79.73660417
236	660003804	HOLT DOUGLAS A & CONSTANCE A	255 BROOKS MILL RD	Franklin County	UNION HALL, VA 24176	36.99469606	-79.73210586
237	660100100	BETS INC	10660 OLD FRANKLIN TPKE	Franklin County	UNION HALL, VA 24176	36.99359244	-79.70566493
238	660009602	EDWARDS CRYSTAL DIANE		Franklin County	UNION HALL, VA 24176	36.99346254	-79.70735214
239	0660009501A	EDWARDS RONALD B II	102 HOLLIDAY LN	Franklin County	UNION HALL, VA 24176	36.99263606	-79.70704675
240	660100200	COOPER CONTRACTORS INC		Franklin County	UNION HALL, VA 24176	36.99256066	-79.70537526
241	660009502	CEMETERY		Franklin County	UNION HALL, VA 24176	36.99233326	-79.70640074
242	660004400	HALL PREDELANA ONEAL	74 EDWARDSWAY RD	Franklin County	UNION HALL, VA 24176	36.99190299	-79.71543168
243	660003802	ANGLE AL N & SHARON M		Franklin County	UNION HALL, VA 24176	36.99199679	-79.72438423
244	660009503	EDWARDS RONALD B	196 HOLLIDAY LN	Franklin County	UNION HALL, VA 24176	36.99166298	-79.70697198
245	660101200	COOPER CONTRACTORS INC		Franklin County	UNION HALL, VA 24176	36.9914107	-79.70145797
246	660009504	WALLER JANIS E		Franklin County	UNION HALL, VA 24176	36.99101094	-79.70637294
247	660003802	ANGLE AL N & SHARON M		Franklin County	UNION HALL, VA 24176	36.99113793	-79.72932928
248	660009505	FREEMAN-MARTIN GLORIA MARIE	256 HOLLIDAY LANE	Franklin County	UNION HALL, VA 24176	36.99044623	-79.70697035
249	660009400	SMITH OTHIELIER	227 HOLLIDAY LN	Franklin County	UNION HALL, VA 24176	36.99028559	-79.70369606
250	660009001	WILLARD CONSTRUCTION OF SMITH MOUNTAIN LAKE LLC		Franklin County	UNION HALL, VA 24176	36.98990717	-79.69495193
251	660010200	LAMBERT GUY JOSEPH (TRUSTEE)		Franklin County	UNION HALL, VA 24176	36.98991437	-79.70559535
252	660010300	POINDEXTER ANDREW LEE		Franklin County	UNION HALL, VA 24176	36.98960054	-79.70491899
253	660010400	ONEILL GLADYS F	381 HOLLIDAY LN	Franklin County	UNION HALL, VA 24176	36.98922375	-79.70437227
254	660010602	LAMBERT SHARON E	233 HOLLIDAY LN	Franklin County	UNION HALL, VA 24176	36.98873903	-79.70269611
255	660010100	BLUE PENNY EDWARDS & ROBERT E III	2371 JACKS CREEK ROAD	Franklin County	UNION HALL, VA 24176	36.98847958	-79.70850664
256	660009200	SMITH OTHIELIER		Franklin County	UNION HALL, VA 24176	36.98834616	-79.70068039
257	660004300	EDWARDS PROPERTIES LTD	10180 OLD FRANKLIN TPKE	Franklin County	UNION HALL, VA 24176	36.98843375	-79.71673748
258	660010500	POINDEXTER ANDREW L		Franklin County	UNION HALL, VA 24176	36.98844889	-79.7048461
259	660007700	WRIGHT DANIEL PAYNE & DONALD WAYNE		Franklin County	UNION HALL, VA 24176	36.98765056	-79.6826545
260	660008100	PERDUE GILES RUSSELL & JANICE TURNER	26 NOVELTY ROAD	Franklin County	UNION HALL, VA 24176	36.98706428	-79.68568471
261	660010600	LAMBERT CHRISTOPHER ERIC	496 HOLLIDAY LN	Franklin County	UNION HALL, VA 24176	36.98727196	-79.70400411
262	660008100	PERDUE GILES RUSSELL & JANICE TURNER	26 NOVELTY ROAD	Franklin County	UNION HALL, VA 24176	36.98681643	-79.68614009
263	660011000	CLEMENTS ANN C & OTHERS		Franklin County	UNION HALL, VA 24176	36.98691713	-79.69854978
264	660004100	WILLIAMS ROBERT W & ROSEMARY <TRUSTEES>	128 TURTLE HILL ROAD	Franklin County	UNION HALL, VA 24176	36.98689407	-79.72031654
265	660011100	BROOKS ELAINE T (TRUSTEE) & CUNDIFF E W & B W HUBB		Franklin County	UNION HALL, VA 24176	36.98608106	-79.68591607
266	660010100	BLUE PENNY EDWARDS & ROBERT E III	2371 JACKS CREEK ROAD	Franklin County	UNION HALL, VA 24176	36.986236	-79.71157954
267	660010601	LAMBERT JOSEPH E & MARY I	237 HOLLIDAY LN	Franklin County	UNION HALL, VA 24176	36.9860232	-79.70176115
268	660011100	BROOKS ELAINE T (TRUSTEE) & CUNDIFF E W & B W HUBB		Franklin County	UNION HALL, VA 24176	36.98591873	-79.69271406
269	660003900	EDWARDS RONALD B		Franklin County	UNION HALL, VA 24176	36.98550376	-79.71425409
270	660011305	ZEIGLER LISA DARLENE	245 ZEIGLER LN	Franklin County	UNION HALL, VA 24176	36.98500302	-79.68596491
271	660010700	ONEAL GLADYS FRANCES	JACKS CREEK RD	Franklin County	UNION HALL, VA 24176	36.9837872	-79.70410772
272	660011302	ZEIGLER KENNEY D & RANDY C	250 ZEIGLER LN	Franklin County	UNION HALL, VA 24176	36.98355007	-79.68554104
273	660011302	ZEIGLER KENNEY D & RANDY C	250 ZEIGLER LN	Franklin County	UNION HALL, VA 24176	36.98345905	-79.68585891
274	660011100	BROOKS ELAINE T (TRUSTEE) & CUNDIFF E W & B W HUBB		Franklin County	UNION HALL, VA 24176	36.98345997	-79.68792375
275	660011800	POINDEXTER GLEN H & NANCY B	1130 NOVELTY RD	Franklin County	UNION HALL, VA 24176	36.98138304	-79.67352714
276	660011700	POINDEXTER BIRKWOOD T & AURIE C	NOVELTY ROAD	Franklin County	UNION HALL, VA 24176	36.98142628	-79.67763114
277	660012100	AMODEO DEBBIE	1354 NOVELTY RD	Franklin County	UNION HALL, VA 24176	36.98105491	-79.67293956
278	660011305	ZEIGLER LISA DARLENE	245 ZEIGLER LN	Franklin County	UNION HALL, VA 24176	36.98064178	-79.68371234
279	660012101	PENHOOK UNITED METHODIST CHURCH	1200 NOVELTY RD	Franklin County	UNION HALL, VA 24176	36.98048221	-79.67256442
280	660011703	POINDEXTER JAY H	1150 NOVELTY ROAD	Franklin County	UNION HALL, VA 24176	36.98024599	-79.67416985
281	660011300	STUMP ADAM KENDRICK & CONNIE Z	423 ZEIGLER LN	Franklin County	UNION HALL, VA 24176	36.97950078	-79.68630311
282	690000800	ENGLISH HENRY WARD		Franklin County	UNION HALL, VA 24176	36.97588615	-79.67293829
283	680000700	HUNT KEITH L & DEBORAH C		Franklin County	PENHOOK, VA 24137	36.97440816	-79.65547745
284	680000301	HORSLEY BENJAMIN F & TAMMY Y		Franklin County	PENHOOK, VA 24137	36.97335063	-79.65900724
285	680000900	NOVELTY LAND HOLDINGS LLC		Franklin County	PENHOOK, VA 24137	36.97294559	-79.64640026
286	680000600	BROWN DIXIE C & STRIKE ELDON R & PATSY C		Franklin County	PENHOOK, VA 24137	36.97192124	-79.65281267
287	690001000	CUNDIFF THOMAS C JR & DOROTHY RAMSEY	355 LISTENING HILL RD	Franklin County	PENHOOK, VA 24137	36.97092533	-79.66498118
288	680000200	POINDEXTER NORMA JEAN	2201 BAR RIDGE RD	Franklin County	PENHOOK, VA 24137	36.97030577	-79.66191866
289	680005000	LESTER CARL E	2019 RAMSEY MEMORIAL ROAD	Franklin County	PENHOOK, VA 24137	36.96935742	-79.63842822
290	690000700	MWV COMMUNITY DEVELOPMENT & LAND MANAGEMENT LLC		Franklin County	UNION HALL, VA 24176	36.96968983	-79.68673132
291	0720034202B	COVENANT PARTNERS LLC	TRIPPLE CREEK RD	Franklin County	ROCKY MOUNT, VA 24151	36.97148088	-79.87013046
292	720034200	FRANKLIN COMMUNITY BANK NA	685 TRIPPLE CREEK RD	Franklin County	ROCKY MOUNT, VA 24151	36.97148306	-79.87155093
293	680004600	HODGES KENNETH A & KEVIN A & DAVIS ERICA S		Franklin County	PENHOOK, VA 24137	36.96890404	-79.63115871
294	690000900	NIFONG WAYNE E & GAYL S	452 LISTENING HILL ROAD	Franklin County	PENHOOK, VA 24137	36.96877894	-79.67284677
295	680003600	WITCHER MEARL TRAVIS & CAROLYN MCENHEIMER	176 ASHWORTH RD	Franklin County	PENHOOK, VA 24137	36.96768628	-79.62078497
296	680000200	POINDEXTER NORMA JEAN	2201 BAR RIDGE RD	Franklin County	PENHOOK, VA 24137	36.96759024	-79.66061311
297	680005000	LESTER CARL E	2019 RAMSEY MEMORIAL ROAD	Franklin County	PENHOOK, VA 24137	36.96763939	-79.6363899
298	720034202	RONILE INC		Franklin County	ROCKY MOUNT, VA 24151	36.96937502	-79.86936354
299	680007000	WORKMAN ROBERT B III & JOAN M	19111 SNOW CREEK RD	Franklin County	PENHOOK, VA 24137	36.96655085	-79.62296737
300	680003600	WITCHER MEARL TRAVIS & CAROLYN MCENHEIMER	176 ASHWORTH RD	Franklin County	PENHOOK, VA 24137	36.96660481	-79.61755575
301	680005203	CABEEN GEORGE M & MARY J & KEMP & GEORGE FRANKLIN		Franklin County	PENHOOK, VA 24137	36.96627929	-79.64520405
302	680005300	DOUGHBOY LLC	1760 BAR RIDGE RD	Franklin County	PENHOOK, VA 24137	36.9661372	-79.65701392
303	680006800	WITCHER WESLEY (DR)		Franklin County	PENHOOK, VA 24137	36.96197928	-79.63008987
304	720020102	PEA PATCH RIDGE LLC	80 SONTAG RD	Franklin County	ROCKY MOUNT, VA 24151	36.95370803	-79.87882796
305	720020100	WORLEY DONALD E JR & JOYCE M	200 SONTAG ROAD	Franklin County	ROCKY MOUNT, VA 24151	36.95047409	-79.87841966
306	820003913	JAMISON DARELL CRAIG	VIRGIL H GOODE HWY	Franklin County	ROCKY MOUNT, VA 24151	36.94780517	-79.8821636
307	820003908	JAMISON DARELL CRAIG	VIRGIL H GOODE HWY	Franklin County	ROCKY MOUNT, VA 24151	36.94684401	-79.88139716
308	820003907	JAMISON DARELL C	10885 VIRGIL H GOODE	Franklin County	ROCKY MOUNT, VA 24151	36.94628247	-79.88093393
309	820013811	COUNTY OF FRANKLIN	CORPORATE DR	Franklin County	ROCKY MOUNT, VA 24151	36.93163404	-79.88094083
310	820013807	COUNTY OF FRANKLIN	278 CORPORATE DR	Franklin County	ROCKY MOUNT, VA 24151	36.93000204	-79.88408342
311	0450006802A	ANGLE EDWARD M & HELENE S	411 FLINT HILL RD	Franklin County	ROCKY MOUNT, VA 24151	37.05377728	-79.83574018
312	370005302	ROANOKE GAS COMPANY	1885 BRICK CHURCH ROAD	Franklin County	ROCKY MOUNT, VA 24151	37.06967498	-79.92461264
313	16-38	UNITED STATES OF AMERICA		Giles County	RIPPLEMEAD, VA 24150	37.39955337	-80.68761266
314	16-2	UNITED STATES OF AMERICA		Giles County	RIPPLEMEAD, VA 24150	37.39480036	-80.6804803
315	16-9	SNIDER RAY H EST	SNIDER TOWN RD	Giles County	RIPPLEMEAD, VA 24150	37.38444424	-80.6748952

Property Owner Information

Owner Phone Number, Email, Fax, SCC unknown. Not included.

MAP ID	GPIN	Owner Name	Owner Street Address	County	City, State, Zip	Latitude	Longitude
316	16-11A	SNIDER ISAIAH R JR		Giles County	RIPPLEMEAD, VA 24150	37.38408301	-80.67907072
317	16-X	NATIONAL GYPSUM		Giles County	RIPPLEMEAD, VA 24150	37.38275104	-80.67561669
318	16-8	LUCAS W A	SNIDERTOWN RD	Giles County	RIPPLEMEAD, VA 24150	37.3826588	-80.66694896
319	17-39	APG LIME CORPORATION		Giles County	RIPPLEMEAD, VA 24150	37.3813999	-80.66553579
320	16-11	COLLINS BERT E AND DANNY RAY LEE		Giles County	RIPPLEMEAD, VA 24150	37.38093384	-80.67778102
321	16-24	MORRIS BEDFORD		Giles County	RIPPLEMEAD, VA 24150	37.38083107	-80.66871572
322	16-26	MARTIN JIMMY LOWE ET UX	110 BRIDGE RD	Giles County	RIPPLEMEAD, VA 24150	37.3807787	-80.66667039
323	27-21C	SANDERS WALTER DANIEL OR BEULAH	GRAVELY HILL RD	Giles County	RIPPLEMEAD, VA 24150	37.38013578	-80.67586283
324	27-21	MERRIX NAOMI S	GRAVELY HILL RD	Giles County	RIPPLEMEAD, VA 24150	37.37914609	-80.67798619
325	27-6-2	DUNBAR MARY ALICE ROGERS	ROGERS RD	Giles County	RIPPLEMEAD, VA 24150	37.37761911	-80.68311188
326	27-6-5	GALLAGHER DANIEL A OR SHERRI O	ROGERS RD	Giles County	RIPPLEMEAD, VA 24150	37.37643306	-80.67728047
327	JEFFERSON NATIONAL FOREST 968	UNITED STATES OF AMERICA		Giles County	NARROWS, VA 24124	37.37563235	-80.72905227
328	27-6-3	GALLAGHER DANIEL A OR SHERRI O	279 ROGERS RD	Giles County	RIPPLEMEAD, VA 24150	37.37364518	-80.68022992
329	27-8	HETZEL MARY RANDOLPH S ET AL	ROGERS RD	Giles County	RIPPLEMEAD, VA 24150	37.37299195	-80.68512109
330	27-6-4	GALLAGHER DANIEL A OR SHERRI O	ROGERS RD	Giles County	RIPPLEMEAD, VA 24150	37.37248225	-80.67727253
331	27-16B	SONGER EDWARD RAYMOND	157 ROGERS RD	Giles County	RIPPLEMEAD, VA 24150	37.37005426	-80.67636942
332	27-8A	HETZEL MARY RANDOLPH SMITH ET AL	GRAVELY HILL RD	Giles County	RIPPLEMEAD, VA 24150	37.36971269	-80.68812314
333	27-16C	LESTER THOMAS E OR DENISE M	206 ROGERS RD	Giles County	RIPPLEMEAD, VA 24150	37.36932016	-80.67869507
334	27-18	ALTIZER DONNA L & ELIZABETH MAE	GRAVELY HILL RD	Giles County	RIPPLEMEAD, VA 24150	37.36916888	-80.68429491
335	27-16A	JAMES RIVER HYDRATE & SUPPLY CO	ROGERS RD	Giles County	RIPPLEMEAD, VA 24150	37.3684784	-80.6766158
336	27-18A	ALTIZER DAVID & ELIZABETH	GRAVELY HILL RD	Giles County	RIPPLEMEAD, VA 24150	37.36806411	-80.68464602
337	16-12	COCHRAN CARL KEITH AND GARY THOMAS	3832 GRAVELY HILL RD	Giles County	RIPPLEMEAD, VA 24150	37.36730497	-80.69048403
338	27-18	ALTIZER DONNA L & ELIZABETH MAE	GRAVELY HILL RD	Giles County	RIPPLEMEAD, VA 24150	37.36584097	-80.68756044
339	27-17	ALTIZER JOHN R OR KAREN L	GRAVELY HILL RD	Giles County	RIPPLEMEAD, VA 24150	37.36570831	-80.67958551
340	27-19	ALTIZER ELIZABETH MAE	GRAVELY HILL RD	Giles County	RIPPLEMEAD, VA 24150	37.36297032	-80.68501752
341	27-73	APG LIME CORP	NORCROSS RD	Giles County	RIPPLEMEAD, VA 24150	37.36004768	-80.68364866
342	27-75	APG LIME CORP	NORCROSS RD	Giles County	RIPPLEMEAD, VA 24150	37.35888845	-80.67559718
343	27-72	WEBB JAMES A OR JANIE WEBB	246 HOOT OWL RD	Giles County	RIPPLEMEAD, VA 24150	37.35597939	-80.66700847
344	28-10A	BOWMAN ANTHONY L OR CAROL ANN	BIG STONEY CREEK RD	Giles County	RIPPLEMEAD, VA 24150	37.35242146	-80.66232715
345	28-10D	COON DEBBIE OR EVERETTE A RICHARDS	161 BUFFALO ANKLETS DR	Giles County	RIPPLEMEAD, VA 24150	37.3516923	-80.65128555
346	28-10	CROOK JASON A	551 BUFFALO ANKLETS	Giles County	RIPPLEMEAD, VA 24150	37.35145646	-80.65578702
347	28-10E2	TONEY RONNIE JR	BUFFALO ANKLETS RD	Giles County	PEMBROKE, VA 24136	37.35076284	-80.64866721
348	28-32	KAUFFELT DAVID L	519 HENDRICKSON RD	Giles County	PEMBROKE, VA 24136	37.35007477	-80.63725599
349	27-69	PHLEGAR WILLIAM CARROLL TRUSTEE	CEDAR HILL LN	Giles County	RIPPLEMEAD, VA 24150	37.34932274	-80.66792826
350	28-10E	WEBB DEBORAH	BUFFALO ANKLETS RD	Giles County	PEMBROKE, VA 24136	37.34892855	-80.64877142
351	28-32	KAUFFELT DAVID L	519 HENDRICKSON RD	Giles County	PEMBROKE, VA 24136	37.34792834	-80.64012539
352	28-10C	HILTON ROGER L SR OR BEVERLY S	255 BUFFALO ANKLETS DR	Giles County	RIPPLEMEAD, VA 24150	37.34785252	-80.65413008
353	28-10E1	WEBB DEBORAH	BUFFALO ANKLETS RD	Giles County	PEMBROKE, VA 24136	37.34778202	-80.64987093
354	28-32A	KAUFFELT DAVID L	BIG BRANCH RD	Giles County	PEMBROKE, VA 24136	37.3471538	-80.63529185
355	28-29N	THOMPSON DREMA KAY STEVERS	BIG BRANCH HOLLOW RD	Giles County	PEMBROKE, VA 24136	37.34642659	-80.63415885
356	28-29H	MCLELLAN KENNETH NEAL		Giles County	PEMBROKE, VA 24136	37.3458388	-80.63243308
357	28-16	SIMMONS RUTH H & WILLIAM G	DRY BRANCH RD	Giles County	PEMBROKE, VA 24136	37.34569324	-80.64364827
358	28-29G	MCLELLAN MARY M (LIFE TENANT)	319 BIG BRANCH HOLLOW RD	Giles County	PEMBROKE, VA 24136	37.34552347	-80.63298915
359	28-25C	CROY KEITH RANDALL	285 BIG BRANCH HOLLOW RD	Giles County	PEMBROKE, VA 24136	37.34527474	-80.63050892
360	28-28A	JONES TERRY L OR JUNE R	121 WINDSLOW DR	Giles County	PEMBROKE, VA 24136	37.3447209	-80.62636323
361	28-25	CROY ALDEN CARROLL	BIG BRANCH HOLLOW RD	Giles County	PEMBROKE, VA 24136	37.34467113	-80.63080828
362	28-32B	YOUNG PHILIP WAYNE	HENDRICKSON RD	Giles County	PEMBROKE, VA 24136	37.34456271	-80.63750145
363	29-13A	GRIGGS DONALD R AND DONNA SUE	161 BIG BRANCH HOLLOW RD	Giles County	PEMBROKE, VA 24136	37.34451683	-80.62411485
364	29-19	PRICE KIMBERLY HALE	1441 CASCADE DR	Giles County	PEMBROKE, VA 24136	37.34376474	-80.62135298
365	29-21A	WILLIAMS CHERYL D	1475 CASCADE DR	Giles County	PEMBROKE, VA 24136	37.34344777	-80.61984811
366	29-14	HILTON TOLBERT O ET UX	131 WINSLOW DR	Giles County	PEMBROKE, VA 24136	37.34342356	-80.62505413
367	28-28	HILTON JOHN WESLEY	WINSLOW DR	Giles County	PEMBROKE, VA 24136	37.34312667	-80.63017716
368	29-17	MARTIN ROBERT LEE	1382 CASCADE DR	Giles County	PEMBROKE, VA 24136	37.34272793	-80.62283096
369	29-15A	CUMBBEE WILLIAM RALPH ET UX	1350 CASCADE DR	Giles County	PEMBROKE, VA 24136	37.34207557	-80.62469585
370	29-17	MARTIN ROBERT LEE	1382 CASCADE DR	Giles County	PEMBROKE, VA 24136	37.34097196	-80.62212952
371	29-40	CONKLIN WILLIAM E	839 KOW KAMP RD	Giles County	PEMBROKE, VA 24136	37.34088108	-80.60346436
372	29-25B	SIZEMORE INC		Giles County	PEMBROKE, VA 24136	37.34064345	-80.61751796
373	29-25	EAGLES NEST MINISTRIES INC	170 ARCHER TRL	Giles County	PEMBROKE, VA 24136	37.34030875	-80.62164791
374	29-36	SNIDOW J. F.	245 FORD LN	Giles County	PEMBROKE, VA 24136	37.33855976	-80.61175913
375	29-39	MARTIN LARRY WAYNE ET AL	201 LYDA LN	Giles County	PEMBROKE, VA 24136	37.33661464	-80.58812459
376	29-37	MAHAFFEY FRANCES K (LIFE TENANT)	KOW CAMP RD	Giles County	PEMBROKE, VA 24136	37.33663516	-80.60853603
377	29-30	MARSHALL DONALD L CAROLYN M	COLLINS AVE	Giles County	PEMBROKE, VA 24136	37.33631387	-80.61596302
378	29-40E	FULLER MICHAEL F OR BEVERLY F	1051 KOW CAMP RD	Giles County	PEMBROKE, VA 24136	37.33620239	-80.59493413
379	29-38	WILLIAMS WILLIAM E II OR BEVERLY S	KOW CAMP RD	Giles County	PEMBROKE, VA 24136	37.33619334	-80.60016729
380	29-40I1	MARTIN LARRY W OR PATRICIA P	LYDA LN	Giles County	PEMBROKE, VA 24136	37.33588141	-80.59267204
381	24B-14-R	BONDS STANLEY C	VIRGINIA AVE	Giles County	NARROWS, VA 24124	37.33580207	-80.80846861
382	24B-14-R	BONDS STANLEY C	VIRGINIA AVE	Giles County	NARROWS, VA 24124	37.33491012	-80.80786885
383	29-40B	WILLIAMS RALPH E OR GALE D	KOW CAMP RD	Giles County	PEMBROKE, VA 24136	37.33395009	-80.59504383
384	38A-6-G-L2	BONDS STANLEY C		Giles County	NARROWS, VA 24124	37.33427182	-80.80665992
385	43-53	CROY KERMIT L	DOE CREEK RD	Giles County	PEMBROKE, VA 24136	37.33352632	-80.58339614
386	38A-6-G-L1	MEADE JOHN F JR OR MARGARET A	4710 VIRGINIA AVE	Giles County	NARROWS, VA 24124	37.33365116	-80.80131126
387	38A-6-G-L2A	BUCKLAND J B AND RONALD E MANN		Giles County	NARROWS, VA 24124	37.33366616	-80.80391457
388	29-29	CRAIG JAMES R OR PATRICIA E	188 BOBWHITE LN	Giles County	PEMBROKE, VA 24136	37.33109755	-80.61675683
389	30-4	DOE CREEK FARM INC	412 DOE CREEK FARM RD	Giles County	PEMBROKE, VA 24136	37.32971065	-80.57653452
390	30-4B	HOLLOPETER GARY OR ALLISON	412 DOE CREEK FARM RD	Giles County	PEMBROKE, VA 24136	37.32896882	-80.58188137
391	30-4A	FREEMAN WILLIAM P TRUSTEE	412 DOE CREEK FARM RD	Giles County	PEMBROKE, VA 24136	37.32797718	-80.57607257
392	44-3-1B	KESSLER JACQUELINE M	MOUNTAIN LAKE RD	Giles County	PEMBROKE, VA 24136	37.32624011	-80.55725231
393	44-13A	CASEY RICKIE D OR MAXINE A	MOUNTAIN LAKE RD	Giles County	PEMBROKE, VA 24136	37.32554174	-80.55141252
394	44-3-3A	LEGGE STEPHEN D OR DAVID LEGGE OR	MOUNTAIN LAKE RD	Giles County	PEMBROKE, VA 24136	37.32554001	-80.55446425
395	44A-1-34	BEACHAM VERNON V SR OR VERNON V II	HIGH NOON RD	Giles County	PEMBROKE, VA 24136	37.32371965	-80.56551268
396	44A-1-32	GRAHAM MARC W	HIGH NOON RD	Giles County	PEMBROKE, VA 24136	37.3236856	-80.5613373
397	43-60	MOORE SAM H AND GRETCHEN M MILLER	VIRGINIA AVE	Giles County	PEMBROKE, VA 24136	37.32371794	-80.57727918
398	44-3-1C	KESSLER STEVEN D	MOUNTAIN LAKE RD	Giles County	PEMBROKE, VA 24136	37.32351005	-80.55686069
399	44A-1-31	GRAHAM MARC W	HIGH NOON RD	Giles County	PEMBROKE, VA 24136	37.32341178	-80.55980118
400	44-3-1D	KESSLER JACQUELINE M	OFF MTN LAKE RD	Giles County	PEMBROKE, VA 24136	37.32312607	-80.55842963
401	44A-1-33	BEACHAM VERNON V SR OR VERNON V II	HIGH NOON RD	Giles County	PEMBROKE, VA 24136	37.32300284	-80.556362748
402	47-11	STEELE BUFORD	206 STEELE ACRES RD	Giles County	NEWPORT, VA 24128	37.32125271	-80.44404297
403	47-12A	MAXEY DAWN E	402 STEELE ACRES RD	Giles County	NEWPORT, VA 24128	37.3200963	-80.44109695
404	47-12C	SMITH ROBERT H	428 STEELE ACRES RD	Giles County	NEWPORT, VA 24128	37.31944376	-80.4399726
405	47-1-3	PETTIPiece MARK OR TERESA J	STEELE ACRES RD	Giles County	NEWPORT, VA 24128	37.31913071	-80.43455615
406	42-12B2A	COMMONWEALTH OF VIRGINIA	VIRGINIA AVE	Giles County	PEMBROKE, VA 24136	37.31971028	-80.65808426
407	44-23	HOGG-PERKINS MARIE	742 BRICKYARD RD	Giles County	PEMBROKE, VA 24136	37.31864418	-80.55404574
408	47-1-2	JONES GEORGE LEE	STEELE ACRES RD	Giles County	NEWPORT, VA 24128	37.31811266	-80.43601089
409	47-11	STEELE BUFORD	206 STEELE ACRES RD	Giles County	NEWPORT, VA 24128	37.31759748	-80.44254555
410	42-12B2	INDUSTRIAL DEVELOPMENT AUTHORITY OF	VIRGINIA AVE	Giles County	RIPPLEMEAD, VA 24150	37.31832363	-80.65804055
411	45-71	CHESTNUT MILL RANCH, LLC, KEVIN BROWNE		Giles County	PEMBROKE, VA 24136	37.31760944	-80.53750517
412	44-21	GREVEUR RUBY J & EFFIE E SHRADER	OFF BRICKYARD RD	Giles County	PEMBROKE, VA 24136	37.31761593	-80.54443655
413	44-22	HOGG-PERKINS MARIE	BRICKYARD RD	Giles County	PEMBROKE, VA 24136	37.31739359	-80.54852016
414	45-54	KAUFFELT VIRGINIA ANN	MOUNTAIN LAKE RD	Giles County	NEWPORT, VA 24128	37.31729294	-80.5256143
415	45-64	MARTIN KITTY P	OFF CAVE HILL RD	Giles County	NEWPORT, VA 24128	37.31724327	-80.53293958
416	47-1-1	JONES GEORGE LEE	STEELE ACRES RD	Giles County	NEWPORT, VA 24128	37.31661149	-80.43720349
417	45-72	CHESTNUT MILL RANCH, LLC, KEVIN BROWNE		Giles County	PEMBROKE, VA 24136	37.31669675	-80.54078581
418	44-26	GREEVER HOWARD J OR RUBY JANE E	BRICKYARD RD	Giles County	PEMBROKE, VA 24136	37.31632769	-80.54591729
419	45-51	KAUFFELT VIRGINIA ANN	MOUNTAIN LAKE RD	Giles County	NEWPORT, VA 24128	37.31583414	-80.52729242
420	47-9	GIVENS CLARENCE B OR KAROLYN W	199 LEFFELL LN	Giles County	NEWPORT, VA 24128	37.31530894	-80.4460861

Property Owner Information

Owner Phone Number, Email, Fax, SCC unknown. Not included.

MAP ID	GPIN	Owner Name	Owner Street Address	County	City, State, Zip	Latitude	Longitude
421	45-53	KAUFFELT VIRGINIA ANN	MOUNTAIN LAKE RD	Giles County	NEWPORT, VA 24128	37.31543517	-80.52914052
422	45-48	LINK ERNEST A ET UX	423 MOUNTAIN LAKE RD	Giles County	NEWPORT, VA 24128	37.31529136	-80.52018748
423	44-26A	VICKERY DEBRA L	BRICKYARD RD	Giles County	PEMBROKE, VA 24136	37.31372665	-80.54614661
424	45-52	KAUFFELT VIRGINIA ANN	MOUNTAIN LAKE RD	Giles County	NEWPORT, VA 24128	37.31358182	-80.52275559
425	47-8	REYNOLDS KATHERINE L AND	BLUE GRASS TRL	Giles County	NEWPORT, VA 24128	37.31360698	-80.4513436
426	44-26C	NEWPORT RECREATION CENTER	BRICKYARD RD	Giles County	PEMBROKE, VA 24136	37.31239125	-80.54287953
427	45-43	LINK JAMES BARRY ET AL	COVERED BRIDGE LN	Giles County	NEWPORT, VA 24128	37.31213534	-80.51858252
428	45-44	LINK JAMES BARRY ET AL	COVERED BRIDGE LN	Giles County	NEWPORT, VA 24128	37.3114671	-80.51480879
429	45-46	LINK JAMES BARRY ET AL	MOUNTAIN LAKE RD	Giles County	NEWPORT, VA 24128	37.31132795	-80.51273592
430	45-66	CHESTNUT MILL RANCH, LLC, KEVIN BROWNE		Giles County	NEWPORT, VA 24128	37.31127129	-80.52764704
431	45-40A	LINK JAMES BARRY ET AL	MOUNTAIN LAKE RD	Giles County	NEWPORT, VA 24128	37.31084356	-80.51469077
432	47-7	REYNOLDS CHARLES WILLIAM		Giles County	NEWPORT, VA 24128	37.30919491	-80.45433089
433	45-70	CHESTNUT MILL RANCH LLC	204 BRICKYARD RD	Giles County	PEMBROKE, VA 24136	37.3098172	-80.53588718
434	45-39E	LUCAS CALVIN B OR VIRGINIA C	TAWNEYS CAVE LN	Giles County	NEWPORT, VA 24128	37.30912744	-80.51272392
435	46-52	DOWDY FARM LLC		Giles County	NEWPORT, VA 24128	37.30784346	-80.46450849
436	45-39D	YOLTON DAVID G	8165 VIRGINIA AVE	Giles County	NEWPORT, VA 24128	37.3066288	-80.5089103
437	45-72	CHESTNUT MILL RANCH, LLC, KEVIN BROWNE		Giles County	PEMBROKE, VA 24136	37.30654655	-80.53965379
438	46-51	WILLIAMS FRANCES D	BLUE GRASS TRL	Giles County	NEWPORT, VA 24128	37.30501621	-80.46497909
439	46-1-3	REYNOLDS SAMUEL HALE OR MARY S	OLD FURNACE RD	Giles County	NEWPORT, VA 24128	37.30394818	-80.4690381
440	45-30A	QUINN FRANK S III OR KATHERINE A	215 ZELLS MILL RD	Giles County	NEWPORT, VA 24128	37.30372922	-80.50130654
441	45-36	LUCAS JAMES E ET UX	8277 VIRGINIA AVE	Giles County	NEWPORT, VA 24128	37.30358913	-80.5065003
442	46-1-2A	REYNOLDS SAM & MARY	194 OLD FURNACE RD	Giles County	NEWPORT, VA 24128	37.30308329	-80.4725482
443	46-11	HODSDEN JOSEPH D TRUSTEE & TAMARA N	237 CLOVER HOLLOW RD	Giles County	NEWPORT, VA 24128	37.30306999	-80.49773939
444	46-22	ALLEN MARJORIE S	528 BLUE GRASS TRL	Giles County	NEWPORT, VA 24128	37.30133467	-80.48933545
445	46-49	MATTOX JAMES D	381 OLD FURNACE RD	Giles County	NEWPORT, VA 24128	37.30028262	-80.46288992
446	45-331	NEWPORT DEVELOPMENT COMPANY LLC	WINDING WAY DR	Giles County	NEWPORT, VA 24128	37.30039644	-80.50194652
447	46-25B	HUFFMAN BENNY L	BLUE GRASS TRL	Giles County	NEWPORT, VA 24128	37.29945067	-80.4863068
448	46-12	MARTIN DONALD W OR DEBORAH R	480 BLUE GRASS TRL	Giles County	NEWPORT, VA 24128	37.29945072	-80.48959448
449	46-15	WILLIAMS CLARICE TRENT	485 WINDING WAY DR	Giles County	NEWPORT, VA 24128	37.29769661	-80.49684076
450	46-49A	MATTOX JAMES D	OLD FURNACE RD	Giles County	NEWPORT, VA 24128	37.30038722	-80.46951976
451	46-2-8	YOLTON DAVID G OR KAREN M	390 BLUEGRASS TRL	Giles County	NEWPORT, VA 24128	37.29703428	-80.49201569
452	46-2-A	MARTIN DONALD W	370 BLUE GRASS TRL	Giles County	NEWPORT, VA 24128	37.29695456	-80.48809736
453	46-66	DEPLAZES JERRY J ET UX	291 SEVEN OAKS RD	Giles County	NEWPORT, VA 24128	37.29685254	-80.47942105
454	46-20A	ECHOLS ESTIAL EARL JR ET UX	362 BLUEGRASS TRL	Giles County	NEWPORT, VA 24128	37.2967976	-80.49350286
455	46-19B	PAYNE J MAURICE EST	BLUE GRASS TRL	Giles County	NEWPORT, VA 24128	37.29633905	-80.49352233
456	46-19A	MARTIN DONALD W OR DEBORAH R	329 BLUE GRASS TRL	Giles County	NEWPORT, VA 24128	37.29608038	-80.49461569
457	46-19	DUNCAN GERALD W OR RUTH M	OLD NEWPORT RD	Giles County	NEWPORT, VA 24128	37.2952662	-80.49035962
458	61-12B	SHAFFER CLIFFORD A OR TERESA C H	249 BROOKSDIE LN	Giles County	NEWPORT, VA 24128	37.29425439	-80.48332872
459	46-66X	BROUGHTON GEORGE E	8943 VIRGINIA AVE	Giles County	NEWPORT, VA 24128	37.29759256	-80.46702965
460	42-12B2C	MAIN STREET MEDICAL LLC	VIRGINIA AVE	Giles County	RIPPLEMEAD, VA 24150	37.31938467	-80.6565269
461	27-8	HETZEL MARY RANDOLPH S ET AL	ROGERS RD	Giles County	RIPPLEMEAD, VA 24150	37.36973664	-80.6871397
462	42-12B2D	INDUSTRIAL DEVELOPMENT AUTHORITY OF	VIRGINIA AVE	Giles County	RIPPLEMEAD, VA 24150	37.31900431	-80.65593573
463	70756	U S GOVERNMENT		Montgomery County	BLACKSBURG, VA 24060	37.32248442	-80.36210243
464	21156	WINGO DONALD L		Montgomery County	BLACKSBURG, VA 24060	37.31404175	-80.40276275
465	9482	HYPES LOWELL T	1538 CRAIG CREEK RD	Montgomery County	BLACKSBURG, VA 24060	37.31325413	-80.40990743
466	9482	HYPES LOWELL T	1538 CRAIG CREEK RD	Montgomery County	BLACKSBURG, VA 24060	37.31306858	-80.40613326
467	26945	HUTTON JAMES L HUTTON PHYLLIS M		Montgomery County	BLACKSBURG, VA 24060	37.29788158	-80.3691181
468	15900	POWELL SANDRA TOWNES		Montgomery County	BLACKSBURG, VA 24060	37.29860392	-80.38939503
469	30449	PRICE NELSON S PRICE AMANDA J	3090 MT TABOR RD	Montgomery County	BLACKSBURG, VA 24060	37.29717763	-80.36054097
470	32870	JOHNSON MODE A		Montgomery County	BLACKSBURG, VA 24060	37.29680439	-80.3627732
471	24589	TRIPLETT THOMAS W TRIPLETT BONNIE B		Montgomery County	BLACKSBURG, VA 24060	37.29676544	-80.37342318
472	5668	DYER FAMILY TRUST DYER LIVING TRUST		Montgomery County	BLACKSBURG, VA 24060	37.29682835	-80.39104345
473	1262	JOHNSON MODE A	3030 MT TABOR RD	Montgomery County	BLACKSBURG, VA 24060	37.29653229	-80.36542452
474	9443	HUTTON JAMES L HUTTON PHYLLIS M		Montgomery County	BLACKSBURG, VA 24060	37.29588992	-80.36976896
475	24591	JONES ROBERT M JONES DONNA T		Montgomery County	BLACKSBURG, VA 24060	37.29540669	-80.37867577
476	7708	BUCHANAN JAMES M		Montgomery County	BLACKSBURG, VA 24060	37.29452689	-80.34950905
477	24588	JONES ROBERT M JONES DONNA THOMAS	2628 MT TABOR RD	Montgomery County	BLACKSBURG, VA 24060	37.29377345	-80.37609105
478	24590	MARGARET MCGRAW SLAYTON LIV TR C/O MARGARET MCGRAW	2626 MT TABOR RD	Montgomery County	BLACKSBURG, VA 24060	37.29364712	-80.3820718
479	15895	BUCHANAN JAMES M PETER BERNHOLZ		Montgomery County	BLACKSBURG, VA 24060	37.29207485	-80.35548165
480	19482	WHALEY LEIGH C JR WHALEY MARY K		Montgomery County	BLACKSBURG, VA 24060	37.29178306	-80.36190953
481	19481	DOSS DONALD M DOSS LINDA M		Montgomery County	BLACKSBURG, VA 24060	37.29129361	-80.36022526
482	6739	FUGATE JOSHUA B LE ETAL C/O SHARON LINKOUS ETAL	1812 DRY RUN RD	Montgomery County	BLACKSBURG, VA 24060	37.29039498	-80.3442186
483	9688	TURMAN LUMBER COMPANY INC		Montgomery County	BLACKSBURG, VA 24060	37.28615889	-80.33407843
484	110940	HENDERSON MARK E NEFF HENDERSON LAURA	3760 MILL CREEK RD	Montgomery County	BLACKSBURG, VA 24060	37.28229192	-80.3453734
485	13432	NEILY WARREN S JR LE ETAL C/O JUDITH T NEILY		Montgomery County	BLACKSBURG, VA 24060	37.27917967	-80.32728116
486	16068	ROANOKE VALLEY 4 WHLERS ASSC C/O ANITA HACKERT	3870 BRADSHAW RD	Montgomery County	ELLISTON, VA 24087	37.27527623	-80.24746932
487	31198	ROANOKE VALLEY 4 WHLERS ASSC C/O ANITA HECKERT		Montgomery County	ELLISTON, VA 24087	37.27479951	-80.25150184
488	30954	NORFOLK & WESTERN RAILWAY CO		Montgomery County	ELLISTON, VA 24087	37.27446072	-80.24623785
489	32745	MILLS JAMES CLINTON JR		Montgomery County	ELLISTON, VA 24087	37.27399686	-80.25243683
490	16068	ROANOKE VALLEY 4 WHLERS ASSC C/O ANITA HACKERT	3870 BRADSHAW RD	Montgomery County	ELLISTON, VA 24087	37.27341889	-80.24416131
491	2599	BROWN JAMES HOWE JR	2537 CATAWBA RD	Montgomery County	BLACKSBURG, VA 24060	37.27138226	-80.29697158
492	32744	SOWERS JO MILLS	BRADSHAW RD	Montgomery County	ELLISTON, VA 24087	37.27046045	-80.25058733
493	13872	ORR LIVING TRUST ORR LESLIE F TRUSTEE	2243 CATAWBA RD	Montgomery County	BLACKSBURG, VA 24060	37.27078573	-80.32617236
494	5370	WILLIAMS L F & PAULINE S C/O H RONNIE MONTGOMERY E		Montgomery County	ELLISTON, VA 24087	37.26957074	-80.24867073
495	30927	NORFOLK & WESTERN RAILWAY CO		Montgomery County	ELLISTON, VA 24087	37.26835865	-80.25221906
496	7636	CRAFT WILLIAM ROBERT LEE III CRAFT TAMMY BARNETT		Montgomery County	ELLISTON, VA 24087	37.26506394	-80.30915425
497	13819	TOMELTY JOSEPH PATRICK	3401 HALF ACRE OF ROCKS RD	Montgomery County	ELLISTON, VA 24087	37.2614605	-80.29155683
498	7635	CRAFT WILLIAM ROBERT LEE III CRAFT TAMMY BARNETT		Montgomery County	BLACKSBURG, VA 24060	37.26079631	-80.30580069
499	5578	KORB JAMES H KORB LISA K	3491 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.26046866	-80.28321234
500	2853	HS TEJAS LTD		Montgomery County	ELLISTON, VA 24087	37.25983861	-80.23950747
501	14257	ARNOLD LLOYD E	3588 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25946438	-80.2760548
502	8743	HERTWECK BRYAN M HERTWECK LARA BURKHOLDER	3451 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25943954	-80.28549472
503	120705	PERKINS RONALD L PERKINS LINDA R	FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25924688	-80.28106931
504	120706	MAXEY BENNY G MAXEY BETTY H	FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25900135	-80.28003417
505	951	PEREZ ENRIQUE PEREZ PAMELA M		Montgomery County	ELLISTON, VA 24087	37.25861789	-80.29963984
506	170027	COX KENNETH WADE	HALF ACRE OF ROCKS RD	Montgomery County	ELLISTON, VA 24087	37.25848681	-80.28723425
507	170028	COX KENNEY C COX PATRICIA B	FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25839679	-80.28360498
508	21559	LONG DONALD W LONG EVELYN W		Montgomery County	ELLISTON, VA 24087	37.2583855	-80.2884142
509	8906	STEINER LEONARD C STEINER DEBORAH L	3566 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25815904	-80.279201
510	190165	ARNOLD LLOYD E	FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25789553	-80.27498721
511	33209	MEADOWS SHEILA M	3475 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25763989	-80.28301204
512	5774	RATLIFF TIMOTHY E RATLIFF LISA A	2902 BACCHUS LN	Montgomery County	ELLISTON, VA 24087	37.25765437	-80.29154563
513	14249	PERDUE CORA EVELYN R	3060 TREMONT RD	Montgomery County	ELLISTON, VA 24087	37.25750093	-80.28909294
514	30035	SCOTT DENNY R	3568 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25735913	-80.27614509
515	120708	BOWMAN STEVEN A BOWMAN RACHEL A	3520 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.2572977	-80.27958118
516	14256	PERDUE HOWARD D	3564 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25704602	-80.27736074
517	21560	LONG DONALD W LONG EVELYN W	3239 HALF ACRE OF ROCKS RD	Montgomery County	ELLISTON, VA 24087	37.25704394	-80.28725224
518	12030	SCOTT DENNY R SCOTT TAMMY K	FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25681046	-80.27393169
519	33280	TAYLOR SHAWN M TAYLOR TRACY L	3421 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.2565679	-80.28500498
520	1477	REESE FAMILY LTD PARTNERSHIP C/O LYNN J REESE		Montgomery County	ELLISTON, VA 24087	37.25623859	-80.2658302
521	14919	JOSEPH SCOTT TAYLOR ESTATE C/O DEBORAH FLINT & STE	3189 HALF ACRE OF ROCKS RD	Montgomery County	ELLISTON, VA 24087	37.25629257	-80.28633408
522	8440	HOGAN CHARLES E HOGAN SUSAN C		Montgomery County	ELLISTON, VA 24087	37.25527537	-80.22185835
523	20506	TAYLOR STANLEY W TAYLOR BOBBIE C	3124 HALF ACRE OF ROCKS RD	Montgomery County	ELLISTON, VA 24087	37.25512768	-80.28594822
524	23554	FIELD PAUL E FIELD JEWELL C	3134 BACCHUS LN	Montgomery County	ELLISTON, VA 24087	37.25397399	-80.28946359
525	160248	HS TEJAS LTD	3261 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.25309108	-80.24628701

Property Owner Information

Owner Phone Number, Email, Fax, SCC unknown. Not included.

MAP ID	GPIN	Owner Name	Owner Street Address	County	City, State, Zip	Latitude	Longitude
526	20824	WHITTAKER FREDERICK A WHITTAKER ELIZABETH S		Montgomery County	ELLISTON, VA 24087	37.25295541	-80.23204333
527	34187	REESE FAMILY LTD PARTNERSHIP C/O LYNN J REESE	BRADSHAW RD	Montgomery County	ELLISTON, VA 24087	37.25283785	-80.26038158
528	170229	UNDERWOOD JAMES D & DONNA M	BRADSHAW RD	Montgomery County	ELLISTON, VA 24087	37.25272296	-80.25803658
529	17721	SMITH CORA LEE C/O W E SMITH		Montgomery County	ELLISTON, VA 24087	37.25278101	-80.29427923
530	3364	CHERRY ALMA B		Montgomery County	ELLISTON, VA 24087	37.25258653	-80.29119993
531	1478	REESE FAMILY LTD PARTNERSHIP C/O LYNN J REESE	LINDSAY DR	Montgomery County	ELLISTON, VA 24087	37.25246375	-80.27382639
532	3363	CHERRY ALMA B		Montgomery County	ELLISTON, VA 24087	37.2524386	-80.28165387
533	140569	REESE FAMILY LTD PARTNERSHIP C/O LYNN J REESE	3011 TAYLOR LN	Montgomery County	ELLISTON, VA 24087	37.25234049	-80.27543449
534	34186	MOUNTAIN VALLEY PIPELINE LLC	3001 BRADSHAW RD	Montgomery County	ELLISTON, VA 24087	37.25213073	-80.26106118
535	25398	REESE FAMILY LTD PARTNERSHIP C/O LYNN J REESE		Montgomery County	ELLISTON, VA 24087	37.25204383	-80.26765277
536	160247	HS TEJAS LTD	3280 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.25151864	-80.24154947
537	35861	MOUNTAIN VALLEY PIPELINE LLC	3010 BRADSHAW RD	Montgomery County	ELLISTON, VA 24087	37.25154431	-80.259191
538	8493	BRENNALT IVAN H & BRENNALT ERIC E ETAL		Montgomery County	ELLISTON, VA 24087	37.25145592	-80.25347908
539	10558	FIELD PAUL R	3128 BACCHUS LN	Montgomery County	ELLISTON, VA 24087	37.25074976	-80.28728918
540	120001	APGAR P I ESTATE C/O DONALD APGAR	REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.24981667	-80.21433039
541	160244	HS TEJAS LTD	2985 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.24996509	-80.23859912
542	8023	DEACON GERALD W DEACON SANDRA L	3227 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.25011359	-80.28642261
543	30946	NORFOLK & WESTERN RAILWAY CO		Montgomery County	ELLISTON, VA 24087	37.24989918	-80.2576763
544	160246	HS TEJAS LTD	3141 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.24950851	-80.24230996
545	23092	ZOOK BRENDA	BRADSHAW RD	Montgomery County	ELLISTON, VA 24087	37.24946063	-80.25903377
546	23092	ZOOK BRENDA	BRADSHAW RD	Montgomery County	ELLISTON, VA 24087	37.24879997	-80.25677048
547	3365	HESS ANTHONY EDWARD HESS CARMELLA	3211 FLATWOODS RD	Montgomery County	ELLISTON, VA 24087	37.24876115	-80.2859918
548	160245	HS TEJAS LTD	3031 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.24801143	-80.24144866
549	4910	DENNIS KENNETH A ETAL		Montgomery County	ELLISTON, VA 24087	37.24791669	-80.23371057
550	160242	HS TEJAS LTD	2881 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.24780681	-80.23748207
551	3368	CHERRY ALMA B		Montgomery County	ELLISTON, VA 24087	37.24804357	-80.28685734
552	160243	HS TEJAS LTD	2971 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.2461783	-80.24110807
553	31305	HOWARD ELIJAH D		Montgomery County	ELLISTON, VA 24087	37.24566433	-80.23304406
554	21098	HANSEN DONALD E HANSEN POLLY E	2530 CANNERY RD	Montgomery County	LAFAYETTE, VA 24087	37.24468756	-80.20731387
555	160241	HS TEJAS LTD	2811 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.24472864	-80.23772167
556	34153	MCBROOM JOHN W MCBROOM CHASTITY G	2536 CANNERY RD	Montgomery County	LAFAYETTE, VA 24087	37.2439966	-80.20367984
557	160240	HS TEJAS LTD	2761 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.24421257	-80.2410484
558	6496	HOWARD ELIJAH HOWARD KRISTIN		Montgomery County	ELLISTON, VA 24087	37.24410861	-80.23468062
559	80578	MCBROOM JOHN W MCBROOM CHASTITY G	CANNERY RD	Montgomery County	ELLISTON, VA 24087	37.24326318	-80.20589322
560	20405	HOWARD DELMER WAYNE	2740 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.24324489	-80.23203739
561	160239	HS TEJAS LTD	2701 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.24181543	-80.23718103
562	2152	BOONE WORTH H JR C/O WORTH INC		Montgomery County	ELLISTON, VA 24087	37.24172977	-80.2312898
563	3025	WIMMER MCCLANAHAN HOLLY R MCCLANAHAN ROBERT C	2630 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.24022656	-80.23137414
564	2902	NOVAK STEPHEN J NOVAK MEREDITH C	6670 STONES KEEP LN	Montgomery County	ELLISTON, VA 24087	37.23878981	-80.20133626
565	210206	FURROW ALBERT	2443 REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.23859921	-80.2341952
566	220076	HALL SEAN L & MICHELLE S	6670 STONES KEEP LN	Montgomery County	ELLISTON, VA 24087	37.23674955	-80.19908927
567	2902	NOVAK STEPHEN J NOVAK MEREDITH C	6670 STONES KEEP LN	Montgomery County	ELLISTON, VA 24087	37.23582281	-80.2004062
568	220076	HALL SEAN L & MICHELLE S	6670 STONES KEEP LN	Montgomery County	ELLISTON, VA 24087	37.23481491	-80.19845737
569	8619	HESLEP RICHARD ARTHUR		Montgomery County	ELLISTON, VA 24087	37.23473225	-80.19648265
570	35144	BRABHAM HENRY J IV	REESE MTN RD	Montgomery County	ELLISTON, VA 24087	37.23426016	-80.23932244
571	70806	VIRGINIA DEPT OF HIGHWAYS	5375 NORTH FORK RD	Montgomery County	ELLISTON, VA 24087	37.23398135	-80.23037815
572	10352	BLUE EAGLE PARTNERSHIP LLC	5383 NORTH FORK RD	Montgomery County	ELLISTON, VA 24087	37.23365602	-80.22773442
573	843	APGAR DONALD D APGAR MILDRED M		Montgomery County	ELLISTON, VA 24087	37.23323015	-80.19928245
574	16298	CRAIGHEAD GEORGE A CRAIGHEAD HELEN P		Montgomery County	ELLISTON, VA 24087	37.23318021	-80.19746981
575	842	APGAR FREDERICK I APGAR JEANETTE H	5613 APGAR DR	Montgomery County	ELLISTON, VA 24087	37.23287147	-80.20070456
576	844	GLOCK BRIAN DAVID BUCH SUSAN ELIZABETH GLOCK	APGAR DR	Montgomery County	ELLISTON, VA 24087	37.23203771	-80.19957381
577	9048	HOWARD FRANK A ETAL	2280 HOWARD DR	Montgomery County	ELLISTON, VA 24087	37.23100669	-80.19610294
578	9065	SOUTHERN REGION INDUSTRIAL REALTY INC	6713 COVE HOLLOW RD	Montgomery County	ELLISTON, VA 24087	37.23018762	-80.19869675
579	160410	NORFOLK SOUTHERN RAILWAY CO		Montgomery County	ELLISTON, VA 24087	37.22892193	-80.2012558
580	9063	SISSON & RYAN INC		Montgomery County	ELLISTON, VA 24087	37.22587725	-80.19925367
581	13751	OLD VIRGINIA BRICK INC		Montgomery County	ELLISTON, VA 24087	37.22548932	-80.20487625
582	538	AKERS GORDON L & JERRY LEE AKERS CHARLES LACY		Montgomery County	ELLISTON, VA 24087	37.22205965	-80.20402008
583	21080	BERUBE DENNIS G BERUBE DIXIE L	5723 BERRY PATCH LN	Montgomery County	ELLISTON, VA 24087	37.22057856	-80.19765317
584	21549	MILLS ROBERT E		Montgomery County	ELLISTON, VA 24087	37.21970205	-80.20323545
585	21547	MILLS ROBERT E		Montgomery County	ELLISTON, VA 24087	37.21743427	-80.20063071
586	3911	MELTON DONALD EVERETT		Montgomery County	ELLISTON, VA 24087	37.21712249	-80.19362943
587	29056	EPERLY RANDALL KEITH EPPERLY JOANNE ALICE		Montgomery County	ELLISTON, VA 24087	37.21572886	-80.1894617
588	2833	EANES JACK E SR EANES DORCAS M	6180 YELLOW FINCH LN	Montgomery County	ELLISTON, VA 24087	37.21484521	-80.19139206
589	30271	BOHON CLETUS W BOHON BEVERLY A	6210 YELLOW FINCH LN	Montgomery County	ELLISTON, VA 24087	37.21398908	-80.19289485
590	32431	LAW JAMES C LAW CAROLYN D	6175 YELLOW FINCH LN	Montgomery County	ELLISTON, VA 24087	37.2135439	-80.19027434
591	17761	BOHON CLETUS W & BOHON BEVERLY A		Montgomery County	ELLISTON, VA 24087	37.21239037	-80.1961238
592	18808	LAW JAMES CABEL LAW CAROLYN DIANA EANES		Montgomery County	ELLISTON, VA 24087	37.21070511	-80.19176409
593	11673	EANES JACK EANES DORCAS M		Montgomery County	ELLISTON, VA 24087	37.20723579	-80.19072527
594	2846	HALDENBY HOLDINGS LLC		Montgomery County	ELLISTON, VA 24087	37.1954931	-80.19373886
595	21104	WIMMER CHARLES S	1521 RADFORD RD	Montgomery County	CHRISTIANSBURG, VA 24073	37.12743546	-80.44260804
596	240091	ROANOKE GAS COMPANY	6670 STONES KEEP LN	Montgomery County	ELLISTON, VA 24087	37.23881887	-80.19840482
597	1561-23-4459	DAVID, JOSEPH DREWRY	36.9671231	Pittsylvania County	PENHOOK, VA 24137	36.9671231	-79.59664864
598	1561-32-4812	DAVID, ELWOOD JUNE	2073 ARMSTRONG RD	Pittsylvania County	PENHOOK, VA 24137	36.96556988	-79.59385373
599	1561-52-6704	WITCHER, ROY H	13685 W GRETN RD	Pittsylvania County	SANDY LEVEL, VA 24161	36.96529992	-79.58594178
600	1561-52-5640	WITCHER, ROY H		Pittsylvania County	PENHOOK, VA 24137	36.9649445	-79.58621049
601	1561-52-5438	WITCHER, ROY H		Pittsylvania County	PENHOOK, VA 24137	36.96463341	-79.58607158
602	1561-42-8793	HUDSON, BARBARA JEAN ET ALS		Pittsylvania County	PENHOOK, VA 24137	36.96435204	-79.5887162
603	1561-32-4812	DAVID, ELWOOD JUNE	2073 ARMSTRONG RD	Pittsylvania County	PENHOOK, VA 24137	36.96430544	-79.5913373
604	1561-12-9077	BOBBITT, BERNICE I ET ALS		Pittsylvania County	PENHOOK, VA 24137	36.96373767	-79.59866854
605	1561-00-0394	FRANKLIN GROCERY & GRAIN CORP		Pittsylvania County	PENHOOK, VA 24137	36.96265261	-79.60603809
606	1561-22-1144	DOSS, HARRY B		Pittsylvania County	PENHOOK, VA 24137	36.96237037	-79.5930388
607	1561-50-7957	BUSH, JERRY W SR	13459 W GRETN RD	Pittsylvania County	SANDY LEVEL, VA 24161	36.96048608	-79.58528442
608	1561-30-7767	BUSH, JERRY W SR		Pittsylvania County	PENHOOK, VA 24137	36.95987606	-79.59232651
609	1561-40-5710	QUARLES, FAYE E	13749 W GRETN RD	Pittsylvania County	SANDY LEVEL, VA 24161	36.95966933	-79.58962302
610	1570-09-0923	HUDSON, BARBARA JEAN ET ALS		Pittsylvania County	SANDY LEVEL, VA 24161	36.95800347	-79.57142115
611	1570-19-3736	HUDSON, BARBARA JEAN ET ALS		Pittsylvania County	SANDY LEVEL, VA 24161	36.9574532	-79.56644789
612	1570-09-0923	HUDSON, BARBARA JEAN ET ALS		Pittsylvania County	SANDY LEVEL, VA 24161	36.9564142	-79.56650442
613	1560-69-1403	TEAMAN GLENN R TRUSTEE	8777 MUSEVILLE RD	Pittsylvania County	SANDY LEVEL, VA 24161	36.95627321	-79.58424481
614	1560-69-4077	TEAMAN GLENN R TRUSTEE		Pittsylvania County	SANDY LEVEL, VA 24161	36.95528035	-79.58296332
615	1560-68-9630	RIDDLE, MARY LEE		Pittsylvania County	SANDY LEVEL, VA 24161	36.95400992	-79.58130829
616	1560-77-0258	RIDDLE, MARY LEE	8424 MUSEVILLE RD	Pittsylvania County	SANDY LEVEL, VA 24161	36.95033275	-79.5808336
617	1560-95-4718	GRUBB, RUBY HODGES		Pittsylvania County	SANDY LEVEL, VA 24161	36.94891949	-79.57886466
618	1560-95-4718	GRUBB, RUBY HODGES		Pittsylvania County	SANDY LEVEL, VA 24161	36.94638282	-79.57256109
619	1570-14-2618	MWV LAND SALES INC		Pittsylvania County	SANDY LEVEL, VA 24161	36.94337344	-79.56592144
620	1570-44-2557	MEASE, MONCIE EDGAR II		Pittsylvania County	SANDY LEVEL, VA 24161	36.94317936	-79.55612151
621	1560-94-0683	SHELTON, R EDWARD		Pittsylvania County	SANDY LEVEL, VA 24161	36.94334677	-79.57352294
622	1570-23-1867	TOSH, MICHAEL GUY	581 STAR LAND DR	Pittsylvania County	SANDY LEVEL, VA 24161	36.94135883	-79.56351731
623	1570-53-1873	FOSTER WILLIAM H TRUST DTD 9-21-2005	3480 GRASSLAND DR	Pittsylvania County	SANDY LEVEL, VA 24161	36.94104211	-79.55334269
624	1570-23-5176	MWV LAND SALES INC		Pittsylvania County	SANDY LEVEL, VA 24161	36.93922051	-79.56118772
625	1570-62-9766	FOSTER WILLIAM H TRUST DTD 9-21-2005	3480 GRASSLAND DR	Pittsylvania County	SANDY LEVEL, VA 24161	36.93827443	-79.54751531
626	1570-12-1595	MWV LAND SALES INC		Pittsylvania County	SANDY LEVEL, VA 24161	36.93782995	-79.56598605
627	1580-02-2305	RORER, WILLIAM R	4153 OXFORD RD	Pittsylvania County	CHATHAM, VA 24531	36.93707998	-79.53552405
628	1580-21-4530	RORER, WILLIAM R		Pittsylvania County	CHATHAM, VA 24531	36.93486683	-79.52808846
629	1570-60-6981	MEASE, MONCIE EDGAR II		Pittsylvania County	SANDY LEVEL, VA 24161	36.93354827	-79.54706452
630	1580-00-0360	COOK, MOLLIE		Pittsylvania County	CHATHAM, VA 24531	36.93159484	-79.53612199

Property Owner Information

Owner Phone Number, Email, Fax, SCC unknown. Not included.

MAP ID	GPIN	Owner Name	Owner Street Address	County	City, State, Zip	Latitude	Longitude
631	1580-00-8311	CLEMENTS, LEWIS O JR	3657 OXFORD RD	Pittsylvania County	CHATHAM, VA 24531	36.93155581	-79.53355385
632	1489-39-5745	OSBORNE, GIRARD ENOCH	1624 LARK DR	Pittsylvania County	CHATHAM, VA 24531	36.92999008	-79.52410479
633	1489-09-2901	CLEMENT, THOMAS	3657 OXFORD RD	Pittsylvania County	CHATHAM, VA 24531	36.93000524	-79.5358765
634	1489-29-4509	JEFFERSON, ROGER P	3540 OXFORD RD	Pittsylvania County	CHATHAM, VA 24531	36.92958484	-79.52803401
635	1489-58-3782	JEFFERSON, ROGER P		Pittsylvania County	CHATHAM, VA 24531	36.92721858	-79.51806072
636	1489-47-0499	JEFFERSON, ROGER P	2249 LARK DR	Pittsylvania County	CHATHAM, VA 24531	36.92373207	-79.52228491
637	1499-07-3292	SHELHORSE, HENRY MARION		Pittsylvania County	CHATHAM, VA 24531	36.922770812	-79.50009832
638	1489-07-4261	JEFFERSON, ROGER P		Pittsylvania County	CHATHAM, VA 24531	36.92302754	-79.53474071
639	1489-86-7542	MCLAUGHLIN, BEVERLY ADAMS		Pittsylvania County	CHATHAM, VA 24531	36.92167301	-79.50625372
640	1499-36-6136	PEARSON, MARY R LIFE TENANT	2805 TOSHES RD	Pittsylvania County	CHATHAM, VA 24531	36.92054607	-79.48927759
641	1489-65-9830	JEFFERSON, ROGER P	2715 SNOWBERRY RD	Pittsylvania County	CHATHAM, VA 24531	36.91952604	-79.51257722
642	1499-14-5945	NUCKOLS, ROBERT EDWARD		Pittsylvania County	CHATHAM, VA 24531	36.91720615	-79.49635491
643	1499-44-5858	PEARSON, MARY Y LIFE TENANT	2481 TOSHES RD	Pittsylvania County	CHATHAM, VA 24531	36.91679855	-79.4867473
644	1499-24-4022	LINTHICUM, HERBERT W		Pittsylvania County	CHATHAM, VA 24531	36.91465578	-79.49417146
645	1499-53-3686	TONEY, LOUISE BRYANT		Pittsylvania County	CHATHAM, VA 24531	36.91375332	-79.48351335
646	1499-72-3859	OWEN, KEVIN EARL		Pittsylvania County	CHATHAM, VA 24531	36.91160375	-79.47665127
647	1499-42-2337	LINTHICUM, HERBERT W		Pittsylvania County	CHATHAM, VA 24531	36.9102033	-79.48736364
648	1499-51-8899	OWEN, JESSE EARLE		Pittsylvania County	CHATHAM, VA 24531	36.90894524	-79.48197107
649	1499-80-0532	OWEN, KEVIN EARL		Pittsylvania County	CHATHAM, VA 24531	36.90723911	-79.47566861
650	1499-90-9788	REYNOLDS, ROBERT J	2045 OLD RED EYE RD	Pittsylvania County	CHATHAM, VA 24531	36.90592314	-79.46768774
651	1499-80-0532	OWEN, KEVIN EARL		Pittsylvania County	CHATHAM, VA 24531	36.90493802	-79.47365521
652	2408-09-7078	OWEN, KEVIN EARL		Pittsylvania County	CHATHAM, VA 24531	36.90140987	-79.46482846
653	2408-27-4519	OAKES, TIMOTHY W		Pittsylvania County	CHATHAM, VA 24531	36.89757903	-79.45915449
654	2418-06-9860	HASKINS, KENNETH L		Pittsylvania County	CHATHAM, VA 24531	36.89559066	-79.42996257
655	2408-56-0919	MARSTIN, WILLIAM L		Pittsylvania County	CHATHAM, VA 24531	36.89560798	-79.45027941
656	2408-06-7831	WILLIAMS, DOUGLAS WAYNE LIFE TENANT		Pittsylvania County	CHATHAM, VA 24531	36.89513899	-79.46482928
657	2408-46-2609	MASON, JOHNNY M		Pittsylvania County	CHATHAM, VA 24531	36.89448398	-79.45322559
658	2408-66-8225	BARTON, JOSEPH E JR		Pittsylvania County	CHATHAM, VA 24531	36.89395386	-79.4444335
659	2408-26-8209	TOWLER, DWIGHT A	3750 ANDERSON MILL ROAD	Pittsylvania County	CHATHAM, VA 24531	36.8938932	-79.4576418
660	2408-86-7068	LUCAS, JENNIFER HARDEN	2572 ANDERSON MILL RD	Pittsylvania County	CHATHAM, VA 24531	36.89334312	-79.43750421
661	2408-55-6668	BRYANT, LOUIS WADE	3401 ANDERSON MILL RD	Pittsylvania County	CHATHAM, VA 24531	36.89230253	-79.447791
662	2408-95-3503	INGRAM, TERRY LEE	2348 ANDERSON MILL RD	Pittsylvania County	CHATHAM, VA 24531	36.89194255	-79.43558088
663	2408-75-4535	MCDANIEL, BETTY RAY ET ALS		Pittsylvania County	CHATHAM, VA 24531	36.89199017	-79.4218763
664	2418-04-3295	WOODSON, ROBERT L		Pittsylvania County	CHATHAM, VA 24531	36.88856834	-79.43181241
665	2418-04-1120	WOODSON, DAVID R		Pittsylvania County	CHATHAM, VA 24531	36.88815863	-79.4327791
666	2418-03-9452	WOODSON, ROBERT L & OTHERS		Pittsylvania County	CHATHAM, VA 24531	36.88643188	-79.42974002
667	2418-22-5946	SWANSON, MARY ALICE ET ALS		Pittsylvania County	CHATHAM, VA 24531	36.88513478	-79.42436986
668	2418-12-7175	POPE, PHYLLIS JEAN MOTLEY	1388 RIDDLE RD	Pittsylvania County	CHATHAM, VA 24531	36.88266054	-79.42707803
669	2418-22-3036	CRADDOCK, JAMES R	1312 RIDDLE RD	Pittsylvania County	CHATHAM, VA 24531	36.88245811	-79.42501038
670	2418-21-5984	CRADDOCK, JAMES R		Pittsylvania County	CHATHAM, VA 24531	36.88201478	-79.42411878
671	2418-30-2966	SHELTON, WALTER HURT JR		Pittsylvania County	CHATHAM, VA 24531	36.88195242	-79.42226196
672	2418-41-9409	MOTLEY, EUGENE RYLAND	717 RIDDLE RD	Pittsylvania County	CHATHAM, VA 24531	36.88085288	-79.41643274
673	2418-50-8820	LAKE ANNA INVESTMENTS L C		Pittsylvania County	CHATHAM, VA 24531	36.87858089	-79.41287144
674	2418-30-2966	SHELTON, WALTER HURT JR		Pittsylvania County	CHATHAM, VA 24531	36.87845796	-79.42154498
675	2417-49-1304	POWELL, DEAN MORRIS		Pittsylvania County	CHATHAM, VA 24531	36.87489558	-79.41895751
676	2417-89-1099	COMMONWEALTH FOREST INVESTMENTS INC		Pittsylvania County	CHATHAM, VA 24531	36.87444827	-79.40499415
677	2417-99-5129	GILL, ELIZABETH J		Pittsylvania County	CHATHAM, VA 24531	36.87423538	-79.40043537
678	2417-68-8838	OAKGROVE CHRISTIAN CHURCH		Pittsylvania County	CHATHAM, VA 24531	36.87399063	-79.40981325
679	2417-58-4539	DALTON, A DOUGLAS JR		Pittsylvania County	CHATHAM, VA 24531	36.87285059	-79.41423103
680	2417-78-3420	LIGHTHOUSE DELIVERANCE CENTER	20540 U S HIGHWAY NO 29	Pittsylvania County	CHATHAM, VA 24531	36.87249274	-79.40792697
681	2417-78-3227	DAVENPORT, BEN J JR		Pittsylvania County	CHATHAM, VA 24531	36.87214718	-79.40792976
682	2417-78-3175	BRUNNER, ARTHUR J		Pittsylvania County	CHATHAM, VA 24531	36.87181022	-79.40776557
683	2417-97-1683	MOTLEY, CRAIG CURTIS		Pittsylvania County	CHATHAM, VA 24531	36.87038743	-79.40159211
684	2417-87-1135	COMMONWEALTH FOREST INVESTMENTS INC		Pittsylvania County	CHATHAM, VA 24531	36.86905585	-79.4051886
685	2417-96-2930	RIDDLE, IRIS M		Pittsylvania County	CHATHAM, VA 24531	36.86822641	-79.40136918
686	2417-86-1458	WESTBROOK, ELIZABETH R		Pittsylvania County	CHATHAM, VA 24531	36.86721598	-79.4050934
687	2417-86-4372	MOTLEY, NELSON C TRUSTEE	133 DUAL TRACK RD	Pittsylvania County	CHATHAM, VA 24531	36.86683738	-79.40400416
688	2427-06-1292	ADAMS, JOHN G II	19780 U S HIGHWAY NO 29	Pittsylvania County	CHATHAM, VA 24531	36.86657385	-79.39805746
689	2427-16-2148	SHELTON, HAROLD J	19808 U S HIGHWAY NO 29	Pittsylvania County	CHATHAM, VA 24531	36.86640132	-79.39427494
690	2427-23-5940	TOLER, LAURA JANE	241 STRADER RD	Pittsylvania County	CHATHAM, VA 24531	36.86020128	-79.39076948
691	2427-22-4237	ROBERTSON, RUTH MAE		Pittsylvania County	CHATHAM, VA 24531	36.85556975	-79.39029123
692	2427-12-7078	WHITTLE, JOHN D III ET ALS	552 MILL CREEK RD	Pittsylvania County	CHATHAM, VA 24531	36.85525332	-79.39227111
693	2427-11-4877	WHITTLE, JOHN D III ET ALS	500 MILL CREEK RD	Pittsylvania County	CHATHAM, VA 24531	36.85453134	-79.39330241
694	2427-71-7879	DAVIS, WAYNE WINSTON JR	1918 MILL CREEK RD	Pittsylvania County	CHATHAM, VA 24531	36.85319387	-79.37039362
695	2427-11-5178	GILL, ELIZABETH J		Pittsylvania County	CHATHAM, VA 24531	36.85258898	-79.3931861
696	2427-21-1168	GILL, ELIZABETH J	476 MILL CREEK RD	Pittsylvania County	CHATHAM, VA 24531	36.8525613	-79.39121377
697	2427-21-9255	COSBY, ELLA MAE ET ALS		Pittsylvania County	CHATHAM, VA 24531	36.8525132	-79.38822347
698	2427-30-5719	JONES, LOUISE & OTHERS		Pittsylvania County	CHATHAM, VA 24531	36.85241789	-79.38643774
699	2427-30-4184	FITZGERALD, FORREST		Pittsylvania County	CHATHAM, VA 24531	36.851919	-79.38646297
700	2427-50-0255	MOTLEY, JOSEPH FULLER ET ALS		Pittsylvania County	CHATHAM, VA 24531	36.85038595	-79.38134311
701	2427-30-5083	FITZGERALD, FORREST	537 NEIGHBORHOOD RD	Pittsylvania County	CHATHAM, VA 24531	36.84985985	-79.38670414
702	2427-30-9081	CLARK, JUANITA W	127 JACKSON LN	Pittsylvania County	CHATHAM, VA 24531	36.84964134	-79.38513417
703	2426-69-3980	MOTLEY, BYRON D		Pittsylvania County	CHATHAM, VA 24531	36.84949392	-79.37648261
704	2426-88-4949	HANKINS, JAMES R LIFE TENANT		Pittsylvania County	CHATHAM, VA 24531	36.84707891	-79.36997439
705	2426-97-2787	TATE, MAURICE E TAYLOR		Pittsylvania County	CHATHAM, VA 24531	36.84367609	-79.36692429
706	2426-87-3293	WILSON, ALICE MARTIN TAYLOR		Pittsylvania County	CHATHAM, VA 24531	36.84211189	-79.36988874
707	2436-06-0273	REDD, WILLIE E JR		Pittsylvania County	CHATHAM, VA 24531	36.83968961	-79.36438492
708	2426-95-2849	WILSON, ALICE MARTIN TAYLOR	1685 CHALK LEVEL RD	Pittsylvania County	CHATHAM, VA 24531	36.83861922	-79.36701553
709	2436-05-4217	TOWN OF CHATHAM		Pittsylvania County	CHATHAM, VA 24531	36.8379343	-79.36204838
710	2436-05-4452	GRUBB	1905 CHALK LEVEL RD	Pittsylvania County	CHATHAM, VA 24531	36.83714264	-79.36346936
711	2436-75-1295	BROWN, ANN F TRUSTEE U/A		Pittsylvania County	CHATHAM, VA 24531	36.83667794	-79.33921008
712	2436-95-5098	FOWLKES, RINDA G		Pittsylvania County	CHATHAM, VA 24531	36.83641651	-79.33157954
713	2436-64-3488	HESS, LYLE F	1271 TRANS CO ROAD	Pittsylvania County	CHATHAM, VA 24531	36.83486045	-79.34209731
714	2436-63-4849	CEMETERY		Pittsylvania County	CHATHAM, VA 24531	36.8330263	-79.34196376
715	2436-53-9983	HESS, LYLE F	1271 TRANS CO ROAD	Pittsylvania County	CHATHAM, VA 24531	36.83301682	-79.34348612
716	2436-03-5489	STUMP, THOMAS S	1912 CHALK LEVEL RD	Pittsylvania County	CHATHAM, VA 24531	36.83206259	-79.36224511
717	2436-73-3459	TRANSCONTINENTAL GAS PIPELINE CORPORATION		Pittsylvania County	CHATHAM, VA 24531	36.83125949	-79.33896771
718	2436-42-6652	JONES, MARY		Pittsylvania County	CHATHAM, VA 24531	36.82980287	-79.34928021
719	2436-21-9771	ROBERTSON, JULIAN WAYNE	740 WAYNE ROBERTSON RD	Pittsylvania County	CHATHAM, VA 24531	36.82727006	-79.35372173
720	2436-60-3630	THORSON, EVE M ET ALS		Pittsylvania County	CHATHAM, VA 24531	36.82482742	-79.34341549
721	2421-82-4471	FORD BROTHERS L L C		Pittsylvania County	BLAIRS, VA 24527	36.69153442	-79.36779621
722	2421-82-0338	FORD BROTHERS L L C		Pittsylvania County	BLAIRS, VA 24527	36.69140859	-79.36927033
723	2421-82-4360	FORD BROTHERS L L C		Pittsylvania County	BLAIRS, VA 24527	36.69125442	-79.36782614
724	2421-82-4250	FORD BROTHERS L L C	5929 U S HIGHWAY NO 29	Pittsylvania County	BLAIRS, VA 24527	36.69090904	-79.36786831
725	2421-82-4140	FORD BROTHERS L L C	5929 U S HIGHWAY NO 29	Pittsylvania County	BLAIRS, VA 24527	36.6905893	-79.36791171
726	2421-82-4020	FORD BROTHERS L L C		Pittsylvania County	BLAIRS, VA 24527	36.69035206	-79.36795091
727	2421-72-9091	FORD BROTHERS L L C		Pittsylvania County	BLAIRS, VA 24527	36.69035671	-79.36951854
728	2421-81-4911	FORD BROTHERS L L C		Pittsylvania County	BLAIRS, VA 24527	36.69010776	-79.3680164
729	2421-81-3795	FORD BROTHERS L L C	5765 U S HIGHWAY NO 29	Pittsylvania County	BLAIRS, VA 24527	36.68967323	-79.36805081
730	2421-81-2744	FORD BROTHERS L L C		Pittsylvania County	BLAIRS, VA 24527	36.68962298	-79.36854438
731	2421-81-1732	FORD BROTHERS L L C		Pittsylvania County	BLAIRS, VA 24527	36.68954025	-79.36906062
732	2421-71-5701	BOARD OF SUPERVISORS PITTS CO	200 BLAIRS MIDDLE SCHOOL CIR	Pittsylvania County	BLAIRS, VA 24527	36.68956957	-79.37121449
733	2427-12-7949	ELLIS, JANE SELF	241 STRADER RD	Pittsylvania County	CHATHAM, VA 24531	36.85794644	-79.392904
734	2436-05-4817	TOWN OF CHATHAM		Pittsylvania County	CHATHAM, VA 24531	36.83751946	-79.36373046
735	055.03-02-14.00-0000	MCGLOTHLIN ELIZABETH JEAN; KING GARY	3878 GARMAN RD	Roanoke County	SALEM, VA 24153	37.27307261	-80.11824405

Property Owner Information

Owner Phone Number, Email, Fax, SCC unknown. Not included.

MAP ID	GPIN	Owner Name	Owner Street Address	County	City, State, Zip	Latitude	Longitude
736	055.03-02-13.00-0000	OBCENCHAIN HORACE M	GARMAN RD	Roanoke County	SALEM, VA 24153	37.2709991	-80.12105487
737	055.03-02-12.00-0000	OBCENCHAIN HORACE M	GARMAN RD	Roanoke County	SALEM, VA 24153	37.26959261	-80.12393864
738	063.03-01-04.00-0000	THOMAS LTD	CAMPBELL DR	Roanoke County	SALEM, VA 24153	37.24546002	-80.19927649
739	072.02-01-43.00-0000	COUCH JESSE D; COUCH MELANIE J	7034 SUTHERLAND CR	Roanoke County	SALEM, VA 24153	37.24255977	-80.19826533
740	072.02-01-45.00-0000	THOMAS LTD	6591 WEST MAIN ST	Roanoke County	SALEM, VA 24153	37.23942343	-80.19426914
741	072.02-01-46.00-0000	GUNTER DWIGHT A	5822 WEST RIVER RD	Roanoke County	SALEM, VA 24153	37.23481407	-80.19346359
742	082.00-01-15.00-0000	MELTON DON E	7391 COVE HOLLOW RD	Roanoke County	ELLISTON, VA 24087	37.2187106	-80.18798656
743	082.00-01-16.00-0000	MELTON DON E	COVE HOLLOW RD	Roanoke County	ELLISTON, VA 24087	37.21639826	-80.18712184
744	082.00-01-17.00-0000	EPPERLY RANDALL KEITH	7393 COVE HOLLOW RD	Roanoke County	ELLISTON, VA 24087	37.21576176	-80.18804406
745	082.00-01-17.00-0000	GRAY KATHLEEN D	7561 COVE HOLLOW RD	Roanoke County	ELLISTON, VA 24087	37.21153757	-80.18431812
746	082.00-01-38.00-0000	TEAFORD KEVIN S; TEAFORD DANA T	7487 COVE HOLLOW RD	Roanoke County	ELLISTON, VA 24087	37.20812095	-80.18221891
747	082.00-01-40.00-0000	ANDREWS ANN ELIZABETH	7485 COVE HOLLOW RD	Roanoke County	ELLISTON, VA 24087	37.20491738	-80.18596046
748	082.00-01-41.00-0000	MAXWELL MARY ANN; MAXWELL JAMES LOUIS	COVE HOLLOW RD	Roanoke County	ELLISTON, VA 24087	37.19843113	-80.17506746
749	093.00-01-44.00-0000	CRONK MARK W; CRONK ALISON G	8451 HONEYUCKLE RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.19363428	-80.16322609
750	093.00-01-47.00-0000	EVANGEL FOURSQUARE CHURCH TRUSTEES	8301 HONEYUCKLE RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.19149218	-80.15691433
751	093.00-01-47.00-0000	EVANGEL FOURSQUARE CHURCH TRUSTEES	8301 HONEYUCKLE RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.19122749	-80.15829263
752	093.00-01-44.00-0000	CRONK MARK W; CRONK ALISON G	8451 HONEYUCKLE RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.18859926	-80.1524595
753	102.00-01-01.02-0000	TERRY GRACE MINOR	POOR MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.18709462	-80.17531581
754	093.00-01-34.00-0000	CFX INC	POOR MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.18293863	-80.14646626
755	093.00-01-46.00-0000	TERRY ELIZABETH LEE	8744 HONEYUCKLE RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.18131662	-80.16224743
756	093.00-01-34.01-0000	SCOTT JAMES T; SCOTT KAREN B	8443 POOR MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.1811403	-80.14189098
757	093.00-01-33.00-0000	CFX INC	POOR MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.18028169	-80.14758097
758	093.00-01-33.01-0000	CFX INC	POOR MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.18037135	-80.14135798
759	102.00-01-05.00-0000	SCOTT MICHAEL THOMAS	8469 POOR MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.17751335	-80.14200186
760	102.00-01-08.00-0000	TERRY JOHN COLES III	8741 POOR MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.17237369	-80.13674394
761	103.00-02-01.00-0000	TERRY HILAH PARKS	8873 POOR MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.17004096	-80.17282872
762	102.00-01-02.00-0000	TERRY FRANK H JR ETAL	8755 POOR MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.16817949	-80.14532267
763	102.00-01-11.00-0000	DUNCAN AGNES M	10450 RUSSWOOD RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.16120328	-80.14003666
764	102.00-01-12.00-0000	JONES MARTHA C ESTATE; ROLLIER MATTHE	10383 RUSSWOOD RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.15906385	-80.13583052
765	102.00-01-13.00-0000	COFFEY BRUCE M; COFFEY MARY E	10303 RUSSWOOD RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.15767859	-80.13351954
766	102.00-01-13.01-0000	LUCKI JACQUELINE J	RUSSWOOD RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.15766172	-80.13283445
767	103.00-02-43.00-0000	RIVES MARY ELLEN	10239 BOTTOM CREEK RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.15659472	-80.13090993
768	102.00-01-14.00-0000	LUCKI JACQUELINE J	10289 RUSSWOOD RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.15626764	-80.13167444
769	110.00-01-44.00-0000	TERRY ELIZABETH LEE	BOTTOM CREEK RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.15175002	-80.13388149
770	110.00-01-46.00-0000	HENRY JEROME DAVID; HENRY DORIS MARIE	10578 BOTTOM CREEK RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.14768068	-80.13872569
771	110.00-01-56.01-0000	HAMM ROBERT MATTHEW; HAMM AIMEE CHASE	10420 MILL CREEK RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.14391387	-80.13116172
772	110.00-01-56.00-0000	VEST FRED W	10434 MILL CREEK RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.14344743	-80.1338433
773	110.00-01-50.00-0000	WALDRON LOIS KING LIFE ESTATE	10800 BOTTOM CREEK RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.14317738	-80.14123339
774	110.00-01-54.00-0000	MONTUORI LENORA W	BOTTOM CREEK RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.14082205	-80.13564661
775	111.00-01-56.03-0000	CONNER BETTY T	10538 GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13986165	-80.1242341
776	111.00-01-56.02-0000	CROWE KERMIT C; CROWE ALVA T	10571 GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13977749	-80.12636877
777	110.00-01-55.00-0000	FULTON JOHN D JR; BROKAW JANICE VANNE	GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13955489	-80.13816554
778	111.00-01-56.05-0000	CROWE TEDDY D; CROWE SUSAN F	10577 GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13955257	-80.12855773
779	111.00-01-63.00-0000	MORSE CLINTON S	GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13911385	-80.13121559
780	111.00-01-56.06-0000	WEHREND GREGG A; LICHLYTER LYNETTE V	10585 GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13760552	-80.12728174
781	111.00-01-56.00-0000	FERGUSON GEORGE ROBERT; FERGUSON DANA	10575 BENT MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.13744446	-80.12610267
782	111.00-01-62.00-0000	PHILLIPS ALEXANDER B; PHILLIPS EMILY	GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.1373788	-80.13113148
783	111.00-01-56.01-0000	WEHREND GREGG A; LICHLYTER LYNETTE V	10573 GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13735548	-80.12802165
784	111.00-01-62.01-0000	CHANDLER JAMES T; CHANDLER KATHY E	GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.136882	-80.13687411
785	111.00-01-61.03-0000	LESTER DAVID W; LESTER MICHELLE R	10660 GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13628554	-80.12995381
786	111.00-01-58.00-0000	ANDREWS MARTHA A	10627 BENT MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.13605109	-80.12807341
787	111.00-01-61.02-0000	LESTER MICHAEL L; LESTER TERESA A	10700 GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13606821	-80.13104888
788	111.00-01-61.01-0000	LESTER LONNIE L; LESTER JUDITH P	10701 BENT MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.13529068	-80.1306531
789	117.00-01-40.00-0000	CONNER JEFFERY L	10757 GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13451591	-80.1347912
790	061.02-02-16.01-0000	DEPARTMENT OF THE INTERIOR	2725 MOUNTAIN VIEW RD	Roanoke County	ROANOKE, VA 24014	37.13410631	-80.11621066
791	117.00-01-39.00-0000	FRALEY JENNIFER L	10812 GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13383061	-80.13613339
792	111.00-01-61.00-0000	DAMERON REBECCA JANE	10721 BENT MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.13368638	-80.13181873
793	117.00-01-38.00-0000	CHANDLER JAMES T; CHANDLER KATHY E	10858 GREEN HOLLOW DR	Roanoke County	BENT MOUNTAIN, VA 24059	37.13361694	-80.13884812
794	117.00-01-41.01-0000	MONTUORI LENORA W	MONTUORI	Roanoke County	BENT MOUNTAIN, VA 24059	37.13326383	-80.13317518
795	117.00-01-41.00-0000	MONTUORI LENORA W	MONTUORI	Roanoke County	BENT MOUNTAIN, VA 24059	37.13259023	-80.13502107
796	117.00-01-41.02-0000	MONTUORI LENORA W	10773 MONTUORI	Roanoke County	BENT MOUNTAIN, VA 24059	37.13191633	-80.13339414
797	117.00-01-43.02-0000	MONTUORI LENORA W	MONTUORI	Roanoke County	BENT MOUNTAIN, VA 24059	37.13168253	-80.1371218
798	117.00-01-42.00-0000	MONTUORI LENORA W	10799 BENT MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.13111883	-80.1323509
799	117.00-01-43.00-0000	MONTUORI LENORA W	10779 MONTUORI	Roanoke County	BENT MOUNTAIN, VA 24059	37.1309369	-80.13582233
800	118.00-01-10.00-0000	UNITED STATES OF AMERICA	BENT MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.12989677	-80.12417395
801	117.00-01-45.00-0000	MONTUORI LENORA	BENT MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.12933554	-80.13239812
802	118.00-01-09.00-0000	THOMPSON HOWARD M; THOMPSON CHRISTINE	10864 BENT MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.12928642	-80.12821406
803	117.00-01-46.00-0000	MONTUORI LENORA W	11069 ROCKY RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.12891393	-80.13697628
804	118.00-01-16.00-0000	UNITED STATES OF AMERICA	BENT MOUNTAIN RD	Roanoke County	BENT MOUNTAIN, VA 24059	37.1261194	-80.12287109

Owner Phone Number, Email, Fax, SCC unknown. Not included.

Table 2. Stream Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	USACE District	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (acres) ⁵	Permanent Impact Area (acres) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-J62	Right Fork Big Elk Creek	Harrison	Pittsburgh	39.445033	-80.482635	Perennial	RPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	20	-	0.0037	-	18	-	4-35
S-B75/F49	UNT to Goose Run	Harrison	Pittsburgh	39.436571	-80.475198	Intermittent	RPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	20	-	0.0028	-	13	-	4-36
S-B74	Goose Run	Harrison	Pittsburgh	39.436245	-80.474976	Intermittent	RPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	20	-	0.0018	-	9	-	4-36
S-B79	UNT to Big Elk Creek	Harrison	Pittsburgh	39.423571	-80.476278	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Temporary Access Road	11	-	0.0004	-	2	-	4-39
S-B79	UNT to Big Elk Creek	Harrison	Pittsburgh	39.423499	-80.476392	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Permanent Access Road	-	60	-	0.0021	-	7	4-39
S-B79	UNT to Big Elk Creek	Harrison	Pittsburgh	39.423434	-80.476486	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Temporary Access Road	24	-	0.0008	-	4	-	4-39
S-J54	UNT to Little Tenmile Creek	Harrison	Pittsburgh	39.400324	-80.479967	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Permanent Access Road	-	26	-	0.0048	-	23	4-43
S-J51	Little Tenmile Creek	Harrison	Pittsburgh	39.398116	-80.477174	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Timber Mat Crossing	20	-	0.0138	-	67	-	4-43
S-A10a	Little Rockcamp Run	Harrison	Pittsburgh	39.370005	-80.484974	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Timber Mat Crossing	20	-	0.0055	-	27	-	4-49
S-B2a	UNT to Rockcamp Run	Harrison	Pittsburgh	39.359262	-80.493290	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Pipeline ROW	115	-	0.0211	-	341	-	4-51
S-B3a	Rockcamp Run	Harrison	Pittsburgh	39.358871	-80.493707	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Pipeline ROW	97	-	0.0445	-	719	-	4-51
S-A128	Rockcamp Run	Harrison	Pittsburgh	39.355569	-80.4901	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Permanent Access Road	-	29	-	0.0320	-	155	4-51
S-RR22	UNT to Grass Run	Harrison	Pittsburgh	39.342166	-80.512422	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Timber Mat Crossing	20	-	0.0055	-	27	-	4-55
S-A11a	Grass Run	Harrison	Pittsburgh	39.335511	-80.522421	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Pipeline ROW	113	-	0.0311	-	502	-	4-56
S-A11a-Braid-1	Grass Run	Harrison	Pittsburgh	39.335500	-80.522502	Intermittent	RPW	Warmwater Fishery, Tier 1	05020002	Pipeline ROW	11	-	0.0015	-	7	-	4-56
S-A11a-Braid-2	Grass Run	Harrison	Pittsburgh	39.335410	-80.522360	Intermittent	RPW	Warmwater Fishery, Tier 1	05020002	Pipeline ROW	77	-	0.0088	-	143	-	4-56
S-OP8	UNT to Indian Run	Harrison	Pittsburgh	39.320959	-80.526445	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Temporary Access Road	-	41	-	0.0047	-	23	4-59
S-OP9	UNT to Indian Run	Harrison	Pittsburgh	39.320682	-80.526449	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Temporary Access Road	-	36	-	0.0025	-	12	4-59
S-B6a	Indian Run	Harrison	Pittsburgh	39.317309	-80.527175	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Temporary Access Road	30	-	0.0207	-	100	-	4-59
S-B6a	Indian Run	Harrison	Pittsburgh	39.317023	-80.526157	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Timber Mat Crossing	20	-	0.0138	-	67	-	4-59
S-B7a	UNT to Indian Run	Harrison	Pittsburgh	39.316755	-80.526222	Intermittent	RPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	20	-	0.0018	-	9	-	4-59
S-UU3	Salem Fork	Harrison	Pittsburgh	39.289870	-80.517903	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Pipeline ROW	76	-	0.1047	-	1,689	-	4-66
S-UU5	Halls Run	Harrison	Pittsburgh	39.253041	-80.540508	Perennial	RPW	Warmwater Fishery, Tier 2	05020002	Pipeline ROW	79	-	0.0073	-	117	-	4-74
S-K73	Coburn Fork	Harrison	Pittsburgh	39.243691	-80.553966	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Pipeline ROW	110	-	0.0126	-	204	-	4-77
S-K74	UNT to Coburn Fork	Harrison	Pittsburgh	39.243647	-80.553903	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Pipeline ROW	36	-	0.0021	-	10	-	4-77
S-K75	UNT to Coburn Fork	Harrison	Pittsburgh	39.243509	-80.554028	Intermittent	RPW	Warmwater Fishery, Tier 2	05020002	Pipeline ROW	96	-	0.0066	-	107	-	4-77
S-K80	UNT to Turtletree Fork	Harrison	Pittsburgh	39.225747	-80.550164	Intermittent	RPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	20	-	0.0014	-	7	-	4-80
S-CV9	UNT to Turtletree Fork	Harrison	Pittsburgh	39.22369	-80.548273	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	20	-	0.0009	-	4	-	4-81
S-K81	Turtletree Fork	Harrison	Pittsburgh	39.223263	-80.547928	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Timber Mat Crossing	30	-	0.0028	-	13	-	4-81
S-CV10	UNT to Turtletree Fork	Harrison	Pittsburgh	39.221719	-80.546951	Perennial	RPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	20	-	0.0014	-	7	-	4-81
S-A106	UNT to Kincheloe Creek	Harrison	Pittsburgh	39.168435	-80.577625	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	168	-	0.0010	-	47	-	4-92
S-A105	UNT to Kincheloe Creek	Harrison	Pittsburgh	39.168266	-80.577815	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	20	-	0.0018	-	9	-	4-92
S-K94	Kincheloe Creek	Lewis	Pittsburgh	39.167831	-80.578867	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Temporary Access Road	18	-	0.0083	-	40	-	4-92
S-K82	UNT to Kincheloe Creek	Harrison	Pittsburgh	39.167753	-80.578181	Perennial	RPW	Warmwater Fishery, Tier 2	05020002	Pipeline ROW	110	-	0.0101	-	49	-	4-92
S-K94	Kincheloe Creek	Lewis	Pittsburgh	39.167575	-80.578144	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Pipeline ROW	79	-	0.0363	-	585	-	4-92
S-I67	Smoke Camp Run	Lewis	Pittsburgh	39.137145	-80.577026	Perennial	RPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	22	-	0.0040	-	20	-	4-99
S-J43	Right Fork Freemans Creek	Lewis	Pittsburgh	39.120579	-80.581328	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Timber Mat Crossing	22	-	0.0126	-	61	-	4-102
S-J44	UNT to Right Fork Freemans Creek	Lewis	Pittsburgh	39.114730	-80.586203	Perennial	RPW	Warmwater Fishery, Tier 2	05020002	Pipeline ROW	79	-	0.0073	-	117	-	4-103
S-K46	UNT to Left Fork Freemans Creek	Lewis	Pittsburgh	39.080252	-80.581430	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Pipeline ROW	93	-	0.0043	-	21	-	4-109
S-B67	Left Fork Freemans Creek	Lewis	Pittsburgh	39.079556	-80.581346	Perennial	RPW	Warmwater Fishery, Tier 1	05020002	Timber Mat Crossing	22	-	0.0061	-	29	-	4-110
S-B69	UNT to Left Fork Freemans Creek	Lewis	Pittsburgh	39.077790	-80.582932	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Temporary Access Road	86	-	0.0030	-	14	-	4-110
S-H184	UNT to Left Fork Freemans Creek	Lewis	Pittsburgh	39.069684	-80.580583	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	22	-	0.0051	-	24	-	4-111
S-H184a	UNT to Left Fork Freemans Creek	Lewis	Pittsburgh	39.069645	-80.580591	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05020002	Timber Mat Crossing	22	-	0.0051	-	24	-	4-111
S-H180	UNT to Left Fork Freemans Creek	Lewis	Pittsburgh	39.068217	-80.581025	Intermittent	RPW	Warmwater Fishery, Tier 2	05020002	Pipeline ROW	68	-	0.0203	-	327	-	4-111
S-ST18	UNT to Mobley Run	Wetzel	Huntington	39.561766	-80.540136	Intermittent	RPW	Warmwater Fishery, Tier 1	05030201	Permanent Access Road	21	-	0.0049	-	23	-	4-2
S-WX3	UNT to Mobley Run	Wetzel	Huntington	39.560611	-80.545823	Intermittent	RPW	Warmwater Fishery, Tier 1	05030201	ATWS	21	-	0.0024	-	12	-	4-1
S-A1a	North Fork Fishing Creek	Wetzel	Huntington	39.553946	-80.545046	Perennial	RPW	Warmwater Fishery, Tier 1	05030201	Pipeline ROW	80	-	0.0641	-	1,034	-	4-3
S-A3a	UNT to North Fork Fishing Creek	Wetzel	Huntington	39.551814	-80.545633	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Pipeline ROW	80	-	0.0166	-	267	-	4-4
S-J66	UNT to North Fork Fishing Creek	Wetzel	Huntington	39.546030	-80.544314	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Timber Mat Crossing	20	-	0.0014	-	7	-	4-5
S-A5a	UNT to Fallen Timber Run	Wetzel	Huntington	39.534241	-80.540995	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Timber Mat Crossing	30	-	0.0028	-	13	-	4-8
S-A6a	Fallen Timber Run	Wetzel	Huntington	39.534023	-80.540889	Perennial	RPW	Warmwater Fishery, Tier 1	05030201	Timber Mat Crossing	20	-	0.0092	-	44	-	4-9
S-A125	Price Run	Wetzel	Huntington	39.503477	-80.532902	Perennial	RPW	Warmwater Fishery, Tier 1	05030201	Timber Mat Crossing	20	-	0.0161	-	78	-	4-19
S-A124	UNT to Price Run	Wetzel	Huntington	39.503288	-80.532680	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Pipeline ROW	100	-	0.0276	-	445	-	4-19
S-A118	UNT to Price Run	Wetzel	Huntington	39.502399	-80.523520	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Pipeline ROW	79	-	0.0109	-	176	-	4-20
S-A120	Stout Run	Wetzel	Huntington	39.489914	-80.522135	Intermittent	RPW	Warmwater Fishery, Tier 1	05030201	Temporary Access Road	8	-	0.0011	-	5	-	4-23
S-A120	Stout Run	Wetzel	Huntington	39.489890	-80.522083	Intermittent	RPW	Warmwater Fishery, Tier 1	05030201	Permanent Access Road	-	26	-	0.0036	-	15	4-23
S-A120	Stout Run	Wetzel	Huntington	39.489866	-80.522029	Intermittent	RPW	Warmwater Fishery, Tier 1	05030201	Temporary Access Road	9	-	0.0012	-	6	-	4-23
S-A120	Stout Run	Wetzel	Huntington	39.489712	-80.520728	Intermittent	RPW	Warmwater Fishery, Tier 1	05030201	Timber Mat Crossing	20	-	0.0028	-	13	-	4-23
S-A119	UNT to Stout Run	Wetzel	Huntington	39.489589	-80.520532	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Timber Mat Crossing	134	-	0.0154	-	74	-	4-23

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Stream ID	NHD Stream Name ¹	County	USACE District	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (acres) ⁵	Permanent Impact Area (acres) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-QR34	UNT to Stout Run	Wetzel	Huntington	39.489140	-80.520658	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030201	Permanent Access Road	-	125	-	0.0072	-	24	4-23
S-QR34	UNT to Stout Run	Wetzel	Huntington	39.489062	-80.520519	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030201	Temporary Access Road	8	-	0.0004	-	2	-	4-23
S-J60	Sams Run	Wetzel	Huntington	39.474354	-80.511825	Perennial	RPW	Warmwater Fishery, Tier 2	05030201	Timber Mat Crossing	20	-	0.0064	-	31	-	4-26
S-J56	Manion Run	Wetzel	Huntington	39.464315	-80.502077	Perennial	RPW	Warmwater Fishery, Tier 2	05030201	Timber Mat Crossing	20	-	0.0046	-	22	-	4-28
S-J56	Manion Run	Wetzel	Huntington	39.464105	-80.502318	Perennial	RPW	Warmwater Fishery, Tier 2	05030201	Temporary Access Road	23	-	0.0054	-	26	-	4-28
S-J56	Manion Run	Wetzel	Huntington	39.463899	-80.502594	Perennial	RPW	Warmwater Fishery, Tier 2	05030201	Permanent Access Road	-	41	-	0.0095	-	46	4-28
S-J59	UNT to Manion Run	Wetzel	Huntington	39.462705	-80.504726	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Permanent Access Road	-	7	-	0.0005	-	2	4-28
S-J59	UNT to Manion Run	Wetzel	Huntington	39.462684	-80.504736	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Temporary Access Road	10	-	0.0007	-	3	-	4-28
S-J58	UNT to Manion Run	Wetzel	Huntington	39.462546	-80.505386	Perennial	RPW	Warmwater Fishery, Tier 2	05030201	Permanent Access Road	26	-	0.0030	-	14	-	4-28
S-K77	Traugh Fork	Doddridge	Huntington	39.229029	-80.552534	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Pipeline ROW	37	-	0.0034	-	54	-	4-80
S-K77	Traugh Fork	Doddridge	Huntington	39.228942	-80.552437	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Pipeline ROW	93	-	0.0085	-	137	-	4-80
S-K67	UNT to Big Issac Creek	Doddridge	Huntington	39.210269	-80.553179	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Pipeline ROW	77	-	0.0177	-	285	-	4-84
S-K65	UNT to Big Issac Creek	Doddridge	Huntington	39.209813	-80.552450	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Pipeline ROW	90	-	0.0165	-	267	-	4-84
S-K54	UNT to Big Issac Creek	Doddridge	Huntington	39.207673	-80.552957	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Timber Mat Crossing	20	-	0.0032	-	16	-	4-84
S-K58	UNT to Big Issac Creek	Doddridge	Huntington	39.205595	-80.553224	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030201	Timber Mat Crossing	20	-	0.0011	-	6	-	4-84
S-K59	UNT to Big Issac Creek	Doddridge	Huntington	39.204704	-80.553272	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030201	Timber Mat Crossing	20	-	0.0011	-	6	-	4-84
S-K60	UNT to Big Issac Creek	Doddridge	Huntington	39.203779	-80.553410	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030201	Timber Mat Crossing	20	-	0.0018	-	9	-	4-84
S-A110/K62	UNT to Laural Run	Doddridge	Huntington	39.201316	-80.553306	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Permanent Access Road	-	25	-	0.0040	-	13	4-85
S-A110/K62	UNT to Laural Run	Doddridge	Huntington	39.201286	-80.553425	Intermittent	RPW	Warmwater Fishery, Tier 2	05030201	Pipeline ROW	59	-	0.0095	-	154	-	4-85
S-A111	Laural Run	Doddridge	Huntington	39.200749	-80.553190	Perennial	RPW	Warmwater Fishery, Tier 1	05030201	Pipeline ROW	77	-	0.0247	-	399	-	4-85
S-J46	Fink Creek	Lewis	Huntington	39.094778	-80.584826	Perennial	RPW	Warmwater Fishery, Tier 1	05030203	Timber Mat Crossing	22	-	0.0076	-	37	-	4-106
S-J47b	UNT to Fink Creek	Lewis	Huntington	39.094003	-80.585481	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0015	-	7	-	4-106
S-I64	Leading Creek	Lewis	Huntington	39.052748	-80.582213	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0020	-	10	-	4-114
S-KK3a	UNT to Laurel Run	Lewis	Huntington	39.019605	-80.597895	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0010	-	5	-	4-119
S-KK5	UNT to Laurel Run	Lewis	Huntington	39.017783	-80.596853	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0015	-	7	-	4-119
S-KK5	UNT to Laurel Run	Lewis	Huntington	39.017738	-80.597017	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0015	-	7	-	4-119
S-KK5	UNT to Laurel Run	Lewis	Huntington	39.017718	-80.597027	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0015	-	7	-	4-119
S-KK6	UNT Laurel Run	Lewis	Huntington	39.017621	-80.596939	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0015	-	7	-	4-119
S-KK7	Laurel Run	Lewis	Huntington	39.017519	-80.597010	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0030	-	15	-	4-119
S-K45	UNT to Cove Lick	Lewis	Huntington	39.002598	-80.595591	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	ATWS	50	-	0.0011	-	6	-	4-121
S-K43	Cove Lick	Lewis	Huntington	39.002111	-80.595843	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Permanent Access Road	-	27	-	0.0043	-	21	4-121
S-K43	Cove Lick	Lewis	Huntington	39.002045	-80.596098	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0035	-	17	-	4-121
S-K38	UNT to Rock Run	Lewis	Huntington	38.992357	-80.592929	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0015	-	7	-	4-123
S-I63	Sand Fork	Lewis	Huntington	38.969369	-80.593138	Perennial	RPW	Non-listed mussels, Warmwater Fishery, Tier 1	05030203	Pipeline ROW	60	-	0.0275	-	444	-	4-128
S-I63	Sand Fork	Lewis	Huntington	38.969290	-80.593203	Perennial	RPW	Non-listed mussels, Warmwater Fishery, Tier 1	05030203	Permanent Access Road	-	26	-	0.0119	-	58	4-128
S-I63	Sand Fork	Lewis	Huntington	38.969239	-80.593244	Perennial	RPW	Non-listed mussels, Warmwater Fishery, Tier 1	05030203	Temporary Access Road	8	-	0.0037	-	18	-	4-128
S-H160	Indian Fork	Lewis	Huntington	38.933179	-80.584562	Perennial	RPW	Warmwater Fishery, Tier 1	05030203	Timber Mat Crossing	23	-	0.0106	-	59	-	4-135
S-L76	Indian Fork	Lewis	Huntington	38.929761	-80.575251	Perennial	RPW	Warmwater Fishery, Tier 1	05030203	Permanent Access Road	33	-	0.0115	-	56	-	4-137
S-H153	UNT to Sugar Camp Run	Lewis	Huntington	38.922846	-80.579227	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	76	-	0.0262	-	423	-	4-136
S-H145	UNT to Indian Fork	Lewis	Huntington	38.918986	-80.573838	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	91	-	0.0313	-	505	-	4-140
S-H165	UNT to Indian Fork	Lewis	Huntington	38.918602	-80.573256	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	144	-	0.0198	-	320	-	4-140
S-CV3	Threelick Run	Lewis	Huntington	38.913415	-80.571854	Perennial	RPW	Warmwater Fishery, Tier 1	05030203	Timber Mat Crossing	22	-	0.0030	-	15	-	4-142
S-CD16	UNT to Second Big Run	Lewis	Huntington	38.904135	-80.563719	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	173	-	0.0318	-	154	-	4-144
S-VV13	Second Big Run	Lewis	Huntington	38.903930	-80.563537	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	80	-	0.0275	-	133	-	4-144
S-VV11	UNT to Second Big Run	Lewis	Huntington	38.903610	-80.563186	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	7	-	0.0007	-	3	-	4-144
S-VV12	UNT to Second Big Run	Lewis	Huntington	38.903575	-80.563308	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	77	-	0.0211	-	341	-	4-144
S-VV13d	Second Big Run	Lewis	Huntington	38.902549	-80.564778	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road	61	-	0.0210	-	102	-	4-144
S-VV20	UNT to Second Big Run	Lewis	Huntington	38.900233	-80.563491	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road	40	-	0.0028	-	13	-	4-145
S-VV19	UNT to Second Big Run	Lewis	Huntington	38.899505	-80.563925	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road	62	-	0.0043	-	21	-	4-146
S-VV13b	Second Big Run	Lewis	Huntington	38.898431	-80.568250	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road	42	-	0.0143	-	69	-	4-146
S-VV18	UNT to Second Big Run	Lewis	Huntington	38.897028	-80.567634	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road	41	-	0.0075	-	36	-	4-146
S-VV16	UNT to Second Big Run	Lewis	Huntington	38.896271	-80.566551	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road	293	-	0.0202	-	98	-	4-146
S-VV16	UNT to Second Big Run	Lewis	Huntington	38.895455	-80.566432	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road	211	-	0.0145	-	70	-	4-146
S-UV11	Oil Creek	Lewis	Huntington	38.893014	-80.556192	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	51	-	0.0351	-	567	-	4-148
S-UV11	Oil Creek	Lewis	Huntington	38.893014	-80.556192	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Permanent Access Road	-	25	-	-	1	-	4-148
S-VV22	UNT to Oil Creek	Lewis	Huntington	38.890411	-80.550986	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road	43	-	0.0029	-	12	-	4-148
S-VV21	UNT to Oil Creek	Lewis	Huntington	38.890221	-80.553817	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road	18	-	0.0012	-	5	-	4-148
S-L61	Crooked Run	Lewis	Huntington	38.880040	-80.563579	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Permanent Access Road	-	30	-	0.0069	-	33	4-151
S-L61	Crooked Run	Lewis	Huntington	38.879034	-80.564307	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Permanent Access Road	-	28	-	0.0064	-	31	4-151

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S-VV9	UNT to Clover Fork	Lewis	Huntington	38.863254	-80.525763	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0051	-	24	-	4-158
S-VV2	Clover Fork	Braxton	Huntington	38.862730	-80.525128	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	90	-	0.0412	-	664	-	4-159
S-L51	Barbecue Run	Braxton	Huntington	38.839355	-80.519693	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0101	-	49	-	4-161
S-J37	UNT to Barbecue Run	Braxton	Huntington	38.839133	-80.519716	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0015	-	7	-	4-162
S-L57	UNT to Barbecue Run	Braxton	Huntington	38.828310	-80.525753	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road	-	26	-	0.0024	-	12	4-165
S-L57	UNT to Barbecue Run	Braxton	Huntington	38.828300	-80.525691	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Temporary Access Road/ATWS	25	-	0.0023	-	11	-	4-165
S-L60	Left Fork Knawl Creek	Braxton	Huntington	38.824034	-80.524988	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	75	-	0.0517	-	833	-	4-165
S-LL1	Knawl Creek	Braxton	Huntington	38.823595	-80.525342	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	88	-	0.0607	-	980	-	4-165
S-IJ27	Little Knawl Creek	Braxton	Huntington	38.809593	-80.541252	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Permanent Access Road	-	34	-	0.0156	-	76	4-168
S-IJ32	UNT to Little Knawl Creek	Braxton	Huntington	38.809568	-80.537319	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Permanent Access Road	-	26	-	0.0030	-	14	4-168
S-IJ27	Little Knawl Creek	Braxton	Huntington	38.808878	-80.543272	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Permanent Access Road	-	50	-	0.0230	-	111	4-168
S-QR30	UNT to Little Knawl Creek	Braxton	Huntington	38.807940	-80.535715	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	79	-	0.0274	-	442	-	4-168
S-JJ1	UNT to Keith Run	Braxton	Huntington	38.786930	-80.530028	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0071	-	34	-	4-172
S-I60	UNT to Falls Run	Braxton	Huntington	38.781068	-80.524577	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0020	-	10	-	4-174
S-J70	Falls Run	Braxton	Huntington	38.778955	-80.525862	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	77	-	0.0530	-	854	-	4-174
S-K34	Hemp Patch Run	Braxton	Huntington	38.766123	-80.520308	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0025	-	12	-	4-178
S-K33	UNT to Hemp Patch Run	Braxton	Huntington	38.765714	-80.520032	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0010	-	5	-	4-178
S-H123	UNT to Elliott Run	Braxton	Huntington	38.761197	-80.514887	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	82	-	0.0113	-	183	-	4-178
S-H123	UNT to Elliott Run	Braxton	Huntington	38.760426	-80.513624	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	82	-	0.0113	-	182	-	4-178
S-H127	UNT to Elliott Run	Braxton	Huntington	38.755029	-80.513692	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0020	-	10	-	4-180
S-H132	Little Kanawha River	Braxton	Huntington	38.751499	-80.514919	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	120	-	0.0606	-	293	-	4-180
S-H129	UNT to Little Kanawha River	Braxton	Huntington	38.749321	-80.514337	Intermittent	RPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0010	-	5	-	4-183
S-H131	UNT to Little Kanawha River	Braxton	Huntington	38.749215	-80.514370	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05030203	Timber Mat Crossing	22	-	0.0010	-	5	-	4-183
S-H117	Stonecoal Run	Braxton	Huntington	38.731020	-80.506280	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	82	-	0.0283	-	456	-	4-188
S-L46	UNT to Laurel Run	Braxton	Huntington	38.721880	-80.499258	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	78	-	0.0267	-	431	-	4-190
S-L44	UNT to Laurel Run	Braxton	Huntington	38.716945	-80.494589	Perennial	RPW	Warmwater Fishery, Tier 2	05030203	Pipeline ROW	81	-	0.0185	-	298	-	4-193
S-I57	Mudlick Run	Braxton	Huntington	38.697413	-80.489560	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	77	-	0.0528	-	852	-	4-196
S-A96/A103	UNT to Left Fork Holly River	Webster	Huntington	38.688706	-80.478590	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	83	-	0.0114	-	185	-	4-198
S-A97	UNT to Left Fork Holly River	Webster	Huntington	38.688329	-80.478406	Intermittent	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	125	-	0.0229	-	370	-	4-198
S-A99	UNT to Left Fork Holly River	Webster	Huntington	38.688120	-80.478371	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	34	-	0.0039	-	19	-	4-198
S-A98	UNT to Left Fork Holly River	Webster	Huntington	38.687906	-80.478024	Intermittent	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW/Temporary Access Road	392	-	0.0629	-	1,015	-	4-198
S-A100	Left Fork Holly River	Webster	Huntington	38.676643	-80.477940	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050007	Timber Mat Crossing	22	-	0.0404	-	196	-	4-200
S-E78/E82/R1	UNT to Left Fork Holly River	Webster	Huntington	38.676223	-80.477663	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	102	-	0.0094	-	151	-	4-200
S-E76	UNT to Left Fork Holly River	Webster	Huntington	38.674988	-80.477360	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0015	-	7	-	4-200
S-KK2	UNT to Left Fork Holly River	Webster	Huntington	38.672226	-80.476315	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	75	-	0.0052	-	84	-	4-200
S-KK3b	UNT to Left Fork Holly River	Webster	Huntington	38.672110	-80.476515	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	100	-	0.0069	-	111	-	4-201
S-KK4b	UNT to Left Fork Holly River	Webster	Huntington	38.671976	-80.476825	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	88	-	0.0061	-	98	-	4-201
S-E74	UNT to Left Fork Holly River	Webster	Huntington	38.671971	-80.476990	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	68	-	0.0062	-	30	-	4-200
S-F40	Oldlick Creek	Webster	Huntington	38.667943	-80.479023	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050007	Timber Mat Crossing	22	-	0.0126	-	61	-	4-201
S-S1	UNT to Oldlick Creek	Webster	Huntington	38.667020	-80.478624	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	21	-	0.0010	-	5	-	4-201
S-S4	UNT to Oldlick Creek	Webster	Huntington	38.664389	-80.484709	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Temporary Access Road	45	-	0.0021	-	10	-	4-204
S-F43	UNT to Oldlick Creek	Webster	Huntington	38.663706	-80.478644	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	101	-	0.0232	-	375	-	4-202
S-E67	Right Fork Holly Creek	Webster	Huntington	38.648021	-80.489704	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	92	-	0.1803	-	2,910	-	4-206
S-B62	Narrows Run	Webster	Huntington	38.646185	-80.486813	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	ATWS	15	-	0.0103	-	50	-	4-215
S-B62	Narrows Run	Webster	Huntington	38.643910	-80.485213	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Permanent Access Road	-	29	-	0.0200	-	97	4-215
S-E71	UNT to Elk River	Webster	Huntington	38.614405	-80.506004	Intermittent	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	44	-	0.0020	-	33	-	4-218
S-H111	UNT to Elk River	Webster	Huntington	38.613367	-80.504620	Intermittent	RPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0020	-	10	-	4-218
S-H111	UNT to Elk River	Webster	Huntington	38.613341	-80.504620	Intermittent	RPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0020	-	10	-	4-218
S-H114	UNT to Elk River	Webster	Huntington	38.613259	-80.504243	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0010	-	5	-	4-218
S-H112	UNT to Elk River	Webster	Huntington	38.613163	-80.504012	Intermittent	RPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0015	-	7	-	4-218
S-H113	UNT to Elk River	Webster	Huntington	38.612982	-80.503647	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	74	-	0.0203	-	327	-	4-218
S-H113	UNT to Elk River	Webster	Huntington	38.612878	-80.503687	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	9	-	0.0026	-	42	-	4-218
S-H113	UNT to Elk River	Webster	Huntington	38.612874	-80.503682	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	9	-	0.0026	-	41	-	4-218
S-H110	UNT to Houston Run	Webster	Huntington	38.587200	-80.509634	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0015	-	7	-	4-222
S-T29	Houston Run	Webster	Huntington	38.579092	-80.525620	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	76	-	0.0525	-	847	-	4-230
S-A83/A91	UNT to Camp Creek	Webster	Huntington	38.557064	-80.535592	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	75	-	0.0518	-	835	-	4-235
S-A93	UNT to Camp Creek	Webster	Huntington	38.556823	-80.535751	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050007	Temporary Access Road	13	-	0.0025	-	12	-	4-235
S-A93	UNT to Camp Creek	Webster	Huntington	38.556682	-80.535572	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	105	-	0.0193	-	312	-	4-235
S-A92	UNT to Camp Creek	Webster	Huntington	38.556658	-80.535607	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	59	-	0.0175	-	282	-	4-235

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Stream ID	NHD Stream Name ¹	County	USACE District	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (acres) ⁵	Permanent Impact Area (acres) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-H108	Lower Laurel Fork	Webster	Huntington	38.549358	-80.539260	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	78	-	0.0251	-	405	-	4-236
S-H105	UNT to Camp Creek	Webster	Huntington	38.548824	-80.539544	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	121	-	0.0083	-	135	-	4-236
S-H107	UNT to Camp Creek	Webster	Huntington	38.548467	-80.540073	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	10	-	0.0003	-	5	-	4-236
S-H107	UNT to Camp Creek	Webster	Huntington	38.548463	-80.540050	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050007	Permanent Access Road	-	30	-	0.0010	-	3	4-236
S-H107	UNT to Camp Creek	Webster	Huntington	38.548378	-80.539980	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	90	-	0.0031	-	50	-	4-236
S-H104	Camp Creek	Webster	Huntington	38.548121	-80.540431	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	104	-	0.0360	-	580	-	4-236
S-H103	UNT to Camp Creek	Webster	Huntington	38.545817	-80.542972	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050007	Pipeline ROW	37	-	0.0034	-	16	-	4-248
S-B34	Amos Run	Webster	Huntington	38.493956	-80.560990	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	81	-	0.0561	-	904	-	4-260
S-B35	UNT to Amos Run	Webster	Huntington	38.493884	-80.560969	Intermittent	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	80	-	0.0037	-	59	-	4-260
S-B36	UNT to Amos Run	Webster	Huntington	38.493819	-80.560919	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	72	-	0.0033	-	53	-	4-260
S-B37	UNT to Amos Run	Webster	Huntington	38.493750	-80.560898	Intermittent	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	82	-	0.0038	-	61	-	4-260
S-B38	UNT to Amos Run	Webster	Huntington	38.493723	-80.560843	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	43	-	0.0020	-	32	-	4-260
S-B42	UNT to Amos Run	Webster	Huntington	38.493645	-80.560892	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	101	-	0.0046	-	75	-	4-260
S-B36b	UNT to Amos Run	Webster	Huntington	38.493532	-80.560792	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	142	-	0.0008	-	13	-	4-260
S-B45	UNT to Amos Run	Webster	Huntington	38.493394	-80.560786	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	177	-	0.0122	-	196	-	4-260
S-B39a/B46	UNT to Amos Run	Webster	Huntington	38.493363	-80.560657	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	110	-	0.0076	-	122	-	4-260
S-B39b	UNT to Amos Run	Webster	Huntington	38.493352	-80.560574	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	3	-	0.0002	-	0	-	4-260
S-B39a/B46	UNT to Amos Run	Webster	Huntington	38.493227	-80.560529	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	11	-	0.0007	-	12	-	4-260
S-O4	Lost Run	Webster	Huntington	38.483002	-80.556464	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	92	-	0.0379	-	612	-	4-263
S-O5	UNT to Laurel Creek	Webster	Huntington	38.482251	-80.555499	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050007	Timber Mat Crossing	22	-	0.0010	-	5	-	4-263
S-A81	UNT to Laurel Creek	Webster	Huntington	38.481219	-80.554668	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050007	Temporary Access Road	81	-	0.0037	-	18	-	4-263
S-A79	Laurel Creek	Webster	Huntington	38.480782	-80.554682	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050007	Timber Mat Crossing	55	-	0.0278	-	134	-	4-263
S-A80	UNT to Laurel Creek	Webster	Huntington	38.480687	-80.554061	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050007	Temporary Access Road	104	-	0.0096	-	46	-	4-263
S-E58	Little Glade Run	Webster	Huntington	38.443669	-80.551989	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0040	-	20	-	4-269
S-E55	UNT to Laurel Creek	Webster	Huntington	38.440270	-80.559955	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050007	Timber Mat Crossing	22	-	0.0010	-	5	-	4-271
S-F35	UNT to Birch River	Webster	Huntington	38.424082	-80.570710	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0025	-	12	-	4-278
S-F34	UNT to Birch River	Webster	Huntington	38.423988	-80.570680	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0025	-	12	-	4-278
S-F36a	UNT to Birch River	Webster	Huntington	38.422056	-80.569457	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Temporary Access Road	5	-	0.0006	-	11	-	4-278
S-F36a	UNT to Birch River	Webster	Huntington	38.421474	-80.570012	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Temporary Access Road	23	-	0.0027	-	13	-	4-278
S-F36a	UNT to Birch River	Webster	Huntington	38.418662	-80.573898	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Temporary Access Road	23	-	0.0027	-	13	-	4-278
S-F36a	UNT to Birch River	Webster	Huntington	38.418122	-80.574566	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Temporary Access Road	20	-	0.0023	-	3	-	4-278
S-F36b	UNT to Birch River	Webster	Huntington	38.417934	-80.576775	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Temporary Access Road	65	-	0.0300	-	145	-	4-279
S-F36b	UNT to Birch River	Webster	Huntington	38.417774	-80.576635	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Pipeline ROW	78	-	0.0359	-	580	-	4-279
S-F36b	UNT to Birch River	Webster	Huntington	38.417693	-80.576495	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Temporary Access Road	16	-	0.0074	-	36	-	4-279
S-F37	UNT to Birch River	Webster	Huntington	38.417651	-80.576431	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Temporary Access Road	20	-	0.0018	-	9	-	4-279
S-C49	UNT to Birch River	Webster	Huntington	38.416587	-80.577890	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0015	-	7	-	4-279
S-B33	UNT to Meadow Fork	Webster	Huntington	38.408941	-80.589063	Intermittent	RPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0051	-	24	-	4-281
S-B32-Braid	UNT to Meadow Fork	Webster	Huntington	38.405871	-80.591069	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0035	-	17	-	4-281
S-B32	UNT to Meadow Fork	Webster	Huntington	38.405683	-80.591116	Perennial	RPW	Warmwater Fishery, Tier 2	05050007	Timber Mat Crossing	22	-	0.0035	-	17	-	4-281
S-EF40	UNT to Meadow Fork	Webster	Huntington	38.400883	-80.597787	Intermittent	RPW	Warmwater Fishery, Tier 2	05050007	Anode Bed	52	-	0.0084	-	41	-	4-282
S-B30	UNT to Meadow Fork	Webster	Huntington	38.399733	-80.597536	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050007	Anode Bed	27	-	0.0024	-	12	-	4-282
S-B29	Meadow Fork	Webster	Huntington	38.399618	-80.597332	Perennial	RPW	Warmwater Fishery, Tier 1	05050007	Pipeline ROW	85	-	0.0136	-	220	-	4-282
S-E50	UNT to Gauley River	Webster	Huntington	38.370597	-80.611921	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	93	-	0.0085	-	138	-	4-289
S-E52	UNT to Gauley River	Webster	Huntington	38.369110	-80.611761	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0015	-	7	-	4-290
S-E50	UNT to Gauley River	Webster	Huntington	38.367280	-80.612317	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	82	-	0.0075	-	122	-	4-289
S-E49	UNT to Gauley River	Nicholas	Huntington	38.365574	-80.613141	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	88	-	0.0020	-	33	-	4-290
S-E46	Strouds Creek	Webster	Huntington	38.363374	-80.617277	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0152	-	73	-	4-291
S-E46	Strouds Creek	Webster	Huntington	38.363326	-80.616955	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Temporary Access Road	43	-	0.0296	-	143	-	4-291
S-F21	Barn Run	Nicholas	Huntington	38.355859	-80.633328	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0020	-	10	-	4-293
S-F20	Barn Run	Nicholas	Huntington	38.355800	-80.633223	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0051	-	24	-	4-293
S-IJ57	UNT to Barn Run	Nicholas	Huntington	38.352362	-80.636401	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	82	-	0.0094	-	152	-	4-293
S-IJ59	UNT to Barn Run	Nicholas	Huntington	38.348372	-80.641152	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0035	-	17	-	4-295
S-IJ60	UNT to Rockcamp Run	Nicholas	Huntington	38.343699	-80.644721	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	77	-	0.0141	-	227	-	4-296
S-IJ62	UNT to Cherry Run	Nicholas	Huntington	38.343547	-80.647035	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	79	-	0.0054	-	88	-	4-296
S-B28	Cherry Run	Nicholas	Huntington	38.340083	-80.655413	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0051	-	24	-	4-298
S-B26	UNT to Cherry Run	Nicholas	Huntington	38.339012	-80.659609	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Temporary Access Road	43	-	0.0039	-	19	-	4-299
S-J32	Big Beaver Creek	Nicholas	Huntington	38.331763	-80.670342	Perennial	RPW	Warmwater Fishery, Tier 1	05050005	Timber Mat Crossing	22	-	0.0177	-	86	-	4-301
S-A76	UNT to Big Beaver Creek	Nicholas	Huntington	38.329126	-80.671211	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	77	-	0.0106	-	172	-	4-301
S-A75	UNT to Big Beaver Creek	Nicholas	Huntington	38.326001	-80.670358	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	84	-	0.0193	-	311	-	4-302

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S-A74	UNT to Big Beaver Creek	Nicholas	Huntington	38.325540	-80.670150	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	75	-	0.0069	-	112	-	4-302
S-A73	UNT to Big Beaver Creek	Nicholas	Huntington	38.323815	-80.670069	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	83	-	0.0114	-	184	-	4-302
S-A72	UNT to Big Beaver Creek	Nicholas	Huntington	38.321687	-80.670952	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0020	-	10	-	4-302
S-A71	UNT to Big Beaver Creek	Nicholas	Huntington	38.321572	-80.670958	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0020	-	10	-	4-302
S-A71-Braid	UNT to Big Beaver Creek	Nicholas	Huntington	38.321548	-80.670969	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0040	-	20	-	4-302
S-A67	UNT to Big Beaver Creek	Nicholas	Huntington	38.317575	-80.671553	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	76	-	0.0121	-	196	-	4-303
S-A69	UNT to Big Beaver Creek	Nicholas	Huntington	38.317217	-80.671495	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	82	-	0.0113	-	183	-	4-303
S-A69	UNT to Big Beaver Creek	Nicholas	Huntington	38.317089	-80.671565	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	16	-	0.0022	-	36	-	4-303
S-H99	UNT to Big Beaver Creek	Nicholas	Huntington	38.312952	-80.673145	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	96	-	0.0088	-	142	-	4-304
S-H96	UNT to Big Beaver Creek	Nicholas	Huntington	38.309759	-80.675706	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Temporary Access Road	39	-	0.0018	-	9	-	4-304
S-H95	UNT to Big Beaver Creek	Nicholas	Huntington	38.309738	-80.675733	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Temporary Access Road	259	-	0.0178	-	86	-	4-304
S-A65	Big Beaver Creek	Nicholas	Huntington	38.308183	-80.675347	Perennial	RPW	Warmwater Fishery, Tier 1	05050005	Pipeline ROW	77	-	0.1240	-	2,000	-	4-304
S-A64	UNT to Granny Run	Nicholas	Huntington	38.304538	-80.673827	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	54	-	0.0086	-	139	-	4-306
S-N15	UNT to Granny Run	Nicholas	Huntington	38.301571	-80.674776	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0061	-	29	-	4-306
S-N14	Granny Run	Nicholas	Huntington	38.297014	-80.676341	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0040	-	20	-	4-307
S-N14	Granny Run	Nicholas	Huntington	38.296646	-80.676258	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0040	-	20	-	4-307
S-I43	UNT to Big Run	Nicholas	Huntington	38.293473	-80.677158	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0051	-	24	-	4-308
S-I44	Big Run	Nicholas	Huntington	38.291332	-80.679265	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0040	-	20	-	4-308
S-I45	UNT to Big Run	Nicholas	Huntington	38.290061	-80.680304	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0030	-	15	-	4-308
S-I47	UNT to Gauley River	Nicholas	Huntington	38.284291	-80.685885	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	80	-	0.0037	-	59	-	4-310
S-I48	UNT to Gauley River	Nicholas	Huntington	38.280116	-80.687738	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0051	-	22	-	4-310
S-J28	UNT to Little Laurel Creek	Nicholas	Huntington	38.263235	-80.687908	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	79	-	0.0091	-	147	-	4-315
S-J25	UNT to Little Laurel Creek	Nicholas	Huntington	38.256682	-80.687348	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	77	-	0.0089	-	143	-	4-317
S-J24	UNT to Little Laurel Creek	Nicholas	Huntington	38.256302	-80.687350	Perennial	RPW	Category B-2 Trout Waters, Tier 1	05050005	Pipeline ROW	76	-	0.0261	-	422	-	4-317
S-J24	UNT to Little Laurel Creek	Nicholas	Huntington	38.256248	-80.687358	Perennial	RPW	Category B-2 Trout Waters, Tier 1	05050005	Pipeline ROW	76	-	0.0261	-	421	-	4-317
S-J23-EPH	UNT to Little Laurel Creek	Nicholas	Huntington	38.234331	-80.707513	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	109	-	0.0025	-	41	-	4-326
S-J22	UNT to Little Laurel Creek	Nicholas	Huntington	38.233718	-80.708268	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	85	-	0.0058	-	94	-	4-326
S-N10	Skelt Run	Nicholas	Huntington	38.231025	-80.710633	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	78	-	0.0071	-	115	-	4-327
S-N10-Braid	Skelt Run	Nicholas	Huntington	38.230934	-80.710804	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	101	-	0.0069	-	112	-	4-327
S-EE1	UNT to Skelt Run	Nicholas	Huntington	38.228924	-80.713076	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050005	Timber Mat Crossing	22	-	0.0020	-	10	-	4-327
S-N13-Braid	UNT to Skelt Run	Nicholas	Huntington	38.226869	-80.715487	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	37	-	0.0050	-	24	-	4-328
S-N13	UNT to Skelt Run	Nicholas	Huntington	38.226851	-80.715393	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	89	-	0.0041	-	66	-	4-328
S-L41	Jims Creek	Nicholas	Huntington	38.220793	-80.717100	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	76	-	0.0349	-	564	-	4-328
S-L38	UNT to Riley Branch	Nicholas	Huntington	38.205534	-80.718246	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	75	-	0.0052	-	83	-	4-340
S-L35	Riley Branch	Nicholas	Huntington	38.204372	-80.719778	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Temporary Access Road	52	-	0.0048	-	31	-	4-341
S-L35	Riley Branch	Nicholas	Huntington	38.203887	-80.719122	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	86	-	0.0079	-	128	-	4-341
S-L35	Riley Branch	Nicholas	Huntington	38.203097	-80.719248	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	87	-	0.0080	-	129	-	4-341
S-L35	Riley Branch	Nicholas	Huntington	38.200338	-80.717177	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	79	-	0.0072	-	117	-	4-341
S-I37	UNT to Hominy Creek	Nicholas	Huntington	38.196644	-80.718856	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	40	-	0.0056	-	27	-	4-342
S-I38	UNT to Hominy Creek	Nicholas	Huntington	38.194221	-80.719357	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	77	-	0.0089	-	143	-	4-342
S-I39	UNT to Hominy Creek	Nicholas	Huntington	38.194025	-80.719298	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	79	-	0.0126	-	204	-	4-342
S-I40	UNT to Hominy Creek	Nicholas	Huntington	38.187582	-80.723025	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	82	-	0.0133	-	214	-	4-343
S-I41	UNT to Hominy Creek	Nicholas	Huntington	38.179384	-80.729497	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	78	-	0.0143	-	231	-	4-344
S-I36	Hominy Creek	Nicholas	Huntington	38.178889	-80.729790	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	77	-	0.0976	-	1,575	-	4-347
S-I31	UNT to Hominy Creek	Nicholas	Huntington	38.163802	-80.730743	Ephemeral	NRPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	73	-	0.0033	-	54	-	4-355
S-N8a	UNT to Hominy Creek	Nicholas	Huntington	38.162363	-80.733602	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Timber Mat Crossing	22	-	0.0020	-	10	-	4-355
S-VV1	UNT to Hominy Creek	Nicholas	Huntington	38.161064	-80.735022	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Timber Mat Crossing	22	-	0.0020	-	10	-	4-355
S-H88	Sugar Branch	Nicholas	Huntington	38.136744	-80.730560	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	76	-	0.0697	-	1,125	-	4-359
S-HT1	UNT to Hominy Creek	Nicholas	Huntington	38.124315	-80.735783	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	93	-	0.0257	-	415	-	4-362
S-H67	UNT to Hominy Creek	Nicholas	Huntington	38.120580	-80.736772	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	85	-	0.0235	-	379	-	4-363
S-H64	UNT to Hominy Creek	Nicholas	Huntington	38.116279	-80.735319	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	87	-	0.0060	-	96	-	4-364
S-V3	UNT to Hominy Creek	Nicholas	Huntington	38.115823	-80.730960	Perennial	RPW	Category B-2 Trout Waters, Tier 2	05050005	Timber Mat Crossing	22	-	0.0061	-	29	-	4-365
S-EF41	UNT to Hominy Creek	Nicholas	Huntington	38.107549	-80.726284	Intermittent	RPW	Category B-2 Trout Waters, Tier 2	05050005	Pipeline ROW	82	-	0.0038	-	61	-	4-366
S-J19	UNT to Meadow Creek	Greenbrier	Huntington	38.028599	-80.743623	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0010	-	5	-	4-382
S-J20	UNT to Meadow Creek	Greenbrier	Huntington	38.023801	-80.747266	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0152	-	73	-	4-385
S-I25	UNT to Meadow Creek	Greenbrier	Huntington	38.020430	-80.753194	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	75	-	0.0086	-	139	-	4-390
S-I26	UNT to Meadow Creek	Greenbrier	Huntington	38.019129	-80.755220	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	78	-	0.0090	-	145	-	4-390
S-I27	UNT to Meadow Creek	Greenbrier	Huntington	38.018031	-80.755999	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0025	-	12	-	4-390
S-L26	UNT to Meadow River	Greenbrier	Huntington	37.981900	-80.755213	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	205	-	0.0141	-	227	-	4-397

Table 2. Stream Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	USACE District	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (acres) ⁵	Permanent Impact Area (acres) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-L26	UNT to Meadow River	Greenbrier	Huntington	37.980598	-80.754872	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	166	-	0.0114	-	184	-	4-397
S-EF38	UNT to Little Sewell Creek	Greenbrier	Huntington	37.963259	-80.733162	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0015	-	7	-	4-400
S-L24	UNT to Little Sewell Creek	Greenbrier	Huntington	37.963068	-80.733141	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0020	-	10	-	4-400
S-L27	UNT to Little Sewell Creek	Greenbrier	Huntington	37.960725	-80.732852	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Timber Mat Crossing	22	-	0.0010	-	5	-	4-401
S-L30	UNT to Little Sewell Creek	Greenbrier	Huntington	37.954276	-80.739708	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	136	-	0.0093	-	151	-	4-402
S-L22	Little Sewell Creek	Greenbrier	Huntington	37.954035	-80.739868	Perennial	RPW	Warmwater Fishery, Tier 1	05050005	Pipeline ROW	75	-	0.0517	-	834	-	4-402
S-L20	UNT to Little Sewell Creek	Greenbrier	Huntington	37.949579	-80.742646	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	96	-	0.0111	-	179	-	4-403
S-L10	UNT to Boggs Creek	Greenbrier	Huntington	37.938308	-80.747009	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	103	-	0.0071	-	115	-	4-405
S-L11	UNT to Boggs Creek	Greenbrier	Huntington	37.938229	-80.746912	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	26	-	0.0018	-	9	-	4-405
S-I21	UNT to Boggs Creek	Greenbrier	Huntington	37.918228	-80.736774	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	30	-	0.0034	-	55	-	4-409
S-I21	UNT to Boggs Creek	Greenbrier	Huntington	37.918164	-80.736852	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	77	-	0.0089	-	143	-	4-409
S-I22	UNT to Boggs Creek	Greenbrier	Huntington	37.918041	-80.736833	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	94	-	0.0043	-	70	-	4-409
S-I23a	UNT to Boggs Creek	Greenbrier	Huntington	37.917347	-80.738534	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Permanent Access Road	-	33	-	0.0030	-	10	4-409
S-IJ54	UNT to Boggs Creek	Greenbrier	Huntington	37.917125	-80.742425	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Permanent Access Road	-	31	-	0.0036	-	17	4-410
S-IJ53	UNT to Boggs Creek	Greenbrier	Huntington	37.916234	-80.744156	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Permanent Access Road	-	20	-	0.0055	-	27	4-410
S-HH8	UNT to Buffalo Creek	Greenbrier	Huntington	37.865308	-80.753802	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	ATWS	15	-	0.0007	-	3	-	4-421
S-K25/K18	UNT to Buffalo Creek	Greenbrier	Huntington	37.863772	-80.756993	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	ATWS	70	-	0.0096	-	156	-	4-421
S-K17	Buffalo Creek	Greenbrier	Huntington	37.863065	-80.757391	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	75	-	0.0432	-	698	-	4-420
S-K19	UNT to Buffalo Creek	Greenbrier	Huntington	37.860940	-80.757825	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	93	-	0.0107	-	172	-	4-421
S-K21	UNT to Buffalo Creek	Greenbrier	Huntington	37.858566	-80.755584	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	82	-	0.0189	-	304	-	4-422
S-K22	UNT to Buffalo Creek	Greenbrier	Huntington	37.858315	-80.755546	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	78	-	0.0125	-	202	-	4-422
S-UV6	UNT to Morris Fork	Greenbrier	Huntington	37.854386	-80.754981	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	88	-	0.0161	-	260	-	4-422
S-UV2	Morris Fork	Greenbrier	Huntington	37.851318	-80.751436	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Permanent Access Road	-	28	-	0.0103	-	50	4-423
S-UV2	Morris Fork	Greenbrier	Huntington	37.851099	-80.752978	Perennial	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	88	-	0.0324	-	523	-	4-423
S-U22	UNT to Meadow River	Greenbrier	Huntington	37.839558	-80.748496	Intermittent	RPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	80	-	0.0221	-	356	-	4-425
S-FF1	UNT to Meadow River	Greenbrier	Huntington	37.837560	-80.751903	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Permanent Access Road	11	-	0.0008	-	4	-	4-425
S-FF1	UNT to Meadow River	Greenbrier	Huntington	37.837519	-80.751898	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Permanent Access Road	-	31	-	0.0021	-	10	4-425
S-EE4	UNT to Red Spring Branch	Summers	Huntington	37.813881	-80.748817	Intermittent	RPW	Warmwater Fishery, Tier 2	05050004	Pipeline ROW	137	-	0.0079	-	127	-	4-429
S-M6	UNT to Red Spring Branch	Summers	Huntington	37.807650	-80.746173	Intermittent	RPW	Warmwater Fishery, Tier 2	05050004	Pipeline ROW	110	-	0.0101	-	163	-	4-430
S-J13	UNT to Patterson Creek	Summers	Huntington	37.797484	-80.733605	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	92	-	0.0085	-	137	-	4-432
S-J13	UNT to Patterson Creek	Summers	Huntington	37.796572	-80.732397	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	96	-	0.0088	-	142	-	4-432
S-J13	UNT to Patterson Creek	Summers	Huntington	37.795915	-80.731850	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050005	Pipeline ROW	124	-	0.0114	-	183	-	4-432
S-M5	Red Spring Branch	Summers	Huntington	37.792243	-80.728802	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050004	Timber Mat Crossing	22	-	0.0030	-	15	-	4-433
S-M4	UNT to Red Spring Branch	Summers	Huntington	37.786834	-80.728719	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050004	Temporary Access Road	47	-	0.0032	-	16	-	4-434
S-I13	UNT to Lick Creek	Summers	Huntington	37.782534	-80.719085	Intermittent	RPW	Warmwater Fishery, Tier 2	05050004	Timber Mat Crossing	22	-	0.0076	-	37	-	4-437
S-I14	UNT to Lick Creek	Summers	Huntington	37.781099	-80.719318	Intermittent	RPW	Warmwater Fishery, Tier 2	05050004	Timber Mat Crossing	22	-	0.0035	-	17	-	4-437
S-I15	UNT to Lick Creek	Summers	Huntington	37.779878	-80.720470	Intermittent	RPW	Warmwater Fishery, Tier 2	05050004	Timber Mat Crossing	22	-	0.0051	-	24	-	4-437
S-I16	UNT to Lick Creek	Summers	Huntington	37.779381	-80.721388	Intermittent	RPW	Warmwater Fishery, Tier 2	05050004	Timber Mat Crossing	22	-	0.0020	-	10	-	4-440
S-I12	Lick Creek	Summers	Huntington	37.775891	-80.710797	Intermittent	RPW	Warmwater Fishery, Tier 1	05050004	Permanent Access Road	-	38	-	0.0035	-	11	4-438
S-I17	UNT to Lick Creek	Summers	Huntington	37.775160	-80.728058	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050004	Pipeline ROW	78	-	0.0045	-	72	-	4-441
S-I10	UNT to Lick Creek	Summers	Huntington	37.772437	-80.713781	Intermittent	RPW	Warmwater Fishery, Tier 2	05050004	Permanent Access Road	-	26	-	0.0018	-	9	4-439
S-I19	Lick Creek	Summers	Huntington	37.772089	-80.732901	Perennial	RPW	Warmwater Fishery, Tier 1	05050004	Pipeline ROW	77	-	0.0285	-	428	-	4-441
S-I20	UNT to Lick Creek	Summers	Huntington	37.771406	-80.733241	Perennial	RPW	Warmwater Fishery, Tier 2	05050004	Pipeline ROW	92	-	0.0212	-	342	-	4-441
S-N5	UNT to Hungard Creek	Summers	Huntington	37.704240	-80.744827	Perennial	RPW	Warmwater Fishery, Tier 2	05050003	Pipeline ROW	87	-	0.0040	-	65	-	4-459
S-K14	UNT to Righthand Fork Hungard Creek	Summers	Huntington	37.696788	-80.739242	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050003	Pipeline ROW	97	-	0.0089	-	143	-	4-460
S-N3	UNT to Hungard Creek	Summers	Huntington	37.694776	-80.736952	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0025	-	12	-	4-461
S-N2	Hungard Creek	Summers	Huntington	37.694507	-80.736682	Perennial	RPW	Warmwater Fishery, Tier 1	05050003	Timber Mat Crossing	22	-	0.0101	-	49	-	4-461
S-CD23	UNT to Hungard Creek	Summers	Huntington	37.694228	-80.736099	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0045	-	22	-	4-461
S-N4	UNT to Hungard Creek	Summers	Huntington	37.693961	-80.735841	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0015	-	7	-	4-461
S-KL29	Right Fork Hungard Creek	Summers	Huntington	37.692932	-80.733839	Perennial	RPW	Warmwater Fishery, Tier 1	05050003	Pipeline ROW	75	-	0.0863	-	1,392	-	4-461
S-M3	Hungard Creek	Summers	Huntington	37.692868	-80.734247	Perennial	RPW	Warmwater Fishery, Tier 2	05050003	Pipeline ROW	80	-	0.0183	-	295	-	4-461
S-CV17	UNT to Greenbrier River	Summers	Huntington	37.681865	-80.730095	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050003	Pipeline ROW	76	-	0.0070	-	34	-	4-464
S-EF53	UNT to Greenbrier River	Summers	Huntington	37.681323	-80.729672	Intermittent	RPW	Warmwater Fishery, Tier 2	05050003	Temporary Access Road	51	-	0.0095	-	46	-	4-464
S-I9	UNT to Greenbrier River	Summers	Huntington	37.675977	-80.732822	Intermittent	RPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0035	-	17	-	4-465
S-K10	UNT to Greenbrier River	Summers	Huntington	37.675079	-80.734384	Intermittent	RPW	Warmwater Fishery, Tier 2	05050003	Temporary Access Road	9	-	0.0013	-	6	-	4-465
S-K10	UNT to Greenbrier River	Summers	Huntington	37.675070	-80.734447	Intermittent	RPW	Warmwater Fishery, Tier 2	05050003	Permanent Access Road	-	31	-	0.0043	-	21	4-465
S-K10	UNT to Greenbrier River	Summers	Huntington	37.675058	-80.734522	Intermittent	RPW	Warmwater Fishery, Tier 2	05050003	Temporary Access Road	9	-	0.0013	-	6	-	4-465
S-L4	UNT to Greenbrier River	Summers	Huntington	37.673213	-80.729772	Perennial	RPW	Warmwater Fishery, Tier 2	05050003	Pipeline ROW	77	-	0.0176	-	284	-	4-465
S-L2	UNT to Greenbrier River	Summers	Huntington	37.671392	-80.728311	Intermittent	RPW	Warmwater Fishery, Tier 2	05050003	Pipeline ROW	88	-	0.0081	-	130	-	4-467

Table 2. Stream Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	USACE District	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (acres) ⁵	Permanent Impact Area (acres) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-L1	UNT to Kelly Creek	Summers	Huntington	37.668076	-80.723470	Perennial	RPW	Warmwater Fishery, Tier 2	05050003	Pipeline ROW	76	-	0.0104	-	168	-	4-468
S-J5	Kelly Creek	Summers	Huntington	37.666864	-80.721794	Perennial	RPW	Warmwater Fishery, Tier 1	05050003	Pipeline ROW	103	-	0.0471	-	759	-	4-468
S-K4	UNT to Keller Creek	Summers	Huntington	37.665806	-80.725709	Intermittent	RPW	Warmwater Fishery, Tier 2	05050003	Temporary Access Road	-	22	-	0.0010	-	4	4-468
S-J4	UNT to Keller Creek	Summers	Huntington	37.663926	-80.715460	Intermittent	RPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0025	-	12	-	4-469
S-G47	UNT to Wind Creek	Summers	Huntington	37.654112	-80.702579	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0010	-	5	-	4-471
S-G52	UNT to Wind Creek	Monroe	Huntington	37.627537	-80.695593	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0010	-	5	-	4-479
S-G49	UNT to Wind Creek	Monroe	Huntington	37.627381	-80.695679	Perennial	RPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0101	-	49	-	4-479
S-G48	Wind Creek	Monroe	Huntington	37.627308	-80.695759	Perennial	RPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0101	-	49	-	4-479
S-H61	UNT to Stoney Creek	Monroe	Huntington	37.618426	-80.699138	Perennial	RPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0126	-	61	-	4-483
S-OP1	Stony Creek	Monroe	Huntington	37.600003	-80.700509	Perennial	RPW	Warmwater Fishery, Tier 2	05050003	Pipeline ROW	78	-	0.0090	-	145	-	4-487
S-IJ64	UNT to Little Stony Creek	Monroe	Huntington	37.591822	-80.705874	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050003	Timber Mat Crossing	22	-	0.0030	-	15	-	4-488
S-A63	Slate Run	Monroe	Huntington	37.560706	-80.709825	Perennial	RPW	Warmwater Fishery, Tier 2	05050002	Permanent Access Road	-	25	-	0.0057	-	28	4-492
S-A63	Slate Run	Monroe	Huntington	37.560460	-80.710233	Perennial	RPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	88	-	0.0203	-	327	-	4-492
S-A61	UNT to Slate Run	Monroe	Huntington	37.559351	-80.709683	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Temporary Access Road	8	-	0.0012	-	6	-	4-493
S-A61	UNT to Slate Run	Monroe	Huntington	37.559334	-80.709736	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Permanent Access Road	-	26	-	0.0041	-	14	4-493
S-A61	UNT to Slate Run	Monroe	Huntington	37.559328	-80.709792	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Temporary Access Road	8	-	0.0013	-	6	-	4-493
S-A61	UNT to Slate Run	Monroe	Huntington	37.559320	-80.710037	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	81	-	0.0131	-	211	-	4-493
S-A60	Slate Run	Monroe	Huntington	37.558698	-80.709966	Perennial	RPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	87	-	0.0358	-	578	-	4-492
S-CV26	UNT to Slate Run	Monroe	Huntington	37.556445	-80.708883	Perennial	RPW	Warmwater Fishery, Tier 2	05050002	Permanent Access Road	-	32	-	0.0044	-	21	4-493
S-D31	Indian Creek	Monroe	Huntington	37.554163	-80.710853	Perennial	RPW	Warmwater Fishery, Tier 1	05050002	Pipeline ROW	75	-	0.1120	-	1,807	-	4-493
S-D29	UNT to Hans Creek	Monroe	Huntington	37.547394	-80.712099	Intermittent	RPW	Warmwater Fishery, Tier 2	05050002	Timber Mat Crossing	22	-	0.0020	-	10	-	4-494
S-D25	UNT to Hans Creek	Monroe	Huntington	37.538768	-80.718855	Intermittent	RPW	Warmwater Fishery, Tier 2	05050002	Timber Mat Crossing	22	-	0.0020	-	10	-	4-496
S-F18	UNT to Hans Creek	Monroe	Huntington	37.538273	-80.719070	Perennial	RPW	Warmwater Fishery, Tier 2	05050002	Permanent Access Road	-	26	-	0.0107	-	52	4-496
S-F18	UNT to Hans Creek	Monroe	Huntington	37.536872	-80.716923	Perennial	RPW	Warmwater Fishery, Tier 2	05050002	Timber Mat Crossing	22	-	0.0091	-	44	-	4-496
S-Z5	UNT to Hans Creek	Monroe	Huntington	37.524333	-80.711450	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	75	-	0.0034	-	56	-	4-499
S-Z4	UNT to Hans Creek	Monroe	Huntington	37.524302	-80.711444	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	75	-	0.0043	-	69	-	4-499
S-MN2	UNT to Hans Creek	Monroe	Huntington	37.520012	-80.707606	Perennial	RPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	81	-	0.0130	-	210	-	4-500
S-CV19	Hans Creek	Monroe	Huntington	37.500284	-80.691498	Perennial	RPW	Warmwater Fishery, Tier 1	05050002	Pipeline ROW	77	-	0.0619	-	998	-	4-505
S-MN39	UNT to Blue Lick Creek	Monroe	Huntington	37.487733	-80.681765	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	22	-	0.0010	-	16	-	4-510
S-MN38	UNT to Blue Lick Creek	Monroe	Huntington	37.487721	-80.681929	Intermittent	RPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	22	-	0.0030	-	48	-	4-510
S-MN37	UNT to Blue Lick Creek	Monroe	Huntington	37.487584	-80.681992	Intermittent	RPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	95	-	0.0040	-	65	-	4-510
S-MN40	UNT to Blue Lick Creek	Monroe	Huntington	37.487519	-80.681996	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	37	-	0.0010	-	16	-	4-510
S-G44	UNT to Hans Creek	Monroe	Huntington	37.474870	-80.676267	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	86	-	0.0079	-	128	-	4-511
S-G43	UNT to Hans Creek	Monroe	Huntington	37.473139	-80.675738	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Timber Mat Crossing	22	-	0.0025	-	12	-	4-511
S-G42	UNT to Hans Creek	Monroe	Huntington	37.472802	-80.675456	Intermittent	RPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	79	-	0.0055	-	88	-	4-512
S-MN45	UNT to Hans Creek	Monroe	Huntington	37.462878	-80.670284	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	87	-	0.0040	-	65	-	4-513
S-CV27	UNT to Hans Creek	Monroe	Huntington	37.462850	-80.669582	Intermittent	RPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	37	-	0.0017	-	8	-	4-513
S-E43	UNT to Dry Creek	Monroe	Huntington	37.453834	-80.664417	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	92	-	0.0147	-	237	-	4-515
S-E45	UNT to Dry Creek	Monroe	Huntington	37.453798	-80.664266	Ephemeral	NRPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	108	-	0.0074	-	120	-	4-515
S-E40	Dry Creek	Monroe	Huntington	37.451003	-80.667795	Perennial	RPW	Warmwater Fishery, Tier 1	05050002	Temporary Access Road	43	-	0.0117	-	57	-	4-515
S-E40	Dry Creek	Monroe	Huntington	37.450757	-80.667719	Perennial	RPW	Warmwater Fishery, Tier 1	05050002	Pipeline ROW	82	-	0.0227	-	366	-	4-515
S-E41	UNT to Dry Creek	Monroe	Huntington	37.450692	-80.667650	Intermittent	RPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	23	-	0.0010	-	5	-	4-516
S-C38	UNT to Painter Run	Monroe	Huntington	37.426915	-80.694499	Intermittent	RPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	89	-	0.0143	-	231	-	4-521
S-C39	Painter Run	Monroe	Huntington	37.426686	-80.694499	Perennial	RPW	Warmwater Fishery, Tier 1	05050002	Pipeline ROW	109	-	0.0125	-	202	-	4-521
S-C41	UNT to Painter Run	Monroe	Huntington	37.426161	-80.694592	Intermittent	RPW	Warmwater Fishery, Tier 2	05050002	Pipeline ROW	143	-	0.0100	-	161	-	4-521
S-C40	UNT to Painter Run	Monroe	Huntington	37.425372	-80.693417	Perennial	RPW	Warmwater Fishery, Tier 2	05050002	Temporary Access Road	77	-	0.0053	-	26	-	4-521
S-Q12	UNT to Kimbalton Branch	Giles	Norfolk	37.375311	-80.680878	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	86	-	0.0079	-	127	-	4-531
S-Q13	Kimbalton Branch	Giles	Norfolk	37.374377	-80.682038	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	90	-	0.0310	-	500	-	4-532
S-P6	UNT to Stony Creek	Giles	Norfolk	37.362202	-80.688092	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	78	-	0.0107	-	173	-	4-535
S-S5-Braid-2	Stony Creek	Giles	Norfolk	37.360325	-80.684214	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0028	-	13	-	4-536
S-S5-Braid-1	Stony Creek	Giles	Norfolk	37.360276	-80.684193	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0032	-	16	-	4-536
S-S5	Stony Creek	Giles	Norfolk	37.360071	-80.683960	Perennial	RPW	Candy darter, Green floater, pistol grip, Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	40	-	0.0184	-	178	-	4-536
S-G29	UNT to Dry Branch	Giles	Norfolk	37.350430	-80.658259	Ephemeral	NRPW	-	05050002	Pipeline ROW	30	-	0.0028	-	13	-	4-541
S-G30	UNT to Dry Branch	Giles	Norfolk	37.350373	-80.658230	Ephemeral	NRPW	-	05050002	Pipeline ROW	85	-	0.0156	-	252	-	4-541
S-G32	Dry Branch	Giles	Norfolk	37.349095	-80.652040	Intermittent	RPW	-	05050002	Pipeline ROW	110	-	0.0152	-	244	-	4-542
S-G33	UNT to Dry Branch	Giles	Norfolk	37.348641	-80.647225	Perennial	RPW	-	05050002	Pipeline ROW	99	-	0.0182	-	293	-	4-542
S-G35	UNT to Little Stony Creek	Giles	Norfolk	37.344876	-80.633426	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	25	-	0.0115	-	69	-	4-544
S-SS4	UNT to Little Stony Creek	Giles	Norfolk	37.344859	-80.631295	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0014	-	7	-	4-544
S-G35	UNT to Little Stony Creek	Giles	Norfolk	37.344779	-80.633379	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	25	-	0.0115	-	69	-	4-544

Table 2. Stream Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	USACE District	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (acres) ⁵	Permanent Impact Area (acres) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure	
S-Z7	UNT to Little Stony Creek	Giles	Norfolk	37.344278	-80.626185	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0014	-	7	-	4-545	
S-Z7-Braid-1	UNT to Little Stony Creek	Giles	Norfolk	37.344277	-80.626113	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0014	-	7	-	4-545	
S-Z9	UNT to Little Stony Creek	Giles	Norfolk	37.344163	-80.628400	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0018	-	9	-	4-544	
S-Z10	UNT to Little Stony Creek	Giles	Norfolk	37.342351	-80.620823	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0055	-	27	-	4-545	
S-Z11	UNT to Little Stony Creek	Giles	Norfolk	37.342236	-80.620542	Perennial	RPW	Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	20	-	0.0023	-	11	-	4-545	
S-Z12-EPH	UNT to Little Stony Creek	Giles	Norfolk	37.342214	-80.620312	Ephemeral	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0028	-	13	-	4-545	
S-Z13	Little Stony Creek	Giles	Norfolk	37.342172	-80.620090	Perennial	RPW	Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	25	-	0.0115	-	69	-	4-545	
S-Z14	UNT to Little Stony Creek	Giles	Norfolk	37.340977	-80.618031	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0018	-	9	-	4-545	
S-YZ1	Doe Creek	Giles	Norfolk	37.338952	-80.614618	Intermittent	RPW	-	05050002	Temporary Access Road	102	-	0.0234	-	113	-	4-546	
S-A34	UNT to Doe Creek	Giles	Norfolk	37.337763	-80.606008	Ephemeral	NRPW	-	05050002	Pipeline ROW	86	-	0.0138	-	223	-	4-548	
S-A33	UNT to Doe Creek	Giles	Norfolk	37.337639	-80.605571	Ephemeral	NRPW	-	05050002	Pipeline ROW	111	-	0.0178	-	288	-	4-548	
S-YZ1	Doe Creek	Giles	Norfolk	37.337562	-80.614711	Intermittent	RPW	-	05050002	Temporary Access Road	92	-	0.0211	-	102	-	4-546	
S-YZ1	Doe Creek	Giles	Norfolk	37.337048	-80.614625	Intermittent	RPW	-	05050002	Temporary Access Road	121	-	0.0278	-	134	-	4-546	
S-A32	UNT to Doe Creek	Giles	Norfolk	37.335094	-80.596868	Perennial	RPW	-	05050002	Pipeline ROW	78	-	0.0287	-	462	-	4-549	
S-QQ2	Sinking Creek	Craig	Norfolk	37.333152	-80.429438	Perennial	RPW	Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Temporary Access Road	40	-	0.0321	-	156	-	4-581	
S-MN11-Upstream	UNT to Sinking Creek	Giles	Norfolk	37.332869	-80.559168	Ephemeral	NRPW	-	05050002	Temporary Access Road	15	-	0.0014	-	7	-	4-554	
S-MN11-Upstream	UNT to Sinking Creek	Giles	Norfolk	37.332191	-80.559979	Ephemeral	NRPW	-	05050002	Temporary Access Road	30	-	0.0028	-	13	-	4-554	
S-MN11-Downstream	UNT to Sinking Creek	Giles	Norfolk	37.332146	-80.560079	Ephemeral	NRPW	-	05050002	Temporary Access Road	37	-	0.0042	-	21	-	4-554	
S-Y3	UNT to Doe Creek	Giles	Norfolk	37.331748	-80.583355	Ephemeral	NRPW	-	05050002	Timber Mat Crossing	20	-	0.0046	-	22	-	4-551	
S-Y2	Doe Creek	Giles	Norfolk	37.331332	-80.583047	Perennial	RPW	-	05050002	Timber Mat Crossing	25	-	0.0115	-	69	-	4-551	
S-PP4	UNT to Sinking Creek	Craig	Norfolk	37.328329	-80.422810	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	84	-	0.0039	-	62	-	4-579	
S-PP3	UNT to Sinking Creek	Craig	Norfolk	37.326705	-80.425803	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	82	-	0.0056	-	91	-	4-579	
S-RR4	UNT to Sinking Creek	Giles	Norfolk	37.326015	-80.556831	Perennial	RPW	-	05050002	Temporary Access Road	85	-	0.0059	-	28	-	4-556	
S-E24	UNT to Sinking Creek	Giles	Norfolk	37.325728	-80.565082	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	81	-	0.0372	-	600	-	4-553	
S-E25-Downstream	UNT to Sinking Creek	Giles	Norfolk	37.325638	-80.564680	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0037	-	18	-	4-553	
S-E25-Upstream	UNT to Sinking Creek	Giles	Norfolk	37.325607	-80.564373	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	15	-	0.0034	-	17	-	4-553	
S-E25-Downstream	UNT to Sinking Creek	Giles	Norfolk	37.325566	-80.564634	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0037	-	18	-	4-553	
S-PP1	UNT to Sinking Creek	Craig	Norfolk	37.324781	-80.431446	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	86	-	0.0059	-	96	-	4-578	
S-RR5	UNT to Sinking Creek	Giles	Norfolk	37.323702	-80.555627	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	83	-	0.0191	-	307	-	4-555	
S-PA07	UNT to Sinking Creek	Giles	Norfolk	37.323533	-80.555257	Intermittent	RPW	-	05050002	Pipeline ROW	115	-	0.0053	-	85	-	4-555	
S-IJ18-EPH	UNT to Sinking Creek	Giles	Norfolk	37.322737	-80.552396	Ephemeral	NRPW	-	05050002	Pipeline ROW	74	-	0.0102	-	164	-	4-555	
S-IJ19	UNT to Sinking Creek	Giles	Norfolk	37.322194	-80.553058	Ephemeral	NRPW	-	05050002	Temporary Access Road	43	-	0.0039	-	19	-	4-555	
S-IJ19	UNT to Sinking Creek	Giles	Norfolk	37.321823	-80.55311	Ephemeral	NRPW	-	05050002	Temporary Access Road	9	-	0.0008	-	4	-	4-555	
S-IJ18-INT	UNT to Sinking Creek	Giles	Norfolk	37.321756	-80.553011	Intermittent	RPW	-	05050002	Temporary Access Road	44	-	0.0040	-	20	-	4-555	
S-PP22	UNT to Craig Creek	Montgomery	Norfolk	37.321090	-80.412831	Intermittent	RPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	44	-	0.0040	-	20	-	4-584	
S-OO12	UNT to Sinking Creek	Giles	Norfolk	37.318956	-80.440648	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	25	-	0.0011	-	6	-	4-577	
S-OO13	UNT to Sinking Creek	Giles	Norfolk	37.318930	-80.440930	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	77	-	0.0354	-	570	-	4-577	
S-OO14	UNT to Sinking Creek	Giles	Norfolk	37.318647	-80.441619	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	86	-	0.0079	-	127	-	4-577	
S-IJ17	UNT to Sinking Creek	Giles	Norfolk	37.318324	-80.547720	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	31	-	0.0057	-	28	-	4-558	
S-IJ16-b	UNT to Sinking Creek	Giles	Norfolk	37.318246	-80.547711	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	78	-	0.0179	-	289	-	4-558	
S-PP21	UNT to Craig Creek	Montgomery	Norfolk	37.317187	-80.409235	Perennial	RPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	20	-	0.0018	-	9	-	4-584	
S-PP20	UNT to Craig Creek	Montgomery	Norfolk	37.316523	-80.408646	Perennial	RPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	20	-	0.0028	-	13	-	4-584	
S-RR13	Craig Creek	Montgomery	Norfolk	37.314504	-80.402613	Perennial	RPW	Atlantic Pigtoe, Stockable Trout, Coldwater Fishery	02080201	Temporary Access Road	41	-	0.0329	-	159	-	4-585	
S-HH18	UNT to Craig Creek	Montgomery	Norfolk	37.313910	-80.398683	Perennial	RPW	Atlatnic pigtoe, orangefin madtom Coldwater Fishery	02080201	Timber Mat Crossing	20	-	0.0028	-	13	-	4-586	
S-RR14	UNT to Craig Creek	Montgomery	Norfolk	37.313615	-80.402521	Ephemeral	NRPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	20	-	0.0032	-	16	-	4-585	
S-OO6	Craig Creek	Montgomery	Norfolk	37.313511	-80.404606	Perennial	RPW	Atlantic Pigtoe, Stockable Trout, Coldwater Fishery	02080201	Timber Mat Crossing	35	-	0.0161	-	136	-	4-585	
S-QQ3	UNT to Sinking Creek	Giles	Norfolk	37.311869	-80.532365	Ephemeral	NRPW	-	05050002	Temporary Access Road	15	-	0.0007	-	3	-	4-560	
S-IJ16-a	UNT to Sinking Creek	Giles	Norfolk	37.311730	-80.544091	Ephemeral	NRPW	-	05050002	Permanent Access Road	20	-	0.0032	-	16	-	4-559	
S-IJ16-a	UNT to Sinking Creek	Giles	Norfolk	37.311730	-80.544091	Ephemeral	NRPW	-	05050002	Permanent Access Road	-	31	-	0.0050	-	24	-	4-559
S-NN17	Sinking Creek	Giles	Norfolk	37.311616	-80.515786	Perennial	RPW	Green floater, Non-listed mussels, Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	55	-	0.0253	-	336	-	4-564	
S-KL43	UNT to Sinking Creek	Giles	Norfolk	37.307524	-80.466665	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	75	-	0.0172	-	278	-	4-573	
S-NN11	UNT to Sinking Creek	Giles	Norfolk	37.305508	-80.467231	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	84	-	0.0096	-	156	-	4-573	
S-NN12	UNT to Sinking Creek	Giles	Norfolk	37.300454	-80.472911	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	88	-	0.0040	-	65	-	4-571	
S-MN21	UNT to Mill Creek	Montgomery	Norfolk	37.299397	-80.391243	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	80	-	0.0129	-	207	-	4-588	
S-MM17	UNT to Sinking Creek	Giles	Norfolk	37.298226	-80.480624	Perennial	RPW	-	05050002	Temporary Access Road	49	-	0.0022	-	11	-	4-569	
S-MN22	UNT to Mill Creek	Montgomery	Norfolk	37.297166	-80.386612	Ephemeral	NRPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	96	-	0.0044	-	71	-	4-589	
S-RR2	Greenbriar Branch	Giles	Norfolk	37.296666	-80.494174	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0037	-	18	-	4-567	
S-YZ6	UNT to Greenbriar Branch	Giles	Norfolk	37.296612	-80.494165	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	0.0028	-	13	-	4-567	
S-EF62	UNT to Mill Creek	Montgomery	Norfolk	37.296356	-80.375118	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	76	-	0.0192	-	310	-	4-590	

Table 2. Stream Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	USACE District	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (acres) ⁵	Permanent Impact Area (acres) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-MM18	UNT to Sinking Creek	Giles	Norfolk	37.296226	-80.481455	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	88	-	0.0101	-	163	-	4-569
S-IJ52	UNT to Mill Creek	Montgomery	Norfolk	37.296153	-80.367510	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	84	-	0.0309	-	498	-	4-591
S-EF65	Mill Creek	Montgomery	Norfolk	37.295743	-80.375921	Intermittent	RPW	Orangefin madtom, Non-listed mussels, Natural Trout, Coldwater Fishery, Stockable Trout	03010101	Pipeline ROW	152	-	0.0209	-	338	-	4-590
S-G36	North Fork Roanoke River	Montgomery	Norfolk	37.268586	-80.313161	Perennial	RPW	Roanoke logperch, Orangefin madtom, Non-listed mussels, Natural Trout, Coldwater Fishery	03010101	Temporary Access Road	26	-	0.0119	-	58	-	4-602
S-G38	UNT to North Fork Roanoke River	Montgomery	Norfolk	37.267002	-80.312898	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0014	-	7	-	4-603
S-G40	UNT to North Fork Roanoke River	Montgomery	Norfolk	37.264882	-80.307302	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0014	-	7	-	4-603
S-PP23	UNT to North Fork Roanoke River	Montgomery	Norfolk	37.264858	-80.307151	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0011	-	6	-	4-604
S-G39	UNT to North Fork Roanoke River	Montgomery	Norfolk	37.264817	-80.308486	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	82	-	0.0113	-	182	-	4-604
S-MM14	UNT to Flatwoods Branch	Montgomery	Norfolk	37.258717	-80.293210	Ephemeral	NRPW	-	03010101	Pipeline ROW	105	-	0.0169	-	272	-	4-608
S-MM15	UNT to Flatwoods Branch	Montgomery	Norfolk	37.258673	-80.296446	Intermittent	RPW	-	03010101	Pipeline ROW	82	-	0.0113	-	182	-	4-608
S-MM11	UNT to Flatwoods Branch	Montgomery	Norfolk	37.258403	-80.288186	Ephemeral	NRPW	-	03010101	Pipeline ROW	80	-	0.0147	-	237	-	4-609
S-F15	UNT to Flatwoods Branch	Montgomery	Norfolk	37.258198	-80.286029	Intermittent	RPW	-	03010101	Pipeline ROW	129	-	0.0178	-	287	-	4-609
S-MM13	UNT to Flatwoods Branch	Montgomery	Norfolk	37.258176	-80.289222	Ephemeral	NRPW	-	03010101	Pipeline ROW	85	-	0.0098	-	157	-	4-608
S-F16a/F16b	UNT to Flatwoods Branch	Montgomery	Norfolk	37.257998	-80.284735	Ephemeral	NRPW	-	03010101	Pipeline ROW	81	-	0.0056	-	90	-	4-609
S-C36	UNT to Flatwoods Branch	Montgomery	Norfolk	37.257260	-80.281611	Intermittent	RPW	-	03010101	Pipeline ROW	96	-	0.0066	-	107	-	4-609
S-C36	UNT to Flatwoods Branch	Montgomery	Norfolk	37.257133	-80.281475	Intermittent	RPW	-	03010101	Pipeline ROW	36	-	0.0025	-	40	-	4-609
S-MM31	UNT to Flatwoods Branch	Montgomery	Norfolk	37.256959	-80.280329	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	0.0018	-	9	-	4-609
S-C29	Flatwoods Branch	Montgomery	Norfolk	37.256387	-80.278021	Ephemeral	NRPW	-	03010101	Pipeline ROW	46	-	0.0013	-	20	-	4-610
S-C25	UNT to Bradshaw Creek	Montgomery	Norfolk	37.254342	-80.267895	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	115	-	0.0079	-	128	-	4-611
S-C24	UNT to Bradshaw Creek	Montgomery	Norfolk	37.254135	-80.266743	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	108	-	0.0074	-	120	-	4-611
S-C21	Bradshaw Creek	Montgomery	Norfolk	37.251791	-80.258990	Perennial	RPW	Roanoke logperch, Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	25	-	0.0115	-	69	-	4-613
S-NN19	UNT to Roanoke River	Montgomery	Norfolk	37.244319	-80.206995	Intermittent	RPW	-	03010101	Pipeline ROW	76	-	0.0061	-	99	-	4-627
S-AB16	UNT to Roanoke River	Montgomery	Norfolk	37.231693	-80.198778	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0023	-	11	-	4-631
S-I1	UNT to Roanoke River	Montgomery	Norfolk	37.231179	-80.198460	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0064	-	31	-	4-631
S-CD12b	UNT to South Fork Roanoke River	Montgomery	Norfolk	37.229764	-80.201144	Perennial	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0028	-	13	-	4-631
S-EF19	UNT to Indian Run	Montgomery	Norfolk	37.216102	-80.197390	Ephemeral	NRPW	Warmwater Fishery, Tier 2	03010101	Pipeline ROW	79	-	0.0091	-	146	-	4-634
S-EF20a	UNT to Roanoke River	Montgomery	Norfolk	37.210922	-80.193318	Perennial	RPW	Orangefin madtom, Non-listed mussels	03010101	Pipeline ROW	80	-	0.0110	-	178	-	4-635
S-MM22	UNT to Roanoke River	Montgomery	Norfolk	37.205284	-80.187282	Perennial	RPW	Orangefin madtom, Non-listed mussels	03010101	Pipeline ROW	175	-	0.0603	-	972	-	4-637
S-IJ50	UNT to Roanoke River	Roanoke	Norfolk	37.194064	-80.167933	Perennial	RPW	Orangefin madtom, Non-listed mussels	03010101	Pipeline ROW	77	-	0.0442	-	713	-	4-641
S-Y13	UNT to Bottom Creek	Roanoke	Norfolk	37.187687	-80.151146	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	85	-	0.0156	-	252	-	4-644
S-Y14	UNT to Bottom Creek	Roanoke	Norfolk	37.187568	-80.151049	Perennial	RPW	Orangefin madtom, Non-listed mussels, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	77	-	0.0247	-	399	-	4-644
S-EF57	UNT to Bottom Creek	Roanoke	Norfolk	37.181736	-80.148948	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Temporary Access Road	42	-	0.0077	-	37	-	4-645
S-EF55	UNT to Bottom Creek	Roanoke	Norfolk	37.181506	-80.149497	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	33	-	0.0061	-	98	-	4-645
S-EF34b	UNT to Bottom Creek	Roanoke	Norfolk	37.181385	-80.149140	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	81	-	0.0186	-	300	-	4-645
S-EF33	UNT to Bottom Creek	Roanoke	Norfolk	37.179186	-80.141000	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	148	-	0.0306	-	493	-	4-647
S-IJ82	UNT to Bottom Creek	Roanoke	Norfolk	37.170458	-80.138216	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0069	-	33	-	4-648
S-IJ85	UNT to Bottom Creek	Roanoke	Norfolk	37.169474	-80.130356	Perennial	RPW	Natural Trout, Coldwater Fishery	03010101	Temporary Access Road	50	-	0.0092	-	44	-	4-650
S-IJ83	UNT to Bottom Creek	Roanoke	Norfolk	37.169211	-80.138258	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	148	-	0.0170	-	82	-	4-649
S-IJ88	Bottom Creek	Roanoke	Norfolk	37.168395	-80.138295	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	30	-	0.0450	-	726	-	4-649
S-IJ84	UNT to Bottom Creek	Roanoke	Norfolk	37.168361	-80.138381	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	35	-	0.0121	-	58	-	4-649
S-IJ89	UNT to Bottom Creek	Roanoke	Norfolk	37.165862	-80.139317	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0046	-	22	-	4-649
S-IJ90	UNT to Bottom Creek	Roanoke	Norfolk	37.165685	-80.139378	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0023	-	11	-	4-649
S-KL25	UNT to Mill Creek	Roanoke	Norfolk	37.160173	-80.134799	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	82	-	0.0094	-	152	-	4-651
S-ST9b	UNT to Mill Creek	Roanoke	Norfolk	37.154424	-80.129179	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0069	-	33	-	4-652
S-KL55	UNT to Mill Creek	Roanoke	Norfolk	37.150009	-80.13246	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0069	-	33	-	4-653
S-IJ12	UNT to Mill Creek	Roanoke	Norfolk	37.148333	-80.133919	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0060	-	29	-	4-653
S-EF44	UNT to Bottom Creek	Roanoke	Norfolk	37.143003	-80.138399	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0032	-	16	-	4-654
S-IJ43	Mill Creek	Roanoke	Norfolk	37.138636	-80.139715	Perennial	RPW	Orangefin madtom, Stockable Trout, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0083	-	40	-	4-655
S-Y9	UNT to Mill Creek	Roanoke	Norfolk	37.134576	-80.137649	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	44	-	0.0040	-	20	-	4-656
S-Y7	UNT to Mill Creek	Roanoke	Norfolk	37.134481	-80.137622	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	32	-	0.0029	-	14	-	4-656
S-Y8	UNT to Mill Creek	Roanoke	Norfolk	37.134176	-80.137484	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0018	-	9	-	4-656
S-B22	UNT to Mill Creek	Roanoke	Norfolk	37.128922	-80.133769	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0018	-	9	-	4-659
S-B23	UNT to Mill Creek	Roanoke	Norfolk	37.128853	-80.133910	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	14	-	0.0006	-	3	-	4-659
S-B25	UNT to Mill Creek	Roanoke	Norfolk	37.128490	-80.132601	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	76	-	0.0087	-	42	-	4-659
S-B21	UNT to Mill Creek	Roanoke	Norfolk	37.128484	-80.130943	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	92	-	0.0084	-	136	-	4-659
S-H1	Green Creek	Franklin	Norfolk	37.127733	-80.116787	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	0.0046	-	22	-	4-661
S-G26	UNT to Green Creek	Franklin	Norfolk	37.127077	-80.111387	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0032	-	16	-	4-662
S-G27	UNT to Green Creek	Franklin	Norfolk	37.126962	-80.111052	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0032	-	16	-	4-662
S-G24	UNT to Green Creek	Franklin	Norfolk	37.126412	-80.121398	Intermittent	RPW	-	03010101	Pipeline ROW	75	-	0.0103	-	167	-	4-661

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S-G25	UNT to Green Creek	Franklin	Norfolk	37.125398	-80.121401	Intermittent	RPW	-	03010101	Pipeline ROW	42	-	0.0067	-	33	-	4-661
S-RR18	UNT to Green Creek	Franklin	Norfolk	37.125055	-80.113578	Intermittent	RPW	-	03010101	Permanent Access Road	8	-	0.0004	-	2	-	4-662
S-D11	UNT to North Fork Blackwater River	Franklin	Norfolk	37.124137	-80.086182	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0046	-	22	-	4-666
S-D8	North Fork Blackwater River	Franklin	Norfolk	37.123098	-80.074673	Perennial	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	78	-	0.0216	-	349	-	4-667
S-D12	UNT to North Fork Blackwater River	Franklin	Norfolk	37.121558	-80.085642	Intermittent	RPW	-	03010101	Pipeline ROW	54	-	0.0074	-	120	-	4-666
S-D13	UNT to North Fork Blackwater River	Franklin	Norfolk	37.121513	-80.085680	Intermittent	RPW	-	03010101	Pipeline ROW	117	-	0.0107	-	173	-	4-666
S-D14	UNT to North Fork Blackwater River	Franklin	Norfolk	37.121473	-80.088457	Intermittent	RPW	-	03010101	Pipeline ROW	234	-	0.0161	-	260	-	4-666
S-II4	UNT to North Fork Blackwater River	Franklin	Norfolk	37.115679	-80.060300	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0069	-	33	-	4-670
S-GH7	UNT to North Fork Blackwater River	Franklin	Norfolk	37.106614	-80.054219	Perennial	RPW	-	03010101	Timber Mat Crossing	20	-	0.0041	-	20	-	4-672
S-GH15	UNT to North Fork Blackwater River	Franklin	Norfolk	37.106177	-80.050105	Intermittent	RPW	-	03010101	Pipeline ROW	75	-	0.0069	-	111	-	4-674
S-GH14	UNT to North Fork Blackwater River	Franklin	Norfolk	37.105883	-80.048861	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	0.0070	-	113	-	4-674
S-GH11	UNT to North Fork Blackwater River	Franklin	Norfolk	37.104707	-80.046220	Intermittent	RPW	-	03010101	Pipeline ROW	77	-	0.0053	-	86	-	4-674
S-GH9	UNT to North Fork Blackwater River	Franklin	Norfolk	37.104329	-80.045343	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	78	-	0.0072	-	116	-	4-674
S-RR08	UNT to North Fork Blackwater River	Franklin	Norfolk	37.103290	-80.041868	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	0.0032	-	16	-	4-674
S-RR09	UNT to North Fork Blackwater River	Franklin	Norfolk	37.102491	-80.041046	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	0.0159	-	257	-	4-675
S-RR11	UNT to North Fork Blackwater River	Franklin	Norfolk	37.101127	-80.039653	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	0.0124	-	200	-	4-675
S-IJ1	UNT to North Fork Blackwater River	Franklin	Norfolk	37.093062	-80.027724	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	107	-	0.0295	-	476	-	4-677
S-IJ2	UNT to North Fork Blackwater River	Franklin	Norfolk	37.092891	-80.027593	Intermittent	RPW	-	03010101	Pipeline ROW	40	-	0.0023	-	37	-	4-677
S-II6	UNT to Little Creek	Franklin	Norfolk	37.092697	-79.978402	Intermittent	NRPW	-	03010101	Timber Mat Crossing	20	-	0.0014	-	7	-	4-685
S-IJ3	UNT to North Fork Blackwater River	Franklin	Norfolk	37.092600	-80.027231	Intermittent	RPW	-	03010101	Pipeline ROW	77	-	0.0088	-	143	-	4-677
S-GH6	UNT to Little Creek	Franklin	Norfolk	37.092397	-79.983227	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0014	-	7	-	4-684
S-II12	UNT to Little Creek	Franklin	Norfolk	37.091608	-79.987839	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0009	-	4	-	4-684
S-II11	UNT to Little Creek	Franklin	Norfolk	37.091564	-79.988051	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0018	-	9	-	4-684
S-II8	UNT to Little Creek	Franklin	Norfolk	37.091413	-79.993944	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0009	-	4	-	4-683
S-II9	UNT to Little Creek	Franklin	Norfolk	37.091382	-79.990620	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0092	-	44	-	4-683
S-II7	UNT to Little Creek	Franklin	Norfolk	37.091354	-79.992013	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0018	-	9	-	4-683
S-IJ4	UNT to North Fork Blackwater River	Franklin	Norfolk	37.091189	-80.024366	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0018	-	9	-	4-677
S-KL2	UNT to Little Creek	Franklin	Norfolk	37.090361	-79.996354	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0017	-	8	-	4-682
S-GH2	UNT to Teels Creek	Franklin	Norfolk	37.090153	-79.953936	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0009	-	4	-	4-689
S-GH4	UNT to Teels Creek	Franklin	Norfolk	37.089812	-79.956077	Perennial	RPW	-	03010101	Timber Mat Crossing	20	-	0.0023	-	11	-	4-688
S-GH3	UNT to Teels Creek	Franklin	Norfolk	37.089745	-79.956042	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0028	-	13	-	4-688
S-IJ10	Little Creek	Franklin	Norfolk	37.089179	-80.005026	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0014	-	7	-	4-681
S-E29	UNT to Teels Creek	Franklin	Norfolk	37.089178	-79.950110	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	80	-	0.0147	-	237	-	4-689
S-E28	Teels Creek	Franklin	Norfolk	37.089047	-79.9613	Perennial	RPW	-	03010101	Pipeline ROW	82	-	0.0226	-	364	-	4-687
S-E28	Teels Creek	Franklin	Norfolk	37.085247	-79.948057	Perennial	RPW	-	03010101	Pipeline ROW	76	-	0.0209	-	338	-	4-687
S-E28	Teels Creek	Franklin	Norfolk	37.082875	-79.945556	Perennial	RPW	-	03010101	Pipeline ROW	101	-	0.0278	-	449	-	4-687
S-EF4	UNT to Teels Creek	Franklin	Norfolk	37.078963	-79.941911	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	80	-	0.0202	-	326	-	4-691
S-EF7	UNT to Teels Creek	Franklin	Norfolk	37.074664	-79.941123	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	0.0009	-	4	-	4-692
S-EF7	UNT to Teels Creek	Franklin	Norfolk	37.074636	-79.941336	Ephemeral	NRPW	-	03010101	ATWS	22	-	0.0010	-	5	-	4-692
S-EF12	Teels Creek	Franklin	Norfolk	37.073367	-79.939865	Perennial	RPW	-	03010101	Pipeline ROW	79	-	0.0363	-	585	-	4-692
S-MM42	UNT to Teels Creek	Franklin	Norfolk	37.070703	-79.937069	Ephemeral	NRPW	-	03010101	Pipeline ROW	81	-	0.0037	-	60	-	4-693
S-D23	Teels Creek	Franklin	Norfolk	37.070322	-79.931039	Perennial	RPW	-	03010101	Pipeline ROW	92	-	0.0479	-	772	-	4-694
S-D22	UNT to Teels Creek	Franklin	Norfolk	37.070101	-79.929732	Intermittent	RPW	-	03010101	Pipeline ROW	83	-	0.0152	-	246	-	4-694
S-D18	UNT to Teels Creek	Franklin	Norfolk	37.069560	-79.926213	Ephemeral	NRPW	-	03010101	Pipeline ROW	30	-	0.0014	-	7	-	4-694
S-RR15	UNT to Teels Creek	Franklin	Norfolk	37.069542	-79.933892	Perennial	RPW	-	03010101	Timber Mat Crossing	20	-	0.0006	-	31	-	4-694
S-D20	UNT to Teels Creek	Franklin	Norfolk	37.069485	-79.926230	Intermittent	RPW	-	03010101	Pipeline ROW	76	-	0.0140	-	225	-	4-694
S-EF48	UNT to Blackwater River	Franklin	Norfolk	37.064748	-79.874420	Intermittent	RPW	-	03010101	Pipeline ROW	86	-	0.0039	-	64	-	4-705
S-YZ4	UNT to Blackwater River	Franklin	Norfolk	37.064723	-79.878190	Ephemeral	NRPW	-	03010101	Pipeline ROW	84	-	0.0058	-	93	-	4-704
S-C14	Teels Creek	Franklin	Norfolk	37.063956	-79.921985	Perennial	RPW	-	03010101	Pipeline ROW	90	-	0.0839	-	1,353	-	4-696
S-YZ5	UNT to Blackwater River	Franklin	Norfolk	37.063464	-79.878281	Ephemeral	NRPW	-	03010101	Pipeline ROW	86	-	0.0079	-	127	-	4-704
S-KL41	UNT to Blackwater River	Franklin	Norfolk	37.062262	-79.862639	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	75	-	0.0207	-	333	-	4-706
S-KL39	UNT to Blackwater River	Franklin	Norfolk	37.061193	-79.880018	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	121	-	0.0181	-	291	-	4-704
S-C16	UNT to Teels Creek	Franklin	Norfolk	37.060610	-79.921179	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0069	-	33	-	4-696
S-KL54	UNT to Maggodee Creek	Franklin	Norfolk	37.059535	-79.840624	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	0.0174	-	281	-	4-710
S-C8	UNT to Blackwater River	Franklin	Norfolk	37.059098	-79.853595	Intermittent	RPW	-	03010101	Pipeline ROW	86	-	0.0099	-	159	-	4-708
S-F4	UNT to Blackwater River	Franklin	Norfolk	37.059060	-79.853379	Ephemeral	NRPW	-	03010101	Pipeline ROW	82	-	0.0188	-	91	-	4-708
S-C17	Teels Creek	Franklin	Norfolk	37.058390	-79.918015	Perennial	RPW	-	03010101	Timber Mat Crossing	30	-	0.0138	-	100	-	4-696
S-KL52	UNT to Maggodee Creek	Franklin	Norfolk	37.058165	-79.844877	Ephemeral	NRPW	-	03010101	Pipeline ROW	105	-	0.0024	-	39	-	4-709
S-S11	UNT to Maggodee Creek	Franklin	Norfolk	37.057776	-79.838583	Perennial	RPW	-	03010101	Temporary Access Road	41	-	0.0104	-	50	-	4-710

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S-F8	UNT to Maggodee Creek	Franklin	Norfolk	37.057724	-79.836406	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	83	-	0.0572	-	922	-	4-710
S-CD6	Little Creek	Franklin	Norfolk	37.057584	-79.913921	Perennial	RPW	-	03010101	Pipeline ROW	77	-	0.1016	-	1,639	-	4-698
S-HH4	UNT to Maggodee Creek	Franklin	Norfolk	37.056594	-79.835785	Intermittent	RPW	-	03010101	Pipeline ROW	97	-	0.0200	-	323	-	4-711
S-KL51	UNT to Blackwater River	Franklin	Norfolk	37.056084	-79.850384	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	67	-	0.0085	-	136	-	4-708
S-KL38	UNT to Blackwater River	Franklin	Norfolk	37.055912	-79.883177	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	78	-	0.0125	-	202	-	4-702
S-C20	UNT to Maggodee Creek	Franklin	Norfolk	37.055193	-79.833881	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	0.0018	-	9	-	4-711
S-C19	Maggodee Creek	Franklin	Norfolk	37.055147	-79.830098	Perennial	RPW	-	03010101	Pipeline ROW	75	-	0.0690	-	1,113	-	4-711
S-KL36	UNT to Blackwater River	Franklin	Norfolk	37.053336	-79.884604	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0034	-	17	-	4-702
S-F11	Blackwater River	Franklin	Norfolk	37.052843	-79.825711	Perennial	TNW	Non-listed mussels	03010101	Pipeline ROW	91	-	0.1553	-	2,506	-	4-712
S-KL35	UNT to Blackwater River	Franklin	Norfolk	37.052125	-79.886182	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	35	-	0.0020	-	10	-	4-702
S-F9b	UNT to Blackwater River	Franklin	Norfolk	37.049238	-79.817223	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	0.0262	-	422	-	4-713
S-II2	Little Creek	Franklin	Norfolk	37.049219	-79.908513	Perennial	RPW	-	03010101	Pipeline ROW	76	-	0.0745	-	1,203	-	4-699
S-F10	UNT to Blackwater River	Franklin	Norfolk	37.048037	-79.813934	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	0.0041	-	20	-	4-713
S-CD1	UNT to Blackwater River	Franklin	Norfolk	37.047765	-79.897636	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	104	-	0.0084	-	135	-	4-701
S-F9a	UNT to Blackwater River	Franklin	Norfolk	37.047172	-79.813000	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0069	-	33	-	4-713
S-MM29	UNT to Maple Branch	Franklin	Norfolk	37.043871	-79.822898	Perennial	RPW	-	03010101	Temporary Access Road	42	-	0.0145	-	70	-	4-714
S-MM23	Maple Branch	Franklin	Norfolk	37.043854	-79.822974	Perennial	RPW	-	03010101	Temporary Access Road	78	-	0.0358	-	173	-	4-714
S-GG4	UNT to Blackwater River	Franklin	Norfolk	37.042742	-79.809015	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	0.0046	-	22	-	4-716
S-A36	UNT to Foul Ground Creek	Franklin	Norfolk	37.037916	-79.804237	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	0.0071	-	114	-	4-717
S-A38	UNT to Foul Ground Creek	Franklin	Norfolk	37.036271	-79.799442	Intermittent	RPW	-	03010101	Timber Mat Crossing	30	-	0.0062	-	30	-	4-718
S-A40	UNT to Foul Ground Creek	Franklin	Norfolk	37.036173	-79.799240	Intermittent	RPW	-	03010101	Timber Mat Crossing	13	-	0.0017	-	8	-	4-718
S-A41	Foul Ground Creek	Franklin	Norfolk	37.031714	-79.788213	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	0.0209	-	338	-	4-720
S-GH36	UNT to Foul Ground Creek	Franklin	Norfolk	37.031063	-79.778588	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0014	-	7	-	4-721
S-KL17	UNT to Foul Ground Creek	Franklin	Norfolk	37.031011	-79.778435	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0023	-	11	-	4-721
S-GH37	UNT to Foul Ground Creek	Franklin	Norfolk	37.030974	-79.778190	Intermittent	RPW	-	03010101	Pipeline ROW	46	-	0.0032	-	15	-	4-721
S-GH38	UNT to Foul Ground Creek	Franklin	Norfolk	37.030972	-79.778083	Intermittent	RPW	-	03010101	Pipeline ROW	7	-	0.0005	-	2	-	4-721
S-GH39	UNT to Foul Ground Creek	Franklin	Norfolk	37.030861	-79.778069	Intermittent	RPW	-	03010101	Pipeline ROW	103	-	0.0095	-	153	-	4-721
S-GH40	UNT to Foul Ground Creek	Franklin	Norfolk	37.028893	-79.774785	Ephemeral	NRPW	-	03010101	Pipeline ROW	89	-	0.0061	-	99	-	4-721
S-GH44	UNT to Foul Ground Creek	Franklin	Norfolk	37.028392	-79.773359	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	103	-	0.0142	-	69	-	4-721
S-G22	UNT to Poplar Camp Creek	Franklin	Norfolk	37.019612	-79.761958	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	80	-	0.0220	-	356	-	4-723
S-G23	UNT to Poplar Camp Creek	Franklin	Norfolk	37.019526	-79.762002	Intermittent	RPW	-	03010101	Pipeline ROW	42	-	0.0029	-	14	-	4-723
S-G21	UNT to Poplar Camp Creek	Franklin	Norfolk	37.019359	-79.761643	Intermittent	RPW	-	03010101	Pipeline ROW	54	-	0.0037	-	18	-	4-723
S-G20	Poplar Camp Creek	Franklin	Norfolk	37.017364	-79.760000	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0046	-	22	-	4-724
S-G18	UNT to Blackwater River	Franklin	Norfolk	37.009236	-79.754238	Intermittent	RPW	-	03010101	Pipeline ROW	81	-	0.0037	-	60	-	4-725
S-G17	UNT to Blackwater River	Franklin	Norfolk	37.005496	-79.752655	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	0.0023	-	11	-	4-726
S-E18	UNT to Blackwater River	Franklin	Norfolk	37.001271	-79.747749	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	94	-	0.0151	-	244	-	4-727
S-E17	UNT to Blackwater River	Franklin	Norfolk	37.000529	-79.742760	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	95	-	0.0174	-	281	-	4-727
S-E14	UNT to Blackwater River	Franklin	Norfolk	36.995814	-79.735144	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	82	-	0.0376	-	607	-	4-728
S-H38	UNT to Jacks Creek	Franklin	Norfolk	36.989430	-79.722366	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0055	-	27	-	4-730
S-H32	UNT to Jacks Creek	Franklin	Norfolk	36.988273	-79.708199	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0046	-	22	-	4-732
S-H37	UNT to Jacks Creek	Franklin	Norfolk	36.988031	-79.717450	Ephemeral	NRPW	-	03010101	Pipeline ROW	82	-	0.0113	-	182	-	4-731
S-H34	UNT to Jacks Creek	Franklin	Norfolk	36.988009	-79.711881	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0014	-	7	-	4-732
S-H36	UNT to Jacks Creek	Franklin	Norfolk	36.988008	-79.714922	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0014	-	7	-	4-731
S-H30	UNT to Jacks Creek	Franklin	Norfolk	36.987961	-79.702711	Intermittent	RPW	-	03010101	Pipeline ROW	4	-	0.0001	-	1	-	4-734
S-A18	UNT to Jacks Creek	Franklin	Norfolk	36.987818	-79.700634	Intermittent	RPW	-	03010101	Pipeline ROW	87	-	0.0052	-	84	-	4-734
S-A19/H26	UNT to Jacks Creek	Franklin	Norfolk	36.987719	-79.698901	Intermittent	RPW	-	03010101	Pipeline ROW	212	-	0.0341	-	550	-	4-734
S-A20	UNT to Jacks Creek	Franklin	Norfolk	36.987715	-79.698555	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0032	-	16	-	4-734
S-H28	UNT to Jacks Creek	Franklin	Norfolk	36.985174	-79.692272	Ephemeral	NRPW	-	03010101	Pipeline ROW	16	-	0.0022	-	11	-	4-735
S-H27	UNT to Jacks Creek	Franklin	Norfolk	36.985124	-79.692272	Ephemeral	NRPW	-	03010101	Pipeline ROW	36	-	0.0083	-	40	-	4-735
S-A22	UNT to Jacks Creek	Franklin	Norfolk	36.984846	-79.691870	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	0.0037	-	18	-	4-735
S-MM44	UNT to Little Jacks Creek	Franklin	Norfolk	36.982507	-79.687818	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0018	-	9	-	4-735
S-MM46	UNT to Little Jacks Creek	Franklin	Norfolk	36.982240	-79.687500	Intermittent	RPW	-	03010101	Timber Mat Crossing	9	-	0.0006	-	3	-	4-735
S-MM45	UNT to Little Jacks Creek	Franklin	Norfolk	36.981971	-79.686901	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	33	-	0.0030	-	15	-	4-735
S-MM48	UNT to Little Jacks Creek	Franklin	Norfolk	36.979223	-79.684192	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	25	-	0.0040	-	19	-	4-736
S-H25	Little Jacks Creek	Franklin	Norfolk	36.978529	-79.682186	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0032	-	16	-	4-736
S-H24	UNT to Little Jacks Creek	Franklin	Norfolk	36.978025	-79.680682	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0046	-	22	-	4-736
S-H23	UNT to Turkey Creek	Franklin	Norfolk	36.976421	-79.677525	Ephemeral	NRPW	-	03010101	Pipeline ROW	92	-	0.0106	-	170	-	4-738
S-HH1	UNT to Turkey Creek	Franklin	Norfolk	36.974647	-79.674453	Ephemeral	NRPW	-	03010101	Pipeline ROW	18	-	0.0021	-	10	-	4-738
S-A13	Turkey Creek	Franklin	Norfolk	36.973282	-79.673075	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0037	-	18	-	4-738

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S-A11	UNT to Turkey Creek	Franklin	Norfolk	36.973237	-79.669898	Ephemeral	NRPW	-	03010101	Pipeline ROW	55	-	0.0038	-	18	-	4-740
S-H17	Dinner Creek	Franklin	Norfolk	36.972125	-79.662987	Intermittent	RPW	-	03010101	Pipeline ROW	101	-	0.0185	-	299	-	4-741
S-A7	UNT to Dinner Creek	Franklin	Norfolk	36.972032	-79.662504	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0028	-	13	-	4-741
S-SS8	Polecat Creek	Franklin	Norfolk	36.970904	-79.657370	Perennial	RPW	Orangefin madtom,	03010101	Timber Mat Crossing	20	-	0.0037	-	18	-	4-741
S-CD8	UNT to Owens Creek	Franklin	Norfolk	36.970522	-79.653726	Intermittent	RPW	-	03010101	Pipeline ROW	78	-	0.0081	-	130	-	4-742
S-AB8	UNT to Owens Creek	Franklin	Norfolk	36.970133	-79.651328	Intermittent	RPW	-	03010101	Pipeline ROW	84	-	0.0077	-	124	-	4-742
S-DD3	Owens Creek	Franklin	Norfolk	36.969118	-79.645042	Intermittent	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0069	-	33	-	4-743
S-G16	Strawfield Creek	Franklin	Norfolk	36.968640	-79.642174	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	30	-	0.0138	-	100	-	4-743
S-G15	UNT to Parrot Branch	Franklin	Norfolk	36.967711	-79.636590	Intermittent	RPW	-	03010101	Pipeline ROW	88	-	0.0182	-	293	-	4-744
S-G13	Parrot Branch	Franklin	Norfolk	36.967025	-79.630747	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0037	-	18	-	4-744
S-D3	UNT to Jonnikin Creek	Pittsylvania	Norfolk	36.965631	-79.605542	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0046	-	22	-	4-747
S-D4	UNT to Jonnikin Creek	Pittsylvania	Norfolk	36.965600	-79.604894	Intermittent	RPW	-	03010101	Pipeline ROW	105	-	0.0145	-	233	-	4-747
S-D2	Jonnikin Creek	Pittsylvania	Norfolk	36.965405	-79.599130	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0083	-	40	-	4-748
S-D7	UNT to Jonnikin Creek	Franklin	Norfolk	36.964763	-79.617043	Intermittent	RPW	-	03010101	Pipeline ROW	80	-	0.0147	-	237	-	4-746
S-D1-EPH	UNT to Jonnikin Creek	Pittsylvania	Norfolk	36.964430	-79.595691	Ephemeral	NRPW	-	03010101	Pipeline ROW	61	-	0.0140	-	226	-	4-748
S-D1-INT	UNT to Jonnikin Creek	Pittsylvania	Norfolk	36.964407	-79.595841	Intermittent	RPW	-	03010101	Pipeline ROW	29	-	0.0067	-	32	-	4-748
S-G11	UNT to Jonnikin Creek	Pittsylvania	Norfolk	36.962420	-79.590500	Intermittent	RPW	-	03010101	Pipeline ROW	77	-	0.0106	-	171	-	4-749
S-G9	UNT to Jonnikin Creek	Pittsylvania	Norfolk	36.959361	-79.586437	Intermittent	RPW	-	03010101	Pipeline ROW	79	-	0.0073	-	117	-	4-751
S-G8	UNT to Jonnikin Creek	Pittsylvania	Norfolk	36.957805	-79.583545	Intermittent	RPW	-	03010101	Pipeline ROW	90	-	0.0083	-	133	-	4-751
S-Q15	UNT to Jonnikin Creek	Pittsylvania	Norfolk	36.957580	-79.583492	Ephemeral	NRPW	-	03010101	Pipeline ROW	103	-	0.0118	-	191	-	4-751
S-A6	UNT to Rocky Creek	Pittsylvania	Norfolk	36.952275	-79.580460	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0023	-	11	-	4-750
S-H11-Braid	UNT to Rocky Creek	Pittsylvania	Norfolk	36.949615	-79.579553	Ephemeral	NRPW	-	03010101	Pipeline ROW	85	-	0.0039	-	19	-	4-750
S-F2	UNT to Rocky Creek	Pittsylvania	Norfolk	36.944049	-79.571442	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	0.0032	-	16	-	4-753
S-C7	UNT to Rocky Creek	Pittsylvania	Norfolk	36.944016	-79.571517	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0092	-	44	-	4-753
S-C3	Harpen Creek	Pittsylvania	Norfolk	36.929762	-79.526109	Perennial	RPW	Roanoke logperch, Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0083	-	40	-	4-758
S-C4	UNT to Harpen Creek	Pittsylvania	Norfolk	36.929745	-79.526290	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	58	-	0.0053	-	26	-	4-758
S-H13	Harpen Creek	Pittsylvania	Norfolk	36.925105	-79.517350	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	77	-	0.0354	-	570	-	4-759
S-G6	UNT to Harpen Creek	Pittsylvania	Norfolk	36.920737	-79.505898	Intermittent	RPW	-	03010101	Pipeline ROW	80	-	0.0110	-	178	-	4-761
S-G5	UNT to Harpen Creek	Pittsylvania	Norfolk	36.917694	-79.496604	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	0.0106	-	171	-	4-762
S-G4	Harpen Creek	Pittsylvania	Norfolk	36.916463	-79.492669	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	30	-	0.0138	-	100	-	4-762
S-G3	UNT to Harpen Creek	Pittsylvania	Norfolk	36.915658	-79.490029	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0041	-	20	-	4-762
S-CC16	UNT to Harpen Creek	Pittsylvania	Norfolk	36.913003	-79.487838	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	0.0051	-	24	-	4-763
S-CC14	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.905329	-79.471492	Intermittent	RPW	-	03010105	Timber Mat Crossing	20	-	0.0037	-	18	-	4-765
S-CC13	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.905307	-79.471574	Intermittent	RPW	-	03010105	Timber Mat Crossing	20	-	0.0032	-	16	-	4-765
S-MM8	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.902991	-79.468220	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	0.0028	-	13	-	4-766
S-CC15	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.901941	-79.466535	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	0.0028	-	13	-	4-766
S-CC8	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.899437	-79.462685	Intermittent	RPW	-	03010105	Timber Mat Crossing	20	-	0.0037	-	18	-	4-766
S-CC5	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.899411	-79.462483	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	0.0055	-	27	-	4-766
S-CC5	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.899248	-79.462396	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	54	-	0.0149	-	240	-	4-766
S-CC9	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.897740	-79.458046	Ephemeral	NRPW	-	03010105	Pipeline ROW	81	-	0.0102	-	165	-	4-767
S-CC10	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.897315	-79.456119	Intermittent	RPW	-	03010105	Pipeline ROW	78	-	0.0161	-	260	-	4-767
S-MM10	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.895915	-79.452960	Intermittent	RPW	-	03010105	Pipeline ROW	9	-	0.0014	-	7	-	4-768
S-CC11	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.895808	-79.452920	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	87	-	0.0160	-	258	-	4-768
S-CC1	Cherrystone Creek	Pittsylvania	Norfolk	36.894043	-79.445744	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	82	-	0.0282	-	456	-	4-769
S-CC3	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.893727	-79.444763	Ephemeral	NRPW	-	03010105	Pipeline ROW	91	-	0.0167	-	270	-	4-769
S-P5	UNT to Cherrystone Creek	Pittsylvania	Norfolk	36.892751	-79.440053	Ephemeral	NRPW	-	03010105	Timber Mat Crossing	20	-	0.0023	-	11	-	4-769
S-IJ35-EPH	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	36.891451	-79.433781	Ephemeral	NRPW	-	03010105	Pipeline ROW	171	-	0.0157	-	253	-	4-770
S-Q4	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	36.886114	-79.430914	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	0.0023	-	11	-	4-771
S-Q3	Pole Bridge Branch	Pittsylvania	Norfolk	36.884444	-79.428220	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	75	-	0.0430	-	694	-	4-771
S-Q2	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	36.884284	-79.427914	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	0.0032	-	16	-	4-771
S-B6	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	36.879063	-79.420189	Ephemeral	NRPW	-	03010105	Pipeline ROW	84	-	0.0193	-	311	-	4-772
S-B8	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	36.877937	-79.417992	Intermittent	RPW	-	03010105	Pipeline ROW	82	-	0.0075	-	121	-	4-773
S-B9	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	36.877416	-79.416255	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	78	-	0.0125	-	202	-	4-773
S-DD4-Braid-1	UNT to Mill Creek	Pittsylvania	Norfolk	36.871651	-79.404061	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	67	-	0.0092	-	149	-	4-775
S-DD4	UNT to Mill Creek	Pittsylvania	Norfolk	36.871478	-79.403907	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	147	-	0.0202	-	327	-	4-775
S-KL27	UNT to Mill Creek	Pittsylvania	Norfolk	36.866534	-79.400511	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	84	-	0.0019	-	31	-	4-776
S-C1	Mill Creek	Pittsylvania	Norfolk	36.863513	-79.397914	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	92	-	0.0127	-	204	-	4-777
S-G2	Little Cherrystone Creek	Pittsylvania	Norfolk	36.851931	-79.386051	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	0.0032	-	16	-	4-779
S-B2	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.849394	-79.377780	Ephemeral	NRPW	-	03010105	Timber Mat Crossing	20	-	0.0023	-	11	-	4-780

Table 2. Stream Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	USACE District	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (acres) ⁵	Permanent Impact Area (acres) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-H55	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.843486	-79.369222	Ephemeral	NRPW	-	03010105	Timber Mat Crossing	20	-	0.0014	-	7	-	4-781
S-H54	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.841112	-79.366848	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	0.0055	-	27	-	4-781
S-GG11	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.841093	-79.366942	Perennial	RPW	-	03010105	Timber Mat Crossing	46	-	0.0084	-	41	-	4-781
S-H3	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.834501	-79.360244	Intermittent	RPW	-	03010105	Pipeline ROW	18	-	0.0025	-	12	-	4-783
S-H5	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.833412	-79.359823	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	83	-	0.0152	-	246	-	4-783
S-OO1	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.830285	-79.356618	Intermittent	RPW	-	03010105	Pipeline ROW	84	-	0.0096	-	156	-	4-783
S-H44	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.829823	-79.346016	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	33	-	0.0061	-	29	-	4-785
S-H42	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.828993	-79.344442	Perennial	RPW	Orangefin madtom	03010105	Permanent Access Road	-	32	-	0.0051	-	25	4-785
S-H42	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.828958	-79.344315	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	0.0032	-	16	-	4-785
S-OO2	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	36.828831	-79.353849	Intermittent	RPW	-	03010105	Pipeline ROW	78	-	0.0090	-	144	-	4-784
S-EF26	Little Cherrystone Creek	Pittsylvania	Norfolk	36.828207	-79.349814	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	0.0092	-	44	-	4-784

Notes:

- 1
- For identified streams without a NHD (National Hydrography Dataset) name, the identified stream was given the name, "Unidentified Tributary (UNT)", of the first named receiving waterbody
- 2
- In decimal degrees
- 3
- RPW = Relatively Permanent Waters
- NRPW = Non-Relatively Permanent Waters
- TNW = Traditional Navigable Waters
- 4
- See Section 1.9.2 and Section 4.2 for more information
- 5
- Acres are rounded to four decimal places.
- 6
- Temporary fill discharge into waters of the U.S. Cubic yards are rounded to the nearest whole number.
- 7
- Permanent fill associated with the construction of Permanent access road and facilities. Cubic yards are rounded to the nearest whole number.

Table 3. Wetland Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (acres) ⁴	Permanent Conversion Impacts (acres) ⁴	Permanent Fill Impacts (acres) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-B55	Harrison	Pittsburgh	39.436246	-80.474973	PEM	RPWWD	05020002	Timber Mat Crossing	0.0054	-	-	26	-	4-36
W-J32-PEM-1	Harrison	Pittsburgh	39.391614	-80.477085	PEM	RPWWN	05020002	Temporary Access Road	0.0417	-	-	202	-	4-44
W-A10a	Harrison	Pittsburgh	39.369569	-80.485054	PEM	RPWWD	05020002	Timber Mat Crossing	0.0153	-	-	74	-	4-49
W-B1a	Harrison	Pittsburgh	39.360192	-80.492766	PEM	NRPWW	05020002	Pipeline ROW	0.0119	-	-	192	-	4-50
W-A40	Harrison	Pittsburgh	39.358924	-80.493367	PEM	RPWWN	05020002	Pipeline ROW/ATWS	0.3111	-	-	1,506	-	4-51
W-A39	Harrison	Pittsburgh	39.358865	-80.490797	PEM	RPWWN	05020002	Permanent Access Road	0.0280	-	-	136	-	4-51
W-ST11	Harrison	Pittsburgh	39.338239	-80.519656	PEM	NRPWW	05020002	Temporary Access Road/ATWS	0.0228	-	-	110	-	4-56
W-ST12-PEM	Harrison	Pittsburgh	39.337471	-80.522128	PEM	RPWWD	05020002	Temporary Access Road/ATWS	0.0582	-	-	282	-	4-56
W-ST12-PSS	Harrison	Pittsburgh	39.337457	-80.522185	PSS	RPWWD	05020002	Temporary Access Road/ATWS	-	0.1444	-	699	-	4-56
W-B2a	Harrison	Pittsburgh	39.316856	-80.525315	PEM	RPWWD	05020002	ATWS	0.1953	-	-	945	-	4-59
W-B4a	Harrison	Pittsburgh	39.316784	-80.526129	PEM	RPWWD	05020002	Timber Mat Crossing	0.0214	-	-	104	-	4-59
W-UU1	Harrison	Pittsburgh	39.290258	-80.518898	PFO	RPWWD	05020002	Pipeline ROW	-	0.0045	-	22	-	4-66
W-UU3	Harrison	Pittsburgh	39.289750	-80.518517	PFO	RPWWN	05020002	Pipeline ROW	-	0.0065	-	105	-	4-66
W-UU4a	Harrison	Pittsburgh	39.253101	-80.540498	PEM	RPWWD	05020002	Pipeline ROW/ATWS	0.1268	-	-	2,046	-	4-74
W-F52	Harrison	Pittsburgh	39.250487	-80.551891	PEM	NRPWW	05020002	Temporary Access Road	0.0625	-	-	302	-	4-76
W-F54	Harrison	Pittsburgh	39.249640	-80.550121	PEM	NRPWW	05020002	Timber Mat Crossing	0.0042	-	-	20	-	4-76
W-F53	Harrison	Pittsburgh	39.249629	-80.549909	PEM	NRPWW	05020002	Timber Mat Crossing	0.0080	-	-	39	-	4-76
W-F55	Harrison	Pittsburgh	39.249464	-80.551040	PEM	NRPWW	05020002	Timber Mat Crossing	0.0173	-	-	84	-	4-76
W-K43	Harrison	Pittsburgh	39.243915	-80.553961	PEM	RPWWD	05020002	Pipeline ROW	0.2086	-	-	3,365	-	4-77
W-K44	Harrison	Pittsburgh	39.243493	-80.554033	PEM	RPWWD	05020002	Pipeline ROW	0.0671	-	-	1,083	-	4-77
W-CV15	Harrison	Pittsburgh	39.223490	-80.548109	PEM	RPWWD	05020002	Timber Mat Crossing	0.0512	-	-	248	-	4-81
W-J40	Lewis	Pittsburgh	39.167631	-80.578355	PEM	RPWWD	05020002	Pipeline ROW	0.2931	-	-	4,729	-	4-92
W-J40	Lewis	Pittsburgh	39.167564	-80.578800	PEM	RPWWD	05020002	Temporary Access Road	0.1812	-	-	877	-	4-92
W-A24	Harrison	Pittsburgh	39.165608	-80.569523	PEM	NRPWW	05020002	Temporary Access Road	0.0002	-	-	1	-	4-91
W-VV5	Lewis	Pittsburgh	39.137820	-80.576075	PEM	RPWWD	05020002	ATWS	0.0202	-	-	98	-	4-99
W-IJ23	Lewis	Pittsburgh	39.131093	-80.572126	PEM	RPWWN	05020002	Temporary Access Road	0.0065	-	-	31	-	4-100
W-IJ24	Lewis	Pittsburgh	39.130718	-80.571966	PEM	RPWWN	05020002	Temporary Access Road	0.0041	-	-	20	-	4-100
W-J20	Lewis	Pittsburgh	39.116053	-80.589196	PEM	NRPWW	05020002	Permanent Access Road	0.0081	-	-	39	-	4-103
W-J23	Lewis	Pittsburgh	39.114118	-80.586522	PEM	RPWWN	05020002	Pipeline ROW	0.0130	-	-	210	-	4-103
W-K31	Lewis	Pittsburgh	39.080555	-80.581362	PEM	NRPWW	05020002	Pipeline ROW/Temporary Access Road	0.1135	-	-	549	-	4-109
W-ST14	Lewis	Pittsburgh	39.079947	-80.583108	PEM	RPWWD	05020002	Anode Bed	0.0394	-	-	191	-	4-110
W-ST15	Lewis	Pittsburgh	39.079855	-80.582499	PEM	RPWWN	05020002	Anode Bed	0.0711	-	-	344	-	4-110
W-B46	Lewis	Pittsburgh	39.079854	-80.581439	PEM	RPWWD	05020002	Pipeline ROW/Temporary Access Road	0.1255	-	-	607	-	4-110
W-B47	Lewis	Pittsburgh	39.079451	-80.581349	PEM	RPWWD	05020002	Timber Mat Crossing	0.0682	-	-	330	-	4-110
W-B51	Lewis	Pittsburgh	39.078107	-80.581235	PEM	NRPWW	05020002	Timber Mat Crossing	0.0035	-	-	17	-	4-110
W-B54	Lewis	Pittsburgh	39.073907	-80.581491	PEM	NRPWW	05020002	Timber Mat Crossing	0.0101	-	-	49	-	4-110
W-H112	Lewis	Pittsburgh	39.066480	-80.581624	PEM	NRPWW	05020002	Pipeline ROW	0.0231	-	-	373	-	4-111
W-ME1	Wetzel	Huntington	39.561837	-80.544176	PEM	RPWWD	05030201	ATWS	0.0382	-	-	185	-	4-1
W-ME2	Wetzel	Huntington	39.559744	-80.546756	PEM	RPWWN	05030201	ATWS	0.1036	-	-	501	-	4-1
W-ME3	Wetzel	Huntington	39.559075	-80.547489	PEM	RPWWN	05030201	ATWS	0.0869	-	-	421	-	4-1
W-A1a	Wetzel	Huntington	39.553912	-80.544941	PEM	RPWWD	05030201	Pipeline ROW	0.0038	-	-	18	-	4-3
W-A2a	Wetzel	Huntington	39.553508	-80.545518	PEM	RPWWN	05030201	Timber Mat Crossing	0.0424	-	-	205	-	4-3
W-A4a	Wetzel	Huntington	39.544642	-80.542833	PEM	NRPWW	05030201	Timber Mat Crossing	0.0070	-	-	34	-	4-5
W-IJ31	Wetzel	Huntington	39.505764	-80.541781	PEM	RPWWN	05030201	ATWS	0.0992	-	-	480	-	4-18
W-IJ31	Wetzel	Huntington	39.505612	-80.541681	PEM	RPWWN	05030201	Permanent Access Road	-	-	0.0082	-	40	4-18
W-A27-PFO	Wetzel	Huntington	39.502389	-80.523497	PFO	RPWWD	05030201	Pipeline ROW	-	0.0547	-	882	-	4-20
W-A27-PEM	Wetzel	Huntington	39.502356	-80.523420	PEM	RPWWD	05030201	Pipeline ROW	0.0497	-	-	802	-	4-20
W-A35	Wetzel	Huntington	39.491159	-80.520537	PEM	NRPWW	05030201	Pipeline ROW	0.0066	-	-	107	-	4-23
W-A34	Wetzel	Huntington	39.489742	-80.520750	PEM	RPWWD	05030201	Timber Mat Crossing	0.0296	-	-	143	-	4-23
W-WX5	Wetzel	Huntington	39.463909	-80.502672	PEM	RPWWD	05030201	Temporary Access Road	0.0011	-	-	5	-	4-28
W-WX4	Wetzel	Huntington	39.463864	-80.502581	PEM	RPWWD	05030201	Temporary Access Road	0.0095	-	-	46	-	4-28
W-K52	Doddridge	Huntington	39.236762	-80.558524	PEM	RPWWN	05030201	Permanent Access Road	0.0021	-	-	10	-	4-78
W-K52	Doddridge	Huntington	39.236727	-80.558550	PEM	RPWWN	5030201	Permanent Access Road	-	-	0.0115	-	56	4-78
W-K45	Doddridge	Huntington	39.228900	-80.552328	PEM	RPWWD	05030201	Pipeline ROW	0.0401	-	-	648	-	4-80
W-K41	Doddridge	Huntington	39.208990	-80.551957	PEM	RPWWD	05030201	Timber Mat Crossing	0.0109	-	-	53	-	4-84
W-A23	Doddridge	Huntington	39.201188	-80.552996	PEM	RPWWD	05030201	Pipeline ROW	0.2701	-	-	4,358	-	4-85
W-A23	Doddridge	Huntington	39.201157	-80.553264	PEM	RPWWD	05030201	Permanent Access Road	-	-	0.0579	-	280	4-85
W-B57	Lewis	Huntington	39.111745	-80.587352	PEM	NRPWW	05030203	Pipeline ROW/Temporary Access Road	0.0336	-	-	163	-	4-104
W-K33-PSS	Lewis	Huntington	39.095059	-80.585064	PSS	RPWWD	05030203	Pipeline ROW	-	0.0024	-	12	-	4-106
W-K33-PEM	Lewis	Huntington	39.095056	-80.584787	PEM	RPWWD	05030203	Pipeline ROW	0.1544	-	-	2,490	-	4-106
W-K34-PEM	Lewis	Huntington	39.093945	-80.585460	PEM	RPWWD	05030203	Timber Mat Crossing	0.0253	-	-	122	-	4-106

Table 3. Wetland Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (acres) ⁴	Permanent Conversion Impacts (acres) ⁴	Permanent Fill Impacts (acres) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-H109	Lewis	Huntington	39.053324	-80.582020	PEM	NRPWW	05030203	Pipeline ROW	-	-	0.0027	-	13	4-114
W-I22-PEM	Lewis	Huntington	39.052952	-80.582437	PEM	RPWWD	05030203	ATWS	0.0018	-	-	9	-	4-114
W-I22-PEM	Lewis	Huntington	39.052768	-80.582196	PEM	RPWWD	05030203	Timber Mat Crossing	0.0162	-	-	78	-	4-114
W-I22-PEM	Lewis	Huntington	39.052760	-80.582147	PEM	RPWWD	05030203	Permanent Access Road	-	-	0.0059	-	28	4-114
W-KK6	Lewis	Huntington	39.017820	-80.596977	PEM	RPWWD	05030203	Timber Mat Crossing	0.0212	-	-	103	-	4-119
W-I15	Lewis	Huntington	38.968609	-80.592042	PEM	RPWWN	05030203	Pipeline ROW	0.0631	-	-	1,018	-	4-128
W-I16	Lewis	Huntington	38.964758	-80.590881	PEM	NRPWW	05030203	Timber Mat Crossing	0.0177	-	-	86	-	4-129
W-I17	Lewis	Huntington	38.964195	-80.590961	PEM	NRPWW	05030203	Timber Mat Crossing	0.0017	-	-	8	-	4-129
W-I20	Lewis	Huntington	38.962362	-80.590607	PEM	NRPWW	05030203	Timber Mat Crossing	0.0379	-	-	183	-	4-129
W-I21	Lewis	Huntington	38.962126	-80.590741	PEM	NRPWW	05030203	Timber Mat Crossing	0.0631	-	-	306	-	4-129
W-UU7	Lewis	Huntington	38.933646	-80.585074	PEM	NRPWW	05030203	Pipeline ROW	0.0038	-	-	19	-	4-135
W-H103	Lewis	Huntington	38.933290	-80.584765	PEM	RPWWN	05030203	ATWS	0.0037	-	-	18	-	4-135
W-H103	Lewis	Huntington	38.933290	-80.584765	PEM	RPWWN	05030203	Timber Mat Crossing	0.0050	-	-	24	-	4-135
W-H102	Lewis	Huntington	38.933168	-80.584990	PEM	RPWWN	05030203	ATWS	0.0129	-	-	62	-	4-135
W-H107	Lewis	Huntington	38.932901	-80.584200	PEM	RPWWD	05030203	Timber Mat Crossing	0.0328	-	-	159	-	4-135
W-H98	Lewis	Huntington	38.925976	-80.578373	PEM	NRPWW	05030203	Permanent Access Road	-	-	0.0331	-	160	4-136
W-H98	Lewis	Huntington	38.925868	-80.578367	PEM	NRPWW	05030203	Temporary Access Road	0.0032	-	-	15	-	4-136
W-H108	Lewis	Huntington	38.918766	-80.573564	PEM	RPWWN	05030203	Timber Mat Crossing	0.0278	-	-	134	-	4-140
W-H96	Lewis	Huntington	38.913939	-80.571910	PEM	RPWWD	05030203	Timber Mat Crossing	0.0039	-	-	19	-	4-142
W-H95	Lewis	Huntington	38.913311	-80.571953	PEM	RPWWD	05030203	Timber Mat Crossing	0.0414	-	-	200	-	4-142
W-VV9	Lewis	Huntington	38.904701	-80.563951	PEM	RPWWD	05030203	Pipeline ROW	0.0534	-	-	259	-	4-144
W-CD17	Lewis	Huntington	38.904074	-80.563709	PEM	RPWWD	05030203	Timber Mat Crossing	0.0335	-	-	162	-	4-144
W-CD16	Lewis	Huntington	38.903722	-80.563418	PEM	RPWWN	05030203	Temporary Access Road/ ATWS	0.0023	-	-	11	-	4-144
W-CD16	Lewis	Huntington	38.903722	-80.563418	PEM	RPWWN	05030203	Pipeline ROW	0.0226	-	-	365	-	4-144
W-VV8	Lewis	Huntington	38.903514	-80.563258	PEM	RPWWD	05030203	Pipeline ROW	0.0708	-	-	1,143	-	4-144
W-CD18	Lewis	Huntington	38.902751	-80.564644	PEM	RPWWD	05030203	Temporary Access Road	0.0322	-	-	156	-	4-144
W-CD19	Lewis	Huntington	38.902618	-80.564694	PEM	RPWWD	05030203	Temporary Access Road	0.0080	-	-	39	-	4-144
W-CD21	Lewis	Huntington	38.901049	-80.566582	PEM	RPWWN	05030203	Temporary Access Road	0.0161	-	-	78	-	4-146
W-CD23	Lewis	Huntington	38.898699	-80.568306	PEM	RPWWD	05030203	Temporary Access Road	0.0349	-	-	169	-	4-146
W-CD24	Lewis	Huntington	38.898648	-80.568238	PEM	RPWWD	05030203	Temporary Access Road	0.0094	-	-	45	-	4-146
W-CD36	Lewis	Huntington	38.898177	-80.568287	PEM	RPWWN	05030203	Temporary Access Road	0.0049	-	-	24	-	4-146
W-CD25	Lewis	Huntington	38.898021	-80.568159	PEM	RPWWN	05030203	Temporary Access Road	0.0100	-	-	48	-	4-146
W-CD26	Lewis	Huntington	38.897805	-80.568155	PEM	RPWWN	05030203	Temporary Access Road	0.0114	-	-	55	-	4-146
W-VV10	Lewis	Huntington	38.897282	-80.567014	PEM	NRPWW	05030203	Temporary Access Road	0.0091	-	-	44	-	4-146
W-UV17	Lewis	Huntington	38.893199	-80.556196	PFO	RPWWN	05030203	Pipeline ROW	-	0.0055	-	27	-	4-148
W-ST16	Lewis	Huntington	38.892534	-80.556680	PEM	RPWWN	05030203	Temporary Anode Bed	0.0711	-	-	344	-	4-148
W-VV11	Lewis	Huntington	38.890576	-80.554852	PEM	NRPWW	05030203	Temporary Access Road	0.0246	-	-	119	-	4-148
W-VV12	Lewis	Huntington	38.890309	-80.553784	PEM	NRPWW	05030203	Temporary Access Road	0.0277	-	-	134	-	4-148
W-VV4-PEM	Lewis	Huntington	38.863280	-80.525705	PEM	RPWWD	05030203	Timber Mat Crossing	0.0131	-	-	64	-	4-158
W-VV4-PFO	Lewis	Huntington	38.863238	-80.525813	PFO	RPWWD	05030203	Timber Mat Crossing	-	0.0263	-	127	-	4-158
W-VV3-PEM	Lewis	Huntington	38.862795	-80.525190	PEM	RPWWD	05030203	Pipeline ROW	0.0447	-	-	721	-	4-158
W-VV3-PFO	Braxton	Huntington	38.862691	-80.525163	PFO	RPWWD	05030203	Pipeline ROW	-	0.0160	-	259	-	4-158
W-H90	Braxton	Huntington	38.760419	-80.513602	PEM	RPWWD	05030203	Pipeline ROW	0.0388	-	-	627	-	4-179
W-QR13	Braxton	Huntington	38.751445	-80.516905	PEM	RPWWN	05030203	Temporary Access Road	0.0618	-	-	299	-	4-180
W-QR12	Braxton	Huntington	38.749364	-80.522081	PEM	RPWWN	05030203	Temporary Access Road	0.0881	-	-	426	-	4-181
W-QR11	Braxton	Huntington	38.747846	-80.521602	PEM	RPWWN	05030203	Temporary Access Road	0.0559	-	-	271	-	4-181
W-I11b	Braxton	Huntington	38.708869	-80.489369	PEM	NRPWW	05050007	Timber Mat Crossing	0.0098	-	-	47	-	4-194
W-R2	Webster	Huntington	38.667178	-80.480225	PEM	RPWWD	05050007	Temporary Access Road	0.0620	-	-	300	-	4-201
W-KK3	Webster	Huntington	38.667027	-80.478547	PEM	RPWWD	05050007	Pipeline ROW	0.0222	-	-	357	-	4-201
W-R3	Webster	Huntington	38.666869	-80.480889	PEM	NRPWW	05050007	Temporary Access Road	0.0155	-	-	75	-	4-201
W-F46	Webster	Huntington	38.664132	-80.479008	PEM	RPWWN	05050007	Timber Mat Crossing	0.0039	-	-	19	-	4-202
W-R4	Webster	Huntington	38.664021	-80.483434	PEM	NRPWW	05050007	Temporary Access Road	0.0432	-	-	209	-	4-204
W-H75	Webster	Huntington	38.607280	-80.504722	PEM	RPWWN	05050007	Pipeline ROW	0.0108	-	-	174	-	4-219
W-H79	Webster	Huntington	38.602069	-80.508493	PEM	NRPWW	05050007	Timber Mat Crossing	0.0077	-	-	125	-	4-220
W-H81	Webster	Huntington	38.599491	-80.506376	PEM	NRPWW	05050007	Timber Mat Crossing	0.0237	-	-	115	-	4-220
W-H82	Webster	Huntington	38.598415	-80.505238	PEM	NRPWW	05050007	Timber Mat Crossing	0.0128	-	-	62	-	4-221
W-H86	Webster	Huntington	38.591803	-80.508481	PEM	NRPWW	05050007	Pipeline ROW	0.0013	-	-	6	-	4-222
W-H83	Webster	Huntington	38.591372	-80.508904	PEM	NRPWW	05050007	Pipeline ROW/Temporary Access Road	0.0177	-	-	86	-	4-222
W-T4	Webster	Huntington	38.586855	-80.518697	PEM	NRPWW	05050007	Temporary Access Road	0.0403	-	-	195	-	4-224
W-H85	Webster	Huntington	38.586644	-80.510350	PEM	NRPWW	05050007	Pipeline ROW	0.0069	-	-	33	-	4-222
W-A20-PFO	Webster	Huntington	38.566923	-80.529968	PFO	NRPWW	05050007	Timber Mat Crossing	-	0.0298	-	144	-	4-232
W-A20-PEM	Webster	Huntington	38.566910	-80.530098	PEM	NRPWW	05050007	Timber Mat Crossing	0.0117	-	-	57	-	4-232

Table 3. Wetland Impacts (revised 4/14/2021)
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Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (acres) ⁴	Permanent Conversion Impacts (acres) ⁴	Permanent Fill Impacts (acres) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-A19	Webster	Huntington	38.557156	-80.538578	PEM	RPWWD	05050007	Temporary Access Road	0.0265	-	-	128	-	4-235
W-H70	Webster	Huntington	38.557097	-80.526293	PEM	NRPWW	05050007	Permanent Access Road	-	-	0.0057	-	28	4-238
W-H71	Webster	Huntington	38.556454	-80.526913	PEM	NRPWW	05050007	Permanent Access Road	-	-	0.0205	-	99	4-238
W-H72	Webster	Huntington	38.553783	-80.527760	PEM	NRPWW	05050007	Permanent Access Road	-	-	0.0064	-	31	4-237
W-H73	Webster	Huntington	38.553085	-80.528148	PEM	NRPWW	05050007	Permanent Access Road	-	-	0.0061	-	29	4-237
W-H74	Webster	Huntington	38.552748	-80.533585	PEM	NRPWW	05050007	Permanent Access Road	-	-	0.0115	-	56	4-237
W-H67	Webster	Huntington	38.549313	-80.539242	PFO	RPWWD	05050007	Pipeline ROW/Temporary Access Road	-	0.0908	-	1,465	-	4-236
W-H66	Webster	Huntington	38.548873	-80.539592	PFO	RPWWD	05050007	Pipeline ROW	-	0.2496	-	4,026	-	4-236
W-H64-PEM	Webster	Huntington	38.548175	-80.540709	PEM	RPWWD	05050007	Pipeline ROW	0.0276	-	-	133	-	4-236
W-H64-PSS	Webster	Huntington	38.548099	-80.540896	PSS	RPWWD	05050007	Pipeline ROW	-	0.0422	-	681	-	4-236
W-H64-PEM-2	Webster	Huntington	38.548058	-80.540847	PEM	RPWWD	05050007	Pipeline ROW	0.0289	-	-	466	-	4-236
W-H56	Webster	Huntington	38.545807	-80.542983	PEM	RPWWD	05050007	Pipeline ROW	0.0206	-	-	100	-	4-248
W-O13	Webster	Huntington	38.533655	-80.513682	PEM	RPWWN	05050007	Permanent Access Road	-	-	0.0405	-	196	4-244
W-KL8	Webster	Huntington	38.519565	-80.545076	PEM	NRPWW	05050007	Pipeline ROW	0.0976	-	-	472	-	4-252
W-H60	Webster	Huntington	38.517850	-80.544693	PEM	NRPWW	05050007	Timber Mat Crossing	0.0495	-	-	240	-	4-253
W-H61	Webster	Huntington	38.517345	-80.545025	PEM	NRPWW	05050007	Timber Mat Crossing	0.0094	-	-	151	-	4-253
W-H62	Webster	Huntington	38.517147	-80.545591	PEM	NRPWW	05050007	Pipeline ROW	0.0335	-	-	162	-	4-253
W-B39	Webster	Huntington	38.508151	-80.559329	PEM	NRPWW	05050007	Pipeline ROW	0.0906	-	-	1,462	-	4-255
W-B31	Webster	Huntington	38.494322	-80.561155	PEM	RPWWD	05050007	Pipeline ROW	0.0515	-	-	831	-	4-260
W-B35	Webster	Huntington	38.493757	-80.560962	PSS	RPWWD	05050007	Pipeline ROW	-	0.0108	-	174	-	4-260
W-A18	Webster	Huntington	38.481237	-80.555783	PEM	RPWWD	05050007	Temporary Access Road	0.2038	-	-	986	-	4-263
W-E28	Webster	Huntington	38.443010	-80.551309	PSS	RPWWD	05050007	Permanent Access Road	-	-	0.0084	-	40	4-269
W-E30	Webster	Huntington	38.441535	-80.550864	PEM	RPWWN	05050007	Temporary Access Road	-	-	0.0316	-	153	4-269
W-F26	Webster	Huntington	38.428623	-80.567054	PEM	NRPWW	05050007	Timber Mat Crossing	0.0045	-	-	22	-	4-277
W-F29	Webster	Huntington	38.424050	-80.570711	PEM	RPWWD	05050007	Timber Mat Crossing	0.0071	-	-	34	-	4-278
W-F28	Webster	Huntington	38.423890	-80.570659	PEM	RPWWD	05050007	Timber Mat Crossing	0.0071	-	-	34	-	4-278
W-F40	Webster	Huntington	38.421461	-80.570007	PSS	RPWWD	05050007	Temporary Access Road	-	0.0188	-	91	-	4-278
W-F41	Webster	Huntington	38.417599	-80.576458	PEM	RPWWD	05050007	Temporary Access Road	0.0002	-	-	1	-	4-279
W-B30	Webster	Huntington	38.405713	-80.591171	PEM	RPWWD	05050007	Timber Mat Crossing	0.0429	-	-	208	-	4-281
W-B28	Webster	Huntington	38.399940	-80.597527	PEM	RPWWD	05050007	Pipeline ROW/Anode Bed	0.2983	-	-	4,812	-	4-282
W-E21	Webster	Huntington	38.370595	-80.611923	PEM	RPWWD	05050005	Pipeline ROW	0.0389	-	-	627	-	4-289
W-E18-PEM	Webster	Huntington	38.367359	-80.612334	PEM	RPWWD	05050005	Pipeline ROW	0.0208	-	-	101	-	4-290
W-E18-PSS	Webster	Huntington	38.367284	-80.612248	PSS	RPWWD	05050005	Pipeline ROW	-	0.0538	-	868	-	4-290
W-E16	Nicholas	Huntington	38.364427	-80.614459	PEM	NRPWW	05050005	Timber Mat Crossing	0.0091	-	-	44	-	4-291
W-E13	Webster	Huntington	38.364017	-80.616570	PFO	RPWWN	05050005	Timber Mat Crossing	-	0.0107	-	52	-	4-291
W-F13	Nicholas	Huntington	38.356737	-80.631888	PEM	RPWWN	05050005	Timber Mat Crossing	0.0394	-	-	191	-	4-293
W-F12	Nicholas	Huntington	38.356528	-80.632264	PEM	RPWWD	05050005	Timber Mat Crossing	0.0576	-	-	279	-	4-293
W-F11	Nicholas	Huntington	38.355680	-80.633383	PEM	RPWWN	05050005	Timber Mat Crossing	0.0652	-	-	315	-	4-293
W-K23	Nicholas	Huntington	38.355273	-80.633811	PEM	RPWWN	05050005	Pipeline ROW	0.0489	-	-	789	-	4-293
W-K20	Nicholas	Huntington	38.354644	-80.634586	PEM	RPWWD	05050005	Timber Mat Crossing	0.0100	-	-	48	-	4-293
W-IJ51	Nicholas	Huntington	38.352366	-80.636369	PEM	RPWWD	05050005	Pipeline ROW	0.0410	-	-	662	-	4-293
W-IJ50	Nicholas	Huntington	38.350787	-80.637226	PEM	RPWWN	05050005	Pipeline ROW	0.0528	-	-	852	-	4-294
W-IJ55	Nicholas	Huntington	38.343568	-80.646491	PEM	RPWWN	05050005	Pipeline ROW	0.0218	-	-	352	-	4-296
W-B27	Nicholas	Huntington	38.339713	-80.655364	PEM	RPWWD	05050005	Timber Mat Crossing	0.0874	-	-	423	-	4-299
W-B26-PEM-1	Nicholas	Huntington	38.339034	-80.659282	PEM	RPWWD	05050005	Temporary Access Road	0.0273	-	-	132	-	4-299
W-B26-PEM-2	Nicholas	Huntington	38.338935	-80.659254	PEM	RPWWD	05050005	Temporary Access Road	0.0060	-	-	29	-	4-299
W-FF6-PSS	Nicholas	Huntington	38.337803	-80.658933	PSS	RPWWN	05050005	Timber Mat Crossing	-	0.0333	-	161	-	4-299
W-FF6-PEM	Nicholas	Huntington	38.337774	-80.658995	PEM	RPWWN	05050005	Timber Mat Crossing	0.0793	-	-	384	-	4-299
W-FF3	Nicholas	Huntington	38.332776	-80.669068	PEM	RPWWN	05050005	Pipeline ROW	0.0444	-	-	716	-	4-301
W-FF4	Nicholas	Huntington	38.329122	-80.671098	PEM	RPWWD	05050005	Pipeline ROW	0.0037	-	-	18	-	4-301
W-A17	Nicholas	Huntington	38.327813	-80.670776	PEM	NRPWW	05050005	Pipeline ROW	0.1300	-	-	2,098	-	4-301
W-A15	Nicholas	Huntington	38.323735	-80.670118	PSS	RPWWD	05050005	Pipeline ROW	-	0.0891	-	1,437	-	4-302
W-A14	Nicholas	Huntington	38.321643	-80.670901	PFO	RPWWD	05050005	Timber Mat Crossing	-	0.0374	-	181	-	4-302
W-H53	Nicholas	Huntington	38.313047	-80.673265	PEM	RPWWD	05050005	Pipeline ROW	0.0039	-	-	63	-	4-304
W-H50	Nicholas	Huntington	38.309707	-80.676585	PEM	NRPWW	05050005	Temporary Access Road	0.0114	-	-	55	-	4-304
W-N25	Nicholas	Huntington	38.302028	-80.674533	PEM	RPWWD	05050005	Timber Mat Crossing	0.0104	-	-	50	-	4-306
W-N24	Nicholas	Huntington	38.299148	-80.675928	PEM	RPWWN	05050005	Timber Mat Crossing	0.0031	-	-	15	-	4-307
W-N22	Nicholas	Huntington	38.296941	-80.676479	PEM	RPWWN	05050005	Timber Mat Crossing	0.0030	-	-	14	-	4-307
W-I7	Nicholas	Huntington	38.293453	-80.677084	PFO	RPWWD	05050005	Timber Mat Crossing	-	0.0333	-	161	-	4-308
W-CV13	Nicholas	Huntington	38.273139	-80.686452	PEM	RPWWN	05050005	Permanent Access Road	0.0159	-	-	77	-	4-312
W-CV12	Nicholas	Huntington	38.271829	-80.685245	PEM	RPWWD	05050005	Temporary Access Road	0.0098	-	-	47	-	4-312
W-RS04	Nicholas	Huntington	38.264804	-80.683146	PEM	NRPWW	05050005	Temporary Access Road	0.0254	-	-	123	-	4-316

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W-J8	Nicholas	Huntington	38.263168	-80.687930	PFO	RPWWD	05050005	Pipeline ROW	-	0.0533	-	860	-	4-315
W-MN4	Nicholas	Huntington	38.262968	-80.683949	PEM	RPWWD	05050005	Temporary Access Road	0.0463	-	-	224	-	4-316
W-J7	Nicholas	Huntington	38.233731	-80.708250	PFO	RPWWD	05050005	Pipeline ROW	-	0.0693	-	1,119	-	4-326
W-N18	Nicholas	Huntington	38.224246	-80.716448	PEM	NRPWW	05050005	Pipeline ROW	0.0075	-	-	36	-	4-328
W-L28	Nicholas	Huntington	38.203621	-80.719372	PEM	RPWWD	05050005	Pipeline ROW	0.0064	-	-	31	-	4-341
W-L27	Nicholas	Huntington	38.202610	-80.718505	PEM	RPWWN	05050005	Timber Mat Crossing	0.0029	-	-	14	-	4-341
W-I11a	Nicholas	Huntington	38.179434	-80.729511	PEM	RPWWD	05050005	Pipeline ROW	0.0579	-	-	934	-	4-344
W-U7	Nicholas	Huntington	38.178298	-80.729744	PEM	RPWWN	05050005	ATWS	0.0666	-	-	322	-	4-347
W-I5	Nicholas	Huntington	38.175595	-80.730736	PEM	RPWWN	05050005	Pipeline ROW	0.0082	-	-	133	-	4-347
W-VV2	Nicholas	Huntington	38.161072	-80.735000	PEM	RPWWD	05050005	Timber Mat Crossing	0.0136	-	-	66	-	4-355
W-N16	Nicholas	Huntington	38.157063	-80.738304	PEM	NRPWW	05050005	Timber Mat Crossing	0.0232	-	-	112	-	4-356
W-H41	Nicholas	Huntington	38.127873	-80.733868	PEM	RPWWN	05050005	Timber Mat Crossing	0.0151	-	-	73	-	4-362
W-H33	Nicholas	Huntington	38.124326	-80.735761	PEM	RPWWD	05050005	Pipeline ROW	0.0590	-	-	952	-	4-362
W-H35	Nicholas	Huntington	38.124117	-80.736018	PEM	RPWWN	05050005	Pipeline ROW	-	-	0.0177	-	285	4-362
W-H31	Nicholas	Huntington	38.116376	-80.735285	PEM	RPWWN	05050005	Pipeline ROW	0.0139	-	-	67	-	4-364
W-EF31	Nicholas	Huntington	38.107483	-80.726303	PEM	RPWWD	05050005	Pipeline ROW/ATWS	0.0208	-	-	336	-	4-366
W-M18	Greenbrier	Huntington	38.061194	-80.720732	PEM	NRPWW	05050005	Timber Mat Crossing	0.0364	-	-	176	-	4-374
W-M20	Greenbrier	Huntington	38.060869	-80.723064	PEM	NRPWW	05050005	Pipeline ROW	0.0031	-	-	15	-	4-374
W-M23	Greenbrier	Huntington	38.060683	-80.722348	PEM	NRPWW	05050005	Pipeline ROW	0.0616	-	-	994	-	4-374
W-M22	Greenbrier	Huntington	38.060661	-80.722616	PSS	NRPWW	05050005	Pipeline ROW	-	0.0039	-	19	-	4-374
W-J6	Greenbrier	Huntington	38.053361	-80.732198	PFO	RPWWD	05050005	Pipeline ROW	-	0.0744	-	1,201	-	4-376
W-ST27	Greenbrier	Huntington	38.029124	-80.742585	PEM	NRPWW	05050005	Temporary Access Road	0.0075	-	-	36	-	4-382
W-KL40	Greenbrier	Huntington	38.029060	-80.736807	PEM	RPWWD	05050005	Temporary Access Road	0.0312	-	-	151	-	4-388
W-ST28	Greenbrier	Huntington	38.028800	-80.743155	PEM	NRPWW	05050005	Temporary Access Road	0.0310	-	-	150	-	4-382
W-IJ60	Greenbrier	Huntington	38.024335	-80.739643	PEM	RPWWN	05050005	Temporary Access Road	0.0174	-	-	84	-	4-387
W-IJ59	Greenbrier	Huntington	38.022031	-80.743027	PEM	RPWWN	05050005	Temporary Access Road	0.0024	-	-	12	-	4-387
W-IJ58-PEM-3	Greenbrier	Huntington	38.021808	-80.743351	PEM	RPWWD	05050005	Temporary Access Road	0.0056	-	-	27	-	4-387
W-V6	Greenbrier	Huntington	37.993269	-80.756363	PEM	RPWWN	05050005	Temporary Access Road	0.0422	-	-	204	-	4-394
W-HS1	Greenbrier	Huntington	37.986454	-80.758418	PEM	NRPWW	05050005	Pipeline ROW	-	-	0.0360	-	581	4-395
W-QR2	Greenbrier	Huntington	37.983978	-80.756817	PEM	RPWWD	05050005	Permanent Access Road	-	-	0.0010	-	5	4-397
W-QR2	Greenbrier	Huntington	37.983212	-80.756099	PEM	RPWWD	05050005	Pipeline ROW/Temporary Access Road	0.2435	-	-	3,929	-	4-397
W-L16	Greenbrier	Huntington	37.980653	-80.754908	PEM	RPWWD	05050005	Pipeline ROW	0.0247	-	-	398	-	4-397
W-L19	Greenbrier	Huntington	37.954250	-80.739757	PEM	RPWWD	05050005	Pipeline ROW/Temporary Access Road	0.1060	-	-	1,711	-	4-402
W-L13	Greenbrier	Huntington	37.953825	-80.740037	PEM	RPWWN	05050005	Pipeline ROW	0.0316	-	-	509	-	4-402
W-L12	Greenbrier	Huntington	37.953736	-80.739892	PEM	RPWWN	05050005	Pipeline ROW	0.0075	-	-	36	-	4-402
W-L11	Greenbrier	Huntington	37.949563	-80.742715	PEM	RPWWD	05050005	Pipeline ROW	0.0194	-	-	94	-	4-403
W-L4	Greenbrier	Huntington	37.938675	-80.746774	PEM	RPWWN	05050005	Pipeline ROW	0.0404	-	-	196	-	4-405
W-L2	Greenbrier	Huntington	37.938326	-80.746878	PEM	RPWWD	05050005	Pipeline ROW/Temporary Access Road	0.0393	-	-	635	-	4-405
W-IJ47-PEM	Greenbrier	Huntington	37.916423	-80.743551	PEM	RPWWD	05050005	Permanent Access Road	-	-	0.0113	-	55	4-410
W-IJ47-PEM	Greenbrier	Huntington	37.916255	-80.743867	PEM	RPWWD	05050005	Permanent Access Road	-	-	0.0520	-	252	4-410
W-W10	Greenbrier	Huntington	37.911495	-80.727880	PEM	NRPWW	05050005	Temporary Access Road	0.0488	-	-	236	-	4-412
W-K7	Greenbrier	Huntington	37.863700	-80.757095	PEM	RPWWN	05050005	Pipeline ROW	0.0078	-	-	126	-	4-421
W-K7	Greenbrier	Huntington	37.863527	-80.757286	PEM	RPWWN	05050005	Pipeline ROW	0.3206	-	-	5,173	-	4-421
W-IJ30	Greenbrier	Huntington	37.862357	-80.757476	PEM	RPWWD	05050005	Pipeline ROW	0.3236	-	-	5,221	-	4-421
W-UV9	Greenbrier	Huntington	37.862309	-80.757756	PEM	RPWWN	05050005	Pipeline ROW	0.1090	-	-	1,759	-	4-421
W-UV11	Greenbrier	Huntington	37.861173	-80.757726	PEM	RPWWN	05050005	Pipeline ROW	0.0285	-	-	138	-	4-421
W-UV10	Greenbrier	Huntington	37.861066	-80.757954	PEM	RPWWN	05050005	Pipeline ROW	0.0035	-	-	17	-	4-421
W-K9-PEM-1	Greenbrier	Huntington	37.860916	-80.757817	PEM	RPWWD	05050005	Pipeline ROW	0.0354	-	-	572	-	4-421
W-K10	Greenbrier	Huntington	37.858743	-80.755724	PEM	RPWWN	05050005	Pipeline ROW	0.0068	-	-	33	-	4-422
W-UV4	Greenbrier	Huntington	37.854391	-80.755038	PSS	RPWWD	05050005	Pipeline ROW	-	0.0885	-	1,427	-	4-422
W-UV8	Greenbrier	Huntington	37.851590	-80.752937	PEM	RPWWD	05050005	Pipeline ROW	0.4913	-	-	7,926	-	4-423
W-EE4	Summers	Huntington	37.813845	-80.748769	PEM	RPWWD	05050004	Pipeline ROW	0.0453	-	-	730	-	4-429
W-M2	Summers	Huntington	37.807721	-80.746088	PEM	RPWWD	05050004	Pipeline ROW	0.1064	-	-	1,717	-	4-430
W-I10	Summers	Huntington	37.783907	-80.718899	PEM	NRPWW	05050005	Permanent Access Road	-	-	0.0550	-	266	4-437
W-EF40	Summers	Huntington	37.693888	-80.735663	PEM	RPWWD	05050003	Timber Mat Crossing	0.0889	-	-	430	-	4-461
W-MM20-PFO	Summers	Huntington	37.681648	-80.730225	PFO	RPWWD	05050003	Pipeline ROW, Temporary Access Road, ATWS	-	0.2990	-	3,773	-	4-464
W-EF36	Summers	Huntington	37.675423	-80.732001	PEM	RPWWN	05050003	Timber Mat Crossing	0.0035	-	-	17	-	4-465
W-K2-PEM	Summers	Huntington	37.668130	-80.723493	PEM	RPWWD	05050003	Pipeline ROW	0.0140	-	-	225	-	4-468
W-G7	Summers	Huntington	37.654106	-80.702592	PEM	NRPWW	05050003	Timber Mat Crossing	0.0121	-	-	59	-	4-471
W-OP1	Monroe	Huntington	37.600067	-80.700400	PEM	RPWWD	05050003	Pipeline ROW	0.1359	-	-	2,193	-	4-487

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Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (acres) ⁴	Permanent Conversion Impacts (acres) ⁴	Permanent Fill Impacts (acres) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-A13	Monroe	Huntington	37.559410	-80.710082	PEM	RPWWD	05050002	Pipeline ROW/Temporary Access Road	0.2991	-	-	4,826	-	4-493
W-A13	Monroe	Huntington	37.559332	-80.709734	PEM	RPWWD	05050002	Permanent Access Road	-	-	0.0228	-	110	4-493
W-MN14	Monroe	Huntington	37.520227	-80.707365	PEM	RPWWD	05050002	Pipeline ROW/Access Road/ATWS	0.0390	-	-	313	-	4-500
W-MN15	Monroe	Huntington	37.520166	-80.707532	PEM	RPWWN	05050002	Pipeline ROW	0.0070	-	-	113	-	4-500
W-MN18-PEM	Monroe	Huntington	37.487662	-80.681791	PEM	RPWWD	05050002	Pipeline ROW	0.0510	-	-	823	-	4-510
W-MN18-PFO	Monroe	Huntington	37.487474	-80.681854	PFO	RPWWD	05050002	Pipeline ROW	-	0.1750	-	2,823	-	4-510
W-MN1	Monroe	Huntington	37.473153	-80.675740	PEM	RPWWD	05050002	Timber Mat Crossing	0.0187	-	-	90	-	4-512
W-G6	Monroe	Huntington	37.472534	-80.675718	PEM	RPWWD	05050002	Pipeline ROW	0.0684	-	-	1,103	-	4-512
W-CV25-PSS-1	Monroe	Huntington	37.462852	-80.669557	PSS	RPWWD	05050002	Pipeline ROW	-	0.0270	-	436	-	4-513
W-MN24	Monroe	Huntington	37.462833	-80.670273	PEM	NRPWW	05050002	Pipeline ROW	0.0100	-	-	161	-	4-513
W-CV25-PEM-2	Monroe	Huntington	37.462746	-80.669518	PEM	RPWWD	05050002	Pipeline ROW	0.0200	-	-	323	-	4-513
W-E12	Monroe	Huntington	37.450761	-80.667516	PEM	RPWWD	05050002	Pipeline ROW	0.0041	-	-	20	-	4-516
W-C14	Monroe	Huntington	37.427083	-80.694569	PEM	RPWWN	05050002	Pipeline ROW	0.0113	-	-	55	-	4-521
W-C13	Monroe	Huntington	37.426734	-80.694534	PEM	RPWWD	05050002	Pipeline ROW	0.2172	-	-	3,503	-	4-521
W-C17	Monroe	Huntington	37.425547	-80.693481	PEM	RPWWD	05050002	Temporary Access Road	0.0306	-	-	148	-	4-521
W-Z11	Giles	Norfolk	37.346591	-80.641713	PEM	NRPWW	05050002	Pipeline ROW	0.0262	-	-	423	-	4-543
W-Z3	Giles	Norfolk	37.342244	-80.620612	PSS	RPWWD	05050002	Timber Mat Crossing	-	0.0136	-	66	-	4-545
W-CD12	Giles	Norfolk	37.318644	-80.441717	PEM	RPWWD	05050002	Pipeline ROW	0.0208	-	-	335	-	4-577
W-MM10	Giles	Norfolk	37.298219	-80.480617	PEM	RPWWD	05050002	Temporary Access Road	0.0254	-	-	123	-	4-569
W-RR1b	Giles	Norfolk	37.296670	-80.494042	PEM	RPWWD	05050002	Timber Mat Crossing	0.0056	-	-	27	-	4-567
W-IJ46-PEM	Montgomery	Norfolk	37.296153	-80.367508	PEM	RPWWD	03010101	Pipeline ROW	0.0294	-	-	474	-	4-591
W-AD4	Montgomery	Norfolk	37.286984	-80.330124	PEM	RPWWD	03010101	Temporary Access Road	0.0069	-	-	33	-	4-596
W-NN6	Montgomery	Norfolk	37.268174	-80.316468	PEM	RPWWN	03010101	Timber Mat Crossing	0.0083	-	-	40	-	4-603
W-F9-PFO	Montgomery	Norfolk	37.258109	-80.285892	PFO	RPWWD	03010101	Pipeline ROW	-	0.0169	-	82	-	4-609
W-C12-PEM	Montgomery	Norfolk	37.257265	-80.281667	PEM	RPWWD	03010101	Pipeline ROW	0.2066	-	-	3,333	-	4-609
W-C12	Montgomery	Norfolk	37.257192	-80.281649	PFO	RPWWD	03010101	Pipeline ROW	-	0.0523	-	253	-	4-609
W-C11	Montgomery	Norfolk	37.257107	-80.281351	PSS	RPWWD	03010101	Pipeline ROW	-	0.0461	-	223	-	4-609
W-C6	Montgomery	Norfolk	37.255860	-80.275715	PEM	NRPWW	03010101	Timber Mat Crossing	0.0139	-	-	67	-	4-610
W-C5	Montgomery	Norfolk	37.255606	-80.274237	PEM	NRPWW	03010101	Pipeline ROW	0.0454	-	-	732	-	4-610
W-AB7	Montgomery	Norfolk	37.231426	-80.198615	PEM	RPWWD	03010101	Timber Mat Crossing	0.0040	-	-	19	-	4-631
W-KL58	Montgomery	Norfolk	37.229183	-80.203106	PEM	RPWWD	03010101	Permanent Access Road	-	-	0.0392	-	190	4-631
W-EF5-PFO	Montgomery	Norfolk	37.210948	-80.193359	PFO	RPWWD	03010101	Pipeline ROW	-	0.0852	-	1,374	-	4-635
W-EF18	Roanoke	Norfolk	37.179449	-80.140665	PSS	RPWWD	03010101	Temporary Access Road	-	0.0052	-	25	-	4-647
W-EF17	Roanoke	Norfolk	37.179402	-80.140600	PFO	RPWWD	03010101	Temporary Access Road	-	0.0224	-	108	-	4-647
W-IJ94-PEM	Roanoke	Norfolk	37.170092	-80.138294	PEM	RPWWD	03010101	Timber Mat Crossing	0.0202	-	-	98	-	4-649
W-IJ96-PEM	Roanoke	Norfolk	37.169461	-80.130376	PEM	RPWWD	03010101	Temporary Access Road	0.0161	-	-	77	-	4-650
W-IJ95-PSS	Roanoke	Norfolk	37.169068	-80.138278	PSS	RPWWD	03010101	Timber Mat Crossing	-	0.0254	-	123	-	4-649
W-IJ102	Roanoke	Norfolk	37.168289	-80.138375	PFO	RPWWD	03010101	Timber Mat Crossing	-	0.0100	-	48	-	4-649
W-KL17	Roanoke	Norfolk	37.160152	-80.134774	PSS	RPWWD	03010101	Pipeline ROW	-	0.0435	-	702	-	4-651
W-EF42	Roanoke	Norfolk	37.157611	-80.133722	PEM	RPWWD	03010101	Pipeline ROW	0.0083	-	-	40	-	4-652
W-HS02	Roanoke	Norfolk	37.157427	-80.133413	PEM	RPWWD	03010101	Pipeline ROW	0.2893	-	-	4,668	-	4-652
W-AB6-PEM-2	Roanoke	Norfolk	37.156825	-80.131998	PEM	RPWWD	03010101	Pipeline ROW	0.3271	-	-	5,277	-	4-652
W-AB6-PFO-1	Roanoke	Norfolk	37.156713	-80.131681	PFO	RPWWD	03010101	Pipeline ROW	-	0.0618	-	997	-	4-652
W-AB6-PEM-1	Roanoke	Norfolk	37.156170	-80.130794	PEM	RPWWD	03010101	Pipeline ROW	0.0647	-	-	1,044	-	4-652
W-AB6-PSS	Roanoke	Norfolk	37.156034	-80.130603	PSS	RPWWD	03010101	Pipeline ROW	-	0.0061	-	30	-	4-652
W-AB5	Roanoke	Norfolk	37.155840	-80.130227	PFO	RPWWN	03010101	Pipeline ROW	-	0.0042	-	20	-	4-652
W-AB3-PEM-2	Roanoke	Norfolk	37.155664	-80.129569	PEM	RPWWD	03010101	Pipeline ROW	0.1547	-	-	2,495	-	4-652
W-EF46	Roanoke	Norfolk	37.154575	-80.129122	PSS	RPWWD	03010101	Timber Mat Crossing	-	0.0682	-	330	-	4-652
W-KL48-PSS-1	Roanoke	Norfolk	37.152292	-80.130022	PSS	RPWWD	03010101	Pipeline ROW	-	0.0454	-	733	-	4-653
W-KL48-PEM	Roanoke	Norfolk	37.151965	-80.130049	PEM	RPWWD	03010101	Pipeline ROW	0.0063	-	-	31	-	4-653
W-KL48-PSS-2	Roanoke	Norfolk	37.150926	-80.131271	PSS	RPWWD	03010101	Pipeline ROW	-	0.0264	-	128	-	4-653
W-KL50	Roanoke	Norfolk	37.150728	-80.131537	PEM	RPWWN	03010101	Pipeline ROW	0.0408	-	-	658	-	4-653
W-KL49	Roanoke	Norfolk	37.150297	-80.132193	PEM	RPWWN	03010101	Timber Mat Crossing	0.0152	-	-	74	-	4-653
W-KL51-PEM	Roanoke	Norfolk	37.150006	-80.132403	PEM	RPWWD	03010101	Timber Mat Crossing	0.0063	-	-	30	-	4-653
W-KL51-PSS	Roanoke	Norfolk	37.149975	-80.132476	PSS	RPWWD	03010101	Timber Mat Crossing	-	0.0080	-	39	-	4-653
W-MN7-PEM	Roanoke	Norfolk	37.148328	-80.133901	PEM	RPWWD	03010101	Timber Mat Crossing	0.0116	-	-	56	-	4-653
W-EF44	Roanoke	Norfolk	37.142977	-80.138322	PEM	RPWWD	03010101	Timber Mat Crossing	0.0085	-	-	41	-	4-654
W-IJ36	Roanoke	Norfolk	37.138922	-80.139845	PSS	RPWWD	03010101	Timber Mat Crossing	-	0.1237	-	599	-	4-655
W-Z7	Roanoke	Norfolk	37.136601	-80.128216	PSS	RPWWD	03010101	Temporary Access Road	-	0.0003	-	1	-	4-657
W-Z6	Roanoke	Norfolk	37.136466	-80.128238	PFO	RPWWD	03010101	Temporary Access Road	-	0.0028	-	14	-	4-657
W-IJ62	Roanoke	Norfolk	37.135529	-80.134044	PEM	RPWWD	03010101	Temporary Access Road	0.0001	-	-	1	-	4-656
W-Y2	Roanoke	Norfolk	37.134284	-80.137448	PEM	RPWWD	03010101	Timber Mat Crossing	0.0189	-	-	91	-	4-656

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W-IJ10	Roanoke	Norfolk	37.132561	-80.131744	PEM	RPWWD	03010101	Permanent Access Road	0.0020	-	-	10	-	4-656
W-Q11	Roanoke	Norfolk	37.132470	-80.131638	PEM	RPWWD	03010101	Permanent Access Road	0.0130	-	-	63	-	4-656
W-KL1	Roanoke	Norfolk	37.132456	-80.131463	PEM	RPWWN	03010101	Permanent Access Road	0.0018	-	-	9	-	4-656
W-B25-PEM-4	Roanoke	Norfolk	37.128942	-80.133774	PEM	RPWWD	03010101	Timber Mat Crossing	0.0093	-	-	45	-	4-659
W-B25-PEM-1	Roanoke	Norfolk	37.128645	-80.133283	PEM	RPWWD	03010101	Pipeline ROW	0.1934	-	-	3,120	-	4-659
W-B24-PSS	Roanoke	Norfolk	37.128540	-80.130794	PSS	RPWWD	03010101	Pipeline ROW	-	0.1637	-	2,641	-	4-659
W-B24-PEM	Roanoke	Norfolk	37.128530	-80.131060	PEM	RPWWD	03010101	Pipeline ROW	0.1031	-	-	1,663	-	4-659
W-B25-PSS-2	Roanoke	Norfolk	37.128527	-80.132335	PSS	RPWWD	03010101	Timber Mat Crossing	-	0.0830	-	402	-	4-659
W-B25-PEM-1	Roanoke	Norfolk	37.128449	-80.132802	PEM	RPWWD	03010101	Timber Mat Crossing	0.0140	-	-	68	-	4-659
W-B25-PEM-2	Roanoke	Norfolk	37.128436	-80.132646	PEM	RPWWD	03010101	Timber Mat Crossing	0.0048	-	-	78	-	4-659
W-ST2-PEM	Franklin	Norfolk	37.125329	-80.121460	PEM	RPWWD	03010101	Pipeline ROW	0.1142	-	-	1,842	-	4-661
W-RR4	Franklin	Norfolk	37.125117	-80.113530	PEM	RPWWD	03010101	Permanent Access Road	0.0216	-	-	105	-	4-662
W-RR3	Franklin	Norfolk	37.124214	-80.114746	PEM	RPWWD	03010101	Permanent Access Road	0.0019	-	-	9	-	4-662
W-KL41	Franklin	Norfolk	37.123851	-80.115802	PEM	RPWWD	03010101	Permanent Access Road	0.0229	-	-	111	-	4-661
W-D7-PEM	Franklin	Norfolk	37.121559	-80.085750	PEM	RPWWD	03010101	Pipeline ROW	0.0159	-	-	77	-	4-666
W-EF3	Franklin	Norfolk	37.117734	-80.095992	PEM	RPWWD	03010101	Permanent Access Road	0.0265	-	-	128	-	4-665
W-IJ1	Franklin	Norfolk	37.092927	-80.027568	PEM	RPWWD	03010101	Pipeline ROW	0.0416	-	-	671	-	4-677
W-IJ2-PSS	Franklin	Norfolk	37.092645	-80.027176	PSS	RPWWD	03010101	Pipeline ROW	-	0.0080	-	129	-	4-677
W-IJ2-PEM	Franklin	Norfolk	37.092596	-80.027214	PEM	RPWWD	03010101	Pipeline ROW	0.0168	-	-	271	-	4-677
W-GH2	Franklin	Norfolk	37.092404	-79.983182	PSS	RPWWD	03010101	Timber Mat Crossing	-	0.0130	-	63	-	4-684
W-II8	Franklin	Norfolk	37.091357	-79.992006	PEM	RPWWD	03010101	Timber Mat Crossing	0.0088	-	-	43	-	4-683
W-IJ6	Franklin	Norfolk	37.089156	-80.005036	PEM	RPWWD	03010101	Timber Mat Crossing	0.0046	-	-	22	-	4-681
W-E7	Franklin	Norfolk	37.084557	-79.947595	PEM	RPWWD	03010101	Pipeline ROW	0.2522	-	-	4,068	-	4-690
W-E8	Franklin	Norfolk	37.082843	-79.946100	PEM	RPWWD	03010101	Pipeline ROW	0.0691	-	-	1,114	-	4-690
W-EF51	Franklin	Norfolk	37.064781	-79.874460	PEM	RPWWD	03010101	Pipeline ROW	0.0133	-	-	64	-	4-705
W-KL43b	Franklin	Norfolk	37.059608	-79.840707	PEM	RPWWD	03010101	Pipeline ROW	0.0004	-	-	2	-	4-710
W-CD6	Franklin	Norfolk	37.057586	-79.915232	PEM	RPWWN	03010101	Timber Mat Crossing	0.0934	-	-	452	-	4-698
W-CD5	Franklin	Norfolk	37.055438	-79.910624	PFO	RPWWN	03010101	Pipeline ROW	-	0.1136	-	1,833	-	4-698
W-EF48	Franklin	Norfolk	37.052142	-79.886197	PEM	RPWWD	03010101	Timber Mat Crossing	0.0080	-	-	39	-	4-702
W-CD1	Franklin	Norfolk	37.047767	-79.897568	PFO	RPWWD	03010101	Pipeline ROW	-	0.1106	-	1,785	-	4-701
W-DD1	Franklin	Norfolk	37.031961	-79.788589	PEM	RPWWN	03010101	Pipeline ROW	0.0813	-	-	1,312	-	4-720
W-A12-PFO	Franklin	Norfolk	37.031754	-79.788099	PFO	RPWWD	03010101	Pipeline ROW	-	0.0040	-	19	-	4-720
W-A12-PEM	Franklin	Norfolk	37.031643	-79.788111	PEM	RPWWD	03010101	Pipeline ROW	0.0651	-	-	1,050	-	4-720
W-GH16	Franklin	Norfolk	37.028394	-79.773243	PFO	RPWWD	03010101	Timber Mat Crossing	-	0.0657	-	318	-	4-722
W-H17	Franklin	Norfolk	36.989390	-79.722090	PFO	RPWWD	03010101	Timber Mat Crossing	-	0.0369	-	179	-	4-730
W-H11	Franklin	Norfolk	36.988077	-79.702803	PEM	RPWWD	03010101	Pipeline ROW	0.0468	-	-	755	-	4-734
W-H16	Franklin	Norfolk	36.988073	-79.714967	PEM	RPWWD	03010101	Timber Mat Crossing	0.0232	-	-	112	-	4-731
W-H14	Franklin	Norfolk	36.988069	-79.711841	PEM	RPWWD	03010101	Timber Mat Crossing	0.0061	-	-	30	-	4-732
W-A8	Franklin	Norfolk	36.987947	-79.700844	PEM	RPWWD	03010101	Pipeline ROW	0.0154	-	-	75	-	4-734
W-H15	Franklin	Norfolk	36.987938	-79.714829	PSS	RPWWD	03010101	Timber Mat Crossing	-	0.0071	-	35	-	4-731
W-H9	Franklin	Norfolk	36.978536	-79.682057	PEM	RPWWN	03010101	Timber Mat Crossing	0.0085	-	-	41	-	4-736
W-H6	Franklin	Norfolk	36.972189	-79.663042	PEM	RPWWD	03010101	Pipeline ROW	0.0057	-	-	28	-	4-741
W-D3	Pittsylvania	Norfolk	36.965318	-79.598760	PFO	RPWWN	03010101	Timber Mat Crossing	-	0.0285	-	138	-	4-748
W-MM17	Franklin	Norfolk	36.964731	-79.617067	PEM	RPWWD	03010101	Pipeline ROW	0.0068	-	-	110	-	4-746
W-B5	Pittsylvania	Norfolk	36.959293	-79.586201	PEM	RPWWN	03010101	Pipeline ROW	0.0048	-	-	23	-	4-751
W-B4-PSS	Pittsylvania	Norfolk	36.957884	-79.583666	PSS	RPWWD	03010101	Pipeline ROW	-	0.0047	-	23	-	4-751
W-C1	Pittsylvania	Norfolk	36.929954	-79.526831	PEM	RPWWN	03010101	Timber Mat Crossing	0.0182	-	-	88	-	4-758
W-H5	Pittsylvania	Norfolk	36.924983	-79.517159	PEM	RPWWD	03010101	Pipeline ROW	0.2067	-	-	3,335	-	4-759
W-B3	Pittsylvania	Norfolk	36.916508	-79.492360	PEM	RPWWN	03010101	Timber Mat Crossing	0.0013	-	-	6	-	4-762
W-CC2-PEM	Pittsylvania	Norfolk	36.905418	-79.471566	PEM	RPWWD	03010105	Timber Mat Crossing	0.0272	-	-	132	-	4-765
W-MM5	Pittsylvania	Norfolk	36.903012	-79.468192	PSS	RPWWD	03010105	Timber Mat Crossing	-	0.0390	-	189	-	4-766
W-MM9	Pittsylvania	Norfolk	36.894087	-79.446110	PEM	RPWWN	03010105	Timber Mat Crossing	0.0108	-	-	52	-	4-769
W-MM8-PEM	Pittsylvania	Norfolk	36.894034	-79.445486	PEM	RPWWN	03010105	Pipeline ROW	0.0553	-	-	893	-	4-769
W-MM8-PFO	Pittsylvania	Norfolk	36.893930	-79.445461	PFO	RPWWN	03010105	Pipeline ROW	-	0.0421	-	679	-	4-769
W-Q2	Pittsylvania	Norfolk	36.884674	-79.428607	PFO	RPWWD	03010105	Pipeline ROW	-	0.3770	-	6,082	-	4-771
W-Q1	Pittsylvania	Norfolk	36.883985	-79.427305	PEM	RPWWD	03010105	Pipeline ROW	0.0146	-	-	236	-	4-771
W-G2	Pittsylvania	Norfolk	36.851816	-79.385930	PEM	RPWWD	03010105	Timber Mat Crossing	0.0346	-	-	167	-	4-779
W-H1	Pittsylvania	Norfolk	36.836097	-79.360895	PEM	RPWWN	03010105	Pipeline ROW	0.0110	-	-	53	-	4-782
W-EF6	Pittsylvania	Norfolk	36.835004	-79.339128	PFO	RPWWD	03010105	Pipeline ROW	-	0.0667	-	323	-	4-786

Table 3. Wetland Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (acres) ⁴	Permanent Conversion Impacts (acres) ⁴	Permanent Fill Impacts (acres) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-H2	Pittsylvania	Norfolk	36.834817	-79.360479	PEM	RPWWD	03010105	Pipeline ROW	0.7987	-	-	12,886	-	4-782
W-IJ21	Pittsylvania	Norfolk	36.834623	-79.338527	PFO	RPWWN	03010105	Timber Mat Crossing	-	0.0106	-	51	-	4-786
W-H3	Pittsylvania	Norfolk	36.833741	-79.360081	PEM	RPWWN	03010105	Pipeline ROW	0.0509	-	-	821	-	4-783
W-MM3	Pittsylvania	Norfolk	36.830361	-79.356631	PSS	RPWWD	03010105	Pipeline ROW	-	0.0340	-	548	-	4-783
W-IJ22-PEM	Pittsylvania	Norfolk	36.827780	-79.350264	PEM	RPWWD	03010105	Timber Mat Crossing	0.0390	-	-	189	-	4-784
W-IJ22-PFO	Pittsylvania	Norfolk	36.827748	-79.350295	PFO	RPWWD	03010105	Timber Mat Crossing	-	0.0785	-	380	-	4-784

Notes:

- 1
- In decimal degrees.
- 2
- PEM = Palustrine Emergent
- PSS = Palustrine Scrub-Shrub
- PFO = Palustrine Forested
- 3
- RPWWD = Wetlands directly abutting Relatively Permanent Waters (RPWs) that flow directly or indirectly into Traditional Navigable Waterways (TNWs)
- RPWWN = Wetlands adjacent but not directly abutting RPWs that flow directly or indirectly into TNWs
- NRPWW = Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- 4
- Construction of access roads will not result in impacts to tidal wetlands or wetlands adjacent to tidal waters. Construction, maintenance, or expansion of substation facilities will not result in discharges to non-tidal wetlands adjacent to tidal waters of the United States.
- Acres are rounded to four decimal places.
- 5
- Temporary fill discharge into waters of the U.S. Cubic yards are rounded to the nearest whole number.
- 6
- Permanent fill associated with the construction of permanent access road and facilities. Cubic yards are rounded to the nearest whole number.

Table 4. Stream Impacts Summary (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

USACE District	Flow Regime	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact (acres)	Permanent Impact (acres)	Temporary Fill (cubic yards)	Permanent Fill (cubic yards)
Pittsburgh District	Ephemeral	617	137	0.0456	0.0093	500	42
	Intermittent	332	0	0.0450	0.0000	622	0
	Perennial	1,007	55	0.3521	0.0368	4,458	178
	Pittsburgh District Total	1,956	192	0.4427	0.0461	5,580	220
Huntington District	Ephemeral	4,966	265	0.4033	0.0224	4,761	91
	Intermittent	5,599	296	0.6611	0.0360	8,445	152
	Perennial	8,586	363	3.0622	0.1209	42,751	587
	Huntington District Total	19,151	924	4.1266	0.1793	55,957	830
Norfolk District	Ephemeral	3,980	31	0.4741	0.0050	6,285	24
	Intermittent	6,383	0	0.8112	0.0000	10,478	0
	Perennial	6,971	32	2.2754	0.0051	30,338	25
	Norfolk District Total	17,334	63	3.5607	0.0101	47,101	49
All District	Ephemeral	9,563	433	0.9230	0.0367	11,546	157
	Intermittent	12,314	296	1.5173	0.0360	19,545	152
	Perennial	16,564	450	5.6897	0.1628	77,547	790
	All Districts Grand total	38,441	1,179	8.1300	0.2355	108,638	1,099

Table 5. Wetland Impacts Summary (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

USACE District	Cowardin Class	Temporary Impacts (acres)	Permanent Conversion Impacts (acres)	Permanent Fill Impacts (acres)	Temporary Fill (cubic yards)	Permanent Fill (cubic yards)
Pittsburgh District	PEM	2.2376	0.0000	0.0000	19,229	0
	PSS	0.0000	0.1444	0.0000	699	0
	PFO	0.0000	0.0110	0.0000	127	0
	Pittsburgh District Total	2.2376	0.1554	0.0000	20,055	0
Huntington District	PEM	7.9213	0.0000	0.4374	90,148	2,723
	PSS	0.0000	0.3698	0.0084	5,306	40
	PFO	0.0000	1.2251	0.0000	17,100	0
	Huntington District Total	7.9213	1.5949	0.4458	112,554	2,763
Norfolk District	PEM	3.9652	0.0000	0.0392	56,755	190
	PSS	0.0000	0.7644	0.0000	7,029	0
	PFO	0.0000	1.1898	0.0000	14,683	0
	Norfolk District Total	3.9652	1.9542	0.0392	78,467	190
All District	PEM	14.1241	0.0000	0.4766	166,132	2,913
	PSS	0.0000	1.2786	0.0084	13,034	40
	PFO	0.0000	2.4259	0.0000	31,910	0
	All Districts Grand Total	14.1241	3.7045	0.4850	211,076	2,953

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
Individual Permit Application
Mountain Valley Pipeline Project

USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	A-001	W-A1a, S-A1a	Dry-Ditch Open-Cut	69	-	N	106	51	648	N	N	\$178,577	Dry-Ditch Open-Cut	This crossing is situated on a long and steep slope on one side that would create logistically difficult construction conditions and provide insufficient area for a bore pit spoils. Additionally, the presence of existing utilities and a completed road crossing do not allow sufficient workspace for excavation of a bore pit and operation of conventional boring or tunneling equipment.
			Conventional Bore	69	28	N	106	51	648	N	N	\$451,592		
Huntington	A-003	S-A3a	Dry-Ditch Open-Cut	47	-	N	71	49	932	N	N	\$64,909	Dry-Ditch Open-Cut	This crossing is situated on a long and steep slope on one side that would involve logistically difficult construction conditions and provide insufficient area for a bore pit spoils. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	47	34	N	71	49	932	N	N	\$754,544		
Huntington	A-005	S-A124	Dry-Ditch Open-Cut	203	-	N	59	44	1432	N	N	\$188,752	Dry-Ditch Open-Cut	This one foot wide stream is situated on a long and steep slope that would involve logistically difficult construction conditions and would require an excessively deep bore pit for a trenchless crossing. An already completed stream crossing is located near this resource which further reduces the available work space and creates an insufficient area for a bore pit soil stockpile. Furthermore, the time to complete a trenchless crossing is nearly four times as long and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	203	48	N	59	44	1432	N	N	\$3,194,292		
Huntington	A-006	W-A27-PFO, W-A27-PEM, S-A118	Dry-Ditch Open-Cut	95	-	N	74	62	1268	N	N	\$90,372	Dry-Ditch Open-Cut	This crossing is located in a valley that has long and steep slopes on both sides which would require a technically and logistically challenging winching system. In addition, the deep bore pits would require additional areas to stockpile soils which may require additional tree clearing in known use Indiana Bat habitat. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	95	36	N	74	62	1268	N	N	\$927,306		
Huntington	A-008	S-A120, S-A119, W-A34	Dry-Ditch Open-Cut	85	-	N	36	20	629	N	Y	\$102,339	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	85	29	N	36	20	629	N	Y	\$506,135		
Pittsburgh	A-009	W-B1a	Dry-Ditch Open-Cut	40	-	N	57	47	350	N	N	\$28,000	Dry-Ditch Open-Cut	This small wetland is located on a steep slope would create logistically difficult construction conditions on both sides of the crossing and provide insufficient room for the spoils from the excessively deep bore pits. The bore duration is estimated to be twice as long and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	40	49	N	57	47	350	N	N	\$2,786,247		
Pittsburgh	A-010/011	S-B2a, W-A40, S-B3a	Dry-Ditch Open-Cut	243	-	N	58	47	711	N	N	\$198,323	Dry-Ditch Open-Cut	This crossing is located on a long and steep slope on one side that would create logistically difficult construction conditions and would require an excessively deep bore pit for a trenchless crossing. Furthermore, the estimated time to complete a trenchless crossing is nearly five times as long and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	243	49	N	58	47	711	N	N	\$3,362,357		
Pittsburgh	A-012	S-A11a, S-A11a-Braid-1, S-A11a-Braid-2	Dry-Ditch Open-Cut	96	-	N	79	59	375	N	N	\$114,692	Dry-Ditch Open-Cut	This crossing is located at the base of a steep slope that would involve logistically difficult construction conditions and would require an excessively deep bore pit for a trenchless crossing. Furthermore, the estimated time to complete a trenchless crossing is nearly four times as long and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	96	43	N	79	59	375	N	N	\$2,617,901		
Pittsburgh	A-013	W-UU3	Dry-Ditch Open-Cut	30	-	N	38	7	0	N	Y	\$21,000	Dry-Ditch Open-Cut	This narrow wetland (less than five feet wide at the pipeline crossing) would be excessively expensive to complete as a trenchless bore. In addition, the bore pits are of such depth (nearly 40-feet) that benching would be required, thereby increasing the amount of spoils created at the crossing and reducing the amount of available workspace.
			Conventional Bore	30	17	N	38	7	0	N	Y	\$162,784		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
Individual Permit Application
Mountain Valley Pipeline Project

USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Pittsburgh	A-014	S-UU3	Dry-Ditch Open-Cut	73	-	N	55	45	808	N	N	\$264,165	Dry-Ditch Open-Cut	This crossing is located adjacent to long and steep slope that would involve logistically difficult construction conditions, an extensive equipment winching system, and an excessively deep bore pit for a trenchless crossing.
			Conventional Bore	73	36	N	55	45	808	N	N	\$864,870		
Pittsburgh	A-015	S-UU5, W-UU4	Dry-Ditch Open-Cut	190	-	N	48	32	412	N	Y	\$148,124	Dry-Ditch Open-Cut	This crossing is located on long and steep slope that would involve logistically difficult construction conditions, an extensive equipment winching system, and an excessively deep bore pit (37') that would require benching for a trenchless crossing. Furthermore, the estimated time to complete a trenchless crossing is nearly twice as long and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	190	37	N	48	32	412	N	Y	\$1,215,184		
Pittsburgh	A-016	W-K43, S-K73, S-K74, S-K75, W-K44	Dry-Ditch Open-Cut	286	-	N	58	36	453	N	N	\$222,731	Dry-Ditch Open-Cut	This crossing is located in a valley that has long and steep slopes on both sides which would require an extensive equipment winching system. In addition, the deep bore pits would require benching, which increases the total volume of material to be excavated. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. The estimated time to complete a trenchless crossing is nearly double and the cost is excessively expensive.
			Conventional Bore	286	36	N	58	36	453	N	N	\$1,469,361		
Huntington	A-017	W-K45, S-K77	Dry-Ditch Open-Cut	38	-	N	70	35	645	N	N	\$41,532	Dry-Ditch Open-Cut	This crossing is located adjacent to a long and steep slope that would involve logistically difficult construction conditions, a winching system that is beyond standard procedures and a deep bore pit for a trenchless crossing. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	38	28	N	70	35	645	N	N	\$363,615		
Huntington	A-018	S-K67	Dry-Ditch Open-Cut	36	-	N	77	51	341	N	N	\$60,206	Dry-Ditch Open-Cut	This crossing is located adjacent to a steep slope that would involve logistically difficult construction conditions, an extensive winching system and a deep bore pit for a trenchless crossing. In addition, the excessively deep bore pits (nearly 40 feet) would create a large volume of material to be excavated and stockpile. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. The estimated time to complete a trenchless crossing is more than double and the cost is unreasonably high relative to the proposed construction method.
			Conventional Bore	36	39	N	77	51	341	N	N	\$814,673		
Huntington	A-019A	S-K65	Dry-Ditch Open-Cut	37	-	N	64	49	148	N	Y	\$55,234	Dry-Ditch Open-Cut	This crossing is located adjacent to a steep slope that would involve logistically difficult construction conditions and a deep bore pit for a trenchless crossing. In addition, the excessively deep bore pits (over 40 feet) would create a large volume of material to be excavated and stockpiled. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. The estimated time to complete a trenchless crossing is more than four times longer than an open cut and the cost is unreasonably high relative to the proposed construction method.
			Conventional Bore	37	41	N	64	49	148	N	Y	\$2,341,369		
Huntington	B-001	S-A110/K62, W-A23, S-A109	Dry-Ditch Open-Cut	238	-	N	73	33	0	N	Y	\$194,600	Dry-Ditch Open-Cut	The estimated time to complete a trenchless crossing is nearly three times and the cost is excessively expensive. In addition, the bore pits are nearly 40-feet deep which requires benching, trench shoring, and sufficient room to create the bench and store the stockpiled material.
			Conventional Bore	238	39	N	73	33	0	N	Y	\$1,387,946		
Huntington	B-001A	S-A111	Dry-Ditch Open-Cut	38	-	N	75	58	667	N	N	\$77,982	Dry-Ditch Open-Cut	This crossing is located adjacent to a long and steep slope on one side that would involve logistically difficult construction conditions, an extensive winching system and a deep bore pit for a trenchless crossing. The proximity of adjacent resources reduces the available amount of room to store the excavated material. Furthermore, the time to complete the trenchless crossing is more than double and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	38	37	N	75	58	667	N	N	\$783,810		
Pittsburgh	B-002	W-J40, S-K82, S-K94	Dry-Ditch Open-Cut	223	-	N	43	29	291	N	N	\$228,434	Dry-Ditch Open-Cut	The pipeline is already installed through a portion of the wetland at this crossing. The layout of a conventional bore would require excavation of a bore pit unacceptably close to the installed pipe. Boring also would not avoid or minimize impacts to the resources because it would require excavation of a bore pit within the wetland.
			Conventional Bore	223	25	N	43	29	291	N	N	\$861,237		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
Individual Permit Application
Mountain Valley Pipeline Project

USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Pittsburgh	B-003	S-J44	Dry-Ditch Open-Cut	46	-	N	70	44	1017	N	N	\$50,537	Dry-Ditch Open-Cut	This stream is approximately five feet wide where the pipeline crosses. It is located a steep valley, with extremely long slopes that would create logistically difficult construction conditions, require extensive winching systems, and bore pits would be approximately 40 feet deep. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. The estimated time to complete a trenchless crossing is three times longer than an open cut and the cost is excessively expensive.
			Conventional Bore	46	39	N	70	44	1017	N	N	\$843,053		
Huntington	B-005	W-K33-PEM	Dry-Ditch Open-Cut	117	-	N	75	57	496	N	N	\$81,900	Dry-Ditch Open-Cut	This crossing is located adjacent to a long and steep slope that would involve logistically difficult construction conditions, an extensive winching system and a deep bore pit (48-feet) for a trenchless crossing. In addition, the excessively deep bore pits would create a large volume of material to be excavated and stockpiled. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	117	48	N	75	57	496	N	N	\$2,950,226		
Pittsburgh	B-006	W-K31	Dry-Ditch Open-Cut	96	-	N	62	55	220	N	N	\$67,200	Dry-Ditch Open-Cut	This crossing is situated on a steep slope that would involve logistically difficult construction conditions, deep bore pits (nearly 40-feet), and provide insufficient area for a bore pit soil stockpile. Furthermore, the time to complete the trenchless crossing is nearly double of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	96	39	N	62	55	220	N	N	\$984,952		
Pittsburgh	B-007	W-B46	Dry-Ditch Open-Cut	143	-	N	56	21	417	N	N	\$100,100	Dry-Ditch Open-Cut	This crossing is situated on a long and steep slope that would involve logistically difficult construction conditions, extensive winching systems, deep bore pits, and provides insufficient area for a bore pit soil stockpile. Furthermore, the time to complete the trenchless crossing is double of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	143	30	N	56	21	417	N	N	\$953,913		
Pittsburgh	B-008	S-H180	Dry-Ditch Open-Cut	45	-	N	32	20	0	N	Y	\$78,375	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are 39-feet deep, which minimizes the available area to complete an efficient crossing. Furthermore, the time to complete the trenchless crossing is more than double of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	45	39	N	32	20	0	N	Y	\$840,215		
Pittsburgh	B-009	W-H112	Dry-Ditch Open-Cut	260	-	N	9	4	0	N	Y	\$182,000	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to 0.02 acre of PEM. Avoiding/minimizing this minor impact through a conventional bore would require a 20 feet deep bore pit - possibly requiring the operator to work from a shallow bench within the pit. Furthermore, the conventional bore crossing cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method and take nearly triple the amount of time to complete.
			Conventional Bore	260	20	N	9	4	0	N	Y	\$920,569		
Huntington	B-010	S-I63	Dry-Ditch Open-Cut	74	-	N	100	59	341	N	N	\$122,275	Dry-Ditch Open-Cut	This crossing is located in a valley that has long and steep slopes on both sides which would require an extensive equipment winching system and excessively deep bore pits. The available area to store the excess material is extremely limited due to the narrowed ROW and county road. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	74	52	N	100	59	341	N	N	\$3,046,374		
Huntington	B-011	W-I15	Dry-Ditch Open-Cut	56	-	N	66	43	661	N	N	\$39,200	Dry-Ditch Open-Cut	This crossing is situated on a long and steep slope that would involve logistically difficult construction conditions, extensive winching systems, deep bore pits, and provides insufficient area for a bore pit soil stockpile. Furthermore the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	56	30	N	66	43	661	N	N	\$707,008		
Huntington	B-012	W-H103, S-H160	Dry-Ditch Open-Cut	148	-	N	33	14	462	N	Y	\$187,175	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	148	24	N	33	14	462	N	Y	\$639,254		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	B-013	S-H153	Dry-Ditch Open-Cut	42	-	N	58	41	567	N	N	\$82,922	Dry-Ditch Open-Cut	This crossing is situated in a valley with steep slopes on both sides of the resource. The topographical constraints complicate the limits of the winching system, creating a logistically difficult construction condition and deep bore pits. In addition there is insufficient area to store the bore pit stockpile in the immediate area. Furthermore the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	42	36	N	58	41	567	N	N	\$776,893		
Huntington	B-014A	S-H145	Dry-Ditch Open-Cut	32	-	N	76	39	520	N	N	\$85,448	Dry-Ditch Open-Cut	This crossing is adjacent to a long and steep slope that would involve logistically difficult construction conditions, deep bore pits (nearly 40-feet), and provide insufficient area for a bore pit soil stockpile. Furthermore, the time to complete the trenchless crossing is nearly five times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method
			Conventional Bore	32	39	N	76	39	520	N	N	\$803,321		
Huntington	B-014B	S-H165	Dry-Ditch Open-Cut	17	-	N	61	55	599	N	N	\$35,892	Dry-Ditch Open-Cut	This small stream (less than 10-feet wide) is situated on a long and steep slope that would involve logistically difficult construction conditions, 31-feet deep bore pits, and provide insufficient area for a bore pit soil stockpile. Furthermore, the time to complete the trenchless crossing is nearly six times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	17	31	N	61	55	599	N	N	\$614,596		
Huntington	B-015A	S-CD16, S-VV13	Dry-Ditch Open-Cut	193	-	N	17	6	0	N	N	\$206,271	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	193	25	N	17	6	0	N	N	\$776,098		
Huntington	B-015B	S-VV12, W-CD16, W-VV8	Dry-Ditch Open-Cut	132	-	N	63	40	873	N	Y	\$162,400	Dry-Ditch Open-Cut	This multiple resource crossing present several factors that support an open-cut crossing. The resources are located on a steep slope that is extremely long, which would require a winching system of nearly 900-feet. In addition, the bore pits would be 35-feet deep, resulting in an excessive amount of soil, with limited area for storage. The cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	132	35	N	63	40	873	N	Y	\$1,014,042		
Huntington	B-016	S-UV11	Dry-Ditch Open-Cut	54	-	N	71	45	782	N	N	\$90,653	Dry-Ditch Open-Cut	Stream S-UV11 is a perennial stream located adjacent to a steep slope that is extremely long, nearly 800 feet in length with an average slope exceed 45%. The bore pits are estimated to be over 20 feet which would require benching and additional area for spoil storage.
			Conventional Bore	54	23	N	71	45	782	N	N	\$363,349		
Huntington	B-017	W-VV3-PEM, W-VV3-PFO, S-VV2	Dry-Ditch Open-Cut	145	-	N	40	32	439	N	N	\$179,415	Dry-Ditch Open-Cut	This crossing is immediately adjacent to a mainline valve. Trenchless crossing methods are logistically difficult because they would require the pipe to be installed too deeply to facilitate connection to the valve site. An open cut crossing is necessary to facilitate connection to the mainline valve. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	145	30	N	40	32	439	N	N	\$959,589		
Huntington	C-001	S-L60	Dry-Ditch Open-Cut	42	-	N	60	32	189	N	N	\$134,876	Dry-Ditch Open-Cut	The pipeline has already been installed under Big Knawl Road and there is a fully restored steep hill adjacent to the pipe tie-in. Trenchless methods are technically and logistically difficult for this crossing because they would require the removal of the completed road bore and are not less environmentally damaging than this temporary stream impact because the steep hill adjacent to the crossing, which has been fully restored, would have to be re-disturbed to complete a bore. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	42	16	N	60	32	189	N	N	\$192,273		
Huntington	C-002	S-LL1	Dry-Ditch Open-Cut	66	-	N	57	48	420	N	N	\$171,170	Dry-Ditch Open-Cut	This crossing is located adjacent to a steep slope that is extremely long, approximately 420-feet in length with an average slope exceeding 45%. The bore pits are estimated to be nearly 30 feet. These factors create logistically difficult construction conditions, complicated winching systems, and excessive spoils. Furthermore, the time to complete the trenchless crossing is nearly double the duration a.
			Conventional Bore	66	30	N	57	48	420	N	N	\$735,388		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	C-003	S-QR30	Dry-Ditch Open-Cut	47	-	N	79	52	609	N	N	\$58,173	Dry-Ditch Open-Cut	This small stream (less than 10-feet wide) is situated in a valley with long and steep slopes on both approaches. The bore pits are projected to be nearly 50-feet deep, which creates logistically difficult construction conditions and insufficient area for a bore pit soil stockpile. Furthermore, the time to complete the trenchless crossing is five times the duration and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	47	50	N	79	52	609	N	N	\$2,860,658		
Huntington	C-004	S-J70	Dry-Ditch Open-Cut	62	-	N	70	57	886	N	N	\$149,548	Dry-Ditch Open-Cut	This stream is located in a valley with long and steep slopes on both approaches. The bore pits are projected to be nearly 50-feet deep, which creates logistically difficult construction conditions and insufficient area for a bore pit soil stockpile. Furthermore, and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	62	49	N	70	57	886	N	N	\$2,848,682		
Huntington	C-005	S-H123	Dry-Ditch Open-Cut	130	-	N	36	22	431	N	N	\$115,859	Dry-Ditch Open-Cut	This small stream (less than 10-feet wide) is located adjacent to a steep slope, creating an extremely difficult construction procedure due to the winching requirements, bore pit depths (nearly 50-feet deep), and lack of sufficient work space. Furthermore, the time to complete the trenchless crossing is nearly four times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	130	48	N	36	22	431	N	N	\$2,987,120		
Huntington	C-006	W-H90, S-H123	Dry-Ditch Open-Cut	135	-	N	63	37	413	N	N	\$119,359	Dry-Ditch Open-Cut	These resources are located adjacent to a long and steep slopes. The bore pits are projected to be over 50-feet deep and the winch hill length is greater than 400 feet, which creates logistically difficult construction conditions and insufficient area for a bore pit soil stockpile. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method and the construction time is greater than six times an open cut.
			Conventional Bore	135	54	N	63	37	413	N	N	\$3,328,582		
Huntington	C-007	S-H117	Dry-Ditch Open-Cut	146	-	N	87	66	571	N	N	\$159,225	Dry-Ditch Open-Cut	This stream is located in a valley with steep slopes on both approaches. The steep slopes, extremely deep bore pits (67-feet), extreme winch hill conditions and lack of sufficient work space create a situation that is conducive to an open cut. Furthermore, the time to complete the trenchless crossing is nearly three times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	146	67	N	87	66	571	N	N	\$4,068,891		
Huntington	C-008	S-L46	Dry-Ditch Open-Cut	95	-	N	47	40	617	N	N	\$119,663	Dry-Ditch Open-Cut	This stream is located in a valley with steep slopes on both approaches. The steep slopes, extremely deep bore pits (65-feet), extreme winch hill conditions and lack of sufficient work space create a situation that is conducive to an open cut. Furthermore, the time to complete the trenchless crossing is more than double the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	95	65	N	47	40	617	N	N	\$3,815,063		
Huntington	C-009	S-L44	Dry-Ditch Open-Cut	57	-	N	38	27	52	N	Y	\$75,133	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit - creating excessive spoil piles, with limited area for storage. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	57	36	N	38	27	52	N	Y	\$819,463		
Huntington	C-010	S-I57	Dry-Ditch Open-Cut	78	-	N	51	34	690	N	N	\$160,343	Dry-Ditch Open-Cut	This stream is located on a steep slope. The steep slope, extremely deep bore pits (49-feet), extreme winch hill conditions and lack of sufficient work space create a situation that is conducive to an open cut. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	78	49	N	51	34	690	N	N	\$2,894,090		
Huntington	C-011	S-A96/A103	Dry-Ditch Open-Cut	80	-	N	43	38	201	N	N	\$75,460	Dry-Ditch Open-Cut	This small stream (less than 10-feet wide) is located on a steep slope, creating an extremely difficult construction procedure due to bore pit depths (nearly 40-feet deep), steep slopes, and lack of sufficient work space. Furthermore, the time to complete the trenchless crossing is nearly three times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	80	37	N	43	38	201	N	N	\$903,006		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	C-012	S-A97, S-A98	Dry-Ditch Open-Cut	121	-	N	41	35	334	N	N	\$133,056	Dry-Ditch Open-Cut	These small streams are less than 10-feet wide and are located on a steep slope, creating an extremely difficult construction procedure due to bore pit depths (64-feet deep), steep slopes, and lack of sufficient work space. Furthermore, the time to complete the trenchless crossing is nearly 5 times the duration of an open cut and the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	121	64	N	41	35	334	N	N	\$3,834,305		
Huntington	C-013A	S-A100	Dry-Ditch Open-Cut	124	-	Y	42	22	460	N	N	\$366,800	Conventional Bore	There are multiple complicating factors at this crossing location that necessitated the development of a unique solution. The Left Fork Holly River at this location is both wide and deep, and it is bounded on one side by a steep slope. Dealing with high water and unfavorable flow conditions, combined with the need to use winched equipment on one side of the river, make an open cut crossing at this location extraordinarily challenging. Mountain Valley's engineering and construction staff developed a plan to complete this crossing with a conventional bore. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	124	24	Y	42	22	460	N	N	\$571,142		
Huntington	C-013B	S-E78/E82/R1	Dry-Ditch Open-Cut	84	-	N	27	7	0	N	Y	\$340,499	Dry-Ditch Open-Cut	The stream is located next to a steep slope and would require a bore pit exceeding 20 feet which creates excessive spoils in a limited area for storage. The duration of the trenchless crossing is nearly three times longer than the open-cut process, thereby increasing the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	84	21	N	27	7	0	N	Y	\$430,219		
Huntington	C-015	S-KK2, S-KK3b, S-KK4b	Dry-Ditch Open-Cut	220	-	N	50	30	396	N	N	\$168,097	Dry-Ditch Open-Cut	The open cut method would result in a temporary impacts to three small UNTs to Left Fork Holly River, each less than three feet wide. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 40 feet on the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The construction time for the bore is estimated to be five times as long as the open cut and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	220	38	N	50	30	396	N	N	\$1,318,593		
Huntington	C-018	S-F40	Dry-Ditch Open-Cut	92	-	N	42	24	11	N	N	\$165,892	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	92	29	N	42	24	11	N	N	\$526,000		
Huntington	C-019	W-KK3	Dry-Ditch Open-Cut	51	-	N	60	26	296	N	N	\$35,700	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require an extensive winching system on a long steep slope in an already reduced area of work. In addition the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	51	16	N	60	26	296	N	N	\$217,815		
Huntington	C-020	S-F43	Dry-Ditch Open-Cut	74	-	N	45	28	53	N	N	\$100,144	Dry-Ditch Open-Cut	A trenchless crossing on this hillside would require bore pits that are greater than thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. The construction time for the bore is nearly twice as long as the open cut and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	74	32	N	45	28	53	N	N	\$794,631		
Huntington	C-021	S-E67	Dry-Ditch Open-Cut	147	-	N	62	45	284	N	N	\$426,366	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact Right Fork Holly River. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 30 feet on the edge of a long steep slope and the excavation of an interim ramp/bench. The additional equipment and excess spoil materials will greatly limit the available space in a work area that has already been minimized. The construction time for the bore is nearly three times as long as the open cut.
			Conventional Bore	147	34	N	62	45	284	N	N	\$1,038,342		
Huntington	C-022	S-E68	Dry-Ditch Open-Cut	296	-	Y	47	12	63	N	Y	\$860,247	Guided Conventional Bore	The Elk River will be crossed using Microtunnel trenchless methodology. While Mountain Valley will typically avoid crossings with bore pits of this depth, several logistical constraints complicate the open cut methodology. There are numerous large boulders within the proposed crossing - removing and restoring these to preconstruction contours would be extremely difficult to accomplish. In addition, the stream depth complicates the constructability since a larger instream diversion would be required thereby reducing the available space in a work area that has already been minimized. The Elk River is also classified by the WVDNR as Group 1 mussel stream. While mussel survey and relocation efforts were completed in 2019, completing a trenchless crossing will further minimize any potential impacts to mussel species.
			Guided Conventional Bore	296	49	Y	47	12	63	N	Y	\$3,112,112		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	C-023	S-E71	Dry-Ditch Open-Cut	84	-	N	26	18	0	N	Y	\$66,476	Dry-Ditch Open-Cut	This small UNT to the Elk River (less than five feet wide) would require a bore pit that is a minimum of 20 feet deep. Due to this depth, it is likely that the use of a bench and interim access ramp would be required which would create a large volume of material to be excavated and stockpile. The lack of sufficient space to stockpile the material further complicates a trenchless crossing. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	84	20	N	26	18	0	N	Y	\$421,084		
Huntington	C-024	S-H111, S-H114, S-H112	Dry-Ditch Open-Cut	272	-	N	36	12	10	N	N	\$221,802	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	272	18	N	36	12	10	N	N	\$854,144		
Huntington	C-025	S-H113	Dry-Ditch Open-Cut	53	-	N	14	9	0	N	Y	\$82,656	Dry-Ditch Open-Cut	This UNT to the Elk River is located in an area that would require a bore pit depth of nearly 30 feet. The excavation to this depth would require the use of a bench and interim access ramp would be required which would create a large volume of material to be excavated and stockpile. The lack of sufficient space to stockpile the material in a work area that has already been minimized further complicates a trenchless crossing. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	53	29	N	14	9	0	N	Y	\$415,319		
Huntington	C-026	W-H75	Dry-Ditch Open-Cut	45	-	N	59	47	369	N	N	\$31,500	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit, with an excavator operating from a bench within the pit, at the edge of a steep slope. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	45	29	N	59	47	369	N	N	\$392,615		
Huntington	C-027	W-H86	Dry-Ditch Open-Cut	78	-	N	13	9	0	N	Y	\$54,600	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact of approximately 0.001 acre of a PEM wetland. Avoiding/minimizing this minor impact through a conventional bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	78	16	N	13	9	0	N	Y	\$294,440		
Huntington	C-028	S-H110	Dry-Ditch Open-Cut	267	-	N	12	9	0	N	Y	\$251,373	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	267	22	N	12	9	0	N	Y	\$958,705		
Huntington	C-029	S-T29	Dry-Ditch Open-Cut	78	-	N	32	13	1903	N	N	\$162,380	Dry-Ditch Open-Cut	The stream (Houston Run) is located in a valley with extremely steep and long approaches. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 20 feet at the edge of long steep slopes. The additional equipment and excess spoil materials will greatly limit the available space in a work area that has already been minimized, which increases the construction difficulty.
			Conventional Bore	78	17	N	32	13	1903	N	N	\$299,008		
Huntington	C-030	S-A83/A91	Dry-Ditch Open-Cut	72	-	N	56	39	866	N	N	\$138,108	Dry-Ditch Open-Cut	This UNT to Camp Creek is adjacent to a steep long slope. A trenchless crossing on this hillside would require bore pits that are nearly 50-feet deep which would necessitate the use of a bench and interim ramp to access the bore pit and a winching system that is technically and logistically difficult. The construction time for the bore is nearly three times as long as the open cut and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	72	47	N	56	39	866	N	N	\$2,767,971		
Huntington	C-031	S-A93, S-A92	Dry-Ditch Open-Cut	120	-	N	78	39	1190	N	N	\$121,741	Dry-Ditch Open-Cut	These two very small UNTs to Camp Creek are located on a long steep slope. Both streams are less than 10 feet wide. A trenchless crossing on this hillside would require bore pits that are over 60-feet deep which would generate a significant amount of spoils and require a significant winching system to be located on the reduced LOD. The construction time for the bore is nearly twice as long as the open cut and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	120	63	N	78	39	1190	N	N	\$3,776,922		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	C-032	S-H108, W-H67, W-H66, S-H105	Dry-Ditch Open-Cut	367	-	N	57	34	1371	N	N	\$307,728	Dry-Ditch Open-Cut	Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 40 feet on the edge of a very long and steep slope, thereby requiring and extensive winching system and the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The excess spoils and winching system would need to be located on the already reduced LOD. The cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	367	36	N	57	34	1371	N	N	\$1,699,237		
Huntington	C-033	S-H107	Dry-Ditch Open-Cut	45	-	N	7	3	0	N	Y	\$39,885	Dry-Ditch Open-Cut	This crossing is immediately adjacent to a mainline valve. Trenchless crossing methods are logistically difficult due to the connection to the valve site. An open cut crossing is necessary to facilitate the connection to the mainline valve.
			Conventional Bore	45	13	N	7	3	0	N	Y	\$187,085		
Huntington	C-034	W-H64-PEM, W-H64-PEM-2, W-H64 PSS, S-H104	Dry-Ditch Open-Cut	172	-	N	48	20	0	N	Y	\$173,907	Dry-Ditch Open-Cut	This crossing is adjacent to a mainline valve. Trenchless crossing methods are logistically difficult because they would require the pipe to be installed too deeply to facilitate connection to the valve site. An open cut crossing is necessary to facilitate connection to the mainline valve.
			Conventional Bore	172	20	N	48	20	0	N	Y	\$670,827		
Huntington	C-035	W-H60, W-H61	Dry-Ditch Open-Cut	312	-	N	20	8	0	N	Y	\$218,400	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	312	16	N	20	8	0	N	Y	\$958,528		
Huntington	C-036	W-B39	Dry-Ditch Open-Cut	101	-	N	36	23	288	N	N	\$70,700	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit - creating excessive spoil piles, with limited area for storage. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	101	24	N	36	23	288	N	N	\$505,869		
Huntington	C-037	W-B31	Dry-Ditch Open-Cut	99	-	N	36	31	1103	N	Y	\$69,300	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit on an extremely long and steep slope which would create excessive spoil piles in a topographical setting that requires an extensive winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	99	25	N	36	31	1103	N	Y	\$509,328		
Huntington	C-038	S-B34, S-B35, S-B36, S-B37, S-B38, W-B35, S-B42, S-B39b, S-B39a/B46, S-B45	Dry-Ditch Open-Cut	339	-	N	54	32	54	N	N	\$345,189	Dry-Ditch Open-Cut	These crossings are located along steep slopes and would require the installation of bore pits nearly 40 feet deep requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The bore pits would need to be located on a steep slope that would require a logistically difficult winching process. The duration of the trenchless crossing is nearly five times longer than the open-cut process, thereby increasing the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	339	38	N	54	32	54	N	N	\$1,656,313		
Huntington	C-039	S-O4	Dry-Ditch Open-Cut	79	-	N	54	35	1723	N	N	\$137,791	Dry-Ditch Open-Cut	This crossing is situated on a long steep slope leading into the resource. The topographical constraints would create an extreme winching system, creating a logistically difficult construction condition and deep bore pits. In addition there is insufficient area to store the bore pit stockpile in the immediate area. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	79	33	N	54	35	1723	N	N	\$827,090		
Huntington	D-002	S-F36b	Dry-Ditch Open-Cut	38	-	N	27	11	0	N	Y	\$97,221	Dry-Ditch Open-Cut	A trenchless crossing method at this location could not be completed without excavating a bore pit within a landowner's driveway and blocking access to their home. This situation would continue for several weeks. Accordingly, a trenchless crossing of this resource has been deemed logistically impracticable. Additionally, boring is not "appropriate and practicable" for this crossing of a perennial UNT to Birch River because the temporary impacts to be avoided are minor, especially when considered in light of the significant adverse impacts on the homeowner.
			Conventional Bore	38	26	N	27	11	0	N	Y	\$345,345		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-004	S-B32, W-B30	Dry-Ditch Open-Cut	59	-	N	39	26	188	N	N	\$74,406	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	59	20	N	39	26	188	N	N	\$350,135		
Huntington	D-005	W-B28, S-B29	Dry-Ditch Open-Cut	112	-	N	52	40	262	N	N	\$103,401	Dry-Ditch Open-Cut	This crossing is located on a slope that would require bore pits greater than 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	112	34	N	52	40	262	N	N	\$939,013		
Huntington	D-006	S-E50, W-E21	Dry-Ditch Open-Cut	50	-	N	35	32	197	N	N	\$57,357	Dry-Ditch Open-Cut	This crossing is located on a slope that would require bore pits that are 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to bore the resources is nearly three times the duration of the open cut and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	50	30	N	35	32	197	N	N	\$689,980		
Huntington	D-007	S-E50, W-E18-PSS, W-E18-PEM	Dry-Ditch Open-Cut	54	-	N	49	39	136	N	N	\$60,157	Dry-Ditch Open-Cut	This crossing is located on a slope that would require bore pits that are nearly 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable. Furthermore, the time to bore the resources is nearly double and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	54	26	N	49	39	136	N	N	\$390,753		
Huntington	D-008	S-E49	Dry-Ditch Open-Cut	29	-	N	44	31	74	N	N	\$23,805	Dry-Ditch Open-Cut	The UNT to Gauley River is approximately one foot in width, creating less than 0.01 acre of temporary impact. This crossing is located on a slope that would require bore pits that are nearly 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to bore the resources is nearly double and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	29	26	N	44	31	74	N	N	\$319,803		
Huntington	D-010	S-E46	Dry-Ditch Open-Cut	59	-	N	35	27	371	N	N	\$151,288	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	59	27	N	35	27	371	N	N	\$414,078		
Huntington	D-011	W-F12, W-F13, W-F15	Dry-Ditch Open-Cut	174	-	N	7	4	0	N	Y	\$121,800	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	174	15	N	7	4	0	N	Y	\$562,319		
Huntington	D-012	S-F20, W-F11	Dry-Ditch Open-Cut	104	-	N	8	4	0	N	Y	\$109,699	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	104	19	N	8	4	0	N	Y	\$381,930		
Huntington	D-013	W-K23	Dry-Ditch Open-Cut	77	-	N	42	26	32	N	Y	\$53,900	Dry-Ditch Open-Cut	This crossing is located adjacent to a slope that would require bore pits that are nearly 20 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	77	17	N	42	26	32	N	Y	\$296,170		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-014	S-IJ57, W-IJ51	Dry-Ditch Open-Cut	37	-	N	54	32	92	N	N	\$38,154	Dry-Ditch Open-Cut	The open cut would result in approximately 0.05 acre of temporary impacts to the wetland and stream system. This crossing is located adjacent to a slope that would require bore pits that are over 30 feet deep requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method and is estimated to take twice as long.
			Conventional Bore	37	33	N	54	32	92	N	N	\$707,895		
Huntington	D-015	W-IJ50	Dry-Ditch Open-Cut	48	-	N	24	17	0	N	Y	\$33,600	Dry-Ditch Open-Cut	This crossing is located on a slope that would require bore pits that are nearly 20 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to complete the bore is nearly double and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	48	19	N	24	17	0	N	Y	\$223,003		
Huntington	D-016	S-IJ60	Dry-Ditch Open-Cut	40	-	N	62	45	119	N	N	\$48,516	Dry-Ditch Open-Cut	The crossing of this small UNT to Rockcamp Run (less than 10 feet in width) open cut would result in less than 0.02 acre of temporary impact. This crossing is located adjacent to a steep slope that would require bore pits that are over 40 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to complete the bore is nearly six times the open cut method and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	40	42	N	62	45	119	N	N	\$2,404,428		
Huntington	D-017	W-IJ55	Dry-Ditch Open-Cut	49	-	N	40	23	0	N	Y	\$34,300	Dry-Ditch Open-Cut	The crossing of the small PEM system would result in approximately 0.02 acre of temporary impacts. This crossing is located on a slope that would require bore pits that are over 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to complete the bore is nearly double the time of the open cut method and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	49	32	N	40	23	0	N	Y	\$723,681		
Huntington	D-018	S-IJ62	Dry-Ditch Open-Cut	18	-	N	54	28	74	N	N	\$20,473	Dry-Ditch Open-Cut	The crossing of this small UNT to Cherry Run (less than 5 feet in width) open cut would result in less than 0.01 acre of temporary impact. This crossing is located adjacent to a steep slope that would require bore pits that are nearly 30 feet deep which would create excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the time to complete the bore is nearly double the time of the open cut method and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	18	32	N	54	28	74	N	N	\$635,704		
Huntington	D-019	S-B28, W-B27	Dry-Ditch Open-Cut	47	-	N	6	3	0	N	Y	\$70,318	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	47	18	N	6	3	0	N	Y	\$215,597		
Huntington	D-020	W-FF6-PEM, W-FF6-PSS	Dry-Ditch Open-Cut	158	-	N	22	11	0	N	Y	\$110,600	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	158	19	N	22	11	0	N	Y	\$535,181		
Huntington	D-021	W-FF3	Dry-Ditch Open-Cut	37	-	N	23	11	0	N	Y	\$25,900	Dry-Ditch Open-Cut	The crossing of the small PEM system would result in approximately 0.04 acre of temporary impacts. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	37	14	N	23	11	0	N	Y	\$168,948		
Huntington	D-022	S-J32	Dry-Ditch Open-Cut	117	-	N	28	19	10	N	N	\$207,247	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	117	23	N	28	19	10	N	N	\$542,142		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-023	S-A76, W-FF4	Dry-Ditch Open-Cut	43	-	N	35	16	21	N	N	\$51,257	Dry-Ditch Open-Cut	The crossing of the small PEM system and UNT to Big Beaver Creek would result in less than 0.02 acre of temporary impacts. The stream is less than ten feet in width. The bore pits associated with this crossing are 20 feet deep, which may require the use of a ramp and benching thereby creating excessive spoil piles, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	43	20	N	35	16	21	N	N	\$304,727		
Huntington	D-024	W-A17	Dry-Ditch Open-Cut	79	-	N	16	9	0	N	Y	\$55,300	Dry-Ditch Open-Cut	The duration of the trenchless crossing would take longer to complete than the open-cut process, thereby increasing the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside. In addition, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	79	15	N	16	9	0	N	Y	\$292,711		
Huntington	D-025	S-A75	Dry-Ditch Open-Cut	25	-	N	31	13	0	N	Y	\$47,961	Dry-Ditch Open-Cut	Stream S-A75 is an UNT to Big Beaver Creek and would have approximately 0.02 acre of temporary impact. The resource is located adjacent to a slope that would require a bore pit exceeding 20 feet. Bore pits of this depth require an interim ramp and benching to successfully reach the required depth. The deep excavation will create an excessive amount of spoil material that will be difficult to store within the already reduced LOD. In addition, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	25	22	N	31	13	0	N	Y	\$271,913		
Huntington	D-026	S-A74	Dry-Ditch Open-Cut	29	-	N	31	14	0	N	Y	\$32,194	Dry-Ditch Open-Cut	An open cut crossing would create approximately 0.007 acre of temporary impact. However the resource is located on a slope that would require a bore pit nearing 20 feet. Bore pits of this depth may require an interim ramp and benching to successfully reach the required depth. The deep excavation will create an excessive amount of spoil material that will be difficult to store within the already reduced LOD. In addition, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	29	19	N	31	14	0	N	Y	\$169,081		
Huntington	D-027	S-A73, W-A15	Dry-Ditch Open-Cut	59	-	N	18	13	0	N	Y	\$64,472	Dry-Ditch Open-Cut	The open cut would result in approximately 0.10 acre of temporary impacts to the wetland and stream. This crossing is located on a slope requiring bore pits that are over 20 feet deep which necessitate the use of a ramp and benching, resulting in excessive spoil piles, all while being located within an already reduced LOD. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact to the wetland is unavoidable. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	59	23	N	18	13	0	N	Y	\$377,539		
Huntington	D-028	W-A14, S-A72, S-A71, S-A71-Braid	Dry-Ditch Open-Cut	92	-	N	35	25	20	N	N	\$94,208	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	92	22	N	35	25	20	N	N	\$462,058		
Huntington	D-029	S-A67	Dry-Ditch Open-Cut	24	-	N	40	27	50	N	N	\$37,518	Dry-Ditch Open-Cut	Crossings D-029 and D-30 are immediately adjacent to each other and have been evaluated in concert. A trenchless crossing method at this location could not be completed without excavating a bore pit within a landowner's driveway and blocking access to their home. This situation would continue for several weeks. Accordingly, a trenchless crossing of these resources has been deemed logistically impracticable. Additionally, boring is not "appropriate and practicable" for these crossings (a small perennial and intermittent UNT to Big Beaver Creek) because the temporary impacts to be avoided are minor, especially when considered in light of the significant adverse impacts on the homeowner. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	24	23	N	40	27	50	N	N	\$278,209		
Huntington	D-030	S-A69	Dry-Ditch Open-Cut	53	-	N	30	24	0	N	Y	\$62,886	Dry-Ditch Open-Cut	Crossings D-029 and D-30 are immediately adjacent to each other and have been evaluated in concert. A trenchless crossing method at this location could not be completed without excavating a bore pit within a landowner's driveway and blocking access to their home. This situation would continue for several weeks. Accordingly, a trenchless crossing of these resources has been deemed logistically impracticable. Additionally, boring is not "appropriate and practicable" for these crossings (a small perennial and intermittent UNT to Big Beaver Creek) because the temporary impacts to be avoided are minor, especially when considered in light of the significant adverse impacts on the homeowner. Furthermore, the cost to avoid the temporary impacts is unreasonably high relative to the proposed construction method.
			Conventional Bore	53	23	N	30	24	0	N	Y	\$360,511		
Huntington	D-031	W-H53, S-H99	Dry-Ditch Open-Cut	37	-	N	24	14	11	N	N	\$40,220	Dry-Ditch Open-Cut	The open cut would result in approximately 0.01 acre of temporary impacts to the wetland and stream. The stream is extremely small, less than five feet in width and the wetland barely enters the LOD. However, the trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	37	20	N	24	14	11	N	N	\$287,699		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-032	S-A65	Dry-Ditch Open-Cut	99	-	N	58	45	441	N	N	\$321,268	Dry-Ditch Open-Cut	The crossing of Big Beaver Creek using a trenchless method would require bore pits up to 40-feet deep. The crossing is also located adjacent to a long steep slope. The combination of deep bore pits and steep slopes would require excessive excavation, the need for significant stock pile storage, and a using an extensive winching system. Furthermore, the time to complete the bore is nearly six times the open cut method and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	99	40	N	58	45	441	N	N	\$2,462,779		
Huntington	D-034	S-N15	Dry-Ditch Open-Cut	40	-	N	39	33	132	N	N	\$70,014	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	40	23	N	39	33	132	N	N	\$323,617		
Huntington	D-035	S-N14	Dry-Ditch Open-Cut	44	-	N	12	6	0	N	Y	\$65,040	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	44	17	N	12	6	0	N	Y	\$202,516		
Huntington	D-036	S-I43, W-17	Dry-Ditch Open-Cut	73	-	N	26	16	0	N	Y	\$87,745	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	73	20	N	26	16	0	N	Y	\$389,867		
Huntington	D-037	S-I44	Dry-Ditch Open-Cut	32	-	N	28	19	0	N	Y	\$52,288	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	32	19	N	28	19	0	N	Y	\$177,595		
Huntington	D-038	S-I45	Dry-Ditch Open-Cut	20	-	N	51	21	10	N	N	\$33,704	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	20	19	N	51	21	10	N	N	\$143,539		
Huntington	D-039	S-I47	Dry-Ditch Open-Cut	27	-	N	15	12	0	N	Y	\$24,803	Dry-Ditch Open-Cut	Stream S-I47 is an UNT to Gauley River and is very small - less than five feet in width. The temporary impact associated with an open cut is less than 0.01 acre. The cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	27	14	N	15	12	0	N	Y	\$140,568		
Huntington	D-040	S-I48	Dry-Ditch Open-Cut	35	-	N	33	16	41	N	N	\$59,850	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	35	14	N	33	16	41	N	N	\$163,272		
Huntington	D-041	S-J29	Dry-Ditch Open-Cut	420	-	N	54	0	1732	N	Y	\$1,389,500	Dry-Ditch Open-Cut	Mountain Valley has committed to the USFWS that the Gauley River would be bored to prevent possible impacts to potential Candy Darter habitat.
			Microtunnel	420	57	N	54	0	1732	N	Y	\$7,309,091		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-042	W-J8, S-J28	Dry-Ditch Open-Cut	87	-	N	43	27	306	N	N	\$78,505	Dry-Ditch Open-Cut	The open cut would result in approximately 0.06 acre of temporary impacts to the wetland and stream. This crossing is located on a slope that would require bore pits that are nearly 30 feet deep which would create excessive spoil piles and require multiple winching equipment, all while being located within an already reduced LOD. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact to the wetland is unavoidable. Furthermore, the time to bore the resources is double and the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	87	26	N	43	27	306	N	N	\$484,406		
Huntington	D-043	S-J25	Dry-Ditch Open-Cut	73	-	N	29	18	0	N	Y	\$69,641	Dry-Ditch Open-Cut	The temporary impact associated with an open cut is less than 0.01 acre. However, the trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	73	21	N	29	18	0	N	Y	\$399,001		
Huntington	D-044	S-J24	Dry-Ditch Open-Cut	73	-	N	31	9	0	N	Y	\$103,246	Dry-Ditch Open-Cut	This area has been subject to frequent flooding from adjacent streams, which previously caused Mountain Valley to relocate a mainline valve to a different location. These conditions present an unacceptable risk for crews and equipment completing a bore at this location over an extended duration. Completing this crossing of a small UNT to Little Laurel Creek with an open cut minimizes the time construction crews and equipment must be onsite, thereby greatly reducing risks to the safety of the crew, the environment, and the success of the crossing installation.
			Conventional Bore	73	17	N	31	9	0	N	Y	\$284,818		
Huntington	D-045	S-J23-EPH	Dry-Ditch Open-Cut	25	-	N	23	14	0	N	Y	\$20,978	Dry-Ditch Open-Cut	Stream S-J23 is an UNT to Little Laurel Creek and is very small - less than two feet in width. The temporary impact associated with an open cut is less than 0.01 acre. However, the trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	25	17	N	23	14	0	N	Y	\$148,594		
Huntington	D-046	S-J22, W-J7	Dry-Ditch Open-Cut	58	-	N	23	18	0	N	Y	\$52,396	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	58	21	N	23	18	0	N	Y	\$356,431		
Huntington	D-047	S-N10, S-N10-Braid	Dry-Ditch Open-Cut	84	-	N	25	18	0	N	Y	\$78,469	Dry-Ditch Open-Cut	The resources are very small (less than five feet in width) UNT to Skelt Run. The trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	84	20	N	25	18	0	N	Y	\$421,084		
Huntington	D-048	S-EE1	Dry-Ditch Open-Cut	30	-	N	17	11	0	N	Y	\$33,872	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	30	15	N	17	11	0	N	Y	\$153,650		
Huntington	D-049	S-N13	Dry-Ditch Open-Cut	27	-	N	38	18	0	N	Y	\$26,485	Dry-Ditch Open-Cut	The stream is a very small (less than five feet in width) UNT to Skelt Run. The trenchless crossing would require bore pits that are approximately 20 feet deep. Bore pits of this depth may necessitate the use of a ramp and benching, resulting in excessive spoil piles that would need to be located within an already reduced LOD. The minimized LOD is insufficient to stockpile the material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	27	18	N	38	18	0	N	Y	\$158,838		
Huntington	D-050	S-L41	Dry-Ditch Open-Cut	88	-	N	77	63	644	N	N	\$132,036	Dry-Ditch Open-Cut	The crossing of the Jims Creek (S-L41) using a trenchless method would require bore pits that are nearly 60 feet deep. In addition, the crossing is at the base of an extremely long and steep approach. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method and would take more than twice as long to complete.
			Conventional Bore	88	58	N	77	63	644	N	N	\$3,413,379		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-051	S-L38	Dry-Ditch Open-Cut	66	-	N	34	29	21	N	N	\$56,701	Dry-Ditch Open-Cut	Stream S-L38 is an UNT to Riley Branch and is very small - less than five feet in width. The crossing is located adjacent to a steep slope. The temporary impact associated with an open cut is less than 0.01 acre. The trenchless crossing would require bore pits that are approximately 30 feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	66	32	N	34	29	21	N	N	\$771,927		
Huntington	D-052	S-L35	Dry-Ditch Open-Cut	28	-	N	29	21	10	N	N	\$34,350	Dry-Ditch Open-Cut	S-L35 is Riley Branch is less than four feet wide through the project area. Crossing #D-052, 053, and 054 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with D-054 exceeding 30 feet. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Each of these crossings is also located near a steep slope which reduces the available area to stockpile soils without compromising worker safety. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	28	21	N	29	21	10	N	N	\$271,292		
Huntington	D-053	S-L35	Dry-Ditch Open-Cut	42	-	N	30	16	0	N	Y	\$46,900	Dry-Ditch Open-Cut	S-L35 is Riley Branch is less than four feet wide through the project area. Crossing #D-052, 053, and 054 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with D-054 exceeding 30 feet. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Each of these crossings is also located near a steep slope which reduces the available area to stockpile soils without compromising worker safety. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	42	21	N	30	16	0	N	Y	\$311,024		
Huntington	D-054	S-L35	Dry-Ditch Open-Cut	51	-	N	32	25	20	N	N	\$53,200	Dry-Ditch Open-Cut	S-L35 is Riley Branch is less than four feet wide through the project area. Crossing #D-052, 053, and 054 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with D-054 exceeding 30 feet. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Each of these crossings is also located near a steep slope which reduces the available area to stockpile soils without compromising worker safety. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	51	33	N	32	25	20	N	N	\$747,627		
Huntington	D-055	S-I37	Dry-Ditch Open-Cut	36	-	N	38	25	32	N	Y	\$46,550	Dry-Ditch Open-Cut	This resource is an extremely small UNT to Hominy Creek. The width of the stream is less than 10 feet. Due to the location on steep slopes, the bore pits for this stream are nearly 20 feet in depth. Avoiding/minimizing this minor impact through a conventional bore would create excessively deep bore pits and spoil piles. Furthermore the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	36	20	N	38	25	32	N	Y	\$284,861		
Huntington	D-056	S-I38, S-I39	Dry-Ditch Open-Cut	142	-	N	63	45	436	N	N	\$126,985	Dry-Ditch Open-Cut	Both of these resources are UNT to Hominy Creek and each is less than 10 feet in width. Due to the location on steep slopes, the bore pits for this crossing are nearly 50 feet in depth. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	142	47	N	63	45	436	N	N	\$2,966,630		
Huntington	D-057	S-I40	Dry-Ditch Open-Cut	24	-	N	59	27	104	N	N	\$39,183	Dry-Ditch Open-Cut	Stream S-I40 is an UNT to Hominy Creek and is very small - less than ten feet in width. The trenchless crossing would require bore pits that are more than 20 feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit near a steep slope which would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	24	26	N	59	27	104	N	N	\$305,614		
Huntington	D-058	W-I11a, S-I41	Dry-Ditch Open-Cut	47	-	N	42	10	489	N	Y	\$62,159	Dry-Ditch Open-Cut	D-058 and D-059 are adjacent crossings are discussed together due to their proximity. These crossings present multiple confounding constructability challenges that limit the available options and necessitated the development of a unique solution. The access to the location of these crossings is severely limited by long steep slopes, and there is insufficient suitable workspace available for construction equipment and spoil piles necessary to complete a trenchless crossing. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	47	13	N	42	10	489	N	Y	\$192,761		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	D-059	S-I36	Dry-Ditch Open-Cut	116	-	Y	16	7	840	N	N	\$279,787	Dry-Ditch Open-Cut	D-058 and D-059 are adjacent crossings are discussed together due to their proximity. These crossings present multiple confounding constructability challenges that limit the available options and necessitated the development of a unique solution. The access to the location of these crossings is severely limited by long steep slopes, and there is insufficient suitable workspace available for construction equipment and spoil piles necessary to complete a trenchless crossing. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	116	26	Y	16	7	840	N	N	\$566,708		
Huntington	D-061	S-I31	Dry-Ditch Open-Cut	25	-	N	38	32	424	N	N	\$26,015	Dry-Ditch Open-Cut	The bore pits for this crossing are greater than 20 feet in depth and the crossing is located on a long steep slope. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	25	22	N	38	32	424	N	N	\$271,913		
Huntington	E-001	S-H88	Dry-Ditch Open-Cut	37	-	N	45	35	122	N	N	\$167,104	Dry-Ditch Open-Cut	A trenchless crossing method at this location could not be completed without excavating a bore pit within proximity to a landowner private drive. Completing an open cut in this location greatly reduces the construction duration and access can be maintained using road plates. A trenchless crossing of this resource has been deemed logistically impracticable due to the need to maintain the landowner's access over an extended duration and the safety risk of operating heavy equipment for an extended time with a private landowner in close proximity and traversing the site.
			Conventional Bore	37	32	N	45	35	122	N	N	\$689,625		
Huntington	E-002	S-H71, W-H33, W-H35	Dry-Ditch Open-Cut	150	-	N	75	46	282	N	N	\$157,500	Dry-Ditch Open-Cut	This group of resources are located adjacent to a steep slope with bore pits to be 80 feet deep. Avoiding/minimizing this minor impact through a conventional bore would create extremely excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	150	80	N	75	46	282	N	N	\$4,789,334		
Huntington	E-003	S-H67	Dry-Ditch Open-Cut	30	-	N	39	24	31	N	N	\$60,392	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are more than 20 feet deep. Avoiding/minimizing this minor impact (approximately 0.02 acre) through a conventional bore would require a deep bore pit creating excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	30	24	N	39	24	31	N	N	\$304,372		
Huntington	E-004	S-H64, W-H31	Dry-Ditch Open-Cut	54	-	N	26	10	0	N	Y	\$52,782	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are more than 20 feet deep. Avoiding/minimizing this minor impact (approximately 0.03 acre) through a conventional bore would require a deep bore pit creating excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	54	24	N	26	10	0	N	Y	\$372,484		
Huntington	E-005	S-V3	Dry-Ditch Open-Cut	56	-	N	47	26	342	N	N	\$240,231	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	56	23	N	47	26	342	N	N	\$369,025		
Huntington	E-006	W-EF31, S-EF41	Dry-Ditch Open-Cut	55	-	N	20	9	0	N	Y	\$44,212	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are more than 20 feet deep, which would necessitate benching and stockpiling significant amounts of spoil material. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	55	21	N	20	9	0	N	Y	\$347,918		
Huntington	E-009	W-M18	Dry-Ditch Open-Cut	223	-	N	35	10	0	N	Y	\$156,100	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	223	17	N	35	10	0	N	Y	\$710,515		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	E-010	W-M22, W-M23	Dry-Ditch Open-Cut	86	-	N	26	16	0	N	Y	\$60,200	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are nearly 20 feet deep, which may necessitate benching and stockpiling significant amounts of spoil material. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method and would take twice as long to complete.
			Conventional Bore	86	17	N	26	16	0	N	Y	\$321,711		
Huntington	E-011	W-J6	Dry-Ditch Open-Cut	101	-	N	26	10	0	N	Y	\$70,700	Dry-Ditch Open-Cut	The trenchless crossing would require bore pits that are nearly 20 feet deep, which may necessitate benching and stockpiling significant amounts of spoil material. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method .
			Conventional Bore	101	15	N	26	10	0	N	Y	\$355,146		
Huntington	E-012	S-J20	Dry-Ditch Open-Cut	255	-	N	43	16	327	N	N	\$298,496	Conventional Bore	FERC has approved the variance for this crossing which will be completed during the boring of the adjacent rail line.
			Conventional Bore	255	37	N	43	16	327	N	N	\$1,399,653		
Huntington	E-013	S-I25	Dry-Ditch Open-Cut	89	-	N	34	24	10	N	N	\$79,837	Dry-Ditch Open-Cut	Stream S-I25 is an UNT to Meadow Creek and is very small - less than ten feet in width. The trenchless crossing would require bore pits that are more than 20 feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	89	26	N	34	24	10	N	N	\$490,082		
Huntington	E-014	S-I26	Dry-Ditch Open-Cut	26	-	N	31	20	10	N	N	\$33,826	Dry-Ditch Open-Cut	Stream S-I26 is an UNT to Meadow Creek and is very small - less than ten feet in width. The trenchless crossing would require bore pits that are more than 20 feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	26	20	N	31	20	10	N	N	\$256,481		
Huntington	E-015	S-I27	Dry-Ditch Open-Cut	41	-	N	17	13	0	N	Y	\$46,828	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	41	18	N	17	13	0	N	Y	\$198,570		
Huntington	E-016	W-HS1	Dry-Ditch Open-Cut	41	-	N	54	33	724	N	N	\$28,700	Dry-Ditch Open-Cut	The bore pits for this crossing are greater than 30 feet in depth . Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit on an extremely long and steep slope which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	41	32	N	54	33	724	N	N	\$700,977		
Huntington	E-017	W-QR2	Dry-Ditch Open-Cut	322	-	N	10	8	0	N	Y	\$225,400	Dry-Ditch Open-Cut	A trenchless crossing in this location would require bore pits that are nearly thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	322	27	N	10	8	0	N	Y	\$1,160,467		
Huntington	E-018	S-L26, W-L16	Dry-Ditch Open-Cut	42	-	N	27	9	0	N	Y	\$42,210	Dry-Ditch Open-Cut	This crossing is immediately adjacent to a mainline valve. Trenchless crossing methods are logistically difficult because they would require the pipe to be installed too deeply to facilitate connection to the valve site. An open cut crossing is necessary to facilitate connection to the mainline valve. Furthermore, using a conventional bore method to avoid a temporary impact to this small intermittent stream and wetland would be unreasonably high relative to the proposed construction method.
			Conventional Bore	42	23	N	27	9	0	N	Y	\$329,293		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	E-019	S-L27	Dry-Ditch Open-Cut	90	-	N	18	11	0	N	Y	\$70,012	Dry-Ditch Open-Cut	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	90	19	N	18	11	0	N	Y	\$342,198		
Huntington	E-020	S-L30, W-L19, W-L12, W-L13, S-L22	Dry-Ditch Open-Cut	315	-	N	77	46	1723	N	N	\$325,500	Dry-Ditch Open-Cut	Due to the location on steep slopes, the bore pits for this crossing are greater than sixty feet in depth which would create extremely excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method and would take nearly 60 days as long to complete.
			Conventional Bore	315	62	N	77	46	1723	N	N	\$4,275,783		
Huntington	E-021	W-L11, S-L20	Dry-Ditch Open-Cut	53	-	N	76	43	765	N	N	\$54,697	Dry-Ditch Open-Cut	Due to the location, the bore pits for this crossing are greater than thirty feet in depth. Avoiding/minimizing this minor impact (approximately 0.03 acre) through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	53	31	N	76	43	765	N	N	\$716,764		
Huntington	E-022	W-L4, S-L10, S-L11, W-L2	Dry-Ditch Open-Cut	92	-	N	32	20	0	N	Y	\$85,538	Dry-Ditch Open-Cut	A trenchless crossing in this location would require bore pits that are greater than twenty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	92	25	N	32	20	0	N	Y	\$489,462		
Huntington	E-023	S-I21, S-I22	Dry-Ditch Open-Cut	70	-	N	37	28	249	N	N	\$66,994	Dry-Ditch Open-Cut	A trenchless crossing in this location would require bore pits that are greater than twenty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	70	28	N	37	28	249	N	N	\$454,430		
Huntington	F-001	W-K7, S-K17, W-IJ30, W-UV9, W-UV11, W-UV10, W-K9-PEM-1, S-K19	Dry-Ditch Open-Cut	1168	-	N	28	20	92	N	Y	\$887,600	Dry-Ditch Open-Cut	A trenchless crossing in this location would require bore pits that are nearly twenty feet deep. Numerous cultural resources have been avoided by the current alignment. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. The trenchless crossing method would take nearly 160 days to complete, while the proposed method would take approximately 24 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Direct Pipe	1168	15	N	28	20	92	N	Y	\$9,412,510		
Huntington	F-002	S-K21, S-K22	Dry-Ditch Open-Cut	123	-	N	78	32	185	N	N	\$125,156	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to Buffalo Creek. Avoiding/minimizing this minor impact through a conventional bore would require an excessively deep bore pit greater than 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	123	48	N	78	32	185	N	N	\$2,967,254		
Huntington	F-003	S-UV6, W-UV4	Dry-Ditch Open-Cut	70	-	N	49	27	52	N	N	\$75,861	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Morris Fork and wetlands system would require bore pits that are nearly thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	70	27	N	49	27	52	N	N	\$445,295		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-004	W-UV8, S-UV2	Dry-Ditch Open-Cut	345	-	N	65	52	371	N	N	\$290,616	Dry-Ditch Open-Cut	This crossing of a small UNT to Morris Fork presents multiple challenges that limit the available options and necessitate the development of a unique solution. A bore pit depth just short of 40 feet would required the excavation of an interim ramp and bench and dramatically increases the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to this waterbody also increase the complexity of a bored crossing, increase safety risk to personnel, and add risk of impact to the waterbody from upland work during a bore. In addition, this crossing is in close proximity to residences, and a trenchless crossing of this location would take longer than six weeks to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration thereby minimizing the disruption the affected residences and businesses. Accordingly, a trenchless crossing of this resource has been deemed logistically difficult due to the compounding constructability constraints.
			Guided Conventional Bore	345	36	N	65	52	371	N	N	\$1,169,818		
Huntington	F-004A	S-U22	Dry-Ditch Open-Cut	593	-	N	52	35	293	N	Y	\$461,800	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a site-specific solution. The proximity of this stream to the adjacent bore of Interstate-64 makes it difficult to tie-in a bore of this resource. A bore pit depth nearing 40 feet at this location requires the excavation of an interim ramp and bench and dramatically increases the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to the waterbody increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. A trenchless crossing would take more than six weeks to be completed. Use of the open-cut method would reduce the construction duration and minimize noise and other disruptions to nearby persons due to construction activities. Accordingly, a trenchless crossing of this resource has been deemed logistically difficult due to the compounding constructability constraints.
			Guided Conventional Bore	593	37	N	52	35	293	N	Y	\$1,556,221		
Huntington	F-005	W-EE4, S-EE4	Dry-Ditch Open-Cut	154	-	N	19	12	0	N	Y	\$120,716	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Red Spring Branch and wetland system would require bore pits greater than thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	154	32	N	19	12	0	N	Y	\$1,021,669		
Huntington	F-006	S-M6, W-M2	Dry-Ditch Open-Cut	163	-	N	47	32	51	N	N	\$130,313	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Red Spring Branch and wetland system would require bore pits that are nearly forty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method and would also take three times as long to complete.
			Conventional Bore	163	38	N	47	32	51	N	N	\$1,156,828		
Huntington	F-007	S-J13	Dry-Ditch Open-Cut	37	-	N	25	15	0	N	Y	\$43,400	Dry-Ditch Open-Cut	S-J13 is an UNT to Patterson Creek, a very small stream, and is crossed three times by the project. Crossing # F-007, 008, and 009 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with F-009 being nearly thirty feet deep. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Crossing F-009 is in a topographical setting that would require a technically and logistically difficult winching system. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	37	22	N	25	15	0	N	Y	\$305,969		
Huntington	F-008	S-J13	Dry-Ditch Open-Cut	45	-	N	32	21	21	N	Y	\$49,000	Dry-Ditch Open-Cut	S-J13 is an UNT to Patterson Creek, a very small stream, and is crossed three times by the project. Crossing # F-007, 008, and 009 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with F-009 being nearly thirty feet deep. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Crossing F-009 is in a topographical setting that would require a technically and logistically difficult winching system. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	45	21	N	32	21	21	N	Y	\$319,538		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-009	S-J13	Dry-Ditch Open-Cut	75	-	N	42	34	419	N	Y	\$70,000	Dry-Ditch Open-Cut	S-J13 is an UNT to Patterson Creek, a very small stream, and is crossed three times by the project. Crossing # F-007, 008, and 009 are discussed together since the requirements associated with a trenchless crossing are applicable to all three crossings. Each of these crossings would require a bore pit exceeding 20 feet, with F-009 being nearly thirty feet deep. Bore pits of this depth result in a significant amount of excavated material that must be stockpiled. The excess material is not only associated with the depth of the bore, but also the access ramps and associated benching that would be required to reach depths greater than 20 feet. Crossing F-009 is in a topographical setting that would require a technically and logistically difficult winching system. In addition to the deep bore pits and limited operating room, the costs to bore these crossings is unreasonably high relative to the proposed construction method.
			Conventional Bore	75	27	N	42	34	419	N	Y	\$459,485		
Huntington	F-010	S-I17	Dry-Ditch Open-Cut	43	-	N	56	44	1538	N	N	\$38,855	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Lick Creek. The crossing is located at the base of an extremely long and steep slope and require bore pits exceeding forty feet. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	43	31	N	56	44	1538	N	N	\$688,384		
Huntington	F-011	S-I19	Dry-Ditch Open-Cut	66	-	N	50	36	1200	N	N	\$101,669	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to Lick Creek. The crossing is located at the base of an extremely long and steep slope and require bore pits exceeding forty feet. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	66	44	N	50	36	1200	N	N	\$2,587,307		
Huntington	F-011A	S-I20	Dry-Ditch Open-Cut	39	-	N	78	57	735	N	N	\$76,000	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Lick Creek. The crossing is located on an extremely long and steep slope and require bore pits that are nearly forty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit on which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	39	35	N	78	57	735	N	N	\$750,110		
Huntington	F-012	S-N5	Dry-Ditch Open-Cut	63	-	N	33	24	10	N	N	\$52,226	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Hungard Creek would require bore pits greater than 20 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	63	24	N	33	24	10	N	N	\$398,025		
Huntington	F-013	S-K14	Dry-Ditch Open-Cut	35	-	N	40	34	252	N	N	\$44,164	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Hungard Creek would require bore pits greater than twenty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	35	22	N	40	34	252	N	N	\$300,293		
Huntington	F-014	S-N3	Dry-Ditch Open-Cut	106	-	N	6	3	0	N	Y	\$97,922	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	106	15	N	6	3	0	N	Y	\$369,336		
Huntington	F-015	S-N2	Dry-Ditch Open-Cut	48	-	N	36	10	0	N	Y	\$107,232	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	48	15	N	36	10	0	N	Y	\$204,733		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-016	S-CD23	Dry-Ditch Open-Cut	128	-	N	8	3	0	N	Y	\$98,350	Conventional Bore	This crossing is adjacent to planned bored, which will allow the existing bore pits to be utilized to avoid/minimize the aquatic impact at this location by boring. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	128	15	N	8	3	0	N	Y	\$431,772		
Huntington	F-017	S-N4, W-EF40	Dry-Ditch Open-Cut	99	-	N	9	4	0	N	Y	\$83,735	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	99	16	N	9	4	0	N	Y	\$354,038		
Huntington	F-019	S-KL29	Dry-Ditch Open-Cut	208	-	N	46	0	0	N	Y	\$299,600	Dry-Ditch Open-Cut	The pipeline has already been installed under an adjacent road (East Clayton Rd). There is no feasible way to tie the two sections of pipe together if a trenchless method is used to install this crossing. Lastly, substantial increase in cost and lost time (four weeks to complete bore) to avoid a temporary impact to this small, one-foot-wide stream is not appropriate and practicable.
			Conventional Bore	208	35	N	46	0	0	N	Y	\$1,229,729		
Huntington	F-020	W-MM20-PFO, S-CV17	Dry-Ditch Open-Cut	0	-	N	0	0	0	N	Y	-\$700	Dry-Ditch Open-Cut	Crossing these resources requires the pipeline to negotiate a bend that cannot be completed with any available trenchless crossing technology.
			Conventional Bore	0	0	N	0	0	0	N	Y	\$0		
Huntington	F-021	S-I8	Dry-Ditch Open-Cut	1250	-	Y	9	3	0	N	Y	\$2,287,563	Direct Pipe	The Greenbrier River will be crossed using the Direct Pipe trenchless methodology. The stream depth would require an instream diversion system that would severely limit the amount of usable workspace in an already reduced LOD. The Greenbrier River is also classified by the WVDNR as Group 1 mussel stream. While mussel survey and relocation efforts were completed in 2020, completing a trenchless crossing will further minimize any potential impacts to mussel species.
			Direct Pipe	1250	13	Y	9	3	0	N	Y	\$10,059,375		
Huntington	F-022	S-I9	Dry-Ditch Open-Cut	91	-	N	14	6	0	N	Y	\$124,405	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	91	18	N	14	6	0	N	Y	\$340,469		
Huntington	F-023	S-L4	Dry-Ditch Open-Cut	30	-	N	42	33	293	N	N	\$51,375	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Greenbrier River would require bore pits greater than thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	30	33	N	42	33	293	N	N	\$688,029		
Huntington	F-024	S-L2	Dry-Ditch Open-Cut	41	-	N	37	35	105	N	N	\$42,713	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Greenbrier River would require bore pits greater that are nearly 30 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	41	29	N	37	35	105	N	N	\$381,263		
Huntington	F-025	W-K2-PEM, S-L1	Dry-Ditch Open-Cut	40	-	N	60	41	146	N	N	\$49,003	Dry-Ditch Open-Cut	A trenchless crossing of this small wetland and small UNT to Kelly Creek would require bore pits greater than thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method.
			Conventional Bore	40	32	N	60	41	146	N	N	\$698,139		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-026	S-J5	Dry-Ditch Open-Cut	42	-	N	82	57	240	N	N	\$100,783	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a unique solution. A bore pit depth greater than 20 feet requires the excavation of an interim ramp and bench and increases the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to these waterbodies increase the complexity of a bored crossing, increase safety risk to personnel, and add risk of impact to the waterbody from upland work during a bore. In addition, this crossing is on a property with a well or spring. The open cut method reduces the construction duration near the well/spring.
			Conventional Bore	42	24	N	82	57	240	N	N	\$338,428		
Huntington	F-027	S-J4	Dry-Ditch Open-Cut	30	-	N	47	34	173	N	N	\$37,647	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	30	19	N	47	34	173	N	N	\$171,919		
Huntington	F-028	W-OP1-PEM, S-OP1	Dry-Ditch Open-Cut	104	-	N	72	25	228	N	N	\$83,831	Dry-Ditch Open-Cut	The pipeline is already installed through a portion of the wetland at this crossing. The layout of a conventional bore would require excavation of a bore pit unacceptably close to the installed pipe. Additionally, a trenchless method would require excavation of a bore pit within the wetland, meaning that that a longer-duration bore pit in the wetland is not less environmentally damaging than a much shorter duration impact associated with an open cut through the wetland and adjacent stream. Lastly, the cost to avoid a temporary impact to these resources is unreasonably high relative to the proposed construction method, especially in light of the fact that boring does not materially avoid or minimize the impact at this location.
			Conventional Bore	104	19	N	72	25	228	N	N	\$381,930		
Huntington	F-029-030	S-A63, W-A13, S-A61, S-A60	Dry-Ditch Open-Cut	742	-	N	20	9	0	N	Y	\$554,400	Dry-Ditch Open-Cut	A trenchless crossing in this area would require bore pits that are nearly 20 feet deep. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. A trenchless crossing of this area would take approximately three times longer to complete than the proposed construction method -- compounding the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Direct Pipe	742	15	N	20	9	0	N	Y	\$6,004,510		
Huntington	F-031	S-D31	Dry-Ditch Open-Cut	81	-	N	55	42	99	N	N	\$284,433	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a unique solution. A bore pit depth of nearly 40 feet will require the excavation of an interim ramp and bench and dramatically increase the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to stream increases the complexity of a bored crossing, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. In addition, this crossing is in close proximity to residences and/or businesses, which would cause increased noise and other impacts to persons nearby for the approximately seven weeks that would be required to complete a trenchless crossing. The open-cut method would reduce construction duration and minimize disruptions to persons due to construction activities.
			Conventional Bore	81	38	N	55	42	99	N	N	\$924,113		
Huntington	F-032	S-D25	Dry-Ditch Open-Cut	32	-	N	23	11	74	N	Y	\$36,432	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	32	19	N	23	11	74	N	Y	\$177,595		
Huntington	F-034	S-Z5, S-Z4	Dry-Ditch Open-Cut	31	-	N	32	25	10	Y	N	\$30,454	Dry-Ditch Open-Cut	Site conditions do not allow sufficient space to stockpile spoils from bore pits. Karst terrain increases the risk of bore failure and environmental impact. Furthermore, avoiding this temporary impact to this small stream with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	31	26	N	32	25	10	Y	N	\$325,479		
Huntington	F-035	W-MN15, W-MN14, S-MN2	Dry-Ditch Open-Cut	88	-	N	51	33	191	N	N	\$86,108	Dry-Ditch Open-Cut	A trenchless crossing of these small wetlands and small UNT to Hans Creek would require bore pits that are 20 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is also shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	88	20	N	51	33	191	N	N	\$432,436		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-036	S-CV19	Dry-Ditch Open-Cut	84	-	N	53	28	536	N	N	\$148,571	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a unique solution. A bore pit depth of nearly 30 feet will require the excavation of an interim ramp and bench and dramatically increase the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to stream increases the complexity of a bored crossing, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. In addition, the topographical constraints create a technical and logistical limit on a winching system further increasing the worker safety risk. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is also shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside. Accordingly, a trenchless crossing of this resource has been deemed logistically difficult due to the multiple compounding constraints.
			Conventional Bore	84	33	N	53	28	536	N	N	\$841,280		
Huntington	F-037	S-MN39, S-MN40, W-CV24, S-MN38, S-MN37, W-MN18-PFO, W-MN18-PEM, W-MN1	Dry-Ditch Open-Cut	180	-	N	64	54	254	N	N	\$140,000	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a unique solution. Installing a trenchless crossing at this location would require a deep bore pit (38 feet) at the bottom of a steep hill that would require winched equipment. There is insufficient space available at this location to stockpile spoils from the bore pit. Avoiding/minimize impacts to this cluster of small aquatic resources would require an extended construction period greater than six weeks and triple the total greenhouse gas emissions associated with completed the crossing. Lastly, the cost to avoid a temporary impact to these resources is unreasonably high relative to the proposed construction method
			Conventional Bore	180	38	N	64	54	254	N	N	\$1,205,073		
Huntington	F-038	S-G44	Dry-Ditch Open-Cut	34	-	N	30	23	0	N	Y	\$38,869	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Hans Creek would require bore pits that are greater than 20 feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	34	24	N	30	23	0	N	Y	\$315,724		
Huntington	F-039	S-G43, W-MN1	Dry-Ditch Open-Cut	52	-	N	40	27	73	N	N	\$56,420	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	52	19	N	40	27	73	N	N	\$234,355		
Huntington	F-040	W-G6, S-G42	Dry-Ditch Open-Cut	83	-	N	61	51	312	N	N	\$69,021	Dry-Ditch Open-Cut	A trenchless crossing of this small wetland and UNT to Hans Creek would require bore pits that are greater than thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is also shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	83	34	N	61	51	312	N	N	\$856,711		
Huntington	F-041	S-MN45, W-MN24	Dry-Ditch Open-Cut	42	-	N	45	33	342	N	N	\$36,464	Dry-Ditch Open-Cut	A trenchless crossing of this small wetland and UNT to Hans Creek would require bore pits that are thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. In addition the crossing is located at the bottom of a long, steep slope, further complicating construction and worker safety. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is also shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	42	30	N	45	33	342	N	N	\$667,277		
Huntington	F-042	W-CV25-PEM-2, W-CV25-PSS-1, S-CV27	Dry-Ditch Open-Cut	50	-	N	27	13	0	N	Y	\$40,250	Dry-Ditch Open-Cut	A trenchless crossing of these small wetlands and UNT to Hans Creek would require bore pits that are approximately twenty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	50	20	N	27	13	0	N	Y	\$324,593		
Huntington	F-043	S-E43, S-E45	Dry-Ditch Open-Cut	42	-	N	34	30	210	Y	N	\$58,269	Dry-Ditch Open-Cut	Site conditions do not allow sufficient space to stockpile spoils from bore pits. Karst terrain presents greater logistical and technical challenges. Furthermore, avoiding this temporary impact to this small stream with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	42	28	N	34	30	210	Y	N	\$374,967		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Huntington	F-044	W-E12, S-E40, S-E41	Dry-Ditch Open-Cut	48	-	N	41	25	295	Y	N	\$78,651	Dry-Ditch Open-Cut	Site conditions reduce the available space to stockpile spoils from bore pits. Karst terrain presents greater logistical and technical challenges.
			Conventional Bore	48	14	N	41	25	295	Y	N	\$200,166		
Huntington	F-045	W-C14, W-C13, S-C38, S-C39	Dry-Ditch Open-Cut	181	-	N	31	19	10	N	Y	\$151,803	Dry-Ditch Open-Cut	A trenchless crossing of these small wetlands and Painters Run would require bore pits that are approximately thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. In addition, the presence of steep slopes logistical and technical challenges. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The time to complete the proposed crossing method is also shorter in duration (nearly half), which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	181	29	N	31	19	10	N	Y	\$778,581		
Huntington	F-046	S-C41	Dry-Ditch Open-Cut	72	-	N	56	46	295	N	N	\$61,161	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to this small UNT to Painters Run. The crossing is located on a steep slope and require bore pits nearly 30 feet. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles, all while being located within an already reduced LOD. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take over forty days to complete.
			Conventional Bore	72	29	N	56	46	295	N	N	\$469,241		
Norfolk	G-001	S-Q12	Dry-Ditch Open-Cut	42	-	N	64	44	75	Y	N	\$43,449	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to this small UNT to Kimballton Branch. The crossing is located on a steep slope and require bore pits exceeding fifty feet. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles. Karst terrain presents greater logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take six times longer to complete.
			Conventional Bore	42	55	N	64	44	75	Y	N	\$3,119,195		
Norfolk	G-002	S-Q13	Dry-Ditch Open-Cut	69	-	N	45	29	331	Y	N	\$118,248	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to Kimballton Branch. The crossing is located on a steep slope and require bore pits exceeding thirty feet. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles. Karst terrain increases the risk of bore failure and environmental impact. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take three times longer to complete.
			Conventional Bore	69	33	N	45	29	331	Y	N	\$798,710		
Norfolk	G-003	S-P6	Dry-Ditch Open-Cut	44	-	N	42	32	84	Y	N	\$51,841	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to UNT to Stony Creek. The crossing is located adjacent to a steep slope and require bore pits nearly thirty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take nearly twice as long to complete.
			Conventional Bore	44	29	N	42	32	84	Y	N	\$389,777		
Norfolk	G-004	S-S5-Braid-1, S-S5-Braid-2, S-S5	Dry-Ditch Open-Cut	300	-	N	21	5	66	N	N	\$356,008	Dry-Ditch Open-Cut	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Guided Conventional Bore	300	0	N	21	5	66	N	N	\$445,322		
Norfolk	G-005	S-G30, S-G29	Dry-Ditch Open-Cut	58	-	N	49	38	110	Y	N	\$70,917	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two UNT to Dry Branch. Both streams are very small - less than ten feet in width. The crossing is located adjacent to a steep slope and require bore pits nearly forty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take three times longer to complete.
			Conventional Bore	58	38	N	49	38	110	Y	N	\$858,839		
Norfolk	G-006	S-G32	Dry-Ditch Open-Cut	100	-	N	46	28	607	Y	N	\$100,749	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to Dry Branch. The crossing is located adjacent to a steep slope and require bore pits greater than twenty feet. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit adjacent to an extremely long and steep slope which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would take twice as long to complete.
			Conventional Bore	100	24	N	46	28	607	Y	N	\$503,031		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	G-007	S-G33	Dry-Ditch Open-Cut	90	-	N	38	34	289	N	N	\$93,649	Dry-Ditch Open-Cut	A trenchless crossing of this small UNT to Dry Branch (less than 10 feet) would require bore pits that are approximately thirty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is also shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	90	30	N	38	34	289	N	N	\$803,500		
Norfolk	G-008	W-Z11	Dry-Ditch Open-Cut	60	-	N	39	26	220	N	N	\$42,000	Dry-Ditch Open-Cut	A trenchless crossing of this small wetland would require bore pits that are greater than twenty feet deep, which necessitates the use of a bench and interim ramp to access the bore pit. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	60	21	N	39	26	220	N	N	\$362,107		
Norfolk	G-009	S-G35	Dry-Ditch Open-Cut	139	-	N	38	34	608	N	N	\$225,223	Conventional Bore	Mountain Valley must use a conventional bore to cross an adjacent road (Big Branch Hollow Road). The bore can be extended to avoid this resource.
			Conventional Bore	139	30	N	38	34	608	N	N	\$942,561		
Norfolk	G-010	S-SS4	Dry-Ditch Open-Cut	30	-	N	22	16	0	N	Y	\$30,059	Conventional Bore	This stream is listed as trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	30	27	N	22	16	0	N	Y	\$331,776		
Norfolk	G-011	S-Z9	Dry-Ditch Open-Cut	48	-	N	45	29	21	N	N	\$49,564	Conventional Bore	This stream is listed as trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	48	27	N	45	29	21	N	N	\$382,860		
Norfolk	G-012	S-Z7, S-Z7-Braid-1	Dry-Ditch Open-Cut	47	-	N	24	14	0	N	Y	\$44,128	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	47	19	N	24	14	0	N	Y	\$220,165		
Norfolk	G-013	S-Z10, S-Z11, S-Z12-EPH, W-Z3, S-Z13	Dry-Ditch Open-Cut	331	-	N	9	4	0	N	Y	\$322,599	Guided Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Guided Conventional Bore	331	23	N	9	4	0	N	Y	\$701,437		
Norfolk	G-014	S-Z14	Dry-Ditch Open-Cut	53	-	N	37	32	292	N	N	\$53,882	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	53	15	N	37	32	292	N	N	\$218,923		
Norfolk	G-015A	S-A34	Dry-Ditch Open-Cut	77	-	N	36	32	330	Y	N	\$74,900	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Doe Creek. The stream is very small - less than ten feet in width and would require bore pits nearly thirty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	77	29	N	36	32	330	Y	N	\$483,431		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	G-015B	S-A33	Dry-Ditch Open-Cut	58	-	N	36	30	388	Y	Y	\$68,849	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Doe Creek. The stream is very small - less than ten feet in width and would require bore pits greater than twenty feet deep on a steep slope. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take twice as long to complete.
			Conventional Bore	58	24	N	36	30	388	Y	Y	\$383,836		
Norfolk	G-016	S-A32	Dry-Ditch Open-Cut	103	-	N	36	32	975	Y	N	\$130,827	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an UNT to Doe Creek. The crossing is located adjacent to a steep slope and require bore pits up to forty feet in depth. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit adjacent to an extremely long and steep slope which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take eight times longer to complete. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	103	40	N	36	32	975	Y	N	\$2,474,130		
Norfolk	G-017	S-Y3, S-Y2	Dry-Ditch Open-Cut	246	-	N	52	25	328	Y	N	\$263,200	Conventional Bore	Mountain Valley must use a conventional bore to cross an adjacent road (Doe Creek Road). The bore can be extended to avoid this resource.
			Conventional Bore	246	37	N	52	25	328	Y	N	\$1,374,111		
Norfolk	G-019A	S-E24	Dry-Ditch Open-Cut	69	-	N	28	13	0	N	Y	\$120,466	Dry-Ditch Open-Cut	This crossing is immediately adjacent to another crossing (G-019B) that will be bored. A significant change in elevation between the two crossing locations does not allow the pipeline to be tied-in together unless this crossing is completed with an open cut. Furthermore, avoiding this temporary impact to a UNT to Sinking Creek with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	69	32	N	28	13	0	N	Y	\$780,441		
Norfolk	G-019B	S-E25-Downstream	Dry-Ditch Open-Cut	92	-	N	48	20	450	N	Y	\$99,400	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	92	19	N	48	20	450	N	Y	\$347,874		
Norfolk	G-020	S-RR5	Dry-Ditch Open-Cut	154	-	N	56	45	400	N	N	\$146,371	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an UNT to Sinking Creek. The crossing is located adjacent to a steep slope and require bore pits nearly forty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit adjacent to an extremely long and steep slope which would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take longer to complete.
			Conventional Bore	154	35	N	56	45	400	N	N	\$1,076,478		
Norfolk	G-020A	S-IJ18	Dry-Ditch Open-Cut	22	-	N	41	13	11	N	N	\$21,300	Dry-Ditch Open-Cut	A trenchless crossing of this small stream (UNT to Sinking Creek) would require bore pits that are nearly twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in an already reduced LOD. Furthermore, the cost to bore is unreasonably high relative to the proposed construction method. The proposed crossing method is shorter in duration, which reduces the noise, aesthetic, and other impacts on nearby persons. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	22	19	N	41	13	11	N	N	\$149,215		
Norfolk	G-022	S-IJ16-b	Dry-Ditch Open-Cut	50	-	N	70	42	537	Y	N	\$52,912	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an UNT to Sinking Creek. The crossing is located adjacent to a steep slope and require bore pits up to thirty feet in depth. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles in a topographical setting that would require a technically and logistically difficult winching system, all while being located within an already reduced LOD. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take nearly twice as long to complete. Reducing the time at the crossing and permanently stabilizing this area will reduce the potential for sedimentation and erosion along the hillside.
			Conventional Bore	50	33	N	70	42	537	Y	N	\$744,789		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	G-023	S-NN17	Dry-Ditch Open-Cut	140	-	N	62	40	372	Y	N	\$296,363	Conventional Bore	Mountain Valley must use a conventional bore to cross an adjacent road (Rt. 604). The bore can be extended to avoid this resource.
			Conventional Bore	140	23	N	62	40	372	Y	N	\$607,416		
Norfolk	G-024	S-RR2, S-YZ6, W-RR1b	Dry-Ditch Open-Cut	133	-	N	63	42	702	Y	N	\$129,388	Conventional Bore	Mountain Valley must use a conventional bore to cross an adjacent road (Rt. 42). The bore can be extended to avoid this resource.
			Conventional Bore	133	28	N	63	42	702	Y	N	\$633,223		
Norfolk	G-025	S-MM18	Dry-Ditch Open-Cut	35	-	N	45	41	349	Y	N	\$43,253	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Sinking Creek. The stream is very small - less than ten feet in width and would require bore pits approximately twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require creating excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take three times as long to complete.
			Conventional Bore	35	20	N	45	41	349	Y	N	\$282,023		
Norfolk	G-026	S-NN12	Dry-Ditch Open-Cut	41	-	N	41	28	276	Y	N	\$37,317	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Sinking Creek. The stream is very small - less than five feet in width and would require bore pits that are twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take longer to complete.
			Conventional Bore	41	20	N	41	28	276	Y	N	\$299,051		
Norfolk	G-027	S-NN11	Dry-Ditch Open-Cut	147	-	N	38	26	43	Y	N	\$121,499	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Sinking Creek. The stream is very small - less than five feet in width and would require bore pits greater than twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit which would create excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take longer to complete.
			Conventional Bore	147	24	N	38	26	43	Y	N	\$636,416		
Norfolk	G-028	S-KL43	Dry-Ditch Open-Cut	48	-	N	43	28	102	Y	N	\$61,648	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Sinking Creek. The stream is very small - less than ten feet in width and would require bore pits greater than twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges.
			Conventional Bore	48	19	N	43	28	102	Y	N	\$223,003		
Norfolk	G-029	W-CD12, S-OO14	Dry-Ditch Open-Cut	70	-	N	23	11	0	Y	Y	\$63,367	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small wetland and small UNT to Sinking Creek. The stream is very small - less than ten feet in width and would require bore pits greater than twenty feet deep. Avoiding/minimizing this minor impact through a conventional bore would create excessive spoil piles, with limited room for stockpiling. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive and would take longer to complete.
			Conventional Bore	70	22	N	23	11	0	Y	Y	\$399,622		
Norfolk	G-030	S-OO12, S-OO13	Dry-Ditch Open-Cut	45	-	N	41	21	73	Y	N	\$101,903	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to Sinking Creek. This crossing is in proximity to a residence, and a trenchless crossing of this location would take nearly three times as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Karst terrain increases the logistical and technical challenges.
			Conventional Bore	45	18	N	41	21	73	Y	N	\$209,921		
Norfolk	G-031	S-PP1	Dry-Ditch Open-Cut	46	-	N	16	8	0	Y	Y	\$43,348	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) intermittent UNT to Sinking Creek. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take four times as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Karst terrain increases the logistical and technical challenges.
			Conventional Bore	46	15	N	16	8	0	Y	Y	\$199,057		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	G-032	S-PP3	Dry-Ditch Open-Cut	25	-	N	17	12	0	Y	Y	\$26,364	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) UNT to Sinking Creek. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	25	17	N	17	12	0	Y	Y	\$148,594		
Norfolk	G-033	S-PP4	Dry-Ditch Open-Cut	38	-	N	22	11	0	Y	Y	\$34,742	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (two-foot wide) intermittent UNT to Sinking Creek. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	11	N	22	11	0	Y	Y	\$158,084		
Norfolk	G-034	S-PP22	Dry-Ditch Open-Cut	48	-	N	57	48	203	N	N	\$44,100	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	48	19	N	57	48	203	N	N	\$223,003		
Norfolk	G-035	S-PP21	Dry-Ditch Open-Cut	35	-	N	33	26	0	N	N	\$38,975	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	35	22	N	33	26	0	N	N	\$300,293		
Norfolk	G-036	S-PP20	Dry-Ditch Open-Cut	48	-	N	26	9	0	N	Y	\$58,844	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	48	18	N	26	9	0	N	Y	\$218,435		
Norfolk	G-037	S-OO6	Dry-Ditch Open-Cut	61	-	N	20	8	0	N	Y	\$166,001	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	61	11	N	20	8	0	N	Y	\$223,358		
Norfolk	G-038	S-RR14	Dry-Ditch Open-Cut	38	-	N	33	19	21	N	N	\$52,813	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	38	13	N	33	19	21	N	N	\$167,219		
Norfolk	G-039	S-HH18	Dry-Ditch Open-Cut	55	-	N	42	24	216	N	N	\$59,609	Conventional Bore	Mountain Valley has only been authorized to boring the streams in this section of the project.
			Conventional Bore	55	29	N	42	24	216	N	N	\$420,995		
Norfolk	G-040	S-MN21	Dry-Ditch Open-Cut	32	-	N	53	42	287	N	N	\$40,296	Dry-Ditch Open-Cut	Access to this crossing location is extremely limited and requires removal and replacement of approximately 200 waterbars per day during period of active construction. Operating a boring operation at this location is logistically and technically challenging. Furthermore, avoiding this temporary impact to this small stream with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	32	28	N	53	42	287	N	N	\$346,587		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	G-041	S-MN22	Dry-Ditch Open-Cut	40	-	N	30	24	0	N	Y	\$43,706	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-feet wide) stream. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	40	20	N	30	24	0	N	Y	\$296,213		
Norfolk	G-042	S-EF65	Dry-Ditch Open-Cut	88	-	N	43	27	560	Y	N	\$166,301	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The stream is also located on a steep slope that would require logistically and technically challenging winching system in an already reduced work area. Karst terrain increases the logistical and technical challenges.
			Conventional Bore	88	22	N	43	27	560	Y	N	\$450,706		
Norfolk	G-043	S-EF62	Dry-Ditch Open-Cut	38	-	N	28	17	293	Y	N	\$58,103	Dry-Ditch Open-Cut	The stream is located on a steep slope that would require logistically and technically challenging winching system in an already reduced work area. Karst terrain increases the logistical and technical challenges.
			Conventional Bore	38	16	N	28	17	293	Y	N	\$180,921		
Norfolk	G-044	S-IJ52, W-IJ46-PEM	Dry-Ditch Open-Cut	46	-	N	63	35	178	Y	N	\$57,673	Dry-Ditch Open-Cut	Site conditions do not allow sufficient space to stockpile spoils from bore pits. Karst terrain increases the logistical and technical challenges. Furthermore, avoiding this temporary impact to this small stream with a conventional bore crossing would be unreasonably expensive and would take longer to complete.
			Conventional Bore	46	24	N	63	35	178	Y	N	\$349,780		
Norfolk	H-001	S-G39	Dry-Ditch Open-Cut	301	-	N	74	46	1576	N	N	\$232,364	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (six-feet wide) intermittent UNT to Roanoke River. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. A conventional bore crossing would extend the duration of this crossing from 6 to 79 days, thereby increasing the greenhouse gas emissions associated with the crossing by nearly 1,400%. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	301	36	N	74	46	1576	N	N	\$1,511,931		
Norfolk	H-002	S-MM15	Dry-Ditch Open-Cut	37	-	N	39	29	74	N	N	\$47,979	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (six-feet wide) intermittent UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	37	33	N	39	29	74	N	N	\$707,895		
Norfolk	H-003	S-MM14	Dry-Ditch Open-Cut	100	-	N	42	33	243	N	N	\$104,394	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	100	37	N	42	33	243	N	N	\$959,765		
Norfolk	H-004	S-MM13	Dry-Ditch Open-Cut	33	-	N	59	34	33	N	N	\$41,924	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-feet wide) UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	33	32	N	59	34	33	N	N	\$678,274		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-005	S-MM11	Dry-Ditch Open-Cut	34	-	N	46	24	33	N	N	\$54,178	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (nine-feet wide) UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	34	25	N	46	24	33	N	N	\$324,859		
Norfolk	H-006	W-F9-PFO, S-F15	Dry-Ditch Open-Cut	55	-	N	56	17	0	N	Y	\$85,276	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an intermittent UNT to Flatwoods Branch and an adjacent PFO wetland (0.02 ac). Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to residences, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	55	35	N	56	17	0	N	Y	\$795,517		
Norfolk	H-007	S-F16a/F16b	Dry-Ditch Open-Cut	32	-	N	30	15	0	N	Y	\$32,899	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-feet wide) UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	32	27	N	30	15	0	N	Y	\$337,452		
Norfolk	H-008	S-C33, S-C36, W-C11	Dry-Ditch Open-Cut	313	-	N	21	15	0	N	Y	\$240,100	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Flatwoods Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit more than 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. A conventional bore crossing would extend the duration of this crossing from 2 to 30 days, thereby increasing the greenhouse gas emissions associated with the crossing by over 1500%.
			Conventional Bore	313	23	N	21	15	0	N	Y	\$1,098,387		
Norfolk	H-009	S-MM31	Dry-Ditch Open-Cut	40	-	N	5	3	0	N	Y	\$43,566	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	40	11	N	5	3	0	N	Y	\$163,760		
Norfolk	H-010	S-C29	Dry-Ditch Open-Cut	44	-	N	21	16	0	N	Y	\$35,326	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (one-foot wide) Flatwoods Branch. A conventional bore crossing would extend the duration of this crossing from 2 to 9 days, thereby increasing the greenhouse gas emissions associated with the crossing by over 450%. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	44	17	N	21	16	0	N	Y	\$202,516		
Norfolk	H-012	W-C5	Dry-Ditch Open-Cut	68	-	N	31	19	0	N	Y	\$47,600	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact to a PEM wetland (0.05 ac). Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. A conventional bore crossing would extend the duration of this crossing from 2 to 8 days, thereby increasing the greenhouse gas emissions associated with the crossing by over 400%. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	68	23	N	31	19	0	N	Y	\$403,081		
Norfolk	H-013	S-C25	Dry-Ditch Open-Cut	65	-	N	39	29	52	N	N	\$62,093	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-feet wide) UNT to Bradshaw Creek. Avoiding/minimizing this minor impact through a conventional bore would require a deep bore pit of nearly 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. A conventional bore crossing would extend the duration of this crossing from 2 to 18 days, thereby increasing the greenhouse gas emissions associated with the crossing by over 900%. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	65	38	N	39	29	52	N	N	\$878,705		
Norfolk	H-014	S-C24	Dry-Ditch Open-Cut	67	-	N	38	20	21	N	N	\$64,412	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Bradshaw Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. A conventional bore crossing would extend the duration of this crossing from 2 to 18 days, thereby increasing the greenhouse gas emissions associated with the crossing by over 900%. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	67	34	N	38	20	21	N	N	\$811,304		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-015	S-C21	Dry-Ditch Open-Cut	90	-	N	18	6	21	N	N	\$168,191	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	90	26	N	18	6	21	N	N	\$492,920		
Norfolk	H-017	S-OO16	Dry-Ditch Open-Cut	360	-	N	45	36	282	Y	N	\$266,002	Conventional Bore	Mountain Valley must use a conventional bore to cross an adjacent road (I-81). The bore can be extended to avoid this resource.
			Conventional Bore	360	39	N	45	36	282	Y	N	\$1,734,180		
Norfolk	H-018	S-NN19	Dry-Ditch Open-Cut	34	-	N	53	27	11	Y	N	\$36,153	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-feet wide) UNT to Roanoke River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take three weeks to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Karst terrain increases the logistical and technical challenges. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	34	33	N	53	27	11	Y	N	\$699,381		
Norfolk	H-019	S-NN16, W-NN8	Dry-Ditch Open-Cut	316	-	N	23	14	0	Y	Y	\$504,735	Dry-Ditch Open-Cut	Mountain Valley must use microtunneling to cross an adjacent road (Rt. 11). The bore can be extended to avoid this resource.
			Microtunnel	316	31	N	23	14	0	Y	Y	\$3,726,351		
Norfolk	H-020	S-I1, S-AB16, W-AB7	Dry-Ditch Open-Cut	280	-	N	4	3	74	Y	Y	\$244,999	Conventional Bore	Mountain Valley must use microtunneling to cross an adjacent road (Rt. 11). The bore can be extended to avoid this resource.
			Conventional Bore	280	16	N	4	3	74	Y	Y	\$867,713		
Norfolk	H-021	S-CD12b	Dry-Ditch Open-Cut	38	-	N	3	2	0	N	Y	\$37,100	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	38	11	N	3	2	0	N	Y	\$158,084		
Norfolk	H-022	W-KL58	Dry-Ditch Open-Cut	114	-	N	1	0	0	N	Y	\$79,800	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	114	12	N	1	0	0	N	Y	\$378,338		
Norfolk	H-023	S-EF19	Dry-Ditch Open-Cut	30	-	N	76	60	647	N	N	\$24,179	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (one-foot wide) UNT to Indian Run. Avoiding/minimizing this minor impact through a trenchless crossing would require an excessively deep bore pit exceeding 50 feet, thereby requiring the excavation of an interim ramp and up to three benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. Using a trenchless method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Microtunnel	30	51	N	76	60	647	N	N	\$3,081,818		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-024	W-EF5-PFO, S-EF20a	Dry-Ditch Open-Cut	83	-	N	63	52	768	N	N	\$80,005	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-foot wide) UNT to Roanoke River and an adjacent PFO wetland (0.11 ac). Avoiding/minimizing these minor impacts through a conventional bore would require an excessively deep bore pit greater than 40 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. In forested wetlands, a 30-foot corridor generally must be maintained free of trees. Accordingly, conversion impacts to the PFO wetland are unavoidable, even if a bore is used. This crossing also is in close proximity to a residence, and a trenchless crossing of this location would take 27 days -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	83	44	N	63	52	768	N	N	\$2,635,553		
Norfolk	H-025	S-MM22	Dry-Ditch Open-Cut	200	-	N	33	25	2582	N	N	\$192,500	Dry-Ditch Open-Cut	The stream is located on a slope that will increase the logistical and technical difficulty of crossing this small stream. The bore pits are nearly 20 feet deep which makes stockpiling the spoils on such steep slope and logistical challenge.
			Conventional Bore	200	17	N	33	25	2582	N	N	\$645,242		
Norfolk	H-026	S-IJ50	Dry-Ditch Open-Cut	88	-	N	74	66	2681	N	N	\$96,784	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Roanoke River. Avoiding/minimizing this minor impact through a trenchless crossing would require an excessively deep bore pit of nearly 60 feet, thereby requiring the excavation of an interim ramp and up to three benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. Using a trenchless method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Microtunnel	88	59	N	74	66	2681	N	N	\$4,098,182		
Norfolk	H-027	S-Y13, S-Y14	Dry-Ditch Open-Cut	104	-	N	66	45	670	N	N	\$124,613	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to Bottom Creek. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	104	38	N	66	45	670	N	N	\$989,387		
Norfolk	H-028	S-EF34b, S-EF55	Dry-Ditch Open-Cut	100	-	N	63	51	508	N	N	\$105,000	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to Bottom Creek. Avoiding/minimizing these minor impacts through a conventional bore would require an excessively deep bore pit greater than 40 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	100	45	N	63	51	508	N	N	\$2,738,344		
Norfolk	H-029	S-EF33	Dry-Ditch Open-Cut	43	-	N	42	19	560	N	N	\$48,809	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-foot wide) intermittent UNT to Bottom Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	43	31	N	42	19	560	N	N	\$688,384		
Norfolk	H-030	S-IJ82	Dry-Ditch Open-Cut	73	-	N	25	14	0	N	Y	\$70,275	Conventional Bore	The stream is a trout water and the direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	73	27	N	25	14	0	N	Y	\$453,809		
Norfolk	H-031	W-IJ94-PEM, W-IJ95-PSS, S-IJ83, S-IJ88, S-IJ84, W-IJ102	Dry-Ditch Open-Cut	362	-	N	25	12	0	N	Y	\$292,224	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	362	28	N	25	12	0	N	Y	\$1,283,121		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-032	S-IJ89, S-IJ90	Dry-Ditch Open-Cut	108	-	N	34	22	212	N	N	\$94,134	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	108	22	N	34	22	212	N	N	\$507,465		
Norfolk	H-033	W-KL17, S-KL25	Dry-Ditch Open-Cut	59	-	N	14	9	521	N	N	\$53,001	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-feet wide) intermittent UNT to Mill Creek and a PSS wetland (0.04 ac). The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. This crossing also is in close proximity to a residence, and a trenchless crossing of this location increases the duration of the crossing work -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents.
			Conventional Bore	59	16	N	14	9	521	N	N	\$240,519		
Norfolk	H-035	W-KL15	Dry-Ditch Open-Cut	59	-	N	15	12	0	N	Y	\$41,300	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact to a PEM wetland (0.03 ac). This crossing is in close proximity to residences, and a trenchless crossing of this location nearly triples the duration of the crossing work -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize the impact to this PEM would be unreasonably expensive.
			Conventional Bore	59	16	N	15	12	0	N	Y	\$240,519		
Norfolk	H-036	W-EF42, W-HS02, W-AB6-PEM-2, W-AB6-PFO-1, W-AB6-PEM-1, W-AB6-PSS, W-AB5, W-AB3-PEM-2	Dry-Ditch Open-Cut	1600	-	N	4	2	0	N	Y	\$1,120,000	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impacts several closely grouped wetland features. To avoid excavating bore pits in wetland areas, Direct Pipe would be necessary to span the excessively long crossing distance. The trenchless crossing would take more than one month to complete (as opposed to three days for an open cut crossing). The greenhouse gas footprint of the crossing would therefore increase by over 1,400%. Furthermore, using a Direct Pipe crossing method to avoid/minimize the temporary impacts to these features would be unreasonably expensive. A minor temporary impact associated with the bore to maintain access will be required.
			Direct Pipe	1600	10	N	4	2	0	N	Y	\$12,845,673		
Norfolk	H-040	W-EF46, S-ST9b	Dry-Ditch Open-Cut	179	-	N	31	17	10	N	N	\$152,132	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	179	21	N	31	17	10	N	N	\$699,827		
Norfolk	H-041	W-KL48-PSS-1	Dry-Ditch Open-Cut	70	-	N	10	5	0	N	Y	\$49,000	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact to PSS wetland. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	70	17	N	10	5	0	N	Y	\$276,304		
Norfolk	H-042	W-KL49-PEM, W-KL51-PEM, S-KL55, W-KL51-PSS	Dry-Ditch Open-Cut	202	-	N	17	13	0	N	Y	\$181,156	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	202	22	N	17	13	0	N	Y	\$774,236		
Norfolk	H-043	W-MN7-PEM, S-IJ12	Dry-Ditch Open-Cut	87	-	N	31	22	340	N	N	\$74,999	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	87	25	N	31	22	340	N	N	\$475,272		
Norfolk	H-044	S-EF44, W-EF44	Dry-Ditch Open-Cut	45	-	N	45	33	84	N	N	\$49,054	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	45	21	N	45	33	84	N	N	\$319,538		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-045	W-IJ36, S-IJ43	Dry-Ditch Open-Cut	282	-	N	43	26	230	N	N	\$251,003	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	282	30	N	43	26	230	N	N	\$1,348,393		
Norfolk	H-046	S-Y7, W-Y2, S-Y8	Dry-Ditch Open-Cut	140	-	N	44	24	43	N	N	\$117,275	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	140	25	N	44	24	43	N	N	\$625,685		
Norfolk	H-047A	S-B22	Dry-Ditch Open-Cut	64	-	N	9	5	0	N	Y	\$59,056	Conventional Bore	Orangefin madtom habitat may be present in this stream and it is a trout water. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	64	14	N	9	5	0	N	Y	\$245,574		
Norfolk	H-047B	W-B25-PEM-1	Dry-Ditch Open-Cut	154	-	N	9	4	0	N	Y	\$107,800	Dry-Ditch Open-Cut	The open cut method would result in a small (0.19 ac) temporary impact to PEM wetland. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take 30 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents.
			Conventional Bore	154	13	N	9	4	0	N	Y	\$496,425		
Norfolk	H-048A	W-B25-PSS-2, S-B25	Dry-Ditch Open-Cut	253	-	N	3	1	0	N	Y	\$202,035	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	253	11	N	3	1	0	N	Y	\$768,251		
Norfolk	H-048B	W-B24-PEM, W-B24-PSS, S-B21	Dry-Ditch Open-Cut	228	-	N	9	6	0	N	Y	\$176,494	Dry-Ditch Open-Cut	The pipeline is already installed through a portion of the wetland at this crossing. The layout of a conventional bore would require excavation of a bore pit unacceptably close to the installed pipe. Additionally, a trenchless method would require excavation of a bore pit within the wetland, meaning that that a longer-duration bore pit in the wetland (3 to 4 weeks) is not less environmentally damaging than a much shorter duration impact associated with an open cut through the wetlands and adjacent four-foot-wide UNT to Mill Creek.
			Conventional Bore	228	20	N	9	6	0	N	Y	\$829,754		
Norfolk	H-051	W-ST2-PEM, S-G24, S-G25	Dry-Ditch Open-Cut	96	-	N	57	48	130	N	N	\$95,320	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to Green Creek and a PEM wetland. Avoiding/minimizing these minor impacts through a conventional bore would require a deep bore pit of nearly 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location increases the duration of the crossing from 2 to 19 days -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	96	36	N	57	48	130	N	N	\$930,144		
Norfolk	H-052	S-D14	Dry-Ditch Open-Cut	79	-	N	34	24	729	N	N	\$65,800	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) UNT. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit.
			Conventional Bore	79	19	N	34	24	729	N	N	\$310,980		
Norfolk	H-053	W-D7-PEM, S-D13, S-D12	Dry-Ditch Open-Cut	89	-	N	27	20	83	N	N	\$84,077	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small intermittent UNTs to North Fork Blackwater River and a PEM wetland. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit exceeding 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	89	24	N	27	20	83	N	N	\$471,813		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-054	S-D11	Dry-Ditch Open-Cut	81	-	N	33	10	51	N	N	\$119,688	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	81	22	N	33	10	51	N	N	\$430,840		
Norfolk	H-055	S-D8	Dry-Ditch Open-Cut	60	-	N	43	37	585	N	N	\$107,791	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) UNT to North Fork Blackwater River. Avoiding/minimizing these minor impacts through a conventional bore would require a deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	60	35	N	43	37	585	N	N	\$809,707		
Norfolk	H-056	S-GH15	Dry-Ditch Open-Cut	35	-	N	62	54	148	N	N	\$38,526	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) intermittent UNT to North Fork Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	35	24	N	62	54	148	N	N	\$318,562		
Norfolk	H-057	S-GH14	Dry-Ditch Open-Cut	54	-	N	48	34	109	N	N	\$52,050	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) UNT to North Fork Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	54	36	N	48	34	109	N	N	\$810,949		
Norfolk	H-058	S-GH11	Dry-Ditch Open-Cut	31	-	N	54	42	231	N	N	\$32,688	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) intermittent UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take longer to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	31	32	N	54	42	231	N	N	\$672,598		
Norfolk	H-059	S-GH9	Dry-Ditch Open-Cut	48	-	N	47	24	62	N	N	\$48,203	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) UNT to North Fork Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	48	34	N	47	24	62	N	N	\$757,382		
Norfolk	H-060	S-RR08	Dry-Ditch Open-Cut	43	-	N	20	12	0	N	Y	\$54,799	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	43	15	N	20	12	0	N	Y	\$190,543		
Norfolk	H-061	S-RR09	Dry-Ditch Open-Cut	30	-	N	56	34	64	N	N	\$48,428	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (nine-foot wide) UNT to North Fork Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	30	31	N	56	34	64	N	N	\$651,490		
Norfolk	H-062	S-RR11	Dry-Ditch Open-Cut	38	-	N	39	26	136	N	N	\$51,125	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (seven-foot wide) UNT to North Fork Blackwater River Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require an excessively deep bore pit greater than 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	27	N	39	26	136	N	N	\$354,480		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	H-063	S-IJ1, W-IJ1, S-IJ2	Dry-Ditch Open-Cut	133	-	N	44	37	928	N	N	\$135,744	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to two small UNTs to North Fork Blackwater River and a PEM wetland (0.002 ac). Avoiding/minimizing these minor impacts through a conventional bore would require an excessively deep bore pit greater than 40 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. The slope adjacent to the crossing is steep and excessively long, requiring equipment operating within and around the bore pit to be winched to other equipment. That increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. There is insufficient space at this location for spoil piles from a bore pit. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly three times as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	133	41	N	44	37	928	N	N	\$2,613,815		
Norfolk	I-001	S-E28	Dry-Ditch Open-Cut	56	-	N	46	18	0	N	Y	\$95,200	Dry-Ditch Open-Cut	This crossing is immediately adjacent to a mainline valve. Trenchless crossing methods are logistically difficult because they would require the pipe to be installed too deeply to facilitate connection to the valve site. An open cut crossing is necessary to facilitate connection to the mainline valve.
			Conventional Bore	56	16	N	46	18	0	N	Y	\$232,005		
Norfolk	I-001A	S-GH3	Dry-Ditch Open-Cut	22	-	N	41	19	31	N	N	\$33,100	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	22	14	N	41	19	31	N	N	\$126,378		
Norfolk	I-002	S-E29	Dry-Ditch Open-Cut	52	-	N	4	2	0	N	Y	\$65,383	Dry-Ditch Open-Cut	This UNT to Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location.
			Conventional Bore	52	14	N	4	2	0	N	Y	\$211,518		
Norfolk	I-003	S-E28	Dry-Ditch Open-Cut	45	-	N	15	3	0	N	Y	\$87,500	Dry-Ditch Open-Cut	Teels Creek in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location.
			Conventional Bore	45	15	N	15	3	0	N	Y	\$196,219		
Norfolk	I-004	W-E7	Dry-Ditch Open-Cut	298	-	N	18	6	0	N	Y	\$208,600	Dry-Ditch Open-Cut	Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take 14 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize the impact to this PEM would be unreasonably expensive.
			Conventional Bore	298	21	N	18	6	0	N	Y	\$1,037,547		
Norfolk	I-005A	W-E8	Dry-Ditch Open-Cut	150	-	N	37	29	0	N	Y	\$105,000	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact (0.07 ac) to a PEM wetland. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 30 feet on the edge of a steep slope, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take 19 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize the impact to this PEM would be unreasonably expensive.
			Conventional Bore	150	27	N	37	29	0	N	Y	\$672,334		
Norfolk	I-005B	S-E28	Dry-Ditch Open-Cut	67	-	N	24	18	0	N	Y	\$102,900	Dry-Ditch Open-Cut	This Section of Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location.
			Conventional Bore	67	23	N	24	18	0	N	Y	\$400,243		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-006	S-EF4	Dry-Ditch Open-Cut	59	-	N	48	29	62	N	N	\$81,979	Dry-Ditch Open-Cut	This intermittent UNT to Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. Furthermore, it would be unreasonably expensive to use a trenchless crossing to avoid only a fraction of the aquatic impact to this small (three-foot wide) stream.
			Conventional Bore	59	34	N	48	29	62	N	N	\$788,600		
Norfolk	I-007	S-EF12	Dry-Ditch Open-Cut	68	-	N	8	2	124	N	N	\$123,232	Dry-Ditch Open-Cut	This UNT to Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location.
			Conventional Bore	68	16	N	8	2	124	N	N	\$266,060		
Norfolk	I-008	S-MM42	Dry-Ditch Open-Cut	43	-	N	25	18	0	N	Y	\$37,690	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (two-foot wide) UNT to Teels Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take nearly twice as long to complete - compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	43	23	N	25	18	0	N	Y	\$332,131		
Norfolk	I-009	S-RR15	Dry-Ditch Open-Cut	60	-	N	25	12	30	N	N	\$102,185	Conventional Bore	Although the bore pits associated with this crossing are 20 feet deep, the relatively flat approaches are reasonable for winching equipment and the excessive spoils associated with deeper bore pits can be managed appropriately.
			Conventional Bore	60	20	N	25	12	30	N	N	\$352,973		
Norfolk	I-010	S-D23	Dry-Ditch Open-Cut	71	-	N	39	19	87	N	N	\$136,216	Dry-Ditch Open-Cut	The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. This location has construction constraints, including winch-hill construction and limited space for soil stockpiles. The open cut method also reduces the construction duration near a private drinking water well on the property.
			Conventional Bore	71	28	N	39	19	87	N	N	\$457,268		
Norfolk	I-011	S-D22	Dry-Ditch Open-Cut	42	-	N	31	21	0	N	Y	\$61,662	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (eight-foot wide) intermittent UNT to Teels Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearly 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	42	21	N	31	21	0	N	Y	\$311,024		
Norfolk	I-012	S-D20	Dry-Ditch Open-Cut	29	-	N	35	27	113	N	N	\$43,964	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (eight-foot wide) intermittent UNT to Teels Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	29	28	N	35	27	113	N	N	\$338,073		
Norfolk	I-013	S-C14	Dry-Ditch Open-Cut	90	-	N	40	28	53	N	N	\$271,204	Dry-Ditch Open-Cut	Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. Construction constraints at this location include a bore pit depth of nearly 40 feet and steep slopes on both sides of the creek, one of which would require winched equipment. The open cut method also reduces the construction duration near a private drinking water well on the property.
			Conventional Bore	90	38	N	40	28	53	N	N	\$949,655		
Norfolk	I-014	S-C17	Dry-Ditch Open-Cut	62	-	N	21	16	0	N	Y	\$187,051	Conventional Bore	Roanoke loggerch habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	62	20	N	21	16	0	N	Y	\$358,649		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-015	S-CD6	Dry-Ditch Open-Cut	109	-	N	4	1	0	N	Y	\$276,201	Dry-Ditch Open-Cut	Teels Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location.
			Conventional Bore	109	20	N	4	1	0	N	Y	\$492,034		
Norfolk	I-016	W-CD6	Dry-Ditch Open-Cut	94	-	N	4	1	0	N	Y	\$65,800	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	94	11	N	4	1	0	N	Y	\$317,011		
Norfolk	I-017	W-CD5	Dry-Ditch Open-Cut	88	-	N	67	54	122	N	N	\$61,600	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact (0.11 ac) to a PFO wetland. Avoiding/minimizing these minor impacts through a conventional bore would require an excessively deep bore pit exceeding 50 feet on the edge of a very steep slope, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to a residence, and a trenchless crossing of this location would increase the duration of the crossing from 4 to 35 days -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable with any crossing method. Using a conventional bore crossing method to avoid/minimize a portion of the impact to this PFO would be unreasonably expensive.
			Conventional Bore	88	52	N	67	54	122	N	N	\$3,086,106		
Norfolk	I-018	S-II2	Dry-Ditch Open-Cut	98	-	N	13	3	0	N	Y	\$278,804	Dry-Ditch Open-Cut	Little Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. The open cut method also reduces the construction duration near a private drinking water wells on the property.
			Conventional Bore	98	20	N	13	3	0	N	Y	\$460,816		
Norfolk	I-019	S-CD1, W-CD1	Dry-Ditch Open-Cut	110	-	N	22	12	0	N	Y	\$89,800	Dry-Ditch Open-Cut	This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly four times longer to long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents.
			Conventional Bore	110	18	N	22	12	0	N	Y	\$394,390		
Norfolk	I-020	S-KL35, W-EF48	Dry-Ditch Open-Cut	72	-	N	32	14	106	N	N	\$62,773	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	72	16	N	32	14	106	N	N	\$277,412		
Norfolk	I-021	S-KL36	Dry-Ditch Open-Cut	39	-	N	34	18	32	N	Y	\$55,130	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	39	17	N	34	18	32	N	Y	\$188,326		
Norfolk	I-022	S-KL38	Dry-Ditch Open-Cut	200	-	N	54	24	0	N	Y	\$165,254	Dry-Ditch Open-Cut	The pipeline has already been installed under an adjacent road (Hwy. 220). There is no feasible way to tie the two sections of pipe together if a trenchless method is used to install this crossing. Furthermore, avoiding this temporary impact to this small UNT to the Blackwater River with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	200	35	N	54	24	0	N	Y	\$1,207,025		
Norfolk	I-023	S-KL39	Dry-Ditch Open-Cut	98	-	N	40	31	85	N	N	\$92,713	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (seven-feet wide) UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open cut method would reduce the construction duration near private drinking water wells on the property. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	98	32	N	40	31	85	N	N	\$862,742		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-024	S-YZ5	Dry-Ditch Open-Cut	40	-	N	31	19	0	N	Y	\$43,080	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-foot wide) UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	40	28	N	31	19	0	N	Y	\$369,291		
Norfolk	I-025	S-YZ4	Dry-Ditch Open-Cut	32	-	N	37	28	52	N	N	\$33,182	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (three-foot wide) UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take longer to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	32	22	N	37	28	52	N	N	\$291,779		
Norfolk	I-026	S-EF48, W-EF51	Dry-Ditch Open-Cut	42	-	N	32	29	0	N	Y	\$36,404	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (two-foot wide) intermittent UNT to Blackwater River and an adjacent PEM wetland (0.01 ac). Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	42	28	N	32	29	0	N	Y	\$374,967		
Norfolk	I-027	S-KL41	Dry-Ditch Open-Cut	48	-	N	41	32	83	N	N	\$75,690	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 8 to 33 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	48	33	N	41	32	83	N	N	\$739,113		
Norfolk	I-028	S-C8	Dry-Ditch Open-Cut	44	-	N	32	23	31	N	N	\$48,854	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-foot wide) intermittent UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 5 to 11 days. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	44	28	N	32	23	31	N	N	\$380,643		
Norfolk	I-029	S-KL51	Dry-Ditch Open-Cut	45	-	N	36	27	105	N	N	\$50,762	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (six-foot wide) stream. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	45	24	N	36	27	105	N	N	\$346,942		
Norfolk	I-030	S-KL52	Dry-Ditch Open-Cut	59	-	N	23	18	0	N	Y	\$45,967	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (one-foot wide) stream. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and a bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open-cut method would reduce the construction duration near private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	59	23	N	23	18	0	N	Y	\$377,539		
Norfolk	I-031	S-KL54	Dry-Ditch Open-Cut	32	-	N	29	21	0	N	Y	\$57,639	Dry-Ditch Open-Cut	The open-cut method would result in a temporary impact to a small (one-foot wide) stream. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit that is nearly 20 feet deep, potentially requiring the excavation of an interim ramp and a bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to a residence, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open-cut method would reduce the construction duration near private drinking water wells on the property.
			Conventional Bore	32	20	N	29	21	0	N	Y	\$273,509		
Norfolk	I-032	S-F8	Dry-Ditch Open-Cut	206	-	N	32	26	0	N	Y	\$257,327	Dry-Ditch Open-Cut	The pipeline has already been installed under an adjacent road (Rt. 122). There is no feasible way to tie the two sections of pipe together if a trenchless method is used to install this crossing. If a trenchless crossing were attempted, it would require a bore pit depth exceeding 40 feet, which would require the excavation of an interim ramp and bench and dramatically increase the space occupied by the bore pit and spoil pile. Lastly, avoiding this temporary impact to this small UNT to the Maggodee Creek with a conventional bore crossing would be unreasonably expensive.
			Conventional Bore	206	41	N	32	26	0	N	Y	\$2,820,988		

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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-033	S-HH4	Dry-Ditch Open-Cut	63	-	N	29	18	20	N	N	\$77,464	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an intermittent UNT to Maggodee Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take 17 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	63	32	N	29	18	20	N	N	\$763,413		
Norfolk	I-034	S-C20	Dry-Ditch Open-Cut	52	-	N	20	13	0	N	Y	\$50,437	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	52	17	N	20	13	0	N	Y	\$225,220		
Norfolk	I-035	S-C19	Dry-Ditch Open-Cut	100	-	N	49	41	234	N	N	\$227,598	Dry-Ditch Open-Cut	The open-cut method would result in a temporary impact to Maggodee Creek. Avoiding/minimizing this minor impact through a conventional bore would require an excessively deep bore pit of greater than 40 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take 34 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a microtunnel crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Microtunnel	100	46	N	49	41	234	N	N	\$3,509,091		
Norfolk	I-036	S-F11	Dry-Ditch Open-Cut	139	-	N	56	40	100	N	N	\$415,926	Dry-Ditch Open-Cut	The Blackwater River's banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. A trenchless crossing at this location also faces significant constructability constraints. The bore pits for this crossing would be just short of 40-feet deep. Site conditions do not allow sufficient space to stockpile spoils from bore pits of that size.
			Conventional Bore	139	39	N	56	40	100	N	N	\$1,106,985		
Norfolk	I-037	S-F9b	Dry-Ditch Open-Cut	56	-	N	37	30	62	N	N	\$92,048	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet at the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to residences, and a trenchless crossing of this location would take 16 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	56	31	N	37	30	62	N	N	\$725,278		
Norfolk	I-038	S-F10	Dry-Ditch Open-Cut	47	-	N	16	9	0	N	Y	\$72,699	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	47	16	N	16	9	0	N	Y	\$206,463		
Norfolk	I-039	S-F9a	Dry-Ditch Open-Cut	66	-	N	20	12	0	N	Y	\$98,700	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	66	20	N	20	12	0	N	Y	\$370,001		
Norfolk	I-040	S-GG4	Dry-Ditch Open-Cut	53	-	N	18	13	0	N	Y	\$56,010	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	53	17	N	18	13	0	N	Y	\$228,058		
Norfolk	I-041	S-A36	Dry-Ditch Open-Cut	51	-	N	21	10	0	N	Y	\$49,896	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-feet wide) UNT to Foul Ground Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take nearly twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	51	22	N	21	10	0	N	Y	\$345,700		

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				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-042	S-A38	Dry-Ditch Open-Cut	78	-	N	20	16	0	N	Y	\$92,243	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	78	20	N	20	16	0	N	Y	\$404,056		
Norfolk	I-043A	S-A41	Dry-Ditch Open-Cut	114	-	N	14	10	0	N	Y	\$121,800	Dry-Ditch Open-Cut	Foul Ground Creek is in an area with highly erodible solids. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. Lastly, it would be unreasonably expensive to use a trenchless crossing to avoid only a fraction of the aquatic impact to this resource.
			Conventional Bore	114	17	N	14	10	0	N	Y	\$401,175		
Norfolk	I-043B	W-DD1	Dry-Ditch Open-Cut	110	-	N	14	7	0	N	Y	\$77,000	Dry-Ditch Open-Cut	The open cut method would result in a small (0.05 ac) temporary impact to PEM wetland. The open cut method would reduce construction time for this crossing by 11 days. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	110	18	N	14	7	0	N	Y	\$394,390		
Norfolk	I-044A	S-GH36, S-KL17	Dry-Ditch Open-Cut	103	-	N	21	9	0	N	Y	\$89,600	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	103	19	N	21	9	0	N	Y	\$379,092		
Norfolk	I-044B	S-GH39	Dry-Ditch Open-Cut	61	-	N	27	23	0	N	Y	\$56,700	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (four-feet wide) intermittent UNT to Foul Ground Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 8 to 25 days. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	61	26	N	27	23	0	N	Y	\$410,619		
Norfolk	I-045	S-GH40	Dry-Ditch Open-Cut	57	-	N	17	13	0	N	Y	\$50,751	Dry-Ditch Open-Cut	The open-cut method would result in a temporary impact to a small (three-feet wide) UNT to Foul Ground Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would double the duration of the crossing. The open-cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	57	22	N	17	13	0	N	Y	\$362,728		
Norfolk	I-046	S-GH44, S-GH38, S-IJ47, W-GH16	Dry-Ditch Open-Cut	217	-	N	11	7	0	N	Y	\$181,597	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	217	20	N	11	7	0	N	Y	\$798,536		
Norfolk	I-047	S-G22	Dry-Ditch Open-Cut	48	-	N	50	38	87	N	N	\$76,133	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a UNT to Poplar Camp Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 40 feet on the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 44 days. The open cut method would reduce the construction duration near two private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	48	37	N	50	38	87	N	N	\$812,190		
Norfolk	I-048	S-G20	Dry-Ditch Open-Cut	62	-	N	39	18	93	N	N	\$81,267	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	62	15	N	39	18	93	N	N	\$244,465		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-049	S-G18	Dry-Ditch Open-Cut	37	-	N	35	18	10	N	N	\$33,422	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (two-feet wide) intermittent UNT to the Blackwater River. The open cut method would reduce by half the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	37	19	N	35	18	10	N	N	\$191,785		
Norfolk	I-050	S-E18	Dry-Ditch Open-Cut	38	-	N	27	18	0	N	Y	\$54,216	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (eight-feet wide) UNT to Blackwater River. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	21	N	27	18	0	N	Y	\$299,672		
Norfolk	I-051	S-E17	Dry-Ditch Open-Cut	77	-	N	35	16	32	N	Y	\$88,594	Dry-Ditch Open-Cut	The open-cut method would result in a temporary impact to a UNT to the Blackwater River. This crossing is in proximity to a residence, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open-cut method would reduce the construction duration near a private drinking water well on the property.
			Conventional Bore	77	16	N	35	16	32	N	Y	\$291,602		
Norfolk	I-052	S-E14	Dry-Ditch Open-Cut	60	-	N	25	18	0	N	Y	\$117,336	Dry-Ditch Open-Cut	The open-cut method would result in a temporary impact to a UNT to the Blackwater River. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to a residence, and a trenchless crossing of this location would take twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property.
			Conventional Bore	60	25	N	25	18	0	N	Y	\$398,646		
Norfolk	I-053	S-H38, W-H17	Dry-Ditch Open-Cut	169	-	N	18	6	0	N	Y	\$164,668	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	169	22	N	18	6	0	N	Y	\$680,582		
Norfolk	I-054	S-H37	Dry-Ditch Open-Cut	35	-	N	47	23	31	N	N	\$45,685	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-feet wide) UNT to Jacks Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet on the edge of a steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take 15 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	35	33	N	47	23	31	N	N	\$702,219		
Norfolk	I-055	S-H36, W-H16	Dry-Ditch Open-Cut	84	-	N	31	25	10	N	N	\$168,404	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	84	30	N	31	25	10	N	N	\$786,472		
Norfolk	I-056	S-H34	Dry-Ditch Open-Cut	32	-	N	40	24	32	N	N	\$33,003	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	32	24	N	40	24	32	N	N	\$310,048		
Norfolk	I-057	S-H32	Dry-Ditch Open-Cut	46	-	N	38	29	74	N	N	\$68,296	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	46	26	N	38	29	74	N	N	\$368,049		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-058	W-H11	Dry-Ditch Open-Cut	83	-	N	32	18	0	N	Y	\$58,100	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact to a PEM wetland. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to several residences, and a trenchless crossing of this location would take 17 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	83	30	N	32	18	0	N	Y	\$783,634		
Norfolk	I-059	S-A18	Dry-Ditch Open-Cut	92	-	N	26	17	0	N	Y	\$80,003	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (four-feet wide) intermittent UNT to Jacks Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to a residence, and a trenchless crossing of this location would take 13 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	92	24	N	26	17	0	N	Y	\$480,327		
Norfolk	I-060A	S-A19/H26	Dry-Ditch Open-Cut	93	-	N	39	28	52	N	Y	\$149,100	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to an intermittent UNT to Jacks Creek. Avoiding/minimizing this minor impact through a conventional bore would require an excessively deep bore pit of greater than 40 feet, thereby requiring the excavation of an interim ramp and two benches and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	93	41	N	39	28	52	N	Y	\$2,500,296		
Norfolk	I-060B	S-A20	Dry-Ditch Open-Cut	82	-	N	39	23	0	N	Y	\$81,900	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method.
			Conventional Bore	82	39	N	39	23	0	N	Y	\$945,220		
Norfolk	I-061A	S-A22	Dry-Ditch Open-Cut	52	-	N	27	18	0	N	Y	\$67,900	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	52	16	N	27	18	0	N	Y	\$220,653		
Norfolk	I-061B	S-H27	Dry-Ditch Open-Cut	60	-	N	28	14	0	N	Y	\$77,000	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small UNT to Jacks Creek. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	60	29	N	28	14	0	N	Y	\$435,185		
Norfolk	I-062	S-MM44	Dry-Ditch Open-Cut	54	-	N	36	24	0	N	Y	\$54,544	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	54	36	N	36	24	0	N	Y	\$810,949		
Norfolk	I-063	S-MM48	Dry-Ditch Open-Cut	83	-	N	29	18	0	N	Y	\$91,845	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	83	29	N	29	18	0	N	Y	\$500,459		
Norfolk	I-064	S-H25, W-H9	Dry-Ditch Open-Cut	31	-	N	40	21	31	N	N	\$53,320	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	31	26	N	40	21	31	N	N	\$325,479		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-065	S-H24	Dry-Ditch Open-Cut	79	-	N	31	21	0	N	Y	\$216,378	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	79	28	N	31	21	0	N	Y	\$479,972		
Norfolk	I-066	S-H23	Dry-Ditch Open-Cut	45	-	N	30	23	0	N	Y	\$49,679	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (five-foot wide) intermittent UNT to Turkey Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	45	27	N	30	23	0	N	Y	\$374,346		
Norfolk	I-067	S-A13	Dry-Ditch Open-Cut	54	-	N	21	16	0	N	Y	\$81,560	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	54	20	N	21	16	0	N	Y	\$335,945		
Norfolk	I-069A	S-A7	Dry-Ditch Open-Cut	61	-	N	23	10	0	N	Y	\$74,200	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	61	19	N	23	10	0	N	Y	\$259,897		
Norfolk	I-069B	S-H17	Dry-Ditch Open-Cut	90	-	N	27	20	0	N	Y	\$86,898	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (seven-foot wide) intermittent Dinner Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit nearing 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in proximity to a residence, and a trenchless crossing of this location would take 22 days to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	90	28	N	27	20	0	N	Y	\$511,190		
Norfolk	I-070	S-SS8	Dry-Ditch Open-Cut	51	-	N	31	24	0	N	Y	\$77,803	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	51	26	N	31	24	0	N	Y	\$382,239		
Norfolk	I-071	S-CD8	Dry-Ditch Open-Cut	38	-	N	27	24	0	N	Y	\$43,598	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-foot wide) intermittent UNT to Owens Creek. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	27	N	27	24	0	N	Y	\$354,480		
Norfolk	I-072	S-AB8	Dry-Ditch Open-Cut	44	-	N	35	24	11	N	N	\$49,580	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (five-foot wide) intermittent UNT to Owens Creek. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit exceeding 30 feet on the edge of a short but steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	44	34	N	35	24	11	N	N	\$746,030		
Norfolk	I-073	S-DD3	Dry-Ditch Open-Cut	81	-	N	10	8	91	N	Y	\$121,514	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	81	16	N	10	8	91	N	Y	\$302,954		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-074	S-G16	Dry-Ditch Open-Cut	53	-	N	34	23	0	N	Y	\$142,157	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	53	31	N	34	23	0	N	Y	\$716,764		
Norfolk	I-075	S-G15	Dry-Ditch Open-Cut	54	-	N	31	20	10	N	Y	\$72,205	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small intermittent UNT to Parrott Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet on the edge of a short but steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would more than double the duration of the crossing. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	54	33	N	31	20	10	N	Y	\$756,141		
Norfolk	I-076	S-G13	Dry-Ditch Open-Cut	42	-	N	57	36	107	N	N	\$57,417	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	42	26	N	57	36	107	N	N	\$356,697		
Norfolk	I-077	S-D7, W-MM17	Dry-Ditch Open-Cut	39	-	N	36	20	21	N	N	\$57,474	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (nine-foot wide) intermittent UNT to Jonnikin Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet on the edge of a short but steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	39	25	N	36	20	21	N	N	\$339,049		
Norfolk	I-078	S-D3	Dry-Ditch Open-Cut	43	-	N	28	16	0	N	Y	\$65,776	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	43	16	N	28	16	0	N	Y	\$195,111		
Norfolk	I-079	S-D4	Dry-Ditch Open-Cut	62	-	N	35	20	10	N	N	\$73,648	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small (six-foot wide) intermittent UNT to Jonnikin Creek. Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 40 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	62	38	N	35	20	10	N	N	\$870,191		
Norfolk	I-080	S-D2, W-D3	Dry-Ditch Open-Cut	54	-	N	41	21	96	N	N	\$102,144	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	54	19	N	41	21	96	N	N	\$240,031		
Norfolk	I-081	S-D1-EPH	Dry-Ditch Open-Cut	82	-	N	28	19	0	N	Y	\$95,632	Dry-Ditch Open-Cut	Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. It would be unreasonably expensive to use a trenchless crossing to avoid only a fraction of the aquatic impact to this UNT to Jonnikin Creek.
			Conventional Bore	82	29	N	28	19	0	N	Y	\$497,621		
Norfolk	I-082	S-G11	Dry-Ditch Open-Cut	55	-	N	35	16	0	N	Y	\$59,983	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-foot wide) intermittent UNT to Jonnikin Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take more than twice as long to complete -- compounding the noise, aesthetic, and other impacts on nearby persons. The open-cut method reduces construction duration to minimize disruption due to construction activities on the affected residents. The open cut method would reduce the construction duration near several private drinking water wells on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	55	33	N	35	16	0	N	Y	\$758,979		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-083	S-G9, W-B5	Dry-Ditch Open-Cut	44	-	N	24	14	10	N	N	\$45,226	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (four-feet wide) intermittent UNT to Jonnikin Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet on the edge of a short slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing by one week. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	44	20	N	24	14	10	N	N	\$307,565		
Norfolk	I-084A	S-G8	Dry-Ditch Open-Cut	41	-	N	24	16	0	N	Y	\$42,700	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (four-feet wide) intermittent UNT to Jonnikin Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 5 to 17 days. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	41	21	N	24	16	0	N	Y	\$308,186		
Norfolk	I-084B	S-Q15	Dry-Ditch Open-Cut	48	-	N	26	22	0	N	Y	\$54,600	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-feet wide) UNT to Jonnikin Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 5 to 17 days. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	48	25	N	26	22	0	N	Y	\$364,590		
Norfolk	I-085	S-A6	Dry-Ditch Open-Cut	44	-	N	28	21	0	N	Y	\$51,308	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	44	22	N	28	21	0	N	Y	\$325,834		
Norfolk	I-086	S-C7	Dry-Ditch Open-Cut	65	-	N	42	19	96	N	N	\$115,499	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	65	19	N	42	19	96	N	N	\$271,248		
Norfolk	I-087	S-C4, S-C3	Dry-Ditch Open-Cut	126	-	N	34	27	115	N	N	\$153,189	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	126	27	N	34	27	115	N	N	\$604,222		
Norfolk	I-088	S-H13, W-H5	Dry-Ditch Open-Cut	173	-	N	33	25	21	N	N	\$191,262	Dry-Ditch Open-Cut	The stream banks at the crossing location are rapidly eroding due to natural conditions unrelated to pipeline construction. Instream work will be necessary to permanently restore and stabilize the banks, which will provide greater protection for the pipeline and have the benefit of reducing long-term sediment loads in the stream. That work can be done efficiently and effectively after completion of an open-cut crossing. Therefore, temporary stream impacts are unavoidable at this location. Lastly, it would be unreasonably expensive to use a trenchless crossing to avoid only a fraction of the aquatic impact to this UNT to Little Cherrystone Creek and adjacent wetland.
			Conventional Bore	173	35	N	33	25	21	N	N	\$1,130,399		
Norfolk	I-089	S-G6	Dry-Ditch Open-Cut	60	-	N	30	23	0	N	Y	\$63,951	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-feet wide) UNT to Harpen Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would more than double the duration of the crossing. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	60	34	N	30	23	0	N	Y	\$791,438		
Norfolk	I-090	S-G5	Dry-Ditch Open-Cut	50	-	N	26	17	0	N	Y	\$56,003	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-feet wide) UNT to Harpen Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 10 days. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	50	26	N	26	17	0	N	Y	\$379,401		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-091	S-G4	Dry-Ditch Open-Cut	74	-	N	30	18	0	N	Y	\$167,471	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	74	32	N	30	18	0	N	Y	\$794,631		
Norfolk	I-092	S-G3	Dry-Ditch Open-Cut	39	-	N	31	17	0	N	Y	\$61,935	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	39	20	N	31	17	0	N	Y	\$293,375		
Norfolk	I-093	S-CC16	Dry-Ditch Open-Cut	52	-	N	18	11	0	N	Y	\$75,678	Conventional Bore	Orangefin madtom habitat may be present in this stream. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	52	16	N	18	11	0	N	Y	\$220,653		
Norfolk	I-094	S-CC13, S-CC14	Dry-Ditch Open-Cut	110	-	N	25	18	0	N	Y	\$105,108	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	110	23	N	25	18	0	N	Y	\$522,276		
Norfolk	I-095	S-MM8, W-MM5	Dry-Ditch Open-Cut	39	-	N	20	14	0	N	Y	\$48,302	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	39	19	N	20	14	0	N	Y	\$197,461		
Norfolk	I-096	S-CC15	Dry-Ditch Open-Cut	33	-	N	18	14	0	N	Y	\$45,144	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	33	18	N	18	14	0	N	Y	\$175,866		
Norfolk	I-097	S-CC8, S-CC5	Dry-Ditch Open-Cut	78	-	N	32	11	10	N	N	\$128,994	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	78	14	N	32	11	10	N	N	\$285,306		
Norfolk	I-098	S-CC9	Dry-Ditch Open-Cut	42	-	N	45	26	21	N	N	\$48,685	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (six-foot wide) UNT to Cherrystone Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 10 days. The open cut method would reduce the avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	42	35	N	45	26	21	N	N	\$758,623		
Norfolk	I-099	S-CC10	Dry-Ditch Open-Cut	38	-	N	38	20	21	N	N	\$58,726	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (nine-foot wide) intermittent UNT to Cherrystone Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 10 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	32	N	38	20	21	N	N	\$692,463		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-100	S-CC11	Dry-Ditch Open-Cut	42	-	N	44	19	0	N	Y	\$60,039	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (nine-feet wide) UNT to Cherrystone Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet on the edge of a short but steep slope, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 10 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	42	27	N	44	19	0	N	Y	\$365,832		
Norfolk	I-101A	W-MM9	Dry-Ditch Open-Cut	35	-	N	44	26	52	N	N	\$83,561	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	35	18	N	44	26	52	N	N	\$181,542		
Norfolk	I-101B	W-MM8-PFO, W-MM8-PEM, S-CC1	Dry-Ditch Open-Cut	161	-	N	20	8	32	N	Y	\$172,200	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small intermittent UNT to Cherrystone Creek and two adjacent wetland features (PEM and PFO). Avoiding/minimizing these minor impacts through a conventional bore would require a relatively deep bore pit of nearly 40 feet , thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 60 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Because the pipeline ROW must remain free of woody vegetation to protect the pipe coating, a conversion impact is unavoidable with any crossing method. Using a conventional bore crossing method to avoid/minimize these minor temporary impacts would be unreasonably expensive.
			Conventional Bore	161	38	N	20	8	32	N	Y	\$1,151,152		
Norfolk	I-102	S-CC3	Dry-Ditch Open-Cut	38	-	N	40	21	0	N	Y	\$56,288	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (eight-feet wide) UNT to Cherrystone Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet on the edge, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 10 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	38	30	N	40	21	0	N	Y	\$655,925		
Norfolk	I-103	S-P5	Dry-Ditch Open-Cut	47	-	N	12	10	0	N	Y	\$56,790	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	47	11	N	12	10	0	N	Y	\$183,626		
Norfolk	I-104	S-IJ35-EPH	Dry-Ditch Open-Cut	32	-	N	23	16	0	N	Y	\$36,895	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (five-feet wide) UNT to Pole Bridge Branch. Avoiding/minimizing this minor impact through a conventional bore would increase the duration of the crossing from 4 to 11 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	32	23	N	23	16	0	N	Y	\$300,913		
Norfolk	I-105	S-Q4	Dry-Ditch Open-Cut	48	-	N	22	7	0	N	Y	\$56,601	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	48	19	N	22	7	0	N	Y	\$223,003		
Norfolk	I-106A	S-Q2	Dry-Ditch Open-Cut	51	-	N	17	15	0	N	Y	\$123,204	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	51	16	N	17	15	0	N	Y	\$217,815		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-106B	W-Q2, S-Q3	Dry-Ditch Open-Cut	319	-	N	17	6	0	N	Y	\$253,621	Dry-Ditch Open-Cut	This crossing presents multiple challenges that limit the available options and necessitated the development of a site-specific solution. A bore pit depth exceeding 20 feet at this location requires the excavation of an interim ramp and bench and dramatically increases the space occupied by the bore pit and spoil pile. Steep slopes (greater than 30%) adjacent to the waterbody increases the complexity of this crossing if bored, increases safety risk to personnel, and adds risk of impact to the waterbody from upland work during a bore. The open cut method also reduces the construction duration near private drinking water wells on the property. Attempting a conventional bore would extend the duration of this crossing from 5 days for an open cut to 60 days for a guided conventional bore -- which also would increase the total greenhouse gas emissions associated with this crossing by 15 times. Furthermore, the other significant environmental impacts associated with a trenchless crossing method at this location outweigh the minimized temporary impact to Pole Bridge Branch.
			Guided Conventional Bore	319	26	N	17	6	0	N	Y	\$711,028		
Norfolk	I-107	W-Q1	Dry-Ditch Open-Cut	55	-	N	10	8	0	N	Y	\$38,500	Dry-Ditch Open-Cut	The open cut method would result in a small temporary impact to a PEM wetland. Avoiding/minimizing this minor impact through a conventional bore would increase the duration of the crossing from 4 to 43 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	55	16	N	10	8	0	N	Y	\$229,167		
Norfolk	I-108	S-B6	Dry-Ditch Open-Cut	55	-	N	42	19	0	N	Y	\$80,024	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (five-foot wide) intermittent UNT to Pole Bridge Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 40 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 11 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	55	36	N	42	19	0	N	Y	\$813,787		
Norfolk	I-109	S-B8	Dry-Ditch Open-Cut	43	-	N	31	16	0	N	Y	\$46,214	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (five-foot wide) intermittent UNT to Pole Bridge Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. It also would increase the duration of the crossing from 4 to 44 days. The open cut method would reduce the construction duration near a private drinking water well on the property. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	43	29	N	31	16	0	N	Y	\$386,939		
Norfolk	I-110	S-B9	Dry-Ditch Open-Cut	41	-	N	19	13	0	N	Y	\$53,226	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (seven-foot wide) UNT to Pole Bridge Branch. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 20 feet, thereby requiring the excavation of an interim ramp and bench and dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	41	22	N	19	13	0	N	Y	\$317,320		
Norfolk	I-111	S-DD4	Dry-Ditch Open-Cut	230	-	N	9	5	0	N	Y	\$213,500	Dry-Ditch Open-Cut	The pipeline has already been installed under an adjacent railroad. There is no feasible way to tie the two sections of pipe together if a trenchless method is used to install this crossing. Furthermore, the railroad bore encountered difficult conditions, which indicates that completing another crossing at this location has a higher degree of potential failure.
			Conventional Bore	230	17	N	9	5	0	N	Y	\$730,381		
Norfolk	I-111A	S-DD4	Dry-Ditch Open-Cut	33	-	N	23	13	0	N	Y	\$75,600	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	33	15	N	23	13	0	N	Y	\$162,164		
Norfolk	I-112	S-KL27	Dry-Ditch Open-Cut	33	-	N	12	7	0	N	Y	\$27,032	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small (one-foot wide) UNT to Mill Creek. It also would double the duration of the crossing. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	33	15	N	12	7	0	N	Y	\$162,164		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-113	S-C1	Dry-Ditch Open-Cut	61	-	N	38	11	0	N	Y	\$64,849	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to the small intermittent Mill Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet with an excavator operating from a bench within the pit, at the edge of short but steep slope, and nearly triple the duration of the crossing. It also would require the excavation of an interim ramp and bench, thereby dramatically increasing the space occupied by the bore pit and spoil pile. Using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	61	31	N	38	11	0	N	Y	\$739,468		
Norfolk	I-114	S-G2, W-G2	Dry-Ditch Open-Cut	122	-	N	35	16	11	N	Y	\$111,010	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	122	21	N	35	16	11	N	Y	\$538,062		
Norfolk	I-115	S-B2	Dry-Ditch Open-Cut	40	-	N	21	12	0	N	Y	\$46,015	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	40	18	N	21	12	0	N	Y	\$195,732		
Norfolk	I-116	S-H55	Dry-Ditch Open-Cut	40	-	N	13	8	0	N	Y	\$38,950	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	40	16	N	13	8	0	N	Y	\$186,597		
Norfolk	I-117	S-H54	Dry-Ditch Open-Cut	56	-	N	15	9	0	N	Y	\$88,685	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	56	16	N	15	9	0	N	Y	\$232,005		
Norfolk	I-118	S-H5, W-H1, W-H2, S-H3, W-H3	Dry-Ditch Open-Cut	835	-	N	22	7	0	N	Y	\$616,507	Dry-Ditch Open-Cut	Due a close cluster of wetlands that would be crossed in one undertaking, this crossing is unusually long at over 800 feet. The direct pipe method would be necessary to cross these features. That crossing would method would extend the duration of this crossing from seven days for an open cut to 99 days for the trenchless method (increasing greenhouse gas emissions associated with the crossing by nearly 1,900%). The open cut method would reduce the construction duration near multiple private drinking water wells on the property. Using a Direct Pipe crossing method to avoid/minimize these minor temporary impacts two a small (6-foot wide) intermittent stream, small (8-foot wide) perennial stream, and two small PEM wetlands would be unreasonably expensive.
			Direct Pipe	835	0	N	22	7	0	N	Y	\$6,680,000		
Norfolk	I-119	S-OO1, W-MM3	Dry-Ditch Open-Cut	59	-	N	35	20	10	N	N	\$58,931	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small intermittent UNT to Little Cherrystone Creek and an adjacent PSS wetland. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit of nearly 30 feet, with equipment operating within a bore pit at the edge of short but steep slope, as well as more than quadrupling the duration of the crossing and the relevant greenhouse gas emissions. The open cut method would reduce the construction duration near multiple private drinking water wells on the property. Lastly, using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	59	27	N	35	20	10	N	N	\$414,078		
Norfolk	I-120	S-OO2	Dry-Ditch Open-Cut	37	-	N	40	22	0	N	Y	\$44,417	Dry-Ditch Open-Cut	The open cut method would result in a temporary impact to a small intermittent UNT to Little Cherrystone Creek. Avoiding/minimizing this minor impact through a conventional bore would require a relatively deep bore pit exceeding 30 feet with an excavator operating from a bench within the pit, at the edge of short but steep slope, and more than double the duration of the crossing. Furthermore, using a conventional bore crossing method to avoid/minimize this minor temporary impact would be unreasonably expensive.
			Conventional Bore	37	31	N	40	22	0	N	Y	\$671,356		
Norfolk	I-121	S-EF26, W-IJ22-PFO, W-IJ22-PEM	Dry-Ditch Open-Cut	405	-	N	18	9	0	N	Y	\$357,812	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	405	19	N	18	9	0	N	Y	\$1,236,163		

Table 15. Crossing Method Determination Summary (revised 3/1/2021)
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USACE District	Crossing #	Waterbody	Crossing Methods Evaluated	Evaluation Factors									Proposed Crossing Method	Crossing Method Decision Rationale
				Crossing Length	Pit Depth	Deep Stream	Maximum Steep Slope (%)	Maximum Average Slope (%)	Maximum Winch Hill Length (feet)	Karst Terrain Present	Sufficient Stockpile Storage Available	Total Cost (\$)		
Norfolk	I-122	S-H44	Dry-Ditch Open-Cut	68	-	N	10	8	0	N	Y	\$87,003	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	68	17	N	10	8	0	N	Y	\$270,628		
Norfolk	I-123	S-H42	Dry-Ditch Open-Cut	43	-	N	20	8	0	N	Y	\$68,600	Conventional Bore	There are no significant constraints on available crossing methods or significant environmental impacts relevant to the available methods. The direct aquatic impact will be avoided/minimized by use of the conventional bore method. A minor temporary impact associated with the bore to maintain access will be required.
			Conventional Bore	43	23	N	20	8	0	N	Y	\$332,131		
Norfolk	I-124	W-EF6	Dry-Ditch Open-Cut	155	-	N	5	3	30	N	N	\$108,500	Dry-Ditch Open-Cut	To protect the integrity of the pipeline coating, woody vegetation cannot be allowed to grow close to the pipe. In forested wetlands, a 30-foot corridor generally must be maintained free of trees. Accordingly, conversion impacts to this wetland are unavoidable. The conventional bore method also entails significant environmental consequences at this location. This crossing is in close proximity to a residence, and a trenchless crossing of this location would take nearly four weeks to complete -- compounding the noise, aesthetic, and other impacts on nearby residents. The longer-duration bore also nearly quadruples the greenhouse gas emissions associated with the crossing.
			Conventional Bore	155	13	N	5	3	30	N	N	\$499,263		

Table 17. (revised 4/13/2021)
Compensatory Wetland Mitigation
Individual Permit Application
Mountain Valley Pipeline Project

Feature	USACE District	HUC 8 Name	HUC 8 #	Cowardin Class ¹	Impact (acres)	Impact Type	Mitigation Evaluation Method ²	Projected Mitigation Requirement	Proposed Mitigation Type ³
W-IJ31	Huntington	Middle Ohio	05030201	PEM	0.0082	Permanent Fill	SWVM	0.0082	Kincheloe
W-A27-PFO	Huntington	Middle Ohio	05030201	PFO	0.0547	Permanent Conversion	SWVM	0.0547	Kincheloe
W-A23	Huntington	Middle Ohio	05030201	PEM	0.0579	Permanent Fill	SWVM	0.0579	Kincheloe
W-H109	Huntington	Little Kanawha	05030203	PEM	0.0027	Permanent Fill	SWVM	0.0027	Kincheloe
W-K33-PSS	Huntington	Little Kanawha	05030203	PSS	0.0024	Permanent Conversion	SWVM	0.0024	Kincheloe
W-I22-PEM	Huntington	Little Kanawha	05030203	PEM	0.0059	Permanent Fill	SWVM	0.0059	Kincheloe
W-H98	Huntington	Little Kanawha	05030203	PEM	0.0331	Permanent Fill	SWVM	0.0331	Kincheloe
W-UV17	Huntington	Little Kanawha	05030203	PFO	0.0055	Permanent Conversion	SWVM	0.0055	Kincheloe
W-VV4-PFO	Huntington	Little Kanawha	05030203	PFO	0.0263	Permanent Conversion	SWVM	0.0263	Kincheloe
W-VV3-PFO	Huntington	Little Kanawha	05030203	PFO	0.0160	Permanent Conversion	SWVM	0.0160	Kincheloe
W-A20-PFO	Huntington	Elk	05050007	PFO	0.0298	Permanent Conversion	SWVM	0.0298	Beverly
W-H70	Huntington	Elk	05050007	PEM	0.0057	Permanent Fill	SWVM	0.0057	Beverly
W-H71	Huntington	Elk	05050007	PEM	0.0205	Permanent Fill	SWVM	0.0205	Beverly
W-H72	Huntington	Elk	05050007	PEM	0.0064	Permanent Fill	SWVM	0.0064	Beverly
W-H73	Huntington	Elk	05050007	PEM	0.0061	Permanent Fill	SWVM	0.0061	Beverly
W-H74	Huntington	Elk	05050007	PEM	0.0115	Permanent Fill	SWVM	0.0115	Beverly
W-H67	Huntington	Elk	05050007	PFO	0.0908	Permanent Conversion	SWVM	0.0908	Beverly
W-H66	Huntington	Elk	05050007	PFO	0.2496	Permanent Conversion	SWVM	0.2496	Beverly
W-H64-PSS	Huntington	Elk	05050007	PSS	0.0422	Permanent Conversion	SWVM	0.0422	Beverly
W-O13	Huntington	Elk	05050007	PEM	0.0405	Permanent Fill	SWVM	0.0405	Beverly
W-B35	Huntington	Elk	05050007	PSS	0.0108	Permanent Conversion	SWVM	0.0108	Beverly
W-E28	Huntington	Elk	05050007	PSS	0.0084	Permanent Fill	SWVM	0.0084	Beverly
W-E30	Huntington	Elk	05050007	PEM	0.0316	Permanent Fill	SWVM	0.0316	Beverly
W-F40	Huntington	Elk	05050007	PSS	0.0188	Permanent Conversion	SWVM	0.0188	Beverly
W-E18-PSS	Huntington	Gauley	05050005	PSS	0.0538	Permanent Conversion	SWVM	0.0538	Spanishburg
W-E13	Huntington	Gauley	05050005	PFO	0.0107	Permanent Conversion	SWVM	0.0107	Spanishburg
W-FF6-PSS	Huntington	Gauley	05050005	PSS	0.0333	Permanent Conversion	SWVM	0.0333	Spanishburg
W-A15	Huntington	Gauley	05050005	PSS	0.0891	Permanent Conversion	SWVM	0.0891	Spanishburg
W-A14	Huntington	Gauley	05050005	PFO	0.0374	Permanent Conversion	SWVM	0.0374	Spanishburg
W-I7	Huntington	Gauley	05050005	PFO	0.0333	Permanent Conversion	SWVM	0.0333	Spanishburg
W-J8	Huntington	Gauley	05050005	PFO	0.0533	Permanent Conversion	SWVM	0.0533	Spanishburg
W-J7	Huntington	Gauley	05050005	PFO	0.0693	Permanent Conversion	SWVM	0.0693	Spanishburg
W-H35	Huntington	Gauley	05050005	PEM	0.0177	Permanent Fill	SWVM	0.0177	Spanishburg
W-M22	Huntington	Gauley	05050005	PSS	0.0039	Permanent Conversion	SWVM	0.0039	Spanishburg
W-J6	Huntington	Gauley	05050005	PFO	0.0744	Permanent Conversion	SWVM	0.0744	Spanishburg
W-HS1	Huntington	Gauley	05050005	PEM	0.0360	Permanent Fill	SWVM	0.0360	Spanishburg
W-QR2	Huntington	Gauley	05050005	PEM	0.0010	Permanent Fill	SWVM	0.0010	Spanishburg
W-IJ47-PEM	Huntington	Gauley	05050005	PEM	0.0633	Permanent Fill	SWVM	0.0633	Spanishburg
W-UV4	Huntington	Gauley	05050005	PSS	0.0885	Permanent Conversion	SWVM	0.0885	Spanishburg
W-I10	Huntington	Gauley	05050005	PEM	0.0550	Permanent Fill	SWVM	0.0550	Spanishburg
W-MM20-PFO	Huntington	Greenbrier	05050003	PFO	0.2990	Permanent Conversion	SWVM	0.2990	Spanishburg
W-A13	Huntington	Upper New	05050002	PEM	0.0228	Permanent Fill	SWVM	0.0228	Spanishburg
W-MN18-PFO	Huntington	Upper New	05050002	PFO	0.1750	Permanent Conversion	SWVM	0.1750	Spanishburg

Table 17. (revised 4/13/2021)
Compensatory Wetland Mitigation
Individual Permit Application
Mountain Valley Pipeline Project

Feature	USACE District	HUC 8 Name	HUC 8 #	Cowardin Class ¹	Impact (acres)	Impact Type	Mitigation Evaluation Method ²	Projected Mitigation Requirement	Proposed Mitigation Type ³
W-CV25-PSS-1	Huntington	Upper New	05050002	PSS	0.0270	Permanent Conversion	SWVM	0.0270	Spanishburg
W-UU1	Pittsburgh	West Fork	05020002	PFO	0.0045	Permanent Conversion	SWVM	0.0045	Kincheloe
W-UU3	Pittsburgh	West Fork	05020002	PFO	0.0065	Permanent Conversion	SWVM	0.0065	Kincheloe
W-ST12-PSS	Pittsburgh	West Fork	05020002	PSS	0.1444	Permanent Conversion	SWVM	0.1444	Kincheloe
W-K52	Pittsburgh	West Fork	05020002	PEM	0.0115	Permanent Fill	SWVM	0.0115	Kincheloe
W-Z3	Norfolk	Middle New	05050002	PSS	0.0136	Permanent Conversion	1 : 1	0.01360	No Mitigation Proposed ⁴
W-F9-PFO	Norfolk	Upper Roanoke	03010101	PFO	0.0169	Permanent Conversion	1 : 1	0.01690	Banister Bend
W-C12	Norfolk	Upper Roanoke	03010101	PFO	0.0523	Permanent Conversion	1 : 1	0.0523	Banister Bend
W-C11	Norfolk	Upper Roanoke	03010101	PSS	0.0461	Permanent Conversion	1 : 1	0.04610	Banister Bend
W-KL58	Norfolk	Upper Roanoke	03010101	PEM	0.0392	Permanent Fill	1 : 1	0.0392	Banister Bend
W-EF5-PFO	Norfolk	Upper Roanoke	03010101	PFO	0.0852	Permanent Conversion	1 : 1	0.0852	Banister Bend
W-EF18	Norfolk	Upper Roanoke	03010101	PSS	0.0052	Permanent Conversion	1 : 1	0.0052	Banister Bend
W-EF17	Norfolk	Upper Roanoke	03010101	PFO	0.0224	Permanent Conversion	1 : 1	0.0224	Banister Bend
W-IJ95-PSS	Norfolk	Upper Roanoke	03010101	PSS	0.0254	Permanent Conversion	1 : 1	0.0254	Banister Bend
W-IJ102	Norfolk	Upper Roanoke	03010101	PFO	0.0100	Permanent Conversion	1 : 1	0.0100	Banister Bend
W-KL17	Norfolk	Upper Roanoke	03010101	PSS	0.0435	Permanent Conversion	1 : 1	0.0435	Banister Bend
W-AB6-PFO-1	Norfolk	Upper Roanoke	03010101	PFO	0.0618	Permanent Conversion	1 : 1	0.0618	Banister Bend
W-AB6-PSS	Norfolk	Upper Roanoke	03010101	PSS	0.0061	Permanent Conversion	1 : 1	0.0061	Banister Bend
W-AB5	Norfolk	Upper Roanoke	03010101	PFO	0.0042	Permanent Conversion	1 : 1	0.0042	Banister Bend
W-EF46	Norfolk	Upper Roanoke	03010101	PSS	0.0682	Permanent Conversion	1 : 1	0.0682	Banister Bend
W-KL48-PSS-1	Norfolk	Upper Roanoke	03010101	PSS	0.0454	Permanent Conversion	1 : 1	0.04540	Banister Bend
W-KL48-PSS-2	Norfolk	Upper Roanoke	03010101	PSS	0.0264	Permanent Conversion	1 : 1	0.0264	Banister Bend
W-KL51-PSS	Norfolk	Upper Roanoke	03010101	PSS	0.0080	Permanent Conversion	1 : 1	0.00800	Banister Bend
W-IJ36	Norfolk	Upper Roanoke	03010101	PSS	0.1237	Permanent Conversion	1 : 1	0.1237	Banister Bend
W-Z7	Norfolk	Upper Roanoke	03010101	PSS	0.0003	Permanent Conversion	1 : 1	0.0003	Banister Bend
W-Z6	Norfolk	Upper Roanoke	03010101	PFO	0.0028	Permanent Conversion	1 : 1	0.0028	Banister Bend
W-B24-PSS	Norfolk	Upper Roanoke	03010101	PSS	0.1637	Permanent Conversion	1 : 1	0.1637	Banister Bend
W-B25-PSS-2	Norfolk	Upper Roanoke	03010101	PSS	0.0830	Permanent Conversion	1 : 1	0.08300	Banister Bend
W-IJ2-PSS	Norfolk	Upper Roanoke	03010101	PSS	0.0080	Permanent Conversion	1 : 1	0.0080	Banister Bend
W-GH2	Norfolk	Upper Roanoke	03010101	PSS	0.0130	Permanent Conversion	1 : 1	0.0130	Banister Bend
W-CD5	Norfolk	Upper Roanoke	03010101	PFO	0.1136	Permanent Conversion	1 : 1	0.1136	Banister Bend
W-CD1	Norfolk	Upper Roanoke	03010101	PFO	0.1106	Permanent Conversion	1 : 1	0.1106	Banister Bend
W-A12-PFO	Norfolk	Upper Roanoke	03010101	PFO	0.0040	Permanent Conversion	1 : 1	0.00400	Banister Bend
W-GH16	Norfolk	Upper Roanoke	03010101	PFO	0.0657	Permanent Conversion	1 : 1	0.06570	Banister Bend
W-H17	Norfolk	Upper Roanoke	03010101	PFO	0.0369	Permanent Conversion	1 : 1	0.03690	Banister Bend
W-H15	Norfolk	Upper Roanoke	03010101	PSS	0.0071	Permanent Conversion	1 : 1	0.0071	Banister Bend
W-D3	Norfolk	Upper Roanoke	03010101	PFO	0.0285	Permanent Conversion	1 : 1	0.02850	Banister Bend
W-B4-PSS	Norfolk	Upper Roanoke	03010101	PSS	0.0047	Permanent Conversion	1 : 1	0.0047	Banister Bend
W-MM5	Norfolk	Banister	03010105	PSS	0.0390	Permanent Conversion	1 : 1	0.03900	Banister Bend
W-MM8-PFO	Norfolk	Banister	03010105	PFO	0.0421	Permanent Conversion	1 : 1	0.04210	Banister Bend
W-Q2	Norfolk	Banister	03010105	PFO	0.3770	Permanent Conversion	1 : 1	0.3770	Banister Bend
W-EF6	Norfolk	Banister	03010105	PFO	0.0667	Permanent Conversion	1 : 1	0.06670	Banister Bend
W-IJ21	Norfolk	Banister	03010105	PFO	0.0106	Permanent Conversion	1 : 1	0.0106	Banister Bend

**Table 17. (revised 4/13/2021)
Compensatory Wetland Mitigation
Individual Permit Application
Mountain Valley Pipeline Project**

Feature	USACE District	HUC 8 Name	HUC 8 #	Cowardin Class ¹	Impact (acres)	Impact Type	Mitigation Evaluation Method ²	Projected Mitigation Requirement	Proposed Mitigation Type ³
W-MM3	Norfolk	Banister	03010105	PSS	0.0340	Permanent Conversion	1 : 1	0.03400	Banister Bend
W-IJ22-PFO	Norfolk	Banister	03010105	PFO	0.0785	Permanent Conversion	1 : 1	0.07850	Banister Bend
				TOTAL	4.1895	-	-	4.1895	-

Notes:

- 1 - Field classification based on Cowardin et al. 1979. PEM - palustrine emergent wetland. PSS - palustrine scrub-shrub wetland. PFO - palustrine forested wetland
- 2 - In WV, the SWVM (Stream and Wetland Valuation Metric) was used to determine mitigation credit requirements
- In VA, per VDEQ and USACE guidance, mitigation ratios are 1:1 for PEM fill, PSS conversion, and PFO conversion impacts.
- 3 - Proposed mitigation bank based on the location of the impact and availability of mitigation credits in the impact area.
- Kincheloe - Kincheloe Mitigation Bank
- Beverly - Beverly Mitigation Bank
- Spanishburg - Spanishburg Mitigation Bank
- Banister Bend - Banister Bend Mitigation Bank
- 4 - Mountain Valley does not propose to purchase credits for impacts associated with wetland W-Z3. The proposed impact is 0.0136 acre conversion from PSS to PEM in the Middle New watershed. No wetland credits are available as no mitigation banks provide coverage within the river basin in which the impacts occur. As a result, Mountain Valley requested use of credits from VARTF that was denied without comment by The Nature Conservancy (TNC) on November 1, 2017. Permittee-responsible mitigation for this minimal impact is not practicable. Because compensatory mitigation is not required for this de minimis wetland impact, and there are no practicable options to provide such mitigation, MVP does not propose to provide any additional individual compensatory mitigation for the impact to W-Z3.

Table 18. (revised 4/13/2021)
Compensatory Stream Mitigation
Individual Permit Application
Mountain Valley Pipeline Project

Feature	USACE District	HUC 8 Name	HUC 8 #	Flow Regime	Impact (LF)	Mitigation Evaluation Method ¹	Projected Mitigation Requirement	Proposed Mitigation Type ²
S-A128	Pittsburgh	West Fork	05020002	Perennial	29	SWVM	24	Kincheloe
S-OP9	Pittsburgh	West Fork	05020002	Ephemeral	36	SWVM	30	Kincheloe
S-OP8	Pittsburgh	West Fork	05020002	Ephemeral	41	SWVM	29	Kincheloe
S-B79	Pittsburgh	West Fork	05020002	Ephemeral	60	SWVM	23	Kincheloe
S-J54	Pittsburgh	West Fork	05020002	Perennial	26	SWVM	17	Kincheloe
S-A120	Huntington	Middle Ohio	05030201	Intermittent	26	SWVM	13	Foster Run
S-QR34	Huntington	Middle Ohio	05030201	Ephemeral	125	SWVM	65	Foster Run
S-J56	Huntington	Middle Ohio	05030201	Perennial	41	SWVM	32	Foster Run
S-J59	Huntington	Middle Ohio	05030201	Intermittent	7	SWVM	4	Foster Run
S-A110/K62	Huntington	Middle Ohio	05030201	Intermittent	25	SWVM	10	Foster Run
S-K43	Huntington	Little Kanawha	05030203	Perennial	27	SWVM	18	Hayes Run
S-I63	Huntington	Little Kanawha	05030203	Perennial	26	SWVM	18	Hayes Run
S-UV11	Huntington	Little Kanawha	05030203	Perennial	25	SWVM	18	Hayes Run
S-L61	Huntington	Little Kanawha	05030203	Intermittent	58	SWVM	40	Hayes Run
S-L57	Huntington	Little Kanawha	05030203	Ephemeral	26	SWVM	13	Hayes Run
S-IJ27	Huntington	Little Kanawha	05030203	Perennial	84	SWVM	63	Hayes Run
S-IJ32	Huntington	Little Kanawha	05030203	Ephemeral	26	SWVM	17	Hayes Run
S-B62	Huntington	Elk	05050007	Perennial	29	SWVM	24	Spanishburg
S-H107	Huntington	Elk	05050007	Intermittent	30	SWVM	12	Spanishburg
S-I23a	Huntington	Gauley	05050005	Intermittent	33	SWVM	18	Spanishburg
S-IJ54	Huntington	Gauley	05050005	Ephemeral	31	SWVM	17	Spanishburg
S-IJ53	Huntington	Gauley	05050005	Perennial	20	SWVM	12	Spanishburg
S-FF1	Huntington	Gauley	05050005	Ephemeral	31	SWVM	31	Spanishburg
S-UV2	Huntington	Gauley	05050005	Perennial	28	SWVM	17	Spanishburg
S-I12	Huntington	Lower New	05050004	Intermittent	38	SWVM	22	Spanishburg
S-I10	Huntington	Lower New	05050004	Intermittent	26	SWVM	18	Spanishburg
S-K10	Huntington	Greenbrier	05050003	Intermittent	31	SWVM	11	Spanishburg
S-K4	Huntington	Greenbrier	05050003	Intermittent	22	SWVM	8	Spanishburg
S-A63	Huntington	Upper New	05050002	Perennial	25	SWVM	16	Spanishburg
S-A61	Huntington	Upper New	05050002	Ephemeral	26	SWVM	14	Spanishburg
S-CV26	Huntington	Upper New	05050002	Perennial	32	SWVM	20	Spanishburg
S-F18	Huntington	Upper New	5050002	Perennial	26	SWVM	17	Spanishburg
S-IJ16-a	Norfolk	Middle New	05050002	Ephemeral	31	USM	16	Graham and David
S-H42	Norfolk	Banister	03010105	Perennial	32	USM	44	Graham and David
TOTAL					1,179	-	751	

Notes:

- 1 - In WV, the SWVM (Stream and Wetland Valuation Metric) was used to determine mitigation credit requirements
- In VA, mitigation ratio values for stream impacts were calculated using Unified Stream Methodology (USM).
- 2 - Proposed mitigation bank based on the location of the impact and availability of mitigation credits in the impact area.
- Kincheloe - Kincheloe Wetland and Stream Mitigation Bank
- Foster Run - Foster Run Mitigation Bank
- Hayes Run - Hayes Run Stream and Wetland Mitigation Bank
- Spanishburg - Spanishburg Mitigation Bank
-Graham and David - Graham and David Mitigation Bank

Table B-1. Virginia Stream Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (square feet) ⁵	Permanent Impact Area (square feet) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-Q12	UNT to Kimbalton Branch	Giles	37.375311	-80.680878	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	86	-	344	-	127	-	4-531
S-Q13	Kimbalton Branch	Giles	37.374377	-80.682038	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	90	-	1350	-	500	-	4-532
S-P6	UNT to Stony Creek	Giles	37.362202	-80.688092	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	78	-	466	-	173	-	4-535
S-S5-Braid-2	Stony Creek	Giles	37.360325	-80.684214	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	122	-	13	-	4-536
S-S5-Braid-1	Stony Creek	Giles	37.360276	-80.684193	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	139	-	16	-	4-536
S-S5	Stony Creek	Giles	37.360071	-80.683960	Perennial	RPW	Candy darter, Green floater, pistol grip, Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	40	-	802	-	178	-	4-536
S-G29	UNT to Dry Branch	Giles	37.350430	-80.658259	Ephemeral	NRPW	-	05050002	Pipeline ROW	30	-	122	-	13	-	4-541
S-G30	UNT to Dry Branch	Giles	37.350373	-80.658230	Ephemeral	NRPW	-	05050002	Pipeline ROW	85	-	680	-	252	-	4-541
S-G32	Dry Branch	Giles	37.349095	-80.652040	Intermittent	RPW	-	05050002	Pipeline ROW	110	-	662	-	244	-	4-542
S-G33	UNT to Dry Branch	Giles	37.348641	-80.647225	Perennial	RPW	-	05050002	Pipeline ROW	99	-	793	-	293	-	4-542
S-G35	UNT to Little Stony Creek	Giles	37.344876	-80.633426	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	25	-	501	-	69	-	4-544
S-SS4	UNT to Little Stony Creek	Giles	37.344859	-80.631295	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	61	-	7	-	4-544
S-G35	UNT to Little Stony Creek	Giles	37.344779	-80.633379	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	25	-	501	-	69	-	4-544
S-Z7	UNT to Little Stony Creek	Giles	37.344278	-80.626185	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	61	-	7	-	4-545
S-Z7-Braid-1	UNT to Little Stony Creek	Giles	37.344277	-80.626113	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	61	-	7	-	4-545
S-Z9	UNT to Little Stony Creek	Giles	37.344163	-80.628400	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	78	-	9	-	4-544
S-Z10	UNT to Little Stony Creek	Giles	37.342351	-80.620823	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	240	-	27	-	4-545
S-Z11	UNT to Little Stony Creek	Giles	37.342236	-80.620542	Perennial	RPW	Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	20	-	100	-	11	-	4-545
S-Z12-EPH	UNT to Little Stony Creek	Giles	37.342214	-80.620312	Ephemeral	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	122	-	13	-	4-545
S-Z13	Little Stony Creek	Giles	37.342172	-80.620090	Perennial	RPW	Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	25	-	501	-	69	-	4-545
S-Z14	UNT to Little Stony Creek	Giles	37.340977	-80.618031	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	78	-	9	-	4-545
S-Y21	Doe Creek	Giles	37.338952	-80.614618	Intermittent	RPW	-	05050002	Temporary Access Road	102	-	1019	-	113	-	4-546
S-A34	UNT to Doe Creek	Giles	37.337763	-80.606008	Ephemeral	NRPW	-	05050002	Pipeline ROW	86	-	601	-	223	-	4-548
S-A33	UNT to Doe Creek	Giles	37.337639	-80.605571	Ephemeral	NRPW	-	05050002	Pipeline ROW	111	-	775	-	288	-	4-548
S-Y21	Doe Creek	Giles	37.337562	-80.614711	Intermittent	RPW	-	05050002	Temporary Access Road	92	-	919	-	102	-	4-546
S-Y21	Doe Creek	Giles	37.337048	-80.614625	Intermittent	RPW	-	05050002	Temporary Access Road	121	-	1211	-	134	-	4-546
S-A32	UNT to Doe Creek	Giles	37.335094	-80.596868	Perennial	RPW	-	05050002	Pipeline ROW	78	-	1250	-	462	-	4-549
S-QQ2	Sinking Creek	Craig	37.333152	-80.429438	Perennial	RPW	Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Temporary Access Road	40	-	1398	-	156	-	4-581
S-MN11-Upstream	UNT to Sinking Creek	Giles	37.332869	-80.559168	Ephemeral	NRPW	-	05050002	Temporary Access Road	15	-	61	-	7	-	4-554
S-MN11-Upstream	UNT to Sinking Creek	Giles	37.332191	-80.559979	Ephemeral	NRPW	-	05050002	Temporary Access Road	30	-	122	-	13	-	4-554
S-MN11-Downstream	UNT to Sinking Creek	Giles	37.332146	-80.560079	Ephemeral	NRPW	-	05050002	Temporary Access Road	37	-	183	-	21	-	4-554
S-Y3	UNT to Doe Creek	Giles	37.331748	-80.583355	Ephemeral	NRPW	-	05050002	Timber Mat Crossing	20	-	200	-	22	-	4-551
S-Y2	Doe Creek	Giles	37.331332	-80.583047	Perennial	RPW	-	05050002	Timber Mat Crossing	25	-	501	-	69	-	4-551
S-PP4	UNT to Sinking Creek	Craig	37.328329	-80.422810	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	84	-	170	-	62	-	4-579
S-PP3	UNT to Sinking Creek	Craig	37.326705	-80.425803	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	82	-	244	-	91	-	4-579
S-RR4	UNT to Sinking Creek	Giles	37.326015	-80.556831	Perennial	RPW	-	05050002	Temporary Access Road	85	-	257	-	28	-	4-556
S-E24	UNT to Sinking Creek	Giles	37.325728	-80.565082	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	81	-	1620	-	600	-	4-553
S-E25-Downstream	UNT to Sinking Creek	Giles	37.325638	-80.564680	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	161	-	18	-	4-553
S-E25-Upstream	UNT to Sinking Creek	Giles	37.325607	-80.564373	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	15	-	148	-	17	-	4-553
S-E25-Downstream	UNT to Sinking Creek	Giles	37.325566	-80.564634	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	161	-	18	-	4-553
S-PP1	UNT to Sinking Creek	Craig	37.324781	-80.431446	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	86	-	257	-	96	-	4-578
S-RR5	UNT to Sinking Creek	Giles	37.323702	-80.555627	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	83	-	832	-	307	-	4-555
S-PA07	UNT to Sinking Creek	Giles	37.323533	-80.555257	Intermittent	RPW	-	05050002	Pipeline ROW	115	-	231	-	85	-	4-555
S-IJ18-EPH	UNT to Sinking Creek	Giles	37.322737	-80.552396	Ephemeral	NRPW	-	05050002	Pipeline ROW	74	-	444	-	164	-	4-555
S-IJ19	UNT to Sinking Creek	Giles	37.322194	-80.553058	Ephemeral	NRPW	-	05050002	Temporary Access Road	43	-	170	-	19	-	4-555
S-IJ19	UNT to Sinking Creek	Giles	37.321823	-80.55311	Ephemeral	NRPW	-	05050002	Temporary Access Road	9	-	35	-	4	-	4-555
S-IJ18-INT	UNT to Sinking Creek	Giles	37.321756	-80.553011	Intermittent	RPW	-	05050002	Temporary Access Road	44	-	174	-	20	-	4-555
S-PP22	UNT to Craig Creek	Montgomery	37.321090	-80.412831	Intermittent	RPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	44	-	174	-	20	-	4-584
S-OO12	UNT to Sinking Creek	Giles	37.318956	-80.440648	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	25	-	48	-	6	-	4-577
S-OO13	UNT to Sinking Creek	Giles	37.318930	-80.440930	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	77	-	1542	-	570	-	4-577
S-OO14	UNT to Sinking Creek	Giles	37.318647	-80.441619	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	86	-	344	-	127	-	4-577
S-IJ17	UNT to Sinking Creek	Giles	37.318324	-80.547720	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	31	-	248	-	28	-	4-558
S-IJ16-b	UNT to Sinking Creek	Giles	37.318246	-80.547711	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	78	-	780	-	289	-	4-558
S-PP21	UNT to Craig Creek	Montgomery	37.317187	-80.409235	Perennial	RPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	20	-	78	-	9	-	4-584

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Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (square feet) ⁵	Permanent Impact Area (square feet) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-PP20	UNT to Craig Creek	Montgomery	37.316523	-80.408646	Perennial	RPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	20	-	122	-	13	-	4-584
S-RR13	Craig Creek	Montgomery	37.314504	-80.402613	Perennial	RPW	Atlantic Pigtoe, Stockable Trout, Coldwater Fishery	02080201	Temporary Access Road	41	-	1433	-	159	-	4-585
S-HH18	UNT to Craig Creek	Montgomery	37.313910	-80.398683	Perennial	RPW	Atlatic pigtoe, orangefin madtom Coldwater Fishery	02080201	Timber Mat Crossing	20	-	122	-	13	-	4-586
S-RR14	UNT to Craig Creek	Montgomery	37.313615	-80.402521	Ephemeral	NRPW	Atlantic Pigtoe, Coldwater Fishery	02080201	Timber Mat Crossing	20	-	139	-	16	-	4-585
S-OO6	Craig Creek	Montgomery	37.313511	-80.404606	Perennial	RPW	Atlantic Pigtoe, Stockable Trout, Coldwater Fishery	02080201	Timber Mat Crossing	35	-	701	-	136	-	4-585
S-QQ3	UNT to Sinking Creek	Giles	37.311869	-80.532365	Ephemeral	NRPW	-	05050002	Temporary Access Road	15	-	30	-	3	-	4-560
S-U16-a	UNT to Sinking Creek	Giles	37.311730	-80.544091	Ephemeral	NRPW	-	05050002	Permanent Access Road	20	-	140	-	16	-	4-559
S-U16-a	UNT to Sinking Creek	Giles	37.311730	-80.544091	Ephemeral	NRPW	-	05050002	Permanent Access Road	-	31	-	217	-	24	4-559
S-NN17	Sinking Creek	Giles	37.311616	-80.515786	Perennial	RPW	Green floater, Non-listed mussels, Natural Trout, Coldwater Fishery, Stockable Trout	05050002	Timber Mat Crossing	55	-	1102	-	336	-	4-564
S-KL43	UNT to Sinking Creek	Giles	37.307524	-80.466665	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	75	-	749	-	278	-	4-573
S-NN11	UNT to Sinking Creek	Giles	37.305508	-80.467231	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	84	-	418	-	156	-	4-573
S-NN12	UNT to Sinking Creek	Giles	37.300454	-80.472911	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	88	-	174	-	65	-	4-571
S-MM21	UNT to Mill Creek	Montgomery	37.299397	-80.391243	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	80	-	562	-	207	-	4-588
S-MM17	UNT to Sinking Creek	Giles	37.298226	-80.480624	Perennial	RPW	-	05050002	Temporary Access Road	49	-	96	-	11	-	4-569
S-MN22	UNT to Mill Creek	Montgomery	37.297166	-80.386612	Ephemeral	NRPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	96	-	192	-	71	-	4-589
S-RR2	Greenbriar Branch	Giles	37.296666	-80.494174	Perennial	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	161	-	18	-	4-567
S-YZ6	UNT to Greenbriar Branch	Giles	37.296612	-80.494165	Intermittent	RPW	Natural Trout, Coldwater Fishery	05050002	Timber Mat Crossing	20	-	122	-	13	-	4-567
S-EF62	UNT to Mill Creek	Montgomery	37.296356	-80.375118	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	76	-	836	-	310	-	4-590
S-MM18	UNT to Sinking Creek	Giles	37.296226	-80.481455	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	05050002	Pipeline ROW	88	-	440	-	163	-	4-569
S-U52	UNT to Mill Creek	Montgomery	37.296153	-80.367510	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	84	-	1346	-	498	-	4-591
S-EF65	Mill Creek	Montgomery	37.295743	-80.375921	Intermittent	RPW	Orangefin madtom, Non-listed mussels, Natural Trout, Coldwater Fishery, Stockable Trout	03010101	Pipeline ROW	152	-	910	-	338	-	4-590
S-G36	North Fork Roanoke River	Montgomery	37.268586	-80.313161	Perennial	RPW	Roanoke logperch, Orangefin madtom, Non-listed mussels, Natural Trout, Coldwater Fishery	03010101	Temporary Access Road	26	-	518	-	58	-	4-602
S-G38	UNT to North Fork Roanoke River	Montgomery	37.267002	-80.312898	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-603
S-G40	UNT to North Fork Roanoke River	Montgomery	37.264882	-80.307302	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-603
S-PP23	UNT to North Fork Roanoke River	Montgomery	37.264858	-80.307151	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	48	-	6	-	4-604
S-G39	UNT to North Fork Roanoke River	Montgomery	37.264817	-80.308486	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	82	-	492	-	182	-	4-604
S-MM14	UNT to Flatwoods Branch	Montgomery	37.258717	-80.293210	Ephemeral	NRPW	-	03010101	Pipeline ROW	105	-	736	-	272	-	4-608
S-MM15	UNT to Flatwoods Branch	Montgomery	37.258673	-80.296446	Intermittent	RPW	-	03010101	Pipeline ROW	82	-	492	-	182	-	4-608
S-MM11	UNT to Flatwoods Branch	Montgomery	37.258403	-80.288186	Ephemeral	NRPW	-	03010101	Pipeline ROW	80	-	640	-	237	-	4-609
S-F15	UNT to Flatwoods Branch	Montgomery	37.258198	-80.286029	Intermittent	RPW	-	03010101	Pipeline ROW	129	-	775	-	287	-	4-609
S-MM13	UNT to Flatwoods Branch	Montgomery	37.258176	-80.289222	Ephemeral	NRPW	-	03010101	Pipeline ROW	85	-	427	-	157	-	4-608
S-F16a/F16b	UNT to Flatwoods Branch	Montgomery	37.257998	-80.284735	Ephemeral	NRPW	-	03010101	Pipeline ROW	81	-	244	-	90	-	4-609
S-C36	UNT to Flatwoods Branch	Montgomery	37.257260	-80.281611	Intermittent	RPW	-	03010101	Pipeline ROW	96	-	287	-	107	-	4-609
S-C36	UNT to Flatwoods Branch	Montgomery	37.257133	-80.281475	Intermittent	RPW	-	03010101	Pipeline ROW	36	-	109	-	40	-	4-609
S-MM31	UNT to Flatwoods Branch	Montgomery	37.256959	-80.280329	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-609
S-C29	Flatwoods Branch	Montgomery	37.256387	-80.278021	Ephemeral	NRPW	-	03010101	Pipeline ROW	46	-	57	-	20	-	4-610
S-C25	UNT to Bradshaw Creek	Montgomery	37.254342	-80.267895	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	115	-	344	-	128	-	4-611
S-C24	UNT to Bradshaw Creek	Montgomery	37.254135	-80.266743	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	108	-	322	-	120	-	4-611
S-C21	Bradshaw Creek	Montgomery	37.251791	-80.258990	Perennial	RPW	Roanoke logperch, Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	25	-	501	-	69	-	4-613
S-NN19	UNT to Roanoke River	Montgomery	37.244319	-80.206995	Intermittent	RPW	-	03010101	Pipeline ROW	76	-	266	-	99	-	4-627
S-AB16	UNT to Roanoke River	Montgomery	37.231693	-80.198778	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-631
S-I1	UNT to Roanoke River	Montgomery	37.231179	-80.198460	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	279	-	31	-	4-631
S-CD12b	UNT to South Fork Roanoke River	Montgomery	37.229764	-80.201144	Perennial	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	122	-	13	-	4-631
S-EF19	UNT to Indian Run	Montgomery	37.216102	-80.197390	Ephemeral	NRPW	Warmwater Fishery, Tier 2	03010101	Pipeline ROW	79	-	396	-	146	-	4-634
S-EF20a	UNT to Roanoke River	Montgomery	37.210922	-80.193318	Perennial	RPW	Orangefin madtom, Non-listed mussels	03010101	Pipeline ROW	80	-	479	-	178	-	4-635
S-MM22	UNT to Roanoke River	Montgomery	37.205284	-80.187282	Perennial	RPW	Orangefin madtom, Non-listed mussels	03010101	Pipeline ROW	175	-	2627	-	972	-	4-637
S-IJ50	UNT to Roanoke River	Roanoke	37.194064	-80.167933	Perennial	RPW	Orangefin madtom, Non-listed mussels	03010101	Pipeline ROW	77	-	1925	-	713	-	4-641
S-Y13	UNT to Bottom Creek	Roanoke	37.187687	-80.151146	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	85	-	680	-	252	-	4-644
S-Y14	UNT to Bottom Creek	Roanoke	37.187568	-80.151049	Perennial	RPW	Orangefin madtom, Non-listed mussels, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	77	-	1076	-	399	-	4-644
S-EF57	UNT to Bottom Creek	Roanoke	37.181736	-80.148948	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Temporary Access Road	42	-	335	-	37	-	4-645
S-EF55	UNT to Bottom Creek	Roanoke	37.181506	-80.149497	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	33	-	266	-	98	-	4-645
S-EF34b	UNT to Bottom Creek	Roanoke	37.181385	-80.149140	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	81	-	810	-	300	-	4-645
S-EF33	UNT to Bottom Creek	Roanoke	37.179186	-80.141000	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	148	-	1333	-	493	-	4-647
S-IJ82	UNT to Bottom Creek	Roanoke	37.170458	-80.138216	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-648

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S-IJ85	UNT to Bottom Creek	Roanoke	37.169474	-80.130356	Perennial	RPW	Natural Trout, Coldwater Fishery	03010101	Temporary Access Road	50	-	401	-	44	-	4-650
S-IJ83	UNT to Bottom Creek	Roanoke	37.169211	-80.138258	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	148	-	741	-	82	-	4-649
S-IJ88	Bottom Creek	Roanoke	37.168395	-80.138295	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	30	-	1960	-	726	-	4-649
S-IJ84	UNT to Bottom Creek	Roanoke	37.168361	-80.138381	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	35	-	527	-	58	-	4-649
S-IJ89	UNT to Bottom Creek	Roanoke	37.165862	-80.139317	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-649
S-IJ90	UNT to Bottom Creek	Roanoke	37.165685	-80.139378	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-649
S-KL25	UNT to Mill Creek	Roanoke	37.160173	-80.134799	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	82	-	409	-	152	-	4-651
S-ST9b	UNT to Mill Creek	Roanoke	37.154424	-80.129179	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-652
S-KL55	UNT to Mill Creek	Roanoke	37.150009	-80.13246	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-653
S-IJ12	UNT to Mill Creek	Roanoke	37.148333	-80.133919	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	261	-	29	-	4-653
S-EF44	UNT to Bottom Creek	Roanoke	37.143003	-80.138399	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-654
S-IJ43	Mill Creek	Roanoke	37.138636	-80.139715	Perennial	RPW	Orangefin madtom, Stockable Trout, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	362	-	40	-	4-655
S-Y9	UNT to Mill Creek	Roanoke	37.134576	-80.137649	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	44	-	174	-	20	-	4-656
S-Y7	UNT to Mill Creek	Roanoke	37.134481	-80.137622	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	32	-	126	-	14	-	4-656
S-Y8	UNT to Mill Creek	Roanoke	37.134176	-80.137484	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-656
S-B22	UNT to Mill Creek	Roanoke	37.128922	-80.133769	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-659
S-B23	UNT to Mill Creek	Roanoke	37.128853	-80.133910	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	14	-	26	-	3	-	4-659
S-B25	UNT to Mill Creek	Roanoke	37.128490	-80.132601	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	76	-	379	-	42	-	4-659
S-B21	UNT to Mill Creek	Roanoke	37.128484	-80.130943	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	92	-	366	-	136	-	4-659
S-H1	Green Creek	Franklin	37.127733	-80.116787	Perennial	RPW	Orangefin madtom, Natural Trout, Coldwater Fishery	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-661
S-G26	UNT to Green Creek	Franklin	37.127077	-80.111387	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-662
S-G27	UNT to Green Creek	Franklin	37.126962	-80.111052	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-662
S-G24	UNT to Green Creek	Franklin	37.126412	-80.121398	Intermittent	RPW	-	03010101	Pipeline ROW	75	-	449	-	167	-	4-661
S-G25	UNT to Green Creek	Franklin	37.125398	-80.121401	Intermittent	RPW	-	03010101	Pipeline ROW	42	-	292	-	33	-	4-661
S-RR18	UNT to Green Creek	Franklin	37.125055	-80.113578	Intermittent	RPW	-	03010101	Permanent Access Road	8	-	17	-	2	-	4-662
S-D11	UNT to North Fork Blackwater River	Franklin	37.124137	-80.086182	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-666
S-D8	North Fork Blackwater River	Franklin	37.123098	-80.074673	Perennial	RPW	Natural Trout, Coldwater Fishery	03010101	Pipeline ROW	78	-	941	-	349	-	4-667
S-D12	UNT to North Fork Blackwater River	Franklin	37.121558	-80.085642	Intermittent	RPW	-	03010101	Pipeline ROW	54	-	322	-	120	-	4-666
S-D13	UNT to North Fork Blackwater River	Franklin	37.121513	-80.085680	Intermittent	RPW	-	03010101	Pipeline ROW	117	-	466	-	173	-	4-666
S-D14	UNT to North Fork Blackwater River	Franklin	37.121473	-80.088457	Intermittent	RPW	-	03010101	Pipeline ROW	234	-	701	-	260	-	4-666
S-II4	UNT to North Fork Blackwater River	Franklin	37.115679	-80.060300	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-670
S-GH7	UNT to North Fork Blackwater River	Franklin	37.106614	-80.054219	Perennial	RPW	-	03010101	Timber Mat Crossing	20	-	179	-	20	-	4-672
S-GH15	UNT to North Fork Blackwater River	Franklin	37.106177	-80.050105	Intermittent	RPW	-	03010101	Pipeline ROW	75	-	301	-	111	-	4-674
S-GH14	UNT to North Fork Blackwater River	Franklin	37.105883	-80.048861	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	305	-	113	-	4-674
S-GH11	UNT to North Fork Blackwater River	Franklin	37.104707	-80.046220	Intermittent	RPW	-	03010101	Pipeline ROW	77	-	231	-	86	-	4-674
S-GH9	UNT to North Fork Blackwater River	Franklin	37.104329	-80.045343	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	78	-	314	-	116	-	4-674
S-RR08	UNT to North Fork Blackwater River	Franklin	37.103290	-80.041868	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-674
S-RR09	UNT to North Fork Blackwater River	Franklin	37.102491	-80.041046	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	693	-	257	-	4-675
S-RR11	UNT to North Fork Blackwater River	Franklin	37.101127	-80.039653	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	540	-	200	-	4-675
S-IJ1	UNT to North Fork Blackwater River	Franklin	37.093062	-80.027724	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	107	-	1285	-	476	-	4-677
S-IJ2	UNT to North Fork Blackwater River	Franklin	37.092891	-80.027593	Intermittent	RPW	-	03010101	Pipeline ROW	40	-	100	-	37	-	4-677
S-II6	UNT to Little Creek	Franklin	37.092697	-79.978402	Intermittent	NRPW	-	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-685
S-IJ3	UNT to North Fork Blackwater River	Franklin	37.092600	-80.027231	Intermittent	RPW	-	03010101	Pipeline ROW	77	-	383	-	143	-	4-677
S-GH6	UNT to Little Creek	Franklin	37.092397	-79.983227	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-684
S-II12	UNT to Little Creek	Franklin	37.091608	-79.987839	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	39	-	4	-	4-684
S-II11	UNT to Little Creek	Franklin	37.091564	-79.988051	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-684
S-II8	UNT to Little Creek	Franklin	37.091413	-79.993944	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	39	-	4	-	4-683
S-II9	UNT to Little Creek	Franklin	37.091382	-79.990620	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	401	-	44	-	4-683
S-II7	UNT to Little Creek	Franklin	37.091354	-79.992013	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-683
S-IJ4	UNT to North Fork Blackwater River	Franklin	37.091189	-80.024366	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-677
S-KL2	UNT to Little Creek	Franklin	37.090361	-79.996354	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	74	-	8	-	4-682
S-GH2	UNT to Teels Creek	Franklin	37.090153	-79.953936	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	39	-	4	-	4-689
S-GH4	UNT to Teels Creek	Franklin	37.089812	-79.956077	Perennial	RPW	-	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-688
S-GH3	UNT to Teels Creek	Franklin	37.089745	-79.956042	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	122	-	13	-	4-688

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Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (square feet) ⁵	Permanent Impact Area (square feet) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-IJ10	Little Creek	Franklin	37.089179	-80.005026	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-681
S-E29	UNT to Teels Creek	Franklin	37.089178	-79.950110	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	80	-	640	-	237	-	4-689
S-E28	Teels Creek	Franklin	37.089047	-79.9613	Perennial	RPW	-	03010101	Pipeline ROW	82	-	984	-	364	-	4-687
S-E28	Teels Creek	Franklin	37.085247	-79.948057	Perennial	RPW	-	03010101	Pipeline ROW	76	-	910	-	338	-	4-687
S-E28	Teels Creek	Franklin	37.082875	-79.945556	Perennial	RPW	-	03010101	Pipeline ROW	101	-	1211	-	449	-	4-687
S-EF4	UNT to Teels Creek	Franklin	37.078963	-79.941911	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	80	-	880	-	326	-	4-691
S-EF7	UNT to Teels Creek	Franklin	37.074664	-79.941123	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	39	-	4	-	4-692
S-EF7	UNT to Teels Creek	Franklin	37.074636	-79.941336	Ephemeral	NRPW	-	03010101	ATWS	22	-	44	-	5	-	4-692
S-EF12	Teels Creek	Franklin	37.073367	-79.939865	Perennial	RPW	-	03010101	Pipeline ROW	79	-	1581	-	585	-	4-692
S-MM42	UNT to Teels Creek	Franklin	37.070703	-79.937069	Ephemeral	NRPW	-	03010101	Pipeline ROW	81	-	161	-	60	-	4-693
S-D23	Teels Creek	Franklin	37.070322	-79.931039	Perennial	RPW	-	03010101	Pipeline ROW	92	-	2087	-	772	-	4-694
S-D22	UNT to Teels Creek	Franklin	37.070101	-79.929732	Intermittent	RPW	-	03010101	Pipeline ROW	83	-	662	-	246	-	4-694
S-D18	UNT to Teels Creek	Franklin	37.069560	-79.926213	Ephemeral	NRPW	-	03010101	Pipeline ROW	30	-	61	-	7	-	4-694
S-RR15	UNT to Teels Creek	Franklin	37.069542	-79.933892	Perennial	RPW	-	03010101	Timber Mat Crossing	20	-	26	-	31	-	4-694
S-D20	UNT to Teels Creek	Franklin	37.069485	-79.926230	Intermittent	RPW	-	03010101	Pipeline ROW	76	-	610	-	225	-	4-694
S-EF48	UNT to Blackwater River	Franklin	37.064748	-79.874420	Intermittent	RPW	-	03010101	Pipeline ROW	86	-	170	-	64	-	4-705
S-YZ4	UNT to Blackwater River	Franklin	37.064723	-79.878190	Ephemeral	NRPW	-	03010101	Pipeline ROW	84	-	253	-	93	-	4-704
S-C14	Teels Creek	Franklin	37.063956	-79.921985	Perennial	RPW	-	03010101	Pipeline ROW	90	-	3655	-	1,353	-	4-696
S-YZ5	UNT to Blackwater River	Franklin	37.063464	-79.878281	Ephemeral	NRPW	-	03010101	Pipeline ROW	86	-	344	-	127	-	4-704
S-KL41	UNT to Blackwater River	Franklin	37.062262	-79.862639	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	75	-	902	-	333	-	4-706
S-KL39	UNT to Blackwater River	Franklin	37.061193	-79.880018	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	121	-	788	-	291	-	4-704
S-C16	UNT to Teels Creek	Franklin	37.060610	-79.921179	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-696
S-KL54	UNT to Maggodee Creek	Franklin	37.059535	-79.840624	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	758	-	281	-	4-710
S-C8	UNT to Blackwater River	Franklin	37.059098	-79.853595	Intermittent	RPW	-	03010101	Pipeline ROW	86	-	431	-	159	-	4-708
S-F4	UNT to Blackwater River	Franklin	37.059060	-79.853379	Ephemeral	NRPW	-	03010101	Pipeline ROW	82	-	819	-	91	-	4-708
S-C17	Teels Creek	Franklin	37.058390	-79.918015	Perennial	RPW	-	03010101	Timber Mat Crossing	30	-	601	-	100	-	4-696
S-KL52	UNT to Maggodee Creek	Franklin	37.058165	-79.844877	Ephemeral	NRPW	-	03010101	Pipeline ROW	105	-	105	-	39	-	4-709
S-S11	UNT to Maggodee Creek	Franklin	37.057776	-79.838583	Perennial	RPW	-	03010101	Temporary Access Road	41	-	453	-	50	-	4-710
S-F8	UNT to Maggodee Creek	Franklin	37.057724	-79.836406	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	83	-	2492	-	922	-	4-710
S-CD6	Little Creek	Franklin	37.057584	-79.913921	Perennial	RPW	-	03010101	Pipeline ROW	77	-	4426	-	1,639	-	4-698
S-HH4	UNT to Maggodee Creek	Franklin	37.056594	-79.835785	Intermittent	RPW	-	03010101	Pipeline ROW	97	-	871	-	323	-	4-711
S-KL51	UNT to Blackwater River	Franklin	37.056084	-79.850384	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	67	-	370	-	136	-	4-708
S-KL38	UNT to Blackwater River	Franklin	37.055912	-79.883177	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	78	-	545	-	202	-	4-702
S-C20	UNT to Maggodee Creek	Franklin	37.055193	-79.833881	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-711
S-C19	Maggodee Creek	Franklin	37.055147	-79.830098	Perennial	RPW	-	03010101	Pipeline ROW	75	-	3006	-	1,113	-	4-711
S-KL36	UNT to Blackwater River	Franklin	37.053336	-79.884604	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	148	-	17	-	4-702
S-F11	Blackwater River	Franklin	37.052843	-79.825711	Perennial	TNW	Non-listed mussels	03010101	Pipeline ROW	91	-	6765	-	2,506	-	4-712
S-KL35	UNT to Blackwater River	Franklin	37.052125	-79.886182	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	35	-	87	-	10	-	4-702
S-F9b	UNT to Blackwater River	Franklin	37.049238	-79.817223	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	1141	-	422	-	4-713
S-II2	Little Creek	Franklin	37.049219	-79.908513	Perennial	RPW	-	03010101	Pipeline ROW	76	-	3245	-	1,203	-	4-699
S-F10	UNT to Blackwater River	Franklin	37.048037	-79.813934	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	179	-	20	-	4-713
S-CD1	UNT to Blackwater River	Franklin	37.047765	-79.897636	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	104	-	366	-	135	-	4-701
S-F9a	UNT to Blackwater River	Franklin	37.047172	-79.813000	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-713
S-MM29	UNT to Maple Branch	Franklin	37.043871	-79.822898	Perennial	RPW	-	03010101	Temporary Access Road	42	-	632	-	70	-	4-714
S-MM23	Maple Branch	Franklin	37.043854	-79.822974	Perennial	RPW	-	03010101	Temporary Access Road	78	-	1559	-	173	-	4-714
S-GG4	UNT to Blackwater River	Franklin	37.042742	-79.809015	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-716
S-A36	UNT to Foul Ground Creek	Franklin	37.037916	-79.804237	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	309	-	114	-	4-717
S-A38	UNT to Foul Ground Creek	Franklin	37.036271	-79.799442	Intermittent	RPW	-	03010101	Timber Mat Crossing	30	-	270	-	30	-	4-718
S-A40	UNT to Foul Ground Creek	Franklin	37.036173	-79.799240	Intermittent	RPW	-	03010101	Timber Mat Crossing	13	-	74	-	8	-	4-718
S-A41	Foul Ground Creek	Franklin	37.031714	-79.788213	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	76	-	910	-	338	-	4-720
S-GH36	UNT to Foul Ground Creek	Franklin	37.031063	-79.778598	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-721
S-KL17	UNT to Foul Ground Creek	Franklin	37.031011	-79.778435	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-721
S-GH37	UNT to Foul Ground Creek	Franklin	37.030974	-79.778190	Intermittent	RPW	-	03010101	Pipeline ROW	46	-	139	-	15	-	4-721
S-GH38	UNT to Foul Ground Creek	Franklin	37.030972	-79.778083	Intermittent	RPW	-	03010101	Pipeline ROW	7	-	22	-	2	-	4-721

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S-GH39	UNT to Foul Ground Creek	Franklin	37.030861	-79.778069	Intermittent	RPW	-	03010101	Pipeline ROW	103	-	414	-	153	-	4-721
S-GH40	UNT to Foul Ground Creek	Franklin	37.028893	-79.774785	Ephemeral	NRPW	-	03010101	Pipeline ROW	89	-	266	-	99	-	4-721
S-GH44	UNT to Foul Ground Creek	Franklin	37.028392	-79.773359	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	103	-	619	-	69	-	4-721
S-G22	UNT to Poplar Camp Creek	Franklin	37.019612	-79.761958	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	80	-	958	-	356	-	4-723
S-G23	UNT to Poplar Camp Creek	Franklin	37.019526	-79.762002	Intermittent	RPW	-	03010101	Pipeline ROW	42	-	126	-	14	-	4-723
S-G21	UNT to Poplar Camp Creek	Franklin	37.019359	-79.761643	Intermittent	RPW	-	03010101	Pipeline ROW	54	-	161	-	18	-	4-723
S-G20	Poplar Camp Creek	Franklin	37.017364	-79.760000	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-724
S-G18	UNT to Blackwater River	Franklin	37.009236	-79.754238	Intermittent	RPW	-	03010101	Pipeline ROW	81	-	161	-	60	-	4-725
S-G17	UNT to Blackwater River	Franklin	37.005496	-79.752655	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-726
S-E18	UNT to Blackwater River	Franklin	37.001271	-79.747749	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	94	-	658	-	244	-	4-727
S-E17	UNT to Blackwater River	Franklin	37.000529	-79.742760	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	95	-	758	-	281	-	4-727
S-E14	UNT to Blackwater River	Franklin	36.995814	-79.735144	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	82	-	1638	-	607	-	4-728
S-H38	UNT to Jacks Creek	Franklin	36.989430	-79.722366	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	240	-	27	-	4-730
S-H32	UNT to Jacks Creek	Franklin	36.988273	-79.708199	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-732
S-H37	UNT to Jacks Creek	Franklin	36.988031	-79.717450	Ephemeral	NRPW	-	03010101	Pipeline ROW	82	-	492	-	182	-	4-731
S-H34	UNT to Jacks Creek	Franklin	36.988009	-79.711881	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-732
S-H36	UNT to Jacks Creek	Franklin	36.988008	-79.714922	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	61	-	7	-	4-731
S-H30	UNT to Jacks Creek	Franklin	36.987961	-79.702711	Intermittent	RPW	-	03010101	Pipeline ROW	4	-	4	-	1	-	4-734
S-A18	UNT to Jacks Creek	Franklin	36.987818	-79.700634	Intermittent	RPW	-	03010101	Pipeline ROW	87	-	227	-	84	-	4-734
S-A19/H26	UNT to Jacks Creek	Franklin	36.987719	-79.698901	Intermittent	RPW	-	03010101	Pipeline ROW	212	-	1485	-	550	-	4-734
S-A20	UNT to Jacks Creek	Franklin	36.987715	-79.698555	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-734
S-H28	UNT to Jacks Creek	Franklin	36.985174	-79.692272	Ephemeral	NRPW	-	03010101	Pipeline ROW	16	-	96	-	11	-	4-735
S-H27	UNT to Jacks Creek	Franklin	36.985124	-79.692272	Ephemeral	NRPW	-	03010101	Pipeline ROW	36	-	362	-	40	-	4-735
S-A22	UNT to Jacks Creek	Franklin	36.984846	-79.691870	Intermittent	RPW	-	03010101	Timber Mat Crossing	20	-	161	-	18	-	4-735
S-MM44	UNT to Little Jacks Creek	Franklin	36.982507	-79.687818	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	78	-	9	-	4-735
S-MM46	UNT to Little Jacks Creek	Franklin	36.982240	-79.687500	Intermittent	RPW	-	03010101	Timber Mat Crossing	9	-	26	-	3	-	4-735
S-MM45	UNT to Little Jacks Creek	Franklin	36.981971	-79.686901	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	33	-	131	-	15	-	4-735
S-MM48	UNT to Little Jacks Creek	Franklin	36.979223	-79.684192	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	25	-	174	-	19	-	4-736
S-H25	Little Jacks Creek	Franklin	36.978529	-79.682186	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-736
S-H24	UNT to Little Jacks Creek	Franklin	36.978025	-79.680682	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-736
S-H23	UNT to Turkey Creek	Franklin	36.976421	-79.677525	Ephemeral	NRPW	-	03010101	Pipeline ROW	92	-	462	-	170	-	4-738
S-HH1	UNT to Turkey Creek	Franklin	36.974647	-79.674453	Ephemeral	NRPW	-	03010101	Pipeline ROW	18	-	91	-	10	-	4-738
S-A13	Turkey Creek	Franklin	36.973282	-79.673075	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	161	-	18	-	4-738
S-A11	UNT to Turkey Creek	Franklin	36.973237	-79.669898	Ephemeral	NRPW	-	03010101	Pipeline ROW	55	-	166	-	18	-	4-740
S-H17	Dinner Creek	Franklin	36.972125	-79.662987	Intermittent	RPW	-	03010101	Pipeline ROW	101	-	806	-	299	-	4-741
S-A7	UNT to Dinner Creek	Franklin	36.972032	-79.662504	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	122	-	13	-	4-741
S-SS8	Polecat Creek	Franklin	36.970904	-79.657370	Perennial	RPW	Orangefin madtom,	03010101	Timber Mat Crossing	20	-	161	-	18	-	4-741
S-CD8	UNT to Owens Creek	Franklin	36.970522	-79.653726	Intermittent	RPW	-	03010101	Pipeline ROW	78	-	353	-	130	-	4-742
S-AB8	UNT to Owens Creek	Franklin	36.970133	-79.651328	Intermittent	RPW	-	03010101	Pipeline ROW	84	-	335	-	124	-	4-742
S-DD3	Owens Creek	Franklin	36.969118	-79.645042	Intermittent	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	301	-	33	-	4-743
S-G16	Strawfield Creek	Franklin	36.968640	-79.642174	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	30	-	601	-	100	-	4-743
S-G15	UNT to Parrot Branch	Franklin	36.967711	-79.636590	Intermittent	RPW	-	03010101	Pipeline ROW	88	-	793	-	293	-	4-744
S-G13	Parrot Branch	Franklin	36.967025	-79.630747	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	161	-	18	-	4-744
S-D3	UNT to Jonnikin Creek	Pittsylvania	36.965631	-79.605542	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	200	-	22	-	4-747
S-D4	UNT to Jonnikin Creek	Pittsylvania	36.965600	-79.604894	Intermittent	RPW	-	03010101	Pipeline ROW	105	-	632	-	233	-	4-747
S-D2	Jonnikin Creek	Pittsylvania	36.965405	-79.599130	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	362	-	40	-	4-748
S-D7	UNT to Jonnikin Creek	Franklin	36.964763	-79.617043	Intermittent	RPW	-	03010101	Pipeline ROW	80	-	640	-	237	-	4-746
S-D1-EPH	UNT to Jonnikin Creek	Pittsylvania	36.964430	-79.595691	Ephemeral	NRPW	-	03010101	Pipeline ROW	61	-	610	-	226	-	4-748
S-D1-INT	UNT to Jonnikin Creek	Pittsylvania	36.964407	-79.595841	Intermittent	RPW	-	03010101	Pipeline ROW	29	-	292	-	32	-	4-748
S-G11	UNT to Jonnikin Creek	Pittsylvania	36.962420	-79.590500	Intermittent	RPW	-	03010101	Pipeline ROW	77	-	462	-	171	-	4-749
S-G9	UNT to Jonnikin Creek	Pittsylvania	36.959361	-79.586437	Intermittent	RPW	-	03010101	Pipeline ROW	79	-	318	-	117	-	4-751
S-G8	UNT to Jonnikin Creek	Pittsylvania	36.957805	-79.583545	Intermittent	RPW	-	03010101	Pipeline ROW	90	-	362	-	133	-	4-751
S-Q15	UNT to Jonnikin Creek	Pittsylvania	36.957580	-79.583492	Ephemeral	NRPW	-	03010101	Pipeline ROW	103	-	514	-	191	-	4-751
S-A6	UNT to Rocky Creek	Pittsylvania	36.952275	-79.580460	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	100	-	11	-	4-750

Table B-1. Virginia Stream Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (square feet) ⁵	Permanent Impact Area (square feet) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-H11-Braid	UNT to Rocky Creek	Pittsylvania	36.949615	-79.579553	Ephemeral	NRPW	-	03010101	Pipeline ROW	85	-	170	-	19	-	4-750
S-F2	UNT to Rocky Creek	Pittsylvania	36.944049	-79.571442	Ephemeral	NRPW	-	03010101	Timber Mat Crossing	20	-	139	-	16	-	4-753
S-C7	UNT to Rocky Creek	Pittsylvania	36.944016	-79.571517	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	401	-	44	-	4-753
S-C3	Harpen Creek	Pittsylvania	36.929762	-79.526109	Perennial	RPW	Roanoke logperch, Orangefin madtom	03010101	Timber Mat Crossing	20	-	362	-	40	-	4-758
S-C4	UNT to Harpen Creek	Pittsylvania	36.929745	-79.526290	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	58	-	231	-	26	-	4-758
S-H13	Harpen Creek	Pittsylvania	36.925105	-79.517350	Perennial	RPW	Orangefin madtom	03010101	Pipeline ROW	77	-	1542	-	570	-	4-759
S-G6	UNT to Harpen Creek	Pittsylvania	36.920737	-79.505898	Intermittent	RPW	-	03010101	Pipeline ROW	80	-	479	-	178	-	4-761
S-G5	UNT to Harpen Creek	Pittsylvania	36.917694	-79.496604	Ephemeral	NRPW	-	03010101	Pipeline ROW	77	-	462	-	171	-	4-762
S-G4	Harpen Creek	Pittsylvania	36.916463	-79.492669	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	30	-	601	-	100	-	4-762
S-G3	UNT to Harpen Creek	Pittsylvania	36.915658	-79.490029	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	179	-	20	-	4-762
S-CC16	UNT to Harpen Creek	Pittsylvania	36.913003	-79.487838	Perennial	RPW	Orangefin madtom	03010101	Timber Mat Crossing	20	-	222	-	24	-	4-763
S-CC14	UNT to Cherrystone Creek	Pittsylvania	36.905329	-79.471492	Intermittent	RPW	-	03010105	Timber Mat Crossing	20	-	161	-	18	-	4-765
S-CC13	UNT to Cherrystone Creek	Pittsylvania	36.905307	-79.471574	Intermittent	RPW	-	03010105	Timber Mat Crossing	20	-	139	-	16	-	4-765
S-MM8	UNT to Cherrystone Creek	Pittsylvania	36.902991	-79.468220	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	122	-	13	-	4-766
S-CC15	UNT to Cherrystone Creek	Pittsylvania	36.901941	-79.466535	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	122	-	13	-	4-766
S-CC8	UNT to Cherrystone Creek	Pittsylvania	36.899437	-79.462685	Intermittent	RPW	-	03010105	Timber Mat Crossing	20	-	161	-	18	-	4-766
S-CC5	UNT to Cherrystone Creek	Pittsylvania	36.899411	-79.462483	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	240	-	27	-	4-766
S-CC5	UNT to Cherrystone Creek	Pittsylvania	36.899248	-79.462396	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	54	-	649	-	240	-	4-766
S-CC9	UNT to Cherrystone Creek	Pittsylvania	36.897740	-79.458046	Ephemeral	NRPW	-	03010105	Pipeline ROW	81	-	444	-	165	-	4-767
S-CC10	UNT to Cherrystone Creek	Pittsylvania	36.897315	-79.456119	Intermittent	RPW	-	03010105	Pipeline ROW	78	-	701	-	260	-	4-767
S-MM10	UNT to Cherrystone Creek	Pittsylvania	36.895915	-79.452960	Intermittent	RPW	-	03010105	Pipeline ROW	9	-	61	-	7	-	4-768
S-CC11	UNT to Cherrystone Creek	Pittsylvania	36.895808	-79.452920	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	87	-	697	-	258	-	4-768
S-CC1	Cherrystone Creek	Pittsylvania	36.894043	-79.445744	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	82	-	1228	-	456	-	4-769
S-CC3	UNT to Cherrystone Creek	Pittsylvania	36.893727	-79.444763	Ephemeral	NRPW	-	03010105	Pipeline ROW	91	-	727	-	270	-	4-769
S-P5	UNT to Cherrystone Creek	Pittsylvania	36.892751	-79.440053	Ephemeral	NRPW	-	03010105	Timber Mat Crossing	20	-	100	-	11	-	4-769
S-IJ35-EPH	UNT to Pole Bridge Branch	Pittsylvania	36.891451	-79.433781	Ephemeral	NRPW	-	03010105	Pipeline ROW	171	-	684	-	253	-	4-770
S-Q4	UNT to Pole Bridge Branch	Pittsylvania	36.886114	-79.430914	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	100	-	11	-	4-771
S-Q3	Pole Bridge Branch	Pittsylvania	36.884444	-79.428220	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	75	-	1873	-	694	-	4-771
S-Q2	UNT to Pole Bridge Branch	Pittsylvania	36.884284	-79.427914	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	139	-	16	-	4-771
S-B6	UNT to Pole Bridge Branch	Pittsylvania	36.879063	-79.420189	Ephemeral	NRPW	-	03010105	Pipeline ROW	84	-	841	-	311	-	4-772
S-B8	UNT to Pole Bridge Branch	Pittsylvania	36.877937	-79.417992	Intermittent	RPW	-	03010105	Pipeline ROW	82	-	327	-	121	-	4-773
S-B9	UNT to Pole Bridge Branch	Pittsylvania	36.877416	-79.416255	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	78	-	545	-	202	-	4-773
S-DD4-Braid-1	UNT to Mill Creek	Pittsylvania	36.871651	-79.404061	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	67	-	401	-	149	-	4-775
S-DD4	UNT to Mill Creek	Pittsylvania	36.871478	-79.403907	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	147	-	880	-	327	-	4-775
S-KL27	UNT to Mill Creek	Pittsylvania	36.866534	-79.400511	Ephemeral	NRPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	84	-	83	-	31	-	4-776
S-C1	Mill Creek	Pittsylvania	36.863513	-79.397914	Intermittent	RPW	Natural Trout, Coldwater Fishery	03010105	Pipeline ROW	92	-	553	-	204	-	4-777
S-G2	Little Cherrystone Creek	Pittsylvania	36.851931	-79.386051	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	139	-	16	-	4-779
S-B2	UNT to Little Cherrystone Creek	Pittsylvania	36.849394	-79.377780	Ephemeral	NRPW	-	03010105	Timber Mat Crossing	20	-	100	-	11	-	4-780
S-H55	UNT to Little Cherrystone Creek	Pittsylvania	36.843486	-79.369222	Ephemeral	NRPW	-	03010105	Timber Mat Crossing	20	-	61	-	7	-	4-781
S-H54	UNT to Little Cherrystone Creek	Pittsylvania	36.841112	-79.366848	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	240	-	27	-	4-781
S-GG11	UNT to Little Cherrystone Creek	Pittsylvania	36.841093	-79.366942	Perennial	RPW	-	03010105	Timber Mat Crossing	46	-	366	-	41	-	4-781
S-H3	UNT to Little Cherrystone Creek	Pittsylvania	36.834501	-79.360244	Intermittent	RPW	-	03010105	Pipeline ROW	18	-	109	-	12	-	4-783
S-H5	UNT to Little Cherrystone Creek	Pittsylvania	36.833412	-79.359823	Perennial	RPW	Orangefin madtom	03010105	Pipeline ROW	83	-	662	-	246	-	4-783
S-OD1	UNT to Little Cherrystone Creek	Pittsylvania	36.830285	-79.356618	Intermittent	RPW	-	03010105	Pipeline ROW	84	-	418	-	156	-	4-783
S-H44	UNT to Little Cherrystone Creek	Pittsylvania	36.829823	-79.346016	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	33	-	266	-	29	-	4-785
S-H42	UNT to Little Cherrystone Creek	Pittsylvania	36.828993	-79.344442	Perennial	RPW	Orangefin madtom	03010105	Permanent Access Road	-	32	-	224	-	25	4-785
S-H42	UNT to Little Cherrystone Creek	Pittsylvania	36.828958	-79.344315	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	139	-	16	-	4-785

Table B-1. Virginia Stream Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Stream ID	NHD Stream Name ¹	County	Latitude ²	Longitude ²	Flow Regime	Water Type ³	Stream Designation ⁴	HUC 8	Impact Type	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Impact Area (square feet) ⁵	Permanent Impact Area (square feet) ⁵	Temporary Fill (cubic yard) ⁶	Permanent Fill (cubic yard) ⁷	Figure
S-002	UNT to Little Cherrystone Creek	Pittsylvania	36.828831	-79.353849	Intermittent	RPW	-	03010105	Pipeline ROW	78	-	392	-	144	-	4-784
S-EF26	Little Cherrystone Creek	Pittsylvania	36.828207	-79.349814	Perennial	RPW	Orangefin madtom	03010105	Timber Mat Crossing	20	-	401	-	44	-	4-784

Notes:

- 1
- For identified streams without a NHD (National Hydrography Dataset) name, the identified stream was given the name, "Unidentified Tributary (UNT)", of the first named receiving waterbody
- 2
- In decimal degrees
- 3
- RPW = Relatively Permanent Waters
- NRPW = Non-Relatively Permanent Waters
- TNW = Traditional Navigable Waters
- 4
- See Section 1.9.2 and Section 4.2 for more information
- 5
- Impact square feet are rounded to the nearest whole number.
- 6
- Temporary fill discharge into waters of the U.S. Cubic yards are rounded to the nearest whole number.
- 7
- Permanent fill associated with the construction of Permanent access road and facilities. Cubic yards are rounded to the nearest whole number.

Table B-2. Virginia Wetland Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (square feet) ⁴	Permanent Conversion Impacts (square feet) ⁴	Permanent Fill Impacts (square feet) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-Z11	Giles	Norfolk	37.346591	-80.641713	PEM	NRPWW	05050002	Pipeline ROW	1,141	-	-	423	-	4-543
W-Z3	Giles	Norfolk	37.342244	-80.620612	PSS	RPWWD	05050002	Timber Mat Crossing	-	592	-	66	-	4-545
W-CD12	Giles	Norfolk	37.318644	-80.441717	PEM	RPWWD	05050002	Pipeline ROW	906	-	-	335	-	4-577
W-MM10	Giles	Norfolk	37.298219	-80.480617	PEM	RPWWD	05050002	Temporary Access Road	1,106	-	-	123	-	4-569
W-RR1b	Giles	Norfolk	37.296670	-80.494042	PEM	RPWWD	05050002	Timber Mat Crossing	244	-	-	27	-	4-567
W-IJ46-PEM	Montgomery	Norfolk	37.296153	-80.367508	PEM	RPWWD	03010101	Pipeline ROW	1,281	-	-	474	-	4-591
W-AD4	Montgomery	Norfolk	37.286984	-80.330124	PEM	RPWWD	03010101	Temporary Access Road	301	-	-	33	-	4-596
W-NN6	Montgomery	Norfolk	37.268174	-80.316468	PEM	RPWWN	03010101	Timber Mat Crossing	362	-	-	40	-	4-603
W-F9-PFO	Montgomery	Norfolk	37.258109	-80.285892	PFO	RPWWD	03010101	Pipeline ROW	-	736	-	82	-	4-609
W-C12-PEM	Montgomery	Norfolk	37.257265	-80.281667	PEM	RPWWD	03010101	Pipeline ROW	8,999	-	-	3,333	-	4-609
W-C12	Montgomery	Norfolk	37.257192	-80.281649	PFO	RPWWD	03010101	Pipeline ROW	-	2,278	-	253	-	4-609
W-C11	Montgomery	Norfolk	37.257107	-80.281351	PSS	RPWWD	03010101	Pipeline ROW	-	2,008	-	223	-	4-609
W-C6	Montgomery	Norfolk	37.255860	-80.275715	PEM	NRPWW	03010101	Timber Mat Crossing	605	-	-	67	-	4-610
W-C5	Montgomery	Norfolk	37.255606	-80.274237	PEM	NRPWW	03010101	Pipeline ROW	1,978	-	-	732	-	4-610
W-AB7	Montgomery	Norfolk	37.231426	-80.198615	PEM	RPWWD	03010101	Timber Mat Crossing	174	-	-	19	-	4-631
W-KL58	Montgomery	Norfolk	37.229183	-80.203106	PEM	RPWWD	03010101	Permanent Access Road	-	-	1,707	-	190	4-631
W-EF5-PFO	Montgomery	Norfolk	37.210948	-80.193359	PFO	RPWWD	03010101	Pipeline ROW	-	3,711	-	1,374	-	4-635
W-EF18	Roanoke	Norfolk	37.179449	-80.140665	PSS	RPWWD	03010101	Temporary Access Road	-	227	-	25	-	4-647
W-EF17	Roanoke	Norfolk	37.179402	-80.140600	PFO	RPWWD	03010101	Temporary Access Road	-	976	-	108	-	4-647
W-IJ94-PEM	Roanoke	Norfolk	37.170092	-80.138294	PEM	RPWWD	03010101	Timber Mat Crossing	880	-	-	98	-	4-649
W-IJ96-PEM	Roanoke	Norfolk	37.169461	-80.130376	PEM	RPWWD	03010101	Temporary Access Road	701	-	-	77	-	4-650
W-IJ95-PSS	Roanoke	Norfolk	37.169068	-80.138278	PSS	RPWWD	03010101	Timber Mat Crossing	-	1,106	-	123	-	4-649
W-IJ102	Roanoke	Norfolk	37.168289	-80.138375	PFO	RPWWD	03010101	Timber Mat Crossing	-	436	-	48	-	4-649
W-KL17	Roanoke	Norfolk	37.160152	-80.134774	PSS	RPWWD	03010101	Pipeline ROW	-	1,895	-	702	-	4-651
W-KL16*	Roanoke	Norfolk	37.159927	-80.134257	PEM	ISOLATE	03010101	Timber Mat Crossing	618	-	-	69	-	4-651
W-KL15*	Roanoke	Norfolk	37.158853	-80.133802	PEM	ISOLATE	03010101	Pipeline ROW	1,451	-	-	537	-	4-651
W-EF42	Roanoke	Norfolk	37.157611	-80.133722	PEM	RPWWD	03010101	Pipeline ROW	362	-	-	40	-	4-652
W-HS02	Roanoke	Norfolk	37.157427	-80.133413	PEM	RPWWD	03010101	Pipeline ROW	12,602	-	-	4,668	-	4-652
W-AB6-PEM-2	Roanoke	Norfolk	37.156825	-80.131998	PEM	RPWWD	03010101	Pipeline ROW	14,248	-	-	5,277	-	4-652
W-AB6-PFO-1	Roanoke	Norfolk	37.156713	-80.131681	PFO	RPWWD	03010101	Pipeline ROW	-	2,692	-	997	-	4-652
W-AB6-PEM-1	Roanoke	Norfolk	37.156170	-80.130794	PEM	RPWWD	03010101	Pipeline ROW	2,818	-	-	1,044	-	4-652
W-AB6-PSS	Roanoke	Norfolk	37.156034	-80.130603	PSS	RPWWD	03010101	Pipeline ROW	-	266	-	30	-	4-652
W-AB5	Roanoke	Norfolk	37.155840	-80.130227	PFO	RPWWN	03010101	Pipeline ROW	-	183	-	20	-	4-652
W-AB3-PEM-2	Roanoke	Norfolk	37.155664	-80.129569	PEM	RPWWD	03010101	Pipeline ROW	6,739	-	-	2,495	-	4-652
W-EF46	Roanoke	Norfolk	37.154575	-80.129122	PSS	RPWWD	03010101	Timber Mat Crossing	-	2,971	-	330	-	4-652
W-KL48-PSS-1	Roanoke	Norfolk	37.152292	-80.130022	PSS	RPWWD	03010101	Pipeline ROW	-	1,978	-	733	-	4-653
W-KL48-PEM	Roanoke	Norfolk	37.151965	-80.130049	PEM	RPWWD	03010101	Pipeline ROW	274	-	-	31	-	4-653
W-KL48-PSS-2	Roanoke	Norfolk	37.150926	-80.131271	PSS	RPWWD	03010101	Pipeline ROW	-	1,150	-	128	-	4-653
W-KL50	Roanoke	Norfolk	37.150728	-80.131537	PEM	RPWWN	03010101	Pipeline ROW	1,777	-	-	658	-	4-653
W-KL49	Roanoke	Norfolk	37.150297	-80.132193	PEM	RPWWN	03010101	Timber Mat Crossing	662	-	-	74	-	4-653
W-KL51-PEM	Roanoke	Norfolk	37.150006	-80.132403	PEM	RPWWD	03010101	Timber Mat Crossing	274	-	-	30	-	4-653
W-KL51-PSS	Roanoke	Norfolk	37.149975	-80.132476	PSS	RPWWD	03010101	Timber Mat Crossing	-	348	-	39	-	4-653
W-MN7-PEM	Roanoke	Norfolk	37.148328	-80.133901	PEM	RPWWD	03010101	Timber Mat Crossing	505	-	-	56	-	4-653
W-EF44	Roanoke	Norfolk	37.142977	-80.138322	PEM	RPWWD	03010101	Timber Mat Crossing	370	-	-	41	-	4-654
W-IJ36	Roanoke	Norfolk	37.138922	-80.139845	PSS	RPWWD	03010101	Timber Mat Crossing	-	5,388	-	599	-	4-655
W-Z7	Roanoke	Norfolk	37.136601	-80.128216	PSS	RPWWD	03010101	Temporary Access Road	-	13	-	1	-	4-657
W-Z6	Roanoke	Norfolk	37.136466	-80.128238	PFO	RPWWD	03010101	Temporary Access Road	-	122	-	14	-	4-657
W-IJ62	Roanoke	Norfolk	37.135529	-80.134044	PEM	RPWWD	03010101	Temporary Access Road	4	-	-	1	-	4-656
W-Y2	Roanoke	Norfolk	37.134284	-80.137448	PEM	RPWWD	03010101	Timber Mat Crossing	823	-	-	91	-	4-656
W-IJ10	Roanoke	Norfolk	37.132561	-80.131744	PEM	RPWWD	03010101	Permanent Access Road	87	-	-	10	-	4-656
W-Q11	Roanoke	Norfolk	37.132470	-80.131638	PEM	RPWWD	03010101	Permanent Access Road	566	-	-	63	-	4-656
W-KL1	Roanoke	Norfolk	37.132456	-80.131463	PEM	RPWWN	03010101	Permanent Access Road	78	-	-	9	-	4-656
W-B25-PEM-4	Roanoke	Norfolk	37.128942	-80.133774	PEM	RPWWD	03010101	Timber Mat Crossing	405	-	-	45	-	4-659
W-B25-PEM-1	Roanoke	Norfolk	37.128645	-80.133283	PEM	RPWWD	03010101	Pipeline ROW	8,425	-	-	3,120	-	4-659
W-B24-PSS	Roanoke	Norfolk	37.128540	-80.130794	PSS	RPWWD	03010101	Pipeline ROW	-	7,131	-	2,641	-	4-659
W-B24-PEM	Roanoke	Norfolk	37.128530	-80.131060	PEM	RPWWD	03010101	Pipeline ROW	4,491	-	-	1,663	-	4-659
W-B25-PSS-2	Roanoke	Norfolk	37.128527	-80.132335	PSS	RPWWD	03010101	Timber Mat Crossing	-	3,615	-	402	-	4-659
W-B25-PEM-1	Roanoke	Norfolk	37.128449	-80.132802	PEM	RPWWD	03010101	Timber Mat Crossing	610	-	-	68	-	4-659
W-B25-PEM-2	Roanoke	Norfolk	37.128436	-80.132646	PEM	RPWWD	03010101	Timber Mat Crossing	209	-	-	78	-	4-659
W-ST2-PEM	Franklin	Norfolk	37.125329	-80.121460	PEM	RPWWD	03010101	Pipeline ROW	4,975	-	-	1,842	-	4-661
W-RR4	Franklin	Norfolk	37.125117	-80.113530	PEM	RPWWD	03010101	Permanent Access Road	941	-	-	105	-	4-662
W-RR3	Franklin	Norfolk	37.124214	-80.114746	PEM	RPWWD	03010101	Permanent Access Road	83	-	-	9	-	4-662
W-KL41	Franklin	Norfolk	37.123851	-80.115802	PEM	RPWWD	03010101	Permanent Access Road	998	-	-	111	-	4-661

Table B-2. Virginia Wetland Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (square feet) ⁴	Permanent Conversion Impacts (square feet) ⁴	Permanent Fill Impacts (square feet) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-D7-PEM	Franklin	Norfolk	37.121559	-80.085750	PEM	RPWWD	03010101	Pipeline ROW	693	-	-	77	-	4-666
W-EF3	Franklin	Norfolk	37.117734	-80.095992	PEM	RPWWD	03010101	Permanent Access Road	1,154	-	-	128	-	4-665
W-IJ1	Franklin	Norfolk	37.092927	-80.027568	PEM	RPWWD	03010101	Pipeline ROW	1,812	-	-	671	-	4-677
W-IJ2-PSS	Franklin	Norfolk	37.092645	-80.027176	PSS	RPWWD	03010101	Pipeline ROW	-	348	-	129	-	4-677
W-IJ2-PEM	Franklin	Norfolk	37.092596	-80.027214	PEM	RPWWD	03010101	Pipeline ROW	732	-	-	271	-	4-677
W-GH2	Franklin	Norfolk	37.092404	-79.983182	PSS	RPWWD	03010101	Timber Mat Crossing	-	566	-	63	-	4-684
W-I18	Franklin	Norfolk	37.091357	-79.992006	PEM	RPWWD	03010101	Timber Mat Crossing	383	-	-	43	-	4-683
W-IJ6	Franklin	Norfolk	37.089156	-80.005036	PEM	RPWWD	03010101	Timber Mat Crossing	200	-	-	22	-	4-681
W-E7	Franklin	Norfolk	37.084557	-79.947595	PEM	RPWWD	03010101	Pipeline ROW	10,986	-	-	4,068	-	4-690
W-E8	Franklin	Norfolk	37.082843	-79.946100	PEM	RPWWD	03010101	Pipeline ROW	3,010	-	-	1,114	-	4-690
W-EF51	Franklin	Norfolk	37.064781	-79.874460	PEM	RPWWD	03010101	Pipeline ROW	579	-	-	64	-	4-705
W-KL43b	Franklin	Norfolk	37.059608	-79.840707	PEM	RPWWD	03010101	Pipeline ROW	17	-	-	2	-	4-710
W-CD6	Franklin	Norfolk	37.057586	-79.915232	PEM	RPWWN	03010101	Timber Mat Crossing	4,069	-	-	452	-	4-698
W-CD5	Franklin	Norfolk	37.055438	-79.910624	PFO	RPWWN	03010101	Pipeline ROW	-	4,948	-	1,833	-	4-698
W-EF48	Franklin	Norfolk	37.052142	-79.886197	PEM	RPWWD	03010101	Timber Mat Crossing	348	-	-	39	-	4-702
W-CD1	Franklin	Norfolk	37.047767	-79.897568	PFO	RPWWD	03010101	Pipeline ROW	-	4,818	-	1,785	-	4-701
W-DD1	Franklin	Norfolk	37.031961	-79.788589	PEM	RPWWN	03010101	Pipeline ROW	3,541	-	-	1,312	-	4-720
W-A12-PFO	Franklin	Norfolk	37.031754	-79.788099	PFO	RPWWD	03010101	Pipeline ROW	-	174	-	19	-	4-720
W-A12-PEM	Franklin	Norfolk	37.031643	-79.788111	PEM	RPWWD	03010101	Pipeline ROW	2,836	-	-	1,050	-	4-720
W-GH16	Franklin	Norfolk	37.028394	-79.773243	PFO	RPWWD	03010101	Timber Mat Crossing	-	2,862	-	318	-	4-722
W-H17	Franklin	Norfolk	36.989390	-79.722090	PFO	RPWWD	03010101	Timber Mat Crossing	-	1,607	-	179	-	4-730
W-H11	Franklin	Norfolk	36.988077	-79.702803	PEM	RPWWD	03010101	Pipeline ROW	2,039	-	-	755	-	4-734
W-H16	Franklin	Norfolk	36.988073	-79.714967	PEM	RPWWD	03010101	Timber Mat Crossing	1,011	-	-	112	-	4-731
W-H14	Franklin	Norfolk	36.988069	-79.711841	PEM	RPWWD	03010101	Timber Mat Crossing	266	-	-	30	-	4-732
W-A8	Franklin	Norfolk	36.987947	-79.700844	PEM	RPWWD	03010101	Pipeline ROW	671	-	-	75	-	4-734
W-H15	Franklin	Norfolk	36.987938	-79.714829	PSS	RPWWD	03010101	Timber Mat Crossing	-	309	-	35	-	4-731
W-H9	Franklin	Norfolk	36.978536	-79.682057	PEM	RPWWN	03010101	Timber Mat Crossing	370	-	-	41	-	4-736
W-H6	Franklin	Norfolk	36.972189	-79.663042	PEM	RPWWD	03010101	Pipeline ROW	248	-	-	28	-	4-741
W-D3	Pittsylvania	Norfolk	36.965318	-79.598760	PFO	RPWWN	03010101	Timber Mat Crossing	-	1,241	-	138	-	4-748
W-MM17	Franklin	Norfolk	36.964731	-79.617067	PEM	RPWWD	03010101	Pipeline ROW	296	-	-	110	-	4-746
W-B5	Pittsylvania	Norfolk	36.959293	-79.586201	PEM	RPWWN	03010101	Pipeline ROW	209	-	-	23	-	4-751
W-B4-PSS	Pittsylvania	Norfolk	36.957884	-79.583666	PSS	RPWWD	03010101	Pipeline ROW	-	205	-	23	-	4-751
W-C1	Pittsylvania	Norfolk	36.929954	-79.526831	PEM	RPWWN	03010101	Timber Mat Crossing	793	-	-	88	-	4-758
W-H5	Pittsylvania	Norfolk	36.924983	-79.517159	PEM	RPWWD	03010101	Pipeline ROW	9,004	-	-	3,335	-	4-759
W-B3	Pittsylvania	Norfolk	36.916508	-79.492360	PEM	RPWWN	03010101	Timber Mat Crossing	57	-	-	6	-	4-762
W-CC2-PEM	Pittsylvania	Norfolk	36.905418	-79.471566	PEM	RPWWD	03010105	Timber Mat Crossing	1,185	-	-	132	-	4-765
W-MM5	Pittsylvania	Norfolk	36.903012	-79.468192	PSS	RPWWD	03010105	Timber Mat Crossing	-	1,699	-	189	-	4-766
W-MM9	Pittsylvania	Norfolk	36.894087	-79.446110	PEM	RPWWN	03010105	Timber Mat Crossing	470	-	-	52	-	4-769
W-MM8-PEM	Pittsylvania	Norfolk	36.894034	-79.445486	PEM	RPWWN	03010105	Pipeline ROW	2,409	-	-	893	-	4-769
W-MM8-PFO	Pittsylvania	Norfolk	36.893930	-79.445461	PFO	RPWWN	03010105	Pipeline ROW	-	1,834	-	679	-	4-769
W-Q2	Pittsylvania	Norfolk	36.884674	-79.428607	PFO	RPWWD	03010105	Pipeline ROW	-	16,422	-	6,082	-	4-771
W-Q1	Pittsylvania	Norfolk	36.883985	-79.427305	PEM	RPWWD	03010105	Pipeline ROW	636	-	-	236	-	4-771
W-G2	Pittsylvania	Norfolk	36.851816	-79.385930	PEM	RPWWD	03010105	Timber Mat Crossing	1,507	-	-	167	-	4-779
W-H1	Pittsylvania	Norfolk	36.836097	-79.360895	PEM	RPWWN	03010105	Pipeline ROW	479	-	-	53	-	4-782
W-EF6	Pittsylvania	Norfolk	36.835004	-79.339128	PFO	RPWWD	03010105	Pipeline ROW	-	2,905	-	323	-	4-786
W-H2	Pittsylvania	Norfolk	36.834817	-79.360479	PEM	RPWWD	03010105	Pipeline ROW	34,791	-	-	12,886	-	4-782

Table B-2. Virginia Wetland Impacts (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Wetland ID	County	USACE District	Latitude ¹	Longitude ¹	Cowardin Class ²	USACE Water Type ³	HUC 8	Impact Type	Temporary Impacts (square feet) ⁴	Permanent Conversion Impacts (square feet) ⁴	Permanent Fill Impacts (square feet) ⁴	Temporary Fill (cubic yards) ⁵	Permanent Fill (cubic yards) ⁶	Figure
W-IJ21	Pittsylvania	Norfolk	36.834623	-79.338527	PFO	RPWWN	03010105	Timber Mat Crossing	-	462	-	51	-	4-786
W-H3	Pittsylvania	Norfolk	36.833741	-79.360081	PEM	RPWWN	03010105	Pipeline ROW	2,217	-	-	821	-	4-783
W-MM3	Pittsylvania	Norfolk	36.830361	-79.356631	PSS	RPWWD	03010105	Pipeline ROW	-	1,481	-	548	-	4-783
W-IJ22-PEM	Pittsylvania	Norfolk	36.827780	-79.350264	PEM	RPWWD	03010105	Timber Mat Crossing	1,699	-	-	189	-	4-784
W-IJ22-PFO	Pittsylvania	Norfolk	36.827748	-79.350295	PFO	RPWWD	03010105	Timber Mat Crossing	-	3,419	-	380	-	4-784

Notes:

- 1
- In decimal degrees.
- 2
- PEM = Palustrine Emergent
- PSS = Palustrine Scrub-Shrub
- PFO = Palustrine Forested
- 3
- RPWWD = Wetlands directly abutting Relatively Permanent Waters (RPWs) that flow directly or indirectly into Traditional Navigable Waterways (TNWs)
- RPWWN = Wetlands adjacent but not directly abutting RPWs that flow directly or indirectly into TNWs
- NRPWW = Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- 4
- Construction of access roads will not result in impacts to tidal wetlands or wetlands adjacent to tidal waters. Construction, maintenance, or expansion of substation facilities will not result in discharges to non-tidal wetlands adjacent to tidal waters of the United States.
- Impact square feet are rounded to the nearest whole number.
- 5
- Temporary fill discharge into waters of the U.S. Cubic yards are rounded to the nearest whole number.
- 6
- Permanent fill associated with the construction of permanent access road and facilities. Cubic yards are rounded to the nearest whole number.
- *
- VDEQ does not require a VWPP for W-KL15 or W-KL16 per the VDEQ 1/23/2018 IWOMEV Determination

Table B-3. Virginia Stream Impacts Summary (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Cowardin Class	Temporary Impact (linear ft)	Permanent Impact (linear ft)	Temporary Fill (cubic yards)	Permanent Fill (cubic yards)
Ephemeral	3,980	31	6,285	24
Intermittent	6,383	0	10,478	0
Perennial	6,971	32	30,338	25
Norfolk District Total	17,334	63	47,101	49

Table B-4. Virginia Wetland Impacts Summary (revised 4/14/2021)
Individual Permit Application
Mountain Valley Pipeline Project

Cowardin Class	Temporary Impacts (square feet) ¹	Permanent Conversion Impacts (square feet)	Permanent Fill Impacts (square feet)	Temporary Fill (cubic yards) ¹	Permanent Fill (cubic yards)
PEM	174,790	0	1,707	57,361	190
PSS	0	33,296	0	7,029	0
PFO	0	51,826	0	14,683	0
Norfolk District Total	174,790	85,122	1,707	79,073	190

Notes:

1

- Includes temporary impacts to W-KL15 and W-KL16, two isolated wetland that VDEQ does not require a VWPP for per the VDEQ 1/23/2018 IWOMEV Determination.



Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

1111 E. Main Street, Suite 1400, Richmond, Virginia 23219

P.O. Box 1105, Richmond, Virginia 23218

(800) 592-5482

www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

April 30, 2021

By email: RCooper@equitransmidstream.com

Receipt Confirmation Requested

Mr. Robert Cooper
Mountain Valley Pipeline, LLC
2200 Energy Drive
Canonsburg, PA 15317

Re: Joint Permit Application No. 21-0416
Mountain Valley Pipeline Project, Giles County, Craig County, Montgomery County,
Roanoke County, Franklin County, Pittsylvania County, Virginia
Additional Information Request Letter (2)

Dear Mr. Cooper:

On March 1, the Virginia Department of Environmental Quality (DEQ) received your application dated February 19, 2021, for the above-referenced project. DEQ received revised application materials on March 4, 2021, dated March 1, 2021. DEQ sent a request for additional information on March 16, 2021 and received the requested materials on April 15, 2021. DEQ is evaluating your application for a Virginia Water Protection (VWP) individual permit in accordance with VWP Permit Program Regulation 9VAC25-210-10 *et seq.* The following information is required to complete your application:

1. Based on the review of Table B-1. Stream Impacts_VA_20210414_revised, Attachment H-3_Virginia Plan and Profile Crossing Drawings, Figure 4 Detail Maps, and other submitted materials, please provide the following information:
 - a. Stream ID Numbers S-S5-Braid-2, S-S5-Braid-1, and S-S5: Table 15 Crossing Method Determination Study Rev 3-1-21 states that the proposed crossing method is a dry ditch, open cut. However, Table 15's Rationale Discussion, and Detail Map 4-536, appear to imply MVP will use a conventional bore to cross these locations. Please clarify the proposed crossing method.

- b. Stream ID Number S-YZ1, Doe Creek (Detail Map 4-546), is an intermittent stream running immediately adjacent to the west edge of proposed temporary access road MVP-GI-241.03. Plan Sheet S-YZ1 does not clearly depict the proposed impact. Table B-1 reports three separate impact locations for S-YZ1. On the plan sheet, the road appears to encroach upon the streambed in several locations; however, there is no hatching to indicate impacts versus running along the proposed roads edge. Please provide clarification or a revised plan sheet illustrating the proposed impacts to stream S-YZ1.
- c. Stream ID Number S-E25-Downstream, UNT to Sinking Creek (Detail Map 4-553) plan sheet not found. This stream may be unlabeled on plan sheets G-019A or G-019B. Please clarify or provide a revised plan sheet;
- d. Stream S-IJ16-a, UNT to Sinking Creek (Detail Map 4-559): The indicated flow line on plan sheet S-IJ16-a appears to run against the apparent topographic gradient. Additionally, the plan sheet does not appear to depict the temporary versus permanent impact locations as listed in Table B-1. Please provide clarification or a revised plan sheet confirming the indicated flow direction for this stream, and depicting temporary versus permanent impacts;
- e. The plan sheet for S-QQ3, UNT to Sinking Creek (Detail Map 4-560) appears to be missing. Please provide clarification or submit a plan sheet;
- f. The plan sheet labeled S-MM17 – WMM10 (Detail Map 4-569) depicts a stream labeled S-G38. Please provide clarification or a revised plan sheet;
- g. Plan sheet SG-40 (Detail Map 4-603) does not show the footprint of the pipe trench. Please clarify the proposed conditions at this crossing or provide a revised plan sheet;
- h. Plan sheet S-PP23 (Detail Map 4-604) does not show the footprint of the pipe trench. Please clarify the proposed conditions at this crossing or provide a revised plan sheet;
- i. Stream S-Y7, UNT to Mill Creek (Detail Map 4-656): the plan sheet depicts two separate streams both labeled S-Y8. Please clarify or provide a revised plan sheet;
- j. Stream ID Number S-B21, UNT to Mill Creek, (Detail Map 4-569) plan sheet not found. Please clarify or provide a plan sheet;
- k. Plan sheet S-IJ10 (Detail Map 4-681) does not show the footprint of the pipe trench. Please clarify the proposed conditions at this crossing or provide a revised plan sheet;
- l. Stream ID S-E28, Teel's Creek (Detail Map 4-687): plan sheet I-005B appears three times in Table B-1 with three different impact totals. Please clarify the impacts at this crossing;
- m. Stream ID S-GH4, UNT to Teel's Creek (Detail Map 4-688): plan sheet not found. Please clarify or provide a plan sheet;

- n. Stream ID S-GH3, UNT to Teel's Creek (Detail Map 4-688): plan sheet not found. Please clarify or provide a plan sheet;
 - o. Stream ID S-D18, UNT to Teel's Creek (Detail Map 4-694): plan sheet not found. Please clarify or provide a plan sheet;
 - p. Stream ID S-D20, UNT to Teel's Creek (Detail Map 4-694): plan sheet not found. Please clarify or provide a plan sheet;
 - q. Stream ID S-KL38, UNT to Blackwater River (Detail Map 4-702): plan sheet I-022: the plan sheet depicts a dry ditch crossing of S-KL38 by the pipeline; however, Detail Map 4-702 shows this crossing as a culvert on an access road. Please clarify.
 - r. Stream ID S-G22, UNT to Poplar Camp Creek (Detail Map 4-723): S-G22 not found on plan sheet I-047. Please clarify or revise plan sheet I-047 with a label for S-G22;
 - s. Stream ID S-CC1, Cherrystone Creek (Detail Map 4-769): plan sheet not found. Please clarify or provide a plan sheet;
 - t. Stream ID S-H3, UNT to Little Cherrystone Creek (Detail Map 4-783): plan sheet not found. Please clarify or provide a plan sheet.
2. Based on the review of Table B-2. Wetland Impacts_VA_20210414_revised, Attachment H-3_Virginia Plan and Profile Crossing Drawings, Figure 4 Detail Maps, and other submitted materials, please provide the following information:
- a. Wetland ID W-MM10 (Detail Map 4-569) plan sheet S-MM17 – W-MM10: This crossing is located at the terminus of a temporary access road that ends in an apparent residential/farmyard. Does the road's purpose require this impact? Can the road end just prior to the wetland and associated stream to avoid this impact?
 - b. Wetland ID W-AD4 (Detail Map 4-569): temporary access road MVP-MN-266.03 impacts this wetland. Plan sheet W-AD4-A labels the feature as W-G4 on the plan view and W-EF6 on the profile view. Please clarify or revise the plan sheet. Additionally, the plan sheet hatching indicates a temporary impact related to a proposed timber mat; however, does not indicate an impact to the wetland located within the proposed roadway. Please clarify if the proposed access road will result in impacts to this wetland beyond the timber mat impact shown in the plan view.
 - c. Wetland ID W-C6 (Detail Map 4-610) plan sheet not found. Please clarify or provide a plan sheet.
 - d. Wetland ID W-IJ96-PEM (Detail Map 4-650): temporary access road MVP RO-283 crosses this wetland buffer on perennial stream S-IJ85. Detail Map 4-650 indicates "permanent fill" for W-IJ96-PEM within the roadway, but Table B-2 lists only temporary impacts at this crossing. Please clarify.
 - e. Wetland W-IJ97 (Detail Map 4-650): detail Map 4-650 indicates temporary access road MVP RO-283 impacts wetland W-IJ97 with "permanent fill", but W-IJ97 does not appear on Table B-2 Wetland Impacts. Please clarify.

- f. Wetland ID W-KL48-PEM (Detail Map 4-653): indicated on Detail Map 4-653 as an open cut impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.
- g. Wetland ID W-KL48-PSS-2 (Detail Map 4-653): indicated on Detail Map 4-653 as an open cut impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.
- h. Wetland ID W-KL50 (Detail Map 4-653): indicated on the Detail Map as an open cut. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.
- i. Wetland ID W-IJ62 (Detail Map 4-656): indicated on the Detail Map as temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.
- j. Wetland ID W-IJ2-PSS (Detail Map 4-677): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.
- k. Wetland ID W-IJ2-PEM (Detail Map 4-677): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.
- l. Wetland ID W-E7 (Detail Map 4-690): note that constricted LOD expands at this crossing, resulting in additional impacts to W-E7. What is the purpose of the expanded LOD?
- m. Wetland ID W-C1 (Detail Map 4-758): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.
- n. Wetland ID W-B3 (Detail Map 4-762): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.
- o. Wetland ID W-H2 (Detail Map 4-782): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.
- p. Wetland ID W-IJ21 (Detail Map 4-786): indicated on the Detail Map as a temporary impact. The plan sheet depicting the crossing not found. Please clarify and/or provide the plan sheet.

Please submit the information to my attention by **May 31, 2021**, so that DEQ can continue to process your application. Please be advised that upon receipt of the requested information, additional information may still be required for DEQ to reach a decision.

Mr. Robert Cooper

JPA No. 21-0416

April 30, 2021

Page 5 of 5

Please contact me by email at steven.hardwick@deq.virginia.gov or by phone at 804-698-4168 if you have any questions or concerns regarding this request. Thank you for your cooperation in this matter.

Respectfully,

A handwritten signature in blue ink that reads "Steve Hardwick". The signature is written in a cursive style with a long, sweeping underline.

Steve Hardwick

VWP Permit Coordinator

cc: Todd Miller, U.S. Army Corps of Engineers
Randy Owen, Virginia Marine Resources Commission
Cory Chalmers, Equitrans Midstream Corporation



Commonwealth of Virginia

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1111 E. Main Street, Suite 1400, Richmond, Virginia 23219

P.O. Box 1105, Richmond, Virginia 23218

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www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

May 20, 2021

By email: RCooper@equitransmidstream.com

Receipt Confirmation Requested

Mr. Robert Cooper
Mountain Valley Pipeline, LLC
2200 Energy Drive
Canonsburg, PA 15317

Re: Joint Permit Application No. 21-0416
Mountain Valley Pipeline Project, Giles County, Craig County, Montgomery County,
Roanoke County, Franklin County, Pittsylvania County, Virginia
Additional Information Request Letter (3)

Dear Mr. Cooper:

On March 1, the Virginia Department of Environmental Quality (DEQ) received your application dated February 19, 2021, for the above-referenced project. DEQ received revised application materials on March 4, 2021, dated March 1, 2021. DEQ sent a request for additional information on March 16, 2021 and received the requested materials on April 15, 2021. DEQ sent a second request for additional information on April 30, 2021 and received the information on May 14, 2021. DEQ is evaluating your application for a Virginia Water Protection (VWP) individual permit in accordance with VWP Permit Program Regulation 9VAC25-210-10 *et seq.* The following information is required to complete your application:

1. A permit application fee of \$18,900 is required to complete the application. DEQ will continue processing the permit application; however, a draft individual permit cannot be issued until the required permit application fee is deposited by the DEQ Receipts Control department. Checks or money orders should be made payable to the Treasurer of Virginia. Do not send cash. Please complete the enclosed Permit Application Fee Form and mail with the designated fee to the following address: DEQ, Receipts Control, P.O. Box 1104, Richmond, Virginia 23218.

Mr. Robert Cooper
JPA No. 21-0416
April 30, 2021
Page 2 of 2

Please contact me by email at steven.hardwick@deq.virginia.gov or by phone at 804-698-4168 if you have any questions or concerns regarding this request. Thank you for your cooperation in this matter.

Respectfully,

A handwritten signature in blue ink that reads "Steve Hardwick". The signature is written in a cursive style with a long, sweeping underline that extends to the right.

Steve Hardwick
VWP Permit Coordinator

cc: Todd Miller, U.S. Army Corps of Engineers
Randy Owen, Virginia Marine Resources Commission
Cory Chalmers, Equitrans Midstream Corporation



Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

1111 E. Main Street, Suite 1400, Richmond, Virginia 23219

P.O. Box 1105, Richmond, Virginia 23218

(800) 592-5482

www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

March 16, 2021

By email: RCooper@equitransmidstream.com

Receipt Confirmation Requested

Mr. Robert Cooper
Mountain Valley Pipeline, LLC
2200 Energy Drive
Canonsburg, PA 15317

Re: Joint Permit Application No. 21-0416
Mountain Valley Pipeline Project, Giles County, Craig County, Montgomery County,
Roanoke County, Franklin County, Pittsylvania County, Virginia
Additional Information Request Letter

Dear Mr. Cooper:

On March 1, the Virginia Department of Environmental Quality (DEQ) received your application dated February 19, 2021, for the above-referenced project. DEQ received revised application materials on March 4, 2021, dated March 1, 2021. DEQ is evaluating your application for a Virginia Water Protection (VWP) individual permit in accordance with VWP Permit Program Regulation 9VAC25-210-10 *et seq.* The following information is required to complete your application:

1. Please provide revised site plan figures at permanent stream impact locations SIJ16a, SIJ85 and S-H42 to include:
 - a. A longitudinal profile of the culvert position and stream bed thalweg, or spot elevations of the stream thalweg at the beginning and end of the culvert, extending to a minimum of 10 feet beyond the limits of the proposed impact;
 - b. Proposed structures and grading contours of sufficient detail to evaluate the culvert's interface with the stream at its inlet and outlet, and to illustrate culvert countersinking.
2. Please provide revised site plan figures at permanent wetland impact locations W-KL58, W-IJ96 PEM, W-IJ97, and W-D4 to include:

Mr. Robert Cooper
JPA No. 21-0416
March 16, 2021
Page 2 of 2

- a. Proposed contours and sufficient details to evaluate potential secondary impacts associated with permanent access road crossings.
3. Please provide documentation of the preliminary jurisdictional determination from the U.S. Army Corps of Engineers (USACE), or other correspondence from USACE or DEQ indicating approval of the boundary of applicable jurisdictional surface waters.
4. A permit application fee is required for the proposed activity, and to complete the application. Once the proposed impact information has been determined, DEQ will notify you of the fee amount.

In addition to the above information required to complete the permit application, the following information is necessary to assist in DEQ's review of the application:

1. Please provide the following tables in a spreadsheet format:
 - a. Table B-1 Virginia Stream Impacts (*revised 3/1/2021*);
 - b. Table B-2 Virginia Wetland Impacts (*revised 3/1/2021*);
 - c. Attachment B-5 Riparian Property Owner Information;
 - d. Table 15 Crossing Method Determination Summary (*revised 3/1/2021*);
 - e. Table 17 Compensatory Wetland Mitigation (*revised 3/2/2021*);
 - f. Table 18 Compensatory Stream Mitigation (*revised 3/2/2021*).
2. Please provide GIS shape files, or the equivalent, showing the project's overall limits of disturbance and aquatic resource impacts within Virginia.

Please submit the information to my attention by **April 15, 2021**, so that DEQ can continue to process your application. Please be advised that upon receipt of the requested information, additional information may still be required for DEQ to reach a decision.

Please contact me by email at steven.hardwick@deq.virginia.gov or by phone at 804-698-4168 if you have any questions or concerns regarding this request. Thank you for your cooperation in this matter.

Respectfully,



Steve Hardwick
VWP Permit Coordinator

cc: Todd Miller, U.S. Army Corps of Engineers
Randy Owen, Virginia Marine Resources Commission

**DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER DIVISION PERMIT APPLICATION FEE FORM**

INSTRUCTIONS

Applicants for individual Virginia Pollutant Discharge Elimination System (VPDES), Virginia Pollution Abatement (VPA), Virginia Water Protection (VWP), and Groundwater Withdrawal (GW) permits are required to pay permit application fees, with the exception of farming operations engaged in production for market and permits pertaining to maintenance dredging for federal navigation channels or other Corps of Engineers or Department of the Navy-sponsored dredging projects. Fees are also required for registration for coverage under most general permits (see Fee Schedule, page 4 of this form).

NOTE: This form is NOT appropriate for Virginia Stormwater Management Program (VSMP) Construction General Permit (VAR10) fee payments.

The permit Fee Schedule is included on pages 3-4 of this form, and includes fees for permit issuance, reissuance*, and for permit modification. Except for VWP permits, fees must be paid when applications are submitted. Applicants for VWP permits will be notified by the DEQ of the fee due. Applications will be considered incomplete if the proper fee is not paid and will not be processed until the fee is received.

* Note: the reissuance fee does not apply to individual VPDES and VPA permits - see the fee schedule for details.

Once you have determined the fee for the type of application you are submitting, complete this form. The form and your check or money order payable to "Treasurer of Virginia" should be mailed to:

Department of Environmental Quality
Receipts Control
P.O. Box 1104
Richmond, VA 23218

You should retain a copy of the form and your check for your records. Please direct any questions regarding this form or fee payment to the DEQ Office to which you are submitting your application.

APPLICANT NAME: Mountain Valley Pipeline, LLC, c/o Robert J. Cooper

ADDRESS: 2200 Energy Drive
Canonsburg, PA 15317

DAYTIME PHONE: (724) 271 - 7600
Area Code

IRS EMPLOYER IDENTIFICATION NUMBER (EIN):
[aka Federal Tax Identification Number (FIN)]

FACILITY/ACTIVITY NAME: Mountain Valley Pipeline Project

LOCATION: Giles, Craig, Montgomery, Roanoke, Franklin and Pittsylvania Counties

TYPE OF PERMIT APPLIED FOR: VWP Individual / Surface Water Impacts
(from Fee Schedule)

TYPE OF ACTION: ☒ New Issuance ☐ Reissuance ☐ Modification

AMOUNT OF FEE SUBMITTED (from Fee Schedule): \$ Contact: Steve Hardwick 804-698-4168

EXISTING PERMIT NUMBER (if applicable): 21-0416

DEQ OFFICE TO WHICH APPLICATION OR REGISTRATION SUBMITTED (check one)

☐ Abingdon/SWRO	☐ Harrisonburg/VRO	☐ Woodbridge/NRO	☐ Glen Allen/PRO
☒ Richmond/Headquarters	☐ Roanoke/BRRO	☐ Virginia Beach/TRO	

FOR DEQ USE ONLY

Date:

DC#:

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FEE SCHEDULES

A. VPDES and VPA Individual Permits. Applications for issuance of new individual VPDES or VPA permits, and for permittee-initiated major modifications that become effective before the stated permit expiration date. (Flows listed are facility "design" flows. Land application rates listed are facility "design" rates.) [NOTE: VPDES and VPA permittees pay an Annual Permit Maintenance Fee (APMF) instead of a reapplication fee for reissuance, and the APMF is invoiced separately by DEQ.]

TYPE OF INDIVIDUAL PERMIT	ISSUANCE	MODIFICATION	LAND APP MOD
VPDES Industrial Major	\$24,000	\$12,000	
VPDES Municipal Major	\$21,300	\$10,650	\$1,000 ¹
VPDES Industrial Minor / No Standard Limits	\$10,200	\$5,100	
VPDES Industrial Minor / Standard Limits	\$3,300	\$3,300	
VPDES Industrial Stormwater	\$7,200	\$3,600	
VPDES Municipal Stormwater MS4 Individual (Large and Medium)	\$16,000	\$5,000	
VPDES Municipal Stormwater MS4 Individual (Small)	\$8,000	\$2,500	
VPDES Municipal Minor / Greater Than 100,000 GPD	\$7,500	\$3,750	\$1,000 ¹
VPDES Municipal Minor / 10,001 GPD - 100,000 GPD	\$6,000	\$3,000	\$1,000 ¹
VPDES Municipal Minor / 1,001 GPD - 10,000 GPD	\$5,400	\$2,700	\$1,000 ¹
VPDES Municipal Minor / 1,000 GPD or Less	\$2,000	\$1,000	
VPDES Municipal that includes authorization for land application, distribution, or marketing of biosolids or land disposal of sewage sludge	\$5,000 ¹	\$1,000 ¹	\$1,000 ¹
VPA Industrial Wastewater Operation / Land Application of 10 or More Inches Per Year	\$15,000	\$7,500	
VPA Industrial Wastewater Operation / Land Application of Less Than 10 Inches Per Year	\$10,500	\$5,250	
VPA Industrial Sludge Operation	\$7,500	\$3,750 ²	
VPA Municipal Wastewater Operation	\$13,500	\$6,750	
VPA Municipal Biosolids Operation	\$5,000	\$1,000 ^{2,3}	
VPA Combined Sludge Operation - Mun. Biosolids & Ind. Sludges (except WTP residuals)	\$7,500	\$3,750 ²	
All other VPA operations not specified above	\$750	\$375	

¹ To be paid in addition to any required VPDES issuance or modification fee. The modification fee shall apply for any addition of land application sites to a permit.

² The modification fee shall apply to any addition of land application sites to a permit.

³ When adding any industrial source (excluding water treatment plant residuals) to a permit that only authorizes the land application of municipal biosolids, the modification fee for a VPA combined sludge operation shall apply.

B. Virginia Water Protection (VWP) Individual Permits. Applications for issuance of new individual, and reissuance or major modification of existing individual VWP permits. Only one permit application fee will be assessed per application; for a permit application involving more than one of the operations described below, the governing fee shall be based upon the primary purpose of the proposed activity. (Withdrawal amounts shown are maximum daily withdrawals.)

TYPE OF INDIVIDUAL PERMIT	ISSUANCE/REISSUANCE	MODIFICATION
VWP Individual / Surface Water Impacts (Wetlands, Streams and/or Open Water)	\$2,400 plus \$220 for each 4,356 sq. ft. (1/10 acre) (or portion thereof) of incremental impact over 87,120 sq. ft. (two acres) (\$60,000 maximum)	\$1,200 plus \$110 for each 4,356 sq. ft. (1/10 acre) (or portion thereof) of incremental impact over 87,120 sq. ft. (two acres) (\$30,000 maximum)
VWP Individual / Nonmetallic Mineral Mining	\$2,400 plus \$220 for each 4,356 sq. ft. (1/10 acre) (or portion thereof) of incremental impact over 87,120 sq. ft. (two acres) (\$7,500 maximum)	\$1,200 plus \$110 for each 4,356 sq. ft. (1/10 acre) (or portion thereof) of incremental impact over 87,120 sq. ft. (two acres) (\$3,750 maximum)
VWP Individual/Minimum Instream Flow – Surface Water Withdrawals equal to or greater than 3,000,000 gallons on any day	\$25,000	\$5,000
VWP Individual / Minimum Instream Flow – Surface Water Withdrawals between 2,000,000 and 2,999,999 gallons on any day	\$20,000	\$5,000
VWP Individual / Minimum Instream Flow – Surface Water Withdrawals between 1,000,000 and 1,999,999 gallons on any day	\$15,000	\$5,000
VWP Individual / Minimum Instream Flow – Surface Water Withdrawals < 1,000,000 gallons on any day that do not otherwise qualify for a general VWP permit for water withdrawals	\$10,000	\$5,000
VWP Individual / Reservoir – Major (any new or expanded reservoir with greater than or equal to 17 acres of total surface water impacts (stream and wetlands), or a water	\$35,000	\$12,500

TYPE OF INDIVIDUAL PERMIT	ISSUANCE/REISSUANCE	MODIFICATION
withdrawal of greater than or equal to 3,000,000 gallons in any one day)		
VWP Individual / Reservoir – Minor (any new or expanded reservoir with less than 17 acres of total surface water impacts (stream and wetlands), or a water withdrawal of less than 3,000,000 gallons in any one day)	\$25,000	\$12,500

C. Groundwater Withdrawal (GW) Individual Permits. Applications for issuance of new individual, and reissuance or major modification of existing individual GW permits.

TYPE OF INDIVIDUAL PERMIT	ISSUANCE/REISSUANCE	MODIFICATION
Groundwater Withdrawal / Initial Permit for an Existing Withdrawal Based Solely on Historic Withdrawals	\$1,200	\$600
Groundwater Withdrawal – effective through 12/31/2018	\$6,000	\$3,000
Groundwater Withdrawal – effective 1/1/2019	\$9,000	\$3,000

D. Registration Statements (VPDES and VPA permits) or Applications (VWP permits) for General Permit Coverage.

TYPE OF GENERAL PERMIT	ISSUANCE
VPDES General Permit for Domestic Sewage Discharges Less Than or Equal to 1,000 GPD (VAG40)	Zero (\$0)
VPDES General Permit for Discharges from Petroleum Contaminated Sites, Groundwater Remediation & Hydrostatic Tests (VAG83)	Zero (\$0)
VPDES General Permit for Discharges Resulting from the Application of Pesticides to Surface Waters of Virginia (VAG87)	Zero (\$0)
VPDES General Permit for Storm Water Discharges Associated with Industrial Activity (VAR05)	\$500
VPA General Permit for Pollutant Management Activities for Animal Feeding Operations and Animal Waste Management (VPG1)	Zero (\$0)
VPA General Permit for Poultry Waste Management (VPG2)	Zero (\$0)
VPDES General Permit for Concrete Product Facilities (VAG11)	\$600
VPDES General Permit for Noncontact Cooling Water Discharges of 50,000 GPD or Less (VAG25)	\$600
VPDES General Permit for Seafood Processing Facilities (VAG52)	\$600
VPDES General Permit for Potable Water Treatment Plants (VAG64)	\$600
VPDES General Permit for Vehicle Wash Facilities and Laundry Facilities (VAG75)	\$600
VPDES General Permit for Nonmetallic Mineral Mining (VAG84)	\$600
VPDES General Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia (VAN)	\$600
VPDES General Permit for Municipal Separate Storm Sewer Systems (MS4) – Small (VAR04)	\$4000
VWP General / Less Than 4,356 sq. ft. (1/10 acre) of Surface Water Impact (Wetlands, Streams and/or Open Water)	\$0
VWP General / 4,356 sq. ft. to 21,780 sq. ft. (1/10 acre to 1/2 acre) of Surface Water Impact (Wetlands, Streams and/or Open Water)	\$600
VWP General / 21,781 sq. ft. to 43,560 sq. ft. (greater than 1/2 acre to one acre) of Surface Water Impact (Wetlands, Streams and/or Open Water)	\$1,200
VWP General / 43,561 sq. ft. to 87,120 sq. ft. (greater than one acre to two acres) of Surface Water Impact (Wetlands, Streams and/or Open Water)	\$1,200 plus \$120 for each 4,356 sq. ft. (1/10 acre) (or portion thereof) of incremental impact over 43,560 sq. ft. (one acre) (\$2,400 maximum)
VWP General / Minimum Instream Flow / Reservoir - Water withdrawals and/or pond construction	\$2,400

NOTE: This form is NOT appropriate for Virginia Stormwater Management Program (VSMP) Construction General Permit (VAR10) fee payments. Please refer to the following web site hyperlink to obtain appropriate VAR10 permit fee forms:

[Hyperlink to the DEQ Virginia Stormwater Management, Construction Stormwater Permit Program website.](#)

Hardwick, Steven <steven.hardwick@deq.virginia.gov>

RE: [EXTERNAL] Request for Additional Information, JPA 21-0416

1 message

Chalmers, Cory M. <CChalmers@equitransmidstream.com>

Thu, Apr 15, 2021 at 5:19 PM

To: Steven Hardwick <steven.hardwick@deq.virginia.gov>Cc: Randy Owen <Randy.Owen@mrc.virginia.gov>, "Miller, Todd M CIV USARMY CENAO (USA)"<Todd.M.Miller@usace.army.mil>, "Pritts, Jared N LRP" <Jared.N.Pritts@usace.army.mil>, "Adam Fannin(Adam.E.Fannin@USACE.army.mil)" <Adam.E.Fannin@usace.army.mil>, "Pero, Vincent D CIV USARMY CENAO (USA)"<Vincent.D.Pero@usace.army.mil>, "Cooper, Bob" <RCooper@equitransmidstream.com>

Mr. Hardwick,

Attached, please find Mountain Valley Pipeline's response to the Department's request for additional information for Joint Permit Application Number 21-0416. We appreciate the opportunity to provide further clarification on the requested items. To supplement the PDF response letter, Excel spreadsheets and GIS shapefiles are also attached.

Respectfully,

Cory Chalmers

From: Hardwick, Steven <steven.hardwick@deq.virginia.gov>**Sent:** Tuesday, March 16, 2021 4:16:45 PM**To:** Cooper, Bob <RCooper@equitransmidstream.com>**Cc:** Miller, Todd M CIV USARMY CENAO (US) <Todd.M.Miller@usace.army.mil>; Randy Owen <Randy.Owen@mrc.virginia.gov>**Subject:** [EXTERNAL] Request for Additional Information, JPA 21-0416

Mr. Cooper,

Please find attached DEQ's request for additional information regarding Joint Permit Application Number 21-0416, Mountain Valley Pipeline Project. Please contact me if you have any questions.

Thank You,

Steve Hardwick

VWP Permit Coordinator

Department of Environmental Quality
Office of Wetlands and Stream Protection
[1111 East Main Street, Suite 1400](#)
Richmond, VA 23219

804.698.4168 Office

(804) 698-4178 Fax

steven.hardwick@deq.virginia.gov

www.deq.virginia.gov

4 attachments



20210414_MVP_VA_Aquatics_Impacts_v2.zip
54K



Excel Tables.zip
6130K



MVP_LOD_IP_April2021.zip
718K



MVP DEQ RAI Response Letter_JPA No. 21-0416.pdf
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